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SERIOUS 3D GAME FOR EDUCATION AND TRAINING IN RADIATION PROTECTION

Rovinj – 2014 Alain PIN (CEA/INSTN/UECO) – France

SUMMARY OF PRESENTATION

- Presentation of the INSTN
- Why a simulation tool ?
- The game and his functionalities
- Short video demonstration of OSIRIS
- Initial feedback and future developments

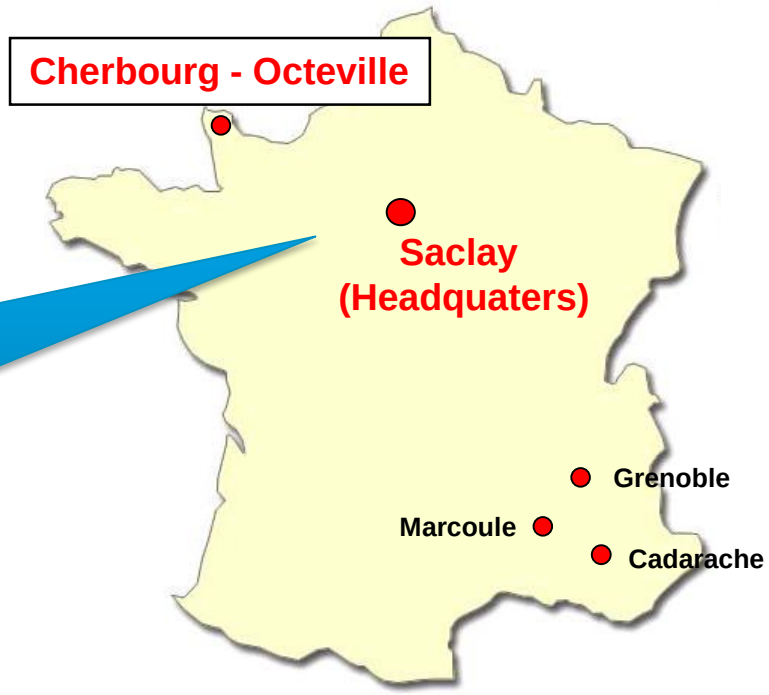
L'INSTN

The National Institute for Nuclear Science and Technology (INSTN) is a **higher education institution.**

The INSTN's mission is to **disseminate the knowledge and know-how** developed at the CEA, especially :

- in nuclear operation and maintenance,
- nuclear safety,
- waste management,
- clean-up and dismantling,
- radiation protection,
- radiation detection and measurement,
- nuclear medicine …

Each year, we train about :
- 7200 trainees in continuing education,
- 900 students,
- And 1500 PhD students.



WHY A 3D SIMULATION TOOL ?

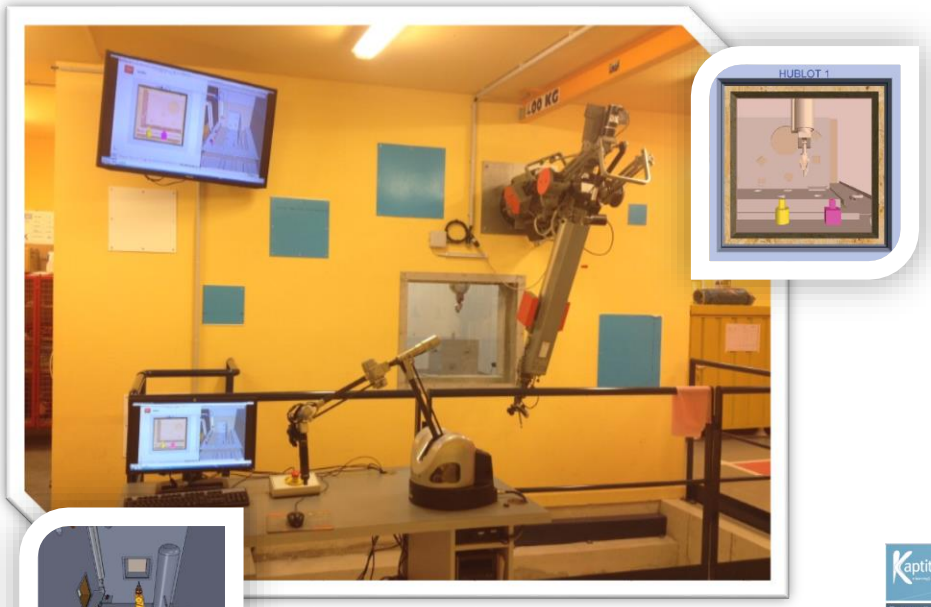
The practical implementation of theoretical knowledge is traditionally done through means such as: educational mock-up facilities for hands-on training, teaching laboratories ... , …

In particular, the educational mock-up facilities for hands-on training are intended to immerse learners in an environment, as close as possible, of the real environment. However, the construction costs often limit the realism that can be achieved and the possible hardware upgrades.

