



M&S Projects from Simulation Team



Liophant Simulation



M&S Net



McLeod Institute of Technology and Interoperable M&S
Genoa Center

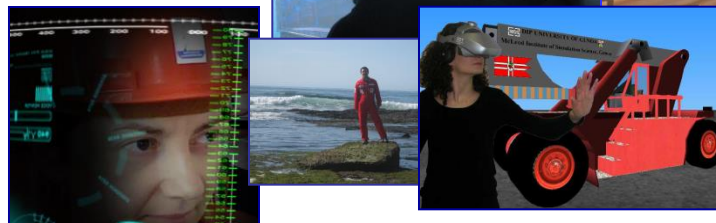
Agostino G. Bruzzone

agostino@itim.unige.it

www.simulationteam.com

www.liophant.org

www.itim.unige.it



DIPTeM
University of Genoa





Who Are We?

Universities, Research Centers and Companies operating worldwide in synergy for developing Innovative Solutions with a particular focus in Modelling and Simulation



DIME
Università
di Genova



Liophant
Simulation



CentraLabs
Cagliari



CSU
Australia



CIREM
Università di Cagliari



Ant@ptima
we speed up your business



VIRTUALLY



MSC-LES



Mik
Riga TU



Universidad
de la Rioja



SimCenter Universitat
Autònoma de Barcelona



LOGIXTICA



DIPMEC
Università Calabria



Rio de Janeiro
Brazil



Perugia
Università di Perugia



LSIS
Marseille



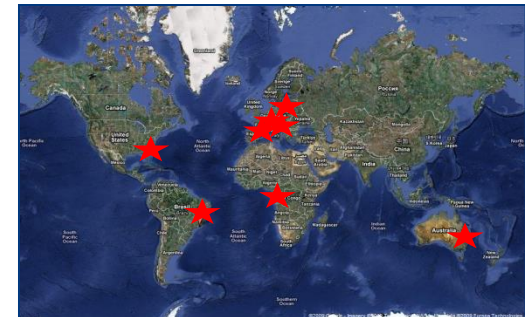
IMS-LAPS
Univ. Bordeaux



McLeod Institute of
Technology & Interoperable
Modeling Simulation Genoa



SPIRAS Russian
Academy of Science





McLeod Institute of Technology and M&S M&S Net Genoa Center

Email: agostino@itim.unige.it

URL: www.mcleodinstitute.org
www.m-s-net.org



The research group of DIME of *Genoa University* is active from '60 in Simulation applied to Industrial Engineering and is cooperating with M&S Net and MITIM

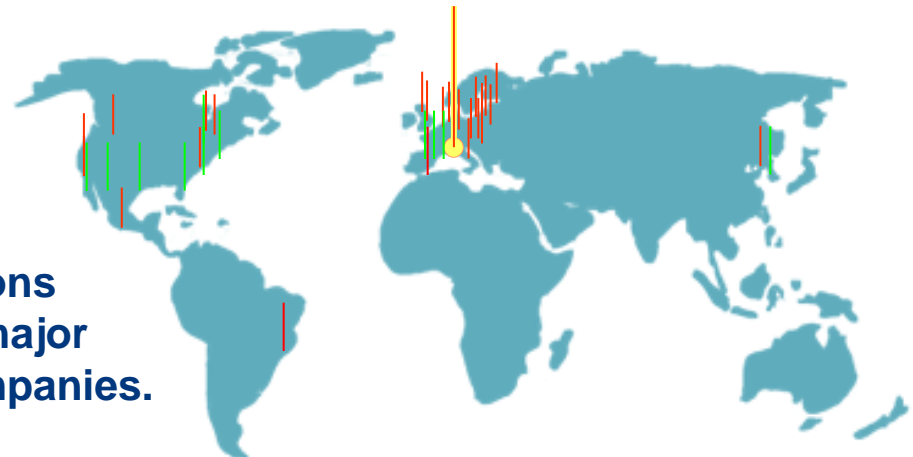
The activities involve modeling, simulation, VV&A and analysis of Industrial Applications and Services (design, re-engineering, management, training etc.)

as:

- Chemical Facilities
- Harbor Terminals
- Manufacturing
- Public Transportation

- Power Plants
- Public Services Environment
- Assembling
- PM
- Logistics

The Department staff is in touch world-wide with the simulation community and is present actively to conferences, exhibitions and working meetings with the major Associations, Agencies and Companies.



34 M&S Net Centers World-Wide



Simulation Team MITIM DIME

The Simulation Team - MITIM DIME of *Genoa University* carries out many industrial projects in cooperation with the large corporations and Small and Medium sized Enterprises; some example of recent industrial simulation project are following:1

ENI Fleet Management Planning & Scheduling

Group Chemical Plant Logistics Optimization

Ansaldo Plant Service Management and Optimization

LAMCE Oil Platform Simulation and Augmented Reality

EDA Decision Support for Country Reconstruction Activity Planning

Ford Motor New Production Line Design Based on Simulation



Members of MISS are appointed in several positions in simulation community such as:

- General Director M&S Net (34 M&S Centers Worldwide)
- President Simulation Team (20 Centers Worldwide)
- Chairman of Technical Chapter in SCS and Past Associate VP
- Member of NATO SAS, MSG, and NIAG, Project Leader for Marine M&S





DIME - University of Genoa

DIPTM was founded in 1997 as evolution of the Institute of Technology and Industrial Management (ITIM) that was operative from '60. In 2011 DIPTM evolved in DIME and it is currently composed by about 80 faculty members, 15 technicians and administrative, plus several PhD Students, external Researchers and Consultants. DIME teachers are involved in Undergraduate, Postgraduate and Professional activities in Engineering, Management.

DIME active in R&D Projects for major Institutions, Companies and Governmental Organisations. DIME co-operates actively with major Excellence Centers World-Wide.





University of Genoa: an Overview

The University of Genoa is one of the oldest in Italy and in the World (founded in 1471 AD), it is located in middle of Italian Riviera.

The students are about 40,000 (about 8,000 new entries), and the engineering departments has about 7,500 students (12% in Savona Branch Departments); in effect the Savona Campus Savona holds about 1,000 Engineering Students.

That campus is located about 2 km from Savona Downtown, in an old complex of barracks recently converted into new University Buildings (over an area of 200,000 m²).

For further Information about
the University of Genoa:

<http://st.itim.unige.it>
<http://www.unige.it>





Savona Campus & Facilities

The University of Genoa includes a new campus in Savona about 2 km outside Downtown; bus services and large parking areas guarantee easy access.

That structure has been obtained transforming Army barracks; today the campus includes a big park with facilities such as tennis courts and sport grounds.

The campus holds Depts on Engineering, Economy and Education; new laboratories have been realised by Simulation Team (Cybersar Mobile Lab, HLA Lab).

Facilities for Professional Congress Centres are available in the surroundings



Savona Campus



Simulation Team Labs



Congress Centre





Partners & Spin-Off



Former Students and Researchers from MISS DIPTM Simulation Team created over the years start up companies that currently cooperate in M&S (i.e. MAST srl, Cal-Tek srl, Virtuality, DLM, AntOptima, Etea, etc); these companies are devoted to drive Innovation to Success in a wide spectrum of Application for different Business Sectors, Companies, Corporations, Agencies, Societies and Governmental Services and to put *Modeling and Simulation* to work by creating Outstanding Solutions Essential to a Better, Safer, Healthier and Wealthier Life operating worldwide.



These Partners offer a wide range of innovative products and services for M&S markets including:

- Aerospace
- Defense
- Electronics
- Engineering
- Safety and Security
- Retail
- Environment
- Logistics
- Service to the Society (nutrition, health care)
- Petrochemical
- Energy and Power
- Shipping & Transportation





Liophant Simulation

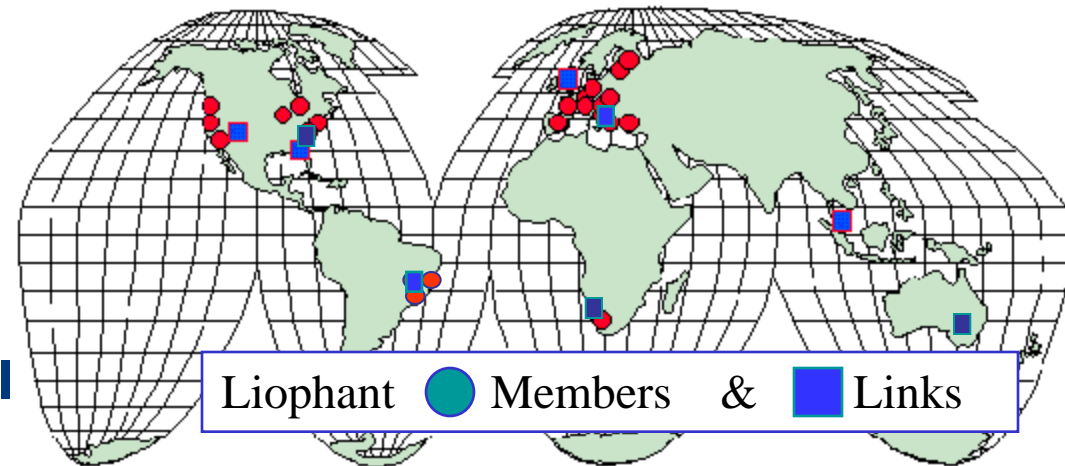
Email info@liophant.org

Simulation Team



The *Liophant Simulation* involves World-Wide over 120 Scientists and Technicians working in Companies and Academia. The *Liophant* develops Advanced R&D Projects for Real Applications:

The *Liophant Simulation* promotes international Cooperations and exchanges with Excellence Centers World-Wide (i.e. NCS, KSC, VMASC, KPI



www.liophant.org



The International Activity of Liophant Simulation 2014





The International Activity of Liophant Simulation 2015



Counter Terror Expo
London, May
Franzinetti

Défense, Paris
December
Murino

Exchange Activity
PhD, Master, BS
I3M, Bergeggi, Sept.
Di Matteo, Maglione,
Franzinetti, Mmurino

STO CMRE, SP
July-December
Di Matteo, Carrera, Piccinini

SIMCJOH
Rome, June
Di Matteo, Maglione,
Poggio, Bertolucci

NATO CAX Forum, Vicenza,
October, Maglione, Murino

NATO VV&A, Rome
November, Maglione

CWIX JFTC
Bydgoszcz, May
Oddone

NATO STO, Paris
July, Maglione

SCSC, Chicago
July, Di Matteo

NMSG, Munich,
October
Oddone

Beihang University, Beijing
Padovano

Loxistica
Singapore
January-December
L. Bucchianica

IITSEC
Orlando, December
Di Matteo, Maglione, Been

Rutgers Univ.
Padovano

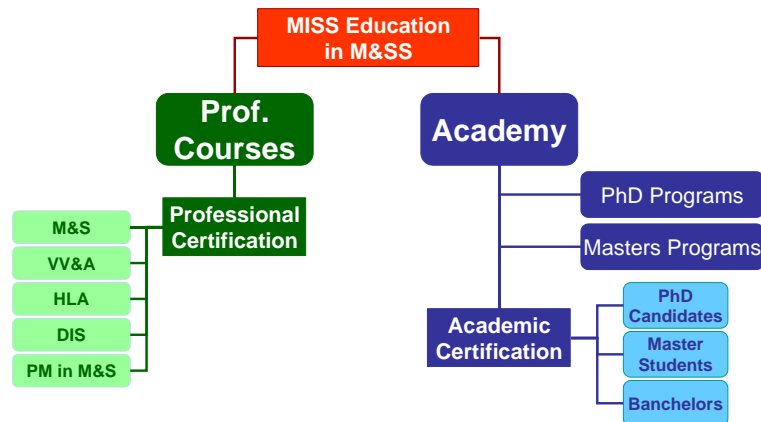
ICAMES, Istanbul, May
Di Matteo, Maglione, Molinari, Vetrano



Simulation Technology Transfer



Since 2000 Simulation Team - DIPTeM support Professional and Academic MITIM International M&S Certification Program:



Course Location



Lecturing



Team Working & Exercises

The Lecturers included experts from major excellence centres (i.e. Boston College, Genoa University, NASA, DMSO, National Center for Simulation, SAIC, Aegis, CSY., Riga TU, UCF, McLeod Institute of Technology and Inter.M&S). The Professional course attendance (PM >100, M&S 60, HLA 40, VV&A 20) included Companies (i.e. Piaggio Aero Industries, Alenia Aeronautica, Alenia Marconi, SIA, Fincantieri, COOP), Academia (Pol.Torino, TU Delft, Univ.Marseille, Pol.Milano, Univ.Firenze, Univ.Bari, Univ.L'Aquila, etc.) and National and International Services (i.e. Army, Navy, Air Force, Joint Forces)



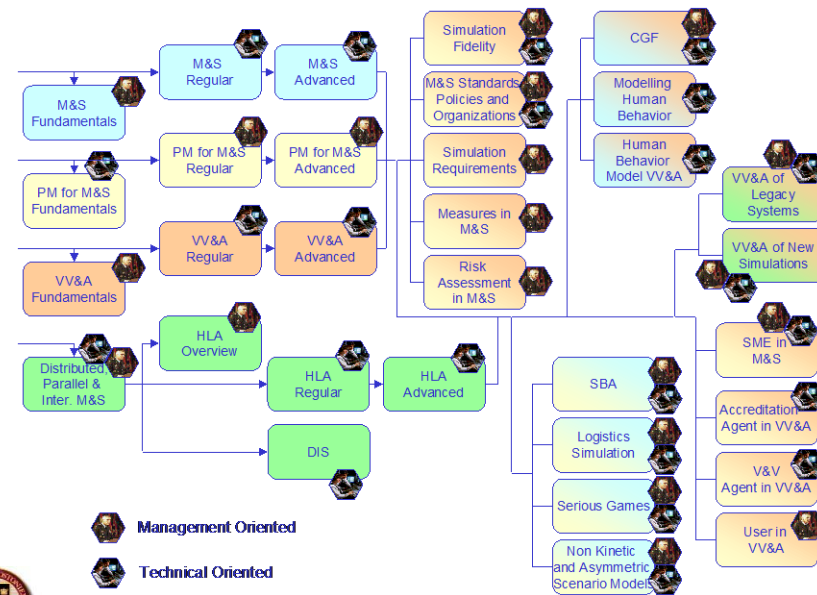
SIREN Professional Courses



The professional courses have been organized since 2000 for World-Wide professional experts and technicians, in English, Italian and French, including:

- PM: Project Management for M&S
- M&S: Modeling & Simulation
- Interoperability M&S
- HLA: High Level Architecture
- VV&A: Verification, Validation & Accreditation
- RCM: Reliability Centered Maintenance

The courses include lecturing and exercises; teachers are usually world wide experts from major excellence centers (i.e. Boston College, MITIM Genoa University, NASA, DMSO, National Center for Simulation, SAIC, Aegis Technologies, CSU, Riga TU, UCF, M&S Net, etc.).





