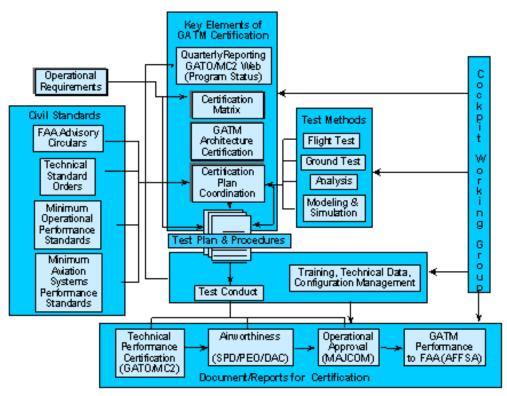## COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

This instruction implements Air Force Policy Directive (AFPD) 63-13, *GLOBAL AIR TRAFFIC MAN-AGEMENT AND NAVIGATION SAFETY CERTIFICATION FOR USAF AIRCRAFT.* This procedural guidance applies to all US Air Force (USAF) aircraft, including those of the Air National Guard (ANG) and Air Force Reserve Command (AFRC), by defining the USAF process required to establish and preserve Global Air Traffic Management (GATM) and Navigation Safety (Nav Safety) performance certification.

1. GATM Certification Process. The purpose of GATM and Nav Safety certification is to ensure Air Force aircraft and Air Force managed aircraft acquisitions and modifications, conform to appropriate civil requirements for communication navigation surveillance/air traffic management (CNS/ATM) and have a defined path for upgrades to meet anticipated future requirements. The GATM and Nav Safety certification process will ensure commercial avionics retain full functionality after integration and that military-unique systems provide an equivalent level of safety.

1.1. Disciplined Engineering Process. A disciplined engineering process is necessary to ensure USAF aircraft comply with established civil CNS/ATM standards. The GATM/Nav Safety Architecture, Certification Matrices, Certification Plan, and Quarterly Reporting as outlined in Figure 1 guide this engineering process and its development. These key documents serve as a guide to establish a coherent GATM and Nav Safety system architecture which maintains configuration control consistent across the Air Force and establishes a robust operational risk management program to make informed cost and performance trades.

1.1.1. GATM/Nav Safety Architecture. The GATM/Nav Safety Architecture defines the technical baseline in GATM and Nav Safety implementation by detailing aircraft modifications, Operational Flight Program (OFP) changes, and the hardware required to satisfy mission requirements. A critical element to reduce technical risk is development of the architecture early in the program.

Proposed architectures shall address aircraft integration as well as other critical architecture-level issues. If GATM/Nav Safety functionality is gained as part of Offerors' proposals, the proposed architectures shall be evaluated as part of the overall proposal evaluation. GATM/Nav Safety architecture shall be finalized prior to the Critical Design Review. The architecture shall ensure sufficient growth (e.g., spare memory, processing speed, and communication bus architecture) is available to meet anticipated future GATM and Nav Safety requirements.

1.1.2. GATM/Nav Safety Certification Matrices. Certification Matrices serve to assist the implementation of GATM and Nav Safety by delineating all civil CNS/ATM performance requirements for given functionality (e.g., Satellite Communication, Mode S, Required Navigation Performance). Certification Matrices define the measurable performance requirements, applicability of requirements to Air Force aircraft, as well as recommended test methods and/or specific actions that will verify an equivalent level of safety. Developed by Global Air Traffic Operations/Mobility Command and Control System Program Office (GATO/MC2), these Certification Matrices offer the latest civil information to facilitate an understanding of technical design implications of associated GATM and Nav Safety requirements. These matrices shall be tailored by the System Program Office to reflect MAJCOM requirements for the specific aircraft.

