Operational Evaluation Board Report

Dassault Aviation
Falcon 900C

Report, Rev 2
29 June 2012

European Aviation Safety Agency
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Dassault Aviation Falcon 900C

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Revision Record

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Acronyms

AGL.................. Above Ground Level
AMC .................. Acceptable Means of Compliance
AOC .................. Air Operator Certificate
ATPL ................. Airline Transport Pilot Licence
ATO .................. Approved Training Organisation
DGAC ............... Direction Générale de l’Aviation Civile (French Civil Aviation Authority)
EASA ............... European Aviation Safety Agency
EU-OPS .......... Appendix to COMMISSION REGULATION (EC) No 859/2008
FSTD ............... Flight Simulation Training Device
FT ................... Feet
ATO .................. Approved Training Organisation
IEM .................. Interpretative and Explanatory Material
KIAS ............... Knots Indicated Air Speed
MEL .................. Minimum Equipment List
MMEL ............. Master Minimum Equipment List
NADP ............... Noise Abatement Departure Procedure
ODR ............... Operator Differences Requirements
OEB ............... Operational Evaluation Board
PF ................... Pilot flying
PNF ............... Pilot not flying
TRTO ............. Type Rating Training Organisation
SOP ............... Standard Operating Procedures
## Dassault Falcon 900C OEB Composition

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<tr>
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1) Noise Abatement Departure Procedure (NADP)
2) Steep Approach Landing Procedure

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**Note on references and reference texts:**
Where references are made to requirements and where extracts of reference texts are provided, these are at the amendment state at the date of publication of the report. Readers should take note that it is impractical to update these references to take account of subsequent amendments to the source documents.
Executive Summary

1. Manufacturer Application
Dassault Aviation has made an official request to EASA for an OEB of the Noise Abatement Departure Procedure (NADP) and the Steep Approach Landing Procedure for the Falcon 900C.

2. Evaluation
Dassault Aviation has proposed the NADP and Steep Approach Landing Procedure which can be found in the Operating Manual – Procedures and AFM Annexes.

2.1 Noise Abatement Departure Procedure
The OEB team evaluated the proposed NADP in a FSTD on the 30 March, 2011 and assessed the proposed pilot training requirements.

The evaluation was performed on a Mystère Falcon 50 full flight simulator. It involved the EASA Falcon OEB Chairman, being supported by Dassault Aviation pilots and engineers. A total of 12 take-offs with thrust reduction at 400 feet AGL have been performed during this evaluation. Abnormal situations, including engine failure and windshear conditions, were introduced to assess a crew's ability to discontinue the noise abatement procedure and adopt the procedure appropriate to the abnormal condition.

Due to similarities between the aeroplane types and the commonalities of the associated NADP procedures, the evaluation of the Mystère Falcon 50 is also valid for the Falcon 50EX, Mystère Falcon 900 and the Falcon 900C.

2.2 Steep Approach Landing Procedure
An Operational Suitability Evaluation of Falcon 900C Steep Approach, using a Mystère-Falcon 900 (same engines) and Falcon 900EX Primus 2000 (same avionics) full flight simulators was performed by EASA OEB respectively on 09 January 2012 and 29 October 2011. No flight testing in the aeroplane was deemed necessary by the EASA OEB.

3. OEB Recommendations

3.1 Noise Abatement Departure Procedure
Thrust reduction height (400 feet AGL) can be applied by Operators as an Acceptable Means of Compliance (AMC) to meet EU-OPS 1.235 provided the provisions of this report are complied with.

Based upon the substantiations provided by Dassault Aviation and the simulator trials undertaken by the OEB, the EASA has determined that a thrust reduction at 400 feet AGL during a close-in Noise Abatement Departure Procedure is safe and acceptable.

Prior to operating the Falcon 900C on a close-in NADP with a thrust reduction at 400 feet AGL, the EASA OEB recommends adherence to this report.
3.2 Steep Approach Landing Procedure

The EASA OEB found that Falcon 900C is operationally suitable for steep approach landing operations up to an approach path angle of 5.5 degrees, using associated Operating Manual Procedures provided by Dassault Aviation.

The EASA OEB has determined that the conduct of steep approach landing operations requires no higher piloting skill level than that of normal 3° approaches. However, the EASA OEB requires flight training, including briefing (no formal academic training, i.e. no classroom training), for competency in conducting steep approach landing operations.

Prior to performing Steep Approach Landing Procedures, the EASA OEB recommends adherence to this report.

