

5th EASp Summit

Risk Portfolio of French SSP

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DSAC

Direction générale de l'Aviation civile

Ministère de l'Écologie, du Développement durable, et de l'Énergie

Risk Portfolio of French SSP

- ❑ The setup of the SSP risk portfolio
- ❑ From risk portfolio to the SSP action Plan
- ❑ Lessons learned, an example in change of focus :

From Non Stabilised Approach to
Non compliant Approach

Set up of the first CAT risk portfolio

□ Work started in 2007 : a group of expert worked

❖ The group felt that the risk-portfolio should be based on undesirable events

- ❖ The undesirable event is the central event of the bowtie model
- ❖ → represented as a line of the portfolio matrix
- ❖ The colour used for each line was based on action priorities

❖ The feared consequences should be presented for each undesirable event

- ❖ The feared consequence is the right hand events of the bowtie model
- ❖ → represented as a column of the portfolio matrix
- ❖ The colour used for each column was based on severity of the feared consequence

❖ The input used to set up the list of undesirable events were:

- ❖ Major accidents reports (with a particular focus on those which occurred in France and nearby countries)
- ❖ Safety studies which were known to the group
- ❖ Limited ECCAIRS data available in 2008

First CAT Risk Portfolio 2009

N°	Identification of the undesirable event	FC1	FC2	FC3	FC4	FC5	FC6	FC7
UE01	Unstabilised approaches	X	#			X		X
UE02	Loading error and entry of erroneous data into the FMS		X			X	X	X
UE03	Runway incursions				X	X		X
UE04	Incident linked to icing or de-icing procedures		X			X	X	X
UE05	Encounters with hazardous weather conditions (thunderstorms, wind shear)		X			X	X	X
UE06	Engine failure on a multi-engined aircraft		X			X	X	X
UE07	Loss of cabin pressure		X				X	
UE08	Deviation from flight path	X		X			X	
UE09	Loss of separation in flight			X			X	
UE10	Inappropriate action by crew (human factors, regulations)	X	X	X	X	X	X	X
UE11	Failure of air-ground interfaces (general)	X	#	X	X	X	X	X
UE12	Incidents linked to a contaminated runway in use					X		X
UE13	Failure of an aircraft system (excluding single engine failure, loss of pressure or reverse thrust failure)	#	X	#	#	X	X	X
UE14	Fire or smoke		X			#	X	X
UE15	Failure of reverse thrust system		X			X	X	X
EI16	Incidents linked to airport maintenance or works	#			X	X		X
UE17	Incident linked to a maintenance issue	X	X	#	#	X	X	X

Set up of the first CAT risk portfolio

- ❑ External consultation was done in 2008
 - ❖ The risk portfolio was considered more or less as an addendum to the strategic action plan
 - ❖ The draft strategic action plan, including the draft portfolio, was sent to stakeholders
 - ❖ Only few minor comments were made to the draft risk portfolio
- ❑ The first strategic action plan and its risk portfolio were adopted by an SSP Management Board by end 2008
- ❑ The strategic action plan and its portfolio were widely distributed
 - ❖ They were translated to the English language
- ❑ Information meetings were organised
 - ❖ With DGAC staff (in particular those in charge of oversight)
 - ❖ With stakeholders

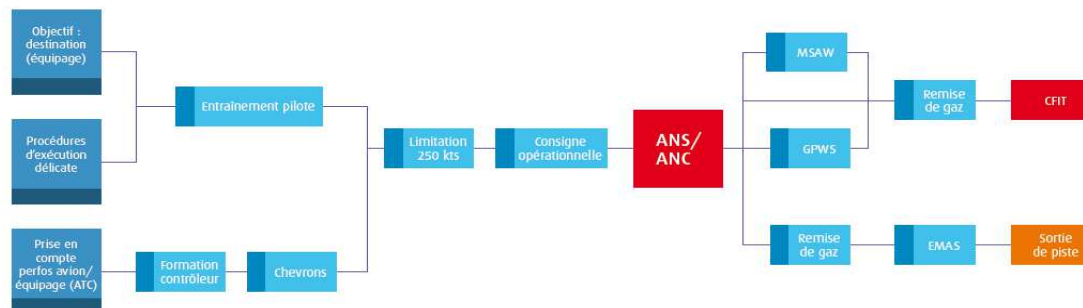
Second version of CAT risk portfolio

- ❑ Risk Portfolio appeared to be carefully considered by numerous people within the Authority and Industry
 - ❖ Numerous questions were raised
 - ❖ Based on questions and comments, a second version was released in September 2010
 - ❖ This second version included more explanations as well as a simplified illustration of the bow-tie model
 - ❖ This version already introduced some focus on non compliant approaches

