



IT Labs Annual Report

2012-2013



Contents

Introduction	4	<i>Engineering Enterprise Data Harvest Standards</i>	35
A Focal Point for NASA IT Innovation	5	<i>Enhance NASA's Large File Transfer Capability to 100GB Capacity</i>	36
<i>Agency CTO for IT: Sasi Pillay</i>	5	<i>Evaluation of PIV Two Factor Authentication with iPads</i>	38
Report Organization	6	<i>Image Data Mining of Terrestrial Lunar Data Sets: Impact Craters for Resource Prospecting</i>	40
IT Labs: Making Strides in Innovation	7	<i>Mobile Audio/Visual Broadcasting From Field Sites and Beyond</i>	42
<i>Evolution</i>	7	<i>NASA Langley RFID Equipment Inventory Project</i>	44
<i>Personnel</i>	7	<i>NASA Real-time Captioning of Meetings and Conferences</i> ..	46
<i>Contact Us</i>	8	<i>Safeguarding NASA's Mobile Assets</i>	48
<i>Partnerships and Collaboration</i>	8	<i>Secure Computing</i>	50
<i>Process</i>	8	<i>Security for Mission Mobile Applications</i>	52
Awards & Recognition	14	<i>SysAdmin.nasa.gov</i>	53
<i>Computerworld</i>	14	<i>Video Conference (V-Concierge)</i>	55
<i>FedScoop</i>	14	<i>Video Search</i>	57
Press	15	<i>VPN Authentication and Automated Policy Enforcement</i>	59
<i>NASA</i>	15	<i>Wolfram Alpha Search Overlay Integration</i>	60
<i>SecureIDNews</i>	15	Upcoming Projects	61
<i>FedScoop</i>	15	<i>Application Level Cyber Security for NASA Public Web Sites and Servers</i>	62
Measuring Success	16	<i>Applying Big Data Analysis Tools and Techniques using Cloud Infrastructure</i>	63
<i>Program Manager: Allison Wolff</i>	16	<i>Automating the Reporting and Releasing of Technologies (ARRT)</i>	64
Driving Innovation with IT Labs	17	<i>Paperless Contracting Initiative</i>	65
<i>Enterprise Services Executive: Saurabh Baveja</i>	17	<i>Persistent Telepresence Portal Network</i>	66
<i>Marshall Space Flight Center CTO-IT: Burt Bright</i>	17	<i>PIV Derived Credential for Strong Mobile Application Authentication</i>	67
<i>Glenn Research Center CTO-IT: Les Farkas</i>	17	IT Labs: On Target for Innovation	69
Distribution Matrices	18	<i>Process</i>	69
<i>Phase Distribution for IT Labs Funded Projects</i>	18	<i>Website</i>	69
<i>IT Theme Distribution for FY 2012 IT Labs Funded Projects</i> ..	19	<i>Graphics</i>	70
<i>Funding Distribution by Center for IT Labs Funded Projects</i> ..	20	<i>Federating Innovation—Partnerships</i>	70
<i>IRM Strategic Goal Distribution for FY 2012 IT Labs Funded Projects</i>	21	Appendix	72
Recent Projects	23	<i>2011 NASA Information Resources Management (IRM) Strategic Goals and Objectives</i>	72
<i>Agency Federated Code Sharing Library</i>	24		
<i>Baseline NASA's Mobile Device Theft and Recovery Processes</i>	25		
<i>Benchmarking Virtual Collaboration Technologies Across Government Agencies</i>	26		
<i>Communications Dashboard "Comm Dash"</i>	28		
<i>Development of a Gesture Interface for the Office Environment</i>	31		
<i>Dropbox for the Enterprise: Secure Collaboration for Mobile Workers</i>	33		

Introduction

In April 2013, NASA Administrator Charlie Bolden sent an Agency-wide message emphasizing the “importance of risk”. He made a call to NASA to adapt and prepare for the challenges of budget austerity.

“As we prepare to undertake the many challenges offered in the President’s 2014 budget for our agency, I ask you to continue to think about how we can identify and seize opportunities to make progress quickly and affordably, identify and manage risks, learn fast and adapt our plans to take the next steps.”

By leveraging a proven approach to IT and IT process development, IT Labs supports phased research and development with concrete deliverables and leverages internal NASA expertise to learn fast and affordably. Using the method of intrapreneurship to incubate solutions to fruition or failure, either outcome is a win for NASA that engages employees and creates a larger knowledge base, optimally resulting in new products to benefit the agency.

IT Labs solicits proposals NASA-wide for proposed Enterprise IT solutions. Applications include the concepts, high-level budgets, and an elevator pitch video describing the proposed activity. A comprehensive review team comprised of the agency’s Chief Technology Officers (CTOs) from each Field Center, Service Executives, and several Mission Directorate representatives provide individual review and ranking of the submissions. The extensiveness of the IT Labs Review Process provides a degree of credibility to highly-ranked projects and ensures support of NASA’s Mission Directorates. If selected, proposals receive funding and IT Labs works with Project Champions, executives who help foster the project’s success and other subject-matter-experts to ensure the work is appropriately collaborated and in alignment with Enterprise goals.

This year, the addition of IT Challenges was added to the Project Call. Of the numerous technical challenges facing IT, the NASA IT experts were consulted to select three (3) challenges to make available to applicants for their submissions. These three IT Challenges provide more structure to the applicant that may need to prioritize several ideas or want direction in the path that the NASA IT community is pursuing. All applications were reviewed equally without preference on IT Challenge submissions versus open topic submissions. The three IT Challenge topics for the FY 2013 Project Call were:

- + Work From Anywhere,
- + Seamless Collaboration Infrastructure, and
- + Bring Your Own Device.

Projects chosen for funding are contained to one of three possible phases for a time period not to exceed 90 days per phase. The Idea / Issue phase explores an area of IT in the first step of development. This initial research phase is followed by the Proof of Concept phase and then, the Prototype phase. Each of these phases can be an entry point to the IT Labs program and with proven technology and deliverable completion, can proceed to the following phase culminating at the Pilot phase where Enterprise Services adopts the project for Agency-wide deployment. This incremental approach is adaptable and lightweight, avoiding the pitfalls of full project funding from conception to delivery. While this method is an essential element to thoughtful, purposeful investment, deep budget cuts have significantly hindered IT Lab’s ability to fund new and existing project work. Ever-tenacious, the IT Labs Team continues to work with representatives across NASA to explore new funding opportunities for high-impact ideas.

Despite these significant Agency-wide cuts, the IT Labs Program Manager and the Agency CTO for IT procured resources and negotiated reduced rates with project proposers to fund six (6) new projects out of the 40 received applications as well as funding to continue two (2) projects from the FY 2012 project portfolio. This is in comparison to the 21 projects funded in FY 2012. The projects of FY 2012 as well as the projects receiving funding for FY 2013 are summarized in this document.

Through the understanding of IT Labs’ work, methodology, and review of the portfolio documented in this report, hopefully it is vividly clear that IT Labs has already been established to answer Administrator Bolden’s call and is blazing a trail to be watched and followed.

A Focal Point for NASA IT Innovation



Sasi Pillay,
Agency CTO-IT

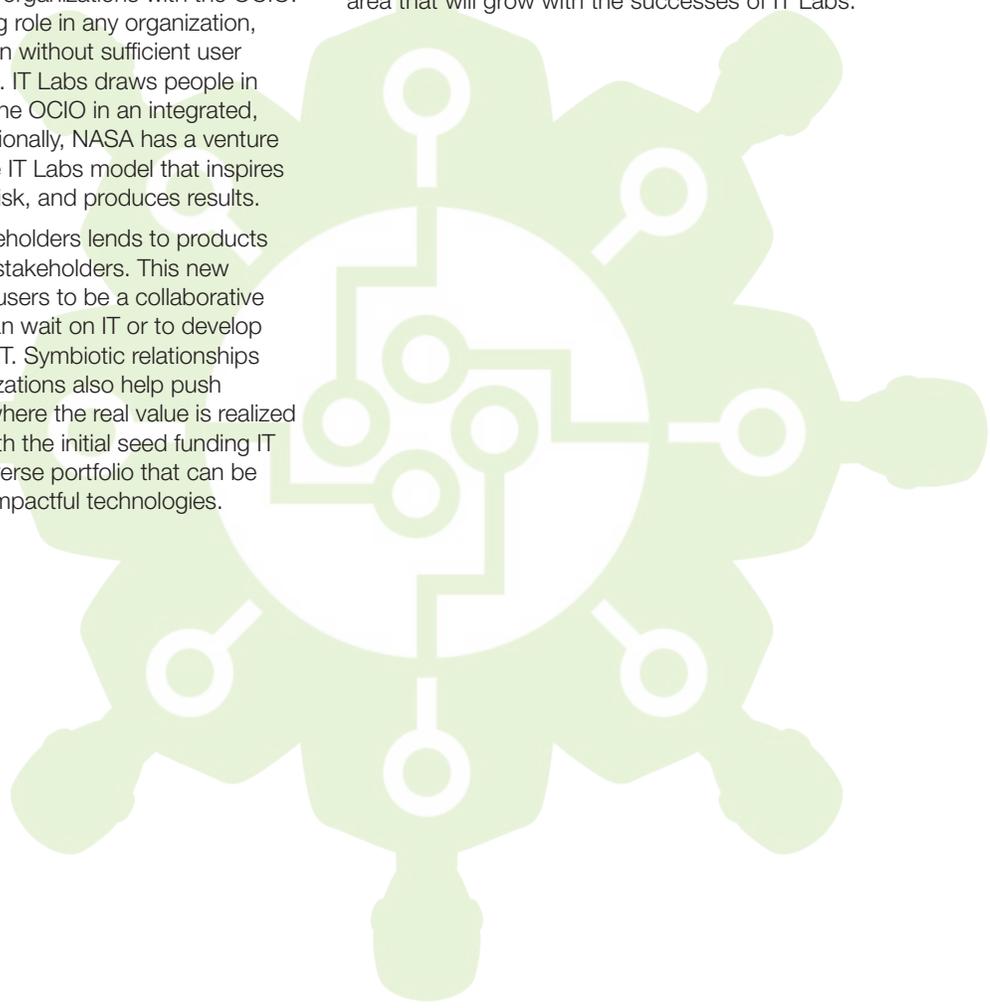
The vision of IT Labs is more than innovation in Information Technology. IT Labs seeks to drive involvement from the NASA community, collaboration with the OCIO and other NASA organizations, and provide an internal venture capital function. I have seen all of these elements increase in this past year's activity as IT Labs becomes more well-known and proves its methodology to be successful.

The long-term vision to create a focal point of new IT ideas and changes to existing IT services is coming into fruition. People can join to discuss and collaborate or generally be involved in the activities as an open meeting place. It has also created a platform to coordinate otherwise loosely connected organizations with the OCIO. Generally, IT has a supporting role in any organization, directed to fix issues but often without sufficient user support in an active dialogue. IT Labs draws people in from many organizations to the OCIO in an integrated, self-motivated manner. Additionally, NASA has a venture capitalist capability within the IT Labs model that inspires the workforce, confines the risk, and produces results.

Bringing together many stakeholders lends to products that are adapted to multiple stakeholders. This new approach to IT engages the users to be a collaborative part of the solution rather than wait on IT or to develop something independently of IT. Symbiotic relationships between IT and other organizations also help push technology into production where the real value is realized by NASA. All of this starts with the initial seed funding IT Labs provides to create a diverse portfolio that can be funneled down to the most impactful technologies.

This past year, IT Labs has gained more notoriety within NASA resulting in a larger review panel and more project submissions in the annual project call. The outcomes of seed funding have drawn more attention in the tangible results of the program. Not to mention, outside of NASA, IT Labs has garnered two external awards from FedScoop50 and Computerworld within the past year for work in IT and innovation. IT Labs has also been mentoring and networking organizations within other Federal Agencies with similar innovation and IT goals.

In this upcoming year, I would like to see IT Labs continue to centralize the IT Innovation efforts across the Agency, whether with direct funding or with a collection of knowledge articles to be the focal point of IT Innovation. Additionally, IT Labs is well positioned to support NASA in a networking role of collaboration and references for external entities of the Federal Government, Industry, and Academia and this is another area that will grow with the successes of IT Labs.



Report Organization

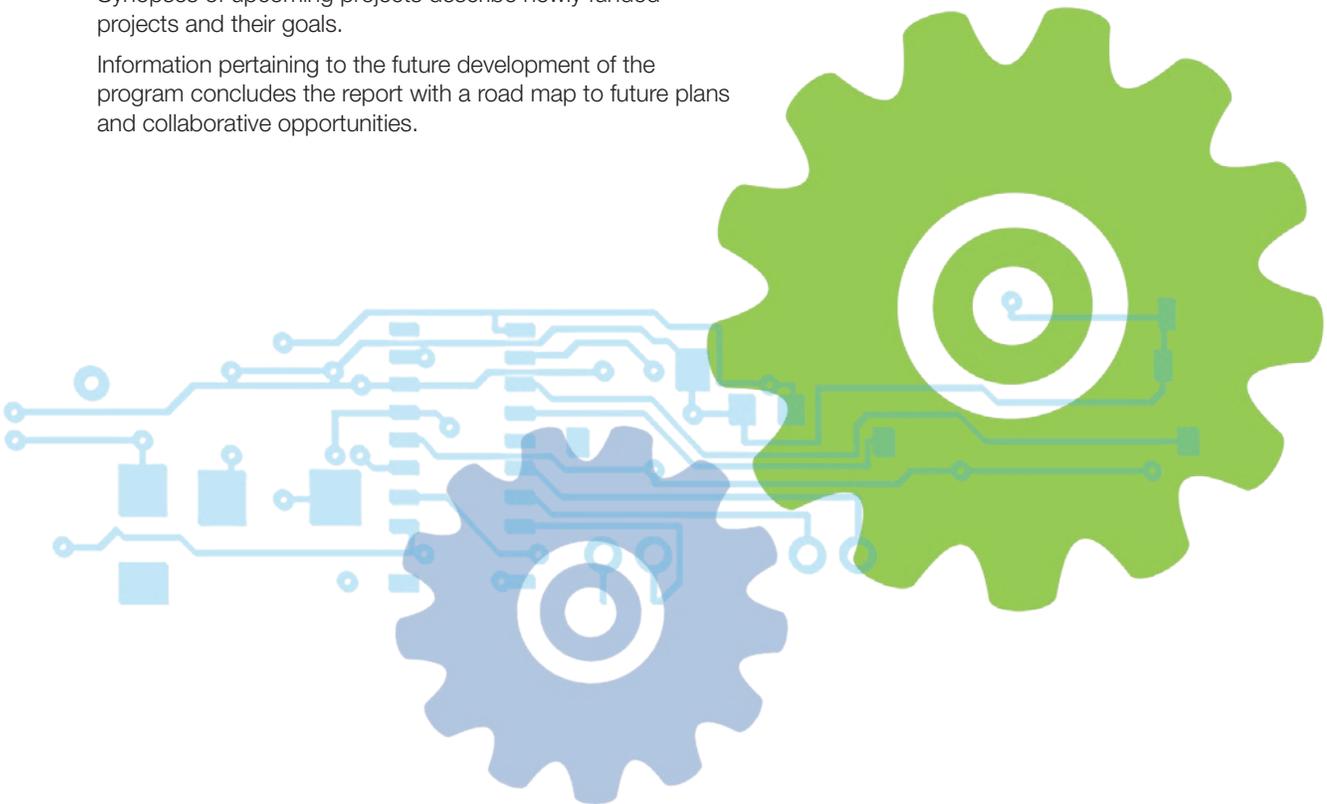
This report includes: an introduction to IT Labs, descriptions of the IT Labs process and phases, NASA IT stakeholder commentary on the program, detailed descriptions of recent projects, brief synopses of upcoming projects and information pertaining to future development of the program.

The first section describes the program's inception, its role in NASA's innovation framework and its development as a valued program. This is followed by recent awards, press coverage, a message from the IT Labs Program Manager, and the observations of a Service Executive and NASA CTO-ITs regarding IT Labs' value.

Data graphics are presented with the distribution of projects according to phase, themes, centers, and the latest NASA Information Resources Management (IRM) Strategic Plan goals and objectives. Descriptions of recent projects are detailed accounts with project lead and project team quotes regarding the collaboration and support of IT Labs through the course of their work. IT Labs' identified relevant themes are also noted for each project as well as the targeted goals and objectives from NASA's IRM 2011 Strategic Plan. (See http://www.nasa.gov/offices/ocio/IRM_Plan.html and/or the objectives as presented in the appendix of this document.)

Synopses of upcoming projects describe newly funded projects and their goals.

Information pertaining to the future development of the program concludes the report with a road map to future plans and collaborative opportunities.



IT Labs: Making Strides in Innovation

The NASA Chief Information Officer's portfolio includes a wide range of infrastructure support services. Some of these solutions are outdated and expensive to maintain, but budget restrictions limit NASA's ability to make the necessary updates to these essential capabilities. In order to evaluate alternative solutions for existing business needs, NASA requires the ability to evaluate, adopt and adapt emerging information technologies—quickly and cheaply. A lightweight innovation framework will also help NASA keep pace with the accelerating dynamics of technological advances and maintain its status as a global technology leader.

The IT Labs program was established under the Office of the Chief Technology Officer for Information Technology (CTO-IT) in May 2011. Its purpose is to provide a streamlined approach for evaluating new information technologies and processes for Agency integration in support of the Office of the Chief Information Officer (OCIO) and the Information Resources Management Strategic Plan.

The Vision: Engage the brightest minds across the Agency to guide NASA's IT strategy and investment decisions, and identify IT capabilities that can best support NASA's needs in a rapidly changing world.

The Mission: Adapt to keep the pace of constantly evolving technology by leveraging a lightweight and efficient process to explore innovative ideas.

IT Labs represents a significant shift from how NASA traditionally evaluates new technologies. To reduce risk, large scale IT projects at NASA are governed by directives, which require multiple layers of documentation, evaluation and approvals. As a result, employees with access to funding at sub-Enterprise levels face a powerful temptation to conduct quick, low-cost evaluations of innovative technology on their own—a temptation to which they often give in. This results in duplicative efforts and spending, even as NASA struggles to maintain essential services with a decreasing IT budget.

IT Labs was created to help make strategic investments in innovation. It is an innovation incubator, soliciting ideas from the greater NASA community and enabling their development as part of a rapid, low-cost, low-risk process.

The program provides a central collection point for innovative ideas, as well as a lightweight, low-cost methodology for research, proofs-of-concept and prototypes. The IT Labs process for project evaluation allows for a project to be quickly and effectively evaluated based on essential criteria identified by the program, at defined points in the project's life cycle. This evaluation of quality and potential viability mitigates risk factors of both time and cost, effectively providing a better chance for more projects to be realized.

IT Labs shares project results with all of NASA, enabling others to apply lessons learned to their own projects or collaborate on new efforts inspired by project results. In addition, IT Labs works diligently to build partnerships within the Agency—Mission Directorates, Centers and facilities—to pool resources in the pursuit of meaningful, cutting-edge technology solutions that can better meet NASA's needs.

The program strives to keep the amount of paperwork and oversight to the necessary minimum, removing institutional inhibitors to innovation and enabling the speedy evaluation of technologies that can help government agencies meet both their Enterprise requirements and their strategic goals.

Evolution

As IT Labs matures, it has tailored elements of the program to better meet the OCIO's requirements for a collaborative innovation framework. It has established and leveraged partnerships, constructed a platform for communication and collaboration and also developed processes to facilitate the innovation-to-operation goals.

Personnel

With the primary focus on innovative projects, IT Labs consists of a small, integrated team with low administrative overhead. This provides the program with better opportunities to fund more projects. This team is well-networked within the NASA IT community and is therefore, able to leverage their knowledge and expertise cohesively to benefit NASA and IT Labs.

Allison Wolff, Program Manager
Jason Duley, Project Coordinator
Joel Abraham, Project Coordinator
Kevin Rosenquist, Communications & Partnerships
Tracy Drew, Web Developer

Contact Us

IT Labs is always looking for opportunities to collaborate inside NASA and with external partners in Academia, Industry, and the Federal Government. To contact our team, email us at HQ-NASA-IT-Labs@mail.nasa.gov. Within the NASA firewall, employees can view our activities at <https://labs.nasa.gov>. We have also established a YouTube page to highlight our project videos which can be found at <https://www.youtube.com/user/NASAITLabs>.

Partnerships and Collaboration

As the great Michelangelo once said, “I am still learning.” IT Labs continues to grow and learn as we develop new projects, processes and relationships. We believe the best way to learn is through sharing and gathering insights from a diverse collaboration network.

The cornerstone of IT Labs’ success is its cross-functional and cross-Center collaboration. By branching out and creating a network of IT innovators, IT Labs is able to identify otherwise stove-piped advancements and initiatives and connect them with like-efforts across the Agency. In doing this, the program is able to reduce duplication of effort and identify shared requirements for processes, systems or applications that can be expanded to fit Enterprise needs.

In addition, IT Labs proudly partners with other Federal Agencies and continues to cultivate those relationships in support of the NASA mission. This year we have worked with several other Agencies to benchmark and share successes, such as the General Services Administration (GSA) and Human Health and Services (HHS).

Along with Federal Agencies, the program has also collaborated with industry partners such as Google, Microsoft, Verizon, Apple and Wolfram Alpha—just to name a few. IT Labs values the insight of its industry partners and works with them to learn about new and cutting edge technology. IT Labs also values partnerships in academia, and has engaged in a formal sponsorship with the MIT Center for Information Systems Research (CISR).

Process

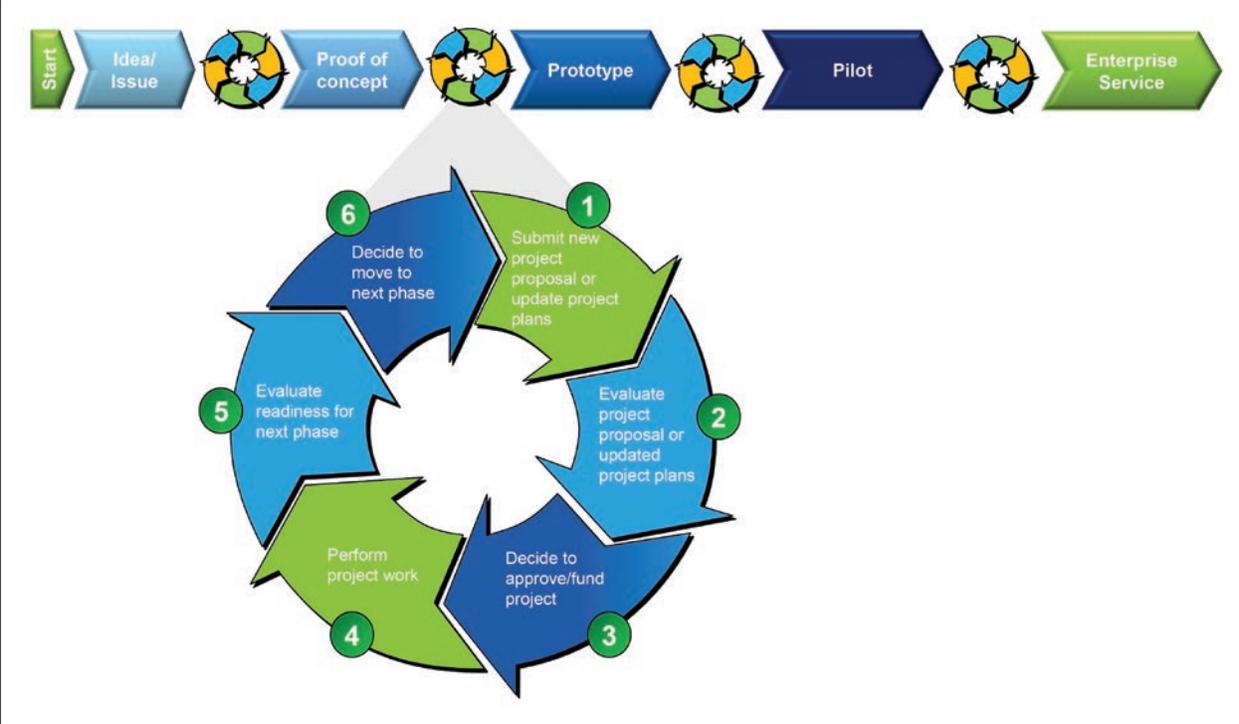
IT Labs has a lightweight process in place for projects funded by the Program. The team has built on its experience with the first two rounds of funded projects and crafted a process that maintains a lightweight approach, but also keeps project leads accountable for milestone deliverables with pre-defined points of review and templates. These templates include documents such as position papers, white papers and business cases—each including a standardized format and commentary that defines what information is required for the project to be evaluated.

IT Labs identifies four distinct phases that a project progresses through to become an Enterprise service. Successive phases build on the deliverables generated in previous phases to ensure efficient utilization of resources.

The four identified and defined phases are as follows:

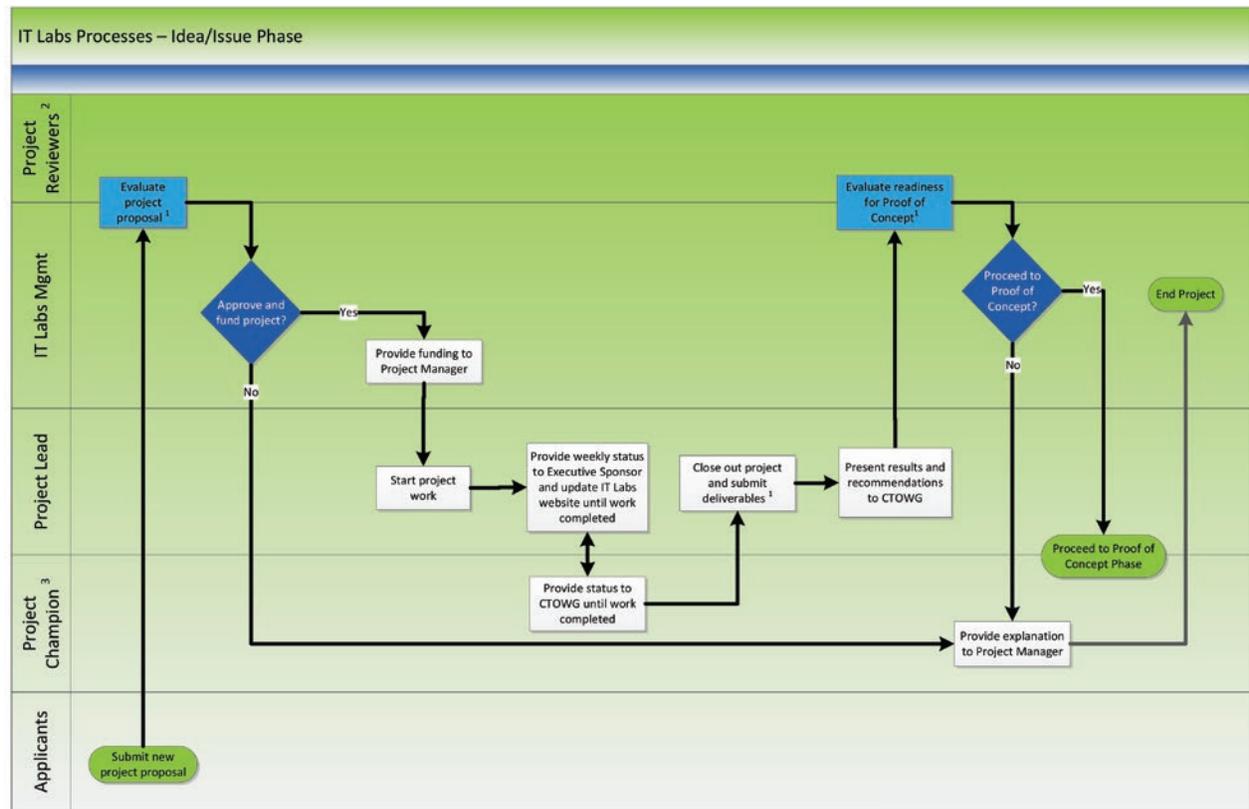
- + Idea/Issue – Identify an Agency need and evaluate processes or technologies that can accommodate that need
- + Proof-of-Concept – An agreement to quickly show whether a thesis for using the targeted capability or technology would work in the proposed environment
- + Prototype – An agreed-upon limited-scope trial aimed at solving a specific business problem that is representative of the eventual larger solution
- + Pilot – A small-scale implementation of the solution that includes a representative subset of customers and other impacted stakeholders

In addition to the four project phases, IT Labs has also defined processes for projects to move from one phase to the next. Refer to the following process diagrams for a visual flow of the process.



