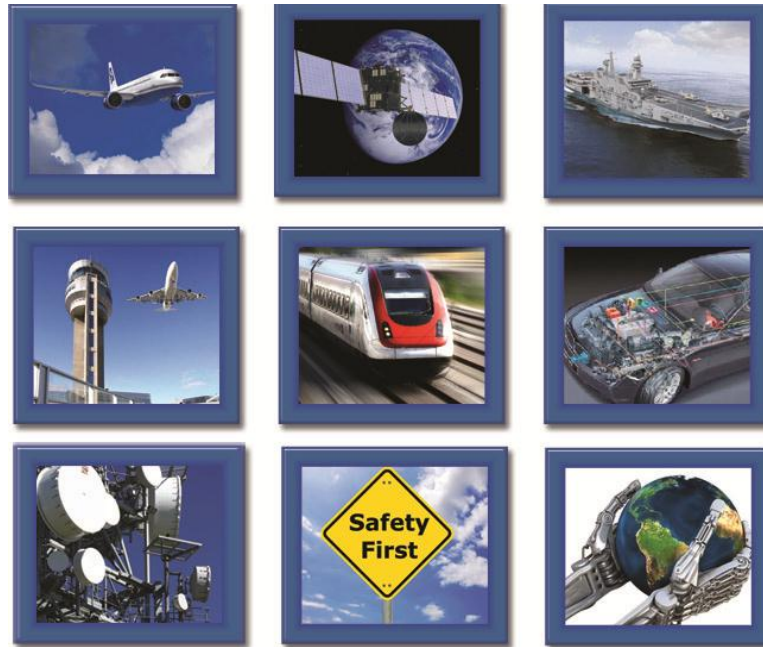




*the Brainware company*



# INTECS Presentation IWES 2017



# 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.**



the Brainware company

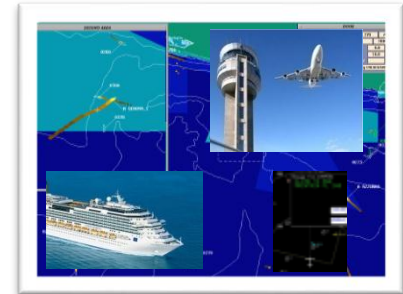
# INTECS IS HIGH-TECH SYSTEMS ACROSS ALL MARKETS



**AeroSpace  
(18%)**



**Defence  
(11%)**



**TrafficControl  
& Surveillance  
(5%)**



**Automotive &  
SmartSystems  
(15%)**



**Railway  
(32%)**



**Telecom.  
(15%)**



**Processes &  
Safety (4%)**



## Services



Software



IV&V



Engineering Processes



System Engineering



Safety & RAM



Hardware

1974

today

Embedded RT Systems



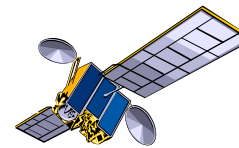
V&V techniques



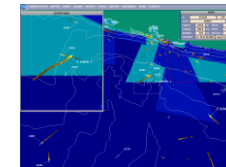
Model Based Engineering



Guidance Nav & Ctrl



HMI



FPGA

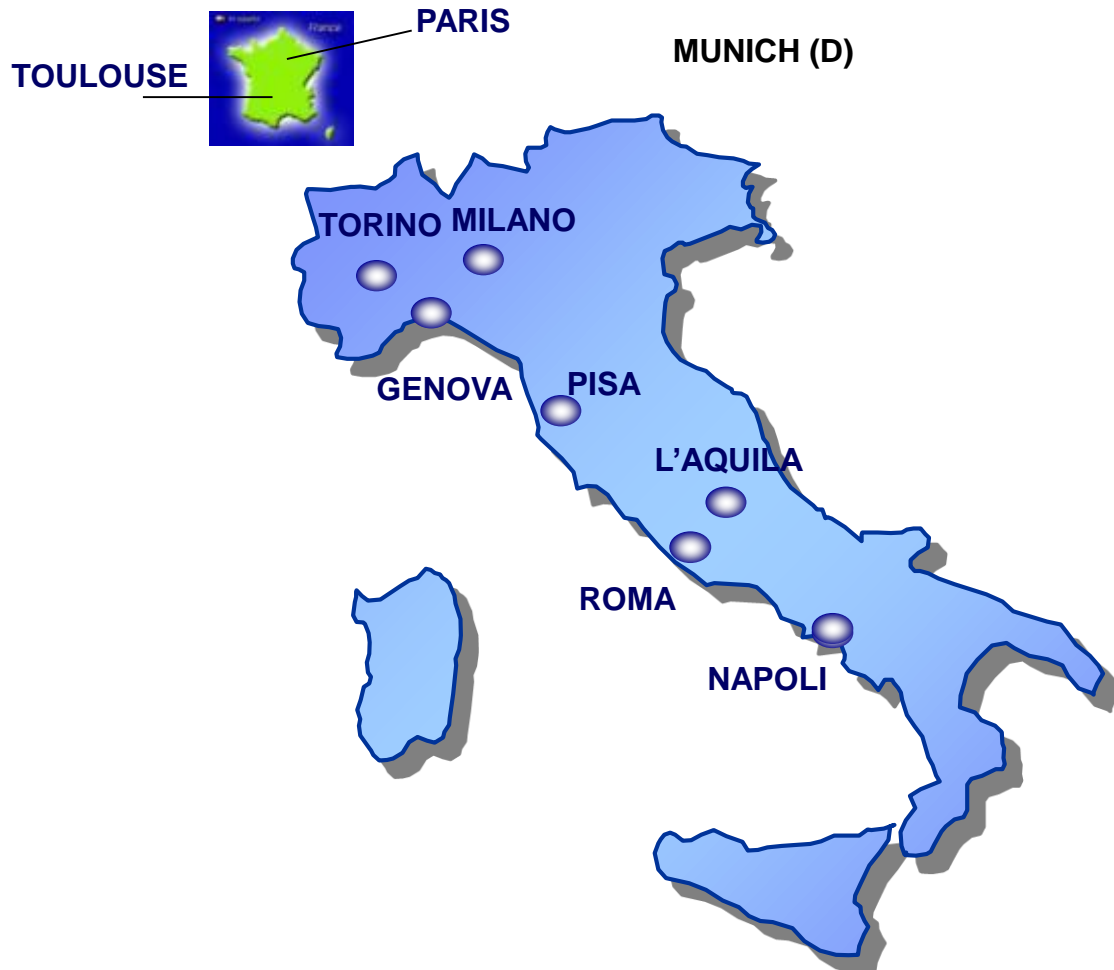


## Technologies



the Brainware company

# HIGH-TECH ENGINEERS ALL OVER ITALY, FRANCE and GERMANY



*About 500 Engineers*

