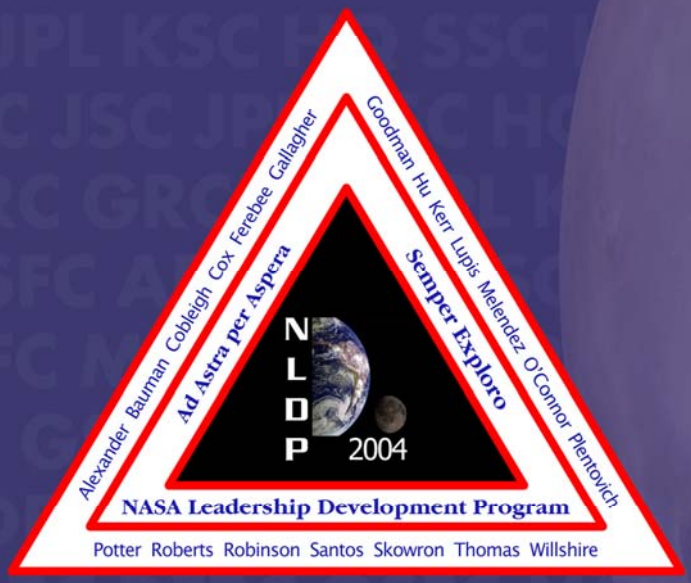
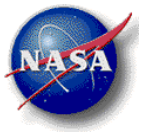
Enhancing Mission Success in the 21st Century Through Collaborations





Enhancing Mission Success in the 21st Century Through Collaborations

Developed and written by the NASA Leadership Development Program Class of 2003 – 2004

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. . . to achieve long-lasting results . . .

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Executive Overview

NASA's first Leadership Development Program (LDP) class of 2003-2004 was asked to define and complete a project that would have a significant impact on the agency. The LDP class vision, "Achieving extraordinary mission success in the 21st century through powerful collaborations," was realized through the project, implementation strategies, and outcomes.

The project focused on the achievement of strategic results for NASA. These results included 1) effective teaming *across and within*: Headquarters Directorates, Centers, disciplines, and at all levels; 2) effective collaboration with external partners; 3) effective leveraging of talent and expertise; 4) ease of collaboration through availability of the tools and systems; 5) availability of resources to stimulate and support effective collaborations; 6) assuring a culture that encourages open, honest communication and information sharing; and 7) assuring trust and a spirit of unity in the way we work.

The process we used to achieve project results during our year together was comprised of three specific goals. These goals were to 1) catalog collaboration principles and best practices, based on internal and external benchmarking of collaboration successes and failures; 2) infuse collaboration best practices into new and existing tools and programs, including embedding collaboration principles and best practices into program and project management; and 3) make recommendations to align organizational incentives and structures to support effective collaboration with at least one "fleshed-out" change initiative.

The initial phase of the project was accomplished with three assessment instruments: a survey, a questionnaire, and an executive survey. Detailed analysis of the data from the surveys and questionnaires yielded 10 major findings that addressed NASA Strengths, Personal Relationships, Interpersonal Interactions, Enablers, and Inhibitors to Collaborations, Travel Funds, Metrics, Recognition and Performance Plans. *Best Practices* for successful collaborations also emerged as a result of the data analysis. These best practices have been grouped into 3 categories of investment – those that address the Human Element, those that address Management Involvement, and those that address Project Framework. Our data showed that collaborations were perceived to be more successful as more *Best Practices* are put in place and that perceived success is maximized by excelling in as many areas of *Best Practice* as possible.

Specific recommendations have been made that are the direct result of the project's findings. These recommendations address technology enhancements, travel considerations, and institutionalizing collaborations through the establishment of specific criteria to assess the health of collaborations, inclusion of teamwork in performance assessments, establishment of targeted awards and incentives for collaboration, and the inclusion of the findings and best practices into program and project management.

We have implemented efforts to widely communicate and infuse our vision for enhancing mission success at NASA through powerful collaborations.

1. Report Availability - The full report will be published on the NASA Leadership Development Program Web site (http://ldp.nasa.gov) with a link from the NASA Academy of Program and Project Leadership (http://appl.nasa.gov).

2. Implementation - Our findings and recommendations are already being implemented through our interactions with One NASA action teams (http://www.onenasa.nasa.gov). In addition, LDP class members are briefing the findings and recommendations to Agency-wide senior leadership at Headquarters and at the centers.
3. Human Resources - We provided specific collaboration language for inclusion in the NASA performance appraisal plan and the NASA peer awards to recognize teaming across organizational boundaries and centers.
4. Business Tools and Practices - We produced collaboration feasibility and planning guidelines and annotated best practices to improve program and project management and foster effective collaboration across the Agency.
5. Training for Collaboration - These collaboration best practices and principals are also being considered by APPL for incorporation into existing performance enhancement, knowledge sharing, and training programs.
6. Collaboration Curriculum - A curriculum for collaboration is also being developed jointly with NASA Engineering Training (NET).

We specifically wanted to achieve long-lasting results. We believe that we have been successful as evidenced by the communication and infusion of our results and recommendations into on-going Agency initiatives.

Background

NASA's first Leadership Development Program (LDP) class of 2003-2004 was asked to define and complete a project that would have a significant impact on the Agency. The project was a new component in the LDP program, inaugurated this year and intended to provide an opportunity for the class to gain experience as a collaborative cross-agency team. The scope of the project was intended to represent about ten percent of the class time during the course of the year. Starting in the midst of the Integrated Financial Management System rollout, One NASA implementation, and the release of the Columbia Accident Investigation Board report, the class had a number of potential topics from which to choose. Through much discussion, one element common to several of the proposed projects became a unifying factor for the class. That element was collaboration, more specifically intercenter collaboration. The appeal for studying collaboration was based upon its increasing importance in support of the NASA mission and its connection to increasing cooperation and breaking down cultural barriers between collaborating parties, including NASA centers.

Introduction

Vision – Our Picture of the Future

The NASA LDP class of 2003-2004 includes 20 high-potential current and future Agency leaders selected from 9 centers (*Appendix 1*). Primary and collateral assignments included rotational assignments to NASA Headquarters, NASA field centers, industry, academia, and Congress. The LDP class vision, "Achieving extraordinary mission success in the 21st century through powerful collaborations," was realized through a project conceived, developed, and implemented by the class during the year-long development program. We specifically wanted to achieve long-lasting results.

Strategic Targets

The project focused on the achievement of strategic results for NASA. These results included 1) effective teaming *across and within* disciplines, Headquarters Directorates, Centers, and at all levels; 2) effective collaboration with external partners; 3) effective leveraging of the talent and expertise; 4) ease of collaboration through availability of the tools and systems; 5) availability of resources to stimulate and support effective collaborations; 6) a culture that encourages open, honest communication and information sharing; and 7) trust and a spirit of unity in the way we work. Through this project, the class was dedicated to make an even greater contribution to the Agency during its developmental year.

Collaboration Project Process

Project Goals

The process we used to achieve results during our year together was comprised of three specific goals. These goals were to 1) catalog collaboration principles and best practices, based on internal and external benchmarking of collaboration successes and failures; 2) infuse collaboration best practices into new and existing tools and programs, including embedding collaboration principles and best practices into program and project management; and 3) make recommendations to align organizational incentives and structures to support effective collaboration with at least one "fleshed-out" change initiative. Systemic assessments of "leverage points" were included to accomplish Goals 2 and 3. In addition, the class benchmarked collaborations with four external entities (*Appendix 2*).

Methodology

The class worked with Jordan Consulting Services to create 3 assessment instruments: a survey, a questionnaire, and an executive survey. The questions posed as part of the project and executive surveys are provided in *Appendix 3a, b, and c*. Class participants were trained to conduct the interview survey to produce unbiased survey results. The 2-page collaboration questionnaire (*Appendix 3a)* asked respondents to indicate their level of agreement, for 36 statements, on a scale of 1 to 7. The collaboration survey (*Appendix 3b)* contained a series of 20 open-ended questions asked of respondents. An upper management, middle management, and front-line worker from each side of the collaboration were asked to participate in the survey and complete a questionnaire.

The findings presented below are the result of 96 people representing 16 programs/projects participating in the survey and questionnaire process. Additional interviews (*Appendix 3c)* were held with NASA senior executives to gain a high level view of collaboration across NASA. The synthesis of the executive interviews is provided following project recommendations.

Findings

Detailed analysis of the data from the project surveys and questionnaires yielded 10 major findings, with multiple aspects to these findings. These are provided below.

Finding #1 – NASA Strengths

NASA has a number of strengths that lend themselves to successful collaborative efforts.

- NASA's workforce is comprised of motivated people who strive for excellence, have a wealth of knowledge, and are willing to do what it takes to "get the job done and get it done right."
- The overarching goal of mission success provides a common vision for collaborations.

Finding #2 –Personal Relationships

Development of personal relationships through face-to-face interactions is the single most important factor for enhancing collaborations. There is no substitute for personal interaction in the ability to form relationships, establish trust, resolve issues, and collaborate.

Finding #3 – Interpersonal Interactions

Intercenter conflict creates an atmosphere fundamentally opposed to all the precepts of collaboration. Interpersonal interaction, whether through face-to-face meetings, team-building retreats, detail assignments, or co-location, substantially improves the ability to overcome this obstacle.

Finding #4 – Commitment and Trust

Perceived Success – Collaborations with a high level of trust between team members and a commitment to the partnership and its outcomes had a high success rating.

Lack of commitment – Lack of commitment to collaboration is the result of competition, turf wars, and a lack of trust between organizations.

Finding #5 – Enablers to Collaborations

Role of Senior Management – Senior management support is critical to the success of collaborations.

Clear Definition of Roles and Responsibilities – Clear definition of roles and responsibilities has a strong impact on the success of a collaborative effort. A lack of clarity in roles and responsibilities most often results in wasted resources, time, and energy; frustration; and lowered morale.

Level of Agreement – Some form of partnership agreement is critical to the success of a collaborative effort. Collaborations with a high level of agreement on the collaboration goals also had a high-perceived success rating. Differing agendas among the participants led to collaboration problems.

Technologies:

Videoconferencing – Accessible, easy-to-use, on-demand videoconferencing was identified most often as the technology that could enhance collaboration.

Desktop conferencing capability – Easy-to-use desktop conferencing capability that allows real-time review of documents, drawings, etc. from remote locations was frequently mentioned as improving the effectiveness and efficiency of collaboration information sharing. (WebEx was the most frequently mentioned example.)

Web-based information – User-friendly, Web-based information sharing was frequently identified as a key tool to improve efficiency and communication on collaborations.

Finding #6 – Inhibitors to Collaborations

Poor Technology – Poorly designed or difficult-to-use technology hinders collaborations.

Personality Issues

- Arrogance and feeling of superiority, on a center or individual level, create major roadblocks in the collaborative process
- Contractors frequently mentioned being treated as inferiors
- Management of personalities lacked consistency
- Difficult personalities can be highly disruptive to a collaborative effort

Process and procedure – Differences in process and procedure between collaboration parties were a major source of frustration, confusion, and conflict. This led to mistrust and reluctance to communicate effectively. Even the use of a particular process without the understanding or buy-in from all parties resulted in conflict.

Level of Risk – Differences in the level of acceptable risk and/or risk mitigations processes led to conflict on some collaborations.

Finding #7 – Travel Funds

Parties identified insufficient travel funds as limiting face-to-face interactions between collaboration participants.

