Simulation Team

M&S Projects from Simulation Team

Liophant Simulation

M&SNet   M&S Net

MITIM Simulation Team Genoa Center

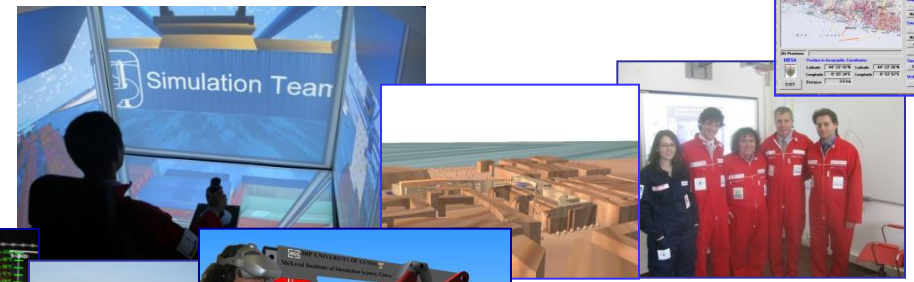McLeod Institute of Technology and Interoperable M&S Genoa Center

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www.simulationteam.com
www.liophant.org
www.itim.unige.it

🇮🇹 ITALY

DIPTEM
University of Genoa

Simulation Team

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

MAST

CALTEK

www.liotech.co.uk

M&SNet Genoa

Liophant Simulation

CENTRALABS

CentraLabs Cagliari

CRiCS Centre for Research In Complex Systems

CSU Australia

CIREM Università di Cagliari

SIM FUTURE

DLM aeronautics

etea SICUREZZA

Blizzard Srl

DARK ENERGY

gii

MSC-LES

Mik Riga TU

Universidad de la Rioja

UNICAL

SimCenter Universitat Autonoma de Barcelona

LOGIXTICA

Perugia

Università di Perugia

LSIS Marseille

GRVa LAMCE COPPE.UFRJ.BR

Rio de Janeiro Brazil

IMS-LAPS Univ.Bordeaux

MITIM Simulation Team Genoa Center

McLeod Institute of Technology & Interopeable Modeling Simulation Genoa

VIRTUALY

DIPTEM Università di Genova

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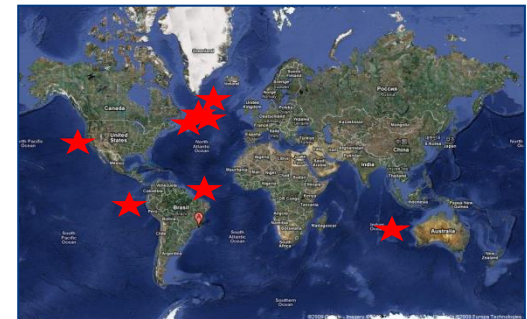
Simulation Team

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   Power Plants   PM
           Harbor Terminals   Public Services Environment
           Manufacturing   Assembling   Logistics
           Public Transportation

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.
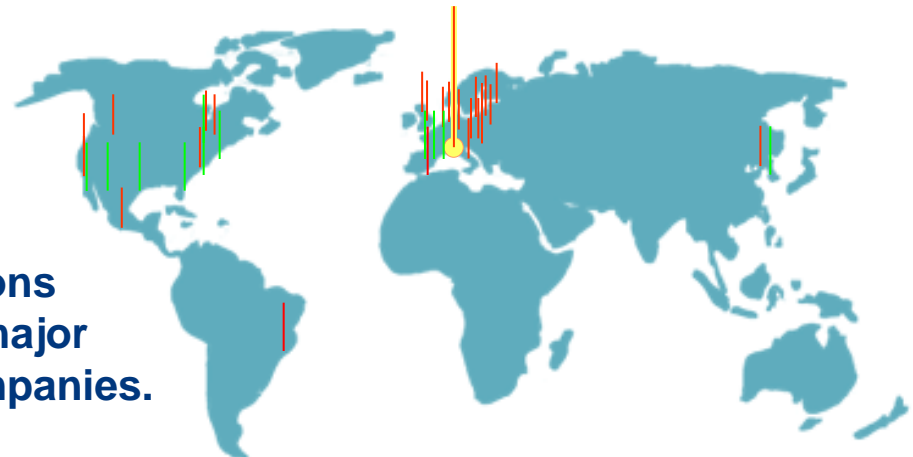
34 M&S Net Centers World-Wide

Simulation Team

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 Petrobras	**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

DIPTEM
Università di Genova

Simulation Team

DIME - University of Genoa

DIPTEM was founded in 1997 as evolution of the Institute of Technology and Industrial Management (ITIM) that was operative from '60. In 2011 DIPTEM 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 m^2).

For further Information about
the University of Genoa:
        http://st.itim.unige.it
        http://www.unige.it

Simulation Team
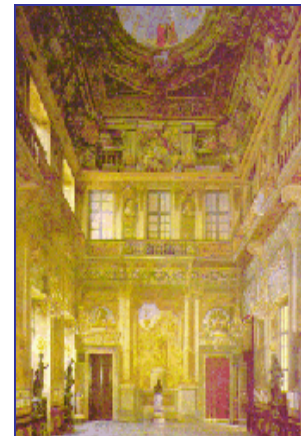
Savona Campus & Facilities

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 DIPTEM Simulation Team created over the years start up companies that currently cooperate in M&S (i.e. MAST srl, Cal-Tek srl, Virtuality, LioTech ltd, DLM Solutions, 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

Simulation Team

Liophant Simulation

Email: info@liophant.org

The *Liophant Simulation* involves World-Wide Scientists and Technicians working in Companies and Academia.
The *Liophant* promotes Advanced R&D Projects using M&S for Real Applications in challenging frameworks (e.g. Space, Industry, Business, Defence, Service of Society)

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

Liophant 🔵 Members & 🟦 Links

www.liophant.org

Simulation Team
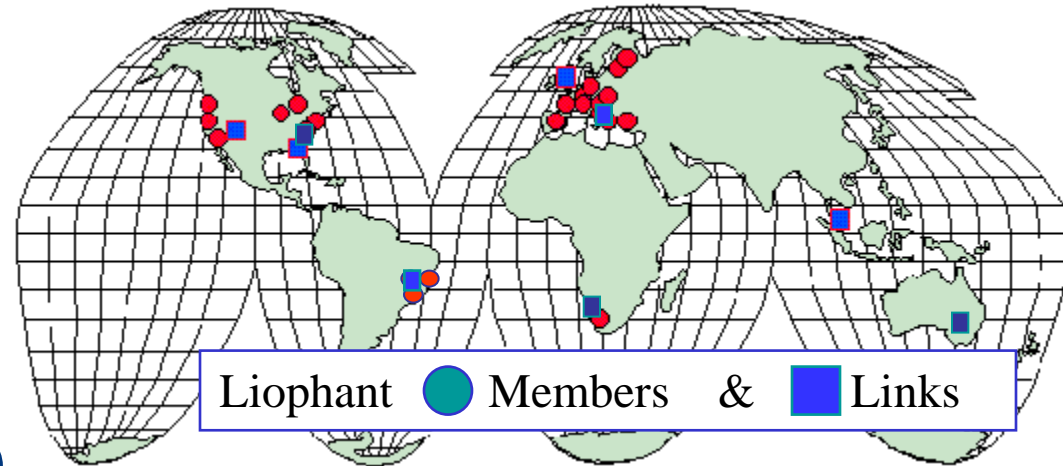
International Liophant Student Exchanges along 2015

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

Défense, Paris
December
Murino

Counter Terror Expo London, May
Franzinetti

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

NATO STO, Paris
Juky, Maglione

CWIX JFTC
Bydgoszcz, May
Oddone

SCSC, Chicago
July, Di Matteo

Beihang University, Beijing
Padovano

NMSG, Munich,
October
Oddone

Rutgers Univ.
Padovano

Loxistica Singapore
January-December
L. Bucchianica

I/ITSEC Orlando, *December*
Di Matteo, Maglione, Been

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

Simulation Team

Simulation Technology Transfer

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

MISS Education in M&SS

Prof. Courses
- M&S
- VV&A
- HLA
- DIS
- PM in M&S

Professional Certification

Academy
- PhD Programs
- Masters Programs

Academic Certification
- PhD Candidates
- Master Students
- Banchelors
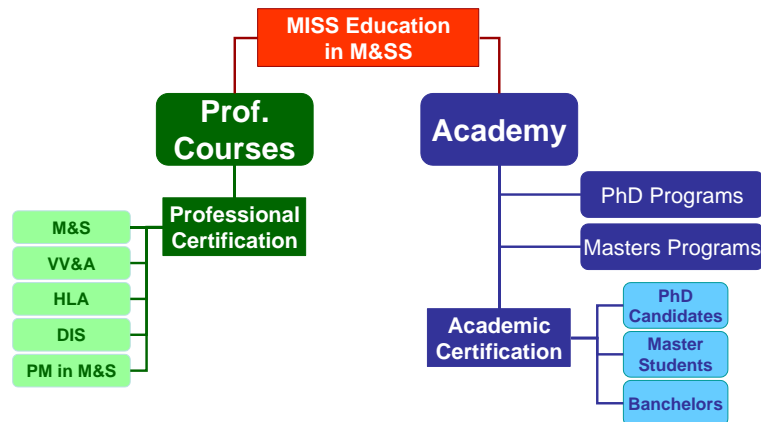
Course Location

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)

Simulation Team

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.).

M&S Fundamentals
M&S Regular
M&S Advanced
Simulation Fidelity
CGF
M&S Standards Policies and Organizations
Modelling Human Behavior
PM for M&S Fundamentals
PM for M&S Regular
PM for M&S Advanced
Simulation Requirements
Human Behavior Model VV&A
VV&A Fundamentals
VV&A Regular
VV&A Advanced
Measures in M&S
VV&A of Legacy Systems
Risk Assessment in M&S
VV&A of New Simulations
Distributed, Parallel & Inter. M&S
HLA Overview
HLA Regular
HLA Advanced
SBA
SME in M&S
DIS
Logistics Simulation
Accreditation Agent in VV&A
Serious Games
V&V Agent in VV&A
Non Kinetic and Asymmetric Scenario Models
User in VV&A

Management Oriented
Technical Oriented

SAIC
An Employee-Owned Company

AEgis TECHNOLOGIES

DMSO

UCF

Simulation Team

JESSI

Joint Environment for Serious Games, Simulation and Interoperability

JESSI is an innovative interoperable environment developed by Simulation Team that includes many different models to simulate complex heterogeneous networks and entities with their interactions & operations. Intelligent Agents are used to reproduce social networks, human factors & autonomous system behavior. JESSI addresses industrial, defense and homeland security complex Scenarios over multiple domains (i.e. air, land, sea, space, cyberspace) and running on multiple platforms (e.g. IoT, cloud, computers) being ready to be federated with other models & simulators. JESSI studies, by virtual experimentation, strategies, policies & technological alternatives for improving overall efficiency, effectiveness and reliability.
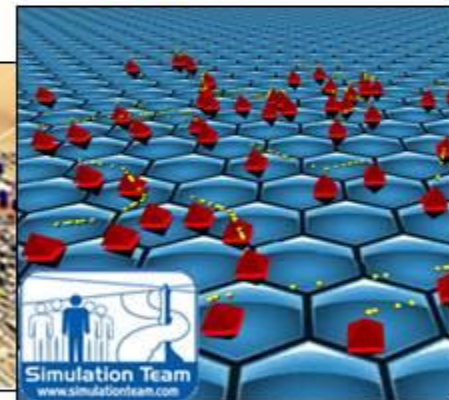
JEANS

Joint Advanced Marine Security Simulator

Simulation Team

JEANS (Join Environment for Advanced Naval Simulation) is a virtual interoperable simulation environment developed by CMRE to reproduce the Extended Maritime Framework.

JEANS runs on multiple platform and modes, from stand alone to HLA and integrates the IA-CGF (Intelligent Agent Computer Generated Forces) developed by Simulation Team.

JEANS is entitled to work with different immersive environments such as the SPIDER Cave.

JEANS was applied to different scenarios in deep waters, coastal areas, port and critical infrastructure protection.

Simulation Team
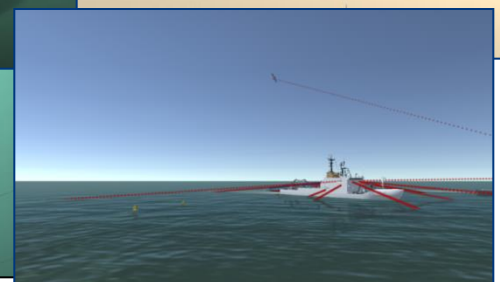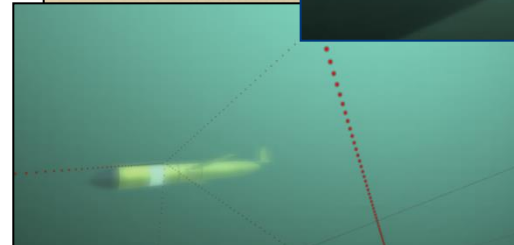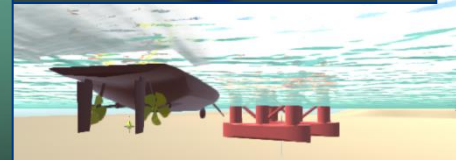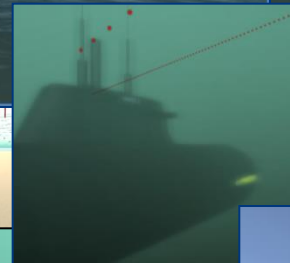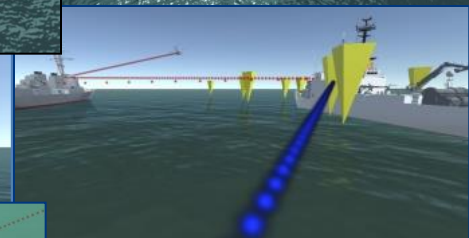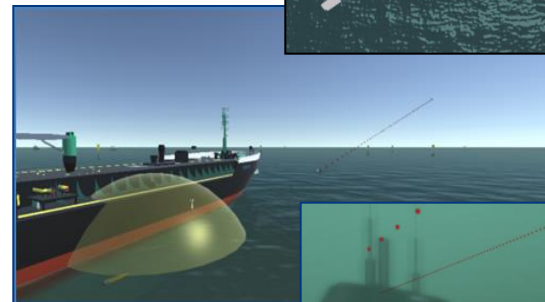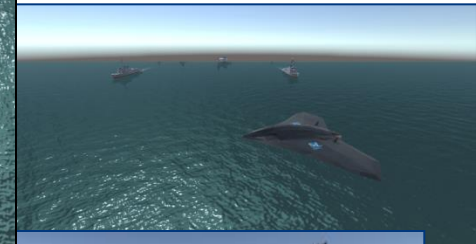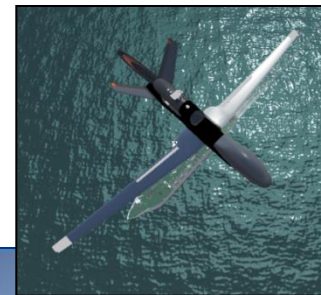
PANOPEA

