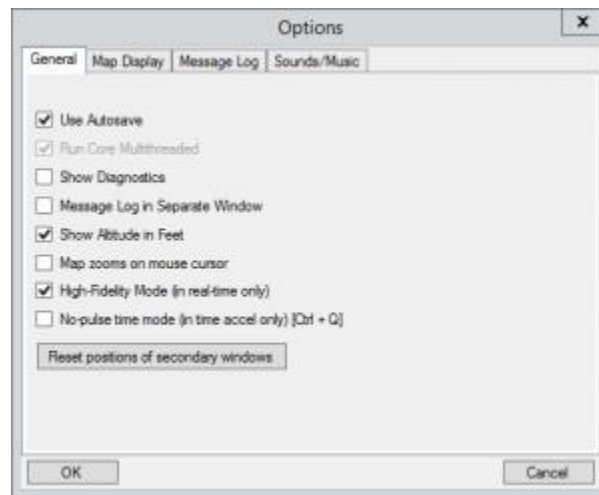


# Manual Addendum: User Interface

## Start Menu

- Added *Order scenarios by...* filter on the *Load Scenario* window. The player can list scenarios by order of their filename, scenario date, difficulty and complexity. This should help new players easily pick out easy/simple scenarios to get started.
- When the player attempts to load a scenario for which the corresponding DB is missing, the game informs them of this and aborts the load.

## Game Options



### General:

The *Options* window has been significantly expanded, with the followings additional options:

- **Map Zooms on mouse cursor location:** When enabled, the map will zoom to the point at which the mouse cursor is located (similar to Google Maps), instead of the camera center.
- **Sonobuoy Visibility.** This helps declutter the tactical map if too many sonobuoys are present in the view. Available settings are: *Normal* (sonobuoys appear like every other unit), *Ghosted* (buoys appear semi-transparent) and *Do Not Show* (buoys do not appear at all; not recommended unless necessary).
- **High Fidelity Mode:** When enabled, at 1:1 time compression (ie. realtime mode) Command's simulation engine runs in 0.1 sec time slices and also refreshes the map every 0.1 seconds. This provides increased simulation & visual fidelity at the cost of performance. When disabled, at realtime mode Command runs in 1-sec slices and refreshes the map every 1 sec. This can speed up gameplay on less powerful machines.
- **No Pulse Mode .** This is on by default and at any time acceleration setting, the map & UI do not refresh every second but every 0.1 sec. This means that the sim engine executes each turn not in "pulsing" mode (emulating Harpoon's presentation), but as fast as possible. The net result of these changes is that at time acceleration (particularly at high values, e.g. 1:30 or 1:60 sec) the map updates much more smoothly and the overall game speed is significantly improved. To retain the "traditional", Harpoon-style pulsing map refresh set this option to *NO*.

This setting can be toggled on/off via three ways:

1. From the main menu bar: *Game* -> *Options* -> *No-pulse time mode*.
2. Drop-down selector *Time Mode*, placed to the right of the existing *Time Compression* drop-down selector.
3. Keyboard shortcut: Ctrl+Q .

### Map Display

- **Sonobuoy Visibility.** This helps declutter the tactical map if too many sonobuoys are present in the view. Available settings are: *Normal* (sonobuoys appear like every other unit), *Ghosted* (buoys appear semi-transparent) and *Do Not Show* (buoys do not appear at all; not recommended unless necessary).



- **Reference point visibility.** Three settings are available: *Normal* (as currently), *Small* (half-size and grayed out), and *Do Not Show*. This significantly declutters the map in cases of dense ref-point concentrations.

- **Map Symbols:** You can now choose different map symbol sets. The choices are (a) *NTDS + NATO APP-6* (current & default setting), and (b) *Stylized*. By default, the stylized set consists of Terry Courtney's icon replacement set, but players can edit/replace each icon at will.

- **Map Cursor Databox:** The map-cursor databox (a.k.a. Black Box of Data, or simply BBD) can now be configured to appear beside the cursor (as currently), appear on the bottom of the map, or not appear at all.



- **Show Ghosted Group Members:** You can toggle ghosted members of group off and on. If off you'll just see a group symbol and if on you will see the ghosted member at its present location.

- **Show Plotted Paths:** Can choose to show plots lines of the select unit, all units or no units.

- \* **New UI feature: Satellite pass predictions.** Selecting this function from the "Game" menu, and then clicking on the desired location on the map, brings up a window with the predicted passes and coverage times (ie. sat being within sensor range of the location) for the next X days for all satellites (default value is 3 days, but this can be modified).

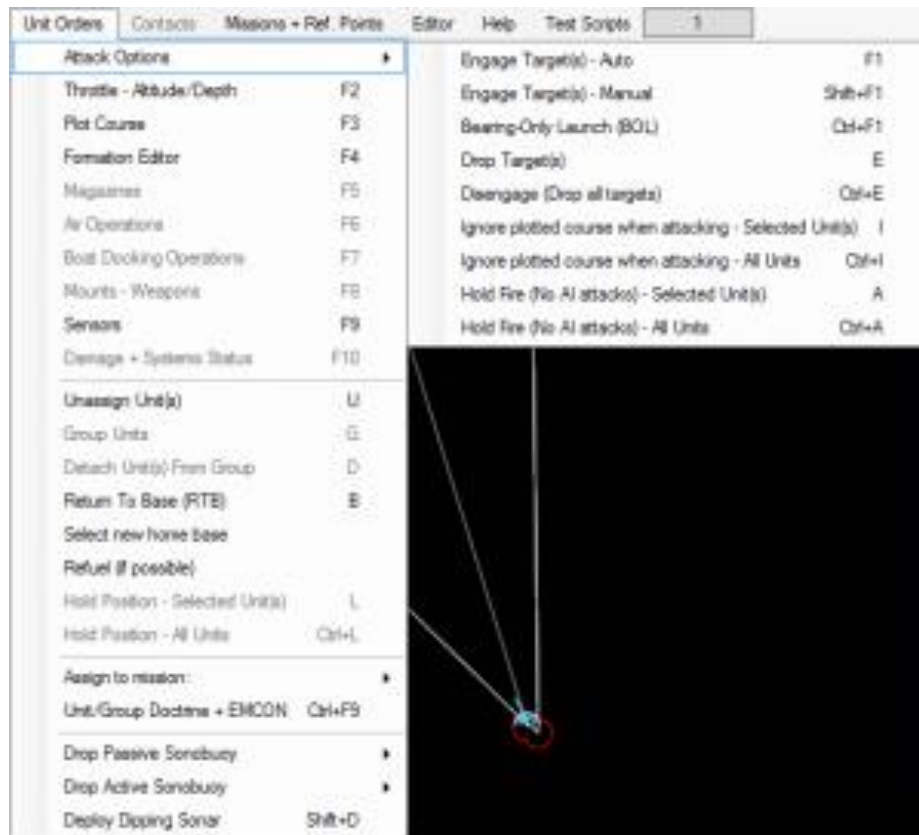
All columns are sortable by clicking on the headers, so for example you can quickly see which sat will pass within coverage from the area of interest, which pass will offer the longest dwell time etc.

## View

- **Wireframe Map (Black Globe) View:** Turning off *BMNG* from the map-view options enables a black wireframe map, emulating the Harpoon3 map style. Note that the relief layer can still be overlaid as usual.



# Unit Orders



The Unit Orders menu has received many new menu items, the most important ones are:

- **Attack Options:** All attack, disengage and weapon state commands are found under the new Attack Options menu item. All menu items have been given associated hotkeys for quick access.
- **Attack Options -> Drop Target(s):** This function allows a player to drop one or more units from it's target list. After selecting this function simply click on the unit you would like to drop or drag select multiples.
- **Attack Options -> Disengage (Drop All Targets):** This function drops all targets from the unit target list and the unit will continue on with its previously assigned mission or plot.
- **Attack Options -> Ignore Plotted Course When Attacking – Selected Unit(s):** When selected, units assigned to missions will ignore plotted courses and attempt to intercept targets.
- **Attack Options -> Ignore Plotted Course When Attacking – All Units:** Sets this property for all own units, not just the selected one(s).
- **Attack Options -> Hold Fire (No AI attacks) – Selected Unit(s):** When selected, units will not fire weapons automatically. Weapons will only fire when manually assigned to targets through *Engage Target(s) – Manual*.
- **Attack Options -> Hold Fire (No AI attacks) – All Units:** Sets this property for all own units, not just the selected one(s).
- **Hold Position – Selected Unit(s):** This function orders the selected mobile facilities to hold position, i.e. ignore movement orders.
- **Hold Position – All Units:** Sets this property for all own units, not just the selected one(s).

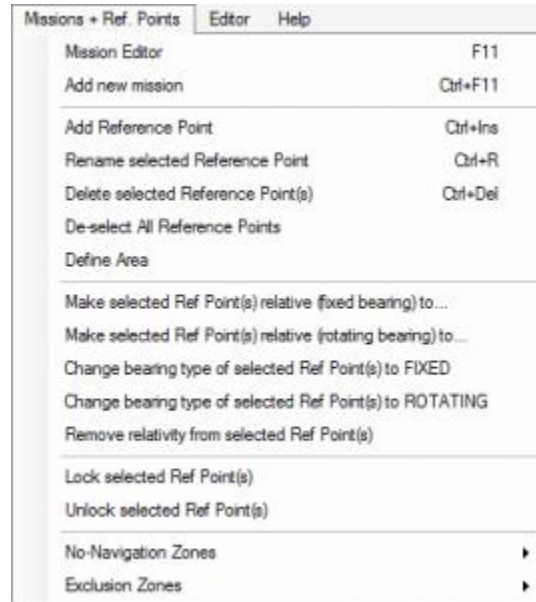
\* The "Select new homebase" function now works for any type of unit and group, not just for aircraft and airgroups. So now you can easily switch home bases for deployed ships, submarines, mobile land units etc.

## Own Unit Context Menu (Mouse Right-Click)

\* The Unit Context Menu has been updated to match the Unit Orders menu. In addition, the context menu has a menu item for the *Range / Bearing Tool*, as well as a handful extra items for use in the scenario editor (*Edit Unit Properties*, *Unit is Auto-Detectable*, *Set Orientation*)

- "Hold Position" command added to right-click menu for mobile ground units.

# Missions & Reference Points



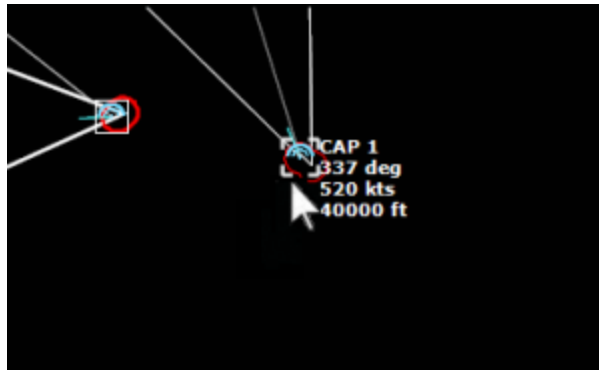
The Missions & Reference Points menu has received the following additions:

- **De-select all reference points:** All currently selected reference points will be de-selected.
- **Define Zone:** Selecting this option and then left click and dragging a square on the map will drop 4 reference points. Same as right click function.
- **Remove relativity from selected Ref Point(s):** This option will clear Fixed or Rotating Bearing settings for the selected reference point(s).
- **Navigation Zone and Exclusion Zone Submenus:** These functions were moved from the unit menu.

## Map Information, Unit/Group/Contact Status & secondary windows

- Command now handles the 125% desktop font setting (increased DPI) much more gracefully, and adjusts the dimensions of the right-column panels to compensate. (We welcome feedback on any UI problem/mismatch we have missed.)
- Significant UI/map modification: Detected non-friendly unit groups (airbases, installations, naval bases, mobile groups etc.) are shown as group entities while in Group view.
- Unit Status Panel now includes a weapons summary panel for selected unit/group. This lists the current weapons inventory for the unit/group selected. Each of the weapon lines is also a link to the relevant page on the DB viewer.
- While having a weapon selected on the map, clicking on the weapon-class button on the unit status window will bring up the weapon's relevant page in the DB viewer.

- New map UI feature: Mouse preview mode. When hovering over a non-selected unit/contact, the selection & datablock information for that unit is displayed slightly ghosted. This is useful for quick-look info (without having to display datablocks for all units) and particularly handy when targeting contacts.



- New major UI feature: Quick-jump slots. This allows the player to quickly & easily jump between locations/views of the battlefield without map zoom/pan delays.  
How they work:
  - To store a slot: Select a unit/contact. Press Ctrl+[num], where [num] = 1...0 . The unit selection & camera altitude are now stored on slot No.[num] (and persisted per-side).
  - To jump to a saved slot: Simply press [num]. If a slot with that index exists, the camera will move to the marked unit location & altitude.
  - If you are using tracking-camera when saving a slot, this setting is also saved and enforced the next time you jump to this slot.
- Secondary windows now remember their last position and size (these are saved on the Command.ini file so they can be tweaked offline). So you can set up your desired "working environment" once and the windows will retain the customizations accross scenarios and game sessions. To reset the locations & sizes to their default values, click on the button "Reset positions of secondary windows" on the Game Options window.
- Secondary windows now correctly minimize/maximize together with the main game window, and they no longer visually block other program windows.
- Secondary windows can now be closed by pressing Esc, or their assigned function key (F2 etc.).
- When you select a unit, its weapon range symbols (in addition to sensor symbols) are now also highlighted (thickened).
- You can now manually mark a contact as friendly ('F') or neutral ('N'). If the contact is subsequently detected with sensors capable of establishing its true side and/or posture, the manually-set posture is discarded.
- Added "Quick Jump" top-level menu which lists all saved quick-jump slots. Clicking any of the slots jumps the camera to the specified location & altitude (ie. same as using 1...10 keys).
- Most hotkeys now have a menu item. Three new menu categories added ('View', 'Contact' and 'Quick Jump').
- On the unit status window, the assigned mission description (if applicable) is now a hyperlink. Clicking it brings up the mission editor window and selects this mission. This streamlines the process of quickly checking up the mission details of the selected unit/group.
- Significant UI/map modification: Detected non-friendly unit groups (airbases, installations, naval bases, mobile groups etc.) are shown as group entities while in Group view.

As an example, [this](#) is a view of Kien, an airbase in "Down Town" under v1.03 (both group- and unit-view). And [this](#) is the same base as presented in group-view under v1.04. The (detected) member units of the group appear as before (ie. individual contacts) in unit-view.

When selecting for attack etc., any orders given affect the member units of the group and not the group entity itself. So for example if the player selects an enemy airbase as the target for manual weapon allocation, the target list of allocation window lists all the detected facilities of said airbase.

\* Improved cloud and thermal layer indicators on throttle/altitude window. This makes it easier to quickly visualize if e.g. an aircraft is blocked by cloud cover (important for EO/IR sensors, LGB-lazing etc.) or where a submarine stands in relation to the thermal layer (very important for sonar detections, as explained in detail on the manual).



\* Added option (ON by default) to display the selected unit's (or identified contact's) image as a thumbnail under the unit's name on the "Unit/Contact Status" info panel: *NOTE: The image will appear only if you have downloaded the DB image pack from the [WS Downloads page](#).*



\* You can drag-select multiple facilities, ships, bases or ship groups and access the Air Ops or Boat Ops menu (F6 / F7 hotkey) to display aircraft on all parking facilities.

\* Major new UI/Doctrine feature: Weapon Release Authorization / Weapon Control Status (WRA/WCS). See here for details: <http://www.warfaresims.com/?p=3598>

\* Discrete range rings for anti-ship and land-attack weapons have been added in v1.07.

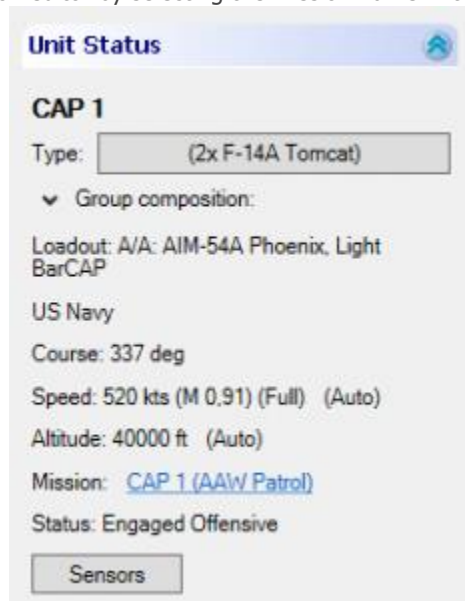
## Mouse Functionality:

- Added double-click functionality:

- Plotting course (F3): double-click when placing the last waypoint when plotting a course to exit Plot Course mode.
- Using Range/Bearing tool (Ctrl + D): double-click to exit Distance/Bearing tool.
- Create new Waypoint: Press and hold Ctrl key, select and drag existing waypoint. Note that the mouse must move minimum 4 pixels for the new waypoint to be created.
- Create new Reference Point: Press and hold Ctrl key, select and drag existing reference point. Note that the mouse must move minimum 4 pixels for the new reference point to be created.
- \* Pressing Ctrl+X now copies the geo coordinates of the map cursor (in decimal form) to the clipboard.
- \* New RMB feature: You can now filter-out a selected contact ("Filter-out" command on the contact context/right-click menu). Filtered-out contacts are shown ghosted and no information on their movement vector, sensor & weapon range symbols and AoU is presented on the map. This can be useful if you have a lot of contacts of no interest (e.g neutrals) on the map and want to eliminate the clutter they create. You can cancel a contact's filter-out status the same way. .

## Mission Editor

- \* Major overhaul of Mission Editor from v1.07 onwards. See details here: <http://www.warfaresims.com/?p=3653>
- You can now launch the mission editor by selecting the mission name in the Unit Status dialog.



- Delay-timed missions are displayed in the mission editor with a "[D]" prefix.
- New patrol option: Patrol Throttle (default is Loiter/Creep). Units that are following a patrol course inside their patrol area and have no other throttle override obey this throttle setting. This allows customizing patrol behavior for persistence (loiter), maximum area scan (cruise) or special cases that warrant full/flank throttle.
- New patrol option: Prosecution Area. You can now define an exact area you want units to pursue contacts during a patrol. Units assigned to it will not pursue contacts outside the area. To use: add and select the necessary reference points, press the prosecution area button and add/remove reference points as you would with the patrol area function. If no prosecution area is added the mission works as it traditionally did in that there is no threshold.

Prosecution Areas (PAs) serve two purposes:

- a) They act much like a forbidden zone in that contacts appearing within them are marked for interception, but they also restrict the extent at which interceptions will happen. So if you want your fighters to e.g. be triggered only by bandits within 200nm of a protected HVU instead of "waking up" to contacts thousands of miles away, PAs are the solution.
- b) They act as a "leash" for assets on a patrol; they effectively determine the extent to which the patrol assets can give chase to receding targets. If the bandit moves out of the PA, the defender is forbidden to follow (though it can still engage with weapons if feasible). This solves the problem of patrol assets over-extending themselves during interception, quite often falling victims to feints/traps.



PAs are supported in the UI by modifications to the Mission Editor UI, and are populated by reference points in the same way as existing patrol areas. They are empty by default, and in this case the AI behavior is the same as before (intercept bandits far away etc.), to facilitate existing scenarios.

Units that are assigned to a patrol with a prosecution area will target & engage only contacts that are within this area (or their patrol area). If they are not on patrol or their patrol does not have a prosecution area, the existing AI rules apply.

This makes it possible to create SAM ambushes (shoot at far less than max range), divide areas of responsibility for multiple patrol forces etc.

PAs work as intended only when the "Investigate targets outside contact area" option is enabled. Also, the "engage targets of opportunity" doctrine option overrides the prosecution area restriction.

- Added sprint-and-drift behavior for units that are part of a surface or sub group (the most common case requiring this behavior). This behavior is enabled by going in the formation editor, selecting the desired unit, and ticking the checkbox "Sprint and Drift" on the formation editor toolbar.

- New Strike Mission option: Use Auto-Planner. Selecting this check box activates the auto mission planning. This allows the AI to set up a variable preplanned flight plan based on range, fuel and load-out flight profile.

- Units listed on the mission editor and the air ops window now use natural sorting for the list order. So instead of this:

- Archer #1
- Archer #10
- Archer #11
- Archer #12

- Archer #2
- Archer #3
- Archer #4

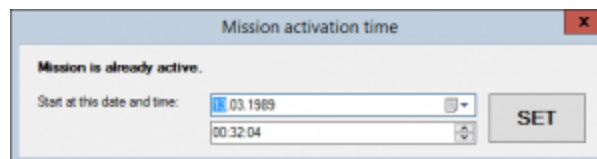
...you get this:

- Archer #1
- Archer #2
- Archer #3
- Archer #4

- [...]

- Archer #10
- Archer #11
- Archer #12

- You can now set the activation time for a mission through the mission editor.



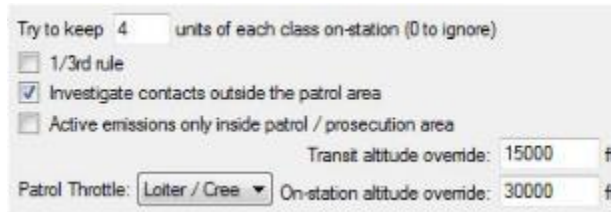
- Aircraft entries are now color coded to show readiness in various lists. Red is unavailable, black is readying, and green is ready.

- \* Patrol/Support mission altitude overrides have been added: You can now set override values for the transit and on-station aircraft altitudes for patrol & support missions. These values are displayed & edited in feet or meters, depending on display preference.

|                               |       |    |
|-------------------------------|-------|----|
| Transit altitude override:    | 15000 | ft |
| On-station altitude override: | 30000 | ft |



\* New patrol & support mission feature: Minimum number of units on station. This appears on the mission editor windows as “Try to keep [XXX] units of each class on-station (0 to ignore)”.



This value can be used to precisely specify the desired number of units (per class) on-station instead of relying only on the 1/3rd rule. However, it can also be \_combined\_ with the 1/3rd rule, and the biggest value between them takes precedence.

Let's look at a concrete example. We have 12 aircraft (same class) on a base and are assigning them to a patrol.

- If the “minimum number” value is 0 and the 1/3rd rule is not used: The airops crew just flushes out all aircraft at once.
- If the “minimum number” value is 0 and the 1/3rd rule is used: The airops crew tries to keep 1/3rd of the force on station.
- If the “minimum number” value is > 0 (let's say 7) and the 1/3rd rule is used: The biggest value between them takes precedence. So in this case  $12/3 = 4$  and  $7 > 4$  so the “minimum number” value wins. If the force was 24 aircraft then the 1/3rd rule would win because  $24/3 = 8$  and  $8 > 7$ .
- If the “minimum number” value is > 0 (let's say 7) and the 1/3rd rule is not used: The airops crew will try to keep 7 aircraft on station.

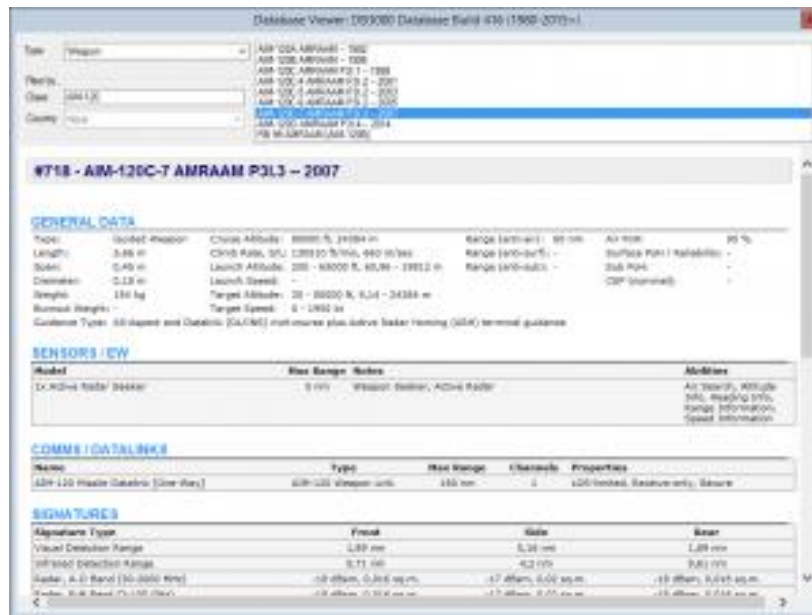
\* The “Area Editor” component (used on mission editor etc.) has a new button: “Highlight + center on selected”. If one or more reference points are currently selected, clicking this button highlights them and brings the map camera to their geographic center. This is useful, for example, for quickly seeing and moving around the reference points that comprise a patrol area.

## Misc Improvements

- You can now select a new home base for multiple-selected aircraft.
- You can now manually order a helicopter to hover and use its dipping sonar if it has one. The key combination is Shift+D.
- Major new feature: You can set speed, altitude and sensor commands per waypoint. There are currently two ways to do this: Select the waypoint and either right-click on it to show available command, or press F2 and/or F9 to bring up the *Speed* / *Altitude* and *Sensor* windows respectively. Waypoint-specific command are applied to the unit once the unit reaches said waypoint.
- Significant improvements on the *Speed* / *Altitude* window (F2): Altitude presets for aircraft, similar to existing submarine depth presets, and ability to input precisely the desired speed & altitude/depth with arithmetic values in addition to the slider bars.
- The player can no longer plot paths or select and drag-move the waypoints of non-datalinked or non-wire-guided weapons. Only datalinked or wire-guided man-in-the-loop weapons can have courses altered.
- Datalinked and wire-guided man-in-the-loop weapons can be re-targeted. Select the weapon(s) to retarget, press the F1 hotkey, and select the new target.
- Datalinked Air-to-Air Missiles (AAMs) and Surface-to-Air Missiles are automatically re-targeted if the original target has been destroyed, granted the new target is of the same general type, within 20 degrees (no sharp turns that bleeds energy), at least a few seconds from impact, etc.

## Database Viewer

\* The DB viewer window, if already open, now refreshes properly when you click on a different friendly or identified non-friendly unit, or perform any other action which would normally open it (e.g. clicking on a weapon entry on the loadout selection screen). So you no longer have to close it repeatedly in order to browse through various in-scenario units.



- A weapon-specific page has been added to the DB Viewer. This allows viewing information relevant to a weapon such as its stats (dimensions, speeds, altitudes), engine, warhead(s), datalink, etc. Search, filtering etc. for weapons work just like any other unit type, except that country-level filtering is not available for weapons.
  - When viewing information on a platform, the per-engine maximum speed is displayed on the "Powerplant" section. This is particularly useful for diesel-electric submarines as it shows the maximum speeds available for each of the available engines (including Air Independent Propulsion, or AIP).
  - Added DB Viewer hyperlinks to weapons on the aircraft *Loadout Selection* window. Click on the weapon name and the DB Viewer will display the page for that weapon.
  - Added DB Viewer hyperlinks to the aircraft types in the *Air Operations* (Air Ops) window. Click on the aircraft type and the DB Viewer will display the page for that aircraft.
  - Added DB Viewer hyperlinks for weapons on the *Unit Weapons* window.
  - The weapon page on the DB Viewer now lists the guidance details for the displayed weapon.
- \* Loadout IDs are now displayed on the aircraft page of the DB viewer.
- \* The DB viewer now lists additional information for mounts & weapons (compatible directors, autonomous, local control possible etc.)

## Music & Sound effects

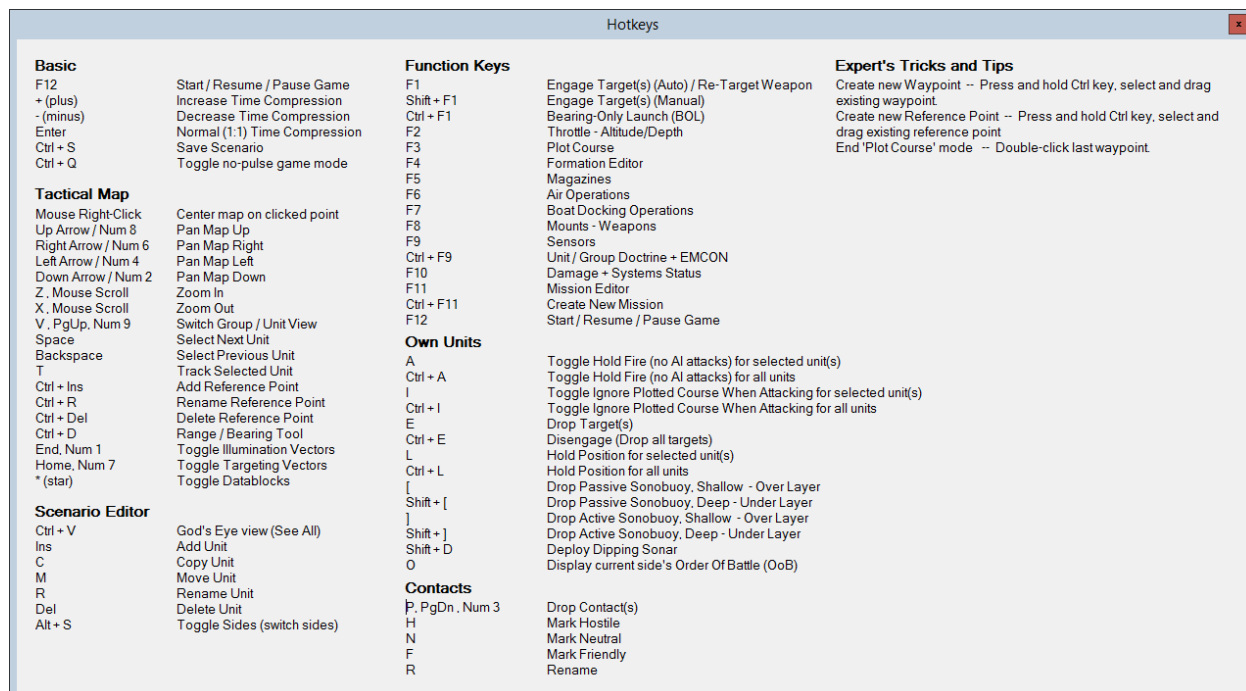
- Sound effects are now played on a single channel instead of multiple parallel channels. This fixes the distortion & crackle problems when too many effects were played concurrently.
- New and improved sound effects for various gun calibers (incl. lasers), aircraft & helicopter take-offs, new contacts, alert (weapon contacts) etc.
- Background music is now available. This can be enabled & disabled through *Game -> Game Options -> Sounds/Music*. Players can add more soundtrack files (MP3) to be played randomly, by placing them on the *Command\Sound\Music* folder. The included track is the "official" Command soundtrack, i.e. the one from the promo trailer.

## Updated Hot Key List

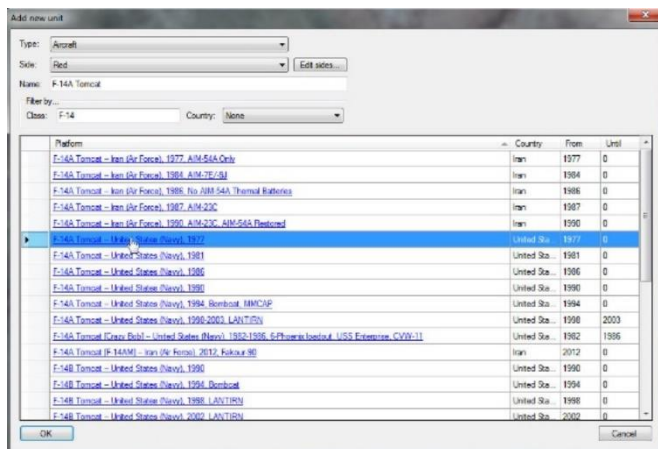
You can always see the current list in a new window displaying all hot keys From the main menu, "Help" -> "Hotkeys".

- Many new hotkeys have been added.

- Most menu items now have a hotkey.



## Other UI Changes



- Losses and expenditures are now listed in alphabetical order, to make it easier to search for specific unit types lost & weapons/stores expended.
- When the player attempts to load a scenario for which the corresponding DB is missing, the game informs him of this and aborts the load.
- \* New logged message type: New Mine Contact. As with all other message types, it can be configured to show (or not) on the message log and also trigger a clock-stopping popup.
- \* On the "Add Unit" window, the unit names are now also hyperlinks to the relevant page on the DB viewer.

**NEW IN v1.08**

- \* Players can now observe the engagement arcs of a unit mount. To do so, bring up a unit's "Weapons" window and click-select the "Show Arcs" checkbox for the desired mount or any weapon on that mount. Only one mount's arc is displayed at a time (this is deliberate). The arc is displayed only as long as the weapons window is visible.
- \* The manual weapon allocation window can (optionally, via a checkbox) present to the player the "soft" restrictions (WRA/WCS/other doctrine settings) which prevent a unit from automatically using a weapon on a given target even though the "hard" restrictions (physically able etc.) are met. The player can of course override the soft restrictions and fire manually.
- \* Map tweak: A targeting vector turns yellow when the targeting unit is not cleared to engage the target (WCS etc.), and green when it is.
- \* The coast/borders line fades out as the camera zooms in on the terrain (similar to Google Earth).

## NEW IN v1.09

- \* New map feature: Placenames (countries, major cities and major geographical elements). It can be enabled/disabled through the "Game Options" window and is persisted like other map visibility options.
- \* New map feature: You can select to display either all detected contact emissions or only the ones associated with weapon fire control (helps reduce clutter when displaying emissions from all contacts)
- \* New map feature: Day & Night lighting of the Earth (ON by default). It can be enabled/disabled through the "View" menu and is persisted per-side as part of the map view options.
- \* Expanding a large scenario folder (e.g. Community scens) on "Load scenario" window is now instantaneous.
- \* ADDED: Semi-transparent background canvas for on-map message log (makes messages easier to read). The canvas is optional, configured through the "Game Options" window.
- \* Fixed: Various visual glitches & performance issues on map zoom/pan.
- \* Added: Weapon records on magazines are now listed by alphabetical order (of weapon name).

## NEW IN v1.10

- \* MAJOR NEW ADDITION: Steam Workshop support.

To upload a scenario to the Steam workshop:

First of all this functionality is available only when running Command from within Steam (the Steam client must also be running).

First, make sure that the scenario has a title, that you have saved the scenario at least once to disk, and provided a description. Then

on the "Editor" menu, click on "Publish scenario to Steam Workshop". This window should appear: <http://i.imgur.com/kMgYhGG.png>

You can use for the image thumbnail either a screengrab of the scenario map or a custom image. Press "Publish New Item", and after a few seconds you should receive the notification that the upload was successful.

To download scenarios you must first subscribe to them. Navigate to the CMANO Steam Workshop page

(<http://steamcommunity.com/app/321410/workshop/>) and individually pick out and subscribe the scenarios that you are interested in: <http://i.imgur.com/Swce6IJ.png>

On the next CMANO startup, these scenarios will be downloaded (or updated) to the "\\Scenarios\\Steam Workshop" folder, and be available for loading through the normal "Load Scenario" window: <http://i.imgur.com/Ukk2IYg.png>

To upload an updated scenario: Load the scenario in ScenEdit and click on "Publish scenario to Steam Workshop". Change any of the text fields or the image if necessary, and click on "Update Existing Workshop Item". A new window will appear, listing all scenarios you have already uploaded. Select the scenario that corresponds to the update that you have made and click on "Upload".

- \* NEW: You can now perform a missile strike with waypoints. For an example of such a strike see here: <http://www.warfaresims.com/?p=4043>

The procedure is:

1. Initiate a manual attack (Shift+F1)
2. Allocate weapons as usual
3. Click-selecting a salvo with weapons that support waypoints, the "Plot Course" button is enabled: <http://i.imgur.com/8vPDNjw.png>
4. Clicking on the button switches to "salvo course plotting" mode. The manual alloc window is temporarily hidden, and you see the current planned course (at the beginning this will be a straight line from shooter to target) and by clicking anywhere on the

map you add an extra waypoint. You are constrained by the number of waypoints (10 max) and the overall plot distance (you're not allowed to plot a course that exceeds the weapon range).

5. To exit this mode press Esc or F3. Afterwards you can re-enter this mode with the same button or erase this plotted course with the "Clear Course" button.

Once the missiles are launched, they should follow the course you have specified.

\* NEW: Nuclear-tipped ballistic missiles can now be set to detonate at high altitude (for maximum EMP effect) instead of directly attacking a ground target. To do this:

1. Target the missile at a target or aimpoint as usual, and create the salvo.
2. Right-click on the salvo and from the context menu click-select on "Special: High-altitude detonation". (Doing this again you can disable this)
3. The missile(s) in the salvo will launch as usual, but instead of descending on the target(s), the missile(s)/RV(s) will remain at high altitude and detonate over the aimpoint(s), maximizing the EMP effect.

\* New game option: Allow automatically switching to High-Performance power profile. (Accessible through "Game Options" window). Default is ON. When this is enabled, upon startup the game will attempt to switch to the operating system's "High-Performance" power plan (if it is not already the selected one). This is very similar to what the "Process Lasso" app does (although only for the lifespan of the game rather than OS-wide), and can provide a useful performance boost. When Command shuts down, the original power plan (if different from High Performance) is restored.

\* The "Unit Orders" top-level menu and the Unit Context Menu (aka unit right-click menu) have been streamlined (grouped related commands under sub-sections) to make them easier to navigate.

\* New map display option: "Show mission area/course". Available choices are All, Selected (mission), and Do Not Show.

\* UI tweak: the message log (and its canvas, if enabled) "grow" from the bottom of the map instead of rolling down from mid-height

\* When the selected unit is ship or submarine, the cavitation speed is displayed on the Throttle/Depth (F2) window.

\* TWEAK: Give focus to formation editor window if it is visible when selecting one of group members.

\* TWEAK: Contact Report window gives better contact description depending on ID status.

## NEW IN v1.11

\* Numerous changes/additions to UI windows to support new simulation mechanics.

\* The Doctrine window now has an extra tab "Withdraw & Redeploy", for the new doctrine settings associated with Pier Operations.

\* The "Docking Ops" window has additional columns to display fuel and (clickable) damage, weapon and magazine information.

\* The "Docking Ops" window now color-codes the various aspects of a unit's deployment readiness (compared against doctrine redeployment thresholds) in order to provide an at-a-glance overview. Example: <http://i.imgur.com/gaSbI23.png>. A unit will deploy under AI control only if it's "green across the board" (and if it is under a mission); otherwise the player can manually order it to deploy at any time, ready or not.

\* AGL altitude settings are now supported for aircraft. See example here: <http://www.warfaresims.com/?p=4199>

\* The mission AI now generates logged messages that explain why a mission has not launched aircraft.

Example: <http://www.warfaresims.com/WarSimsWP/wp-content/uploads/2016/02/UserFeedback.jpg>

\* New window dedicated to game speed options. See overview here: <http://www.warfaresims.com/?p=4243>

\* ADDED: Display mine deployment depths in DB Viewer

\* "Load Scenario" Dialog: Expanded left table so longer scenario names are exposed

\* UI Tweak: Don't report "BDA change" if the previous BDA state is blank (ie. no more BDA message flood when you approach e.g. an enemy airbase)

\* Added: Rename ships in Boat Ops window

\* Added: Hotkeys to open add/remove aircraft/boats

\* UI Tweak: On the "Edit Event" window, the dropdown lists for Triggers, Conditions and Actions are sorted alphabetically

\* UI TWEAK: Ship fuel panel now lists the available fuel types. Example: <http://i.imgur.com/X5o8odT.png>

\* UI addition: Lua script error generates a log message when run non-interactively

\* New option on "Game Options" window: Extra Memory Protection (OFF by default). When enabled, this adds an extra layer of checking for out-of-memory errors. Disabling it confers a UI/map performance increase, most noticeable on real-time (1-1 sec) mode.

\* On Doctrine-WRA form, the weapons are now listed in natural-alphabetic order (e.g. AIM-9 goes before AIM-120)

\* UI TWEAK: Adjusted Missions + Ref. Point menu: Moved "Delete Ref Point" to under "Add Ref Point"

## NEW IN v1.11 SR1

- \* Map tweak: All weapon impacts (both hits and misses) are displayed for a few seconds on the tactical map.
- \* UI tweak: When using the "zoom to the cursor position" option, after zooming re-center the mouse cursor at the map
- \* UI Tweak: Spacebar (instead of F12) pauses/resumes game. "|" now cycles to next unit.
- \* Improved support for high-DPI (150-200% font size) desktop resolutions

## NEW IN v1.11 SR6

- \* Wholly revised right-column underlying UI stack that works accross different DPI settings (see article: <http://www.warfaresims.com/?p=4376> )
- \* Added listing of comm devices on "Damage Control" window.
- \* UI tweak: "Damage Control" button & window (and fire damage indicator) enabled for aircraft.
- \* Map tweak: Detected jamming emissions are displayed in yellow text and do not "fade"

## NEW IN v1.11 SR7

- \* New map/UI feature: Directional unit icons (Example: <http://i.imgur.com/F1VWERd.jpg>). This can be enabled through Game -> Game Options -> Map Display -> Set "Map Symbols" to "Directional Stylized".
- \* Revised "Realism Options" window: <http://i.imgur.com/4gnjYZB.png> . It has two features: (a) The activated and disabled options are more clearly visible, and (b) the player cannot change these options in normal play, only through the Scenario Editor.
- \* UI tweak: On the "Unit Magazines" window, for each magazine the weapon records are listed by non-empty/empty first, then alphabetically by weapon name. (This reduces/eliminates the necessity to scroll down on large magazines like in airbases/carriers to see available stores)
- \* The existing "New Contact" message type is supplemented by more focused "New Air Contact", "New Surface Contact", "New Submerged Contact" and "New Land Contact" types. This allows tailoring printing to the message log and raising clock-stopping popups with higher granularity (e.g. "alert me when a sub is detected but not when a plane is detected").

## NEW IN v1.12

- \* Two significant tweaks on time acceleration:
  - An extra time accel setting, "2x", has been added.
  - The sim resolution (ie. pulse timeslice) is now 0.1 sec not only when running at 1-1, but also at 2x and 5x accel. The practical result should be that the player gets a smoother "acceleration curve" when moving from 1x to 2x and 5x time compression.
- \* Improved support for 4K/UHD screens (no longer necessary to temporarily downscale to 1080p).
- \* UI tweak: Display "No-Cav" on Unit Status panel for vessel that is reducing speed to avoid cavitation
- \* If the scenario save path does not "sit under" the \Scenarios folder, the game forcefully defaults to the latter



# Manual Addendum: General gameplay



- The "Start Game" window has an extra button added: Resume from last Autosave. This makes it even easier (and more immediate) to continue a game session after a crash, freeze or other problem.
- Autosave now allows going farther "back in time": When an autosave is performed, the existing autosave file is renamed to autoscen\_20, the existing (if any) autoscen\_20 file is renamed to autoscen\_40 etc. all the way to autoscen\_100. This way, whenever there is a reported problem the dev team can go back up to 100 (RL) seconds to troubleshoot reported issues. This solves the "autosave after the fact" problem.

## NEW IN v1.08

- \* **A brand-new series of tutorial videos by Baloogan.**

## NEW IN v1.09

- \* Campaign playing & campaign editing! v1.09 includes the "Northern Inferno" campaign, a "WW3 in the North Atlantic in 1975" storyline created by Paul A. Bridge.

TO PLAY A CAMPAIGN / RESUME FROM SAVE:

From the start menu, click on "New Campaigns". The "Campaigns" window will come up, listing all available campaign. Clicking on any campaign lists the general description for it. You can then click on "Start new campaign" to commence a new campaign session, or click on the tab "Resume from save" where you will see the available saves grouped by the campaign to which they belong. (An infinite number of saves per campaign are possible).

After the intro video plays (you can skip videos by pressing any key during playback) you are presented with the first scenario. Once you reach the specified pass-score for the scenario (visible on the "Scoring" window), you can either proceed to the next scenario or press on to achieve a better score.

If instead you want to resume from a campaign save, simply select the desired save and click "Resume from selected save".

The campaign scenarios are also available for play as "standalone" scenarios, like all other existing Command scenarios. Simply navigate to the "\\Scenarios\\Northern Inferno" path from within the "Load Scenario" window.

NOTE: You can play the NI scenarios only if you have purchased NI, either as a standalone expansion (no previous ownership of CMANO) or as an addition to your current CMANO installation. If you attempt to load a NI scenario without having a license for it, a relevant window will pop up and prompt you to purchase the license.

CAMPAIGN EDITOR:

The new campaign editor is available in ScenEdit mode; from the main Editor menu select Campaign -> "Create new" / "Load from file". Once a new campaign is created or an existing one is loaded, you have several options:

- \* You can add both scenarios and attachments (typically videos), and re-arrange their order with the "Move up" / "Move Down" buttons.
- \* You can edit the title & description of the campaign, as well as its "ending" page.
- \* You can set the pass-score for each scenario. Once the player reaches this score he can then proceed to the next scenario.



- \* You can save the campaign. IMPORTANT: All campaign-related files, including attachments, should reside in a single folder. Throughout the code the campaign logic first of all searches for the campaign file (by ID) and uses it as a "reference" for the location of all other related files. (If you check you will notice that while playing a campaign scenario only the "Save" command is available, and not the "Save As". This is deliberate so that the player doesn't save outside the campaign folder).
- \* FIXED: Out-of-memory error causes "red X of doom" on main map.
- \* When browsing saved games, the data & time of each save is listed. This helps the player pick the most recent save or a particular save of interest.
- \* Includes 3 new tutorial scenarios by Mark Gellis (from the "Uncle Mark's Tutorials" series), and a dedicated air-to-air refueling tutorial by Tomcat84.

## NEW IN v1.10

- \* Miscellaneous tweaks to reduce RAM usage, and significant performance improvements.

## NEW IN v1.11

- \* Massive improvements to simulation speed and RAM consumption.

## NEW IN v1.11 SR1

- \* Command can now load and run much larger scenarios (>10.000 active units)
- \* If autosave fails while running a very large scenario (due to memory exhaustion), the player is notified by a balloon popup instead of crashing the game.
- \* Recording tweak: Maintain God's Eye enabled/disabled preference between frames during playback

## NEW IN v1.11 SR6

- \* Significant performance improvements on both sim-core and map engine.

## NEW IN v1.11 SR7

- \* More reliable shapefile loader for icepacks (should help with the rare OLEDB exception on startup).
- \* Speed improvement for scenarios with lots of escort-tasked aircraft
- \* Speed improvements on scenarios featuring zones
- \* Significant speed improvement for scens with lots of deployed sonobuoys
- \* Faster game startup due to revised method of checking DB files

## NEW IN v1.12

- \* Major new feature: [Communications disruption](#)
- \* Major new feature: [Aircraft damage](#)
- \* Major new feature: [Cargo / landing / airdrop operations](#)
- \* Major new weapon types:

– [Enhanced High-Energy Lasers \(HELs\)](#)

– [Railguns & High-velocity Projectiles \(HVPs\)](#)

– [Tactical electromagnetic pulse \(EMP\) weapons](#)

All new major features are optional (enabled per-scenario, just like the pre-existing features "Detailed gunfire control" and "Unlimited base munitions"), and available for use only when the Chains Of War license is present. Attempting to load a scenario with any of the new features without having the corresponding license results in a block, with a window shown that informs the player of the unlicensed features and how they can be unlocked/enabled.

# Manual Addendum: AI & Mechanics

- NCTR (Non-Cooperative Target Recognition) for select radar systems has been added, enabling active type/class-identification of air targets. See here for introduction to the technology: [http://en.wikipedia.org/wiki/Radar\\_MASINT#Non-Cooperative\\_Target\\_Recognition](http://en.wikipedia.org/wiki/Radar_MASINT#Non-Cooperative_Target_Recognition)  
NCTR as modeled in Command is broken into two techniques:

- JEM: Jet engine modulation (aka fan blade counting). This is simpler to process and more widespread but works only within a frontal arc of 15 degree offset from the target's front (so that the fan blades are visible to the radar).
- NBILST: Narrow-beam Interleaved Search & Track (aka synthetic pseudo-imaging). This is far more demanding computationally and is possible only with phased-array radars, but can work regardless of target aspect.

Interestingly enough, even some quite old radar systems (like Square Pair on SA-5 batteries) have an NCTR ability. However, because of its manual/semi-automated nature (the operator literally looks on raw radar return modulation data on an oscilloscope) the classification time varies highly with operator proficiency. In modern systems the highly automated nature of the process (point the radar at the target and wait) means that crew skill is irrelevant.

When a target is classified using NCTR a relevant message is added to the message log. • Damage repair rates (for sub-systems) have been increased and messages are now provided when a subsystem is repaired for a heavier to a lighter state of damage or fully restored.

\* When examining subsystems damage on a unit (Damage Control window), the different degrees of subsystem damage (light, medium, heavy) are represented by different colors (yellow, orange and orange-red). Destroyed systems retain the red color.

\* Numerous fixes and tweaks to damage modelling have been implemented including ARM impacts, cluster munitions, proximity blast damage, depth charge damage & duds etc.

- Aircraft & submarines have more realistic dive rates.

- Ships can now effectively use semi-active SAMs in anti-surface mode, as they are taking terminal illumination concerns into account during pre-fire checks.

- Refined acoustic reverberation modifiers for sonars. Now the sonar's tech level (more modern sets are affected less) and operating frequency (lower-frequency sets suffer the most) also play a part in determining degradation due to reverberation from shallow water or under-ice conditions.

- Strategic submarines now actively evade not only weapon contacts but also potential sub & surface threats in proximity.

- New doctrine option: Use SAMs in anti-surface mode (or not).

- New patrol type: Sea Control. This type effectively combines the targeting criteria of the ASuW-Naval and ASW patrol. Units assigned to this patrol type will target anything on the sea surface and below it.

- New doctrine option: Engage targets of opportunity (default is NO). When enabled, a unit will target and engage any contact for which it has suitable weaponry (at range up to 2x of max suitable weapon range), regardless of its mission tasking.

- Floating mines can now be detected by visual sensors (incl. eyeballs) on ships and aircraft who fly lower than 150m/450ft and slower than 200kts. Perfect-conditions detection range is 300 meters but actual detection range can be significantly lower depending on lighting, weather etc.

- There are now 11 pre-defined cloud cover profiles. The mouse pointer has been updated with more information on the clouds so that the player can adjust operations accordingly. Some profiles have two layers of clouds which opens the door for some interesting scenarios. It is now possible to operate underneath clouds, over clouds, inside clouds, and visibility through cloud layers depends on cloud density. The profiles are:

- Thick fog 0-2k ft, solid cloud cover 7-36k ft
- Thin fog 0-2k ft, solid cloud cover 7-36k ft
- Solid middle clouds 7-16k ft, moderate high clouds 30-36k ft
- Moderate middle clouds 7-16k ft, light high clouds 27-30k ft
- Moderate high clouds 25-28k ft
- Moderate middle clouds 7-16k ft
- Moderate low clouds 2-7k ft
- Light high clouds 20-23k ft
- Light middle clouds 10-16k ft
- Light low clouds 5-7k ft

- Clear sky
- \* Offboard sonar sensors (e.g. towed arrays & VDS) not only have their powerplant own-noise modifiers halved, but also get a further reduction as per the existing thermal layer and deep sound channel modifiers on sound propagation. This makes these sensors even more potent, especially when they hang on the other side of the thermal layer than their carrier platforms.
- The AI in ships & surfaced submarines can now engage incoming SAMs in ASM mode. (Player-issued attacks on SAMs are still deliberately ignored).
- \* Significant improvements to ABM/ASAT intercept logics:
  - Units with ABMs/ASATs target & begin tracking ballistic & orbital targets at much larger distances (to compensate for the very fast closure speed). This allows taking shots at the maximum intercept range.
  - Additional pre-fire checks for mandatory datalinks. If a mandatory datalink connection cannot be established, the firing sequence is aborted rather than launching the weapon "blind". (This is critical for ABMs but also benefits other weapon types with mandatory datalinks).
- \* New major feature: Proficiency levels
  - Proficiency modifiers are applied either on a side level (on the "Add/Edit Sides" window in ScenEdit mode) or at the individual unit level (see here: <http://www.warfaresims.com/?p=3539> ) and can affect a wide number of factors. The available levels are Novice, Cadet, Regular, Veteran & Ace. Default proficiency level for each side is Regular.
- The weapon endgame messages have been updated to display the information of these modifiers.
- OODA values are affected by proficiency levels. Novice crews take twice the nominal OODA value to execute their targeting process while ace crews beat even the nominal best-case value (all other levels in-between).
- \* Radars able to detect mobile ground units are limited by target speed. A halted tank platoon for example is much harder to pick up than one on the move. Radars with progressively higher frequency (NATO J/K/L/M bands) get extra bonus on this as their higher frequency allows them to pick out even low-speed or static targets. (Not coincidentally, such seekers feature prominently on weapons like Longbow-Hellfire, Brimstone etc. which are optimized for engaging mobile targets.)
- \* "Submarine Datum" contact: If an inbound torpedo is detected where no submarine contact is held, a presumed submarine contact is auto-generated on the assumption that the weapon came from *somewhere*. The initial AoU for the presumed sub contact has a 10nm radius and expands with time as with normal detections. Likewise, if a sub-launched missile is detected *immediately* after launch (within 1nm of its firing submarine) then a sub contact is generated with a 1nm-radius AoU (*remember how "Operation Doolittle" in RSR went horribly wrong?*). This helps surface/sub forces under sub attack to respond quickly to the attack even without having positively detected the attacker (and hopefully kills the player "sub sniping" cheat).
- \* A long-standing bug on the "Unit enters area" trigger has been fixed: it was firing for every moment at which a unit was in the area (so if it was chained to a repeatable event, the event was firing continuously). Now it fires only when the unit actually steps into the area from outside.
- \* Additional factor for ship gunnery: Ship size. Large ships are very stable platforms for unguided weapon fire (guns, rockets, lasers etc.) even during heavy seas, while smaller craft face progressively more severe aiming problems (even with advanced fire-control directors) as the weather worsens.
- \* Torpedoes can now be fired to their maximum kinematic range instead of 6/8nm. So if you really want to e.g. fire a Mk48 out to a target 25nm away because Jane's says that's the max range, now you can. (Just don't blame anyone if the target easily outruns it or if the firing solution at that range is so poor that the torp misses outright). The firing behavior is configurable as a doctrine setting (so it can be applied to side-, mission-, group- or unit-level), and can be set to apply only for manual (i.e. player-initiated) shots only (so the AI remains conservative), both manual and AI shots, or none.
- \* Major new AI/Doctrine feature: Weapon Release Authorization / Weapon Control Status (WRA/WCS). See here for details: <http://www.warfaresims.com/?p=3598>
- \* AAW missiles attacking small-or-larger size ships/facilities disable their proximity (airburst) fuzes and rely on direct impact instead. Primary damage delivery is through impact kinetic energy.
- \* Sub battery recharge rate has been significantly increased. Also now the recharge rate is maximum when creeping, and reduces as throttle setting increases.

