



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Policy Statement

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**Subject:** Policy Statement Concerning  
Non-Required Safety Enhancing Equipment  
(NORSEE) in Rotorcraft

**Date:** 05/29/2013

**Policy No:**  
PS-ASW-27,29-10

**Initiated By:**  
ASW-100

## Purpose

1. This policy statement provides certification guidance for applications to install Non-Required Safety Enhancing Equipment (NORSEE) into rotorcraft. NORSEE is equipment, not required by any federal regulation, installed in rotorcraft with the intent to measurably increase rotorcraft safety.
2. The FAA encourages the use of optional, non-required equipment that can improve safety for an increased number of rotorcraft under most operational conditions. This approach involves considering not only the *risk* side of the safety equation, as is typically done, but also the safety *benefits*. A possible increased safety risk from failed or malfunctioning non-required equipment to an individual rotorcraft operating in unusual conditions should not necessarily overshadow the rest of the fleet benefiting from the safety enhancement resulting from the introduction of such equipment in most operational conditions. With this approach, we expect the safety benefits to be greater than the potential risk introduced by the installation of NORSEE. However, since NORSEE equipment is not required, the safety assessment should determine that any known loss of function of the equipment would not present a hazard higher than minor to the rotorcraft.

## Current Regulatory and Advisory Material

The regulations applicable to NORSEE include 14 CFR 27.1301, 27.1309, 29.1301, and 29.1309. NORSEE can improve safety when installed in rotorcraft even though it is not required by 14 CFR parts 27 or 29, as applicable, or the rules under which rotorcraft operate (e.g., parts 91, 133, 135, 136, or 137). For rotorcraft certificated under parts 27 or 29, §§ 27.1301 and 29.1301 (Equipment: Function and Installation), and §§ 27.1309 and 29.1309 (Equipment, Systems and Installations) establish the certification and qualification requirements of systems and equipment installations. The premise of these rules is that systems and equipment in rotorcraft must be appropriately designed, manufactured, and installed so each performs its intended function and does not present an unacceptable hazard to the rotorcraft because of malfunction or failure. The result of these requirements will determine the appropriate system function development assurance level (FDAL), consistent with Society of Automotive Engineers (SAE) Aerospace Recommended Practice (ARP) 4754A. The FDAL requirements will determine the level of rigor of the development process for items and drives the electronic hardware assurance level, consistent with Radio Technical

Commission for Aeronautics (RTCA) Document Order (DO)-254, or software assurance level DO-178B, collectively referred to as item development assurance level (IDAL). The term design assurance level (DAL) is used in this policy statement to refer to any or all of the assurance levels, as appropriate, for the NORSEE system approval that is being sought.

### **Relevant Past Practice**

1. Advisory Circulars (ACs) 27-1B and 29-2C, sections 27.1309 and 29.1309 respectively, provide guidance for establishing DALs for installation of systems and equipment. These ACs recognize the Safety Assessment process reflected in SAE ARP 4761 (Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment) and SAE ARP 4754 (Certification Considerations for Highly Integrated or Complex Aircraft Systems) documents. The Safety Assessment process consists of Functional Hazard Assessments (FHA), Preliminary System Safety Assessments, System Safety Assessments, and Common Cause Analysis.
2. These tools help determine the necessary availability, reliability, and integrity of the systems and equipment being installed based on the assessed hazards to the aircraft resulting from a system or equipment malfunction. Some of the key certification considerations are system redundancy, isolation, software and airborne electronic hardware DALs, minimum operational performance standards, as well as any mitigating features incorporated to meet the established DAL for the system under consideration. There has been no previous relaxation in DALs from these requirements that consider hazards introduced by the installation of systems and equipment. This is true even when the introduction of the system and equipment had no regulatory requirement and incorporated features shown to improve rotorcraft safety. We are now implementing a change to this practice for these systems and equipment.

### **Policy**

1. Use this policy and existing guidance material (including, but not limited to ARP 4754, AC 27-1, AC 29-2, and RTCA/DO-313) for certification of NORSEE on rotorcraft certificated under parts 27 and 29. When an applicant shows and the FAA agrees that the NORSEE system under consideration provides an overall safety benefit for installation in the rotorcraft model, a one level reduction in DAL may be authorized. For this process, the FAA uses an issue paper to document the determination of DAL reduction authorization(s) for those systems not already assessed, evaluated, and determined to meet the NORSEE criteria. Currently, the DAL reduction policy has only been applied to non-required attitude display indicators and terrain awareness systems. As other systems are determined to be eligible, an updated list will be maintained in the Design Approvals section under the Regulations, Policies, and Guidance page on the Rotorcraft Directorate public website: [http://www.faa.gov/aircraft/air\\_cert/design\\_approvals/rotorcraft/rot\\_regs/](http://www.faa.gov/aircraft/air_cert/design_approvals/rotorcraft/rot_regs/). As mentioned, at the system level is the FDAL that is supported by software or airborne electronic hardware, which constitute the IDAL.
2. Depending on architecture, the DALs for various aspects of the system may not be the same level. For systems with an independent monitor, there may be a different DAL for the system

