presented to

NASA Advisory Council
Technology & Innovation Committee

October 21, 2010

Lesa Roe
Director
NASA Langley Research Center
What Matters Next?

Founded in 1917
1st civil aeronautical research lab

~$800m Budget
~$685m NASA Langley budget
~$115m External business & 2009 Recovery Act

~3,800 Workforce
~1,900 Civil Servants
~1,900 Contractors (on/near-site)
(~260 students)

Infrastructure/Facilities
788 acres, 181 Buildings
~$3.3b replacement value

Langley’s Economic Impact (2009)
National economic output of ~ $2b and generates over 16,450 high-tech jobs
Virginia economic output of ~ $920m and generates over 8,100 high-tech jobs

Aeronautics $218m
Exploration $94m
Science $95m
Space Operations $6m
Education $16m

Cross-Agency Support Program & Construction/Environmental Compliance & Restoration
- Center Management & Operations
- Agency Management & Operations
- Construction/Environmental Compliance & Restoration
NASA Langley Core Competencies

Aerosciences
Research for Flight in All Atmospheres

Aerospace Systems Analysis
Entry, Descent & Landing

Characterization of all Atmospheres (Lasers & LIDAR)

Aerospace Structural & Material Concepts
The spectrum of innovation

- Differentiating Innovation
- Disruptive Innovation
- Next-Step Innovation

desired distribution
Prove feasibility of novel, early-stage ideas with potential to revolutionize a future NASA mission and/or fulfill national need.

Creative ideas regarding future NASA systems or solutions to national needs.

Prove it WORK?

Possible Solution

Possible Solution

Possible Solution

Possible Solution

Is it Flight Ready?

Infusion Opportunities for NASA Mission Directorates, Other Govt. Agencies, and Industry

Mature crosscutting capabilities that advance multiple future space missions to flight readiness status.
NASA Langley’s Mission Success

Deliver on Today’s Commitments and Prepare for Tomorrow’s Opportunities

Customer Relations

Work with our Customers to define and solve compelling national challenges

Technical Excellence

Deliver Systems Solutions to Enable NASA’s Missions

Foster Continuous Learning, Exploratory Thinking and Informed Risk-taking

Efficient Operations

Ensure an Agile, Adaptable and Responsive Langley

Create the NASA Langley of 2050

As of 9-28-2010
Langley Strategy Teams

**RTC**
Inform R&D direction based on aerospace-related science and technology horizon.

**Planning Time Horizon:**
25 – 30 years

**SOT**
Foster advocacy and identify opportunities for LaRC in new business markets.

**Planning Time Horizon:**
1 year

**IOT**
Develop technical content for input to near-term program planning activity.

**Planning Time Horizon:**
1 – 2 months

---

**RTC**
**Revolutionary Technical Challenges**
1. Designer Extreme Materials
2. Climate Understanding & Prediction
3. Characterization and Entry/Traversal through Planetary Atmospheres
4a. Synergistic, Integrated Commercial Aircraft Design
4b. Distributed Aviation Vehicle Technologies
5. Distributed Intelligent Aviation Technologies
6. Advanced Cognitive Computing
7. Earth & Orbit Spaceliner
8. Affordable Exploration
9. Immersive Virtual Human Exploration
10. Energy

**SOT**
**Strategic Opportunity Teams**
1. Participatory Exploration
2. ModSim
3. Energy Independence Technology
4. Making NASA Cool
5. Planetary Science
6. Aerial Robotics
7. Frontier Sensors
8. Commercial & Military Space
9. Exploration Technologies

**IOT**
**Innovation Opportunity Teams**
1. Digital Distribution
2. Personal Air Vehicles
3. Structural CNT & BNNT
4. Revolutionary Emissions Reduction Transport
5. Inflatables/Membranes
6. Climate Sensors
7. Virtual STEM Education
8. Space Exploration Reliability
9. Radiation Protection Invention
10. Commercial & Military Space
Grand Challenges

Make space part of mankind's natural environment...

- Achieve economical, on-demand space access
- Enable in-space commercial/marketable services
- Improve spacecraft safety and protect astronaut health
- Enable publicly accessible virtual presence and exploration

...manage space as a natural resource...

- Fully understand climate change and natural disasters
- Portable and economical energy on demand
- Understand and manage the near-earth environment
- Invent tools of exploration that exploit in-situ resources

...and blaze our trail into the universe...

- Understand laws of the universe
- Discover life and earth-like worlds
- Operate at the very limits of what is possible

Where will your ideas take us?

What challenges will you add to this list?
Building the Langley of the Future

“Renew, Modernize, Sustain, Consolidate → 21st Century Lab”

New Town Follow-on

System Development Complex (Integrated Fab)
Research Wind Tunnel Complex
Core Competency Complexes

New Town Timeline

2008 Langley Headquarters 2019
Engineering Collaboration & Shared Services
Measurement Sciences Labs
Structures/Materials Labs
Multi-use Hoteling/Collaboration Space

Revitalize Langley

Lab Consolidation
Large/Small Facility Strategies

IT Infrastructure & Mod/Sim Synergies
Continual Lab Modernization

Comprehensive Rehabs
New Town Project

A Major Repair By Replacement Upgrade

5 New Buildings, 2 Rehabilitated Buildings, 10 Demolished Buildings in Core Area
Personnel Directly Affected: 1200

- Total Office: 253,000 GSF
- Total Labs: 105,000 GSF
- Total Shared Use: 73,000 GSF
- Total New: 431,000 GSF
- Total Rehab: 72,000 GSF
- Total Demolitions: 780,000 GSF

Main Entrance

W. Taylor St

Langley Blvd.
What we are doing to encourage innovation …

Lecture Series

Revolutionary Technical Challenges

Organization Innovation Plans

TEDxYouthDay

[Individual “Beyond the State of the Art” Plans]

Creativity & Innovation Funds

Lunch & Learn

10% White Space