



PAS 2011

NORTHROP GRUMMAN



Euro Hawk Program Update

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- Program Background
- The Euro Hawk Formula
- Program Structure
- Program Test Status
- Germany Deployment Activities



- **Program Background**
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- Phase-out of weapon system BR1150 SIGINT mission aircraft
- Provide high-altitude long-endurance (HALE) wide area surveillance & reconnaissance SIGINT capability
- Experiences from NATO engagements and other deployments – more national independency



New Requirements

- Wide area stand-off surveillance capabilities
- High performance off-the-shelf unmanned aircraft system (UAS)
- Near real-time capabilities
- National access to payload source code



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The Euro Hawk Formula



Wide Area Surveillance & Reconnaissance With Stand-Off Capabilities

Electronic Intelligence (ELINT) - Detection & Evaluation of Radar Emitters

Communication Intelligence (COMINT) - Detection & Evaluation Communication Emitters

Euro Hawk Platform



Euro Hawk

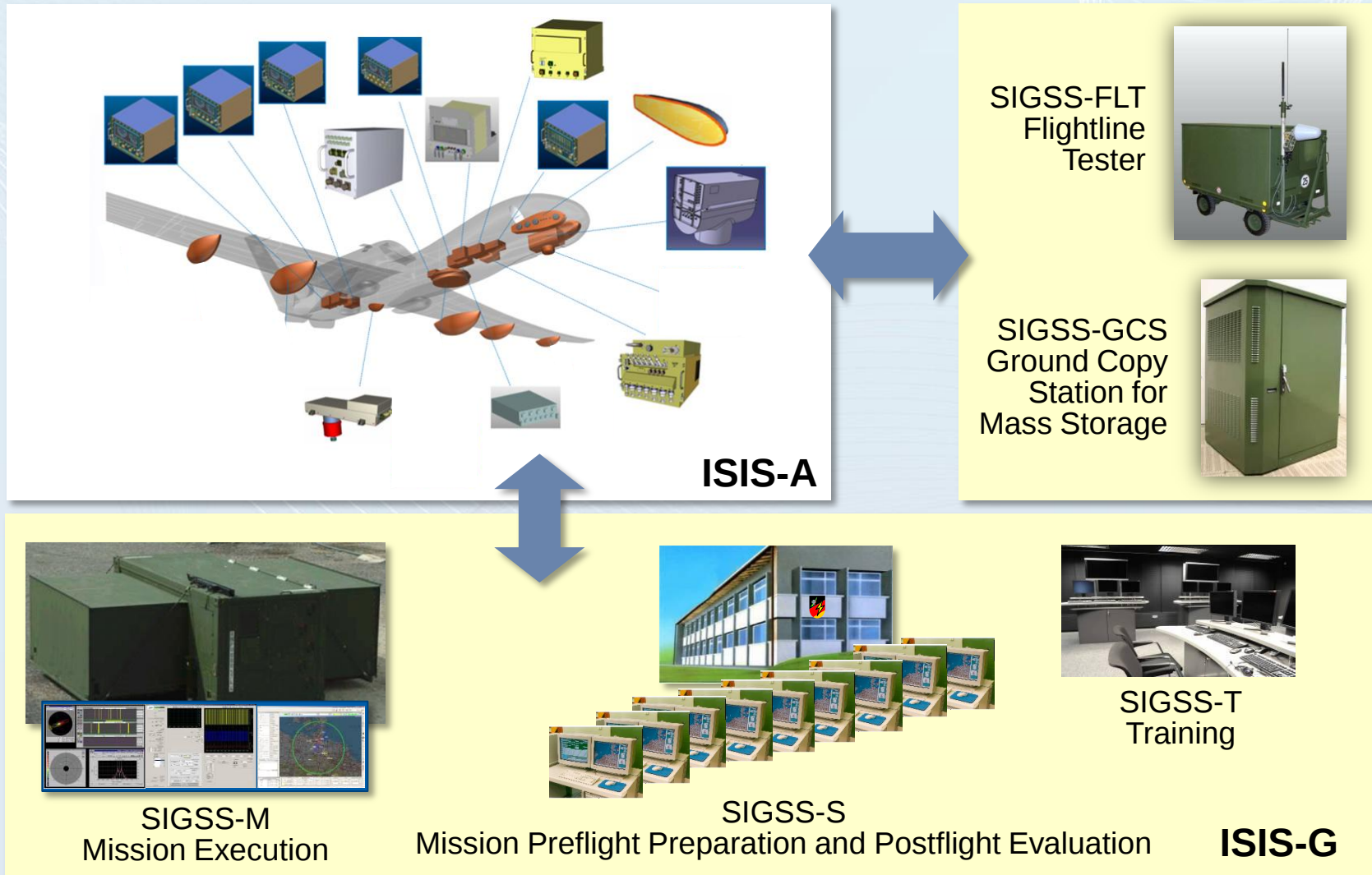
Wingspan	39.9 m
Length	14.5 m
Height	4.6 m
Gross Takeoff Weight	14,628 kg
Payload Capability	1,360 kg
Maximum Altitude	FL600
Maximum Endurance	30.5 hrs



