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R&D-SPONSORED TECHNOLOGY WINS INDUSTRY AWARD

R&D Magazine has selected a FAA-sponsored software code, known as DARWIN (Design Assessment of Reliability With Inspection) as one of the top 100 R&D products of 2000 as part of its 38th annual competition. The R&D 100 award, a prestigious, highly competitive award, recognizes the top 100 most technologically significant engineering products that are commercially available to industry. This year's competition included outstanding entries from many of the most prestigious companies, research organizations, and universities in the world.

DARWIN, a new computer design assessment tool, has been recognized by FAA Aircraft Certification/Engine & Propeller Directorate as an acceptable means to determine the risk of a turbine engine disk failure caused by material anomalies. This risk assessment capability will improve the structural integrity of turbine rotor disks used in commercial service. (Disks are heavy high-speed rotating parts inside an engine with attached fan blades that produce thrust.) DARWIN's code assesses the rotor disk design through a life risk management process by considering the uncertainties in hard-alpha melt related material defects (size, location, and occurrence rate), stresses, crack growth, nondestructive inspection effectiveness, and shop visit rate. Undetected material or manufacturing flaws in turbine engine disks can undermine a disk's structural integrity.

Uncontained disk failure is the most critical engine safety issue in commercial service today. When a disk fails, it can have catastrophic results. Fast-moving, high energy disk fragments can disable or damage the airplane. For example, investigators traced the 1989 fatal accident of a DC-10 at Sioux City to an undetected material defect in the disk that resulted in an uncontained disk failure.

The DARWIN computer design tool is the product of a four-year FAA research, engineering, and development grant with the Southwest Research Institute (SwRI). SwRI developed the tool in collaboration with engine manufacturers Honeywell, Rolls Royce-Allison, General Electric, and Pratt & Whitney. This tool represents a major breakthrough in FAA's safety research program, and complements the actions announced by FAA Administrator Jane F. Garvey as part of the agency's Safe Skies Agenda, requiring enhanced inspections of engine fan disks to detect cracks that are precursors to uncontained disk failures. The tool has received strong acceptance by most turbine engine manufacturers worldwide.

The R&D 100 awards, first handed out in 1963, have been called the "The Oscars of Invention" and the "Nobel Prizes of Applied Research." Past winners have included breakthrough technologies, such as Polacolor film (1963), the flashcube (1965), the automated teller machine (1973), the halogen lamp (1974), the fax machine (1975), the liquid crystal display (1980), the printer (1986), the Kodak Photo CD (1991), the Nicoderm antismoking patch (1992), Taxol anticancer drug (1993), lab on a chip (1996), and HDTV (1998).

Originally known as the I-R 100s, in keeping with the original name of the magazine, Industrial Research, this year's winners were selected by a distinguished panel of over 70 judges and the magazine's editors. To be eligible for the competitions, products must have been available for sale or licensing during the calendar year preceding the judging. The award will be presented formally to high level representatives of SwRI on September 27 at the Museum of Science and Industry in Chicago.

For more information on DARWIN, contact **Bruce Fenton** (AAR-430) at (609) 485-5158 or **Joe Wilson** (AAR-432) at (609) 485-5579.