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SURVEILLANCE AUTHORITY

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DURABLES

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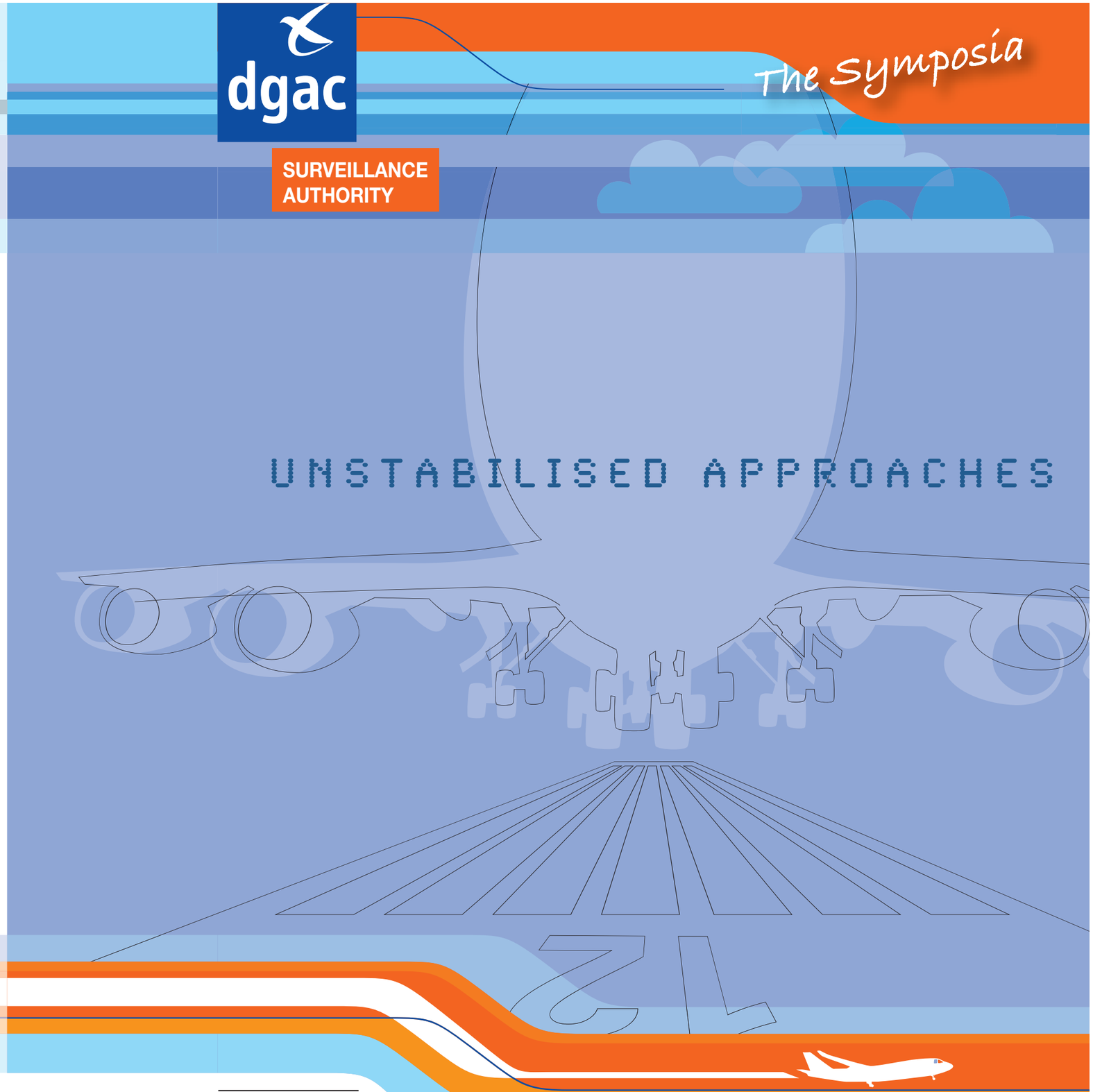
The Symposia

UNSTABILISED APPROACHES



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AIR FRANCE

SUMMARY

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INTRODUCTION

In light of a number of serious incidents and accidents that have occurred in France in the last few years, the Department of Safety Management decided to launch a review into the subject of **Unstabilised** Approaches. The risks associated with **Unstabilised** Approaches are mainly as follows:

- In poor meteorological conditions: CFIT
- In all situations, runway excursions or landing short of the runway.

The events which we will refer to here are principally:

- the serious incident involving a CRJ 100 on the 13th January 1998 at Montpellier Frejorgues;
- the 2nd July 1993 incident involving a B747-100 at Santo Domingo (Dominican Republic);
- the serious incident that occurred with an MD83 on the 21st March 2004 on approach to Nantes Atlantique airport;
- the accident that occurred on the 22nd June 2003 at Brest Guipavas with a Bombardier Canadair CL-600 2B19;
- the accident involving a Fokker 50 on the 6th November 2002 at Luxembourg;
- the ATR42 accident at Florence, 30th July 1997;
- the serious MD83 incident on the 23rd November 1997 at Orly.

More generally, it is well known that half of public transport accidents occur during the Approach and Landing phases. The majority of these accidents can be identified as being the direct or indirect consequence of an **Unstabilised** Approach, for which precursory factors can appear back in the initial approach.

The Department of Safety Management(1) (DSM) has launched an initiative with a number of partners to reduce the risks in this area:

- First of all, the DSM approached the airlines nationally with a qualitative (survey) and quantitative (Flight Data Monitoring) questionnaire, to establish a coherent basis for the studies. Twenty airlines replied in a detailed way, providing insight into a problem that was widely documented in the analysis of their FDM data.
- Then the BEA(2) was approached for its knowledge on accidents and incidents linked to **unstabilised** approaches which it had investigated, either directly or as the competent agency.
- Finally, since among the ways of making progress the interface between Air Crew and ATC had strongly come to the fore, the participation of the DSNA(3) was requested.

To understand the causes of the problem and to put forward ways of reducing the risks of **unstabilised** Approaches, a working party was formed from representatives from Air France, Corsair, the BEA, the DTI(4), the DAST(5), the DSNA and the Department of Safety Management (viz. Appendix 1). The originality of this working party was that it allowed the main operators and their respective surveillance authority to sit down at the same table to compare their points of view and find common solutions. After several meetings over a period of 18 months, the working party had produced the following results:

- An action plan by theme and desired outcomes for each area, aimed at preventing **unstabilised** approaches.
- Training reference sheets based on BEA investigations throwing light on the main scenarios and factors contributing to **unstabilised** approaches.
- A first draft of a “Good Practice Guide” for air traffic controllers and flight crews.

These three initiatives are intended to be complementary, linked and continually evolving; also the outcomes of the action plans will be a reference for the training sheets produced by the BEA. These sheets and the good practice guides will be updated and put up on the DGAC and/or BEA websites.

The symposium organised by the DSM on the 29th November 2006 was to present the results of this effort to the industry and obtain their feedback to finalise the actions the DGAC is taking in this area.

1 - Direction du Contrôle de la Sécurite (DCS) – Department of Safety Management, part of the DGAC.
2 - Bureau d'Enquêtes et d'Analyses – the French AAIB (Air Accident Investigation Board)
3 - Direction des Services de la Navigation Aérienne – French equivalent to NATS in the UK.
4 - Direction de la Technique et de l'Innovation – Technical and Innovation Department of the French NATS
5 - Direction des Affaires Stratégiques et Techniques – Strategic and Technical Affairs Department (part of the DGAC).

