

New software tools for dynamic radiological characterisation and monitoring in nuclear sites

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Overview

Decommissioning can greatly benefit from flexible, easy-to-use but professional, quick/real-time but reliable, 3D/2D radiological characterisation tools, since:

- the radiological conditions are dynamically changing,
- accidents, requiring quick intervention, may happen,
- realistic, easy to understand user interface is required for good situation awareness,
- communication between stakeholders and towards the authorities is very important for common understanding of the situation,
- decisions made may have severe health or financial consequences, etc.



The Halden Planner

is a real-time 3D software tool for:

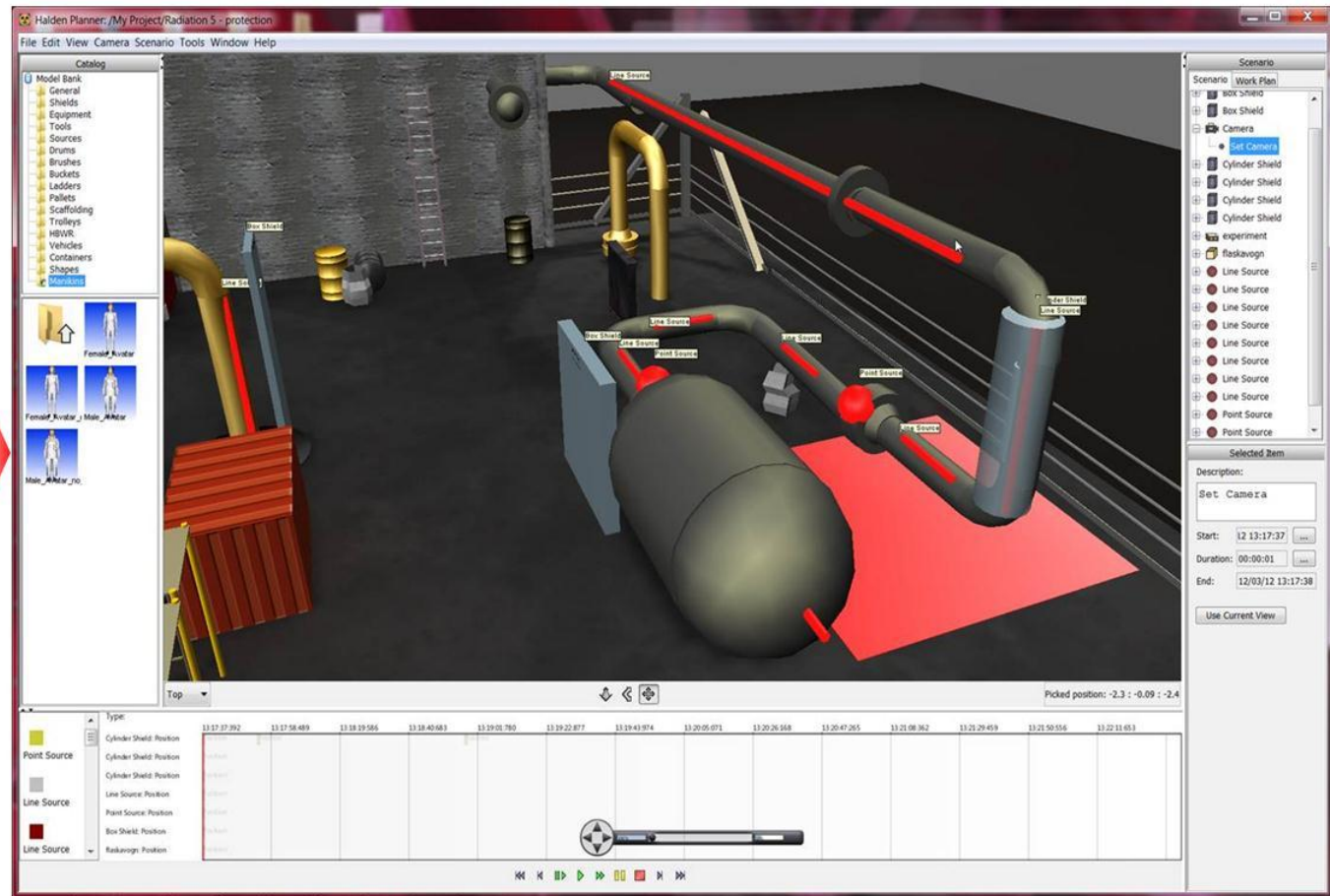
- modelling & characterizing nuclear environments by
 - characterising radiological features,
 - and analysing exposure conditions,
- planning a sequence of activities,
- demonstrating, teaching and rehearsing work protocols,
- producing job plan reports,
- producing post-work review reports,
- presenting information.