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**
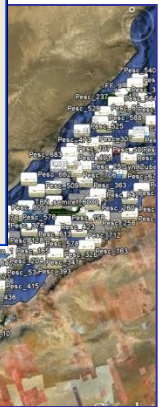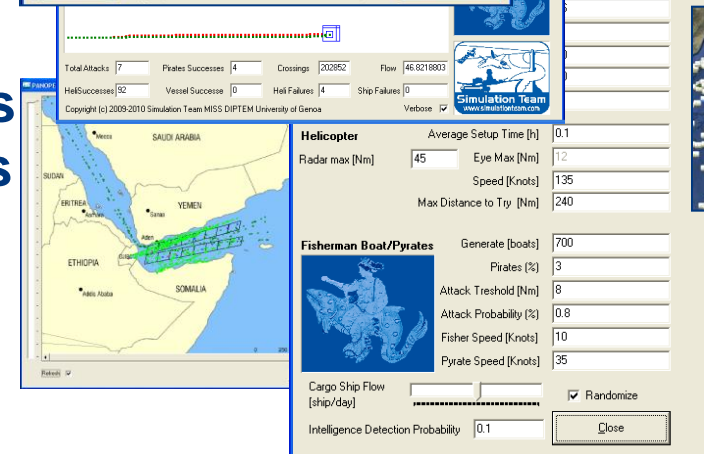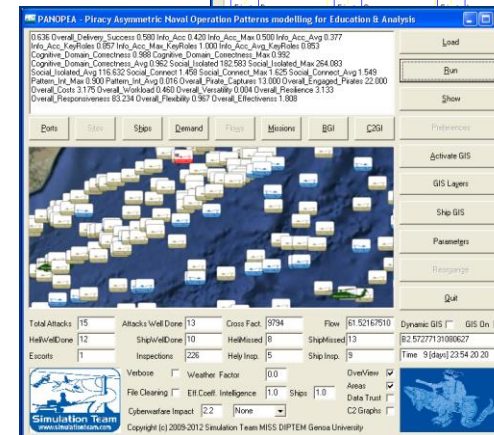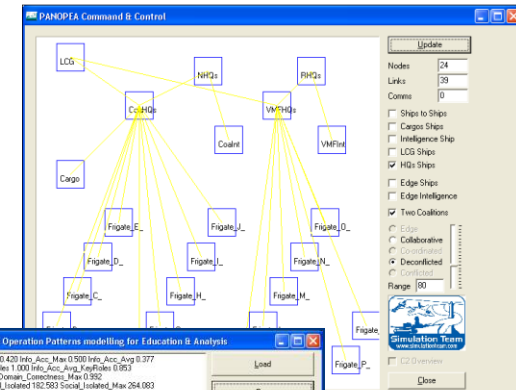
Simulation Team

MALICIA

Model of Advanced pLanner for Interoperable Computer Interactive Simulation

MALICIA is a constructive simulation derived from PANOPEA and devoted to analyze Maritime Interdiction Scenarios including anti piracy, illegal immigration patrolling and block operations.

The simulator considers boarding operations as well as inspections operating with multiple Assets (i.e. MPA, Vessels, AUV, Helicopters, RHIB, USV, AUV, Submarines). The model uses Web services to collect data and interact with Tactical Naval Situation and it is open for supporting dynamic Operational Planning and Optimization considering Efficiency, Risks and Costs of the whole aspects within scenarios where false alarms and intense commercial traffic is present

DIME
Università di Genova
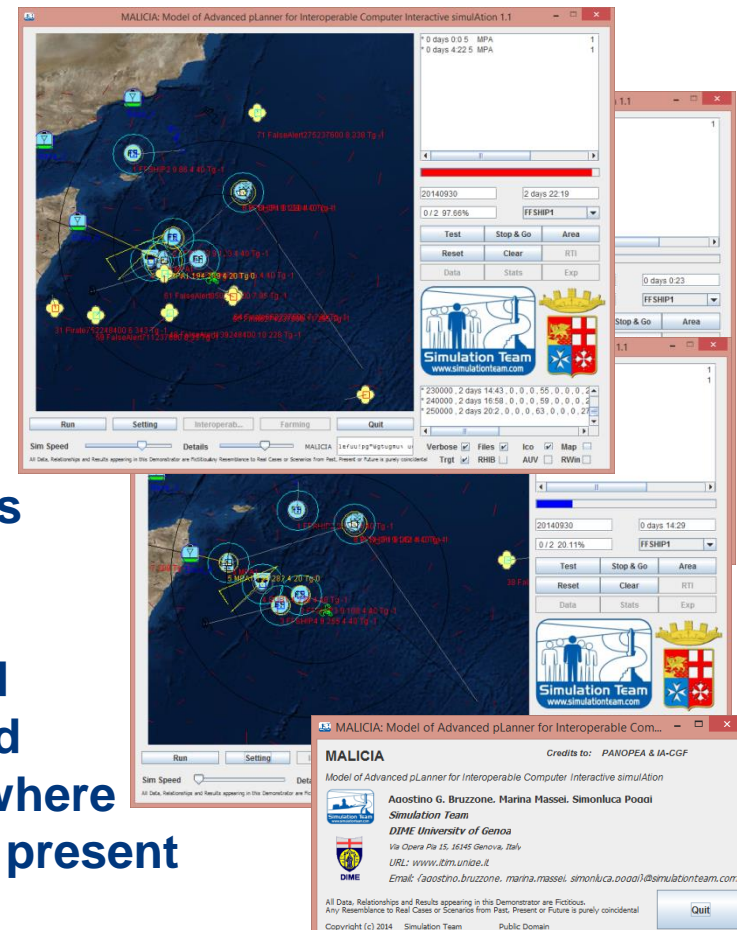
Simulation Team

Operational Interoperable Simulation: IA-Drones & SEAVIT

> **IA-Drones is a IA-CGF NCF (Non Conventional Framework) Developed by Simulation Team to federate and simulate real assets interacting with virtual ones to maximize the overall performance**

> **Main goal: to investigate requirements and solutions to be adopted for Interoperability of AUVs, USVs, UAVs**

> **Advantage: possibility to conduct tests over complex scenarios**
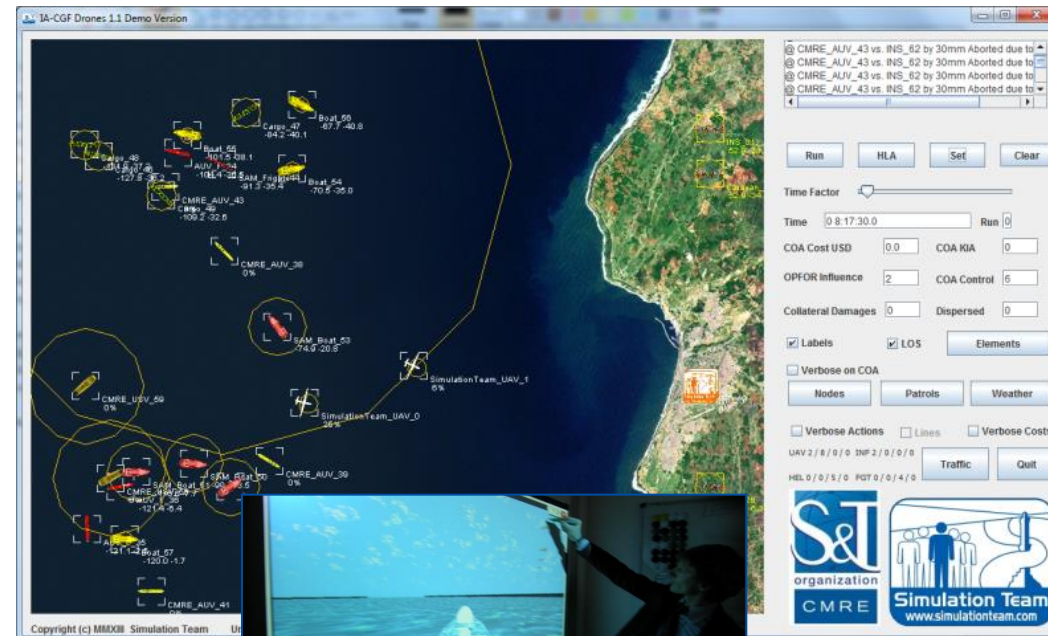
Simulation Team

Synergy with NATO Maritime Security Initiative

NATO STO CMRE

NATO M&S COE
NATO MSG

Some Institutions and Universities are already active in this R&D Initiative including Simulation Team, MSC-LES, Genoa Univ. La Coruna Univ

DIME

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 project 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 the impact of human factors. The Models of Population and Human Behaviors have been developed by Simulation Team by Using IA-CGF; so SIMCJOH VIS and VIC and represent the core of SIMCJOH Federation and are available to develop even further Complex Scenarios.

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Simulation Team

T-REX
Threat network simulation for REactive eXperience

T-Rex (*Threat network simulation for REactive eXperience*) is a MS2G (Modeling, interoperable Simulation & Serious Game) devoted to reproduce Hybrid Warfare and to be federated with other elements to evaluate the impact of these actions. T-REX reproduces urban, as well as extra urban contexts over multiple domains including land, air, sea, space and cyberspace. The models allows to consider media communications and possibility to use different assets and to experiment virtually the different decisions in terms of COAs (Courses of Actions)

Simulation Team

www.liotech.co.uk
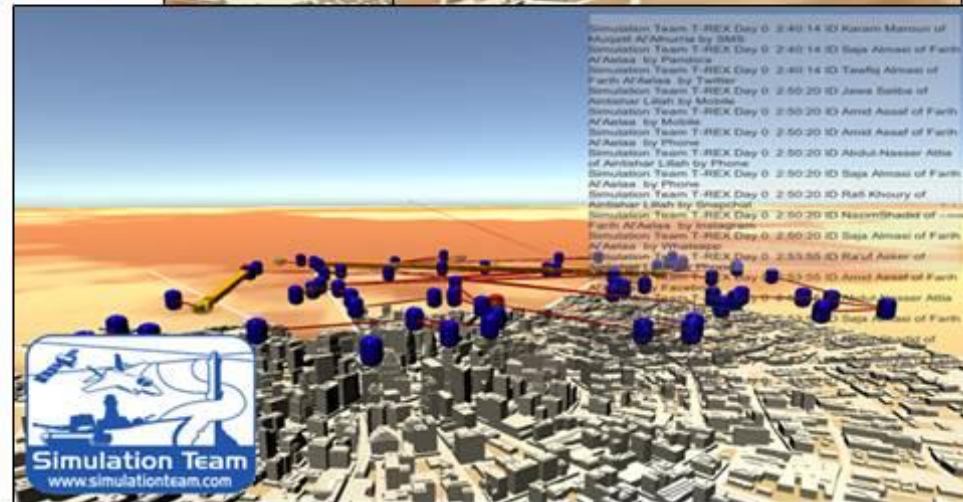
DYTACCO

DYnamic Targeting Collateral damages and Consequences

DYTACCO is a dynamic Targeting Simulator focused on evaluating collateral damages, risks and consequences of operations in complex contexts. DYTACCO is a Serious Game conceived for Commanders and Staff training over new mission environments.

The Simulator proposes challenging Opportunity and Dynamic Targeting Cases to the JFIB (Joint Fire and Intelligence Branch), requiring them to define the Decision Making Briefing for Commander considering risk, collateral damages, consequences, second effects, available assets, caveats, etc. The Commander finalizes the decision on the Dynamic Target Case that is elaborated by the simulator providing direct and indirect outcomes of the different alternatives on the scenario, population and interest group reactions.

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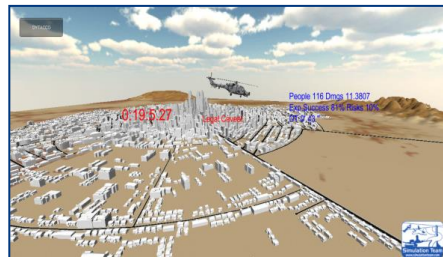
Haiti Case

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
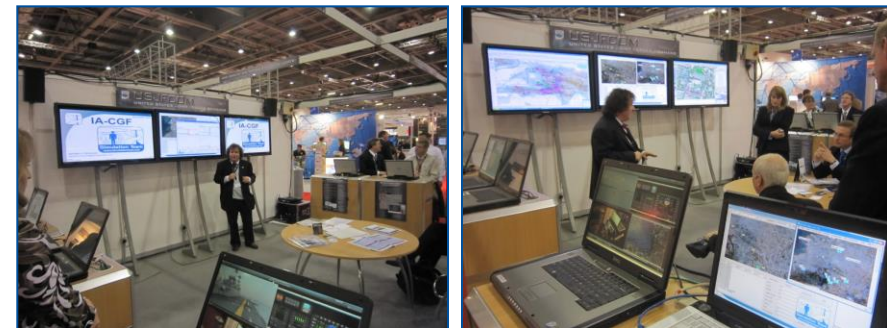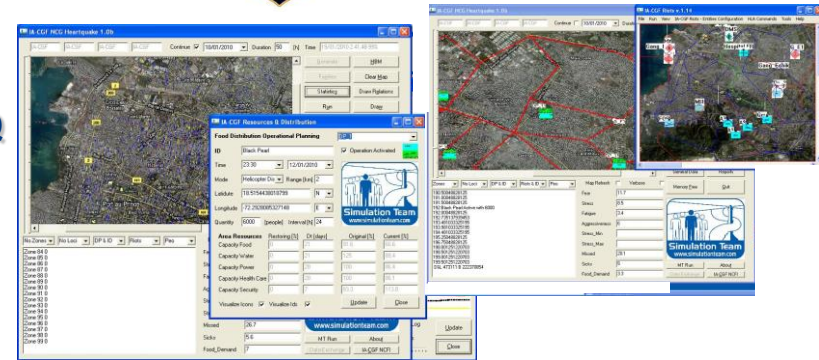
SMARTCITY Decision Theater

Simulation Team

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
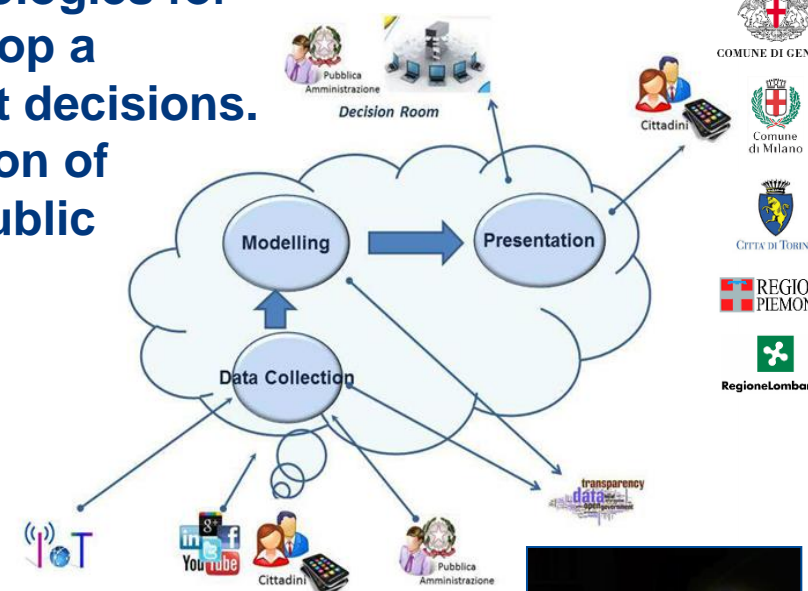
Simulation Team
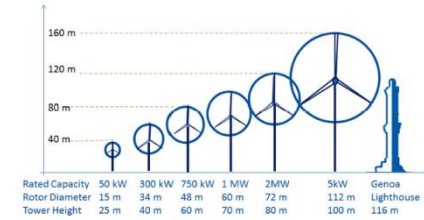
MEGACITY

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.