Annexe : diagramme papillon

Les termes d'« événement indésirable » et d'« événement ultime » utilisés dans la cartographie des risques sont issus du modèle de diagramme papillon (ou bow-tie). L'exemple simplifié figurant ci-dessous illustre un événement indésirable (EI), l'approche non stabilisée/non conforme (ANS/ANC), et deux EU, le CFIT et la sortie de piste.

L'enchaînement des événements se lit de gauche à droite. Les pavés les plus à gauche représentent des facteurs de risque. Ces facteurs rencontrent ensuite des barrières pouvant empêcher la dégradation de la situation. L'événement pourra se développer dans le cas où la barrière concernée serait déficiente. L'événement peut, si les barrières sont franchies, mener à l'EI. De même, en aval de l'EI, des barrières peuvent empêcher la dégradation de la situation. Si toutes les barrières se montrent déficientes, l'événement peut alors se propager jusqu'à l'EU (ici le CFIT ou la sortie de piste).



The latest version of the risk portfolio

- ❑ A group of expert was mandated by end 2011 to work on a revised CAT risk portfolio
 - ❖ The possibility to restructure totally the risk-portfolio was offered to the group
 - ❖ Question was even raised whether the risk portfolio should or should not be included in the strategic action plan
- ❑ Proposed decision : the risk portfolio should still be published
 - ❖ The major change was to suppress the colours of the headings of the lines (which leaves more space for the reader to assess himself the need for actions)
 - Example : was the focus on Non Stabilised Approaches and the associated go around policy not too much stressed ?
- ❑ The second strategic action plan including its risk portfolio was adopted by an SSP Management Board by end 2013 and was released in January 2014

- ❖ Available on internet as well as the former versions

<http://www.developpement-durable.gouv.fr/Les-documents-du-PSE.html>

Commercial air transport risk portfolio

This is the risk portfolio related to commercial air transport, managed by the DGAC within the framework of the State Safety Programme (SSP) and does not affect operators' risk portfolio.

It is noteworthy that in the context of the State Safety Programme:

- An feared consequence (FC) (in the causal chain) is an accident in the sense of ICAO Annex 13;
- An undesirable event (UE) is an unwanted event in view of the services expected. An undesirable event may be technical, procedural or human.

In the analysis model used by DGAC, which is close to the «bowtie» model, the feared consequence is placed on the right side, and the undesirable event at the centre.

N°	IDENTIFICATION OF UNDESIRABLE EVENT	CFIT	LOC-I	IN-FLIGHT COLLISION	GROUND COLLISION	RWY-EXC	ACFT DAMAGE OR IN-FLIGHT POB	ACFT DAMAGE OR IN-FLIGHT POB ON GROUND
UE3.1	Non-stabilised or non-compliant approach	■	■			■		■
UE3.2	Unusual flight attitude (pitch, bank angle, angle of attack....)		■				■	
UE3.3	Event relating to aerodrome conditions (runway surface condition and aerological parameters)		■			■	■	■
UE3.4	En-route encounter of dangerous weather phenomena (thunderstorm, turbulence, icing)		■	★			■	■
UE3.5	Misuse of aircraft systems (weight and balance, speed, track, aircraft configuration, etc.)	■	■	■	■	■	■	■
UE3.6	Events pertaining to works/maintenance operations on or close to a runway		★		■	■		■
UE3.7	Bad coordination / execution of ground operations (deicing, loading, stowing, line maintenance, etc.)	■	■		■		■	■
UE3.8	Runway incursion		★		■	■		■
UE3.9	Loss of separation in flight and/or airspace infringement		★	■			■	
UE3.10	Wildlife hazard, including bird hazard		■		■	■	■	■
UE3.11	Ground-onboard interface failure (misunderstanding, unsuitability of transmitted information, etc.)	■	■	■	■	■	■	■
UE3.12	Aircraft maintenance event	■	■		★	■	■	■
UE3.13	Fire/smoke in flight	★	■			★	■	■
UE3.14	Aircraft system failure resulting in flight management disturbance	■	■	★	★	■	■	■
UE3.15	Loss of cabin pressure		■	★			■	
UE3.16	Aircraft damage due to FOD		■			■	■	■

C A P T I O N S :

■ the undesirable event leads to a significant increase in the probability of the occurrence of a feared consequence.