3.3 There is no Falcon 900C OEB Report assessing the full training course and the type rating determination for this aeroplane

[Signature]
Captain Herbert Meyer
Section Manager, Operational Suitability - Fixed Wing -
Experts Department, EASA Certification Directorate
1. **Noise Abatement Departure Procedure**

### 1.1 Legal requirements for NADP procedures

EU-OPS stipulates procedures for NADP in OPS 1.235 (see below)

**OPS 1.235**

**Noise abatement procedures**

(See OPS 1.192)

An operator shall establish appropriate operating departure and arrival/approach procedures for each aircraft type in accordance with the following:

(a) The operator shall ensure that safety has priority over noise abatement, and

(b) These procedures shall be designed to be simple and safe to operate with no significant increase in crew workload during critical phases of flight, and

(c) For each aeroplane type two departure procedures shall be defined, in accordance with ICAO Doc. 8168 (Procedures for air navigation services, “PANS-OPS”), Volume I:

1. noise abatement departure procedure one (NADP 1), designed to meet the close-in noise abatement objective; and

2. noise abatement departure procedure two (NADP 2), designed to meet the distant noise abatement objective; and

3. in addition, each NADP climb profile can only have one sequence of actions.

### 1.2 General Description of the NADP

The procedure is designed to meet the close-in noise abatement objective (NADP 1).

The procedure involves:

- Normal take-off to 400 ft. AGL - including Gear retraction
- Target speed V2 + 10 KIAS
- Thrust reduction at 400 ft. AGL
- At or above 3000 ft. AGL flap retraction.

#### 1.2.1 Specific Thrust Reduction

The procedure requires a specific reduction of all 3 engines at 400 ft. AGL to a specific N1 designated “N1reduced”.

N1reduced is computed based on N1take-off of centre engine and ground temperature as specified in AFM section 5A-40 (with or without ice protection).

\[
N1_{reduced} = N1_{take-off} - 12\% 
\]
1.3 The evaluation process
An evaluation of the thrust reduction procedure, based on the operational procedure close-in NADP, using a Mystère Falcon 50 full flight simulator was performed 30 March, 2011.
No flight testing in the aeroplane was deemed necessary by the EASA OEB.

1.4 Training Areas of Special Emphasis
Prior to operating the Falcon 900C on a close-in NADP with a thrust reduction at 400 feet AGL, the Falcon OEB recommends the following Training Areas of Special emphasis:

1.4.1 The departure briefing should include all aspects of the NADP including as a minimum:
- the N1 to be set at 400 feet AGL. This parameter (reduced N1) is computed by Dassault Aviation and is available in the Normal Procedure for close-in NADP (Operating Manual – Procedures),
- abnormal/emergency procedures during the NADP

1.4.2 The crew should become proficient on the task sharing described in the Special Procedure for close-in NADP, in particular regarding the thrust reduction at 400 feet AGL which is to be performed by the PNF under the authority of the PF.

1.4.3 Before executing the NADP both pilots shall be trained in the procedure as PF and PNF as applicable.

1.5 Specification for training

1.5.1 Crew must be trained in using the procedure provided in the Dassault Aviation Operating Manual - Procedures (Special Normal Procedure close-in NADP) or in equivalent company SOP’s,

1.5.1.1 Crew should be made aware that the Special Procedure for close-in NADP - and only this one - supersedes normal Falcon 900C Standards Operating Procedures (SOPs),

1.5.2 Pilot Training Prerequisite
No prerequisite is required before entering the NADP pilot course except current type rating on the aeroplane.

1.5.2.1 The NADP pilot training course can also be included as an integral part of the aeroplane type rating training course

1.5.3 NADP Pilot Training

1.5.3.1 The initial training should comprise, as a minimum, three take-offs followed by the NADP, and two take-offs where non-normal situations are introduced during the NADP (engine failure, windshear, gear retraction problems etc.).
1.5.3.2 The Recurrent NADP training should be performed annually, and should include, as a minimum, one take-off followed by the NADP and one take-off where non-normal situations are introduced during the NADP.

1.6 Currency

1.6.1 The OEB recommends that pilots are not assigned to operate a Close-in NADP with a thrust reduction at 400 feet AGL on a Falcon 900C as part of the minimum certified crew either as PF or PNF unless he/she has carried out at least 3 NADPs within the previous 6 months on the aircraft or in the simulator.

1.6.1.1 Credit can be given for currency for NADPs performed on Falcon 50EX, Mystère Falcon 50 and Mystère Falcon 900 aeroplanes; however one NADP has to be performed on the Falcon 900C within the previous 12 months.

1.6.1.2 If currency has been lost, it can be renewed by completing the training described in paragraph 5.3.1 of this Report.

1.6.1.3 The Currency for Close-in NADP with thrust reduction at 400 feet AGL, may be maintained by performing the procedure during any take-off, provided that the defined procedure does not conflict with local operational provisions.

1.7 Training Commonality credits

Training commonalities between the Falcon 900C and the Falcon 50EX, Mystère Falcon 50 and Mystère Falcon 900 aeroplanes could be considered following an OEB catch-up process.

1.8 Applicability to specific airports

See Attachment 1: NADP Procedure - London City Airport / Other Airports.

2. Steep Approach Landing Procedure

2.1 General Description of the Steep Approach

2.1.1 A Steep Approach is used primarily when there are obstacles in the approach path that are too high to allow a normal 3° approach path. An approach path angle of 4,5 degrees or more is considered a steep approach.

