NONDESTRUCTIVE EVALUATION CENTER

“Providing quality assurance for MPI’s industrial partners”

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www.wpi.edu/+mpi
Metal Processing Institute

- Advanced Casting Research Center
- Center for Heat Treating Excellence
- Powder Metallurgy Research Center
- Sloan Industry Studies
- NDE Center (being established)
Why NDEC?

• **Mission**
  – To assist our industrial partners in their quality assurance requirements

• **NDEC offers**
  – Dedicated staff with extensive multi-disciplinary academic and industrial experience
  – State-of-the-art equipment in all key NDE areas

• **Organization of NDEC**
  – Supported by industrial partners
  – Part of and integrated in MPI’s infrastructure
NDEC Approach

• NDE is a field/defect interaction process

• NDEC concentrates on
  – Industrial problem formulations
  – Physical testing approaches
  – Simulations
  – Instrumentation
  – Customizing

![Diagram of NDEC Approach]
Research Focus

Ultrasonic testing
   Contact/immersion methodology

Microwave imaging
   CW in the frequency range 2 – 20 GHz

Electromagnetic testing
   DC and eddy-current testing

Infrared imaging
   Active and passive thermography

X-ray inspection
   2D and 3D computed tomography (CT) testing
Examples of NDE projects

**On-going projects**

- Electric resistivity testing of green-state powder metallurgy compacts
- Cleanliness assessment of molten aluminum through Lorentz force concepts
- On-line infrared imaging of monitoring of green/sintered powder metallurgy compacts

**New projects**

- Microwave imaging of lost foam casting
- Ultrasonic inspection of aluminum casting products
Example 1: Crack detection in green-state powder metallurgy compacts (patented)
Example 2: Cleanliness assessment of molten aluminum in the casting industry (patented)
Example 3: Thermal imaging

**On-line testing**

- High-speed recording with 3 – 13 micron IR camera
- High speed data acquisition (T=20ms) and process control
- Remote (3 – 7 ft from parts)
- Rapid inspection (500 parts/h)