ROBOTIC CELL FOR VIDEO INSPECTION, WITH FOUR WORKSTATIONS, INTEGRATING AN INDUSTRIAL ARTICULATED ARM ROBOT ON TRACK MOTION PLATFORM AND FOUR PERIPHERAL ROBOTIC SYSTEMS

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The 3D vision offline quality and metrology cell is the ABB standard cell for off-line quality inspection. It offers a faster, more dynamic technology than traditional CMM (Coordinated Measuring Machine) based methods. The measurement is performed without contact, using only structured light for the object geometry, by projecting light patterns onto the measured part, with the resulting data being used to create a digitalised high-density 3D point cloud representation of that part.

The procedure for calibrating the working volume consists in taking images of the space of interest from different positions and with different camera angles. Each shot locates an independent number of simple targets, coded targets and the scaling bar. Once the whole capture process has been completed, the data are processed and the user is provided with a file with the XYZ position of all the measured simple targets. These XYZ references will be used to combine all the digitalization made while the parts are measured.
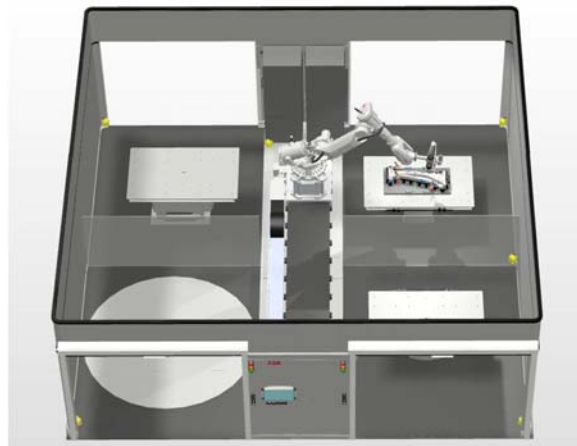
1. Introduction

The study aims to present a revolutionary robotic inspection cell, integrating an industrial articulated arm robot from ABB, equipped with ABB SIDIO AIRUS optical scanner.

The robotic cell contains four workstations, an industrial robot on track motion platform, four peripheral robotic systems, safety system, storage systems, transfer systems, monitors and controllers, all in a thermostatic enclosure.

The industrial articulated arm robot from ABB corresponds to IRB 6700 series, 3.20mm reach and 150kg model.
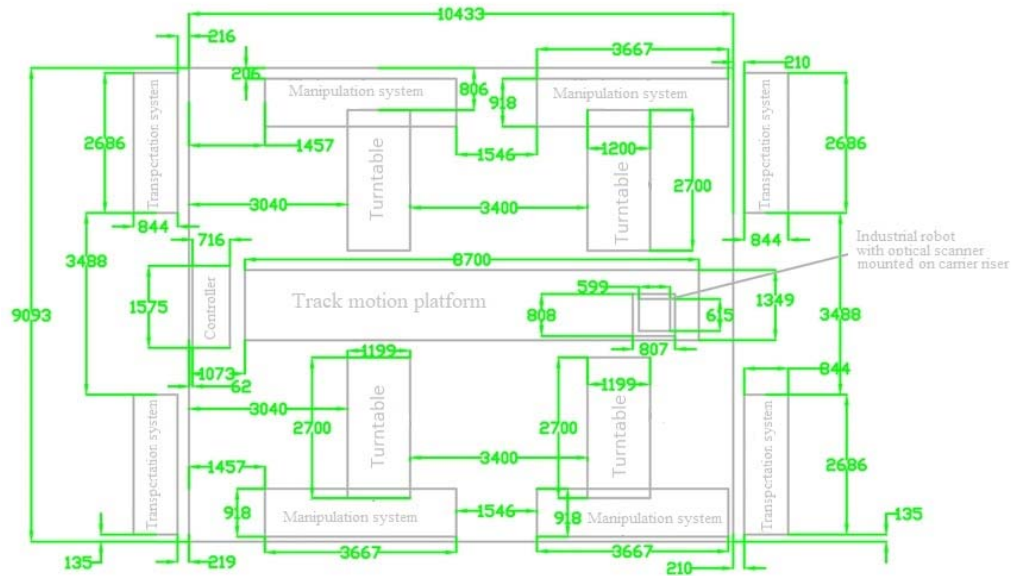
The project was based on a virtual prototype suggested by ABB, as a top developer of robotic solutions for inspection applications. The refference model is shown in the image below.
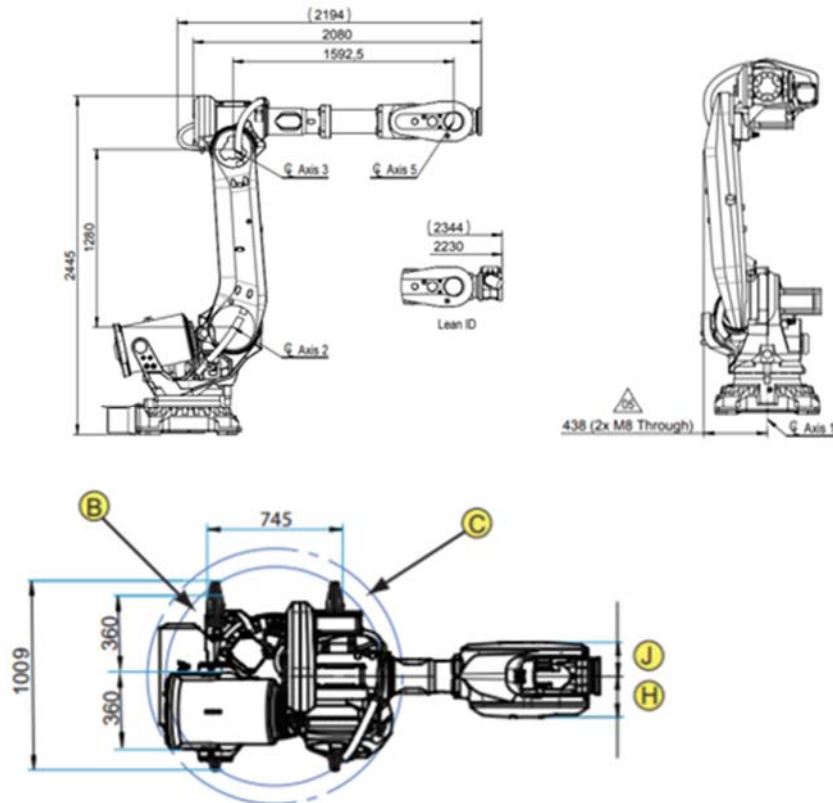

