



## RADAR ALTIMETER FAMILY

Selex ES has a strong heritage in the field of Radar Altimeters after entering the market in 1966. Since then it has developed its capabilities to design and produce state-of-the-art equipment that is in competition with major US and European companies.

The Digital Radar Altimeter is the latest Radar Altimeter developed by Selex ES, and the first based on a full digital architecture. It is advanced equipment that has successfully proven its high performance in all fixed and rotary wing applications, as well as for low level terrain tracking, sea skinning missiles, aerial photographic reconnaissance, precision hovering and Remotely Piloted Vehicles (RPV).

The system is composed of two microstrip antennas and a Receiver/Transmitter, with an optional mounting tray and height indicator also available.

All of the versions of the Receiver/Transmitter system share the same basic modules, whilst providing a dedicated interface board that is suitable for different aircraft installations.

The high accuracy and high resolution system is designed to fulfil the demanding requirements of the fixed and rotary wing combat aircrafts.

## KEY FEATURES

- Pulsed Radar Altimeter, maximum duty cycle 3%
- Leading edge tracking technique
- High resolution accuracy
- Doppler effect immune
- Low radiated power
- Frequency agility
- PRF jitter
- Low Probability of Intercept (LPI)
- Sensitivity Time Control (STC) management
- No forced air cooling is required
- Extended self test and BIT
- Capability to operate in all weather, including heavy rain and snow
- Thermal drift recovery during flight
- On ground auto-zero procedure for AID (Aircraft Installation Delay)
- Modular OPSW allows suitability for application specific requirements
- Provides interfaces ranging from analogue to fibre-optic connections to ease its integration with new or existing mission systems, making it the superior choice for upgrades to the most advanced platforms
- Supported by an Obsolescence Management Plan and a Technology Insertion Plan which are common to several major programmes.

## DIGITAL RADAR ALTIMETER FOR FIXED WING APPLICATIONS

The Digital Radar Altimeter for fixed wing aircrafts has been developed to meet integrity and dependability requirements for the Eurofighter Typhoon, PANAVIA Tornado and AMX.

The Tornado Radar Altimeter has been designed to satisfy the most demanding low level terrain following.



Adapters for heliborne Radar Altimeter for AN/APN172 and AN/APN198 compatibility

All versions of the Digital Radar Altimeter for aircrafts are based on the same RX/TX module but with different interfaces and dedicated software applications.

### **Eurofighter Digital Radar Altimeter**

The EFA version of the Digital Radar Altimeter is in-service with the Eurofighter Typhoon aircraft. The height and status information is transmitted to other avionic subsystems through MIL-STD-1553B and STANAG 3910 interfaces.

- STANAG G-3838 Digital Data Bus
- STANAG G-3910 Digital Fibre Optic Bus
- Supported by CASS/LM-STAR TPS and/or STTE





### Tornado Digital Radar Altimeter

The Tornado version of the Digital Radar Altimeter has been developed for the mid life update of PANAVIA Tornado. The height and status information is transmitted to other avionic subsystems through MIL-STD-1553B, PANAVIA and analogue interfaces for AFDCs and indicators.

- Low level terrain following
- Redundant STANAG G-3838 Digital Data Bus
- Supported by CASS/LM-STAR TPS and/or STTE

### DIGITAL RADAR ALTIMETER FOR ROTARY WING APPLICATIONS

The Digital Radar Altimeter for rotary wing has been developed to satisfy the most demanding NOE (Nap of Earth) and hovering requirements. In addition to the normal test activity, it has also been tested in-flight by the Italian Navy pilots on AB212 NLA (Special Ops) helicopters.

Two version of Digital Radar Altimeter for helicopters are available, both based on the same RX/TX module but with different interfaces and dedicated software applications.

### Helicopters Multi Purpose Digital Radar Altimeter

Helicopter Multi Purpose is a version of the Digital Radar Altimeter that can manage up to 24 different configurations. The single configuration, identified through the coupling with RX/TX and adapter, makes the Digital Radar Altimeter suitable for the installation on different helicopters such as AB212, AB412, SH3D, CH47C, AB212AS, AB205, NH500, A109 etc.

