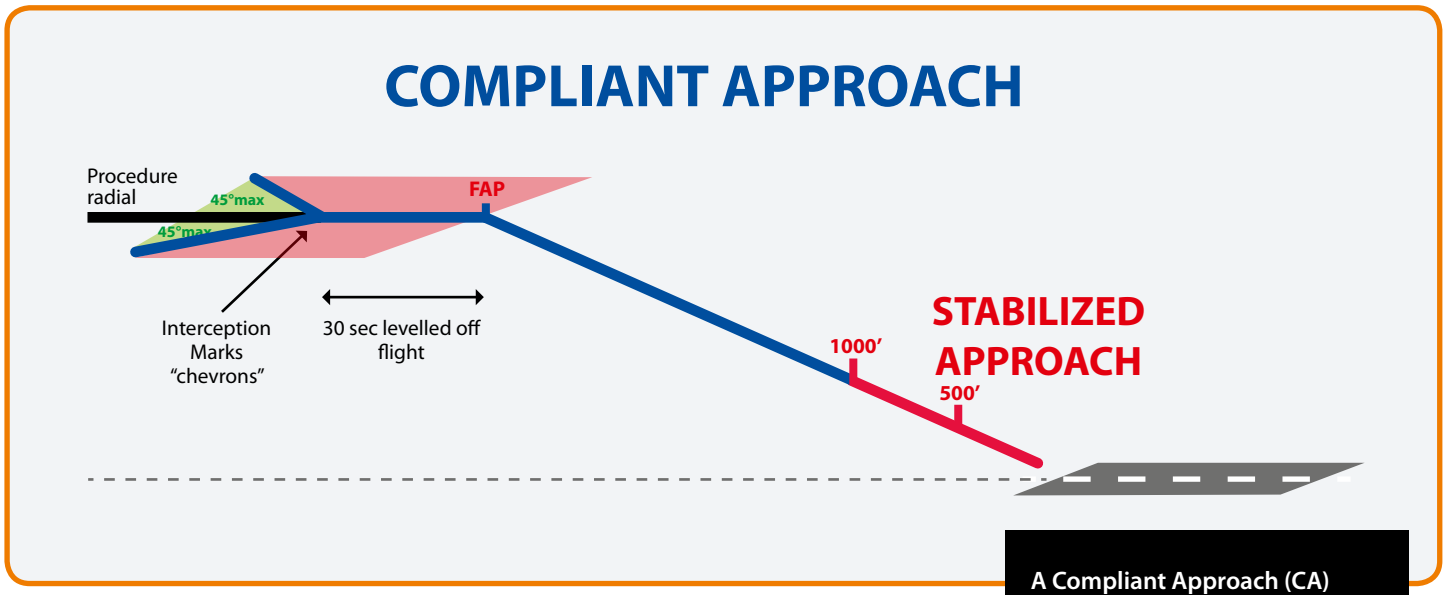
Defining a Compliant Approach (CA): A joint response to enhance the safety level of approach and landing

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° (or <30° on parallel active approaches)**
- **AND a level leg once established on the FAT of at least 30 seconds (or 2nm for GNSS approaches)**
- **AND glidepath interception from below**
- **AND the required airspeed until the FAP shall permit the aircraft configuration**

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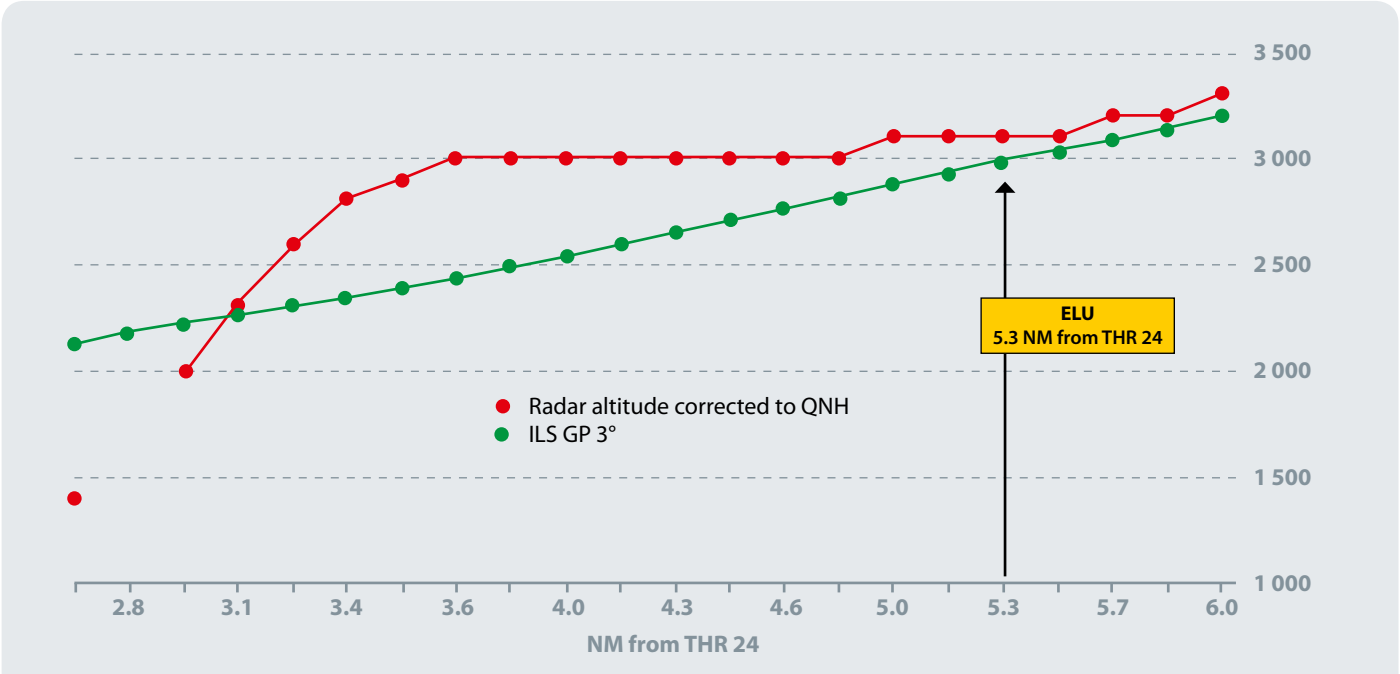
After a 20 year career as pilot, human factors specialist and investigator in charge in the Air Force, André joined the French DGAC to take charge of the interaction between aviation actors and systems in order to work on safety and security improvements and communication. A Paris Descartes University graduate, he is involved in developing the French SSP, safety reports analysis and monitoring SMS implementation. A Member of European working groups such as EARPG, ECAST, EHFAG, he participates in the ACARE work on the EC SRIA policy.

