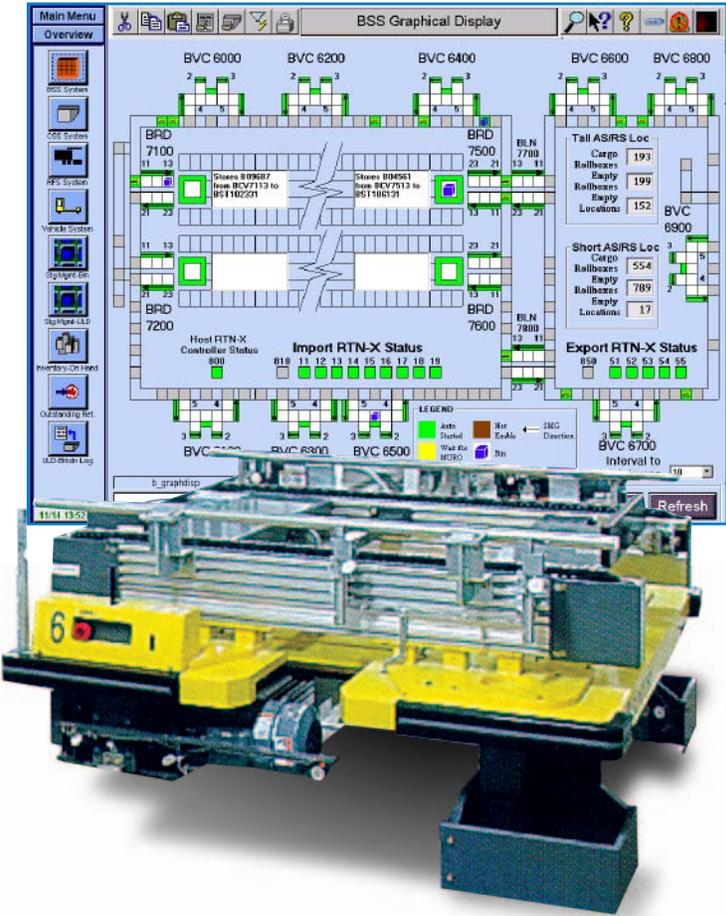# Cielo™ Roll Box Movement Control Module

Coordinate and move your cargo seamlessly throughout your air cargo terminal with Cielo™.

The Roll Box Movement module controls the movement of the automated machinery that handles rollboxes, and tracks the position throughout the storage system. After manually entering a rollbox Cielo takes control, assuring that the rollbox reaches its destination.

katlyn.

AIR CARGO SYSTEMS SPECIALISTS

Cielo™ Roll Box Movement Control Specifications

EQUIPMENT

Powered Conveyors
Vertical Lift Conveyors
Stacker Cranes
Transfer Vehicles (TVs) or Robo Trains

COMMUNICATION

Ethernet network CIELO to Equipment

CONTROL

Automatic Mode

USER INTERFACE SCREENS

Roll Box Retrieval
Roll Box – Retrieve Empty
Roll Box – Details
Roll Box – Update

Coordinates and controls all Roll Box movements

To store a Roll Box, the operator must load it in an entry point. Once this is done the operator is free to begin processing the next Roll Box. CIELO then makes all routing decisions, paths to take and which vehicle to use. All automatic movements are initiated by CIELO. The retrieval of a Roll Box operates in a similar way, the operator specifies the Roll Box and its destination. CIELO then coordinates the required movements to get the Roll Box to where the operator has requested it.

Controls multiple vehicles on the same set of tracks.

CIELO coordinates vehicles servicing the same area. In order to process multiple commands quickly, CIELO will coordinate vehicle movements between two or more vehicles. Allowing the vehicles to work together and/or at the same time. For example; one stacker dropping off a Roll Box to a conveyor while a second stacker is storing another Roll Box. Allowing both stackers to move simultaneously, each one processing a separate command.

Tracks Roll Boxes through the cargo facility

Whenever a Roll Box moves onto or off of an automatic piece of equipment, there is a message sent to CIELO. The Roll Box is not allowed to proceed to the next location until the acknowledgement has been sent back by CIELO. This ensures that all cargo movements are controlled and tracked all of the time.

Changes routing of Roll Boxes in motion in response to revised commands

If a Roll Box is in motion it does not have to arrive to its destination (ie: Storage location) before another command for it can be issued and processed. For example, if a Roll Box has just entered the system and is en route to storage, then the operator decides that the Roll Box is needed somewhere else, he simply issues another command to return the Roll Box to the new location. It is not necessary to wait for the completion of the original command.

Optimizes Roll Box routing

When CIELO determines a route for a Roll Box it assures that it will not block any other Roll Box paths. Crossing point decks and vehicles are kept clear and only used for transferring never for queuing.

Manages redundant paths

Depending on the facility, CIELO can control multiple routes within the cargo building. Availability and load factors will determine which path CIELO selects for a unit. For the case when the primary path is blocked, CIELO would direct units through the secondary or tertiary paths.

Communicates with individual machine-control PLCs and 3rd party controllers

CIELO sends commands and receives conformation messages from the PLCs on the network. Messages are also received from the automatic equipment as to the precise state of the machinery.

Performs a large number of error checking and handshaking with PLCs for alarm and fault messages

An error message is created when the PLC has a problem, the message is sent to CIELO notifying that the PLC is unable to process the command. This would typically be an electro-mechanical fault defined at the PLC level. The purpose of the fault is to notify operators of a problem and allow CIELO to stop automatic movement and redirect other Roll Boxes around the faulted piece of equipment.