MINISTRY OF DEFENCE

General Secretary for Defence and National Armaments Directorate
Directorate of Air Armaments and Airworthiness

NEW GENERATION IDENTIFICATION FRIEND OR FOE (NGIFF)

NATIONAL AUTONOMOUS CERTIFICATION CAPABILITY (NACC)

NOTE

This regulation supersedes and replaces
the regulation of the same number, Edition 14th May 2024

Edition 14th February 2025

LIST OF EFFECTIVE PAGES

NOTE : This standard is valid if it consists of the pages listed below, duly updated. Copy of this Technical Publication may be found at the address:

https://www.difesa.it/amministrazione-trasparente/segredifesa/armaereo/pubblicazioni-tecniche/34942.html

The issue dates of the original and amended pages are:

Original…….. 0…….. 14th February 2025

This regulation consists of a total of 46 pages, as specified below, including 5 Attachments:

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1. Introduction

1.1. General

With the letter at reference [1], the DAAA has been designated as New Generation Identification Friend or Foe (NGIFF) National Certification Authority (NCA) [*Autorità Nazionale di Certificazione* (ANC) in Italian]. This appointment followed the SMD direction to have a NGIFF National Autonomous Certification Capability (NACC) [*Capacità Nazionale Autonoma di Certificazione* (CNAC) in Italian], recognised at NATO/international level, as per the NATO *Policy* at reference [2]. This Policy allows each NATO Nation to have a NCA responsible to release box and platform NGIFF certificates following the NATO guidelines [paragraph 2.1 "*The objective of this policy is to define the minimum NATO requirements for an independent IFF Mode 5 performance and interoperability assessment and validation, at the box (transponder, interrogator or combined interrogator transponder) and integrated platform level. The main focus of this certification policy is IFF Mode 5 but some nations may also include other related capabilities/functionalities such as ADS-B or Mode S as part of their certification*"]. The Policy requires the identification of a Certification Authority and at least one Test Organization (TO) that has to be:

- independent from the Applicat (for the definition see paragraph 2.4.2);
- able to verify that the box/platform is compliant with the STANAG 4193 at reference [7] using the tests defined by the NATO itself.

1.2. Purpose

The purpose of this regulation is to define the constitutive elements and processes necessary for the DAAA to contribute to the NGIFF NACC realization.
In the NGIFF NACC field, DAAA is the NCA and so it is responsible for guaranteeing to the NATO the satisfaction of the principles and/or procedures defined in the NATO Policy by issuing, under its own responsibility, the relevant certificates.
This regulation identifies/defines the following items:

- the NACC Structure (paragraph 2.1);
- the NGIFF Certification Requirements (paragraph 2.2.1);
- the Test Organization Requirements (paragraph 2.2.2);
- the Test Organization and NCA Accreditation Procedures (paragraph 2.3);
- the NGIFF Certification Procedures (paragraph 2.4).

1.3. Applicability

The present regulation is applicable to all the activities in which DAAA acts as NGIFF NCA.

1.4. Validity

The present regulation supersedes and replaces any previous editions and shall enter into force from the date of its approval.

1.5. Definitions and glossary

Unless differently specified/integrated in the body of this regulation and the relevant Attachments, refer to the regulation AER.Q-2010 for the abbreviations, vocabulary and expressions.

1.6. Acronyms

A.D. *Amministrazione Difesa*

AEtP Allied Electronic Publication

AIMS Air Traffic Control Radar Beacon System (ATCRBS), Identification Friend or Foe (IFF), Mark XIIA/XIIB System

ANC *Autorità Nazionale di Certificazione*

AOC Automatic Overload Control

ASID Air to Surface IDentification

CNAC *Capacità Nazionale Autonoma di Certificazione*

DAAA *Direzione Armamenti Aeronautici e per l'Aeronavigabilità*

DASAS *Divisione Aerea di Sperimentazione Aeronautica e Spaziale*

F-ID Full IDentification

IFF Identification Friend or Foe

M5R Mode 5 Reverse

MoD Ministry of Defence

MTL Minimum Triggering Level

NACC National Autonomous Certification Capability

NCA National Certification Authority

NGIFF New Generation IFF

PRF Pulse Repetition Frequency

RF Radio Frequency

S-ID Short IDentification

SIF Selective Identification Feature

TO Test Organization

1.7. Reference documents

[1] M_D GSGDNA REG2020 0021060 25-03-2020 - *Ordine di Servizio* ANC Issue 2

[2] Policy NATO - NATO IFF Mode 5 Certification Policy AC/322-D(2018)0047 del 22 October 2018

[3] M_D SSMD REG2020 0066520 04-05-2020 - Mission Need Requirement – "*Costituzione di un centro nazionale per la certificazione degli apparati New Generation Identification Friend or Foe (NGIFF) della Difesa*"

[4] M_D GARM REG2020 0036238 14-12-2020 "*Accreditamento del Centro Sperimentale Volo quale Test Organization dei sistemi New Generation Identification Friend or Foe (NGIFF)*"

[5] AC/322(CP/2)WP(2019)0006-REV4 (INV) "*IFF Mode 5 national certification authorities and processes*" del 03 Agosto 2023

[6] M_D A0D32CC REG2023 0099942 16-05-2023 "*Programma New Generation Identification Friend or Foe (NGIFF) - Istituzione del "Board interforze per le certificazioni NGIFF"*"

[7] STANAG 4193 "*Technical Characteristics of IFF Mk XIIA Interrogators and Transponders*" Ed. 3

[8] STANAG 4722 "*Technical Characteristics of Reverse IFF using Mode 5 Waveform*" Ed. 2

2. NGIFF National Autonomous Certification Capability (NACC)

2.1. Structure

The NACC is made of the following organizations:

- *Stato Maggiore della Difesa (SMD) - III Reparto*:
  Responsible for the definition of the Mission Need Requirement and for the identification of the Test Organizations.
- *Stato Maggiore della Difesa (SMD) - VI Reparto*:
  National NGIFF Program manager. It is responsible to send the NGIFF certification tasks to the NCA defining their priorities. As so, SMD is the Tasking Authority and provides the list of boxes/platforms to certify with the relevant priorities.
- *Stati Maggiore di Forza Armata (EI, MM, AM)*, *Comando Generale dei Carabinieri*, *Corpi Armati dello Stato*:
  They present to SMD their own needs about each single platform. They are also responsible to provide platform/personnel/support necessary for the test activities/evaluation of the platform of their competence.
- *SEGREDIFESA - IV Reparto*:
  Coordinator of all the SEGREDIFESA Organizations (TERRARM, NAVARM, ARMAEREO, TELEDIFE).
- *TERRARM, NAVARM, ARMAEREO, TELEDIFE*:
  Possible Contracting Authorities for NGIFF contracts.
- NCA:
  It is responsible for guaranteeing to the NATO the satisfaction of the principles and/or procedures defined in the NATO Policy by issuing, under its own responsibility, the relevant certificates. The NCA is a branch of DAAA (ARMAEREO).
- Test Organization (TO):
  One or more Organizations identified by *SMD – III Reparto* and accredited by NCA that are able to evaluate the compliace of a box/platform with the Test Requirements of the NATO Policy.
- Joint Board for NGIFF certification:
  Board appointed by SMD (document at reference [6]) to plan/manage the certification activities. The SMD use this board for the NGIFF activities related to the single platform and so the Board Chairman is a Colonnel (or equivalent) of the Armed Force that owns the platform to be certified. The Chairman Deputy is always a Colonnel (or equivalent) of *SMD - VI Reparto*. Permanent members are: the NCA and the TO.

As for the document at reference [3], SMD:

- is the Tasking Authority that receives and evaluates all the Armed Forces requirements and then provides NCA with the priority list of the certification to be performed;
- identified the Divisione Aerea di Sperimentazione Aeronautica e Spaziale (DASAS) as the only MoD TO.

