

# Remote handling of heavy components at CERN: past experiences and future needs

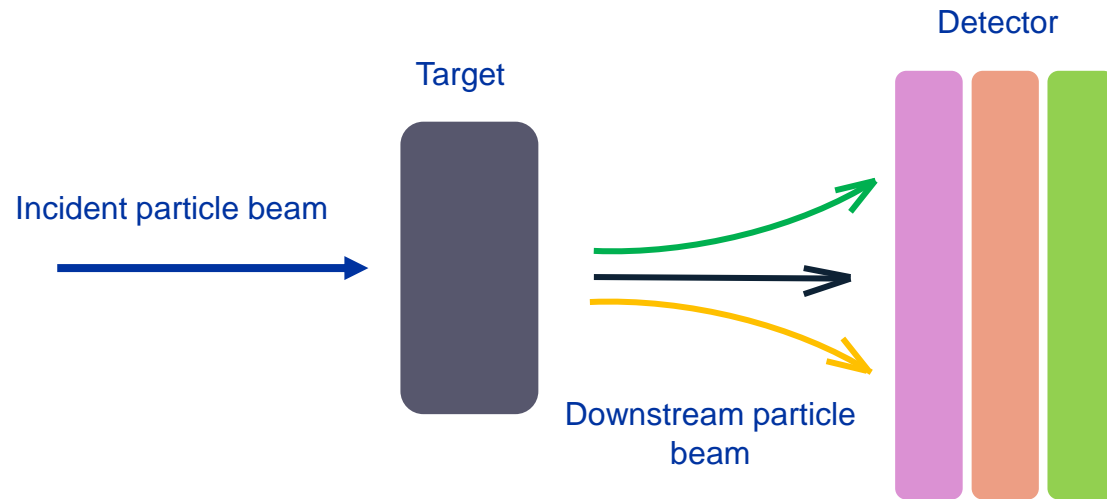
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# Why remote handling at CERN

Radiation at CERN is generated:

- In linear and circular accelerators: accelerated charged particles (protons, ions) radiate energy in the form of electromagnetic waves
- In fixed-target experiments:



Schematic of a fixed-target experiment

The target and the objects around it get activated by the particles.

Activation remains even when the incident beam is off

# Why remote handling at CERN

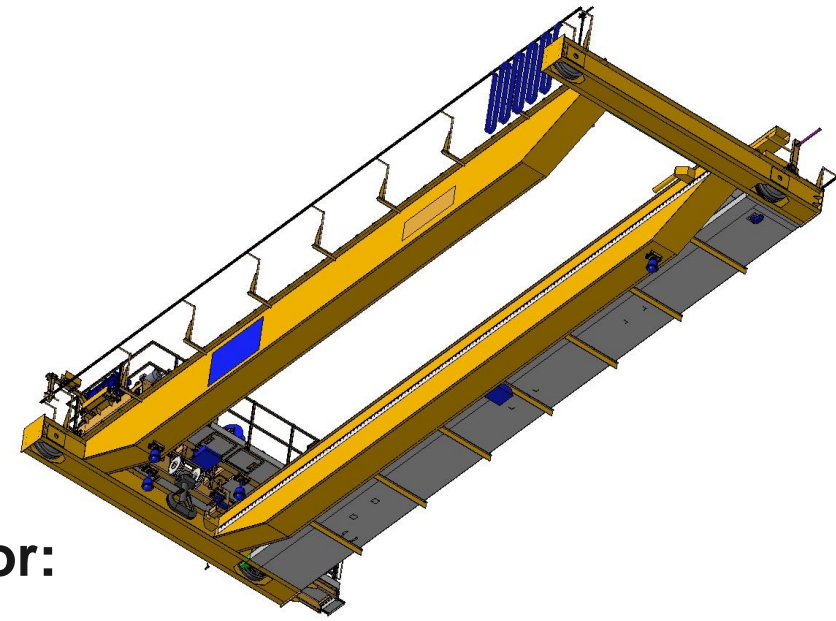
- **Handling is needed for the target, the detector components and the technical infrastructures (shielding blocks etc.) during the whole experiment lifetime:**
  - Regular target replacement;
  - Repair;
  - System upgrade;
  - Dismantling.
- **Weight range: 100 kg to 30 tonnes**
- **Dimensions: few centimetres to several meters**
- **Radiation dose rate: in the order of 10  $\mu\text{Sv/h}$**
- **Fragile components -> significant duration of each operation**
- **Repetitive tasks**
- **Reduced need to wait for radioactive decay -> increased effective operation time**



# Example project



Remote control desk



- **Cameras on-board of the crane for:**
  - Operation supervision
  - Bridge and trolley positioning
- **Additional positioning system with resolvers**
- **Motorised spreader**
- **Electronic components in a remote cubicle**
- **Mechanical redundancies (double-motors)**



