

Motivation

Developing the digital twin



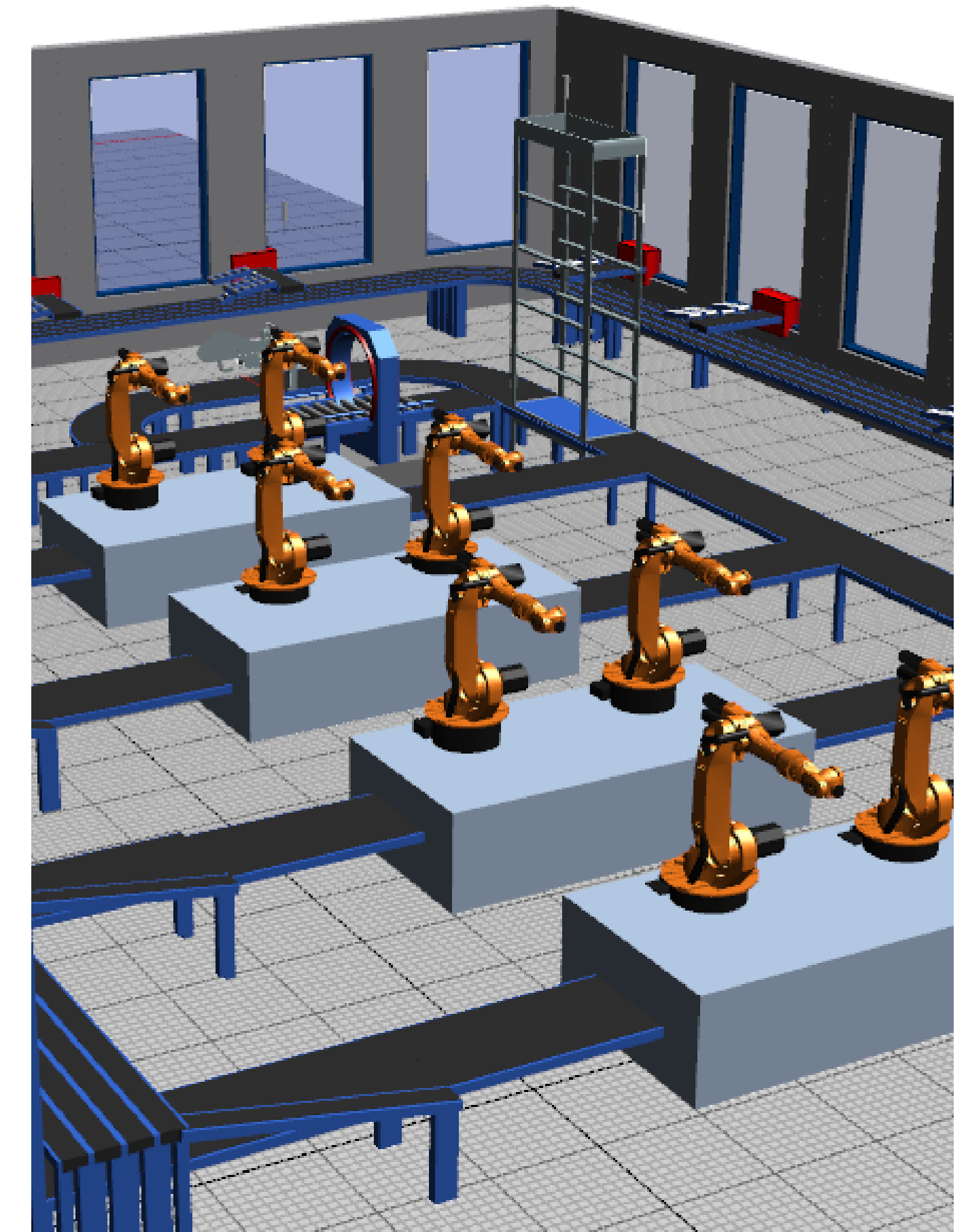
1. At 16/02/2022 Morato Iberia and Deuser Tech Group started the development of the new automated warehouse at Antequera plant.
2. Works were started using Deuser offer proposal.
3. Deuser first detailed works were the development of a digital twin with two different goals: process and mechanical.
4. Process digital twin is being developed using Siemens Tecnomatix Plant Simulation.
5. Digital twin for process flow is developed to avoid mistakes related to bottle necks, collisions, buffers dimensioning, machines productivity and others.
6. During this period, our engineering team have found different situations where they proposed a new layout.
7. The objective of this document is communicate the points that we think must be improved and our proposal to solve these situations.
8. Points to reviewed are:
 1. Packing stations.
 2. Material flow.
 3. Bread flow.
 4. Manual operations.
 5. First stage.

