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**MINISTRY OF NATIONAL DEFENCE**

**HELLENIC NATIONAL DEFENCE GENERAL STAFF**

**C' Branch**

**NARFA GRC**

# **Frequency Clearance Agreement**

**for Link 16 Operations within  
ATHINAI FIR / HELLAS UIR**

Date of Issue: 8 March 2024

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## **1. General**

### **1.1 Introduction**

According to the International Telecommunications Union (ITU) Radio Regulations (RR), Link 16 (a Defense application) does not operate under a primary or a secondary frequency allocation. The only way to accommodate these applications is the regulatory provision of Article 4.4 of the Radio Regulation: «Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and the Radio Regulations». However, in accordance to Article 48 of the International Telecommunication Constitution: «Member States retain their entire freedom with regard to military radio installations». Therefore a National Frequency Clearance Agreement for the usage of Link 16 is needed.

In the early 1970's when the Joint Tactical Information Distribution System (JTIDS) was being developed, a decision was made to operate Link 16 in the 960-1215 MHz frequency band (also known as the L-band). Whilst best effort was made to develop the new Link 16 waveform so that it caused the minimum level of interference with existing equipment, the interference potential could not be eliminated. Since Link 16 was introduced, the use of the L-band has changed considerably and is set to change even further over the next decade as new systems are introduced. Currently, this band is allocated on a primary basis (Ref. ITU R.R Article 5) for use by the AERONAUTICAL RADIONAVIGATION Service (ARNS) with systems such as Distance Measurement Equipment (DME) / Tactical Air Navigation (TACAN). In addition, the band is utilized by Air Traffic Control Radar Beacon Systems (ATCRBS) consisting of Secondary Surveillance Radars on the ground and Identify Friend or Foe (IFF) and Mode S transponders on the aircrafts. Additional systems such as Airborne Collision Avoidance Systems (ACAS), Traffic Collision Avoidance Systems (TCAS) and (Automatic Dependent Surveillance Broadcast (ADS-B) also operates in the band. Finally, the band is also allocated on a primary basis to AERONAUTICAL MOBILE (R) Service and RADIONAVIGATION-SATELLITE Service.

As an unauthorized user in the L-band, it is the responsibility of the military community to ensure that Link 16 does not cause more than tolerable interference with the authorized Air Traffic Control Systems in the band. The pulses generated from Link 16 terminals can affect the performance of both Civil and Military Communication, Navigation and Surveillance (CNS) systems. To date the DME/TACAN ground beacons have provided to be the most susceptible piece of ATC equipment to Link 16 interference. Extensive amounts of test data have been collected to verify that when certain operational

restrictions are placed in Link 16 operations, the DME/TACAN will not experience any harmful performance degradation. Based on the robust technical evidence these operational restrictions are covered by this Agreement.

The use of Link 16 operations with the Multi-functional Information Distribution System (MIDS) and/or JTIDS in the ATHINAI FIR / HELLAS UIR is subject to restrictions / conditions imposed by the Hellenic National Defence General Staff (HNDGS)/National Radio Frequency Agency (NARFA GRC) and the Hellenic Civil Aviation Authority (HCAA). It has been jointly agreed that the use of Link 16 within the ATHINAI FIR / HELLAS UIR is authorized in peacetime on a non-interference basis and as described in the following sections.

## 1.2 Aim

The aim of this document, namely Agreement therein, is to establish and describe the terms, conditions, criteria, as well as generally accepted standards and procedures to adhere to, while utilizing Link 16 during peacetime on a non-interference basis within the GRC's Area of Responsibility (AoR), which corresponds to ATHINAI FIR / HELLAS UIR, as depicted in Parag.6.

## 1.3 Operating Authority

The GRC National Joint Data Link Management and Interoperability Cell (NJDLMIC) is a joint organization within MOD GRC, which is the sole responsible for designing, planning, coordinating, monitoring, managing, authorizing and directing Link 16 operations within ATHINAI FIR/ HELLAS UIR. All Link 16 users operating within ATHINAI FIR / HELLAS UIR shall fully comply with this FCA and all NJDLMIC GRC instructions. Failure to adhere to the conditions set out in this Agreement will result in the withdrawal of approval for continued use of Link 16 within ATHINAI FIR/ HELLAS UIR.