ISIS Mission System – Key Features

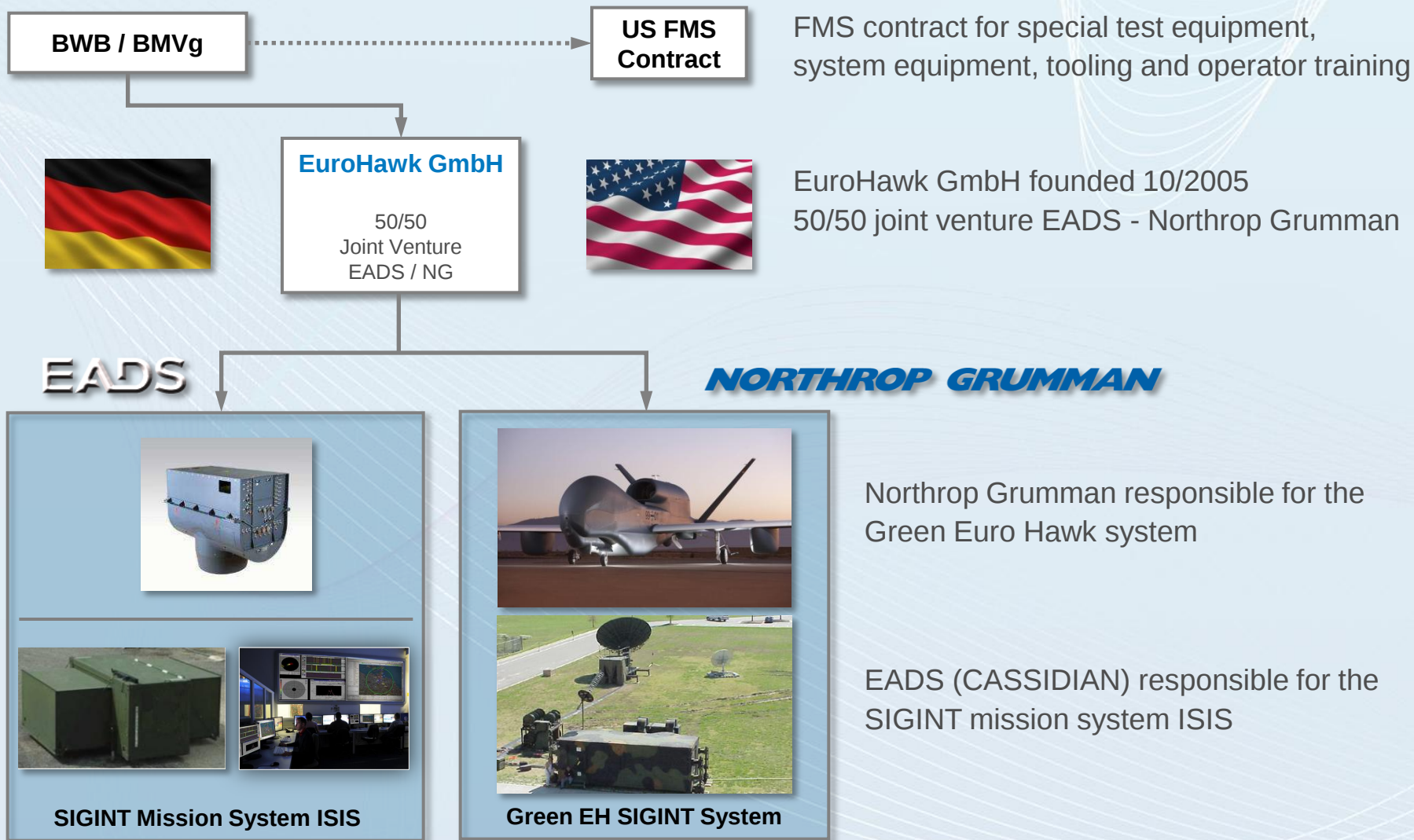
- Integrated SIGINT system (ELINT / COMINT)
- Stand-off capability
- Digital receiver
- Automatic analysis
- Man-in-the-loop concept
- Near real-time situation display
- Full ground support for sensor mission planning, online sensor control, monitoring and post evaluation
- Integrated in network enhanced capabilities