VELA

Virtual Environment, Live systems and Augmented reality

VELA, Virtual Environment, Live systems and Augmented reality, is an innovative approach that allows by using new technologies to improve Safety through Virtual Environments, Augmented Reality & Phenomena Simulation. VELA is an approach to support:

- **Safety & Security Assessment**
- **Training**
- **Operational Support**



Developed in Cooperation
with Simulation Team





MOSES

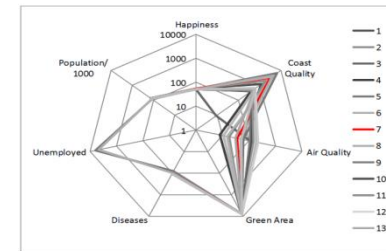
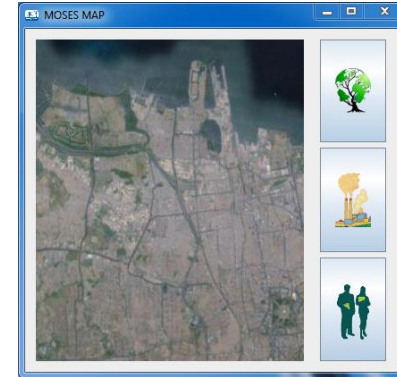
Modelling Sustainable Environments through Simulation



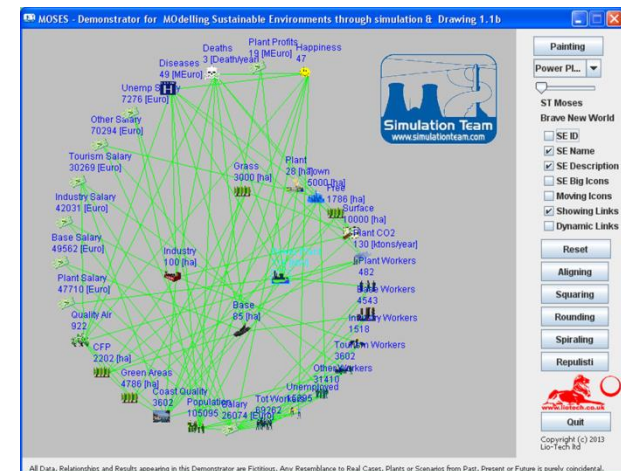
tenova



PAUL WURTH



MOSES is a simulator reproducing the impact of actions over an urban environment. The refurbishment of a Power Plant, the redesign of the port and industrial activities as other actions on the area affects the Economical, Environmental and Social Sustainability. The simulator allows to analyze the interactions among many variables and it is used to support training and education. MOSES has been developed by Lio-Tech in synergy with Simulation Team, Industries and Institution in relation to the organization of interactive experiences for International Master Students and Professional Engineers working with Genoa University, Dupont, Tenova, PW etc. the Model is used within Role Play Games over confrontation between Power Plant Investors and Public Authorities in order to negotiate Industrial Offsets and conditions to finalize a sustainable and profitable solution for both sides



DIME

Università di Genova

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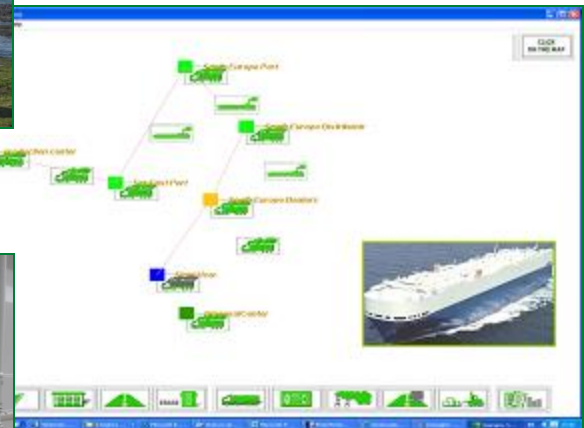
GreenLog Simulators



Simulation Team developed GreenLog Simulators for Analyzing Production, Logistics and Supply Chain.

GreenLog is a Web Based Simulation Engine devoted to evaluate Costs and Environmental Impacts of Productive, Logistics and Transportation Elements of the Supply Chain and Specific Modules have been developed for focusing on specific aspects:

- GreenLog Port
- GreenLog Ship
- GreenLog Crane
- GreenLog Warehouse
- GreenLog Train
- GreenLog Air
- GreenLog Heavy Haul





GREENLOG Project

Green Logistics Project

GreenLog is a web framework combining simulation and analysis techniques for self evaluating the Supply Chain efficiency in term of Costs, Quality and Environmental Impact.

The GreenLog was developed by Simulation Team for supporting a Joint Venture on Green Logistics coordinated by Assologistica in cooperation with several major production, logistics and distribution companies operating in Italy



Cultura • Formazione
Assologistica

CAMPARI

Mars

SONY

CRAI

coop

DHL

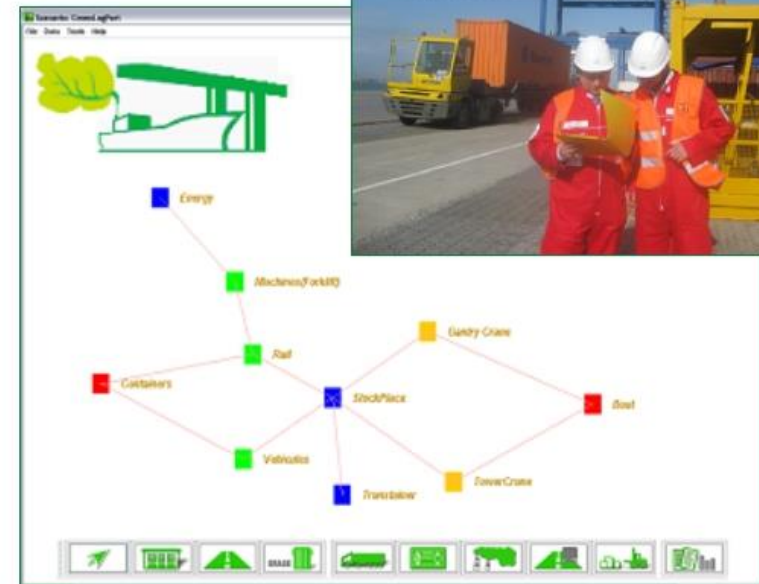


GREENLOG Port

GreenLog Port Simulator

GreenLog Port is a specific Simulation Module devoted to support estimation of Environmental Impact in Ports

- Garbage & Port Waste
- Dredging
- Dust
- Noise
- Ship Air Emissions
- Air Quality
- Hazardous cargo
- Bunkering
- Port development
- Ship Discharge



*Developed in Cooperation
with Simulation Team & DIPTM*





GREENLOG Ship

GreenLog Ship Simulator

GreenLog Ship is a specific Simulation Module devoted to analyze the Environmental Impact of the Ship for supporting monitoring, alternative evaluation, saving and benefits from different solution in use, handling, operating as well as in Ship Design GreenLog Ship Includes Air Emission, Consumption, Ship Paints, Garbage/Waste Disposal, Noise, Ship Discharges, Hazardous Cargo and Spills



*Developed in Cooperation
with Simulation Team & DIPTM*



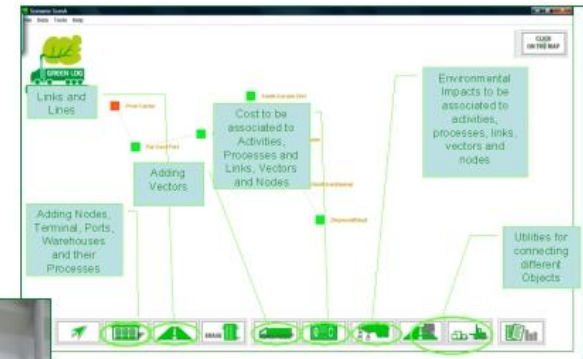


GREENLOG Crane

GreenLog Crane Simulator



GreenLog Crane is a specific Simulation Module devoted to analyze the Environmental Impact of Cranes and Handling Devices considering Operative Costs and Environmental Impact. GreenLog Crane allows to estimate the benefits provided by innovative solutions in terms of power saving, oil spill reductions, better safety procedures and higher performances.



*Developed in Cooperation
with Simulation Team & DIPTM*



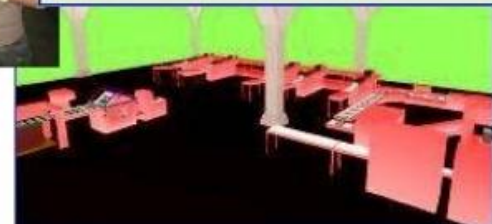
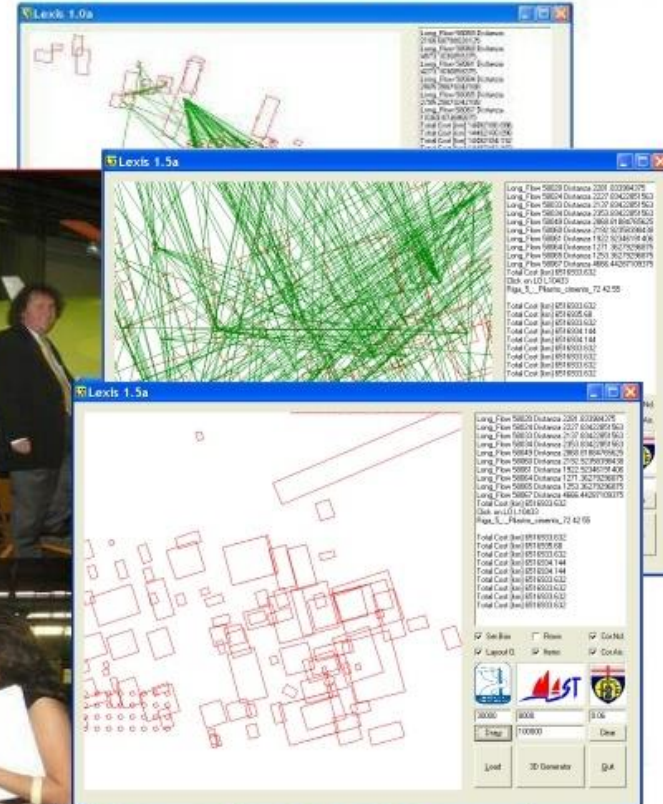


LEXIS

Layout Excellence Integrated Simulation



Developed in Cooperation with DIPTEM University of Genoa



LEXIS (Layout Excellence Integrated Simulation) integrates Layout Optimization based on Genetic Algorithms, Modeling & Simulation & Virtual Reality. LEXIS was applied with success to new large Production Facility for Aerospace Industry. The system allows to consider costs, distances, times and all different production processes and internal and external logistics solutions

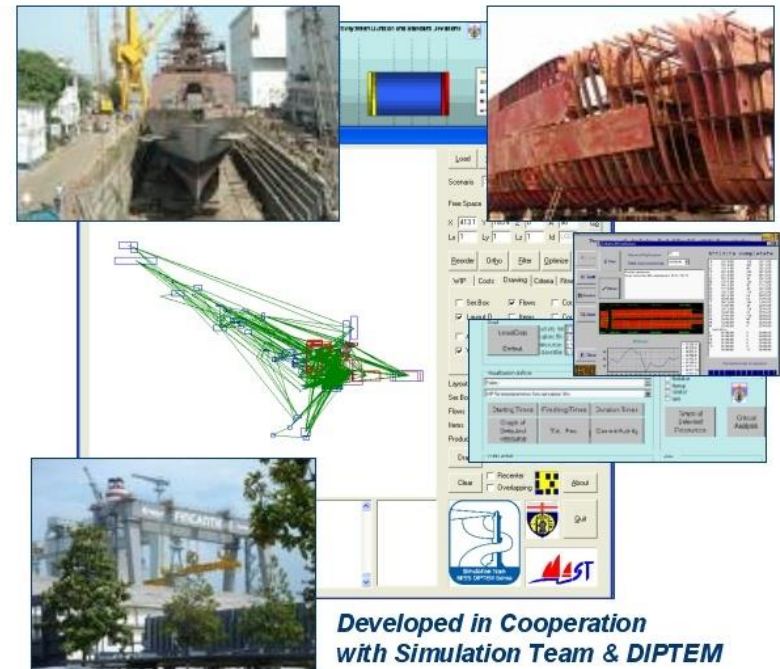




LEXIS for Ship Yard Constructions



LEXIS (Layout Excellence Integrated Simulation) represents a solution for **Optimizing Space, Planning and Operations in Ship Yard Constructions** as well as its management.



