JOINT AVIATION AUTHORITIES
JOINT OPERATION EVALUATION BOARD REPORT

Airbus A340
A340-200, 300, 500 & 600
Airbus has requested a JOEB process for evaluation of the A340-500/600. Due to the various subjects, subgroups have been set up and are:

- MMEL Subgroup
- FCL & OPS Subgroup
- Cabin Crew subgroup
- EFB (Electronic Flight Bag) Subgroup
- ULR (Ultra Long Range) Subgroup.

The enclosed report only covers the activities of the FCL & OPS subgroup, as some work is still going on in other areas; the respective subgroups will issue subgroup reports as required. No specific report will be issued by the MMEL sub-group as the **A 340** MMEL is the document recommended for approval by the JAA.

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JAA Operation Evaluation Board – FCL & OPS Subgroup

Jean Claude Albert
JOEB Chairman

Captain Patrick Pouligny
Chief Flight Inspection - DGAC France

Captain Pete Griffiths
Flight Inspector - CAA UK

Captain Michel Bedrine
FCL Advisor- DGAC France

Jean Pierre Mesure
Licensing Division - DGAC France

Jean Baril
JOEB Co-ordinator - Central JAA

Evan Nielsen
JOEB Co-ordinator - Central JAA

Report prepared and submitted by:

Jean Claude ALBERT, JOEB Chairman

Jean Pierre MESURE, FCL § OPS Subgroup Focal Point
Preamble

This Joint Operation Evaluation has been performed by an integrated team composed of JAA, FAA and TCCA, members. However, this report is applicable to the JAA only.

As no JAA JOEB report is available for Airbus A 340-200 and A 340-300 series, this Joint Operation Evaluation report includes the differences between the variants using the findings of existing evaluation reports from JAA National Aviation Authorities (JAA NAA) and the FAA FSB.

The report specifies the JAA type rating, initial training course, familiarization courses, checking and currency minimum requirements:
- For an initial type rating on the A340,
- For pilots already qualified on one A340 variant and moving onto another variant.

This Evaluation has been made in compliance with the JAA Terms of Reference and the JOEB handbook.

JAA recommends the approval of the Airbus proposed training courses for initial type rating on the A340 and familiarization training for variants.

JAA recommends approval of the Airbus referenced ODR Tables

JAA recommends a single licence endorsement (same type rating) for all variants of the A340.

Fergus Woods
JAA Licensing Division Director

Georges Rebender
JAA Operations Division Director
Executive Summary

The Operational Evaluation (OE) was conducted as a joint effort by the Joint Aviation Authorities (JAA), Federal Aviation Administration (FAA), and Transport Canada Civil Aviation (TCCA) to simultaneously meet the JAA requirement for the JOEB, the FAA requirement for a Flight Standardization Board (FSB) and the Canadian requirement for an Operational Evaluation. Each Authority used the results of the evaluation process to produce a report specific to its particular requirements that, while similar in intent, differ somewhat in detail.

Airbus proposed that the A340-600 and the A340-500 share the same type rating with the A340-300, and should therefore have a single licence endorsement (same type rating): “A340” for all variants (200, 300, 500 and 600).

The base aircraft for comparison purposes for the OE was the A340-300.

In addition Airbus submitted that pilots holding an A340 rating achieved on the A340-200 or the A340-300 should be able to qualify on the A340-500 or A340-600 after completion of familiarization training (difference training under FAA - TCCA terminology). The same qualification criteria should apply to pilots who achieve the A340 type rating on the A340-500 or A340-600, and subsequently convert to the A340-200 or the A340-300.

The familiarization training included ground school (CBT) to cover technical differences.

The Operational Evaluation was conducted in accordance with the processes detailed in the JAA JOEB Handbook, dated December 2002 and in the FAA AC 120-53 Crew Qualification and Pilot type rating requirements for Transport category Aircraft operated under FAR Part 121, dated 13 May 1991.

JAR requirements as in JAR-OPS 1 (§ 1.940, 1.945, 1.950, 1.965, 1.970 and 1.980 including associated appendices, AMCs and IEMs), JAR-FCL 1 (§1.215, 1.220, 1.225, 1.230 1.235, and 1.261 including associated appendices, AMCs and IEMs) have been considered.

Airbus provided the Operational Evaluation team with proposed Operator Differences Requirements (ODR) tables to be used as a basis for the evaluation.

