



U.S. AIR FORCE

HQ AFFSA

Remotely Operated Aircraft (ROA) Endorsement Issues



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HQ AFFSA/XOPF
04 Sep 02**

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Rules of Engagement

- ***What you are about to see is the “Official” AFFSA Position on ROA endorsement.***
- ***We know that AFFSA doesn’t run the FSDG, but we are the AF/XOO representative and we write the rules that the Air Force and the FSDG live by.***
- ***The views and opinions presented in this brief are not written in stone, but they are written in quick-drying cement.***
- ***Debate and questions are encouraged.***



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Overview

- 1. FSDG – Our Guidance**
- 2. Is an ROA an Aircraft?**
- 3. Goal**
- 4. Recommendation**
- 5. What does this mean for the FSDG?**
- 6. Summary**



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ROA Endorsement Issues

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FSDG – Our Guidance

CHARTER

OBJECTIVE

The objective of the USAF Flight Symbology Development Group (FSDG) is to coordinate symbology development efforts across the USAF and evaluate USAF display symbology, mechanization, terminology, and formats for all **COCKPIT (as defined in AFI 63-112 (draft) Cockpit Working Groups – Space in an aircraft or remote operator station designed for a pilot)** instrument displays (Head-Up, Helmet-Mounted, and Head-Down) used as a “Primary Flight Reference” (PFR) system. The FSDG recommends endorsement of PFRs to the HQ USAF/XOO. The group operates under the auspices of and chaired by the Joint Cockpit Office (JCO).

SCOPE

The FSDG serves as the focal point in the US Air Force for flight symbology evaluation, endorsement, and standards (AFI 11-202, Vol 3). This effort includes: (1) evaluation of head-up, head-down, and helmet-mounted displays (HUD, HDD, HMD) and (2) maintaining contact with and providing endorsement guidance/procedures to MAJCOMs, aircraft SPOs, and industry.



FSDG – Our Guidance (cont)

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AFI 11-202 Vol 3

2.6. Equipment Required for Flight.

2.6.1. Flight Instrumentation. Primary flight instrumentation must provide full-time display of attitude,

altitude, heading, and airspeed. **Regardless of the type aircraft, mission, or mission phase, attitude awareness and paragraph 2.6.1. instrumentation are a full-time Air Force mission requirement.**

- Prominent Horizon Reference
- Complete Fault Indications (Off Flags)

2.6.1.1. Electronic Flight Displays. Many modern instrument displays allow the pilot to optimize cockpit instrumentation for a particular mission by decluttering, removing or relocating presentations. In some cases, a pilot can omit elements necessary for basic attitude awareness and aircraft control. Regardless of the type aircraft, mission, or mission phase, attitude awareness and paragraph 2.6.1. instrumentation are a full-time Air Force mission requirement.



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FSDG – Our Guidance (cont)

MIL STD 1787C

4.1.1 Primary flight reference (PFR)

All crew stations from which a pilot is to control an air vehicle shall have at least one complete set of PFR data. All PFR displays shall provide full-time presentation of critical flight data, to include climb/dive angle (or pitch and vertical velocity), bank, altitude, airspeed, a prominent horizon reference, and any other parameter that is essential to safe flight in a particular aircraft.



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Is an ROA an Aircraft?

- Is an ROA an aircraft?
- Why endorse ROAs?



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Is an ROA an Aircraft?

- **AFI 11-202 Vol 3 (Draft) - ★2.6.1. Flight Instrumentation.** Primary flight instrumentation must provide full-time display of attitude, altitude, and airspeed information and the capability to recognize, confirm, and recover from unusual attitudes. Information must be positioned and arranged in a manner that enables an effective pilot crosscheck. (For the purposes of this regulation the term “cockpit” includes ROA ground control stations)

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the term “cockpit” includes ROA ground control stations)



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Is an ROA an Aircraft? (cont)

Pilot/Controller Glossary (P/CG)

Effective 2/21/02

The P/CG is an addendum to:
Aeronautical Information Manual
Order 7110.10, Flight Services
Order 7110.65, Air Traffic Control

- FAA 7610.4 - AIRCRAFT- Device(s) that are used or intended to be used for flight in the air, and when used in air traffic control terminology, may include the flight crew.
- AIRCRAFT [ICAO]- Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.