DIPTEM
Università di Genova
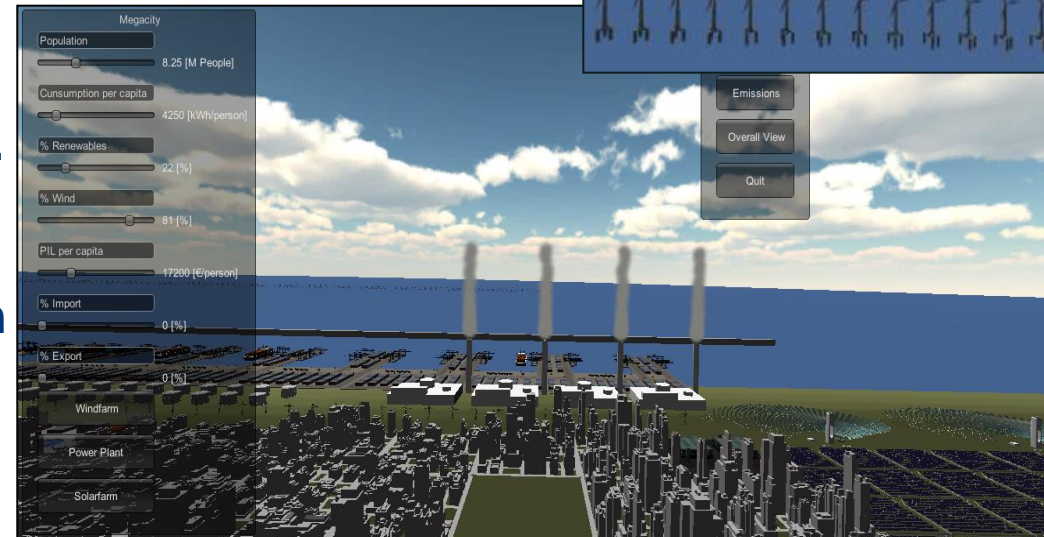
Simulation Team

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.


State Definition

Regular Activities & Transportation

Hurricane Simulation

GIS Integration

Overall Simulation

Evacuation P&P
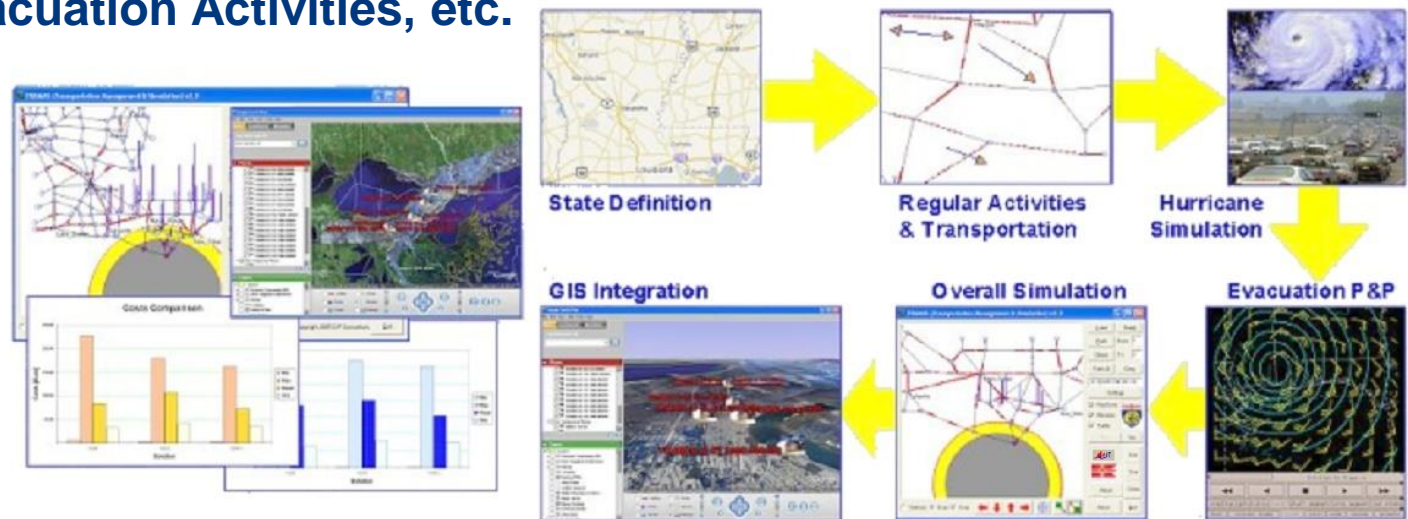
IDRASS

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 Facilties, 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
DIPTEM *HLA High Level Architecture*
Università di Genova
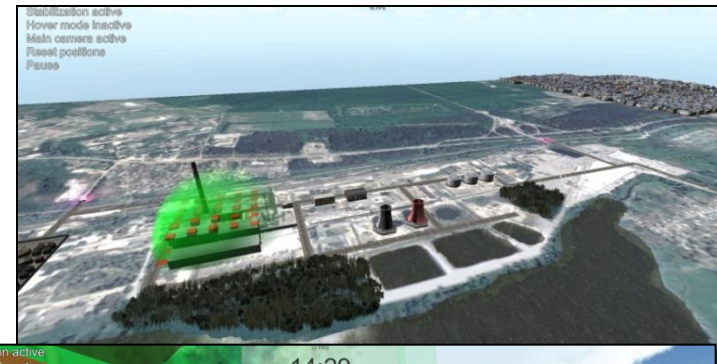
ARTEM

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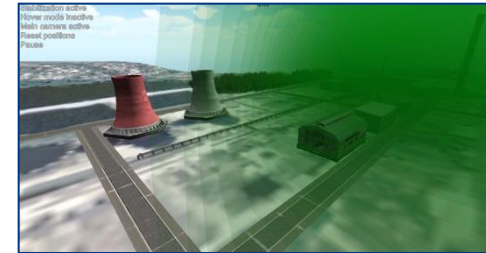
ARTEM (Augmented Reality TErrain interoperable Module) is a Module integrated through High Level Architecture with MS2G (Modeling, interoperable Simulation & Serious Game) systems.

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.

Simulation Team

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

Childhood: Influence of Parents

| Changes in Behavior | Imbalance Nutrition | Weight | BMI in Childhood |

Childhood: Preventive Actions

Adult BMI

Mortality & QALYs ← Related Pathologies

Basic Model of Obesity in Childhood

BACCUS - Behavioral Advanced Characters and Complex System Unified Simulator

Generate | Explosion
Families | Clear Map
Statistics | Draw Relations
Run | Draw
Memory Free | Quit
Id 1 Levels 1 Extend
Social | Sex
Religion | Party
Education | Age
Ethnic | Affinities
Zones | Loci
General Data | Conditions

Sons 4957
Olds 2333
Friends 37980
Education 1.83312499523163
Sex 0.477925002574921
Age 47.6828498840332
Social 3.14397501945496
Party 0.0697000026702881
Religion 4.10047483444214
O[days] BMI Avg. 25.2435583350521 Regular: 56.2214050292969% Overweight: 33.8183441162109% Obese: 9.96024894714355%

Beth Israel Deaconess Medical Center

A TEACHING HOSPITAL OF HARVARD MEDICAL SCHOOL
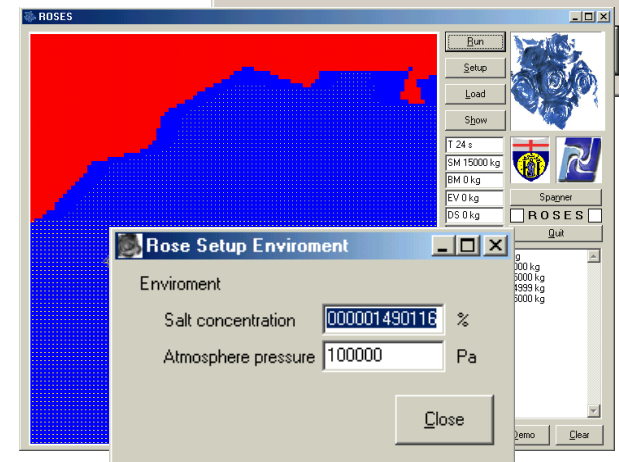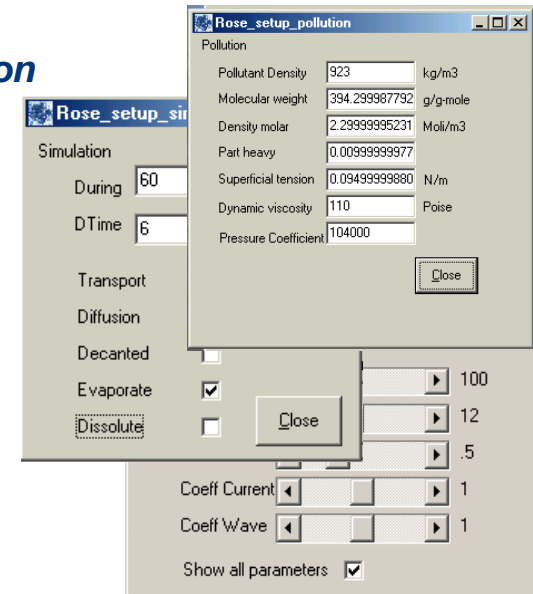
Simulation Team

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.

Simulation Team

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
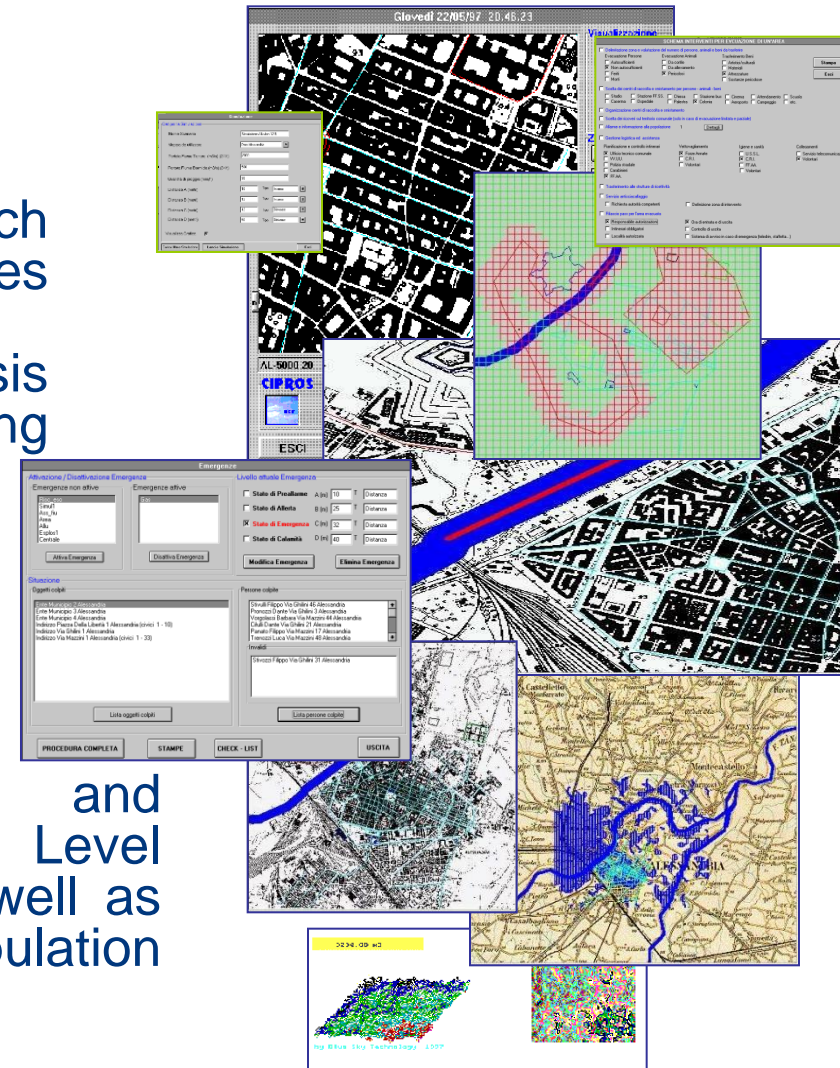
Simulation Team

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

Federal Government → Federal Police

Illegal Immigrants

External Workforce

Money Founding

Local Workers

Crime Organizations

Agriculture Companies

Local Authorities

Fakes Documents

Fake Workers

Unemployment Benefits

Virtual Companies

Unemployment Office

Perugia

Simulation Team
www.simulationteam.com

M&SNet
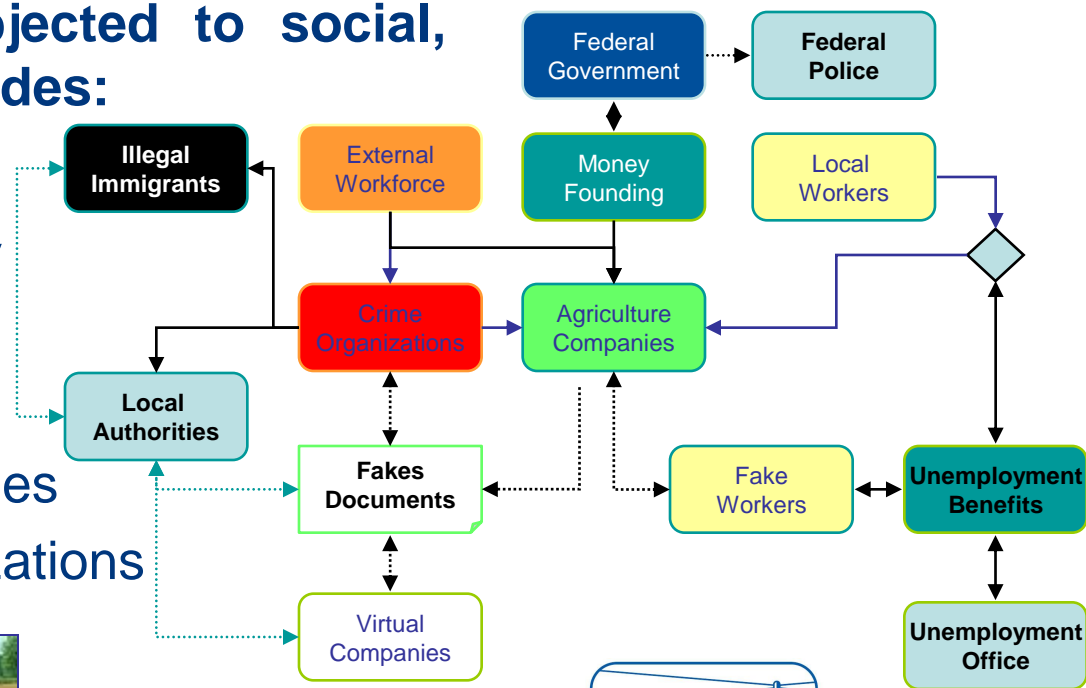
PSYSOP

Psychological and cultural Simulation Of Population

PSYSOP is a Simulator Reproducing a Town including Psychological and Cultural aspects affecting the Population behavior and reactions. The model includes social, cultural, educational, psychological, gender, age, religion and many other parameters including the social networks related to family and work environment and their influence on the scenario evolution.

