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Team Collaboration: Lessons Learned Report

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January 2005

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This report contains preliminary findings, subject to revision as analysis proceeds.

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Executive Summary

An Agency team collaboration pilot was conducted from July 2002 until June 2003 and then extended for an additional year. The objective of the pilot was to test a set of tools and supporting processes to be considered as a team collaboration service for the Agency. In an effort to share knowledge and experiences, the lessons that have been learned thus far are documented in this report. Overall, the pilot has been successful. An entire system has been piloted: tools, adoption, and support. The pilot consisted of two collaboration tools, a virtual team meeting capability and a team space. For the virtual meeting capability, we used WebEx Meeting Center application (WebEx Communications, Inc., San Jose, CA). For the team space capability, we used the eRoom Hosted Enterprise Service application (eRoom Technology, Inc., Cambridge, MA).[1] Of the two tools that were evaluated, the team meeting tool has been more widely accepted. Though the team space (eRoom) tool has been met with a lesser degree of acceptance, the need for such a tool in the NASA environment has been evidenced. Both adoption techniques and support were carefully developed and implemented in a way that has been well received by the pilot participant community.

The pilot administration team members have had much experience conducting similar pilots. Because of this experience, several of the lessons reported in this document were not newly learned but simply reconfirmed. More than a year into the pilot, we have also learned many new lessons. While they are captured in detail in this report, the major ones fall into three categories: (1) Collaborative tools enable NASA virtual teams to work more efficiently, (2) Adoption (change management) planning and implementation are critical to the successful use of the tools, and (3) Issues unrelated to the technology or its acceptance have significant impact on the pilot. The top 10 lessons learned from the pilot are listed below.

Collaborative Tools Enable NASA Virtual Teams

(1) A virtual meeting solution is quickly accepted by teams and provides immediate value. The fact that this type of application fits existing meeting norms most likely contributed to its high acceptance.

(2) A team space enables virtual team processes to be completed much more efficiently than sole reliance on typical mechanisms such as telephone and e-mail. However, team spaces had a lower acceptance rate than the virtual meeting solution. This can be attributed to the significantly larger time investment and change of work habits the team must make at the onset of utilizing this type of tool.

[1] Application's company and name at time of pilot. Presently eRoom Enterprise from Documentum (Pleasanton, CA).

(3) Web-based tools provide the accessibility needed for collaboration amongst NASA centers and their external partners. Barriers such as client software, network configurations, or specific hardware requirements can prohibit potential collaborators from fully participating thereby minimizing true collaboration.

(4) Application service providers (ASPs) provide excellent operational capability as well as security—even though team members may perceive security issues with the use of ASPs since data may reside outside of the NASA domain.

Adoption Planning and Implementation

(5) The team coordinator (TC) role is crucial in the adoption process of tools, especially a team space. The TC should be IT (information technology) savvy and must be engaged so that he or she can serve as a team champion as well as an early adopter. This allows the person to motivate and support the team. Pilot participants with team vision, goals, and deliverables have greater probability of engagement. When these items are known, work processes and views of how the tools enable those processes are much clearer.

(6) A team space needs to address a "pain point" that the team is experiencing. Perhaps it is a process that is not as efficient as could be. An example of that might be assuring that team members are reviewing the same version of a document.

(7) The pilot administrators must be engaged with the pilot participants. Various mechanisms can be used to cultivate the exchange of information between the two groups. Proactive facilitation, communication, and customer-focused support are all methods of supporting the administrator-participant relationship.

Pilot Issues

(8) Executive and management sponsorship and support must exist. Workers tend to adopt tools and processes utilized by management. Management support also creates a higher level of visibility of the new way of doing business.

(9) Teams are reluctant to heavily invest in a tool or process that will exist for a short duration (1 year), particularly if there is a large initial time investment as is the case with a virtual team space.

(10) The limited scope (and funding) of a pilot results in limiting the community of people with access to tools (especially where tools require per-seat licensing). This impedes the adoption of those tools.

Pilot Overview

Shortly after the events of September 11, 2001, the NASA Administrator asked the NASA Chief Information Officer (CIO) to improve the ability for NASA teams to accomplish work with less reliance on travel. NASA has many teams that are distributed across NASA centers and external partner locations. There is currently no NASA standard method for basic collaboration beyond teleconferences and e-mail. However, commercial tools exist for increasing the richness of virtual team meetings, supporting virtual team processes, and sharing information. Best-practice companies have realized corporate value by deploying and adopting these tools across the organization. It was felt that NASA would benefit by establishing a common language and standard methodology for collaboration.

Purpose

Extensive collaboration amongst NASA personnel was inhibited since NASA has many teams that are geographically distributed across NASA centers and external partners. While it has always been somewhat difficult to accomplish work without travel, the events of September 11, 2001, and additional travel restrictions that followed have made it even more challenging. It has become more evident that NASA needs a corporate capability for its "virtual teams," and it was strongly felt that successful deployment of team collaboration tools could make a difference at NASA. In addition, both electronic Government (eGOV) and OneNASA objectives included improving collaboration via information technology. The goals of the team collaboration pilot were

(1) To assess the value of commercial collaboration tools applied to NASA teams
(2) To refine NASA requirements for team collaboration tools
(3) To provide a valued service to pilot participants and exceed their expectations by emphasizing facilitation change and adopting new work processes
(4) To serve as a first step towards a corporate capability for team collaboration at NASA

Business drivers and functional requirements for NASA team collaboration had been identified over the preceding years and updated after discussions with a sampling of potential users of this technology. This information then served as the basis for the selection of the tools. It was determined that a team collaboration capability should

(1) Reduce reliance on travel to get work done
(2) Enable collaboration between NASA centers
(3) Enable collaboration between NASA and its external partners (industry, academia, other government agencies, and international partners)
(4) Be easy to learn and use (usability)
(5) Be operational and deployable in a short (1- to 2-month) time frame
(6) Appeal to a broad-based audience (scientists, engineers, technicians, managers, and administrators)
(7) Be secure—all users shall be authenticated and all communication shall be private
(8) Have high availability and performance
(9) Have a reasonable cost of implementation

Process

The process of conducting the pilot consisted of (1) recruitment and selection of pilot teams, (2) selection and deployment of collaborative technology, (3) development and application of team adoption strategies, and (4) measurement of results.

Recruitment and selection of pilot teams.—The pilot was planned for a population of about 500 people, and participation would be based on selecting a set of virtual teams representing a cross section of NASA project and work areas. As we considered recruitment and selection of pilot teams, we first defined criteria we felt were essential for a team to be successful in the pilot. Specifically,

(1) The team must be geographically distributed and actively working on team tasks.
(2) The team and team leader must be willing to adopt new work methods and ideally be somewhat frustrated with current distributed work methods.
(3) The team must have a leader who is committed to actively leading the adoption of new work methods and tools.

(4) The team must name one of its members as a pilot focal point who will be responsible facilitating the setup and adoption of tools.

(5) The team should be no larger than 25 people in size.

Next, the NASA CIO sent a call for participation memo to the Agency inviting all centers and Enterprises to submit candidate teams for pilot participation. A selection process was performed to select teams that represented NASA mission-oriented and administrative areas. To account for the pilot capacity of approximately 500 seats, 25 teams were selected for the pilot.

Selection and deployment of collaborative technology.—One of the main objectives of the pilot was to sell the concept of using collaborative technology to enable distributed teams, more so than a particular product or service. Thus, we did need to select collaborative applications for the pilot. This selection was guided by the NASA business drivers and functional requirements that had been identified. Key areas of consideration for pilot product selection included

(1) Features: The pilot focus was to enable virtual team meetings and virtual team spaces. Data conferencing was the key feature intended to enable virtual team meetings. Data conferencing enables people to share presentations and live applications running on their computers with all meeting participants. The virtual team space required basic asynchronous features including file sharing, discussion lists, action item management, calendars, and workflow features.