Overall Process Diagram for an IT Labs Project Progressing to an Enterprise Service

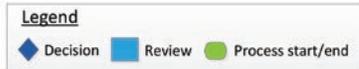
IT Labs has defined processes for projects to move from one phase to the next. The goal of each phase is to progress to the next one resulting in an Enterprise Service. The figure above shows the overall process a project typically goes through starting from the Idea phase until it becomes an approved Enterprise Service.



¹ Further detail available in process documentation

² Project Reviewers include CTOWG members and solicited representatives from the OCIO

³ Project Champion is the NASA Center CTO-IT



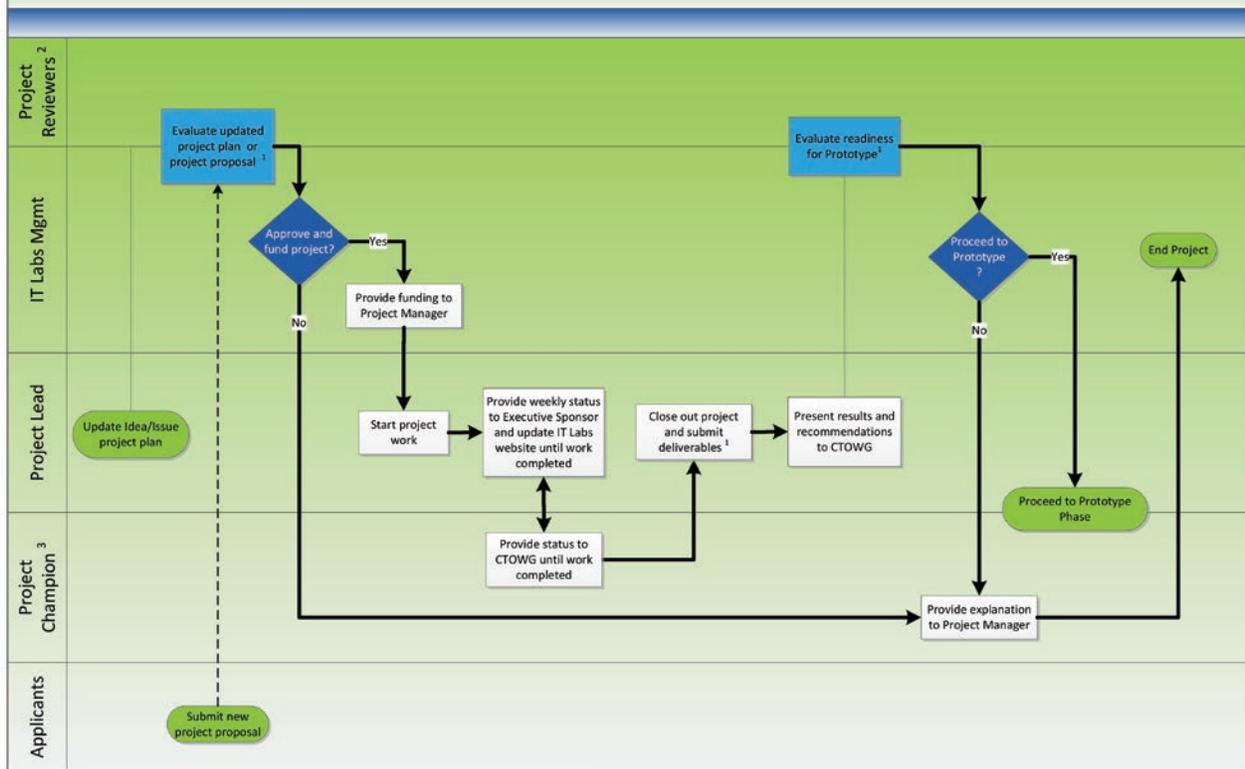
Progression from an Idea/Issue to a Proof-of-Concept

The Idea / Issue phase is the first phase of the IT Labs research and development profile. It is the initial look into a capability or technology that has potentially significant value to NASA. Project teams conducting a project in this phase deliver a technical position paper and a presentation to the CTO-ITs at the completion of the phase. The FY 2012 projects conducted in this phase are listed below.

FY 2012 Idea / Issue Phase Projects

- + Baseline NASA's Mobile Device Theft and Recovery Processes
- + Benchmarking Virtual Collaboration Technologies Across Government Agencies
- + Communications Dashboard
- + Image Data Mining of Terrestrial Lunar Data Sets: Impact Craters for Resource Prospecting
- + Lightweight Digital Signatures
- + Safeguarding NASA's Mobile Assets
- + Security for Mission Mobile Applications
- + Video Conference (V-Concierge)

IT Labs Processes – Proof of Concept Phase



¹ Further detail available in process documentation

² Project Reviewers include CTOWG members and solicited representatives from the OCIO

³ Project Champion is the NASA Center CTO-IT

Legend

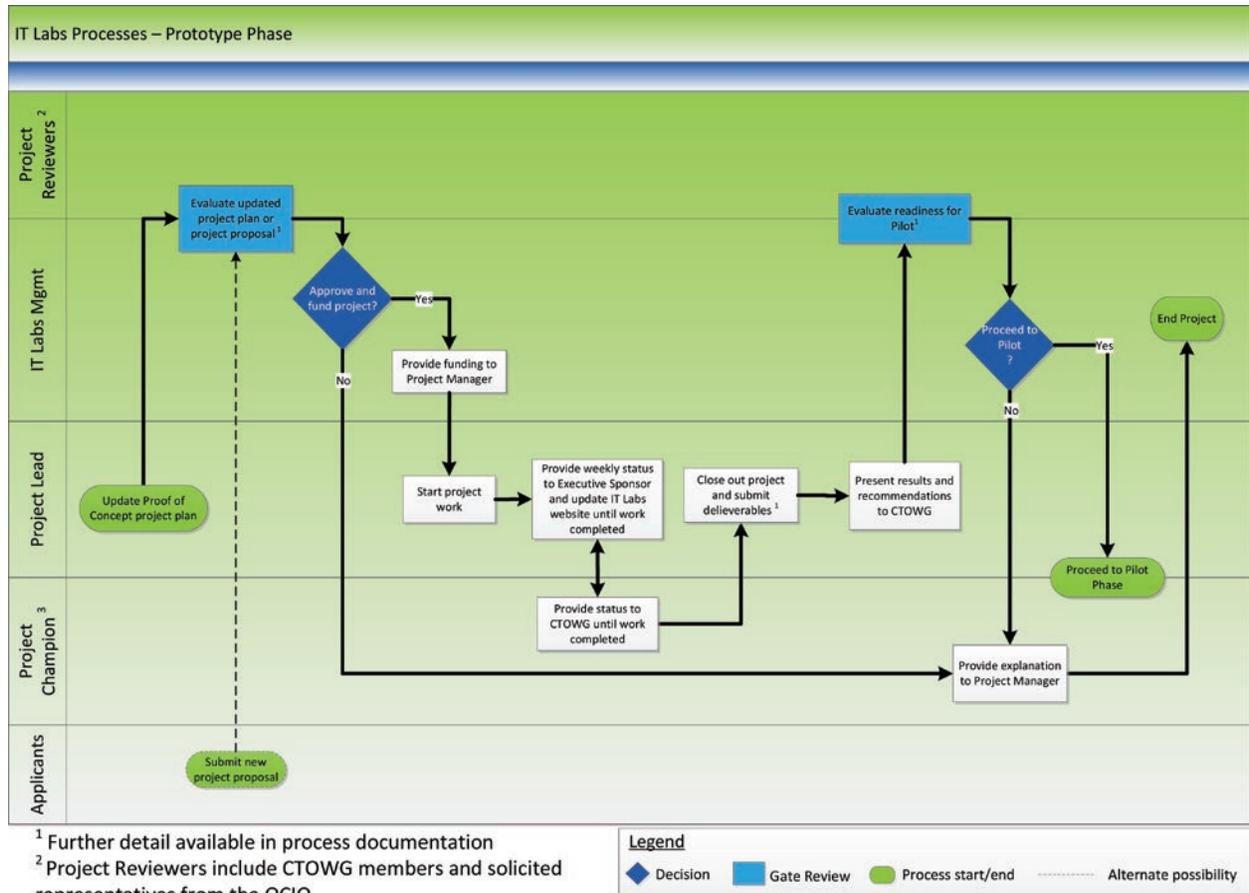
◆ Decision ■ Gate Review ● Process start/end - - - - - Alternate possibility

Progression from a Proof-of-Concept to a Prototype

The second phase of the IT Labs profile is the Proof of Concept phase. In this phase, an agreement is made to quickly show if a thesis for using a targeted capability will work in the proposed environment. As in the Idea / Issue phase, a final presentation to the CTO-ITs is made. Deliverables also include a white paper and observable demonstration. The Proof of Concept projects from FY 2012 are presented below.

FY 2012 Proof of Concept Phase Projects

- + Development of a Gesture Interface for the Office Environment
- + Dropbox for the Enterprise: Secure Collaboration for Mobile Workers
- + Enhance NASA's Large File Transfer Capability to 100GB Capacity
- + Mobile Audio/Visual Broadcasting from Field Sites and Beyond
- + Secure Computing
- + VPN Authentication and Automated Policy Enforcement
- + Wolfram Alpha Search Overlay Integration

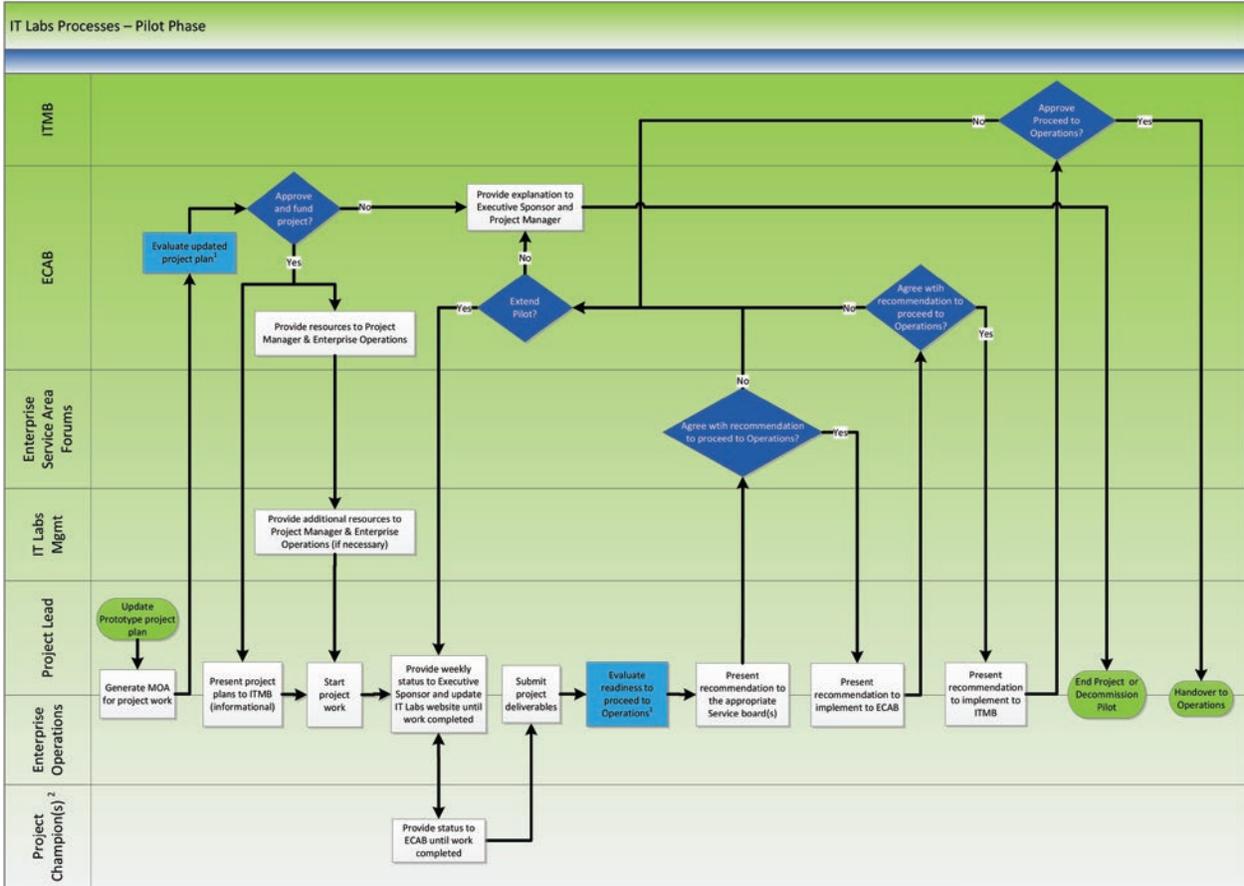


Progression from a Prototype to a Pilot

IT Labs' third phase is the Prototype phase. An IT Labs Prototype is an agreed-upon limited-scope trial aimed at solving a specific business problem that is representative of the eventual larger solution. In this phase, the project team must deliver a detailed business case, demonstrable prototype, and a final results presentation. Below are the FY 2012 projects conducted as prototypes.

FY 2012 IT Labs Prototype Phase Projects

- + Agency Federated Code Sharing Library
- + Engineering Enterprise Data Harvest Standards
- + Evaluation of PIV Two Factor Authentication with iPads
- + NASA Langley RFID Equipment Inventory Project
- + NASA Real-time Captioning of Meetings and Conferences
- + SysAdmin.nasa.gov - Knowledge Sharing for Improved Operations



¹ Further detail available in process documentation

² Project Champion(s) can include Enterprise Service Executive(s) & NASA Center CTO-IT(s)



Progression from a Pilot to an Enterprise Service

Pilots are the final phase of the IT Labs project flow and are the handover to Enterprise Services to execute and put into operations. They are a small scale implementation of the solution that includes a representative subset of the customers and other impacted stakeholders with an operational readiness review and final presentation at the end of the pilot. The FY 2011 IT Labs portfolio included a Google Apps for the Enterprise pilot which is still in implementation but no longer under IT Labs support. For tracking, Google Apps was included in our graphic for project phases but is essentially out of IT Labs' hands at this point. The IT Labs pipeline of projects did not include any other pilots in the FY 2012 portfolio.

Awards & Recognition

IT Labs is thrilled to be recognized so early in the program's development by the following organizations:

Computerworld

Recognized 2013 Computerworld Honors Laureate

— **Computerworld, Honors Laureate Program** (19 March 2013)

Link: <http://www.eiseverywhere.com/ehome/49069/83917/>

Computerworld recognized IT Labs as an Honors Laureate in Innovation.

FedScoop

FedScoop 50 Awards honor top government, industry leaders and innovators

— **FedScoop, Events** (29 November 2012)

Link: <http://fedscoop.com/fedscoop-50-awards-honor-top-federal-it-innovators-of-2012/>

IT Labs received the FedScoop50 award for 2012 Federal IT Program of the Year.

Management Innovation eXchange

*We are proud to announce the eighteen finalists of the **Leaders Everywhere Challenge**, the second leg of the **Harvard Business Review/McKinsey M-Prize for Management Innovation**—a robust collection of real-world case studies and courageous experiments in rethinking the work of leadership, redistributing power, and unleashing 21st century leadership skills.*

— **Management Innovation eXchange, M-Prize** (30 July 2013)

Link: <http://www.mixprize.org/m-prize/leaders-everywhere-challenge>

IT Labs is a finalist for the M-Prize Leaders Everywhere Challenge.

Nextgov Bold Awards

*The **Nextgov** editorial staff has selected 19 finalists for Bold Awards from more than 180 nominations.*

The honors recognize federal employees who have taken risks to implement innovative programs that make government more effective.

— **Nextgov, Bold Awards** (30 July 2013)

Link: <http://www.nextgov.com/cio-briefing/2013/07/dozen-agencies-produced-19-finalists-tech-innovation-awards/67661/?oref=ng-boldawards>

Program Manager, Allison Wolff, is a finalist in the Bold Award for Tech Innovation.

Press

As a demonstration of the proven value that IT Labs holds, detailed below are several articles pertaining to the program across various web media outlets.

NASA

FY'13 IT Labs Project Selection Announcement
— **Internal NASA OCIO**, CIO News (26 June 2013)
Link: http://insidenasa.nasa.gov/ocio/news/ITLabs/Project_Selection.html (Internal NASA web site)

Announcement of the five new selected projects for funding in FY 2013 chosen from the FY 13 Project Call applications and the three projects selected to continue into another phase after reevaluation.

IT Labs: Improving Information Infrastructure
— **IT Talk** (Volume 3, Issue 2; April – June 2013)
Link: http://www.nasa.gov/pdf/738451main_ITTalk_APR2013_FINAL.pdf (PDF, 8.5 MB)

An IT Labs-funded project is now producing a plug-and-play modular approach to test automation. Institute of Electrical and Electronics Engineers (IEEE) Standards Association Project 1877 will define a Web/XML test orchestration interface that will enable discovery of modular assets; summary control and status data and metadata; and behaviors, requirements, hardware interfaces, and other descriptive information in a standardized machine-interpretable information format.

IT Labs – Call for Projects
— **IT Talk**, Spotlight (1 January 2013)
Link: <http://www.nasa.gov/offices/ocio/ittalk/ITLabs.html>

This is an article that describes the IT Labs Project Call and solicits for applications from around the Agency for innovative IT solutions.

IT Labs: Fueling Innovation
— **IT Talk** (Volume 2, Issue 4; October – December 2012)
Link: http://www.nasa.gov/pdf/693023main_ITTalk_OCT2012_Final.pdf (PDF, 3.6 MB)

Some of the projects that were awarded funding from IT Labs for the FY12 Project Call are presented in this article. Here is a small synopsis of what they plan to accomplish in their phase period.

IT Labs @ Langley Research Center
— **IT Talk** (Volume 2, Issue 4; October – December 2012)
Link: http://www.nasa.gov/pdf/693023main_ITTalk_OCT2012_Final.pdf (PDF, 3.6 MB)

Langley Research Center had several projects that were funded by IT Labs in FY 2012 and benefitted Langley with summaries in this article.

SecureIDNews

PIV-enabling Google apps
— **SecureIDNews**, NASA aims for the cloud (28 January 2013)
Link: <http://www.secureidnews.com/2013/01/28/piv-enabling-google-apps>

NASA and Google are enabling government employees to access networks more conveniently and securely using their agency-issued Personal Identity Verification (PIV) cards.

“NASA has been running a pilot with Google Apps for Government for more than a year,” says Tim Baldrige, former NASA ICAM Solutions Architect who presented the pilot at an Interagency Advisory Board meeting.

The pilot—open to 600 IT personnel at the agency—enables NASA users to connect to Google Apps for Government using their existing PIV smart card for access to networks and accounts.

Incorporating NASA’s user interface—NASA Access Launchpad—the initiative increases authentication security and convenience while taking advantage of the Federal ICAM architecture.

FedScoop

FedScoop 50 Q&A: Graves, Wolff, Calabrese
— **FedScoop**, Events (18 December 2012)
Link: <http://fedscoop.com/fedscoop-50-qa-graves-wolff-calabrese/>

During the FedScoop 50 Awards reception, FedScoop passed out a fun questionnaire to award winners and nominees to get to know them better outside of the office with answers compiled for your enjoyment, including IT Labs Program Manager, Allison Wolff.



Left to right: Allison Wolff, IT Labs Program Manager; Linda Cureton, NASA CIO; Nick Skytland, Open Gov Program Manager.
Photo Credit: FedScoop

Measuring Success



Allison Wolff,
IT Labs Program Manager

As a young program, starting in 2011, it is difficult to measure success, particularly in Research and Development. As time passes, success becomes evident where strategic investments gain additional

support and projects find new synergies that may have been unrealized if left on the design floor.

We are pleased to receive validation so early in our program's development. The FedScoop50 2012 IT Program of the Year award, as well as being recognized as a Computerworld Laureate for Innovation, fortifies our position going forward and gives credence to the IT Labs' approach. While we are humbled by this recognition, what truly drives us is the desire to make IT better at NASA. Key to this endeavor are our numerous collaborators, contributors, and project leads, who advance this cause with their hard work, creativity, and passion to make a difference. We are honored to represent them on behalf of the OCIO and NASA. Perhaps one of the best surprises from our experimental approach to improving IT, is the variety of resources beyond the IT-focused organizations who have stepped forward as outstanding contributors. Furthermore, the numerous opportunities to increase collaboration and decrease duplication of effort, has been another byproduct of the IT Labs' approach.

Through initial seed funding from IT Labs, a project from Johnson Space Center (JSC) that seeks to standardize mark-up language conversions resulted in a new IEEE standard (see Engineering Enterprise Data Harvest Standards) which drew in attention and funding from the Engineering Directorate at JSC. Additionally, a project out of Langley Research Center, which started as a small-scale code-sharing effort is now considered the hub for systems administrators Agency-wide. By taking a portfolio approach to managing IT innovation projects, we are able to fund strategically and identify synergies. For example, the work performed in both these projects is now being incorporated into a larger Agency Federated Code Sharing initiative in support of a NASA Automated Rendezvous and Docking Community white paper citing

potential savings of \$60M per project with the successful implementation of a code reuse model. This is just one instance of how IT Labs brings together the interests of numerous NASA Centers and Programs for a product to benefit the entire Agency.

As I mentioned, ideas for IT improvements are not limited to the IT experts. Another important component of IT Labs is that we believe a great idea can start anywhere, and by canvassing the Agency, we are able to help bring new ideas to fruition from areas that may not otherwise have the appropriate exposure. For instance, a support services specialist with the logistics management branch at Langley, overseeing inventory, wanted to investigate the cost savings and efficiencies of implementing a Radio Frequency Identification (RFID) system. With the injection of resources to test out the capabilities, significant efficiencies were realized and interest in the findings kept escalating from the NASA CTOs for IT, to the NASA Agency Facilities management, to the Federal Facilities Council (FFC).

Numerous projects have leveraged the visibility gained through IT Labs to develop collaborations and partnerships that were otherwise unlikely formed through such a large agency as NASA. IT Labs has also had the pleasure to provide direction as a premier model of intrapreneurship in the Federal space to the Human Health Services innovation program "Ignite" and network an organization within the Government Services Administration to appropriate parties in NASA IT as well as Department of Defense personnel to persons working in the Personal Identification Verification arena.

While 2013 has been shaping up as an exciting year, 2014 is poising into an even stronger posture. We are building a mobile application to share the work of IT Labs. We are refining processes for stronger integration into operations, and we are solidifying partnerships inside and outside the OCIO to ensure healthy collaboration on future R&D projects. We have proudly supported stellar IT projects and formed mutually beneficial relationships both inside and outside of NASA. I am very excited about the work of IT Labs in this past year and for the years to come and believe by any measure of success, IT Labs is proving its merit time and time again.

Driving Innovation with IT Labs



Saurabh Baveja,
Service Executive
Enterprise Service Desk

Innovation at its core takes a novel idea and/or method to do something different in a value added manner. IT Labs encompasses the core values of innovation while providing

a structured and agile process to help realize the value of infusing new technologies into our environment. From the get go, IT Labs has offered the NASA community a collaborative and transparent approach to explore, prioritize, vote and fund innovative ideas from concept to operational implementation.

IT Labs does a superb job of ensuring stakeholder involvement at all levels through each step of the process in its lifecycle. IT Labs, through seed funding for a project, is able to assess risk and provide value of an idea by conducting a step by step feasibility assessment through its phased innovation infusion approach. This allows for quick turnaround of the concept at each phase mitigating risk of failure upon implementation as well as ensuring buy-in and cost containment by successively building on the deliverables one phase at a time.

From the initial idea, to the proof of concept, prototype and pilot, the IT Labs team stays fully engaged with the stakeholder community and effectively communicates from the executive sponsor to the governing boards such as the ECAB and ITMB consistently. With its growing partnership and continued push for cross-center collaboration, IT Labs is becoming a model for innovation not only within NASA but within the Federal space. We have seen the success of IT Labs' approach to innovation in the past year and continue to see the eagerness of the NASA community for more ideas to be realized through the IT Labs initiative.



Burt Bright, MSFC CTO-IT

The concept of IT Labs is something that is long overdue for the NASA community. IT Labs has proven to be an excellent environment that allows the NASA community to explore new and innovative ideas while promoting a creative and collaborative mindset.

One of the advantages of IT Labs is the "quick review" that allows a project the opportunity to be reviewed in a quick and concise manner.

As a result of this innovative environment, IT Labs has helped foster cutting edge projects that might have otherwise remained undiscovered and unfunded. The fact that IT Labs has been awarded several prestigious awards is a testament to the value and merit of the program. It is environments such as IT Labs that our users will continue to look for to foster their new and explorative ideas. IT Labs is the type of innovation that NASA needs to continue its mission of exploration and innovation.