2.2. NGIFF Certification

The reasons why it is necessary to have a NGIFF certification are reported in the NATO Policy (ref. [2]) at paragraph 2.3:

- *to improve operational effectiveness and therefore to reduce the risk of an air incident and/or fratricide;*
- *to ensure required Mode 5 performance is assessed, verified and validated;*
- *to verify and validate installed Mode 5 and Mode 5 crypto operations and performance;*
- *to ensure Mode 5 interoperability;*
- *to ensure minimal impact on 1030 and 1090 MHz frequencies and facilitate obtaining frequency approval and assignment.*

In accordance with the NATO Policy at ref. [2], the NGIFF certification has to be applicant/vendor independent. The definition of “Indepedet Certification” is reported below:

> Verification and validation that a box/platform is compliant with the functional and performance requirements of the IFF Mode 5. These activities must be performed by a Test Organization whose requirements are reported at paragraph 2.2.2. The Test Organization must be independent from the vendor/applicant of the box/platform to be certified.

Furthermore, as for all the ARMAEREO certification programs, the office in charge of the NGIFF certification (NCA) is independent from the relevant Contracting Authority.

2.2.1. NGIFF Certification Requirements

The requirements to be compliant with in order to reach the box/platform NGIFF certification are defined in the “AEtP-12 NATO IFF MK XIIA and *Mode S test guidance and tests requirements documentation package*”.
All the data to be reported in the NGIFF certificates are listed in paragraph 4 of the document at reference [2].
The applicable AEtP-12 are listed below and they must be used for all the box/platform NGIFF Certifications:

AEtP-12	NATO IFF Test Requirements	Note
AEtP-12.1	Transponder – Box	If the ASID functionality is implemented in the box, for the verification that the ASID has no impact on the Mode 5, see paragraph 2.4.3.1
AEtP-12.2	Transponder – Box – Add1 (anti-jam)	
AEtP-12.3	Transponder – Platform Integration	
AEtP-12.4	Transponder – Flight	For Surface and Subsurface Platforms, the AEtP-12.4 is not mandatory.
AEtP-12.5	Interrogator – Box	
AEtP-12.6	Interrogator – Box – Add1 (anti-jam)	
AEtP-12.7	Interrogator – Box – Add2 (evaluation)	
AEtP-12.8	Interrogator – Platform Integration	
AEtP-12.9	Interrogator – Flight	The targets that can be used during the tests are: • platforms already certified; • platforms with a stand-alone IFF Transponder system that has been already certified; • platforms, with an integrated Transponder box already certified, on which the Platform Integration has been already performed without problems or with minor deviations only.

Table 1: NATO IFF Test Requirements

The test activities are divided in 3 phases:

- Phase 1: *Box Test*
  The aim is to verify the box (transponder/interrogator) compliance with the STANAG 4193. The Vendor of the transponder/interrogator performs the lab tests and the TO defines a subset of tests on which they perform witnessing activities.
- Phase 2: *Platform Integration Test*
  The aim is to verify (through tests on ground) the compliace with STANAG 4193 when the box is installed on the platform. The TO performs and/or verifies the tests with the Vendor support.
- Phase 3: *Flight Test*
  The aim is to evaluate the overall performance of the system. The interaction between the IFF and other equipment has to be evaluated. This evaluation is performed through:
  a. flight test for air assets;
  b. ground test using cooperative air targets for ground/naval assets.

  The TO performs and/or verifies the flight tests with the Vendor support.

2.2.1.1. Cooperative Platforms

During the Fight Tests, the platform under test has to be tested against another NGIFF platform (Cooperative Platform). If a platform equipped with an interrogator is under test a Cooperative Platform equipped with a transponder has to be used and viceversa. In case of a platform equipped with an interrogator, on the transponder of the Cooperative Platform (in this case also called Target Platform or Transponder Target Platform) the Mode to be verified (1, 2, 3/A, C, S, M5 L1, M5 L2) shall be available. For the Platform with an interrogator, some test cases (see Azimuth/Range Resolution) require two Cooperative Platforms. If the interrogator has the M5 L2, it is acceptable to use 1 (one) M5 L2 Cooperative Platform and 1 (one) M5 L1 Cooperative Platform. In any case, it has to be possible to record the Cooperative Platforms position during the flight.

2.2.2. Test Organization Requirements

The requirements that an organization shall have in order to be accredited as a Test Organization are:

- the capability to plan, conduct and analyze complex test activities through:
  - the definition of the test requirements and procedures on the basis of the guidelines defined at paragraph 2.2.1;
  - the capability to perform flight test campaigns;
  - the identification of any discrepancies/problems;
  - the evaluation of any mitigation/solution proposed by the Vendor/Applicant;
  - the issuance of Technical Reports with relevant observations/warnings;
- the possibility of using modified platforms (Experimental/Out of Approved Configuration) for the purposes of collecting data and evidence required by the NATO procedures at paragraph 2.2.1 both on the system under test and on the cooperative target systems;
- a Certified Quality System related to the definition of operational processes and the documentation issuance; alternatively, for military entities, the internal operational procedures authorised in writing by the Commander of the Organization can be accepted[1];
- the availability of human resourses able to perform the tests and materials (especially test tools) suitable for the execution of the tests.

2.3. Accreditation procedure

2.3.1. Test Organization (TO) Accreditation

The accreditation of a Test Organization ensure that the organization is technically capable of carrying out NGIFF Certification including the testing activities. The Test Organization accreditation process is the following:

[1] For example, the operating procedures shall provide that the test reports are signed by the Commander of the Organization and that intermediate levels of control are present (drafting, control, approval and authorization of the document).

- identification by SMD of the Organization to be accredited and communication to the NCA;
- application by the Organization to the NCA in order to be accredited as TO. This application shall include the description of the Organization, its own procedures and the human resourses that will be used;
- preliminary evaluation by the NCA;
- if necessary, auditing by the NCA in order to verify operational procedures and the human resources of the Organization;
- in case of a positive evaluation, the NCA adds the Organizations in the list of the TOs and sends this list to the NATO.

At the time of this regulation issuance, only the *Divisione Aerea di Sperimentazione Aeronautica e Spaziale* (DASAS) has been recognised as *Test Organization* (letter at reference [4]).

2.3.2. National Certification Authority (NCA) Accreditation

The NCA is responsible for its own accreditation to the C3 Board Navigation and Identification Panel (CaP 2). In order to do that, the NCA has to provide NATO with all the information about the national NGIFF certification process and about the TO. All the information are provided to C3 Board Navigation and Identification Panel (CaP 2) by the NCA through SMD. At the time of this regulation issuance, as for the document at reference [5], the NCA has been accredited through the information in Attachment A.

2.4. NACC Operational Procedures

2.4.1. NGIFF Certification

The certification process is made by the following steps:

- identification of the box/platform to be certified by SMD;
- issue of the Application by the Applicant (see paragraph 2.4.2) using the form in Attachment B. It is important that the configuration of the item to be certified is clearly identified in the Application. The Application has to be an attachment of the NGIFF Certification Plan;
- NGIFF Certification Plan agreement with the TO that has to perform the test activities. The Applicant is responsible for the coordination of the Certification Plan with the TO;
- NCA approval of the NGIFF Certification Plan after coordination with the TO;
- tests execution and issuance of the Technical Report by the TO with the Applicant support;
- evaluation of the Technical Report/supporting documents by the NCA;
- issuance of the NGIFF Certificate and supporting documents by the NCA to the Applicant, SMD and, if requested, to C3 Board.

It is important to note that the NGIFF Certificate is released for a specific configuration (the tested one). Any change in the configuration after the issuance of the NGIFF

Certificate shall be notified to the NCA and, if necessary (meaning that there is an impact on the NGIFF), a new certification process shall be initiated in order to have a new NGIFF Certificate.

