



NASA Glenn Research Center

Goals and Objectives

March 2007

Table of Contents

Executive Summary Page 3

Signature Page Page 4

Goal 1: Be Valued as a Leader in Space Flight Systems Development Page 5

Goal 2: Be Known for Excellence in Project Management Page 7

Goal 3: Excel in Aeronautics and Space Research Page 9

Goal 4: Become an Integral Part of the Ohio Community and the NationPage 11

Executive Summary

The Glenn Research Center (GRC) is transforming to implement the vision for the Nation's space exploration program. We are committed to creating a strong, healthy, viable Center that is valued by the Agency as a critical partner. The Glenn Senior Leadership Team held a strategic planning meeting on March 19 to 21, 2007, resulting in the adoption of the following Center goals, in priority order:

(1) Be Valued as a Leader in Space Flight Systems Development

We will excel in space flight systems development with the entire Center embracing a shared development vision to perform as a winning team, focusing on satisfying partners, and using GRC's highly skilled workforce to deliver on commitments.

(2) Be Known for Excellence in Project Management

We will excel in high-profile project management responsibilities that will translate into visibility and awareness of our project management prowess. To achieve this goal, we will secure and place GRC project managers in key Agency programs to lead in systems and subsystems development. In addition, we will use project manager presentations, forums, workshops, and symposia to showcase the Center's work. Added visibility will enable us to be recognized by our peers as leading project managers.

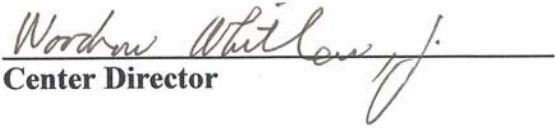
(3) Excel in Aeronautics and Space Research

We will excel in aeronautics and space by conducting cutting-edge innovative research as only NASA can. We will use our world-class staff and facilities to ensure the success of NASA's missions.

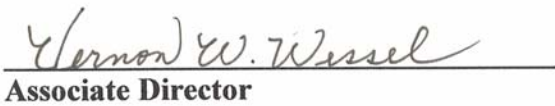
(4) Become an Integral Part of the Ohio Community and the Nation

The Center has tremendous talent and capabilities that can provide benefits beyond its physical boundaries. While focusing on NASA's mission, we must be good citizens of the state of Ohio, the Great Lakes Region, and the Nation and provide benefits to the taxpayers through the formation of partnerships, use of our technology to spur new businesses and industries, and increased outreach efforts.

