



NASA Langley Research Center

presented to

NASA Advisory Council Technology & Innovation Committee

October 21, 2010



Aeronautics



Science



Exploration

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What Matters Next?

NASA Langley at a Glance (2010)



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

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

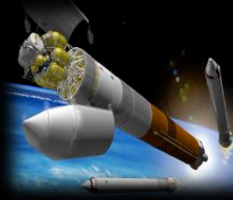
Aeronautics

\$218m



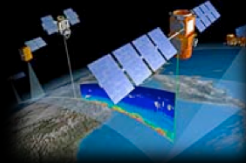
Exploration

\$94m



Science

\$95m



Space Operations

\$6m



Education

\$16m



Cross-Agency Support Program & Construction/Environmental Compliance & Restoration

- Center Management & Operations

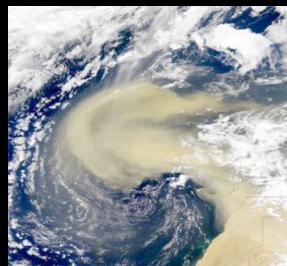
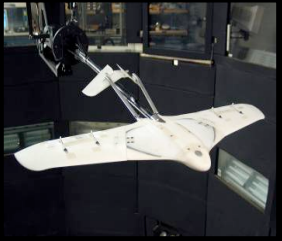
- Agency Management & Operations

- Construction/Environmental Compliance & Restoration

NASA Langley Core Competencies

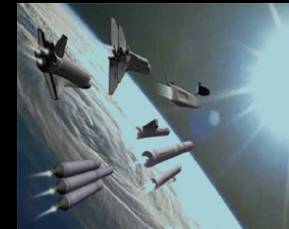
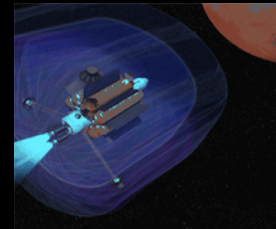
Aerosciences

Research for Flight
in All Atmospheres

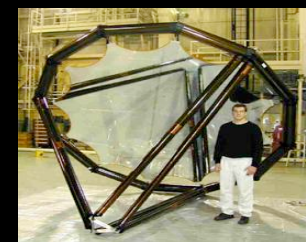
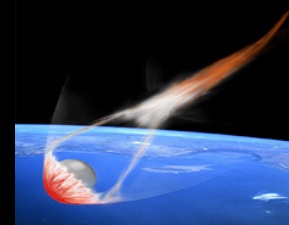


Characterization of
all Atmospheres
(Lasers & LIDAR)

