

NCA

Non Compliant Approach

The big « C »
for
Compliance



André VERNAY
Human risks programme manager



Direction générale de l'Aviation Civile

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

NCA Definition

An IFR approach for which the intermediate and final approach legs joining conditions do not comply with the prescription of the operational documentation.



Fatal accidents and severe incidents Involving NCA

- | | |
|--|----------------|
| ➤ Fatal accident B738 Schiphol | February 2009 |
| ➤ Severe incident B737 Air Europa Express | November 2006 |
| ➤ Severe incident MD-83 Luxor Air Nantes | March 2004 |
| ➤ Fatal accident CRL 100 Brest | June 2003 |
| ➤ Fatal accident FK27 Luxair, ELLX | November 2002 |
| ➤ Severe incident MD83 Paris Orly | November 1997 |
| ➤ Severe incident A310 TAROM Paris Orly | September 1994 |
| ➤ Fatal accident Dash 8 Paris CDG | January 1993 |
| ➤ Fatal accident A320 Mont Saint Odile | January 1992 |
| ➤ Fatal accident EMB120 Bordeaux (Eysines) | December 1987 |



Non Compliance from what ?

The international rules, statements...
already perfectly define
the approach and final compliancy



DOC 4444 PANS/ATM

- § 4.6.3 “Only minor changes in speed, **not exceeding 20 kts IAS** should be applied to the aircraft on intermediate or final approach”.
- § 8.9.3.6 « intercept angle with the final approach track of **45 degrees or less** ».

« Rendering of heading instructions by air traffic control **stop** at the moment **the aircraft leaves the last assigned heading to start the final approach** ».



FOBN Reference : FLT_OPS - GEN - SEQ 02 - REV 01 - OCT. 2007



Final approach:

- Ensure that the aircraft is established in landing configuration at V_{APP} prior to the FAF;



AMC 20-27 Effective: 23/12/2009

Annex III to ED Decision 2009/019/R of 16/12/2009

AMC 20-27 Airworthiness Approval and Operational Criteria for RNP APPROACH (RNP APCH) Operations Including APV BARO-VNAV Operations



OPS guide for RNAV approaches (GNSS) LNAV, LNAV/VNAV and LPV

http://www.developpement-durable.gouv.fr/IMG/pdf/ST-GuideO1-PBN-RNAV_GNSS_.pdf

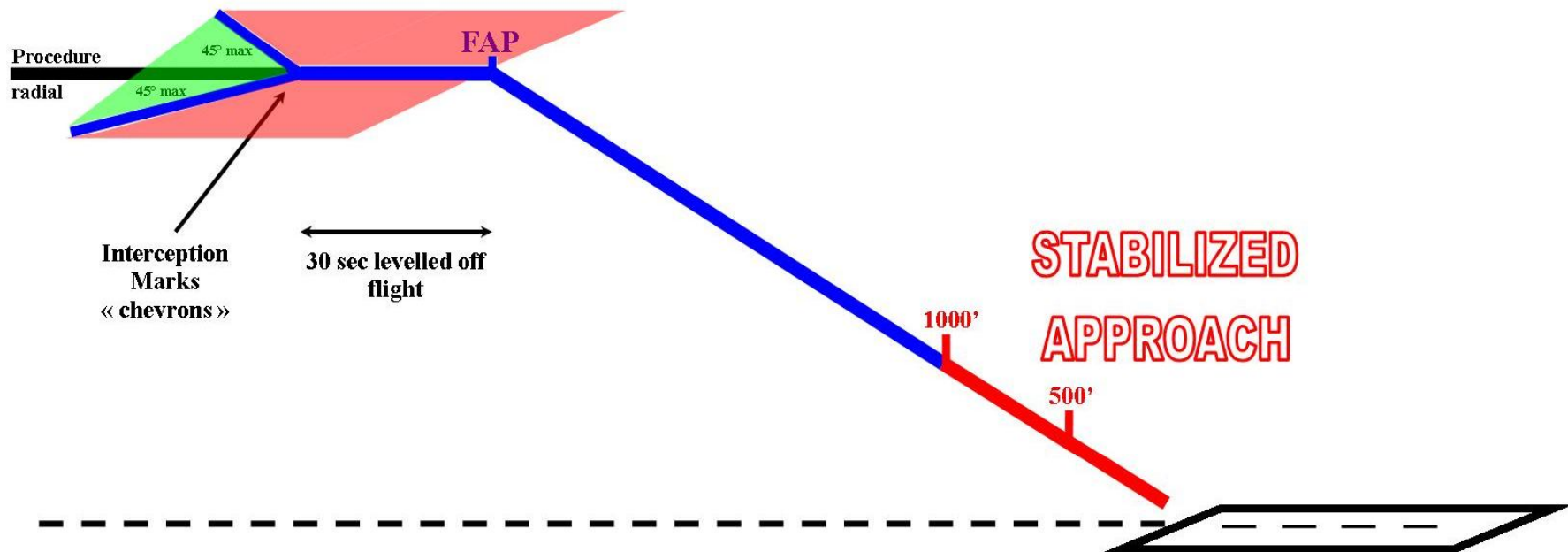
Radar vectoring :

- Guidance leading to a final axis of the interception within 2Nm upstream of FAF **should not be accepted.**
- Clearances "Direct To" to the FAF **should not be accepted.**
- Clearances "Direct To" towards a waypoint outside the procedure **should not be accepted.**

RCA III Chapter 10 Radar use

https://www.sia.aviation-civile.gouv.fr/dossier/texteregle/RCA3_291208.pdf

NON COMPLIANT APPROACH



NCA occurs (outside the green sector) if:
interception angle $> 45^\circ$ (or $> 30^\circ$ on parallel active approaches)
and/or intermediate leg < 30 seconds (2Nm for GNSS App) before FAP
and/or glide interception from above
and/or with a non adapted speed (> 180 kts at FAP)

In some fair words:

ATC controllers : responsible to guide the aircraft
to the final approach track

and

Crews : responsible for final APP execution

But

Any significant upset should tend
to questioning for both

« At anytime, the crew can refuse or abandon an
approach for safety reasons and perform a go-around »



ECCAIRS (reports data base) survey

- A 14 month research period
- Glide from above interception
- Focused on a major airport

Only 45 occurrences confirmed by the narratives

-> Lack of reporting explained by

- a weak appreciation of danger
- when trajectory catch up success
→ actors daily slow acceptance



A live survey invalidating the low ECCAIRS score

- 1 major airport
- Recording period : 1 month (June 2010),
2h30 duration per day
- Results individually checked and verified by ELVIRA software

Approaches:

**30 % with glide from above interceptions
(nearly 500 occurrences)**



Non Compliant approaches, precursors of incidents ?

