

# **Why are go-around policies ineffective?**

## **The view from the airline manager's desk**

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### **1. Problem Statement**

A lack of go-arounds is the number one risk factor in approach and landing accidents and the number one cause of runway excursions (1). Recent analyses of the past 16 years indicate that 33% of all accidents are runway excursions, the most common type of accident (2). Unstable approaches occur on 3.5% to 4.0% of all approaches, meanwhile, only about 3% of these unstable approaches result in go-arounds while 97% of aircrews in this state continue to land (1). The Flight Safety Foundation (FSF) initiated a 'Go-around Decision Making and Execution Project' (2011) designed to mitigate industry runway excursions due to unstable approaches by achieving a high level of pilot compliance with unstable approach go-around policies. This enhanced compliance will result from answering the research question, "Why are go-around decisions that policy states should be made actually not being made during so many unstable approaches?" and then making recommendations based on the findings. This survey study sought to understand the etiology of compliant versus non-compliant go-around decision making using unique questioning and experimental methodologies. These included assessing airline safety managers' perceptions and beliefs about, as well experiences of, the issue of unstable approaches and how they are managed at their host companies. To fully understand the systemic roots and dynamics of noncompliance with unstable approach policies across the industry, the results of the managers study will also be compared with those from a parallel study of pilots done on this topic.

### **2. Approach and Methodology**

In this study we asked safety managers at major airlines—both those charged with the power to recommend or enact changes to unstable approach criteria and policy/procedures, and those responsible for day-to-day quality control of flight operations—a series of questions regarding their views of the safety practices, procedures and organizational cultures within which unstable approaches and go-arounds occur for their own particular airline operations. More specifically, we asked such managers about the rates of compliance with unstable approach policies they believed their airlines

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experienced, as well as those experienced by the commercial industry as a whole. Beyond this basic knowledge, we asked further about whether they were satisfied with their airline’s performance on compliance with their UA-GA policies and procedures and whether they thought them effective, about their perceptions of the clarity and appropriateness of these policies and procedures, about their beliefs that they had the supports (informational support and organizational approval) to manage their company’s GA rates, and about their overall assessment of how urgently they felt that the risks (if any) perceived in their GA rates needed to be addressed (if at all). The content of the entire survey was thoroughly reviewed, commented upon and amended in accordance with the recommendations made by members of the FSF International Advisory Committee (IAC), the European Advisory Committee (EAC) and other expert advisory team members by which it was vetted.

The main set of psychological and psychosocial factors assessed were a differentiated set of nine facets of awarenesses that “unpack” the concept of *situational awareness* in a comprehensive and holistic way, giving a rich phenomenological account of how effectively, from a manager’s experience, they are managing pilot compliance to the UA-GA policies. These nine facets, once identified, provide useful and targeted guidance for mitigations. This set of psychosocial awarenesses (Presage Group Inc.) includes the aspects detailed in Table 1, which comprise an inter-related system of mutual causation. It was hypothesized that greater awareness on each of these nine awareness dimensions of low UA-GA compliance performance would be associated with making better assessments of operational risk and therefore more effective management of non-compliance behavior to UA-GA policies. In general, greater situational awareness competencies are associated with more operationally compliant, safer decision-making.

**Table 1. Glossary of Presage Situational Awareness Constructs**

Construct Name	Description
Affective Awareness (C1) “Gut feeling for threats”	Manager’s gut feelings for threats; seat of the pants experience or “spider sense”, which is characterized by an emotional, sensory experience that triggers further cognitive analysis
Anticipatory Awareness (C2) “Seeing the threats”	Manager’s ability to see and/or monitor real and potential threats as they move and change over time
Critical Awareness (C3) “Relying on experience”	Manager’s ability to draw from their personal and professional experience bank as a means to assess here and now events as “normal”
Task-empirical Awareness (C4) “Knowing the limits”	Manager’s expert knowledge of the operational envelope of his/her policies and procedures; in other words, knowing their boundaries
Functional Awareness (C5) “Knowing the performance metrics”	Manager’s expert knowledge of knowing how to read and translate what data about his/her policies and procedures are telling them

Compensatory Awareness (C6) “Adjusting to threats”	Manager’s ability to know how and when to compensate or adjust correctly for present and anticipated future operational conditions in order to ensure safe – compliant operations (policing the exposure)
Hierarchical Awareness (C7) “Knowing the procedures”	Manager’s expert knowledge of operational policies, procedures, their order and correct sequencing
Relational Awareness (C8) “Keeping each other safe”	Manager’s ability to accurately assess how his/her actions in managing the internal policies and procedures either facilitates and protects safety and compliance or compromises them
Environmental Awareness (C9) “Company support for safety”	Manager’s experience of how their company supports and encourages safety – compliance and how this in turn shapes his/her commitment to safe and compliant behavior or adherence to the operational policies and practices

Go-around thresholds. A second task was also included in this survey whose details are too numerous to fully describe here and whose results proved largely non-diagnostic due to the presence of low sample sizes of managers with which to populate the experimental conditions of the study.<sup>1</sup> This experiment was designed to uncover the environmental and physical instability parameters that have the most influence on pilots’ and managers’ perceptions of the risks inherent in flying unstable approaches, and to examine when the attention paid to these parameters by each group may affect their judgments about when it is appropriate to call go-arounds. Because we had posed this question in the parallel study of pilots, it was thought that understanding the boundaries of manager’s perceived safety thresholds in comparison, by examining the gaps (if any) between these two groups’ thresholds, could provide information about the basic congruence or incongruence between the beliefs and experiences of these two that might prove illuminating.