Simulation Team

RATS

Riots, Agitators & Terrorists by Simulation

RATS is a simulator based on Intelligent Agents for simulating Riots, Civil Disorders as well as Agitators and Terrorists actions within Urban Scenarios considering different entities and influence of Human Factors such as :

Paramilitary Forces	*Terrorists*	*Warlords*
Police Forces	*Firefighters*	*Health Care*
Military Units	*NGOs*	*Governmental Entities*
Population	*Protesters*	*Ethnic Groups*

SLAMS

Simulation Lean Advanced Mobile Solutions

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.

Simulation Team

IA-CGF UCOIN

Intelligence Agent Computer Generated Forces UAV and Counter-Insurgency

www.liotech.co.uk

IA-CGF UCOIN is a Stochastic Simulator of Joint Operations involving UAV (i.e. Rapiers and Predators) for Counter Insurgency in coordination with other assets (i.e. ground units, attack helicopters, planes).

IA-CGF UCOIN allows to simulate complex scenarios where population and civilians are used to hide and shield insurgent activities and to estimate operative performance as well as collateral damages and costs. IA-CGF UCOIN is a support to evaluate technological improvements as well as new operative policies, procedures and to experiment doctrine and enemy tactics evolution.
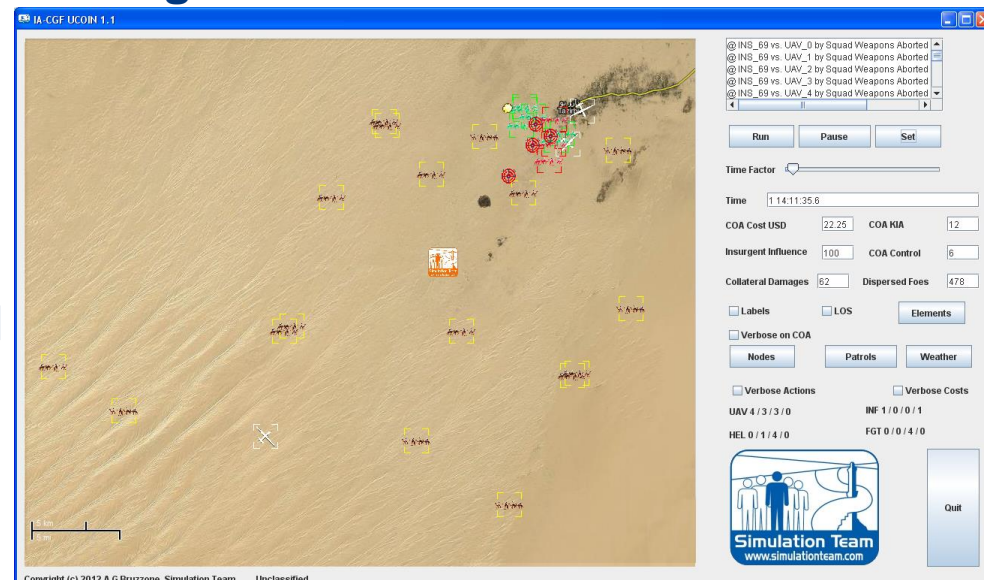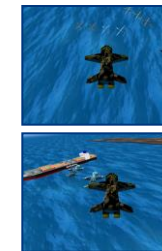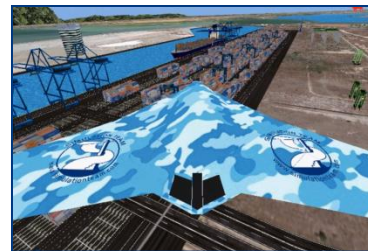
Simulation Team

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).

www.liotech.co.uk

Simulation Team
www.simulationteam.com

Simulation Team

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*

Simulation Team

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

Simulation Team
www.simulationteam.com

DIPTEM
Università di Genova

Simulation Team

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

Simulation Team

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.

Simulation Team

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)**

CeSiVa

Simulation Team
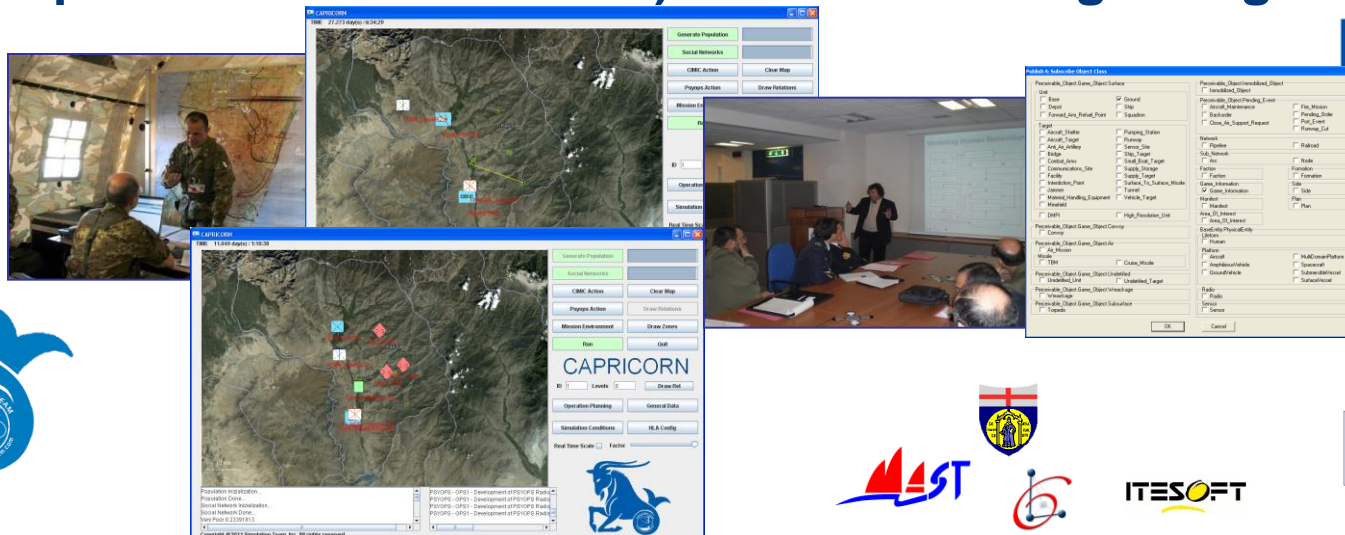
CGF C4 IT

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
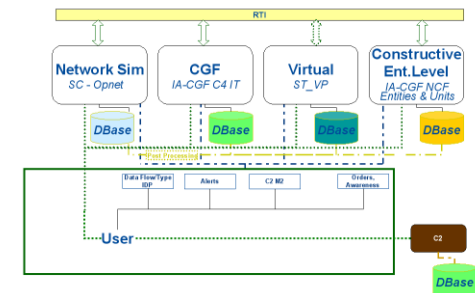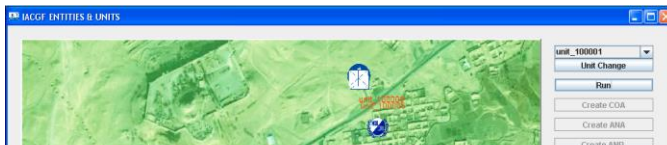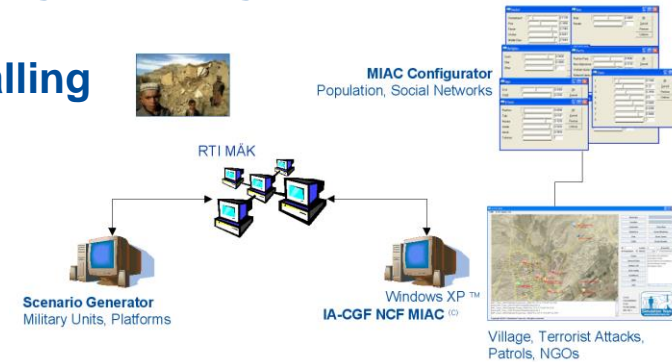
MIAC

Models of Intelligent Agents for Computer Generated Forces

Simulation Team

SELEX Sistemi Integrati
A Finmeccanica Company

MIAC NCF and MIAC Configurator are designed to drive a Federation where the IA-CGF allows to reproduce population within an Afghan Village. MIAC Federation is designed to operate under HLA using RTI MÄK on Workstations using Windows XP™ O.S. and installing IA-CGF NCF MIAC© derived by IA-CGF NCF PSYSOP© MIAC is interoperable with other federates (i.e. Scenario Generators) while the MIAC Configurator supports the Scenario Definition

MIAC Configurator
Population, Social Networks

RTI MÄK

Scenario Generator
Military Units, Platforms

Windows XP ™
IA-CGF NCF MIAC (C)

Village, Terrorist Attacks, Patrols, NGOs
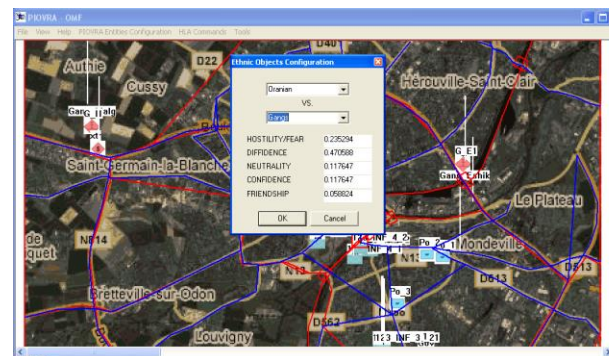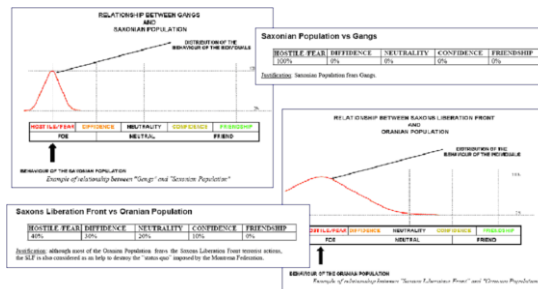
Simulation Team
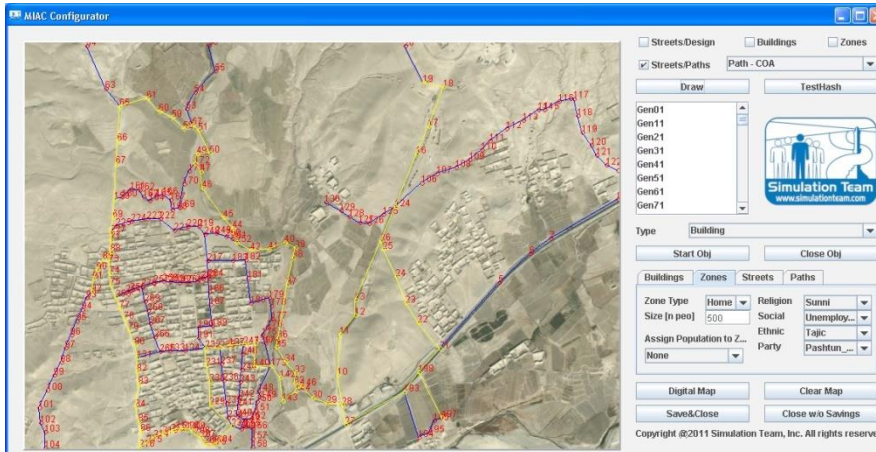
PIOVRA

Polyfunctional Intelligent Operational Virtual Reality Agents

PIOVRA was an EDA Project developed in cooperation with Italian and French MoDs in partnership between MITIM DIPTEM & LSIS.

PIOVRA allowed to develop a new Generation of CGF able to simulate "Intelligent" behaviors, filling up the gap between user requirements and current available CGF performances

PIOVRA demonstrated the new intelligent agents directing the CGF as effective models integrated in HLA Simulation reproducing Urban Disorders integrated in a Theater Simulation

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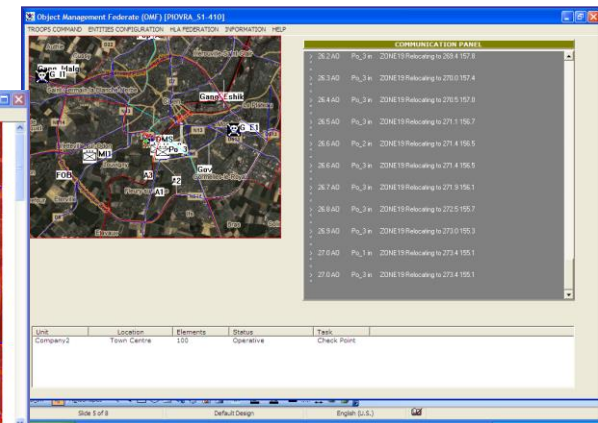
MESA

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.

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 DIPTEM University of Genoa and MAST.