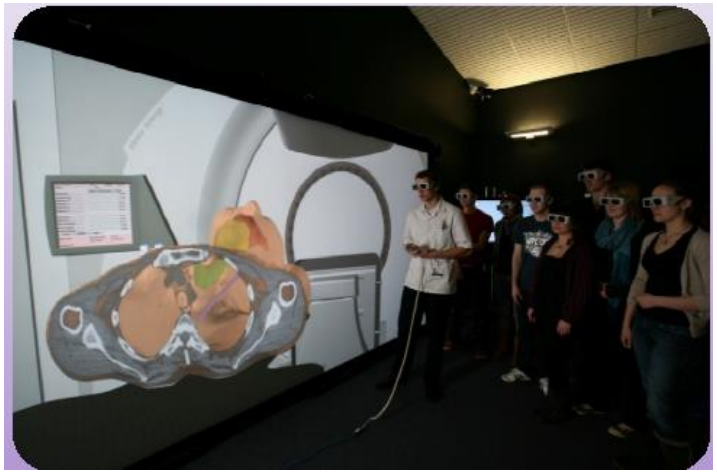
Virtual reality appears as a complement of traditional tools, allowing learners to project in realistic environments without any risk (no radioactive sources, for example).

Example of educational mock-up facilities for hands-on training – *CEA/INSTN Cherbourg-Octeville*

EXAMPLES OF SIMULATION TOOLS INVESTMENT



Simulation witch **HAPTION arm**
and
a real telescopic telemanipulator
MT200 (2013 - 2014)



Immersive room (Saclay 2014)

E-learning module in radioprotection
avalable in English and French (2012 - 2013)

OSIRIS

O.S.I.R.I.S. (French acronym for “Tool for Simulation of work under ionising radiation”) is an innovative teaching tool developed by The National Institute for Nuclear Science and Technology (INSTN /Teaching Unit of Cherbourg-Octeville) and OREKA (Company specialized in engineering 3D software).

Picture 1 : *OSIRIS Home page*

FUNCTIONALITIES OF THE GAME

Through the use of this serious game, trainees must:

- Carry out dose rate measures and loose radioactive contamination control to establish a predictive dose evaluation,
- Think about radiation warning signs to put in place at the workstation and on the necessary collective or portable control instruments.
- Implement the principles of radiation protection, in particular the ALARA principle.
- Analyse the discrepancy between the predictive collective dose and the collective dose achieved.
- Know how to react in case of emergency or in an irregular situation (for example an alarm on an electronic dosimeter).

Picture 3 : *OSIRIS ALARA menu*

Picture 4 : *OSIRIS markup and instruments menu*

LOCATION OF THE CASE STUDY

The case study takes place in the steam generator building, at the level of the bottom of a steam generator, during a checking operation of tubes by using Eddy currents.

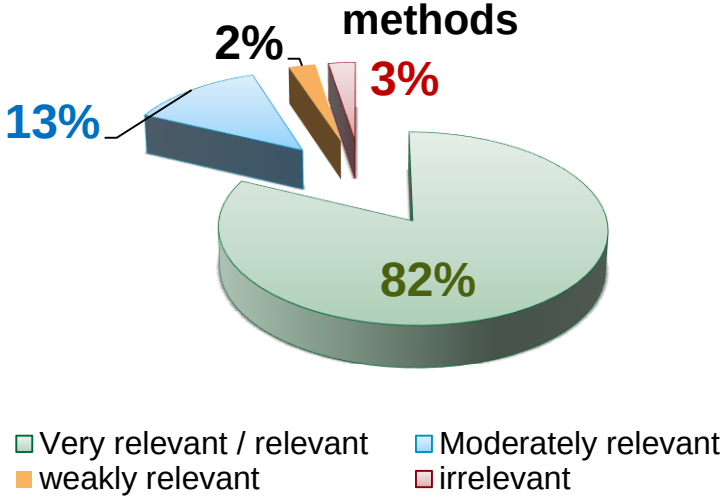
OSIRIS NAVIGATION INTERFACE

The tool is built on a virtual 3D environment in which users operate in a totally free way in the first-person (the user is immersed in the scene as if the press camera was positioned at eye level).

