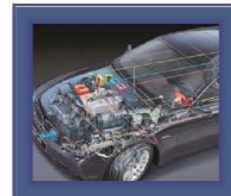*the Brainware company*

INTECS Presentation
Italian WS on ES, September 2016

FORTY YEARS IN A NUTSHELL

1974 - Founded with core business in software controlling advanced Defence systems (Army, Air Force and Navy).

1986 - MATRA Marconi Space takes minority to boost Intecs into Space on ESA Programs (Columbus station, Hermes shuttle, Helios, Spot-4).

1994 - First Italian company to obtain ISO 9001 certification

1999 - ACTIA replaces MATRA to push further Intecs achievements on "civilian" markets: Automotive, Railway and Telecom.

2003 - Major restructuring around Intecs core business: software embedded, real-time and safety-critical

2005 - First Italian company to reach Maturity level 3 of CMM

2009 - Finmeccanica "best global supplier" prize

2011 - Acquisition of Technolabs, former Italtel and Siemens R&D center with strong hardware, ASIC/FPGA, mechanical and product design skills

2014 - Main reorganization with focus on products for: Rail Safety, Media Converter for broadband telecommunication, Software Defined Radio and Electronic Appliance for Defence.

INTECS
ACROSS ALL MARKETS

AeroSpace (18%)

Defence (11%)

TrafficControl & Surveillance (5%)

Automotive & SmartSystems (15%)
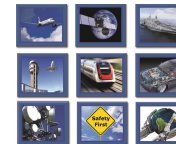
Railway (32%)

Telecom. (15%)

Processes & Safety (4%)

HIGH-TECH ENGINEERS
ALL OVER ITALY, FRANCE and GERMANY

the Brainware company

intecs

PARIS

TOULOUSE

MUNICH (D)

TORINO MILANO

GENOVA PISA

L'AQUILA

ROMA

NAPOLI

Personnel [1]

Year	Personnel
dic-04	186
dic-05	200
dic-06	242
dic-07	337
dic-08	368
dic-09	482
dic-10	506
dic-11	696
dic-12	653
dic-13	564
dic-14	530
dic-15	525
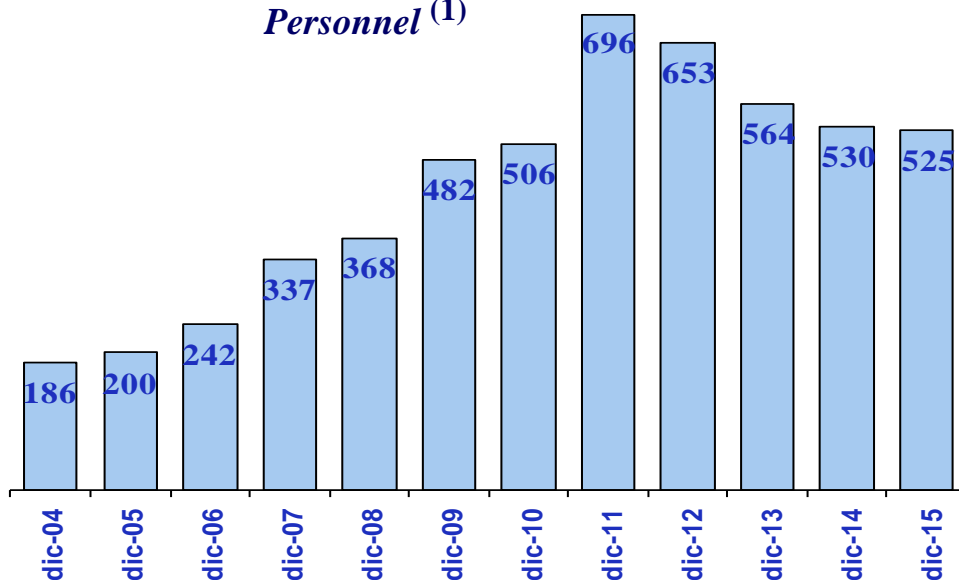
(1) Head Count (not FTE), all inclusive.

