

PLEIADES

Smarter Plant Decommissioning



WP 1 TASK 4

Development of a nuclear decommissioning ontology

AB Meeting on 19 September 2023 – Maarten Becker



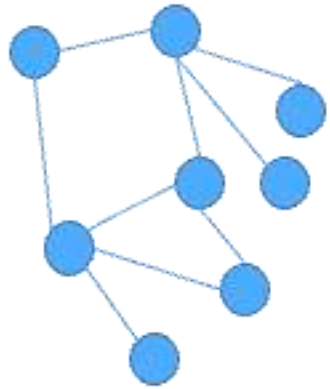
This project has received funding from the EURATOM Research & Training Programme 2014-2018 under the Grant Agreement n°899990. The content of this document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

Overview

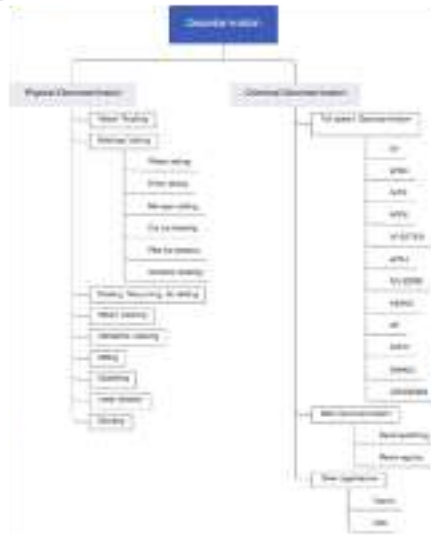
- Introduction
- Development of the Decom Core Ontology
- Benefits of an ontological approach



