APPENDIX A – RETURN TO FLIGHT TASK GROUP CHARTER

The original Task Group charter is shown below.

Establishment and Authority

The NASA Administrator, having determined that it is in the public interest in connection with performance of the Agency duties under the law, and with the concurrence of the General Services Administration, establishes the NASA Return to Flight Task Group, pursuant to the Federal Advisory Committee Act (FACA), 5 U.S.C. App. §§1 et seq.

Purpose and Duties

1. The Task Group will perform an independent assessment of NASA's actions to implement the recommendations of the Columbia Accident Investigation Board (CAIB), as they relate to the safety and operational readiness of STS-114. As necessary to its activities, the Task Group will consult with former members of the CAIB.

2. While the Task Group will not attempt to assess the adequacy of the CAIB recommendations, it will report on the progress of NASA's response to meet the intent.

3. The Task Group may make other such observations on safety or operational readiness, as it believes appropriate.

4. The Task Group will draw on the expertise of its members and other sources to provide its assessment to the Administrator. The Task Group will hold meetings and make site visits as necessary to accomplish its fact-finding. The Task Group will be provided information necessary to perform its advisory functions, including activities of both the Agency and its contractors.

5. The Task Group will function solely as an advisory body and will comply fully with the provisions of the FACA.

Organization

The Task Group is authorized to establish panels in areas related to its work. The panels will report findings and recommendations to the Task Group.

Membership

In order to reflect a balance of views, the Task Group will consist of non-NASA employees and one NASA non-voting, *ex officio* member, the Deputy Associate Administrator for Safety and Mission Assurance. In addition, there may be associate members selected for Task Group panels. The Task Group may also request appointment of consultants to support specific tasks. members of the Task Group and panels will be chosen from among industry, academia, and government with recognized knowledge and expertise in fields relevant to safety and space flight.

The Task Group members and the Co-Chairs of the Task Group will be appointed by the Administrator. At the request of the Task Group, associate members and consultants will be appointed by the Associate Deputy Administrator (Technical Programs).

Administrative Provisions

1. The Task Group will formally report its results to NASA on a continuing basis at appropriate intervals, including a final written report.

2. The Task Group will meet as often as required to complete its duties and will conduct at least two public meetings. Meetings will be open to the public, except when the General Counsel and the Agency Committee Management Officer determine that the meeting or a portion of it will be closed pursuant to the Government in the Sunshine Act or that the meeting is not covered by the Federal Advisory Committee Act. Panel meetings will be held as required.

3. The Executive Secretary will be appointed by the Administrator and will serve as the Designated Federal Official.

4. The Office of Space Flight will provide technical and staff support through the Task Force on International Space Station Operational Readiness. The Office of Space Flight will provide operating funds for the Task Group and panels. The estimated operating costs total approximately $2 million, including 17.5 work years for staff support.

5. Members of the Task Group are entitled to be compensated for their services at the rate equivalent to a GS 15, step 10. Members of the Task Group will also be allowed per diem and travel expenses as authorized by 5 U.S.C. § 5701 *et seq.*

Duration

The Task Group will terminate 2 years from the date of this charter, unless terminated earlier or renewed by the NASA Administrator.

Charter Extension

Because the Task Group did not complete their activities prior to the July 23, 2005, expiration of the original charter, an extension was required to complete the final report and prepare data for delivery to the National Archives. The revised charter is shown below.

Establishment and Authority

The NASA Administrator established the NASA Return to Flight Task Group ("Task Group"). Having determined that it is in the public interest in connection with performance of Agency duties under the law, and with the concurrence of the General Services Administration, the NASA Administrator hereby renews and amends the Task Group's charter, pursuant to the Federal Advisory Committee Act (FACA), 5 U.S.C. App. §§1 *et seq.*

Purpose and Duties

1. The Task Group will perform an independent assessment of NASA's actions to implement the recommendations of the Columbia Accident Investigation Board (CAIB), as they relate to the safety and operational readiness of STS-114. As necessary to its activities, the Task Group will consult with former members of the CAIB.

2. While the Task Group will not attempt to assess the adequacy of the CAIB recommendations, it will report on the progress of NASA's response to meet the intent.

3. The Task Group may make other such observations on safety or operational readiness, as it believes appropriate.

4. The Task Group will draw on the expertise of its members and other sources to provide its assessment to the Administrator. The Task Group will hold meetings and make site visits as necessary to accomplish its fact-finding. The Task Group will be provided information necessary to perform its advisory functions, including activities of both the Agency and its contractors.

5. The Task Group will function solely as an advisory body and will comply fully with the provisions of the FACA.

Organization

The Task Group is authorized to establish panels in areas related to its work. The panels will report findings and recommendations to the Task Group.

Membership

To reflect a balance of views, the Task Group will consist of non-NASA employees and one NASA nonvoting, *ex officio* member, the Deputy Chief Safety and Mission Assurance Officer. In addition, there may be associate members selected for Task Group panels. The Task Group may also request appointment of consultants to support specific tasks. Members of the Task Group and panels will be chosen from among industry, academia, and government with recognized knowledge and expertise in fields relevant to safety and space flight.

The Task Group members and the Co-Chairs of the Task Group will be appointed by the Administrator. At the request of the Task Group, associate members and consultants will be appointed by the Deputy Chief Engineer/Independent Technical Authority.

Administrative Provisions

1. The Task Group will formally report its results to NASA on a continuing basis at appropriate intervals, including a final written report.

2. The Task Group will meet as often as required to complete its duties and will conduct at least two public meetings. Meetings will be open to the public, except when the General Counsel and the Agency Committee Management Officer determine that the meeting or a portion of it will be closed pursuant to the Government in the Sunshine Act or that the meeting is not covered by the FACA. Panel meetings will be held as required.

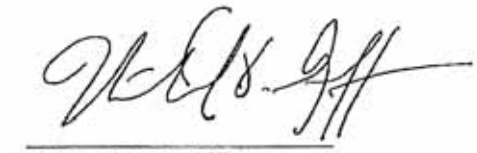
3. The Executive Secretary will be appointed by the Administrator and will serve as the Designated Federal Official.

4. The Space Operations Mission Directorate will provide technical and staff support through the Task Force on International Space Station Operational Readiness. The Space Operations Mission Directorate will provide operating funds for the Task Group and panels. The estimated operating costs total approximately $3.5 million which includes 7 workyears for staff support.

5. Members of the Task Group are entitled to be compensated for their services at the rate equivalent to a GS 15, step 10. Members of the Task Group will also be allowed per diem and travel expenses as authorized by 5 U.S.C. § 5701 *et seq.*

Duration

The Task Group shall terminate upon the issuance of its final report unless terminated before that date or subsequently renewed by the NASA Administrator.



Michael D. Griffin
Administrator

JUL 22 2005
Date

APPENDIX B – RTF TG MEMBERS

Lieutenant General Thomas P. Stafford, U.S. Air Force (Retired)
Co-Chair, Return to Flight Task Group
President, Stafford, Burke & Hecker Inc., technical consulting firm

A member of NASA's second astronaut group, Stafford was pilot of Gemini 6 and commanded Gemini 9, and orbited the moon as Commander of Apollo 10. He was the American Commander in the Apollo-Soyuz Test Project, the first rendezvous between American and Soviet spacecraft. Stafford became head of the astronaut group and was later named Deputy Director of Flight Crew Operations at the NASA Manned Spaceflight Center. He left NASA in 1975 to head the Air Force Test Flight Center and in 1978 became Deputy Chief of Staff, Research, Development and Acquisition, U.S. Air Force Headquarters. A consultant since 1980, Stafford is Chairman of the NASA Advisory Council Task Force on International Space Station Operational Readiness. He served as Defense Adviser to President Ronald Reagan and headed The Synthesis Group, which planned for the U.S. return to the moon and eventual Mars missions. He was Chairman of the NASA Advisory Council Task Force on Shuttle-Mir Rendezvous and Docking Missions. Among his awards, Stafford received the Congressional Space Medal of Honor. He served on the National Research Council's Aeronautics and Space Engineering Board, the Committee on NASA Scientific and Technological Program Reviews, and the Space Policy Advisory Council. Stafford is an graduate of the U.S. Naval Academy.

Colonel Richard O. Covey, U.S. Air Force (Retired)
Co-Chair, Return to Flight Task Group
President, Boeing Service Company

Colonel Covey is a veteran of four Space Shuttle flights. He was the pilot of *Discovery* on the first return-to-flight mission following the *Challenger* accident, and he was commander of *Endeavour* on the first mission to service and repair the Hubble Space Telescope. He also held management positions in the Astronaut Office and Flight Crew Operations Directorate. As a fighter pilot, Covey flew 339 combat missions in Southeast Asia. He was an F-4 and A-7D weapons systems test pilot and Joint Test Force Director for electronic warfare testing of the F-15. Covey's organization at Boeing supports commercial and U.S. government space and communication programs. Earlier, he was Vice President of Boeing's Houston operations. Covey has received 27 Defense Department and Air Force medals, plus the National Intelligence Medal of Achievement. NASA awarded him the Distinguished Service Medal, the Outstanding Leadership Medal, and the Exceptional Service Medal. For his role on the Hubble servicing mission, Covey and his crew received both the Goddard Trophy and the Collier Trophy. He holds a B.S. in Engineering Sciences from the U.S. Air Force Academy and an M.S. in Aeronautics and Astronautics from Purdue University, and was named the Outstanding Graduate of his class at the Air Force Test Pilot School.