1.1.3. GATM/Nav Safety Certification Plan. A critical step in the engineering process is the close collaboration among the aircraft System Program Office, Major/Using Commands, GATO/MC2, and Air Force Flight Standards Agency (AFFSA) in the establishment of a GATM and Nav Safety Certification Plan. This Certification Plan defines the engineering process required to validate and maintain aircraft compliance with requisite civil standards. For GATM/Nav Safety procurements, the Certification Plan shall be proposed by the Offerors' as part of the overall Integrated Management Plan (IMP) and Integrated Master Schedule (IMS). It should address GATM and Nav Safety implementation, engineering services, test methods, configuration control, training, technical data, logistics support, and responsibilities of organizations involved in certification. Additionally, the Certification Plan shall document the plan to obtain host nation frequency approval required for operation of certain GATM and Nav Safety avionics within host nation controlled airspace. It is imperative the Certification Plan address the test process required to certify aircraft platforms as ready to operate in civil/military airspace as well as the process to maintain certification in an environment characterized by evolving civil CNS/ATM standards.

1.1.4. GATM/Nav Safety Quarterly Status Reporting. GATO/MC2 has implemented a standardized reporting system for GATM and Nav Safety equipage across all Air Force aircraft by providing quarterly assessments of program execution. The GATO/MC2 Web Site provides a vital communication link on cross-cutting issues among the integrated product team geographically separated at various Air Force facilities. This reporting process documents GATM and Nav Safety timelines, issues in satisfying the required exit criteria, as well as MAJCOM need dates to support operation in national and international airspace. Finally, GATO/MC2 Web Site tracking and a robust operational risk management program link integrated product teams with issues driving cost and performance tradeoffs. Records will be maintained and disposed of in accordance with AF records management requirements.

Figure 1. GATM Certification Process.

1.2. Configuration Management. Performance certification documentation must capture the configuration of the GATM and Nav Safety avionics and functionality which the avionics support. Formal documentation of the GATM/NAV Safety architecture and performance is needed to ensure that required functionality is in compliance with civil standards. This information should be readily accessible for review by other government organizations and international civil authorities to ensure timely GATM/Nav Safety Certification as well as rapid approval for access to controlled civil airspace. This configuration management process is therefore a critical element in obtaining FAA and host nation approval.

1.3. Test and Evaluation. A comprehensive test and evaluation program is required to validate an equivalent level of performance mandated by FAA Circulars, Technical Standard Orders (TSOs), Minimum Operational Performance Standards (MOPS), Minimum Aviation Systems Performance Standards (MASPS) and other appropriate technical performance standards as defined in the system specification. CNS/ATM requirements will establish the foundation by which aircraft system performance is to be tested. Much of the required GATM/Nav Safety functionality will be validated in Development Test and Evaluation (DT&E) test methods consisting of modeling/simulation, analysis, bench/performance testing, and flight-testing. The GATM/Nav Safety Certification Plan should define how DT&E results will complement Operational Test and Evaluation (OT&E) in validating operational requirements to achieve levels of performance needed to gain access to international civil airspace.

1.4. Technical Orders. Current validated and verified technical orders are required to operate GATM and Nav Safety avionics within national and international airspace. A key element in the publication

of technical orders is a disciplined process to update technical orders with the latest procedures and requirements mandated by evolving civil CNS/ATM standards.

1.5. Training. Aircrew and maintenance personnel must be adequately trained to preserve GATM and Nav Safety certification. Training should reflect the latest requirements contained in FAA and host nation Civil Aviation Authority regulatory documents. Theater indoctrination training shall be provided to aircrews for specific flight operations including theater unique GATM/Nav Safety requirements and procedures.

1.6. Certification Documentation. Aircraft listed on the FAA registry of CNS/ATM compliant aircraft are normally accepted by host nations as satisfying applicable requirements required for flight in their controlled airspace. Figure 2 contains the formal documentation and process required for inclusion into FAA registry of CNS/ATM compliant aircraft.

1.6.1. GATM/Nav Safety Architecture Verification (OPR: GATO/MC2). To gain unrestricted access to civil airspace, Architecture Verification is required to document the GATM/Nav Safety system design. It shall include a physical and functional description of hardware and associated software changes used in the GATM and Nav Safety solution. It should also address environmental qualifications of the avionics and constraints resulting from environmental considerations. Finally, this verification documents any variances from the recommended equipage in civil standards and defines the steps taken to ensure that USAF aircraft provide an equivalent level of safety without associated system equipment degradation.

