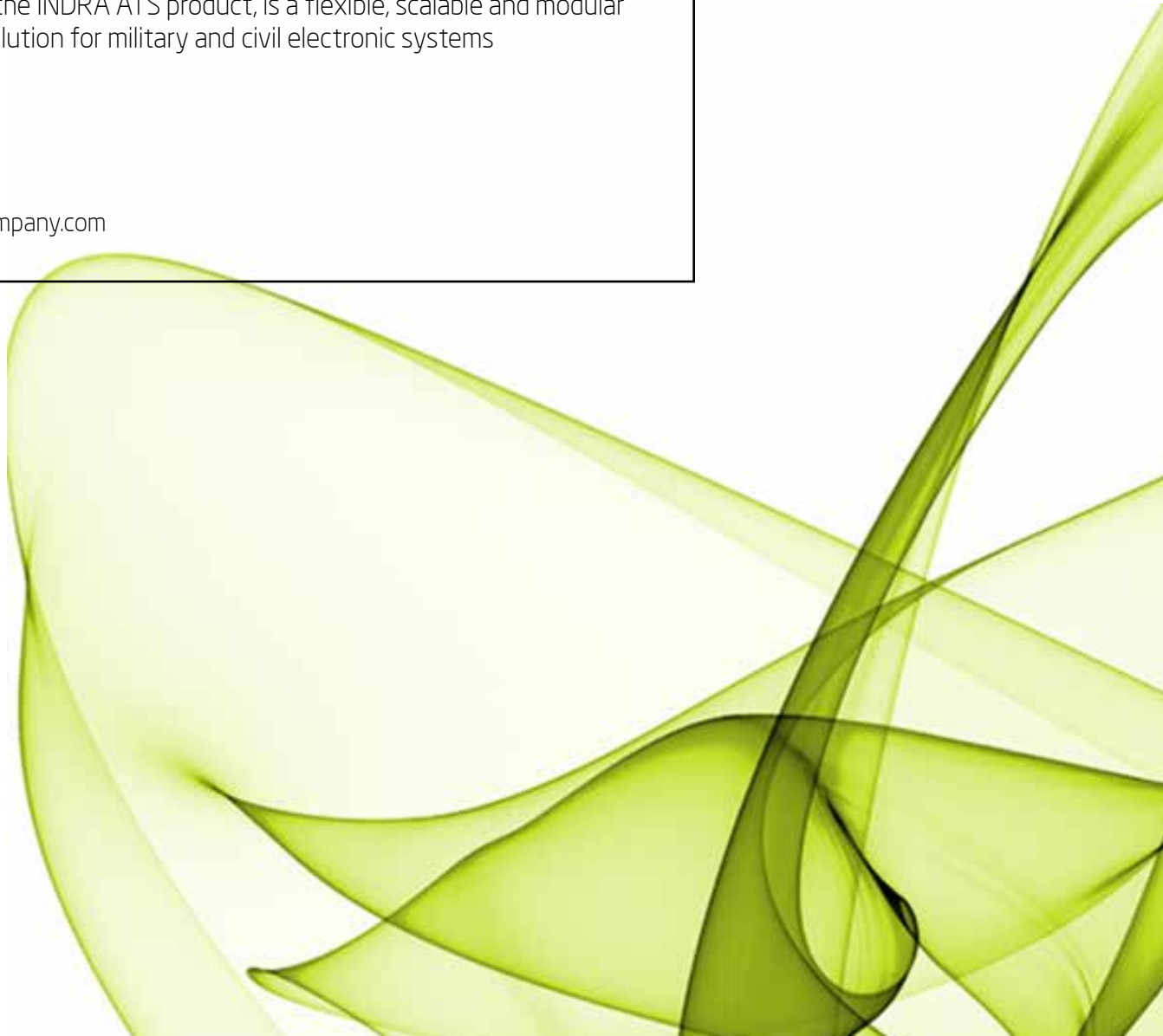


LOGISTICS SYSTEMS AND SERVICES

STANDARD AUTOMATIC TEST SYSTEM (SAME)

SAMe, the INDRA ATS product, is a flexible, scalable and modular Test Solution for military and civil electronic systems

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STANDARD AUTOMATIC TEST SYSTEM (SAMe)



SAMe is a Standard Automatic Test System for Intermediate and Depot Level maintenance of modern avionics and electronic systems

Introduction

SAMe is a European standard already in service in the UK, Italy, Germany and Spain for the maintenance of Eurofighter Typhoon, EF-18, AV8B+ and Tornado aircrafts, LAMPS, Tiger and SH-60 helicopters, Leopard tank and Hawk missile.