*Developed in Cooperation
with Simulation Team & DIPTM*



LEXIS for Port Terminals



LEXIS (Layout Excellence and Integrated Simulation) represents a solution to Optimize Terminal Layout and Area Assignments by combining a Smart Optimization Framework with an Interactive Dynamic Simulation of the Processes. LEXIS includes possibility to consider external areas and outsource services



Developed in Cooperation
with Simulation Team & DIPTM



Email: info@mastsrl.eu

URL: www.mastsrl.eu



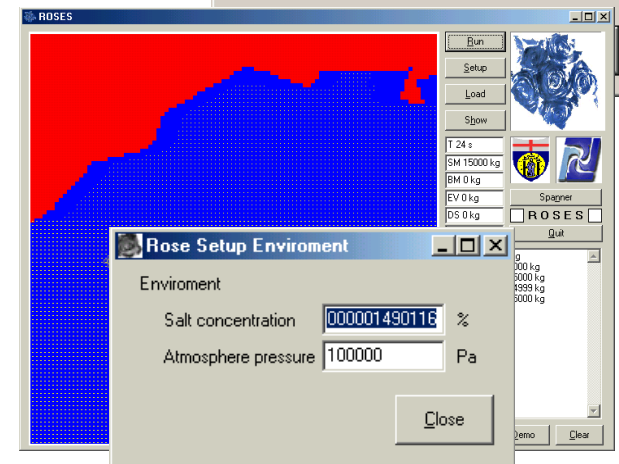
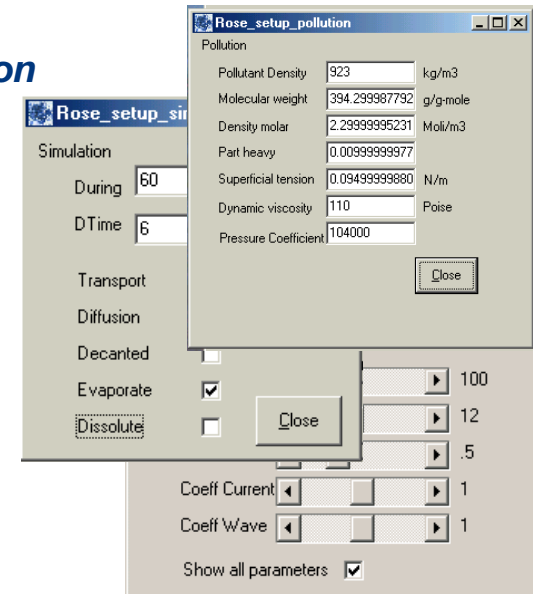
ROSES

Reaction to Oil Spill Emergency and Simulation

The project is devoted to create an Oil Spill Simulator for CETENA including countermeasure models.

The Simulator was validated in relation to historical data available from previous cooperations (i.e. MESA, Kuwait University, etc.) and existing databases (i.e. Istituto Idrografico Italian Navy) in order to guarantee the result fidelity.

Roses reproduces both the oil spill physical phenomena and the countermeasures actions in order to provide estimations about risks, policy effectiveness and standing operating procedures.





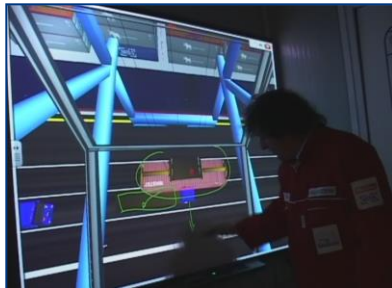
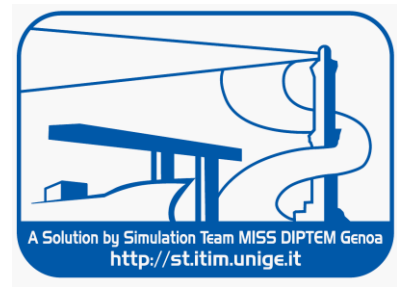
Interoperable Virtual Simulators



The Simulators developed by Simulation Team are an important support in Training both Operative Resources and Decision Makers. The Interoperability of our simulators is based on state of art standards (i.e. HLA High Level Architecture) and emphasize in addition to traditional stand-alone training in Operating, even Concurrent Cooperative Training in Operations and Policies; Simulation Team collect long experience in Professional and Executive Training.



ST_PT & ST_RS Simulators



This new generation of simulator is mobile, real-time, scalable and interoperable and compliant with state of art technology and standards

Shelter & Facilities

ST_PT Crane Sim

ST_PT Truck Sim





Atout of our Virtual Simulation



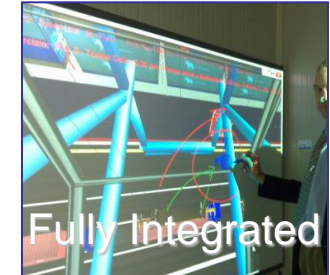
Training & R&D



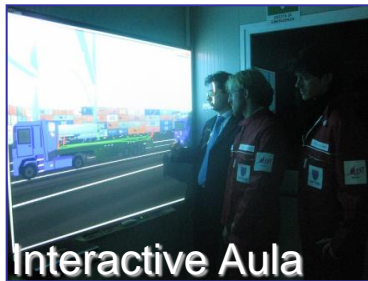
Cave H270° V130°



Containerized



Fully Integrated



Interactive Aula



On-Line
Action Review



HLA Federation



Full Motion,
Sound
& Vibrations



Real-Time
Distributed
Simulation



Bio-measures
Integrated in
Simulation



Strong
VV&A



Scalable
Solutions



ST_RS: Truck Simulation



The **ST_RS** is an Innovative Interoperable Truck Simulator fully integrated with **ST_PT** and Virtual Port; it provides opportunities for Training, Operative Planning and Terminal Procedure Redesign and Re-Engineering

ST_RS is fully containerized real-time distributed HLA Truck Simulator with Port & Inland Terminal and External Scenarios. **ST-RT** is integrated in a 40' High Cube Container ready to be used on site immediately after arrival.

ST_RS Simulator allows to operate Trucks in Terminal and over External Roads within a Virtual World by an immersive Cave (270 ° Horizontal and 130° Vertical), reproducing Sounds, Vibrations and Motion.

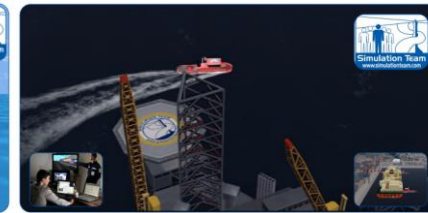
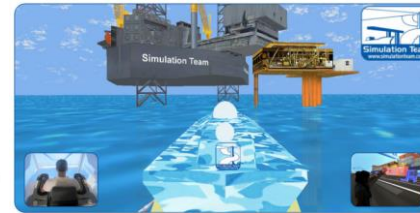
ST_RS includes a Full-Scope Simulation for Training Truck Driving, Logistics Procedures, an Integrated Class Room, the Instructor Debriefing Room, and secondary Interoperable Simulators of Different Cranes Cranes, Biomedical Module for Ergonomic and Stress Level Enhancement.

ST_RS World is tailorable for each Terminal Scenario, Truck, Procedure and Equipment.

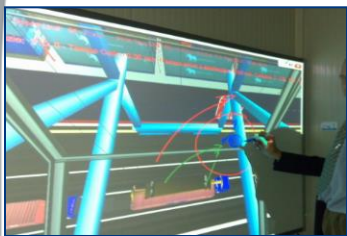




ST_VM: Virtual Marine



The ST-VM is the ultimate Marine Simulator developed by Simulation Team and includes many different Marine components, equipment and platforms as well as New Solutions for Terminal Design, Operator Training, Safety and Security, Procedure Definition, Equipment Design and Virtual Prototyping



ST-VM is fully containerized real-time distributed HLA Simulator reproducing Port Operations. ST-VM is integrated in a 40' High Cube Container ready to be used on site immediately after arrival.



ST-VM Simulator allows to operate all the different Marine Devices in a Virtual World by an immersive Cave (270° Horizontal and 150° Vertical), reproducing Sounds, Vibrations, Motion in all weather conditions

ST-VM includes a Full-Scope Simulation for Training Operations & Procedures, an Integrated Class Room, the Instructor Debriefing Room, and secondary Interoperable Simulators of different Marine equipment with other modules (i.e. Biomedical Module for Safety, Ergonomic and Posture Enhancement).

ST-VM World is customizable for each Platform, Port, Crane, Procedure and Equipment.





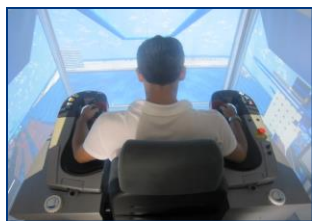
ST_VP: Virtual Port Simulation



The **ST-VP** is the ultimate Port Crane Simulator developed by Simulation Team and includes all the different crane types and New Solutions for Operator Training, Safety and Security, Procedure Definition, Equipment Design and Virtual Prototyping



ST-VP is fully containerized real-time distributed HLA Simulator reproducing Port Operations. ST-VP is integrated in a 40' High Cube Container ready to be used on site immediately after arrival.



ST-VP Simulator allows to operate all the different Port Cranes in a Virtual World by an immersive Cave (270° Horizontal and 150° Vertical), reproducing Sounds, Vibrations, Motion in all weather conditions

ST-VP includes a Full-Scope Simulation for Training Operations & Procedures, an Integrated Class Room, the Instructor Debriefing Room, and secondary Interoperable Simulators of all the Port Cranes and a Biomedical Module for Safety, Ergonomic and Posture Enhancement.

ST-VP World is customizable for each Port, Crane & Procedure and Eq



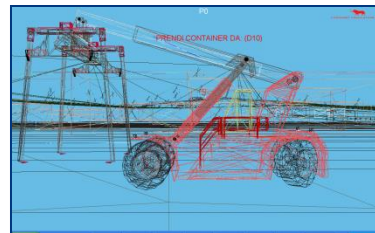
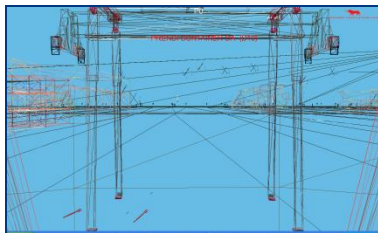


Virtual Prototyping



The Simulation Team Solutions are very effective as support for Virtual Based Design and Prototyping measuring Real Overall Performances in the Virtual World by considering dynamic interactions among all the Elements and Entities.

Experience was carried out in Equipment, Control and Man-Machine Interface Re-Engineering





Virtual Degenerative Operator Conditions

Simulation Team Solutions is proposing to start up a new project for Modeling the Degenerative Perception of Humans in Critical Conditions combining Simulation and Biomedical Measures. The Goal is to reproduce the Operator Perception under high stress or fatigue, or upon drug/alcohol abuse for creating a Virtual Framework devoted to develop possible MMI Aids and support definition of policies and regulations





CRYSTAL

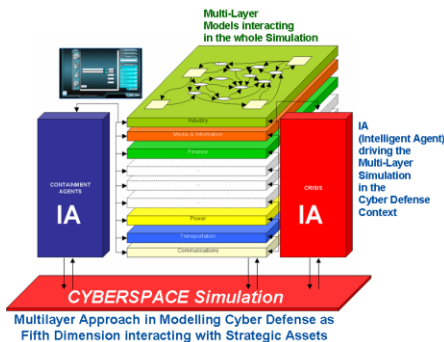
Cyber Reality Simulation for Threat Assessment and Defense Learning



Simulation Team



The CRYSTAL is a research coordinated by Genoa University. CRYSTAL Goals is to develop a simulation framework able to simulate Cyber Defense scenarios related to the Different Layers representing Strategic National Assets (i.e. energy, communication, finance, transportation); CRYSTAL is a modern interoperable architecture allowing a modular approach aimed at advancing the research in a Cyber Defense by using a federation of interoperable stochastic simulators driven by IA-CGF (Intelligent Agents Computer Generated Forces).





CUMANA

*Cooperative/Competitive Utility for Management
and Advanced Networking skill Acquisition*

CUMANA is a Web Multiplayer Game that provides the opportunity to play interactively a cooperative/competitive game, in a distributed environment where different “Managers” operate concurrently with benefits and penalties connected to both common and individual objective achievements related to their role in their Corporation.

The main goal is to share information in order to support Decisions Making in a Corporation Framework based on market reports affected by risks

The Identification of the market event in time is the key for individual success of each player as well as the overall corporation, while risks not properly addressed generate losses for the whole players



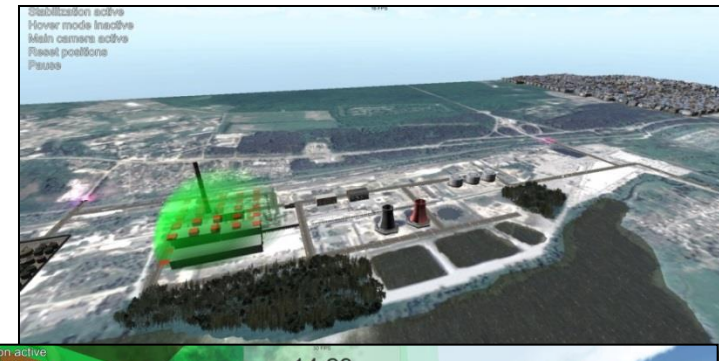


IDRASS

Immersive Disaster Relief and Autonomous System Simulation



IDRASS (*Immersive Disaster Relief and Autonomous System Simulation*) is a MS2G (Modeling, interoperable Simulation & Serious Game) operating in multiple modes: standalone, federated in HLA, integrated through IoT (Internet of Things) to support Education and Training. IDRASS has been applied to different cases including Accidents in Industrial Facilities, Nuclear Plants, CBRN attacks, anti-Terrorism, CWA and RDD. IDRASS is an interoperable real and fast time simulator.



