

# MOI

## Magneto-Optic Imaging Systems



### **Aircraft Inspection**

Fatigue cracks

Corrosion, subsurface cracks

Spotwelds

Alodine rivets

### **Industrial NDI**

Fatigue cracks

Ferromagnetic metals

Non-ferromagnetic metals

### **Purchase or Rental Options**



**Rapid Metallic Structures Inspection**

# Our aircraft skin and rivet inspection solution

Our patented MOI 308 Magneto-Optic Imager (MOI) systems feature a nondestructive evaluation (NDE) process that is highly effective at detecting cracks and corrosion in aircraft skin and around rivets. Using eddy current excitation, MOI's rapid scanning and data processing speed enables aircraft operators to achieve greater flaw detail and greatly reduce downtime for required inspections.

MOI is also highly valuable when used for industrial NDI of metallic structures that are flat or have some shallow curvature and require high safety levels.

## MOI advantages:

- Calibration not required
- Significant time savings in inspections
- Minimal operator training required
- Paint stripping not required
- Rapid real time inspection of large areas
- Demonstrated 10 times faster than eddy current probes alone

## MOI 308 Specifications



**MOI 308/3**



**MOI 308/7**

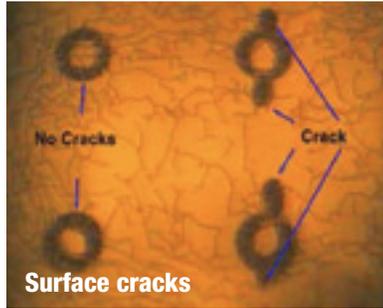


**MOI 308 TDF**

Feature performance:	<ul style="list-style-type: none"> <li>• Large format imager</li> <li>• Excitation built into control unit</li> <li>• Penetration depth: 0.12" to 0.012" (aluminum)</li> </ul>	<ul style="list-style-type: none"> <li>• Lightweight and compact</li> <li>• Use w/ two excitation units</li> <li>• Penetration depth: 1/8" (aluminum)</li> </ul>	<ul style="list-style-type: none"> <li>• Turbo dual frequency with 303 TDF imager</li> <li>• Dual frequency excitation built in</li> <li>• Higher power</li> <li>• Increased sensitivity</li> <li>• Higher resolution imaging</li> <li>• Accepted Boeing method for lap joint inspection at Alodine rivet</li> </ul>
Frequency range:	1.5 kHz – 100 kHz	1.5 kHz – 200 kHz	Dual Frequency
Field of view:	2" x 1.7" (50 x 44 mm) w/16 mm lens 2.8" dia (70 mm) w/10 mm lens	1.4" x 1.1" (35 x 28 mm)	2" x 1.7" (50 x 44 mm) w/16 mm lens 2.8" dia (70 mm) w/10 mm lens
Display:	PVS (Personal Viewing System) Video output for optional monitor NTSC or PAL available	PVS (Personal Viewing System) Video output for optional monitor NTSC or PAL available	PVS (Personal Viewing System) Video output for optional monitor NTSC or PAL available
Excitation method: (eddy current)	Multidirectional	Two detachable induction units: <ul style="list-style-type: none"> <li>• High frequency: 20-200 kHz</li> <li>• Low frequency: 1.5-50 kHz</li> </ul>	Multidirectional
Flaw detection:	Surface and subsurface flaws	Surface and subsurface flaws	Surface and subsurface flaws Flaws around anodized rivet sites
Operational temperature:	Operating: 0° C - +40° C	Operating: 0° C - +40° C	Operating: 0° C - +40° C
Imager height:	11.5" (29.2 cm)	3.3" (8.3 cm)	6.6" (16.9 cm)
Imager base size:	4.5" x 5.5" (11.4 x 14.0 cm)	3.5" x 3.1" (8.9 x 7.8 cm) 4.0" x 3.5" (10.2 x 8.9 cm)	4.5" x 5.5" (11.4 x 14.0 cm)
Imager weight:	3.69 pounds (1.68 kg)	High frequency unit: 16 oz. (0.46 kg) Low frequency unit: 20 oz (0.57 kg)	3.8 pounds (1.72 kg)

**Model 308/37 System** (Not shown). This system is the 308 power unit with the standard 303 imager combined with the smaller, palm size 307 imager.

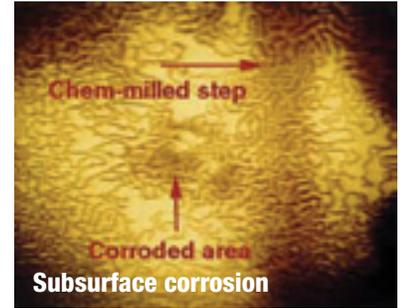
## MOI Model 308/3 Images



Rivets or holes show as smooth circular forms. In the MOI image shown above there are two rivets with no cracks and two rivets with cracks. Cracks can be seen around the complete circumference of the rivet site in one pass of the imager over the aircraft. Surface images are viewed using higher frequencies (50 - 100 kHz). To penetrate more deeply into the metal, the inspector must lower the frequency level on the power unit. Images are viewed in the PVS headset by the inspector, or on an optional outside monitor (NTSC or PAL compatible) that connects to the control unit.

