

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





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



etea SICUREZZA



MSC-LES



Mik
Riga TU



Universidad
de la Rioja



UNICAL



SimCenter Universitat
Autònoma de Barcelona

LOGIXTICA



Rio de Janeiro
Brazil



Università di Perugia



LSIS
Marseille



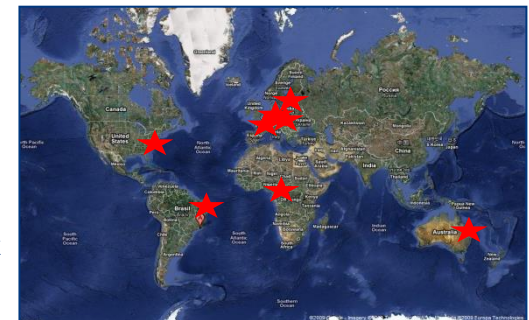
IMS-LAPS
Univ. Bordeaux

MITIM
Simulation Team
Genoa Center

McLeod Institute of
Technology & Interoperable
Modeling Simulation Genoa



VIRTUALLY



DIPTM
Università di Genova



Unclassified

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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



M&SNet

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

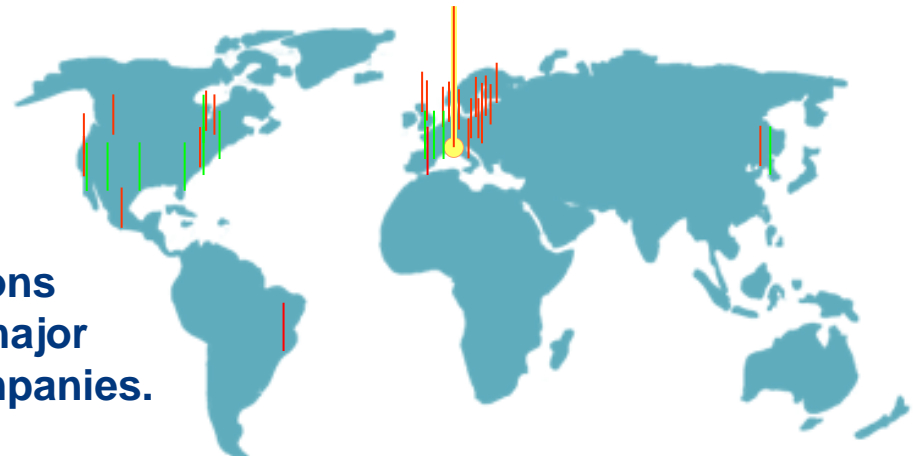
PM

Public Services Environment

Assembling

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
- Petrobras**
- 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





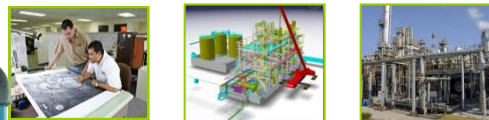
MIPET Master Program

International 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.



SPONSORS AND SUPPORTERS



SPONSOR COMPANIES EDITION 2010



Prof. Agostino Bruzzone

www.master.itim.unige.it



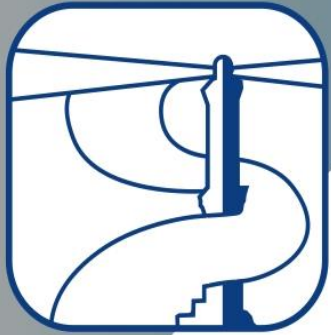
STRATEGOS

Engineering Technology for Strategy & Security in Industry, Business, Service of Society, Government & Defense



Partners and Affiliates:

- Kibernetes
- pass...
- accenture**
- ANSALDO ENERGIA**
- VEGA research laboratories
- MBDA**
- LEONARDO**
- HITACHI** Inspire the Next
- rulex Innovation Labs
- tenova**
- BearingPoint**
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- BRANDNEW PROMCIER**
- ANTYCIIP simulation**
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- Simulation Team** www.simulationteam.com
- NeMeA Sistemi**
- MCA**
- SiglaTech Business Energy**
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- amiu GENOVA**
- CONSIGLIO NAZIONALE INGEGNERI**
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- TMC** PEOPLE DRIVE TECHNOLOGY
- RINA**
- TCMI**
- Agostino Bruzzone**
agostino@itim.unige.it



DIME - University of Genoa

Simulation Team



www.itim.unige.it

DIPTTEM was founded in 1997 as evolution of the *Institute of Technology and Industrial Management (ITIM)* that was operative from '60. In 2011, DIPTTEM 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 in all Continents





University of Genoa: an Overview

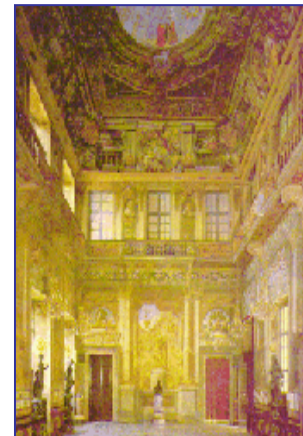
The University of Genoa is one of the oldest in Italy and in the World (founded in 1471 AD), it is located in middle of Italian Riviera.

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

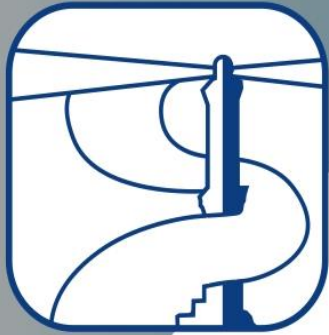


Simulation Team Labs



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, 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





VR, AR, M&S, AI/IA, Big Data for Industries & Business Processes



www.sim4future.com



Proud Member of





Liophant Simulation

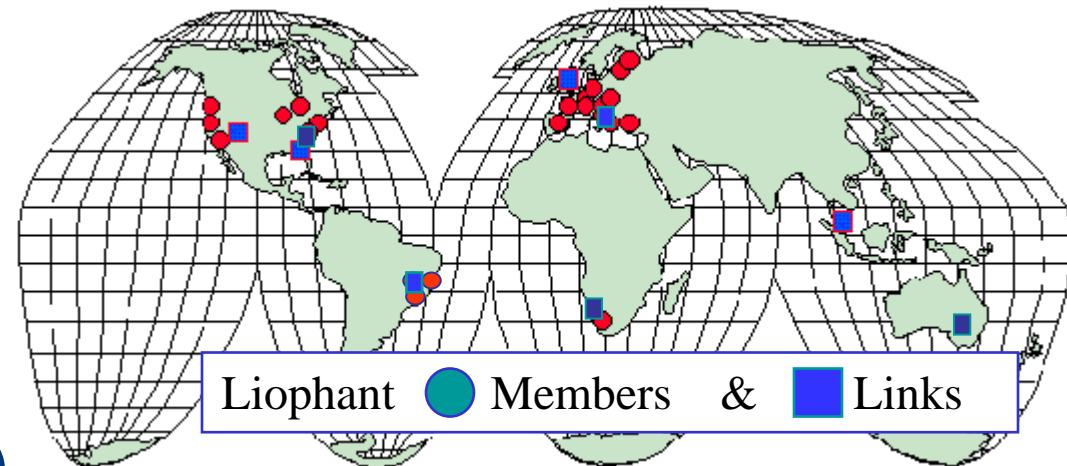
Email: info@liophant.org



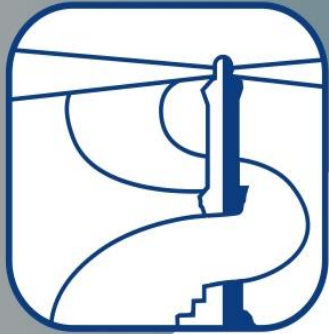
The *Liophant Simulation* involves World-Wide Scientists and Technicians working in Companies and Academia.

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)



www.liophant.org



International Liophant Student Exchanges along 2019



*Exchange Activity
PhD, Master, BS*



**Summersim
Toulon**
November
K. Sinelshchikov



**Simulation Team
Genoa Labs**

*K. Sinelshchikov, J.Pernas
B.Gadupuri*



Cagliari
January-Dec
P.Di Bella

WAMS & STRATEGOS, JCU
Singapore
January-December
L. Bucchianica, G.Toso



Summersim
July, Berlin
K. Sinelshchikov



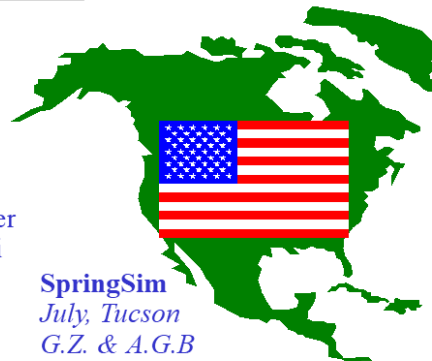
I3M, Lisbon, September
K.Sinelshchikov



**MESAS
Palermo, Sept**
*G.Fabbrini,
M.Gottelli*



**Lio-Tech
London**
Jan-December
G.Franzinetti



SpringSim
July, Tucson
G.Z. & A.G.B

**ICAMES
Istanbul, May**
*Aamsa Taib, Alessia Palmieri, Annamaria Turbinelli,
Luis Eduardo Mella*





International Liophant Student Exchanges along 2020



Brand New Promoter
Singapore
January-December
L. Bucchianica



Exchange Activity
PhD, Master, BS



Simulation Team
Genoa Labs

K. Sinelshchikov, J.Pernas
B.Gadupuri



covid-19 crisis



Summersim
Just Virtual
K. Sinelshchikov

SEE
Just Virtual
Kirill Sinelshchikov
& Bob Ferrari

I3M, Athens
Just Virtually

K. Sinelshchikov, J.Pernas
B.Gadupuri



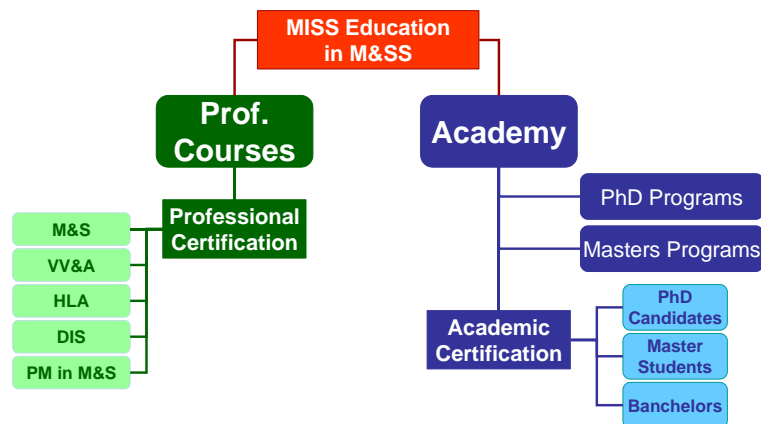
Lio-Tech
London
Jan-December
G.Franzinetti





Simulation Technology Transfer

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



Course Location

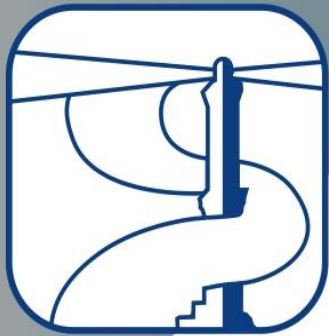


Lecturing

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)



Team Working & Exercises



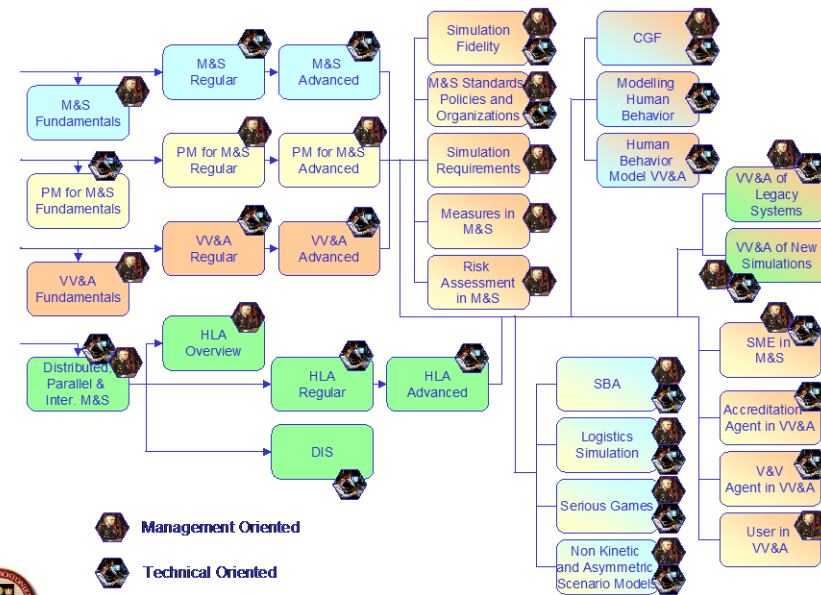
SIREN Professional Courses



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.).





Example of Overall Architecture

Smart Planner

Simulation

Man on the Loop

VR & AR

Real Situation

Manual & Automated Planning

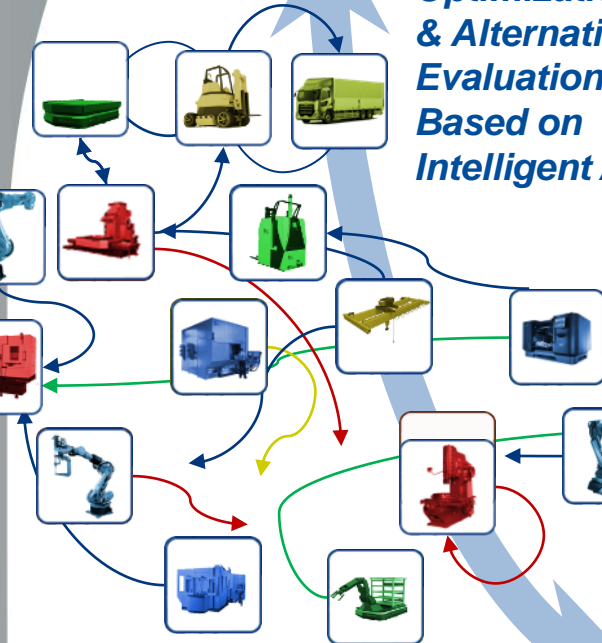
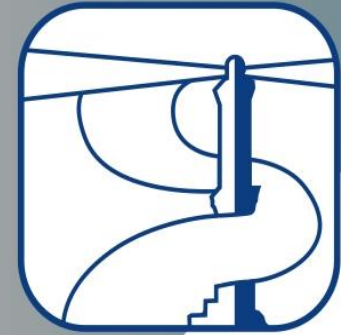
Simulation for Optimization & Alternative Evaluation Based on Intelligent Agents

MR

Multiple Methods for Analyzing Historical & Current Data

Data Analytics

Innovative solutions integrating Artificial Intelligence, Simulation, VR & AR, Data Analytics for improving the whole process





Enabling Technologies

We propose new Solutions to Major Problems based on Enabling Methods & Technologies

- Big Data
- Data Analytics
- Machine Learning

- Robotic Process Automation
- IoT, IIoT & IoE

- Modeling, interoperable Simulation & Serious Games
- Virtual & Augmented Reality



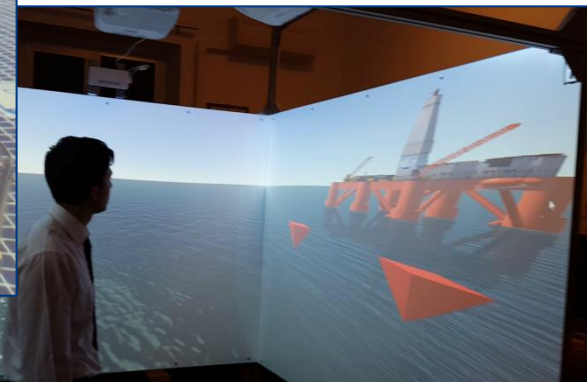
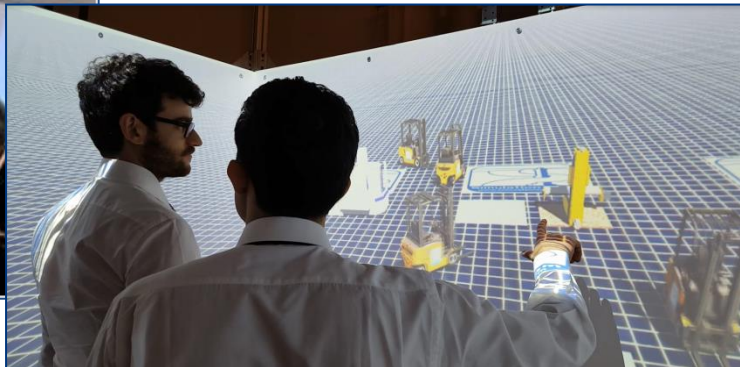
SPIDER

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.

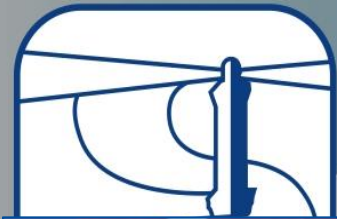
The SPIDER is interactive through touch screen technologies.



The SPIDER is fully Immersive including sound and motion.



Multiple Issues addressed

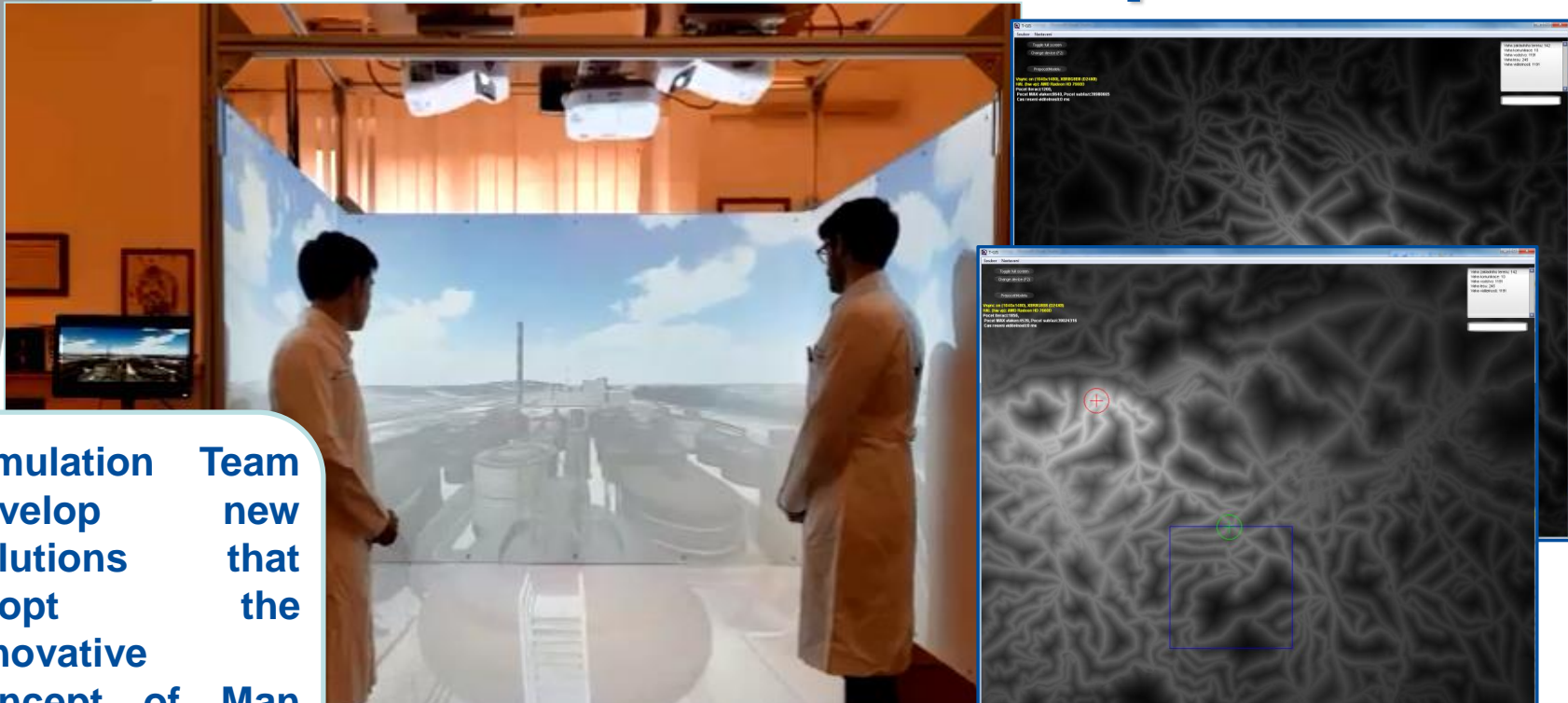


SPIDER is a Virtual Immersive, Interactive, Interoperable cube 2x2x2.6m recreating and simulating Plants, Skids and Machineries





AI & Man on the Loop vs. Man in the Loop



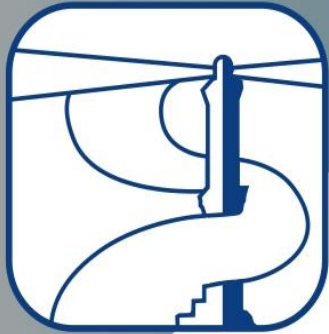
Simulation Team develop new solutions that adopt the innovative concept of Man on the Loop: Supervising use of UxV and RAP

UxV Unmanned multiple domain Vehicle
RAP Robotic Process Automation

Human Operators evolve as Supervisors assigning high level tasks to Intelligent Agents driven by Artificial Intelligence Solutions



AI... Artificial Intelligent for Awareness driven Initiatives



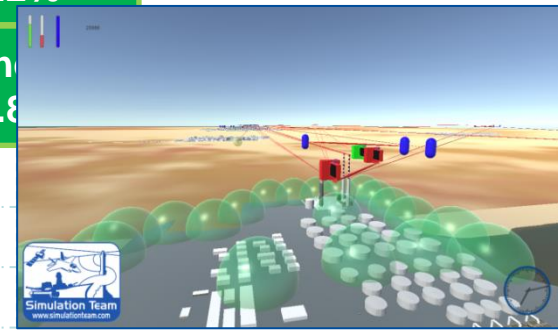
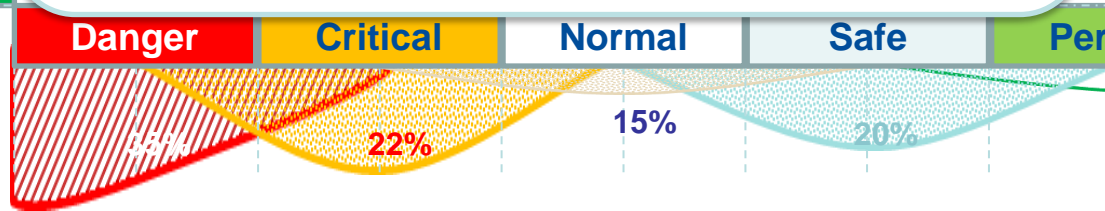
Danger	31.5%
Inspect	35.2%
Monitor	23.3%
Stand by	8.0%

General Situation on the Plant

Activating "Very Strong" at 10%
Symptoms From Sensor
Ref Values
Activating "Strong" at 90%

Very Strong	Alarm 31.5%	Inspection 19.8%	Monitor 13.5%	Monitor 18.0%	Sand by 7.2%
Strong	Inspection 3.5%	Monitor 2.2%	Monitor 1.5%	None 2.0%	Sand 0.8%

Innovative AI techniques allows to understand the Situation and driving proper decisions autonomously as well as the capability to apply directives by humans. This provides to Humans Supervisors enhanced capabilities and more time to most critical decisions





JESSI

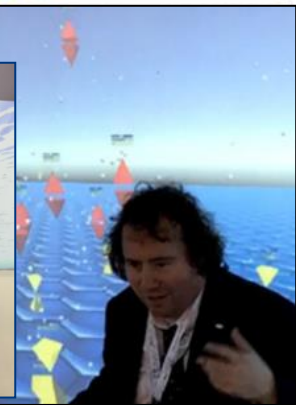
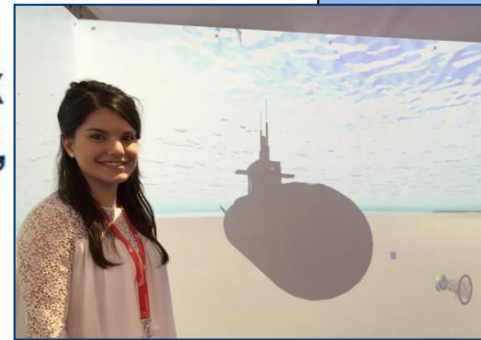
Joint Environment for Serious Games, Simulation and Interoperability



Simulation Team



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.





CRIPEM

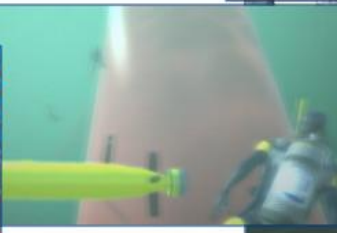
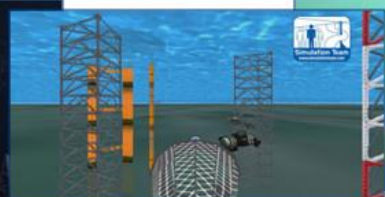
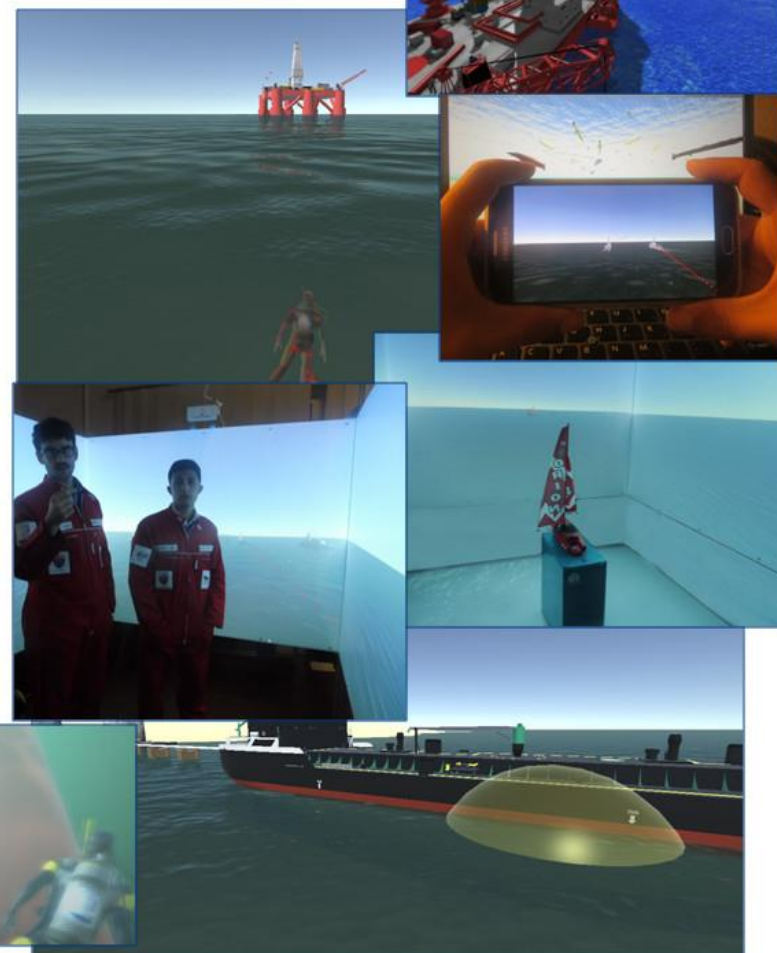
CRITICAL Infrastructure Protection in Extended Maritime framework

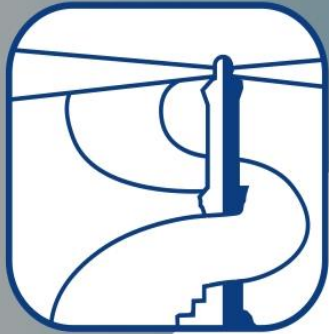


Oil Rig Protection (ORP) is a virtual MS2G (Model, interoperable simulator & Serious Game) reproducing operations devoted to protect critical infrastructure at sea from multi domain threats.

