



# SCANNING TO FIT

A handheld laser scanner is being used to guarantee that aircraft exterior parts are placed correctly the first time.

NVision's (Coppell, TX) handheld laser scanner is being used by Lockheed Martin engineers at its Missiles and Fire Control business (Orlando, FL) to ensure the fit of accessories to aircraft exteriors and interiors are positioned perfectly the first time.

The NVision handheld scanner is a portable scanning device capable of capturing 3-D geometry. NVision's handheld scanner has helped Lockheed Martin engineers accurately measure millions of points by simply moving it over an aircraft's surface, enabling perfect fits on first prototype iterations.

"The handheld laser scanner is a perfect fit for this application because its ability to move freely around a part makes it possible to reverse engineer virtually any size or shape of part," says Steve Kersen, president of NVision.

## BENEFITS

- » NVision's handheld scanner has helped Lockheed Martin engineers accurately measure millions of points.
- » The handheld laser scanner can reverse engineer virtually any size or shape of part.
- » Laser scanning provides accurate measurements of parts ranging in scale from the entire exterior of a commercial helicopter down to very small components.

The scanner is attached to a mechanical arm which moves about the object, freeing the operator to capture data rapidly and with a high degree of resolution. An optional tripod provides complete portability in the field. Intuitive software allows full model editing, polygon reduction and data output to all standard 3-D packages.

◀ The NVision handheld scanner is a portable scanning device capable of capturing 3-D geometry. Source: NVision Inc.

## ACCURATE MEASUREMENT

"An important advantage of laser scanning is that it provides accurate measurements of parts ranging in scale from the entire exterior of a commercial helicopter down to very small components," says Stephen Rocca, manager of Mechanical Laboratories at Lockheed Martin Missiles and Fire Control. "Getting the fit correct the first time provides significant time and cost savings. Laser scanning also has improved the accuracy of the fluid dynamic models that we use to predict the effect of the accessories on flight performance, providing a safety advantage."

In building aircraft accessories, it is critical to determine the exact geometry of the aircraft which normally cannot be obtained from computer-aided design (CAD) models because the exact configuration varies from aircraft to aircraft. For example, aircraft interiors are populated with cables and hydraulic lines that often do not show up or show up in a different position in the CAD model. In the past, conventional measuring instruments were used to physically measure the aircraft. For example, technicians would measure the body exterior, rotor, skids, windows and doors of a commercial helicopter.

This was a tedious process because an individual measurement had to be taken for each point. There was never enough time to take enough points to fully define the geometry so technicians frequently had to take a best guess as to the exact surface contours. The result was that the prototype often had to be reworked to get it to fit the exterior. The inherent inaccuracies of the manual measurement methods used in the past meant that three or four prototype iterations were typically required to obtain a good match to the aircraft.

After NVision demonstrated the ability to obtain high levels of accuracy in laser scanning, Lockheed Martin purchased an NVision handheld scanner for a production site in Alabama, and later, a second scanner, for its Orlando, FL, manufacturing facility.

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