**NEW IN v1.08**

- \* New weapon type: Anti-torpedo torpedoes and related torpedo-warning systems. (The player can fire these manually but by default the AI handles them just like with anti-missile weapons)
- \* New weapon type: Enhanced fragmentation warhead (aka "superfrag"). Examples: M30A2 MLRS Alternate Warhead, CBU-107 PAW.
- \* New weapon type: Contact explosive – sabotage & suicide subtypes. Sabotage allows simulating e.g. Tanya blowing a radar station (obligatory Red Alert reference: check). Suicide explosive allows modelling kamikaze units (e.g. the attack on USS Cole).
- \* New "ship" type: Mobile Offshore Base (aka "Battle Island"). Contrary to aircraft carriers, a MOB can also operate land-based aircraft (e.g. large transports).
- \* Significant speed improvement on large scenarios.
- \* Uncertainty areas for long-range passive detections (SOSUS, ESM etc.) are more accurate and reliable.
- \* Subs always recharge their batteries when at periscope depth or shallower. They are also smarter about not running after targets they have no chance of catching up, and vary their approach speed against viable targets more intelligently.
- \* UNREP is performed at a realistic pace (1 item every 2 minutes per connecting line), and ships being replenished do not overload their first compatible weapon mount.
- \* Numerous tweaks to damage modelling related to light-caliber, very high-ROF automatic weapons.

## NEW IN v1.09

- \* New major weapon feature: Nuclear detonations now produce a broadband EMP wave.
- a) Effects radius & intensity: The radius is independent of yield and hinges mostly on LOS and whether the detonation is within the atmosphere, in the stratosphere or in near/outer space.
- In the atmosphere: The radiation is absorbed quite heavily by the atmosphere and intensity falls linearly with distance. Maximum range is a bit longer than maximum blast range.
  - In the stratosphere: Part of the energy escapes to space while another part is trapped on the troposphere upper layer, forming an "EMP blanket". Absorption is much less severe so the max range is much larger.
  - Near/outer space: All the energy headed towards earth is refracted through the atmosphere and forms a very intense EMP blanket of near-uniform intensity. Max effects range can be as far as 1500nm from ground zero with high intensity. (This is why most EMP-attack scenarios in the Cold War assumed this profile. See also "GoldenEye" and "The Day After").
- b) System effects: As currently implemented only platform sensors are vulnerable to damage. Factors affecting damage probability:
- Pulse intensity – see above.
  - Operating status: Sensors that are turned off can be affected but much less likely
  - Tech generation: Early 60s and earlier (vacuum tubes) are the most resistant, late 60s (first transistors and solid states) are more vulnerable, late 70s (VLSI) more so, and from late 80s (COTS) onwards it's a party.
- \* Massive performance increases (as in up to over 10x faster) under certain "heavy" setups such as very complex radar/ECM interactions and thousands of AI-busy units.
  - \* Significant speed improvement in scenarios with numerous underwater biological entities (whales, fish etc.).
  - \* Tweaks to ship damage caused by torpedo hits (greater blast, more components hit).
  - \* ADDED: Proper optimum-height-of-burst calculation for nuclear weapons against soft targets.

## NEW IN v1.10

- \* NEW MAJOR FEATURE: Cooperative Engagement Capability (CEC).

CEC takes many forms. Examples:

- SM-6 ERAM can be launched from a surface ship and switch its datalink parent to another ship or to an orbiting E-2D.
- AIM-120D can be launched from an aircraft and guided mid-course from an E-2D.
- Heavy Soviet anti-ship missiles like the SS-N-3/12/19/22 can receive mid-course updates from Bear-D MPA and Hormone-B helo.
- Weapons like the GBU-15, AGM-130, AGM-62 Walleye II ER/DL and AGM-84E SLAM can switch datalink parent in-flight.

In order for a weapon to switch datalink parent platform, both the weapon and the candidate platform must support CEC (apart from the standard requirement of having a compatible datalink). For example, an old F-15C may be able to launch an AIM-120D and provide mid-course guidance to it but is unable to act as CEC platform for other shooters.

- \* Tech generation is now taken into account for noise jamming (OECM). Older jammers are less effective against modern radars and vice versa (see here for example: <http://www.warfaresims.com/?p=4091>)
- \* Electronic-scan radars (PESAs but especially AESAs) have strong resistance against noise jamming.
- \* New weapon feature: SAM/ABM warhead modifiers.

Several modern SAMs with ABM capability have advanced warheads (directional-frag or Hit-To-Kill) optimized for ABM operation. These warheads were developed as a result of the Desert Storm experience, where Patriot PAC-2 missiles (with normal continuous-rod

warhead) would frequently impact incoming TBMs but rarely actually destroy them, usually just causing them to deviate from their trajectory. The new warheads, and especially HTKs, provide a much bigger probability of physically destroying the target missile or RV. These characteristics are now reflected in the simulation. This is what happens when the SAM impacts the incoming missile/RV:

- A conventional warhead has a 15% chance of outright destruction of the target, and a 30% chance of significant trajectory deviation (CEP increased by 3x). If none of these happens then the target missile/RV suffers only a minor deviation (CEP increased by 1.5x).
- A directional-frag warhead has a 30% chance of outright destruction of the target, and a 60% chance of significant trajectory deviation (CEP increased by 3x). If none of these happens then the target missile/RV suffers only a minor deviation (CEP increased by 1.5x).
- A HTK warhead reliably destroys the target every time.

NOTE: Trajectory deviations are cumulative, so an incoming missile/RV may be impacted multiple times by non-HTK ABMs and still survive but impact far away from its intended aimpoint (this happened in a few instances in DS).

AAW weapons with advanced warheads are also favored by AI crews in "best weapon to use" calculations, as their warheads also make them more lethal on anti-aircraft engagements.

\* AI-controlled units can now perform cruise missile attacks with waypoints (where applicable). See this screenshot for example: <http://i.imgur.com/PJCsVy8.png>.

Generally the closer within weapon range the target is, the more "wide" the doglegs will be, so a unit shooting at the "edge of envelope" may not do a dogleg at all (this also means the player can indirectly control the dogleg behavior by manipulating the weapon-range WRA for the weapon in question). The entire salvo follows the same course, to maintain concentration of fire. Off-axis (dogleg) release of weapons from aircraft is restricted by slipstream to 45 degrees maximum.

\* Significant enhancements to unguided weapon accuracy calculations, and ship gunnery in particular:

1) The moving-target accuracy penalty (as target speed increases, accuracy errors may increase up to double) applies only for local-control mounts, e.g. a pedestal-mounted machine gun with no automated sight or a main gun that has lost its normal FC director and is used in emergency "manual" mode. Weapons that retain their FC director are assumed to easily compensate for target movement (if the TDC could do it in WW2...).

2) As more than 5 rounds in a salvo are shot, the accuracy of each shot/burst gradually increases, eventually stabilising to 33% of original CEP (against land/sea targets) and double the original PoK (against air targets) after the 25th shot. This models the ability of FC systems (particularly those with radar) to observe the errors on the first firings and adjust their aim.

For example, with an LCS shooting 100 bursts of 57mm gunfire against a target ship, the first 5 bursts use the nominal CEP and PoK values, and then accuracy starts to improve:

- Bursts #6-#10: CEP reduced by 10%, PoK improved by 10%
- Bursts #11-#15: CEP reduced by 20%, PoK improved by 25%
- Bursts #16-#20: CEP reduced by 30%, PoK improved by 50%
- Bursts #20-#25: CEP reduced by 50%, PoK improved by 75%
- Subsequent bursts: CEP reduced by 70%, PoK improved by 100%

(This, incidentally, also means that "one pass, haul a\$\$" becomes even more critical for aircraft in penetrating AAA-heavy areas. If you stick around to re-attack or observe/DBA, not only do the gunners get more shots at you but each shot gets ever more likely to nail you.)

3) As range to target decreases and shots become flatter-trajectory, the silhouette of the target becomes more visible to the weapon aim rather than the flat target area. This significantly increases the probability of a direct hit. (It also makes it more imperative to control the "open fire" range through WRA rather than simply blast at maximum range.)

\* Mine-hunting vessels on mine-clearing mission will now deploy their ROVs/UUVs (if any) only when they actually reach the mission area, not while they are still in transit.

## NEW IN v1.11

\* MAJOR NEW: Pier operations. See overview here: <http://www.warfaresims.com/?p=4215>

To support pier operations, new 'Withdraw' and 'Redeploy' doctrine settings have been added to the AI behavior of ships/subs. These control the criteria/thresholds that the ship/sub AI will use in order to RTB (if it is underway) and re-deploy (if it is docked). The thresholds cover damage, fuel, primary attack & defence weapons. Each threshold type has several appropriate values.

[NOTE #1: The definition of primary attack/defence weapon points to the longest-ranged ASuW weapon (attack) and AAW/ASW (defence) weapon, and uses the default DB-fed values for reference. So for example if an Aegis cruiser is stocked with SM-2s on its DB-pristine version but the scen author opts to clean them out and re-stock with TLAMs and a few ESSMs, the cruiser is considered as "primary defence weapon exhausted" even though it still has the ESSMs].

[NOTE #2: The rules for picking the primary attack/defence weapon are slightly different for submarines. Hunter-killer subs (both nuclear and DE) consider torpedoes their primary weapon for both attack and defence even if they carry other longer-ranged weapons (missiles etc.). Cruise- and ballistic-missile subs however, consider their missiles their primary attack weapon.]

Docked ships/subs can re-arm from either magazines on the pier itself or ammo facilities belonging to the same group (ie. naval base) as the pier, just like with ammo bunkers on airbases.

When putting out from a pier to sea again, ships/subs first navigate to a point at the edges of the pier lane area and then re-plot for their destination.

\* MAJOR NEW: Aircraft in airbases and ships/subs at naval bases can now be spotted and catalogued during a BDA/recon run. See overview here: <http://www.warfaresims.com/?p=4236>

\* MAJOR UPDATE to the Air-Independent Propulsion (AIP) model. While it is possible to recharge the submarine's batteries using AIP, the low power of typical AIP systems relative to the diesel-powered generators means that it would take extremely long time to recharge a deeply discharged battery. Storing energy in batteries is also a less efficient than storing the energy in the AIP reactants. As such, AIP is best used to minimize discharge of the submarine's batteries, and wait with conventional diesel engine recharging to a time and location that is more suitable. This means the AIP system will only be able to keep up with battery drainage at creep throttle setting. At higher speeds, the electric motors will require more power than the AIP can deliver, which forces the sub to eventually snorkel.

\* New and expanded submarine doctrine settings. See overview here: <http://www.warfaresims.com/?p=4243>

\* Significant changes to replenishment rates (both UNREP and pierside). The rate at which a given store can be transferred to the receiver unit is now determined by the characteristics of the item:

- Guided weapons up to 10kg, gun & rocket rounds up to 15mm: One per second.
- Guided weapons up to 50kg, gun & rocket rounds up to 24mm: One per 5 seconds.
- Guided weapons up to 100kg, gun & rocket rounds up to 60mm: One per 15 seconds.
- Guided weapons up to 150kg, gun & rocket rounds up to 80mm: One per 30 seconds.
- Guided weapons up to 250kg, gun & rocket rounds up to 150mm: One per minute.
- Guided weapons up to 500kg, gun & rocket rounds up to 200mm, depth charges, mines, decoys, dispensers, drop tanks, laser charges and everything else not covered: One per 5 minutes.
- Guided weapons up to 1000kg, gun & rocket rounds up to 350mm: One per 15 minutes.
- Guided weapons up to 2500kg, gun & rocket rounds up to 450mm: One per 30 minutes.
- Guided weapons heavier than 2500kg, gun & rocket rounds larger than 450mm: One per hour.

The rate is further affected by the UNREP capability of the receiving unit, doubled if the provider is a land facility (stability and more equipment), and halved if the receiver is a submarine (more complicated to get anything bulky inside a sub).

\* The pathfinding engine has been refined and made more performant and also user-configurable

(see: <http://www.warfaresims.com/?p=4243>)

\* Changed the way that facility aimpoints are affected by blast damage (tanks are a lot harder to kill with proximity blast now, while e.g. trucks are easy as ever).

\* Bomblets are very likely to start fires if they impact (lots of small explosions). For the same reason they are more likely to cause component hits even if they barely scratch the target structurally.

\* Units cannot perform component repairs if the unit has non-minor fire or flooding (all hands are busy!).

\* Only minor component damage can be repaired while underway (the unit must dock to parent boat/pier for heavier repairs).

\* The "unlimited weapons at airbases" realism option is now expanded to the more generic "unlimited base magazines", and affects both air and naval bases. So you can use (or experiment with) pier re-arming without first having to populate ammo dumps with suitable weapon records.

\* AI tweak: Targets that identified as waste of ammo (e.g. tarmac already heavily damaged [cannot be totally destroyed]) are deliberately avoided in targeting evaluations.

\* Single-unit airbases can no longer be targeted (use normal multi-unit airbases if they are to be attacked).

\* Added more detailed mechanics for thermobaric/FAE warheads:

- Upon impact, this type of warhead creates an instant "killing cloud" (size is dependent on warhead weight) which detonates uniformly and creates a strong overpressure wave. The maximum damage applied is less than that on the epicenter of a conventional HE detonation, but contrary to HE (where the effective blast damage falls sharply with distance) the explosive force is applied almost the same at any point in the cloud; naturally, this makes FAE an excellent area-effect weapon against non-hardened targets. In addition, any target within the cloud suffers severe fire damage.
- Targets outside the detonation cloud but near it can also receive blast damage, depending on their distance from the cloud border.
- Contrary to HE and because of the way they operate, FAE warheads are highly sensitive to rain (intense storm severely degrades them) and high altitude (because they use atmospheric oxygen as the explosion oxidant, they are severely less effective at high altitudes where the air is thinner). This makes them less versatile than conventional HE warheads.



\* ADDED: Nuclear detonations produce an intense but short-ranged neutron wave (this is the basis of the “enhanced radiation warhead” a.k.a. “neutron bomb”). Nuclear-tipped AAMs/SAMs use this as their primary kill mechanism against fast incoming targets (ie. missiles/RVs).

## NEW IN v1.11 SR6

\* Sonar model addition: Bottom-bounce mode (active sonar only). Overview here:

<http://www.oc.nps.edu/~bird/oc2930/acoustics/bottombounce.html>

<http://defence.pk/threads/tactics-101-anti-submarine-warfare-asw.270380/#post-4625585>

\* AI Tweak: Mobile facility contacts have the same expiration age as surface contacts (2 hrs)

\* Ship AI change: Do not adjust speed for cavitation when in simple plotted course transit.

\* Weapons tweak: Weapons that impact on a set of coords first check if any target is actually there (chance of direct-hit!).

\* Aircraft and aerial weapons that travel at high-supersonic and hypersonic speeds now get a substantial (linear) boost in their IR signatures (these things literally glow!)

## NEW IN v1.11 SR7

\* Improved parabolic & direct-flight trajectories for unguided weapons

\* Ships now maneuver and zig-zag to unmask the preferred mount for firing (similar to how AC-130s maneuver to bring their side guns to bear). This is most easily observed on ships that cannot fire dead ahead (e.g. Perry FFG using the 76mm gun).

\* Non-aircraft units can now use mission escort logic (only for strike missions for now). When assigned as escort, the unit will try to stick close to the nearest “escort subject” of the same mission and prioritize threats to it for engagement instead of actively seeking out to attack targets on its own.

\* When creating an “airborne” salvo (e.g. ballistic missile firing RV), if the target is an aimpoint, assume we’re firing at an actual target contact, and that is the one nearest to the aimpoint. (Fixes issue where new salvos are mistakenly created for a target still engaged, because existing salvos regard as target the aimpoint rather than the contact sitting on it)

\* Re-implemented incendiary weapons (napalm etc.). These have relatively small individual effect areas (e.g. a single Vietnam-era canister will typically cover a 25-30m radius circle), but when used en-masse they can really “remove a grid” (in artillery parlance). The effect of an incendiary explosion on a unit depends on both the unit’s size and its armor levels. Small unarmored craft (hello Boghammers!) are promptly fried, while a similarly unarmored but large ship (e.g. cruise liner) will suffer a smaller fire. Large, heavily armored units (e.g. battleships) mostly ignore such explosions.

\* Gun rounds now shed speed in flight and their kinetic damage and penetration at impact are directly linked to their impact velocity (so the closer the shot, the bigger the penetration & damage).

\* Sensor max-min target altitude values are now enforced in detection checks. For example, many short-range air-search radars have a specific ceiling over which they cannot detect aircraft.

\* The localization logic hitherto used only by aircraft for ASW prosecutions is now also used by non-AC units for any contact type. For example a submarine who closes in on the last reported position of an uncertain contact, if it is unable to find it there, it will begin searching within the AoU to try and narrow down the target location.

\* ASAT calculations are much more reliable; as a result ASAT-capable units have a lot more valid shot opportunities

\* Added loiter ability for tactical decoys that have the flag

## NEW IN v1.12

\* Addition to passive sonar model: Target masking. When the sub/ship being detected is within X degrees bearing (relative to the sonar sensor) of another one, the (comparatively) louder one may prevent the other(s) from being detected.

(X = a given angular difference referred to as the “bearing gate”. This value decreases in more modern sonar sets (as low as 4

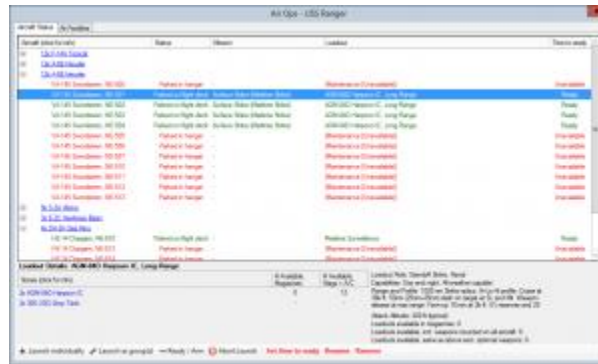


degrees) and increases in older ones (as high as 20 deg). To fool a modern passive sonar by masking under another vessel on the same bearing, you need to get very close to the other unit angularly).

- \* Significant improvements to automatic flight plan generator
- \* Misc tweaks to tanker & bingo calculations
- \* Mine navigation updates

# Manual Addendum: Scenario Editor

\* The “Add Unit” window now remembers all selection filters used on the last unit addition and re-applies them whenever called up. This makes it easier to rapidly add different but similar units.



- \* You can now edit aircraft names and delete specific aircraft directly through the Air-Ops window.
- \* New event trigger: Unit Detected. Fires when a unit (flexibly filtered from side-wide down to specific unit) is detected by the specified side.
- \* New event-engine addition: Event Conditions. Conditions are managed and added to/removed from events just like triggers and actions. An event without conditions fires normally (probability check etc.). If conditions are present, all of them must be satisfied in order for the event to fire.
- \* Added new realism option: Unlimited Aircraft Weapons. When enabled, aircraft have unlimited loadout packs available even if their bases are not loaded with weapons at all. This is not recommended for realistic prolonged scenarios (it makes airpower too omnipotent) but can be useful for quick experimentation.
- \* Added first event condition: Side posture. (e.g. Side-A must consider Side-B as [friendly|neutral|unfriendly|hostile]). The condition also has an optional “NOT” operator (e.g. Side-A must not consider Side-B as friendly).
- \* Significant addition to patrol missions: Prosecution Area. Prosecution Areas (PAs) act much like a forbidden zone in that contacts appearing within them are marked for interception, but they also restrict the extent at which interceptions will happen. So if you want your fighters to e.g. be triggered only by bandits within 200nm of a protected HVU instead of “waking up” to contacts thousands of miles away, PAs are the solution.  
PAs Act as a “leash” for assets on a patrol; they effectively determine the extent to which the patrol assets can give chase to receding targets. If the bandit moves out of the PA, the defender is forbidden to follow (though it can still engage with weapons if feasible). This solves the problem of patrol assets over-extending themselves during interception, quite often falling victims to feints/traps.  
PAs are supported in the UI by modifications to the Mission Editor UI, and are populated by reference points in the same way as existing patrol areas. They are empty by default, and in this case the AI behavior is the same as before (intercept bandits far away etc.), to facilitate existing scenarios. Units that are assigned to a patrol with a prosecution area will target & engage only contacts that are within this area (or their patrol area). If they are not on patrol or their patrol does not have a prosecution area, the existing AI rules apply. This makes it possible to create SAM ambushes (shoot at far less than max range), divide areas of responsibility for multiple patrol forces etc.  
For PAs to work, the patrol option “Investigate targets outside contact area” needs to be enabled. The doctrine option “engage targets of opportunity” overrides the prosecution area limit.
- \* Grouping land units with ammo dump type units with matching weapons records for replenishment. This allows for reloads which means that SAM, artillery and land units can be replenished.
- \* Added sprint-and-drift behavior for units that are part of a surface or sub group (the most common case requiring this behavior). This behavior is enabled by going in the formation editor, selecting the desired unit, and ticking the checkbox “Sprint and Drift” on the formation editor toolbar.
- \* When rebuilding a scenario with the latest database, the simulator will automatically re-shuffle the aircraft and move those that are ready in less than 60 minutes to the flight deck. Ditto when readying an aircraft in the scenario editor and selecting 'Ready'

Immediately'. It may be worth noting that the simulator is not topping up the deck completely, it is keeping some free space on the deck for the recovery cycles since landing aircraft may have to park there in case all elevators are busy.

\* Major new addition: Lua scripting. See here for details and examples: <http://www.warfaresims.com/?p=3565> Special reserved variable for Event Engine: UnitX. This is a global (scenario-wide) variable representing the active unit responsible for firing any of these triggers:

- Unit is damaged
- Unit is destroyed
- Unit is detected
- Unit enters an area
- Unit remains in area

So whichever unit causes one of the above triggers to fire, it gets tagged as "UnitX". You can then use this special variable as a reference in any Lua-mapped function that takes a unit's name/ObjectID as a parameter (so for example you can dictate "whichever unit enters this area will get assigned to this mission").

\* New Event Trigger type: "Scenario is loaded". This fires immediately once a scenario is loaded from file and before it is presented to the player/editor, `_if_` the scenario current datetime is at or before the "start of scenario" datetime. This enables doing initial setup actions (e.g. randomize unit locations) before the player starts the scenario.

\* New Scen-Edit feature: Clone a unit (ie. copy a unit and also copy all customizations of the original). The keyboard shortcut is Shift + C. The only limitation currently is that modifications to an aircraft's loadout (extra weapons etc.) are not copied.

\* Major new ScenEdit feature in v1.07: Scenario Attachments (a.k.a. auto-bundling). See detailed description here: <http://www.warfaresims.com/?p=3710>

## NEW IN v1.08

\* Added "Reset All Side Scores" button on Losses & Expenditures window.

\* New side-level option (editable on "Edit Sides" window): Can Auto-track civilians. When enabled, the selected side automatically detects and tracks civilian/commercial units. This simulates access to publicly available traffic sources like AIS, and can be handy for piracy & law-enforcement scenarios.

\* Various tweaks to mission editor UI.

## NEW IN v1.09

\* New Lua action: Change the side of a unit

\* New Lua action: Explode a warhead.

\* New event condition: "Scenario Has Started". Useful for scripting actions that you want to happen only at the very beginning of a scenario (e.g. randomizing start positions).

\* New attachment type: Local video file (local = stored on hard drive, not streamed e.g. YouTube). Has option for full-screen or windowed mode, and optional delay before playing. The video file must be in WMV format (the "Movie Maker" application included in Windows can easily convert almost any media format to WMV).

\* When adding new aircraft, if the player does not specify a callsign, one is automatically assigned.

\* FIXED: Right-click while in "add unit" status opens up the "Add Unit" window in addition to panning the map.

## NEW IN v1.10

\* NEW MAJOR FEATURE: Special Actions. These are very similar to TOAW's "Theater Options", in the sense that they allow the player to execute a number of pre-defined special actions that may bring favorable results (or not – often the best way to model such actions is as high-risk gambles that can spectacularly backfire). Contrary to TOAW, Special Actions can range from the strictly tactical ("Host this SOF squad into the building") through operational ("request nuclear release") all the way to grand strategic ("The Assad regime requests assistance from the Russian Federation and makes Latakia airbase and Tartus harbor available to their forces"). Special Actions are created and edited through ScenEdit (Editor -> Event Engine -> Special Actions) and are made available to the player in normal play mode via Game -> Special Actions (disabled actions are hidden). Such an action may be one-off or repeatable (through Lua it can also be made active for only a finite number of calls, ie. "you may request this 3 times"). From a technical standpoint, Special Actions act as containers for Lua scripts so they can be very powerful. Once an action is executed a message

(generated by the script) is shown to the player as to what happened as a result of the action, so scen authors are encouraged to be elaborate in their explanations.

- \* You can now add a new magazine to a unit directly through the ScenEdit UI (instead of using the SBR). To do this, select the unit, bring up the "Magazines" window and click on the "Add Magazine" button.

- \* Major new EE feature: Lua scripting on Conditions. You can combine this with the existing event triggers to create very elaborate conditional triggers.

- \* The existing "Side Posture" and "Scenario has started" event conditions now have Lua counterparts:

ScenEdit\_GetSidePosture(SideANameOrID, SideBNameOrID) and ScenEdit\_GetScenHasStarted() respectively.

- \* You can now order a unit to RTB via Lua: Using the existing ScenEdit\_SetUnit method, use the "RTB" key (e.g. RTB=Yes)

- \* You can now host a unit to a suitable parent unit/group (e.g. aircraft to airbase, small boat to larger ship etc.) via Lua. The new method is: ScenEdit\_HostUnitToParent(table). Usage example: ScenEdit\_HostUnitToParent({HostedUnitNameOrID='Eagle 1', SelectedHostNameOrID='Bitburg AFB'}) . The unit to be hosted is 'snatched' either from mid-air or from its current host.

- \* The editor textboxes for Lua scripts now have a much larger character limit (tens of millions).

- \* New EE feature: You can now clone events, triggers, conditions and actions

- \* New Lua method: ScenEdit\_SetSpecialAction. Usage example: ScenEdit\_SetSpecialAction({ActionNameOrID="MyAction", IsActive="True", IsRepeatable="False"}). This is very handy if the scen author wants to activate/deactivate special actions depending on other events happening.

- \* New Lua method: ScenEdit\_GetSideIsHuman('SideNameOrID') . Returns 'Yes' if the referenced side is currently under human control, 'No' otherwise.

- \* New Lua method: ScenEdit\_SetLoadout. Usage example: ScenEdit\_SetLoadout({UnitNameOrID="Viper #1", LoadoutID=631, TimeToReady\_Minutes=45, IgnoreMagazines="False"})

- \* Scenario authors can now edit a unit's fuel level through Lua. Usage examples:

```
a=ScenEdit_GetUnit{side='a',name='test'}
print(a.fuel)
{ [3001] = { current = 240000, max = 240000 }, [4001] = { current = 3750, max = 3750 } }
fuel = a.fuel
fuel[3001].current=1000
a.fuel = fuel
```

- \* Added "Copy unit ID to clipboard" command to the ScenEdit section of the unit-context menu. This makes it much faster to grab a specific unit's unique ID and start using it on Lua scripts (vs. getting it from the SBR template file).

- \* An extra criterion, "minimum classification level", has been added to the "Unit Detected" trigger. This allows the scenario author to tailor the desired level of target classification reached (everything from simply "detected" all the way to "precise ID") before the trigger is actually fired. For backwards compatibility, the default level is "Detected - Known Domain".

## NEW IN v1.11

- \* NEW: Spatial polygon validation: All windows with area editors now have a 'Validate Area' button that allows the player to quickly determine if the polygon used for the area (exclusion zone etc.) is valid or not. The simulator will also display the polygon in the tactical map. This includes areas used by the event engine. Furthermore, all areas in a scenario are validated on load, and the player will be presented with warnings if the scenario contains invalid polygons.

- \* FIXED: When cloning an EE SimEvent, the lists of Triggers/Conditions/Actions pointed to the very same instances (thus when e.g. removing a trigger, the trigger would be removed from both events).

## NEW IN v1.11 SR1

- \* SBR/Clone tweak: The cloned unit gets the same heading as the original unit.

- \* You can now enable/disable non-navigation zones and exclusion zones, in two ways:

- a) Through the UI, as the grids on the relevant windows have an extra "Is Active" checkbox for each zone entry.

- b) Through Lua. Usage example:

```
mySide = VP_GetSide({Name="US"})
myZone = mySide:getnonavzone("AAW Zone 1") [Alternative for excl. zone: myZone = mySide:getexclusionzone("Forbidden Zone 1")]
myZone.isactive = "True"/"False"
```

Inactive no-navigation zones are not rendered on the map at all. Inactive exclusion zones are rendered with a dash line (instead of solid).

## NEW IN v1.11 SR4

- \* ScenEdit Tweak: The "DB Migration" window displays visual confirmation of the target DB.

## NEW IN v1.11 SR7

Large number of new & updated Lua methods:

Updated Lua function: ScenEdit\_SetUnit() – added keys: COURSE, SPEED/THROTTLE, PROFICIENCY, DEPTH, REFUEL, FUEL

Updated Lua function: ScenEdit\_AddUnit() – added keys: BASE

Updated Lua function: ScenEdit\_AssignUnitToMission() – added keys: ESCORT (for strike missions)

Updated Lua function: ScenEdit\_SetDoctrine() – added keys: ESCORT, additional doctrines, withdraw/docking

Updated Lua function: ScenEdit\_SetReferencePoint() – added keys: TYPE, RELATIVETO, LOCKED

Updated Lua function: ScenEdit\_SetLoadout() – allow READYING a/c to be updated

Updated Lua function: ScenEdit\_RunScript() – allow to run from attachmentRepo attached to scenario

Updated Lua function: ScenEdit\_UseAttachment() – fixed to allow Lua Scripts

New Lua function: ScenEdit\_AddWeaponToUnitMagazine(table) – reload magazines

New Lua function: ScenEdit\_AddReloadsToUnit(table) – reload unit mounts

New Lua function: ScenEdit\_GetSideOptions(table) / ScenEdit\_SetSideOptions(table) – adjust side awareness, proficiency

New Lua function: ScenEdit\_SetUnitDamage(table) – damage components

New Lua function: ScenEdit\_AddMission(side,...) / ScenEdit\_GetMission(side,mission,...) / ScenEdit\_SetMission(side,mission,...)

New Lua function: ScenEdit\_DeleteMission(side,mission,...)

New Lua function: ScenEdit\_AssignUnitAsTarget(contact(s),mission)

New Lua function: ScenEdit\_GetReferencePoints(table) – returns table of reference point details

New Lua function: VP\_GetContact(table) – get table of contacts

New Lua function: ScenEdit\_RefuelUnit(table) – make unit refuel as per AAR doctrine

New Lua function: ScenEdit\_SetEvent('EventNameOrId', table) / ScenEdit\_GetEvent('EventNameOrId')

New Lua function: ScenEdit\_GetSpecialAction(table) / ScenEdit\_ExecuteSpecialAction('EventNameOrId')

New Lua function: ScenEdit\_GetContacts(side) – contacts from the side's perspective

New Lua function: ScenEdit\_GetContact(table) – a contact's details

New Lua function: ScenEdit\_FillMagsForLoadout(table) – fill magazine with a number of a specific loadout

New Lua function: ScenEdit\_AttackContact(attacker, contact, table) – automatic or using specific weapon

New Lua function: ScenEdit\_UpdateUnit(table) – updates sensor/mounts on unit

New Lua function: ScenEdit\_SetDoctrineWRA(table) / ScenEdit\_GetDoctrineWRA(table) – WRA doctrine

New Lua function: ScenEdit\_UpdateEvent(eventName, table) – update Lua script on selected event

New Lua function: ScenEdit\_GetWeather( table ) – at scenario or unit level

New Lua function: Tool\_DumpEvents() – dumps out all events to an XML file in '\\Scenarios'; useful to examine all events without clicking-through the ScenEdit UI

New exposed Lua object: unit [ mounts, magazines, base (hosted at), proficiency, components, mission (returns mission object rather than name),group (returns mission object rather than name), fuelstate, weaponstate, manualSpeed, manualAltitude, AirborneTime, loadoutdbid, throttle, weather, method :filterOnComponent (filter components on a type eg sensor), :rangetotarget( contact id) ]

New exposed Lua object: side [ awareness, proficiency ]

New Lua object: group [ unitlist ]

New Lua object: mission [ unitlist, targetlist, starttime, endtime, active, SISH, AAR, plus 'mission specific details' ]

New exposed Lua object: referencePoint [ locked, relativeTo ]

New exposed Lua object: contact [ type, potentialmatches, side (contact's), missile\_defence, age, fromside (who made the contact), FilterOut, weather, method :DropContact() ]

New exposed Lua object: doctrine [ additional doctrines ]

General Lua:

\* ADDED: Lua: Add plotted course when inserting unit

\* ADDED: Lua Function: Return to port

\* Lua commands and response (incl. errors) are now stored to text files on [CMANO]\\Logs\\LuaHistory\_[date & time] .

\* NLua library upgraded to 1.3.2 (kudos to MichaelM!)

\* Improved error reporting – attempts to show which command and/or line failed

\* Improved in-event error handling

- \* Added Lua history file in \Logs folder
- \* Allow true/false for boolean values
- \* Added executing Lua scripts to log (note that this may cause large files!)
- \* "Copy unit ID from editor" method can handle multiple units
- \* Added option on Event that can controls logging to the game log; ON by default, but useful for an event that fires quite often
- \* Lua: Tool\_DumpEvents writes to a file (file located in \scenarios as "[scenario title] + events.xml")
- \* Lua: Contact type as string and number
- \* Lua: Doctrine – withdraw & deploy settings
- \* Lua: Added event names to RunScript
- \* Lua: carry over event name to RunScript in Sandbox
- \* Lua: Fixed unitname keyword for SetLoadout()
- \* Lua: Added 'unitname' to Doctrine inline with standard naming
- \* Lua: Improved error handling. Errors are displayed and execution stops when running in console mode. When running from special-actions, the function returns NIL but the script continues to run. The error is shown in the Lua variable '\_errmsg\_' and the function in '\_errfnc\_'

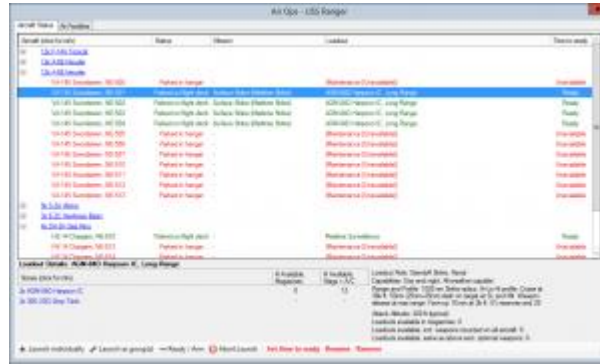
Refer to Command Lua (<http://commandlua.github.io>) for more detailed explanation of exposed objects and functions.

## NEW IN v1.12

- \* Lua: Fix manual/desired speed on SetUnit()
- \* Lua: Enhance EndScenario trigger/action
- \* Lua: Enhanced "Unit Detected" event trigger



# Manual Addendum: Air Ops



- \* Major enhancement: Surge & quick turn-around capability. See for details: <http://www.warfaresims.com/?p=3539>
- \* An "Abort Launch" button has been added to the Air Ops menu. When clicked, any of the selected aircraft which is preparing to launch will abort the sequence and attempt to return to an available parking facility.
- \* Major enhancement: Surge & quick turn-around capability. See for details: <http://www.warfaresims.com/?p=3539>
- \* Only aircraft that are in a parking facility can be armed. This solves the problem of airbase traffic jams due to aircraft being readied while they are parked on transit points, e.g. elevators.
- \* When an aircraft being re-equipped (at its base) ends up in Winchester status because one or more of the loadout's primary stores are missing, the outfitting is cancelled and the aircraft reverts to Reserve (clean) loadout. If this is happening interactively (ie. the player has manually ordered this re-equipment) then a notification pop-up for this; otherwise the action is performed silently.
- \* Tweaked the non-bingo RTB behavior for aircraft so that they return to base at full rather than cruise throttle.
- \* Significant tweaks to "air boss" AI:
  1. When an aircraft is about to occupy a transit facility (e.g. elevator on ship) in order to get to the runway and take off, a check is first made if another aircraft is in the post-touchdown sequence. If that's the case, and if only one transit facility is available, the outgoing aircraft is held to wait so that the incoming one uses the transit facility to clear the runway. (This was added to rectify the problem of "the air boss is sending back to the hangar one or two aircraft from an entire outgoing group [in order to make the transit facility available to the ones that just landed] and therefore breaks group cohesion". So now an outgoing group may take longer to get out, but it get out whole.)
  2. Likewise, the air boss sends back aircraft to hangars more selectively (much more rarely).
- \* Aircraft now use mid-air refueling much smarter and more reliably, dramatically reducing cases of running out of fuel. There is a long list of tweaks and improvements in AI behavior, but three major changes stand out:
  1. Crews are now context-aware in their logic of picking the most suitable tanker. Depending on what the aircraft is supposed to be doing (enroute to mission, returning, free-roaming, on patrol, on support circuit etc.) the optimal choice is often significantly different.
  2. Tankers are now smart enough to avoid overbooking (and thus getting completely drained). They now reject refueling requests that they estimate they will not be able to service.
  3. Aircraft returning from a mission (e.g. strikers on the RTB leg) will opt to bypass available tankers and head straight for their home bases if possible. This lightens the load on available tanker assets and eliminates the need to manually change the "use refuel" doctrine mid-mission. If they do need to refuel on the return leg they do as before.
- \* Fighters launching BVR missiles now regularly attempt to "crank" (turn to the side while still tracking/painting as necessary, and throttle back) once they have taken all their shots. The purpose of the maneuver is to reduce the rate of approach with the enemy and thus delay enemy countershots as much as possible.
- \* Aircraft now determine the correct altitude to drop their ordnance much more reliably without manual control.
- \* Helmet-mounted sights (HMS) are now taken into account when deciding how much off-boresight an aircraft can shoot an AAM.
- \* Aircraft dropping sonobuoys are now constrained by the channel capacity of their sonobuoy datalinks. In most cases this means they will drop fewer sonobuoys per "string". To compensate for this, the default minimum spacing between successive sonobuoys has been doubled.
- \* Aircraft now have different safety margins for the Bingo calculations depending on their type. "Force-multiplier" assets like tankers, AWACS, EW aircraft have higher, more conservative safety margins while more "expendable" assets like tactical fighters have lower, more aggressive margins.

- \* Any aircraft with less than 1500 lbs of internal fuel remaining is considered to be in bingo status regardless of its proximity to its home base (this helps with bingo calcs very close to the base).
- \* Aircraft AI improvements. Group members now always stick with the leader on a manual plotted course even if they have strike targets assigned.
- \* Major new simulation feature: Payload weight & drag affects the aircraft fuel consumption. You can test this easily by e.g. assigning two identical aircraft to a patrol, one heavily armed and one lightly loaded, and comparing their endurance & range figures.
- \* Engine throttle (cruise, full, flank etc.) is now taken into account when calculating the IR signature of aircraft, and thus its detection range by a sensor.
- \* Aircraft on ground attack whose attack profile altitude is lower than the minimum weapon release altitude will attempt to stay just over the latter (instead of bombing from max release altitude). This significantly improves bombing accuracy but can also make aircraft more vulnerable to air defences.
- \* Improved weather effects modelling: cloud cover now significantly disrupts EO/IR/laser sensors, depending on cloud thickness (difficult but doable in light/medium clouds, but good luck dropping LGBs from med/high altitude in typical CentFront weather).
- \* Aircraft turn rates and agility modifiers on missile evasion attempts are now affected by proficiency levels. The changes, as percentages of the original values, are as follows:
  1. Novice : 60% of nominal
  2. Cadet : 70% of nominal
  3. Regular : 80% of nominal
  4. Veteran : 100% of nominal
  5. Ace : 110% of nominal
- \* The various altitude parameters (transit altitude, on-station altitude etc.) of a loadout's mission profile are now enforced for air patrol & support missions. So for example a P-3 on a typical ASW patrol will transit at high altitude (optimum fuel consumption) and once it enters the patrol area it descends to 300m for the actual patrol. Combined with the optional altitude overrides for patrol & support missions, this means that an aircraft's altitude is now configurable at 3 different levels (controlled by loadout, controlled by mission-level override, or finally overridden by direct player input).
- \* Modified patrol behavior for aircraft: Once they get a class ID on a contact, if they do not have suitable weapons to engage it, they stop going after it and resume their patrol. This is meant to address the "MPA twirls over hostile surface ship and gets shot down" problem.
- \* Aircraft returning to base on RTB-Mission Over / Winchester / Manual status now accept course orders (but not if they are on RTB-Bingo).
- \* Thoroughly revised mechanics for the endgame of AAW weapons against aircraft:
  - Speed is life: Most AAW weapons are optimized for engaging highly-subsonic (500-600 kts) targets since this is by far the most common flight regime in the jet age. Target aircraft at higher speed are proportionally more difficult to engage both for guns and guided weapons. The degradation depends on the maximum target speed of the AAW weapon (listed on the DB viewer); for example a SAM with a 1500-kts max target speed will be severely degraded against a 1200-knot target while a missile with a 5000-kt max target speed will barely notice the difference. This makes high-speed aircraft like the SR-71 and MiG-25R (and UAVs like the D-21 and Tu-123) very tough targets even if the intercept geometry is achieved, which is consistent with RL reports.  
This also means that an aircraft evading a missile (and having its speed reduced as a result of the manoeuvre) will, for at least a few seconds, have reduced ability to dodge subsequent attacks until it accelerates again to higher speed. This means that oft-quoted real combat examples like the "Kosovo Slammer Dodger" (the Serbian MiG-29 that evaded 3 AMRAAMs before finally succumbing to the fourth, probably because it was close to stall speed by then) are actually now reproducible in the sim. So ripple-fire those AAMs/SAMs!
  - The evasion bonus must now be earned: Until now all aircraft got their full evasion bonus (as long as they detected the incoming weapon) regardless of their actual geometry at the time of impact. This allowed players to "cheat" by disabling auto-evasion on an aircraft, heading stright down their target (or enemy shooter) and still get the full evasion modifier. Now however, the projected impact angle is critical: High-deflection ("crossing target") impacts maximize the agility effect, while head-on (less so) and tail-on (severely more so) impacts significantly reduce the actual evasion modifier (with further variations for forward-oblique and rear-oblique geometries). So now it often comes down to "beam or die", as in known RL engagements.
- \* Doctrine for landed aircraft use new inheritance rules for Air Ops Tempo and Quick Turnaround, so that aircraft will use the Air Ops Tempo and Quick Turnaround setting of the base they're currently staying unless explicitly set on the aircraft themselves or their mission: Unit – mission – host – host's mission – host's group – side

\* Airborne aircraft assigned to strike mission via right-click menu or Unit -> Assign To Mission will have flight plans automatically generated for them.

## NEW IN v1.08

- \* Side-firing gunships (e.g. AC-130) now manoeuvre properly to place their targets on their weapons' line of fire.
- \* Snap-up/down limits are now taken into account for AAW guided weapons.
- \* Aircraft body IR signatures are now affected by speed (mainly affects supercruising and high-supersonic aircraft like F-22, SR-71 etc.)
- \* Mechanical-scan radars (with the exception of ICWI-capable sets) cannot perform volume scan while they are providing SARH illumination for missiles. So e.g. once a fighter launches a Sparrow at a target it becomes radar-blind to any other contact while it is guiding the weapon. This can severely reduce situational awareness if the fighter is not backed-up by other friendly radars. (It also makes possible co-operative "you draw missile fire and I'll flank and stab him" tactics). Phased-array or ICWI-capable radars do not have this limitation.

## NEW IN v1.09

- \* Improved logic for selecting most suitable A2AR tanker (see here: <http://www.matrixgames.com/forums/tm.asp?m=3901751>)

## NEW IN v1.10

- \* NEW MAJOR ADDITION: Aircraft kinematics & evasion agility are now affected by the aircraft's weight fraction; essentially a fraction representing the AC's current weight against its "airshow" weight which forms the basis of all nominal kinematic & agility values. See here for example: <http://www.warfaresims.com/?p=4091>

Factors affected:

- Climb & dive rate
- Acceleration
- Turn rate
- Evasion agility

- \* NEW: On multi-engine aircraft, engines are now treated as discrete components instead of a single "Powerplant" entity (for example a B-52 will now have 8 separate J57 engine entities). This doesn't affect anything ATM but will be necessary for the aircraft-damage improvements in the future (incl. damage from EMP). Existing scenarios have to be deep-rebuilt in order to feature this.

## NEW IN v1.11

- \* MAJOR NEW: Detailed Winchester & Shotgun (weapons) and Bingo, Joker & Chicken (fuel) states for aircraft. See overview here: <http://www.warfaresims.com/?p=4182>

- \* MAJOR UPDATE: Significant improvements to air-to-air refuelling AI and mechanics. See here for details: <http://www.warfaresims.com/?p=4190>

- \* Aircraft will now jettison their A2G stores when evading an attack (if the relevant doctrine setting is set to YES). This is accompanied by a relevant message detailing the stores ejected. The jettison check is made every 5 seconds (it takes a few seconds to do this in the cockpit), so there is a chance that an aircraft that is caught by surprise will have no time to jettison its stores before the missile impact happens. Also only external stores can be jettisoned.

The current implementation has a known issue: Conformal Fuel Tanks (CFTs), like those on the F-15E and numerous export F-16s, are treated like drop tanks and thus jettisoned (in RL they cannot be ejected). This is to be addressed in the future.

- \* Unguided bombs and rockets fired in salvos are now impacting as "sticks" rather than treated as totally individual/independent impacts. So for example when weapon #1 impacts at coords X-Y the rest of the salvo will (CEP deviations aside) fall more or less on a line pattern starting from that first impact. This is particularly important when attacking multiple-aimpoint facilities as it forces the attacking unit to "commit" to a specific aimpoint (straddle it with weapon impacts) and just hope for collateral damage on the other aimpoints.

- \* Fixed: Ignore gun strafing doctrine under manual fire.

- \* TWEAK: Airborne GMTI radars (e.g. J-STARS) detect moving targets more easily.

## NEW IN v1.11 SR1

\* Significant improvements to stick bombing mechanics: The bombs are laid across the target, using CEP (adjusted by bombsight generation and pilot skill) and random factors to determine the exact impact points of individual bombs. For smaller bomb sticks on tactical aircraft, the bombs are released at 50ft intervals. Bomb sticks up to 24 bombs are laid in sticks up to 300ft long, larger bomb sticks are laid in sticks up to 600ft long. Bombers are handled slightly differently, with 75ft between bombs and stick lengths up to 2000ft. For sticks with 28 bombs or more, the distance between bombs is narrowed.

## NEW IN v1.11 SR7

\* More realistic altitude/attitude behavior for aircraft close-combat maneuvering when intercepting target: "Point" at the target instead of just heading to its altitude.

\* Added aircraft cockpit visibility checks (kudos to Ben Scheppke [Cik] for the laborious DB research!). The visibility values are listed on the DB-viewer for each aircraft. This makes it possible to sneak up on an aircraft completely undetected visually if you stay in its blind zones (this includes under and behind). (NOTE: The cockpit restrictions affect human eyeballs only. Supplemental EO/IR systems like the F-35's DAS ignore these limits)

\* Aircraft now begin maneuvering against missile fire earlier (20 secs before estimated impact instead of 10). They will also attempt to dive towards the ground to drag the missile down and increase their own evasion agility.

\* Aircraft evasion agility depends on altitude (at high altitude most aircraft are really sluggish). Super-maneuverable aircraft (TVC etc.) suffer less from this.

\* Aircraft kinematics tweak: Current sink/rise rate now affects actual climb/dive capacity (e.g. an aircraft that is falling cannot instantly point the nose up and climb at max rate, even with supreme AoA authority)

\* Aircraft using standoff A2G munitions (incl. LGBs) will now try to keep their distance from the target if the "Maintain standoff" doctrine option is enabled.

\* Improved engagement behavior for fighters/interceptors with "temperamental" missiles (1950s/60s):

a) If their weapons are aspect-limited, they try to position themselves behind the target instead of simply going head-on at it

b) They try to extend if they are within minimum weapon range (of their own preferred weapon)

These improvements help avoid some common "stupid" behaviors like merging head-on while not having a suitable weapon (e.g. no gun and only rear-aspect missiles) or exposing one's fighter to the target bomber's tailguns.

# Command v1.06 – The new features Part I

As usual, it's been a very busy time for the WarfareSims crew.

The [September Steam launch](#) was very successful and once again exceeded sales estimates by a wide margin, as well as providing us with some very valuable feedback for the way forward. The [Christmas sale](#) is now in effect and again the numbers are very strong. [Baloogan](#), a staunch fan of Command (and not unimportantly a man who shares our vision for it) has joined WarfareSims as an additional member of the development team and is already contributing his valuable skills to the game's ongoing development. Version 1.06 is the next major Command public update, expected to be delivered within December. Simply put, there is a lot in it. It has something we have been working on for a long time (and have been wishing for since the days of Harpoon2/3), lots of improvements directly requested by the user community and a veritable armory of new scenario-editing tools that are certain to make scenario authors salivate. Let's take a look.

## Surge & Quick-turnaround times in Air Operations

The rationale for this new feature is comprehensively explained on [a separate article](#), so here we'll discuss the “what” and “how” rather than the “why”.