Finding #8 – Metrics

Schedule and budget were generally the only project metrics being monitored. Attention should be paid to defining and measuring additional, meaningful metrics.

Finding #9 – Recognition

Recognition of collaborations was not consistent, and not always timely. Peer recognition was seen as the most meaningful form of recognition by many of the respondents.

Finding #10 – Performance Plans

Only a third of the performance plans of the project leadership included "teamwork" as a performance element.

Collaboration Best Practices

Best Practices for successful collaborations emerged as a result of the data analysis. These best practices have been grouped into 3 categories of investment – those that address the Human Element, those that address Management Involvement, and those that address Project Framework. Our data showed that collaborations were perceived to be more successful as more *Best Practices* are put in place. While it was clear that a project can overcome deficiencies in some areas by excelling in other areas, it was overwhelmingly supported by the data that perceived success is maximized by excelling in as many areas of *Best Practice* as possible.

Best Practices: Human Element

- Efficient and effective collaborations are the product of relationships. Managers should recognize this and such relationships should be cultivated.
- Face-to-face interactions between the collaboration participants should be highly encouraged, especially as the collaboration forms. Such interactions facilitate the formation of relationships, help to establish trust, and allow resolution of issues.
- Interpersonal interaction substantially improves the ability to overcome conflicts. Such interactions include face-to-face meetings, team-building retreats, detail assignments, or co-location.

Best Practices: Management Involvement

- Proper management of the workforce is essential for effective collaborations. Management should encourage and model respect and appreciation for each other's capabilities and knowledge.
- Health of collaborations should be measured, continually assessed, and discussed at management reviews. Corrective actions should be taken, where necessary, to ensure the health of the collaborative efforts.
- Collaborative efforts should be recognized and rewarded throughout the project lifecycle. Recognition of team members should be timely and peer-driven.
- Leaders should fully utilize the available award systems.
- Senior managers should continue their traditional support of collaborations through periodic reviews, funding support, and avoidance of micromanagement.
- Senior managers should play an active role in the development of suitable collaboration agreements, setting of project expectations, and management of intercenter difficulties.
- Personal visits by senior management to the project staff and facilities recognizes and encourages the staff and increases management's understanding of the project's progress.
- Managers should foster sufficient team relationships to ensure that routine personnel turnover does not cripple the collaboration.
- Managers should consider personality compatibility when forming teams.
- Managers should assure that difficult personalities are not in positions that will disrupt or damage the relationships within the collaboration.
- Project leadership involved in collaborations with personnel from other centers, academia, contractors, or other agencies should have "teamwork" as an element of their performance plans.
- Project managers should have a trial and evaluation period for any new communication technology introduced to assist a collaborative effort.

Best Practices: Project Framework

- The processes and procedures used in the collaboration should be agreed upon, understood, and documented as early as possible. One approach is to blend processes, not simply having one group's processes dominate. Ultimately, the processes must have buy-in from the collaboration parties.
- Problems over process can be resolved by increased personal interaction, discussion of differing processes, and informed agreement on what processes are to be used in the collaboration.
- Fixed, organization-specific processes should be documented and made available to all collaboration parties.
- Partnership agreements must be established early and have 1) a shared vision with goals and objectives, 2) clearly defined roles and responsibilities, 3) buy-in from the collaboration participants, and 4) flexibility to deal with changes over time.

- A well-designed partnership agreement will have defined approaches for decision making and conflict resolution between the parties.
- The level of acceptable risk and the process for risk mitigation should be collaboratively established and documented among all the parties to the collaboration. If that is not possible, the level of acceptable risk and the process for risk mitigation must be clearly documented and communicated to all the collaboration parties.
- Even if funds are not to be transferred between parties, funding issues need to be considered, recognized, and appropriately addressed in the partnership agreement.
- Points of contact in each group in the collaboration should be established to manage and resolve issues.
- Successful collaborations require sufficient travel to support teaming. Planning for travel should include adequate funds for project formulation, teaming, and execution.

Appendix 4 depicts our recommended best practices with respect to systemic conditions, project management responsibilities, and the 3 keys to successful collaborations described above.

Systemic Assessment of "Leverage Points"

Systemic assessments of "leverage points" were made 1) with respect to tools that facilitate effective collaboration and 2) with respect to incentives and structures to support effective collaboration. Systemic assessments of leverage points were made using the approach of systems mapping. The systems maps, depicting mission success through effective collaborations, are based on the 3 Best Practices elements of management involvement, project framework and the human element. These assessments are depicted in the system maps shown in *Appendix 5* and correlate well with the findings of the study.

Recommendations

The specific recommendations that follow are the direct result of the project's findings.

Technology Enhancements

Video conferencing – NASA should increase the availability of videoconferencing equipment for work groups. The systems should have telephone-like ease of use and not require prior scheduling or dedicated operators.

Desktop conferencing – NASA should assure that all computers and networks are configured to use real-time desktop conferencing software (one example is WebEx) and that it is available to all users.

Web-based tools – Several web-based collaboration tools already exist. At least one is offered free of charge to any NASA work group. The existence of this service is not widely known. NASA should widely publicize its Web-based collaboration tools and assure that the evolving requirements of the users are continually met.

Travel

Increase Travel Budget – NASA should allow for resizing of travel budgets to support the increasing importance of collaborations to the agency, without sacrificing technical content..

Travel authorization – Should be delegated to lowest management level.

Mobility - The One NASA philosophy can be enhanced by providing greater opportunity for Program and Project Managers to spend time at another Center in the conduct of a project during any project phase, from formulation through operations. Extended details at another Center will reinforce trust for future collaborations.

Institutionalize Collaborations

Establish Criteria – Criteria for measuring the health of collaborations should be established. The Best Practices should be used as one of the measurement elements.

Establish Awards System – To illustrate their value to NASA, an agency-wide award system for collaborations should be established. LDP is participating in the definition of a new award (*Appendix 6*).

Recognition Incentives – The agency should explore flexibilities in use of program funds to spend a nominal amount each year on recognition incentives. Examples are the purchase of items such as pins for individual recognition or lunches for group recognition.

Performance Assessment – The NASA performance assessment system should include teamwork as an element for all job categories involved in collaborations. LDP is participating in the definition of a new performance/ teamwork element (*Appendix 7*).

Program and Project Management – The collaboration best practices, along with supporting information, should be integrated into NASA's Program and Project Management Processes and Requirements (NPR 7120.5). Proposed language has been submitted to the Office of the Chief Engineer (*Appendix 8).*

The collaboration findings and best practices, along with supporting information, should be integrated into NASA's Project Management training programs. Training modules are being developed and will be published on the NASA Leadership Development Program Web site (http://ldp.nasa.gov). A summary is provided in *Appendix 9.*

Executive Survey Synthesis

NASA senior executives were interviewed to gain a high-level "view from the balcony" perspective of collaboration across the agency. Senior agency leaders play a key role in whether collaboration will be successful, beginning with the very earliest stage of collaboration formulation when partners are selected and resources are allocated. We interviewed 10 senior leaders at Headquarters and at the centers including Enterprise Associate Administrators, Enterprise Deputy Associate Administrators, Center Directors, Deputy Center Directors, and other senior leaders. We posed 7 broad questions (See Appendix 3c) with interviews taking from 30 minutes to 1 hour. These interviews were used to help build the systemic maps and validate the findings from the project interviews. The executive interviews were synthesized and the insights grouped into the following 3 thematic categories:

- "Alignment of Needs: Recipes for Success or Failure"
- "People Make the Difference"
- "Collaboration Benefits, Incentives, and Disincentives"

These themes provide valuable insight into the motivation for collaboration within NASA, and identify key factors that should be examined when considering the need for collaboration, whether between centers, enterprises, or external partners.

"Alignment of Needs: Recipes for Success or Failure"

1. Collaborations succeed when there is a clear need for the collaboration.

   a. Limited overlap in capability is a key factor.
   b. Collaboration on capability when one organization does not have all the talent or capability needed to do the job or to achieve joint goals and objectives; identification of the most effective use of resources.
   c. Collaboration works well when another organization can offer its best strength to you and you recognize where you do not have strength.
   d. Sometimes the stars have to be aligned, the timing right for collaboration to succeed.
   e. Success is creating opportunities for people to work together when resources are limited.
   f. Collaboration on cost when we can't afford to do it ourselves or we save money (do it cheaper) working together.
   g. We believe in collaboration when the budget is constrained and projects are more complex; it is important to communicate this to others.
   h. Sufficient resources needed to pull people together and identify partners.
   i. The Centers are still learning what skills each has to offer one another.
   j. We are learning from ourselves and acknowledging the talent in the Agency.

2. Collaborations have the potential to fail when there is no evident need for it.

   a. If you do not have autonomy, if people are fearful, then you will not have collaboration.
   b. If not careful you can use incentives to make it look like you are collaborating, but collaboration can be overused.
   c. There needs to be a balance between a relationship that retains some of the competition (which is healthy because it keeps the centers sharp), yet avoids widespread duplication of efforts and resources.

3. Improve collaboration by looking at what works best and remove the barriers.

   a. History shows people look after their self-interest; we need to provide collaborative opportunities; we can improve collaborations if programs are structured so that collaboration is a requirement.
   b. Focus on outcomes; if you focus only on the collaboration, then you never make decisions.
   c. The One NASA initiative and breaking down stovepipes will improve collaboration.

"People Make the Difference"

1. Collaboration works because of the people – structure the organization if necessary to allow people to work together.

   a. Select people who are successful and collaborative; do not reward people who must control and people who just maintain the status quo; people need to think differently and stop being so turf conscious.
   b. Provide (people) meaningful assignments, growth opportunities, autonomy, and a scorecard.
   c. Changeover in personnel hurts the management of programs.
   d. You can teach tools to people but they do not need to be taught to collaborate, they do it naturally. Kids have no problem collaborating, being honest and natural, but something happens that trains them not to be that way during their time in an organization.

2. Good communication between partners is critical for building confidence and mutual respect.

   a. Face to face communication is absolutely vital.
   b. Off-site quarterly meetings for NASA senior leadership has changed the environment; more positive and therefore more conducive to collaboration.
   c. The mobility requirement will enhance collaborations; it brings people in and rotates people to new locations, increasing the potential for successful communications.
   d. As a senior manager it is important to understand other cultures and to spend time operating within other cultures.

3. Collaboration requires extra effort.

   a. A steering group is good to help manage conflict.
   b. Spend the time to define roles and responsibilities up-front, very important when working between centers and internationally.

c. The more you make the collaboration win-win, the more each participant is willing to contribute. All partners must believe they will win/gain something as a result of the collaboration; both sides contribute and receive benefits.
d. Over time collaboration will work its way down the management chain.
e. Collaboration is difficult because each participant loses control, becomes dependent on one another, and is risky because there are unknowns.
f. Managers with need for control inhibit collaboration.
g. Collaboration complicates the lines of authority.
h. In a partnership your own self-interest is no longer #1 priority.

"Collaboration Benefits, Incentives, and Disincentives"

1. We should work together because the whole is greater than the sum of the parts; collaboration conserves resources.

   a. Collaboration is fun, efficient, and makes everyone better. We get more done this way.
   b. Collaboration helps us produce the best product for our stakeholders.
   c. We have to collaborate internationally to do our job.
   d. Collaboration opens up many possibilities for success.
   e. Collaboration increases comfort level and trust.
   f. The more you collaborate, the more products you get.

