MAUS® V

The MAUS® V system is packaged as a turnkey system configured with a combination of the components listed below. Several choices are provided for each component to customize the system for specific inspection requirements. In addition, optional equipment is offered that can enhance the system operation.

Standard Components

MAUS® V electronics chassis
Laptop computer w/ Windows XP Professional
Multiple options for scanners
Available sensor sets:
- UT Longitudinal, Angle Beam
- Ultrasonic Arrays
- Resonance
- Pitch/catch
- Mechanical impedance
- Eddy current
- Magneto-resistive

Optional Equipment

Couplant feed sub system

System Support

System/maintenance manuals
Training manuals
On-site operator training
One year full system warranty
Extended warranty options

Performance Specifications

Adjustable data pixel sizes:
- 0.010"-0.500", increments of 0.010"

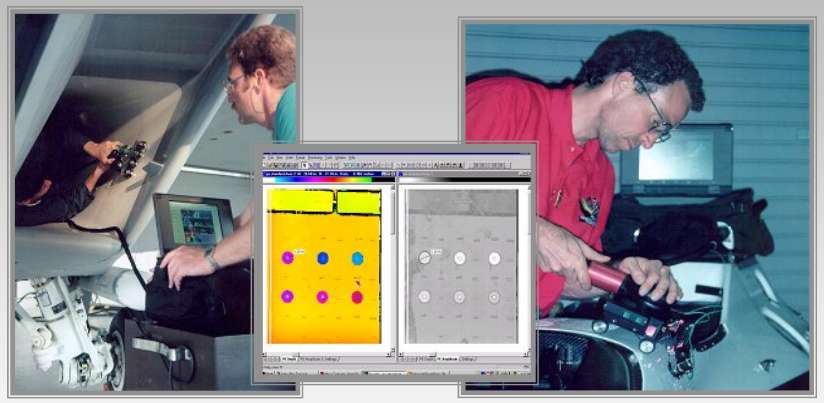
Inspection rates:
- Up to 100 sq ft/hr using single sensors
- Up 1000 sq ft/hr using array technology

Software Features

Point, line, and area measurement
Histogram calculations
Waveform analysis
Data merge utilities
Parameter combine functions
Hard copy data prints
Digital data store and retrieve
File Transfer: modem or internet

For additional information contact:

The Boeing Company, MC S1021111
PO Box 516, St. Louis, Missouri 63166
314-777-7000 or 314-705-3786
314-777-3745 (fax)



BOEING®

MAUS® V

Mobile Automated Scanner

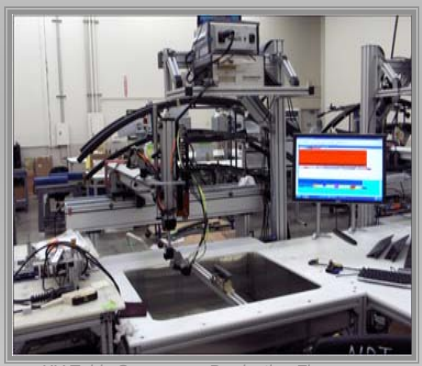
The MAUS® V nondestructive inspection system is the most versatile product in the NDI marketplace. System components may be configured from a suite of options to address many inspection applications in the production and maintenance of aerospace structures.

Multiple Modes enable the inspection of many types of materials

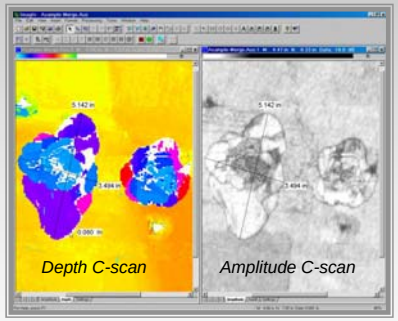
Unique features of the MAUS® V system include equipment portability, ease of setup, inspection versatility, and very fast inspection rates. These features contribute to an efficient approach for the on-site inspection of large structures. Inspection applications include metals, monolithic composites, hybrid composite-metals, and bonded structures

The MAUS® V may be configured as a portable C-scan inspection system that integrates several traditional and nontraditional inspection techniques into a single package. This system is effective in a variety of production manufacturing and aircraft maintenance environments for process quality inspections, damage assessment, aging structure evaluation, and repair validation programs

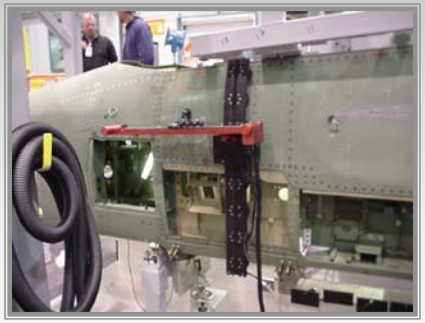
The system may also be configured with a variety of scanning platforms to provide production floor inspection of complex composite structures. These configurations typically include multiple linear arrays used in both immersion and surface dribbler applications. This is a particular effective solution for lower cost production facilities and/or low capacity processes.



