National Aeronautics and Space Administration
Washington, DC

RETURN TO FLIGHT TASK GROUP

April 16, 2004

Webster Conference Center
Houston, Texas

PUBLIC MEETING MINUTES

Vincent Wathen for:
David Lengyel
Executive Secretary

R O Covey
Richard Covey
Co-Chairman

RETURN TO FLIGHT (RTF) TASK GROUP
Webster Conference Center, Houston, TX
April 16, 2004

PUBLIC MEETING REPORT
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Meeting Report Prepared By:
David J. Frankel, Consultant
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Return to Flight (RTF) Task Group

Webster Conference Center, Houston, TX
April 16, 2004

Introductory Remarks

Mr. Richard Covey, Co-Chair of the RTF Task Group, welcomed the public observers. He noted that there would be at least one more public meeting of the Task Group and he acknowledged the hard work of the support staff and the Task Group members. He stated that the Task Group is working towards acceptance of closure packages submitted by the Agency and he discussed the Task Group's Charter. The Columbia Accident Investigation Board (CAIB) had identified a number of recommendations in its report that NASA needs to implement prior to the next Space Shuttle flight. The Task Group will assess those actions and provide advice on whether they do or do not meet the CAIB findings and recommendations.

Mr. David Lengyel, Executive Secretary of the RTF Task Group called the meeting to order at 0800 and identified himself as the Designated Federal Official (DFO). A Press Conference was scheduled for 1200 at the Johnson Space Center (JSC). The interim report will be released May.

Mr. Covey turned the meeting over to Dr. Dan Crippen, Management Panel Chair

Management Panel Fact-Finding Status

Dr. Crippen stated that the Management Panel is very encouraged by the progress that they have seen. NASA's work has been impressive, thorough, and is producing first-rate results.

Mr. Gary Geyer reported on CAIB Recommendation 6.3-2 (NASA/National Imagery and Mapping Agency (NIMA) Memorandum of Agreement (MOA)). He stated that due to security requirements, there are limitations on what can be publicly discussed. NASA is seeking all available data that may assist in the resolution of future investigations and is well underway to obtaining the necessary clearances for utilization of data. The agreements are in place. Compliance is being verified by analysis, demonstration, and end-to-end simulation. The NASA closeout package has been submitted. The Panel recommends that this item be closed. Mr. Covey asked whether there are any objections to closing this item. Hearing none, he declared this item closed.

Mrs. Susan Livingstone reported on CAIB Recommendation 6.3-1 (Mission Management Team [MMT] Improvements). She explained that the MMT is critical during launch and in-flight operations and there has been a lot of interaction with NASA. They are going well beyond the CAIB requirement. For instance, they have required senior level participation on the MMT to be mandatory. NASA is testing new procedures very rigorously and is soliciting minority opinion and drawing that into the MMT. They have developed a written training plan and have established pre-certification and sustaining certification requirements to serve on the MMT. Simulation exercises provide a venue to not only test new MMT membership, processes and critical decision-making, but also provide a venue to test other CAIB recommendations and the ability of the MMT to deal with the vastly increased data flow. NASA deserves credit for the work that has been done in this area. The simulations involve many people. Based on the observations so far, NASA has made significant progress. With continued maturing, the simulations should become effective in identifying critical issues. Additional documentation is needed. The MMT has to show that it can deal with the quantity of information. They need to conduct further simulation exercises. They will need to establish criteria to judge their own performance and demonstrate correction of lessons-learned from prior MMT simulations. They face a difficult task to integrate data into decision-making. Great progress, but more to follow. Dr. Kathy Clark stated that simulation is only as good as the simulators; the simulators need to know what is required and we are not sure what the MMT would want to know. Mrs. Livingstone responded that there has been an increasing sophistication in the simulations. There are multiple objectives for the simulations: training the MMT and serving as an integration lab. There is a need for additional clarity in that arena and there is a need for a formal feedback loop to close out lessons learned. Dr. Clark asked whether there is a plan in place for a sophisticated simulation that would involve

