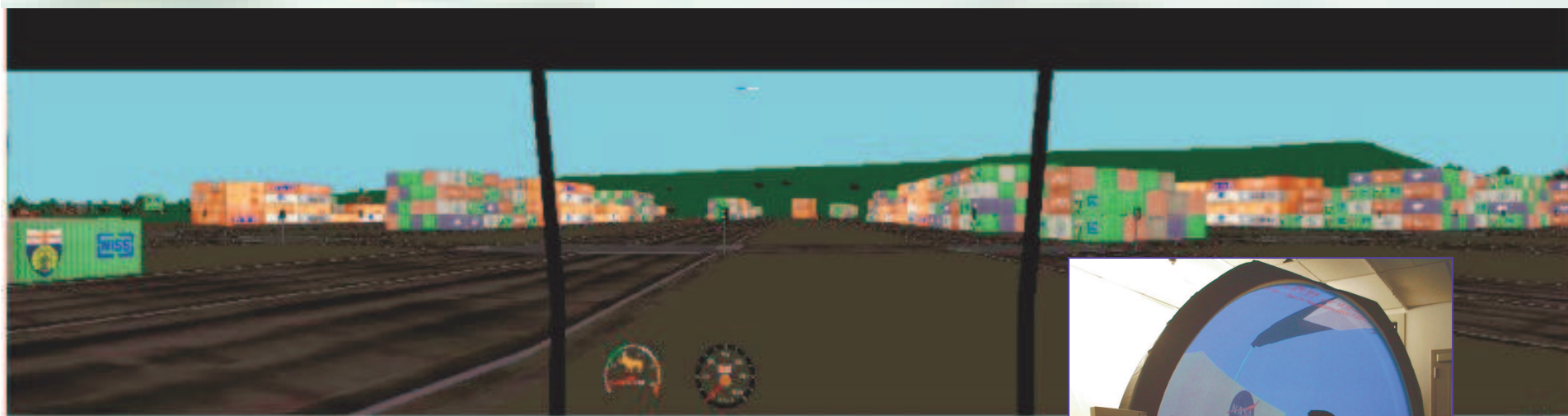




Modelli di Simulazione per l'Addestramento in Nodi Logistici



Agostino Bruzzone, Matteo Brandolini, Simone Viazzo, Enrico Bocca

matteo.brandolini@brbstudio.com

www.brbstudio.com

agostino@itim.unige.it

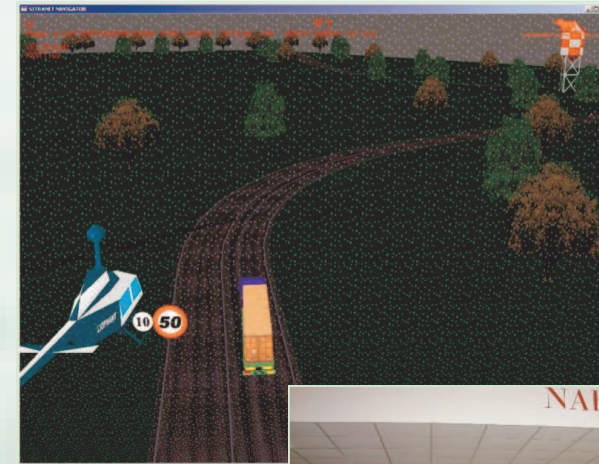
st.itim.unige.it

info@liophant.org

www.liophant.org

Research Activities

- Development of Logistics Training Equipment based on Simulation
- HLA integration for Cooperative Competitive Training
- VV&A Procedures for Training Simulator within Logistics Operator



HLA Federation per Training nella Logistica

La ricerca mira a sperimentare diverse applicazioni per l'impiego della Simulazione Real-Time Distribuita, basata sullo Standard HLA, nel settore della Logistica con particolare attenzione a:

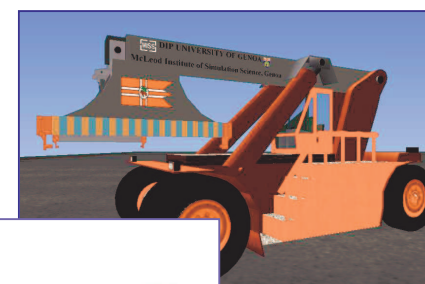
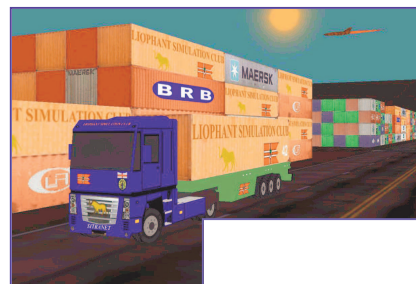
- *Definizione delle Procedure Operative*
- *Formazione degli Operatori*
- *Sicurezza nell'Handling ed Efficienza Operativa*



Driving Simulators

Driving Simulators requires today the development of different equipment based on most advanced technologies (HLA, Cocodris Engine, etc). Currently simulators was devoted to reproduce:

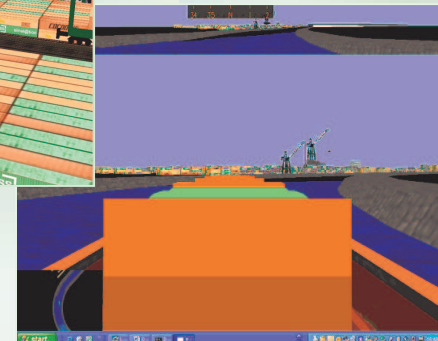
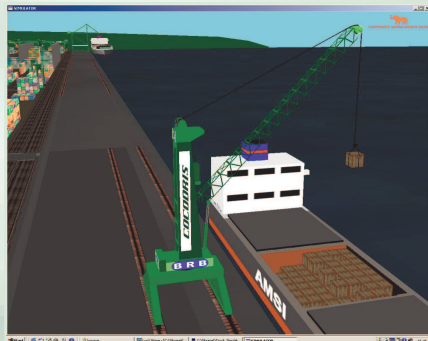
- **ContStackers**
- **Special Cranes**
- **Trucks**
- **Port Cranes**



Sea and River Port, Intermodal Terminal

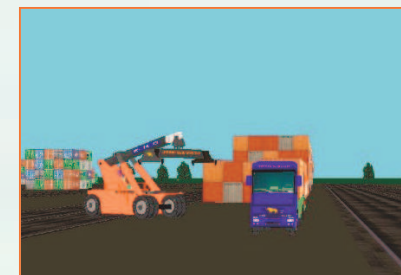


Cocodris Simulation Engine involves the development of all port cranes



Real-Time Distributed Simulation

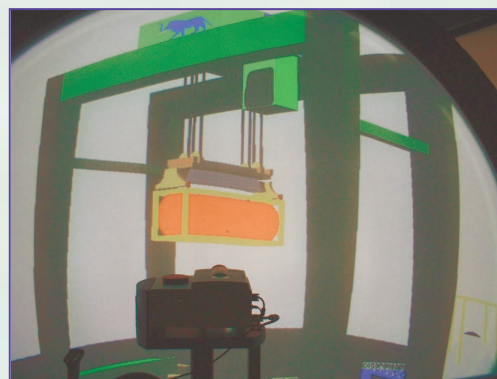
- The Intermodal terminals are an area quickly evolving, so major investments are requested in infrastructures, management systems, operative policies and training in order to guarantee competitiveness.
- Our research involve the use of Simulators based on new technologies for cooperative operations, running on low-level platforms, allowing to change training procedures and to increase safety in each terminal.



Innovative Immersive Solutions

This Research for Distributed Simulation of Handling and Logistics Operations at Kennedy Space Center, NASA included:

- Tailoring Training Procedures
- Refining Dynamic Simulation Model
- Integrating a New Special Dome



HLA Integration

HLA integration allows to create interactive real time simulation across a network





