



TRINITY Centria Use cases and modules
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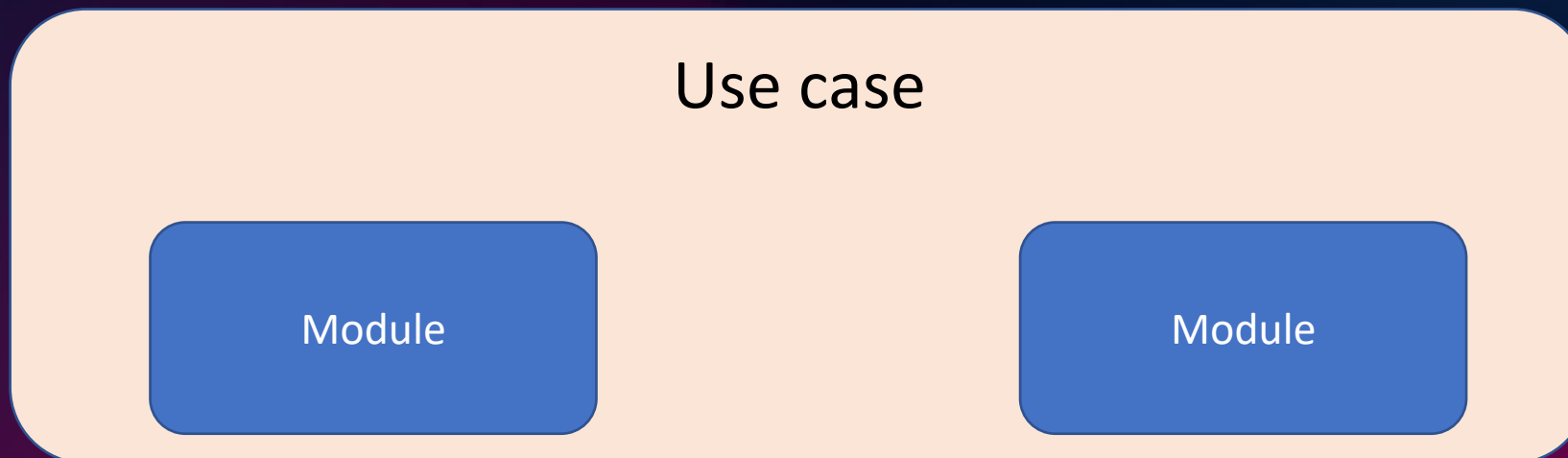
www.trinityrobotics.eu

Topics of this presentation

1. Basics of Trinity module / use case structure
2. Presentation of Centria modules
3. Presentation of use cases
4. Digital twins for robot cell remote control

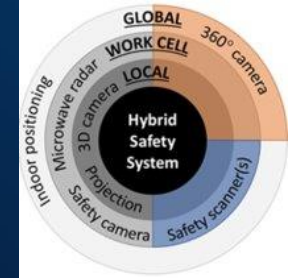
Trinity modules and Use Case basics

- Each Trinity partner has created modules
- By combining these modules different use case scenarios can be compiled
- Centria has prepared four modules and two use cases for Trinity
- Our use case ideas are based on needs and ideas from local companies



Module: Safe Human Detection in a Collaborative Work Cell

- Hybrid safety system with multiple devices
 - Sick and Pilz laser scanners (safety approved)
 - Sick microwave radar (safety approved, latest technology)
 - Omron and Sick safety light curtains(safety approved)
 - Quuppa indoor positioning system (additional safety)
 - 360 camera and CNN for person detection (additional safety)
- Any appropriate safe combination of these can be chosen