MAIN CUSTOMERS

- ACEA
- Ansaldo STS
- Ansaldo Breda
- ASI (Ag. Spaziale Italiana)
- Biomerieux
- Brembo
- Bureau Veritas
- Coriant (ex NSN Optical)
- CGS
- Cobra
- Dragonwave (ex NSN Microwave)
- Ducati
- Elettronica
- ENI - R&M
- Ericsson
- Eurotech
- ESA (European Space Agency)
- Ferrari
- Fiat Auto
- Indesit
- Italcertifer

- Iveco
- Jeppesen
- Northrop Grumman
- Magna
- Magneti Marelli
- MBDA
- Metasystem
- Octo Telematics
- Piaggio
- Rheinmetall
- RFI (Rete Ferroviaria Italiana)
- Saipem-Snamprogetti
- Selex-ES (ex Comms,ex Datamat)
- Selex-ES (ex Selex Galileo)
- Selex-ES (ex Selex Sistemi Integrati)
- Sistemi Dinamici (Agusta-IDS)
- STMicroelectronics
- Telespazio
- Thales Alenia Space
- Thales
- TUV Monaco
- WASS

# TELECOMMUNICATIONS

Fixed networks

- Development, maintenance and field support of SDH Transmission systems and multiplexers; **OSS** and **BSS**.
- Development of IP MicroWave systems
- **Ethernet repeater** for Microwave outdoor unit ◀ Product
- **EFAS**: Gateway between Gigabit Ethernet and legacy systems ◀ Product
- **MCX**: Electro Optical Media Converter for BB communication ◀ Product

Mobile networks
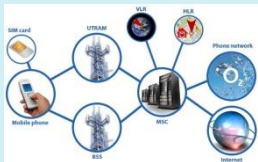
- Development, Integration & testing of Subsystem Devices (base stations, SCN, etc).
- Development of (sub)system emulators for validation. (base stations, SCN, etc)
- TETRA, VOIP x ATC, WiMax (firmware)

Mobile terminals

- Study, Development, Integration & testing of TETRA, GSM(R), UMTS, LTE and WiMax Devices.
- Short range protocols (Bluetooth, ZigBee)

Software Defined Radio
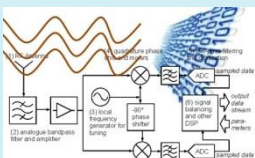
- Development of SDR software system for SANDRA and ESSOR projects.
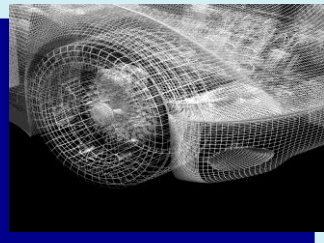- **DEJAMMER**: Sentinel for jamming activity detection ◀ Product

TRANSPORTS

Railway

- On-Board and Ground Hard Real-Time embedded Software development
- Validation and Verification of safety critical system
- Support for CENELEC certification
- RAMS Analysis
- **SIRIOXX**: Obstacle detection system ← Product

Automotive

- Verification and Validation of Powertrain applications
- Development of Dashboard and Body applications
- Embedded SW for Car Security (GPS/GSM car alarms)
- **Diana**: CAN Diagnostic system ← Product
- AUTOSAR consortium Premium member
- GENIVI consortium member
- **MICROSEK**: OSEK-VDX compliant RTOS ← Product

DEFENSE

Naval Systems

- Processing, fusion and presentation of radar sensor data for the tracking of air and surface objects
    - Italo-French frigate "Horizon"
    - Italian aicraft-carrier "Cavour"
    - And others

Terrestrial Systems

- Processing and georeferencing of distributed sensor data for the determination and forecast of objects' positions and movements
    - NATO Programme Single European Sky ATM Research (SESAR)
    - Italian Inter-Force Programme "C2I-Difesa"
    - **OPTIGRID**: Acoustic Detection System for FOB and Critical Infrastructure Surveillance ◀ Product