Img.1. ABB 3DQI virtual prototype

2. Current phase

An important chapter of the project is the modeling of the cell and its simulation, in specific working environments from the Siemens company, NX design software, respectively Process Simulate simulation software.

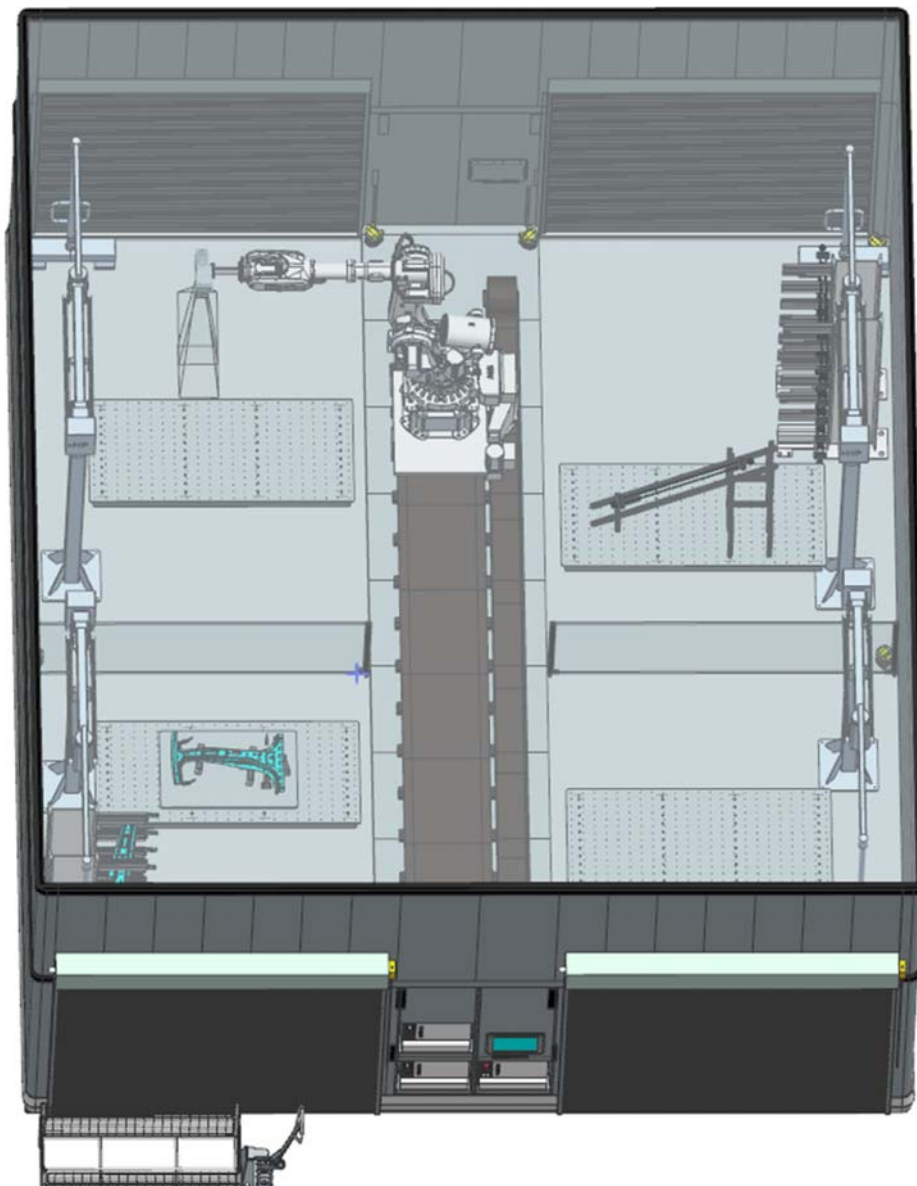Img.2. Block diagram of the robotic application with overall dimensions