# MAIN CUSTOMERS



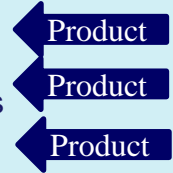
- ACEA
- Ansaldo STS
- Ansaldo Breda
- ASI (Ag. Spaziale Italiana)
- Biomerieux
- Brembo
- Bureau Veritas
- Coriant (ex NSN Optical)
- CGS
- Cobra
- Dragonwave (ex NSN Microwave)
- Ducati
- Elettronica
- ENI - R&M
- Ericsson
- Eurotech
- ESA (European Space Agency)
- Ferrari
- Fiat Auto
- Indesit
- Italcertifer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



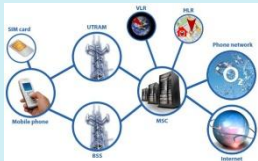
## Fixed networks



- 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
- EFAS**: Gateway between Gigabit Ethernet and legacy systems
- MCX**: Electro Optical Media Converter for BB communication



## Mobile networks



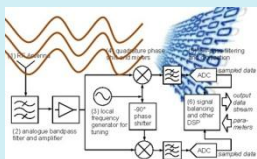
- Development , Integration & testing of Subsystem Devices (base stations, SCN, etc).
- Development of (sub)system emulators for validation. (base stations, SCN, etc)
- TETRA, VOIP x ATC, WiMax (firmware)