Colonel James C. Adamson, U.S. Army (Retired)
CEO, Monarch Precision, LLC

Colonel Adamson, a former astronaut, earned his B.S. in Engineering from the U.S. Military Academy at West Point and his M.S. in Aerospace Engineering from Princeton University. He returned to West Point as an Assistant Professor of Aerodynamics, after which he was selected to attend the Navy Test Pilot School. In 1981 he became Aerodynamics Officer for the Space Shuttle Operational Flight Test Program. Adamson became an astronaut in 1984 and flew two missions, one aboard *Columbia* and the other on *Atlantis*. After retiring from NASA, Adamson established his own consulting firm, Monarch Precision, and then became President/CEO of Lockheed Engineering and Sciences Company. In 1995 he helped create United Space Alliance and became the company's first Chief Operating Officer. Adamson was then recruited to serve as President/CEO of Allied Signal Technical Services Corporation, which later became Honeywell Technology Solutions, Inc. Retiring from Honeywell in 2001; Adamson resumed part-time consulting with Monarch Precision. In addition to corporate board positions, he has served as a member of the NASA Advisory Council Task Force on Shuttle-Mir Rendezvous and Docking Missions and is currently a member of the NASA Advisory Council Task Force on International Space Station Operational Readiness.

Major General William A. Anders, U.S. Air Force Reserve (Retired)

Major General Anders was selected for the astronaut corps in 1963. He was the Lunar Module Pilot of Apollo 8 and backup Command Module Pilot for Apollo 11. Anders subsequently received Presidential appointments to the National Aeronautics and Space Council, the Atomic Energy Commission and the Nuclear Regulatory Commission (where he was the first Chairman), and he served as U.S. Ambassador to Norway. Anders held executive positions at a number of corporations, including General Electric, Textron and General Dynamics, where he was Chairman and CEO. While in that position, he was awarded the National Security Industrial Association's "CEO of the Year" award. Anders established several world flight records and has received numerous awards, including Distinguished Service Medals from the Air Force, NASA and the Atomic Energy Commission. He is a member of the National Academy of Engineering, the Society of Experimental Test Pilots and the Experimental Aircraft Association. He is also the founder and President of the Heritage Flight Museum. Anders received his B.S. in Electrical Engineering from the United States Naval Academy and earned his pilot's wings in 1956. He received his M.S. in Nuclear Engineering from the U.S. Air Force Institute of Technology, graduating with honors.

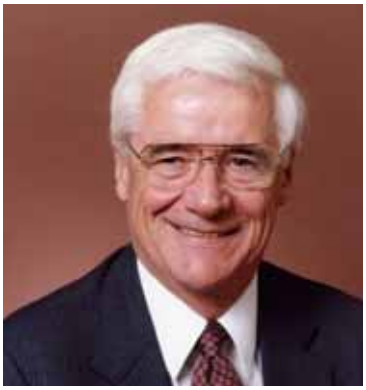
Dr. Walter D. Broadnax, Ph.D
President, Clark Atlanta University

Prior to his current position, Dr. Broadnax was Dean of the School of Public Affairs, American University, and Professor of Public Policy and Management at the University of Maryland, where he directed the Bureau of Governmental Research. Broadnax also served as: Deputy Secretary and Chief Operating Officer, U.S. Department of Health and Human Services; President, Center for Governmental Research; President, New York State Civil Service Commission; Lecturer and Director, Kennedy School of Government, Harvard University; Senior Staff Member, Brookings Institution; Principal Deputy Assistant Secretary for Planning and Evaluation, U.S. Department of Health, Education and Welfare; Director, Children, Youth and Adult Services, State of Kansas; and Professor, Federal Executive Institute. Broadnax has held leadership positions in professional associations such as: the American Political Science Association, the Association of Public Policy and Management and the American Society for Public Administration. Broadnax received his Ph.D. from the Maxwell School at Syracuse University, his B.A. from Washburn University and his M.P.A from the University of Kansas. He has served as President, American Society for Public Administration, Fellow, National Academy of Public Administration and Trustee of the Academy's Board. He is a member of the Syracuse University Board of Trustees, Harvard University's Taubman Center Advisory Board and the United States Comptroller General Advisory Board.

Dr. Kathryn I. Clark, Ph.D.
President, Docere (consulting firm specializing in science and education)

Dr. Clark served as NASA's Chief Scientist for the International Space Station Program and as Chief Scientist for the Human Exploration and Development of Space Enterprise. Her particular interest is in human factors, the elements necessary for the health, safety and efficiency of crews in long-duration space flight. Clark served as Deputy Director of the Center for Microgravity Automation Technology, one of the NASA Commercial Space Centers. Clark's NASA experience began with a neuromuscular development study that flew on *Atlantis* in 1994. These experiments were repeated and augmented on *Discovery* in 1995. She was also involved in the Neurolab project flown on *Columbia* in 1998 and a student-designed ladybug experiment that flew on *Columbia* in 1999. Clark is the recipient of the NASA Goddard Space Flight Center Customer Service Excellence Award. Clark received both her M.S. and Ph.D. from the University of Michigan and then joined the university faculty in the Department of Cell and Developmental Biology in 1993. Clark chairs the Academic Affairs Committee, Board of Control, Michigan Technological University. She also serves on the Board of Trustees of the Western Reserve Academy and the Board of Advisors of the Jean Michel Cousteau Society. She serves on the boards of the Space Day Foundation and Orion's Quest, both education-oriented not-for-profit organizations. Clark is also a member of the NASA Advisory Council Task Force on International Space Station Operational Readiness.

Mr. Benjamin A. Cosgrove
Consultant



In the course of a 44-year career with the Boeing Company, Mr. Cosgrove was an engineer and manager associated with most of the company's jet aircraft programs. He served as stress engineer or structural unit chief on the B-47, B-52, and KC-135, and on the Boeing 707, 727, 737, and 747 jetliners. He was Chief Engineer of the 767. Cosgrove was honored by *Aviation Week & Space Technology* for his role in converting the Boeing 767 transport design from a three-member to two-member cockpit configuration, and he received the Ed Wells Technical Management Award for his work addressing issues of aging aircraft. Cosgrove received the National Aeronautics Association's Wright Brothers Memorial Trophy for his lifetime contributions to commercial aviation safety and for technical achievement. He is a member of the National Academy of Engineering and a fellow of both the American Institute of Aeronautics and Astronautics and the Royal Aeronautical Society. After retiring in 1993 as Senior Vice President, Boeing Commercial Airplane Group, Cosgrove became a consultant. Cosgrove was elected to the National Academy of Engineering in 1992. He holds both a B.S. in Aeronautical Engineering and an honorary Doctorate of Engineering from the University of Notre Dame. Cosgrove has served on the NASA Advisory Committee's Task Force on International Space Station Operational Readiness and the Committee on Space Shuttle Upgrades.

Dr. Dan L. Crippen, Ph.D.
Former Director, Congressional Budget Office

Dr. Crippen served as the fifth Director of the Congressional Budget Office. His public service positions have also included: Chief Counsel and Economic Policy Adviser to the Senate Majority Leader (1981-1985); Deputy Assistant to the President for Domestic Policy (1987-1988); and Domestic Policy Advisor and Assistant to the President for Domestic Policy (1988-1989) – a position in which he advised the President on all issues relating to domestic policy, including the preparation and presentation of the federal budget. He has served on several national commissions, including the National Commission on Financial Institution Reform, Recovery, and Enforcement. He currently serves on the Aerospace Safety Advisory Panel. Crippen has substantial experience in the private sector as well. Before joining the CBO, he was a principal with Washington Counsel, a law and consulting firm. He has also served as Executive Director of the Merrill Lynch International Advisory Council and as a founding partner and Senior Vice President of The Duberstein Group, an independent strategic planning and consulting firm. Crippen received a B.A. from the University of South Dakota in 1974, an M.A. from Ohio State University in 1976, and a Ph.D. in Public Finance from Ohio State in 1981.

Mr. Joseph W. Cuzzupoli
Vice President and K-1 Program Manager, Kistler Aerospace Corporation

Mr. Cuzzupoli has more than 40 years of experience in aerospace engineering and management. He began his career with General Dynamics as Launch Director (1959-1962), and then became Manager of Manufacturing/Engineering and Director of Test Operations for Rockwell International (1962-1966). As Rockwell's Assistant Program Manager for Apollo, Cuzzupoli managed the building and testing of Apollo 6, Apollo 8, Apollo 9, and Apollo 12. He later became Rockwell's Vice President of Operations and then Vice President and Program Manager for the Space Shuttle Orbiter Project. Cuzzupoli left Rockwell in 1980 and consulted on various aerospace projects for NASA centers until 1991 when he joined American Pacific Corporation as Senior Vice President. In his current position at Kistler Aerospace, he has primary responsibility for design and production of the K-1 reusable launch vehicle. Cuzzupoli holds a B.S. in Mechanical Engineering from the Maine Maritime Academy, a B.S. in Electrical Engineering from the University of Connecticut and a Certificate of Management/Business Administration from the University of Southern California. He was a member of the NASA Advisory Council's Task Force on Shuttle-Mir Rendezvous and Docking Missions and is a current member of the Council's Task Force on International Space Station Operational Readiness.

