

APPENDIX E

ELEMENTS OF A STATEMENT OF AIRWORTHINESS QUALIFICATION (SAQ)

E-1 INTRODUCTION

AR 70-62, *Airworthiness Qualification of US Army Aircraft Systems*, (Ref. 1) establishes the requirement for preparation of a statement of airworthiness qualification (SAQ). Format of the SAQ is essentially the same as an airworthiness release (AWR) and should be prepared in accordance with (IAW) established standing operating procedure (SOP) or outside military command or agency general correspondence format. The SAQ is normally prepared by the Air Vehicle Systems Engineer or designated preparer from the organization having engineering cognizance over the system.

E-2 CONTENTS

E-2.1 ADMINISTRATIVE INFORMATION

Prior to the main body of the SAQ, the following administrative information should be provided.

E-2.1.1 EFFECTIVE DATE

An effective date for the SAQ should be identified. This effective date is defined as the date after which this SAQ or revision becomes effective. For example, the effective date provisions should read:

"This SAQ/revised SAQ is effective as of date (DAY MONTH YEAR)."

E-2.1.2 ADDRESSEE Once approved, the SAQ becomes part of the Airworthiness Qualification Substantiation Report (AQSR), and will usually be routed, using a distribution list, through the program, product, project manager (PM) to all authorized users of the subject system. These users may be operators in table of organization and equipment (TO&E) units, training and testing activities, and other authorized operators. The first and second tier technical points of contact (POCs) should be identified on the cover sheet or within a transmittal letter prepared by the approving authority. Typically, these technical POCs will be the PM Systems Engineer and the Air Vehicle Systems Engineer at the procuring activity (PA), respectively.

E-2.1.3 SUBJECT

The cover sheet or first page of the SAQ should clearly identify that this is an Interim/Final Statement of Airworthiness Qualification for a specific type (ground or flight) of test, evaluation, or operation of one model, design, and series Army air vehicle with identifying serial number(s). Applicable operating units may be identified. Model, design, and series prefixes and suffixes should be included.

An example follows:

INTERIM STATEMENT OF AIRWORTHINESS QUALIFICATION FOR OPERATIONAL FLIGHT TEST OF YAH-68A HELICOPTERS SERIAL NUMBERS 95-00001, 95-00002, 95-00003, 95-00004, AND 95-00005 or SERIAL NUMBERS 95-00001 THROUGH 95-00005

INCLUSIVE WITH MODIFIED XM-201 WEAPONS SYSTEM INSTALLED AT US ARMY AVIATION TECHNICAL TEST CENTER. The use of distribution statements as provided for in Department of Defense Directive Number 5230.24, *Distribution Statement on Technical Documents*, 18 March 1987 (Ref. 2) should be considered for use on sensitive technical information.

E-2.2 MAJOR ELEMENTS

E-2.2.1 REFERENCES*

References cited in the main body of the SAQ should be listed in the order in which they are referenced, or may be included in an appendix. If an appendix is used, that appendix should be cited in this paragraph. Operations and maintenance manuals, contract numbers, Government and contractor specifications, AQSRS, previous Federal Aviation Administration (FAA) or military certificate(s), and systems safety assessments should be cited as appropriate. An example follows:

CONTRACT NUMBER

CONTRACTOR'S SPECIFICATION NUMBERS ##### (AS NECESSARY TO DEFINE CONFIGURATION)

AIRWORTHINESS QUALIFICATION SUBSTANTIATION REPORT NUMBER ##### FOR THE YAH-68A ROTORCRAFT OPERATOR'S MANUALS AND CHECKLISTS TM 55-1520-XYZ-10 AND TM 55-1520-XYZ-IOCL (DRAFT AND/OR FINAL, WITH CHANGES CITED) MAINTENANCE MANUALS TM 55-1520-XYZ-23 (DRAFT AND/OR FINAL, WITH CHANGES CITED) TO&E NUMBERS. Changes to referenced documents should not require changes in the SAQ. When there are changes to rotorcraft configuration, procedures, limitations, or restrictions, changes to the other elements of the SAQ will not normally be required. These changes normally require issuance of a separate airworthiness release (AWR) reflecting those changes. AWRs are covered in Appendix D of this handbook.

