

**Johnson Space Center  
Astronaut and Flight Surgeon Survey Report**

**January 2008**

## Executive Summary

In early 2007, an incident involving former astronaut, Lisa Nowak, led NASA to conduct several reviews including internal and external evaluations of astronaut behavioral health and medical care. The internal NASA review, led by Johnson Space Center (JSC), focused on two elements: 1) current astronaut behavioral medicine practices and 2) a review of relevant records and information to determine whether any leading indicators that could have averted the incident were missed. The external review, conducted by the NASA Astronaut Health Care System Review Committee (comprised of external experts from the behavioral health and aerospace medical communities), focused on space medicine operations at JSC.

### Purpose and Methodology

In response to findings of both the internal JSC review and NASA Astronaut Health Care Committee, JSC decided to gather additional data. JSC collected information directly from astronauts and flight surgeons through an anonymous survey, to understand if changes in current policies or procedures are needed. Based on findings of the two previous reviews, the survey focused on these four key areas:

- the relationship between astronauts and flight surgeons as defined by openness of communication, level of trust, and understanding of safety responsibilities;
- concerns with raising and responding to issues of flight safety and/or crew suitability for flight;
- knowledge and implementation of policies and procedures detailing astronaut performance and crew assignment;
- knowledge and implementation of space flight alcohol policy and determination if there was personal knowledge of a United States astronaut, on launch day, presenting a risk to flight safety due to alcohol use.

From August to December 2007, the survey was developed, deployed, and analyzed through a deliberate and rigorous process (employing both internal specialists and external academic experts) to ensure the assessment was valid and reflective of the unique organizational context in which astronauts and flight surgeons work. All aspects of the assessment were designed to provide diagnostic results to assist in understanding the strengths and weaknesses of the organizational policies and procedures relative to the focal areas identified. This report will be used to develop specific action plans to address any needed changes.

### Respondents

The survey was completed by 91% of astronauts and flight surgeons. Specifically, 87 of 98 astronauts (response rate 89%) and 31 of 31 flight surgeons (response rate 100%) provided input. This high number of responses provides confidence that results accurately represent the perceptions and experiences of all astronauts and flight surgeons.

### Key Findings

The comprehensive results of the survey clearly highlight many organizational strengths as well as specific areas for continued improvement. Additionally, these results facilitate further insights to the findings from the two reports that precipitated this assessment.

**Key Area 1: *Relationship between astronauts and flight surgeons.*** Assessment of the relationship focused on three elements: 1) openness of communication, 2) level of trust, and 3) understanding of safety responsibilities. Results indicate that both astronauts and flight surgeons agree they have a healthy relationship. Both groups noted that the relationship has significantly improved over time; with

the current working relationship being the best to-date and additional improvements can be made to ensure continued progress. Suggestions for improvement centered on three key areas: 1) providing opportunities for continued relationship building between the two groups; 2) clarifying medical privacy practices to prevent inappropriate sharing of information, and 3) continuing to focus on safety within the organization.

**Key Area 2: Raising and responding to issues of flight safety, crew performance, and suitability for flight.** Assessment of this area focused on organizational factors including: understanding of avenues available to raise issues of flight safety, crew performance, or suitability for flight; feedback received on these issues raised; and barriers to raising these issues to various levels of leadership at NASA. For both astronauts and flight surgeons, there is a very clear understanding of the avenues available to them for raising flight safety, crew performance, or suitability for flight concerns and familiarity with the anonymous safety reporting systems at NASA.

Astronauts and flight surgeons reported that barriers generally do not prevent them from raising concerns of flight safety to various levels of leadership at NASA. Specific barriers surveyed included: fear of retribution, ostracism, and potential effect on flight status eligibility/credibility as a physician. Within these positive results, both astronauts and flight surgeons indicated that they are most comfortable and perceive fewer barriers when raising issues to their first-line (Flight Crew Operations/Space Life Sciences) leadership team, as compared with Center or Agency level leaders. Rationale for this finding was provided by astronauts and flight surgeons comments, as both groups state that barriers are not affecting their ability to raise safety issues and the comfort raising issues has improved significantly with management being approachable at present time. However, while astronauts generally did not report barriers to raising issues, a small number of responses did note that some individuals still hold perceptions that raising issues can affect flight status, even with organizational improvements in recent years.

Approximately 60% of astronauts and 80% of flight surgeons responded that they had first-hand experience with raising issues. Of these respondents, both astronauts and flight surgeons agreed that they received feedback on how raised concerns are addressed. Astronauts reported a more varied response, indicating a more diverse set of experiences with receiving feedback, which was highlighted in comments suggesting an increased focus on ensuring that feedback is provided to the individual raising the concern.

Across multiple decision-making forums (i.e., day-to-day operations, real-time mission operations, medical certification processes), flight surgeons report that they can raise issues of flight safety and they perceive that management will respond to these concerns. Within their organizational context, flight surgeons report open discussions where alternative and dissenting opinions concerning crew and flight safety are actively solicited by leadership. During real-time operations (where flight surgeons interact with management outside their direct chain), there is high agreement among flight surgeons that any flight safety issue raised would be investigated and acted upon by astronaut leadership and flight control teams. Further, within the critical medical certification process, which contains multiple review panels, flight surgeons reported that open communication is occurring both upward and downward, dissenting opinions are actively solicited, and they are provided rationale for decisions made.

**Key Area 3: Understanding of whether there is adequate knowledge and implementation of policies and procedures detailing performance and crew assignment.** Concerning the performance appraisal process (which differs for civilian and military astronauts), astronauts reported that generally the process is being used, is understood, and includes honest and constructive feedback from their leadership team.