Dr. Charles C. Daniel, Ph.D.
Engineering Consultant

From Saturn V to the International Space Station (ISS), Dr. Daniel has served as an engineer and manager in space flight vehicle design, analysis, integration and testing. His career began in 1968 at the Marshall Space Flight Center (MSFC) where he supported Saturn Instrument Unit operations for Apollo 11, 12 and 13. He performed avionics integration work for the Skylab program. For the Space Shuttle's Solid Rocket Boosters (SRB), he developed avionics and served as Flight Operations Lead. Daniel worked with the original Space Station Skunk Works for definition of the space station concept and developed the project's master engineering schedule. Following the *Challenger* accident, he led the evaluation of all Space Shuttle hazard analyses and coordinated acceptance analyses associated with modifications to the SRBs. During Space Station Freedom development, he was the Avionics Lead and served as MSFC Lead for Level II assembly and configuration development. Daniel helped plan Russian participation in the Space Station Restructure activity and later returned to MSFC as Chief Engineer for Space Station. Daniel holds a Ph.D. in Engineering and has completed postgraduate work at the University of California, Berkeley and MIT. He has served on one NASA Advisory Council task force on Shuttle-Mir Rendezvous and Docking Operations and another on ISS Operational Readiness.

Dr. Amy K. Donahue, Ph.D.
Assistant Professor of Public Policy, the University of Connecticut

Dr. Donahue teaches in the Master of Public Administration and Master of Survey Research programs. Her research focuses on productivity of emergency services organizations and on the nature of citizen demand for public safety services. Her published work deals with the design, management and finance of fire departments and other public agencies. Donahue has served as technical adviser to the Department of Homeland Security's Science and Technology Directorate, helping to develop programs for emergency responders. As Senior Adviser to the NASA Administrator from 2002 to 2004, Donahue sought opportunities within NASA to contribute to homeland security efforts government-wide. Donahue has 20 years of field experience and training in an array of emergency services-related fields, including managing a 911 communications center, and working as a firefighter and emergency medical technician in Fairbanks, Alaska and upstate New York. In addition, she has served as an officer in the U.S. Army's Medical Service Corps. In 2003, Donahue spent three months in the field in Texas managing the *Columbia* debris recovery operation. Donahue currently serves on the Aerospace Safety Advisory Panel (ASAP). Donahue received her B.A. in Geological and Geophysical Sciences from Princeton University and both her Ph.D. in Public Administration and her M.P.A. from the Maxwell School of Citizenship and Public Affairs, Syracuse University. Donahue currently serves on the Aerospace Safety Advisory Panel (ASAP).

General Ronald R. Fogleman, U.S. Air Force (Retired)
President and Chief Operating Officer, Durango Aerospace Inc.

General Fogleman has experience in air and space operations, expertise in long-range programming and strategic planning and extensive training in fighter and mobility aircraft. He served in the Air Force for 34 years, culminating in his appointment as Chief of Staff, after which he retired in 1997. Fogleman has served as a military adviser to the Secretary of Defense, the National Security Council and the President of the United States. Among other advisory boards, he is a member of the National Defense Policy Board, the NASA Advisory Council, the Jet Propulsion Laboratory Advisory Board, the Council on Foreign Relations, and the congressionally directed Commission to Assess United States National Security Space Management and Organization. He chaired the National Research Council Committee on Aeronautics Research and Technology for Vision 2050. Fogleman received an M.A. in Political Science from Duke University, graduated from the Army War College, and earned an M.A. in Military History from the U.S. Air Force Academy. His military decorations include: Defense Distinguished Service Medal with two oak leaf clusters; the Air Force Distinguished Service Medal with oak leaf cluster; both the Army and Navy Distinguished Service Medals; Silver Star; Purple Heart; Meritorious Service Medal; and two Distinguished Flying Crosses.

Ms. Christine H. Fox
President, Center for Naval Analyses

A President of the CNA, a federally-funded research and development center, Ms. Fox is responsible for providing the Department of the Navy and Department of Defense with high-quality, independent analysis of key issues regarding manning, training, acquisition, and operations. Before becoming President, Fox was the Vice President and Director of the Center's Operations Evaluation Group. With approximately 45 field representatives and 45 Washington-based analysts, this group's analytical purpose is to help operational commanders execute their missions. Fox joined the CNA in 1981 and since then has served in a variety of analysis, leadership and management positions. These positions include: Team Leader, Operational Policy Team; Director, Anti-Air Warfare Department; Program Director, Fleet Tactics and Capabilities; Team Leader of Third Fleet Tactical Analysis Team; Field Representative to Tactical Training Group – Pacific; Project Director, Electronic Warfare Project; Field Representative to Fighter Airborne Early Warning Wing – U.S. Pacific Fleet; and Analyst, Air Warfare Division, Operations Evaluation Group. Fox received her B.S. in mathematics and her M.S. in applied mathematics from George Mason University.

Colonel Gary S. Geyer, U.S. Air Force (Retired)
Consultant

Colonel Geyer has 39 years of experience in space engineering and program management. In senior positions in both government and industry, he has been responsible for all aspects of system success, including schedule, cost and technical performance. He served for 26 years with the National Reconnaissance Office (NRO) and was the NRO System Program Office Director for two major programs, responsible for design, manufacture, test, launch and operation of several of the most important U.S. reconnaissance satellites. Geyer was one of 46 "Pioneers of National Reconnaissance" honored by the NRO in 2000 for their "significant and lasting contributions to the discipline of national reconnaissance," which contributed to the end of the Cold War. Following his NRO service, Geyer was Vice President for a major classified program at Lockheed Martin, where he was responsible for all aspects of program and mission success. Geyer teaches courses in space design and system engineering/ program management at New Mexico State University. He has a B.S. in Electrical Engineering from Ohio State University, an M.S. in Electrical Engineering, and M.S. in Aeronautical Engineering from the University of Southern California.

Brigadier General (Select) Susan J. Helms, U.S. Air Force
Deputy Director, Operations for Technical Training, Headquarters Air Education and Training Command

Before her current assignment, Colonel Helms was Vice Commander of the 45th Space Wing where she oversaw military space launches from Cape Canaveral Air Force Station (CCAFS) and Eastern Range support for commercial, NASA and military space launches from CCAFS and Kennedy Space Center, along with ballistic missile tests at sea. Selected for the astronaut program in 1990, she flew on five Space Shuttle flights and served aboard the International Space Station as member of the Expedition 2 crew. She logged 211 days in space, including a world-record extravehicular activity of 8 hours, 56 minutes. After receiving a B.S. in Aeronautical Engineering from the U.S. Air Force Academy and her commission, Helms was assigned to the Air Force Armament Laboratory as F-16 Weapons Separation Engineer, and then became Lead Engineer, F-15 weapons separation. In 1985 she received her M.S. in Aeronautics/Astronautics from Stanford University and returned to the Air Force Academy as Assistant Professor of Aeronautics. After attending the Air Force Test Pilot School in 1988, Helms was assigned as Exchange Officer to Canada's Aerospace Engineering Test Establishment, where she worked as Flight Test Engineer and Project Officer on the CF-18. She was managing development of a CF-18 flight control system simulation when selected by NASA. Helms returned to the Air Force in 2002 to direct the Space Superiority Division, Space Command Requirements Directorate.

Mr. Richard H. Kohrs
Chief Engineer, Kistler Aerospace Corporation

Mr. Kohrs has over 40 years of experience in aerospace systems engineering, stress analysis and integration. He has held senior management positions in NASA programs from Apollo to Space Station. After Apollo, Kohrs's positions in the Space Shuttle Program included Manager of System Integration, Deputy Manager and then Deputy Director. As Deputy Director, he was responsible for the daily engineering, processing and operations activities of the Shuttle Program, and he developed an extensive background in Shuttle systems integration. In 1989, Kohrs became Director of Space Station Freedom, with overall responsibility for its development and operation. After years of public service, he left NASA to become Director of the ANSER Center for International Aerospace Cooperation (1994-1997). Kohrs joined Kistler Aerospace in 1997. His primary responsibilities as Chief Engineer include vehicle integration, design specifications, design data books, interface control, vehicle weight, performance and engineering review board matters. In 1956, he received a B.S. from Washington University in St. Louis.

