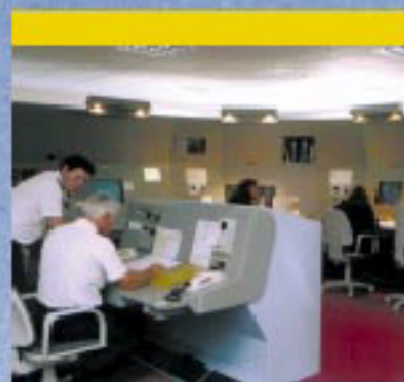


TSA 1010

Lorads IFF Interrogator

- Modes 1,2,3/A,C and 4/Secure
- Mode S and NGIFF upgradable
- High performances
- Monopulse option
- Compact, integrated
- Modular to fulfill all requirements
- Adaptable to any host system
- Operable with pointing and scanning antenna
- High reliability
- Powerful BITE, maintenance without specific test equipment



General characteristics

Derived from previous SA 10, the TSA 1010 IFF interrogator is a cost-effective solution for LOng Range Air Defense System (LORADS). It can be fitted in fixed stations as well as in mobile radar systems or on board ships. It is an integrated 19 inches x 6 U unit including:

- Interrogator
- Extractor (Target Data Processor)
- Fan unit
- Receptacle for cryptocomputer, KIR size or miniaturized (if required, the cryptocomputer can be external).

The TSA 1010 is compliant with STANAG 4193 and ICAO Annex 10. It is capable of IFF/SSR Modes 1,2,3/A,C and, in option, of Mode 4/Secure. Optionally, it can operate with Automatic Code Changing (ACC) procedures in Mode 1 and 3/A. It includes provisions for upgrade to Mode S and NG IFF.

Configurations

The TSA 1010 is very modular and easily reconfigurable: adding optional modules permits to increase the performances and functionalities of the basic configuration.

Main configurations:

- Interrogator only (basic configuration)

The TSA 1010 interfaces with external extractor or decoder. Remote control is available via the dedicated SR 19 Control Box Unit (CBU) or equivalent.

- Interrogator with advanced video and reply pre-processing

This configuration of TSA 1010 is a cost-effective solution to improve performances of existing IFF system without changing processing and exploitation equipment in service.

Additional functionalities:

- remote control by a host system computer via standard serial link,
- intelligent management of interrogation modes and sectors,
- high-performance anti-interference processing,
- efficient reply decoding and evaluation.

Even in heavy RF environment, a "clean" video (raw and/or symbolic) is delivered to existing decoders or extractors.

- Interrogator-extractor

The TSA 1010 interfaces with a host system computer.

It performs all the functions previously split in several boxes :

- Interrogation management,
- Transmission / reception,
- Anti-interference processing,
- Reply decoding, degarbling and evaluation,
- Plot extraction (computing of target location, code and identification data),
- Plot filtering and transmission via standard serial link.

These high-performance functions make the TSA 1010 very efficient in terms of:

- ECCM (exploitation, spoofing, jamming),
- resistance to interferences (Fruit, multipath...),
- target capacity,
- location accuracy,
- target resolution,
- identification probability,
- false alarm rate.

This high performance level is maintained even with a lower number of hits and can be still improved with monopulse option.

- Interrogator-extractor with pre-processed video output

This configuration combines all the functions described above.

The TSA 1010 interfaces with a host system computer for automatic control and plots delivery. In parallel, it also interfaces with the SR 19 CBU and delivers "clean" video to external decoder for manual exploitation.



TSA 1010 with KIR

Integration

The TSA 1010 interfaces with any host system:

- Broad range of primary power supplies
- External or internal sync
- External or internal ISLS RF switch
- Compatible with pointing, scanning or both scanning and pointing antennas
- Compatible with multi-mode radar:
 - Automatic PRF control or adaptation (internal or external sync)
 - Azimuth resolution independent of PRF and rotation speed.
- Able to feed any external decoder (or extractor), even in parallel to internal extraction processing
- Configurable parameters for performance and installation optimization

Future IFF/SSR use, Mode S & NG IFF provisions

Growing air traffic and extension of Mode S and TCAS will impact current IFF modes operations:

- jamming by Mode S Fruit,
- limitation of interrogation rates to avoid frequency band overload.

Besides, implementing Mode S and/or NG IFF will require sharing the dwell time between these modes and current modes, thus reducing the available number of hits.

The TSA 1010 is designed to fit into this future environment. It includes all provisions for upgrade to Mode S and NG IFF:

- Intelligent multi-mode interrogation management including round to round position prediction,
- NG IFF transmission and reception,
- Control of additional transmitter required for Mode S,
- Mode S and NG IFF target processing.

Design and Technology

The TSA 1010 uses front-edge technologies:

- Fully solid-state transmitter and receiver,
- Fully digital signal processing,
- Software extraction,
- Extensive use of powerful programmable elements: DSP, microprocessor, VLSI circuits, ASICs,
- High-capacity memory.



TSA 1010 with KIR, ACC memory module and SR 19 Control Box

Logistics

High-performance built-in-test makes TSA 1010 easily maintainable.

Results of the self-tests (including status of cryptocomputer) are delivered through the plot serial data link and/or via a dedicated data link (eg for centralized test system).

In addition, controls and status are available on the front panel and on the SR 19 CBU.

When installed with a cosite transponder (eg : ship-board installation) it can perform global loop test involving all the IFF system (interrogator, transponder, cables and antennas).

Most of the modules are LRUs and TSA 1010 self-test functions permit a maintenance up to intermediate level without specific test equipment.

Up to 16 different configurations selectable by switch can be pre-programmed. If necessary, these configurations can be changed and loaded into the TSA 1010 using a standard PC. This permits the pooling of spares for different platforms.

TSA 1010

Specifications

General characteristics

Modes	1, 2, 3/A, C, 4/Secure ACC option Mode S and NG IFF upgradable
Interrogation patterns	IFF/SSR Modes interlacing Overriding Mode 4/Secure Supemode
Peak power output	33 dBW typical
Sectorized programmable power adjustment	- 2, - 4, - 6 dB
Duty cycle	1 %
Sensitivity (Minimum Decoding Level)	- 83 dBm
Dynamic range	70 dB
Anti-interference processing	Sectorized programmable STC RSLs and/or monopulse beam sharpening Complete Anti jam processing Anti Mode S Fruit Advanced defruiting Multi-path cancellation
Range	Up to 260 nmi
Target capacities	up to 65 / beam > 1500 / scan
Identification / decoding probability	> 98 %
Enemy rejection	Very high
Range accuracy	$\sigma = 20$ m
Azimuth accuracy	$\sigma = 1/40$ EBW (monopulse) $\sigma = 1/20$ EBW (sliding window)
Range resolution	75 m Processing of 3 garbled replies
Azimuth resolution	0.4 EBW Independent of PRF and/or rotation speed
False alarm rate	< 1/s @ 20000 Fruit/s Independent of number of IFF/SSR Interlaced Modes
MTBF	> 5000 hours (@ ground fixed, 30')

Note : EBW = Effective BeamWidth after ISLS and RSLs beam sharpening

Physical

Dimensions	Width	6 U x 19"
	Height	483 mm
	Depth	266 mm
Weight		594 mm
Weight		39 kg
Power requirement		115/230 V, 50 to 400 Hz

Environment

Temperature	Operating	- 40° C to + 71° C
	Storage	- 50° C to + 71° C
Humidity		95 %, + 40° C
Shock & vibration		Ground mobile or Naval applications
EMC		MIL-STD-461

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