2. Incentive is that you can do things you could not do otherwise; draws out the best talent, facilities, and capabilities to contribute to success.

   a. Incentive is getting program approved versus not getting it approved.
   b. The performance plan provides an incentive; all Enterprise AA and Center Director performance evaluations and bonuses require evidence of collaborations and contributions to the President's Vision and One NASA.
   c. Financial incentives go both ways for and against collaboration.
   d. We are incentivized to share risk.
   e. Disincentive is that it is hard to partner with other organizations in another location; it takes time to collaborate; need to balance risks and gains.
   f. G&A rates can be a disincentive.
   g. If you are not able to collaborate, you are dead!

Summary – Opportunities for Communication and Infusion of Project Findings

Our vision for enhancing mission success at NASA through powerful collaborations will be more widely communicated and infused into on-going initiatives throughout the Agency. The full report will be published on the NASA Leadership Development Program Web site (http://ldp.nasa.gov) with a link from the NASA Academy of Program and Project Leadership (http://appl.nasa.gov). Our findings and recommendations are already being implemented through our interactions with One NASA action teams (http://www.onenasa.nasa.gov). For Human Resources we provided specific collaboration language for inclusion in the NASA performance appraisal plan and the NASA peer awards to recognize teaming across organizational boundaries and centers. For Business Tools and Practices we produced collaboration feasibility and planning guidelines and annotated best practices to improve program and project management and foster effective collaboration across the Agency. These collaboration best practices and principals are also being considered by APPL for incorporation into existing performance enhancement, knowledge sharing, and training programs. A curriculum for collaboration is also being developed jointly with NASA Engineering Training (NET). We intend to keep the spirit of One NASA and the grass roots collaboration movement alive after graduation in July 2004 through the creation of a LDP ad hoc working group on collaboration, where members drawn from the current class and the 2004-2005 class can provide on-going advice and support to APPL and one or more of the One NASA implementation teams.

On-going actions are described below; actions sponsors, and completion dates are summarized in Table 1.

Actions

- NASA Collaboration Handbook – Develop an implementation plan jointly with the Chief Engineers Office to develop, rollout, and evaluate a NASA Collaboration Handbook that provides guidance to NASA Program and Project managers for development and execution of effective collaborations.
- ASK Magazine – Develop an ASK magazine article that describes the collaborative aspects of our own class collaboration on the LDP project.
- One NASA Competition and Collaboration Study Team – The LDP class serves in an advisory capacity to the One NASA Team based on our collaboration project findings.
- NASA Peer and Group Achievement Awards – The LDP class serves in an advisory capacity to the Headquarters team that is developing criteria for a new NASA Peer Award that recognizes collaboration across centers.
- NASA Performance Plans and Appraisals – The LDP class serves in an advisory capacity to the Headquarters team that is developing a new performance plan and rating system, which includes teamwork and collaboration performance elements.
- Ad-Hoc Working Group on Collaboration – The LDP class will form an ad-hoc working group on collaboration to serve as an on-going resource for the Agency.
- Project Assessments – Develop metrics and conduct assessments with project managers to evaluate the health of on-going intracenter NASA project collaborations (e.g., Kepler, James Webb Space Telescope, ISS, Shuttle, NASA-MIR). The assessment criteria will be based on application of the LDP collaboration study findings, recommendations, survey instruments, and handbook to augment project health assessment criteria.
- Collaboration Training Module – Identify the basic collaboration skill elements and coordinate with course content developers/instructors to integrate these into existing and new classes that would be taught at Wallops or at the centers.
- NASA Leadership Dialogue on Collaboration – Inaugural APPL Leadership Dialogue and panel forum on collaboration to be broadcast on NASA TV, moderated by APPL Director Dr. Ed Hoffman, and with representatives from the LDP class, the APM 60 class, and One NASA. Following a synopsis of the LDP Collaboration Project, a moderator will offer questions to the panel for discussion.
- Center for Program/Project Management Research – APPL's 2004 initiative with the Universities Space Research Association (USRA) engages the university research community in addressing significant problems in Project Management (http://cpmr.usra.edu). A handful of the 54 proposals submitted in response to the initial NRA for project management research address collaboration and teamwork. The competitive proposal selection with 10 awards was completed in July. APPL asked that the LDP class serve in an advisory capacity and make the project surveys and questionnaires available for further study.
- Center Briefings – Each Center Director and their senior staff will receive an executive level briefing on the LDP Project. LDP class members from the host center and 1-2 additional classmates from the other centers will jointly lead the briefings. If the Center Director chooses, these briefings will be followed by a town hall for all employees at the respective center and posting of the LDP Final Report on the center's intranet.

Table 1 - Summary of LDP 2003-2004 Collaboration Initiatives

Action	Sponsor	Scheduled Completion
NASA Collaboration Handbook	Chief Engineer	On-going
ASK Magazine	APPL	July
Competition Study	One NASA	On-going
NASA Peer Award	HR/One NASA	July
NASA Performance Plan	HR	July
Ad-Hoc Collaboration Working Group	LDP	On-going
Project Assessments	LDP 2005	On-going
Collaboration Training Module	APPL/NET	July
NASA Leadership Dialogue	APPL	August
Center for Program/Project Management	APPL	On-going
Center Briefings	Center Directors	September

Appendices

Appendix 1 – Members of the 2003 – 2004 LDP

To ensure mission success into the future, NASA needs a diverse cadre of leaders who are adaptable, who inspire, motivate, and guide others to produce tangible results, who mentor and challenge the workforce, and who demonstrate high standards of honesty, integrity, trust, openness, and respect.

As part of NASA's integrated Strategic Human Capital Plan, the LDP is a key succession-planning tool aimed at ensuring that the Agency has the right kind and number of diverse leaders to achieve mission success.

Specifically, the NASA Leadership Development Program (LDP) is intended to:

- Prepare leaders to take on higher and broader roles and responsibilities in the near future;
- Provide opportunities to obtain experiential understanding of Agency-wide, national and global issues and their impact on NASA's mission and U.S. goals;
- Enhance understanding, effectiveness, and mobility across programs, projects and centers;
- Provide opportunities to participate and contribute while learning; and
- Create a culture of collaborative leaders who understand and focus on achieving valuable results that matter to the American people and to the world.

The LDP is a program that provides training and experience focused on increasing leadership effectiveness of the individual participant. It is aligned with the NASA Senior Executive Service (SES) selection criteria, but is not an "SES Development Program," and is not a pre-requisite for entry into the SES.

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Appendix 2 – External Benchmarking

The class benchmarked collaborations through visits with 4 external entities: 1) Cisco Systems Incorporated, a private sector internet technology company known for its routers; 2) Starbucks Corporation, a private sector service company known for its coffee; 3) the NOAA National Marine Fisheries Service Northwest Fisheries Science Center, a government laboratory that provides scientific information to support the management of the Pacific Northwest's living marine resources, and 4) the Southeast DC Partnership, a non-profit outpost in Washington, DC known as a refuge and resource for serving the needs of young people living in the inner city. The benchmarking process included briefings from senior leaders during class visits to Starbucks, NOAA and the Southeast DC Partnership (formerly the SE Whitehouse), and a detailed presentation at NASA Headquarters on collaborative tools, employee awards and recognition, and performance plans from representatives of the CISCO Internet Business Solutions Group.

Cisco Systems Incorporated

Cisco Systems is a company with 37,000 employees located in nearly 70 countries. Chief Executive Officer John Chambers has defined teamwork as "sharing resources, information, and talent across functional and geographic lines to deliver the best solutions to our customers." This approach provides vision, motivation, and performance plan accountability for collaboration.

a. Recognition – On a quarterly basis CISCO recognizes exceptional teams that collaborate across organizational boundaries. Any employee can nominate a team. The selection panel is cross-functional. Award winning collaborations are prominently highlighted on the company Intranet start page and in company meetings, which provide exposure and sharing of best practices. The "team of the year" is awarded $5000 to donate to the charity of their choice. Senior management encourages and rewards the collaborative behaviors it desires.

The LDP project survey and interview synthesis echoes the need for both high level and more frequent recognition. These precepts were proposed to the NASA Peer Awards team.

b. Annual Performance Review – During each employee's performance review with their manager they determine goals to improve teamwork and collaboration. Collaboration is one of the rated factors in the annual employee assessment and ranking, with 360-degree reviews contributing to the validation of the metrics. Performance plans for managers and their annual bonuses are strongly linked to collaboration. Management incentivizes, measures, and rewards collaboration.

The LDP team proposed performance plan language for collaboration and teamwork to the NASA Headquarters Human Resources team developing a new performance appraisal system. Sample performance evaluation worksheets provided to us by CISCO were also forwarded to the NASA Human Resources team.

c. Collaboration Tools – Collaboration Center of Excellence is a centralized team within Cisco that provides collaborative tools and more to support collaboration (e.g., instant messaging, video and audio conferencing, Webcasts, threaded discussions).

IBSG is currently consulting to the Chief Information Officer at Headquarters and MSFC.

d. Characteristics of Successful Teams at CISCO

- Sharing resources, talent, and information openly
- Focus on common goals
- Encouraging and valuing diversity in people and perspectives
- Sharing ownership, recognition, and visibility
- Building partnerships internal and external to own group
- Soliciting and learning from feedback
- Respect for others

Starbucks Corporation

Starbucks Corporation has over 75,000 partners (employees) and more than 7,500 retail locations with whom to communicate on a regular basis. Starbucks collaborates throughout its operations, having many diverse partnerships with suppliers, distributors, vendors, and farmers. Information Technology, a critical supporting element for collaboration, represents a significant part of the Starbucks Headquarters operation. The Starbucks Enterprise portal helps foster collaboration across the business.

Senior headquarters managers routinely call store managers to discuss and share successes and to provide employee recognition. This is a continuous process, not just an annual event at Starbuck's headquarters. We learned that a 2004 Starbucks international retail store expansion in Paris relied on collaboration with a partner in Spain, because they best understood European culture and values. In a Harvard Business School interview (HBS Working Knowledge, May 6, 2002), CEO Orin Smith stated that key partnering success criteria include shared values, trust, and integrity on both sides, with clear goals and expectations from the start of the partnership.

Starbucks frequent recognition of employees and criteria for successful collaboration/partnering validate key enablers and leverage points identified in the NASA project interviews. WebEx, a portal tool for sharing information used by the LDP class, (or a similar tool) should be more broadly used throughout NASA to foster effective collaboration.

NOAA Northwest Fisheries Science Center

Dr. Usha Varanasi, science and research director at the NOAA Northwest Fisheries Science Center manages 300 scientists and staff at the headquarters in Seattle and at five research stations in Washington and Oregon. She described her leadership philosophy and the collaborative relationship with multiple stakeholders having diverse and competing interests. Establishing scientific objectivity, face-to-face communication, and open and honest dialogue were key elements in developing trust between her organization and their diverse constituents. Her organization collaborates across organizational boundaries, both internally and externally. Collaborative research projects are highlighted on the Center's Web page (http://www.nwfsc.noaa.gov).

In concert with the NASA interviews, establishing trust and open and honest communication with partners are key elements of successful collaborations.

Southeast DC Partnership

The Southeast DC Partnership is supported by volunteers, many from the local community interested in helping children (tutoring, mentoring) and adults living in the inner city. In a dialogue with their senior leadership, we learned they would much prefer that someone donate their time rather than their money. During our visit, we were introduced to current and retired senior leaders of the Washington, DC police force, who also volunteer their time in support of the Southeast DC Partnership. Free lunches, held weekly, offer a safe and non-threatening environment for open dialogue among those in need, elected officials, staff, and other volunteers. Developing relationships is a key element in building and sustaining this community partnership.