Ms. Susan Morrisey Livingstone
Policy and Management Consultant

From 2001 to 2003, Ms. Livingstone served as Under Secretary of the Navy. Her broad executive management portfolio comprised planning, budget and other functions, but she also focused on programs such as space, information technology, and criminal investigation. Currently, she serves on the Maxwell School's National Security Studies Board of Advisers and the Secretary of the Navy's Subcommittee on Naval History. Livingstone was CEO of the Association of the United States Army and Deputy Chairman of its Council of Trustees. She was a consultant to the Defense Science Board. At American Red Cross headquarters, her executive positions included Vice President, Health and Safety Services. Livingstone was Assistant Secretary of the Army for Installations, Logistics and Environment (1989-1993). Among several posts at the former Veterans Administration, Livingstone was Associate Deputy Administrator for Logistics. She worked on personal staffs of a Senator and two Congressmen. Livingstone received the Secretary of Defense Award for Outstanding Public Service and the highest civilian awards from the National Reconnaissance Office, the VA, and the Army and Navy Departments. Livingstone received her B.A. from the College of William and Mary (1968) and her M.A. in Political Science from the University of Montana (1972), and post graduate work at the Fletcher School of Law and Diplomacy.

Mr. James D. Lloyd, *ex-officio*
Deputy Chief Safety and Mission Assurance Officer, NASA

Mr. Lloyd has extensive experience in safety engineering and risk management and has supported a number of blue ribbon panels addressing safety problems. Beginning in 1969 as a safety engineering intern trainee and later as a journeyman system safety engineer with the U. S. Army Aviation Systems Command, he honed his skills with Army aircraft development programs. He was later appointed as Chief, Program Evaluation Division in the Army Material Command (AMC) Safety Office in Virginia. In 1979, he was again reassigned as Director, AMC Field Safety Activity in Indiana, where he managed safety engineering, evaluation and training support for the command's military-industrial operations located world-wide. After the Space Shuttle *Challenger* disaster in 1986, Lloyd joined NASA to help the Agency rebuild its SMA program. He was instrumental in fulfilling several of the recommendations from the Rogers Commission investigation report. Immediately after Space Shuttle flights resumed, Lloyd moved to the Space Station Freedom Program Office in Virginia, where he served in various roles culminating in Product Assurance Manager for the program. In 1993 he became Director, Safety and Risk Management Division, Office of Safety and Mission Assurance, serving as NASA's "Safety Director." He assumed his present position as Deputy Chief of the same office in 2003. Lloyd also serves as *ex-officio* member for the NASA Advisory Council's standing Task Force on International Space Station Operational Readiness. Lloyd holds a B.S. with honors in Mechanical Engineering from Union College, Schenectady, and an M.S. in Industrial Engineering, Texas A&M University.

Lieutenant General Forrest S. McCartney, U.S. Air Force (Retired)
Consultant

Lt. General McCartney was Commander of the Ballistic Missile Organization (responsible for development of the Minuteman and Peacekeeper ICBMs), Commander of the Air Force Space Division and Vice Commander, Air Force Space Command. He directed several major satellite programs. He received the Distinguished Service Medal, Legion of Merit with one oak leaf cluster, Meritorious Service Medal and Air Force Commendation Medal with three oak leaf clusters, as well as the General Thomas D. White Space Trophy and the Military Astronautical Trophy. Following the *Challenger* accident, McCartney was assigned to NASA and served as Director of the Kennedy Space Center until 1992. His numerous awards include NASA's Distinguished Service Medal, the Presidential Rank Award, the National Space Club Goddard Memorial Trophy and the AIAA Von Braun Award for Excellence in Space Program Management. After 40 years of military and civil service, McCartney became an industry consultant, specializing in evaluation of hardware failure and flight readiness. At Lockheed Martin, from 1994 to 2001, he was Astronautics Vice President for Launch Operations. McCartney was Vice Chairman of the NASA Aerospace Safety Advisory Panel. He has a B.S. in Electrical Engineering from Auburn University, an M.S. in Nuclear Engineering from the Air Force Institute of Technology and an honorary doctorate from the Florida Institute of Technology.

Dr. Rosemary O'Leary, Ph.D
Distinguished Professor of Public Administration and Political Science, Syracuse University

As the Co-Director of the Program for the Analysis and Resolution of Conflict at the Maxwell School of Syracuse University, O'Leary also coordinates the Ph.D. program in public administration. A member of the NASA Aerospace Safety Advisory Panel and the National Academy of Public Administration, she was a Senior Fulbright Scholar in Malaysia and the Philippines. Previously, O'Leary was Professor of Public and Environmental Affairs at Indiana University and Co-Founder and Co-Director of the Indiana Conflict Resolution Institute. She served as Director of Policy and Planning for the Kansas Department of Health and Environment and has worked as an environmental attorney. O'Leary is the author or editor of seven books and more than 90 articles and has won nine national research awards. She was awarded the Syracuse University Chancellor's Citation for Exceptional Academic Achievement, the highest research award at the university, and she has won eight teaching awards. She received the Distinguished Service Award of the American Society for Public Administration. O'Leary was Chair of the Public Administration Section, American Political Science Association, and the Section on Environment and Natural Resources Administration, American Society for Public Administration. O'Leary has a Ph.D. in Public Administration from The Maxwell School of Syracuse University, and a J.D., M.P.A., and B.S from the University of Kansas.

Dr. Decatur B. Rogers, Ph.D.
Dean, College of Engineering, Technology and Computer Science, Tennessee State University

Dr. Rogers has held the post of Dean since 1988, and he is also Professor of Mechanical Engineering. Before joining the faculty of Tennessee State University in Nashville, he was Professor and Dean at: Florida State University, Tallahassee; Prairie View A&M University, Prairie View, Texas; and Federal City College, Washington, D.C. At Tennessee State, Rogers has fostered a number of collaborations with fellow universities and other partners, such as NASA, Boeing, General Motors and the Office of Naval Research. One of these collaborations is the Strategic Manpower Development Project, which aims to increase the number of African Americans pursuing doctorates in the fields of engineering, technology and computer science. Rogers's areas of expertise include: mechanical and thermal engineering; heating, ventilation and air conditioning; two-phase flow; heat transport systems; and engineering management. Examples of his publication titles include: *Thermodynamics of Fiber-Power Insulation; The Engineering Pipeline: A Long-Term Talent Development Strategy for Minorities on the Recruitment and Retention of Minorities and Women in Engineering* and *Preparing Black Children to Become Engineers*. Rogers holds a Ph.D. in Mechanical Engineering from Vanderbilt University, an M.S. in Engineering Management and another in Mechanical Engineering from Vanderbilt University and a B.S. in Mechanical Engineering from Tennessee State University.

Mr. Seymour Z. Rubenstein
Aerospace Consultant and Former President of the Rockwell International Space Systems Division

Mr. Rubenstein has been a leader in commercial and government projects for more than 35 years. He served as President of the Rockwell International Space Systems Division and was a major contributor to the design, development and operation of the Space Shuttle. At Rockwell, the prime contractor for the Space Shuttle, he was the Director of Avionics System Engineering during the early development of the spacecraft. Subsequently he was promoted to Vice President of Engineering and Chief Engineer for Space Shuttle Development, followed in 1979 by Vice President and Program Manager. He then advanced to the position of President of the Rockwell Space Station Division before becoming the Space Division President. After his tenure at Rockwell, Rubenstein held several positions at McDonnell Douglas. For his contributions to manned space exploration and in recognition of his skills as an innovator and problem solver, Rubenstein has received the NASA Public Service Medal, the NASA Medal for Exceptional Engineering and the Space Systems Award of the American Institute of Aeronautics and Astronautics. He is a Fellow of both the AIAA and the American Astronautical Society. Mr. Rubenstein holds an MBA from California State University, an MEE from New York University, a B.S. in Electrical Engineering from MIT, and a certificate of completion from the Stanford Executive Program.

Mr. Robert B. Sieck
Aerospace Consultant

Mr. Sieck, former Director of Shuttle Processing at the Kennedy Space Center (KSC), has an extensive background in Space Shuttle systems, testing, launch, landing and processing. After serving in the Air Force involved with the activation of Titan II missiles, joined NASA in 1964 as Gemini Spacecraft Systems Engineer and served as Apollo Spacecraft Test Team Project Engineer. He became Shuttle Orbiter Test Team Project Engineer and was named Engineering Manager for the Shuttle Approach and Landing Tests at Dryden Flight Research Facility. Sieck was the Chief Shuttle Project Engineer for missions STS-1 through STS-7 and became the first KSC Shuttle Flow Director in 1983. He was appointed Director, Launch and Landing Operations, in 1984, serving as Shuttle Launch Director in 1984 and 1985. After the *Challenger* accident in 1986 he was again appointed Launch Director, and also Deputy Director, Shuttle Operations (1992-1995). He was Launch Director for the return-to-flight of STS-26R and all subsequent Shuttle missions through STS-63. He was appointed Director of Shuttle Processing in 1995. After his retirement from NASA, Sieck served with the NASA Aerospace Safety Advisory Panel. He earned his B.S. in Electrical Engineering, University of Virginia, in 1960 and had post graduate work at Texas A&M and the Florida Institute of Technology.

