

# RoboDecom: New modular robotic solutions for nuclear decommissioning in Norway and abroad

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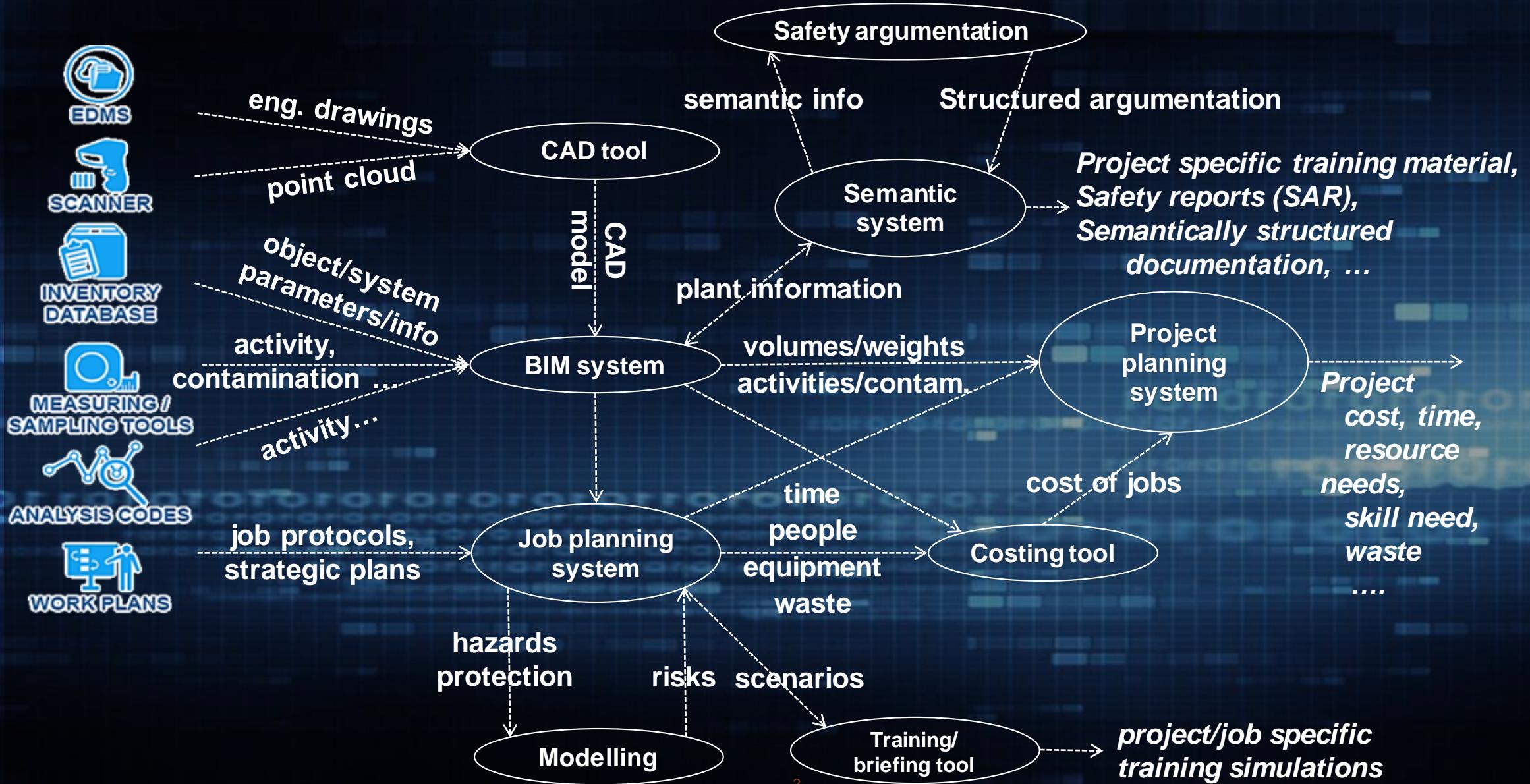
# LiveDecom: Digital support for management of nuclear decommissioning in Norway and abroad