In short, players can now keep a constant sustainable “campaign” operational tempo as well as go to “Day-1” super-high sortie rates with very fast (30 mins or even less) turn-around times for loadouts supporting them. There is a price for this however: After a certain period of hyperactivity, aircraft have to stand-down for an extended period of maintenance (and pilots badly need to rest). The super-high sortie rate option (aka “Quick Turnaround” capability) is available only for a specific range of loadout types, typically those that do not need extensive mission briefing and coordination with other assets, for example close air-support (CAS) and air defence loadouts. So for example an A-10A Thunderbolt II can now indeed fly a series of quick CAS sorties but then has to stand down. Relevant loadouts have a “Quick Turnaround” option that allows aircraft to fly a certain number of short duration sorties in quick succession with a maximum overall airborne time limitation. For example, 3 sorties with 4 hours total flying time and 20 minute turnaround between each. The aircraft will then step down for the period set by the loadout’s Surge Operations or Sustained Operations ready time.

| Air Ops - Air Base                                                                                                                                                                   |                        |         |                                                  |                           |                                                                                                                                                                          |                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------|--------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Aircraft (click for info)                                                                                                                                                            | Status                 | Mission | Loadout                                          | Time to ready             | Quick Turnaround                                                                                                                                                         |                                                   |
| The JAS 39A Gripen C                                                                                                                                                                 |                        |         |                                                  |                           |                                                                                                                                                                          |                                                   |
| Ace #1                                                                                                                                                                               | Readying               | -       | A/A: RB 74 Sidewinder (AIM-9L) / Max Intercept   | 11 min 51 sec             | Enabled: 1 / 4 sorties                                                                                                                                                   | 1 hr 13 min / 4 heeling time, 2 hrs downtime      |
| Ace #2                                                                                                                                                                               | Readying               | -       | A/A: RB 74 Sidewinder (AIM-9L) / Max Intercept   | 7 min 18 sec              | Enabled: 1 / 4 sorties                                                                                                                                                   | 32 min 18 sec / 4 hrs flying time, 2 hrs downtime |
| Ace #3                                                                                                                                                                               | Readying               | -       | A/A: RB 74 Sidewinder (AIM-9L) / Max Intercept   | 1 hr 50 min               | -                                                                                                                                                                        | -                                                 |
| Ace #4                                                                                                                                                                               | Readying               | -       | (Maintenance Unavailable)                        | (Maintenance Unavailable) | -                                                                                                                                                                        | -                                                 |
| Ace #5                                                                                                                                                                               | Readying               | -       | BK 90 Mörner Mk2, RB 75 Maverick EO, Short-Range | 30 min 49 sec             | Enabled: 2 / 4 sorties                                                                                                                                                   | 1 hr 37 min / 4 heeling time, 6 hrs downtime      |
| Ace #6                                                                                                                                                                               | Readying               | -       | BK 90 Mörner Mk2, RB 75 Maverick EO, Short-Range | 19 min 7 sec              | Enabled: 2 / 4 sorties                                                                                                                                                   | 1 hr 35 min / 4 heeling time, 6 hrs downtime      |
| Ace #7                                                                                                                                                                               | Readying               | -       | BK 90 Mörner Mk2, RB 75 Maverick EO, Short-Range | 16 min 34 sec             | Enabled: 2 / 4 sorties                                                                                                                                                   | 1 hr 24 min / 4 heeling time, 6 hrs downtime      |
| Ace #8                                                                                                                                                                               | Readying               | -       | UGS0 Mörner Mk1, RB 75 Maverick EO, Short-Range  | 14 min 32 sec             | Enabled: 2 / 4 sorties                                                                                                                                                   | 1 hr 13 min / 4 heeling time, 6 hrs downtime      |
| Ace #9                                                                                                                                                                               | Readying               | -       | M/70 135mm Rockets, Short-Range                  | 25 min 10 sec             | Enabled: 2 / 4 sorties                                                                                                                                                   | 39 min 34 sec / 4 hrs flying time, 6 hrs downtime |
| Ace #10                                                                                                                                                                              | Readying               | -       | M/70 135mm Rockets, Short-Range                  | 23 min 59 sec             | Enabled: 2 / 4 sorties                                                                                                                                                   | 33 min 35 sec / 4 hrs flying time, 6 hrs downtime |
| Ace #11                                                                                                                                                                              | Readying               | -       | (Maintenance Unavailable)                        | Unavailable               | -                                                                                                                                                                        | -                                                 |
| Ace #12                                                                                                                                                                              | Readying               | -       | (Maintenance Unavailable)                        | Unavailable               | -                                                                                                                                                                        | -                                                 |
| Ace #13                                                                                                                                                                              | Preparing to launch    | -       | UGS0 Mörner Mk1                                  | 7 min 16 min              | -                                                                                                                                                                        | -                                                 |
| Ace #14                                                                                                                                                                              | Preparing to launch    | -       | BK 90 Mörner Mk1                                 | 1 hr 16 min               | -                                                                                                                                                                        | -                                                 |
| Ace #15                                                                                                                                                                              | Readying               | -       | BK 90 Mörner Mk1, Short-Range                    | 7 min 29 sec              | Enabled: 2 / 3 sorties                                                                                                                                                   | 1 hr 42 min / 4 heeling time, 6 hrs downtime      |
| Ace #16                                                                                                                                                                              | Readying               | -       | BK 90 Mörner Mk1, Short-Range                    | 20 min 3 sec              | Enabled: 1 / 3 sorties                                                                                                                                                   | 54 min 50 sec / 4 hrs flying time, 6 hrs downtime |
| Ace #17                                                                                                                                                                              | Failed                 | -       | BK 90 Mörner Mk1, Short-Range                    | Ready                     | Enabled: 0 / 3 sorties                                                                                                                                                   | 0 / 4 hrs flying time, No downtime                |
| Ace #18                                                                                                                                                                              | Failed                 | -       | UGS0 Mörner Mk1, Short-Range                     | Ready                     | Enabled: 1 / 2 sorties                                                                                                                                                   | 1 / 2 4 heeling time, No downtime                 |
| Ace #19                                                                                                                                                                              | Readying               | -       | (Maintenance Unavailable)                        | Unavailable               | -                                                                                                                                                                        | -                                                 |
| <input checked="" type="checkbox"/> Enable Quick Turnaround: <b>Enabled (Warning)</b> 4 sorties @ 4 hrs maximum airborne time and 30 min turnaround, with 6 hrs standdown ready time |                        |         |                                                  |                           |                                                                                                                                                                          |                                                   |
| Loadout details: BK 90 Mörner Mk2, RB 75 Maverick EO, Short-Range                                                                                                                    |                        |         |                                                  |                           |                                                                                                                                                                          |                                                   |
| Source (click for info)                                                                                                                                                              | If Available, Magazine |         | If Available, Mags / A/C                         |                           | Loadout Role: Standard Strike, Land                                                                                                                                      |                                                   |
| 2x BK 90 Mörner Mk2 (24 x Mk2 / via Tank)                                                                                                                                            | 40                     |         | 48                                               |                           | Aircraft: Unusable, Limited altimeter capable                                                                                                                            |                                                   |
| 2x RB 74 Sidewinder (AIM-9L)                                                                                                                                                         | 54                     |         | 54                                               |                           | Range and Profile: 240 mi. Strike radius, H-H profile. Cruise at 34k-ft. Weapon release at max range. Weapon release at max range. Form up 10 min at 26 ft. 10% reserves |                                                   |
| 2x RB 75 Maverick EO (AGV-45B)                                                                                                                                                       | 35                     |         | 35                                               |                           | Attack Altitude: -                                                                                                                                                       |                                                   |
| 1x T200M Drop Tank                                                                                                                                                                   | -                      |         | -                                                |                           | Loadouts available in magazines: 18                                                                                                                                      |                                                   |
| Launch individually                                                                                                                                                                  |                        |         |                                                  |                           | Launch as group(s)                                                                                                                                                       |                                                   |
| Ready / Arm                                                                                                                                                                          |                        |         |                                                  |                           | Abort Launch                                                                                                                                                             |                                                   |
| Set time to ready                                                                                                                                                                    |                        | Rename  |                                                  | Remove                    |                                                                                                                                                                          |                                                   |

Let's take a look at a practical example. In this screenshot (click for full size) the highlighted JAS-39A Gripen has the QT option enabled, which allows a maximum of four rapid-fire missions (just 30 mins turn-around) to be flown with a maximum air-time of four hours. On the "Quick Turnaround" column we see that the aircraft has already flown two of the four quick sorties and spent 1 hr 37

mins in-air (out of the four hours total available), after which it will be forced to stand down for six hours for rest and maintenance. It is now up to the player to decide how best make use of the remaining sorties.

It should be noted that aircraft flying Quick Turnaround sorties may be re-armed with a different loadout without having to step down, granted the new loadout is quick-turnaround capable. This means you can fly the first two Quick Turnaround sorties with iron bombs, re-arm with rockets for the third sortie, and cluster bombs for the fourth.

There are three limiting factors for quick turnaround: flying time, number of sorties (land-refuel-rearm-takeoff), and day/night capability. All three are used to determine if the aircraft can be quickly turned around to fly another sortie, or has to step down.

Ready Aircraft: 1x JAS 39A Gripen at Air Base

Check Base Magazines

| Loadout Name                                       | # Available, Magazines | # Available, Mags + A/C | # Available, Mandatory | Ready Time, Surge Ops | Ready Time, Sustained Ops | Quick Turnaround                      | Time of Day   | Weather             | Radius / Profile                        |
|----------------------------------------------------|------------------------|-------------------------|------------------------|-----------------------|---------------------------|---------------------------------------|---------------|---------------------|-----------------------------------------|
| (Ferry)                                            | Unlimited              | Unlimited               | Unlimited              | 30 min                | 20 hrs                    | -                                     | Day and night | All-weather         | 1725 nm Ferry Range. Cruise at opt      |
| (Maintenance [Unavailable])                        | Unlimited              | Unlimited               | Unlimited              | n/a                   | n/a                       | -                                     | n/a           | n/a                 | n/a                                     |
| (Reserve [Available])                              | Unlimited              | Unlimited               | Unlimited              | 30 min                | 20 hrs                    | -                                     | n/a           | n/a                 | n/a                                     |
| A/A: RB 74 Sidewinder [AIM-9L], Max Intercept      | 9                      | 9                       | 9                      | 2 hrs                 | 20 hrs                    | 4 sorties @ 20 min, 4 hrs flying time | Day and night | All-weather         | 260 nm Intercept radius. Outbound at    |
| A/A: RB 74 Sidewinder [AIM-9L], Standard Intercept | 13                     | 14                      | 14                     | 2 hrs                 | 20 hrs                    | 4 sorties @ 20 min, 4 hrs flying time | Day and night | All-weather         | 540 nm Intercept radius. Outbound at    |
| BK 90 Mjolner Mk1                                  | 15                     | 15                      | 15                     | 6 hrs                 | 20 hrs                    | -                                     | Day and night | All-weather         | 500 nm Strike radius. Hi-Hi-Hi profile. |
| BK 90 Mjolner Mk1, RB 75 Maverick EO, Short-Range  | 15                     | 15                      | 15                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day-only      | Limited all-weather | 240 nm Strike radius. Hi-Hi-Hi profile. |
| BK 90 Mjolner Mk1, Short-Range                     | 15                     | 15                      | 15                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day and night | All-weather         | 270 nm Strike radius. Hi-Hi-Hi profile. |
| BK 90 Mjolner Mk2                                  | 24                     | 25                      | 25                     | 6 hrs                 | 20 hrs                    | -                                     | Day and night | All-weather         | 500 nm Strike radius. Hi-Hi-Hi profile. |
| BK 90 Mjolner Mk2, RB 75 Maverick EO, Short-Range  | 18                     | 19                      | 19                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day-only      | Limited all-weather | 240 nm Strike radius. Hi-Hi-Hi profile. |
| BK 90 Mjolner Mk2, Short-Range                     | 24                     | 25                      | 25                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day and night | All-weather         | 270 nm Strike radius. Hi-Hi-Hi profile. |
| M/70 135mm Rockets                                 | 27                     | 28                      | 28                     | 6 hrs                 | 20 hrs                    | -                                     | Day-only      | Limited all-weather | 435 nm Strike radius. Hi-Lo-Hi profile. |
| M/70 135mm Rockets, Short-Range                    | 22                     | 22                      | 22                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day-only      | Limited all-weather | 160 nm Strike radius. Hi-Lo-Hi profile. |
| RB 15F Mk1                                         | 7                      | 7                       | 7                      | 6 hrs                 | 20 hrs                    | 2 sorties @ 30 min, 4 hrs flying time | Day and night | All-weather         | 180 nm Strike radius. Hi-Lo-Hi profile. |
| RB 75 Maverick EO                                  | 18                     | 19                      | 19                     | 6 hrs                 | 20 hrs                    | -                                     | Day-only      | Limited all-weather | 550 nm Strike radius. Hi-Lo-Hi profile. |
| RB 75 Maverick EO, Short-Range, Heavy              | 9                      | 9                       | 9                      | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day-only      | Limited all-weather | 235 nm Strike radius. Hi-Lo-Hi profile. |
| RB 75 Maverick EO, Short-Range, Light              | 18                     | 19                      | 19                     | 6 hrs                 | 20 hrs                    | 4 sorties @ 30 min, 4 hrs flying time | Day-only      | Limited all-weather | 280 nm Strike radius. Hi-Lo-Hi profile. |

☒ Enable Quick Turnaround 4 Sorties (Maximum) 4 sorties @ 4 hrs maximum airborne time and 30 min turnaround, with 6 hrs standdown ready time

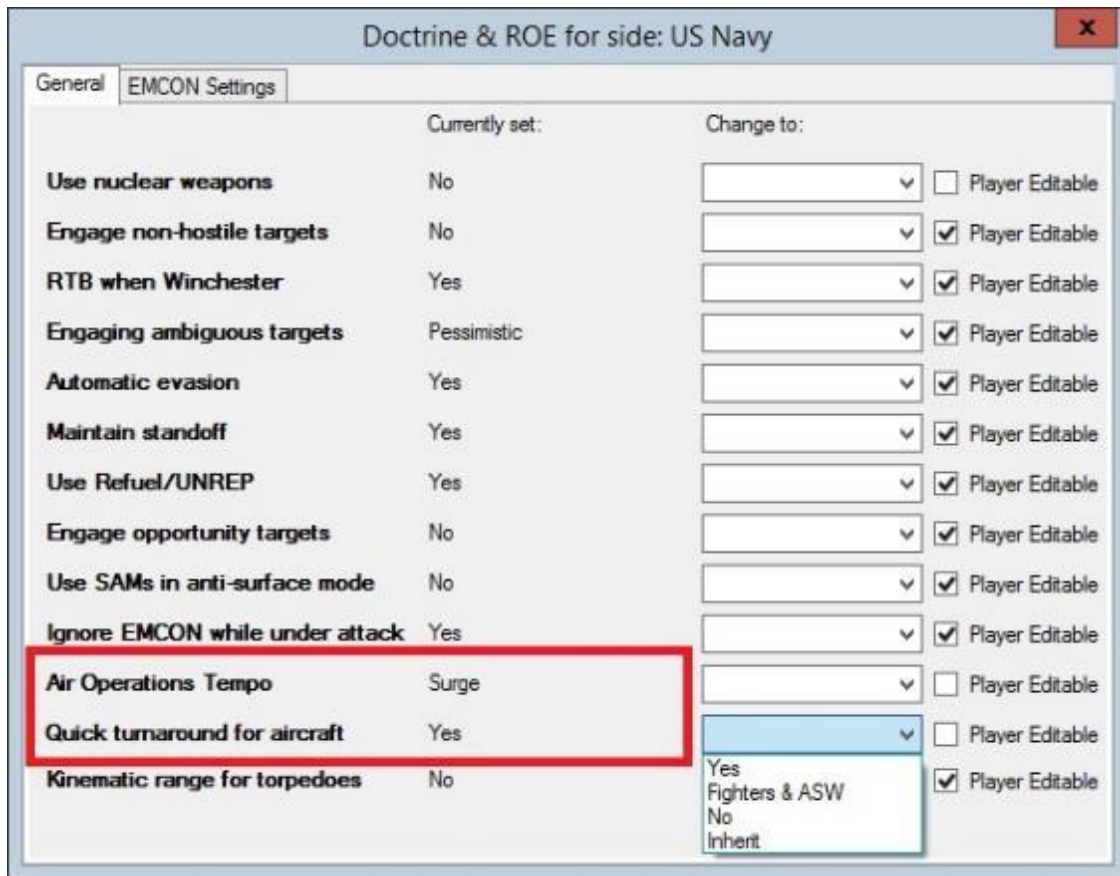
Loadout Details:

| Stores (click for info)                   | # Available, Magazines | # Available, Mags + A/C | Loadout Role: Standoff Strike, Land Attack, Altitude               |
|-------------------------------------------|------------------------|-------------------------|--------------------------------------------------------------------|
| 2x BK 90 Mjolner Mk2 [24 x MJ2 Anti-Tank] | 48                     | 50                      | Loadouts available in magazines: 18                                |
| 2x RB 74 Sidewinder [AIM-9L]              | 54                     | 56                      | Loadouts available, incl. weapons mounted on selected aircraft: 19 |
| 2x RB 75 Maverick EO [AGM-65B]            | 36                     | 38                      | Loadouts available, same as above excl. optional weapons: 19       |
| 1x 1200 liter Drop Tank                   | -                      | -                       |                                                                    |

OK - Ready OK - Ready (Exclude Optional Weapons) Ready Immediately (SceneEdit) Ready Immediately - Ignore Magazines (SceneEdit) Cancel

The player can easily determine if a given loadout supports quick-turnaround when browsing through loadouts on the "Ready Aircraft" window. Here we see that CAS, air-defence and short-range strike loadouts enable Quick Turnaround while long-range strike loadouts, which take a lot more preparation and coordination, do not.





The distinction on whether to have a low (peacetime) or wartime (high) operational tempo is configurable as a doctrine setting and thus, like all other similar settings, can be configured by both the player and the scenario author at the side-, mission-, group- and individual-unit level. So for example you can simulate an entire country being at peacetime level of activity while one or two bases are kept in high tempo as a “quick reaction” force. Quick-turnaround ability is also configurable as a separate setting. (So for example a base may be on wartime tempo but not be allowed to use super-high sortie rates in order to instead operate on a 24/7-sustainable rate. Keeping up a steady pace is frequently more important than going all-out.)

There is also a corollary benefit from those improvements, which resolves a longtime players bane: When an aircraft, fully loaded and prepped for a mission, switches to a different loadout, it is not punished for it by going through the entire ready cycle again. Instead, only the time necessary for the actual re-arming is considered.

Being able to simulate historically-accurate bursts of air activity without resorting to the ridiculous “30 mins for everything and everyone!” setting of older games has been one of the holy grails of air-ops enthusiasts, and v1.06 finally brings this dream to reality.

#### Unit-level proficiency values

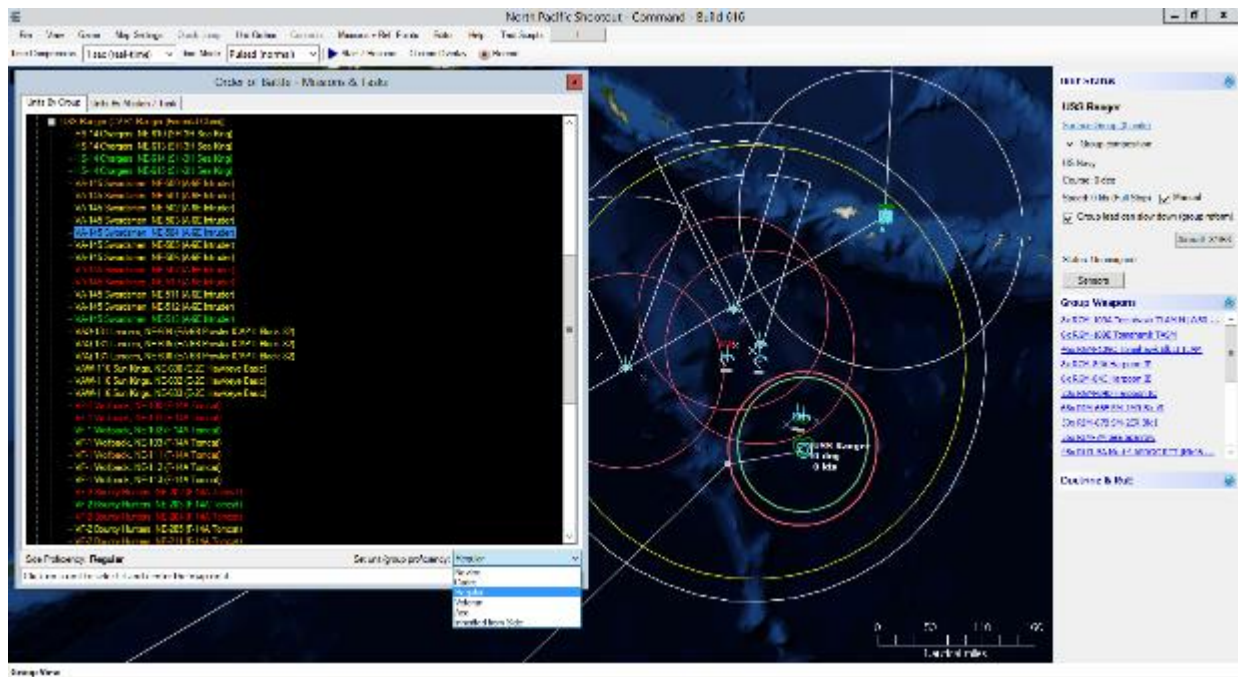
This is a direct response to a popular user request. When we introduced side-level proficiency ratings, the addition was welcome by players and scen authors alike. A frequent request, however, was to be able to combine different skill levels on the same side so as to emulate groups of forces with different skill or readiness levels, as is common in most military arms.

Pre-v1.06, doing this required the workaround of defining multiple allied sides and setting the proficiency level differently on each of them. Version 1.06 allows defining the skillset on an individual unit level, making this workaround unnecessary.

There are two ways to view and (in ScenEdit mode only) alter the proficiency level of an individual unit:

*\* Through the ORBAT window:*





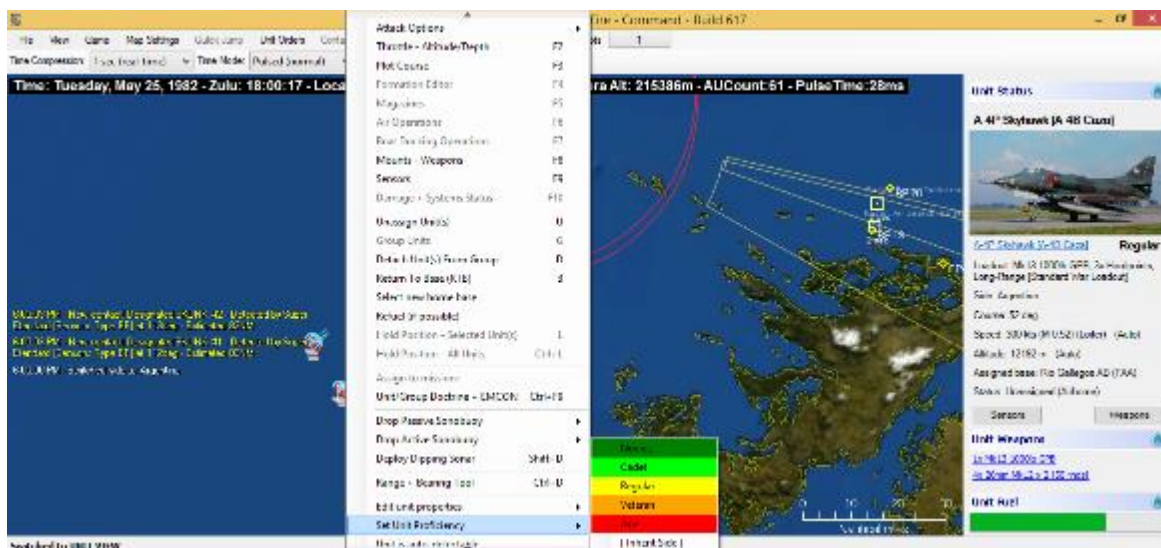
In this example you can see the individual units being listed in different colors that represent their proficiency levels (from the dark green of novices all the way to the red of the aces). As this shot was taken in Scenario Edit mode, the dropdown menu for setting the selected unit's proficiency is also visible. A unit can be set to either auto-inherit its parent side's overall proficiency level (which is the default behavior) or override it with a custom level of its own.

*\* Through the "Unit Status" window and the right-click menu:*



A unit's proficiency level appears next to its class DB-hyperlink on the "Unit Status" window:

If running the scenario in editor mode, you can change the proficiency level of one or more units by selecting them, bringing up the unit-context menu (mouse right-click or context-menu key), clicking on “Set Unit Proficiency” and selecting the desired level (or setting it to auto-inherit from side):



Apart from making them configurable on a unit level, skill values now also have an even greater effect (e.g. when performing unguided weapon attacks, and in damage control) and their effects / modifiers are intensified. Novices and to a lesser extent cadets are now really lamb to the slaughter, while ace crews almost walk on water. Without knowing in advance just how capable an adversary you are facing (unless reliably pre-briefed), the ghastly uncertainties of combat become even more pronounced.

# Command v1.06 – The new features Part II

DECEMBER 10, 2014 • POSTED IN [COMMAND](#)

On [Part I](#) of our coverage of the new v1.06 goodness we covered the radically revised Air Ops and unit-level proficiency settings. If you thought these were the big attractions though, there is an ever bigger fish in the new release. Let's have a look.

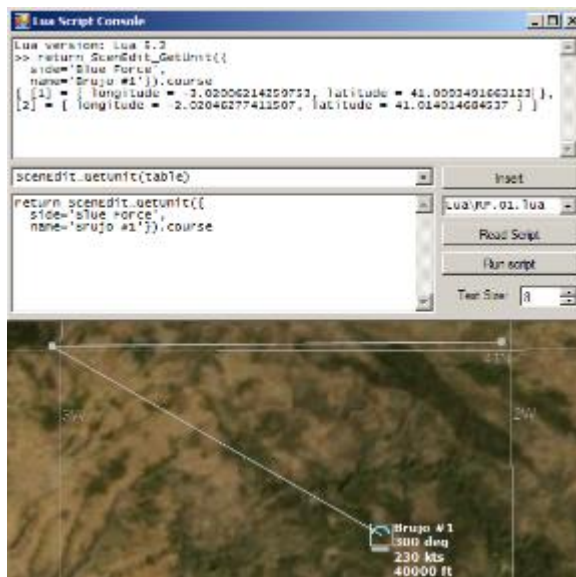
Game-changer, thy name is Lua



The [Lua scripting language](#) has been [widely employed](#) in games & simulations in the industry and so its introduction to Command marks a milestone event. On this first iteration, Lua has been integrated as another “Event Action” type in the Scenario Editor’s established Event Engine. Within this new action type, a whole range of script functions are supported for altering elements of the running scenario (see [HERE](#) and [HERE](#) for comprehensive documentation of available scripts).

The new supported functions include:

- Assigning units to missions, removing them from existing missions or reassigning them to others.
- Changing EMCON settings. One could make an event for an entire side’s radars to engage.
- Creating new Aircraft, Ships, Submarines and Land Units at specific or random locations.
- Moving units, setting new courses for units. Telling units to hold fire, or to open fire.
- Changing side posture, for example one could make an event to make Soviet Union and NATO hostile towards each other.
- Changing the doctrine for a specified side, mission or unit.
- Changing the weather, either specifying a precise change or randomizing the weather.

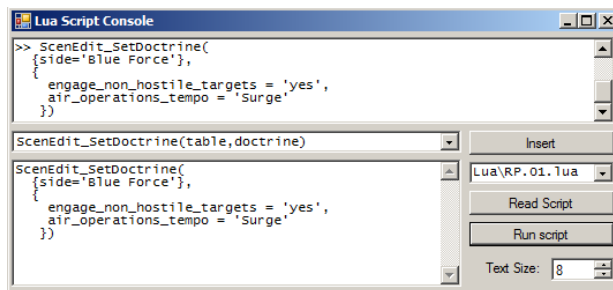


All of these new actions can be performed by the AI side in a scenario according to events triggered via the Event Editor. Scenario designers therefore now have a whole new set of tools to make more dynamic, highly-variable and interactive scenarios. Imagine for instance a scenario where the AI side performs allocation of aircraft to different CAP missions and zones based on the amount of aircraft destroyed or land units destroyed. Another aspect of this is that a scenario author can move and set course for units. This is especially interesting when a scenario author sets an action to move reference points if there is a mission patrol zone attached to the reference points. This allows a scenario author to edit patrol zones during a mission – thus changing the behavior of the AI in a scenario. Doctrine settings are now manipulable via the event editor as well. An example of this might be the Russian side enabling the use of nuclear weapons if Moscow is destroyed or damaged. Or, tying in with the air operations tempo doctrine settings from earlier, an AI controlled nation could have an event that bumps up air operations tempo from sustained to a surge footing.

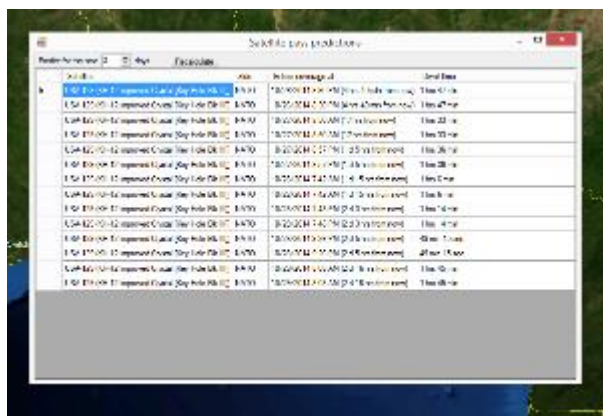
**Tomcat84** from the beta crew has put together two Lua-in-Command video tutorials: an [introductory](#) one, showing how easy it is for someone completely unfamiliar with Lua to use it to enhance a scenario, and an [advanced](#) one demonstrating how a familiar author can completely transform a scenario, for example:

- Making a CAP change mission to become more aggressive once approached
- Having a 50% chance of an AWACS being added when the scenario is loaded
- Removing radar information from fighters when the Fighter HQ is bombed (permanently or coming back online after X amount of minutes)
- Making tanks become detectable to the player side when crossing into an area
- Making those tanks retreat once they reach a certain amount of damage together
- Randomizing whether an SA-2 site is dumb with radar on or smart with radar off and a prosecution area at scenario load
- Randomly adding either an SA-3, SA-6 or SA-8 at a location with 40% chance for SA-3 or SA-6 and 20% for the SA-8
- Randomizing which CAPs a group of MiG-29s goes to
- Having the weather improve over time with slight amount of randomness
- Showing how to have a strike mission marshal somewhere first before randomly selecting which target they go to
- Having SAM's EMCON go active once too many EW Radars are taken out
- Having SAM's EMCON go active when the SAM HQ is bombed
- Having SAM's go passive again when HQ backup is online after X minutes, UNLESS they were already active because EW radars were taken out

Scen authors can use a "Lua script console" (if you have played first-person shooters you are probably familiar with drop-down consoles that offer all sorts of hacks and diagnostics) to try out and experiment with their scripts before committing them to the Event Engine. One thing that is important to note is that the introduction of these new event editor actions in no way changes existing Command scenario functionality. This only acts in addition to existing functionality: your favorite scenarios will still play out just way ou like them.



## The other new features



Aside from the "big three" new features, the v1.06 release contains a myriad of fixes and additions, some of them long-time desires of the dev team but most of them directly influenced by the plentiful feedback we have received since Command's triumphant public debut. This is a summary rundown of the most visible additions; for full details see the release notes accompanying the v1.06 release.

**\* New UI feature: Satellite pass predictions.** Selecting this function from the "Game" menu, and then clicking on the desired location on the map, brings up a window with the predicted passes and coverage times (ie. sat being within sensor range of the location) for the next X days for all satellites (default value is 3 days, but this can be modified).

All columns are sortable by clicking on the headers, so for example you can quickly see which sat will pass within coverage from the area of interest, which pass will offer the longest dwell time etc.



|                               |       |    |
|-------------------------------|-------|----|
| Transit altitude override:    | 15000 | ft |
| On-station altitude override: | 30000 | ft |

\* **Patrol/Support mission altitude overrides on Mission Editor:** You can now set override values for the transit and on-station aircraft altitudes for patrol & support missions. These values are displayed & edited in feet or meters, depending on display preference.

\* **Radars able to detect mobile ground units are limited by target speed.** A halted tank platoon for example is much harder to pick up than one on the move. Radars with progressively higher frequency (NATO J/K/L/M bands) get extra bonus on this as their higher frequency allows them to pick out even low-speed or static targets. (Not coincidentally, such seekers feature prominently on weapons like Longbow-Hellfire, Brimstone etc.)

\* **"Submarine Datum" contact:** If an inbound torpedo is detected where no submarine contact is held, a presumed submarine contact is auto-generated on the assumption that the weapon came from *somewhere*. The initial AoU for the presumed sub contact has a 10nm radius and expands with time as with normal detections. Likewise, if a sub-launched missile is detected *immediately* after launch (within 1nm of its firing submarine) then a sub contact is generated with a 1nm-radius AoU (*remember how "Operation Doolittle" in RSR went horribly wrong?*). This helps surface/sub forces under sub attack to respond quickly to the attack even without having positively detected the attacker (and hopefully kills the player "sub sniping" cheat).

\* **No need to close and re-open the DB viewer:** The DB viewer window, if already open, now refreshes properly when you click on a different friendly or identified non-friendly unit, or perform any other action which would normally open it (e.g. clicking on a weapon entry on the loadout selection screen). So you no longer have to close it repeatedly in order to browse through various in-scenario units.

\* **Fixed long-standing bug on "Unit enters area" trigger:** it was firing for every moment at which a unit was in the area (so if it was chained to a repeatable event, the event was firing continuously). Now it fires only when the unit actually steps into the area from outside.

\* **Loadout IDs** are now displayed on the aircraft page of the DB viewer.

\* **Special reserved variable for Event Engine: UnitX.** This is a global (scenario-wide) variable representing the active unit responsible for firing any of these triggers:

- Unit is damaged
- Unit is destroyed
- Unit is detected
- Unit enters an area
- Unit remains in area

So whichever unit causes of the above triggers to fire, it gets tagged as "UnitX".

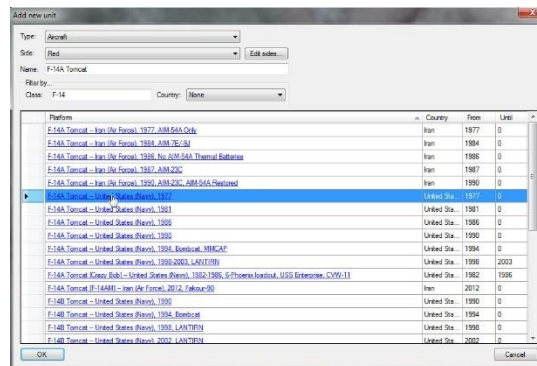
You can then use this special variable as a reference in any Lua-mapped function that takes a unit's name/ObjectID as a parameter (so for example you can dictate "whichever unit enters this area will get assigned to this mission").



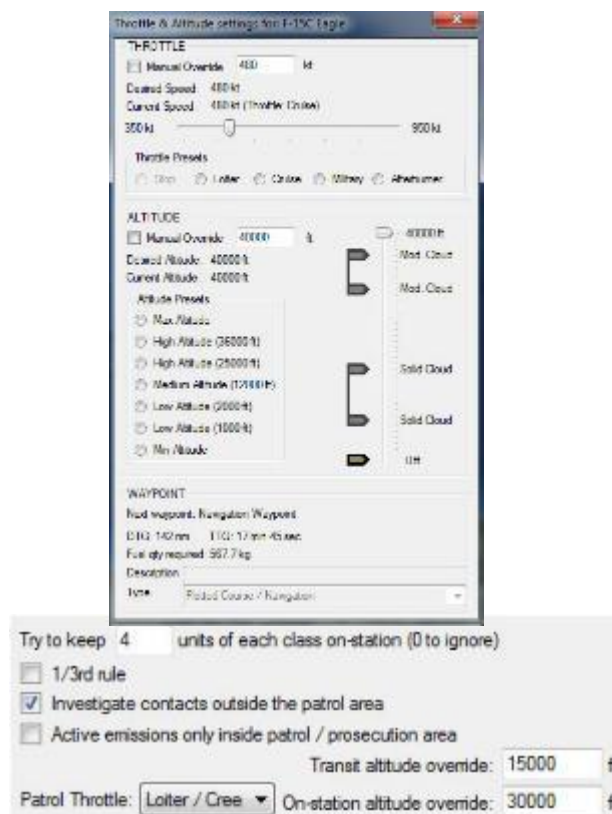
\* **New logged message type: New Mine Contact.** As with all other message types, it can be configured to show (or not) on the message log and also trigger a clock-stopping popup.

**\* The "Select new homebase" function now works for any type of unit and group, not just for aircraft and airgroups. So now you can easily switch home bases for deployed ships, submarines, mobile land units etc.**

initial setup actions (e.g. randomize unit locations) before the player starts the scenario. \* On the "Add Unit" window, **the unit names are now also hyperlinks** to the relevant page on the DB viewer:



\* **Improved cloud and thermal layer indicators on throttle/altitude window.** This makes it easier to quickly visualize if e.g. an aircraft is blocked by cloud cover (important for EO/IR sensors, LGB-lazing etc.) or where a submarine stands in relation to the thermal layer (very important for sonar detections, as explained in detail on the manual).



\* **New patrol & support mission feature: Minimum number of units on station.** This appears on the mission editor windows as "Try to keep [XXX] units of each class on-station (0 to ignore)".

This value can be used to precisely specify the desired number of units (per class) on-station instead of relying only on the 1/3rd rule. However, it can also be \_combined\_ with the 1/3rd rule, and the biggest value between them takes precedence.

Let's look at a concrete example. We have 12 aircraft (same class) on a base and are assigning them to a patrol.

- If the "minimum number" value is 0 and the 1/3rd rule is not used: The airops crew just flushes out all aircraft at once.
- If the "minimum number" value is 0 and the 1/3rd rule is used: The airops crew tries to keep 1/3rd of the force on station.
- If the "minimum number" value is > 0 (let's say 7) and the 1/3rd rule is used: The biggest value between them takes precedence. So in this case  $12/3 = 4$  and  $7 > 4$  so the "minimum number" value wins. If the force was 24 aircraft then the 1/3rd rule would win because  $24/3 = 8$  and  $8 > 7$ .
- If the "minimum number" value is > 0 (let's say 7) and the 1/3rd rule is not used: The airops crew will try to keep 7 aircraft on station.

\* **Additional factor for ship gunnery: Ship size.** Large ships are very stable platforms for unguided weapon fire (guns, rockets, lasers etc.) even during heavy seas, while smaller craft face progressively more severe aiming problems (even with advanced fire-control directors) as the weather worsens.

\* **Modified patrol behavior for aircraft:** Once they get a class ID on a contact, if they do not have suitable weapons to engage it, they stop going after it and resume their patrol. This is meant to address the "MPA twirls over hostile surface ship and gets shot down" problem.

\* **Torpedoes can now be fired to their maximum kinematic range instead of 8nm.** So if you really want to e.g. fire a Mk48 out to a target 25nm away because Jane's says that's the max range, now you can. (Just don't blame anyone if the target easily outruns it or if the firing solution at that range is so poor that the torp misses outright). The firing behavior is configurable as a doctrine setting (so it can be applied to side-, mission-, group- or unit-level), and can be set to apply only for manual (i.e. player-initiated) shots only (so the AI remains conservative), both manual and AI shots, or none.

\* **New Scen-Edit feature: Clone a unit** (ie. copy a unit and also copy all customizations of the original). The keyboard shortcut is **Shift + C**. The only limitaton currently is that modifications to an aircraft's loadout (extra weapons etc.) are not copied.



\* Added option (ON by default) to **display the selected unit's (or identified contact's) image as a thumbnail** under the unit's name on the "Unit/Contact Status" info panel: *NOTE: The image will appear only if you have downloaded the DB image pack from the [WS Downloads page](#).*

\* Aircraft returning to base on RTB-Mission Over / Winchester / Manual status **now accept course orders** (but not if they are on



RTB-Bingo).

\* Pressing **Ctrl+X** now **copies the geo coordinates** of the map cursor (in decimal form) to the clipboard.

\* Includes a large number of **new import files** by Mike Mykytyn and Jakob Wedman.

\* Includes **rebuilt and improved versions of all official scenarios**.

\* Includes the **latest versions of the DB3000 & CWDB databases**, with the usual mile-long list of database fixes and additions in direct response to user requests. \* You can drag-select **multiple facilities, ships, bases or ship groups** and access the Air Ops or Boat Ops menu (F6 / F7 hotkey) to display aircraft on all parking facilities.

# The road to v1.10: Waypoints for cruise missiles

DECEMBER 12, 2015 • POSTED IN [COMMAND](#), [UNCATEGORIZED](#)

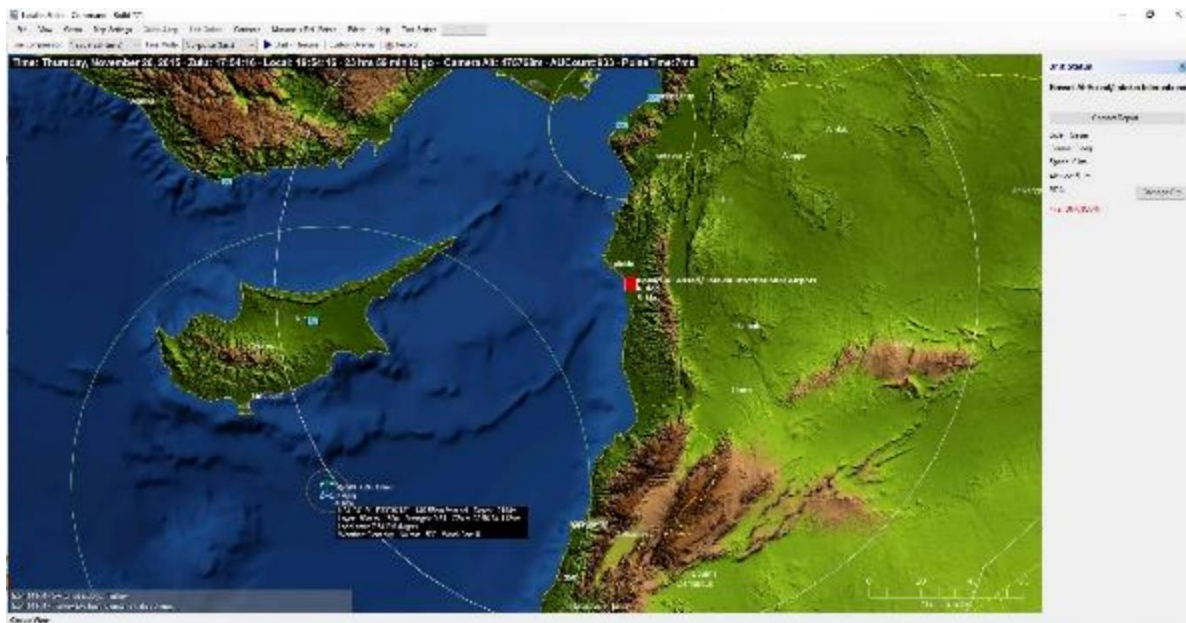


Command Build 757.12, which had been made available unofficially [at the start of December](#), has now officially been released through MatrixGames and Steam. Barring any emergencies, this is probably the last update released as part of the post-v1.09/NI release support process (*Command is still 50% off at MatrixGames until early January!*). The development team's focus is now the next major public update, designated v1.10. Let us take a look at some of the major improvements that the new version will feature.

## Complex missile courses for fun and profit

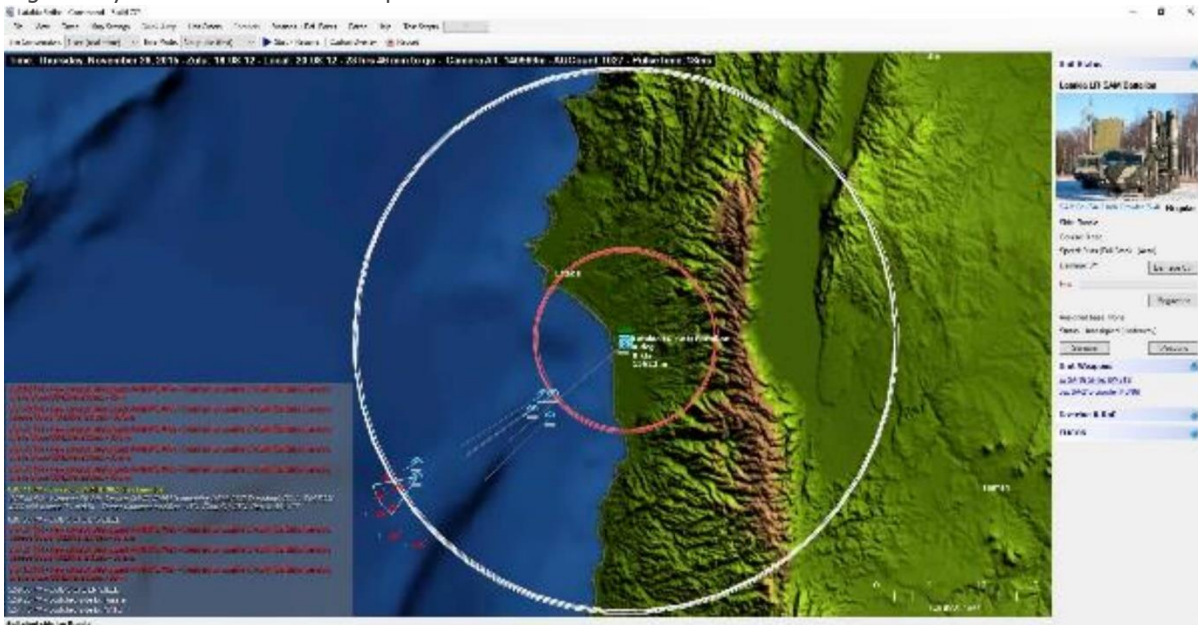
Arguably one of the most visible changes in v1.10 is the new ability to plot complex routes with multiple waypoints for cruise missile attacks. While this was already possible for weapons under positive datalink control (e.g. heavy Russian "carrier killer" missiles like the SS-N-19), this is now possible also for completely autonomous weapons. Let's see how this works.

In this **completely hypothetical** example, the [USS Ohio](#), loaded with [Tactical Tomahawk \(TACTOM\)](#) land-attack cruise missiles, is



tasked to attack the air facilities at Latakia airbase in order to hamper Russian air operations from this important base. The airfield is protected by a battery of [Pantsir-S1](#) short-range air-defence vehicles and, most importantly, a full [S-400](#) long-range air-defence missile battery.

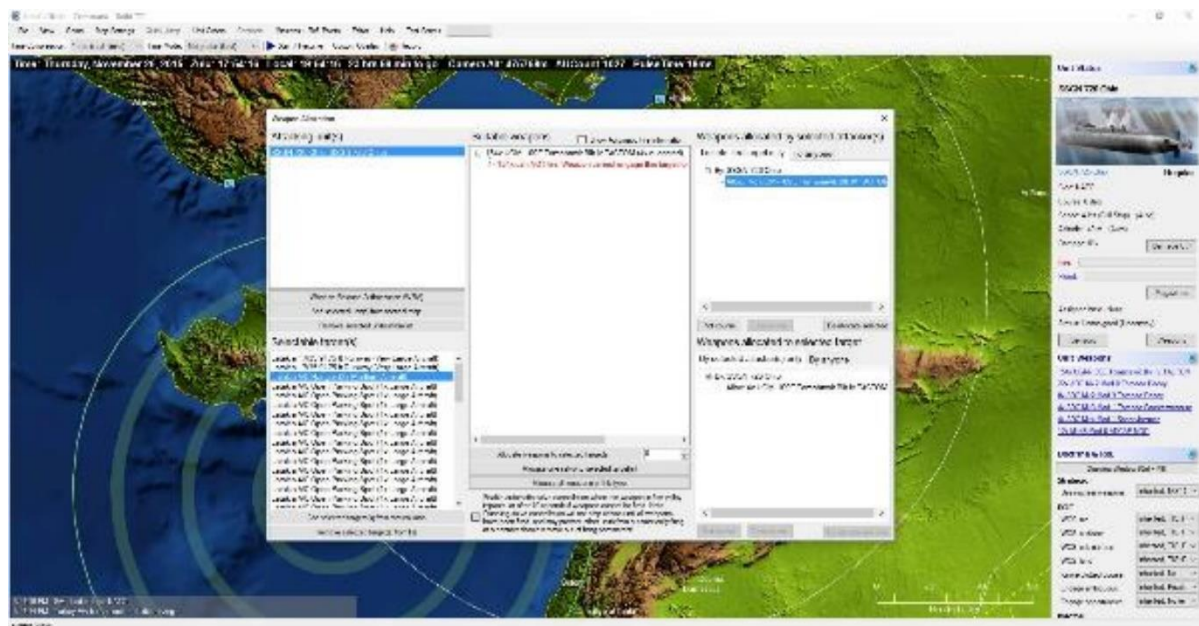
From the position that the Ohio is currently located, a direct missile attack would appear the most obvious course of action. However, we have already tried this on a previous test run and observed that the airfield's location (placed on a ~40m elevated plateau overlooking the Syrian coast) offers a near-perfect field of view for the air-defence radars located at the base. The results against an attack coming directly from the sea were thus predictable:



Even with a large-scale missile strike, the majority of the TACTOMS were detected, engaged and destroyed by the S-400 battery well before crossing the coast. Leakers were then engaged successfully by the Pantsir-S1 systems. While some of the missiles did manage to impact their targets, this was more a result of simply overwhelming the airfield's defences by sheer numbers (the S-400 battery was completely drained of weapons, and the Pantsir-S1 vehicles nearly so) rather than outwitting them.

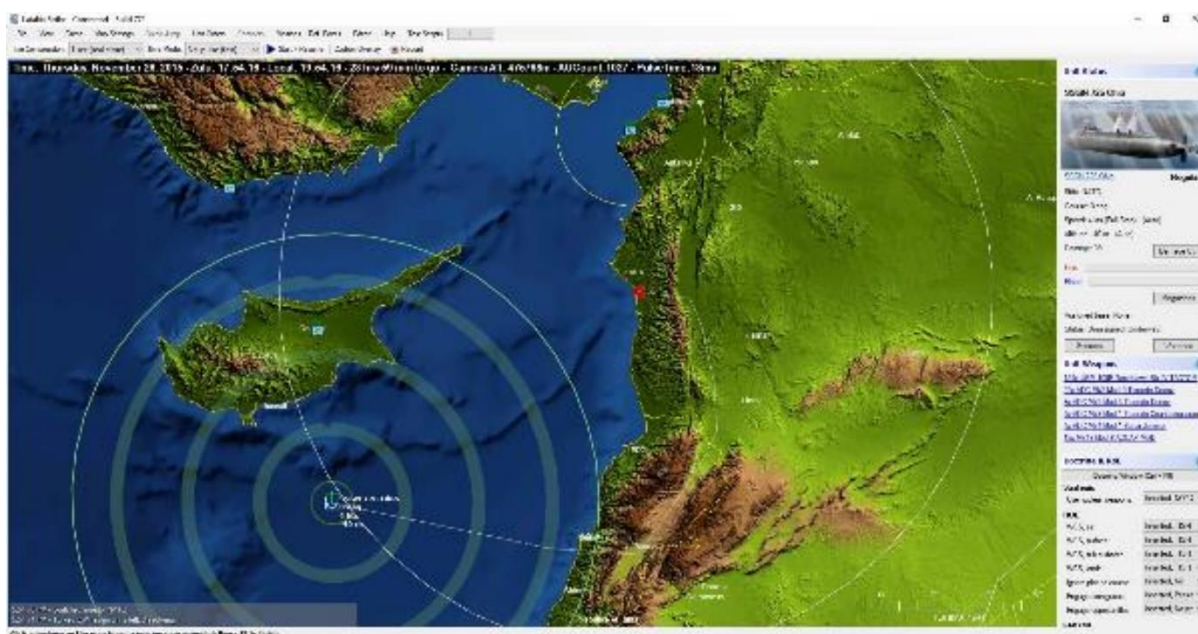
So let's see if we can execute a smarter, more efficient attack. We observe that the airbase, while having an excellent view to the west, is somewhat lodged between the coast and the so-called "[Syrian Coastal Mountain Range](#)". This ridge could make an excellent radar mask for our TACTOMS if we can get them to attack the base from this direction rather than from the sea.