E-2.2.2 PURPOSE

The SAQ constitutes the final Airworthiness Release (AWR) issued in conjunction with the Airworthiness Qualification Substantiation Report (AQR). An AQR is described in Appendix F of this handbook. While this purpose may be brief for a modification of a previously qualified air vehicle, an air vehicle undergoing developmental testing may have more extensive testing requirements. Because of the extensiveness of the testing requirements, the purpose of the SAQ may be quite involved for these developmental air vehicles.. Issuance of the SAQ normally completes the airworthiness qualification process.

E-2.2.3 CONFIGURATION Configuration of the subject air vehicle should be defined by reference to contractor or Government specifications and drawing numbers, modification work orders (MWOs), technical bulletins (TBs), approved engineering change proposals (ECPs), software version descriptions, etc. These references should be included in paragraph 1 of the SAQ (explained in paragraph E-2.2.1 of this appendix) or may be included in an appendix to the

*The underlined portion of the paragraph number and title identifies the paragraph number and title in the SAQ.

SAQ, and should completely and clearly identify the configuration of each air vehicle to be operated, tested, or evaluated. When individual air vehicles are configured differently, citation of a reference unique to one or more air vehicles should identify, by serial number, applicable air vehicle.

E-2.2.4 AIRWORTHY OPERATION

This element should include, as a minimum, all operating instructions, procedures, restrictions, and limitations not included in referenced operator's manuals. Reference to approved and applicable operator's manuals is acceptable in whole or in part. Only limitations, restrictions, procedures, and instructions applicable to this/these particular air vehicle(s) are required, and special emphasis should be placed on characteristics of this/these particular air vehicle(s). The use of "NOTES," "CAUTIONS," AND "WARNINGS," as defined in the Glossary., in the text of the SAQ, should occur only when not cited in referenced documents, or when necessary for added emphasis.

E-2.2.4.1 OPERATING INSTRUCTIONS AND PROCEDURES

This element should identify additional, deleted, and amended operating instructions which modify the content of approved operator's manuals cited by reference. Reference to approved and applicable operator's manuals is acceptable in whole or in part. Addition, deletion, substitution, and/or supplementation of operator's manual procedures should identify applicable page and paragraph numbers. An example, showing both an additional instruction and substitution of instructions, follows:

"Air vehicle (Serial Number Identification[s]) should be operated using the following additional instruction, added as paragraph 8-20.1, page 8-8 of TM 55-1520-XYZ-10:
 8-20.1 TEXT OF ADDITION"

"The air vehicle contractor (AC) should delete existing paragraph 8-25, page 8-12 of TM 55-1520-XYZ-10, replace with paragraph below, and subject air vehicle should be operated in accordance with paragraph below:
 8-25 TEXT OF SUBSTITUTION".

(Revised text would be placed here.)

Revisions to the approved operating instructions, procedures, limitations, or restrictions may be documented in tabular format in the SAQ. Minimum contents of this table should include revision number and date, a brief description of changes, and identification of affected pages. An example follows:

REVISIONS TO (DOCUMENT IDENTIFICATION)

REV #, DATE	DESCRIPTION OF CHANGE	AFFECTED PAGES
R-1 DDMMYY	CHANGE MAXIMUM SAS OFF AIRSPEED TO 90 KIAS FROM 100 KIAS	5-21

R-2, DDMMYY INCREASE V_{ne} FROM 193 KIAS 5-23
TO 200 KIAS

If not covered in other references, requirements for preflight briefings, postflight debriefs, and chase and rescue air vehicles should be discussed.

E-2.2.4.2 LIMITATIONS AND RESTRICTIONS

Limitations which are different or missing from operator's manual limitations should be cited in this paragraph. Such limitations may include, but are not limited to, limitations on flight envelopes, operating limitations for fatigue critical components, and mission equipment operating limitations. An example follows:

"Operators of the air vehicle should observe three additional limitations for operation. These limitations are:

1. Maximum airspeed for external cargo jettison when transporting SYSTEM XYZ externally should be 70 KIAS.
2. Maximum main rotor speed should be 334 revolutions per minute (RPM).
3. The Radar should not be operated for more than twenty (20) minutes in the 'active' mode, and each period in the 'active' mode should be followed by a minimum period of five (5) minutes in either the 'standby' mode or with power off."