Simulation Team

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 Exerts (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
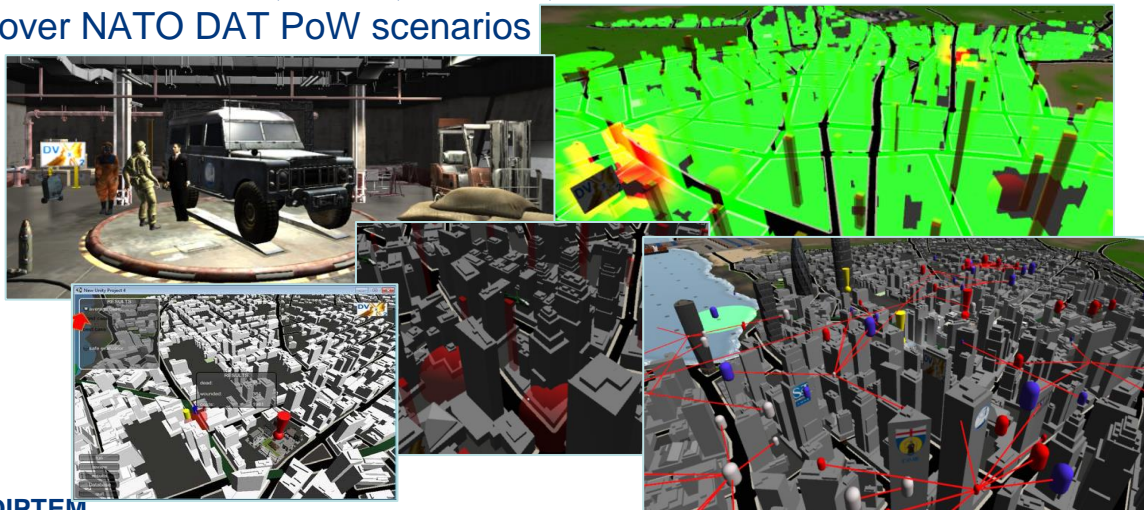
DVx2 focuses on scenarios involving:
- **C-IED/EOD Counter Improvised Explosive Device / Explosive Ordnance Disposal**
- **JISR, Joint Intelligence Surveillance and Reconnaissance**
- **CBRN, Chemical Biological Radiological & Nuclear**

DIPTEM
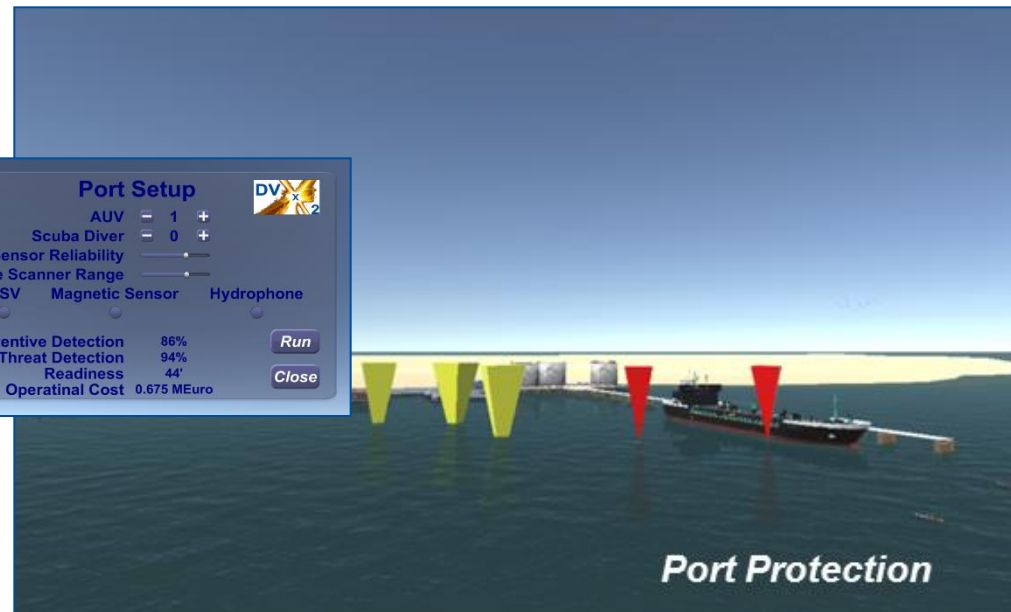**Università di Genova**
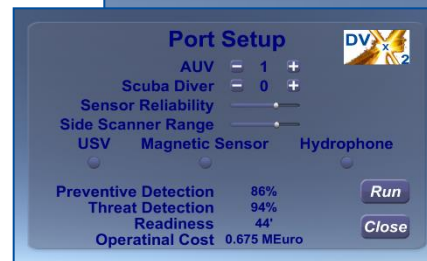
Simulation Team

Defense Against Terrorism (DAT) & IA-CGF: DVx2

IA-CGF NCF has been effectively applied to DVx2 (Distributed Virtual eXperience & eXercise) by Simulation Team in cooperation with CMRE to investigate combined use of Autonomous Systems and Traditional Assets for DAT activities for Vulnerability Reduction within the EMF (Extended Maritime Framework).

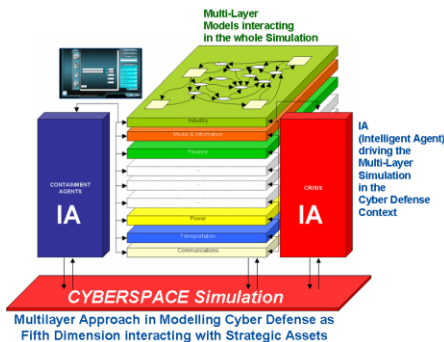The Scenario includes AUV, USV, Scuba Divers, Spec Ops and different Threats

Port Setup

AUV	− 1 +	
Scuba Diver	− 0 +	
Sensor Reliability		
Side Scanner Range		
USV	Magnetic Sensor	Hydrophone

Preventive Detection	86%
Threat Detection	94%
Readiness	44'
Operatinal Cost	0.675 MEuro

Run

Close

Port Protection

Unclassified *Copyright © 2004-2016 Agostino G.Bruzzone Simulation Team*

CRYSTAL

Cyber Reality Simulation for Threat Assessment and Defense Learning

   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).

Multi-Layer Models interacting in the whole Simulation

IA (Intelligent Agent) driving the Multi-Layer Simulation in the Cyber Defense Context

CONTAINMENT AGENTS — IA

CRISIS — IA

CYBERSPACE Simulation

Multilayer Approach in Modelling Cyber Defense as Fifth Dimension interacting with Strategic Assets

Simulation Team

SIBILLA

Simulation of an Intelligence Board
*for Interactive Learning and Lofty Achievements*
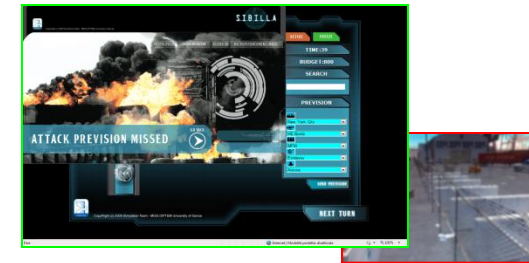
- **SIBILLA is multiplayer web strategy game that simulate Terrorist Actions organized by different organization directed by IA that plan, prepare and execute attacks on specific:**

  – **Location**
  – **Site**
  – **Time**
  – **Threat Type**

| Terrorist Action Concept | → | Terrorist Action Planning | → | Terrorist Action Preparation | → | Terrorist Action Execution |

| Intelligence Reports | → | Intelligence Reports | → | Intelligence Reports | → | Prevention |

Dummies

Mis-Communication

Comprimezed Sources

- **The intelligence reports are distributed among the players based on their capabilities and shared by a stochastic engine**
- **The Identification of the attacks in time is the key for individual success; the players cooperate and compete for budget and success**
- **Threat missed to be identified generate terrorist attacks that reduce global trust and support to intelligence agencies**
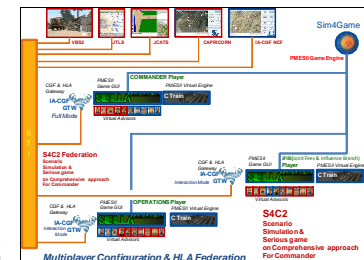
Simulation Team

MCWS

Marine Cyber Warfare Simulation

Simulation Team provided support to CMRE for the development of MCWS with special attention to use of IA-CGF and HLA modules. MCSW Simulator was developed to investigate complex scenario combining traditional battlefield operations (Sea Surface, Underwater, Air, Space) with action on the Cyberspace. The simulator evaluates the impact of Cyber Attacks and Defense actions respect the evolution of the situation. The mission environment involves multiple autonomous systems operating over an heterogeneous network involving both classified and unclassified computer infrastructures. MCWS was federated in RTI and tested integrated with CMRE MSTPA (Multi Static Tactical Planning Aid) respect ASW (Anti Submarine Warfare) Mission Environments
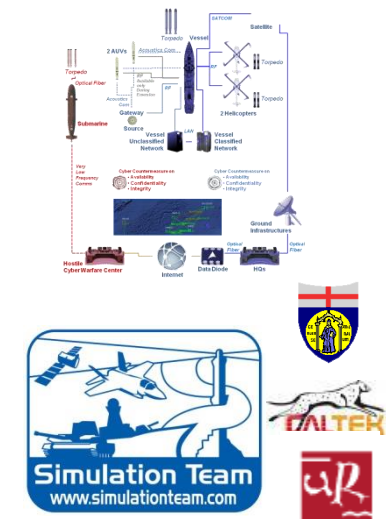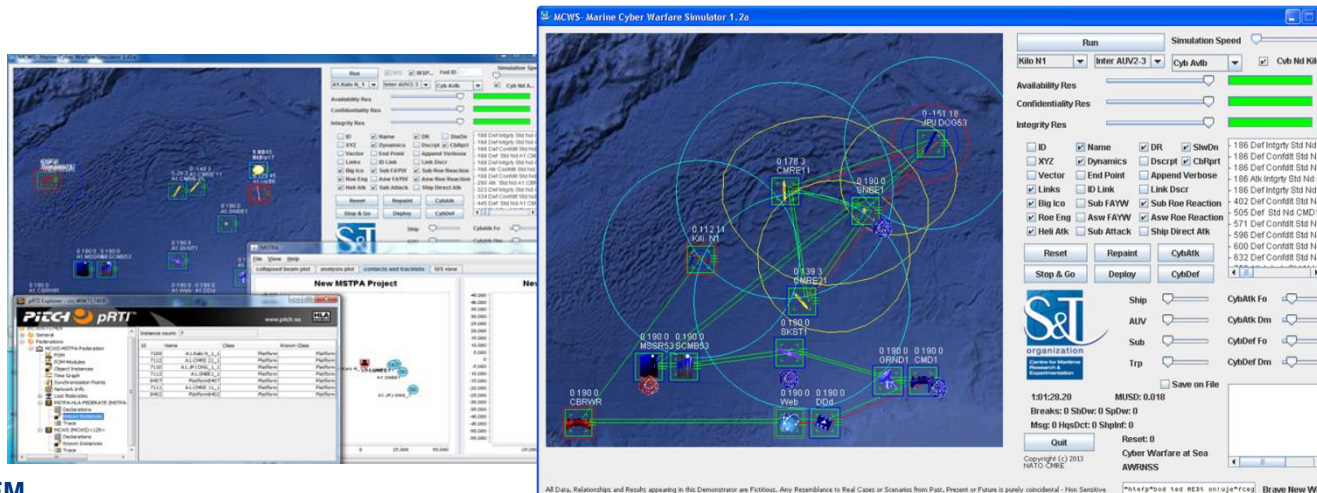
CUMANA

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
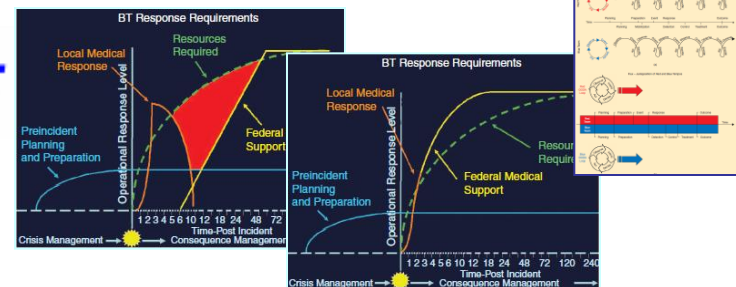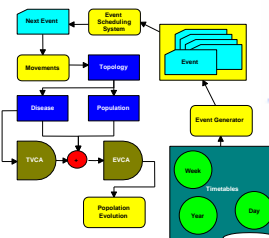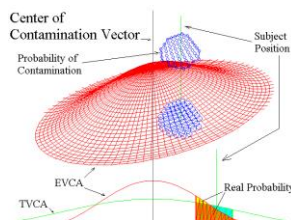
Simulation Team

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 DIPTEM, 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.
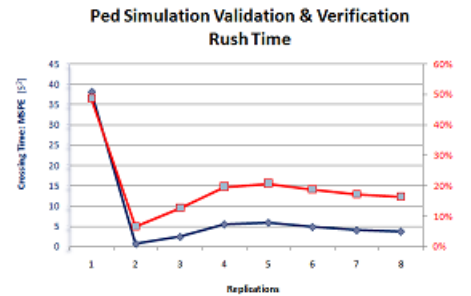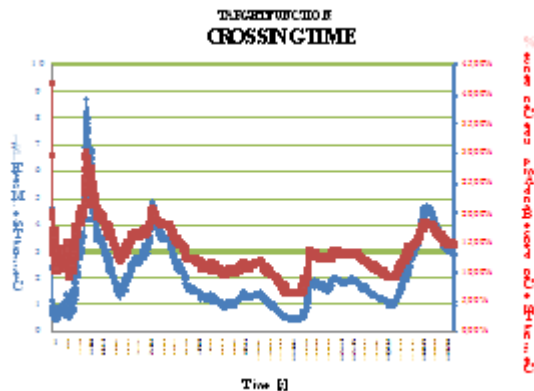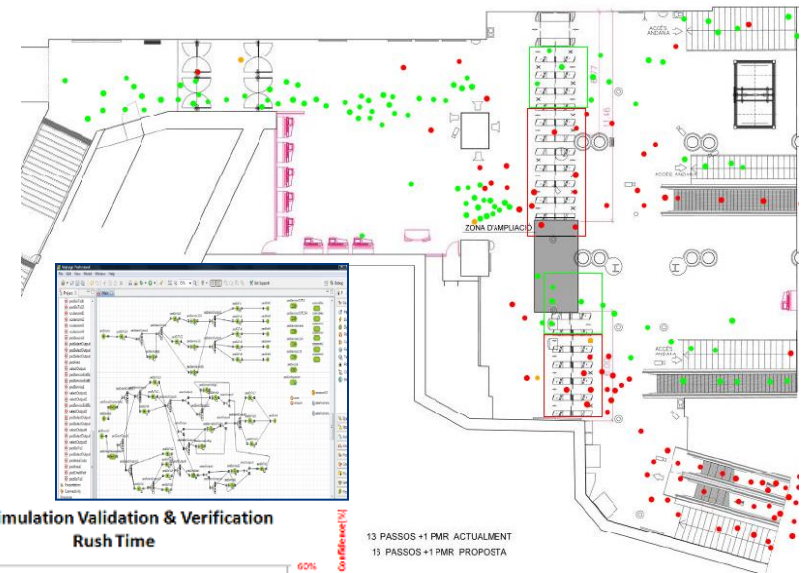
Simulation Team

PEDES

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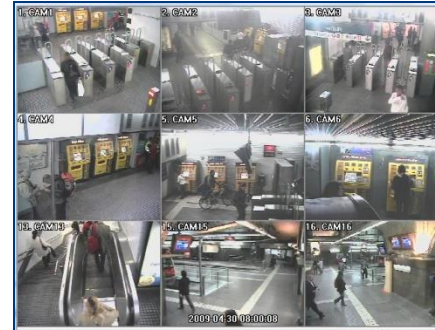
PEDES is a Simulation of pedestrian flows in mass transportation (i.e. underground) devoted to support functional analysis, safety and security solution design and analysis; PEDES is integrated with Human Behavior Models
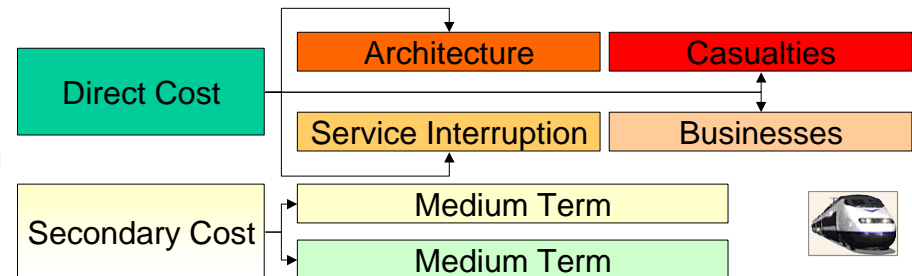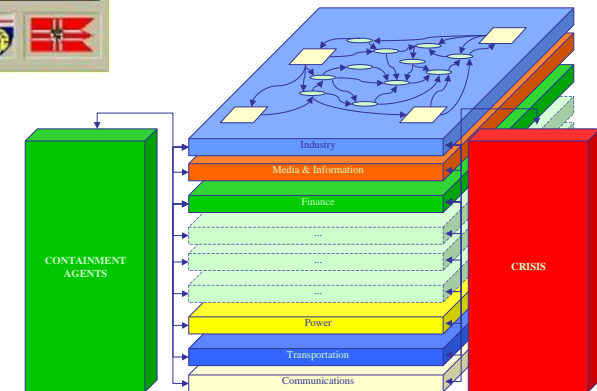
Simulation Team