So let's do exactly that:

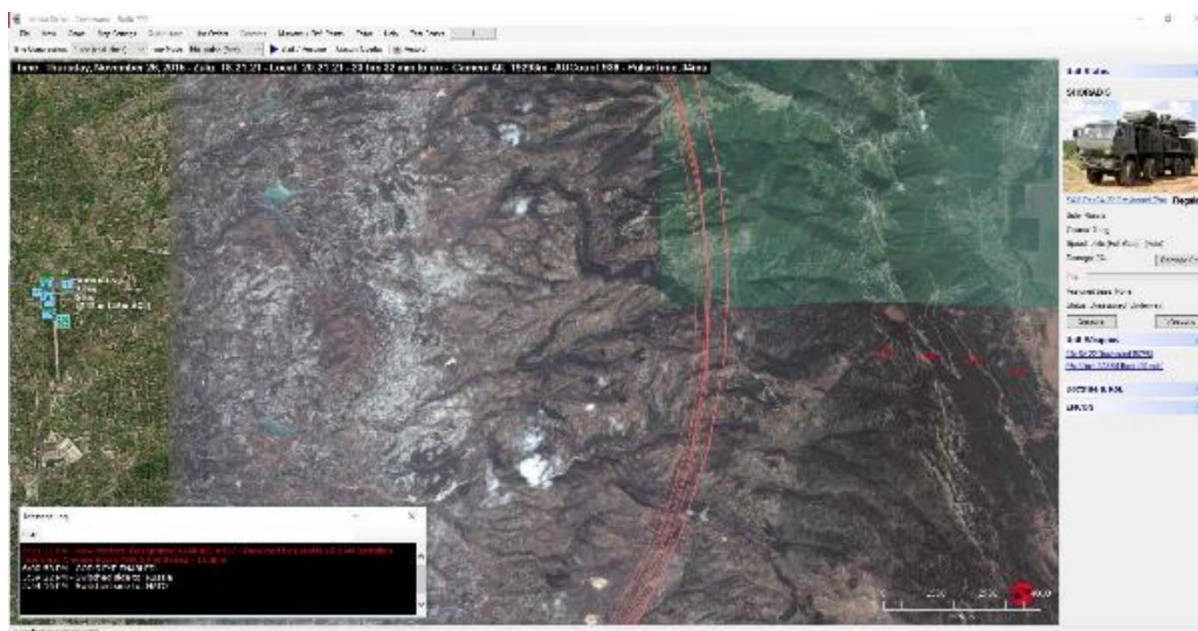




Using the manual weapon allocation window, we assign a salvo of 4 TACTOMs to one of the airfield facilities. We select the salvo (blue outline) and click on the “Plot course” button under it. This temporarily hides the allocation window and allows us to plot the desired course:

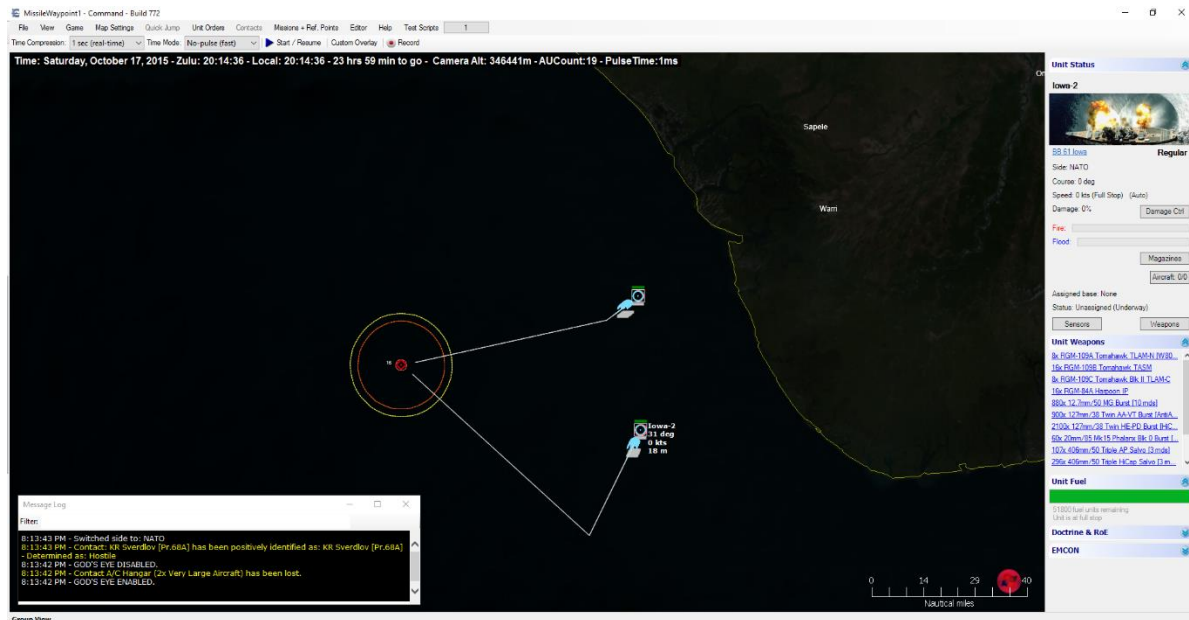


In this case we set the missiles to cross the coast at Lebanon, skirt behind the mountain ridges on their way up north and pop up to attack the base at the last possible moment. Note that we do not have absolute freedom in plotting such courses: We are constrained both by the maximum range of the weapon and also the number of available waypoints to use. This is not a problem for TACTOM, but numerous anti-ship missiles have only a handful of waypoints available. This is the result of the revised attack, from the Russian point of view:



The difference is quite dramatic. The 96L6 (Cheese Board) radar that supports the base defences detected the first TACTOMs at just 12.8nm, as they popped over the mountain ridge. Combined with the inevitable OODA delay, this gives the Russian SAMs very little time to react. If the TACTOM strike is as massive as before, the Russian repair crews at Latakia are going to have a very busy day...

Units under AI control are also able to utilize missile waypoints to their benefit. Although not currently able to “think” about radar/SAM coverage as in the above example, they nevertheless attempt to make off-axis attacks whenever possible (this obviously depends on how much weapon range they can spare) in order to hide their true bearing from their target. No longer does the bearing to a detected incoming missile provide an immediate clue to the attacker’s location:



The inclusion of missile waypoints in v1.10 introduces a whole new range of tactical options based on RL operations, and we are certain the players will find even more uses for them (complex TALD/MALD flight paths anyone?).

# The road to v1.10: Electronic warfare improvements and weight-dependent aircraft kinematics

JANUARY 4, 2016 · POSTED IN [COMMAND](#)

## *Happy new year!*

Command Build 757.12, which had been made available unofficially [at the start of December](#), has now officially been released through MatrixGames and Steam. Barring any emergencies, this is probably the last update released as part of the post-v1.09/NI release support process. The development team's focus is now the next major public update, designated v1.10. Let us take a look at some of the major improvements that the new version will feature.

## Electronic warfare improvements



Image: Jamie Hunter / [www.aviacom.co.uk](http://www.aviacom.co.uk)

A rather consistent piece of feedback we have received since the original release of Command is that the offensive jamming (OECM) systems of many aircraft appeared to be overpowered against their target emitters. The “poster child” for this issue was the EA-18G Growler, which was able to flood with jamming even very modern SAM systems such as the S-400/SA-21, to the point where the aircraft was able to even overfly such a SAM battery with impunity.

We investigated these reports, and concluded that the fundamental problem was that our radar/ECM formulas, while technically quite accurate, failed to take into account the various counter-countermeasures (and counters to them, and counters to the counters, ad nauseum...) that are applied by both radars and the jammers that target them. Discretely incorporating these techniques in a public-domain simulation is tricky, not least because non-classified information is scarce, both on the details of these techniques and also as to which system supports which tricks.

However, we already had at our disposal a successful template for abstracting and emulating these factors: The technology generation system, employed already on defensive jammers (DECM). We were also informed of the decisive advantages of phased-array systems (and especially AESAs) in countering most jamming techniques.

So here are the steps we undertook to improve the OECM modelling:

- \* As described, tech generations are taken into account when preparing the variables used on the radar/ECM formulas. The greater the generation difference between jammer and radar emitter, the more pronounced the effect is; so for example a very modern jammer like the forthcoming NGJ has a fair chance of defeating a modern radar like the 96L6 Cheese Board or the YLC-27, while it will laugh at older systems like (non-modernized) Tall King or Spoon Rest. (The other already-existing factors that affect jamming effectiveness like distance, positional geometry, sidelobes, emission characteristics like beamwidth, frequency band, PRFs etc. etc. are all still there and are critical as ever, but the tech-gen gap adds an extra wrinkle.)

- \* Phased-array systems get decisive bonuses both on the radar and on the jammer side (NGJ is an example of the latter). AESAs in particular are able to ignore many OECM techniques altogether thanks to their very low sidelobes, high SNR and advanced beamforming capabilities.

As an example of how these refinements affect tactical employment, we ran the popular but artificial “lone EA-18G jam-attacks S-400 battery head-on” strawman setup. In this case the SAM battery was using only 48N6DM missiles (TVM/SAGG guidance) and was



supported by a 91N6 (Big Bird D) brigade-level surveillance radar. The 91N6 briefly detected the Growler at 168nm but immediately lost it again. It was able to re-detect it and hold it reliably only at 71nm. The battery's 96L6 (Cheese Board) acquisition radar detected the aircraft at barely 14nm, and the 92N2E (Grave Stone) fire-control radar was able to achieve missile lock at just under 7nm (*...cue the fanboy hordes screaming that our numbers are way off*).

(As an aside, the large range gap between firm target track and reliable TVM/SAGG missile lock may help explain the design rationale for fitting both the 40N6 and 9M96 missiles [the other two weapon options for S-400 batteries] with active-radar seekers. In theory, both of those missile types could have been launched against the EA-18G as soon as a reliable track was achieved and the contact entered their respective kinematic envelopes.)

So as we see, modern OECM systems are still quite effective even against modern radar systems but not nearly as omnipotent as was hitherto the case. Against older threats, modern jammers remain overwhelmingly effective as has been repeatedly demonstrated in real-life air operations in the last few decades.

## Weight-dependent aircraft kinematics



Fully populating the aircraft loadout entries in the DBs with weight and drag data has enabled us to refine a significant aspect of aircraft kinematics: The effect of weight on agility and manouvering. Until now, although weight and drag were taken into account for fuel consumption puproses (and indeed were re-calculated continously so that e.g. an aircraft that dropped its bombs would immediately experience a benefit in endurance and range), the aerodynamic performance itself (including evasion against attacks) always assumed an "airshow" configuration (minimal external stores, half-full fuel load). This mostly worked for air-combat loadouts but could cause significant distortions in evaluating attacks against heavily-loaded aircraft.

So now the actual aircraft weight, including fuel and stores, is continously calculated as the "weight fraction" (compared against the nominal "airshow" values and the maximum take-off weight) and it has a decisive effect on actual performance. Sustained turn rate, climb/dive rate, acceleration and attack evasion agility are all affected by this.

As an example, a USAF F-16CM Blk52 (2014) with a light A2A-patrol loadout (2x 370USG tanks, 4x AIM-9X, 1x ALQ-184 DECM pod) at 36Kft has a weight fraction of 0.44 with full internal fuel. With this fraction the aircraft has a 16.7 deg/sec sustained turn rate (against the nominal 22.8) and its evasion agility is reduced from the nominal 4.9 to 3.6 (not taking into account any other factor such as crew proficiency, impact angle etc.). In contrast, the very same aircraft in a heavy attack loadout (2x 370USG tanks, 2x GBU-31(V)1 JDAM, 2x AIM-120C-7, 2x AIM-9X, 1x AAQ-33 Sniper-XR pod, 1x ALQ-184(V) DECM pod) has a weight fraction of 0.68, which reduces its turn rate to 13.4 deg/sec and its evasion agility to just 2.9.

As fuel is consumed this fraction steadily decreases and the aircraft performance increases, and of course even more so if the loadout stores are expended.

So if you have been watching the news and see aircraft on actual ops carrying much fewer stores-per-sortie than the "Christmas tree" brochure drawings, part of the reason is range/endurance but a significant consideration is also this: Too much weight can really get you killed.

# The great leaps of v1.11: Winchester, Shotgun, Bingo, Joker and Chicken

MARCH 4, 2016 • POSTED IN [COMMAND](#)



The [v1.10 update](#) for CMANO was released on Feb 26 to widespread acclaim. The dev team is already hard at work preparing the next upcoming major release, version v1.11. After the panoply of new features in past updates, what new tricks do the CMANO devs have up their sleeves? Let's find out.

## Winchester, Shotgun, Bingo, Joker and Chicken

Winchester and Bingo are well-known brevity calls for “no ordnance remaining” and “low fuel state” respectively. However, in many situations it would make sense for aircraft to begin separation well before they are completely out of weapons or flying on fumes. Command v1.11 adds player-customizable “Shotgun” weapon state and “Joker” fuel state, and even includes the “Chicken” fuel state for emergencies. A quick intro to these terms can be found in the [Multiservice tactical brevity code article on Wikipedia](#) and in the [Command Mega-FAQ](#).

Air Ops - Gran Canaria Airport

Aircraft Status / Air Facilities

| Aircraft (click for info)                                 | Status | Mission | Loadout                          | Time to ready | Quick Turnaround                                                      |
|-----------------------------------------------------------|--------|---------|----------------------------------|---------------|-----------------------------------------------------------------------|
| 16x F/A-18A Hornet (EF-18A+ C-18A) (Gran Canaria Airport) |        |         |                                  |               |                                                                       |
| Sqd 462 #3                                                | Parked | -       | A/A AIM-7P Sparrow III, Light    | 1 hrs 35 min  | Enabled: Day/Night: 0 / 2 sorties, 0 / 4 hrs flying time, No downtime |
| Sqd 462 #4                                                | Parked | -       | A/A AIM-7P Sparrow III, Light    | 1 hrs 35 min  | Enabled: Day/Night: 0 / 2 sorties, 0 / 4 hrs flying time, No downtime |
| Sqd 462 #5                                                | Parked | -       | A/A AIM-7P Sparrow III, Light    | 1 hrs 35 min  | Enabled: Day/Night: 0 / 2 sorties, 0 / 4 hrs flying time, No downtime |
| Sqd 462 #6                                                | Parked | -       | A/A AIM-7P Sparrow III, Light    | 1 hrs 35 min  | Enabled: Day/Night: 0 / 2 sorties, 0 / 4 hrs flying time, No downtime |
| Sqd 462 #7                                                | Parked | -       | A/A AIM-7P Sparrow III, Light    | 1 hrs 35 min  | Enabled: Day/Night: 0 / 2 sorties, 0 / 4 hrs flying time, No downtime |
| Sqd 462 #8                                                | Parked | -       | (Maintenance [Unavailable])      | Unavailable   | Unavailable                                                           |
| Sqd 462 #9                                                | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #10                                               | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #11                                               | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #12                                               | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #13                                               | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #14                                               | Parked | -       | GBU-16B/B LGB (Mk83), NITE Ha... | 5 hrs 35 min  | -                                                                     |
| Sqd 462 #15                                               | Parked | -       | (Maintenance [Unavailable])      | Unavailable   | -                                                                     |
| Sqd 462 #16                                               | Parked | -       | (Maintenance [Unavailable])      | Unavailable   | -                                                                     |
| Sqd 462 #17                                               | Parked | -       | (Maintenance [Unavailable])      | Unavailable   | -                                                                     |

✓ Enable Quick Turnaround

2 Sorties (Maximum)

2 sorties (R 4 hrs maximum airborne time and 30 min turnaround, with 3 hrs standdown ready time - Superiority, BVR AAMs)

Capabilities: Day and night, All-weather capable

Range and Profile: 90 minutes at 150 nm CAP, Turnout at 30k ft, on station later, 2 minutes combat in AG, Form-up 2 min at 20k ft, 5% reserves and 20 minute later at 20k ft

Loadout Details: A/A: AIM-7P Sparrow III, Light

Stones (click for info)

# Available, Magazines

# Available, Mags + A/C

2x AIM-7P Sparrow III

6x AIM-9L-1 Sidewinder

3x 330 LGB Drop Tank

40

62

60

102

He-briefed weapon state: Shotgun. One engagement with both UVH and WVR or Stand-Off and Strike weapons. Allow easy targets of opportunity with air-to-air guns.

Attack Altitude: -

Loadouts available in magazines: 10

Loadouts available, incl. weapons mounted on all aircraft: 17

Loadouts available, same as above excl. optional weapons: 17

Launch individually

Launch as group(s)

Ready / Arm

Abort Launch

Doctrine

Assign to mission

Set time to ready

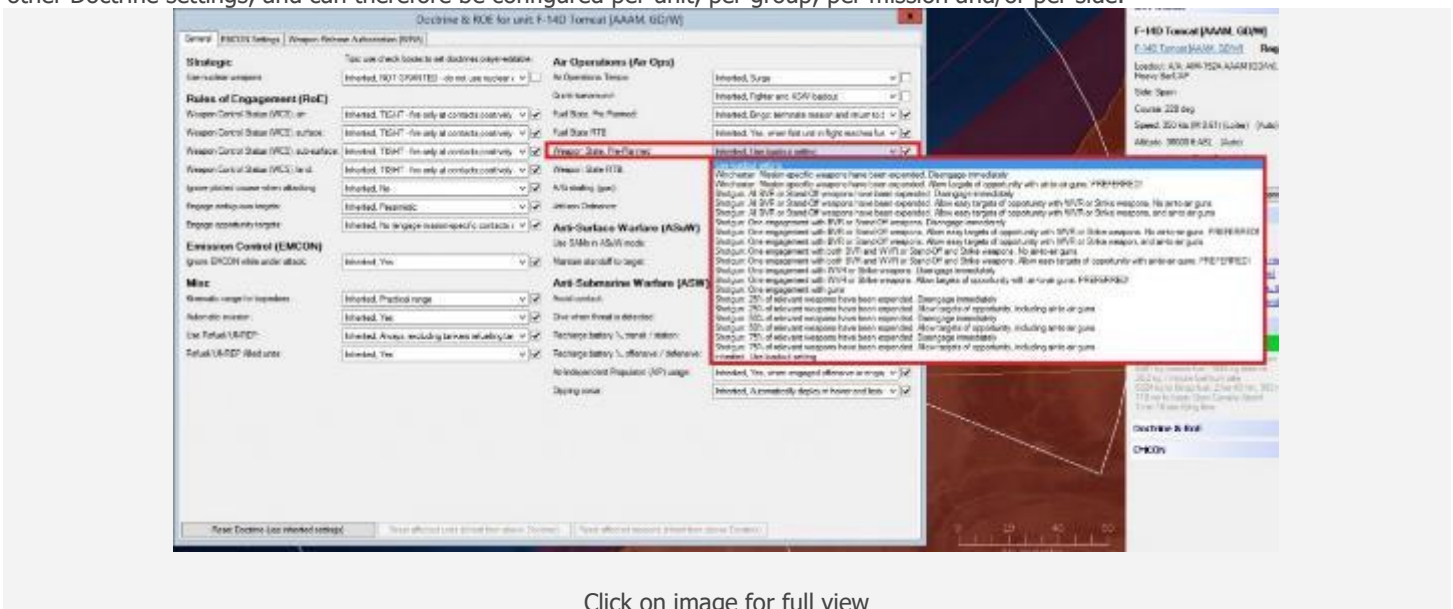
Rename

Remove

Click on image for full view

All aircraft loadouts now have their own pre-defined Winchester or Shotgun weapon states. The default states depend on loadout role and weapon types, which vary from all-Sidewinder F-16 air superiority loadouts to MiG-31 long-range one-pass intercept loadouts.

In some cases the player may not want to use the pre-defined Winchester or Shotgun settings stored in the database. For instance, a loadout may allow an aircraft to bore in on and engage hostiles with guns. However that may not be desirable in many situations. Therefore, the player can decide to override the default settings through the Doctrine window. Weapon states are inherited like all other Doctrine settings, and can therefore be configured per unit, per group, per mission and/or per side.



Click on image for full view

There are approximately twenty different Winchester and Shotgun settings to choose from. The first two are normal Winchester weapon states while the remainder are Shotgun setups that allow aircraft to disengage when it is most advantageous to do so. It should be noted that Shotgun states are split into two main categories: those where aircraft will start separation when certain *types or quantities of ordnance has been expended*, and those that will make aircraft *disengage after the engagement is over*. The latter is usually preferred, as the aircraft will continue fighting until the enemy has been defeated or the weapon state has been reached, whatever comes first. This means aircraft may go home with weapons left onboard, and will not hang around after an engagement is over, low on fuel and ordnance, and risk getting ambushed by flights of 'fresh' bogies. Past experience shows that the latter settings significantly reduces losses to own forces and has also made the AI a tougher opponent.

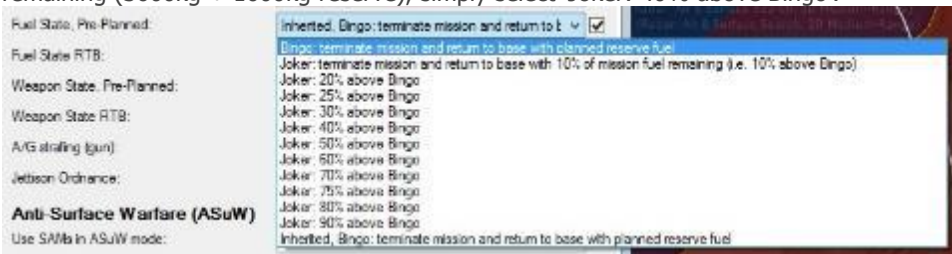
The user-selectable Winchester and Shotgun doctrine settings are:

- **Use loadout setting** – Uses default weapon state settings from the database, tailored to each loadout's role and ordnance.
- **Winchester: Mission-specific weapons have been expended. Disengage immediately** – The traditional pain vanilla Winchester weapon state.
- **Winchester: Mission-specific weapons have been expended. Allow targets of opportunity with air-to-air guns** – Same as above, but engage nearby bogies with guns after we're out of missiles. Applies to air-to-air missile loadouts only. For guns-only air-to-air loadouts and all air-to-ground loadouts the behaviour is the same as above.
- **Shotgun: All BVR or Stand-Off weapons have been expended. Disengage immediately** – Disengage after firing all Beyond Visual Range (BVR, air-to-air) or Stand-Off (SO, air-to-ground) weapons. This is a risky option as your fighter aircraft may only have one medium-range air-to-air missile (AAM) left and then decide to engage 'fresh' flights of bandits. Use with caution!
- **Shotgun: All BVR or Stand-Off weapons have been expended. Allow easy targets of opportunity with WVR or Strike weapons. No air-to-air guns** – Same as above, but if easy targets or threats are nearby then shoot at them with remaining Within Visual Range (WVR, air-to-air) or SR (Short-Range, air-to-ground) weapons before disengaging. A target has to be within 120% of the WVR/SR weapons' range to be engaged. Otherwise, the aircraft will turn, go to afterburner, and try to leave the area at max speed.
- **Shotgun: All BVR or Stand-Off weapons have been expended. Allow easy targets of opportunity with WVR or Strike weapons, and air-to-air guns** – Same as above, but also engage bogies with guns if given an easy chance. Typically, a target has to be within 5nm and closing to be of any interest. Applies to air-to-air (A/A) loadouts only. For air-to-ground (A/G) loadouts the behaviour is the same as above.
- **Shotgun: One engagement with BVR or Stand-Off weapons. Disengage immediately** – Attempt one engagement with BVR or SO weapons. Continue fighting for as long as there are targets within easy reach and then disengage. This is a safe option as it ensures aircraft do not 'hang around' after they have expended their most potent weapons, and thus avoid becoming easy targets if engaged by 'fresh' enemy units.
- **Shotgun: One engagement with BVR or Stand-Off weapons. Allow easy targets of opportunity with WVR or Strike weapons. No air-to-air guns** – Same as above, but if easy targets or threats are nearby, shoot at them with remaining WVR or Short-Range weapons before disengaging. A target is considered 'easy' when within 120% of the remaining

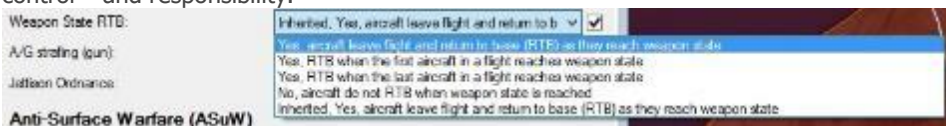
WVR or Strike weapon's maximum range (minimum 5nm). In other words, the fighter won't spend much energy chasing down a bogey after the Shotgun weapon state has been reached, and will leave the target area as quickly as possible.

- **Shotgun: One engagement with BVR or Stand-Off weapons. Allow easy targets of opportunity with WVR or Strike weapon, and air-to-air guns** – Same as above, but also engage bogies with guns. Applies to air-to-air (A/A) loadouts only. For air-to-ground (A/G) loadouts the behaviour is the same as above.
- **Shotgun: One engagement with both BVR and WVR or Stand-Off and Strike weapons. No air-to-air guns** – Make one engagement with BVR and WVR, or SO and Strike Weapons. Do not disengage when out of BVR or SO weapons, but continue the engagement with WVR weapons.
- **Shotgun: One engagement with both BVR and WVR or Stand-Off and Strike weapons. Allow easy targets of opportunity with air-to-air guns** – Follows the above logics.
- **Shotgun: One engagement with WVR or Strike weapons. Disengage immediately** – Make one engagement with WVR or SR weapons. Continue fighting for as long as there are targets within easy reach and then disengage.
- **Shotgun: One engagement with WVR or Strike weapons. Allow targets of opportunity with air-to-air guns** – Same as above but also engage bogies with guns. Applies to air-to-air (A/A) loadouts only. For air-to-ground (A/G) loadouts, the behaviour is the same as above.
- **Shotgun: One engagement with guns** – Make one engagement with guns. Continue fighting for as long as there are targets nearby and then disengage.
- **Shotgun: 25% of relevant weapons have been expended. Disengage immediately** – Disengage after 1/4 of mission-specific weapons have been expended.
- **Shotgun: 25% of relevant weapons have been expended. Allow targets of opportunity, including air-to-air guns** – Same as above, but if easy targets or threats are nearby then shoot at those too. Also engage bogies with guns (applies to air-to-air (A/A) loadouts only).
- **Shotgun: 50% of relevant weapons have been expended. Disengage immediately** – Disengage after half of mission-specific weapons have been expended.
- **Shotgun: 50% of relevant weapons have been expended. Allow targets of opportunity, including air-to-air guns** – Same as above, but if easy targets or threats are nearby then shoot at those too. Also engage bogies with guns (applies to air-to-air (A/A) loadouts only).
- **Shotgun: 75% of relevant weapons have been expended. Disengage immediately** – Disengage after 3/4 of mission-specific weapons have been expended.
- **Shotgun: 75% of relevant weapons have been expended. Allow targets of opportunity, including air-to-air guns** – Same as above, but if easy targets or threats are nearby then shoot at those too. Also engage bogies with guns (applies to air-to-air (A/A) loadouts only).

The Joker fuel state can be set as a percentage of mission fuel, which is max fuel minus reserves. If an aircraft carries 10 000kg of fuel, reserves is typically 10%, which means mission fuel is 9000kg. If the player wants an aircraft to land with 40% mission fuel remaining (3600kg + 1000kg reserve), simply select 'Joker: 40% above Bingo'.



In addition to setting the weapon and fuel state conditions, the player may also choose what shall happen when said state is reached. Shall a flight of fighters Return To Base (RTB) when the first aircraft reaches the fuel/weapon state? Last aircraft? Or shall the aircraft disengage and leave their wingmen behind as they run out of weapons and fuel? Or should they not RTB at all? The player now has full control – and responsibility.





# The great leaps of v1.11: Massive refuelling improvements

MARCH 7, 2016 · POSTED IN [COMMAND](#)



The [v1.10 update](#) for CMANO was released on Feb 26 to widespread acclaim. The dev team is already hard at work preparing the next upcoming major release, version v1.11. After the panoply of new features in past updates, what new tricks do the CMANO devs have up their sleeves? Let's take a peek.

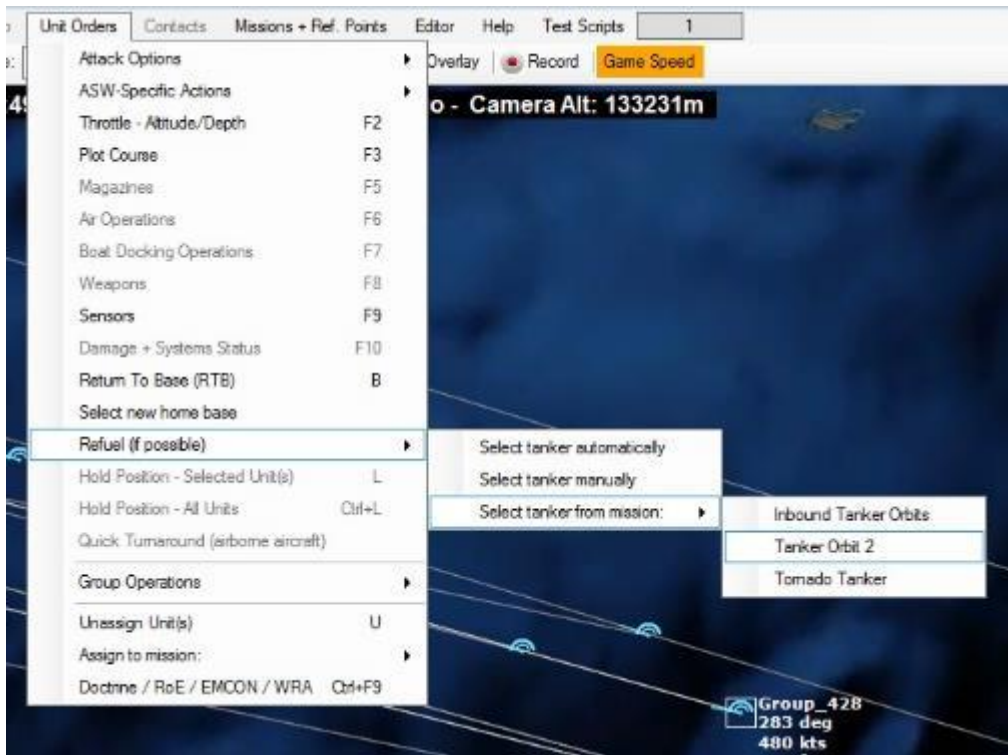
---

## Massive Air-to-Air Refueling (A2AR) improvements

Air-to-air refueling (A2AR) has been given a complete overhaul. There are significant improvements to the AI's decision making processes and it is a lot smarter about when and where to refuel. Furthermore, the player is given the ability to manually select which tanker(s) to refuel from, and there are additional options in the Mission Editor to control tanker usage. Tankers will also tell the player which receivers are currently queued for refueling, and display the number of aircraft served thus far. Further super-specialized A2AR improvements are planned for integration into the Advanced Strike Planner, such as 'refuelling waypoints', but we believe the current tanker functionality will satisfy 99% of Command players' needs.

Many players have told us the thing they have missed the most is the ability to manually select which tanker their aircraft should refuel from. You now have three choices:

- **Automatic**, which is the same behavior as earlier, i.e. the AI picks the most suitable tanker based on remaining fuel and shortest rendezvous time.
- **Manual**, simply click on the tanker you want to refuel from.
- **From mission**, pick the most suitable tanker from the tankers assigned to the specified support or ferry mission.



(Click on image for full view)

The improved Mission Editor has several new settings for configuring tanker usage. A new window called the 'Tanker Planner' allows the player to set the conditions for when tanking should be attempted when the aircraft are in the air, and also set launch conditions for the mission itself. The parameters are as follows:

**Use nearest tanker with enough fuel to serve receivers:** Airborne receivers assigned to this mission will pick the most suitable tanker based on remaining offloadable fuel and shortest rendezvous time.

**Use tankers assigned to specific missions:** Limit the tanker pick to those assigned to given missions only. When combined with the new mission Startup and Termination functionality along with the Support Mission 'One refueling cycle' and 'Number of receivers' limitations (explained below), the player now has the ability to do pretty detailed tanker planning.

**Mission planning details – Minimum number of tankers needed:** Specify the minimum number of tankers needed to launch this mission. In some cases, especially for larger air strikes, you may need a minimum amount of fuel (2,000,000 lb, hah!) and this setting allows you to postpone strike missions if the tanker requirements cannot be met.

**Mission planning details – Minimum number of tankers airborne:** Same as above, but specifies the minimum number of tankers that have to be in the air rather than just available.

**Mission planning details – Minimum number of tankers on station:** This is a further refinement of the above settings and specifies the number of tankers that must be on-station. It only applies to tankers assigned to support missions. Ferry missions are ignored.

**Mission planning details – Launch mission without tankers in place (Extremely risky!):** The description says it all. In some cases it is desirable to launch a mission without having tankers within tactical radius of the target. Especially in high-threat environments. This setting allows the player to override all built-in safety measures and just launch the strike aircraft regardless of tanker availability at the moment. The aircraft will of course attempt to refuel when airborne, however *on the ingress leg they will only attempt to hook up with tankers ahead of them*, not behind. Thus it is up to the player or scenario designer to make sure tankers get into position before the receivers run out of fuel and crash. (Dev note: on the return leg, strike aircraft will also look for tankers behind them so the requirements are not so strict there).

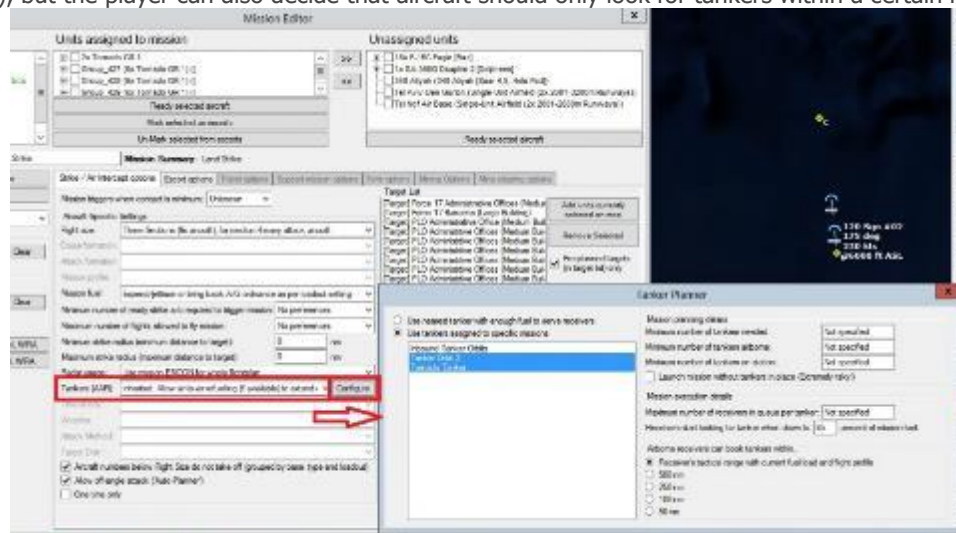
**Mission execution details – Maximum number of receivers in queue per tanker:** In order to prevent one tanker from accepting too many receivers, the player can specify the maximum number of aircraft to send to each tanker.

**Mission execution details – Receivers start looking for tankers when down to X percent of mission fuel:** By default, strike aircraft will start looking for tankers when down to 85 percent of mission fuel, and aircraft on patrol missions will attempt to refuel when reaching 60 percent. This works well in most cases. However, sometimes it is desirable to delay the search for tankers, and this



is a super-nerdy way of doing just that. The setting works for all mission types including Ferry missions. A prettier way to do it is to use the setting below:

**Airborne receivers can book tankers within....:** When aircraft are down to the fuel percentage specified above, they start looking for tankers. The default is to pick a tanker within the receiver's tactical range (i.e. strike radius multiplied by two, minus fuel already burned), but the player can also decide that aircraft should only look for tankers within a certain radius.



(Click on image for full view)

It is our experience that most players use Support Missions for tanker stations. In order to improve tanker ops flexibility and realism, Command v1.11 adds user-configurable mission termination time (in addition to mission activation time found in earlier versions of the simulator). This allows the player to minimize the tankers' exposure to threats by de-activating the mission and force them to go home. In addition, the updated Mission Editor adds the ability to make tankers return to base when they have conducted one refueling cycle, or when a specified number of receivers have been served:

**Tankers return to base after one refueling cycle, when queue is empty:** Tankers will remain on-station for as long as there are receivers in the tanker's receiver queue. The tankers will accept refueling requests from additional receivers for as long as there is enough fuel, and once all aircraft in the queue have been served the tankers will return to base. This ensures the tankers will only stay on station for as long as they are needed.

**Tankers can refuel maximum X receivers, rounded up to nearest flight:** Tankers will serve a limited number of receivers. This is especially useful when each tanker carries limited amount of fuel, e.g. when using buddy refueling or when refueling strategic bombers. The number is rounded upwards to the nearest flight. I.e. if the maximum number is six receivers, the tanker will accept two flights of four receivers each. This option can be used in combination with the above setting to create very flexible mission termination conditions.



(Click on image for full view)

# The great leaps of v1.11: AGL altitude settings, stores jettison and mission player feedback

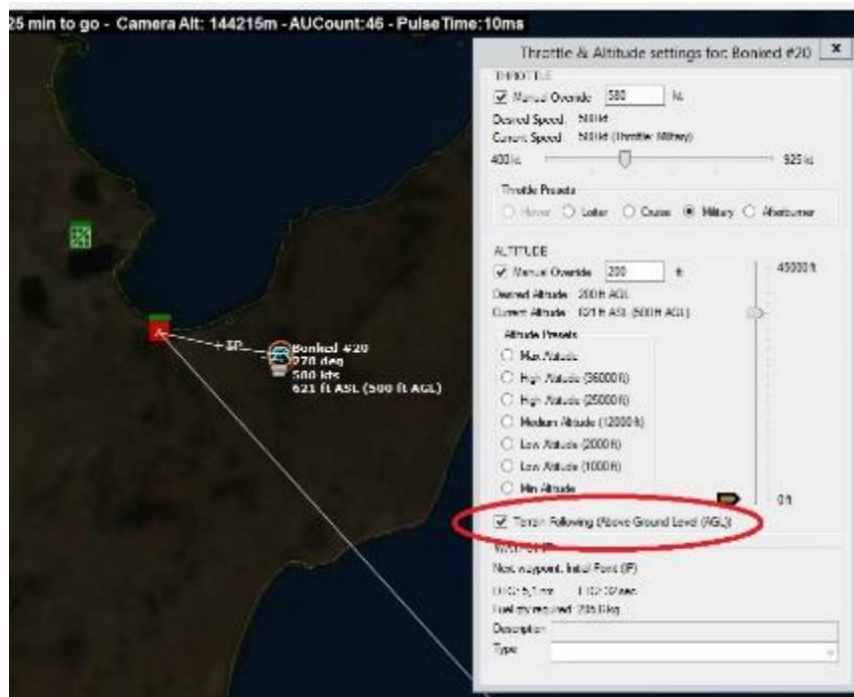
MARCH 9, 2016 · POSTED IN [COMMAND](#)



The [v1.10 update](#) for CMANO was released on Feb 26 to widespread acclaim. The dev team is already hard at work preparing the next upcoming major release, version v1.11. After the panoply of new features in past updates, what new tricks do the CMANO devs have up their sleeves? Let's take a peek.

## Above Ground Level (AGL) altitude settings

Further preparations have been made for the startup of the Advanced Strike Planner project. Command v1.11 adds an Above Ground Level (AGL) altitude setting, in addition to the existing Above Sea Level (ASL) setting, to enable terrain-following (i.e. ride altitude) for aircraft equipped with terrain-following and terrain-avoidance radar. Currently, this distinction is only made in the Speed/Altitude window but it will be an important feature in the Advanced Strike Planner.



(Click on image for full view)

In addition, all weapons have had their weapon release parameters updated in database v441. The minimum and maximum release altitudes may be AGL or ASL, or both. For example, the firing parameters could require the aircraft to fly at minimum 1000ft above sea level (ASL) and also have minimum 200ft ground clearance (AGL).

#### GENERAL DATA

|                                                                                           |               |                  |                                                   |                    |           |
|-------------------------------------------------------------------------------------------|---------------|------------------|---------------------------------------------------|--------------------|-----------|
| Type:                                                                                     | Guided Weapon | Cruise Altitude: | 30 ft AGL, 9 m AGL                                | Range (anti-air):  | -         |
| Length:                                                                                   | 3,8 m         | Climb Rate, S/L: | 18700 ft/min, 05 m/sec                            | Range (anti-surf): | 2 - 75 nm |
| Span:                                                                                     | 0,9 m         | Launch Altitude: | 200 ft AGL - 35000 ft ASL, 61 m AGL - 10668 m ASL | Range (anti-land): | 2 - 75 nm |
| Diameter:                                                                                 | 0,34 m        | Launch Speed:    | -                                                 | Range (anti-sub):  | -         |
| Weight:                                                                                   | 522 kg        | Target Altitude: | -                                                 |                    |           |
| Burnout Weight:                                                                           | -             | Target Speed:    | -                                                 |                    |           |
| Guidance Type: Inertial (INS) mid-course plus Active Radar Homing (ARH) terminal guidance |               |                  |                                                   |                    |           |

#### SENSORS / EW

| Model                  | Max Range | Notes                       | Abilities                                 |
|------------------------|-----------|-----------------------------|-------------------------------------------|
| 1x Active Radar Seeker | 5 nm      | Weapon Seeker, Active Radar | Late 1990s Technology, Surface Search, Ra |

## Stores Jettison

This has been a popular user request and especially after we introduced the [weight-dependent aircraft performance tweaks](#) in v1.10. Aircraft will now jettison their A2G stores when evading an attack (if the relevant doctrine setting is set to YES). This is accompanied by a relevant message detailing the stores ejected.

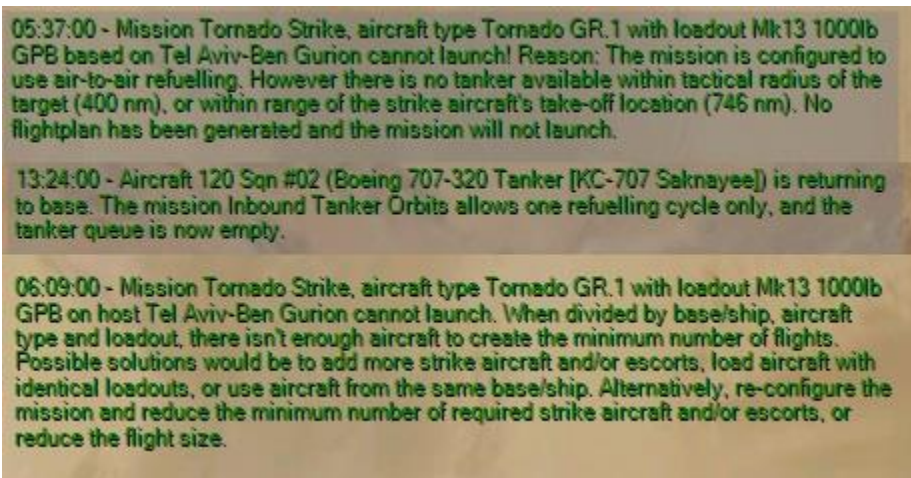
The jettison check is made every 5 seconds (it takes a few seconds to do this in the cockpit), so there is a chance that an aircraft that is caught by surprise will have no time to jettison its stores before the missile impact happens. Also only external stores can be jettisoned (we have no knowledge of internal stores being ejected in combat).

The current implementation has a known issue: Conformal Fuel Tanks (CFTs), like those on the F-15E and numerous export F-16s, are treated like drop tanks and thus jettisoned (in RL they cannot be ejected). We plan to address this in the future.

## Mission player feedback: “Why aren’t my strike aircraft taking off!?”

[Mission Editor 2.0](#) introduced in Command v1.07 was a significant step forward in mission planning capabilities. However, many users felt that the built-in flightplan generator wasn’t too forthcoming with the reasons why a mission would refuse to launch. Is the target out of range? Have we run out of aircraft or targets? Is it due to a lack tankers? Something else?

Command v1.11 solves this by giving a lot more feedback. If a strike mission fails to launch it will tell the player the exact reason, and in most cases also give advice on how to solve the problem. So keep an eye on the message log, and you may see something like this:



05:37:00 - Mission Tornado Strike, aircraft type Tornado GR.1 with loadout Mk13 1000lb GPB based on Tel Aviv-Ben Gurion cannot launch! Reason: The mission is configured to use air-to-air refuelling. However there is no tanker available within tactical radius of the target (400 nm), or within range of the strike aircraft's take-off location (746 nm). No flightplan has been generated and the mission will not launch.

13:24:00 - Aircraft 120 Sqn #02 (Boeing 707-320 Tanker [KC-707 Saknayaes]) is returning to base. The mission Inbound Tanker Orbits allows one refuelling cycle only, and the tanker queue is now empty.

06:09:00 - Mission Tornado Strike, aircraft type Tornado GR.1 with loadout Mk13 1000lb GPB on host Tel Aviv-Ben Gurion cannot launch. When divided by base/ship, aircraft type and loadout, there isn't enough aircraft to create the minimum number of flights. Possible solutions would be to add more strike aircraft and/or escorts, load aircraft with identical loadouts, or use aircraft from the same base/ship. Alternatively, re-configure the mission and reduce the minimum number of required strike aircraft and/or escorts, or reduce the flight size.



# The great leaps of v1.11: Pier operations

MARCH 12, 2016 · POSTED IN [COMMAND](#)



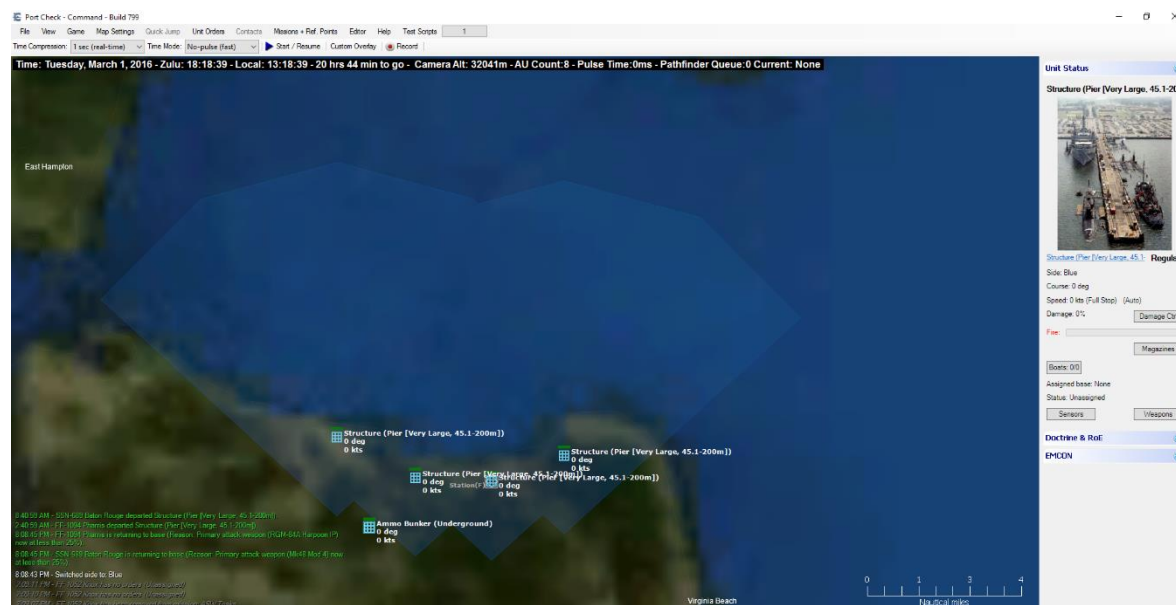
The [v1.10 update](#) for CMANO was released on Feb 26 to widespread acclaim. The dev team is already hard at work preparing the next upcoming major release, version v1.11. After the panoply of new features in past updates, what new tricks do the CMANO devs have up their sleeves? Let's take a peek.

## Pier Operations

You asked for it, so here it is!

Ships have had the ability to dock with designated parent ships and facilities ever since [the beta days of Command](#), but their ability to be serviced while docked was very limited. This changes with v1.11: Proper refuel, re-arm and repairs are implemented.

Pier facilities now extend passable “pier lane” areas around them that allow ships to navigate to pier areas even slightly inland (similar to canals). This allows true-to-life positioning of pier facilities without having to flatten the terrain data around them in order to make them accessible.



The light-shadow polygon is the “pier lane” area projected by the multiple pier facilities inland. Ships and submarines can freely traverse this area (even though terrain is nominally present) to navigate in and out of the piers.



Once a ship docks to a pier (or parent ship), the process of refuel, repair and replenishment begins. Both refueling and rearming happen at faster rates than on UNREP hookups as the docking condition allows for a stabler environment and more extended facilities and tooling. In addition, while a ship underway can perform repairs only to minor component damage and cannot repair structural damage, docked units can perform repairs on medium- and heavily-damaged systems, and can also repair their structures. Replenishment rates have been given a thorough overhaul in v1.11, both for pierside and UNREP modes. Light weapons can be loaded quite fast as before, but heavier weapons (particularly heavy gun shells or large bombs, missiles or rockets) can take hours to transfer and load.

Readying a ship for redeployment differs from aircraft turnaround in a number of ways. Ship preparation typically takes far longer than aircraft (except for very small boats), and in contrast to an aircraft, a ship is perfectly able to put to sea again while still in far from optimal condition. Accordingly, the player can order one or more ships to redeploy while they still have damage, or miss weapons and fuel.

This sounds simple enough for manual control, but what about AI control? How do AI-controlled ships decide when to disengage from frontline operations and when it makes sense to stop repairs etc. and re-deploy? To enable the AI to make reasonable decisions, a new set of doctrine settings (Withdraw / Redeploy criteria) are added:

The status of each of those aspects is continuously tracked and evaluated against the doctrine threshold and a ship will withdraw from its mission if any of the withdrawal criteria are reached. Conversely, while docked, these criteria are regularly checked and a ship is allowed (by the AI) to re-sortie only if everything is "green across the board". The player of course can still order any ship to sail immediately regardless of its condition.

Doctrine & ROE for unit: FF-1094 Pharris

General EMCON Settings Weapon Release Authorization (WRA) Withdraw & Redeploy (Ships / Subs / Land)

### Withdraw when....

Damage is more than:

OR Fuel is less than:

OR the primary attack weapon is at less than:

OR the primary defence weapon is at less than:

### Redeploy when....

Damage is less than:

AND Fuel is at least at:

AND the primary attack weapon is at least at:

AND the primary defence weapon is at least at:

These new settings allow tailoring the withdraw and redeploy behavior of a ship to its unique strengths / weaknesses as well as to the needs of her mission tasking. For example an anti-aircraft escort may be set to ignore depletion of its offensive weapons, fuel and any damages to itself and withdraw from the line only when its defensive (AAW) armament is depleted. Conversely, a sensitive high-value unit may be configured to withdraw immediately on the first scratch of damage.

Busy day at Norfolk. Both the frigate and the fast attack sub are fine on damage and fuel, but both are short on ammo. Will you wait for them to re-arm (which may take a while!) or flush them out to sea immediately? Choices, choices...

Docking Ops - Norfolk

Boat Status Docking Facilities

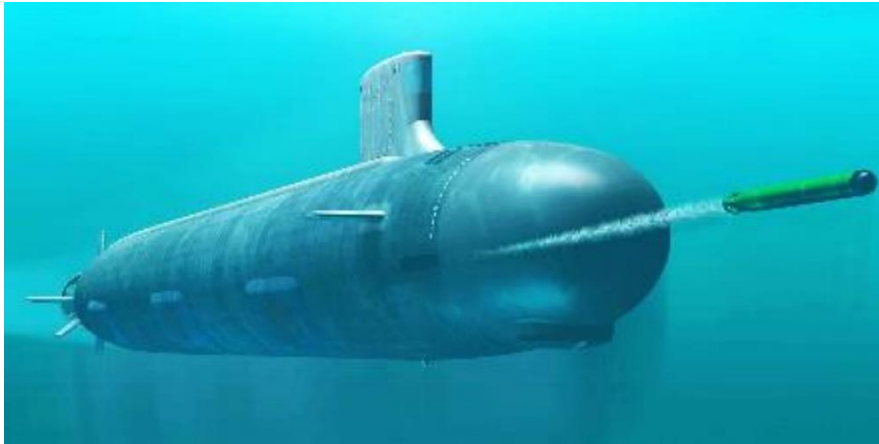
| Boat (click for DB info)          | Damage (click for details)               | Weapons (click for                              | Magazines                    | Fuel | Mission                | Status   | Time to ready |
|-----------------------------------|------------------------------------------|-------------------------------------------------|------------------------------|------|------------------------|----------|---------------|
| 1x FF 1052 Knox                   |                                          |                                                 |                              |      |                        |          |               |
| FF-1094 Pharis                    | No structural damage, all systems online | Guided: 6/20<br>Unguided: 620/620<br>Other: 2/2 | Guided: 18/26                | 100% | ASW Tasks (ASW Patrol) | Readying | 27 min 33 sec |
| 1x SSN 688 Los Angeles [Flight I] |                                          |                                                 |                              |      |                        |          |               |
| SSN-689 Baton Rouge               | No structural damage, all systems online | Guided: 4/4<br>Other: 4/4                       | Guided: 2/22<br>Other: 20/20 | 100% | ASW Tasks (ASW Patrol) | Readying | 10 min        |

The redeployment criteria allow the player (or scenario author) to make his own decisions on how "ready" he wants his ships to put out to sea again: Does he wait until every last bit of ammo is restocked? Is it enough to repair damage and get refueled? Remember, while your ships are in port they are not out to sea and the enemy gets a free pass. Obviously there is no single "best" answer, and the theater/operational exigencies (as well as time pressure) are likely to force the player to make decisions that he is not entirely happy with. Real-life ops are very often a compromise, and Command reflects this.

The implementation of pier ops in Command, even in its "raw", unpolished form in v1.11, is a huge step forward in expanding the scope of the game into the theater/strategic scale. Numerous players have asked for the ability to fight out to air and sea, then get their forces back in port and repair/ready them as possible, and get out there to fight again. v1.11 is the answer to their prayers. We hope implementing this along with our substantial lua scripting and event editor features will encourage editor's and players to explore longer duration scenarios.

# The great leaps of v1.11: Under the sea and under the hood

MARCH 14, 2016 · POSTED IN [COMMAND](#)



The [v1.10 update](#) for CMANO was released on Feb 26 to widespread acclaim. The dev team is already hard at work preparing the next upcoming major release, version v1.11. After the panoply of new features in past updates, what new tricks do the CMANO devs have up their sleeves? Let's take a peek.

---

## Under the sea: Improvements on submarine ops

### *Updated Air-Independent Propulsion (AIP) model*

The implementation of Air-Independent Propulsion (AIP) has been refined in Command v1.11. While it is possible to recharge the submarine's batteries using AIP, the low power of typical AIP systems relative to the diesel-powered generators means that it would take extremely long time to recharge a deeply discharged battery. Storing energy in batteries is also a less efficient than storing the energy in the AIP reactants. As such, AIP is best used to minimize discharge of the submarine's batteries, and wait with conventional diesel engine recharging to a time and location that is more suitable. This means the AIP system will only be able to keep up with battery drainage at creep throttle setting. At higher speeds, the electric motors will require more power than the AIP can deliver, which forces the sub to eventually snorkel.