In this part of the study, both pilots and managers were presented with a hypothetical flight scenario in which they were randomly assigned to receive variations in the severity of the risk associated with wind conditions, runway conditions/braking action and runway length. They were then asked at what degree of deviation, on five different flight parameters, those variations would cause them to call a go-around. Pilots and managers were instructed to report on their likelihood of calling a go-around based on their own *personal* risk criteria, not those of their companies or of the industry, on this set of five flight parameters, and to do so at different altitudes. This allowed us to infer where on the flight path different risk factors become personally salient and important as drivers of pilots’ versus managers’ judgments to go around, and how these factors might interact.

Part of the objective was to determine whether or not there was basic alignment between pilots’ perceptions about when there is a need to call a go-around and managers’ perceptions, and whether one or the other group was better aligned, in absolute terms, with the current general industry policies about when these instabilities necessitate such a decision. However, it is not assumed within the general framework of this project that the current industry standards necessarily constitute the most

ideal or appropriate set of conditions or procedures to guide GA decision-making. In the case of evidence of any pilot-manager gaps, our goal was to use these data to guide realistic recommendations about changes to policy that might bring pilots and managers into both mutual alignment with a new and more effective standard to ensure a heightened level of safety assurance in the industry. To the extent that pilots' do not see current policies as constituting a set of legitimately unsafe conditions, they are likely to ignore such SOPs and engage in potentially riskier, noncompliant flight behaviors. To the extent that managers agree with pilots on this score, they are likely to either explicitly or implicitly sanction such noncompliance and embody those norms in the organization on a systemic basis. This was an experimentally-based attempt to explore pilot and manager perceptions of what *should* constitute the conditions to go around, in *their* experienced judgment, and to begin to develop a view about whether such beliefs could or should be incorporated into industry SOPs in a way that would be helpful in ensuring compliant, safe behavior among pilots, and the demand for this behavior among managers.

Respondent sampling. The managerial respondents whose participation was solicited for this Flight Safety Foundation-sponsored survey were contacted via email communication/invitations made by the FSF, IATA and A4A, as well as by several airlines directly. The goal was to invite and administer the online survey to as many managers as possible from across the world, representing a variety of fleets, aircraft, flight operations, respondent experience levels, cultures, physical geographies, and so on. Anonymity was assured in order to inspire honest and complete self-reports of managers' beliefs and opinions regarding unstable approach and go-around rates and policy, as well as to stimulate participation.

As was true also of the achieved pilot sample, among the managers who completed the survey we achieved wide geographical representation, suggesting that our results are perhaps generalizable to management personnel worldwide (see Table 2; however, read on below for caveats to this inference). In fact, the gender, continental and language and distributions for the managers' sample were nearly identical to those for the pilots. While few Directors chose to complete the survey, there were a sizeable number of mid- and senior-level managers in the sample. However, a subsequent question asking about respondents' roles and responsibilities within their airlines for recommending and leading change around UA-GA policies and procedures revealed that only 63% of the sample had such authority. Also included were those respondents who were responsible for quality control of day-to-day flight operations, irrespective of whether their role included policy development or implementation.

**Table 2. Sample Characteristics**

Variable	Category	% of sample
Gender	Male	100%
	Female	0%
Continent of operations	Africa	2%
	Asia	23%
	Europe	24%
	North America	34%
	Oceania	4%
	South America	13%
First language	Non-English	53%
	English	47%
Current Position	Manager	32%
	Senior Manager	23%
	Check Airman	13%
	Captain/Pilot	10%
	Instructor	8%
	Supervisor	5%
	Director (or above)	2%
	Other/Not reported	7%
Roles/Responsibilities for developing policies and procedures for UAs and GAs	Make recommendations only	36%
	Make recommendations and changes	44%
	QA, but not policy development	20%

Achieved respondent sample. The considerable efforts we made in our outreach and engagement strategy for the survey, through multiple contacts and channels of appeal to attract managerial safety personnel to the website, in the end garnered a total of 880 unique visits to the survey portal. We consider this number of hits to be very good, indicating the engagement strategy drove a meaningful number of airline managers to the site. However, of those visiting, only n=164 (18.6%) stayed and completed the survey, a response rate both low in absolute terms, and also low relative to the rate of participation among pilots (34%) who, it must be recalled, were asked to complete a much lengthier and demanding survey. This low response rate constitutes, we believe, the first evidence pointing toward disengagement with the topic of UA-GA policy and procedures among airline safety personnel at the managerial level FM1 (Finding –Management 1). This is especially true when we consider that the original criterion for inclusion in our final analysis stipulated that the respondent actually be in a position to develop and influence UA-GA policies and procedures at their airlines of employment by virtue of their authority to recommend or make changes to such operational features. Based on this inclusion criterion and an analysis of respondents’ self-reported roles and responsibilities, we achieved a sample of only n=103 qualified respondents after many attempts to contact and inspire participation through the many, many months (over a year, in fact) that the study was online and accessible. As a result, in

