Statement of

Lieutenant General Thomas Stafford
Co-Chairman
Return to Flight Task Group

Before the

Commerce, Science and Transportation Committee
United States Senate

September 8, 2004

Mr. Chairman and members of the Committee, thank you for the opportunity to appear before you today to discuss the status of the Return to Flight Task Group's assessment activities.

In July 2003, the NASA Administrator chartered the group, under the Federal Advisory Committee Act, to perform an independent assessment of the agency'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.

The Task Group consists of 26 members from industry, academia, and government. Some key members also serve on the NASA Advisory Council's International Space Station Operations Readiness Task Force, which I chair. And two serve on the Aerospace Safety Advisory Panel. All of our members bring with them recognized knowledge and expertise in a variety of relevant fields.

The Task Group is organized for fact-finding into three panels – Management, Technical, and Operations. I have with me here today the leaders of these three panels. (Detailed biographies are appended to this testimony as Enclosures.)

No stranger to many of you, Dr. Dan Crippen, who leads our Management Panel, has a strong reputation for objective and insightful analysis. He is the former Director of the Congressional Budget Office, has served as Chief Counsel and Economic Policy Adviser to the U.S. Senate Majority Leader, and Domestic Policy Advisor and Assistant to the President for Domestic Affairs. Dr. Crippen is also a member of the Aerospace Safety Advisory Panel.

Mr. Joseph Cuzzupoli, leader of our Technical Panel, brings to the Task Group more than 40 years of aerospace engineering and managerial experience. Presently Vice President and K-1 Program Manager for Kistler Aerospace Corporation, he was Vice President and Program Manager for the Space Shuttle Orbiter Project for Rockwell International during

its design, development, and initial operations, and was an Assistant Program Manager on Apollo. He is a current member of the ISS Operational Readiness Task Force.

Colonel James Adamson, the Task Group's Operations Panel leader, has an extensive background in aerodynamics and operations as well as business management. He is a former astronaut with two Space Shuttle missions to his credit. He has served as President of Allied Signal Systems Technical Services, a government services company which later became Honeywell, and was one of the founders and the first Chief Operating Officer for United Space Alliance. He is currently CEO of his own consulting firm, Monarch Precision, and a member of the ISS Operational Readiness Task Force.

These three gentlemen have been deeply involved in the Task Group's activities and will be available to answer the details of your questions.

Since August of 2003, the Task Group has conducted extensive fact-finding activities at all levels within the agency and its contractor team.

Task Group members have visited NASA and contractor facilities, participated in teleconferences, reviewed documents, conducted interviews, received formal and informal briefings, and have observed tests, simulations, and program reviews.

In all, to date, the Task Group has conducted approximately 100 formal fact-finding activities and has issued more than 90 formal requests for information to the Space Shuttle Program Office.

Throughout the process the Task Group has, when appropriate, consulted with former members of the CAIB to ensure our members fully understand the intent of their recommendations.

The Task Group has conducted four public meetings at which it reviewed NASA's progress in meeting the intent of CAIB and the group has issued two interim reports. The next public meeting will take place in Houston next week and another interim report is planned for October.

Based on these extensive activities, I can report to you today that the Task Group is encouraged by NASA's progress, and as we said in our last report, we have observed that throughout the organization the people of NASA are engaged and dedicated to correcting the deficiencies that led to the Columbia accident.

We believe that NASA has made significant progress in many areas. At the same time, we believe that the agency continues to face significant challenges and has considerable work ahead of it in some areas before it will be ready to return the Shuttle to flight.

Over the last several months, the Task Group has formally assessed and conditionally closed 5 of the CAIB's 15 return to flight recommendations. This means that based on its independent fact-finding and deliberations, the Task Group believes that, contingent on

the agency meeting some specific additional conditions, NASA will have met the intent of these 5 CAIB recommendations.

I would like to briefly address each of these recommendations.

