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Midfield Terminal at
Springfield-Branson National Airport
Springfield, Missouri

MODERN BUILDER

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WALTON CONSTRUCTION DELIVERS MIDFIELD TERMINAL BUILDING AT SPRINGFIELD-BRANSON NATIONAL AIRPORT

New Terminal Opened May 6, Features Southwest Missouri-Inspired Design



View of the west side of the new Midfield Terminal. Passengers enter the terminal on the south, through the Great Hall, the large structure which contains the ticket counters and baggage claim carousels. The bumpout on the south side is the main entry vestibule. The rental car counters are located in the bumpouts on the west side. The glass curtainwall is 40' tall. The two upper rows of ceramic-coated spandrel glass panels mask structural framing and the roof assembly. The entry canopy at right is an exposed painted structural tube steel frame supported by 14 stylized tube steel tree columns.

Walton Construction Company, LLC has completed Midfield Terminal at Springfield-Branson National Airport, a replacement terminal for a 44-year-old terminal which had exceeded its maximum capacity of 880,000 passengers a year and was landlocked on the east and west. The new terminal was constructed on previously undeveloped farmland on the west side of Springfield, less than a mile from

the old terminal and about 50 miles north of Branson.

The building portion of the terminal was bid in January 2007 and negotiated as a lump sum contract based on a best value of \$64.3 million. Walton was given notice to proceed on May 23, 2007. They delivered the project on time, with a substantial completion date of April 25, 2009, and under budget. Midfield Terminal opened on May 6, 2009.

The new terminal is located midway between a 7,000-foot runway on the east and a future third runway to the northwest; hence the name Midfield. (The airport currently has two runways. The second runway is 8,000 feet.)

The \$117 million project is being financed by \$97 million in revenue bonds issued by the airport and \$20 million of discretionary federal aviation funds. Walton was responsible for construction of the terminal building and everything within 75 feet of the building.

Midfield Terminal contains 275,000 square feet, 100,000 square feet more than the old terminal. It spans more than 900 linear feet and incorporates 2,700 tons of structural steel. The Great Hall alone contains 43,500 square feet. The terminal currently has 10 gates, and was designed to accommodate another 45 gates to the north. A satellite spur would potentially add another 15 gates to the west, said Gary A. Cyr, Sr., A.A.E., Director of Aviation, Springfield-Branson National Airport.

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Cover: Spirit of 2003, a replica of the plane that was built and designed by the Wright brothers and became the first powered aircraft to achieve sustained flight with a pilot aboard on December 17, 1903, is suspended from a 187' 6"-long girder truss inside Midfield Terminal's Great Hall. The replica was built by William W. Ghan, a local aviation enthusiast and retired Industrial Technical Instructor, with assistance from the Experimental Aircraft Association. It was finished in time to celebrate the centennial of powered flight. Mr. Ghan tested it and achieved flight for a few seconds on December 17, 2003.

The ceiling of the Great Hall features suspended curvilinear stainless steel architectural mesh. A baggage claim carousel is in the lower-left portion of the photo. In the background are entrances to the gates and Route 66 News and Gifts.

Midfield Terminal

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PROJECT TEAM

Midfield Terminal was a joint venture project between Walton's Kansas City and Springfield Divisions. The Walton project team included Rick Quint, President (Springfield); Brad Kaestner, LEED® AP, Project Executive (KC); Lance Garrett, LEED® AP, Project Manager (Springfield); Andy Hood, Assistant Project Manager (Springfield); Norris Cornell, General Superintendent (Springfield); Scott Brown, Project Superintendent (Springfield); Cody Elliott, Assistant Superintendent (Kansas City); Clay Alexander; Assistant Project Superintendent (Kansas City/Springfield); Carrie Shires, Project Engineer (Kansas City); Karen Jones, Project Administrator (Springfield); and Lucas Schutte, Project Intern (Springfield).

Reynolds, Smith and Hills, Inc. (RS&H), Jacksonville, Florida, were the architects and the structural, civil, and MEP engineers. The RS&H design team included Martin Wander, Vice President-Aviation and Lead Design Architect; Michael Spitzer, Senior Aviation Architect; Mahesh Adhyaru, Senior Aviation Engineer-Electrical; Stan Mazza, Senior Aviation Engineer-Mechanical; and Randy Musser, Senior Aviation Engineer-Structural. The RS&H office field staff included Max Marble, Senior Aviation Engineer-Civil; Heather Weigel, Resident Project Representative; and Harlan Hill, Aviation Architect.

The Walton team made safety a priority, holding weekly toolbox talks and safety inspections. They and their subcontractors completed

Builders' Association Subcontractor Members Who Worked on Midfield Terminal at Springfield-Branson National Airport

- Advanced Concrete Technology, Inc.
- APAC-Missouri, Inc. Missouri Division
- Atkins Weatherproofing, Inc.
- Audio Acoustics, Inc.
- Benton Blind
- Carthage Marble Corporation
- Custom Coatings
- Desco Coatings, Inc.
- Discount Pest Control
- Doing Steel, Inc.
- Faith Technologies, Inc.
- Gray and Associates LLC
- FormanFord Glass & Glazing
- Image Flooring, LLC
- Kennedy Contractors, Inc.
- Loveall Custom Sheetmetal
- Midland Masonry Contractors, Inc.
- D.H. Pace Co. Inc. dba Overhead Door Co. of Springfield
- Springfield Engineering Company
- Springfield Striping & Sealing
- ThyssenKrupp Safway, Inc.

