NAVAIR AIRWORTHINESS AND CYBERSAFE PROCESS MANUAL

Implemented and Endorsed by NAVAIRINST 13034.1F.
### Record of Changes

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Foreword

This manual is issued to prescribe policy details, responsibilities, procedures, and additional guidance for executing the Naval Air Systems Command (NAVAIR) Airworthiness and Cybersecurity Safety (CYBERSAFE) policies for air vehicles and aircraft systems. NAVAIRINST 13034.1F implements and endorses NAVAIR M-13034.1 as the official NAVAIR policy for Airworthiness and CYBERSAFE.

Forward recommended changes to this manual to:

Airworthiness and CYBERSAFE Directorate (AIR-4.0P)
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Copies of this manual may be obtained via the Directives Web site, located under the “Guidance” tab at: https://directives.navair.navy.mil/
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References

(a) NAVAIRINST 13034.1F
(b) DoD Directive 5030.61
(c) OPNAVINST 3710.7U
(d) OPNAVINST 3510.15A
(e) Flight Clearance Process Guide
(f) SECNAVINST 5400.15C
(g) Memorandum from Commander, Naval Air Systems Command – Cybersecurity Safety Technical Warrant Holder Designation, 1 Feb 2016
(h) Memorandum from Commander, Naval Air Systems Command – Designation as the Naval Air Systems Command Cybersecurity Safety Program Director
(i) NAVAIRINST 5100.3D
(j) MIL-STD-882E
(k) OPNAVINST 4790.2J
(l) COMNAVAIRFORINST 4790.2B Change 1, of 15 June 2013
(m) NAVAIRINST 3700.4
(n) OPNAVINST 8000.16D
(o) DCMA INST 8210.1C
(p) OPNAVINST 3750.6S
(q) NAVAIRINST 4355.19E
(r) SECNAVINST 5239.22
(s) Memorandum from Commander Naval Air Systems Command – Commander’s Intent on Cybersecurity Safety (CYBERSAFE) Program, 1 Feb 2016
(t) MIL-HDBK-516C
(u) Joint Service MOA for Mutual Acceptance of Airworthiness Certification, Assessments and Data of 24 June 2014
(v) FAA Order 8110.101A, Type Certification Procedures for Military Commercial Derivative Aircraft of 25 Feb 2015
(w) NAVAIRINST 13100.15
(y) NAVAIRINST 5100.11A
(z) FAA Order 8900.1 of 23 Jun 2014
(aa) RCC 323-99 Range Safety Criteria for Unmanned Air Vehicles of Apr 2004
(ab) NAVAIRINST 4130.1D
(ac) NAVAIRINST 5400.158A
(ad) OPNAVINST 3500.39C
(ae) STANAG 4671 Unmanned Aerial Vehicles Systems Airworthiness Requirements (USAR) of 03 Sep 2009

(af) STANAG 4702 Rotary Wing UAV Systems Airworthiness Requirements of 04 Sep 2014

(ag) STANAG 4703 Light UAV Systems Airworthiness Requirements of 04 Sep 2014
Chapter 1 - Purpose, Authority, and Background

1. **Purpose**

   a. To establish detailed policy, responsibilities, and procedures for executing airworthiness and CYBERSAFE reviews resulting in Naval Air Systems Command (NAVAIR) flight clearances and/or CYBERSAFE certifications for all Department of the Navy (DON) Public Aircraft Operations (PAOs), per references (a) through (e).

   b. This manual applies to all DON aircraft and all aircraft conducting DON PAOs including air vehicles and aircraft systems owned, leased, operated, used, designed, or modified by any DON entity or component, whether or not they are reflected in the official United States Navy and/or United States Marine Corps (USMC) inventory, and regardless of operating area, including but not limited to:

      (1) All manned and unmanned air vehicles and aircraft systems, including pre-accepted aircraft. Examples include, but are not limited to; all air vehicles and aircraft systems in-service and under development, including Joint Program Office systems being developed for DON use, all Assistant Secretary of the Navy for Research, Development and Acquisition designated aviation acquisition programs being developed or acquired for DON use, and to fleet units that own, operate, or manage DON air vehicles and aircraft systems.

      (2) Manned and unmanned air vehicles and aircraft systems in standard and non-standard configurations, including hardware, firmware, software, flight envelopes, and operation. Examples include, but are not limited to; stores and store suspension equipment, Aviation Life Support Systems (ALSS) utilization, and airborne and surface based components for unmanned air systems (UAS).

      (3) Developmental Testing (DT), Operational Testing (OT), Follow-on Operational Test and Evaluation (FOT&E), and fleet operations. This instruction does not supersede or take precedence over the process for formal certification of readiness for DT, OT, or recertification for FOT&E required by applicable acquisition directives.
2. Authority

a. DON Airworthiness Authority. The Commander, NAVAIR (AIR-00), is the DON Airworthiness Authority via the following statutory and regulatory authorities:
   - Title 49 U.S.C., Section (§) 40103;
   - Title 10 U.S.C., § 5013;
   - References (c), (d), and (f).

   (1) Per references (c) and (d), reference (a) directly delegates day-to-day execution of airworthiness authority to the DON Airworthiness and CYBERSAFE Directorate, AIR-4.0P. AIR-4.0P is the single delegated authority for the issuance of interim and permanent flight clearances (FCs) for all DON air vehicles and aircraft systems and provides direction and tasking to NAVAIR competencies to execute the airworthiness process on behalf of AIR-00.

   (2) Reference (f) establishes that AIR-00 is also the Technical Authority for Naval aviation systems and, per Defense Federal Acquisition Regulation Supplement (DFARS) 209.270-2, the Design Control Activity, specifically responsible for ensuring the airworthiness of Naval aviation systems or equipment.

b. CYBERSAFE Technical Authority. Per reference (g), CYBERSAFE technical authority for all DON aviation systems is assigned to the Assistant Commander for Research and Engineering (AIR-4.0). Additionally, per reference (h), AIR-4.0P is designated as CYBERSAFE Program Director (CSPD) and is delegated process execution responsibilities for NAVAIR CYBERSAFE certifications which are defined in the cyber-related portions of this manual, applicable task-specific AIR-4.0P and competency Standard Work Packages (SWPs), Standard Skills Packages (SSPs), and other operating guides.

3. Background

a. Airworthiness Concepts. Assessment of the airworthiness of an air system configuration determines its ability to safely attain, sustain and terminate flight ("complete" in case of UAS) per approved usage limits. All manned aircraft must be airworthy. UAS may have a lower level of inherent airworthiness and a higher probability of catastrophic failure than manned
aircraft. Assessment of Safety of Flight (SOF) determines the property of an air system configuration to safely attain, sustain, and terminate or complete flight (to include in-flight or post-flight aircrew survivability), within prescribed and accepted limits for injury or death to personnel, damage to equipment, property, and/or environment. The intent of assessing SOF is to show that the level of system safety risk (hazards resulting in death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment) have been appropriately identified by the Technical Area Experts (TAE), accepted by the appropriate authority, and concurred with by the fleet or test user for high and serious risks per references (i) and (j).

(1) Airworthiness Overview: The assessment of airworthiness is a multi-disciplinary concept requiring not only the establishment of initial (design-based) airworthiness of an aircraft system, but also the continuing airworthiness of that aircraft system throughout its life cycle. The determination of airworthiness is executed via an airworthiness certification process that encompasses engineering and life cycle support requirements necessary to design, build, and maintain an air vehicle as airworthy and safe for flight. The engagement of appropriately qualified people, the execution of proven and documented processes and standards, and availability of effective tools are keys to successful execution of airworthiness processes.

(2) Systems Command (SYSCOM) Airworthiness: Within NAVAIR, different organizations are delegated Technical Authority over specific aspects of the overall SYSCOM Airworthiness process. Each competency contributes uniquely to the acquisition and life cycle support of airworthy Naval Aviation assets. As an example, a Flight Clearance authorizes flight in a specific aircraft configuration to specified limits. Configuration Management (CM) is the responsibility of Assistant Commander for Acquisition (AIR-1.0). Authority to modify an aircraft is managed by Assistant Commander for Logistics and Industrial Operations (AIR-6.0). Corporate Operations and Total Force (AIR-7.0) provides operational and business services including cybersecurity and authority to operate for information technology solutions. Air vehicle limits for that configuration are determined by personnel from Test and Evaluation (AIR-5.0) and/or Air Vehicle Engineering (AIR-4.0) and approved by
empowered AW TAEs. AIR-4.0P and the program Class Desk coordinate with AIR-1.0, 4.0, 5.0, 6.0, and AIR-7.0 to ensure that the integrity of these critical tenets of airworthiness are maintained.

(3) Tenets of Airworthiness: The evaluation of an air vehicle or aircraft system to be in and to remain in, an airworthy state requires the execution of processes across a wide range of technical, operational and logistical disciplines. These tenets include continuing airworthiness (encompassing configuration management, maintenance, and materiel management), training systems and training devices, safety management systems and system safety risk assessment, flight test specific processes and procedures (including continuation criteria and aircraft operating limit databases), independent systems engineering processes, and the resultant airworthiness certification products. See Figure 1 for a graphical depiction of the tenets of airworthiness.

![Figure 1- Tenets of Airworthiness](image-url)
(a) Continuing Airworthiness: Encompasses all of the processes to ensure that an aircraft system complies with its airworthiness certification products throughout its lifecycle, and is in a condition for continued safe operation; an aircraft system must remain in an approved configuration and must be maintained to specific standards for it to remain airworthy. Continuing airworthiness goes beyond initial design engineering analysis of the aircraft system and includes configuration management, maintenance, and materiel management. The training of aircrew and maintainers, ordnance handling, and safety management systems (SMS) are also considered. For Program of Record aircraft systems, references (c), (k), (l), (m) and (n) provide guidance on continuing airworthiness processes. For Contracted Air Services (CAS), and non-Program of Record aircraft systems, references (m) and (o) provide guidance on the continuing airworthiness processes.

1. Configuration Management (CM): The approved configuration for an aircraft system routinely changes over its life cycle, and an effective configuration management program must include the combined and systematic application of CM planning, identification, audits, controls, accounting, and data management to appropriately account for these changes and any airworthiness implications they might have. Flight clearances are written to the appropriate “take-off” configuration, accounting for the “as maintained” aircraft system with the addition of approved carry on-carry off, roll on-roll off, and ALSS equipment, as well as authorized aircrew and passengers.

2. Maintenance: Aircraft systems must have the appropriate and documented engineering, maintenance, and repair schemes in place to ensure their airworthiness over time. The fatigue spectrum must be established and tracked, time-critical and routine maintenance executed, and training implemented to provide initial and continued competence of personnel within the maintenance organizations.

3. Materiel Management: Aircraft systems must be maintained using approved parts from approved vendor and materiel sources. Inspections and parts tracking are required to ensure counterfeit parts and materials do not enter the supply chain, especially for Critical Safety Items.
(b) Training Systems / Training Devices: A new or modified aircraft must have approved aircrew and maintenance training curricula and certified simulators. Accurate simulators, whether flight or maintenance trainers, are required to ensure proper training for aircrew and maintainers. Simulators that do not accurately capture the aircraft configuration or performance can provide negative training that is detrimental to safety. Training curriculum and devices require appropriate levels of scrutiny within the airworthiness process.

(c) Safety Management Systems and System Safety Risk Assessments: An airworthiness process must ensure system safety risk is evaluated for a given air system configuration and flight envelope and includes methodologies, processes and products necessary to meet safety requirements for initial and continuing airworthiness certification. A system safety risk determined to adversely affect the airworthiness or safety of flight of an air vehicle could be corrected with a design modification or avoided by limiting the flight envelope in such a way that the risk becomes operationally irrelevant. Alternatively, system safety risk could be mitigated by the provision of procedures and may result in inclusion of a Warning, Caution, or Note in a flight clearance so the user understands the hazard and its implication. In cases where safety risk is determined to be above normal for the intended mission (e.g., flight test, air show, fleet use), a System Safety Risk Assessment (SSRA) may be required to document the hazard and have it accepted at the appropriate level, per reference (j). The airworthiness process addresses only a small part of the overall risk management process. Programmatic, operational, flight test and contractual risks are all managed separately from the airworthiness process, and are discussed in more detail in references (i), (j), and (q).

(d) Flight Test: Flight test is unique by its nature and therefore requires specific methods, such as aircraft operating limits databases (Op Limits) and continuation criteria, to safely expand the envelope. Op Limits are specific limits inside a broader desired end-state flight test envelope and may be used to facilitate deliberate envelope expansion efforts in accordance with approved test plans without requiring multiple modifications to the airworthiness certification issued for the flight test. Continuation criteria are used for
determining the overall success or failure of the item under test. They are specific and measurable, either quantitatively or qualitatively, by the procedures and methodology detailed in the flight test plan.

(e) Systems Engineering Technical Review Process: Within NAVAIR, independent systems engineering is executed via the Systems Engineering Technical Review (SETR) process per reference (q). SETR events are an integral part of the NAVAIR Systems Engineering (SE) process and life-cycle management. SETR events are characterized by the application of engineering rigor, interdisciplinary communications and competency subject matter expertise to assess the requirements traceability, product metrics and decision rationale of the maturing design. Execution of the SETR process ensures that programmatic (cost, schedule, etc.) and operational issues do not have undue influence on technical airworthiness analyses and products.

(f) Aircraft Airworthiness Certification Products: A Flight Clearance is the resultant product of the NAVAIR airworthiness process and is evidence that an independent engineering assessment of airworthiness and SOF has been performed. This assessment indicates the aircraft system can be operated with an acceptable level of system safety risk for the intended mission.

b. CYBERSAFE Concepts. CYBERSAFE is a vital component of the Navy’s comprehensive overarching cybersecurity strategy. The purpose of the CYBERSAFE Program is to provide maximum reasonable assurance of survivability and resiliency of critical warfighting Information Technology, components, and processes. The term CYBERSAFE is not intended to imply that platform safety is the single impetus behind the Program. Safety is a key concern; however, Navy platforms exist to execute our national defense mission and therefore, mission assurance is the primary CYBERSAFE consideration. The Navy CYBERSAFE Program is composed of the following three main interrelated facets:

- Cyber System Levels (1 – 4) correspond to the basic subdivisions of a platform's enclaves for system types and are used to categorize platform architectures for design purposes.
• CYBERSAFE Grades (A, B, and C) signify the rigorousness of the assigned material (hardware and software) procurement, handling, and maintenance controls.

• Cyber Conditions (Fully Netted, Semi-Netted, No Net) determine the operating and casualty procedures used to adjust the platform characteristics to respond to cybersecurity intrusions or abnormal conditions.

Overall, the correct and disciplined application of the multiple facets of the CYBERSAFE Program provides the means to achieve mission assurance. Key elements of the CYBERSAFE Program are defined and further explained in references (r) and (s).
Chapter 2 - Policy

1. General Airworthiness Policy. Per reference (c), all DON PAO (including CAS and non-program of record activities) shall have an airworthiness approval in the form of a flight clearance issued by COMNAVAIRSYSCOM. As aircraft systems develop and mature, they undergo configuration changes and/or expansion of the operational flight envelope. At each step, from first flight through retirement of the platform, airworthiness must be assured and certified by a NAVAIR flight clearance. NAVAIR flight clearances are issued in the form of interim or permanent clearances and are products resulting from a DON airworthiness assessment, as required by reference (b).

   a. Flight Clearance. A flight clearance is a formal document that provides assurance of airworthiness and SOF, and ensures system safety risk has been identified and accepted at the appropriate level, within acceptable bounds for the intended mission. Flight clearances provide flight operating limitations for specific air vehicle and air system configurations and store loadings.

   (1) Interim Flight Clearance (IFC). IFCs provide NAVAIR airworthiness approval of aircraft systems operating in non-standard configurations, envelopes, conditions, or aircraft systems that have no permanent flight clearance, such as new Type/Model/Series (T/M/S) aircraft. IFCs are valid until the specific expiration date or other conditions specified in the IFC are met. IFCs are commonly used in the Research, Development, Test and Evaluation (RDT&E) community, but can also be used on a temporary basis for fleet operations. They are also the authoritative document that permits the use of a draft NATOPS and/or NATIP product by DT units and for a preliminary NATOPS and/or NATIP product by OT units.

   (2) Permanent Flight Clearance (PFC). PFCs come in the form of NATOPS and NATIP or specific AIR-4.0P approved products that are determined to be equivalent to NATOPS and NATIP (e.g., F-35 Flight Series Data). The NATOPS provides standardized aircraft operating procedures, limitations, technical data, and training requirements necessary for safe and effective operation of the aircraft model or aviation support activity. The NATIP provides critical technical data and limitations for all
weapons, weapon systems, avionics, and mission systems required for the operator to safely and effectively employ the aircraft weapon and mission systems. The program Class Desk is responsible for transitioning IFC information to PFCs once testing is complete, however not all IFCs will generate changes to the PFC.

b. Flight Clearance Applicability. A flight clearance is valid only for the defined configurations and flight envelopes and operations specified in the clearance. There are cases when multiple flight clearances apply to the same T/M/S or Bureau Number aircraft. Care must be taken to ensure that when multiple flight clearances are applicable, the most restrictive set of limits are observed to ensure airworthiness standards are not compromised. Any change to the specified configuration or flight operation requires issuance of a separate or revised flight clearance. NAVAIR flight clearances are additionally only valid when aircraft are maintained per references (k) and (l) and/or NAVAIR accepted and/or approved maintenance and structural life management plans.

c. Thresholds for Flight Clearance. For manned or unmanned fixed wing aircraft, a flight clearance is required when there is intent or the potential for flight (e.g., high-speed taxi). For fixed-wing UAS with operator-controlled taxi capability, the threshold is low-speed taxi. For manned and unmanned rotary wing or tilt-rotor aircraft, a flight clearance is required for engagement or turning of the rotors.

d. Authority to Modify Aircraft. Per references (k), (l), and (ab) NAVAIR is the only authority to approve, modify, or withhold modification of U.S. Navy aeronautical equipment. Per references (k) and (l), the Aircraft Controlling Custodian (ACC) has the authority to modify one aircraft under their command; however, a flight clearance must be obtained to fly an aircraft system in that non-standard configuration.

e. Flight Certification Plan (FCP). Each Program Office is responsible for planning and obtaining the varied certifications (e.g., LASER certification, Weapons certification, CNS/ATM certification, CYBERSAFE, cybersecurity risk management framework (RMF) authorization to operate (ATO), etc.) required before conducting operations. Typically the System Engineering Plan (SEP) addresses the needed certifications and may include a
FCP to coordinate timing of certifications with milestone decisions and operational requirements. A FCP should detail how and when all required flight certifications will be obtained.

f. Airworthiness Qualification Plan (AQP). An AQP is highly recommended for all programs, but required for each new aircraft development program (e.g., new type/model/series), major upgrade program, Foreign Military Sales (FMS) case, Joint Program, and when a Program intends to utilize non-DON airworthiness certifications and/or non-DON TAEs. An AQP defines the plan for an air system to achieve interim and permanent flight clearances over the system life cycle, including the roles, responsibilities, processes and products to establish the initial and continuing airworthiness basis for the air system. Reference (t) should be used to establish the airworthiness criteria, standards, methods of compliance and data artifacts. In cases where multiple airworthiness organization are involved, the AQP shall delineate the use of Recognition Agreements, acceptance of previous certificates, the conduct of engineering reviews, and the treatment of unique configurations, limitations, and operations to ensure there are no gaps in the airworthiness certification basis.

g. Acceptance of Airworthiness Certifications and Data. Airworthiness authorities (AAs) depend upon and interact with other AAs in order to minimize duplicative effort in establishing an airworthiness basis and certifying air vehicles for which they are responsible. Reference (b) enclosure 3, paragraph 14.b, permits the DoD to leverage a previous certification by a recognized AA. In such cases, the procuring Service must fully understand the particular standards to which the system was previously certified, the exact configuration, and the design usage and environment in order to assess what specifically could be accepted as a (partial) certification basis. The flight clearance process shall utilize airworthiness certifications and data from other recognized AAs to the maximum extent possible in establishing the airworthiness basis and operating limitations for aircraft purchased, leased, contracted, and/or used by the DON.

(1) Recognition Agreements. Relationships may be established with other domestic and/or foreign government agencies and/or AAs to facilitate the use of existing airworthiness certifications and/or data as a basis for DON
airworthiness approval. These relationships are affirmed after evidentiary review of policy, processes, people, and tools specific to that agency or AA. The extent of the relationship is documented via formal Recognition Agreement between the affected parties. Three tiers of AA recognition characterize the scope of recognition assessments. Tier 1 looks to gain confidence in the life cycle airworthiness governance of an AA and addresses the existence of and adherence to policy, the empowerment of qualified people, the execution of documented and repeatable processes, and the appropriateness and availability of tools. Tier 1 is sufficient for compliance with reference (b) and allows DON personnel to operate in foreign-owned aircraft. Tier 2 addresses the maintenance, design, or production organization approvals and would allow an organization to provide maintenance services, for example, on DON aircraft. Tier 3 requires an examination and comparison of specific design and qualification specifications, standards, criteria to determine sufficiency and to allow acceptance of the previously issued certification for DON use. The recognition of an AA is further explained in reference (b).

(a) Other U.S. Government AAs. NAVAIR maintains an agreement with the U. S. Air Force and U. S. Army that outlines the mutual acceptance of airworthiness certifications, assessments, and airworthiness certification data as the basis for issuance of Service-specific airworthiness findings, see reference (u). Airworthiness artifacts of other U.S. Government agencies may be leveraged when appropriate as determined by AIR-4.0P.

(b) Civil AAs. Issuance of DON flight clearances for Commercial Derivative Aircraft (CDA) may be based on an Federal Aviation Administration (FAA) or other recognized foreign civil AA issued Type Inspection Authorization, Type Certificate (TC), Supplemental TC (STC), or other supporting airworthiness certificates, see references (v) and (w). It is imperative that DON-unique configuration, usage and continuing airworthiness requirements are clearly stated in the CDA Program's contractual documentation. This utilization includes, but is not limited to; training philosophy, maintenance plan, operational envelope, flight profiles, flight manuals, and environmental factors. Per reference (x), the Armed Services maintain a Memorandum of Agreement with the FAA for airworthiness support of CDA aircraft.
(c) Foreign Military AAs. Recognition of foreign military AAs is predominately used within the DON to support the safe flight of DON Service members, civilians, and contractors as passengers and/or aircrew on foreign-owned military aircraft as required by reference (b) and per SWP NAC-01, Conduct of Foreign Airworthiness Authority Recognition Assessments.

(2) For air vehicles and/or air systems purchased, leased, contracted, and/or used by the DON that the DON wishes to leverage a previous certification from a recognized AA, the NAVAIR Assistant Program Manager for Systems Engineering (APMSE) class desk or Integrated Product Team (IPT) lead shall determine if the configuration, operating envelope, limitations, and usage spectrum are the same as that certified by the original AA, and document this in writing to AIR-4.0P. If there are DON-unique requirements, appropriate TAEs (as determined by AIR-4.0P) will be required to review the DON-unique requirements and ensure that system safety risks have been identified and the above normal risks have been accepted at the appropriate level (per reference (j)). If there are no DON-unique requirements, appropriate TAEs are informed of this action, but are not asked to provide engineering assessment of the aircraft.

2. IFC Specific Policy. IFCs are primarily used to support the RDT&E, DT, and OT processes where configurations are not standardized and may change, requiring frequent airworthiness assessments. IFCs may also be used to support fleet-deployed forces when a determination of airworthiness and SOF is critical to the fleet mission. IFCs are issued for new and/or modified aircraft system configurations, including hardware, firmware, and software changes; expansion of flight envelopes; and nonstandard operations.

   a. An IFC is required when the air system will:

      (1) Commence its first test flight, and/or subsequent developmental test flights in a non-standard configuration or operating envelope;

      (2) Undergo DT with a draft NATOPS and/or NATIP and/or equivalent NAVAIR-approved product;
(3) Undergo OT, FOT&E, or fleet operations with the preliminary NATOPS and/or NATIP and/or equivalent NAVAIR-approved product;

(4) Operate outside of envelopes or limits approved by the NATOPS, NATIP, or equivalent NAVAIR-approved product;

(5) Operate in a configuration or loading not approved via formally released NAVAIR Technical Publications, Technical Directives (TDs) (including interim TDs), or specified in a NATOPS, NATIP, or equivalent NAVAIR-approved product; and,

(6) Operate with original equipment manufacturer (OEM), contractor, or system owner operating manuals or equivalent NAVAIR-approved product in the absence of a permanent flight clearance (NATOPS or NATIP).

b. IFCs are required until all applicable PFCs (NATOPS, NATIP, and/or equivalent NAVAIR-approved product) have been updated. If flight limitations and/or warnings, cautions, and notes are affected, an IFC is required, despite a configuration becoming standard (e.g., production-line Engineering Change Proposals (ECPs), TDs, etc.) until the PFC update is released.

(1) Tailored Technical Standards for Test Applications. Special purpose configurations of DON aircraft and weapons systems not intended for fleet introduction, but intended for limited operation in a controlled test and evaluation environment, may use tailored application of technical standards. In this case, the IFC provides an airworthiness assessment and ensures that safety risks have been appropriately identified by the TAE, and accepted by appropriate authorities for that specific limited environment, test location, and/or limited test duration.

(2) IFC Flight Envelope Restriction. IFC Flight Envelope Restrictions are issued by AIR-4.0P to provide a temporary restriction in flight envelope or other limitations while long-term resolutions are in-work. An IFC Flight Envelope Restriction is typically communicated via Naval Message or other approved distribution method and should specify the restriction to the current IFC or PFC, an explanation of the restriction, and conditions that would allow the restriction to be lifted. IFC Flight Envelope Restrictions are not used to Ground
aircraft, but may compliment a Grounding Action per reference (y), especially when no prescribed maintenance remedy has been developed.

(3) Operating Limits (Op Limits) Databases. An Op Limits Database, when used, shall be referenced in an IFC. Op Limits and Op Limits databases are further described in SWP4P00-35, Managing Temporary Operating Limits Databases (Op Limits). Implementation of Op Limits databases shall be periodically reviewed by AIR-4.0P to ensure adherence to the approved Operating Limits implementation plan for that program.

(4) Rapid Response (RR) Support. During wartime or times of urgent humanitarian need, combat forces, or DON relief personnel may have urgent needs for delivery of capabilities that have no pre-planning and little or no data to support flight clearance decisions.

(a) Projects that result follow a non-traditional acquisition path and are supported by the NAVAIR RR Leadership Team who engages the Warfighter and senior NAVAIR Level 1 Leadership. The RR Leadership Team is responsible for fully understanding the requirements and implementing a deployment strategy consistent with NAVAIR roles and responsibilities. Additionally, the RR Leadership Team ensures compliance with contracting law, legal restrictions, flight clearance integrity and technical authority, security, and other Command responsibilities. These projects will generally exhibit the following characteristics:

1. Operational impact justifies accepting higher risk than usual and appropriate level decision makers have formally accepted those risks;

2. Current combat losses or threats to Warfighters justify higher level of system safety hazard acceptance, once again formally accepted at an appropriate level; and,

3. Highly pressurized schedules and limited (if any) substantiating data are available to support informed engineering recommendations.
Flight clearances needed to support RR projects will be identified by the Program Executive Officer (PEO), Program Manager Air (PMA), Class Desk, and/or the RR Leadership Team to AIR-4.0P and NAVAIR Level 1 Leadership. Due to the inherent risks, these projects will always be "exceptions to the rule," and will be engaged in sparingly and only when explicitly directed by AIR-00.

(c) AIR-00 or his/her designated representative will direct AIR-4.0P to begin an RR IFC effort only after fully understanding the risks involved and judging that the need is sufficiently urgent to tailor the normal engineering practices. When so directed, the RR Leadership Team and/or AIR-4.0P will appoint a senior engineering review team for the subject RR IFC. From the start of the flight clearance process for an RR IFC, the appointed senior engineering reviewers will be expected to identify, characterize, and provide possible mitigations for risks based on their best engineering judgment, using all available data that may be obtained within the timelines identified by the RR Leadership Team and PEO or PMA. The senior engineering review team will provide IFC approval or disapproval. The team will also ensure final flight clearances fully convey the risk areas still present, and include appropriate procedures and measures to follow when operating in regimes affected by these risks. AIR-00, his/her designated representative, or the PEO or PMA, may request a final system safety risk acceptance review presentation by the PEO or PMA to understand how system safety risks have been characterized by the senior engineers.

3. NATOPS-Specific Policy. The NATOPS primarily support standardized aircraft operating procedures, limitations, technical data, and training requirements necessary for safe and effective operation of the aircraft model or aviation support activity.

   a. NAVAIR is responsible for providing and maintaining accurate and up-to-date NATOPS products to the fleet.

   b. The NATOPS, or NATOPS-equivalent products, are published for all Navy and USMC aircraft T/M/S. Depending on its maturity, a set of NATOPS products may be categorized as draft, preliminary, or promulgated. The technical content, style, and format for both paper and electronic NATOPS products shall be
per AIR-4.0P-approved publication and electronic Flight Clearance application toolsets (e.g., document type definition and formatting output specification instance).

c. A NATOPS product is updated via an interim change (IC), change, or revision.

(1) A NATOPS IC is initiated by an urgent or priority change recommendation, and issued by rapid means, normally via Naval Message with accompanying replacement pages or electronic files, if appropriate.

(2) A NATOPS Change is typically a larger update to a NATOPS product. Unlike a complete revision, a NATOPS Change package is limited to only those portions containing revised information.

(3) A NATOPS Revision is a second or subsequent edition of a complete product (or set of products), superseding the preceding edition and incorporating all previously issued changes and interim changes. Revisions to NATOPS products are identified by the date on the title page.

d. Further NATOPS-specific policy is delineated in reference (c).

4. NATIP-Specific Policy. NATIP primarily support standardized aircraft weapon and mission systems configurations operated within standard limits or operating envelopes. However, NATIP may include combinations of standard or non-standard configurations and limits or operating envelopes.

a. NATIP Program Management. AIR-4.0P is responsible for the management of the NATIP program, per reference (d). The NATIP is the primary technical reference upon which tactics are developed. As such, NATIP are issued primarily for aircraft systems that have corresponding AIR Naval Tactics Techniques and Procedures (AIR NTTP). The technical content, style, and format shall be per AIR-4.0P-approved publication and electronic Flight Clearance application toolsets (e.g., document type definition and formatting output specification instance).
b. NATIP Development. Depending on its maturity, a specific T/M/S NATIP may be categorized as draft, preliminary, or approved.

(1) Draft NATIP. New acquisition or major system upgrade programs should begin developing a draft NATIP in support of RDT&E. Draft NATIP shall contain approved engineering data and limits, and its use is restricted to the test community. An IFC is the authoritative document that permits the RDT&E community to use a draft NATIP during DT.

(2) Preliminary NATIP. New acquisition or major system upgrade programs shall have a Preliminary NATIP in support of Operational Test Readiness Review and to facilitate the development of the post-OT AIR NTTP. Draft NATIP typically are matured via the DT process and updated to become a preliminary NATIP. Preliminary NATIP shall contain mature engineering data, configurations, limits, interfaces, and operating steps for use by the OT community. An IFC is the authoritative document that permits the OT and Evaluation community to use a Preliminary NATIP during OT.

(3) Approved NATIP are authorized for fleet use and shall have an accompanying AIR-4.0P release message that specifies the current NATIP by calendar date. Approved NATIP shall be accessed by fleet users via an AIR-4.0P-approved web-based electronic library (e.g., airworthiness website).

(4) Approved NATIP are changed via a NATIP Update. Updates are initiated via a flight clearance request and upon approval, the updated content is incorporated into the appropriate NATIP and issued to the fleet via an AIR-4.0P approved web-based electronic library.

5. UAS-Specific Policy

a. Background. UAS vary widely in unmanned aircraft (UA) size, weight, complexity, mission, autonomy, and cost. Therefore, the flight clearance policy for UAS must accommodate a wide range of aircraft size and usage. UAS-specific flight clearance policy takes into account that the UA carries no people onboard and may have a lower level of airworthiness than a manned aircraft. In order to mitigate the hazards to people and/or property on the ground and/or in the air, uncontrolled
flight outside of pre-planned or contingency flight profiles, and midair collision, the flight clearance may place limitations on UAS operations to ensure an overall acceptable level of safety of flight. In addition to airworthiness, UAS flight clearance policy considers the airspace and area of operation of the UA, the weight, total energy, usage, and inherent airworthiness of the system. Consistent with UAS flight clearance category definitions, flight clearances may limit areas of UAS operation (to mitigate hazards to persons and property on the ground or in the air), but whenever possible, not limit operation to specific ranges or operating areas. AIR-4.0P issues flight clearances for UAS, however, this is not a substitute for formal aircraft reporting requirements defined in references (k) and (l).

b. UAS Flight Clearance Categories. Three categories of UAS flight clearances have been established to accommodate the wide spectrum of UAS and the inherent level of airworthiness that each system may exhibit. The overall process for issuing UAS flight clearances is the same as for manned aircraft; however, the configuration, usage, environment, and airworthiness basis (to include the inherent level of airworthiness and the airworthiness criteria, engineering design standards, and substantiating data) determines which of the three UAS flight clearance categories is appropriate. The APMSE, with AIR-4.0P concurrence, is responsible for assigning the flight clearance category for the UAS based on the design criteria, standards, methods of compliance, intended usage, supplied data, safety analysis, system analysis, and recommendations of the TAEs. See Chapter 6 for additional information on UAS airworthiness considerations, engineering data requirements, and IFC categorization.

(1) Category 1 UAS. Category 1 UAS flight clearances are issued for UAS that operate over all population densities and in all classes of airspace (including international and foreign airspace) (Category 1 UAS and Category 1 UAS flight clearance may be used interchangeably). Qualitatively, UAS receiving a Category 1 flight clearance have a level of airworthiness and SOF equivalent to manned aircraft. The airworthiness basis for Category 1 UAS flight clearances is based on manned aircraft airworthiness criteria, engineering standards, data requirements, while taking into account UAS-unique design considerations. Category 1 flight clearances may
be issued to UA of any weight. Category 1 UAS flight clearances utilize a design engineering review-based process to establish the airworthiness basis by assessing airworthiness and SOF against a set of documented airworthiness criteria, standards, methods of compliance, and substantiating data.

(2) Category 2 UAS. Category 2 UAS flight clearances are issued for UAS that operate in all classes of airspace, with limitations on overflight over densely populated and congested areas (Category 2 UAS and Category 2 UAS flight clearance may be used interchangeably). Category 2 UAS utilize a tailored set of airworthiness criteria, engineering standards, and data requirements, see reference (t), to ensure airworthiness and SOF for operations in the intended operating environment(s). Category 2 UAS flight clearances may be issued to UA of any weight. Category 2 UAS flight clearances utilize a design engineering review-based process to establish the airworthiness basis based on assessment of airworthiness and SOF against a set of documented airworthiness criteria, standards, methods of compliance, and substantiating data. Because Category 2 UAS engineering standards and data requirements may be less stringent than Category 1 UAS, operating limitations and operating procedures may be used to ensure acceptable levels of safety to people and property on the ground and in the air.

(3) Category 3 UAS. 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 competency-established airworthiness criteria or standards (Category 3 UAS and Category 3 UAS flight clearance may be used interchangeably). As such, 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. Category 3 UAS flight clearances may be issued to UA of any weight. Category 3 UAS flight clearances do not alleviate the responsibility of the operator to comply with references (c), (k), (j) or (p).

c. Accelerated Deployment of UAS. A UAS designed to Category 1 or 2 UAS standards may be issued a lower category flight clearance as part of a comprehensive airworthiness strategy. A UAS that requires a Category 1 flight clearance for
full operational capability may be issued a Category 2 or 3 flight clearance to allow initial deployment with airspace and/or operational restrictions, while additional data is generated to support of a Category 1 flight clearance.

d. UAS Acquired by NAVAIR for Non-DON Government Entities. UAS acquired by NAVAIR (including subordinate commands) for non-DON Government entities under a NAVAIR contractual instrument which are then transferred to the non-DON Government entity require a Navy flight clearance for flight of the UA until such time that ownership and/or custodial responsibility transfers to the non-DON Government entity.

e. Weaponized UAS. Any UAS that is weaponized (approved for carriage or employment of weapons, explosives, or other energetics functions) shall have a minimum of a Category 2 flight clearance. Only by exception (explicitly approved by Assistant Commander for Research and Engineering (AIR-4.0)) will a UAS be authorized to carry and/or deploy live ordnance under a Category 3 flight clearance.

f. FAA Certificates of Waiver and Authorization (COA). In order to fly in the U.S. National Airspace System (NAS) outside of Restricted or Warning Areas, references (c) and (z) requires DON public UAS to obtain an FAA COA. FAA requires an airworthiness statement from the sponsoring Military Department in support of the COA application. See Chapter 6 for additional information on use of IFCs in support of COA applications.

6. CAS Specific Policy

a. Background. PAO of contracted air services vary widely by contractual scope and/or requirements, mission, and pedigree of aircraft airworthiness and maintenance history. CAS PAO determinations are made on an operation-by-operation basis and may be bounded by specific contract language that establishes when a service provider is operating an aircraft in support of a Naval contract and when conditions exists that exclude the operation from being “civil”. The Armed Forces PAO Decision tool, located at https://myteam.navair.navy.mil/corpapps/ams/home/pao/sitepages/default.aspx and Standard Work Package SWP4P00-36, Public Aircraft Operations Assessments contain detailed information on how to conduct PAO assessments. The DON (e.g., program manager,
program contracting officer, administrative contracting officer, or authorized representative), not the contractor or the FAA, is responsible for declaring contracted air service operations to be “public”. Government oversight of CAS PAO is conducted per contract terms and often requires a Government Flight Representative (GFR) per reference (o).

b. Contracted Aircraft Airworthiness Evaluation. Although assignment of liability and responsibilities may be accomplished by contractual delegation, it is critical that all known system safety risks be identified and accepted at the appropriate level to ensure a complete evaluation is accomplished. The level of risk and probability of incurring a hazard in many contracted aircraft cases cannot be quantified. Many contracted aircraft have a varied history of ownership, operators, and airworthiness certifications. An acceptable aircraft pedigree will be used as the basis for CAS IFC without further NAVAIR engineering review. Contracted aircraft airworthiness evaluations focus on aircraft deviations and modifications from the baseline to include, but are not limited to: modifications to configuration (including parts obsolescence), flight limitations and operations, and modified maintenance practices (including tracking and replacement of fatigue and life limited parts). Because the baseline aircraft may have been designed and certified to non-Navy standards, the inherent level of risk in these operations may be different than standard Navy operations. Airworthiness criteria, engineering standards, and data requirements may be tailored to meet the anticipated level of risk for a given operation.

c. CAS Flight Clearance Types. Two Types of CAS flight clearances have been established to accommodate the spectrum of DON PAO conducted by CAS aircraft.

(1) Type 1 CAS IFC. Type 1 CAS IFCs may be issued based on previous airworthiness certification(s), an accepted aircraft pedigree, a review of all aircraft modifications, and factors such as the presence of a GFR assigned to oversee safety, maintenance, and/or flight operations. If required, TAEs shall apply appropriate airworthiness criteria, engineering standards, and data requirements for a Type 1 CAS IFC. An example of a Type 1 CAS IFC is an FAA Type Certified baseline aircraft complying with FAA approved maintenance and operational practices, with modifications for military purposes which can be
evaluated and approved by TAEs. A second example is a former military aircraft with current and clear pedigree with modifications for military purposes which can be evaluated and approved by TAEs.

(2) Type 2 CAS IFC. Type 2 CAS IFCs may be issued by taking into consideration what is known about pedigree, hazard identification and risk assessments, and mitigating factors such as the presence of a GFR assigned to oversee safety, maintenance, and/or flight operations. When engineering judgment is applied due to the lack of data and/or time to make a thorough evaluation, restrictions, limitations, and/or procedural mitigations may be placed on the operation to ensure safety to people, property, and environment. As such, Type 2 CAS IFCs are issued after system safety risks are documented and accepted with the appropriate mitigations applied. An example of a Type 2 CAS IFC is an FAA special category, experimental certified aircraft, or former foreign military aircraft that has gaps in the aircraft pedigree, and/or configuration, usage, or maintenance changes which cannot be fully evaluated by TAEs due to the lack of data.

7. **Non-DON Aircraft Specific Policy.**

   a. Flight Clearances. AIR-4.0P will issue a flight clearance for a non-DON aircraft system only by exception. Exceptions include, but are not limited to:

      (1) AIR-00 has entered into a formal written agreement that establishes NAVAIR as the airworthiness authority for the aircraft system.

      (2) Navy Ship or Facility Involvement. If a non-DON aircraft system is to be operated from or near a DON ship or facility, the ship or facility may require a NAVAIR flight clearance.

   b. Flight Clearance Recommendations. A flight clearance recommendation may be issued for non-DON aircraft system customers if a formal written agreement has been reached between the customer, AIR-00, and the PEO or PMA. In this case, the airworthiness review will be handled in the same manner as for a flight clearance. A flight clearance recommendation will be
issued in lieu of a flight clearance to the requesting agency for acceptance and use at their discretion.
Chapter 3 - Responsibilities

1. **AIR-00**: AIR-00 is the DON Airworthiness and CYBERSAFE Authority for all DON PAO, Technical Authority for Naval aviation systems, and Design Control Activity Authority.

2. **PEOs, Program Managers, AIR, and Project Leader (e.g., APMSE, IPT Lead, and/or delegate)** shall:

   a. Take ownership of flight clearance and CYBERSAFE actions and priorities;

   b. Integrate flight clearance planning milestones to adequately prepare for major program evolutions such as first flight of a new weapon system or fleet introduction, and provide funding for IFC, NATOPS, and NATIP actions;

   c. Implement the flight clearance process described herein for all configuration and envelope changes. The IPT leaders shall allocate budget and define the schedule for airworthiness assessments. IPT or Externally Directed Team leaders shall manage the execution of the process and establish flight clearance priorities within the programs;

   d. Establish and maintain lines of communication to the customers and stakeholders during the execution of the flight clearance and CYBERSAFE processes and establish cross-competency consensus in the airworthiness assessment and CYBERSAFE certification. The PMAs, PEOs, ACCs, National Airworthiness Team (NAT), contractors, TAEs, designers, testers, other APMSEs (including weapons, human systems, etc.), and the engineering team are all contributors to the success of this process;

   e. Develop, fund, acquire, maintain, and coordinate delivery of required technical data to the TAEs in support of airworthiness assessment for the flight clearance and CYBERSAFE certification;

      (1) Ensure OEMs/contractors/system owners provide appropriate flight clearance product content.

      (2) Ensure OEMs/contractors/system owners follow NAVAIR flight clearance policies and processes.
(3) Ensure OEMs/contractors/system owners use reference(s) to determine airworthiness certification requirements in support of aircraft certification.

f. Validate and track flight clearance and CYBERSAFE certification requests;

g. Assist AIR-4.0P in determining required set of TAEs;

h. Conduct flight clearance and CYBERSAFE certification planning activities (e.g., meetings) with AIR-4.0P and TAEs and develop formal EDRAP documentation when necessary;

i. Coordinate a systems engineering review;

j. De-conflict engineering competency issues;

k. Submit flight clearance requests when needed (with concurrence from the aircraft owner);

l. Provide a flight clearance facilitator if workload requires;

m. When an Operating Limits Database is implemented, the APMSE shall:

(1) Manage and control the Op Limits process per the approved plan;

(2) Serve as the final approval authority for all Op Limits;

(3) Ensure Op Limits are coordinated with TAEs for technical accuracy and the test team for executability;

(4) Ensure that each Op Limit is more restrictive than the limits documented in any applicable flight clearance; and,

(5) Make timely notification of Op Limits changes to the appropriate stakeholders consisting of the government and contractor test team, TAEs, Subject Matter Experts, Test Flight Clearance Officers (TFCOs), Flight Clearance Release Authorities (FCRAs), and Test & Experimentation Coordination Team;
n. When Category 3 UAS Flight Clearances are issued for UAS that are not designed to competency-established airworthiness engineering standards and/or where there is insufficient data to verify compliance to standards, the following unique responsibilities exist:

(1) Prior to initiation of a flight clearance request, the APMSE is responsible for ensuring completion of a safety risk assessment questionnaire, such as reference (aa) or equivalent. A safety case may be utilized to support issuance of Category 3 flight clearances, provided the safety case shows that hazards to personnel, property, and environment are identified, mitigated, and accepted at the appropriate level as defined in reference (i). Reference (z) provides safety case guidance. The safety case methodology shall be proposed by the APMSE and concurred by AIR-4.0P and NAVAIR System Safety Engineering.

(2) The APMSE is responsible for obtaining a statement from the UAS owner or sponsor acknowledging higher probability of loss of the UA, concurrence with issuance of a Category 3 flight clearance for the UAS, and acceptance of UAS material loss safety hazards.

o. The APMSE recommends and AIR-4.0P determines the Type of CAS IFC to be issued for the contracted aircraft. Type determination is based on previous airworthiness certification(s), aircraft pedigree (including maintenance history), aircraft modifications, available aircraft data, intended usage, TAE input, time, or other resource availability. The APMSE (and Assistant Program Manager for Logistics, if required) approval on a CAS IFC signifies that the following have been affirmed or completed:

(1) Oversight of pilot training and operations, CM, conformity, maintenance plans, maintainer qualification, training, safety programs, material management regarding use of qualified parts, tracking, replacement of fatigue and life limited parts are all being conducted per contractual requirements. Initial and periodic evaluations of continuing airworthiness are accomplished per reference (m) to determine Safe for Flight (SFF) status. After the CAS IFC is in place, the GFR monitors the contractor to ensure continuing airworthiness and contractual compliance.
(2) Evaluate technical modification made to a previously certified aircraft configuration. APMSE shall provide an assessment of the intended usage of the aircraft for Navy purposes compared to previous certificate(s), highlighting any differences to be examined by TAEs during the technical evaluation.

(3) Documented risks have been mitigated or accepted at the appropriate level.

p. Maintain a permanent record documenting the airworthiness basis supporting each flight clearance and CYBERSAFE certification;

q. Provide competencies and contractors with CYBERSAFE-related guidance, directives, correspondence, and supporting information; and,

r. Be trained and certified by AIR-4.0P to participate in the Airworthiness and CYBERSAFE Processes, see reference (e) for role-based training requirements.

3. Commanders, Commanding Officers, and Officers-in-Charge of NAVAIR Commands and Activities shall:

a. AIR-1.0 Program Management. With regard to the execution of NAVAIR’s Airworthiness Authority, AIR-1.0 is responsible for Configuration Management (CM) per reference (ab). Sound CM planning, audits, control, status accounting, and data management are essential to form the baseline of the configuration that will be authorized in a flight clearance. ECPs are used to assess proposed aircraft modifications and, when approved, result in aircraft design changes. Airworthiness-related responsibilities are delineated in reference (ab) and include:

(1) Providing planning and coordination of CM and data management policy, processes, guides, and requirements.

(2) Developing, coordinating, promoting and implementing Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA) standardized processes across all PEO competencies for NAVAIR.
(3) Managing and chairing the Centralized Configuration Control Board (CCB) and Decentralized Change Control Board (DCCB), approving Program Office Configuration Management Plans (CMP), and approving Office of Primary Responsibility/Program Office Decentralized Control board charters.

b. AIR-2.0 Contracts. With respect to the execution of NAVAIR’s Airworthiness Authority, AIR-2.0 facilitates the development and execution of contracts through which required Airworthiness data is delivered by the contractor to NAVAIR engineering competencies to substantiate the aircraft system’s airworthiness basis and ultimately airworthiness approval via the Flight Clearance process.

c. AIR-4.0 Air Vehicle Engineering. AIR-4.0 is designated as the engineering Technical Authority for all DON aircraft systems (reference (ac)). AIR-4.0 provides the resources for the engineering needs of science and technology development, systems acquisition, and product support of all Naval aviation aircraft, weapons, and support systems. AIR-4.0 engineers are the primary TAEs that review airworthiness products including interim and permanent flight clearances for release. Flight Clearance TAEs are nominated by their specific competency to approve flight clearances on behalf of their competency for a specific aircraft type/model/series and empowered by AIR-4.0P once they have been further trained to execute their duties within the airworthiness process. CYBERSAFE responsibilities, including Technical Authority, are described and assigned per reference (g).

d. AIR-4.0P Airworthiness and CYBERSAFE Directorate. AIR-4.0P is the single authority for the issuance of interim and permanent flight clearances for all DON PAOs and provides direction and tasking to NAVAIR Competencies to execute the airworthiness process on behalf of AIR-00. The Director, AIR-4.0P, is also designated as the CYBERSAFE Program Director (CSPD) and is responsible for developing, implementing, and maintaining the NAVAIR CYBERSAFE certification process under the guidance contained in reference (p) and per reference (h). AIR-4.0P approves FCs for release, including content, format, and promulgation media; and oversees the processes used to develop, review, and issue FCs. Additionally, AIR-4.0P empowers all personnel executing within the airworthiness and CYBERSAFE
processes using AIR-4.0P-established standards and selection criteria contained in reference (e), this manual, and task-specific SWPs and SSPs. The level of empowerment and authorization to manage and execute the flight clearance process is specified in the individual “Empowerment Letter” signed by the Director, Military Director, or Deputies. These empowerment levels are defined below.

(1) NAT. The NAT is the cross-competency group of AIR-4.0P empowered personnel dedicated to the processing, tracking, and issuance of NAVAIR flight clearances. Responsibilities of the NAT include:

(a) Ensuring that all applicable processes have been followed prior to issuing a flight clearance;

(b) Establishing the requested flight clearance need date as the work to date for issuing the final flight clearance;

(c) Maintaining a record of flight clearance actions (requests, issued clearances, denials, etc.);

(d) Managing the routing of draft flight clearances and distribution of issued flight clearance actions;

(e) Educating all participants on the flight clearance process;

(f) Informing leadership of airworthiness and SOF issues;

(g) Providing guidance and support to the aircraft system IPT and APMSE in the development of flight clearance strategy including planning meetings, EDRAP development, and/or an AQP development; and,

(2) Specific empowerment levels and/or responsibilities for NAT personnel are:

(a) AA. The Director, Military Director, and Deputies are empowered as the AIR-4.0P AA and are responsible for all operations of AIR-4.0P and airworthiness support for the DON. The AAs are authorized to release all DON flight clearances.
(b) Designated Airworthiness Agent (DAA). The AIR-4.0P Chief Airworthiness Engineers, Senior Airworthiness Engineers, and other designated personnel are empowered as DAAs to manage the interim and permanent flight clearance processes, ensure appropriate engineering reviews of all clearances, and are authorized to release all DON flight clearances.

(c) Test Airworthiness Agent (TAA). TFCOs are empowered as TAAAs to manage the Test Wing flight clearance process, submit flight test clearance requests, ensure appropriate engineering reviews of flight test clearances, and are authorized to release all test flight clearances.

(d) Limited Airworthiness Agent (LAA). Flight Clearance Releasing Authorities (FCRAs) have limited empowerment as LAAs to manage and facilitate the flight clearance process, ensure appropriate engineering reviews, and release limited scope flight clearances.

(e) Flight Clearance Facilitators. Facilitators shall coordinate planning meetings, distribute data to TAEs, create and route draft flight clearances, ensure all required TAEs and APMSE sign off on flight clearance actions, and prepare final flight clearances into the appropriate format.

(f) Permanent Flight Clearance Product Leads. The Permanent Flight Clearance Product Leads serve as liaison between AIR-4.0P, the platform APMSE, NAVAIR cognizant TAEs, and fleet advisory group members, to ensure comprehensive and timely development of flight manual updates.

(g) PFC Coordinator. The PFC Coordinator coordinates all PFC Update, IC, and Advance Change activity; including engineering, fleet review and editorial support. The PFC Coordinator also reviews ECPs to determine the impact to NATOPS and/or NATIP changes.

e. AIR-5.0 Test and Evaluation. With respect to the execution of NAVAIR’s Airworthiness Authority, AIR-5.0 plans, conducts, monitors, and reports results of tests and experimentation for the development, production, evaluation, and fielding of air warfare systems, subsystems, and support systems in a variety of test environments. The Test and Evaluation
Group provides full spectrum Research, Development, Test, and Evaluation (RDT&E) facilities and services, which create a realistic battle space environment for testing and experimentation. This includes testing systems and/or subsystems installed, attached to, carried on, or integrated into an air vehicle or aircraft system, as well as other tests conducted in NAVAIR facilities (e.g., Shielded Hangar, Anechoic Chamber, Hazards of Electromagnetic Radiation to Ordnance Pad) and non-NAVAIR facilities, in support of airworthiness requirements.

(1) AIR-5.0D Aircraft Controlling Custodian Office.

(a) In conjunction with PMA-226 and Systems Safety (AIR-4.1.6) provides a technical assessment of continuing airworthiness of CAS conducting DON PAO through its SFF authority.

(b) Performs a SFF evaluation per reference (m), on contracted aircraft to evaluate the continuing airworthiness practices of the contractor. An AIR-5.0D SFF approval of a contracted aircraft and/or endorsement of a CAS IFC signifies that the appropriate contractor personnel, processes, and tools are in place to conduct continuing airworthiness.

(c) AIR-5.0D has delegated responsibility for submitting IFC requests to NAVAIR ARCs and as such AIR-4.0P issues IFCs directly to NAVAIR ARCs.

(2) AIR-5.0F Aviation Safety Office. Sets aviation safety policy and represents AIR-00 in all safety-related issues concerning DoD, SECNAV, CNO, CMC, NAVSAFECEN, USAF, WSA, FAA, and NTSB.

f. AIR-6.0 Logistics and Industrial Operations. With respect to the execution of NAVAIR’s Airworthiness Authority, AIR-6.0 is the authority for continued airworthiness of Naval Aircraft operating per reference (k) and (l) or equivalent NAVAIR-approved policies and responsible for developing approved maintenance practices for each DON aircraft that will ensure the continuing airworthiness of each specific air vehicle system. AIR-6.0 is also responsible for the release of Technical Directives approving the modification of aircraft. Flight
Clearances are released by AIR-4.0P to approve flight in these modified configurations.

g. AIR-7.0 Corporate Operations and Total Force. AIR-7.0 directly and indirectly supports the other competencies, IPTs, Commanding Officers, and business unit managers, by providing services including strategic leadership support, cybersecurity and authority to operate, information management, human resources, security, public affairs, infrastructure business operations, and business and financial services.

4. NAVAIR Competency Managers (Deputy Warrant Officers) and Division Heads (Technical Warrant Holders) shall:

   a. Establish and document certification requirements for personnel to perform airworthiness assessments as TAEs. The competency managers shall identify NAVAIR certified personnel to support the IPT and staff the flight clearance engineering review team. All TAEs must be Airworthiness Technical Warrant Holders. Obtaining certification is contingent upon thorough knowledge and understanding of the flight clearance process, including attendance at AIR-4.0P-specified flight clearance training;

   b. Maintain accurate information in TAE database;

   c. Resolve prioritization conflicts for TAEs assigned to multiple programs;

   d. Ensure attendance at planning meetings;

   e. Assist APMSE and AIR-4.0P to resolve engineering conflicts;

   f. Budget for and manage program funding adequately to provide needed technical competency for all required tasks. If funding or other contingencies limit completion, manager shall personally intervene and resolve the issue with the APMSE or program manager. No fleet support related flight clearance action shall be delayed or refused due to funding issues, and work priorities will be worked aggressively to attempt to satisfy all customer needs; and,
g. Be trained and certified by AIR-4.0P to participate in the Airworthiness Process, reference (e) for role-based training requirements.

5. Airworthiness TAE Certificate Holders shall:

a. Be trained and certified by AIR-4.0P to participate in the Airworthiness Process, see reference (e) for role-based training requirements;

b. Attend planning meetings and integrate reference (t) into airworthiness requirements and decision making;

c. Ensure compliance with all airworthiness-related instructions, processes, and procedures;

d. Establish and communicate the technical data requirements to determine the operating envelopes, limitations, cautions, and special inspections required, based upon a specified configuration in an interim and/or permanent flight clearance. See Chapter 8 for examples of types of data typically required for each flight clearance application;

e. Provide maximum airworthiness limitations possible with respect to SOF for a given configuration;

f. Respond in a timely manner to all flight clearance actions. Open all flight clearance actions upon receipt and triage for criticality, scope, availability of required supporting data, and availability of support funding. If funding, work priorities, or any other contingency prevention action per requested timeline; notify competency manager, APMSE, and AIR-4.0P. Continue work on the flight clearance effort while issues are being resolved;

g. Document and record the airworthiness basis for their chop on each flight clearance. This basis defines what data and assumptions were used to assess the airworthiness of the aircraft configuration;

(1) TAE approval on a Category 3 UAS flight clearance signifies that, for the TAE’s area of responsibility, SOF is maintained, and the TAE has conducted the following:
(a) The risk assessment questions and/or safety case have been reviewed;

(b) The inherent level of SOF of the UAS is consistent with the proposed operating limitations, warnings, cautions, and notes placed in the flight clearance;

(c) Safety and/or operational risks have been identified and communicated to APMSE, System Safety, and operational or test user, based on available data and operational restrictions; and,

(d) The flight manuals (or compilation of appropriate references) define normal and emergency procedures, have been reviewed and any discrepancies identified, and associated residual risks communicated to System Safety and APMSE. For Category 3 UAS flight clearances, it is presumed that data and procedures in the flight manuals will not be independently verified by the TAEs.

(2) TAE approval on a CAS IFC signifies that, for the TAE’s area of responsibility, the TAE has conducted the following:

(a) Evaluated technical modification made to a previously certified aircraft configuration(s) and usage spectrum. This evaluation entails review of available data defining the configuration and usage to identify certification gaps, and associated risks. Data, configurations, limitations, procedures, maintenance practices, etc., found in the baseline flight manuals (e.g., OEM flight manual) do not need to be substantiated by TAEs.

(b) Identified risks and provided recommended mitigations such as restrictions, configuration changes, flight limitations, warnings, procedures, etc.

(c) Reviewed aircraft flight manuals and identified any areas which require updating or clarification to define Navy operations.

h. Attend NATOPS reviews when requested by APMSE or AIR-4.0P; and,
i. Identify safety risks recommend mitigations for each risk, and assist System Safety in documenting the risk.

6. **Type Commander (TYCOM) or ACC shall:** Collect and prioritize requirements, submit accurate requests to AIR-4.0P for all configuration and/or envelope changes as defined in Chapter 8 and, participate in review process when appropriate.

7. **Designated AIR NTTP and NATOPS Model Managers and Program Managers shall:**

   a. **AIR NTTP Model Managers:** Develop and maintain platform level tactics, techniques, and procedures for platforms assigned by Naval Aviation Warfighting Development Center (NAWDC).

   b. **NATOPS Model Managers:** Thoroughly review their assigned NATOPS products to, ensure they contain the latest approved operating procedures, make appropriate change recommendations on matters concerning the NATOPS products and host NATOPS review conferences for their assigned NATOPS products.

   c. **NATOPS Program Managers:** Be responsible to the NATOPS Model Manager for specific duties in the maintenance of the assigned NATOPS products, acts as the model manager’s single point of contact for NATOPS related issues, and coordinate with the appropriate AIR NTTP Model Manager when appropriate.
The general flight clearance process as depicted above is comprised of six steps, summarized below. Process participant responsibilities at each step are summarized in the table. See task-specific SWPs and reference (e) for an in-depth discussion of both the general flight clearance process as well as specific processes for IFC, NATOPS, and NATIP.

1. **Planning.** Sound planning and communication are critical to the successful execution of the flight clearance process. Planning activities should be initiated as soon as possible after a requirement or issue has been identified and shall include both the interim and permanent flight clearance solutions. Upon notification of a requirement or issue, the NAT will determine if a flight clearance is required. Planning is an iterative phase and may recur as the program matures.

2. **Request.** All flight clearance requests shall be submitted to AIR-4.0P. The flight clearance request specifies the new or non-standard configuration and/or usage limits or the desired changes to the existing flight clearances. Before submission, requests must be concurred with by TYCOM, applicable ACC (COMNAVRESFOR, COMNAVAIRSYSCOM, COMNAVAIRFOR, and CNATRA) or Program Office (in the case of CAS). In the case of NATOPS requests, concurrence is satisfied by the NATOPS advisory group review process executed per reference (c). Documentation of concurrence, per reference (e), must accompany the request. Requests should specify a clearance need date that permits sufficient review time, dependent on the complexity of the modification. A flight clearance request should be tailored to
the requirements of the specific type of flight clearance desired.

3. Chop Sheet. Upon receipt of a flight clearance request, the NAT reviews it for thoroughness, checks that all required engineering data has been referenced, checks for any potential configuration problems, and logs it into the NAVAIR flight clearance request database. A list of required technical disciplines, known as a “chop sheet”, is created by AIR-4.0P to specify which technical areas are required to review the draft flight clearance. The chop sheet determines the scope of the required review and should reflect the pre-determined technical areas named in the planning phase unless the program details have changed. The NAT assigns the request to an appropriate flight clearance facilitator for action. The assigned flight clearance facilitator uses the chop sheet and Airworthiness database of empowered TAEs to determine the appropriate staffing of the draft flight clearance. The APMSE may provide additional input on the technical disciplines required to review the clearance, based on their knowledge of the flight clearance action being requested. AIR-4.0P shall make the final determination of required chops. AIR-4.0P may elect to issue a permanent or IFC, as appropriate, in lieu of what was requested.

4. Flight Clearance Product Development and Review. AIR-4.0P provides direction and assigns competencies to execute the airworthiness review process per priorities communicated to AIR-4.0P by PMAs and senior NAVAIR leadership. Appropriate personnel, including TAEs, fleet representatives, and program representatives execute a thorough review of the proposed flight clearance content and provide their comments and/or concurrence to AIR-4.0P.

5. Finalize Flight Clearance. The empowered Flight Clearance Releaser (FCR) verifies that the proper TAEs have reviewed and concurred with the proposed flight clearance, including changes that were made during the review process. The FCR reviews the flight clearance for cross-competency coherence and user executability. The format and content will also be reviewed by the FCR for completeness. If the draft flight clearance has the required technical correctness and concurrence, the document is approved by an empowered FCR. If the FCR determines that additional engineering review is required, the draft flight clearance will be routed through the additional necessary
personnel. If technical modifications are made to the proposed flight clearance, it will be routed back to the APMSE for concurrence.

6. Release Flight Clearance. The final flight clearance is issued to the recipients detailed in the request. The flight clearance is posted to the Airworthiness website for distribution or archival purposes. If required, flight clearances addressed to an ACC or TYCOM may be readdressed to subordinate commands, at their discretion.

The following Table summarizes the responsibilities for each of the six flight clearance process steps.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Responsible Party</th>
<th>Process Duties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>APMSE and/or IPT Lead</td>
<td>Initiate planning; provide info about proposed flight clearance to all stakeholders, including TYCOM or applicable ACCs, or Program Office (in the case of CAS); determine flight clearance strategy (Interim Flight Clearance (IFC), Permanent Flight Clearance (PFC)); advise on existing data; come to consensus with Technical Area Experts (TAEs) on data requirements; document planning agreements (including Engineering Data Requirements Agreement Plan (EDRAP)); obtain supporting data prior to request; reinitiate additional planning as needed</td>
</tr>
<tr>
<td></td>
<td>TYCOM, ACCs, or Contracting Program Office (in the case of CAS)</td>
<td>Coordinate requirements with APMSE; concur with flight clearance request resulting from planning activity</td>
</tr>
<tr>
<td></td>
<td>National Airworthiness Team (NAT) Naval Air Systems Command Airworthiness and CYBERSAFE Directorate (AIR-4.0P)</td>
<td>Provide planning chop sheet; attend planning meeting and provide strategy and assessment guidance; update planning chop sheet as needed</td>
</tr>
<tr>
<td></td>
<td>TAEs</td>
<td>Participate in planning activities; assess proposed flight clearance; provide necessary testing and/or data requirements, communicate technical risks and potential mitigations</td>
</tr>
<tr>
<td></td>
<td>Deputy Warrant Officers</td>
<td>Empower TAEs for subject technical areas</td>
</tr>
<tr>
<td></td>
<td>Test Team</td>
<td>Participate in planning activities; provide data</td>
</tr>
<tr>
<td>Process Step</td>
<td>Responsible Party</td>
<td>Process Duties</td>
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<td>--------------</td>
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<tr>
<td>Request</td>
<td></td>
<td>and/or input, coordinate the development of test risk mitigations</td>
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<tr>
<td></td>
<td>APMSE and/or IPT</td>
<td>Submit or cancel requests (with TYCOM, ACC, or Program Office (in the case of CAS) concurrence); determine need date; provide input for Test Clearance requests</td>
</tr>
<tr>
<td></td>
<td>TYCOM, ACCs or Program Offices (in the case of CAS)</td>
<td>Submit requests or provide concurrence with requests; provide need dates; cancel requests if no longer needed</td>
</tr>
<tr>
<td></td>
<td>NAT (AIR-4.0P)</td>
<td>Receive all flight clearance requests; deny requests if content not acceptable</td>
</tr>
<tr>
<td></td>
<td>TAEs</td>
<td>Submit recommendations for changes to existing flight clearances</td>
</tr>
<tr>
<td></td>
<td>Test Wing</td>
<td>Submit requests and/or cancel requests for ACC COMNAVAIRSYS.COM (AIR-5.0D) aircraft</td>
</tr>
<tr>
<td></td>
<td>Fleet Squadrons and Units</td>
<td>Communicates flight clearance needs with TYCOM and/or applicable ACC for coordination with NAT (AIR-4.0P)</td>
</tr>
<tr>
<td>Scope of Review</td>
<td>APMSE and/or IPT</td>
<td>Recommend required reviewers</td>
</tr>
<tr>
<td></td>
<td>Facilitators</td>
<td>Determine specific TAEs based on approved chop sheet</td>
</tr>
<tr>
<td></td>
<td>NAT (AIR-4.0P)</td>
<td>Review request; determine required reviewers; create chop sheet</td>
</tr>
<tr>
<td>Review</td>
<td>APMSE and/or IPT</td>
<td>“First in” to review; develop draft clearance content; assess program and system safety risks; work disagreements up applicable NAVAIR chain of command; “last out” to review before Finalize Flight Clearance phase</td>
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<tr>
<td></td>
<td>Facilitators</td>
<td>Format draft clearance</td>
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<tr>
<td></td>
<td>NAT (AIR-4.0P)</td>
<td>Assist in reconciling review conflicts</td>
</tr>
<tr>
<td></td>
<td>TAEs</td>
<td>Review draft clearance; provide timely input; approve, disapprove, or determine chop not required, and identify system safety risk for empowered technical area</td>
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<tr>
<td></td>
<td>Deputy Warrant Officers</td>
<td>Prioritize workload for TAEs; reconcile TAE-IPT flight clearance content disagreements</td>
</tr>
<tr>
<td>Finalize Flight Clearance</td>
<td>NAT (AIR-4.0P)</td>
<td>Provide comprehensive engineering review of final clearance; ensure all required chops are completed, TAE comments are adjudicated, and system safety risks are clearly documented; ensure system safety risks are accepted at the appropriate level and/or mitigated via appropriate limits, procedures, warnings, cautions and notes; ensure clearance is coherent and executable</td>
</tr>
<tr>
<td>Release Flight</td>
<td>TYCOM, ACCs or Program Offices</td>
<td>Readdress flight clearance as required to subordinate activities for action</td>
</tr>
<tr>
<td>Process Step</td>
<td>Responsible Party</td>
<td>Process Duties</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>Clearance</td>
<td>(in the case of CAS)</td>
<td></td>
</tr>
<tr>
<td>NAT (AIR-4.0P)</td>
<td>Issue or deny flight clearance and post to website</td>
<td></td>
</tr>
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</table>
Chapter 5 - Assessment of Risk in a Flight Clearance

The NAT, APMSE, and TAEs will assess the systems safety risks that a requested flight clearance may incur. SOF, risk to personnel, non-program property, and probability of aircraft loss (due to questions regarding the airworthiness of the system) may all be assessed and a clearance may be issued stating these system safety risks and considerations. If analysis indicates that the system meets SOF requirements, but based on the available data, there are questions regarding the airworthiness of the system, the clearance will be issued (see SWP4P00-028, Hazard Identification and Risk Acceptance in Flight Clearances) after system safety risks are appropriately documented and mitigated. When this type of clearance is issued, the decision to fly or not then becomes an operational risk-based decision, see reference (ad). In most cases, this type of FC will be limited to IFCs supporting RDT&E operations, Category 3 UAS, or Type 2 CAS.
Chapter 6 – UAS Airworthiness Considerations, Engineering Data Requirements, IFC Categorization, and Statements of Airworthiness in Support of a Certificate of Waiver and Authorization (COA)

1. Unmanned Aircraft (UA) System (UAS) Airworthiness Considerations. There are airworthiness considerations unique to UAS that must be considered for all three categories of UAS flight clearances. The overarching UAS airworthiness principles are: Safety of personnel during launch and recovery, safety of personnel on the ground during flight, airspace and operating area containment, and midair collision. Specific areas of consideration include, but are not limited to:

   a. Launch and recovery methods and equipment such as pneumatic launch, parachute, and net recovery;

   b. Datalink and/or Global Positioning System (GPS), availability, integrity, and accuracy;

   c. UA operator workload and situational awareness of UA status and position relative to other aircraft within the airspace;

   d. Control of multiple UA from a single control station, including handoff of UA control between control stations;

   e. Environmental considerations such as robustness to precipitation, winds, icing and/or lightning; and,

   f. Pre-programmed contingency responses to loss of link or flight critical failure, including autonomous "return home" and/or flight termination.

   g. Shipboard operations including operations to, from, or near a ship, shall consider effects to structural integrity, propulsion system dynamic response and tolerance to hot gas or vapor ingestion, control systems response to approach and landings in high sea states and ship air wake, electromagnetic environmental effects (e.g., effect on data links), shipboard integration of the UAS control station, and unique launch and recovery equipment. Additionally, the potential for the UAS to
damage critical equipment on the ship shall be taken considered when assessing safety of flight.

2. Engineering Data Requirements Tailoring. The scope and amount of engineering data requirements necessary for determining UAS airworthiness and/or safety of flight, as determined by the TAEs, may be affected by, but not limited to:

   a. Intended use, including the area of operation and airspace requirements (e.g., densely populated, congested areas vice sparsely populated, or unpopulated areas, on a controlled test range vice in civil airspace or combat zones);

   b. Airframe life and design margins to which the UA is designed and tested (e.g., whether proof testing can be used in lieu of dedicated static testing);

   c. UAS owner or sponsor acknowledgement of a higher probability of loss of the UA and acceptance of system safety risks associated with the material loss of the UAS;

   d. Risks associated with operating the UA in close proximity to the remote control station, personnel, property, or other equipment;

   e. Ability of the UA to recover from stall, spins or departures;

   f. Weapons carriage and/or release;

   g. Operations to, from, on-board, or near ships;

   h. Guidance, navigation, and control accuracy requirements (e.g., requirement for the UA to stay contained in a specified area), and pre-programmed contingency responses to loss of link or flight critical failure;

   i. Landing precision (e.g., whether differential GPS or beam-following systems will be used to improve landing accuracy for shipboard or land-based operations);

   j. Requirements to operate in certain weather conditions (e.g., lightning, rain, gusts, icing, etc.); and,
k. The desired operational Electromagnetic environment, including proximity to radio frequency (RF) emitters.

Furthermore, so that the TAEs can appropriately tailor the airworthiness criteria, engineering standards, and data requirements for a UAS, the APMSE may establish a Design Controllable Probability of Loss of Aircraft (PLOAdc) or Cumulative Probability of Catastrophic Failure (PCumCat) for Category 1 or Category 2 UAS. The determination of airworthiness and safety of flight (in each technical discipline) is based on compliance with criteria and standards established by each competency, as well as an assessment of safety of flight, including assessment of PLOAdc and/or PCumCat for Category 1 or Category 2. The APMSE may specify a PLOAdc or PCumCat in the air system specification; however, compliance with that requirement, in and of itself, does not determine the airworthiness or SOF of the UAS. Either PLOAdc or PCumCat may be used as suitable metrics for assessing safety of flight and hazards to personnel on the ground. For PCumCat the methodologies found in references (ae), (af), and (ag) may be used.

3. Data Requirements for Category 1 UAS Flight Clearance. Competencies establish appropriate airworthiness criteria, engineering standards, and data requirements for a Category 1 UAS flight clearance such that the level of airworthiness correlates to a PLOAdc rate of no more than 1 loss of UA per 100,000 flight hours (1E-05 per flight hour), or a PCumCat rate of no more than 1 loss of UA per 100,000 flight hours (1E-05 per flight hour) for UA with a design gross takeoff weight less than or equal to 12,500 lb; and rate of no more than 1 loss of UA per 1,000,000 flight hours (1E-06 per flight hour) for UA with a design gross takeoff weight greater than 12,500 lb. Determination of Category 1 UAS airworthiness is primarily based on compliance with Competency-established airworthiness criteria and standards, rather than verification of a design controllable PLOA or PCumCat. UAS designed and qualified to the standards in references (ae), (af), or (ag), or DON equivalent, qualify for a Category 1 UAS.

4. Data Requirements for Category 2 UAS Flight Clearance. Competencies establish appropriate airworthiness criteria, engineering standards, and data requirements for a Category 2 flight clearance such that the level of airworthiness correlates
to a PLOAdc rate of no more than 1 loss of UA per 10,000 flight
hours (1E-04 per flight hour), or a PCumCat rate of no more than
1 loss of UA per 10,000 flight hours (1E-04 per flight hour) for
UA with a design gross takeoff weight less than or equal to
12,500 lb; and rate of no more than 1 loss of UA per 100,000
flight hours (1E-05 per flight hour) for UA with a design gross
takeoff weight greater than 12,500 lb. Determination of
Category 2 UAS airworthiness is primarily based on compliance
with Competency-established criteria and standards, rather than
verification of a design controllable PLOA or PCumCat.

5. Data Requirements for Category 3 UAS Flight Clearance.
Category 3 UAS flight clearances utilize an engineering review
and risk assessment to establish safety of flight. The primary
SOF considerations are: assuring safety to personnel during
launch, recovery and flight (including third parties on the
ground); containment within the intended operating area; and
midair collision risks. Alternatively, a Category 3 UAS flight
clearance may utilize a design engineering review-based process
to establish the airworthiness basis based on assessment of SOF
against a set of Competency-established airworthiness criteria,
standards, methods of compliance, and substantiating data.
Category 3 UAS flight clearances include stringent operating
limitations to ensure safety to people, property, and
environment. The data requirements for a Category 3 flight
clearance directly correlate to the proposed operational usage
and areas of operation. Area of operation considerations
include airspace (restricted areas, warning areas, combat zones,
U.S. National airspace, international or foreign airspace) and
shipboard launch and recovery. Category 3 UAS flight clearances
typically contain operating limitations prohibiting flight over
personnel due to their lack of airworthiness.

   a. The data requirements for a Category 3 flight clearance
will vary significantly, based on the proposed operating
airspace and ground space for UA flight operations. The data
requirements to fly a UA in Active Restricted airspace or in a
Warning Area, over an unpopulated or sparsely populated area
monitored by range safety personnel, may be limited to a
completed Range Commander’s Council (RCC) 323-99 Range Safety
Questionnaire (reference (aa)); safety case (or equivalent);
assessment of hazards to people and property on the ground;
detrimental effects to the environment; and potential for the UA
to stay within the approved area of operation. Because a higher
probability of loss of the UA is acknowledged and risk of material loss is accepted, and because the UA will be flown in a controlled environment, a reduced number of engineering disciplines may be required to review and approve the flight clearance.

b. For a proposed Category 3 flight clearance where UA flight occurs in a shipboard environment, the data requirements will require a larger complement of engineering disciplines to review the data and concur with the flight clearance to assure safe operations in a shipboard environment.

6. Statements of Airworthiness in Support of a Certificate of Waiver and Authorization (COA). Within the United States National Airspace, a COA is required for flight outside of restricted and/or warning areas. A statement of airworthiness is required by the FAA in support of COA applications. To use an IFC as the statement of airworthiness, any operational and/or airspace restrictions found in the flight clearance must be consistent with the operations proposed in the COA application. To ensure adequate TAE review, the APMSE must indicate in the flight clearance request whether the flight clearance is intended to be used as a statement of airworthiness in support of a COA application and provide information describing the planned National Airspace operations. See reference (e) for examples of statements that are typically used to fulfill the FAA requirement for a statement of airworthiness in support of a COA.
Chapter 7—Exclusions

A flight clearance is not or does not:

a. Authorize operation of the aircraft system;

b. Assign aircraft or authorize aircrews or operators;

c. Authorize modification of the aircraft system;

d. Authorize installation of equipment;

e. Grant exemption from the formal NAVAIR CM Process, defined in reference (ab);

f. Constitute a safety review, to the level of those performed by the Naval Safety Center, or imply that such a review has been performed;

g. Preclude the need for a range clearance;

h. Indicate adequate sponsorship or funding;

i. Guarantee the modification or aircraft system will perform its intended function;

j. Indicate adequate logistics support;

k. Preclude the need for coordination with the facility, range, ship, or airspace controlling authority to conduct operations;

l. Authorize ground or flight testing;

m. Authorize changes to OEM documentation;

n. Authorize the use of a laser system;

o. Provide acceptance of cybersecurity risks (ATO); and/or

p. Required for a UA weighing five (5) or fewer pounds that is operated inside an unoccupied building or enclosed structure
(except for personnel essential to the safe operation of the UAS) and there is no potential for open-air flight.
Chapter 8 – Conditions Requiring a New Flight Clearance

The following conditions must be evaluated to determine if a new or modified flight clearance is required:

1. New and/or Modified Configuration. Examples of configuration changes requiring a flight clearance include, but are not limited to:

   a. Structural and material changes;

   b. Modification to the exterior contour and mold line of the air vehicle (addition and/or removal of antenna, wing fence, ventral fin, vortex generator, air induction system, auxiliary inlets, etc.); and,

   c. Carriage and release of stores, mixed loads, out of sequence release, or expanded limitations not specifically authorized by NATIP or NATOPS. This shall include:

      (1) Deviations in store mass properties that exceed the original certified store limits by the following; weight +/- 5%, center of gravity (CG) +/- 0.5 inches, and mass moments of inertia +/- 10%;

      (2) Changes in autopilot software affecting separation characteristics;

      (3) Changes in structural properties affecting load paths; and,

      (4) Modification to weapons release or firing system, including stores management system and associated weapon software.

   d. Any changes in software. Software changes are divided into different levels (see Appendix B)

   (1) Subsystem modifications that do not interface or affect flight operations, propulsion, or weapons control, such as User Data Files changes generally do not require a flight clearance, however, in this case the aircraft platform class desk shall have written certification from the subsystem
development lead, or weapon and/or store software IPT lead stating that there is no aircraft interface or airworthiness concern.

(2) Flight clearances can be issued to allow undefined changes in software versions without the need to obtain a new flight clearance, referred to as 'green box' clearances. These will be considered on a case by case basis and are generally only authorized for flight testing of a software system that does not interface with the primary systems of the aircraft and/or due to the software architecture changes to that system cannot affect the airworthiness of the aircraft. Flight clearances can also be granted to allow several defined versions of software to be interchanged or to allow defined changes in software gains or parameters.

(3) Fleet software releases are issued by OPNAV rather than AIR-4.0P.

e. Modification to the flight control system, including software revisions within the flight control system or within systems that provide data to the flight control system.

f. New or modified propulsion system or its control system, including software.

g. Modification of the displays, annunciation or critical information presented to the aircrew or operator which may affect situational awareness, aircraft control, weapon/store release and weapon system employment.

h. Installation of equipment, including Non-Developmental Items (NDI) or Commercial-Off-The-Shelf (COTS) systems, mounted to the air vehicle (whether interior or exterior) that is not part of the configuration authorized by NATOPS.

i. Changes to a UAS or target system, including the remote control station, data links, flight control system, communications systems/links, unique launch and recovery equipment, etc., as well as the air vehicle. Changes include hardware, firmware, and/or software.

j. Modification of the ALSS.
k. Modification of any aircraft subsystem interfacing with and affecting flight operations, propulsion, or weapons control, e.g., mission computer, radar, and navigation, warning systems.

(1) When required, flight clearances for mission planning systems shall be requested by the platform making use of the system.

(2) If a mission planning system produces an artifact that, when loaded into the aircraft computer, affects flight controls, autopilot, automatic weapons release, etc. that is not already covered in NATOPS or NATIP or another flight clearance document, then a flight clearance is required.

(3) When no airworthiness or SOF impact is present, no flight clearance is required.

(4) For mission planning systems the platform class desk officer shall determine the need for a flight clearance with input from the weapons and/or mission planning system class desk. If the platform class desk has any doubt, the class desk should request advice from AIR-4.0P. AIR-4.0P will provide advice according to prevailing policy and best engineering practices.

l. Carry-on, carry-off, Roll-on, Roll-off equipment that either interfaces directly with aircraft systems and/or has potential to interfere with aircraft systems, including mission related electronic and/or battery powered devices of any kind.

m. Flight test instrumentation, including, but not limited to; wingbooms, nosebooms, sensitive gauges, and camera pods.

2. New or Modified Envelope. Examples of flight envelope changes requiring a flight clearance include, but are not limited to:

a. Envelope expansion, evaluation of crosswind landing or wet runway landing limits, Instrument Meteorological Conditions (IMC) flight (see NAVAIRINST 13034.3, Procedures for Obtaining Authorization for Flight in Instrument Meteorological Conditions), emergency procedures, structural or flight control limits, wind envelopes, dynamic interface limits, air show procedures, or helicopter external lift, cargo hook system, and tow limits.
b. Use of flight test techniques and/or procedures that are non-standard. Non-standard techniques and procedures are those that are planned for flight test and are not generally accepted by the aviation community in a formal publication such as the United States Naval Test Pilot School or United States Air Force (USAF) Flight Test Manuals, equivalent Non-Department of Defense (DoD) Government Agency Manuals (such as National Aeronautics and Space administration (NASA)), published Industry Standards, or DON program unique flight test practices and guidelines agreed to between the appropriate technical area and the test team such as those delineated in the F/A-18E/F Maneuver Test Library. Examples of "standard" techniques include pitch, roll, and yaw doublets at constant frequency or amplitude. Example of "non-standard" technique would include a pitch, roll, and yaw doublet at increasing frequency and amplitude.

c. Intentional operation in degraded mode for test purpose not covered by NATOPS (e.g., simulation of partial loss or malfunction of flight control system, engine, avionics, etc.), this includes testing of the failure mode and establishing limits and envelopes for this mode.

3. Missions or flight profiles that are outside of the scope of the intended use of NATOPS. Examples include, but are not limited to: Airshows or Flight Demonstrations (as defined by reference (c)). Airshows and Flight Demonstrations introduce unique technical challenges that need to be considered in light of the different mission aspects when compared to the as-designed missions reflected in NATOPS. Simply put, NATOPS are not written with the airshow/flight demonstration "mission" in mind. Coordination with the appropriate Program Office Systems Engineering (class desk) and unit conducting the airshow is required to ensure the planned maneuvers and flight profile are conducted within the bounds of an existing flight clearance when possible, or if a specific airshow/flight demonstration flight clearance is required.
Chapter 9 – Information Required for Determination of Flight Operating Limitations

Introduction. The following is a compilation of the data typically required for the determination of flight operating limits for non-standard aircraft system configurations, including proposed store loadings, and expansions to the operating envelope. (This list does not include all possible data requirements for all flight clearance applications, nor are all data listed required for each application. The NAT, in cooperation with cognizant engineers, will determine the applicability and tailor the data requirements for each specific application.) Reference (t) provides a more detailed list of typical data requirements for Department of the Navy (DON), United States Air Force, and United States Army approvals.

a. Descriptive:

(1) A complete description of proposed modification or operation, including aircraft configuration, store loadings, flight envelope, and store carriage, employment, and jettison envelope;

(2) Three-view drawings, including all dimensions, materials, and physical, geometric, and kinematics clearances;

(3) Air vehicle and stores weight and balance data, and appropriate mass moments of inertia;

(4) Air vehicle electrical wiring diagrams;

(5) Description of store arming and tail banding wiring configuration;

(6) Software architecture and version description documents and a listing of associated computer software configuration items;

(7) Assembly drawings of ALSS equipment;

(8) Drawings detailing installation of test instrumentation;
(9) Store release and launch event timelines, delays, and activation;

(10) The largest center of gravity shift during a store drop, launch, fuel jettison, burn, or airborne refueling; and,

(11) The location of onboard instruments; e.g., angle-of-attack, Mach, airspeed, etc.

b. Analysis (reports that detail the following):

(1) Design criteria;

(2) Air vehicle loads, store loads, and strength;

(3) Vibrations, flutter, and divergence;

(4) Vibration, thermal, and acoustic fatigue;

(5) Electrical loads;

(6) Effects on aircraft performance;

(7) Effects on air vehicle stability and control, including flight control system failure or degraded mode effects;

(8) Stores separation characteristics, including miss distances;

(9) Store autopilot or aircraft stability augmentation system function changes;

(10) Aircraft or store control system mechanism dynamic effects;

(11) Effects on air vehicle spin and stall recoveries;

(12) Effects on air vehicle Aviation Life Support Systems (ALSS);

(13) Software change hazard analysis;
(14) Effects of normal operation and failures of test instrumentation on air vehicle systems, stores and stores employment, and ALSS operation, including:

(a) Electromagnetic interference;

(b) Integrity of structures modified for instrumentation installation; and,

(c) Physical interference and/or clearance.

(15) System safety hazard analysis;

(16) Hazards of Electromagnetic Radiation to Ordnance (HERO) Analysis, including restrictions, safe separation distances, and HERO Emission Control bill (per NAVSEA OP 3565);

(17) Powerplant effects;

(18) Data links;

(19) Flight termination system vulnerability and,

(20) Cyber risk assessments.

c. Testing (reports that detail the following):

(1) Laboratory and ground testing;

(2) Air vehicle and stores compatibility (fit check, electrical interface, arming wire, clip, tail band, etc.);

(3) Static ejection and gun, rocket, and/or missile firing;

(4) Store separation and jettison (wind tunnel);

(5) Ground vibration frequency (including ground resonance for rotary wing and rotorcraft) and modal survey;

(6) Electromagnetic effects, including HERO (per NAVSEA OP 3565);
(7) Stability and control, flying qualities, and performance (wind tunnel);

(8) Thermal, vibration, and acoustic fatigue;

(9) Environmental;

(10) Structures static and fatigue;

(11) Aircrew restrictive code effects (per NAVAIRINST 3710.9A, Anthropomorphic Accommodation in Naval Aircraft);

(12) Man-mounted ALSS equipment compatibility and tolerance tests;

(13) Escape system compatibility;

(14) Cockpit lighting, instrument lighting, and readability;

(15) Aircrew or operator displays, including software change effects;

(16) Software formal qualification and regression testing;

(17) Flight control integration testing (lab and ground);

(18) Test instrumentation compatibility;

(19) Powerplant effects; and,

(20) Cockpit transparencies and transmissivity.

d. In-Flight Testing (reports that detail the following):

(1) Stores captive carriage;

(2) Store carriage loads;

(3) Stores separation and jettison;
(4) Weapon delivery data (ballistics, safe escape, etc.);

(5) Carrier suitability (catapults and arrestments);

(6) Flutter and divergence;

(7) Acoustic and vibration environment;

(8) Loads and stress survey;

(9) Electromagnetic compatibility and electromagnetic interference;

(10) Flying qualities, stability, and control;

(11) Aircraft performance;

(12) Engine, transmission, auxiliary power unit, and cross shaft performance;

(13) Escape and egress system compatibility;

(14) Aircrew or operator displays;

(15) Flight controls, including software change effects;

(16) Effects of forward firing ordnance on engine operation, including surge and restart envelope;

(17) Software, including effects on aircrew or operator displays; and,

(18) Air vehicle subsystems performance.
Appendix A - Acronyms

AA – Airworthiness Authority
ACC – Aircraft Controlling Custodian
ALSS – Aviation Life Support Systems
APMSE – Assistant Program Manager for Systems Engineering
AQP – Airworthiness Qualification Plan
ARC – Aircraft Reporting Custodian
ASN(RD&A) – Assistant Secretary of the Navy for Research, Development and Acquisition
ATM – Air Traffic Management
ATO – Authorization to Operate
CAS – Contracted Air Services
CCB – Configuration Change Board
CDA – Commercial Derivative Aircraft
CM – Configuration Management
CNAF – Commander Naval Air Forces
CNO – Chief of Naval Operations
CNS – Communication, Navigation, Surveillance
COA – Certificate of Authorization
DAA – Designated AADCCB – Decentralized Change Control Board
DCMA – Defense Contract Management Agency
DON – Department of Navy
DT – Developmental Testing
EDRAP – Engineering Data Requirements Agreement Plan
ECP – Engineering Change Proposal
FAA – Federal Aviation Administration
FC – Flight Clearance
FCA – Functional Configuration Audit
FCO – Flight Clearance Officer
FCP – Flight Certification Plan
FCR – Flight Clearance Releaser
FCRA – Flight Clearance Releasing Authority
FOT&E – Follow-on Operational Test and Evaluation
GFR – Government Flight Representative
HERO – Hazards of Electromagnetic Radiation to Ordnance
IC – Interim Change
IPT – Integrated Product Team
IFC – Interim Flight Clearance
IMC – Instrument Meteorological Conditions
LAA – Limited Airworthiness Agent
MIL-HDBK – Military Handbook
NAS – National Airspace System
Appendix B – Definitions

1. **Airworthiness.** The property of an air system configuration to safely attain, sustain, and terminate (“complete” in case of Unmanned Aircraft Systems (UAS)) flight per approved usage limits.

2. **Airworthiness Authorities (AA).** Naval Air Systems Command (NAVAIR) Airworthiness Directorate (AIR-4.0P) Director, Military Director, and Deputies are responsible for all operations of AIR-4.0P and airworthiness support for the Department of the Navy (DON). The AAs are empowered by the Commander, NAVAIR (AIR-00) and authorized to release all DON flight clearances.

3. **Aircraft Controlling Custodian (ACC).** A Naval administrative function within major commands exercising administrative control of assignment, employment, and logistic support of DON aircraft and engines, as assigned by the Chief of Naval Operations. The command exercising administrative control of assignment, employment, and logistic support of aircraft.

4. **Aircraft Owner.** All Navy aircraft, including unmanned aircraft, are owned by the DON. To facilitate management of aircraft the Navy operates in terms of Custody either ACC or Aircraft Reporting Custodian. Program Offices do not own aircraft nor do TYCOMs. Contracted aircraft are owned by the contractor but the DON becomes responsible for the airworthiness and continuing airworthiness of those contractor owned aircraft when the aircraft are supporting PAO or State operations.

5. **Aircraft Pedigree.** An accounting of the history of an aircraft from its production to its current condition. This includes documentation of the original and subsequent design and airworthiness certifications, ownership, configuration changes, maintenance records, flight envelopes, usage, qualifications of operators and maintainers, incidents and discrepancies, the current aircraft material condition, and any other applicable information in the aircraft-service history.

6. **Aircraft Reporting Custodian (ARC).** A Naval administrative function, assigned by the ACC, at the lowest organizational level; to account for, provide information about assigned
aircraft, or support equipment. This does not necessarily imply or require physical custody.

7. Aircrew. Personnel located within the air vehicle with duties assigned to operate or assist in the aircraft system operation.

8. Authorization to Operate (ATO). The document stating that the system has been approved by the cognizant RMF authorizing official for operation within the Navy or Department of Defense enterprise based on assessment establishing an acceptable level of risks.

8. Aviation Life Support System (ALSS). Equipment required for aircrew to operate aircraft and for aircrew flight safety including aircraft escape system, special environmental protective system, personal parachute system, aviator’s personal protective and survival equipment, aircrew mounted mission systems (e.g., night vision goggles), search and rescue gear, and aircraft fixed seat system. The man-mounted ALSS standard configuration is identified in the Aviation Crew Systems Technical Manual for Aircrew Protective Equipment, NAVAIR Document 13-1-6-7-1.

9. Aircraft System. A manned or unmanned fixed wing, rotary wing, tilt rotor aircraft, vertical and/or short take-off and landing (V/STOL) aircraft, airship, manned balloon, or aerial target. Aircraft systems include all onboard hardware, firmware, and software, equipped with or without stores. Store loading is considered to be part of the aircraft system. The remote control station, UA launch and recovery, and data link systems for unmanned aircraft are also part of the aircraft system. Unmanned tethered aerostats and balloons are not considered aircraft or aircraft systems.

10. Civil Aircraft. Aircraft, other than public aircraft, per 49 U.S.C. § 44101. The FAA is the AA for all civil aircraft, as well as the licensing of civil pilots and mechanics.

11. Commercial Derivative Aircraft and Aircraft System. Any aircraft system having a basic design previously certified by the Federal Aviation Administration, or other equivalent AA that is adapted to perform specific DON missions.
12. **Continued Airworthiness**: All the tasks (e.g., maintenance, configuration control, etc.) to be conducted to verify that the conditions under which a flight clearance have been granted are still valid to ensure the safety of the aircraft at any time.

13. **Continuing Airworthiness**. Aspects of airworthiness that go beyond initial engineering analysis of the aircraft system to include, maintenance, configuration management, training of aircrew and maintainers, ordnance handling, parts management, and safety management systems (SMS), all which serve to ensure the safe continued operation of the aircraft system.

14. **Cybersecurity**. Measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include providing for restoration of information systems by incorporating protection, detection, and reaction capabilities.

15. **Designated Airworthiness Authority (DAA)**. The AIR-4.0P Chief Airworthiness and Senior Airworthiness Engineers and other designated personnel who are empowered by AIR-00 and authorized to release all DON flight clearances.

16. **Engineering Data Requirements Agreement Plan (EDRAP)**. The EDRAP represents the negotiated written agreement established during the flight clearance planning process between the Integrated Product Team or Externally Directed Team leader and the Technical Area Experts. The written plan shall contain a detailed description of the engineering data that the competencies require to establish the system airworthiness with confidence. It should be understood that not all characteristics of a system or planned test can be known well ahead of the system development or test plan development. Therefore some deviation from the original EDRAP agreement should be expected as detailed knowledge of the system or test becomes available. See reference (e) for additional information on EDRAP formats.

17. **Firmware**. Firmware is the programmable content of a hardware device, which can consist of machine language instructions for a processor or configuration settings for a fixed-function device and gate array or programmable logic
device. A common feature of firmware is that it can be updated post-manufacturing by electronic means (reprogramming).

18. Flight Clearance. A flight clearance is a formal document that provides assurance of airworthiness and safety of flight (SOF), and ensures system safety risk has been identified and accepted at the appropriate level, within acceptable bounds for the intended mission.

19. Flight Clearance Facilitator. Individual tasked to assist in development and progression of the draft flight clearance as the document advances through the engineering review of airworthiness. Facilitators are generally aircraft platform specific and funded by the respective program office.

20. Flight Clearance Process. The process by which an independent engineering analysis is performed to provide assessment of airworthiness and safety of flight, and ensure that system safety risk has been identified and accepted at the appropriate level, within acceptable bounds for the intended mission, resulting in issuance of a flight clearance.

21. Interim Flight Clearance (IFC) Flight Envelope Restriction. An IFC issued by AIR-4.0P to restrict operations (other than full grounding), due to safety issues. It specifies the restriction, an explanation of the restriction and conditions that must be followed to allow the restriction to be lifted.

22. Limited Airworthiness Agents (LAA). The Flight Clearance Releasing Authority empowered by the AA to release IFCs at diverse levels of authority according to their experience and abilities. These empowered LAAs exist at various sites as required for convenience and operational efficiency.

23. Mission Equipment. Any piece of equipment (electrical or otherwise), on an aircraft that is used to fulfill an aircraft’s particular mission or task during takeoff, flight, and landing. Mission equipment may be carry-on or carry-off.

24. National Airworthiness Team (NAT). The NAT represents the cross competency group of empowered personnel dedicated to the processing, tracking, and issuance of NAVAIR flight clearances. The NAT is headed by the civilian and military airworthiness director(s). The empowered personnel at various sites,
including AAs, DAAs, Test Airworthiness Agents (TAAs), and LAAs, in conjunction with the AIR-4.0P support staff and facilitators constitute the NAT.

25. Nonstandard Configuration. Any aircraft system configuration, including stores, onboard avionics, software not approved via published NAVAIR technical publications (maintenance manuals), Technical Directives (TDs), Naval Aviation Technical Information Product (NATIP), or Naval Air Training and Operating Procedures Standardization (NATOPS). Published TDs include Formal Changes, Interim Changes, Rapid Action Minor Engineering Changes, and Bulletins per NAVAIR 00-25-300. Nonstandard configurations include but are not limited to changes in external configuration, changes to hardware, firmware, software, modification, change in personal flight equipment, modification to an external store, modification to payload, changes to Ground Control Station hardware, or software for an UAS.

26. Nonstandard Operating Envelope or Limits. Any operating envelope or limit not authorized by the NATOPS, NATIP, or NAVAIR-approved operator manual.

27. Operator. Personnel not located within the air vehicle with duties assigned to operate or assist in the aircraft system operation. Typically remote control station staff for UA and UAS.

28. Pre-accepted. A Pre-accepted aircraft is an aircraft system for which development or procurement has been funded by the Government and where the Navy retains an equitable interest in the aircraft, and which has not been accepted into the Naval aircraft inventory.

29. Public Aircraft Operations (PAO). The U.S. Armed Forces considers an aircraft operation "Public" when the aircraft is owned by the Armed Forces, or is used by the Armed Forces and operates outside of the purview of its FAA airworthiness certificate (e.g., configuration, operational use, or maintenance) and applicable operating regulations under 14 CFR. See 49 U.S.C. § 40102 (a)(41) and 41 U.S.C. § 40125. FAA Advisory Circular 00-1.1 provides guidance on whether operations are public or civil. For additional information see the NAVAIR PAO knowledge portal:
30. Software Levels. Changes to software and/or firmware are divided into levels according to software criticality, type of change, and what systems in the aircraft systems are affected, see reference (h).

   a. Safety Critical Software (Level I): Includes software and/or firmware products that:

      (1) Directly control the flight dynamics of the aircraft. Examples are flight control computer software and engine control software;

      (2) Directly control a flight critical system, provided there is not a backup system that is immediately available if the primary fails. Example is software within the Heads Up Display that controls how and where flight critical information is displayed when no backup attitude display is available;

      (3) Provide flight critical data to a flight critical system provided there is not a backup system that is immediately available if the primary fails. Examples are attitude, airspeed data provided by the inertial navigation system, and air data computer without secondary sources; or,

      (4) Control the release timing of stores and/or the flight dynamics of stores within the stores separation region. Example is release timing software within the Stores Management Set.

   b. Safety-Related Software (Level II):

      (1) Includes software and/or firmware that provide critical data to flight critical systems and in-flight management systems that control primary warning or caution systems, fire suppression, stores release systems, essential attitude, and navigation instruments that have independent backup systems immediately available.

      (2) Software and/or firmware that provide non-critical data to flight critical systems and in-flight management systems
that control aircrew or operator advisories, stores release systems, and navigation instruments. Examples include:

(a) F/A-18 Mission Computer, and Cockpit Display Software that is not flight critical (e.g., fuel displays or engine instruments that have an independent backup);

(b) Inertial Navigation Systems that have independent backup attitude systems immediately available; and,

(c) Environmental control systems with independent warning or caution systems.

c. Non-Critical Software (Level III): Software, firmware that controls, and/or provides data to perform non-flight critical functions. Examples include radar warning receiver and fire control radar.

31. Safety of Flight (SOF). The property of an air system configuration to safely attain, sustain, and terminate (“complete” in case of UAS) flight (to include in-flight or post-flight aircrew survivability), within prescribed and accepted limits for injury or death to personnel, damage to equipment, property, and/or environment.

32. State Aircraft. For the purposes of this instruction, a “public” aircraft operating outside of U.S. National Airspace is referred to as a “state” aircraft.

33. Store. Any device intended for internal or external carriage or mounted on aircraft suspension and release equipment, whether or not the item is intended to be separated in flight from the aircraft. Stores include missiles, rockets, missile, rocket launchers, bombs, mines, torpedoes, sonobouys, fuel tanks, aerial targets, countermeasures (chaff, flares, and decoys), all types of pods, and dispensers (e.g., refueling, gun, instrumentation, electronic, cargo, bomblet, countermeasures, and chemical spray). Items dispensed from pods and dispensers are part of the store, and are also stores, and therefore are subject to the applicable portions of the requirements herein. Aircraft thrust augmentation devices such as Jet Assisted Takeoff units or auxiliary engines, are not included. Specific equipment items mounted outside aircraft mold lines may be defined as a store by the procuring activity;
for example, the PAVE PENNY and LANTIRN pods were considered stores even though they are mounted to special pylons not incorporating store suspension equipment.

34. **Suspension Equipment.** A device such as a rack, adapter, missile launcher, or pylon; used for store carriage, employment, and/or jettison.

35. **Test Airworthiness Agents (TAA).** The Test Flight Clearance Officers manage the test flight clearance process and are empowered by the AAs to release all test IFCs.

36. **Termination of Flight.** The point at which the air system is no longer under power at the completion of a mission, or the mission is concluded as a result of a crash landing or ejection.

37. **TYCOM.** Refers to commands that have responsibility for the readiness of their forces, which includes maintenance and logistics as well as the assignment and training of their personnel. TYCOMs are responsible to train, man and equip fleet forces. Each of the two Fleet Commanders-in-Chief has subordinate “type” commanders who supervise specific categories of forces and activities (e.g., Naval Air Force, Naval Surface Force and Submarine Force). The Commander, U.S. Naval Air Forces, Pacific Fleet (COMNAVAIRPAC) is designated as the Commander, Naval Air Forces (CNAF) for the U.S. Fleet Forces Command, with the Commander, U.S. Naval Air Forces, Atlantic Fleet (COMNAVAIRLANT) as his deputy.

38. **UA.** A remotely piloted or autonomous air vehicle designed for purposes other than as a direct-to-target weapon of destruction. Targets, long-loiter weapons, and weapons originally designed to be aircraft are considered to be UA. Conventional missiles, cruise missiles, and guided bombs are not considered UA.

39. **UA System.** A UAS is an UA and its remote operating system. The operating system can be built into the vehicle or be part of the support equipment for remotely piloted vehicles. This “system” includes the remote control station, data links, flight control system, communications systems and links, UA-unique launch and recovery equipment, etc., as well as the air vehicle. The remote control station may be located on the ground (stationary or mobile), on a ship, submarine, aircraft, etc.