



1090 EXTENDED SQUITTER ADS-B/TIS-B AIRBORNE RECEIVER

GENERAL DESCRIPTION

Selex Communications designed and manufactures 1090 Extended Squitter Airborne Receiver (herein referenced as 1090ES RX) to enable “ADS-B IN” applications and services for civil Air Transport and General/Business Aviation.

1090ES RX is a less bulky and cost effective solution to upgrade (retrofit/forward-fit) aircraft with full and real Air Traffic Situational Awareness (ATSAW) capability according to the up to date requirements of Air Traffic Management regulations.

1090ES RX functions are fully compliant to RTCA DO-260 and 260A MOPS.

1090ES RX IS COMPLIANT TO FAA TSO C166A.

1090ES RX receives ADS-B/TIS-B Mode S squitters (DF17, DF18 and DF19) and performs message decoding and checking of validity being forwarded to the air traffic data processing unit for “ad hoc” data fusion with complementary equipment such as TCAS (Basic Configuration). It can be upgraded with full ADS-B/TIS-B processing capability for direct interface with the Cockpit Display of Traffic Information (CDTI), through software download (Enhanced Configuration).

MAIN CHARACTERISTICS

- 1090ES RX is provided with two completely independent receiving and processing channels for redundancy and diversity operations.
- 1090ES RX implements Enhanced Reception Technique that allows guaranteeing high performances in areas at high density of air traffic and/or in high electromagnetic pollution environments (fruits and signal overlapping conditions).
- 1090ES RX is a low volume (2 MCU) and light equipment that can be interfaced with standard multifunction displays and/or air traffic data computer and connected with standard antennas being compatible with existing avionics architecture.
- 1090ES RX is provided with comprehensive Built-In Test capability (PBIT, CBIT, IBIT) for fault detection and isolation and is capable to support graceful degradation with segmentation in stages and automatic reconfiguration.

SYSTEM DESCRIPTION

1090ES RX receives ADS-B/TIS-B messages through the antenna system (Top and Bottom antennas). Enhanced Reception Technique decodes the received messages and data are forwarded to the HMI through standard interfaces as per the existing avionic architectures.

BASIC CONFIGURATION

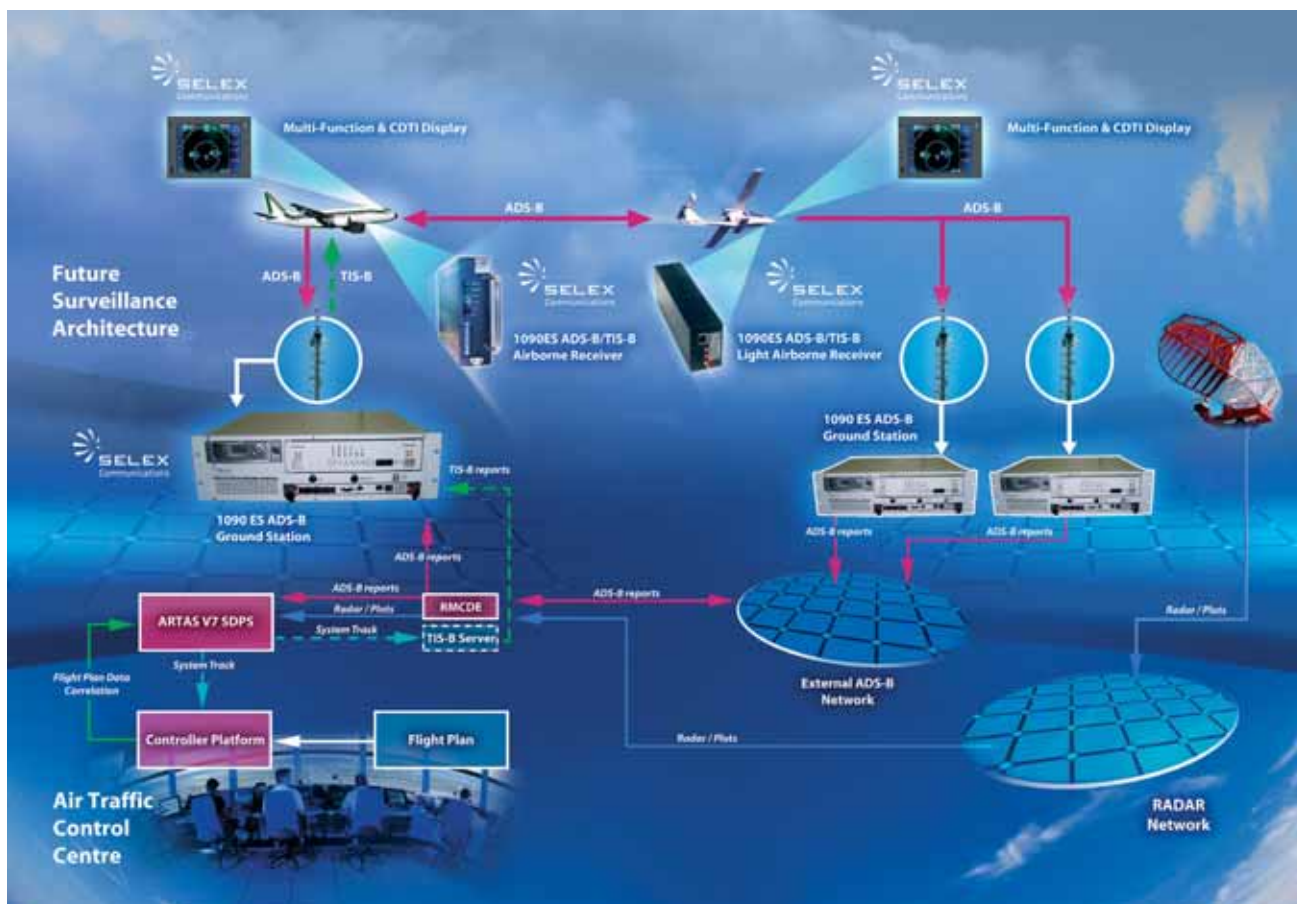
In the Basic Configuration, 1090ES RX decodes and validates Mode S DFs (raw data) being forwarded to the air traffic data processing unit by means of fast Ethernet interface or AFDX Avionic Bus. This solution allows End-Users to perform data fusion or ADS-B/TIS-B reports processing according with its own requirements or applications to guarantee maximum usage flexibility for the Customer.

