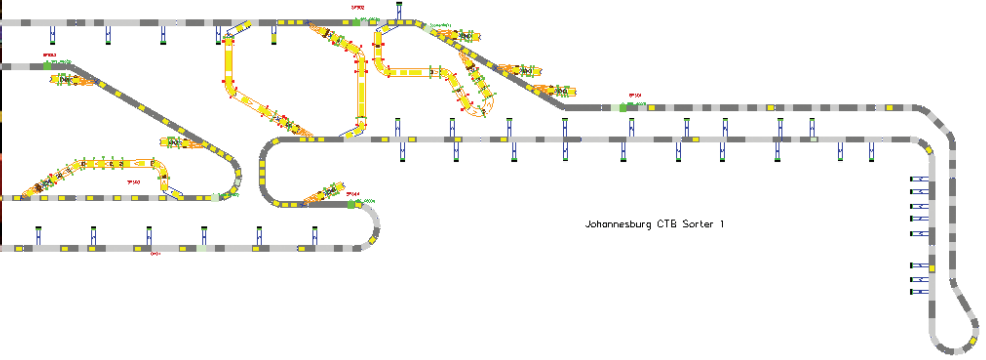
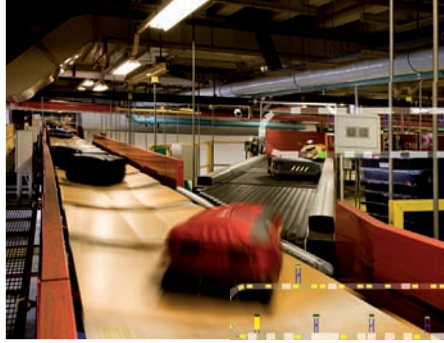


Emulation

Airport Baggage Handling Systems





The commissioning phase is optimised considerably with use of simulation and a complete auto generated emulation model.

Emulation

At Crisplant, the use of emulation for airport baggage handling systems is an important part of the process when building reliable controls software and hardware. All airport baggage handling projects of high scale and complexity are submitted to a multi-stage test concept, which includes module tests, software integration tests and a FAT & SAT (Factory Approval Test & Site Acceptance Test). System simulation and emulation is used as part of these tests to verify the software and hardware upon completion of the system design and software coding. Having the opportunity to perform an emulation process to test the system early in the project, before the equipment is packed and delivered for assembly on site, is a direct benefit that minimises valuable project site time and reduces costs.

At Crisplant, emulation is performed in-house in close cooperation between software and mechanical equipment teams. Based on experience from more than 1,500 sorting projects, our teams always take a customer-orientated approach to be certain to meet the customer's individual needs for reliability.

