EASA
European Union Aviation Safety Agency

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[precision in special mission]

EASA Certification process for Mission Aircraft

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STC WORKSHOP

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Your safety is our mission.

An Agency of the European Union

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- Aerodata, short introduction
- Project tasks
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  - Radom and Lift, part of Textron FAA certification
  - Verification of AFM, applicable Cert. Basis, scheduling FT with EASA
  - Mission system, certification of COTS

Aerodata AG, Braunschweig, Germany

- Aerodata's unique set of technological capabilities:
- **Positioning, Real-Time Data Processing** and **Sensing**
- Markets:
  - **Worldwide leader in Flight Inspection** Systems for calibration of navigation and landing aids (civil and military)
  - **Turn-key special mission solutions** for maritime patrol, marine pollution surveillance and police helicopters
  - **avionic systems** (navigation and communication) & **consulting**
- The Group covers the **entire value chain** from design to production, system integration, certification, training, maintenance and operation
- Aerodata has demonstrated **100% on-time delivery** of special mission aircraft during the past decade

Aerodata AG, Braunschweig, Germany

Facilities:

- 2500 m² office space
- 200 m² production (mechanical, electrical)
- 500 m² laboratory space
- 3600 m² hangar space
- Test facilities for temperature and electromagnetic compatibility

Aerodata AG, Braunschweig, Germany

Staff members from 15 nations

approx. 50 % engineering graduates

Braunschweig (GER)	130
Bremerhaven (GER)	12
USA	1
Norway	2
Australia	20
Brazil	10
Part of the DO	30

Aerodata AG, Braunschweig, Germany

CORE COMPETENCIES

- **DESIGN**

  EASA 21J Design Organisation

- **PRODUCTION**

  - EASA 21G Production Organisation,
  - DIN EN 9100:2018 9110:2016

- **INTEGRATION**

  - EASA 145 Maintenance Organisation

- **OPERATION**

  - Flight Inspection Organization (AeroPearl)

- **MAINTENANCE**

  - EASA 145 Maintenance Organisation

- **TRAINING**

  - EASA 147 Practical Training

- **Entire Value Chain / 10 major projects performed as prime contractor**

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King Air B200 with AeroMission
(Armed Forces of Malta)

CASA 235 with MEDUSA
(SASEMAR, Spain)

EC 155 with AeroMission (German Federal Police)

Aerodata AG and OPTIMARE provide unmatched capabilities in the field of surveillance aircraft:

- **Fully integrated mission systems including data link capabilities and a ground segment**
- **Aircraft modification and certification capabilities for a broad range of jet, turboprop and rotary wing aircraft**
- **Provision of unique sensors for oil pollution detection and quantification**
- **Experience in turn-key surveillance aircraft projects as prime contractor**

The Mission Equipment, Cockpit

- Cockpit Information Display (CID) to provide situational awareness
- Workload reduction
- Full access to moving map display
- DF guidance

•King Air ProLine 21 Cockpit with CID

•Cockpit Information Display (CID)