### *New submarine doctrines*

Submarines have several new doctrine settings. The new settings are:

**Dive when threat is detected:** User-selectable options are *No*, *Yes on periscope/surface search capable radar detection*, *Yes when ships are within 20nm or aircraft are within 30nm*, or *Yes on both ESM detection and threat proximity*. In some cases it is not desirable to go to the surface to snorkel or use the periscope. The player can configure whether the submarine should dive if a threat radar has been detected, if there are nearby air or surface threats, or both.

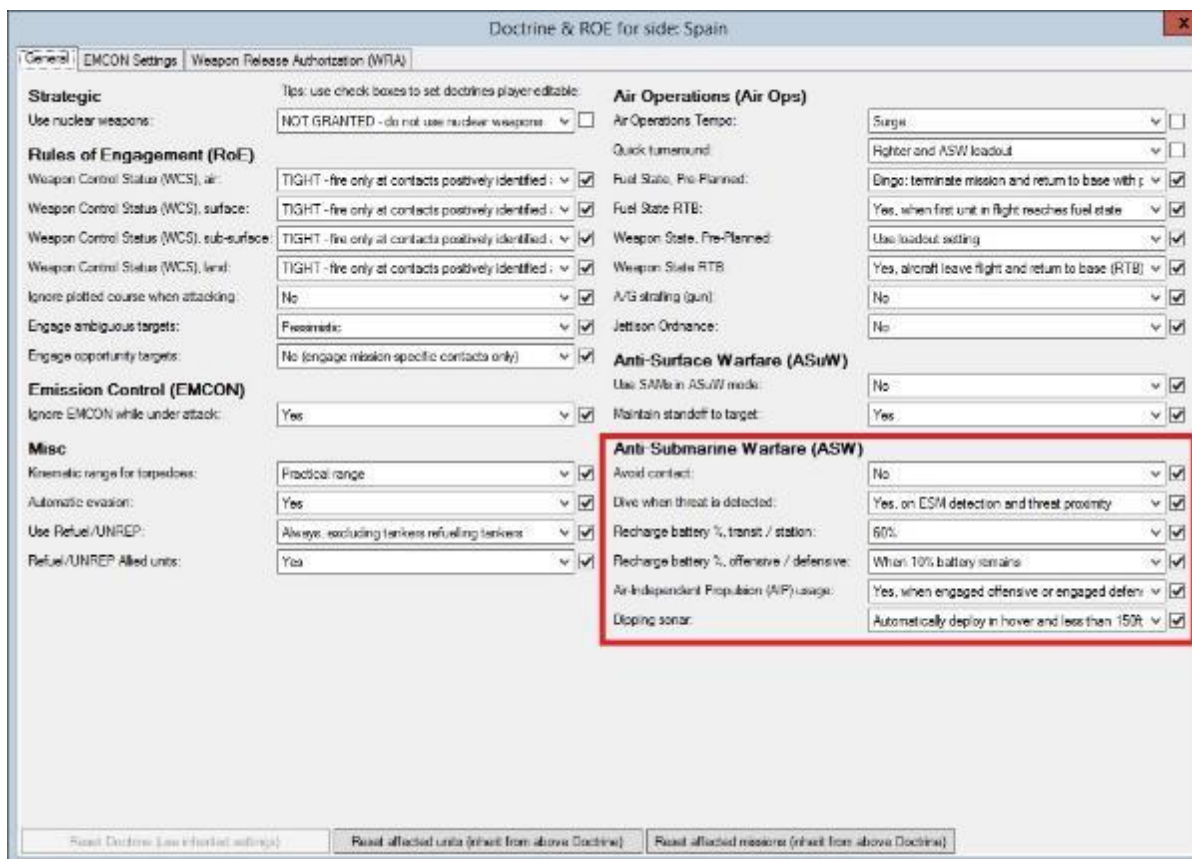
**Recharge battery %, transit / station:** Set the batter percentage at which the submarine should snorkel to re-charge when in transit or on patrol.

**Recharge battery %, offensive / defensive:** Set the battery percentage at which the submarine should snorkel to re-charge when engaged offensive or defensive.

**Air Independent Propulsion (AIP) usage:** User-selectable options are *No*, *Yes*, or *Yes when engaged offensive or engaged defensive*. Allows the player to limit AIP usage, including saving the AIP fuel for attack and defence only.

**Dipping sonar:** User-selectable options are *Automatically deploy in hover and less than 150ft altitude*, or *Only deploy manually or when assigned to mission*. Enable unassigned helicopters to dip their sonar while loitering.

**Avoid contact:** User-selectable options are *Yes* or *No*. This setting isn't used much by the AI quite yet as it is currently being overridden by built-in mission logics. The functionality be further expanded in the future.



## Under the hood: Performance, memory & pathfinding improvements

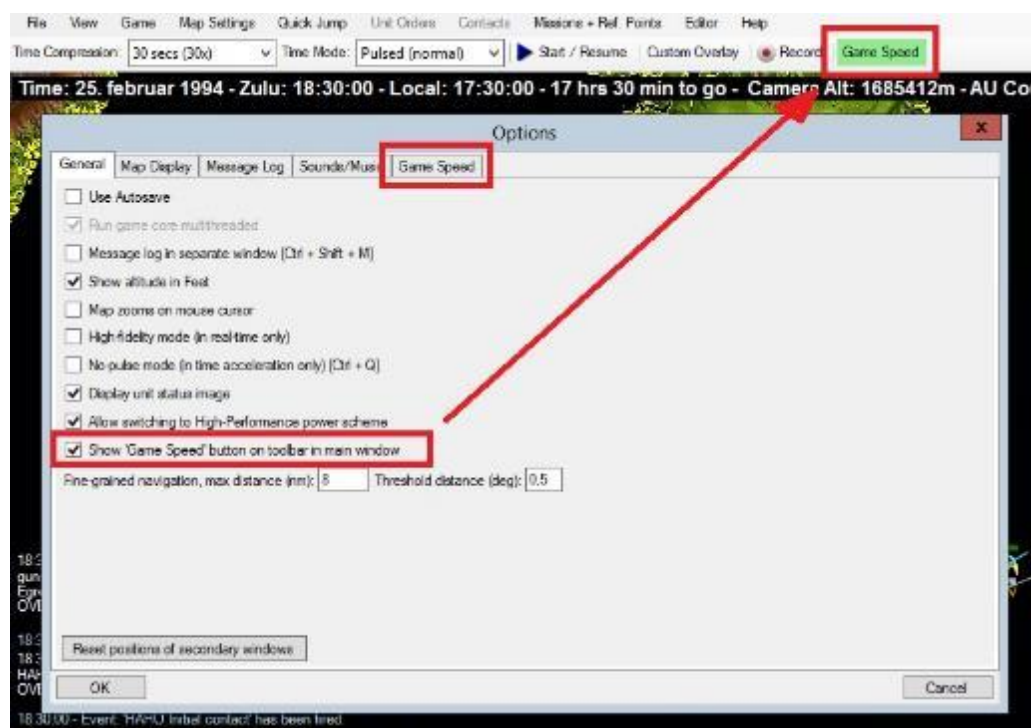
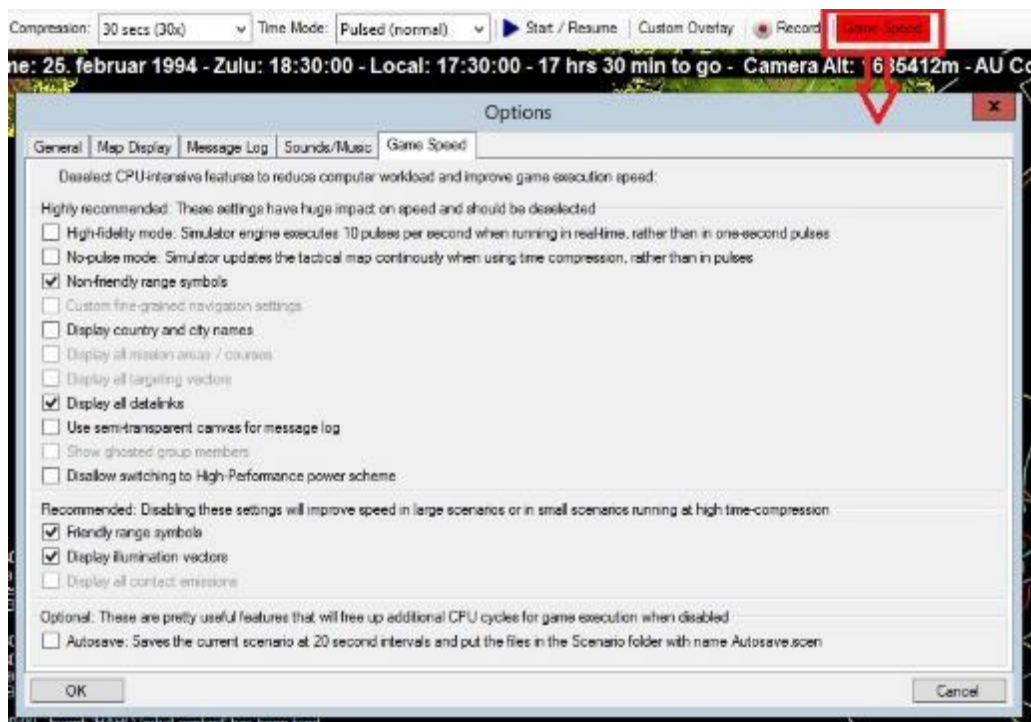
*"We need greasy, fast speed!"*

Command v1.11 runs significantly faster than earlier versions of the simulator. Small/simple scens run just as fast as before (although older PCs may notice a difference in them too), but the benefits become most apparent in large complex scenarios, with speed increases between 3x-10x being common in many setups. The massive gains have come from a number of sources; memory optimizations (see below), more efficient data structures, careful removal of wasteful operations etc. Great care has been taken to leave the "business logic" of the simulation untouched in order to prevent the appearance of bugs. The end result is that v1.11 provides a substantial performance improvement while fully retaining the simulation finesse that Command is renowned for.

### *New options for game speed*

Having a highly detailed and feature-rich simulator engine comes with its share of disadvantages. Command is chock-full of functionality that can easily chew up trainloads of CPU-cycles and cause the sim engine to crawl on even high-end computers.

Command v1.11 adds a 'Game Speed' tab in the Options window that allow players to easily turn off CPU-intensive features that may not be needed in the current scenario. The player can also choose to enable a shortcut to the 'Game Speed' tab from the main window. The shortcut changes color depending on how many CPU-intensive features are active, which helps the player to quickly determine if the simulator is running at optimum speed.



### Memory handling

Since many Command players still use 32-bit operating systems, the sim is limited by a 32-bit memory space. Although switching to a pure 64-bit environment would confer many benefits, the current reality is that we will probably be stuck with 32-bit limitations for quite some time. This is the bad news.



The good news is that Command v1.11 has significantly improved memory handling. During testing, large scenarios have been running continuously for 36-48 hours without any speed drop, memory corruption, or Out Of Memory (OOM) exceptions like those reported on past versions. Another noticeable memory stress-test, loading large scenarios in rapid succession, has been passed with flying colors (more than 60 "monsters" in a row were loaded without any issues).

It is therefore a reasonable claim that most (dare we say all?) of the memory issues that have caused problems in past versions have now been resolved.

#### *Area (Polygon) Validation*

In Command, all areas such as mission areas, exclusion zones, no-navigation zones and event trigger areas are geometric figures called polygons. If the lines that make up a polygon cross then the area is considered invalid, and it is difficult for the in-game '*point-in-polygon*' function to determine if a unit is inside or outside this area. We have noted that sometimes players and scenario designers accidentally create areas that are indeed invalid, and tasks such as navigation and target prioritization may not behave as expected. As such, all windows with area editors now have a 'Validate Area' button that allows the player to quickly determine if the polygon is valid or not. The simulator will also display the polygon in the tactical map. This includes areas used by the event engine. Event engine areas are displayed on the tactical map in a 'Hot Pink' color (of course...) when the event editor or event trigger windows are open. Furthermore, all areas in a scenario are validated on load, and the player will be presented with warnings if the scenario contains invalid polygons.

## Pathfinding refinements and new options

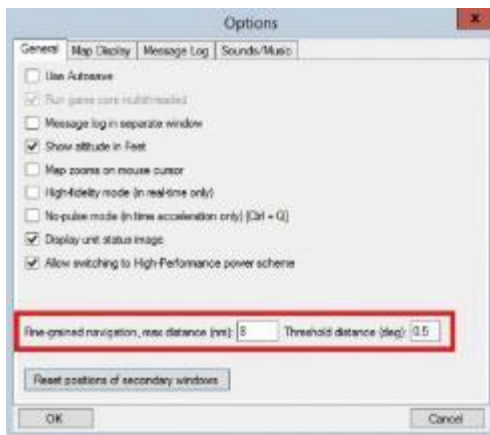
Command has a pretty sophisticated pathfinder which is used by the built-in navigator to find routes around obstacles like land masses, islands, shallow water (for submarines), No-Navigation Zones, and polar ice. The elevation data used in Command has a resolution of 900 meters at the equator, which is roughly 0.008 angular degrees. The number of sampling points per degree of latitude remains constant which means the resolution increases as we get closer to the poles (with exceptions at the extreme north or south), and the resolution at 60 degrees north or south will be twice that at equator (450m between elevation points).

Pathfinding is extremely expensive in terms of computing power. Finding a path covering just one hundred nautical miles will have to check millions of elevation points, and No-Navigation Zones and polar ice will have to be checked for each of those points as well. Although Command uses multi-threading and hands off complex tasks to helper-threads on other cores, the pathfinding operations will still have to be queued and processed. This steals significant amounts of computing power from all the other multi-threaded operations.

As a consequence, Command was designed with both coarse and fine-grained pathfinding. Coarse pathfinding has a 0.05 angular degree resolution, while fine-grained pathfinding uses 0.005 degrees. The advantage of using coarse pathfinding is speed; it is significantly faster. The drawback is of course that it doesn't check all elevation points and may miss narrow peninsulas and tips of land, tiny islands, and narrow straits.

In previous versions of Command, fine-grained pathfinding would only take place when the distance was less than 8 nautical miles, and it would search for a path in a box that was 0.5 angular degrees larger than the box made up of the start and end points. Because of these rather strict range limitations it was rarely used. This was by design, but had the side-effect of making some players think the elevation data and pathfinding model was flawed – it never was.

Command v1.11 allows players to configure when to use fine-grained navigation. Our recommendation is to use this feature with caution as it will slow down simulation speed significantly, and for instance a 50 nm course with 2 degrees lat/lon search area outside the start and end points may take up to five minutes to compute on a fairly fast computer with an SSD. After all, the pathfinder needs to check nearly one million (!) points. Most players will probably continue to use the default settings, but in some cases such as ops in littoral waters, being able to change this setting will make a big difference as the ships will no longer drive across an island or two by accident.



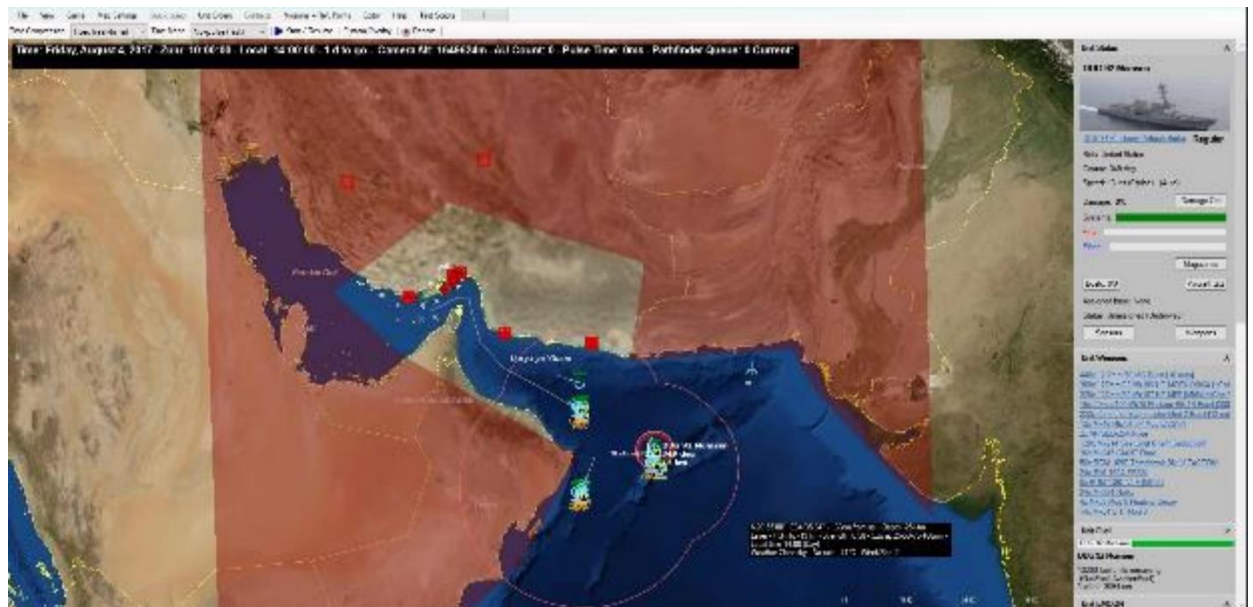
Command's navigator code can perform complex pathfinding tasks. Smaller paths are typically resolved in a matter of seconds, however longer paths may have to evaluate millions of terrain points and it can take several minutes finish each pathfinder request. As an example, if you place a sub in the Indian Ocean and put a single destination waypoint in the Atlantic Ocean just off Gibraltar, the navigator will be perfectly capable of finding its way through the Red Sea and Suez canal, across the Mediterranean, into the Atlantic Ocean... a distance of more than 4000nm. See screenshot below, the dotted line indicates it is a navigator-created path as opposed to a manually plotted or mission-created path. (Let's see any other similar game do *that* :))



The above path is still a pretty straightforward job for the navigator since it didn't have to find a route around large land masses. It should be noted that the maximum threshold distance is 20 angular degrees outside the start and end points, which means that the pathfinder would not be able to find a course from the Persian Gulf to the Kola Peninsula because the start and end points are in a north-south direction and the path would have to be plotted beyond 20 angular degrees east or west.

In other words, if an Iranian Boghammar boat is assigned to a *sea control*/patrol mission that is not geographically limited by the patrol area or prosecution area, the AI might decide to target a contact far away. The navigator will do its best to plot a path to the target, and will use a lot of computing power in the process. However in extreme cases it will not be able to find a route, and the Boghammar boat's AI will soon make another pathfinder request that will do nothing but waste computing power. The cycle will continue for the duration of the scenario, eating up a large percentage of the available computing power and slowing down game execution.

Because of this, we've added information about the Pathfinder Queue on the Diagnostics bar. The Diagnostics bar can be enabled via the Options window. This gives the scenario designer and player information about the number of pathfinding requests in the queue, and which platform is currently having its request processed.



Under normal circumstances, units rarely make pathfinder requests. And when they do, the requests are usually processed in 2-4 seconds. If units start making frequent requests it is usually a sign of flawed mission setup. For instance, patrol missions may not be limited by patrol and prosecution zones. Or that patrol areas are too large and ships have to deal with too much land between themselves and their targets. Turning off 'Opportunity Fire' can also help, as ships will only stick to mission-relevant targets and not chase after contacts they will not be able to reach.

As with past versions of Command, overall game performance still depends heavily on good scenario design and the way the player has configured the simulator.

# We hear you: High DPI-friendly UI on the way

OCTOBER 18, 2016 • POSTED IN [COMMAND](#)



Bug Bash by Hans Bjordahl

<http://www.bugbash.net/>

As always, it's been a very busy time of the year for the WS team. Between the dev work for all the cool new stuff we have been preparing for [REDACTED] and our recent [Pro tour on the US](#), there's been truly no rest for the wicked – or the virtuous for that matter.

One of our top priorities on the commercial side of development has been to resolve the issues that have arisen related to the increasing use of high-DPI desktop setups. As our regular players know, we started tackling this issue already from summer, with the [release of v1.11 SR1](#) and with the subsequent update releases supporting the Command-LIVE DLCs.

Microsoft's Windows 10 Anniversary Update (aka "Redstone"), a massive update that appears to [have left](#) a [bitter taste](#) in



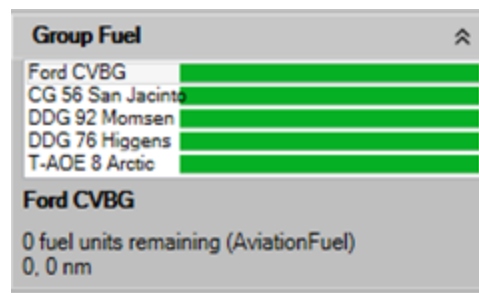
the [IT industry](#), also apparently wound back the clock on our hard work on DPI remedies. The combination of "Win10 Redstone + high-DPI desktop" was particularly hostile to our UI fixes and caused significant issues with readability, especially on important information displayed on the right vertical column. We released a number of hotfix executables to remedy this as much as possible but we were well aware that these, along with our "temporary workaround" recommendation to use 100% DPI settings, were only just temporary. Something more permanent was becoming necessary.

So we rolled our sleeves and went to work:

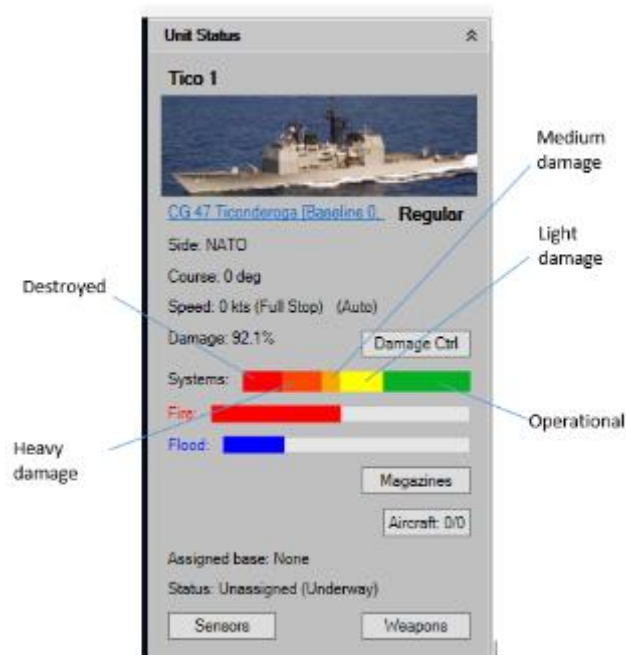
The right-column UI element was completely re-written using high-DPI-friendly technologies and techniques and we are happy to report that on our repeated tests so far, it scales beautifully from 1366×768 cheap laptops all the way to NORAD wall screens.

Re-writing the UI stack for this important screen element also gave us the chance to sneak-in some oft-requested improvements that we never seemed to have the time to devote to so far. For example:

\* A vertical scrollbar now runs the full length of the column and allows scrolling to the lowermost info panels without needing to collapse the (often essential) unit-status and unit-weapons panels.



\* At-a-glance fuel summaries for group members. You asked for it, and we're happy to oblige. Clicking on any of the fuel bars provides the full details on the relevant unit's fuel status, radius, persistence etc.



\* At-a-glance summary bar for the status of a unit's components. The full damage-control window is still there for details, but now you no longer have to bring it up to get a feeling of how your unit's internal guts are holding up. (*Pro tip: The less green on that bar, the more in trouble you are*).

We hope to be able to include these and other improvements on the forthcoming v1.11 SR6 update, which will accompany the release of **Command LIVE #4: Don of a New Era**. We thank everyone who has reported to us the high-DPI issues and shared with us their patience for a definite solution, and we are confident you will enjoy this revised portion of the UI as much as we and the beta team currently do.



# The new features of Chains Of War: Communications disruption

APRIL 15, 2017 • POSTED IN [COMMAND](#)

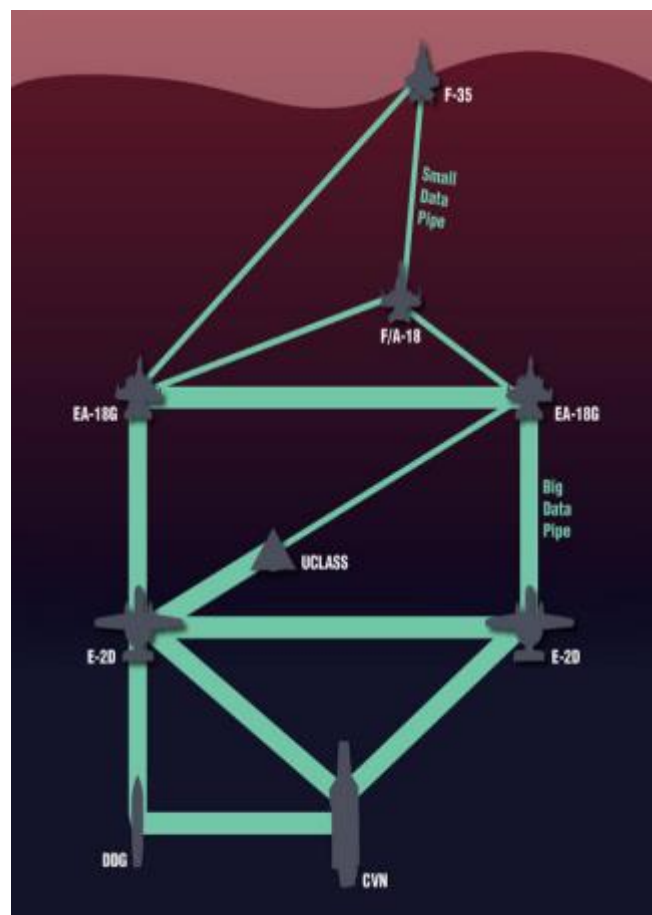


The first few "Release Candidate" (ie. public beta) builds of the v1.12 update (the companion to the upcoming "*Chains Of War*" DLC pack) have begun being distributed *on the MatrixGames forum* and we're happy to say the feedback so far has been very encouraging. Additions like the new 2x time compression step and much improved 4K/UHD support have long been favorite requests and it is good to see them well received. *Chains of War*, however, will introduce *a number of major new features* with significant effects on scenario design and gameplay. Today we are looking at one of them; **communications disruption**.

**NOTE: This feature requires Chains Of War to be installed.**

## Static on the radio

*The US Navy's vision for modern operations. What happens if the data pipes break?*



Most wargames and simulations accustom their users to the idea of omnipresent, instant, always-on communications. The battle may be lost – your forces & assets may be in disarray – but you are always in control of them and aware of their whereabouts, activities and condition. You are always in the know and in power. The pawns in the chessboard are always at your disposal.

But what happens when the lights go out? When the only thing on the radio is static? When the datalink is dead?

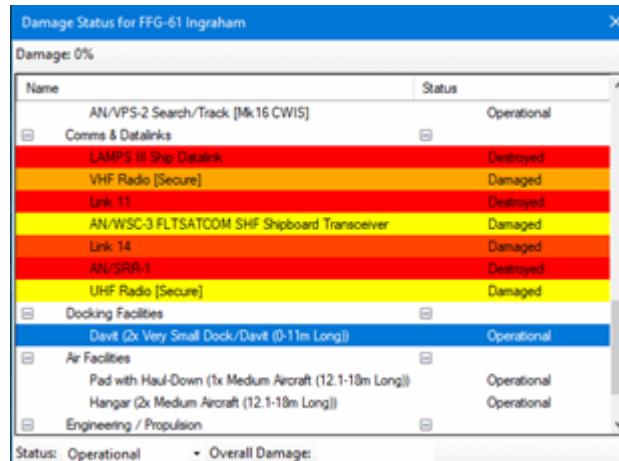
This is fast becoming an ever-important question, both because the western armed forces are increasing their reliance on distributed, hyper-connected force concepts ([the F-35 and the US Navy's NIFC-CA being fine examples](#)) and because potential peer competitors, fully aware of this trend, are rapidly improving their electronic attack and cyber-warfare capabilities. The ever-evolving chess game of electronic warfare has never been limited to the radar bands, but more recently communications and datalinks are becoming increasingly appealing targets.

Beginning with v1.12, Command makes a bold step forward in exploring this domain. We want to show players both the “how” and the “why” of communication lines breaking, and the practical effects of units being isolated from their parent side’s common picture.

## Causes...

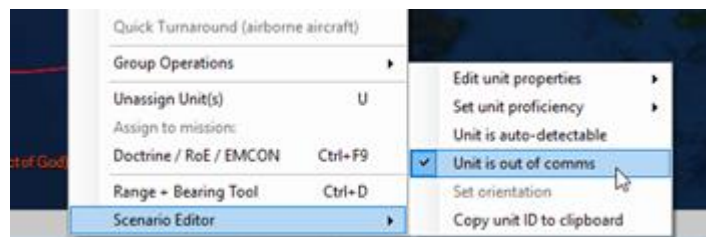
A unit can have its communications disrupted in a number of ways:

- **If all its onboard comm devices and datalinks become non-operational** (damaged or destroyed):



- **Through the Lua scripting API:** As an example: `ScenEdit_SetUnit({Name="USS Vigilant", OutOfComms="True"})`. This is a very versatile technique as it can be used to model any number of factors, both man-made and natural, that can cause a unit to go “off-grid”:
  - A submarine hooking up to HF or satellite communications when it goes to periscope depth, and breaking contact again when it submerges.
  - A satellite linking only temporarily with its ground station to dump its intelligence product and receive new tasking instructions, then again going in isolation in space (*contrary to popular fiction, even modern intelligence satellites are rarely, if ever, in constant link with their ground control stations*).
  - A cyber attack directed at the internal comms infrastructure of the targeted platform. (*Your comm devices may be physically untouched, but the server at the core of the comms exchange just got taken over. Tough world! Chains Of War has strong examples of this.*)
  - Physical incapacitation (damage/destruction) of a critical C3I node leading to other units dependent on it going offline (*remember that many of the first-night targets in Desert Storm were headquarters, C3 bunkers and comm buildings? You can now recreate why this was a critical action*).
- **Through the scenario editor GUI,** by selecting the unit and marking it as “out of comms”:

This is less powerful than using the Lua API but a simpler and faster way for quick setups. So for example you may use this to configure a unit to be “off grid” at the start of a scenario, and follow-up with a Lua script depending on some later action that changes this unit’s connectivity.

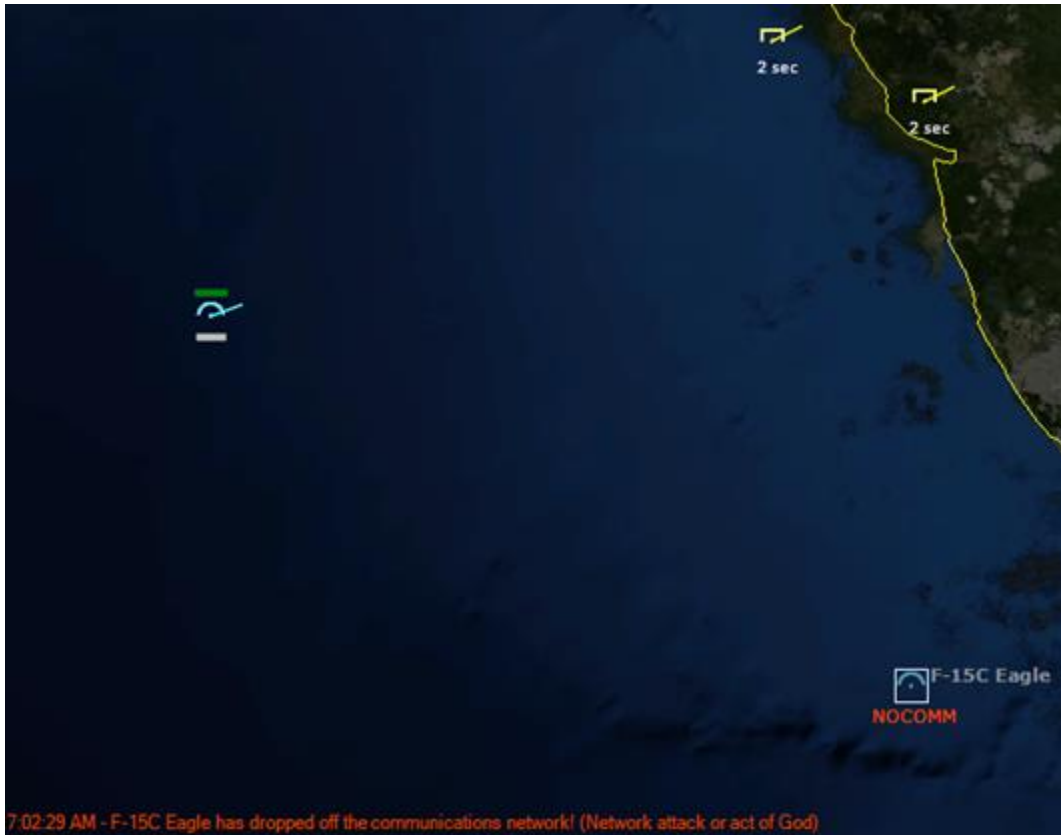


- **By jamming its comm devices,** using communications jamming equipment similar to existing OECM systems. [NOTE: Integrated comms-jamming is a feature reserved for the *Professional Edition*. However, with a bit of creative work you can use the Lua API to approximate this in the commercial version of Command.]

## ...and Effects

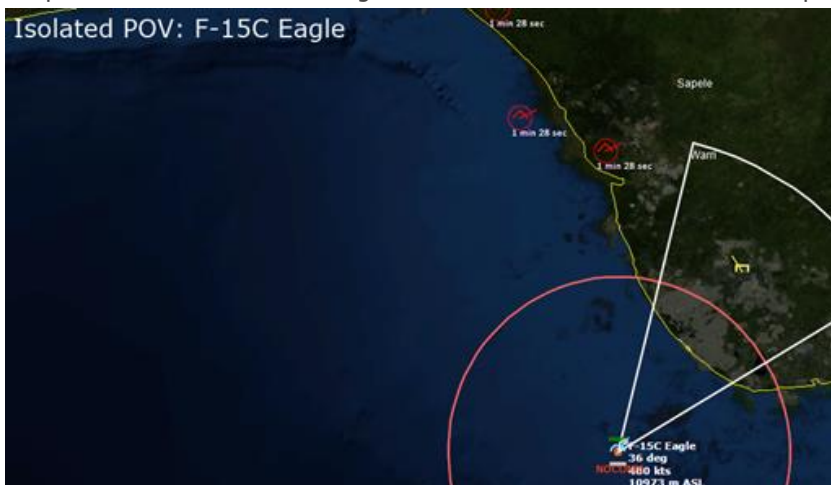
So what are the results of a unit going “off-grid”?

The most obvious effect is that the unit is no longer under your positive control. You no longer know where it is currently located (you only know where it was when it last checked-in, and if any of your other still-connected assets manages to make contact with it, this “last datum” is updated). You don’t know what it is doing, what its fuel, weapons or damage status is. You don’t know if it is peacefully loitering with not a care in the world or if it is fighting for its life. You will know its fate with certainty only when it comes back to its base – or is destroyed first.



*"Last we heard from Garry he was somewhere there... and that's all we know."*

For its part, the cut-off unit loses all the benefits of the common side-wide operational picture; its situational awareness now reaches out just to the limit of its own sensors and no further. It has no idea what is going on “out there”. It can still detect, investigate and prosecute contacts on its own and proceed with its assigned mission if it has one, but all the benefits of mutual support are gone. Cooperatively patrolling a large area to split up areas? Nope. Efficient fire coordination? (“You shoot bandit #1 and I’ll take #2”) Forget about it. Even worse, it now has to be really careful with anything that shows up on the scope. Is that new contact a friendly or an enemy? You’d better hope its RoE and doctrine settings take such a situation into account – or prepare for blue-on-blues!



*Meanwhile, Garry is now alone and trying to adjust to the sudden loss of SA from the nearby AWACS. Notice the only contact still "fresh" is the one that the F-15 is actually detecting on its own; the other contacts, hitherto provided by the E-3, are now deteriorating fast.*

Units that lose their comms connectivity retain local copies of the contacts that were available to them before they went offline; essentially, they inherit a snapshot of their parent side's theater picture at the moment of their breakaway. However, without the benefit of information exchange with their parent network, this snapshot immediately starts to lose its currency and most of the contacts will soon vanish unless refreshed by the unit's own sensors. *(It's like walking down a busy street, taking a last look around and closing your eyes. The longer you remain blind, the less relevant & useful your last memory will become.)*

Units that manage to get through their "isolation" and re-join their side comms network share their contact information. You can use



this to model things like film-return satellites (*the Russians still use them!*), a submarine sharing its intelligence take after rejoining its battlegroup etc. If the parent side already has these contacts, the updated information (*including BDA – very handy!*) is merged and used to refine the contact information.

As mentioned, the player has no control over his "disconnected" units. However, playing out a scenario in ScenEdit mode (which is essentially "cheating" but also very useful for analysis) affords an additional ability: To literally jump into the cockpit/CIC of the isolated unit and experience its "loneliness" first-hand (Editor → Isolated POV view. This menu selection is only available when the "Comms Disruption" feature is enabled for the scenario). This is an excellent way to understand how a comms-isolated unit perceives its environment and reacts to it (which is usually quite different from when it operates as part of an integrated network). Quickly switching between "side-wide common picture" and "isolated POV view" can be a real eye-opener as to the value of a well-connected battleforce and the hazards and challenges of "comms off". It is simple enough to say "we'll not transmit so the bad guys cannot sniff us out". But how well can you really fight in the dark?

## Living with vulnerable comms

During the course of our internal testing, we realized players using this new feature will probably have to adjust to a different mindset as well as absorb the new options it affords them. A few random thoughts:

- Non-kinetic options are now significantly more expanded. Forget jamming radars; now you can do some real sneaky tricks. It is remarkable how much more brittle and inefficient, say, an IADS becomes when you can selectively take any of its critical nodes offline. *Michael Scofield would love to be able to brick the guards' phones during his break-out/break-in escapades.* Put another way: Going ultra-stealth or swarming cruise missiles over every radar & SAM site are no longer your only, or even your best options.

- An initial tempting thought was to freely use comms disruption as a standard built-in feature to all existing scenarios. We soon discovered, in hilarious ways, how this can wreck scenarios that were not designed with this factor in mind. As an example, in the standalone scenario "Duelists", we "flipped the switch" on the Soviet surface group just to see what would happen. Because the group had a standing "forbidden zone" around it that automatically marked violators as hostile, and in combination with very liberal "shoot first" ROEs, the ships in the group almost immediately proceeded to blow each other out of the water with righteous fury, with even a distant Oscar sub joining the action with its beastly antiship missiles. It really was blue-on-blue in its most pure, raw form.
- Apart from the obvious step of making this new feature optional so that existing scenarios can function as before, we also added a lot of "reasonable smarts" to the AI crews so that events like the above Soviet shootout were less likely to happen. So for example, when detecting a new contact close to where a friendly off-grid unit was last known/reported, the side-wide AI is now a bit more careful even if the new contact is a violator of a forbidden zone ("easy on the trigger, guys... maybe it's Garry after all"). Likewise, cut-off units compare their new contacts with the most recent datum of their known comrades and will ignore contacts that seem to be right on top of where their buddies were when they last heard from them. After putting together such refinements and re-trying the Duelists test, the isolated Soviet units were now significantly more restrained on how they prosecuted sudden new contacts after their breakaway.

*(On the flip side, if you are the one creating the chaos, this creates excellent "false flag" opportunities for exploiting it. For example, if you can swiftly and unobserved dispatch comms-isolated units that are part of an enemy distributed force, the longer you can remain in their general location the longer it may take for their friends to get suspicious of you. Cloak and dagger fans rejoice!)*

- Comms vulnerability really drives home the dirty little secret of most network-based CONOPS. People talk about swarms, distributed lethality and all the rest of current jargon – but all of this assumes reliable communications. This also reinforces the importance of sufficient individual capability: A modern warship, even when comms-isolated, is still a powerful unit. It has a fair chance of accomplishing its mission even without the obvious benefits of cooperation with its consorts. On the other hand, a "swarm" unit (be it a small speedboat, a drone etc.) that relies on the "my strength is in the pack" principle? Take comms off and its power drops precipitously (it is not an accident that comms-jammers are rather more favored for counter-drone defence than hard-kill measures).

Some other scenario-editing ideas for taking advantage of this feature:

- Special actions, with units on the opposing side getting their comms knocked out. This is used to simulate a computer network attack, but could also represent saboteurs physically disrupting the comms network.
- A "unit enters area" trigger where a friendly unit representing a jammer (ie, an EA-6B Prowler or similar) arrives on station. The script is fired, and representing its jamming capabilities, units on the opposing side have their comms taken out.
- A "unit enters area" trigger where run-off the mill friendly units get their comms knocked out, forcing them to continuing prearranged missions or move aimlessly in circles until they run low on fuel and return to base. This, especially in earlier-period scenarios, simulates units outrunning their lines of communication. It can also be used to simulate submarine operations.

## Looking forward

Further improvements to the comms-disruption feature are already planned and underway, but most of them are currently restricted to the Professional Edition. In the meantime, it is obvious that this feature represents a huge step forward in modeling the intricacies of modern operations, and scenario authors are likely going to have a creative blast with it just like with other existing features. **What are YOU going to do with it?**



# The new features of Chains Of War: Aircraft Damage

APRIL 27, 2017 • POSTED IN [COMMAND](#)



The "Release Candidate" (ie. public beta) phase of the v1.12 update (the companion to the upcoming "Chains Of War" DLC pack) continues steadily [on the MatrixGames forum](#). The feedback on the new additions like the new 2x time compression step and much improved 4K/UHD support has been overwhelmingly positive, and the new sonar masking feature has also been well received. Chains of War, however, will introduce [a number of major new features](#) with significant effects on scenario design and gameplay. We already had a look at [communications disruption](#). Today we are looking at another significant enhancement, aircraft damage.

**NOTE: This feature requires Chains Of War to be installed.**

## Getting back home – in one or more pieces



– The other problem is that the A-10 is vulnerable to hits because its speed is limited [...]. **We had a lot of A-10s take a lot of ground fire hits.** Quite frankly, we pulled the A-10s back from going up around the Republican Guard and kept them on Iraq's [less formidable] front-line units. That's fine if you have a force that allows you to do that. In this case, we had F-16s to go after the Republican Guard.

– At what point did you do that?

– I think I had **fourteen airplanes sitting on the ramp having battle damage repaired**, and I lost two A-10s in one day [February 15], and I said, "I've had enough of this..."

(Interview of [Chuck Horner](#) to Air Force Magazine, June 1991)

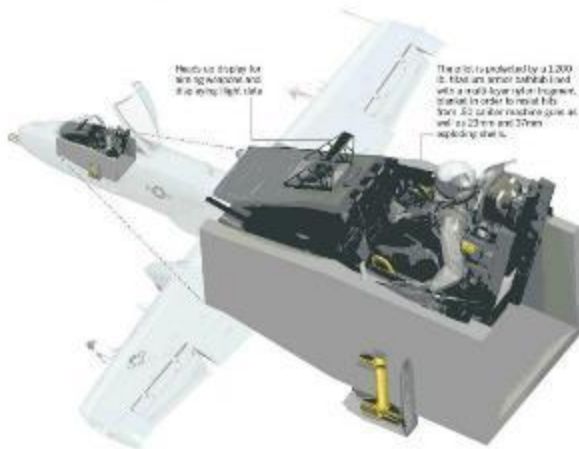
Comprehensive aircraft damage modeling, while well-modelled on most combat flight simulators, is something of a rare appearance on grand-tactical, operational or strategic-level simulations and wargames, for a number of reasons. Command, following the paradigm of numerous other similar titles before it, started with the simple binary "100% healthy until shot down" model for aircraft. It has always, however, been our intention to do something more comprehensive. With v1.12 we are taking a significant step forward in this regard.

When the “Aircraft Damage” feature is enabled on a scenario (it is “off” by default in order to avoid disrupting existing scenarios), aircraft are evaluated for specific damage when hit by a weapon. Each aircraft now has a damage-point value representing its fundamental structural tolerance (similar to ships, subs and land units & facilities) plus three distinct armor levels – for cockpit, fuselage and engines. When a weapon impacts the aircraft, the damage is applied to the overall structure and in addition the chance of penetration is evaluated against each armor level. Each penetration probability is obviously dependent on the armor level and the nature and severity of the weapon warhead (e.g. penetrating rounds have a better chance than impact-explosive ones), but geometry factors are also taken into account; for example a cockpit hit is far more probable if the weapon impacts in the frontal quarter, engine hits are most common in rear-quarter impacts, while the fuselage is most vulnerable to side hits.

*This Fulcrum driver is having a rather bad day*

| Damage Status for MiG-29 Fulcrum A |             |
|------------------------------------|-------------|
| Damage: 6%                         |             |
| Name                               | Status      |
| <b>Mounts</b>                      |             |
| 30mm Gsh-30-1 [150 mds]            | Operational |
| BVP-30-26M x 2 [60 Cartridges]     | Destroyed   |
| <b>Sensors</b>                     |             |
| Slot Back [N-019 Rubin]            | Damaged     |
| OLS-K [IRST]                       | Destroyed   |
| SPO-15 Beryoza [L-006]             | Operational |
| OLS-K [Laser Rangefinder]          | Operational |
| Mk1 Eyeball                        | Operational |
| <b>Comms &amp; Datalinks</b>       |             |
| UHF/VHF Radio [Unsecure]           | Destroyed   |
| HF Radio [Secure]                  | Damaged     |
| <b>Engineering / Propulsion</b>    |             |
| RD-33 #1                           | Destroyed   |
| RD-33 #2                           | Operational |

Similar to other platform types, when immediate damage is sustained, secondary fires can also erupt. The aircraft crew will attempt to suppress those every 5 seconds. The fire burns through the aircraft fuselage quite rapidly, causing structural damage, and if it evolves to conflagration can even cause a fuel explosion, destroying the aircraft (*few things are as infuriating as blowing up from uncontrollable fire just as you are on final approach to land...*). Critical hits from penetration are also possible; if the cockpit is compromised the aircraft is immediately out of control and destroyed, whereas a critical hit to an engine will damage or destroy it (for single-engine aircraft this has rather unpleasant consequences). Aircraft with at least one operational engine can still limp back home but all their kinematic properties are negatively affected. A plane with more than 80% structural damage will disintegrate in mid-air.



Because the existing armor levels were geared mostly towards surface & land targets (the smallest amount of armor being 40mm RHA equivalent), we also had to add several lesser armor levels in order to properly differentiate the differences in armor commonly found on aircraft. The revised armor levels are:

- **None** (Human flesh, unarmored aircraft etc.)
- **Armor – Handgun** (Human body armor or equivalent – can stop a handgun/pistol round)
- **Armor – Rifle** (human body armor or equivalent – can stop a rifle or LMG round (5.56 / 7.62mm etc.))
- **Armor – HMG** (can stop a heavy machine gun or heavy sniper rifle round (12.7 / 14.5mm etc.))
- **RHA – 20mm** (20mm RHA – can stop a 20mm AP round)
- **RHA – 25mm** (25mm RHA – can stop a 25mm AP round)
- **RHA – 30mm** (30mm RHA – can stop a 30mm AP round)
- **RHA – 35mm** (35mm RHA – can stop a 35mm AP round)
- **Light** (41-90mm RHA – as before)
- **Medium** (91-140mm RHA – as before)
- **Heavy** (141-200mm RHA – as before)
- **Special** (201+ mm RHA – as before)

The topmost armor levels will naturally have to be revised in the future as we [ REDACTED ].



Aircraft are also assigned “damage tolerance” levels before they abort/RTB. For fighter and attack aircraft this is set to 30%, for CAS aircraft 50%, and for all other aircraft to 10%. Once this threshold is exceeded, the aircraft breaks off and attempts to RTB. The player can of course issue an RTB order before this level is exceeded. Damaged aircraft will jettison their heavy stores when RTBing due to damage (regardless of the “Jettison stores under attack” doctrine setting).

## Down for repairs

Damaged aircraft that manage to return to their base are not “magically” restored; they need an extensive amount of time to be repaired. The so-called “Estimated Time To Commission” (ETIC) value is calculated based on the extend and types of damage and may range from a few additional hours to entire days or even weeks. Obviously, depending on the duration of the scenario, this may mean that an aircraft is effectively out of the fight (*On the Professional Edition, the method for calculating the ETIC is far more extensible and can use private customer data*). The estimate for the repair time is communicated to the player through the message log, for example: *"Aircraft-X (class Y) has damage that requires an estimated time-Z to restore. The repair time will be added to the aircraft's ready-time."*



Developing and testing the improved damage model for aircraft has been a lot of fun for the dev & beta teams. There are cases where the differences in combat resolution are not significant; for example heavy AAMs or SAMs will take down a small aircraft, no ifs and buts. On the other hand, with light-caliber AAA or missiles with small warheads (Stinger, AIM-9 etc.) and particularly against large or well-armored aircraft the effect is quite dramatic. We were never comfortable with the fact that a single Stinger or machine-gun burst could bring down a B-52 with a lucky hit; this is now rectified.

Another factor (and a significant “last straw” in making us not delay this feature any longer) is the gradual service introduction of high-energy lasers. By their nature, these are currently not powerful enough to take down an aircraft (or in fact even large drones) with a single burst; concentrated or consistent fire is necessary (oddly, this is reminiscent of gunfire-vs-aircraft in WW2). The improved AC damage model is ideal for modeling this peculiarity which will probably last for at least the near future.

May your battle damage repairs never keep you down for long!

# The new features of Chains Of War: Lasers, railguns and tactical EMPs

MAY 4, 2017 · POSTED IN [COMMAND](#)



The "Release Candidate" (ie. public beta) phase of the v1.12 update (the companion to the upcoming "Chains Of War" DLC pack) is wrapping up [on the MatrixGames forum](#). The feedback on the new additions like sonar masking, the new 2x time compression step and much improved 4K/UHD support has been very positive. We have already covered two of the [new major features](#) in the DLC, [communications disruption](#) and [aircraft damage](#). Today we are looking at some of the new weapon systems introduced in v1.12.

**NOTE: This feature requires Chains Of War to be installed.**

## Ray of light: High-Energy Lasers

Combat lasers have been on the drawing board and test lab ever since the days of SDI, but advances in materials and engineering are finally enabling their long-awaited breakout in the field. Command has featured two major representative systems from its initial release (the [YAL-1 COIL laser](#) and the [AN/SEQ-3 LaWS](#)), but for the needs of Chains Of War and the v1.12 update we have undertaken a thorough revamp of the mechanics.

Command now models four distinct types of laser systems, each with its own peculiarities:

- [Chemical oxygen iodine \(COIL\)](#)
- [Deuterium Fluoride](#)
- [Carbon Dioxide](#)
- [Solid-state / fiber](#)



As an example of the practical differences, COIL and DF are so-called "chemical" lasers and use magazines of chemical materials to shoot, which need to be replenished just like gun rounds. CO2 and SSL lasers on the other hand replenish their ready-to-fire "magazine" by drawing power directly from their parent platform's powerplant (no UNREP necessary!). Of course this also means that if the powerplant is not working for any reason, the magazine will be depleted.

This would appear to put chemical systems at a severe disadvantage; however, chemicals generally dissipate their thermal waste more easily (heat management is a major issue in solid-state lasers). This allows them to enjoy both a superior rate of fire and usually achieve greater power output per shot – thus greater absolute range and damage-at-range than CO2 & SSL lasers. (Solids typically



counter this by ganging up lots of small-power emitters and converging their beams at the target point. Fibers make this easier, but aiming is obviously more complicated.)



*Taste the rainbow.*

Each laser type uses different operating wavelengths and this affects both their atmospheric losses and their actual absorption factor by the target surface.



HELs bring unique strengths and challenges to the combat environment. For instance, aircraft under attack by HELs do not get any evasion ability at all, since there is no practical delay between shot and impact; the pilots can only pray that the aim itself is defective. Laser mounts are susceptible to the same accuracy modifiers as unguided weapons like guns and rockets (for example, in a rocky sea a small ship will be a significantly less stable firing platform than a large one), but to a lesser extent thanks to their instant transmission.

HELs offer an instant attack on a target at significant range, but their actual on-target delivered power reduces dramatically with distance, even in "ideal" atmospheric conditions (this is part of why the AL-1 ABL was meant to cruise over the clouds). Under bad weather conditions their range shrinks even more, even down to almost nothing. They also need a clear line of sight to work.

Despite their tremendous future potential, HELs currently are generally not powerful enough to bring down anything larger than a small drone with one shot. Against aircraft, they somewhat resemble WW2 flak guns: They can shoot down an aircraft, but it usually takes a while to do so. This, incidentally, necessitated the introduction of the improved [aircraft damage model](#). For this reason, scenario authors are encouraged to activate the aircraft damage feature when building a scenario that features AAW-capable HELs; otherwise, these systems may be too overpowered, swatting aircraft out of the sky like flies with single bursts.



## Speed kills: Railguns and HVPs



Railguns are a frequently misunderstood subject with a lot of urban legends and myths floating around. [This most excellent primer on Reddit](#) is a good starting point for a quick refresher at the fundamentals.

Railguns conceptually are similar to conventional gun rounds. What makes them special are the very high muzzle velocities they can achieve (which directly translate to large absolute range and tremendous impact energy-at-range), and the fact that they use electric rather than chemical/propellant power for the projectile acceleration; combined with the typically smaller projectile weight & volume this allows vast improvements in magazine capacities.

