



INTEGRATION OF HUMAN-FACTORS WITHIN THE DESIGN OF A TRAINING TOOL WITHIN THE RADIATION-PROTECTION FIELD :

**AN OPPORTUNITY TO FOSTER THE TOOL'S APPROPRIATION AND
DEVELOP THE TRAINER'S COMPETENCES**

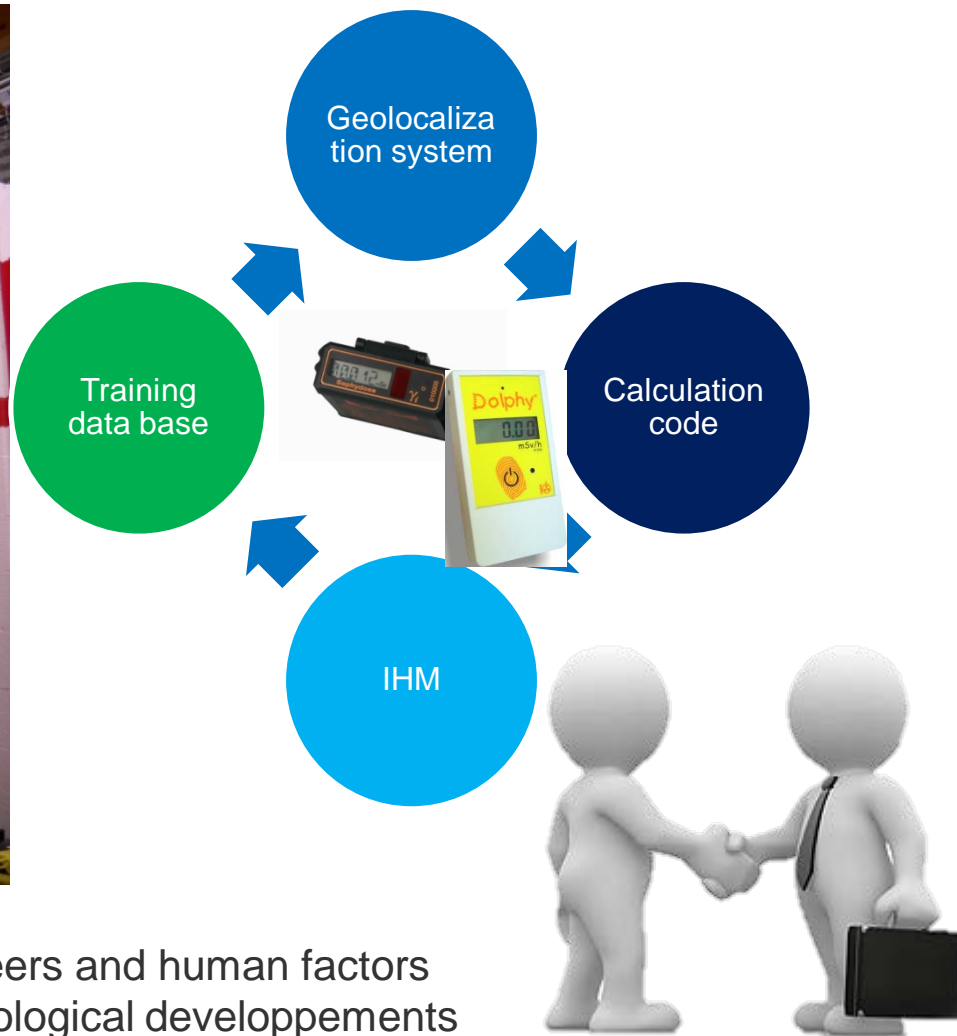
BRUNET Lucie, Ergonomist researcher LIMSI-CNRS

LE MEUR Gaëlle, RP research project manager, R&D EDF, Chatou

FUCKS Isabelle, Human factors research project manager, R&D EDF, Saclay

BOCCARA Vincent, ergonomist MCF, Université Paris Sud XI

A NEW TECHNOLOGICAL TRAINING TOOL ...



→ A necessary link between RP engineers and human factors specialists to fit training needs and technological developpements

GOALS : TO TRAIN MORE EFFICIENTLY TO RADIATION-PROTECTION PRACTICES THANKS TO SOPHISTICATED TRAINING SCENARIOS

POSTULATE : A BETTER UNDERSTANDING/ EXPERIMENT OF THE IRRADIATION IN TRAINING SHOULD DRIVE TO MORE COMPLIANCY & ADAPTED BEHAVIOR IN REAL WORK SITUATIONS

TODAY

TRAINING SCENARIOS

Limited scenarios

No irradiation simulation & verbal simulation

Objectives

- To go in and out in controlled area/ HP rules to work in safely conditions
- To identify the expected HP rules according to the work step : start, realization, closure

FUTUR

TRAINING SCENARIOS WITH CERNUM

Scenarios

Irradiation simulation

Objectives

- To compare the real HP work conditions with the estimated conditions
- To detect high dose rate level
- To adopt the right behavior in case of events : alarms, unexpected problems, hazard, foreign materials, ...
- To control the individual dose per day and the collective dose per day.

