UAL Baggage Handling System Upgrades ($17,530,246)

Category 7: Best Building Project – Specialty Contractor (Over $10 Million)

Intermountain Electric, Inc.

Since the original construction of Denver International Airport (DEN) in the early 1990's, United Airlines has been looking to automate and make baggage handling more efficient. United Airlines has been DEN's top carrier since 1995 when the airport was first opened. Before opening, United Airlines requested that DEN implement a fully automated baggage handling system, causing a 16-month delay to the initial airport opening date. This system, modern for its time, was well documented in the news over the following years, but not for its efficiency. In 2012, due to the increasing cost of maintenance and baggage mishandling, United abandoned the conveyor system and converted their baggage operations to a fully manual process that involved a series of routes driven by tugs through the maze of tunnels under the airport.

Fast forward to 2018 – United now has over 425 flights daily through DEN, averaging 40,000 passengers and up to 50,000 pieces of luggage daily, all transported by hand in the mile-long journey from your airplane to baggage claim, or what would seem a simple 500 foot long transfer to your connecting flight just a few gates away. Even on the shortest journey within the airport, luggage was still mishandled, and flights were delayed as a result.

In late 2018, IME began work with United on a new high-speed baggage handling system designed to support United's needs for the next 20 years. Once completed, even at the busiest travel times, the new system will only operate at one third capacity, allowing plenty of leeway for future growth.

During one of DEN's busiest years on record, the IME team had to develop a plan to install this work in the underbelly of Concourse B without affecting the ongoing airport operations. Shutdowns were limited to just a few hours in the middle of the night. Tugs, pulling baggage carts weighing in at 12 tons and travelling upwards of 25 MPH, needed to continue to drive under and adjacent to the new conveyors being installed to keep flights on time. IME worked with Siemens (the General Contractor), United and DEN to develop specific phasing plans and temporary measures to ensure that our work would get done on time without any passengers knowing what was happening below their feet. The project was broken down into 6

phases, each phase including up to 7 make-up units located at the apron level. In each phase, the most challenging shutdown to schedule involved the replacement of the makeup units (the circular conveyor belts on the apron level that served as the hand-off point from the conveyor system to the crew that loads the baggage onto the airplanes). IME developed a plan to temporarily power and control the existing makeup units while the new system was constructed. Scheduling around incoming and outgoing flights, only small windows of time were allotted to make the transition between old and new. The team had every step of the transitions planned out and were able to make the switch without issue.

Work on demolishing the old baggage handling conveyors, power and controls began in 2018. About three quarters of the way through demolition, there was now enough room to start the installation of the new system. The new system involved the installation of 35,000 ft of new conveyor and the replacement of 28 original makeup units. Implementing this work involved installing a completely new electrical distribution and controls system serving the 1,607 new conveyor motors and 3,377 monitoring and control devices that track, scan and sort the baggage to and from each airplane with more accuracy at a higher rate of speed.

Several factors contributed to the successful execution of the project, most notably the team's partnerships, prefabrication and collaboration. In support of DEN's goals, IME continued their partnership with two MBE contractors, North/Western Electric and Premisys Support Group, for installation of the lighting surrounding the baggage system as well as low voltage infrastructure to support new cameras, wireless access points, and baggage handling controls communication systems.

Our prefabrication plan was developed in the first phase of the project through the use of mock-ups and with additional support from our Building Information Modeling (BIM) team. These prefabrication techniques were able to reduce the on-site manpower by 30%. This innovative approach helped our team be more flexible to accommodate design changes without impacting the schedule, as well as eliminate additional impacts to DEN operations by reducing the amount of material handling and crew circulation in the tug drive aisles.

Because of IME's team-first mindset and innovative solutions, Siemens put their trust in the IME team to effectively coordinate and manage the execution of the project. This was

performed through weekly user group meetings as well as daily inter-subcontractor planning sessions that coordinated every activity to account for each contractor's safety and productivity.