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

Direct Cost

Architecture

Casualties

Service Interruption

Businesses

Secondary Cost

Medium Term

Medium Term

CONTAINMENT AGENTS

CRISIS

Industry
Media & Information
Finance
...
...
...
Power
Transportation
Communications

Simulation Team
Genoa Center

Simulation Team

Virtual Security Assessment and Training

VISAT (Virtual Security Assesment 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
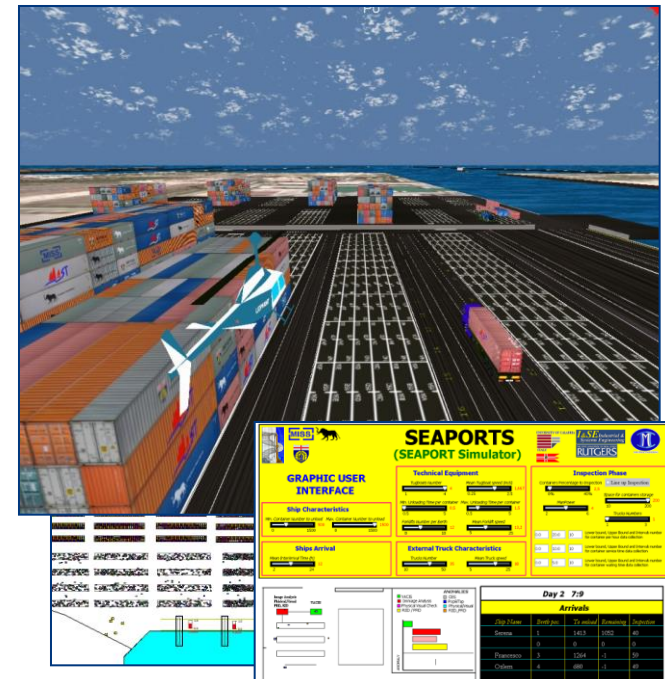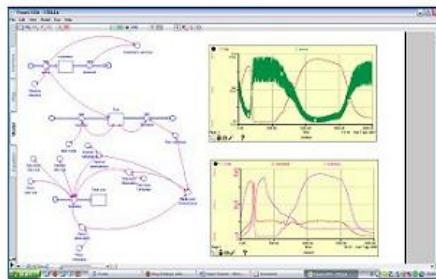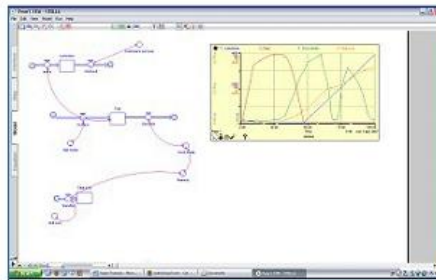
MOSCA

MO*delling* **S***upply* **C***hain* **A***ttacks*

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

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

Simulation Team

DIME

Centro di Competenza
della Sardegna sui trasporti
CENTRALABS

MAST
MSC LES
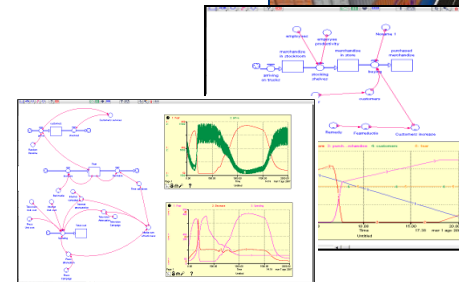
S4PT

Safety, Security Simulation System for Port Terminals

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 CentraLabs

Simulation Team

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 dedicates 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

SPIDER

Simulation Team

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.
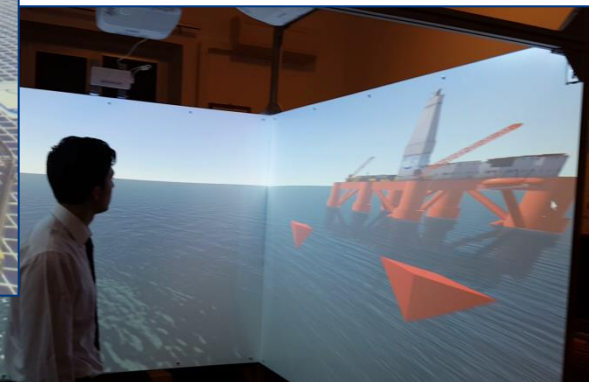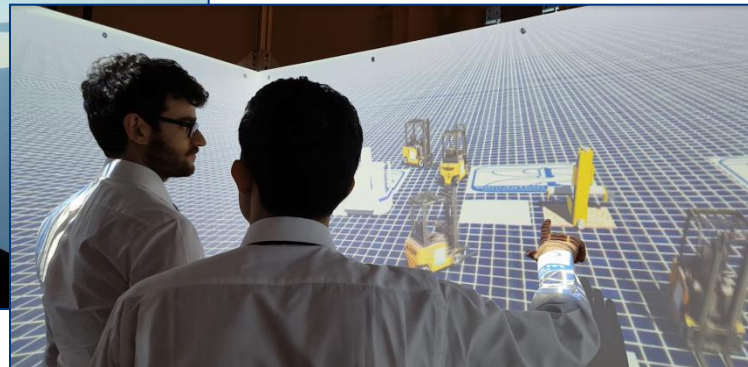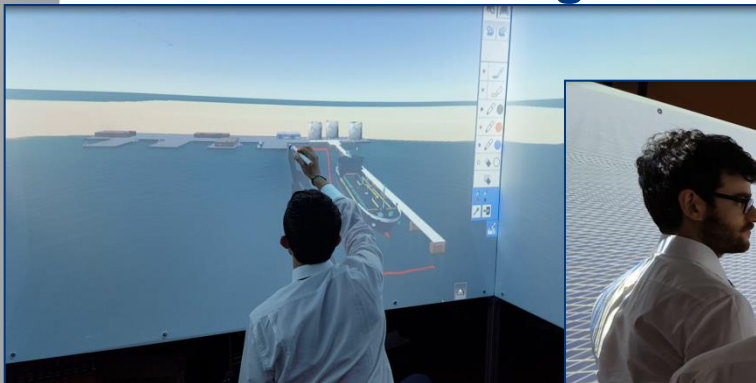
The SPIDER is fully Immersive including sound and motion.

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Simulation Team

LEMAS

Lean Manufacturing Simulation

LEMAS is an innovative approach to support development of Lean Manufacturing solutions by using advanced Modeling and Simulation techniques. LEMAS is based on the integration of simulation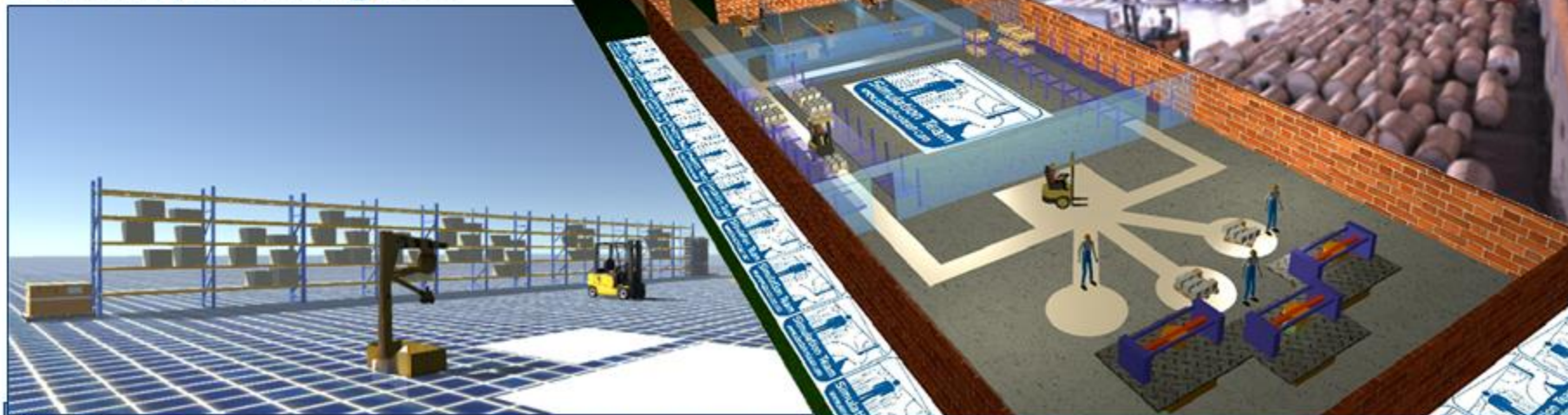 models and Design of Experiments techniques for improving manufacturing considering Logistics, Production, Human Factors, Planning, etc.

Simulation Team

ERGOS

Ergonomics and Re-engineering for General Production Optimization & Simulation

ERGOS focuses on the development of integrated discrete event and virtual simulation to re-engineering production processes and manufacturing solutions. This approach allows to conduct virtual experimentation for analyzing and optimizing of workspace, operations, flows, activities and automation solutions. ERGOS was successfully applied to a wide variety of real cases including among the others: mechanical assembling, food industry, leather production.

The approach allows to improve the overall manufacturing procedure re-engineering the Production Process and Work Stations based on Key Performance Indexes considering Effectiveness, Efficiency, Ergonomics and Safety

LAPIS

Simulation Team

AnsaldoEnergia
A Finmeccanica Company
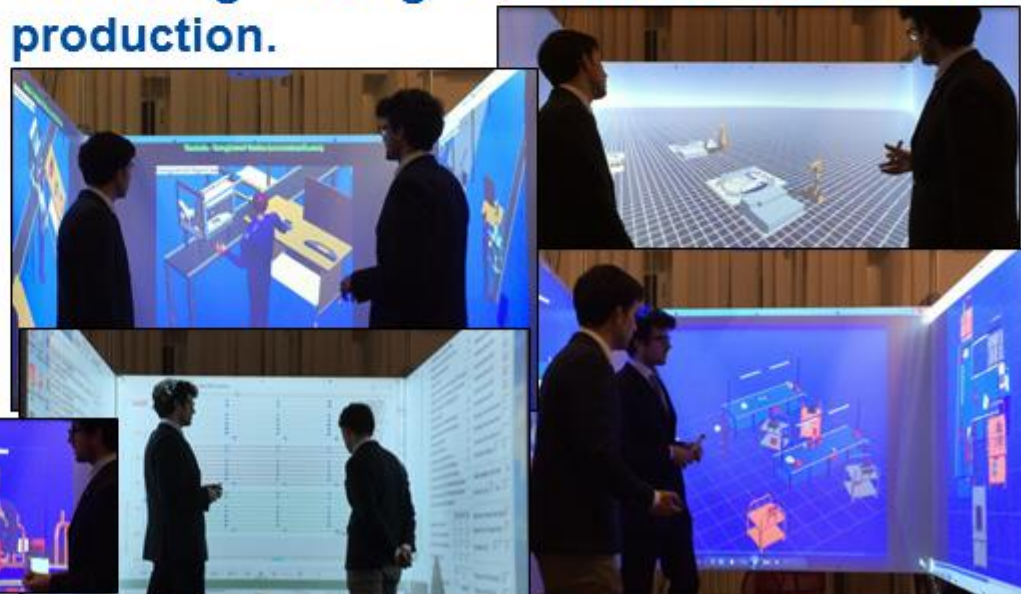
Lean Advanced Pooling Intelligent optimizer & Simulator

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

Simulation Team
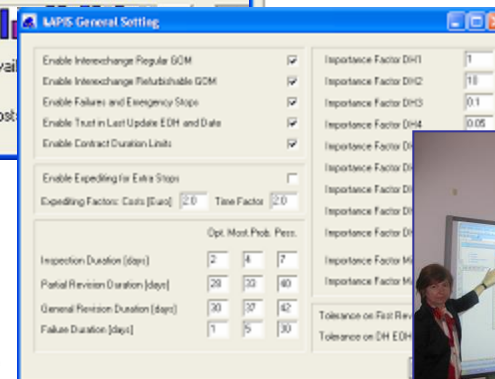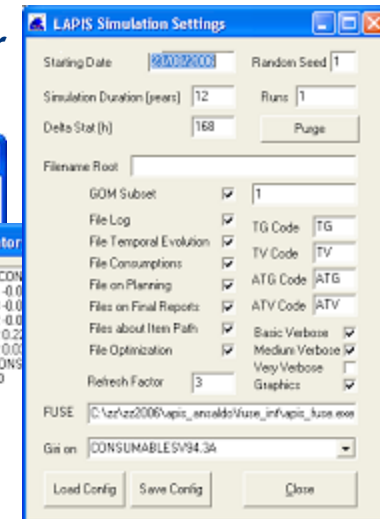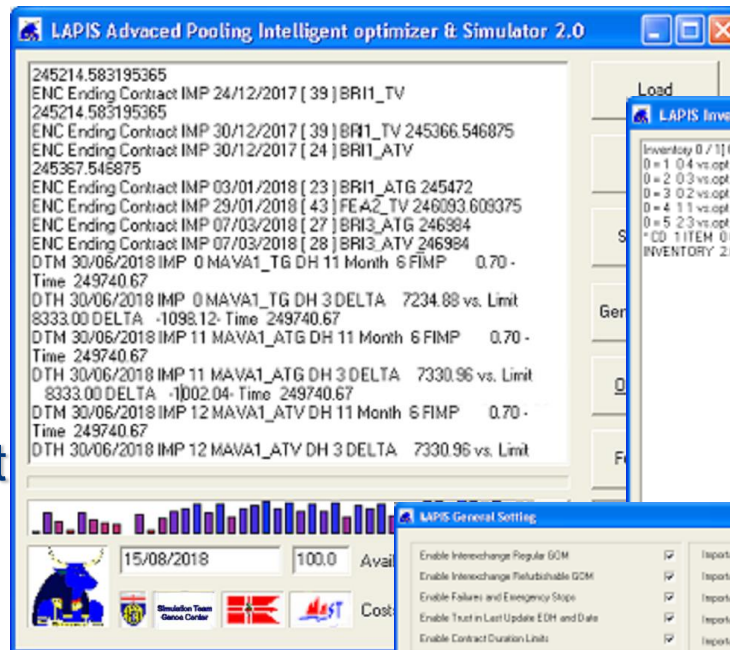
COUGAR

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.