## 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





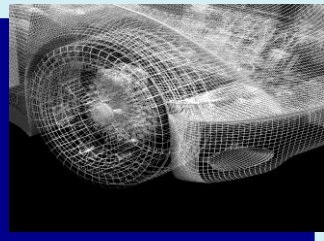
## Railway



- 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



## 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
- AUTOSAR consortium Premium member
- GENIVI consortium member
- **MICROSEK**: OSEK-VDX compliant RTOS







**Naval Systems**

- Processing, fusion and presentation of radar sensor data for the tracking of air and surface objects
  - Italo-French frigate "Horizon"
  - Italian aircraft-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 aircraft-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



## 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 Geographical 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 Software Receiver Soft-REC ESA)
- Personal Mobility Receivers
- GALILEO I&V (Local Test Station, etc.)

← Product



## 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), Formal methods



- 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™ (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 Brandenburg, 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)



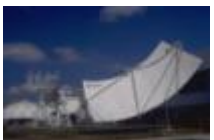
- Department of Defense (DOD Mil-STD-2167A, DOD Mil-STD-498), DO-178B, Arinc



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



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



- ETSI norms, SDL (Telecommunications)



**SIRIO** : is a safety related system (CENELEC SIL4) based on radar technology for detection of falling objects, in proximity of bridges or tunnel entrances/exits, along railway lines. Each SIRIO node is composed of 4 radar sensors and an outdoor cabinet, interfacing directly a signaling system and a remote monitoring centre.



**LTAXX**: is a turnkey solution for surveillance and environmental monitoring mission through remotely piloted lighter-than-air aerial platforms (i.e. blimps).



**Dejamm-R**: a monitoring system for the detection of JAMMING in Railway networks. The DEJAMM-R sentinels are autonomous devices that continuously monitor all the downlink and uplink GSM-R bands, which are used for ETCS Level 2 signaling in high speed rail systems.





# Intecs R&D Activities

- ❖ 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

- ❖ System and Sw Engineering is the Intecs main capacity acquired through
  - Well-established cooperation with major Italian and European industries, academic and research institutes
  - Applications to the domain of embedded systems (both as technology and as use case provider)
    - Model Based System Engineering, System and software co-engineering, Model Driven Engineering
    - Component model, contract based, correct-by-construction approaches
    - Predictability, Dependability, Safety and Security,
    - Contract refinement, Model Checking,
    - Assurance and Certification
    - Reuse and Domain Engineering
  - Focus on the Unified Modelling Language (UML) since 1996, and then on other OMG Standards (SysML, MARTE, etc.)
- ❖ In addition, 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

# Interests for Future Projects

- ❖ Cyber Physical Systems of Systems
- ❖ IoT/Cloud-enabled/FOG computing
- ❖ Big Data applications
- ❖ Cybersecurity
- ❖ Industry 4.0
- ❖ 5G Sperimentation

# System and Sw Engineering ESA Studies

- ❖ System and Software Functional 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

# System and Sw Engineering EC Projects (1/2)

- ❖ 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 (OPENCROSS), FP7 Project,
  - Common certification language and platform
  - Multi-domain application for the avionics, telecommunications, railways and automotive

# System and Sw Engineering EC Projects (2/2)

- ❖ 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

# System and Sw Engineering Current Projects

- ❖ 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 development platform, hiding complexity from the programmer, with multi-dimensional optimization
- ❖ Safe Cooperating Cyber-Physical Systems using Wireless Communication (SafeCOP), ECSEL Call 2015 Project
  - Development and certification approach for safety-related CO-CPS, 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), ECSEL Call 2015 Project
  - Architecture-driven, multi-concerns assurance and certification open tool platform for software-intensive critical systems
- ❖ MegaModelling at runtime -scalable model-based framework for continuous development and runtime validation of complex systems (MegaM@art), ECSEL Call 2016 Project
  - Methods and tools for continuous system engineering cycle and traceability between design and runtime
- ❖ Aggregated Quality Assurance for Systems (AQUAS), ECSEL Call 2016 Project
  - Solutions for Safety/Security/Performance Co-Engineering (CE)