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Why Endorse ROAs? (cont)

- People
 - Ground
 - Air
- Equipment
 - \$\$\$
- Global Access/Acceptance/Confidence



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Goal

Come up with a way to categorize ROAs into those that need to be endorsed and those that do not.

- 1. Must be easy to understand***
- 2. Must limit the ability to be “interpreted”***



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Different ROAs



Dark Star



Firebee



Tail Sitter



Exdrone



Cypher



Predator



Eagle Eye

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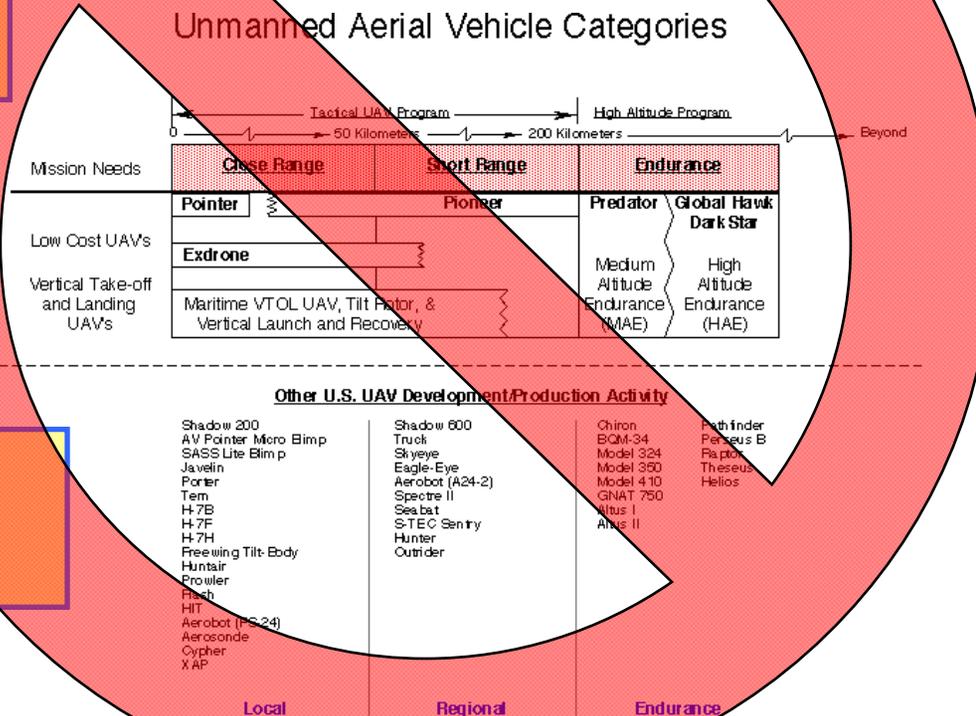
How do we Classify ROAs?

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NASA GSFC/Wallops Flight Facility Unmanned Aerial Vehicles

1. Must be easy to understand



2. Must limit the ability to be "interpreted".

5/27/99



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How do we Classify ROAs? (cont)

Classification based on Level of Autonomy:

- 1. Must be easy to understand*
- 2. Must limit the ability to be “interpreted”*