Simulation Team
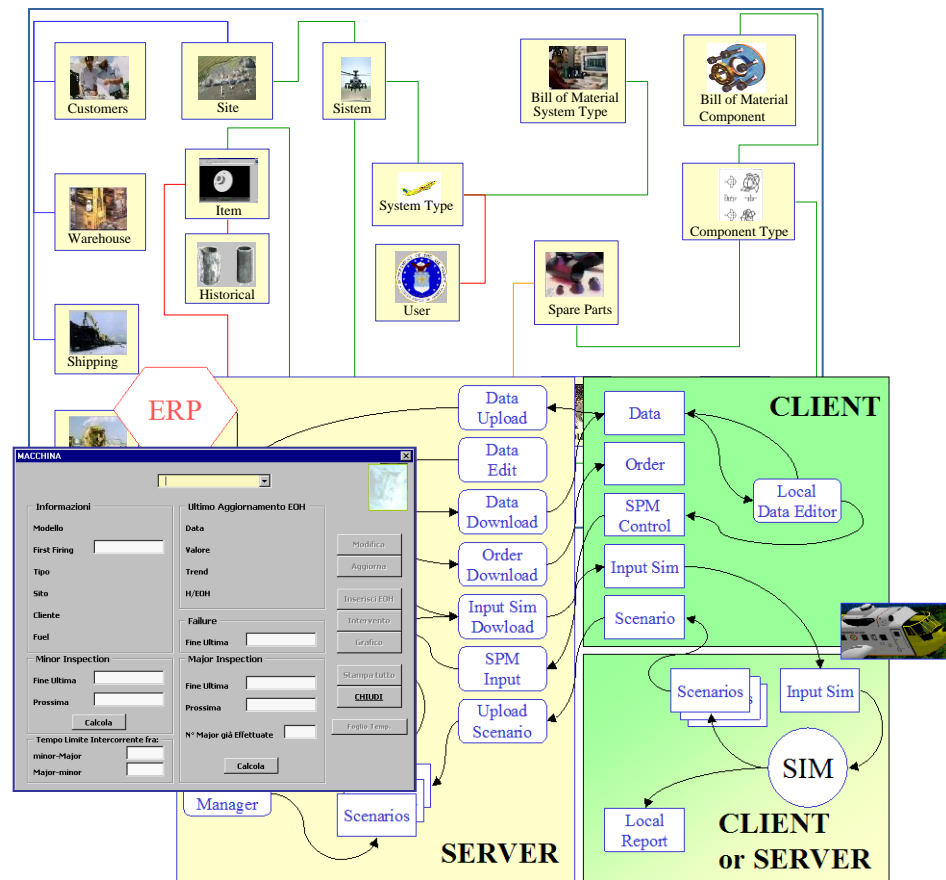
ANSALDO

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.

Simulation Team

J20 Experience

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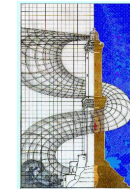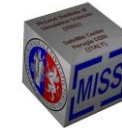
J20 allows to experience in a Web Based Environment a New Product Development by working in Cooperative Teams (Engine, Avionics Cell) representing different Joint Ventures competing for the Project a New Advanced Fighter.

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

Cellula		Min	Max	Motori		Min	Max	Avionica		Min	Max
Lunghezza	23 [m]	10	30	Spinta	10800 [kg]	1000	20000	Coef. TFR	[grade]	0	1
Apertura Alare	13 [m]	10	30	Coef.Consumo Std	[grade]	0	1	Coef. AA	[grade]	0	1
Superficie Alare	59 [m2]	15.0	59.8	Coef.Consumo Super	[grade]	0	1	Coef. AG	[grade]	0	1
Capacita` Carburante	4000 [kg]	0	10000	Coef.Post Bruciatore	[grade]	0	1	Coef. FLIR	[grade]	0	1
Coef.Stealth	[grade]	0	1	Coef.Invertitore Spinta	[grade]	0	1	Coef. ECM	[grade]	0	1
Carico Utile Esterno	3000 [kg]	0	15000	Coef.Robustezza	[grade]	0	1	Flares	20	0	60
Coef.Robustezza	[grade]	0	1	Coef.Spinta Vettoriale	[grade]	0	1	Chaff	20	0	60
Coef.Compositi	[grade]	0	1	Coef.Schermatura	[grade]	0	1	Numero Target AA		0	20
Numero Motori	2	1	4	Coef.Peso	[grade]	0	1	Coeff.Inerziale	[grade]	0	1
Equipaggio	1	1	2	Coef.Prese d'Aria	[grade]	0	1	Range Attivo	180 [km]	0	200

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]			EFF_AG_AVION	1.85 [grade]
rapporto_medio	1.482				
rapporto_AA	1.416				
rapporto_AG	1.376				
MANOV_CEL	45.17 [grad]				
DECOLLO_CEL	13.23 [grad]				
lunghezza_pista	453 [m]				
V_MAX_CEL	2343 [km/h]				
V_LOW_CEL	1252 [km/h]				

NIG-29

R	Raggio d'Azione	229 km
	Speed_Hi	2343 km/h
	Speed_Low	1252 km/h

Simulation Team

WILD

Web Integrated Logistics Designer

The WILD project involves the development of a Federation composed by Simulators, Scheduling Systems and ERP.

WILD Federation reproduces the supply chain and supports on-line distributed management and control among customers, main contractors, suppliers

Raw Material
Product
Process Unit

CUSTOMER

MAIN CONTRACTOR

LEVEL 1 SUPPLIERS

LEVEL 2 SUPPLIERS

LEVEL n SUPPLIERS

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Simulation Team

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

MAST

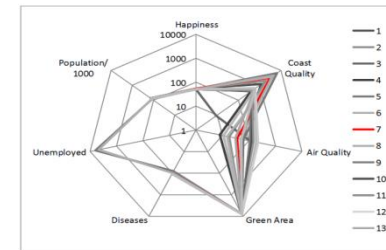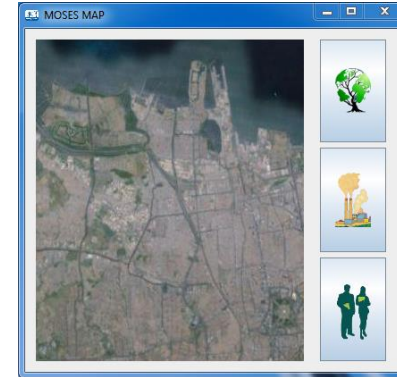**Simulation Team**

MOSES

Modelling Sustainable Environments through Simulation


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 Industrail Offsets and conditions to finalize a sustainable and profictable solution for both sides

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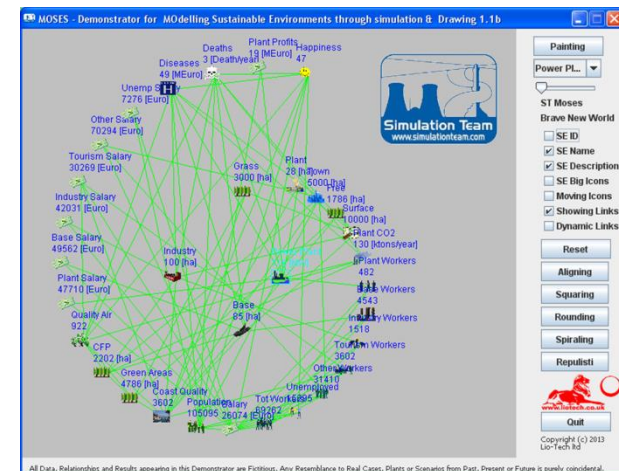
Simulation Team

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**
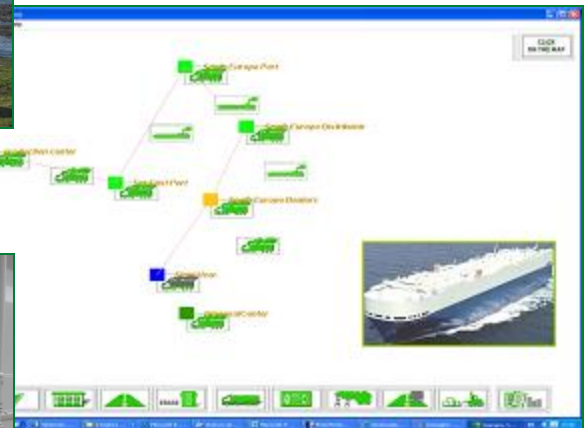
Simulation Team

GREENLOG Heavy Haul

GreenLog Heavy Haul Simulator

GreenLog Heavy Haul is a specific Simulation Module devoted to analyze the Environmental Impact of Trucks and Heavy Hauls considering Operative Costs and Environmental Impact
GreenLog Heavy Haul allows to estimate the benefits provided by innovative solutions in term of oil and gas consumption, tires, better safety procedures
and higher performances

Developed in Cooperation with Simulation Team & DIPTEM

MAST

Simulation Team

FLODAF

Fuzzy Logic Data Fusion

FLODAF is an tools to support engineering and performance estimation of Data Fusion Solution; this suite includes a Scenario Generator and a Simulator for analyzing the Data Fusion performances over complex Air-Naval scenarios including ships, submarines, missiles, airplanes and helicopters.
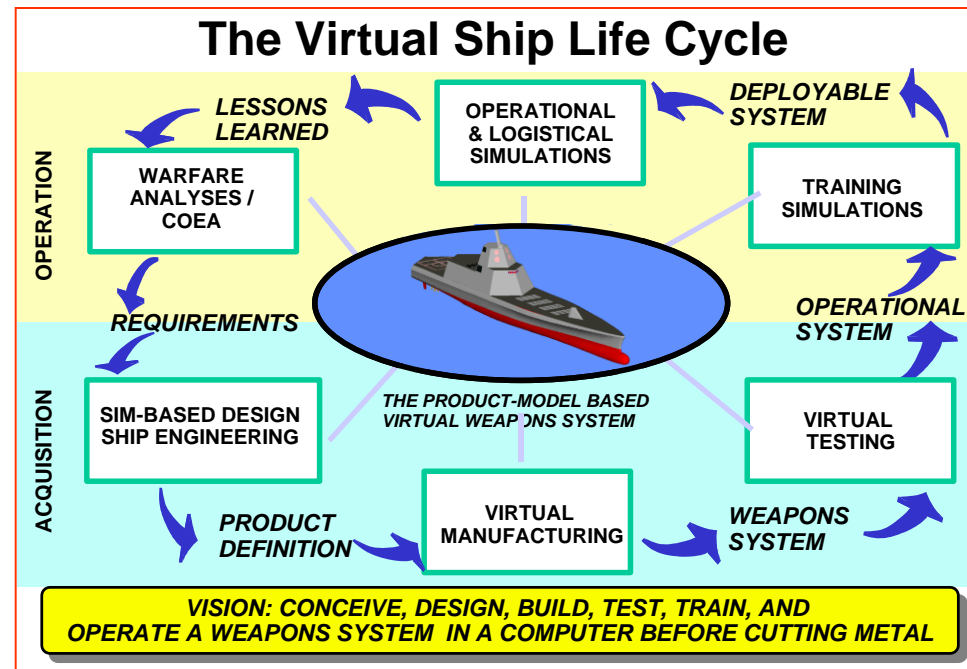
NIAG SG-60

Simulation Based Design And Virtual Prototyping (SBD & VP)

The NIAG SG-60 is devoted to evaluating the effectiveness of SBDVP on Ship Design

The results of the SG60 Study include analysis of Virtual Prototype VV&A procedures, Simulation Based Acquisition impact in terms of saving, costs, resources

The Virtual Ship Life Cycle

OPERATION

LESSONS LEARNED

OPERATIONAL & LOGISTICAL SIMULATIONS

DEPLOYABLE SYSTEM

WARFARE ANALYSES / COEA

TRAINING SIMULATIONS

REQUIREMENTS

OPERATIONAL SYSTEM

ACQUISITION

SIM-BASED DESIGN SHIP ENGINEERING

THE PRODUCT-MODEL BASED VIRTUAL WEAPONS SYSTEM

VIRTUAL TESTING

PRODUCT DEFINITION

VIRTUAL MANUFACTURING

WEAPONS SYSTEM

VISION: CONCEIVE, DESIGN, BUILD, TEST, TRAIN, AND OPERATE A WEAPONS SYSTEM IN A COMPUTER BEFORE CUTTING METAL
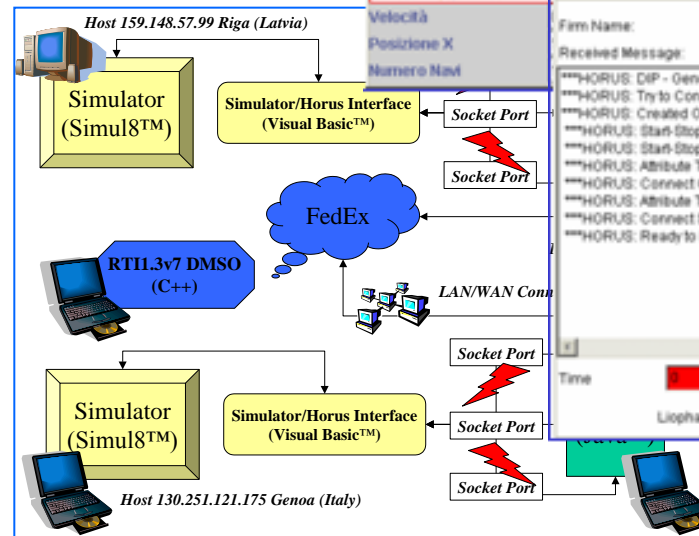
VISION

Virtual Ship Simulation

DIPTEM, as reference point in Distributed Simulation and HLA in Italy, was in charge as responsible for defining VV&A procedures in VISION Project devoted to create a Virtual Ship using HLA.

Simulation Team

DIME   DINAEL   DIBE

FINCANTIERI

IDS INGEGNERIA DEI SISTEMI

ELSEL

SELMAR ENGINEERING & MATERIALS

Nuova CONNAVI s.r.l.
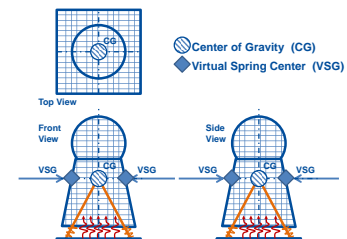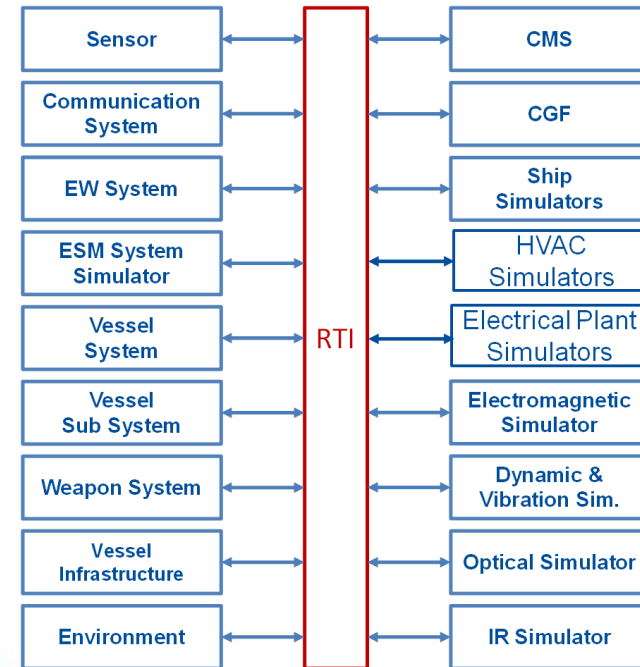
Selex ES

PIXIS

Alberto Integrato per il Sistema Nave Militare

Simulation Team provided within PIXIS projects the general architecture to simulate the interaction among sensors, antennas, electrical, electronic and HVAC equipment in relation to an innovative mast integrating different sensors and systems to be adopted by modern military vessels. The solution propose an interoperable simulation based on HLA that ensure interoperability of the different models (i.e. communications, radars, Consumptions, Optoelectronic and Infrared sensors etc.) Considering mutual interferences as well as Interaction with other vessel systems

Left	RTI	Right
Sensor		CMS
Communication System		CGF
EW System		Ship Simulators
ESM System Simulator		HVAC Simulators
Vessel System		Electrical Plant Simulators
Vessel Sub System		Electromagnetic Simulator
Weapon System		Dynamic & Vibration Sim.
Vessel Infrastructure		Optical Simulator
Environment		IR Simulator

Top View

Center of Gravity (CG)
Virtual Spring Center (VSG)

Front View   Side View

VSG   CG   VSG   VSG   CG   VSG

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Simulation Team

FINCANTIERI

Orizzonte Sistemi Navali S.p.A.

