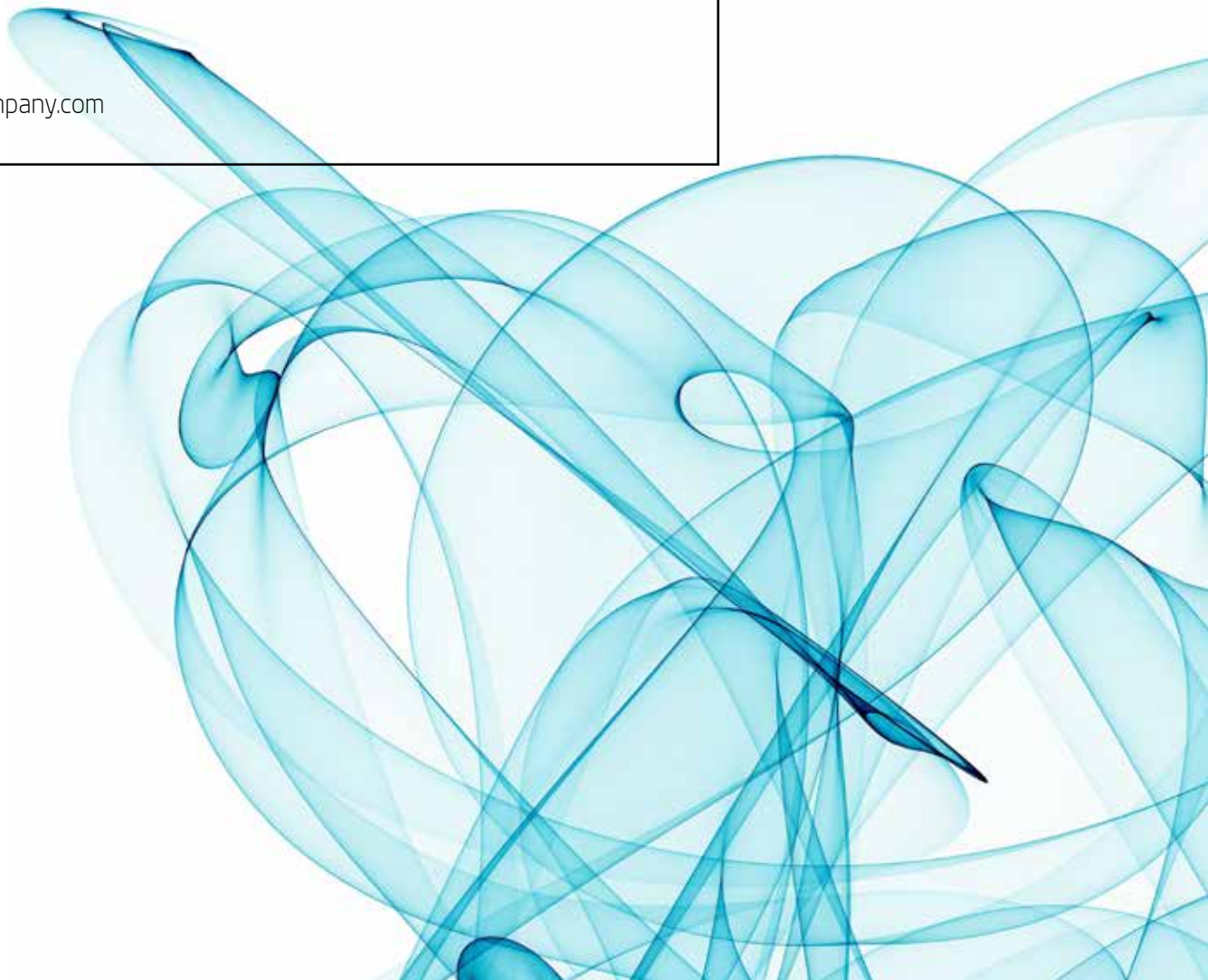


LOGISTICS SYSTEMS AND SERVICES

AUTOMATIC TEST SYSTEM SOLUTIONS

Indra has developed testing solutions covering the whole cycle of the weapon system, from design and integration to the level III and depot maintenance levels.