THE TRAINEES COMPLY WITH RULES

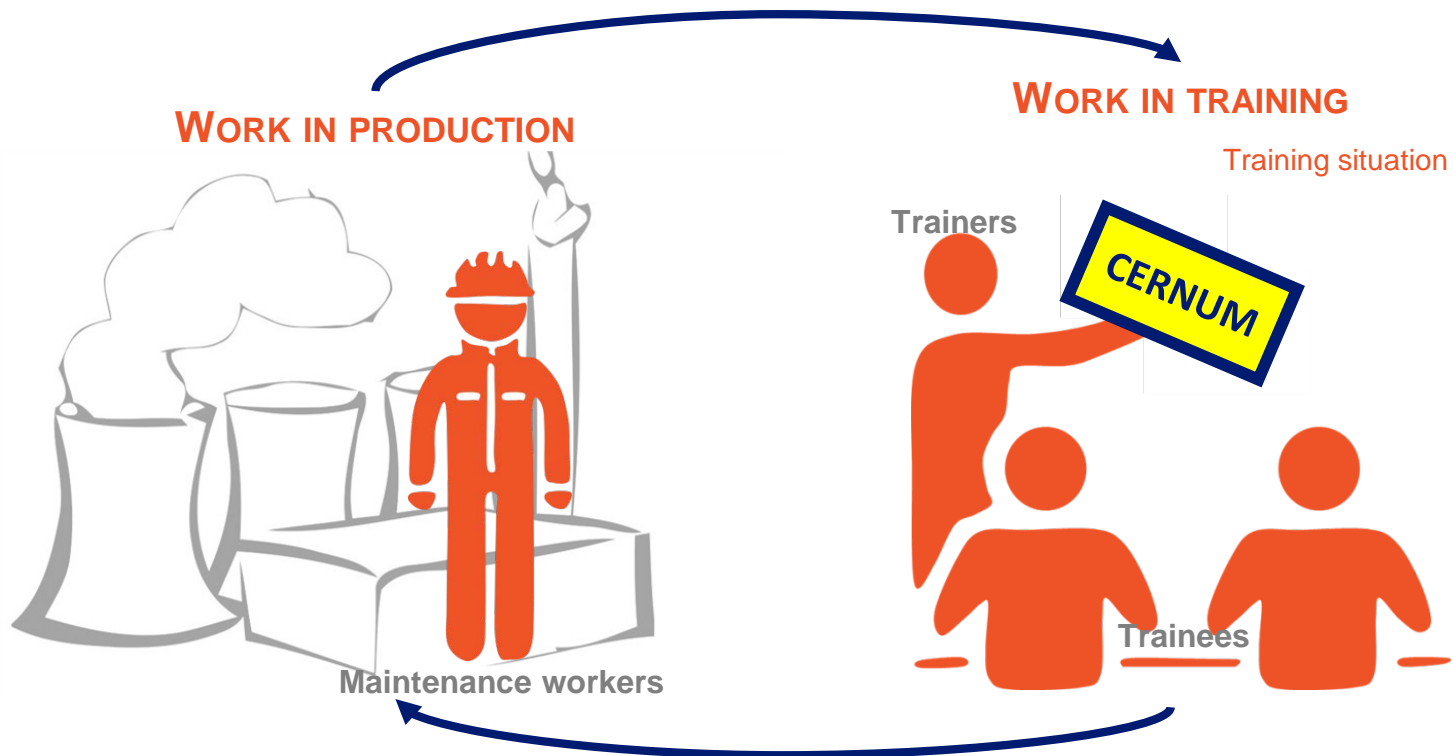


THE TRAINEES MANAGE WORK SITUATIONS :
ACCEPTABLE AND PERTURBED

TRAINING TOOL DESIGN required WORKS ANALYSIS

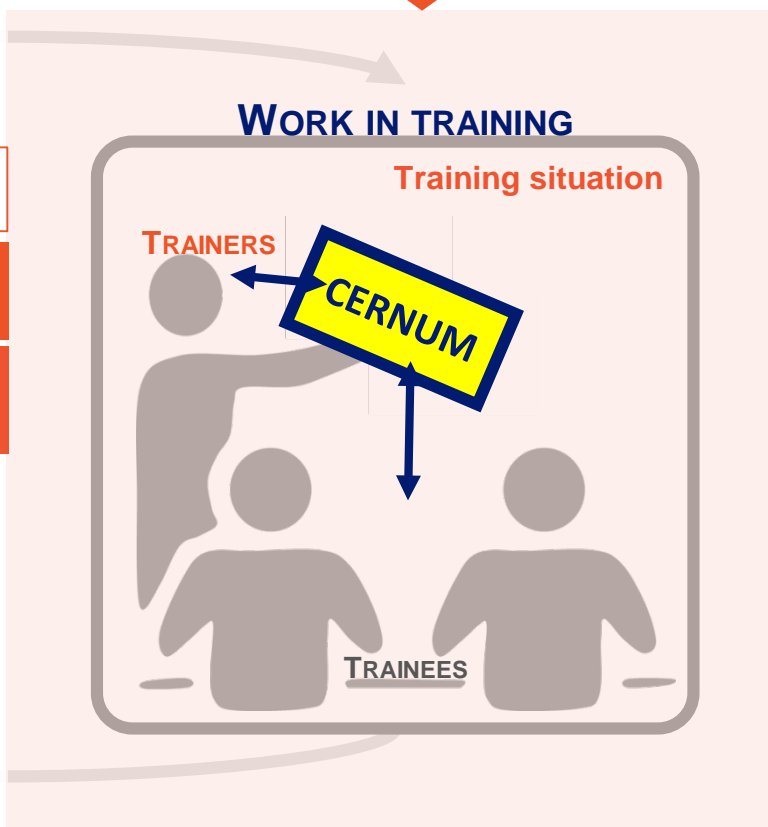
[Boccaro & Delgoulet, 2016]

Training situations had to be built on the work in production



