

# Human Sensory Experience

Team: Maxwell

## **Mission**

How can we create a system for replicating human sensory experience over distance?

## **Background/context**

Many people work in hostile environments and sometimes take unnecessary risks to perform their duties. In fields such as mining, building maintenance, quarantine areas or even remote teaching and medical procedures, significant risks could be negated by allowing people to perform some tasks remotely.

After the current maintenance break, the radiation level of ATLAS detector will increase, and using humans to search for and fix the problems becomes an unsafe option. Especially as many of the locations inside and around the detector are difficult to access by humans, which further increases the time spent in the hostile environment.

The current off-the-shelf –technologies have the capacity to create a near realistic virtual experience, transferring the user from his home or office to another side of the world – or 100 meters down to otherwise inaccessible environment. First generation telepresence robots are already roaming around CERN campus and other collaborative locations, but they are not really aware of all the aspects of their environment and their interaction capabilities are quite limited.

## **CERN connection**

- Daniel Dobos at ATLAS detector
- Joonas Kurikka for remote collaboration

## **Society connection**

Miners, mining companies, maintenance workers, nuclear and medical facilities or other professions and areas with containment requirements.

## **Exploration questions**

- What are the critical points in remote maintenance?
- What are the limitations in robot movement inside experimental, multi-billion euro experiment?
- What is the current technology in the market on:
  - o Recording 360 degrees video & other relevant data?
  - o Moving such devices in enclosed space?
- What are the small details that cannot be ignored when you can't send a human to fix them?
- How a similar setup might work for remote collaboration / ideation?

**Target users**

ATLAS maintenance personnel and researchers.

People working in dangerous conditions.

Anyone with a need to perform maintenance or sensing in otherwise inaccessible environments.

**Expected outcome**

A maintenance/research device that allows remote presence within difficult or inaccessible environments and has potential societal impact.

**Success metrics**

Concept is validated with a proof of concept prototype and tested with real users. Positive societal impact of the solution is clearly demonstrated.

**Research plan**

Benchmark the telepresence technology currently available in the market.

Research the use case in ATLAS environment.

Find situations or locations where physical presence is difficult or impossible for humans.