Anatomy of an MRO: Rockford's jet repair hub is a high-tech marvel

Work continues Thursday, July 7, 2016, at AAR's new facility at the Chicago Rockford International Airport in Rockford. MAX GERSH/STAFF PHOTOGRAPHER/RRSTAR.COM

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ROCKFORD — The $40 million jet repair hub that stands midfield at Chicago Rockford International Airport is an engineering marvel.

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It's not the largest MRO facility — the acronym stands for maintenance, repair and overhaul — that AAR Corp. operates, but it will be the aviation company's newest and most modern jet service center when it goes online in the next six weeks or so.

Friday is the "official, unofficial" date that airport leaders give AAR the keys to the building, said Airport Director Mike Dunn. For the next month or so, the company will be busy with all the necessary inspections and certifications that the Federal Aviation Administration requires of an MRO.

"AAR has already started the hiring process, and my understanding is that the first customer arrival will come around Labor Day," Dunn said. "There's a punch list of final construction items that's being completed. But for all practical purposes, the building is done."

From a distance, the twin 9½-story jet hangars, each spanning 90,000 square feet, look like regular airplane hangers. They're not.

A cloak of insulated steel panels and polymer sheathing covers a skeleton of galvanized steel trusses and cables that are held together with tension bolt framing.

The engineered framework and skin that covers the 200,000-square-foot building allows it to flex and sway — up to six inches — to accommodate changes in temperature and wind speed and withstand pounding rain, snow or hail. The floor is made of Ductilcrete, a concrete-like product that resists curing when it is poured and is more durable than regular concrete, allowing it to bear the massive weight of jets.

Each hangar spans 300 feet by 300 feet and is big enough to house any aircraft that flies today, including the Boeing 777 and the double-decker Airbus A-380. Just how big is that? Big enough that the downtown BMO Harris Bank Center could fit inside either mirror-image hangar.

"The MRO is 15 feet higher on the inside than the BMO Harris Bank Center is on its outside," said Dan Roszkowski, a partner with Rockford's Larson & Darby architecture firm, which provided architecture and design services for the project.

Lots of things inside the MRO are supersized. Gigantic ceiling fans circulate air inside the MRO. They're made by a company in Lexington, Kentucky, that aptly named its signature product line Big Ass Fans.

A custom foam fire suppression system is one of the MRO's many unique features. Water doesn't do the job when jet fuel ignites and a fire spreads. For that, a chemical foam is used to cool the fire and coat the fuel, preventing it from coming into contact with oxygen and doing more damage.
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The foam that's part of the Rockford MRO facility is sprayed from what look like giant shower heads hanging from the ceiling. The entire process is controlled from a cavernous control room inside the MRO that's filled with tanks and pumps.

Once the foam hits the floor, the building literally fills up like bubbles in a bathtub. Within 24 hours, the foam turns into a powder that can simply be swept up and cleared away.

A sophisticated computer system opens and shuts mammoth five-panel doors on the east wall of each hangar. The doors cost about $1 million apiece. Opening and closing takes less than 10 minutes. When opening, the doors fold up like a venetian blind so no space is wasted inside the building. Vertical "mullions" that separate the door panels slide up, providing enough clearance for a jet to roll inside.

There's a loading dock where trucks can deliver machinery, tools or jet parts. There's a parts room to store parts and a tool room to store tools. There are four "owners' suites" — two in each bay — where jet owners and their staff can watch, inspect and consult with AAR technicians as their aircraft is being repaired and serviced.

"You have to remember," said Jeff Polsean, the airport's director of economic development, "this facility is going to be running 24-7. Jet owners typically have staff with them to monitor inspections or parts replacement and repairs. When you have a million-dollar jet, you want to be there when it's being fixed."

There's a master electrical control room in the south hangar with electrical panels that dwarf the kind you find in the basement of a typical home with a 100 amp service. The Rockford MRO has a 3,000 amp service. Each bay is illuminated by 90 bright, energy efficient LED lights.

"There are well over a hundred conduits that were placed underground before the concrete floor was poured," said Joe Sinclair of Ballard Companies. "Everything from 1-inch to 4-inch conduit is all over this place. Typically, what you'd find in your home is ¾-inch conduit."

Conduit that snakes up from the floor, hugs a wall and powers the hangar doors and other aspects of the building is filled with a fireproof epoxy that hardens like concrete, literally sealing off the inside of the pipe so that an electrical arc, or flames should a fire occur, can't spread.

"This is a very big, very unique job," Sinclair said. "We'd like more of this type of development to come to Rockford."

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$40 million: Total construction cost.

12: Number of months it took to build the MRO.

200,000: Square feet inside the MRO.

9½: Stories tall in terms of building height.

2: Number of jet bays.

500: Minimum number of jobs that AAR Corp. expects to create at the MRO.

$22 to $26: AAR Corp.’s expected average hourly pay rate (actual salaries may vary based on experience and skill sets).

5: Number of MROs in the U.S. that are run by AAR Corp. (Rockford will be the sixth).

$1 million: Approximate cost of each Megadoor (there are two of them) at the MRO.

180: Number of LED lights inside the MRO.

3,000: Electrical ameusage service of the MRO.

16: Diameter (measured in feet) of ceiling fans that circulate air inside the MRO.

20,000: Square feet of administrative and office space inside the MRO.

12: Number of minutes it takes to entirely fill up each of the two MRO jet bays with fire-suppression foam.

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