

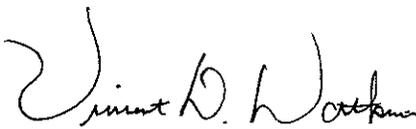
**National Aeronautics and Space Administration
Washington, DC**

**RETURN TO FLIGHT
TASK GROUP**

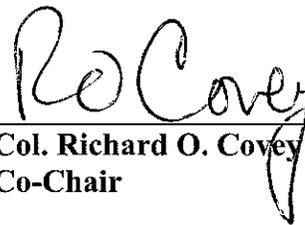
June 27, 2005

**Holiday Inn Capitol Conference Center
Washington, DC**

MEETING MINUTES



**Vincent D. Watkins
Executive Secretary**



**Col. Richard O. Covey
Co-Chair**

RETURN TO FLIGHT TASK GROUP (RTF TG)
Holiday Inn Capitol Conference Center
Washington, DC
June 27, 2005

MEETING REPORT
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Meeting Report Prepared By:
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Infonetic

Return to Flight Task Group (RTF TG)
Holiday Inn Capitol, Washington, DC
June 27, 2005

Welcome and Introductory Remarks

Mr. Vincent Watkins, Executive Secretary of the RTF TG, called the meeting to order, made introductory announcements, and introduced the members present at the meeting: Col. Richard Covey (Co-Chairman), Dr. Dan Crippen (Lead of the Management Panel), Dr. Walter Broadnax, Ms. Susan Livingstone, Mr. Thomas Tate, Mr. Joseph Cuzzupoli (Lead of the Technical Panel), Dr. Charles Daniel, Mr. Richard Kohrs, Col. James Adamson (Lead of the Operations Panel), Ms. Christine Fox, Dr. Amy Donahue, Dr. Kathryn Thornton, Lt. Gen. Forrest McCartney, and Mr. James Lloyd (Ex-Officio). Mr. Sy Rubenstein and Mr. Gary Geyer participated via teleconference.

Col. Covey welcomed attendees to the public meeting. He apologized for the delay in the start of the meeting. He noted that important Shuttle Program milestones the previous week had provided additional data for the RTF TG to review at its fact-finding session prior to the public meeting. The charter of the RTF TG is to deliver assessments to the NASA Administrator on the 15 Columbia Accident Investigation Board (CAIB) recommendations relative to the Agency's implementation of those recommendations. Also, the RTF TG has the ability to make other observations relative to safety and operational readiness. In prior meetings, the RTF TG has completed 12 of the 15 recommendations as well as NASA's "raising the bar" activity on Contingency Shuttle Crew Support. NASA's Flight Readiness Review (FRR) is on Wednesday, June 29, 2005. It is the intent of the RTF TG to complete all assessments prior to that review. The RTF TG Final Report will be a record of public deliberations. It is important to understand the three open assessments: Orbiter Hardening (R3.3-2), External Tank (ET) Debris Shedding (R3.2-1), and Thermal Protection System (TPS) Inspection and Repair (R6.4-1). All of these come together in a common way—NASA's approach to an integrated risk assessment for the return to flight activities. These three technical and operational recommendations are the most demanding the CAIB brought to bear and the Agency accepted. The CAIB knew they were making demanding recommendations and is reflected in the way the RTF TG brings forward these recommendations for closure.