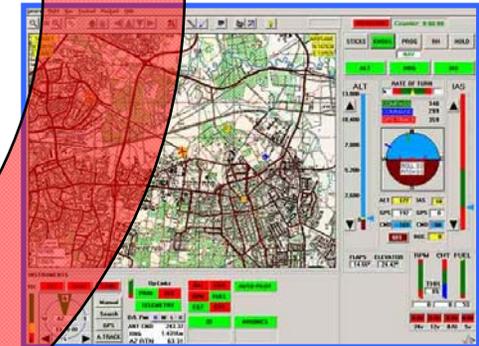
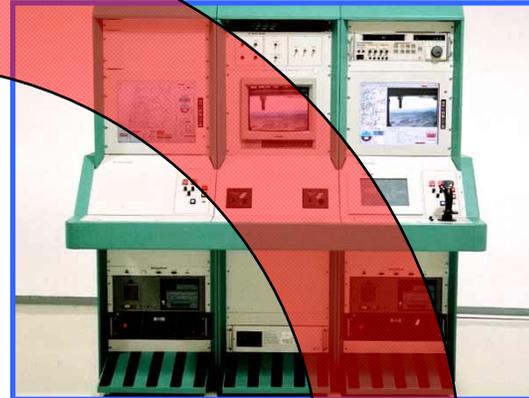
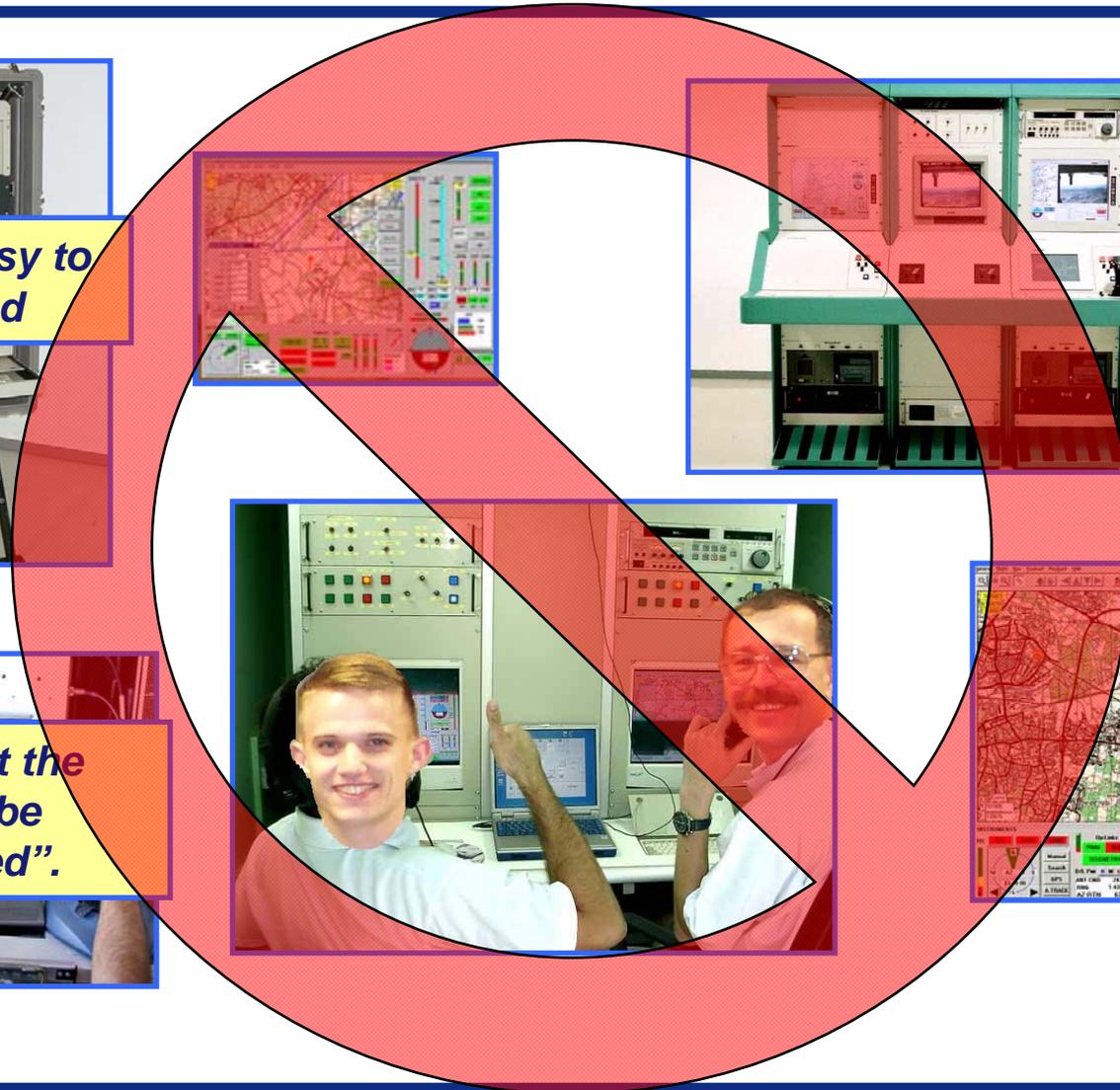


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Different GCS

1. Must be easy to understand

2. Must limit the ability to be "interpreted".



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Proposed Classification

- **Classify according to one mission requirement**

- **Does the aircraft plan on using civil airspace for any portion of the flight?**



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What Does This Mean for the FSDG?