# Example project



# Future projects: new TAN crane

Timeframe: 2026-2027

- Stainless steel structure
- Camera system
- Remote control desk and cubicles

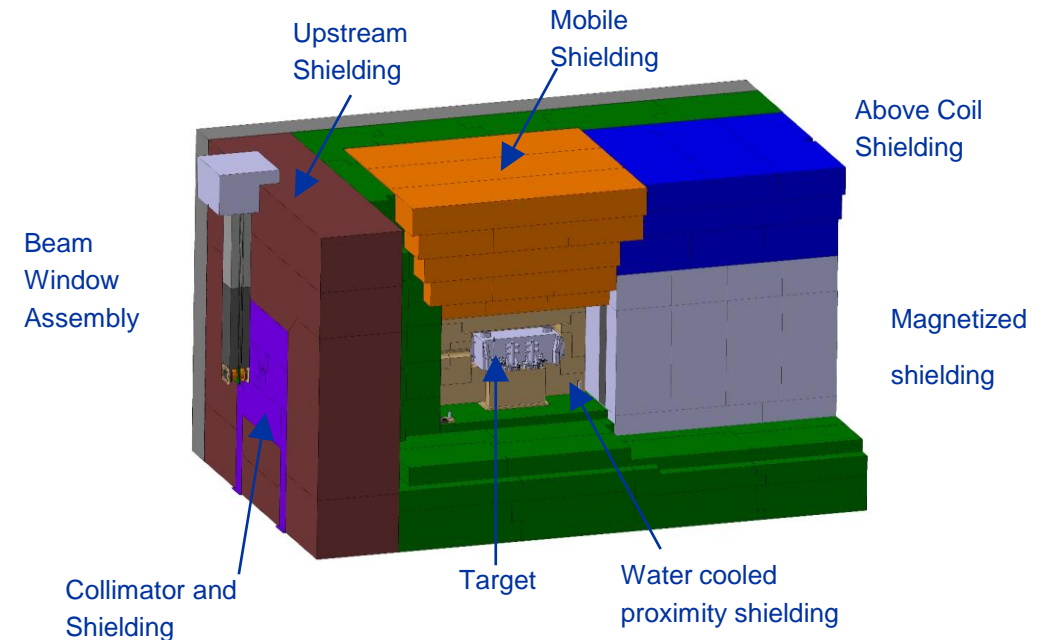
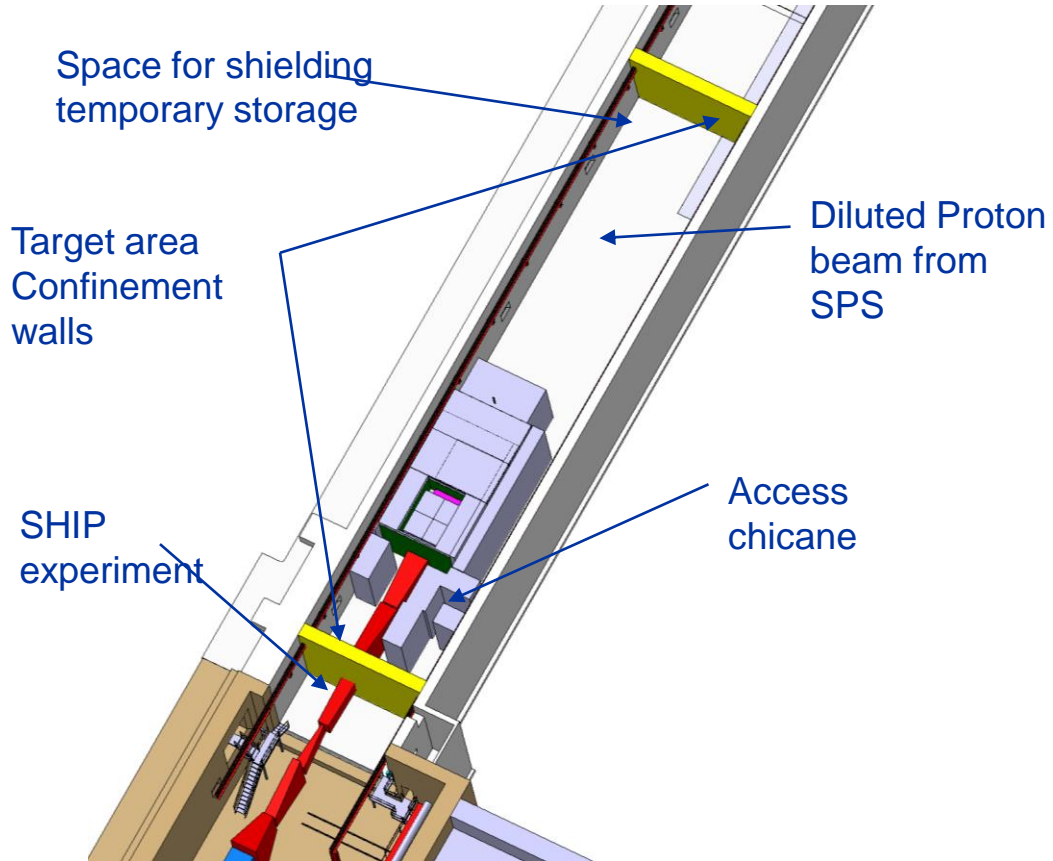