Changes to flight envelope, weight and balance, flight and mission equipment operation, and environmental limitations should be cited in this paragraph. These restrictions may be more or less restrictive than those in the operator's manual. If necessary, these may be presented in graphical format, and included as an appendix to the SAQ. An example follows:

"The air vehicle should not be intentionally flown into known or forecast moderate or more severe icing conditions. Maximum gross weight should be increased from 24500 pounds to 25000 pounds, and center of gravity limitations should be in accordance with the 'Center of Gravity Limits' shown in Appendix B."

E-2.2.5 SUSTAINING AIRWORTHINESS

This element should describe additional inspections, inspection frequencies, treatment of limited life and flight safety parts, and maintenance procedures not cited in referenced maintenance manuals. In all subparagraphs of this element, reference to approved and applicable maintenance manuals and supplemental procedures is acceptable in whole or in part, and should be used where applicable. The use of "NOTES," "CAUTIONS," AND "WARNINGS," should be the same as defined in paragraph 4 of the SAQ (paragraph E-2.2.4 of this appendix), and should occur only when not cited in referenced documents or when necessary for added emphasis.

E-2.2.5.1 INSPECTIONS AND FREQUENCY OF INSPECTION

This element should include additional or modified inspection requirements during preflight, postflight, and periodic or phase maintenance on air vehicle systems or mission equipment packages (MEP), and not contained in referenced maintenance manuals. These inspections may be necessitated by additional or modified equipment for modification programs, and may be based on experience gained during prototype air vehicle flight and maintenance operations. Special equipment required for inspection or testing should also be identified.

An example would be the requirement to inspect fire control computer connections for moisture or corrosion after flight in visible moisture.

Only frequencies which have changed from those specified in the maintenance manual should be included in this paragraph. Three types of frequency of inspection changes may be required. Scheduled maintenance inspections which have frequencies changed from maintenance manual frequencies should be cited. Additionally, new scheduled inspection requirements may be generated due to equipment additions in a modification program or based on experience gained during prototype air vehicle flight and maintenance operations. Finally, excessive repetition of scheduled inspections may induce maintenance related failures, and inspection frequencies may be reduced in order to evaluate the effect on safety.

Inspection frequency changes should identify the scheduled inspection and revised frequency (expressed in days, flight hours, cycles, rounds, etc.). An example follows:

INSPECTION REQUIREMENT	REV. FREQUENCY
CLEAN & LUBRICATE ARMAMENT SYS, XM-201	2000 ROUNDS
LUBRICATE ARMAMENT SYS, XM-201	MONTHLY

The consequences of failure to perform a required inspection should be clearly specified. In the previous example above, failure to lubricate the armament system in accordance with revised frequencies could require a restriction from use of the armament system until the inspection is complete. Appropriate logbook entries caused by uncompleted inspections should be explained in this section of the SAQ.

E-2.2.5.2 LIMITED LIFE AND FLIGHT SAFETY PARTS If retirement lives (point at which overhaul or repair is either unauthorized or not economical) are different from those lives in approved, referenced maintenance manuals, the retirement lives of these fatigue critical parts should be included in the SAQ. The part should be clearly identified along with the retirement criteria, expressed in flight hours, calendar time, exposure, etc. When flight safety parts (FSP) are involved, the procedures for identification, monitoring, surveillance, and disposition should be identified if different from procedures in approved maintenance manuals. If procedures are not established, par. 3-13 of this handbook provides procedures for handling of FSP.

E-2.2.5.3 MAINTENANCE PROCEDURES

All special maintenance procedures which are not included in approved maintenance manuals should be identified. Reference may be made to maintenance manuals, contractor's approved procedures, and appropriate Safety of Flight (SOF) messages. At this point in the developmental or modification program effort, most required maintenance procedures should be included in approved technical manuals. However, due to publication update cycles, some maintenance procedures may not have been incorporated into those manuals. An example of such a cited procedure would be a required inspection which is cited in the maintenance manual using one chemical compound, but is changed to use a different chemical. Most required special tools and ground support equipment should be included in approved maintenance manuals. Depending on the scope of the program (limited number of air vehicles, minor modification, funding for publication updates, etc.), these special tools and ground support equipment may not be included in technical manuals. Additionally, some of the equipment may be obtained by local manufacture. Such local manufacture typically includes tow plates, tow bridles, tow bar adapters, etc. If not included in approved technical manuals, these special tools should be completely described in the SAQ.

