Flight Operations Safety Awareness Seminar (FOSAS)

Adhere to Standard Operating (SOPs)

Airbus Flight Operations Support and Training Standards
Nairobi, 19-21 Sep. 2017

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SOP Regulation

The U.S. FAA defines the scope and contents of SOPs in **Advisory Circular (AC) 120-71B**, that includes:

- General operations policies (i.e., non-type related)
- Airplane operating matters (i.e., type-related)

The European EASA defines the scope and contents of SOPs in IR-OPS ORO.MLR.100 and associated AMCs and GM, and allocates the SOP in the following pats of the Operations Manual:

- **Part A** : General operational policies (i.e., non-type-related)
- **Part B** : Airplane operating matters (i.e., type-related).

SOP and Safety Standard

- **FSF ALAR Briefing Notes**
  Information on 33 topics related to prevention of approach-and-landing accidents (ALAs), including those involving controlled flight into terrain (CFIT).
- ***Flight Safety Digest*, November 1998–February 1999 "Killers in Aviation"**
  FSF ALAR Task Force findings and data sources.
- ***FSF ALAR Task Force Conclusions and Recommendations***
  What the data showed about ALAs, and how to prevent them.
- **"Killers in Aviation: An Update"**
  Findings from analyses of more recent data on ALAs.
- **"Review of Detailed ALA Reports: 1995–2007"**
  Insights on the causal factors and consequences of ALAs.
- **Selected FSF Publications**
  Related reading on ALAs and runway excursions.
- ***Approach-and-landing Risk Awareness Tool***
  Approach briefing supplement to increase hazard awareness.
- ***Approach-and-landing Risk Reduction Guide***
  Guidelines for evaluating training, procedures and equipment.
- ***Standard Operating Procedures Template***
  Recommended operating and training procedures.
- **ALAR Information Posters**
  Illustrations of lessons learned.
- ***CFIT Checklist***
  Guidelines in six languages for assessing CFIT risk.

FLIGHT SAFETY FOUNDATION

Flight Safety Foundation ALAR Approach-and-Landing Accident Reduction Tool Kit

FSF **A**pproach and **L**anding **A**ccidents **R**eduction

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SOP Regulation

Flight Safety Foundation

ALAR Tool Kit

Standard Operating Procedures Template

[The following template is adapted from U.S. Federal Aviation Administration (FAA) Advisory Circular 120-71, *Standard Operating Procedures for Flight Deck Crewmembers.*]

A manual or a section in a manual serving as the flight crew's guide to standard operating procedures (SOPs) may serve also as a training guide. The content should be clear and comprehensive, without necessarily being lengthy. No template could include every topic that might apply unless it were constantly revised. Many topics involving special operating authority or new technology are absent from this template, among them extended-range twin-engine operations (ETOPS), precision runway monitor (PRM), surface movement guidance system (SMGS), required navigation performance (RNP) and many others.

The following are nevertheless viewed by industry and FAA alike as examples of topics that constitute a useful template for developing comprehensive, effective SOPs:

- Captain's authority;
- Use of automation, including:
  - The company's automation philosophy;
  - Specific guidance in selection of appropriate levels of automation;
  - Autopilot/flight director mode selections; and,
  - Flight management system (FMS) target entries (e.g., airspeed, heading, altitude);
- Checklist philosophy, including:
  - Policies and procedures (who calls for; who reads; who does);
  - Format and terminology; and,
  - Type of checklist (challenge-do-verify, or do-verify);
- Walk-arounds;
- Checklists, including:
  - Safety check prior to power on;
  - Originating/receiving;
  - Before start;
  - After start;
  - Before taxi;
  - Before takeoff;
  - After takeoff;
  - Climb check;
  - Cruise check;
  - Approach;
  - Landing;
  - After landing;
  - Parking and securing;
  - Emergency procedures; and,
  - Abnormal procedures;
- Communication, including:
  - Who handles radios;
  - Primary language used with air traffic control (ATC) and on the flight deck;
  - Keeping both pilots "in the loop";
  - Company radio procedures;
  - Flight deck signals to cabin; and,
  - Cabin signals to flight deck;

Flight Safety Foundation Standard Operating Procedures Template (Rev. 1.1, 11/00) 1

- The ALAR tool kit proposes Standard FAA Operating Procedures Template

- EASA SOP slightly differ:
  - No abnormal procedures

Airbus SOPs

+ **Airbus SOPs** are designed in order to:
  + Reflect the **Airbus Cockpit Philosophy**
  + Reflect **Airbus Family** or **Commonality Concepts**
  + Enhance optimum use of **Airbus specific A/C systems**
  + Apply to a **broad range of airlines** operations and environments

Adhere to SOPs

Why do we need SOPs?