However, differences between civilian and military astronaut appraisal systems resulted in military astronauts reporting receiving less regular feedback throughout the year and at year-end than civilian astronauts. Comments highlighted these diverse experiences and suggested instituting a more standardized feedback process for all astronauts, regardless of employment status. Astronauts reported receiving and understanding the performance feedback from technical skills training, but were less positive in reporting understanding of how the feedback is used for decision-making in the Astronaut Office. Comments suggested increasing the transparency of the connection and impact that technical skills training feedback has on decisions, particularly crew assignment. Further, astronauts reported a lack of clarity and understanding of the purpose and objectives of the Astronaut Evaluation Board (AEB), an internal space flight eligibility review process. Astronauts suggested that the AEB should be more fully understood by all astronauts which requires increasing the transparency of all aspects of the process—from the understanding of the purpose and objectives, to the frequency of occurrence, to receiving feedback post-process. Further, astronauts provided comments indicating their desires to increase the transparency of the crew assignment process, including understanding of the factors used for decision-making and their understanding of their personal standing for eligibility and assignment.

***Key Area 4: Understanding of whether there is adequate knowledge and implementation of space flight alcohol policy and if there was personal knowledge of a United States astronaut, on launch day, presenting a risk to flight safety due to alcohol use.*** Both flight surgeons and astronauts reported understanding the space flight alcohol policy. Comments emphasized that the policy is clear and being followed. Further astronauts and flight surgeons suggested ways to ensure that both groups maintain awareness of the policy over time. In response to a direct question regarding personal observations, all respondents reported never witnessing a crew member consume alcohol, on launch day, in the time leading up to launch. Finally, responses also brought forward information of a single isolated incident of perceived impairment of a crew member which occurred in the final days before launch, but not on launch day or within 12 hours of a launch or aviation event. Medical personnel and management assessed the situation and determined there was no impact to mission flight readiness or risk to space operations. Further details are protected by medical privacy.

## **Conclusions**

The strong participation levels demonstrate the seriousness with which the flight surgeons and astronauts approached this survey and provides confidence that the results are representative of the experiences of these groups. It affirms the mutual respect between flight surgeons and astronauts, as well as a strong understanding of roles and responsibilities. This assessment was one of several actions taken as a result of findings and recommendations contained within the NASA Astronaut Health Care Committee Report. The survey purpose was to understand what concerns exist in raising issues of flight and mission safety, to understand the relationship between astronauts and flight surgeons, and to ensure a clear understanding of policies and procedures relating to astronaut performance.

Both astronauts and flight surgeons express strong agreement they are confident in their ability to raise any safety concerns, and in their belief that any such concerns would be promptly addressed through the normal chain of command. Similarly, policies and procedures relating to astronaut performance were well understood, with some opportunities for improvement with performance evaluation and transparency of crew selection. The information gathered through this anonymous study reinforces the strong relationships between the astronaut corps and flight surgeons and between those groups and Center and Agency leadership. It also identifies specific improvement opportunities. The findings of this assessment provide the basis for actions that will ensure we maintain and enhance an environment of open, honest communications focused on the safety of human space flight.

## Key Survey Information

**Survey Purpose:** Produce a report detailing changes needed, if any, in current policies and processes as a result of findings of the astronaut and flight surgeon survey.

**Survey Objectives:** In response to the Astronaut Health Care System Review Committee Report, the JSC Center Director requested a survey of astronauts and flight surgeons with the following objectives to determine if current policies and processes are effective.

In reference to the timeframe of post STS-114 (August 2005) to present,

- Understand the relationship between astronauts and flight surgeons by assessing the openness of communication, level of trust, and safety responsibilities.
- Understand whether there are any concerns related to raising or responding to issues of flight safety and/or crew suitability for flight.
- Understand whether there is adequate knowledge and implementation of policies and procedures detailing astronaut performance, crew assignment, and space flight alcohol use.

In reference to the timeframe of post-Challenger (1987) to present,

- Determine whether there was personal knowledge of a US astronaut, on launch day, presenting a risk to flight safety or being of questionable suitability for flight due to alcohol use.

### Survey Population:

- United States astronauts assigned to the Astronaut Office, Flight Crew Operations Directorate, Johnson Space Center
- Flight surgeons serving in flight medicine, medical operations, or behavioral medicine, Space Life Sciences Directorate, Johnson Space Center

### Survey Milestones:

- August – September: Survey objectives and question set developed
- September 20: External panel of three academic experts validated survey question set
- September 26 – October 17: Survey open for responses by astronauts and flight surgeons
- October 18 – November 7: Survey data analysis plan developed by internal specialist and external academic expert; Survey analysis, according to data analysis plan, conducted by two NASA assessment specialists
- November 8 – November 20: Survey analysis verified by two academic experts; Survey analysis reviewed by leadership in preparation for group sessions; Group session process created by internal specialist and external academic expert
- November 27-28: Group sessions conducted by internal specialists and independent external facilitator with astronauts and flight surgeons

## Survey Methodology

The survey purpose and objectives were set by the JSC Center Director to follow-up on key issues identified by the JSC internal review of astronaut behavioral medicine procedures and the Astronaut Health Care System Review Committee Report that focused on current astronaut health care systems and medical policies and standards. The survey content was developed by internal experts who possess the unique knowledge of the organization, relevant expertise, and sufficient independence from the astronaut and flight surgeon organizations. The content of the questions for the survey was subsequently validated by a panel of three external experts from academia who provided valuable input, recommendations, and final approval.

The survey contained 65 questions designed to assess the four objectives noted previously. Quantitative questions comprised approximately two-thirds of the total number of questions and were given a standard response scale of one to five: strongly disagree (1) to strongly agree (5), as well as a not applicable response option for each question. The qualitative questions comprised the remaining one-third of the questions and were designed to allow for elaborative and explanatory responses.

All survey responses were collected using a web-based system. A pre-defined distribution list, based on the target audience for the survey, was used to grant access to the survey and manage responses. In preparation for the survey opening, the JSC Center Director and the leaders of both Flight Crew Operations and Space Life Sciences held a series of meetings and provided information electronically to astronauts and flight surgeons to explain the purpose and objectives of the assessment and answer questions. The survey was launched on September 26, 2007, and remained open for three weeks, until October 17, 2007. Overall, 118 of 129 astronauts and flight surgeons responded for a combined response rate of 91%. Specifically, 87 of 98 astronauts responded for response rate of 89% and 31 of 31 flight surgeons responded for response rate of 100%.

An analysis plan was jointly created by an internal specialist and an external academic expert and was conducted by two NASA assessment specialists. Data analysis was focused solely on the stated survey objectives and was conducted separately for astronaut responses and flight surgeons responses. Validation of the quantitative and qualitative data analysis and interpretation was conducted by two independent assessment experts from academia.

