

General Rotorcraft Update and Non- Required Safety Enhancing Equipment (NORSEE)



Presented to: NZ - Design Delegation Holders

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Federal Aviation
Administration



AIR's Safety Goal

From AIR: 2018 (Aircraft Certification Service's Vision of the Future)

“AIR applies safety management principles to achieve the next level of product safety consistent with the safety continuum.”

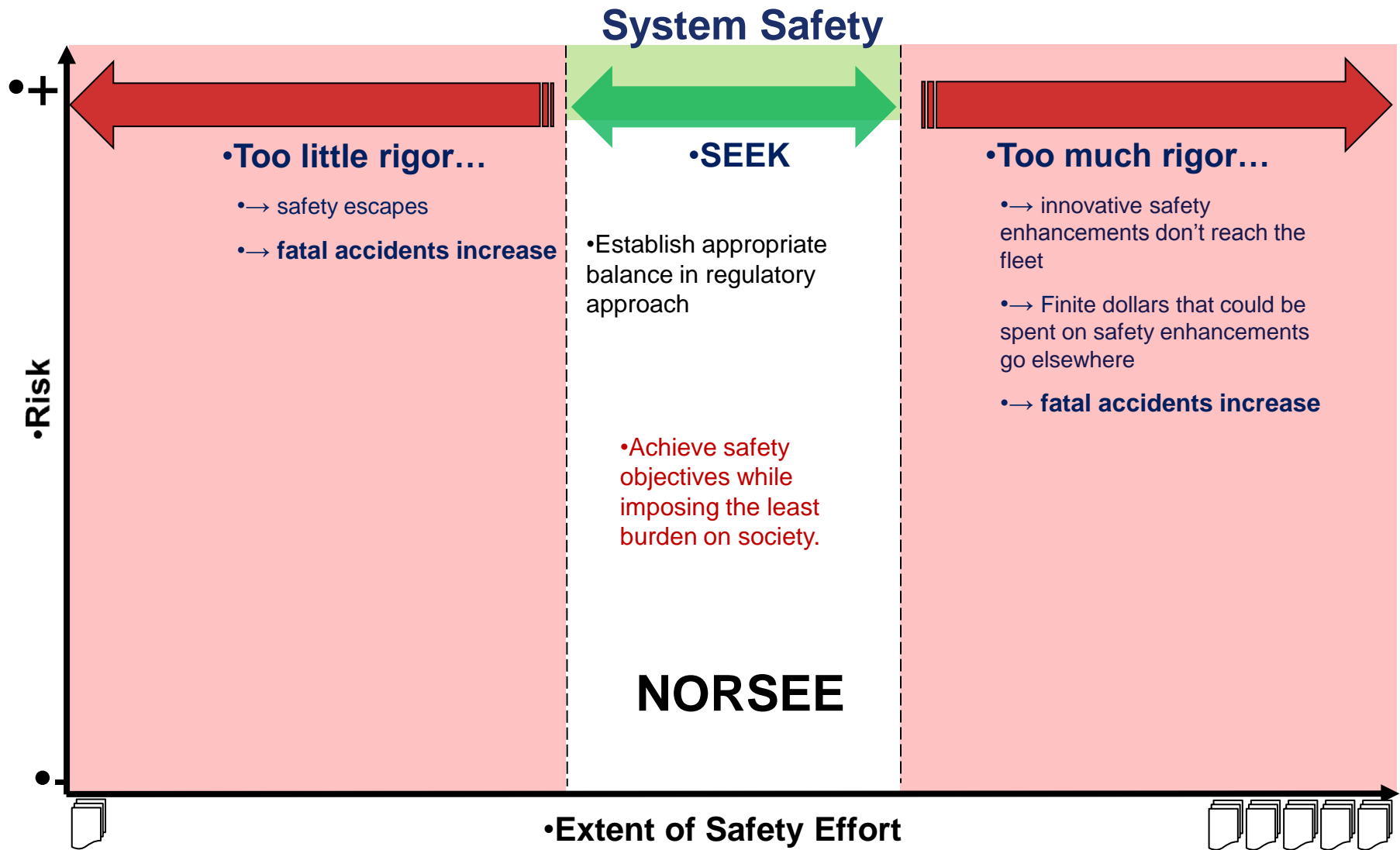


Safety Continuum

- Is reflected in Title 49 USC and integral to FAA standards & oversight
- Recognizes differences in acceptable levels of safety and certitude
- Helps FAA:
 - to balance risk and safety requirements
 - determine appropriate level of rigor in standards, policies, and processes
 - focus safety resources in a manner consistent with the public's expectations



