Langley Research Center (LaRC)

Highlights*:

- Game Changing Development: New Program Office to manage $124 million in FY 2011 and $1.5 billion over five years to foster innovate research and development projects that have the potential to revolutionize spaceflight.
- Earth Science Missions: Augmentation and acceleration of Earth Science missions, including SAGE III on the ISS (climate continuity measures), CLARREO (Decadal Survey Tier 1 mission), and NASA's Venture Class activities.
- Aeronautics Research: The FY 2011 funding augmentation will be used to increase research activities into green aviation and Next Generation Air Transportation System (NextGen) capabilities

* Proposals regarding Program Office assignments will be implemented following Congressional approval of the FY 2011 budget; and funding amounts include the cost of civil service labor.

Center Assets: Located in Hampton, VA, LaRC employs over 1,900 civil servants, consisting mainly of professional engineers and scientists. Center capabilities that will be tapped in the President's new program include aerospace research, atmospheric science, aerodynamics and flight research, structures and materials science, and technology development. Specific new activities include the following.

Game Changing Development Program Office: This program will use a DARPA-like "end-game" approach. Research teams, provided with challenge goals and top-level requirements for the desired capability, will be required to define solution approaches and the anticipated technology needs. Teams are held accountable for ensuring that discoveries will move rapidly from the laboratory to application through fixed-duration awards. Game Changing Development projects are intended to be capability-oriented and differ from traditional R&D methods that advance discipline or core knowledge. In this grand challenge technology development program, individual project failure must be acceptable for innovation to flourish, and even in cases of failure, we extract program knowledge. As the Program Office, LaRC will spearhead the development of this new approach for the Space Technology Program.

Climate Initiative: The President's FY 2011 Budget provides additional funding to accelerate the development of new satellites to enhance observations of the climate and other Earth systems. Included in that acceleration are specific projects managed by LaRC including:

- Refurbishment of the SAGE-III (Stratospheric Aerosol and Gas Experiment) instrument, for use on the ISS, will provide near-global, long-term measurements of key components of the Earth's atmosphere. The most important of these are the vertical distribution of

aerosols and ozone from the upper troposphere through the stratosphere. SAGE-III will be ready for flight to the ISS by late calendar year 2013.

- CLARREO (Climate Absolute Radiance and Refractivity Observatory) is a Tier-1 Decadal Survey mission, designed to make precision, stable measurements to enable rapid detection of long-term changes in the climate system, and its radiation-related feedback mechanisms. The mission is a jointly managed with GSFC, and being developed with other partner organizations. The President's FY 2011 budget provides for accelerated development and launch by CY 2017 of the first of two CLARREO spacecraft.

- Venture Class Program investments will enable the program to expand in two distinct and complementary directions:
    - Beginning in FY2011, the conduct of annual competitive Venture-Instrument solicitations for a single, $90M-class instrument (5-year development) for launch on a flight of opportunity;
    - Release in FY2012 of the Venture-2 competitive solicitation for development and flight of a complete, PI-led, small mission ($150M NASA funding cap, launch no later than FY2018 after a 5-year development), with an every-other-year pattern of solicitations alternating between aircraft and space mission opportunities.

Aeronautics Research Augmentation:

LaRC will support the Aviation Safety Program in the verification and validation of flight critical systems that will be required in order to successfully realize NextGen. This support will include the development of more efficient verification and validation approaches to satisfy flight-critical safety requirements, especially needed considering the trend for increasingly software-intense automation and networks of distributed systems.

LaRC will support the Integrated Systems Research Program, addressing operational and safety issues related to the integration of unmanned aircraft systems (UAS) into the national airspace by providing expertise in the areas of hardware and software verification and validation, autonomous system design, separation assurance technologies, and associated certification issues.

LaRC, along with the other NASA research centers, will support the augmented research and development efforts, including grants and cooperative agreements, to support NASA's environmentally responsible aviation project. These research plans, which are currently being developed, will include design and feasibility studies, high-fidelity simulations, flight demonstrations, design competitions and prize challenges.