(2) Usability: The ease of use of collaborative technology is very important for NASA teams. People realize that if tools are difficult to use, team adoption will not likely occur. Teams are already stressed by lack of time and information overload. While usability can be rather subjective, it is a key requirement that came directly from NASA customers.

(3) Ubiquitous access: A key business driver is to enable collaboration across NASA centers and external partners. Lessons learned from previous pilots reveal significant problems when special firewall ports must be open and/or when desktop client software (especially if it must be licensed and maintained) must be installed. Our vision was to allow collaborators to participate from anywhere using the Internet and common network and desktop configurations. No special rooms or network configurations should be required; tools should be accessible from any office, hotel room, telecommuting site, partner location, and so forth.

(4) Security: It is vital that the privacy of NASA team information and processes be maintained. All team members must be authenticated and all communication must be private. All support processes must work in concert with the guidance from NASA's standards for information technology security.

(5) Multiplatform functionality: NASA (and some of its partners) has a heterogeneous computing environment consisting of Windows, Macintosh, Linux, and Unix workstations.[2] It is essential that collaborators be able to participate using their normal work environment, since this is where their work (applications and data) resides.

Other issues considered include product maturity, vendor viability, training alternatives, cost, and deployment options. With respect to deployment options, the NASA CIO and the team at Glenn Research Center were interested in pursuing the option of providing the pilot infrastructure via an application service provider (ASP) rather than deploying in house. The ASP model is being driven by fundamental enabling trends in network services; specifically, the relentless increase in network bandwidth. From a Government perspective, the ASP model provides a provocative option for information technology (IT) outsourcing. ASPs can give NASA access to the identical services that are competing for customers in the commercial marketplace. In addition, since this was intended to be a pilot, we were interested in both a

[2] Windows is owned by Microsoft Corporation, Redmond, WA; Macintosh by Apple Computer, Inc., Cupertino, CA; Linux by Linus Torvalds, San Jose, CA; and Unix, by The Open Group, San Francisco, CA.

short deployment time and avoiding capital costs (e.g., purchasing and installing servers and software applications).

Finally, with inputs from Gartner Consulting (Gartner, Inc., Stamford, CT) and the META Group, Inc., (Stamford, CT) and from previous piloting and standards work at Glenn, we recommended a pilot of two ASP-hosted capabilities:

(1) Virtual team meetings via the WebEx Meeting Center service
(2) Virtual team space via eRoom Hosted Enterprise Service

To help assure a short deployment time, support processes and plans were developed and implemented. These included e-mail, phone, and online assistance, documents such as a pilot frequently asked questions (FAQ), customer support documents, and on-line help, as well as other important elements such as hours of operation and maintenance, priority levels and response time, and points of contact databases.

Development and application of team adoption strategies.—Realizing it would be a significant challenge to transition pilot teams to new ways of working, a tool adoption plan was developed. We also set realistic customer expectations and planned for customer-focused technical and administrative support.

The adoption plan focused on the following techniques:

(1) Defining key roles: Key roles and responsibilities of pilot personnel were defined prior to the creation of the adoption plan. The three key roles were the team leader (TL), team coordinator (TC), and team facilitator (TF). A critical success factor for a team to adopt collaborative technology is that one team member must become an active proponent of the required change in work habits and use of tools. A key role then was that each team must have a defined TL who accepted the responsibility of actively leading the team into the ongoing application of team collaboration tools. In addition to the TL, each team was to name a person on the team to act as the team tool expert (or TC), who would be responsible for identifying opportunities to apply tools, tool setup (i.e., directory structures), and immediate assistance to team members. A member from the Glenn team was assigned to serve as the TF for each team. The TF would be responsible for developing a relationship with and checking in on the TL and TC to assist with the team adoption of tools.

(2) Providing proactive facilitation: From past pilot experiences, we learned that simply giving people access to collaborative technology usually resulted in the tools not being effectively used, if used at all. We decided that active facilitation with the teams would go a long way in the adoption of the tools being provided. TFs would proactively monitor teams by checking in with teams on a regular basis, attending team meetings when appropriate, and monitoring the team space. TFs would then be in a good position to encourage and assist in tool adoption.

(3) Facilitating monthly pilot forums: One way to encourage adoption is to facilitate sharing of results and best practices among all the teams participating in the pilot. Each month, we scheduled a virtual meeting with all of the team leaders and team coordinators. The forums were used to obtain feedback as well as share team information and best practices of tool use. The best practices shared at these forums included the use of WebEx to host a large international conference, the use of WebEx to collaborate on video content, and the use of eRoom to create a project operating plan with multiple authors. The forums were also used to provide technology briefings such as tool tips and features of new software versions.

(4) Providing tool technology training: An understanding of the use and purpose of all tool features can facilitate adoption of tools. We planned for vendor-supplied tool training, both instructor-led as well as self-paced. eRoom training was completely led by an instructor and was provided at the onset of the pilot. Further into the pilot, it was provided on an as-needed basis by the pilot administrators. WebEx offers virtual instructor-led training sessions and self-paced instruction on an ongoing basis at no additional cost.

Measurement of Results.—A key objective of the pilot was to assess the value of team collaboration tools as applied to NASA teams. To that end, we decided to administer two surveys to pilot participants—one before the application of team collaboration tools and another after the teams had used the pilot tools

for a fairly significant period of time—about 9 months. The focus of the first survey was to both measure the prepilot state of each team's ability to get distributed work done and to assess basic team collaborative skills (e.g., trust, communication, etc.). The focus of the second survey was to measure each teams' ability to get distributed work done while using the pilot tools and to gather additional feedback on the pilot such as how well business drivers were met.

In addition to the surveys, customer feedback was collected by team facilitators and at the monthly pilot forums.

The survey distributed before the pilot is found in appendix A, and the survey given after the pilot is found in appendix B. To aid the reader, a list of acronyms used in this report is found in appendix C.

Lessons Learned

The pilot administrators brought to this pilot experience and knowledge from conducting past IT pilots. The lessons learned during those earlier pilots aided in the success of the team collaboration pilot. Realizing the importance of documenting those lessons, it is with forethought that we provide a summary of the lessons learned during this pilot. This section is divided into three major areas: (1) adoption issues, (2) technology issues, and (3) general pilot issues. Requirements for team collaboration are also listed.

Adoption Issues for Team Collaboration at NASA

Tool adoption is key to obtaining value from collaborative technology. Technology is only half the battle. It is difficult for one person to change habits, let alone getting 10 to 25 people to change them together. Executive acceptance is also critical to success. The success of any project initiative is shown to be directly linked to the degree of executive acceptance, and as such it is absolutely necessary that senior management have a comprehensive understanding of the business benefits of the system that is being evaluated. Upper management support, TL involvement, and forming a critical mass of team members with technological skills are all methods that contribute to the likelihood of tool adoption.

Lessons were captured regarding overall tool adoption as well as each of the specific pilot applications.

Overall.—The following were learned about adopting tools for team collaboration in general.

Lesson: The team must be committed to working differently. The TL in particular must commit and actively lead the group into new ways of working. If there is not a commitment to work differently, real or perceived barriers to adoption grow both in number and size and seriously jeopardize the possibility of incorporating the tool into a team's normal workflow.

Lesson: Key pain points or impediments for the team must be identified. Identification of pain points focuses application of team collaboration tools on areas of maximum benefit. Expected results of utilizing the toolset must be clear and valued by the team. Valuation is directly related to the number and size of the impediments. Greater value is perceived when impediments are reduced.