Applying the Safety Continuum



State of Part 27 & 29 Regulations

- Parts 27 & 29 regulations established 50+ years ago
- No significant updates to the standards in 20+ years
- Technology advancements have outpaced our Part 27 & 29 standards
- Seeking ways to promote technology that can enhance rotorcraft safety
- Applying our standards to the rotorcraft of the future



Rotorcraft Rulemaking - Current

Current Miscellaneous Part 27/29

- 27/29.1305 & 27/29.1549 (OEI Training Mode)
- 27/29.1305 (Synthesized Power Indicator)
- **27/29.1309** (Eliminate need for 27.1309 SCs, update failure condition terminology)
- 27/29.1329 & 27/29.1335 (Autopilot & Flight Director)
- 27/29.1333 & Appendix B (Interconnection of pilot/co-pilot systems)
- 27/29.1545 & 27/29.1549 (Powerplant Instrument display of operating ranges)
- **27/29.1353** (Recognize various battery technologies, e.g. Lithium)

Special Rotorcraft Configurations Search & Rescue (SAR)

- 30-Minute All Engine Operative (AEO)
- Anti-Collision lights (red/white)

27/29.773 Pilot Compartment View - Rulemaking

- Single Program Office Tool (SPOT) Rule
- NPRM issued Oct. 17, 2016
- Public comment period ends Nov. 16, 2016
- Relieving to industry by adding “**ground test**” as an option where appropriate. Current rule requires night “**flight test**”.

Rotorcraft Occupant Protection - ARAC

Scope

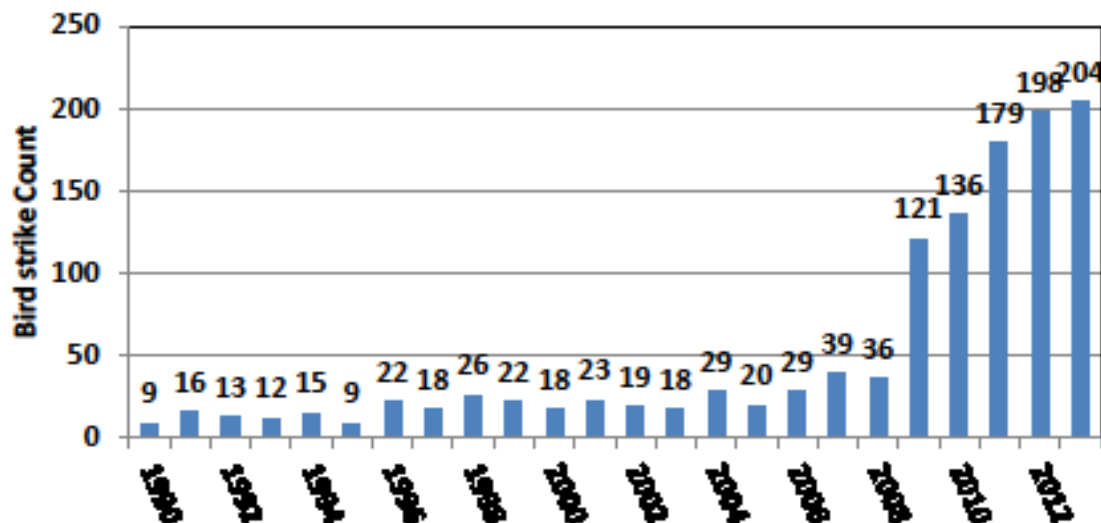
- Covers both CRFS and BFT Provisions
- Considers both Newly Manufactured Rotorcraft (NMR) and the Existing Fleet
- Members – rotorcraft OEMs, operators, vendors, associations, etc.

ARAC Working Group Status

- Aviation Rulemaking Advisory Committee (ARAC) tasking was published in the Federal Register November 5, 2015
- Working group has been meeting since January 2016.
- First deliverable is a cost/benefit analysis report- due date extended by 9 months (goal is to provide to ARAC by Oct/Nov 2016).
- Final report (newly manufactured & existing fleet) – Aug. 2018

Rotorcraft Bird Strike - ARAC

- Dramatic increase in number of Rotorcraft Bird Strikes



- No bird strike rule exists for Part 27, which is 90% of the U.S. fleet.
- Federal Register Notice published April 27, 2016.
- Working Group held several meetings since Aug. 2016.
- Addressing Part 27 & Part 29.
- Final report due Oct. 2017.

