

**CENTRAL JOINT AVIATION AUTHORITIES**  
**JOINT OPERATIONAL EVALUATION BOARD**  
**REPORT**



**Sikorsky S-92A**

**Revision final draft**

Dated 10<sup>th</sup> of June 2005

Revision 2

Joint Aviation Authority  
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The Netherlands

[www.jaa.nl](http://www.jaa.nl)

Sikorsky has requested a JOEB process for evaluation of the Sikorsky S-92. Due to the various subjects, subgroups have been set up and are:

- FCL & OPS Subgroup
- SIMULATOR EVALUATION (JSET) Subgroup
- MMEL Subgroup

The MMEL is not part of this report. The MMEL is a stand alone document.

## **REVISION RECORD**

<u>Revision no.</u>	<u>Section</u>	<u>Page</u>	<u>Date</u>
Original	<u>All</u>	<u>All</u>	<u>February 24<sup>th</sup>, 2005</u>
Revision 1	<u>All</u>	<u>All</u>	<u>April 20<sup>th</sup>, 2005</u>
<u>Revision 2</u>	<u>All</u>	<u>All</u>	<u>June 10<sup>th</sup>, 2005</u>

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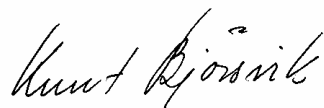
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## **PREAMBLE**

This evaluation has been made in compliance with the JAA Terms of References for JOEB, corresponding complementary Procedures Document and the JOEB handbook.

This report specifies the JAA minimum requirements for the initial Type rating training course, Checking and Currency on the Sikorsky S-92A.

This report also contains the findings of the operational acceptability of the S-92A with regards to JAR-OPS 3. The Operational Evaluation was conducted in accordance with the processes detailed in the JAA Administrative and Guidance Material, Section One, Part Two, Chapter 5.

Central JAA recommends the approval of the Sikorsky proposed training course for initial type rating on the Sikorsky S-92A.



Fergus Woods  
Licensing Division Director



Georges Rebender  
Operations Division Director

## **ACRONYMS**

ACAS	Airborne Collision Avoidance System
ADF	Automatic Direction Finder
ADS	Air Data System
AFCS	Automatic Flight Control System
ATC	Air Traffic Control
ATPL	Airline Transport Pilot License
CAA UK	Civil Aviation Authority United Kingdom
CPL	Commercial Pilot License
CVR	Cockpit Voice Recorder
DME	Distance Measuring Equipment
EGPWS	Enhanced Ground Proximity Warning System
EICAS	Engine Indication and Crew Alerting System
ELT	Emergency Locator Transmitter
FAA	Federal Aviation Administration
FDR	Flight Data Recorder
FMS	Flight Management System
FNPT	Flight Navigation Procedure Trainer
IFR	Instrument Flight Rules
ILS	Instrument Landing System
JAA	Joint Aviation Authorities
JAR-FCL 2	Joint Aviation Requirements Flight Crew Licensing (Helicopters)
JAR-OPS 3	Joint Aviation Requirements Operations 3 (Commercial Transport Helicopters)
JOEB	Joint Operational Evaluation Board
JSET	Joint Simulator Evaluation Team
kt	Knots (speed unit)
MAPt	Missed Approach Point
MDA	Minimum Descent Altitude
MFD	Multi-function Display



MMEL	Master Minimum Equipment List
MSP	Mode Select Panel
NAV	Navigation
PA	Public Address
PCM	Project Certification Manager
PFD	Primary Flight Display
RFM	Rotary Flight Manual
TCAS	Traffic Collision and Avoidance System
T5 Test	Refer to FCL/OPS Common Procedure Document
TSO	Technical Standard Order
VFR	Visual Flight Rules
VHF	Very High Frequency (Radio equipment)
VNAV	Vertical Navigation Mode
VOR	VHF Omni-directional Range

## **EXECUTIVE SUMMARY**

The Operational Evaluation (OE) was conducted by the Joint Aviation Authorities (JAA) to meet the JAA requirement for the JOEB.

The Operational Evaluation was conducted in accordance with the processes detailed in the JAA Administrative and Guidance Material, Section One, Part Two, Chapter 5, JAR requirements as in JAR-OPS 3 (§ 3.940, 3.945,3.950, 3.965, 3.970 and 3.980 including associated appendices, AMC's and IEM's) and JAR OPS 3 Subpart K and L, JAR-FCL 2 (§2.215, 2.220, 2.225, 2.230 2.235,and 2.261 including associated appendices, AMC's and IEM's) have been considered.

Two JAA pilots were trained on the Sikorsky S-92A.

As part of this evaluation process, the Normal, Abnormal, and Emergency procedures for the Sikorsky S-92A were reviewed and Sikorsky made the necessary corrections.

## **OPERATIONAL EVALUATION REPORT / FCL & OPS SUBGROUPS**

### **1. Purpose and applicability**

This report:

- Defines the Type Rating assigned to the Sikorsky S-92,
- Makes recommendations for initial Training,
- Makes recommendations for checking,
- Makes recommendations for currency,
- Determines findings on the operational acceptability to be considered by NAAs and Operators.