conflicting data. Mrs. Livingstone responded that there was; there are a number of types of "test and stress" simulations planned. Ms. Christine Fox asked how simulation and full dress rehearsal are distinguished. Mrs. Livingstone responded that a simulation involves a test plan that is thrown at the MMT for resolution. It does not involve the complete scope of an event that would be covered in a full dress rehearsal. She does not know whether NASA has a plan for a full dress rehearsal. Dr. Crippen stated that a plan for a full dress rehearsal is in the works. Mr. James Lloyd noted that the culture survey indicated a problem with people coming forward with minority opinions. He is impressed with the training that is being given at senior levels to encourage people to come forward. Mrs. Livingstone observed that is something that all organizations have to work on. The issue is how to encourage minority opinions when there is limited time for making decisions. Dr. Crippen stated that the culture issue is not being evaluated because it is not a return to flight issue, but that it is being watched by the Task Group because it permeates many areas.

Dr. Walter Broadnax reported on the status of CAIB Recommendation 9.1-1 (Organization), which requires that NASA prepare a plan for an Independent Technical Engineering Authority, an independent safety program, and a reorganized Space Shuttle Integration Office. There was not a specific recommendation under this CAIB item that dealt with culture; however, that part of the discussion has been given a lot of emphasis. The NASA leadership has clearly recognized that culture and change is required within the NASA organization. The most visible activity to date has been the hiring of the Behavioral Science Technology (BST) group, which has begun work on a three-year study. The BST has developed a plan that includes data collected from surveys. The plan is now in the hands of the NASA work force for feedback. There is going to be an Academy of Public Administration study that will be looking at the workforce. The Panel has been briefed on the BST initiative. They expect to receive from BST and NASA additional documents and products as they are developed. The activity addressing the culture change issue is substantial and the Panel finds the level of activity to be encouraging. Mr. Covey asked in the context of 9.1-1 and BST, how do they relate to climate and would that lead to a cultural change. Dr. Broadnax responded that those kinds of connections are not obvious; there are a series of climate changes and how that would fit with the BST activity is not clear. Dr. Crippen stated that there is a tension over how much should be done, while at the same time they are engaged in the complex project of bringing the Shuttle back on line. Dr. Cark asked how the cultural change would be scored. Dr. Broadnax stated that there would be a full evaluation at the end of 3 years on the successes and failures of the BST intervention. Dr. Clark expressed concern over the issue raised by Dr. Crippen. Dr. Broadnax concurred with that concern. Dr. Rosemary O'Leary asked whether there is a culture czar. Mr. Lloyd stated that Mr. Jim Jennings is the culture czar and that there is also a steering committee that is working with BST and encouraging change. BST will be using interventions and will use surveys to measure progress resulting from the interventions. Mr. Joe Cuzzopoli, Chair of the Technical Panel, stated that the Technical Panel has been to many Centers and does not see a problem with the culture. He hopes that what they come up with does not harm what is being done that is good.

Dr. Crippen reported on the status of CAIB Recommendation 7.5-1 (Independent Technical Engineering Authority (ITEA)). The ITEA is to be responsible for technical requirements and all waivers to those requirements and independently verify launch readiness. It is to be funded directly from NASA Headquarters and should have no connection to or responsibility for schedule or program cost.
The Panel has met with NASA's Mr. Bryan O'Connor and discussed with him what the structure of the ITEA should look like. It is expected to be neither Headquarters-centric, nor Center-centric. They expect that there will be headquarters authority and responsibility with considerable delegation to the Centers. CAIB was most interested in separating the authority to waive critical authority from the Program Office. The Panel is encouraged with the progress, however much difficult work remains ahead. Col Jim Adamson asked whether the ITEA would be involved in the current effort to return to flight. Dr. Crippen stated that it is NASA's intent to have some pieces operational before the next flight. One change is the establishment of the NASA Engineering and Safety Center (NESC). Mr. Covey stated that the CAIB did not know when the next flight would be and the fact that the first flight has been delayed does not mean that the implementation of the ITEA should be delayed. Those organizational changes need to be implemented at an appropriate time. In response to a question from Dr. O'Leary, Dr. Crippen explained that the ITEA's authority would flow from Headquarters. The Chief Engineer would have the authority to issue standards and would, therefore, have authority to issue waivers from those requirements. The Chief Engineer may issue warrants to delegate to experts in the field the authority to issue waivers. In response to a question

