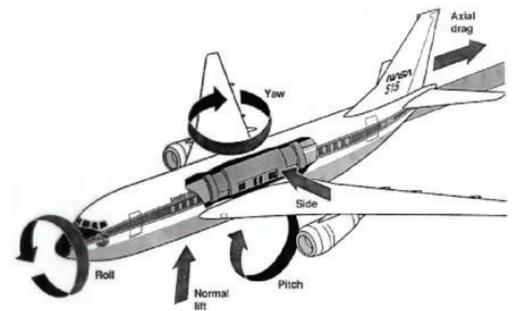




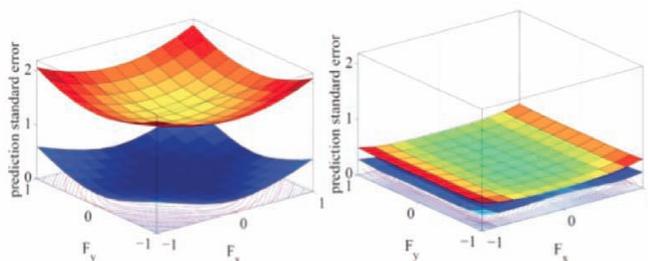
NASA's Aeronautics Test Program

# National Force Measurement Technology Capability (NFMTC) Strategy

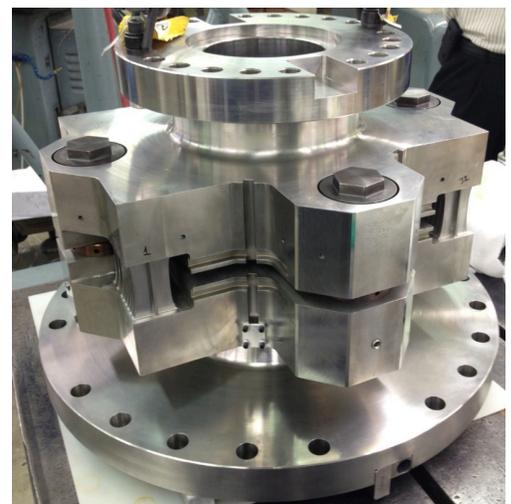
The National Force Measurement Technology Capability (NFMTC) Project is a “capability” development activity established by the Aeronautics Test Program (ATP) to fulfill part of its charter, to preserve the capabilities of the largest, most versatile and comprehensive set of testing facilities in the nation. This project has been formulated to address the erosion of this critical measurement technology of the aeronautics community. The project is executed by a coordinated team approach of the NASA Research Centers (Langley Research Center (LaRC), Ames Research Center (ARC), Dryden Flight Research Center (DFRC) and Glenn Research Center (GRC)) and in partnership with Arnold Engineering and Development Center (AEDC). This activity established the foundation for the National Force Test Measurement capability by providing resources to: support aeronautics test requirements for NASA, AEDC, and the nation. The initial emphasis is on wind tunnel strain-gage balances. Once established, this capability can be utilized by the nation for all of its aeronautics testing needs. Strategic investments in infrastructure, technology development, and personnel will be utilized long-term to maintain this critical capability for the nation.



Internal Balance Axis System



Improved Prediction through Statistical Engineering



Ames 11' Tunnel 30K Balance

## Benefits

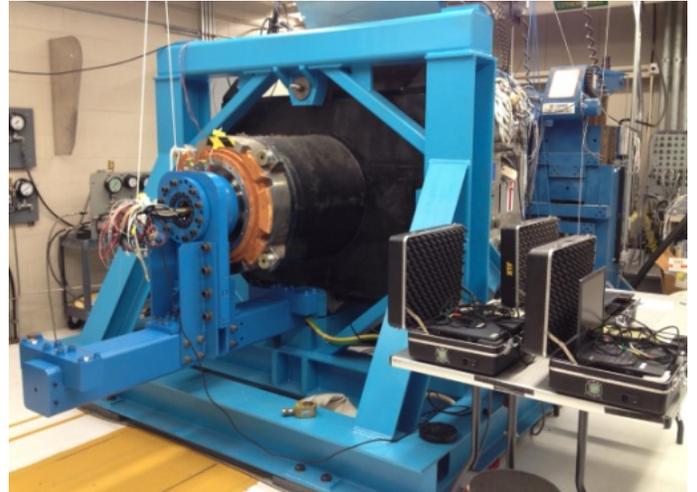
Coordinated consultation services for force measurement needs that enable expertise to be obtained through government, academia and industry using existing agreements and contracts. Access to the nation's wind tunnel balances through the national inventory database.

## Technical Areas and Capabilities

- Force measurement design, strain-gaging, calibration and fabrication
- Materials, sensors, stress analyses, fracture mechanics and fatigue analyses
- Balances, calibration systems, inspection techniques
- Statistical engineering (Design of Experiments (DOE), Response Surface Methodology RSM), uncertainty analyses, statistical quality control
- Standards and training documents
- Trained personnel in force measurement technology

## Recent and Current projects

- In-tunnel check load rigs
- Inventory replenishment – internal and semi-span balances
- Flow-thru balance evaluation
- Standard practices
  - Calibration study
  - Stress Analysis
  - Training plan development
- Large Load Rig (LLR) refurbishment – semi-span balance calibration system
- Balfit software development – enhanced calibration analysis capability
- Weight basket improvement
- High temperature balance development
- Program support consultation
  - Mars Science Laboratory
  - Orion and Ares
  - Department of Defense (DOD)
  - Fundamental Aeronautics (FA) Program and Projects
- Recapitalization of the NASA strain-gage balance inventory ([www.natbalinv.com](http://www.natbalinv.com))
- Sponsor AIAA GTTC Internal Balance Technology Working Group II and the 7th International Symposium on Internal Strain-Gage Balances



Jet Exit Rig Balance at GRC PSL



MSL Test with Flow-Thru Balance

## Contact Information

[www.aeronautics.nasa.gov/atp](http://www.aeronautics.nasa.gov/atp)

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