DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.

BUSINESS AVIATION SAFETY SURVEY
2016 Survey Results
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The 2016 NBAA Safety Survey was launched in November 2015, with data collection continuing until Jan. 15, 2016. The robust response from 809 business aviation professionals of all roles and specialties more than doubled the response rate from the inaugural survey performed in 2015.

A specific effort was made to increase the applicability to – and participation by – single-pilot operators, with a branch of the questions tailored specifically to that segment of the membership.

About 100 of the respondents said they were primarily single-pilot operators, indicating some success was achieved at gaining safety perspectives from this segment, but much work remains to maximize inclusiveness in future surveys. Some questions were redesigned from the 2015 survey while additional new questions were added.

Where applicable, this report notes 2015 results in green text to establish initial trend monitoring. These results, which were used to inform the Safety Committee’s annual risk assessment process, are reported here for use and review by all interested parties.
Demographics

Survey Question:
My/our business flight operations are flown:

- Mix but mostly Part 91 (11%)
- Mix but mostly Part 135 (9%)
- All Part 91 (77%)
- All Part 135 (3%)

Aircraft Types Flown By Respondent Organizations

- Turbojet: 716
- Single Engine Turboprop: 70
- Multi Engine Turboprop: 117
- Piston Fixed Wing Single Engine: 94
- Single Engine Turbo: 77
- Piston Fixed Wing Multi Engine: 61
- Helicopter: 9

Key Takeaways
Operators that fly turbojet aircraft were highly participatory in the survey and make up a majority of respondents. Most respondents operate under Part 91 exclusively and only a small (3 percent) minority conduct all operations under Part 135.

Discussion
This survey’s response pool being very Part 91-centric seems acceptable, since that general aviation component of business aviation aligns closely with the safety initiatives developed by the Safety Committee. Their high participation rate implies that turbojet operators were successfully reached by the channels used to solicit for survey respondents. Going forward, it will be important to consider ways to boost the outreach to operators of other types of aircraft. It is relevant to ask if operators of types other than turbojets were less inclined to respond to a safety survey, or if they were simply not aware of it.

Recommendations
Future survey deployments should seek ways to increase response rate from operators of non-turbojet powered aircraft, while sustaining the strong response rate from that highly participatory segment.
**Key Takeaways**

Though there is clearly representation in the data from across the spectrum of business aviation operations, a sizeable portion of the data collected in this survey appears to emanate from medium- to large-sized business aviation operations.

**Discussion**

If the highest concentrations of the demographic data collected imply where the “median representative” survey respondent sits, it is in a flight department with three to four aircraft, four to nine pilots, one to three maintenance personnel and one to three additional support personnel. This implies that a sizeable portion of perspectives in this data are informed by experiences in settings that most would consider to be the “higher end” of operations represented in NBAA membership. Gaining a diverse and inclusive distribution of respondents from various operational settings (mirroring the spectrum of NBAA membership) remains an ongoing goal of future survey efforts. One factor likely affecting the response is that sizeable flight departments have correspondingly mature safety and administrative functions, thereby making it 1) more likely for leadership to become aware and interested in having the department participate in the survey and 2) efficient means for distributing information are typically in place in such organizations, so the availability of the survey and any encouragement to participate from department leadership is efficiently distributed.

**Recommendations**

Continue efforts to integrate all segments of NBAA membership into future survey response pools.

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**Demographics**

Relative size and scope of responding organizations.

<table>
<thead>
<tr>
<th>Number of Aircraft Operated</th>
<th>Number of Pilots in Organization</th>
<th>Number of People Other than Pilots/Maintenance Personnel in Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3-4</td>
<td>3-4</td>
<td>4</td>
</tr>
<tr>
<td>5-10</td>
<td>5-10</td>
<td>4</td>
</tr>
<tr>
<td>&gt;20</td>
<td>&gt;20</td>
<td>4</td>
</tr>
</tbody>
</table>

---

4 NBAA Safety Survey
Demographics and Ground Handling Practices

Key Takeaways
The breakdowns in line service activity correlate strongly with 2015 survey data, raising confidence that the results shown here are representative of actual practice. A roughly two-thirds majority stated aircraft towing at home base is performed by own company’s personnel and a similarly-sized majority reported that contract personnel handle fueling at home base.

Discussion
It’s notable that towing incidents are among the most frequent and costly ground handling mishaps. Performing towing with internal personnel may increase familiarity and confidence in the people doing the towing, but handling towing operations in-house also means all liability is kept in-house, and training/supervision is fully the operator’s responsibility. If an operation has just a few aircraft, internal personnel will perform a much lower total volume of towing evolutions than FBO personnel who do it routinely, and that may lead to comparatively limited towing experience for in-house personnel. However, the lower rate of towing evolutions and the extra “TLC” provided by own operation’s personnel may well serve to combat complacency. There is no single “right answer” and the choice is likely situational for aviation managers to discern.
Dual vs. Single-Pilot Practices

**Survey Question:**
The majority (or all) of my/our flight operations are flown:

- **Single-Pilot**
  - 12%
- **Dual-Pilot**
  - 88%

**For those that answered primarily single-pilot:**
The percentage of operations flown dual-pilot in our flight organization is:

- None (all single) 38%
- Occasionally (<10%) 36%
- 11-49% 26%

**For those that answered primarily dual-pilot:**
The percentage of operations flown single-pilot in our flight organization is:

- None (all dual) 81%
- Occasionally (<10%) 12%
- 11-49% 7%

**Key Takeaways**
An 81 percent majority of dual pilot respondents fly exclusively dual-pilot (no single-pilot ops) while a 62 percent majority of single-pilot respondents indicated they fly a mix of single and dual-pilot operations.

**Discussion**
The significant majority of survey respondents hail from dual-pilot operations, by a factor of nearly seven to one. Single-pilot respondents to this survey number just over 100, and the relative size of that data segment should be considered when drawing conclusions. The reason that a majority of dual-pilot respondents fly exclusively dual-pilot (no single-pilot ops) may be that their aircraft type(s) require two pilots, rather than arising from operational choice or staffing necessity. Single-pilot operations differ in that most of those platforms can be flown dual or single, providing an opportunity for operational choice about whether to fly dual or single-pilot. This appeared to be illustrated in the data, which indicated only 38 percent of the single-pilot operators fly exclusively single-pilot.
Safety-Related Practices

The survey branched for several questions based on whether the respondent reported being in a primarily single-pilot or primarily dual-pilot operation. Aggregate 2015 Survey results for dual-pilot operations shown in green to right of bars; 2015 survey did not have questions specific to single-pilot operators.

### Survey question:
Is a list of relevant aviation safety risks and mitigations periodically identified by you/your business?

<table>
<thead>
<tr>
<th>For those in primarily single-pilot operations</th>
<th>For those in primarily dual-pilot operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>36%</td>
<td>34% [22%]</td>
</tr>
<tr>
<td>64%</td>
<td>66% [78%]</td>
</tr>
</tbody>
</table>

### Survey question:
Do you or other members of your business participate regularly in a regional aviation safety roundtable or similar group, or the safety-oriented activities of a regional business aviation association?

<table>
<thead>
<tr>
<th>For those in primarily single-pilot operations</th>
<th>For those in primarily dual-pilot operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>55%</td>
<td>36% [47%]</td>
</tr>
<tr>
<td>45%</td>
<td>64% [53%]</td>
</tr>
</tbody>
</table>

### Key Takeaways
Results imply that around two-thirds of business aviation operations engage in annual risk assessment and profiling. Further, dual-pilot operators report a higher rate of participation in safety roundtables and forums (with clear majority indicating participation) than single-pilot operators, who report that a bit fewer than half participate in such activities.

### Discussion
The comparatively lower rate of participation in safety roundtables and forums by single-pilot operators may indicate that the programming and outreach of regional business aviation associations is succeeding more effectively in reaching, welcoming and encouraging participation by corporate flight departments that primarily operate dual-pilot. It is also possible that single-pilot business settings, in which people frequently have enterprise roles other than (and in addition to) flying, may not afford time to attend or prioritize opportunities for those persons to participate.

### Recommendations
Increasing single-pilot business operators’ participation in safety outreach and regional forums would likely benefit their safety performance and also broaden understanding of the relevant threats and countermeasures. It is recommended that regional business aviation associations act to increase their awareness of single-pilot business aircraft operators in their area and improve outreach to them, in an effort to boost connection with and relevance to this segment.
Safety-Related Practices

The survey branched for several questions based on whether the respondent reported being in a primarily single-pilot or primarily dual-pilot operation.

### For those in primarily single-pilot operations

**Survey question:**
The aircraft primarily used in my business aviation operations is/are:

- Privately/externally owned: 22%
- Externally leased/rented: 7%
- Owned and supported by the business: 71%

### For those in primarily dual-pilot operations

**Survey question:**
Does your organization participate in any third-party flight operation audit programs (e.g., IS-BAO, ARG/US, ACSF IAS)? Aggregate 2015 results shown in green.

- No: 27% [33%]
- Yes: 73% [67%]

### Survey question:
How often do you undertake formal aviation training (e.g., instructor-led refresher flight(s) or simulator if a pilot, or OEM-approved maintenance training if you are a technician)?

- Occasionally, but less than annually: 7%
- Twice or more per year: 28%
- Annually: 64%

### Survey question:
How often do you undertake formal aviation training (e.g., instructor-led refresher flight(s) or simulator if a pilot, or OEM-approved maintenance training if you are a technician)?

- Occasionally, but less than annually: 3%
- Twice or more per year: 36%
- Annually: 60%

**For those in primarily single-pilot operations**

**For those in primarily dual-pilot operations**
Key Takeaways
Results imply a high 73 percent engagement rate by dual-pilot operators in external audits, and that a modest increase in the engagement rate may be occurring. A 71 percent majority of single-pilot respondents indicated the aircraft they fly are owned and supported by the benefited business. A 60 percent majority of dual-pilot operators reported they go to recurrent training twice annually. Most single-pilot respondents (62 percent) indicated they train once annually, with 28 percent indicating they train twice per year.

Discussion
The 71 percent of single-pilot respondents who reported the aircraft they fly are owned and supported by the benefited business anecdotally seems a bit high, and single-pilot business operations may actually involve more personally-owned and leased aircraft than the 29 percent implied in these results. Ongoing study of the single pilot mishap rate has illuminated inflight maintenance issues as a significant mishap factor, implying a greater understanding of aircraft ownership and maintenance paradigms of single-pilot business aircraft may be worthy of more in-depth exploration. The training frequency question was asked identically for both single and dual-pilot operators. Though some respondents indicated no or only occasional training, some of these responses are likely from persons in supporting roles (e.g., other than pilots, mechanics, etc.). Opinions are valued from these members of the business aviation community and, going forward, surveys should include more suitable answer options for “supporting cast” respondents. The 60 percent majority of dual-pilot operators that reported twice-annual training anecdotally struck as potentially higher than the industry norm. This may be a result of high-end corporate departments (which are more likely to train two times per year) making up a significant part of the survey response pool. It may also reflect the degree to which corporate departments are operating aircraft of differing type ratings and are sending pilots to train once per year on each of two types. The single-pilot annual training rate was encouraging at 64 percent, and the twice-annual rate of 28 percent seemed elevated above expectations for single-pilot operators, implying that the balance of single-pilot survey respondents may have hailed from flight operations trending toward the advanced end of training practices in use by single-pilot business operators.
International Ops and Info Sharing

The survey continued in branched fashion with respondents routed to different questions based on whether they reported being from a primarily single-pilot or primarily dual-pilot operation.

### For those in primarily single-pilot operations

**Survey question:**
The percentage of international flights in our business aviation operation is:

- None: 37.1%
- Occasional (<10%): 53.2%
- 11-50%: 8.1%
- >50%: 1.6%

**Option to continue:**
Single-pilot respondents were given the option to exit the survey at this point, or continue despite some of the remaining questions being framed in a flight department context that may or may not fully apply in a primarily single-pilot operation. 79 percent of the single-pilot respondents elected to continue the survey.

### For those in primarily dual-pilot operations

**Survey question:**
The percentage of international flights in our business aviation operation is:

- None: 14.6%
- Occasional (<10%): 32.7%
- 11-50%: 44.9%
- >50%: [29%]

**Survey question:**
Does your flight organization participate in any industry safety data sharing program(s) such as ASAP, ASIAS, CFOQA or similar?

- Yes: 34% [31%]
- No: 66% [69%]

### Key Takeaways
Just eight percent of dual-pilot respondents reported exclusively domestic operations, but only about half fly consistent (i.e., more than occasional) international flights. Among single-pilot respondents, 37 percent reported flying no international operations, and about half fly occasional international operations. Results imply that about two thirds of dual-pilot operations do not participate in an industry data sharing program, which is generally consistent with 2015 results and implies no significant shift toward greater data sharing has occurred.

### Discussion
International operations are an integral aspect of most dual-pilot business operations. That said, a sizable 45 percent component flies only occasional international operations, implying an ongoing need for robust support functions for those that don’t achieve a high working level of re-currency with international operations.

### Recommendations
Develop case studies to illustrate positive effects of data sharing among business aviation operators to help counter a lingering reticence to embrace data sharing.
Safety Reporting

The survey continued with the remaining questions being the same for all respondents.

**Survey Question:**
Which statement best describes your personal awareness about safety reports, safety program issues, and risk management activities in your business aviation operation?

<table>
<thead>
<tr>
<th>Statement</th>
<th>With Comprehensive Awareness</th>
<th>Without Comprehensive Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>I’m an observant participant in the organization but don’t have comprehensive awareness of safety reports or issues outside of my own purview.</td>
<td>27%</td>
<td>73%</td>
</tr>
<tr>
<td>I have comprehensive awareness (e.g., I serve in a management role and/or participate directly on safety committee, etc.).</td>
<td>73%</td>
<td>27%</td>
</tr>
</tbody>
</table>

**Survey Question:**
Does your business aviation operation have a process for employees to internally report safety events, hazards or suggestions?

<table>
<thead>
<tr>
<th>Process Description</th>
<th>With Comprehensive Awareness</th>
<th>Without Comprehensive Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>4.63%</td>
<td>19.08%</td>
</tr>
<tr>
<td>Yes—we have a process specific to aviation safety but I’m unsure about the rest of the enterprise</td>
<td>12.93%</td>
<td>17.11%</td>
</tr>
<tr>
<td>Yes—we have a process specific to aviation safety, plus separate reporting process(es) elsewhere in enterprise</td>
<td>32.68%</td>
<td>34.87%</td>
</tr>
<tr>
<td>Yes—we have one process that covers all (aviation and non-aviation) employees of the business enterprise</td>
<td>49.76%</td>
<td>28.95%</td>
</tr>
</tbody>
</table>
Key Takeaways
Results reassuringly imply that a significant majority of operations have some form of safety reporting process. A surprising 73 percent majority of respondents feel they have comprehensive awareness of safety reports and issues across their organization. The rate of respondents indicating their organization has no safety reporting process was four times higher among persons who do not claim comprehensive awareness.

Discussion
A question was developed for this survey to distinguish which respondents’ underlying perspectives on safety reports and issues were mostly self-oriented (e.g., a line mechanic or pilot who knows about issues in which directly involved, but not necessarily every issue or incident in the operation) from those who, because they are in leadership or safety committee roles, have comprehensive awareness of all safety reports and incidents. Results imply that the question may not have been clearly understood, as it seems a stretch to casually accept that 73 percent of all respondents have comprehensive awareness of all safety matters in their operations. However, in a small aviation operation it is possible that consistent interaction makes everyone comprehensively aware. Despite the unexpectedly high percentage of respondents claiming comprehensive awareness, the differences in response to relevant questions was examined. In one about safety reporting, the preferred answers expected were either of the two middle options — that having a safety reporting protocol specific to aviation is optimal. The roughly 15 percent disparity in the “no reporting system” response between the comprehensively aware group and the others is a bit concerning. It may imply that some organizations have not successfully communicated awareness about the reporting system to line personnel, leading a larger portion of those employees to believe their organization does not have a safety reporting system. The percentage of respondents indicating a single enterprise-wide safety reporting system was higher than expected. It would seem that if a large retailer, for example, mixed flight department safety reports with those from warehouse personnel and retail outlet operators, aviation concerns could be sub-optimally suppressed or dealt with by people lacking aviation specific expertise. It is possible some respondents did not interpret the wording of that option as intended, and therefore that these results over- imply the amount of actual consolidation of aviation safety reporting with other enterprise concerns.

Recommendations
Organizations should periodically reinforce awareness of their safety reporting systems. A reporting system specific to aviation concerns should be in place to expeditiously alert relevant supervisors with aviation-specific expertise to safety issues reported.
Safety Reporting

The survey continued with the remaining questions being the same for all respondents.

Survey Question:
An earlier question in the survey asked: Does your flight organization periodically identify a list of top safety risks and mitigations for communication or discussion within your organization? Responses to that question are re-depicted here sorted based on whether the respondent reported having comprehensive awareness of internal safety issues or not.

Key Takeaways
A 72 percent majority of respondents who feel they have comprehensive awareness of safety reports say their organizations conduct periodic risk profiling, whereas their counterparts who do not claim to have comprehensive awareness are more evenly split on this issue.

Discussion
The intent of this question was to gauge the amount of cyclical self-mapping (or profiling) of risk being done in business flight operations. The difference in the answers between the comprehensively aware respondents and those not comprehensively aware are interesting. The comprehensively aware group unambiguously reported that most operations (nearly ¾) are conducting periodic risk profiling, whereas the not-comprehensively aware group was more evenly split. This may imply that the results of some risk profiling efforts are not shared with all personnel, thereby making those in leadership and safety roles aware of it, but leaving some others under-informed. It strikes as a reminder that working to improve and optimize internal communications is a worthy goal that deserves consistent attention.

Recommendations
Results of risk profiling (e.g., summation of key threats and mitigation plans) should ideally be shared to sustain a well-informed workforce, demonstrate organizational commitment to safety, and encourage participation in the internal safety dialogue of the company.
**Safety Reporting**

**Survey Question:**
How many safety events, hazards and suggestions do you estimate were submitted within the last two years by the following groups in your organization? (See interpretation example on following pages)

<table>
<thead>
<tr>
<th>Responses from those with comprehensive awareness of company safety reports/issues</th>
<th>Responses from those without comprehensive awareness of company safety reports/issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other Groups</strong></td>
<td><strong>Other Groups</strong></td>
</tr>
<tr>
<td><strong>Schedulers &amp; Dispatchers</strong></td>
<td><strong>Schedulers &amp; Dispatchers</strong></td>
</tr>
<tr>
<td><strong>Flight Attendants</strong></td>
<td><strong>Flight Attendants</strong></td>
</tr>
<tr>
<td><strong>Maintenance Personnel</strong></td>
<td><strong>Maintenance Personnel</strong></td>
</tr>
<tr>
<td><strong>Pilots</strong></td>
<td><strong>Pilots</strong></td>
</tr>
</tbody>
</table>

**Legend**
- Red: Don’t have this group
- Orange: 6-20
- Gray: 1
- Green: 20+
- Blue: None
Key Takeaways
A significant amount of safety reporting activity is perceived. Pilots are perceived to have somewhat higher reporting participation than maintenance workers overall, but results imply that both of those groups are quite participatory in reporting. An opportunity to boost engagement in safety reporting from schedulers and flight attendants is implied for those operations with these roles.

Discussion
Response to this question tracked with expectations, in that the comprehensively aware respondents generally indicated knowledge of somewhat more reporting than the other group. This makes sense, since the comprehensively aware group should be seeing and processing reports from across all the organization’s workers. It is encouraging to see both groups indicating that a reasonable amount of reporting is perceived. Pilots are indicated to have somewhat higher reporting participation than maintenance workers overall, but results imply that both of those groups are quite engaged in reporting (e.g. the comprehensively aware group reports 35 percent of pilots submitted six to twenty reports in the last two years while some 45 percent of maintenance workers submitted one to five. Participation falls off somewhat in other groups of employees. While many respondents indicate that their operation does not include flight attendants or scheduler/dispatchers, the response indicating “none” for reports submitted from these groups (for operations that have them) seems high, implying that an opportunity exists to seek ways to enfranchise them and boost their participation in safety reporting.

Recommendations
Flight organizations should seek to understand the distribution of safety reports being received from across its various worker segments and ensure all segments are enfranchised in the safety dialogue and encouraged to make reports.
Incidents and Close Calls

Survey Question:
Within the last two years, how many incidents or close calls would you say have occurred in your flight operations during the following activities?

Responses from those with comprehensive awareness of company safety reports/issues

Responses from those without comprehensive awareness of company safety reports/issues

Interpretation examples:
About 32 percent of respondents in the left charts recalled having one to three incidents/close calls during landing in the last two years. Roughly eight percent of respondents in the right chart recalled four to nine ground servicing & handling incidents/close calls in the last two years.
Key Takeaways
Respondents gauged “ground servicing and handling” to be the most incident- and close call-prone activity. Maintenance, approach and landing, and en-route phases were also toward the top end of activities during which respondents recalled incidents and close calls.

Discussion
The results on this question show mostly solid alignment between the two groups regarding the relative comparison of activities that experienced incidents and close calls (e.g., both groups felt the leading activity with 1-3 incidents and 4-9 incidents was Ground Servicing & Handling, that Maintenance Activities was the second most incident-prone activity in the 1-3 range, and that Approach was the third in the 1-3 range). There were a few places where the relative order was reversed between one or two particular activities, but never by enough to stand out as especially significant. One interesting aspect to the results is that the not-comprehensively aware group tended to recall slightly higher rates of incidents and close calls than the compressively aware group. This could be signaling that some incidents or close calls are not making it into reports, and thus leadership and safety committees may lack awareness. However, given that the majority of respondents claimed comprehensive awareness and that the deltas are not severe, this minor difference seems interesting to note and watch for the future, but not compelling enough to merit serious concern.

Recommendations
Continue emphasis on Ground Servicing and Handling concerns through the “Airport Ground Collisions” top focus area identified by the Safety Committee.
## Incidents and Close Calls

**Survey Question:**
Within the last two years, how many incidents or close calls would you say have occurred in your flight operations during the following activities?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responses from those with comprehensive awareness of company safety reports/issues</th>
<th>Responses from those without comprehensive awareness of company safety reports/issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Service &amp; Handling</td>
<td><img src="chart1" alt="Bar chart" /> 55%</td>
<td><img src="chart2" alt="Bar chart" /> 64%</td>
</tr>
<tr>
<td>Approach</td>
<td><img src="chart3" alt="Bar chart" /> 44%</td>
<td><img src="chart4" alt="Bar chart" /> 54%</td>
</tr>
<tr>
<td>Maintenance Activities</td>
<td><img src="chart5" alt="Bar chart" /> 43%</td>
<td><img src="chart6" alt="Bar chart" /> 44%</td>
</tr>
<tr>
<td>Landing</td>
<td><img src="chart7" alt="Bar chart" /> 38%</td>
<td><img src="chart8" alt="Bar chart" /> 38%</td>
</tr>
<tr>
<td>Enroute</td>
<td><img src="chart9" alt="Bar chart" /> 37%</td>
<td><img src="chart10" alt="Bar chart" /> 36%</td>
</tr>
<tr>
<td>Taxi</td>
<td><img src="chart11" alt="Bar chart" /> 31%</td>
<td><img src="chart12" alt="Bar chart" /> 30%</td>
</tr>
<tr>
<td>Initial Climb</td>
<td><img src="chart13" alt="Bar chart" /> 30%</td>
<td><img src="chart14" alt="Bar chart" /> 25%</td>
</tr>
<tr>
<td>Takeoff</td>
<td><img src="chart15" alt="Bar chart" /> 27%</td>
<td><img src="chart16" alt="Bar chart" /> 30%</td>
</tr>
<tr>
<td>Standing</td>
<td><img src="chart17" alt="Bar chart" /> 24%</td>
<td><img src="chart18" alt="Bar chart" /> 25%</td>
</tr>
</tbody>
</table>

**Interpretation examples:**
These tables illustrate the percentage of respondents that answered other than “none” for each activity on the previous question and sorts them from highest to lowest.

**Trend note:**
2015 Survey results shown to the right for comparison. 2016 survey operational phases were expanded to align with CAST/ICAO Common Incident Taxonomy conventions.
**Key Takeaways**
The same three activities (Ground Servicing & Handling, Maintenance and Approach) emerged as most incident- and close-call prone in both this and last year’s survey. In particular, the high percentage of respondents (more than half) recalling incidents and close calls during “Ground Servicing & Handling” sounds like a call to action to reduce incidents in this activity.

**Discussion**
The results to the incidents and close calls question, when viewed this way, illustrate the slightly higher recall rate of incidents and close calls by the not-comprehensively aware group compared to the others. Again, even where some activities swapped places in the order of issues recalled, the correlations were fairly strong between the groups. The magnitude of difference was greatest in the “Ground Servicing & Handling” and “Maintenance Activities” categories, with the non-comprehensively aware group 9 percent and 11 percent higher in their recall of incidents and close calls during these activities, respectively.

**Recommendations**
Continue emphasis on the concerns raised in this question’s responses through the “Airport Ground Collisions” and “Runway Excursions” top focus areas set by the Safety Committee.
## Threat Perceptions

### Survey Question:
Order the following list from what you feel is most to least likely to have an incident occur during that activity in your flight organization.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Composite Activity Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Service &amp; Handling</td>
<td>(1st)</td>
</tr>
<tr>
<td>Landing</td>
<td>(2nd)</td>
</tr>
<tr>
<td>Approach</td>
<td>(5th)</td>
</tr>
<tr>
<td>Takeoff</td>
<td>(6th)</td>
</tr>
<tr>
<td>Taxi</td>
<td>(7th)</td>
</tr>
<tr>
<td>Maintenance Activities</td>
<td>(8th)</td>
</tr>
<tr>
<td>Initial Climb</td>
<td>(9th)</td>
</tr>
<tr>
<td>Standing</td>
<td>(10th)</td>
</tr>
<tr>
<td>Enroute</td>
<td></td>
</tr>
</tbody>
</table>

### Composite Activity Ranking
Percent of respondents ranking as their number one issue noted (%)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distraction-related error</td>
<td>19.2%</td>
</tr>
<tr>
<td>Person fatigued, ill or otherwise physically impaired</td>
<td>21.0%</td>
</tr>
<tr>
<td>Lapse in professionalism, judgment or procedural compliance</td>
<td>22.3%</td>
</tr>
<tr>
<td>Time pressure, rushing or task-saturation error</td>
<td>9.9%</td>
</tr>
<tr>
<td>Automation confusion, anomaly or user error</td>
<td>7.9%</td>
</tr>
<tr>
<td>Skill-related error/lack of proficiency</td>
<td>3.9%</td>
</tr>
<tr>
<td>Communication or needed information insufficient or lacking</td>
<td>5.3%</td>
</tr>
<tr>
<td>Knowledge-related error</td>
<td>1.9%</td>
</tr>
<tr>
<td>Standard procedures insufficient or lacking</td>
<td>1.9%</td>
</tr>
<tr>
<td>Experience or supervision insufficient or lacking</td>
<td>3.2%</td>
</tr>
<tr>
<td>Equipment lacking or inadequate for the task</td>
<td>5.4%</td>
</tr>
</tbody>
</table>
Key Takeaways
Distraction, fatigue, professionalism and pressure appear to weigh heavily as top potential triggers for mishaps. These issues (in the first to fourth positions on this list) are unchanged in rank order from the 2015 results.

Discussion
The list used in the activity rank-ordering question was modified to conform to CAST/ICAO Common Incident Taxonomy for this year’s survey, so several items changed slightly from 2015 (e.g., “approach and landing” and “takeoff and initial climb” each became two separate activities). There was a strong correlation between this and last year’s results. A drop in “Maintenance Activities” and corresponding elevation of concern for issues during taxi and takeoff seem worth noting and watching closely. The question asking respondents to rank order a list of event triggers was similar to last year except “automation confusion” was moved to this list from its prior location in another question. Year-to-year results were again strongly aligned. It is interesting that the “professionalism/procedural compliance” trigger ranked third overall yet had the highest percentage of respondents rating it number one (22.32 percent).

While a subtle point, this would seem to signal a bit of polarization on this issue. The highest plurality of respondents (almost a quarter of them) view it as their number one issue, but rather than running a consistent second or third with the rest of respondents, it must vary in the pecking order of a fair number to drive its rank to third overall. It seems sensible to consider that, if one perceives their organization has a professional culture, concern over procedural non-compliance is considerably suppressed, whereas if one feels their work culture is other than professional, concern over non-compliance or questionable judgment becomes a hot coal (number one) issue. In contrast, distraction appears to be a less polarized and more consistent concern that must have been ranked in the top few places for most respondents in order to earn the first ranking overall, despite being the third-most ranked as the first concern of individual respondents.

Recommendations
Continue emphasis on the issues raised on this question through the Professionalism and Fit For Duty Working Groups of the Safety Committee.
Threat Perceptions

Survey Question:
Considering your operations on an overall or average basis, indicate your personal degree of concern for each potential type of incident listed and its associated risks in your operations.

Stable, lowest tier concern – controls in place work with least extra attention needed
Moderate, third tier concern – occasional need for situational management
Significant, second tier concern – frequent need for active management
Top tier concern – highest need for active management and improved risk controls

Interpretation examples:
For scoring, a top tier selection was assigned four points, on down to one point for the lowest tier. If every single respondent had considered the same issue a top tier concern, it would have scored four points on the composite graph.

Trend note:
2015 ranking shown in green to right of bars. The top-ranked 2015 issue (automation confusion) was recognized as more of an event trigger and moved to the preceding question.
Key Takeaways
Several top-ranking issues reported by respondents (ground handling incidents, runway excursions) directly comport with issues elevated as top focus areas. A divergence of opinion is implied, however, between various safety and trade groups that have designated LOC-I as a top focus area, and operational practitioners, who gauge it well down in their hierarchy of concerns.

Discussion
This question asks for a fair amount of introspection from the survey taker. It provides a contrast to others in which respondents must rank-order concerns, and permits issues here to be treated as equivalent, which provides an alternative view into respondent perceptions. This year’s results were generally consistent with last year’s. The top item in 2015 was “automation confusion or automation anomaly” but on review, that issue was seen to be more appropriately considered an event trigger and was addressed this year in a different question. Several of the top-ranking issues (ground handling incidents, runway excursions) directly align with issues elevated as top focus areas. It is interesting to see CFIT and LOC-I fairly far down the pecking order (consistently in this and last year’s results) despite the prominence of these concerns in current aviation safety dialogue. Results from the single-pilot segment of respondents were reviewed separately for any significant differences in their rankings compared to the composite results shown. Though “powerplant malfunction” made a significant jump to the sixth ranked concern in the single-pilot segment (logical, considering many of their aircraft are single-engine types) CFIT and LOC-I concerns occupied the third and fourth slots from the bottom on both the single-pilot-specific and composite sorts of the survey results. The reasons for this could involve several factors. Since the response pool was heavy with people from dual-pilot corporate turbojet operations, they may feel insulated from these issues (true or not) by advanced training undertaken. A low rate of incidents of these types in the public consciousness involving dual, proflown business turbojets, could also affect their perception. These two mishap modes have earned attention more from their production of catastrophic outcomes than their frequency of occurrence (which is quite low). That may function to make it easier to assume that “it won’t happen to me.” Whatever the underlying cause(s), it is important to note the dichotomy between various safety bodies elevating the LOC-I issue, in particular, as a top focus area, and operational practitioners gauging it well down their list of concerns.

