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RiskNat

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BSSIT_Eng

19 Oct 2011

UNITO: Department of Earth Sciences and Computer Science (*) of Torino's University and IRPI (Istituto di Ricerca per la Protezione Idrogeologica).

Three dimensional passive stereo visualizations of geological data are nowadays featured in several applications, but true real-time interactive simulations (4D: space+time) of geological events aren't very common.

Study uses this type of simulations derived from Space Exploration technology to represent geological phenomena as risks public education and planning support

Application is built upon VERITAS (Virtual Environment Research in TAS), a SW framework developed internally by TAS-I capable of simulating 4D environments. **TAS-I participating to a Regional project called STEPS (Systems and Technologies for the ExPloration of the Space) integrated Physic Engine Software technologies into VERITAS** allowing the reproduction of the physical interaction between the Spacecraft and the environment. **The main objective is to simulate critical mission profiles in order to optimize the Spacecraft design**
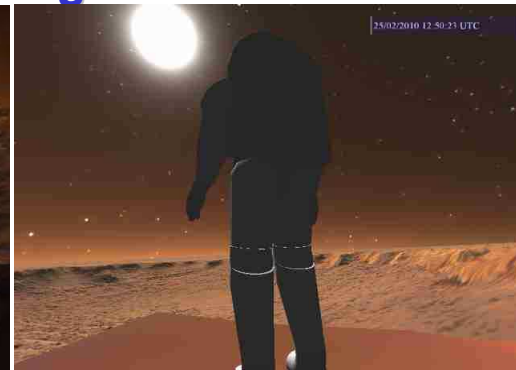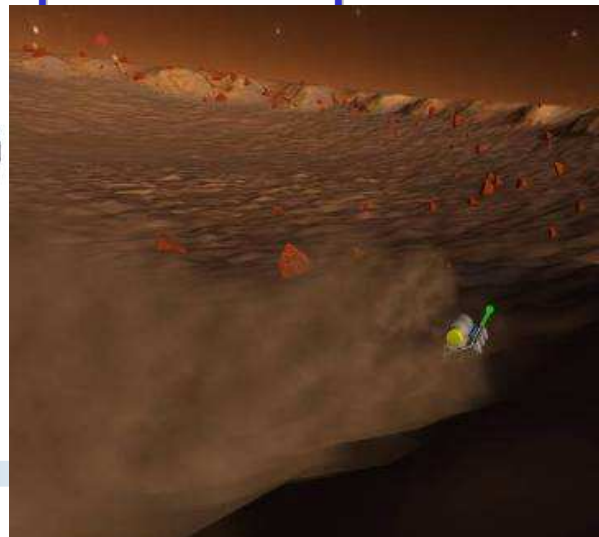

<Environment effects Dust, Rock & Stones, 1/3 Gravity, etc

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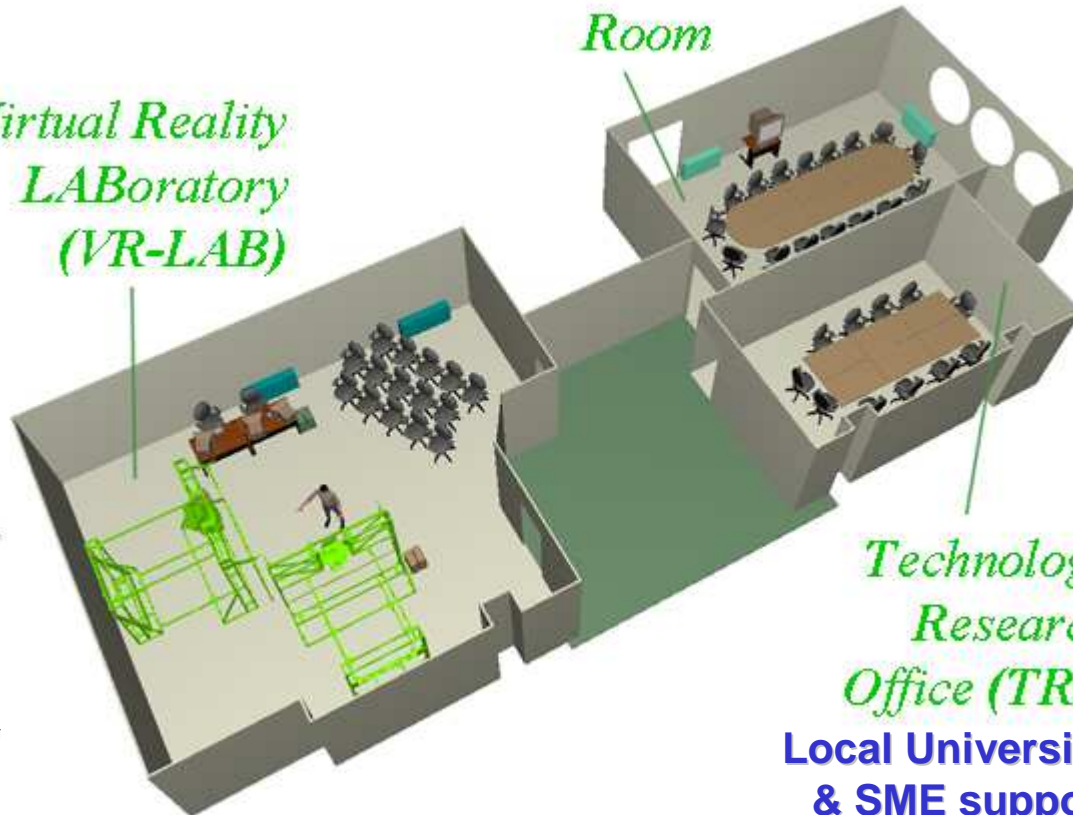
Technology Research Office (TRO)

