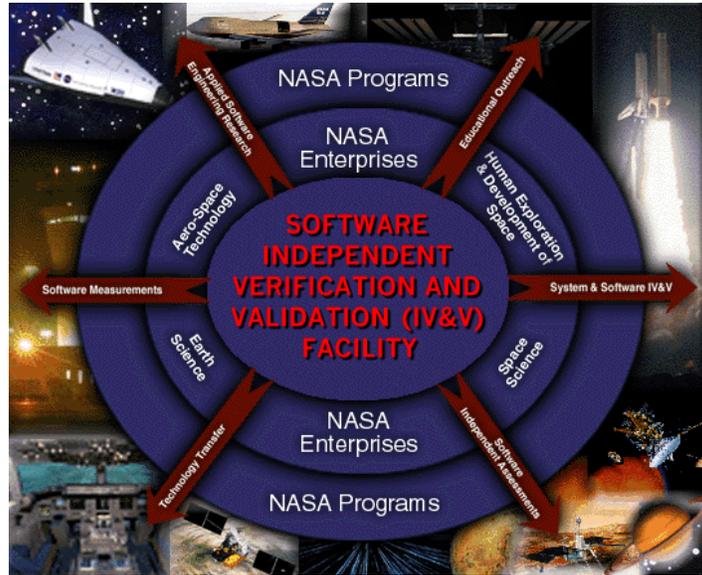


NASA SOFTWARE INDEPENDENT VERIFICATION AND VALIDATION (IV&V) FACILITY



FAIRMONT, WEST VIRGINIA

MAPPING A SUCCESSFUL FUTURE

STRATEGIC PLAN 2003-2008

Presenting Excerpts from the NASA IV&V Facility Strategic Plan

**For more information regarding
NASA IV&V, its strategic plan, or its programs
please see our website: www.ivv.nasa.gov
or write us at info@ivv.nasa.gov**

LETTER FROM THE DIRECTOR

Fellow employees, customers, partners, and all others we serve:

The NASA IV&V organization strategic plan, *Mapping a Successful Future*, represents the results of our commitment to comprehensive planning as a cornerstone of how we effectively operate and succeed in today's ever-changing world. Our NASA Administrator Sean O'Keefe has stated, "NASA must serve as an effective leader that advances the understanding of our world, from science to service, both today and tomorrow, here and beyond."

I am pleased to present key excerpts from our plan. We offer a new, shared vision for us to strive toward as we go forward, along with our mission and what it encompasses. Also important to our work is a set of guiding values that we believe serve as the underpinnings of our purpose and will define our future success.

Based on listening to many different voices from different perspectives of the NASA IV&V organization and our customers, we have developed nine overarching goals that will focus our future actions. As you will read, these goals provide a greater balance of what we traditionally do—research and programs—and where we want to go—toward more support of our employees and our community. Our success depends on our daily work, but also on our research, education, and support of our community. The plan clearly delineates our commitments to our customers and to our employees. The customers are at the foundation of our work. Our employees are our most valuable assets.

I look forward to working together with all of you to bring this plan into reality.

Sincerely,



Nelson H. (Ned) Keeler
Director, NASA IV&V Facility
Fairmont, West Virginia

"So in the end, NASA is about creating the future . . . and our greatest asset in fulfilling this demanding charter is the excellence of our people." –Sean O'Keefe, NASA Administrator

BACKGROUND

Located in Fairmont, in the heart of West Virginia's emerging technology sector, the NASA Independent Verification and Validation (IV&V) Facility was established in 1993 as part of an agency-wide strategy to provide the highest achievable levels of safety and cost-effectiveness for mission critical software.

The IV&V Facility has experienced continual growth in personnel, projects, capabilities and accomplishments. The IV&V Facility's efforts have contributed to the improved safety record of NASA since its inception. Today, the IV&V Facility is governed by the Goddard Space Flight Center and houses over 150 full-time employees and leverages the expertise of over 20 in-house partners and contractors.

The NASA Independent Verification and Validation (IV&V) organization's staff have embarked on a process to establish an increased value-added presence within the NASA community. The effort centers around its main purpose of offering needed software services, including independent verification and validation of the critical software under development, independent assessments of software development practices and products, systems engineering support, and software assurance research.

Software IV&V is a systems engineering process employing rigorous methodologies for evaluating the correctness and quality of the software product throughout the software life cycle.