Acquired skills should be operational

INTRODUCTION OF SIMULATION TOOL



USE CONDITIONS

WORK SUITABLE TOOL

PROFESSIONNALIZATION PATH

ACCOMPANIMENT ...

Opérateurs

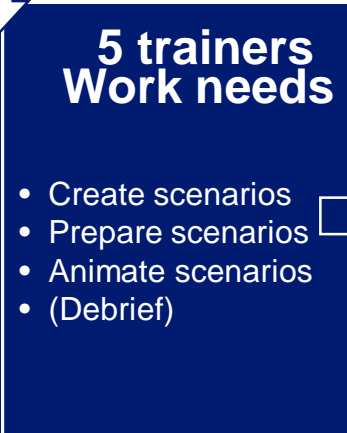
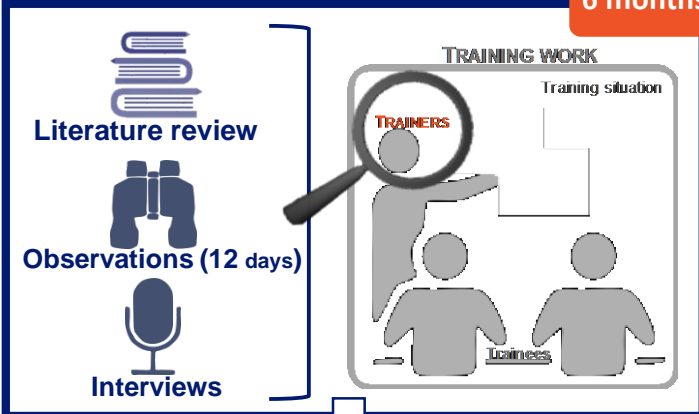
ERGONOMIC APPROACH
to anticipate the likely future work of the TRAINER