Defining SOPs and Standard Calls

Using the SOPs and Standard Calls

Deviating from SOPs

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Adhere to SOPs

Why do we need SOPs?

Defining SOPs and Standard Calls

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Deviating from SOPs

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Why do we need SOPs?

The Standard Operating Procedures

+ Define **company's operating philosophy**

+ **Ensure standardization** among the flight crew

+ Define **what-to-do** and **when-to-do**

+ Define PF/PM **Task sharing** - Who-does-What
  + **PM role** as **Pilot Monitoring**

Why do we need SOPs?

The Standard Operating Procedures

- Provide **basis** for efficient crew communication and coordination (**best CRM practices**)
- **Promote** PF/PM **mutual crosscheck** and **back-up**
  - Define **Standard Calls** and **Deviation Callouts**
- **Prevent omission** of actions and **inappropriate** actions (**Checklists**)
- **Promote optimum use** of aircraft-type design features

Why do we need SOPs?

SOPs: An effective Safeguard to minimize potential for errors …

+ In daily / routine situations

+ Following interruptions, distractions …

+ In unusual or high pressure situations

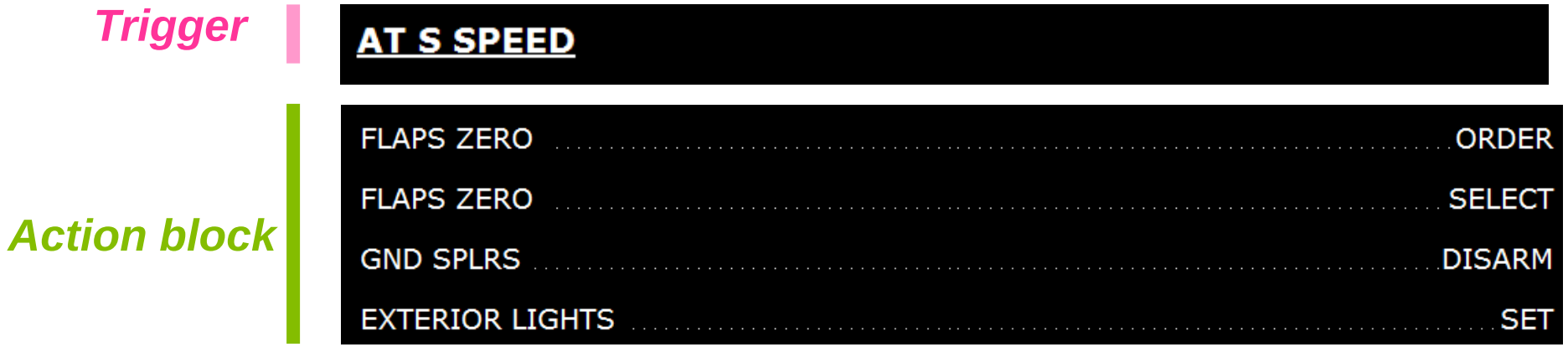
Factor	% of Events
Inadequate decision making	74 %
Omission of action or inappropriate action	72 %
Inadequate CRM practice (crew coordination, cross-check and backup)	63 %
Insufficient horizontal or vertical situational awareness	52 %
Inadequate or insufficient understanding of prevailing conditions	48 %
Slow or delayed crew action	45 %
Flight handling difficulties	45 %
Incorrect or incomplete pilot / controller communication	33 %
Interaction with automation	20 %

Factors in Approach-and-Landing Accidents – FSF – 1998-1999

Why do we need SOPs?