Prepared by István Szőke

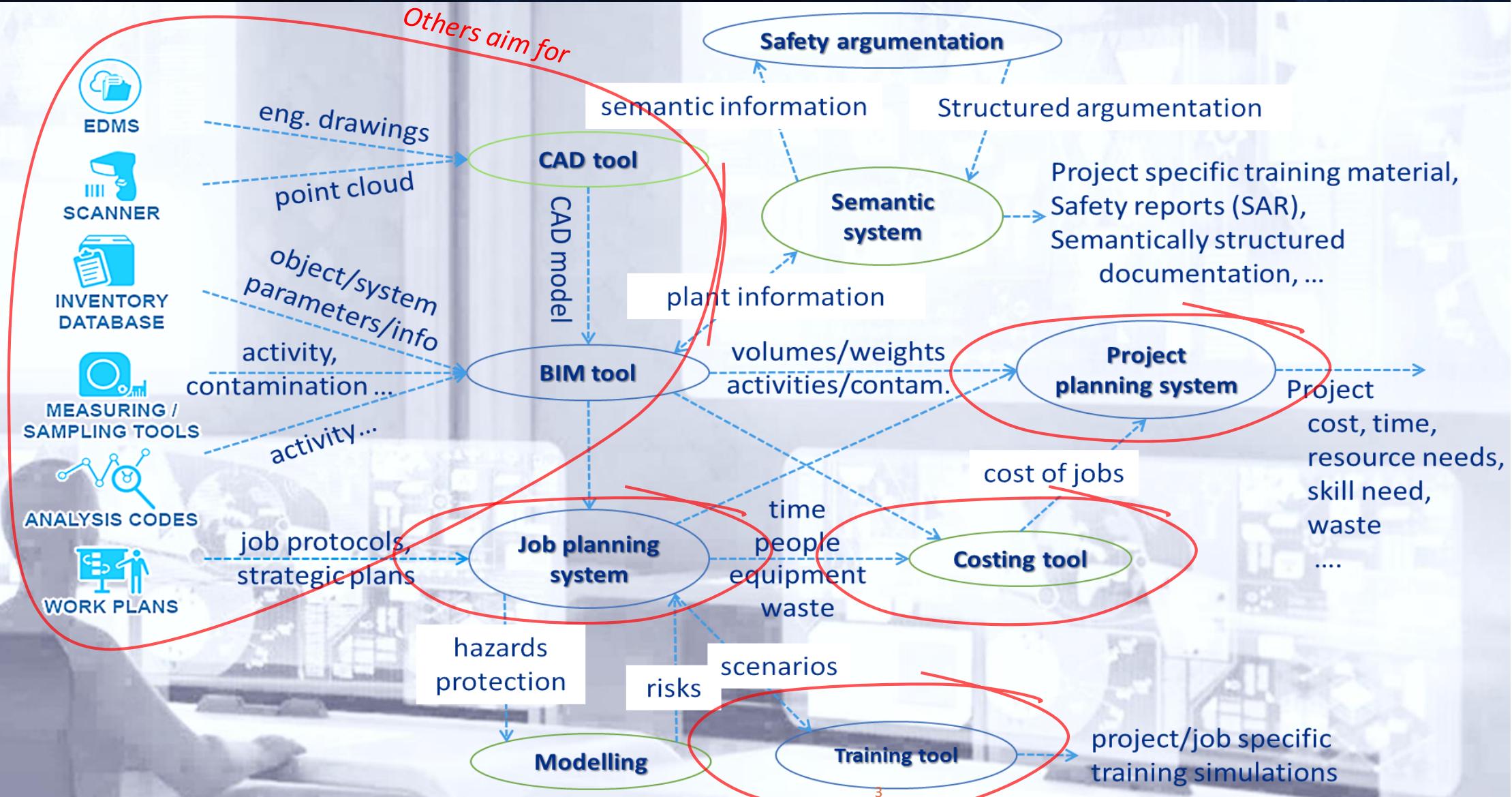
Institute for Energy Technology, Halden, Norway

Contact: [Istvan.Szoke@ife.no](mailto:Istvan.Szoke@ife.no)