E-2.2.6 AIR VEHICLE LOGBOOK ENTRIES

The SAQ should contain only the applicable logbook entries required under the discretion of the preparer. Logbook entries should be in accordance with DA PAM 738-751, *Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)*, (Ref. 3).

The explanation and proper use of the various DA 2408 series forms are included in DA PAM 738-751 (Ref. 3). Entries should be made on Department of Army (DA) Form 2408-13-1/2408-13-1-E. The appropriate status symbol will be specified in the SAQ, with a reference of the SAQ effective date entered in the Fault Information Block. A red dash should be used in the status block for electromagnetic compatibility (EMC) tests, special inspections, and/or functional checks, required prior to the next flight. For readiness reporting purposes, AWRs which require perpetual circle red "X" write-ups (semi-permanent restrictions) should not cause the air vehicle to be reported as partially mission capable (PMC). For those purposes, air vehicles which are nonstandard configured and operating under the AWR may be reported as fully mission capable (FMC).

The air vehicle DA Form 2408-15/2408-15-E should be annotated to reflect the successful completion of the EMC test and/or special inspections and to cite the SAQ by effective date. The DA Forms 2408-15/15-E need to be annotated to reflect temporary installations, as well as, permanent changes to configuration.

An exact copy of the applicable SAQ sections describing the operating procedure, limitations, and restrictions should be inserted in the air vehicle logbook and another copy inserted in the Air Vehicle Historical Record File.

E-2.2.7 SIGNATURE OF ISSUE AUTHORITY

The Commander, US Army Aviation and Troop Command (ATCOM) has delegated airworthiness authority to the Director of Engineering, ATCOM. Typically, all technical content is coordinated and validated by the appropriate technical offices according to the policies in the SOP of the approving authority. Essential classified information should be placed in a classified addendum. The document should be properly marked and coordinated with the security office of the approving authority prior to submittal for approval by the Director of Engineering. Also, prior to submittal of an airworthiness release for signature, any identified hazard or risk should have been eliminated or reduced to an acceptable level in accordance with AR 385-16, *System Safety Engineering and Management*, (Ref. 4) or in accordance with the managing activity's system safety management plan.

E-2.2.8 APPENDICES

Appendices may be used to show configuration data, list references, provide operating and maintenance limitations figures, other graphical data, and information which is too voluminous for inclusion in the main body of the SAQ. Additionally, when a limited amount of classified information is to be a part of the SAQ, a classified appendix may be used to allow the main body of the SAQ to remain unclassified. All appendices used should be referenced in the appropriate paragraph of the SAQ, and should be packaged in the order in which they are referred to in the SAO.

APPENDIX E GLOSSARY

NOTE - An operating procedure, practice, or condition that must be highlighted. CAUTION - An operating procedure, practice, or condition which, if not strictly observed, could result in damage to or destruction of equipment, or minor injury to personnel. WARNING - An operating procedure, practice, or condition which, if not correctly followed, could result in severe injury to personnel or loss of life, or loss of a major system.

APPENDIX E

LIST OF ACRONYMS AND ABBREVIATIONS

AQSR	=	airworthiness qualification substation report
ATCOM	=	aviation and troop command
AWR	=	airworthiness release
DA	=	department of army
ECPs	=	engineering change proposals
EMC	=	electromagnetic compatibility
FAA	=	federal aviation administration
FMC	=	fully mission capable
FSP	=	flight safety parts
IR	=	infrared
MEP	=	mission equipment package
MWOs	=	modification work orders
PA	=	procuring activity
PM	=	program, product, project manager
PMC	=	partially mission capable
POC	=	points of contact
SAQ	=	statement of airworthiness qualification
SOF	=	safety of flight
SOP	=	standing operating procedure
TB	=	technical bulletin

APPENDIX E
REFERENCES

1. AR 70-62, *Airworthiness Qualification of US Army Aircraft Systems*, 15 July 1978.
2. DoDD 5350.24, *Distribution Statement of Technical Documents*, March 1987.
3. DA PAM 738-751, *Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS - A)*, 15 June 1992.
4. AR 385-16, *System Safety Engineering and Management*, 3 September 1985.