Characterising radiological features

(The Halden Planner).

INPUT

- 3D model of the scene.
- Radiological data:
 - position and shape,
 - isot. composition,
 - activity / activity concentrationof rad. sources / hot spots,
 - type & energy spectrum of rad. emitted (γ),
 - scattered measurements, etc.
- Other data
 - the work plan (activities, paths, speed, etc.)



Analysing exposure conditions (The Halden Planner)

INPUT

DOSIMETRIC PACKAGE

- Deterministic radiation transport
- Mapping based on measurements
- Other dosimetric tools
- User defined tools
- Mixture of tools

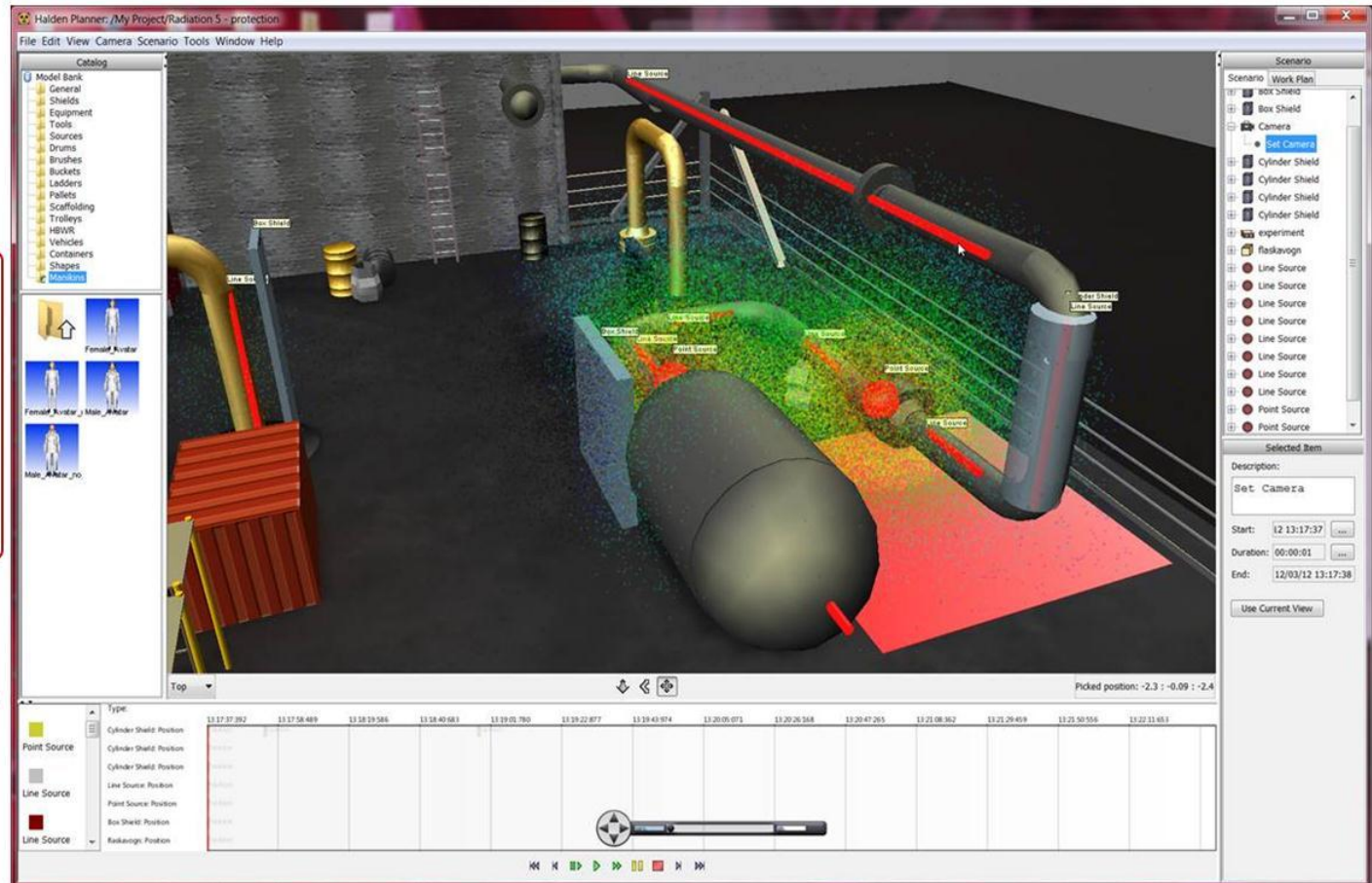
USER INTERFACE

OUTPUT

- 3D visual output:
 - Distr. & param. of the rad. sources
 - Radiological maps
 - Personal/organ doses (actual & accumulated)

Reports

Dynamic radiological mapping.



Planning a sequence of activities (The Halden Planner)

INPUT

DOSIMETRIC PACKAGE

- Deterministic radiation transport
- Mapping based on measurements
- Other dosimetric tools
- User defined tools
- Mixture of tools