★ the undesirable event leads exceptionally to a feared consequence.

Column : colour code according to the severity of individual feared consequences.

From Risk Portfolio to Action Plan

- ❑ The strategic action plan “the 2018 Agenda” aims to take into account the risks included in the portfolio
 - ❖ Feasibility or resources issues while setting priorities...
 - ❖ These priorities will impact the actions of the Authority, in the domains of Oversight and Safety Promotion
 - ❖ The strategic action plan covers a five year period
- ❑ A detailed action plan is set up on the basis of the strategic action plan
 - ❖ The detailed action plan relates to actions for the Authority
 - ❖ The detailed action plan comprises about 200 active lines (who, what deliverable, what date) ; it is updated several times a year
 - ❖ Detailed actions may also arise from other inputs (Safety Review AIB recommendations, EASp...)
- ❑ The strategic action plan also includes systemic issues



<http://www.developpement-durable.gouv.fr/Les-documents-du-PSE.html>

Systemic issues

Focusing on SMSs



- ☐ A/1 Making SMSs the cornerstone of the improvement of safety at the operators' level
- ☐ A/2 Towards more synergy between the SSP and SMSs
- ☐ A/3 The Authority is gradually introducing risk-based oversight
- ☐ A/4 Training of Authority personnel
- ☐ A/5 Reinforcing knowledge and implementation of a just culture
- ☐ A/6 Evaluating and implementing, at the national level, the appropriate safety improvement measures of the European plan

CAT Operational Objectives

❑ B/1 Informing and training flight crews better to reduce the risk of loss of control in-flight

- ❖ The number of this type of accident does not decrease
- ❖ Actions will take into account the work done by the international community with a focus on training

❑ B/2 Improving the management of approach and landing phases

- ❖ The action plan aims not only to reduce the number of runway excursions but also the other type of accidents during approach (especially loss of control including during go around)
- ❖ Actions will focus on Non Compliant Approaches
- ❖ and on EAPPRE (European Action Plan for the Prevention of Runway Excursions)

❑ B/3 Managing adverse meteorological conditions better

- ❖ Often a contributory factor in runway excursions
- ❖ Focus on information exchange between airports, ATM and crews



CAT Operational Objectives

- ❑ **B/4** Reducing the risk of mid-air collision involving commercial aircraft
 - ❖ Focus on airspace infringements
- ❑ **B/5** Adopting a global approach to safety on a platform
 - ❖ Focus on Local Safety Teams in order to enhance the dialogue on the interfaces
- ❑ **B/6** Improving aeronautical information on infrastructures and air navigation systems, from inception to use by crews
 - ❖ The crew is not always aware of a critical safety information such as the reduction of the runway length available
 - ❖ The conclusions of a symposium held in December 2013 should help to improve the situation
- ❑ **B/7** Reducing the risk of undetected fire on-board the aircraft or in an inaccessible part of the aircraft
 - ❖ Actions will aim to increase awareness on this risk by airlines and ground handlers



EXAMPLE OF CHANGE IN FOCUS

From non stabilised approach
to non compliant approach



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UE3.8	Runway incursion		★		■	■		■
UE3.9	Loss of separation in flight and/or airspace infringement		★	■			■	
UE3.10	Wildlife hazard, including bird hazard		■		■	■	■	■
UE3.11	Ground-onboard interface failure (misunderstanding, unsuitability of transmitted information, etc.)	■	■	■	■	■	■	■
UE3.12	Aircraft maintenance event	■	■		★	■	■	■
UE3.13	Fire/smoke in flight	★	■			★	■	■
UE3.14	Aircraft system failure resulting in flight management disturbance	■	■	★	★	■	■	■
UE3.15	Loss of cabin pressure		■	★			■	
UE3.16	Aircraft damage due to FOD		■			■	■	■