Rotorcraft Rulemaking - FY17/18

Rotor Drive System – Loss of Lubrication

- Participating on EASA's main gearbox loss of lubrication rulemaking program
- CS/FAR 29.927
- FAA Harmonization rulemaking after EASA issues final rule

Ditching Rulemaking

- Participating on EASA's rotorcraft ditching rulemaking program
- FAA Harmonization rulemaking after EASA issues final rule

Rotorcraft Rulemaking – Part 27/29 Rewrite

- Industry is conducting a study of a potential rewrite of Parts 27/29 and will provide recommendations to the FAA
 - Recommendations to be provided 3rd Quarter of 2017
- Industry recommendations will be reviewed by FAA and coordinated with other bilateral partners (EASA and TCCA)
- Any rulemaking recommendations will follow formal rulemaking process, including use of the ARC/ARAC process



CARP

Certification Authorities for Rotorcraft Products

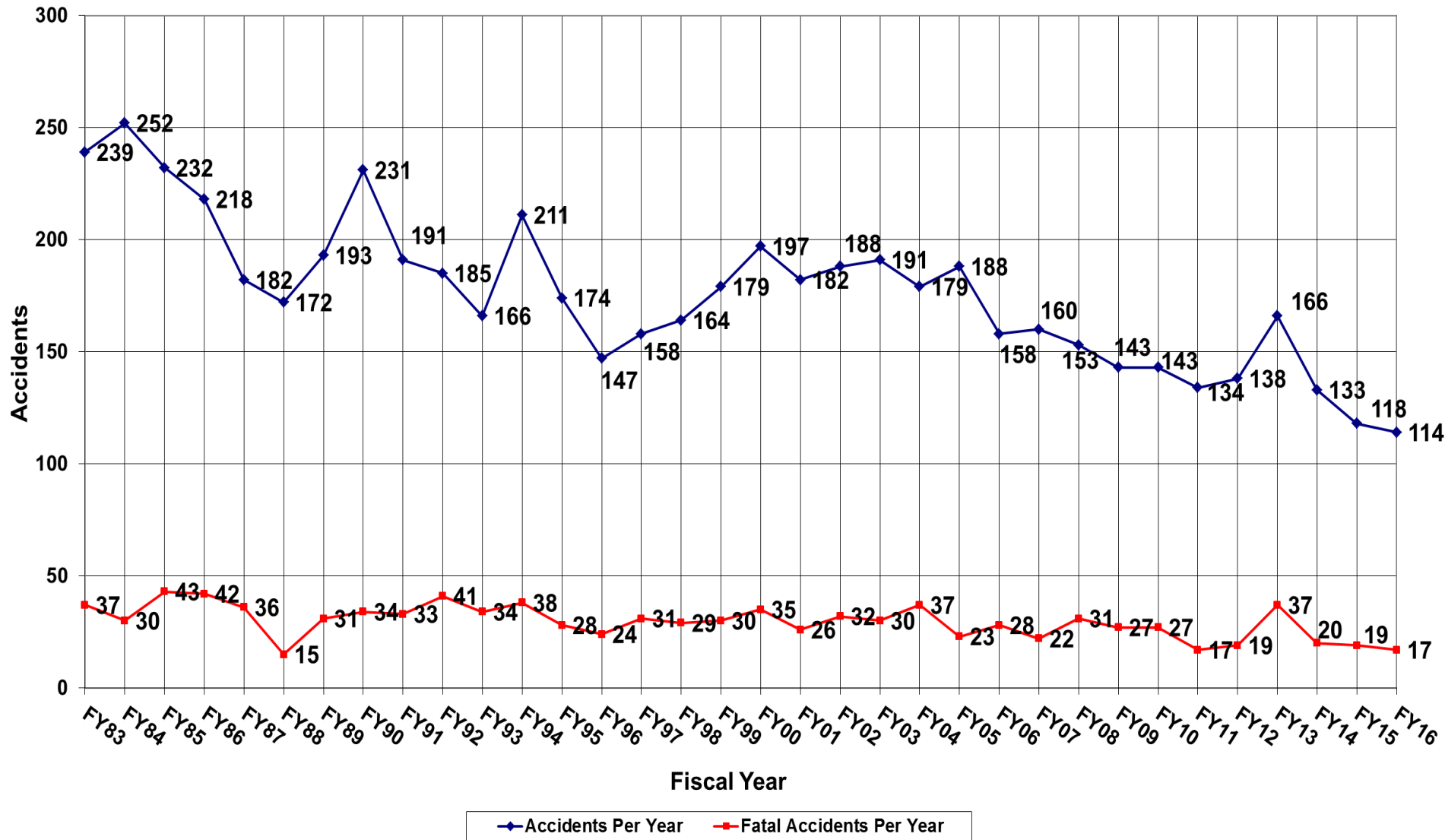
What is it?