"Having worked with Walton Construction Company on our Intermodal Facility in 2000-2001, I was confident they could deliver on our new Midfield Terminal, and they did. They were always responsive, whether the challenge related to coordinating with other contractors whose work was ongoing, or executing the design team's vision. Effective solutions in these and other areas were essential to our ability to provide a world-class facility."

– **Gary A. Cyr, Sr., A.A.E.,**

Director of Aviation, Springfield-Branson National Airport

the project without a single lost-time accident.

EASE OF ACCESS

Midfield Terminal was designed to provide travelers easy access; they can walk from the parking lot to the main concourse without climbing or descending a single step.

There is an approximately 14-foot differential between the main level of the concourse and the apron where the planes sit.

The terminal has a lower level located in the area of the Great Hall, from the west side of the baggage carousels to the east side of the ticket counters, extending south under a portion of the parking area. The lower level is used for baggage handling and offices. The foundations for the car rental counters on the west and the airline/travel offices on the east are slab on grade.

EVOKING THE OZARKS LANDSCAPE

The facility was designed to evoke the surrounding Ozark mountain countryside. In the Great Hall, blue carpeting resembles water shimmering in the sunlight. It is bordered by earth-tone carpet with a river-rock motif. The carpet in the main concourse has a grass design.

A total of about 10,000 square feet of terrazzo flooring graces the terminal's two interior circulation (or transition) areas, which lie perpendicular to the axis of the airport. In the circulation area south of the entrance to the security checkpoint, Table Rock Lake and Lake Taneycomo are repre-

sented in dark blue terrazzo set in a field of beige terrazzo. In a second circulation area located immediately north of the Great Hall, Stockton Lake and Pomme de Terre Lake are depicted in the same dark blue colors (see photo on page 3). The latter two lakes are also set in a field of beige terrazzo.

RS&H created the lake designs from aerial GPS photographs. Desco Coatings, Inc. plotted the designs on blueprint-size paper. (The larger design, Table Rock Lake and Lake Taneycomo, required 98 sheets.) The brass divider strips were performed, mounted on sheets of plywood, and transported to the jobsite, where the brass strips were screwed into the concrete.

The terrazzo was created by binding marble chip and mother of pearl aggregates together with resins and then troweling the mixture in place. Once it hardened, the surface was ground smooth. Additionally, river pebbles (in their natural colors) were inlaid in the beige terrazzo (around the perimeter of the blue terrazzo) at the time it was poured. They were ground flat with the rest of the surface.

Porcelain tiles on the facade and interior walls in three earth tones mimic the limestone found throughout the area. Italian marble tiles were also used, and are a gray hue.

Inset into the west wall of the security check-

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View overlooking the new Midfield Terminal. Long-term and short-term parking (upper portion of photo) are located on the south. The apron and gates are on the north. Buses, shuttles, and an employee lot are on the east (left). Rental car returns are on the west (right). The new terminal lies southwest of the old terminal (out of view at lower-left). The Great Hall is the large structure on the south. There are 1,826 spaces in the public parking areas. Airport Boulevard (top center), a new road, feeds into Chestnut Expressway, which connects with I-44 about a mile to the east.

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point area are 28 handpainted art glass panels imported from Munich, Germany. The design simulates an underwater aquatic environment, with plants and fish. The glass was segmented into panels to accommodate the curve of the wall. The wall covering around the panels is an eco-friendly woven straw fiber with a cotton backing.

A water feature with a river rock basin is located near the center of the Great Hall. It has 76 tall, narrow strips of etched glass (5"W x 5"H) secured with silicone in a curving stainless steel channel. The glass is freestanding; the strips are not secured at the top.

The curvilinear design motif is repeated in the sidewalks, the block walls with limestone caps, the perforated dot patterns in the stainless steel planters, and elsewhere throughout the facility.

TREE COLUMNS

Steel columns resembling abstract trees are located throughout the terminal. Of the 30 tree columns, 11 are on the interior and 19 are on the exterior. The 19 exterior tree columns support the exterior canopies at the east, west, and main entrances as well as the canopy over the parking ticket booths. The canopies are tube steel structures assembled in a symmetrical 5' x 5' grid throughout.

Concrete was poured around the base of each tree column. The bases provide uplighting for the columns and are painted an earth tone. The tops of the interior bases feature black terrazzo that was troweled 3/4" thick. The terrazzo surface was broadcast with mother of pearl and then a clear seal coat was applied.

The internal tree columns are non-load-bearing structures that, along with the tube steel roof framing, replicate the 5' x 5' grid of the exterior canopy design in the circulation areas.