*RDD Radiological Dispersal Device
CWA Chemical Weapon Agent*

DIME *HLA High Level Architecture*

Università di Genova

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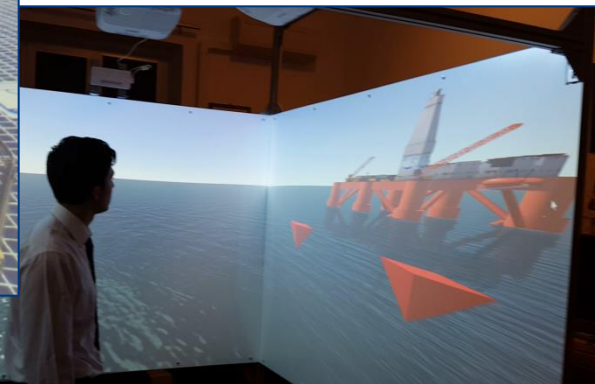
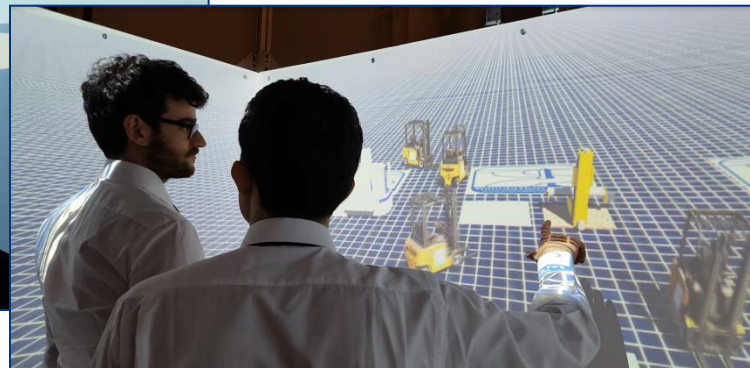
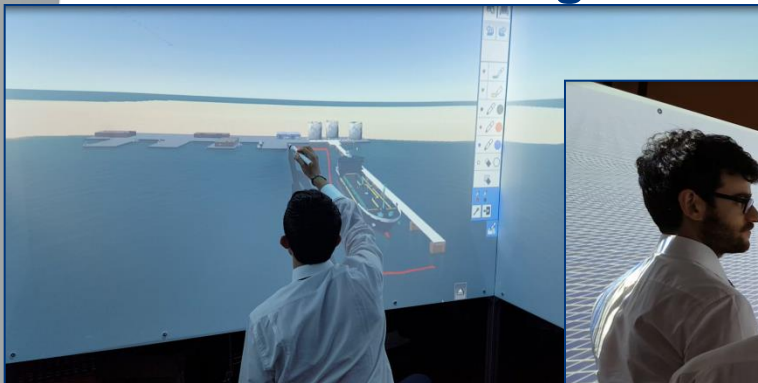
SPIDER

Simulation Practical Immersive Dynamic Environment for Reengineering



The SPIDER (Simulation Practical Immersive Dynamic Environment for Reengineering) is an innovative Interactive and Interoperable CAVE (Cave Automatic Virtual Environment) developed by Simulation Team. The basic configuration is compact (just 2m x 2m x 2.6m) and could be embedded within a standard Container and integrated in any interoperable simulator.

The SPIDER is interactive through touch screen technology.



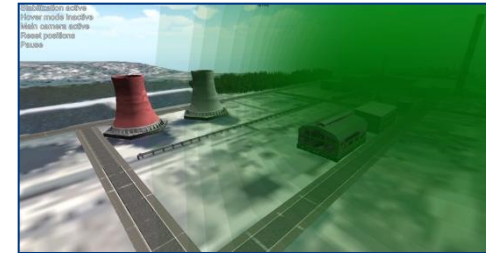
The SPIDER is fully Immersive including sound and motion.





ARTEM

Augmented Reality Terrain interoperable Module



ARTEM (Augmented Reality Terrain interoperable Module) is a Module integrated through High Level Architecture with MS2G (Modeling, interoperable Simulation & Serious Game) systems.

ARTEM allows to present over smartphone and other mobile device the situation in real-time geo-referenced dynamically respect the on going simulation.

ARTEM provides the opportunity to train personnel directly on the field using details models and simulator that interact dynamically with personnel and assets during the exercises.

The system allows to visualize real and virtual assets as well as different effects on the terrain.





SIMCJOH VIS & VIC

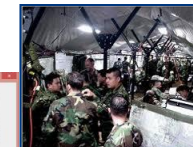
*Simulation of Multi Coalition Joint Operations involving Human Modeling
Virtual Interoperable Simulation & Virtual Interoperable Commander*

The SIMCJOH (Simulation of Multi Coalition Joint Operations Involving Human Modeling) is a MS2G (Modeling & Interoperable Simulation and Serious Game) project for Strategic Decision Making; SIMCJOH is lead by Genoa University and provides an HLA interoperable immersive framework for the Commander and his staff within critical decision making over Joint and MultiCoalitions scenarios, considering a strong impact of human factors

Simulation Team VIS & VIC Models on Population and Human Behavior represent the core of SIMCJOH Project.



The experimentation allows to **face issues** related to strategic decision making in complex scenarios



Simulation Team





Haiti Case

IA-CGF NCF Riots & IA-CGF NCF EQ

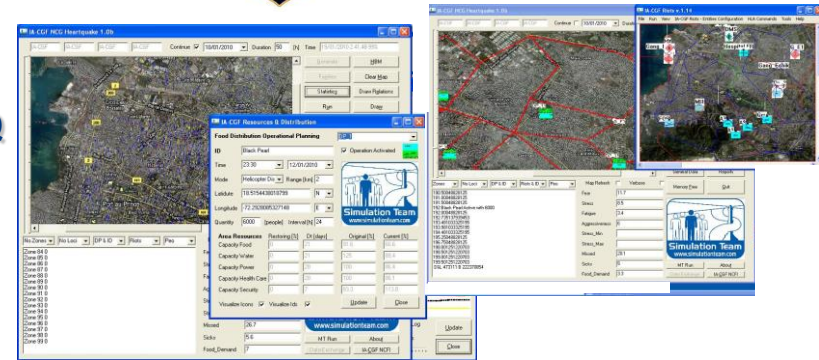
The Demonstration was based Haiti Earthquake 2010 and presented by USJFCOM at ITEC within 2 months.

The demonstration was devoted to show the potential of interoperability in combining different simulators for full coverage of a complex problem such as that one of Haiti.

Simulation Team was involved by using his interoperable IA-CGF reproducing Population Behavior, Human Factors (famine, stress, diseases, fear, aggressiveness), Riots and Gang Activities as well as the impact of the Simulation Earthquake

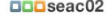


Simulation Team

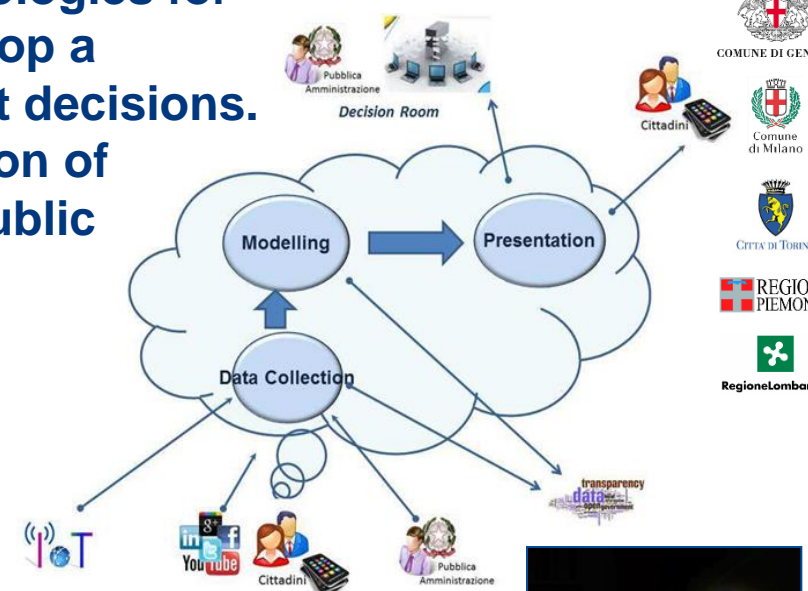




SMARTCITY Decision Theater



The Decision Theater (DT) Project is a major SmartCity project inserted within Cloud Computing Technologies for Smart Government: the aim is to develop a platform of services dedicated to support decisions. Decision Theater use modeling for validation of alternative solutions and procedures on Public Administration (PA) strategic planning. Rome, Genoa, Milan and Turin Cities The experimentation focuses on Flooding and its impact on population.. Simulation Team develops the simulator, Population and Social Network Models as well as the whole scenario

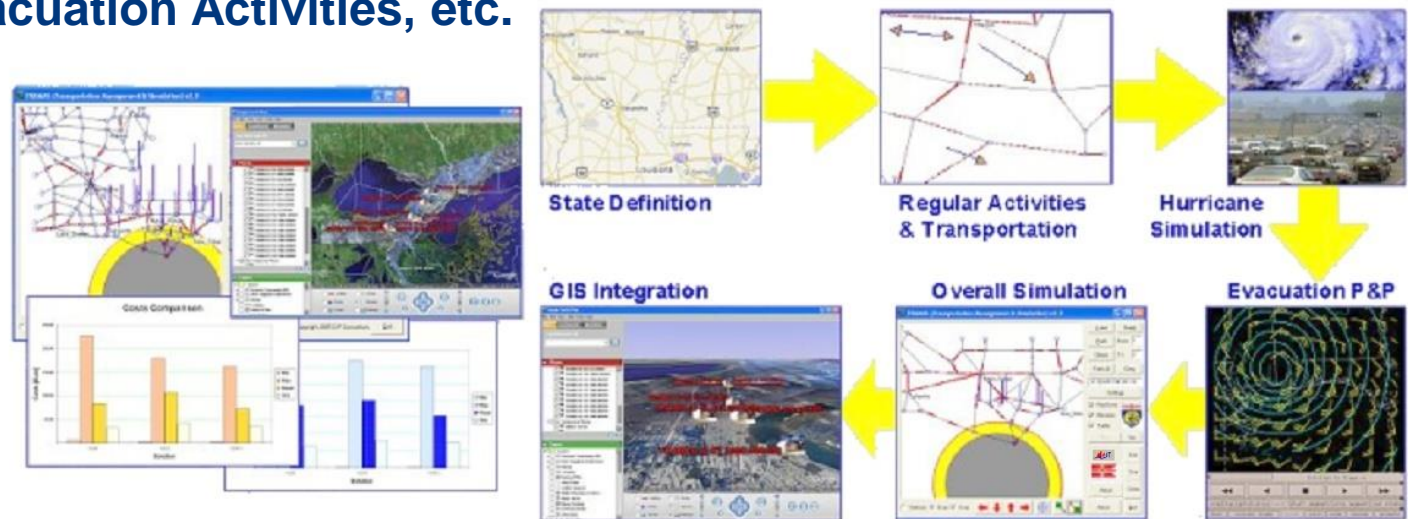




KATRINA LIKE

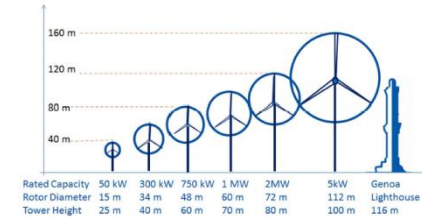


KATRINA LIKE was a Joint Venture that Demonstrated the possibility to Model a National Crisis and to Simulate a Wide Emergency; the Project successful demonstrated the Simulation of an Hurricane Impact on the Transportation Layers of Louisiana State Considering Traffic Cargo, Evacuation Activities, etc.





MEGACITY

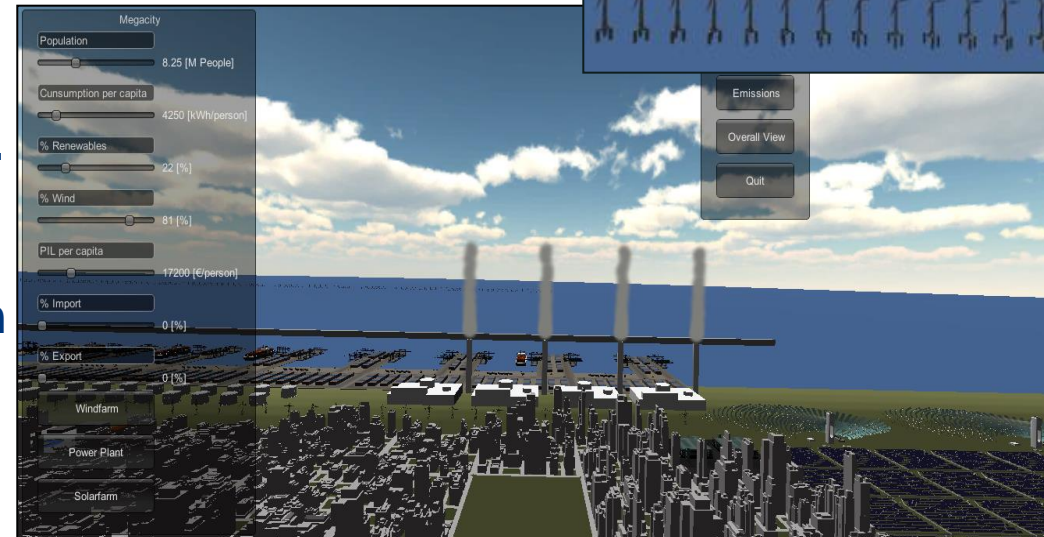


MEGACITY project is a MS2G (Model, Simulation & Serious Game) devoted to investigate scenarios of Megacities projected over 2030, with particular attention to energy, logistics and population demand & services.

The simulator addresses environmental, technical and economic issues, in order to support decision and study the scenario. A Smart Optimizer inside the simulator provides the user with effective proposals.

MEGACITY provides a web immersive virtual framework for crowdsourcing devoted to inform and educate people.

The immersive simulator is self Explaining the situation.