- Quadrilateral aviation authorities group – ANAC, EASA, FAA, and TCCA formed to address rotorcraft strategic certification and validation issues.
- Seeking to avoid duplication of effort while maintaining required level of safety
- Seeking to identify and resolve differences that could lead to conflicts in certification and validation

What do they do?

- More likely that a product certified by one authority will be readily accepted (validated) by other authorities
- Minimal differences in expectations between authorities
- Higher confidence in what to expect from the validating authority
- Reduced delays and costs
- Improved access to world markets for your product

U.S. Registered Rotorcraft Accidents FY83 - FY16



Need Changes?

2010 – 2013 Total Fatalities

U.S. Scheduled Service
(Airlines and Commuter)

0

U.S. Rotorcraft

253

Equivalent to the loss of
all passengers aboard
two Boeing 737s

USHST

U.S. Helicopter Safety Team

Part of IHST with a Focus on Fatalities

Most common occurrences

- Loss of control
- Obstacle & wire strikes
- Degraded visibility
- System component failures
- Fuel issues

Ways to improve crash survivability

- Helmets
- Crash-resistant fuel cells
- Crash-worthy seats with upper torso restraints
- Seatbelt airbag systems

Collaborative FAA Fatal Accident Study

- **Conducted by**

- Rotorcraft Directorate, Standards Staff, Safety Management Group
- Civil Aerospace Medical Institute (CAMI)
 - CAMI Autopsy Program Team
 - Medical Case Research Physician
 - CAMI Biostatistician

- **Method**

- Autopsy Study, U.S. Registered Aircraft
- 5 years of NTSB accident records (10/13/2008 through 9/27/2013)
- CAMI's autopsy data for 97 of 125 fatal accidents
 - No data for U.S. registered aircraft operating outside the U.S.
 - No data if pilot not fatally injured

- **Scope**

- Post Crash Fire (PCF)
- Blunt Force Trauma (BFT)

Post Crash Fire (PCF) Study Findings of FATAL Accidents

- **Crash resistant fuel systems –**
 - **Decrease the Occurrence of PCF**
 - Part 27 without CRFS, 39% had PCF
 - Part 27 with CRFS, 9% had PCF
 - **Decrease deaths attributable to PCF**
 - Part 27 without CRFS, 20% due to thermal injuries
 - Part 27 with CRFS, 0% due to thermal injuries


NOTE: Part 27 made up 90% of the data sample. For Part 29 without CRFS, 40% had PCF. In half of those cases, PCF contributed to a fatality. For Part 29 with CRFS, no fatal accidents.

Blunt Force Trauma (BFT)

- **Compared 2014 data to similar 2003 study**
 - 5-years of data for each study
 - Same injury categories were used -
 - Bony Injuries
 - Organ/Visceral Injuries
 - Many subcategories of each
- **10 years after the 2003 study, no statistically significant difference for most documented bony injuries and organ/visceral injuries in fatal U.S. rotorcraft accidents.**
- **No meaningful progress in occupant protection**
- **50% skull injuries, 65% brain injuries. WEAR A HELMET!!**

FAA Accident Lessons Learned

GA & Rotorcraft Coming Soon
<http://lessonslearned.faa.gov/>



Federal Aviation Administration

[Lessons Learned Home](#)

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Lessons Learned From Transport Airplane Accidents




International commercial air travel has reached levels of safety and convenience which would have been unimaginable just a generation ago. Although almost always extremely tragic events, the lessons from accidents have played an important role in the process to continue improving aviation safety.

This Lessons Learned From Transport Airplane Accidents library represents some of the most major accidents and their related lessons. The U. S. Federal Aviation Administration, with support from many other organizations and individuals, plans to continue adding to this material on an annual basis. The objective is to populate the material with many more of the most historically significant, policy shaping accidents, in order that the lessons that can be learned from their review may be available to all users of the library.