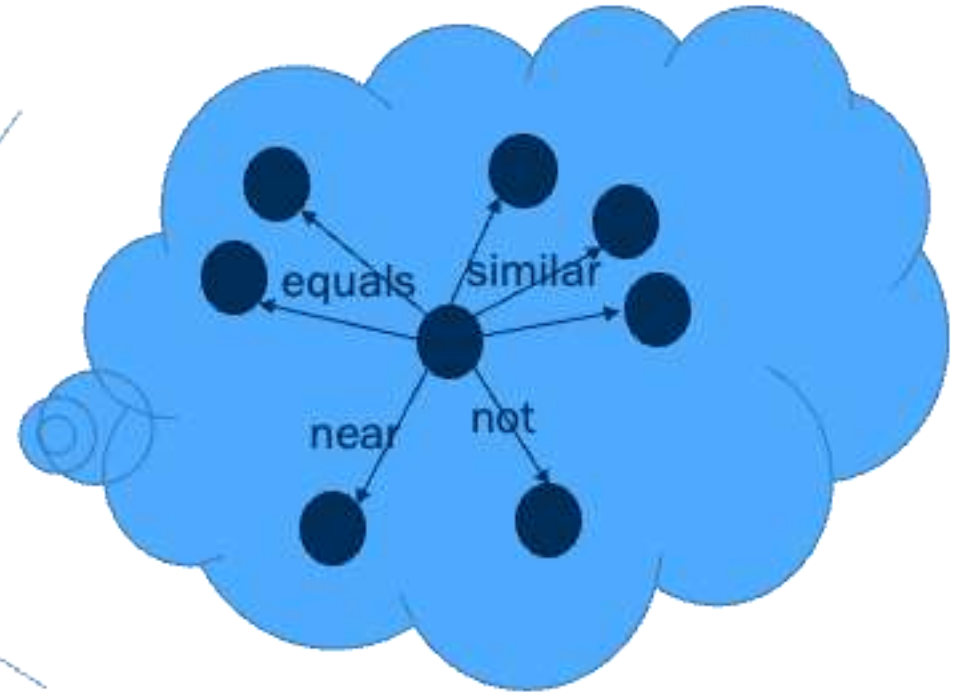
Ontologies, Taxonomies, Thesauri



Ontology
linking
concepts



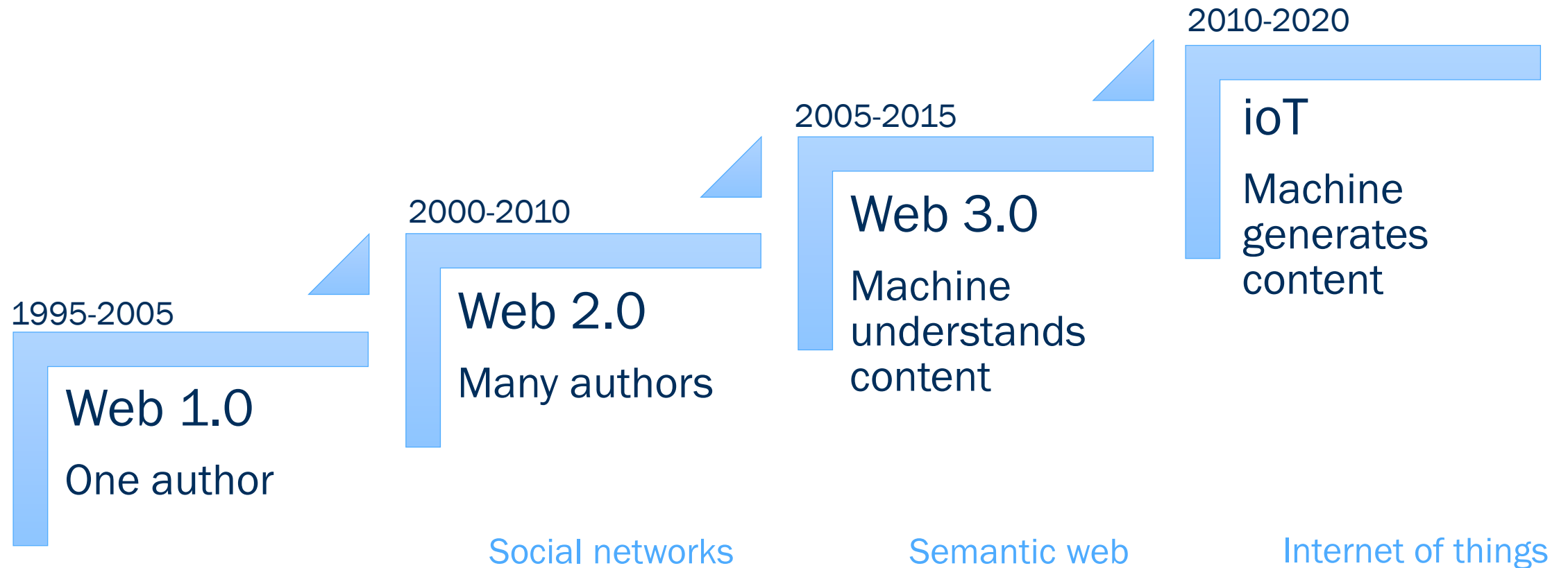
Taxonomy
sorting terms inside
concepts



Thesaurus/SKOS
describing terms and their
environment



Progression of web technologies

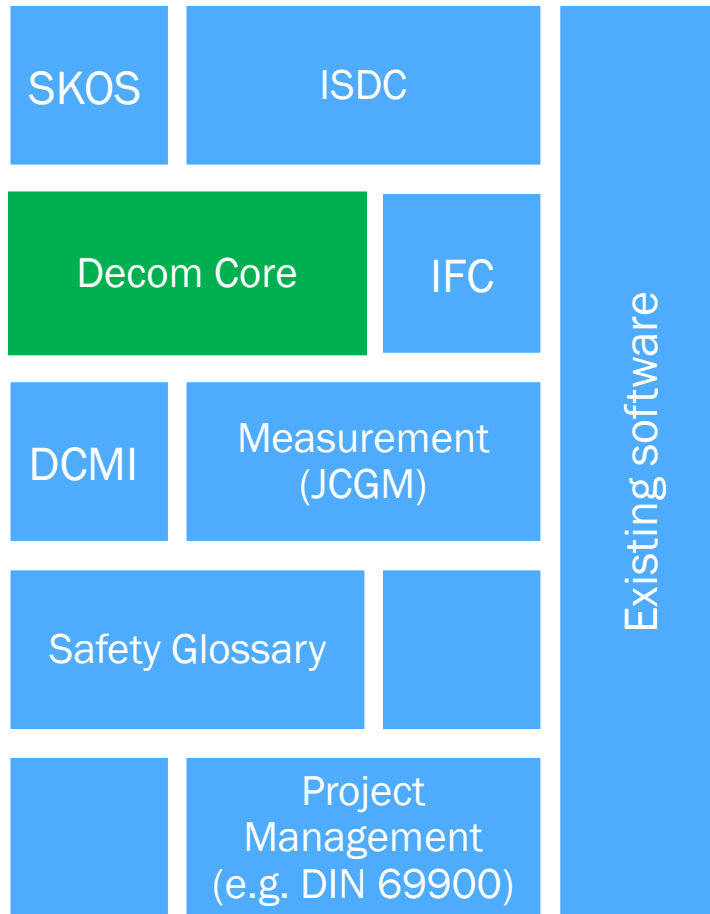


Why an ontology for PLEIADES?