CIPROS

CIVIL Protection Simulator

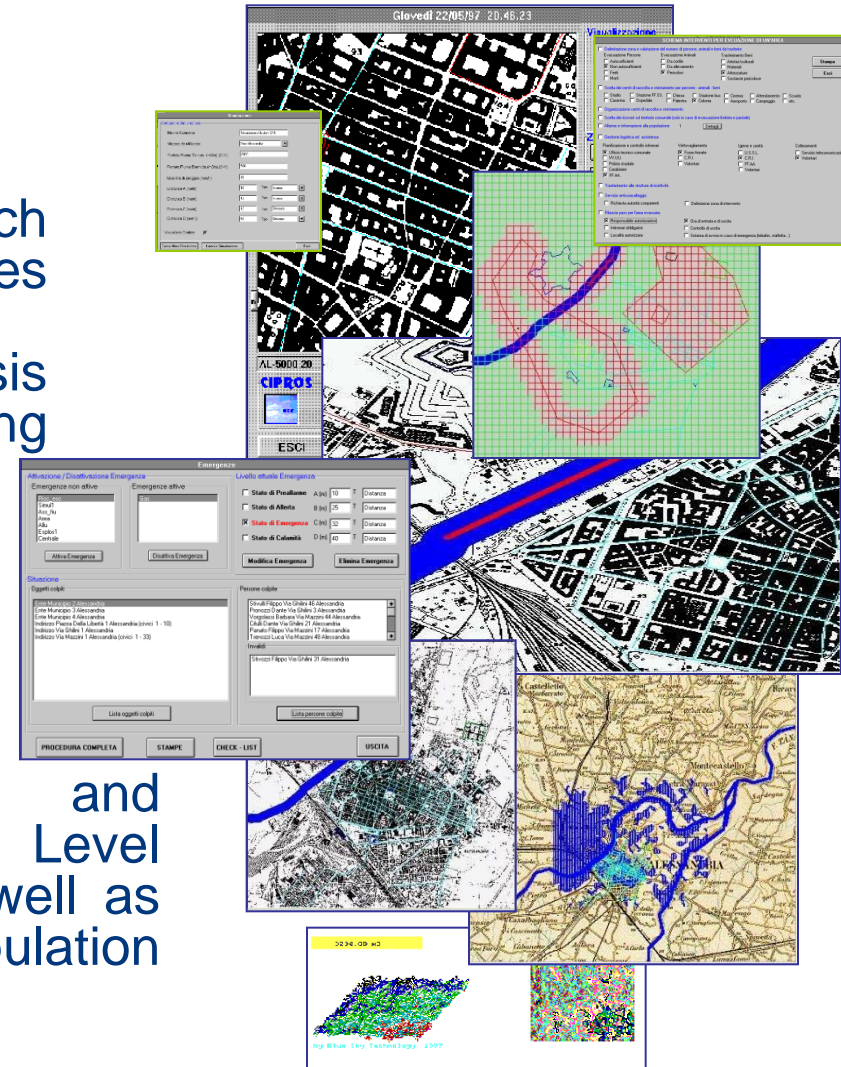
CIPROS is a modular approach for Civil Protection that integrates GIS and Simulation.

CIPROS generates Crisis Dynamic Web Sites for supporting training and information share

CIPROS includes simulation of:

- Major Flooding
- Explosions
- Hazardous Material Fallout

CIPROS support definition and management of different Alert Level and Threats Classification as well as evacuation Procedures for Population and people with impediments



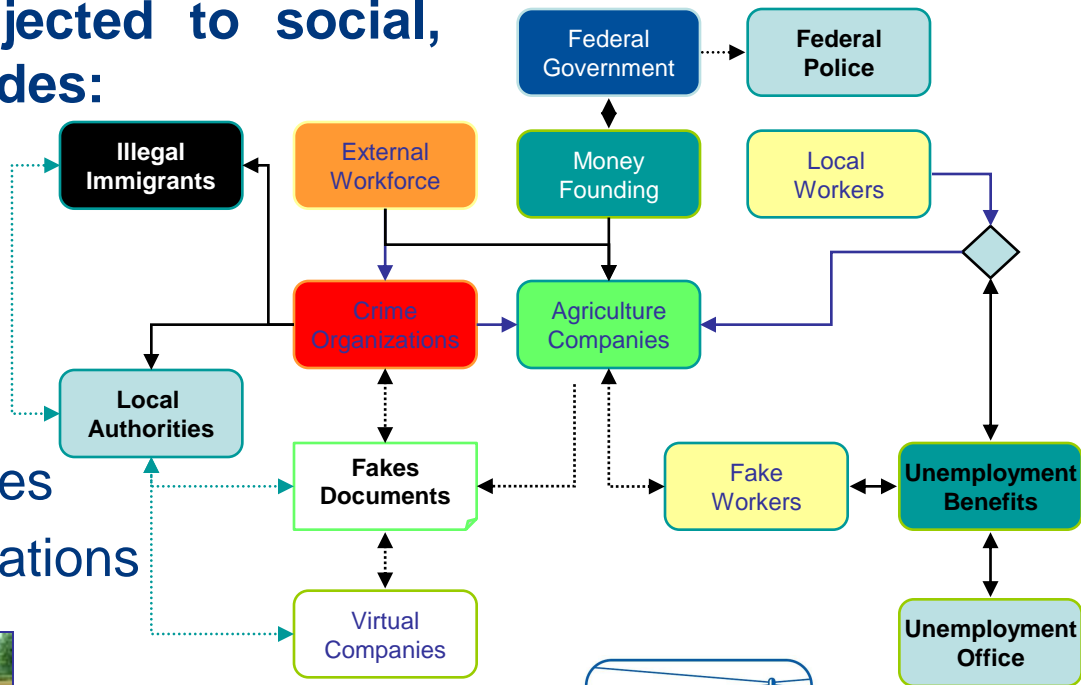


INDASTRIA

This model is inspired by real case and simulate a region subjected to social, economic crisis, it includes:



- Small Region Simulation
- Social Multi Ethnic Reality
- Real & Fake Economy
- Civil Disorders
- Federal vs. Local Authorities
- Polices vs. Crime Organizations





SLAMS

Simulation Lean Advanced Mobile Solutions



Microsoft



New technologies make possible to develop simulation solutions tailored for smartphones and tablets; SLAMS (Lean Simulation Advanced Mobile Solutions) is research coordinated by University of Genoa with the aim to identify solutions for education and training for defense, this goal will be reached through models and simulators which are expected to take advantage from these hardware solutions. In particular, Serious Games based simulators for training will be developed, in terms of approach and engines for games as well.



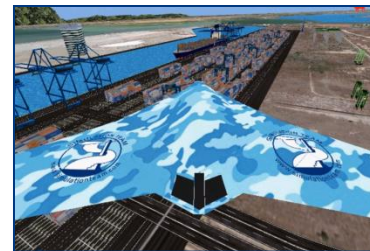


ST_VIV

Simulation Team Virtual Intelligent UAV & AUV



ST_VAV is a Real-Time Agent Driven Simulation of Autonomous Vehicles that operates as swarms and to test Virtual Manned Drone Concept within an HLA Federation (ST_VP Federation). This Synthetic Environment supports different types of UAV (i.e. Predator, Reaper and UACV) and AUV (autonomous underwater vehicle) such as sea gliders. Currently ST_VAV allows to manage different swarms of UAV (i.e. 12 Unmanned Aerial Vehicles) flying as a wing controlled by a Intelligent Agents or directed by an Operator immersed in the Simulation Team CAVE (Covering 270° Horizontal and 120° Vertical, 6 DOF and/or 3 DOF Motion Platform, 3D Stereo Surroundings) integrated with Biometric Devices (i.e. eye flickering, eye tracking, cardio frequency, muscular tone).





IA-CGF MODULES

The new *IA-CGF* Modules devoted to create the simulation of complex Scenarios include:

- *IA-CGF Units*
- *IA-CGF Human Behaviors*
- *IA-CGF Non-Conventional Frameworks*





IA-CGF Units

IA-CGF Units are a set of interoperable units with capability to be integrated in constructive simulation

- Police
- Gangs
- Local Population
- Rioters
- Insurgents
- Terrorist
- Local Authorities
- Warlord
- Criminal Organizations
- NGOs (CIMIC ops.)
- Civil Personnel (CIMIC ops.)
- Domestic/National Situation (for instance for troops moral):
 - Population
 - Media
 - Lobbies
- International Public Opinion
- International Diplomacy
- New Threats (i.e. 2nd Generation Terrorists)



These are examples of non-conventional units controlled by IA-CGF

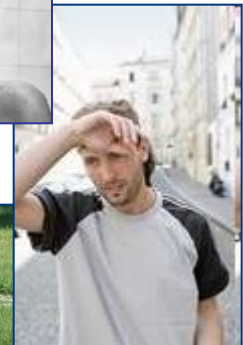




IA-CGF Human Behaviors

Specific modules with *IA-CGF Human Behaviors*:

- Fear
- Stress
- Fatigue
- Training Level
- Aggressiveness
- Ethnic Factors
- Religious Factors
- Combat Skills/Experience



IA-CGF Human Behaviors operate as a set of further characteristics to be added to each unit in constructive simulation.

i.e. now in constructive simulation every unit in the scenario have infos about status and type of ammo, by IA-CGF it will be added dynamic information about level of fear and stress and the Units performing according to it



IA-CGF Non-Conventional Frameworks



It is important to consider the integration in a scenario of the *IA-CGF-Non-Conventional Frameworks (IA-CGF-NCF)*, each simulating specific events:

- *IA-CGF CIMIC/HUMANITARIAN FRAMEWORKS*
 - Food Distribution
 - Reconstruction
- *IA-CGF Homeland Security and Civil Protection FRAMEWORKS*
 - Natural Disaster (i.e. Hurricanes, Earthquakes)
 - Man Made Disasters (i.e. Explosion, Hazardous Material Spills)
 - Evacuation
- *IA-CGF PSYOPS and INTELLIGENCE FRAMEWORKS*
 - Integration *Sibilla*® Serious Game for Intelligence Officers training



In non conventional scenarios for particular training purposes.

We can imagine to have active different non conventional

Frameworks, in different locations, with different level of detail inside the simulated theater.





CeSiVa

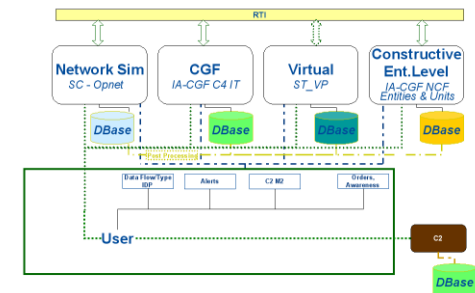
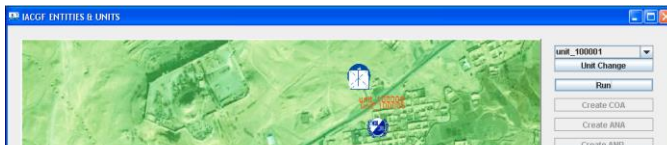
Simulation Team

CGF C4 IT

Computer Generated Forces C4 for Italian Army



CGF C4 IT allows to measure the effectiveness of different C2 Maturity Models involving local and coalition forces, police and other resources in an foreign urban framework. This Federation is based on use of IA-CGF and SC and is devoted to support Italian Army Simulation in term of experimentation and analysis of technologies and policies





MESA

Maritime Environment for Simulation & Analysis

MESA is an integrated environment to perform simulation and risk analysis in ports and maritime sector.

MESA is devoted to support port organizations, entities and operators in Emergency & Environmental

Management.

MESA is a modular system based on combined simulators running on PC and providing direct output also on WWW servers.

The screenshot displays the MESA web interface. At the top, a Netscape browser window shows the URL `file:///C:/C7C/PROTCLV/web/OilSpil2.htm`. The main content area features a map of Genoa, Italy, with a yellow line indicating a path and a red line indicating a distance. Below the map, a table provides geographic coordinates and distance information:

Position in Geographic Coordinates	
Latitude	44° 23' 16"N
Longitude	8° 55' 34"E
Latitude	44° 23' 26"N
Longitude	8° 53' 52"E
Distance	3.6 km

Below the map, there are several control panels:

- Choose Map:** Background Map set to 1:2000.
- Simulation Clock:** Time set to 9 hours.
- Simulation Inputs:** Simulation Time set to 10 hours, Time Resolution set to 1 hour. A button labeled "Choose Spilled Material" is present.
- Simulation Outputs:** Total Amount of Oil: 66.08658599 (m³), Oil on Coast: 0 (m³), Total Oil Surface: 72000 (m²).

At the bottom right, there are "Run" and "Close" buttons. The 3D visualization at the bottom shows a blue and pink grid representing the oil spill dispersion over the port area.

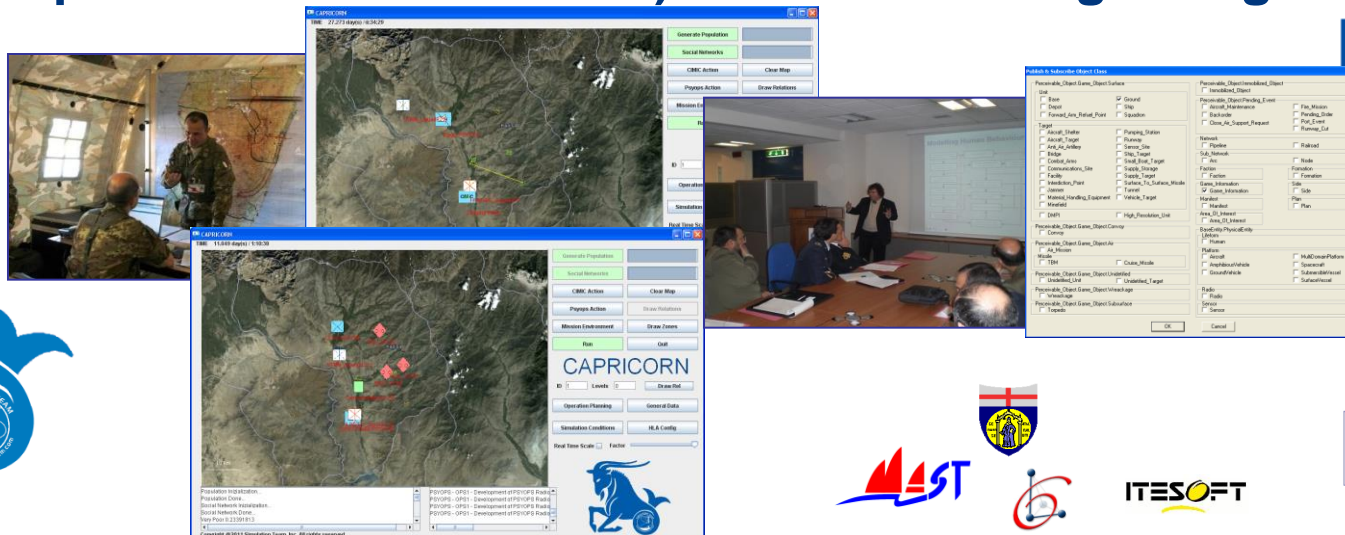


CAPRICORN

Civil Military Co-operation And Planning Research in Complex Operational Realistic Network