The JOEB performed a T5 test, according to JAA specific regulation and guidance.

Due to the Sikorsky production plan, new and more restrictive US government foreign pilot training entry requirements to the USA, availability and planned time window for the simulator evaluation, the JOEB OPS/FCL members were split on two different courses, six weeks apart.

The chairman followed the first FAA approved ground courses for a FAA customer. This ground course started 12<sup>th</sup> of July and finished 4<sup>th</sup> of August 2004 at the Sikorsky /Flight Safety International Training Centre, West Palm Beach, Florida.

Being also a member of the JSET team, the Chairman received 8,8 hour actual hands-on flight training on pre-production number 4 (N492SA) at Grand Prairie Municipal Airport, Dallas, Texas over a three day period starting August 7<sup>th</sup>, 2004.

This additional training was desired in order to have some actual S-92A feeling for the upcoming simulator evaluation.

The first changes were made in the process of the course. However an initial report was given to Sikorsky/FSI containing shortcomings based on this initial evaluation. A second assessment was done after the completion of the course by the second JOEB member, Dé Jansen.

In view of the fact that during the second assessment (first JAA course) already JAA pilots were following the course, the following provisions were pre-arranged with Sikorsky / FSI. Depending on this second assessment;

- if extensive changes had to be made in order to be able to give it final approval, additional training would have to be made available for all students attending the course.

From 30. August to 25. September 2004, the second JOEB OPS/FCL member (D  Jansen) joined Sikorsky S-92A initial pilot ground school course, also at Sikorsky / Flight Safety International facility at West Palm Beach, Florida. In addition to Captain Jansen four instructor pilots from the first JAA off-shore customer (Norsk Helikopter AS, of Stavanger, Norway) attended this course as well as a Norwegian CAA FCL inspector pilot.

The ground course consisted of classroom instruction (given by a FSI instructor), supplemented with practice of Rotorcraft Flight Manual normal, abnormal and emergency procedures using the simulator as a procedure trainer. Cockpit mock-ups with touch screen interfaces (level FNPT) are not yet available (expected availability in 2005). Once the FNPT will be available, the NAAs will have to assess the device against JAR STD 3.

From 22. September to 8. October 2004, Captain Jansen received manoeuvres and procedures training, using the Flight Safety International S92A level C flight simulator, qualified by both the FAA National Simulator Program (NSP) and the JAA Joint Simulator Evaluation Team (JSET).

The type rating training followed by the second JOEB member was performed according to the Sikorsky / FSI proposed JAA Type Rating Training Program (JAA TRTP).

The JOEB performed on the aircraft one short-range flight, one mid-range, and one long range flight, totalling approximately 5 flight hours with 3 full-stop landings. These flights were used to determine if the Sikorsky S-92A was suitable for operation.

- The JOEB Sikorsky S-92A operational evaluation report is presented as Appendix 1.
- Compliance with JAR-OPS 3 was reviewed and is presented in Appendix 2
- The RFM normal, abnormal, and emergency procedures were evaluated during the simulator training and the operational evaluation.
- The Sikorsky type rating training program is presented in Appendix 3.

## **2. Pilot type rating requirements**

In reference to JAR FCL 2.220 and the JOEB Evaluation Process, a new Pilot Type Rating is assigned to the Sikorsky S-92A and the Designated Licence Endorsement is **SK 92**.

### **3. Specific operational issues**

#### **3.1 *Flight Director coupled operations***

During coupled operations the flight director bars are only presented at the pilot flying position.  
See details Appendix 1, 5.3.3.1.

#### **3.2 *AP features***

See details Appendix 1

#### **3.3 *RFM and checklist***

Has been reviewed for consistency.

#### **3.4 *APU***

See details Appendix 1

### **4. MDR –OD**

#### **4.1 *MDR***

Reserved – Due to the fact that the Sikorsky S-92A is a new type of helicopter, no Master Difference Requirement tables has been produced.

#### **4.2 *ODR***

Reserved – Due to the fact that the Sikorsky S-92A is a new type of helicopter, no Operator Difference Requirement tables has been produced.

### **5. Specifications for training**

#### **5.1 *Full type rating training course***

The Sikorsky proposed JAA TRTP is in compliance with the AMC 2.261 (c) (2) of JAR-FCL 2 (H) Subpart F. Refer to Syllabus in Appendix 1 of this report. The course is divided in the following phases:

- Theoretical Ground School phase,
- Simulator phase,
- Skill test,
- Aircraft training.
- Student prerequisite: Refer to Flight Training Plan paragraph 1.02

Note: The type rating course is recommended for approval provided that operator specific documentation is used throughout the course.