Les Farkas, GRC CTO-IT

The importance of technology has manifested as a primary reason for the increase in business productivity. The need for technology has driven innovation. Essentially every business process and function is supported by an Information Technology (IT)

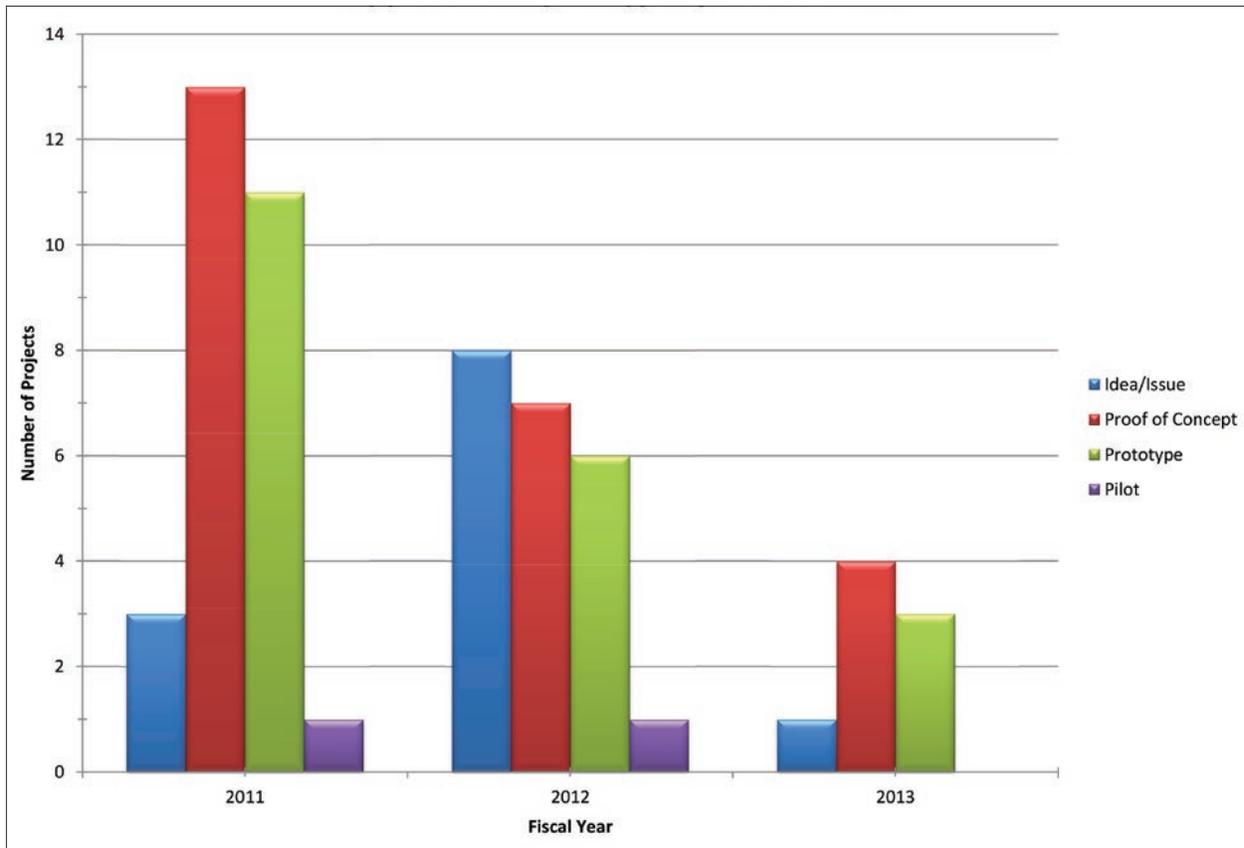
environment. Therefore, if an organization is to become or remain competitive, efficient, and highly productive it is essential that the organization actively pursue and incorporate new IT solutions. Without a proactive approach, organizations will lose opportunities to execute at their maximum. NASA's IT Labs brings value to the Agency by enabling opportunities to enhance business capabilities and productivity through the exploration and advancement of relevant information technologies.

With its organized method of crowd sourcing, IT Labs has tapped into the best and brightest NASA has to offer. The annual IT Labs Projects solicitations have sparked great interest throughout the NASA community. Organizations from both the Mission Directorates and the OCIO have submitted highly innovative proposals that are accelerating the advancement and adoption of NASA's IT innovation and technology infusion. IT Labs has opened a door for innovation through teamwork at NASA!

Distribution Matrices

The IT Labs project review process aims for a diverse portfolio of work in terms of phase of Research and Development, IT themes, NASA Field Centers, and NASA IT's strategic goals. Below are matrices and graphs displaying this data for ease of review. While some Centers were absent from the portfolio in FY 2012, the increased awareness and participation of IT Labs across the Agency has become evident with an increased number of applications submitted for the FY 2013 Project Call from nearly every Field Center.

Phase Distribution for IT Labs Funded Projects



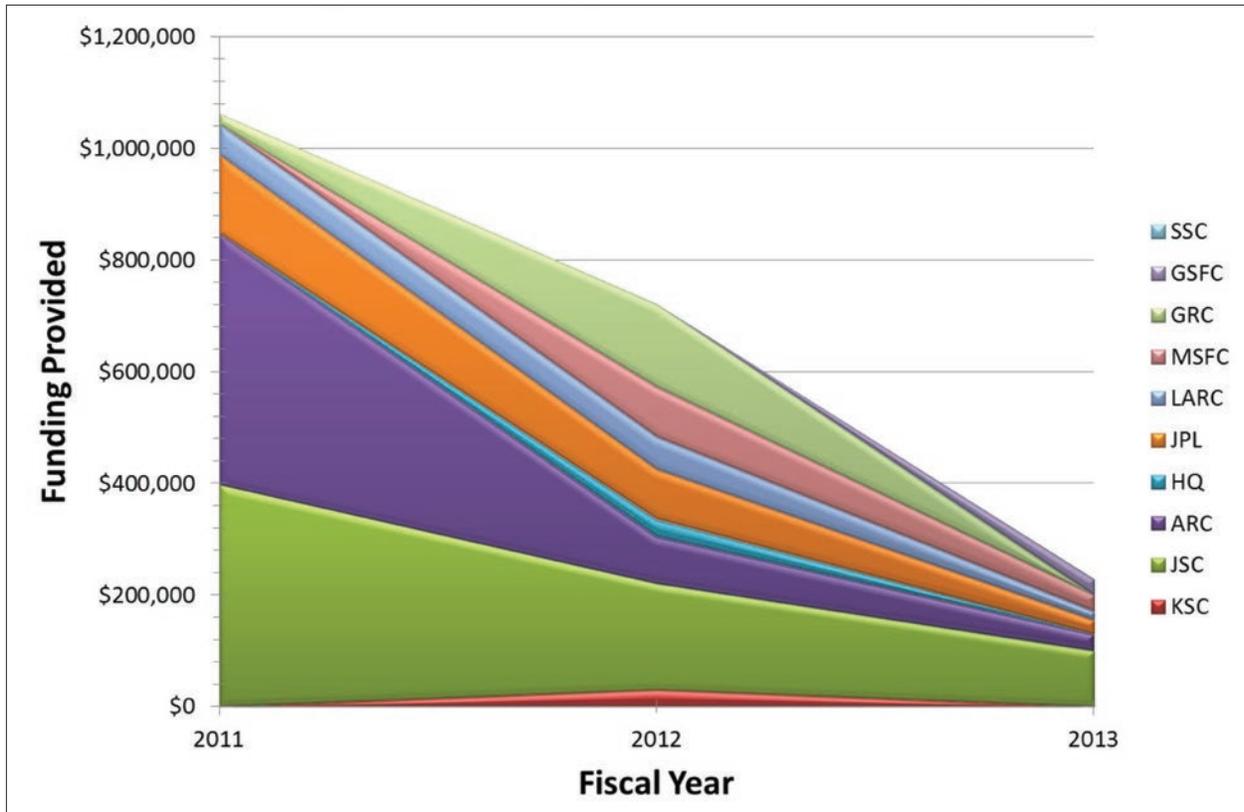
Approved Project Types per Fiscal Year

IT Theme Distribution for FY 2012 IT Labs Funded Projects

Project Title	Accessibility	Access Management	Big Data	Cloud Computing	Collaboration	Cyber Security	Data Center Consolidation	Data Visualization	End User Experience	End User Training & Support	Enterprise Applications	Gaming Tech	Green IT	Information Management	Interoperability	IT Security	Knowledge Management	Mission IT	Mobility	Networks	Search	Simulation and Modeling	Social Media
Agency Federated Code Sharing Library			●		●												●	●					
Baseline NASA's Mobile Device Theft and Recovery Processes										●						●			●				
Benchmarking Virtual Collaboration Technologies Across Government Agencies				●	●														●				●
Communications Dashboard					●		●	●	●								●	●					●
Development of a Gesture Interface for the Office Environment	●								●			●											
DropBox for the Enterprise: Secure Collaboration for Mobile Workers				●	●	●			●										●				
Engineering Enterprise Data Harvest Standards									●						●			●					
Enhance NASA's Large File Transfer Capability to 100GB Capacity					●													●	●	●			
Evaluation of PIV Two Factor Authentication with iPads		●														●			●				
Image Data Mining of Terrestrial Lunar Data Sets: Impact Craters for Resource Prospecting							●											●			●		
Mobile Audio/Visual Broadcasting from Field Sites and Beyond					●														●				
NASA Langley RFID Equipment Inventory Project									●					●									
NASA Real-time Captioning of Meetings and Conferences	●				●				●														
Safeguarding NASA's Mobile Assets		●		●	●	●			●							●			●				
Secure Computing				●	●	●										●			●				
Security for Mission Mobile Applications					●											●		●	●				
SysAdmin.nasa.gov - Knowledge Sharing for Improved Operations					●					●				●		●	●				●		
Video Conference (V-concierge)	●				●				●	●													●
Video Search	●								●								●				●		
VPN Authentication and Automated Policy Enforcement		●				●			●							●							
Wolfram Alpha Search Overlay Integration									●												●		

Relevant themes were selected based upon the 2011 NASA Information Resources Management Strategic Plan and help illustrate the diversity of the IT Labs portfolio. Choosing themes for each project also facilitates identification of potential collaborations inside and external to NASA.

Funding Distribution by Center for IT Labs Funded Projects



Funding awarded per Center per Fiscal Year

IT Labs strives to maintain a rich and diverse portfolio. In addition to having a variety of technical solutions in our portfolio, we also encourage and appreciate the geographic and cultural diversity of each NASA center, and consider multi-Center participation a key program success indicator.

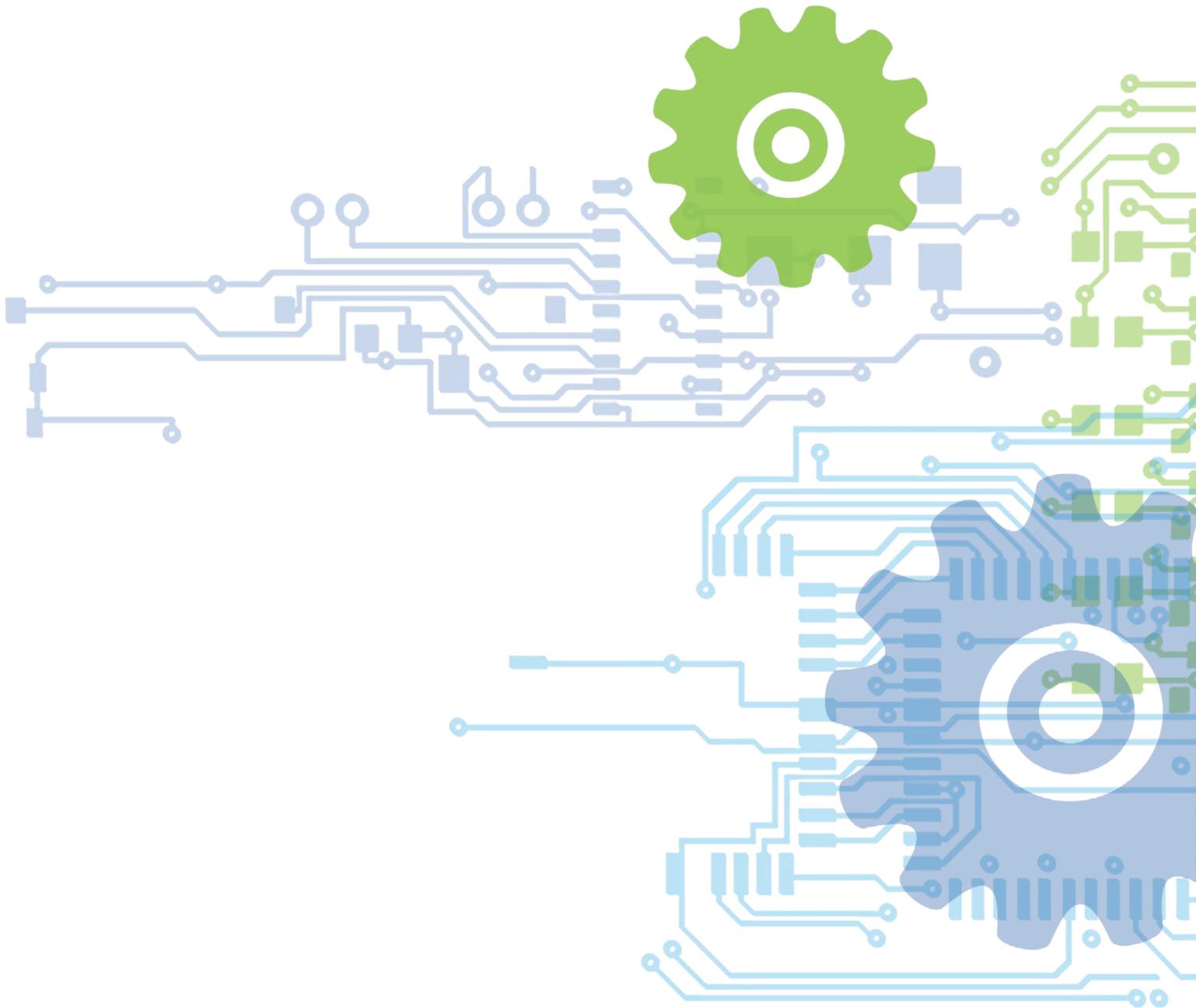
The graph above shows the funding distribution per Center. Metrics are based on the Center where project lead and project champion reside. Funding for projects involving multiple centers is represented under the Lead NASA Center's total amount.

IRM Strategic Goal Distribution for FY 2012 IT Labs Funded Projects

Project Title	Goal 1					Goal 2				Goal 3			Goal 4			
	IT Infrastructure and User Experience					IT Security and Cyber Security				Identify, Test & Adopt New IT			Workforce Enhancement			
	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	4.4
Agency Federated Code Sharing Library		●			●							●				
Baseline NASA's Mobile Device Theft and Recovery Processes						●	●	●	●							
Benchmarking Virtual Collaboration Technologies Across Government Agencies					●						●					
Communications Dashboard	●				●							●		●		
Development of a Gesture Interface for the Office Environment	●										●	●				
DropBox for the Enterprise: Secure Collaboration for Mobile Workers			●	●	●							●				
Engineering Enterprise Data Harvest Standards		●								●	●	●		●		
Enhance NASA's Large File Transfer Capability to 100GB Capacity	●	●	●	●	●											
Evaluation of PIV Two Factor Authentication with iPads							●									
Image Data Mining of Terrestrial Lunar Data Sets: Impact Craters for Resource Prospecting		●			●							●				
Mobile Audio/Visual Broadcasting from Field Sites and Beyond			●									●		●		
NASA Langley RFID Equipment Inventory Project					●											
NASA Real-time Captioning of Meetings and Conferences				●						●				●		
Safeguarding NASA's Mobile Assets							●			●	●	●				
Secure Computing			●			●	●	●								
Security for Mission Mobile Applications	●		●	●			●			●						
SysAdmin.nasa.gov - Knowledge Sharing for Improved Operations		●			●		●	●					●			
Video Conference (V-concierge)	●		●		●							●				●
Video Search					●							●		●		
VPN Authentication and Automated Policy Enforcement	●				●		●									
Wolfram Alpha Search Overlay Integration	●			●	●						●					

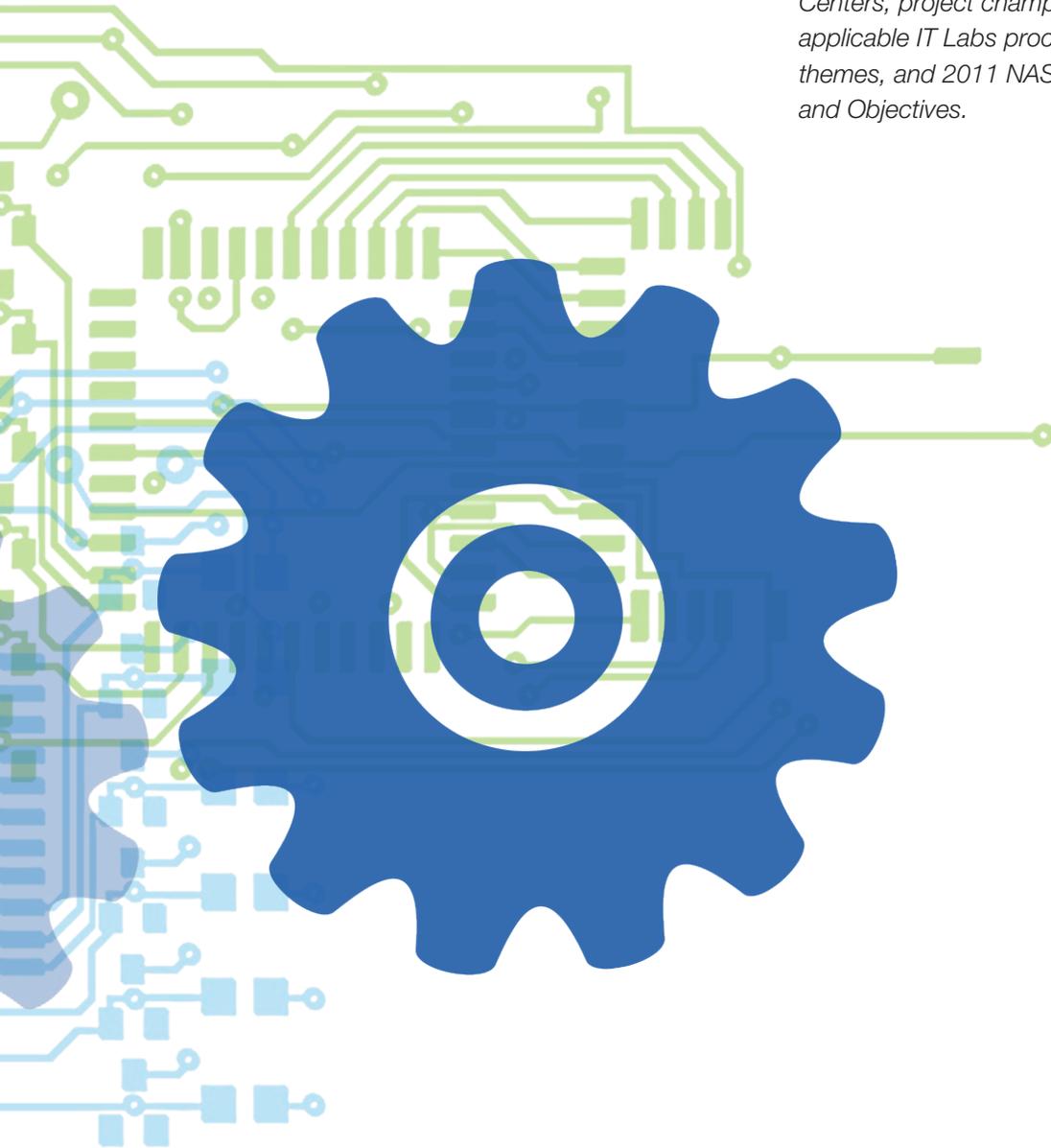
NASA's latest Information Resources Management (IRM) Strategic Plan (June 2011) identifies the four IT goals and their underlying strategic objectives to be accomplished over the next three to five years in support of advancing our Agency's mission and vision. Together, these goals define a common future ideal, such as providing affordable information technology and enhanced IT security for our IT workforce to collaboratively focus on to accomplish the IT strategy – within the constraints of the forecasted IT budget environment.

Each of the IT Labs projects meets one or more of these goals as illustrated in the matrix above and indicated in the header of each project summary. Refer to the full list of strategic goals in the Appendix of this document or navigate your browser to the website http://www.nasa.gov/offices/ocio/IRM_Plan.html for the entire 2011 NASA IRM Strategic Plan.



Recent Projects

Detailed in the following pages are projects funded by IT Labs in the FY 2012 project cycle. Each project is described with quotations from the project leads or champions and words regarding the successes and lessons learned. The projects denote the engaged NASA Field Centers, project champions, leads, and teams, applicable IT Labs process phases, relevant themes, and 2011 NASA IRM Strategic Goals and Objectives.



Agency Federated Code Sharing Library



Project Lead: Jason Duley
Project Team: Richard Mrozinski, Chris D'Souza,
Bill Othon, Mike Moreau, Rick Loffi,
Matt Fritz, Ian Mitchell
Project Champion: Allison Wolff
Centers: JSC, ARC, GSFC
IRM Strategic Goals: 1.2, 1.5, 3.3

Phase: Prototype
Themes: Big Data, Collaboration, Mission IT, Search

"With the visibility provided through the IT Labs program, the necessary partnerships were aggregated to enable disparate teams to engage in a federated code sharing effort. Without the catalyst of collaboration we saw working through IT Labs, it is likely these teams would have developed redundant products, more slowly, and less comprehensively."

Jason Duley, Project Lead

In early 2012, the Agency-wide Autonomous Rendezvous and Docking (AR&D) Community of Practice released a white paper, signed by 8 centers and the NASA Engineering and Safety Center (NESC), detailing the number one strategic initiative, by far, that the Agency can take in AR&D. That initiative is designing a user-friendly software and hardware "warehouse" that enables future projects to re-use AR&D software where it makes sense, and also enables supply-chain hardware development of AR&D sensors, and the resulting safety, reliability, cost, and schedule benefits of both.

Per AR&D Community estimates, such a warehouse can save the Agency up to 60 million dollars and 2 years development time, per vehicle that requires AR&D, which encompasses nearly all foreseeable NASA exploration missions. This concept has been endorsed by the Agency's Flight Sciences Steering Committee, the Agency Chief Engineer, the GN&C Technical Discipline Team, and the NESC Review Board. Also, the Office of Chief Technologist (OCT) has incorporated most of the aforementioned white paper into its roadmap for AR&D.

Currently, there are various code repositories across NASA with limited opportunities for collaboration and reuse. There is also an inability to implement or enforce standards at project and community levels. Additionally, software reporting and release processes are confusing and tedious. This project has now completed requirements gathering, tools analysis, trade studies, identifying stakeholders, and an initial lab prototype based on open source GitLabs software.

Forward work includes laying out the federation architecture, designing and implementing the front-end and middleware layers, modeling "code objects" to enable federated search and researching software reporting and software release processes and policies. In follow-on phases, there will be an emphasis on end-user testing and development of an operational model, as well as added features such as object discovery and automation of software release processes. The final deliverable, projected for FY15, is a full-scale production service with support for federating external partners.

Collaboration and integration potential is also likely with the IT Labs project SysAdmin.nasa.gov for sharing System Administrator code as well as partnering with the CTO-IT Program, Open Innovation, and their <http://code.nasa.gov> project.

Baseline NASA's Mobile Device Theft and Recovery Processes



Project Lead: Shawn Postich
Project Team: Richard Haas, Rob Prante,
Ann Schaft, Peter Destro
Project Champion: Tony Facca
Center: GRC
Strategic Goals: 2.1, 2.2, 2.3, 2.4

Phase: Idea / Issue
Themes: End User Training & Support,
IT Security, Mobility

"The value of IT Labs transcends the CTO community, it transcends NASA; in fact, it transcends IT itself. What IT Labs does, and does very well, is provide opportunities to identify, explore and with a little luck resolve issues that are challenging by today's standards and potentially overwhelming to future generations. It's a value proposition that cannot easily be quantified in sheer dollars and cents. What IT Labs ultimately represents is a strategic investment targeting the greater good."

Shawn Postich, Project Lead

The Baseline NASA's Mobile Device Theft and Recovery Processes Project is a collaborative effort between the Agency's IT Security community, the IT Security Awareness and Training Center (ITSATC) and NASA's Emerging Technology and Desktop Standards (ETADS) program. It attempts to identify measurable gaps and deficiencies in NASA's IT Security training efforts, augment IT Security's mobile forensics capabilities and demonstrate the efficacy and value of enterprise mobile device management.

The intent of this project was to determine how the NASA populace responds to finding a lost mobile device. What is unknown, and of significant programmatic value, is how the NASA community will respond when such an event occurs. By evaluating user behavior when finding a lost device that includes a mobile device management (MDM) system implemented on it, critical knowledge can be gained regarding the success of NASA's IT security training program in nurturing a culture of security awareness and good habits as well as the effectiveness of mobile device management in controlling access to NASA data and IT assets.

The project findings provide an important glimpse into the state of Personally Owned Devices (POD) in the enterprise and the behavior of NASA's workforce as the mobile tsunami envelops the Agency. The narrative suggests that employees want to do the right thing when locating missing devices but are overreaching in their altruism, likely stemming from process gaps and lack of formal guidance. The study identifies significant areas for improvement, particularly in reporting and responding to smartphone discoveries. The first vector for improving these deficiencies is raising institutional awareness to mobile's influx and its implications in the environment. The Agency must not consider mobile device management to be the mobile cure-all and needs to establish centralized processes and procedures that are uniformly implemented across the Agency. The Information Technology Security Awareness and Training Center (ITSATC) needs to be a central partner in these efforts so that they can understand, advocate and instruct employees on emerging processes and promote proper response techniques. In the midst of a rapidly changing landscape driven by a steadily increasing reliance on mobile technology, failure to act may put NASA and its employees at potentially needless risk.

Benchmarking Virtual Collaboration Technologies Across Government Agencies



Project Lead: Mary Walsh
Project Team: Desireemoi Bridges, Julie Fletcher
Project Champion: Ray Gilstrap
Base Center: ARC
IRM Strategic Goals: 1.5, 3.2

Phase: Idea / Issue
Themes: Collaboration, Cloud Computing, Mobility, Social Media

“The IT Labs website was a wonderful tool for allowing the Project Lead to keep track of background information, interview notes, drafts and biweekly updates.”

Mary Walsh, Project Lead

NASA is facing great constraints in its ability to hold conferences and fund traveling for staff because of new federal guidelines. While some organizations within NASA, such as the NASA Astrobiology Institute (NAI), have been using virtual tools that go far beyond normal videoconferencing rooms and slideshows, virtual tool use is not widespread within the Agency.

This project proposed a quick, cheap benchmarking study to identify virtual collaboration in use or planned at the other federal R&D agencies. For the survey, virtual collaboration was defined simply as “collaboration with remotely located colleagues.” The intent is to help NASA continue necessary mission-enabling meetings in more affordable ways and support the IRM Strategic Objectives of providing efficient and effective access to enterprise information and collaborative functionality (Objective 1.5) and expand partnerships with other Government agencies (Objective 3.2).

The benchmarking study sought out to compare the virtual collaborative technologies in use or planned by the following federal organizations: DoE (Department of Energy), Naval Research Laboratory (NRL), National Institute of Standards and Technology (NIST), U.S. Geological Society (USGS), National Oceanic and Atmospheric Administration (NOAA), Department of Homeland Security (DHS), U.S. Department of Agriculture (USDA), and the Patent and Trademark Office (PTO). As predicted during the project call review process, this was a daunting task to find the correct points of contact in each of the organizations and complete the study in the allotted time. Three agencies were initially omitted from the study due to unattainability of points of contact, however, a former employee of one of these three was able to answer interview questions to satisfy the study. One additional agency determined that their selection as a R&D entity was inappropriate and did not participate. Thus, this project fulfills the requirements of a benchmarking study but is, by no means, fully comprehensive of all collaboration tools used across federal agencies.

This benchmarking survey is an important first step in developing new or utilizing existing technologies to speed NASA mission success. The study findings showed brand loyalties that can be changed when compelled by outside environments. Some agencies purposely allow multiple coexisting, redundant systems. This permits people to work within their comfort zones as well as encourages competition between providers. Cloud services are under serious investigation for implementation across the federal government and cooperation is underway in consortial groups to develop and procure virtual services. Mobile access projects are also being examined as the next logical virtual collaboration step. Virtual collaboration with external clients and partners will be a secondary step.

Recommended future work includes a cost-benefit analysis of most commonly used technologies as well as virtual meetings with federal organizations that have approaches of interest to gather data regarding procurement, regulations, cultural resistance, and cost savings. Additionally, NASA should study internal organizations with differing user bases for their current methods and issues using collaboration tools, especially with external collaborators. Since NASA already has virtual collaboration pilots running, it would be moving backwards for the CIO to start a study on this topic without taking into account the results of those pilots. The suggested approach should weave the results of those projects into the results of further in-depth interviews with other agencies, to provide the CIO with a broad spectrum of solutions from which to choose.

Chronology

Please tell me what your Agency has done in virtual collaboration?

Social

Does your Agency have a strategic plan for virtual collaboration?