- CAPRICORN is an innovative EDA R&D Project devoted to develop capabilities in the complex and critical sector of Military Operation Planning, specifically for asymmetric warfare scenarios involving CIMIC and PSYOPS, by using CGF (Computer Generated Forces) based on Intelligent Agents (IAs)



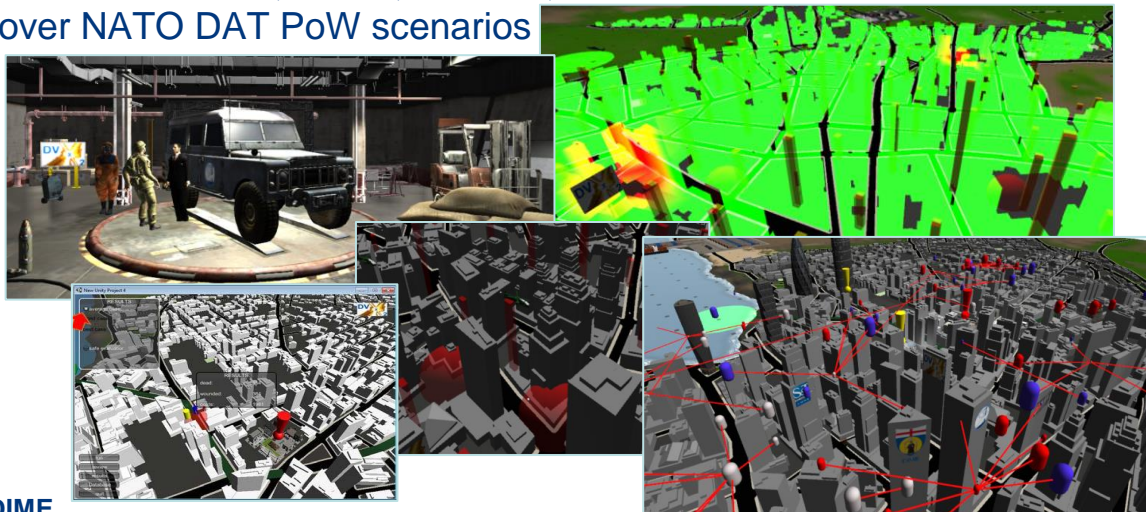


DVx2

Distributed Virtual Experience and Exercise



DVx2 is a MS2G (Modeling, interoperable Simulation and Serious Game) devoted for NATO HQs by STO CMRE for with support of Simulation Team to Demonstrate Vulnerability Reduction in the Defence Against Terrorism (DAT). DVx2 is a Virtual Interactive Exercise enabling NATO DAT PoW, Subject Matter Experts (SMEs) and NATO Executives to demonstrate, validate, benchmark & appreciate the Defense Against Terrorism accomplishments. DVx2 drives Virtual Terrorists & Defenders by using Intelligent Agents and enables to generate Tests and Experience, by Simulation as a Service (SaaS) paradigm, on improvements and challenges such as Vulnerability Reduction, Technological and Organizational Advances, etc. DVx2 by his Web approach provides an innovative capability to immerse Decision Makers, SMEs, Alliance, Nations and General Public in Intuitive and Interactive Experiences over NATO DAT PoW scenarios



DVx2 focuses on scenarios involving:

- C-IED/EOD Counter Improvised Explosive Device / Explosive Ordnance Disposal
- JISR, Joint Intelligence Surveillance and Reconnaissance
- CBRN, Chemical Biological Radiological & Nuclear





SGT-SDM

Serious Games for Training in Strategic Decision Making



ACT has activated the SGTSDM as a R&D Project to investigate the use of Serious Games for Training in Strategic Decision Making. The project involves an international team including ACT, NATO Defense College, ARRC, M&S COE, Simulation Team, MITIM DIPTM University of Genoa and MAST.



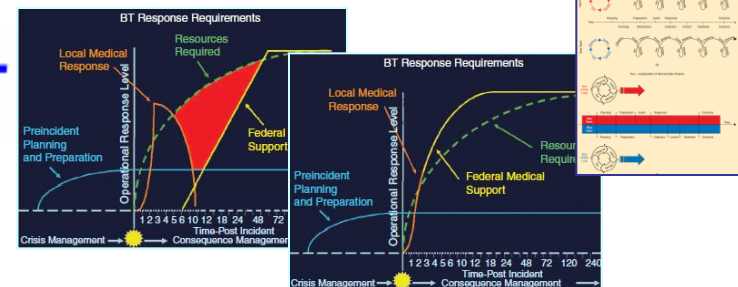
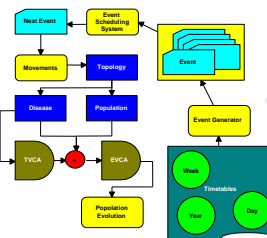
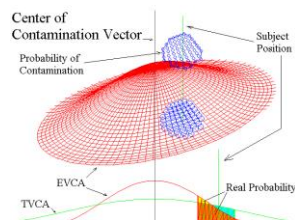


PANDORA

PANdemic Dynamic Objects Reactive Agents



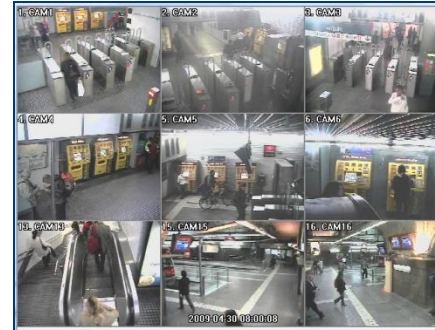
- PANDORA addresses the dynamics of the spreading of a Pandemic and experiments are on-going on H1N1 influenza A virus by a joint simulation project involving USA, European and Australian R&D Centers (MITIM DIPTM, Dartmouth College, CRiCS).
- PANDORA proposes to use an evidence-based approach whereby statistical data (census) and ethnographic surveys are source for the model and integrated with Human Factors representing the psychological and social parameters impact on people behaviors and their reaction to containment measures and policies
- PANDORA evaluates the efficacy and cost benefit of various mitigation strategies such as school closures, target anti-viral prophylaxis and other mitigation measures, level of absenteeism, and its impact on commerce, industry, economy and functioning of society as well as population attack rate, risks related to specific groups and on flows across State borders.



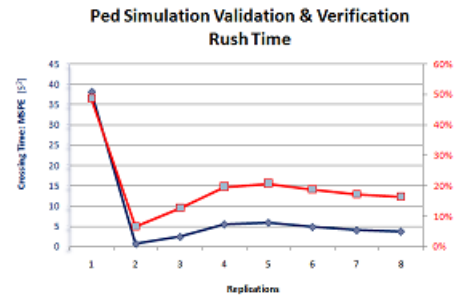
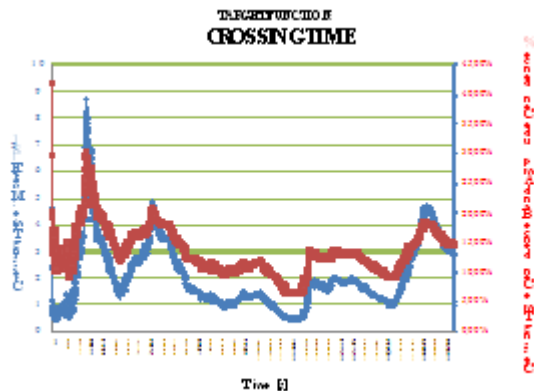
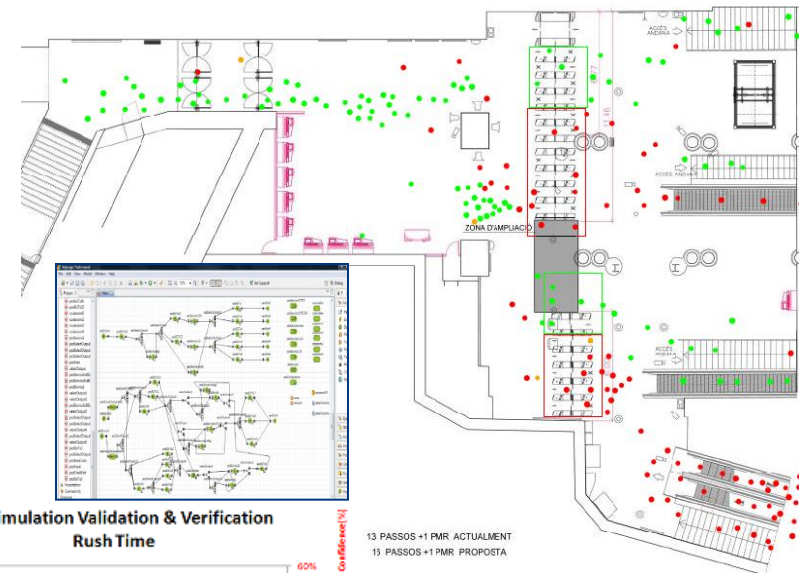


PEDES

PEDEstrian Simulation



PEDES is a Simulation of pedestrian flows in mass transportation (i.e. underground) devoted to support functional analysis, safety and security solution design and analysis; PEDES is integrated with Human Behavior Models



13 PASSOS +1 PMR ACTUALMENT
13 PASSOS +1 PMR PROPOSTA



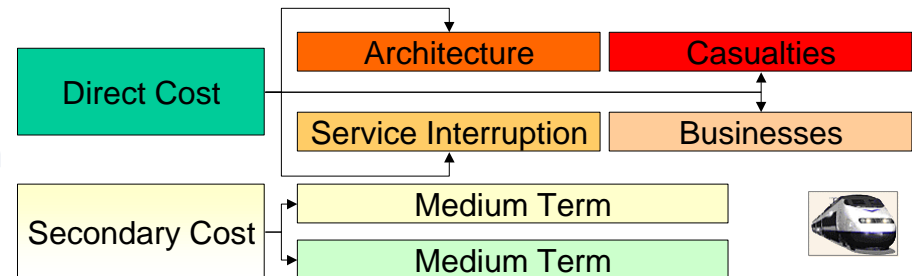
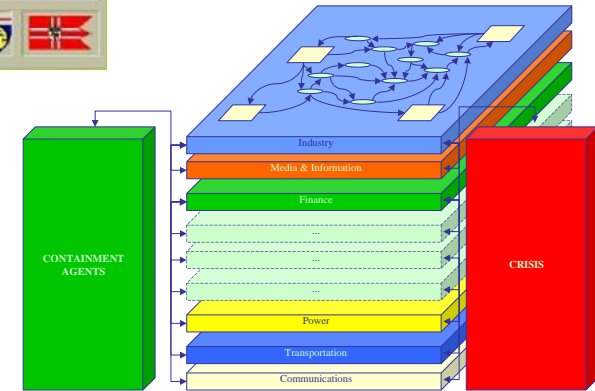


RAILSEC

Railways Security

The project concentrated in developing models for Risk Analysis related to Security in Rail Environments. The project develop emergency management and event simulators as well as model devoted to identify medium and long term effects in term of costs, resources and impact on the overall environment.

The project was developed in cooperation with Institutes in North America and focused on terrorist attack issues

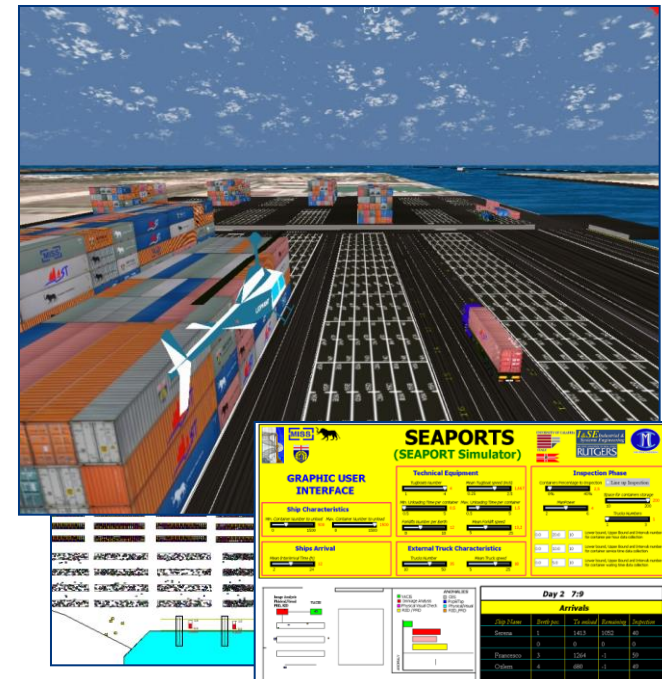




Virtual Security Assessment and Training



VISAT (Virtual Security Assessment and Training) allows to Simulate Security Issues in Complex Framework such as that one related to Port Environments. VISAT includes Constructive Sim of organizations and layouts as well as Synthetic Environment for Virtual Sim supporting Distributed Cooperative Training among different Actors (i.e. Port Authority, Coast Guard, Custom Resources, Terminal Operators, Public Urban Authorities) within different Scenarios



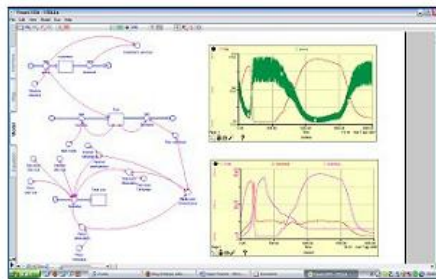
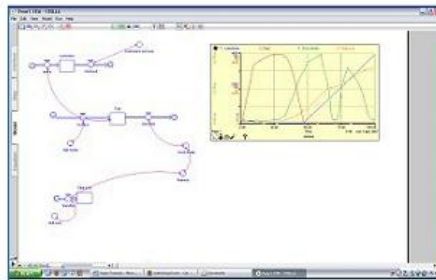


MOSCA

MOdelling Supply Chain Attacks



MOSCA project is devoted to the development of Models for estimating the impact of attacks or disasters affecting supply chain of consumer goods; MOSCA includes dynamic impact of events on consumer emotions as well as effectiveness of countermeasures



Simulator of Attacks to Retail Chains.txt - Blocco note

File Modifica Formato Visualizza ?