Missile Systems

- Management of the launch sequence, including continuous missile self-test and vertical launch system control
    - SAAM-FR for French aicraft-carrier "De Gaulle"
    - And others

Avionics Systems

- Development of On-Board Software components for Mission Computers and Equipments(EH101,NH90, A129,AMX, EFA)
- Independent Verification & Validation (EFA, Tornado)
- Pilot training simulators, Lesson Planner & Scenario Generator (EFA)
- Safety Analysis

TRAFFIC CONTROL

Air Traffic Control

Management, archiving, control and presentation of airplane flights and airport traffic information

- Italian and international systems
- European Flight Data Processing ("CoFlight")
- Single European Skyway ATM Research ("SESAR")

Vessel Traffic Systems

Management, archiving and presentation of vessel traffic information; integration with Geografical Information Systems and Nautical Maps

- Italian and international systems
- Decision Support Systems
- Search and Rescue (SAR) systems

AEROSPACE

On-Board Segment

- On Board software for payloads, sensors, comms, MMUs etc
  - BEPI COLOMBO:development of Basic SW and of MassMemoryUnit SW
  - KOMSAT, COSMO, PAMELA, AURORA: Mass MemoryUnit SW
  - GALILEO e MIOSAT: Satellite navigation
  - HIPERCAR: Space vehicles control – Development of Board Support Package
  - ROSETTA e MARS EXPRESS XMM Star Trackers
  - COSMO Second Generation (EGSE, SMU simulatore)
- Software Engineering and Safety critical methods/tools
- Independent Validation and Verification

Ground Segment

- Ground Segment operations of ESA Missions (Landsat, ERS, Envisat)
- User services for EO ground segment (MUIS, SSE, ...)
- ENVISAT Data Dissemination and Operations
- COSMO-SkyMed Ground Segment Sub/Systems
- Support to Testing (EGSE) and launch

Satellite Navigation
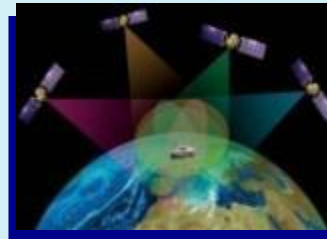
- Software Defined Radio for Satellite Navigation Applications
  (GPS/EGNOS Sofware Receiver Soft-REC ESA)
- Personal Mobility Receivers
- GALILEO I&V (Local Test Station, etc.)

Product

SMART SYSTEMS

Smart City & Intelligent Transport Systems

- Home Security (i.e intrusion, water, smoke, gas, …)
- Positioning and Assurance (crash detection)
- Lighting
- Parking
- Road Tolling

Smart Grid

- Monitoring and Control System for Energy Service Providers
- Wireless Communication Network (TETRA, LTE,. ..)

PROCESS & SAFETY

- ESA Software Engineering Standards (PSS-05-0), European Cooperation for Space Standardization (ECSS series), Spice4Space (S4S)
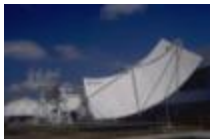
- Department of Defense (DOD Mil-STD-2167A, DOD Mil-STD-498), DO-178B/C, DO-254, ARP 4754, Arinc, RAMS, MDE, Ada, QA

- CENELEC norms for Railways (EN 50128, EN50126, EN 50129)

- ISO26262, Automotive SPICE, AUTOSAR, OSEK-VDX, RAMS, Design Review, QA

- ETSI norms, M2M, SDL (Telecommunications)

- CMMI, SPICE^{TM} (ISO/IEC 15504), Software Life Cycle processes (ISO12207)

MAIN CERTIFICATIONS

- ISO 9100:2003 since 2008 (L'Aquila site)
- ISO 9001 since 1994 (Det Norske Veritas), Vision 2008 since May 2009