# Job Opportunities in Intecs

# Job Opportunities in Intecs

- ❖ To face the increasing demand from the relevant business markets where INTECS has been operating with professional attitude, INTECS has to strengthen the technical teams nationwide
- ❖ We have open positions for all our branches for candidates holding a Master degree in
  - Computer Sciences and Engineering,
  - Automation and Control of Complex Systems
- ❖ We select and provide training to
  - Embedded software programmers
  - Developers of Client/Server application for our domains
  - Model developers
  - System managers and system integration experts, Test and validation engineers
- ❖ We offer Theses, Stages and Contract proposals for recruitment at Intecs
- ❖ Contact:
  - Dott.ssa Brunella Antodaro
  - Responsabile U.O. Ricerca & Selezione
  - Phone +39 050 9657 411 (switchboard)
  - Phone +39 050 9657 532 (direct)
  - Fax +39 050 9657 400
  - email: [brunella.antodaro@intecs.it](mailto:brunella.antodaro@intecs.it)
  - Visit our web-site: [www.intecs.it](http://www.intecs.it)

# Recruiting Events

- ❖ INTECS is organizing events aimed at brilliant graduates, interested in taking a career in our company, to promote INTECS and industry reference technologies
  - Next Event: Workshop Automotive Recruiting Day in Turin, October 17-18
    - ✓ The workshop will focus on the following topics:
      - Principles of operation of internal combustion engines
      - Control of spark ignition and spark ignition engines
      - Communication protocols LIN, CAN, FlexRay
      - Electrical hybrid propulsion or vehicle propulsion requirements or Concepts and architectures
      - Electric machines and accumulators
- ❖ INTECS is available to organize other timely events at Universities and Research Centers



**WORKSHOP  
AUTOMOTIVE**

CONTROLLI ELETTRONICI NELLE  
APPLICAZIONI AUTOMOBILISTICHE

**&**

**RECRUITING  
DAY**

**TORINO 17 -18  
Ottobre 2017**

Il Workshop **GRATUITO** tratterà principalmente i seguenti temi:

- Principi di funzionamento dei motori a combustione interna
- Controllo di motori ad accensione comandata e accensione spontanea
- Protocolli di comunicazione LIN, CAN, FlexRay
- Propulsione ibrida elettrica

**17  
OTTOBRE**

Workshop **Controlli elettronici nelle applicazioni automobilistiche** con attestato di partecipazione presso l'hotel NH Torino Centro, C.so V. Emanuele, 104 (TO) a partire dalle h. 9:30 e si concluderà alle 17:30.

**18  
OTTOBRE**

**Selezione**, per inserimento diretto in Azienda. Ai colloqui di selezione, che si terranno presso la Sede Intecs di Torino (Strada del Drosso n. 33/8), verranno invitati tutti i partecipanti al Workshop.

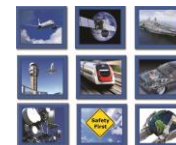
**Requisiti di partecipazione:**

- Aver conseguito o essere in procinto di conseguire un titolo di laurea in una delle seguenti discipline: Ing. Informatica, Ing. Elettronica, Ing. Meccatronica, Scienze dell'Informazione, Informatica
- Avere ottenuto o aver una previsione di voto non inferiore a 92/110
- Competenze di base di modellazione
- Forte interesse per le tecnologie elettroniche avanzate applicate al mondo Automotive
- E' gradita una buona conoscenza della lingua Inglese o Tedesca

Candidati inviando il tuo CV a **recruiting@intecs.it** riportando nel SUBJ "Workshop & RD - AT - <nome.Cognome>

I candidati ammessi a partecipare riceveranno una mail di conferma.

Deadline per l'invio delle domande di partecipazione: 13 Ottobre 2017.



# THANK YOU !



***[www.intecs.it](http://www.intecs.it)***