The simulator reproduces use of traditional assets as well as innovative autonomous systems in reference to different potential targets including ports, terminals and Oil Rigs.

The Simulator could be used for training, education as well as for capability assessment, vulnerability reduction and procedure definition respect a wide spectrum of threats





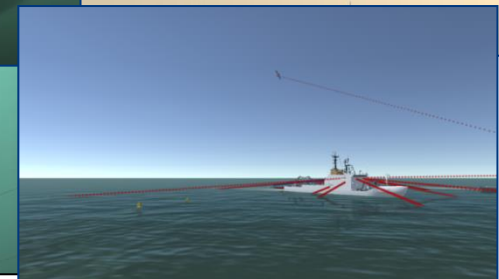
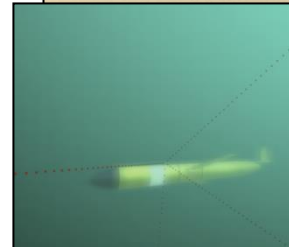
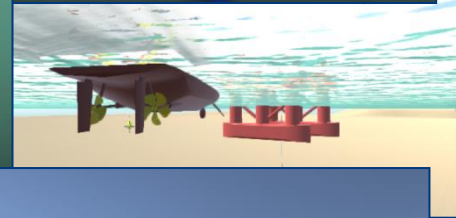
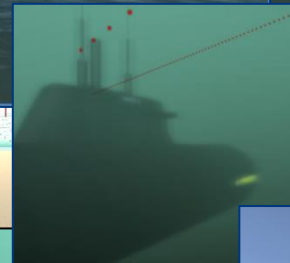
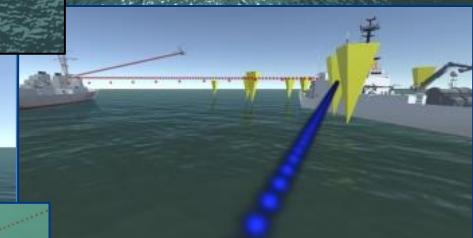
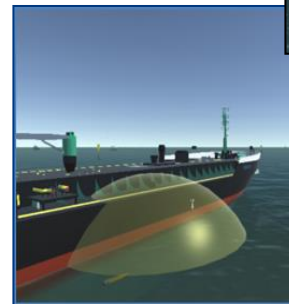
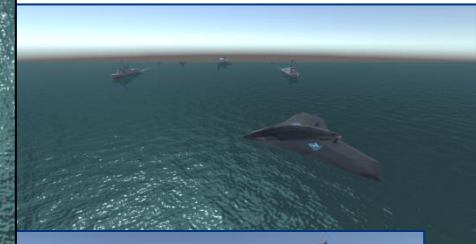
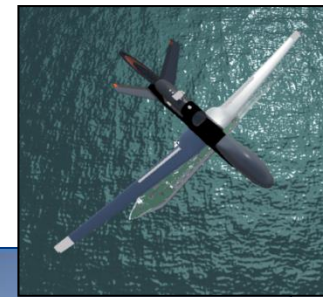
JEANS

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.





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

PANOPEA Command & Control

Nodes: 24
Links: 58
Cases: 0

Ships to Ships
 Cargo Ships
 Intelligence Ship
 LCG Ships
 HQs Ships
 Edge Ships
 Edge Intelligence
 Two Coalitions
 Collaborative
 Coordinated
 Deconflicted
 Composites

Range: [80]

PANOPEA - Piracy Asymmetric Naval Operation Patterns modelling for Education & Analysis

0.636 Overall_Delivery_Success: 0.580 Info_Acc: 0.430 Info_Max: 0.900 Info_Avg: 0.377
Info_Acc_SoftIndex: 0.867 Info_Acc_Max: 1.000 Info_Acc_Avg: 0.746 Info_0.853
Cognitive_Domain_Connectness: 0.988 Cognitive_Domain_Connectness_Max: 0.992
Cognitive_Domain_Connectness_Avg: 0.962 Social_Isolated: 182.983 Social_Isolated_Max: 264.003
Social_Isolated_Avg: 116.052 Social_Connect: 1.456 Social_Connect_Max: 1.508 Social_Connect_Avg: 1.549
Pattern_Inf_Max: 0.800 Pattern_Inf_Avg: 0.616 Overall_Pirate_Captures: 13.000 Overall_Engaged_Pirates: 22.000
Overall_Costs: 3.175 Overall_Workload: 0.462 Overall_Variability: 0.084 Overall_Resilience: 3.153
Overall_Responsiveness: 63.234 Overall_Flexibility: 0.967 Overall_Effectiveness: 1.808

Total Attacks: 15 Attacks Well Done: 13 Cross Fact: 9734 Flow: 61.52167510
HelWellDone: 12 ShipWellDone: 10 HelWellMiss: 8 ShipMissed: 13 62.57277121080627
Escorts: 1 Inspections: 226 Help Insp: 5 Ship Insp: 9 Time: 9 [days] 23:54:20.20

Dynamic GIS GIS On
Activate GIS
GIS Layers
Ship GIS
Parameters
Reorganize
Quit

Verbose Weather Factor: 0.0 OverView
File Clearing ER Coeff. Intelligence: 1.0 Ships: 1.0 Data Trail
Cyberwarfare Impact: 2.2 None C2 Graphs

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PANOPEA

Total Attacks: 7 Pirates Successes: 4 Crossings: 20282 Flow: 46.8218803
HelSuccesses: 32 Vessel Successes: 0 Hel Failures: 4 Ship Failures: 0 62.57277121080627
Copyright (c) 2009-2010 Simulation Team MISS DIPTTEM University of Genoa Verbose

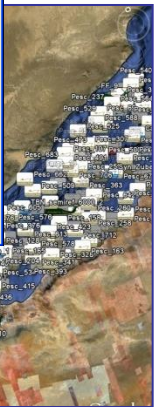
Helicopter

Average Setup Time [h]: 0.1
Radar max [Nm]: 45 Eye Max [Nm]: 1.2
Speed [Knots]: 135
Max Distance to Try [Nm]: 240

Fisherman Boat/Pirates

Generate [boats]: 700
Pirates (%): 3
Attack Threshold [Nm]: 8
Attack Probability (%): 0.8
Fisher Speed [Knots]: 10
Pirate Speed [Knots]: 35

Cargo Ship Flow [ship/day]: _____ Randomize
Intelligence Detection Probability: 0.1





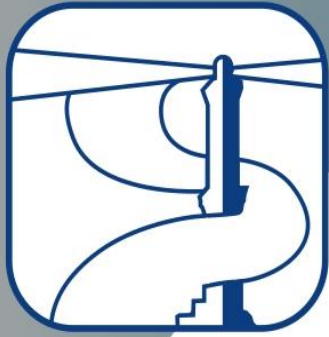
MALICIA

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





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.

Simulation Team





T-REX

Threat network simulation for REactive eXperience

Simulation Team

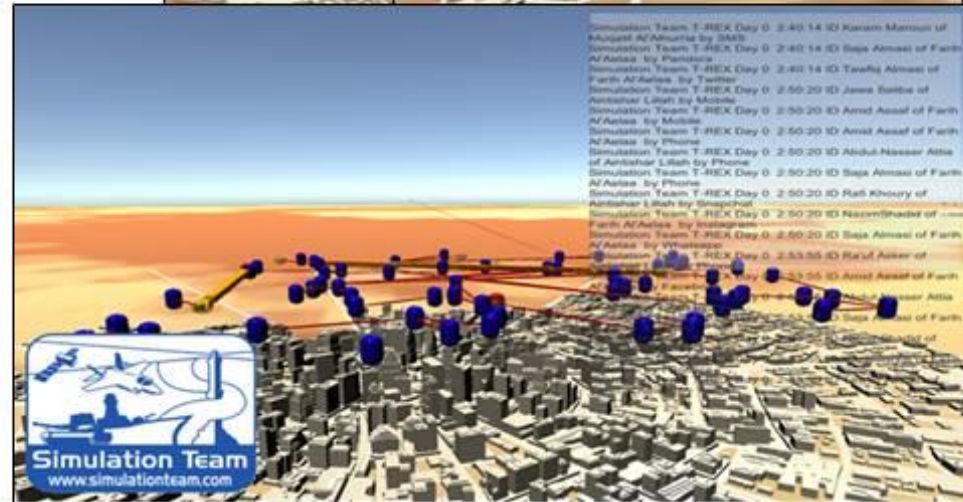


T-Rex (*Threat network simulation for REactive eXperience*) is a MS2G (Modeling, interoperable Simulation & Serious Game) devoted to reproduce Hybrid Warfare and to be federated with other elements to evaluate the impact of these actions.

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)





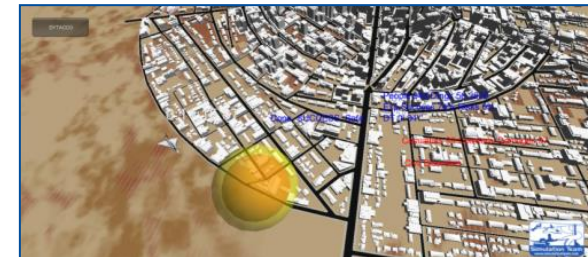
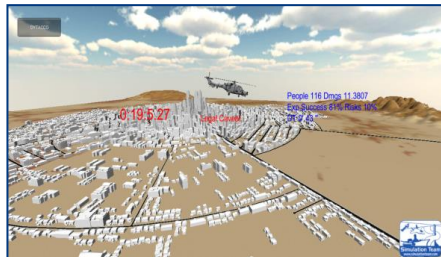
DYTACCO

*DY*namic *T*argeting *C*ollateral *d*amages and *C*onsequences



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.





PSYSOP

Psychological and cultural Simulation Of Population

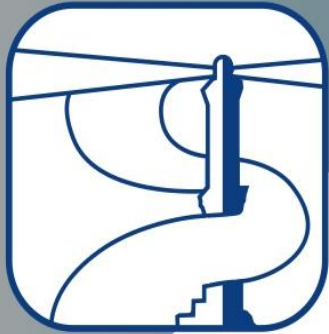


PSYSOP is a Simulator Reproducing a Town including Psychological and Cultural aspects affecting the Population behavior and reactions. The model includes social, cultural, educational, psychological, gender, age, religion and many other parameters including the social networks related to family and work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

PSYSOP 1.0

Inhabitants: 20000
 Married: 5567
 Sons: 4323
 Olds: 2458
 Friends: 18952
 Education: 1.40525
 Sex: 0.474500000476837
 Age: 38.9463996987207
 Social: 1.81474995613058
 Party: 2.31509390310669
 Religion: 4.24545620675559

Simulation Team
www.simulationteam.com



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*
- Police Forces*
- Military Units*
- Population*

- Terrorists*
- Firefighters*
- NGOs*
- Protesters*

- Warlords*
- Health Care*
- Governmental Entities*
- Ethnic Groups*



	CRIMINAL POPULATION	GRASS ROOTS	LANCERS	SECURITY FORCES	SECURITY POLICE	SECURITY POLICE	SECURITY POLICE	SECURITY POLICE	SECURITY POLICE
SIBERIAN POPULATION	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
GRASS MINORITY	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
SAXONS MINORITY	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
SEQUENA LOCAL POLICE	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
MONTEANA FEDERAL POLICE	Fire	Fire	Fire	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
SAXONS LIBERATION FRONT	Fire	Neutral	Neutral	Fire	Fire	Fire	Fire	Fire	Fire
SEQUENA LIBERATION MOVEMENT	Fire	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
GANGS	Fire	Fire	Fire	Fire	Fire	Fire	Fire	Fire	Fire
BLUE FORCES	Fire	Fire	Fire	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
RED FORCES	Fire	Neutral	Neutral	Fire	Fire	Fire	Fire	Fire	Fire





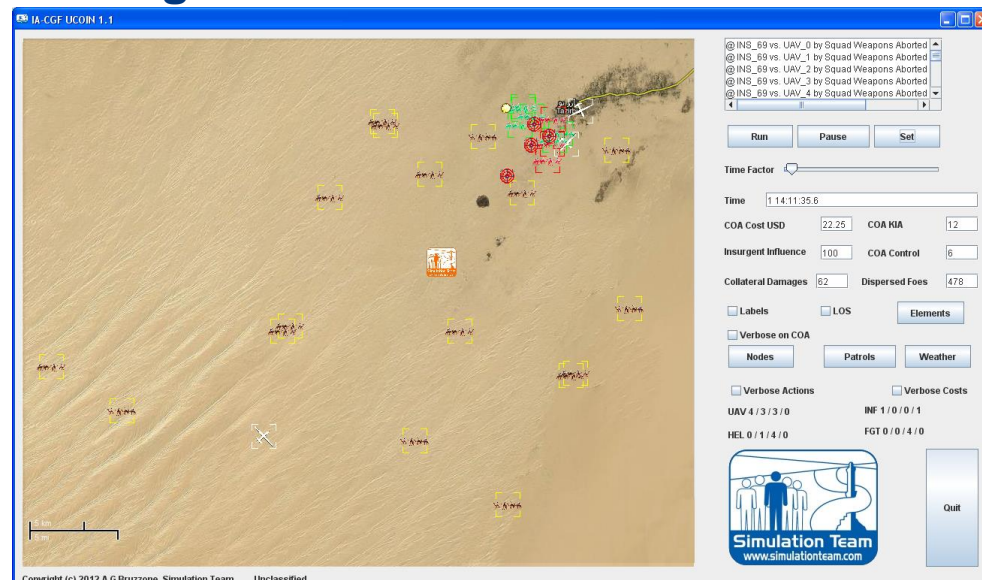
IA-CGF UCOIN

Intelligence Agent Computer Generated Forces UAV and Counter-Insurgency



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.



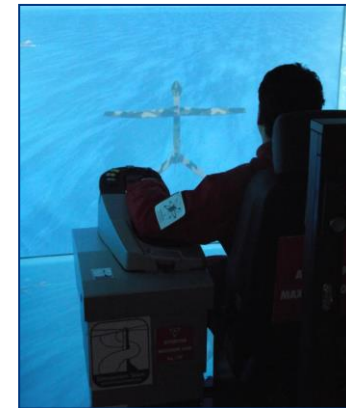
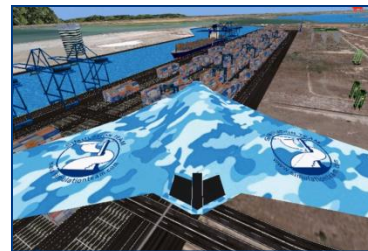


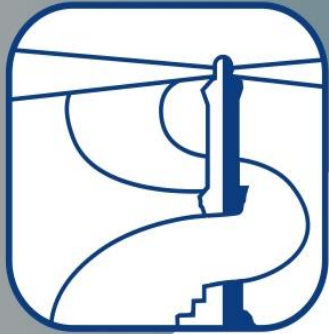
ST_VIV

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

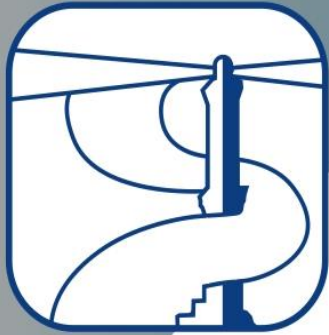
IA-CGF Units are a set of interoperable units with capability to be integrated in constructive simulation

- 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

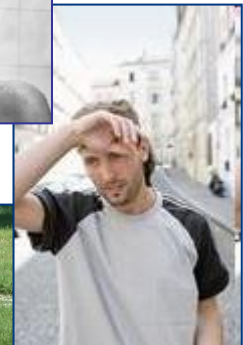




IA-CGF Human Behaviors

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.





DIES IRAE

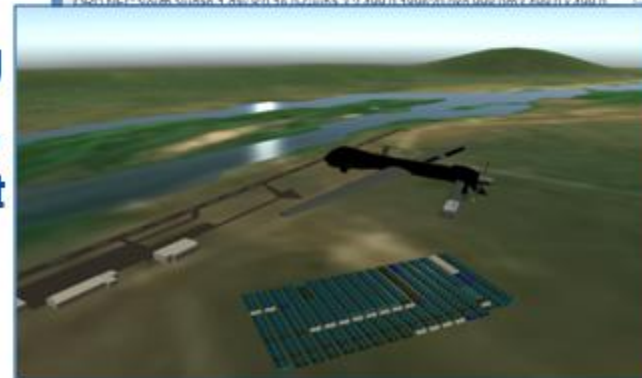


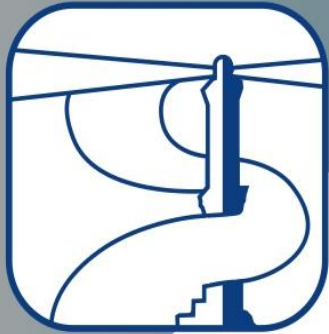
Disasters, Incidents & Emergencies Simulation
Interoperable Relief Advanced Evaluator



DIES IRAE uses Interoperable IA-CGF to reproduce humanitarian and disaster relief missions. Simulation Team is applying this simulator on a Scenario inspired by South Sudan Crisis and conducting experiments to quantify the benefits of this Integrated Interoperable Simulation & Serious Game approach.

DIES IRAE is a simulator addressing logistics, food distribution, health care, temporary housing, military support and administrative support



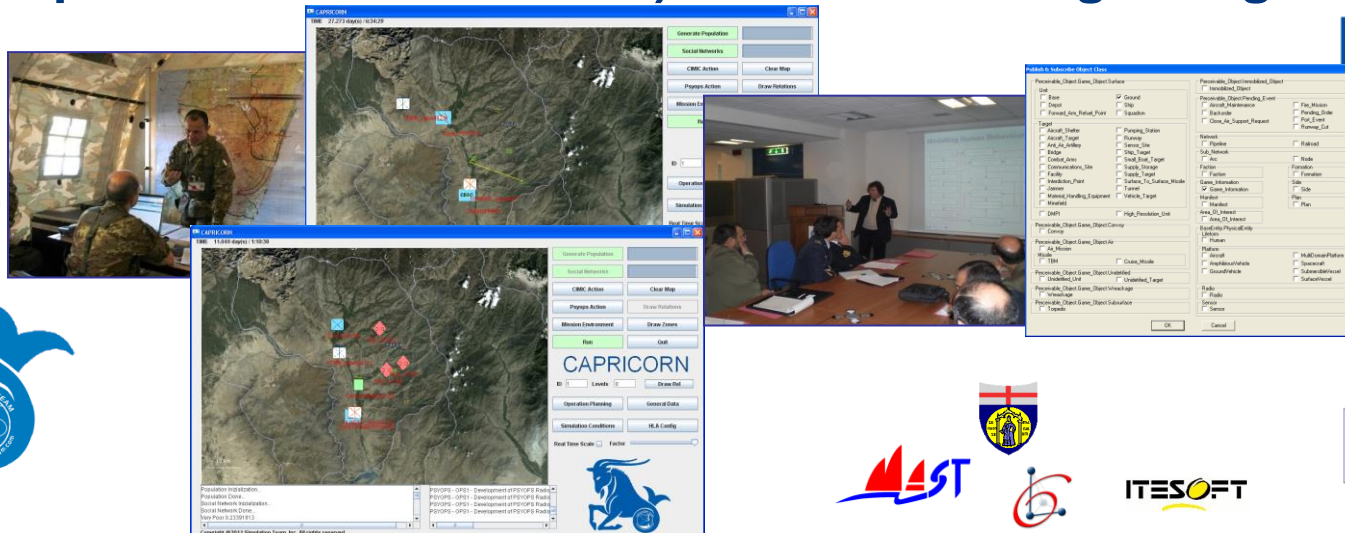


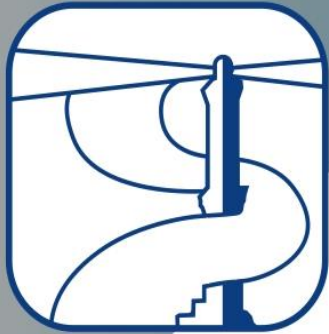
CAPRICORN

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

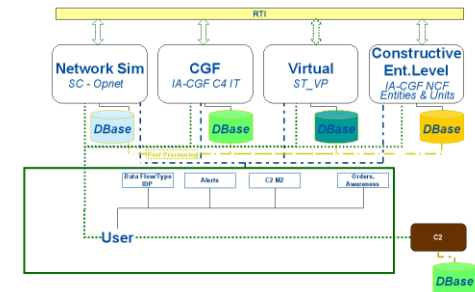
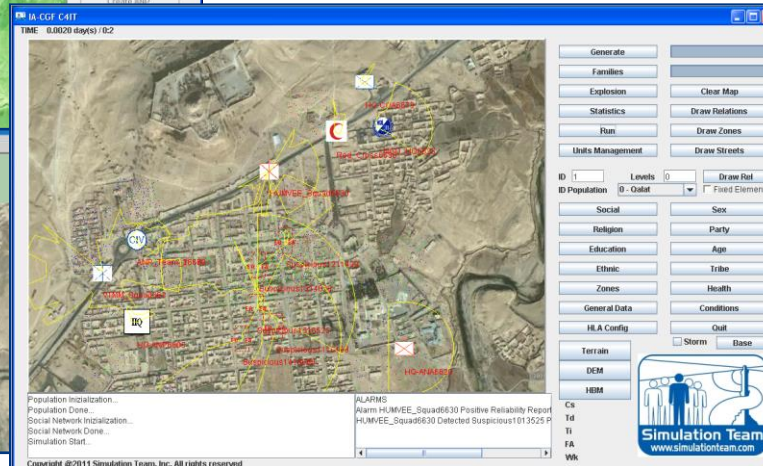
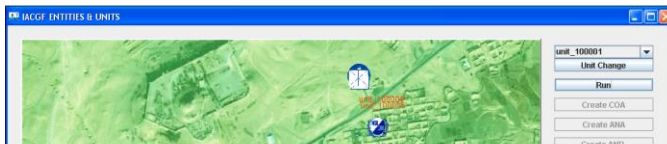
Simulation Team

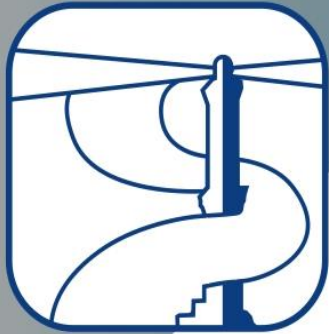
CGF C4 IT

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

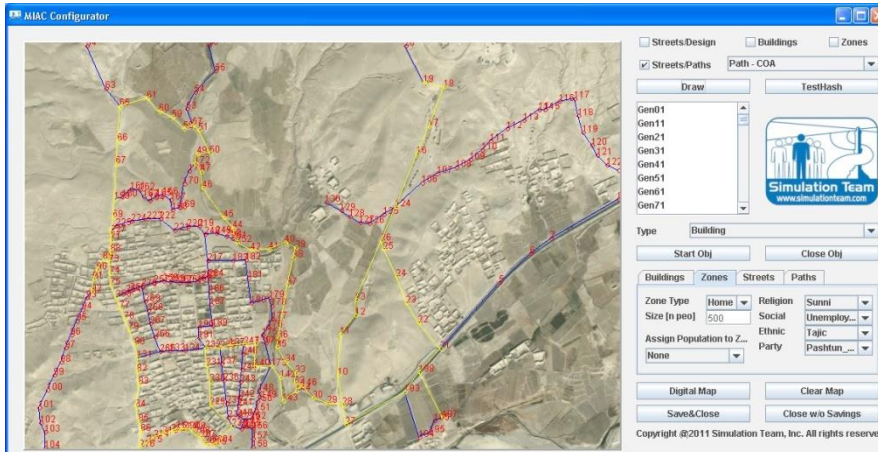
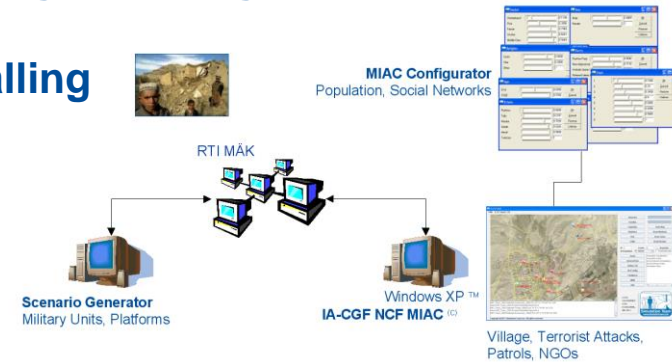
Models of Intelligent Agents for Computer Generated Forces

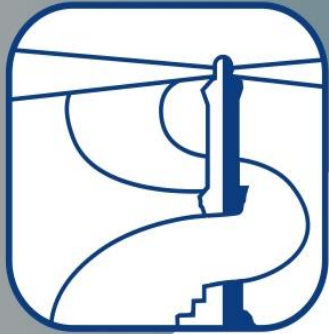


Simulation Team



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





PIOVRA

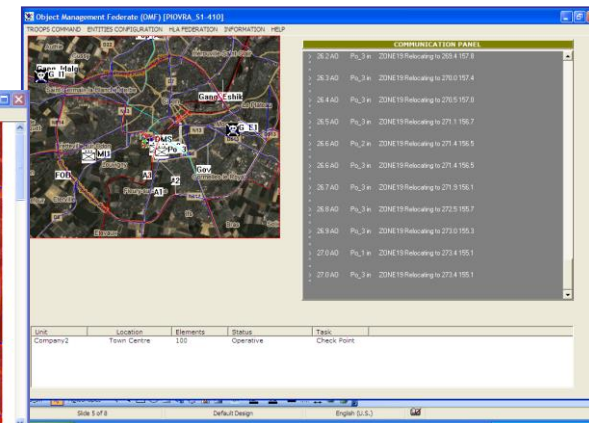
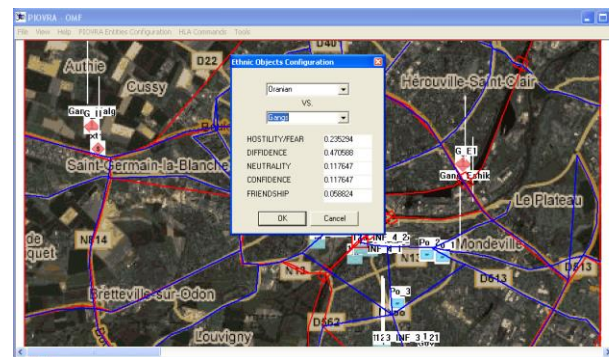
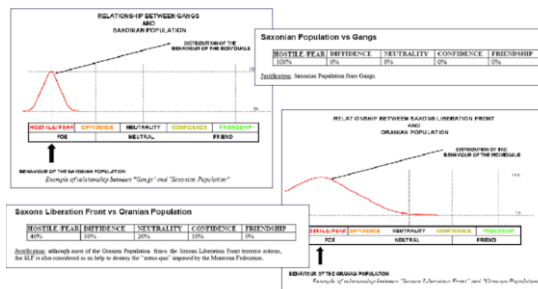
Polyfunctional Intelligent Operational Virtual Reality Agents

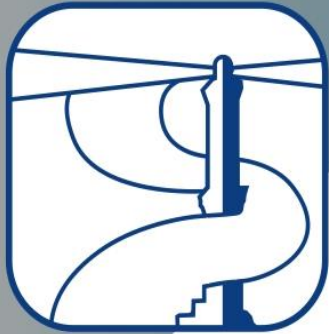


PIOVRA was an EDA Project developed in cooperation with Italian and French MoDs in partnership between MITIM DIPTM & LSIS.

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





CRYSTAL

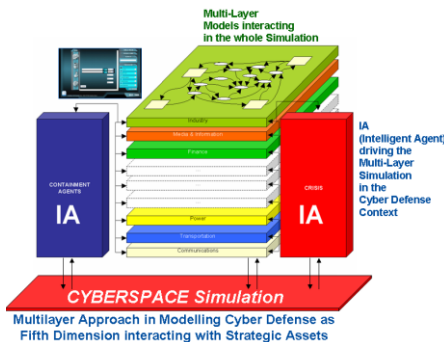
Cyber Reality Simulation for Threat Assessment and Defense Learning



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).