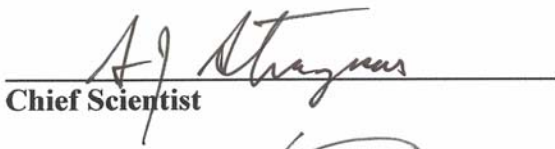
Signature Page

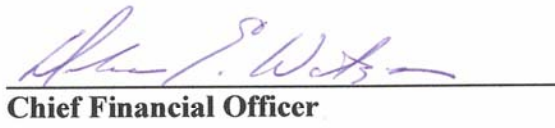

Center Director


Deputy Center Director


Associate Director


Director, NASA Safety Center


Chief Scientist


Chief Financial Officer

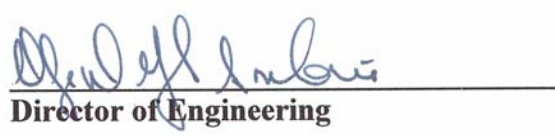

Chief Counsel


Director, Plum Brook Management Office


Director, Office of Strategic Management


Chief Information Officer


Director of Center Operations


Director of Engineering

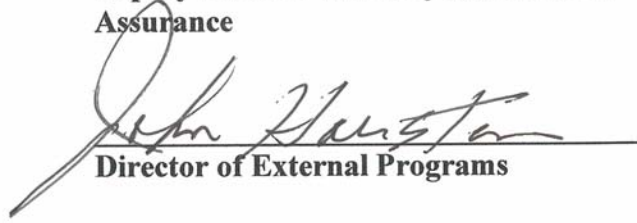

Director of Facilities and Test


Director of Space Flight Systems


Deputy Director of Space Flight Systems


Deputy Director of Safety and Mission Assurance


Director of Research and Technology


Director of External Programs

Goal 1: Be Valued as a Leader in Space Flight Systems Development

An environment for effective space flight systems development is created when the entire program and project management team embraces a shared vision to perform as a winning team, focuses on satisfying partners, and is a highly skilled workforce that delivers on commitments. The management team must define a sound architecture; partition project deliverables into incremental, usable levels of functionality that support expected outcomes; establish accountability of organizational operating units; employ concurrent engineering; establish configuration discipline, resources management, and performance metrics; and communicate effectively. The objectives listed below are essential to attaining the goal.

Performing as a Winning Space Flight Team

Winning space flight teams are built on at least three attributes: (1) a “can do” attitude that matches objectives and risks, (2) a sense of urgency that values the simplest solution consistent with the facts, and (3) open communication which fosters a comfortable environment in which people are voicing potential challenges and contrary points of view to improve the process of space flight development.

Setting a Comprehensive Development Vision

Development vision articulates an overall concept for how the Center can best support the NASA mission, what the Center decides to pursue, and how we will execute that concept, including the identification of specific targets, vetting and selection of projects, and communicating both the decision and the deliberations to stakeholders. Fundamental to the successful completion of any development activity is the understanding of the mission. This understanding can be accomplished by answering four questions. Why is the project being undertaken? What are the expected outcomes? Who are the stakeholders? What are the operational uses of the project’s products? Adhering to a development vision that incorporates responsibility, understanding, and communication will help GRC succeed. The process focuses on choices that align with the mission of the Agency and Center and capitalizes on the strengths of the current workforce, facilities, and partnerships. The process also builds on successes with current and past space flight systems development projects. Key to this process is accepting responsibility for each part of the implementation process—from the Center Director to the people who make the Center work.

Satisfying Our Development Partners

Satisfying other development partners shows the Center’s capacity to go the extra mile to deliver reliable, on-time, and on-cost products and services to a project. Inherent in this objective is the Center’s ability to meet the challenges of the project regardless of technical, schedule, cost, facility, infrastructure, or other issues. This objective also reflects the Center’s capability to quickly adjust to programmatic modifications such as changing requirements with shifts in skill mix, staffing levels, and facility infrastructure needs. Equally important are our partners’ commitments to us, indicated by their deliverables on schedule.

Synchronizing Designs using Concurrent Engineering

Concurrent engineering harmonizes and integrates design efforts among each participant. Changing the Center’s focus will require the involvement of every individual and organization participating in the life cycle of the project (project inception, execution, delivery, and use). For space flight hardware, this will involve all internal organizations, as well as external interfaces such as flight crews (astronauts), launch services, mission controls and contractors responsible for

the development and manufacturing of the hardware. These projects typically require support from across the Center, the Agency, and the Nation. Synchronizing designs improves safety, performance, efficiency, and conserves resources.

Building and Sustaining a World Class Workforce

In order to achieve our objectives and deliver on our commitments to the Agency, the Center continues to foster a highly skilled, motivated, and productive workforce, with the skills required to lead, manage, and implement our current and future projects, augmented by our partners and suppliers as needed. We need to continue to focus on hands-on experience and targeted training, so that we can be smart, effective, and excellent in all we do. The people who operate test and evaluation facilities infrastructure must be trained (taught system operation and/or maintenance including emergency procedures), proficient (demonstrating familiarity both by initial certification and a minimum number of operations in a specified time), and sufficiently rested (work limited to specified shifts or intervals—day/week/month/year).

Guaranteeing Safe, Effective, Reliable, and Available Infrastructure

Infrastructure, including facilities, information technology, and people, provides the tools necessary for spaceflight programs to design, build, test, and fly space systems. Like the space systems it supports, infrastructure must be safe (operate without harm to humans or equipment), effective (provide outputs as intended), reliable (provide repeatable results), and available (have the capacity to meet needs). Particularly important are the test facilities that help verify hardware requirements and validate that space flight systems are safe, effective, and reliable.