1.6.2. FAA Type Certification (OPR: Platform SPO/FAA). For civil derivative aircraft that maintain FAA Type Certification, GATM and Nav Safety documentation shall be tailored to satisfy FAA certification requirements. The Supplemental Type Certification shall serve to document GATM and Nav Safety system performance and replaces the GATM and Nav Safety Performance Certification. The aircraft Single Manager's letter of request for Supplemental Type Certification shall also request the FAA approve GATM and Nav Safety system-level performance.

1.6.3. GATM and Nav Safety Performance Certification (OPR: GATO/MC2). For aircraft that do not maintain a FAA Type Certificate, a Performance Certification is required to validate the GATM and Nav Safety system-level performance for FAA and host nation Civil Aviation Authorities. This Certification documents GATM and Nav Safety compliance and facilitates international acceptance by demonstrating GATM and Nav Safety system performance and software development process either satisfy civil standards or provide an equivalent level of safety and performance. Note, Certification Matrices facilitate the aircraft Performance Certification by delineating all civil CNS/ATM performance requirements for given functionality.

1.6.4. Airworthiness Certification (OPR: Platform SPO). Aircraft that have been modified with GATM and Nav Safety avionics shall have airworthiness verified for safety of flight performance. Any safety of flight or operational limitation will be resolved or adequately documented.

1.6.5. Operational Approval (OPR: MAJCOM). Aircraft modified with GATM and Nav Safety functionality shall obtain an Operational Approval from the lead and user MAJCOM, AFRC, or ANG as applicable. Operational Approval certifies operational compliance with requisite host nation CNS/ATM procedures and requirements. This Operational Approval is based upon compliance with civil CNS/ATM standards including adequacy of training, operating procedures, maintenance, and logistics support. The Operation Approval shall ensure that required aircrew
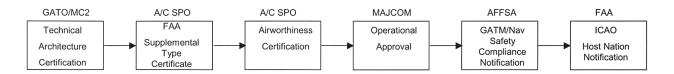
proficiency and maintenance personnel training is maintained and documented as required by applicable civil standards.

Figure 2. GATM/Nav Safety Certification Documentation.

GATM/Nav Safety Certification

GATO/MC2	GATO/MC2	A/C SPO	MAJCOM	AFFSA	FAA
Technical Architecture Certification	GATM/Nav Safety Performance Certification	Airworthiness Certification	Operational Approval	GATM/Nav Safety Compliance Notification	ICAO Host Nation Notification

Civil Derived Aircraft with

FAA Supplemental Type Certification

GATO/MC2	A/C SPO	A/C SPO	MAJCOM	AFFSA	FAA
Technical Architecture Certification	FAA Supplemental Type Certificate	Airworthiness Certification	Operational Approval	GATM/Nav Safety Compliance Notification	ICAO Host Nation Notification

1.6.6. GATM/Nav Safety Compliance Notification (OPR: AFFSA). AFFSA is charged with the responsibility of informing the FAA of the extent to which Air Force aircraft comply with GATM and Nav Safety standards.

2. Roles and Responsibilities.

2.1. SAF/AQ:

2.1.1. Guides the programming and execution of the GATM and Nav Safety program.

2.1.2. Assigns AFPEO/AT as OPR and AFPEO/FB as OCR for this instruction.

2.1.3. Monitors and reviews GATM and Nav Safety programs to ensure aircraft modifications and acquisitions adhere to appropriate policies, guidance and supplements.

2.2. MAJCOMs, AFRC, and ANG:

2.2.1. Function as the office of primary responsibility for development of operational requirements for GATM/Nav Safety, concept of operations, maintenance concept, and training.

2.2.2. Develop and document operational requirements for GATM and Nav Safety in applicable Mission Need Statements, Operational Requirement Documents, and Capstone Requirement Documents.