Future tool
integrated in
WORK & TRAINING

WORKS ANALYSIS

6 months



PARTICIPATORY DESIGN

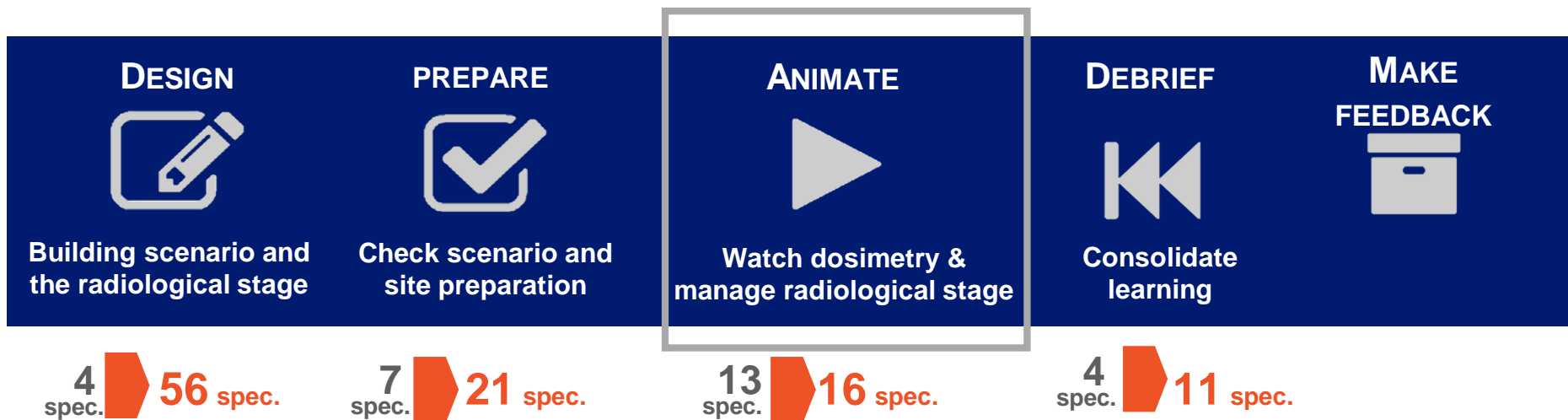
6 months

Designers working groups (4)
Human machine interface W.groups (5)
Stakeholders W.groups (3j)

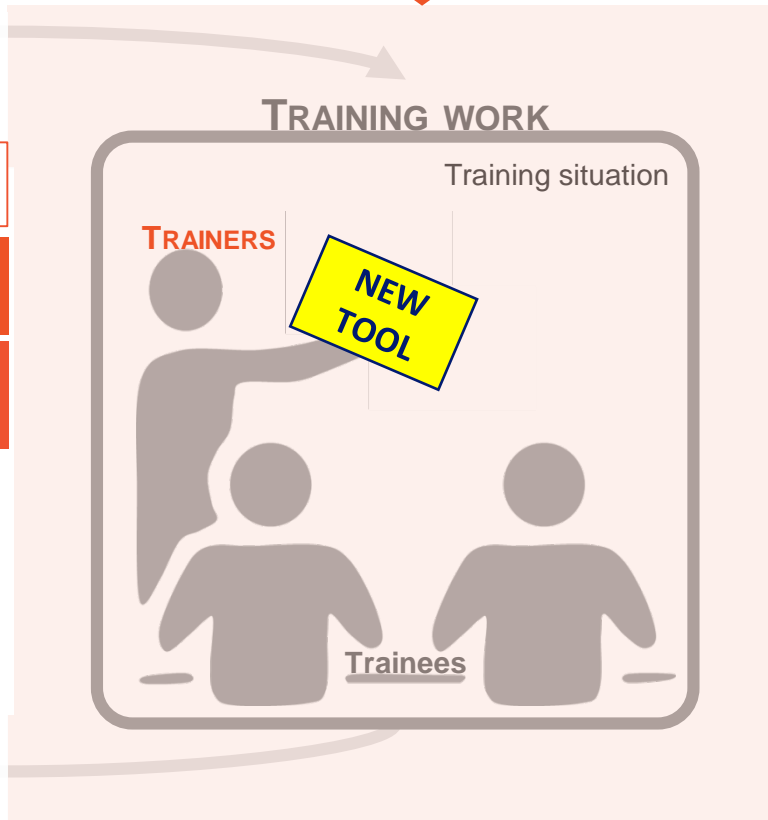




IHM organized into **5** additional **modules** in line with the work needs



INTRODUCTION OF SIMULATION TOOL



USE CONDITIONS

WORK SUITABLE TOOL

PROFESSIONNALIZATION PATH



ACCOMPANIMENT ...

Opérateurs



Observation & Interviews (5)



Document review



Surveys (25)



Impact study trainers practices and their professionalization path

TRAINERS

Issues, organization and roles of professionalization stakeholders

Trainers cartography

- Profiles
- Professionalization paths

Cues for professionalization transformations



Impact study of inserting the new tool on trainers practices and their professionalization path ...



TRAINING WITHOUT CERNUM



Behaviorism and
its expositive
methods

TRAINING WITH CERNUM



Constructivism and
its demonstrative
methods



Socioconstructivism
and its operating
methods

Additional methods for **quality** learning

MAIN CONCLUSION: ERGONOMICS CONTRIBUTIONS

At the beginning Cernum was a **TECHNOLOGICAL TOOL**. At the end, Cernum, is a complete **TRAINING PACKAGE**

The integration of ergonomic approach is crucial in the design step to draw results:

- Drive operational choices
- Avoid further costly reviews
- Anticipate the appropriation

PERSPECTIVES