ANALYSIS OF INVESTIGATION INTO ACCIDENTS AND SERIOUS INCIDENTS FOLLOWING AN UNSTABILISED APPROACH

→ CARRY OUT AN ANALYSIS OF INVESTIGATION INTO ACCIDENTS AND SERIOUS INCIDENTS FOLLOWING AN UNSTABILISED APPROACH

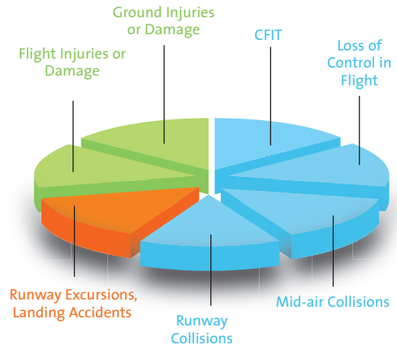
In order to assist the French airlines, the DSM launched a national survey to collect qualitative and quantitative data on **unstabilised** Approaches. One area considered was Flight Data Monitoring (FDM). Analysis of results from this showed that **unstabilised** approaches represent nationally on average 3% of approaches, with however, big differences between aircraft types. Best figures are approximately equal to 0.5%.

Nevertheless, globally (according to ICAO) as well as nationally (according to the BEA) public transport Controlled Flight into Terrain (CFIT) accidents represent about a third of fatal accidents and about 20% of runway excursions.

These figures are in line with those issued by the Flight Safety Foundation (FSF). The FSF state that a stabilised approach is about 60 times safer than an **unstabilised** approach.

CFIT on approach – which are overwhelmingly linked to an **unstabilised** approach – incur a very high risk of fatality as well as serious material damage. Runway excursions often incur serious damage to aircraft and are also sometimes catastrophic, for example:

- the accident at Irkutsk on the 9th July 2006, even though this did not follow an **unstabilised** approach;
- the accident involving a BAe 146 at Sord-Sørstokken on the 10th October 2006 in Norway.



- **CFIT**
- **Loss of Control in Flight**
- **Mid-air Collisions**
- **Runway Collisions**

→ Total Loss (hull/occupants)
→ Maximum Severity
→ Minimum Probability

- **Landing Accidents and all Runway Excursions**

→ Hull Loss Possible, victims rare
→ Lowest Severity
→ Highest Probability

Rather than produce a detailed report, it was decided to highlight the main **unstabilised** Approach scenarios and their associated risks in the form of training sheets, which would be easier to use than inquiry reports. The first sheets were produced by the BEA and presented to the symposium in November 2006.

It is proposed that these sheets will be completed as and when required and widely distributed via the BEA's Internet site.

The national action plan includes the following action:

"CARRY OUT AN ANALYSIS OF THE INVESTIGATION INTO ACCIDENTS AND SERIOUS INCIDENTS THAT FOLLOWED AN UNSTABILISED APPROACH"

GO AROUND (MISSED APPROACH)

→ STANDARDISATION OF POSITIVE CALLOUTS "STABILISED" OR "GO AROUND"

The missed approach culture has changed greatly over the last 30 years. The participants in the national working party determined that risk taking among professional pilots is disappearing. We must therefore continue to put out the message that an **unstabilised** approach is a risk and that carrying out a go around is always a good decision in case of an **unstabilised** approach.

Following an **unstabilised** approach, the following reasons are often put forward to justify the decision not to perform a go-around:

- Absence of perceived risk;
- Flight with an instructor;
- Putting it off till too late;
- Company culture;
- Incomplete approach plan (routine briefing, non-standard visual approach);
- Crew Resource Management;
- Perceived risk of going around being higher than continuing;
- Doubt/hesitation by ATC causing doubt with the flight crew;
- First time;
- Slots, commercial pressure or other factor creating a "hurry up" syndrome.

At a large number of airlines, we have determined that the callout in the Operations Manual is often, **on final approach:**

- **at or below** the minimum stabilisation height when it is obvious that the aircraft is not or no longer on the final approach path:

"... x feet, UNSTABILISED".

Unfortunately this callout seems to be ineffective when crew reports from **unstabilised** approaches are studied because it is both negative and apportions blame.

Among the (non exhaustive) factors which could explain the ineffectiveness of this callout, which should be made by the PNF (Pilot Not Flying) are the following:

- Excessive professional courtesy;
- Submissiveness or lack of self expression;
- Fatigue and mental lassitude;
- Denial of a situation that is not following the plan;
- Searching for reasons instead of anticipating the consequences;
- Mental rigidity by imagining (hoping) that "It will work", "It must work".
- Encountering a situation which could be worse on a missed approach;
- Excessive workload;
- Overload from tunnel vision, so unable to consider any solution other than landing;
- Strong authority of the Captain.

Short term memory in the case of an **unstabilised** callout is poorly used because it is to do with a situation and not an action. Human factors training teaches us that long term memory stores unlimited knowledge but that accessing it is sequential and slow, because of our resource limitations. In an action situation, the useful aspects of this memory must be pre-activated so they can be accessed quickly (the role of briefings). Memory primed by Flight Preparation or by briefings, called working memory, can be accessed in about 15 seconds. But in the majority of cases we work with an even smaller part of the memory, limited to "planned actions", with incidents linked to these planned actions to which we can respond extremely quickly (less than 2 seconds).

It must be stressed that in general, the arrival briefing is carried out some dozens of minutes before landing. The main aim of this briefing is to read the approach chart and rarely to highlight the configuration and gates in which the approach must be carried out. Therefore it is an aid whose usefulness gets blurred with time.

How can you start an action by a negation without giving the solution, without re-activating the action plan? In the case of an **unstabilised** approach below the minimum stabilisation height, there are no more callouts!

Therefore we must introduce another type of callout.

The party proposes that **at the minimum stabilisation height,** the following callout is made:

Stabilised Approach ..... "...x feet, STABILISED".

This callout is POSITIVE.

Therefore we propose that airlines standardise their callouts at the minimum stabilisation height (1000 feet in general) on this format:

- at the **minimum stabilisation height,** call out ***"x feet STABILISED"*** and if the aircraft is not stabilised ***call "GO AROUND".***
- below the minimum stabilisation height if the aircraft is no longer stabilised, call ***"GO AROUND"***.

The national action plan includes the following action:

"STANDARDISATION OF POSITIVE "STABILISED" OR "GO AROUND" CALLOUTS"

→ ENCOURAGE THE AIRLINES TO PRACTICE GO-AROUNDS AT HIGH ALTITUDE OR HIGH ENERGY DURING PROFICIENCY TEST AND TYPE QUALIFICATION TRAINING.

Among the reasons why a go-around is not carried out during an **unstabilised** approach, there are among other reasons: putting it off, an incomplete crew approach plan but also the risk of executing a missed approach being perceived as higher than continuing the approach.

The perceived risk of a go-around comes from time pressure, uncertainties causing crew doubts as to the missed approach path, fear of personal failure but also, frequently, doubt by the crew concerning their ability to carry out a missed approach in an unfamiliar situation.

The missed approach is a normal procedure described in the operations manual.

Pilots practice it during Type Qualification Training, during an annual training session and practice it during their two bi-annual simulator check rides at their airlines as required by OPS 1.965 to maintain proficiency.

However the go-arounds carried out during training are always done in the same conditions, i.e. in the landing configuration at Minimum Descent Altitude *(MDA)* or Decision Height *(DH)* and often carried out with the help of the autopilot.

Pilots are never trained to execute a go-around at higher altitudes where controlling the aircraft can be more difficult because of the even more rapid sequence of actions to be performed.

Go-arounds during an **unstabilised** approach occur exactly in these conditions not encountered in the simulator, i.e. at "high altitude" such as 1000 feet AGL, which is the minimum stabilisation height commonly used by the airlines.

Therefore, the national action plan includes the following action:

"ENCOURAGE THE AIRLINES TO PRACTICE MISSED APPROACHES AT HIGH ALTITUDE OR HIGH ENERGY DURING PROFICIENCY TEST AND TYPE QUALIFICATION TRAINING"

→ CREATE AN UNSTABILISED APPROACH AWARENESS TRAINING MODULE FOR FIs, CRIs AND TRIs

AND

ASK THE PILOT TRAINING SCHOOLS TO LET PUPILS RECOGNISE AND CARRY OUT THE GO AROUND BY THEMSELVES.