The Applicant and the TO shall work together until the NCA accepts the TO Technical Report and issues the NGIFF Certificate.

All the activities have been summarized in Figure 1.

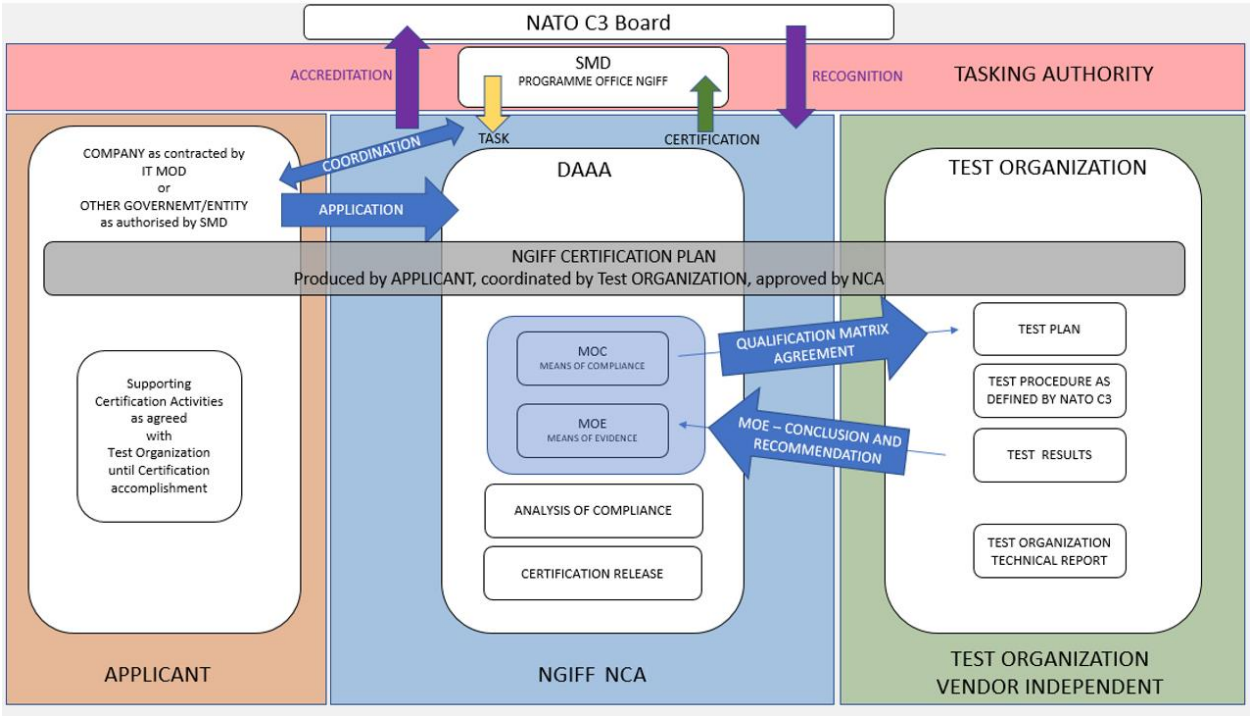


Figure 1: NACC activities

2.4.2. Applicant

In the Certification Process, the Applicant is the organization that requests the NGIFF Certificate and that will be the holder of the Certificate.

Usually, as per the Homologation Process, the Applicant is the Company that is responsible for the platform integration/box development as per a specific contract with the MoD.

In some particular cases, the Applicant could be a Defence Organization (i.e. platform not modified by a Company) or an organization of another Nation (i.e. platform of another Nation) as defined by SMD as Tasking Authority.

The Applicant, after a preliminary agreement with the TO, will issue the NGIFF Certification Plan and the Application.

2.4.3. National Certification Authority (NCA)

The NCA, after approving at least one TO, performs its own accreditation to NATO. In its own duties, the NCA will make use of the TO.

On the basis of the requirements reported in paragraph 2.2.1, the NCA identifies the evidence to be presented for the certification.

The NCA evaluates the content of the NGIFF Certification Plan already agreed between TO and the Applicant and, if in line with the NATO requirements, approves it.

On the basis of the Techincal Report issued by TO at the end of the TO evaluation, the NCA performs its own evaluation and issues:

- the NGIFF Certificate;
- the NGIFF Certificate Data Sheet in order to provide all the necessary information about the box/platform;
- the Technical Report to explain all the activities performed to issue the NGIFF Certificate.

The certificate and its Data Sheet are sent to the Applicant, the Tasking Authority (SMD) and, if required, the NATO C3.

The Certificate and its Data Sheet are issued by the NCA using the template provide in Attachment C (for boxes) and D (for platform).

During the Platform Certification Process and if there are not certified Cooperative Platforms, the NCA can decide to use not certified Cooperative Platform but at least the IFF box shall be certified by the NCA or another NGIFF certification authority (for more details see paragraph 2.2.1.1 and Table 1).

If the IFF box is made for air platform, the box shall receive a homologation certificate or be covered by the airworthiness certification of the platform it is part of. The Box NGIFF certification and the Box Homologation process are not linked together and so the two certificates (NGIFF and Homologation) are independent. Instead, at platform level, the Platform NGIFF Certificate can be issued only after (or maximum at the same time of) the Airworthiness Certificate.

2.4.3.1. Mode 5 Reverse

In addition to all the activities directly linked to the NATO Policy at ref. [2], if the Air to Surface IDentification (ASID) functionality is declared in the NGIFF Certification Application, the NCA has to certify that the ASID functionality (also known as “Mode 5 Reverse”) has no impact on the Mode 5. Currently, there is not a NATO standard procedure to do that. In Attachment E, the procedure at Box level to be performed by the TO in order to assess if the Mode 5 Reverse has any impact on the Mode 5 is reported. No tests at Platform level are required.

2.4.3.2. NGIFF Desktop Certification

In case of configuration changes of an object already covered by a NGIFF Certificate, if the NCA identifies only a marginal impact on the Certificate, the NCA can decide, on the basis of its own evaluation, to follow the Desktop Certification process. The Desktop Certification allow to issue a new certificate or a revision of a certificate on the basis of the evidence provided by the Applicant and without any direct activitiy (test/witnessing) performed by the TO. The initial evaluation of the impact on an already issued NGIFF certificate and the evaluation of the evidence provided by the applicant is completely demanded to the NCA. In its own evaluation, the NCA could involve the Applicant and

the TO through dedicated meetings. The overall process is in any case the one described at paragraph 2.4.1 where the activities demand to the TO will not be performed. An example of possible application of the Desktop Certification is the following one:

- Box NGIFF Certificate already issued by the NCA;
- new Crypto Applique (already certified by AIMS) to be added to the Box NGIFF Certificate;
- it is necessary to issue a Revision of the Box NGIFF Certificate to include the new Crypto Applique.

2.4.3.3. NGIFF Certificate Endorsement

The NCA, on the basis of its own evaluation, can endorse the NGIFF Certificate issued by another Nation Certification Authority (i.e. AIMS). The NCA evaluation will be based on the NATO Policy requirements and the certification process decleared by the other Certification Authority.

In general, the applicant shall provide the NCA with the Certification Plan, the attached Application and a copy of the Certificate released by the other Certification Autority.

In the Certification Plan, the Applicant shall provide all the information about the box/platform configuration, about the Certificate of the other Certification Authority and an evaluation of the discepancies (if any) reported in the Certificate. The Applicant is also responsible to provide the NCA with all the information about configuration changes (if any) from the release of the Certificate by the other Certification Authority.

The NCA, evaluated all the Applicant documents, can request the Applicant, or the other Certification Authority through the Applicant, further documentation/data. Moreover, at its sole discretion, the NCA can require to perform further tests.

The NCA, endorsing a Certificate, shall issue a new Certificate, its Technical Attachment and the relevant Technical Report.