Is virtual collaboration changing your Agency? How?

Technology

Why did you choose the virtual collaboration components you are using?

Projects

Do you have any prototype projects under development?

If you have had any projects that didn't work out, why do you think that might have happened?

Monetary

With enough resources, what would be your end goal for virtual collaboration?

Questionnaire for collaboration tool benchmarking study

Resources	DoE	DHS	NASA	NOAA	NRL	PTO	USDA	USGS	NIST
Accenture IT Services									•
Adobe Connect		•	•						
Chat	•								
Cisco Unified Meeting Place						•			
Cisco WebEx	•		•			•		•	
Cisco's Lync version									
Cloud	•	•		•			•		•
Cuci Lync						•			
Dropbox			•						
Google Apps				•					
Google Chat								•	
Google Docs				•					
GoToMeeting				•					•
Instant Messaging	•	•				•			
Interagency collaborations	•								
Microsoft FMS								•	
Mobile Devices							•		
MS Communicator		•					•		
MS Lync	•	•				•			
MS suite									
SharePoint				•		•		•	
Skype		No*			•			No*	
VBrick						•			
VITS		•							
VoIP	•	•	•			•			
VTC					•		•		

*Explicit policies established prohibiting use of this resource.

Virtual Collaborative Tools in Use or Planned by Federal R&D Agencies

NASA does need to use caution in proceeding with virtual collaboration. The recommendations below should be considered before procurement decisions are made.

- + Cultural resistance within agencies is a real issue. Significant time should be spent prior to purchase or development of technologies learning how users across the targeted organization prefer to handle their collaborations.
- + One size does not fit all. There is nothing wrong with having more than one technical solution available to your agency's staff. It is possible that providing more than one solution might have added benefits. The issue of sole source contracts can be avoided and might attract more responsive vendors, if they are aware that they share NASA's business.
- + Expect to support a spectrum of virtual collaboration technologies in the five year term, from traditional videoconferencing up through 3D collaboration. Internal and external collaborators will use what they are comfortable with and the comfort level will vary across NASA's organizations.
- + Write a strategic plan for virtual collaboration to help NASA staff developing pilot projects. While the IRM Strategic Goals and Objectives are a good start, a more complete statement of collaborative goals would help future staff to propose projects that align even more with CIO objectives.

As a side note, the difficulty in reaching IT counterparts across Federal agencies further established that Federal IT resources are stretched thinly as they are at NASA. Furthermore, this study is even more important as budgets decrease and the necessity for collaborative methods increases to maintain technological growth. As part of the agreed upon deliverables, a paper detailing this project was delivered including the varying agencies' best practices and lessons learned in collaborative technologies.

Communications Dashboard “Comm Dash”



Project Lead: David Scott
 Project Champion: Burt Bright
 Base Center: MSFC
 IRM Strategic Goals: 1.1, 1.5, 3.3, 4.2

“The IT Labs process and policies are in general quite workable and reasonable. Preparation of the ‘elevator pitch’ was of tremendous help in sharpening the description of the idea/concept. Many other programs at NASA might benefit from this requirement.”

David Scott, Project Lead

Phase: Idea / Issue
Themes: Collaboration, Data Center Consolidation, Data Visualization, End User Experience, Knowledge Management, Mission IT, Social Media

While gathering software requirements for web-based applications to be used in International Space Station (ISS) flight control operations, it was noted that a lot of text and attachments are replicated among several systems and that much voice traffic involves coordination of sending and receiving legacy type communications. Another observation was that Facebook and other Social Networking Services (SNS) excel at integrating information and processes relevant to their intended audiences and purposes. Perhaps a similar—though certainly not identical—approach could gather information and processes relevant to real time control operations.

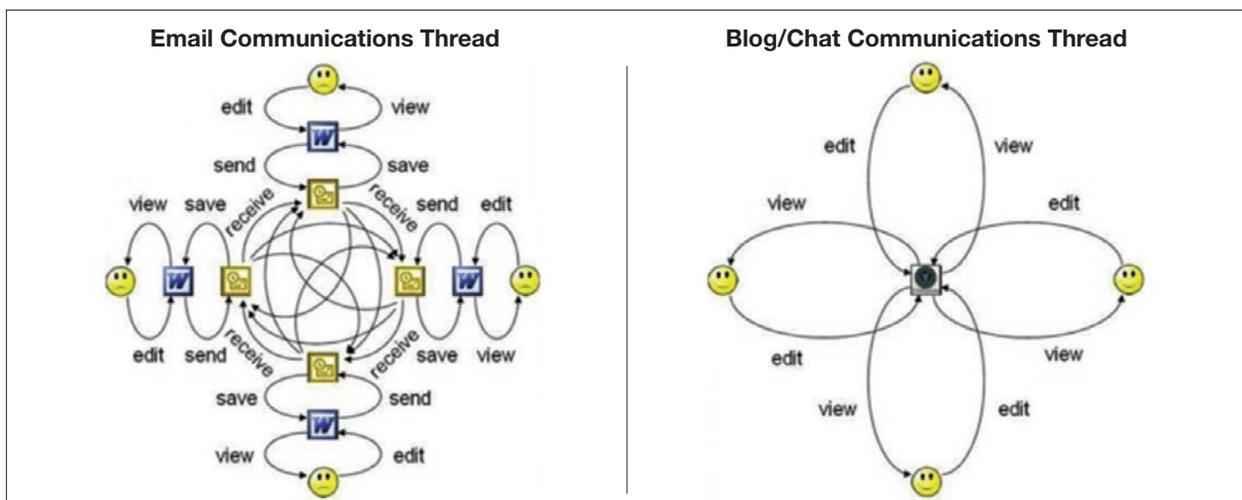
The aim of this project is to build a software testbed to explore unconventional integration, presentation and exchange of flight control communications in intra-Center and/or inter-Center contexts, the ultimate goal being to create a unified interface for multiple communication tools to complement and/or augment voice loop discussions. This would enable flight controllers to manage more operations with fewer spoken and written words and with greatly reduced stress.

Potential benefits include some totally new methods and/or unique mash-ups of existing techniques that could apply to a wide variety of real time control environments, such as aircraft flight control, factory operations, military operations, 911 call centers and inter-Agency responses to large-scale disasters. The same methods could also be applied to a wide variety of less stressful environments that involve significant information juggling, e.g., large scale design projects, Source Evaluation Boards (SEB).

Phase one of this project investigated the concept and high-level implementation possibilities for a Facebook-like Communications Dashboard (or “Comm Dash”) that would integrate console logs, text chat streams analogous to voice loops, text chat streams dedicated to particular conversations, generic and position-specific status displays and streams, and a graphics-based hailing capability.

Such approaches can reduce flight controller stress via these goals and principles:

- Information is represented in fewer places, reducing disconnects and/or divergent copies.
- Multiple parties look at the same instance of information, reducing disconnect opportunities even further
- Manual cut/copy-and-paste operations are minimized.
- Information is discoverable when needed and disappears when it is not.
- Less voice traffic is needed because the log keeping system can now carry many conversations with excellent retention, organization, and visual persistence.



Cleanliness and Efficiency of Blog/Chat Streams compared to Email or Voice

It should be relatively easy to integrate CommDash with other situational awareness improvement tools in development at NASA. For example:

A recently deployed log keeping application, Console Log Tool (CoLT), at MSFC's POIC provides "anywhere" access, comment/notifications features similar to those found in SNSs, report generation, and email transmission at several levels of automation. A future events tracking capability in CoLT could foster appropriate bidirectional communication via the log. Future versions might include connections to other ISS communications and/or planning systems. Initial use in support of real time operations has been successful. Ongoing development may lead to offering CoLT as a service to multiple missions and/or agencies, or as licensed or open source software.

Cross-Log communication via social techniques is a concept being explored at JSC's Mission Control Center Houston (MCC-H that would use microblogging's @tag and #tag protocols to make information/requests visible and/or discoverable in logs owned by @Destination addressees. Some #Object designations could serve as links to products/locations in other systems, e.g., Flight Notes. As the Cross-Log PI has made a career change, this concept eagerly awaits its next champion.

Voice Traffic related to PAYCOM chat stream:

025/1510 PAYCOM and PSE, POD on POD loop: Could you work situation ABC and summarize on this loop when finished?
 PAYCOM: Wilco – PSE, meet me on PAYCOM chat?. PSE: Wilco.

025/1525 POD, PAYCOM on POD loop: We've finished working ABC, and recommend DEF because of GHI.
 POD: Thanks, PAYCOM and PSE. I'll discuss with FLIGHT and get back with you.

(Interested parties can review the detailed discussion by viewing the PAYCOM data channel between 1510 and 1525)

Alerts & Pulldowns, e.g., messages, actions, hailing

Major Announcements with Acknowledge Function

Search

1535/POD: Need DPCe inputs 1 hour early! Ack

Status Scroll

GMT 201 Day 025

1523: StatusMon ER1 powered on

1527: ExcMon TBD Temp 35.5 High

1530 – POD/J. Doe Guests in viewing room. Let's look sharp!

Hailing

To Fr Where

POD OC1

OC2 ● OC Loop

DMC

PRO1

PRO2

LIS Silent Hailing

STOW

PPM

POM

PAYCOM Console Log Console Log

Day/Time	Loop	Entry
201/1510	POD	POD asked PSE and I to work ABC. Took conversation to PAYCOM chat.
201//1513	S/G2, POD	ISS CDR called: Payload XYZ output temp 45C, should be 42. Confirmed we see same in telemetry. GO to perform MAL procedure 4.002
201/1525	201/1525	Advised POD re: ABC, recommend DEF because of GHI. POD will check with FLIGHT and get back to us. PAYCOM Chat details

Clicking link highlights appropriate text in chat or pops new window (avoid cut & paste!)

Items of interest to target community; posted by humans or systems, manually, semi-auto, or auto

"Instant" situational awareness

Acknowledge – 1 click
Clear – Double-click

PAYCOM Chat (POIC)

025/1432 OC: (Different conversation)

025/1512 PAYCOM: I think ABC is happening because ... (Interrupted by flight crew call-down)

025/1513 PSE: (While PAYCOM is working crew call) Checked document such-and-so ... (Details, details)

025/1522 PAYCOM: OK, we suggest DEF because of GHI. I'll review with POD.

025/1545 KLM PD: (Another conversation)

POD Chat (ISS)

Authorized viewers/participants in chat channel/conversation, e.g., POIC, all ISS Centers, named participants

Less voice coordination and repetition/relay/copying because relevant content is already at hand!

Chats/Blogs/Discussions relevant to user or task (user can easily swap in/out, rearrange)

Chat: [Title of Specific Conversation] (Distribution)

Status Panel

Ku Until S Until

AOS ● 15:43 ○

LOS ○ 15:38 ●

Countdown

DPC ○ 2:15:20

AFD ○ 7:13:32

Global and/or user-specific statuses

Communications Dashboard Mockup Based on ISS Payload Operations at POIC

Communications Dashboard “Comm Dash” ...continued

In the case of CommDash, CoLT, and Cross-Log Communication, two separate Field Centers independently hatched and collaboratively improved three similar and perhaps linkable concepts in similar disciplines. This hints at an evolutionary paradigm shift in console support that parallels cultural change. Comm Dash seeks to improve situational awareness, team cohesiveness, and individual effectiveness while reducing stress by modernizing communication practices and tools with advancements seen in the commercial world. (This is benevolent payback for NASA's Apollo-era influence on commercial methods.)

These three concepts were the topic of a SpaceOps 2012 Conference (Stockholm, Sweden) paper titled “Simplify ISS Flight Control Communications and Log Keeping via Social Tools and Techniques,” which was selected as a “Top 10%” submission for publishing in the SpaceOps 2012 bound volume.

<http://tinyurl.com/SimplerOps-SO2012-Paper>

<http://tinyurl.com/SimplerOps-SO2012-Presentation>

“Communications Dashboard (Control Rooms, Take a Cue from Facebook!), Chapter 1” was published via the 2013 IEEE Aerospace Conference (Big Sky, Montana).

<http://tinyurl.com/CommDash-IEEE2013-Paper>

<http://tinyurl.com/CommDash-IEEE2013-Presentation>

The Comm Dash team hopes to build a working prototype in 2013.

Innovation is the art of the adjacent possible.

Development of a Gesture Interface for the Office Environment



Project Lead: Allan Stilwell
Project Team: Jonathan Dory,
Shelby Thompson
Project Champion: James McClellan
Center: JSC
IRM Strategic Goals: 1.1, 3.2, 3.3

Phase: Proof of Concept
Themes: Accessibility,
End User Experience, Gaming Tech

“Due to the great support from IT Labs, we have not only been able to explore gesture-based human and computing interfaces but also collaborate across multiple areas and centers. This is generating an exciting discussion of the future of computer interaction and how we can create an aware and integrated office environment without creating custom hardware and just utilize off-the-shelf products that are gaining traction in industry and with the next generation workforce. IT Labs has been a tremendous advocate of innovation and helping NASA stay on the cutting edge of IT technologies. This is one of the greatest programs I have had the honor of being involved in and I hope that it only continues to expand and gain more support around the Agency and possibly across agencies.”

Allan Stilwell, Project Lead

The project was to investigate gesture-based computer interaction by developing a prototype using both gestures and voice commands with a Windows desktop environment. The interface will allow users to navigate using gestures (or voice) through a menu structure whereby commanding of Microsoft Office applications will be possible. The major component of the system and what makes gesture recognition possible is the utilization of the Microsoft Kinect. The Kinect uses infrared technology and sophisticated software to track a person and derive a skeleton composite that is tracked in x-, y-, and z-space (see Figure 1). Once a users' skeleton is tracked, the software is programmed to recognize certain movements, or gestures, and convert those physical actions into commands on the interface.



Figure 1. The Kinect sensor generates three data streams, depth, skeletal, and RGB camera. Image courtesy of Microsoft.

The formal goals of the project were:

- (a)** to develop a proof of concept interface that allows users to navigate a menu structure using only gestures and voice commanding to open and use common Microsoft Office applications (e.g., Word, PowerPoint),
- (b)** provide voice recording capabilities during a presentation for later transcription by MAVIS (a product of the Video Search project) and compatible with Agency search infrastructure, and
- (c)** evaluate the feasibility of gesture and voice commanding technology and provide recommendations as to whether this is a technology that NASA should invest in for streamlining human-computer interaction in an office.

At this point in the project, a working prototype interface has been developed. Evaluations will be conducted this Summer followed by a complete report on the project. While the project progressed on schedule and budget, there was definitely a steeper learning curve than anticipated with development. Several additional features were planned for implementation into the software (e.g., integration with SharePoint applications), but those will have to wait.

However, many desirable and technologically advanced features did become part of the prototype. The core framework of the prototype does allow for integration and after user feedback and testing next steps will be recommended. The initial focus was to ensure that it was kept in line with where these types of interfaces were going and did not redevelop the wheel. For example, the look of the interface itself employs a very modern Metro-style look that is currently being used with Microsoft products (see Figure 2). In addition, several new gestures were able to be integrated. There are some common gestures that are used such as “swiping” but also the interface included “push to enter,” rather than “hover over” gestures, and “grab and drag” for files (see Figure 3). Some voice commanding is currently incorporated but additional work is needed for full voice integration. It is recommended that more voice recognition features be included in future versions to make the interface more usable. Future versions of the software will include more support for voice

Development of a Gesture Interface for the Office Environment ...continued

recording and the addition of video recording. More control of the settings for the Kinect is planned to be included with a later version which will result in better usability and could include dual user control. Also, the team would like to investigate the Kinect's integration with other types of hardware such as Raspberry Pi which could yield more input features like creation of a media center interface to control music and videos.

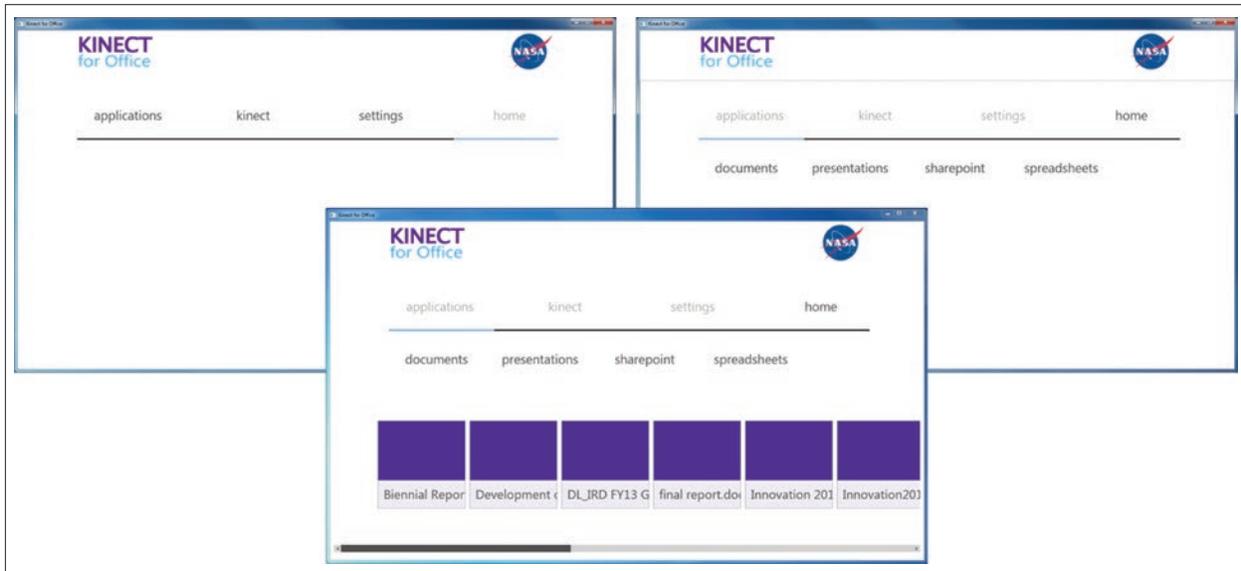


Figure 2. Three of the menus available on the Kinect for Office interface: Main Menu (top left), Applications Menu (top right), and Document File Menu (bottom). Notice the Metro styling and simple features of the interface designed for optimal usability.

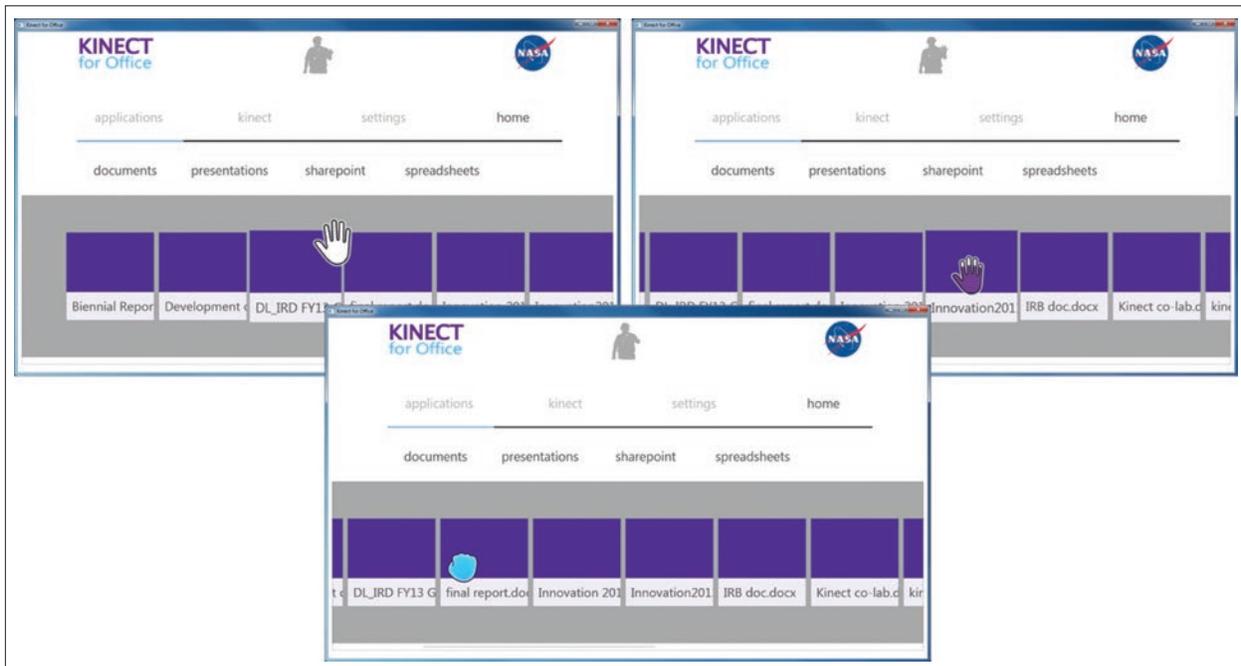


Figure 3. The user interacts with the interface using a virtual hand which is controlled by their hand (top left). To open a file or select a menu item, the user simply has to "push" their hand forward to press the button on the interface (top right). To scroll through the files, the user makes a fist which grabs the files and allows them to be dragged to the left or right. A grey silhouette provides user feedback of the user's position and gestures.

Dropbox for the Enterprise: Secure Collaboration for Mobile Workers



*Project Lead: Michael Killingsworth, Manson Yew
Project Team: Gabriel Rangel, Tracy Bierman,
Lula Wright, Bryan Walls
Project Champion: Tom Soderstrom
Centers: JPL, KSC, MSFC
IRM Strategic Goals: 1.3, 1.4, 1.5, 3.3*

Phase: Proof of Concept
**Themes: Cloud Computing, Collaboration,
Cyber Security, End User Experience, Mobility**

“Working on the Dropbox project was exciting and allowed me to work with many of the other NASA centers. Having been involved in the early stages of proposing a new service, surveying many of the users was a learning experience and reminded me many times over that our user community is no average set of users. IT Labs created the opportunity not only for me to improve NASA’s IT resources but also for me to grow professionally within the Agency through that work.”

Michael Killingsworth, Project Lead

A growing part of the NASA workforce is mobile and often this mobile workforce plays key roles in various team collaboration activities. However, existing tools used for mobile collaboration are fractured such that more often than not mobile workers resort to email. Not only is email a poor collaboration environment but it exposes the worker and NASA to privacy and security issues, configuration management issues and a variety of organization and usability issues that limit the productivity of these important members of the NASA workforce.

In the previous Idea / Issue phase IT Labs project, exploring Drag-Drop-Sync-Share (DDSS) tools such as DropBox, the growing limitations on mobile collaboration were uncovered. However, elegant, consumer-driver solutions for supporting mobile collaboration were found. Not only are there well-designed IT applications for secure collaboration but these same applications also include such valuable services as backup and personal cloud for general users.

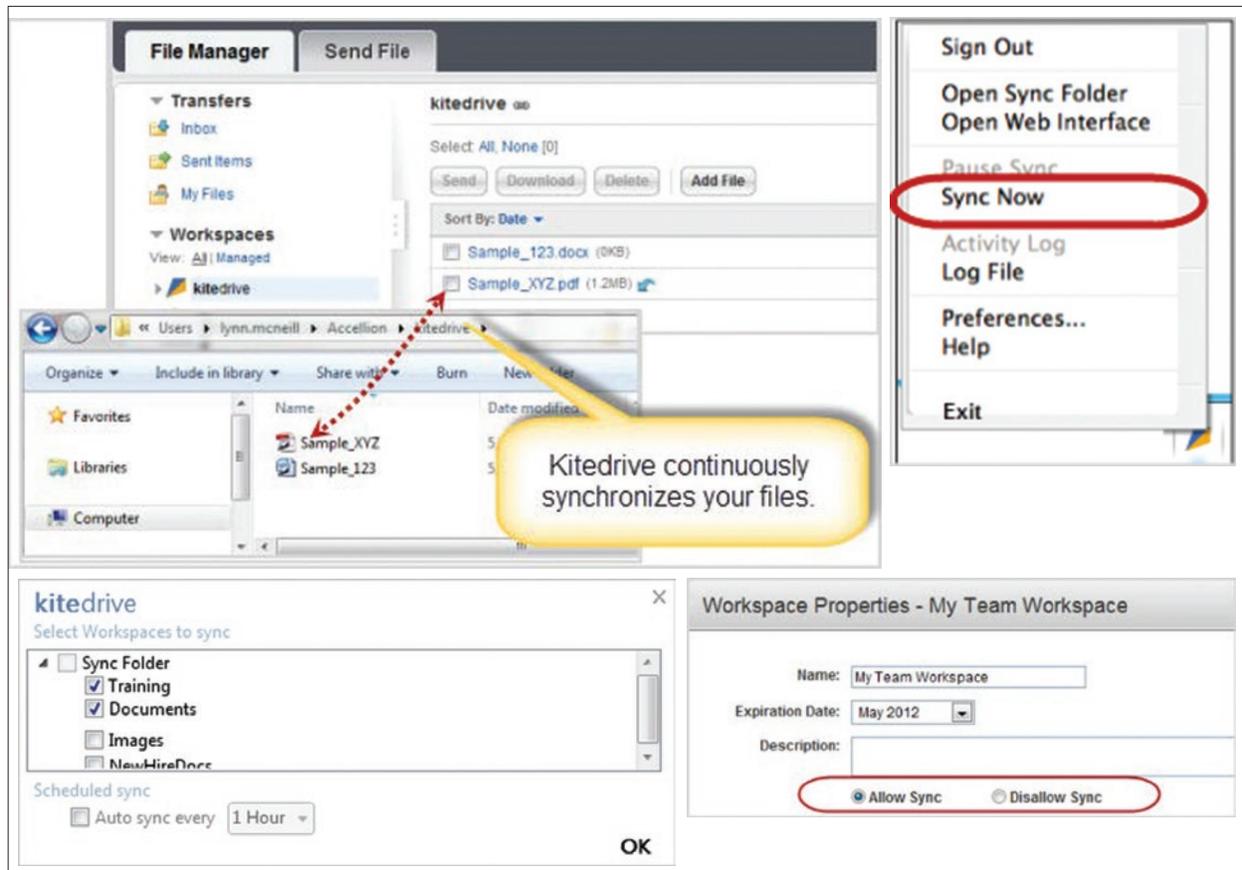
This task is the follow on to DDSS. It takes the capabilities explored previously and provides a proof-of-concept for secure collaboration for mobile workers. In addition, this proof-of-concept will explore the applicability for ancillary services and how they may support the overall architecture for mobile tools for NASA.

Employees are using cloud services to store company information despite organizational policies. Employees and partners need anytime, anywhere, any device access to the latest information to get the job done; that is “Dropbox for the Enterprise”. While seeking these attributes as well as ease-of-use and visibility, it is critical to ensure that information is secure, compliant, and in control. Employees are turning to consumer-based public clouds to access, share and synchronize corporate data even though NASA provides a business solution that allows users to store information in a local collaboration solution. However, accessibility is an issue. The solution must deliver on all of these qualities to be effective.

Another part of the equation that needs to be addressed is the ever growing demand of “Bring Your Own Device” (BYOD) and “consumerism” of many of the products that employees use or want to use on the job such as smartphones and tablets to be more productive and flexible. However, the risks are serious and often out of the control of IT as sensitive data is being accessed through unmanaged devices.

What is needed is a user-centric solution that will provide the required security for both internal as well as external users, collaboration, on premise storage, document protections, tracking for compliance, flexible and extensible architecture, central administration, and branding and customization. From the user’s point of view the ability to control their data (folder based file syncing and sharing), clients on multiple platforms (desktop and mobile), no hassle file sharing, ability to set the restrictions, and innovative features are part of the package. From the backend perspective, manageability, integration with directory services, storage flexibility and capabilities are needed to name a few. The last consideration is security. The following recommendation takes all of this into account and proposes a step forward to the final solution.