- The task is to achieve a common platform for existing software for 3D and BIM in decommissioning
- Each software has it's own history, terms and concepts
- Direct interfaces would be very difficult to generate and maintain
- A common understanding of the decommissioning process is necessary
 - Between subject matter experts
 - Between subject matter experts and data scientists



The development approach



- No intention to reinvent the wheel, use what is available, established and suitable
- Simultaneous top-down and bottom-up approach
- Decom core covers specific parts



Development steps

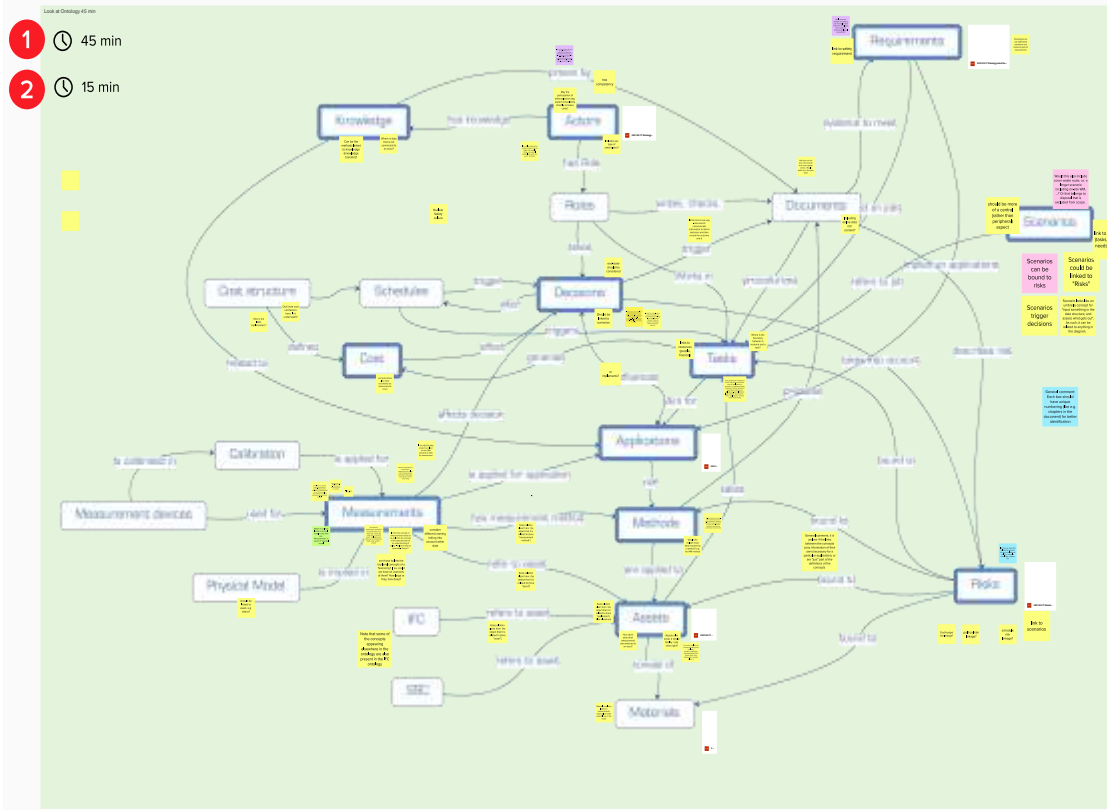
- Definition of boundaries
- Informal capture of concepts from subject matter experts
 - Series of discussions captured on mindmaps
 - Several topical workshops
 - Final review workshop with external participants
 - Integration of workshop outcomes
- Connection of concepts by core properties
- Reality check – can we describe a real project?
- Formalization (SKOS, definitions, translations, OWL-format)