order to increase the sample size for analysis, we widened the sample frame, relaxing the qualification criterion to further include those respondents responsible for quality control of day-to-day flight operations at their airlines even if they did not have policy development responsibilities (Note: a thorough comparison of the latter group with the original target revealed no systematic differences in their survey responses, justifying their inclusion in the final sample). The study therefore reports the results of n=128 managers (78% of all survey respondents and 15% of survey site visitors).

This low response rate essentially disallowed us from analyzing data for the second, experimental task of determining personal thresholds for UA risk among managers. As a result, no results are reported here for that part of the study (not even directional ones) until such time as a larger sample can be added to the database of managers' responses. Meanwhile, a caveat must be issued for all other results that we do chose to report below, in light of the low response rate. And that is that because the normative response to the survey invitation among safety managers worldwide was in fact to choose *not* to participate, we must question the representativeness of this sample as a valid and reliable sample of the universe of safety managers. That said, we report results that, while based on this small and perhaps non-representative sample, are highly suggestive of trends in managers' perspectives on UA-GA policies and procedures. While we are of course unsure if the sample is in fact biased, and even whether it can be argued that these results would systematically under- or over-state the knowledge, beliefs and opinions of a more representative sample, our intuition tells us that any sample bias, if present, would tend toward having surveyed managers who are more engaged, aware and concerned about the issue than those less so. If this hypothesis is true, these results may more likely over-represent the degree of awareness and concern about UA-GA non-compliance that is really extant in the industry.

### 3. Results and Discussion

In Table 3 we present data for managers' self-reports of their simple awareness of, and their specific estimates of (if aware), both the industry's and their own companies' rates of compliance with UA-GA policy.

**Table 3. Self-reports of Awareness and Levels of UA-GA Policy Compliance**

	Perceived Rates of Compliance with UA-GA Policy		
	For the Industry	For their Company's Flight Operations	As indicated by their Company's Flight Data Analysis Program
<b>Awareness of Rate:</b>			
% Claiming knowledge of each rate	32%	45%	na
% Reporting a rate	27%	42%	47%
<b>Distribution of Perceived Rate of Compliance:</b>			
0% - <10%	16%	15%	12%
10% - <50%	7%	12%	14%
50% - 100%	4%	15%	21%
Unaware/Did not answer	73%	58%	53%
Mean perceived rate of compliance (among those reporting)	19.6% sd=24.4%	33.9% sd=34.7	44.3% sd=37.4%

When asked whether they knew what the industry rate was, only 32% of managers said that they did . Of those who claimed awareness, however, fewer were willing to estimate a rate in the follow up question, which asked them to report it. Twenty-seven percent of the full sample (n=34) reported a rate, which averaged 20% compliance (seven times the true rate) and was highly variable (range: 1% to 80%; standard deviation: 24%). Only one in seven of all managers (16%) reported a rate that was “accurate” (here defined as 0% to <10%), insofar as their estimate was at or near the true 3% industry rate. The perception of industry-wide rates may not be the central concern of managers working to police their own noncompliance with UA-GA policy, but this general lack of awareness and general lack of accuracy in estimating the true rate, even among those claiming awareness, cannot be overstated (FM2).

When asked whether they knew what their own company's compliance rate was, 45% of managers claimed they did, though in the end only 42% made an estimate of that rate. Thus, even in "their own

backyard," a majority of managers are largely unaware of UA-GA compliance and noncompliance rates (FM3). Among the minority estimating (n=54), the mean rate was reported to be 34%, again with large range (0% to 100%) and standard deviation (35%). If their reports of their companies' rates were to be considered accurate, these managers are asserting compliance rates at their companies that are on average more than 50% higher than the industry average as they perceive it (20%), and would be outperforming the industry as a whole more than tenfold (35% vs. 3%) if their reports were actually true. What is most striking is the tremendous degree of variability in the data, revealing that there is very little common basis of perception even among those claiming knowledge of and reporting upon the rates at their particular airlines. In our view it is highly unlikely that this is an objective effect rather than a subjective one. For perceptions to have truly "tracked reality" in managers' reports in these data would mean that companies are really exhibiting the full range of compliance from 0% to 100%. It is very hard to imagine that this is the case, and how this could result in the aggregate in an industry wide average that continues to hover at just 3% year after year.