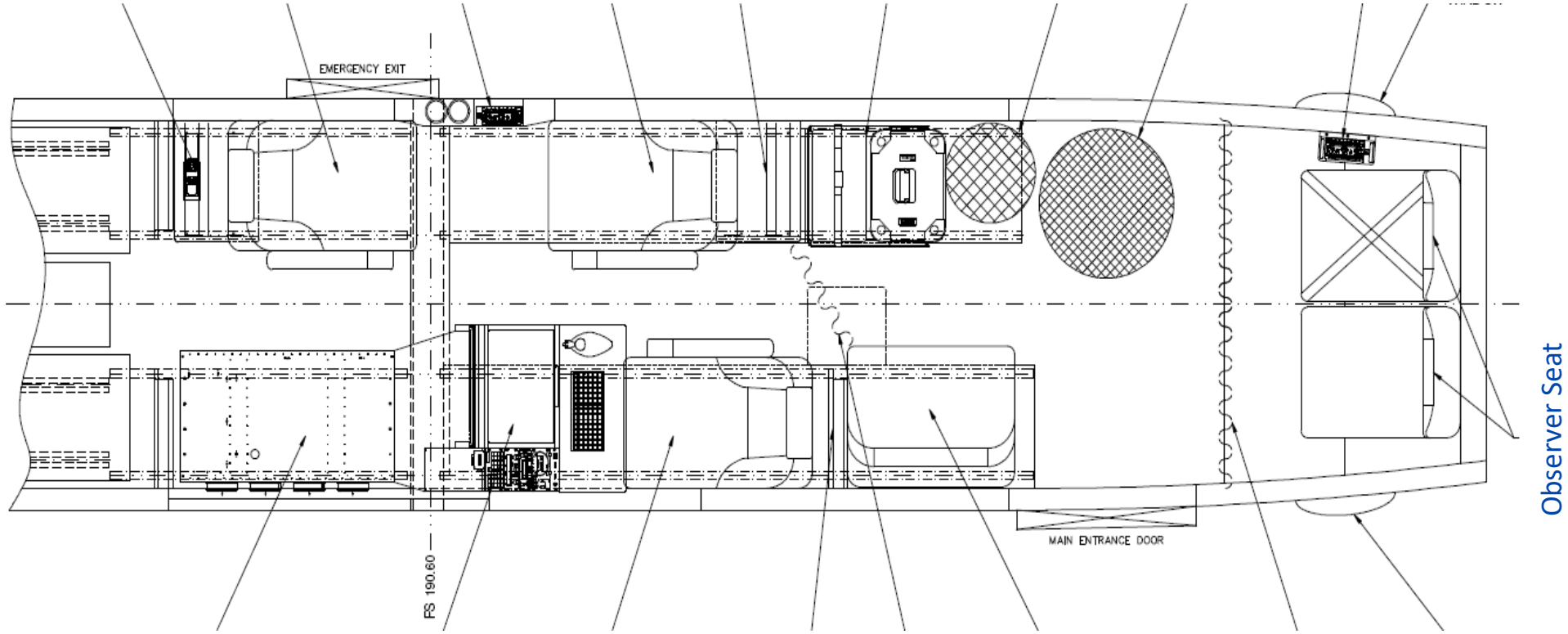
The Mission Equipment, external

- 360° Surveillance Radar
- SAR Direction Finder
- Satcom Inmarsat
- Retractable EO/IR System
- AIS Transponder
- Bubble Window

- Drop Equipment
- Drop Hatch

The Mission Equipment, Cabin

- Cabinet/ Satcom Handset
- Pax Seat
- Intercom Control Panel (ICP)
- Pax Seat
- Galley
- Crew Raft & Marker Box
- SAR Life Raft
- Drop Hatch
- ICP
- Bubble Window



- Equipment Rack
- Operator Work Station
- Operator Seat
- Partition with Chart Holder
- Toilet
- Curtain
- Bubble Window

The Mission Equipment, operational feature

Dropping of SAR Life Raft

Installation of customized mission equipment in 3rd A/C

Installation of customized mission equipment in 3rd A/C

Requirement:

- **The design and performance of the third A/C (Textron B250) should be as close as possible to the previous two A/C (Beechcraft B200)**

Modification in two steps, certification in two STC:

- **Step 1: Increase of MTOW to 14.000lbs by modifying the wing to enable longer endurance**
  - ❑ **Major Change „significant“**

- **Step 2: Installation of customized mission equipment, e.g. radome and EO/IR lift**
  - ❑ **Major change „non significant“**

Installation of customized mission equipment in 3rd A/C

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16.1 Milestones and Project Schedule