Continuing the approach during an **unstabilised** approach can have potentially serious consequences such as a CFIT or a runway excursion. Despite these risks, some pilots are convinced that it is easier to save a critical situation that has exceeded the flight-parameter-deviation limits, rather than to carry out a missed approach which in the majority of cases will change the action plan and affect operations.

Training has time constraints which lead the instructors to plan everything and even anticipate the go-around, by taking the clearances themselves. It can even happen that while training at some airports with specific constraints that the controller, wanting to be helpful, anticipates and delivers a missed approach clearance at departure simply because he knows the flight plan.

Therefore pilots should no longer practise the missed approach like a simple exercise but as a full procedure with its complete workload.
This situational experience will lay a strong foundation in the pilot's memory.
The pilot will be better able to evaluate the much less serious consequences of a go-around than continuing the approach. The different instructors involved must be asked to confront the pilot under training with an unpredictable go-around, entirely managed by him, if possible at the end of the session when the effects of fatigue are present.

Unpredictable means that meteorological conditions will not be an important factor in the decision.

Therefore the national action plan includes the following action:

« CREATE AN UNSTABILISED APPROACH AWARENESS TRAINING MODULE FOR FIs, CRIs AND TRIs

AND

ASK THE PILOT TRAINING SCHOOLS TO LET PUPILS RECOGNISE AND CARRY OUT THE GO AROUND BY THEMSELVES"

→ ADD AN EXERCISE TO MCC COURSES WHICH SIMULATES THE ACTIVE INCAPACITY OF A FLIGHTCREW MEMBER DURING APPROACH.

During several accidents and incidents, one of the crew members (PF or PNF) was fully aware of the situation; however, he often intervened too late or his own stress became so great that he could no longer communicate effectively with his PF/PNF.

This situation can arise because of an authoritarian pilot but also more simply by not recognising an active incapacity linked to the hierarchy of risks.
(Example: an airspeed 10kts too high might be perceived as being as serious as starting an ILS descent with the localiser blocked, justifying this as being protected by the NDB procedure).

During training, pilots are confronted with passive incapacity situations which usually enact an illness with the pilot in command.

However they are never confronted with an active incapacity.
Not reacting to an alarm is a passive incapacity. However, in the case of an active incapacity such as downplaying an alarm, the other pilot can be made somewhat passive.

Therefore the national action plan includes the following action to be carried out:

"ADD AN EXERCISE TO MCC COURSES WHICH SIMULATES THE ACTIVE INCAPACITY OF A FLIGHTCREW MEMBER DURING APPROACH"

GO AROUND

→ FROM AN ATM POINT OF VIEW, AVOID "ALTITUDE" CLEARANCES DURING THE GO AROUND WHICH BY ADDING WORKLOAD DO NOT SUIT A MISSED APPROACH.

Go-arounds are rarely practised in line flying. Speed management, gear and flap control and altitude capture produce an elevated workload. An altitude change by ATC towards a lower altitude during the missed approach increases the difficulty of this manoeuvre.

Therefore the national action plan includes the following action:

"FROM AN ATM POINT OF VIEW, AVOID "ALTITUDE" CLEARANCES DURING THE GO AROUND WHICH BY ADDING WORKLOAD DO NOT SUIT A MISSED APPROACH"

LEARNING FROM EXPERIENCE, RADAR USAGE AND RECURRENT TRAINING OF AIR TRAFFIC CONTROLLERS

→ END RADAR VECTORING ON A PUBLISHED PROCEDURE AT THE FAP OR FAF ALTITUDE AND ON THE FINAL APPROACH PATH.

The Department of Safety Management conducted a national qualitative and quantitative survey with the airlines regarding **unstabilised** Approaches. The working party analysed the data and from this it was apparent that one of the factors contributing to **unstabilised** approaches was radar vectoring that did not end on the intermediate approach segment, either laterally or vertically.

Some public transport **unstabilised** approach scenarios show that the aircraft did not fly for even 30 seconds in level flight during the intermediate segment, for instance:

- the serious incident with an MD-83 at Orly, 67 feet above the outer marker;
- the serious A310 incident at Orly in 1994.

Aircraft risk therefore not being aligned with the final approach path in the vicinity of the FAF, with difficulties in transitioning to final descent. Aircraft automation systems are designed to intercept the localiser and then the glideslope, not the opposite. The investigations showed that in these scenarios, the crew sometimes select Heading Mode (heading held by the autopilot) and the Vertical Speed descent mode. They focus on lateral navigation to the detriment of vertical navigation to get back on the approach path or the opposite. This can cause the aircraft to descend below the descent path and lose the attendant obstacle protection.

Respecting this 30 second phase during the intermediate approach is very important since on the one hand, the crew are preparing the aircraft and on the other, the aircraft can probably then carry out the approach with the autopilot.

In addition, arriving at the FAP or FAF aligned with the final approach path is a determining factor for initiating and starting the final approach. Numerous examples show that when an aircraft starts the descent above or below the start-descent-reference-level, the risk of an **unstabilised** approach increases and can possibly lead to an accident or incident.

Here are some extracts from a BEA report:

In September 1994, an Airbus A310 stalled near Orly while it was manoeuvring to intercept the ILS runway 26. The aircraft was under radar control.

The official investigation report states:

"The heading 330 given by approach control was tending to bring the aircraft practically to the FAF for an immediate ILS intercept. The heading 310 reduced the convergence angle between the aircraft's flight path and the ILS. This angle was still too great for the aircraft to align easily with the ILS and follow it immediately, especially since the indicated airspeed was still about 235kts at the intercept point."

Another extract states:

"In level flight at 3000 feet, the aircraft had crossed below the descent path before intercepting the localiser. The crew seem to have attributed the non-capture of the glideslope to a malfunctioning autopilot, while in fact the system logic subordinates that to the localiser and had disconnected the autopilot".

Another example:

In 1995, a PA 46 crashed near Toussus-le-Noble. The aircraft under radar control was 1000 feet below the FAF on the ILS approach path, and therefore below the descent profile.

The official inquiry report states:

"Analysis of the flight path shows that the pilot probably entered a vertical descent voluntarily at the FAF." (...) "After discussions with several instrument flight instructors from different companies, it appeared that carrying out an ILS intercept initiated from below the FAF is neither planned nor taught in the situation where one can no longer determine the point of starting the descent. In effect, it is imperative on an ILS procedure to be able to confirm the FAF either for example by a DME reading or a magnetic bearing. It is advisable to fly over the FAF reference point in the correct place at the correct altitude because it forms the basis of the decision to start the descent."

It is important to underline that when an aircraft exceeds its defined flight parameters, pilots are not trained to recover from the flight path deviation. On the contrary, the plan of action insists that they go around. Moreover, automation is not designed to fly the aircraft under non-standard approach path intercept conditions and then carry out the descent. The crews are therefore placed in an abnormal flight management situation which can entrap them.

Therefore, the national action plan includes the following action:

"END RADAR VECTORING ON A PUBLISHED PROCEDURE, AT THE ALTITUDE OF THE FAP OR FAF AND ALIGNED WITH THE FINAL APPROACH PATH"

→ LAUNCH A REVIEW ON HOW TO RESPOND WHEN ATC DETECT A FLIGHT PATH DEVIATION OR WHEN THEY ARE DOUBTFUL.

During the serious incident on the 21st March 2004 with an MD-83 on approach to Nantes Atlantique airport, the BEA's investigation report stated:

"The radar information service exists notably to warn aircraft of these deviations. There is nothing compulsory about continued radar surveillance by the approach controller".

To maximise its effectiveness:

- *it must be based on precise radar information. At Nantes, each time the IRMA 2000 image is refreshed, the plot shows the position of the aircraft with more details in paragraph ...(..). If the refresh rate of 8 seconds does not allow a separation distance between aircraft of less than 8nm to be applied, the information supplied can still be used to detect deviations from the flight path. Nevertheless the scale selected must match the phase of flight under surveillance;*
- *radar surveillance must provide permanently a precise representation of aircraft position. That was not the case during this incident.*

"Nantes Airport was recently equipped with an IRMA 2000 visualising radar. The position information it provides allows radar assistance and surveillance. It was determined during the inquiry that control procedures had not changed as a result and that the users did not have the same understanding of the possibilities offered by this new tool".