Almost all companies (91%) had a FDA program. Among managers at those companies (n=116), 47%--still minority--reported on their rate of compliance as indicated by their data. These 54 managers are not exactly the same 54 who reported on their companies' flight operations rates in the prior question (this match is a coincidence; some managers answered one but not both questions, which accounts for why there is a difference in the results across the last two columns of Table 3). One in eight managers (12%) with access to FDA reported company rates broadly in line with the industry average (i.e., less than 10%). At the opposite end of the spectrum, one in five (21%) reported rates above 50%. The mean rate was 44%, again with a wide range and variability (0% to 100%; sd=37%). That such a spread of compliance rates is reported by this sample is surprising and reflects, we believe, not only a general lack of awareness among managers of the rates of compliance with their own policies (as strongly indicated by the incidence of non report), but perhaps also a specific inaccuracy of their knowledge even when objective data are available to them for examination (FM4). This assertion can only be made, however, by again assuming that compliance rates exceeding 50% are extremely rare in the industry, and we cannot rule this out entirely with these self-report data for we lack any objective verification of company rates. If these rates are accurate, it suggests that our sample is drawn from an unusually compliant subsample of companies. In that light, the lack of awareness effects across the whole study would under-estimate unawareness industry-wide.

We begin with some overall observations about these data in Table 3. First, on none of these three questions does even a simple majority of our managers claim to know or report a rate of compliance; the normative response is not to know. Second, as expected, managers claim and report compliance rates for their own companies more frequently than they do for the industry as a whole, with whose statistics they are probably less familiar. Third, their perception of the industry rate (3%) is well out of line with reality, at six times the rate of compliance on average than is actually the case. Fourth, focusing closer to home, managers tell us as an aggregate sample that they believe their companies are outperforming the industry's rate of compliance, 50% to 100%, on average, and are therefore also claiming a compliance rate at least ten times greater than the industry as a whole. Finally, fifth, if we assume a more realistic UA-GA policy compliance rate below 10% to be true for these companies (i.e., a



rate span still ranging up to three times better than the current industry norm, thus still allowing the members of this survey in relative terms to be significantly higher performers on average), this would mean that only about one in seven managers (12% to 17%) in the survey reported an accurate rate for their host companies, whether based on personal estimate or on their FDA data. If we give them even more "compliance credit," allowing their companies to have really achieved rates upward of 50%, then a high accuracy of managers' rates of report is still only shared by fewer than one third of the sample: Seven in ten simply do not know their own rates, or if they do know or claim to, over-report their compliance rates at 50%+. These kinds of perceptual errors are likely to produce overconfidence and complacency about managers' UA-GA policy compliance performance (FM5).

Perceptual Measures of Situational Awareness.

Managers completed 17 questions to assess their attitudes, beliefs and behaviors concerning their company's GA rates and UA-GA policies. Some of these measures also constituted part of the assessment of the constructs of Presage's proprietary "Dynamic Situational Awareness Model" (DSAM). The results are presented in Table 4.

**Table 4. Psychosocial/Perception Results for Managers**

	Overall Sample	Report of FDA Compliance Rate		Segmentation		
		0% - <10% "Correct"	10% - 100% "Incorrect"	High Risk Perceivers	Low Risk Perceivers	
		n=128	n=14	n=40	n=45 (35%)	n=83 (65%)
	Means <sup>1</sup>	Means	Means	Means	Means	
<b>Factor 1: Perceived Informational/Organizational Support for Understanding/Managing Company's GA Rate</b>						
There is a collective agreement within our department that the way we manage our go-around rates increases flight safety.	4.88	4.57	5.08	4.34	5.17	*
I have access to all the information required to help me understand our company's go-around rates.	4.41	5.00	4.75	4.24	4.51	
I have the support of my superiors in managing the go-around rates of our company.	5.06	5.00	5.10	4.56	5.35	*
I find solutions to compensate for any inability of our company to effectively manage go-around rates.	3.75	3.43	3.54	3.45	3.91	*
I feel comfortable approaching our senior management on any issues regarding how we manage our go-around rates.	5.10	4.93	5.28	4.57	5.39	*
<i>There is no real desire to improve our company's go-around rates, either presently or in the future.<sup>2</sup></i>	2.51	2.64	2.43	2.69	2.41	
<b>Index of Perceived Support (6-questions; Cronbach <math>\alpha = .57^3</math>; high scores=high support)</b>	4.64	4.55	4.70	4.31	4.82	*
<b>Factor 2: Perceived Clarity/Appropriateness/Effectiveness of Company's UA-GA Definitions, Policies/Procedures</b>						
Our company's definition of when to initiate a go-around, while perhaps conservative, is there to ensure everyone's safety.	5.25	5.29	5.28	4.73	5.54	*
Our Standard Operational Procedures are very well defined with respect to when to perform a go-around.	5.35	5.36	5.20	4.93	5.57	*
The design of our go-around policies is effective in managing our go-around rates.	4.46	3.93	4.58	3.49	4.96	*

<i>Our company's definition of a 'stable' approach is too narrow.</i>	2.30	3.07	2.33	*	2.98	1.93	*
<i>Our company's procedures regarding when to initiate go-arounds are not realistic.</i>	2.22	3.14	2.13	*	3.16	1.72	*
<b>Index of Perceived Effectiveness (5-questions; Cronbach <math>\alpha</math> = .70; high scores=positive view)</b>	4.93	4.47	4.96	*	4.20	5.30	*