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Schleswig / Jagel
Main Operating Base

Nienburg
SIGINT Ground Operations

Manching
Integration & Flight Test

Immenstaad / Ulm
ISIS Development



- ✓ 2007 Contract Award RRP
Risk Reduction Phase – 1 Full Scale
Demonstrator System
- ✓ 2009 Contract Award CLS Part 1
Logistics Support, Spares, Documentation
ISIS Training
- ✓ 2010 Contract Award Euro Hawk AV Training
- 2011 Contract Award CLS Part 2 Setup Phase
- 2012 Contract Award CLS Part 3 Operational Phase
- 2012 Contract Award IP (Introduction Phase)
 - Additional 4 SIGINT Airborne Systems
 - Additional 1 Ground Station Set(Possibility for a 2012 contract award is currently
under investigation and not finally decided yet)
- 2014 Contract Award Operations and Support Phase



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- ✓ Air vehicle production completed
- ✓ Roll-out ceremony in October 2009 in Palmdale, CA
- ✓ Maxi-taxi tests in April 2010 successfully completed
- ✓ Take-off abort test in May 2010 successfully completed
- ✓ Preliminary type certificate (PTC) in June 2010 received
- ✓ Flight clearance for US air space in June 2010 received
- ✓ First flight on June 29, 2010 successfully completed
- ✓ Customer requested EMI/EMC testing completed
- Flight test in Edwards Air Force Base in final phase
- Next step: Ferry flight to Germany in Summer 2011

As of Today:

▪ Total Flights:	10
▪ Total FHRS:	97
▪ Max. Altitude:	60.179 ft (18.343 m)
▪ Max. Endurance:	30.3 h



- Development of mission system software in final phase
- Complete ISIS hardware available in integration and validation lab
- Lab integration with radar- and communication-simulators completed
- Qualification testing in progress
- Mission system LRU mock-ups and radomes installed in air vehicle for ferry flight
- Final laboratory acceptance planned for end 2011
- UAV systems available for air vehicle integration
- ISIS ground segments integrated at Manching, Germany test site



Edwards AFB Flight Test Summary

- **Flight #1 (29 June 2010)**
 - First Flight
 - 1.9 hour mission
- **Flight #2 (22 - 23 July 2010)**
 - 7.1 hour mission
 - Envelope Expansion #1
 - Mid Weight Test Points
- **Flight #3 (9 - 10 September 2010)**
 - 5.9 hour mission
 - Envelope Expansion #2
 - Heavy Weight Test Points
 - Heavy Weight Landing
- **Flight #4 (17 - 18 September 2010)**
 - 11.2 hour mission
 - Envelope Expansion #3
 - Light & Medium Weight Test Points
 - Light Weight Landing
- **Flight #5 (29 - 30 September 2010)**
 - 10.6 hour mission
 - Envelope Expansion #4
 - Light & Heavy Weight Test Points
- **Flight #6 (14 October 2010)**
 - 2.3 hour mission
 - Cross Wind #1 - Heavy Weight Landing
- **Flight #7 (26 October 2010)**
 - 0.8 hour mission
 - Cross Wind #2 - Light Weight Landing
- **Flight #8 (3 November 2010)**
 - 7.5 hour mission
 - Envelope Expansion #5
 - Light Weight Test Points
 - Achieved Ceiling Altitude
- **Flight #9 (1 - 2 December 2010)**
 - 30.3 hour mission
 - Envelope Expansion #6 (Endurance & COMMS)
- **Flight #10 (9 - 10 December 2010)**
 - 10.3 hour mission
 - Envelope Expansion #6 (COMMS)
- **Flight #11 (Planned June 2011)**
 - Operational Check Flight
 - Ferry Flight Dress Rehearsal