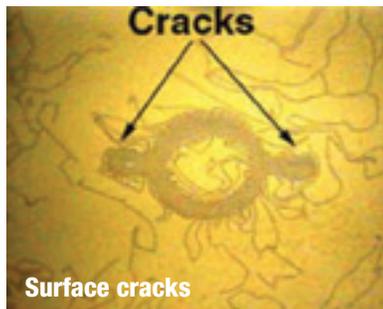


This is a third layer crack image that is 0.084" from the surface. The frequency has been set to 5 kHz resulting in a more diffuse image. Since surface cracks will also be visible, it is important that the inspector perform a high frequency scan first and mark surface defects. When the frequency is lowered, new crack images are subsurface defects.



This is an MOI 308/3 image of corrosion on the aircraft bellyskin. Frequency has been set to 5 kHz. Corrosion images are irregular in shape and show as dark shadows between rivets or around rivet sites. In this sample there is a chem-milled step which shows as a dark line shape to the right of the corroded area. Since the MOI is an area inspection device instead of a point by point device (such as an eddy current probe) the MOI can rapidly locate corroded areas.

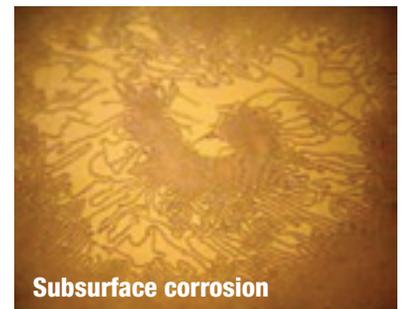
## MOI Model 308/7 Images



MOI 308/7 image of a surface crack protruding from both sides of the circular rivet site. The small format imager examines one rivet site at a time. The frequency for this image was 200 kHz.



The MOI is also being used by the military to detect defective spotwelds. Good spotwelds show as very faint rivet like images. A broken spotweld image shows clearly. A technical order exists for spotweld inspection of the KC-135 aircraft.



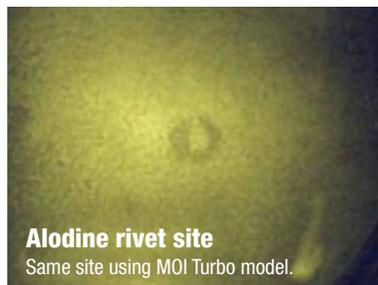
MOI 308/7 image of a small corrosion pit (dark area in the center of the picture). Corrosion is irregular in shape and can be most easily identified by moving the imager across the area being inspected. Corrosion is seen as irregular shadow shapes moving with the imager.

## MOI Model 308 TDF Images

Has same capability as 308/3 images above, but includes Alodine rivet inspection ability.



**Alodine rivet site**  
Using standard MOI model.



**Alodine rivet site**  
Same site using MOI Turbo model.



## Inspector's Experience

Application	MOI	Eddy Current Probes
To examine specific section of B-52 (Tinker Air Force Base)	3 1/2 hours	30-40 hours
To examine fuselage section (Cessna Fatigue Test)	3 hours	24 hours

### All models come standard with:

- Power control unit
- Imager with cable
- PVS (Personal Viewing System)
- One roll imager wear pad tape
- Custom ruggedized shipping case

### Optional accessories:

- Setup standard for cracks
- Setup standard for corrosion
- Imager wear pad tape
- Demagnetizer

### Qi2 quality/support:

- We design and build all our systems
- Total product life cycle support
- Systems serviced by skilled in-house technicians
- Receive a superior customer experience

### Qi2 experience makes a difference

A recognized technology leader in measurement and sensors since 1985, government and industry have looked to Qi2 to solve the unsolved and deliver new technologies that change what is possible.

Qi2's non-contact measurement systems are delivering improved operating safety, extending useful equipment life, improving parts reliability and delivering improved process control within an array of industries.

- Aerospace
- Automotive
- Civil Aviation
- Civil Government
- Defense & Military
- Electronics
- Energy
- Highway and Transportation
- Instrumentation
- Industrial
- Marine / Shipbuilding
- Munitions
- Nuclear
- Oil and Gas
- Pipeline
- Paper and Plastics
- Power Generation
- Refining and Chemical
- Space Systems
- Utilities

### Chosen by manufacturers, carriers and military fleets

- |                        |                    |
|------------------------|--------------------|
| Aerospatiale           | US Air Force       |
| Boeing                 | Air National Guard |
| Canadair               | US Navy (NAVAIR)   |
| Cessna                 | Raytheon E-Systems |
| Daimler-Benz Aerospace | China Air Force    |
| FAA                    | Israeli Air Force  |
| Gulfstream             | Polish Air Force   |
| Northrop Grumman       |                    |
| NASA                   |                    |

- American Airlines
- Continental
- Delta
- Nippon Airways
- Qantas
- Royal Air Maroc
- Southwest
- Singapore Airlines
- United

