

Air Force Uses Robotics To Paint Aircraft

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Safari is the designation given to a new system for applying primer, paint and camouflage to F-15s in an enclosed hangar. The system is intended to keep workers out of a potentially hazardous environment and reduce atmospheric emissions. The Air Force began use of the system in June at Robins AFB, Warner Robins, Ga.

The Air Force projects cost savings of \$1 million per year using the system, and hopes to incorporate it at bases in other environmentally sensitive areas.

The robotic painting system applies acidic conversion coatings, primer, paint and camouflage to the entire aircraft. The system's mobile gantry can be used also to wash the aircraft.

The Safari carrier and standard 6-ft. robotic arm travel on horseshoe rails and provide access to all areas of an aircraft at speeds up to 4 ft./sec. The articulated robotic arm has six degrees of freedom; the mobile robot positioner travels on U-shaped rails and provides three additional motion axes, giving the system nine axes of motion with an 11-lb. end effector load.

As configured, the system has a 24-ft. vertical and 24-ft. horizontal reach. Combined with a 175-ft. rail, this gives the tool mounting faceplate unrestricted access to 100,000 cu. ft.

The system covers approximately 110,000 cu. ft. and can adjust its parameters to aircraft centerline skew up to ± 6 in. The system is controlled by an IBM 386 PC and can be operated by a technician at a pushbutton control panel in an adjacent room.

Prior to going into production the Air Force switched from standard polyurethane paint to a high-solids paint, lowering the amount of VOCs released into the atmosphere. Because high solids paint has a variable viscosity and does not flow predictably, it was necessary to put components on the robotic carrier and mix them with a proportioning system as the robotic arm paints.

Air Force maintenance crews will be able to do touch-ups anywhere in the world and still meet the most stringent air quality standards because the paint has more solids and less solvents, resulting in fewer atmospheric emissions, according to



Safari system for painting aircraft uses robotics to protect workers from potentially harmful toxic materials in paint. Control is maintained by an IBM 386 PC in an adjacent room (inset).

the system supplier. In addition, the system has a thermal fume oxidizer that reduces VOC emissions by 98.5%, according to the supplier.

The system is capable of producing an aircraft every 52 hr.

The wash and rinse gantry consists of open trusses of stressed pipe. Its aircraft specific shape allows all the spray nozzles to be close to the target surface. Nozzle

actions are programmable to minimize fluid waste. The wash gantry access platforms allow workers to reach the top of a fuselage for close inspection or touch-up without walking on the aircraft.

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