Feedback collection in review workshop

PLEIADES Ontology feedback

Detail levels of ontology are examples only



iUS Institut für Umwelttechnologien und Strahlenschutz GmbH

3 ⌚ 5 min

4 ⌚ 5 min

5 ⌚ 5 min

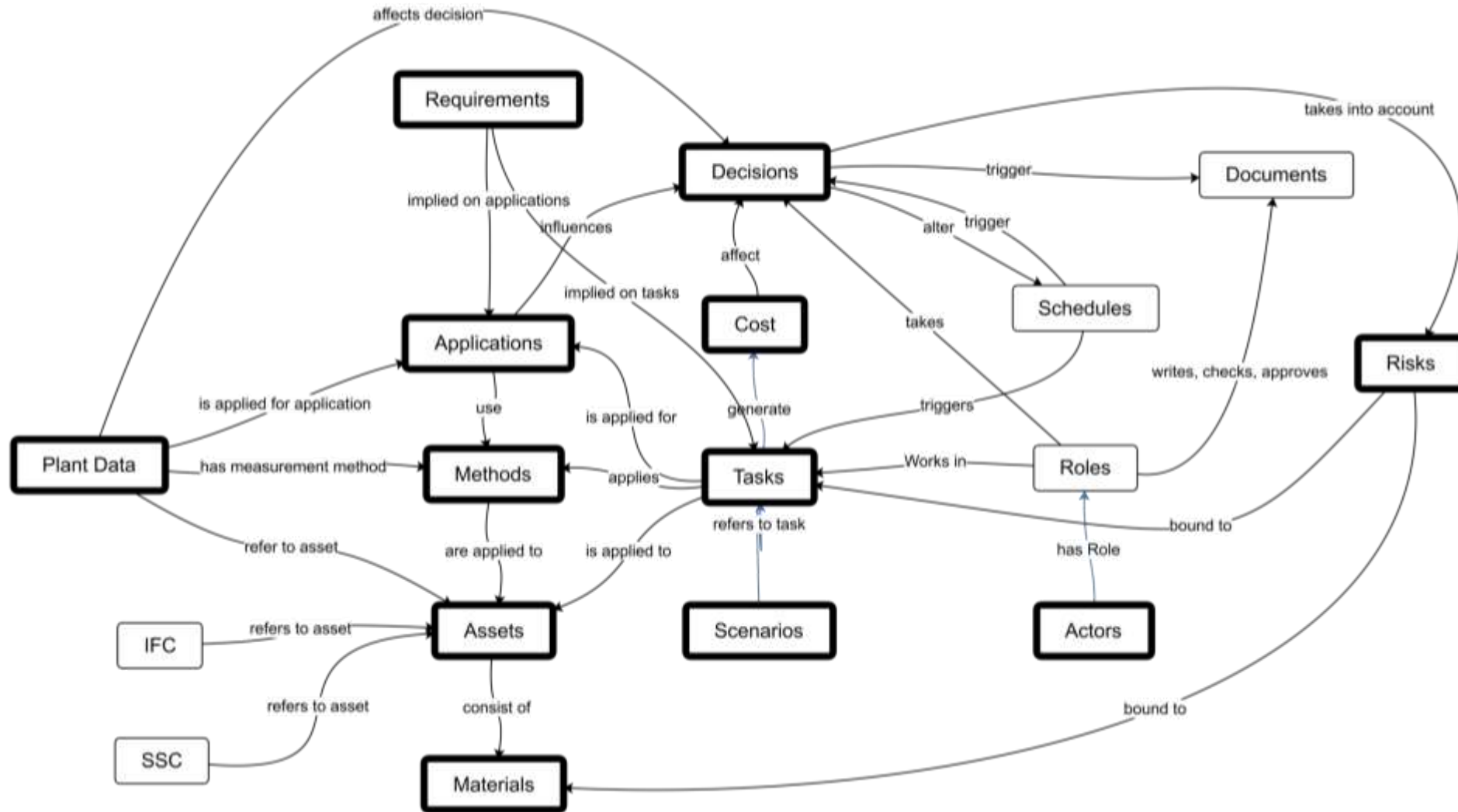
Managing Stakeholder Expectation

INFLUENCE	Keep satisfied	Actively engage
	Monitor	Keep informed
	INTEREST / AVAILABILITY	

