UPRT:
The Three Pillars of Prevention

Dr Wayne Martin
BAvMan, MAvMgmt, MBus, PhD, FRAeS

Topics

- The problem with LOC-I
- Common Precursors to LOC-I
- The Three Pillars of Prevention

The Problem with Loss of Control

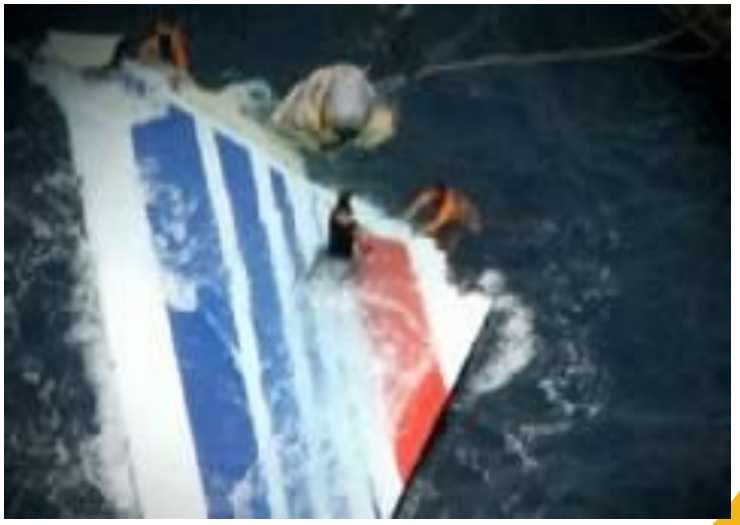
Colgan Air – Buffalo 2009

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

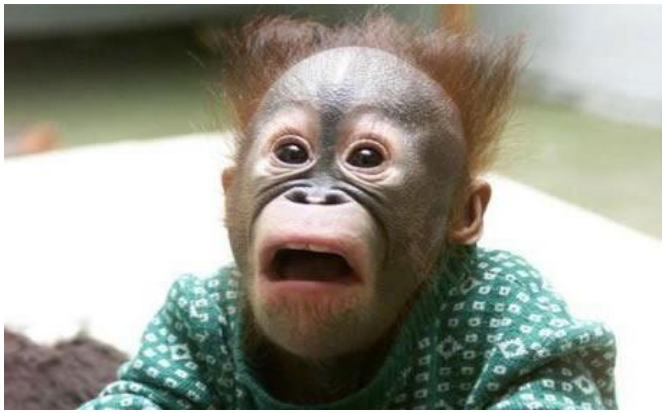
Pilot Techniques
(including Pilot Induced Oscillation Avoidance or Recovery)

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)

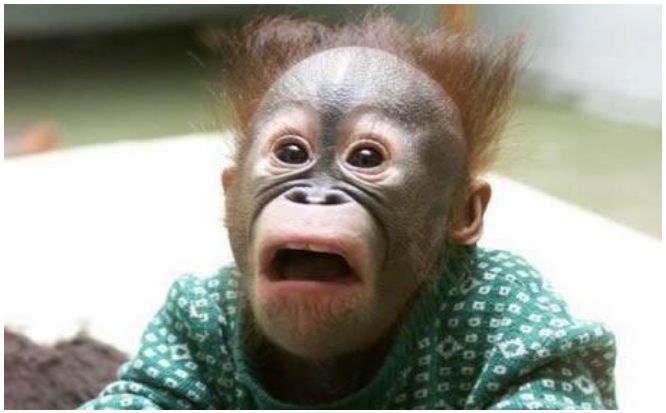


Common Precursors to Loss of Control

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

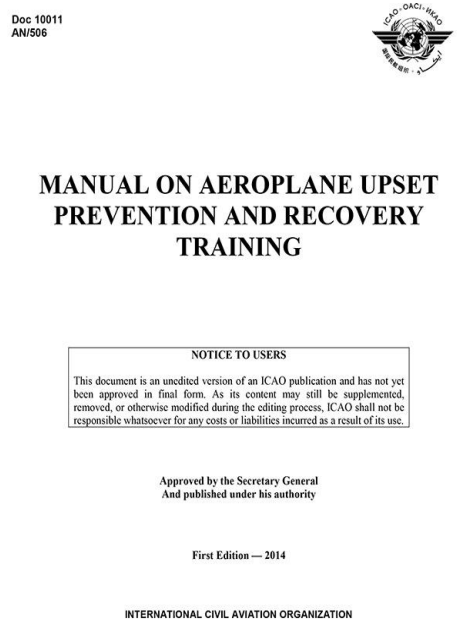
Prevention of Loss of Control remains the highest priority for dealing with the LOC-I problem.