from Dr. Clark, Dr. Crippen explained that many of the engineers doing the independent technical reviews would be borrowed from other areas of NASA due to limited resources. The NESC is located at Langley Research Center, but reports to Mr. O'Connor at NASA Headquarters. It is now staffed with some of the best people. They are developing processes and are actually working on a couple of cases. This will be a complementary function to the Space Shuttle Program. Dr. Crippen stated that the Panel is encouraged with NASA's approach to date and that it needs to resolve implementation issues. The basic objectives necessary for success are independence from the program, authority to issue waivers, and clarity of scope and accountability.

Mr. Tom Tate reported on the status of CAIB Recommendation 7.5-2 (Safety & Mission Assurance (S&MA) Organization.) NASA is moving out smartly and has made significant progress on this item. The plan is moving through the leadership cycle and personnel assignments are underway. Mr. O'Connor will be a voting member of the institutional counsel. NASA is pursuing improved process and compliance audit capability. The Panel will continue to assess the progress. Mr. Covey asked whether the Agency would satisfy 9.1-1, which requires a plan on organizational changes, with one common plan or would separate plans be issued out as they mature. Mr. Tate stated that they are integrating everything into one plan. Dr. Crippen stated that the Panel may approve pieces of the plan separately as they are developed. In response to a question from Mr. Cuzzopoli, Mr. Tate stated that the biggest problem is to find people to fill the spots; there is an engineering shortage. Dr. Crippen stated that NASA is about 30 days away from beginning to utilize the recently enacted Flexibility Act, which should afford some relief from Civil Service requirements. Money does not appear to be a problem.

Mr. Geyer reported on the status of CAIB Recommendation 7.5-3 (Shuttle Integration Office Reorganization). NASA has retained the Aerospace Corporation to assist here and the proof will be what they do. They have taken on a very difficult issue: transport analysis, which means determining what happens to foam that is shed by the External Tank (ET). The Panel will hold this item open and watch how it matures.

Dr. Crippen reported on the status of CAIB Recommendation 6.2-1 (Scheduling & Resources). This calls for NASA to adopt and maintain a Space Shuttle flight schedule that is consistent with available resources, and for deadlines to be regularly evaluated to ensure that any additional risk incurred to meet the schedule is recognized, understood, and acceptable. The Panel is concerned that adequate personnel are not in place and that the ultimate restraint may be the insufficiency of adequate personnel. Mr. Covey stated that he has wrestled with this recommendation to understand what it takes to show that it has been implemented. Dr. Crippen noted that it is an issue of first impression. They have not found indications that lack of monetary resources are a constraint; there are adequate financial resources to do the technical work. Mr. Covey observed that this begs to a degree the assessment of the process and tools that are available. Dr. Crippen stated that a number of new tools have been developed to assess the risks in an on-going fashion. Mr. Lloyd stated that he has not seen any lack of resources; the problem is the limits of current technology.

Technical Panel Fact-Finding Status

Mr. Cuzzupoli described the closeout process. NASA presents a complete item to the Panel for closeout and the Panel looks closely to see that they have met the requirement, that there is an implementation plan, and that it can be verified.

Mr. Richard Kohrs reported on the status of CAIB Recommendation 3.2-1 (External Tank Debris Shedding). He described the areas of the ET that generate foam debris shedding and he reviewed NASA's accomplishments. The ability to use Non-Destructive Evaluation (NDE) to detect voids less than .5 inches has not developed; the ET Thermal Protection System (TPS) certification plan, therefore, is based on process control and will use NDE as a confidence tool. Under the flight verification plan, test panels will be manufactured alternatively with flight panels. This item will remain held open. Mr. Kohrs described how it was determined to expand the ET debris zone to +/- 112 degrees. Mr. Bob Sieck asked whether the requirement is to eliminate critical debris and not all debris. Mr. Kohrs stated that this is difficult to determine. Col. Adamson suggested that the verification process would be indicted if critical debris shedding is observed on the first flight. Mr. Kohrs concurred and stated that they would have to go back

and revisit it. Mr. Cuzzopoli stated that this item would probably be kept open until the ET is shipped. Mr. Covey stated that the importance of this is critical and fundamental to the rationale for returning to flight. It will be followed closely.

