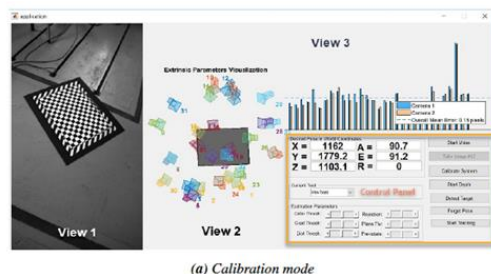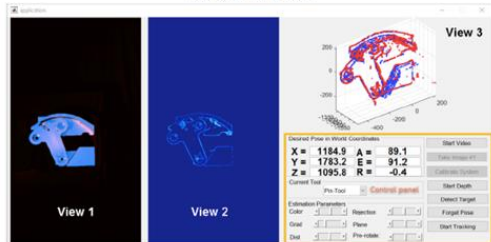# Simple vision software for harsh environments

Tampere University in collaboration with F4E and TEKES have developed a vision software that can locate the position and orientation of a piece of remote handling equipment in an extremely harsh environment. Its simplicity and reliability make remote handling operations more efficient and accurate in different domains such as space, offshore deep sea exploration, rescue and energy.

(a) Calibration mode

The technology

In harsh, dark or hard to access environments, exploration and maintenance operations are often conducted with Remote Handling Equipment systems with the support of user interface. Remote handling operations of ITER require high accuracy (mm) but also face challenges of camera views occlusions or poor quality. The Tampere University in collaboration with F4E and TEKES have developed a vision software that can provide reliable and highly accurate information on the equipment and parts of the radioactive chamber. With respect to a stereo camera pair, the 3D Node software can locates and detects the position and orientation of a piece of RH equipment or reactor element and use this information to adjust the movement of a RH system.

Reliable and accurate information for parts and systems

This solution makes possible the target detection and recognition of the position using single stereo cameras, without need of other sensors, making 3D Node cheaper than other solutions. 3D Node increase the reliability, simplicity and safety of remote handling operations thanks to the information provided to adjust the motion trajectories or to inspect equipment's. It can also provide a simple update of VR models and implementation of augmented reality applications.

A software adapted to harsh, dark and not accessible areas

This technology can solve similar issues for extremely harsh environments with radiations or with extremely dark and not accessible areas that need to be mapped or recorded. Identified potential applications are space missions (rover, satellite handling equipments), offshore oil & gas autonomous maintenance, deep sea exploration and maintenance, cave exploration and rescue and nuclear plants for remote handling or inspection usecases.

Collaboration opportunities

The technology is available for direct use or towards customization services to adapt the software to the different applications or needs.

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