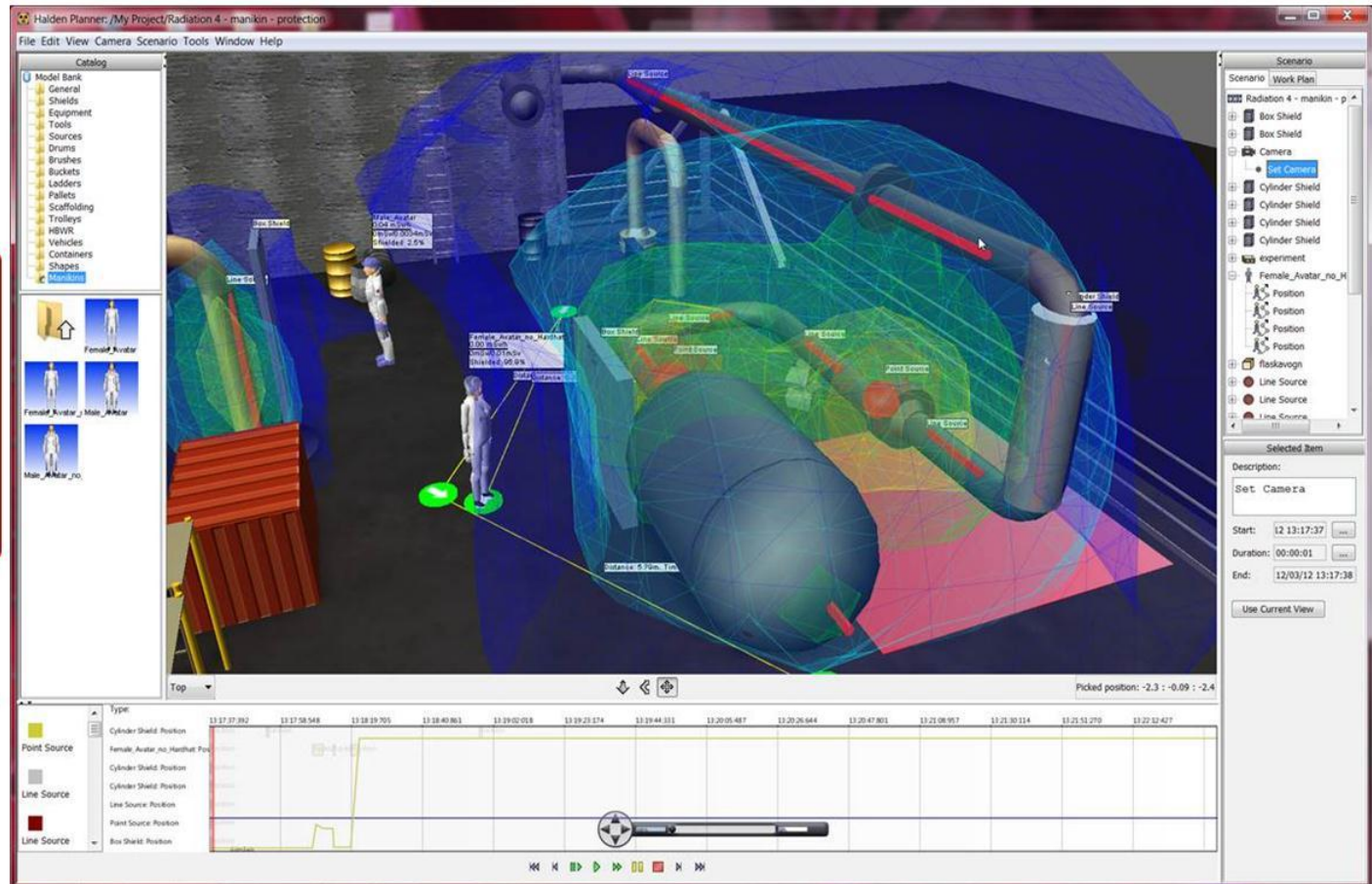
USER INTERFACE

OUTPUT

- 3D visual output:
 - Distr. & param. of the rad. sources
 - Radiological maps
 - Personal/organ doses (actual & accumulated)

Reports

Real-time design of protection.



Reporting and communication

(The Halden Planner)

- producing job plan reports describing
 - characterisation of the environment (rad. maps),
 - the consecutive steps of the work,
 - the entailed radiation exposure (personal, collective), etc...
- producing post-work review reports,
 - containing additional user input (e.g. real measurements).
 - suitable for final documentation of the work.
- presenting information to different types of users, thus serving as an aid to
 - communication between stakeholders,
 - reporting towards the authorities, etc...