components than for the monitor. The mutual agreement to allow a DAL reduction needs to be established early in the certification process. For example:

a. If a system has a loss of function assessed as minor but with the display of misleading information assessed as hazardous in the FHA, the described system would typically require satisfying DAL B. This would result in Level B software or airborne electronic hardware (AEH) that can contribute to the display of misleading information with a probability of failure on the order of  $1 \times 10^{-7}$ .

b. If the FAA accepts the above system's classification as NORSEE, this policy allows system approval while satisfying only DAL C with Level C software or AEH and with a probability of failure on the order of  $1 \times 10^{-5}$ . This is acceptable even though the FHA hazard classification remains at hazardous. This approach recognizes the overall safety benefit resulting from a more affordable DAL C system and encourages more rotorcraft installations than the more expensive DAL B system.

3. In cases allowing this DAL relief, there should be a way to readily identify this system and equipment as NORSEE, and there should be appropriate limitations on the installation approval (e.g., placards, rotorcraft flight manual supplement, supplemental type certificate (STC) limitations). This is necessary to convey that this particular NORSEE system and equipment installation is not approved where the system or function is "required" by any regulation, including operational regulations, without further showing. For example, there may be approval of an attitude display as NORSEE in a part 27 rotorcraft; however, this attitude display is useable under part 91 only for VFR because IFR operations and part 135 night operations require an attitude display. For applicants seeking TSO authorization, classification of an article as NORSEE does not modify any of the requirements, including the design assurance level requirements, specified in the TSO. To obtain TSO authorization, an applicant must meet the design assurance level specified in the TSO standard or obtain approval to deviate by demonstrating an equivalent level of safety to the TSO under 14 CFR 21.609.

4. If NORSEE software is installed in required equipment (such as an integrated modular avionics system) and the DAL of the required equipment is higher than the NORSEE DAL, the software partitioning guidance in accordance with the latest FAA recognized version of RTCA/DO-178 should be followed. In other words, software incorporating NORSEE components should comply with RTCA/DO-178 requirements, where applicable, to protect required functions.

5. Applicants need to consider the limitations imposed by taking the NORSEE DAL reduction, and weigh the advantages and limitations of each approach before determining which path to pursue.

### **Effect of Policy**

1. As with all guidance material, this policy statement identifies one means, but not the only means, of compliance. However, applicants and certificating officials should follow this policy when it is applicable and captured in a method of compliance issue paper. Agency employees, their designees, and delegations must not depart from this policy statement without appropriate justification and concurrence from the FAA management that issued this policy statement. The

authority to deviate from this policy statement is delegated to the Rotorcraft Standards Staff Manager.

2. Whenever a proposed method of compliance deviates from the guidance in this policy statement, the aircraft certification office coordinates with the policy issuing office using an issue paper. Similarly, if the aircraft certification office becomes aware of reasons to disapprove an applicant's proposal that meets this policy, it coordinates its response with the policy issuing office.
3. Applicants may utilize other acceptable methods to show compliance to the regulations. When choosing this approach, applicants are advised to coordinate with the FAA early in the application process to ensure that the desired method is acceptable.

## **Implementation**

This policy discusses compliance methods that apply to type certificate, amended type certificate, STC, and amended STC programs with an application date that is on or after the effective date of the final policy. If the date of application precedes the effective date of the final policy, and the methods of compliance have already been coordinated with and approved by the FAA or its designee, the applicant may choose to either follow the previously acceptable methods of compliance or follow the guidance contained in this policy.

## **Conclusion**

The FAA is supportive of the installation of optional NORSEE equipment to enhance rotorcraft safety, but the evaluation of potential risks to safe operation is necessary. Following this policy, the required system DAL for non-required systems that have been shown to increase overall rotorcraft fleet safety, can be reduced by one more DAL level than would be permissible without this policy. Though the FAA is not required to follow this policy in the same manner as we would be required to follow a regulation, this policy is how the FAA expects to generally apply certain approvals for installation of NORSEE for parts 27 and 29 rotorcraft.

## **Point of Contact**

For questions about this policy statement or its implementation, please contact the Rotorcraft Directorate, Mr. George Schwab, ASW-112, at 817-222-5114.

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