The Applicant is fully responsible to timely and completely communicate any change to the Certificate released by the other Certification Authority and at the basis of the Certificate issued by the NCA.

2.4.3.4. Configuration Changes

In the Box NGIFF Certificate (see Attachment C) it is reported "*Any deviation or revision to the hardware, firmware or software of the system will require an update to the certification by D.A.A.A.*".

In the Platform NGIFF Certificate (see Attachment D) it is reported "*Any deviation or revision to the subject platform configuration or performance parameters with an impact on NGIFF capabilities will require an update to the certification by D.A.A.A.*".

Any modification to a certified box/platform and the relevant impact on the NGIFF Certification shall be communicated to the NCA by the NGIFF Certificate Holder. The NCA, evaluated the provided documentation, shall decide if it is necessary to issue a new Certificate (mainly when the two certificates have to coexist), a revision of the

certificate (in substitution of the original certificate) or the original NGIFF certification has not been impacted (it is not necessary to issue a new certificate).

If a new certificate or a revision of a previous one is necessary, the certification process at paragraph 2.4.1 shall start again.

2.4.4. Test Organization (TO)

The TO[2] shall be third party in the evaluation of the test evidence in order to comply with the independece requirement of the certification. To have an independent evaluation, it is sufficient that the TO performs witnessing of the tests. On the other hand, the TO can perform the tests completely under its own responsibility. The choice among these possibilities shall be made in accordance with the NCA dispositions. On the basis of these activities the TO shall in any case issue a Technical Report with the results of its own analysis/evaluation providing identification of deviations, recommendations, suggestion of limitations, etc..

Before issuing the Technical Report, the TO shall arrange a meeting with the NCA, and Applicant/Vendor to discuss about all the identified problems. After the meeting, the Applicant/Vendor can provide the TO with further evidence that shall be evaluated before the issuance of the final Technical Report.

When the test activities are under the responsibility of the TO, the tests are performed in accordance with the TO procedures (evaluated for the accreditation as for paragraph 2.3.1).

The TO, in the limit of the procurement contract and without undermining the independence requirement, can arrange its own activities and can agree directly with the Applicant the way in which the tests have to be performed.

The TO can be supported by any qualified personnel (from other MoD Organization or even outside the MoD) but in any case all the evaluation/analysis have to be reported in the Technical Report issued and signed by the TO.

The TO shall communicate to the Joint Board for NGIFF certification (appointed by SMD with the document at reference [6]) any deviation of the test activities with respect to the MoD certification plan.

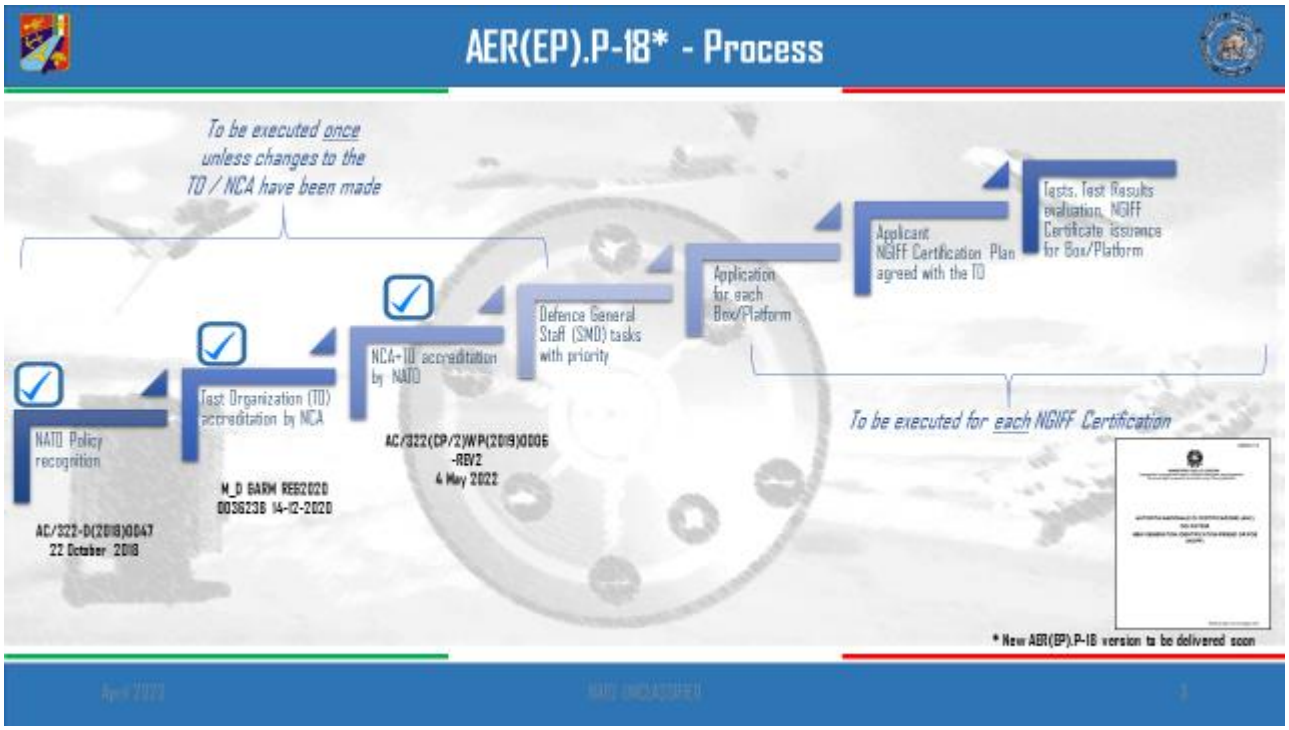
[2] After the accreditation of the TO, that ensures the organization is technically capable of carrying out NGIFF Certification including the testing activities, any TO adjustment in terms of personnel, tools, infrastructure necessary support the SMD level of ambition has to be identified by SMD.