Lesson: A system for how team work will be automated by technology must be established. On a personal level, people create a system for themselves, often enabled by their personal computer, including folder structure, method of tracking their actions, and in some cases establishing processes. Likewise, a team system must be established to organize team information, actions, and processes. Each team must designate a coordinator (TC) to ensure that the team makes use of the tool as appropriate, to implement and maintain the structure for the team's information according to agreed upon criteria, and to be the primary team contact for issues regarding the use of the tools. Without a person who is dedicated and available for this function, most teams do very poorly in adoption of the tools. There needs to be

executive support of the TC to empower him/her to get a team to incorporate the collaborative tools into the team's normal work patterns. As an example, The Payload Safety Review Panel (PSRP) successfully adopted WebEx in part because of a very engaged TC. The TC (1) developed a training program for all team members, which included PSRP and support engineers as well as payload organizations, (2) effected cultural change throughout the team, one person at a time, and (3) developed a process for the scheduling and notification of WebEx meetings.

Lesson: Team acceptance of the new system must be established. Team members must feel vested in the system and actively use it for team work. They must also have an agreement among themselves for how they will work together using the new system. Though the entire team must buy into the new system, cultural change often occurs with one individual at a time.

According to one TC's philosophy, there are several roles as it pertains to the adoption of a new system: innovators, hesitators (perfectionists and procrastinators), and resisters. The innovator thrives with the new system as their motto is "Change can be fun!" Hesitators include both perfectionists who are uncomfortable with displaying their lack of knowledge and procrastinators who often proclaim that they are too busy for training. Resisters feel that change is bad, and often management support is needed to reinforce the need for change.

Team Meetings.—The following lessons were learned about the tool applied for team meetings.

Lesson: Conferencing (e.g., WebEx for the pilot) is quickly accepted by teams and provides immediate value. Meetings are a common process at NASA. Enriching the meeting experience with a tool like WebEx fits fairly simply into this existing process. The ability to share live content from any computer in a meeting significantly increases the richness of the communication. Several teams eliminated travel due to this increase in communication. For example, the Stennis Space Center Office of Technology Transfer (OTT) successfully utilized WebEx to conduct two very high level and sensitive meetings in place of traveling to Washington, DC. The OTT managers from all NASA centers participated in the meeting. A significant amount of time was saved using WebEx—4 to 6 hours versus 3 days.

Note: See the Post-Pilot Survey (appendix B) for additional points.

Virtual Team Space.—The following lessons were learned about the tool applied for team space.

Lesson: Teams are reluctant to heavily invest in a tool/process that will only exist for a short duration (1 year). Since team space does not fit into an existing work pattern (as compared to conferencing), more time is needed for teams to adopt. There was reluctance to heavily invest in a tool that might be available for the short term.

Lesson: Training should be provided just in time for active use of the tool. If training is offered before individuals are ready to use the tool, its usefulness is minimized. Training should cover the features of the tools, but just as importantly, training needs to demonstrate how the tool can effectively be incorporated into automating a team's existing processes.

Lesson: Piloting a team space is better accomplished by targeting an entire user segment (i.e., the entire project, program, or enterprise), rather than distributing seats to small teams at the working level. The training and needs assessment should be done with the targeted group so that they learn the common language of using the tool, thereby having a better chance for broader acceptance since everyone will be on the same page regarding how the tool is going to be incorporated into their work processes.

Note: See the Post-Pilot Survey (appendix B) for additional points.

Technology Issues for Team Collaboration at NASA

Technology has been an incredible enabler for distributed teams to get more work done. High-speed network connectivity and feature-rich applications allow virtual teams to accomplish their work remotely in a very efficient manner. For the technology selected as part of this pilot, particular attention was paid to selecting tools that supported two critical requirements for NASA: ease of use and interoperability in a multiplatform environment. Other areas that were very important were availability, security, and service delivery. While the tools generally worked as advertised, there were a few technology issues that surfaced during the course of performing this pilot. We felt the issues were grouped somewhat into four topic areas of (1) application service providers, (2) multiplatform issues: operating systems and browsers, (3) security issues, and (4) ubiquitous access: browsers and Internet.

Application service providers.—The pilot was conducted using application service providers (ASPs). So while we piloted the tools and their adoption, we also piloted the mechanism for offering the service. A driving force for using ASPs was the short turnaround time needed to initially offer the services. Our experience using ASPs was mostly a positive one. Generally, operations and support have been excellent for both tools. Software updates took place with little or no disruption to the end user. Performance of the tools (e.g., end-user response time) was generally very good. Pilot participants were inconvenienced on a few occasions when there were problems with the tools. There also were some unresolved problems that were due to limitations with the operating systems, browser applications, and firewall restrictions in the systems NASA used to access the services.

While WebEx had a couple of operational incidents, they were addressed in a timely manner by WebEx support staff. There were numerous software updates that occurred over the course of the pilot. These updates would have taken more administrative resources if the Web-conferencing service were offered in-house, since we would have needed to install and test in a development environment and then move them to a production system. It was also very helpful to have access to beta sites with the next release of the tool to test and evaluate any impacts before it was moved into the production environment. The overall availability of the service was very good as was the response time of WebEx ASP support.

We experienced literally no down time on eRoom. However, on the occasion that we needed assistance, response time for eRoom ASP support was poor.

Lesson: ASPs provide excellent operational capability as well as security. However, team members may perceive security issues with the use of ASPs since data may reside outside of the NASA domain.

Lesson: ASPs allow for virtually trouble-free software upgrades and reduce need for in-house resources.

Lesson: Operating systems, browser applications, and firewall restrictions can pose problems for ASPs in the NASA environment.

Multiplatform issues: operating systems and browsers.—Multiplatform access is needed but is also a challenge. Both eRoom and WebEx support Windows, Mac OS 9/X, Linux, and some Unix variants, but you still find more issues and functionality gaps on the non-Windows platforms. This is somewhat hard to overcome in a Windows-dominated world. However, we believe we are as close to full interoperability as possible considering there are many Windows-only applications that were purposely avoided. There is also a challenge with multiple browser types (Netscape, Internet Explorer, Mozilla, and Safari) and versions in use.

Because of the platform diversity within NASA, it would be useful to know which operating systems and browsers are currently being used and which ones are in the queue for future deployment. Likewise, consideration must be given to the NASA environment when a new release of software is made available. As with any other software, the benefits of a release must be weighed against any complications it might bring to our desktop environment. So it is important that thorough testing occur before a decision is made

to deploy the software. It is also worth noting that the tool feature set may vary from one platform to the next.

Lesson: Multiplatform goes beyond types of desktop (PC, Mac, Unix, etc.) and must include versions of operating systems and browsers.

Security issues.—This pilot surfaced many IT security issues that had to be addressed. It was imperative that a security plan be developed to cover matters such as NASA Procedures and Guidelines (NPG) 2810 conformance and in particular the Business and Restricted Technology (BRT) data category that is of interest to many customers. Some customers expressed interest in collaborating on International Traffic in Arms/Export Administration Regulations (ITAR/EAR) data. Additionally, the service was provided beyond NASA proper since collaboration often extends to external partners in industry, academia, and other Government agencies. As a result of that, it became clear that a process must be developed to address external partners agreeing to the service providers' and data owners' rules and regulations on the use of a Government service. All of these security issues were managed by working cooperatively with the NASA Information Technology Security (ITS) personnel and the pilot vendors (WebEx and eRoom).

Pilot participants stated a desire for stronger authentication. However, they also wanted an easy way to securely access systems, such as the RSA SecurID (RSA Security Inc., Bedford, MA) tokens, so that they would not have to remember yet another username and password.