## 1.4 Applicability

This Agreement applies to any use of Link 16 operating within ATHINAI FIR / HELLAS UIR, during peacetime operations.

HCAA reserves the right either to impose further supplementary conditions regarding the Link 16 operations or ask the immediate cease of Link 16 transmissions, whenever required necessary for the safety of air navigation.

## 1.5 Precedence

This Agreement is the principal document governing the use of Link 16 within ATHINAI FIR/ HELLAS UIR and has precedence over all other documents and instructions.

## 1.6 Link 16 Definition

The use of the term "Link 16" in this document refers to the physical layer of the Time Division Multiple Access (TDMA) communications RF waveform architecture that uses the Link 16 message standard.

## 1.7 Compliance

The acceptance by the NARFA GRC and the HCAA of any use of Link 16 within the frequency band 960 to 1215 MHz is conditional on the strict observance of the specified conditions of operations mandated in this FCA document. No condition contained in this Agreement implies any status for the Link 16 (MIDS/JTIDS) other than that stated, nor does any condition imply an obligation for the acceptance of the use of Link 16 (MIDS/JTIDS) beyond that specified in this Agreement.

## 1.8 Review and Amendment

This document is jointly sponsored by the HNDGS and the HCAA, and is managed by the NARFA GRC. This Agreement will continually be reviewed and will be subject to change. Amendments will be considered at any time when deemed necessary by the HNDGS and/or the HCAA.

## 1.9 Operating Clearance

NARFA GRC is the sole authority, responsible to authorize Link 16 terminals and associated platforms for Link 16 transmissions within ATHINAI FIR / HELLAS UIR. No other authority is to permit/deny Clearance to Radiate (CTR) within ATHINAI FIR / HELLAS UIR.

Link 16 platforms are to obtain a CTR from NARFA GRC. CTR within the ATHINAI FIR / HELLAS UIR must be requested by the Link 16 user or authorities, by filling a CTR Request (CTRR). The CTRR form is available in Appendix A of the Joint GRC Link 16 SOP.

Link 16 users or authorities are to obtain a Clearance To Operate (CTO) from the NJDLMIC GRC only, before using Link 16 within ATHINAI FIR / HELLAS UIR. Link 16 users and authorities must request CTO by filling the CTO Request (CTOR) form. The CTOR form is available in Appendix B of the Joint GRC Link 16 SOP.

If any external coordination is needed, NJDLMIC GRC is the sole responsible authority to perform it, in order to assure the use of Link 16 within ATHINAI FIR / HELLAS UIR.

A MIDS/JTIDS platform shall only operate with a network (initialization data) load authorized by the NJDLMIC GRC.

Reporting has to be executed in accordance with paragraph 2.13.

## **2. Conditions of Use**

### **2.1 Introduction**

This chapter defines the restrictions/conditions under which Link 16 operations are allowed. The measures as laid down are designed to safeguard the availability of CNS systems within ATHINAI FIR / HELLAS UIR. To ensure that Link 16 does not cause more than tolerable interference the following mechanisms are in place:

- Active monitoring, based on best effort, ATHINAI FIR / HELLAS UIR of all Link 16 activities.
- Procedural monitoring of Link 16 activities within ATHINAI FIR/ HELLAS UIR.

Execution of both mechanisms is tasked to the NJDLMIC GRC, which is also the sole authority concerning the operational usage of Link 16 within ATHINAI FIR / HELLAS UIR. Link 16 operations shall be in accordance with the restrictions / conditions contained in this FCA.

### **2.2 Time Slot Duty Factor (TSDF)**

100% TSDF is defined as 396288 Link 16 pulses in a 12 second interval. A single Link 16 user shall not transmit more than 198144 pulses in a 12 second interval, more commonly referred to as 50% TSDF.

The maximum TSDF within a Geographical Area is limited as identified in paragraph 2.7.

### **2.3 Message Types**

Link 16 data is transmitted using either 258 or 444 pulses in a time slot. Both 258 and 444 pulse time slots are allowed on the condition the maximum pulse count limit (expressed as a Geographical Area TSDF) is maintained. The permitted message types are standard (258 pulses), packed 2 single pulse (258 pulses), packed 2 double pulse (444 pulses), and packed 4 (444 pulses).