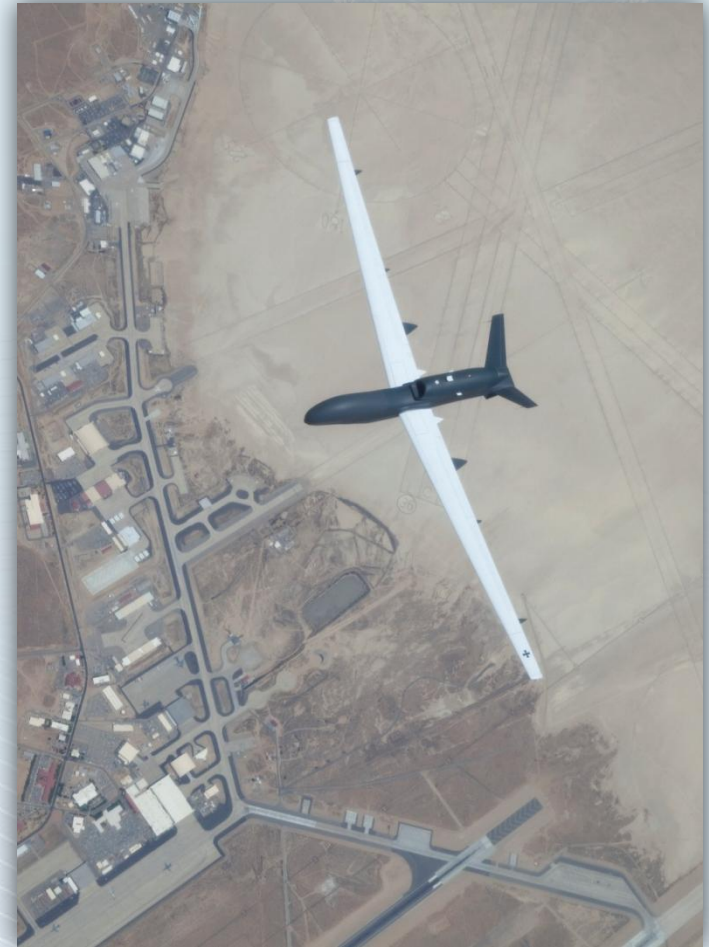
EMI/EMC Characterization Testing

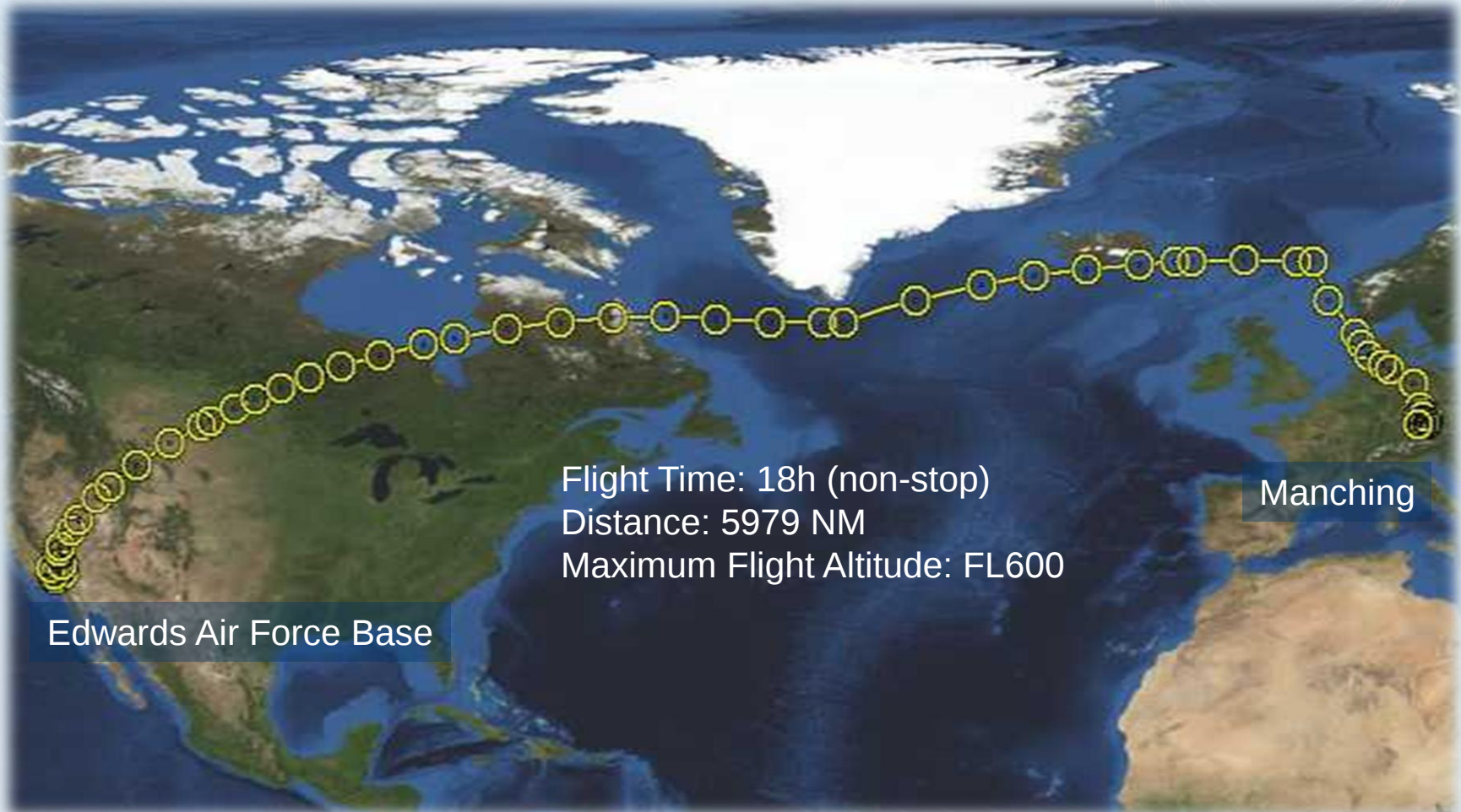
- Additional EMI/EMC testing done prior to ferry flight
- Successfully performed susceptibility testing of aircraft systems to potential adverse RF environments
 - Threats from ground transmitters (television/radio, radar, power lines)
 - Threats from airborne transmitters (communications, radar)
 - Natural threats (lightning, solar)
- Approach was to leverage existing USAF Edwards AFB Benfield Anechoic Facility (BAF) test capabilities
- Industry developed detail test plan in coordination with German airworthiness authority and USAF combined test force

- July 2010
 - German MoD reserved Edwards AFB BAF for testing
- September - October 2010
 - NGC prepared draft of EMI/EMC detailed test plan for German Airworthiness Authority
- November - December 2010
 - NGC coordinated test plans and prepared test support equipment
- 31 January 2011
 - EMI/EMC testing initiated
- 11 March 2011
 - BAF testing successfully completed