Lesson: A balance must be struck between security and information sharing through collaboration. There are tradeoffs between the usability of a service and making it too restrictive. A tiered approach for various security levels should be developed.

Ubiquitous access: browsers and Internet.—Access via ubiquitous infrastructure is a big win. We chose products that work with in-place network and desktop configurations so that no real infrastructure changes were required (e.g., we did not require additional firewall ports open; we used SSL, and we did not require any active installation of special or licensed desktop software—just quick downloads when accessing services). And because most teams need to interact both across NASA centers and with external partners, ubiquitous access was a key enabler.

The tools operated well in a wide range of firewall and proxy server implementations and configurations. With WebEx, there was only one unresolved firewall and proxy server issue with one NASA center at the conclusion of the first year of the pilot.

Lesson: Web-based tools provide the accessibility needed for collaboration amongst NASA centers and their external partners.

Conducting Pilots

Just as knowledge was acquired with respect to the adoption (change management) issues and technological issues involved in piloting the two collaborative tools, we also gained knowledge about conducting IT pilots. The lessons captured below will hopefully aid in conducting more efficient and effective pilots in the future.

Lesson: Executive sponsorship and support must exist.

Lesson: Develop and adhere to criteria for team selection. If a team is participating in a pilot simply because they were told by management "thou shall participate," the chance of engagement is greatly reduced. Team members—in particular the TLs—need to see the value of adoption.

Lesson: Pilots need to be customer focused. Both communication and support should be just as people centered during a pilot as it is in a production environment. Multiple methods can be utilized to share information as well as to receive feedback. A pilot Web site, e-mail, surveys, a discussion area, and monthly forums were all used to communicate during the pilot. Monthly forums were also useful for pilot participants to share best practices, ideas, and concerns with fellow pilot participants. A support plan should include necessary elements such as pilot FAQs, on-line help, problem escalation and resolution, and customer support documents.

Lesson: Customer expectations must be defined. What you expect from customers and what they should expect from you must be clear. This includes the duration of pilot, service levels, and so forth.

Lesson: Pilot participants with team vision, goals, and deliverables have greater probability of engagement. Knowing one's goals and/or objectives is sometime difficult because of fairly broad Agency shifts. Also, participating in a pilot is often viewed as a layered add-on. Therefore engagement in the pilot can be superficial.

Lesson: Plan beyond a successful pilot. Be prepared for a larger scoped service if the pilot is successful. This includes procurement, infrastructure, security, and other areas.

Key Requirements for Team Collaboration at NASA

One of the first steps in defining the pilot was to draft business requirements (or drivers) for a team collaboration service at NASA and verify them with NASA focus groups. Those requirements have been further verified by our pilot participants. Key requirements have been developed. Some critical requirements are listed below. The team collaboration service must

(1) Enable NASA teams to participate from any NASA desktop computer
(2) Enable external partner participation without requiring reconfiguration of existing network perimeters
(3) Be easy to learn and use
(4) Be based on a leading commercially available Internet service
(5) Conform to NASA NPG 2810 IT security guidelines
(6) Provide multiplatform support (Windows, Macintosh, Linux, and Unix) in combination with NASA-recommended Web browser applications

Survey Results

Surveys were conducted as part of the pilot to assess the value of team collaboration tools. There were two major surveys conducted during the pilot: a Pre-Pilot Readiness Assessment (appendix A) conducted at the start of the pilot and a Post-Pilot Survey (appendix B) conducted 9 months into the pilot.

Both surveys measured the ability to get distributed work done. The Pre-Pilot Readiness Assessment was focused on evaluating the work environment and benefits of collaborative work. Issues such as trust and motivation were queried. The Post-Pilot Survey was more focused on the use of the pilot tools. As a result, only a limited cross analysis between the two has been done. Another limitation that prevented greater analysis of the two sets of data was the different audiences for the two surveys because a number of teams did not participate for the duration of the pilot. There were several reasons why teams did not participate for the duration: (1) Projects and programs were cancelled; therefore teams were disbanded,

(2) A team's work processes were unknown or did not lend themselves to virtual collaboration, and (3) The abundance of team responsibilities did not allow adequate time to learn and incorporate new tools into their work processes. In addition, other teams entered the pilot midyear through the pilot. Yet another difference in the survey audience was the first survey was distributed to all known pilot participants whereas the second survey was distributed only to team leads and coordinators.

The Pre-Pilot Readiness Assessment consisted of three major sections: demographic, social aspects of collaboration, and lastly the current state of the collaborative tool environment for virtual teams. The rate of return for the survey was 23 percent (137 out of 593 responded). Summarizing the data returned from the survey:

- Respondents represented a cross section of NASA and its external partners. In fact, representatives from all the NASA centers responded to the survey.
- A high level of trust among workgroups existed, and fellow workgroup members were motivated and adequately engaged in the work.
- Workgroup members openly communicated, and to a lesser degree managed knowledge.

Complete details of the Pre-Pilot Readiness Assessment can be found in appendix A.

The Post-Pilot Survey (found in appendix B) yielded more information about the technology and the implementation of the pilot. The Post-Pilot Survey had a 24 percent rate of return (126 out of 517 responded), and again all centers were represented in the survey responses with 41 percent of the respondents being a support service contractor (SSC) or external partner. While the majority of the respondents used a PC-Windows platform, just under 25 percent of them used Mac or Linux platforms.

From the results of the survey in the table below, it appears the original business drivers were met. Highlights from the survey include

- Teams that had a clear mission, schedule, and deliverables more readily embraced the pilot tools and had greater success using them.
- Individual responses were aligned with their respective team response (i.e., not many outliers).
- Collocated teams that had access to WebEx still received benefit from the tool.
- Teams with access to both eRoom and WebEx often only used one of the tools.
- Pilot participants using eRoom were often collocated and able to meet face-to-face. This might have resulted in less of a need to participate in virtual meetings.
- Pilot participants using WebEx often utilized asynchronous tools with which they already had access and familiarity (and not eRoom).

Business requirement	Applicable post-pilot survey question number(s)	Requirement met?	
		eRoom	WebEx
Tools shall reduce the reliance on travel to get work done	3, 10	Not necessarily	Yes
Tools shall enable collaboration between NASA centers	4, 11	Yes	Yes
Tools shall enable collaboration between NASA and its external partners	4, 11	Yes	Yes
Tools shall be easy to learn and use	5, 12	No	Yes
Tools shall appeal to a broad-based audience (scientists, engineers, managers, and administrators)	NA	Yes	Yes

Concluding Remarks

Conducting this pilot has proven to be valuable to the Agency in many ways. While sharing the aforementioned lessons learned is intended to broaden the knowledge within the Agency, we also feel that the pilot served to yield the following discoveries and confirmations:

Increased productivity and efficiency are better proved by pilots as opposed to paper studies. Vendors often tout their ease of use, reliability, full feature sets, and so forth. However, it is not until customers use a product that these characteristics can be verified.

Requirements can only be validated through the actual use of a product. Often an initial set of requirements evolve as a tool is used in one's work processes. Requirements are updated—deleted, modified, and added—as the tool is used. The pilot then serves to yield a better set of requirements. Lastly, the experience gained during a pilot is valuable as one plans for transition to an operational state.

Appendix A
Pre-Pilot Readiness Assessment

The survey presented in this appendix was administered by the Principal Center for Workgroup Hardware and Software at the NASA Glenn Research Center. It was distributed to the participants of the team collaboration pilot to assess their proficiency in collaborative skills and practices before the pilot took place.