## **5.2 Specifications for special emphasis training during initial training**

- 5.2.1 The type rating course, as proposed by Sikorsky and Flight Safety International, was found suitable for pilots with previous multi pilot helicopter experience. For pilots with previous FMS experience with the Universal Navigation System (UNS), CBT training could be waived. Specific conditions are set in the proposed JAA TRTP.
- 5.2.2 The JOEB has identified several helicopter systems and / or procedures that should receive special attention in the Sikorsky S-92A type rating course:
- Flight Management System (FMS),
  - Automatic Flight Control System (AFCS),
  - Multi-function display (MFD) and Engine Indications and Crew Alerting System (EICAS),
  - Enhanced Ground Proximity Warning System (EGPWS),
  - Traffic Collision and Avoidance System (TCAS),
  - Reversion modes of the FADEC controlled engines
- 5.2.3 In addition, the following characteristics of the Sikorsky S-92A should be emphasized throughout the training program:
- With regards to the high level of automation in this helicopter, crew coordination and proper flight management (task sharing and crosschecking) should be reinforced.
- 5.2.4 **IMPORTANT NOTE: The JOEB also found that early exposure to the interaction of AFCS and FMS is important, especially for pilots with no or limited previous FMS experience. Establishing early confidence in manually flying the aircraft, with a proper mixture of manual and FMS controlled flight mode is equally important due to heavy reliance on the AFCS.**

## **5.3 Recurrent training**

- 5.3.1 Recurrent training must be performed as specified in JAR-FCL 2 and JAR OPS 3. The recurrent training proposed by Sikorsky is beyond JAR OPS 3 requirements. The JOEB recommends to follow the requirements as specified in JAR OPS 3.
- 5.3.2 Proficiency Checks must be conducted in compliance with adequate JAR-FCL 2.245 and JAR-OPS 3.965.

## **6. Specifications for checking**

### **6.1 Skill test**

As required by Appendix 1 and 2 to JAR FCL 2.240 and 2.295, amendment 3.

### **6.2 Line checks**

As specified in Appendix 1 to JAR-OPS 3.965 .

## **7. Specifications for Currency / recent experience**

Applicants must meet the requirements of JAR-OPS 3.

## **8. Specifications for LIFUS (Line Flying under Supervision)**

In the case of a type rating training course onto a S-92A, the JOEB recommends a minimum of 10 legs, for LIFUS with a minimum of 5 hours total flight time plus a line check.

## **9. Additional JOEB findings and recommendations**

Reserved

## **10. Aircraft regulatory compliance checklist**

- 10.1 Sikorsky provided the JOEB with helicopter serial number 92007, registration N908W, to conduct the operational evaluation in November 2004. The helicopter is the second production helicopter and was presented in a VIP configuration (19 seats).N908W has the optional fifth (centre position) MFD installed.
- 10.2 All comments, remarks and observations made in Appendix 2 to this report are based solely on this MFD configuration.
- 10.3 Regarding the items mentioned in section 13 of this report the absence of MSP and AP/FD cross talk is under investigation, the JOEB has determined that the helicopter is in compliance with JAR-OPS 3, and especially subparts K and L.

The attached checklist, Appendix 2, provides all the JOEB findings and detailed information.

## **11. Specifications for devices and simulators**

The Sikorsky S-92A simulator at the FSI plant in West Palm Beach has been assessed according to JAR-STD 1 H and qualified initially to JAA interim level C.

The training course recommended for approval in this report is based upon the use of a Full Flight Simulator (presently FAA level D, interim JAA level C). No OTD (Other Training Device) has been evaluated. Any credit based upon the use of OTD's must be assessed on an individual basis.

## **12. Application of JOEB Report**

This JOEB report applies to AOC holders, JAA Flight Training Organizations (FTO's) and Type Rating Training Organizations (TRTO's). However in the case of private or corporate operations, JOEB recommends to follow the findings of this report.

### **13. Alternate means of compliance**

13.1 Regarding the presentation of the FD information, Sikorsky will be studying the possibility of synchronising the FD and AP information to both pilots. Quarterly Sikorsky will provide an update on the development of the study. Due to fact that Sikorsky cannot provide an interim solution, and the fact that this is level “A”-software, Sikorsky should modify all JAA registered helicopters before the 1st of May 2006 with a software update so that AP/FD information is presented which fulfills the requirements of the JOEB. It is up to the national CAA's to approve current operations with S-92A. These approvals should have a validation limited to the 1st of May 2006. In the mean time operators will have to implement appropriate crew coordination operating procedures to ensure a high industry standard level of safety which is acceptable to the Authority. For more information see Appendix 1.

13.2 Due to the coupling of the RADALT to the EGPWS, some warnings in a shuttling offshore environment will not be given due to the algorithms in the software.

- Sikorsky proposes that Operators include the following text in their Ops Manuals:  
For those operations that require an AVAD under JAR OPS 3.660 the following requirements would apply:

1. Do not use EGPWS audio inhibit mode.
2. Select EGPWS Low Alt mode before departing rigs/ships.
3. Except for low-level flights of short duration (for example when the landing gear is left in the down position), deselect Low Alt mode following the After Takeoff Checks and remain in the normal mode for the duration of the flight

The attached checklist, Appendix 2, provides all the JOEB findings and detailed information. Sikorsky should modify all JAA registered helicopters before the 1st of November 2005 to solve this finding.

### **14. Miscellaneous**

Reserved

### **15. Appendices**

*Appendix 1: Operational Evaluation – Helicopter*

*Appendix 2: JAR-OPS 3 Compliance checklist*

*Appendix 3: Sikorsky / FSI TRTP*