# Holistic digital support



# Attempts for integration



# LiveDecom: Prototyping integration of digital capabilities

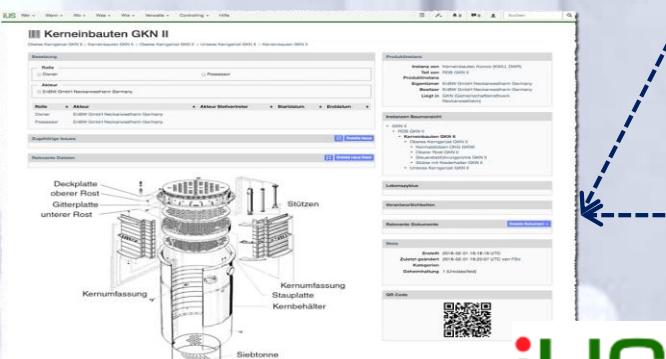
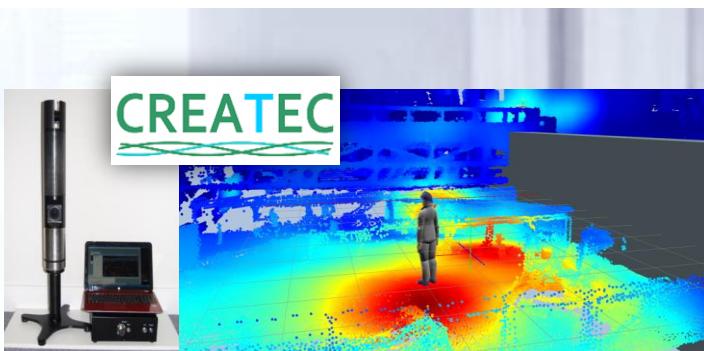
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Demonstrate **integration** of digitalized capabilities for

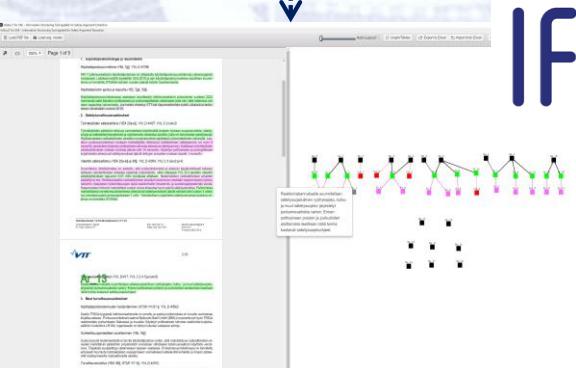
- project planning,
  - configuration management,
  - rad. characterisation,
  - job planning,
  - training,
  - costing, and
  - reporting for decom
- through integration of tech. like
- BIM/PIM,
  - advanced project planning interface,
  - 3D job and hazard simulation,
  - 3D gamma mapping,
  - ISCD costing,
  - ...