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AUTOMATIC TEST SYSTEM SOLUTIONS



Indra's Logistics Systems and Services Division provides maintenance technology and solutions to help OEMs, Platform Integrators and Armed Forces to improve their maintenance processes while keeping down the associated cost

Introduction

With military equipment becoming more complex and electronics-intensive every day, modern Armed Forces need reliable maintenance equipment to ensure safety and perfect operation readiness.

Indra's Automatic Test Systems (ATS) activity began in 1980 with the development of the maintenance solution for the F-18 aircraft, and has continued to the present day with maintenance solutions for the most modern aircrafts, helicopters, and land vehicles for the three services, including the Mirage F-1,

AV-8B, Eurofighter Typhoon, SH-60, AS 532 Cougar, Superpuma, Tiger helicopter, NH90, and Leopard tank and Hawk missile among others.

Indra is the undisputed leader of automatic test systems in Europe for the military market and one of the foremost global companies. Indra is the main contractor of the most important ATS & TPS European military program for the design and definition of the ATS for the Eurofighter Typhoon.

Indra has been a US Navy (one of the most demanding customers of this kind of systems) supplier for longer than a decade with its automatic test system efforts on the AV-8B Harrier.

Indra Logistics Systems and Services Division has provided the world most advanced Armed Forces with state-of-the-art systems for the maintenance of the electronic units of their land, air and naval platforms.

Our ATS Products

Indra's family of ATS products include solutions for OEMs (Original Equipment Manufacturers), Platform Integrators and Armed Forces, covering the whole LRU life cycle.

STTE (Special-to-Type Test Equipment)

STTEs are flexible and comprehensive Automatic Test Systems designed to help OEMs in:

- LRUs HW/SW integration
- LRUs acceptance test procedures and final design acceptance
- LRUs production validation

STTEs provide complete automatic testing capabilities for one or several LRUs with similar testing requirements. Designed using latest technologies as PXI/LXI/VXI modular instrumentation, the result is a new generation of testers with reduced footprint, cost and high performance.

STTEs are based on Commercial-Off-The-Shelf (COTS) HW & SW and Open Standards to minimize obsolescence impact.



Flight-Line Radar / ECM Generator

Indra provides a range of radio-frequency generators in Radar band (EWE Series), oriented to analysis, diagnostic and ECM, as well as ESM Electronic Warfare Systems validation.

EWE-1000: Portable Radar Generator

The most basic in the range, but able to emit any frequency signal inside the work band, either in continuous or pulsed way, and modulated by a wide characteristics spectrum of video value signals.

Its main feature is its low weight and large autonomy, that makes it a portable equipment for any location. It is best suited for validation of devices just before a mission (GO / NOGO).

EWE-2000: Electronic Warfare End-to-End Tester

It is the only one in the EWE family that combines RF generation and results analysis process in the same equipment. It performs parametric testing (test emissions using a very accurate generation of RF) and functional testing (with the objective of validating the ESM response in complex scenarios of EW). The connection of the injection elements is made through specific hoods (also developed by Indra) located close to the receiving elements. It performs the signal analysis and intercepts the responses transmitted by the unit to other control systems. Typical applications are verification of RF wiring, ECM/ESM EW systems in preventive maintenance and GO / NOGO testing before a mission.

EWE-3000: Multi-emitter Environment Generator

Intended for generating active multi-emitter scenarios in the radar band with a mean density of 16 simultaneous complex emitters (intrapulse modulation). Such emitters are dynamically active (moving on a scenario with real topographic information) and its behaviour depends on terrain constraints. The emitters are operator-controlled, so leading to an effective simulation of a real EW scenario.