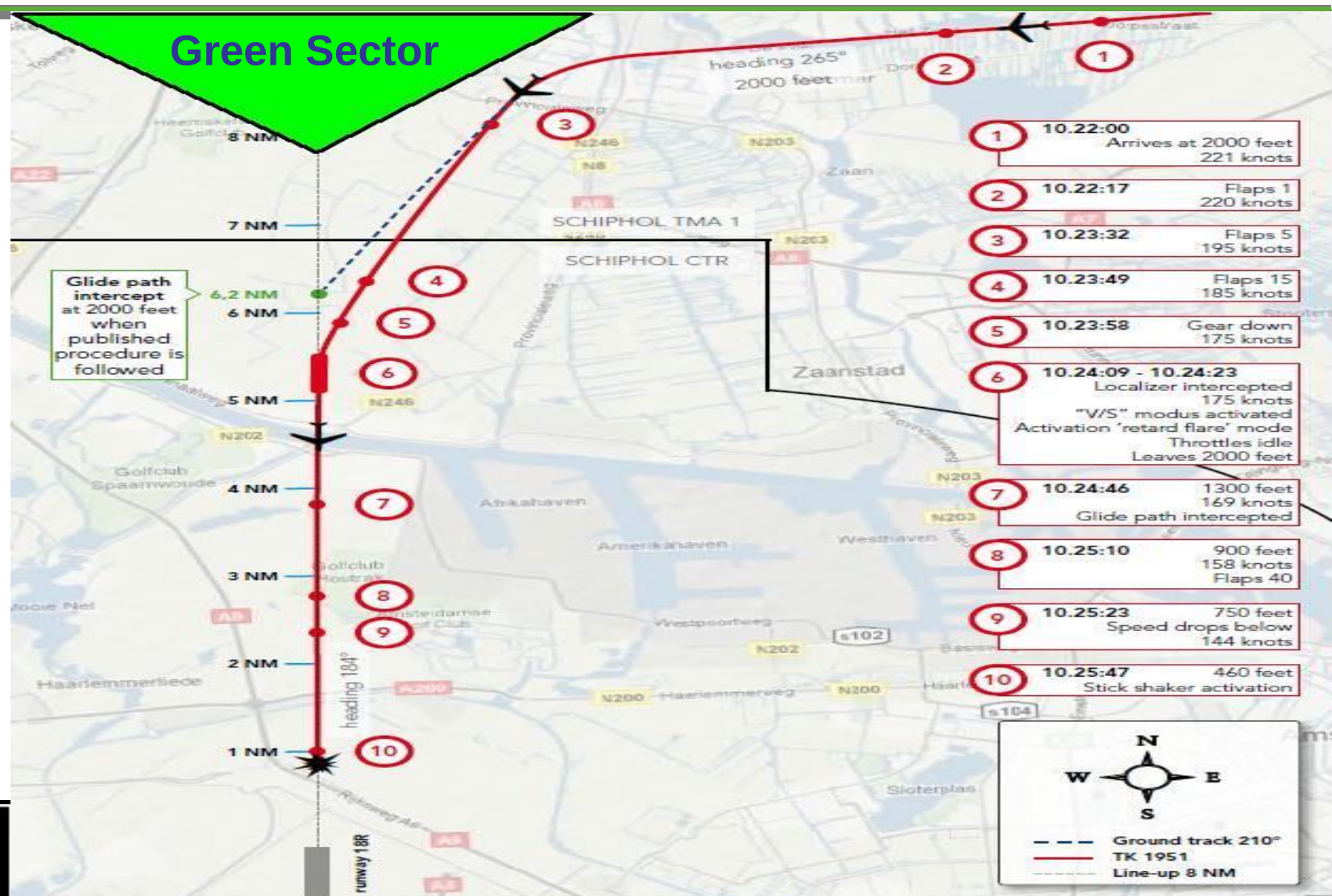
Our team analysis pointed that
YES
and not only for severe incidents
but also for fatal accidents.