VIEW of the future

intuition VIRTUAL REALITY

STEPS

Local Universities & SME support

ManuVAR

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The aim of RiskNat Project is to evaluate the risk's scenarios in order to allow **Citizen risks Awareness.**

- **immersive, interactive and physically plausible representation** of geological data and phenomena => inhabitants of a territory understanding of the dynamics of the events

- **obtaining a real understanding of the dimensions and consequences of the phenomena.**

- **side effect** of the integrated virtualization is the immediate **evaluation of the state of the art and homogeneity of the available data** which could address **further studies thanks to the integrated objectives.**

- the simulation is the first step for the **evaluation of the effects on territories and population** and it is an important **support for the administrators to develop civil protection plants.**
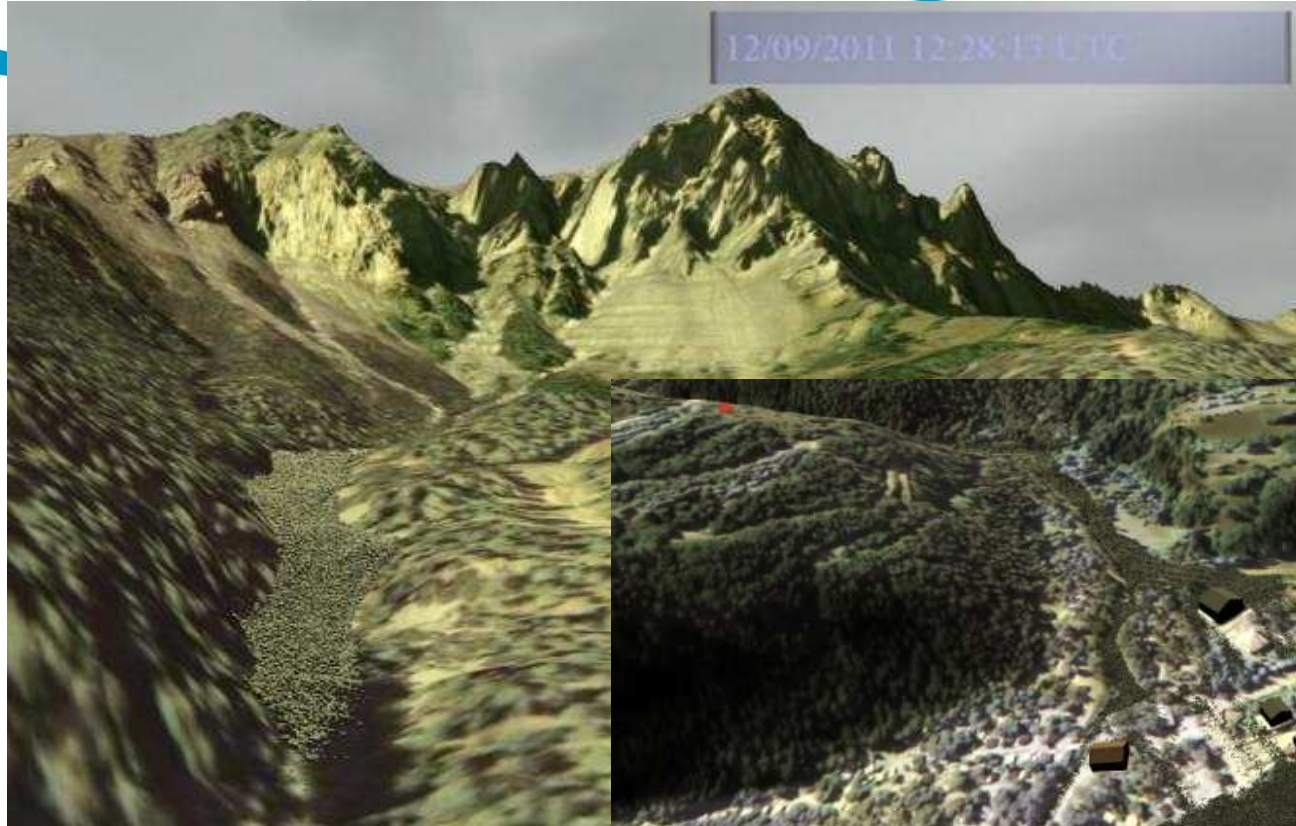
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4D VALSUSA debris flow real-time Simulations event date: 07.08.1981 and last around 15 minutes

Photo Regione Piemonte

TAS-I has been engaged in the project with the objective to develop three types of meaningful geological event simulations which are typical for the Susa Valley in Piedmont: debris flows, snow avalanches and landslides.

Actually, the debris flow simulation is the most advanced one. **Debris are simulated using a hardware accelerated fluidic model** and efforts are being made to render uniformly the particles as a coherent fluid**. Both the terrain data and the physical parameters of the fluid are derived from real-case data** to ensure the realism.

For the future it should be necessary **to expand the range and the realism of the events simulated in order to allow further use cases for the civil protection.** For example RiskNat could be used as a tool to **pre-estimate in real-time the timing of an occurring event as an aid to scheduling procedures during an evacuation plan**

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The degree of simulation has to be improved to better respond to the needs of Space Exploration missions.

For example the following enhancements are deemed necessary:

- **Planet surface details** (auto-generation of missing recursive elements present in libraries)
- **Planet Climate models** (e.g. wind, atmosphere, terrain below the surface) taking into account accuracy/ performance realisms.
- **Collaborative robotics** (e.g. risks analysis in critical environments).

25/02/2010 12:50:23 UTC

Thanks for your attention!

Questions?