Mr. Sy Rubenstein reported on the status of CAIB Recommendation 3.3-1 (Reinforced Carbon-Carbon (RCC) Structural Integrity). There are 22 RCC panels on each wing side, heat seals, one nose cap, and one chin panel. The concern is whether something is going on under the surface that might affect the strength of the RCC. In the past, tactile and visual inspection had been used. The only way to satisfy the CAIB requirement was to recycle all components to the manufacturer now and pursue a technique for in-situ evaluation. There has been significant progress and there are a number of improvements being made to the inspection techniques. The development of techniques for in-situ NDE is well underway. Mr. Rubenstein summarized the status of the inspection of the panels on OV-103 and OV-104. The manufacturer has re-baselined all RCC components. All panels have been thermographically inspected and their strength has been revalidated through testing. All the data measured to date exceeds the allowable limits; there are no aging or corrosion issues. The Technical Panel assessment is that there has been thorough activity to clear all flight hardware and that significant progress has been made in baselining new NDE. All RCC Leading Edge Structure System (LESS) components will have manufacturer's NDE and new thermography data. The RCC standard is well underway. Flaw detection requirements are being defined. Data storage, reduction and analysis process is in development. "Turn-key" systems for in-situ techniques are under development. NASA has submitted a detailed closeout package and the Panel recommends it be accepted. Mr. Cuzzopoli noted that the closeout statements provide that any changes will be brought to the Panel's attention. Due to the Space Exploration Vision, some long-term fixes may not be pursued. Mr. Covey asked whether there are any objections to closing this item. Hearing none, he declared this item closed.

Mr. Cuzzopoli reported on the status of CAIB Recommendation 4.2-3 (Two-Person Close Out). This item requires that at least two employees attend all final closeouts and intertank area hand-spraying procedures. The CAIB subsequently clarified that this recommendation was intended to apply to the entire space transportation system for all types of close outs. At Michoud, the tank manufacturer, Material Processing Procedures (MPP's) will be modified in accordance with the two-person closeout requirement. NASA will review and update the contractor's process controls. Government Mandated Inspection Points (GMIP's) are also to be included in MPP's. The Space Shuttle Program Office (SSPO) has issued letters directing each project manager to review and audit by April 30, 2004, all flight hardware final closeouts at the Space Shuttle element manufacturing sites, and during launch preparation at Kennedy Space Center. NASA has produced a draft MPP for the Task Group to review and comments have been returned. The MPP's will be revised and released. The rest of the elements will be completed by April 30. Mr. Cuzzopoli described the NASA verification process for the two-person closeout and he reviewed the schedule for the audit. The audit results will be provided to the Task Group and will be included in the S&MA Quality Control Plan. The Technical Panel recommends that NASA's closeout package be accepted. Mr. Covey noted that the CAIB had not found any other instances where there was less than a two-person closeout other than the ET. Mr. Cuzzopoli expressed appreciation to the assistance from the Operations Panel, particularly Mr. Bob Sieck. Mr. Covey asked whether there are any objections to closing this item. Hearing none, he declared this item closed.

Mr. Cuzzopoli reported on the other CAIB Recommendations under the purview of the Technical Panel:
3.3-2 Orbiter Hardening. The plan is great; however, much testing remains.
4.2-1 Solid Rocket Booster (SRB) Bolt Catchers. The package is not ready for NASA to present to the Panel.
6.4-1 Thermal Protection System (TPS) Repairs – Tile Repair and RCC Repair
This item has a long way to go. They are not done with the RCC system yet and the boom needs to be developed.