Five Pilots (JAA, FAA and TCCA crews) qualified and current on the A340-300 shared an agreed flight programme for the handling comparison test.
The first phase of the joint evaluation of the Airbus A340-600 aircraft by the JAA, FAA, and TCCA was completed by 1 March 2002. System differences were reviewed and Normal, Abnormal, and Emergency procedures were compared between A340-300 and A340-600 variants. Sample Operator Difference Requirements were examined and proposed Computer Based Training (CBT) reviewed. Both the A340-300 and A340-600 aircraft were flown to assess any potential differences in handling qualities.

The second phase of the joint evaluation of the Airbus A340-500 aircraft by the JAA, FAA, and TCCA was completed by 1 October 2002. System differences were reviewed and Normal, Abnormal, and Emergency procedures compared between A340-300 and A340-500 variants. Sample Operator Difference Requirements were examined and proposed Computer Based Training (CBT) reviewed. Both the A340-600 and A340-500 aircraft were flown to assess any potential differences in handling qualities.

The Operational Evaluation team recommends same type rating, "A340" (as single licence endorsement), is applied to all variants of the A340.

JAA recommends that:
- At least two familiarization sectors are operated when transitioning from the A340-200 or from the A340-300 to the A340-600, and
- At least one familiarization sector is operated when transitioning from the A340-200 or from the A340-300 to the A340-500.
- At least one familiarization sector is operated when transitioning from the A340-500 to the A340-600.

Note: Whilst it was determined that both the A340-500 and the A340-600 were sufficiently similar in terms of system presentation and handling qualities to share the same type rating with the A340-200 or with the A340-300, there were, nonetheless, some differences that could only be satisfactorily addressed by familiarization sectors. These related to engine handling and the increased size and weight of the other variants.

The Operational Evaluation team determined that only "B" level differences (aircraft are functionally similar) existed between the A340-500 (variant), the A340-600 (variant) and the A340-300 (base aircraft). Ground courseware on CBT/Video/Transparencies is adequate to cover differences when transitioning from:
- The A340-300 variant to the A340-500 variant,
- The A 340-300 variant to the A340-600 variant,
- The A340-300 variant to the A340-200 variant, and vice versa
- The A 340-500 variant to the A340-600 variant, and vice versa
1. Purposes and Applicability

This report
- Defines the Type Rating assigned to the A340 family.
- Proposes Master Common Requirements (MCR).
- Describes Master Differences Requirements (MDR) for crews requiring differences training
- Provides reference of acceptable Operator Difference Requirements (ODR tables).
- Makes recommendations for initial Training
- Makes recommendations for Familiarization training course
- Makes recommendations for checking
- Makes recommendations for currency

2. Pilot Type Rating requirements

In reference to JAR FCL1 Subpart F and to the JOEB evaluation procedure, the same Type Rating and, consequently, the same licence endorsement is assigned to the A340-200, A340-300, A340-500 and A340-600.

Pilots completing the necessary training and checks in the A340-200/300/500/600 as per JAR- FCL 1, prescribed by this report, are assigned the “A340” type rating.

Unless otherwise specified “A340” means A 340-200, 300, 500 and 600 variants throughout the report.

3. Master Common Requirements

These Master Common Requirements have been jointly agreed with the TCCA and FAA Flight Standardisation Board, through the integrated evaluation process.

MCRs are requirements common to the A340-200, 300, 500 and 600.
The A340-200, 300, 500 and 600 have been designed with a very high level of commonality in terms of:

1) Cockpit layout,
2) System definition and operation, and
3) Handling characteristics.

This level of commonality has a direct and significant impact on the definition of the training programmes.

3.1 Altitude callouts during landing

Use of automatic voice callouts for landing is the same for all A340 aircraft.

These callouts may be customized consistent with JARs for low visibility operation (JAR-AWO, JAR-OPS 1) for the intended operation. Unless otherwise agreed by the NAA, operators flying more than one A340 variant fleet, should standardize those callouts within the fleet.

3.2 Aircraft Approach and circling Categories:

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A340-200/300</td>
<td>C</td>
</tr>
<tr>
<td>A340-500/600</td>
<td>D</td>
</tr>
</tbody>
</table>
4. Master Differences Requirements tables

Master Difference Requirements for the A340 aircraft are shown in the table below and represents the result of work performed in the joint JAA, FAA and TCCA evaluation. The table also includes the requirements for the A340-200 & 300 based on FAA FSB report (catch up process).

Definitions of the various levels for Training/ Checking/ Currency are the ones from the JOEB handbook, and the relevant definitions are included after the table for reference.