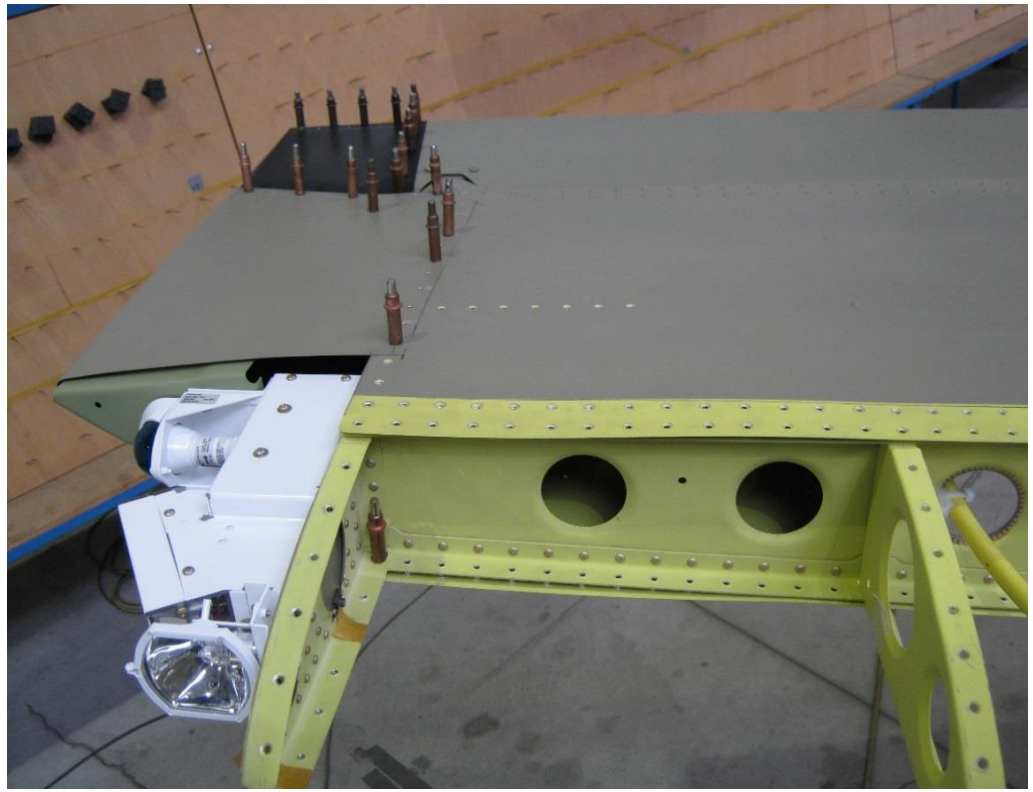
The project has been started in August 2015 Major milestones are shown in the table below. The continuously updated time schedule will be maintained as an MS Project File[1].

- Step 1
- Step 2

Project Start	31. August 2015
Contract Signature	20. October 2015
Availability of Beechcraft Parts	31. May 2016
End of flight testing for MTOW	15. July 2016
Begin MPA Modification	18. July 2016
Mission System Completion	30. June 2016
Installation Mission System / Ground Test	11 Jan 2017
Start Flight testing	22. Feb 2017
Start Painting	22. March 2017
Compliance Summary completed	15. March 2017
Start Acceptance & Training	12 April 2017
Delivery	27. April 2017

Step 1: Increase of MTOW to 14.000lbs

Changes to Wing



Step 1: Increase of MTOW to 14.000lbs

Facts:

- **The third A/C has winglets**
- **To meet the configuration of an existing STC „clean wings“ are required**
- **The substantiation data related to the wing configuration of the A/C are design and property of Textron**
- **AERODATA should be the responsible STC holder for the wing-mod.**