Operations Panel Fact-Finding Status

Col. James Adamson, Operations Panel Chair, stated that the 6 items being addressed by the Operations Panel were not yet ready for closeout, although two items are close: Foreign Object Debris, and Contingency Shuttle Crew Support or safe haven. He noted that safe haven is an additional risk mitigation

or "raise the bar" effort on the part of NASA—in case there is a problem that could not be repaired. The Panel will monitor that item even though it was not a CAIB recommendation.

Mr. Sieck reported on the status of CAIB Recommendation 3.4-1 (Ground-Based Imagery). NASA has begun to refurbish 14 existing range trackers. It will continue to establish requirements and procure new optics and cameras. It is assessing airborne (WB-57) cameras as imagery assets. It has begun development of launch commit criteria for the ground-based camera systems assessment. The high volume of information from ground and airborne-based imagery, along with other sensor data, will require development of an integrated process that analyzes the data and integrates the results for mission operations decision-making. The Panel believes that the plan is mature and that implementation is nearing completion. The Panel recommends keeping this item open. Mr. Covey asked whether there were any plans to exercise the new assets. Mr. Sieck responded that NASA intends to exercise some assets in the simulations that are planned. Mr. Cuzzopoli stated that some assets would be exercised while being used in other non-shuttle activities. Dr. O'Leary asked whether there was a management challenge because the Air Force cameras are contracted out with a private contractor. Mr. Sieck responded that this is something to watch. Mrs. Livingstone noted that an operational approach is being developed for the simulation exercises.

Lt. Gen. Forrest McCartney reported on the status of CAIB Recommendation 3.4-2 (High-Resolution Imagery of ET), calling for a capability to obtain and downlink high-resolution images of the ET after it separates. NASA has moved out very swiftly on this item. A crew handheld camera will be used to give earlier, quicker, and better views. It will be digitized to facilitate downlinking. NASA will use an umbilical well camera to show separation. The film has to be recovered after the Space Shuttle lands. NASA has developed an Enhanced Launch Vehicle Imagery System (ELVIS) Integration Team concept, which is a very worthwhile exercise. The implementation should realize the results that are needed. NASA has a good plan. The schedule for the Orbiter Boom Sensor System (OBSS) is aggressive. They are making good progress. A closeout package should be presented in the fall. The high volume of information from ground and airborne-based imagery, along with other sensor data, will require development of an integrated process that analyzes the data and integrates the results for mission operations decision-making.

Mr. Sieck reported on the status of CAIB Recommendation 3.4-3 (High-Resolution Imagery of Orbiter). He noted that NASA has shifted to using on-orbit assets. The implementation plan reflects that the OBSS and the International Space Station (ISS) will be used. This is a complex development project involving a remote manipulator system and has all the challenges of a new technical project. NASA has approved improved cameras for the Solid Rocket Booster (SRB) aft skirts and for the ET O2 flow line fairing. The next step in addition to the OBSS is managing the high volume of data. The high volume of information from ground and airborne-based imagery, along with other sensor data, will require development of an integrated process that analyzes the data and integrates the results for mission operations decision-making. This item will be kept open for some time. Mr. Covey noted that this item is tied to TPS inspection and that the overall objective is to determine the state of the TPS before committing to re-entry.

Lt. Gen. McCartney reported on the status of CAIB Recommendation 4.2-5 (Foreign Object Debris [FOD]). He stated that NASA understands the need to educate the workforce about FOD and they have a good plan. Best practices were determined from benchmarking. A FOD program milestone schedule has been developed. The Program Control Requirements Board (PCRB) approval, updated procedures, training and implementation are expected to occur in May or June 2004. They are moving along with it; they have a good plan; the main problem stems from lack of education. This is a candidate for closeout in August.