# Future projects: new beam dump facility

Project in **proposal phase**

- **Timeframe: after 2027**
- **Upgrade of an existing 30T overhead crane:**
  - **camera system**
  - **mechanical redundancies**
  - **remote control desk and cubicles**





# Future projects: hot cell

## Project in **preliminary analysis**

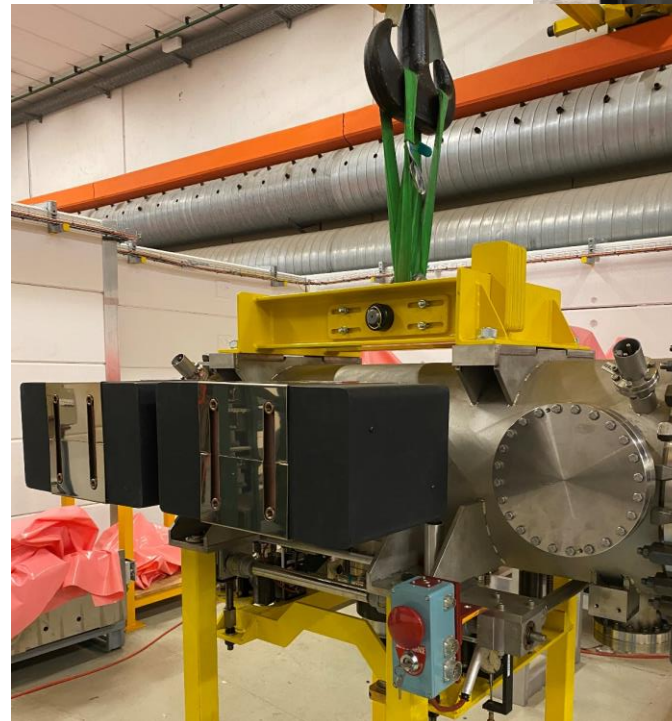
- Repair of activated equipment
- Post-mortem analysis
- Waste treatment: sorting of parts according to their activation to optimize the volume of waste

## Building equipped with:

- Overhead crane
- Manipulators
- Tooling

# Future projects: tooling

Specific or general-purpose handling accessories



# Possible partnerships

The partner profile varies according to the project:

Project type	Company profile
Conceptual / feasibility study for an entire facility	Engineering services company with experience in nuclear power plants
Design, manufacturing and installation of an overhead crane remotely controlled	Overhead crane manufacturer specialized in custom cranes (not necessarily in the nuclear field). Experience in installation areas with limited room.
Supply of handling tooling	Handling equipment manufacturer with a solid quality assurance system in the fabrication of steel components
Handling operations	Service contractor with experience in the handling and transport of sensitive objects

**Tender strategy: dedicated invitations to tender or purchase orders as part of a frame contract**

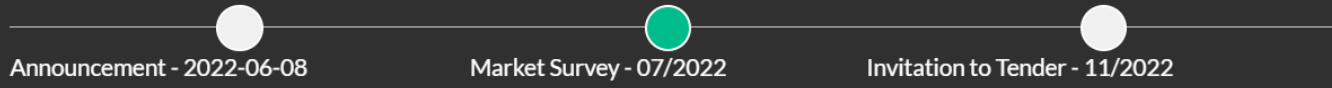
**Contractors may benefit from the consolidated experience of the CERN personnel in similar applications**

# Forthcoming contract:

<https://forthcoming-ms.app.cern.ch/?id=MS-4780/EN/#!/>

## Reference: MS-4780/EN

**Status:**



Announcement - 2022-06-08      Market Survey - 07/2022      Invitation to Tender - 11/2022

**Available action:**

- Download Market Survey documents  
Firms may reply as long as Market Survey documents are available.

**Description:**

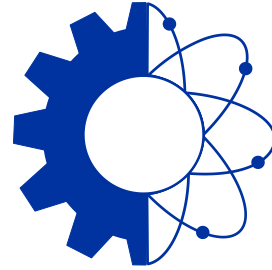
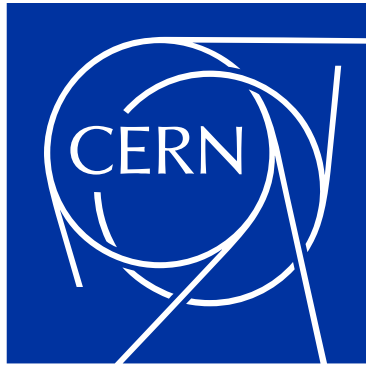
- Supply and refurbishment of an estimated quantity of eight overhead travelling cranes with capacities above 10t. (11020101)
- CERN intends to place a contract for the supply and refurbishment of an estimated quantity of eight overhead travelling cranes with capacities above 10t, for the purpose of CERN's EOT cranes consolidation program as well as those of the HOSTLAB project.

Interested firms shall have a proven experience and competence of min. 15 years in the supply and refurbishment (design, production, installation, maintenance, general overhaul and modification) of EOT cranes with capacities between 10t and 300t. The firm shall have an ISO9001 quality system certification or equivalent, covering the supply of EOT cranes (design, manufacture and installation).

**Type of Contract:** Supply

**Cost Range:** 750k - 5M CHF





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