# LiveDecom suite



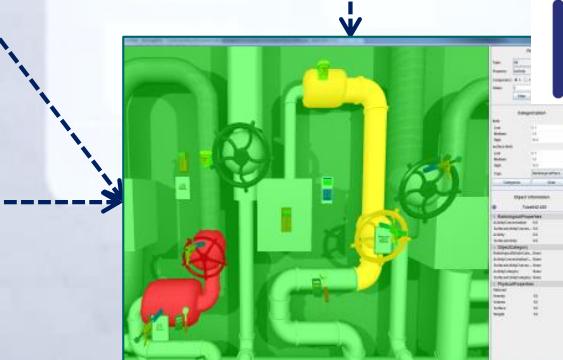
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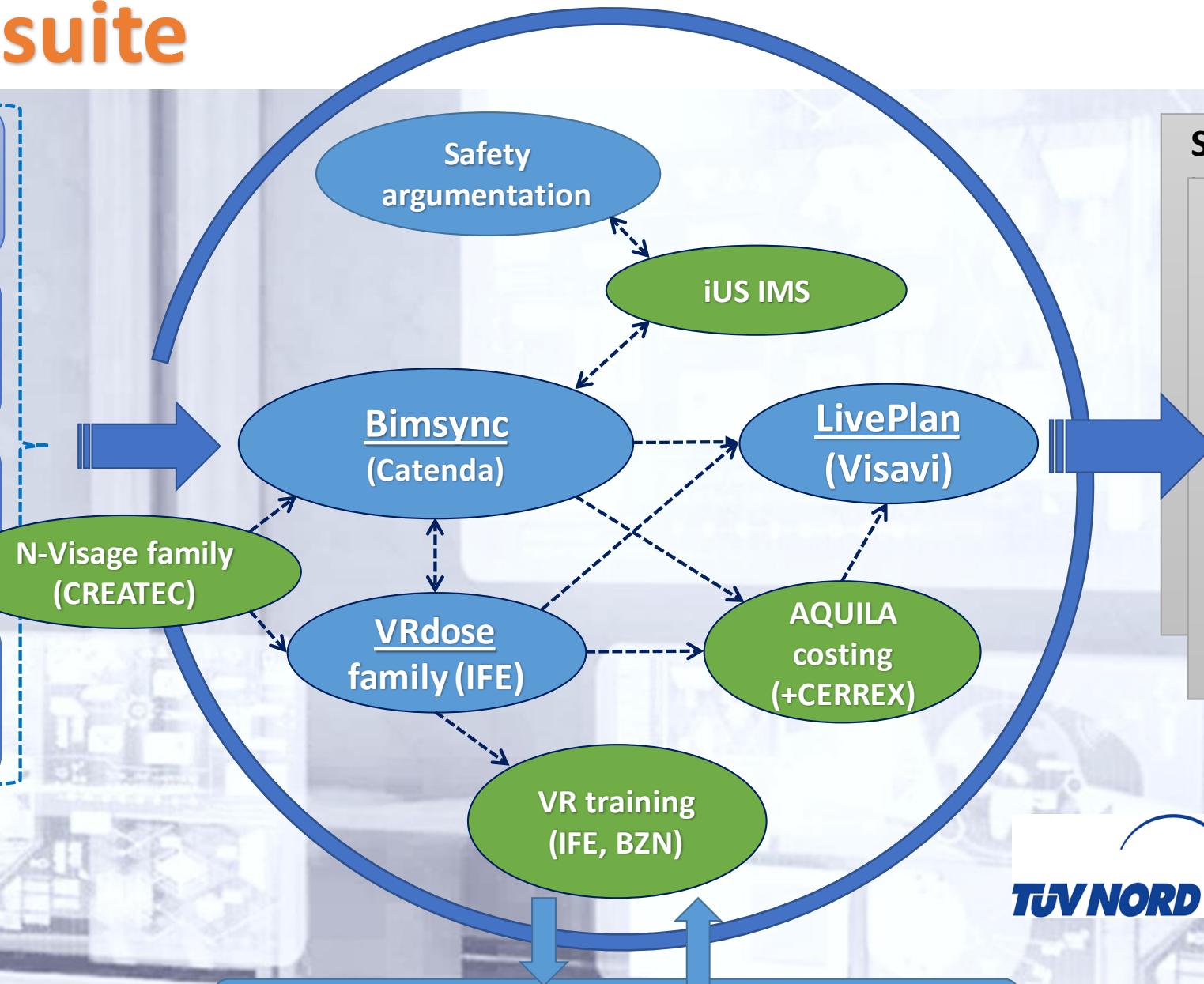
# LiveDecom suite

**EDMS, SCANNERS,...**  
point cloud (3D scan), eng.  
drawings, photos

**INVENTORIES**  
physical & radiological  
characteristics

**INSTRUMENTS**  
measurements,  
samples, calculations

**WORK PLANS**  
strategies, scenario  
descriptions, ...



Other software interfacing with LiveDecom  
EDMS, MRO, EPR, Safety evaluation, ... systems