SOPs: An effective Safeguard that provides:

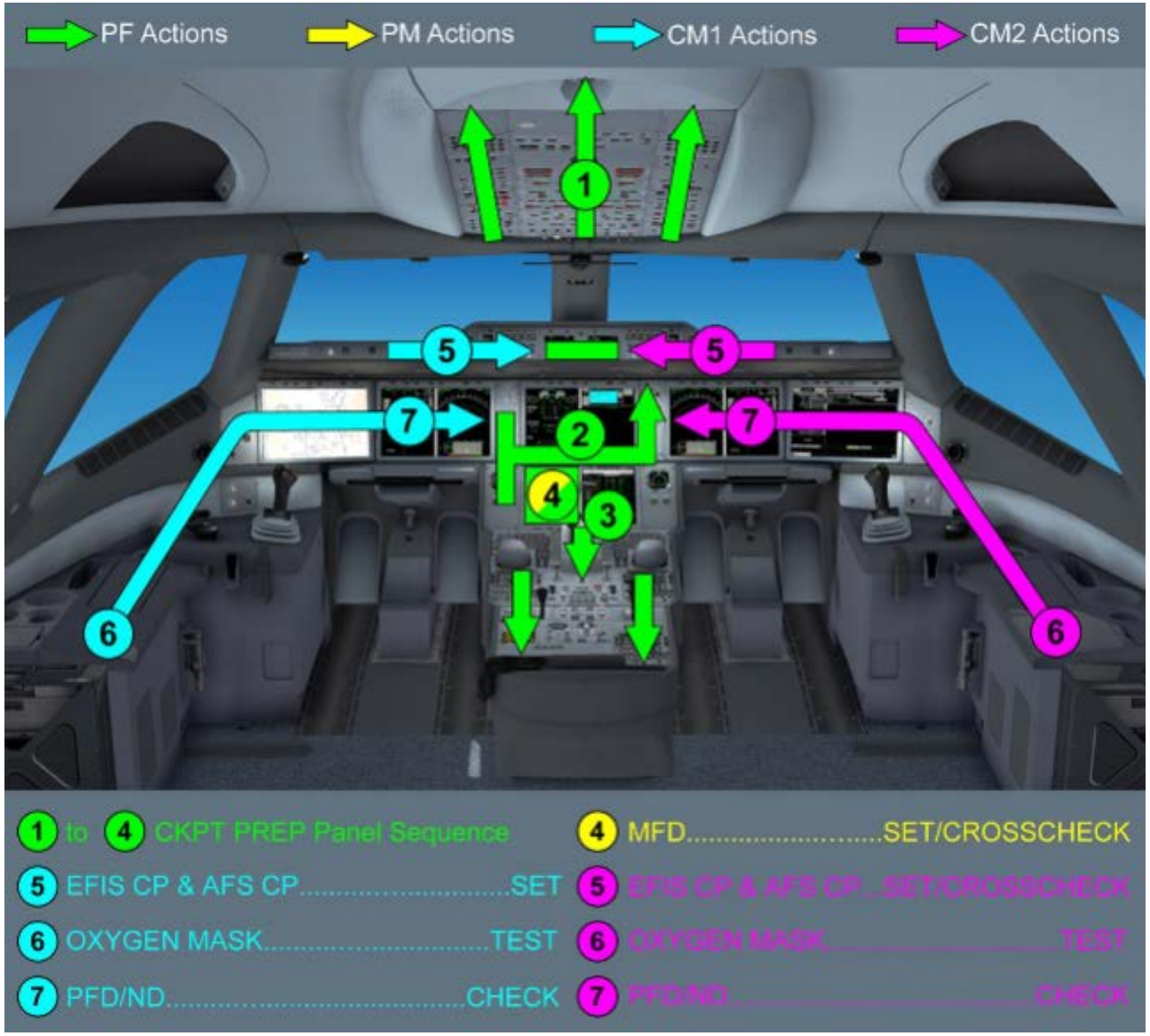
+ ***Triggers***: events or actions initiating groups of actions (called action-blocks)
+ ***Action blocks***: groups of actions being accomplished in sequence as a group



Why do we need SOPs?