Event: Contaminated fresh food Bad media: Moderate Aggression

Fear perception: < 11 >

Store Code: 62 Division code: 6

Media Spending: Internet 34 Television 33 Press 25

Path: _____

Delay	Internet	Television	Press	
_____	20	10	30	
Duration	_____	60	00	30

Media Unit Cost	Internet	Television	Press
_____	1	2	3

Average Arrives rate: < 47 > Average Checkout rate: < 47 >

"Terrorism Attack In Retail Business" Simulator

GO!

Load

Simulatore / Codici / Historical / Matrix / Fear / Arriving / Badmedia / Mediums / Spending / Timecardown / Old-Data / data /

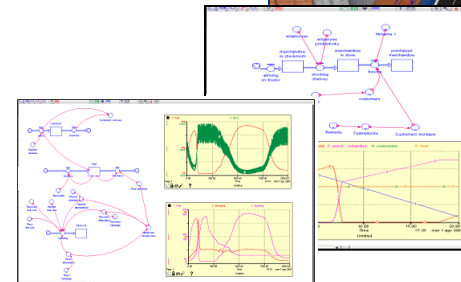


Port/Terminal Security Simulation



Simulation Team is active in Modelling & Simulation for Guaranteeing Security in Maritime Environment especially in reference to Ports and Terminals

A major goal in this context it is to create solutions that support the Definition of operative and training procedures for security and safety harbours operations with strong emphasis on common standards and multi user framework





S4PT

Safety, Security Simulation System for Port Terminals



Centro di Competenza della Sardegna sui trasporti

S4PT project was conducted to create a virtual environment able to support safety and security simulation respect port activities; S4PT allows drones and marine Assets to interoperate within distributed real time HLA federation . The simulation framework is based on Simulation Team Virtual Marine integrated with new objects for Security such as UGV (unmanned ground vehicle), USV (unmanned surface vehicle), UAV (unmanned aerial vehicle) and AUV (autonomous underwater vehicle) as well as with cameras and security units. The project was tested and completed just by MAST and University of Genoa in collaboration with MSC-LES and CentralLabs





CTSim

Serious Game for Ro-Ro Operations



CTSIM is a research project developed by MSC-LES, Genoa Univ, CAL-TEK under the umbrella of Simulation Team. CTSIM can be used to train operators working in car terminals with particular attention to drivers, marshalls, quality checkers and tally men.

The CTSIM architecture is based on interoperable simulation and makes use of dedicated external hardware (i.e. motion controllers, virtual immersive helmets, wheel, pedals, etc) to provide users with the sensation to be in a real car terminals.

Multiple scenarios are available in terms of different terminal layouts (based on real existing terminals), multiple vehicles (i.e. cars, trucks, buses, etc.) and multiple types of available operators.



www.sim4future.com/cloud_1.html

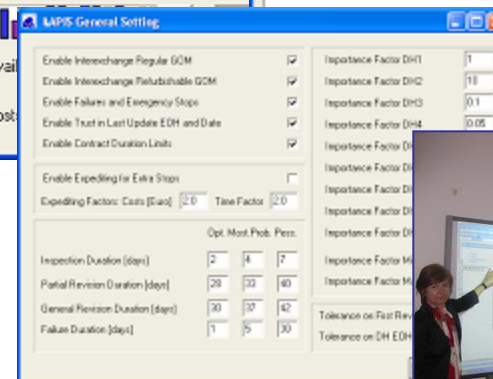
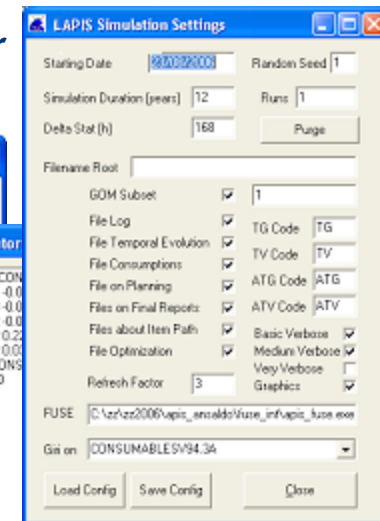
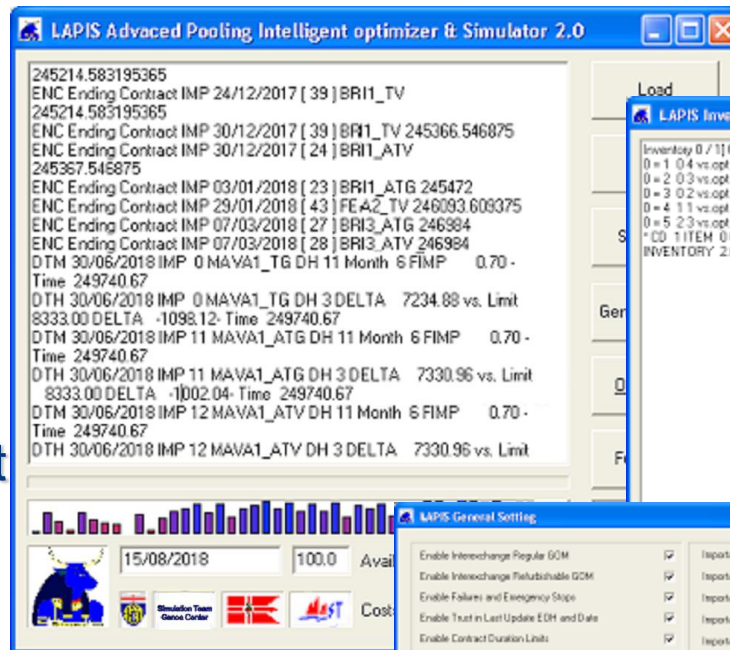


LAPIS

Lean Advanced Pooling Intelligent optimizer & Simulator

LAPIS is an intelligent decision support system for Service Division of Construction and Engineering Companies. LAPIS combines different modules:

- Service Model
- Inventory Optimizer
- Scheduling Optimizer
- Overall Resource Optimizer
- Metrics & Key Performance Indexes

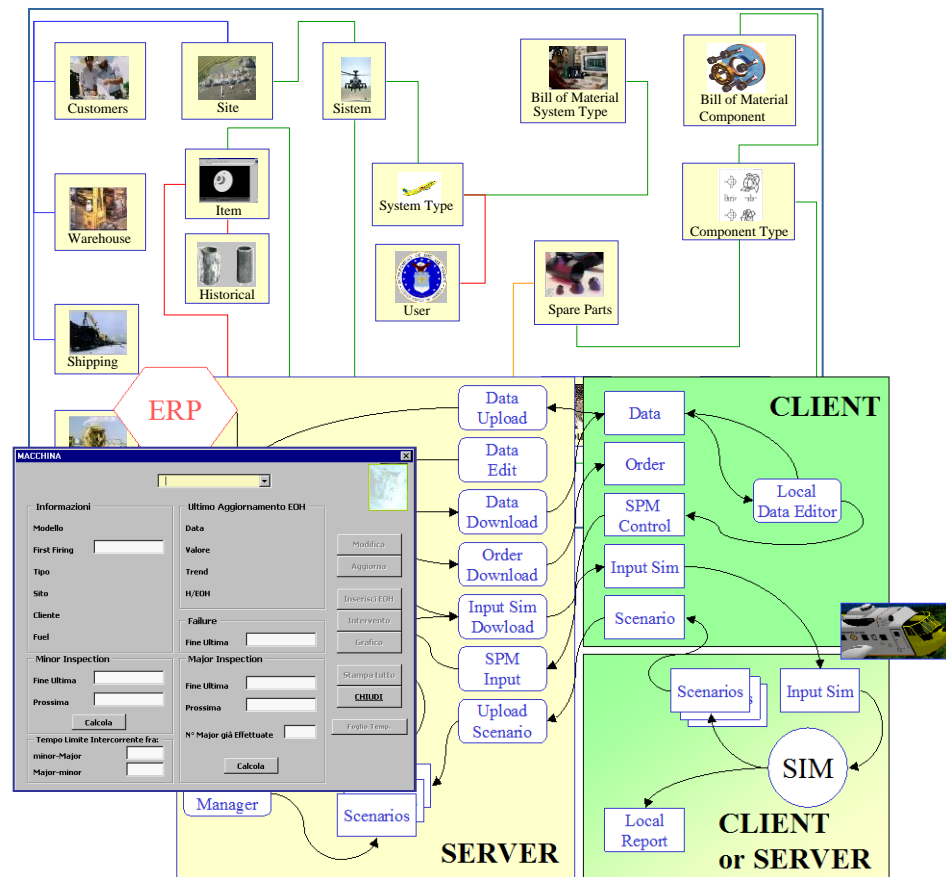




COUGAR

Controller & Organizer for Ultimate Government of Availability and Reliability

COUGAR is the innovative system for the Service and Maintenance of complex systems (i.e. Helicopters). The system is designed to satisfy the requirements connected with the maintenance management of helicopters taking care of both pre-planned and emergency actions.





PUMA

Project for Ultimate MAintenance

PUMA is the innovative system for re-organizing Gas Turbine Service in Ansaldo Energia. The system allows to manage resources, spare parts, internal/external warehouses, shipping and scheduling of all the maintenance operation for over 50 power plants distributed world-wide.

The screenshot displays the PUMA DATA SERVICE interface with several windows open:

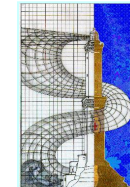
- PUMA DATA SERVICE:** Main dashboard with icons for CLIENTI, STORICO, ORDINI, SITI, ITEM, MAGAZZINI, TIPI, MACCHINA, and SIMULATORE.
- ASSE MACCHINA:** Window for selecting an axis (SELEZIONE ASSE: MIRFA_TG643).
- PUMA Simulator:** Simulation window showing data for various components and their operational states.

Component	Value
Onere Magazzino Ansaldo. (Lit/Mese)	12087414
Onere Magazzino Sit. (Lit/Mese)	34607512
Onere Pezzi in Viaggio. (Lit/Mese)	6881925
Costo Pezzi Installati. (Lit/Mese)	12310192
Costo Handling. (Lit/Mese)	51250288
Costo Spedizione. (Lit/Mese)	37423912
Costo Stock - Out. (Lit/Mese)	25239000
Numero Blocchi. (N/Mese)	4
Costo Ripoting. (Lit/Mese)	0
Giorni Fermo Macchina. (gg/Mese)	17
Numero Ordini.	36087
Simulazione al	42 %
- Stati Operativi Macchina:** Legend for machine states:
 - Ferma (White)
 - Avvio (Red)
 - Marcia (Green)
 - Ferma Minor (Pink)
 - Ferma Major (Brown)
 - Ferma Guasto (Dark Red)
 - Inizio Minor (Yellow)
 - Inizio Major (Blue)
 - Inizio Riparazione (Cyan)



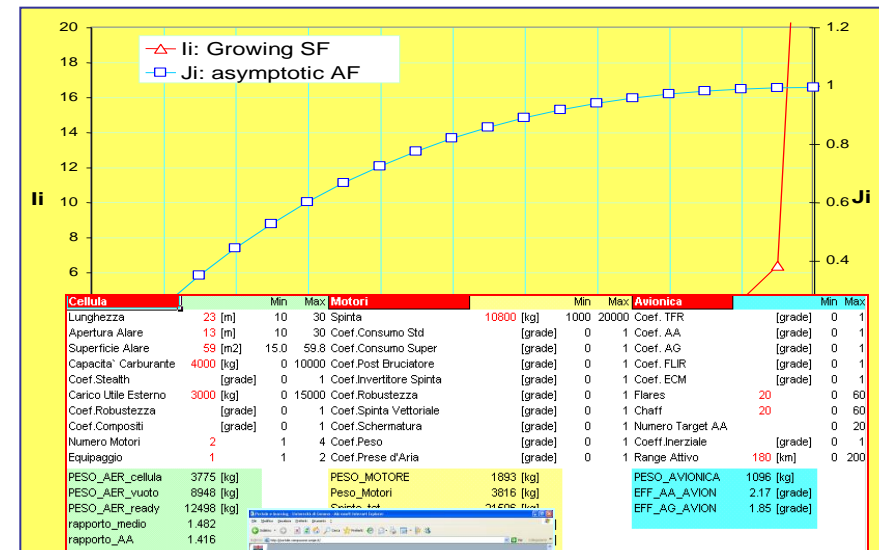
J20 Experience

E-Learning Concurrent/Cooperative Project Game



J20 allows to experience in a Web Based Environment a New Product Development by working in Cooperative Teams (Engine, Avionics Cell) representing different Joint Ventures competing for the Project a New Advanced Fighter.