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Initial phase 2006-2009

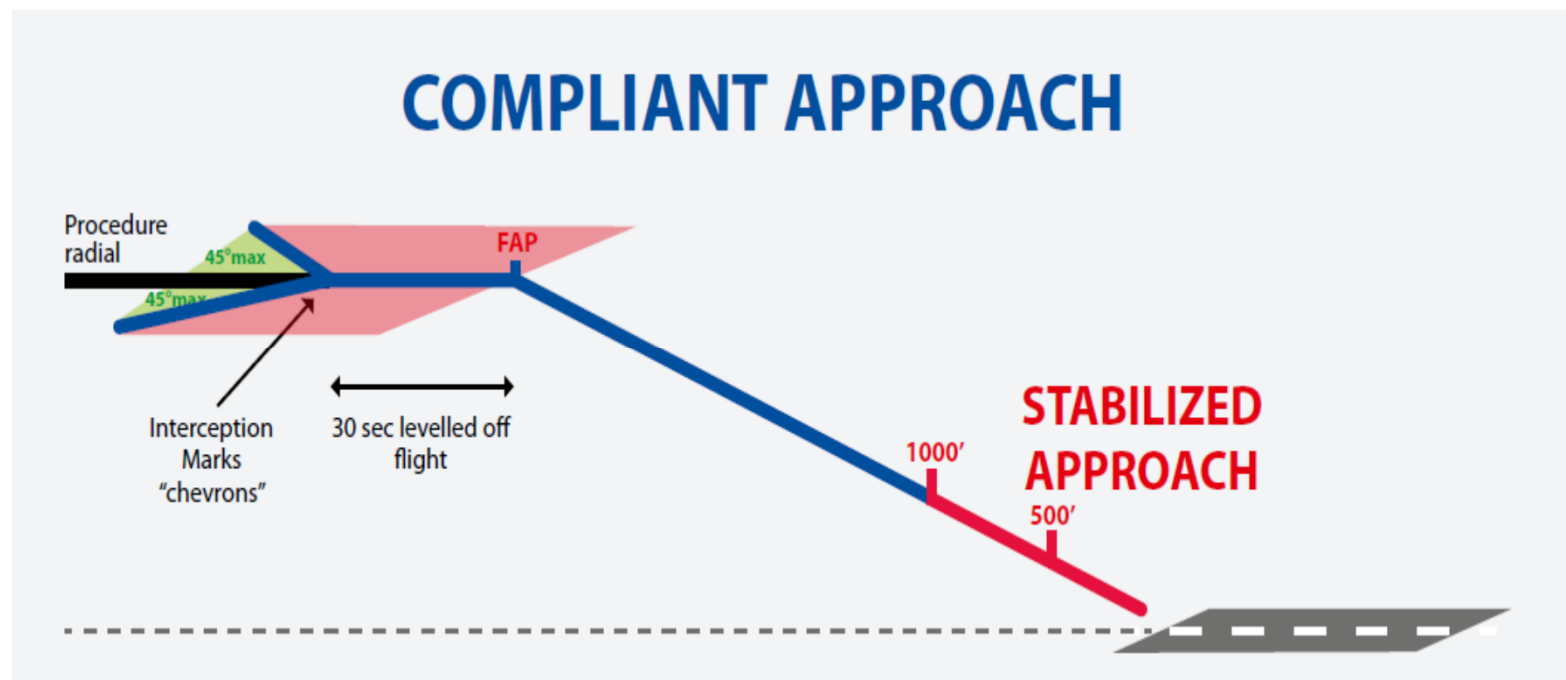
- ❑ 2006 annual safety Symposium
- ❑ Action plan:
 - Standardisation of positive callouts
« stabilised » or « go around »
 - Training (pilots and ATCO)
 - Visual approaches
 - « **Chevrons** »
 - Evaluate where possible establishing
intermediate approach segment at close
to 3000 ft AAL
 - ...

