



Baltimore/Washington Int'l Creates New Airfield While Complying with Runway Safety Area Regs

BY ROBERT NORDSTROM



When officials at Baltimore/Washington International Thurgood Marshall Airport (BWI) began strategizing about how to comply with the recent runway safety area deadline, they did not expect to end up with a new airfield. One decade later, however, that's essentially what they have.

The \$350 million airfield program that created the new airfield required more than 50 separately procured construction packages and 10 interagency agreements between various governmental entities. The Maryland Aviation Administration credits the vision of airport officials and the commitment and coordination of numerous government agencies and private contractors for making it all happen.



PAUL SHANK

FAA's late 2015 deadline for runway safety area compliance set the wheels in motion. Paul Shank, chief engineer at BWI, explains the interrelated nature of the multi-project program it prompted: "To work on the runway safety area, you have to shut the runway down. If we're going to shut the runway down, why not upgrade the lighting to LED? And while we're at it, why not replace all the light cans and cable? And since our runways are old and in need of repair, why don't we also rehabilitate them

at the same time? And then, to make as much of the work as possible eligible for federal funding, let's retire dozens of airfield modifications to standards that date back decades."

As if that weren't enough, the FAA also asked the airport to replace its navigational aids. And thus was born BWI's Runway Safety Area Pavement Management and Standards Compliance Program. When the last of its projects are completed later this year, the Washington, D.C., area airport will effectively have a completely new airfield.

Pre-Season Super Bowl

As is often the case with airfield projects, maintaining safe and efficient operations during construction was a top priority; but BWI's airfield configuration magnified the usual challenges. The five-concourse airport has only two primary runways—9,500-foot 15R-33L and 10,500-foot 10-28—which intersect. It also operates a non-intersecting 5,000-foot general aviation runway and, until recently, another intersecting, but seldom used, 6,000-foot runway that was historically used as a taxiway.

For a major overhaul program to succeed, however, the airlines had to get on board. "That was the first order of business," Shank recalls. Airport officials explained how important it was to repave, update lighting and address outstanding modifications

to standards while meeting new and impending runway safety area mandates. They were also direct about money, noting that it would cost airlines “about 10 cents on the dollar” to cope with phased closings then, but much more if the airport waited five to 10 years and had to shut down and rebuild each runway separately.

“It was an easy sell,” Shank reports, “and we were able to bring an airport that was designed during World War II up to 21st century FAA standards.”

At the airlines’ request, BWI undertook the most complicated and challenging project first: reconstructing the intersection of the two primary runways. Their rationale was that if the intersection pavements were to fail, the entire airport would have to shut down. The carriers also felt that sooner was better, because the inconveniences associated with temporarily closing the two main runways would grow in the future due to increasing traffic volume. Finally, they reasoned that Runway 4-22, the seldom-used crosswind runway slated for conversion to a taxiway, would be available for use at the beginning of the program but not at the end.

Airport officials agreed, and planning for a temporary closure began—about 1½ years in advance. To complete the intersection work, BWI closed its two primary runways for 54 hours. To select the most propitious weekend for the work, airport officials studied two years of weather data.

Kicking off BWI’s multiyear initiative with the intersection project required a steep ascent for JMT, the firm that managed the program. “It was like playing the Super Bowl before playing any regular season games,” quips JMT Vice President Alan Peljovich.



ALAN PELJOVICH

As work progressed, it proved vital to keep looking ahead. “[Runway] 15R-33L had to be moved 3 feet to the west. While that was a standards requirement, it helped us keep the runway in service, because we could keep the existing lighting system running while we built a new parallel lighting system 3 feet away,” explains Peljovich. “When we did the intersection, we had to add 3 feet of full-depth pavement and install the new cans then, even though the full runway improvements were still four years in the future.”

During the 54-hour runway closure, BWI made Runway 4-22 available for wider use.

Southwest supported the plan by supplying a 737 for flying test approaches to ensure that temporary operations on 4-22 would be safe and workable under a wide variety of conditions. FAA air traffic control personnel confirmed that their procedures were in order for safe and efficient operations during the temporary closure as well.



FACTS & FIGURES

Project: Runway Safety Area Pavement Mgmt & Standards Compliance Program

Location: Baltimore/Washington Int’l Thurgood Marshall Airport

Owner/Operator: Maryland Aviation Admin.

Project Cost: \$350 million

Funding: Airport Improvement Program (26%); Passenger Facility Charge (60%); State Trans. Trust Fund (10%); Other (4%)

Program Manager: Johnson, Mirmiran & Thompson

Runway Design Consultants: Michael Baker Int’l; URS; AECOM; ADCI

Construction Mgmt: Parsons Transportation Group

General Contractors: P. Flanigan & Sons; Allan Myers; Atlantic; Gray & Son; Concrete General

Concrete Paving: Hi-Way Paving

Electrical: Enterprise Electric; Midasco; Bruce & Merilees

Lighting Suppliers: ADB Airfield Solutions; Integro; Jaquith Industries

Runway Status Light Design: Arora Engineers

Nav aids: DACO

Pavement Markings: Hi-Lite Airfield Services; Speidel Construction

Thermoplastic Markings Supplier: Ennis-Flint

Accolades: MdQI Award of Excellence (2012, 2014, 2015, 2016); ACEC Maryland Honor Award (2012); IES International Air Carrier Award (2013)



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BWI's airfield configuration magnified the usual challenges of maintaining operations during runway safety area improvements.