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



Doc 10011
AN/506

MANUAL ON AEROPLANE UPSET PREVENTION AND RECOVERY TRAINING

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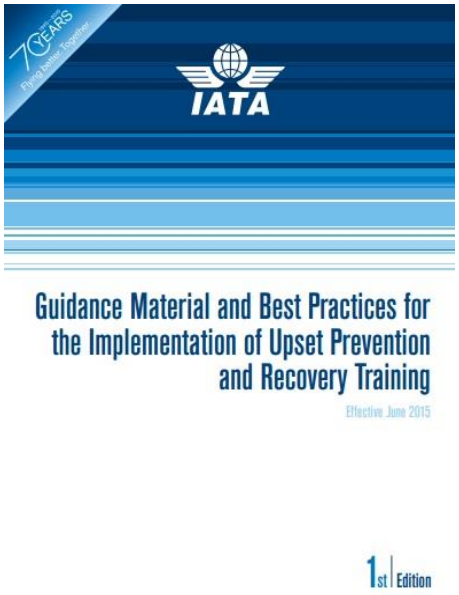

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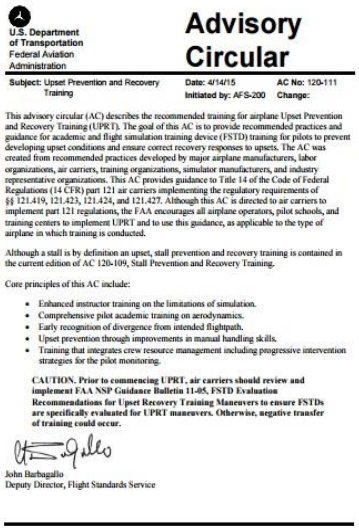
IATA

Guidance Material and Best Practices for the Implementation of Upset Prevention and Recovery Training

Effective June 2015

1st Edition



U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Upset Prevention and Recovery Training
Date: 4/14/15
AC No: 120-111
Initiated by: AFS-200
Change:

This advisory circular (AC) describes the recommended training for airplane Upset Prevention and Recovery Training (UPRT). The goal of this AC is to provide recommended practices and guidance for academic and flight simulation training device (FSTD) training for pilots to prevent developing upset conditions and ensure correct recovery responses to upsets. The AC was created from recommended practices developed by major airplane manufacturers, labor organizations, air carriers, training organizations, simulator manufacturers, and industry representative organizations. This AC provides guidance to Title 14 of the Code of Federal Regulations (14 CFR) part 121 air carriers implementing the regulatory requirements of §§ 121.419, 121.423, 121.424, and 121.427. Although this AC is directed to air carriers to implement part 121 regulations, the FAA encourages all airplane operators, pilot schools, and training centers to implement UPRT and to use this guidance, as applicable to the type of airplane in which training is conducted.

Although a stall is by definition an upset, stall prevention and recovery training is contained in the current edition of AC 120-109, Stall Prevention and Recovery Training.

Core principles of this AC include:

- Enhanced instructor training on the limitations of simulation.
- Comprehensive pilot academic training on aerodynamics.
- Early recognition of divergence from intended flightpath.
- Upset prevention through improvements in manual handling skills.
- Training that integrates crew resource management including progressive intervention strategies for the pilot monitoring.

CAUTION. Prior to commencing UPRT, air carriers should review and implement FAA NSP Guidance Bulletin 11-05, FSTD Evaluation Recommendations for Upset Recovery Training Maneuvers to ensure FSTDs are specifically evaluated for UPRT maneuvers. Otherwise, negative transfer of training could occur.

