

Combat Identification IFF Systems



Tellumat



➤ Introduction

Positive identification of platforms in the combat environment is essential. IFF is a key means of providing identification using Mk XII IFF interrogator and transponder systems capable of ATCRBS, Mode S and National Secure Mode (NSM). When operating in airspace shared with commercial and civilian air traffic support for TCAS and Mode S Enhanced Surveillance (EHS) is equally important. With the increasing use and importance of ADS-B the support for Mode S Extended Squitter (ES) is a Vital feature.

Standardisation of modes, codes and cryptographic keys provide efficient operation and ensures interoperability between arms of service.

Equally crucial is the provision of cryptographic management systems to ensure the security of platforms and to provide clients with the capability of developing and maintaining national secure IFF capabilities.

Utilising industry standards, protocols and Built-In Test (BIT) capabilities enables our IFF products to be quickly and easily integrated into platforms operating in the combat environment. Similarly, test benches, IFF testers and Integrated Logistic Support (ILS) are essential to the successful maintenance capabilities for IFF systems throughout their life cycles.

Tellumat's Defence division addresses local and international aerospace, landward and maritime markets with facilities located in Cape Town, South Africa.

Tellumat Defence's mission is to provide IFF products to defence forces and covers the following :

- Airborne transponders and Combined Interrogator-Transponder systems (CIT) and associated on-board control and combat system interface elements
- Ground-based interrogators and associated control and combat system interface elements
- Naval interrogators and transponders
- UAV transponders

In addition, Tellumat Defence provides the following support elements for IFF systems:

- Antennas
- O-, I- and D-level ramp testers and test benches
- Cryptographic data management systems
- Integrated Logistic Support (ILS)
- In-house system-level integration and environmental testing

➤ The Role of Shipborne, Airborne and Ground-based IFF

- To interrogate surface targets and air targets, aid in their identification and derive secondary radar information for Combat Management System (CMS) target designation and tracking purposes
- To respond to valid interrogations received from other surface, air or ground platforms
- To maintain secure platform identification under combat conditions using National Secure Mode (NSM)
- To contribute to the development of the overall air and surface / ground tactical pictures

➤ National Secure Mode System Description

Country-specific National Secure Mode (NSM) is used for:

- Positive identification between own forces
- Minimising the probability of firing a weapon against own forces
- Simultaneously minimising the possibility of exploitation by the enemy of the challenge / reply transaction (between friendly interrogating radars and replying platforms)

The IFF System is a Secondary Surveillance Radar (SSR) system for use in Air Traffic Control (ATC), air space control and weapon delivery. The system includes a secure mode of interrogation and reply, allowing for rapid, positive, secure identification of friendly targets. The objective is to minimise the probability of firing a weapon against friendly forces, while at the same time, minimising the possibility of exploitation by the enemy of the challenge/reply transaction between interrogating radar systems and transponding (replying) airborne or surface-borne friendly target platforms.

The system comprises interrogation equipment (ATC, air-space control and weapon-delivery platforms – ground and ship-based radars) and transponder equipment (target platforms – aircraft and vessels). The secure mode is a military identification mode which uses encryption techniques to ensure secure challenges and responses.

➤ Capabilities and Competencies

The core capabilities of Tellumat Defence are:

- Project management and Systems engineering
- System and product design, development and qualification
- High reliability manufacture of own and other OEM products
- System integration, installation and commissioning
- Full product support to Organizational- Intermediate- and Depot-level



IFF System Configuration Options

IFF SYSTEM	FEATURES
Naval	
- Standard power transponder, control by CMS (Ethernet / Serial) or CDU	500 W, ATCRBS, Mode S, NSM
- Medium/high power interrogator, control by CMS (Ethernet / Serial)	1.3 kW, ATCRBS, Mode S, NSM
Ground-based	
- Medium/high power interrogator, control by radar console (Ethernet / Serial)	200 W / 1.3 kW, ATCRBS, Mode S, NSM
- Standard power transponder, control by CMS (Ethernet / Serial) or CDU	500 W, ATCRBS, Mode S, NSM
Air (Manned Aircraft)	
- Standard power transponder, control by mission system or dedicated CDU (ARINC 429 / MIL-STD-1553) or CDU	1 kW, ATCRBS, Mode S, NSM
- Combined Interrogator and Transponder (CIT), Control by mission system (ARINC 429 / MIL-STD-1553)	500 W / 1 kW, ATCRBS, Mode S, NSM
Air (Unmanned)	
- Low power transponder, control by mission system (ARINC 429 / MIL-STD-1553 / Ethernet / Serial)	200 W, ATCRBS, Mode S, NSM

➤ Logistic Support

Supporting the product / system life-cycle, Tellumat provides any combination of the following maintenance solutions to provide our customers with independent test, maintenance and repair capabilities, together with the associated documentation, training and spares:

Tellumat Defence is a supplier of Intermediate-level test benches, which provide the means of performing interrogator, transponder, cryptographic computer and altitude encoder testing, to evaluate the performance of IFF products.

Organisational Level (O-Level) Maintenance:

Operational check-out and go/no-go testing, confirmation of line replaceable unit (LRU) fault and re-test after replacement. Equipment includes off-the-shelf ramp testers and NSM test equipment crypto computers. Documentation includes LRU O-Level manual and test equipment manual(s).

Intermediate level(I-level) MaintenanceIntermediate Level (I-Level) Maintenance:

Bench check-out and diagnosis of faulty LRU, fault location to shop replaceable unit (SRU) level and automatic test equipment (ATE) re-test after SRU replacement. Equipment includes I-Level test benches comprising off-the-shelf test equipment and custom hardware and software. Documentation includes test bench manual, LRU test / diagnostic procedures, SRU removal / replacement instructions, schematics and parts lists.

Depot Level (D-Level) Maintenance:

Workshop check-out and diagnosis of faulty SRU, fault location to component level and re-test after replacement. Equipment includes special-to-type module testers and standard off-the-shelf test equipment. Documentation includes SRU test procedures, assembly drawings, schematics, parts lists and diagnostic procedures.



➤ Why is Tellumat a preferred IFF solutions provider?

- Tellumat has built an extensive track record in the field of IFF dating back to the early 1980's
- Tellumat enjoys a world-class pedigree of excellence given its roots with the Plessey group of companies which operated in South Africa since 1963
- Tellumat is the IFF system design authority for the South African National Defence Force (SANDF) and other international users
- Tellumat is a 100% South African-owned company
- South Africa is a non-aligned country



Tellumat is open to consider all levels of technology transfer. This includes the field of IFF national secure mode systems where the philosophy extends to transferring all related fundamental capabilities required such as algorithm development, key management and distribution. This allows for the independent maintenance and future adaption of the system by the end user.



The cryptographic technology offered is entirely independent from existing systems and offers guaranteed national security. The IFF interrogator and transponder equipment offered is however compatible with international standards and are compatible with STANAG compliant cryptographic computers.

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