Simulation Team

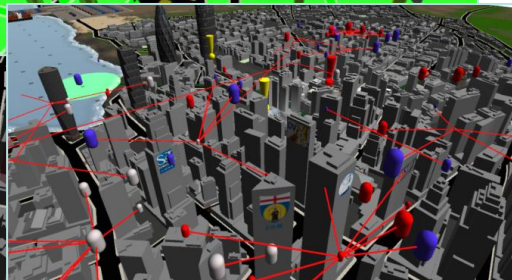
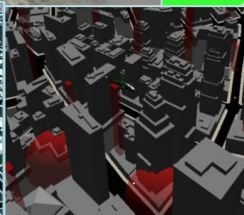
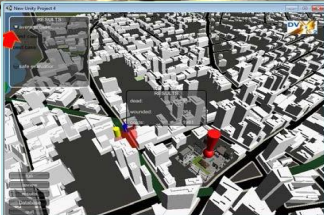
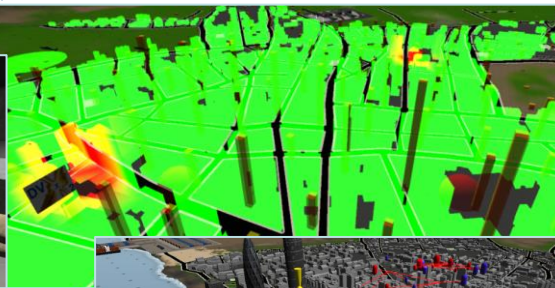


DVx2

Distributed Virtual Experience and Exercise



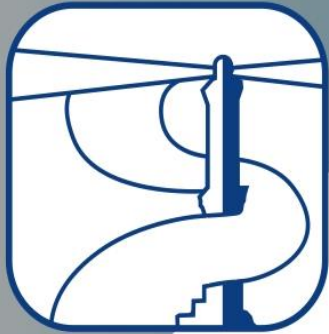
DVx2 is a MS2G (Modeling, interoperable Simulation and Serious Game) devoted for NATO HQs by STO CMRE for with support of Simulation Team to Demonstrate Vulnerability Reduction in the Defence Against Terrorism (DAT). DVx2 is a Virtual Interactive Exercise enabling NATO DAT PoW, Subject Matter Experts (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






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

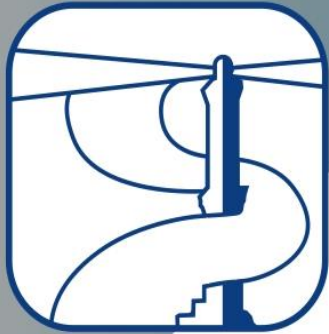
Preventive Detection 86%

Threat Detection 94%

Readiness 44'

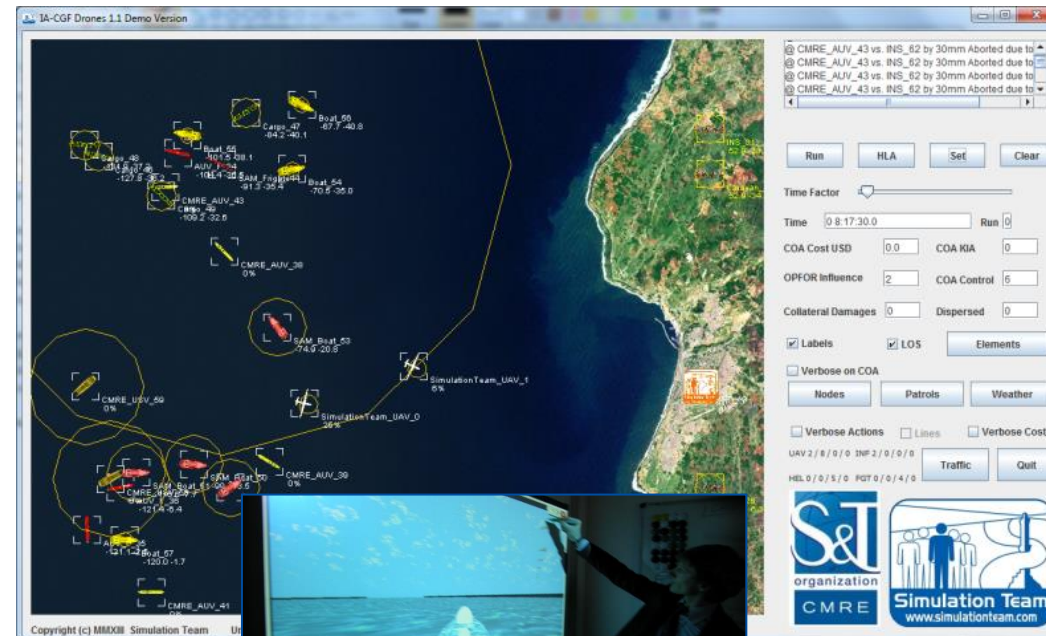
Operational Cost 0.675 MEuro





Operational Interoperable Simulation: IA-Drones & SEAVIT

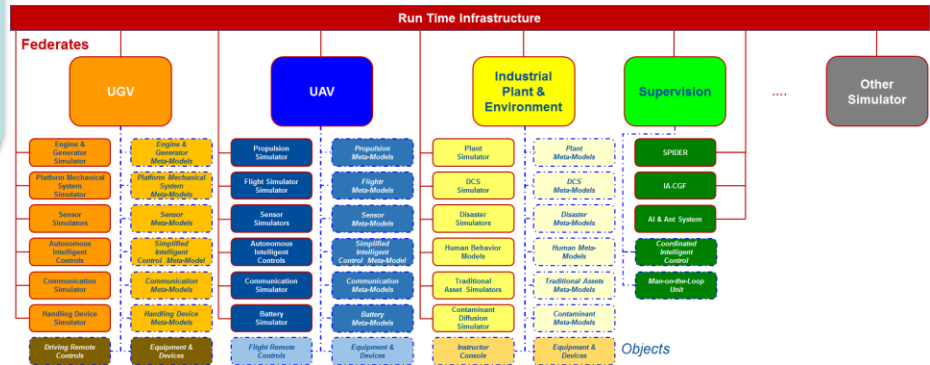
- IA-Drones is a IA-CGF NCF (Non Conventional Framework) Developed by Simulation Team to federate and simulate real assets interacting with virtual ones to maximize the overall performance
- Main goal: to investigate requirements and solutions to be adopted for Interoperability of AUVs, USVs, UAVs
- Advantage: possibility to conduct tests over complex scenarios



UxV in Plants



Autonomous Systems could reinvent the way to conduct activities and operations in Industrial Plants





IDRASS

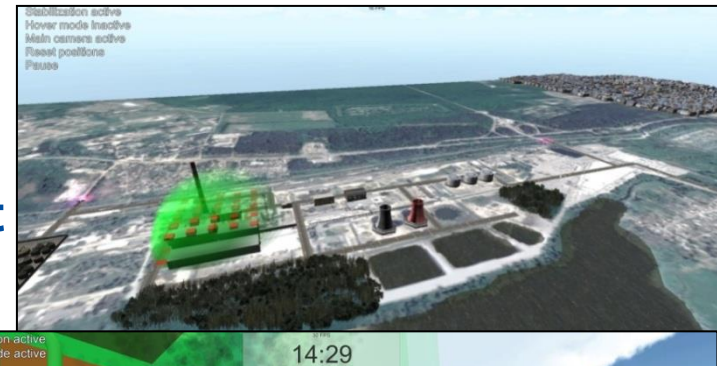
Industrial Dynamic Representation of Autonomous Systems by Simulation



IDRASS (Industrial Dynamic Representation of Autonomous Systems by Simulation) is a MS2G (Modeling, interoperable Simulation & Serious Game) operating in multiple modes: standalone, federated in HLA, integrated through IoT (Internet of Things), Education & Training, Assessment

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
HLA High Level Architecture*

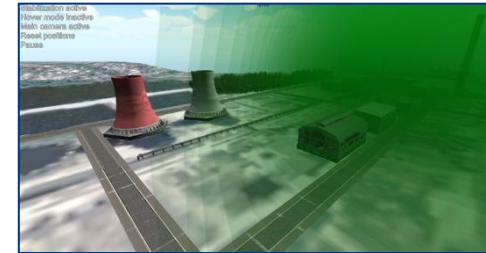
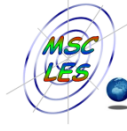


Simulation Team



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.

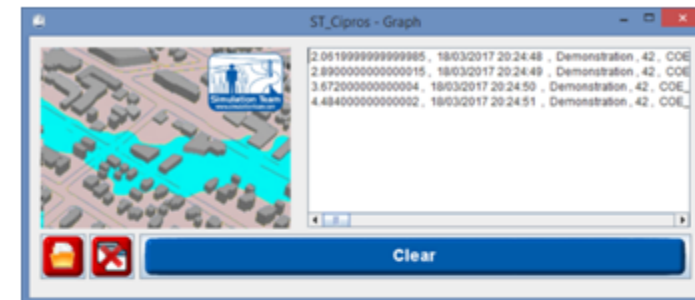




ST_CIPROS VIS

Simulation Team Civil Protection Simulator

Virtual Interoperable Simulation



ST_CIPROS (Simulation Team Civil Protection Simulator) VIS (Virtual Interoperable Commander) is a MS2G (Modeling, interoperable Simulation and Serious Game) project for supporting Commander and Staff in addressing a Crisis within a Civil Protection Scenario.

ST_CIPROS provides an HLA interoperable immersive framework for the supporting critical decision making over a complex situation respect different kinds of crisis (e.g. flooding, hazardous material spill, CBRN, fires). ST_CIPROS includes models of Population and Human Behaviors developed by Simulation Team based on IA-CGF. CIPROS could support training and operate stand alone or federated in HLA with CRISOM and/or other simulators





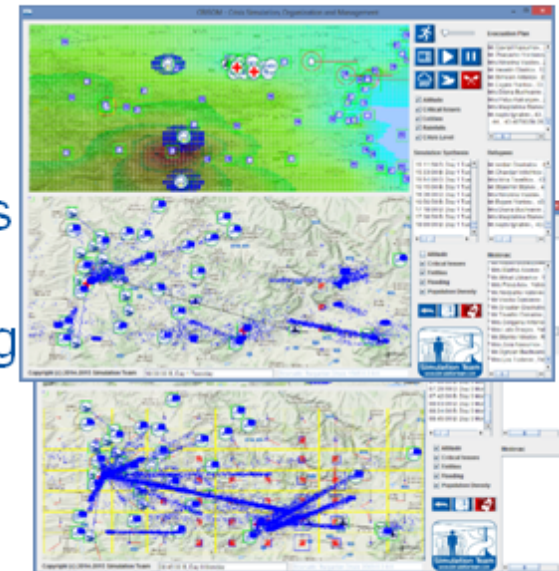
ST_CRISOM

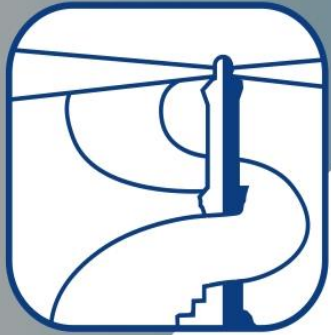
Simulation Team Crisis Simulation, Organization and Management

Simulation Team



ST_CRISOM (Simulation Team Crisis Simulation, Organization and Management) reproduces the dynamics of a complex scenario where a crisis evolves. CRISOM considers the human behavior of the population in terms of evacuations, reactions due to the emergency as well as to human factors such as fear, stress, fatigue and aggressiveness. CRISOM uses the IA-CGF (Intelligent Agent Computer Generated Forces) to reproduce both civilian Populations as well as First Responders and Military Units, Health Care, Civil Protection Agents & Public Infrastructures. CRISOM acts as a NCF (Non Conventional Framework) for IA-CGF. CRISOM simulates Flooding Scenario over regional areas and impact on Town, Industrial Facilities and Critical Infrastructures. It could be federated in HLA with other Simulators.





Interoperable Virtual Simulators

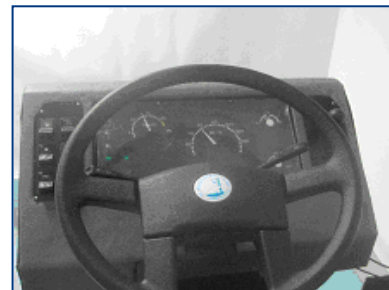


The Simulators developed by Simulation Team are an important support in Training both Operative Resources and Decision Makers. The Interoperability of our simulators is based on state of art standards (i.e. HLA High Level Architecture) and emphasize in addition to traditional stand-alone training in 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



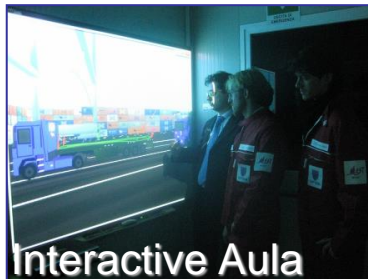
Cave H270° V130°



Containerized



Fully Integrated



Interactive Aula



On-Line
Action Review



HLA Federation



Full Motion,
Sound
& Vibrations



Real-Time
Distributed
Simulation



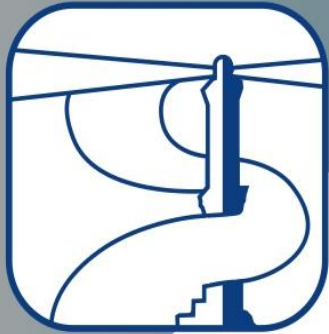
Bio-measures
Integrated in
Simulation



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.

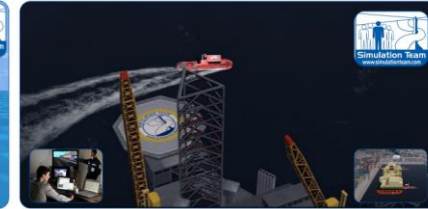
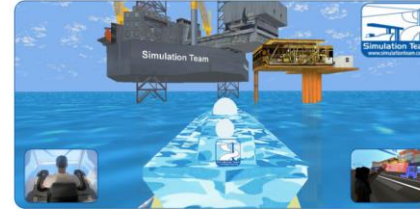
ST-RS includes a Full-Scope Simulation for Training Truck Driving, Logistics Procedures, an Integrated Class Room, the Instructor Debriefing Room, and secondary Interoperable Simulators of Different Cranes Cranes, Biomedical Module for Ergonomic and Stress Level Enhancement.

ST-RS World is tailorable for each Terminal Scenario, Truck, Procedure and Equipment.

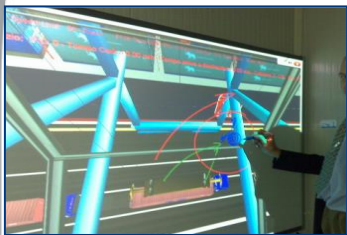




ST_VM: Virtual Marine



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.





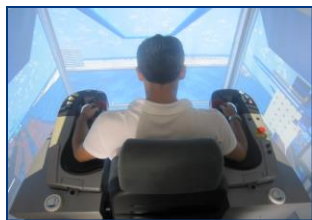
ST_VP: Virtual Port Simulation



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.

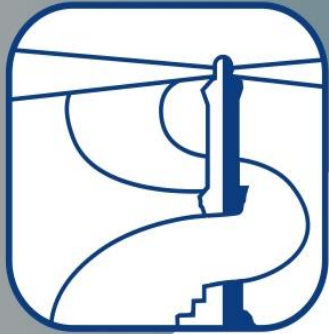


ST-VP Simulator allows to operate all the different Port Cranes in a Virtual World by an immersive Cave (270° Horizontal and 150° Vertical), reproducing Sounds, Vibrations, Motion in all weather conditions

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



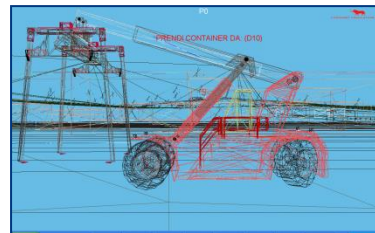
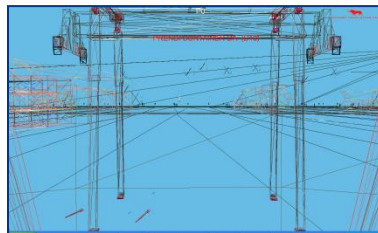


Virtual Prototyping



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

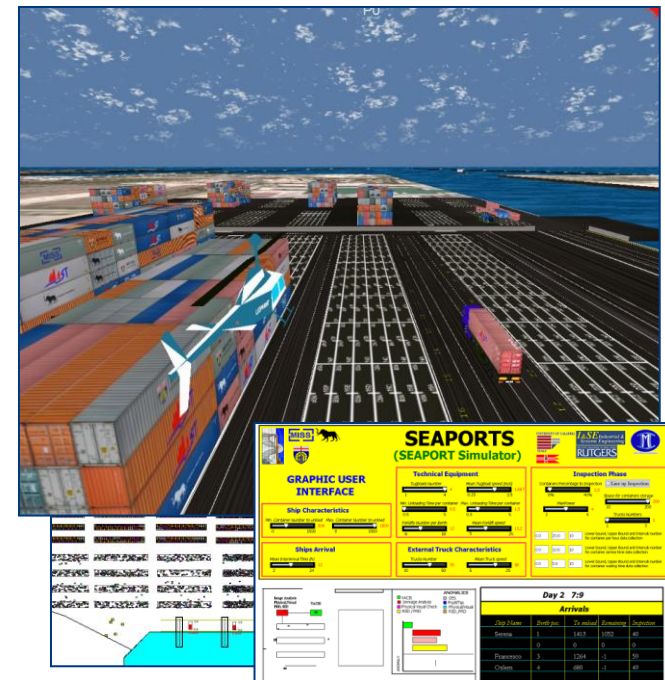




Virtual Security Assessment and Training



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





I4 D3 A2

Immersive	Developing	Areas
Intuitive	Delivering	Activities
Interactive	Dangerous	
Interoperable		



I4D3A2 is focused on developing intuitive solutions to experience within a digital twin and challenging environment respect Safety issues the goal is to Experiment Virtually new solutions as well as new procedures to reduce Risks. Extended Reality within the MS2G Paradigm



allows to combine the benefits of Serious Games in terms of Engagement and Usability with the Fidelity of Simulation.

The use of such innovative Solutions could support both Experimentation, New Procedure Design as well as Training.



POC: Prof. Agostino G. Bruzzone
agostino@itim.unige.it



Immersive, Interoperable, Intuitive, Interactive virtual environment for Developing and Delivering training by simulation to operators in Dangerous Areas & Activities



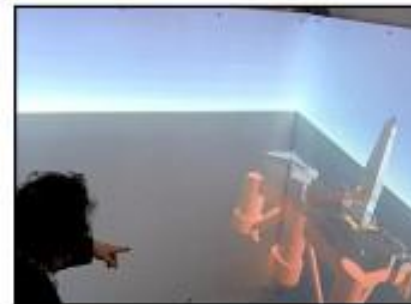


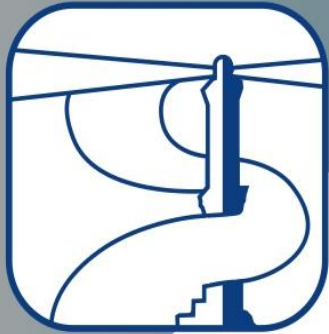
SO2UCI

Simulation for Off-Shore, On-Shore & Underwater Critical Infrastructure



SO2UCI is a Simulation for Training on protecting Off-Shore Platforms (e.g. oil rig, gas rig), On-Shore Critical Infrastructures (e.g. ports, power plants, refineries, desalinators) and Underwater Critical Infrastructures (e.g. cables, pipelines) from Asymmetric Threats using conventional autonomous systems (e.g. RHIB, Helicopters, Sensors, UAV, etc.). The simulator is interoperable by using HLA (High Level Architecture) and support integration with real equipment as well as with other solutions as the SPIDER. SO2UCI integrates scenarios for the use of specific sensors on rotary wing UAV to discriminate suspicious objects around the perimeter of Oil Rig (e.g. face recognition, thermal camera).





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.





Haiti Case

IA-CGF NCF Riots & IA-CGF NCF EQ

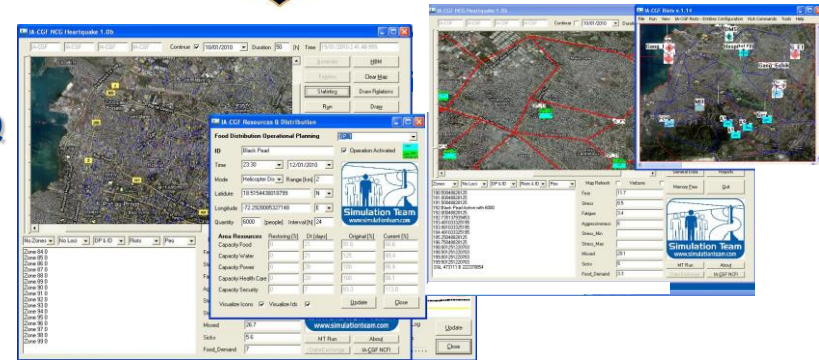
The Demonstration was based Haiti Earthquake 2010 and presented by USJFCOM at ITEC within 2 months.

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

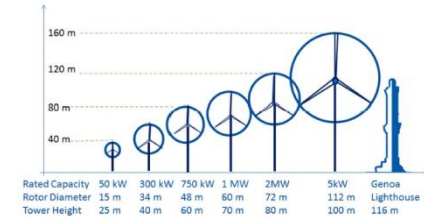


Simulation Team





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.

Megacity Control Panel:

- Population: 8.25 [M People]
- Consumption per capita: 4250 [kWh/person]
- % Renewables: 22 [%]
- % Wind: 81 [%]
- PIL per capita: 17200 [€person]
- % Import: 0 [%]
- % Export: 0 [%]
- Windfarm
- Power Plant
- Solarfarm

Buttons: Emissions, Overall View, Quit

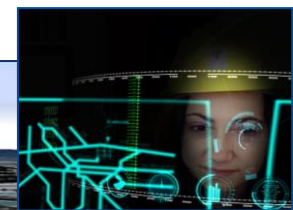
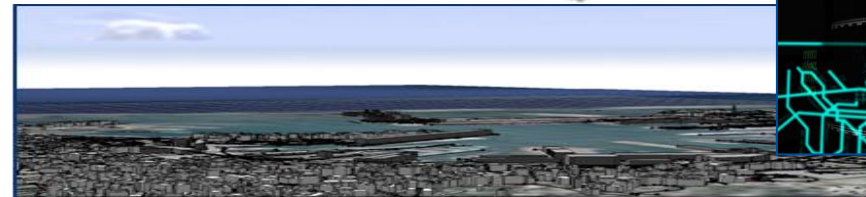
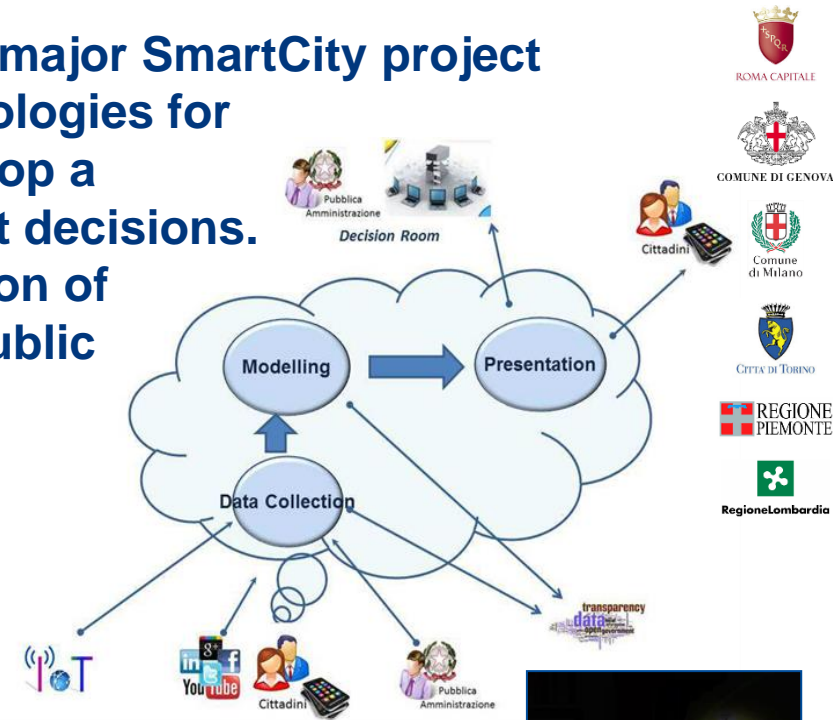




SMARTCITY Decision Theater



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





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.

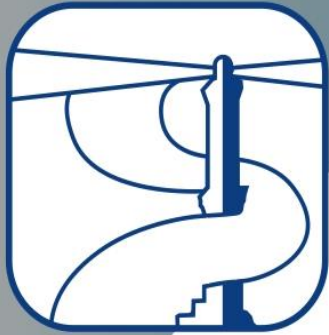
The screenshot displays several windows from the VOR software:

- Naval Tasks:** A table with columns for MOE, Weight, Min, Max, Active, and Importance.

MOE	Weight	Min	Max	Active	Importance
MIO	30.0	75.0	100.0	<input type="checkbox"/>	30.0
ASuV	45.0	75.0	100.0	<input type="checkbox"/>	45.0
SAR	89.0	75.0	100.0	<input type="checkbox"/>	89.0
ABW	75.0	75.0	100.0	<input type="checkbox"/>	75.0
FP	90.0	75.0	100.0	<input type="checkbox"/>	90.0
- Configuration optimizer:** Shows optimization mode (Genetic Algorithms), number of runs (100), population (100), and other parameters.
- Vessel Optimizer & Reconfigurator 1.1b:** Main control panel with buttons for 'Optimize', 'Save', 'Load', and 'Quit'. It includes sections for 'Propulsion' (Type-Engine, N° Engine), 'Diesel Generators' (Diesel Gen), and 'Equipment of the Vessel'.
- Equipment of the Vessel:** A detailed configuration window for various units and weapons.

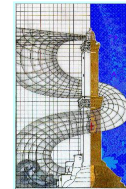
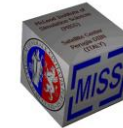
Unit	Value	Optimize	Details
Helo	0	<input checked="" type="checkbox"/>	Details
Hangar	1	<input checked="" type="checkbox"/>	Details
N° Helo	2	<input type="checkbox"/>	Details
Boats	0	<input type="checkbox"/>	Details
N° Boats	1	<input type="checkbox"/>	Details
Rhib	0	<input type="checkbox"/>	Details
N° Rhib	1	<input type="checkbox"/>	Details
- Margin Estimation:** A table showing weight and volume constraints.

Area	Weight	Min	Max	Active	Importance
Area	0.0	-10.0	10.0	<input type="checkbox"/>	1.0
Volume	1.0	-10.0	10.0	<input type="checkbox"/>	1.0
Power	1.0	-10.0	10.0	<input checked="" type="checkbox"/>	1.0
Range	1.0	-10.0	10.0	<input type="checkbox"/>	1.0
KW	1.0	-10.0	10.0	<input type="checkbox"/>	1.0
QMB	1.0	-10.0	10.0	<input type="checkbox"/>	1.0



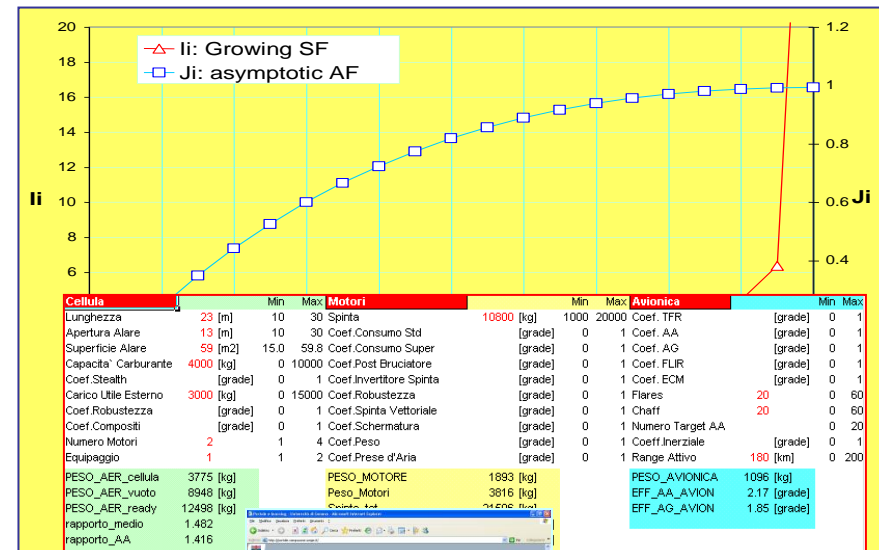
J20 Experience

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.