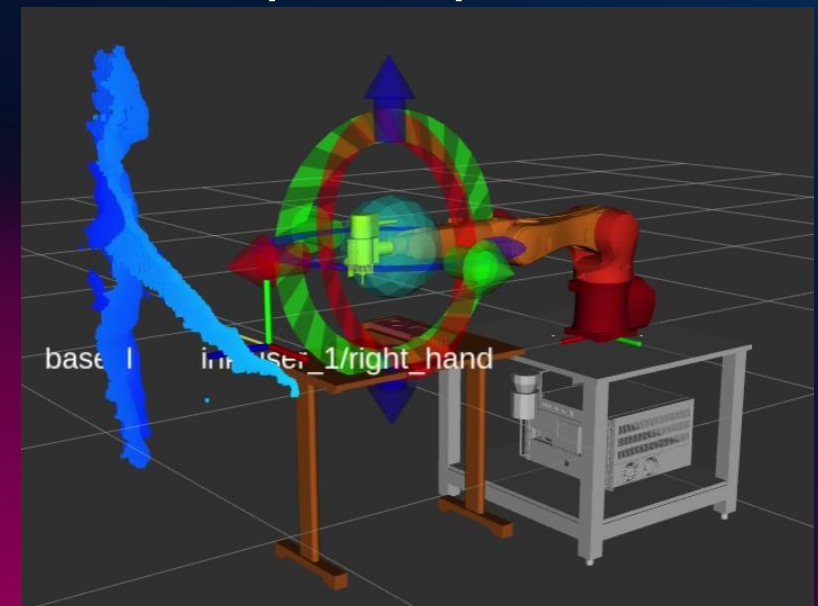
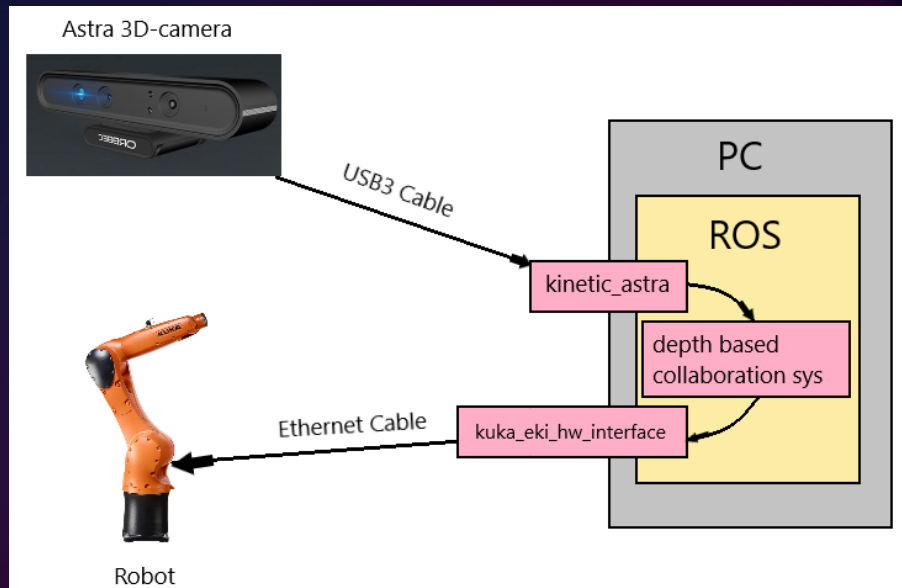


Centria hybrid safety system



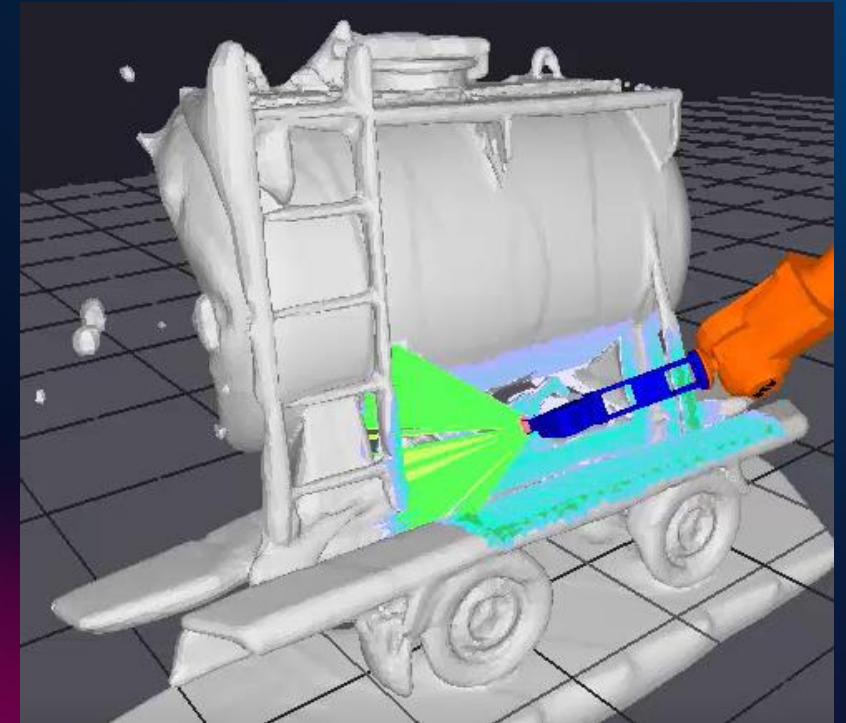
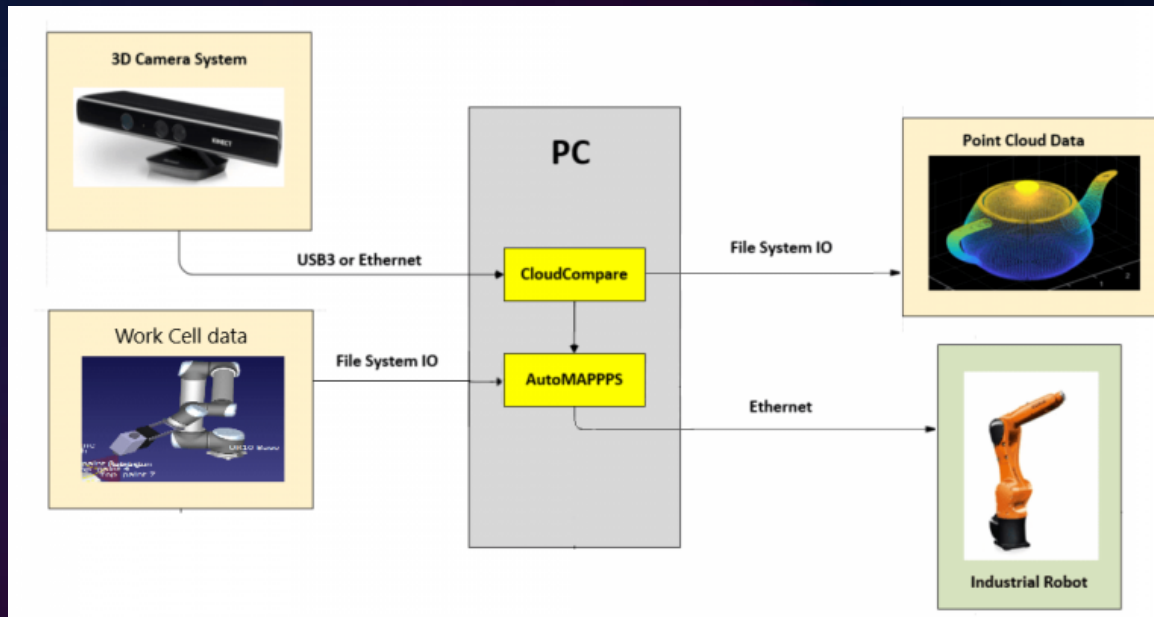
Module: Dynamic Robot Trajectory Generation Based on Information from 3D-camera