Aerospace Systems Analysis

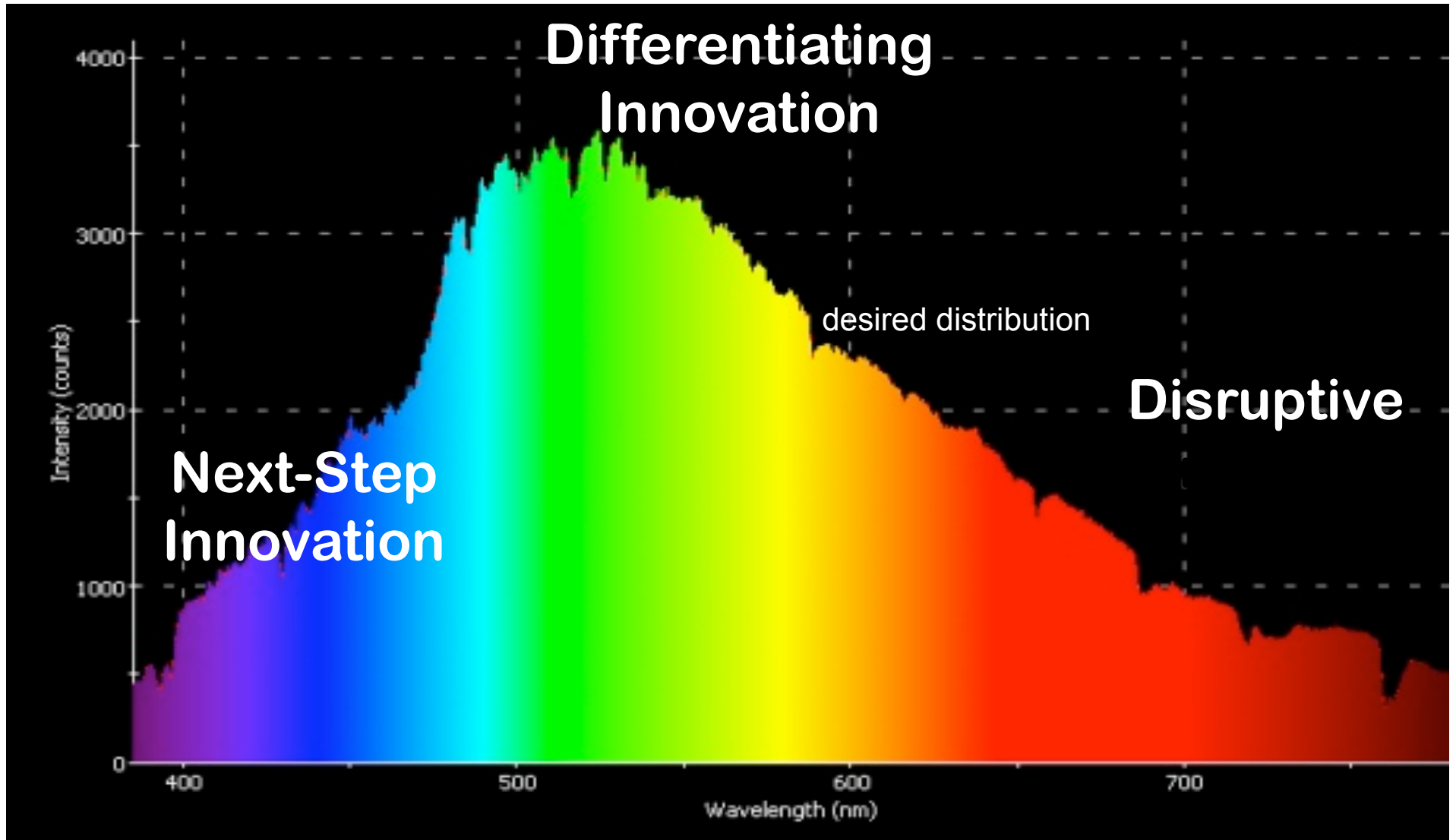


Entry, Descent & Landing



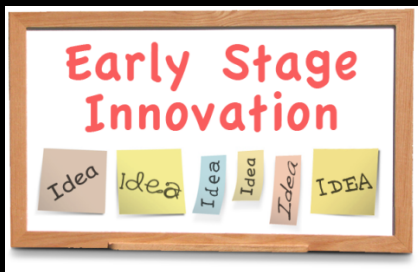
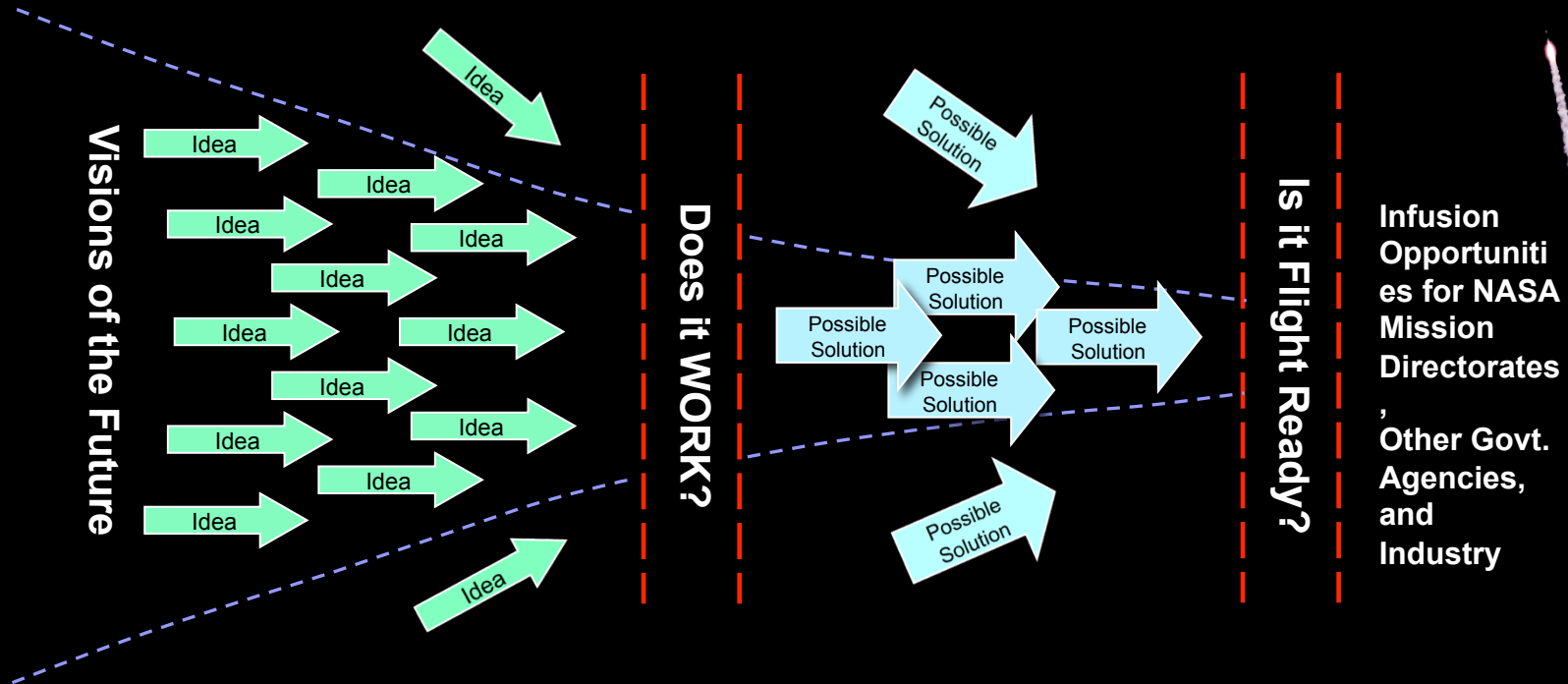
Aerospace Structural & Material Concepts