—NASA IV&V

The NASA IV&V organization continues to grow and become stronger as it contributes to a wide variety of NASA missions and projects. Strategic planning has long been a value embraced and practiced by NASA. The NASA IV&V organization has historically made planning a critical element of its work.

"In broad terms, our mandate is to pioneer the future . . . to push the envelope . . . to do what has never been done before. An amazing charter indeed . . . NASA is what Americans . . . and the people of the world . . . think of when the conversation turns to the future."

—Sean O'Keefe, NASA Administrator

THE NASA IV&V FACILITY VISION

To be recognized as the preeminent organization applying and improving independent verification and validation for software and systems.

THE NASA IV&V FACILITY MISSION

To ensure that our customer's mission-critical software and systems are of the highest quality and are reliable and safe by applying software and systems expertise and tools, while researching new approaches, deploying innovative solutions, providing a learning environment, and participating in the vitality of the community.

NASA IV&V Facility further defines its mission as the following:

- Acquiring, developing, and promulgating the very best in independent verification and validation processes, tools, and techniques;
- Initiating and coordinating software assurance and the IV&V organization research that improves methods and practices, and advances learning;
- Seeking and embracing collaborative opportunities that garner new ideas, create positive change, and achieve success for all partners;
- Facilitating the transfer of science and engineering data, methods, and practices to the most appropriate places;
- Supporting and developing the use of quality standards and performance metrics;
- Sharing our research and knowledge with education, government, business, and industry;
- Participating actively in the educational, cultural, and economic vitality of the community in which our employees live and work;
- Encouraging the development of our personnel and providing them a safe, efficient, and effective environment in which to work.

NASA IV&V FACILITY'S GUIDING VALUES

The NASA IV&V organization has developed the following set of shared values. The organization embraces these in its words and deeds to shape behaviors, pilot actions, deliver services to customers, and establish the organization's culture.

Integrity

Doing what was said would be done; having trust; being honest, fair, and accountable, both personally and organizationally; having steadfast ethical conduct; living by high standards of individual behavior.

Teamwork

Working together; supporting each other; collaborating effectively; sharing accomplishments and successes; providing collective wisdom; being responsible; helping others; leveraging synergy; exhibiting open communication.

Respect

Noticing individual worth; being open-minded; accepting diversity; seeking first to understand and then to be understood; having credibility; empowering oneself and others; welcoming every idea; listening; being civil.

Excellence

Producing quality goods and services; doing the right thing; performing second to none; practicing continuous improvement; being distinctive, creative, and committed; leading in best practices; being efficient.

Balance

Being well rounded with work, family, and self; balancing professional and personal time; giving to the community; practicing wellness of living; having a balanced involvement that enhances all; being there; coaching others.

Innovative

Seeking better ways or new methods to do things; being imaginative to enhance processes; staying on the leading edge; being original, agile, adaptive, and responsive to change.

Safety

Being safe and ensuring personal safety for employees and the public; providing security for everyone and secured protection of our resources and assets; being good stewards.

NASA IV&V FACILITY'S CUSTOMER AND EMPLOYEE COMMITMENT

Having a strong customer focus is foremost in all that the NASA IV&V organization does. Serving the customer is a central purpose for the NASA IV&V organization and thus, the following credo or statement of commitment to all customers.

COMMITMENT TO OUR CUSTOMERS

Our customers are first and foremost in all we do. For every customer we work with, regardless of the purpose or the length of time, we pledge to do what it takes to truly exceed the customer's expectations. We do this by being responsive, learning and understanding customer requirements, and doing what we promise.

Similarly, recognizing our success in meeting our customer commitment depends on the service provided by our employees. The following statement reflects our commitment to IV&V employees.

COMMITMENT TO OUR EMPLOYEES

Our employees are the foundation of our success and our greatest resource. We value each employee and are committed to providing a safe, comfortable, well-equipped workplace while being conducive to creativity, learning, and productivity. Through our guiding principles we will appreciate our diversity, respect each other, and focus on ensuring a balance between professional and personal time.

OVERARCHING GOALS AND OBJECTIVES

The planning process surfaced a number of areas for NASA IV&V to focus its energy and resources on in the next five years. These included continuing successful programs and practices, undertaking improvement initiatives, as well as defining new areas needing developed. Also important was the desire to take advantage of new opportunities and to strengthen the organization's long term growth and stability.