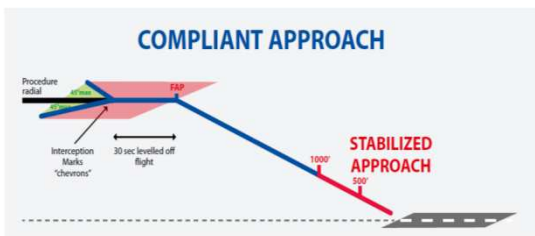


<http://www.developpement-durable.gouv.fr/29-novembre-2006-Les-approches-non.html>

From NSA to NCA

« the green sector »

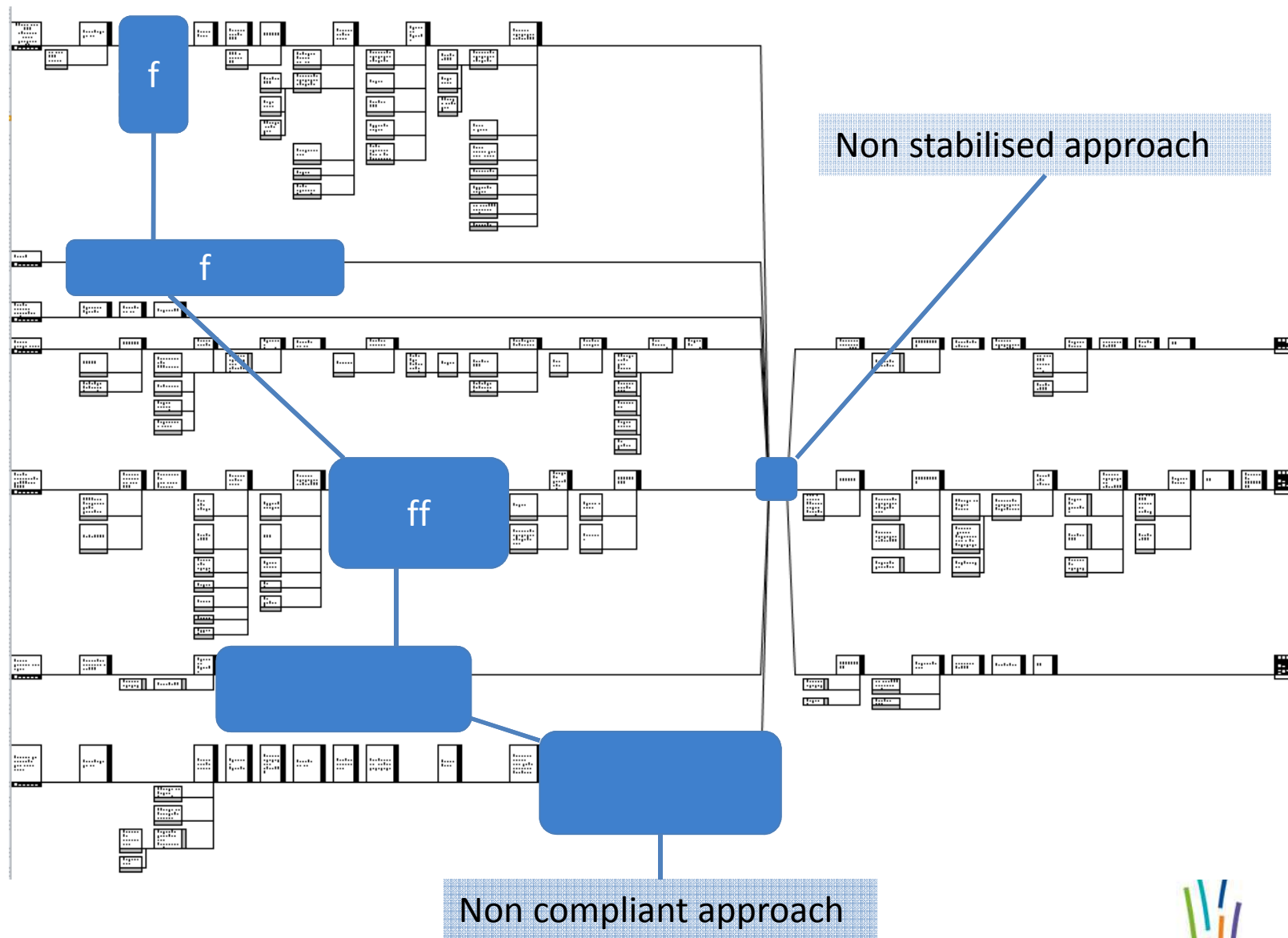




NCA - definition

A Compliant Approach (CA) requires (from the **GREEN** sector in the diagram):