Resuming Human Spaceflight Systems Management and Reporting

Increasing the effectiveness and efficiency of our systems management and reporting processes allows for a more informed decision-making process. Human spaceflight projects particularly depend on the rigor, repeatability, integration, and commonality of these processes across the Center and Agency. These processes must include mechanisms that highlight necessary additional resources. Systems that allow us to capture data and report it timely and efficiently must be required for the decision-making process. The processes must also serve to capture information to communicate our story and provide prompt corrective action as needed.

Managing Funding

Proper funding of spaceflight development programs includes stable, sequenced increments of resources, each with enough reserve to address inherent technical and schedule risk without additional external funding. When funding profiles do not meet this ideal, options include reducing program content, delaying program schedule, or both. Once defined, programs cannot absorb frequent changes to funding profiles without correspondingly increased risks to both content and schedule. Proper management of funding also includes accurate assessment of project risk so problems that can lead to cost and schedule overruns are addressed early enough to be mitigated.

Goal 2: Be Known for Excellence in Project Management

A major goal of GRC is to be celebrated for excellence in project management, which is critical to our key stakeholders. These stakeholders, such as the Administrator and Deputy, Associate Administrator, Mission Directorate Associate Administrators, their staff, and major Program Managers, are responsible for assigning projects to NASA centers.

This goal is defined by three objectives. The first objective is to demonstrate excellence in project preplanning and planning that leads to correct go/no-go decisions to continue a project into the more expensive phases. The prephase period develops a coherent framework of requirements to guide stakeholders over the project life. The second objective is to demonstrate excellence in project implementation where deliverables are met at the agreed costs and schedules. The third objective focuses on our contributions to the intellectual and practical progress of the project management competency within the Agency, across the U.S. Government, and where appropriate, internationally.

Planning Excellence

Excellence in project management planning is defined as the ability to assemble a strong team, develop an articulate project plan, communicate with our customers and stakeholders, and incorporate knowledge and experience from the past. Leadership is critical in the planning stage. An effective project team includes program control (scheduler), cost analyst/estimator, appropriate engineering/technical leads, a requirements manager (definition and book manager), configuration management/control specialist, and risk management expertise. Project management leadership hinges upon early and clear definition of roles and responsibilities. Superior project planning results in an effective project plan that adheres to Agency and Center policies and guidelines while delivering clear objectives and executable timelines. Good communication is essential for effective project management. The stakeholders must be kept informed throughout the critical planning phase. Planning is the period in a project's lifecycle where the biggest positive impacts can be made and where the lack of preparation will echo into implementation and operation. Finally, excellence in project planning utilizes the best from the past by incorporating relevant lessons learned and embracing input from experienced project managers. This phase of the process results in an informed decision to proceed with implementation.

Project Management Implementation Excellence

Excellence in project management implementation consists of several elements. A well-implemented project is one where products are consistently delivered on time, within or under budget, and with technical expectations met or exceeded.

Continuous risk management is essential to assuring project success. When all significant risks are identified and understood, they can be eliminated or mitigated to continually minimize the likelihood of failure and its potential impact. Project requirements that are established during formulation are consistently met, and the project team fully understands the consequences of not meeting them, even just once. Project management validates the resources needed during each phase of the project, and continually monitors project performance within those allocated resources.

Project management implementation excellence includes conducting effective, efficient, thorough, and timely management reviews with the findings addressed by the project team.

Independent project assessments are conducted on a scheduled basis, and as needed, to validate that critical aspects of project implementation are healthy. Finally, project teams aggressively manage their indirect/collateral duties, such as management “show and tell,” congressional briefings, and Headquarters questions or mandates.

