UPRT: The Three Pillars of Prevention

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Topics

• The problem with LOC-I
• Common Precursors to LOC-I
• The Three Pillars of Prevention
The Problem with Loss of Control

Colgan Air – Buffalo 2009
The Problem with Loss of Control

Turkish Airlines – Amsterdam 2009
The Problem with Loss of Control

Air France – Atlantic Ocean 2009
The Problem with Loss of Control

Pinnacle Airlines – Jefferson City 2004
The Problem with Loss of Control

West Caribbean Airlines – Venezuela 2005
The Problem with Loss of Control

Air Asia – Indonesia 2014
Common Precursors to Loss of Control

Environmental Factors

• Severe turbulence, including clear air and mountain wave turbulence.
• Windshear;
• Thunderstorms;
• Microbursts;
• Wake turbulence; and
• Aircraft icing
Common Precursors to Loss of Control

Aircraft System Anomalies

• Flight instruments;
• Autoflight systems; and
• Flight control and other anomalies
Common Precursors to Loss of Control

Misinterpretation or Breakdowns in Cross-checking Information
Common Precursors to Loss of Control

Adjusting Attitude and Power
Common Precursors to Loss of Control

Vertigo or Spatial Disorientation
Common Precursors to Loss of Control

Distraction from Primary Cockpit Duties
Common Precursors to Loss of Control

Inattention
Common Precursors to Loss of Control

Improper Use of Aircraft Automation
Common Precursors to Loss of Control

Pilot Techniques
(including Pilot Induced Oscillation Avoidance or Recovery)
Common Precursors to Loss of Control

Surprise
An unexpected event that violates a pilot’s expectations and can affect the mental processes used to respond to the event

(FAA, 2015)
Common Precursors to Loss of Control

Startle
An uncontrollable, automatic muscle reflex, raised heart rate, blood pressure, etc., elicited by exposure to a sudden, intense event that violates a pilot’s expectations.

(FAA, 2015)
Prevention of LOC-I

Prevention of Loss of Control remains the highest priority for dealing with the LOC-I problem.

There needs to be holistic processes put in place which allow more attention to be focussed on the problem at both an organisational and personal level.
Training Interventions

UPRT Guidance

Becoming widespread across the world
The Three Pillars of Prevention

- Knowledge
- Motivation
- Monitoring
The 1\textsuperscript{st} Pillar: Knowledge Elements
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- Aerodynamics;
- Causes and contributing factors of upsets;
- Safety reviews of accidents and incidents relating to aircraft upsets;
- G awareness;
- Energy management;
- Flight path management;
- Recognition;
- Upset prevention and recovery techniques;
- System malfunctions;
- Various specialised training elements (e.g., spiral dives and recovery from stick-pusher);
- Human factors
- Recovery procedures;
- Factors leading to a stall event;
- Airplane-specific systems knowledge; and
- Airplane certification differences
The 2nd Pillar: Motivation

While Pilots may practise emergencies in the sim for perhaps four days a year, the remainder of the 360+ days are often routine and emergency-free.

This leads to a ‘Conditioned Expectation for Normalcy’

On those rare occasions when things do go wrong, then a lack of expectation can produce some heightened surprise and stress reactions, with negative effects on situation outcome.
The 3rd Pillar: Effective Monitoring
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The following are some of the sub-skills/ actions required to actually perform the monitoring task:

**Attention management:** Procedures/techniques for directing a pilot’s attention to a particular place at a particular time.

**Deliberate checking:** The active, disciplined and effortful action a pilot must take to look for something rather than just look at something, including the devotion of adequate visual dwell time on the thing being checked.

**Cross-checking/cross-verifying:** Comparing separate, independent sources of information to confirm or refute understanding derived from the initial source.

(Flight Safety Foundation, 2014)
The 3rd Pillar: Effective Monitoring

What to monitor:

**Flight path:** Monitoring the trajectory and energy state of the aircraft, power settings and the automated systems directly affecting flight path

**Systems:** Monitoring of aircraft systems, excluding those directly affecting the flight path

**Operational factors:** Monitoring other operational factors affecting the flight

**Crew/situational awareness:** Monitoring the actions/condition of the other pilot(s) and crew/situational awareness

(Flight Safety Foundation, 2014)
The 3rd Pillar: Effective Monitoring

Additional Guidance for effective monitoring:

• ‘Following SOPs consistently;
• Clearly communicating deviations to other crewmembers;
• Aggressively managing distractions;
• Remaining vigilant;
• Intervening if flight guidance modes or aircraft actions don’t agree with expected actions;
• Continuously comparing known pitch/power settings to current flight path performance;
• Considering that the primary flight displays and navigation displays (PFD, ND) might be “lying” and always being on the lookout for other evidence that confirms or disconfirms what the displays are saying;
• Methodically regaining flight path situational awareness after completing non-flight-related tasks; and,
• Alerting other crewmembers when monitoring is inhibited (e.g., heads down).

(Flight Safety Foundation, 2014)
Questions?