The Task Group believes that NASA has conditionally met the intent of CAIB Recommendation 3.3-1 in its development and implementation of a comprehensive inspection plan to determine the structural integrity of all Reinforced Carbon-Carbon (RCC) system components. And that the inspection plan takes advantage of advanced Non-Destructive Inspection (NDI) technology.

In satisfying CAIB Recommendation 3.3-1, NASA has:

- Requested the manufacturer to rebaseline all RCC system components
- Undertaken development of new NDI methods for RCC inspection: thermography, X-ray, and eddy current techniques
- Begun incorporating new methods of NDI into existing field processes.

Prior to fully closing this recommendation, the Task Group wants to see completion of requirements documentation and directives, and the results of some additional testing.

We believe that the agency has conditionally met the intent of CAIB Recommendation 4.2-3 to require that at least two employees attend all final closeouts and intertank area hand spraying procedures. In fact this commitment has been expanded to include all flight hardware closeouts.

In satisfying CAIB Recommendation 4.2-3, NASA has:

- Amended all manufacturing processes and procedures to ensure that at least two employees are present at all manufacturing steps
- Incorporated more stringent quality assurance requirements through additional employee training, certification, and procedures for inspections and imagery.

Before fully closing this item, the Task Group is awaiting completion of requirements documentation and directives, and the results of a program-wide audit.

The Task Group believes that NASA has conditionally met the intent of CAIB Recommendation 6.3-2 to modify the Memorandum of Agreement with the National Imagery and Mapping Agency -- now the National Geospatial Intelligence Agency -- to make the imaging of each Shuttle flight while on orbit a standard requirement.

In satisfying the intent of CAIB Recommendation 6.3-2, NASA has:

- Modified Memorandum of Agreement with the National Geospatial Intelligence Agency to request all available data that may assist NASA in the resolution of investigations
- Implemented an Interagency Operating Agreement
- Obtained necessary security clearances for appropriate positions
- Developed plans to demonstrate new capabilities in simulations.

Prior to fully closing this recommendation, the Task Group is awaiting the assessment of simulation results.

We believe that NASA has conditionally met the intent of CAIB Recommendation 4.2-5 by returning to a straightforward, industry-standard definition of 'Foreign Object Debris' (FOD) and eliminating any alternate or statistically deceptive definitions like "processing debris" by the Kennedy Space Center Quality Assurance and United Space Alliance.

In satisfying CAIB Recommendation 4.2-5, NASA has:

- Adopted FOD definition derived by National Aerospace FOD Prevention, Inc.
- Eliminated the term "processing debris"
- Conducted benchmarking to determine industry and government best practices and analysis on FOD handling
- Completed workforce training on new definition and procedures.

Before fully closing this item, the Task Group is awaiting NASA's completion of FOD process audits and interviews.

And, the Task Group believes that the agency has conditionally met the intent of CAIB Recommendation 10.3-1 by developing an interim program of closeout photographs for all critical sub-systems that differ from engineering drawings and by digitizing the closeout photograph system so that images are immediately available for on-orbit troubleshooting.

NASA's actions to satisfy CAIB Recommendation 10.3-1 include:

- Established a more precise definition of "closeout photography" and strengthen general closeout requirements
- Mandated that all digitized closeout photography be entered into a common closeout database system
- Implemented enhancements to the closeout database system
- Implemented photography steps in work procedures
- Upgraded digital photography equipment and developed user training and photography certification.

Prior to closing this recommendation, the Task Group is awaiting the results of simulations to demonstrate that the database can be accessed in a timely manner by appropriate personnel, the completion of photographer training, and development of a database system familiarization course and computer-based training.

I want to assure this committee that the Task Group will continue to monitor NASA's implementation of these recommendations and that we expect the agency to advise the Task Group if there is any material change in the status of any recommendation.