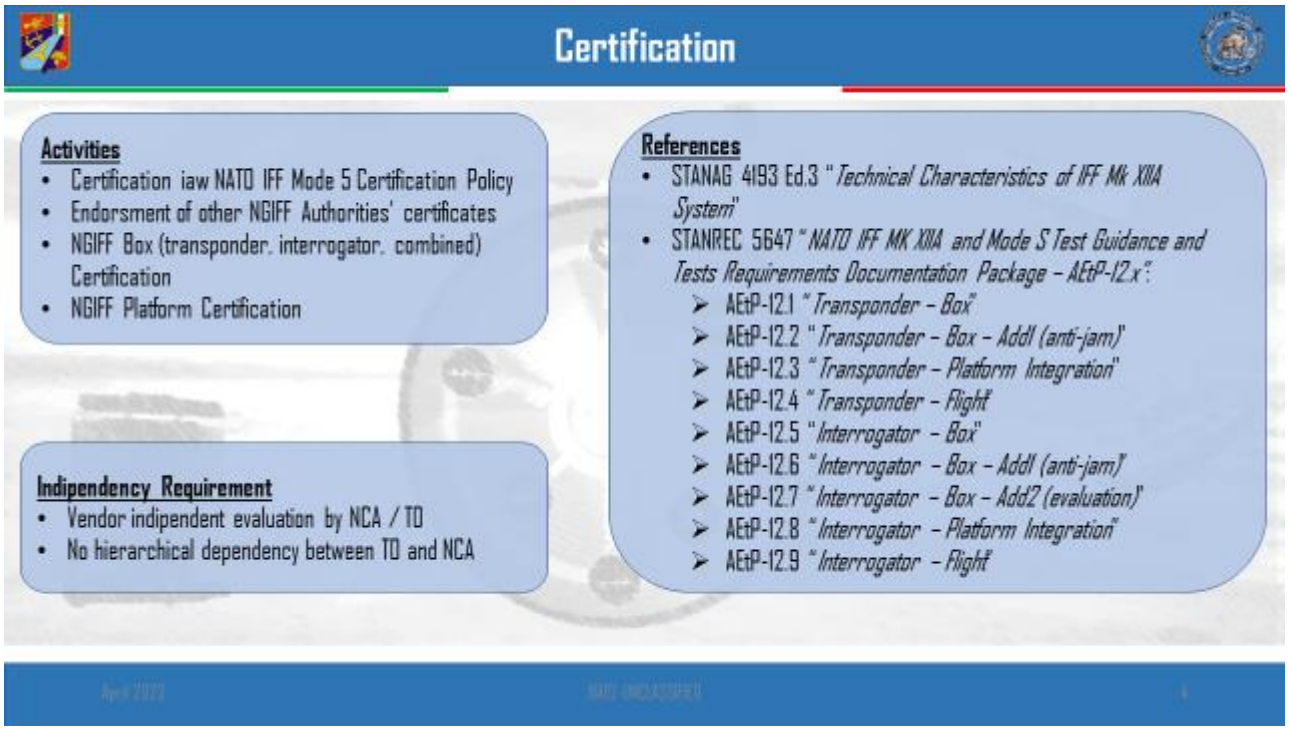
Attachment A

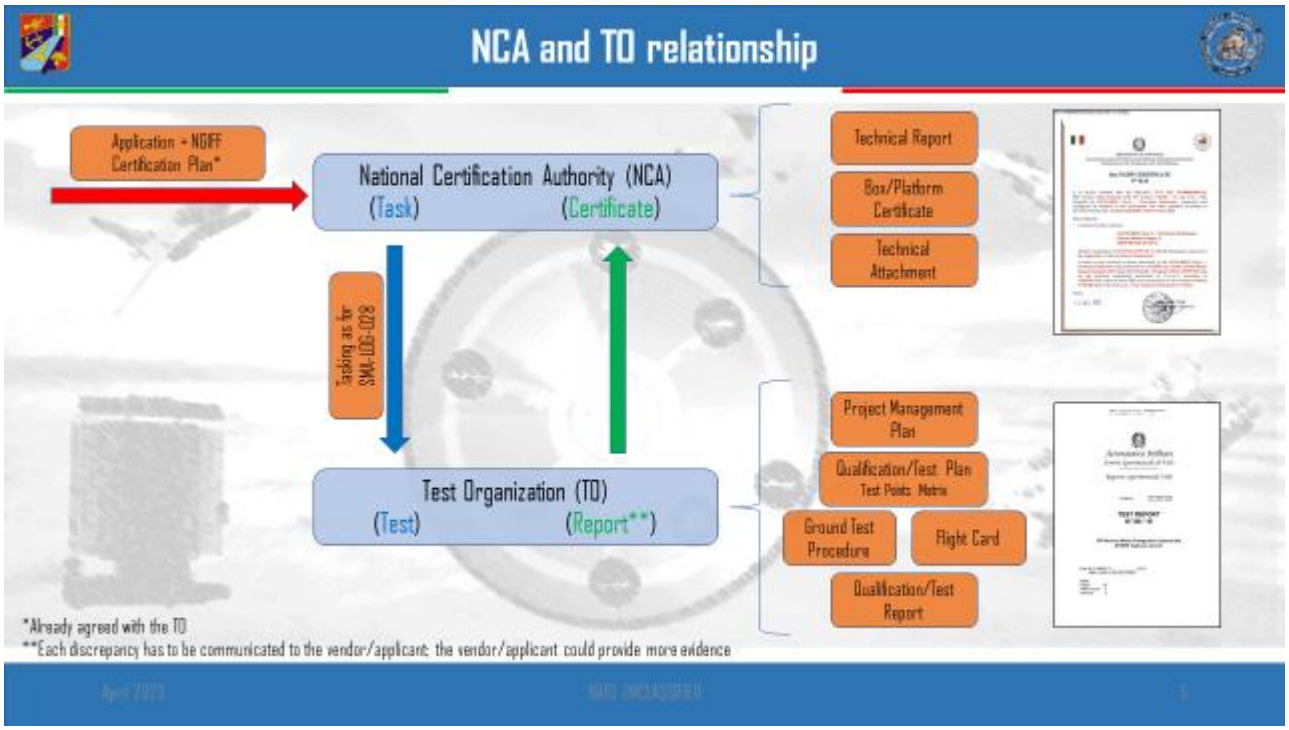
NCA Presentation for NATO Accreditation


NGIFF Italian National Certification Authority
IFF Mode 5
April 2023
NATO UNCLASSIFIED


NGIFF Italian National Certification Authority
SGD IV
TERRARM
NAVARM
ARMAERED
TELEDIFE
Contractual Authorities
Industry/Vendor/Manufacturer/ Applicant
Defence General Staff (SMD)
Tasking Authority
Directorate for Air Armaments and Airworthiness (DAAA)
NGIFF Italian
National Certification Authority (NCA)
DASAS (Pratica di Mare Airbase)
Test Organization (TO)
Tasking
SMA-LOG-B28
Operational Area
Assets Owners
Army General Staff (SME)
Navy General Staff (SMM)
Air Force General Staff (SMA)
ICAO NATO POLICY, VENDOR INDEPENDENT evaluation by NGIFF Italian NCA / TO
Process described in the AER(EP).P-18 (DAAA's norm)
April 2023
NATO UNCLASSIFIED
2


AER(EP).P-18* - Process
To be executed once unless changes to the TO / NCA have been made
NATO Policy recognition
AC/322-D(2018)0047
22 October 2018
Test Organization (TO) accreditation by NCA
M_D GARM REG2020 0036238 14-12-2020
NCA-TO accreditation by NATO
AC/322(CP/2)WP(2019)0006 -REV2
4 May 2022
Defence General Staff (SMD) tasks with priority
Application for each Box/Platform
Applicant NGIFF Certification Plan agreed with the TO
Tests, Test Results evaluation, NGIFF Certificate issuance for Box/Platform
To be executed for each NGIFF Certification
* New AER(EP).P-18 version to be delivered soon


Certification
Activities
• Certification iaw NATO IFF Mode 5 Certification Policy
• Endorsment of other NGIFF Authorities' certificates
• NGIFF Box (transponder, interrogator, combined) Certification
• NGIFF Platform Certification
Indipendency Requirement
• Vendor indipendent evaluation by NCA / TO
• No hierarchical dependency between TO and NCA
References
• STANAG 4193 Ed.3 "Technical Characteristics of IFF Mk XIIA System"
• STANREC 5647 "NATO IFF MK XIIA and Mode S Test Guidance and Tests Requirements Documentation Package – AEtP-12.x":
➢ AEtP-12.1 "Transponder – Box"
➢ AEtP-12.2 "Transponder – Box – Addl (anti-jam)"
➢ AEtP-12.3 "Transponder – Platform Integration"
➢ AEtP-12.4 "Transponder – Flight"
➢ AEtP-12.5 "Interrogator – Box"
➢ AEtP-12.6 "Interrogator – Box – Addl (anti-jam)"
➢ AEtP-12.7 "Interrogator – Box – Add2 (evaluation)"
➢ AEtP-12.8 "Interrogator – Platform Integration"
➢ AEtP-12.9 "Interrogator – Flight"


NCA and TO relationship
Application + NDFF Certification Plan*
National Certification Authority (NCA)
(Task)
(Certificate)
Tasking as for SWA-DD-028
Test Organization (TO)
(Test)
(Report**)
Technical Report
Box/Platform Certificate
Technical Attachment
Project Management Plan
Qualification/Test Plan Test Points Matrix
Ground Test Procedure
Flight Card
Qualification/Test Report
*Already agreed with the TO
**Each discrepancy has to be communicated to the vendor/applicant; the vendor/applicant could provide more evidence


