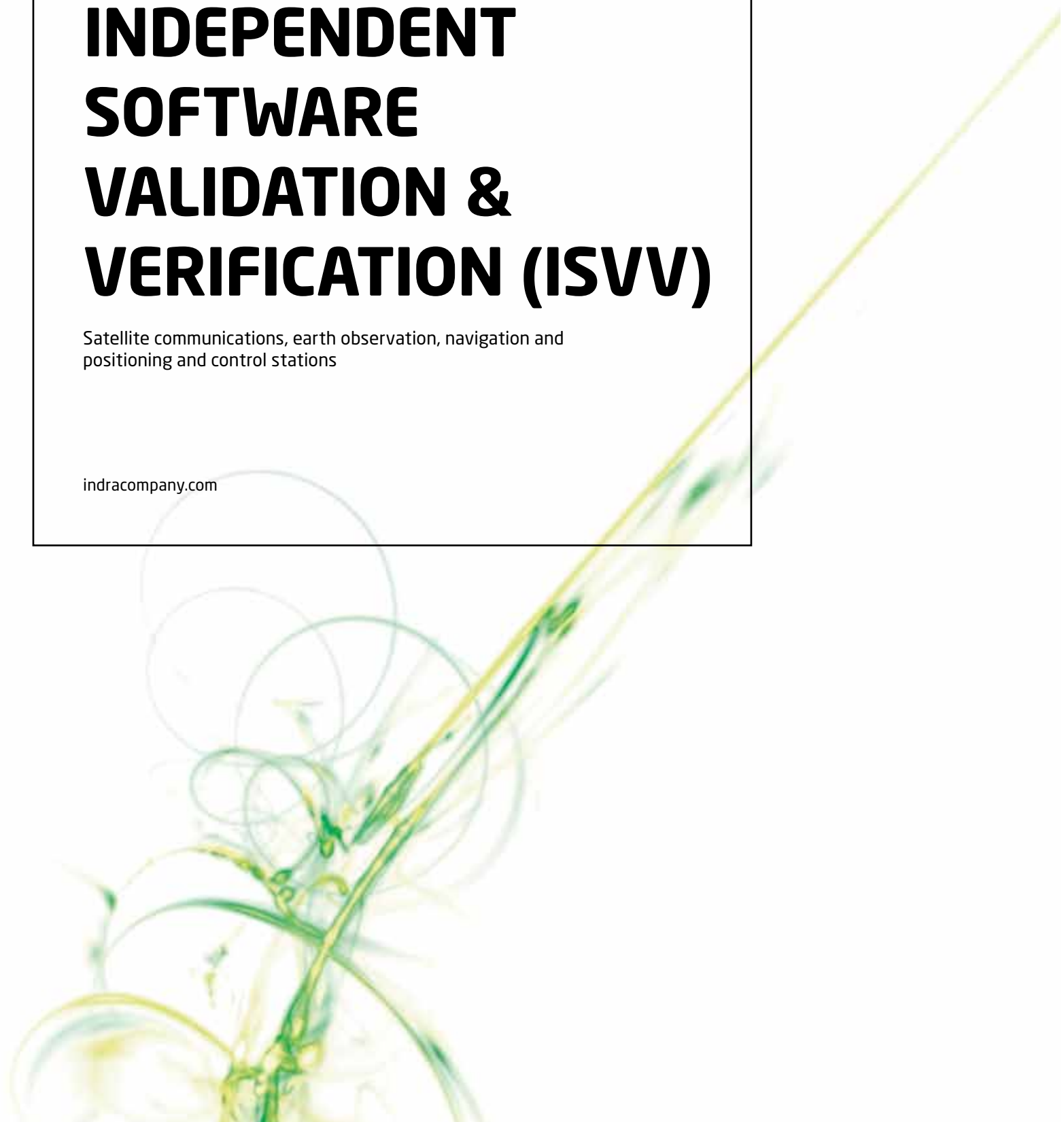indra

SPACE

INDEPENDENT SOFTWARE VALIDATION & VERIFICATION (ISVV)

Satellite communications, earth observation, navigation and positioning and control stations

indracompany.com

INDEPENDENT SOFTWARE VALIDATION & VERIFICATION (ISVV)

Indra Espacio can perform all the Life cycle activities to your software product developments to ensure the accomplishments of the aeronautical and aerospace industry Standards of Quality.