Pre-Pilot Readiness Assessment

The Survey

Collaboration is a socio-technical process that involves social processes and technology to achieve high levels of workgroup performance and productivity. To help workgroups better exploit their collaboration skills throughout the course of the pilot activity, each workgroup was surveyed to assess their current strengths in the four key skill areas that are considered important to effective collaboration in a virtual workspace. While this survey instrument is by no means a comprehensive cultural assessment, it does provide general insight into the workgroups' skill proficiency so that any necessary incremental changes can be implemented. The survey was conducted via the Internet using Facilitate.com.

General data was collected from 137 (out of the 593 mailed) respondents from various Centers throughout the Agency. The survey questionnaire consisted of three parts:

> Part I of the questionnaire asks for user demographic information. This information will be used to identify the participating workgroups. This information will also help in defining the type of work that workgroup members are actively engaged in.
>
> Part II contains questions relating to the social aspects of utilizing collaborative workgroup technology. The questions in this section are specifically focused on the core skills, attitudes, and behaviors that are essential to successful collaboration in a virtual environment. Responses obtained in this section will give a general view of the workgroup's skills for effective collaboration.
>
> Part III contains questions about the state of the current virtual team/collaborative tool environment. These questions will help assess the efficiency and effectiveness of current collaborative workgroup technology and will provide a baseline for documenting any changes in workgroup productivity.

Survey Limitations

The data collection tool was not robust enough to provide adequate error checking and exception handling. Consequently, scores from two non-responsive respondents had to be eliminated. In some cases, survey respondents did not answer all of the questions. Total responses will therefore vary from question to question.

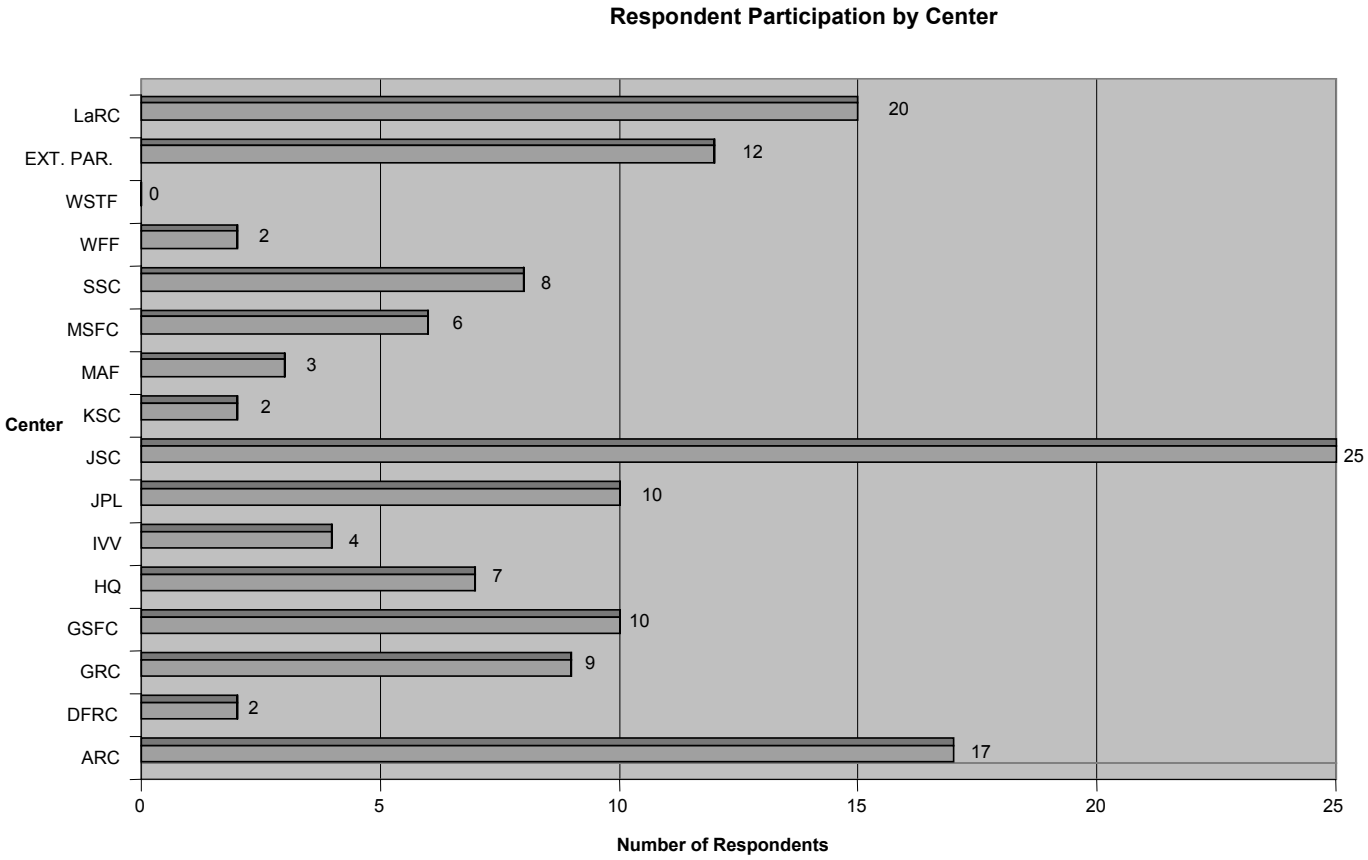
A statistically-significant number of respondents (approximately 20%) did not select the proper workgroup (question 2). As a result, the survey results could not be analyzed and reported for each workgroup (sample population - pn). The results discussed herein are the results for the entire group of survey respondents (population P). This is probably the most unfortunate limitation of the survey.

Survey Results

The survey results are provided in this report, which is organized according to the survey layout. Part I of this report provides demographic information such as Center location, workgroup name, and workflow type. Part II provides the results of the collaborative skill assessment. The four skill dimensions are trust, motivation, open communications, and knowledge management. Part III contains the results on the respondents' experience with their current virtual environment.

Part I - Demographic Information

Center Participation



Return Rates

Analysis

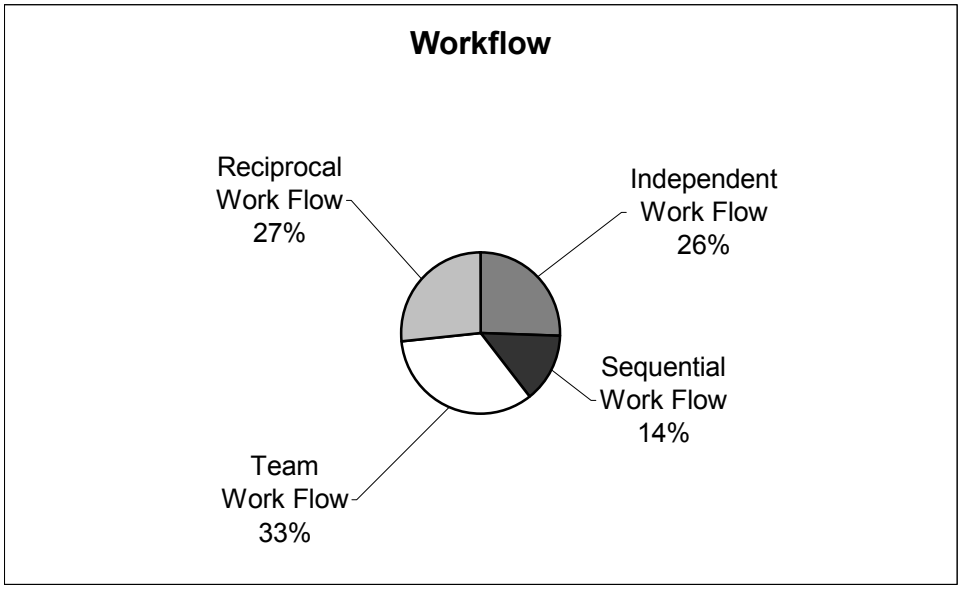
A 23% return rate (137/593 = 23%) provides a significant statistical sampling for this assessment. The return rate is slightly higher than the typically-accepted return rate for web-based surveys (20%). This suggests that participants care about collaboration and are willing to explore alternative ways to enhance and improve their collaboration skills and abilities.