External Visibility in Project Management

The Center will take on high-profile responsibilities in project management, which will translate into visibility and awareness of our project management prowess. To achieve this, we will place GRC project managers in key Agency programs to lead systems and subsystems development. Furthermore, we will showcase our leadership in this area by organizing and participating in project management presentations, forums, workshops, and symposia to highlight work developed at GRC. This added visibility will enable us to be recognized nationally and internationally as leaders in the project management area by our peers.

Goal 3: Excel in Aeronautics and Space Research

The President of the United States established the very first National Aeronautics Research and Development Policy on December 20, 2006, and identified the Government's roles. NASA's responsibilities were well defined and GRC, with its expertise in advancing aeropropulsion, high-temperature structures and materials, and instrumentation and controls is critical to the long-term success of the policy's goals and objectives.

The President established the vision for the Nation's space exploration program on January 14, 2004, challenging NASA to return to the Moon, and then go to Mars and beyond. The Center's research has historically contributed in cryogenic propellant management, electric propulsion, photovoltaics, advanced battery, research in fluids and combustion in microgravity, and high-power deep space communications. The GRC will energize its expertise in these areas to provide enabling technologies for the journey.

Crosscutting research disciplines such as structures and materials, simulation and modeling, heat transfer, fluid physics and combustion, and instrumentation and controls will synergistically support aeronautics and space program objectives. For example, GRC's ballistic impact research developed under the Aeronautics Program enabled our leadership in determining the root cause of the Columbia orbiter's leading-edge failure. This dual use of capability is one example of how GRC's research disciplines contribute to both aeronautics and space.

To excel in aeronautics and space research will require an investment in the continuous education of the workforce, active participation in professional societies, and associated symposia and workshops. Rigorous peer review and independent evaluation processes will be reinstated for quality control. Honest technical debate will be promoted to pursue technical truth. The Center will continue to motivate researchers for their professional achievement through appropriate reward and recognition systems. The full spectrum of recruiting tools will be used to ensure the health and vitality of the workforce. Investments in facility infrastructure will be necessary to enable research excellence.

The objectives listed below are essential to attaining the goal.

Regarded as an International Leader in Air-Breathing Propulsion Research

The U.S. preeminence in the aviation industry results in aviation products being number one in the positive balance of U.S. trade. Air-breathing engines in the future will have to be safe, fuel efficient, high performing, and environmentally friendly. Over the last 50 years, GRC has been recognized as a leader in air-breathing propulsion. Building on this reputation, GRC will use its world-class staff and facilities to ensure the success of the NASA aeronautics programs and to enable the Nation in meeting these challenges.

- Conduct cutting-edge, innovative as-only-NASA-can research
- Promote honest technical debate and pursue technical truth
- Increase the number of peer-review publications and presentations
- Improve the quality and content of technical publications
- Nurture and expand on GRC's leadership roles in the NASA aeronautics programs
- Determine the optimum workforce to support GRC areas of excellence (both civil servants and contractors)

- Seek opportunities for internal and external collaboration and recognition

Maintain Leadership in In-Space Propulsion, Power, and Communications Research

With the advent of the exploration vision, the GRC space research technology disciplines will enable the colonization of the Moon and exploration of the outer planets. Our technical excellence in advanced power and propulsion research will enable robotic and human exploration beyond the Moon. The Center's advanced power and communication capabilities will enable surface power, surface communication, in situ resource utilization, crew health, and other technical capabilities that are instrumental to colonization of the Moon and Mars.

- Maintain GRC excellence and leadership roles in structures and materials, instrumentation and controls, power, in-space propulsion, communication, space processing, and experiments
- Increase the number of peer-review publications and presentations
- Improve the quality and content of technical publications
- Seek more opportunities and collaboration in the Advanced Capabilities Program of the Exploration Systems Mission Directorate, nuclear power and in-space propulsion technologies from the Science Mission Directorate, and communication technologies from the Space Operations Mission Directorate
- Determine the optimum workforce to support GRC areas of excellence (both civil servants and contractors)

Promote a Collaborative Relationship with Industry, Academia, and Other Government Agencies

Beyond our own needs, NASA's recognized research expertise helps other Government agencies to develop and implement plans and programs that meet the Nation's needs. Building on the Agency's expanding partnerships, GRC's personnel must actively participate in these multidisciplinary teams to stay current on the status of the technologies and the challenges of our partners and also to leverage the resources across the Government. The Center will market its unique facilities and workforce to maintain critical core competencies that will be needed for the future.