Lt. Gen. McCartney reported on the status of CAIB Recommendation 10.3-1 (Digital Close Out Imagery) NASA has procured 6.M pixel cameras for close out photography. Generic and RTF-specific closeout photo requirements have been obtained from the Program Elements. NASA has identified Shuttle Imaging Management System (SIMS) enhancements that are required and upgrades are in work. NASA has developed training materials for SIMS database users and a schedule for training. NASA is collecting close out and configuration imagery requirements from users and documenting requirements. They need to revalidate that all the needs are met. Col. Adamson noted that this is a candidate for a simulation. Lt. Gen. McCartney agreed and stated that the MMT has been asked to identify the information they would like to

be able to call up. The goal is to retrieve timely configuration imagery in a user-friendly way. This is an on-going process and is a strong candidate for closing in August, depending on receipt of a closeout package.

Col. Susan Helms reported on the status of SSP3 (Contingency Shuttle Crew Support [CSCS]). NASA is evaluating the feasibility of providing contingency life support on board the ISS to stranded Space Shuttle crewmembers until repair or rescue can be affected. This has to be coordinated with the international partners and is viewed as a "sparing" issue. NASA has identified the key consumables to maintain life for an extended time on the Space Station and has calculated the number of days that supplies would last. The definition of requirements to develop CSCS concepts across the Space Shuttle and ISS Programs has to mature. Dr. O'Leary asked how long it would take to rescue the crew. Col. Helms responded that the plan now is to evaluate each consumable and estimate how long it would last. Food is not the problem; it is oxygen, water, and carbon dioxide removal. The Shuttle can be "milked" for a few weeks. There will be at least several weeks of safe haven. Mr. Covey stated that if you look at the practicability of launch on need, there would need to be two to three months. He does not see the Agency being able to launch within two or three weeks.

Col. Adamson made a general comment for the benefit of the general public. He stated that many recommendations have interdependencies and are very complicated. For example, the critical debris issue affects the RCC repair, which affects imagery. Much hinges on developing brand new tools for analysis. The Agency is having to "invent its way out of this pickle." He noted that there are many people in the Agency who should be given credit for working hard to make this work.

Integrated Vehicle Assessment Sub-Panel (IVASP) Fact-Finding Status

Ms. Christine Fox, IVASP Chair, reported on the IVASP. The purpose of the IVASP is to assess NASA's process to obtain and integrate external damage data and translate that data into integrated vehicle assessments based on a variety of imagery and sensor sources in direct support of decision-making for real-time operations. She explained that this is the sub-panel to look at process to support decision-making. The Systems Engineering & Integration Office (SEIO) has produced an Operations Concept to support the process to bring the integration together and has established the Systems Engineering Office for Imagery Coordination. The IVASP met with NASA in February and a revised Operations Concept plan has been submitted. NASA has made significant progress in a short period of time. The Operations Concept plan is expected to be a living document that will evolve as requirements become clear. It is the first document that identifies all the data resources that would be available throughout the flight and includes a timeline showing the availability of the data. NASA has identified all of the organizations that collect data during the flight and has identified the process for flowing data to the MMT. There still is a lot of work to be done. The current Operations Concept plan is being circulated throughout the Agency for comments. NASA intends to start conducting simulations to look at the Operations Concept. The IVASP will observe and comment on the simulations. Col. Adamson asked whether the actual history of communication coverage and drop-outs are being looked at. Ms. Fox stated that this is a good point and that the downlink process has to be explored so that NASA knows the bandwidth that is needed for downlinking, the analysis timeline, and how to present that information to the decision-makers on the MMT. The people drafting the Operations Concept are considering these requirements. Mr. Sieck stated that it was encouraging to see the early involvement of the Mission Directors in this process. Col. Adamson expressed concern that so much energy is being focused on the TPS, that other elements of the Space Shuttle might get ignored. Dr. Crippen stated that a lot of effort is being made to look beyond TPS for things that are similar to TPS that may need to be investigated. Mr. Covey concurred with Col. Adamson's comments on the complexities that are involved and stated that the sub-panel has made an excellent start.

Action Item Summary and Closing Remarks

Mr. Covey stated that the Task Group's assessment is that NASA's responses to CAIB Recommendations 6.3-2, 3.3-1, and 4.2-3 were complete and accepted as having met the intention of the CAIB Recommendations. He thanked the support staff for its assistance and adjourned the meeting.