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>A340-200</th>
<th>A340-300</th>
<th>A340-500</th>
<th>A340-600</th>
</tr>
</thead>
<tbody>
<tr>
<td>A340-200</td>
<td>NA</td>
<td>A/A/A</td>
<td>B/A*/B</td>
<td>B/A*/B</td>
<td></td>
</tr>
<tr>
<td>A340-300</td>
<td>A/A/A</td>
<td>NA</td>
<td>B/A*/B</td>
<td>B/A*/B</td>
<td></td>
</tr>
<tr>
<td>A340-500</td>
<td>B/A*/B</td>
<td>B/A*/B</td>
<td>NA</td>
<td>B/A*/B</td>
<td></td>
</tr>
<tr>
<td>A340-600</td>
<td>B/A*/B</td>
<td>B/A*/B</td>
<td>B/A*/B</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

"NA" means "Not Applicable"

Yellow cells correspond to the cases demonstrated, others have been deduced from analysis, based on FAA FSB report.

"**" means "No requirement exists for a formal check, but it is recommended that theoretical knowledge should be verified by a multi choice questionnaire or other suitable method".
Difference level definitions Training/Checking/Currency extracted from the JOEB handbooks:

**Level A Training.** Level A difference training is applicable to functionally equivalent aircraft with differences that can adequately be addressed through self instruction. Level A training represents a knowledge requirement such that, once appropriate information is provided, understanding and compliance can be assumed to take place. Compliance with Level A training is typically achieved by methods such as issuance of operating manual page revisions, dissemination of flight crew operating bulletins or differences handouts to describe minor differences between aircraft.

**Level B Training.** Level B difference training is applicable to functionally similar aircraft with system or procedure differences that can adequately be addressed through aided instruction. At Level B, aided instruction is appropriate to ensure crew understanding, emphasize issues, provide a standardised method of presentation of material, or to aid retention of material following training. Level B aided instruction typically employs such methods as slide/tape presentations, Computer Based Training (CBT), stand-up lectures, or videotapes.

**Level A Checking.** Level A checking indicates that no check related to differences is required at the time of differences training. A crewmember is, however, responsible for knowledge of each variant flown, and differences may (and should) be included as an integral part of subsequent recurrent proficiency checks.

**Level A Currency.** At Level A currency is considered to be common to each variant. Thus, assessment or tracking of currency for separate variants is not necessary or applicable. Maintenance of currency at in any one variant or a combination of variants suffices for any other variant.

**Level B Currency.** Level B currency is "knowledge related" currency, typically achieved through self-review by individual crewmembers for a particular variant. Self-review is usually accomplished by review of material provided by the operator to crewmembers for that purpose. It may be undertaken at an individual crewmember's initiative, but the operator must identify the material and the frequency or other situations in which the material should be reviewed. Self-review may be based on
manual information, bulletins, aircraft placards, memos, class handouts, videotapes, or other memory aids that describe the differences, procedures, manoeuvres, or limits for pertinent variant(s) that crews are flying.
5. Operator Differences Requirements Tables

ODR tables are used to show an operator’s compliance method. Detailed Airbus generic ODR tables are on file with the Central JAA. Copies are available on request. These ODR tables are provided as Airbus generic, and therefore may not include items that are applicable to particular operators. The ODR tables assume that pilots are qualified, current and experienced in operating the base aircraft.

The Airbus ODR tables have been developed in accordance with AMC 1.980(b) & IEM 1.980(b) of JAR-OPS 1 Subpart N.

These ODR tables have been found acceptable by JAA. They represent an acceptable means of compliance with MDR provisions for the aircraft evaluated based on those differences and compliance methods shown. These tables do not necessarily represent the only means of compliance for operators with aircraft having other differences.

Operators flying more than one A340 variant fleet must established ODR tables pertinent to their fleet. These operators’ ODR tables should be accepted by NAA.
6 Specifications for Training

6.1 Type rating course (transition course)

6.1.1 Area of emphasis

Features within the electronic flight control system and its associated side stick controller, the A/THR system, the Electronic Centralized Aircraft Monitoring system (ECAM) warrant special interest and emphasis.

NOTE: The following applies to the A340 family but also to all aircraft types and variants that belongs to the Airbus “fly by wire” family.

In light of the unique features of this aircraft family, the JOEB has determined that certain aspects of knowledge, skills and abilities must be emphasized during the initial training process:

- **Fly by wire**
  - Knowledge of flight characteristics and the degree of flight envelope protection provided by the various flight control laws both for pitch, roll and yaw control.
  - Procedural and handling consequences following multiple failures that result in alternate and/or direct law.
  - Knowledge of the use of side stick controller with a special emphasis on the relationship between the two controllers and the transfer of control.