Moreover, during the investigation into the serious incident of the 23rd November 1997 at 67 feet near Orly, the controller's statement indicated:

"At the time of the incident, there was fog, no ceiling and the RVR was less than 500 metres ...()... the controller was using the approach radar" ...()...

"At time of radar contact, the aircraft was on an intercept heading to the south west of Orly. He had crossed the approach path and was following a flight path close to the ILS path which brought him north of the ORW beacon. The controller informed the crew of this position error, who acknowledged. The aircraft regained the flight path shortly before the Outer Marker. The controller saw that the Flight Level was between FL10 and 19 which alarmed him given the position of the aircraft. He contacted the aircraft to ask them if they were established. The crew replied immediately that they were going around. At that moment, they passed the Outer Marker and the controller saw on the approach radar a flight level of FL04. After the go around, he kept them on his frequency and made them do a circuit ...()... The controller stated that once an aircraft is on the ILS, there are no particular rules at Orly concerning surveillance radar (the Rules of the Air apply). A large number of aircraft were holding above the field waiting for conditions to improve".

OUTCOMES ACTION III

LEARNING FROM EXPERIENCE, RADAR USAGE AND RECURRENT TRAINING OF AIR TRAFFIC CONTROLLERS

It is clear that we cannot **ask** controllers to watch the traffic and detect systematically flight path deviations during final approach at the expense of his other tasks. The MSAW system is, on the airfields that have it, an aid that allows some of these deviations to be detected with a formal response by the controller described in the RCA[6].

On the other hand, and especially in the absence of an MSAW system, there is nothing in writing to permit ATC to determine from what point a flight deviation should be considered critical and no rules to help them react correctly when such a deviation is detected.

In such a situation where the controller's information might sometimes be critical, the system relies only on his common sense, but it is by no means certain that the situation will allow him to improvise the best response in real time... the above examples show that in some cases, an appropriate reaction could have greatly reduced the seriousness of the incident.

It would therefore be sensible to produce aids, rules and complementary tools so that ATC can better respond when they detect a flight path deviation or they are doubtful and can therefore suggest another effective course of action (or a sound basis) to avoid these types of serious incidents and accidents.

Therefore the national action plan also includes the following action:

"LAUNCH A REVIEW ON HOW TO RESPOND WHEN ATC DETECT A FLIGHT PATH DEVIATION OR WHEN THEY ARE DOUBTFUL"

6 - Règlementation de la Circulation Aérienne – Rules of the Air

→ IMPROVE THE AWARENESS OF THE RISKS ASSOCIATED WITH ATC ACTIONS DURING APPROACH

AND

IMPROVE THE INITIAL TRAINING AT ENAC[7] AND THE RECURRENT TRAINING OF ATC CONTROLLERS ON UNSTABILISED APPROACHES.

Pilot – controller interactions are a contributory factor to **unstabilised** approaches *(e.g. see the events referenced above or the BEA's files)*.

Of course, ATC does not have the legal responsibility to prevent **unstabilised** approaches, but circumstances show that controllers have been censured following these types of accidents and overall the pilot-controller interface is often fundamental in the genesis of **unstabilised** approaches.

Good knowledge by the controller of the potential consequences of clearances or information he provides during the approach is a key factor in the campaign against **unstabilised** approaches, of which the particularly important safety considerations are summarised in the first action above.

The initial and continuous training of controllers on the risks of **unstabilised** approaches must be strengthened, as it is already for pilots. The risks associated with controller actions must therefore be evaluated and controllers given feedback on the potential seriousness of **unstabilised** approaches. It must be noted that training films have been jointly developed by the DSNA and the airlines under the "COMPLICES[8]" project. They present and play out various scenarios close to a real situation. Supported by teaching aids that present insight into what it is like to be a pilot, they are a way to raise awareness on the potential consequences of certain controller instructions and help controllers pick up the faint signs indicating the pilot is in difficulty. This is an awareness raising effort to be integrated into initial and recurrent controller training.

Therefore the national action plan includes the following actions to be put into effect:

"IMPROVE THE AWARENESS OF THE RISKS ASSOCIATED WITH ATC ACTIONS DURING APPROACH
AND
IMPROVE THE INITIAL TRAINING AT ENAC AND THE RECURRENT TRAINING OF ATC CONTROLLERS ON UNSTABILISED APPROACHES"

7 - École Nationale de l'Aviation Civile – National Civil Aviation School (college for engineers, pilots, ATC staff etc.)
8 - COMPLICES – Connaissances Mutuelles Pilotes des Ligne/ Contrôleurs, Enjeu de Securité
(Line Pilot/ Controller Mutual Familiarisation, Safety Considerations)

→ EVALUATE IN A JOINT PILOT/CONTROLLER WORKING PARTY THE BEST TIME TO CARRY OUT COMMUNICATION HAND-OVERS

The control of the vertical approach profile by the crew allows them to ensure that obstacle clearance margins are maintained. This is therefore a priority task. This is always carried out at the moment of intercepting the descent path and during final approach at certain particular points such as passing the Outer Marker or beacon if there is one. Transmitting a radio message when the aircraft is near one of these key points is an interruption which risks interfering with or preventing verification. It would be desirable if the frequency change took place well before passing the OM. This subject can be evaluated and put into effect by the local pilot-controller safety committees because the constraints at each airfield may be different.

Therefore the national action plan includes the following action to be put into effect:

"EVALUATE IN A JOINT PILOT/CONTROLLER WORKING PARTY THE BEST TIME TO CARRY OUT COMMUNICATION HAND-OVERS"

→ INTEGRATE THE SUBJECTS GO AROUND, RADAR UTILISATION AND VISUAL APPROACH IN THE JOINT PILOT/CONTROLLER SAFETY COMMITTEES.

The DSNA has developped a safety management system (SMS) and created local safety promotion structures, suited to each airfield's geographic and aviation environment. These local structures, sometimes called "Safety Promotion Committees", sometimes called something else, allow problems specific to an airfield to be dealt with, bringing together the different stakeholders, air traffic organisations, airlines, other users and airfield operators. These structures are therefore well suited to studying solutions to all of the areas in this action plan, particularly:

- on the management of go-arounds (Action II);
- on the use of approach radar;
- on the management of visual approaches (Action VI).

It is therefore desirable to encourage local discussions between pilots and controllers on these subjects within these Safety Promotion Committees.

Therefore the national action plan includes the following action to be put into effect:

"INTEGRATE THE SUBJECTS GO AROUND, RADAR UTILISATION AND VISUAL APPROACH IN THE JOINT PILOT/CONTROLLER SAFETY COMMITTEES"

→ EVALUATE WHERE POSSIBLE ESTABLISHING INTERMEDIATE APPROACH SEGMENT AT CLOSE TO 3000 FEET AAL

The standardisation of the intermediate approach segment of an instrument approach is one safety factor in designing approaches. The aim is mainly to give the crew more time on finals to become stabilised.

The DSNA has already had the aim of standardising the intermediate approach segment of instrument approach procedures for several years. Today, two thirds of the major approaches have intermediate approach segment at 3000ft AMSL which sometimes translates into 2000ft AAL. The DSNA will continue this standardisation effort. The major change introduced into ICAO's PANS-OPS is the distinction between safety altitudes and procedure altitudes: the corresponding representation (grey check pattern) on the profile view of the Instrument Approach Chart is supports this effort and a DSNA action plan will accelerate the updating of aeronautical publications.

To further standardise matters, it would be desirable to establish an action plan to standardise intermediate approach segment at a height of about 3000ft AAL, airspace constraints permitting.