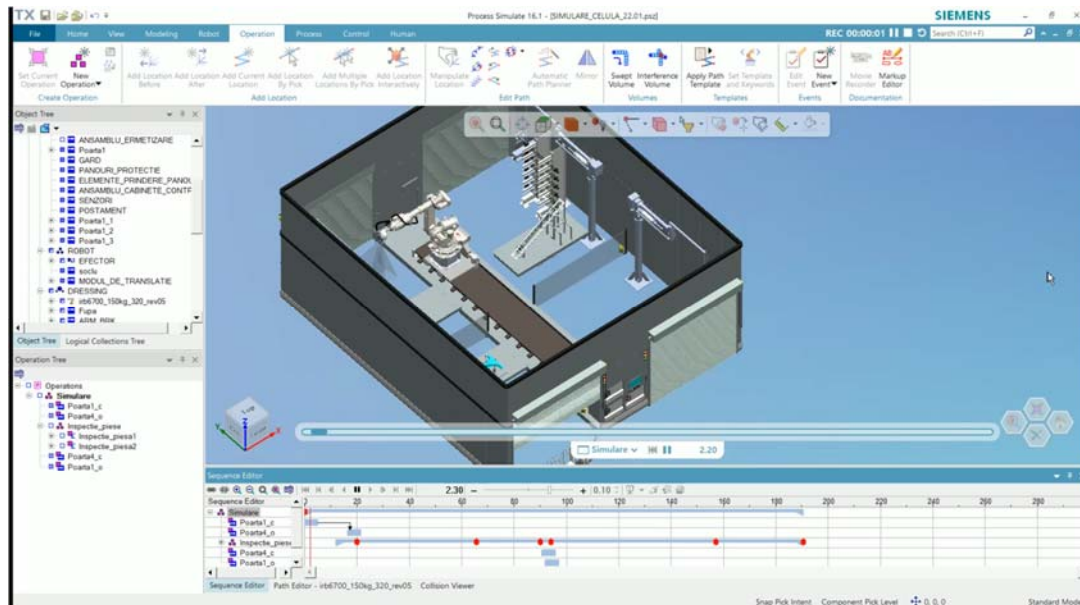The industrial robot: ABB IRB 6700-150/3.2

Img.3. Orthogonal views of ABB IRB 6700-150/3.2 robot

Table 1. Product specification ABB IRB 6700-150/3.2

Reach without LeanID	3.20 [m]
Handling capacity without LeanID	150 [kg]
Centrul gravitatii without LeanID	300 [kg]
Momentul incheieturii without LeanID	1135 [Nm]
Distanta maxima pe care o poate atinge withLeanID	3.20[m]
Capacitatea de manevrare with LeanID	145[kg]
Center of gravity with LeanID	300 [kg]
Wrist Torque with LeanID	1135 [Nm]
Supply voltage	200-600 [V], 50/60 [Hz]
Energy consumption	2.8 [kW]
Robot weight	1280 [kg]
Position repeatability	0.10 [mm]
Path repeatability	0.15 [mm]

Img.4. Virtual prototype of the robotic application, modeled in NX design software

Img.5. Simulation of the robotic cell

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