- Multiple 3D-cameras supported (Intel RealSense, Orbec, Kinect, ...)
- Flexibility on software (RoboDK, AUTOMAPPS, ROS)
- Adds vision capability to robot controller
- Robot controller is able to dynamically create new trajectories for new workpiece
- Also creation of new trajectories in case of obstacles in robot path is possible



Module: Online Trajectory Generation for Industrial Robot with 3D Camera

- Multiple 3D-cameras supported (Intel RealSense, Orbec, Kinect, PhotoXi, Artec Leo...)
- Reactive trajectory generation using AUTOMAPPPS



Module: Digital Design Content Based Robot Trajectory Generation

- Data necessary for robotized workpiece production can be integrated into the workpiece design at the design phase.
- This is an agile way for automating manufacturing processes and speeds up production phase.



Use Case: Collaborative robotics in large scale assembly, material handling and processing

Collaborative robotics in large scale assembly, material handling and processing

Safe Human Detection
in a Collaborative Work
Cell

Dynamic Robot
Trajectory Generation
Based on Information
from 3D-camera

Online Trajectory
Generation for
Industrial Robot with
3D Camera

Use Case: Collaborative robotics in large scale assembly, material handling and processing



Use case 3: Collaborative robotics in large scale assembly, material handling and processing

Case "Agile robotized pressure washing of heavy machinery"

Modules: Dynamic virtual model generation of robot cell and work objects with 3D cameras
Dynamic trajectories generation based on information from 3D cameras

Use Case: Integrating digital context to the digital twin with AR/VR of the robotized production

Integrating digital context to the digital twin with AR/VR of the robotized production

Safe Human Detection
in a Collaborative Work
Cell

Digital Design Content
Based Robot Trajectory
Generation

Use Case: Integrating digital context to the digital twin with AR/VR of the robotized production



TRINITY: Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production
in Future European Manufacturing Ecosystems

Use Case 4 Video

Module name: Robot trajectories generation based on BIM
(Building Information Modeling)