**Factor 3: Perceived Threat Inherent in Company's GA rates**

I feel a sense of urgency to act on our company's go-around rates.	3.06	4.36	3.18	*	4.20	2.41	*
I am anxious about the company's management of our go-around rates.	2.56	3.50	2.51	*	3.60	1.96	*
Our company needs a better plan for corrective action to manage and improve our go-around rates.	3.29	4.36	3.40	*	4.60	2.56	*
<i>My management experience tells me that our go-around rates are not a significant flight safety issue for this company.</i>	3.57	2.29	3.45	*	2.69	4.05	*
<i>The way we manage our go-around rates does not compromise flight safety.</i>	4.38	3.79	4.41	*	3.44	4.90	*
<b>Index of Perceived Threat (5-questions; Cronbach <math>\alpha</math> = .78; high scores=high threat)</b>	3.02	4.03	3.08	*	4.05	2.42	*

**Factor 4: Response to Flight Crew Noncompliance with UA-GA Policies and Procedures**

I debrief all flight crews who have broken our company's policies on operational procedures for go-arounds.	3.81	3.64	3.62		3.16	4.19	*
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**Overall Measures**

Overall Measure of Perceived Effectiveness of GA Policies and Procedures (as they Relate to Unstable Approaches)	4.42	3.93	4.58	*	3.51	4.92	*
Overall Measure of Satisfied With Compliance Rate with Flight Operations' GA Policies	4.12	3.50	3.98		3.00	4.72	*

Notes:

<sup>1</sup>Means range from 1 (strong disagreement with an item's assertion) to 6 (strong agreement).

<sup>2</sup>Questions in italics are reverse worded; means on these are expected to be at the opposite end of the scale compared with regular questions.

<sup>3</sup>Cronbach  $\alpha$  is a measure of the internal consistency reliability of each index, ranging from 0 to 1.0.

\*Asterisks indicate statistically reliable differences at  $p < .05$  (one-tailed) between means in the two preceding columns

First, the results of question responses were subjected to an empirical factor analysis in order to see how they "ran together" in managers' minds and to provide simpler summary categories for presentation and discussion. Three of the four factors to emerge had more than one question associated with them. One "factor" (Factor 4) was a single-question assessment of behavior, namely, whether the respondent debriefed flight crew who had broken UA-GA company policy.

Factor 1's theme was the perceived support the respondents got from their companies in understanding and managing their go-around rates. The six questions this factor comprised were averaged and called simply "Perceived Support". Factor 2 comprised questions assessing the degree to which managers thought that their companies' UA-GA policies and procedures and their associated operational definitions were effective, clear and appropriate. Five questions (including two reversals) were averaged to create an index of "Perceived Effectiveness." Finally, Factor 3 was an expression of managers' concerns about and sense of urgency surrounding their companies' go-around rates. It again was formulated by the simple averaging of the five questions shown in Table 4, and named "Perceived Threat."

In addition to the four factors, we present overall measures recorded by managers of their satisfaction with, and perceived effectiveness of, their companies' GA policies and procedures as they relate to unstable approaches.

The first thing to notice in Table 4 about these manager perceptions are the absolute levels of the means on their underlying 6-point scales. (This 6-point scale did not offer a midpoint, but did present the opportunity to report slight, moderate or strong agreement or disagreement with each statement or assertion; the midscale is therefore 3.5 on this 1 to 6, labeled Likert scale). An examination of the means on both the factor indexes and their underlying questions reveals that managers perceive a moderate degree of effectiveness of their policies and procedures (FM6) (Perceived Effectiveness, M=4.94, close to "moderately agree" on the 6-pt scales used), and just below a moderate level of support from their organizations in managing their GA rates (FM7) (Perceived Support, M=4.64). The overall measure of Perceived Effectiveness was slightly weaker than the index score of effectiveness, at M=4.42, while overall satisfaction with compliance rates with their flight ops GA policies, while slightly lower at M=4.12, was still on the positive side of the scale. In concert with this pattern, indeed perhaps *because* of these perceptions and judgments, managers slightly disagreed overall (Perceived Threat, M=3.02) that there was cause for concern or a need for action to improve their GA rates (FM8).

Taken together, these absolute scores indicate that managers are not completely happy with their companies' performance on GA policy and procedures, but neither are perceptions of effectiveness, satisfaction or support low enough, nor concern high enough, seemingly, to stimulate greater awareness or action.

(As an aside, a regression analysis of the "drivers" of the Overall Effectiveness and Overall Satisfaction scores revealed that Overall Effectiveness is perceived in proportion to scores on the Perceived Effectiveness Index (i.e., there is no surprise there), and to a lesser degree the lack of urgency and concern expressed by scores on the Perceived Threat Index. In complementary fashion, Overall Satisfaction was driven first by lower Perceived Threat scores and secondarily by higher Perceived Effectiveness Index perceptions. These meaningful, differential patterns were observed even though the overall measures of Satisfaction and Effectiveness shared a high correlation of +.75).