John Barbagallo
Deputy Director, Flight Standards Service

European Aviation Safety Agency

Notice of Proposed Amendment 2015-13

Loss of control prevention and recovery training

RMT.0581 & RMT.0582 — 1.9.2015

EXECUTIVE SUMMARY

This Notice of Proposed Amendment (NPA) addresses a safety and regulatory coordination issue related to aeroplane Loss of Control In-flight (LOC). The following initiatives are linked to this NPA: various accident Safety Recommendations; European Aviation Safety Plan (EASp) safety actions and amended International Civil Aviation Organization (ICAO) standards and recommended practices. This NPA proposes to integrate so-called upset prevention and recovery training (UPRT) requirements and provisions into the EU pilot training regulatory framework. An aeroplane upset is a condition whereby an aeroplane unintentionally exceeds the flight parameters experienced during normal flight. Upsets which are not timely corrected are likely to lead to Loss of Control In-flight (LOC). The proposed training requirements aim to provide pilots with competencies to prevent upsets or to recover from developed upsets. As a result from taking a risk based approach to develop regulations, the main focus of the new training standards is on pilots who intend to pursue a pilot career with a commercial airline. Such pilots would likely complete either an aeroplane Airline Transport Pilot Licence (ATPL(A)) or a Multi-crew Pilot Licence (MPL) integrated course, followed by a type rating on a multi-pilot aeroplane. The proposed pilot training aims to deliver enhanced pilot competencies through additional upset prevention and upset recovery related theoretical knowledge (TK) and flight instruction. Nevertheless, upset prevention training is also to be integrated into existing flight syllabi for other aeroplane licence training courses, such as for the Light Aircraft Pilot Licence (LAPL(A)), Private Pilot Licence (PPL(A)) and Commercial Pilot Licence CPL(A). The provisions for the LAPL(A) and PPL(A) training courses mostly related to the General Aviation community are lighter and thus more proportionate when compared to the CPL(A) and ATPL(A) training courses. The newly developed upset recovery training in an aeroplane, which is to be mandated for the ATPL(A) training course and also serve as a pre-requisite prior to commencing the first multi-pilot type rating course, is seen as an important step towards enhancing a commercial pilot's resilience to the psychological and physiological aspects often associated with upset conditions, and towards providing them with an enhanced ability to not only overcome these human factor aspects, but to also apply appropriate recovery strategies to return the aeroplane to safe flight. In support of the new standards, the proposals place greater emphasis on the flight and Flight Simulator Training Device (FSTD) instructors who are foreseen to deliver the various UPRT elements. New instructor privileges are proposed for the upset recovery training course in an aeroplane. In addition, FSTD instructor training standards are to be increased, notably for those instructors that deliver upset recovery training in existing Full Flight Simulators (FFSs), to ensure that negative transfer of training is avoided.
The proposal also introduces further supporting amendments, such as guidance for NAA inspectors, and is expected to increase safety and ensure harmonisation with ICAO. The foreseen entry into force date of the proposed requirements and provisions is April 2018.

Applicability

Affected regulations and decisions:	Part-FCL, Part-ARA, Part-ORA, Part-ORO, Part-ARO, CS-FCD, CS-SIMD, CS-FSTD(A) and associated AMC or GM
Affected stakeholders:	flight crew, instructors, examiners, Approved Training Organisations, 'FSTD only' operators, aeroplane operators, FSTD manufacturers, NAAs
Driver/origin:	Safety, regulatory harmonisation
Reference:	Safety Recommendations: FRAN-2010-004, FRAN-2010-005, FRAN-2011-09, FRAN-2012-39, FRAN-2012-40, FRAN-2012-41, FRAN-2012-46, FRAN-2012-71, NETH-2010-007, SPAIN-2011-018, and SOUF-2010-009 European Aviation Safety Plan (EASp) safety actions AER 4.8, 4.10 & 4.16

Process map

Concept Paper:	Yes
Terms of Reference (Issue 2):	30.4.2015
Rulemaking group:	Yes
RIA type:	Full
Technical consultation during NPA drafting:	No
Duration of NPA consultation:	3 months
Review group:	Yes
Focussed consultation:	No
Publication date of the Opinion:	2016/Q1
Publication date of the Decision:	2017/Q1