As at NASA, successful collaborations are built on personal relationships that are established through face-to-face interactions.

Appendix 3a – Collaboration Questionnaire

Date: _____ Total funding for collaboration: _____

Name: _____ # of people working on collaboration: _____

Name of collaboration: _____ Start Date of collaboration: _____

Collaboration role/title: _____ Scheduled/Actual End date: _____

Center: _____ Time you personally have spent in collaboration to this point: _____

Please mark the most appropriate response to the following questions in the space provided.

1 = strongly disagree 4 = neither agree nor disagree 7 = strongly agree

Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I consider this collaboration to be a success, or clearly working towards a successful outcome.							
The team members chosen for this collaboration were appropriate for the collaboration and its goals.							
There was/is an effective mechanism/metric to measure the success of this collaboration.							
The collaboration is being/has been completed on schedule.							
Team members were willing to share knowledge.							
There was an adequate amount of face-to-face interaction.							
The members of the collaboration team had the same collaboration goals.							
Communication was difficult because team members were in different locations, which inhibited collaboration success.							
There was a clear and strong team identity.							
Funding for this collaboration was equitably and fairly distributed.							
Control over the collaboration was equitably distributed between Centers/Partners.							
There was adequate recognition of my work and responsibilities in this collaboration from my superior.							
This collaboration involved an “us vs. them” attitude.							
The rate of staff turnover presented obstacles in this collaboration.							
Successes of the team were acknowledged.							
Successes of the team were celebrated.							
There was a high level of trust between team members.							
The frequency of communication between team members was adequate.							
The physical location of various team members was an obstacle in this collaboration.							
The schedule for this collaboration was realistic.							
Inadequacy of funding strained working relationships.							
Scheduling pressures inhibited the team’s ability to work well together.							
The team had access to necessary expertise.							

Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Unclear team member/partner responsibilities negatively affected working relationships.							
Upper management gave this collaboration an adequate amount of support.							
Planning for the current collaboration involved input from all relevant parties.							
The goals for this collaboration were appropriate and realistic.							
The distribution of funding strained working relationships.							
The workload was reasonable for this collaboration.							
Responsibilities of all team members were clearly defined at the start of the collaboration.							
Allocation of accountability was built into the collaboration procedure and applied equitably.							
There was adequate administrative support for team members by including collaboration work in performance plans, incentives, etc.							
The collaboration is being/has been completed within budget.							
There were conflicts between individuals that inhibited the success/progress of this collaboration.							
Funding for this collaboration was adequate to meet collaboration goals.							
The team members were invested in this collaboration and its outcomes.							

Appendix 3b – Collaboration Survey

(Questionnaire returned: yes / no)

Date: _____ Total funding for collaboration: _____

Name: _____ # of people working on collaboration: _____

Name of collaboration: _____ Start Date of collaboration: _____

Collaboration role/title: _____ Scheduled/Actual End date: _____

Center: _____ Time you personally have spent in collaboration to this point: _____

Brief description of collaboration: _____

_____

_____

_____

_____

_____

1. What technology was used as a tool for communication in this collaboration? (examples: phone, email, virtual teaming, etc.)
2. What kinds of technology would have offered a significant improvement on your ability to communicate and affect the success of the collaboration? How would this technology have made the collaboration more likely to succeed?
3. What types of *formal agreements* are recognized and recorded as to who is responsible for various aspects of the collaboration? Was this type of agreement effective? Would a less formal agreement have been helpful?
4. What types of *informal agreements* are recognized and recorded as to who is responsible for various aspects of the collaboration? Was this type of agreement effective? Would a more formal agreement have been helpful?

5. What organizational processes inhibited collaboration? How did these inhibit collaboration? How would you fix these things?
6. What organizational processes enhanced collaboration? How did these enhance collaboration?
7. What are the cultural traits of NASA and/or the working groups that inhibited collaboration? How did these inhibit collaboration? How would you fix these things?
8. What are the cultural traits of NASA and/or the working groups that enhanced collaboration? How did these enhance collaboration?
9. In what ways did the parties involved in this collaboration receive recognition for their work? How could recognition of people and teams be improved?
10. What metrics were used to measure the success or failure of this collaboration?
11. How did Senior Management support this collaboration? What other kinds of support would have been helpful?
12. What were some of the problems resulting from team dynamics, or the working relationships between different teams in the collaboration?
13. What were some of the assets resulting from team dynamics, or the working relationships between different teams in the collaboration?
14. Were the characteristics and personalities of team leaders and team members taken into consideration and managed at an appropriate level? Please explain.
15. What were some of the problems created by a difference in *organizational culture* between team members? Please explain.
16. What are the top 2 or 3 elements that have contributed to the collaboration's success?
17. What are the top 2 or 3 elements that have inhibited the success of this collaboration?

18. How was teamwork included in your performance plan?
19. Do you have any thoughts on any mechanisms or cultural issues that are important to make a collaborative effort successful?
20. Is there anything else that you would like to share with us?

Appendix 3c – Executive Survey

Date: _____ Center: _____

Name: _____ Enterprise: _____

Title: _____

1. Could you give us some examples of collaborative efforts that have succeeded or failed and why it was a success or failure? (for each example given, note whether it was a success or failure)

2. What was your role in these collaborations?

3. What were the results of these collaborations?

4. Why or why not would you like to be involved in more collaborative efforts?

5. What incentives or disincentives are there for you to be involved in further collaborations?

6. What can be done to improve the collaborative process at NASA?

7. What incentives for collaboration are currently in place?

Appendix 4 – Recommended Best Practices

Appendix 4a –Systemic Conditions

Recommended Best Practices	Partner Selection Process	Rewards & Recog of Collaboration	Lack of Training for Collaboration	Command & Control Culture	Effect of NASA Induced Turnover	Fear of Loss of Control
1. Focus on the relationship: Efficient and effective collaborations are the product of relationships.	X	X		X	X	X
2. Build mutual trust and respect: Face-to-face interactions should be used to establish mutual trust and respect.				X	X	X
3. Maximize team interaction: Interpersonal interaction substantially improves the ability to overcome conflicts.				X	X	X
4. Lead by example: Management should model respect and appreciation for each other's capabilities and knowledge.				X		X
5. Know the risks: The risk of the collaboration should be properly assessed and mitigated.	X		X	X		X
6. Assess collaboration performance: Health of collaborations should be measured, continually assessed, and discussed at management reviews.			X	X	X	X
7. Reinforce desired behavior and performance: Collaborative efforts should be recognized and rewarded throughout the project.		X				
8. Give a lot to get a lot: Leaders should fully utilize the available award systems.		X				
9. Keep senior management engaged: Continue the support of collaborations through periodic reviews and oversight.				X	X	X
10. Get the right people involved: Senior managers should be active in developing collaboration agreements.	X			X		X
11. Practice "management by walking around": Visits by senior management serve multiple positive purposes.		X		X		X
12. Manage employee turnover: Foster team relationships to ensure that personnel turnover does not cripple the collaboration.					X	
13. Strategically manage team composition: Managers should consider personality compatibility	X					

Recommended Best Practices	Partner Selection Process	Rewards & Recog of Collaboration	Lack of Training for Collaboration	Command & Control Culture	Effect of NASA Induced Turnover	Fear of Loss of Control
when forming teams.						
14. Manage the personalities: Assure that difficult personalities are not in positions to disrupt the relationships of collaboration.	X		X			
15. Assess and rate leadership on teamwork: Leadership should have "teamwork" rating in their performance plans.		X				
16. Use communication technology wisely: Have a trial period for any new collaboration communication technology introduced.						
17. Take care of details early: Processes should be agreed upon, understood, and documented as early as possible.	X					
18. Negotiate for mutual success: Problems can be overcome by discussion and agreement on processes to be used.	X		X	X		X
19. Keep everyone informed of key information: Organization-specific processes should be documented and available to all.				X		X
20. Work for clarity and commitment: Clearly defined roles and responsibilities, a shared vision with goals and objectives.	X			X		X
21. Agree on a conflict resolution process: Have a means for decision-making and conflict resolution between the parties.	X		X	X		
22. Clearly define the financial details: Funding issues need to be considered, recognized, and appropriately addressed.			X			
23. Collaboration management board: Establish points of contact as conduits to manage and resolve issues.	X					
24. Maximize the effectiveness of travel: Successful collaborations require sufficient travel to support teaming.				X		X
25. Lessons Learned: Document collaboration lessons learned.			X			

Appendix 4b – Project Management Responsibilities

Recommended Best Practices	Teamwork	Recognition	Communication	Funding	Planning	Logistics	Scheduling	Distribution of Control and Responsibilities
1. Focus on the relationship: Efficient and effective collaborations are the product of relationships.			X		X	X		X
2. Build mutual trust and respect: Face-to-face interactions should be used to establish mutual trust and respect.	X		X					
3. Maximize team interaction: Interpersonal interaction substantially improves the ability to overcome conflicts.	X		X					X
4. Lead by example: Management should model respect and appreciation for each other's capabilities and knowledge.	X		X					
5. Know the risks: The risk of the collaboration should be properly assessed and mitigated.	X			X	X	X	X	X
6. Assess collaboration performance: Health of collaborations should be measured, continually assessed, and discussed at management reviews.		X						X
7. Reinforce desired behavior and performance: Collaborative efforts should be recognized and rewarded throughout the project.		X		X				
8. Give a lot to get a lot: Leaders should fully utilize the available award systems.		X						
9. Keep senior management engaged: Continue the support of collaborations through periodic reviews and oversight.				X				X
10. Get the right people involved: Senior managers should be active in developing collaboration agreements.				X	X			X
11. Practice "management by walking around": Visits by senior management serve multiple positive purposes.	X	X	X					
12. Manage employee turnover: Foster team relationships to ensure that personnel turnover does not cripple the collaboration.	X				X	X		X
13. Strategically manage team composition: Managers should consider personality compatibility when forming teams.	X				X	X		X
14. Manage the personalities: Assure that difficult personalities are not in positions to disrupt the relationships of collaboration.	X				X	X		X

Recommended Best Practices	Teamwork	Recognition	Communication	Funding	Planning	Logistics	Scheduling	Distribution of Control and Responsibilities
15. Assess and rate leadership on teamwork: Leadership should have "teamwork" rating in their performance plans.	X	X						X
16. Use communication technology wisely: Have a trial period for any new collaboration communication technology introduced.	X		X					
17. Take care of details early: Processes should be agreed upon, understood, and documented as early as possible.				X	X	X	X	X
18. Negotiate for mutual success: Problems can be overcome by discussion and agreement on processes to be used.	X			X			X	X
19. Keep everyone informed of key information: Organization-specific processes should be documented and available to all.	X		X					
20. Work for clarity and commitment: Clearly defined roles and responsibilities, a shared vision with goals and objectives.	X		X		X	X		X
21. Agree on a conflict resolution process: Have a means for decision-making and conflict resolution between the parties.	X		X		X			X
22. Clearly define the financial details: Funding issues need to be considered, recognized, and appropriately addressed.				X				
23. Collaboration management board: Establish points of contact as conduits to manage and resolve issues.	X		X		X	X		X
24. Maximize the effectiveness of travel: Successful collaborations require sufficient travel to support teaming.	X		X			X		X
25. Lessons Learned: Document collaboration lessons learned.			X		X	X		