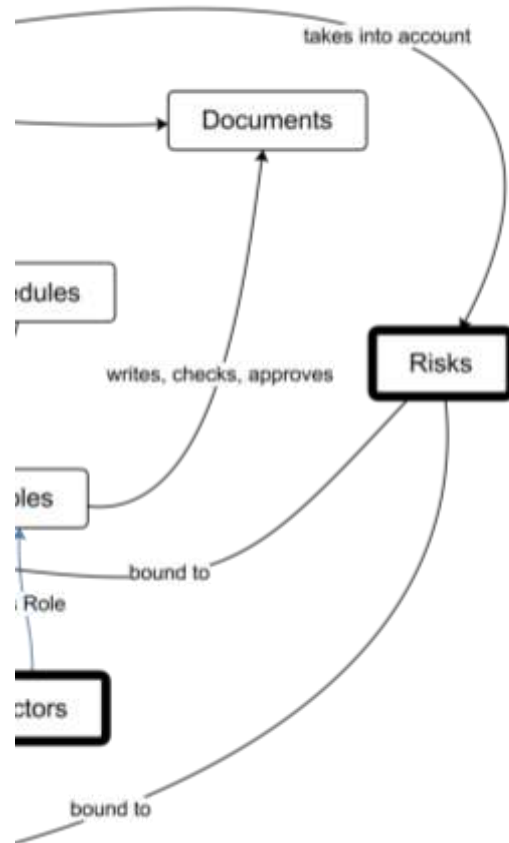
Workshop was attended by 25 persons from operators, service providers regulators int. organizations



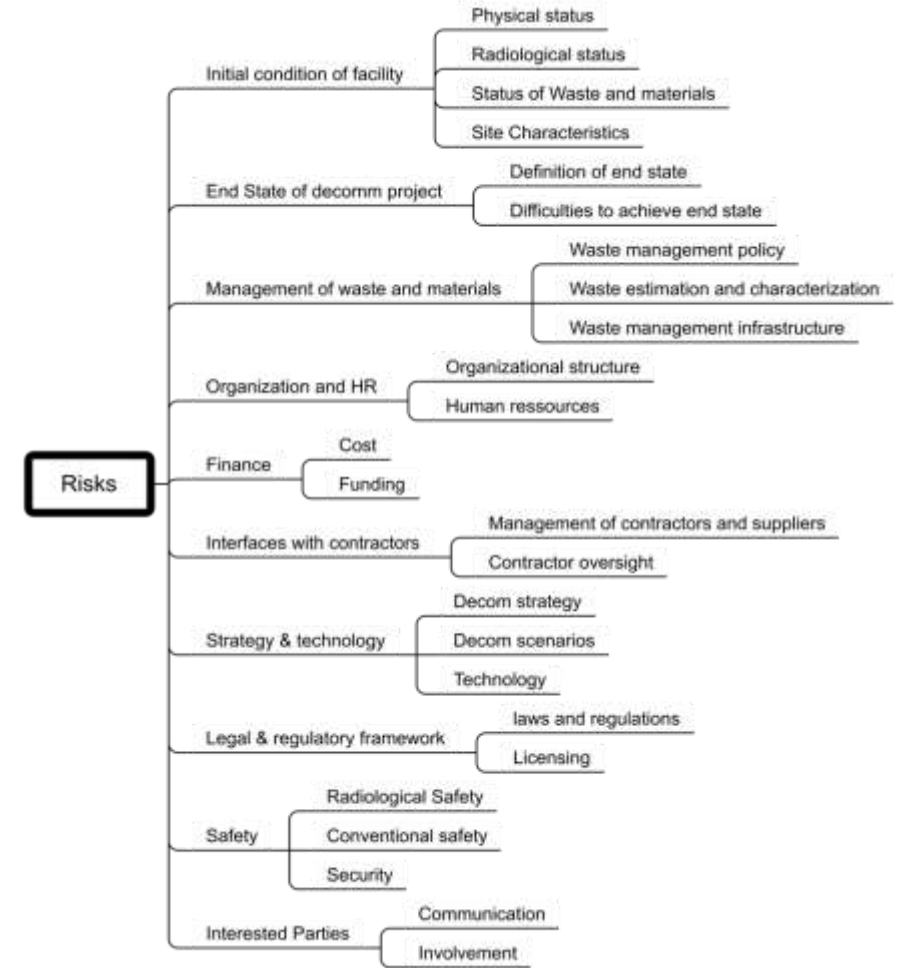
The Decom Core Ontology



Example – Decommissioning Risks



Definition:
Effect of uncertainty on objectives [ISO 31000]



Formalization - VocBench

The screenshot displays the VocBench interface. On the left, a tree view shows a hierarchy of classes under 'Concept'. The selected class is 'Anforderung (de), Requirement (en)'. The right pane shows the details for this class, including its types, top concept, schemes, broader terms, lexicalizations, notes, and other properties.