- a closing track to final approach of $< 45^\circ$ (or $< 30^\circ$ on parallel active approaches)
- **AND** a level off leg of at least 30 seconds (or 2nm for GNSS approaches) once established on the intermediate leg
- **AND** glidepath interception from below
- **AND** an adapted airspeed until the FAP to permit a safe aircraft configuration



LIMITS TO THE GO AROUND BARRIER AFTER NSA

Accident/Serious incidents during go around

- Fatal accident B737 Kazan Airport Russia November 2013
- Serious incident A319 Paris CDG September 2009
- Serious incident B757 Gatwick December 2009
- Serious incident A330 Abidjan March 2007
- Fatal accident A320 Sochi May 2006
- Fatal accident A320 Bahrein August 2000
- Serious incident A310 TAROM Paris Orly September 1994
- **French AIB ASAGA study** <http://www.bea.aero/etudes/parg/parg.php>

What about the risk balance between

- performing a landing despite a NSA
- going around as required by the procedure ?

A real need to reduce the number of NSA...

Why working on NCA ?

Accidents and serious incidents involving NCA

- Non fatal accident A321 Lyon March 2013 RE
 - Fatal accident B738 Schiphol February 2009 LOC-I
 - Serious incident B737 Air Europa Express November 2006 RE
 - Serious incident MD-83 Luxor Air Nantes March 2004 CFIT
 - Fatal accident CRL 100 Brest June 2003 CFIT
 - Fatal accident FK27 Luxair, ELLX November 2002 LOC-I
 - Serious incident MD83 Paris Orly November 1997 CFIT
 - Serious incident A310 TAROM Paris Orly September 1994 LOC-I
 - Fatal accident Dash 8 Paris CDG January 1993 CFIT
 - Fatal accident A320 Mont Saint Odile January 1992 CFIT
 - Fatal accident EMB120 Bordeaux (Eysines) December 1987 CFIT
-
- Only very few approach accidents or serious incidents after a compliant approach
 - Non fatal accident in Lorient October 2012 RE

Why working on NCA ?

❑ Numerous incidents in ECCAIRS data base support the correlation between NCA and approach accidents

➤ Pilot reports explaining why an NSA occurred

- High speed (suggested by ATC or pilot initiative)
- ATC vectoring
- Visual approach without sufficient briefing
- Windshear
- Tailwind during approach