2.1.2 The EASA OEB has determined that the conduct of steep approach landing operations requires no higher piloting skill level than of normal 3° approaches. However, since steep approach landing operations are often tailored to demanding airports - located in mountainous areas, having short runways - the EASA OEB requires flight training, including briefing (no formal academic training, i.e. no classroom training), for competency in conducting steep approach landing operations.
2.1.3 The EASA OEB found that Falcon 900C is operationally suitable for steep approach landing operations up to an approach path angle of 5.5 degrees with aircrew trained in accordance with the requirements set in this paragraph, and using associated Operating Manual Procedures provided by Dassault Aviation.

2.2 The Operational Suitability Evaluation process
An Operational Suitability Evaluation of Falcon 900C Steep Approach, using a Mystère Falcon 900 (same engines) and Falcon 900EX Primus 2000 (same avionics) full flight simulators was performed by EASA OEB respectively on 09 January 2012 and 29 October 2011. No flight testing in the aeroplane was deemed necessary by the EASA OEB.

2.3 EU-OPS Requirements for Steep Approach Procedures
The following EU-OPS and associated AMC references relate to steep approaches:
- Appendix 1 to OPS1.515(a)3: Steep approach procedures
- EU-OPS1.975: Route and aerodrome competence qualification
- AMC OPS1.975 §5 (TGL44): Route and aerodrome competence qualification (Category C aerodrome)

2.4 Falcon 900C References
Refer to appropriate Operating Manual Procedures and AFM Annexes.

2.5 Specifications for Training

2.5.1 Pilot Training Prerequisite
No prerequisite is required before entering the Steep Approach pilot course except a current type rating on the aeroplane, or full initial type rating training up to, but excluding, the check ride.

2.5.2 The crew must be trained in using the procedure provided in the Dassault Aviation Operating Manual Procedures or in the equivalent company SOP’s.
The Steep Approach pilot training course can be included as an integral part of the aeroplane type rating training course.

2.5.3 Steep Approach Pilot Training Programme

2.5.3.1 Flight Training
Flight training (as PF or PNF) may be conducted in a Falcon 900C (or Mystère Falcon 900 or Falcon 900EX) Level C or D FFS or in the aircraft with a Type Rating Instructor (TRI) and must address the following:
- **Briefing** prior to the simulator session, or during the flight preparation to include: AFM/ Operating Manual Procedures Limitations, Normal / Abnormal Procedures, Performance with special emphasis on increased landing distance.
- **Phases of the Steep Approach**, to include: Stabilized approach concept as a key success for steep approach landing, appropriate slats / flaps configuration, approach speed, and flare initiation.
2.5.3.2 Initial Training

The initial training should comprise, as a minimum, three Steep Approaches:

- one approach following a 5.5° Approach Path Angle with full stop landing to comply with normal procedures; and
- one approach following a 5.5° Approach Path Angle introducing an abuse in speed, managed by crew using AB1 and AB2 alternatively (pilot has to demonstrate his ability to be stabilized at 1000 ft), until touchdown followed by a go-around; and
- one approach following a 5.5° Approach Path Angle with an engine failure below 400 ft, followed by a full stop landing or a go-around at pilot discretion.

2.5.3.3 Recurrent Training

The Recurrent Steep Approach training should be performed every 6 months, and should include, as a minimum, one Steep Approach and a second Steep Approach where non-normal situations are introduced during the Approach.

2.5.3.4 Training Areas of Special Emphasis

The approach briefing should include all aspects of the Steep Approach, including as a minimum:

- normal and abnormal procedures during the Steep Approach;
- transition from a glide path reference system to a visual glide path indicating system; and
- computation of the field length data when using steep approach criteria.

The crew should become proficient on the task sharing described in the Special Procedure for Steep Approach, in particular regarding go-around. Both pilots shall be trained in the procedure as PF and PNF, as applicable.

2.6 Recent Experience / Currency

The OEB determined that there are no specific recent experience or currency requirements for Steep Approach.

2.7 Training Credit

Training credit (Initial and Recurrent) can be given for Steep Approaches training performed on either Mystère Falcon 900, Falcon 900EX, Falcon 2000, or Falcon 2000EX, provided a briefing covering the steep approach procedures avionics differences is taken.

2.8 Period of Validity of Competence

Before performing Steep Approach Landing Operations, an operator shall ensure that the commander fulfils the same requirements of EU-OPS1.975(b)(c) and (d).

2.9 Checking Requirements

There is no requirement for knowledge checking or flight proficiency testing for Falcon 900C steep approach qualification.

Attachment 1

NADP Procedure – London City Airport / Other Airports

1. Applicability to London City Airport

This procedure has been assessed by the EASA OEB team for London City Airport.

Refer to Dassault Operating Manual - Procedures, reference DTM 9819.

2. Other Airports

The process and the associated close-in NADP procedure have been developed for the London City Airport, and can be validated for other airports, provided:

- The new NADP procedure is accepted by the local Authority, and
- All obstacle clearance requirements are fulfilled.