NCA Contact Information
MINISTRY OF DEFENCE
Secretariat General of Defence & National Armaments Directorate
Directorate for Air Armaments and Airworthiness (DAAA)
NDFF Italian National Certification Authority (NCA)
Military Airport "F. Baracca"
Via di Centocelle, 301 – 00175 Rome IT
Phone: +39 06 46913 2019 / 2227
Email: sdsuls01@armaereo.difesa.it / sdsuls11@armaereo.difesa.it
PEC: armaereo@postacert.difesa.it

Attachment B

Application Form

PART I: Applicant Information	
1. ORIGINATOR:	**5. COMPANY NAME:**
2. EMAIL ADDRESS:	
3. PHONE NUMBER:	**6. COMPANY ADDRESS:**
4. DATE:	

PART II: Service Request			
7. TYPE OF SERVICE REQUESTED *(Select Only One (1), Submit one (1) request form for each individual service required)*			
Box Certification ☐		**Platform Certification ☐**	
8. EQUIPMENT TYPE *(Select only (1) one)*			
Interrogator (IR) ☐	**Transponder (XP) ☐**	**Combined IR/XP (CIT) ☐**	
9. MODES TO BE CERTIFIED *(Select all that apply)*			
Mode 1 ☐	**Mode 2 ☐**	**Mode 3/A ☐**	**Mode C ☐**
Mode S (ELS) ☐	**Mode S (EHS) ☐**	**ADS-B Out ☐**	**ADS-B In ☐**
Mode 5 Level 1 ☐	**Mode 5 Level 2 ☐**	**Mode 5 Level 2-B Out ☐**	**Mode 5 Level 2-B In ☐**
10. FURTHER CHECKS			
ASID ☐			

PART III-a: Box Information *(Required for all Certification Requests)*	
11. BOX NOMENCLATURE *(i.e. M428F, SIR-M5/E)*	**16. TSO/ETSO Certified: Yes ☐ No ☐**
12. PART NUMBER	**TSO/ETSO Information:**
13. SOFTWARE VERSION	**17. Other Certifications:**
14. FIRMWARE VERSION	**18. CRYPTO(s) USED:**
15. MANUFACTURER	**19. EQUIPMENT USED DURING THE TEST** *(Only for Box Certification)*

PART III-b: Interrogator Information *(only for Interrogator)*			
20. Mode 5 Level 2 Capabilities			
	Interrogates	**Receives Triggered (Active) Reports Mode 5 Level 2**	**Receives Squittered (Passive) Reports Mode 5 Level 2-B In**
SUM	**Yes ☐ No ☐**	**Yes ☐ No ☐**	**Yes ☐ No ☐**
DELTA (Difference)	**Yes ☐ No ☐**	**Yes ☐ No ☐**	**Yes ☐ No ☐**
OMNI (Guard)	**Yes ☐ No ☐**	**Yes ☐ No ☐**	**Yes ☐ No ☐**
Also During Level 1 Only Operation		**Yes ☐ No ☐**	**Yes ☐ No ☐**
Do you accept all Level 2 Report Formats regardless of interrogation format? Yes ☐ No ☐			
PART III-c: Notes *(details about Part III)*			

PART IV-a: Platform Information *(Not required for Box)*			
21. PLATFORM TYPE (*Fixed Wing, Rotary Wing Aircraft, UAS (Rotary Wing), Ship, Ground (Fixed Site) and Ground (Mobile Site)*)		**22. PLATFORM DESIGNATOR** *(i.e. F-35, NH90, FADR, DADR)* **Type Design Configuration reference:**	
23. DEVICES ONBOARD PLATFORM *(Select and list all that apply)*			
ARC-210 ☐	**TACAN ☐**	**TCAS ☐**	**Tactical Data Link ☐ :** *(i.e. Link 16, Link 22)*
Others ☐ :			
24. TRAFFIC COLLISION AVOIDANCE SYSTEM *(Required only if TCAS is onboard)*			
Manufacturer: **System Nomenclature:**	**P/N:** **Software Version:**		**TSO/ETSO Certified: Yes ☐ No ☐** **TSO/ETSO Information:**
25. MODE 5 TOD/POSITION SOURCE INFORMATION			
Manufacturer: **System Nomenclature:**	**P/N:** **Software Version:**		**Update Rate TOD:** **Position:**
26. ADS-B POSITION SOURCE INFORMATION *(Refer to DO-260)*			
Manufacturer: **System Nomenclature:**	**P/N:** **Software Version:**		**Update Rate TOD:** **Position:**
Is this Position Source Qualified? Yes ☐ No ☐		**Latency Analysis Completed? Yes ☐ No ☐**	
27. PLATFORM MODE 5 TOD MANAGEMENT			
Automatic Update ☐	**Manual Update ☐**		**Other ☐ :**
PART IV-b: Antenna Information *(Not required for Box)*			
28. DEVICES SHARING ANTENNAS WITH IFF *(List all that apply i.e. TCAS, COM's Radios)*			
29. TRANSPONDER ANTENNA TYPES *(Select all that apply in reference to above platform)*			
One Omnidirectional ☐	**Two Omnidirectional ☐**		**Special Antenna ☐ :**
Antenna Shared w/other systems ☐	**Dual Element ☐**		
30. INTERROGATOR ANTENNA TYPES *(Select all that apply in reference to above platform)*			
Mechanical ☐	**Electronic Steerable ☐**	**Sector Size/Number of Sectors: /**	**Number of Elements:**
SUM Only ☐	**SUM and Delta ☐**		**Omni-directional ☐**
PART IV-c: Controls Information *(Not required for Box)*			
31. BUS TYPE *(i.e. ARINC 429, 1553 Multiplex Data Bus, RS-232, Ethernet, etc)*:			
Remote Control Unit (RCU) ☐ **RCU P/N:** **Software Version:**	**Multifunction Display/Control Display Unit (MFD/CDU) ☐** **MFD/CDU P/N:** **Software Version:**		**Other IFF Controls ☐ :** **P/N:** **Software Version:**
PART IV-d: Notes *(details about Part IV)*			

Date	**Print Name**
	Signature

GENERAL INSTRUCTIONS

For Platform Certification, if there is more than 1 box, fill one form for each box. All the forms shall be provided as a single file and with the same document number.

- **Part I**:
  - it is mandatory for all the requests;

- **Part II**:
  - it is mandatory for all the requests;

- **Part III**:
  - it is mandatory for all the requests;
  - in field 19, list all the equipment (and relevant P/N) used during the test (i.e. control panel);
  - use the field Notes (Part III-c) to add anything could be useful to describe the system.

- **Part IV**:
  - is only for Platform Certification;
  - in field 21, if no designator is available for a ground station, refer to the platform as a "*Ground (Fixed Site)*" or "*Ground (Mobile Site)*";
  - use the field Notes (Part IV-d) to add anything could be useful to describe the system.

Attachment C

Box NGIFF Certificate and Data Sheet

MINISTRY OF DEFENCE
Secretariat General of Defence and National Armaments Directorate
Directorate of Air Armaments and Airworthiness

Box NGIFF CERTIFICATE
N° XX-B

It is hereby certified that the **XXXXX** (SW Version **XXXXX**, FW Version **XXXXX**), composed and configured as detailed in the attached Data Sheet, has been qualified according to IFF NATO Policy Ref. **AC/322-D(2018)0047 dated 22 October 2018**.

This certificate:

– is released to the Company:

XXXXX

– declares compliance to **STANAG 4193 Ed. 3** with the limitations reported in the **Appendix 1** of the **attached Data Sheet**;

– is based on the technical evidence presented by the **XXXXX** and on the technical evaluations performed by D.A.A.**,** according to **AER(EP).P-18**, dated XXXXX, and summarized in the **Technical Report XXXXX** filed in the **D.A.A.A. - Vice Technical Directorate 1st Office**.