2.2.3. Identify maintenance concept of operations, develop theater indoctrination training and ensure aircrews as well as maintenance personnel are trained for specific flight operations including unique theater GATM/Nav Safety requirements and procedures.

2.2.4. Approve operation of aircraft modified with GATM and Nav Safety certifying operational compliance with requisite host nation CNS/ATM procedures and requirements. A copy of the Operational Approval documentation shall be provided to GATO/MC2.

2.2.5. Request frequency allocations for GATM/Nav Safety transmitters/receivers in accordance with AFI 33-118, Radio Frequency Spectrum Management. Note, this action is often time critical.

2.3. AFFSA:

2.3.1. Function as the office of primary responsibility for coordination with FAA on CNS/ATM equipage issues.

2.3.2. Responsible for informing the FAA which MAJCOM/AFRC/ANG aircraft the USAF has certified to be compliant with respective GATM and/or Nav Safety standards.

2.3.3. Assist GATO/MC2, MAJCOMs/ANG/AFRC, and aircraft system program offices with operational interpretation of civil performance.

2.3.4. Provide aviation subject matter operational expertise relating to GATM/Nav Safety.

2.4. Global Air Traffic Operations/Mobility Command and Control System Program Office (GATO/ MC2):

2.4.1. Function as the USAF Office of Primary Responsibility (OPR) for GATM and Nav Safety Architecture Verification and Performance Certification, consultation, procurement, and sustainment.

2.4.2. Verify, during source selection if appropriate, that proposed GATM/Nav Safety architecture is capable of satisfying required civil CNS/ATM airspace standards.

2.4.3. Certify aircraft GATM/Nav Safety performance as satisfying civil CNS/ATM airspace requirements.

2.4.4. Maintain the GATM/Nav Safety status and update it quarterly with inputs from aircraft Single Managers.

2.4.5. Collaborate with the aircraft Single Manager and MAJCOM to ensure that each aircraft platform's certification plan will assure compliance with CNS/ATM standards.

2.4.6. Provide engineering services to assist USAF aircraft Single Managers in assessing and documenting GATM and Nav Safety system architectures to ensure compatibility with the civil infrastructure as well as USAF logistics support requirements.

2.4.7. Interpret civil CNS/ATM performance standards for aircraft Single Managers and closely track the evolving requirements for access to civil airspace. Provide this information as well as the potential impact to aircraft Single Managers and MAJCOMs on a timely basis.

2.4.8. Convene conferences and working groups to review and improve communication on GATM and Nav Safety requirements, policies, and procedures.

2.4.9. Certify Air Force Mission Planning Systems navigation data processing will meet CNS/ATM requirements.

2.4.10. Obtain frequency approval for avionics transmitters/receivers listed on the ESC contract catalog of certifiable avionics.

2.4.11. Facilitate the rapid access to formal documentation required for GATM and Nav Safety certification and approvals.

2.5. Aircraft System Program Offices:

2.5.1. In close collaboration with the MAJCOMs, AFFSA, AFOTEC, and GATO/MC2, develop requirements and evaluation criteria for USAF internal, or contractor proposed, GATM and Nav Safety certification plan that characterizes the disciplined engineering process to achieve civil CNS/ATM compliance. If applicable, the plan should be approved as part of source selection.

2.5.2. Define the requirements and evaluation criteria for GATM and Nav Safety architecture and obtain Architecture Verification, which verifies proposed architecture will comply with civil CNS/ATM standards as well as airworthiness/flight safety.

2.5.3. Implement GATM and Nav Safety system architecture. Implementation includes development of necessary technical data, training, configuration management, and logistics support to assure access to worldwide civil airspace.

2.5.4. Provide information to facilitate the MAJCOMs/AFRC/ANG operational approval for GATM and Nav Safety modified aircraft.

2.5.5. Ensure that the Pilot Vehicle Interface is adequate to support GATM performance requirements.

2.5.6. Provide necessary GATM/Nav Safety documentation for the library function at the GATO/MC2.

2.5.7. Certify the airworthiness of aircraft.

DARLEEN A. DRUYUN
Principal Deputy Assistant Secretary of the Air Force
  (Acquisition & Management)

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 11-202v3, *General Flight Rules*

AFI 33-118, *Radio Frequency Spectrum Management*

AFI 63-112, *Cockpit Working Groups*

AFI 63-1201*, Assurance of Operational Safety, Suitability, and Effectiveness*

AFI 90-901, *Operational Risk Management*

AFI 91-202, USAF Mishap Prevention Program

AFPD 63-12, *Assurance of Operational Safety, Suitability & Effectiveness*

RTCA/DO-178B, *Software Considerations in Airborne Systems and Equipment Certification*

Federal Aviation Regulations

Abbreviations and Acronyms

AEEC—Airline Electronic Engineering Committee

AFI—Air Force Instruction

AFFSA—Air Force Flight Standards Agency

AFOTEC—Air Force Operational Test and Evaluation Center

AFPEO/AT—Air Force Program Executive Office, Airlift and Trainers

AFPEO/FB—Air Force Program Executive Office, Fighter and Bombers

AFRC—Air Force Reserve Command

ANG—Air National Guard

CNS/ATM—Communication, navigation, surveillance/air traffic management

DoD—Department of Defense

FAA—Federal Aviation Administration

GATM—Global Air Traffic Management

GATO/MC2—Global Air Traffic Operations/Mobility Command and Control System Program Office

GPS—Global Positioning System

ICAO—International Civil Aviation Organization

MAJCOM—Major Command

MASPS—Minimum Aviation Systems Performance Standards

MOPS—Minimum Operational Performance Standards

Nav Safety—Navigation Safety

ORD—Operational Requirements Document

OFP—Operational Flight Program

PDO—Publishing Distribution Office

SAF/AQ—Assistant Secretary of the Air Force (Acquisition)

TSOs—Technical Standard Orders

USAF—United States Air Force

Terms

FAA Airworthiness Certification —Formal documentation from the Federal Aviation Administration (FAA) to the aircraft owner to confirm the aircraft meets applicable airworthiness standards. Two conditions are necessary for issuance of an airworthiness certificate:

The aircraft must conform to its type certificate.

The aircraft must be in condition for safe operation.

If one or both of these conditions are not met, the aircraft would be considered not airworthy. Also see FAA Order 8130.2C, Airworthiness Certification of Aircraft and Related Products.

GATM/Navigation Safety (Nav Safety) Performance Certification —Formal documentation to confirm the aircraft performance meets applicable Global Air Traffic Management and Navigation Safety requirements.

GATM/Nav Safety Architecture Verification —Formal documentation to confirm the aircraft architecture should allow the aircraft to meet civil performance standards if the proposed avionics systems are properly integrated.

Global Air Traffic Management —Air Force term describing, Communication, Navigation, Surveillance/Air Traffic Management and other civil performance required to access the controlled airspace needed to complete an aircraft's assigned mission.

Navigation Safety —Secretary of Defense directed program to increase the safety of DoD operations worldwide. Installs specific FAA approved safety equipment on USAF passenger/troop carrying aircraft (Nav/Safety Baseline). In some cases, Nav/Safety equipment may be required for airspace access.

Operational Certification —Formal documentation from the Major Command, Air National Guard, or Air Force Reserve to Air Force Flight Standards Agency stating that operational crews and maintenance personnel are trained to operate and maintain the aircraft with appropriate Communication Navigation Surveillance/Air Traffic Management modifications in accordance with the applicable operational and performance standards.

Radio Frequency Equipment Certification —Approved Military Communications-Electronics Board (MCEB) application for radio frequency allocation (DD Form 1494) and associated Joint Frequency Working Group (J/F) file number.

USAF Airworthiness Certification —Formal documentation, in accordance with AFPD 62-6, from the aircraft System Program Director to the owning Major Command, Air Force Reserve Command, or Air National Guard to confirm the aircraft is airworthy.