Benefits

Benefits Respondents Would Like To Receive Through Pilot Participation

Stated Benefit	Frequency
Make group information more accessible	115/137 = 84%
Provide a virtual context for meetings	98/ 137 = 71%
Provide a means for problem solving	93/137 = 68%
Identify project issues	89/137 = 65%
Encourage all members to contribute	80/ 137= 58%
Enhance team building	76/137 = 55%
Maintain historical project records	74/ 137= 54%
Make lessons-learned more accessible	71/137 = 52%
Increased creativity	66/137 = 48%

Current Workflow



Analysis

Survey respondents spend slightly over one-third of their time working in a team environment where they collaborate to solve problems and share information to fulfill the charter of the group. In this arrangement, all share in the responsibility of the work. Respondents spend slightly more than one-quarter of their time in reciprocal work arrangements where the work and activities are exchanged back and forth. In this work flow format, responsibility for the work may shift as the work is passed among group members. Respondents spend one-quarter of their time working independently. Respondents spend the remaining time in an arrangement where work and activities flow between group members in one direction.

Part II - Collaborative Skills Results: All Workgroups

Introduction

Research on virtual teams and workgroup collaboration shows that there is a connection between collaboration and workgroup culture. This study specifically examines the social aspects of organizational culture that have a significant impact on workgroup collaboration. Drawing upon the literature, four key competencies are identified and assessed, namely, trust, open communications, motivation (engagement), and managing knowledge.

Central to this research is the premise that workgroups with high competencies in these major collaborative skills are most likely to succeed in transferring these competencies to a virtual environment using virtual team collaboration technology. See the white paper entitled, The Affects of Workgroup Culture on Collaborative Tool Adoption, for a comprehensive discussion of this research.

Overall mean average scores for each skill category are based on a Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree

Trust

Question: I trust my fellow workgroup members:

Trust	
Category Description	**Frequency of Responses Over 3**
Are competent in performing their jobs	123/134 = 92%
Respect authority when appropriate	122/134 = 91%
Will generally keep the promises they make	119/134 = 89%
Feel free to contribute to the success of the group	119/134 = 89%
Express their true feelings about important issues	113/134 = 84%
Have a high level of trust and respect for each other	111/134 = 83%
Collaborate on projects and tasks even when it takes time away from other duties	92/133 = 69%
Will openly acknowledge their own mistakes	83/134 = 62%

Overall Mean Average Score: 4.06

Analysis

The results reveal that the respondents collectively hold a high level of trust among members within their respective workgroups. Respondents trust that workgroup members:

- Are competent in performing their jobs,
- Respect authority when appropriate,
- Will generally keep the promises they make,
- Feel free to contribute to the success of the group,
- Express their true feelings about important issues, and
- Have a high level of trust and respect for each other.

Respondents reported slightly lower perceptions of trust in workgroup members' willingness to collaborate on projects and tasks when it takes time away from other tasks and duties. Respondents also reported slightly lower perceptions of trust that workgroup members will openly acknowledge their own mistakes. In a collaborative environment, individual needs must often compete with the needs of the workgroup. In most cases, individuals will protect their personal interests unless they realize a greater benefit in doing otherwise. For these reasons, it is not surprising to find a reluctance to trust that workgroup members will subordinate their individual interests to the overall needs of the group. Nonetheless, it is important to note that high trust scores were not anticipated.

High levels of trust increase the likelihood that workgroups will experience and realize the full benefits of team collaboration. These high scores suggest that workgroup members are willing to trust the information they share because they trust the competency and integrity of each other.

These scores also suggest that despite the fact that Centers often ‘compete’ for the same program dollars and other resources, a high level of trust and respect still exists amongst team members. While spirited competition among Centers may exist, team members are willing to work collaboratively and cooperatively for the good of the whole team. When a program is operating across Center boundaries, workgroup members still want to succeed, for themselves and the program.

Motivated/Adequately Engaged

Question: I am confident that my fellow workgroup members:

Motivated/ Adequately-Engaged	
Category Description	**Frequency of Responses Over 3**
Are generally motivated to succeed	123/132 = 93%
Are involved in making appropriate decisions that affect their work	117/132 = 88%
Generally have a sense of belonging to the workgroup	110/132 = 83%
Consider the success of the workgroup as their success	108/132 = 82%
Understand the overall mission and strategy of the workgroup and how their work supports it	103/131 = 79%
Feel adequately-engaged in shaping the outcomes and deliverables of the workgroup	103132 = 78%
Clearly understand their role in, and responsibilities to, the workgroup's effort	96/132 = 73%
Understand how the outcomes and deliverables of the workgroup are tied to the business strategy and objectives of the organization	83/131 = 63%

Overall Mean Average Score: 4.00

Analysis

The results suggest that the respondents collectively believe that workgroup members are highly-motivated to succeed and take ownership for the overall success of the workgroup. Respondents are involved in making decisions that affect their work and feel a sense of ownership for their products and deliverables.

Respondents have a sense of belonging to the workgroup and this suggests that there is a high degree of comfort with the identity of the workgroup. It is not unlikely that this strong sense of belonging is a motivating factor in workgroup members' willingness to contribute their best effort and take ownership for the success of the group.

While respondents generally understand the overall mission and strategy of the workgroup, nearly 30% indicated that they were unclear on their individual role and responsibility to the workgroup's efforts. Moreover, nearly 40% indicated they were unclear on how outcomes and deliverables are tied to the overall business strategy and objectives of the organization.

Clarity of purpose is among the best predictor's of team success. Role clarity is important to collaboration activities because individuals will put forth their best effort when they understand what they are expected to do and why they were selected to do it (Santous, 1993) (Fullan, 2001). Individuals will have an intrinsic caring about their tasks and embrace the importance of their cause.

Individual workgroups participating in this study would do well to take the extra time to map the current roles of each workgroup member to the charter and then to the mission. This activity will help clarify how these individuals contribute to the mission and business of the overall organization they serve.

Open Communications

Question: My fellow workgroup members:

Open Communications	
Category Description	**Frequency of Responses Over 3**
Pass on new or useful information as appropriate	111/131 = 85%
Actively listen to the thoughts, feelings, and ideas of others	108/131 = 82%
Provide timely information about changes in current plans	96/132 = 73%
Have easy, rapid access to key information	83/131 = 63%

Overall Mean Average Score: 3.88

Analysis

Respondents report that they experience meaningful communication as workgroup members pass on useful information and actively listen to the thoughts, feelings, and ideas. Nearly 30% of the respondents indicate that they are not informed about changes to current plans in a timely manner. This is a common dilemma of distributed workgroups and, in most cases, can be addressed by providing more frequent meetings, either face-to-face or virtual. Another way to increase communication is the use of web-based news sources like eRoom, Livelink, and similar tools that have event-based email notification and places project information in a single location. This type of technology will only work if the project members are disciplined enough to create a record of the changes. Nonetheless, workgroups would benefit from identifying a method for communicating project information as well as a communication plan for ensuring the timely release of news to all parties that will be affected by the information.

Nearly 40% of the respondents indicate that they do not always have easy, rapid access to critical information. Workgroups are already intuitively aware of this dilemma as one of the primary benefits they hope to realize through this pilot is gaining more access to group information.