Appendix 4c – 3 Keys to Successful Collaboration

Recommended Best Practices	Sound Project Framework	Effective Management	Focus on the Human Element
1. Focus on the relationship: Efficient and effective collaborations are the product of relationships.			X
2. Build mutual trust and respect: Face-to-face interactions should be used to establish mutual trust and respect.			X
3. Maximize team interaction: Interpersonal interaction substantially improves the ability to overcome conflicts.			X
4. Lead by example: Management should model respect and appreciation for each other's capabilities and knowledge.		X	
5. Know the risks: The risk of the collaboration should be properly assessed and mitigated.	X		
6. Assess collaboration performance: Health of collaborations should be measured, continually assessed, and discussed at management reviews.			X
7. Reinforce desired behavior and performance: Collaborative efforts should be recognized and rewarded throughout the project.			X
8. Give a lot to get a lot: Leaders should fully utilize the available award systems.			X
9. Keep senior management engaged: Continue the support of collaborations through periodic reviews and oversight.		X	
10. Get the right people involved: Senior managers should be active in developing collaboration agreements.		X	
11. Practice "management by walking around": Visits by senior management serve multiple positive purposes.		X	X
12. Manage employee turnover: Foster team relationships to ensure that personnel turnover does not cripple the collaboration.			X
13. Strategically manage team composition: Managers should consider personality compatibility when forming teams.		X	
14. Manage the personalities: Assure that difficult personalities are not in positions to disrupt the relationships of collaboration.		X	
15. Assess and rate leadership on teamwork: Leadership should have "teamwork" rating in their performance plans.		X	
16. Use communication technology wisely: Have a trial period for any new collaboration communication technology introduced.	X		
17. Take care of details early: Processes should be agreed upon, understood, and documented as early as possible.	X		
18. Negotiate for mutual success: Problems can be overcome by discussion and agreement on processes to be used.		X	

Recommended Best Practices	Sound Project Framework	Effective Management	Focus on the Human Element
19. Keep everyone informed of key information: Organization-specific processes should be documented and available to all.	X		
20. Work for clarity and commitment: Clearly defined roles and responsibilities, a shared vision with goals and objectives.	X		
21. Agree on a conflict resolution process: Have a means for decision-making and conflict resolution between the parties.	X		
22. Clearly define the financial details: Funding issues need to be considered, recognized, and appropriately addressed.	X		
23. Collaboration management board: Establish points of contact as conduits to manage and resolve issues.	X		
24. Maximize the effectiveness of travel: Successful collaborations require sufficient travel to support teaming.			X
25. Lessons Learned: Document collaboration lessons learned.	X		

Appendix 5 – System Mapping

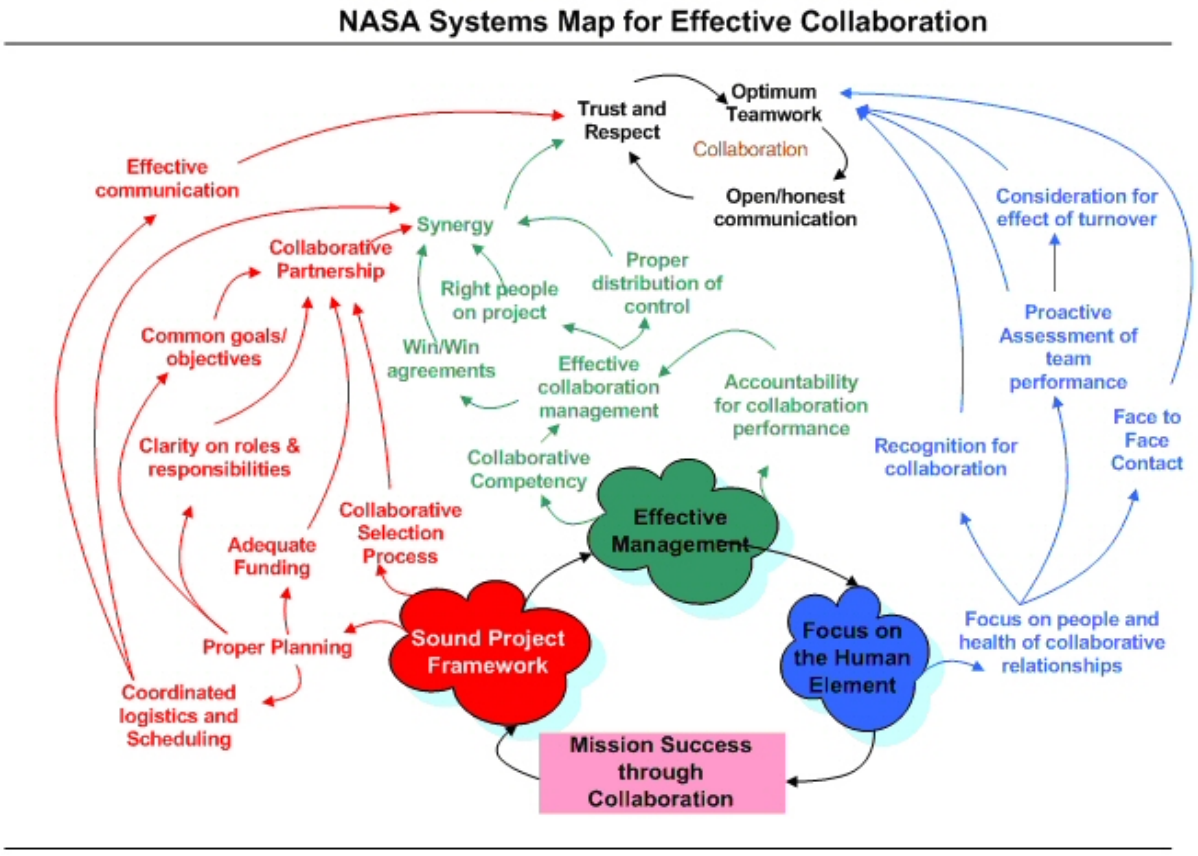
Systemic assessments of leverage points were made using the approach of Systems Mapping. The systems maps depict mission success through effective collaborations are based on the 3 elements of management involvement, project framework and the human element. These are shown below and correlate well with the findings of the study.

Effective Collaboration

The traits of effective collaboration are open and honest communication, optimum teamwork, and trust and respect between the collaborating parties. Open and honest communication allows for sharing of information and knowledge that is vital to becoming a learning organization. Optimum teamwork is important because it maximizes the usefulness of all team members, eliminates redundancy, and ensures that a highly motivated team is working together in a cooperative manner to accomplish objectives that matters to the public. Trust and respect is critical to opening the doors for teamwork and communication. The greater the degree of trust and respect, the higher performing the team will be and the more effective the exchange of information and knowledge.

NASA Systems Map for Effective Collaboration

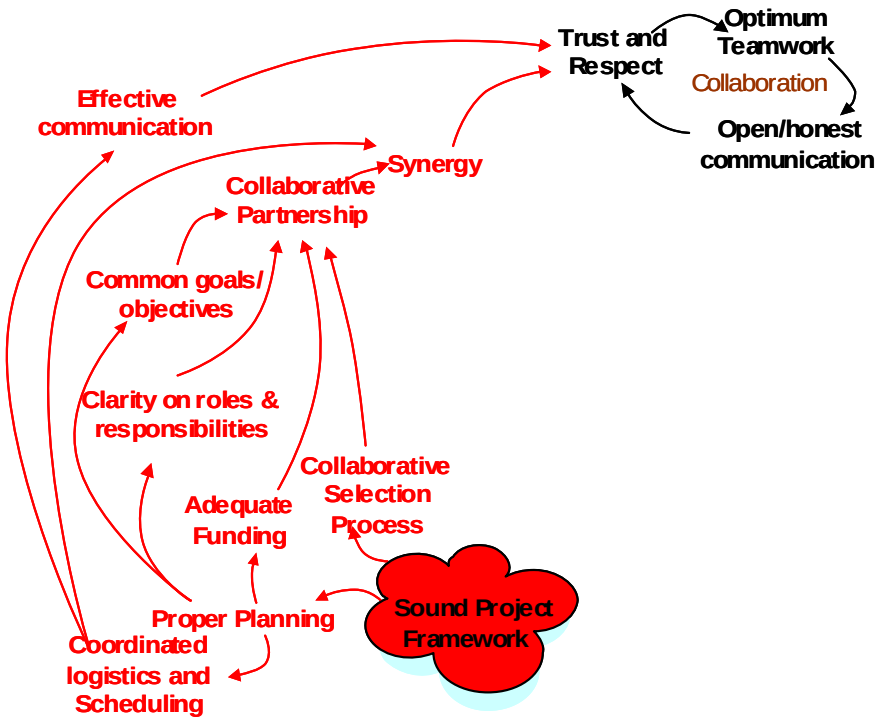
The NASA Systems Map for Effective Collaboration relies on three inter-related major components to achieve mission success through collaboration: 1) Sound Project Framework, 2) Effective Management, and 3) a Focus on the Human Element. These components are represented by 3 different colors: red for Project Framework, green for Effective Management, and blue for Human Element.



Sound Project Framework

Sound Project Framework: Effective collaboration results from a sound project framework as illustrated below.

Sound Project Framework



Proper planning ensures that there is clarity on the roles and responsibilities of the collaborating parties and that there are common goals and objectives. Best practices indicate this is best accomplished as early as possible. This leads to a collaborative partnership, which leads to a more synergistic relationship. This synergistic relationship leads to trust and respect among the partners and begins the cycle of teamwork optimization, open and honest communication, and increased trust and respect; a reinforcing loop for collaborative behavior.

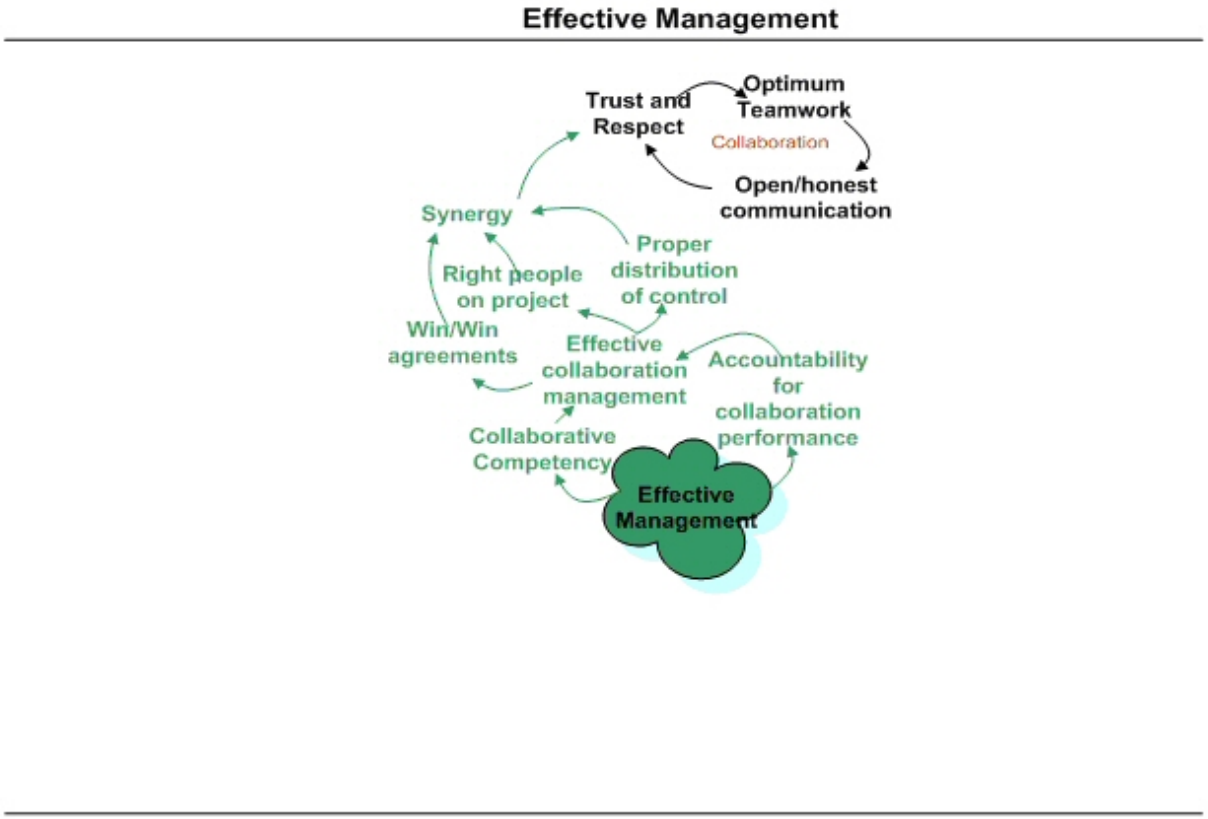
In addition, proper planning will detail the funding profile and ensure alignment between scope, funding, and schedule commitments. This leads to more effective communication and synergy, which leads to increased trust and respect, and the collaboration-reinforcing loop.