Concepts

SKOS content

- Labels / Translations
- Definitions
- Relations

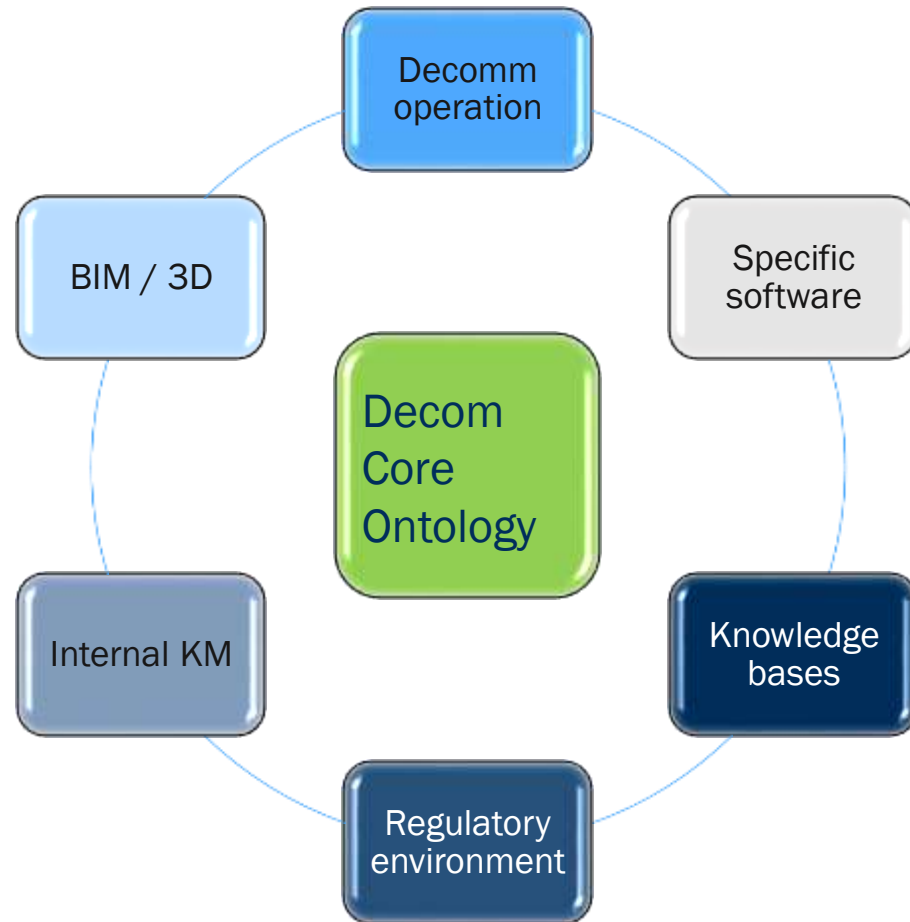


Conclusion

- **Ontology** will be the basis of PLEIADES
- Provision of an **interface** will only work if all participants have a **common understanding** of the content
- Development follows
 - A **top-down approach** ensuring compatibility i.a. to IAEA approach for the top layer
 - A **bottom-up approach** from the participants existing solutions to ensure a common understanding
- **Alignment** of approaches highly recommended and **beneficial** for all sides
- Clear limits of cooperation possibilities by funding scheme and financial capabilities



Ontologies foster interoperability



Through the decom core ontology, it will be much easier to connect different applications and knowledge bases

In PLEIADES it will allow access also to other knowledge resources

It will be feasible to deploy knowledge content packages for multiple applications and frameworks

This will also allow to reuse the vast decommissioning knowledge



Beyond PLEIADES

- In parallel, a Working Group of IAEA, OECD-NEA and EU-JRC has formed and worked out an ontology for managing the knowledge on decommissioning
- Different scope, PLEIADES aims for managing decommissioning projects
- The interaction between the Working Group and PLEIADES allowed both sides to come to an aligned approach
- The ontology forms a basis for the further digitalization of decommissioning, for example AI



Questions? Ideas?



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