It is nearly impossible to isolate the root causes of this dilemma without further investigation. However, social structure, technology limitations, and/or organizational structure may contribute to the problem. In many cases, knowledge and information is closely held by tightly knit group or subgroups, making it nearly impossible to obtain unless members sanction its release. Cultural norms and organizational design can also impact accessibility to information - it may not be an acceptable practice to cross organizational lines to access information. This may be particularly true for workgroups that function in a hierarchical organization. Also, employees may not be adequately compensated to share information, since their performance evaluations are based on individual, not team performance.

While technology such as email and document management tools play a major role in storing and exchanging information, other tools may be needed to harvest the full potential of that information. Tools such as Expert Locator and Tacit Knowledgemail which identify likely experts based on topics within a common directory or based on email content.

A legitimate reason for inaccessibility to key information may be poor assimilation of knowledgeable members into the workgroup. These individuals are not sure what type of information to share and how to share what they know, especially if communication processes are loosely followed. Another reason might be the lack of knowledge or experience, which may make an individual deliberately avoid situations to share what they know in order to save face. Each of these reasons requires a different coaching process.

Workgroups may benefit from providing more opportunities for members to interact - whether via web-based newsletter or web pages, face-to-face meetings, or frequent teleconferences. Workgroups may also benefit from understanding which of its members are central or core and which are considered peripheral and why. Workgroup leaders may need to reconstitute these sub-groups especially if it would increase accessibility to information and knowledge.

Managing Knowledge

Question: Mark the answer that represents your level of agreement with the statement provided:

Managing Knowledge	
Category Description	**Frequency of Responses Over 3**
We frequently collaborate and share information within our workgroup	110/133 = 83%
Creative ideas are given support and recognition within our workgroup	107/133 = 80%
We produce quality deliverables	107/133 = 80%
Our workgroup knows how to apply what we learn toward improving what we do and how we do it	96/132 = 73%
We are able to solve complex problems effectively because we get the right people involved at the right time	95/133 = 71%
Our workgroup actively applies what we learn toward improving what we do and how do it	94/133 = 70%
We systematically document and distribute our knowledge	80/133 = 60%
We have mechanisms built into our workgroup processes to ensure that we learn from previous success and failures	73/133 = 55%

Overall Mean Average Score: 3.83

Analysis

The key purpose of collaborating is to produce something, whether it is solving a problem or creating something new. Over 80% of the respondents report that they frequently collaborate and share information within their workgroups. Respondents are adept at exploiting their collaborative synergy to solve complex problems and produce quality deliverables. This suggests that the majority of the participating workgroups value knowledge sharing and are accustomed to collaborating and that sharing knowledge is widely practiced and supported.

While the results indicate that the survey respondents are apparently effective at collaborating and managing their knowledge, the results also show that more than of the workgroups are limited in their ability to learn from previous experiences. Of those who do harness key learning from their previous experiences, only 70% actively apply this learning toward process improvement.

Furthermore, only 60% of the respondents indicated that they systematically document and distribute knowledge, which may be contributing to their inability to gain access to critical knowledge in a timely manner as indicated in the previous section. While these indications are not alarming, they do suggest that workgroups may benefit from revisiting their continuous improvement strategies and processes for gathering and distributing lessons learned in order to get the most out of the pilot.

Part III - Current Collaborative Environment: All Workgroups

Virtual Team Meetings

Question: Mark the answer that represents your level of agreement with the statement provided:

Virtual Team Meetings	
Category Description	**Frequency of Responses Over 3**
Attending virtual meetings is a simple process	95/134 = 71%
Scheduling virtual meetings is a simple process	63/131 = 48%
Communication in virtual meetings is adequate	61/133 = 46%
Sharing electronic information in virtual meetings is simple to do and effective	56/132 = 42%
Consensus is easily reached in virtual meetings	40/133 = 30%

Overall Mean Average Score: 3.35

Analysis

While over half of the respondents experience some degree of difficulty in scheduling virtual meetings, most respondents perceive their overall experience in attending virtual meetings as relatively simple. More than half of the respondents indicate that communicating and sharing electronic information in virtual meetings is less than adequate. Only 30% find group consensus easy to reach.

Since WebEx is a tool designed specifically to facilitate scheduling, communicating, and sharing documentation during virtual meetings, workgroups should see marked improvements as they become more adept at using this tool throughout the pilot.

Virtual Team Information Sharing

Question: Mark the answer that represents your level of agreement with the statement provided:

Virtual Team Information Sharing	
Category Description	**Frequency of Responses Over 3**
Team members are aware of their actions	87/133 = 65%
I am aware of my team's schedule of events	83/133 = 62%
Actions items are effectively documented and tracked	73/133 = 55%
Sharing team information is simple and effective	71/133 = 53%
I can always find the current version of team documents	56/133 = 42%
Team leaders can easily track progress on actions	53/133 = 40%

Overall Mean Average Score: 3.43

Analysis

Nearly 40% of the respondents are not aware of their workgroup's schedule of events and actions. Much worse, almost half of the respondents report that action items are not effectively documented and tracked. Respondents, in general, do not find information sharing simple. These findings are consistent with those in the Open Communication section of this report, which showed that nearly 40% of the respondents found access to information is difficult and complex. Clearly inaccessibility to basic and critical information is the most recurrent theme.

In light of these findings, workgroups would do well to embrace eRoom as a mechanism to reach out and communicate with each other. Workgroup facilitators must look for ways to encourage members to use eRoom as a central hub for communicating between face-to-face meetings and/or teleconferences. Workgroup members must gain enough experience beyond the training exercises in order to realize the full value and benefits of the tool.

Productivity

Question: How likely would you be to adopt for regular use software/services that:

Productivity	
Category Description	**Frequency of Responses Over 3**
Allows you to enhance your virtual meetings by keeping discussions focused and actively engaging members	63/73 = 86%
Allows your virtual team members to simultaneously mark up a drawing or document on your desktop	63/78 = 86%
Allows you to make team documents and records available to the workgroup at all times	54/67 = 80%
Allows you to reduce or eliminate the need to travel to other destinations to make presentations	59/83 = 71%

****Responses indicate level of agreement**

Analysis

Most of the respondents indicated that they would adopt collaborative software or services that enhance the richness of virtual meetings. Not only would the respondents appreciate software that would allow them to simultaneously modify or edit a document, but also archive that document and make it accessible to others at all times. These requirements overshadow the respondents need to adopt collaborative tools that would reduce the need for travel.

Again, eRoom and WebEx are excellent tools that will allow pilot participants to enhance meeting activities and the flow of work products.

Collaborative Tool Use

Nearly 90% (119/135) of those that responded to this set of questions indicated that they were actively seeking new collaborative tools to improve productivity. The collaborative tools that workgroups reported using are:

eRoom	NetMeeting	Livelink	Docushare	WebEx	Telecons	ViTS	PBMA and other Intranet Websites	*Other
2	20	13	3	4	7	8	7	19

*Other tools include:
Government Off The Shelf (GOTS) product VSDE (1)
Meeting Maker (1)
Windchill (3)
CUCMe (3)
I-TIPS (1)
Email (5)
Smartboads (1)
Productview (1)
Science Organizer (1)
Postdoc (1)
PDS (1)

Part IV - Summary

Respondents care about collaboration and are willing to work on improving their collaborative capabilities. Respondents are skilled in the four core collaborative competencies: trust, open communications, knowledge management, and motivation. Respondents have a high degree of trust in each other as competent professionals and their ability to perform in the best interest of the group. Respondents are motivated to do a good job and take pride in the outcomes and deliverables of the workgroup.

While workgroup members practice and enjoy active listening and information exchange, many have difficulty accessing basic and critical project information. Like most teams and groups, survey respondents do not have continuous improvement processes.