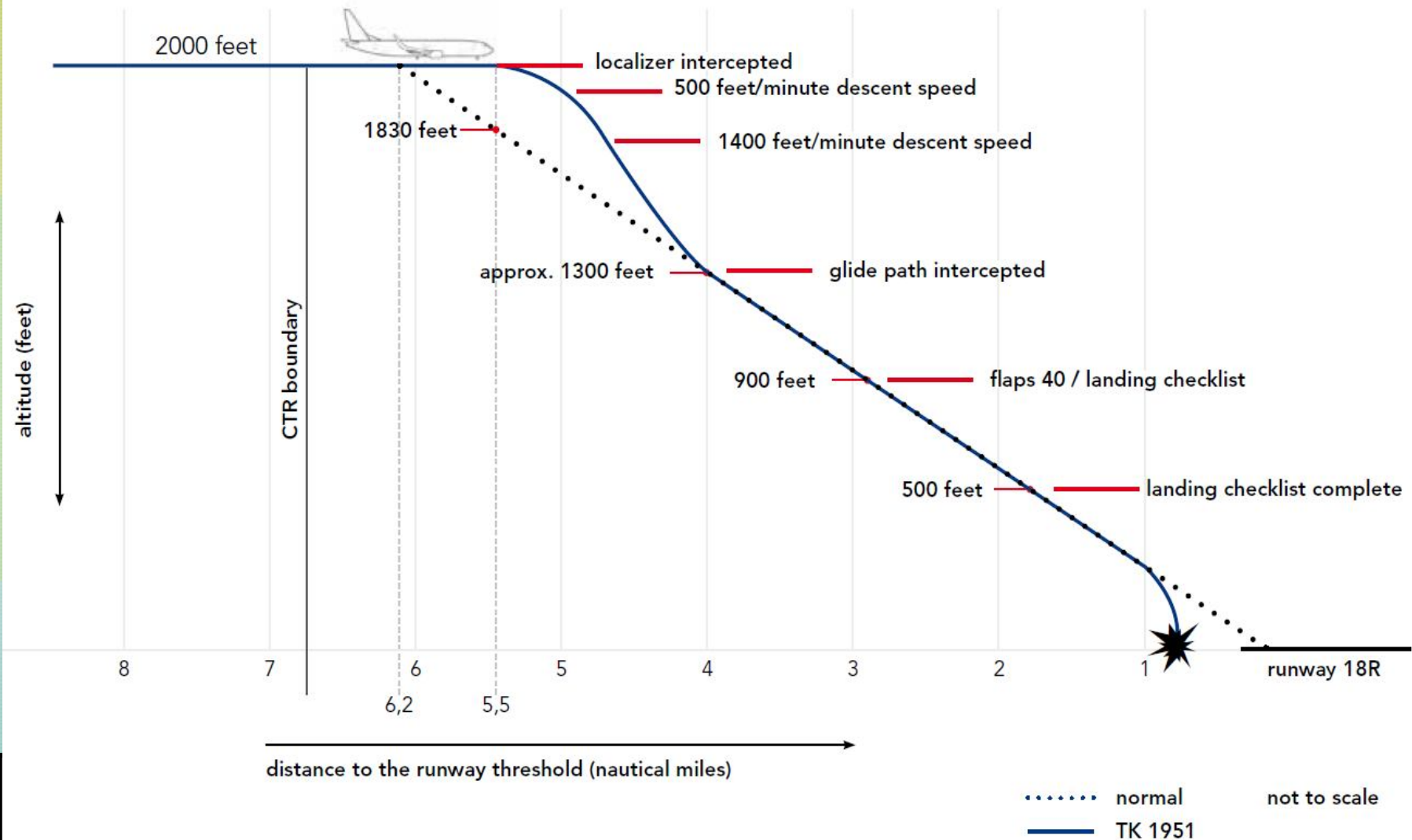
Crash B738 Schiphol 25th February 2009



Crash B738 Schiphol 25th February 2009

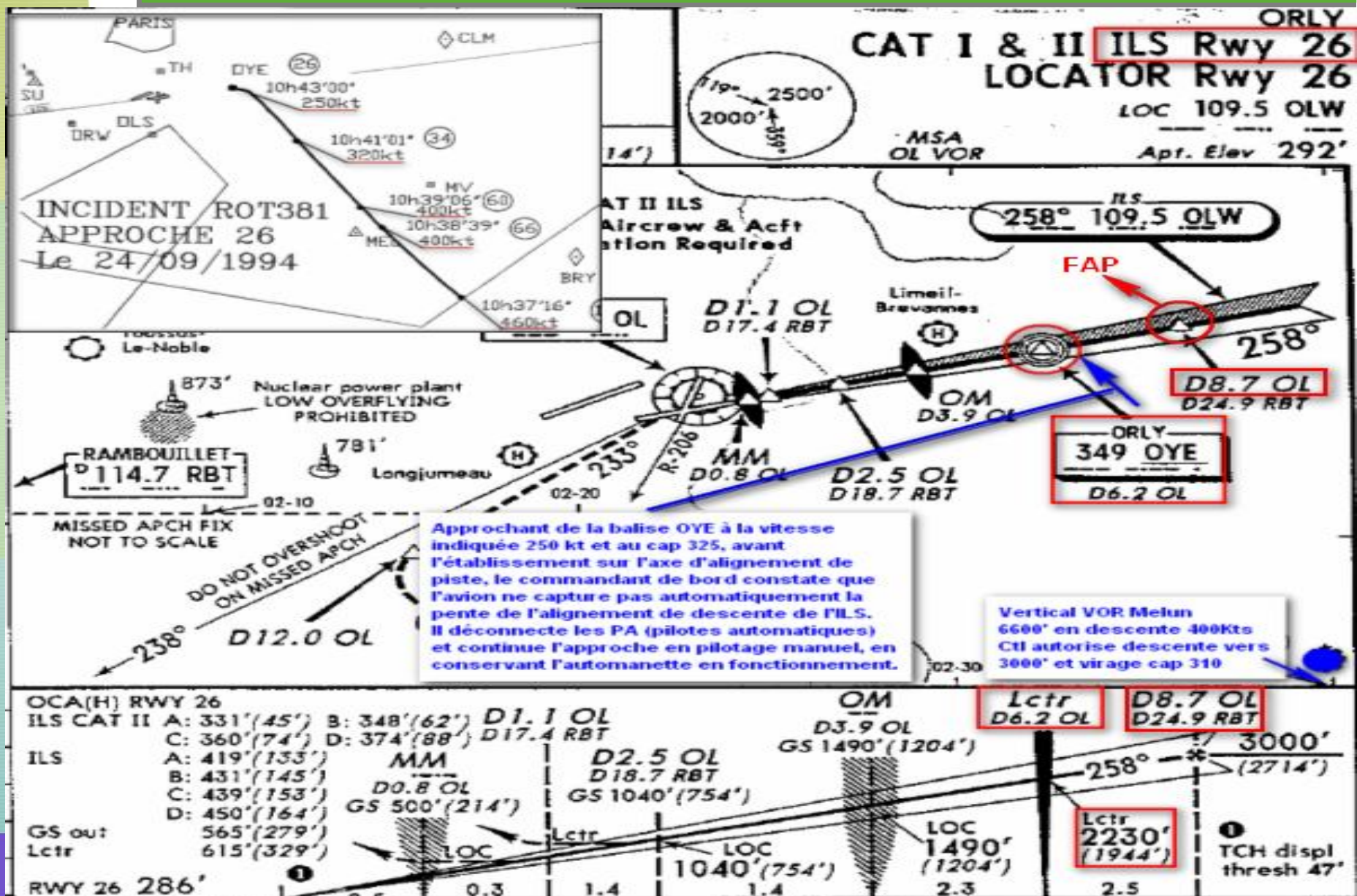


Crash B738 Schiphol 25th February 2009



- The aircraft's navigation equipment has been designed and optimised for an approach and **interception from below and not from above**.
 - Turn-in manoeuvre between 5 and 8 NM at Schiphol airport occurs in **more than 50%** of all for runway 18R approaches.
- 
- Crews are not asked whether they **can or wish to accept** such vectoring.
 - **No feedback mentioned** that this ops mode led to a higher risk.
 - In addition, pilots sometime ask for **a short line up**.
 - As a **result of intercepting the glide slope signal from above**, the incorrect operation of the auto throttle was **obscured** for the crew
 - Completing the landing checklist, **no pilot monitored the flight path and aircraft speed**.