Finally, using a collaborative selection process will lead to a collaborative partnership, synergy, and trust and respect. This collaborative selection process will recognize the power

of collaboration (and perhaps make it a selection criteria), as well as provide incentive for different organizations to look outside their boundaries for expertise and capability that will lead to better solutions. When collaboration is taken into account during the selection process, better collaboration partnerships will result.

Effective Management

Effective Management: Effective management is also a major requirement to achieve mission success through collaboration, as illustrated below:



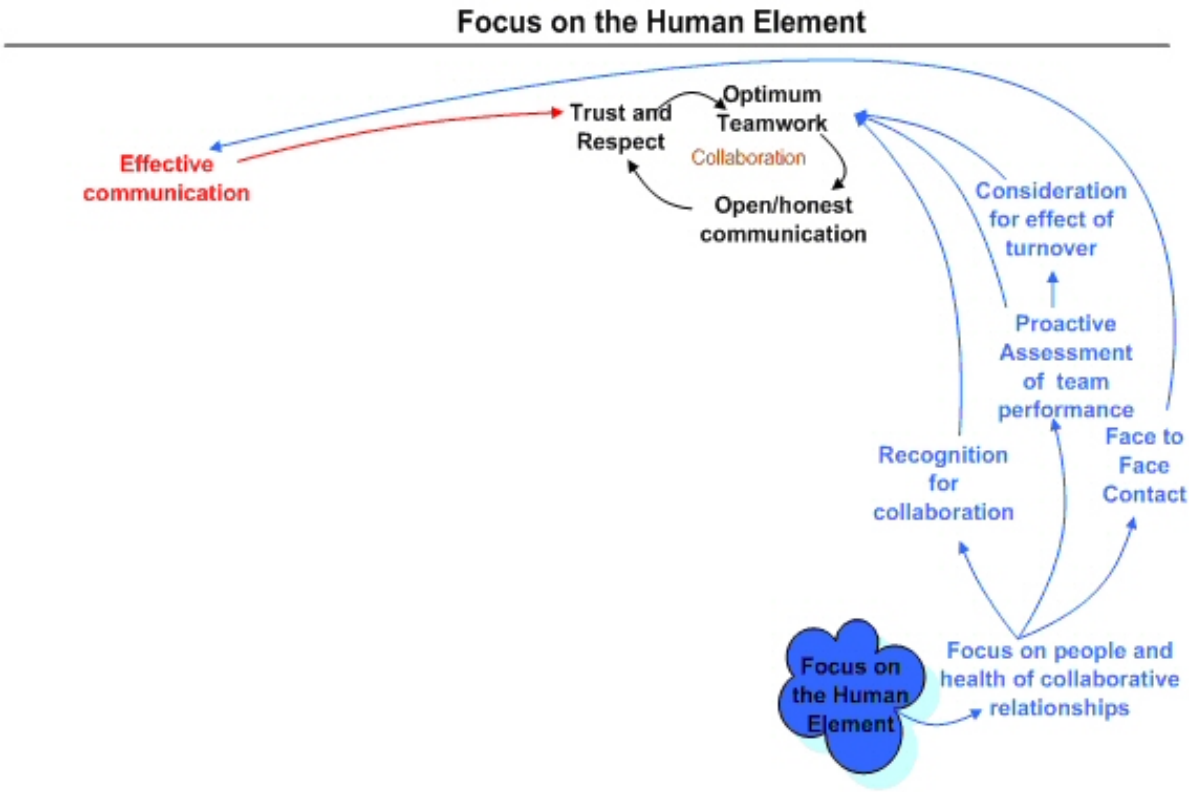
Effective management for a collaborative effort involves 2 major requirements:

1) competency in leading collaborative initiatives, and 2) accountability for performance of the collaboration. Competent management that is accountable for the performance of the collaboration negotiates win/win agreements, selects the right people for the project who behave collaboratively, and appropriately distributes control among the collaborative partners.

These behaviors lead to a synergistic relationship, which increases trust and respect among the collaborative members. This also leads into the reinforcing loop of increased trust and respect, optimum team performance, and open and honest communication, which are the keys to effective collaboration.

Focus on the Human Element

Focus on the Human Element: A focus on the human element is the final link in achieving mission success through collaboration, as illustrated below:



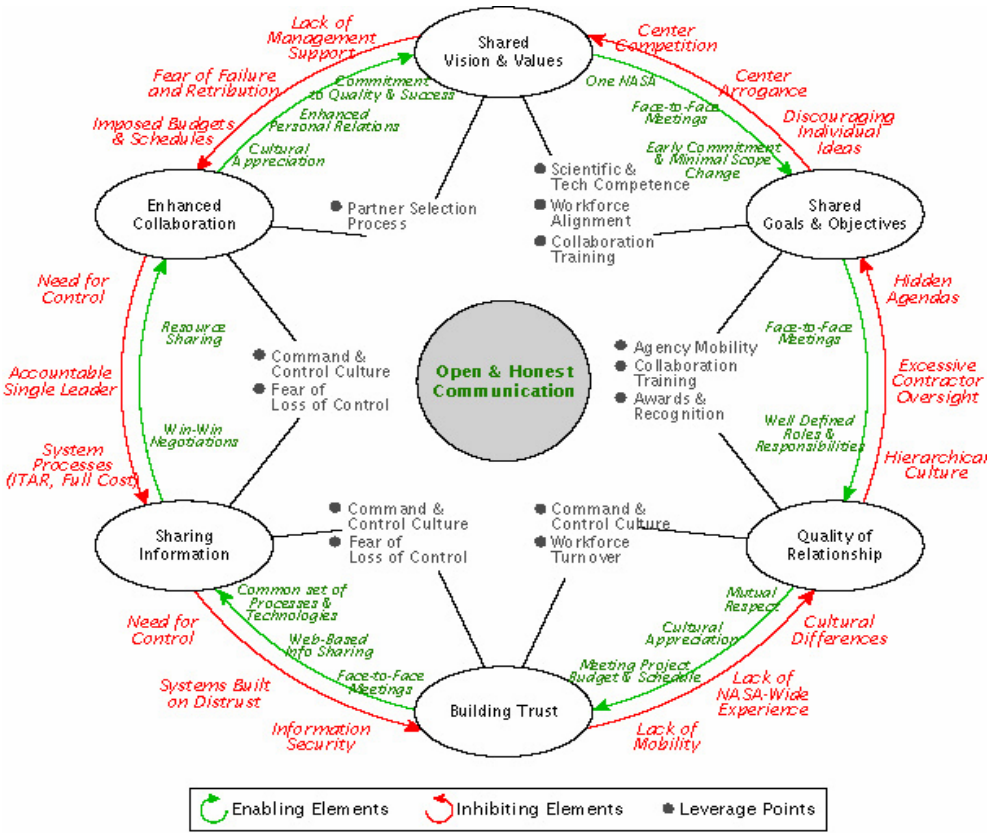
Focusing on the people in the collaboration and the overall health of the collaboration is witnessed by recognizing those that act in a collaborative manner and rewarding them appropriately, regularly assessing the performance of the team, and building trust and respect through face to face contact. Face to face communication and contact has been highlighted as a key ingredient to building trust and respect in collaborative relationships. Maximizing face-to-face interaction early in the process is preferable, such as in the pre-formulation phase of a project. Trust and respect can be established through face-to-face interactions that are important aspects part of mobility assignments with other organizations, centers, or agencies.

Additionally, focusing on the human element means that the effects of team members coming and going is properly considered and mitigated. Although we tend to think of engineers and others as interchangeable elements in the collaboration, in fact, they are not. Team building takes time and effort and can be largely undone when key members leave to take on other initiatives or assignments. By recognizing this and taking measures to maintain a strong team

and collaboration, teamwork is optimized, open and honest communication follows, and increased trust and respect remains present in the collaboration.

The Human Element Map: Reinforcing the Enablers and Inhibitors

From the project and executive surveys, and the synthesis above, we understand the human element to be core to the success of collaboration. The relationships of these elements, shown in the figure below, indicate that a reinforcing loop describes the foundation of the human element interactions. The human element map tells the fundamental story of effective collaboration. The story begins at the top of the loop with the development of a shared vision and values for the collaboration. From this you can then develop the shared goals and objectives and the quality relationships that become the core of successful collaborations. Quality relationships will enable the collaboration to build the trust necessary to lead to true information sharing, which in turn is vital to the enhancement and sustainability of collaboration. Central to development of each of these relationship elements is open and honest communication, which is located in the center of the human element map. There exist enablers (those things that support) and inhibitors (those things that are barriers) to collaboration. The enablers (shown in green) will tend to build or enhance collaboration at various locations in the loop. The inhibitors (shown in red) will prevent and can even destroy collaborations. Key enablers and inhibitors, known as leverage points, were identified from the survey data (shown as bulleted elements in black). The leverage points are the areas where people could make the greatest impact on the quality of the collaboration.



Appendix 6 – Recognition and Awards

One of the goals of the Leadership Development Program (LDP) class project was to make recommendations for aligning organizational incentives and structures to support effective collaboration. Many elements of the project, from best practices to leverage points, highlighted that recognizing and showing appreciation for the efforts of people will reinforce the desired behavior and performance. A finding from the study surveys and interviews with project managers identified that leaders can "give a little to get a lot" and should fully utilize the available award system to recognize employees. As the project results were collected and synthesized, Code F was in the process of forming an agency level team to revise the criteria and develop enhancements to the NASA awards program. The LDP class was invited to participate on this Agency-level team and provide award criteria to encourage collaboration; particularly through the design of a One NASA Peer Award. This award recognizes individuals and teams that collaborate to share knowledge, expertise, capabilities, and resources for the good of the agency. An objective of class project was to infuse collaboration best practices as learned during our project into the structure and language of these awards. LDP members participated in an awards "kick-off" workshop and offered on-going input to the award language. The awards team incorporated many of our suggestions and input into the language and implementation plans. Specific recommendations based on the 2003-2004 class project findings that were incorporated where possible and appropriate are provided below.