A Non CA may occur when aircraft is vectored or not, during instrument or visual approach and can be detected either by crew or ATC with the help of surveillance.

A CA will increase the chances of successful negotiation of the subsequent stabilised approach gate(s) and so reduce the chances of Runway Excursions (RE) and Controlled Flight into Terrain (CFIT). There is also a link between a CA and reducing Airborne Loss of Control (LOC-I) events. Non-CA has been involved as a precursor and contributor into at least five fatal accidents and four major incidents within the last 25 years in and near to France. This experience strongly supports the importance of prescriptively managing the whole of the approach, not just the last 1000 feet.

A focus over five scenarios picked up from this activity is described in our study. The investigated accidents highlight the strong influence of the lack of a CA and a live traffic survey at a major French airport (also mentioned in our study) also provides confirmation of this, as does a consultation of the ECCAIRS occurrence report database. An example of an approach which did not have a CA – and was therefore very likely to end up being an unstabilised approach as the safety nets fell away – is shown in the box:



The visibility for landing is initially below minima but when a sudden improvement is notified, the crews are tempted to change their mind. Their plan quickly changes from going around to continuing with the approach but an attempt to intercept the glidepath from above involves a big reduction in both speed and altitude to reach the threshold. This culminates in the prohibited use of reverse propeller pitch in the air to create this rapid descent. There is a complete change from a well planned and organised approach to a complete mess in less than a minute. In fact, in telling the crew about the weather improvement, the air traffic controller had intended to provide some useful information to help the crew but instead it provided an incentive for them by feeding a non renunciation of the approach and a way back to the holding pattern.

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

This French DGAC research topic, directed at all Aircraft Operators and ATM, is the result of combined and sustained efforts of many people and is already added to the risk portfolio of our State Safety Program as a major focus for safety enhancement. This work also highlights the missed approaches and the quality of their execution.

Today more than ever, resources to implement any initiative, whether financial and human, are hard to find; So, central to our CA cost-neutral recommendations is that no new regulation is called for. Instead, we propose to rely on developing guidance material and explaining and translating the elements into better practices and operational appliance for commercial flights.

Whilst technology is not a big part of our solution, training in unfamiliar situations that can lead to better quality landings is important too. The French DGAC therefore undertook a three-year internal study focusing on the major points of safety improvement included in the recently published European Action Plan for the Prevention of Runway Excursions (EAPPRE, part 3, chapters 3.3 and 3.4). Furthermore, a major French operator has already added this topic to the pilots' annual skills course after working with our Civil Aviation Safety Directorate (DSAC) office and the airline Training Department.

There is an obvious need to reach a wide audience with the information contained in this team work. Each organisation involved in the conduct of instrument approaches is invited to review and prioritise the proposal for a defined and well applied CA.

Our vision is now to proceed from a single issue of CA to develop a new family of incident classification and treat each one similarly, for example in-flight loss of separation. Sometimes, when regular experience is translated into "common habits", it is linked to an optimistic feeling that a successful outcome is assured ignoring the real threat and operational stress that may exist (helped by Human factors management). The efforts to develop a common and coordinated response, to what we believe is an important emerging topic, have already begun with both Operators and ATC and national coordination with the French Air Navigation Service Provider – DSNA is the first positive step which is confirmed by the major increase of safety reports identified not meeting CA criteria.

Our common cooperative intention is to enhance approach and landing safety by advocating the implementation of the recommendations our analysis contains: we now count on more stakeholders (authorities, operators, air traffic controllers, manufacturers…) to implement the CA criteria and work closely with us on their adoption.

Nb	Undesirable event identification	CFIT	LOC-I	Mid-air collission	Ground collission	RWY-EXC	Damage/ injury in flight	Damage/ injury on the ground
EI2.1	Unstabilised or Non Compliant Approach	X	X			X		X

The risk portfolio in the French aviation state safety programme

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

Extracts from the EAPPRE Recommendations Summary