A most interesting spinoff of railgun development has been the realization that the high-velocity projectiles (HVPs) that have been developed for railguns can in fact be also adapted/scaled to be fired from current conventional gun systems. This allows spreading the benefits of the new technology on fleet platforms before the proper “full capability” rail mounts reach operational maturity. The latest version of the DB3000 database shipping with the v1.12 update includes the 155mm/52 AGS HVP (used by a new 2018 variant of the DDG-1000 Zumwalt) and the 127mm/62 HVP, fired by a modified Mk45 Mod 4 gun (Mount #3016) suitable for placing on any modern surface combatant. More types will be added as additional systems are introduced into service.

Did we mention that these projectiles are pretty fast, and they can punch through some serious armor?

## “Instead of Hiroshima, you get the 17th century”: Tactical EMPs



Already since the release of [v1.09](#) and [Northern Inferno](#), Command has made it possible to generate a massive [electromagnetic pulse](#) through a high-altitude nuclear detonation (*GoldenEye!*), with frequently catastrophic effects on exposed platforms and their component sensors and comm systems. Non-nuclear systems producing [a more localized variation of the same effect](#) are now gradually entering service, offering new “non-kinetic” disruption capabilities and expanded tactical options. Command models both major variants of tactical EMP warheads; the v1.12 update includes omni-directional systems a.k.a “EMP grenade” types (*Directional systems like the USAF-developed [CHAMP](#) are available on the [Professional Edition](#).*

Tactical EMP systems can act as an “trump card” by disrupting a carefully-constructed adversary network; their effect is most profound when they are combined with coordinated electronic attack and [communications disruption](#) to completely dislodge the enemy’s plan. They can also be used alone literally as “grenades”, temporarily punching an electronic hole through an otherwise inaccessible strong enemy screen.

```

10:10:37 AM - 10:10:37 AM - SAM Bn (SA-10a Grumble [S-300PT-1]) damage report: Flap Lid A [5N63] has been destroyed!
10:10:37 AM - 10:10:37 AM - SAM Bn (SA-10a Grumble [S-300PT-1]) damage report: Clam Shell [5N66] has suffered moderate damage.
10:10:37 AM - 10:10:37 AM - SAM Bn (SA-10a Grumble [S-300PT-1]) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - BA Control Tower (Building) damage report: UHF Radio [Secure] has suffered moderate damage.
10:10:37 AM - 10:10:37 AM - BA Control Tower (Building) damage report: HF Radio [Unsecure] has suffered light damage.
10:10:37 AM - 10:10:37 AM - BA Control Tower (Building) damage report: VHF Radio [Secure] has suffered light damage.
10:10:37 AM - 10:10:37 AM - BA Control Tower (Building) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - AAA Bty (100mm KS-19 Auto [Sair] x 4, GFCR) damage report: Generic Gun Director [Radar] has suffered moderate damage.
10:10:37 AM - 10:10:37 AM - AAA Bty (100mm KS-19 Auto [Sair] x 4, GFCR) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - AAA Ptl/2 (23mm ZSU-23-4 Shilka x 2) damage report: Gun Dish [RPK-2 Tobol] has suffered moderate damage.
10:10:37 AM - 10:10:37 AM - AAA Ptl/2 (23mm ZSU-23-4 Shilka x 2) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - AAA Sec (35mm Oerlikon x 2, Skyguard FCR) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - AAA Ptl/3 (23mm ZU-23-2 x 2) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - SAM Sec (SA-16 Ginet [9K310 Igla-1] MANPADS x 3) is being hit by an EMP wave!
10:10:37 AM - 10:10:37 AM - Radar (Tin Shield A [5N59]) is being hit by an EMP wave!
10:10:36 AM - 10:10:36 AM - Weapon: SA-10a Grumble [5V55KD] #3482 is running blind for more than 5 sec... self-destructing.
10:10:35 AM - 10:10:35 AM - Contact GuidedWeapon #16 has been lost.
10:10:35 AM - 10:10:35 AM - Weapon: PL-BA [Python 3] #3485 is attacking AGM-158B JASSM-ER [O-EMP] #3453 with a base PH of 85%. Sea-skimmer modifier: -30%. Target speed modifier: -5%. Final PH: 50%. Result: 2 - HIT
10:10:33 AM - 10:10:33 AM - Weapon: SA-20a Gargoyle [48N6] #3478 is running blind for more than 5 sec... self-destructing.
10:10:31 AM - 10:10:31 AM - Contact GuidedWeapon #13 has been lost.
10:10:31 AM - 10:10:31 AM - Weapon: SA-10a Grumble [5V55KD] #3482 has no eligible alternative target to be redirected to...
10:10:31 AM - 10:10:31 AM - Weapon: SA-20a Gargoyle [48N6] #3488 is attacking AGM-158B JASSM-ER [O-EMP] #3455 with a base PH of 80%. Target signature modifier: -20%. Final PH: 60%. Result: 12 - HIT
10:10:30 AM - 10:10:30 AM - Weapon: SA-20a Gargoyle [48N6] #3489 is running blind for more than 5 sec... self-destructing.
10:10:29 AM - 10:10:29 AM - Contact GuidedWeapon #6 has been lost.
10:10:29 AM - 10:10:29 AM - SAM Bn (SA-10a Grumble [S-300PT-1]) is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - NAS BA Control Tower (Building) damage report: MF Radio [Secure] has suffered light damage.
10:10:29 AM - 10:10:29 AM - NAS BA Control Tower (Building) damage report: UHF Radio [Unsecure] has suffered light damage.
10:10:29 AM - 10:10:29 AM - NAS BA Control Tower (Building) damage report: HF Radio [Secure] has suffered light damage.
10:10:29 AM - 10:10:29 AM - NAS BA Control Tower (Building) is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - Bandar Abbas West is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - Bandar Abbas East is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - AAA Bty (100mm KS-19 Auto [Sair] x 4, GFCR) is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - AAA Ptl/3 (23mm ZU-23-2 x 2) is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - AAA Sec (35mm Oerlikon x 2, Skyguard FCR) damage report: UAR-1021 Skyguard has suffered heavy damage.
10:10:29 AM - 10:10:29 AM - AAA Sec (35mm Oerlikon x 2, Skyguard FCR) is being hit by an EMP wave!
10:10:29 AM - 10:10:29 AM - SAM Ptl (SA-13 Gopher [9K35 Strela-10]) is being hit by an EMP wave!

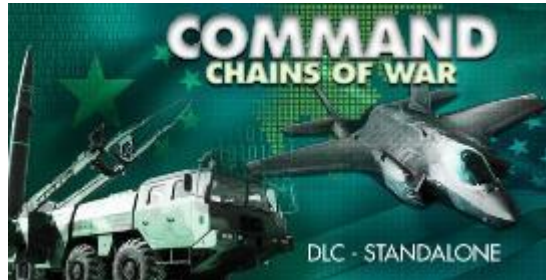
```

*On the receiving end of a tactical-EMP strike. It hurts.*

Tactical EMPs provide even more flexible solutions to existing tactical problems are we are quite curious to see how experienced players will put them to use.

# The new features of Chains Of War: Cargo, amphibious and airdrop operations

MAY 11, 2017 · POSTED IN [COMMAND](#)



The public beta phase of the v1.12 update (the companion to the upcoming "[Chains Of War](#)" DLC pack) has been concluded, and the "Gold" version is now going through the production paces. We have already covered most of the [new major features](#) in the DLC, such as [communications disruption](#), [aircraft damage](#) and the [new weapon types](#). Today we are looking at arguably the most anticipated new feature of v1.12: Cargo, amphib and airdrop operations.

**NOTE: This feature requires Chains Of War to be installed.**

## "Professionals study logistics"



Faithful representation of landing & airdrop operations was a high user request even back on the early alpha development days of Command. The v1.0 release shipped with a respectable system that combined the [new docking-operations](#) ability and the rich new capabilities offered by the powerful event editor (and later Lua), the classic example being along the lines of "once amphib/transport/airdrop vehicle X reaches area/point Y, teleport/spawn unit-Z on the vehicle location to simulate the drop off". This worked, but was of course limited (for example the player was restricted in which areas he could disembark forces); [poaw](#) illustrated the limits of this system hilariously in [his not-a-review of CMANO v1.0](#). We were aware of these restrictions and have been gradually working on "something better".

Probably a lot better.

## Transportable forces, and the people who [love](#) carry them

In Command's terminology, all units that that can be transported by other able units are counted as "cargo". This can cover anything from foot infantry up to super-heavy vehicles or transportable facilities. In order to realistically restrict what any unit can carry, we had to expand the available information both for the units marked as carry-able and the units that can act as transports:

- For transportable units, the volume, weight and crew properties are populated in the databases. The general type of the unit is also delineated as one of five basic types (personnel teams [*Squads*, *MANPADS*, *ATGM*], small cargo [*Car*, *AAA Guns*, *light guided weapon*], medium cargo [*APC*, *Towed Arty*, *heavy guided weapon*], large cargo [*Tank*, *missile TEL*, *Trailer*], and very large cargo [*IRBM* / *ICBM TEL*]).

- For units that can act as transports, their available weight, volume and crew limits are also present in the databases. Each unit also has a “maximum cargo type” indicator for the kind of load it can carry. For example, while you can cram quite a few people into a C-130 if you get creative, you cannot really load a medium tank on it (*It’s been tried. Once.*)

When the time comes to actually start loading, manually or automatically, these properties are cross-checked and either presented to the player as restrictions or obeyed by the crew AI in its decisions as to what to load where.

Transfer of units can occur both between one independent unit and another (e.g. personnel from one ship to another), or from a parent host to its hosted unit (e.g. from a pier to a docked ship, or from LPD to hosted LCAC), or from a host unit to any arbitrary point on the map.

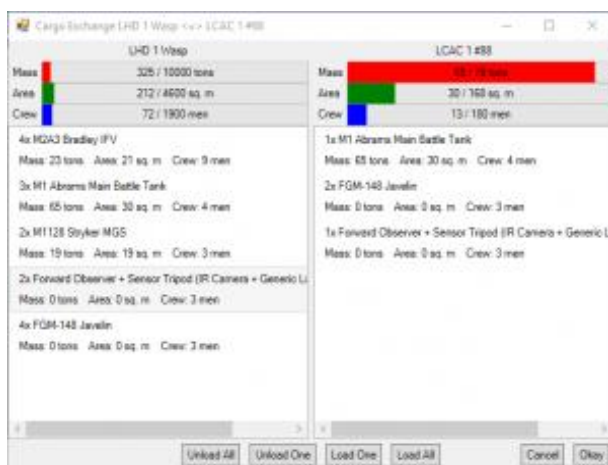
The loading of able units in suitable hosts, as well as the actual transport from X to Z, can happen in either mission AI-driven mode or with direct player intervention.

## By hand and heart



Like every feature in Command, there is always the option to perform every action manually. Cargo is no different.

Pictured below is the interface for exchanging cargo between docked units and their hosts (think: hovercraft in the well-deck of a LHD, or a C-130 at an airbase).



This example illustrates a typical airdrop, with all the steps performed manually by the player:

And this video demonstrates transloading a heavy assault force from a naval base to a Wasp-class LHD that is currently docked at the pier, and preparing for an amphibious landing:

# We're on a cargo mission from God

So only the micromanagers get to have all the fun? No way! A new class of mission ("cargo mission") has been added for those who prefer a more "hands off" approach (and of course for the benefit of non-friendly AI sides).

The screenshot displays the 'Mission Editor' window with the 'Cargo Mission' selected. The interface is divided into several sections:

- Missions:** A list containing 'Cargo Mission'.
- Units assigned to mission:** A list showing 'LCAC 1 #88 (LCAC 1)' and 'LCAC 1 #89 (LCAC 1)'. Below this are buttons for 'Ready selected aircraft', 'Mark selected as escorts', and 'Un-Mark selected from escorts'.
- Unassigned units:** A list of available units including '2x C-130J Hercules', 'Djibouti-Ambouli International Airport/Camp Lemonier', 'Landed Detachment #85 (Landed Detachment)', 'LHD 1 Wasp (LHD 1 Wasp)', and 'Structure (Pier (Extra Large, 200-500m)) (Structure (Pier (Extra Lan...))'. A 'Ready selected aircraft' button is at the bottom.
- Mission Name:** Set to 'Cargo Mission'.
- Mission Summary:** A tabbed interface with 'Cargo options' selected. It includes:
  - Motherships:** A list with 'LHD 1 Wasp'.
  - Cargo items to unload:** A list with 'M2A3 Bradley IFV 0 / 4', 'M1 Abrams Main Battle Tank 4 / 4', 'M1128 Stryker MGS 0 / 2', 'Forward Observer + Sensor Tripod (IR Camera + Generic Laser Designator) 0', and 'FGM-148 Javelin 0 / 6'.
  - Aircraft Throttle and Altitude:** Settings for 'Transit Throttle' (Cruise), 'Landing Zone Throttle' (Afterburner/Flank), 'Transit Altitude (ft)' (2,000), and 'Landing Zone Altitude (ft)' (1,000).
  - Ship Throttle:** Settings for 'Transit Throttle' (Cruise) and 'Landing Zone Throttle' (Cruise).
- Edit Beach Area:** A section with a list of points (RP-90, RP-91, RP-92, RP-93) and buttons for 'Add points currently highlighted on map', 'Remove selected', 'Highlight + center on selected point', and 'Validate Area'.
- Issues:** An empty list for reporting problems.

Additional controls on the left include 'Create New Mission', 'Delete Mission', 'Status' (Active), 'Activation Time' (Date: None, Time: None), and 'Deactivation Time' (Date: None, Time: None). At the bottom, there are buttons for 'Mission Doctrine, EMCON, WRA' and 'Escort Doctrine, EMCON, WRA', along with a checkbox for 'Scrub mission if side is human'.

Cargo missions are broken down by the units (hovercraft, helicopters, aircraft) assigned to unload, and then by the cargo items themselves. Multiple cargo missions can be assigned to fine-tune the locations where the units are unloaded.

The mission progresses in a cycle, the units assigned to the mission load up units from their assigned base – either a ship at sea (LHD, LHA, CV etc) or an airbase – then take off, set course to the mission area reach the mission, then unload, and RTB. This continues until every piece of cargo has been unloaded.

Using our previous example with the amphibious assault force now in position, we can either manually again transfer the mobile units from the large amphib to its hosted LCACs and helicopters and fly/sail them to the beach...

....or we can create a cargo mission to handle the landing, and sit back and watch:

## Looking forward

One future direction the cargo functionality could move in is allowing weapons to be moved from airbase to airbase by cargo aircraft. An example of this might be an embattled Norwegian airbase in the opening hours of WWII eating through AMRAAMs like they were candy. Large stocks of AMRAAMs exist in bases in the UK, so let's pack up 40x AMRAAM on the next C-130 flight heading towards the frontlines. There are quite a few similar use cases and we are open to community feedback as to which cases deserve development priority and why.



# Appendix - CMANO official updates

Since its initial release, Command has enjoyed a series of significant free updates provided by the Warfare Sims development team. In order of release these are :

**v1.01, released on October 9, 2013**, was a quick-fix update to resolve

issues discovered during late beta or just after the v1.00 release, and

incorporate early customer feedback. Its main new features were:

- Significant performance increase, both for UI (map zoom/pan) and sim-core execution (which in turn means even better scalability). Also the high-fidelity mode (0.1 sec pulse in realtime) is now optional instead of mandatory so Command runs great even on low-spec machines – and screams on capable rigs.
- UI enhancements: Option to zoom at mouse location, option to ghost/hide sonobuoys, ability to quickly de-select all reference points, ability to abort aircraft launches, ability to order hold-fire on multiple selected units/groups.
- DB viewer enhancements: Dedicated weapon page, various improvements on existing pages.
- Scen Editor improvements, e.g. the "Add Unit" window remembers its last used filters (much fewer clicks needed).
- Simulation mechanics improvements (refined dive rates, helmet-mounted sights, semi-active SAMs in anti-surface mode etc.)
- Four scenarios previously available separately (community downloads) were integrated on the standard release: Brother against Brother, Canary's Cage, Choking Halifax and Fighter Weapons School – GAT 5&6.



**v1.02, released on December 19, 2013**, was the first comprehensive update.

Its main features were:

- Significant improvements on performance, scalability and stability.
- Improved user interface (UI) with lots of new features, fixes & changes in every aspect (map, unit control, DB viewer etc.) straight from user feedback
- Improvements to the scenario editor & mission editor
- More configurable realism options (e.g. unlimited aircraft weapons at bases) for users who want to quickly experiment
- Improved simulation realism with new features like variable crew proficiency (side-level only), improved sonar modeling, more AI & doctrine options and other additions & fixes
- Improved multimedia experience with new sound effects & optional background music.



**v1.03, released on March 21, 2014**, focused on further improving

performance and stability:

- Greatly improved game speed with the new no-pulse (aka "Turbo mode") time mode.
- Improved stability with hundreds of crash/bug/logic-flaw fixes.
- Further realism features like realistic loadout drag & weight effect on fuel consumption ("Christmas tree" loadouts now have a price), enhanced weather effects and refined air-ops AI options.
- Countless database & installation additions – from WW2-era IJN aircraft and hypothetical Cold War units & weapons like the Yak-141, Ulyanovsk CVN, F-23 ATF, A-12 Avenger II, Super Tomcat 21 and "son of Phoenix" AIM-152 AAAM all the way to ultra-modern hardware like the MOP super bunker-buster, Club-K container-launched cruise missile, the UK's Type-26 frigate, Russian Vityaz and Morfey SAMs and Chinese burgeoning air and naval forces.



**v1.04**, released on July 9, 2014, further emphasized air operations by introducing the "strike auto-planner", effectively a "light" version of the comprehensive strike planner currently under development which automatically plots sensible ingress & egress profiles for strike missions, thus providing a ready-to-modify template to the player. Other changes and additions were:

- An extensive array of UI enhancements such as wireframe-only map view, selection-only range symbols, new hotkeys, menu list for quick-jump slots, additional information on the database viewer, configurable ghosted-unit visibility, configurable plotted course visibility, one-click jump to unit mission, single-icon enemy groups and more.
- AI and mission editor additions such as configurable sprint-and-drift, optional prosecution areas for patrols (which significantly improved the AI's ability to avoid hopeless long-range shots or fall victim to player draw-out ambushes), new doctrine options and more.
- Improved simulation mechanics such as multiple cloud conditions, refined offboard-sonar modelling, ABM/ASAT guidance refinements, realism improvements for anti-missile engagements, longer-range AI torpedo shots and more.
- Further performance & stability improvements.



**v1.05**, also known as "Wargame Of The Year" edition, was released on September 26, 2014 concurrently on [Steam](#) and the MatrixGames site. It boasted [improved simulation performance, a massive overhaul of air refuelling AI and mechanics, BVR cranking, Non-Cooperative Target Reconition \(NCTR\) functionality and improved damage & repair modelling](#), as well as a host of issue fixes and database additions.



**v1.06** was released on December 17, 2014. It features significant improvements to [modeling "surge" air operations, unit-level proficiency settings](#), and most importantly [incorporates the Lua scripting language to its scenario editor](#), offering unprecedented scripting abilities. It also boasts [numerous other tweaks and additions](#).



**v1.07** was released on March 9, 2015. It includes three flagship new features and numerous minor additions:

- [Weapon](#) tailoring of (how weapons
- [Mission](#) editor with friendly tasking.
- [Scenario](#) scenario (map have them without

Other features

- Tons of UI anti-ship redesigned manual weapon allocation window, contact filter-out (even more map declutter) and much more.
- Lots and lots of additional Lua scripts.
- Better performance on scenarios that use zones (ie. most scns out there).
- Massive overhaul of AAW missile endgame logic; [target speed matters more, and the evasion bonus must now be earned instead of automatically granted](#).
- Bigger effect of crew proficiency on damage control & underway repairs.



[Release Authorization](#), which allows precise weapon allocation and engagement doctrine many weapons per target, shoot early or conservatively etc.) according to individual and target types.  
[Editor 2.0](#), a thoroughly revamped mission lots of new options for tailoring of both and enemy AI behavior depending on asset

[Attachments \(aka auto-bundling\)](#), which allows authors to include various attachment objects overlays, Lua scripts etc.) to a scenario and executed automatically on scenario startup manual player action.

& improvements included: enhancements such as discrete range rings for and land-attack weapons, even more hotkeys,



- Improvements to submarine battery recharge rates.

**v1.08** was released on July 14, 2015. It includes:

- New simulated weapon systems such as anti-torpedo torpedoes and related torpedo-warning sensors, new warhead types such as enhanced fragmentation ("superfrags"), new weapon types such as "Contact explosive" (for modelling sabotage or suicide bombs), a new ship type (Mobile Offshore Base (aka "Battle Island")) etc.
- A number of user interface enhancements: Players can now observe the engagement arcs of a unit mount, permission-dependent color of targeting vectors, coastline/border fade-out on zoom (as in GE), the manual weapon allocation window can present to the player the "soft" restrictions (WRA/WCS/other doctrine settings), various tweaks to mission editor UI. etc.
- Simulation improvements: Major speed boost on large scenarios, more accurate uncertainty areas for long-range passive detections (SOSUS, ESM etc.), more reliable sub battery recharge, improved sub-captain AI on chasing after unreachable targets, snap-up/down limits for AAW guided weapons, side-firing gunships (e.g. AC-130) now maneuvering properly, more realistic UNREP transfer rates, speed-dependent aircraft IR signatures (e.g. supercruising aircraft can be picked up on IR sensors at longer ranges), tweaks to damage modelling related to light-caliber automatic weapons, realistic "no scan while painting" limitation on older mechanical radars etc.
- Various scenario editor improvements such as the "Can Auto-track civilians" side-level ability, Lua speed enhancements etc.



**v1.09** was released on October 22, 2015. Its flagship new feature was of course the included "Northern Inferno" standalone DLC, a 15-scenario campaign forming a storyline set on 1975 in the North Atlantic.

Other features of this release included:

- The ability to construct campaigns just like Northern Inferno through the integrated scenario editor.
- Nuclear EMP: Nuclear detonations now generate a proper electromagnetic pulse which can really fry sensors in the vicinity – or really far away. The magnitude and radius of the effect vary with detonation altitude and realistically affect different sensor tech generations (wonder why the Russians still like vacuum tubes?).
- New UI/Map features like optional map placenames and the ability to display either all detected contact emissions or only those that are fire control-related.
- Massive speed improvements on large, complex scenarios.
- New Lua scripting functions like "Add Explosion" and "Change Unit Side".
- Three new tutorial scenarios, from Mark Gellis' popular "Uncle Mark's Tutorials" series.



**v1.10** was released on February 26, 2016. It was the first version to make use of the Steam Workshop functionality, enabling Steam users to easily upload new scenarios. Other features included:

- Waypoints for cruise missile attacks
- Cooperative Engagement Capability (CEC / NIFC-CA)
- Improved ABM modelling
- One-click EMP strikes
- Improvements to electronic warfare modeling
- Weight-dependent aircraft kinematics
- New ScenEdit and Lua features
- Numerous gunnery-related improvements and numerous fixes, DB additions and other tweaks.



## **v1.11 was released on May 9, 2016.**

One of its marquee features is vastly expanded pier operations (ships can now rearm, refuel and repair at docks) which adds an operational/strategic layer to Command's scope. Other new features include:

- Proper Winchester, Shotgun, Bingo, Joker and Chicken states for aircraft
- Thoroughly revised air-to-air refueling mechanics and AI
- AGL altitude settings, stores jettison and mission player feedback
- Pier Operations and revised replenishment rates
- ORBAT recon of air/naval bases
- New submarine options and massive performance gains
- "Neutron wave" effect of nuclear detonations

In addition, each released update contains numerous bug fixes and additions to the sim databases based on user feedback.

As the documentation for the new features has not yet been merged on the original user manual, it is available separately in the form of a "Manual Addendum".



# **CMNAO Frequently Asked Questions**



# General

## What is 'Command: Modern Air / Naval Operations'?

Command: Modern Air / Naval Operations, also known as C:MA/NO or CMANO, is the most realistic and accurate air/naval warfare simulator available on the commercial market. The simulator puts the player in charge of air and naval operations in a period stretching from post-WW2 all the way to the modern day and even the near future at tactical and operation level. Detailed information and screen shots can be found on the [What is 'Command: Modern Air / Naval Operations'](#) page.

## Do I need to be a military analyst to play Command? Will it suit regular Joes like me?

Many Command players have military backgrounds but the simulator is also played by regular guys with a fascination for air and naval warfare. The developmental efforts have been on making the simulator easy to operate and we've released a number of tutorial scenarios that help players learn basic concepts of modern air and naval warfare as well as the GUI.

We'd like to point out that Command is not an arcade game with visually stunning explosions and all that. This simulator requires a significant investment of intellectual and temporal capital, and is not for everyone. It is a niche simulator. However, if you really want to understand modern air or naval warfare, this is your only choice as a simulation.

## Where can I obtain a copy?

To purchase the simulator go to [this page](#).

## Do I need an internet connection to activate or play?

Command does not require an internet connection to activate or play. However, if you want to upgrade the simulator to the latest version (which is highly recommended) you will need an internet connection.

## Is Command a replacement for Larry Bond's Harpoon-series of naval war games?

Sometimes, old [Harpoon](#) players come over and expect Command to be Harpoon since the focus is similar. But Command is a scratch-built product that is not related with the Harpoon franchise. The simulator brings in many new features and ideas, has a far more realistic balance between air and naval operations, and allows for a whole new range of play styles from macro to micromanagement.

## Is there a demo available?

There is no demo available at the moment, sorry! This is a publisher's (Matrix Games) decision, not developer (WarfareSims). Baloogan has a lot of Command tutorial videos called [Command episodes](#). Check them out to get an idea of how the simulator works.

## What are the system requirements?

The minimum requirements are as follows.

OS: Windows XP SP3 / Vista / 7 / 8

CPU: 1 GHz (Dual-core Pentium and above recommended)

RAM: 1 GB (2GB+ recommended)

Video/Graphics: DirectX 9.0c compatible video card with 16 MB RAM

Sound: Compatible sound card

Hard disk space: 10 GB Free

DVD-ROM: Yes, for boxed version

DirectX version: DirectX 9.0c (Suitable Direct-X version bundled with game)

The faster your computer is, the better. Generally, Command likes Intel processors better than AMD since Intel uses fewer but more powerful cores. The simulator is multi-threaded in that CPU-intensive operations are handed off to helper threads. But since the main game engine thread runs on a single core, processors with few-but-powerful cores have an advantage over many-but-less-powerful cores.

Command runs significantly faster on Windows 8.0 and 8.1. Speed improvements are typically 30-50%. If you're running Win7 or WinXP (God forbid!) we recommend upgrading to the very latest windows version.

We also recommend installing Command on the fastest disk you can get your hands on. Preferably a SSD (Solid State Disk). This is especially important for database and map operations. Running on a slow HDD may significantly reduce performance on large scenarios.

You can also make Command run *considerably* faster by re-configuring Windows and turn off CPU-intensive features in the operating system. A quick guide on how to configure Windows 10 for optimum performance can be found [here](#).

### Does the simulator run on Mac?

Command does not run on any Mac operating systems, but you can use Parallels9 which is a virtual machine on Mac that runs Win7 pretty well. However it will not run the simulator as fast as a native Windows installation by dual boot. Parallels supports DX9 and DX10.

### What is the game performance like?

Command is by far and away the most performant and most scalable simulator of its kind, particularly with the v1.11 upgrade. It can run scenarios with thousands of units in greatly accelerated time.



Will the simulator scale correctly on triple monitors,

### 3072×768 resolution?

Yes, and even more. We would like to thank [Robin J Lee](#) for sending us a photo showing Command running on four monitors. This is 3 x ASUS 24" 1920×1080 monitors driven as a single display surface using AMD Eyefinity, plus a fourth Planar 22" 1920×1080 touch screen monitor below. All very ordinary off-the-shelf stuff. It was set up for flight simulators, but works well for Command too.

### Are there any known incompatibilities?

Some motherboard utilities and screencasting programs (particularly those working with DirectX overlays) can interfere with Command's execution and distort some of its data windows. See the [Tech Support forum on Matrix Games](#) for a detailed rundown of known issues.

### **Is there a printed manual included with the boxed set?**

Yes. And if you want to print the manual yourself you can download a more printer-friendly (and some would argue, also eyes-friendly) version of the manual [here](#).

The manual refers to the original version v1.00 of the game, and the updates released since have added a plethora of new features and improvements. To get up to speed on what's new, see the manual addendum section on the WarfareSims site [here](#).

### **Does the simulator have multiplayer?**

Command does not currently support real-time multiplayer. WEGO-style multiplayer is under development.

Baloogan has developed a PBEM-style add-on called **Joint Command** which has become very popular with the user community. So if you're interested in battling other players go ahead and download it. Joint Command is continuously being developed and supported and has proved a great success.

### **How does the simulator compare to earlier games like Dangerous Waters and the like?**

Dangerous Waters, Sub Command etc. are more tactical, "push button" simulations so the actual actions of driving a platform are certainly more detailed (go to sonar station, see water fall display on sonar, turn wheel, open/close torpedo tubes etc. etc.). Command assumes that the AI crew handles many of the housekeeping tasks that are explicitly modeled in DW (for example, resolving the bearing ambiguity of passive sonar, performing TMA etc.) so you can focus on the tactical picture, much like in Microprose's classic "Red Storm Rising". Command's scope is from that of a grand tactical/operational commander. So you manage forces and many of the tactical functions will be handled by the AI although you can take manual control and do things like plot courses, set speeds/depths and fire weapons if you want to. This higher-level modeling allows Command to scale to much greater theaters and unit numbers than what is practical in "study" sims. In terms of the physics, sensors & weapons simulation Command holds its own against such detailed sims with the probable exception of some sonar details (e.g. no explicit DEMON mode, no manual tweaking of sonobuoy depth etc.).

### **Are WW2 scenarios possible, like Battle of Midway?**

Yes, with certain limitations. Many of the technologies developed or perfected during WW2 also saw use in the Cold War era, so Command has them. There are have depth charges, straight-running torps, mines, a wide variety of unguided munitions, etc. Many of the platforms that served during WW2 are available in the Cold War Database (CWDB, 1946-1979) since they also operated post-war, and at the request of players we've even added some units that did not survive WW2 (e.g. Japanese fleet carriers). This has allowed players to recreate some historical & hypothetical battles of WW2, as well as, ermm... [see for yourself](#). On the other hand, some things that mattered a lot in WW1/2 but became increasingly irrelevant post-war are not yet modelled. Plunging shell fire easily comes to mind. Another is that the tactical AI (Artificial Intelligence) is unaware of "crossing the T". Diesel subs are always assumed to have a snorkel, which was true only to a limited extend towards the end of the war. Plus some other things.

If these details don't distract you much, you can have a lot of fun. On water splashes, take a look at [this screenshot](#). This from a scenario depicting the "Battle of Chumonchin Chan" (a historical engagement during the Korean War), and shows HMS Jamaica amid a hail of water splashes as a result of being targeted by multiple North Korean coastal artillery batteries.

## **Getting Started**

### **I'm downloading the simulator but my connection is unstable. What should I do?**

There are a couple of downloader managers you can use. These protect what was downloaded if it is interrupted and resumes from where you left off. One of these is [Free Download Manager](#).

### **I have installed the game but it will not start. What is wrong?**

Try reinstalling the prerequisites. You can do that by going to the following folder on your computer: C:\Matrix Games\Command Modern Air Naval Operations\PreRequisites  
Run the dotNetFx40\_Full\_x86\_x64.exe.

Then go to the following folder C:\Matrix Games\Command Modern Air Naval Operations\PreRequisites\directx\_mar2009\_redist  
Run the DXSetup.exe.

Finally, reboot the computer and run Command.

Still not working? Okay if you are running Windows 8.1N then you need to install Windows Media Player. Command dislikes the lack of Windows Media Player (WMP). You may also have to reinstall DX after WMP to get Command to function properly.

Still not working? Open the Command.ini file, located on the main Command folder (e.g. C:\Matrix Games\Command Modern Air Naval Operations). It's a text file so you can open it with Notepad etc. Make sure the following preferences are set thus:

GameSounds = False

GameMusic = False

Then save and try to run it again.

### How can I upgrade to the latest official version of the simulator?

There are two ways to Upgrade:

1) Use the updater from the game launcher applet:



2) If the updater does not work for any reason, or if you prefer to have the update files available offline, you can download them manually from the publisher's [Product Download Page](#)

Update files are cumulative, so you only need to download the most recent version.

In addition to the official updates, the Command development team regularly releases "unofficial" updates. These are typically listed on the main forum, in a thread titled "Build XXX is available". These releases offer the latest fixes, improvements, new functionality etc. and are fully supported by the development team. There is also an even more frequent series of internal beta releases but these are available only to the beta group. Very frequently the solution to an issue encountered in the official version is found in the unofficial public releases. For this reason we highly recommend to always use the latest publicly available "unofficial" update.

IMPORTANT NOTE: If you have problems updating the simulator using the updater from the game launcher applet, i.e. you get a Runtime Error, try downloading the [Updater Fix](#) and run the updater again.

### Where can I download more scenarios to play?

Command has 42 scenarios included, but many more have been developed by the user community. To download them or browse through them, go to the [Command Downloads Section](#). As of May 2016, there are more than 300 scenarios available for Command and the number is continuously increasing. Updates to the community scenario pack are announced on the WarfareSims main page and on the [Publisher's Forum](#).

### **Where can I get images and text descriptions for the simulator's integrated Database Viewer?**

In the [Command Downloads Section](#) you will find image & description packs for the database viewer. Downloading these means that when you look up for a platform's technical data you also get images & text description for that platform if available. Updates to these packs are announced on the WarfareSims main page and on the [Publisher's Forum](#). The images and descriptions were deliberately not bundled with the game in order to avoid IP/copyright issues.

### **Where can I find playing tips & misc. support?**

The [publisher's forum](#) is probably the single best place for answering any questions you might have on playing the simulator. The developer and a community of myriads are ready to answer any sort of question and provide all the support you may need. You can also visit the [developer's forum](#). "No question is stupid, no call for help is lame" is our motto.

Baloogan has put together a fantastic website with tons of useful Command material, including:

[Video Series](#)

[Chatroom](#)

[Online Database Viewer](#)

[Platform Type Index](#)

[Nation Index](#)

[Import Index](#)

Spelk has written an Air Tutorial which seems popular with folks. It explains the process of creating form-up points and inactive empty missions, so that you can schedule waves onto the target. It should be noted the tutorial was created for Command 1.00 and many new features, adjustments and bug fixes have been made since then.

[Air Tutorial Part 1](#)

[Air Tutorial Part 2](#)

### **Where can I find Video Tutorials?**

Other than hands-on experimentation, the best way to learn the game is probably to watch others playing it. The dev team has put together a series of video tutorials covering the basics:

- [Gameplay Demo](#)
- [Basic Attack Tutorial](#)
- [Basic Plotting and Mission Editor Tutorial](#)
- [Event Editor Tutorial](#)
- [Import Files Tutorial](#)

Baloogan has put together a fantastic series of video playthroughs, covering everything from basic gameplay all the way to massive global-scale scenarios. Treat yourself to his [video series](#).

On the same site you will find plenty of support material such as gameplay tips, an online database viewer, etc.

### **Is there a chatroom where I can meet other players, get help on gameplay, etc?**

Baloogan runs a chatroom located [here](#) and should definitely be paid a visit.

### **Oops... I think I've found a bug. How can I report it?**

You can submit reports on any problem/issue encountered on the [Tech Support forum](#). But first we ask that you read the [guidelines for submitting a bug report](#).

### **Bah... The simulator crashed. And I haven't saved the scenario. What happens now?**

Command automatically saves your scenario every 20 seconds. Restart Command and reload the autosave by clicking on "Resume from autosave" in the start menu.

### **Is there anything else I should know?**



Share your war stories and gameplay tips with other players on the [After Action Reports](#) and the [War Room](#) pages.

Get a taste of new & upcoming scenarios on the [Mods & Scenarios forum](#).

You will find the community a kind & friendly place to be, and members of the dev team are regularly present to solicit feedback from users, discuss future development and in general move the game forward.

### **Are there any small and simple scenarios you can recommend to beginners?**

Stand Up, 2011 is often mentioned as a good starter scenario. Others are:

Wooden Leg, 1985 – Air

The Shark, 1971 – Anti-Submarine Warfare (ASW)

Operation Trident, 1971 – Surface

### **Can you recommend books for information on platforms, weapons and tactics?**

As far as the best all around modern naval tactics book, look at CAPT Wayne Hughes' [Fleet Tactics and Coastal Combat, 2nd ed](#) (1999).

Milan Vego's [Soviet Naval Tactics](#) and [Naval Strategy and Operations in Narrow Seas](#) are also very good. Admiral Sandy

Woodward's [One Hundred Days: The Memoirs of the Falkland Battle Group Commander, 2012 ed](#) is an excellent case study of the operational level of modern naval warfare.

The classic techno thrillers by Clancy, Dale Brown, Larry Bond et al. might be good introduction. Red Storm Rising overall manages to explain modern naval and air tactics pretty well, especially the whole concept of EMCON.

Michael A. Palmer's book [The War That Never Was: A Novel](#) is in many ways far better than Red Storm Rising. You should probably also read Barret Tillman's [The Sixth Battle](#). Salty as heck and the ultimate reading of a What-If between Russian and US CVs. Tillman is a former Chief Editor at Tailhook Magazine – this man knows naval aviation. Is not in print anymore but there are a lot of used books for a few dollars in Amazon.

I can also recommend [Red Army](#) by Ralph Peters. Describes a Warsaw Pact invasion of Western Germany, but from the Soviet perspective. Another great book from the Soviet POV, with discussions after each chapter, is [Red Thrust](#) by Steven Zaloga. It's completely tactical (at least the vignettes are) with some discussion of strategic concerns in the summaries after each chapter. Written in 1989, it's obviously a little dated, but it's impressive how much he managed to get right. Highly recommended if you can find it!

A few other books are:

The Naval Institute Guide to World Naval Weapon Systems, 5th Edition (2005) by Norman Friedman

Conway's all the World Fighting Ships

The Naval Institute Press series of "US Battleships (or Aircraft Carriers, or Destroyers, or Submarines, or Small Combatants), an Illustrated Design History" by Norman Friedman

The Jane's series of books

The Guide to the Soviet Navy by Norman Pomlar

Modern Submarine Warfare (Salamander Books, 1987)

Modern Naval Combat (Salamander Books, 1987) by D.M.O. and C. Miller

Beyond the General Belgrano and Sheffield: Lessons in Undersea and Surface Warfare from the Falkland Islands Conflict (1998) by Luke Swartz

A few websites are:

[Principles of Naval Weapon Systems](#)

[Sierra Hotel – Flying Air Force Fighters in the Decade After Vietnam](#)

And lastly, but hard to find, is the [Harpoon II: The Official Strategy guide](#) (1993) by Ed Dille and T. Basham.

## **Steam**

### **The Unit Status panel gets corrupted when I mouse over it. Why?**

This may happen when you have installed the simulator via Steam. It is *not* a Steam problem, however. You most likely have the AMD G.E Raptr Overlay enabled which causes issues with the Steam install. Disabling it works.

It may also happen if you have Nahimic installed. This is a small piece of software that runs in the background to improve sound. Disabling it works too.

# Configuration

## How can I make Command run faster?

Go to Game -> Game Options. Turn off the following two:

High-fidelity mode

No-pulse time mode

Turning off these will make the game run much smoother as the simulator makes far fewer calculations per second, running at 1 second resolution rather than 1/10 second resolution.

Next, turn off as many range rings as you can. This can be a bummer but you can manage if you leave most important range rings on (depending on your force) and show them for Selected Unit Only. The range rings will then only be shown for the currently highlighted unit.

**Process Lasso** , a free utility, has been noted by many users to provide a substantial speed improvement for Command.

## How can I change altitude from metric to imperial/USM (feet)?

To view altitude and depth in feet rather than meters, to go Game -> Game Options, and check 'Show Altitude in Feet'.

## What is the difference between 'pulse' and 'no-pulse' time compression?

No-pulse time mode is the default setting. When using time acceleration (particularly at high values, e.g. 1:30 seconds or 1:1 minute) the map updates much more smoothly and the user experience is significantly improved. However this option requires a fast computer, and older computers may experience lags. When enabled the simulator will:

- \* Refresh the User Interface (UI) every 0.1 second rather than every 1 second.

- \* Execute each turn within the simulator core engine as fast as possible rather than in 1 second pulses. This eats up a good portion of the computer's resources, but looks good visually.

Pulse mode is recommended for older computers that have problems running no-pulse mode. Or when you have a newer computer but want to spend the system resources on game speed than visual presentation (1 second screen updates rather than 0.1 sec screen updates). When enabled, the simulator will:

- \* Refresh the User Interface (UI) every second when time compression is used.

- \* Execute each turn in pulsing mode, emulating Harpoon's presentation.

These setting can be toggled on/off via three ways:

a) From the main menu bar: Game -> Options -> No-pulse time mode.

b) Drop-down selector "Time Mode", placed to the right of the existing "Time Compression" drop-down selector.

c) Keyboard shortcut: Ctrl+Q .

# User Interface

## What kind of maps does the simulator use?

Command's built-in map layers include a global "Blue Marble NG" tileset and a custom relief layer derived from our terrain elevation data. Blue Marble NG has a resolution of ca 500m and is the tileset used as standard.

The elevation data come from the Shuttle Radar Topography Mission (SRTM) and has a base resolution of 3 arc-seconds (~900m/cell at the equator), thus allowing for unprecedented terrain detail benefiting air, naval and land operations alike. The elevation data is used by the navigator, weapon logics, sensors logics (line of sight, LOS), etc.

Due to the many errors in the 3rd party maps and elevation data we've made quite few manual corrections to the digital terrain in Command. Primarily in areas where scenarios have been built. We are well aware of the fact that many errors remain (the planet earth

is pretty big at 500/900m resolution!) and if there are any map errors that affects a scenario you're playing or building, let us know and we'll see if we can fix it in the next update.

### **How do I edit a plotted course?**

To create a new plotted course, press the F3 hotkey and click on the tactical map to place the waypoints. When you're done press Esc or F3 key. Alternatively, double-click when placing the last waypoint to exit Path Plotting mode.

To move a waypoint, click and drag the waypoint with the mouse pointer.

To create a new waypoint, hold down the Ctrl key, click and drag an existing waypoint with the mouse pointer. The mouse pointer must move at least four pixels for a new waypoint to be created.

To delete a waypoint, click on it and press the Delete key.

To delete a whole plot select the unit and press F3 twice.

If you want to re-plot a course from a waypoint in the middle of an existing plot (say, starting at waypoint 3 out of 6), select the waypoint (#3) and press F3. All waypoints beyond the selected waypoint (#3) are deleted and you can plot a new course from this point onwards.

### **How can I specify throttle and altitude settings for individual waypoints?**

Select the waypoint and press the F2 hotkey. Alternatively, right-click on the waypoint and select Throttle – Altitude/Depth.

### **How can I specify EMCON settings for individual waypoints?**

Select the waypoint and press the F9 hotkey. Alternatively, right-click on the waypoint and select Sensors.

### **The rightmost Unit Status menu is truncated. How can I resolve that?**

Set your desktop font size to 100% instead of 125% or 150%.

### **The message log window is gone, how can I get it back?**

If you've selected to show the message log in a separate window it could be that you moved it somewhere awkward and exited the simulator. Next time the simulator is run it may not be able to be rendered from where you moved it. There is a 'Reset positions of secondary windows' button in the Options window to address this. Go to Game -> Game Options -> Reset position of secondary windows.

### **Why are most windows lacking OK and Cancel buttons?**

If a window does not have the standard OK/Cancel buttons it means the orders/settings you are generating through it are applied immediately. Usually there is a sound technical reason for it. Some of the actions, when made in windows, cannot be cancelled, and thus are always OK.

All windows can be closed with the Escape (Esc) hot key. Windows that were opened with a function key (F1, F2...F11) can be closed using the same key.

### **Is there a way to make the tactical map stick to a unit?**

To keep a unit centred on the tactical map, select the unit to track and press the T hotkey. Alternatively, go to Map Settings -> Track Selected Unit. To stop tracking the unit, press the T hotkey or the menu item again.

### **How can I make mouse scroll zoom in at the cursor location, rather than at centre of screen?**

Go to Game -> Game Options -> General, and select 'Map zooms on mouse cursor'.

### **I get too many / not enough messages about what's happening. Can I change this?**

You can configure which message types will appear by going to Game -> Game Options -> Messages. You can also configure which message types will cause a pop-up to appear, freezing the clock. This is very useful for new weapon contacts.

### **Can I have the time compression revert to 1:1 under certain conditions?**

Go to Game Options -> Message Log and then select events you like to raise pop-up. Once you get the popup window, you can hit the keypad enter key which drops the time to 1:1 even while it is still on pause and the popup is still open. Then press Close + Resume. Alternatively, press Close which pauses the game.

### **Is there a "ruler and compass" tool so you can know distances and headings?**

To activate the Range / Bearing Tool, press Ctrl + D or go to View -> Range / Bearing Tool. It is also available through the context (right-click) menu. The tool allows you to draw a temporary line between two points and displays the distance and bearing between those two points. To de-activate the Range / Bearing Tool, either double-click on the map, press Ctrl + D, or go to -> Range / Bearing Tool again.

### **Is there a way to know cloud height/base and does the weather engine consider it?**

The mouse pointer 'black tag' gives information about the weather, including sea state, temperature, cloud cover and rain. The weather affects sensor effectiveness, and is configurable in the scenario editor.

### **Why is the Radar Illuminator text in red in the Emissions list?**

Radar Illuminators are really dangerous radars. They are used with Semi Active Radar Homing (SARH) guided missiles. Most medium and long-range Air-to-Air Missiles (AAMs) and Surface-to-Air Missiles (SAM) use SARH guidance, where the missiles home in on radar energy reflected from the illuminated target. Once an illuminator goes active there is most likely a missile in the air

### **Can I manually designate contacts as Hostile? Neutral? Friendly?**

Yes. Select the contact(s) and press the H key to mark as Hostile, N key to mark as Neutral and F key to mark as Friendly. Alternatively, go to 'Contacts' and select the desired option.

### **I have dual monitors. How can I move the message log to a separate monitor?**

To have the message log in a separate window, go to Game -> Game Options, and tick 'Message Log in Separate Window'. You can then move the message window to the second monitor.

### **What does the 'Reload Priority' button in the Weapons window do?**

Reload priority instructs your crew to give priority in loading a specific weapon on a mount. This is not obvious on mounts of a single weapon type, but in multiple-type weapon launchers this can be very useful. You can, for example, direct the crew on one of your subs to always keep Mk48 torpedoes loaded on two of the torpedo tubes and Harpoon missiles loaded on the other two. Effectively you are overriding the built-in crew AI routines for determining which weapon to load on a given mount. The AI routines are quite sophisticated, but the player may have ideas of his own.

### **What does this mean: Weapon (40mm/70 Single Breda Burst [4 rnds]) airburst off K 21 by 103m?**

That's a burst (4 shells fired at once in a salvo) from a 40mm/70 Single Breda gun mount, exploding in flight (not on impact) 103m off a unit named K21, and it's happening at 22:56:33.

### **How can I make my own custom map overlays?**

There is a great introduction to custom map overlays [here](#) and [here](#).

### **How can I sort the scenario list by date, by difficulty, or complexity?**

At the top of the scenario box, you can have scenarios ordered alphabetically, by date, by difficulty, or complexity. Keep in mind that the difficulty and complexity settings are totally arbitrary.

## **Gameplay tricks and tips**

### **How do I select which side to play in a scenario?**

When you load a scenario you will first see a window with the briefing for the default side. On top of that window you will see a "Side:" label and a drop-down list with all the playable side for that scenario. Some scenarios can only be played from one side, while others can be played from two or more sides.

### **Where can I find the hotkeys list?**

Go to Help -> Hotkeys.

### **Are there any instructions to go along with the tutorial scenarios?**

Just start the scenario to get all the necessary pop-up instructions. You can also open the scenario side briefings by going to Game -> Side Briefing.

### **How do I select multiple units on the map?**

You can click and drag for multiple targets, or use Shift + mouse click.

### **How can I set 'weapons tight' (Hold Fire)?**

To set weapons tight for the selected unit(s), press the 'A' hotkey or go to Unit Status -> Attack Options -> Toggle Hold Fire for selected units (no AI attacks). You can also set weapons tight for all units on your side by pressing 'Ctrl + A' or go to Unit Status -> Attack Options -> Toggle Hold Fire for all units on current side (no AI attacks). These options are also available through the mouse context (right-click) menu.

### **How do I control the amount of ordnance to shoot at a target?**

To manually allocate weapons, select the firing unit and press 'Shift + F1'. Alternatively, go to Unit Status -> Attack Options -> Engage Target(s) – Manual. This option is also available through the mouse context (right-click) menu. The cursor has now become a cross. Select the target(s) you want to shoot at, and that brings up the Weapon Allocation window where you can assign weapons to targets.

### **How can I disband a group?**

To disband a group, select the group in Group View and press the Delete button.

Alternatively, switch to Unit View, drag-select the units you want to disband, and press the 'D' (Detach) hotkey. To disband the whole group, select all units and press the 'D' hotkey.

### **How can I select specific sensors on specific unit in a group?**

Switch to Unit View and select the individual unit. Then press the F9 hotkey to bring up the Sensor hotkey.

### **Plotting a course for a unit that is 'Engaged Offensive' doesn't work. Can I override this behaviour?**

To take control over a unit, press the 'I' hotkey or go to Unit Orders -> Attack Options and uncheck Ignore Plotted Course When Attacking – Selected Unit. Alternatively, right-click on the unit, select Attack Options, and uncheck Ignore Plotted Course When Attacking – Selected Unit. The unit will then revert to its plotted course.

### **What is the difference between postures Unfriendly and Hostile?**

Unfriendly: manouver to intercept and localize/ID but do not engage unless the "Engage non-hostiles" doctrine option is activated, in which case all bets are off.

Hostile: manouver to intercept and engage if part of mission. Aircraft and missile contacts are always automatically engaged, mission type be damned.

### **How do I deploy troops from ships and aircraft?**

They cannot be delivered as per Command v1.04, but you can use the Event Editor to model the delivery of SOF teams and the like.



### **How can I make units on support or patrol missions only use active sensors inside the station area?**

There's a check box in the mission editor for this.

### **How does one deploy Mk55 Naval mines from B52 bombers?**

The easiest (and certainly least tedious!) way to mass-deploy mines is to assign the laying platform(s) to a mine-laying mission. We did a video on this a while ago, have a look [here](#).

The more tedious but more "hands-on" way is to perform "BOL-launch" on every point where you want to lay a mine. This can work for a dozen or so but not really recommended if you want to lay hundreds or thousands.

You can also lay "prefabricated" minefields, for scenarios where the laying action itself is not important. This is described in detail [here](#).

### **How can I order Check Fire?**

To disengage all targets, select the attacking unit and press 'Ctrl + E'. Alternatively go to Unit Orders -> Attack Options -> Disengage (Drop All Targets). This option is also available through the mouse context (right-click) menu.

If you want to drop a certain target before it has been destroyed (and has disappeared from the tactical map), select the attacking unit and press 'E'. Alternatively go to Unit Orders -> Attack Options -> Drop Target(s). This option is also available through the mouse context (right-click) menu. Lastly select the target(s) to drop. To select multiple targets, hold down the Shift key when clicking.

### **What are Illumination Vectors (broken red line) and Targeting Vectors (broken green line)?**

A targeting vector is telling you a unit has orders to engage a target, and is firing or preparing to fire. An illumination vector means the target is illuminated by some kind of sensor, i.e. a laser is used to illuminate a target for a laser-guided bomb (LGB).

To view targeting and illumination vectors, go to Map Settings -> Targeting Vectors – Show All or Selected Unit.

### **Why do enemy radars still have their "range ring" when they are no longer active?**

The enemy radar range rings are an estimation. Your crews cannot know for sure if the radar has been knocked out. That it's not radiating right now is an indication, but an unreliable one. Particularly against a competent IADS operator like the Soviets, Egyptians or Serbs.

### **How can I make my units maneuver, unmask weapons and engage instead of automatically run and evade?**

If you don't want your units to automatically go defensive you can disable this behaviour in the Doctrine / ROE window. Set Automatic Evasion to No.

### **Is there a way to simulate Search and Rescue (SAR)?**

Not per Command v1.04. You can kind of achieve this by using the teleport action coupled with an area trigger in the event editor to model it but there is no true SAR in the simulator yet. We need to complete the amphibious model to really put this into action.

### **When I drop a contact, it comes back a second later. Why?**

If the contact is a ground facility set to 'auto detect' it will be re-detected immediately.

Also, if your side is allied with another side that sees the contact, the contact will automatically be transferred to your side.

### **Can I re-target datalinked weapons like Tactical Tomahawk?**

Yes. Select the weapon, press F1, and select the new target.