HLA Cooperation

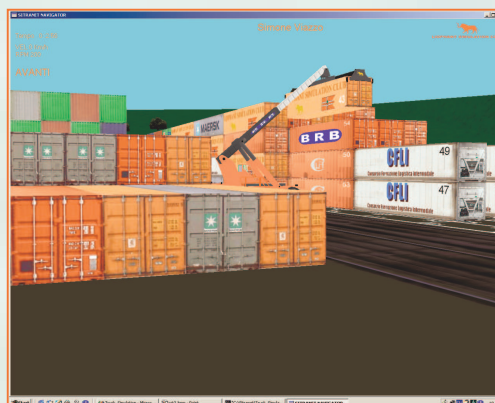
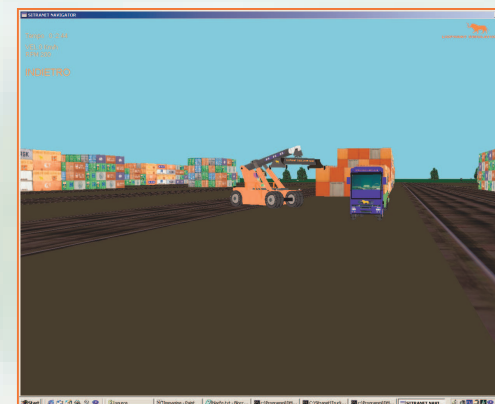
HLA integration allows to test trailer exchange by Cocodris virtual trucks over different scenarios, as well as crane interoperations.



HLA High Level Architecture Standard DMSO, DoD USA

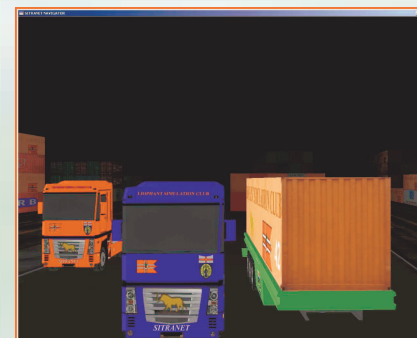
Operations in the Yard

The HLA Simulators allows to proceed in cooperative operations in the Container Terminal interacting with other vehicles.



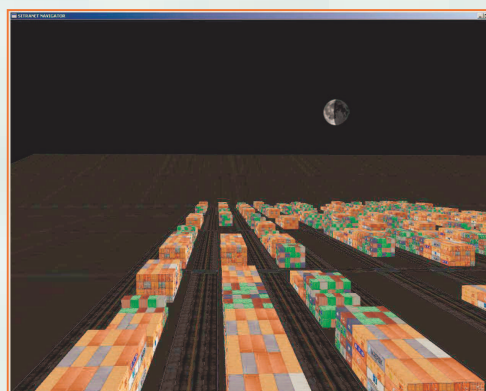
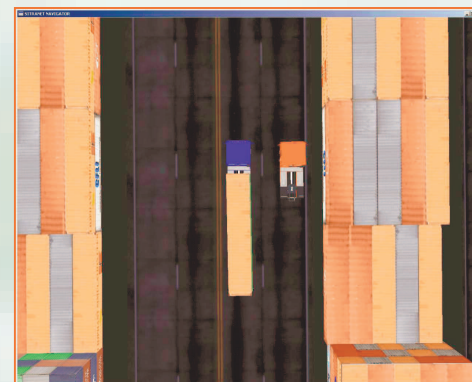
Weather Conditions

Cocodris provides very different weather conditions, including ground characteristics for testing driving ability with fog, snow, rain etc.



Virtual Containers in the Yard

The Cocodris Container Area allows to reproduce the interactions among trucks and cranes with different weather conditions



VIRTUAL INTERMODODAL TERMINAL



Cocodris allows to develop a virtual layout in order to simulate Intermodal Terminals



User Interface

Cocodris Simulator
allows to setup
different interfaces
allowing to operate in
co-operative
environments



Simulation Federation in Scenario Race



Scenario allows to define complex road mixages; while the federation for the test race included:

People

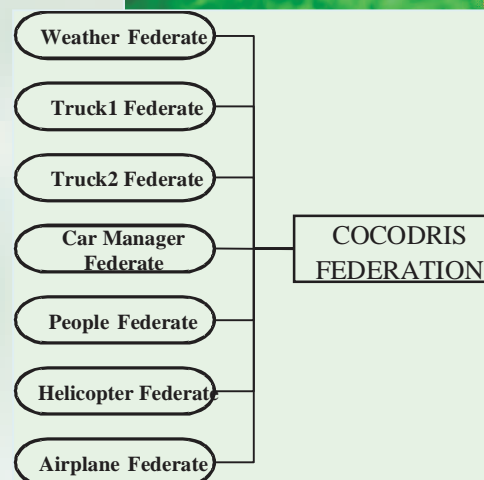
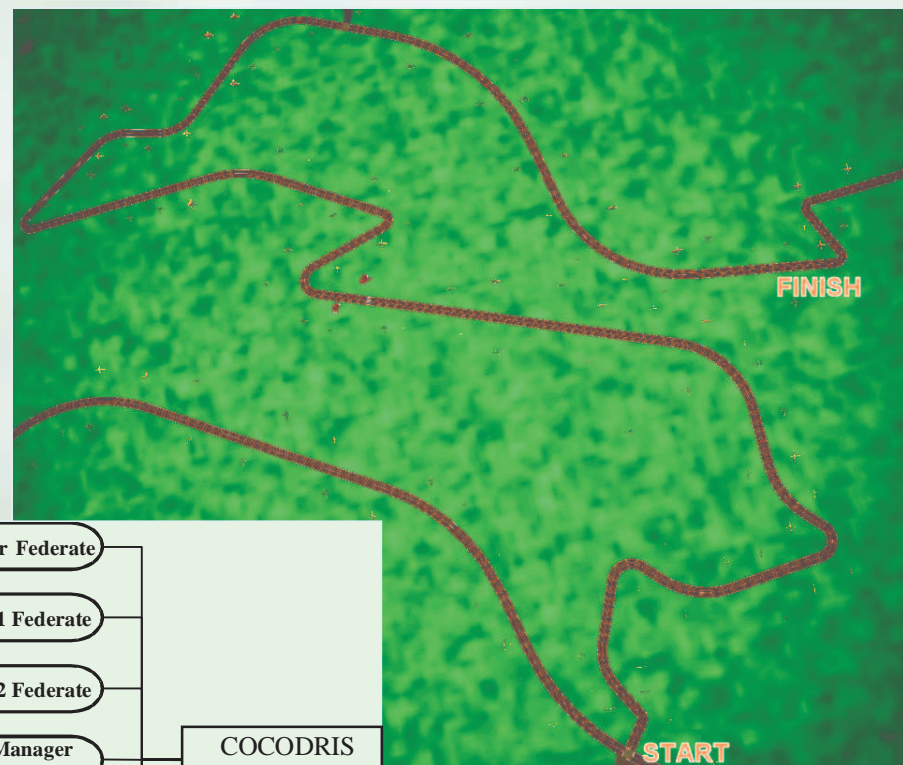
Cars

Trucks

Police Helicopters

Observer Planes

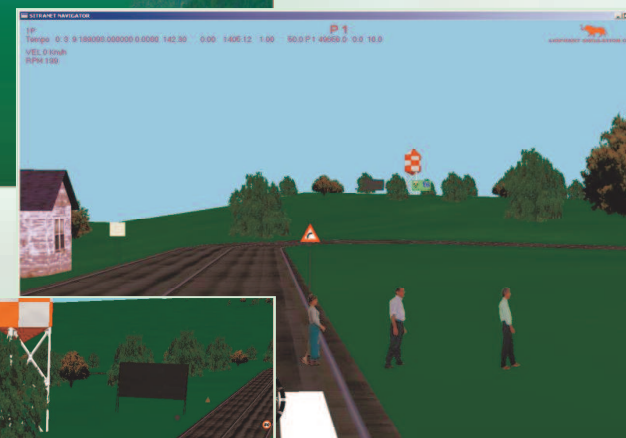
Weather Manager



Driving & Operative Regulation Testing

Missions are estimated as:

- Best Trajectories for Truck/Trailer
- Collisions Details
- Rule Respect
- Reaction to Critical Events
 - Cars
 - People





Conclusions

- Cocodris represent a very innovative development, allowing to promote simulation in an interactive distributed environment based on HLA at very low cost
- This introduces the possibility to extend use of simulation as training support in new sectors and to experience scenarios involving interaction, cooperation and competition that traditional simulators are not able to face effectively
- It is critical to extend the impact of these system over large number of users characterized by reduced resources
- The testing experience allows to validate the System by extensive training campaign



References

Development of Innovative Projects Consortium



MISS/DIPTEM

via Opera Pia 15
16145 Genova
www.simulationscience.org
agostino@itim.unige.it

BRB Studio

Office Tower, Voltri Port
16145 Genova
www.brbstudio.com
matteo.brandolini@brbstudio.com