Technical Panel Fact-Finding Status

Mr. Cuzzupoli reviewed the Technical Panel recommendations. Three have been closed prior to this meeting. Three are still open: Orbiter Hardening (R3.3-2), ET Debris Shedding (R3.2-1), and TPS Inspection and Repair (R6.4-1). Mr. Rubenstein discussed R3.3-2. The CAIB recommendation was to "initiate a program designed to increase the Orbiter's ability to sustain minor debris damage by measures such as improved impact-resistant Reinforced Carbon-Carbon (RCC) and acreage tiles. This program should determine the actual impact resistance of current materials and the effect of likely debris strikes." What the RTF TG felt the CAIB meant was to "develop a detailed plan for an Orbiter hardening program including the testing and modeling to determine the impact resistance of the thermal protection system. For the first Orbiter returning to flight, the actual impact resistance of installed material and the effect of likely debris strikes should be known. Implement hardware changes as defined in the hardening program." Mr. Rubenstein showed all of the changes NASA planned to meet this recommendation. All of the Phase I changes have been implemented. A change was made to the Phase II plan for the Main Landing Gear Doors (MLGD). Robust RCC is no longer included in Phase III. A decision was made by the Program to not implement the MLGD redundant thermal barrier modification due to associated high risk with requiring significant MLGD mechanism rework. Instead, Boeing Rigidized Insulation (BRI)-18 will replace the current FRCI-12 tiles around the MLGD perimeter. These tiles are more impact resistant. Orbiter Vehicle-105 will be the first vehicle to receive BRI-18 tiles. Col. Covey noted the President's Vision leading to retiring the Shuttle in 2010 has affected the plan for long-term work. Mr. Rubenstein discussed impact and damage tolerance. The windows are good for the predicted debris environment. Tile impact tolerance was determined empirically by test. Tile damage maps were developed from a series of linked models. The foam damage map was produced for full certification rigor. No ice damage map was produced—it was produced using 50 percent reduction from the foam damage map. RCC impact tolerance was determined by physics-based DYNA model and verified by testing. Mr. Rubenstein showed the impact test summary for window testing, tile testing, and RCC testing. He discussed the certification rigor impact tolerance curves for tile and damage depth curves for foam. He showed the RCC impact tolerance threshold

definitions with associated factors. This set of data was used in the probability assessment for RCC expected failure distribution for BX-265 foam debris. In addition, criteria were established for Wing Leading Edge (WLE). WLE panel zones and regions allow for two critical damage states (1-inch hole and coating loss). Mr. Rubenstein described the debris assessment process. There were specific foam and ice assessments. He showed the probability numbers for foam exceeding capabilities of RCC and tile. Another area of examination was the bipod. The bipod ramp was eliminated. New foam closeout around the bipod has the potential for some voids. The Aerospace statistical model shows high reliability. Another area examined was the bellows ice. This was the primary reason for the launch delay. A bellows heater was added and has been through qualification test. Mr. Rubenstein showed the results of the ice on tile results. NASA is reexamining the ice numbers to ensure the numbers are appropriately conservative. The last area examined was the history of strike damage. Mr. Rubenstein showed the pattern of impacts recorded on the Orbiter surface. Umbilicals are capable of having very large ice formations based on flight history. Large sizes exceed the bounds of the tile damage model. The Launch Commit Criteria will be updated to monitor the umbilical area ice formation. It is essential that launch controls ensure that no umbilical ice is formed. Dr. Daniel commented the NASA Engineering and Safety Center (NESC) has accepted an action to look at the umbilical. The ice work is still in process.