SEASTEMA MARINE AUTOMATION SOLUTIONS

BK brain and knowledge

Selex ES IBR SISTEMI

DIME DINAEL DIBE DIST DICAT ISME

PRODICON

Progettazione Integrata, Difesa e Controllo Nave Militare

Simulation Team identified simulation requirements and architecture for interoperable simulation that should be used to address asymmetric threats in marine environment; this was a study devoted to provide guidelines to enhance and improve the simulators currently in use from some Partner in order to support decision making Process in this complex environment IA-CGF resulted the best solution to Address such kind of scenario to reproduce Complex and not cooperative behaviors of Threats hiding among general naval traffic

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.
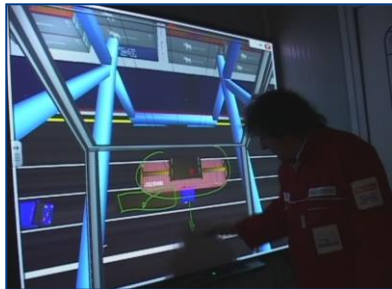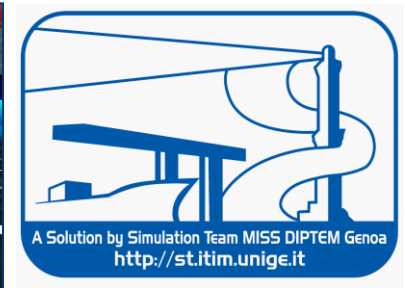

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Simulation Team

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.

Simulation Team

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**

Simulation Team

Atout of our Virtual Simulation

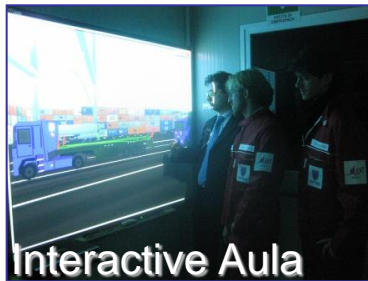Training & R&D

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

Simulation Team

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.
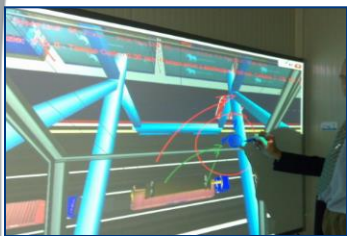
Simulation Team

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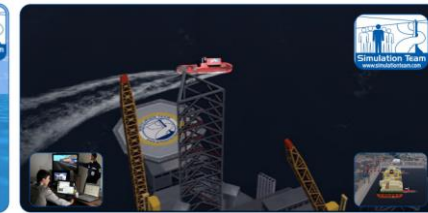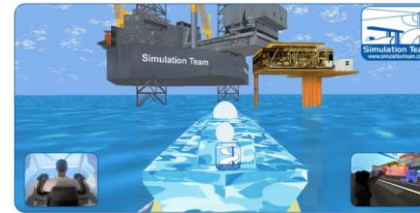
The ST-VM is the ultimate Marine Simulator developed by Simulation Team and includes many different Marine components, equipment and platforms as well as New Solutions for Terminal Design, Operator Training, Safety and Security, Procedure Definition, Equipment Design and Virtual Prototyping

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.

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Simulation Team

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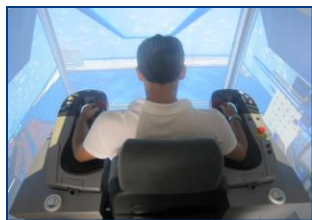
ST-VP Simulator allows to operate all the different Port Cranes in a Virtual World by an immersive Cave (270 ° Horizontal and 150° Vertical), reproducing Sounds, Vibrations, Motion in all weather conditions

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

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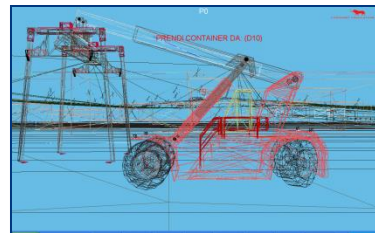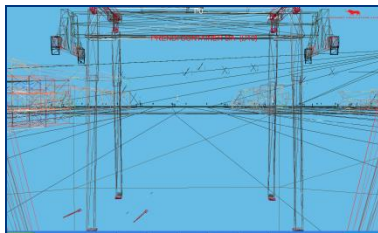
Simulation Team

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

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Simulation Team

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

Simulation Team

FINCANTIERI

CALYPSO

Carrier Life cYcle Period Simulation & Optimization

CALYPSO project investigated methodologies and techniques devoted to analyze the Life Cycle of the New Italian Carrier Cavour.

CALYPSO included development of Tools for comparing costs, operations and performances of different Carriers.

Simulation Team

ACASO

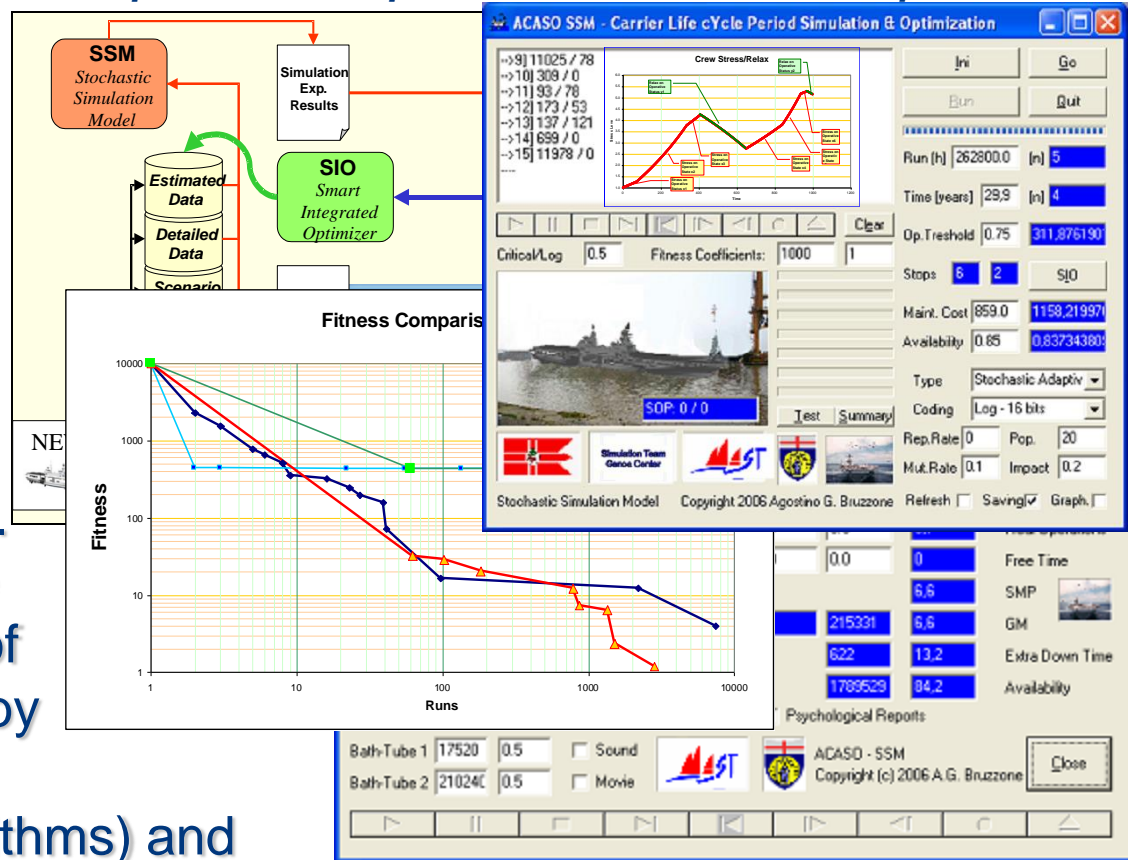*Advanced Carrier Acquisition and Operation cost Simulation & Optimization*

ACASO is a system for design new Vessel by simulating their performances in relation to their operative profiles and maintenance policies. The system estimates the unknown characteristics of the new Vessel Systems by applying advanced AI techniques (genetic algorithms) and evaluating different hypotheses and scenarios

IPHITOS

Simulation Team

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

Interoperable Simulation of a Protection solution based on ligHt Interceptor Tackler operating in Outer Space
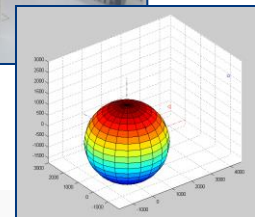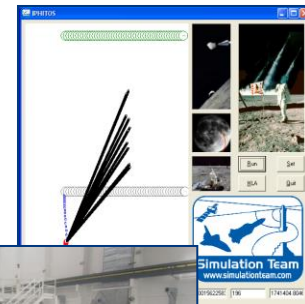
MBDA MISSILE SYSTEMS

TELESPAZIO A Finmeccanica / Alcatel 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

SISO

FORWARDSIM simulations & technologies

NASA

VT MÄK A company of VT Systems

PiTCH

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Simulation Team

DREDIS

Drones based RElief on DIsaster Simulation
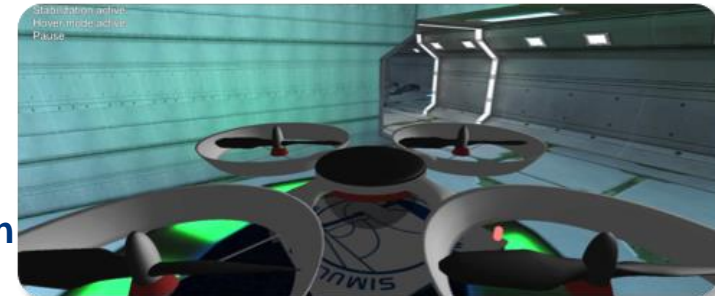
The simulator proposes an innovative solution based on using autonomous systems inside the lunar base for reconnaissance and exploration missions

Stabilization active
Hover mode active
Pause

Stabilization active
Hover mode active
Pause
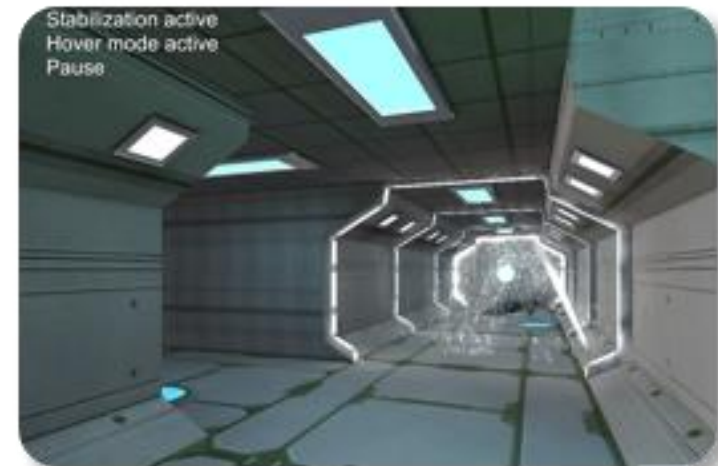
Drones are employed as lifesaving resource to increase safety for hazardous situation

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Simulation Team

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

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Prof. Agostino Bruzzone

www.master.impianti.unige.it
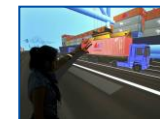
Simulation Team

PREMITEL Program

Preparation for Management within
Innovative Transportation services and Evolving Logistics

PREMITEL 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 PREMITEL 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 PREMITEL is founded by the Italian National Department of Transportation.


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Simulation Team

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 DIPTEM (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.

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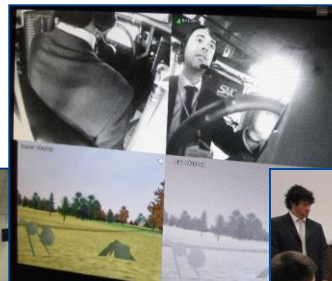
Conclusions

NATO CAX Forum & WAMS

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 Simulation Team members will serve as General Chairs and Program Chairs 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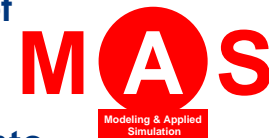, joint to CAX Forum, was the largest scientific event in M&S worldwide, involving over 500 speakers from 56 countries and over 30 live demonstrations (including Distributed simulation through live connection with NASA, MIT and Genoa University)

Montreal

I W I S H

M A S Modeling & Applied Simulation

EMSS

IMMM

HMS

Cyprus

IMAACA

SpringSim **Los Angeles**
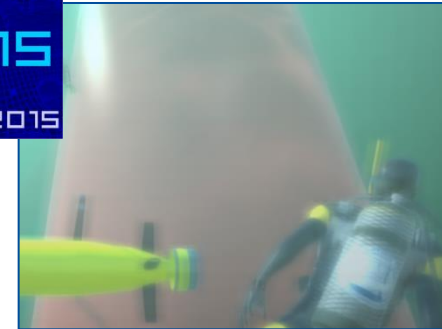
DHSS

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Simulation Team

Potential Cooperations

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

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 & Procedures in M&S

– Promoting M&S in Service of the Society

– Development of Networks of Excellence in M&S

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References

Simulation Team
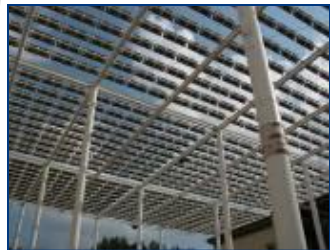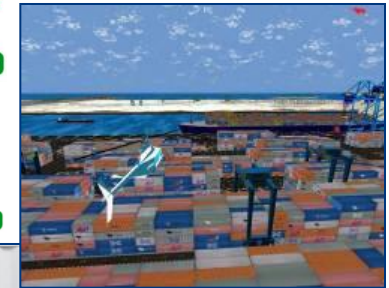
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