Currently, NASA is using Accellion for Large File Transfer (LFT). Accellion is one of the companies that has made many improvements to their product over the last year and with their current licensing, enterprise “Dropbox for the Enterprise” is included. For any of the Centers that are using the Accellion product for LFT and have the current license or will be renewing their license in the near future, the “Dropbox for the Enterprise” functionality will be included.



Accellion windows for synchronizing files

The selection of Accellion as a participant in this recommendation is based on two factors. The functionality and security features that are implemented closely represent many of the other solutions. Secondly, NASA already has a license with Accellion. The Accellion product falls into the “middle” tier of applications based on features, functionality, and security and would represent a good test subject. The other recommended product for evaluating hands-on is WatchDox which falls into the upper tier of security features. Watchdox has many innovative features such as Per document encryption, apply controls on printing, cut, copy etc, dynamic expiration date based removal, geofencing of documents, and specialized readers to name a few.

A hands-on and more detailed look at these types of features may open up and present more or specialized use cases. Both of these products will provide more functionality than the standard consumer-based “dropbox.” However, with more functionality also comes more complexity at the user end. To better determine the true usability of these applications will require an evaluation period. One test during the evaluation would be to compare each of the products with all the security features turned off and then again with the security features turned on. During the evaluation, as noted, the security features can be turned on and off and this flexibility will allow discovery of the balance between security and ease of use. A testing group consisting of users from various centers and organizations, including security, should be established for an evaluation. The evaluations are to be defined to a specified period of time with a report of findings back to the CTO with possible candidates for implementation.

Engineering Enterprise Data Harvest Standards



Project Lead: Chatwin Lansdowne
Project Team: Patrick McCartney,
Christopher Winton, John Maclean
Project Champion: James McClellan
Center: JSC
IRM Strategic Goals: 1.2, 3.1, 3.2, 3.3, 4.2

Phase: Prototype
Themes: End User Experience,
Interoperability, Mission IT

"Information Technology is cross-cutting across all NASA organizations, but funding is directed into silos. IT Labs has filled the otherwise empty role of sponsor for activities that identify, package, and inject the cross-cutting modern best-practices that will enable NASA to function as a unified enterprise. My organization was asking for non-standard, proprietary lab automation. With a small infusion from IT Labs I was able to pursue an industry standard approach with relevant outside players instead. That's what changes the game."

Chatwin Lansdowne, Project Lead

In 2012, Chatwin Lansdowne was awarded an IT Labs study to investigate the possibility of deriving Automatic Test Markup Language (ATML) documents from a SysML model (see the ATML & SysML project described in the Recent Projects section of the FY 2011-2012 Annual Report). SysML is a tool used by the ModelBased Systems Engineering grass-roots initiative. The study conclusions were published at the IEEE AutoTestCon 2012.

Lansdowne has continued to explore the ATML information framework this year with IT Labs in the prototype phase. In April, he hosted the IEEE Standards Coordinating Committee-20 meeting at JSC where he provided tours of NASA use cases, including Integrated Power Avionics and Software (IPAS) and Training Systems for the 21st Century (TS-21) and provided a pitch from Dr. Paul Keller (ARC) on the NASA Information Architecture and the desire for interoperable data format standards. Despite interest in Engineering (iPAS) and Mission Operations (TS-21), initially neither organization wanted to fund external standards development or even formulate an interface definition for internal exchanges. However, with the infusion of IT Labs funding, and the subsequent realization of the project's value, JSC's Engineering Directorate matched IT Labs funds in support of this value-added effort.

The driving purpose was to reduce the cost and schedule of the engineering cycle for flight projects. The proposal to do this uses industry standards to enable automated data harvest into interoperable formats. The standard interface IEEE agreed to open will enable software to discover system elements, discover their configurable parameters, the constraints on those parameters, how to interpret indicators and measurements and ultimately discover how behaviorally to use the elements.

This project is now producing a plug-and-play modular approach to test automation. The IEEE Standards Association project 1877 will define a web/XML Test Orchestration Interface that will enable discovery of modular assets, the summary control and status data and metadata, and behaviors, requirements, hardware interfaces, and other descriptive information in a standardized machine-interpretable information format.



The IEEE 1877 standard is built on an interface which was developed at JSC through collaborative support in a half-dozen local Engineering laboratories for demonstration activities. The interface has been adopted by Training Systems 21st Century which will become the Space Station Training Facility. Called mREST, the interface combines plug-and-play and web services protocols with Automatic Test Markup Language (ATML). ATML is an IEEE information framework standard. The mREST prototype emerged from a Constellation-funded study defined by Lansdowne and executed by METECS software engineers.

ATML was initiated by DoD in 2002 and seeks to make test capabilities agile by separately describing each piece of equipment, linkages, test articles, interfaces, and requirements. With the team's ingenuity and support from IT Labs, a new aerospace industry standard is emerging that can transition ATML into products.

More information is found in this article under IEEE copyright
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6058728

Enhance NASA's Large File Transfer Capability to 100GB Capacity



"The most value to me so far has been connections made with other IT Labs participants."

Bryan Walls, Project Lead

*Project Lead: Bryan Walls
Project Team: David Mitchell, James Osborne,
James Gibson, Fred McMullen
Project Champion: Burt Bright
Center: MSFC
IRM Strategic Goals: 1.1, 1.2, 1.3, 1.4, 1.5*

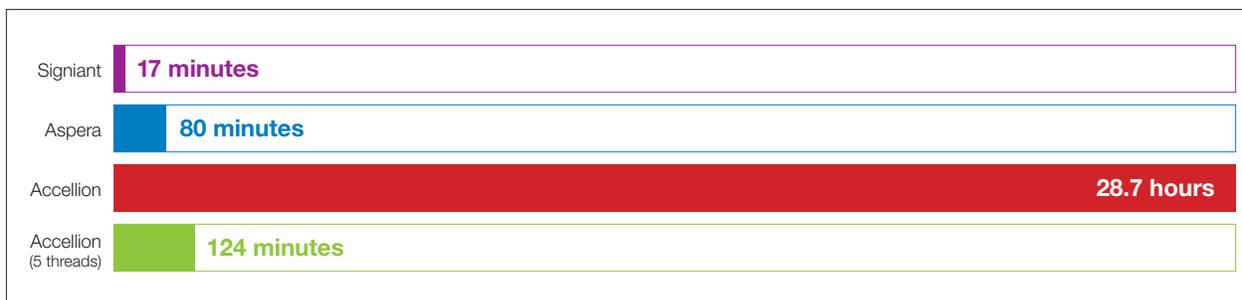
Phase: Proof of Concept
Themes: Collaboration, Mission IT, Mobility, Networks

The current NASA Large File Transfer (LFT) system supports files up to 20GB in size. The Digital TV program has a dedicated file transfer capability for moving large video files up to 100GB in size. Other programs also have requirements for file transfer above the current 20GB limit. This proposal suggests enhancing or replacing the existing LFT to support the larger requirements as a shared NASA resource, rather than supporting multiple file transfer implementations on a program by program basis.

The purpose of the first phase of the proposal is to demonstrate the required functionality of primary vendor offerings in the NASA environment to enable a product choice for further phases. Three vendors were considered and compared for functionality, cost, and performance in the NASA environment. The three candidate systems are product suites by Accellion, the incumbent for the current LFT system; Aspera, the leader in file transfer in the video arena; and Signiant, a competitor in the same arena. A fourth product, EMC's Syncplicity is a cloud-based service that does not fit into the constraints of the closed network NASA requirement and therefore, was not evaluated.

The objective was to compare the vendor offerings using computers in the NASA environment, simulating network and environment for systems located at one of the major field Centers and Headquarters, for transferring files in the 20GB to 100GB size range. Testing was performed in the Network Operation Systems Lab at Marshall Space Flight Center, using virtual servers connected by a simulated network modeling a link between NASA centers.

The initial test configuration showed clear differentiation between the three products, with the Accellion product being unacceptably slow. However, a retest enabling multiple transfer threads improved Accellion performance to match actual test experience with the existing NOMAD LFT implementation of the product. The conclusion of the test showed Signiant a very significant victor, but both Aspera and Accellion as capable of meeting the minimal file transfer requirements of the NIEP Launch replacement. Signiant had the best time moving the test file from agent to agent in 17 minutes. Aspera moved the same file from agent to agent in 80 minutes (4.7 times longer). Accellion's time for agent to agent transfer was 28 hours and 42 minutes in the initial configuration (101 times longer than Aspera). By modifying the threading on Accellion to support five threads, the time was reduced to 2 hours four minutes (7.3 times longer than Aspera).



Comparative transfer rates for tested products



Based on these results, Signiant is the clear winner. Upgrading the existing Accellion NOMAD LFT to support 100 GB files meets the minimum requirements for file transfer speed however, it does not meet the overnight delivery requirement since upload and download are independent actions requiring manual initiation. The Accellion product does support virtual machines (VMs) that could be located at destination sites. With support from the ACES contract to establish VMs at key locations (primarily at the NASA Headquarters TV studio), Accellion is a minimally acceptable solution. If actual Accellion testing and use show that transfer speed is adequate for a download to occur within a couple of hours, some locations may be able to waive overnight delivery.

Because NIEP users need reliable file delivery and the existing Launch system is dying, the need for a viable replacement is immediate. For that reason, if funding is available, NIEP would prefer an upgrade to the existing Accellion-based NOMAD LFT system with a 100 GB file limit and a virtual machine version of the appliance at NASA HQ configured as a dropbox.

The proposed next phase for this work is to move to an IT Labs Prototype phase investigation into performance of the Signiant product for file transfer between NASA HQ and at least one NASA Center. Additional work may be appropriately directed into a collaboration with another IT Lab's project, JPL's Dropbox for the Enterprise, after each project has now conducted their independent reviews of products. Adding dropbox capability to the NOMAD LFT actually complicates use for NIEP needs. A practical test of a virtual machine for a large file dropbox is a recommended next step.

Evaluation of PIV Two Factor Authentication with iPads



Project Lead: Ridley DiSiena
Project Team: Richard Haas, Dennis Kay, Rob Prante, Ann E. Schaft, Irene Wirkus
Project Champion: Tony Facca
Center: GRC
IRM Strategic Goal: 2.2

Phase: Prototype
Themes: Access Management, IT Security, Mobility

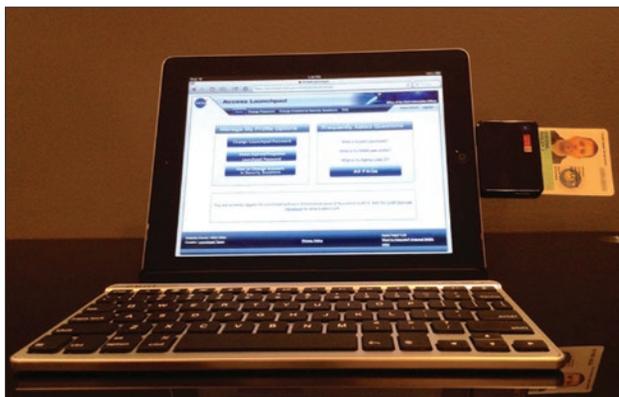
"IT Labs allowed us to take an early mobile PIV prototype solution and quickly get it in the hands of a diverse group of NASA users. We know much more now about what it will take to achieve a successful comprehensive solution as well as helping us identify the true challenges ahead for supporting PIV on mobile devices."

Ridley DiSiena, Project Lead

NASA's adoption of a Work from Anywhere model presents unique challenges for users needing to access applications requiring PIV (Personal Identity Verification)/Smartcard authentication. One of the specific challenges is enabling users to work from the end user computing devices of their choice. At this time, the requirement for PIV authentication limits device options to traditional desktop computers and laptops and is an impediment to the Work from Anywhere initiative.

The use of Apple iOS devices within the Agency increases every day and their continued use is key to the success of NASA's overall mobility strategy. Users of iOS devices do not currently have the ability to access applications that require PIV/smartcard authentication. One of the possible solutions for enabling this capability within NASA is the use of an iOS smartcard reader device with supporting browser application. Implementing this type of solution would allow users to access applications requiring smartcard authentication and for which no alternative means of authentication exists. Currently, some NASA users are already using applications that require PIV authentication, such as the NASA ASUS Enterprise Data Warehouse and Department of Defense's JPAS application. Additionally, PIV/smartcard-based authentication can provide a simpler method of logon for NASA Access Launchpad integrated applications versus using complex passwords. The PIV smartcard can be used to authenticate to any of the hundreds of Launchpad applications, making use of the highest level of authentication assurance available. Popular Federal sites such as Max.gov also leverage PIV for logon.

This proposal sought to evaluate the feasibility of using the Thursby PKard reader and associated PKard reader app in the NASA environment for access to applications requiring PIV authentication. Other iOS PIV card readers in the marketplace were also set to be evaluated.



The first task was to identify the Commercial-Off-The-Shelf (COTS) hardware products to be evaluated. The list of tested readers includes: the Thursby PKard iOS Reader, Tactivo iPhone 4/4S Case Reader, and the BaiMobile 3000 Bluetooth Reader. The evaluated COTS software products were the free PKard Reader App and the paid version of the PKard Browser App which is required for BaiMobile 3000 Support.

Forty-one evaluators were selected from multiple centers representing: Agency OCIO, Mission, IT Labs, ICAM, ETADS, NCAD, and IT Security. These volunteers were provided PKard readers and in some cases, iPads. Due to cost and availability, only the core team tested the BaiMobile 3000 Bluetooth reader, the PKard Browser

App (which requires to be purchased from the Apple iTunes Store), and the Tactivo iPhone Case Reader. All supported iOS devices were tested, but iPads were chosen as a baseline device for participants due to the limited mobile phone screen size and format compatibility with many of the target Government web applications.

Some logistical challenges included identifying potential evaluation volunteers that already have iPads, procurement and delivery of the hardware, and getting survey responses from evaluators. Vendor and product related challenges included several initial PKard App software bugs, required certificate trust anchor management enhancements, and delays the vendor encountered in getting their app updates through the Apple iTunes Store. Also, some users encountered physical challenges using the device. The form factor of the PKard reader did not work with many iPad cases. It was found that this could be overcome either by removing the case or using an extension cable. Per the feedback of the



prototype project, and also from other customers, the form factor of the device will be modified in the new version of the PKard reader from Thursby.

While many Government websites that accept the NASA PIV card worked perfectly with the product, halfway through the prototype evaluation period, a change occurred to the NASA ICAM infrastructure that made the “smartcard login” button on Launchpad stop functioning with the PKard product. Unfortunately, resolving this issue has not been a priority, but a workaround is available for the time being.

Some other technical limitations most evident by the prototype evaluation were:

- + many NASA web applications leverage technologies are incompatible with many mobile solutions.
- + Most PIV/smartcard-enabled NASA and Federal applications do have authentication requirements that are compatible with the PKard solution. Unfortunately, many of the same web applications have dependencies that are not available on mobile solutions such as iOS and Android based devices, e.g., Flash, Java, Rich Media File Support, etc.

The prototype project produced several recommendations based on the initial evaluation of this solution. As of January 1, 2013, DoD requires CAC (Common Access Card) or PIV for authentication. NASA individuals must use their PIV card to access these resources and thus, should be permitted to purchase selected readers if they have a need to access DoD smartcard-only applications from an Apple iOS based device.



It is also recommended that NASA make it a higher priority to address the integration and compatibility issues identified in the pilot, including making NASA Launchpad compatible with the PKard browser as a standard implementation.

Another important recommendation to come out of the project is to require that NASA web applications use standard technologies that are compatible with mobile devices. The use of current web standards such as HTML5 and CSS 3 should be strongly encouraged. iPads offer a full format browser so it is not always necessary to develop an iOS app for each application as long as NASA application providers remove dependencies such as Flash, Java, Active X, etc. It is worth noting that these same legacy dependencies for clients are often the same technologies that unnecessarily increase the attack surface of NASA GFE (Government Furnished Equipment) and BYOD devices.

The PIV-on-iPad project suggested NASA make mobile tablets a first class solution for NASA work. Developing a “Secure Mobile” and/or “Secure Tablet” seat which incorporates NASA ICAM requirements is critical to the success of NASA’s Mobility Strategy. It is strongly urged that NASA realize the economic advantages of mobile solutions, users’ desire to use leverage these devices, as well as the capabilities as demonstrated by this project.



Funding for follow-up activities was suggested to evaluate new mobile devices, PIV readers, and related solutions and technologies. NASA should make an investment to monitor emerging Federal standards like NIST SP 800-157 for strong authentication consistent with other Federal mandates (OMB M-11-11, etc.). NASA ICAM Engineering reminds those interested in the future of Federal mobile device use that secure email has an approaching forcing function for compatibility with the NIST FIPS 201-2 standard now being finalized. In order to meet the mid-2014 deadline, NASA ICAM work on the production of new NASA PIV cards with SMIME certificate capability is already well underway. ICAM Engineering should be consulted for smartcard use guidance on mobile devices, especially as NASA begins to fully embrace the mobile landscape in a secure and responsible way that meets Federal requirements.

IT Labs is further supporting adherence to Federal ICAM requirements in a recently funded effort seeking the use of PIV-derived credentials for mobile devices.

Image Data Mining of Terrestrial Lunar Data Sets: *Impact Craters for Resource Prospecting*



Project Lead: Ali Shaykhian, Ph.D.
 Project Team: Robert Beil, Kien A. Hua, Kyle Martin, Kutalmis Apkinar
 Project Champion: Benjamin Bryant
 Center: KSC
 IRM Strategic Goals: 1.2, 1.5, 3.3

“Advances in image data mining will clearly benefit numerous applications of knowledge mining and discovery in NASA and private industries.”

Ali Shaykhian, Project Lead

Phase: Idea / Issue
Themes: Data Center Consolidation, Mission IT, Search

An easy-to-use Content-Based Image Retrieval (CBIR) system would be a useful data-mining tool to assist NASA and private-sector scientists and engineers working with large surface imagery datasets like those from the Lunar Reconnaissance Orbiter (LRO). It would increase value of NASA’s extensive collection of image data and improve tools for NASA and private-sector mission planning.

Outer space contains a vast amount of resources that offer virtually unlimited wealth to the humans that can access and use them for commercial purposes [1]. Planning landing sites for future missions to the Moon and beyond will require balancing a number of competing objectives, such as available water ice, proximity to valuable geological formation, hazard to landing craft, etc. Planets and other bodies in the solar system share a number of visually distinct features that provide important information on their formation and geology, such as craters, basaltic flows, and fractures. Image data mining of extraterrestrial data sets will help automate the discovery of geological formations important for missions to the Moon, asteroids, Mars, and beyond. The primary objective of this research project is to explore novel information technology in order to maximize the value of NASA’s large archive of imagery data sets.

Imagery data from NASA missions like the Lunar Reconnaissance Orbiter can be used to discover visual features that characterize particular geological formations such as craters. For instance, feature vectors can be extracted from LRO imagery to build a large metadata base (i.e., a multidimensional feature space). By clustering these feature

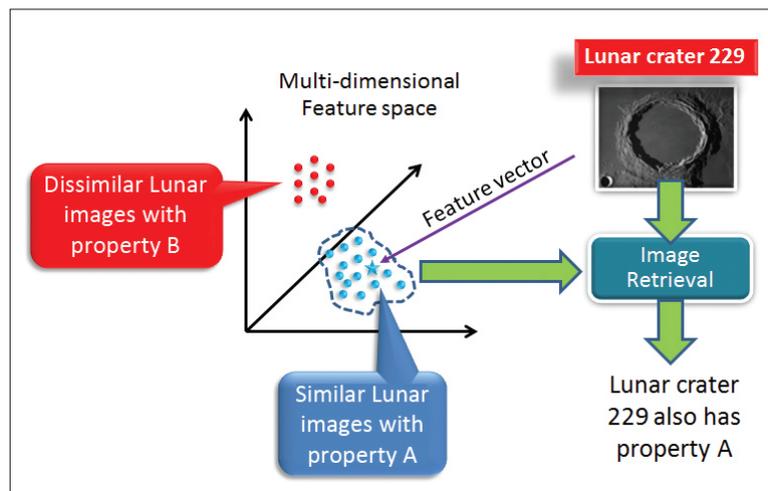


Figure 1 Investigate lunar craters by examining the geological properties of craters with similar appearance

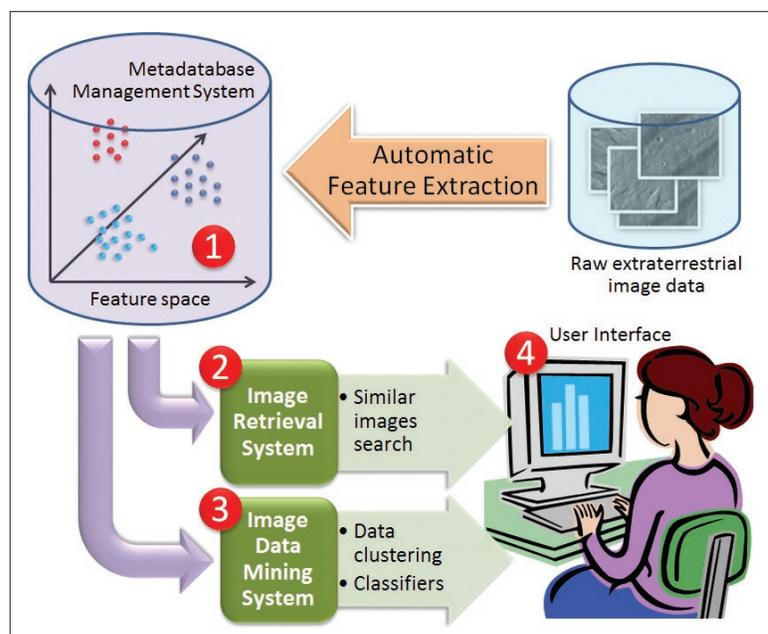


Figure 2 An advanced IT Environment for studying very large extraterrestrial data sets

vectors (i.e., points with coordinates) in the multidimensional feature space, the corresponding craters are classified into categories (Figure 1). Known properties of craters and other surface features can then be used to annotate feature clusters and assign geological properties to the categories. This information-technology (IT) approach to knowledge discovery may reveal implicit information, otherwise hidden in the very large LRO data sets. Annotations in the metadatabase may also be used as training sets for machine learning algorithms mining the large data set for unique features. This mechanism provides a novel means to remotely study lunar craters and plan future science and resource prospecting missions.

The goal of this project is to investigate image mining and database processing techniques to develop a novel IT environment that enables NASA scientists to effectively study very large image data sets. For development purposes, in this project the focus is on Lunar surface features in the LROC and LOLA data sets; however the new system could be easily adapted to accommodate other NASA data sets. This IT environment is illustrated in Figure 2 with four major systems:

1. Meta Database Management System: Scientists will be able to use the automatic feature extraction mechanism to build the multidimensional metadatabase and maintain the image database for the LROC and LOLA data sets.
2. Image Retrieval System: Scientists will be able to use an image with known geologic properties to retrieve similar images to study their properties.
3. Image Mining System: Scientists will be able to use machine learning and data mining techniques such as image classifiers and mining algorithms to investigate different classes of extraterrestrial objects (i.e., lunar craters).
4. User Interface: A user-friendly 3D imagery browser provides a unified view of the above systems.

Saliency-based Landmarking Interesting landforms like craters are difficult to identify in surface imagery.

Landmarking is the process of identifying rectangular regions of interest (ROIs) which are visually distinct from the background. Saliency is a well-studied topic in computer vision research and involves detection of image locations which stand out from the background and attract human attention. In this project, saliency-based landmarking is utilized to identify ROIs in lunar surface imagery and extract features vectors which can be queried through content-based image retrieval (CBIR). This technique has been implemented using OpenCV.

Lunar CBIR System An initial prototype of the CBIR system has been implemented using the Lucene Image REtrieval (LIRE) library to store the set of ROIs and associated feature vectors into a Lucene index. For a given query image, multiple ROIs and feature vectors are extracted which can be chosen as the target for a similarity search against indexed ROI feature vectors. The OpenCV implementation of the saliency-based landmarking algorithm is currently being integrated into the prototype. Once this is complete, this algorithm and feature extractors will be evaluated to optimize parameters. An easy-to-use 3D interface based on NASA's World Wind user interface will then be integrated to complete the CBIR system prototype. This UI will allow users to browse and search imagery to find locations with similar visual features.

The original goal of this project was to visually compare terrestrial and lunar craters to correlate geologic properties. However, the stark visual contrast between them precluded such an analysis; instead, lunar craters and other landforms are analyzed to identify visual and geological similarities.

There is a clear need for better tools to tackle the overwhelming amount of imagery data collected by NASA missions in the past, present, and future. Content-Based Image Retrieval is a powerful data-mining tool that can help NASA and private-sector scientists and engineers analyze surface imagery for mission planning, resource prospecting, and scientific research. This project has identified a promising saliency-based landmarking algorithm and is currently implementing a prototype CBIR system to evaluate the performance of feature extractors for classifying landforms. Further work is necessary to complete the development of an easy-to-use interface and study different image features for classifying landform types. Future research includes studying image features suitable for elevation data and hyperspectral imagery, developing novel machine-learning classifiers, and scaling the CBIR system to support larger datasets.

Mobile Audio/Visual Broadcasting From Field Sites and Beyond



Project Lead: Mike Toillion
Project Team: Estelle Dodson, Marco Boldt,
Ray Gilstrap, Bill Hunt, Bill Notley, Don Beddell
Project Champion: Ray Gilstrap
Center: ARC
IRM Strategic Goals: 1.3, 3.3, 4.2

Phase: Proof of Concept
Themes: Collaboration, Mobility

“NASA has always been a ‘frontier-based’ organization, and within NASA, IT Labs serves the same principals, allowing its employees to embark on their own scientific adventures. Without IT Labs, we would never have had the chance to explore the possibilities of satellite-based video communication. Thanks to NASA IT Labs, we now know that we can truly communicate from anywhere, to anywhere.”

Mike Toillion, Project Lead

Many of NASA's missions and goals consist of teams that are geographically distributed and interdisciplinary in nature. These teams require the use of various virtual communication technologies, such as Videoconferencing, Livestream, WebEx and Adobe Connect, in order to work together effectively. With the advancement of cellular and satellite network technology, these communication tools now have the potential to be used as a means to broadcast audio/visual and scientific data from, and to, almost anywhere in the world. Remote field sites can be linked to NASA agency centers and labs. NASA researchers and explorers can be delivered to classrooms and lecture halls. Live, robust interactions can take place amongst colleagues that could not otherwise be connected.

In the current era of fiscal readjustment and travel reduction, making greater use of online communication tools is becoming more and more important every day. By increasing the capabilities and efficacy of existing NASA tools and architecture to the mobile realm, the agency can improve not only scientific and mission-related research, but education and public outreach, as well.

Generous funding from IT Labs made it possible to create a prototype and test a streamlined, portable broadcast kit that can use either satellite or cellular network connections for live HD videoconferencing and virtual meetings. Collaboration tools that were tested include: LifeSize Softphone, Polycom RealPresence, Vidyo Desktop Videoconferencing, and Adobe Connect. The test sessions proved that rich, high-definition videoconferencing experiments can be created with bit rates as little as 1.2 mbps.



Mike Toillion and Bill Hunt snowshoeing through Lassen Volcanic National Park, towing the satellite broadcasting equipment.



Dr. David Des Marais and the Astrobiology Intern Program students from Red Bluff High School.

When it comes to collaboration over distance, however, quantitative reports can be insufficient to determine whether or not a virtual experience is robust and engaging. As part of this project, the aim was to not only test the technology in controlled situations at NASA Ames Research Center, but to also use the system in a real-life situation.