XY Table Scanner on Production Floor



UT Pulse-echo C-scans of Impact Damage on C/E Skin



Flexible Track Scanner Positioned on Aircraft Fuselage

BOEING®

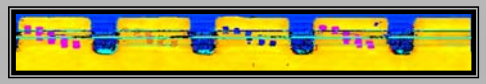
MAUS® V Applications

Ultrasonic Arrays

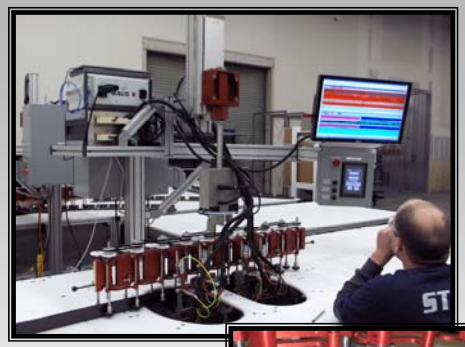
Ultrasonic arrays have created a quantum leap in capabilities for aerospace structure inspection. In particular, linear arrays used to duplicate longitudinal single sensors provide equivalent detection sensitivity with a tremendous increase in inspection rates. In addition, the MAUS V system configurations frequently use multiple arrays to cover multiple surfaces on a complex composite part during a single pass inspection. This multiple array capability is particularly useful when full inspection of all areas in a complex part is required.

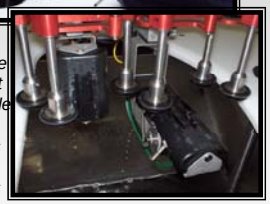
Ultrasonic pulse-echo

Ultrasonic arrays used in the pulse-echo mode allow for the detection of delamination, voids, porosity, and foreign objects in composite laminates. This technique applies to the wide range of construction methods and materials used in the aerospace industry. MAUS V scanners include positioning mechanisms to align the ultrasonic arrays on complex part surfaces with minimal distortion to the ultrasonic signals. Data from multiple arrays in combined in the data display providing a full C-scan image of the part.



Pulse-echo data from multiple arrays showing defects





The Snake scanner is designed to accommodate long parts with significant curvature changes. Multiple arrays are positioned on each of the part surfaces resulting in complete inspection complex parts

Thru-transmission

In some constructions a more appropriate inspection methods is ultrasonic thru-transmission. In these applications two arrays are positioned on opposite sides of the structure. Sound is transmitted from on array through the part to the second array. The C-scan map indicates the locations where the sound was attenuated as it was transmitted through the part. When additional surfaces are inspected multiple arrays are used to provide the thru-transmission data for all surfaces.

Thru-transmission data showing inserts in test standard

The XY table configured as an immersion table. Two pairs of arrays in shoe positioned for Thru-transmission across the part and at 45 degrees to part resulting in a single pass inspection

Single Point Sensors

The MAUS V scanners may be configured with many traditional NDI inspection sensors including Resonance, Mechanical Impedance, Pitch-catch, Eddy Current, and Magneto-resistive sensors. A sensor type is selected based upon the specific inspection needs of each customer. Several different types of sensors provide a menu of options when a MAUS V system is used to inspect many types of structures including metallic and/or composite materials. Frequently, two different sensor types are used to fully interrogate a single structure.

Bond testing

Continuous wave sensors are used to detect bond line voids in adhesively bonded structures, These sensors include resonance, MIA, and Pitch-catch methods. The MAUS V system displays the impedance changes that occur in the sensor signals as the sensors are loaded by the local area of the structure. Well-bonded areas are distinguished from voids by these changes in the sensor signals. However, bond strength is typically not predicted by these changes.

Crack or corrosion detection

Corrosion detection programs often center on visual inspection of the inner and outer surface of the fuselage skin. Unfortunately, the ability to detect corrosion located between skin layers is limited in a visual inspection. MAUS V eddy current C-scans easily identify hidden corrosion in these structures. Inspection programs have been performed since 1997 to detect hidden corrosion under doubled surfaces in large commercial and military aircraft. Software features include automatic gap compensation capabilities and corrosion quantification algorithms.