In summary, four return to flight hardware changes have been certified and installed. The Phase II Program has been updated. The impact TPS test program has been completed. TPS certification and statistical allowables have been completed. The inspection criteria have been updated. Damage assessment models have been developed. The historical data base has been reexamined. There has been an extensive effort to develop techniques to assess likely debris effects. The independent verification of models is in process by the NESC. The Technical Panel feels the hardware program supports return to flight. The TPS impact resistance is supported by significant test and analysis. The likely effects of debris are very complicated. NASA has conducted an extensive program to improve its understanding of the impact resistance of TPS and the likely effects of damage. Major additions to the database will come from flight. The Technical Panel believes with the completion of the open work, the Program has demonstrated it has met the intent of the CAIB recommendation. Col. Covey asked about the status of the final NASA closure package. Mr. Kohrs indicated he has received the signed-off version on R3.3-2. There were no changes from the previous version. Members also received final copies of the closure package for R3.2-1. Ms. Livingstone noted a couple of issues. NASA has met the intent of the recommendation in part. There are a couple of areas that need to be recognized as still open. The decision to retire the Shuttle in 2010 was made after the CAIB Report was issued. The absence of a long-term program for RCC hardening is an issue. In addition, the type of work yet to be done is important in fulfilling the CAIB intent. There are a number of open critical items. Ms. Livingstone proposed instead of stating NASA met the intent of CAIB, the RTF TG should agree the intent of the CAIB has been met in part due to the open work from the Design Verification Review (DVR) and the lack of a long-term program for hardening RCC. Dr. Daniel supported that position with the addition of words that the decision by the Agency to retire the Orbiter has led to the cancellation of any long-term plan for RCC. Mr. Rubenstein clarified detailed design work on RCC was, in fact, initiated by NASA and attempts were made to come up with more robust RCC. That effort was cancelled when the decision to retire the Shuttle was made. Mr. Cuzzupoli noted open work activities may continue up through FRR. Col. Covey observed that in the past, the RTF TG has approved recommendations pending completion of open work where the open work was standard in nature. Dr. Daniel observed that in this case, the work is non-standard—it is focused-work relating to understanding the nature of debris flow and impacts. The completion of the remaining work is considered a constraint to STS-114 launch. The database has been accepted; most of the analysis has been done but it is being refined. Ice is difficult to characterize and the Program is struggling with this from a limited dataset. Mr. Cuzzupoli noted there is a plan and NASA will proceed up through FRR. At the DVR, the members of the DVR were polled and they voted to proceed to flight based on data observed at the DVR. There are two basic actions: the independent look at the ET umbilical ice and the NESC activity confirming the foam and ice models. The Program is formulating the criteria for a day-of-launch item.

Col. Covey summarized: the RTF TG believes the intent of the CAIB has been met in part but has not been demonstrated as fully met due to lack of a long-term program to harden RCC (because of the decision to retire the Shuttle in 2010) and open work relative to DVR actions, e.g., NESC validation work on models and absence of final allowable levels for ice. Mr. Cuzzupoli indicated he had no objection to the wording

proposed for the RTF TG recommendation, but the Technical Panel stands with its Panel recommendation. Col. Covey recommended that based upon the closure package submitted by NASA, the Technical Panel presentation, and the RTF TG deliberation that modified the recommendation, NASA has met, in part, the R3.3-2, but has not demonstrated it has met all the intent based upon open work and a long-term program to enhance RCC. The RTF TG agreed with this recommendation.