On March 12th, an event was conducted called Lassen Link, a live audio/visual satellite broadcast from a field site in Lassen Volcanic National Park. Co-sponsored by the NASA Astrobiology Institute's NASA Ames team, this was a one-day education and public outreach event via videoconferencing to two participating schools, Red Bluff High School (Red Bluff, CA) and Mayo Planetarium (Rochester, MN). The goal was to test the real-life practicality of trying bi-directional communication using videoconferencing tools over satellite connections, particularly the effects of latency introduced by the system.

With the support of the NASA Ames satellite communications team, Lassen Link required transport to Lassen, CA and setup of a 1-meter satellite dish, a satellite transceiver, a satellite modem, and a broadcasting kit (consisting of an HD camcorder, Blackmagic HD capture device, laptop, wireless microphone). With this equipment in tow, the team snowshoed one mile into Lassen Volcanic National Park, to a truly remote area with zero cellular connectivity, which also happened to be a key field site for the NASA Ames Astrobiology team, called Sulphur Works. The plan was to setup the broadcasting equipment, initiate the videoconferencing connection back to the bridge at NASA Ames, and then invite the NASA Ames Astrobiology team to give a full introductory lecture to astrobiology and the field sites at Lassen Volcanic National Park. Unfortunately, a partial failure was experienced in the satellite transceiver (broken signal filter), which prevented video from broadcasting during the event. Normally, the satellite team would have brought a backup, but on this particular week, no one was available. However, the event was completed via audio only using Eridium satellite phones.

While the real-life experiment did not fully come to fruition, it was proven that these type of connections are not only possible, but can be completed with minimal equipment and satellite service costs. With continued funding, the real-life experiment in Lassen Volcanic National Park could be reattempted, as well as expand into other field sites of the scientific community such as the Mojave desert and Yosemite National Park.



Portable audio/visual broadcasting kit: Generator, satellite broadcasting equipment, HD video camcorder, wireless microphone kit, HD video capture device, and a laptop.

NASA Langley RFID Equipment Inventory Project



Project Lead: Fabiola Martin, PhD
 Project Team: Connie Buffin, Steve Mercier,
 Justin Moore, Amy Tardy, Frank Johnson
 Project Champion: Ed McLarney
 Center: LaRC
 IRM Strategic Goal: 1.5

Phase: Prototype
**Themes: End User Experience,
 Information Management**

“To help us attain our goal, the IT Labs team’s support to NASA Langley has been invaluable. We launched this new RFID equipment inventory initiative with many unknowns but we felt we had a chance to challenge the idea that it couldn’t be done efficiently. The funding from the IT Labs gave us an enhancement that increased visibility over the RFID process by providing online reports connecting RFID tag numbers to the corresponding Equipment Control Number (ECN) tags. IT Labs funds also helped us to extend our limited funding by allowing us to update equipment items with the new RFID tags. The exposure provided by the IT Labs has increased the awareness of enormous potential for use of RFID throughout NASA as well as throughout the Government.”

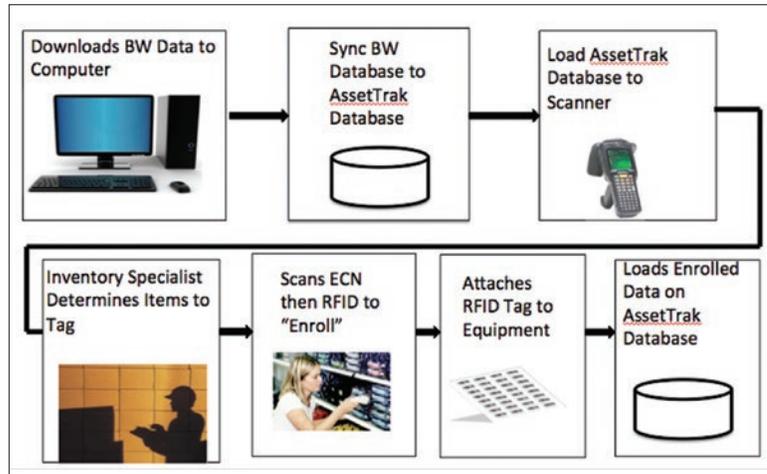
Fabiola C. Martin, Ph.D., Project Lead

NASA Langley determined that the use of Radio Frequency Identification (RFID) tags is a new enhancement that is needed for inventorying equipment because the current inventory process is very tedious and labor intensive. Each item to be inventoried must be visibly sighted in order to conduct the inventory. This means that the owner of the equipment must ensure that every item is removed from drawers, cabinets, shelves, etc. so that the item can be scanned.

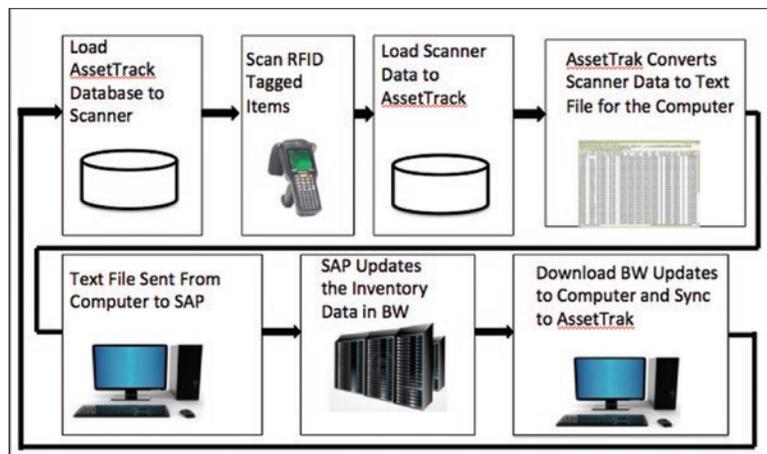
Conducting an inventory is further exacerbated by the fact that items are often moved from one room to another without proper documentation due to reorganizations, job changes, and attrition. This makes it difficult to ensure that accurate information is maintained in the equipment database. Consequently, a faster method for conducting the inventory is desirable.

NASA Langley’s decision to choose RFID technology was spawned by a pilot study that was conducted by Steve Mercier of the Science Directorate. Mercier was in charge of a large computer facility that had numerous racks of computer equipment which were frequently swapped from one rack to another. When it was time to conduct an inventory and several items were determined to be missing, Mercier had difficulty finding the items. He therefore tested the use of RFID tags and found that the time it took him to find an item was reduced from days to less than an hour. The Logistics Management Branch at Langley decided to expand his successes by applying RFID tags to the equipment inventory for the entire Center.

One of the major differences between RFID and Equipment Control Number (ECN) tags is the proximity required between the person conducting the inventory and the



RFID Pre-Inventory Process Flow



RFID Inventory Process Flow

item being inventoried. With ECN tags, the inventory specialist must stand within six to 12 inches away from the item to scan it, whereas with RFID technology, an item can be scanned by simply walking around a room and moving the scanner in a wand-like fashion several feet away from the item.

Since RFID scanning allows items to be detected that are not in plain sight, fewer items are missing at the end of the inventory. The time that it takes to conduct an inventory, at minimum, can be cut in half. This translates into benefits such as less time searching for lost items, fewer lost items, less time completing survey reports, and the potential to reduce the number of people required to conduct the inventory.

However, RFID technology is not perfect. For example, the scanners are not able to detect items that are in metal containers or items that are out of range such as in high-reach locations. In addition, Wi-Fi transfer of data from the scanner to the computer has not been perfected. Currently, batch mode downloads of data are still required. Another disadvantage is that RFID technology has not yet been adopted agency-wide. Therefore, dual tagging with both an RFID tag and an ECN tag is still necessary to allow transfer of items from one NASA Center to another. Other pending issues include the inability to communicate directly with SAP, the financial management system. Although uploading the data from a text file to SAP is a viable alternative, it is not the most efficient one.

Some of the lessons learned that might be of benefit to others who want to conduct inventories using RFID technology include ensuring that the scanners that you select do not interfere with the radio frequencies on your Center. It is also imperative that you engage an IT person, preferably one with equipment management knowledge, to support your project throughout the definition, installation, and testing phases. From a funding perspective, there will be an annual maintenance fee for technical support as well as for updates to the RFID software and scanner software. When considering whether to purchase the web-based software that allows managers to access reports of the RFID tagging progress; perhaps purchasing the main RFID software program with a site license for multiple users might be a better solution. One final precaution would be to coordinate the purchase of RFID tags to ensure that the tag numbers are not duplicated when there are several locations that are initiating the purchase of tags. One future enhancement that can be pursued is to apply Wi-Fi technology to share files between the scanner, computer, and the SAP financial system instead of using batch processing.

RFID BASIS For Estimating Cost Savings/Cost Avoidance	
Assumptions Used to Create an Estimate	Estimates
Total value of 41 items lost in 1 year	\$172,000
Total number of Custodians	393
Estimated average grade of Custodians	GS-9 step 5
Time custodians spend searching for 1 misplaced item	15 minutes
Estimated annual salary of Inventory Specialist	\$50,000
Number of people on Survey Board	5
Estimated average grade Survey Board Members	GS-11 step 5
Time spent by Survey Board Members each month	1 hour
Number of employees interrupted @15 minutes to conduct the inventory	1875
Estimated average grade of employees	GS-11 step 5

With RFID, NASA Langley has been able to demonstrate that is it possible to reduce the time it takes to conduct an inventory by at least one half, and found that there is also the potential to reduce the number of people required to conduct the inventory from 3 to 2. As a result of Langley's experience, it is recommended that others explore the use of RFID technology to conduct their equipment inventories.

Estimated Potential Annual Savings/Cost Avoidance	Before RFID	After RFID (Estimated)	
		Cost Savings	Cost Avoidance
Cut the value of items lost in half	\$172,000	\$85,800	
Reduce 3 Inventory Clerks to 2 Inventory Clerks annual salary (burdened)	\$150,000	\$50,000	
Half of the Custodians (197) @\$21.13/hr. for 15 minutes searching for misplaced items	\$2,000		\$1,000
Half of the time for 5 Property Survey Board members @\$31.28/hr. for 1/2 hr./mo. for 12 mos.	\$1,900		\$900
Half of the time for 1,875 employees @\$31.28/hr. being interrupted for 7 mins. to conduct the inventory	\$14,700		\$7,300
	\$340,600	\$135,800	\$9,200

NASA Real-time Captioning of Meetings and Conferences



Project Lead: Craig Moore
Project Team: David B. Howell, James B. Gibson,
Jonathan D. Patterson, Katherine L. Russell, Stephen B. Johnson
Project Champion: Burt Bright
Center: MSFC
IRM Strategic Goals: 1.4, 3.1, 4.2

Phase: Prototype

Themes: Accessibility, Collaboration, End User Experience

"I am grateful for the opportunity IT Labs provided for the captioning project. I strongly believe that a great deal of innovation results from support of small research projects."

Craig Moore, Project Lead

Today's weak economy with its low tax revenues, high deficits, and reduced budgets limits the size of the workforce and available resources for many federal agencies, state and local governments, as well as the private sector. In view of these long term fiscal constraints, it is imperative to find novel ways of increasing productivity. NASA can replace only a fraction of the workers it loses through attrition and recently there has also been a large reduction in the funding of contractor support. Furthermore, there is a severe shortage of young people trained for STEM careers (Science, Technology, Engineering, and Math) hence, the average age of a NASA new hire is 39 years. In 1995, the average age of a Marshall employee was 42.6 years which has risen to the current average of 48.5 years and predicted to continue rising. Therefore, NASA must maintain a high level of productivity while operating with a large reduction in the number of its employees.

This project proposed to implement and test a method of providing real-time captioning of meetings and conferences in two conference rooms at MSFC. The captioning was done by using laptops equipped with speech to text software. Script files residing on a server identified and collated inputs from meeting participants. The captions were projected on a screen and sent via the web to laptops and mobile devices. An option for saving written transcripts of formal presentations was also implemented.

In 1999, it was estimated that untreated hearing impairments cost the U.S. economy \$56 Billion in lost productivity, special education, and medical care. Hearing impairment can have a profound effect on an individual's emotional, physical, and social well-being which in turn reduces their effectiveness and productivity on the job.

The impact of hearing impairment is greatly magnified in meetings and conferences. The complexity of conversations, distraction of social interactions and the acoustics of larger rooms where meetings are held are particularly challenging to people with hearing impairments. People are not aware of how much they cannot understand. They want to appear to be able to follow a conversation, so they incorrectly fill in blanks in their perception of what is communicated which in turn causes misunderstandings. Furthermore, people do not realize how exhausting it is not to hear well.

The effectiveness and efficiency of communication during a meeting would tremendously improve by providing captioning of and for all the participants. Since all people could easily follow the discussions in meetings, their participation and contributions to the meetings and follow up conversations would increase which would enhance teamwork, improve safety, and the overall quality of their work. They would no longer be frustrated or fatigued from trying to follow poorly heard conversations. In turn they would have more confidence, more energy, be more productive, have increased morale, and improved quality of life.

A method of captioning meetings by using speech to text software has been tested. Captions are generated by using several copies of Dragon Naturally Speaking, the industry standard, running with YouCaption software on laptops. Dragon produces text input from speech while YouCaption disables the portion of Dragon which issues commands to a computer so that Dragon only displays the text of what is being said. This adaptation also increases the speed of Dragon in generating captions. Script files residing on a server are used to stream the captions via the web to off-site participants. These script files are also responsible for collating inputs from individuals to form a coherent caption of the conversation. The captions can also be saved as a permanent record of transcripts for more formal meetings or conferences.



The technology worked well when one speaker at a time was captioned. However, the script files did not collate the content of text well when two or more speakers were engaged in a discussion. There was also interference when several microphones were open in order to caption a conversation of several participants. Opening one microphone at a time improved the results. In the last few weeks the vendor made two modifications to the script files which are responsible for collating the captions with improved results. The team has not been able to duplicate these results and is verifying that they have the correct updates from the vendor.

This method is the most economical way of providing captions of large numbers of meetings and has proven its effectiveness. Forward work needs to be done to test the modified script files that can more accurately collate input from two or more participants in order to capture discussions within a meeting. In future work, the efficacy of this method of captioning needs to be evaluated with a short survey at the end of the trial period to determine the accuracy of this captioning method. The effects on discussion comprehension and participation in meetings also require examination.

Captioning should not be a special service provided to a few people but it should become part of the infrastructure of a progressive environment available to all. NASA should be on the cutting edge in creating a cultural shift where people are open to these changes. NASA must lead the way in creating an environment which is inclusive for all people regardless of their disabilities or ages, one that would bring about a better way of living which results in a better way of contributing.

Safeguarding NASA's Mobile Assets



Project Lead: Ruth Novak O'Toole
Project Team: Shawn Postich, Richard Haas,
Paul Nelson, Arjun Batra
Project Champion: Tony Facca
Center: GRC
IRM Strategic Goals: 2.2, 3.1, 3.2, 3.3

"As NASA's workforce becomes increasingly mobile it's incumbent upon us as IT professionals to collaborate with industry leaders to explore technology that provides the greatest degree of interoperability and security for our constituency."

Shawn Postich, Project Team Member

Phase: Idea / Issue

Themes: Access Management, Cloud Computing, Cyber Security, End User Experience, IT Security, Mobility

The need to shield NASA employees from modern day threats becomes of paramount concern with the growing use of mobile devices. While once adequate, NASA's historical practice of relying on policy and process does little to protect intellectual property or Agency assets exiting NASA's secured infrastructure.

While the Agency has taken steps via its DAR initiative, gaps remain. These gaps include extending the protective footprint in a manner that deters theft by securing not just the local hard disk, but the entire PC. Protective services that trigger additional layers of security, such as system disablement in the event policy or threshold conditions are met. Also missing is the ability to remotely disable (or "kill") or return to service a missing, lost, or stolen system.

This proposal describes a collaborative effort among the Agency's IT Security community, NASA's Emerging Technology and Desktop Standards (ETADS) program and Intel to study the efficacy, viability and Enterprise requirements needed to support Intel's Anti-Theft technology. This technology is inherent to Intel's processor architecture and has the potential to augment NASA's Data at Rest (DAR) initiative extending protection services to the entire PC rather than just the local hard disk.

Anti-Theft Technology (AT) primarily provides some protection against use of stolen devices and theft deterrence. It does not provide asset location or recovery services, but provides some limited data protection insurance. In instances where the DAR password is compromised (shoulder surfing, user carelessness, stolen along with laptop, laptops in sleep mode, etc.) by an amateur, AT can provide an extra layer of data protection through disabling of the device itself. However, AT does not offer much in the case of compromise by a professional since a professional would know to remove the drive to another system.

Current requirements for middleware and a central server to enable the AT chipset will necessitate installation and lifecycle maintenance costs. Costs to implement Symantec PGP RDD would have been negligible since the middleware software is already owned by NASA ACES and management would likely have been facilitated via NASA's existing Universal PGP server. In addition, the Symantec PGP RDD solution leveraged a key feature of AT, hardening of DAR encryption keys preventing exfiltration from slaved encrypted drives (i.e., drives removed to another system). However, Symantec's decision to discontinue support of that product has eliminated this option, driving procurement of another vendor's solution.

Though Intel AT shows the potential to deter future theft of NASA-owned devices being deployed to an increasingly mobile workforce by extending protection to the entire PC rather than just the local hard disk, equipment costs are falling, and NASA would need to lose a significant number of devices to offset the apparent costs which would be associated with an ISV implementation of Anti-Theft Technology. Until it can be demonstrated that Intel AT and its associated ISVs can add significant value to NASA's existing full disk encryption effort through enhanced protection of encrypted data against compromise and/or lower the costs to implement the technology, a wide-scale implementation is not recommended. AT does enhance DAR functionality through the ability to render a machine unbootable on demand and via timers and tampering triggers in some cases, but these benefits are not likely wide-scale enough to offset implementation and maintenance costs required to leverage the technology. In addition, the feature which permits tying of the data to a device via storage of encryption keys in the AT chipset is currently being leveraged only by WinMagic, a turn-key data protection application deployed within several U.S. Government agencies. Until recently, this feature was also a component of NASA's Symantec PGP implementation, but the vendor has recently announced end-of-life of that component.

In spite of the recommendation to suspend AT deployment, there may be targeted use cases in which Anti-Theft might enhance the security of DAR-enabled systems such as:

- Smaller special purpose environments which have elevated need for data security (e.g. Office of the Inspector General, Source Evaluation Boards, etc.)
- Environments capable of standardizing on a single hardware platform, and performing future upgrades all at once (minimizing operational issues with Intel AT)
- End users with local system administration staff support (further minimizing operational issues with Intel AT and handling configuration/recovery activities)

In addition, further exploration into possible data protection capabilities via Intel AT or otherwise is warranted. Intel was extremely cooperative in our efforts to explore this technology and is anxious to make this technology work for NASA. Communications with Intel and other vendors promoting AT, and other agencies implementing AT, should be maintained with an eye on new or improved capabilities and feature sets that enhance data protection including:

- Continued demonstration with Softex and discussions regarding future plans for product integration into PGP's Universal Server management console; plans to house encryption keys; and planned NDA improvements in AT-enhanced DAR
- Follow-up with Symantec on discontinuation of the PGP RDD product already owned by NASA to determine what if any enterprise support Symantec intends to provide to enhance DAR through inclusion of an alternative to Intel AT or integration with another ISV.
- Make inquiries with the Department of Homeland Security, the NSA, and/or the US Department of the Treasury regarding their deployments of WinMagic and whether the AT component of that product is enhancing their organizations data protection efforts.
- Continue to track work with Intel regarding its AT roadmap, including discussing whether or not AT's usefulness might be enhanced if Intel were to eliminate the ISV and infrastructure requirements by retooling its Anti-Theft capabilities in a fashion similar to Apple's "Find My iPhone", thereby extending the platform's functionality to a broader audience, simplifying the experience and bringing an added measure of security to laptops regardless of enterprise residency.

In addition, given the staggering cost of DAR through inconvenience to users, infrastructure management and deployment costs, user carelessness which reduces DAR's effectiveness (i.e., passkeys stored near devices) and the cost of IT Security staff needed to identify and track lost or stolen systems, consideration might be given instead to strict enforcement of and workforce education regarding a mandate stipulating that absolutely no sensitive data be stored on laptops or equipment otherwise removed from NASA. Steps might additionally be taken to lock down sensitive information to centralized storage devices which prevent downloading of the information. As a minimum, a mandate establishing that laptops (especially those removed from NASA and those containing sensitive data) be required to enter hibernation rather than sleep state when closed.

The funding of this project allowed extensive research and analysis to be conducted that disproved the implied value of a heavily touted industry value proposition and resulted in potentially significant cost avoidance to the Agency were it to pursue this enticing technology. The discovery of such limited ROI on AT suggests that significant cost savings may be achievable by not restricting organizations solely to an OEM's enterprise caliber portfolio. Given the ETADS charter to closely follow and align the Desktop Computing Standards with Federal policy guidelines, tighter coordination and enhanced communication between NASA's current desktop services provider and ETADS would better facilitate information gathering, testing on relevant (i.e., HP/ACES) platforms, and provision of information to IT Labs, the CTO's and the CIO community at large. It is useful to employ multiple reviewers to gain different perspectives. Every reviewer added new insights, and significantly enhanced the scope of this paper. Gartner proved a very valuable and knowledgeable resource providing objective viewpoints, pointing out vendor biases, and even pointing out features not shared by vendors.

Secure Computing



*Project Lead: Greg Walker, Irene Wirkus, Richard Haas
Project Team: Cosmin Trif, John Ford
Project Champion: Sasi Pillay
Center: GRC
IRM Strategic Goals: 1.3, 2.1, 2.2, 2.3*

Phase: Proof of Concept
Themes: Cloud Computing, Cyber Security, IT Security, Mobility

“The Secure Computing Device Study IT Labs Project provided the technical team here at the Glenn Research Center the opportunity to evaluate leading edge desktop and mobile virtualization technologies in the quest to provide a frame work for NASA to move forward with an adoption of a BYOD (Bring Your Own Device) strategy.”

Greg Walker, Project Lead

NASA as an agency has been tasked with examining ways to improve efficiencies while reducing costs in the Information technology space. A large portion of the costs for the I3P Information Technology service contract is for the procurement, support, and deployment of end user mobile and desktop workstations.

A study was initiated by the CTO of headquarters to identify a framework that would supply a secure isolated desktop execution environment that could be deployed to a removable device, ACES/HP workstation, and/or an employee owned device.

A rough ROI was calculated based on annual cost to NASA for workstation seats supplied to employees. It is estimated that NASA could save 9 million dollars by supplying a non-hardware secure execution environment to employees as part of a BYOD initiative.

Past studies were performed to identify similar solutions and were concluded to be not viable because of costs and technology constraints. Improvement in virtualization technology along with the decreasing costs associated with deploying such technology facilitated this initiative to revisit the possibility of deploying and using secure desktop virtualization technology within NASA.

This proof of concept study validates the assumption that it is possible to deploy a secure desktop execution environment within the current NASA IT infrastructure using the standard ACES/HP supplied client workstation software configuration.

Of the three MokaFive client configuration types that were evaluated, the “Bare Metal” hypervisor configuration provided for the greatest level of performance.

During the evaluation phase of this study MokaFive regulated the USB memory stick client configuration type to a backup solution for the “Bare Metal” and “Virtual Guest” configurations. The reason for the USB memory stick client configuration being relegated to a backup solution was because of feedback the vendor received from users who were improperly removing the USB device while the virtualized environment was in use.



MokaFive Inc. Software was founded in 2005 by a team of Stanford University researchers.



Performance testing with IOMETER of the “Bare Metal” and “Virtualized Guest” configurations indicated the level of performance of both configurations was greater than or equal to a standard ACES supplied desktop client. Executing the standard applications deployed with the ACES/HP desktop image showed no decrease in performance when running the MokaFive desktop client environment.

The MokaFive Application Suite provided robust security such as AES 256-bit encryption of the MokaFive desktop client environment. This feature negates the need for an additional Data-At-Rest (DAR) encryption solution and reduces costs. Extensive testing found no cross-contamination of data between the host and the MokaFive virtual container. End user testing indicated the MokaFive desktop client environment had the capability of using standard NASA authentication mechanisms such as 2-factor authentication with tokens and Smart Card readers. The MokaFive Application Suite implements granular security policies that were tested in the ETADS/NASA environment. The security policies allowed for automated or manual destruction of the MokaFive client environment by setting a specific date for destruction.

Ease of deployment of the MokaFive solution was validated by the use of the bulk deployment feature that is part of the MokaFive provisioning application. To take advantage of this cost-saving feature requires NASA to allow for the creation of an Active Directory Service that has machine object creation rights in the NDC domain. Since the MokaFive desktop client environment executes the same operating system as agency applications and tools that are deployed with the standard ACES/HP desktop client workstation, it was found that very little additional end user training is required.

In conclusion, the potential to improve efficiency and reduce costs to NASA by deploying a solution like the MokaFive Application Suite is great. Challenges do however remain as a barrier to the adoption of this technology but most have been identified as business specific issues and not technical.

Security for Mission Mobile Applications



Project Lead: Andrew Cecil
Project Team: William Schneider, Ronny Miller,
George Ritter, Carl Ellis, Mike Farlow, Gayleen Ijames
Project Champion: Burt Bright
Center: MSFC
IRM Strategic Goals: 1.1, 1.3, 1.4, 2.2, 3.1

Phase: Idea / Issue

Themes: Cyber Security, IT Security, Mission IT, Mobility

“IT Labs helped kick start the project. The support provided by IT Labs enable us to be put in contact with other teams working similar problems. Those other teams had looked at core elements of mobile device usage that could be adopted in the mission environment. IT Labs also provided a useful framework for leading the team to a solution.”

Andrew Cecil , Project Lead

Ubiquitous mission operations are quickly approaching. The Space Launch System (SLS) engineering teams are looking for applications to monitor 24-hour tests. Both the SLS and International Space Station (ISS) programs personnel are looking to have the ability to support from their desk, at home or even at the ballpark.

Often the testing and operations for space missions require many hours to days of setup and execution. It is anticipated that less personnel will be needed onsite and can be available on-call with mobile applications to monitor data by exception notifications, phone calls, text messages or email. Mobile applications provide unique methods to bring operators, subject matter experts and engineers together quickly for troubleshooting.

However, to send data to mobile devices, security needs to be evaluated. The system needs to be able to authenticate the user and then verify and validate the information being transmitted. This proposal planned to evaluate National Institute of Standards and Technology (NIST) security controls applicability and achievability to mobile applications.

The goal is to produce a strawman security control configuration to understand how NIST controls can be applied to mobile applications and devices, both managed and unmanaged. By exploring the aspects of security in the beginning of the application development, this ensures that security is applied during the entire lifecycle of the applications. It also begins to provide a template of sorts that can be used to enhance future applications.

As another part of this activity, evaluation was conducted on the Center for Internal Mobile Applications (CIMA) framework to determine its applicability to mission environments. This will review the question: Can the Enterprise solution support mission environments, and if so, how would this look?

In studying the controls that mobile devices should need to build a framework for mission mobile applications the NIST document SP 800-124 Rev 1 outlines the specific considerations needed for using mobile devices in the enterprise. These considerations are important to look through when designing mobile services. However, for the ubiquitous support required by programs it is necessary to explore the implementation of those controls for the remote world. This leads to the use of central management packages designed to allow both internal and remote users secure access to enterprise services. Management tools will help enforce mobile policy by checking that encryption is on, that devices will auto-lock, prevent the use of personal accounts for data sharing or storage, and many other protection features.