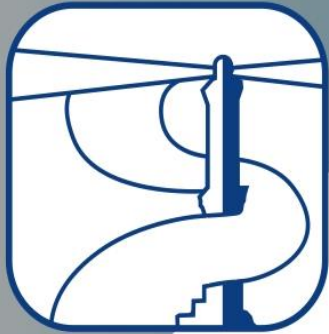
The Exercise has been extensively tested in Distributed Environment for Professional and Academic Courses



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	



Simulation Team



SLAMS

Simulation Lean Advanced Mobile Solutions

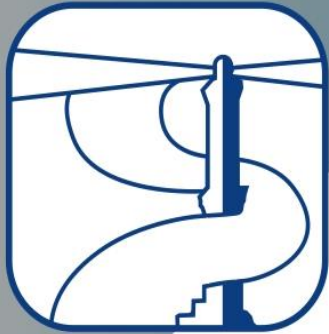


Microsoft



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.





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.

swbs	descrizione
	sistema piattaforma
	sistema combattimento
	sistema integrato di telecomunicazioni
200	impianto di propulsione
300	gruppo impianto elettrico
400	gruppo comando e sorveglianza
500	gruppo impianti ausiliari
45111	radar di scoperta navale
41211	sottosistema comando e controllo
41511	sottosistema data transfer system
45112	sottosistema radar di navigazione
42811	sottosistema di navigazione
48412	sottosistema meteo oceanografico
440	sottosistema di comunicazioni esterne
430	sottosistema di comunicazioni interne

CALYPSO - Carrier Life cYcle Period Simulation & Optimization
PLANE EVALUATION

Historical data | Plane | Coeff menu

Ref-Comparison: Nimitz-Cavour

Direct operating and support cost

- Personnel coeff: N° personnel (0.313)
- Fuel coeff: hp (0.421) **Results direct operating and support cost coeff**
- Depot maintenance: Full load displacement (0.335)
- Others: Acquisition cost (0.670)

Indirect: Training, Fuel del, Other

Click for final estimation

Main menu | Historical data | Technical data | LCC fiscal year (30 years)

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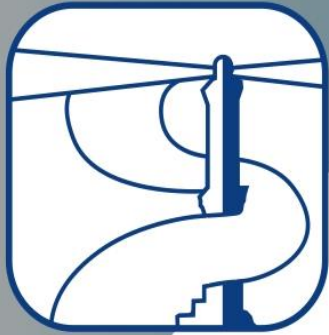
ACASO: Advanced Carrier Acquisition cost Simulation & Optimization

8.20424	8.43488
8.20424	8.43488
8.20424	8.43488
11.724	13.4826
11.724	13.4826

Historical data | Technical data | LCC fiscal year (50 years)

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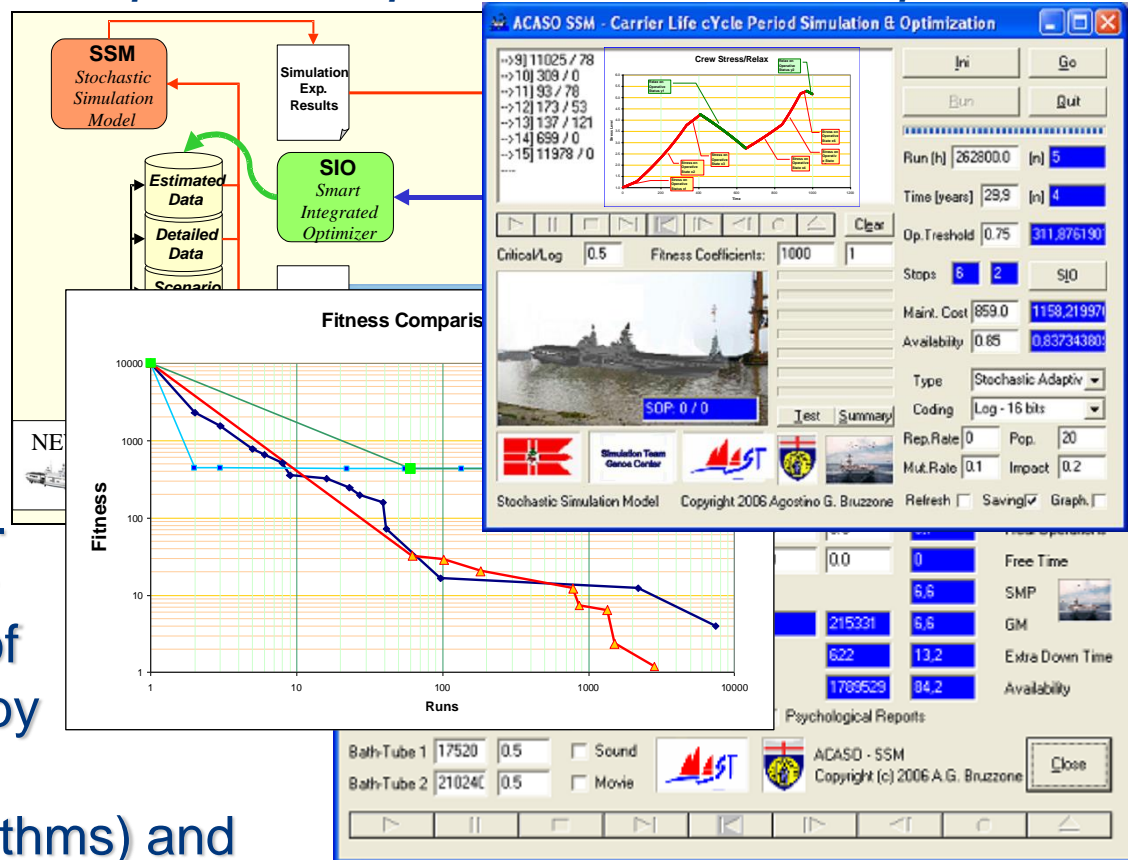


ACASO

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

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



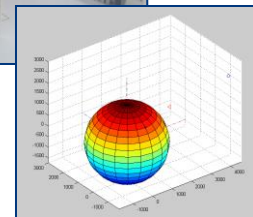
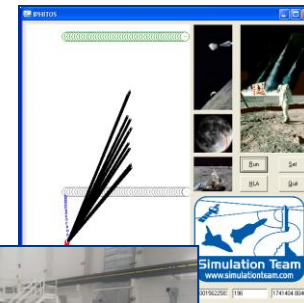
MBDA
MISSILE SYSTEMS

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

FORWARD SIM
simulations & technologies



VT MÄK
A company of VT Systems

PITCH



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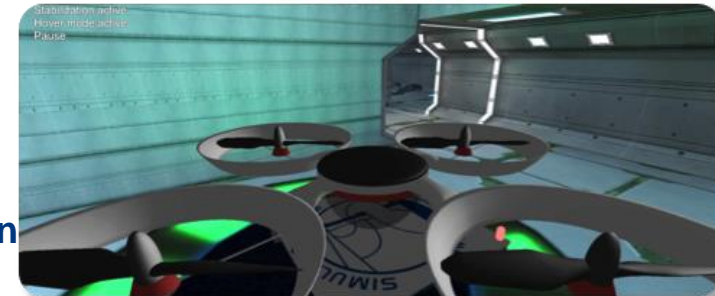
DIPTM
Università di Genova



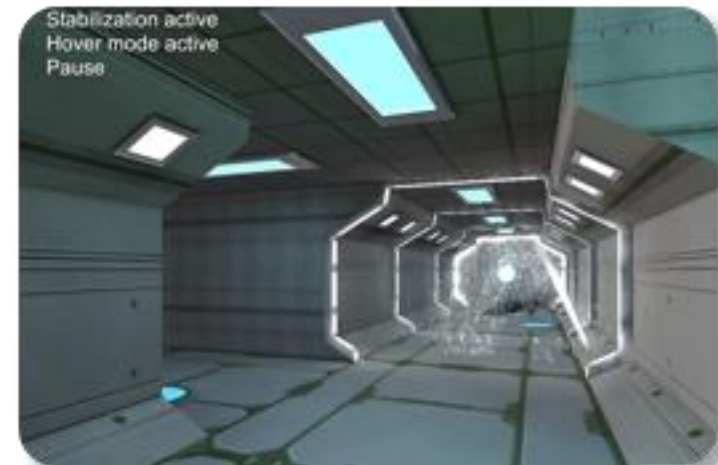


DREDIS

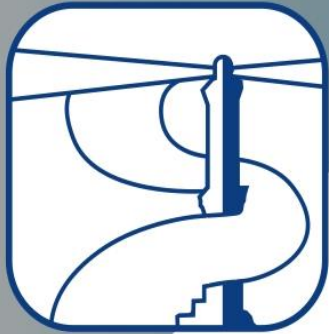
Drones based RELief on Disaster Simulation



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



Drones are employed as lifesaving resource to increase safety for hazardous situation



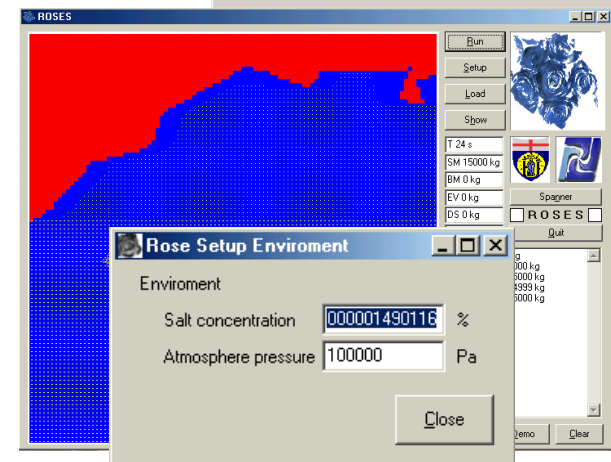
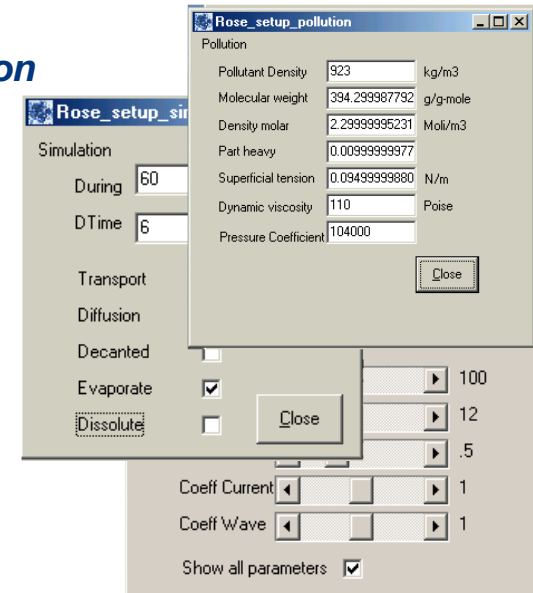
ROSES

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.

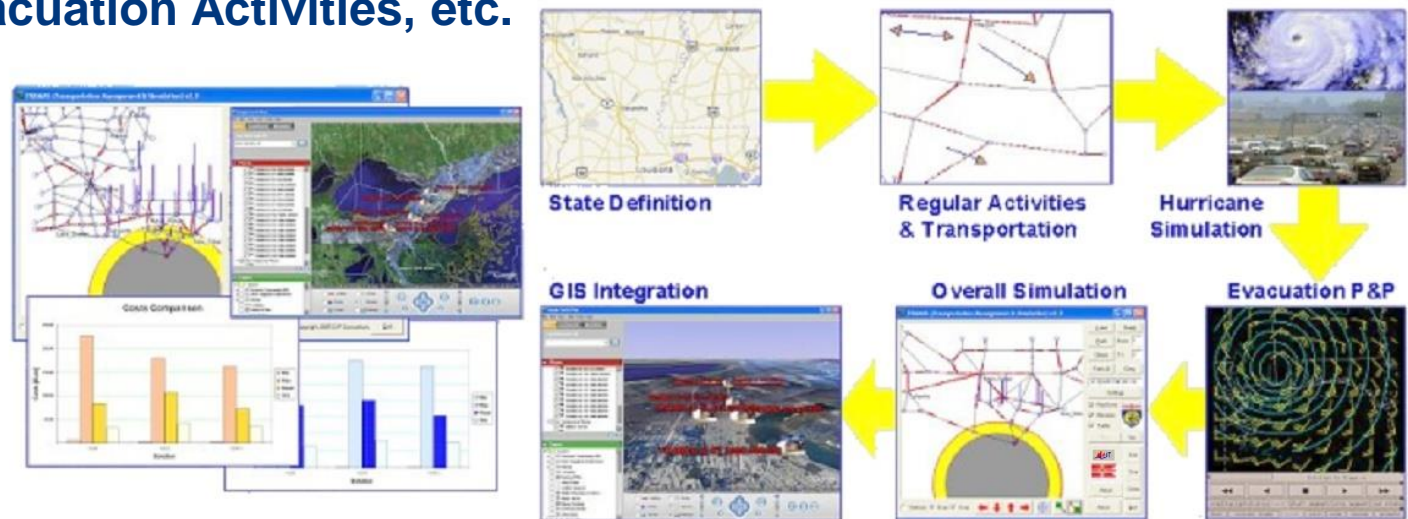




KATRINA LIKE



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.





CIPROS

CIVIL Protection Simulator

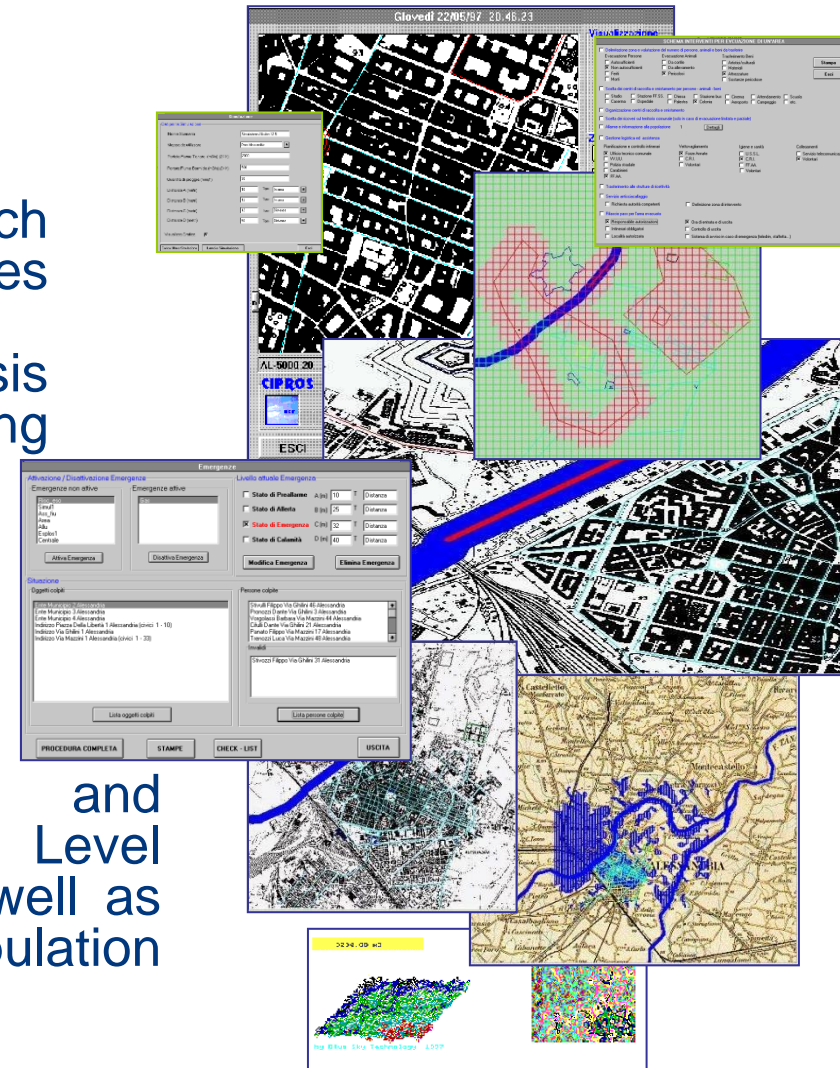
CIPROS is a modular approach for Civil Protection that integrates GIS and Simulation.

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





TOPRO

Town Protection



TOPRO is devoted to support the operations related to protecting a Town or a Region during a epidemics and contamination crisis.

The System reproduce People Behaviors, Units and Entities as well as activities related to Protection, Cordoning of Areas and Cities to protect them from Contaminations and Epidemics as well as planning of decontaminations and treatments and resource allocation.

Entities include law enforcements, military units, health care resources, sensor networks, social media info. TOPRO allows to Identify the Critical Areas and Part of a Town at Risk, as well key points and sectors to control in case of detection of infected people and it provides support for tracking them. TOPRO is a Decision Support System able to be used for training, education as well as operational planning and operation support, CheckPoints Organizer and Management Tool during Pandemics and CBRN crises. TOPRO aims to support also training and operational planning for isolation and containment of epidemics



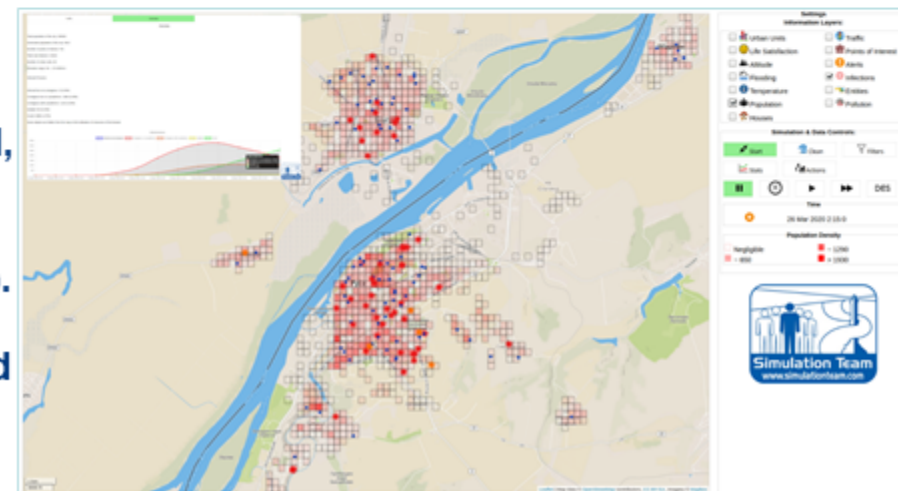


VESTIGE

Virus Epidemics Simulation in Towns & Regions
for Infection Governance during Emergencies



The proposed Technological Solution is applied to Pandemics and it based on the innovative **Strategic Engineering** to address pandemics, the proposed approach integrates Simulation, Artificial Intelligence and Data Analytics in closed loop to support decisions based on scenario evolution, human behavior and population modeling. The current approach has been already demonstrated in relevance to Smart Government and several applications, including PONTUS & Decision Theatre, have been already employed in Operations and Strategic Planning as part of Smart City Project. Therefore, the conceptual models and simulation experimentations on pandemics have been carried out by Scientists of Genoa University and Senior Partners of SIM4Future since over 10 years with specific attention to Pandemics, Epidemics and CBRN (Chemical, Biological, Radiological and Nuclear). The very innovative aspect of this solution relies on its capability to reproduce human behavior of population and interest groups, coupled by IA and reproducing individuals & social networks considering Age, Gender, Health Status, Social level, Education, Ethnics, Religion, Political Preferences and other attributes, including psychological modifiers (e.g. fear, stress, fatigue, aggressiveness). VESTIGE evaluates different courses of Actions and to keep forecasts about effectiveness of applied measures aligned with data collected on field and social media.





MINOTAUR

Multipurpose Industrial New Operator & Transport system based on Autonomous Unmanned Robot



DISC



PROLEXIA

MINOTAUR represents an innovative concept of UGV (Unmanned Ground Vehicle) derived from the experiences made by different partners in Industry and in the Defense and Homeland Security sector also thanks to common contacts in NATO and MESAS Initiative.

The partnership involves DIME, SIM4Future Spin Off UNIGE, Prolexia (French Company) as well as University of Defense (Czech Republic), Dartmouth College for the development of innovative Autonomous Vehicles and Robotic Systems that combine arm robots, sensors, speakers and microphones for indoor industrial use / outdoor, operations and inspections in risk areas, reducing staff exposure. There are different configurations of MINOTAUR, on wheels and on tracks that have been made for different purposes (e.g. asbestos removal) and that can be quickly customized thanks to the digital twin built that allow simulating their operation.

In the current case, it is assumed to take an adequate configuration to move in the wards of hospitals or areas where infected patients are housed and use MINOTAUR to keep medical personnel at a distance and interact and monitor both them and supervise the equipment/equipment through the arm/camera and various sensors.

MINOTAUR is currently conducting tests to perform cleaning operations that could be adapted to act as cleaning of infected areas and/or decontamination. It would also be possible to use it to provide doctors with support also for interventions on infected patients outside the hospital and at home. It could also be used at check points or in support of first responders.

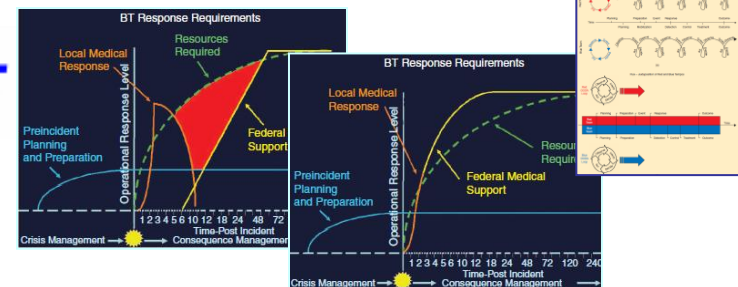
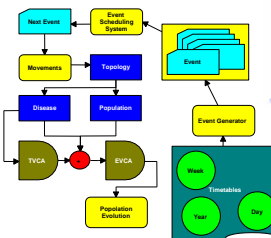
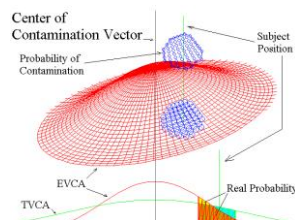


PANDORA

PANdemic Dynamic Objects Reactive Agents



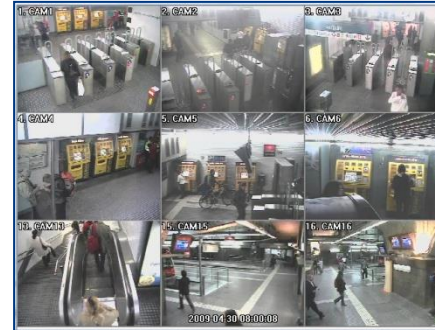
- PANDORA addresses the dynamics of the spreading of a Pandemic and experiments are on-going on H1N1 influenza A virus by a joint simulation project involving USA, European and Australian R&D Centers (MITIM DIPTM, Dartmouth College, CRiCS).
- PANDORA proposes to use an evidence-based approach whereby 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.



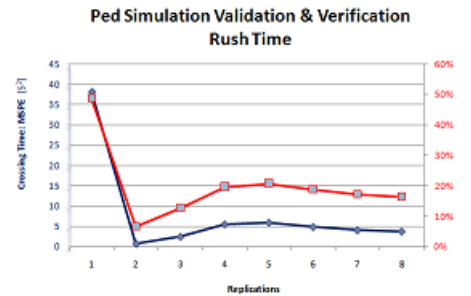
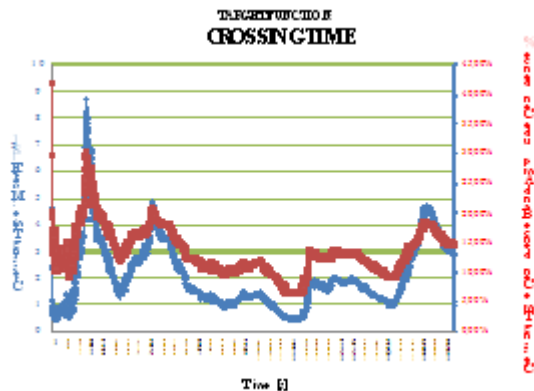
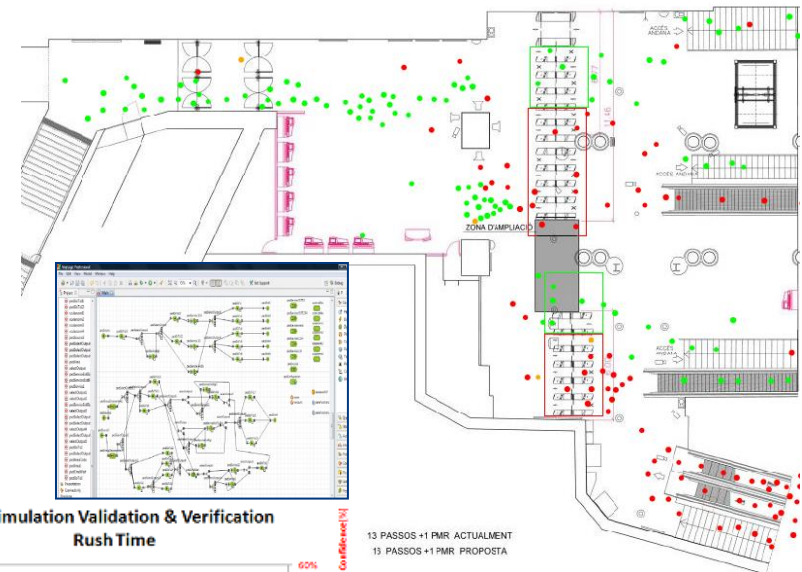


PEDES

PEDEstrian Simulation

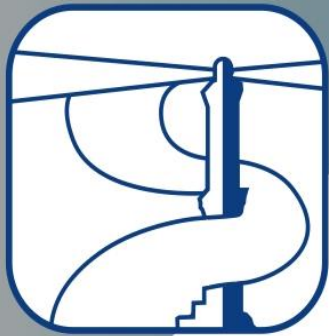


PEDES is a Simulation of pedestrian flows in mass transportation (i.e. underground) devoted to support functional analysis, safety and security solution design and analysis; PEDES is integrated with Human Behavior Models



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



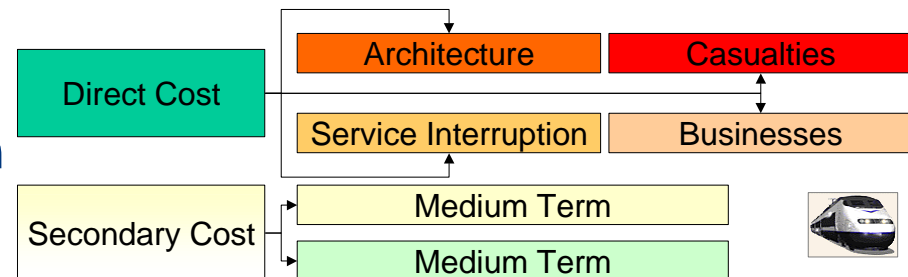
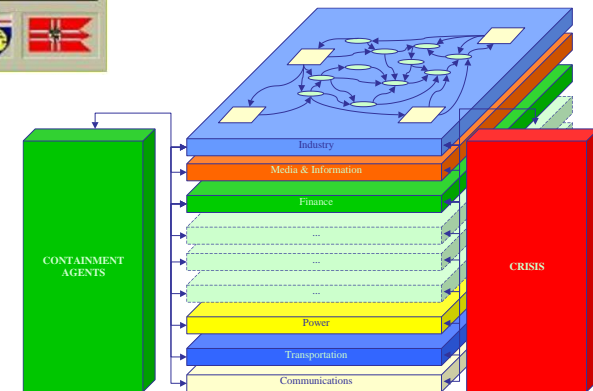


RAILSEC

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



Simulation Team
Genoa Center





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:

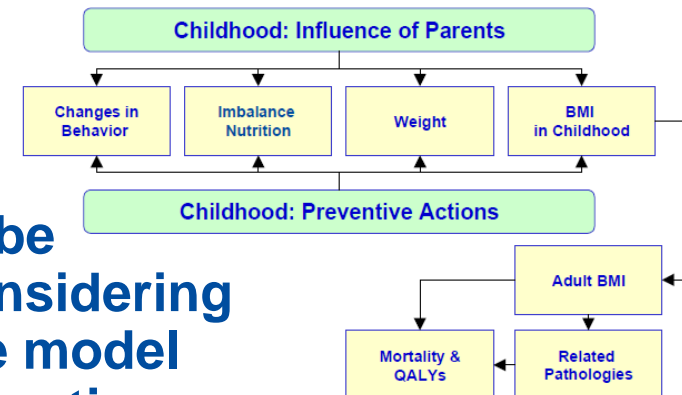
- BMI
- Sport Profile
- Stroke
- Alcohol Profile
- Infarct
- Atrial Fibrillation
- Diabetes
- Hypertension
- Cancer
- Hyperlipidemia

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

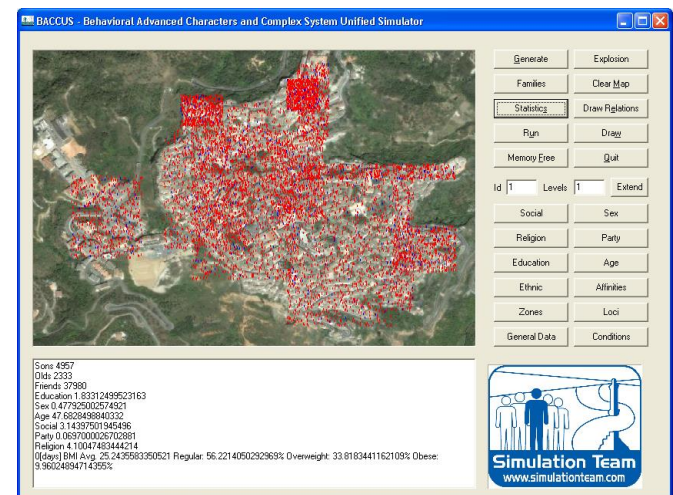


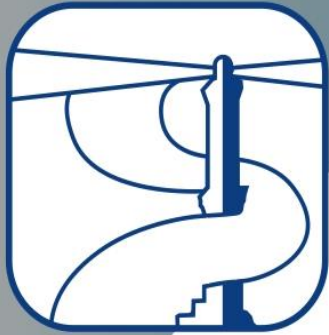
Beth Israel Deaconess
Medical Center

A TEACHING HOSPITAL OF HARVARD MEDICAL SCHOOL



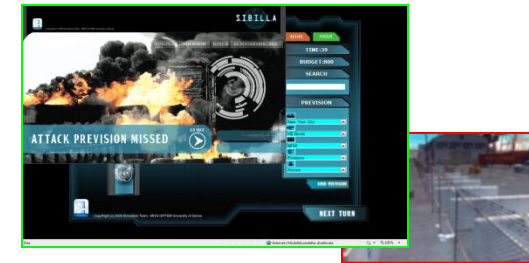
Basic Model of Obesity in Childhood





SIBILLA

*Simulation of an Intelligence Board
for Interactive Learning and Lofty Achievements*

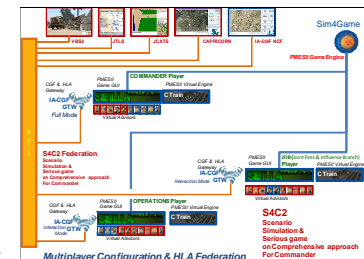


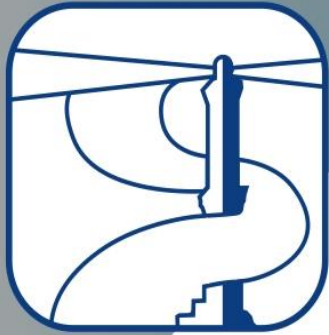
- SIBILLA is multiplayer web strategy game that simulate Terrorist Actions organized by different organization directed by IA that plan, prepare and execute attacks on specific:

- Location
- Site
- Time
- Threat Type



- 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





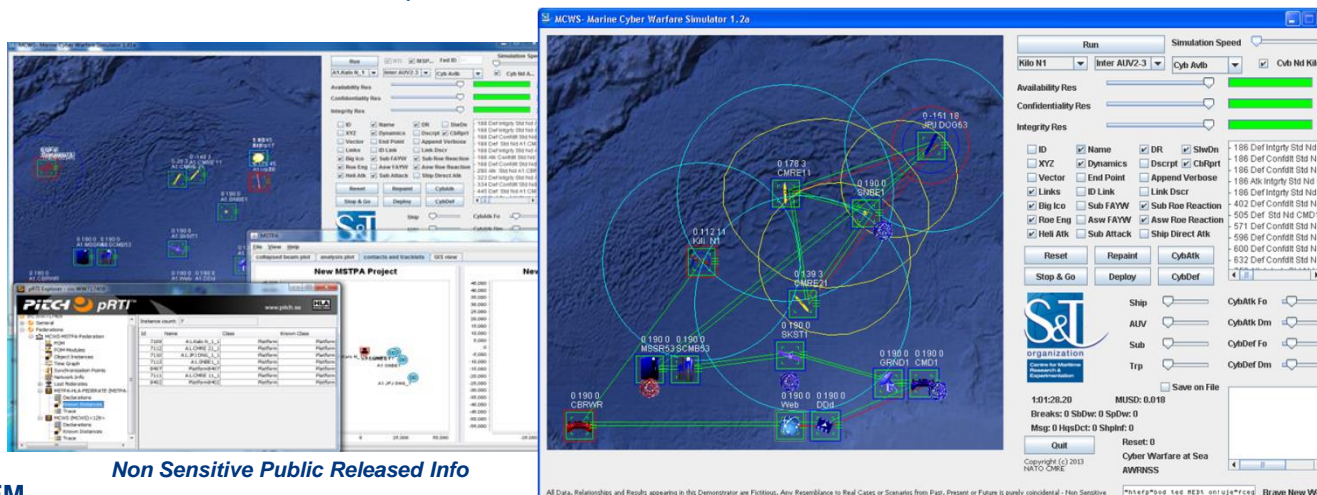
MCWS

Marine Cyber Warfare Simulation

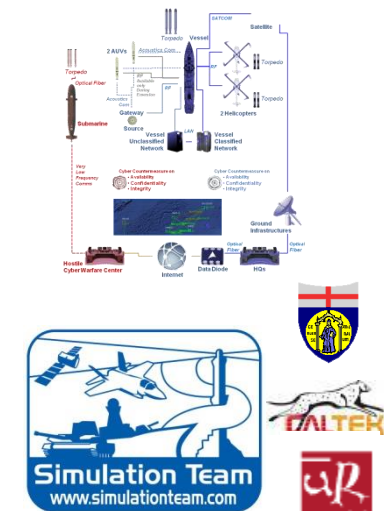
Simulation Team

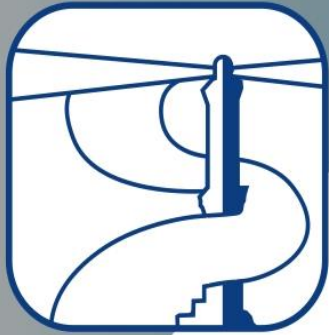


Simulation Team provided support to CMRE for the development of MCWS with special attention to use of IA-CGF and HLA modules. MCSW Simulator was developed to investigate complex scenario combining traditional battlefield operations (Sea Surface, Underwater, Air, Space) with action on the Cyberspace. 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



Non Sensitive Public Released Info





PRODICON

Progettazione Integrata, Difesa e Controllo Nave Militare

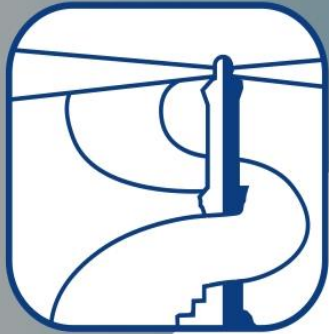
Simulation Team identified simulation requirements and architecture for interoperable simulation that should be used to address asymmetric threats in marine environment; this was a study devoted to provide guidelines to enhance and improve the simulators currently in use from some Partner in order to 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

Simulation Team FINCANTIERI



DIME DINAEL DIBE DIST DICAT ISME





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



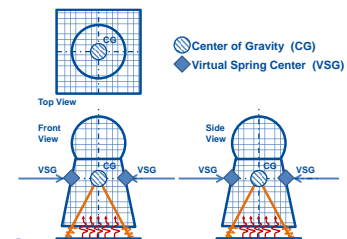
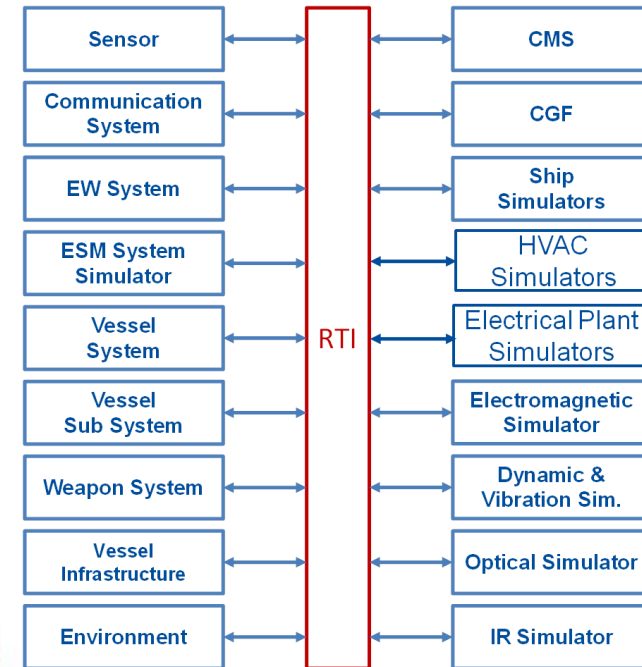
FINCANTIERI

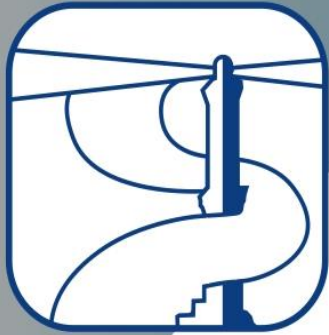


Simulation Team



Nuova CONNAVI s.r.l.

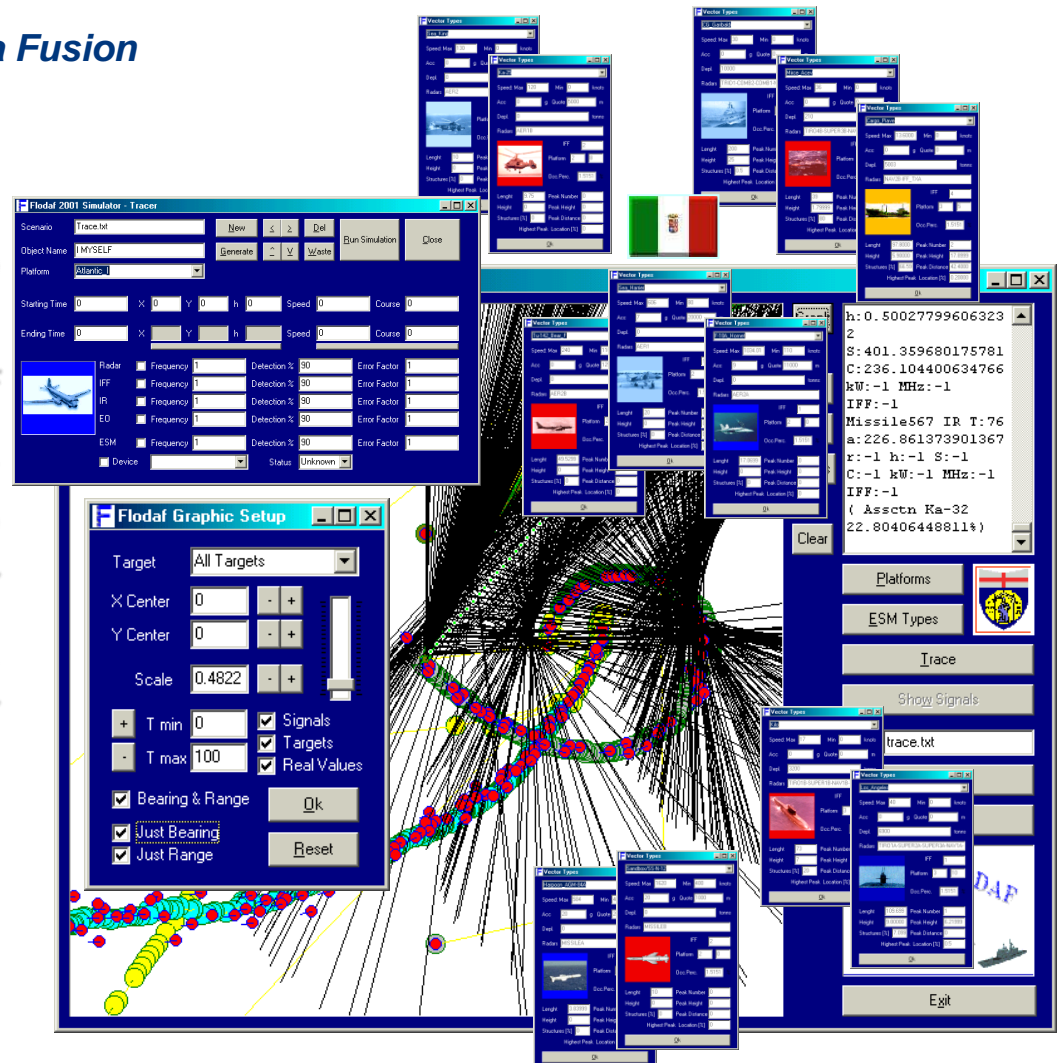




FLODAF

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.





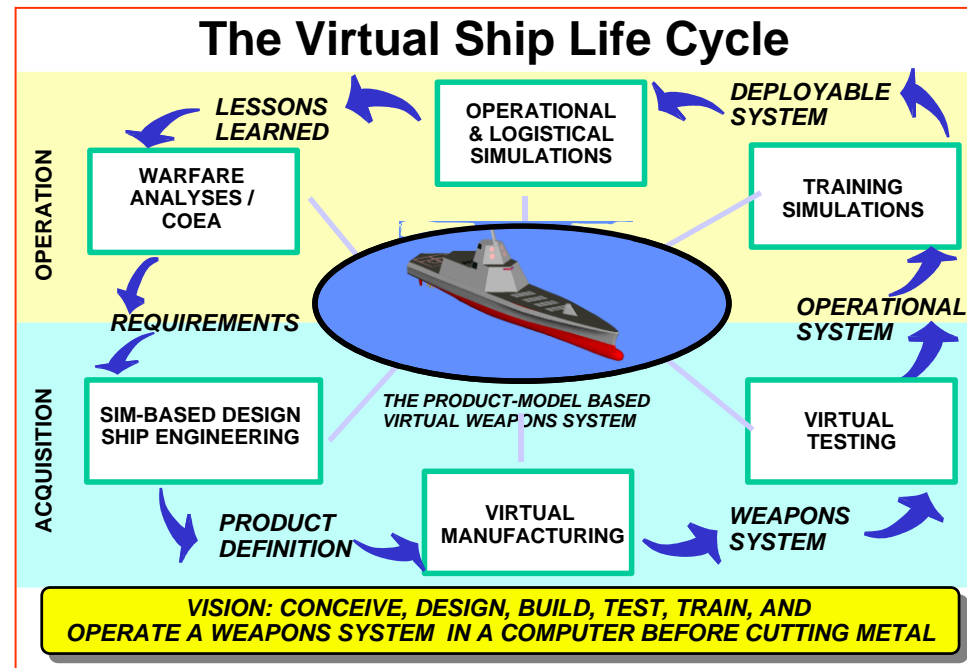
NIAG SG-60

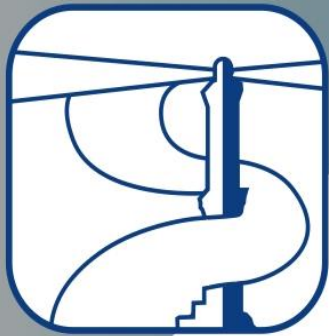
Simulation Based Design And Virtual Prototyping (SBD & VP)



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





VISION

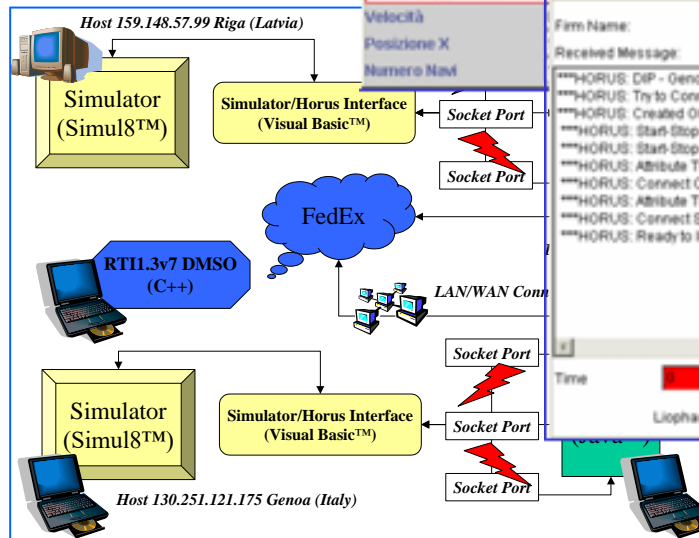
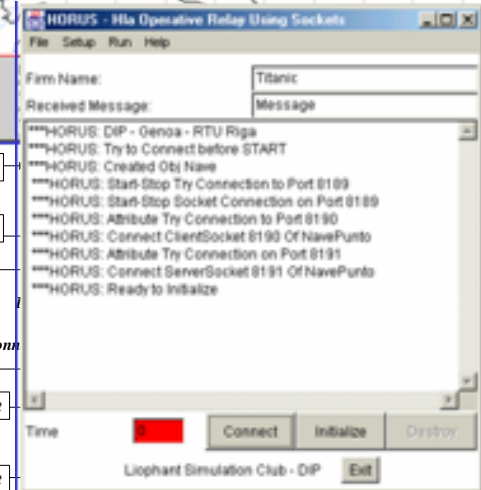
Virtual Ship Simulation



Orizzonte Sistemi Navali



DIPTM, 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.





Data Opportunities: Big Data & Data Farming

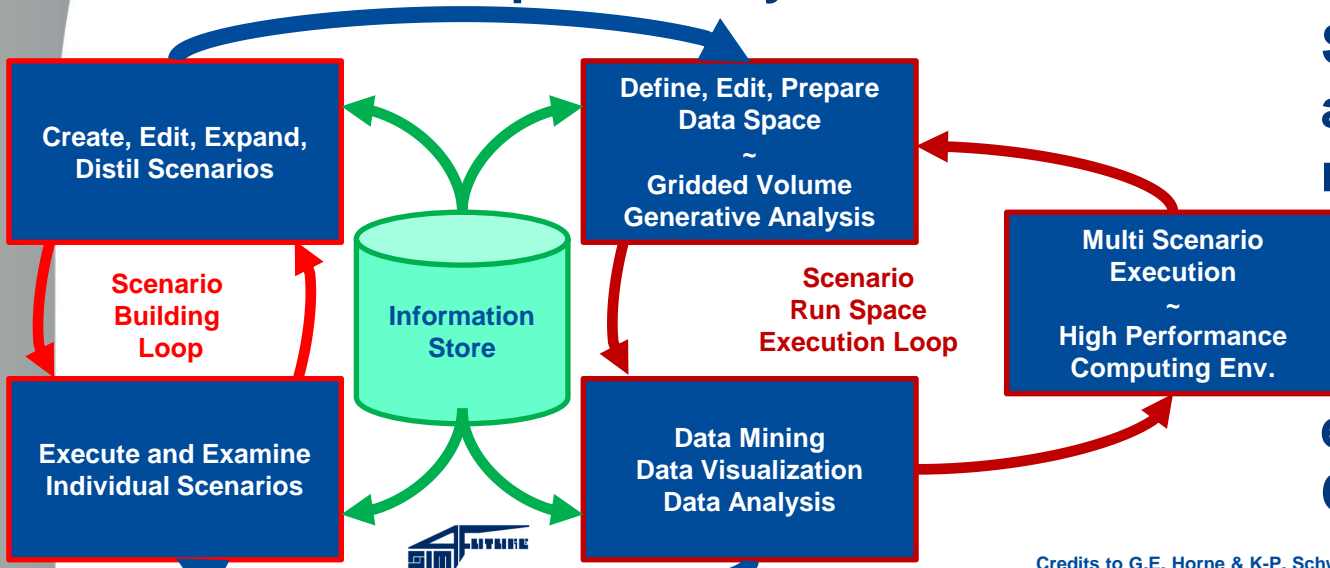
We have to guarantee Data Dominance being able to:

- Mine Data received by IoE and IoT
- Data Farming about Future by M&S
- Extract & Process Information
- Complete Analysis & Draw Conclusions

IoT Internet of Things
IoE Internet of Everything



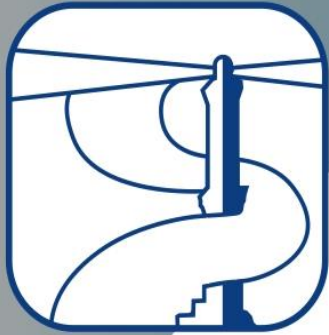
Smart Simulation is allowing to develop new Models based on Big Data and to feed Investigators by Data Farming & enabling the use of Crowdsourcing



Credits to G.E. Horne & K-P. Schwierz for Data Farming Iterative Process Scheme

Credits to M.Massei & G.L.Maglione for ST_VM as Example of Lean Simulation based on DOE & Data Farming

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Simulation, Virtual Reality & Augmented Reality

Simulation, AR/VR and Serious Games Reality are crucial elements for developing new solutions:

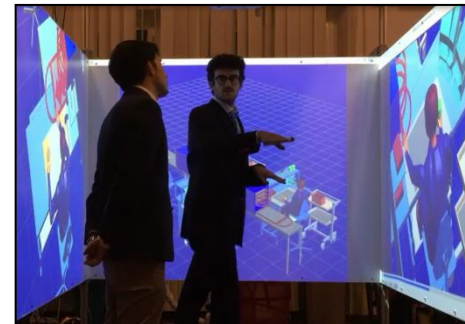
During Process Development

- Identify & Quantify Risks & Critical Issues
- Support Design & Engineering
- Defining Procedures
- Development of new Education & Training
- Involve Users in Processes Development
- Testing and Evaluating new Solutions
- Improve Safety & Security



During Operations

- Evaluate Impact of Changes
- Develop Training Programs
- Support Decision Making
- Checking Effectiveness of Decision & Actions
- Speeding Up reaction Time
- Support in Crisis & Dangerous Situations
- Accident Causes Identification



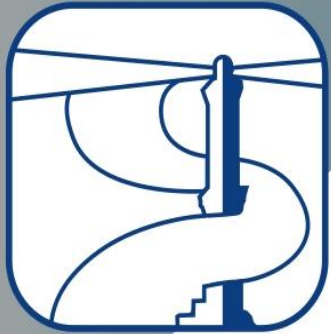
*MR Mixed Reality
VR Virtual Reality
AR Augmented Reality*



A new Approach to Enhance Education and Training

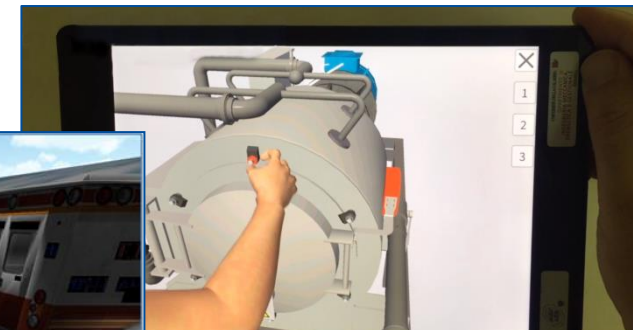
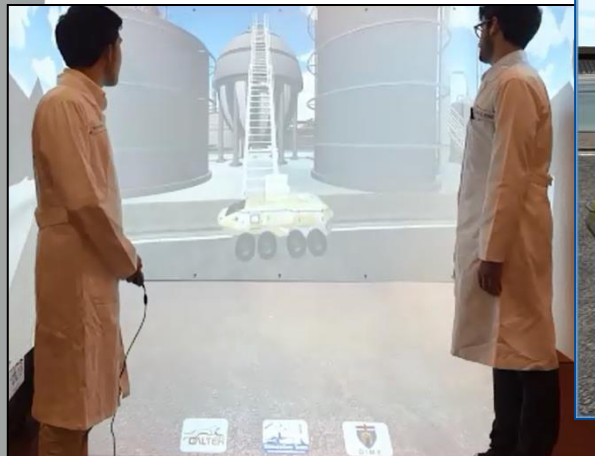
Integrated Solutions for E&T that combines Simulation, AR & VR are able today, especially for new Young Generation, to enhance Efficiency and Effectiveness of Education Programs. In particular it becomes possible to Engage and Motivate in new ways the Trainees as well as to provide them a Realistic Virtual Labs where to Test and Experience the studied theories and procedures, as well as to Exercise on Complex Simulated Scenarios. MR is further reinforcing these concepts. It is evident the necessity to tailor and integrate these technologies in the whole E&T process.

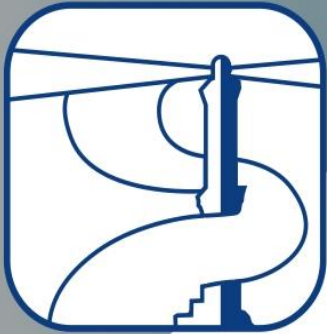




MS2G Paradigm as new Enabler

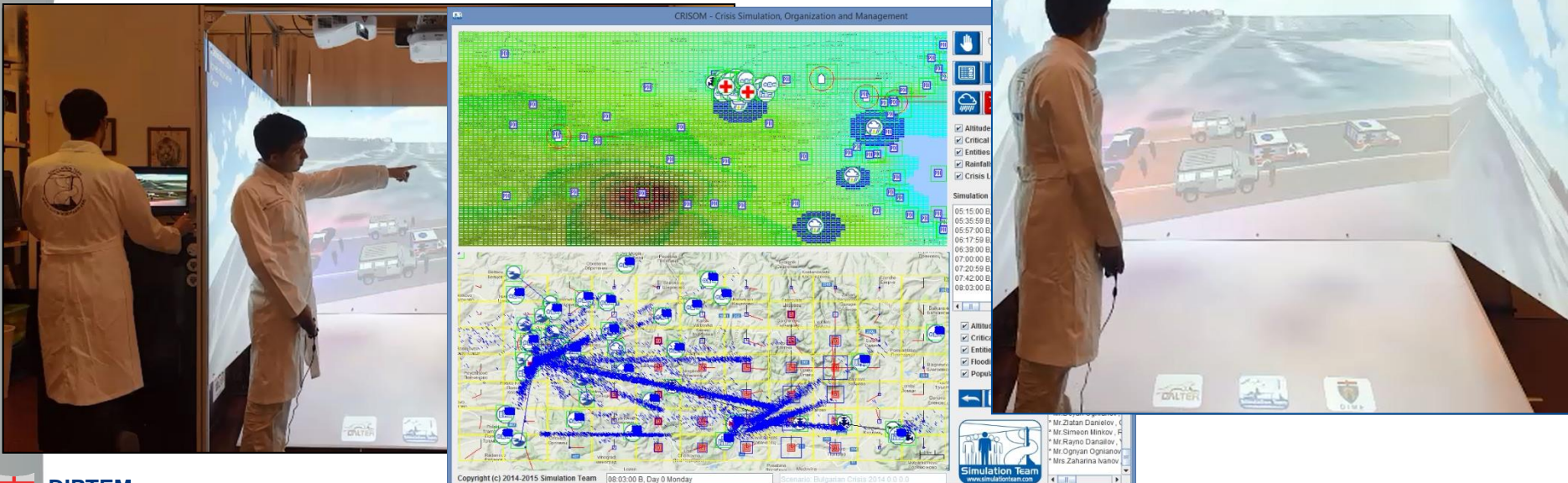
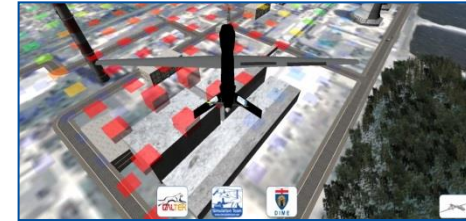
The innovative concept of MS2G (Modeling, interoperable Simulation and Serious Games) allows to develop interoperable scalable and reusable simulators with benefits of new Immersive Solutions. MS2G is very flexible and enable use from different platforms: regular laptops, computers, CAVE (Computer Automatic Virtual Environment) large enough to immerse 4-5 people in the Virtual World, HDM, HoloLens as well as Smartphones and Tablets

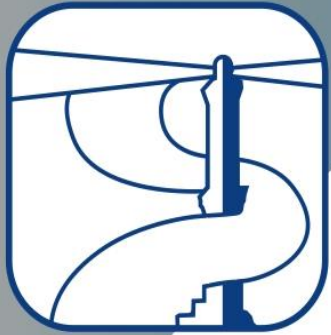




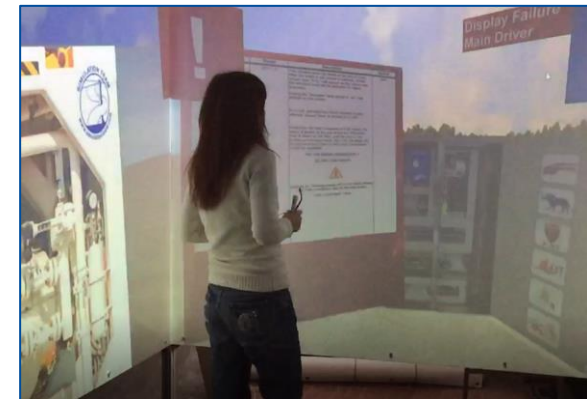
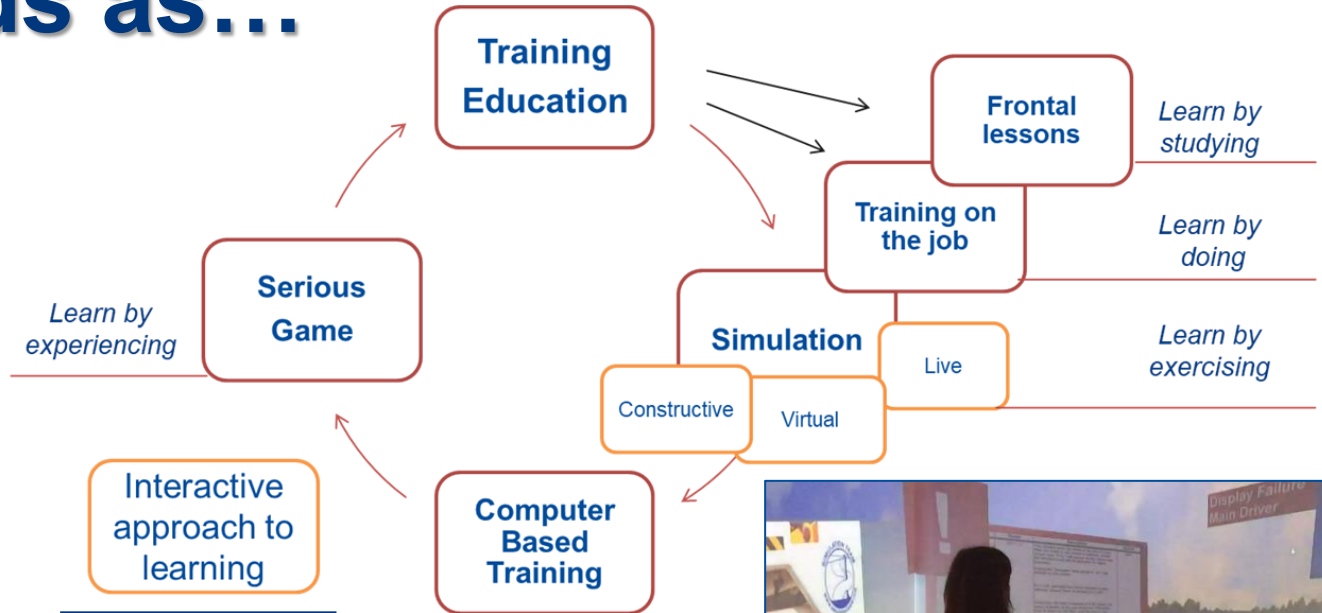
MS2G and IA-CGF

The MS2G (Modeling, interoperable Simulation and Serious Games) could be combined with use of IA (Intelligent Agent such as IA-CGF by Simulation Team). The AIs (Artificial Intelligences) drive concurrently many actors, people and related actions enabling to recreate and study very complex scenarios to improve simulation capabilities & Training Efficiency



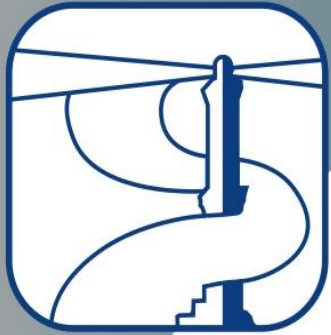


Education & Training Aids as...

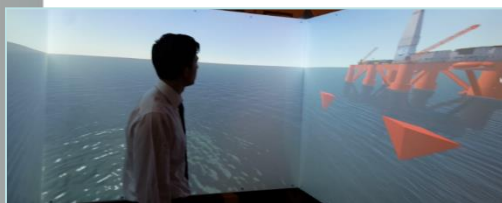


“Tell me and I will forget. Teach me and I will remember. Involve me and I will learn”,

Confucius



... Serious Games Evolve into Simulation Team Roadmap



Training on the Job



Simulation for Training

Experimenting on the Simulator

Many Installations
Many More Users

Serious Games for Training



New Education Modes
New Utilization Modes

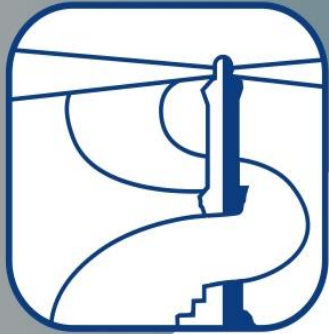
Playing while Learning

Experimenting on Games

[Nuclear War]
..a strange game the only winning move is not to play

Joshua in War Games Movie





Interoperable Virtual Simulators & Models

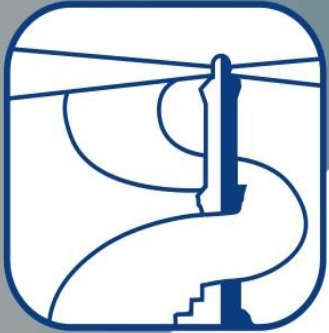


The new generation Simulators represent crucial supports for Industry 4.0 in terms of Engineering, Management and Training. The Virtual Simulators are aids for Operative Resources, Technical Staff & Decision Makers.

The Interoperability of our simulators is based on most advanced standards (i.e. HLA High Level Architecture, MS2G, Modeling, Interoperable Simulation & Serious Games).

These Solutions enable stand-alone and Federated Simulation of Operations, Activities and Processes. Simulation Team have very long experience in Project with Industries and major International Players (e.g. NASA, NATO, EDA, EC).

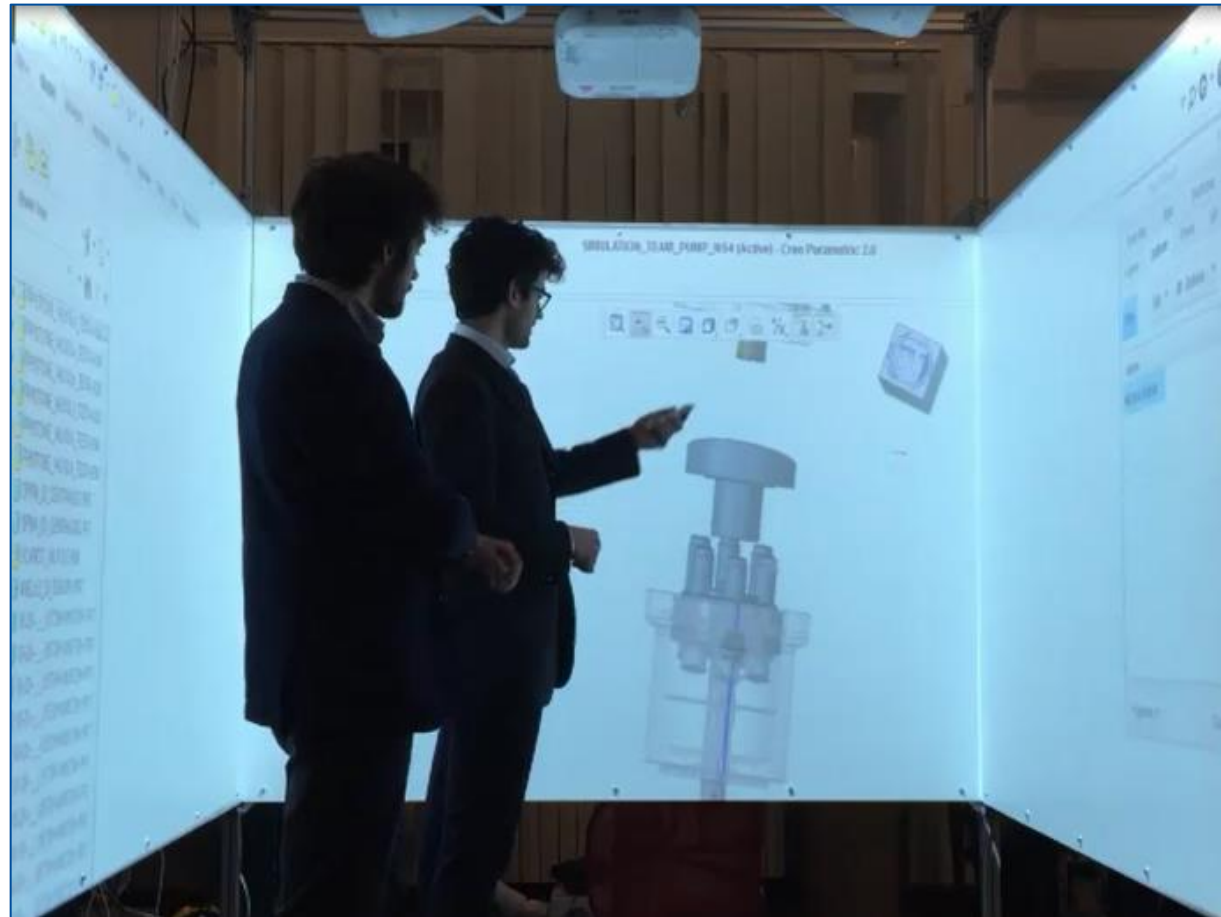




Collaborative Remote Supervision & Service



The Central Subject Matter Experts (SMEs) become available to check remotely the Status of Different Distributed Assets. So, it becomes possible to create new remote services as well as to conduct Supervised Service Operations. This could be applied to maintenance, problem solving, commissioning



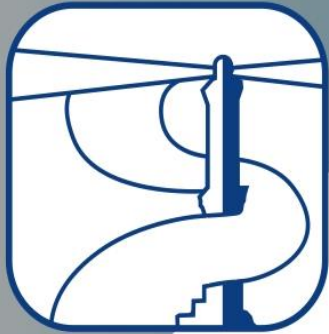


Many Different Solutions: Glasses & Goggles



In facts there are many solutions available to be adopted as support for VR and AR implementations. New CAVE could support cooperative supervision. Other ones are more useful for Training, as Head Mounted Displays. The Oculus Rift is a basic and valuable commercial example of VR while the HoloLens represents a new product for MR



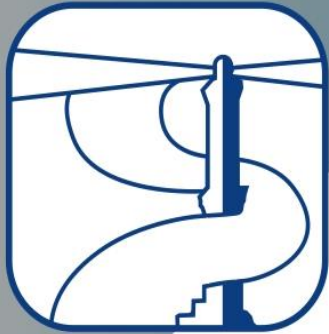


Tablets & Smart Phones as Intuitive Approaches to AR



Indeed sometime it is more effective to use basic Hardware solutions that result reliable and intuitive for potential users. From this point of view the tablets provide an interesting Man Machine Interface for supporting Service and Maintenance of Equipment and being operated by basic Operators.



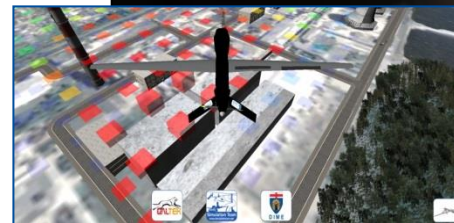
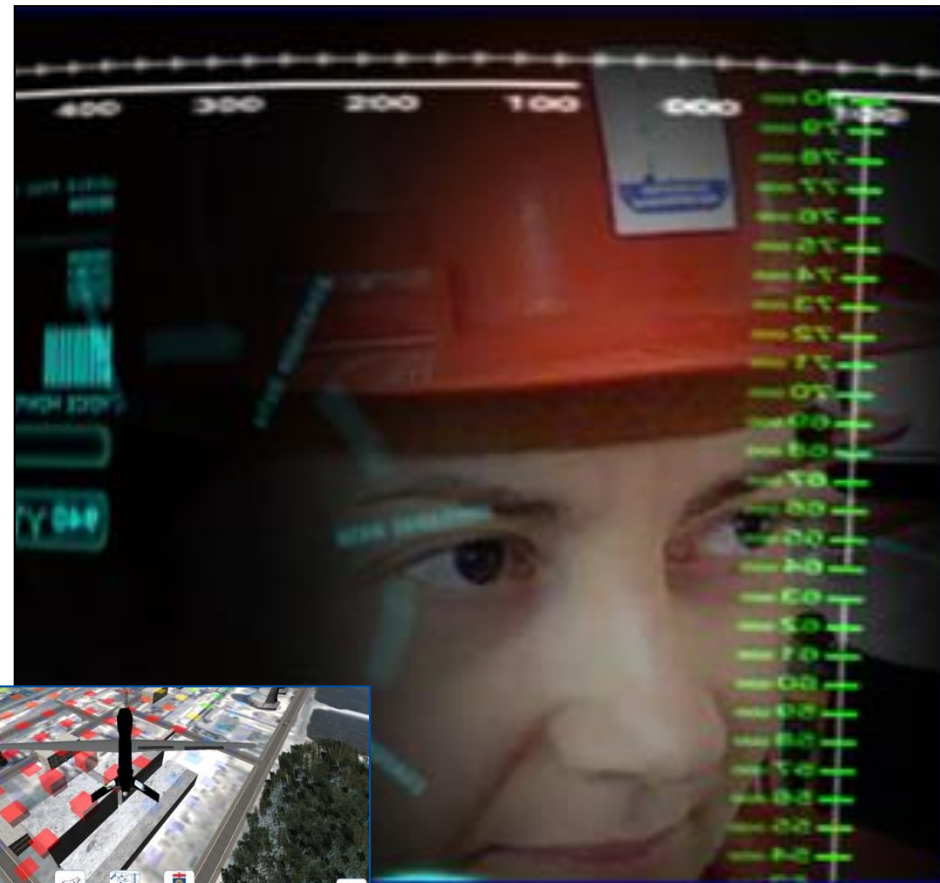


Future Uses and Innovative Interface

The new architectures are designed to combine present & future technologies for continuous development.

This R&D addresses especially:

- Monitoring & Tracking
- Remote Test & Troubleshooting
- Supervision
- Remote Service Support
- Mobile Service Support
- Availability Improvements
- Improving Efficiency
- Reducing Errors





Addressing Multiple Issues

In general the MR could be scalable on different supports to be reusable to address many different goals:

- **Education and Training**: answering dynamically and interactively to questions of the trainees as well as providing examples of sequences and action points
- **Planning**: Support Decision Makers and Planners in optimizing the plan, anticipating problems and getting opportunities
- **Operational Support**: directly interacting with the operator or supporting it by IA and/or remote supervision for guarantee a safe and efficient remote supervision

In addition to lean supports, such as Glasses and Tables, new CAVEs such this SPIDER could be effectively used for training and for remote supervision



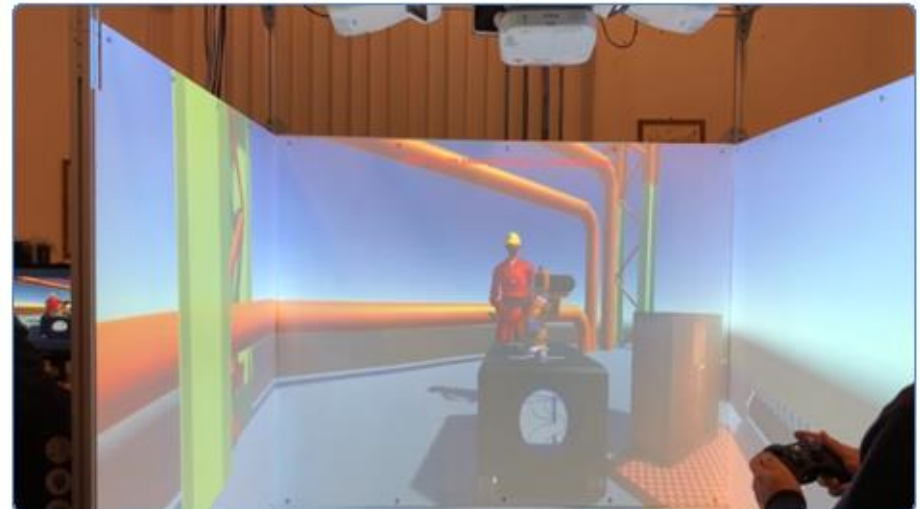


FASOLT

Foremost Autonomous Solutions for Operations in industrial plants

Simulation Team and PW cooperated jointly in development of Innovative Solutions for Industrial Plants based on Autonomous Systems, Artificial Intelligence and Modeling & Simulation. The Project addresses Safety and provided very interesting results including among others:

- Safety in Industrial Plants
- Efficiency Improvements
- Effectiveness Improvements
- Availability & Reliability
- Man-Machine Collaboration
- Innovative Supervision
- Autonomous Capability Development



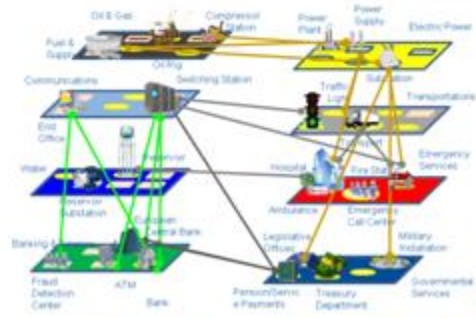
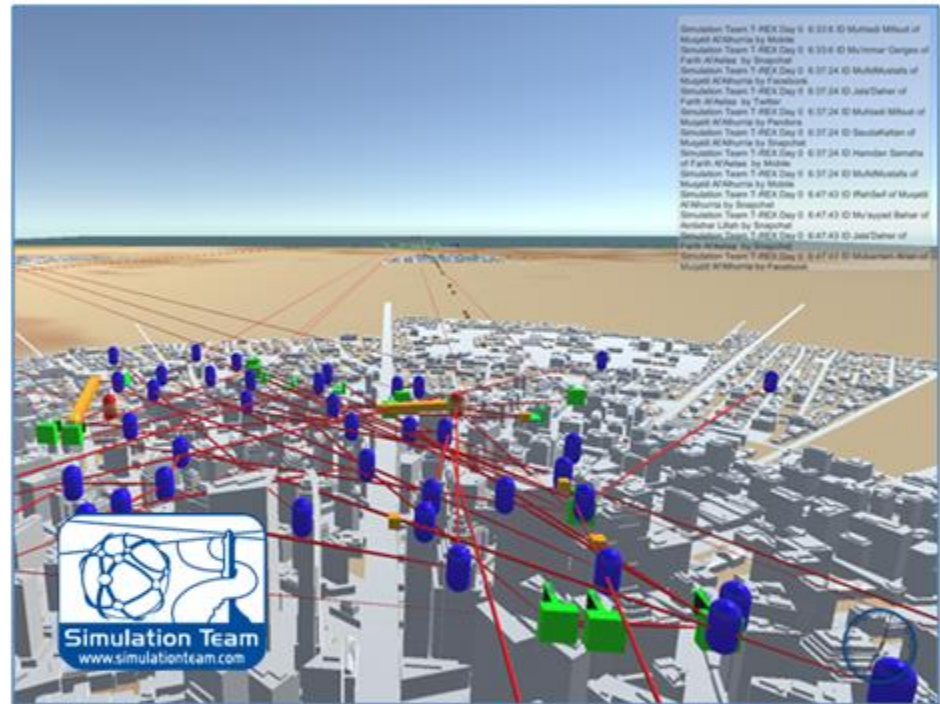


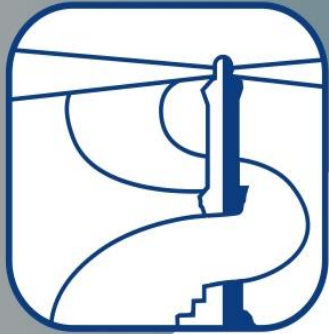
MLEA

Multi Layer Engineering Approach

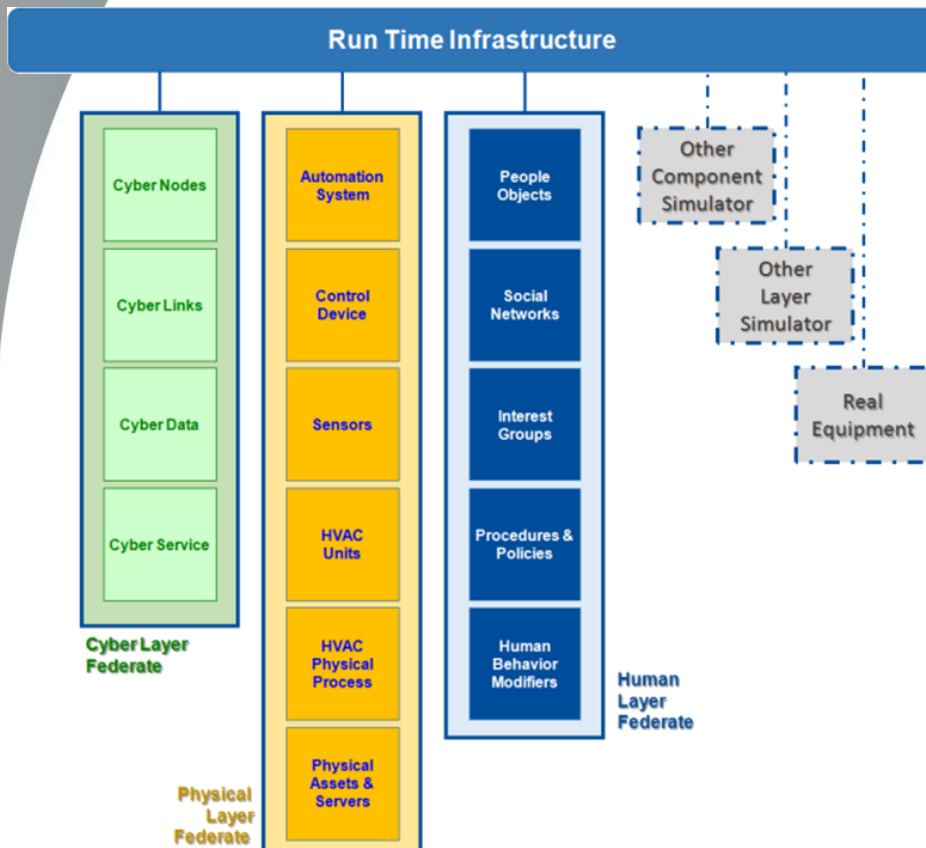
Modern systems, plants, buildings and infrastructures are usually related to Multiple Layers and they requires to Model & Simulate these aspects to address their complexity as well as issues facing Safety & Security. MLS is a new approach fundamental for :

- ⦿ Engineering
- ⦿ Safety and Security
- ⦿ New Policies & Procedures
- ⦿ New Technologies and Processes
- ⦿ Education & Training Programs for Multiple Players





Cyber as the New Dimension



Safety and Security needs more and more to be addressed by a Joint Approach



Blue Project

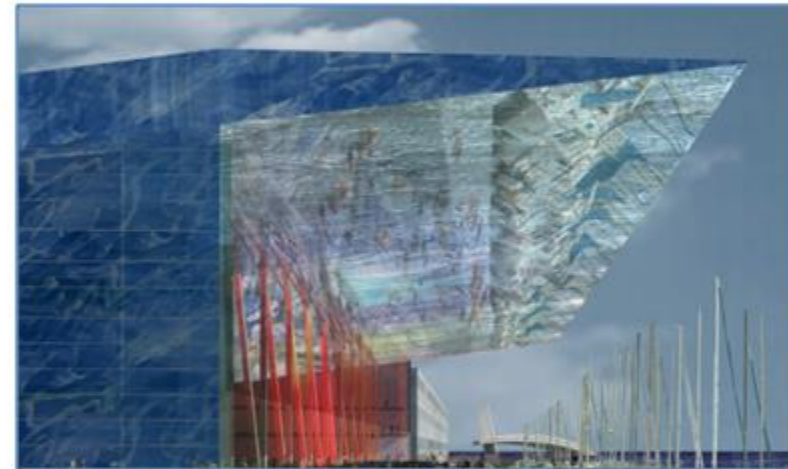
The Multi-Layer Engineering Approach at Work



I c3i Simulation Team
COMITATO ITALIANO
INGEGNERI INFORMATICA



Blue Exhibition Hall is a project related to a major fair infrastructure where Safety and Security Solutions have been developed by the applying the **Multi-Layer Engineering Approach** based on **Simulation** to protect **Humankind's Heritage Exhibition**





MLEA for S&S

Multi Layer Engineering Approach for Safety & Security

*Key Note Presentation invited
at World Engineering Forum*



Human Behavior



Cyber & Physical Actions



Fire Safety Engineering

Simulating: Joint Threats, WiFi & Speakers hacking, Fake News, attracting People in most critical area, Blocking Doors by Cyber, using Drones to disable Fans, igniting Fire, using Trucks to block Exits and to create Panic



DROTHS

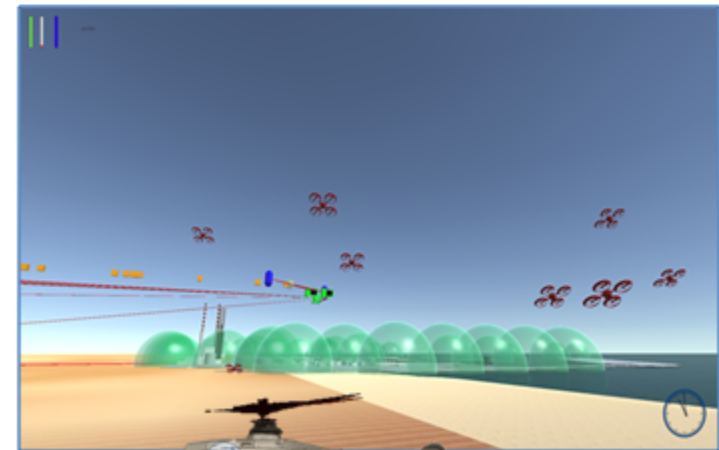
DROne THreat Simulator



Simulation Team



DROTHS is a MS2Gs (Modeling & Interoperable Simulation and Serious Game) devoted to investigate the vulnerabilities due to the use of Drones, UAV (Unmanned Aerial Vehicles), UGV (Unmanned Ground Vehicles), UUV, USV and other Autonomous Systems. The Scenario covers Multiple Mission Environments including the Protection of Critical Infrastructures. DROTHS simulates the interactions of Drones with other assets including traditional ones over multiple domains, including Cyber. This approach allows to simulate *Hard & Soft Kill* and different *Doctrines & Technologies*. DROTHS quantifies *Risks, Vulnerability Levels, Damages, Measure of Merits*. The Simulator is able to operate *Stand Alone* as well as *HLA Federate* and it is driven by *Intelligent Agents Driving Actions of Different Parties & Civilians*