Introduction

Indra Espacio takes profit of the heritage and wide experience in software validation and verification of real-time and critical software applications within the Space Ground Segment, in particular in the EGNOS and Galileo satellite navigation programs and it can play a key role in the Validation and verification of your real-time and critical software applications.

The products that have been validated and verified are characterized by dealing to high performance requirements (i.e. hard real time constraints, large data volumes, high processing and bandwidth capabilities). Most of them have been verified according to the requirements of the RTCA/DO-178B standard (Software Considerations

in Airborne Systems and Equipment Certification), which is the standard for critical aeronautic and space applications.

Indra Espacio has an extensive knowledge of Critical Software Development and a suite of products for effective ISSV

The extensive use of SW engineering and SW Product Assurance methodologies in Indra Espacio guarantees the service provided:
- Traceability analysis (DOORS, Requisite Pro,...)
- Configuration management (CVS, gnu-arch, DARCS,...)
- Documentation management and review (Alfresco, Mantis,...)
- Continuous of source code (Peer review, Code inspections,...).
- Test driven development (Cantata++, atol,...)
- Continuous SCS verification (Rulechecker,...)
- Continuous compliance inspection.
- Integrated defect management (Mantis, IE corporate tools)
- UML model driven development (Telelogic Tau,....)
- Automatic validation procedure.
- Metrication program (ISO 9126)

(Sloccount, RSM,...)
The Indra Espacio staff have extensive expertise in validation, verification and certification and is proficient with the policies, tools and the technology of Software Verification, Validation and Certification.

Indra Espacio Verification and Validation activities rely not only on the expertise of its staff but also on a suite of products that have been developed for this purpose.

CIS: Compliance Inspector Suite

Keeping development under continuous supervision and control regarding compliance and testing is an easy task: watch CIS

Keeping development under continuous supervision and control regarding compliance and testing is not an easy task. CIS performs the following operations:
- Download and compile source code from repositories.
- Calculate metrics.
- Report defects associated to the source code.
- Perform static code analysis, checking adherence to coding standards.
- Deploy to target platform(s).
- Execute unit and integration tests on target.
- Execute validation tests on target.

CIS is executed automatically every night generating a single and complete web report containing coding standard violations, code coverage and failed tests. This report is shared by developers, integration engineers and Quality Engineers to have an up-to-date view of the development.

When CIS is executed on a formal release, generates the certification material / artifacts like unit and validation test reports (including coverage) or Coding Standard Compliance. Reports can be extended and customized to fit your exact regulatory needs.
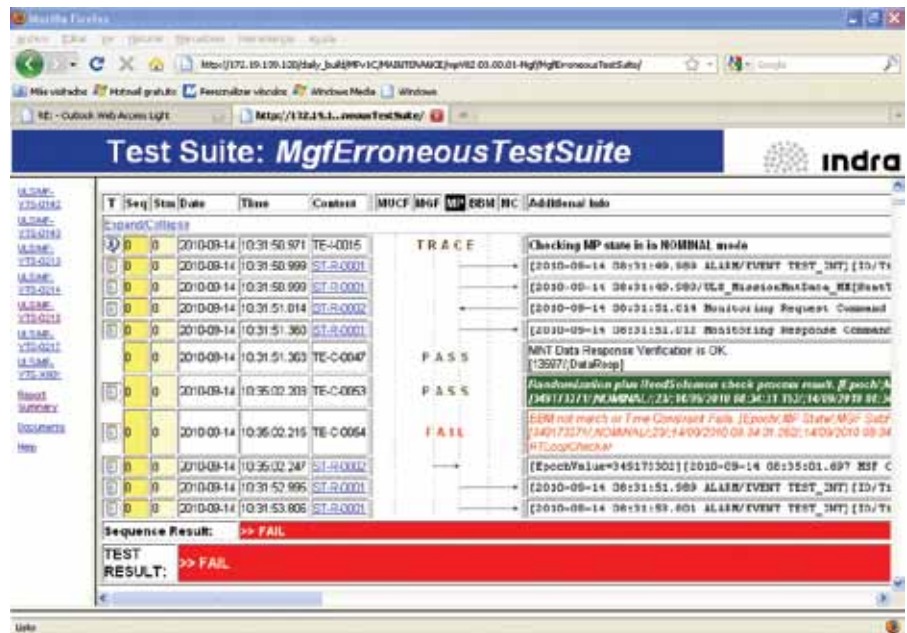
ATE: Automated Test Engine