ENHANCED CONFIGURATION

In the Enhanced Configuration, 1090ES RX decodes and validates the received Mode S DF and generated ADS-B/TIS-B reports being directly forwarded to the aircraft display (e.g. Cockpit Display of Traffic Information) or air traffic processing unit by means of standard ARINC 429. This solution is particularly designed for End-Users claiming for immediate Air Traffic Situational Awareness on the existing Multi Function Display or Electronic Flight Bag without intervention of additional processing units.

For ease of installation and operation both Basic and Enhanced 1090ES RX are controlled by HMI in the cockpits and need only power supply, top/bottom antennas linkage and transponder blanking line (if any) from the ownship aircraft.

The 1090 ES RX allows immediate testing and equipment configuration through the embedded Support Port.



1090ES RX FURTHER CHARACTERISTICS

Diversity

The 1090 ES RX can be connected to a Top and Bottom Antenna System and can operate in Top Only, Bottom Only, Diversity and Alternate configurations.

Discrete controls and indications

The 1090 ES RX provides the necessary discrete interfaces to the aircraft. It provides double standard suppression input RS422 for protection against 1090 MHz transmission of Mode S transponders onboard the ownship aircraft (as per DO-260A). Indications and relevant discrettes regarding the equipment status are also provided.

Design and construction

The 1090 ES RX is fully solid-state equipment; it makes extensive use of large-scale programmable components and state of art technologies, in order to reduce volume and weight but maximising the reliability. 1090 ES RX structure is modular and includes a powerful BITE (Power-up, Continuous and Initiated BIT).

Cooling

The 1090 ES RX does not require forced air and has not embedded any ventilators for cooling.

Software

The 1090 ES RX has flexible software architecture and is designed i.a.w. RTCA DO-178B level C. In the Enhanced configuration, the 1090ES RX may host the ADS-B/TIS-B-Reports software processing to provide reliable situation awareness of ownship position, surrounding terrain/obstacles and air traffic to aid safe air navigation and avert potentially dangerous situations. ADS-B/TIS-B-Reports Software development or customization is possible on Customer request. Software update is accomplished through a standard serial interface (Support Port).

Power supply

The power supply accepts 28 V DC; maximum input power is 35 W.

TECHNICAL SPECIFICATION SUMMARY

Environmental conditions	RTCA DO-160D
Operating temperature	-55°C to +71°C
Electromagnetic compatibility	RTCA DO-160D
Rx frequency	1090 ±1 MHz
Sensitivity	-79dBm
Skirt bandwidth (selectivity)	i.a.w. DO-260A
Dynamic range	from MTL to -21 dBm
Reliability	MTBF > 20000 hours
Maintainability & Testability	MTTR: 30 min. at Intermediate Level
Dimensions	ARINC 600 2 MCU
LRU Connector	ARINC 600 Size 1
RF Connector (each channel)	N-Type
Weight	< 4.0 kg (ARINC 600)
Input power	28 V DC, 35 W



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