Looking ahead, at our public meeting next week the Task Group plans to consider NASA's request for closure of a sixth recommendation, 7.5-3, which calls for NASA to

reorganize the Space Shuttle Integration Office to make it capable of integrating all elements of the Space Shuttle Program, including the Orbiter.

Our fact-finding activities indicate that NASA continues to make progress with the other recommendations as well and we anticipate several of them will be brought to us for formal assessment by the Task Group in the next month or two.

In April 2004, the Space Shuttle Program Office Safety and Mission Assurance Manager described for the Task Group a framework for reducing the risk from thermal protection system debris. The primary hazard control in the framework is the elimination of critical debris shedding. Should the primary control not be completely satisfied, the capability to detect impacts during ascent and to detect impact damage on-orbit provides warning devices. The ability to make on-orbit repairs to tile and RCC, and -- as a last resort -- crew rescue, provides special mitigating procedures.

The Task Group indicated in its last report that it is satisfied with this "top-down" approach as it is applied to this hazard reduction program. We have said that we believe that this same "top-down" approach needs to be implemented across NASA as a whole and specifically to all NASA Implementation Plan items.

Now, looking at some of the challenges, the Task Group believes – as stated in its last report – that NASA's most important work is its efforts to eliminate critical ascent debris and the agency has made considerable progress in this area. If it could be guaranteed that no critical debris would come from the External Tank, the immediate cause of the loss of Columbia would be rectified. Analytical and testing techniques will allow a level of comfort before launch. Advances in NDI techniques may add confidence. Still, to guarantee that no critical debris will be shed is impossible short of extensive testing in flight. However, it may not be possible to obtain statistically significant data verifying External Tank debris conditions even by the end of the Shuttle Program. Therefore, on-orbit inspection and repair capabilities remain necessary to reduce the risk to future flights. Since our last report, it has become apparent that NASA continues to face some technical challenges in fully developing these capabilities. Should one or both of these capabilities not be sufficiently developed by the anticipated date of return to flight, the ability for the crew to await a rescue mission at the ISS will become an important consideration for the next launch. Therefore, the Task Group is assessing this "safe haven" capability.

A universal concern of the Task Group is the personnel requirements to meet the CAIB recommendations and return to flight. The various new organizations, from the NASA Engineering and Safety Center to the Independent Technical Authority to the Space Shuttle System Engineering and Integration Office, all require talented staff drawn largely from the current NASA and contractor pool.

In summary, the Task Group believes that although significant work lies ahead, NASA has made substantial progress toward meeting the intent of the CAIB's return to flight recommendations. On Aug. 26, 2003, following the release of the CAIB report, we stated

publicly that, “the Return to Flight Task Group is committed to doing its part to help ensure the Shuttle returns safely to space by making a careful, thorough, and independent assessment of NASA’s return to flight plans.” I want to assure this committee that the Task Group remains engaged and aggressive in its fact-finding and we will continue to carefully and thoroughly assess -- and publicly report on -- NASA’s progress toward meeting the intent of the CAIB. I appreciate the opportunity to discuss the work of the Return to Flight Task Group with you. Colonel Adamson, Mr. Cuzzupoli, Dr. Crippen, and I now look forward to responding to your questions.

Dan L. Crippen, Ph.D.

Former Director of the Congressional Budget Office

Dr. Dan Crippen has a strong reputation for objective and insightful analysis. He served, until January 2003, as the fifth Director of the Congressional Budget Office. His public service positions also include 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), where he advised the President on all issues relating to domestic policy, including the preparation and presentation of the federal budget. He has provided service to several national commissions, including membership on the National Commission on Financial Institution Reform, Recovery and Enforcement. He presently serves on the Aerospace Safety Advisory Panel.

Crippen has substantial experience in the private sector as well. Before joining the Congressional Budget Office, 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.

He received a Bachelor of Arts degree from the University of South Dakota in 1974, a Master of Arts from Ohio State University in 1976, and Doctor of Philosophy degree in Public Finance from Ohio State in 1981.