Therefore the national action plan includes the following action to be put into effect:

"EVALUATE WHERE POSSIBLE ESTABLISHING INTERMEDIATE APPROACH SEGMENT AT CLOSE TO 3000 FEET AAL"

REINFORCE CONTROLLER KNOWLEDGE CONCERNING THE RANGE OF SPEEDS COMPATIBLE WITH AIRCRAFT PERFORMANCE IN RELATION TO EACH SEGMENT OF THE APPROACH PROCEDURE.

→ REINFORCE CONTROLLER KNOWLEDGE CONCERNING THE RANGE OF SPEEDS COMPATIBLE WITH AIRCRAFT PERFORMANCE IN RELATION TO EACH SEGMENT OF THE APPROACH PROCEDURE.

The Department of Safety Management carried out a qualitative and quantitative national survey among the airlines regarding **unstabilised** Approaches. The Working Party analysed the data and from this one of the important contributing factors to **unstabilised** approaches that became apparent was speed requests by ATC incompatible with aircraft performance. For example, an Airbus A330 crew were asked to maintain a speed of 200kts up to the Outer Marker. These excessive speeds increase the risk of an **unstabilised** approach since the aircraft is never at the correct approach speed at minimum stabilisation height.

The more modern the aircraft are, the better their aerodynamic efficiency is. It becomes more difficult to lose significant excess speed in the descent. Controllers must become aware that clearances such as "maintain 200kts until 4nm" are aerodynamically impossible for aircraft to perform if they want to carry out a stabilised approach. Where possible, controllers must also avoid clearances during the approach such as "increase vertical speed and decrease airspeed" which from an operational point of view are rather contradictory. To ensure stabilised flight at the minimum stabilisation height, it is requested that the following rules are adopted progressively:

do not ask pilots to fly faster than:

- *220kts when the aircraft is established on the approach path centreline;*
- *180kts at 7nm (2000ft AAL).*

Closer than that, do not ask for speeds to be maintained that are incompatible with the stabilisation parameters at 1000 feet.

Therefore the national action plan includes the following action to be put into effect:

"REINFORCE CONTROLLER KNOWLEDGE CONCERNING THE RANGE OF SPEEDS COMPATIBLE WITH AIRCRAFT PERFORMANCE IN RELATION TO THE EACH SEGMENT OF THE APPROACH PROCEDURE"

ATC PROCEDURES AND SYSTEMS

→ EXTEND NATIONALLY THE ADOPTION OF THE RADAR SCREEN INTERCEPTION REFERENCE MARKER DEVELOPED AT CDG AND ORY.

A significant number of approaches do not comply with the operational parameters, particularly the intercept angle with the intermediate approach segment where 30 seconds of level flight became conspicuous during the safety analysis performed by the DSNA at Roissy and Orly. To help the controllers, an interception reference marker was placed on the radar screen to allow them to guarantee a minimum of 30 seconds level flight before beginning the descent. This symbol appeared 1.5nm before the FAP at Roissy and Orly. Since its adoption, it has allowed controllers to improve their termination of radar control and has significantly reduced the number of **unstabilised** approaches due to ATC.

It is therefore desirable that this positive development should be pursued and installed on all airfields where approach radar is used.

Therefore the national action plan includes the following action to be put into effect:

"EXTEND NATIONALLY THE ADOPTION OF THE RADAR SCREEN INTERCEPTION REFERENCE MARKER DEVELOPED AT CDG AND ORY"

→ EXTEND THE USE OF MSAW NATIONALLY

Today, nobody disputes the value of GPWS to the flight crew during a dangerous approach to the ground. Nowadays the system is reliable.

The same applies to the MSAW which is in some ways the GPWS counterpart for controllers. It alerts the controller to a dangerous approach of an aircraft with the ground. The controller must then alert the crew and ask them to verify their altitude immediately.

The presence of MSAW has already resulted in crews being alerted to a dangerous ground closure in several critical or difficult situations.

However, during the public transport accident to a CRJ at Brest in 2003 and the serious MD83 incidents at Nantes in 2004 or Orly in 1997, MSAW was not yet operational or simply not available.

Moreover, we have determined that in numerous incidents or accidents, paradoxically the controller's workload was not very high. This makes the case for MSAW even stronger, to alert controllers to imminent danger.

Therefore the extension of MSAW to all airports with adequate radar coverage must be pursued.

The national action plan includes the following action:

"EXTEND THE USE OF MSAW NATIONALLY"

OUTCOMES ACTION V

ATC PROCEDURES AND SYSTEMS

→ ENSURE OBSERVANCE OF THE SPEED LIMIT OF 250KTS BELOW FL100

A summary of the airlines' Operations Manuals gives us a homogeneous definition of a stabilised approach. Beyond the fact that:

- the aircraft must be in the landing configuration and the landing checklist completed;
- the approach and landing briefing has been completed;
- the aircraft is on the published approach path (vertically and laterally);
- thrust is set in relation to the configuration and selected approach speed;

One of the important factors is to insist on strict compliance with the approach speed which is therefore an essential stabilisation factor. Excessive speed on approach cannot be compatible with a stabilised approach. The DAST points out that current regulations stipulate a speed limit of 250kts below FL100 for VFR traffic in Class C airspace and for all aircraft in Class D, E and G airspace (viz. Appendix D of the RCA/1) *(airspace (viz. Appendix D of the RCA/1)*.

Following a request from the DSNA, an experiment was started from the 19th January 2006 for a period of 12 months extending this speed limit to all CAG[9] aircraft in Class A and C airspace, with the exception of aircraft which could not maintain this restriction for technical or flight handling reasons *(viz. AIC A20/05 published 15th December 2005)*.

An analysis of this experiment will be carried out during 2007 and rule changes will be proposed if necessary.

Regarding learning from experience from excessive speed on approach, numerous airlines insist on the fact that on descent through FL100, non-compliance with the 250kts limit can lead to an **unstabilised** approach.

Moreover, one of the points from the study on unstabilised approach causes, appeared to be that the speed limit is regularly broken by pilots reacting to commercial pressure among other things and by controllers acting to optimise the landing rate.

The consequences of this go beyond **unstabilised** approaches. While obeying the speed limit reduces the number of **unstabilised** approaches, it also reduces other risks such as the consequences of a bird strike, gives extra reaction time in case of having to avoid other aircraft and reduces TCAS alerts.

This limit must be respected scrupulously, the development of its regulatory context evaluated and knowledge of this rule at the airlines and ATC ensured.

The national action plan includes the following action to be taken:

"ENSURE OBSERVANCE OF THE SPEED LIMIT OF 250KTS BELOW FL100"

9 - Circulation Aérienne Générale – General Air Traffic (i.e. any civil aircraft, not military aircraft)

OUTCOMES ACTION VI

VISUAL APPROACHES

→ DEFINITION OF A VISUAL APPROACH BRIEFING

Several accidents have been identified as being the result of an **unstabilised** approach following a decision by the crew to execute a visual approach. The results of the national survey corroborated this view.

Among the reasons why a visual approach was not stabilised are:

- lack of a joint action plan by the crew concerning it;
- lack of waypoints, key points on the visual approach path or gates (for instance 1500 feet across the threshold in correct configuration at correct speed);
- most of the time the approach briefing is only a review of the instrument approach procedures and flight paths. If the crew plan to shorten the final approach path, they often say: "we'll try and finish visually".

However, the visual approach is a normal procedure described and/or present in synoptic form in the "Standard Operational Procedures" section of the manufacturer's FCOM and in Section B2 "Normal Procedures" of the airlines' Operations Manuals.

The essential points of the visual approach such as the flightpath to follow and the speeds required in the pattern are therefore defined in the same way as for a precision or non-precision approach.

The briefing to be carried out each time a visual approach is envisaged should include:

- review of meteorological conditions on the field at the expected arrival time and compatibility with a visual approach;
- flightpath envisaged to join the procedure described in the synoptic visual approach chart suited to the environment;
- key points (speeds and configurations) for the join;
- waypoints (end of downwind and stabilisation);
- role of the Pilot Not Flying.