A310 TAROM at LFPO 24th September 1994



10:44:09 UTC



10:44:14 UTC



10:44:24 UTC



10:44:30 UTC



10:44:35 UTC



10:44:40 UTC



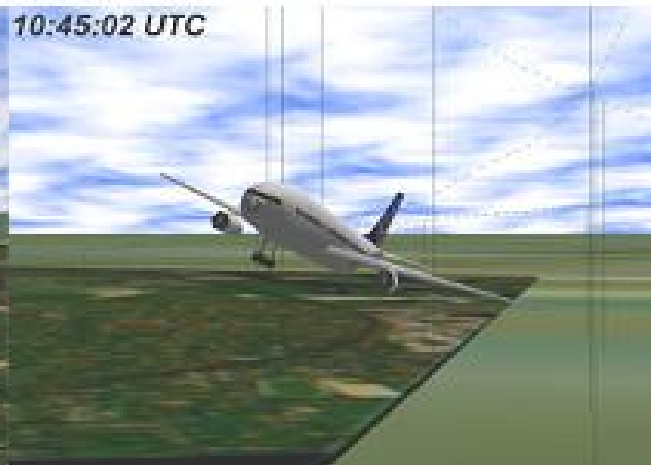
10:44:48 UTC



10:44:49 UTC



10:45:02 UTC



Causes

- Hard vectoring (400 kts, - 4000 ft/mn) previous to FAP
- Wrong « ALT » select. in APP: climb mode consequences
- Instinctive upward and downward trim actions:
pitch from + 50 ° to - 32 ° in 7 s
bank 75 °
- Hurry up use of sticks: lowest recorded speed 35kts

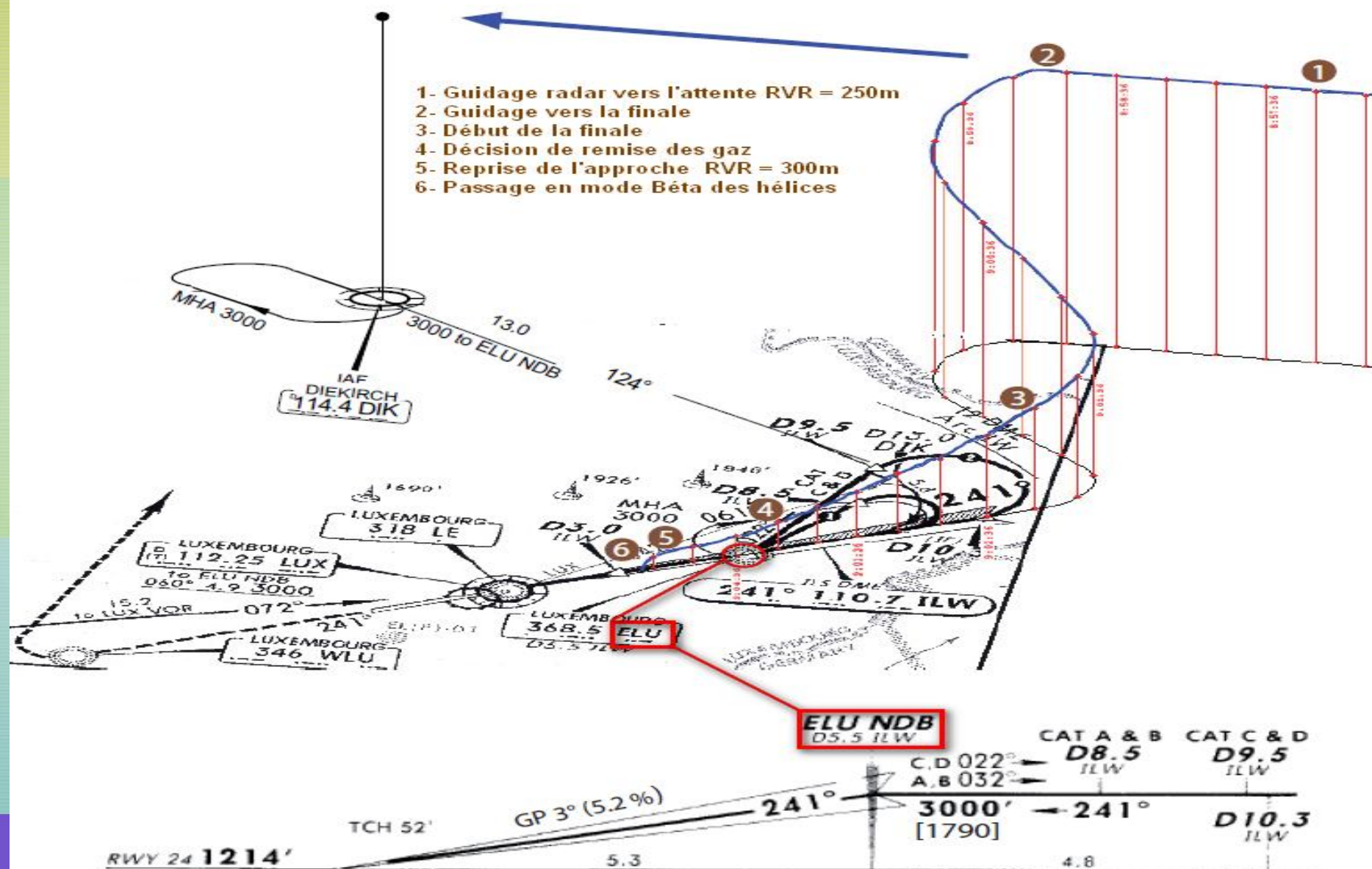
Other factors

- Plan of action change: from an auto approach to a partial disconnection (auto throttle reversion mode)
- Very late renunciation creating upset recoveries