- Seek opportunities to collaborate on national programs/projects
- Serve as subject matter experts in support of other Government agencies
- Effectively market unique facilities and workforce expertise on a reimbursable basis

Serve as a Bridge Between Academia and Industry

While industry facilities are dedicated to product development, GRC provides many unique facilities that can be used to validate emerging technologies in relevant environments. The technology transfer efforts expedite the movement of ideas from the laboratory to practical application. The Center's consortia with academia and industry foster knowledge sharing and technology transfer to potential nonaerospace application users. As an unbiased, third-party broker, we can facilitate collaboration between the science and technology communities.

- Validate development technologies in relevant environments using GRC-unique assets
- Commercialize technology through patents, licenses, and partnership activities
- Foster exchange and collaboration between academia and industry

Goal 4: Become an Integral Part of the Ohio Community and the Nation

The NASA Glenn Research Center has tremendous talent and capabilities that can provide benefits beyond its gates and can benefit more than just the NASA mission. At the same time, key constituencies throughout the country can provide invaluable support to NASA. The Center, as an entity, must be a good citizen that delivers on commitments to the Nation and provides benefits to the taxpayer. This can be accomplished through partnerships, economic development, and outreach efforts. The results of these efforts will be greater appreciation and support for GRC, an expanding economy, and a stronger community.

Conduct Public Outreach Activities

The Glenn Research Center is rich in science, technology, engineering, and mathematics knowledge; world-class facilities; and highly-trained personnel. Showcasing these assets in a strategic, coordinated framework will educate and inspire citizens to understand and participate in the vision for the Nation's space exploration program and will support the implementation of the National Aeronautics Research and Development Policy. Examples of specific actions include the following.

- Conduct activities that benefit the community
- Acquire an offsite Aerospace Educational Center with the ability to educate the public about GRC's technical capability
- Provide educational outreach to develop talent for the Nation's workforce

Personally Involve Senior Management in Community and National Activities

To increase knowledge and visibility of GRC and increase stakeholder support, GRC should be more active in the community. This is accomplished by serving on councils and boards and volunteering at community events. The senior leadership team will set the pace in this area by partnering with national, state, and local leaders to enhance the quality of life. Actions that could be taken include the following.

- Co-host a technology council with local and regional businesses along with the State government that provides technical assistance in problem solving
- GRC leaders participate in regular meetings with civic and business leaders
- Senior managers serve on boards and councils that support the community, institutions of higher learning, and national and international professional organizations as permitted by law and policy

Serve as a Catalyst for Economic Development

The focus of this objective is to have GRC recognized as a value-added partner in developing a strong economic engine for the community. It also clearly demonstrates GRC's commitment to being a good citizen. This is accomplished through the use of GRC's technical expertise and related products to spur the development of new businesses and industries. Actions that could be taken include the following.

- Provide technical support to new business development organizations to commercialize NASA technology
- Provide technical assistance for regional organizations, both public and private
- Partner with the community to bring in cooperative work and help recruit and retain talent

- Encourage and facilitate contractors to locate in and around the Center

Increase Community and National Support for NASA's Mission

In order to further the accomplishment of its mission, GRC must recognize and effectively respond to efforts by external parties to support its activities. To do this GRC must cultivate effective relationships with key constituencies. GRC must also provide these constituencies with concise, easily understandable information about its accomplishments and its strategic and tactical priorities. Actions that could be taken include the following.

- Institutionalize processes to optimize community support for NASA
- Facilitate coordinated support activities by NASA retirees
- Deliver a consistent and coherent message to organizations seeking to support NASA