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Release 10, 4/16/2015

Airplane Life Cycle	Accident Threat Categories / Groupings	Accident Common Themes
		

Arrangement of the library
Three different "perspectives" are used to arrange the accidents in this library and illustrate the complex interrelationship of accident causes. Each accident also contains at least one high level lesson related to a threat element, and at least one lesson related to a theme element. View each of these perspectives and their related elements by clicking in the areas above.

NON-Required Safety Enhancing Equipment (NORSEE)



- **What is NORSEE?**
 - Applies to equipment not required by airworthiness rules (parts 27/29) or operational rules (e.g. parts 91, 135)
 - Subset of Non-Required Equipment that can be shown to improve overall safety in rotorcraft
 - Considers the *risk* side of the safety equation (as with any system)
 - Also considers the overall *safety benefits* of that system

NORSEE

- **Regulations, Policy, Guidance**
 - 14 CFR Part 21.8(d)
 - PS-AIR-21.8-1602, Approval of Non-Required Safety Enhancing Equipment (NORSEE) March 31, 2016
 - PS-ASW-27,29-10, Policy Statement Concerning Non-Required Safety Enhancing Equipment (NORSEE) in Rotorcraft May 29, 2013

NORSEE - Increase Safety

- By aiding the pilot/ flight crew in:
 - Overall **situational awareness**, (e.g., traffic and terrain advisory);
 - Providing **additional information** other than the aircraft primary system (e.g., weather advisory);
 - Providing independent warning, cautionary, or **advisory indications** (e.g., monitoring, detection systems);
 - Provide additional **occupant safety** protection (e.g., airbags)
 - Providing **control and stability** (e.g., autopilot or stability augmentation system).

NORSEE - Industry/FAA Partnership

Working together to:

- Continue to encourage and enable public's *voluntary implementation* of safety enhancement equipment on aircraft.
- Jointly *evaluate recommendations* for improvements in aircraft design, technology, and operation to increase safety.
- Collaborate on the *development of consensus standards* for NORSEE.



Current NORSEE

FAA Home • Aircraft • Aircraft Certification • Design Approvals

Non Required Safety Enhancing Equipment (NORSEE)

Non required Safety Enhancing Equipment addresses equipment that is not required by any Federal regulation with the intent to measurably increase aircraft safety. This web page will be updated regularly with NORSEE approvals.

Top Tasks

- Get Form 337, Major Repair and Alteration
- Register an aircraft
- Look up an N-number
- Review preliminary accident data
- Find aircraft safety alerts
- Search for SAIBs

Manufacturer	Approval Date	Equipment	Model/Type	Description
Guardian Avionics	10/26/2016	USB panel charger various	200-101A,B USB panel charger. 200-201A,B. 200-301A,B. IP6-100, IP6+100, IPM-100, IPR2-100, IPR-100	USB panel charger for various electronic equipment (iPhone, iPad, etc) (PDF)
Guardian Avionics	01/30/2017	CO Panel Mount CO Remote Mount	451-101 451-201	Carbon Monoxide Detector (PDF)
MYGOFLIGHT	03/06/2017	Mount	MNT-2020/ 2025	Mount for iPad series (PDF)

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Regulations, Policies and Guidance

Title 14 Code of Federal Regulations

- Part 27, Airworthiness Standards: Normal Category Rotorcraft
- Part 29, Airworthiness Standards: Transport Category Rotorcraft

Design Approvals

- 27-1, Certification of Normal Category Rotorcraft
- 29-2, Certification of Transport Category Rotorcraft

Policy

- Policy Statement Concerning Non-Required Safety Enhancing Equipment (NORSEE) in Rotorcraft, May 29, 2013. Systems Meeting NORSEE Criteria (PDF)
- Policy Statement on Approved Model List (AML) Supplemental Type Certificate (STC) Approval of Avionics Installations on Rotorcraft, June 30, 2010
- Guidance for rotorcraft Health and Usage Monitoring System (HUMS) Installation, July 15, 1999
- Requirements for Electro-Magnetic Compatibility (EMC) Testing, Information Memorandum, April 25, 2003
- Certification of Foreign Military Surplus Aircraft (PDF), May 13, 1996.

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https://www.faa.gov/aircraft/air_cert/design_approvals/norsee/

https://www.faa.gov/aircraft/air_cert/design_approvals/rotorcraft/rot_regs/



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