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Manching Base Overview



South
Runway to
be used for
Euro Hawk
Operations

“Otto
Lilienthal
Werft”
Hangar
213

Deployment of ISIS Ground Segments



Packing and Loading in Friedrichshafen



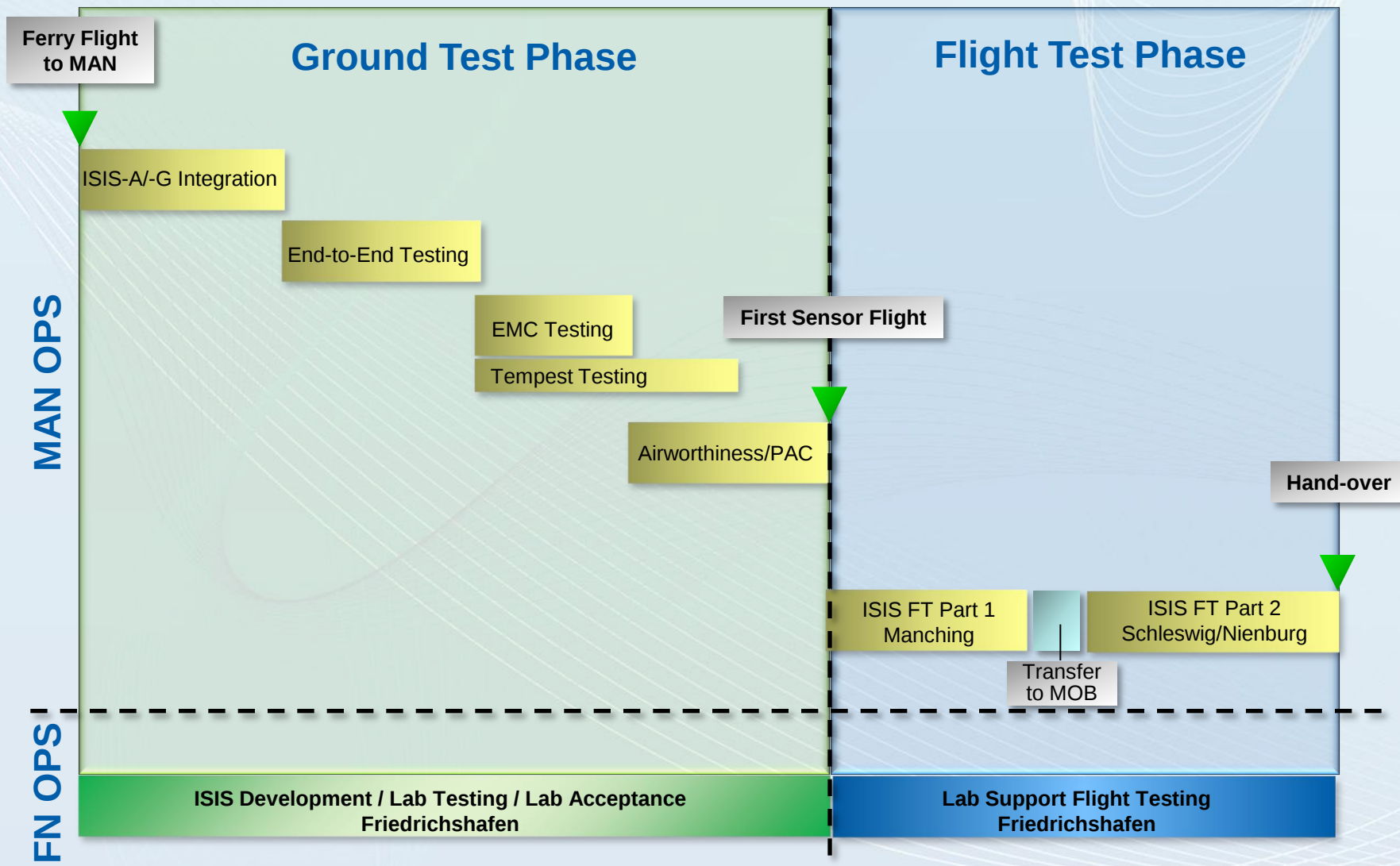
Deployment in Manching 16.05.2011

- ✓ Ferry flight software load completed
- ✓ Acceptance test procedure retest completed
- ✓ Pack-up for shipment completed
- ✓ Lynden L-100 airlift to Germany completed
- ✓ Set-up at Manching completed
 - ✓ DGPS antenna set-up completed
- Link check during operational check flight
- Ferry flight frequency approval/assignment
- Perform ferry flight



- ✓ Ferry flight software load completed
- ✓ Acceptance test procedure retest completed
- ✓ Pack-up for shipment completed
- ✓ Lynden L-100 airlift to Germany completed
- ✓ Set-up at Manching completed
 - ✓ Ku antenna set-up completed
 - ✓ CDL antenna set-up completed
- Link check during operational check flight
- Ferry flight frequency approval/assignment
- Perform ferry flight





- ISIS Development and Test
 - Final mission system qualification
 - Upcoming payload integration with aircraft

- Flight Operations
 - Manching Air Base setup
 - Ferry flight to Manching Air Base

- Euro Hawk is the answer to the strategic SIGINT surveillance requirement of the Bundeswehr



- Euro Hawk will be the most modern SIGINT HALE UAS