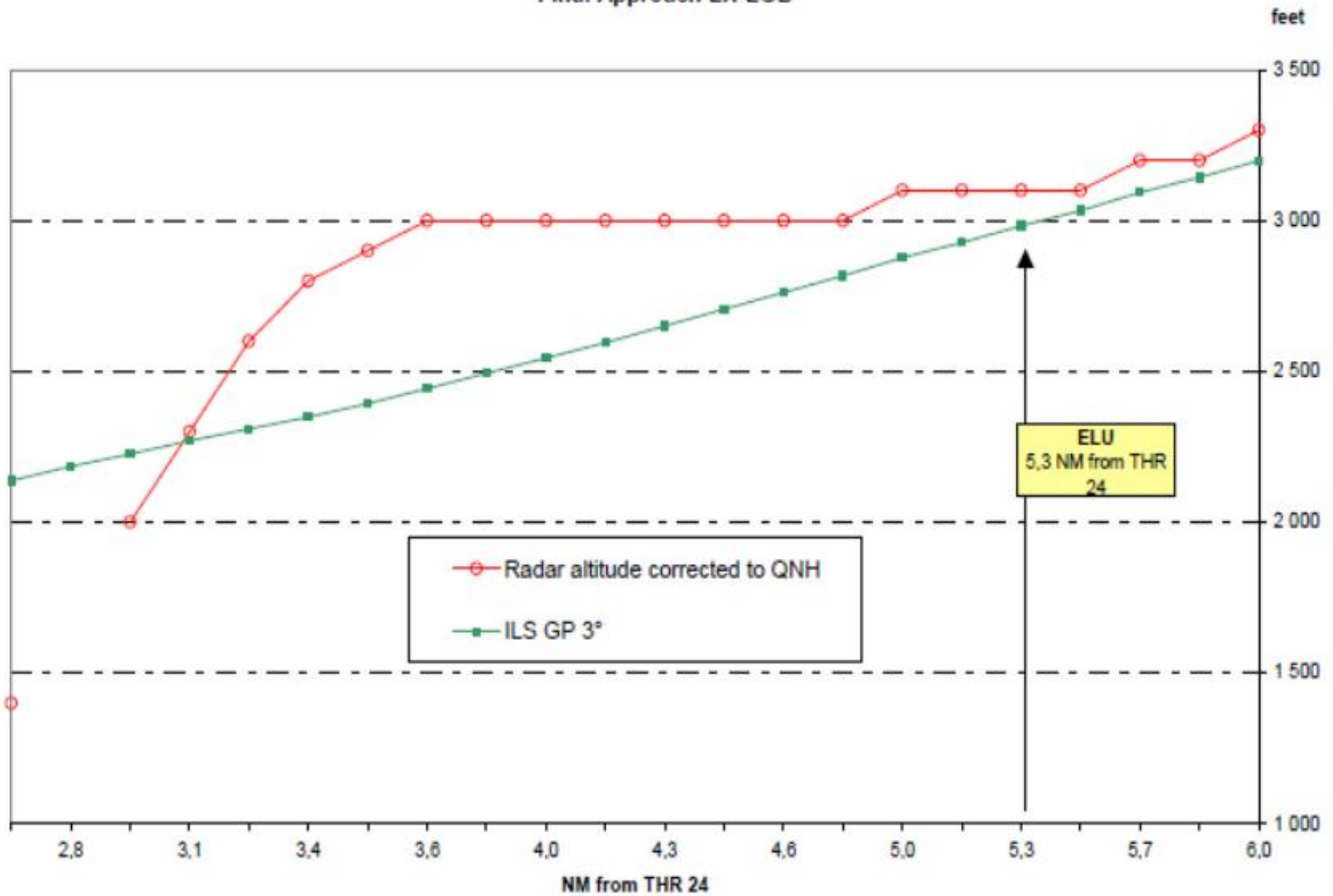
Fokker 27 Luxair at ELLX 6 th November 2002



Fokker 27 Luxair at ELLX 6 th November 2002



Final Approach LX-LGB



Causes

- ATC cooperative goal (primary)
- Glide interception from above with no adapted procedure
- Strong loss of speed and altitude
- Propellers position to « beta » after a « personal retrieving solution » (+ technical problem)
- Change of mind after key decision point (RVR, HdG, above glide...)

Other factors

- Plan of action change (GA planned) and lack of preparation : planned holding pattern process changed to procedure vectoring
- Weather conditions below crew minimas + late improvement
- Aircraft and crew disorganised for landing

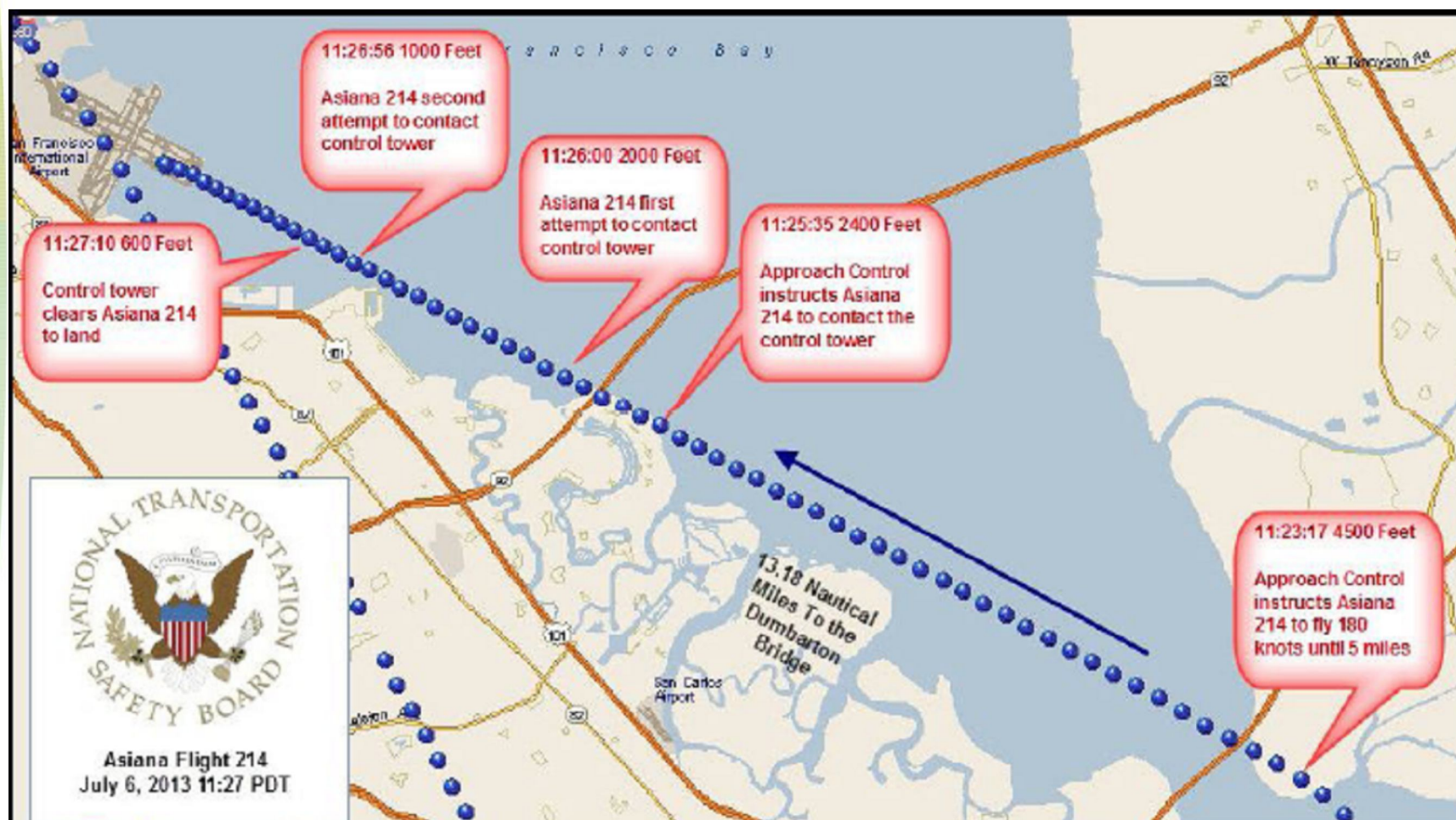
Asiana 214

San Francisco

July 2013



<http://www.nts.gov/investigations/2013/asiana214/asiana214.html>



Is it enough or important enough ?