The Exercise has been extensively tested in Distributed Environment for Professional and Academic Courses



Cellula	Min	Max	Motore	10800	Min	Max	Avionica	Min	Max
PESO_AER_cellula	3775 [kg]		PESO_MOTORE	1893 [kg]			PESO_AVIONICA	1096 [kg]	
PESO_AER_vuoto	8948 [kg]		Peso_Motori	3816 [kg]			EFF_AA_AVION	2.17 [grade]	
PESO_AER_ready	12498 [kg]		Spinta Tot	24295 [kg]			EFF_AG_AVION	1.85 [grade]	

NIG-29

Raggio d'Azione	229 km
Speed_Hi	2343 km/h
Speed_Low	1252 km/h
3 m	
6	
3 [grade]	
7 [grade]	
7 M USD	

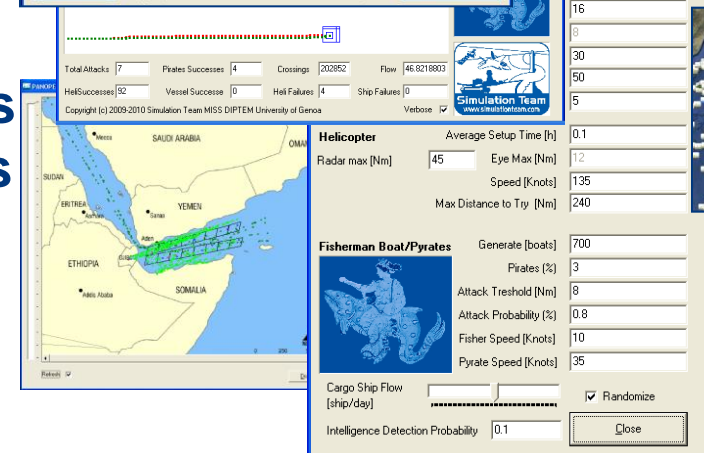
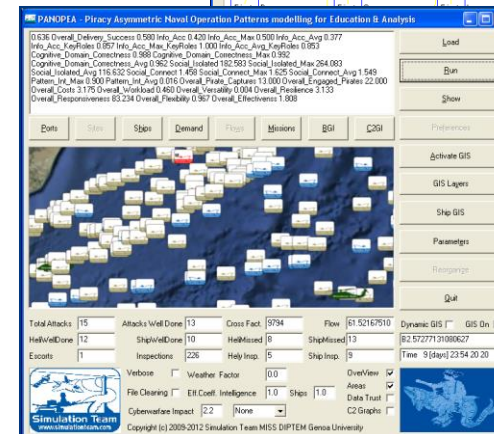
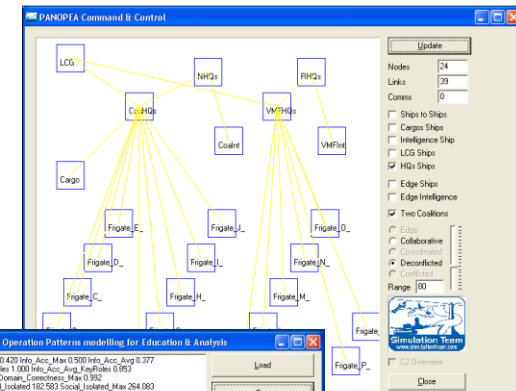




PANOPEA

*Piracy Asymmetric Naval Operation
Patterns modeling for Education & Analysis*

- PANOPEA is a simulator for reproduction of Piracy activities and for evaluating different strategies in NEC C2 M2 (Netcentric Command and Control Maturity Models).
- PANOPEA reproduces military vessels and helicopters, ground base, cargos as well as fisherman and yachts traffic as well as Pirates
- Pirates are directed by Intelligent Agents and apply strategies for succeeding





VOR

Vessel Optimizer and Reconfigurator



VOR was developed as a smart optimizer using genetic algorithms to investigate a large number of variables in the optimization of vessel configuration. By this approach it becomes possible to optimize the ship requirements (e.g. speed, length, engine Solution, Radars, weapon systems, etc) and assets (e.g. helicopter type and number, UAV, RHIB etc.) in order to address different roles over all different marine missions. The optimizer investigate the different Alternatives and provides solutions optimizing the Measure of Merits over all the different target Functions Including among the others Costs, Efficiency, Effectiveness, Reliability, etc.

The screenshot displays several overlapping windows from the VOR software:

- Naval Tasks:** A table with columns for MOE, Weight, Min, Max, Active, and Importance. It lists various mission types like MIO, ASuW, SAR, ABW, and FP.
- Configuration optimizer:** A window for setting optimization parameters such as Genetic Algorithms, Adaptive Stochastic, and Simple Crossover.
- Equipment of the Vessel:** A window for configuring various components like Helo, Hangar, Boats, RHIB, Weapons (SAM, SSM, GUN), and Sensors (Radar, ECM).
- Margin Estimation:** A window showing a table of metrics like Area, Volume, Power, Range, KW, and QMB, with Min and Max values.
- Main Requirements:** A window showing a table of performance metrics like Sustained speed, Endurance speed, Range, and Endurance.



IPHITOS

Interoperable Simulation of a Protection solution based on light Interceptor Tackler operating in Outer Space

Location: MOON

- Latitude: 26 08' 9.94"N
- Longitude: 3 34'40.34"E
- Elevation: -1828.8 m

Simulation Team



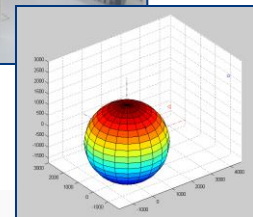
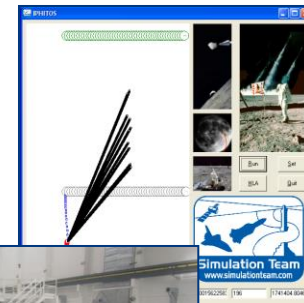
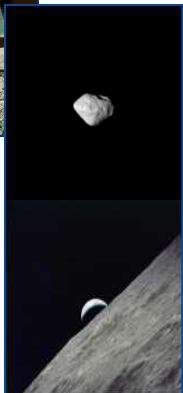
MBDA
MISSILE SYSTEMS

TELESPAZIO
A Finmeccanica / Alitalia Company



IPHITOS Project is developed by a team of students from different Universities (Genoa, La Sapienza Rome, Pisa), members of Liophant and students in internship in MBDA and support from Telespazio. This project is devoted to create a federate for Smackdown the initiative, led by NASA & sponsored by several companies, devoted to diffuse and advance the HLA culture by creating a distributed HLA Federation of a Moon Base.

IPHITOS federate is in charge of simulating small asteroids as threats for the Moon Base as well as a Safeguard Solution based on Interceptors, Sensors and Launchers



AEGIS
TECHNOLOGIES

SIS

FORWARDSIM
simulations & technologies



VT MÄK
A company of VT Systems

PITCH



BACCUS

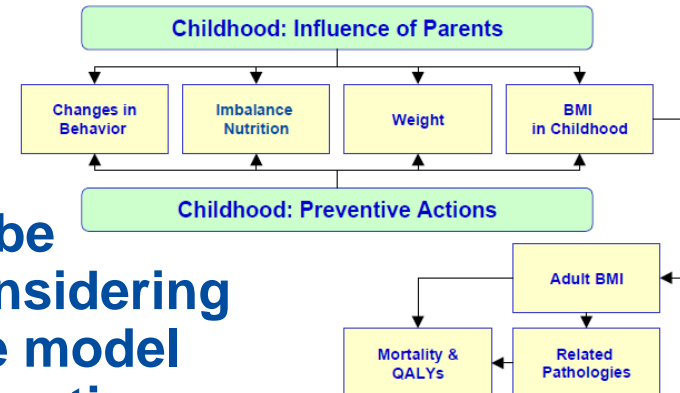
Behavioral Advanced Characters & Complex Systems Unified Simulator



The BACCUS simulator is intended to be used to study the Obesity Epidemics considering both physiological and social aspects; the model reproduces the population dynamics, estimating correlation among different factors:

- BMI
- Sport Profile
- Stroke
- Alcohol Profile
- Infarct
- Atrial Fibrillation
- Diabetes
- Hypertension
- Cancer
- Hyperlipidemia

BACCUS simulates social networks such as Family and Friends to assess the population evolution and the mutual interaction with diffusion of pathologies

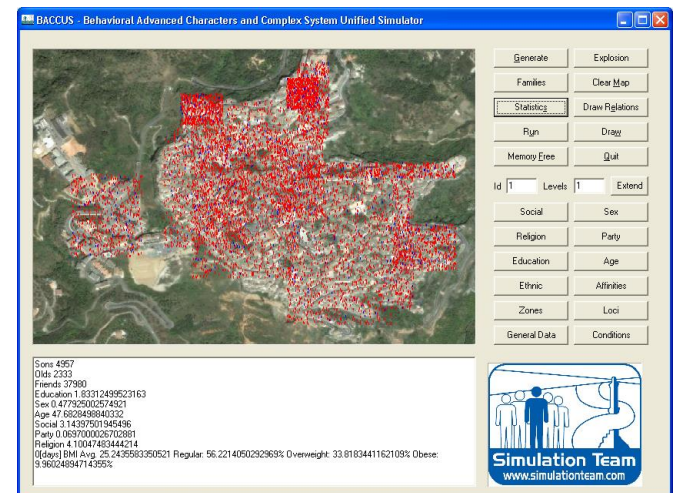


Basic Model of Obesity in Childhood



Beth Israel Deaconess
Medical Center

A TEACHING HOSPITAL OF HARVARD MEDICAL SCHOOL





MIPET Master Program

Master in Industrial Plant Engineering & Technologies
www.itim.unige.it/mipet



The Master in Industrial Plants is a Master degree program organized in Genoa University focusing on preparing new generations of top quality technical experts for process engineering and power equipment supplier as well as construction contractor. Its main aim it is to satisfy the expectation from Leading Industries in term of high technical skills and excellence capabilities in Industrial Plants and Engineering. The Master Program is directed by Faculty of Engineering in strong cooperation with leader industries and major companies operating in these industrial sectors, this aspect guarantees the relevance and effectiveness of the initiative. In fact this project it is part of a large initiative devoted to develop excellence in Industrial Plant Engineering through the synergy between the expertise of Genoa University Engineering Faculty and Top Level Companies with long traditions that are leading this Area Nationally and Internationally in term of turnovers, size, processes and products complexity as well as know how and technical skills.



Master in Industrial Plant Engineering and Technologies

SPONSORS AND SUPPORTERS



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Prof. Agostino Bruzzone

www.master.itim.unige.it





PREMITELE Program

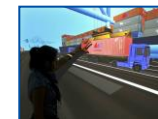
*Preparation for Management within
Innovative Transportation services and Evolving Logistics*



PREMITELE Program (Preparation Business Management, Transportation and Logistics) was established to provide Methodologies and Tools for Transportation Services and Logistics with special attention on the following issues:

- *Assessment and Forecasting of logistics demand while facing emerging behaviors and new trends*
- *Definition of Evaluation criteria and solution for Supply Chain Management (SCM)*
- *Planning and Management of transport and logistics services*
- *Technology Transfer and Skill Acquisition on logistics considering operations, economy, legal aspects, engineering*
- *Identification of customer needs*
- *Use of Models and Tools for operative, economic & financial analysis and evaluation of investments and management solution for transport infrastructures and logistics*
- *Marketing planning for new transportation services and logistics*
- *Development of systems of management and control for Logistics and SCM*
- *Support and Guide the public administrators and operators in decision making and in the definition and implementation of realistic and effective policies in Transportation*

The aim of the course and then PREMITELE the preparation of a new generation of experts that who could be valuable in business within the area of Logistics and Transportation Services, becoming the new leaders in this area to support developments and strategic decisions and their implementation. People involved in the program should have skills in the fundamentals of engineering, economics, and regulatory and procedural issues related to transport and logistics characteristic within their university education; the attendees are students of Engineering, Economics or Law Faculties with Genoa, Rome, Bologna, Trieste, Salerno Universities. The PREMITELE is founded by the Italian National Department of Transportation.





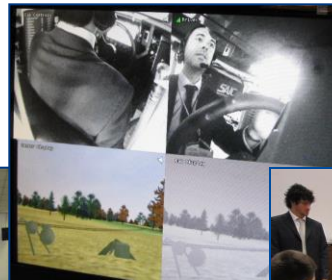
DIMS PhD Program

*phD program in Innovative Mathematical engineering,
modeling & Simulation*



DIMS is a PhD program in Mathematical Engineering and Simulation sponsored largely by Simulation Team and Specific R&D Projects such as PIOVRA and CAPRICORN.

DIMS PhD program was activated by DIPTM (Production Engineering & Mathematical Modelling Dept.) and DIBE (BioEngineering Dept.) during fall 2005; today DIMS involves about 20 Courses in M&S for PhD Students and over 20 PhD Students are enrolled in this program.





Conclusions

The Simulation Team is acting at international level as a reference point between users and providers in simulation area.

The integration of experts, technicians is providing very good results on real case studies and complex projects.

An active area of development is related to distributed simulation and web-based modeling for extending the impact and exploitation of these proposed systems.

Every year Simulation Team - MITIM DIME and Liophant organize major Conferences and International Workshops focusing on application of Modelling & Simulation.

For instance the I3M2015 was in Genoa, SummerSim2015 in Chicago; in 2014 I3M it was in Bordeaux, WAMS in Istanbul and Summersim in Toronto.

There is a constant interest in fostering joint cooperation and exchanges with international Excellence Centers working on simulation.

In 2016 Prof. Bruzzone will serve as General Chair of WAMS in Cagliari as well as of I3M in Cyprus: this last conference represent one of the major scientific event worldwide

in simulation: i.e. the I3M2011 organized in Rome,

joint to CAX Forum, probably was the largest scientific event

in M&S worldwide, involving over 500 speakers from 56 countries and over 30 live demonstrations (including Distributed simulation connecting NASA, MIT and Genoa University)

Simulation Team



Chicago



Bordeaux



Tampa

IMAACA





Potential Cooperations



Simulation Team

& NATO CAX
Forum in Rome

Simulation Team provides R&D/Scientific Opportunities such as:

- Conferences and Track Organization in event where the Simulation is Strongly Involved (i.e. SummerSim, I3M, WAMS, AMS, ect)
- Exchanges for Senior and Young Scientists
- Opportunity for Scientific Cooperations devoted to promote new developments in M&S
- Developing new Standards and Procedures in M&S
- Promoting M&S in Service of the Society
- Development of Networks of Excellence in M&S



Wien

Austria

IMAACA



Simulation Team is looking for Opportunities including:

- Activation of Innovative Simulation Projects
- Combining Simulation Team Solutions with Partner's Models as Options to be proposed to Sponsors during the Proposal Phase
- Include in Simulation Team Solutions Add-In from Partners as Option for Sponsors during the Proposal Phase
- Supporting Partners in future Proposal acting directly or as subcontractor and viceversa
- Receiving Support by Partner in future Proposal acting directly or as subcontractor

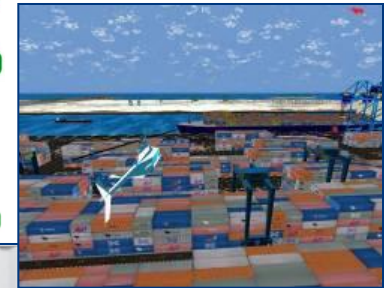


Bond graph

Summersim



References



DIME



MITIM
DIME Genoa University
via Opera Pia 15
16145 Genova, Italy
www.itim.unige.it
Agostino G. BRUZZONE
agostino@itim.unige.it