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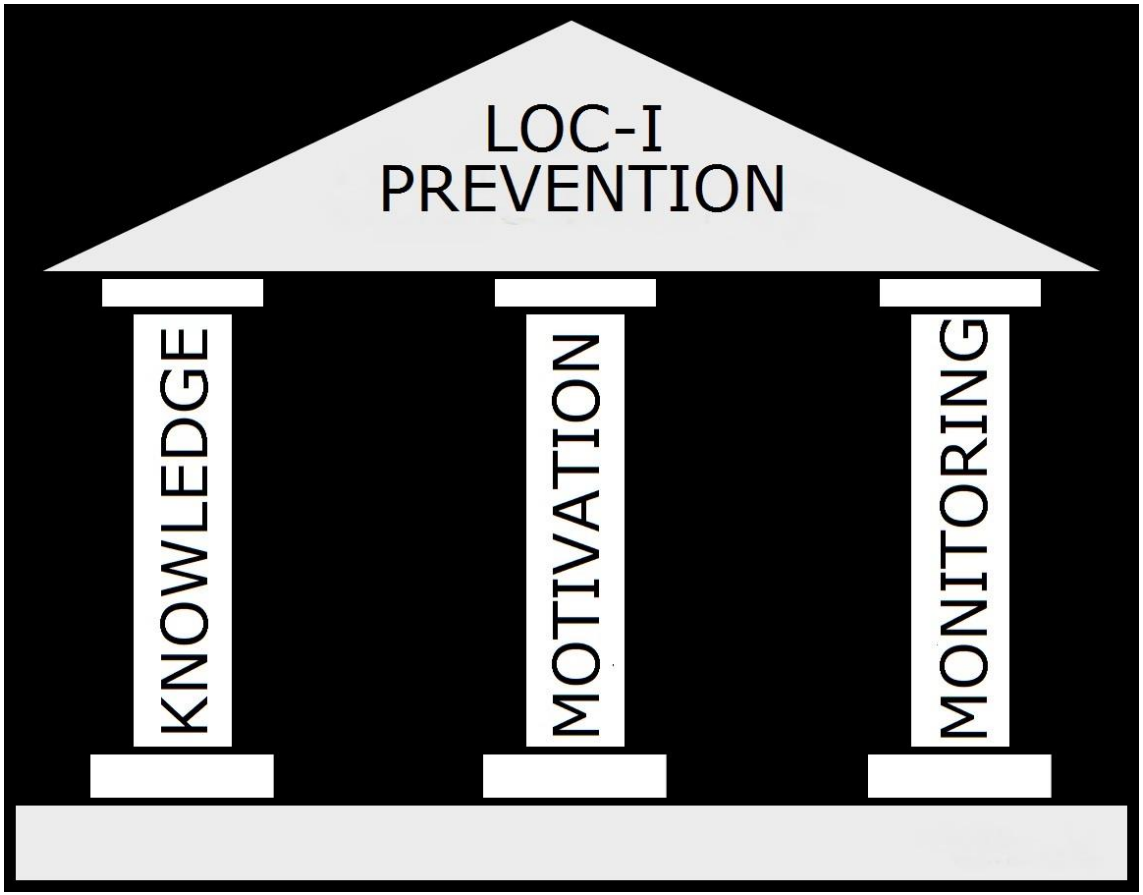
The Three Pillars of Prevention



The 1st Pillar: Knowledge Elements

The 1st Pillar: Knowledge Elements

- 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

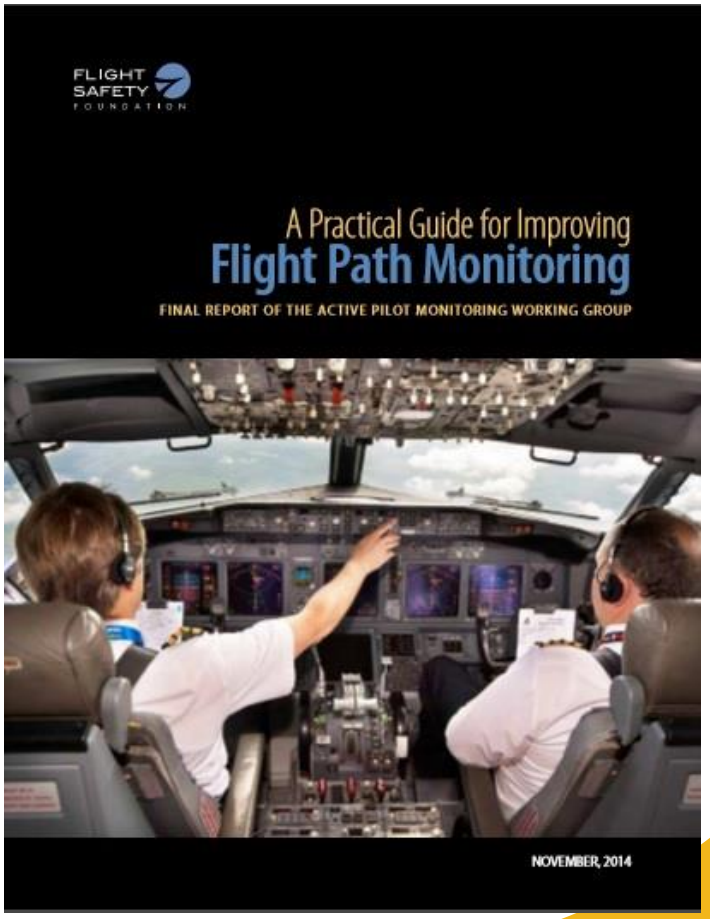
The 2nd Pillar: Motivation

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



The 3rd Pillar: Effective Monitoring

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?