Mr. Thomas N. Tate
Consultant

Mr. Tate was Vice President of Legislative Affairs for the Aerospace Industries Association for 17 years. Before joining AIA in 1987, he served on the staff of the House Committee on Science and Technology in positions that included Counsel and Special Assistant to the Chairman. He also served with the House Subcommittee on Space Science and Applications and the House Subcommittee on Energy Research and Development. At the Space Division of Rockwell International, 1962-1973, Tate worked in engineering and marketing on programs such as the Gemini Paraglider, Apollo, Apollo/Soyuz, and the Space Shuttle. He eventually became Director of Space Operations. Earlier, he worked for RCA's Missile and Surface Radar Division (1958-1962), and he served in the U.S. Army as Artillery and Guided Missile Officer. Tate received a B.S. from the University of Scranton, 1956. With his 1970 J.D. from Western State University College of Law, he was named that year's most outstanding student. In 1991, he received the University of Scranton's Frank J. O'Hara Award for Distinguished Alumni in Science and Technology. Tate is adviser to the National Space Institute and member of aerospace and defense associations such as AIAA and the National Space Club. For 15 years, Tate served on the NASA Senior Executive Service Salary and Performance Review Board.

Dr. Kathryn C. Thornton, Ph.D.
Professor, School of Engineering & Applied Science, University of Virginia

Dr. Thornton teaches in the Department of Science, Technology and Society and in the Department of Mechanical and Aerospace Engineering. She also manages the Graduate Studies Office as Associate Dean for Graduate Programs. Selected as an astronaut in 1984, Thornton is a veteran of four Space Shuttle flights between 1989 and 1995, including the maiden flight of *Endeavour* in 1992 and the first Hubble Space Telescope Service Mission in 1993. She was Payload Commander in 1995 on the second U.S. Microgravity Laboratory mission. She has logged over 975 hours in space, including more than 21 hours of extravehicular activity. Her technical assignments at NASA included flight software verification in the Shuttle Avionics Integration Laboratory (SAIL). She was a member of the Vehicle Integration Test Team at the Kennedy Space Center, and she served as a Spacecraft Communicator, or CAPCOM. Thornton holds a B.S. in Physics from Auburn University and an M.S. and Ph.D. in Physics from the University of Virginia. She was awarded a NATO Postdoctoral Fellowship to continue her research at the Max Planck Institute for Nuclear Physics in Heidelberg, West Germany. She was then employed as a physicist at the U.S. Army Foreign Science and Technology Center in Charlottesville, Virginia.

Mr. William Wegner
Consultant

Mr. Wegner graduated from the U.S. Naval Academy in 1948. He then received M.S. degrees in Naval Architecture and Marine Engineering from Webb Institute in New York. In 1956, Admiral Hyman Rickover selected Wegner to join the Navy's nuclear program, and he was sent to MIT, where he received his M.S. in Nuclear Engineering. After a number of field positions, including Nuclear Power Superintendent at the Puget Sound Naval Shipyard, Wegner served for 16 years as Deputy Director to Admiral Rickover in the Naval Nuclear Program. He received Distinguished Service Awards from both the Defense Department and the Atomic Energy Commission. In 1979, Wegner retired from government service and formed Basic Energy Technology Associates with three fellow naval retirees. During its 10 years of successful operation, the firm provided technical services to over 25 nuclear utilities and other nuclear-related activities. Wegner has served on a number of panels, including one of the National Academy of Sciences that studied the safety of Department of Energy nuclear reactors. From 1989 to 1992, he provided technical assistance to the Secretary of Energy on nuclear matters. He has supplied technical services to over 50 nuclear facilities. Wegner served on the Detroit Edison Board of Directors, 1990-1999.

Mr. Vincent D. Watkins
Executive Secretary, Return to Flight Task Group

Mr. Watkins has devoted his entire career, now 25 years, to the U.S. space program. Prior to his current position, he was Assistant Chief of the Flight Equipment Division in the Johnson Space Center's Safety and Mission Assurance Directorate. He managed assurance activities related to the definition, design, development and operation of government-furnished equipment (GFE) and extravehicular activity equipment. These engineering functions included flight readiness verification, risk assessments, hazard analysis, nonconformance tracking and product delivery. In 2003 Watkins served as Executive Officer to the Chief of Staff at NASA Headquarters. During this assignment in the Office of the Administrator, he was instrumental in developing and implementing several key initiatives, including the Columbia Families First Team and the Columbia Accident Rapid Reaction Team. Watkins joined NASA in 1980 as Control System Engineer on the Shuttle Training Aircraft. From 1997 to 2003, he served as Chief of the Flight Equipment Division's GFE Assurance Branch. At UCLA in 2003, he completed a NASA Fellowship on Creativity and Innovation in the Organization. He was an inaugural member of the JSC Leadership Development Program in 2002. He received the Mark D. Heath Aircraft Engineering Award, the NASA Exceptional Service Medal and numerous NASA Group Achievement Awards. Watkins has a B.S. in Mathematics from Albany State University.

Colonel Michael J. Bloomfield, U.S. Air Force
Astronaut Office Operations Officer, NASA

Colonel Bloomfield is a NASA astronaut who has logged more than 753 hours in space. The Space Shuttle veteran was a crewmember aboard *Atlantis* in 1997, *Endeavour* in 2000 and *Atlantis* in 2002. A Shuttle Commander and Pilot, he has served as Director of Shuttle Operations, Chief Instructor Astronaut, and Chief of Safety in the Astronaut Office. He was Astronaut Representative to the Columbia Accident Investigation Board. Before entering training at the Johnson Space Center in 1995, Bloomfield served as test pilot for all models of the F-16 at Edwards Air Force Base, as well as Safety Officer and Flight Commander for the 416th Flight Test Squadron. From 1983 until 1991, he served as a combat-ready pilot and instructor pilot in the F-15. He completed the F-15 Fighter Weapons Instructor Course and was honored as a Distinguished Graduate of the U.S. Air Force Test Pilot School. In 1983 he won the Commanders Trophy as Top Graduate from Air Force Undergraduate Pilot Training. Bloomfield holds a B.S. in Engineering Mechanics from the U.S. Air Force Academy and an M.S. in Engineering Management from Old Dominion University. He was also 1980 Captain of the U.S. Air Force Academy Falcon Football Team.

APPENDIX C – RTF TG STAFF

Name	Role	Affiliation
Shannon K. Bach	Administrative Support	Valador, Inc. Consultant
Thomas E. Diegelman	IVASP Support	NASA Johnson Space Center
David B. Drachlis	Public Affairs Officer	NASA Marshall Space Flight Center
Maj. Gen. Joe H. Engle, U.S. Air National Guard (Ret.)	Task Group Support	Engle Technologies
Malise M. Fletcher	Technical Panel Support	NASA Johnson Space Center
Paula B. Frankel	Recorder	Westover and Associates, Inc.
Lillian M. Hudson	Travel Coordinator	Valador, Inc. Consultant
Dennis R. Jenkins	Task Group Support	Valador, Inc. Consultant
Jennifer L. LeStourgeon	Information Technology	NASA Johnson Space Center
Mario Loundermon	Report Cover Artist	Valador, Inc.
Sharon J. Martin	Budget Manager	Al-Razaq Computing Services
Susan E. Mauzy	Task Group Support	NASA Johnson Space Center
Lt. Col. George E. “Ned” Mueller, U.S. Marine Corps (Ret.)	Management Panel Support	Valador, Inc. Consultant
Lester A. Reingold	Report Editor	Valador, Inc. Consultant
Anna K. “Kitty” Rogers	Project Manager	Valador, Inc.
Susan K. Stone	Travel Coordinator	Valador, Inc. Consultant
Barbara J. Teague	Operations Panel Support	NASA Johnson Space Center
Tamara R. West	Administrative Support	NASA Johnson Space Center

Discovery mated to ET-120 in the Vehicle Assembly Building at the Kennedy Space Center; anomalies with this ET eventually forced the program to switch to ET-121 for STS-114.

APPENDIX D – RTF TG FACT-FINDING ACTIVITIES

June 2003

June 10, 2003	NASA Headquarters, RTF TG Charter.
June 24, 2003	Johnson Space Center, RTF TG Meeting with Managers for Space Shuttle and International Space Station.

August 2003

August 5-7, 2003	Kennedy Space Center, Plenary Meeting.
August 18, 2003	Johnson Space Center, NASA-National Geospatial-Intelligence Agency (NGA) Memorandum of Agreement (MoA).
August 19-20, 2003	Johnson Space Center, discussions with Space Shuttle Program, USA, and Boeing Management.
August 21, 2003	Videoconference, Space Flight Leadership Council Meeting.
August 25, 2003	Kennedy Space Center, Ground-based Imagery Discussions.
August 27, 2003	Lockheed Martin Missiles and Fire Control, Dallas, Texas, Reinforced Carbon-Carbon Non-Destructive Inspection.
August 28, 2003	Michoud Assembly Facility (MAF), External Tank Return to Flight Status.

September 2003

September 9-11, 2003	Johnson Space Center, Plenary Meeting.
September 17, 2003	House Science Committee Members and Senior Staff visit.

Charles G. Stevenson of the Kennedy Space Center (foreground) briefs staff and members of the Return to Flight Task Group during an August 5, 2003 visit to the Columbia Debris Hangar at the Kennedy Space Center.