The SAMe Automatic Test System (ATS) was selected for the maintenance of the Typhoon 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.

Key Features

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, both from the HW and SW points of view.
- **Based on COTS elements**, it makes use of state-of-the-art technology.
- **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**. Ease to change/upgrade the testing capabilities of the ATS by removing, replacing or adding instruments or subsystems.
- Available in **two different configurations**: rack mounted and deployable.
- **Wider application scope**, from small test systems for specific units to huge test solutions covering large electronic systems, all of them sharing the same HW and SW architecture.
- **Integrated Self-test and Calibration** capabilities.
- **Multilanguage capability**: able to execute test programs written in an expandable set of programming languages.

Deployable Version

Designed for use in the field, it is composed of 11 operating carbon fibre boxes and blind mate connectors between the boxes that can be completely mounted and dismantled by two operators in less than one hour, requiring just one standard allen key.



This top-technology deployable test system allows deploying the SAMe ATE in field missions and test and repair the UUTs on the field and has been qualified against the demanding temperature, humidity, altitude, shock, vibration and EMI/EMC standards. This test system has been acquired by the RAF, the Saudi Arabian DoD, the Italian DoD and the Spanish DoD.

Rack Version

Designed for use in a laboratory, it is functionally equivalent and fully compatible with the deployable version, assuring TPS transportability and TPS investment protection. It provides a more cost-effective solution when use in the field is not a requirement.



SAMe Test Interface Definition

The SAMe test standardized interface is implemented through a General Purpose Interface (GPI). It is based on the Consolidated Automated Support System (CASS) that is the US Navy's ATE standard for testing requirements.

Designed to solve problems of unreliability, rapid obsolescence and difficult logistic support, CASS incorporates modularity and flexibility to allow for expansion of testing both current and future technologies.



Integrated Self-test and Calibration

A collection of built-in self-verification capabilities are provided with every SAME ATS:

1. Self-check.

- Executes BIT of instruments in parallel.
- It does not require additional HW or SW items.
- Less than 1 minute.

2. Self-test.

- Instrument and wiring functional verification.
- Requires external adapter (OPID).
- Less than 1.5 hours (depends on the ATE configuration).

3. Self-calibration.

- Calibration without removing instrumentation.
- Less spares required.

4. Self-alignment.

- It compensates loss in wiring and calibrates the system at GPI level.

SAME System Software

The SAME Software is a highly flexible, modular and configurable software for Test Systems, which is the result of years of experience using and building test systems for a large number of customers and users with different needs.

It relies on a powerful instrumentation management layer that allows modifying the ATS configuration (adding, removing or replacing instruments) without need of SW recompilation and without affecting existing TPS thanks to its layered structure.

The SAME Software provides multiple ATS-related services: TPS execution control, test reporting, statistics, station utilities, UUT SW downloading.

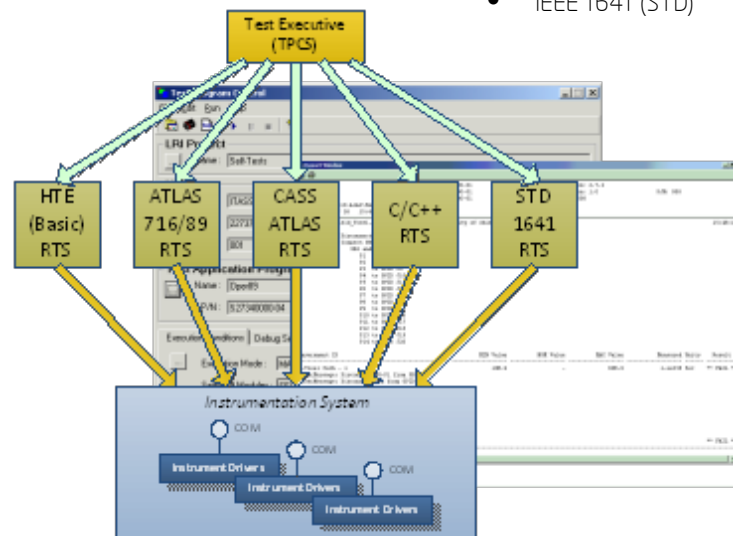
Its design flexibility allows replacing, removing or adding capabilities in an easy way.