1: Packing stations

Optimizing space and resources

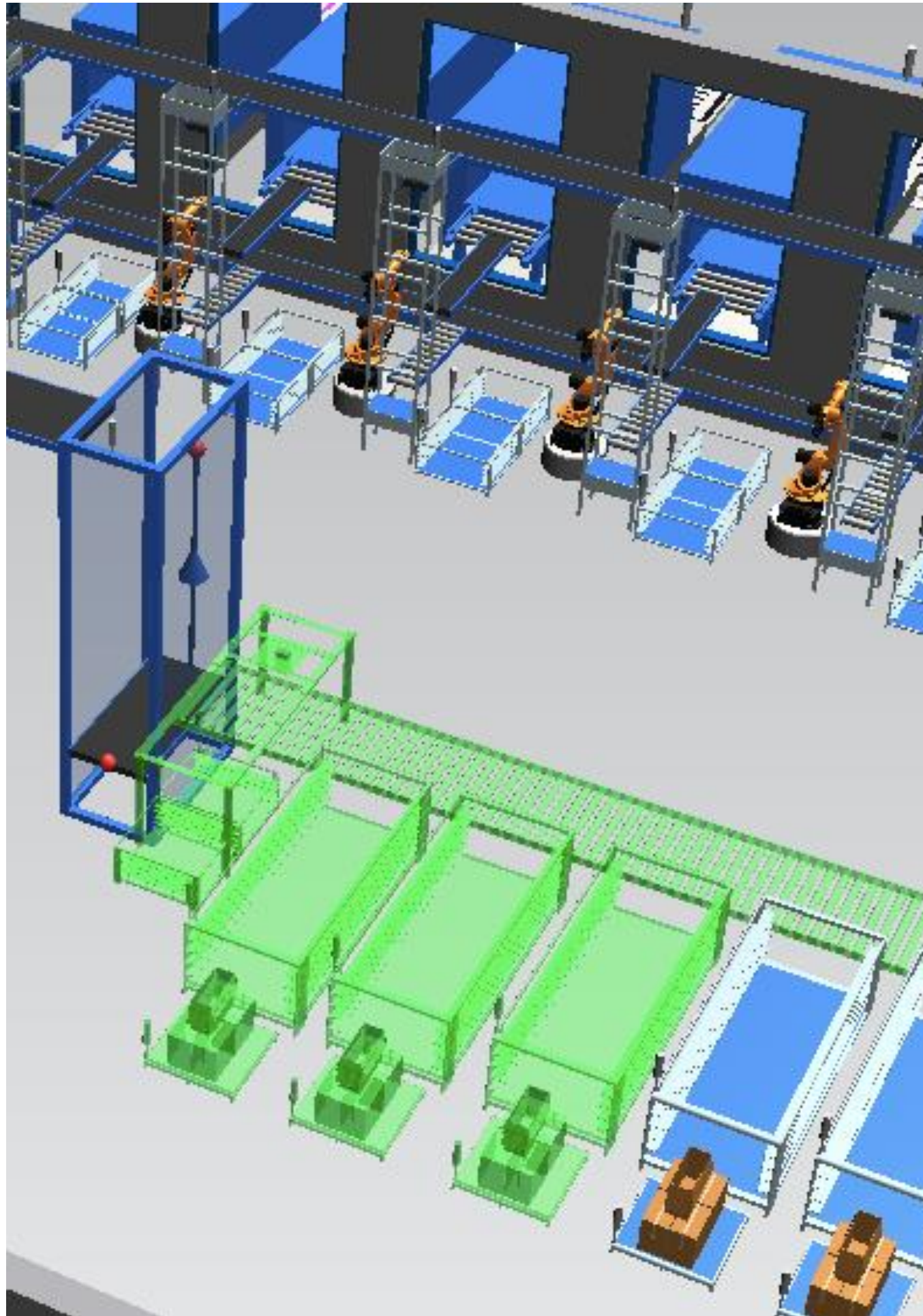


1. Mechanical engineering team found that there was not enough space to develop a fully useful packing station. Specially if we talk around corners positions.
2. Moreover, production responsables sent us information about inline baggers, and we found that only 4 lines are working in parallel.
3. If Morato deploys 10 packing stations, and the real situation is that only 4 are working at the same time, then **customer** will be always underusing 6 stations.
4. Our improvement proposal is to develop 4 fully equipped packing stations. This will result in productive-capacity optimization and in higher flexibility.

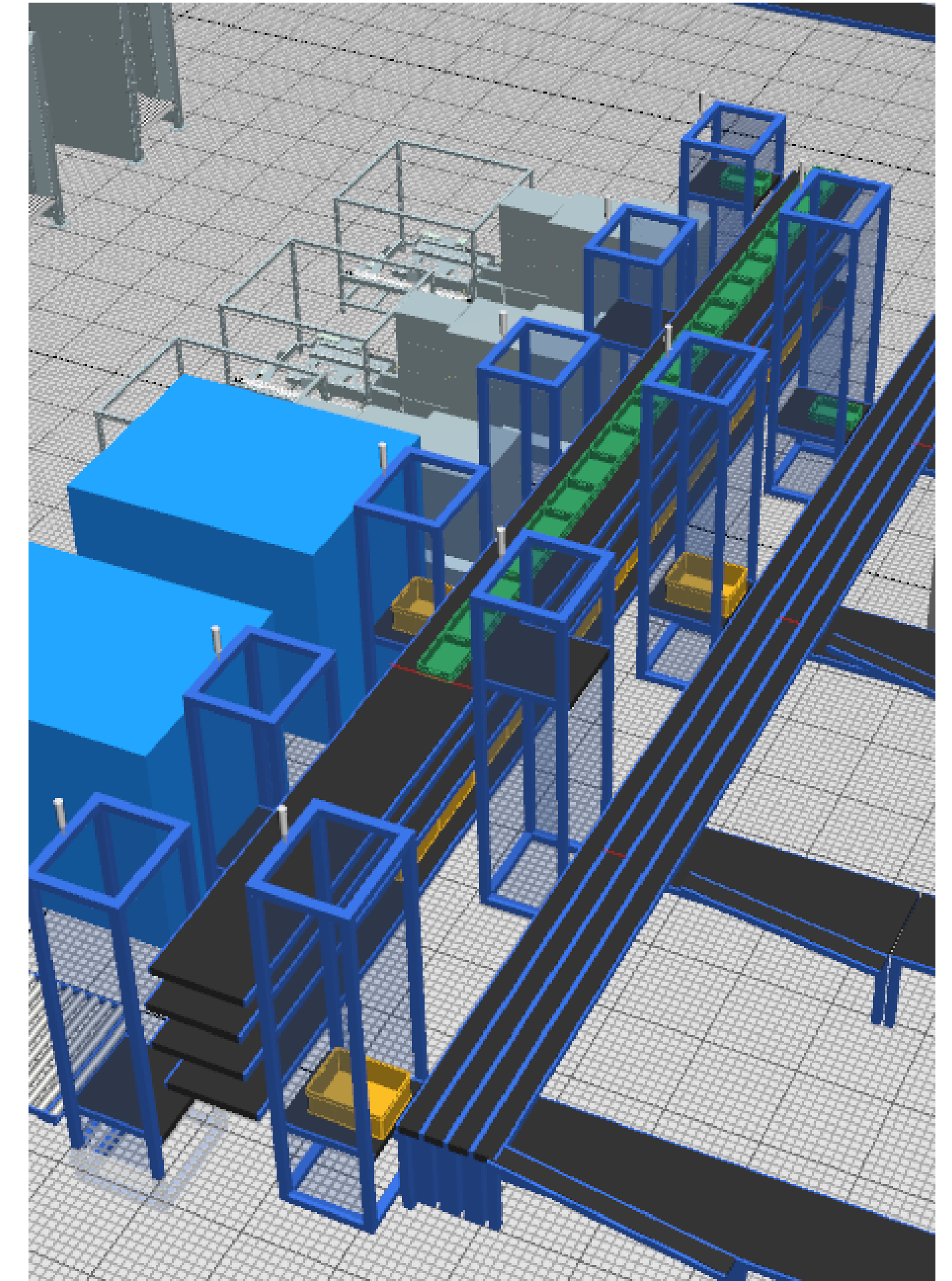


2: Material flow

Fully configurable



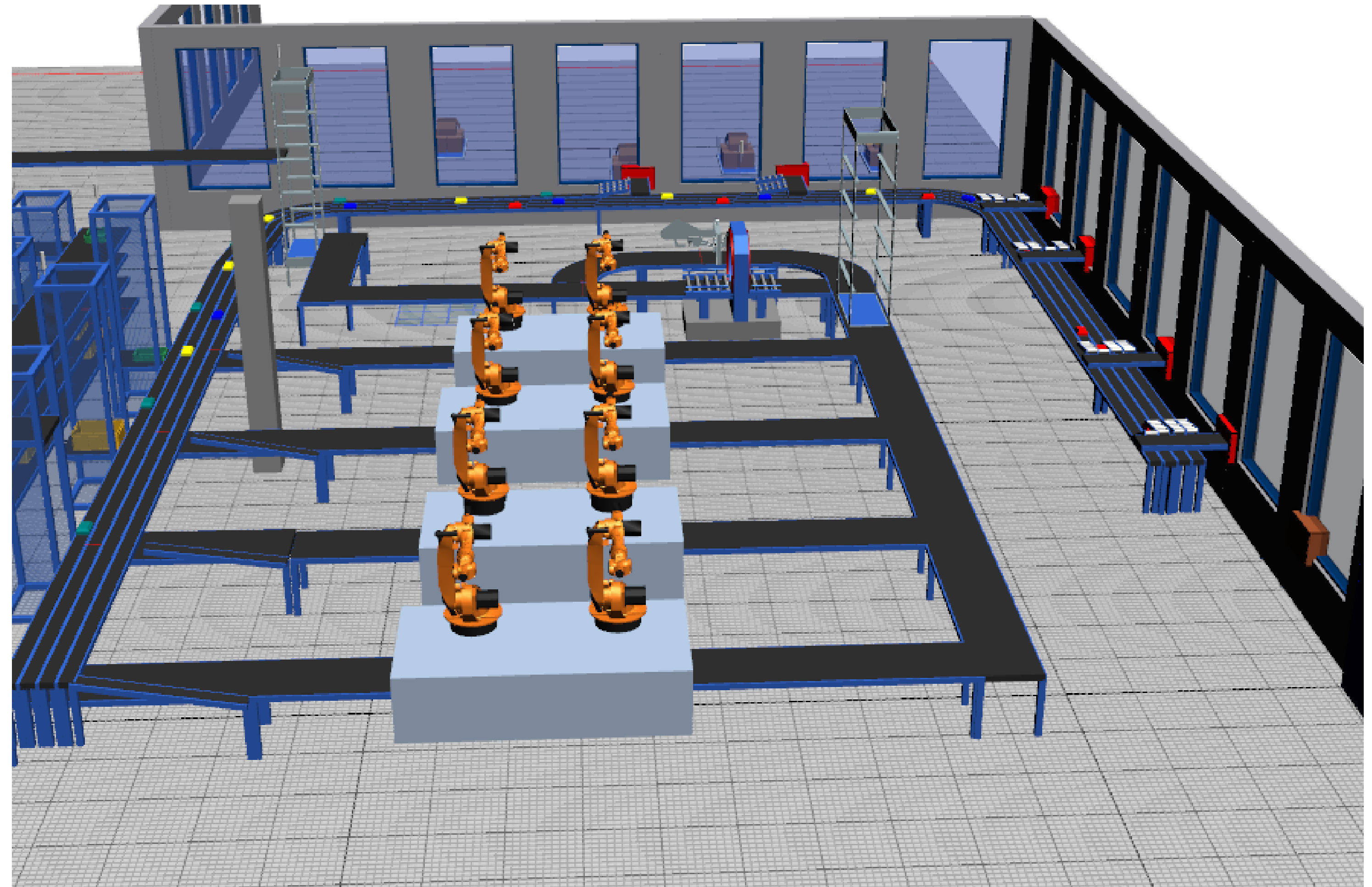
1. In the original plan moment the box forming machines are sending boxes using elevators and conveyors.
2. All different box models are sent using same conveyor.
3. This situation is a bottle neck.
4. Mechanical team has developed a new transfer system that can be used to send any box to any packing station.
5. For this proposal we have designed 4 conveyors and 8 elevators that can be used at the same time.



