

BECKER
AVIONIC SYSTEMS



Company's view on ADS-B

Development

BECKER
AVIONIC SYSTEMS

Product Groups

- Communication



BECKER COM
COMMUNICATION

- Navigation



BECKER NAV
NAVIGATION

- Search and Rescue



BECKER SAR
SEARCH AND RESCUE

- Air Traffic Control



BECKER ATC
AIR TRAFFIC CONTROL

Market Areas

- Business, General and Commercial Aviation
- Military Aviation
- Search and Rescue
- Air Traffic Control



Partial Customer List

- BGS
- French Armed Forces
- German Air Force
- German Navy
- Indian Armed Forces
- Italian Armed Forces
- Korean Armed Forces
- Nordic Armed Forces
- RAAF
- RNZAF
- South African Air Force
- US Navy
- Agusta Aerospace
- Airbus Industry
- British Aerospace
- Cessna
- AvCraft
- EADS
- Embraer
- Eurocopter
- Pilatus
- Xian Aircraft Industry



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Remote Equipment - Control Units



COM
RT 3209-(11)



NAV
RN 3320-(1)



XPDR
ATC 3401-1-R



ADF
RA 3502-(1)



Remote Equipment - Radio Management



- Triple Function
- Highest Redundancy
- Available in 160 mm and DZUS mount

COM
RT 3209-(11)



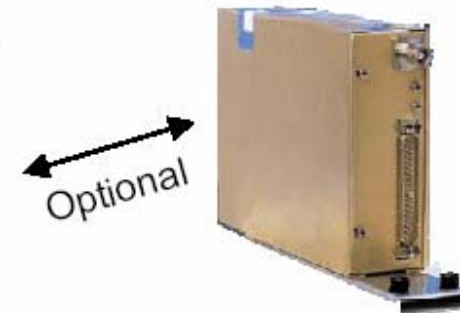
NAV
RN 3320-(1)



XPDR
ATC 3401-1-R



ADF
RA 3502-(1)



DZUS Single Block

- Highly rugged, combat proven, units
- Low installation effort
- Ultra short time component exchange
- Saves space in the avionic compartment for additional mission equipment
- Easy and logical operation for use within complex missions in harsh environmental conditions

ACU 5100

AR 3202

NR 3330

AD 3502

ATC 3401

CU 519



2 1/4" Single Block - VHF - Transceiver

- Small full solid state VHF-Transceiver
- Mounting racks in 160mm and DZUS format available
- JTSO and TSO certified
- Retrofit unit (software driven radio) already under development
- Approaches a wide scale of possible aircraft and ground applications



AR 4201

BFW Competence in 1090 MHz

- 1970 's development of first Transponder A/C
- 1979 delivery of certified Transponder ATC 2000 (A/C)
- 1988 delivery of certified Transponder ATC 3401 (A/C)
- 2002 delivery of solid state certified Transponder ATC 4401 (A/C)
- 2005 delivery of solid state certified Transponder BXP 6401 (Mode S, Level 2 es, Class I and II)
- Member in EUROCAE and Participation WG 49 Transponder, WG 51 ADS - B

BFW's roadmap towards ADS-B based on 1090 MHz

- 1090 MHz Technology in service since 1970 's
- Technology now well known globally
 - Understanding of system
 - Maintenance and repair
 - Implementation Airborne and Ground based
- Good for actual traffic scenarios
- So BFW decided to develop ADS-B on 1090 MHz
- The Flight and Airdata Sensors are often more expensive than the ADS-B Transmitter itself
- Future Development to be envisaged, such as Display Equipment for Cockpit Traffic Information (CDTI)

Technical Considerations ADS-B Concept

European Standard
– ED 102 / DO-260

versus

American Standard
- DO-260A
(accepted by ICAO)

significant differences in technical requirements

Technical Considerations ADS-B Concept

- Down link

1090 MHz

UAT

VDL Mod 4

Limitation when at 1090 MHz Air Traffic > 200 aircrafts
the Link reduces operational range due to overload.

American Standard therefore decided to apply 1090 MHz at
Upper Airspace (as international recognized) and UAT
(Universal Access Transceiver) for GA purposes.

Russian Federation decided to go for VDL Mod 4

Technical Considerations ADS-B Concept

- To enable communication between Upper Airspace and GA the link is being made by means of TIS – B that transmits at 1090 MHz
- Another solution that is under consideration is a broadband receiver covering 1090 MHz and 980 MHz (UAT) frequency

Technical Considerations ADS-B Concept

- Another issue that affects the development of ADS-B for the General Aviation is the availability of reliable sensors.

While in commercial aircrafts operating in the Upper Airspace external sensors with respective accuracy are available, so is the situation in the GA sector different.

This presents the industry the problem to provide and develop these sensors (i.e. WAAS certified GPS engines) resulting in higher cost for the ADS-B system.

Solution

- Becker Avionics follows the Step by Step approach.
- Disregarding the ongoing discussions on standards, Becker has developed and MODE – S Transponder with extended Squitter.
- This transponder specifically designed for Low power consumption and compact design is at the moment under ETSO Certification.
- The TSO Certification is expected to take place in the 4th quarter of 2005.
- The BFW Transponder Family will be increased in the near future, e.g. diversity, additional interfaces

2¹/₄" Single Block - Transponder

- Smallest full solid state A/C XPDR worldwide
- LCD display readable in all lighting conditions
- Two versions: 175 and 250 Watt transmit power
- JTSO and TSO certified
- From 9.5 to 32.2 V DC
- Standard encoding altimeter or blind encoder can be connected



ATC 4401

2 1/4" Single Block - MODE S - Transponder

- FFF Compatibility with ATC 4401 as retrofit unit
- Several mechanical designs available to fulfil any integration requirements
- Two versions: Class I and Class II
- Certification Pending ETSO
- From 9.5 to 32.2 V
- interface to Air Data Computer
- System extensions with extended environmental resistance, diversity, hijack mode and further functions



BXP 6401



GPS-BASED DIGITAL MAP AND MISSION SUPPORT SYSTEMS

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EMS-10 TERRA

EMS-10 TERRA

- Single block unit
- NVG compatible
- Meets MIL-STD's
- ARINC 429, RS 232 Interfaces
- 3-D Imaging
- **Display of Situational Awareness Data (CDTI capabilities)**



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