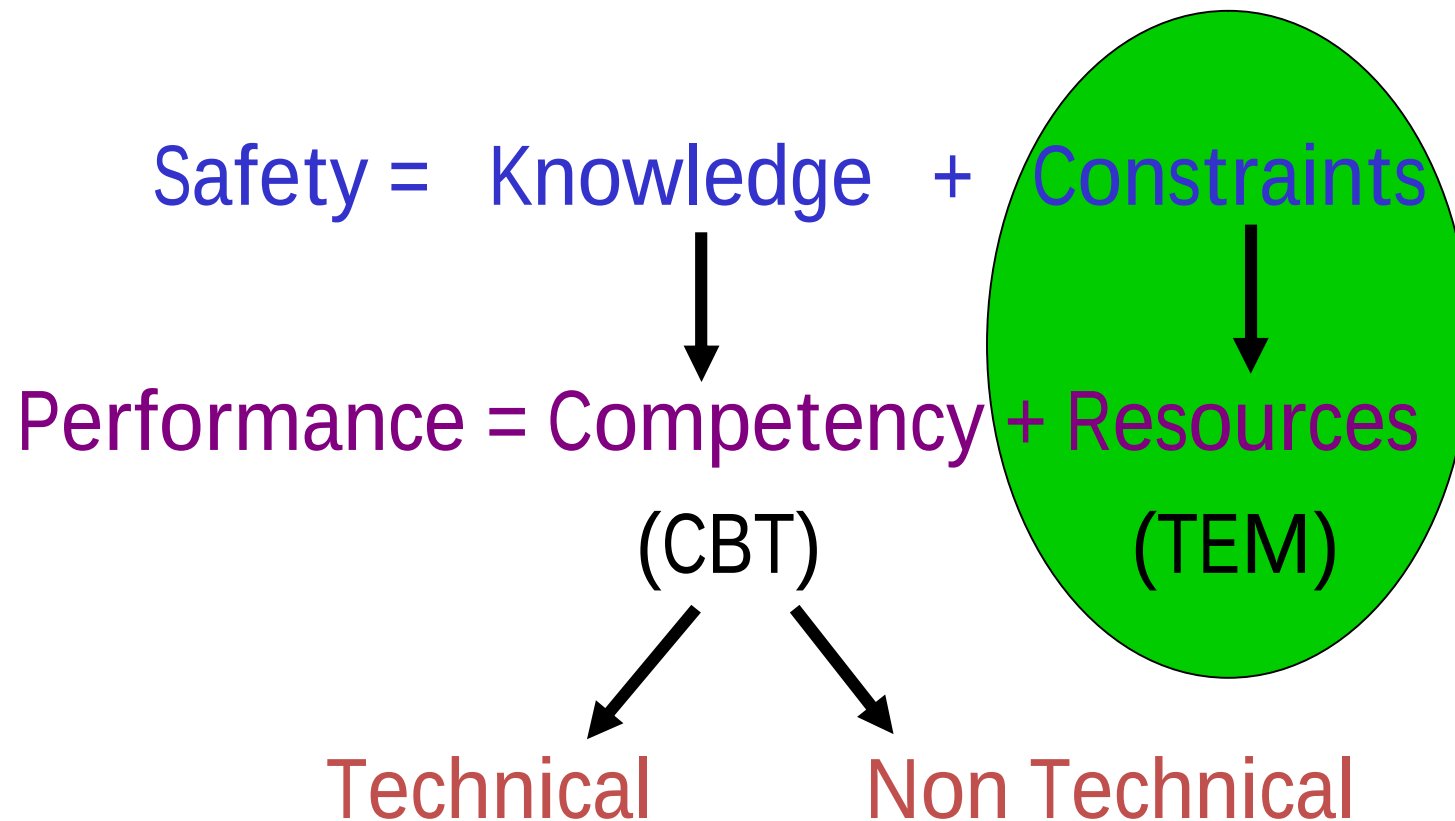
For us, it is time to cooperate
and
communicate on this major costless point.



Why is it worth ?

- Procedures are safely built but **Hazards exist**. 
- Inboard systems are **well designed** to intercept safely.
- A great cooperative objective: **landing safely**.
- Procedure application contains the **safety nets**.
- Compliance with the interception **and** the execution.
- Difference between **an** action expected and **the** reality.
- Bad use of the « **optimisation** » term (short cut...)
- Focused tasks often **occult** action priorities.
- Simultaneous actions hamper the full tasks execution

Availability and Renunciation capability



Goals and objectives

- Increase the **Crew + ATC Availability** and awareness to face weak incidents or inputs
- **Follow up attitude** (s.a): « **Call back when G/S established** » or « **Manoeuvring suggestion** »
- SMS: **Feedback** process and **experiences** shared
- **Collaborative** attitude or **assistance** proposal
- Glide from above interception as an **international awareness**

Stabilisation points alone are no more sufficient to prevent :

- Hard landings
- Bad quality of Going Around procedures



French SSP risk portfolio

Nb	Undesirable event identification	CF IT	LO C-I	Mid- air collis ion	Grou nd collisi on	R W Y- EX C	Dama ge/ injury in flight	Dama ge/ injury on the groun d
EI2 .1	Unstabilised or Non Compliant Approach	X	X			X		X

Promotion into symposium and meetings

ANC markers positioned for ATC



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Flight path deviations during final approach

PILOTS

ATC can be an extra aid to safety if you deviate from the flight path.

Request assistance from ATC if you are in any doubt at all.

CONTROLLERS

When you observe flight path deviations, you must react and even suggest a Go Around.

Given the stress levels that this type of event can create, evaluating such situations should be covered by special training in order to ensure consistent reactions.

N.B. : In several accidents and incidents in France investigated by the BEA, the controller saw what was happening and could have made a more appropriate response.
(It may be necessary to give controllers appropriate information).