Users need access to both mission and administrative tools, it is also necessary to work to share credentials. The CIMA framework for mobile applications is capable of being installed in the mission environment to allow mission mobile users access to mission services. Their research also includes the possibility for expanding the framework for VPNs (Virtual Private Network). However, as the mission systems are growing a solution to provide a universal credential for all services is necessary. The Huntsville Operations Support Center (HOSC) work with Identity, Credential, and Access Management program (ICAM) allows for the NASA issued credential to be used in the HOSC mission systems. It also lays the foundation for the Agency and the HOSC as well as other NASA systems to accept other Agency's credentials, such as the Department of Defense issued credentials. This study has found some potential solutions to the mobile device use for mission support. These solutions need to be evaluated for the effectiveness in meeting the controls required for mobile devices.

The mobile management tools available need to be fully evaluated to insure they meet the controls required for mobile devices managed by the HOSC. It is also equally important to evaluate the effectivity of the management tool to allow a user to provide their own device and still allow for the protection of data. The results of this will allow the installation of mobile applications as a service the mission community can use to support flight operations.



*Project Lead: Branson Matheson
Project Team: Eric Everton, Lee Sheridan, Erik Clark,
Michael Arida, William LaMarsh, Matthew Linton
Project Champion: Ed McLarney
Centers: LaRC, HQ, GSFC, ARC
IRM Strategic Goals: 1.2, 1.5, 2.2, 2.3, 4.1*

Phase: Prototype

**Themes: Collaboration, End User Training & Support,
Information Management, IT Security,
Knowledge Management, Search**

“As an agency wide group of system administrators, representing most Centers and many different disciplines, we have desired to build a project which would enable the sysadmin community to collaborate, communicate and improve. The sysadmin.nasa.gov initiative has proven to be huge leap in achieving those goals. IT Labs has been a fantastic resource and supporter for our initiative and we would not have been able to get it off the ground without the dedication and encouragement of this group. Thank you!!!”

Branson Matheson, Project Lead

In the day-to-day operations of system administrators maintaining diverse and dependent systems, the expanding base of technology, and keeping production systems available and secure; there are a plethora of methods and solutions developed concerning information systems which are committed to memory, various local file repositories or local ticket systems. The limited contact within the system administration community creates the situation where this information is either stove piped, passed down from senior system administrators (SAs) to junior SAs, shared among known colleagues or lost through attrition. This means that many administrators are addressing the same or similar issues, repeating work, and as a community, hemorrhaging knowledge.

This proposal is a grassroots endeavor developed by a large team of system administrators and IT security professionals around the Agency, for the internal hosting of a community-supported centralized set of services. These services are available to all NASA system administrators to and the team. The community develops and organizes information and provides it to all admins, enhancing cross-Agency communications and improving operations.

The site uses the open-source Trac system to provide several major services: blogs, documentation wiki, issue tracking, and code repository management. The features are integrated and allow easy linking of relevant information across the system. The blogging area allows current issues to be discussed and posted. The wiki creates a common body of knowledge which can be used by anyone to post tips, tricks-of-the-trade and links to other information.

The code repository uses subversion, which hosts tools developed and used by NASA administrators. Issue tracking is used to allow site and tool managers a unified way to organize issues, defects or enhancements to their toolset. Service access and authorization uses NASA central authorization services. A volunteer team of system administrators from across the Agency, with members from both system administration and IT security, provide oversight and organization of content.



Example of shared information for all subscribed System Administrators.

Site content may be created, edited and reviewed by all users. Wiki page changes are sent to the original author and there is also a comment/rating system is available to provide feedback. Tools are provided a 'home' for documentation and use. Tools are developed, managed and made available through software repositories. Tool management can be simple or complex (including enhancement and issue tracking, etc.) Team members solicit and create blog entries, publish tools, organize information and provide feedback to authors.

Through implementation of this site, we've found several challenges. Users like having Center specific, as well as Agency wide, information repositories. However, center-specific sites atrophy quickly and need sponsors. Contributors can be hesitant to expose their work but the work that has been contributed to date has been of high quality. The site has gotten very favorable feedback on concept and implementation. Promotion and content creation is a time- consuming process that requires direct resource allocation, however there is a direct correlation between promotion and usage.

Some of the current issues include:

- Many individuals and groups across the agency continue to remain unaware of the resource.
- While the team was able to contribute some content in spare time, the bulk of the content was developed by the team-lead using chargeable time. Continued promotion and encouragement to use the site for documenting resolutions can mitigate this issue.
- Authentication and firewall-based access to the area where the service is hosted is limited.

Using the vision of IT Labs, `sysadmin.nasa.gov` (SNG) has proven its capability. The site has been established and has growing use by System Administrators and IT Security for collaboration and communication. Combined with the chat and mailing list, SNG is fostering a sense of community between admins and security associates across disciplines, branches, contracts, and centers. Individuals and groups are starting to use the facilities to store documentation, code and other information in support of their local services.

This project has integrated the OpsSchool training system directly into the site, providing community best-practices and stronger training for junior and senior sysadmins. Another goal is to perform an independent survey of the site and capabilities. This initiative is being worked in collaboration with Utah State University. Finally, there is a need to integrate more search resources on the site to improve results.

SNG needs broader promotion and support that a pilot program will enable. As it grows, it will be championed by NASA management and exposed to far greater numbers of personnel around the agency. With promotion, NASA can improve the culture of system administration to meet goals.

By fully funding the project, the site can be further extended and integrated into current and future processes and systems (centralized code repository). The community is self-sustaining and encourages growth and produces better results. Having central services, owned and managed by groups within the community, encourages use and expansion. Since most "solutions" developed through the site are community driven, they will be technically superior and inspire a greater sense of ownership for individuals and groups, thus improving implementation. As communications between disparate groups improves, the level of awareness and capability has increased, improving operations. It is also worth noting that this site is rapidly becoming a go-to place for sysadmin collaboration Agency-wide.

With the success of this project, IT Labs has determined to fund SysAdmin.nasa.gov into a second phase for FY 2013.

Video Conference (V-Concierge)



Project Lead: Manson Yew
 Project Champion: Tom Soderstrom
 Base Center: JPL
 IRM Strategic Goals: 1.1, 1.3, 1.5, 3.3, 4.4

“Videoconference Concierge began as a series of creative conversations among NASA engineers from different technical disciplines about what might be possible to enhance our videoconferencing environment. IT Labs provided the crucial platform to turn creative conversations into reality.”

Manson Yew, Project Lead

Phase: Idea / Issue
Themes: Accessibility, Collaboration, End User Experience, End User Training & Support, Social Media

NASA has made many investments in its teleconferencing and videoconferencing capabilities. However for a variety of reasons, NASA's videoconferencing capabilities are underutilized, especially by the cross-Agency program and project personnel that videoconferencing was designed to enable. With the current budget pressures on travel, videoconferencing at NASA has never been more critical.

This proof-of-concept begins with the idea that NASA may be missing just two ingredients to fully exploit the videoconferencing infrastructure: a “bridge” for the variety of devices and facilities available to NASA personnel and case-specific instructions that enable a broad cross-section of NASA personnel to easily set up videoconferences. This multi-phase proof-of-concept/prototype provided the analysis that supports a way forward for greater utilization of videoconferencing by NASA programs and projects.

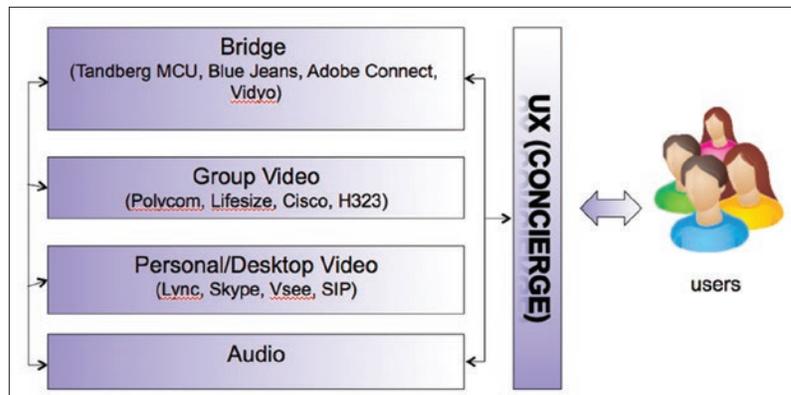
The initial phase provided an analysis of the variety of conferencing capabilities currently available and under evaluation. The resultant white paper provides functional architecture inputs that facilitate the NASA “as-is” architecture and assist in the “to-be” architecture for conferencing and collaboration. Integral to this initial phase is an evaluation of “integrators”, including the variety of software or hardware based multi-point conferencing units (MCU's) available, and how they match up to the requirements

and use cases that are representative of NASA videoconferencing needs. Supporting the analysis is a model or mockup of a v-concierge, the future online wizard for identifying the type of videoconferencing the user requires, recommending the instructions/best practice for planning and setting up the videoconference.

Conceptually, video conference concierge provides an exciting opportunity to explore two emerging technologies that have the potential to radically enable how NASA engage IT services and each other. Further, it builds on existing NASA services (VITS) and emerging NASA capabilities (Desktop Video), to provide a satisfying end-to-end experience for multiple types of users at NASA.

	Group Video Conferencing	Personal Video Conferencing
Benefit focus	Travel savings	Enhanced productivity
Primary meeting type	Scheduled	Scheduled and ad-hoc
Media focus	1. Video 2. Data collaboration	1. Data collaboration 2. Video
Connection focus	Need to call other rooms	Need to call other users as well as rooms
Primary equipment	Dedicated systems	Tablets, computers, smartphones (BYOD)

Overview of group versus personal video conferencing



Notional Video Conferencing Architecture

Video Conference (V-Concierge) ...continued

The next step is to prove out the concept, which entails designing the user interface using METRO design language, and integrating the back end with the service providers. This includes an opportunity to work with the various IT providers at NASA (VITS, ACES, desktop video) and help further enable their services. It also further explores operational and maintainability issues, including IT security, bandwidth requirements, reliability, and certain unknowns in providing this new concept for engaging users in provisioning IT services. With the potential for this project, IT Labs has decided to fund an additional phase for FY 2013.



Conceptual Video Conferencing Concierge Display

Video Search



Project Lead: Ricky Ma, Manson Yew
Project Team: Brandon Buie, Wayne Wong, Jeff Liu, Evan Chan
Project Champion: Tom Soderstrom
Center: JPL
IRM Strategic Goals: 1.5, 3.3, 4.2

Phase: Prototype
Themes: Accessibility, End User Experience, Knowledge Management, Search

"IT Labs is a great way to try out new ideas. We are excited about trying out new ideas rapidly and learning from everyone else. This is truly innovation in action and will have a lasting impact on the NASA community at a very low cost."

Tom Soderstrom, JPL CTO-IT and Project Champion

At NASA, the rate of using and publishing videos as a means of capturing valuable knowledge and information is arguably backwards. Two main reasons limit the use of video at NASA:

NASA does not have a central service for searching videos. As such the effort to create video is tempered by the fear that the investment is not worthwhile as users will not know what is in the video and will not spend the time to scan the whole video to see if there is anything.

Under Section 508, NASA cannot publish videos without providing basic accessibility such as captioning. The cost of captioning can be prohibitive in these times of budget constraints, such that owners of videos do not share their videos, and are often deterred from making videos in the first place.

The Video Search and Auto-Captioning Service Project will provide NASA with a much needed capability to search videos and find specific instances of words and phrases in a video file as easily as if it were a text document. In addition, since an intermediate step of indexing videos with MAVIS (Microsoft research Audio Video Indexing System) automatically generates a textual transcript, this service also provides captioning for NASA video.

Microsoft Video Web
Powered by MAVIS and Microsoft Research

amazon

Microsoft Research

All | NASA

Searched 70 videos from All (23.5 hours) in 0.34 seconds.
Showing results 1-5 of 5 for query **amazon**.

Amazon Web Services: A New World of Exploration
All - NASA IT Summit 2011 - Andy Jassy, senior vice president for Web services, Amazon.com
... areas of amazon our amazon web services business which is our cloud computing business as ... u.-w. us or amazon web services business i've been working on ... annual technology summit for nasa amazon is a company that really prides itself on being innovators and listening to customers ... for amazon web services which allows businesses and developers to build their technology applications on top of our infrastructure platform — ... where amazon came from — that's why i give you a little bit of an idea about ... amazon simple storage service amazon ... [show all 30](#)

[video link](#) [original page](#) 00:51:45

Opening Ceremony
All - NASA IT Summit 2011 - Opening Ceremony
... amazon web services — based ... on sites like amazon before ...

[video link](#) [original page](#) 01:19:34

Mission Enabling Technologies
All - NASA IT Summit 2011 - Information technology will deliver solutions to support NASA's mission. These solutions will be an integral part of all mission-focused technology. Industry partners will play a major role in developing

Search results from querying videos by captioned text in the MAVIS testbed.

Beginning at the technical position paper stage, the project has matured through proof of concept and prototype. The prototype allows the user to upload a video file online which auto-captions the file in twice the file duration. The auto-captioning can be saved as a transcript and incorporated back into the video file for captioned viewing. Further documentation in the form of the technical position paper, white paper and draft business case, along with the product description for the NASA Tube prototype are found on the IT Labs SharePoint workspace behind the NASA firewall.

Several lessons were learned through this project. Video search was approached as a technology but the ancillary capability for providing auto-captioning has captured many stakeholders' attention. The quality of auto-caption varies and most video require quality metadata at upload to improve accuracy. While video searching is quite possible, the more exacting requirements of captioning means the technology needs to further mature. There are broad needs and uses for internal video hosting, video searching, and auto-captioning. However, as a new technology, there are various chargeback models that need to be explored, to sustain it as a service.

From work on this project, it is recommended to proceed to pilot phase where inline auto-caption editing along with other capabilities identified in the prototype phases can be developed. Further, the technology is ready for piloting with multiple NASA collection owners, including:

- JSC Imagery Collection
- STI collection
- IT Labs 2013 Elevator Pitches
- JSC Innovation Day Collaboration Speakers

Further, deep dive evaluations of multiple chargeback to mission models needs to be critically explored with a roadmap for transitioning from new technology to sustained service.

Far reaching implications of video search

Being able to search for and find any content will have far-reaching and positive implications for the NASA community. These are my vision hopes for this project.

The Video Search effort will enable any NASA employee to find any video content by searching for the words that were spoken in the video. At your option, it will also point you to the exact spot in the video where those words were spoken and start playing from that point on.

We needed to impact industry to create a product that will enable this type of video search. We partnered with Microsoft, who had prototype technology in Microsoft Research. We then prototyped it and provided requests for improvements or bug-fixes. Microsoft has since productized it and we have partnered with a company called Greenbutton, which has commercialized the service. All this was needed so that NASA could benefit from this capability.

In order to show the video search, the project will need to create a mechanism to upload and show video content. We will call it NASATube for now.

It will also have an interactive transcript (close captioning), where at the option of the person watching the video, the transcript will automatically scroll through the video. This will help us with 508 compliance.

Employees will be able to upload their own videos and have these automatically captioned. We will use cloud technology to do this, so it can scale to any demand. The videos will hopefully be viewable on mobile devices.

IT Labs is a great way to try out new ideas. We are excited about trying out new ideas rapidly and learning from everyone else. This is truly innovation in action and will have a lasting impact on the NASA community at a very low cost.

I'm really excited about this project!

Tom Soderstrom, JPL Chief Technology Officer for IT

VPN Authentication and Automated Policy Enforcement



Project Lead: Richard Pearson
Project Team: Michael Turner, Gregory Goucher, David Kelldorf, Vu Nguyen, David P. Kizer, Robert Barrett, Christopher Bertagnolli, Eric Burnett, Peter Cauwels, Charles Clem, John Possel, John Vogel, Frank Machnicki, James Q. Berry, Wayne Baswell, David P. Kizer, Corey Baswell, Tommy McGuire

Project Champion: Tom Miglin
Centers: HQ, MSFC, GSFC, JSC
IRM Strategic Goals: 1.1, 1.5, 2.2

Phase: Prototype
Themes: Access Management, Cyber Security, End User Experience, IT Security

"I would like to express my appreciation for IT Labs support on the VPN Authentication work the CSO has recent completed. IT Labs funding allowed the CSO to develop a prototype solution for using the Agency LaunchPad authentication website as a frontend to the center VPN services. The prototype proved the concept of using LaunchPad in conjunction with the VPNs is a valid approach. This approach brings a familiar look and feel for the VPNs to all NASA users. The prototype also uncovered some technical 'pitfalls' with some equipment vendors that should be avoided in a production deployment. Without the IT Labs support, the concept would have remained unproven and NASA would not have had the advantage of the knowledge gained through this prototype effort."

Richard Pearson, Project Lead

Every center has a VPN (Virtual Private Network) solution in place leading to differing architectures and additional costs. In an effort to consolidate and reduce the dependency on VPN tokens, innovative ways to perform authentication are desired. This project proposes to unify and consolidate VPN authentication and policy enforcement throughout the Agency within the LaunchPad framework. Existing VPN services are provided individually at each of the field Centers, within their own framework. Centralized authentication is the first step toward a consolidated Agency VPN solution to include remote workstations and mobile devices.

Enabling a centralized and unified authentication/authorization solution for VPN devices allows the Agency to take additional steps toward a highly redundant and available VPN solution. Integration between the VPN devices and the LaunchPad authentication and authorization database is critical to any future progress. This project will provide the necessary development to enable that communication, and provide a white paper and a demonstrable prototype of the solution.

The VPN Authentication and Automated Policy Enforcement Project was initiated as an IT Labs project to meet a requirement levied on NASA by the Office of Management and Budget (OMB). OMB released a mandate that requires all of the Federal Agencies and Departments to be PIV enabled by October 1st, 2012. Since most NASA Centers only utilize RSA two-factor authentication, a unified approach to enabling PIV was required. In addition to PIV support, there does not exist a unified single-sign on portal associated with VPN access.

Since each NASA Center provides and manages their own VPN systems, there is a mix of vendors and methods across the Agency. While most systems do require two-factor authentication, there are some systems that still rely on username-password authentication. With the OMB mandate in place, all systems need to be able to support PIV.

The Agency has a unified authentication source that is known as LaunchPad. With the appropriate technology and programming, integration between the VPN systems and the LaunchPad system is possible. Since the LaunchPad authentication system is currently in production, servicing different web portals across the Agency, it was the go-to system to support VPN authentication.

The VPN Authentication and Automated Policy Enforcement Project requires multiple I3P Contracts (both NICS and EAST) to develop a prototype for unified VPN authentication. The IT Labs funding was requested to cover the labor necessary to develop the prototype. That said, the EAST contractor has a sandbox test environment to develop and test different software and patches. At GSFC, MSFC, and JSC the NICS VPN Engineers had both Juniper and Cisco VPN appliances available in a test environment.

The NICS VPN Engineers need to work with the EAST Developers to develop and test a solution to share the attribute stored in the LaunchPad system with the VPN appliances securely and provide a simple user interface.

The VPN Authentication and Automated Policy Enforcement Project successfully created a prototype solution to provide a single web log-on page that authenticates VPN users at GSFC and JSC. Problems were encountered with the Cisco implementation, but a work-around is possible to ensure that it works on the Cisco devices as well.

The going-forward recommendation is that the NASA Communications Services Office (CSO) identify and secure additional funding to continue this project, which would implement the unified VPN authentication and policy enforcement.

Wolfram Alpha Search Overlay Integration



*Project Lead: Allan Stilwell
Project Team: Stephen Foster, Kyle Bryan, David Johnson
Project Champion: James McClellan
Center: JSC
IRM Strategic Goals: 1.1, 1.4, 1.5, 3.2*

Phase: Proof of Concept
Themes: End User Experience, Search

“Overall, IT Labs is one of the best programs for Innovation in IT in the Agency. I have had the pleasure of being able to test new search and human application interface concepts through the IT Labs model. It has enabled several centers to collaborate and engage in discussions on solutions for cross-center information retrieval that might not otherwise have been highlighted and has enabled the Agency to have some very fruitful and productive conversations on the future of information access and how to enable it in an efficient and user-friendly way.”

Allan Stilwell, Project Lead

The project team assessed the technical capabilities of the Wolfram Alpha application programming interface (API) by researching the documentation and produced a working proof of concept that integrates the Wolfram Alpha results within the JSC search results.

The API provided by the Wolfram Alpha project is fairly simple to integrate within the existing JSC Search environment requiring minimal effort in setup time. It has been found that some unwanted public domain data may be returned from user's requests. However, with some added mitigated effort between NASA and Wolfram Alpha's technical team, results returned from the provided API integrated into the JSC Search results will provide an added benefit to the NASA customer base while introducing little risk to the environment.

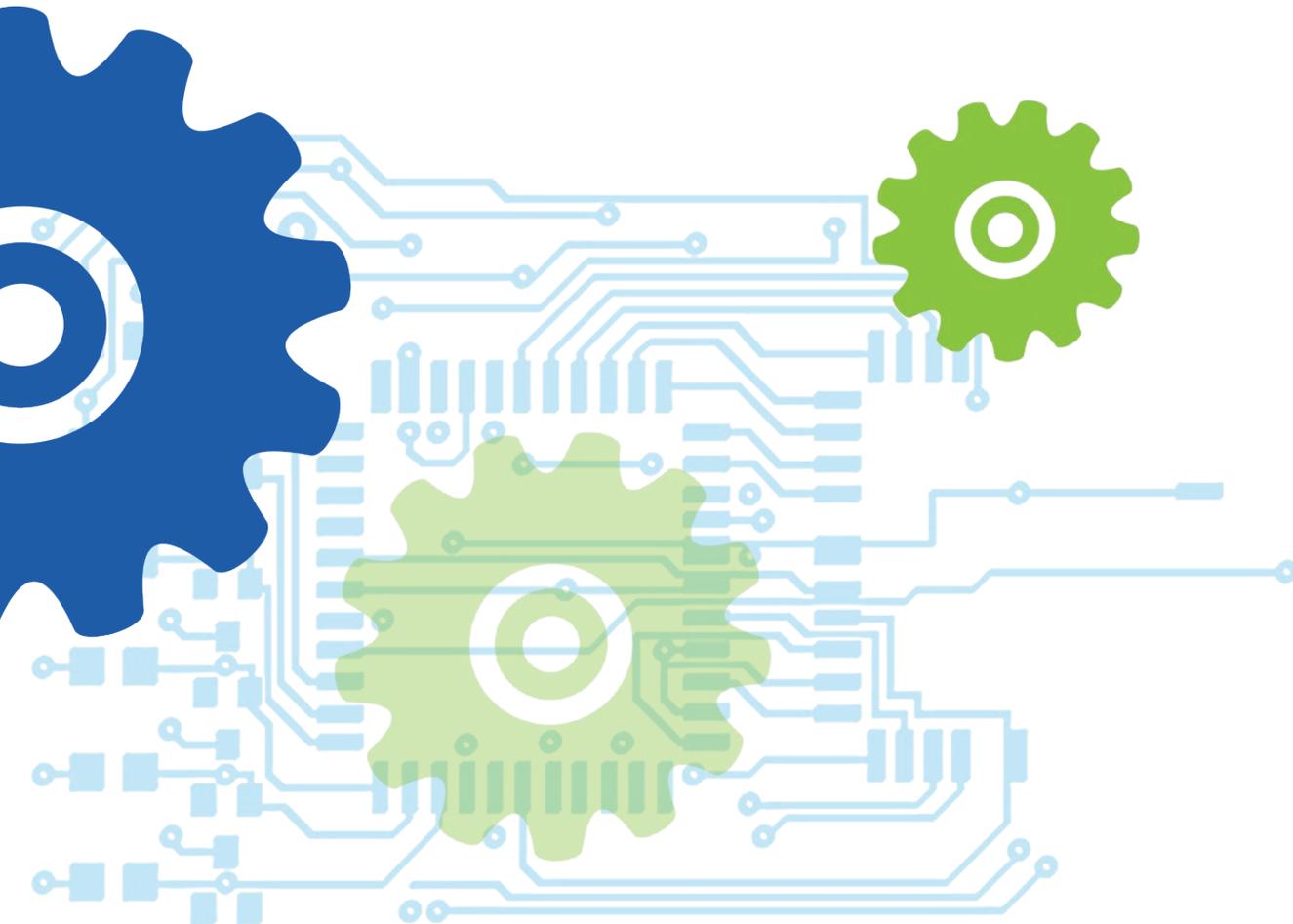
The success of search technology is currently determined by the content that is crawled, which can lead to mixed results. Often, the content does not contain comprehensive details on any specific knowledge area. In short, search is optimized for finding documents. Wolfram Alpha's service adds the capability to analyze comprehensive knowledge sets and produce an intelligent answer. There is potential to combine the existing NASA Search technologies which provide results from NASA intranet results and integrate the Wolfram Alpha knowledge-based computed datasets, that users will receive a better overall product of results within one interface.

Overall, the integration of the Wolfram Alpha data sets into the JSC Search Portal was completed with minimal effort. There remain some issues to address. These issues, however, can be mitigated through stakeholder feedback regarding the user interface and mitigation with the technical team of Wolfram Alpha regarding both filtering unwanted data from results, such as pop-culture references, and weighting NASA records versus public domain records when applicable.

Upcoming Projects

With the successful run of projects that IT Labs experienced previously, the program sent out another call this year to solicit proposals for ideas, proofs-of-concept, and prototypes.

Approximately forty (40) proposals were submitted from nearly every Center across NASA. The following pages detail the awarded projects and a small synopsis of what each project intends to accomplish in FY 2013.



Application Level Cyber Security for NASA Public Web Sites and Servers

Project Lead: Abul Chowdhury

Project Team: Kathy Johnson-Throop, Afzal Ahmed, Daniel Febus, Lynn Buquo, Seth Robertson

Project Champion: James McClellan

Center: JSC

IRM Strategic Goals: 2.1, 2.2

Phase: Prototype

Theme: Cyber Security

The Life Sciences Data Archive (LSDA) team manages a public website. With this comes the daunting task of maintaining security from the tenacious hacking community. NASA IRD has infrastructure in place to detect threats at the firewall, network and systems levels. Our LSDA team has developed Cyber Threat Detector, an application-level threat detection software specific to Windows-based Web servers. We have been using it as a cyber-threat detection software application to monitor suspicious web activities on our lsda.jsc.nasa.gov site. On November 22nd, 2011, LSDA's Cyber Threat Detector software detected an attack on our public website. This early notification allowed LSDA personnel to neutralize the security threat long before the JSC security team notified us of the event. IRD was very impressed and requested a copy of the software to implement on other web applications. Lynn Buquo, the Human Health & Performance Directorate Information Architecture Lead, highlighted the Cyber Threat Detector software at the December 2011 Space Life Science Directorate (now known as the Human Health & Performance Directorate) All Hands Meeting as a best practice.

Over the years, our team has systematically monitored and evaluated these attempts to breach the security of our public system, noting trends and methods used to gain access to LSDA systems. This knowledge led to our development of this software, which has been invaluable to the LSDA project, Bioastronautics Contract and NASA.

This software, currently deployed in our LSDA infrastructure, was significantly updated in February 2013. For this funding call, our team proposes conducting a feasibility assessment to determine if the software can be deployed across other websites in the NASA community.