Mr. Kohrs discussed ET Debris Shedding, R3.2-1. The CAIB recommendation was to “initiate an aggressive program to eliminate all External Tank Thermal Protection System debris shedding at the source with particular emphasis on the region where the bipod struts attach to the External Tank.” The CAIB recommendation did not address ice, just the TPS. The program was broken into three phases: Phase I for return to flight STS-114; Phase II for process improvements; and Phase III for future flights. Phase III was dropped shortly after the announcement to retire to the Shuttle in 2010. The Program took the first phase to mean “elimination of all sources of critical debris including eliminating the bipod strut foam and determine the void size that correlates with a debris size that is acceptable, based on the transport and energy analysis.” The RTF TG took this as its interpretation. Mr. Kohrs reviewed the ET return to flight activities to date. New TPS debris requirements have been established for return to flight. ET TPS hardware designs have been verified to return to flight TPS debris requirements. Limitations to the TPS verification approach were identified during the design certification process and accepted by the Shuttle Program Requirements Control Board. At the Delta DVR in April, ice on the forward bellows was identified as a source of critical debris. Mr. Kohrs described the ET design changes for debris reduction and showed the TPS debris certification verification results. The ice team will closely monitor the ET ice debris sources. For foam, the ET demonstrated it met the Program foam debris requirements at the Design Certification Review. The Program determined the requirements exceeded Orbiter capability. The ET Project then provided a best estimate of expected debris based on test data and flight history. For ice, the Project added the drip lip to the bellows. The Program analysis showed this as unacceptable risk. The Project replaced this with a new tank with heaters on the forward bellows that eliminated critical ice debris. A statistical analysis was performed to evaluate the risk of critical damage due to residual ice from other locations. The Program has not eliminated critical debris, but debris has been categorized into likelihoods. The Technical Panel feels the ET Project implemented an aggressive program to eliminate critical foam debris and met the Program requirements. The certified tank debris allowables exceeded the capability of the Orbiter. The best estimate of debris allowables is significantly lower than the certified values. Although the Program has performed an extensive effort to reduce debris for return to flight, there still is the potential for foam and ice to cause damage to the Orbiter that exceeds safe entry limits; however, this potential has been significantly reduced. The Technical Panel believes the ET Project and the Space Shuttle Program have demonstrated they have initiated an aggressive program to eliminate ET debris and, within the exceptions and limitations documented in NSTS-60559, have met the intent of the CAIB recommendation. The Program should continue their program to eliminate critical debris by aggressively working off the limitations documented in NSTS-60559. The Program recognizes they cannot drive the risk to zero. Col. Covey noted the RTF TG picked the interpretation used by NASA in its Implementation Plan—elimination of all critical debris. Because of the Exploration Initiative and retirement of the Shuttle, elimination of all debris was not feasible. Col. Adamson noted a lot of decisions in NASA’s Implementation Plan hinged on elimination of critical debris. In the context of the total risk mitigation architecture, this was a linch pin. Ms. Livingstone agreed with Col. Adamson. Ultimately, despite terrific efforts and achievements, NASA was not able to eliminate all critical debris. In this instance, the intent of the CAIB was not met. However, in the environment today, the CAIB recommendation may not be practicable. Mr. Cuzzupoli commented NASA has taken all steps necessary to reduce the amount of critical debris. With the size of the vehicle, it is impossible to run a combined environments test. The only way to do that is to fly.

Col. Covey proposed using the last statement of the Panel assessment with modification: “Although the Program has performed an extensive effort to reduce debris for return to flight, there still is the potential for foam and ice to cause damage to the Orbiter that exceeds safe entry limits; however, this potential has been significantly reduced. Based on the RTF TG’s interpretation to eliminate all critical debris, the recommendation has not been met.” Lt. Gen. McCartney observed this is totally consistent with statements in NASA’s closeout package. Col. Covey noted the RTF TG was in agreement that what NASA did was appropriate, although not all critical debris was eliminated. Col. Covey recommended that based on the

closure package submitted by NASA, the Technical Panel presentation, the RTF TG deliberations, and the revised assessment and recommendation, the intent of the CAIB was not met based upon the RTF TG's interpretation. The RTF TG agreed with this statement.