Incident involving a MD 83 at Nantes in 2004:
<http://www.bea-fr.org/docspa/2004/su-f040321/pdf/su-f040321.pdf>

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Best practices guidance material

<http://www.developpement-durable.gouv.fr/IMG/pdf/GUIDEBPDBLEGB.pdf>



André VERNAY

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

Direction générale de l'Aviation Civile

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CSCA

(independant ATC safety commitee)

- Gathering controllers, pilots, rulemakers and transport inspectors
- Recommendations:
 - Creation of an ANC counting and classification tool
 - Integration into the pilots and ATC « in-service » training sessions
 - Promotion and integration of the **ANC markers** into the ATC procedure manuals



European Action Plan for the Prevention of Runway Excursions

Edition 1.0



REF	RECOMMENDATION	OWNER	IMPLEMENTATION DATE	GUIDANCE
3.3.1	Ensure the importance of a stabilised approach and compliance with final approach procedures is included in training and briefing for air traffic control staff.	Air Navigation Service Provider	02 January 2014	APPENDIX C
3.4.7	GENERAL The aircraft operator should ensure the importance of a stabilised approach and compliance with final approach procedures is included in briefing for flight crews. The commander should not accept requests from ATC to perform non-standard manoeuvres when they are conflicting with the safety of the flight.	Aircraft Operator	Immediate	APPENDIX E



André VERNAY

Direction générale de l'Aviation Civile

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Endorsement and publication

- Eurocontrol to develop and promote the CAs

HindSight17

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



Safety versus Cost

Production and safety are not opposites

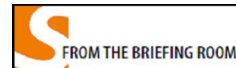
by Professor Sidney Dekker

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

Cash is hot and safety is not
by Captain Rob van Eekeren



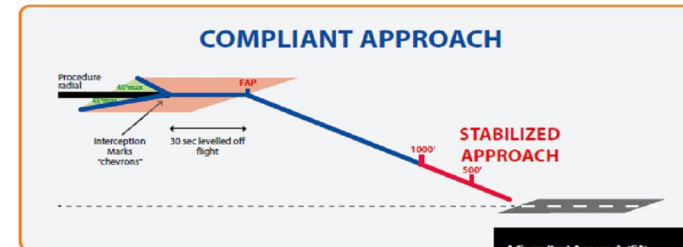
Summer 2013



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 FAT 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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Operators implementation

- 3 french operators train their crews to CA management

Approche non conforme > Enseignements

AIRFRANCE

Changement tardif (2/2)

Se ménager une phase de préparation en palier avant la descente finale



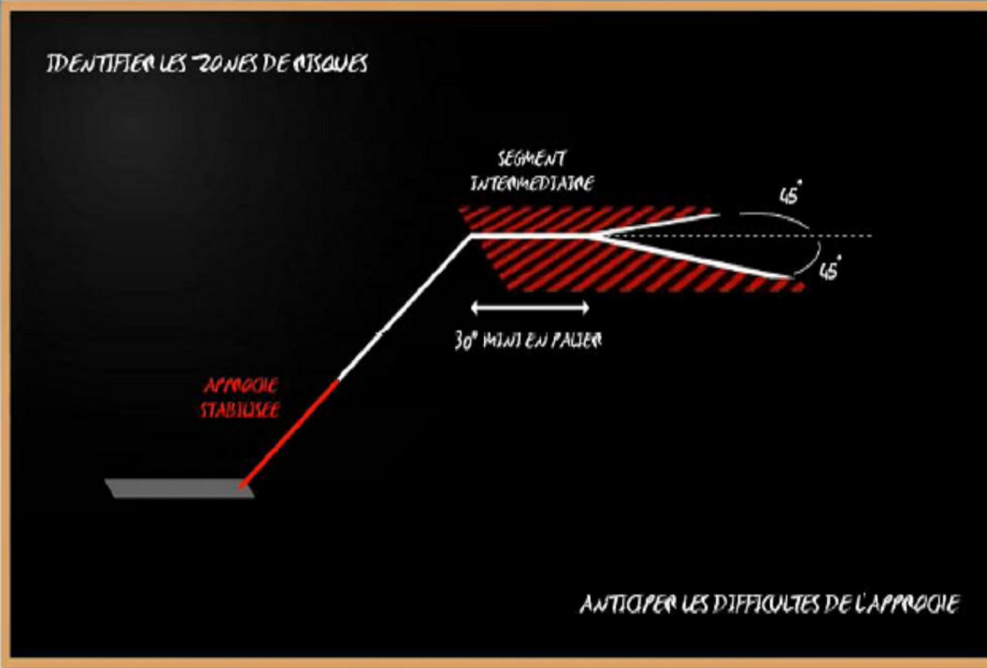
PRESSION
TRAJECTOIRE
AUTOMATISMES?
PROJECTION
SECURITE DES VOLS



Approche non conforme > Conclusion

AIRFRANCE

IDENTIFIER LES ZONES DE RISQUES



SEGMENT INTERMEDIAIRE
45°
45°
30° MONT EN PALIER
APPROCHE STABILISEE
ANTICIPER LES DIFFICULTES DE L'APPROCHE



Thanks for your attention



«Learn from the gaps done by all the others !
Because
you will never live long enough to make them all...»