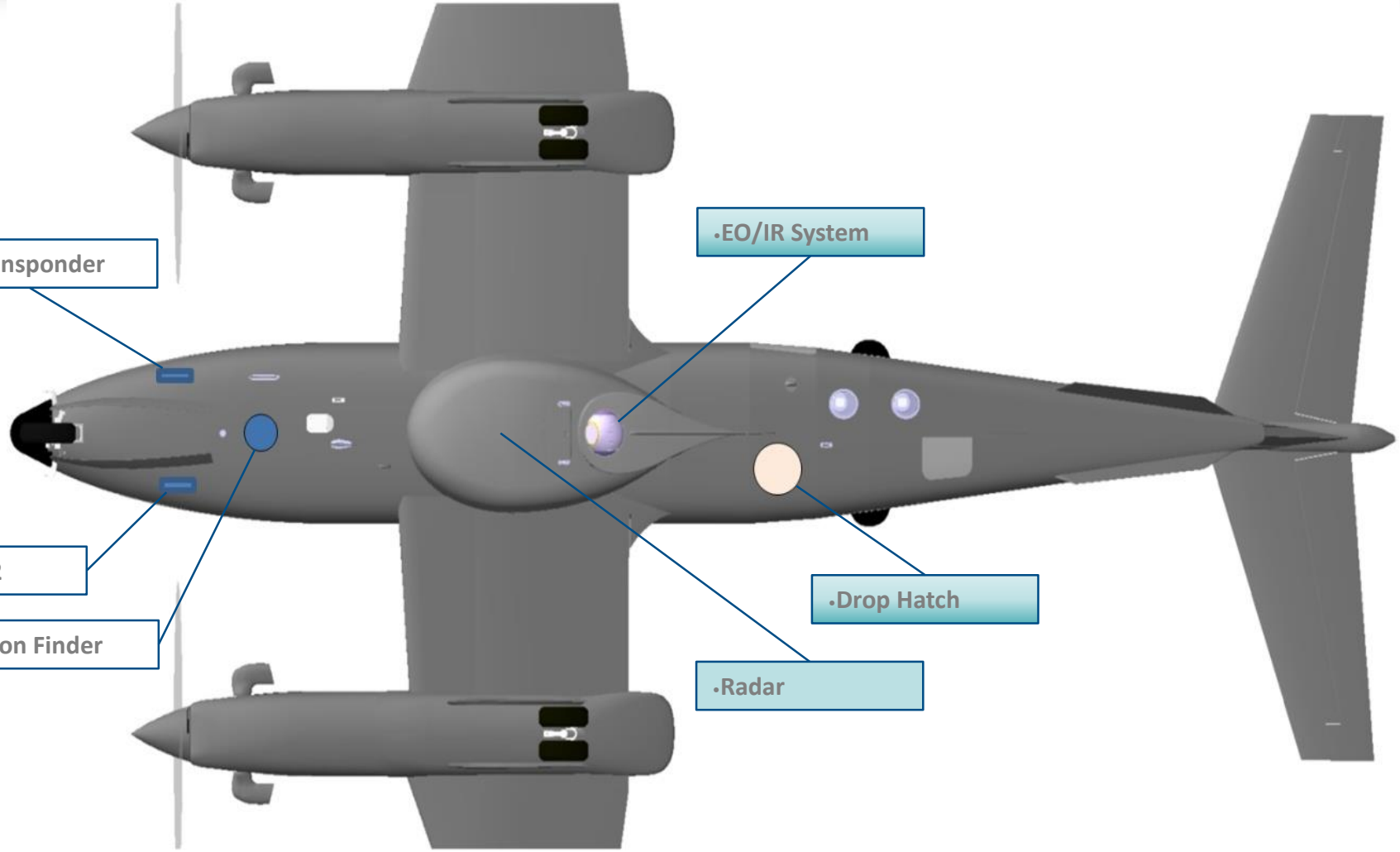
Resolution:

- **Reaching an arrangement with Textron, that Textron will deliver the substantiation data directly to EASA**
- **Reaching a agreement with EASA to accept data from the TC holder**

Lesson learned:

- ➢ **It has to be ensured by the STC-Holder that he is in the position to provide all related substantiation data, even if the data have been provided directly to EASA by the ODA of the TC-holder.**

Step 2: Installation of mission equipment



Step 2: Installation of mission equipment

Facts:

- **The A/C was delivered by Textron in “green configuration”**
- **The mission kits, as EO/IR radome and lift was certified for Textron by FAA as “change to TC”**
- **The substantiation data related to the mission kits are property of Textron**
- **AERODATA should be the responsible STC Holder**

Resolution:

- **Reaching a arrangement with Textron, that Textron will deliver a statement that the mission kits are subject of FAA certification**
- **Reaching an arrangement with Textron, that Textron will support the installation of mission kits**
- **Reaching an agreement with EASA to accept such letter from the TC holder**

Lesson learned:

- ➢ **These changes are properly covered by Textron and their ODR**

Step 2: Verification of AFM

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Airplane Flight Manual Supplement

B200GT Maritime Patrol Aircraft

for

Aircraft Model: **B200GT (King Air 250)**

Registration No.:

Serial No.: **BY-249**

Mission System: **AD-MS-0110**

This Flight Manual Supplement must be carried in the aircraft when modified for increased MTOW in accordance with modification ident B200-17 and with the Aerodata Mission System installed in accordance with modification ident B200-19.

The technical content of this document is approved under the privileges of DOA ref. EASA.21J.040.

The information in this Supplement supersedes or adds to the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only as set forth within this document. Users of the Handbook are advised to always refer to the Supplement for possibly superseding information and placarding applicable to operation of the airplane.

