

The F-22 will eventually replace the F-15.



A king wouldn't have the royal coach serviced in some ordinary garage. By the same token, neither would Lockheed Martin work on the world's first supersonic stealth jet fighter in any run-of-the-mill hangar.

Because only the best would do for the world's most advanced fighter aircraft and the star of the U.S. Air Force livery, the aeronautics company asked Burns & McDonnell to design and build a \$29-million, high-security,

high-tech coatings facility that's more environmentally controlled than many laboratory clean rooms.

Advanced Aircraft, Special Facility; Classified Coatings

Designed to eventually replace the F-15, the F-22 flies at Mach 2.5 (two-and-a-half times the speed of sound) and has a three-dimensional thrust vectoring system that maximizes maneuverability.

In addition to speed and control, the F-22 offers another military advantage: It doesn't show up on most radar screens. That characteristic requires special coatings, all classified, that must be evenly applied under strict temperature and humidity control.

"These facilities aren't just in some big metal building," says Burns & McDonnell project manager Bill McCully. "The coatings facility is designed to deliver the most technologically advanced aircraft in the world."



The coatings shop is designed to give the F-22 a perfect finish.



From the inside looking out of the Air Force's high-security, high-tech coatings facility.

can affect image size, by putting the aircraft on a turntable, lifting it with cable, and shooting it with radar in every direction.

"If things aren't perfect," McCully says, "the aircraft goes back for touch-ups."

A Permanent Home

As Lockheed Martin's F-22 robotics coatings facilities near completion, Burns & McDonnell engineers and architects are designing bed-down facilities for the aircraft at Tyndall Air Force Base in Florida, where all U.S. Air Force F-22 pilots will be trained.

This facility features a flight simulator training room with four computerized flight simulators to teach pilots the intricacies of aerial combat.

Burns & McDonnell will also design the first operational base for F-22 Air Combat Command at Langley Air Force Base in Virginia. The Langley bed-down will house three combat-ready squadrons of F-22 fighters. *P&SF*

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Precision Application

For Phase I of the project, Burns & McDonnell designed a 4,200-sq-meter coatings hangar with custom-made air handling units that provide laminar airflow, which enables coatings to be applied continuously and consistently. Precise humidity and temperature controls, including heating the space to 110 °F, expedite the drying.

For Phase II, engineers designed a 7,300-sq-meter robotics facility that includes two bays where people and robots apply portions of the coatings. A robot, for example, that is guided by a wire in the floor, moves around the aircraft, applying the exact amount of coating in the proper direction to ensure uniformity during multiple applications.

Picture Perfect

After coating, the F-22 moves to the radar cross section building where operators test the size of the aircraft's radar image, or cross section. They check for flaws in the coating, which



Burns & McDonnell is designing a bed-down facility in Florida where pilots will be trained.