The spectrum of innovation





NASA Space Technology



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



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



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

RTCs

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

Planning Time Horizon:
25 – 30 years

SOTs

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

Planning Time Horizon:
1 year

IOTs

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

MISSION
CONTRIBUTIONS



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 publically accessible virtual presence and exploration

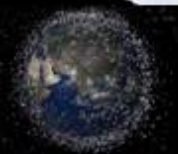
...manage space as a natural resource...



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?

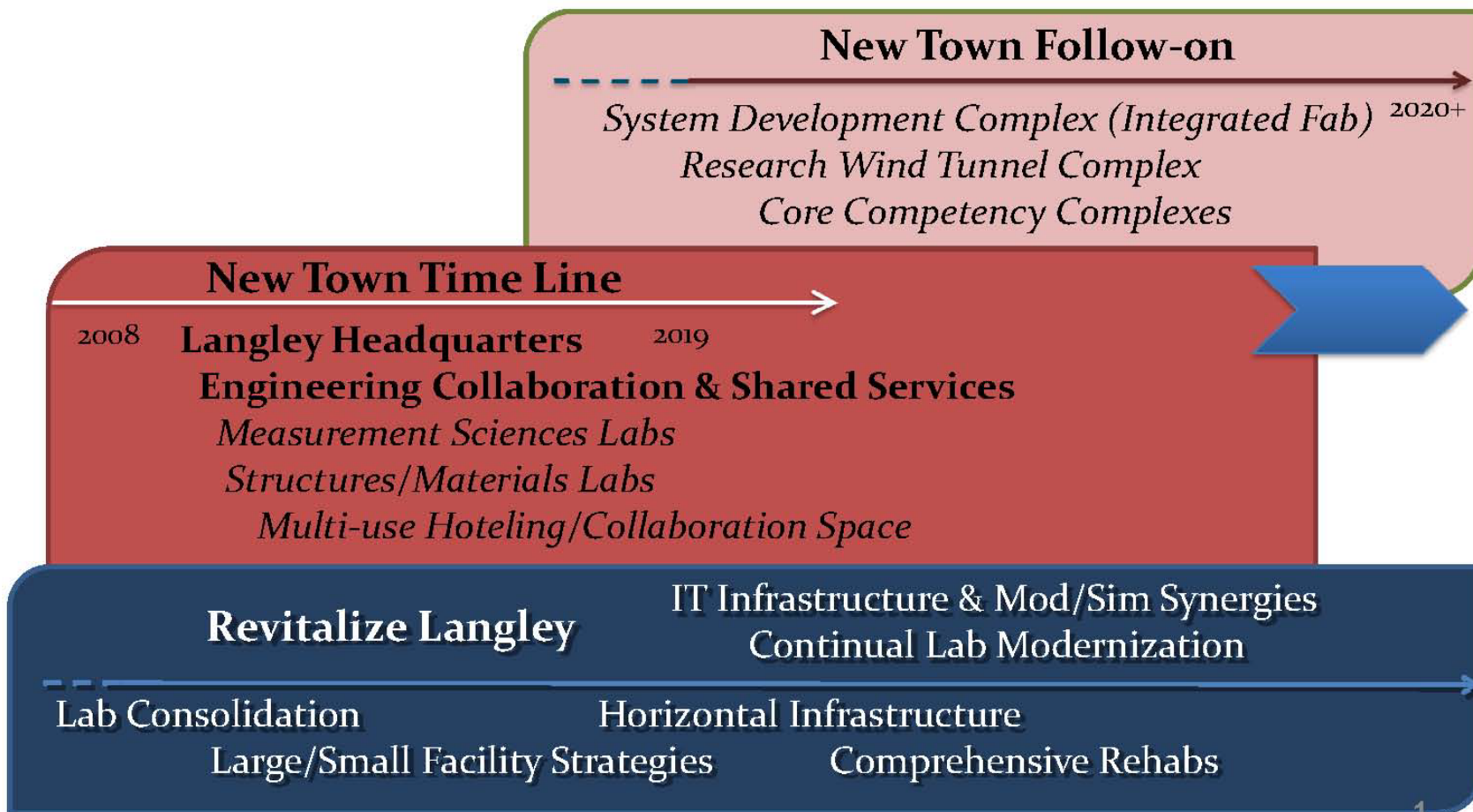


LaRC Master Plan – Final HQ Presentation – Aug 27, 2010



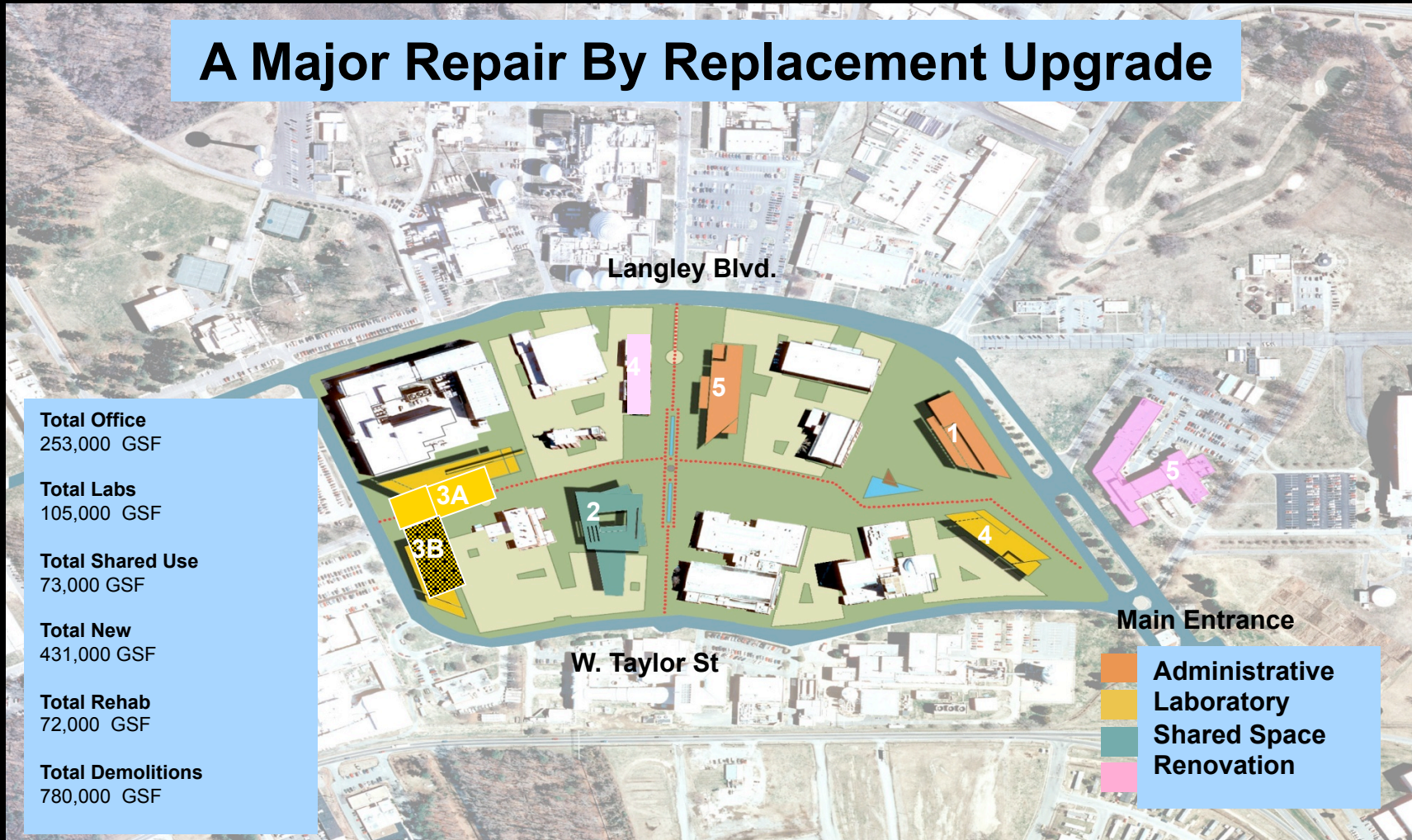
Building the Langley of the Future

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



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**

What we are doing to encourage innovation ...



Lecture Series



Revolutionary Technical Challenges

Organization
Innovation

IOTs



Colloquiums

TEDxYouthDay



[Individual "Beyond the State of the Art" Plans]

TEDxNASA
x = independently organized TED event



Lunch &
Learn

Creativity & Innovation Funds



10% White
Space

INNOCENTIVE®



NASA Langley