Outlined next, in list fashion, are NASA IV&V's nine overarching goals that emerged from planning and serve as the foundation of its strategic plan. Each represents a significant aspect of the total activities NASA IV&V must achieve to be successful. For each, several of the key objectives needing accomplished to fulfill the goal are listed. The full plan provides more detail strategies to reach these objectives and separate annual action plans will be constructed to provide specific steps that will lead to the plan's full implementation.

Goal 1: Institutionalize IV&V services throughout NASA as a natural 'best practice' and as a wise investment of time and resources.

Objectives

- Become recognized as valuable throughout the ranks of NASA projects and software managers.
- Gain NASA-wide recognition of IV&V being instrumental to success.
- Become more involved in NASA non-mission-specific projects (i.e., all software critical to NASA functioning).
- Establish a NASA-wide environment in which project managers seek out and welcome IV&V Facility participation.

Goal 2: Become nationally recognized as a preeminent leader in IV&V expertise, tools, and processes.

Objectives

- Increase recognized NASA-wide assets.
- Increase the actual occurrence of technology transfer both internally and to others outside the NASA IV&V organization.
- Be called upon as a federal resource in our expertise areas of IV&V and related software and systems assurance.
- Develop relationships and partnerships with other federal and state organizations conducting critical software development.
- Raise awareness of NASA IV&V, its capabilities and successes among other federal and state organizations.

Goal 3: Develop fully an internationally known and valued software assurance research presence.

Objectives

- Do precedent-setting research and publish results.
- Objectively show value for IV&V.
- Enhance IV&V practitioners and researchers collaborative work.

Goal 4: Establish a desired organizational culture that engages and rewards employees and cultivates their long-term commitment to the NASA IV&V organization's workforce.

Objectives

- Cultivate a flexible and efficient workforce to support mission objectives.
- Acquire and sustain a vital workforce (e.g., hiring, recruiting, retention).
- Provide appropriate training and personal growth opportunities for our staff.
- Establish the NASA IV&V organization as a diverse, unified team.

Goal 5: Ensure a focus on customers that is second to none.

Objectives

- Refine our institutional and administrative functions to enable efficient, effective, and accurate support to our customers.
- Maintain an active and fully compliant ISO process as it relates to customer satisfaction.
- Develop a customer ‘first and foremost’ way within the IV&V culture.
- Ensure open lines of communication with all customers.

Goal 6: Achieve continued quality improvement, compliance, and innovation throughout the NASA IV&V organization that advance effective and efficient operations.

Objectives

- Create administration business processes that reduce workload on project managers and other staff.
- Instill practices and rewards that foster innovation and creativity in all areas of the NASA IV&V organization.
- Improve the quality and explicitness of our processes to maintain a standard at or above the ISO requirements.

Goal 7: Capitalize on appropriate direct and collaborative opportunities to ensure maximization of existing resources and advance planned future growth.

Objectives

- Ensure the viability and long-term growth of the NASA IV&V organization.
- Seek effective collaborative opportunities that will advance the NASA IV&V organization’s vision and mission.
- Become the Capability Maturity Model Integrated (CMMI) certification authority for NASA.

Goal 8: Be an active partner in our communities' futures through educational outreach, economic development, and service.

Objectives

- Encourage and enable employees to participate in community activities.
- Increase the awareness of the NASA IV&V organization within the community it serves.
- Be a significant resource for pre-service and in-service teachers related to science and math.

Goal 9: Ensure a safe, comfortable, and well-equipped workplace that is conducive to high performance and supports individual and team productivity.

Objectives

- Enhance the facility's infrastructure to support all other goals and objectives.
- Ensure all aspects related to safety and security are monitored and addressed when improvement or compliance is needed.
- Provide for co-location of NASA IV&V staff and contractors within the same locality.

INDEPENDENT VERIFICATION AND VALIDATION

INDEPENDENT VERIFICATION AND VALIDATION

Independent

- *Technical—IV&V prioritizes its own efforts.*
- *Managerial—Independent reporting route to Program Management.*
- *Financial—Budget is allocated by program and controlled at high level such that IV&V effectiveness is not compromised.*

Verification (*Are we building the product right?*)

- *The process of determining whether or not the products of a given phase of the software development cycle fulfill the requirements established during the previous phase.*
- *Is internally complete, consistent, and correct enough to support next phase.*

Validation (*Are we building the right product?*)

The process of evaluating software throughout its development process to ensure compliance with software requirements. This process ensures

- *Expected behavior when subjected to anticipated events.*
- *No unexpected behavior when subjected to unanticipated events.*
- *System performs to the customer's expectations under all operational conditions.*