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Subject: Managing Disruptions and Distractions

1 Background

A threat is a condition generated in the operating environment that affects or complicates the performance of a task or a crew's compliance with applicable standards. Interruptions and distractions are frequent threats facing flight crews and have been shown to lead to significant safety problems.

2 Introduction

Interruptions (e.g., due to ATC communications) and distractions (e.g., due to a conversation among others on the flight deck) occur frequently during flight. Some cannot be avoided and therefore must be coped with by the flight crew. Others can be minimized or eliminated through training, adoption of effective procedures, discipline and the use of good judgment. If the number of interruptions and distractions is not minimized or the impact of residual interruptions and distractions is not controlled, flight safety can be affected. If a flight crew is disturbed while monitoring or controlling the aircraft, errors can occur and go undetected.

This circular discusses the causes and consequences of interruptions and distractions and describes techniques for reducing and dealing with them.

3 Data

The omission of a required action or an inappropriate action is the most frequent causal factor in incidents and accidents as illustrated by Table 1. These omissions or errors are often the result of an interruption or distraction. Also, the US Aviation Safety Action Program (ASAP) reveals that 14 percent of crew reports include references to an interruption or distraction*

Table @ 1 Effects of Distractions and Interruptions in Approach-and-Landing Accidents

| Factor | % of Events |
|---|--------------------|
| Omission of action or inappropriate action | 72% |
| Inadequate crew coordination, cross-check and backup | 63% |
| Insufficient or loss of lateral or vertical situational awareness | 52% |
| Inadequate or insufficient understanding of prevailing conditions | 48% |
| Slow or delayed action | 45% |
| Incorrect or incomplete pilot/controller communications | 33% |

4 Factors Involved in Interruptions and Distractions

Interruptions and distractions in the cockpit may be subtle and momentary or intrusive, obvious and continuing, but all can be disruptive to the flight crew. A study by the NASA Aviation Safety Reporting System (ASRS) in 1998 indicated that there are four primary factors that generate interruptions or distractions such as:

- Communications
 - receiving the final weights while taxiing
 - a flight attendant entering the cockpit
 - calls from ATC or on company radio
- Head-down activity
 - reading the approach chart
 - programming the FMS
- Responding to an abnormal condition or unanticipated situation
 - system malfunction
 - weather or environmental threat
- Searching for traffic after a TCAS/ACAS alert.

Over time, the ASRS database has been used to estimate the respective contributions of the four sources that contribute to the interruptions and distractions. These estimates are shown in Table 2.

Table # 2 Factors Involved in Interruptions and Distractions #

| Factor | % of Events |
|--|--------------------|
| Communications | 50 to 68% |
| Head-down activity | 16 to 22% |
| Response to abnormal condition/unanticipated situation | 14 to 19% |
| Searching for traffic after a TCAS/ACAS Alert | 8 to 11% |

The four factors shown in Table 2 are flightcrew related. A variety of other contributing factors can make these and other flight events more likely to result in interruptions and distractions. These include poor flight-deck ergonomics, high flight-deck noise levels, inadequate language proficiency (pilots and controllers), poor airport infrastructure (e.g., unclear markings) and flight crew fatigue.

It is also important to note that interruptions and distractions need not be large or of long duration to result in a safety problem. Even minor disruptions (e.g., a non-threatening equipment malfunction) can turn a routine flight into a challenging event, particularly for a crew at the end of a long, tiring day of flying.

5 Effect of Interruptions or Distractions The primary effect of interruptions or distractions is a breakdown of the normal flow of ongoing cockpit activities which, in turn, can lead to errors and associated safety problems. An error may occur if the attention of the flight crew is diverted while they are engaged in safety-critical tasks such as following SOPs or doing normal checklists or communications or monitoring or problem solving.

An interruption/distraction often leaves the flight crew with a feeling of being rushed and faced with completing tasks of varying priority. This can result in an increase in workload even when the actual task load is reasonable and steady. As a result, a crew faced with concurrent task demands will typically focus on one or a few tasks while inadvertently ignoring all others. This response is typical of most crew when dealing with excessive workload.

Unless mitigated by effective compensatory techniques, a disruption leading to a lapse of attention can result in:

- Failure to monitor the flight path, possibly leading to an altitude or course deviation or even CFIT.

- Missing or misinterpreting an ATC instruction leading to a traffic conflict or runway incursion.
- Omitting an action and failing to detect and correct the resulting abnormal condition or configuration.
- Being “behind the aircraft” because of a task overload due to the combination of flying duties and attention to the interruption or distraction.
- Non-adherence to SOP’s.
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6 Reducing Interruptions and Distractions

In order to reduce interruptions and distractions, actions are required at both the company and personal levels. Company policies and procedures should be designed with full knowledge of the sources and effects of interruptions and distractions. Likewise, the training for both flight and cabin crews should include information on interruptions and distractions and advice on how to decide when an interruption is warranted.

6.1 General strategies

A good first step in a prevention program involves assessing the exposure of both the company and flight crew personnel to interruptions and distractions. Strategies can then be developed to prevent or deal with the identified problems.