RETURN TO FLIGHT TASK GROUP

Public Meeting Agenda
April 16, 2004

Location: Webster Conference Center
Houston, TX

0800 – 9005	Introductory Remarks	Mr. Richard Covey Co-Chair
0805 – 0855	Management Panel Fact-Finding Status	Dr. Dan Crippen
0855 – 0945	Operations Panel Fact-Finding Status	Col. James Adamson
0945 – 1035	Technical Panel Fact-Finding Status	Mr. Joseph Cuzzupoli
1035 – 1050	Integrated Vehicle Assessment Sub-Panel Fact-Finding Status	Ms. Christine Fox
1050 – 1100	Action Item Summary and Closing Remarks	Mr. Richard Covey Co-Chair

RTF Task Group Membership

Co-Chairmen of the Return to Flight Task Group

Lt. Gen. Thomas Stafford, USAF (Ret), Chairman, NASA Advisory Council Task Force on International Space Station Operational Readiness (Stafford Task Force), President, Stafford, Burke & Hecker Inc., Astronaut (Gemini 6A, Gemini 9A, Apollo 10, CDR of the Apollo-Soyuz Test Project)
Mr. Richard O. Covey, Vice President, Support Operations, Boeing Homeland Security and Services, Astronaut (STS-51I, STS-26, STS-38, STS-61)

Task Group Members

Colonel Jim Adamson, US Army (Ret.), CEO, Monarch Precision, LLC, Astronaut (STS-28 & 43)
Major General Bill Anders USAF (Ret.), Retired Chair and CEO of General Dynamics Corporation, Astronaut (Apollo 8)
Dr. Walter Broadnax, President, Clark Atlanta University
Rear Admiral Walter Cantrell, US Navy (Ret.), Aerospace Consultant, Member Aerospace Safety Advisory Panel, Former Commander, Space and Naval Warfare Systems Command
Dr. Kathryn Clark, Vice President for Education, TIVY, Incorporated
Mr. Ben Cosgrove, Senior Vice President, Boeing Commercial Airplane Group (Retired)
Dr. Dan Crippen, Former Director of the Congressional Budget Office
Mr. Joseph Cuzzupoli, Vice President and K-1 Program Manager, Kistler Aerospace Corporation
Dr. Charles Daniel, Engineering Consultant, Stafford –Anfimov Task Force
Dr. Richard Danzig, J.D., Director of National Semiconductor Corporation and Human Genome Sciences, Senior Fellow, Center for Naval Analysis
Dr. Amy Donahue, Assistant Professor of Public Administration, University of Connecticut
General Ronald Fogleman, USAF (Ret.), President and Chief Operating Officer of Durango Aerospace Incorporated
Ms. Christine Fox, Vice President and Director the Operations Evaluation Group at the Center for Naval Analyses
Mr. Gary Geyer, Aerospace Consultant, Served for 26 years with the NRO
Colonel Susan Helms, Division Chief , Space Superiority Division, Air Force Space Command, Astronaut (STS-54, STS-64, STS-78, STS-101 and ISS 2)
Mr. Richard Kohrs, Chief Engineer, Kistler Aerospace Corporation
Mrs. Susan Livingstone, Former Under Secretary of the Navy
Mr. James Lloyd, Deputy Associate Administrator, Office of Safety & Mission Assurance, NASA Headquarters
Lieutenant General Forrest McCartney, USAF (Ret.), Aerospace Consultant, Member Aerospace Safety Advisory Panel, Former Director of Kennedy Space Center
Dr. Rosemary O'Leary, Professor of Public Administration, Syracuse University
Dr. Decatur Rogers, Dean, Tennessee State University, College of Engineering, Technology and Computer Science
Mr. Sy Rubenstein, Aerospace Consultant, Former (Ret) President Rockwell International Space Division.
Mr. Robert Sieck, Aerospace Consultant, Member Aerospace Safety Advisory Panel, Former Director of Shuttle Processing, Kennedy Space Center
Mr. Thomas M. Tate, Consultant, Vice President of Legislative Affairs for Aerospace Industries Association (AIA) (Retired)
Dr. Kathryn C.Thornton, Professor, University of Virginia School of Engineering and Applied Science, former Astronaut
Mr. Bill Wegner, Consultant, Former Deputy Director to Admiral Rickover in Nuclear Navy Program