➤ Controller reports in case of Go Around

- Correlating with Non Compliant Approach

❑ Part of the NCA lead to accident before the NSA checkpoint

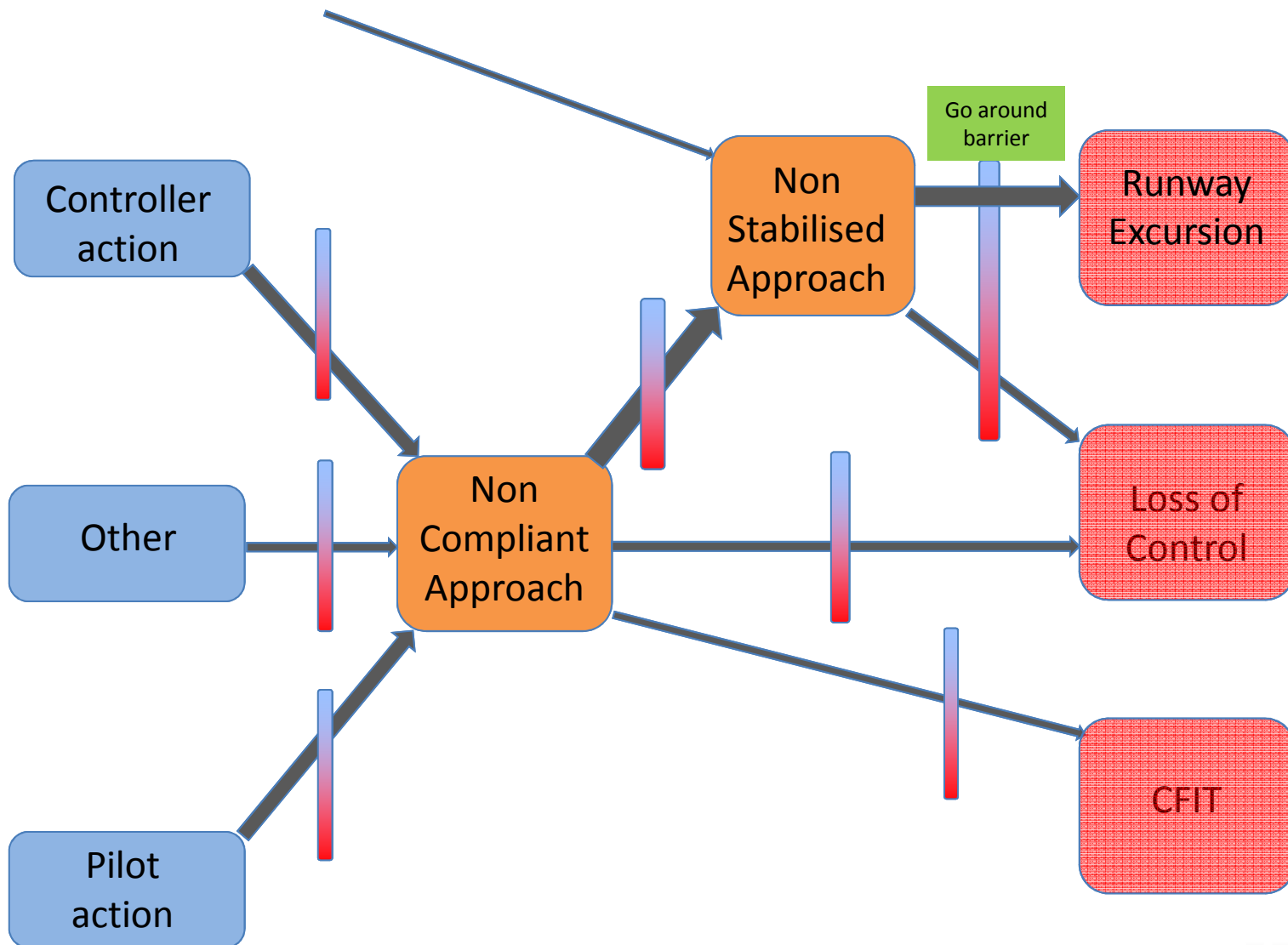
➤ LOC-I, often CFIT

❑ Only one barrier after NSA

➤ The go around

❑ There are numerous NCA

➤ A high potential to improve Safety



Raising Awareness – Infos Sécurité DGAC

	INFO SÉCURITÉ DGAC N° 2013/08
<small>Une info sécurité est un document diffusé largement par la DGAC, non assorti d'une obligation réglementaire dont le but est d'attirer l'attention de certains acteurs du secteur aérien sur un risque identifié. Cette info sécurité est disponible sur : http://www.developpement-durable.gouv.fr/Info-securite-DGAC.html</small>	
Opérateurs concernés	Exploitants d'avions
Sujet	Les interceptions de glide par le haut
Objectif	Clarifier les procédures d'interception de glide par le haut
Contexte	<p>Bien que pratiquée sur certains aéroports, la manœuvre de rattrapage de plan par le haut peut conduire à des assiettes et/ou des variomètres excessifs lorsqu'elle est réalisée dans des conditions opérationnelles marginales. De plus, imposant en général le maintien d'une vitesse élevée pendant l'approche, il est nécessaire de s'assurer de la capacité de l'avion à décélérer par la suite (en fonction de sa masse du jour, de l'altitude lors de la manœuvre...) afin de permettre la stabilisation de l'approche avant le plancher fixé par la compagnie.</p> <p>Dans certains cas, les interceptions de glide peuvent donc conduire à des risques de collision avec le sol sans perte de contrôle, perte de contrôle en vol, sortie de piste...</p> <p>Par ailleurs, les limites d'emploi des systèmes automatiques ne permettent pas toujours d'intercepter un glide d'ILS par le dessus. Le succès d'un rattrapage de glide par le haut est donc fortement dépendant des capacités des automatismes des avions à réaliser cette manœuvre. Pour assurer une fiabilité optimale, certains constructeurs préconisent une procédure adaptée à leurs avions dont il ne faut pas s'écarter.</p> <p>Enfin, les limites dues à la physiologie du faisceau ILS doivent être prises en compte : l'existence d'un lobe secondaire possédant une pente double de la pente nominale peut être à l'origine d'incidents graves. Totalement invisible lors d'une interception classique par le dessous, ce faux glide peut soudain se matérialiser lorsque l'interception est débutée depuis une position très au dessus du plan.</p> <p>Un moyen de se protéger efficacement contre les risques liés à ce type d'approches consiste donc à fixer des limites (par exemple en termes de taux de descente ou d'écart par rapport au plan) au-delà desquelles l'approche devra nécessairement être interrompue. Dans ce cadre, le PNF/PM tient un rôle plus que jamais primordial de surveillance des paramètres et de détection des écarts dans la trajectoire de rattrapage de plan prévue.</p> <p>De plus, chaque compagnie souhaitant autoriser ce type d'interception pourra identifier sur son réseau les aéroports sur lesquels les approches de ce type sont le plus souvent rencontrées afin que ses pilotes y soient sensibilisés et qu'ils puissent en tenir compte lors de leur briefing arrivée.</p>