### **2.4 Use of Round Trip Timing**

Round Trip Timing (RTT) messages consist of 72 pulses in a timeslot and are used to request a system time update from other platforms having a greater time quality in the area. The time update is provided when the terminal with the accurate timing transmits a 72 pulse reply within the same time slot. There are two types of RTT messages RTT-A (Round Trip Timing Address Mode) and RTT-B (Round Trip Timing Broadcast Mode). Both RTT-A and RTT-B messages are permitted. RTT-B messages can result in a slightly higher TSDF.

## 2.5 Use of Access Modes and Functions that can Result in Contention Access

Contention transmissions occur when two or more platforms transmit in the same time slot using the identical net number and cryptographic key. This configuration has the potential to cause a slight increase in the number of Link 16 produced decodes in the TACAN/DME interrogator receiver.

The access modes and functions that could result in contention can be used without restriction. Link 16 terminal time slot assignments with access modes that result in contention transmissions include but are not limited to:

- Initial Net Entry (INE);
- Round Trip Timing - Broadcast (RTT-B);
- Precise Participant Location and Identification (PPLI-A&B);
- Fighter to Fighter contention access;
- Time Slot Reallocation (TSR) in the non-centralized mode;
- TSR Initial Entry;
- Re-promulgation Relay;
- Conditional Paired Slot Relay (CPSR).

## 2.6 Multinet and Multiple Network Operations

Multinet and multiple network usage occur when two or more platforms transmit in the same time slot using a different net number and/or a different cryptographic key and/or a different time offset. This configuration has the potential to cause a slight increase in the number of Link 16 produced decodes in the TACAN/DME interrogator receiver. Multinet operations (time slot reuse on different nets) are allowed. Multiple network operations (time slot reuse in different networks whether synchronized or unsynchronized) are allowed.

## 2.7 Geographical TSDF (GEO TSDF)

The Geographical Area dictates the pulse density (identified by TSDF) that can be collectively transmitted concurrently by the aggregation of all platforms within a cylinder of radius equal to the defined geographic area radius.

The Geographic Area of Link 16 within ATHINAI FIR / HELLAS UIR operations is defined by Any Point in Space (APIS) and is set to 100NM. The total TSDF is defined as 100% in a 100 NM radius. Geographical Area is generally identified by type, radius, maximum total pulse count and maximum single platform pulse count, more commonly referred to as APIS 100: 100/50).

## 2.8 Output Power

The maximum output power of a terminal is assumed to be a nominal 200 Watt measured at the terminal output; however the Effective Isotropic Radiated Power (EIRP) will vary dependent on the individual platforms antenna gains and cable losses.

## 2.9 Separation Distances Restrictions

- Ground Based ATC Equipment

The minimum separation between any fixed site, marine mobile or ground mobile Link 16 terminal and any ground based DME/TACAN operating in the 960 to 1215 MHz band shall be based on a received signal level of -33 dBm (decibels relative to a mW). The minimum separation shall be 0.5NM.

The minimum separation between any fixed site, marine mobile or ground mobile Link 16 terminal and any Air Traffic Control Radar Beacon System/Secondary Surveillance Radar (ATCRBS/SSR) ground equipment operating in the 960 to 1215 MHz band shall be based on a received signal level of -20 dBm. The minimum separation shall be 275 meters (900ft).

The minimum separation between any airborne Link 16 terminal and a civil aircraft operating ATC equipment in the 960 to 1215 MHz band shall be 1000ft or 305 meters in altitude and 5NM horizontal.

On military airbases, all moving aircrafts on ground level (taxing, recovering or departing), are allowed to infringe the above mentioned separation distances, only when operating in a maximum power setting of 1 Watt. Aircrafts that are not being able to select the 1 Watt power setting shall maintain the minimum separation.

- Airborne ATC Platforms

The minimum separation between any airborne Link 16 terminal and a civil aircraft operating ATC equipment in the 960 to 1215 MHz band shall be 1000 feet or 305 meters slant range.

The separation between airborne ATC equipment operating in the 960 to 1215 MHz band and Link 16 surface based platforms shall be at least 1000 feet or 305 meters.