It is important to:

- Maintain a high level of interaction and communication among flight crew members and between the flight and cabin crews without simultaneously increasing interruptions and distractions. Effective communication involves a two-way transfer of information, not just a simple one-way consultation
- Schedule actions that can be controlled (e.g., initiation of normal checklists) during periods that are less prone to disruption in order to prevent interference with actions that cannot be controlled (e.g., ATC communications)
- Recognize the range of potential sources of interruptions and distractions and to understand their effect on the flow of cockpit duties
- Reduce interruptions and distractions by adopting appropriate policies and rules
- Acknowledge that the flight crew does not have control over all sources of interruptions/distractions and, thus, mitigation as well as prevention is needed.
- Develop prevention strategies, specific techniques and lines-of-defence to minimize the exposure to interruptions and distractions

6.2 Good rules to follow

There are no absolute methods to prevent or control interruptions and distractions. The effectiveness of efforts will depend to some extent on factors such as an airline's operating environment, prevailing rules and the cultural background of the crewmembers. Nevertheless, some good general rules to follow would be:

- Adhere to the Sterile Cockpit Rule as an integral part of SOPs because it has the potential to reduce interruptions and distractions. The Sterile Cockpit Rule limits unnecessary conversations and communications during taxi, takeoff, landing and below 10,000 feet
- Include the Sterile Cockpit Rule in preflight briefings and in CRM training with the cabin crew
- Avoid the most frequent causes of interruptions and distractions such as Non-flight-related conversations, Distractions by cabin crewmembers, Non-flight-related radio calls, Non-essential public-address (PA) announcements.

6.3 Specific approaches for each major factor

There are specific ways to help control each of the major factors that promote interruptions and distractions discussed earlier. These include:

- Communications
 - Brief all jump-seat occupants on the Sterile Cockpit Rule
 - Put headsets on during critical phases of flight (e.g., for any operations below 10,000 ft)
 - Plan PA announcements for low workload periods
 - Keep intra-cockpit communications brief, clear and concise
 - Pause or end conversations in advance of approaching the next defined target or the next altitude restriction/constraint.
- Control Head-down activity in Terminal Areas and define an SOP for task sharing when programming or reprogramming the FMS depending on the level of automation being used and the flight phase
 - Announce when you are going "head down."
- Responding to an abnormal condition or to an unanticipated situation
 - Keep the autopilot engaged to decrease workload unless otherwise required
 - Adhere to PF/PNF task sharing for abnormal/emergency conditions (e.g., PNF should maintain situational awareness, monitor and back up the PF)

- Pay particular attention to the proper completion of normal checklists. Handling an abnormal condition has a tendency to disrupt the normal flow of actions as specified in SOPs. When there is an interruption or distraction, the “trigger” event for an SOP or checklist may go unnoticed, resulting in the omission of the associated actions or verifications.
- Search for Traffic - Express a clear and loud “I fly, you watch” or “flight watch with you” call when required to search for traffic by a TCAS alert or a call from ATC.

7 Managing/ Mitigating Interruptions and Distractions

Some interruptions and distractions are subtle and potentially difficult to detect. The first priority, therefore, must be to recognize that a disruption has, in fact, occurred. Once you are aware that the normal flow of activities has been interrupted, the second priority is to re-establish situational awareness. This is accomplished through the following steps:

- Identify – What was I doing?
- Ask – Where was I interrupted?
- Decide/ Act – What decision or action shall I take to get “back on track?”

When deciding on an action:

- Use the clear guidelines of operations golden rules – “Fly, Navigate, Communicate and manage systems, in that order”
- Plan all activities and be willing to postpone some actions until time and conditions are more conducive
- Ask for more time (e.g., from the ATC or from the other crewmember) to prevent being rushed. “Take time to make time”
- Follow SOPs to verify that any postponed action(s) have been accomplished
- If a disruption interrupts the course of any checklist, an explicit hold should be verbalized to mark the pause in the checklist, and an explicit command should be used for resuming the checklist.

8 Summary of Key Points

- A. Interruptions and distractions usually result from the following factors:
- Pilot/controller, intra-cockpit or cockpit/cabin communications
 - Head-down activity
 - Responding to an abnormal condition or unanticipated situation

- Searching for traffic
- B. Prevention strategies and lines-of-defence should be developed to minimize interruptions and distractions and to lessen their effects
- c. The most effective company prevention strategies and personal lines-of-defense involve strict adherence to SOPs, Operations golden rules, Standard calls, Sterile cockpit rule, Recovery techniques such as: “Identify – Ask – Decide – Act”, “Prioritize – Plan – Verify.”

9 Regulatory References

- ICAO - Preparation of an Operations Manual (Doc 9376).
- ICAO – Human Factors Training Manual (Doc 9683).
- ICAO – Human Factors Digest No 8 – Human Factors in Air Traffic Control (Circular 241).
- Operations Circular - CRM Training.(Ops Circular 2 of 1996)
- Operations Circular – SOP's.(Ops Circular)

11 Industry References

- Flight Safety Foundation website – <http://www.flightsafety.org>

12 Source:

* (Source: US ASAP – 2000-2001).

@(Source: Flight Safety Foundation - ALAR - 1998-1999)

#(Sources: NASA – ASRS)

Sd/-
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