### **What is the best way to employ the ITALD and TALD loadouts?**

The TALD and ITALD air-launched decoys are just extra targets for SAM and radar sites, so just fire them along with other ASMs or ahead of your strike aircraft. The hotkey to fire air-launched decoys is Ctrl + F1 (the same key is also used for BOL-attacks). The AI cannot use decoys as per Command v1.04.

### **How do I fire naval Surface-to-Air Missiles (SAMs) against surface ships?**

Many ship-based SAMs with Semi-Active Radar Homing (SARH) have an anti-surface mode. To fire the weapon successfully you need to get closer till your ship can literally see the other ship to point your illuminators at it. And then you have to go into the doctrine window (Ctrl + F9) and turn the Use SAMs in anti-surface mode to Yes. That option restricts your ships from using SAM against other surface targets.

### **Can I assign ARMs to specific radars on a target?**

You can't in do this in Command v1.04 when targeting single units with multiple sensors, although we'd like to add this in the future. The simulator will automatically prioritize the detected radars and spread its ARM fire among those: weapon illuminators first, then fire control radars, and lastly target indicator radars and air-search radars. Surface search radars, navigation radars, etc, are ignored.

### **WINCHESTER and SHOTGUN weapon state, BINGO and JOKER fuel state? What does it all mean?**

The WINCHESTER and SHOTGUN states are paired much like BINGO and JOKER.

BINGO is a multiservice tactical brevity code for a low fuel state, i.e. the fuel to return to base plus reserves. Reserves are typically 5% of original fuel plus 20 minutes loiter at sea level.

JOKER is the pre-briefed fuel state at which separation/bugout/event termination should begin. JOKER is reached before BINGO.

WINCHESTER means that no ordnance is remaining, i.e. the aircraft is down to the gun or harsh language.

SHOTGUN is the pre-briefed weapons state at which separation should begin.

For more information, please see the [Multiservice tactical brevity code article on Wikipedia](#).

### **Why are my land-based SSM not firing?**

Units will only do what you explicitly tell them to, or allow them to. To get your SSM batteries to fire, you need to assign them to either an ASuW Strike or Patrol, a Sea Control Patrol, or change their Rules of Engagement (ROE) to allow them to "Engage Opportunity Targets".

Also the AI won't fire at unidentified targets, unless you set the ROE to allow them to, as stated above. You would either need to be sure the AI had confirmed the ships were hostile or set up an exclusion zone so that any ships within area "X" are legitimate targets.

### **Can I manually fire chaff and flares?**

Defensive chaff clouds and flares are fired automatically. You can see their results in your logs. If you try the Battle of Latakia scenario from the 1973 Yom Kippur war you'll see the older SS-N-2s are pretty useless against Israeli chaff and jammers.

### **What is the difference between a Patrol Area and a Prosecution Area?**

A basic way of looking at the two types of area would be:

- Patrol Area – the area your units move within.
- Prosecution Area – the area in which targets are considered a threat and engaged. If someone enters a prosecution area, units will ignore the patrol area to engage it.

If a mission is set up without a Prosecution Area, the assigned units will only engage contacts that enter the Patrol Area. By enabling Prosecution Area you can have the CAP stay in the patrol area fairly close to the carrier but still rush for the unidentified contact entering the larger prosecution area, and also ignore contacts that are too far away to be of any threat.

Enabling 'Investigate contacts outside the patrol area' will make the assigned units run off and investigate any and all unidentified contacts on the map.

### **How can I make an air intercept mission that launches when a contact enters an area?**

You can make fighters scramble and intercept contacts entering a certain area the following way:

- Set up Intercept Missions as desired but keep them deactivated.
- Set up an exclusion zone where you want the intercept to happen.
- Set up an event to activate the intercept missions when the enemy aircraft enters the exclusion zone.

# Platforms and Weapons

## **Why do the databases have multiple entries for the same platform?**

There are multiple database entries for the same platform to represent all operators, main versions, subversions and weapon configurations over time.

## **Why no TASM (Tomahawk Anti-Ship Missile) after 1991?**

The nuclear (TLAM-N) and anti-ship (TASM) variants of the Tomahawk missile were withdrawn in the early 1990s after the Cold War had ended. TASM was withdrawn because there was no longer any chance of blue-water engagements against a navy with large, high-value targets like the Soviets, and many of the missiles were converted to land attack. The TLAM-N was withdrawn as per a 1991 agreement with Russia to not deploy nuclear weapons at sea (other than strategic ballistic missiles).

## **Why are later S-3 Viking variants not carrying ASW weapons?**

The Viking's ASW role was removed in 1999. US aircraft carriers then deployed with six S-3 Vikings; some for the tanker role, and two aircraft dedicated to ASuW armed with iron bombs, Harpoons and Mavericks. The ASW mission was taken over by Seahawks and Orions. The Viking was retired from frontline service in 2009.

## **Why do many guns have such a low PoK against aerial targets?**

Many air targets like anti-ship cruise missiles are extremely difficult to shoot down. And even if destroyed in mid-air, the missile may still cause serious damage if the warhead detonates at ranges closer than 500m from the target, or if the ship is hit by debris from a disabled missile. In the Falklands War, only one of six Exocet missiles fired at British ships was shot down, and this kill is not even 100% certain. PoK (Probability of Kill) for guns is the chance of hitting a target with a burst of fire – this can either be a single round (for larger guns) or up to several hundred (for Mk15, AK-630 etc).

## **Why do Aegis ships (and others) have empty Mk41 VLS cells in the database?**

There are not enough weapons around to fill all VLS cells, so ships deploy with empty cells. Typical loadout for a Tico, for instance, is 96x SM-2s, 48 per VLS. The 'heavy' AAW loadout for Burkes is 72x SM-2. The ships also carry a handful Tomahawks and VLAs.

## **Why do not newer USN Arleigh Burke Flight IIA ships carry any Harpoon missiles?**

The USN is not fitting Harpoon missiles to new ships. They carry helicopters instead. The anti-surface task is now left to carrier air and to submarines (using torpedoes only). If you look in the database there are no Sub-Harpoon missiles on modern submarines either. These were withdrawn in the late 1990s.

## **Why do newer USN Arleigh Burke Flight IIA ships not carry any SM-2MR missiles by default?**

ESSM replaces both the SM-2 and CIWS on newer Burkes, although a single CIWS has been re-installed on some ships. You can reconfigure the Burkes from land-attack role (which is the default loadout used in the database) to AAW manually in the scenario editor. The standard AAW loadout on the Burkes comprise 72 SM-2MRs (96 SM-2MRs on the Ticonderogas), a handful Tomahawks (probably 8-10) and some VLAs.

24x SAMs used to be (and still is?) the 'standard destroyer loadout' of anti-air missiles. Whether its SM-2 or ESSM. This is also the same number of SAMs that the Spruance carried, however the Burke can fire them all at once. So 24x anti-air missiles is a pretty potent loadout in most environments. Aircraft carriers used to have 24x ready-fire Sea Sparrows (see a pattern?), however this has now been changed to 16x + 42x RAM.

So the default missile loadouts in the database are 'typical loadouts' and, like it or not, are realistic. The good thing about Command, though, is that you are free to configure the VLS the way you want in the scenario editor.

## **Why do USN Arleigh Burke ships not carry any SM-3 missiles by default?**

The USN is upgrading its AEGIS cruisers (CGs) and destroyers (DDGs) with Ballistic Missile Defence (BMD) capabilities, which includes upgraded radars and the new SM-3 Standard missile. However, few missiles are available and are only carried by a handful ships. Because of this, all BMD-capable ships have room for SM-3 missiles in their Mk41 Vertical Launch Systems (VLS's) however the default quantity in the Command database is 0. The only ship in the database that actually have any SM-3s loaded by default is the 'CG 70 Lake Erie' sub-class.

If you want your BMD-capable ship to carry these weapons you can load them manually in the scenario editor. This is a pretty straightforward job and is described in detail in the Command manual.

### **Why aren't F-111s armed with AGM-65 Maverick missiles in the simulator?**

Just because an aircraft is able to physically carry a given weapon does not mean the pilots train to use it operationally. For example, while A-10A Thunderbolt IIs are authorized to employ laser-guided bombs, they never do because Mavericks, iron bombs and cluster bombs are their weapons of choice. The F-111Fs are authorized to deliver Maverick missiles but they never train with this weapon, preferring their trusty LGBs instead.

### **Why is there no 10-AMRAAM loadout for the F/A-18 Hornet?**

The short answer is weight & drag, and weapon availability. Plus there's a psychological aspect; when fighters carry more missiles, pilots tend to 'hang around' longer which dramatically increases the chance of getting killed. Shoot your missiles and get outa there!

### **Why is there no 6-Phoenix loadout for the F-14 Tomcat?**

Except for **Crazy Bob's CVW-11**, the F-14 Tomcat never trained to use the 6-Phoenix operationally. Most photos of the 6-Phoenix loadout that you find on the interweb were taken of aircraft flying from land bases or during the first fleet qualification trials back in 1972. Slamming a fully loaded 50,000lb & 140kt monster into the deck of a carrier was found to be impractical since fuel levels had to be dangerously low for it to be safe. In fact, even the 4-Phoenix loadout on the F-14 was considered draggy by the pilots and was rarely used.

Another fact of life was that there weren't enough AIM-54s around to arm all 24/20/14/10 aircraft on a carrier with six AIM-54s each. A carrier would typically carry 96 rounds back in the golden years – sometimes fewer and sometimes more. There were rumors that a carrier (USS John F. Kennedy?) once carried 300 AIM-54s when going north to provoke the Soviets off Kola in the 1980s, but this information has never been confirmed by other (reliable) sources.

So instead of having aircraft flying with unrealistically heavy loadouts, the Command developer has added lighter loadouts that were indeed used operationally. These loadouts offer a number of advantages such as speed and range / endurance. For instance, it was common for F-14s to carry only four missiles on CAP, i.e. 2x AIM-7s and 2x AIM-9s or one AIM-54s, one AIM-7 and a pair of AIM-9s. The player will therefore have to consider the trade-offs between endurance and punch as it is done in real life.

### **What is so special about the 'F-14A Tomcat [Crazy Bob]' database entry?**

F-14s didn't use the 6-Phoenix loadout operationally, except for a few years (1982-1986) when "Crazy Bob" (aka Capt. R. L. Leuschner) was Commanding Officer of USS Enterprise with Carrier Air Wing Eleven (CVW-11) embarked. He was legendary for elaborate and highly realistic combat-drills. Here is some creative copy-paste from a [discussion on Airliners.net](#):

*In early '80s CVW-11 F-14 Tomcats regularly flew exercise missions with 6-0-2 loads [6xAIM54, 0xAIM7, 2xAIM9]. As combat training exercises, the missiles were all dummies, but at full size and weight. F-14A's had to be pretty low on the fuel when returning, but since we were simulating real combat scenarios the objective was to exercise the equipment & crew as you would during real combat missions.*

*As to weight vs. drag issue, the weight always became the real issue since the AIM54 was about 1,000 lbs. The more you load, the higher the fuel burn, less maneuverable the plane and lighter the fuel load required for CV landing. A 6-0-2 load would be for a pretty "strategic" mission. The standard "tactical" load was 1-1-1 or 2-2-2 (or some combination of same). Since the F14 was designed with the pallet system, the pallets did not create much aerodynamic issues for the F14. You can not compare the pallet issue with other aircraft though as no other fighter was designed to use the pallets... no other fighter used the AIM-54 either.*

*CVW-11/BG-F was the first battle group to actually count the weapons used during OpEval exercises, probability-of-kill (PK) for all missile shots [both surface-to-air and air-to-air] and realistic "turnaround" times for returning planes to be used again [required actual*

*downloading of weapons and uploading of new (different) weapons]. We were even trying to simulate missile time-of-flight to impact. Plus a whole host of other stuff was just "swag'd" before then. CVBG magazine mix was significantly changed when the pentagon planners started to see actual weapon use levels.*

*The more Phoenix one carried, the more "strategic" the mission... and the less manouverability/speed required. When carrying a lot of AIM-54's, you're going after bombers so range is more important to start with. Therefore, the range reduction was "worse" but could be countered with effective tanker practices. It became pretty much SOP for CVW-11 F-14s to operate 1,000 nm missions with 6-0-2 loads. Big headache for the Hummer Moles (E-2C Hawkeye radar operators) [who had to coordinate all the real-time support for such missions] and I don't want to know what the "lucky" guys who flew them were thinking.*

*There are many sea-tales about Capt. Bob, most of which are based in significant fact. Yes, he had a hand in the "realism" but CVW-11's "Burner Bob" Hickey was the one who started the counting of actual weapons used. When compared to what the ship's magazines stored, the discrepancies were "enlightening" to say the least. Once the ball got rolling, we kept getting more and more "realistic." SecNav Lehman flew aboard once during OpEval and the Hummer's reply to his check-in was "turn right 40 degrees, descend & maintain XXXXX, welcome to the Big-E's world Navy-1, by the way... you're dead." I kept the tape of that for almost 6 months. Lehman was a USN Reserve A-6 Bomber-Navigator flying during his "active duty assignment." They did not do ANY of the appropriate "friendly ID" things they were supposed to do so... they became just one of the 486 "enemy" targets shot down that day [Orange Forces launched 485 planes so we were pretty busy and he just got caught up in all the missile firings]. He was just a bit "upset" and I guess his pilot (supposedly that squadron's "top hook") making 4 bolters before successfully trapping aboard Big-E didn't help his attitude [the square island makes for an ugly "burble" behind the ship]. IIRC, it was Leuschner who squeezed him into the back-end of an E-2C sitting on the flight deck (only working CIC available on the ship due to simulated "battle damage") to show him the progress of the "war." His spirits were much improved by the time he met us after we landed some 4+ hours later. Improved even more the next day as he got to watch/listen to the early morning 900+nm 45-aircraft "Alpha Strike" on NAS Miramar, NAS North Island, and NALF San Clemente (the "orange force" airfields). So much so he had Orange Forces "stand down" for the day [unheard of in exercises] since they supposedly had no useable runways anymore. That worked out much better than it was planned. That was but one day. OpEval lasted 3 full weeks.*

### **Why is the AN/AWG-9 radar on the F-14 Tomcat limited to a 40 deg search arc?**

Although the AN/AWG-9 has a +/- 65 degrees frontal scan sector, the aircraft doesn't search arcs larger than 40 deg / 2 bars or 20 deg / 4 bars at a time. This is so that tracks can be updated every 2 seconds. A full 130 deg / 8 bar sweep may take as much as 30 seconds and has limited tactical use. As such, it has a 40 degree frontal arc in Command.

Looking beyond Command v1.04, the plan is to allow the AI and player to turn the search arc (scan cone) sideways, so the aircraft can scan 65-25 deg off-angle. The aircraft can then launch medium-range missiles, turn 60-ish degrees to reduce the closure rate, and still guide missiles to the target. Getting this to work properly for all aircraft/weapon and tactical combinations is a bit of a pain so will take time to implement and test. However the database has already been updated supports this so the groundwork has already been done. The developer won't give any promises on ETA, though.

### **My F-16C Falcon with the Sniper pod can ID targets at ranges up to 70nm. How is that possible?**

Please check out [this link](#). The Sniper pod can magnify up to 30 times. Similar pods like ATFLIR have really impressive ranges too. However, scanning for targets using these systems is like looking through a straw and is difficult. They do not have an auto-scan mode either. As such, the pods are primarily slaved to the radar when used in the air-to-air role, and are used to ID targets already detected.

### **Why won't my fighter jets fly faster than 925kt (Mach 1.6)?**

Warplanes never fly at their theoretic maximum speeds operationally. Over a fighter aircraft's 6000-8000hrs life span, less than 10% is spent at supersonic speeds. Most airframes will never even go beyond Mach 2, and certainly not while flying a combat sortie. Aircraft use a lot of fuel accelerating and maintaining those speeds, and going beyond 925kt (Mach 1.6) offers no real tactical advantages and may even be impossible simply due to the long time it takes to accelerate to those speeds and the insane amounts of fuel needed to get there. Furthermore, in many cases getting to those speeds will be physically impossible due to weapon and drop tank drag, weapon



Please see the screenshot from the database editor. It gives some clues about what's going on under the hood.

The reason the afterburner (AB) setting is missing is because the F-22 doesn't use AB for cruise, only acceleration/climb/dogfighting.

We would like to expand our propulsion model post-Command v1.04, but have a bunch of other things we want to do first.

When that's said, the F-22 will fly at 1000kt using Military power so fuel consumption is quite good. No afterburner-style 'dry in 15 minutes' burn rates.

### **Why does the F-22A Raptor have a 480kt cruise speed like most 4th generation fighters?**

Physical laws apply to the F-22, even at \$200 million a copy. So although we're lacking a lot of stats on engines and airframe capabilities, we can still make some (painfully?) realistic assumptions about the aircraft's capabilities.

Having a fixed and inefficient 'stealth' jet intake and duct has a nasty effect on the F-22's thrust/SFC. Static military thrust at sea level (SL) for the F119-PW-100 is supposedly 25000lb and Specific Fuel Consumption (SFC) is probably 0.76. Which is slightly higher than for the latest F100 engines on the F-15C/E Eagle.

The static thrust figure is for an engine installed on a test rig. When installed on the aircraft the thrust drops due to inefficient inlets. Adjusting for altitude and Mach speed (yes, we actually do that in Command!) the thrust for each F119-PW-100 engine on a F-22 flying at military throttle (650kt) at sea level, is 16764lb. SFC is 1.04. The SFC is calculated as follows:  $\text{Thrust} / (1 + \text{Constant} * \text{Mach}) * \text{Density}$ .

Public sources suggest that the F-22 is only capable of doing relatively short 'sprints' at full military throttle (supercruise) in real life. The military thrust in the simulator is 10083lb and SFC is 1.32 at 36k ft and Mach 1.75. Fuel consumption at full military throttle for the F-22 is quite high.  $10083\text{lb} * 1.32 \text{ SFC} * 2 \text{ engines} = 26500\text{lb}$  of fuel burned per hour. Which is 6000lb more fuel than the F-22 carries. So the "800nm combat radius at Mach 1.6" capability is a myth. A typical combat sortie is flown mostly at subsonic speeds. A cruise speed of around 480-500kt (Mach 0.85) is the most economical as the engines are working efficiently and drag is relatively low. Transonic drag is very (very!) high, but drops sharply beyond Mach 1. However beyond Mach 1 drag is still higher than at Mach 0.85 so fuel consumption goes up and range suffers. This is true for all aircraft, F-22 included. So everything points towards 480kt as a realistic cruise speed. And you can always hit 'Military Throttle' and go to 1000kt supercruise (ca Mach 1.75) with relatively economical fuel consumption.

### **The F-35A Lightning II supposedly has a Mach 0.9 cruise speed but in Command it is 'only' 480kts. Why?**

A Mach 0.9 cruise speed at 36k feet is ca 515 knots. In other words a 35kt difference between the stated speed and the one used in the simulator. But will the F-35 really cruise faster than 4th generation fighters? While normally "Because I can" is a 100% valid argument, in this case it is not so certain. Higher speeds and supercruise is great to use in tactical scenarios, but just while cruising it is more common to see various participants in a mission choose the same ingress speed, so that you can talk in timings easily as well. Luckily though, in Command you can manually set the desired speed. So feel free to increase speed to 515kt or 535kt. Fuel consumption goes up, of course.

### **Radar types: FCR, target indicator, weapon director, radar illuminator? What does it all mean?**

FCR – Fire control Radar is a radar which is designed specifically to provide information (mainly target azimuth, elevation, range and velocity) to a fire-control system in order to calculate a firing solution (i.e. information on how to direct weapons such that they hit the target(s)).

Target Indicator – A radar of lesser range capabilities but of greater inherent accuracy than that of surveillance radar, whose normal function is to acquire aerial targets either by independent search or on direction of the surveillance radar, and to transfer these targets to tracking radars.

Weapon director – An anti-aircraft artillery radar that directs gunfire.

Radar illuminator – An anti-aircraft radar that illuminates targets for Semi-Active Radar Homing (SARH) weapons.

Let's look at the radars for a SA-5b (S-200V) Surface-to-Air Missile (SAM) system: Square Pair (5N62) – FCR-radar. This will be used to guide missiles to target. No need to manually active them. Odd Pair A HF (PRV-13) – Height-Finder. Older 2D radars are unable to obtain height of the target. Also they had blind spot for low flying aircraft/helicopter. A second radar was used to overcome these weaknesses. Tall King – 2D Long Range. Main radar for detection.

### **Why does the Mk214 Sea Gnat Chaff have "surface ships" as valid target?**

For decoys, the "valid target" value represents the type of contact they will represent to enemy sensors.

### **Why do torpedoes have such a short range?**

Simulating technical limitations is one thing, taking into account practical 'field limitations' is another. In order to have a realistic simulator we need to take into account both. For instance, Soviet doctrine stated that torpedoes should not be fired at targets beyond 13k yards. The chance of actually hitting the target drops dramatically beyond that range while at the same time you notify the target about your presence and possibly even give away your (approximate) position. This also goes for the super-heavy 650mm torpedoes, which would use their speed and range to catch up with a fleeing US CVN. As such, the practical firing range in Command is limited to ca 8nm, even for high-end torpedoes. It makes sure that both the player and the AI adhere to the same real life technical/tactical/doctrine/field limitations. The ADCAP still has enough fuel to make it out to 20nm at 55kt, or 27nm at 40kt. We can easily lift the practical firing range limitations and let the AI shoot at any target within kinematic range. In fact that's how the simulator handled it for a while. So the functionality is already there – we do on-the-fly Dynamic Launch Zone (DLZ) calculations for SAM/AAMs to allow weapons to be fired 'early' to hit a fast closing target like an ASBM. But for relatively slow tops and fast ships this leads to a lot of stupid shots as the weapons are usually detected early and the defender has lots of time to move out of the way. It is still possible to BOL-launch torpedoes if you want to fire the weapon at long ranges. You can then manually steer them to their target at max range – granted the weapons have wire guidance and you don't fire more torpedoes than you have wire guidance channels.

We actually tried a more advanced method for determining max firing range based on torpedo speed and target speed & heading. This resulted in a lot of stupid shots while the AI was building a firing resolution. If you have contact at 20nm but no speed info, do you shoot? No? But if the same contact is at 4nm? Etc, etc.

The end result was that the targets fled as soon as the submarine fired a torpedo, and helicopters scrambled to locate and sink the ship. The submarine-fired torpedoes were outrun one hundred percent of the time. A diesel sub in this situation is in pretty deep poo-poo since it doesn't have the speed to catch up with the fleeing SAG or fast convoy, and also lacks the speed and diving depth to get the hell outa here before the helos start dipping their sonars. This situation got even worse when the opening long-range shot was against one of the outer screen ASW escorts. The SAG/convoy would automatically turn around and run, and there was no way an AI-controlled submarine would ever get into position for a shot on the HVUs. As such, limiting the firing range from 'max theoretical' to 'max practical' the AI was much more successful. It would wait for the targets to get real close before shooting off torpedoes and sinking ships in quick succession.

As for fighting other submarines, sub-vs-sub is like a knife fight in a phone booth. Torpedo launch usually takes place at around 1nm. So the firing range limit is pretty much a non-issue there.

### **What advantage does New Threat Update (NTU) ships have over pre-NTU ships?**

New Threat Upgrade (NTU) was a United States Navy program to improve the capability of ships equipped with Terrier and Tartar anti-aircraft systems. The system allows the ships to which it was fitted to time share illumination radars for multiple missile interceptions in a manner similar to the Aegis Combat System. For details, see the [NTU article on Wikipedia](#).

Pre-NTU upgrade ships have pure-SARH Terrier/Tartar, SM-1ER or SM-2ER missiles that fly a direct pursuit flight profile. Post-upgrade ships have upgraded missiles, time-shared SARH illumination, and AEGIS-style weapon datalink which means the ship is communicating with the weapons and directs them to a "kill box". The missiles fly a lead pursuit and a highly economical lofted profile, and can also be re-targeted in-flight. Command does all of this, including automatic re-targeting.

The difference in efficiency between pre-NTU direct pursuit and NTU lead pursuit profiles is best demonstrated against fast crossing targets such as SS-N-12 Sandbox or SS-N-19 Shipwreck anti-ship missiles. The old Standard, Terrier and Tartar missiles will in most cases end up in an ineffective tail chase and in many cases be unable to overtake the target or lose guidance due to illumination issues (illuminator/SAM/target geometry). The newer SM-2ERs on the other hand are actually quite effective.

You can test the difference yourself, by inserting pre-NTU and NTU variants for the CG 16 Leahy class cruisers, and have them defend a HVU against SS-N-12s.

### **The radar 'Rock Cake HF [PRV-10M] does not seem to be working. Why?**

This is a height-finding radar (HF), which provides height information on contacts detected by search radars.

# Air Operations

## **Why do most combat aircraft have a 40 000 feet (12192 m) ceiling?**

Combat aircraft rarely go higher than 40k ft. In special cases 45k ft but not higher than that.

## **What is the yellow "L0" or "L1" under aircraft symbols?**

This is the landing priority number. Aircraft at the marshal point are automatically prioritized based on remaining endurance. Aircraft L0 gets to land first.

## **How can I get aircraft to egress from target on a plotted path instead of calling Winchester?**

If the aircraft are assigned to a mission, make sure the RTB When Winchester option in the Doctrine / ROE / EMCON window is set to off. Then check the 'Use Auto Planner' in the Mission Editor. The mission logics will then automatically create randomly placed ingress and egress routes from the target based on the mission's default profile.

Alternatively, you can unassign the aircraft from the mission, plot a course manually, make sure that either the the RTB When Winchester option in the Doctrine / ROE / EMCON window is set to off for the air group, and manually allocate weapons through the Manual Allocation (Shift + F1) window.

## **Is the grounding of aircraft simulated because of bad weather or night-time conditions?**

Not in Command 1.04. It is our plan to add this, however. And when it's there you'll probably wish it wasn't hehe.

## **How can I get ground units to illuminate targets for air-dropped Laser-Guided Bombs (LGBs)?**

Ground units illuminate targets automatically if the aircraft do not have an onboard laser illuminator, once the aircraft releases the bomb.

## **Is it possible to jettison drop tanks and ordnance on aircraft?**

Not at the moment. For this to work in a simulator like Command there are a few concerns that would need to be worked out, particularly on the AI side as well as calculating pre/post jettison endurance, etc. But it will likely be added in the future since we like the idea of 'soft kills' on strike aircraft because your anti-air missiles, while they didn't hit, did cause the enemy to jettison stores and abort their mission.

## **Is it possible to land one's aircraft at an airbase or airport belonging to an allied side?**

Yes, allied air bases work the same way as any own-side air bases.

## **Is it possible to drop ordnance at a given location irrespective of any enemy units being there?**

Dropping bombs on a coordinate is not possible in Command v1.04 but is planned for the Advanced Strike Mission Editor. Currently you can only drop bombs on contacts.

## **What is the deal with the "Maintenance (Unavailable)" loadout?**

The aircraft fitted with the Maintenance (Unavailable) loadout are a representation of the typical situation in an airbase. You have a number of aircraft that you cannot use, but they are there nevertheless, and they take up space and resources. The fact that you cannot use them doesn't make them invisible. Not having them at all would make your entire airbase's resources available to the player e.g. 10 out of 10 usable aircraft. Which of the two is more realistic?

As such, you can have 60 aircraft on an air base but only 4 available for operations. Unfortunately for the player that happens in real life and is (painfully) realistic. Since it happens in real life, it also happens in Command.

Plus they make great targets. Don't you just love scrubbing a airbase clean of aircraft with cluster bombs.

## **What is the difference between 'Reserve' and 'Unavailable' loadouts?**

If the scenario author wants aircraft to be unavailable at the start of a scenario but become ready for operations later on he would give them the 'Reserve' loadout rather than the 'Unavailable' loadout. 'Unavailable' means unavailable for the duration of the scenario. Alternatively, the scenario author can arm the aircraft with the intended combat loadout and manually give them a delayed 'ready time'.

### **Is there a way to activate aircraft set to Maintenance (Unavailable)?**

No, aircraft set to Maintenance (Unavailable) can not be used in the scenario. If you are designing a scenario and want the aircraft to become ready later on, you can load them with a weapon loadout or Reserve loadout, and specify a Ready Time.

### **Why does it take 6 hours to prepare my strike aircraft for a sortie?**

The short answer is we look at everything involved in launching a mission including arming, planning etc. and not just the physical act of loading weapons on to the aircraft. For a quick introduction to this complex subject, please read the following article on [Aircraft Sortie Rates](#).

### **I do not want aircraft to be down for maintenance or use realistic ready times, how can that be done?**

You can do a couple things to solve this, by using the scenario editor:

- a) Unavailable aircraft: Open the scenario in the scenario editor and change the loadout from 'maintenance' to a mission loadout.
- b) Aircraft ready times: Play the scenario in the scenario editor, and reload the aircraft using the 'Ready Immediately' option.



### **Can I manually move aircraft from hangar to flight deck on aircraft carriers?**

It is not possible to manually move aircraft between flight deck and hangar in Command 1.04. However, readied aircraft are automatically moved to the flight deck, and landing aircraft move to the hangar.

The size of the flight deck of a Nimitz-class carrier is 80 F/A-18A/C (medium aircraft) spots. The maximum combined hangar and flight deck spot capacity is 130. When loaded to the maximum no sorties can be generated since there is no room to operate, and the deck is considered 'locked'. In the mid-1970s the operating capacity was set to 75 percent, with 80 percent as a maximum upper bound.

In Command it is possible to put a maximum of 60 large aircraft (which roughly equals 80 medium aircraft) on the flight deck of a Nimitz-class aircraft carrier. Four parking spots are reserved for returning aircraft to avoid congestion in case the elevators are busy, so a total of 56 large aircraft will be moved from the hangar to the flight deck when readied.

In practice the player or scenario designer would rarely be able to put this many aircraft on the deck unless he does something really weird / unrealistic / stupid, like making too many aircraft available for operations or adding too many aircraft to the ship. A minimum of 25% and typically 35-50% of the aircraft will be permanently under maintenance, in the air, or not scheduled for flying at any given time. So even with a 85-aircraft wing it would be rare to see a full deck in Command.



In the photo to the right there are at least 52 aircraft on the deck. If you move 1x aircraft you can launch from two cats, and if you move 5-6 aircraft you'd also be able to recover aircraft.

### **Do UAVs behave differently from manned aircraft?**

Yes, UAVs do not apply their agility bonus on the weapon endgame calculations. As a result they are terribly vulnerable to anti-air fire. Remote human operators must rely on their sensor information instead of their own eyes. As a consequence they might have less situation awareness (looking through an EO/IR sensor is always compared to "looking through a straw") and might be unable to respond or evade ground fire as quickly.

### **The loadout selection window has "time-of-day" and "weather" columns. Are these in use?**

Weather and day/night limitations are not yet supported in Command v1.04. The database development is slightly ahead of the simulator engine development, and we have populated various database fields to support future features.

### **Can I reload my aircraft without air-to-air weapons in air-to-ground loadouts?**

Yes, you can ready aircraft using the 'Exclude Optional Weapons' option. This will load the aircraft without self-defence air-to-air missiles, or with a reduced number of self-defence missiles.

### **Why do my aircraft fly at 350kt on patrol, 480kt when Bingo and 520kt on manual RTB?**

350 knots is loiter throttle. Great for maximum endurance (hence for e.g. patrolling an area), not ideal for maximum distance covered per fuel unit.

480 knots is cruise throttle. Not so good endurance, but maximum range for given fuel. When the aircraft reaches Bingo fuel that's what it needs.

520 knots is full military throttle. If you order a manual Return to Base (RTB) or the aircraft go Winchester they will try to get out there as fast as possible, granted there is enough fuel to do a fast sprint.

### **What is the best way to disable an airbase?**

The simple answer is that it varies a lot. Depending on the airfield configuration, the runway or the access points may well be the best targets, but if it's an open airfield with only tarmac parking instead of hangars/revetments, then a single strike has a chance of getting rid of a significant portion of the aircraft based there.

It is also dependant on what you have available for weapons – some of the high penetration cruise missiles or bombs are ideal for getting rid of ammo bunkers, whereas regular iron bombs or JDAMs are more suited for runway and parking area removal.

My general approach is to assess airfields based on 3 criteria;

1. Number of access points vs number of runways/taxiways
2. Type of aircraft parking – open vs protected (hangar) vs hardened (HAS or underground)
3. Concentration of ammo storage

The first often lets you filter out those airfields that are fairly easy to shut down – if for example there is 1 runway with 3 access points, the access points are the obvious and easier targets, and will completely neutralize the airfield. Larger airfields become progressively harder to do this to, as they can have 4-8 access points per runway, as well as several runways/runway-capable taxiways. In these cases, it may be more sensible to strike the runways instead, or look at other ways to disable the base.

The second criteria is important because it lets you neutralize the airfield by destroying the aircraft based there. A lot of large civilian airports have many access points and runways, but typically very unprotected parking spaces, so if faced with this kind of facility, then the logical target is the aircraft themselves, often arranged in fairly dense parking areas, and vulnerable to strikes. Military bases will often have revetments or hangars which will limit damage (particularly blast damage to the surroundings), and so it will be harder to eliminate the aircraft, though in some cases only fighters will be protected by hangars, with larger aircraft like AWACS/Tankers/etc. left in the open. The worst targets are those with underground aircraft storage, as these take either specialized munitions or a lot of bombardment to crack open.

Lastly, looking at how ammo is stored can provide a third approach to neutralizing a base. Most bases will have several ammo depots/bunkers, but some will only have one, and if this is only a surface depot then it presents a clear vulnerability. Even a single

ammo bunker may be the easiest target in a hardened base, especially if you have the correct weapons. This last one is also of course dependent on if you are using the 'unlimited weapons at bases' realism option.

## Submarine & Anti-Submarine Operations

### **My submarine's batteries are drained. How do I recharge?**

Go to periscope depth. The submarine will automatically raise the snorkel, start the diesel generators, and begin recharging batteries. If you want to recharge batteries faster, set throttle to creep so that you don't drain the batteries while you recharge.

### **How do I deploy towed array sonar?**

Towed array sonar is automatically deployed and used in deep enough water. If you can see the faint Convergence Zone (CZ) rings around your ship/sub then you have a towed array operational.

### **How is submarine communications handled?**

All platform-to-platform communication is instantaneous. So you're allowed to actively control units and share information between them even in situations when it would be impossible in real life. However, Command has a fairly complex platform-to-weapon datalink model including one and two-way communication. Two-way communication allows the weapon to pass data to the operator, e.g. Walleye, SLAM-ER and Tactical Tomahawk, where as one-way communication only sends target position updates to the weapon. The simulator also handles wire-guidance (for both torpedoes and missiles) and command guidance. If you feel there is too much communications between units, you can choose to add surface units and the submarines (or each submarine) to separate sides. You can control how much information they share, without making them hostile to one another, by setting side postures as either friendly (shares location and treats anyone attacking you as hostile) or neutral (is not hostile but does not share information, etc.). You get some interesting results by setting side A as friendly to side B but setting side B as neutral to side A.

### **How do I get helicopters (or aircraft) to search for submarines?**

To set up ASW patrols define an area using reference points. Create a mission "Patrol/ ASW" and assign the vessels and/or helicopters and/or aircraft to that mission.

### **I'm trying to change the depth of my submarine but my orders are ignored. Why??**

If you're on an ASW or Sea Control mission the logic will dictate speed and depth. You can use the Unassign (U) hotkey to remove the unit from the mission. If you'd like more manual control, turn off the automatic evasion ROE as this controls the engaged defensive logic.

### **My ASW aircraft have localized a submarine target but are not dropping a torpedo on it until they're virtually on top of it, even though the torp has several miles range. Why?**

Real-life ASW tactics, dictated by physics. If you drop the torpedo from further away, it takes some time (and much of its fuel) to get at the pre-drop target position, and if the sub captain is not deaf he has cleared datum at high speed. The only way to give the torpedo a good chance of catching up with the submarine is to drop it as close to its estimated position as possible.

## Simulator Mechanics

### **Command is missing a feature that I'd really like to see implemented. What can I do?**

Please go to [Gameplay Features](#) thread. If your feature is already on the list and wish it to receive higher priority bump it with your vote. If not, write a post with your request and it might be added to the list.

### **Are High Off-Boresight (HOB) Air-to-Air Missiles (AAMs) simulated?**

There's both a HOB flag for weapons and a Helmet Mounted Display (HMD) flag for aircraft. The two can but don't always combine. The simulator is modelling each of these factors as having a cumulative effect. So:

- Standard missile, guided weapon, or torpedo: 40 degrees firing arc
- HOB missile: +20 deg.
- HMD: +30 deg.

So for example an early MiG-29 Fulcrum A with AA-8 Aphid [R-60TM] (HMD, no HOB) has 70-deg capability. An F-16C Fighting Falcon with AIM-9X Sidewinder (HOB) but no HMD can shoot up to 60 deg. And a Su-27 Flanker with AA-11 Archer [R-73] or F-15I Eagle with Python 4 (HOB + HMD) can go all the way to 90 deg.

### **Do anti-air missiles have their base hit probabilities adjusted for range?**

To reflect their reduced manoeuvrability at extended range, rocket-powered weapons (most missiles) have their PHs maximized at 50% of maximum range and gradually reduced up to 50% of the base-PH at full range. Ramjet-powered weapons (Sea Dart, SA-6, Meteor etc.) are less affected; they maintain their full base-PHs up to 75% of maximum range and their max PH reduction is 25% of original.

### **Do aircraft bombsight affect bombing accuracy?**

Yes the bombsight affects the Circular Error Probability (CEP) for ballistic weapons (bombs and rockets) as follows.

Basic: No reduction

Ballistic Computing: 25% reduction

Advanced Computing: 50% reduction

Advanced Navigation (INS/GPS): 75% reduction

### **How does the sim treat periscopes?**

Periscopes are automatically raised when the submarine gets to periscope depth.

### **Can flying boats land on water?**

Not in Command v1.04. We would like to add this in the future though.

### **Do you take Daylight Saving Time (DST) into account?**

Command relies primarily on Zulu time, which is the military name for Coordinated Universal Time (UTC). This is almost the same as Greenwich Mean Time (GMT), but not exactly.

In addition, Command displays local time without Daylight Saving Time, also known as Summer Time or DST. Many countries in the northern hemisphere (north of the equator) have decided to make better use of the natural daylight by setting the clock forward one hour during the summer months, and back again in the fall. Daylight saving time is in use between March and April and ends between September and November, and the exact dates varies with country and year.

In order to match local times with sunrise and sunset (important when planning air strikes), Command supports the use of DST. But since there are great variations in dates, the scenario designer will have to manually enter the start and end date for DST in his scenario. This is done with the Editor => Scenario Date and Duration dialog window. Command always assumes that daylight saving is one hour, although historically there have been (rare) examples of countries using two hours, 20 minutes, 30 minutes or 40 minutes DST.

### **Is the cloud cover spread throughout the whole world evenly, or localized in areas?**

In Command v1.04 the weather is the same everywhere on the globe. Configurable localized weather is planned.

### **A group of infantry platoons moves but they are travelling at a really slow speed, why?**

Land units move very slowly in harsh mountainous terrain. You can use the Relief map layer to visualize this, or the "Slope %" text on the map cursor for precise info. Once they get to flatter terrain they'll pick up speed.

### **Is water depth taken into account?**

Water depths do not currently have an effect for ships. However, water depths affect submarine operations and will force submarines to periscope depth or even to surface.

### **What is the communications model like?**

All platform-to-platform communication is instantaneous. So you're allowed to actively control units and share information between them even in situations when it would be impossible in real life. However, Command has a fairly complex platform-to-weapon datalink model including one and two-way communication. Two-way communication allows the weapon to pass data to the operator, e.g. Walleye, SLAM-ER and Tactical Tomahawk, whereas one-way communication only sends target position updates to the weapon. The simulator also handles wire-guidance (for both torpedoes and missiles) and command guidance.

### **Do you simulate COMINT and communications jamming?**

Not as per Command v1.04. This is terribly complex stuff, probably even more so than the radar & electronic warfare model we already have. There are no immediate plans to add this, although we'd like to add it at some point.

### **What is the land warfare model like?**

When discussing land units in Command, it is important to distinguish between assets that directly affect air/naval/strategic operations and those that are more "tactical", field army-like.

The former are represented in excellent detail: Fixed and mobile radar sites, electronic warfare units, anti-aircraft units, long-range artillery and missile units, coastal anti-ship guns and missile launchers, even things like ICBM silos and underground command bunkers; everything is included and modelled meticulously and interacts realistically with air and naval forces. (If you want to see just why the S-400 is such a feared SAM system, or why mobile Scud launchers were such a pain to hunt down in Desert Storm, or how satellite surveillance allows you to keep updated target lists of ground forces, CMANO will show you. No ifs and buts.)

Tactical units like infantry teams, tank platoons etc. are also present and can interact against air and naval forces (engage them and be engaged by them). Where the limitations of CMANO most strongly manifest themselves is when you throw these ground units against each other for a Fulda Gap-like land engagement. For example, the absence of terrain cover at small scale (other than LOS) means that the units will very rapidly run out of ammo, and the lack (currently) of automated resupply means keeping the units properly stocked becomes a manual chore. Warhead-vs-armor penetration & effects is simpler than in the rest of the game (because it gets squeezed at the very lowest end of the modelled range – remember, the upper end is battleship citadels, underground nuclear bunkers etc.). No non-scripted transport & amphib ops – YET (the emphasis is not coincidental). No cost-based pathfinding – again, yet. Units don't do automatic replenishment shuttle runs back and forth from the line. And so on and so on. There is no single blocking item that outright forbids doing a land-centric battle, but the "Air/Naval" part of the title is there for a reason.

A complete list of land facilities and units in the database is available

here: <http://wiki.baloogancampaign.com/index.php/DataFacility?DB=DB3000>

As long as you stay within the limitations of the engine, you can do a decent ground battle: Units engage each other reasonably, they are realistically handicapped by terrain slope (e.g. mech units on mountain ranges) and they do plot around non-passable terrain. Unguided weapons use CEP instead of just a PoK so weapon accuracy and target size actually matter, and near-misses or airbursts produce blast and frag (depending on warhead type) damage. Also fire-control of unguided weapons plays a critical role; the very same gun will have radically different accuracy if it's aimed by a guy with binoculars, a fire-control radar or laser designator – and problems in director operation (jammed, damaged/destroyed, blocked by weather etc.) also affect things. Aimpoint-type facilities & units means no more of the Harpoon-era "I'll wipe that tank company with a single LGB" balooney. Plenty of ground-oriented warhead types like cluster munitions, FAEs, long-rod penetrator, HEAT etc. (browse the DB for a complete list). Faithful modelling of nuclear strengths and limitations on units in the field (e.g. if you expect to simply wipe out a massive armor assault with a tac nuke you may be disappointed). Arty units reasonably stand-off if they can, only few units types fire on the move, you can replenish units manually etc. etc. These things may sound bread-and-butter for anyone coming from a Steel Panthers / Armored Brigade / Armored TaskForce background but compared to anything else air/salt-focused out there it's a quantum leap.

Baloogan had a few episodes featuring ground ops (most of them unsurprisingly focused on Ukraine) which demonstrated both the strengths and the limitations of ground ops in Command. These give a good sense of what one can do and what should be avoided.

Implementation examples are plenty, as quite a few scenarios use ground units in one way or another. Is it SP or AB ? Not yet (then again what else is), but we do want to get closer to that level. One step at a time.

### **Do you model the midnight sun and the polar night to the north/south of the arctic circles?**

Yes, the simulator accurately adjust day/night conditions to simulate the **midnight sun** and the eternal darkness of the **polar night**:

### **What kinds of warhead types and explosives types are modelled?**

In Command, one Damage Point (DP) equals 1kg of TNT. This is different from earlier simulators like Harpoon where 1DP = 5kg of TNT.

Command also automatically converts various explosives types to TNT equivalents. I.e. the Mk84 2000lb GPB [429kg/945lb Tritonal] has 429kg of HE [kg] Tritonal explosives, which automatically becomes 643.5 DP in the simulator since 1kg Tritonal = 1.5kg of TNT. The Command damage model is being systematically improved and expanded. Command v1.04 has the following warhead types.

High Explosive (HE) Blast / Frag

Armor-Piercing (AP)

High Explosive Anti-Tank (HEAT) Shaped Charge

Incendiary (Napalm, WP)

Fragmentation

Semi Armor-Piercing (SAP)

High Explosive Splash Head (HESH)

Continuous Rod

Hard Target Penetrator (HTP)

Fuel-Air Explosive (FAE / Thermobaric)

Torpedo

Depth Charge

Nuclear

Chemical

Bacteriological

Cluster Bomb, Anti-Personnel (Fragmentation)

Cluster Bomb, Anti-Tank (Shaped Charge)

Cluster Bomb, Anti-Runway (Penetrator)

Cluster Bomb, Guided Submunitions, Anti-Tank (Shaped Charge)

Mine, Anti-Personnel (Fragmentation)

Mine, Anti-Tank (Shaped Charge)

Long Rod Penetrator (APDS / APFSDS)

Anti-Electrical

Leaflet Dispensing

Laser Energy

EMP – Directed

EMP – Omnidirectional

Explosives types (that are converted to TNT equivalents):

HE [kg], TNT (Trinitrotoluene)

HE [kg], HMX

HE [kg], PETN (Pentrite)

HE [kg], RDX (Cyclonite / Hexogen / C4)

HE [kg], C4

HE [kg], Tritonal

HE [kg], Ammonium Nitrate (Ammonite)

HE [kg], Picric Acid / Trinitrophenol / Type 97 (Pertit / Pikrinit / Melinit / Ekrasit / Shimose)



HE [kg], Torpex  
HE [kg], Dynamite  
HE [kg], PBXN-1XX  
HE [kg], AFX-757  
HE [kg], Minol-2  
HE [kg], H-6  
HE [kg], Destex  
HE [kg], Minol-1  
HE [kg], HBX-1  
HE [kg], HBX-3  
HE [kg], Hexanite  
HE [kg], Dipicrylamine / Hexyl (Hexamine / Hexite / Hexanitrodiphenylamine)  
HE [kg], Minol-3  
HE [kg], Minol-4  
HE [kg], PBX  
Incendiary [kg], Napalm  
Incendiary [kg], WP  
Incendiary [kg], FAE  
HEAT Shaped Charge, Light Armor (41-90mm)  
HEAT Shaped Charge, Medium Armor (91-140mm)  
HEAT Shaped Charge, Heavy Armor (141-200mm)  
HEAT Shaped Charge, Special Armor (201-500mm)  
Fragmentation [kg], Prefragmented  
Continuous Rod [kg]  
Nuclear [kT]  
Chemical [kg]  
Bacteriological [kg]  
Submunitions [kg], Anti-Personnel (Fragmentation)  
Submunitions [kg], Anti-Tank, Light Armor (41-90mm)  
Submunitions [kg], Anti-Tank, Medium Armor (91-140mm)  
Submunitions [kg], Anti-Tank, Heavy Armor (141-200mm)  
Submunitions [kg], Anti-Tank, Special Armor (201-500mm)  
Submunitions [kg], Anti-Runway (Penetrator)  
Mine [kg], Anti-Personnel (Fragmentation)  
Mine [kg], Anti-Tank, Light Armor (41-90mm)  
Mine [kg], Anti-Tank, Medium Armor (91-140mm)  
Mine [kg], Anti-Tank, Heavy Armor (141-200mm)  
Mine [kg], Anti-Tank, Special Armor (201-500mm)  
Long Rod Penetrator, Light Armor (41-90mm)  
Long Rod Penetrator, Medium Armor (91-140mm)  
Long Rod Penetrator, Heavy Armor (141-200mm)  
Long Rod Penetrator, Special Armor (201-500mm)  
Anti-Electrical (Conductive Fiber)  
Leaflets  
Laser Energy [kW]  
Kinetic Energy

## Sensor Modelling

### How are sensors modelled in the simulator?

Sensors work according to their RL counterparts. Radars are affected by factors such as weather, clutter, jamming (true radar equation, incl. propagation loss), line of sight, horizon (incl. surface effect) and others. Likewise for sonar (passive, active, ping intercept), visual and IR sensors, electronic warfare (ESM/ECM) and so on. Some types of sensors like laser designators/rangers and MAD have simpler models.

The radar model takes a great number of factors into account, like frequencies, horizontal and vertical beamwidth, System Noise Level, Processing Gain/Loss, Peak Power, Pulse Width, Blind Time (yes we simulate pulse compression!), PRF, min & max range, min & max altitude, scan interval, range/height/angle resolution, various capabilities such as air/surface/ground/periscope & range/altitude/speed/heading (RASH) info, OTH-B/OTH-SW, pulse-only & early/late doppler with limited/full LDSD, MTI, NCTR, Phased Array continuous target tracking, CW and CWI capability.

### Does the weather affect sensors?

Yes, it affects most sensors. Particularly visual & IR but also radar at certain frequencies.

Command's predecessors, Harpoon 2 and Harpoon 3, had an excellent "random weather generator" with believable variable weather fronts. The problem was that the different weather conditions didn't really affect sensors/weapons much (e.g. you could drop an LGB in the middle of a tropical storm no problem). The Command 1.04 weather model is simpler in terms of generation/variability but its effects actually impact you. And wait till you see what happens when we activate air-operations being limited by night & bad weather... You will wish you hadn't asked for weather effects in the simulator!

### Does weather affect underwater acoustics as well, or just surface and above?

It affects sonar performance in the surface duct (e.g. shallow sub vs ship or shallow sub vs shallow sub). Once you go below shallow the weather does not affect you except from the local temperature which affect the strength of the thermal layer.



### How detailed is your radar model?

Click on the screenshots to the right for a full view. They are taken from the Radar Calc MS/Excel sheets that we've used to balance out the radar sensors in Command, and should give some clues about the input parameters that we use and also the model's complexity. Note that stats from public sources are in **black**, our guessimations are in **red**. There is only one operating mode per radar set, which is the most typical operating mode. The radar model also has range capping (see Max Rng column) to simulate PRF cutoff and scope limitations.



The 1980-2015+ database for Command 1.04 contains 1917 (finished) radars and they've all been balanced out like this. The 1946-1979 database has a load of earlier sets extinct by 1980. The database editor

uses the same Visual Basic sensor code as the simulator and the MS/Excel spreadsheet, and also does a bunch of sample calcs in the database editor itself to make sure the input stats aren't out of whack.

A screenshot of a software interface displaying a large table of data. The table has many columns and rows, with some cells highlighted in blue and others in green. The data appears to be related to sensor or radar systems.

#### How do your ESM / RWR sets work?

There are 698 ESM/RWR systems in the Command 1.04 database. To the right is a screenshot showing range estimations for some ESM sets against five typical radar sets. You can click on the screenshots for a full view. **Black** stats are from public sources, **red** are our guesses.

As you can see, high-end ESM/ELINT sets produce some pretty ridiculous range estimates against powerful radars.

A screenshot of a data table showing range estimations. The table is organized into columns and rows, with some cells highlighted in blue and others in red. The data represents range estimates for various ESM sets against different radar sets.

#### What is the electronic warfare (ECM) model like?

To the right are some ECM vs radar examples. You can click on the screenshots for a full view. As you can see it is pretty complex. **Black** stats come from declassified sources, **red** stats are our guessimations. The effects assume the target radar antenna points directly at the jammer beam. Sidelobe jamming (which Command also simulates) has less effect.

We even developed our very own radar and electronic warfare simulator while building the radar and electronic warfare models for Command. We are considering releasing it to the public so that the players can look at the models in detail, but haven't had the time to 'productify' it yet.

#### How does stealth work with F-117A Nighthawk, B-2A Spirit, and other stealth aircraft?

Stealth and low-observable aircraft and ships in the database have smaller radar, visual and IR signatures than other units. The simulator uses several different generations of radar stealth and various signature modifiers to produce realistic detection ranges. We also simulate the fact that A to D-band radars are far better at detecting stealth aircraft than E to K-band radars.

The AN/FPS-130 is a D-band long-range air search radar which means it is quite effective against stealth aircraft since the wave length is equal to the aircraft or big fuselage components such as wings or tails. This produces resonance effects which give good radar returns. This is not the case for E to K-band radars, and the effect of LO shaping is much, much higher.

#### How do Low Probability of Intercept (LPI) radars work?

In Command, LPI radars use their real-life power output (0.1W or 1W) and pulse lengths but have much lower System Noise Levels and better Processing Gain/Loss than conventional sets. We do not simulate the 'ESM-style analysis techniques' used by these radars in real life, we adjust the processing gain. As such LPI radars work just like any other radar set except they are counter-detected at much shorter ranges.

RWRs have much smaller antennas than the LPI radars, and thus the LPI has an advantage as it uses signal analysis methods similar to that of ESM gear. That means modern LPIs are often detecting stuff before being counter-detected, and this is also the case in the simulator. For more advanced RWRs and ESM sets the LPI will be picked up at longer ranges

### **What are your visual and infrared (IR) models like?**

Command distinguishes between Detection, Classification, and Identification. Visual detection and classification/identification signatures are based on physical size and various Visual/IR modifiers such as High-Viz, Retro Camo, Low-Viz Camo, etc. However the aircraft's color only has limited impact on detection range except fluorescent colors. Typical classification ranges for high-viz civilian aircraft is ca 8nm while for low-viz aircraft it is ca 5nm. For visual sensors it is actually the \_length\_ of the aircraft has the largest impact on detection range.