Finally, managers on average slightly agreed that they "debrief all flight crews who have broken our company's policies on operational procedures for go-around," M=3.81 (i.e., close to "4 -- slightly agree"). Taken at its face, 37% disagree that all flight crews are debriefed, a high absolute number of managers who admit to less than complete debriefing protocols. However, while in absolute terms this may seem like a high level, the fact that the statement was phrased as "I debrief" as opposed to "our company debriefs" may account for a higher than actual level of this activity.

In order to examine the correlates of positive perceptions of organizational support, compliance effectiveness, satisfaction and low concern with their GA rates, we conducted a split among just those managers who had reported upon their companies' FDA-sourced GA compliance rates--that is, all those claiming knowledgeability of this information. We divided them into managers whose reports were generally close to the industry average of 3%, accepting anyone who reported a rate within the range of

0% to less than 10% (effectively, 9%) into a group we labeled "correct" (for reporting what looked like a reasonably accurate rate, compared with the industry base rate). All other managers reported compliance rates from 10% to 100% and were grouped for comparison with the first group; this group was named "incorrect" (for reporting a compliance rate not likely to be accurate).

The results show that stating an "incorrect" rate of compliance is associated, at significant statistical levels, with higher scores on two of the five questions on the second factor of Perceived Effectiveness, the Effectiveness Index as a whole, and the overall, single measure of effectiveness (Overall Effectiveness). It is also correlated with lower scores on the Perceived Threat Index and four of its five component questions. While this pattern may seem to be obvious in hindsight, it makes the point well that independently of the level of support perceived for managing a company's GA rates (there were no difference on the Perceived Support Index), the perception of one's policies as effective, and one's threat low, may well flow from a basic lack of realistic knowledge or appraisal of one's GA compliance rates (FM9). If this causal effect is true—that is, positive perceptions lead to low perceived threat—then what is again clearly indicated by these data is the need for consciousness-raising about the industry norm of massive noncompliance, and dissemination of managers' own companies' data identifying their internal rates of UA-GA policy compliance and noncompliance.

Segmentation Analysis. In order to see whether there exist a few "types" of managers in the sample, whose internal consistency of responding makes members of each type consistent with each other in how they view their GA compliance rates and performance, but also makes them as a group different from other groups or types, we conducted a traditional cluster analysis on this sample of managers (i.e., non-hierarchical, agglomerative K-means cluster analysis, based on Euclidean distances). Due to the small sample size of the study we generated just two groups to compare, and based the mathematics of this segmentation on a variety of responses given in the survey. To be exact, the "basis of segmentation" consisted of the 17 perception questions and the two overall measures of effectiveness and satisfaction—all the measures presented in Table 4.

Not surprisingly, the resulting groups consisted of one who perceived a "High Risk Perceivers" in their GA compliance rates and a second group who had a more moderate view (the "Low Risk Perceivers" group). The 35% of managers who perceived high risk differed from the 65% low risk type on almost all of the measures collected in the survey, and powerfully so (in both statistical and magnitude senses). Table 4 shows that on 17 of 19 measures, and on all three Indexes, the High Risk Perceiver group showed a pattern of higher concern and perceived threat, and lower satisfaction with their companies' GA compliance performance, at the same time as lower perceived policy and compliance effectiveness and lower perceived support from the organization for managing their GA rates. They also reported lower rates of debriefing their noncompliant aircrew.

When we profiled these two groups on other measures collected in the study, we found interesting correlated effects on this other information. For example, High Risk Perceiver types tended to see their company compliance rates as slightly underperforming relative to (perceived) industry norms, whereas Low Risk Perceiver types reported that their companies were definitely outperforming the industry compliance rate. High Risk types were more likely to claim that prior to the study they were already

aware of the industry rate and of their own companies' flight ops rate of compliance to GA policy. Interestingly, High Risk Perceiver types were more likely to report being in roles where they had less power to effect change, more often saying they were able only to offer recommendations and were not charged with making changes to policy or rates in their current positions. Added to the fact that the High Risk Perceiver group were three times less likely than the Low Risk Perceiver group to say their compliance rates were between 50% and 100%—surely an incredible number—and more than four times as likely to say that their FDA showed their rate was between 0% and 9%—a number more in line with industry norms—you have a picture of a group that is more realistic and appropriately anxious and concerned about their companies' low rates of GA compliance, but who perhaps have little voice or power within their company to change policy or procedures FM10 (which they see as more likely to be unrealistic) or to offer a new definition of what should constitute a stable approach (which they see as overly narrow).