1. Individuals may receive a One NASA award. When the award is specifically for collaboration, then a team award is appropriate. The award language incorporates our input to make both individuals and teams eligible for the award.
2. The terminology of "One NASA approach" could mean different things to different people and it is important to clarify what this means in the context of the award.
3. It is very important to assure that the award ultimately encourages the transfer of knowledge. Weighting of criteria should be carefully considered to confirm that the desired behaviors are recognized and encouraged.
4. It was clarified that these are peer awards where a peer would nominate another peer, supervisor another supervisor. It was further suggested that a 360-degree review could be implemented by the collaboration participants and customers to acknowledge that the criteria have been satisfied by those recognized for the award.
5. The award should enable timely recognition in order to be most effective. The award could be made before the activity has successfully been completed, cancelled, or the individual recipients have moved on. The award language was specifically modified in order to allow the award at any phase within a project.
6. Recommendations were adopted to modify the language relative to "ingenuity." As suggested, awards were edited to read: "Innovative approaches are displayed in the conception, design, or execution of the project."
7. It was suggested that the award include non-program travel funds to allow the team an opportunity to visit other NASA centers and engage in dialog about the collaboration in a Center-wide forum. This was considered a good idea and was forwarded to the One NASA representatives. However, the awards team has no influence on the use of funds.

Appendix 7 – NASA Performance Management System

Incorporating Accountability for Collaboration into Performance Appraisals

Background: The NASA Leadership Development Program (LDP) class of 2003-2004 undertook a project to enhance mission success in the 21st century through effective collaboration. A recommendation of the project was the need for accountability across NASA's employees to work in a collaborative manner. Trust and respect, open and honest communications, and working effectively in teams are all key characteristics of effective collaboration. It is well known and established that what gets measured gets done. Therefore, the LDP class recommended including elements of effective collaboration into NASA's performance management and appraisal system.

It was fortuitous for the LDP class that NASA Code F, in response to the President's Management Agenda regarding Human Capital Management, was undertaking an initiative to improve the performance management and appraisal system for the Agency. The LDP class was invited to assist in re-writing the Agency's performance management system. Members of the 2003-2004 class participated in the opening video teleconference for this initiative, as well as the workshop conducted May 11 – 13, 2004 at Tyson's Corner, VA.

Recommended Non-SES and Project Manager Elements: The following elements were forwarded for inclusion as critical elements in performance plans for non-SES supervisors and project managers. Standards related to collaboration are underlined below:

TOPIC: Strategic Alignment and Program Performance

Element: Ensures organizational goals and program performance are aligned with those of the Agency

Standards:

- Identify and/or develop program and project goals and objectives that are clear, measurable, realistic, and aligned with the goals and objectives of the Agency's strategic plan and consistent with the integrated budget and performance plan.
- Ensure that budget submissions are complete, defensible, and timely.
- Ensure that employees' assignments achieve results towards the organization's strategic objectives.
- Link employee's performance plans to organizational strategic goals and objectives.
- Develop and execute program and project plans that align with Agency mission, goals, and objectives.
- Meet organizational objectives within agreed on costs and schedule milestones.
- Identify opportunities for improvement and/or take action to improve process, products, and services.
- Clearly communicate products and ensure that products demonstrate systems integrity.

TOPIC: Health and Safety

Element: Demonstrates a commitment to Health and Safety. Creates and sustains an environment where NASA employees and contractors feel free to raise health and safety concerns without fear of retribution.

Standards:

- Act on all health and safety concerns raised by employees and contractor personnel.
- Identify and expeditiously take action to correct unsafe conditions and/or procedures.
- Ensure that employees comply with applicable safety and health standards, rules and regulations.

TOPIC: Collaboration and Teamwork

Element: Demonstrates a commitment to integrate a One NASA approach. Fully utilizes collaborative and team approaches to manage and perform work.

Standards

- Promote the One NASA concept through cooperation and teamwork with other managers and teams across centers and organizational boundaries.
- Share knowledge of best practices and lessons learned and resources to accomplish tasks and projects with a NASA-wide approach and benefits.
- Identify and consider internal and external customers' needs and expectations when making decisions identifying solutions, and resolving conflicts.
- Respect differing approaches and maintain disagreements on a professional level during interactions with others

TOPIC: Human Capital Management

Element: Actions and decisions demonstrate commitment to the strategic management of human capital.

Standards:

- Identify current and future workforce competencies needed to successfully execute the organization's goals, objectives, and succession planning.
- Ensure merit principles and rules are utilized and applied in promotions, selection, and other personnel actions.
- Ensure that employees understand
- Organizational goals and objectives.
- The alignment of work and developmental assignments with organizational goals and objectives.
- The assessment and measurement of performance based on performance and results achieved.
- Appropriately, fully, fairly utilize the incentives based on demonstrated performance results.

- Address and resolve performance and conduct issues in a fair and timely manner.
- Assess and provide employees with education, development, and growth opportunities to enhance performance, skills, abilities, and competencies need to meet current and future agency needs. Includes succession planning and professional development and learning.
- Provide appropriate feedback for employee's career development.
- Create and sustain an environment of trust and respect among employees and stakeholders.

TOPIC: Equal Opportunity/Diversity

Element: Actively supports equal opportunity and diversity

Standards:

- Participate in EEO and diversity training.
- Respond quickly and effectively to real or potential discrimination issues.
- Ensure an organizational environment where employees value individual and cultural differences, treat one another with respect, and have an opportunity to excel.
- Demonstrate a commitment to equal opportunity in hiring, assignments to career enhancing projects and in all personnel decisions.
- Create a working environment that is free of discrimination, including sexual harassment and is accessible to individuals with disabilities.

TOPIC: Communications

Element: Demonstrates effective communication at all levels

Standards:

- Effectively present information orally and in writing
- Assure open and honest communications among all levels, up, down and across the organization.
- Listening includes demonstrating the listener has given fair and full consideration of views and different opinions of others.
- Communication reflects a partnering relationship with employees and others.
- Capture and share knowledge and information.
- Create and sustain an environment for open and honest communication.
- Communication represents the best interests of the Agency in a manner consistent with an Agency-wide message.
- Communications incorporate respect for individual and cultural differences.

Recommended Non-Supervisory Elements

After much discussion among the group at the May 11–13 workshop, it was agreed that collaborative behavior and teamwork elements should be included in employees' performance plans to the extent possible. However, the Human Resource Specialists in attendance were not

supportive of designating collaboration and teamwork elements as critical elements for non-supervisory employees. However, employees must demonstrate the NASA core values in the performance of their duties. These core values are derived from the NASA Strategic Plan. They are: Safety, People, Excellence, and Integrity. Within these core values, "People" represents the basic elements of collaboration regarding trust, respect, teamwork, and communication. As long as employees will be held accountable to act in concert with the NASA core values, the LDP class is sufficiently satisfied that the proposed changes to the performance management and appraisal system will help to enhance mission success in the 21st century through effective collaboration.

Status of Recommendations

The process of rewriting the Agency's Performance Management and Appraisal system is a very detailed process. As of May 17, 2004, a "strawman" of the new system was being prepared for presentation to Code F senior management by May 24, 2004. Once approved, Code F will need to get buy-in from the various unions that represent NASA employees, as well as approval from the Office of Personnel Management. It is highly likely that many aspects of the proposed performance management system will change through the various stages of approval. However, the LDP class was able to bring forward recommendations that, if implemented, will reinforce accountability for collaborative behaviors and enhance mission success through effective collaboration.

Appendix 8 – Program and Project Management Guidelines for Processes and Requirements

The Leadership Development Class of 2003-2004 recognizes a need for providing guidance to Program and Project leadership to foster increasing trust and cooperation between all the parties participating in a joint venture. We therefore developed both a collaboration feasibility assessment – a step by step plan to determine if a collaboration is even warranted to produce a product – and a collaboration plan that can form the basis for modifying the NASA Program and Project Management Processes and Requirements document, NPG 7120.5B, or future revisions of the document.

Appendix 8a – Collaboration Feasibility Assessment (CFA)

Purpose: The Collaboration Feasibility Assessment (CFA) is the formal method of determining whether a project or program lends itself to collaboration with other centers, enterprises, agencies, industry, and/or countries. By systematically addressing a series of questions, a determination can be made to seek partners for collaboration or accomplish the project within an organization's boundaries.

Definition: A collaboration is when two or more organizations work together to accomplish mission objectives. A CFA is the written document that addresses why a project or program does or does not lend itself to collaboration.

Requirements: A CFA shall be developed during the formulation phase. The CFA shall provide the following information:

- Construct a list of the knowledge, skills, abilities, and resources required for the project (Include in the CFA as Addendum 1).
- Address whether your organization has all of the knowledge, skills, abilities, and resources to perform this initiative.
- List other organizations that have knowledge, skills, abilities, and/or resources to offer to this project.
- List the potential benefits of enlisting the other organizations in this project (expertise, international credibility, resources, etc).
- List the potential drawbacks of enlisting the other organizations in this project, if any.
- Assess the following factors and rate them as red, yellow, or green:

a. Environment: is the political climate favorable to collaborate with this/these partner(s)? Is there a successful history of collaboration with this entity?
b. Characteristics: Can a relationship of mutual trust, understanding, and respect exist with this partner? Do they see collaboration in their best interests? Can the parties to the collaboration compromise to reach decisions when necessary?
c. Process and Structure: Is it possible for members to share a stake in both the process and outcome? Can the collaborative group remain open to various ways of organizing and accomplishing work? Can the group clearly define, understand, and agree to their roles, rights, and responsibilities?

d. Communication: To what extent is open and frequent communication possible so that group members interact often, update one another, discuss issues openly, and convey all necessary information to one another? To what extent is regular face-to-face communication possible?

e. Purpose: Can the collaborative group agree to concrete, attainable goals and objectives? Will the collaboration have a unique mission and goals that differ, at least in part, from those of the member organizations? Can the collaborating members agree to a common vision, with clearly defined and agreed upon objectives and strategy?

- Provide a determination and supporting rationale for the decision to seek or not seek collaborative partners for the project.

Evidence of Compliance: A comprehensive CFA is included in the project files.

Appendix 8b – Collaboration Plan

Purpose: The Collaboration Plan (CP) serves as the structure for managing a collaborative effort with another organization. As an addendum to the approved Project Plan, the CP identifies the actions that will be taken relative to the project framework, human element, and management involvement to ensure collaboration success.

Definition: A collaboration is when 2 or more organizations work together to accomplish mission objectives. A CP is the written document that addresses actions that will be taken by the project team relative to best practices of successful collaborations.

Requirements: A CP will be developed by the end of Phase B activities. The CP will address measures for successfully managing the human element, management involvement, and project framework of the collaboration. Therefore, the CP shall provide a means for ensuring success in the following areas:

1. **The Human Element** – The importance of interpersonal communication cannot be overstated. The investment in travel to facilitate face-to-face communication is an investment in the success of the project. Establishing personal relationships is pivotal in overcoming barriers presented by differences in culture and processes, center rivalries, establishing trust, and the willingness to share information. Best practices include:

a. Focusing on the relationship: Successful managers recognize that efficient and effective collaborations are the product of relationships.
b. Building mutual trust and respect: Face-to-face interactions between the collaboration participants, especially as the collaboration forms, should be highly encouraged to improve the formation of relationships, establish mutual trust and respect, and work through issues.
c. Maximizing team interaction: Interpersonal interaction, whether through face-to-face meetings, team-building retreats, detail assignments, or co-location, substantially improves the ability to overcome inter-organizational conflicts. Training related to improving interpersonal interaction, such as understanding the differences between people and teams, and building communication skills, should be scheduled and budgeted.