Any deviation or revision to the hardware, firmware or software of the system will require an update to the certification by D.A.A.A..

Rome,

THE DIRECTOR

MINISTRY OF DEFENCE

SECRETARIAT GENERAL OF DEFENCE AND NATIONAL ARMAMENTS DIRECTORATE
DIRECTORATE OF AIR ARMAMENTS AND AIRWORTHINESS

BOX NGIFF CERTIFICATE

N° XX-B

DATA SHEET

XXXXX NGIFF Transponder/Interrogator

P/N XXXXX

CERTIFICATE HOLDER:
XXXXX

The present document is composed by n° XXXXX pages (XXXXX pages + contents and cover).

INDEX

1. APPLICABLE DOCUMENTS

[1] XXXXX

2. OBJECTIVE AND SCOPE OF CERTIFICATION

Mark XIIA, Mode 5 Level 1, Mode 5 Level 2…

3. CONFIGURATION

transponder, interrogator, combined interrogator/transponder

Specific Details of the Configuration for Box Level certification:

- Part Number
- Nomenclature (product name, specific references…)
- Firmware version
- Hardware version
- Software version

XXXXX configuration is reported in Table 1.

Unit	Info	
XXXXX	Manufacturer	XXXXX
	Nomenclature	XXXXX
	Part Number	XXXXX
	NATO Stock Number (NSN)	XXXXX
	Software Version	XXXXX
	Firmware Version	XXXXX

Table 1: XXXXX configuration

Equipment used during the test of the box:

- IFF Control configuration
- Antennas configuration
- Control and Display (HMI, FMS, OFP…)

Crypto configuration: ECU firmware, hardware and software versions, which key fill device has been used…
The XXXXX has been cleared for operations with XXXXX Crypto Applique, as defined in Table 2.

Crypto Module	Info	
XXXXX	Manufacturer	XXXXX
	Nomenclature	XXXXX
	Part Number	XXXXX
	Firmware/Software Version	XXXXX

Table 2: XXXXX configuration

4. TECHNICAL BASELINE

The technical baseline is the STANAG 4193 Edition 3.

5. TECHNICAL NOTE

- Test Organizations involved with the testing: including the test locations and venues;
- Test Bench description;
- Test report

- Discrepancies/exemptions Log
- Discrepancies Mitigation Solutions
- Final Deviations and Waivers
- List all the certified IFF Modes

Interrogation Mode	Certified (YES/NO)	Notes
Mode 1		
Mode 2		
Mode 3/A		
Mode C		
Mode 5 Level 1		
Mode 5 Level 2		
Mode S ELS (Elementary Surveillance)		
Mode S ENH (Enhanced Surveillance)		
ADS-B		

For Interrogators, fill the following table

	Interrogates	Receives Triggered (Active) Reports Mode 5 Level 2	Receives Squittered (Passive) Reports Mode 5 Level 2-B In
SUM	Y/N	Y/N	Y/N
DELTA (Difference)	Y/N	Y/N	Y/N
OMNI (Guard)	Y/N	Y/N	Y/N
Also During Level 1 Only operation		Y/N	Y/N

Table 3: Mode 5 Level 2 Capabilities

5.1 AEtP 12 – Qualification Matrix

Provide the Qualification Matrix and the general information needed to read the matrix;
Test case within the AEtP 12 that are Not Applicable (N/A).

AEtP 12 test case	Description	MoC	Compliance / Notes

6. APPENDIX 1

Limitations (Non Compliance, Partially Compliance, Limitations, Deviations, Problem Reports, AEtP Test Cases Not Applicable);

THE DIRECTOR

Attachment D

Platform NGIFF Certificate and Data Sheet

MINISTRY OF DEFENCE
Secretariat General of Defence and National Armaments Directorate
Directorate of Air Armaments and Airworthiness

Platform NGIFF CERTIFICATE
N° XX-PLT

It is hereby certified that the platform **XXXXX**, composed and configured as detailed in the attachedData Sheet, has bee-n qualified according to IFF NATO Policy Ref. **AC/322-D(2018)0047 dated 22 October 2018**.

This certificate:

– is released to the Company:

XXXXX

– declares compliance to **STANAG 4193 Ed. 3** with the limitations reported in the **Appendix 1** of the attached Data Sheet;

– is based on the technical evidence presented by the **XXXXX** and on the technical evaluations performed by D.A.A.A**.,** according to **AER(EP).P-18**, dated xxxxx, and summarized in the **Technical Report XXXXX** filed in the **D.A.A.A. - Vice Technical Directorate 1st Office**.

Any deviation or revision to the subject platform configuration or performance parameters with an impact on NGIFF capabilities will require an update to the certification by D.A.A.A..

Rome,

THE DIRECTOR

MINISTRY OF DEFENCE

SECRETARIAT GENERAL OF DEFENCE AND NATIONAL ARMAMENTS DIRECTORATE
DIRECTORATE OF AIR ARMAMENTS AND AIRWORTHINESS

PLATFORM NGIFF CERTIFICATE

N° XX-PLT

DATA SHEET

XXXXX

P/N XXXXX

CERTIFICATE HOLDER:
XXXXX

The present document is composed by n° XXXXX pages (XXXXX pages + contents and cover).

INDEX

1. APPLICABLE DOCUMENTS

[1] XXXXX

2. OBJECTIVE AND SCOPE OF CERTIFICATION

General information about the platform and the certification scope (Mark XIIA, Mode 5 Level 1, Mode 5 Level 2…)

3. CONFIGURATION

Detail the tested configuration.

transponder, interrogator, combined interrogator/transponder

Specific Details of the Box Configuration:

- Part Number
- Nomenclature (product name, specific references…)
- Firmware version
- Hardware version
- Software version

XXXXX configuration is reported in Table 1.

Unit	Info	
XXXXX	Manufacturer	XXXXX
	Nomenclature	XXXXX
	Part Number	XXXXX
	NATO Stock Number (NSN)	XXXXX
	Software Version	XXXXX
	Firmware Version	XXXXX

Table 1: XXXXX configuration

Crypto configuration: ECU firmware, hardware and software versions, which key fill device has been used…

The XXXXX has been cleared for operations with XXXXX Crypto Applique, as defined in Table 2.

Crypto Module	Info	
XXXXX	Manufacturer	XXXXX
	Nomenclature	XXXXX
	Part Number	XXXXX
	Firmware/Software Version	XXXXX

Table 2: XXXXX configuration

Specific Details of the Configuration for Platform Level certification:

- Serial / Part Number
- Nomenclature (platform name, specific references…)
- Firmware version
- Hardware version
- Software version
- Avionic configuration
- IFF Control configuration
- Antennas configuration
- Control and Display (HMI, FMS, OFP…)

Platform	Info	
XXXXX	Manufacturer	XXXXX
	Nomenclature	XXXXX
	Serial/Part Number	XXXXX
	NATO Stock Number (NSN)	XXXXX
	Software Configuration	XXXXX

Table 3: Platform configuration

4. APPLICABILITY

- List all the platforms that are covered by the certificate on the basis of the activities performed on the specific platform reported in paragraph 3;

5. BOX DISCREPANCIES/CAPABILITIES

- For all the discrepancies reported in the Box NGIFF CERTIFICATE provide an evaluation of the impact at the Platform level;

6. TECHNICAL BASELINE

The technical baseline is the STANAG 4193 Edition 3.

7. TECHNICAL NOTE

- Test Organizations involved with the testing: including the test locations and venues;
- Test Bench description;
- Test report
- Discrepancies/exemptions Log
- Discrepancies Mitigation Solutions
- Final Deviations and Waivers
- List all the certified IFF Modes

Interrogation Mode	Certified (YES/NO)	Notes
Mode 1		
Mode 2		
Mode 3/A		
Mode C		
Mode 5 Level 1		
Mode 5 Level 2		
Mode S ELS (Elementary Surveillance)		

Interrogation Mode	Certified (YES/NO)	Notes
Mode S ENH (Enhanced Surveillance)		
ADS-B		

7.1 AEtP 12 - Qualification Matrix

Provide the Qualification Matrix and the general information needed to read the matrix;
Test case within the AEtP 12 that are Not Applicable (N/A).