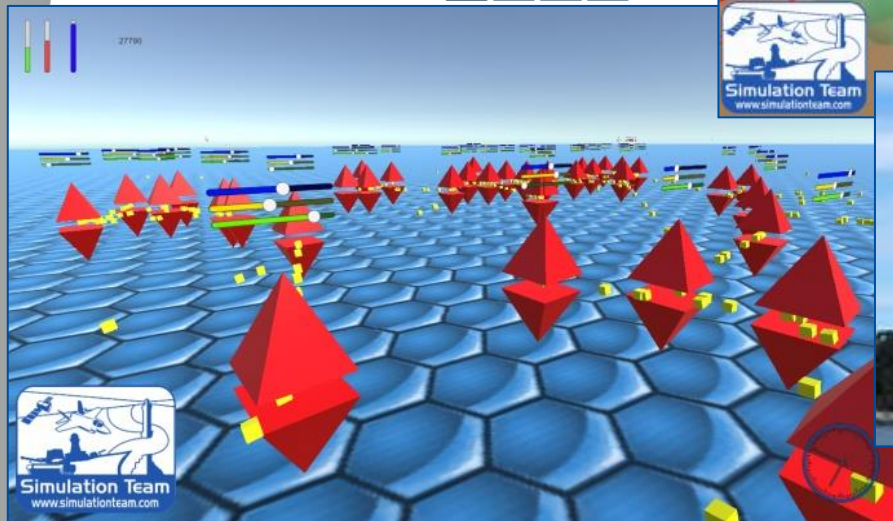
UUV Unmanned Underwater Vehicle
USV Unmanned Surface Vehicle



Simulation Team Creating Comprehensive Environments



In this example it is simulated critical infrastructure, ICT Networks, Social and Demand



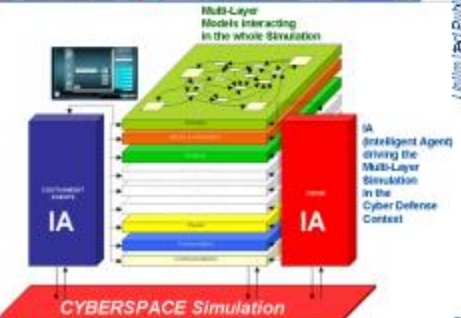
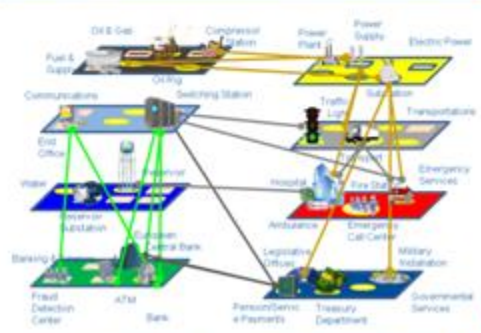
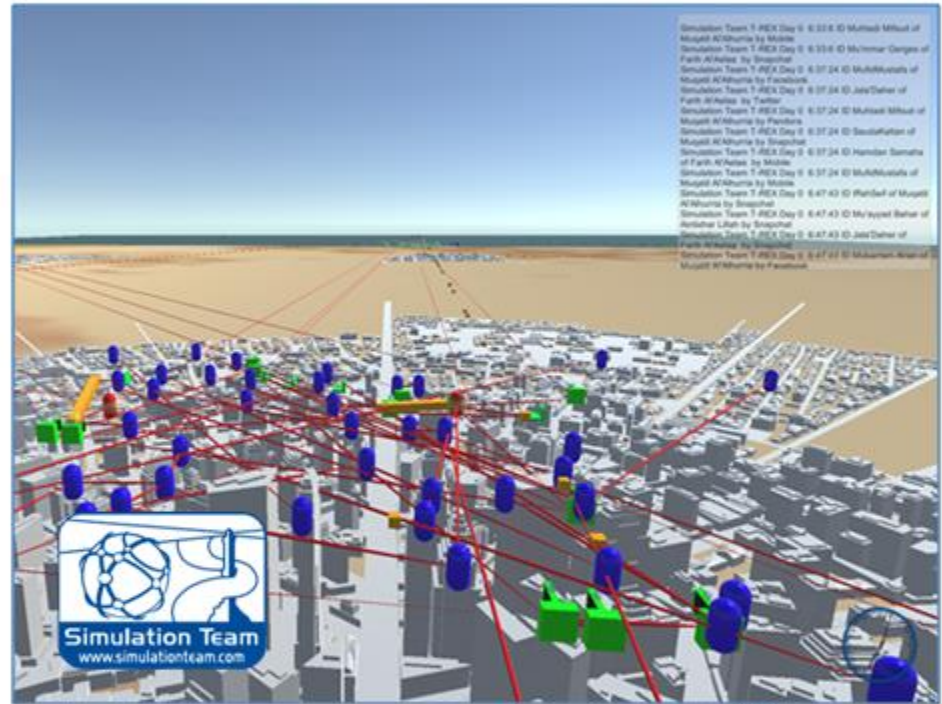


MLEA

Multi Layer Engineering Approach

Modern systems, plants, buildings and infrastructures are usually related to Multiple Layers and they requires to Model & Simulate these aspects to address their complexity as well as issues facing Safety & Security. MLS is a new approach fundamental for :

- ⦿ Engineering
- ⦿ Safety and Security
- ⦿ New Policies & Procedures
- ⦿ New Technologies and Processes
- ⦿ Education & Training Programs for Multiple Players





Blue Project

The Multi-Layer Engineering Approach at Work

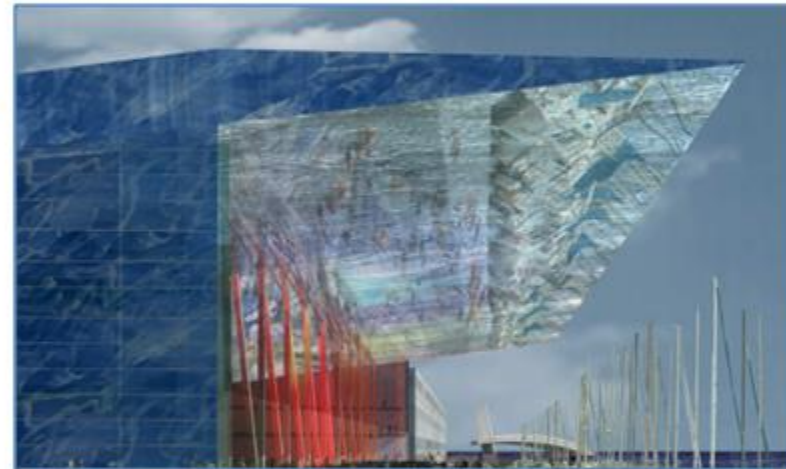


Ic3i Simulation Team

COMITATO ITALIANO
INGEGNERI INFORMATICA



Blue Exhibition Hall is a project related to a major fair infrastructure where Safety and Security Solutions have been developed by the applying the **Multi-Layer Engineering Approach** based on **Simulation** to protect **Humankind's Heritage Exhibition**





BIM3S

BIM Safety, Security & Simulation

**Buildings & Plants
are plenty of devices
that live concurrently
in Physical World
and Cyber Space**





QUICIC

Quis custodiet ipsos custodes?

Juvenal, Satires, 347-348



New Technologies are too much convenient to be neglected or even to consider to return back to old solutions

Therefore, New Solutions introduce Vulnerabilities to be addressed

Reduced Personnel, Centralized Supervision, Quick Response, Real Time Monitoring, Distributed Control, Improved Efficiency, 24/7 Support, Big Data for Improving,...



Virtual Assistants based on ICT & IoT





W-Artemys

Wearable augmented reality for employee safety in manufacturing systems



Simulation Team supports W-Artemys by its Labs & Tools (e.g. Cave SPIDER, ST Applications, etc.). The Focus of Genoa group is on the modeling and definition of the general architecture, Integration of new Interactive & Intelligent Mixed Reality Solutions, Development of Intelligent Elements, Smart Solutions design and implementation, W-Artemys Demonstration & Integration. Test of the system on real industrial case will allow to evaluate the performance in different Industries

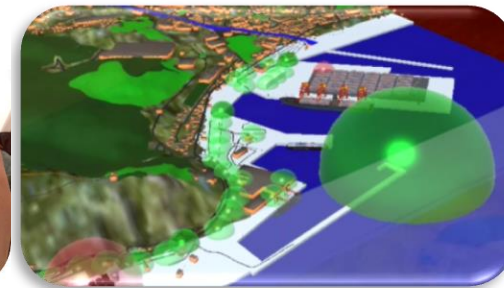
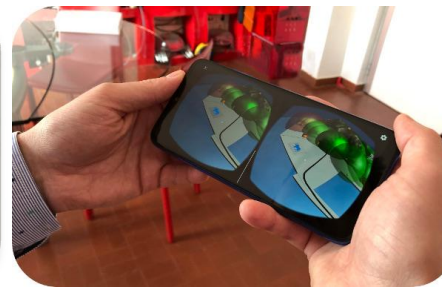
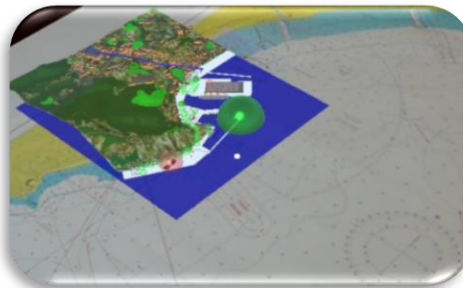


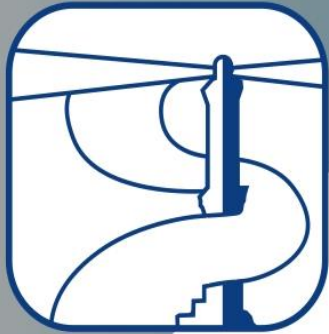


ALACRES2



This project is focused on the utilization of Modeling and Simulation Solutions, combined with Virtual and Augmented Reality in order to improve Port Safety and Security. ALACRES2 includes simulation of port activities in order to evaluate outcome of different scenarios in various initial and boundary conditions. **ALACRES2 (*Advanced Laboratory for Crisis and Emergencies in Ports and marine domain developed by Simulation within a common collaborative Space*)** is lead by Genoa University and carried out with different partners. It includes identification of scenarios of interest for port safety and their application to several ports of interest in order to create a virtual lab able to support definition of Policies & Guidelines as well as to be able to be used also as an efficient modern training equipment for Decision Makers, Managers and Operators





SISOM Project

SISOM Project allowed to study and implement Innovative Solutions to be applied to real cases to improve Safety, Efficiency and Effectiveness in relation to Industrial Machines. SISOM Project was carried out in strict cooperation with different Industries active in Design, Engineering and Production of Industrial Equipment and Machines. SISOM is a joint R&D Project among several



Leading Institutions, Universities and Companies. This Project allowed to complete an extensive set of tests and experiments to measure quantitatively the benefits obtained by these Innovative Technologies (e.g. M&S, AR & VR) applied on the real industrial application in terms of training efficiency and safety.



INAIL





DIEM-SSP

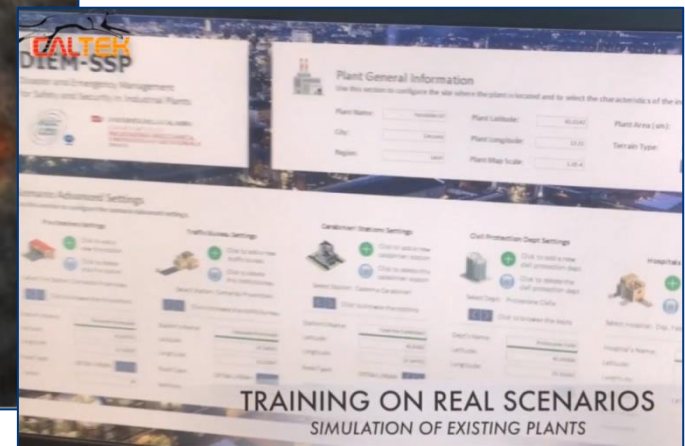
Augmented Reality Terrain interoperable Module



DIEM-SSP is a simulation devoted to create a framework that combines Virtual and Constructive Simulation to support Crisis Management in Industrial Plants. The Models allows to be used as training system both for internal personnel of the Plants as well as for Crisis Managers and First Responders. It could be possible also to use this approach to develop SOP and support Engineering.



COOPERATIVE TRAINING
THEY CAN MOVE AND INTERACT IN THE VIRTUAL ENVIRONMENT



TRAINING ON REAL SCENARIOS
SIMULATION OF EXISTING PLANTS



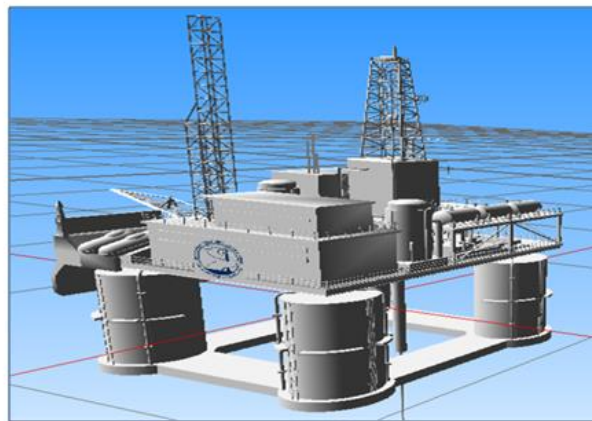
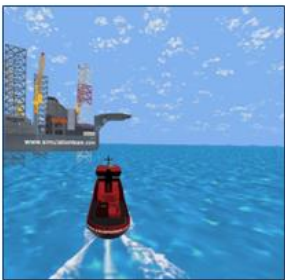
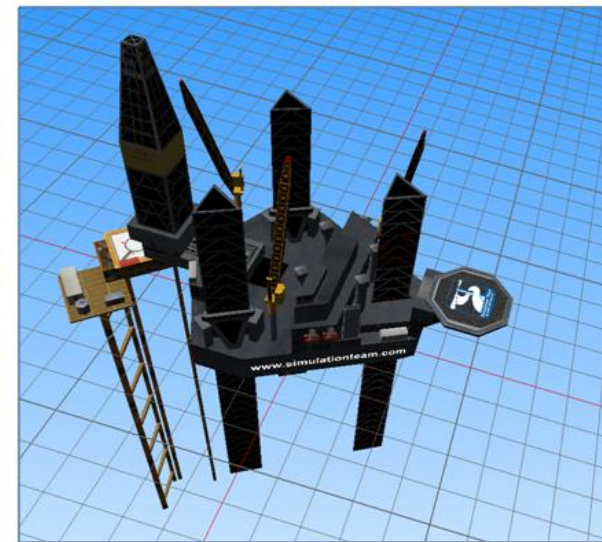
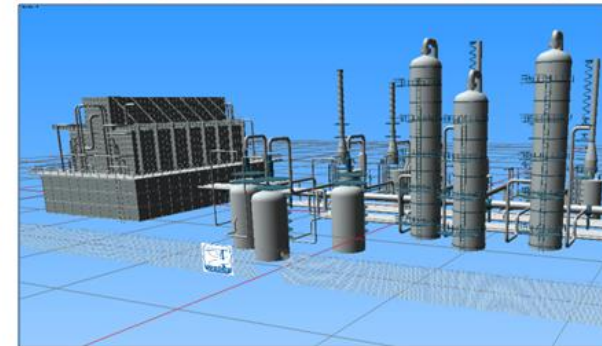
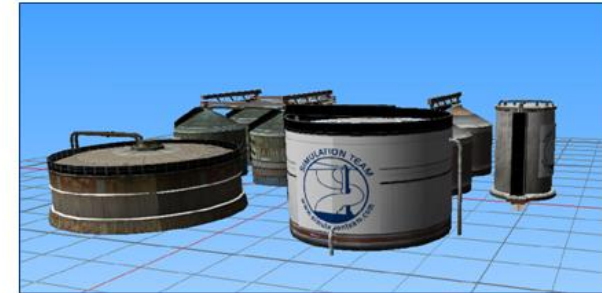


PAS

Plant Advanced Simulation



The PAS (Plant Advanced Simulation) is an initiative for developing a real-time distributed interoperable simulation of complex industrial plants to support different aspects including design, engineering, training. The simulation environment could be used to improve safety and security as well as to support education.



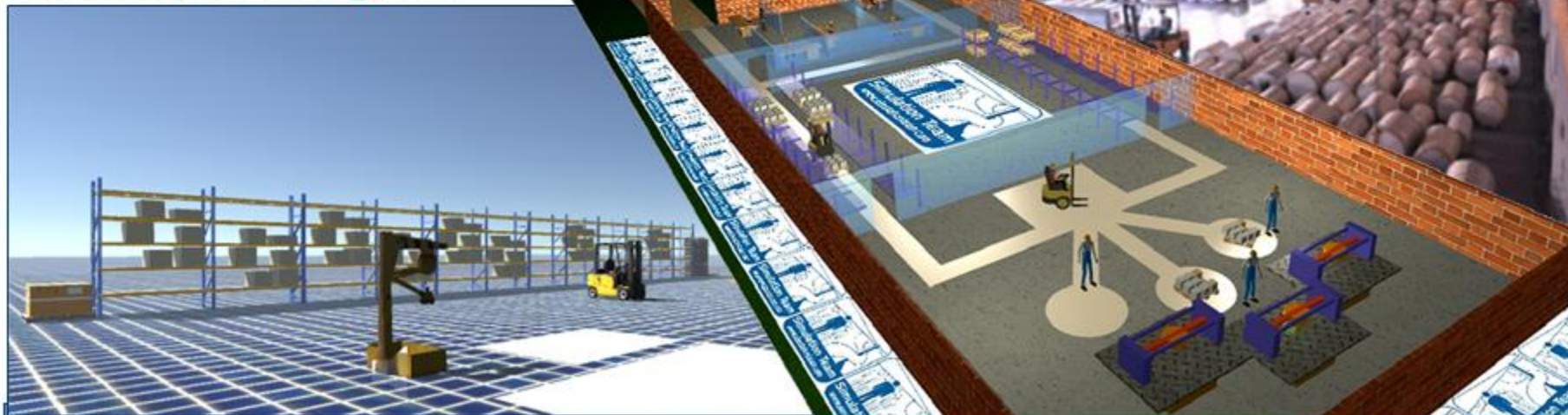


LEMAS

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.





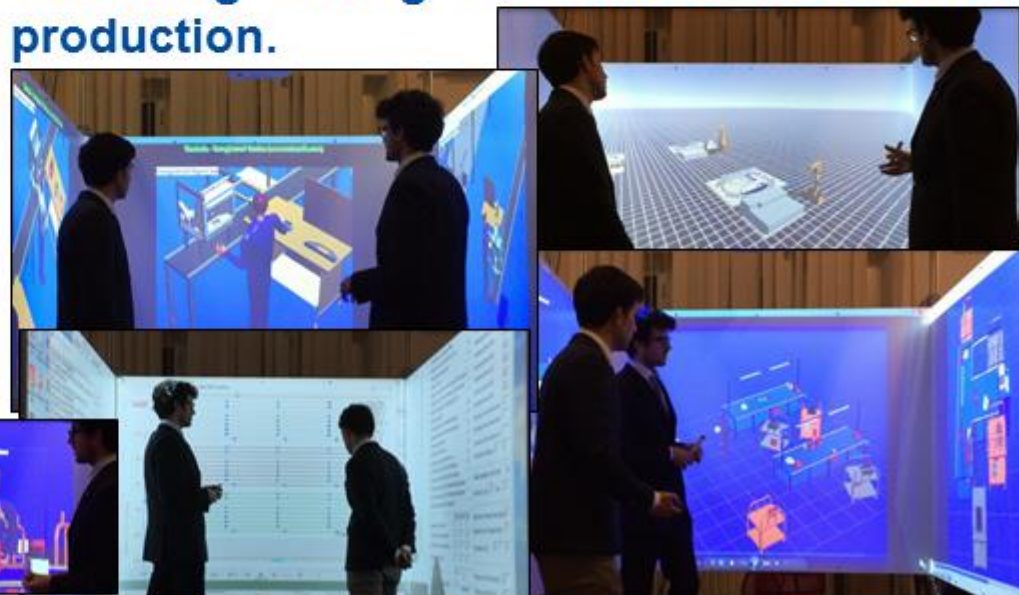
ERGOS

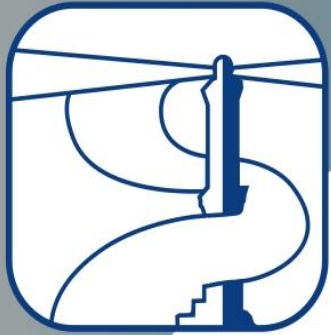
*Ergonomics and Re-engineering for General
Production Optimization & Simulation*



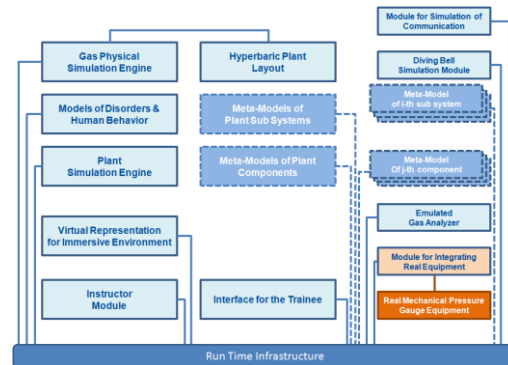
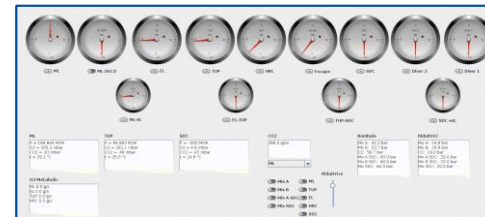
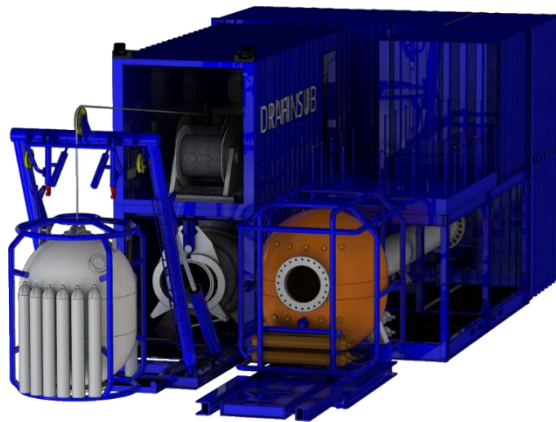
ERGOS focuses on the development of integrated discrete event and virtual simulation to re-engineering production processes and manufacturing solutions. This approach allows to conduct virtual experimentation for analyzing and optimizing of workspace, operations, flows, activities and automation solutions. 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





Simulators for Oil & Gas Underwater Operations





CRIPEM

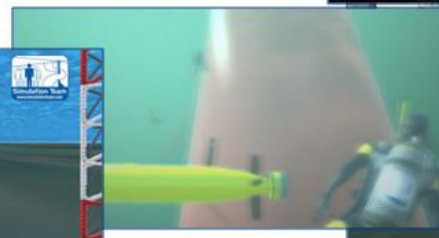
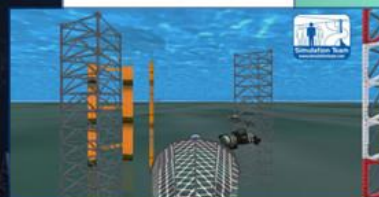
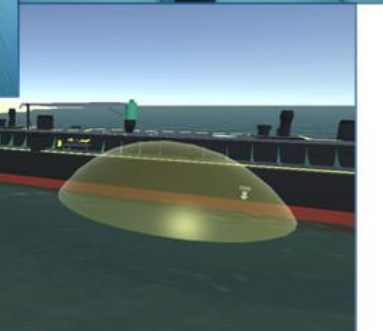
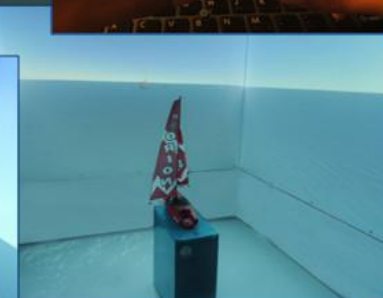
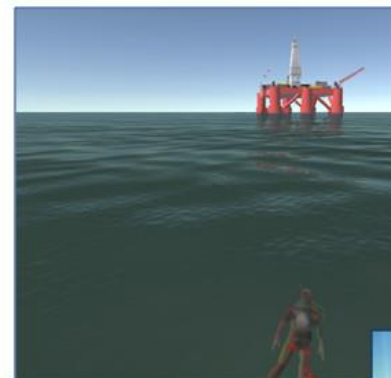
CRITICAL Infrastructure Protection in Extended Maritime framework



Oil Rig Protection (ORP) is a virtual MS2G (Model, interoperable simulator & Serious Game) reproducing operations devoted to protect critical infrastructure at sea from multi domain threats.

The simulator reproduces use of traditional assets as well as innovative autonomous systems in reference to different potential targets including ports, terminals and Oil Rigs.

The Simulator could be used for training, education as well as for capability assessment, vulnerability reduction and procedure definition respect a wide spectrum of threats





ST Train

Simulation Team Solutions for Training



Simulation Team



Simulation Team develops many different kind of training simulation from Ship Bridge for Defense & Commercial Applications to Port Cranes, Drones and Vehicles. ST_VM (Simulation Team Virtual Marine) is a complete suite devoted to Simulate ships, boats, gantry cranes, trucks, straddle carriers, contstackers, Fixed and Rotary wing UAV, etc. ST_VM supports training Dual Use and addresses Safety and Security purposes. ST_VM is an interoperable distributed real time simulation including vibrations, motions, 3D Stereo Sounds, etc. All Simulation Team solutions are interoperable through HLA providing the possibility to support collective training for cooperative operations in complex scenarios. Simulation Team Solutions are scalable from Workstations up to Full Scope Simulator wrapped in 40' Containers able to be moved around the world and become operative within four hours. All solution are modular and provide support to integration with Biomedical Device for Monitoring the stress and fatigue level of the trainees.





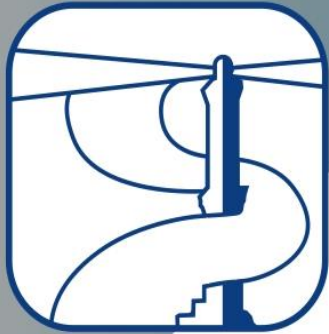
OUTSIDE REAL

Virtual & Augmented Reality, Speech Recognition & Simulation



OUTSIDE REAL : is an innovative HLA Simulator integrating real camera with Augmented Reality for providing additional information on the scene (e.g. dynamic data on the element detected by a camera). The system includes also interactive speech recognition solution, SOPHOS, for requesting additional information or changes in the representation mode.





CUMANA

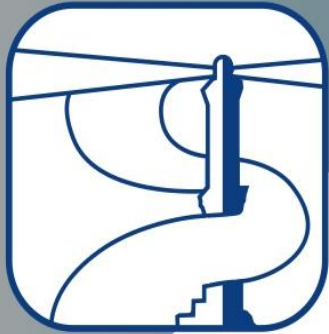
*Cooperative/Competitive Utility for Management
and Advanced Networking skill Acquisition*

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



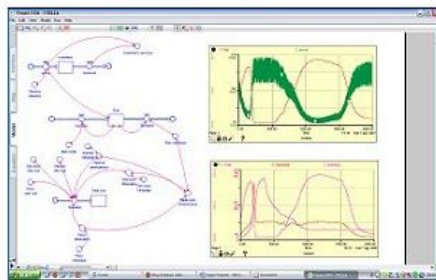
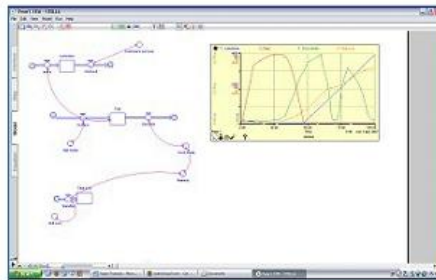


MOSCA

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
Duration	20	10	30
Cost	60	00	30

Media Units	Internet	Television	Press
Cost	1	2	3

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

"Terrorism Attack In Retail Buisness" Simulator

GO!

Load

Simulatore / Codici / Historical / Mobile / Fear / Arriving / Badmedia / Mediums / Spending / Timecardown / CMS-Data / data /



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 software interface. At the top, a Netscape browser window shows the URL `file:///C:/C7C/PROTCLV/web/OilSpil2.htm`. Below the browser, a map of Genoa is shown with a yellow line indicating a path. A text box on the map reads: "The Distance from Polluted Area is presented by". A legend indicates "Cellular Flow" Simulation. Below the map, a panel shows the position in geographic coordinates for MESA: Latitude 44° 23' 16" N, Longitude 8° 55' 34" E, and a distance of 3.6 km. The interface also includes a "Simulation Clock" set to 9 hours, "Simulation Inputs" (Simulation Time: 10 hours, Time Resolution: 1 hour), and "Simulation Outputs" (Total Amount of Oil: 66.08658599 m³, Oil on Coast: 0 m³, Total Oil Surface: 72000 m²). A "Run" button is visible at the bottom right.