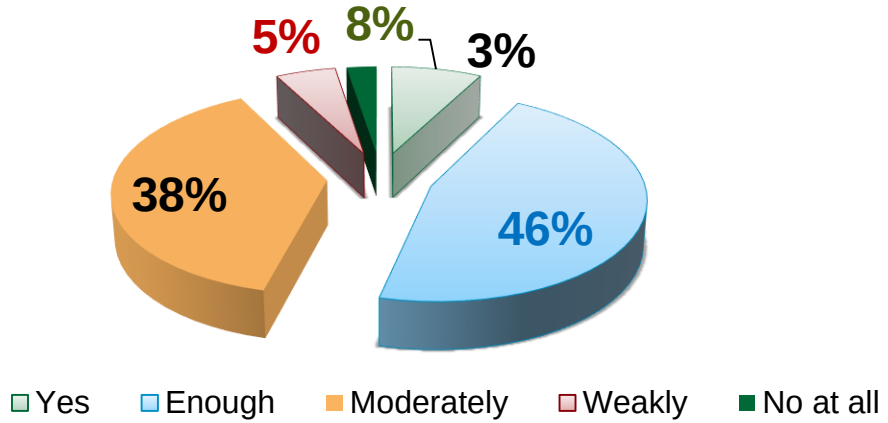
Picture 2 *: OSIRIS Navigation interface*

OUR INITIAL FEEDBACK : TRAINEES

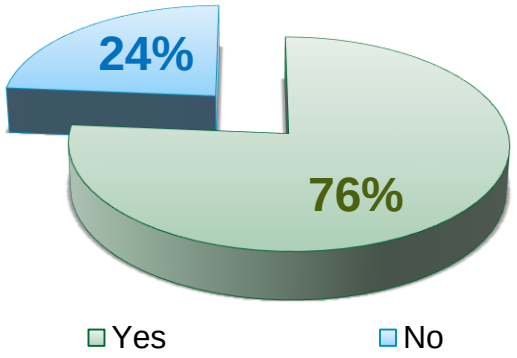
The simulation in a virtual environment Vs traditional methods



This first experience she helped to better implement your skill or knowledge?



Do you want to use OSIRIS another time in a similar course ?



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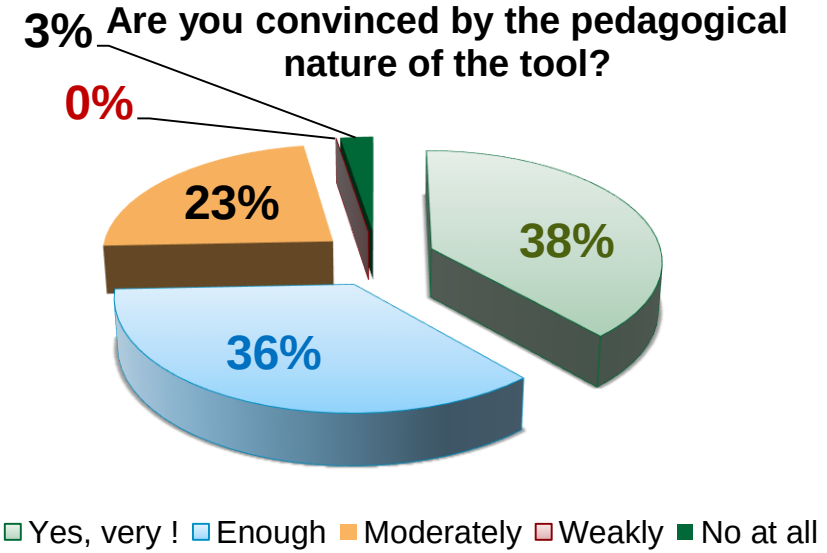
Are you convinced by the pedagogical nature of the tool?



CONCLUSION

For 3 years, OSIRIS has been used by about 200 trainees in practical courses in radiation protection (Essentially the prototype, then the commercial version since October 2013).

In our process of updating our training methods, the 3D serious games represent an alternative of our traditional methods.

Future add-on

- Develop others environments : medical, research, recycling used fuel factory, …
- Add the possibility to “drag and drop” radioactive sources into the virtual environ (several type of sources : point sources, cylindrical sources, …).
- The ability to track the learning of trainees while using the game.

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THANK YOU FOR YOUR ATTENTION

OSIRIS WEBSITE : http://osiris.oreka-group.fr/

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