In retrospect, Peljovich likens the process of coordinating the temporary runway closures with BWI's carriers to knowing about a major snowstorm months in advance and planning accordingly. "We had contingency plans A, B, C and D in place, and actually ended up using Plan C, which went off flawlessly," he reports. "In fact, Southwest Airlines went on record saying it was one of the best examples of airport construction communication they had ever experienced."

Marching Along

With the intersection project completed, BWI began work on Runway 10-28 in 2012. Crews graded the runway safety area and modified the runway to meet FAA guidelines that require 150 feet of width and 35-foot shoulders. Previously, the runway was 200 feet wide with 12-foot shoulders. To make the changes, workers laid approximately 60,000 tons of asphalt and 500 square yards of concrete, and installed 110,000 linear feet of conduit connecting 900 lights.

Work began on Runway 15R-33L in 2013. During this phase, contractors moved the runway 3 feet west, displaced both ends and moved navigational aids. The runway also required a range of corrective measures to meet pavement rehabilitation requirements and resolve FAA profile standard deficiencies. In some places, a single lift of asphalt was sufficient; elsewhere, five lifts were

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needed in a single area. New 35-foot shoulders were added to each side of the newly located runway as well.

Project planners scheduled the installation of a new offset lighting system in bits and pieces to keep the existing system up and running for as long as possible. Throughout the process, crews installed approximately 230,000 tons of asphalt, 31,000 square yards of concrete, 104,000 linear feet of conduit and 1,700 new lights. Where FAA regulations allowed, lighting was converted from incandescent to LED throughout all phases of the program.

Relocating the glide scope antenna on the 15R side proved to be somewhat involved. The antenna had to be moved because it was too close to the runway; but the standard offset put the antenna 40 feet above a stream. To remedy the issue, engineers specified a 1,000-foot culvert covered with 40 feet of fill so the glide scope could be positioned in the correct place.

Other 2013 projects included updating the 15R deicing pad and completing runway safety area work on the general aviation runway. At the deicing pad, crews replaced asphalt with concrete and rebuilt the drainage system.

Throughout all of its airfield construction, BWI used incentives and liquidated damages to encourage contractors to meet

project and program milestones. As a result, officials were able to return Runway 15R-33L to service at the end of 2014 and fulfill runway safety area requirements a full year ahead of the FAA compliance deadline.

To be eligible for federal funding, however, the FAA required the airport to meet standards on all the projects by the end of 2015. That meant it had to address a number of remaining IOUs last year: navigational aids on Runway 10-28, the final conversion of Runway 4-22 to a taxiway, and lowering the catenary system on an Amtrak railroad line located off the end of the runway.

When Less Is More

Before construction began in 2010, BWI had four runways. Today, it has three: a pair of intersecting primary runways and a separate general aviation runway. Runway 4-22, which had historically been used as a taxiway, was officially converted into a taxiway. And despite being down one runway, the airport increased its overall airfield capacity.

“It would have cost in excess of \$150 million to bring 4-22 up to standards, as we essentially would have had to relocate it,” Shank explains. “It would have been a high-cost project with few benefits.”

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By making 4-22 comply with FAA taxiway design standards, BWI's efforts qualified as capacity project because 4-22 had more value to the airport as a taxiway than as a runway. At the end of its overall program, BWI will end up with a dual parallel taxiway system around the airfield—a major enhancement to capacity, Shank notes. As a result, it, too, becomes eligible for federal funding.

Peljovich likens his role during the sweeping airfield initiative to directing professional musicians in concert. "We've been conducting this symphony since 2008 and we've hit every programmatic milestone, kept on budget, delivered (runway safety areas) early and standards compliance early, all while maintaining safety and operations," he reports proudly.

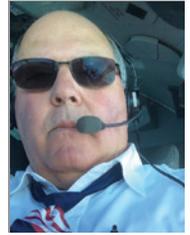
Roger That

Shank credits BWI's commitment to excellent communication for the various project successes. In fact, he cannot emphasize enough the role that effective, consistent and persistent communication has played throughout the program.

"We have tried to create an environment where all the vested interests—owner, contractor, designer, FAA, airlines and the public—are brought together to create and subscribe to a vision as to how the individual projects and the program as a whole will succeed," Shank informs. "It helps to put a human face on the work to be done."

From pilots to FAA officials, personnel involved at various levels of the program echo his sentiments.

"One of the greatest attributes of BWI under Paul Shank's leadership is the way they communicated. 'Death by meetings' was not the case," reflects Bert Seither, chief pilot for Southwest during most of the airfield work. "Meetings were proactive and everyone was heard—operators, the airlines and the airport. Everyone quickly realized that the airport was doing everything it could to minimize negative impacts. They projected a partnering message that we're all in this together. They had credibility."



BERT SEITHER

Eduardo Angeles, FAA associate administrator for airports, is positive about the agency's \$91 million investment of Airport Improvement Program funds in BWI's airfield initiative. "We did it because the FAA lines-of-business, the Maryland Aviation Administration and the airlines wanted to make sure we were aware of everyone's needs," explains Angeles. "Good planning, hard work and talking to each other paid off. The results of this collaboration will pay dividends for the next 20 years and beyond." ✈️



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