Further, three face-to-face group sessions were held with the astronauts and flight surgeons to present the data analysis results to ensure the accuracy of the data interpretation. The structure for these sessions was jointly created by an internal expert and external research scientist to achieve the purpose of verification of the data analysis results and to gain more in-depth information in key areas highlighted by the survey results. The sessions were conducted by internal specialists, experts in facilitation, with an understanding of the survey results and organizational context. Additionally, an external expert observed each session to ensure the integrity of the group session process, the presentation of the results, and the interpretation of feedback provided by astronauts and flight surgeons.

## Survey Results

The results below are organized according to the survey objectives. The analysis and results are presented separately for astronauts and flight surgeons within each objective. The results are an integration of both the quantitative and qualitative questions as structured in the survey as well as the information provided by respondents in the group sessions.

For the quantitative questions, the response scale was as follows:

1=Strongly Disagree 2=Disagree 3=Neither Disagree or Agree 4=Agree 5=Strongly Agree

Question means and standard deviations are presented for each question, separately for astronauts and flight surgeons. For qualitative questions, the major themes are summarized in connection to the quantitative results.

Interpretive guidelines were used to characterize the results. For overall group (astronaut or flight surgeon) means on a quantitative question, the following ranges and associated interpretive standards were used: 1.0 – 1.49 = Strongly Disagree; 1.5 – 2.49 = Disagree; 2.5 – 3.49 = Neutral; 3.5 – 4.49 = Agree; 4.5 – 5.0 = Strongly Agree. Likewise, inclusion of themes from qualitative questions was based whether the theme represented 10% or greater of the total comments and was comprised of three or more comments.

### **Objective 1: Understand the relationship between astronauts and flight surgeons by assessing the openness of communication, level of trust, and safety responsibilities.**

#### **Relationship: Openness of communication**

Results reveal a high level of openness of communication between astronauts and flight surgeons as reported by both groups. In particular, astronauts strongly agreed with the statement that they have open and honest communication with flight surgeons (mean,  $M=4.57$ , standard deviation,  $SD=0.71$ ). Further, astronauts agreed with the statements that they are comfortable with expressing thoughts and concerns to flight surgeons ( $M=4.43$ ,  $SD=0.87$ ), and are satisfied with the openness of communication with flight surgeons ( $M=4.38$ ,  $SD=0.92$ ). Astronaut comments revealed details of the strength of the relationship with flight surgeons, which is based on trust and has been improved in recent years. Astronauts also highlighted that the openness of communication with flight surgeons is dependent on the personal relationship between each astronaut and flight surgeon. Astronaut suggestions for continuous improvement centered on ensuring that flight surgeons do not have competing priorities for providing medical care to astronauts as well as considering various options to increase the continuity of care over time and across medical disciplines for each astronaut.

Likewise, flight surgeons reported a high level of openness of communication with astronauts. In particular, flight surgeons strongly agreed with the statements that they have open and honest communication ( $M=4.63$ ,  $SD=0.56$ ), comfort with expressing thoughts and concerns ( $M=4.57$ ,  $SD=0.57$ ), and satisfaction with the openness of communication with astronauts ( $M=4.50$ ,  $SD=0.68$ ). Comments provided by flight surgeons further highlighted the openness of communication with astronauts, with specific examples of candid and honest contact between the groups. Flight surgeons suggested continued relationship building between the two groups to further enhance the openness of communication.

**Relationship: Level of trust**

The strength of the relationship between astronauts and flight surgeons was also reflected in the results assessing the level of trust between the two groups. Both astronauts ( $M=4.38$ ,  $SD=0.77$ ) and flight surgeons ( $M=4.30$ ,  $SD=0.70$ ) reported agreement with the statement that there is a high level of trust between the groups. Additionally, astronauts agreed with the statements that that they trust flight surgeons will appropriately use shared information ( $M=4.37$ ,  $SD=0.84$ ); that they trust flight surgeons to protect medical information while ensuring mission success ( $M=4.26$ ,  $SD=0.91$ ); and that they trust that flight surgeons will make decisions based on what is best for an astronaut while ensuring mission success ( $M=4.41$ ,  $SD=0.74$ ). Comments provided by astronauts detailed the trusting relationship and characterized it as one based on professional behavior, both groups feeling part of the same team, and a joint focus on ensuring mission success. Astronauts again highlighted that the level of trust with flight surgeons is dependent on the personal relationship between each astronaut and flight surgeon and that the right match between the two is important. Suggestions for improvement focused on ensuring that medical privacy is understood and practiced by all involved parties in astronaut health care to prevent inappropriate sharing of medical information.

Similarly, flight surgeons agreed with the statement that they trust astronauts will appropriately share information with them ( $M=3.90$ ,  $SD=0.90$ ). Flight surgeons also agreed with the statement that astronauts trust flight surgeons to protect medical information while ensuring mission success ( $M=4.28$ ,  $SD=0.70$ ) and strongly agreed that they have a trusting relationship with astronauts for whom they provide medical care ( $M=4.59$ ,  $SD=0.63$ ). Flight surgeons highlighted in their comments that astronauts' trust of flight surgeons is affected by concerns of medical privacy, specifically as medical information is shared with management for mission decision making. Flight surgeons also noted that the level of trust is dependent on the relationship between the individual astronaut and individual flight surgeon and based on first-hand experiences. Flight surgeons suggested that the level of trust with astronauts could be increased by clarifying and strictly following policies and procedures for protecting medically private information and considering methods to demonstrate to astronauts that flight surgeons are focused on enabling, not preventing, astronauts to maintain their flight status.

**Relationship: Safety Responsibilities**

Finally, the clear understanding of safety responsibilities by both astronauts and flight surgeons further contributes to the success of the relationship between the two groups. In particular, astronauts strongly agreed with the statement that they raise flight safety or crew suitability concerns when they arise ( $M=4.55$ ,  $SD=0.65$ ); agreed with the statement that other astronauts raise concerns when they arise ( $M=4.36$ ,  $SD=0.91$ ); and agreed with the statement that flight surgeons raise concerns when they arise ( $M=4.38$ ,  $SD=0.83$ ). Comments provided by astronauts stressed that the safety systems in place are working, provide adequate avenues for the raising of issues, and that issues are raised as needed.

Likewise, flight surgeons strongly agreed with the statement that they raise flight safety or crew suitability concerns when they arise ( $M=4.70$ ,  $SD=0.47$ ); agreed with the statement that other flight surgeons raise concerns when they arise ( $M=4.37$ ,  $SD=0.69$ ); and strongly agreed with the statement that astronauts raise concerns when they arise ( $M=4.50$ ,  $SD=0.59$ ). Flight surgeon comments were complementary to these results and emphasized that there is a healthy focus on safety and issues are raised when needed.

**Objective 2: Understand whether there are any concerns related to raising or responding to issues of flight safety and/or crew suitability for flight.****Understand Avenues Available To Raise Concerns**

Both astronauts (M=4.71, SD=0.57) and flight surgeons (M=4.67, SD=0.48) strongly agreed with the statement that there is clear understanding of the avenues available to report flight safety, crew performance, or suitability for flight concerns. Further, astronauts (M=4.70, SD=0.49) and flight surgeons (M=4.63, SD=0.49) strongly agreed with the statement that they are familiar with the anonymous reporting safety systems in place at NASA.

**Potential Barriers to Raising Concerns**

Four potential barriers to raising concerns of flight safety or crew suitability for flight were assessed: fear of retribution, fear of flight status eligibility or credibility as a physician, fear of ostracism, and general comfort. Additionally, each barrier was assessed at three sequential levels of leadership within the organization: first-line leadership (Flight Crew Operations or Space Life Sciences), the Center (Johnson Space Center level) leadership, and the Agency (NASA level) leadership.

Overall, both astronauts and flight surgeons agreed that fear of retribution is not a barrier to raising issues of flight safety, crew performance, or crew suitability for flight. Astronauts agreed with the statements that they can elevate a concern without fear of retribution to Flight Crew Operations (M=4.48, SD=0.75), Center (M=4.28, SD=0.91), and Agency leaders (M=4.22, SD=0.94). While there was agreement that fear of retribution is not a barrier to raising issues to any of the three levels of leadership, the barrier is lowest in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses. Comments provided by astronauts, relative to all barriers assessed, highlight this trend by noting that the chain of command is working, with little need to engage higher levels of management, and they will raise issues to their first-line management as needed. Astronauts provided suggestions for continued improvement that center on ensuring that leaders are exhibiting behaviors that facilitate open communication of concerns and issues. Flight surgeons also reported agreement with the statements that they can elevate a concern without fear of retribution to Space Life Sciences leaders (M=4.35, SD=0.88), Center leaders (M=4.30, SD=0.84), and Agency leaders (M=4.21, SD=0.82). Fear of retribution is not presenting a barrier for flight surgeons raising issues to any of the three levels of leadership and the barrier is lowest in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses at this level. Flight surgeon comments, which relate to all barriers assessed, emphasize that barriers are not affecting their ability to raise safety issues and the comfort raising issues has improved significantly with management being approachable at present time.

Similarly, astronauts and flight surgeons agreed that fear of affecting flight status eligibility (astronauts) or credibility as a physician (flight surgeons) is not a barrier for raising issues of flight safety, crew performance, or crew suitability for flight. Astronauts agreed with the statements that they can elevate a concern without fear for flight status eligibility to Flight Crew Operations (M=4.35, SD=0.92), Center (M=4.14, SD=1.03), and Agency leaders (M=4.14, SD=1.05). While there was agreement that fear of affecting flight status eligibility is not a barrier to raising issues to any of the three levels of leadership, the barrier is lowest in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses. As mentioned in the previous section, comments underscored that the chain of command is working, with minimal need to engage higher levels of leadership. Additional comments specifically highlighted perceptions that raising issues could affect flight status are still held by some, even with organizational improvements in recent years.

Similarly, flight surgeons agreed with the statements that they can elevate a concern without fear for their credibility as a physician to Space Life Sciences leaders ( $M=4.29$ ,  $SD=0.94$ ), Center leaders ( $M=4.23$ ,  $SD=0.86$ ), and Agency leaders ( $M=4.17$ ,  $SD=0.85$ ). Fear of affecting credibility as a physician is not presenting a barrier for flight surgeons raising issues to any of the three levels of leadership and the barrier is lowest in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses at this level. As noted in the previous section, flight surgeon comments emphasize that barriers, including the potential impact to their credibility as a physician, are not affecting their ability to raise safety issues.

Furthermore, both astronauts and flight surgeons agreed that fear of ostracism is not a barrier for raising concerns of flight safety, crew performance, or crew suitability for flight. Astronauts agreed with the statements that they can elevate a concern without fear of ostracism to Flight Crew Operations ( $M=4.25$ ,  $SD=0.97$ ), Center ( $M=4.10$ ,  $SD=1.04$ ), and Agency leaders ( $M=4.12$ ,  $SD=1.04$ ). While there was agreement that fear of ostracism is not a barrier to raising issues to any of the three levels of leadership, the barrier is lowest in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses. Comments provided were consistent with this pattern of results. Likewise, flight surgeons agreed with the statements that they can elevate a concern without fear of ostracism to Space Life Sciences leaders ( $M=4.19$ ,  $SD=1.01$ ), Center leaders ( $M=4.13$ ,  $SD=0.90$ ), and Agency leaders ( $M=4.07$ ,  $SD=0.92$ ). As noted in the previous section, flight surgeon comments emphasize that barriers, including fear of ostracism, are not affecting their ability to raise safety issues.

Moreover, both astronauts and flight surgeons reported agreement with the statement that they are comfortable in raising concerns of flight safety, crew performance, or crew suitability for flight. Specifically, astronauts agreed with the statements that they are comfortable elevating concerns about flight safety, crew performance, or suitability for flight to Flight Crew Operations ( $M=4.33$ ,  $SD=1.02$ ), Center ( $M=3.93$ ,  $SD=1.22$ ), and Agency leaders ( $M=3.90$ ,  $SD=1.23$ ). While there was agreement that astronauts are comfortable raising issues to any of the three levels of leadership, the greatest level of comfort in raising issues within their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses. Astronaut comments noted that there is a strong desire for certainty of information before raising issues. Additionally, comments highlighted that astronauts are concerned about leaders and peers not misconstruing their raising of an issue as inappropriate or irresponsible sharing of information. Flight surgeons agreed with the statements they are comfortable elevating concerns to Space Life Sciences leaders ( $M=4.32$ ,  $SD=0.98$ ), Center leaders ( $M=4.20$ ,  $SD=1.00$ ), and Agency leaders ( $M=4.10$ ,  $SD=1.05$ ). Generally, flight surgeons are comfortable raising issues to any of the three levels of leadership and this comfort is highest with their direct chain of command, as evidenced by the high levels of agreement and minimal variation in responses at this level. Comments by flight surgeons do not identify any barriers to raising issues and that the communication of safety concerns is occurring as needed.

### **Feedback on Concerns Raised**

An additional element of raising concerns of flight safety or crew suitability for flight that was assessed was the feedback to astronauts and flight surgeons after an issue is raised. Overall, both astronauts and flight surgeons, who have had personal experience raising an issue, report receiving feedback on concerns raised. In particular, the 61% of astronauts that reported having personal experience raising concerns about flight safety, crew performance, or suitability for flight concerns agreed with the statement that they received feedback on how the concern was addressed ( $M=3.83$ ,  $SD=1.24$ ). While generally astronauts agreed with this statement, the mean coupled with the higher variation, denotes that

there is an increased range of experiences in receiving feedback on a concern raised as compared to other organizational elements assessed in this survey. Astronauts suggested that more feedback on issues raised would continue to improve this aspect of the communication loop. Likewise, the 83% of flight surgeons that reported having first-hand experience raising concerns agreed with the statement they had received feedback on how the concern was addressed ( $M=4.44$ ,  $SD=0.96$ ). Flight surgeon comments aligned with these results; feedback is being provided on raised issues.

### **Flight Safety in Normal Operations, Real-time Operations, and Medical Certification Process (Flight Surgeons Only)**

Flight surgeons were assessed on multiple facets of how issues of flight safety or crew suitability for flight are raised and responded to in three different environments in which they operate: their normal day-to-day organization (Space Life Sciences Directorate); during real-time operations; and through the medical certification process. Across all three environments, flight surgeons agree with the statements that flight safety and crew suitability for flight concerns are being addressed as needed.

Within the normal day-to-day operations of the Space Life Sciences Directorate, flight surgeons reported an overall positive environment for raising and considering of dissenting opinions. In particular, flight surgeons agreed with the statements that open discussions of flight safety and crew suitability issues, within medical privacy bounds, occur ( $M=4.37$ ,  $SD=1.00$ ) and that alternative and dissenting opinions are actively solicited by leadership ( $M=4.20$ ,  $SD=1.00$ ). Additionally, flight surgeons reported agreement with the statements that they are comfortable raising dissenting or minority opinions to leaders ( $M=4.39$ ,  $SD=0.88$ ) and that they receive feedback from leaders on the rationale for flight safety decisions ( $M=4.37$ ,  $SD=0.88$ ). Comments provided were aligned with these results, denoting that flight safety concerns are raised as needed and there are no significant barriers to raising these issues.

During real-time operations, flight surgeons strongly agreed with the statement that if they raise an issue about flight safety or performance that astronaut management will investigate and act ( $M=4.56$ ,  $SD=0.75$ ). Likewise, flight surgeons strongly agreed with the statement that during mission operations, they trust the flight control team to investigate and act on issues raised about flight safety or performance ( $M=4.64$ ,  $SD=0.62$ ). Comments provided were aligned with these results.

The medical certification process references a hierarchical series of boards which reviews and decides on the medical readiness and status of astronauts for missions. Flight surgeons report that the medical certification process is functioning well with respect to raising and responding to issues of flight safety or crew suitability for flight. Flight surgeons strongly agreed with the statements that they are comfortable raising issues through the process ( $M=4.66$ ,  $SD=0.67$ ); are comfortable raising dissenting or minority opinions ( $M=4.57$ ,  $SD=0.68$ ); and trust that the board(s) will act on issues raised ( $M=4.55$ ,  $SD=0.74$ ). Further, flight surgeons strongly agreed with the statements that alternative and dissenting opinions about flight safety/crew suitability for flight are actively solicited in the medical certification process ( $M=4.62$ ,  $SD=0.73$ ); that open discussions of flight issues occurs, within medical privacy bounds ( $M=4.66$ ,  $SD=0.61$ ); and have received feedback on the rationale from flight decisions from the medical certification process ( $M=4.66$ ,  $SD=0.48$ ). Comments provided were aligned with the results expressing that communication about flight safety or crew suitability for flight takes place, as needed, within the medical certification process.

**Objective 3: Understand whether there is adequate knowledge and implementation of policies and procedures detailing performance and crew assignment.****Performance Feedback**

Astronaut performance is assessed in a variety of methods including a yearly performance appraisal, through technical skills training feedback, through expeditionary training feedback, and in Astronaut Evaluation Boards. Each of these feedback methods was separately considered in the survey.

With respect to the performance appraisal system, astronauts agreed with the statements that they receive a yearly written performance appraisal (M=4.48, SD=0.83); that a face-to-face verbal session accompanied that yearly appraisal (M=4.19, SD=1.07); and that they understand the criteria used by their manager to evaluate performance (M=3.91, SD=1.19). Further, astronauts agreed with the statements their manager gave honest and constructive feedback during the appraisal (M=4.28, SD=0.94) and that they receive periodic feedback throughout the year from the leadership of the Astronaut Office (M=3.91, SD=1.14).

Due to differences in overarching performance appraisal systems used for civilian and military astronauts, further analyses were conducted to understand the experiences of both groups. Results indicated that civilian and military astronauts are experiencing performance appraisals differently, with military astronauts' responses less positive than civilian astronauts. In particular, civilian astronaut strongly agreed (M=4.52, SD=0.64), whereas military astronauts agreed (M=3.68, SD=1.36), with the statement that they have a face-to-face verbal session with the yearly appraisal. Both civilian astronauts (M=4.06, SD=0.83) and military astronauts (M=3.68, SD=1.47) agreed with the statement that they receive period feedback throughout the year from leadership of the Astronaut Office, however the overall agreement with the statement was lower and the variation in agreement was higher for military astronauts. Comments provided highlighted the range of diverse experiences that astronauts have had with the performance appraisal process, from very positive with constructive and honest feedback to negative with little substance to the evaluation. While improvements in the appraisal process were noted and increased verbal feedback is occurring, astronauts clearly suggested improvements are needed to the appraisal process with a desire for more constructive performance and developmental feedback that is standardized and regularly provided, regardless of employment status (civilian or military). Coupled with this suggestion, astronauts proposed that the leaders in the organization assume a greater mentoring role and ensure appropriate time and focus is given to performance and developmental feedback for their subordinates.

For performance feedback on technical skills, astronauts agreed with the statements that they receive feedback (M=4.21, SD=0.98) and understand how the feedback from technical skills training is generated (M=4.06, SD=1.10). However, astronauts were lower in their agreement, falling into the neutral range, with the statement that they understand how technical skills training feedback is used within the Astronaut Office for decision making (M=3.47, SD=1.37). Additionally, the trend across these three questions denotes a decreasing agreement and an increasing variation of responses. Explanation of this pattern of results is provided by the comments which point out that while training feedback is straightforward, the understanding of how that feedback is incorporated into key decisions, such as crew assignment, is less well understood. Suggestions for improvement focus on increasing the transparency of this process and clearly explaining how such feedback is used for both organizational and crew assignment decisions.

For expeditionary interpersonal training, astronauts agreed with the statement that they understand the objectives of the training and how it fits into the astronaut training program (M=4.35, SD=0.84). Comments were aligned with this result.

Finally, astronauts reported agreement with the statement that they understand the purpose and objectives of the Astronaut Evaluation Board (an internal process used to determine the flight status of each astronaut, to decide upon corrective actions if necessary, and to pass recommendations of flight status and corrective actions to the Chief, Astronaut Office for final disposition) (M=3.66, SD=1.25). The lower mean, while still in the agree range, coupled with an increased variation for this item was clarified by the comments provided by astronauts. These comments demonstrated the range of understanding of the purpose and objectives of the Astronaut Evaluation Board, from limited to full understanding by astronauts. Suggested improvements centered on increasing the transparency of all aspects of the process, from understanding of the purpose and objectives, to the frequency of occurrence, to receiving feedback post-process.

Flight surgeon performance is assessed through the standard appraisal system and results demonstrated that the process is working well. In particular, flight surgeons strongly agreed with the statements that they received a yearly written performance appraisal (M=4.58, SD=0.58) and that a face-to-face verbal session accompanied that yearly appraisal (M=4.55, SD=0.62) with honest and constructive feedback (M=4.52, SD=0.68). Further, flight surgeons agreed with the statement that they understand the criteria used by their manager to evaluate performance (M=4.32, SD=0.83). Comments reflected these results and conveyed the appraisal process is working and constructive feedback is provided on a regular basis as expected.

### **Crew Assignment Process (Astronauts Only)**

Astronauts report a varied understanding of the crew assignment process, including performance and medical eligibility. In particular, astronauts agreed with the statements that they understand the medical eligibility process and criteria being used (M=3.84, SD=1.14) as well as understand the performance eligibility process and criteria (M=3.64, SD=1.24). The pattern of means coupled with higher variations on these questions highlights that understanding of the eligibility processes is divergent across the astronaut corps. Further, astronauts reported lower agreement, falling into the neutral range, with the statements that they know where to find the documented crew assignment process (M=3.45, SD=1.35) and that they understand the crew assignment process and criteria being used (M=3.32, SD=1.32). The pattern of lower means coupled with higher variations on these two items draws attention to the disparate understanding of the crew assignment process. Comments provided by astronauts highlight various elements of the crew assignment process that are reflective of this pattern. Specifically, astronauts noted a desire to increase the transparency of the crew assignment process, including the factors being considered, the inputs used for decision making, understanding of their personal standing for eligibility and assignment, and more insight into the likelihood for and the timing of flights. Further comments noted an understanding of the complexity of the assignment process. Suggestions for improvement were aligned with these results and focused on increasing the transparency of the process through more communication on how the process works, feedback on individual standing, and openness throughout the process.

**Objective 4: Understand whether there is adequate knowledge and implementation of space flight alcohol policy and determination if there is personal knowledge of a United States astronaut, on launch day, presenting a risk to flight safety due to alcohol use.**

Overall, there is a high level of understanding of and knowledge of where to find the documented Space Flight Alcohol Use policy across both astronauts and flight surgeons. In particular, astronauts strongly agreed with the statement that they understand the policy (M=4.84, SD=0.53) and agreed with the statement that they know where to find the documented policy (M=4.47, SD=0.91). Likewise, flight surgeons agreed with the statements that they understand the policy (M=4.41, SD=0.82) and that they know where to find the documented policy (M=4.07, SD=1.02). Comments provided by both astronauts and flight surgeons noted that the policy is clear and being followed.

Further, all respondents reported never witnessing a crew member consume alcohol, on launch day, in the time leading up to launch. Comments emphasized that the policy is clear and being followed. Further astronauts and flight surgeons suggested ways to ensure that both groups maintain awareness of the policy over time. Finally, responses also brought forward information of a single isolated incident of perceived impairment of a crew member which occurred in the final days before launch, but not on launch day or within 12 hours of a launch or aviation event. Medical personnel and management assessed the situation and determined there was no impact to mission flight readiness or risk to space operations. Further details are protected by medical privacy.

## Appendix A

### Survey Question Set

**65 Total Items**

**Note:** This is **not** the format in which the survey was provided to respondents. The formatting presented below is intended to clarify the connections between survey objectives and questions and to allow for immediate comparisons between the survey content presented to astronauts and that presented to flight surgeons.

**Scale for responses to quantitative questions**

1 – Strongly Disagree   2 – Disagree   3 – Neither Disagree or Agree   4 – Agree   5 – Strongly Agree

N/A – Not Applicable

**Open ended, free responses questions are highlighted in grey.**

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**Objective 1: Understand the relationship between astronauts and flight surgeons by assessing the openness of communication, level of trust, and safety responsibilities.**

Astronaut	Flight Surgeon
<b>Objective 1 - Relationship between Astronauts &amp; Flight Surgeons: Openness of Communication</b>	
I have open and honest communication with flight surgeons.	I have open and honest communication with astronauts.
I feel comfortable expressing my thoughts and concerns to the flight surgeons.	I feel comfortable expressing my thoughts and concerns to the astronauts.
I am satisfied with the openness of communication with flight surgeons.	I am satisfied with the openness of communication with astronauts.
Please provide additional information/observations concerning the openness of communication between astronauts and flight surgeons.	Please provide additional information/observations concerning the openness of communication between astronauts and flight surgeons.
Please provide specific recommendations for improving the openness of communication between astronauts and flight surgeons.	Please provide specific recommendations for improving the openness of communication between astronauts and flight surgeons.
<b>Objective 1 - Relationship between Astronauts &amp; Flight Surgeons: Level of Trust</b>	
I trust that flight surgeons will appropriately use information that I share.	I trust that astronauts will share appropriate information with me as a flight surgeon.
I trust that flight surgeons will protect my medical information while ensuring mission safety and success.	Astronauts trust that I will protect their medical information while ensuring mission safety and success.
I trust that flight surgeons will make decisions based on what is best for me while ensuring mission safety and success.	I have a trusting professional relationship with astronauts that I provide medical care for.
I can trust flight surgeons.	I can trust astronauts.
Please provide additional information/observations concerning the level of trust between astronauts and flight surgeons.	Please provide additional information/observations concerning the level of trust between astronauts and flight surgeons.
Please provide specific recommendations for improving the level of trust between astronauts and flight surgeons.	Please provide specific recommendations for improving the level of trust between astronauts and flight surgeons.

<b>Astronaut</b>	<b>Flight Surgeon</b>
<b>Objective 1 - Relationship between Astronauts &amp; Flight Surgeons: Safety Responsibility</b>	
I raise flight safety and/or crew suitability concerns when they arise.	I raise flight safety and/or crew suitability concerns when they arise.
Other astronauts raise flight safety and/or crew suitability concerns when they arise.	Other flight surgeons raise flight safety and/or crew suitability concerns when they arise.
Flight surgeons raise flight safety and/or crew suitability concerns when they arise.	Astronauts raise flight safety and/or crew suitability concerns when they arise.
Please provide additional information/observations concerning your responsibility for raising flight safety and/or crew suitability concerns.	Please provide additional information/observations concerning your responsibility for raising flight safety and/or crew suitability concerns.
Please provide specific recommendations for clarifying responsibilities for raising flight safety and/or crew suitability concerns.	Please provide specific recommendations for clarifying responsibilities for raising flight safety and/or crew suitability concerns.

**Objective 2: Understand whether there are any concerns related to raising or responding to issues of flight safety and/or crew suitability for flight.**

<b>Astronaut</b>	<b>Flight Surgeon</b>
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Understand Avenues Available</b>	
I understand the avenues that are available to me for raising issues or concerns related to flight safety, crew performance, or suitability for flight.	I understand the avenues that are available to me for raising issues or concerns related to flight safety, crew performance, or suitability for flight.
I am familiar with the anonymous reporting systems that are in place to raise safety concerns such as NASA Safety Reporting System (NSRS) and JSC Safety Hotline.	I am familiar with the anonymous reporting systems that are in place to raise safety concerns such as NASA Safety Reporting System (NSRS) and JSC Safety Hotline.
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Potential Barriers</b>	
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Flight Crew Operations Directorate leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Space Life Sciences Directorate leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Center leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Center leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Agency leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of retribution, when reporting the concern to Agency leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own flight status eligibility, when reporting the concern to Flight Crew Operations Directorate leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own credibility as a physician, when reporting the concern to Space Life Sciences Directorate leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own flight status eligibility, when reporting the concern to Center leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own credibility as a physician, when reporting the concern to Center leaders.

Astronaut	Flight Surgeon
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Potential Barriers</b>	
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own flight status eligibility, when reporting the concern to Agency leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear for my own credibility as a physician, when reporting the concern to Agency leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Flight Crew Operations Directorate leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Space Life Sciences Directorate leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Center leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Center leaders.
I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Agency leaders.	I can elevate a concern about flight safety, crew performance, or suitability for flight without fear of ostracism, when reporting the concern to Agency leaders.
I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Flight Crew Operations Directorate leaders.	I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Space Life Sciences Directorate leaders.
I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Center leaders.	I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Center leaders.
I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Agency leaders.	I am comfortable elevating a concern about flight safety, crew performance, or suitability for flight to Agency leaders.
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Real-Time Operations</b>	
	During launch countdown and on-orbit operations, if I raise an issue about flight safety or a crew member's performance, I believe that on-scene astronaut management will investigate and act on it.
	During real-time mission operations, if I raise an issue about flight safety or a crew member's performance, I trust that the flight control team will investigate and act on it.
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Organizational Communication</b>	
	If I have a dissenting or minority opinion, I would be comfortable raising it to Space Life Sciences Directorate leaders, within medical privacy bounds.
	Alternative and dissenting opinions about flight safety/crew suitability are actively solicited by Space Life Sciences Directorate leaders.
	Open discussion of flight safety/crew suitability issues occurs with Space Life Sciences Directorate leaders, within medical privacy bounds.

Astronaut	Flight Surgeon
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Feedback on Issues Raised</b>	
When I raise an issue or concern of flight safety, crew performance, or suitability for flight, I receive feedback on how my concern was addressed.	When I raise an issue or concern about flight safety, crew performance, or suitability for flight, I receive feedback on how my concern was addressed.
	I receive feedback on rationale for flight safety/crew suitability decisions from Space Life Sciences Directorate leaders, within medical privacy bounds.
Please list any barriers to you raising concerns about flight safety, crew performance, or suitability for flight.	Please list any barriers to you raising concerns about flight safety, crew performance, or suitability for flight.
Please provide specific recommendations for removing the barriers noted in questions above.	Please provide specific recommendations for removing the barriers noted in questions above.
<b>Objective 2 - Raising concerns of flight safety/crew suitability for flight: Medical Certification Process</b> <i>References these decision boards: Aerospace Medicine Board (AMB); Medical Policy Board (MPB); MSMB (Multi-lateral Space Medical Board)</i>	
	I feel comfortable raising flight safety or crew suitability for flight issues in the medical certification process.
	If I raise an issue with flight safety or crew suitability for flight through the medical certification process, I trust the Board will act on it.
	If I have a dissenting or minority opinion, I would be comfortable raising it through the medical certification process.
	Alternative and dissenting opinions about flight safety or crew suitability for flight are actively solicited through the medical certification process.
	Open discussion of flight safety or crew suitability for flight issues occurs in the medical certification process, within medical privacy bounds.
	I receive feedback on rationale for flight safety or crew suitability for flight decisions from the medical certification process, within medical privacy bounds.
	Please list any barriers to you raising concerns about flight safety, crew performance, and suitability for flight through the medical certification process.
	Please provide specific recommendations for removing the barriers noted in questions above.

**Objective 3: Understand whether there is adequate knowledge of policies and procedures detailing astronaut performance, crew assignment, and space flight alcohol use.**

Astronaut	Flight Surgeon
<b>Objective 3 - Policies &amp; procedures: Performance evaluations including appraisals, astronaut evaluation board, crew training feedback, analog training (NOLS, NEEMO)</b>	
I receive yearly written performance appraisals.	I receive yearly written performance appraisals.
I receive a face-to-face verbal appraisal session with my manager/branch chief as part of my yearly performance appraisal.	I receive a face-to-face verbal appraisal session with my manager as part of my yearly performance appraisal.
I know the criteria used by my manager/branch chief to evaluate my performance in the appraisal.	I know the criteria used by my manager to evaluate my performance in the appraisal.
My manager/branch chief gave honest and constructive feedback during my performance appraisal.	My manager gave honest and constructive feedback during my performance appraisal.
I receive periodic feedback, through the year, on my overall performance from the leadership team in the Astronaut Office (office chief, branch chief, crew commander).	
I receive feedback in my technical skills training (i.e., Shuttle Systems & Operations, Station System & Operations, Robotics, EVA, Rendezvous, Aircraft training).	
I understand how the feedback from technical skills training is generated.	
I understand how the feedback from technical skills training is used within the Astronaut Office for decision making.	
I understand the purpose and objectives of the Astronaut Evaluation Board (AEB).	
I understand the objectives of the expedition interpersonal training (NOLS/NEEMO) and how it fits into the astronaut training program.	
Please provide additional information/observations concerning performance ratings and feedback processes (performance appraisals, technical skills training, AEB, NOLS/NEEMO).	Please provide additional information/observations concerning performance ratings and feedback processes.
Please provide specific recommendations for improving the performance ratings and feedback processes (performance appraisals, technical skills training, AEB, NOLS/NEEMO).	Please provide specific recommendations for improving the performance ratings and feedback processes.
<b>Objective 3 - Policies &amp; procedures: Astronaut Crew Assignment</b>	
I understand the medical eligibility process and criteria being used.	
I understand the performance eligibility process and criteria being used.	
I know where to find the documented process for crew assignment.	
I understand the crew assignment process and criteria being used.	
Please provide additional information/observations concerning the process of crew selection and assignment.	
Please provide specific recommendations for improving the process of crew selection and assignment.	

<b>Astronaut</b>	<b>Flight Surgeon</b>
<b>Objective 3 - Policies &amp; procedures: Space Flight Alcohol Use</b>	
I understand the Space Flight Alcohol Use policy.	I understand the Space Flight Alcohol Use policy.
I know where to find the documented Space Flight Alcohol Use policy.	I know where to find the documented Space Flight Alcohol Use policy.
Please provide additional information/observations concerning the Space Flight Alcohol Use policy.	Please provide additional information/observations concerning the Space Flight Alcohol Use policy.
Please provide specific recommendations for improving the Space Flight Alcohol Use policy.	Please provide specific recommendations for improving the Space Flight Alcohol Use policy.

**Objective 4: Determine whether there was personal knowledge of a US astronaut, on launch day, presenting a risk to flight safety or being of questionable suitability for flight due to alcohol use.**

<b>Astronaut</b>	<b>Flight Surgeon</b>
<b>Objective 4 - Possible Alcohol Incident</b>	
<i>Response options for following questions was YES/NO. Only if question was answered YES, then following questions was asked. If answered NO, following questions not asked</i>	
On launch day, prior to launch, have you ever witnessed a United States astronaut, who was scheduled for launch, consuming alcohol (other than a ceremonial toast)?	On launch day, prior to launch, have you ever witnessed a United States astronaut, who was scheduled for launch, consuming alcohol (other than a ceremonial toast)?
On launch day, have you ever witnessed a United States astronaut present a risk to flight safety or be of questionable suitability for flight due to alcohol use?	On launch day, have you ever witnessed a United States astronaut present a risk to flight safety or be of questionable suitability for flight due to alcohol use?
Did you raise it as a flight safety or crew suitability for flight concern?	Did you raise it as a flight safety or crew suitability for flight concern?
Did management investigate and take appropriate action?	Did management investigate and take appropriate action?
Please provide any additional information/observations concerning your response to the above items.	Please provide any additional information/observations concerning your response to the above items.

**Summary Questions**

<b>Astronaut</b>	<b>Flight Surgeon</b>
<b>Summary: Open-ended questions</b>	
Please provide any additional information/observations (positive or negative) concerning key elements of the organizational environment that contribute to productive working relationships, effective organizations, and ultimate flight safety and mission success.	Please provide any additional information/observations (positive or negative) concerning key elements of the organizational environment that contribute to productive working relationships, effective organizations, and ultimate flight safety and mission success.
Please provide any comments concerning this survey.	Please provide any comments concerning this survey.