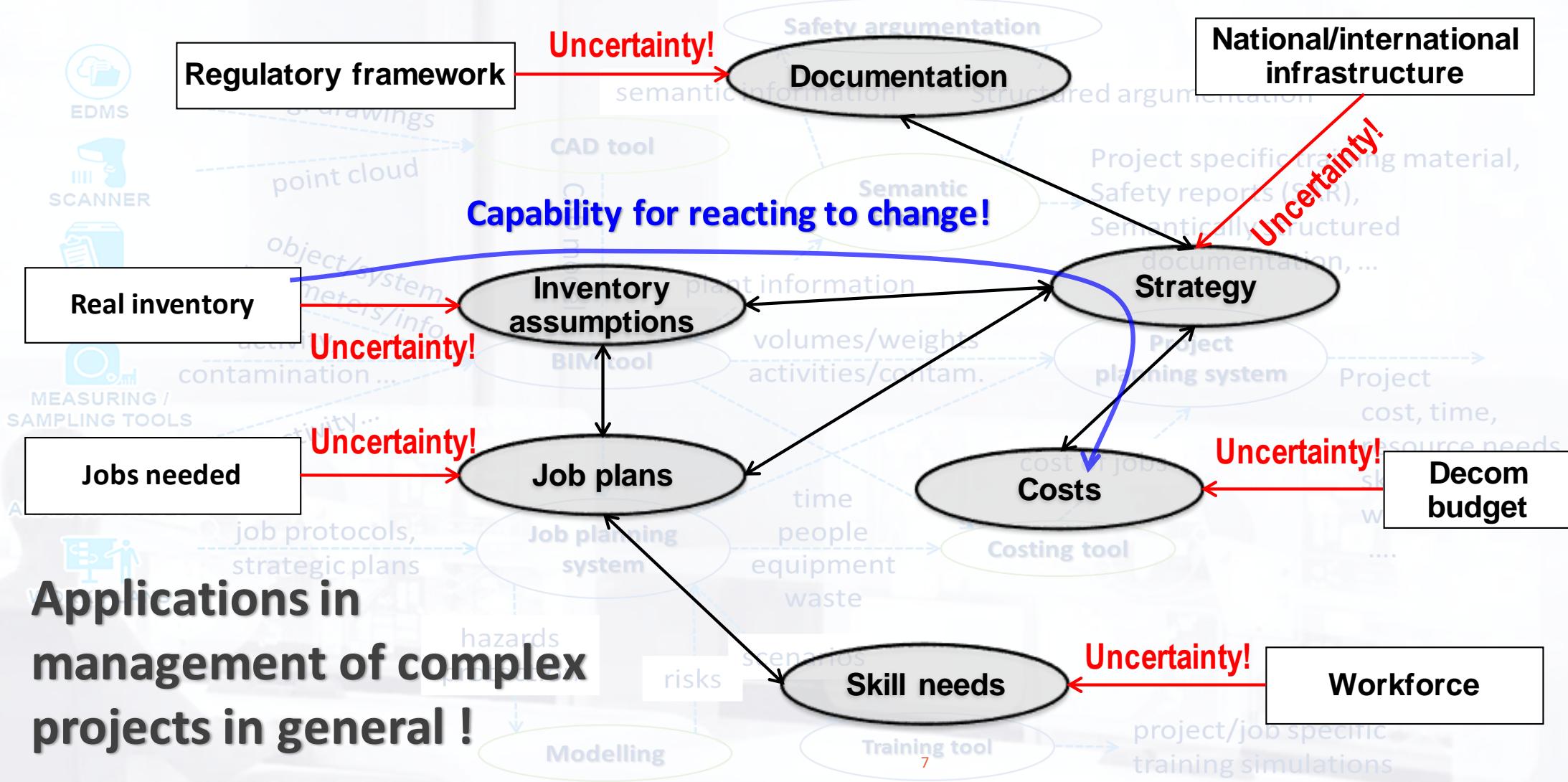
**Strategy 1**

**Strategy 2**

**Strategy 3**

Waste  
Exposure  
Costs  
Risks  
Time  
Uncertainty  
Resources  
Skills  
Equipment  
...