This Supplement should be attached to Section 9 (SUPPLEMENTS) of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

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Step 2: Verification of AFM

Facts:

- **The third A/C was delivered by Textron with performance improvements, by e.g. new engine and new propeller**
- **AERODATA has established an Aircraft Flight Manual applicable for the previous version without the performance improving measurements**
- **The data of the AFM have to be verified, flight test with EASA witnessing have been considered**
- **The change was classified as Major Change, non significant, Cert. Basis: TCDS**

Way forward:

- **Indicating the flight test to EASA, including scheduling with EASA**
- **Certification Plan provided to EASA was based on TCDS**

Lesson learned:

- ➢ **Communication and frequently performed status meetings to avoid delays caused be personnel shortage at EASA (or delays at applicants schedule)**
- ➢ **Clear agreement on the applicable certification basis**

Step 2: Certification of COTS

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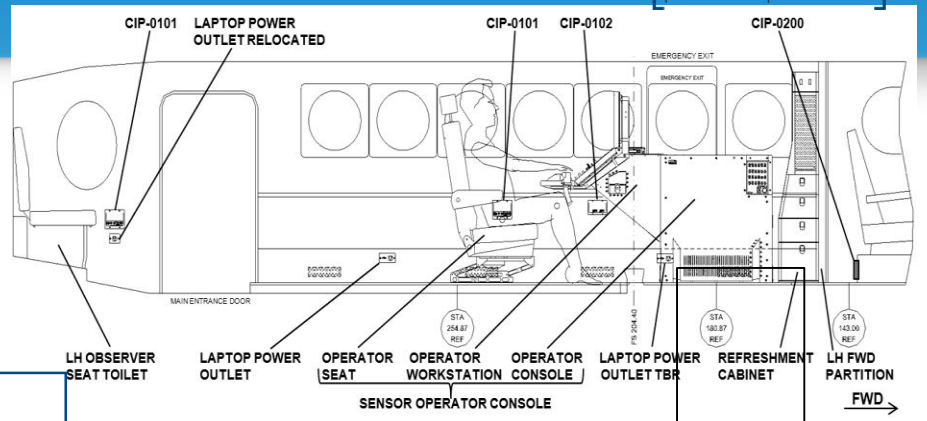
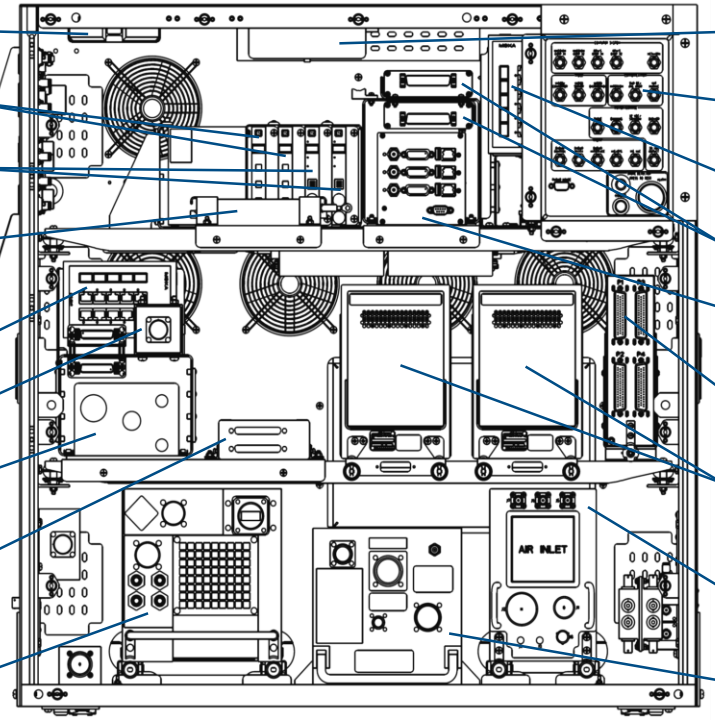


- Map Hard Disk
- Video Splitter 1 & #
- Video Switch 1 & 2
- PAL/NTSC Converter
- Ethernet Switch 1
- Dimming Unit
- AIS Transponder
- ARINC / Ethernet Converter
- Radar Transmitter



- Smoke Detector
- Circuit Breaker Panel
- Ethernet Switch 2
- Audio Adapter 1 & 2
- Triple Video Server
- Remote Electronic Unit Intercom
- Mission Computer 1 & 2
- Inertial Navigation System
- Radar Interface Unit

Step 2: Certification of COTS

Facts:

- **Several sensors and mission computers are not certified for aircraft usage**
- **The safety of the aircraft has to be assured**
- **Compliance to Certification Specification have to be demonstrated**

Resolution:

- **Individual qualification of the non certified special equipment**
- **Functional qualification of the entire mission system in laboratory environment**
- **Ground and if necessary flight testing of the system A/C plus mission equipment**

Lesson learned:

- ➢ **Significant effort to ensure configuration control and continuously observation of the design and qualification of COTS-equipment**

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Thank you
for your attention

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