IME had approximately 40 employees on-site throughout the installation of the new baggage handling system, combined with an additional 20 employees from our subcontractor partners. Daily pre-task planning with IME's project manager, superintendent, our subcontractor partners and the installing crew allowed the team to work safely and efficiently, as well as be pro-active in identifying problems and coming up with solutions in order to present to the general contractor so there were no delays or unplanned changes to the phasing.

Multiple unique safety hazards presented themselves on this project. Our lockout-tagout procedure was essential on this job because of the risk involved with the moving conveyor system; the conveyor sections could be started remotely from the control room or locally via the sensors on each conveyor section. In order to address this, each section of conveyor before and after the section being worked on was locked out to prevent unrecognized startup. IME had a designated Isolation Officer on-site whose job was to ensure that all lockout-tagout procedures were being followed precisely.

IME also followed a specific procedure to avoid struck-by situations with tugs driving through work zones. Tugs can move upwards of 25 mph and are often in such a rush to deliver baggage they fail to notice their surroundings. IME sectioned off work areas using concrete barricades to ensure the safety of those at work. In areas that could not be entirely barricaded off, IME installed fencing around more confined work areas.

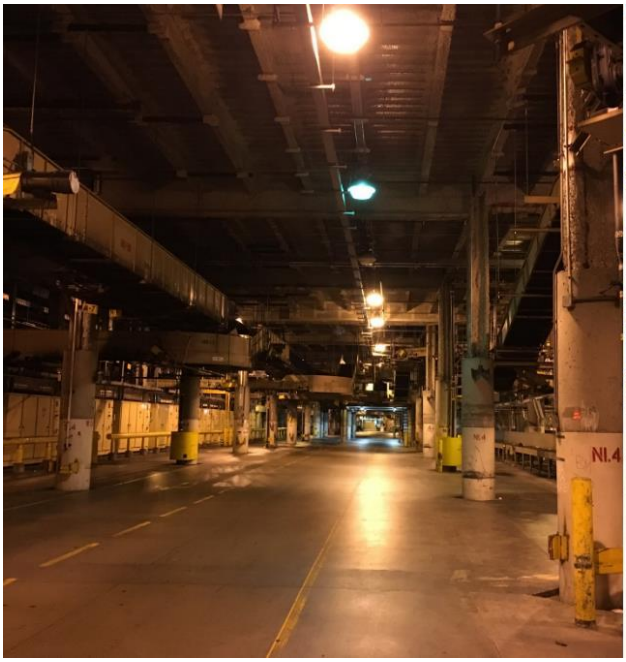
Because of IME's quality control plan and extensive pre-check and testing efforts, Siemens was able to commission and turn-over this system 4 months faster than scheduled. With this new baggage conveyor system operational, United is saving approximately 33% of the labor cost that was involved with the tug system, and a portion of that staff was retrained to manage the new baggage handling system. The controls for this new conveyor system also include energy saving techniques that shut down segments of the conveyor when no baggage is present. The successes of this installation will be a valuable component of the passenger experience when flying through DEN for years to come.

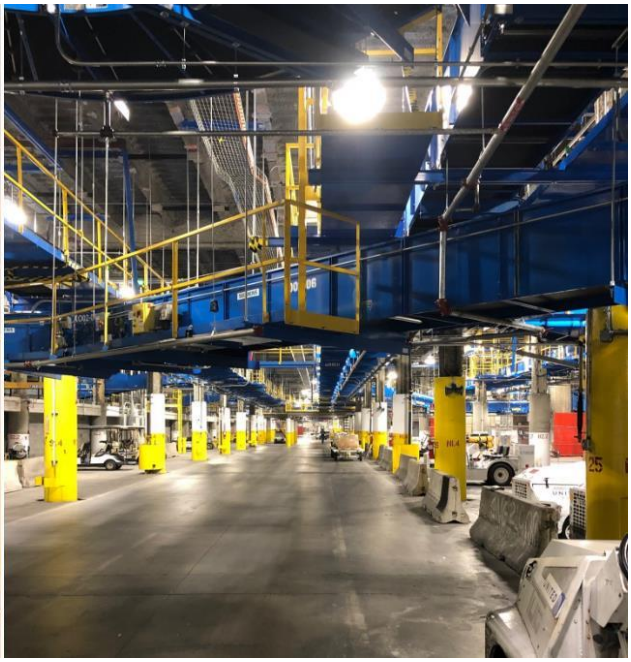
Jacob Paredes, Project Manager for Siemens Logistics, said of Intermountain Electric's performance, "*Intermountain Electric has shown exemplary performance, particularly in the quality of their planning and execution. Their high standard of work was exhibited in their day-to-day work, coordination with other stakeholders, and with their communication and planning with us and the end user, United Airlines. Intermountain Electric routinely goes above and beyond to support any operational challenges that the team may encounter throughout the project."*