Recommendations
Along with the more technical aspects of addressing the threat, also recognize and be responsive to the “hearts and minds” advocacy challenge for the LOC-I issue implied by these results.
Personal Electronic Devices

Survey Question:
Regarding your flight organization’s policy on use of personal electronic devices (PED) during each of the listed activities [2015 results in green to left of corresponding 2016 result]

<table>
<thead>
<tr>
<th>Activity</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Duties (Pilot)</td>
<td>2.7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Flight Duties (Non-pilot)</td>
<td>9.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Maintenance Duties</td>
<td>43.2%</td>
<td>22.6%</td>
</tr>
<tr>
<td>Scheduler / Dispatcher Duties</td>
<td>21.4%</td>
<td>10.1%</td>
</tr>
</tbody>
</table>

Key Takeaways
A 62 percent majority of respondents consider PED distraction a “minor” or “no impact” issue. The percentage of respondents indicating their organization has no PED policy dropped marginally across all four specialties, but the percentage perceiving frequent or rampant violations to PED policy rose in all specialties as well, most prominently in the pilot category, where it rose from 4.8 percent in 2015 to 12.3 percent this year.

Discussion
These questions were identical in both the 2015 and 2016 surveys. Results for the question about perceived risk of PED distraction were nearly the same in both years despite the much larger respondent pool in the 2016 survey. This lends some confidence this is a bankable depiction of how industry people view this threat, with a 62 percent majority considering it a “minor” or “no impact” issue. At first glance, the results on the question about policy
and the degree of adherence to it appear similar to 2015 results, but there are a few subtle shifts. On one hand, it is encouraging that the percentage of respondents indicating their organization has no PED policy dropped marginally across all four specialties. But on the other, the percentage of respondents reporting frequent or rampant violations to PED policy rose in all specialties as well, most prominently in the pilot category, where it rose from 4.8 percent in 2015 to 12.3 percent this year. Any growth in non-compliance rates merits attention for its potential to signal a shift away from professional and safe cultural norms. It seems reasonable to consider the pilot specialty the most needful of a PED policy, owing to the severity of potential consequences from distraction during flight duties, and while it is positive that about a two-thirds majority indicate the presence of a pilot policy and strong or better compliance, it strikes as regrettable that nearly a quarter of respondents indicate no PED policy is in place for pilots during flight duties. The 46 percent that report no PED policy exists for maintenance activity also seems concerning, considering that maintenance is often performed by technicians working solo, and distractions in that context also would appear to carry significant potential consequences. The lack of established PED use policies seems especially needless when one considers that implementing one is virtually a zero-cost endeavor.

Recommendations
Develop some boilerplate PED policy language and offer it for download for local refinement, much like the flight department management guide and similar administrative textual aids are offered.
## General Safety Outlook

### Survey Question:
I feel the safety culture in my flight organization is:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>30%</td>
</tr>
<tr>
<td>Very Good</td>
<td>48%</td>
</tr>
<tr>
<td>Moderate</td>
<td>16%</td>
</tr>
<tr>
<td>Weak</td>
<td>4%</td>
</tr>
<tr>
<td>Minimal</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Survey Question:
I feel the trend in my organization’s safety posture over the last year has been:

<table>
<thead>
<tr>
<th>Trend</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving</td>
<td>70%</td>
</tr>
<tr>
<td>Staying the Same</td>
<td>23%</td>
</tr>
<tr>
<td>Declining</td>
<td>7%</td>
</tr>
</tbody>
</table>

### Key Takeaways
Results year-to-year in the two General Safety Outlook questions indicated no sweeping changes. There was a modest shift from those who felt their safety trend was “staying the same” to “declining” which caused the percentage of those reporting a “declining” posture to rise from two percent to seven percent of respondents.

### Discussion
With only two years of survey results to go on, it seems sensible to resist attaching too much significance to the slight growth in the percentage of respondents reporting a “declining” posture, but to monitor it going forward.

### Recommendations
Continue to monitor the perception of general safety outlook in future surveys as one potential leading indicator of workforce sentiment in an industry known to be facing some staffing pressure in coming years.
Safety Concerns

Survey Question:
What do you consider the top three safety risks facing your flight operation in the next year? (Three blank fields were provided for open-ended responses.)

Trend note:
A similar 2015 survey question yielded top concern categories (in order) of fatigue, distractions, complacency, ground servicing & handling and weather.

Responses:
Respondents entered a total of 1252 statements in the blanks provided for this question. A keyword sort was followed by a manual review of the responses to group them into categories. Fifty-six responses were deemed non-specific to aviation safety issues (e.g., comments or suggestions about the survey itself) and were set aside from the sorted response set. The percentage of the relevant 1196 responses landing in each issue category is shown below for comparative purposes. Because respondents were not specifically asked to list their highest concern first, no inference was drawn from which of the three blanks a respondent used to mention an issue.
The Parting “Catch-All” Question

In a familiar survey-ending technique, the final item on the survey stated:
OK, one last thing before you complete the survey. If you have a safety-related concern that has not been mentioned in this survey, or have additional comments, please describe here: (One blank field was provided for an open-ended response.)