Therefore the national action plan also contains the following action to be enacted:

"DEFINITION OF A VISUAL APPROACH BRIEFING"

→ THAT THE AIRLINES DEFINE THEIR OPERATIONAL PARAMETERS UNDER WHICH A FLIGHTCREW CAN REQUEST OR ACCEPT A VISUAL APPROACH.

The visual approach requires good flying technique and good judgement. Visual approaches are also a means made available to flight crews, when weather conditions permit, to maintain flying skills and at the same time shorten the arrival. Certain environmental constraints (built-up areas, separation from other traffic) can make the execution of an approach procedure difficult and contribute to **unstabilised** approaches. It is therefore important that the controller specifies the limits he wants to see applied during the visual approach. At the same time, given the relative manoeuvring freedom left to the pilot, he must specify the key waypoints in his visual approach during the approach briefing.

Therefore the national action plan also contains the following action to be enacted:

"THAT THE AIRLINES DEFINE THEIR OPERATIONAL PARAMETERS UNDER WHICH A FLIGHTCREW CAN REQUEST OR ACCEPT A VISUAL APPROACH"

→ THE DSM AND THE DAC[10] MUST ENSURE THAT THE AIRLINES HAVE A DEFINED BRIEFING FOR ALL TYPES OF APPROACH.

Once the airlines have been made aware of the risks associated with visual approaches and have considered the measures to take with respect to the national action plan, the surveillance authority will have to follow these developments closely and assist the airlines if necessary. The Department of Safety Management and the DACs will have to undertake this and control the steps taken to ensure they do improve safety connected with **unstabilised** approaches caused by visual approaches.

Therefore the national action plan also contains the following action to be enacted:

"THE DSM AND THE DAC MUST ENSURE THAT THE AIRLINES HAVE A DEFINED BRIEFING FOR ALL TYPES OF APPROACH"

10 - Direction de l'Aviation Civile – local regional office of the DGAC

→ ENCOURAGE THE AIRLINES TO CONSIDER ADOPTING THE TERM PILOT MONITORING INSTEAD OF PILOT NOT FLYING.

The term "PNF" to designate the "Non Flying Pilot" is rather reductionist. Boeing recommends and from now on uses the term "PM", i.e. "Pilot Monitoring" instead of "PNF".

This expression is more positive and underpins this crew member by defining his role. It emphasises his complementary position.

The term PM is also more in line with the spirit of CRM. It integrates and involves the second pilot in all phases of flight, which is an asset for avoiding or detecting and calling attention to an **unstabilised** approach.

Some airlines, some of them European, have already adopted this term. Corsair has introduced it into their 747-400 Operations Manual and will soon be extending it onto two other fleets (A330 and 747-300).

Therefore the national action plan also contains the following action:

"ENCOURAGE THE AIRLINES TO CONSIDER ADOPTING THE TERM PILOT MONITORING INSTEAD OF PILOT NOT FLYING"

→ ENCOURAGE THE AIRLINES TO CARRY OUT VISUAL APPROACHES DURING LINE TRAINING.

To ensure the young line pilot is aware of the procedures connected with Visual Approaches, he must be confronted with having to execute one.
To do this, the simulator does not seem to be the best way to teach this exercise. On the other hand, during Line Training the First Officer is carrying out public transport flights and is with a Training Captain. Line Training includes a number of phases which provide the opportunity for pilots to execute a Visual Approach and to verify that airline procedures in this area have been assimilated effectively.

Therefore the national action plan also contains the following action:

"ENCOURAGE THE AIRLINES TO CARRY OUT VISUAL APPROACHES DURING LINE TRAINING"

OUTCOMES ACTION VI

VISUAL APPROACHES

→ AT NIGHT, FAVOUR INSTRUMENT APPROACH PROCEDURES OVER VISUAL APPROACHES.

During a visual approach, the crew are freed from rigorously following a well defined flight path. This is a more difficult manoeuvre to put into practice particularly at night.

In this situation, estimating heights and distances is more difficult than during the day, since it is based on the ability of the eye to interpret the positions and relative dimensions of objects. In addition, the night time environment gives rise to sensory illusions.

During the approach which led to an accident with an ATR 42 at Lyon Bron in 2005, the aircraft came out of its final turn to one side of the runway centreline and too close to the runway, significantly above the flight path and at elevated speed. During the flare, the aircraft landed heavily and the Main Landing Gear shock absorbers were destroyed.

The analysis of this accident showed up the classic ingredients of an **unstabilised** approach (lack of approach briefing, uncertainty about the approach, different intentions between the Captain and First Officer etc...).

Other CFIT accidents have occurred even though the crew were in sight of the runway but the aircraft's flight path did not "follow" the visual flight path...

A review of these incidents and/or accidents allowed the principal factors giving rise to an **unstabilised** approach during a Night Visual Approach to be determined:

- Difficulties in positioning the aircraft due to altered sensory perception:
  - "false" distances with respect to the runway (impression of being closer rather than perceiving the reality or risk of a premature descent);
  - difficulty in judging the flight path due to lack of visual ground references and/or missing, insufficient or defective ground lighting aids (Runway Centre Lights, VASIs, PAPIs etc.);
  - greater difficulty in determining aircraft attitude (particularly bank angle) due to lack of natural horizon, mist, false impressions from stars and/or lights on the ground.
- The risks of entering IMC close to the ground not on an IFR flight path because of specific meteorological conditions (scattered clouds invisible at night) and/or of mistaking the runway:
  - with a straight road headed in the same direction;
  - for another runway where parallel runways each have different intensity lighting.

These risks mean the crew must carry out a very rigorous briefing with a precise definition of the flight path, using if possible all the radio aids available, a strict allocation of tasks and effective deviation callouts. Given the inherent risks in these types of approaches, especially at night, it would be desirable to discourage operators from using these procedures except when an IFR arrival is not possible and under certain other specifically defined conditions.

Therefore the national action plan also contains the following action:

"AT NIGHT, FAVOUR INSTRUMENT APPROACH PROCEDURES OVER VISUAL APPROACHES"

OUTCOMES ACTION VII

UNSTABILISED APPROACH AIRFIELDS

→ THE AIRLINES ARE INVITED TO INFORM THE DSNA WHICH AIRFIELDS REGISTER A HIGH LEVEL OF UNSTABILISED APPROACHES.

The Department of Safety Management has carried out a qualitative and quantitative national survey with the airlines on **unstabilised** Approaches. The Working Party analysed the data and from this it became apparent that certain airfields have particular characteristics and a higher **unstabilised** approach rate than the national average.

Therefore the reasons which might explain these **unstabilised** approach rates must be examined and shared between public transport operators and ATC so that possible corrective action can be taken.

Therefore the national action plan also contains the following action:

"THE AIRLINES ARE INVITED TO INFORM THE DSNA WHICH AIRFIELDS REGISTER A HIGH LEVEL OF UNSTABILISED APPROACHES"

OUTCOMES ACTION VIII

NATIONAL ACTION PLAN FOR UNSTABILISED APPROACHES

ORGANISING A SAFETY SYMPOSIUM ON UNSTABILISED APPROACHES

→ BRING TOGETHER IN A SYMPOSIUM AS MANY OPERATORS AS POSSIBLE AFFECTED BY THE RISKS OF UNSTABILISED APPROACHES.

Involving different operators in the system, particularly pilot - controller communication, **unstabilised** Approaches are sufficiently serious in their consequences that their characteristics should be reviewed widely and communicated throughout the industry, so that everyone is aware of the causes, understands the risks and can suggest corrective action.