The roof and ceiling assembly in the Great Hall is actually supported by a total of six 187' 6"-long clear span

trusses extending from one end of the Great Hall to the other. Wide flange beams supporting the roof deck complete the structure. The circulation areas of the terminal utilize a composite floor structure and tube steel roof framing. The gated areas are framed using a composite floor structure and steel bar joist to support the roof assembly.

Each clearspan truss weighs about 58,000 pounds and was enclosed in a sheetrock box. The truss design provided no lateral support until the entire structure was erected, posing a real danger that the trusses could fold up or collapse during hoisting. To address this issue, a structural engineer was employed by the steel erector to engineer the erection procedure, including hoisting, temporary bracing, and supervision of the operation. Safe erection of the six trusses required five cranes, including a pair of 210-ton cranes, a pair of 185-ton cranes, and a small 65-ton crane.

The cranes, which were located on the east and west (outside the building footprint), swung the trusses out over the basement area where they could be set and tied together with tie beams. The trusses had to be set and restrained with temporary cabling before the next truss could be erected.

The first three trusses were erected from the west side, and then everything was remobilized to the east side to complete the roof structure. Temporary cabling and bracing were left in place until the roof structure was completed and they could safely be removed. Intermediate beams were used to tie the girders together and were also utilized as joists for the roof. Finally, decking was placed to complete the diaphragm of the roof. The trusses are 15' 6" deep; the tops of the trusses are 41' off the floor and the bottoms of the trusses are 25' 6" off the floor.

GLAZING

Midfield Terminal's exterior is wrapped with high performance double-pane glazing in shades of blue and green. There are also expanses of clear glass at the ends of the circulation areas. Glass is the dominant feature on the exterior, which has more than 50,000 square feet of curtain wall. The exterior also has about 46,000 square feet of 2' x 2' ceramic tiles, some of which were cut to enhance the uneven look of natural limestone.

Some of the glass has a wavy fritted pattern. The pattern, along with low-e coating, was

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View looking east down the northernmost circulation area, part of the secured area (there are no doors in the glazing in this area). The beige terrazzo floor features Stockton Lake, the dark blue portion in the foreground. The smaller Pomme de Terre Lake is farther east, behind the tree column at center. A portion of the hand-painted art glass is visible at right. Irregular layers of porcelain wall tiles in various earth tones mimic limestone outcroppings.



View of Gates 8 and 10 on the west side of the terminal. The soffit lines match up exactly with the curvatures and lines in the carpet. At right (north) is the curtainwall affording views of the runways and taxiways. Fiber-reinforced laminate (FRL) panels are used at the entrance to the ramps, as well as the entrance to the security checkpoint and in the Great Hall ticket counter area.



The mechanical room for the pumps and water chillers, located on the lower level of the Great Hall.

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applied to the second surface of the glass (the interior face of the exterior pane), said Chris Jones, Branch Manager, FormanFord. Portions of the glass were painted on the third surface (the exterior face of the interior pane) to mask structural framing, the roof assembly, and the like.

"FormanFord, the glazing subcontractor, went through a painstaking submittal process to get each color and each frit right where the architect wanted it," said Brad Kaestner.

Midfield Terminal has two curtainwall systems: a 10" structural system (the mullion is 10" deep) on the Great Hall and a 7-1/2" system in the administrative office and boarding areas. The Great Hall curtainwall is anchored at the head and at the sill. In other areas of the terminal, the curtainwall is attached to the side of the building using a cantilever system, and is suspended above grade. There is also a 4-1/2" storefront system on the interior. A point-supported structural glass system, in which the face glass is supported on the inside by a glass fin, is on the east and west ends of the circulation areas. The face glass and glass fin are connected with stainless steel spiders.

GREEN FEATURES

The HVAC has several environmentally-friendly features. The terminal has a white TPO (thermoplastic polyolefin) roof, which minimizes heat gain. The high-performance glazing offers enhanced daylighting opportunities and a lower solar heat gain coefficient (SHGC). Seventy-three 4' x 4' pyramidal skylights located throughout the facility provide additional natural light.

Entrance vestibules limit the loss of heat and air conditioning. The building's high efficiency air conditioning uses ozone friendly water chillers (see photo on page 3). Heat is provided by clean burning natural gas. The air handling systems use economizers which allow 100 percent outdoor air as an alternative cooling source when outdoor temperatures are mild. Dual panes of glass, as well as low-e coating, enhance the performance of the HVAC system.

ELEMENTS OF SUCCESS

"Things went exceptionally well for a project of this size due to the working relationship between the owner, architect, Walton Construction, the subcontractors, and suppliers," said Brad Kaestner. "The complete team effort made this project a success for all parties involved."

Having received his B.S. in Construction Management from Missouri State University, Brad has a personal connection to the area. "It was very special for me to return to Springfield, where I spent several years of my life, to help build something of this size and importance to the Southwest Missouri community," he commented.

Lance Garrett lived in Kansas City six years before moving with his family to Springfield in April 2007. "Living in Springfield gave me an even greater personal investment in the project's success," he commented. Lance also credited Gary Cyr, Sr., for his strong leadership as aviation director, stating, "Gary knew this project inside out and took a very direct, involved role in keeping things flowing. He attended every meeting and made a huge difference in resolving issues. He made it all come together." ▲



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