Results:
121 respondents made comments in the field provided, eight of which were non-specific to safety concerns (e.g., feedback about the survey, which will gratefully be incorporated for future planning but not included herein as safety concerns). The remaining responses were manually reviewed and sorted into the categories shown below. The number of responses landing in each category is shown for comparative reference. Summaries of key sentiments expressed by comments in each category are shown on the next two pages.
## The Parting Question – Summaries

<table>
<thead>
<tr>
<th>Categories</th>
<th>Examples/summary of comments received</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Practices</strong></td>
<td>Over-reliance on automation; requirement to maintain quals and operate multiple aircraft types stretches people too thin; sterile cockpit is not practiced consistently; lack of PED policy in own organization and concern that proliferation of aircraft wi-fi systems will exacerbate PED misuse; lenient/lack of policy on increased number of lithium battery powered devices being brought aboard is viewed as a risk booster; concerns over lax management of MEL and sentiment that operative TCAS should be a required item; lack of incentives for becoming or staying a safety officer/safety manager; concern expressed that repetitiveness of corporate transports breeds complacency.</td>
</tr>
<tr>
<td><strong>Safety Culture</strong></td>
<td>Career fear/retribution concerns impede reporting – some companies pay lip service to concept of non-punitive policies; several respondents indicated there is a fair amount of lingering resistance to SOPs, particularly among people who previously operated without them; several noted that SMS seems to primarily engage and burden those who are intrinsically engaged in safety already, and the malcontents and non-investors don’t engage and therefore don’t get any safer despite the broader effort – in essence, SMS “preaches to the choir;” several respondents indicated flight organizational leadership is noticeably lacking, and apathy is rising.</td>
</tr>
<tr>
<td><strong>SMS and Audit Process</strong></td>
<td>Lack of rigor in audit process; some organizations are successfully gaming the system to obtain results not earned; paperwork and documentation don’t make an organization safe, and the volume of work and attention applied to SMS administration is detracting from capacity needed to address basic safety enablers like training people and managing operational complexities.</td>
</tr>
<tr>
<td><strong>Technical Proficiency and Knowledge</strong></td>
<td>Concern expressed over a palpable, ongoing reduction in pilot manual handling skills; many pilots have inadequate mental models of automation &amp; navigation utilities; requirement to fly multiple types impedes ability to stay truly proficient in any of them; pilot experience is narrowing/specializing and breeding overconfidence despite lack of truly broad experience.</td>
</tr>
<tr>
<td><strong>Supporting Aeronautical Infrastructure and Resources</strong></td>
<td>Error-prone cartography on STARs was raised by one respondent; another questioned increased use of rejuvenating sealants on runways that appear to reduce friction; several expressed need for improved and more consistent braking action reports; concern was raised over risks to privacy in ADS-B and other non-governmental flight tracking utilities.</td>
</tr>
</tbody>
</table>
## The Parting Question – Summaries

<table>
<thead>
<tr>
<th>Categories</th>
<th>Examples/summary of comments received</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC Concerns</td>
<td>ATC is often too slow to approve WX deviations; inadequate control of military routes leads to awkward mix of high/low performance traffic; confusion over hold-short areas (ground controllers and lack of standard airport markings) raises risk of incursions; controllers seem to be getting less situationally aware and over-reliant on standard routings, leaving them less able to sensibly adapt to any abnormality; lack of accommodation by ATC for single-pilot platforms (no grace on speed of readbacks or delivery of info versus dual).</td>
</tr>
<tr>
<td>Regulatory Concerns</td>
<td>Concern expressed over safety implications of aircraft owners being permitted to lease aircraft to a management company holding a PT-135 certificate, leading to mismatch in priorities, aircraft use rate, crew management issues; some expressed that it is a struggle to keep up with increasing volume of need-to-know rules/regs/TFRs without a suitable central distribution method for such info; several mentioned significant, detrimental impact from extremely slow process for any federal approvals sought.</td>
</tr>
<tr>
<td>Talent Pipeline</td>
<td>Pilot attrition is lowering the aggregate experience level of pilots; shortage of experienced pilots is becoming more pronounced; there is a lack of leadership training opportunities for those ascending to DO/CP/DOM roles in flight departments.</td>
</tr>
<tr>
<td>Fitness for Duty</td>
<td>Impacts of aging on pilot fitness are under-addressed; concern for lack of written rest requirements in PT91 operations; it’s becoming a too-commonplace managerial assumption that extending crew duty day is okay and a “given” without directly consulting any individuals.</td>
</tr>
<tr>
<td>Training</td>
<td>Lack of consistency and real-world training in current model of simulator recurrence training; emphasis is too heavy on checking and not enough on training; one respondent lamented that there is a lack of training activity done external to simulator visit.</td>
</tr>
<tr>
<td>Ground Handling</td>
<td>Concern over declining skill, knowledge, training and supervision of FBO line personnel, respondents reported observing increased complacency, procedural corner-cutting and high personnel turnover; general sentiment of comments is that the situation is trending downward, with risk of aircraft ground damage incidents increasing.</td>
</tr>
<tr>
<td>Security</td>
<td>General concern expressed that business aviation can be targeted for terrorism; concern was also expressed over increasing laser threats to aircraft on approach.</td>
</tr>
<tr>
<td>UAS</td>
<td>Collision risk is primary concern.</td>
</tr>
<tr>
<td>Procedural Compliance</td>
<td>Going around from an unstable approach is impeded by cultural barriers – we “profess it but don’t live it”; general lapses in professionalism and desire by some to appear “smooth” rather than fully complying with procedures.</td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS
This NBAA publication was created by the NBAA Safety Committee in the summer and fall of 2016. NBAA expresses its gratitude to the committee for its work in compiling, analyzing and contextualizing this important data.

ABOUT NBAA
Founded in 1947 and based in Washington, DC, the National Business Aviation Association (NBAA) is the leading organization for companies that rely on general aviation aircraft to help make their businesses more efficient, productive and successful. Contact NBAA at 800-FYI-NBAA or info@nbaa.org. Not a member? Join today by visiting www.nbaa.org/join.