3: Bread flow

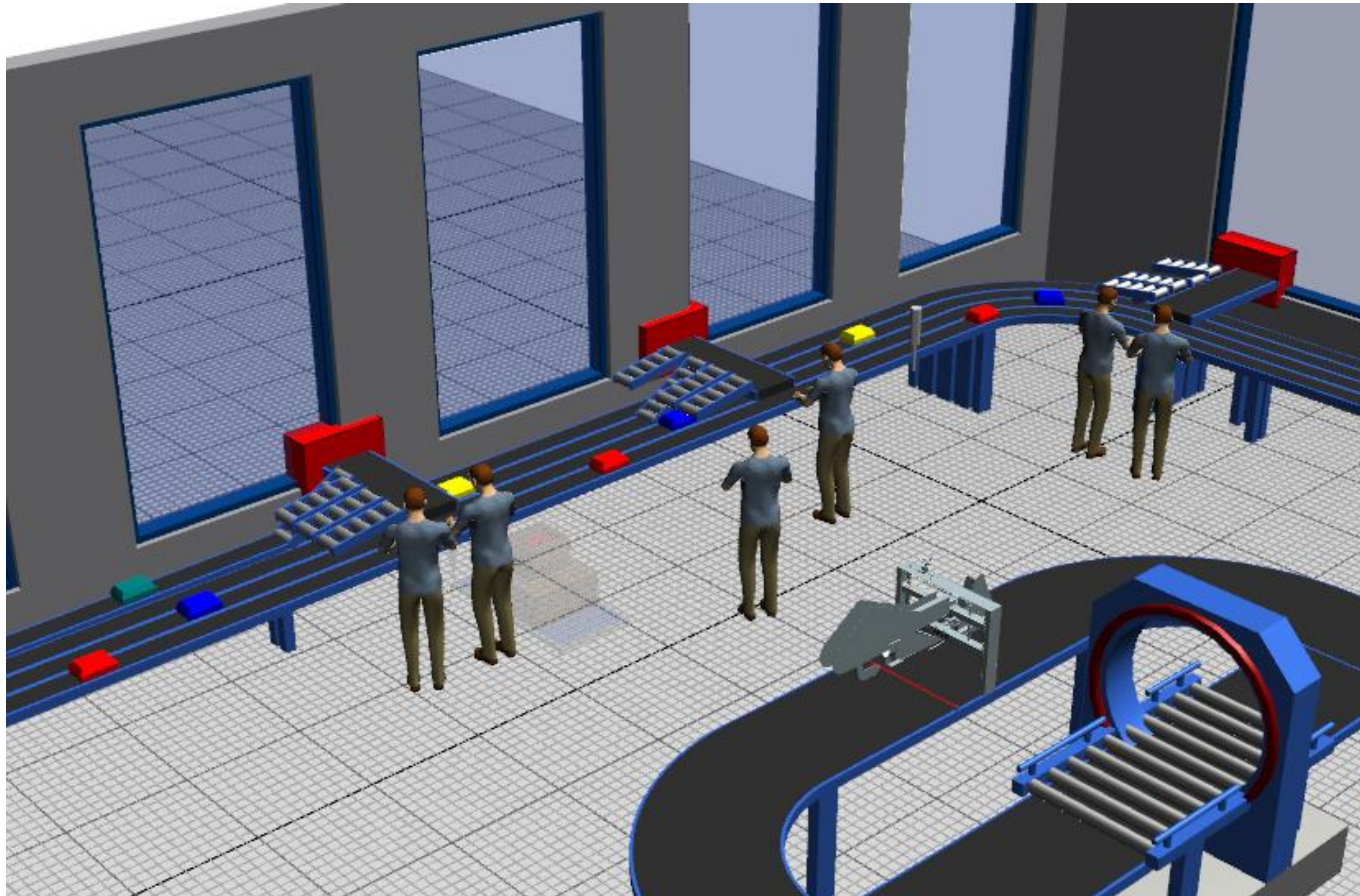
Full flexibility

1. Warehouse is fed using 10 baggings lines.
2. If we develop 4 packing stations we must add a sorter system capable to send from any line to any station.
3. We have designed a modular belt conveyor to recived the bagged breads and send to packing stations.
4. Baggings lines will have a automated sorter system to configure the full way to trace flow from bagging line to packing station.