September 17, 2003	Senate Committee on Commerce, Science and Transportation Members and Senior Staff visit.
September 18, 2003	Johnson Space Center, Extravehicular Activity Tile and Reinforced Carbon-Carbon Repair.
September 23, 2003	NASA Headquarters, CAIB Recommendation 9.1-1 Fact-Finding.
September 24, 2003	Kennedy Space Center, Foreign Object Debris (FOD) and Non-Destructive Inspection.
September 30, 2003	Michoud Assembly Facility, External Tank Return to Flight Status.

October 2003

October 3, 2003	Videoconference, Space Flight Leadership Council Meeting.
October 8, 2003	Kennedy Space Center, Waivers and Deviations for Kennedy Space Center Ground Support Equipment.
October 14, 2003	Washington, D.C., NASA-National Geospatial-Intelligence Agency (NGA) Memorandum of Agreement (MoA).
October 20, 2003	Kennedy Space Center, Ground-based Imaging.
October 20, 2003	House Science Committee Senior Staff visit.
October 22-23, 2003	Ogden, Utah, Program Managers Review.
October 27-28, 2003	NASA Headquarters, Submarine Safety Colloquium.

Frank Benz of the Johnson Space Center in Houston, briefs members of the Return to Flight Task Group's Technical Panel on the reinforced carbon-carbon (RCC) impact test rig during a fact-finding visit to the Southwest Research Institute in San Antonio, Texas on October 29, 2003. Task Group members and supporting staff are, from left, Sy Rubenstein, Astronaut Carlos Noriega, Rob Hammond, and Ben Cosgrove.

Return to Flight Task Group Technical Panel members and support staff inspect the External Tank planned for the STS-114 mission during a December 2, 2003 fact-finding visit to the Michoud Assembly Facility near New Orleans. Lockheed Martin Space Systems Company's Michoud Operations builds the External Tank for NASA at the facility.

October 28-30, 2003	Johnson Space Center and Southwest Research Institute, San Antonio, Texas, Thermal Protection System Meetings.
October 29-30, 2003	Cape Canaveral, Florida, Service Life Extension Program Summit.
October 31, 2003	Teleconference, *Atlantis* Nosecap Non-Destructive Inspection.

November 2003

November 5-30, 2003	Marshall Space Flight Center, SRB Bolt-Catcher Critical Design Review.
November 12, 2003	Johnson Space Center, JAXA Fact-Finding.
November 20, 2003	Johnson Space Center, Management Meetings.
November 20, 2003	Johnson Space Center, Mission Management Team Normal Accident Theory.
November 21, 2003	Johnson Space Center, Space Flight Leadership Council Meeting.

December 2003

December 3-4, 2003	Johnson Space Center, Mission Management Team Simulation (Flight 12A.1).
December 2, 2003	Michoud Assembly Facility, External Tank Status.
December 3, 2003	Kennedy Space Center, Digital Closeout Imagery.
December 9-10, 2003	Johnson Space Center, Plenary Meeting.

December 11-12, 2003	Marshall Space Flight Center, Space Shuttle Certification Status Review.
December 16, 2003	NASA Headquarters, Space Flight Leadership Council Meeting.

January 2004

January 15, 2004	Johnson Space Center, STS-114 Flight Techniques Panel.
January 22, 2004	Teleconference, Regarding R3.4-1, R3.4-2, R3.4-3, Imagery and R6.4-1, TPS Inspection and Repair with Mr. Steve Wallace (CAIB member).
January 26, 2004	Teleconference, with Bryan O'Connor, Chief Safety and Mission Assurance Officer Regarding CAIB Recommendation 9.1-1.
January 27, 2004	Teleconference, Jim Halsell Regarding Planning Framework for STS-114 and STS-121.
January 28-30, 2004	Kennedy Space Center, SEIO Summit II.
January 29, 2004	Johnson Space Center, Sub-nominal Bond Technical Interchange Meeting.

February 2004

February 2, 2004	Teleconference, ADM Harold W. Gehman (CAIB Chairman)
February 3, 2004	Michoud Assembly Facility, External Tank Mini-Technical Interchange Meeting.
February 3, 2004	Integrated Vehicle Assessment Sub-Panel, Organizational Telecon.
February 4, 2004	Johnson Space Center, DTO 848 Preliminary Design Review.
February 2-5, 2004	Kennedy Space Center, Launch and Landing Imagery Program Requirements Document Requirements Review.
February 4, 2004	NASA Headquarters, ITEA Meeting.
February 5, 2004	Johnson Space Center, STS-114 Joint Operations Panel #9 Telecon.
February 6, 2004	Kennedy Space Center, Solid Rocket Booster Thermal Protection System Mini-Technical Interchange Meeting.
February 10, 2004	Johnson Space Center, Imagery Technical Interchange Meeting.
February 11, 2004	Johnson Space Center, Mission Management Team Simulation.
February 12, 2004	Teleconference, with Johnson Space Center MER Personnel Regarding SIMS Database.
February 12-13, 2004	Johnson Space Center, Debris Summit II Summit.

February 17-18, 2004	Galveston, Texas, SLEP II Summit.
February 18, 2004	NASA Headquarters, JAXA Fact-Finding.
February 19, 2004	Johnson Space Center, Space Flight Leadership Council Meeting.
February 19, 2004	Johnson Space Center, STS-114 Joint Operations Panel #10 Telecon.
February 18-19, 2004	Johnson Space Center, NASA-NGA MoA Meeting.
February 20, 2004	Johnson Space Center, Integrated Vehicle Assessment Sub-Panel Meeting.
February 24-25, 2004	NASA Headquarters, Management Panel Meetings.

March 2004

March 4, 2004	Johnson Space Center, STS-114 Joint Operations Panel #11 Telecon.
March 11, 2004	Kennedy Space Center, FOD and Digital Closeout Imagery.
March 23-24, 2004	Johnson Space Center, OBSS Status Meeting.
March 30, 2004	Johnson Space Center, STS-114 Joint Operations Panel #12 Telecon.
March 31, 2004	Sandia Labs, Albuquerque, New Mexico, OBSS Status Meeting.

April 2004

April 1, 2004	Kennedy Space Center, External Tank Monthly Review.
April 2, 2004	Kennedy Space Center, Two-Person Closeout, Orbiter Hardening, and RCC Non-Destructive Inspection Briefings.
April 2, 2004	Kennedy Space Center, Pre-Launch Mission Management Team Simulation.
April 9, 2004	Kennedy Space Center, Two-Person Closeout, Orbiter Hardening, and RCC Non-Destructive Inspection Dry Run Briefings.
April 12-15, 2004	Johnson Space Center, Plenary Meeting.
April 28-30, 2004	Marshall Space Flight Center, SRB Bolt Catcher Delta Critical Design Review.

May 2004

May 14, 2004	Kennedy Space Center, Foreign Object Debris and Digital Closeout Imagery Status Review.
May 19, 2004	Marshall Space Flight Center, SRB Bolt Catcher Critical Design Review Pre-board.

May 26, 2004	Johnson Space Center, Mission Management Team Simulation #5.
May 27, 2004	Johnson Space Center, Reinforced Carbon-Carbon Plug Repair Preliminary Design Review.
May 27, 2004	Marshall Space Flight Center, SRB Bolt Catcher/NSI Pressure Cartridge Critical Design Review.

June 2004

June 8-9, 2004	Johnson Space Center, LDRI Orbiter Inspection System Critical Design Review.
June 9, 2004	Ogden, Utah, Space Flight Leadership Council Meeting.
June 10, 2004	Ogden, Utah, Engineering Test Motor Firing at ATK-Thiokol.
June 14-15, 2004	Kennedy Space Center, Systems Engineering & Integration Office Summit .
June 17, 2004	Johnson Space Center, Operations Panel Fact-Finding Telecon with Space Shuttle Program regarding CAIB Recommendation 6.4-1.
June 22, 2004	Langley Research Center, Virginia, Management Panel visit to the NASA Engineering and Safety Center regarding CAIB Recommendations 6.2-1, 7.5-1, and 7.5-2.
June 23, 2004	NASA Headquarters, Management Panel visit regarding CAIB Recommendations 6.2-1, 7.5-1, and 7.5-2.
June 25, 2004	Michoud Assembly Facility and Stennis Space Center, External Tank Monthly Review.

A full-scale Reusable Solid Rocket Motor is fired at ATK Thiokol Propulsion Division's Promontory, Utah, test facility on June 10, 2004. This motor tested modifications designed to enhance the safety and integrity of the Space Shuttle. Members of the Return to Flight Task Group observed the test during a fact-finding visit to the facility.

Return to Flight Task Group Management Panel members and staff meet with NASA officials during a fact-finding meeting in Washington, D.C. June 23, 2004.

June 28, 2004	Johnson Space Center, Tile Test Article Review.
June 29, 2004	Kennedy Space Center, SIMS Production Tool Demonstration.
June 30, 2004	Kennedy Space Center, Mission Management Team Simulation #6.

