



Federal Aviation
Administration

Rotorcraft TCAS II and FAA Certification

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Symposium

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Challenges of Rotorcraft TCAS II

- **TCAS II Background**
- **TCAS and Rotorcraft**
- **TCAS II and Rotorcraft**
- **FAA Certification Concerns**
- **Current FAA Workings**
- **Certification Solution(s)**



TCAS II Background

- **Philosophy**

- Reduce the risk of mid-air collisions
- Traffic advisories
- Resolution advisories
- Utilize transponder interrogations
- Traffic densities
- Sphere of protection
- Coordinated Encounters



TCAS II Background

- **Requirements and Guidance**
 - Operational Requirements
 - None for rotorcraft
 - AC20-151A
 - Written for transport category airplanes
 - TSO C119a
 - RTCA/DO-185B
 - TA display
 - RA display
 - Aural annunciations
 - Etc.



TCAS And Rotorcraft

- **TCAS I**

- Provides traffic surveillance and awareness
- Existing approvals for rotorcraft
- Current solution versus ADS-B



TCAS And Rotorcraft

- **The Desire for Rotorcraft TCAS II**
 - Off shore operators
 - Operational environment
 - Generally low visibility
 - High traffic areas
 - Limited ATC surveillance



TCAS II And Rotorcraft

- **Historical Record**

- Where has Rotorcraft TCAS II been used
 - Northern Europe (North Sea)
 - Africa
 - Trinidad & Tobago may make TCAS II required
- Operational feedback
 - Several documented reports of collisions avoided due to RAs



FAA Certification Concerns

- **The Good**
 - Operational interest
 - TA Display
 - RA Display
 - VSI Indications
 - Aural Annunciations



FAA Certification Concerns

- **The Bad**

- Cautionary stance by TCAS II technical experts
- Operations in vicinity of numerous aircraft
- External Load Operations
- Vertical polarization of upper antenna
- Lack of Risk Ratio Assessment



FAA Certification Concerns

- **The Bad (continued)**
 - Rotorcraft Climb Performance
 - TCAS II RA algorithm assumptions may be invalidated
 - Minimum airspeed may be required



FAA Certification Concerns

- **The Ugly**
 - Certification challenges
 - TCAS II designed for transport airplanes
 - Multiple offices involved, including HQ



Current FAA Workings

- **Recently Concluded Research**

- TCAS II equipped aircraft with performance similar to helicopters
 - Rate of climb treated as variable
- FAA TCAS II Program Office is reviewing the data

- **ACAS-X**

- Next generation of ACAS (TCAS)
- Will address rotorcraft
- More than 10 years away



Brainstorm for FAA Certification

- **Recommendations / Suggestions**

- ELOS...

- ELOS can only be written against a regulation

- Method Of Compliance Issue Paper...

- Is there a way to back out a minimum separation distance from the specification?

- H-TCAS II

- Is it time for a new specification?

- TCAS I

- Risk Reducer until TCAS II + Rotorcraft Solved



Brainstorm for FAA Certification

- **Outreach**

- Industry lead group

- Study the total effects of TCAS II installed in rotorcraft
 - Propose a method to install TCAS II on rotorcraft
 - Authority involvement



TCAS II and Rotorcraft

- **Questions?**