Typical applications are threat library validation, development, qualification and acceptance of EW systems, maintenance requirements, mission planning, and more.

First Line Testers, On-Aircraft

These are Testers based on a ruggedized PC including communication cards to interface and communicate directly with the aircraft buses. They are intended for gathering internal maintenance and BIT information from the aircraft and from the different LRUs.

Capable of monitoring, recording, processing, displaying and analysing the aircraft and LRUs BIT/PBIT information, First-Line Testers include tools for SW downloading and uploading to/from the LRUs. If a LRU reports

First Line Testers, Off-Aircraft

a failure while in the aircraft, the next step is to remove it in order to verify its malfunction before forwarding it to upper maintenance levels. This verification is made with Off-Aircraft First Line Testers, which are able to power-on the LRU off-aircraft, initiate the BIT/PBIT sequences and retrieve the results, as well as performing any additional testing necessary to flag the LRU as faulty. The instrumentation included in these Testers depends on the LRU type and the degree of additional testing required. These systems

are designed to have a minimal operational footprint in order to facilitate its deployment. The main application of these test systems is to act as filter testers, reducing the number of NFFs (No Fault Found) in later maintenance levels.

Supporting and helping Armed Forces in the maintenance of different weapon systems has been traditionally the area where Indra has provided highest technology products and valuable assistance



The General Purpose Test Equipments are intended for the maintenance of whole weapon systems or subsystems. These products are focused on intermediate and depot maintenance levels, for testing and diagnostic of LRUs and SRUs. Some of the GPATE products that Indra has developed and manufactured are the following:

INERTEST

The INERTEST system is a test equipment designed to support inertial navigation units installed in different aircrafts, mainly F-18.

SARAY

SARAY is a GPATE designed to support navigation units (ILS, TACAN, DME, Radios...). This program included the development of the TPSs for these units.

AIRSIM

The AIRSIM is a functional, real time ATS developed for the maintenance of the EF-18 LRUs. AIRSIM simulates the behaviour and performances of all the electronic systems in the EF-18 under all environmental conditions. This allows testing and verification of the 16 LRUs, isolating failures up to SRU level.

MASH

MASH is a GPATE designed to perform second and third level maintenance for Cougar helicopters. It involved the development of TPSs for 64 SRUs and 40 LRUs.

BASAM

BASAM is a GPATE with similar characteristics to the MASH ATS. Both were developed at the same time, although BASAM was intended for supporting second and third level maintenance for MIRAGE F-1 navigation units (52 TPSs developed).

ICARO

It is a GPATE oriented to the civil market, providing support for 30 LRUs from the A3XX aircraft family.

Thanks to this experience and background, Indra faced the development of a new state-of-the-art standard tester, able to meet the testing requirements of present and future weapon systems while being compatible with legacy ATS nearly to its end life cycle (like THE and CASS). This new standard test system is the SAME.

SAMe

SAMe is a European standard already in service in the UK, Italy, Germany and Spain currently used in the maintenance of aircrafts like EF-18, AV-8B, Tornado and Eurofighter Typhoon, helicopters like LAMPS, SH-60, Tiger and NH90, armed vehicles like Leopard 1E/2A4 and Pizarro, ships like F100 and missiles like Hawk.

The SAMe Automatic Test System (ATS) was selected for the maintenance of the Eurofighter Typhoon (Eurofighter GPATE) and for the replacement of the legacy Italian Tornado ATS. SAMe has been also selected by Spain for the maintenance of the NH90 helicopter. The Icaro ATS family, which use the SAMe SW, are used for the maintenance of civil aircrafts like the A320.

SAMe is an ATS concept best suited for intermediate (I-Level) and depot (D-Level) maintenance levels of modern electronic units. SAMe is at the forefront of the technology and has been designed to meet the most demanding requirements for the maintenance of present and future weapon systems, although it is equally competent for the maintenance of other systems.