Applying Big Data Analysis Tools and Techniques using Cloud Infrastructure

Project Lead: Joshua Krage

Project Team: David Obler, Thomas Gaeng, Michael Greason, R. Tom Northcutt

Project Champion: Jaya Bajpayee

Center: GSFC

IRM Strategic Goals: 1.2, 1.5

Phase: Proof of Concept

Themes: Big Data, Cloud Computing

All network connected devices from the servers in the data centers to the desktops and laptops, printers, and even BYOD generate a continual stream of log data. These data stream with great velocity, volume, and variety. Ultimately these data are distributed across many organizations. This scattershot approach makes it impossible to examine the logs in aggregate thus log analysis techniques are not consistently applied across NASA. Splunk is one commercial tool well suited to the job, but the cost of Splunk rises as a function of the volume of data that it is pointed to. We propose to:

- Employ big data backends like Storm, MongoDB and SciDB to collect and consolidate log data.
- Select a suite of open source tools such as Graylog, Logstash, and Cubrid for log analysis
- Leverage the infrastructure as a service in the Code 700 trailer.

This approach could allow the SOC to monitor logs across the Center and provide new tools for systems administrators to aid in log analysis. The Big Data tools expertise and novel techniques we develop will pay substantial dividends. Making a small investment now in technologies that can compete with Splunk in both functions and features could save taxpayer money on license and support costs.

The primary purpose of the project is to determine whether big-data oriented solutions can address the challenge of collecting, aggregating, and analyzing system log data effectively (as compared to current practices). This in turn will increase NASA's experience with big data systems, application to a targeted solution (system log data), and offer alternatives for future investments in these areas. Aggregation of data in correlatable form has the opportunity to better inform decision-making around system use and performance. Aggregated data enables security analysis to become more proactive, by identifying ongoing activity in sufficient time to mitigate identified threats. Easy access to correlated information enables system administrators to spend less time searching for essential troubleshooting information, and more effective time managing their systems. The result of this project are hoped to provide a path to alternatives in the log aggregation and analysis areas. Ideally, the capabilities demonstrated will become an internal service. The service would provide groups a cost-effective way to store and analyze their log data. In addition, this will enable system performance analysis and trending to be performed across a larger scale, leading to potential future efficiency gains. The NASA Security Operations Center can leverage these capabilities to further inform and protect NASA's IT infrastructure. Ultimately, we improve the efficiency of our systems management teams by enabling them to focus more time on supporting mission activities.

Automating the Reporting and Releasing of Technologies (ARRT)

Project Lead: Justin Morris

Project Team: Brandon Bailey, Justin McCarty, Romae Young, Enidia Santiago-Arce

Project Champion: Keith Keller

Center: GSFC

IRM Strategic Goals: 1.2, 1.4, 1.5

Phase: Idea / Issue

Themes: Collaboration, Knowledge Management

The acquisition, development and maintenance of new technology is critical to NASA's success. Civil servants and contractors across NASA report newly developed and re-engineered software systems and technologies via NASA's form NF-1679 which is then released through the Software Release (SWR) process as defined by NPR 2210.1C. The SWR process is an effective solution to ensuring that NASA remains aware of its software assets and continually searches for opportunities to benefit agency and society. However, the SRW program is limited in that it does not provide an effective infrastructure to support the day-to-day needs of project managers, software developers and testers on NASA missions.

This effort initially aims to utilize and expand upon the existing SWR system to provide a more effective means for NASA employees to search and attain software technologies that may benefit their individual projects and/or missions. This capability would provide a means to increase software reusability and help ensure software technologies from previous efforts are evaluated and considered in support of new projects and/or missions. The primary objective is to mature and identify recommendations to automate the SWR processes and system to provide a means for NASA employees to search for and identify previously developed and available software technologies, thereby reducing the level of effort to report and release software products developed by NASA innovators.

Paperless Contracting Initiative

Project Lead: Zachary Burkland

Project Team: Cynthia Cowan, Ryan Crowley, Franco Cuevas, Karen Fallon, Deborah Ford, Dave Garner, Lisa Harvey, Christine Martinez, Rob Quinn, Sandi Ray, Robert Rice, Chris Signorino, Linda Urquhart, Brett Vu, Virginia Wycoff

Project Champion: Ray Gilstrap

Centers: ARC, LaRC

IRM Strategic Goals: 1.1, 1.2, 1.4, 1.5

Phase: Proof of Concept

Themes: Cloud Computing, Collaboration, Information Management

This is a joint proposal between the Ames Research Center and the Langley Research Center to develop an electronic, paperless system for processing NASA procurements which could be used across the agency by every NASA procurement office. We hope our findings will inform NASA Headquarters' position in response to the Managing Government Records Directive, which is due December 31, 2013.

Based on the success of the initial phase where only Simplified Acquisitions were processed electronically, Langley would like to now include larger dollar value, complex contracts with more sensitive information (labor rates, approaches to fulfilling contract requirements, and proprietary proposal information) in order to investigate processing these acquisitions and to determine their electronic storage requirements. In order to do this, Langley needs to purchase additional DocuShare/NX licenses for our workforce. Langley will also explore reporting tools and their capabilities for providing procurement statistics (e.g., the identification of sole source procurements, Buy American Act Determinations, etc.) and a contractor electronic submission system for contractor's to submit sensitive deliverables (proposal submissions, financial reports, technical reports) versus providing hard copy, paper submissions.

Ames will work with Langley to evaluate alternative electronic filing solutions that may serve well for NASA as a whole. These may include more generic, more specialized, higher cost, or lower cost solutions. There are a lot of options that need to be evaluated. At the end of the specified period Ames will select an intermediate and long term electronic file storage solution to test. After implementation Ames will initiate electronic contracting on simplified purchase orders to evaluate the option utilizing lessons learned from the Langley Pilot.

Lessons learned from this exercise will be written into the IT Labs deliverables, and incorporated into briefings and opinion papers for the good of the Agency.

Persistent Telepresence Portal Network

Project Lead: Jon Welch

Project Team: Estelle Dodson, Kristina Wilmoth, Brenda Velasquez

Project Champion: Ray Gilstrap

Centers: ARC, JPL, JSC

IRM Strategic Goals: 1.1, 1.5, 3.3

Phase: Proof of Concept

Themes: Collaboration

We propose to create a network of “persistent telepresence portals” that will create virtual bridges between spaces at two or more NASA research centers. These portals would be available to all NASA staff for work and social use. Each node would provide a high-resolution “window” (e.g. large tiled display system or hyperwall) into the remote locations in the network, and would allow high-fidelity audio conversations between those present. The first two nodes of this telepresence network would be at ARC and JSC; possible locations include cafeterias, reception areas, and other general access locations that have a high volume of foot traffic. The locations would all have the same degree of “publicness” to prevent confusion about the privacy of conversations.

This proof of concept project will provide an “always on, no training required” demonstration of high quality videoconferencing in an informal setting, in order to:

- Create opportunities for cross-pollination between domain experts
- Foster social connections among physically separated NASA workers
- Raise awareness of remote collaboration tools
- Encourage new thinking on ways to cut travels costs
- Provide a test bed for a novel technique we have conceptualized to increase audio fidelity among distant users (presence-aware smart phones for individual audio connections)
- Demonstrate the potential of telepresence portals in creating a “meta-building” that links distant offices into a shared, persistent workspace.

PIV Derived Credential for Strong Mobile Application Authentication

Project Lead: Jane Maples

Project Team: Corey Baswell, Randy Johnson, Wayne Stone, Jeff Thurston, Kellie White, Peter Cauwels, Rob Birchmeier

Project Champion: Burt Bright

Center: MSFC

IRM Strategic Goals: 1.3, 2.2

Phase: Prototype

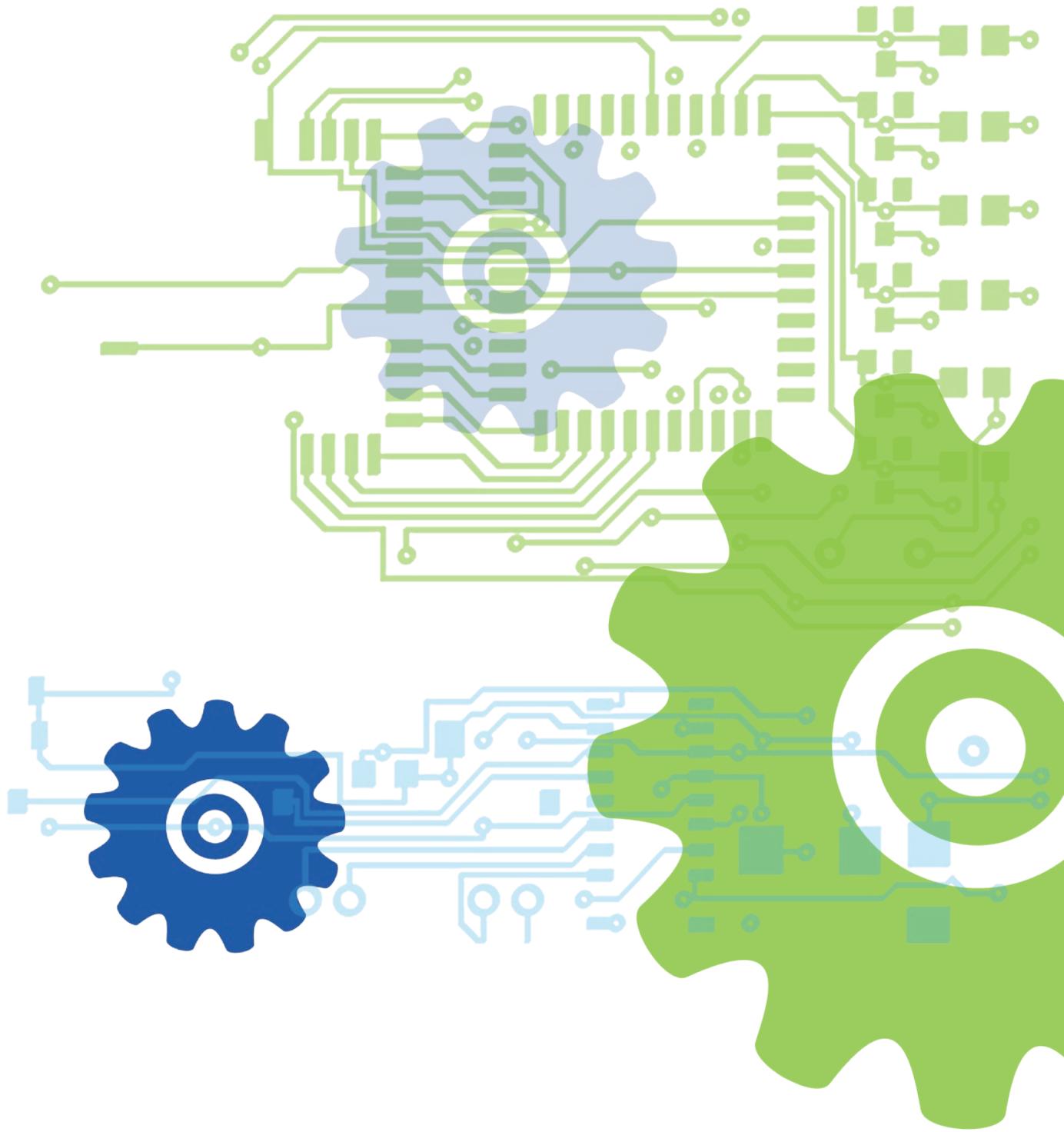
Themes: Access Management, Mobility

In today's world, a NASA user is able to access a multitude of applications via their mobile device without ever stopping to consider the security ramifications of what would happen if that device was misplaced or stolen. This is a growing concern, and one that must be not only acknowledged but also resolved. Federal policies require all moderate applications to be Level of Assurance 3 compliant (LOA-3), but what does this really mean?

The Office of Management and Budget has defined in OMB 04-04 the levels of assurance, which must be met by each Government Agency. The category, or rather the level of assurance, defines the Agency's degree of confidence in two areas; the vetting process of the identity and the person presenting the identity. In other words the user accessing the application is in fact the person they claim, and they were provided this identity via a fully vetted process. With the majority of NASA's business applications falling into a LOA-3, including the extension of mobile applications, we are forced to seek out new ways of meeting LOA-3. Ways in which not only meet the requirements, but a way in which will not degrade the user experience. This has been a challenge because the NIST SP800-63-1 defines the technical requirements to meet LOA-3. Again, what does this all mean? Well it means the application must make use of multi-factor authentication, which we typically consider a password and also be used in combination with either a software token, hardware token or one-time password device token. The Center for Internal Mobile Applications has been working with the ICAM Community to leverage existing ICAM services to meet this requirement and make it feasible to implement on a mobile device without making the user want to run away screaming.

After months of collaboration and design CIMA has prototyped the use of a PIV Derived Credential, which is issued based on proof of possession, control and ownership of a valid NASA issued PIV credential. This prototype can be implemented for web applications and mobile devices, provides a positive user experience and meets the requirements of LOA-3. The derived credential will leverage both the ICAM provided PKI based certificate from the NASA PIV card and NASA ICAM services for the certificate lifecycle and all required authentication and authorization services. This prototype methodology was developed in conjunction with the ICAM engineers and was approved by the Engineering Change Advisory Board (ECAB) in 2012.

The proposed prototype has been briefed to multiple leadership communities including the Agency CTO, JSC CTO, HQ IT Security, and Agency VPN team, and has been met with great anticipation and buy-in for the proposed approach.



IT Labs: On Target for Innovation

IT Labs is working to clear the path, empower the workforce, and let the power of intrapreneurship drive change, improve morale, and inspire growth in IT.

With so much success experienced by the program, what is next on the horizon one might ask? Well, plenty is the answer! IT Labs is forever in search of new and innovative ways of evolving as a program and helping NASA in reaching its strategic goals. As such, it is constantly improving elements of the program and searching for efficient ways to acquire additional funding to garner great ideas.

Process

With each iteration and fiscal year, IT Labs reviews the steps it took leading up to, conducting and completing its project calls. Lessons learned are compiled and reviewed to refine the process the program uses. Looking forward, the process is already becoming more succinct while still adhering to the objectives the program strives to reach. Currently, IT Labs is aligning all project deliverables with NASA's program management requirements to smooth the transition of each technology from R&D into production as an enterprise service and decrease the time for implementation. The impact of this program cannot only be in technology innovation but also the management of technology to bring it to the people it is meant to serve more quickly and efficiently. It is great to have good ideas but sometimes making them reality is even more difficult. IT Labs is working to clear the path, empower the workforce, and let the power of intrapreneurship drive change, improve morale, and inspire growth in IT.

Website

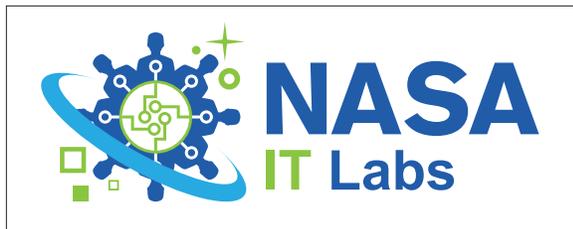
The program tries to stay light on paperwork, but still thrives on effective communication. With this in mind, IT Labs' internal website (<https://labs.nasa.gov>) is always under review to make communication more effective. For projects and their leads, there is a project dashboard. This dashboard tracks elements such as the project title, project lead, project champion, schedule, milestones, and updates. Templates for status updates are available with all information required to streamline that effort. Additionally, a blog page was started for a more flowing description of the IT Labs program, projects, and events.

A terminology change made in this past year was a nomenclature reference to the CTO-ITs that sponsor funded projects and the potential sponsors who have funding outside of IT Labs to support projects IT Labs was unable to fund. Due to the dual use of the term "sponsor," the CTO-ITs and other executives that mentor projects are now considered the "Project Champions." The champion has no financial responsibility to the projects since they are mentoring with IT Labs funding the projects. Now, a "sponsor" is a person or organization that is capable of funding projects that were not funded by IT Labs.

As is the unfortunate case, not all projects submitted to IT Labs can be funded, despite their possible value to the Agency. In light of their potential, the website includes a new page called "Sponsorship Opportunities" for those projects that showed promise, but were not fortunate enough to be funded. On this page, potential sponsors are able to view each project that was not funded and be presented with the opportunity to provide funding should they be interested. Even if one is unable to fund, it is a great place to see what work is being done or could be done. This page can also serve as an opportunity to find collaborations with similar ongoing work.

Graphics

One of NASA's shining stars of innovation is the Center of Excellence for Collaborative Innovation (CoECI). With NASA's growing experience in the area of challenge-driven open innovation, CoECI was created at the behest of the White House Office of Science and Technology Policy (OSTP) to champion the use of challenges and prizes across the federal government. Through CoECI and the Harvard NASA Tournament Lab (NTL), IT Labs conducted a challenge on the TopCoder crowd sourcing platform for the development of a new representational graphic for the program as well as a new banner for the IT Labs web sites.



The representational graphic depicts symbolic elements of IT Labs such as information technology, collaboration, networks, and others. The centerpiece of the graphic is a gear made of people with circuitry linking them together. The gear symbolizes a potent, working force and collective teamwork and collaboration. The idea of networking inside and outside of NASA is captured with the imagery of circuits linking people, an obvious reminder of information technology. To the lower left, squares are shown to depict input and output of data and to the upper right, circles and a star are shown to illustrate the tie to Space and pay homage to the NASA "meatball" logo with white stars and planets in its blue field. The element circling around the IT Labs logo ties everything together with collaborative efforts to empower and embolden the Space program in a classic orbit icon.

This graphic has been incorporated into banners that were chosen from a second challenge, also conducted through CoECI via Harvard NTL and a team at TopCoder. The results were very pleasing and many of the graphic elements found in this document are contributions from one of the winning banners.

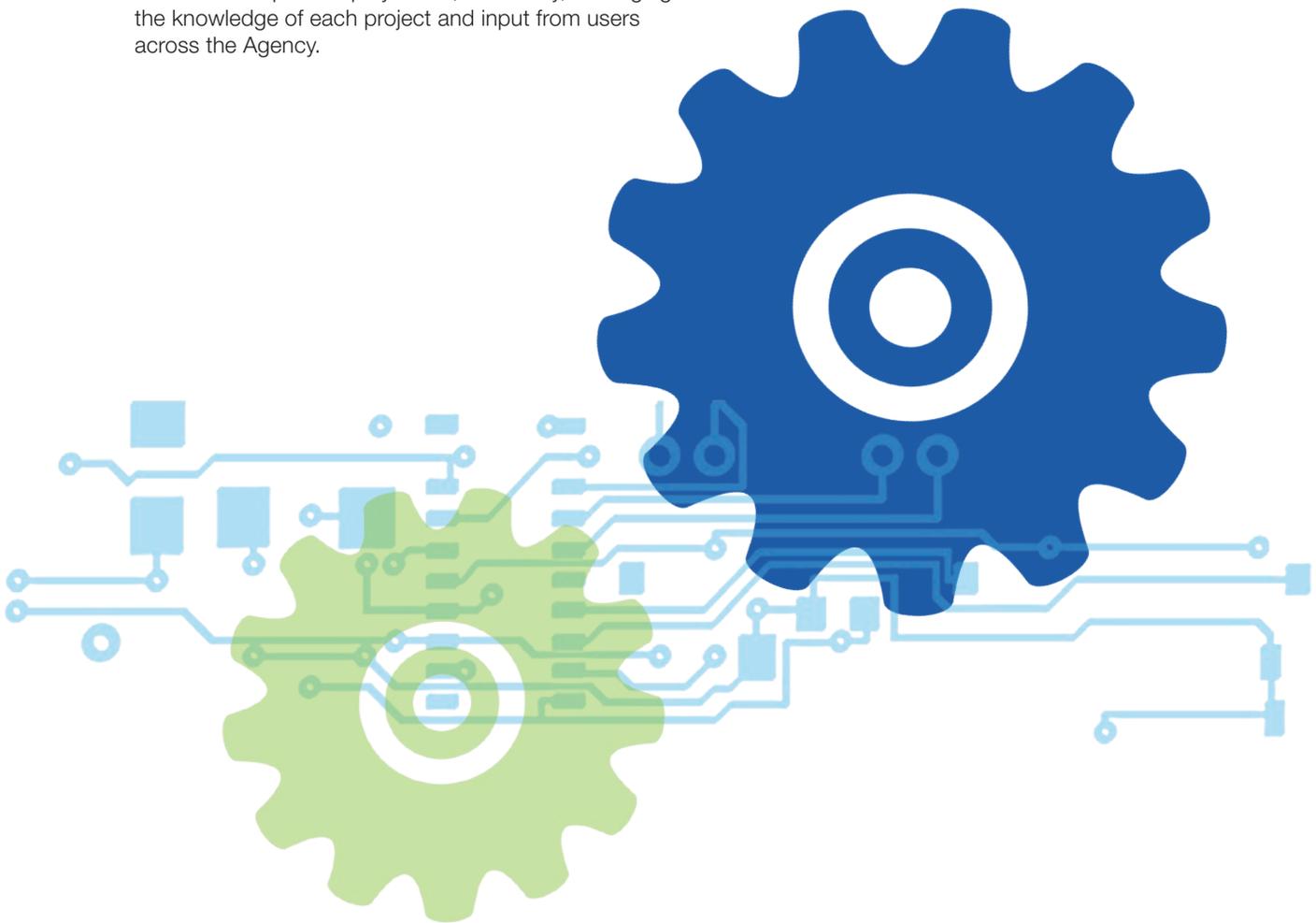
Federating Innovation—Partnerships

IT Labs is not the only play in NASA's playbook. Other programs at other Centers within the Agency are also looking for ways to help NASA reach its goals, including in the IT community. The program not only wants to bring awareness to these other programs (e.g., NASA Center of Excellence for Collaborative Innovation (CoECI), NASA@Work, innovate.nasa.gov at JPL, Idea Tank at MSFC, etc.), but also partner with them in the hopes that synergy will present itself and produce even more effective, innovative ways to accelerate NASA's performance. As mentioned earlier, the new IT Labs graphic was generated via collaboration with CoECI and their work with the Harvard NASA Tournament Lab and TopCoder. This project was a good way to familiarize IT Labs with CoECI crowdsourcing techniques and processes and resulted in superb products.

IT Labs projects have drawn attention to spur collaborations within NASA for partnerships in research and funding compounding the interest of IT Labs' seed investments. One project has even gone through all ranks of interest from the IT Labs community to the Federal Communications Council. The Program has also provided mentorship for another fledgling intrapreneurship program, Ignite of Human Health and Services. The model is a good one and IT Labs just happens to be further along than Ignite and hopes the successes of IT Labs will bolster the impact of Ignite within HHS.

In efforts of openness and transparency, IT Labs wants the entire Agency to be aware of these partnerships in hope that more programs will be inspired to partner as well. Tentatively titled Partners in Innovation, this new page on our website will inform Agency members of IT Labs' continuing collaborative efforts.

In closing, IT Labs appears to be staying on target with its model of mentorship to the Agency and outside the Agency, two accolades from Computerworld and FedScoop50, catalyzing partnerships within and outside NASA, and forming a nexus of communication about innovations in IT. While on this path, the program will take the following steps: the continuation of our objectives and the development of innovative partnerships and relationships; improving the website for more effective communication between the program and its projects; further refining of the process from our previous experience with project calls; working on integrating innovations into operational capabilities and valuable Enterprise deployments; and finally, leveraging the knowledge of each project and input from users across the Agency.

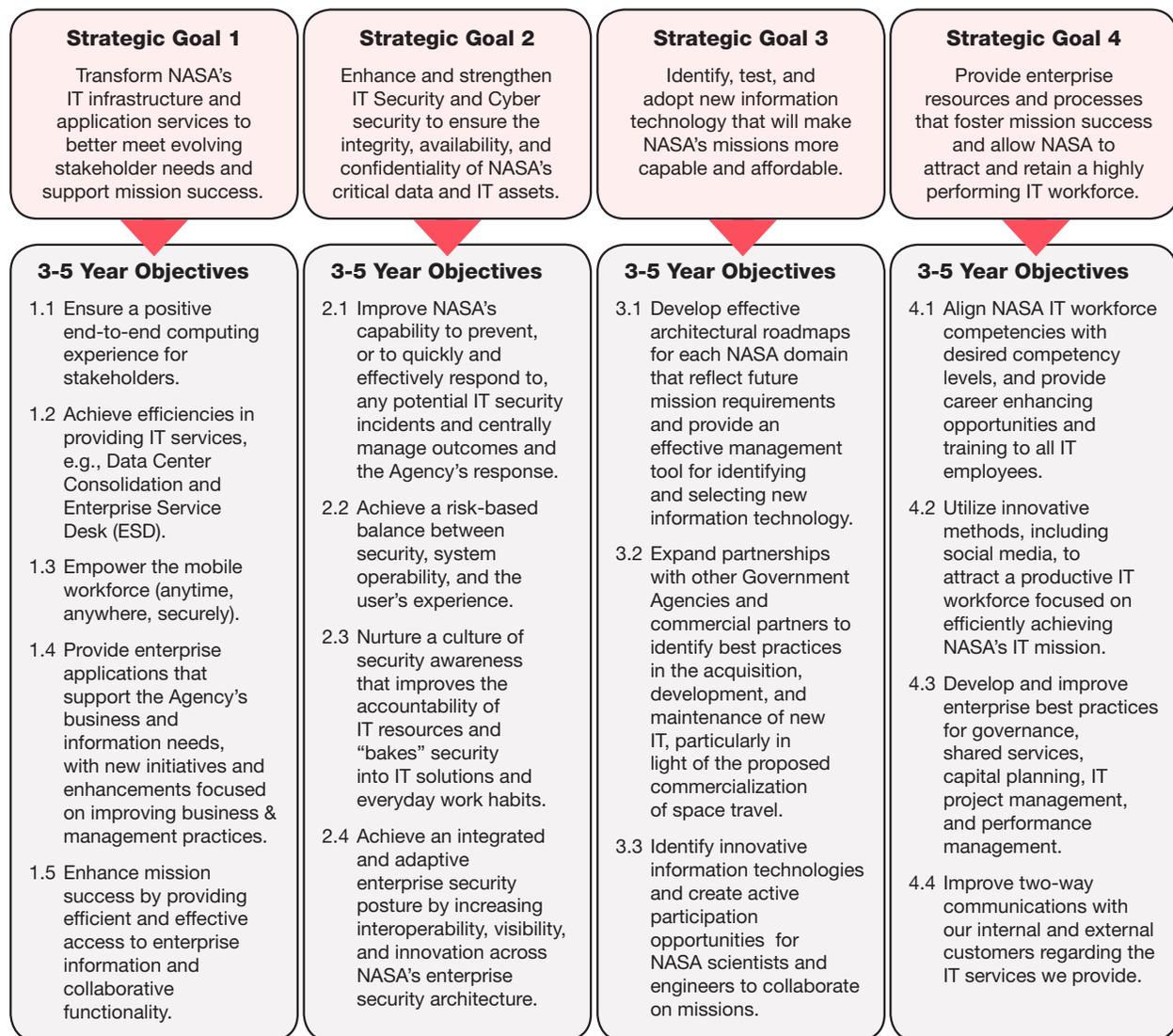


Appendix

2011 NASA Information Resources Management (IRM) Strategic Goals and Objectives

The following is only an excerpt of the 2011 NASA IRM Strategic Plan for reference and guidance to evaluate the IT Labs project portfolio. These goals and objectives were identified as key focal points for NASA IT as a whole and thus, guide the IT Labs program for project selection.

A complete electronic version of the 2011 NASA IRM Strategic Plan may be found at http://www.nasa.gov/offices/ocio/IRM_Plan.html.



National Aeronautics and Space Administration

Headquarters

Washington, DC 20546-0001

www.nasa.gov

*An electronic version of this document and
more information can be found at:
<https://labs.nasa.gov> (internal NASA network only)
or email the IT Labs team:
HQ-NASA-IT-Labs@mail.nasa.gov*