Therefore the national action plan also contains the following action:

"BRING TOGETHER IN A SYMPOSIUM AS MANY OPERATORS AS POSSIBLE AFFECTED BY THE RISKS OF UNSTABILISED APPROACHES"

ACTION I – SUMMARY ANALYSIS OF INVESTIGATION INTO UNSTABILISED APPROACH ACCIDENTS AND SERIOUS INCIDENTS

- Carry out an analysis and summary of investigation into accidents or serious incidents that followed an **unstabilised** approach

ACTION II – THE GO AROUND

- Standardisation of positive callouts "STABILISED" or "GO AROUND".
- Encourage the airlines to practice go arounds at high altitude or high energy during Proficiency Test and Type Qualification Training.
- Create an **unstabilised** Approach Awareness Training Module for FIs, CRIs and TRIs.
- Ask the pilot training schools to let pupils recognise and carry out the Go Around by themselves.
- Add an exercise to MCC courses which simulates the active incapacity of a flightcrew member during approach.
- From an ATM point of view, avoid "Altitude" clearances during the Go Around which by adding workload do not suit a missed approach.

ACTION III - LEARNING FROM EXPERIENCE, RADAR USAGE AND RECURRENT TRAINING OF AIR TRAFFIC CONTROLLERS

- End Radar Vectoring on a published procedure at the FAP or FAF altitude and on the final approach path.
- Launch a review on how to respond when ATC detect a flight path deviation or when they are doubtful.
- Improve the awareness of the risks associated with ATC actions during approach.
- Improve the initial training at ENAC and the recurrent training of ATC controllers on **unstabilised** Approaches.
- Evaluate in a joint Pilot/Controller Working Party the best time to carry out communication hand-overs.
- Integrate the subjects Go Around, Radar Utilisation and Visual Approach in the Joint Pilot/Controller Safety Committees.
- Evaluate where possible establishing intermediate approach segment at close to 3000 feet AAL.

ACTION IV - REINFORCE CONTROLLER KNOWLEDGE CONCERNING THE RANGE OF SPEEDS COMPATIBLE WITH AIRCRAFT PERFORMANCE IN RELATION TO THE EACH SEGMENT OF THE APPROACH PROCEDURE.

- Reinforce controller knowledge concerning the range of speeds compatible with aircraft performance in relation to the each segment of the approach procedure.

ACTION V - ATC PROCEDURES AND SYSTEMS

- Evaluate where possible establishing intermediate approach segment at close to 3000 feet AAL.
- Extend nationally the adoption of the radar screen interception reference marker developed at CDG and ORY.
- Extend the use of MSAW nationally.
- Ensure Observance of the Speed Limit of 250kts below FL100.

ACTION VI - VISUAL APPROACHES

- Definition of a Visual Approach Briefing.
- That the airlines define their operational parameters under which a flightcrew can request or accept a visual approach.
- The DSM and the DAC must ensure that the airlines have a defined briefing for all types of approach.
- Encourage the airlines to consider adopting the term Pilot Monitoring instead of Pilot Not Flying.
- Encourage the airlines to carry out visual approaches during Line Training.
- At night, favour Instrument Approach Procedures over Visual Approaches.

ACTION VII - UNSTABILISED APPROACH AIRFIELDS

- The airlines are invited to inform the DSNA which airfields register a high level of **unstabilised** Approaches.

ACTION VIII - ORGANISING A SAFETY SYMPOSIUM ON UNSTABILISED APPROACHES

- Bring together in a symposium as many operators as possible affected by the risks of **unstabilised** approaches.

LIST OF ORGANISATIONS THAT PARTICIPATED IN THE UNSTABILISED APPROACH WORKING PARTY

The DSM would like to thank the following organisations who participated in the development of these actions to be taken in the campaign against Unstabilised Approaches:

- **CORSAIR**
  Flight Safety Dept.
- **AIR FRANCE**
  Preventative Safety and Flight Safety Dept.
  B777 Flight Safety
- **DIRECTION DES SERVICES DE LA NAVIGATION AERIENNE (DSNA)**
  Safety, Quality and Security Dept.
  Operations Directorate
  Environmental Dept.
  Human Factors Dept.
- **SOUTH EAST REGION CIVIL AVIATION DIRECTORATE**
  Air Transport and General Aviation Dept.
- **LE BUREAU D'ENQUETES ET D'ANALYSES POUR LA SECURITE DE L'AVIATION CIVILE (BEA)**
  Incidents Dept.
  Research Dept.
- **DIRECTION DES AFFAIRES STRATEGIQUES ET TECHNIQUES (DAST)**
  Aircraft Operations Office
- **DEPARTMENT OF SAFETY MANAGEMENT (DSM)**
  Quality and Data Analysis Office
  Training and Schools Office
  Navigation Crew Department
  Navigation and Operations Sub Directorate
  Aircraft Operations Office
  Equipment and Simulator Office
  ATC Service Providers Certification Office

SUMMARY OF AIRLINE RESPONSES FROM THE NATIONAL SURVEY

→ INTRODUCTION

Following the accident on the 22nd June 2003 with a CRJ at Brest, the DSM decided to launch a review into the subject of **unstabilised** Approaches.

At the end of 2004, the SFACT (now the DSM) sent a questionnaire on **unstabilised** Approaches to all of the French airlines. The qualitative and quantitative characteristics of the data that came out of the FDM analysis and the compulsory reports are covered in the questionnaire in the appendix of this summary. The DSM received the responses during the first quarter of 2005. The FDM analysis from several tens of thousands of cumulative flights allowed the DSM and its partners to identify ways to prevent **unstabilised** approaches.

→ SUMMARY

Twenty airlines replied to the questionnaire, most of them in depth. The survey was in general welcomed by the public transport airlines. Many lessons can be drawn from it.

How do we define a stabilised approach?

The analysis of results shows that the airlines' Operations Manuals are fairly homogeneous in this area and fairly clear. The definition below was drawn from all the responses:
The aircraft is configured for the landing and the pre-landing checklist has been performed.
The approach and landing briefing has been performed.
The aircraft is on the published flight path (vertically and laterally).
The airspeed is not less than Vref and not greater than Vref plus a "small" margin.
Thrust is set according to the aircraft configuration.

80% of French airlines stated that these general criteria must be met before passing through 1000 feet AGL in IMC and 500 feet AGL in VMC.

Another 15% stated that they use 1000 feet AGL whatever the meteorological conditions. 5% use 500ft AGL (mainly those who execute the most visual approaches).

If a single parameter is not met, a go-around must be initiated.

→ SOME FIGURES TO BEAR IN MIND

Nationally, about 3% of all approaches are **unstabilised** Approaches with, however, large differences between type. The best figures are about half a percent while the worst reach practically 50%!

These figures all come from an analysis Flight Data Monitoring of airline flights. They depend on the deviation limits set by each airline and which caused an investigation by the operator. Preferably these flight-parameter-deviation limits will remain confidential to prevent aircraft being flown up to the limit of these parameters. Since therefore some deviations do not show up, the real situation will be worse. For this reason the airlines do not in principle inform their pilots what the parameter-deviation limits are that will cause a flight to be analysed.

Nevertheless one can say that the majority of French airlines group **unstabilised** Approaches into **3 categories** depending on the **seriousness of the deviation.** The parameters monitored are the same as those which define a stabilised approach (viz. Definition of **unstabilised** approach in the Operations Manual).

Therefore the **unstabilised** approach rate at a particular airline depends closely on the parameter-deviation limits; however, the survey results indicate that with few exceptions the French airlines use more or less **the same parameters** for the **same type of aircraft,** which allow us to be relatively confident in our interpretation of the results.

→ PROBLEMS WITH THE GO-AROUND

The airlines raised the point that not enough go-arounds are performed when an **unstabilised** approach is detected.

At Roissy for example, the main base for many French airlines, there are about 3 go-arounds per thousand approaches of which a third are initiated by the pilot and two thirds by ATC. Therefore the flight crews at this airfield are carrying out 1 go-around per thousand approaches while there are about 3 **unstabilised** approaches per 100 approaches!