SAMe was devised from its very beginning more as an architecture than a closed or COTS product, and it has been continuously evolving and growing since its initial implementation. Main SAMe features are:

- Open architecture, modular and flexible
- Based on COTS elements.

- Multiplatform: VXI, GPIB, LXI, PXI, Ethernet.
- Designed to mitigate the effect of HW and SW obsolescence.
- Aimed to protect TPS investment: enhanced portability and re-hosting of TPSs.
- Modular design and growing capability.
- Available in two different configurations: rack mounted and deployable.
- Integrated Self-test and Calibration capabilities.
- Multilanguage capability: able to execute test programs written in an expandable set of programming languages.

Eurofighter GPATE & DATE

Indra is one of the main contractors for the maintenance of the Eurofighter Typhoon. Indra has designed, manufactured and delivered the GPATE ATS (12 deployed) and DATE ATS (3 deployed) used to support 58 TPSs (Tranche 1 and Tranche 2) corresponding to different subsystems of the aircraft. These GPATE and DATE ATS are based on the SAME concept and run the SAME Software.



The GPATE and DATE ATS are deployable SAME and have been qualified against the most demanding temperature, humidity, altitude, shock, vibration and EMI/EMC standards.

TPS Development

Related with the ATS activity, Indra has developed more than 1000 TPSs since 1990, either for SRUs or LRUs, for all kind of electronic unit types and technologies. One of the most remarkable Indra customers in the TPS area the US Navy, for whom more than 80 TPS have been successfully developed and delivered.

Defined processes and procedures as well as a comprehensive set of automatic tools allow Indra to meet the most demanding requirements and achieve the highest detection and isolation figures in delivered TPSs.

IMaS

Indra IMaS (Integrated Maintenance Solution) concept represents Indra's view about what a comprehensive support solution should include. Indra is in the position to provide a complete maintenance solution covering the whole life cycle of LRUs and Platforms / Weapon Systems.

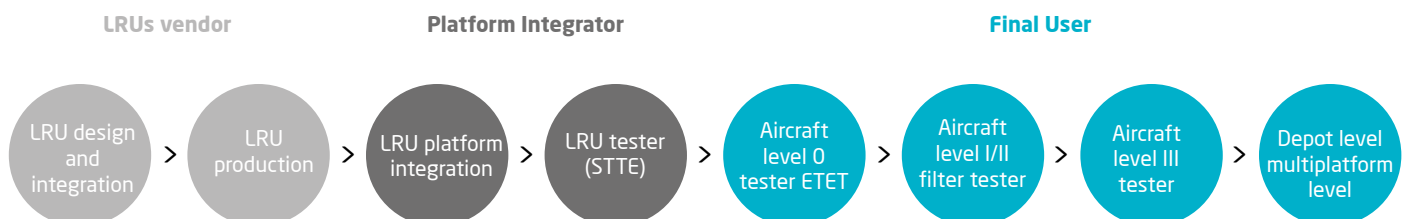
Indra can provide state-of-the-art technical solutions for all the maintenance levels based on a common, scalable open architecture (SAME concept).

The standardization of technology, the testing environment and libraries, and the general purpose SAME SW shared by all maintenance levels, assure that any development and investment performed on a specific maintenance level can be reused at other maintenance levels. This is true even across different platforms.

This makes it possible to execute testing solutions developed by OEMs on an Indra specific STTE in a SAME general purpose ATS with minimal or null HW/SW modifications.

The above picture is completed with tools for close-up diagnostic integration (by interchanging information among maintenance levels) with the aim of reducing the NFF (No Fault Found) rate and the testing time required, and improving the diagnostic capability.

Experience developing ATS





ISO 9001:2000



indra

C/ Mar Egeo, 4
Polígono industrial, 1
28830 San Fernando de Henares
Madrid (Spain)
T +34 91 627 14 50
F +34 91 627 10 07
infodefense@indracompany.com
indracompany.com

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