July 2004

July 1, 2004	NASA Headquarters, NASA Administrator's Retreat on Agency's Space Shuttle Return to Flight.
July 8, 2004	Kennedy Space Center, Operations Panel Fact-Finding on Space Shuttle Program-3, Contingency Shuttle Crew Support.
July 8, 2004	Kennedy Space Center, Fact-Finding on CAIB Recommendations 4.2-5 and 10.3-1.
July 16, 2004	Teleconference, Fact-Finding on CAIB Recommendation 3.2-1.
July 21, 2004	Teleconference, Plenary for Conditional Closures to CAIB Recommendations 4.2-5 and 10.3-1**.**
July 26-27, 2004	Johnson Space Center, Reinforced Carbon-Carbon Test Article Review.
July 27-28, 2004	Johnson Space Center, Mission Management Team Simulation #7.
July 27-28, 2004	Johnson Space Center, Integrated Vehicle Assessment Sub-Panel Fact-finding Meeting with Simulation Planning Team, Mission Management Team training community, and System Engineering and Integration Office on Thermal Protection System Integrated Operations Plan.
July 28, 2004	Johnson Space Center, Technical Panel Fact-finding with Space Shuttle Program on Integrated Risk Assessment for CAIB Recommendation 3.2-1.

August 2004

August 10, 2004	Kennedy Space Center, Operations Panel Fact-finding on Space Shuttle Program-3, Contingency Shuttle Crew Support.
August 10-12, 2004	Johnson Space Center, Space Shuttle Program Impact Testing and Debris Summit.
August 13, 2004	Johnson Space Center, R6.4-1 Strategy Session.
August 16, 2004	Teleconference, Internal Review of CAIB Recommendation 4.2-1 Closure.
August 18, 2004	Johnson Space Center, Fact-Finding with Space Shuttle Program on CAIB Recommendations 6.3-1 and 7.5-3.
August 18-19, 2004	Kennedy Space Center, External Tank TPS Certification Technical Interchange Meeting.
August 25, 2004	Kennedy Space Center, External Tank Monthly Review.
August 30, 2004	Kennedy Space Center, Management Panel and Operations Panel Fact-finding with Space Shuttle Program Workforce.
August 30-3, 2004	Michoud Assembly Facility, ET Flange Critical Design Review.
August 31-1, 2004	Johnson Space Center, Orbiter Boom Sensor System Design Review.

September 2004

September 1, 2004	Marshall Space Flight Center, Space Flight Leadership Council Meeting.
September 3, 2004	Teleconference, Debris Summit Debrief.
September 13, 2004	Johnson Space Center, Tile Repair System Design Review.
September 13, 2004	Johnson Space Center, Integrated Vehicle Assessment Sub-Panel Fact Finding on TPS Integrated Operations Plan.
September 14-16, 2004	Johnson Space Center, Plenary Meeting.
September 22-23, 2004	Johnson Space Center, On-Orbit Mission Management Team Simulation.

October 2004

October 5-6, 2004	Ogden, Utah, RCC Plug Repair Technical Interchange Meeting.
October 08, 2004,	Washington, D.C., Meeting with OMB, OSTP, and White House staff.
October 19-20, 2004	Marshall Space Flight Center, RCC Crack Repair Preliminary Design Review.

October 20-21, 2004	Michoud Assembly Facility, ET TPS Certification Technical Interchange Meeting.
October 25-26, 2004	Kennedy Space Center, Ground Camera Ascent Imagery Project Critical Design Review.
October 27, 2004	Teleconference, on Verification, Validation and Certification Definitions.
October 28, 2004	NASA Headquarters, RTF TG Leadership Meeting.
October 28-29, 2004	Johnson Space Center, RTF Flight Operations Progress Review.
October 29, 2004	Videoconference, Space Flight Leadership Council Meeting.

November 2004

November 8-10, 2004	Johnson Space Center, Space Shuttle Program Impact Testing Debris Summit.
November 9-10, 2004	Michoud Assembly Facility, External Tank TPS Certification Status Briefing.
November 15, 2004	Johnson Space Center, Management Panel Briefing to the Aerospace Safety Advisory Panel.
November 16, 2004	Johnson Space Center, Management Panel Fact Finding on CAIB Recommendation 6.3-1.
November 16-18, 2004	Marshall Space Flight Center, SRB Bolt Catcher Design Certification Review Onsite Documentation Review.

Return to Flight Task Group members and staff inspect the Space Shuttle External Tank being prepared for the STS-114 mission during a visit to the Michoud Assembly Facility in New Orleans November 10, 2004.

November 16-19, 2004	Johnson Space Center, STS 114 On-Orbit Mission Management Team Simulation.
November 18, 2004	Telecon with Space Shuttle Program on CAIB recommendation R3.3-2.
November 22, 2004	Johnson Space Center, Space Shuttle Program Presents R3.3-2 and 4.2-1 Closures to Technical Panel/Integrated Vehicle Assessment Sub-Panel.
November 23, 2004	NASA Headquarters, Deputy Chief Engineer Presents R7.5-1 and R9.1-1 Closures.
November 30, 2004	Johnson Space Center, Space Shuttle Program Presents R3.4-1, R3.4-2, R3.4-3 Closures to Operations Panel and Integrated Vehicle Assessment Sub-Panel.
November 30-1, 2004	Johnson Space Center, RCC Plug Repair Technical Interchange Meeting #3.
November 30, 2004	Marshall Space Flight Center, SRB Bolt Catcher Design Certification Review Pre-Board.

December 2004

December 2, 2004	Johnson Space Center, Cure-In-Place Ablator (CIPA) Critical Design Review.
December 3, 2004	Marshall Space Flight Center, SRB Bolt Catcher Design Certification Review Board.

Return to Flight Task Group Management Panel Lead Dr. Dan L. Crippen, left, confers with Technical Panel Lead Joseph W. Cuzzupoli during a December 2004 fact-finding plenary at the Marshall Space Flight Center in Huntsville, Alabama.

December 9, 2004	Videoconference, Space Flight Leadership Council Meeting.
December 10, 2004	Marshall Space Flight Center, SRB Bolt Catcher Design Certification Review Delta Board.
December 13, 2004	Johnson Space Center, Integrated Vehicle Assessment Sub-Panel Fact Finding on TPS Integrated Operations Plan.
December 14-15, 2004	Marshall Space Flight Center, Plenary Meeting.
December 15, 2004	Johnson Space Center, Space Shuttle Program Fact Finding on CAIB Recommendation 6.4-1.

January 2005

January 7, 2005	Johnson Space Center, Orbiter Return to Flight Working Group – Down Select for Repair Option Meeting.
January 10-14, 2005	Johnson Space Center, Debris Summit.
January 13, 2005	Johnson Space Center, Program Requirements Control Board – Down Select for Repair Option.
January 21, 2005	Kennedy Space Center, Imagery Technical Interchange Meeting .
January 24, 2005	Michoud Assembly Facility, External Tank Design Certification Review II.
January 26-27, 2005	Johnson Space Center, R6.4-1 Fact Finding.
January 27, 2005	Johnson Space Center, Component Simulation.

February 2005

February 2-3, 2005	Johnson Space Center, Japanese Space Agency (JAXA) Fact-Finding.
February 7-10, 2005	Johnson Space Center, Orbiter Delta Design Certification Review.
February 8, 2005	Washington, D.C., Imagery Technical Interchange Meeting.
February 15, 2005	Teleconference Plenary for Conditional Closure of CAIB Recommendation 3.3-1.
February 18, 2005	Videoconference, Space Flight Leadership Council Meeting.
February 22-23, 2005	Kennedy Space Center, Systems Design Certification Review II.
February 24-25, 2005	Michoud Assembly Facility, ET Design Certification Review II Pre-Board.
February 25, 2005	Johnson Space Center, Component Simulation.
February 25, 2005	Johnson Space Center, RCC On-Orbit Crack Repair Gun Critical Design Review.

Return to Flight Task Group Technical Panel members and staff observe Space Shuttle Solid Rocket Booster stacking operations in the Vehicle Assembly Building during a February 22, 2005, fact-finding visit to the Kennedy Space Center, Florida.

February 28-March 7, 2005	Kennedy Space Center and Johnson Space Center, STS-114 On-Orbit Mission Management Team Simulation.

March 2005

March 8-9, 2005	Michoud Assembly Facility, ET Design Certification Review I and II Board.
March 10, 2005	Johnson Space Center, Space Shuttle Program Closure Presentation to Operations Panel and the Integrated Vehicle Assessment Sub-Panel on Space Shuttle Program-3, Contingency Shuttle Crew Support.
March 15, 2005	Johnson Space Center, Space Shuttle Program Closure Presentation to Technical Panel and Integrated Vehicle Assessment Sub-Panel on CAIB Recommendation 3.2-1, ET Debris Shedding.
March 15, 2005	Washington, D.C., Meeting with Congressman Calvert and Staff.
March 21, 2005	NASA Headquarters, Management Panel Closure Discussion on CAIB Recommendations 9.1-1, 6.2-1, and 6.3-1.
March 22, 2005	Johnson Space Center, Operations Panel Fact Finding with Mr. Wayne Hale, Deputy Space Shuttle Program Manager on Space Shuttle Program-3, Contingency Shuttle Crew Support.
March 24, 2005	Johnson Space Center, Space Shuttle Program Closure Presentation Telecon with Technical Panel and Integrated Vehicle Assessment Sub-Panel on CAIB Recommendation 3.3-2.
March 28, 2005	Johnson Space Center, Management Panel Splinter Session on Space Shuttle Program Closure Packages for CAIB Recommendations 9.1-1, 6.2-1, and 6.3-1.
March 29, 2005	Johnson Space Center, Integrated Vehicle Assessment Sub-Panel Splinter Session on Final Report Comments.
March 29-31, 2005	Johnson Space Center, Plenary Meeting.