Task Group Support

Ex Officio Member: Mr. James Lloyd, Deputy Associate Administrator, Office of Safety & Mission Assurance, NASA Headquarters

Executive Secretary: Mr. David M. Lengyel, NASA Headquarters
Astronaut Representative: Mr. Carlos Noriega, NASA Johnson Space Center
Mr. Thomas Diegelman, Technical Support
Maj. Gen. Joe Engle, Technical Support
Ms. Susie Mauzy, Technical Support
Mr. George Mueller, Technical Support
Ms. Barbara Teague, Technical Support
Mr. David Frankel, Minutes

RETURN TO FLIGHT (RTF) TASK GROUP
Webster Civic Center, Houston, TX
April 16, 2004

MEETING ATTENDEES

RTF Task Group Members:	*Affiliation:*
Richard Covey (Co-Chairman)	Boeing Homeland Security and Services
Jim Adamson	Monarch Precision, LLC
Walter Broadnax	Clark Atlanta University
Walter Cantrell	Aerospace Safety Advisory Panel
Kathryn Clark	TIVY, Inc.
Ben Cosgrove	Consultant
Dan Crippen	Consultant
Joseph Cuzzupoli	Kistler Aerospace
Christine Fox	Center for Naval Analyses
Gary Geyer	Consultant
Susan Helms	Air Force Space Command
Richard Kohrs	Kistler Aerospace
Susan Livingstone	Consultant
Forrest McCartney	Aerospace Safety Advisory Panel
Carlos Noriega	Astronaut
Rosemary O'Leary	Consultant
Sy Rubenstein	Consultant
Bob Sieck	Aerospace Safety Advisory Panel
Thomas Tate	Consultant
Bill Wegner	Consultant

NASA Attendees:	*Affiliation:*
Charles Armstrong	NASA/RTF TG
William Bihner	NASA/HQ
Tom Diegelman	NASA/RTF TG
Dave Drachlis	NASA/RTF TG
Joe Engle	NASA/ETI
Mark Erminger	NASA/HQ
Mike Evans	NASA/RTF TG
Lindy Fortenberry	NASA/JSC
David Lengyel (Executive Secretary)	NASA/HQ
Jennifer Lestourgeon	NASA /RTF TG
James Lloyd (Ex-Officio)	NASA/HQ
Marianne Luther	NASA/JSC
Dana Mellerio	NASA/JSC
Susan Mauzy	NASA/JSC
Barbara Moody	NASA/JSC
Rebecca Sharek	NASA/OIG
Barbara Teague	NASA/RTF TG

Other Attendees:	*Affiliation*
Joyce Abbey	OXIC
Shannon Bach	RTF TG Support
Mark Carreau	Houston Chronicle

Harold Draughon	HST
Pam Eastern	Associated Press
Mary Estacion	News 24
Mark Evangelista	Clear Lake Citizen
Tracy Evans	KTRH Newsradio, Houston
Gerald Griffith	JAI
Robert Jones	TEAMS of Houston
Isao Kanazawa	JAXA
Steve Krahn	Perot Systems Government Services
Kristie Kubovic	WBOY
Bob Lane	ARES
Daniele Lavrini	ESA/Houston
Ned Mueller	RTF TG Support
Ken Monroe	House Science Committee
Kitty Rogers	RTF TG Support
Gwiyneth Shaw	Orlando Sentinel
Linda Shiner	Smithsonian Air & Space Magazine
Ole Smistad	Valador
Susan Stone	RTF TG Support
Richard Stonely	Public
Pat Sullivan	AP
Gina Treadgold	ABC News
Tammy West	RTF TG Support
Richard Winniam	Metro Ch (11)
John Whiteley	PSGGS