Operations Panel Fact-Finding Status

Col. Adamson introduced the Operations Panel recommendations. He thanked the RTF TG Co-Chairs and the other Panel members, as well as the members of the Operations Panel, for their efforts. Dr. Thornton discussed TPS Inspection and Repair, R6.4-1. She noted the CAIB recommendation was in four parts and was an extraordinarily challenging recommendation. Two of the parts do not relate to return to flight, as they relate to non-Station missions and autonomous repair capability. No non-Station missions have been scheduled and the autonomous repair capability is beyond return to flight. Col. Covey noted there was a contentious debate over the interpretation of the intent of the CAIB recommendation. A significant minority had a different interpretation. There was a discussion with some members of the CAIB and they indicated the real intent was the Agency does the best they could on repair capabilities and go fly and continue to work on improving the repair capability. This was the minority RTF TG position. Dr. Thornton noted the only issue was over the interpretation of "capability." For inspection, NASA developed an extensive suite of sensors to ascertain the condition of TPS. There is an extensive plan to integrate the data from all of the sensor sources. Any decision to implement a repair or commit to entry with a repair will be extremely difficult. It will have to be pulled together in the Mission Management Team. Tile repair was probably the most challenging recommendation for NASA. The critical damage threshold for tile has been defined as 1-inch around the MLGD or ET umbilical doors and 3 inches in major dimension for acreage tile. Dr. Thornton discussed the three techniques for tile repair: emittance wash (intended for shallow damage anywhere on black tile); the Cure-In-Place Ablator repair and STA-54 (intended for damage up to 10 inches x 20 inches anywhere on tile); and tile overlay (intended for damage up to 10 inches x 20 inches for most of the tile locations). For RCC, critical damage has been defined as cracks 0.020 inches x 2 inches long and 0.020 inches deep. The two techniques for RCC repair are a non-oxide adhesive experimental sealant intended for cracks up to 0.0625 inches x 9 inches and small areas of coating loss, and plug repair intended for holes up to 4 inches diameter. The Primary methods to be used for on-orbit inspection of TPS, the Orbiter Boom Sensor System and the R-bar pitch maneuver have been assessed and accepted. In terms of risk mitigation, detection is quite different from being able to adequately respond to the detected damage. NASA will carry five experimental options to effect emergency repairs to the TPS on STS-114. Experimental repair options manifested on STS-114 show promise for future flights but are contingency measures rather than practicable repair capabilities at this time. To date, none of the repair techniques have gone through a rigorous design and certification process. Tile and RCC repair techniques are not considered sufficiently mature to be a practicable repair capability for STS-114. Dr. Thornton made two observations. The recommendation of the CAIB with respect to repair as written presented an extreme technical challenge to NASA. While there is a gap between possible debris liberation and the ability of the Orbiter to withstand impact and repair damage, the proximate cause of the loss of STS-107 is no longer possible. Inspection has been addressed in Recommendation 3.4-3 and meets the intent of Recommendation 6.4-1 with regard to inspection. Based on the majority opinion interpretation of the intent of R6.4-1—any repair technique must be vetted through the design and ground verification processes prior to being considered a "capability," and the failure of any of the current repair techniques to meet this standard—NASA has not met the intent of the CAIB recommendation with respect to TPS repair. NASA is well on the way to having a certified capability and will have a broader range of options in the future but it is not available for STS-114. Col. Covey applauded the Technical Panel and the Operations Panel for working through this difficult recommendation. At this point, the intent of the recommendation has not been met, not through any lack of intent or effort, but because of the technical difficulty and the high standard for capability. Mr. Lloyd noted there is great value in understanding what is repairable and what is not. Repair can create more damage. There are operational things that can be done to make entry safer without doing repair.

Col. Covey recommended based on the closure package submitted by NASA, the Operations Panel report, and the RTF TG deliberations, NASA has not met the intent of the recommendation as to repair, but has met it with respect to inspection. The RTF TG agreed to disposition this recommendation as such. As noted earlier, there was a minority position relative to the interpretation.

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

Ms. Fox reported on the IVASP. Its purpose was to assess NASA's process to obtain and integrate external damage data to directly support decision-making. The effort cut across many CAIB recommendations. Members of all Panels participated. Ms. Fox reviewed the activities. There has been significant revision to the Orbiter Damage Assessment Process Annex to the Operations Integration Plan (OIP). OIP developers have significantly increased training and broadened participation and have conducted fact-finding trips to explore data integration and independent assessment issues. Fundamentally, the Annex has become an integral part of the decision-making process. Recently, NASA published the baseline version of both the OIP and its Annex. This is an important recognition at the Program level. Ms. Fox highlighted the Sub-Panel observations. The Annex is an important source of information to support decision-making. It documents the sources of data necessary to support complex decisions; it includes risk versus risk assessment matrices; and it is a significant part of the closure criterion for R6.4-1, Inspection and Repair. Senior NASA management continues to accept and support the OIP and Annex. Known values for critical damage assessment and critical debris size are key to the Annex. These values are required to assess sensor capabilities, data analysis timelines, and information quality. In summary, the RTF TG commends the OIP and Damage Assessment developers for designing, documenting, and training to a data integration and assessment process to support STS-114. In the view of the Sub-Panel and the RTF TG, the OIP should continue to develop after STS-114. Because of its importance, the RTF TG suggests IVASP development and training efforts as a candidate for Aerospace Safety and Advisory Panel (ASAP) follow-on. The OIP should serve as a model for other NASA information assessment processes required to support complex decision-making. Col. Covey thanked the Sub-Panel for its work and helping to guide the OIP in its approach. He recommended based upon the data presented in the presentation, the RTF TG accept the observations and summary for the record. The RTF TG agreed with this recommendation.

