



Industrial Inspection System

AN AEROSPACE
IMAGING SYSTEM IS
SERVING GENERAL
INDUSTRY AS A
DEFECT DETECTOR

139

For Marshall Space Flight Center (MSFC), BIR Inc., Lincolnshire, Illinois developed an industrial inspection system that employs computed tomography (CT) technology to find imperfections in aerospace structures and components, such as castings, assemblies, rocket motors and nozzles.

Known as ACTIS, for Advanced Computed Tomography Inspection System, it has been in service at MSFC since 1989 and commercial units have been sold to aerospace manufacturers. Now BIR (Bio-Imaging Research) has refined the technology and introduced for general

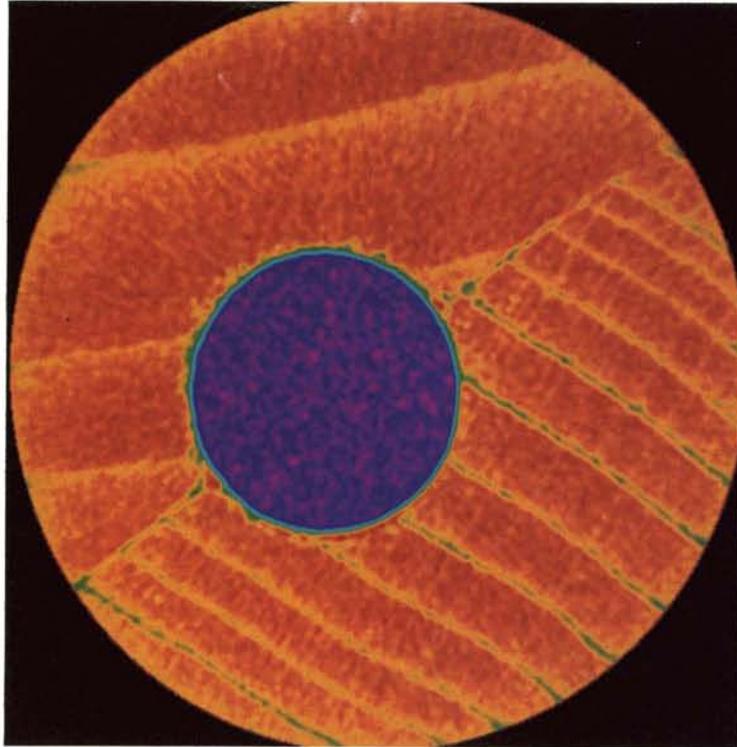
industrial use a smaller, PC version called ACTIS+ which, the company says, can "provide CT imaging capability at less than one-tenth the cost of current industrial CT systems."

CT is an aerospace spinoff technology known to millions of Americans who have undergone the medical body-scanning diagnostic technique known as CATscanning, which incorporates digital image processing technology that originated in NASA research and development as a prelude to the Apollo moon landings. The technology is also in wide industrial use, principally in the field of non-destructive testing.

The key to the low cost of ACTIS+ is that it is designed to be added to an existing RTR (real time radiography) system; it uses major RTR components and eliminates the expense of an x-ray system, detector system and radiation-safe site modification.

ACTIS+ is pictured *below*. The components include, from left, a high precision rotation/elevation manipulator; a color image monitor; a graphical user interface monitor with keyboard and mouse; and the Unix-based PC compatible workstation that houses the electronics for data acquisition, image





348

processing and motion control.

ACTIS+ can generate "cross-sectional CT images that enhance inspection capabilities by providing detail not found in projection radiographic images," according to BIR. Company literature lists some examples of how CT can improve the manufacturing process:

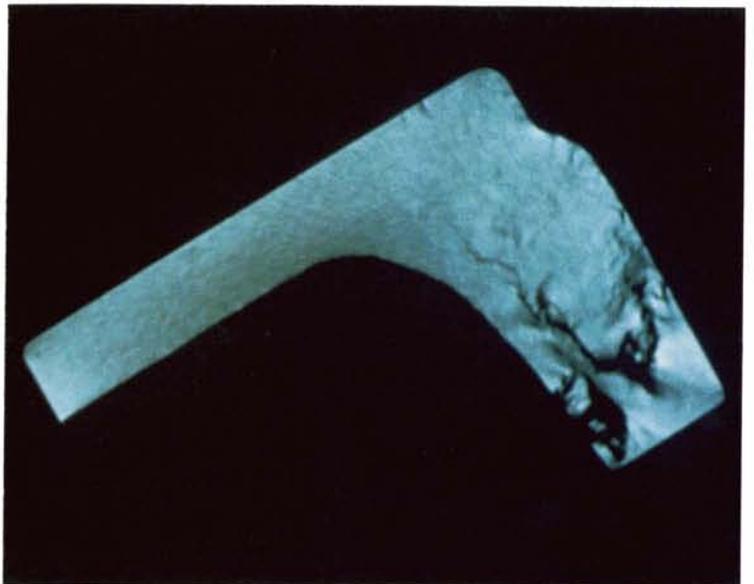
"Find internal defects in parts before machining and processing; monitor the effects of process changes on product quality; verify assembly before a product is put into service; make dimensional measurements and transfer to computer-

aided design/computer-aided manufacturing; locate reinforcements in structural composites; identify potential product safety and liability problems; and generate or correct computer-aided design data."

Above is an ACTIS+ image of an ordinary pencil showing the detail in the graphite core (purple) and the glue joints between sections of wood.

Below is an image of a two-inch aluminum casting in which a hairline crack is identified in the lower right portion of the image.

The high speed scanning feature of ACTIS+ — scanning and image reconstruction in less than one minute — offers the capability for 100 percent inspection in a production environment. ●



141