- **Use of Flight Management System**
  - Knowledge of the various modes of automation
  - Knowledge and skills related to MCDU / FCU use
  - Recognition of mode awareness and transition modes through the FMA
  - CRM issue linked to automation (task sharing and crosschecks)

- **Use of ECAM**
  - Knowledge of appropriate use of ECAM in conjunction with system failures
  - Crew discipline for ECAM actions: respect of the depicted procedure, crosscheck of irreversible actions, aircraft status analysis
- Auto Thrust system
  - Knowledge of the thrust control system in conjunction with the “non moving throttles”
  - Recognition of all messages associated to Auto Thrust failure, engagement and disconnection

6.1.2 Type rating course (Transition course)

The Airbus proposed type-rating training (transition course) is in compliance with the AMC 1.261 (c) (2) of JAR-FCL 1 (A).

The course is divided in the following phases:
- Ground phase
- Normal phase
- Abnormal/emergency phase
- LOFT phase
- Skill test (See checking § 7 for details)
- Flight phase (base training if applicable)

All students are “Trained to Proficiency”. The objectives and phases breakdown are included in Appendix 1. They are extracted from the Airbus TRTO documentation and reflect the status of the A340 type-rating course.

Note: As the flight crew training program has evolved since October 2002, the current JAR/FCL 1 approved breakdown (version “Footprint 2”) is included in Appendix 1.

For a pilot to be qualified onto a specific variant of the A340, several paths exist depending upon simulator availability and are as follows:

a) Qualification onto A340-200:

At this stage no dedicated A340-200 simulator exists, consequently to qualify onto the A340-200 the path is:

- Type Rating course conducted on A340-300 simulator then familiarization course from A340-300 to A340-200.
b) **Qualification onto A340-300:**
- Type rating course conducted on an A340-300 simulator, or
- Type Rating course conducted on an A340-600 simulator then familiarization course from A340-600 to A340-300.

c) **Qualification onto A340-600:**
- Type rating course conducted on an A340-600 simulator, or
- Type Rating course conducted on an A340-300 simulator then familiarization course from A340-300 to A340-600.

d) **Qualification onto A340-500:**
- At this stage no dedicated A340-500 simulator exists, consequently to qualify onto the A340-500 the path is:
  - Type Rating course conducted onto A340-600 simulator then familiarization course from A340-600 to A340-500, or
  - Type Rating course conducted on A340-300 simulator then familiarization course from A340-300 to A340-500.

In summary, for type rating course on the A340 family, any simulator configuration can be used provided that the familiarisation training for the variant to be flown is subsequently conducted.

Nevertheless the JOEB strongly recommends that crews intending to fly the A340-200 or the A340-300 are trained on an A340-300 simulator and that crews intending to fly the A340-500 or the A340-600 are trained on an A340-600 simulator.

When the Type Rating Training Course is part of an Operator’s Conversion Course, the Operator’s documentation must be used (e.g. Operating Manual, Check-list, SOPs) as required by JAR-OPS 1.945.

**6.2 Line flying under supervision (LIFUS)**

6.2.1 **Purpose of Line Flying Under Supervision (LIFUS)**
There are a variety of reasons why the JOEB may specify LIFUS in conjunction with master difference requirements. One or more of the reasons described below may apply:

- a. Introduction of new aircraft types or variants;
- b. Introduction of new systems (e.g., FMS, TCAS);
- c. Introduction of new operation (e.g. oceanic operation);
d. Experience for a particular crew position (e.g. PIC, SIC, F/E);
e. Post qualification skill refinement (e.g. refining alternate or multiple ways to use particular equipment to increase operating efficiency, operating flexibility, or convenience);
f. Special characteristics (e.g. unique airports, mountainous areas, unusual or adverse weather, special air traffic control procedures, non-standard runway surfaces, etc.)

6.2.2 LIFUS in case of initial type rating onto any A340 variant

In the case of an initial type rating onto the A340, a minimum of 10 sectors including a line check is recommended for Line Flying Under Supervision (LIFUS). This may be reduced at the discretion of NAA taking in account relevant factors such as conclusions to be established by the JAA Cross Crew Qualification / Mixed Fleet Flying (CCQ/MFF) working group and previous Airbus “fly by wire” experience of the pilots. Where there is a change of operating conditions or route structure this should also be taken into account.