Multilanguage Capabilities

The most outstanding expression of this open scheme is the ability to run test programs written in a variety of languages and executed under different run-time systems.

At present, several programming languages/ run-time systems are already available for the SAME Software:

- ATLAS / TYX RTS (ATLAS-89 and CASS ATLAS)
- C/C++
- C# / .NET
- Basic
- IEEE 1641 (STD)



TPS Transportability

The major goal of the SAME concept is that "any TPS working in a certain ATS of the SAME family must work in any other ATS of the SAME family, provided that the necessary resources are available". The transportability of TPSs is a key concern, and the HW and SW has been designed with this target in mind from the very beginning.

All SAME ATSs connect to the TPS hardware via an industry standard General Purpose Interface (GPI) where every test resource is made available. The mapping of signals and measurement points at the GPI has been standardised, allowing that a hardware test interface developed for a SAME ATS can be connected to any other SAME ATS.

In this way, a TPS designed and manufactured for a given SAME ATS can be ported to a different ATS model of the SAME family without modifications. In addition, The SAME test systems are scalable and are prepared to follow the evolution of TPSs during its lifetime.

SAMe TPSs

More than 500 TPSs have been developed specifically for SAMe, covering a wide range of electronic systems and LRU types. TPSs from other platforms like CASS and HTE have been successfully rehosted on SAMe without modifying the HW interfaces and with minimal SW changes.

Indra provides support for the development of TPSs on SAMe by customers. In the ITASSS, GPATE and DATE programs Indra provided the test system and an environment for the development of test programs, either in ATLAS or in C/C++.

Currently, the SAMe system, including ATS and TPSs, is used in the maintenance of aircrafts like EF-18, AV-8B, Tornado and Eurofighter Typhoon, helicopters like LAMPS, SH-60, Tiger and NH-90, armed vehicles like Leopard 1E/2A4 and Pizarro, ships like F100 and missiles like Hawk.

Extensive Library of Testing Capabilities

During its lifetime, different test solutions have been developed following the SAMe concept, to test a large number of electronic units requiring a wide range of testing requirements. An extensive set of testing capabilities have been implemented in the SAMe ATSs:

Low frequency measurement

- Digital multimeter
- Universal counter
- Digital oscilloscope
- Audio signal analyser/generator
- Power Supplies
- Programmable VDC power supplies, including reverse polarity and output isolation
- Programmable AC Power Supplies (including high power)
- Low & High wattage power loads

Low frequency stimulus

- Arbitrary Waveform Generator
- A/D and D/A Converters
- Pulse Generator
- Universal video pattern generator (digital, NISTC/PAL and RGB format)
- Programmable Resistor

Digital

- Up to 384 high performance digital I/O channels
- Low performance TTL/CMOS channels

Communication buses

- IEEE 488 (GPIB)
- RS-232/422/485
- MIL-STD-1553 / STANAG 3838
- STANAG 3910
- ARINC 429
- CANBUS
- IEEE 802.3 (Ethernet)

Switching

- Low frequency, general purpose
- Power relays
- High frequency relays

Radio frequency

- Spectrum Analyser
- Synthesizers
- RF Switches
- Power Meters
- Arbitrary Waveform Generator
- Network Analyser
- Scalar Network Analyser
- Peak Power Meter
- Noise Figure Meter

Ancillary and other equipment

- System trigger
- Rubidium clock reference
- Blower unit for UUT cooling
- Liquid Cooling
- Power conditioning for aircraft (115VAC/400Hz) power facility
- Electro-optic: energy, power, pulse width, boresight error, FOV, line of sight, beam divergence, MTF.
- System calibrator (6.5 digit multimeter and oscilloscopes)
- Synchro-resolver (simulator and measurement)

SAMe extensions

Library with additional testing capabilities for Electronic Warfare (EW), Microwaves, High Power, Communications, Inertial and many other applications are available and can be integrated according to the customer's needs.

Indra has also the capability to cope with user-defined testing requirements, by designing and manufacturing special-to-type instruments where a commercial alternative is not feasible.



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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