Respondents realize that better access to project information would enhance their performance and collaborative capabilities as a team. In fact, the most recurrent theme in the analysis of responses was inaccessibility to project information. Fortunately, the respondents are motivated to explore new collaborative technologies that enhance virtual meetings by keeping members actively engaged. For these reasons, participants will benefit from the tools being piloted in this study.

Appendix B
Post-Pilot Survey

Overall Pilot Questions

1) Which Team Collaboration tool(s) did you attempt to use during this Pilot?

	Number of Responses	*% of Total*
eRoom and WebEx	27	21%
WebEx only	99	79%
Total	126	100%

2) Which platform(s) did you use for the Team Collaboration tool(s)?

	Number of Responses	*% of Total*
Macintosh	21	17%
PC/Windows	97	80%
Linux	3	2%
Unix/HP	1	1%

(Note: Some responses had more than one system type indicated; some responses did not make a selection).

eRoom Related Questions

3) eRoom has enabled my team to get work done with less reliance on travel.

Negative	28%
Neutral	32%
Positive	**40%**

4) eRoom has enabled collaboration among team members distributed across NASA Centers and external partners.

Negative	4%
Neutral	32%
Positive	**64%**

5) eRoom was easy to learn and use.

Negative	12%
Neutral	38%
Positive	**50%**

6) Considering the application of eRoom, check all that apply:

Sharing team information is simple and effective.	88%
I am aware of my team's schedule of events.	38%
Team members are aware of their action items.	25%

Action times are effectively documented and tracked.	19%
Team leaders can easily track progress on actions.	19%

7) Considering the capabilities you consider essential for a NASA Virtual Space service - please rate the importance of the following capabilities on a 1-5 scale where (1) is 'Not Important,' ... (5) is 'Very Important.'

Rank	
1	Multi Platform Support
2	Action Tracking
3	Team Calendar
4	Email Alerts/Notifications
5	Coordination of document changes (Check In/Out)
6	Threaded Discussions
7	Databases
8	Drag and Drop from Windows Desktop
9	Polling/Voting

8) If your team did not successfully adopt eRoom - please check your top 3, or so, primary reasons why.

Rank	
N/A	We did successfully adopt eRoom! (4 responses)
1	Unclear (and perhaps undocumented) team organization and/or processes
2	Did not want to take the risk of putting all the energy into shifting to this tool - and then not have it be adopted as a corporate solution – and have to transition all our data out
3	Lack of commitment by the team and team leader to employ a new tool
4 tie	Unidentified 'pain points' that team is attempting to address with collaborative tools
4 tie	Lack of commitment by the team and team leader to alter work habits
5 tie	Unclear (or changing) team goals and deliverables
5 tie	Lack of tool training
5 tie	Tool did not do what I needed it to do - it did not deliver on needed functionality
6 tie	Tool too difficult
6 tie	Already have this functionality - so don't want to switch from the tool we use now
7 tie	Lack of collaborative tool facilitation assistance from outside the team
7 tie	Lack of collaborative tool adoption assistance (internal resources) within the team
7 tie	Duration of the pilot not long enough to get started
8	Lack of executive sponsorship (support)

9) Overall, our team successfully used eRoom.

Negative	30%
Neutral	**43%**
Positive	26%

WebEx Meeting Center Related Questions

10) WebEx Meeting Center has enabled my team to get work done with less reliance on travel.

Negative	9%
Neutral	18%
Positive	**73%**

11) WebEx Meeting Center has enabled collaboration among team members distributed across NASA Centers and external partners.

Negative	5%
Neutral	13%
Positive	**82%**

12) WebEx Meeting Center was easy to learn and use.

Negative	4%
Neutral	17%
Positive	**79%**

13) Considering WebEx Meeting Center to conduct virtual meetings, rate all that apply:

Rank	
1	Attending virtual meetings is a simple process.
2	Attendees are able to participate effectively in virtual meetings.
3	Sharing electronic information in virtual meetings is simple to do and effective.
4	Scheduling virtual meetings is a simple process.
5	Consensus is easily reached in virtual meetings.

14) Considering the capabilities you consider essential for a NASA Virtual Meeting service - please rate the importance of the following capabilities on a 1-5 scale where (1) is 'Not Important,' ... (5) is 'Very Important.'

Rank	
1	Presentation Sharing
2	Simple attendance by external partners
3	Application Sharing
4	Multi platform support
5	Integration with telephone based voice conferencing
6	Desktop Sharing
7	Meeting recording and playback
8 tie	Polling
8 tie	Video
9	VoIP

15) Overall, our team successfully used WebEx Meeting Center.

Negative	7%
Neutral	14%
Positive	**79%**

General Pilot Questions

16) Our team has a clear mission, schedule, and deliverables.

Negative	10%
Neutral	16%
Positive	**74%**

17) My team embraced the Team Collaboration Tool(s) offered by the pilot.

Negative	8%
Neutral	24%
Positive	**68%**

18) Considering the ingredients you consider essential to successful team adoption of collaboration tools - please rate the importance of the following ingredients on a 1-5 scale where (1) is 'Not Important,' ... (5) is 'Very Important.'

Rank	
1	Easy to use tools
2	Commitment by the team and team leader to alter work habits and employ new tools
3	Corporate commitment to tool support and availability
4	Executive Support
5	Collaborative tool adoption assistance from inside the team
6	Clear team goals and deliverables
7	Clear (and perhaps documented) team processes
8	Collaborative tool facilitation assistance from outside the team
9	Clear team vision/mission statement
10	Agreed to “pain points” (most pressing problems) that team is attempting to address with collaborative tools
11	Critical mass of NASA people already using tools

19) Please list any challenges that made adoption of the pilot’s collaborative tools difficult, check all that apply:

Rank	
1	N/A
2	My team members were not able to commit enough time to learn features of the application
3	My team relied on, and only required, traditional/basic forms of communication - phone, email, fax
4	The leadership of my team changed
5	My team was reorganized
6	Our project lost funding
7	My team members do not see the value of using collaborative tools

20) Please rate the Support that you received during the Team Collaboration pilot.

Negative	2%
Neutral	30%
Positive	**76%**

21) A standard set of tools for team spaces and virtual team meetings (e.g., eRoom and WebEx) would benefit NASA.

Negative	2%
Neutral	12%
Positive	**86%**

22) My team/project/program/Center/enterprise would likely be willing to pay for these types of capabilities.

Yes	48%
No	52%

Appendix C
Acronyms

ASP	application service provider
BRT	Business and Restricted Technology Information
CIO	Chief Information Officer
EAR	Export Administration Regulations
eGOV	electronic Government (initiative)
FAQ	frequently asked questions
GOTS	Government off-the-shelf (software)
IT	information technology
ITS	Information Technology Security
ITAR	International Traffic in Arms
NPG	NASA Procedures and Guidelines
POC	point of contact
PSRP	Payload Safety Review Panel
SSC	support service contractor
SSL	secure sockets layer
TC	team coordinator
TF	team facilitator
TL	team leader

REPORT DOCUMENTATION PAGE

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13. ABSTRACT ***(Maximum 200 words)***

An Agency team collaboration pilot was conducted from July 2002 until June 2003 and then extended for an additional year. The objective of the pilot was to assess the value of collaboration tools and adoption processes as applied to NASA teams. In an effort to share knowledge and experiences, the lessons that have been learned thus far are documented in this report. Overall, the pilot has been successful. An entire system has been piloted—tools, adoption, and support. The pilot consisted of two collaboration tools, a team space and a virtual team meeting capability. Of the two tools that were evaluated, the team meeting tool has been more widely accepted. Though the team space tool has been met with a lesser degree of acceptance, the need for such a tool in the NASA environment has been evidenced. Both adoption techniques and support were carefully developed and implemented in a way that has been well received by the pilot participant community.

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