The ATE performs automated validation tests and generates test reports

ATE is an standalone tool that automatically executes a suite of test cases and generates test reports, containing each of them detailed information about the sequence of injected data into the real system (by means of developed stubs), middle results and final Test Cases results (PASSED or FAILED).

ATE is written in Java/C/Python and built upon a distributed, scalable and modular architecture.

ATE is composed by a core application in charge of reading and executing Validation Rules, commanding scalable and distributed stubs and checking that defined Validation Rules where properly satisfied by the system to be tested.

ATE supplies a Development Kit to create customized stubs and Validation Rules.

Product development background

During more than 10 years, Indra Espacio has been developing mission critical SW.

During more than 10 years, Indra Espacio has been developing mission critical SW, mainly in the frame of EGNOS and GALILEO programs.

EGNOS Programme:
- Monitoring stations RIMS-A
- Core SW on the top of LynxOS according to level C for the Monitoring stations deployed worldwide (RIMS-A)
- Master Control Centre facilities:
- Mission monitoring and Archive elements of the Central Control Facility (CCF) on the top of UNIX according to level E.
- Central Processing facility (CPF) generating the corrections and integrity information

GALILEO Programme
- Definition of Galileo System:
- Interface definition including security aspects,
- Galileo data dissemination
- SAR/Galileo mission
- Performance analysis
- Responsible of the Data Server Facility design and development
- Leader of the Ground Mission Segment and the In Orbit Test Subsystem related
- Responsible of the GSTBv2 Experimental Sensor Stations (GESS)
- Responsible of the Galileo Sensor Stations Core (SW critical DAL C*)
- Responsible of the Uplink Stations (ULS) (SW critical DAL C*)
- Responsible of the Telemetry, Tracing and Command stations (TTC)

(*) On the top of LynxOS-178 OS in a PENTXM2 based-platform.

Indra Quality standards certifications and expertise

Indra Espacio has the following certifications:
- UNE-EN ISO 9001:2000: Quality Management Systems.
- PECAL / AQAP 2110: NATO Quality Assurance Requirements for Design, Development and Production
- PECAL / AQAP 2210: NATO Supplementary Software Quality Assurance Requirement
- UNE-EN ISO 14001: Environmental management systems

In addition to this, Indra Espacio has extensive knowledge of the following standards:
- RTCA/DO-178B Software considerations in airborne systems and equipment certification
- RTCA/DO-278 Guidelines for Communication, Navigation, Surveillance, and Air Traffic Management (CNS/ATM) Systems Software Integrity Assurance

- ESA Standards: ECSS (European Cooperation for Space Standardization) series
- EGNOS Software Engineering Requirements Standard (DRD920)
- EGNOS Software Qualification Standard
- GALILEO Software Standard (GSWS)
- Extensive use of FAA standards
- Extensive use of MIL standards