- **FSDG Charter**
- **MIL STD 1787**
- **AFFSA White Paper**



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FSDG Charter

- **Defines “cockpit” to include ROAs**
 - **AFI 63-112 – Cockpit: Space in an aircraft or remote operator station designed for a pilot, or pilots and crew, including the flight deck and other crew operating stations.**
- **Charter remains basically the same... Make use of technical teams as outlined in the charter -** *“Technical teams shall be ad hoc groups that focus on responding to specific technical challenges facing the FSDG. For instance, when an endorsement request is received, a technical team will be established to review and make technical recommendations to the full FSDG who then coordinate a response to the AFFSA. This technical team would include members of the FSDG, scientists and engineers as well as members of the weapon system program office and the operational using community.”*



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MIL STD 1787

- **New section for ROA (similar to rotary section) – deal with display and automation issues**

Until then.....

- **1787 allows room for “tailoring”**
 - **Stay within the intent**
 - **Differences will be handled on a case-by-case basis by the FSDG**
 - **PhDs in the FSDG will help formulate test plans**



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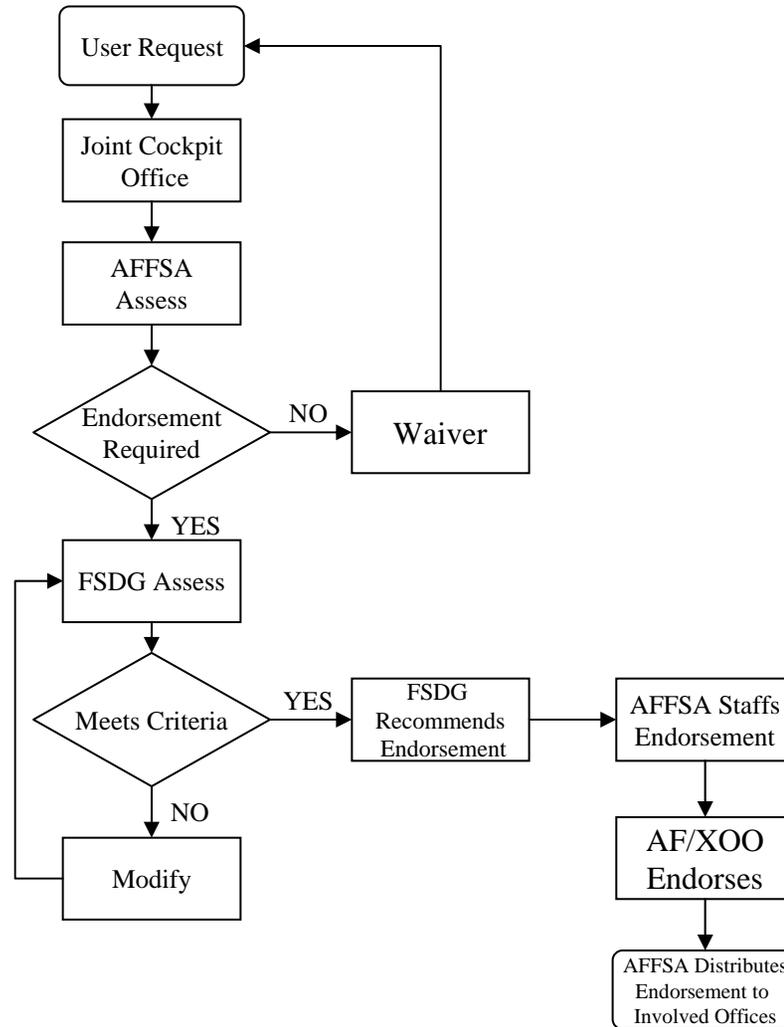
AFFSA White Paper

- **Unusual Attitude Recovery (UAR) procedures updated to include the following note:**
 - **“Depending on type of aircraft (i.e. Global Hawk) UAR tests may include only the recognition portion and not the recovery segment”**
- **Clarification of the endorsement process**



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Endorsement Process





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Summary

- ROAs are aircraft
- Airspace usage will determine if they must go through the endorsement process
 - Exceptions will need waivers
 - Global access questions must be answered upfront



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Questions?

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