

Written Testimony of
Lieutenant General Thomas P. Stafford, USAF (ret.)
Chairman, International Space Station Advisory Committee
Before the
Committee on Science, Space and Technology
United States House of Representatives

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Thank you, Mr. Chairman, for that warm introduction. I appreciate the opportunity to come before the Members to once again express my views and concerns, and those of my Committee members at this hearing. I will attempt to answer the questions provided in your letter of invitation from the standpoint of my expertise as a former astronaut, Air Force Deputy Chief of Staff for Research and Development and Acquisition, having served on and chaired many committees overseeing NASA in human spaceflight programs, and my current position as the ISS Advisory Committee Chairman. In this most recent position, I lead the committee to review NASA's current plans, and the underlying assumptions, for supplying the necessary upmass and downmass capacity to ensure the continued health and maintenance of the International Space station, and enable scientific research utilization through at least 2020. All members of my Committee have extensive experience in the development, testing and flight operations of the NASA Human Spaceflight program. I also had the unique experience of working with the Soviet-era Russians as the Commander of Apollo during the Apollo-Soyuz Test Project. Through that effort, I was afforded an opportunity to view their space program up close alongside their best engineers and technicians. As a result of that successful joint program, NASA and ROSCOSMOS were able to again cooperate in space with the Shuttle-MIR program, culminating in our successful partnership on ISS. I have had the privilege of serving as Chairman of the ISS Advisory Committee for over 10 years, and in that capacity, I became familiar with the Shuttle-Mir operations and have since been fortunate to have assessed the assembly, maintenance and day-to-day operations of the ISS since its inception. Throughout our long collaboration, I have continued to observe and assess the Russian space program.

Question 1

Are NASA's current plans adequate to ensure that requirements for a) ISS maintenance, growth, crew supplies, and expendables, b) NASA's scientific research utilization, c) National Laboratory growth and utilization, and d) other contingency maintenance, can be met through at least 2020?

In response to your first question, NASA's current plans are adequate to ensure that requirements for ISS maintenance, growth, crew supplies, and expendables, NASA's scientific research utilization, National Laboratory growth and utilization, and other contingency maintenance, can be met for the immediate future (at least 1 – 2 years). This is in large part thanks to the fortuitous delivery of consumables and spares delivered to the ISS by STS-134 and STS-135. Beyond that timeframe, NASA becomes increasingly dependent on its projected flow of sparing and re-supply needs, on the planned fleet of cargo vehicles which includes the ATV, HTV, Progress, and Commercial Resupply Service (CRS) Vehicles. In joint assessment with the Aerospace Safety Advisory Panel (ASAP), my ISS Advisory Committee concluded that the commercial vehicle launch schedule was overly optimistic and we have not received sufficient data to conclude with confidence that the schedule could be met. This was the unanimous conclusion of both groups. Both commercial cargo contractors (Orbital Science Corporation and Space Exploration Corporation) continue to experience significant delays in their development, testing and launch dates. Beyond the year 2016, ISS resupply is almost totally dependent on these CRS vehicles.

NASA has updated and revised the launch manifest, making the schedule more realistic, but this may still have potentially optimistic assumptions. Real time updates of the use of consumables and spares, the changing mission requirements, and the development of alternative operational procedures and techniques will continually alter the schedule, the changing logistics needs and the required vehicle launches in the out years. The increased dependence on the Follow-On Commercial Cargo Vehicles still gives us concern until they have demonstrated reliability and repeatability. For the near term, NASA has done a credible job in adjusting the schedule to meet the changing consumables and propellant required.

Question 2

Highlight any areas of concern, or assumptions, that could materially affect NASA's ability to ensure complete, effective and safe functioning, and full scientific utilization of the International Space Station through at least 2020.

It is important that the ISS investment provide high-value return with more time allocated to research. Clearly the major drivers to increasing utilization margins are crew size and availability of utilization hardware, that is, up mass and down mass. The ability to maintain a 6-person crew together with ISS utilization is critically dependent on the success and continued

viability of both commercial resupply service providers and continued viability of current logistics vehicles. The ISS is in a safe and logistically- sustained configuration through the rest of this year, so there is margin for it to absorb delays in the launch schedule of the commercial providers. Given that, and the extra help that my Advisory Committee has seen the ISSPO provide to the commercial cargo suppliers, my Committee is confident that they could safely deliver cargo to the ISS within the next year to 18 months. However, experience has shown that with many developmental program, delays are inevitable. The concern is that these providers become operational in order that major adjustments to the current launch schedules are avoided. Mean Time Between Failures (MTBF) calculations for Orbital Replacement Units (ORUs) by NASA have historically been done conservatively, using the best practices and industry standards. Operational experience shows that many components are operating well past calculated life and the ISS Program Office has used that data to forecast sustainability plans that support the station through 2020 with the possible potential to go beyond that with continued support. Ensuring the technical rigor of testing and analysis of critical ISS components to function through 2020 is another area that needs to remain at the forefront of the ISS Program Office's priorities. The Advisory Committee has not seen any indications of that being overlooked. This is a complex vehicle and extending its use will present challenges to the program, however they are challenges that NASA can overcome with appropriate resources and support.

Mr. Chairman, I thank you and the committee for giving me this opportunity, and thank you for all you do to advance American human space flight.