4: Manual operations

Full availability

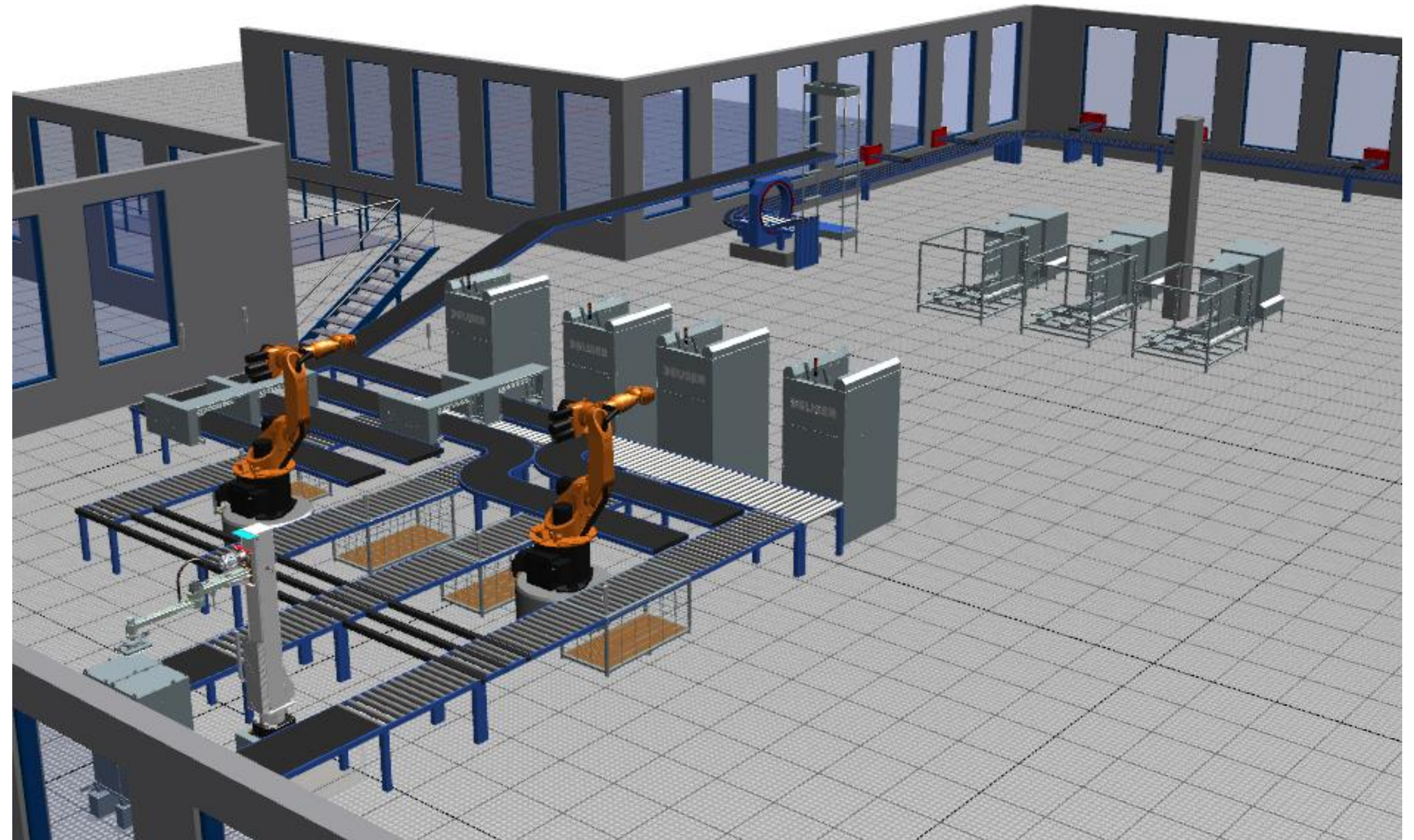


1. Our first offer proposal is ready for a space if we need a temporary manual operation.
2. In this layout space for manual operation is shared with AGVs way.
3. This situation is going to generate inefficiencies due to AGVs stop in presence of the operators.
4. We have developed a new situation for stations and AGV operations to avoid previous situation.
5. Space for manual operations is free of AGV traffic and completely safe.
6. In order to schedule a manual operation, the control system send the bread to free space, where operators can use working tables.

5: First stage

Getting better

1. At the end of 2022 **this factory** has to improve productivity.
2. In order to achieve this goal is mandatory to startup the palletizer.
3. We advise to deploy modular belt conveyor for this stage.
4. Belt conveyor under bagging lines is designed for bread transport, but at this stage we can use it for packed box transport to the palletizer.
5. Once the packing stations are deployed, belt conveyor will be used for bread transport.



Summary

Live development

Points reviewed at this document were:

1. Packing stations.
2. Material flow.
3. Bread flow.
4. Manual operations.
5. First stage.

We advise the adoption of this changes because it improve next points:

1. Better use of resources for packing operations.
2. Reduction of bottle necks.
3. Safe operator space for manual operations.
4. Design ready for first stage objective.
5. Higher flexibility and reliability of the solution

We wait for your comments or approval for this proposal.