April 2005

April 4, 2005	Johnson Space Center, Stafford Task Force/Anfimov AEC Fact Finding.
April 4, 2005	NASA Headquarters, RTF TG Meeting.
April 5, 2005	Jet Propulsion Laboratory, California, RTF TG to ASAP Transition Meeting.
April 6, 2005	Johnson Space Center, System Design Certification Review II Board.
April 7-8, 2005	Teleconference, Operations Panel Mission Management Team Training Fact-Finding.
April 7-9, 2005	Johnson Space Center, System Design Verification Review III (Debris) Board.
April 12, 2005	Teleconference, Space Shuttle Program Fact Finding on Certificate of Flight Readiness Process.
April 13, 2005	Johnson Space Center, RCC Repair Interim Design Review.
April 19, 2005	Kennedy Space Center, Program Design Certification Review.
April 20, 2005	Washington, D.C., RTF TG Co-Chair and Management Panel Lead Meeting with Congressmen Gordon and Udall and Staff.
April 20, 2005	Washington, D.C., RTF TG Co-Chair and Management Panel Lead Meeting with House Science Committee Staff.
April 25, 2005	Johnson Space Center, CAIB Recommendation 6.4-1 Fact Finding.
April 26-27, 2005	Johnson Space Center, Delta System Design Verification Review III (Debris).
April 26-28, 2005	Johnson Space Center, Operations Integration Plan Simulation #3 Flight Day 04-06.

May 2005

May 3-4, 2005	Michoud Assembly Facility, Monte Carlo Inputs Review of External Tank Debris Data.
May 4, 2005	Johnson Space Center, Mission Management Team Simulation #13, Contingency Shuttle Crew Support.
May 9, 2005	NASA Headquarters, RTF TG Co-Chair Meeting with NASA Administrator.
May 10, 2005	Johnson Space Center, Review of Debris Transport Validation.
May 11, 2005	Johnson Space Center, Orbiter Impact and Damage Tolerance Models for RCC and Tile.

May 12, 2005	Johnson Space Center, R6.4-1 Closure Discussion with Space Shuttle Program.
May 18, 2005	Michoud Assembly Facility, Foam Divot-Transport-Impact Damage Technical Interchange Meeting.
May 24, 2005	Johnson Space Center, Ice Technical Interchange Meeting.
May 25, 2005	Johnson Space Center, Unexpected Debris Review Foam Divot-Transport-Impact Damage Technical Interchange Meeting.
May 26, 2005	Johnson Space Center, Aerospace Corp. Go/No-Go Decision for Monte Carlo Analysis.
June 2005	
June 2-3, 2005	Johnson Space Center, Debris Design Verification Technical Review Dry-Run.
June 6-7, 2005	Johnson Space Center, Plenary Meeting.
June 15, 2005	Johnson Space Center, R6.4-1 Closure Data Review.
June 16-17, 2005	Johnson Space Center, Debris Verification Technical Review Dry Run.
June 20, 2005	Michoud Assembly Facility, Bellows Heater Design Certification Review.
June 22, 2005	Johnson Space Center, STS-114 Delta Safety and Mission Assurance Readiness Review.
June 23, 2005	Kennedy Space Center, Delta Systems Design Certification Review.
June 24, 2005	Kennedy Space Center, Final Debris Design Verification Review.
June 25, 2005	NASA Headquarters, R3.2-1 and R3.3-2 Closure Data Review.
June 27, 2005	NASA Headquarters, Plenary Meeting.
June 28, 2005	NASA Headquarters, RTF TG Co-Chairmen and Panel Leads Meeting with NASA Administrator.
July 2005	
July 1, 2005	Johnson Space Center, Japanese Space Agency (JAXA) Fact-Finding.

APPENDIX E – ACRONYMS

AFB	Air Force Base
AFRSI	Advanced Felt Reusable Surface Insulation (TPS blankets)
ASAP	Aerospace Safety Advisory Panel
ATOTS	Advanced Transportable Optical Tracking System
BFS	Backup Flight System (Orbiter avionics)
BST	Behavioral Science Technology, Inc.
C-SiC	Carbon-Silicon Carbide
CAD	Computer-Aided Design
CAIB	Columbia Accident Investigation Board
CDR	Critical Design Review
CIA	Central Intelligence Agency
CIPA	Cure In-Place Ablator
CIPAA	CIPA Applicator
CO2	Carbon Dioxide
CSCS	Contingency Shuttle Crew Support
DCR	Design Certification Review
DFO	Designated Federal Official (FACA)
DOAMS	Distant Object Attitude Measurement System
DoD	Department of Defense
DTO	Development Test Objective
DVR	Design Verification Review
ECLSS	Environmental Control and Life Support System
EFM	Equivalent Flow Model (Scheduling tool)
EPOCC	Expanded Photographic Optic Control Center
ET	External Tank
EVA	Extra-Vehicular Activity
FACA	Federal Advisory Committee Act
FOD	Foreign Object Debris
FRCS	Forward Reaction Control System
HDTV	High Definition Television
HQ	Headquarters
HSC	House Science Committee
HSDT	High Speed Digital Television
HST	Hubble Space Telescope
JSC	Johnson Space Center (Texas)
ICB	Integration Control Board
ISS	International Space Station
ITA	Independent Technical Authority
ITAR	International Traffic in Arms (Federal law)
IVA	Intra-Vehicular Activity
IVASP	Integration Vehicle Assessment Sub-Panel
KSC	Kennedy Space Center (Florida)
KTM	Kineto Tracking Mount
LCC	Launch Commit Criteria
LO2/LOX	Liquid Oxygen
LH2	Liquid Hydrogen
LON	Launch-on-Need
MAF	Michoud Assembly Facility (Louisiana)
MAS	Manifest Assessment System (scheduling tool)
MER	Mission Evaluation Room
MMT	Mission Management Team
MoA	Memorandum of Agreement
MPP	Material Processing Plan
MR	Material Review

MRB	Material Review Board
MSFC	Marshall Space Flight Center (Alabama)
NASA	National Aeronautics and Space Administration
NESC	NASA Engineering and Safety Center
NDE	Non-Destructive Evaluation
NDI	Non-Destructive Inspection
NGA	National Geospatial-Intelligence Agency (formerly NIMA)
NIMA	National Imagery and Mapping Agency (now NGA)
NOAX	Non-Oxide Adhesive eXperimental
NSI	NASA Standard Initiator
NSTS	National Space Transportation System (Space Shuttle)
O2	Oxygen
OBSS	Orbiter Boom Sensor System
OIP	Operations Integration Plan
OMM	Orbiter Major Modifications
OMDP	Orbiter Modification and Down Period
OMRS	Operation and Maintenance Requirements System
ORM	Orbiter Repair Maneuver
OV-102	*Columbia*
OV-103	*Discovery*
OV-104	*Atlantis*
OV-105	*Endeavour*
PAL	Protuberance Air Load (ramps on ET)
PASS	Primary Avionics Software System (Orbiter avionics)
PDL	Polymer Development Laboratories (TPS foam)
PDR	Preliminary Design Review
POCS	Photographic Optic Control System
PR	Problem Report
PRCB	Program Requirements Control Board
PRR	Production Readiness Review
PTS	Pad Tracker System
RCC	Reinforced Carbon-Carbon
RFI	Request for Information
RPM	R-bar Pitch Maneuver
RSRM	Reusable Solid Rocket Motor (propulsion part of SRB)
RTF TG	Return to Flight Task Group
SDTV	Standard Definition Television
SEIO	Systems Engineering and Integration Office (also SE&IO)
SFLC	Space Flight Leadership Council
SiC	Silicon Carbide
SIMS	Shuttle Image Management System
SMA	Safety and Mission Assurance
SRB	Solid Rocket Booster
SRMS	Shuttle Remote Manipulator System
SSME	Space Shuttle Main Engine
SSP	Space Shuttle Program
SSPO	Space Shuttle Program Office
SSRMS	Space Station Remote Manipulator System
STS	Space Transportation System (Space Shuttle)
TPS	Thermal Protection System
TZM	Titanium, Zirconium, Molybdenum (metal alloy)
USA	United Space Alliance
WAVE	WB-57 Ascent Video Experiment
WLE	Wing Leading Edge (on Orbiter)

Discovery being lifted to a vertical position in the transfer aisle of the Vehicle Assembly Building at the Kennedy Space Center. After the Orbiter is vertical, it will be lifted into one of the high bays to be mated with a waiting stack of Solid Rocket Boosters and an External Tank.

Discovery hangs in the transfer aisle of the Vehicle Assembly Building at the Kennedy Space Center. The two green squares are the undersides of the umbilical well doors; after the External Tank separates, these doors close over the areas just outboard of them.