# Holistic capability – agile decom



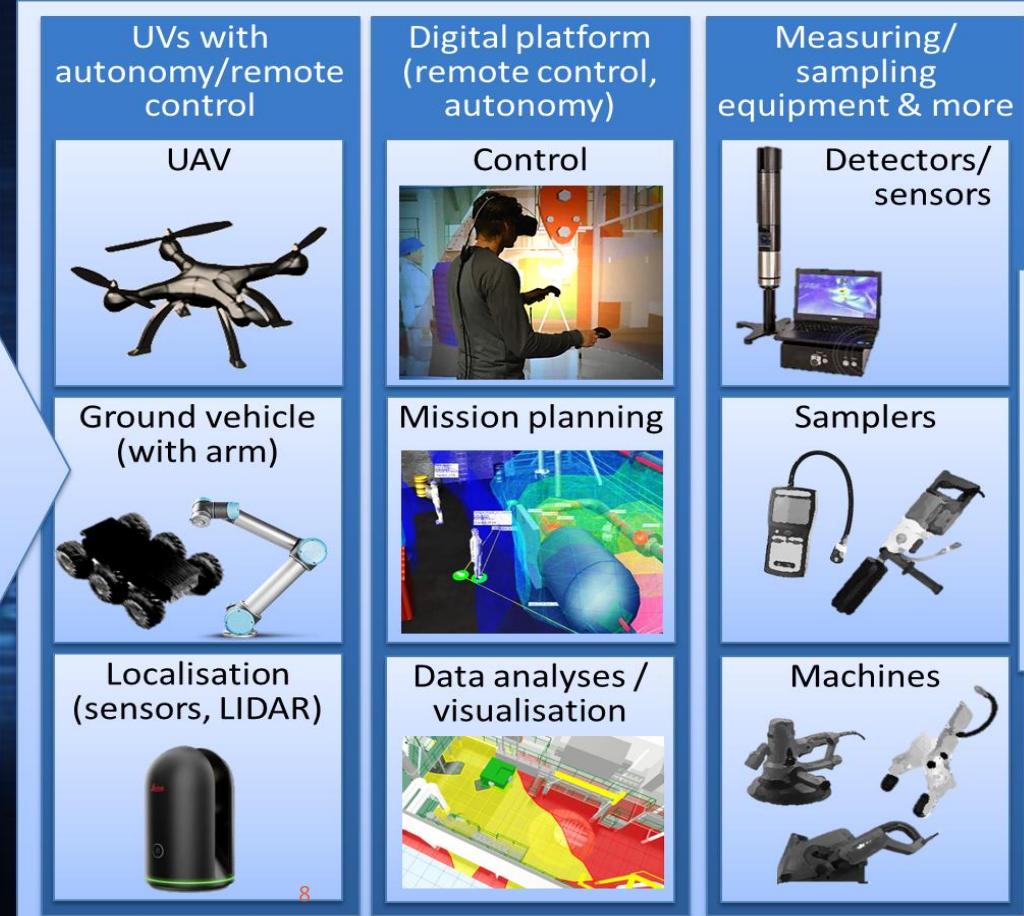
# RoboDecom – Digitalisation for Robotics in decom.



Your project needs our care



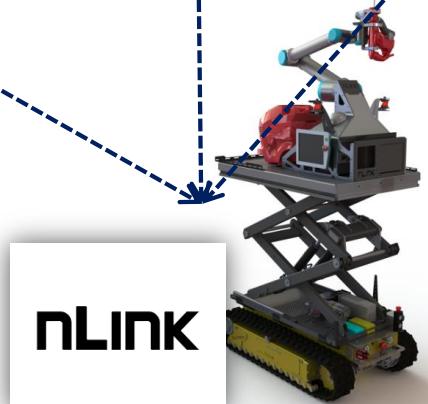
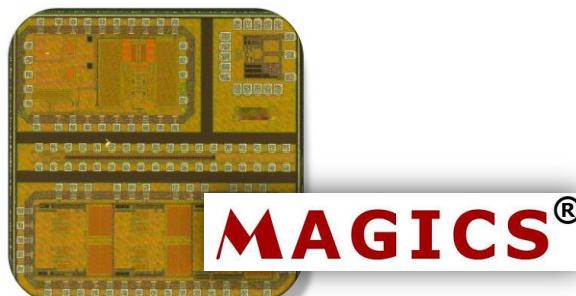
- Integrate standard / emerging equipment in a **modular design**
- Integrate digital, sensor and robotic tech
- Enable high autonomy
- Prove safety/security
- Validate in the field and prove efficiency
- Full scope support: design, training, control, ...
- Guidance for application to specific needs