→ « 180 kts, 8 NM »

→ Glide interception from above

<http://www.developpement-durable.gouv.fr/Info-securite-DGAC.html>

Raising Awareness – Eurocontrol initiatives

European Action Plan for the Prevention of Runway Excursions

Edition 1.0



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HindSight17

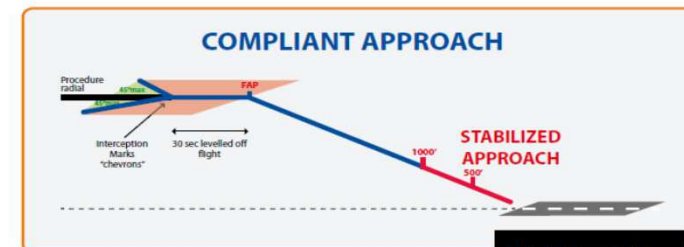
The ability or opportunity to understand and judge an event or experience after it has occurred



Defining a Compliant Approach (CA): A joint response to enhance the safety level of approach and landing

by André Vernay

The chances of a stabilised approach are improved if we look to the intermediate and final leg intercepting conditions and make sure that they support the outcome we are looking for where the aircraft passes successfully through the stabilised approach gate(s) late in the final approach.



According to clear international standards, recommendations and guidance such as ICAO Doc 4444, guidelines for RNAV approaches, ATM and Aircraft Operator SOPs, the ideal approach is fully defined. But experience shows that variations often appear due to pressure on crews' and air traffic controllers' or optimisation objectives.

The intermediate leg of an approach should prepare the aircraft for the stabilised final approach. It also offers the opportunity to prepare the aircraft in good time for the defined stabilisation gate(s) which seem to sometimes be treated like the "last chance" for a crew to configure their aircraft with very little time available to react in any unexpected situation.

Managing day to day variation in a whole system can appear difficult with the differing responsibilities of air traffic controllers, manufacturers or operators. The solution is to define what we term a **Compliant Approach (CA)**. This depicts a shared safety objective which requires that the corresponding gaps with ICAO safety provisions are better handled.

A **Compliant Approach (CA)** requires (from the **GREEN** sector in the diagram):

- A closing track to final approach of $< 45^\circ$ (or $< 30^\circ$ on parallel active approaches)
- AND a level leg once established on the FAP of at least 30 seconds (or 2nm for GNSS approaches)
- AND glideslope interception from below
- AND the required airspeed until the FAP shall permit the aircraft configuration

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Lessons learned

❑ Need for a risk portfolio at national level

- A tool to help setting priorities for the Authority Safety actions
- Experience shows that it attracts attention even more than the content of the strategic action plan (external as well as internal Authority)
- It should not be taken as “the” reference by the SMS of an operator
It may help the operator to set up its own risk portfolio amongst other data

❑ Traps to avoid :

- Forgetting that the portfolio is the result of expert judgement based on information available
- Overlooking feasibility or resources issues while setting actions according to each risk of the portfolio
- Acting on a given item of the risk portfolio may have negative side effects on another risk due to the constraints of the system.