SOPs: An effective Safeguard that provides:

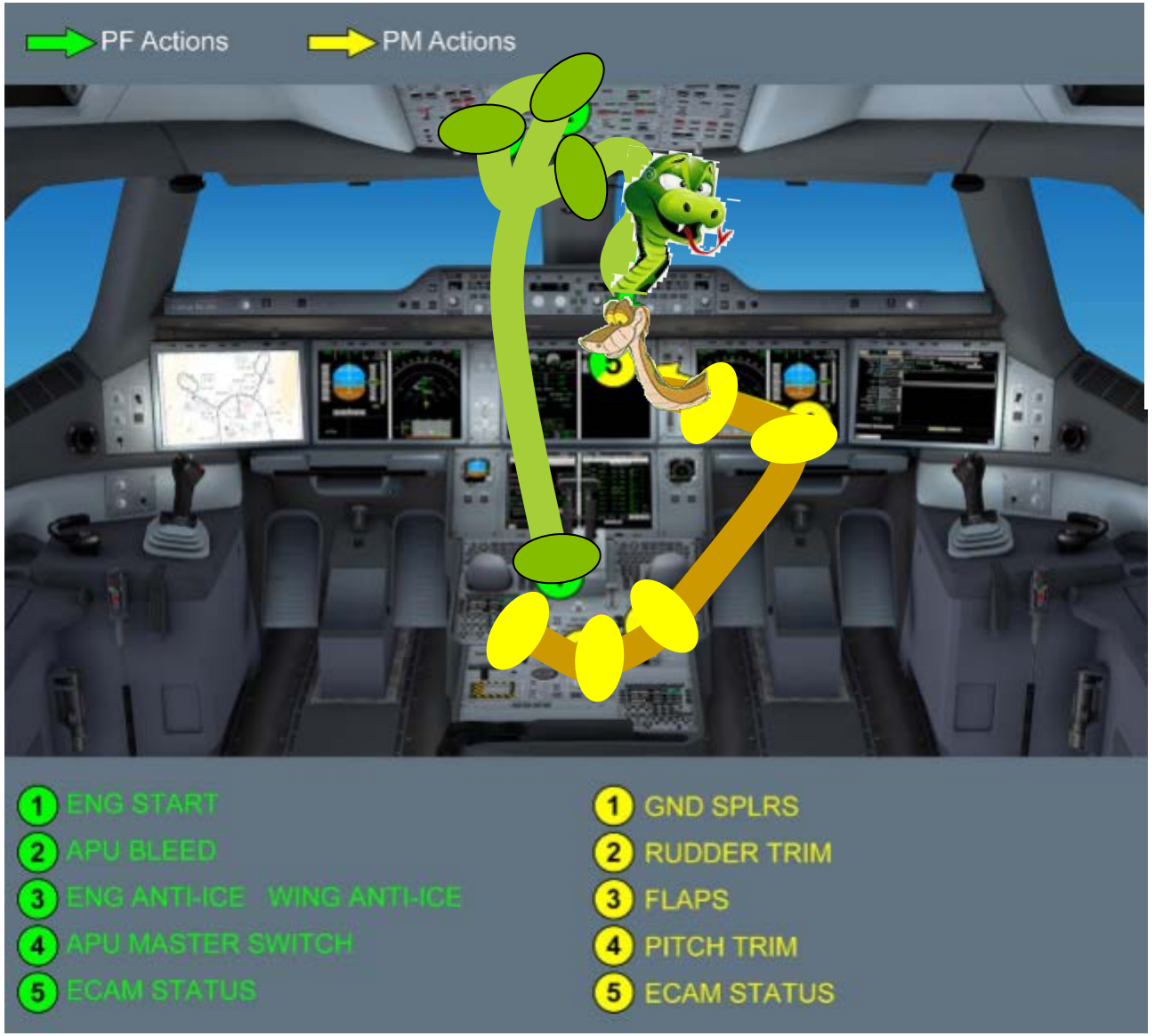
+ ***Action patterns***: flight deck panel scanning sequences or patterns supporting the flow and sequence of action blocks



Why do we need SOPs?

SOPs: An effective Safeguard that provides:

- *Action patterns*
- Some will memorize:
  - a litany…
  - or, a gesture…
  - or, a design.



Why do we need SOPs?

SOPs: An effective Safeguard that provides:

+ *Standard calls*: **standard phraseology** and **terms** used **for effective intra-crew communication**

Why do we need SOPs?

Benefits of Standards Calls

- Are clear to identify
- Enable optimum use of automation
- Enhance flight crew situational awareness
- Effective interaction and communication
- Reduce the risk of decision-making errors
- Have the same meaning for all crews
- Provide the right information with a minimum number of words
  - The **importance of using standard call**s increases with **increasing workload** or **flight phase criticality.**

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Why do we need SOPs?

SOPs: The reference for Crew Standardization

Adhere to SOPs

Why do we need SOPs?

Defining SOPs and Standard Calls

Using the SOPs and Standard Calls

Deviating from SOPs

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Defining SOPs?

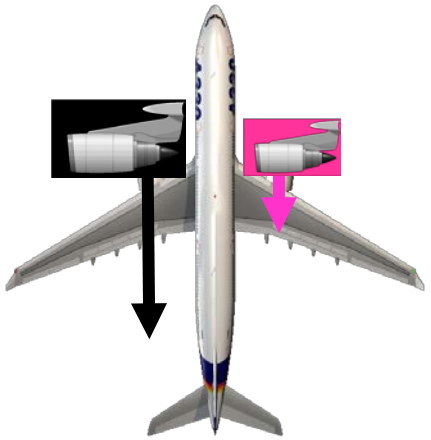
SOPs: The Company's Operating Philosophy

- Company SOPs are :
  - Based on **manufacturer's** SOPs
  - Adapted to suit **Operator's policies** and **environment**
  - Periodically reassessed based on **in-service experience**

Update of manufacturer's SOPs

Feedback from flight crews and cabin crews

Defining SOPs?



SOPs: From In-Service Event Analysis

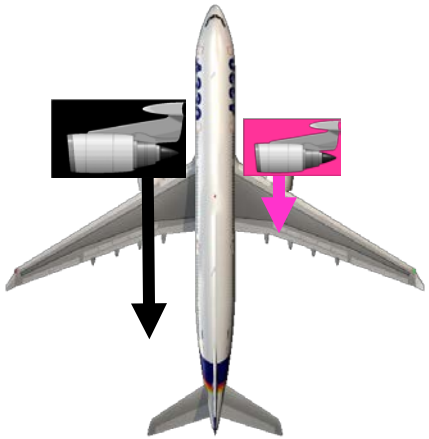
+ Low speed runway excursion:

"In order to expedite the takeoff, I have set TOGA just after being aligned…"

SOP extract:

- **Announce** . . . . . **"TAKE OFF"**
- **CLOCK** . . . . . **START**
- Slightly advance throttles and monitor spool-up, until both engine are above idle (approx. 40% N1).

Defining SOPs?



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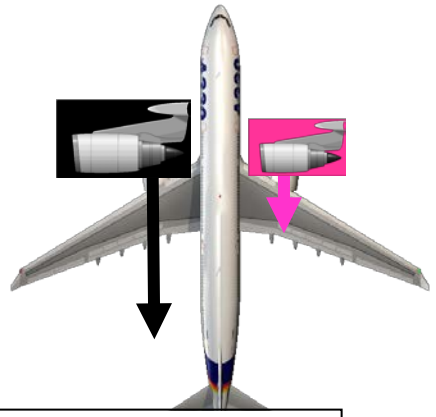
Defining SOPs?

SOPs: From In-Service Event Analysis



+ Following other similar incidents, SOP **has been enhanced** to **explain the rationale of the published takeoff thrust technique**:

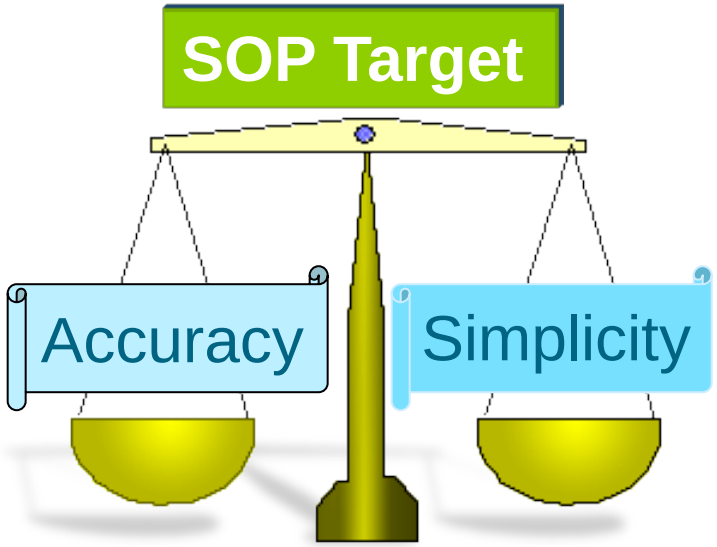
– **Announce** . . . . . **"TAKE OFF"**
– **CLOCK** . . . . . **START**
– Slightly advance throttles and monitor spool-up, until both engine are above idle (approx. 40% N1).

R – **INTERMEDIATE THRUST SETTING** . . . . . **SET**
R – PF progressively adjusts and stabilizes engine thrust
R from idle to about 40 % N1.
– **BRAKES** . . . . . **RELEASE**
– **GO-LEVERS** . . . . . **TRIGGER**
R *Note 1 : Intermediate thrust setting will ensure that both*
R *engines will accelerate similarly and will minimize*
R *any directional control problem.*

Defining SOPs?

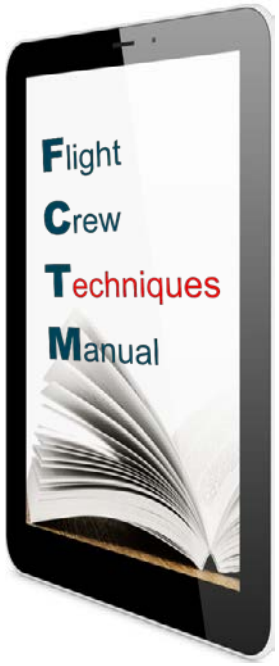
- To avoid an over-abundance of SOP's that may result from:
  - The need to adapt to constantly changing habits & policies
  - The need to increase capacity & efficiency of operations
  - The need to manage an increasingly complex environment

Everything should <u>not</u> be SOP-related …



Defining SOPs?

+ **Basic airmanship skills, piloting techniques** and **training** related matters are **not** SOP-related:
  - + Use of the weather radar
  - + Briefing techniques
  - + Crosswind landings and takeoffs
  - + Navigation accuracy check
  - + Flare technique
  - + Etc.

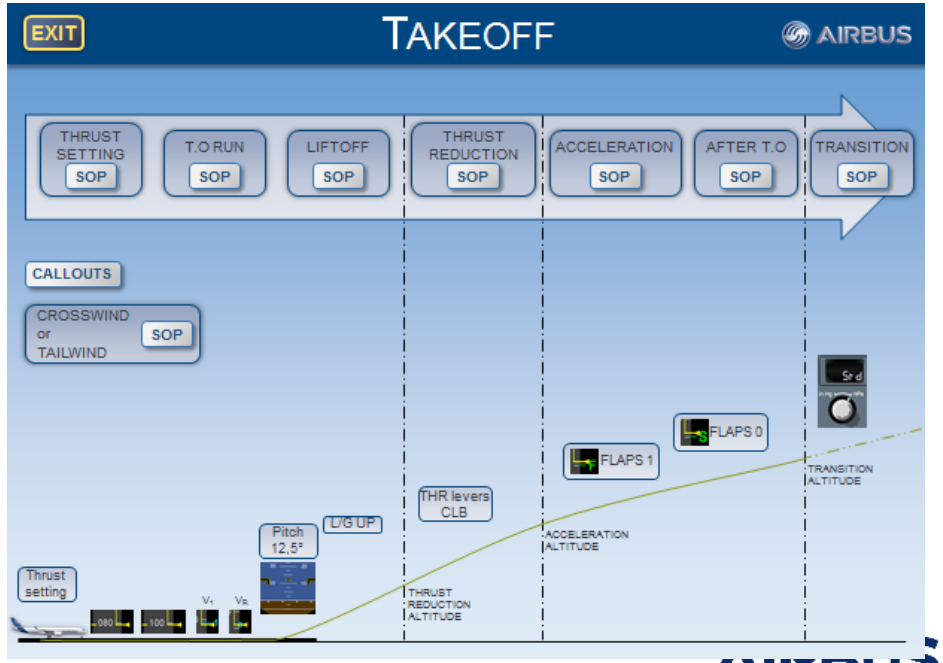


+ SOPs have been designed for **flight crews** that have **already** been **type-rated** to fly this type of aircraft and are **current with the aircraft's handling characteristics**

Defining SOPs?

- **Standard calls** should be **defined in order to be** :
  - **Clearly identified** by the **PF or PM**; and,
  - **Distinguished** from **other intra-cockpit** or **ATC** communications.

- **Standard calls** should be
  - **Included in the flow sequence** of company' SOPs (or summarized at the end of the SOPs)
  - **Illustrated** in the **Flight Patterns** published in the company' AOM or QRH (as applicable).



Adhere to SOPs

Why do we need SOPs?

Defining SOPs and Standard Calls

Using the SOPs and Standard Calls

Deviating from SOPs

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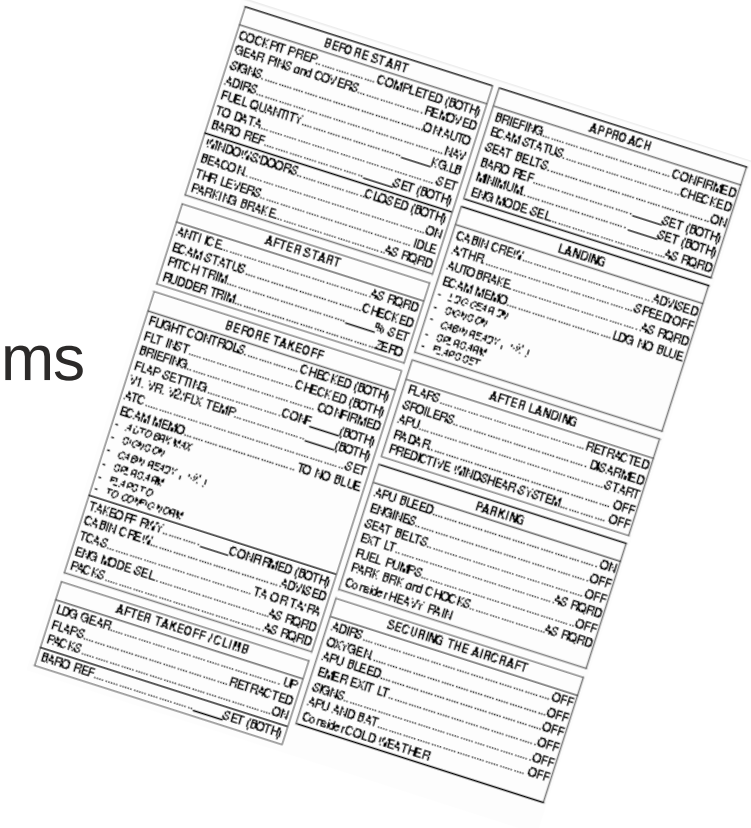
Using the SOPs

SOPs: How to Use

- SOPs are:
  - Performed **by memory**
  - Supplemented by use of **Normal Checklists** for critical items
  - Based on the "**challenge and response**" concept



Using the SOPs

SOPs: How to Use

+ **Disciplined** use of **SOPs** and normal checklists should begin during the **transition training course**, because habits and routines acquired during transition training have a lasting effect.

› **Training** provides an **opportunity** for pilots **to discuss** and **understand**:

› **The rationale for SOPs**

› **The potential consequences** of **failing to adhere** to them

Using Standard Callouts

Standard Callouts: How to Use

- **Upon a Standard Callout:**
  - The other crewmember should accomplish the requested command or verify the requested condition and respond accordingly.
  - Standard calls may be generated automatically (auto callouts)
    - **In the absence of such auto callouts** (i.e., due a system malfunction), the PM should make verbally the appropriate standard call. (eg: « Minimums »)

Using Standard Callouts

Standard Callouts: How to Use

- **The absence of standard call** at the appropriate time or the absence of acknowledgment may :
  - Result in a loss of situational awareness for the other crewmember
  - Be an indication of a system or indication malfunction
  - Indicate a possible incapacitation of the other crewmember

Using Standard Callouts

- Standard calls are used to:
  - Ask the other pilot to perform an action
    - E.g. Flaps, L/G, Anti-ice...
  - Use/Monitor the aircraft automations
    - E.g. : AP , FD, A/THR engagement status
    - Modes engagement status
  - Check lateral and vertical trajectory
    - Ex: Active F-PLN leg, altimeter setting, next altitude clearance…
  - Initiate a Checklist
  - Manage abnormal situations and failures
    - Ex: Initiation of ECAM actions
  - Detect and correct deviations from nominal flight parameters
    - Ex: Announcing deviations (bank, pitch, LOC…)

Adhere to SOPs

Why do we need SOPs?

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Deviating from SOPs

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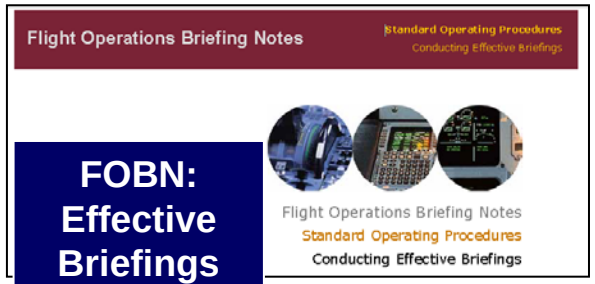
Deviating from SOPs

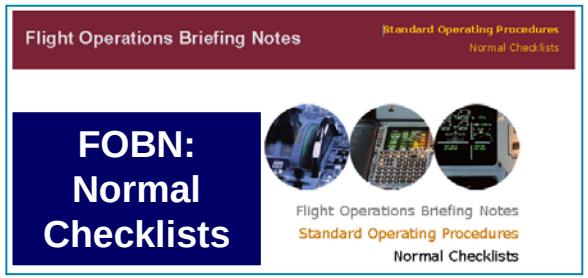
- To effectively enforce SOPs, it is important to **understand why pilots deviate** from them:
  - Inadvertent deviation = working error
  - Intentional deviation = violation

- **Many operational and human factors** are involved in deviations

- **Companies** and pilots should:
  - **Assess** their **exposure**
  - Develop **prevention strategies** / lines-of-defense



FOBN: Effective Briefings



FOBN: Normal Checklists

Safety First: Compliance to SOP

Deviating from SOPs

- **Underlying factors** that contributed to **deviations** from SOPs:
  - Inadequate **knowledge** of the procedure
  - Insufficient emphasis on strict adherence to SOPs during **training**
  - Insufficient **vigilance** (i.e. fatigue)
  - **Interruptions** (e.g. due to ATC com), **distractions**
  - Task **saturation**
  - Incorrect management of **priorities** for **time-critical situations**
  - Reduced **attention** (tunnel vision)
  - Incorrect **CRM** techniques
  - **Company policies**
  - **Personal** desires or constraints
  - **Complacency**, **overconfidence**
  - …

Source: NTSB, AIB, TSB, BASI on 132 Approach and landing accidents

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Deviating from SOPs – In-service event analysis

+ ***Touchdown at 215 kt followed by tires deflation***

+ *A320 in approach: AP OFF, A/THR in SPEED mode, FD in HDG-V/S mode*

210 kt selected on FCU down to landing

› Flight Guidance not as per SOP

CONF 2 selected (***VFE = 200 kts***)

> OVERSPEED warning

> CONF 1 selected and flaps no more extended

› SOP requests that PM checks the speed before extending flaps

Aircraft above G/S, high Rate of Descent

> SINK RATE GPWS alert

› No crew action (repeated alert)

210 kt and CONF 1 until touchdown

› SOP requires to be stabilized at 500 ft (VMC); if excess deviation: Go Around

Deviating from SOPs – In-service event analysis

- ***Touchdown at 215 kt followed by tires deflation***
- ***Lessons-Learned?***
  - Experience factor (new operator)
  - Mutual crosscheck and back-up:
    - Undetected / Unchallenged crew error

  - Adherence to SOPs must be reinforced:
    - Effective briefings (speed and configuration management)
    - Standard call outs (SPD checked, deviation call outs by PM)
    - Stabilization policy and go around policy
    - … during recurrent training, line training, …

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Adhere to SOPs - **Conclusion**

Why do we need SOPs?

Defining SOPs and Standard Calls

Using the SOPs and Standard Calls

Deviating from SOPs

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Conclusion

How can Airbus Flight Operations propose adapted standards?

Propose

Implement

Support

Enhance

SOP enhancements benefits from airlines experience

Share the benefits with the whole fleet

New markets, new constraints…➔ new standards

Conclusion

Adhering to SOPs

« Decades of experience stand behind SOPs »

+ *(Flight Safety Foundation ALAR Tool kit)*

Manufacturers should:

+Create SOPs that are logical, efficient and error-resistant

+Supplement SOPs by decision aids, cockpit and training systems to support quality decision-making

Operators should:

+Promote the strict adherence to SOPs

+Identify and address the reasons for intentional or inadvertent deviations from SOPs

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