



# 1522 – Experimental Mechanics & Non-Destructive Testing Diagnostics

SAND2007-5356P

**Mission:** *To accurately characterize the structural response of systems to pressure, temperature/humidity, load, and acceleration environments. Provide design expertise for fixturing and development of experimental configurations. Develop and apply state of the art radiographic and acoustic diagnostics.*



Acceleration



Climatic



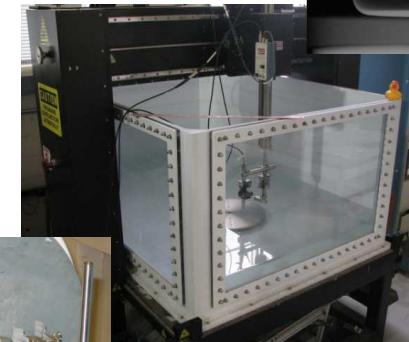
Structural Mechanics



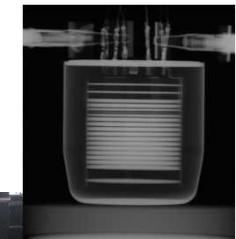
Production Testing



Non-Destructive Testing



Fixture Design



# 1522: Structural Mechanics Lab (860)

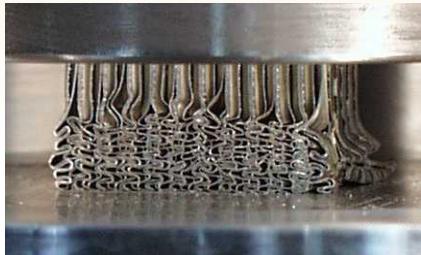
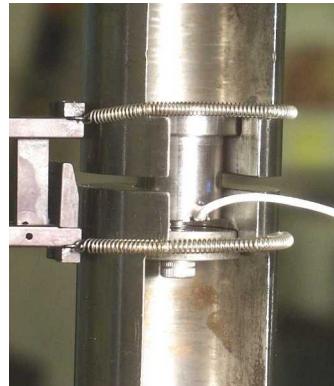


Photo: QuickTime™ and a  
Photo - JPEG decompressor  
are needed to view this picture.



- **Overview of Capabilities**

- Force up to 600,000 lbs
- Field test up to 120,000 lbs
- Pressure up to 20,000 psi
- Vacuum down to .1 psia
- Displacement / Strain measurement

- **Accomplishments**

- 3 degree of freedom static test
- Combined thermal and pressure tests

- **Future Activities**

- Combine vacuum and pressure tests
- Improved multiaxis load and displacement control
- Utilization of Digital Image Correlation for full field displacement and strain measurements

**Point of Contact: Nathan Roberts**  
[ndrober@sandia.gov](mailto:ndrober@sandia.gov)

**Personnel: 1 Engineer, 3 Technologists**



# 1522: Climatic Lab (860)



- **Overview of Capabilities**

- Altitude / Temperature Chamber
  - -100°F to 350°F, ambient to 160,000 ft
- Thermal Shock Chamber
  - -100°F to 350°F
- Oven
  - Ambient to 1292°F
- Salt Fog/Humidity Chamber
  - Corrosion Testing
- 5 Temp/Humidity Chambers, 1 walk-in
  - -100°F to 350°F, 10% to 95% relative humidity
  - -85°F to 200°F, 10% to 95% relative humidity (walk-in)
- 3 Temperature Chambers
  - -100°F to 350°F
- Data Acquisition
  - Data Loggers and Circular Chart Recorder

- **Accomplishments**

- Development, Qualification, and Acceptance of multiple system components
- Portable data acquisition system upgrade
- Temp/humidity chamber controller conversion upgrade

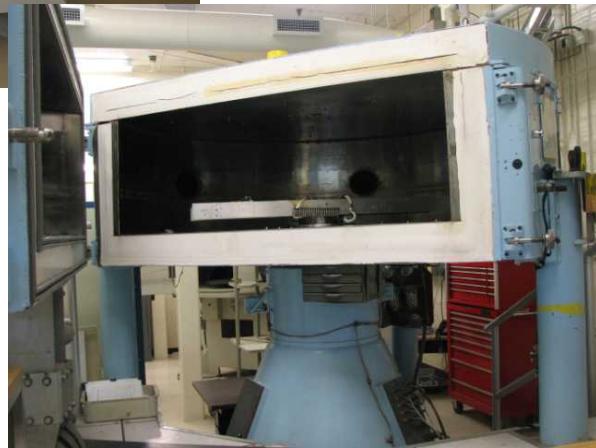
- **Future Activities**

- Walk-in chamber controller upgrade
- Support equipment upgrade

**Point of Contact: Rudy Sedillo**  
[rsedill@sandia.gov](mailto:rsedill@sandia.gov)

**Personnel: 2 Technologists**

# 1522: Centrifuge Lab (860)



- **Overview of Capabilities**

- Space Electronics

- 400g
    - 50 lb. payload
    - 33" max radius
    - 16 Data/Power Connections via sliprings
    - RF Data Connection
    - Accelerometer and RPM data availability

- Goerz

- 100g
    - Fast rise time
    - 50 lb. payload
    - 27" max radius
    - 34 data/power connections via sliprings
    - Accelerometer and RPM data availability

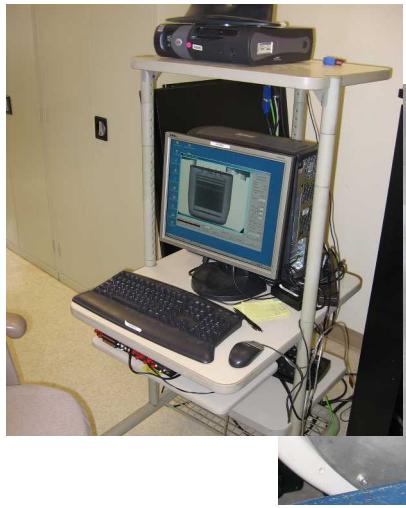
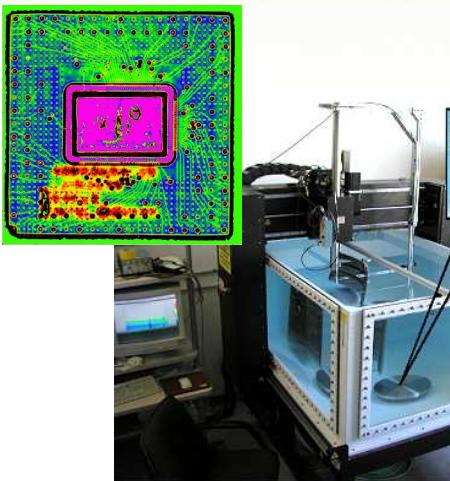
- **Accomplishments**

- Development, Qualification, and Acceptance of multiple system components
  - Power installed for portable temp chamber

- **Future Activities**

- Goerz controller software/computer upgrade
  - Investigate active thermal conditioning
  - Investigate replacement for higher g level
  - Vibrafuge capability added to Goerz

# 1522: Non Destructive Test Lab (860/6539)



## • Overview of Capabilities

- Film Radiography
- Digital Radiography
- High Energy X-ray
- Flash and High Speed X-ray
- Computed Tomography
- Ultrasonics
- Eddy Current, Dye Penetrant, Visual Inspection, Optical Measurement

## • Accomplishments

- Flaw Detection
- Micro Computed Tomography
- Material Characterization

## • Future Activities

- High Energy CT
- High Temp Material Characterization
- Nonlinear Acoustics