Thomas Wappler, Director of Operations for Siemens Logistics said, "IME *were successful in winning this contract due to the innovative thinking they demonstrated in their approach to the technical solution and the execution approach for this project. Since then, they have continued to deliver to this initial plan with the Project meeting both its schedule and cost goals. The system was successfully put in operation on schedule in March 2020.*"

Intermountain Electric is proud to have been a partner in this significant and challenging project for Siemens and United Airlines, which will continue to show our dedication to support the ongoing projects and improvements at DEN.

Photos:



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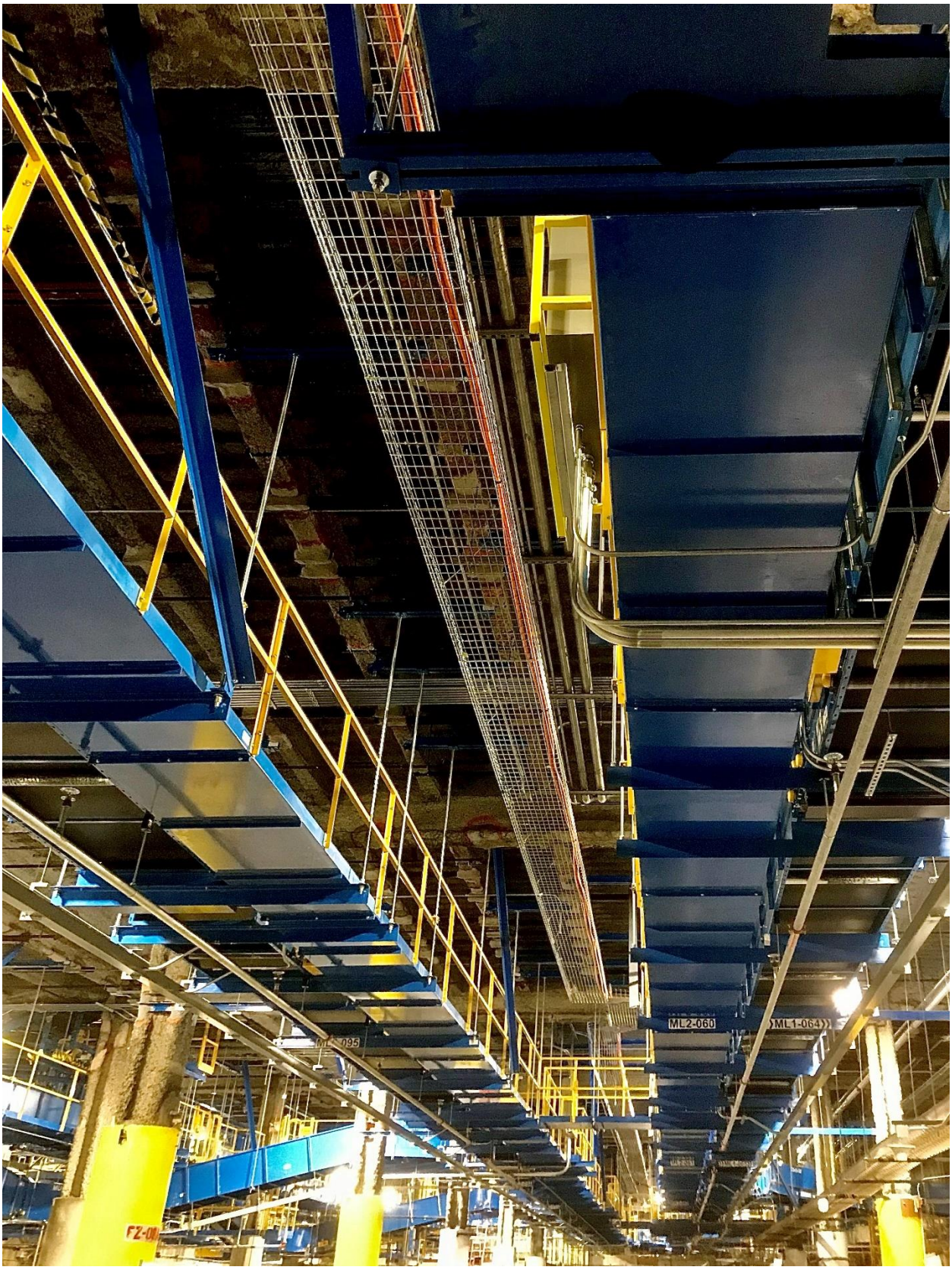
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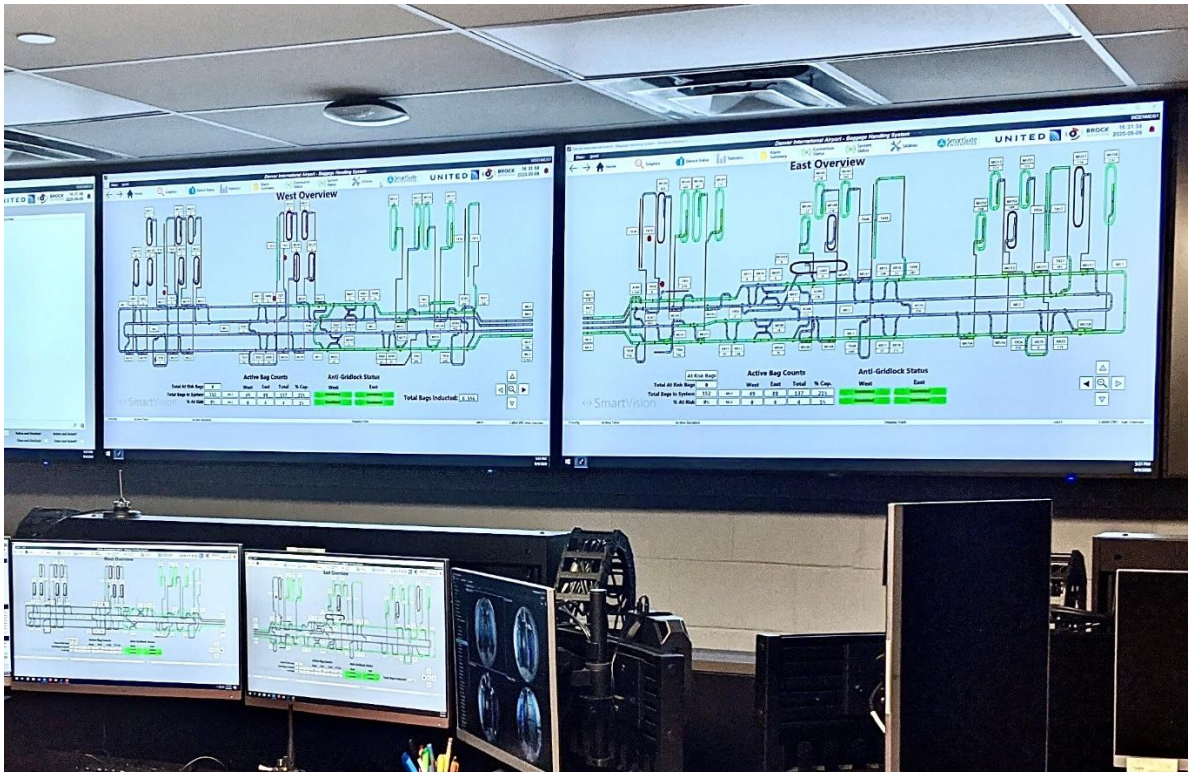
West Overview
East Overview
UNITED
Active Bag Counts
Anti-Gridlock Status
Total Bags Inducted: