



AIRWorks: Non-POR UAS Brief

09 February 2023





Topics

- Public Aircraft Operations vs Civil Aircraft Operations
- Department of the Navy (DoN) UAS Operations
- Airworthiness
- Relevant UAS Policy
- DoN Owned and Operated UAS Operations Construct
- Contractor Owned and/or Operated (COCO or GOCO) Non-POR UAS Operations Construct
- UAS Groups and Airworthiness Categories
- Top Level IFC Process
- IFC Data Requirements
- Points of Contact



Three Categories of US Aircraft Ops

- **Civil Aircraft Operations:**

- Private or commercial aircraft operations
- **FAA certification required** for systems, equipment, and aircraft operations

- **Public Aircraft Operations:**

- Government aircraft operating within US National Airspace (NAS)
- FAA has no jurisdiction over systems, equipment or aircraft operations except for Air Traffic Control, No FAA certification required.
- Regulations like CNS/ATM may apply world-wide
- Government agencies self-certify (**agency operating aircraft is responsible**)

- **State Aircraft:**

- Government aircraft operating outside US national airspace
- No FAA certification required
- The “State” is responsible for ensuring airworthiness
- State Department (foreign equivalent) is responsible for authorizing use of airspace





Public Aircraft Operations (PAO)

- U.S. Armed Forces consider operation "Public" when aircraft is
 - owned by the Armed Forces, or
 - used by the Armed Forces and operates outside of its FAA airworthiness certificate (e.g., configuration, operational use, or maintenance).
 - PAO Assessments are Required prior to IFC issuance, See [NAVAIRINST 13034.1G](#)
- DON Public Aircraft Operations of Contracted Air Services
 - Case-by-case PAO determinations, refer to;
 - [NAVAIRINST 13034.1G](#)
 - [NAVAIR PAO SWP](#)
 - [US Armed Forces PAO Decision Tool](#)
 - [FAA PAO Circular 00-1.1B](#)



Civil



Public





DoN UAS Operations

- **Do I need an IFC? Yes if PAO;**
 - Per ALNAV 074/18 regarding the procurement and operation of unmanned aircraft systems, *“All USN and USMC UAS of any size that are owned, leased, operated, used, tested, or demonstrated by DON activities, or any other **DON public aircraft operation** conducted by or for DON (including contracted UAS services), must have an airworthiness approval in the form of a flight clearance issued or promulgated by COMNAVAIRSYSCOM.”*
 - Per NAVAIRINST 13034.1G *“This instruction applies to all air systems that are owned, leased, operated, used, designed, or modified by or on behalf of the DON. DON air systems include, but are not limited to, air systems accepted into the DON Aircraft Inventory and Readiness Reporting System, Federal Acquisition Regulation Part 15 pre-accepted air systems, **and Contracted Air Services (CAS) air systems performing DON Public Aircraft Operations (PAO).**”*
- **What is a Non-POR UAS?** Any UAS not managed by a NAVAIR Program Office.
- **What are the key requirements to Procure and Operate a UAS?** An IFC, a COTS Cyber Waiver or Exception to Policy (ETP), and depending on configuration and local authorities, Cyber assessments, RMF Authorizations (i.e ATO), Spectrum approval, Lithium Battery Certifications and Laser Safety Review Boards (LSRB).
- **What are the key requirements to contract for UAS Services?** Airworthiness Cert based on the Determination of PAO (IFC) vs CAO (FAA), a COTS UAS Waiver or Exception To Policy (ETP) and depending on various factors a Lithium Battery Cert, LASER Safety Review Board (LSRB) Letter, a Civil Aircraft Landing Permit (CALP) and Spectrum approval may be required.
- **How can the AIRWorks Non-POR team help?** We act as the liaison between fleet customers and NAVAIR and other Certifying Agencies. We provide policy guidance and execute the Airworthiness Process to include Airworthiness Engineering technical review and the Airworthiness and Cybersafe Directorate who issues IFCs.



NAVAIR Airworthiness Authority



US Code Title X, Ch 803, Sec 8013



DoDD 5030.61

DoD Responsible for Public Aircraft Operations



SECNAVINST 5400.15C



OPNAV/CNAF M-3710.7 & 3510.15B

All USN/USMC owned or leased aircraft shall have an airworthiness approval in the form of a Flight clearance issued by COMNAVAIRSYSCOM



NAVAIRINST 13034.1G

AIR-00 is: Airworthiness Authority, Technical Authority, CYBERSAFE Authority



Airworthiness Execution

AIR-00 DELEGATES AIRWORTHINESS AUTHORITY TO THE AIRWORTHINESS OFFICE



Intro to DON Airworthiness

- The DON Airworthiness framework encompasses **all of the policies, processes, procedures, and products necessary to establish and sustain the airworthiness** of an air system throughout its life cycle. An overview of life cycle airworthiness is provided below. The DON airworthiness framework encompasses two primary elements: Design Airworthiness and Continuing Airworthiness. Design Airworthiness is the focus of the **NAVAIRINST 13034.1G**, Design Airworthiness **must be evaluated in view of Continuing Airworthiness**.



Airworthiness Life Cycle



UAS Airworthiness Discussion

- NAVAIR airworthiness assessments review the airworthiness of the air vehicle (ability of the air vehicle to obtain, sustain and terminate flight) as well as the safety of flight (within the prescribed limits of injury/death to personnel, damage to equipment and/or environment).
- NAVAIR airworthiness assessments consider the design of the air system **as well as the intended usage**.
 - Design- e.g. Fixed/rotary wing; size (length, wing span, height, weight); flight control system; equipage (radios, lighting, IFF, TCAS, etc...); fuel (battery, hydrocarbon) ; launch/recovery mechanisms; weight, speed; payloads (lasers, weapons); flight characteristics.
 - Usage- e.g. environment (wind, weather, day/night, electromagnetic, etc..), airspace (civil, military, international, combat); launch/recovery location (land, ship, airborne), Unit CONOPS;
- Per [NAVAIRINST 13034.1G](#) , three categories of UAS flight clearances have been established to accommodate the wide spectrum of UAS designs and the inherent level of airworthiness that each system may exhibit (further detailed in slide 24).
- The result of an airworthiness assessment is a NAVAIR issued Flight Clearance.
 - Includes configuration of air system assessed and intended usage. Prescribes strict limitations on air system operation to ensure an overall acceptable level of safety of flight in order to mitigate the hazards to people / property on the ground and in the air. Informs the operator of residual risk through warnings, cautions, and notes to allow the operator to make decisions on appropriate course of action.



Relevant UAS Policy

- NAVAIRINST 13034.1G is the Airworthiness Policy. To define airworthiness roles and responsibilities across the Naval Air Systems Command (NAVAIR) Organization and Naval Aviation Enterprise (NAE).
- CNAF M-3710.7 is the Naval Air Training Operating Procedure Standardization (NATOPS) instruction. Chapter 14 is specific to UAS operations and states that “non-program of record UAS may need to operate under deviations from the strict limitations of this instruction”. (applies to Group 3-5)
- CNAF M-3710.9 is the Department of Navy (DoN) Training and Operations Manual for Group 1 & 2 Unmanned Aircraft Systems, including command oversight responsibilities, minimum operator qualifications, and baseline Airworthiness Data. (applies to Group 1 & 2)
- DOD/FAA Memorandum of Understanding (MOU) which allows access for DOD UAS into the National Airspace System (NAS) outside of Restricted, Warning and Prohibited Areas. (applies to all PAO)
- DON Requirements and Guidance for Access to and Operations within U.S. Civil Airspace by DoN UAS is the instruction standardizing procedures across the USN and USMC to provide a common set of regulations between UAS operators, planners, air traffic controllers, and airspace managers in order to ensure the safe and effective execution of UAS operations within airspace shared by military and civil users.

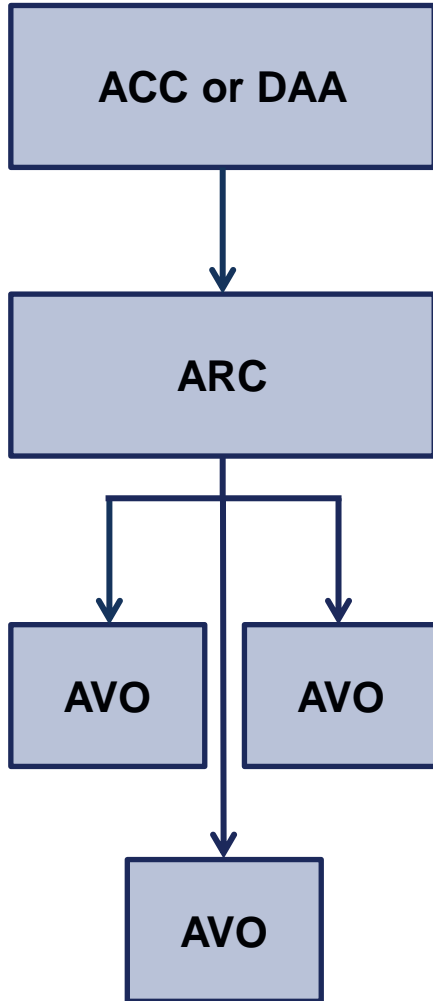


Relevant UAS Policy

- NAVSEA TM S9310-AQ-SAF-010 is the Navy Lithium Battery Safety Program which requires lithium battery certification. All lithium batteries utilized in the UAS must obtain a safety certification when the UAS is DoN owned and/or during operations on any Naval property or vessel.
- CONTRACTOR'S FLIGHT AND GROUND OPERATIONS, DCMAINST 8210.1C (NAVAIR 3710.1G) establishes requirements for flight and ground operations involving all contracted work performed on aircraft where this Instruction is incorporated as a contract requirement, as well as procedures to be followed by Government Flight Representatives (GFRs). (applies to all PAO)
- CNICINST 3700.1 is the Commander, Navy Installation Command (CNIC) policy. This policy provides guidance on the operation of UAS on Navy installations that is consistent with the policies defined within the document. Counter UAS is addressed separately, not in this instruction.
- SECNAVINST 3700.2 is Guidance for the domestic use of Unmanned Aircraft Systems in United States National Airspace. (All UAS)



DoN Owned UAS Construct



- **Aircraft Controlling Custodian (ACC)**
 - ACC’s are established to oversee flying activities within the Naval Aviation Enterprise (NAE) Group 1-5 UAS.
- **Designated Approving Authority (DAA)**
 - 0-7 or SES who assumes responsibilities of an ACC, for Group 1 & 2 UAS only, for an entity outside of the NAE.
- **Aircraft Reporting Custodian (ARC)**
 - Lowest echelon of command accepting responsibility for UAS operations Group 1 and 2 (IAW CNAF M-3710.9) Group 3-5 (IAW CNAF M-3710.7).
 - Typically an 0-5 or Civilian appointed by the ACC or DAA in writing.
- **Air Vehicle Operator (AVO)**
 - UAS Crewmembers are appointed by the ARC in writing.
 - CNAF M-3710.9 explains minimum quals required.



ACC & DAA Responsibilities

- Exercises administrative control of assignment, employment, and logistic support of Non-POR UAS under their cognizance.
- Designates in writing the Non-POR UAS Aircraft Reporting Custodian (ARC).
- Provides written notification to COMNAVAIRFOR (N45) and NAVAIR AIRWorks documenting the establishment of the DAA and all ARC Designations.
- Maintains an inventory of all Group 1 and 2 UAS in subordinate commands and units.
- Provides general oversight, funding, manning, training, operations, safety, standardization, maintenance and any other topic areas that may apply.
- Endorses Cyber Waivers/ETPs.



ARC Responsibilities

- Responsible and accountable for the operational activity of ARC's assigned UAS with in current Navy UAS Policy. Cyber Policy to include DON COTS SUAS exemptions, Cyber assessments and RMF Authorizations (i.e ATO), additionally, Spectrum approval, Laser Safety Review Boards (LSRB), Lithium Battery Policy and other requirements apply.
- Maintains the requisite personnel, training, equipment, and infrastructure to support safe flight operations in compliance with Department of Navy policies.
- Maintains and reports inventory of all Non-POR UAS and their configuration/status to the ACC or DAA.
- Designates AVOs in writing.
- Develops and routes Cyber Waivers/ETPs.
- Responsible for ensuring compliance with approved Cyber Waivers/ETPs.



Establishing a Group 1 & 2 Flying Activity - DAA

- **DAA Notification requirement.** IAW CNAF M-3710.9, DAA must provide written notification to COMNAVAIRFOR (N45) and NAVAIR AIRWorks documenting the establishment of the DAA. This notification should include DAA contact information and a list of designated ARC(s) under the cognizance of the DAA.
- **Other Requirements.**
 - AVO Designations. AVOs are designated by the ARC (DoD Self Certifies Pilots).
 - Minimum Basic UAS Qualification (BUQ) level I (Group 1) and BUQ level II (Group 2-3) training required to fly in VFR conditions in Class D, E, G, and Restricted/combat airspace up to 18,000' MSL.
 - More in-depth BUQ III training is required to fly in B and C airspace up to 18,000' MSL.
 - BUQ IV is required for operations in IFR and above 18,000' MSL.
 - BUQ training ***MAY*** be found online in the Small Unmanned Aircraft Systems Manager (SUASMAN) portal via Small Unmanned Aircraft Systems Manager website (<https://suasman.sofapps.net>). Go to this website, request the access, SUASMAN POC is Ms. Kim Censabella, HQ AFSOC/A3OU, at kimberly.censabella.1.ctr@us.af.mil or (850) 884-8022.
 - AVO medical qualifications (see following subject slide).



AVO Training

- Per CNAF M-3710.7:

- UAS Qualification (BUQ) Levels:

- The Basic UAS Qualifications (BUQ) levels, described in **Appendix N** shall be utilized as standards for training and certifying UAS crewmembers. The BUQ levels are cumulative. Therefore, to meet BUQ Level II requirements, a UASC must complete all BUQ Level I tasks as well.

- Appendix N:

- BUQ Level I: Knowledge and knowledge-based skills required to fly in VFR conditions in Class E, G, and Restricted/combat airspace <1200' AGL. The 14 Code of Federal Regulation (CFR) requirements do not currently exist for this group of aircraft. (Note: these BUQ Charts pre-Date FAA Commercial Drone Pilot under 14 CFR Part 107...)
- BUQ Level II: Aviation knowledge and UAS knowledge-based skills required to fly in VFR conditions in Class D, E, G, and Restricted/combat airspace <18,000' MSL. **BUQ Level II meets or exceeds the knowledge requirements of 14 CFR Sub-part J 61.309 and 61.311 for a FAA sport pilot license**... ..As stated above, tailoring of BUQ requirements toward individual UAS, and BUQ Levels are cumulative in nature.
- **BUQ Level III meets or exceeds the knowledge requirements of 14 CFR Sub-part E 61.105 and 61.107 for a FAA private pilot license.**
- BUQ Level IV: Knowledge and knowledge-based skills required to fly VFR/IFR in all weather conditions in airspace up to FL600. BUQ Level IV meets or exceeds the knowledge requirements of 14 CFR Sub-part F 61.125 and 61.127 for an FAA commercial pilot license with instrument rating.

- Per CNAF M-3710.9 :

- UAS ARC Responsibilities for AVO Training:

- ARCs are authorized to approve UAS crew qualifications and certifications after ensuring each UAS crewmember has completed the requisite training for the applicable crewmember classification.
- **The ARC is responsible for establishing UAS crew training and qualification requirements.** The following minimum air vehicle operator (AVO) qualifications must be met prior to group 1 and 2 UAS operations inside of national class D, E or G airspace; U.S. special use airspace (e.g., military operating areas, prohibited areas, restricted areas, warning areas, etc.); joint operating areas; combat or contingency airspace; or international airspace.
 - Minimum BUQ level I and BUQ level II training.

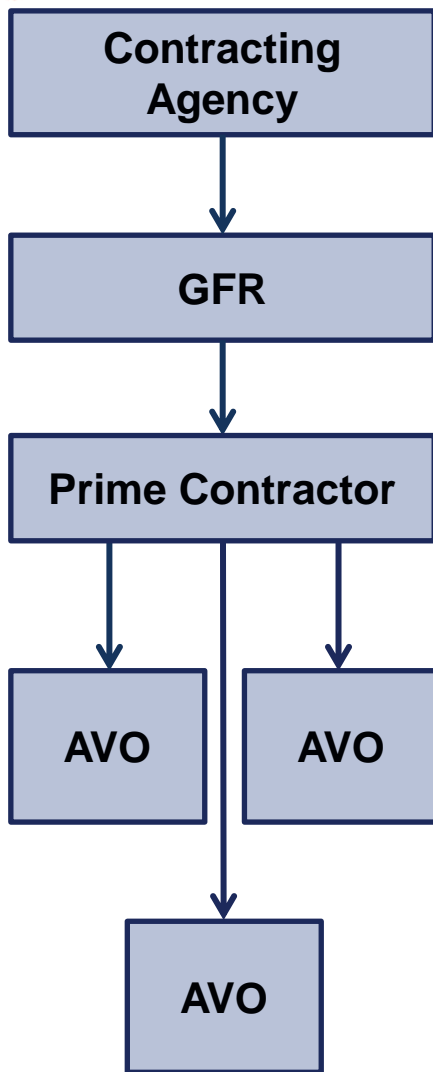


AVO Medical Qualifications

- **AVO medical qualifications per CNAF M-3710.9 and as follows;**
 - MANMED Change 159 updates MANMED 15-63, Classes of Aviation Personnel, to add Class IV Unmanned Aircraft Systems (UAS) Operators and points the reader to the Aeromedical Reference and Waiver Guide (ARWG) and provides clear background on UAS AVO Medical Requirements to provide proper context for the use of “Approved Locally”. See [MANMED Change 159](#)
 - ARWG Physical Exams and Standards Chapter 1.20 CLASS IV PERSONNEL: Physical Standards for Applicant and Designated, Active Duty and DoN/DoD-GS Personnel that Operate Unmanned Aircraft Systems (UAS). [ARWG](#) States;
 - [UAS Group 1 and 2](#): Personnel that operate UAS Group 1-2 aircraft require a medical screening exam maintained locally. An applicant or designated qualification exam for UAS Group 1-2 only, can be completed locally by a qualified medical provider. The UAS Physical Worksheet must be completed locally, maintained locally, and uploaded into the DoD Electronic Health Record. Disqualifying conditions must be documented. Waiver consideration and approval for UAS Group 1-2 is accomplished by the local command and documented. Therefore, waiver recommendation and approval for UAS Group 1-2 can be completed locally. The UAS Physical Worksheet can also be uploaded with a NAMI submission as part of a Class I (Pilot) or Class II (NFO, Aircrew) physical/waiver if that qualification is also required and maintained.
 - [UAS Group 3, 4, and 5](#): Personnel that operate UAS Group 3-5 aircraft require a complete Class IV flight physical with submission to NAMI as required. Waiver requests must be electronically submitted to NAMI and local waiver approval is not authorized. The UAS Physical Worksheet is to be completed and uploaded with the electronic submission to NAMI. An applicant physical must be electronically submitted to NAMI as a long-form with an Aeromedical Summary when required for waiver requests. UAS Group 3, 4, 5 designated physicals can be submitted to NAMI as electronic short form physicals in accordance with MANMED.
 - *Note: (Civilian Contract Operators must abide by their individual contracts)
 - Group 1 & 2 Physical Worksheet (NAVMED 6410/13); [NAVMED 6410/13](#)



COCO/GOCO PAO UAS Construct



- **Contracting Agency (Group 1-5 UAS)**
 - Shall determine PAO vs CAO. For PAO, the contracting agency shall ensure [DCMAINST 8210.1](#) is on the contract. Ensure a GFR has been assigned and if required process a GFR qualifications waiver per the DCMA 8210.1.
- **Government Flight Rep (GFR)**
 - A rated U.S. Military officer or Government civilian in an aviation position. GFRs are appointed to perform the Contract Administration Services (CAS) function, [FAR subpart 42.302\(a\)\(56\)](#) maintain surveillance of flight operations.
- **Prime Contractor**
 - Are responsible for establishing and enforcing safe and effective written Procedures IAW the [DCMAINST 8210.1](#). Prime contractors shall ensure their subcontractors comply with the provisions of this Instruction.
- **Air Vehicle Operator (AVO)**
 - Per the [DCMAINST 8210.1](#), contractors request crewmember approval by the GFR.



Contracting Agency Responsibilities

- Ensures a GFR has been properly assigned per the [DCMAINST 8210.1](#) . GFR qualification waiver may be appropriate for Group 1 & 2 UAS.
- Exercises administrative control of assignment, and employment of Non-POR UAS under their contract.
- Ensures development, proper routing and endorses Cyber Waivers.
- Refer to [DCMAINST 8210.1](#) for additional detail.



GFR Responsibilities

- Ensure contractors establish and follow written procedures IAW DCMAINST 8210.1.
- Contract Administration.
- Approve Contract UAS Crewmembers.
- Document Contract Deficiencies/Concerns.
- Flight Operations. The GFR may need to discuss the flight program and flight profiles with contractor flight operations personnel.
- Flight Approval. GFR approval is required for all PAO flights.
- Contractor Flight And Ground Operations Surveys. To include ensuring compliance with approved Cyber Waivers.
- Refer to DCMAINST 8210.1 for additional detail.
- Good Resource <https://www.dau.edu/cop/ao/Pages/Surveillance.aspx>



Contractor Responsibilities

- Establishing/writing, implementing and enforcing its Contractor Operating Procedures IAW DCMAINST 8210.1, and identifying and correcting deficiencies.
- Use of Service Guidance where required.
- Submit UAS Crewmembers for approval by the GFR.
- Answer GFR's Contract Deficiencies/Concerns.
- Request GFR Flight Approval for all PAO flights.
- Refer to DCMAINST 8210.1 for additional detail.



UAS Groups and Airworthiness Categories

- UAS are assigned a group identifier (1-5) based on:
 - Weight
 - Operating altitudes
 - Speed
- There are three categories of UAS airworthiness certification (flight clearance)–based on the following criterion:
 - Intended usage
 - Airworthiness standards & data
 - Level mishap rates
- Typically, Non-POR UAS fall under Category 3 (CAT 3) Interim Flight Clearance
 - CAT 3 is a risk-based airworthiness assessment



UAS Groups

- **NAVAIR IFCs may cite UAS Group 1 or 2 rather than specific UAS.**
- **Group 3 UAS and larger will be on UAS specific IFCs.**
- **Most Group 1-3 UAS were not designed to accepted engineering standards and receive CAT 3 UAS IFCs.**

	Maximum Gross Takeoff Weight (lbs)	Normal Operating Altitude (ft)	Airspeed (KIAS)	Example Platforms <i>Targets</i>
Group 1	0-20	<1200 AGL	<100	DJI Mavic, DJI Phantom, RQ-11B Raven, RQ-20A Puma, Skydio.
Group 2	21-55	<3,500 AGL	<250	DJI Matrice, MQ-27A ScanEagle, Pulse Aero Vapor.
Group 3	55-1320	<18,000 MSL	<250	RQ-21A, RQ-23A, FLARES, Vanilla, X-Fold Dragon.
Group 4	>1320	<18,000 MSL	Any Airspeed	MQ-8B, MQ-8C, CQ-24A K-Max.
Group 5	>1320	>18,000 MSL	Any Airspeed	RQ-4A, MQ-4C MQ-9, MQ-25.

Groups 1-3 are differentiated by increasing weight

Groups 4 & 5 are differentiated by operating altitude (18kft = Class A airspace)

A UA possessing one attribute of the next higher numbered group is categorized in the higher numbered group.



UAS Airworthiness Categories

UAS Category	Intended Usage	Airworthiness Standards & Data	Target System Level Mishap Rate*
CAT 1	<ul style="list-style-type: none"> • Airspace- All military and civil use airspace with no limits to flight over persons / populations. • Flight over populations- unrestricted. 	<ul style="list-style-type: none"> • UAS meets airworthiness standards similar to manned A/C. 	≤ 1 UA Loss in 100,000 ft hrs
CAT 2	<ul style="list-style-type: none"> • Airspace- All military and civil use airspace with limits to flight over persons / populations. • Flight over populations- Flight over densely populated areas prohibited. 	<ul style="list-style-type: none"> • UAS meets tailored airworthiness standards. • Higher expected aircraft loss rate than CAT 1 UAS. 	≤ 1 UAV in 10,000 ft hrs
CAT 3	<ul style="list-style-type: none"> • Airspace- All military and limited civil use airspace with limits to flight over persons / populations. • Flight over populations- Flight over unpopulated or sparsely areas only. • Flight over persons- Intentional flight over personnel prohibited. 	<ul style="list-style-type: none"> • <i>UAS not designed to accepted engineering standards and/or insufficient data to verify compliance.</i> • <i>Higher expected aircraft loss rate than CAT 1 or 2 UAS.</i> • <i>High Probability of Loss acknowledgement required.</i> 	> 1 UAV in 10,000 ft hrs or Unknown

CAT 3 UAS were not designed to accepted aviation engineering standards.

- Didn't follow basic aircraft design practices.
- Lack redundancy for major systems (propulsion, flight controls).
- Resultant mishap rates for CAT 3 UAS are UNKNOWN.

CAT 3 UAS Interim Flight Clearances only consider Safety of Flight.

- Assumes UAS mishap will occur, provides limits to allow UAS operation IOT mitigate risk to people/property.
- Limits consider the unmanned aircraft design and intended usage.
- Limits provided for safety of personnel during launch and recovery, safety of personnel on the deck during flight, safety airspace and operating area containment, and midair collision.



Category 3 UAS Conclusions

- Category 3 UAS flight clearances
 - Are issued for UAS that are not designed to meet accepted engineering standards and/or where there is insufficient engineering data to assess compliance with airworthiness criteria or standards.
 - Category 3 UAS flight clearances are issued with owner or sponsor **acknowledgement of a higher probability of loss of the UA**, and acceptance of system safety risks associated with material loss of the air system.
 - Are issued with limits designed to mitigate risk to ship and personnel to acceptable levels.
 - When operated aboard ship, these UAS present a **potential risk of shipboard damage**. *Examples include:*
 - Impact to expensive sensors, RADARs, and antennas
 - Impact to nearby aircraft or equipment, etc...
 - ***Flight Clearance recipients are required to communicate appropriate limits, warnings and cautions in the IFC to participants prior to commencing flight operations.***

Authorizing flight operations of CAT 3 UAS constitutes the acceptance of operational risks.



Interim Flight Clearances (IFC)

7 Paragraph Naval Message

292000Z NOV 2020
 FM COMNAVAIRSYSCOM PATUXENT RIVER MD//ACO//
 TO COMNAVAIRFOR SAN DIEGO CA//N421J// (for example)
 INFO MAWTS ONE YUMA AZ//S3//
 VX-9, VMGR-252, VFA-122, VT-31 etc -
 SUBJ: CAT 3 UAS IFC FOR ...
 REF:

Command authorized to utilize the IFC

IFC Category UAS

REMARKS/ 1. INTERIM FLIGHT CLEARANCE FOR: (Aircraft & subject)

UAS and usage assessed including ships assessed

2. TAKE OFF CONFIGURATION / LOADING: (Describes what configuration assessed – can reference other documents; includes External Stores / Pods / etc.)

3. LIMITS: (IAW operator manuals, other references and those contained in this paragraph)

Minimize risks from AW issue to safely operate UAS.

4. PROCEDURES, WARNINGS, CAUTIONS, AND NOTES (IAW operator manuals, other references and those contained in this paragraph)

Identifies residual risk when AW issue not eliminated.

5. TIME PERIOD: (expiration date)

6. POINTS OF CONTACT: (Class Desk, AW office)

7. OTHER REMARKS: (Other Info, battery certs,)

Additional information regarding accepted above normal risks, frequency coordination, etc.

Limits do not assure all risks are eliminated only that they have been mitigated to an acceptable level

- Based on expected UAS behavior.
- Considers normal and degraded system within the UAS.



Top Level IFC Process

- **Phase 1: Initial Customer Engagement (~1 Week)**
 - Customer provides Concept of Operations (CONOPS)
 - AIRWorks briefly introduces relevant UAS Policy
 - AIRWorks provides cost estimate for IFC effort
- **Phase 2: IFC Funding & Data Collection (~2-4 Weeks)**
 - Customer affirms IFC commitment
 - Customer begins providing IFC data requirements and sends funding
 - The NAVAIR funding acceptance process can take up to 3 weeks.
 - Work on the IFC cannot begin until the funding is received
 - AIRWorks drafts IFC and sends for ACC or DAA approval once the funding has been released for use.
 - IFC planning meeting held with AIRWorks, Airworthiness Office and Subject Matter Experts (SME)
- **Phase 3: IFC Request & Release (~3-4 Weeks)**
 - AIRWorks submits IFC request once all the data requirements have been received. TAEs chop/review the flight clearance and is last reviewed and released by the Airworthiness Office.



Current IFC Options

- **Fleet Group 1 & 2 IFCs.** Two options available these IFCs cover a number of common MR and FW UAS up to 55 lbs contained on the “AIRWorks-approved list.”
 - Group 1 & 2 Multi-Rotor (MR) UAS
 - Group 1 & 2 Fixed Wing (FW) UAS
- **Laboratory Group 1 & 2 IFCs.** For RDT&E units that possess a “Capacity-limited Li Ion Battery Certification,” a more-flexible/open set of IFCs can be granted. This allows certain new UAS to be added to the DAA-approved list without any NAVAIR involvement. Three options are available:
 - Group 1 & 2 Dev/Lab (MR) UAS
 - Group 1 & 2 Dev/Lab (FW) UAS
 - Group 1 & 2 Dev/Lab Single Main Rotor UAS
- **Standalone IFC.** This is the recommended approach for a specific UAS that do not fit the configuration or limitations of the above Group 1 & 2 IFCs. Examples include Group 3-5 UAS or Armed UAS. This is a required approach for tethered UAS due to unique risks.
- **Armed CAT III UAS.** These IFCs require 1-star approval at NAWCAD, and therefore are issued on a case-by-case basis after an in-depth engineering review.



IFC Data Requirements

- Per **NAVAIRINST 13034.1F**, the following are data requirements for a NAVY IFC:
 1. CONOPS (Intended Usage)
 2. Contract (*If applicable is the DCMAINST 8210 on Contract?)
 3. Range Commander's Council (RCC-323) (Other Risk Assessment?)
 4. UAS Data Sheet Or other Configuration Management Document
 5. Operating Manuals
 6. Standard Operating Procedures (SOPs)
 7. FAA Certificate of Authorization (COA) (*if applicable)
 8. Lithium battery certification (*if applicable)
 9. Laser Safety Review Board (LSRB) Letter (*if applicable)
 10. DAA Notification Letter
 11. DAA Designation of ARC Letter
 12. Higher Probability of Loss (HPOL) acknowledgement letter
 13. ACC/DAA IFC concurrence



CONOPS

- CONOPS intended to provide clarity as to the proposed UAS operations to assist the Safety of Flight Assessment.
 - A Concept of Operations (CONOPS) is a user-oriented document that "describes systems characteristics for a proposed system from a user's perspective. A CONOPS also describes the user organization, mission, and objectives from an integrated systems point of view and is used to communicate overall quantitative and qualitative system characteristics to stakeholders."
 - A CONOPS "describes the proposed system in terms of the user needs it will fulfill, its relationship to existing systems or procedures, and the ways it will be used. CONOPS can be tailored for many purposes, for example, to obtain consensus among the acquirer, developers, supporters, and user agencies on the operational concept of a proposed system. Additionally, a CONOPS may focus on communicating the user's needs to the developer or the developer's ideas to the user and other interested parties."



Contract

- **Copy of the Contract.** It is imperative that a copy of the contract covering the contracted air services be provided by the PM/PCO/ACO/COR. The contract will provide the following information:
 - what service is being provided,
 - who is in a binding agreement with the government,
 - how oversight is being provided for continuing airworthiness,
 - who has liability,
 - how indemnity is being shared,
 - what standards are being levied for airworthiness and safety of flight.
- **Additional Questions**
 - Is the contract for flight operations or simply for data?
 - Is the DCMAINST 8210 on the contract?
 - Has a Government Flight Representative been assigned?



RCC-323 Questionnaire

- Questions intended to identify potential hazards while operating UAS on ranges.
- Ensures safeguards are put in place to reduce risk to an acceptable level, consistent with existing local policy guidance.
- Outlines the following:
 - UAS Background
 - UAS description & performance
 - Loss of Control
 - Command uplink & flight control characteristics
 - Safeguards
 - Fail-safes & flight termination systems
 - Midair Collision Hazards
 - Avoidance systems & UAS routes



UAS Data Sheet

- Data Sheet captures system data generally detailed in standalone IFCs. Data supports the Group IFC Construct and supports Airworthiness Engineering Reviews.
- Contains the Following Information:
 - Operators Manuals and Checklists
 - Air Vehicle
 - System Limits
 - Propulsion Systems
 - Avionics
 - Datalinks
 - Payloads and other Airborne Computers
 - Lasers
 - Control Station
 - Hardware
 - Software
 - Datalinks
 - Hand Controller
 - Launch and Recovery Systems
 - UAS Batteries
 - Air Vehicle
 - Control Station
 - Other



Operator Manuals & SOPs

- Operator manuals and/or SOPs describing the following;
 - Air Vehicle (AV)
 - Auto-pilot & software
 - Ground Control Station (GCS)
 - Maintenance
 - Launch
 - In-flight
 - Recovery
 - Fail safe containment methods
 - Emergency procedures
 - Safety hazard keep out zones



FAA COA

- Per **DOD/FAA Memorandum of Understanding (MOU)**, an FAA COA or DON AAA is required for DOD OPS in the NAS. Follow steps in the *DON Requirements and Guidance for Access to and Operations within U.S. Civil Airspace by DoN UAS* .
- An IFC that may be used as a ‘statement of airworthiness’ in support of an FAA COA will say so in Paragraph 7 of the IFC.
- **Chicken or the Egg?** COA application artifacts (what the FAA needs) are required to support IFC requests for Class C, Civil/Joint-use Class D, and E airspaces, but the **COA will not be processed without the approved IFC**.
 - You may apply for an FAA account, and start the COA application while waiting for the IFC.
 - Provide COA artifacts to AIRWorks in support of the IFC review.
 - Once the IFC is released, upload it to the FAA website and notify the NAVREP. **FAA Processing can take up to 60 working days.**
- Coordinate with your regional NAVREP:
 - **FAA Eastern Service Area email: 9-AJO-ESA-DON@faa.gov**
 - **USMC: LtCol Charles Nunally, charles.nunally@faa.gov or 404-305-6907**
 - **USN: CDR Wallace, bradford.d.wallace@faa.gov or 404-305-6908**
 - **FAA Central Service Area email: 9-AJO-CSA-DON@faa.gov**
 - **USN/USMC: CDR Haase, david.s.haase@faa.gov or 817-222-5931**
 - **FAA Western Service Area email: 9-AJO-WSA-DON@faa.gov**
 - **USMC: LtCol Lipski, kevin.lipski@faa.gov or 206-231-2503**
 - **USN: CDR Wright, jgranville.c.wright@faa.gov or 206-231-2502**
 - **FAA HQ Liaison**
 - **USMC: LtCol Joe Turkal, joseph.b.turkal@faa.gov or 202-267-8439**
 - **USN: CDR Bryce “Jed” Klaput, bryce.klaput@navy.mil or 202-267-9431**



FAA Night Lighting Requirements in the NAS

- The FAA looks to DOD to certify that its lights meet the requirement designated requirements.
 - The UAS must meet the night lighting requirements prescribed in 14 CFR Subpart C 91.209 or alternate means approved by the FAA as safe for the intended operation.
 - Flight crews have been trained on the lighting configuration of the unmanned aircraft and are required to be in place 30 minutes prior to night operations to ensure that night vision adaptation has occurred, as applicable.



Lithium Battery Certification

- Per NAVSEA TM S9310-AQ-SAF-010, lithium batteries are subject to a safety review and certification.
- Review/certification & cost varies on a case by case basis.
- Certification requirements:
 1. 'Safety Data Package Battery Certification Form'
 - Outlines the parameters of the battery
 - Covers usage, storage and handling procedures
 2. 'Battery Certification Request Letter'
 - AIRWorks will assist the customer with draft & submission
- Note: Not required for COCO ops on Non-Navy Facilities conducted by Non-Navy Personnel.



Laser

- Per OPNAV INSTRUCTION 5100.27B/MARINE CORPS ORDER 5104.1C Laser Systems are subject to special controls and potential certification prior to use.
- Data Requirements,
 - CONOPS/Use Case. (Combat/Combat Training, Testing, Operator Training, mapping etc.).
 - Laser Classification (Class 1, 1M, 2, 2M, 3R, 3B, 4).
 - OEM Product Documentation and/or Datasheets.
 - **OEM Testing Data utilized to determine Laser Classification.**
 - FDA Accession Number or Military Exemption Letter(s).

NOTE

Laser Testing at the DoN Laser Test Lab (LNTL) costs roughly \$25K per test. Without Laser Test Data, special limits, procedures or notes may be applied to the Interim Flight Clearance that may impede planned UAS Operations.

NOTE

All military exempt and class 3B and class 4 lasers, used in airborne, at sea or military ground operations shall be reviewed and approved by the Navy Laser Safety Review Board (LSRB) prior to their use to determine compliance with regulations, laser hazard data, and recommended eye protection.



DAA, ARC, CAPS Letters

- DAA Notification Letter
 - Memorandum for the Record addressed to COMNAVAIRFOR (N45) and AIRWorks.
 - Letter serves as the basis for HPOL letter(s) and required IFC Concurrence(s).
 - Required for COA Applications
- DAA Designation of ARC Letter
 - Letter from the ACC/DAA establishing an ARC and delegates the authority to generate Category 3 IFC requests through AIRWorks.
 - Letter serves as the basis for discussions with regard to Category 3 IFC requests.
- DoN Unmanned Aircraft System (UAS) Airspace Access Applicant Designation
 - Letter from the ACC/DAA (Proponent) establishing an Certificate of Authorization (COA) Processing System (CAPS) account to request and manage Command COAs.



HPOL & ACC/DAA Concurrence

- Higher Probability of Loss (HPOL)
 - Letter is submitted on letterhead and needs to come from the ACC, DAA or the funding sponsor of the UAS.
 - HPOL letter acknowledges that they are likely to lose the CAT3 UAS during operations
- ACC/DAA Concurrence
 - Email concurrence is given after the ACC or DAA reviews the draft IFC
 - Acknowledges that the IFC request is valid:
 - *“I concur that the category 3 IFC request for the (Platform) UAS supporting (Organization) is valid”*



AIRWorks Points of Contact



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Back-up Slides

- Back-ups Slides



FARS & DFARS

- **FAR 42.302 Contract administration functions.**
 - (56) Maintain surveillance of flight operations. (FAA would address Civil Aircraft Oversight. DoD would assume Public Aircraft Oversight)
- **DFARS 242.302 Contract administration functions.** (Public or State Aircraft Operations)
 - (56) Within DoD, maintaining surveillance of aircraft flight and ground operations is accomplished by incorporating into the contract, task order, or delivery order the requirements of the applicable version of the combined regulation/instruction entitled “Contractor’s Flight and Ground Operations” (Air Force Instruction 10-220, Army Regulation 95-20, Naval Air Systems Command (NAVAIR) Instruction 3710.1 (Series), Coast Guard Instruction M13020.3 (Series), and Defense Contract Management Agency Instruction 8210-1 (Series)).



NAVAIRINST 13034.1G cont.

- **Continuing Airworthiness.** In order to ensure Contracted Aircraft Services (CAS) air systems performing PAO, for which NAVAIR is serving as the airworthiness authority (**to include CAS operations conducted outside of the U.S. NAS that may be deemed State**), are maintained and operated in a condition for safe operation, **government oversight is required per references (y) and (z)**. In addition to an airworthiness approval, a Safe for Flight Certification Inspection and an assigned Government Flight Representative are generally utilized to oversee the contractor operations to ensure continuing airworthiness and contractual compliance.
- Continuing Airworthiness encompasses the life cycle sustainment processes necessary to ensure that individual air systems remain in a condition for safe operation and that each air system (i.e., each “tail”) conforms to the approved Design Airworthiness configuration. Continuing Airworthiness processes... ..and **Contractor Flight and Ground Operations**.
- References
 - (y) NAVAIRINST 3710.1 series Contractor’s Flight and Ground Operations (i.e. Tri-Service Agreement = DCMAINST 8210.1D).
 - (z) NAVAIRINST 3700.4 series Safe for Flight Operations Certification.



Contracted Air Services (CAS)

Example Contract Language for either PAO or CAO Contracts.

• PAO (COCO Operations)

- “The DCMAINST 8210.1C, Change 1 procedures associated with Contractor Owned/Contractor Operated aircraft conducting Public Aircraft Operations (PAO) shall be applied to this Contract/SBIR/CRADA (#_____). A Government Flight Representative (GFR) will be assigned by (YOUR ACTIVITY or NAVAIR) and shall review the Concept of Operations, the contractor provided ground and flight operations associated with maintaining and operating the aircraft as PAO in support of providing a Navy IFC. IAW the DCMAINST 8210.1C a government appointed GFR shall review and approve all applicable contractor procedures, personnel and flights IAW DCMAINST 8210.1 Change 1. 48 CFR § 252.228-7001 - Ground and Flight Risk Clause in not applicable to this agreement, and therefore cannot indemnify the contractor against loss or liability. Liability shall be IAW Article _____ of the Contract/SBIR/CRADA. The contractor shall provide proof of insurance to the Navy for GFR review and concurrence.”

• PAO (GOCO Operations)

- “The DCMAINST 8210.1C, Change 1 procedures associated with Government Owned/Contractor Operated aircraft conducting Public Aircraft Operations (PAO) shall be applied to this Contract/SBIR/CRADA (#_____). A Government Flight Representative (GFR) will be assigned by NAVAIR and shall review the Concept of Operations, the contractor provided ground and flight operations associated with maintaining and operating the aircraft as PAO in support of providing a Navy IFC. IAW the DCMAINST 8210.1C a government appointed GFR shall review and approve all applicable contractor procedures, personnel and flights IAW DCMAINST 8210.1 Change 1. The DFARS 252.228-7001 - Ground and Flight Risk Clause has been applied to this Contract/SBIR/CRADA, see contract clauses.”

• CAO

- “This Contract /SBIR/CRADA is for Contractor Owned/Contractor Operated Civil Aircraft Operations operating IAW the Federal Aviation Administration (FAA) established regulations. Liability shall be IAW Article _____ of the Contract/SBIR/CRADA.”

NOTE

A contracted aircraft and aircrew could conduct a civil operation in the morning and then that same crew operating the same aircraft, could be tasked to conduct a PAO in the afternoon based on changes to the aircraft configuration and/or the operation being conducted.



GFR Qualification Requirements

- A rated U.S. Military officer or Government civilian in an aviation position. GFRs are appointed to perform the Contract Administration Services (CAS) function, FAR subpart 42.302(a)(56) “Maintain surveillance of flight operations.”

Note:

GFRs receive their appointment letters from their Approving Authority.

- The Approving Authority designates a GFR for contractor PAO.
 - Navy Approving Authority - Commander, Naval Air Systems Command (COMNAVAIRSYSCOM). Delegated to other Controlling Custodian Commanders who administer FAR subpart 42.302 responsibilities for organizational level support and training contracts.
- Required Training Courses obtained via DAU;
 - CMA 100 - Fundamentals of the GRF and GGFR (*Required*)
 - CLC 011 - Contracting for the Rest of Us (*Highly Recommended*)
 - CMA 241 **or** CMA 241V Government Flight & Ground Representative (GFR/GGR) (*Required*)



Remote ID Part 89

- From 89CFR:
 - Except as provided in paragraph (b) of this section, this subpart applies to the following:
 - (1) Persons operating unmanned aircraft registered or required to be registered under part 47 or 48 of this chapter. – **DoD UA are not registered under those rules.**
- From the Final Rule:
 - “There are limited exceptions allowing the production of unmanned aircraft without remote identification, which include home-built unmanned aircraft and **unmanned aircraft of the United States Government,** amongst others.”



Civil Aircraft Landing Permit

- Civil Aircraft Landing Permit (CALP)

- <https://www.cnic.navy.mil/Operations-and-Management/Base-Support/DoN-Civil-Air-Landing-Permits/>
- Official Government Regulation: 32 CFR 766 "Use of Department of the Navy aviation facilities by other than United States Department of Defense Aircraft" This regulation applies to civil aircraft use of Department of the Navy (DoN) land based air facilities. Civil aircraft include domestic or foreign aircraft operated by individuals or corporations, foreign government owned aircraft operated for commercial purposes, aircraft operated under contract to a government agency, aircraft that are leased from the United States Government but able to be used for non-government purposes, all commercial aviation and all general aviation.
- A CALP is a permit to use specified DoN air stations and facilities for a specified, authorized purpose. To use these facilities, the applicant must have a permit based on a bona fide, approved purpose, adequate insurance and an executed Hold Harmless agreement.
- For UAS that weigh less than 55 pounds, the operator must obtain approval to land directly from the installation commanding officer and must provide the installation with indemnification and hold harmless agreement prior to operations when the government is not assuming liability associated with the UAS operations. A CALP can be obtained from an installation, a Navy region or from Commander, Navy Installations Command (CNIC).
- CALP Form: DD2401
- Also need to include a DD2402, Civil Aircraft Hold Harmless Agreement.



Airworthiness Responsibilities

- **FAA oversees Civil Aircraft Operations (CAO);**
 - Initial Airworthiness – Parts 21-59.
 - Aircrew Training & Cert – Part 60-68.
 - Operating Rules – 89-109 highlighting 91 & 107.
 - Continued AW – Part 145.
- **Governmental Agency (DoN) oversees Public Aircraft Operations (PAO);**
 - **GOGO:**
 - Initial Airworthiness – NAVAIR issued IFC.
 - Aircrew Training & Cert – 3710.7/3710.9/3500.
 - Operating Rules – 3710.7/3710.9/Part 91 (NO PART 107).
 - Continued Airworthiness – for Group 1, 2 and sometimes 3 this is accomplished IAW OEM Manuals or Aircraft Reporting Custodian (ARC) whenever the OEM has not developed instructions. Per the CNAFINST 4790.2 for Group 4/5.
 - **COCO/GOCO/COGO:** (PCO has FAR subpart 42.302(a)(56) responsibilities)
 - Initial Airworthiness – NAVAIR issued IFC.
 - Aircrew Training & Cert – DCMAINST 8210. (service guidance aligned to 3710.7/3710.9 and Part 91) (NO PART 107).
 - Operating Rules – DCMAINST 8210.1 (service guidance aligned to 3710.7/3710.9 and Part 91) (NO PART 107).
 - Continued Airworthiness – DCMAINST 8210.1 (Service Guidance) this is accomplished IAW OEM Manuals or Contractor Procedures.