2. **Management Involvement** – Regularly scheduled oversight, involving project and senior management from all parties is important. The input and guidance given to the collaboration is seen as pivotal, as is having a forum to resolve issues and conflicts that may arise. Providing regular encouragement to the team breeds team morale. Best practices include:

a. Lead by example: Proper management of the workforce is essential for effective collaborations. Management should encourage and model respect and appreciation for each other's capabilities and knowledge.

b. Assess collaboration performance: Health of collaborations should be measured, continually assessed, and discussed at management reviews. If possible, include risks due to collaboration in the Risk Management Plan and report accordingly at project management reviews.

c. Reinforce desired behavior and performance: Collaborative efforts should be recognized and rewarded throughout the project lifecycle. Recognition of team members should be timely and peer-driven.

d. Utilize Award System: Leaders should fully utilize the available award systems. Time spent recognizing the deserving members of the collaboration will return positive results in morale and performance.

e. Keep senior management engaged: Senior managers should continue the support of collaborations through periodic reviews, funding support, and oversight (without micromanagement).

f. Get senior management involved: When necessary, senior managers should play a more active role in the development of suitable collaboration agreements, setting of project expectations, and management of inter-center difficulties.

g. Practice "management by walking around**":** Personal visits by senior management to the project staff and facilities serve multiple purposes: direct recognition and encouragement of the staff and increased understanding of the project's progress.

h. Manage employee turnover: People will come and go on projects, especially projects with long durations. Managers should foster sufficient team relationships to ensure that routine personnel turnover does not cripple the collaboration. When key personnel are replaced, another round of team building may be in order.

i. Strategically manage team composition: Successful teams will need a diverse group of skills and capabilities to ask the right questions and bring forward solid solutions. Managers should consider personality compatibility when forming teams and leverage the strengths of people.

j. Manage the personalities: Managers should assure that difficult personalities are not in positions that will disrupt or damage the relationships within the collaboration.

k. Assess and rate leadership on teamwork: Project leadership involved in collaborations involving substantial involvement with personnel from other centers, academia, contractors, or other agencies should have "teamwork" as an element of their performance plans.

l. Use communication technology wisely: Project managers should have a trial and evaluation period for any new communication technology introduced to assist a collaborative effort.

3. **Project Framework**: – An up-front investment in establishing common and agreed upon goals, processes, roles, responsibilities, and buy-in from all parties before the project begins is critical. Best practices are:

a. Take time to agree on the details early on: The processes and procedures used in the collaboration should be agreed upon, understood, and documented as early as possible. One solution is to blend processes, not simply having one group's processes dominate. Ultimately, the processes should have buy-in from the collaboration parties. It is important to understand the internal processes of the other parties to avoid potential conflicts.

b. Negotiate for mutual success: Problems over process can be overcome by increased personal interaction, discussion of differing processes, and informed agreement on what processes are to be used in the collaboration.

c. Keep everyone informed of key information: Fixed, organization-specific processes should be documented and made available to all collaboration parties.

d. Work for clarity and commitment early on and then sustain it: Partnership agreements must be established early and have clearly-defined roles and responsibilities, a shared vision with goals and objectives, flexibility to deal with changes over time, and buy-in from the collaboration participants. Continuous reinforcement of the project goals helps to keep the team focused.

e. Agree on a conflict resolution process: A well-designed partnership agreement will have a means for decision-making and conflict resolution between the parties.

    1. Manage risk collaboratively: To best meet 7120.5 risk management requirements, the level of acceptable risk and the process for risk mitigation should be collaboratively established and documented among all parties to the collaboration. If that is not possible, the level of acceptable risk and the process for risk mitigation must be clearly documented and communicated to all of the collaboration parties.

    2. Clearly define the financial details: Even if funds are not to be transferred between parties, funding issues need to be considered, recognized, and appropriately addressed in the partnership agreement.

    3. Define a collaboration management board or similar structure: Establishing points of contact across the groups within the collaboration should serve as conduits to manage and resolve issues.

    4. Maximize the effectiveness of travel: Successful collaborations require sufficient travel to support teaming. Planning for travel should include adequate funds for project formulation, teaming, and execution. Every trip should have a purpose and criteria for success defined in advance.

        a. Retain collaboration knowledge: Lessons learned regarding the management and framework of the collaboration should be incorporated into the lessons learned that are mandatory at the end of the project.

Evidence of Compliance: A comprehensive Collaboration Plan (CP) is included in the project files.

Recommended change to Section 5.5: Human Resources Management

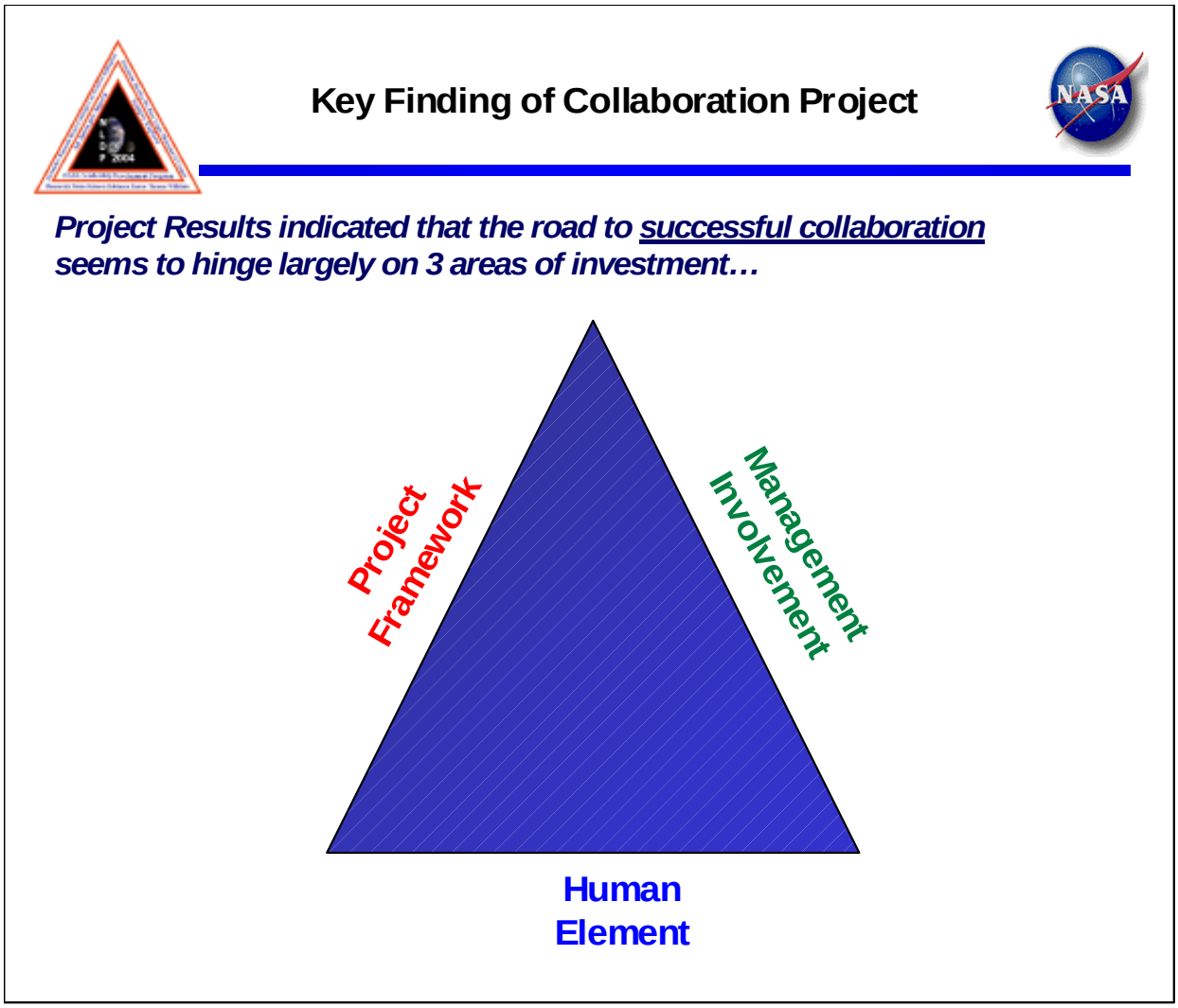
5.5.1b Program/project management success is ultimately dependent on the effective collaboration of the people. The manager must view the program/project team as the most essential attribute for mission success. Behaviors associated with effective teaming include open and honest communication, demonstrated trust and respect among team members, effective sharing of necessary information, recognition of superior individual and team performance, healthy team dynamics, appropriate team composition, knowledge management, and team, as well as, personal development and learning. Effective team communication enhances the behaviors of effective teams. The program/project manager is responsible for the use of effective communication mechanisms, such as face-to-face communication, team meetings, teleconferences, video teleconferences, and electronic collaboration tools to establish and develop high-performing project teams.

Appendix 9 – Collaboration Training Module

The Collaboration Training Module will be published on the NASA Leadership Development Program Web site (http://ldp.nasa.gov). The intent of the training is to provide program management with effective tools for collaboration. This is intended to be a 4-hour training program included with the program and project series of courses offered by the NASA Academy of Program and Project Leadership (http://appl.nasa.gov). The objectives of the Collaboration Training Module are to

- Outline best practices related to collaboration.
- Provide some tips to make working in the collaboration more effective
- Provide a list of complementary courses that would enhance the attendees collaboration skills

The best practices covered in the Collaboration Training Module fall into 3 categories as shown in the figure below.



The key findings and best practices presented in the Collaboration Training Module are:

Human Element

- Interpersonal communication establishes trust and a willingness to share
- Face-to-face communication is a key component in collaboration and travel funds will be necessary to facilitate communication
- Establishing personal relationships overcomes differences in center cultures and center processes

Project Framework

- Establishing common and agreed upon goals, processes, roles and responsibilities is vital to the success of the collaboration
- Establishing upfront buy-in from will ensure the objectives of the collaboration are met.

Management Involvement

- Scheduled oversight by management provides encouragement to the collaboration membership
- Involving project and senior management from all parties in the collaboration is an important tenant to the collaboration success.
- Management over-site is needed to provide guidance to the collaboration
- Providing a forum to resolve any issues

Other Noteworthy Findings/Best Practices

- Projects can overcome deficiencies in some areas by excelling in others.
- Perceived project success can be maximized by excelling in as many areas as possible.

The Collaboration Training Module also provides information that allows individual gap analysis to determine other training needs to effectively support a collaborative effort. Individual Training may be needed in the areas of

- Project/Program Management
- Management and Leadership Courses
- Business Management
- Communications and Interpersonal skills

The Collaborative Training Module also provides information for team building, including

- Tips for Developing Team charters/agreements
- Tips for Developing Trust
- Tips for Effective Face to face meetings
- How to Celebrate

The Collaboration Training Module also provides information for using enabling technologies in collaboration such as telephones, voice mail, teleconferencing, videoconferencing, e-mail, and other Web based tools.

The project results also identified the basic collaboration skill elements necessary for members of a collaboration. The content of this course has been coordinated with developers/instructors in order to integrate this course material into existing and new classes that would be taught at centers. This course material is geared for those engineers and scientist unable to attend the APPL series of courses.