In contrast to earlier games, anti-air missiles and small ASM/AGMs can not be visually classified by type in Command. So there are no more 'Incoming AIM-9M-5 Mod 4 Build 3 Block A-2/63' messages.

There is much talk about usingIRST sensors to counter stealth. But in realityIRST sensors have relatively short range due to the fact that IR radiation is absorbed very quickly by the atmosphere. As such it is a great tool to help improve short/medium-range situational awareness as it has a much wider FOV than the radar, but it certainly isn't a long-range anti-stealth sensor! This fact is of course also reflected in Command.

Command also handles contrails. The effects of these can be demonstrated through the following example: Three A-4M Skyhawks are overflying a ground observer using Mk1 Eyeball as search sensor. One Skyhawk is at 1000ft, one at 25000ft and one at 36000ft.

- \* The lowest is detected at ca 2.1-1.8nm slant range and classified as a A-4 Skyhawk at ca 0.8-1.0nm slant range.

- \* The middle aircraft is not detected as it is too far away / too small.

- \* The highest Skyhawk creates a contrail and is detected at a considerable distance, and thus is the first of the three to be detected.

The ground observer can determine the size of the contrail (small/medium/large) but can never see the actual aircraft nor classify it as an A-4 Skyhawk.

TECHNICAL DETAILS: Contrails will only form at altitudes greater than 8000m, and at temperatures below -40 deg C. The simulator has a 'standard atmosphere' model that checks if the temperature is lower than 233 deg Kelvin at the aircraft's current altitude.

The simulator uses the aircraft's 'Visual Size Class' to determine the size of the contrail, and thus detection range. The detection range also depends on time-of-day and cloud cover.

- Very Large: 50nm
- Large: 30nm
- Medium: 20nm
- Small: 10nm

### **Are snorkelling subs visible to radar?**

Yes, the periscope can be detected by radars that have the ability to search for periscopes (not many of them).

### **What weapon guidance types are modelled in the simulator?**

Command has a comprehensive set of weapon guidance logics. There are 15 types, each with specialized handling. These are:

Semi-Active (SARH, SALH)

Inertial Plus Semi-Active (INS + SARH, INS + SALH)

Datalink Plus Semi-Active (DL + SARH)

Passive (ARM, IR)

Inertial Plus Passive (INS + ARM, INS + IR)

Datalink Plus Passive (DL + ARM)

Active (ARH)

Inertial Plus Active (INS + ARH)

Datalink Plus Active (DL + ARH)

Command-Guided / Datalinked

Track-Via-Missile (TVM)

Beam Riding

Inertial (INS, INS + GPS)

Semi-Active Plus Active (SARH + ARH)

Timeshared Semi-Active Plus Active (TSARH + ARH)

In addition, the simulator has complex activation point/target overshoot/illumination geometry issues/redetection/retargeting logics & associated target prioritizing.

Some weapons combine guidance types. For example the SM-2MR Blk IIIB is datalinked with semi-active terminal illumination and a backup IR seeker. The missile is fired at a non-cooperative fighter target. The weapon flies lead-pursuit to the kill box and will request target illumination from an AN/SPG-62 ca 5 sec from impact. In extreme cases the fighter may be able to maneuver enough to make the SARH seeker go blind due to target-missile-illuminator geometry issues. In this case the AEGIS system will order the missile to switch to IR seeker and go autonomous – freeing up an illuminator and a datalink channel, and allowing the system to fire another weapon. The SM-2MR is now a pure-IR homing weapon.

### **A SARH-guided missile flew to the target and hit, but the target was outside the radar's search arc. Why?**

The radar "wedge" being displayed on the map represents the \_search\_ scan limits of the shooter's radar. The \_illumination\_ angle limits of the radar are actually a bit wider than that (this is not a game cheat, it's RL practice), to allow the shooter to jink while guiding the missile and thus mess up the kinematic calculations of a counter-shot. (Yes, our AAW expert is a real stickler for detail.). Hence the jinking that you observed.

If the shooter is forced to "flinch" and breakaway out of the azimuth limits in order to evade an attack, you will notice a time value (in seconds) next to the weapon(s) being guided. This indicates that the weapon is "blind". Once a pure-SARH weapon like the Sparrow goes blind for 5 seconds or more, it self-destructs.

### **How do you calculate horizon limitations?**

We're not using  $3.57 \cdot (\sqrt{h_1} + \sqrt{h_2})$  or  $4.12 \cdot \sqrt{h}$  textbook approximations. We use earth radius, tangent angle, etc to calculate surface angle etc etc.

### **How do you simulate Look-Down/Shoot-Down (LD/SD) limitations on older aircraft radars?**

Older radar sets without LD/SD capabilities can detect targets at a downwards angle of 5 degrees. Radars with limited LD/SD have a 15 degree limitation, and modern radars have no limitations at all.

The AN/APQ-120 radar fitted to F-4E Phantoms have limited LD/SD capabilities. A F-4E patrolling at 40 000 feet (ca 12 km) will therefore be able to detect a MiG-23 flying Nap-of-Earth (NoE) at a distance of 35nm since the downwards angle is roughly 12 degrees. This is within the 15 degree limitation of the radar.

### **How do you model 'looking through a straw' limitations for long-range TCS?**

In earlier naval/aerial warfare sims such as **Harpoon**, aircraft like the F-14 Tomcat with its TCS (TV Camera Set) would detect, classify and identify ANY aircraft at ranges up to ca 70nm. This doesn't make much sense but was a result of both severe sensor model limitations and AI limitations, with the AI refusing to fire at unidentified targets and thus nulling the AIM-54's range advantage. The TCS retained its 70nm range even with the radar turned off, and so the F-14 could fire AIM-54s silently at stealthy F-22s from 70nm out! And the wide 90-deg FOV of the TCS didn't exactly help improve realism. This, in turn, meant that playing the opposing side was often very frustrating since there was nowhere to hide, resulting in less experienced players resorting to ridiculous 'cheatos' tactics. Thankfully, Command has configurable doctrines that allows the AI to automatically engage unknown contacts (FREE FIRE!) which in turn would allow Command to simulate visual detections far more realistically. But how should air-to-air detection & classification in Command be handled? Lets start with some facts:

BASIC FACT 1: Binoculars and high-magnification TV camera sets can help identify aircraft at long ranges. However, searching for air contacts with these sets is like "looking through a straw", and RL experience shows that this kind of search produces long scan times due to the narrow field of view. In turn, this means that that detection ranges with high-magnification visual sensors are very close (and in some cases even shorter!) than what the human Mk1 Eyeball can produce. In fact, a ground observer with a binocular with a 2x zoom would, depending on source, detect the target at 0.9 to 1.1 times the range of the naked eye. And even the best systems would very rarely produce detection ranges greater than two times the human eye.



BASIC FACT 2: Many IR/Visual sensors/turrets are not used for target search due to their narrow FOV. These are typically used with fire control systems. Other sensors have wide FOVs and are used exclusively for situational awareness and early warning, and not for fire control. Most sets also have multiple FOVs with high/low magnification levels; typically low magnification for target acquisition, and high for target classification, identification and tracking.

These facts are also covered by the Command sensor models. All visual sensors and imaging IR sensors have two magnification (zoom) levels, one for general target search and one for classification of already detected targets. As such there is a clear split of roles between dual-role search/fire-control sensors, general search-only sensors, and fire-control-only sensors. The visual Search Magnification is typically 1x to 2x, with 2.3x being the highest search magnification level in Command. This means that, if a plane is detectable at 3nm with the naked eye, it will never be detected at more than 6nm using a TCS. The Classification Magnification is typically 2x to 40x, with 43x being the highest magnification level in the Command database. Some sensors like space object classification cameras have higher zoom levels, ditto for the special 80x detailed target classification & identification camera on the AC-130U, and a handful others.

Special rules apply for imaging IRST sets, which will detect targets at longer ranges but identify them (granted they have imaging IR capabilities) at relatively short ranges. In addition, IR sets like early-gen IRSTs and Line Scanners are not imaging and thus have no Classification zoom as they cannot classify targets.

So how does Command compare to RL observed behavior? Lets take a look at a handful sensors, their stats, and the expected detection & classification ranges against small and large contacts:

Typical magnification levels:

F-14 TCS: 10x

Original LANTIRN: 8x

Modernized LANTIRN: 20x (as such, from 1998 onwards the F-14 Bombrat crews actually used their LANTIRN pod to identify air targets rather than the 15-20 year old TCS as the LANTIRN was a day & night sensor, had twice the range, and offered a clearer picture of the target!)

Sniper: 30x (very impressive!)

ATFLIR: 30x

Original Maverick missile seeker: 2x

From declassified sources we know the typical detection ranges for the Mk1 Eyeball against a given targets at a given aspects. Say 3nm head-on vs MiG-23, 12nm vs B-52, etc. We also know the Classification ranges against the same types: 1.5nm for MiG-23 and 4nm for B-52. The F-14's TCS classification range against the MiG-23 is 14nm and B-52 40nm.

When we put an F-14, B-52 and MiG-23 into a Command scenario and press Play the following will happen:

SCENARIO 1: The F-14's radar is turned off and the aircraft is 30 deg off-angle from the contacts. The contacts are outside the TCS's search arc and are detected and classified by the Mk1 Eyeball at normal ranges: ca 3nm / 1.5nm for MiG-23 and ca 12nm / 4nm for the B-52.

SCENARIO 2: The F-14's radar is turned off and the contacts are within the TCS's search arc. The contacts are detected at up to twice their normal range. Once detected, the F-14 automatically switches the TCS to high magnification mode and immediately identify the contacts. As such, detection and classification ranges are identical: ca 6nm / 6nm for the MiG-23 and ca 24 nm / 24nm for the B-52.

SCENARIO 3: The F-14 operates as normal, using its radar. The MiG-23 is detected by the radar at ca 125nm and the B-52 at ca 180nm. The TCS is slaved to the radar and uses max magnification. The TCS sensor will classify the MiG-23 at ca 14nm and the B-52 at ca 40nm.

### **What is a semi-active seeker, and how do they work in the simulator?**

Semi-active seekers home in on radar or laser energy reflected from the target. An illuminator is a type of radar or laser that paints a target with energy for the weapons to home in on. Basically an illuminator is a big bright light that other weapons know to track.

Illuminators require line-of-sight to the target and are limited by the horizon, so if planet earth is between you and it, you cannot fire your weapon. Worse, laser illuminators cannot see through fog or clouds, which makes Laser Guided Bombs (LGBs) useless in these conditions.

Illuminators are automatically turned on in the simulator when Semi-Active Radar Homing (SARH) or Semi-Active Laser Homing (SALH) weapons are fired.

Illuminator beams are displayed as a broken red line leading from shooter to target. To display these, go to Map Settings -> Illumination Vectors, and set them to be displayed for the selected unit, all units or none by clicking on your choice in the menu. The option is set to None by default to reduce the clutter on the display.

For further information, please visit the [Missile Guidance](#) article on Wikipedia.

# Scenario Editing

## How do you determine Complexity and Difficulty

The complexity and difficulty level for a scenario is subjective. Difficulty is how hard a given scenario is. Complexity is how many units are in the scenario and the nuances of the victory conditions.

## What are the 'Single Unit Airfields' in the database, and how do I use them?

The Single Unit Airfields are "all in one" units. You would normally use them for air bases that are not targets and are generally the preferred unit to use as the number of active units in a scenario does impact game speed.

If you'd like to build an airbase from scratch you must have at least 1 runway unit, 1 access point or taxiway, 1 unit A/C holding unit (tarmac, A/C revetment, open parking space, hanger etc), 1 Ammo holding unit (ammo dump, ammo revetment, ammo pad) and at least one fuel facility (AvGas, not really active as per Command v1.04 but should be there). The manual covers airbase construction and deconstruction in detail.

## Is there an upper limit to the number of units I can have in a scenario?

The number of units that the simulator engine can handle is almost unlimited (a few billions), however the core calcs aren't cheating as much as in earlier games and/or simulators so the more stuff you add the more calcs need to be done. Performance is also affected by units plotting complex nav paths, a lot of long-range sensors, lots of jammers, etc, etc.

## Why should I include 'unavailable' aircraft in my scenario?

Aircraft stuck on the ground are part of the unit compliment and portray real life operations, and should always be included in scenarios. Aircraft that are grounded for extended maintenance or have stood down due to pilot availability or doctrine will still take up valuable hangar/revetment space. They also often pose valuable assets for protection or, from the enemy's point of view, for destruction. If the 'unavailable' aircraft were not included in a scenario because they were "useless", three things would happen:

- 1) The aircraft management screen would de-clutter somewhat (not significantly though, when you're carefully managing air assets).
- 2) Your operational aircraft would have unrealistic availability of air facilities.
- 3) The grounded aircraft would not be able to be used as scenario targets.

So in effect, setting aircraft to 'unavailable' is a way of occupying hangar capacity without providing all aircraft for operations (which never happens in real life) as well as providing the other side targets.

## I selected a carrier group and added aircraft, and some were distributed to destroyers. Why?

If you select to add multiple ships then the simulator will spread the aircraft among them. The solution is to switch to Unit View, select the aircraft carrier, and add the aircraft on a per-ship basis.

## Do I need to fill aviation magazines with drop tanks, sonobuoys and gun ammo?

No. Drop tanks, sonobuoys and gun ammo are 'free', i.e. in unlimited supply. You do not have to worry about their quantities, and here is no point in adding them to aviation magazines.

## How can I find out what a particular aircraft carrier type's normal complement of aircraft is?

There are many web sites where this info is at. For US Navy carriers we can strongly recommend the [Go Navy site](#):

## What about CVBG ship composition? Any good suggestions for that?

Often, ships would join and leave a battlegroup during a work-up and cruise, so the ships that started a deployment may not necessarily be the same that completed the deployment. For a general idea of what deployed with a battlegroup, one creative idea is to look up the cruise book of the carrier in question. Usually, there is a battlegroup photo near the front of the book. You can ID the type and number of ships from the photo (although not the name). In 1985-87 Commander, Cruiser-Destroyer Group 8 was the embarked flag on USS SARATOGA, so you could also research what the assigned ships were for Cruiser-Destroyer Group 8 at that particular time.

Today, CVBGs typically deploy with a CG and 3-4 DDGs. Probably an SSN attached to it, too. The trick is that if there's no real or perceived threat, only the CG will typically stick with the CVN. The DDGs and SSNs might be scattered all across the place. Ditto with PHIBRONs – the LHD might be 2000 miles away from the LSD and 1000 miles away from the LPD that it sailed with. They typically only come together for contingency ops and collective MEU training. I'm not even sure if an ARG deploys with a DDG anymore.

The battlegroup photo is normally early in the cruise book. For instance, the image below is from the [USS Saratoga 1987 cruisebook](#). Also, try googling "Command History" with the ship name or the embarked flag's command, for instance "COMGRUDESGRU EIGHT" "COMMAND HISTORY" The [Naval History Command website](#) may also be useful.

Good links:

[Cruise Books](#)

[BatGru Nomenclature](#)

### **If I add sensor, mount, etc to a unit in a scenario, will those modifications survive a database update?**

Command lets you tweak individual platforms by adding and deleting weapons and sensors. Like, filling up ammo dumps on airfields, changing the VLS loadouts on ships, or updating submarine torpedo magazines.

But because these changes will be erased when you update the scenario to a new version of the database, the simulator lets you save any changes you have made to a special .ini file (using the Editor -> SBR -> Generate Delta Template command). This file contains all deviation from the database including any change in magazines.

When applied to a scenario, the file will restore the changes you made even after the updated scenario has been scrubbed by the new version of the database. This is covered in detail in the manual.

So every time you create a scenario you should also create an .ini file. Then add that to the scenario zip file so people can rebuild the scenario if they have to.

### **Is there a way show cities on the map?**

You can insert a facility called 'Marker (City)' and rename as needed.

### **How much aircraft ordnance should I put in a typical ammunition shelter?**

Ammunition is typically stored by explosive class and type, at least in the West. So for a simple example separate-loaded artillery projectiles (usually 150 mm or larger) are stored separately from propellants and both are in different locations than the fuzes. Big exception for fixed or semi-fixed ammunition which is packaged in single-round units but may also have several complete rounds to a box and multiple boxes per pallet. The big delimiter is NEQ or Net Explosive Quantity, a value that varies between nations and is based on explosive type and weight. NEQ governs how much can be stored in a single space and the distance between storage platforms or buildings. The aim is to prevent sympathetic detonation should one space detonate high-order due to accident or attack. Bombs and fuzes are stored in separate buildings or bunkers and any guidance units or fins are stored separately as non-explosive components. So the question is a bit like asking "How big is a balloon?" and the answer is always "It depends". The NEQ storage rules apply to NATO or are at least NATO standard and are generally rigidly enforced in fixed installations, at least in theory. So pretty much any outlay you want can be "accurate" as CMANO allows your ammo bunkers to be whatever you want them to be without messing about with explosive classes, NEQ's and safe distances.



To the right is a satellite image from Google Earth of a moderate-sized ammunition depot storing all types of non-nuclear munitions. Click for full-size view. It measures about 5-km north-south and is about half that from east-west. Each building or structure will hold a specific explosive class (or compatible mix of classes according to storage regulations) and are frequently separated from their neighbour by a berm to deflect the shock wave of a high-order blast. A building should only hold an NEQ that will prevent sympathetic detonation of the magazine next door in the event of accident or attack. Rail lines run down the east side and the ammunition assembly buildings are off the screen to the south. Note to that there are bunkers and above-ground shelters on the northern part of the magazine area and that the individual building tend to be long and narrow as another aid to limit catastrophic propagation of a detonation.

For example, before you can determine how many Mk-83 bombs can be placed into a single magazine you need to know many details that the game cannot provide such as:

- Type of magazine – Above ground concrete or open storage or earthen bunker or underground bunker or hardened shelter etc.
- Berms or no berms separating the individual magazine structures
- Safety distance from – similar or nearby magazines, civilian structures, POL, military facilities etc.

Only with this information does it become possible to determine the NEQ (also known as NEW for Net Explosive Weight) that can be stored in the structure. The calculation of NEQ that can be stored always comes before the item to be stored so suppose that we calculate that the single magazine can store an NEQ of 4000 lbs. A single Mk-83 Mod 4 bomb has an NEQ of 445 so our hypothetical magazine can safely store 8-bombs ( $4000/445 = 8.989$  rounded down to 8).

For a Mk-82 Mod 4 the NEQ is 180 and so instead of 8 x Mk-83s, the same magazine can store 22 x Mk-82 bombs ( $4000/180 = 22.22$  rounded down to 22) or for that matter 195 x Hellfire rocket motors waiting to be mated to their warhead and guidance components. Ammo storage is a logistical problem rather than an operational one requiring literally thousands of pages of rules and regulations covering a vast number of ammunition items and contingencies that only the most fanatical of rivet-counters would want more details than CMANO already provides. Particularly since any scenario would really not benefit from additional complexity in the way ammo storage is already modelled. The above figures come from a 1990 ammo catalogue but it is unlikely that the values have changed too much in the intervening decades.

You can also lower the NEQ by cladding to provide insulation in the event of fire, something the USN learned well before the 1967 Forrestal disaster but somehow managed to forget. This is the principle reason why some naval ordnance will have a lower NEQ than its Air Force equivalent.

### **Is there some sort of "standard" aircraft complements for different ships in the database?**

Not at the moment. However if you feel like taking on the task of compiling the necessary data we can provide you with a list of all the ships in the database in an XLS sheet. Then you can add the 'standard' or 'typical' helicopter/aircraft to each, and once finished we can add these to the database and update the sim GUI.

Should be a pretty straightforward job really, but need to check that the helicopter torpedo/missile magazines match up with those on the ship. I.e. a 2008 version of a Burke carries a correct version of the Seahawk, etc.

### **How do I put pictures in the scenario summary or briefing?**

In Command 1.04 the simplest way to add a picture in the briefing is to have it fetched from a web-public address. We are working on a better system but it may take a while.

Alternatively, you can use a data URI instead of a link in the href field. Go to [here](#), upload your image, run the process, and then take the base64 result and put it into the href field in the editor.

### **How can I convert Google Earth Placemarks to Installation (INST) files in Command?**

You can use the KML-to-INST tool. For more information please go [here](#). The subject is also covered in the manual.

### **How can I fit a ship with future weapons loadout like LRASM?**

In the Weapons window, add 0/29, 0/32, 0/61 or 0/64 weapon records to the mounts, depending on the number of VLS cells. Then load the number of weapons you want.

### **Can I add laser guns to my futuristic Arleigh Burke?"**

Yes you can, there are several laser cannons in the database already. Add the mount(s) through the Weapons window.

### **How were Soviet Red Banner Naval Aviation naval bomber regiments organized??**

There were usually 3 squadrons per regiment; two bomber squadrons of 10-11 aircraft each, and one electronic attack squadron of 6-10 aircraft each.

### **How should I name aircraft?**

Aircraft in Command are handled on an individual level, with each unit having its own callsign. It is recommended to use the squadron/regiment's name and aircraft number / tail code as callsign. It is also recommended to use the RL number/code. In cases where the number/code is not available, use generic numbering, i.e. #01, #02. The standard naming convention is as follows:

F-14A Tomcat on USS Ranger, Carrier Air Wing Nineteen CVW-2, tail code 'NE', squadron VF-1 Wolfpack, aircraft number 101:  
VF-1 Wolfpack, NE-101

RF-8G Crusader on USS Oriskany, Carrier Air Wing Nineteen CVW-19, tail code 'NM', squadron VFP-63 Eyes of the Fleet, detachment 10, aircraft number 601:

VFP-63 Eyes of the Fleet, Det 10, NM-601

SH-2F Seasprite on USS Cook, a helicopter detachment from HSL-37 Easy Riders, aircraft number 31 (the aircraft number is known, so use '31' rather than '#01':

HSL-37 Easy Riders, Det, 31

P-3C Orion from VP-48 Boomers, aircraft #01 (no number/tailcode is known, so use generic '#01'):

VP-48 Boomers #01

F-15C Eagle from 43rd Tactical Fighter Squadron, aircraft #05 (no number/tailcode is known, so use generic '#05'):  
43rd TFS #05

Su-27 Flanker B from the first squadron of the 611 Fighter Regiment (IAP) of the Soviet air defence force (PVO), aircraft number 10:  
611 IAP PVO, 1 Sqn #10

Tu-16K-10-26P Badger C Mod from the second squadron of the 987 Naval Missile-Carrying Regiment at Severomorsk-1, aircraft number 4:

987 MRAP, 2 Sqn #04

Ka-27PL Helix A on Udaloy, of the Soviet Northern Fleet's 830 Independent Anti-submarine Helicopter Regiment, Detachment A, aircraft number 01:

830 OKPLVP, Det A #01

Sea Harrier FRS.1 on HMS Invincible, No. 801 Naval Air Squadron (NAS), aircraft #04 (note 'No.' prefix):

No. 801 NAS #04

Lynx HAS.3 on HMS Battleaxe, No. 849 Naval Air Squadron (NAS), Detachment B, aircraft #01 (note 'No.' prefix):

No. 849 NAS, Det B #01

Nimrod MR.2P on RAF Kinloss, No. 120 Squadron, aircraft #04 (note 'No.' prefix):

No. 120 Sqn #04

Norwegian F-104G from Bodø Air Base, 334 Sqn, aircraft #05:

334 Sqn #05



Norwegian NH90 NFH helicopter on HNoMS Fridtjof Nansen, 334 Squadron, Detachment A, aircraft #01:  
334 Sqn, Det A #01

### **How many sides can I create?**

A scenario can have an almost unlimited number of sides. However, since each side needs to maintain separate contact lists, exchange data with allies (if any), etc, each additional side will have a significant impact on game speed. It is therefore recommended to use as few sides as possible to ensure highest possible game speed.

For neutral / civilian sides that take no active part in the scenario (i.e. shoot stuff up), make sure to set the awareness level to 'Blind' to skip sensor calculations and targeting logics. It is also recommended to uncheck 'Collective Responsibility' for these sides so that the action of one civilian unit (e.g. a pirate) will not unleash a barrage of missiles on the other civilian units.

## **Database Editing**

### **Does the simulator come with a database editor?**

There are pros and cons in supporting third-party databases for a simulator that is being actively maintained by the developer. Our current view is that the disadvantages are more profound. So Command does not come with a database editor.

The ability to modify a database has been taken from a stand-alone programs and integrated into the Scenario Editor. You can customise platforms in the scenarios by adding/removing mounts, magazines, sensors and comms gear as well as changing weapon types and quantities, but you aren't able to add units or otherwise edit the database. This gives you the ability to do some new nifty things e.g. stick a Club-K container on an innocent merchant ship. And there is nothing stopping you (well, except common sense) to equip a Perry-class frigate with the SS-N-19 complement normally reserved for a Kirov. The scenario design section of the manual explains how you can do this either through the editor or via templates.

There are many reasons why databases in Command are not directly editable.

First and foremost we did not want to repeat the database mess/confusion observed in Harpoon. The scenario authors handled more than their fair share of support mails on database/scenario mismatches for that game. So for Command we wanted to shift all focus to scenarios. Command is pretty much a 'scenario sandbox' that started out as a scenario editor and evolved into a simulator. Everyone on the Command development team have a long history of scenario design behind them, mainly for Harpoon2/3, and we wanted to make the ultimate scenario editor for ourselves and other naval war gaming fans out there – without the noisy database element. As such, in Command there is no need to copy/overwrite database files or edit configuration files, followed by odd behaviour and crashes if database and scenarios don't match one hundred percent. Command scenarios know exactly what database they were built with based on the database's checksum (!), and a scenario will pick the right database upon load. We have received much positive feedback on this solution, as the players only have to care about what scenario to play rather than worrying about whether the scenario will crash with the currently installed database or not.

Second, the database for Command is very complex. Anyone who has spent time in the Harpoon2/3 database editor will immediately notice the increased number of parameters when they look in the Command DB Viewer. Editing or leaving out the wrong parameter could have rather negative impact on gameplay, generating a ton of unnecessary support tickets for the developer.

Third, having multiple user-created databases makes continued expansion of Command far more difficult. Any schema changes would also have to be applied (correctly!) to any 3rd party databases, each of which may or may not have been abandoned by its author at that point in time. There would also be the risk of making associated material (scenarios) unusable. The Command database schema & enum tables are updated regularly and keeping all database hobbyists up-to-date would be a monstrous task, both on the dev end and on the 3rd party end. It would not take many weeks (or days!) before a new db author simply would give up.

### **Where can I submit my request for a new platform (aircraft, ship, submarine, facility, weapon, etc)?**

The databases contain something like 10,000 platforms but if you still need a new platform for a scenario that you're working on feel free to give us a pling. Preferably with links to information from reliable sources.

You can request new 1946-1979 (Cold War) platforms [here](#).

And 1980-2020+ (DB3000) platforms [here](#).

Please note that in order to add a new platform we need adequate data to model them with. There's a lot of pull from the community for access to emerging systems to play with as well as an expectation for technical accuracy. Having both (early access and full fidelity) is a knife edge to negotiate, and fancy new toys will often go through several complete rebuilds as more information gradually becomes available.

We are also quite selective about which hypothetical platforms we add.

### **There is an error in the platforms database. What can I do about it?**

If you think you've found an error in the 1980-2020+ (DB3000) database, please report it [here](#). If the error is in the 1946-1979 (Cold War) database, please report it [here](#).

### **Where are the Colonial Wars Database (CWDB) and the DB3000 Database?**

The databases are already installed on your system. Updated databases are released with the regular game upgrades.

### **Why was 1979 selected for the end of the Cold War Database rather than 1989?**

1979 was in many ways a watershed year with the Soviet invasion of Afghanistan and the Iranian Revolution beginning to change superpower dynamics and the Cold War's end game unknowingly commenced. 1980 would see the Reagan era and the biggest peacetime military build up in history unfolding.

By the time the Cold War ended, much of the hardware was technologically mature and the current setup demonstrates this nicely. Each covers roughly thirty-years, about as long as a professional career in the armed forces of the given periods.

Also, there is platform overlap built into both databases so from a user standpoint when one database ends and the other begins is pretty much irrelevant. Also, no mother of a database from 1946 to near future is too big for one guy so Paul Bridge covers the 1946-1979 time frame and Ragnar Emsoy covers from 1980 onwards. Mike is working on both databases and is the land combat element expert.

### **I cannot find Charles de Gaulle carrier (of France) in the DB. Why?**

There are in fact several entries in the database for the ship, representing different refits. Maybe you are playing a 1946-1979 scenario and are looking for the ship in the wrong platform database? Load a scenario that uses the 1980-2020+ platform database and you should find the ship.

### **How can I add images to the database and write platform descriptions?**

The top line of each database entry in the Database Viewer has a number at the beginning (#1234). This is the platforms' unique identification number.

Now an example for the Chilean PCFG LM 30 Casma. The Number for this ship is #1701, so you have to put a image of it in the database image folder as follows:

[Path\_to\_COMMAND\_game\_folder]\DB\Images\DB3000\Ship\_1701.jpg

The Database Viewer will support up to seven photos: one main photo that scales with the size of the window, and two rows of three smaller photos. The Database Viewer will auto-detect the number of photos available and position them accordingly. It will look for files named as follows:

[type]\_[id].jpg (main photo)

[type]\_[id]\_t1.jpg (thumbnail 1, optional)

[type]\_[id]\_t2.jpg (ditto)

[type]\_[id]\_t3.jpg (etc)

[type]\_[id]\_t4.jpg

[type]\_[id]\_t5.jpg

[type]\_[id]\_t6.jpg

For the description you create a .txt file with the description in it and save it to

[Path\_to\_COMMAND\_game\_folder]\DB\Descriptions\DB3000\Ship\_1701.txt

Now you have image and description for this ship in your DB3000 database.

For the other types use:

Aircraft\_[number].jpg / Aircraft\_[number].txt,

Submarine\_[number].jpg / Submarine\_[number].txt and

Facility\_[number].jpg / Facility\_[number].txt

Lastly, most other players out there would love to have the same photos and descriptions you have added. And since there are tens of thousands of objects in the database it makes sense to share this with the community. But for this one had to respect the copyrights of the images and description texts. On Wikipedia the most images are applicable by mentioning the creator. There is some info about the conditions for using them under the images.

### **How extensive is the nuclear weapons database?**

You can easily you build something like the old game DefCon or SPIs World War 3. Here is a list of the nuclear weapons included in the 1980-2020+ database. Ca 180 in Command v1.04, and new ones are added regularly. The 1946-1979 database also has a large number of weapons not present in the 1980+ database, which starts literally from (and including) Little Boy and Fat Man.

[Here](#) is a quick demonstration of Command's strategic nuclear warfare capabilities.

53-58 Gyro [NATO 53-59N, 15kT Nuclear] — 1961, Submarine, November

53-65N Gyro [NATO 53-68N, 20kT Nuclear] — 1971, Submarine

65-73 Gyro [20kT Nuclear] — 1975-91

AGM-129A ACM [150kT Nuclear] — 1993-2006

AGM-69A SRAM [200kT Nuclear] — 1973-1993

AGM-86B ALCM [200kT Nuclear] — 1983-1992

AN.22 Bomb [60kT Nuclear] — 1968-1988

AN.52 Bomb [25kT Nuclear] — 1973-92

AS-15 Kent A [Kh-55, 200kT Nuclear] — 1984, Tu-95MS-6

AS-15 Kent B [Kh-55SM, 200kT Nuclear] — 1987, Tu-95MS-16

AS-16 Kickback [Kh-15, 200kT Nuclear]

AS-2 Kipper [K-10SD, ASM, 200kT Nuclear] — 1967, Tu-16K-10D, LR Hi-Alt

AS-2 Kipper [K-10SDV, ASM, 200kT Nuclear] — Tu-16K-10D, LR Low-Alt, Operational

AS-2 Kipper [K-10SNB, ASM, 200kT Nuclear] — 1963?, Tu-16K-10N, SR Low-Alt, Operational

AS-3 Kangaroo [Kh-20M, ASM, 800kT Nuclear]

AS-4 Kitchen A Mod 1 [Kh-22PG ASM, 200kT Nuclear] — 1968, Tu-22K

AS-4 Kitchen A Mod 2 [Kh-22M ASM, 350kT Nuclear] — 1976, Tu-22M-2, Tu-22KD

AS-4 Kitchen A Mod 3 [Kh-22N ASM, 350kT Nuclear] — 1983? Tu-22M-2/3

AS-4 Kitchen B Mod 1 [Kh-22PSI INS, 200kT Nuclear] — 1971, Tu-22K

AS-4 Kitchen B Mod 2 [Kh-22MA INS+TERCOM, 350kT Nuclear] — 1976, Tu-22M-2, Tu-22KD

AS-4 Kitchen B Mod 3 [Kh-22NA INS+TERCOM, 350kT Nuclear] — 1983? Tu-22M-2/3

AS-4 Kitchen C Mod 1 [Kh-22P ARM, 200kT Nuclear] — Tu-22KP/KPD, Flawed

AS-4 Kitchen C Mod 2 [Kh-22MP ARM, 350kT Nuclear] — 1980, Tu-22KP/KPD, Limited Service

AS-4 Kitchen C Mod 3 [Kh-22NP ARM, 350kT Nuclear] — Not Adopted, Tu-22M-2/3

AS-5 Kelt [KSR-2M, ASM, 1mT Nuclear] — 1972

AS-6 Kingfish A Mod 1 [KSR-5, ASM, 350kT Nuclear] — 1971, Tu-16K-26/10-26

AS-6 Kingfish A Mod 2 [KSR-5N, ASM, 350kT Nuclear] — 1973, Tu-16K-10-26N

AS-6 Kingfish A Mod 3 [KSR-5M, ASM, 350kT Nuclear] — 1976, Tu-16K-26PM

ASMP [300kT Nuclear] — 1987

ASMP-A [300kT Nuclear] — 2011

B-28 Strategic Bomb [1.45mT Nuclear] — 1958-1991

B-43 Strategic Bomb [1mT Nuclear] — 1962-1991

B-53 Strategic Bomb [9mT Nuclear] — 1953

B-57 Multipurpose Sub Bomb [20kT Nuclear] — Aerial

B-57 Multipurpose Surface Bomb [20kT Nuclear] — 1965  
B-61 Tactical/Strategic Bomb [340kT Nuclear] — 1968  
B-83 Strategic Bomb [1.2 mT Nuclear] — 1984  
BGM-109G Tomahawk GLCM [W80-0 200kT Nuclear]  
China Type 639-6 Strategic Bomb [3.3mT Nuclear]  
Depth Charge [10kT Nuclear] — Aerial  
Depth Charge [15kT Nuclear] — Aerial  
Depth Charge [20kT Nuclear] — Aerial  
Depth Charge [5kT Nuclear]  
Depth Charge [Aerial, 80kT Nuclear]  
DF-2 [12kT Nuclear, CSS-1] — 1969-1982  
DF-21 [500kT Nuclear, CSS-5 Mod-1] — Not Operational  
DF-21A [500kT Nuclear, CSS-5 Mod-2] — 1997  
DF-3 [3mT Nuclear, CSS-2] — 1972  
DF-31A [1.0mT Nuclear, CSS-9 Mod-2] — 2008  
DF-3A [3mT Nuclear, CSS-2 Mod-2] — 1989  
DF-4 [3mT Nuclear, CSS-3] — 1981  
DF-5 [3mT Nuclear, CSS-4 Mod-1] — 1982  
DF-5A [4 MIRV x 350kT Nuclear, CSS-4 Mod-2] — 1987  
FRAS-1 [RPK-1 Vikhr, 5kT Nuclear] — 1969  
FROG-7a [9M21, 20kT Nuclear] — R-65, R-70, 9K52 Luna-M  
Hatf 4 [150kT Nuclear, Shaheen 1] — 2004  
Hatf 6 [150kT Nuclear, Shaheen 2] — 2009  
Hatf 7 [150kT Nuclear, Babur] — Pakistan, 2006, Cruise Missile  
Jericho 1 [20kT Nuclear] — 1974  
Jericho 2 [1mT Nuclear] — 1991  
Jericho 3 [1mT Nuclear] — 2011  
JL-1 [500kT Nuclear, CSS-N-3] — 1988  
JL-2 [1mT Nuclear, CSS-N-4] — 2007  
Kh-102 [200kT Nuclear] — 2011  
LGM-118A Peacekeeper [W87 400kT Nuclear] — 1987-2005  
LGM-25C Titan II [W53 9mT Nuclear] — 1964-1987  
LGM-30F Minuteman II [W56 1.2mT Nuclear] — 1966-1993  
LGM-30G Minuteman III [3 MIRV x W62 170kT Nuclear] — 1971  
LGM-30G Minuteman III [3 MIRV x W78 335kT Nuclear] — 1983  
LGM-30G Minuteman III [W87 400kT Nuclear] — 2009  
M1/TN41 [1mT Nuclear] — 1971  
M2/TN41 [1mT Nuclear] — 1975  
M20/TN60 [1.2mT Nuclear] — 1978  
M45/TN75 [6 MIRV x 150kT Nuclear] — 1998  
M4A/TN70 [6 MRV x 100kT Nuclear] — 1986  
M4B/TN71 [6 MRV x 150kT Nuclear]  
M51/TN75 [6 MIRV x 150kT Nuclear] — 2011  
MGM-31B Pershing IA [W50 400kT Nuclear] — 1971-1991  
MGM-31C Pershing II [W85 50kT Nuclear] — 1985-1989  
MGM-52C Lance [100kT Nuclear] — 1974-1992  
Popeye Turbo [20kT Nuclear] — Israel, Submarine  
RGM-109A Tomahawk TLAM-N [W80-0 200kT Nuclear] — 1985-1991

RIM-2D Terrier [W45-0 1kT Nuclear] — SAM-N-7 BT-3A(N)  
RIM-8B Talos [W30 5kT Nuclear] — 1960, SAM-N-6bW  
RIM-8D Talos [W30 5kT Nuclear] — 1961, SAM-N-6bW1  
RIM-8E Talos [W30 5kT Nuclear] — 1963, SAM-N-6c1 Unified, SARH  
RN-24 Tactical Bomb [10kT Nuclear] — Russia, Su-24  
RN-28 Tactical Bomb [1kT Nuclear] — Russia, 8U49, Su-24  
RN-30 Strategic Bomb [200kT Nuclear] — Russia  
RN-32 Strategic Bomb [200kT Nuclear] — Russia  
RN-40 Tactical Bomb [30kT Nuclear] — Russia, 8U-64, MiG-23, MiG-27, MiG-29 (9-12)  
RN-42 Strategic Bomb [200kT Nuclear] — Russia  
RUR-5A Mod 3 ASROC RTD [10kT Nuclear DC] — 196x-89  
SA-2e Guideline [S-75M Volkhov, 15E / V-760, 25kT Nuclear] — 1965, Soviet Only  
SA-2f Guideline Mod 2 [S-75M3 Volkhov, 5V29 / V-760V] — 1976, Nuclear 5YA23 / V-759  
SA-5b Gammon [5V28, 25kT Nuclear] — 1972, S-200V Vega  
SH-04 Galosh ABM [ABM-1B, Nuclear] — 1972  
SH-08 Gazelle ABM [ABM-3 / 53T6, Nuclear] — 1989  
SH-11 Gorgon ABM [ABM-3 / 51T6, Nuclear]  
SS-11 Sego Mod 1a [UR-100 / RS-10, 1.1mT Nuclear] — 1966, 8K84, Withdrawn by 1974  
SS-11 Sego Mod 1b [UR-100UTTH / RS-10, 1.3mT Nuclear] — 1970, 8K84M  
SS-11 Sego Mod 2 [UR-100K / RS-10M, 1.3mT Nuclear] — 1971, 15A20  
SS-11 Sego Mod 3 [UR-100U / RS-10M, 3 MRV x 350kT Nuclear] — 1974, 15A20U  
SS-12a Scaleboard [9M76, 500kT Nuclear] — 1963-1987, 9K76 Temp-S  
SS-12b Scaleboard [9M72, 500kT Nuclear] — Not Operational, 9K71 Temp  
SS-13 Savage Mod 1 [RS-12, 750kT Nuclear] — 1969-19xx, RT-2 Temp-2  
SS-13 Savage Mod 2 [RS-12, 750kT Nuclear] — 1975-1995, RT-2 Temp-2  
SS-16 Sinner [RS-14, 1mT Nuclear] — 1979-1985, RT-21 Temp-2S, Experimental Deployment  
SS-17 Spanker Mod 1 [MR-UR-100 / RS-16A, 4 MIRV x 750kT Nuclear] — 1976-1991  
SS-17 Spanker Mod 2 [MR-UR-100 / RS-16A, 3.5mT Nuclear] — 1976-1991  
SS-17 Spanker Mod 3 [MR-UR-100UTTH / RS-16B, 4 MIRV x 750kT Nuclear] — 1981-1996  
SS-18 Satan Mod 1 [R-36M / RS-20A, 24mT Nuclear] — 1976-1984  
SS-18 Satan Mod 2 [R-36M / RS-20A, 8 MIRV x 1.3mT Nuclear] — 1976-1983  
SS-18 Satan Mod 3 [R-36MUTTKh / RS-20B, 24mT Nuclear] — 1980  
SS-18 Satan Mod 4 [R-36MUTTKh / RS-20B, 10 MIRV x 550kT Nuclear] — 1980-2010  
SS-18 Satan Mod 5 [R-36M2 / RS-20V, 10 MIRV x 750kT Nuclear] — 1989  
SS-18 Satan Mod 6 [R-36M2 / RS-20V, 20mT Nuclear] — 1992  
SS-19 Stiletto Mod 1 [UR-100N / RS-18A, 6 MIRV x 550kT Nuclear] — 1976-1983  
SS-19 Stiletto Mod 2 [UR-100N / RS-18A, 5mT Nuclear] — 1978  
SS-19 Stiletto Mod 3 [UR-100NUTTH / RS-18B, 6 MIRV x 750kT Nuclear] — 1980  
SS-1c Scud B [8K14-8F14, 70kT Nuclear] — 1962, 9K72 Elbrus  
SS-1d Scud C [70kT Nuclear] — Never Operational  
SS-21a Scarab [9M79B, 100kT Nuclear] — 9K79 Tochka  
SS-21b Scarab [9M79B-1, 100kT Nuclear] — 1990, 9K79-1 Tochka-U  
SS-23 Spider [9M714V, 200kT Nuclear] — 1981-1990  
SS-24 Scalpel Mod 1 [RS-22, 10 MIRV x 550kT Nuclear] — 1990-2002, Silo  
SS-24 Scalpel Mod 2 [RS-22, 10 MIRV x 550kT Nuclear] — 1988-2005, Rail-Based  
SS-25 Sickle [RS-12M Topol, 750kT Nuclear] — 1989  
SS-27 Sickle B [RS-12M1 Topol-M, 550kT Nuclear] — 1999  
SS-29 Sickle B Mod 2 [RS-12M2 Topol-M, 550kT Nuclear]



SS-4 Sandal Mod 1 [R-12, 2.3mT Nuclear] — 1959, 8K63  
SS-4 Sandal Mod 2 [R-12U, 2.3mT Nuclear] — 1963, 8K63U  
SS-5 Slean Mod 1 [R-14, 2.3mT Nuclear] — 1962, 8K65  
SS-5 Slean Mod 2 [R-14U, 2.3mT Nuclear] — 1965, 8K65U  
SS-9 Scarp Mod 1 [R-36, 18mT Nuclear] — 1967-1975, 8K67  
SS-9 Scarp Mod 2 [R-36, 25mT Nuclear] — 1967-1975, 8K67  
SS-9 Scarp Mod 3 FOBS [R-36O, 5mT Nuclear] — 1968-1970, 8K69, Fractional Orbital Bombardment System  
SS-9 Scarp Mod 4 [R-36P, 3 MRV x 2mT Nuclear] — 1972-74, 8K67P  
SS-N-12 Sandbox Mod 1 [P-500 Bazalt , 350kT Nuclear] — 1976  
SS-N-12 Sandbox Mod 2 [P-1000, 350kT Nuclear] — 1988  
SS-N-14 Silex [60R, 5kT Nuclear Depth Charge] — 1969  
SS-N-15 Starfish [RPK-2 Viyoga, 5kT Nuclear] — 1970, 82R  
SS-N-15 Starfish [RPK-6 Vodopad, 5kT Nuclear] — 1982, 83R  
SS-N-16 Stallion [RPK-7 Vodopei, 10kT Nuclear] — 1985, 84R  
SS-N-17 Snipe [3M17, 500kT Nuclear] — 1980-1991, 1x Yankee SSBN  
SS-N-18 Stingray Mod 1 [3 MIRV x 500kT Nuclear] — 1978  
SS-N-18 Stingray Mod 2 [450kT Nuclear]  
SS-N-18 Stingray Mod 3 [7 MIRV x 200kT Nuclear]  
SS-N-19 Shipwreck [P-700 Granit, 200kT Nuclear] — 1984  
SS-N-20 Sturgeon [10 MIRV x 200kT Nuclear]  
SS-N-21a Sampson [S-10 Granat, 200kT Nuclear]  
SS-N-21b Sampson [S-10 Granat, 200kT Nuclear]  
SS-N-22 Sunburn [P-80 Zubr, 200kT Nuclear] — 3M80  
SS-N-23 Skiff [4 MIRV x 100kT Nuclear] — 1986  
SS-N-32 [6 MIRV x 150kT Nuclear]  
SS-N-3a Shaddock [P-6, ASM, 350kT Nuclear] — 1965  
SS-N-3b Shaddock [P-5D, AGM, 350kT Nuclear] — 1962-1966  
SS-N-3c Shaddock [P-35 Progress, ASM, 350kT Nuclear]  
SS-N-5 Sark [800kT Nuclear] — 1964-1988  
SS-N-6 Serb Mod 1 [1mT Nuclear, R-27 Serb] — 1969, 4K10  
SS-N-6 Serb Mod 2 [1mT Nuclear, R-27U Serb]  
SS-N-6 Serb Mod 3 [3 MRV x 200kT Nuclear]  
SS-N-7 Starbright [P-70 Ametist, 200kT Nuclear]  
SS-N-8 Sawfly Mod 1 [1mT Nuclear] — 1974  
SS-N-8 Sawfly Mod 2 [800kT Nuclear]  
SS-N-9 Siren [P-120 Malakhit, 200kT Nuclear]  
T-20 Strategic Bomb [20mT Nuclear]  
T-5 Strategic Bomb [5mT Nuclear]  
T-50 Strategic Bomb [50mT Nuclear]  
Tactical Bomb [8U69, 5kT Nuclear] — Russia, Izdelie 244N, First Tactical Bomb, Su-7B, MiG-21  
UGM-109A Tomahawk TLAM-N [W80-0 200kT Nuclear] — 1985-1991, TT  
UGM-109A Tomahawk TLAM-N [W80-0 200kT Nuclear] — 1985-1991, VLS  
UGM-133 Trident II D5 [4 MIRV x W88 475kT Nuclear]  
UGM-133 Trident II D5 [8 MIRV x W76 100kT Nuclear] — 1991  
UGM-27C Polaris A3 [3 MRV x W58 200kT Nuclear] — 1965-1996  
UGM-73A Poseidon C3 [10 MIRV x W76 100kT Nuclear] — 1972-1993  
UGM-96A Trident C-4 [8 MIRV x W76 100kT Nuclear] — 1980-2005  
UUM-44A SUBROC [10kT Nuclear DC] — 1966-1989

WE.177 Type A Depth Charge [15kT Nuclear] — 1966-1998, Aerial

WE.177 Type B [400kT Nuclear] — 1966-1995

WE.177 Type C [300kT Nuclear] — 1973-1998

### **What battleships are included in the database?**

The battleships included in the 1946-1979 database are as follows:

BB 43 Tennessee — United States (Navy), 1947-1959, In Reserve

BB 44 California — United States (Navy), 1947-1959, In Reserve

BB 45 Colorado — United States (Navy), 1947-1959, In Reserve

BB 46 Maryland — United States (Navy), 1947-1959, In Reserve

BB 47 West Virginia — United States (Navy), 1947-1959, In Reserve

BB 55 North Carolina — United States (Navy), 1947-1961, In Reserve

BB 56 Washington — United States (Navy), 1947-1960, In Reserve

BB 57 South Dakota — United States (Navy), 1947-1962, In Reserve

BB 58 Indiana — United States (Navy), 1947-1962, In Reserve

BB 59 Massachusetts — United States (Navy), 1947-1962, In Reserve

BB 60 Alabama — United States (Navy), 1947-1962, In Reserve

BB 61 Iowa — United States (Navy), 1944-1950

BB 61 Iowa — United States (Navy), 1953-1958

BB 61 Iowa — United States (Navy), 1966

BB 62 New Jersey — United States (Navy), 1943-1950

BB 62 New Jersey — United States (Navy), 1953-1957

BB 62 New Jersey — United States (Navy), 1967-1969

BB 63 Missouri — United States (Navy), 1944-1955

BB 64 Wisconsin — United States (Navy), 1944-1953

BB 64 Wisconsin — United States (Navy), 1953-1958

BB 67 Montana — United States (Navy), 1953-1958

BB Almirante Latorre — Chile (Navy), 1942-1959, -Last Refit

BB Anson — United Kingdom (Royal Navy), 1942-1951

BB Anson — United Kingdom (Royal Navy), 1951-1955, -Reserve, scrapped 1957

BB Duke of York — United Kingdom (Royal Navy), 1941-1949

BB Duke of York — United Kingdom (Royal Navy), 1950-1955, -Reserve, scrapped 1957

BB Gangut — Soviet Union [-1991] (Naval Fleet [V-MF]), 1911-1956

BB Howe — United Kingdom (Royal Navy), 1942-1951

BB Howe — United Kingdom (Royal Navy), 1951-1957, -Reserve, scrapped 1958

BB Jean Bart — France (Navy), 1949-1953

BB Jean Bart — France (Navy), 1953-1961

BB King George V — United Kingdom (Royal Navy), 1940-1949

BB King George V — United Kingdom (Royal Navy), 1950-1955, -Reserve, scrapped 1957

BB Oktoberskaya Revolutsia — Soviet Union [-1991] (Naval Fleet [V-MF]), 1951, Cancelled Project

BB Richelieu — France (Navy), 1949-1960

BB Vanguard — United Kingdom (Royal Navy), 1946-1960

BB Vanguard — United Kingdom (Royal Navy), 1962, Proposed Refit

BB Vanguard — United Kingdom (Royal Navy), 1975, Proposed Refit

KR Kronshtadt — Soviet Union [-1991] (Naval Fleet [V-MF]), 1949

KR Stalingrad — Soviet Union [-1991] (Naval Fleet [V-MF]), 1956

RKR Stalingrad (SS-N-2) — Soviet Union [-1991] (Naval Fleet [V-MF]), 1961, Cancelled Project

RKR Stalingrad (SS-N-3) — Soviet Union [-1991] (Naval Fleet [V-MF]), 1963, Cancelled Project

1980-2015+ database:

BB 61 Iowa — United States (Navy), 1983

BB 61 Iowa — United States (Navy), 1987

BB 61 Iowa — United States (Navy), 1989

BB 61 Iowa — United States (Navy), 1990-1990

BB 62 New Jersey — United States (Navy), 1983

BB 62 New Jersey — United States (Navy), 1987

BB 62 New Jersey — United States (Navy), 1989

BB 62 New Jersey — United States (Navy), 1991-1991

BB 63 Missouri — United States (Navy), 1987

BB 63 Missouri — United States (Navy), 1989

BB 63 Missouri — United States (Navy), 1991-1992

BB 64 Wisconsin — United States (Navy), 1989

BB 64 Wisconsin — United States (Navy), 1991-1991

RKR Admiral Lazarev [Pr.1144 Orlan, Ex-Frunze] — Russia [1992-] (Navy), 1992-1994

RKR Admiral Nakhimov [Pr.1144 Orlan, Ex-Kalinin] — Russia [1992-] (Navy), 1992-1999

RKR Admiral Nakhimov [Pr.1144 Orlan, Ex-Kalinin] — Russia [1992-] (Navy), 2006

RKR Frunze [Pr.1144 Orlan] — Soviet Union [-1991] (Naval Fleet [V-MF]), 1985-1991, Admiral Lazarev

RKR Kalinin [Pr.1144 Orlan] — Soviet Union [-1991] (Naval Fleet [V-MF]), 1989-1991, Admiral Nakhimov

RKR Kirov [Pr.1144 Orlan] — Soviet Union [-1991] (Naval Fleet [V-MF]), 1980, Admiral Ushakov

RKR Kirov [Pr.1144 Orlan] — Soviet Union [-1991] (Naval Fleet [V-MF]), 1984-1991, Admiral Ushakov

RKR Petr Velikiy [Pr.1144 Orlan, Ex-Yuri Androvo] — Russia [1992-] (Navy), 1999 Fighting Falcon with AIM-9X Sidewinder (HOB) but no HMD can shoot up to 60 deg. And a Su-27 Flanker with AA-11 Archer [R-73] or F-15I Eagle with Python 4 (HOB + HMD) can go all the way to 90 deg.