Many of the airlines underlined the inadequacy of the number of go-arounds compared to the number of **unstabilised** approaches. **The overwhelming majority of unstabilised approaches are not resulting in a go-around according to the data from the Flight Data Monitoring analysis.**

The airlines have indicated therefore that the message must continue to be made that **a go-around is always a good decision if an approach is unstabilised.**

Flight crew awareness of this must be raised. Numerous accidents or serious incidents have occurred **because a go-around was not performed** (or because it was too late).

The majority of the analyses show that flight crew believe that the parameter deviations are minor and that they can recover the aircraft. Operational time pressure is a factor which often comes up, as well as the feeling that the approach cannot fail. Once again, this tendency must be reversed. Failure is the failure to decide to go-around, when that is the only alternative in the given situation.

The airlines also indicated that go-arounds due to an **unstabilised** approach occur in situations that were not foreseen in the training exercise scenarios carried out in the simulator and that they can be "difficult" to perform. They are particularly feared and perceived as more difficult to execute than those integrated into the standard exercises.

A training review should take into account the fact that we must certainly not train crews to perform **unstabilised** approaches but we must definitely review the go-around exercise and complete it with a go-around in a more realistic configuration.

There is clearly a reality-gap between the go-arounds performed in the simulator and those carried out in everyday operations.

→ PROBLEMS DUE TO ATC AND ITS OPERATIONAL CONSEQUENCES

There is agreement in the airlines' remarks on this subject. Aircraft are "released" too late by ATC, leading to **unstabilised** approaches. Cross analysis between this survey and BEA investigation shows that a poor join-up between the end of radar control and a published approach path, laterally or horizontally, is not exceptional.

The majority of the scenarios highlighted by the airlines relate to the accidents or incidents cited in the introduction.

The airlines insisted notably that radar control should not terminate on the descent path and/or too late, which makes the flight crews have to regain the flight path, generally from above.

Aircraft automation is designed to intercept the localiser and then the glideslope, not the other way around, since it is not envisaged that in a normal configuration the glideslope would be intercepted before the localiser; moreover, when ATC give instructions that make the aircraft pass through the localiser it can force the crew to select the Heading or Vertical Speed mode. This is not the normal mode for carrying out ILS intercepts on a straight-in approach and this practice increases the risk that vertical mode will be forgotten by the crew.

ATC ensuring 30 seconds of level flight during the intermediate approach is indispensable so that the crew can prepare and so the aircraft can intercept automatically. Not ensuring this was highlighted by the airlines as a contributing factor.

Some airlines seemed to indicate that these parameters were better assured in other European countries.

→ DECELERATING APPROACHES

Another problem raised by the French airlines was that crews are sometimes requested to maintain an elevated speed on approach. An example combining the results of the FDM analysis and a crew report indicates that ATC requested an Airbus A330 (a particularly low-drag design) to maintain 200kts up to the Outer Marker. This led to an **unstabilised** approach because this aircraft in particular could never attain the correct approach speed by the minimum stabilisation height.

The airlines underlined that the cleaner aircraft become, the more difficult it becomes to lose significant excess speed in the descent.

→ 250KTS BELOW FL100

Passing below FL100, non-compliance with the 250kts limit can cause an **unstabilised** approach, as some airlines emphasised.

→ VISUAL APPROACH

Numerous airlines emphasised that a good number of **unstabilised** approaches occur when a visual approach is executed.

Beyond the effect of seasonality on the statistics (high number in Summer), it is important to note that on seeing the runway crews carry out **unstabilised** approaches whose flight path ends too close to the threshold or in which excess speed is significantly high (especially with turboprops).

The airlines insist that the causal factors are principally: the lack of a briefing and the consequences of a "laissez-faire" attitude.

→ AIRFIELD PROBLEMS

Among the airfields which have characteristics predisposing them towards **unstabilised** approaches, 5 in particular stand out. These are Calvi, Marseille, Montpellier, Basle-Mulhouse and Nice. Therefore the factors which might explain this should be investigated.

→ AIRLINE ACTIONS

The policies followed by each airline to reduce the risks of **unstabilised** approaches are **fairly diverse.**

At one extreme, one airline indicated that they did not intend to take any action on **unstabilised** approaches because "it had not been a major factor in any incident" and because of the "low seriousness of these events".

On the other hand, the majority of airlines follow the actions listed below.

Some airlines are very aware and carry out numerous actions during Recurrency Training in CRM and/or biannual Proficiency Training, by frequently reminding them of the risks and giving recommendations to their crews on procedure modifications gained from experience. Recurrent information campaigns are often used by the Flight Safety Officers.

In general, FDM analysis is widely proposed as a preventative tool; however, it only detects the problem after the event.

ministère de
l'Equipement
des Transports du Logement
du Tourisme
et de la Mer

direction
générale
de l'Aviation
civile

service
de la Formation
aéronautique
et du Contrôle
technique

division
Réglementation

Bureau des etudes et du
retour d'expérience

Paris, the

To Flight Data Analysis Managers
at the French Airlines

Aim: Questionnaire for a Study
on **unstabilised** Approaches

Ref: SFACT/RE

Managed by: L. Angerand

Under the JSSI (JAA Safety Strategy Initiative), it was clear that about half of public transport accidents occur during the approach and landing phase. A certain number of recent accidents or serious incidents with aircraft belonging to French airlines have highlighted the **unstabilised** approach. SFACT has therefore decided to carry out a safety study to evaluate the problem, basing it on the existing data in the airlines' Flight Data Monitoring Systems.

This study will examine **unstabilised** approaches that occurred during the course of the last 6 months of 2004.

You will find below the questionnaire which I would ask you to send to your local DAC before the 15th February 2005, who will then send it on to SFACT.

May I remind you that Flight Data Monitoring (FDM) is required by OPS 1.037 which obliges the airlines to analyse all anomalies detected by flight data monitoring and to produce a report in a format suited to its seriousness. This report must be sent to the authority. It must respect the anonymity of the individuals concerned and cannot be used for disciplinary action against the aircrew concerned. As a result, the reports submitted by the airlines for this study should respect these conditions.

NATIONAL SURVEY QUESTIONNAIRE

This questionnaire is to be filled in by each airline operating an FDM system based on the parameters recorded under OPS 1.037.

Airlines can fill in a single questionnaire for all the types they operate or a questionnaire for each type.

The reports sent to the DGAC by the airline should respect anonymity as laid down by OPS 1.037.

This questionnaire must be returned before the 15th February 2005 to your local DAC, who will send it on to the SFACT/ R.E.

Further details concerning this questionnaire can be obtained by contacting SFACT/R.E, 50 rue Henri Farman, 75720 Paris CEDEX 15 - Tel. : 01 58 09 48 92

→ 1. DEFINITION OF UNSTABILISED APPROACH USED BY THE AIRLINE:

1.1. What are the criteria for a stabilised approach in your Operations Manual?

1.2. What are the parameters used by your FDM system to detect **unstabilised** approaches (declare the name of the parameter and the defined deviation limits)?

→ 2. QUANTITATIVE ANALYSIS

2.1. During the period 1st July 2004 to 31st December 2004, how many **unstabilised** approaches were detected by your FDM system?

2.2. Do you categorise **unstabilised** approaches by the magnitude of the parameter deviations or as a function of other criteria? If yes, what are the corresponding figures. If no, what is the magnitude of the parameter deviation for each **unstabilised** approach?

→ 3. QUALITATIVE ANALYSIS

3.1. From the analysis of these flights, what main scenarios leading to an **unstabilised** approach came to the fore? Include the reports produced by the airline or the reference under which it was sent to your local DAC.

3.2. What are the consequences of **unstabilised** approaches on the rest of the flight: go-around, stabilised approach below the minimum stabilisation height, approach **unstabilised** all the way to landing. Are there any statistics in this area? Do any scenarios for particular aircraft types stand out?

3.3. Have actions already been taken by the airline to address this question? If yes, has their effectiveness been determined (either quantitatively – reduction in the **unstabilised** approach rate – or qualitatively – reduction in the seriousness of **unstabilised** approaches).