The modular design and flexibility of the electrical and functional interface of the new Heliborne Radar Altimeter allows the emulation of the interface and functional behaviour of any variant of the Rx/Tx used in the AN/APN171 and AN/APN198 Radar Altimeters families.

The outstanding state-of-the-art performance, low cost and supportability of the new Heliborne Radar Altimeter make it a perfect candidate for upgrades on ageing helicopters, whose operational life needs to be extended.

The direct replacement of the Rx/Tx does not require any modification to the helicopter, nor any change to the cable harness. This allows a full backward compatibility and therefore a "smooth transition" from the old to the new Rx/Tx without logistic impact.

### AMX Digital Radar Altimeter

The AMX version of the Digital Radar Altimeter has been developed for the avionic update of AMX. The height and status information is transmitted to other avionic subsystems through analogue interfaces for AFDCs and indicators.

- Analogue interface
- Supported by CASS/LM-STAR TPS and/or STTE



Digital Radar Altimeters. (L-R) AMX, PANAVIA Tornado and Eurofighter Typhoon versions.

By a dedicated adapter and the characterisation made by a "pin-code" on the main connector, the same Receiver Transmitter P/N can repeat the old RX/TX versions in the AN/APN 171 and AN/APN 198 system.

The auto-zero function available through PTT (Push To Test) signal allows the pilots to calibrate the AID (Aircraft Installation Delay) of the single machine on the ground without removing the Digital Radar Altimeter from the avionic bay.

Although the new Rx/Tx implements a full BIT coverage and it is supported by its own STTE (or CASS/LMSTAR TPS) for 2nd level maintenance, the former test benches for the old Rx/Tx can still be used for a 1st level go/no-go test.

### T129 Digital Radar Altimeter

The T129 version of the Digital Radar Altimeter has been developed for the T129 Attack/Reconnaissance Helicopter. The height value is transmitted to other avionic subsystems through Arinc 429 High Speed Interface.

The auto-zero function available through PTT (Push To Test) signal allows the pilots to calibrate the installation characteristics of the single machine on the ground without removing the Digital Radar Altimeter from the bay.



## TECHNICAL CHARACTERISTICS

### General

Dimensions	as per PAN STD 75.6601 size ¼ (171.0 x 57.2 x 335.0 mm)
Weight	less than 3.7kg (RX/TX)
Power supply	28V DC
Power dissipation	less than 40W
Cooling	convection
MTBF	up to 4850 hours

### Performance

Altitude range	0 to 5000 feet (a version up to 10000 feet is also available)
Operating frequency	C Band
Maximum peak power	less than 1W
Accuracy	± 2 feet in range 0 - 100 feet ± 2 % in range 100 - 5000 feet (± 1.5% from 5000 to 15000ft)
Height data rate	up to 250Hz
Hazard probability	less than 10 <sup>-9</sup> per operating hour
Readiness for operation	less than 10 seconds

### Manoeuvrability

Pitch/roll angle	± 60°
Height rate	up to 2000 ft/sec
Speed	800 KCAS max

### Environmental

Temperature	-54 °C to +71 °C (operating)
Vibration (random)	0.04 g <sup>2</sup> /Hz functional 0.17 g <sup>2</sup> /Hz endurance
EMC	in accordance with MIL-STD-461E

### Applicable Standards

MIL-STD-810D
MIL-STD-704D
Nuclear Hardening Requirements
Lightening

### Associated Test Equipment

Special Type to Test Equipment (STTE)
Rig Support Equipment (RSE) *

### Available Interfaces

#### Wired Links:

STANAG G-3838 Digital Data Bus
ARINC 429 High Speed Digital Serial Lines
RS232 (for maintenance purpose)
PANAVIA serial interface
Analogue interfaces with linear and logarithmic output law (positive and negative dynamics are available)

#### Optical Links

STANAG G-3910 Digital Fibre Optic Bus
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All RX/TX models make the last flight log failure file available on the ground without removing the LRU from avionic bay.

\* Note: the equipment is also supported by CASS/LM-STAR TPS