6.3 Familiarization courses & familiarization sectors

6.3.1 Familiarization courses

JAA, FAA and TCCA recommend approving the Airbus familiarization training courses:
➢ The transition between A340-200 and A340-300 is assessed as requiring training level A.
➢ The transition from the A340-300 to A340-600 is assessed as requiring training level B.
➢ The transition from the A340-300 to A340-500 is assessed as requiring training level B.
➢ The transition between A340-500 and A340-600 is assessed as requiring training level B.

Familiarisation training is based upon clearly defined learning objectives and addresses all ODRs as identified in the ODR tables and validated by JAA, FAA and TCCA in their joint OE/FSB evaluation.

Airbus familiarization courses provided under Computer Based Training (CBT) have been assessed and found acceptable.

6.3.2 Familiarization sectors

Following familiarization training onto the A340-600, JOEB recommends familiarization sector(s) as per the table below. They differ from LIFUS, as a line check is not required following their completion.
Those familiarization sector(s) should be done with a commander specifically nominated by the operator.

<table>
<thead>
<tr>
<th>FROM</th>
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<th>A340-300</th>
<th>A340-500</th>
<th>A340-600</th>
</tr>
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<td>A340-200</td>
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<td>0</td>
<td>1*</td>
<td>2*</td>
</tr>
<tr>
<td>A340-300</td>
<td>0</td>
<td>NA</td>
<td>1*</td>
<td>2*</td>
</tr>
<tr>
<td>A340-500</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>1*</td>
</tr>
<tr>
<td>A340-600</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>NA</td>
</tr>
</tbody>
</table>

* means “When moving, from the A340-200 or from the A340-300, to the A340-500, and when moving, from the A340-200, A 340-/300 or the A340-500, to the A340-600, a minimum of one familiarization sector as Pilot Flying (PF) is required”.

6.4 Recurrent training.

The recurrent training program must comply with JAR-OPS 1.965.

All A340 variants are under the same license endorsement, as a consequence, recurrent training on one variant is valid for all, provided that the differences between variants are covered. However, when there are significant additional equipment differences to the standard fit (e.g. HUD, FMS) between the A340 variants flown, the operator shall ensure that familiarity is maintained on all variants.

Difference between A 340 variants are identified in ODR tables, as specified under JAR-OPS 1.980.

The differences between the A340 variants have been assessed as maximum of level B. For variants at level B, recurrent training shall be addressed through aided instruction such as:

- Slide / tape presentations
- Computer Based Training (CBT) which may be interactive
- Video
- Classroom instruction

JOEB recommends approval of the specific program developed by Airbus and which is described in Annex 2

As a consequence recurrent training can be conducted on any A340 simulator, provided that the differences are covered as per the proposed matrix in Annex 2.
7. Specification for Checking

7.1 Skill test following type-rating course (transition course)

In addition to the mandatory items from the skill test as per Appendix 2 to of JAR-FCL 1.240 the following features must be checked:
- Use of side-stick controller
- Knowledge of the various mode of automation
- Knowledge and skills related to the use of MCDU/ FCU and crosschecks using the FMA
- Use of ECAM
- Use of auto thrust system

7.2 Recurrent Checking Checks

Proficiency checks must be conducted in compliance with JAR-FCL 1.245 and JAR-OPS 1.965.
JOEB, JAA, FAA and TCCA confirmed that a proficiency check conducted on one variant is valid for all variants, provided that the differences have been covered during the recurrent training, as per the enclosed matrix in Annex 2. Consequently proficiency checks can be conducted on any A340 simulator.

7.3 Line checks

As all A340 variants share same type rating (single licence endorsement), a line check on any variant is valid for all variants.
However, when there are significant additional equipment differences to the standard fit (e.g. HUD, FMS) between the A340 variants flown, the operator shall ensure that familiarity is maintained on all variants.
8. Currency / Recent experience

Compliance with JAR-OPS 1.970 or JAR-FCL 1.026 as appropriate is required for recent experience.
Concerning the A340 family, JAA, FAA and TCCA concluded that take-offs and landings performed on one A340 variant, within ninety days, are valid for all variants. This means that for pilots flying more than one A340 variant, the recent experience requirement is satisfied as soon as they achieve 3 take-offs and landings, as handling pilot, regardless the variant flown.

9. Operations recommendations

JOEB recommend that operators, when flying more than one A340 variant fleet, use, when possible, a unique cockpit configuration for the following safety related items:
- Unit system (metric or non metric) on all displays.
- Altimeter settings (QNH/QFE)
- Callouts
- FMS specifications and functions (software and hardware)

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