

Condor Mk3 Mode S MSSR Monopulse Secondary Surveillance Radar

Class Leading, High Performance, Low Cost of Ownership



The Mk3 MSSR utilises the very latest technologies to offer a combination of high performance and high probability of detection (even in severe multipath and reflection environments), together with industry-leading reliability and low-cost of ownership.

The Mk3 MSSR provides cutting-edge systems to air traffic operators around the world. The Condor Mk3 will deliver the highest performance, without compromise, at a very competitive and affordable price.

Features:

- Minimal maintenance design
- Implements the latest processing technologies
- Considerably fewer LRUs for improved reliability and reduced footprint
- Adaptive false target processing suppresses false targets without degrading system performance
- Surveillance coordination functionality permitting Mode S interrogator clustering
- Product lifetime support commitment
- Four Ethernet and two synchronous interfaces
- Integrated GPS.

Enhanced – Built on the excellent pedigree of the Condor Mk2, the Mk3 introduces enhanced features such as a higher duty cycle transmitter, GaN technology, automatic adaptive power control and built-in ADS-B.

Low Cost of Ownership – Simple to maintain, a low cost of ownership is assured through high reliability and a minimum maintenance regime. Extensive parameter control allows easy system reconfiguration for the user, and the flexible architecture ensures future proofing for the next 15+ years.

Reduced Size – The Condor Mk3 size has been greatly reduced from previous models to combine two channels into a single 19” rack resulting in not only a lower cost, but also a clear decrease in the system space requirement.

More Environmentally Friendly – The Condor Mk3 is far more economical to operate with a 35 percent reduction in power consumption and heat generation, decreasing the annual operating costs for both site power and HVAC requirements respectively and power-range look-up attenuation.

More Savings – The Condor Mk3 was designed to implement the latest available processing technologies allowing Raytheon to greatly decrease the number of internal LRUs in the system. This system simplification benefits the operator not only making it easier to maintain, but also

reducing any spares holding requirement. This results in a much reduced cost of ownership for the product life-cycle.

Reliability –The Mean Time Between Critical Failure (MTBCF) of the Mk3 is calculated to be 401,557 hours (or more than 45 years), giving an inherent system availability of 0.999999.

All Mk3 Line Replaceable Units (LRUs) are accessed from the front. Should a failure occur, the Mean Time To Repair (MTTR) is less than 30 minutes. Built-in diagnostics, accessed on site or remotely, can detect 98 percent of all hardware faults.

Using field-proven components configured in a redundant and fault tolerant architecture, Condor Mk3 delivers 24-hour continuity over a 15+ year useful life.



(*future enhancement)

ADS-B – The ADS-B processing in the Raytheon Condor Mk3 uses the patented Raytheon algorithms that are proven to provide excellent decoding abilities in all RF environments. ADS-B messages support the following features:

- Track Initiation (Selectable option)
- Track Support (if the target is not updated by a normal Surveillance interrogation)
- ADS-B data output on ASTERIX Cat 21.

Comm-B information provided by aircraft as Downlinked Aircraft Parameters (DAP) are encoded in to ASTERIX data fields.

Surveillance data messages are output for the end-user or as an input to the Mode S processing for track acquisition and track maintenance.

By comparing ADS-B and MSSR track position data alignment error will be calculated. This alignment difference can be used to continuously check the accuracies of the radar or, for use during commissioning as an initial alignment tool.

BIT – Comprehensive Built-In-Test (BIT) and fault isolation facilitates fault finding. Each interrogator channel contains full control and monitoring capability. Local and remote Control and Monitoring System terminals combine control and monitoring functionality with performance analysis.

Processing – The Condor Mk3 retains the proven SSR and Mode S reply processing algorithms using both amplitude and monopulse data, to provide high levels of performance in congested RF environments. Spare capacity and processing power are incorporated to allow for even greater capacity or other future enhancements.

The Condor Mk3 features adaptive false target processing. Unlike other systems that apply reflection processing after target data output, the Raytheon approach uses internal information, such as pulse reply amplitude, to assist false target rejection. This enables false target suppression without degradation of system performance, even in severe multipath and reflection environments.

Target data output reports are formatted in ASTERIX Cat 34 and 48 Formats supporting Elementary and Enhanced Surveillance data content.

Mk3 Performance Specifications

Fully compliant to ICAO amendment 87 and Eurocontrol specifications

Instrumental range	0.1 to 256 nautical miles
PRF range	50 to 250 Hz (Typical 80 - 155 Hz for MSSR/Mode S)
Staggered PRF	256 pseudo random up to 20 percent in 0.5 percent step
Mode interlace patterns	Single, double or triple and scan
Fully solid state transmitter	
Transmitter peak duty cycle	Max 65% over 2.4mS
Transmitter continuous duty cycle	6.6%
Transmitter power attenuation	15dB range in 1dB ± 0.5dB steps
IISLS operation	

Fully Configurable Sensitivity Time Control (STC) Profile

Target capacity	1400 (360°), 350 (90°), 100 (11.25°) and 32 (2.4°)
Overall Mode S probability of code detection	>99%
Overall Mode A probability of code detection	>98%
Overall Mode C probability of code detection	>97%
Overall false target report rate	<0.1%

Output formats	ASTERIX Cat 34/48 (Mode S) or ASTERIX Cat 01 /02. ASTERIX Cat 21/23 ADS-B ASTERIX Cat 240 Video
Inherent availability (dual channel system)	> 0.99999
SNMP support	
System is fully configurable by software – no hardware links or jumpers	
Antenna pattern measurement capability	
Built-in ADS-B	
Integrated GPS	
Remote update of software and STC profile via ethernet and use of local USB	

Functions:

- Terminal Approach and En-Route Secondary Radar
- Comprehensive BIT
- CMS terminal(s) for control and performance monitoring
- Adaptive false target processing for determining possible reflections
- High reliability with an inherent system availability of a dual channel being 0.999999
- Ease of maintenance – All LRU's accessible from the front of the interrogator.

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