Sam Levenson

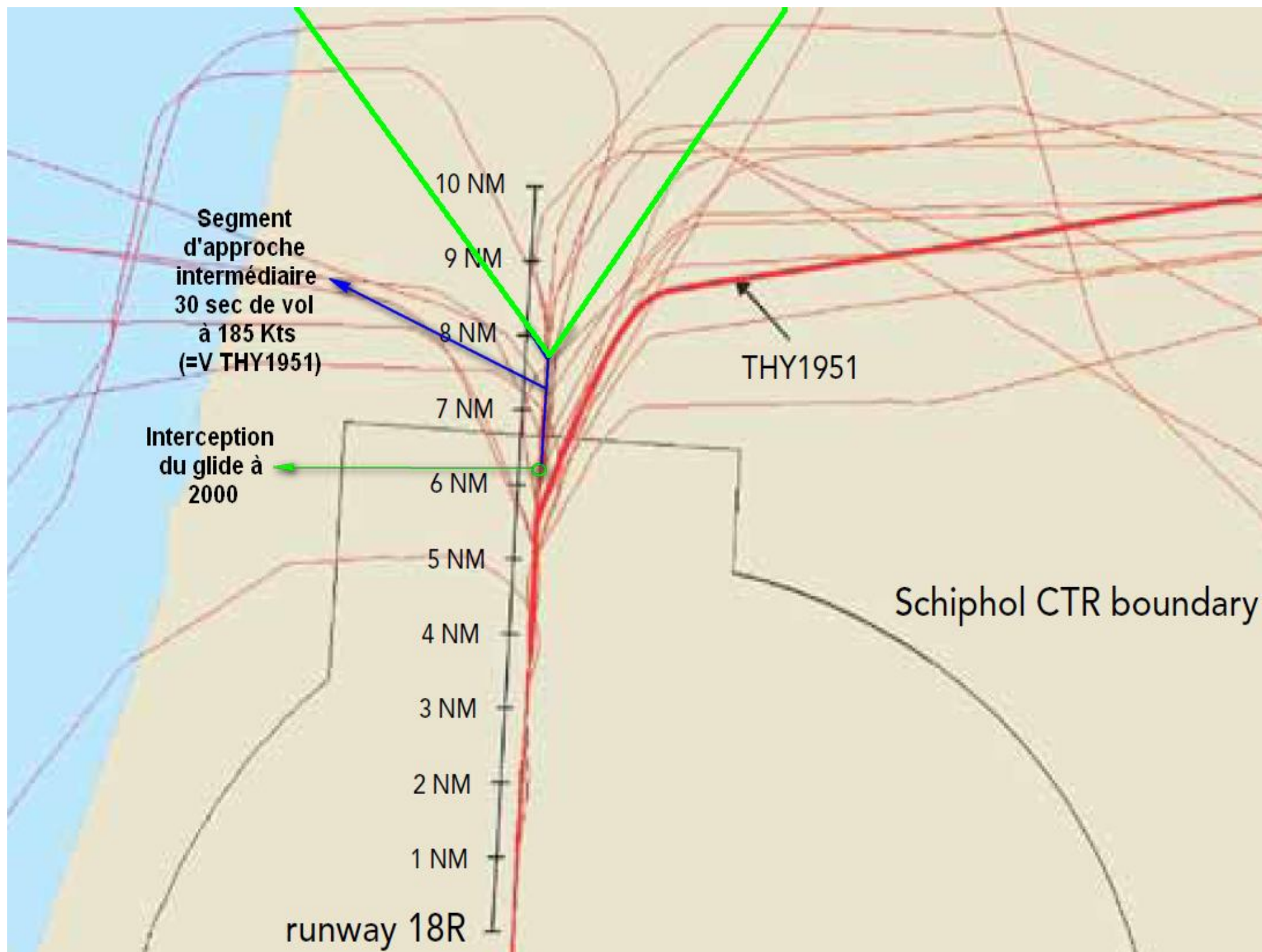


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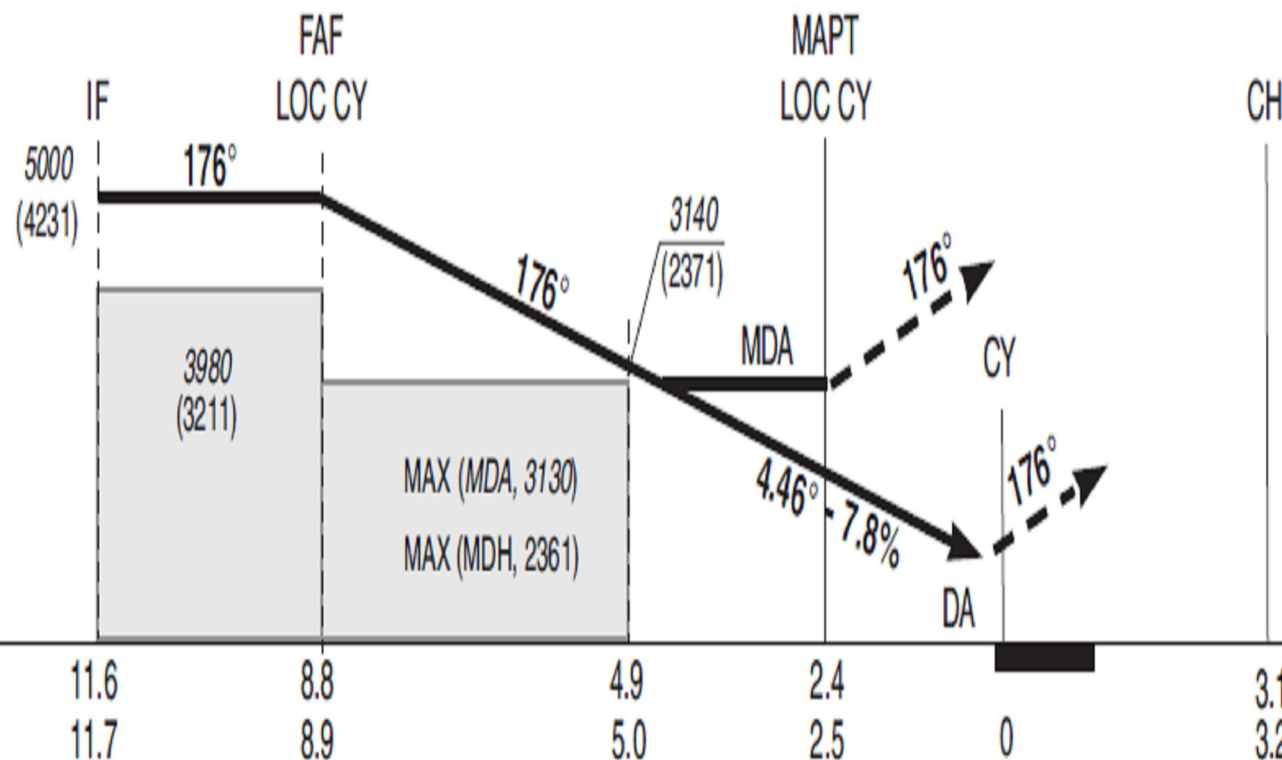
André VERNAY

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MFO versus OCA/H

Missed APCH : Climb straight ahead.
At CH, make a climbing conventional turn 80°/260° (left initial turn, 20° bank turn, IAS MAX 160 kt) to join CH. Then climb on QDR 356° CH to receive LOC CY and proceed following back course LOC climbing up to 6500 (5731). At 6500 (5731), join VOR/DME CBY then REVPA in order to enter VIRIE holding. Acceleration segment not calculated.



→ DTHR (NM)

→ DME CY (NM)

MNM AD : Voir au verso / See overleaf

REF HGT : ALT DTHR

DME CY

NM	8	7	6	5	4	3
ALT	4561	4087	3613	3139	2665	2191
(HGT)	(3792)	(3318)	(2844)	(2370)	(1896)	(1422)

WL ARRIVEES