- CMMI® Level 3 in Pisa in June 2010
- CMMI® Level 3 in Rome and Naples in May 2009
- CMM® Level 3 in Naples since 2004
- BOOTSTRAP (european version of CMM) maturity assessment run by SYNSPACE (D), June 1996: top 5% in Europe

- Automotive SPICE ™ level 2 by VOLKSWAGEN in 2006
- SPICE Assessment (ISO15504),"Assessment trials" by CNR in 1996
- Assessments for MUIS-B and ROSETTA run by ESA

- CENELEC Assessor Brandeburg, qualified by SciroTÜV and TÜV Rheinland Berlin

- Assessments: Sx-Galileo (hardware, 2012), FMC (best supplier 2009), Ansaldo STS, Northrop Grumman, ESA, ALENIA (1996), OTE (1996)

STANDARDS

- CMMI, SPICE™ (ISO/IEC 15504), Software Life Cycle processes (ISO12207)

- ESA Software Engineering Standards (PSS-05-0), European Cooperation for Space Standardization (ECSS series), Spice4Space (S4S)
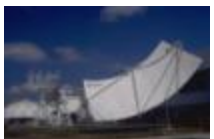
- Department of Defense (DOD Mil-STD-2167A, DOD Mil-STD-498), DO-178B, Arinc

- CENELEC norms for Railways (EN 50128, EN50126, EN 50129), IRIS

- WD26262, Automotive SPICE, AUTOSAR, GENIVI, OSEK-VDX

- ETSI norms, SDL (Telecommunications)

intecs

the Brainware Company

- ❖ **Maintenance of state-of-the-art competences** thanks to a continuous commitment in R&D activities

- ❖ **Study of innovative technology** in close cooperation with major European Universities and Research Centres

- ❖ **Experimentation of R&D results** in close cooperation with major European Industries

- ❖ **Main Funding Programmes:**
  - ➢ European Community's Framework Programmes
  - ➢ European Joint Technology Initiatives
  - ➢ Italian Research Programmes at national and regional level
  - ➢ European Space Agency Research Programmes
  - ➢ Agenzia Spaziale Italiana Research Programmes

- One of the Intecs main capacities acquired through
  - Well-established cooperation with major Italian and European industries, academic and research institutes
  - R&D projects partially funded from European and national organizations
- Applications to the domain of embedded systems
  - Model Based System Engineering, System and sofware co-engineering, Model Driven Engineering
  - Reuse and Domain Engineering
  - Component model, contract based, correct-by-constraction approches
  - Predictability, Dependability, Safety and Security, Contract refinement, Model Checking
- Focus on the Unified Modelling Language (UML) since 1996, and then on other OMG Standards (SysML, MARTE, etc.)

- ❖ System and Software Funtional Requirements Techniques, ESA/Estec Project, Prime Intecs
  - Model Based System Engineering Methodology for Space (MBSSE) and guidelines for system and software co-engineering based on OMG SysML
- ❖ Next Generation Requirements Engineering (NextGenRE), ESA/ESTEC Project, Intecs Prime
  - Semantic Wiki and integrated Model Based Requirement Engineering
- ❖ Functional Requirements and Verification Techniques for the Software Reference Architecture (FoReVer), ESA/ESTEC Project, Intecs Prime
  - Systematic approach for the enrichment of the MBSE process with the contract-based formal verification of properties, at different stages from system to software, through a step-wise refinement, and support for the Software Reference Architecture.
- ❖ Model Based Approach Research for Verification Enhancement through the Lifecycle of a System (MARVELS)
  - ➢ Improvement of the overall verification process of space systems through the usage of model-based methodologies, formalization of requirements, and the formal verification of properties