Summary and Closing Remarks

Col. Covey noted there is a Memorandum of Understanding with the ASAP relative to the transition of items the RTF TG recommends they follow after the Task Group concludes. These items are being refined and will be reflected in the RTF TG Final Report. Also, various members of the RTF TG have observations they are in various stages of formulating and vetting either as an individual representation or for support as a RTF TG observation. The RTF TG will provide a way of dispositioning these. Most of these should not be related to STS-114, but should be related to the overall observations on safety and operational readiness. Mr. Cuzzupoli asked if there were any members that would like to delineate those they intend to bring forward. Ms. Livingstone outlined a few general areas on behalf of Dr. Crippen, who had to depart early. One of the issues relates to NASA's change in skill sets. NASA has transitioned from an operations role back into a test and developmental role. In terms of management areas, there have been some concerns with planning and engineering processes. There is continuous need for very high standards of discipline and rigor and systems integration, documentation of processes, etc. Another area is lessons-learned. It is important the lessons-learned process be sustained, including the importance of risk assessment. There is also a concern over schedule and sustainment of resources. It is expected that schedule and budget pressures will continue. Col. Covey noted observations are currently works in process. Dr. Daniel noted the CAIB Report was written at a static point in time and NASA stepped up and said it would embrace those recommendations for return to flight in totality. The environment has changed in the past two years, including the President's Vision and the decision to retire the Shuttle in 2010. The intent to meet all of the recommendations verbatim has restricted NASA in many ways. Acceptance of a static point in time and limitation of implementing to the letter of those findings is difficult two years down the road. This has had an impact on the flexibility of the Program to respond. With respect to operations observations, Col. Adamson noted the manual foam application process needs continual observation and monitoring for all future flights.

The meeting was adjourned at 1655. There was a press conference immediately following the meeting.

Public Meeting Agenda

June 27, 2005

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- 1300 – 1305 Administrative Remarks
Mr. Vincent Watkins – Executive Secretary
- 1305 – 1310 Introductory Remarks:
Col. Richard Covey – Co-Chair
- 1310 – 1410 Technical Panel Fact-Finding Status
Mr. Joseph Cuzzupoli – Lead
- 1410 – 1450 Operations Panel Fact-Finding Status
Col. James Adamson – Lead
- 1450 – 1515 Integrated Vehicle Assessment Sub-Panel Fact-Finding Status
Ms. Christine Fox – Lead
- 1510 – 1530 Action Item Summary and Closing Remarks
Mr. Richard Covey – Co-Chair

RTF Task Group Membership

Co-Chairs:

Lieutenant General 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)
Col. Richard O. Covey, Vice President, Support Operations, Boeing Homeland Security and Services, Astronaut (STS-51I, STS-26, STS-38, STS-61)

Members:

Colonel James Adamson, US Army (Ret.), CEO, Monarch Precision, LLC, Astronaut (STS-28 & 43)
Major General Williams Anders USAF (Ret.), Retired Chair and CEO of General Dynamics Corporation, Astronaut (Apollo 8)
Dr. Walter Broadnax, President, Clark Atlanta University
Dr. Kathryn Clark, President Docere Company, Consultant in science and education
Mr. Benjamin Cosgrove, Senior Vice President, Boeing Commercial Airplane Group (Retired)
Dr. Dan Crippen, Former Director of the Congressional Budget Office, Member Aerospace Safety Advisory Panel
Mr. Joseph Cuzzupoli, Vice President and K-1 Program Manager, Kistler Aerospace Corporation
Dr. Charles Daniel, Engineering Consultant, Stafford –Anfimov Task Force
Dr. Amy Donahue, Assistant Professor of Public Administration, University of Connecticut, Member Aerospace Safety Advisory Panel
General Ronald Fogleman, USAF (Ret.), President and Chief Operating Officer of Durango Aerospace Incorporated
Ms. Christine Fox, President, Center for Naval Analyses
Mr. Gary Geyer, Aerospace Consultant, Served for 26 years with the NRO
Colonel Susan J. Helms, U.S. Air Force, Deputy Director of Operations, Technical Training, Randolph Air Force Base, Texas, Astronaut (STS-54, STS-64, STS-78, STS-101, and ISS-2)
Mr. Richard Kohrs, Chief Engineer, Kistler Aerospace Corporation
Ms. Susan Livingstone, Former Under Secretary of the Navy
Mr. James Lloyd (Ex-Officio Member), Deputy Chief Safety and Mission Assurance Officer, NASA Headquarters
Lieutenant General Forrest McCartney, USAF (Ret.), Aerospace Consultant, Former Director of the Kennedy Space Center
Dr. Rosemary O’Leary, Distinguished 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 President, Rockwell International Space Division.
Mr. Robert Sieck, Aerospace Consultant, Former Director of Shuttle Processing, Kennedy Space Center
Mr. Thomas Tate, Retired former Vice President of Legislative Affairs for Aerospace Industries Association
Dr. Kathryn Thornton, Professor, University of Virginia School of Engineering & Applied Science, Astronaut (STS-33, STS-49, STS-61)
Mr. William Wegner, Consultant, Former Deputy Director to Admiral Rickover in Nuclear Navy Program

Task Group Support

Executive Secretary: Mr. Vincent Watkins
Astronaut Representative: Col. Michael Bloomfield, USAF

Return to Flight Task Group Public Meeting

Washington, DC

June 27, 2005

ATTENDEE LIST

RTF Task Group Members:

Richard Covey (Co-Chair)
James Adamson
Walter Broadnax
Dan Crippen
Joseph Cuzzupoli
Charles Daniel
Amy Donahue
Christine Fox
Gary Geyer (attended via telecon)
Richard Kohrs
Susan Livingstone
James Lloyd (Ex-Officio)
Forrest McCartney
Sy Rubenstein (attended via telecon)
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Aerospace Consultant
Consultant
Consultant
University of Virginia

NASA Attendees:

Vincent Watkins (Executive Secretary)
M. Cobb
Todd McIntyre
David Schuman

NASA Johnson Space Center
NASA Headquarters
NASA Headquarters
NASA Headquarters

Other Attendees:

Mark Carreau
Beth Dickey
Michael Cabbage
Bill Harwood
John Kelly
Traci Watson
Tind S. Ryen
John Schwartz
Ken Monroe
Catherine Lari
James Paul
Frank Moring
Bill Adkins
Lester Reingold
David Schwarz
Michael Lehull
Allen Powell
Joe Engle
Shannon Bach

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USA Today
House Science Committee
NY Times
House Science Committee
JTNS
House Science Committee
Aviation Week
House Science Committee
Valador
[self]
[self]
ABC News
RTF TG Support
RTF TG Support

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Susan Mauzy
Kitty Rogers
Tom Diegelman
Jennifer LeSturgeon
Malise Fletcher
Dave Drachlis
Dennis Jenkins
Paula Frankel

RTF TG Support
Minutes Taker