**Table 5. Presage Situational Awareness Construct Results for Managers**

	Overall Sample	Report of FDA Compliance Rate		Segmentation			
		0% - <10% "Correct"	10% - 100% "Incorrect"	High Risk Perceivers	Low Risk Perceivers		
	n=128	n=14	n=39	n=44 (35%)	n=82 (65%)		
	Means <sup>1</sup>	Means	Means	Means	Means		
<b>Situational Awareness Indices</b>							
Functional Awareness Index (Knowing the performance metrics)	3.32	4.07	3.42	**	3.72	3.10	*
Hierarchical Awareness Index (Knowing the procedures)	1.71	1.69	1.74		2.19	1.46	*
Task-Empirical Awareness Index (Knowing the limits)	2.16	2.67	2.15	*	2.90	1.77	*
Critical Awareness Index (Relying on experience)	2.95	3.96	3.01	*	3.84	2.41	*
Affective Awareness Index (Gut feel for threats)	3.00	4.06	3.05	*	4.04	2.38	*
Anticipatory Awareness Index (Seeing the threats)	3.08	4.11	3.14	*	4.19	2.42	*
Compensatory Awareness Index (Adjusting to threats)	3.02	3.45	3.01	**	3.59	2.71	*
Relational Awareness Index (Keeping each other safe)	2.34	2.54	2.36		2.90	2.03	*
Environmental Awareness Index (Corporate support for safety)	2.28	2.66	2.22	*	2.92	1.93	*

**Notes:**

<sup>1</sup>Means range from 1 (low awareness of UA-GA threat) to 6 (high awareness).

\*Asterisks indicate statistically reliable differences at p < .05 (two-tailed) between means in the two preceding columns

\*\*Asterisks indicate statistically reliable differences at p < .10 (two-tailed) between means in the two preceding columns

Presage situational awareness index results.

How did these managers score on the Presage indices of situational awareness? The first thing to understand is that this situation presents a clear instance of violation, via near complete non-compliance, of most airlines' policies and procedures surrounding UA-GA performance rates and their

management. As such, our metrics are likely to show low absolute scores based on 1- to 6-point scaling, where 6 corresponds to high safety awareness. The first column of Table 5, displaying these scores for the overall sample, shows this to be the case; in no case does the absolute score on any of our awareness metrics exceed the midscale of 3.5. Safety awareness is low in all of the awareness areas assessed by our system.

Because we know in this instance that UA-GA noncompliance is a major problem for the industry, our measures of situational awareness are scored to be higher when this problem is recognized to be present. In this approach to scoring (Table 5), all measures are scored such that higher numbers indicate a greater degree of realistic threat awareness and appraisal (i.e., veridical perception of the threat). As a result, higher situational awareness on our measures is associated with seeing the current threat to be real (high anticipatory awareness) and the procedural measures used to compensate for it as inadequate (poorly adjusting to the threat) FM11. Managers with higher situational awareness see their current procedures as being unrealistic and the definitions of instability as too narrow (FM12) (high knowing the procedures and knowing the limits). Their experience (their critical awareness: high reliance on experience) tells them there is a problem and they feel more anxious and eager to take action against this safety threat (higher gut feeling for threats). However, because a new plan is needed in the face of a general lack of appreciation of the threat to compliance in their organizations, higher awareness is also associated with a perception that their companies have little will to change, and are generally complacent about the SOPs in place to manage it FM13 (low relational and corporate support for safety). As a result, those with higher awareness also feel less support from, and a higher level of discomfort in approaching, senior management to broach the issue (FM14).

With this understanding of our methods of scoring in mind, we examined these scores by the two groups we created containing those managers who reported a compliance rate based on their FDA that was "correct" (<10%) versus those who overestimated this compliance rate (10%+). We hypothesized that a more accurate awareness of the true, low rate of compliance would be associated with a heightened sense of awareness, perceived threat and anxiety, felt need to compensate, etc.—all aspects of the situational awareness model. We predicted, therefore, that managers aware of the actual low rate of compliance with UA-GA policies at their airlines would show higher scores on all nine of our metrics than their colleagues who were unawares, even if the magnitude of these scores was still low in absolute terms when compared to the scale range (1 to 6).

Table 5 shows the results, where it can be seen that on seven of our nine metrics of situational awareness the one-way hypotheses were supported ( $p < .10$  or better). Only on "Knowing the procedures" and "Keeping each other safe" were the levels of awareness similar for these two groups, albeit at low absolute levels. In summary, those aware of the low compliance rates at their companies ( $n=14$ ) scored at or above the midscale on five of our metrics (Functional, Critical, Affective, Anticipatory and Compensatory)(FM15). If a minimum midscale threshold of situational awareness across a majority of our measures were enough to trigger some action, the individuals in this group are close to reaching such a trigger point. However, note that this group constituted just 11% (14/128) of our sample; they are a very small minority still coming to full awareness of the problem.

Finally, we present in Table 5 results on the Presage metrics for our two groups derived from cluster analysis, those perceiving relatively high risk in their companies' UA-GA policies and rates (35% of sample), and those not generally perceiving such risks (65%) (It will be recalled these groups were derived for all managers in the sample irrespective of whether they claimed to know, or ventured to report, what their company compliance rate actually was according to their FDA or otherwise). In this case, all nine awareness factors are statistically reliably different, with five means again above midscale for the high threat perception group. These results are more encouraging in terms of "sizing" the complement of managers perhaps ready to act on this important area of noncompliance, as about one third of the sample shows signs of having reached a threshold of awareness that will trigger activity to manage this issue more safely in the near future.