# RoboDecom prototypes



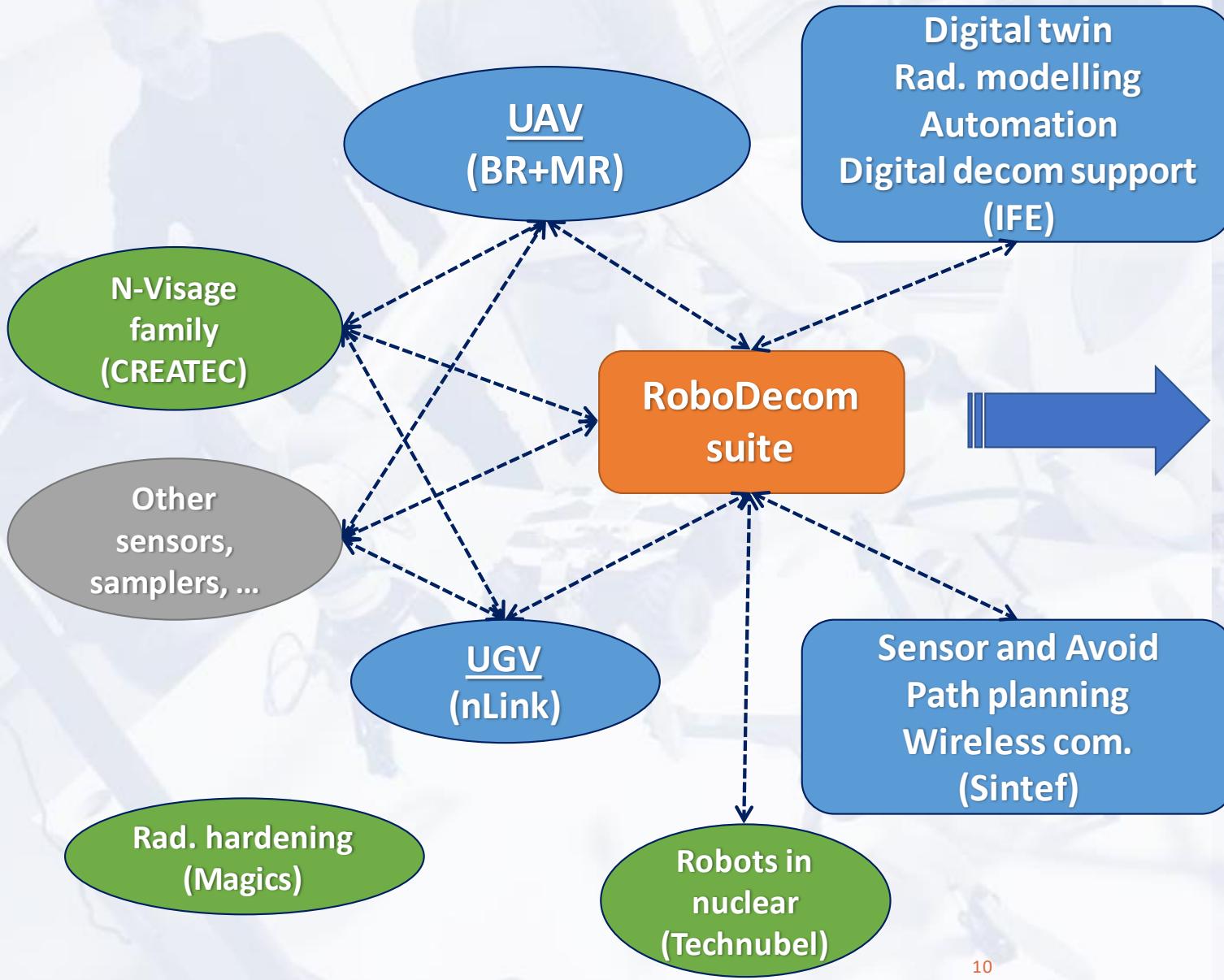
Sensor and Avoid  
Path planning  
Wireless com.



Digital assessments,  
Field tests

LiveDecom suite

# RoboDecom prototypes



**Remote, semi- or autonomous capabilities for:**

360 photography supporting:

- site monitoring
- briefing – situation awareness
- design/config. info checking
- training

3D scanning & radiological mapping for supporting

- design/config. info
  - reconstruction
  - validation - 'as is'
  - update
- digital capabilities supporting
  - safety planning
  - safety monitoring
  - safety training
  - in-the field safety info

Sampling? – rad. characterisation  
Emergency management

# RoboDecom

UVs with  
remote  
control

Digital platform  
(remote control,  
autonomy)

Measuring/  
sampling  
equipment & more

- Remote semi- or fully automatic radiological mapping and visual survey in nuclear environments/sites
  - Reduce manual labour
  - Reduce the need for human access to rad. environments
  - Provide more regular and detailed data

## Application in

- Nuclear decom – radiologic characterisation + monitoring
- Nuclear and non-nuclear
- Emergency management
- ...

Localisation  
(sensors, LIDAR)

Data analyse:  
visualisation



# Discussions on Holistic digital support & Modular robotics systems

- What are the needs from the industry these techs could satisfy?
- How would these techs satisfy these needs?
- What are the current barriers for adoption?
- How cold we overcome these barriers? What facilitators are there?
- Who should develop/provide these techs?
- What tech development is required for field applicability?
- What risks could be introduced by these techs?
- Are there any regulatory issues?
- How to demonstrate safety of such techs?
- Do you have examples (good or bad / own or others) from application of such tech?
- Any other comment?