Enclosure

Mr. Joseph W. Cuzzupoli

Vice President and K-1 Program Manager, Kistler Aerospace Corporation

Joseph Cuzzupoli brings to the Task Group more than 40 years of aerospace engineering and managerial experience. 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). Cuzzupoli directed all functions in the building and testing of Apollo 6, Apollo 8, Apollo 9 and Apollo 12 flights as Rockwell's Assistant Program Manager for the Apollo Program; he later was Vice President of Operations. In 1978, he became the Vice President and Program Manager for the Space Shuttle Orbiter Project and was responsible for 5000 employees in the development of the Shuttle.

He 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 (Vice President and Program Manager, 1996 ? present) he has primary responsibility for design and production of the K-1 reusable launch vehicle.

He holds a Bachelor of Science degree in Mechanical Engineering from the Maine Maritime Academy, a Bachelor of Science degree 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 NASA Advisory Council's Task Force on International Space Station Operational Readiness.

Enclosure

Col. James C. Adamson, U.S. Army (Ret.)

CEO, Monarch Precision, LLC, Consulting firm

Colonel Adamson, a former astronaut, has an extensive background in aerodynamics as well as business management. He received his Bachelor of Science degree in Engineering from the U.S. Military Academy at West Point and his Master's degree in Aerospace Engineering from Princeton University. He returned to West Point as an Assistant Professor of Aerodynamics until selected to attend the Navy Test Pilot School at Patuxent River, Md. in 1979. In 1981 he became Aerodynamics Officer for the Space Shuttle Operational Flight Test Program at the Johnson Space Center's Mission Control Center. Colonel Adamson became an astronaut in 1984 and flew two missions, one aboard Columbia (STS-28) and the second aboard Atlantis (STS-43).

After retiring from NASA in 1992, he created his own consulting firm, Monarch Precision, and was then recruited by Lockheed as President/CEO of Lockheed Engineering and Sciences Company. In 1995 he helped create United Space Alliance and became their first Chief Operating Officer, where he remained until 1999. In late 1999, Colonel Adamson was again recruited to serve as President/CEO of Allied Signal Technical Services Corporation, which later became Honeywell Technology Solutions, Inc. Retiring from Honeywell in 2001, Colonel Adamson resumed part-time consulting with his own company, Monarch Precision, LLC. 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.

Enclosure

Lt. General Thomas Stafford, U.S. Air Force (Ret.)

President, Stafford, Burke & Hecker Inc., technical consulting

General Stafford, an honors graduate of the U.S. Naval Academy, joined the space program in 1962 and flew four missions during the Gemini and Apollo programs. He piloted Gemini 6 and Gemini 9, and traveled to the moon as Commander of Apollo 10. He was assigned as head of the astronaut group in June 1969, responsible for the selection of flight crews for projects Apollo and Skylab.

In 1971, Stafford was assigned as Deputy Director of Flight Crew Operations at the NASA Manned Spaceflight Center. His last mission, the Apollo-Soyuz Test Project in 1975, achieved the first rendezvous between American and Soviet spacecrafts.
He left NASA in 1975 to head the Air Force Test Flight Center at Edwards Air Force Base and in 1978 assumed duties as Deputy Chief of Staff, Research Development and Acquisition, USAF Headquarters in Washington. He retired from government service in 1979 and became an aerospace consultant.

Stafford has served as Defense Advisor to former President Ronald Reagan; and headed The Synthesis Group, which was tasked with plotting the U. S. return to the moon and eventual journey to Mars.

Throughout his careers in the Air Force and NASA space program, he has received many awards and medals including the Congressional Space Medal of Honor in 1993. 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.

He was Chairman of the NASA Advisory Council Task Force on Shuttle-Mir Rendezvous and Docking Missions. He is currently the Chairman of the NASA Advisory Council Task Force on International Space Station Operational Readiness.

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