#### **4. Recommendations**

As the FSF Go-around Decision Making and Execution Project is ongoing, and as results of other survey work and go-around analysis is pending, the following recommendations are preliminary and based upon the results of this portion of phase 1 work. We offer the following five essential strategies labeled SM1 (Strategy-Management 1) through SM5.

SM1. Enhance situational awareness, among operator management, of the UA GA Policy non-compliance rates for the industry, and the serious impact this non-compliance has on the industry accident rate.

SM2. Enhance situational awareness, among operator management, of the UA GA Policy non-compliance rates for their company, and the specific risk to their operation.

SM3. Enhance situational awareness, among flight crew associations, of the UA GA Policy non-compliance rates for their company, and the specific risk to their members.

SM4. Operators set specific compliance rates, and establish initiatives to achieve these rates.

SM5. Amend audit programs to include Standards and Recommended Practices that address specific non-compliance of go-around policies.

Although these strategies are targeted towards the management of go-around policies and improving the compliance rates, they are complimentary and in addition to the strategies listed in the flight crew study.

The following table lists preliminary recommendations, RM1 (Recommendation-Management 1) through RM9, the corresponding finding(s) that support them and the strategy and psychosocial construct(s) they address.

**Table 6. Recommendations**

Recommendation		Finding(s)	Strategy(s)	Construct(s)
RM1.	Develop and implement a strategy to communicate the go-around compliance rate problem industry wide. The industry target audience should include, regulators, operators, audit program groups, operator associations, flight crew associations, Trade groups, flight training organizations, and manufacturers, etc.	FM1, FM2	SM1, SM2, SM3	C1, C2, C5, C6,
RM2.	Operators understand their own respective go-around compliance rates.	FM1, FM3, FM4, FM6, FM8, FM9	SM2, SM3	C2, C5, C6
RM3.	Operators understand their respective managers and flight crews psychological profiles for managing current go-around rates	FM1, FM5, FM6, FM7, FM8, FM9, FM10 FM14, FM15	SM2, SM3	C2, C6, C8
RM4.	Operators set internal compliance rate measures, targets, and goals.	FM1, FM4, FM5, FM6, FM7, FM8, FM9, FM11, FM12, FM13, FM14, FM15	SM4, SM3	C4, C5, C9
RM5.	Operators communicate internal go-around rates, measures, targets, and goals to all management who have any association or influence in achieving them.	FM1, FM2, FM4, FM5, FM6, FM7, FM8, FM9, FM10, FM11, FM13, FM14, FM15	SM2, SM3, SM4	C2, C5, C8, C9
RM6.	Establish an info-share mechanism where operators can share common strategies to improve go-around compliance rates.	FM1, FM9, FM10, FM12, FM13, FM14	SM1, SM2, SM3, SM4	C3, C6, C8, C9



RM7.	In collaboration with operators and flight crew associations establish a basis in which flight data analysis programs can be used to assist in effectively managing the go-around compliance to the established targets.	FM7,	SM2, SM3, SM4	C5, C7, C9
RM8.	Industry audit programs establish standards and recommended practices for operators to manage their respective go-around rates.	FM1, FM2, FM6, FM7, FM8, FM10, FM12, FM13, FM14	SM4, SM5	C4, C6, C7

## 5. Conclusions

This research and analysis set out to help determine if there exists, from a psychological point of view, an answer to the question “Why are go-around decisions that policy states should be made, actually not being made during so many unstable approaches?” and to then make preliminary recommendations based on the findings.

On balance, the story these data tell is one of unawareness and inaccuracy in the perceptions and estimates managers have and make about their rates of compliance with their own UA-GA policies. Moreover when we thread these results through the findings of our pilot survey we discover a number of common outcomes. To refresh for a moment, our pilot survey revealed that the UA pilots at the time they need to make an appropriate decision whether or not to go around: they have a lowered sense of situational awareness across all facets, which has led them to minimize the importance of objective threats in their assessment of risk. Further, their decision making process finds little failsafe in protective crew norms and processes and there is no real disincentive to continue an unstable approach based on the expected company response to that decision. We suggested that these findings were characteristic of a psychosocial phenomenon known as the “normalization of deviance”, wherein a “new normal” mode of operation has been established, which is passively supported, tolerated and/or approved by its stakeholders (pilots), owners (company management), and in some cases, regulators. We also noted that once entrenched within a given culture this new mode’s power and authority can be overwhelmingly influential on behavior and individual decision making in the moment, as evidenced in the Challenger and Columbia space shuttle tragedies (3).

The evidence gathered from the manager survey echo’s those findings from our pilot survey adding further credibility to our hypothesis of a systemic normalization of deviance across the industry in the pilot’s performance on complying to go-around policies and manager’s correctly managing poor go-around rates. The need for consciousness-raising among managers is strongly indicated as a needed first step on the road to improving this threat to safety.

## 6. References

- (1) Flight Safety Foundation Year In Review, IASS 2011.
- (2) Flight Safety Foundation 2012.
- (3) Vaughan D. (1996). *The Challenger Launch Decision: Risky Technology, Culture and Deviance at NASA*. Chicago: The University of Chicago Press.