## 2.10 Interference Protection Features (IPF)

Interference Protection Features (IPF), also known as EMC Protection Features (EPF) were developed to ensure that if the Link 16 RF waveform is altered due to malfunction within the Link 16 terminal, the Link 16 terminal will cease transmitting. IPF shall be implemented in all Link 16 terminals or systems and be fully operational. After coordination with the NJDLMIC GRC an exception to the IPF controls can be granted by the NJDLMIC GRC.

## 2.11 Operating Modes

There are two basic operating modes that have been implemented in a number of Link 16 terminals. The first is to always transmit the Link 16 pulses using a uniform selection of 51 carrier frequencies (corresponds to mode 1). The



second is to always transmit all Link 16 pulses on a fixed frequency of 969 MHz (corresponds to mode 2, 3 and 4).

All Link 16 operations within ATHINAI FIR / HELLAS UIR shall be in Mode 1 only, which uses a pseudo random sequence amongst 51 carrier frequencies.

## 2.12 Cross Border Coordination

With the expansion of Link 16 activity across Europe and around the world, it is necessary to communicate scheduled Link 16 activity by each nation to enable a process of cross borders' coordination to take place. The methods of achieving cross border coordination are defined in the EJCC Cross Border Coordination SOP.

The NJDLMIC GRC shall employ Cross Border Coordination.

## 2.13 Reporting

Platforms/units operating MIDS/JTIDS within ATHINAI FIR / HELLAS UIR being in LOS with terminals of the NJDLMIC GRC are not required to forward a JTIDS Activity Report (JAR). However, the NJDLMIC GRC retains the right to order any unit to forward a JAR. Platforms/units operating MIDS/JTIDS within ATHINAI FIR / HELLAS UIR being BLOS with terminals of the NJDLMIC GRC are required to forward a JAR. The JAR has to be in compliance with the Joint GRC Link 16 SOP (JGRCL16SOP).

# 3. Compliance Monitoring of Link 16 Activity

## 3.1 Introduction

To safeguard the permission for Link 16 equipment to operate within ATHINAI FIR / HELLAS UIR, Link 16 transmissions should not cause harmful interference. Link 16 equipment that operates within ATHINAI FIR / HELLAS UIR in accordance with the restrictions and conditions of this Agreement, meets this requirement.

Within ATHINAI FIR/ HELLAS UIR, all Link 16 MIDS/JTIDS activity is monitored to ensure / guarantee compliance with the restrictions and conditions of this Agreement and to optimize the data link operation. This compliance monitoring is performed by the NJDLMIC GRC.

## 3.2 Purpose

The purpose of compliance monitoring of Link 16 activity is as follows:

- To prevent potential violations of the terms and conditions of this Agreement through the use of procedural methods;
- To allow authorities involved to take preventive actions in order to ensure that ARNS is not affected by harmful interference;

- To detect actual violations of the terms and conditions of this Agreement as early as possible. This allows authorities involved to take immediate actions in order to minimize any potential interference to ARNS;
- To record and/or log all Link 16 activity to permit subsequent analysis and reporting of Link 16 operations.

### 3.3 Responsibility

The NJDLMIC GRC has sole executive responsibility for Link 16 operations within ATHINAI FIR / HELLAS UIR.

Moreover, the NJDLMIC GRC is the sole authority responsible for compliance monitoring, recording and logging of any Link 16 activity within ATHINAI FIR / HELLAS UIR. Consequently, the Network Managers at the NJDLMIC GRC are to be consulted by all users prior to any Link 16 operations to ensure that activities are coordinated properly.

Personnel employed on compliance monitoring duties are to be qualified accordingly. Their responsibilities for compliance monitoring are to be defined clearly and they must have access to sufficient equipment to ensure that Link 16 activity complies with the terms and conditions of this Agreement.

### 3.4 Methodology

The compliance monitoring task is to be performed either or both by technical or / and procedural methods. The procedural methods should incorporate detailed record keeping. The active methods must comprise observation by qualified personnel, together with manual and electronic recording of Link 16 activity.

The NJDLMIC GRC will adhere to following principles, in relation to Link 16 activity, in order to maintain compliance with the terms and conditions of this Agreement:

- This Agreement shall be promulgated widely;
- Only qualified personnel is to be employed in Link 16 activities that have a bearing on compliance with the terms and conditions of this Agreement;
- Checks and validations of the compliance of Link 16 network designs are to be made. All Link 16 users are to operate in accordance with JGRCL16SOP to ensure that they are fully familiar with the terms and conditions contained within this Agreement. All records of Link 16 activities are to be held for a period of at least 60 days. This will permit retrospective investigation into reports of interference where Link 16 may have been a contributory factor. Furthermore, these records will permit the undertaking of investigations into violations of the terms and conditions of this Agreement. Records of the following aspects of Link 16 activity must be maintained:
- MIDS/JTIDS network designs utilized;

- MIDS/JTIDS User (JU) call signs;
- JU network entry and exit times;
- JU positions and areas of operation, including the locations of ground terminals;
- JU Initialization Data Load allocations, including any subsequent amendments;
- JU Network Function and Role allocations, including any subsequent amendments;
- Full details of all violations of the terms and conditions of this Agreement.

These details should be sufficient to permit potential future analysis.

### 3.5 Violation Procedures

All violations of the terms and conditions of this Agreement are to be recorded by the NJDLMIC GRC and reported to the HCAA.

The severity and effect of any violation will be dependent upon the type of occurrence and the prevailing operational situation. Different processes will exist for different occurrences and violations will be categorized as either 'Major' or 'Minor'.

Cases categorized as 'Major':

- Failure to comply immediately with a NJDLMIC GRC's instruction
- Persistent use of an unauthorized network (initialization data) load by a JU whereby the conditions of use of this Agreement are breached.
- Persistent infringement of the aeronautical CNS system(s) or ground-based Cooperative Surveillance System separation minima.
- Persistent infringement of controlled airspace<sup>1</sup>.
- Persistent operation by a JU as Relay whereby the conditions of use of this Agreement are breached.
- Persistent selection of NTR by an unauthorized JU.
- Any unauthorized use of a High Power mode.
- Operation from unauthorized location.
- Operation of an unauthorized JTIDS/MIDS terminal/platform.
- Any unauthorized use of the Contention Access Mode.

Cases categorized as 'Minor':

- Temporary use of an unauthorized network (initialization data) load by a JTIDS/MIDS User (JU).
- Temporary infringement of aeronautical CNS system(s) or ground-based Cooperative Surveillance System separation distance minima.

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<sup>1</sup> Controlled airspace: Airspace of defined dimensions within which ATC services are provided. The level of control varies with different classes of airspace, as defined by ICAO (in ICAO DOC 9426-AN/924, Annex 11: Air Traffic Services Chapter 2 Section 2.6)

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- Temporary infringement of controlled airspace.
- Temporary erroneous selection of Relay.
- Temporary erroneous selection of Network Time Reference (NTR) by an unauthorized JU.
- Infringement of air-to-air separation criteria.

'Major' violations are to be investigated and notified to NJDLMIC GRC as soon as practicable, noting any immediate Network Manager corrective actions. NJDLMIC GRC will instruct the Network Manager whether any further action is required. The NJDLMIC GRC will forward a copy of the violation report to the unit of the violating platform and to the HCAA. The report will include a recommendation of how this type of violation can be prevented from reoccurring.

'Minor' violations don't need to be reported immediately, but must be recorded. The NJDLMIC GRC is to forward a copy of the violation report to the unit of the violating platform and to the HCAA. The unit is to take necessary action(s) to minimize the risk of a violation occurring again.

The NJDLMIC GRC is to maintain a database of all violations for further action and analysis. If an incident is deemed a 'Major' violation, any hand-written logs and automatic recording tapes or files are to be held for further evaluation until the investigation is closed by the HCAA. Although the processes for analyzing data from platforms may differ, the NJDLMIC GRC will be responsible for undertaking any data extraction and analyses required to fully document and report the violation. NJDLMIC GRC is to produce a periodic summary of all incidents to be presented to the HCAA.

**4. Points of Contact**

4.1 PoCs for coordination:

<b>Dept/Office</b>	<b>Branch</b>	<b>Tel</b>	<b>E-mail</b>
GRC JDLMIC	HNDGS/A' Branch	+30 210 657 1157 +30 210 657 1292	<a href="mailto:jdldmic@hndgs.mil.gr">jdldmic@hndgs.mil.gr</a>
NARFA GRC	HNDGS/C' Branch	+30 210 657 3541 +30 210 657 3542	<a href="mailto:narfa.gr@hndgs.mil.gr">narfa.gr@hndgs.mil.gr</a>
DLMC/NDF	HTAF/A' Branch	+30 241 051 1451 +30 241 051 1452	<a href="mailto:dlmc.htaf@haf.gr">dlmc.htaf@haf.gr</a>

**5 Reference Documentation**

- ITU Radio Regulations RR-4.4
- Convention on International Civil Aviation

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- ICAO Standards and Recommended Practices for the Radio Navigation Aids operating in the band 960-1215MHz
- ICAO DOC 9718 concerning the use of the band 960-1215MHz
- ICAO DOC 7754 (European Air Navigation Plan – EUR ANP Part I of VOL I)
- Aeronautical Information Publication of Greece (AIP GREECE)
- Common Frequency Clearance Criteria (CFCC)<sup>2</sup> Issue 3, dated 30 October 2012,
- STANAG 4175 – Technical Characteristics of the Multifunctional Distribution System (MIDS) – Volume I & II
- STANAG 5516 / ATDLP5.16 – Tactical Data Exchange – Link 16
- STANAG 5641 (AEMP-01) – Spectrum Management in Military Operations
- Allied Data Publication-33 (ADatP-33)
- SHAPE MIDS/JTIDS Activity Planning Coordination and Reporting Instruction – CH.1/2007
- ACO Joint Concept of Employment for Tactical Data Links in NATO/SHAPE/2016
- JGRCL16SOP – Joint GRC Link 16 Standard Operation Procedures within ATHINAI FIR / HELLAS UIR
- EUROPEAN EJCC/Link16 CROSS-BORDER COORDINATION SOP/2014
- A Simplified Method for the Analysis of Interference from JTIDS Radio Networks to DME Aeronautical Radionavigation Systems. The Journal of Navigation (2009),62,721-737, Vassiliios A. Houdzoumis

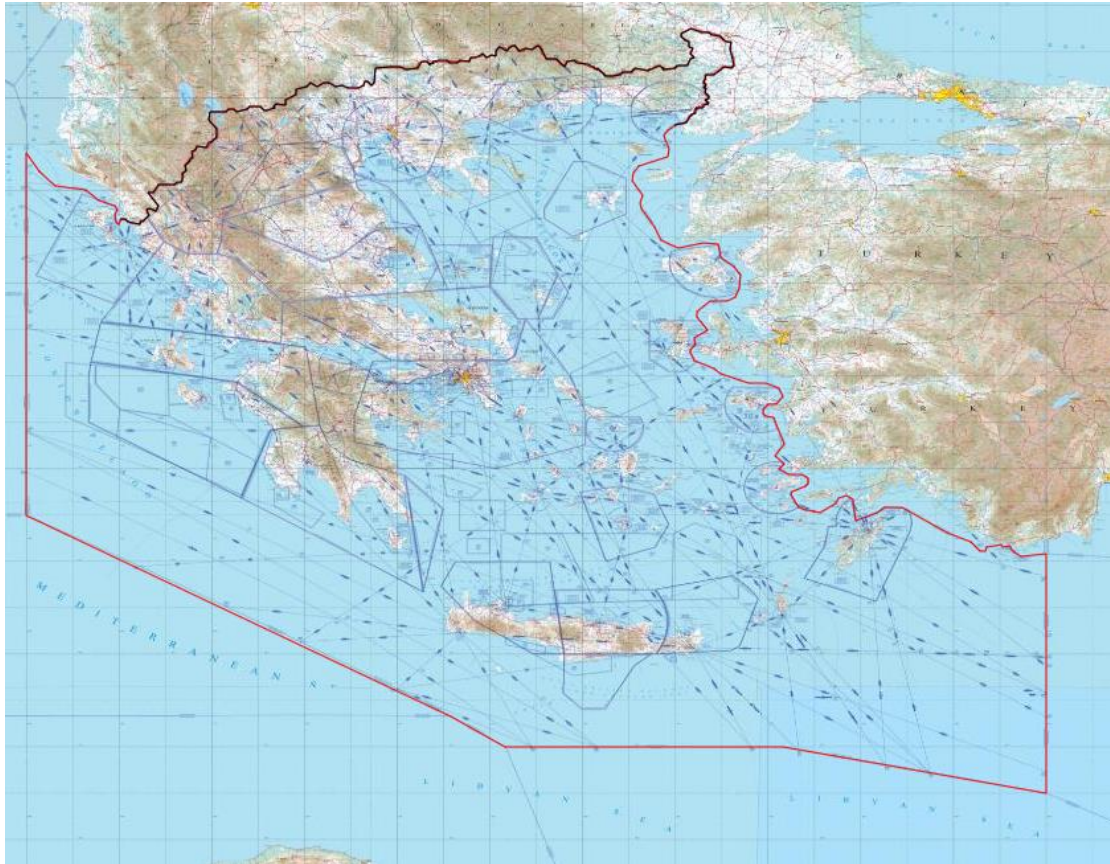
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<sup>2</sup> The Common Frequency Clearance Criteria are produced by The Frequency Clearance Expert Group and is authorized by the Multi National Working Group. The CFCC is a composite document based on the testing and technical evidence that has been used in the generation of a wide variety of National Frequency Clearance Agreements for allowing the use of Link 16 within National borders