- ❖ Composition with Guarantees for High-integrity Embedded Software Components Assembly (CHESS), ARTEMIS Call 2008 Project, Intecs coordinator
  - Model driven and component-based engineering for high-integrity embedded systems (methodology and toolchain development), exploring dependability and predictability non functional properties
  - Multi-domain application for the space, telecommunications, railways and automotive
- ❖ Certification of Software-intensive Systems with Reusable Components (pSaferCer ARTEMIS Call 2010 Project, and nSaferCer ARTEMIS Call 2011 Project)
  - Model Drive technology for Composable and reusable safety certification
  - Multi-domain application for the aerospace, medical, construction equipment, railways and automotive
- ❖ Open Platform for EvolutioNary Certification Of Safety-critical Systems (OPENCOSS), FP7 Project,
  - Common certification language and platform
  - Multi-domain application for the avionics, telecommunications, railways and automotive

❖ Security and Safety Modelling (SESAMO), ARTEMIS Call 2011 Project, Intecs coordinator

- Component-oriented, model-driven approach, to jointly address safety and security aspects and their interrelation for networked embedded systems

- Guaranteed Component Assembly with Round Trip Analysis for Energy Efficient High-integrity Multi-core Systems (CONCERTO), ARTEMIS Call 2012 Project, Intecs coordinator

- Multi-domain architectural framework for complex, highly concurrent, and multi-core systems, where real-time, dependability, and energy management non-functional properties are addressed

- Design of embedded mixed-criticality CONTRol systems under consideration of EXtra-functional properties (CONTREX)

- Design of mixed-critical systems by developing predictable computing platforms and mechanisms for segregation between applications of different criticalities sharing computing resources, analysis and segregation of real-time, power, temperature and reliability extra-functional properties

- Cross-layer and multi-objective Programming approacH for next generAtioN heTerogeneous parallel cOMputing systems (PHANTOM), H2020, ICT-4-2015, Customized and low power computing
  - Multi-core, heterogeneous hardware platforms managed by a hardware-agnostic software platform, hiding complexity from the programmer, multi-dimensional optimization
- Safe Cooperating Cyber-Physical Systems using Wireless Communication (SafeCOP), ARTEMIS Call 2015 Project
  - Safety-related cooperating cyber-physical systems, characterized by use of wireless communication, multiple stakeholders, dynamic system definitions, and unpredictable operating environments
- Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems (AMASS), ARTEMIS Call 2015 Project
  - Assurance and certification tool platform for software-intensive critical systems, model-based development
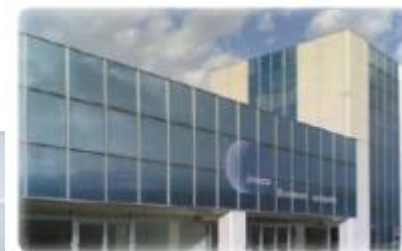
❖ Further than on System & Software Engineering, INTECS is developing R&D projects on a number of other emerging technologies in domain like

- Smart Systems
  - Infrastructures providing value-added services for inter-modal transportation and mobility

- Communications
  - Advanced approaches for the management of wireless communication networks

- Security
  - Sensors for the surveillance of sensitive areas

❖ Da oltre 40 anni INTECS a fornisce servizi e soluzioni a grandi aziende nei sistemi embedded.

❖ Da alcuni anni INTECS definisce e progetta anche sistemi per il mercato (prodotti).

❖ INTECS sta cercando collaborazione per nuove idee, con **università, enti di ricerca, start-up ed aziende specializzate** per agire come Integratore di Sistema per la realizzazione di nuovi prodotti innovativi.

❖ INTECS è in fase di forte espansione sui mercati storici di sistemi embedded per difesa, avionica, spazio, ferroviario ed automotive.

❖ INTECS sta organizzando in tutte le sue sedi dei Recruitment Days per i quali cerchiamo laureandi o laureati che siano interessati.

❖ INTECS è disponibile per organizzare interventi puntuali presso le Università e i Centri di ricerca per promuovere la INTECS e le tecnologie di riferimento industriali.

❖ INTECS è disponibile per l'organizzazione di stage

❖ Responsabile recruitment: *brunella.antodaro@intecs.it*

THANK YOU !

www.intecs.it