Information Technology Infrastructure Committee (ITIC)

Report to the NAC

December 2013

Larry Smarr

Chair ITIC

ITIC Committee Members

Membership

- *Dr. Larry Smarr (Chair), Director- California Institute of Telecommunications and Information Technology, UC San Diego*
- *Dr. Charles Holmes (Vice-Chair), Retired- NASA HQ Heliophysics Program*
- *Dr. Robert Grossman, Professor- University of Chicago*
- *Hon. Mark Forman, former associate director of IT and e-government, OMB*
- *Mr. Joel Mambretti, Director, Intl. Center for Advanced Internet Research, NW Univ.*
- *Dr. Mark Boster; President-ImpaQ Solutions, LLC*
- *Mr. Alan Paller, Research Director- SANS Institute*
- *Dr. Ed Lazowska, Gates Professor & Chair , Dept of Computer Science, UWash*
- *Mr. John Muratore, former NASA engineer & Program Manager, now with Space X*
- ** Dr. Pete Beckman, Dir., Exascale Technology and Computing Institute, Argonne NL*
- ** Dr. Alexander Szalay, Professor- Johns Hopkins University*

- *Deborah Diaz (Exec Sec), Deputy CIO, NASA*

* Not Present for Meeting

NASA is Rapidly Transforming

- KSC Reinventing Itself for a Post-Shuttle Era
- Orion/SLS Asteroid Redirect Multi-Center, Flexible Approach
- Integrated Data Science in Multiple Science Disciplines
- Commercial Cargo Success-New Partnership Model
- Financial Audit-From Dog House to Clean Audits for 3 Years
- Education/Outreach Developed Outstanding Web/Social Media

Vision of a 21st Century NASA

- **21st Century High-Performing Organizations Respond in an Agile, Flexible Manner to Challenges By Quickly Discovering and Integrating Required Resources**
- **They Enable Disparate and Distributed Groups to Rapidly Come Together to Solve Problems and to Develop New Capabilities by Using Common Tools Implemented Over a Unified High Bandwidth IT Architecture**
- **NASA Historically Has Been Organized to Solve Problems With People Working at a Single Center or Mission Directorate With Limited Sharing of Tools, Resources, Solutions & People**
- **NASA Is Developing into a 21st Century Agile Organization That Explores Aero/Space**

A Digitally Enabled OneNASA Organization

- **NASA is Evolving Towards a Vision: IT-Enabled Teams of Experts at Multiple Centers Joining to Rapidly Solve Problems**
- **OCIO, In Collaboration with Centers & Missions, is Articulating This Vision and Identifying the Products and Joint Capabilities that Need to be Developed to Enable This Vision**
  - Building Trust Across Boundaries is Essential
  - Increasing Innovation Funds and Collaboration Incentives High Priority
  - **Agency-Wide IT Governance is Critical to this Transformation**
- **Key to Unlocking the Potential and Creativity of NASA Staff in Times of Major Challenges, Including Reduced Budgets**
- **Deep Cultural Changes Will be Required Throughout NASA to Realize the Benefits Seen in Private Sector Examples**

NASA is Committed to IT Governance

"NASA should produce a clear and concise IT governance document, including documented processes, policies, and organization roles and responsibilities. The framework should incorporate leading IT governance methods."
--NAC ITIC Recommendation July 2013

NASA concurs with the recommendation and appreciates the interest the NAC is showing in IT governance.
The NASA Administrator has stated that
improving IT governance is a top priority for the Agency.
The OCIO is currently implementing
8 recommendations provided by the OIG in
"Audit of NASA's Information Technology Governance".
The Council recommendation ***aligns closely*** with the recommendations included in the OIG report.
--NASA Administrator November 2013

NASA Is Responding to IT Governance as It has to Oversight Financial Audit Criticism



By Frank Konkel Dec 02, 2013

Oversight

GAO: NASA needs to reflect IT investments in EA

"A recent GAO report evaluated the progress of the **26 agencies** required to comply with the OMB's 2012 PortfolioStat initiative and found five agencies that failed to incorporate 100 percent of their IT investments in their Enterprise Architectures (Eas), as PortfolioStat mandates. **NASA was at the bottom of the list.**"

NASA Has Taken Important First Steps in IT Governance

- **OCIO Leads Development of a Framework in Collaboration with Centers & Missions, Driven by their Needs**
  - The Mission Support Council's 12/5/13 Decision is a *vital first step* in coordinating with the Mission IT communities:
    - Increases Authority of CIO through the MSC & Cross Agency Account Manager
    - Provides Agency CIO oversight on Center Investments
  - Next Step are OCIO/MSC Proposals on Agency-Wide Framework, Common Standards, and Specialized Tools and Services.

- **OCIO Is Supporting Adoption of Common Tools by Making Them Available at Low Cost / Low Bureaucratic Overhead, Allowing Future Budget Tightening to Steer Projects into Common Solutions**

- **Implementing Security That Demonstrates Cyber-Risk Reduction**

- **OCIO Owns the Agency-Wide IT Framework**

NASA Has Started the Transition – Utilizing COBIT

How well NASA does IT planning and organizes for success:

- **PO1** Define an IT Strategic Plan (needed to implement the NASA Strategic Plan and close GPRA Modernization Act performance gaps) *NEEDS EMPHASIS*
- **PO2** Define Enterprise Information Architecture *NEEDS EMPHASIS*
- **PO3** Determine Technological Direction *MAY BE TOO HARD-NASA*
- **PO4** Define IT Organization and Relationships *GOOD PROGRESS*
- **PO5** Manage the IT Investment *NEEDS EMPHASIS*
- **PO6** Communicate Management Aims and Direction *NEEDS EMPHASIS (ESPECIALLY BEYOND CIO)*
- **PO7** Manage Human Resources *MAJOR GAPS AND SCARCE CENTER RESOURCES LIKELY WASTING TIME RELEARNING IT SOLUTIONS AND PRACTICES RATHER THAN LEVERAGING SKILLS ACROSS CENTERS*
- **PO8** Manage Quality *NEEDS EMPHASIS, APPEARS THAT NASA IS OPERATING AT CMMi LEVEL 1*
- **PO9** Assess Risks *NEEDS EMPHASIS*
- **PO10** Manage Projects *SEEMS OK, BUT NOT LEVERAGING AT CORPORATE LEVEL, WE NEED TO SEE DATA USING CMMI*

How well NASA does IT acquisition and implementation:

- **AI1** Identify Automated Solutions (this includes analysis of alternatives, requirements definition and prioritization) *NEEDS EMPHASIS*
- **AI2** Acquire and Maintain Application Software *MAY NEED EMPHASIS, NEED SOME DATA HERE*
- **AI3** Acquire and Maintain Technology Infrastructure *IMPROVEMENT EFFORTS UNDERWAY*
- **AI5** Procure IT Resources *NEEDS EMPHASIS, SEEMS SOME PROGRESS IS BEING MADE*
- **AI4** Enable Operation and Use *NEEDS EMPHASIS*
- **AI6** Manage Changes *NEEDS EMPHASIS, AND MUST TIE TO ENTERPRISE ARCHITECTURE ELEMENTS*
- **AI7** Install and accredit solutions and changes *NEEDS EMPHASIS ON LIFECYCLE*

Evaluations by Mark Forman, ITIC Member

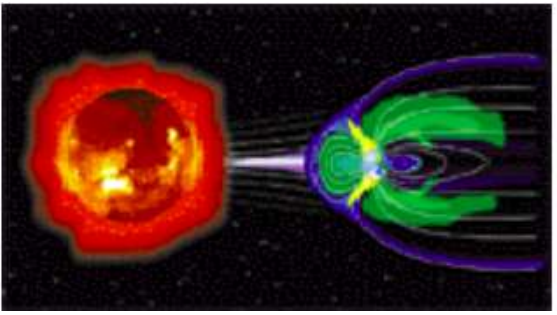
How well NASA does IT DELIVERY AND SUPPORT

- **DS1** Define and manage service levels. ***NEEDS EMPHASIS, success depends on creating & maintaining a services catalog of value to ALL NASA operations***
- **DS2** Manage third-party services ***MAKING PROGRESS***
- **DS3** Manage performance and capacity ***NEEDS EMPHASIS***
- **DS4** Ensure continuous service ***NEEDS EMPHASIS***
- **DS5** Ensure systems security ***MAKING PROGRESS***
- **DS6** Identify and allocate costs ***NEEDS EMPHASIS***
- **DS7** Educate and train users ***NEEDS EMPHASIS, EVERYONE IS RE-LEARNING & NO SEPARATION BETWEEN USERS AND DEVELOPERS***
- **DS8** Manage service desk and incidents ***MAKING PROGRESS ON INFRASTRUCTURE,***
- **DS9** Manage the configuration ***NEEDS LOTS OF EMPHASIS (SEE P.O.2)***
- **DS10** Manage problems ***NEEDS LOTS OF EMPHASIS***
- **DS11** Manage data ***NEEDS HUGE EMPHASIS***
- **DS12** Manage the physical environment ***MAKING PROGRESS***
- **DS13** Manage operations ***NEEDS EMPHASIS, NEED TO CLARIFY/OPTIMIZE SEPARATION OF DUTIES***

How well NASA does IT MONITORING AND EVALUATION -*THIS AREA NEEDS EMPHASIS TO GAIN DATA NEEDED FOR DRIVING POSITIVE CHANGE*

- **ME1** Monitor and Evaluate IT Performance.
- **ME2** Monitor and evaluate internal control.
- **ME3** Ensure compliance with external requirements
- **ME4** Provide IT governance

The Issue of IT Governance Will Be Taken Over by the Newly-Formed NAC Institutional Committee



NASA's Heliophysics Data Environment: Data and Services for the Heliophysics System Observatory

Principles: Scientific involvement; Open access to useful data

Architecture: Federated data servers connected by virtual observatories, subject to periodic scientific peer review.





Source: Chuck Holmes, NASA (retired)

SMD Missions Require Research Infrastructure

- **A NASA-Wide IT Framework Will Support and Enable the Enhanced Analysis and Access to Existing Mission Databases**
  - Build on Existing Examples of Data Portals (eg. Helio and others)
  - Analysis of Existing Valuable Research Data Sets is a Low Cost Path to New Discoveries from Prior SMD Investments.
- **Integrated High Performance Computing, Cloud Provisioning, Next Generation Networking, Storage, and Analytics for Big Data Is Being Designed Across NASA and Remote Investigators**
- **NASA Is Increasingly an Active Participant in Cross-Agency Big Data and Data Access Federal Initiatives.**

NAC Committee on IT Infrastructure Recommendation #1 July 31, 2013

- **Recommendation:** The NASA NAC ITIC & Science Committees should collaboratively explore the existing and planned evolution of NASA's science data cyberinfrastructure that supports broad access to data repositories for NASA SMD missions. This exploration should be undertaken in the context of effective practices within NASA, other Federal agencies, as well as industry and research institutions.

Wording Agreed to by Both ITIC and Science Committees July 31, 2013

Work Will Continue as Big Data Taskforce Under Science Committee