Emulation process

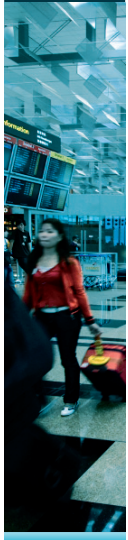
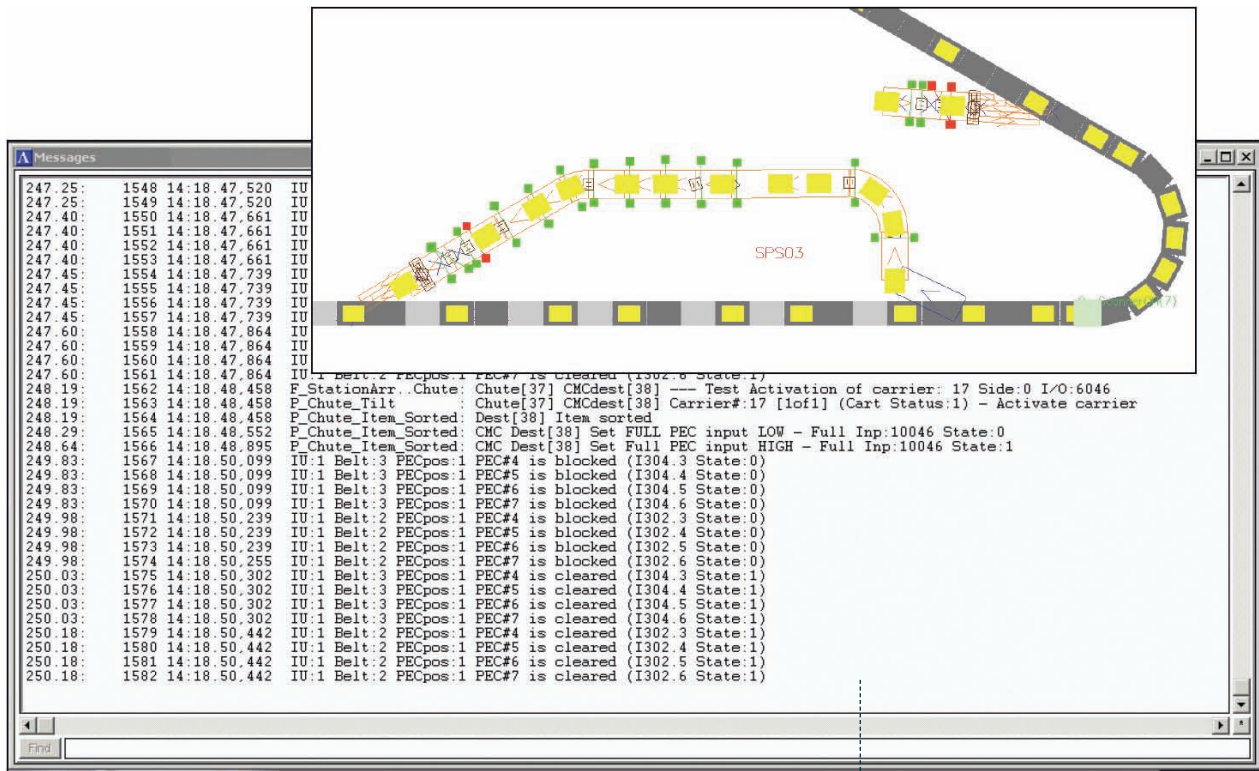
Crisplant has developed a software tool to generate emulation from the project specific 3D AutoCAD drawings of a baggage handling system. The emulation process is a test sequence in which the actual controls software and hardware will be linked to a computer model running the actions and initiating the I/Os and telegram flow in real time. The process ensures that the upper and low level software is fully tested before shipment to the airport site.

By linking the hardware and controls software to the computer model, the controls system is made to believe that it is connected to the real physical activities in an airport. This method not only tests the configuration of the mechanical system, it also proves the reliability of the controls software.

Using the real control system, the entire baggage handling system is subjected to realistic tests of the layout capacity, peak throughput, error handling, operational scenarios etc. This ensures the team is able to correct any problems at a very early stage, thereby reducing cost and time for on-site tests.

Servers mounted in racks and ready to ship to the airport after the emulation sequence.