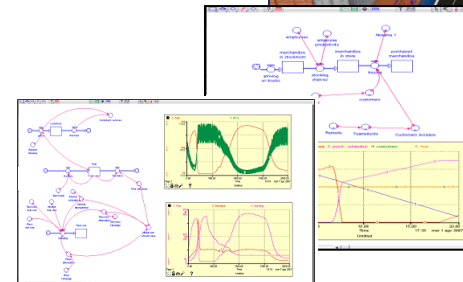


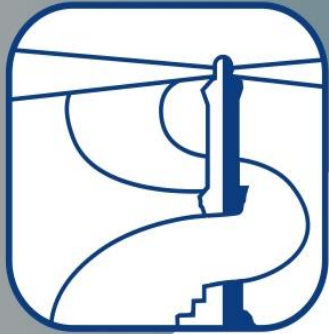
Port/Terminal Security Simulation



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

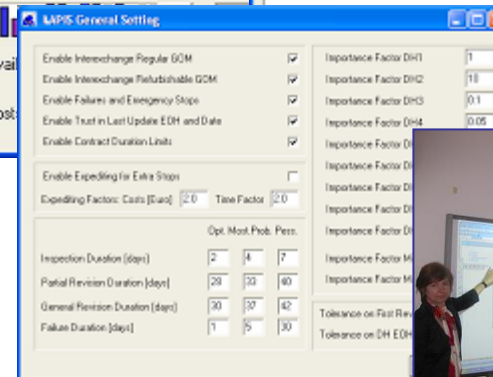
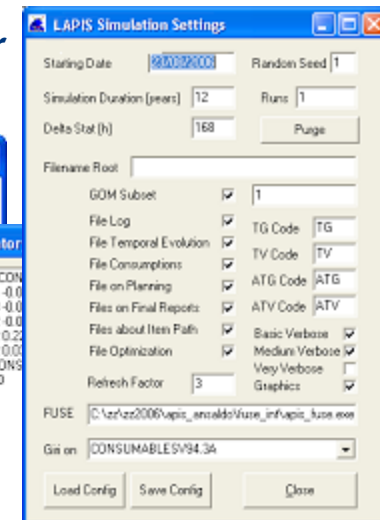
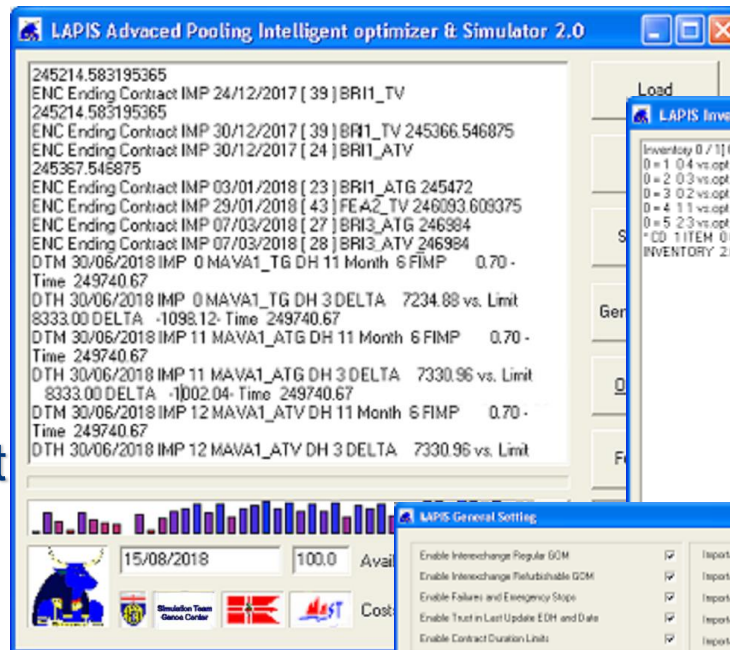


LAPIS

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

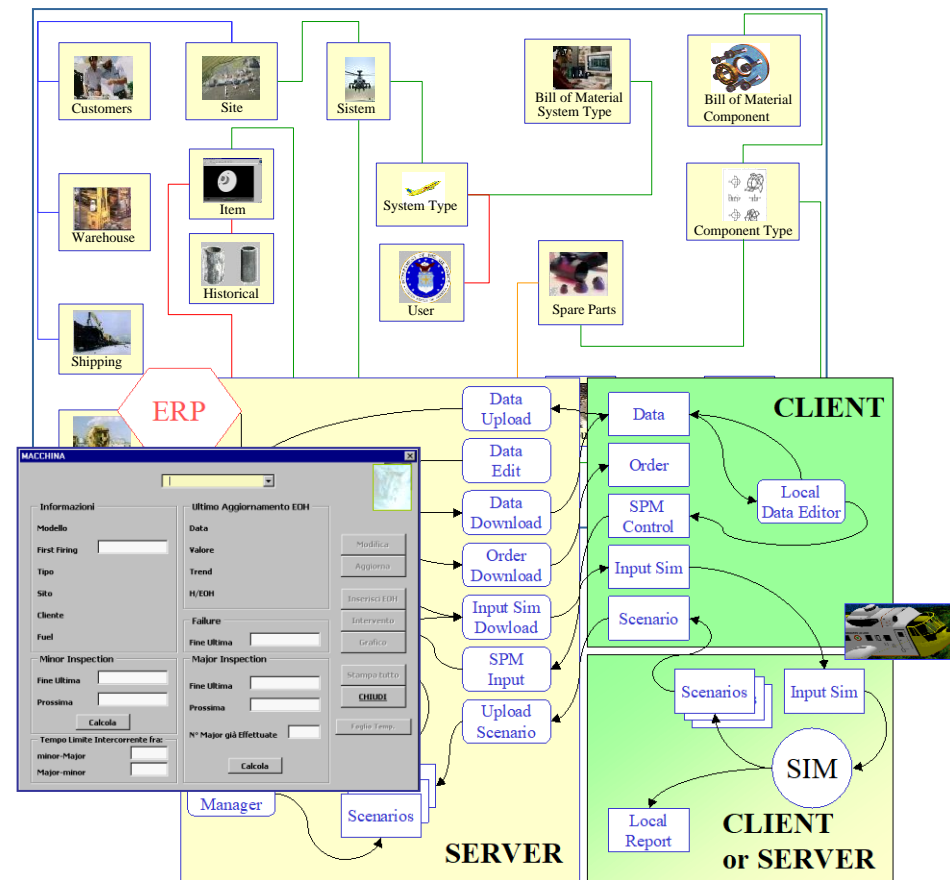




COUGAR

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

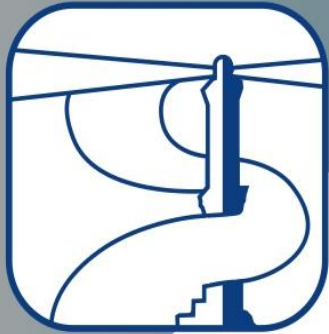
PUMA is the innovative system for re-organizing Gas Turbine Service in Ansaldo Energia.
 The system allows to manage resources, spare parts, internal/external warehouses, shipping and scheduling of all the maintenance operation for over 50 power plants distributed world-wide.

The screenshot displays the PUMA software interface, which is divided into several main sections:

- PUMA DATA SERVICE:** A central dashboard with a grid of icons for different data services: CLIENTI, STORICO, ORDINI, SITI, ITEM, MAGAZZINI, TIPI, and MACCHINA. A SIMULATORE icon is also present at the bottom.
- ASSE MACCHINA:** A window for selecting a specific turbine axis, currently showing 'MIRFA_TG643'.
- PUMA Simulator:** A detailed simulation window with the following data:

File Output	Onere	Giorni	Data
<input checked="" type="checkbox"/> Brogliaccio	Onere Magazzino Ansaldo.....(Lit/Mese)	36748	10/8/2000
<input checked="" type="checkbox"/> Controllo Mese	Onere Magazzino Siti.....(Lit/Mese)		
<input checked="" type="checkbox"/> Item Mese	Onere Pezzi in Viaggio.....(Lit/Mese)		
<input checked="" type="checkbox"/> Ordini	Costo Pezzi Installati.....(Lit/Mese)		
<input checked="" type="checkbox"/> Macchine Mese	Costo Handling.....(Lit/Mese)		
	Costo Spedizione.....(Lit/Mese)		
	Costo Stock - Out.....(Lit/Mese)		
	Numero Bloccii.....(N/Mese)		
	Costo Recoting.....(Lit/Mese)		
	Giorni Fermo Macchina.....(gg/Mese)		
	Numero Ordini:	36087	
	Simulazione al	42 %	
- Stati Operativi Macchina:** A legend for machine status colors:

Stato	Stato	Stato
■ Fermo	■ Fermo Minor	■ Inizio Minor
■ Avvio	■ Fermo Major	■ Inizio Major
■ Marcia	■ Fermo Guasto	■ Inizio Riparazione

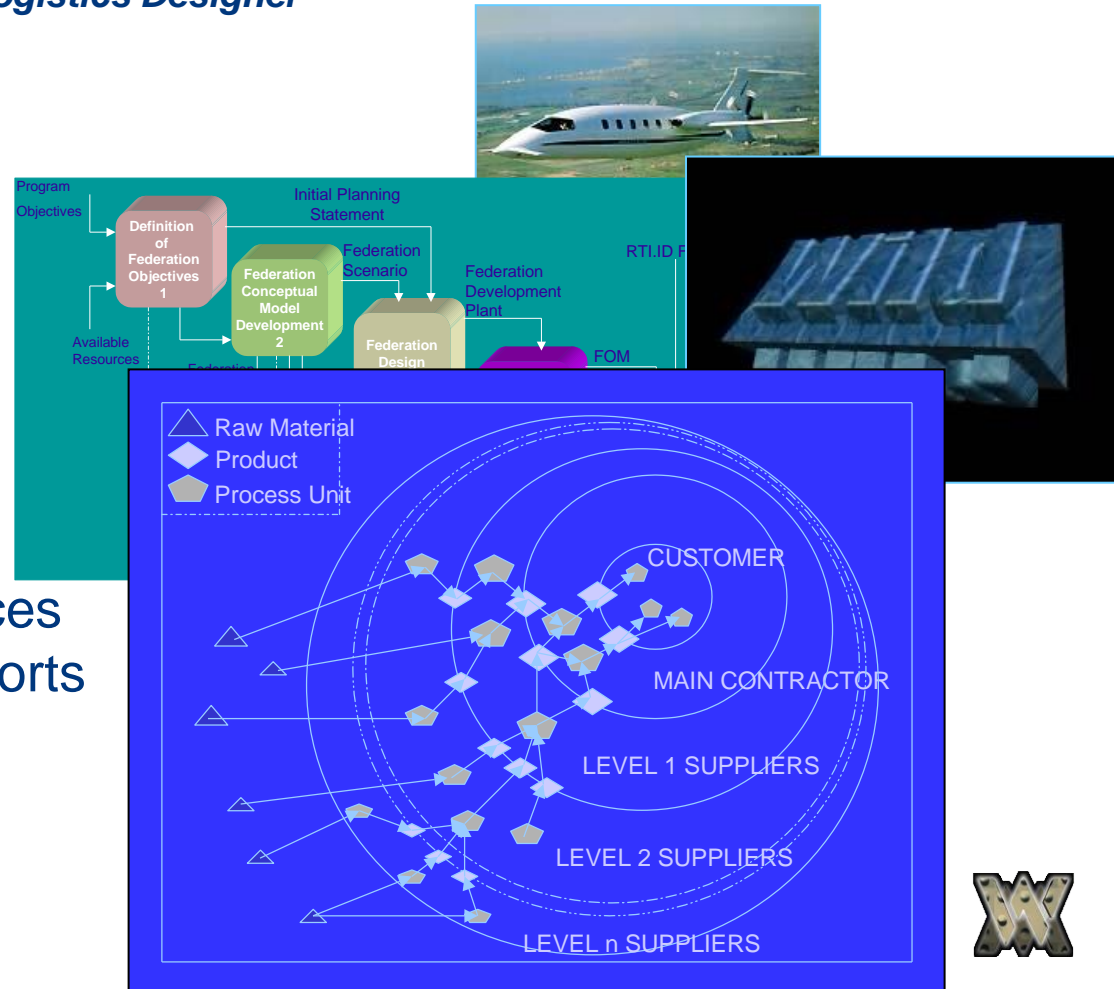


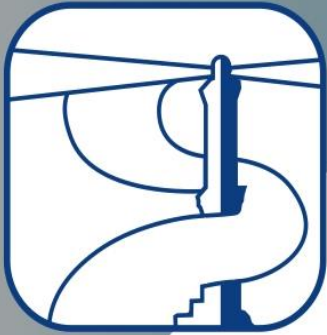
WILD

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





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**



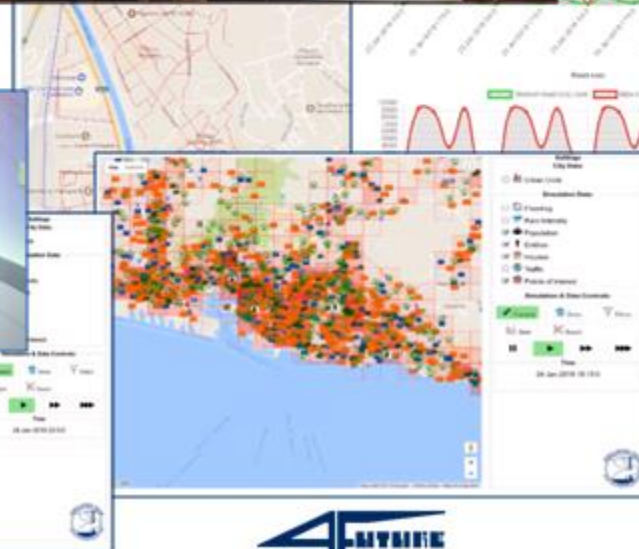
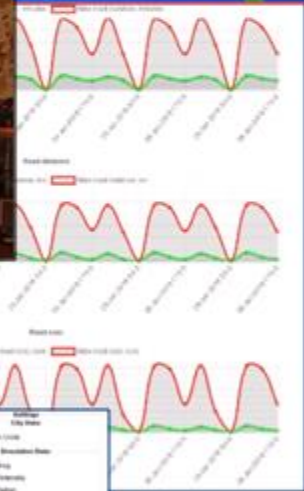
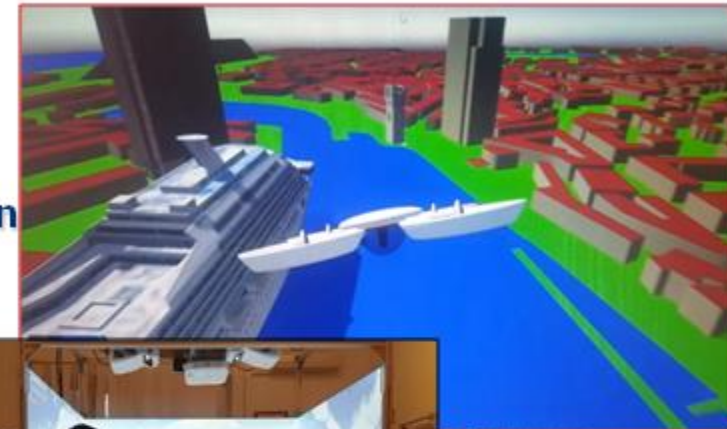
Developed in Cooperation
with Simulation Team



ARPIAS

Augmented & virtual Reality for Population modeling based on Intelligent Agents

ARPIA is a Simulation Environment able to integrate in HLA different Simulation Models and IA-CGF to reproduce City Dynamic Evolution as well as People Consensus and Population Behaviors over Regular conditions as well as during a Crisis or a Disaster. ARPIA allows to present the results in Augmented and Virtual Reality by Immersive Environments as well as to interoperate in the web.





DROTHS

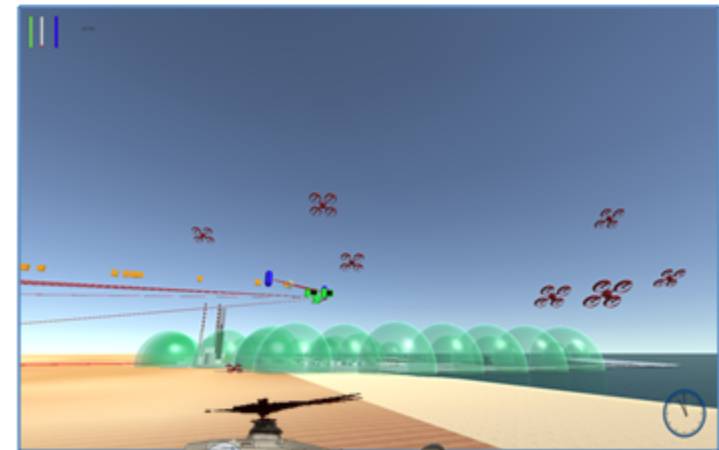
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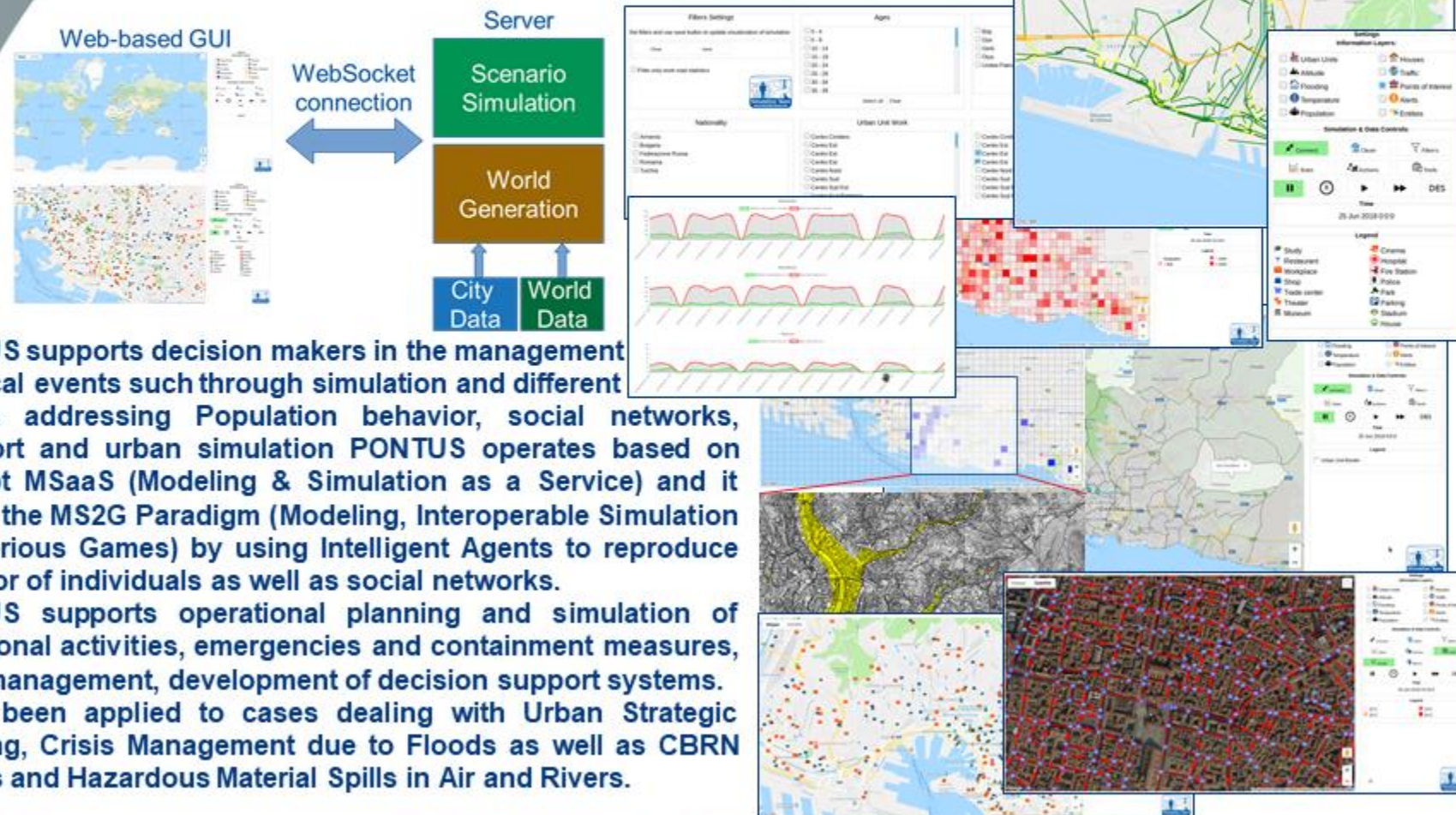
UUV *Unmanned Underwater Vehicle*
USV *Unmanned Surface Vehicle*





PONTUS

POPulation behavior, social Networks, Transportation, infrastructures and industrial Urban Simulation





MOSES

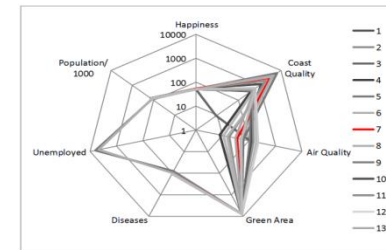
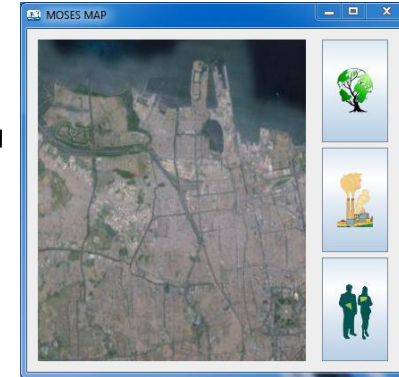
Modelling Sustainable Environments through Simulation



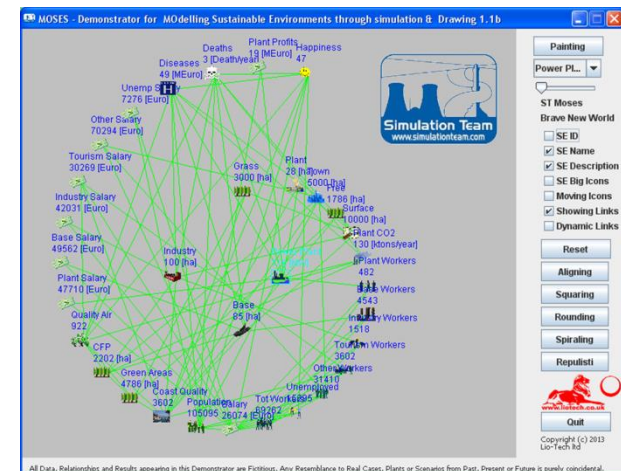
tenova

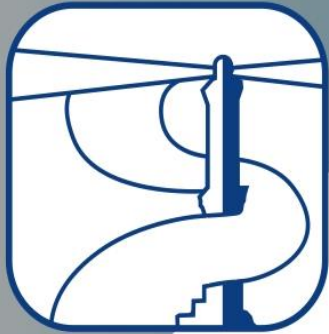


PAUL WURTH



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, MOSES 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





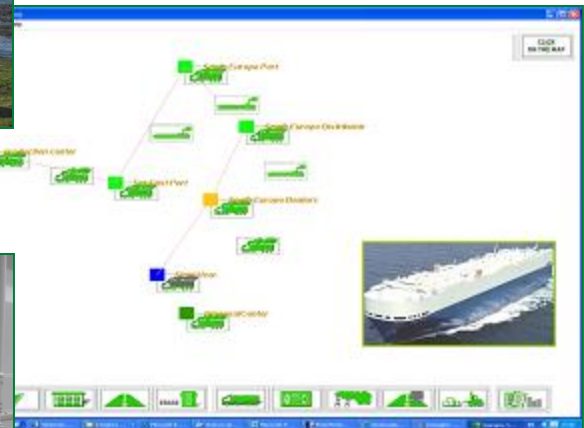
GreenLog Simulators

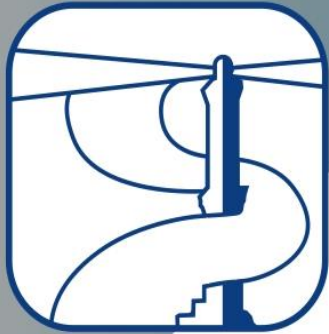


Simulation Team developed GreenLog Simulators for Analyzing Production, Logistics and Supply Chain.

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 Heavy Haul

GreenLog Heavy Haul Simulator



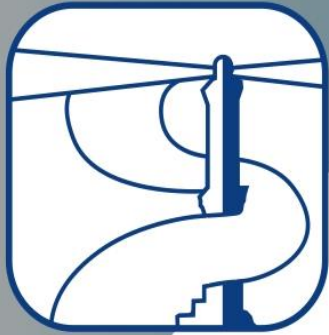
GreenLog Heavy Haul is a specific Simulation Module devoted to analyze the Environmental Impact of Trucks and Heavy Hauls considering Operative Costs and Environmental Impact

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 & DIPTM*





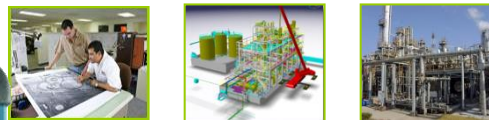
MIPET Master Program

International 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.



SPONSORS AND SUPPORTERS



SPONSOR COMPANIES EDITION 2010



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.





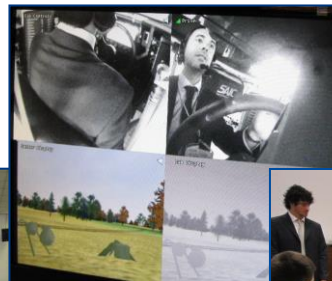
DIMS PhD Program

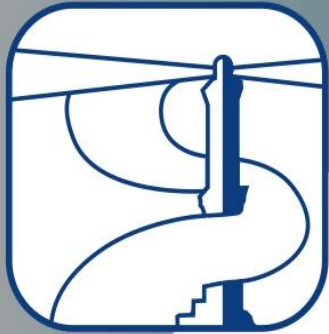
*phD program in Innovative Mathematical engineering,
modeling & Simulation*



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

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 the proposed solution.

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 2022 Simulation Team members serve as General Chairs and Program Chairs of WAMS as well as of I3M: 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 57 countries and over 30 live demonstrations (including Distributed simulation through live connection with NASA, MIT and

Genoa University)



WISH



HMS
Rome



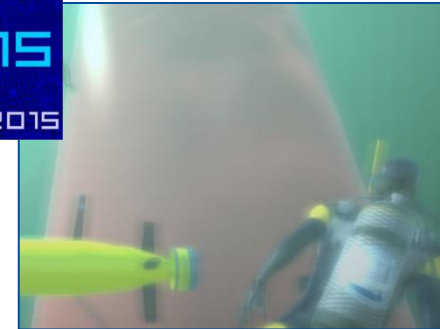
San Diego

IMAACA





Potential Cooperations



Simulation Team is looking for Opportunities including:

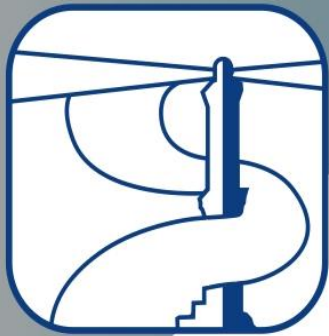
- Activation of Innovative Simulation Projects
- Combining Simulation Team Solutions with Partner's Models as Options to be proposed to Sponsors during the Proposal Phase
- Include in Simulation Team Solutions Add-In from Partners as Option for Sponsors during the Proposal Phase
- Supporting Partners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



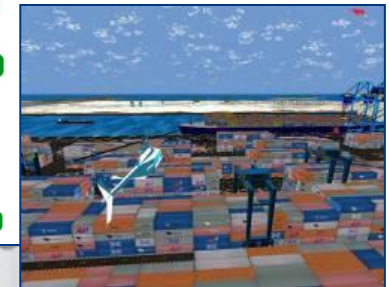
Simulation Team provides R&D/Scientific Opportunities such as:

- 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





References



DIME



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

