PLEIADES

Smarter Plant Decommissioning

User stories presentations and demos: SMG Use case US#2

Final Workshop Presentation

25th October 2023

Jospeh Ridao – Karlsruher Institut für Technologie (KIT)

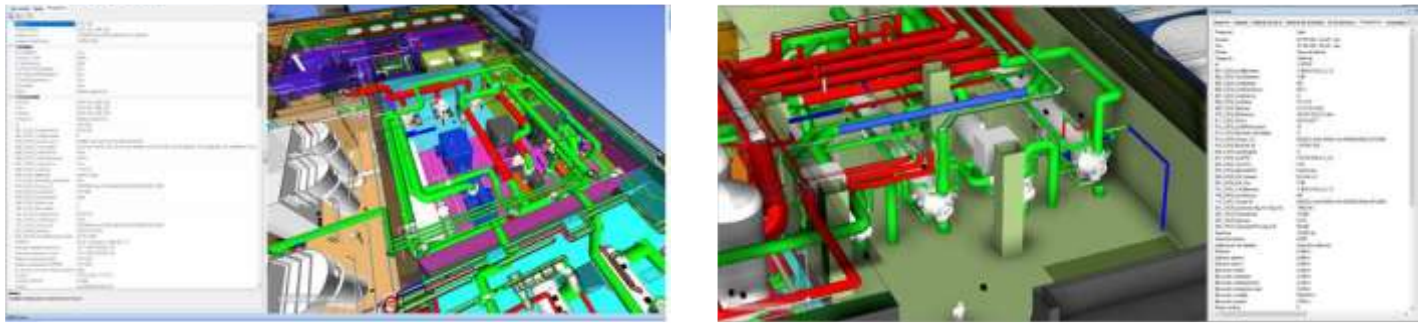
Nicolas de Bièvre – Cyclife Digital Solutions (CDS)

This project has received funding from the EURATOM Research & Training Programme 2014-2018 under the Grant Agreement n°899990. The content of this document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

User story #2 – Overview

3D supported vs Digitally enhanced dismantling:

- Input 3D/BIM model: ENRESA model based on Santa Maria de Garona.
- Initial Input database:
  - BIM model of the component, surrounding area and path followed in the US;
  - Desing drawings and specifications of the component to be removed;
  - Radiological characterization of the area containing the component, as well of the transportation path to be followed;
  - Physical parameters of the component (mass, material thickness, density, etc.);
  - Planning of the activities to be completed.



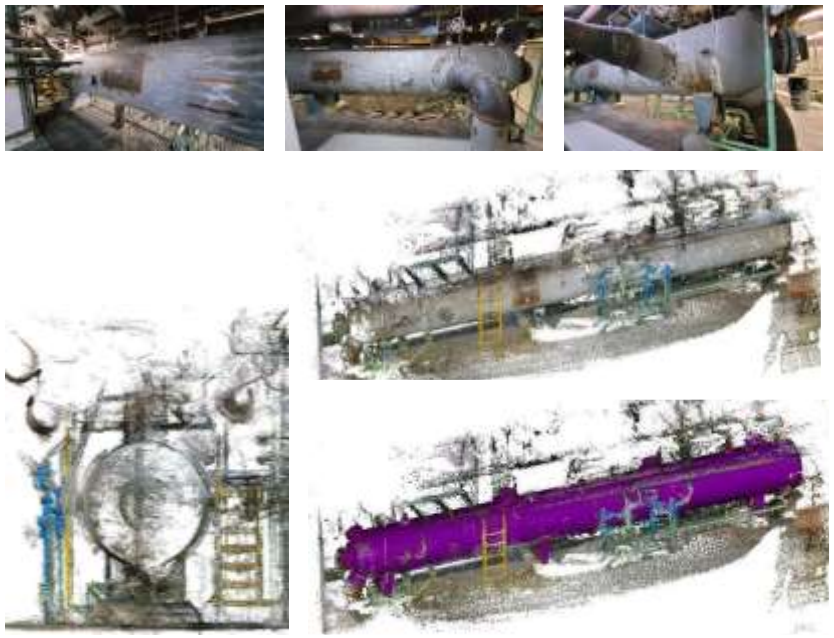
Models of the environment for parts 1 and 2 used for the US#2

User story #2 – Overview

3D supported vs Digitally enhanced dismantling:

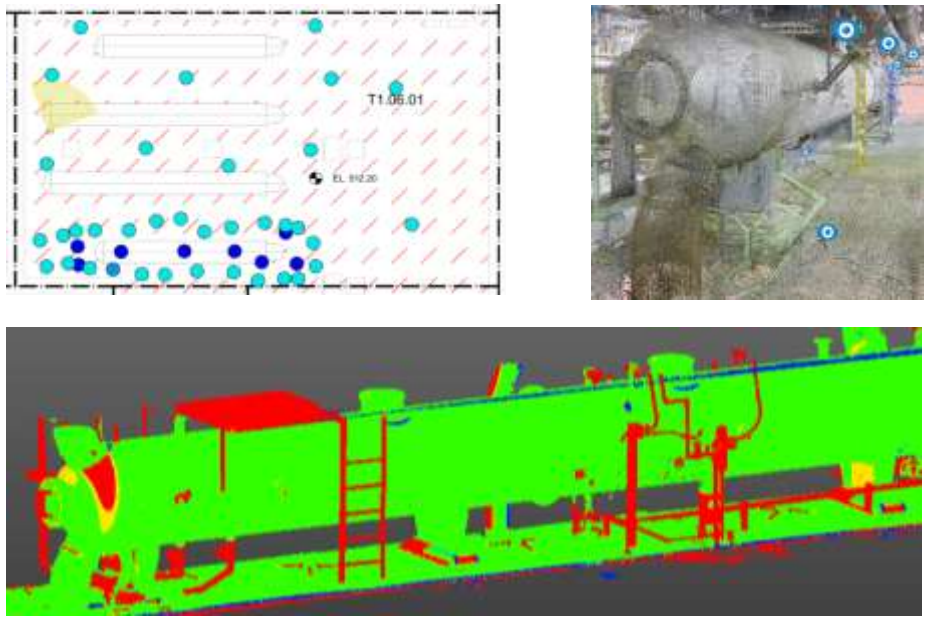
- Production of point clouds to verify and complete the database:
  - No point cloud was available at first, so two solutions were carried out:

Point cloud from photogrammetry (KIT)



Some of the pictures used, point cloud view from 3DScanPF, and superimposition with the 3D model of the heater (3DScanPF, KIT)

Point cloud from scan campaign (Quadrica)



3D scan location, poin<t cloud view from MySurvey software, and visual result from deviation calculation (Cyclife DS)

User story #2 – Overview

3D supported vs Digitally enhanced dismantling:

- Expected outcomes:
  - Comparison of a conventional vs. digitally enchanced support provides by PLEADES;
  - Monitoring of the efficiency of PLEIADES in terms of dose rate, scheduling, costing, waste production, safety and risk management;
  - Implementation of tasks described in the test procedure;
  - Comparison between simple use of a 3D models and the comprehensive digitally enhanced dismantling toolkit providing multiple functionalities;
  - Obtention of dose maps and radiological 3D models (activity/contamination maps) directly from the set of tools included in PLEIADES;
  - Further development using XR visualization and execution allowing users to navigate and experience related work tasks in real size environments.

User story #2 – Test procedure

3D supported vs Digitally enhanced dismantling:

- Load 3D model (optionally point cloud) of the area and models of dismantling tools to be applied;
- Increase LOD of the component to be removed in the 3D model;
- Load 3D model of the areas to be crossed by the component on its route from its original position to the final position before leaving the facility;
- Identify and update whether the component, or the system the competent is part of, is relevant for safety or not;
- Model the dose distribution based on measurements from radiological characterization of the component and the system it is part of;
- Model the dose distribution based on measurements from radiological characterization of the disassembly area;
- Model the dose distribution based on measurements from radiological characterization of the transportation route;
- Enable animation of the element in the 3D model (move, rotate);
- Define sequence of activities (work order) with specific information for all involved disciplines;
- Estimate dose exposure of workers;
- Simulate and visualize the sequence of activities in the 3D model;
- Visualize and execute the sequence of activities in XR;
- Estimate time schedule and costs for work orders;
- Estimate waste quantities;
- Perform sensitivity analysis on selected input parameters (identify the parameter with the highest impact on waste amounts);
- Save all available data and test results for further analysis;
- Assess the radiological risks in terms of ALARA and worker safety;
- Compare the alternative dismantling scenarios.

Contact:

contact@pleiades-platform.eu

http://pleiades-platform.eu

@pleiades platform