AEtP 12 test case	Description	MoC	Compliance / Notes

8. APPENDIX 1

Limitations (Non Compliance, Partially Compliance, Limitations, Deviations, Problem Reports, AEtP Test Cases Not Applicable)

THE DIRECTOR

Attachment E

Mode 5 Reverse vs Mode 5

1. Multi-Mode/System Characteristics

The following tests are meant to verify M5R multi-mode capability as defined by the STANAG at reference [8] in the areas of AOC, Reply Priority and Rescheduling.

1.1. AOC Testing

Insert M5R S-ID replies in the equipment at a level of MTL + 3dB, first on one antenna then on the other. Set the Mode 3 code to 7777 and Mode 2 code to 7777.

Insert Mk XIIA/S interrogations in each antenna separately (same as the one used for M5R replies), as defined below and note M5R Reply Efficiency.

M5R operation shall not be degraded nor change appreciably going from a Mk XIIA/S low interrogation rate to an AOC condition.

Top Channel

Int Type	Rate (Hz)	RF Level (dBm)	Duty Cycle per Reply (%)	Duty Cycle (%)	Reply Rate Measured (Hz)	Duty Cycle (%)	M5R Reply Eff. (%)	M5R Reply Limit
M5L2	50	-57	0,0039	0,1950				>95%
M2	100	-57	0,00063	0,0630				>95%
M5L1	450	-57	0,0011	0,4950				>95%
M3	550	MTL +23	0,00063	0,3465				>95%
MS	50	MTL +23	0,003	0,1500				>95%
			Total Duty Cycle:	1,2495	Total Duty Cycle (>1%):			

Bottom Channel

Int Type	Rate (Hz)	RF Level (dBm)	Duty Cycle per Reply (%)	Duty Cycle (%)	Reply Rate Measured (Hz)	Duty Cycle (%)	M5R Reply Eff. (%)	M5R Reply Limit
M5L2	50	-57	0,0039	0,1950				>95%
M2	100	-57	0,00063	0,0630				>95%
M5L1	450	-57	0,0011	0,4950				>95%
M3	550	MTL +23	0,00063	0,3465				>95%
MS	50	MTL +23	0,003	0,1500				>95%
			Total Duty Cycle:	1,2495	Total Duty Cycle (>1%):			

Comments:

1.2. Reply Priority

1.2.1. SIF versus M5R

Enable M5R S-ID interrogation bursts together with M3 interrogations at the same rate; no M5R response shall be provided.

Adjust the phase relationship between M3 and M5R so that the M3 interrogation happens just before the first anticipated M5R interrogation position (4 µs nominal delay from SIF P3 to start of M5R interrogation); monitor reply efficiency for M3 and the number of sent interrogations.

Repeat the test operating M5R in Full-ID (F-ID) mode.

Interrogation Type	PRF (Hz) (bursts)	RF Level (dBm)	Reply Efficiency	M5R Interrogation Messages	Limit
M3	10	-50			>99%
M5R S-ID	10	-50			3
M3	10	-50			>99%
M5R F-ID	10	-50			2

Verify that the first interrogation message in the burst was rescheduled by measuring the delay from the P3 pulse in M3 to the leading edge of the M5R interrogation.

Delay M3 reply to M5R interrogation (rescheduled) for S-ID……..

Delay M3 reply to M5R interrogation (rescheduled) for F-ID……..

Comments:

1.2.2. Mode S versus M5R

Enable M5R S-ID interrogation bursts together with MS interrogations at the same rate; no M5R response shall be provided.

Adjust the phase relationship between MS and M5R so that the MS interrogation happens so that the MS reply is at the same time as the anticipated M5R interrogation position (130 µs nominal delay from MS sync phase reversal); monitor reply efficiency for MS and the number of interrogations sent.

Repeat the test operating M5R in Full-ID (F-ID) mode.

Interrogation Type	PRF (Hz) (bursts)	RF Level (dBm)	Reply Efficiency	M5R Interrogation Messages	Limit
MS	10	-50			>99%
M5R S-ID	10	-50			3
MS	10	-50			>99%
M5R F-ID	10	-50			2

Verify that the first interrogation message in the burst was rescheduled by measuring the delay from the P4 pulse in MS to the leading edge of the M5R interrogation.

Delay P4 pulse to M5R interrogation (rescheduled) for S-ID ……..

Delay P4 pulse to M5R interrogation (rescheduled) for F-ID ……..

Comments:

1.2.3. M5 Lethal Reply versus M5R

Enable M5R S-ID interrogation bursts together with M5 Lethal interrogations at the same rate; no M5R response shall be provided.

Adjust the phase relationship between M5Lethal and M5R so that the M5 reply occurs at the same time as the first anticipated M5R interrogation position (480 µs nominal delay from M5 P4 to start of M5R interrogation with a fixed Mode 5 Random Reply Delay of 0); monitor reply efficiency for M5 Lethal and the number of interrogations sent.

Repeat the test operating M5R in Full-ID (F-ID) mode.

Interrogation Type	PRF (Hz) (bursts)	RF Level (dBm)	Reply Efficiency	M5R Interrogation Messages	Limit
M5 Lethal	10	-50			>99%
M5R S-ID	10	-50			3
M5 Lethal	10	-50			>99%
M5R F-ID	10	-50			2

Verify that the first interrogation message in the burst was rescheduled by measuring the delay from the M5 Lethal preamble to the leading edge of the M5R interrogation.

Delay M5 Lethal preamble to M5R interrogation (rescheduled) for S-ID ……..

Delay M5 Lethal preamble to M5R interrogation (rescheduled) for F-ID ……..

Comments:

1.2.4. M5 Reply versus M5R

Enable M5R S-ID interrogation bursts together with M5 interrogations at the same rate; no M5R response shall be provided.

Adjust the phase relationship between M5 and M5R so that the M5 reply occurs near the end of the first anticipated M5R interrogation position (2520 µsec nominal delay from M5 P4 to start of M5R interrogation with a fixed Mode 5 Random Reply Delay of 255); monitor reply efficiency for M5 and the number of interrogations sent.

Repeat the test operating M5R in Full-ID (F-ID) mode.

Interrogation Type	PRF (Hz) (bursts)	RF Level (dBm)	Reply Efficiency	M5R Interrogation Messages	Limit
M5 Lethal	10	-50			>99%
M5R S-ID	10	-50			3
M5 Lethal	10	-50			>99%
M5R F-ID	10	-50			2

Verify that the first interrogation message in the burst was rescheduled by measuring the delay from the M5 preamble to the leading edge of the M5R interrogation.

Delay M5 preamble to M5R interrogation (rescheduled) for S-ID ……..

Delay M5 preamble to M5R interrogation (rescheduled) for F-ID ……..

Comments:

1.3. M5R processing

1.3.1. Mode 5 interrogations

Provide an analysis of the capability to process a M5 interrogation when a M5R reply from a responder is received at the same time.

Analysis shall be provided as follows: synchronize M5R operation in Short-ID (S-ID) so that the M5 interrogation occurs inside the Reply Gate of M5R (4,5 ms nominal delay), but not overlapping the M5R reply; show the M5R Reply efficiency and M5R decode efficiency.

1.4. Priority of Mode 5 Level 2 and M5R

Provide an analysis of the priority of M5R and Mode 5 reports per reference [8] paragraph 4.3.1 to show that M5R interrogations have priority over unsolicited M5 reports and that triggered M5 reports have priority over M5R interrogations.