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## **6. GRC LINK 16 Area Of Responsibility**



ATHINAI FIR / HELLAS UIR corresponds to the GRC Link 16 Area of Responsibility (AoR)

## **7. Abbreviations**

ACAS	Airborne Collision Avoidance System
ACO	Allied Command Operations
ADATP	Allied Data Publication
ADS-B	Automatic Dependent Surveillance Broadcast
AEMP	Allied Electromagnetic Publication
AIP	Aeronautical Information Publication
AoR	Area of Responsibility

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ARNS	Aeronautical Radionavigation Service
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
ATDLP	Allied Tactical Data Link Publication
BLOS	Beyond Line Of Sight
CFCC	Common Frequency Clearance Criteria
CNS	Communication Navigation and Surveillance
CPSR	Conditional Paired Slot Relay
CTO	Clearance to Operate
CTOR	Clearance to Radiate Request
CTR	Clearance to Radiate
CTRR	Clearance to Radiate Request
DLMC	Data Link Management Cell
DME	Distance Measurement Equipment
EIRP	Effective Isotropic Radiated Power
EJCC	European JTIDS Cross Border Coordination
FCA	Frequency Clearance Agreement
FIR	Flight Information Region
GEO TSDF	Geographical Time Slot Duty Factor
GRC	Greece
HCAA	Hellenic Civil Aviation Authority
HNDGS	Hellenic National Defence General Staff
HTAF	Hellenic Tactical Air Force
ICAO	International Civil Aviation Organization

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IFF	Identify Friend or Roe
INE	Initial Net Entry
IPF	Interference Protection Features
ITU	International Telecommunications Union
JAR	JTIDS Activity Report
JGRCL16SOP	Joint GRC Link 16 Standard Operating Procedure
JTIDS	Joint Tactical Information Distribution System
JU	JTIDS/MIDS User
LOS	Line of Sight
MIDS	Multi-functional Information Distribution
MOD	Ministry of Defence
NARFA	National Radio Frequency Agency
NDF	Network Design Facility
NJDLMIC	National Joint Link Management and Interoperability Cell
NM	Nautical Mile
NTR	Network Time Reference
PoC	Point of Contact
PPLI	Precise Participant Location and Identification
RF	Radio Frequency
RR	Radio Regulations
RTT	Round Trip Timing
RTT-A	Round Trip Timing Address
RTT-B	Round Trip Timing Broadcast
SHAPE	Supreme Headquarters Allied Powers Europe

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SOP	Standard Operating Procedures
SSR	Secondary Surveillance Radar
STANAG	Standardization Agreement
TACAN	Tactical Air Navigation
TCAS	Traffic Collision Avoidance System
TDMA	Time Division Multiple Access
TSDF	Time Slot Duty Factor
TSR	Time Slot Reallocation
UIR	Upper Information Region