Other software developed / to be developed at IFE

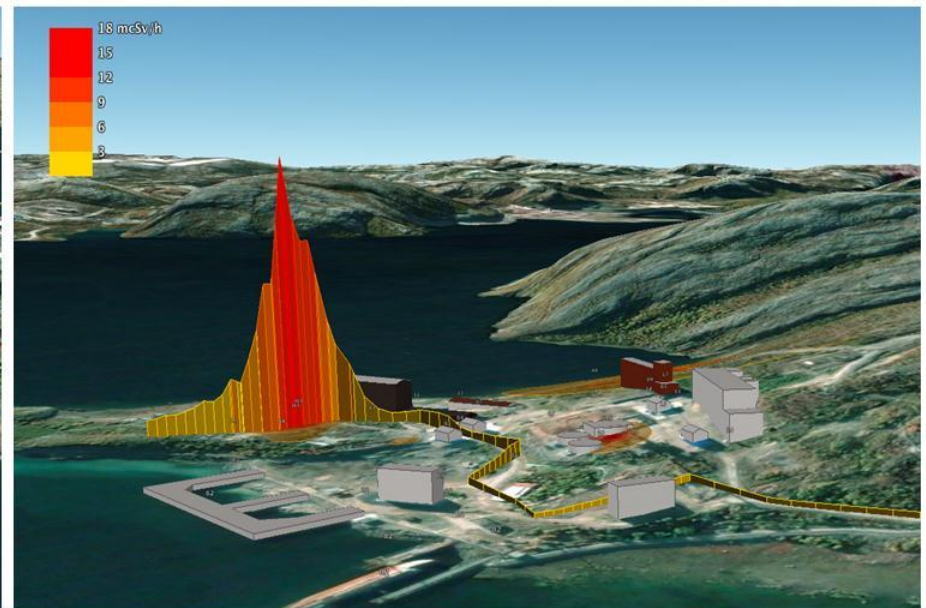
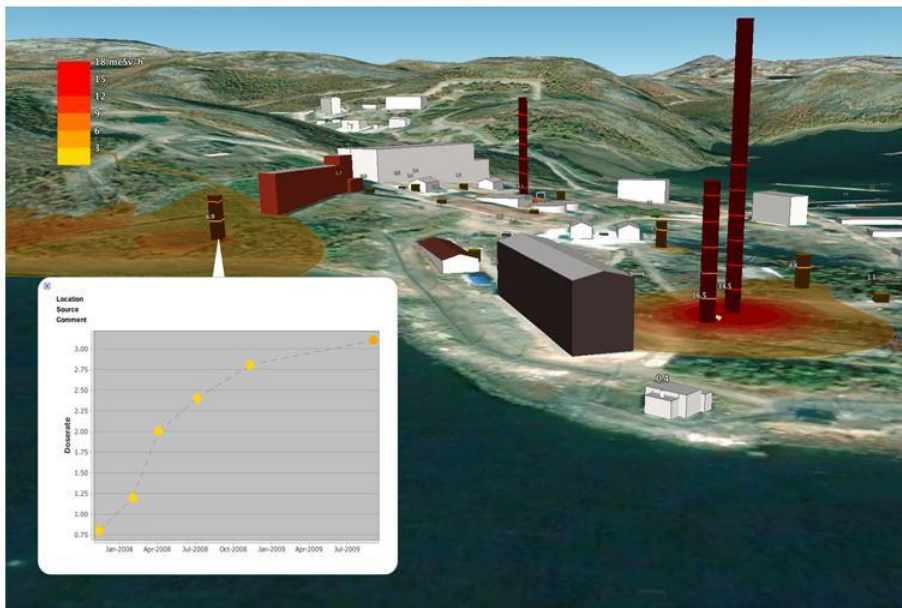
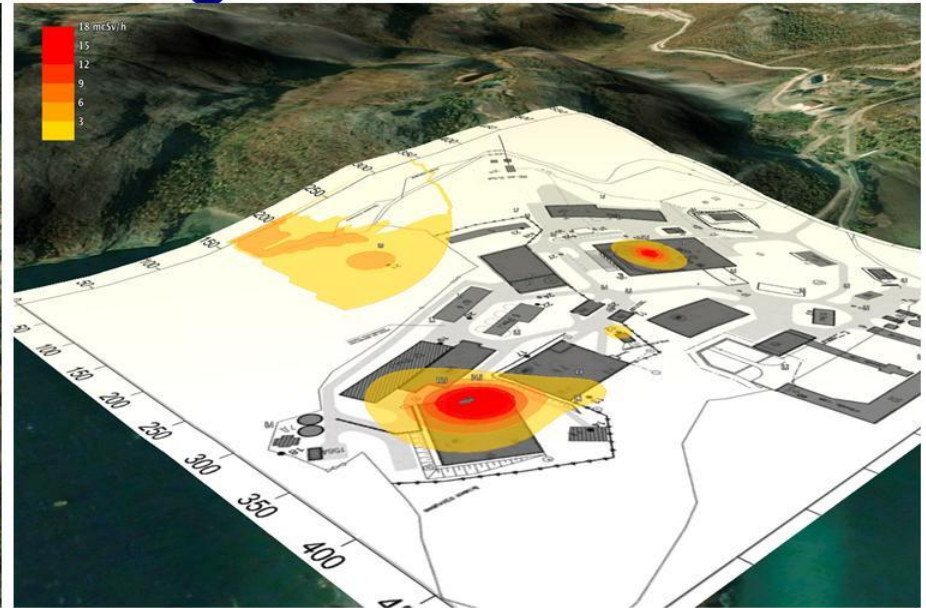
include tools for:

- radiological characterisation of large outdoor areas,
- in-situ radiological characterisation (using portable devices),
- etc.