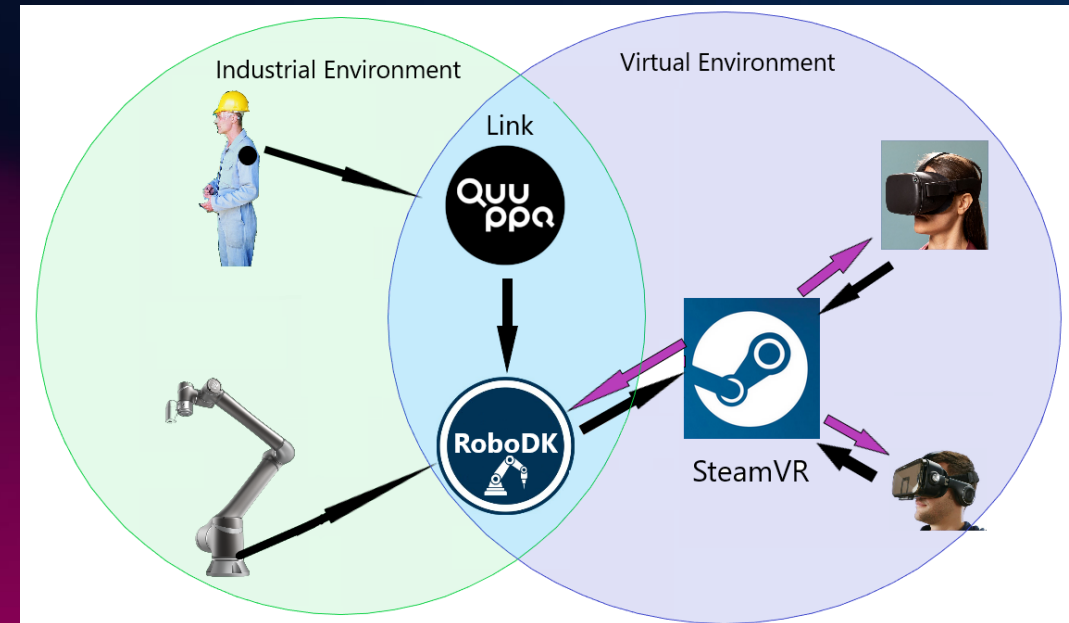
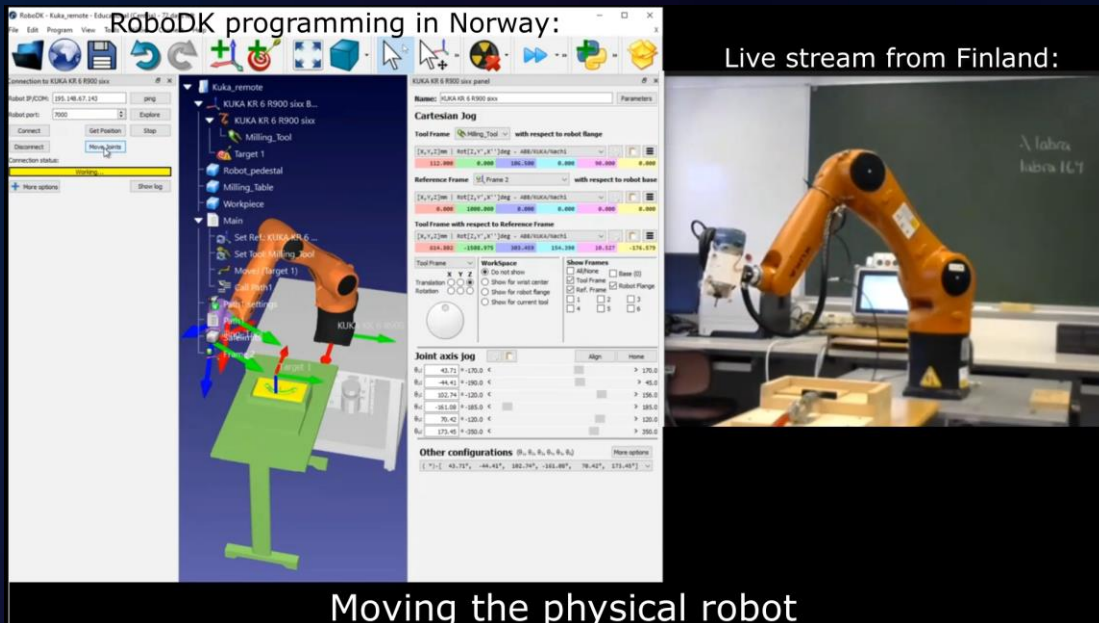
TRINITY: Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production
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Use Case 4 Video

Module name: Creation of AVR models based on digital content
including virtual 3D model

Digital twins for remote collaboration

- Digital twins of robotic cells can be utilized in collaboration between organizations
- Centria has been researching this with University in Narvik, Norway



The background is a dark navy blue. On the left side, there are two abstract, rounded rectangular shapes. The upper one has a blue-to-purple-to-red gradient, and the lower one has an orange-to-purple gradient. On the right side, there is a larger abstract shape with a green-to-blue-to-purple gradient. In the center, the word "trinity" is written in a white, lowercase, sans-serif font.

trinity