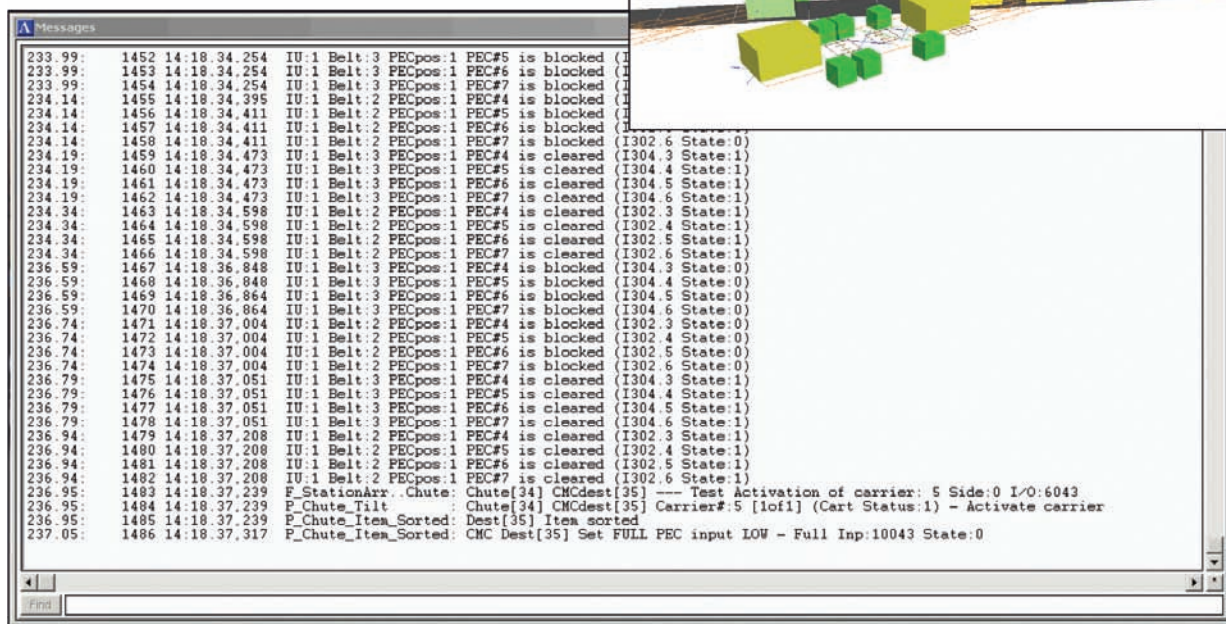
Depending on the specific project, the emulation process contains sorters, CrisBag, conveyors and/or other baggage handling equipment. During the emulation process the team is able to see the physical baggage move through a 3D model of the baggage handling system in real time. When an item is discharged in a chute, the team follows the specific action on the screen and simultaneously watches the item data in the software, just as it would be in a real BHS control room in operation.

Emulation helps Crisplant to deliver extensive projects, on specification, on time, every time. Due to the baggage handling solution being tested and proven at a very early stage, the installation and commissioning phase runs on a predictable time frame with minimised project risk.

Future proof

As an extra safety measure, the emulation process is conducted as a stress on the performance tests of the controls. Such a test can be based on system passenger growth forecasts, e.g. for the next 10-15 years. In addition, emulation can force the speed of the system to a level far beyond the demand for performance, forcing everything to run faster than real-time and thereby submitting the system to a stress level higher than the actual mechanical system. Crisplant always run tests on worst case scenario conditions for baggage handling performance, ensuring a high confidence level in the control system and a smooth baggage handling operation when installed at the airport.





During emulation, it is possible to rotate, tilt and pan the view of items moving in the system.

Virtual training and test tool

As an option, simulations and emulations can be expanded to work as a tool for airports to have their own virtual training and/or test environment. This option can be tailored both for training baggage handling system operators and supervisors, and for testing the installed system according to an airport's master plan development.

The training of operators combines the virtual system with a copy of the actual controls software in an educational simulated environment, providing hands-on baggage handling system training. The training tool has the ability to mimic the operator stations and is very useful for off-line incident management training before the baggage handling system goes live. Through the use of an emulated airport flow, the system operators prepare themselves for all types of baggage handling scenarios. Various incidents can be emulated and every reaction and action is logged and analysed to identify and correct procedural problems.

The training can last until all procedures are in place and the airport staff feels comfortable operating the new system.

The system has a user interface in which flight schedules, scanner read rates, EDS reject rates and other data can be loaded into the computer models. Using this data, the airport can simulate a day production and make the system generate reports to be used for analysis. As an example, the airport can verify how changes in the flight schedules will influence the sorting system, or what will happen with the baggage handling system if two A380s arrive at same time. Being able to perform this type of simulation and emulation gives the airport an early insight on future planning and further investment needed in the baggage handling system.

Not only does this type of training save valuable time and training costs, it is also a tool to help ensure the continued overall satisfaction and success of the airport.