Radiological characterisation of large outdoor areas (Terrain Viewer)

- High definition 3D visualisation of the environment (landscape, buildings, 2D overlay maps, etc.).
- Real-time 3D radiological mapping (areal distribution along the surface, vertical dispersion).
- Dynamic analyses of the exposure based on user defined paths.
- *Interactive assessment of the costs entailed by remediation.*
- Etc.

Rad. characterisation of large outdoor areas



In-situ radiological characterisation (using portable devices)

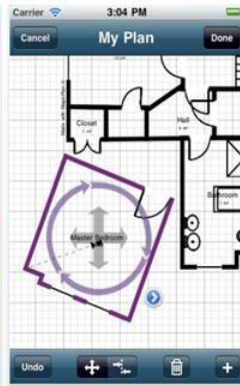
Huge potential in hand-held devices!



- Registering - radiological data using - 3D models and/or
- other - 2D maps and/or
- drawings and/or
- photos.
- On-the-fly processing, checking and comparison (e.g. to
calculated) of acquired data.
- Note deviances (and on-the-fly update) of 3D models, maps
and drawings based on real measurements.

Minimise presence in hostile areas.

Registering data in-situ

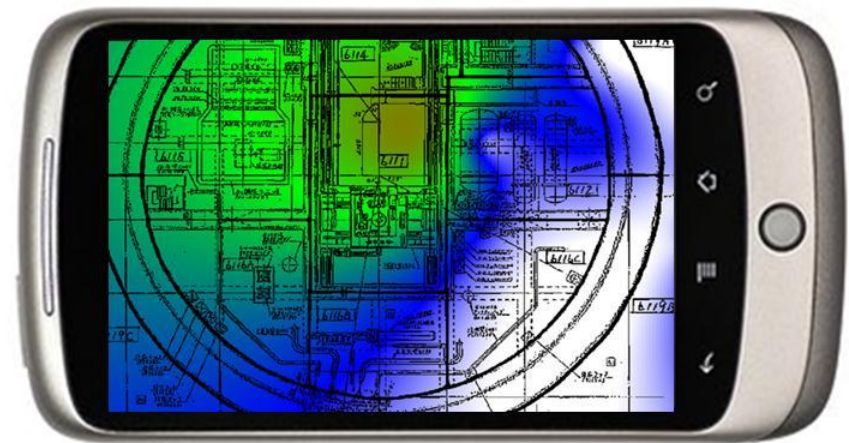
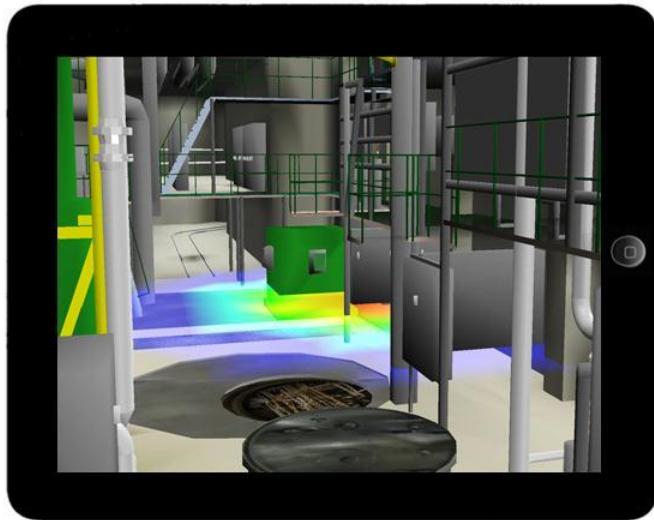


automatic / manual
localisation



On-the-fly processing, checking and comparison of acquired data

e.g. comparison to calculated



Summary

Use different data gathering/processing, simulation and visualisation tools/methods (some very archaic).



**Efficient (quick/real-time, easy to use, but reliable)
radiological characterization
for decommissioning (or other purpose)
is needed?**



IFE nuclear toolkit!