CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION

J6
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CJCSI 6232.01B
16 March 2001

LINK-16 SPECTRUM DECONFLICTION WITHIN THE UNITED STATES AND POSSESSIONS

1. Purpose. This instruction implements policy to ensure use of Link-16 systems including the Joint Tactical Information Distribution System (JTIDS) and Multifunctional Information Distribution System (MIDS) do not exceed pulse density limitations specified in National Telecommunications and Information Administration (NTIA) and US Military Communications-Electronics Board (MCEB) guidance. This instruction applies to all units operating JTIDS/MIDS in the proximity of the United States and its Possessions (US&P). This instruction provides the policy, definition, procedures, and organizational responsibilities to manage JTIDS/MIDS use through the control, monitoring, supervision, and management of pulse densities, referred to as pulse deconfliction.

2. Cancellation. CJCSI 6232.01A, 1 June 1998, "Deconflicting JTIDS/MIDS Operations," is canceled.

3. Applicability. This instruction applies to the Military Services, Joint Staff, combatant commands, and those activities and agencies reporting to the Chairman of the Joint Chiefs of Staff operating JTIDS/MIDS equipped systems within 200 nautical miles (nm) of the coastal US&P. This instruction applies to US link managers and deconfliction authorities in their management of Link-16 operations with foreign and/or coalition units within 200 nm of the coastal US&P. Pulse density limits and deconfliction policies contained in this instruction do not apply during armed conflict or the exercise of self-defense, to the extent it is necessary for US forces and participating foreign and/or coalition forces to operate outside those limits and policies.

4. Policy

a. JTIDS/MIDS must not cause harmful interference to navigational aids operating in the same frequency band (including Identification Friend or Foe (IFF), Tactical Air Navigation (TACAN) and Distance Measuring Equipment (DME), among others). JTIDS/MIDS operations must comply with frequency assignments granted for specific geographic/operational areas. JTIDS/MIDS operations shall be deconflicted:

(1) Within these areas to ensure local pulse densities do not exceed assignment restrictions.

(2) With concurrent operations in adjacent or overlapping geographic areas to ensure composite pulse density restrictions are not exceeded.

b. Individual units will deconflict operations to ensure compliance with frequency assignment restrictions. If local units are unable to deconflict, the first common commander will perform this function. In cases where no common commander exists or where such coordination is not possible, the Joint Staff J6 will serve as the final JTIDS/MIDS deconfliction authority and will ensure operations comply with the restrictions cited in this instruction.

c. Combatant commands serve as the deconfliction authority for Link-16 operations outside the US&P. General guidance regarding a common clearance criteria adopted by several nations may be found in the JTIDS/MIDS Spectrum Users Guide (published by the Naval Electromagnetic Spectrum Center and available at https://totn.acc.af.mil) and should serve as a starting point for requesting the appropriate clearances to conduct Link-16 operations.

5. Summary of Changes. This revision clarifies procedures for conducting deconfliction, the entities involved in the process and the ultimate authorities for making deconfliction decisions. It also reflects the most current restrictions on JTIDS/MIDS operations based on NTIA guidance.

6. Organizational Responsibilities. See Enclosure A.

7. Procedures. See Enclosure B.

8. Restrictions. See Enclosure C.

9. Definitions. See Glossary.

10. Releasability. This instruction is approved for public release; distribution is unlimited. DOD components, other Federal agencies, and the public may obtain copies of this instruction through the Internet from the CJCS Directives home page -- http//www.dtic.mil/doctrine/jel/cjcsd.htm. Copies are also available through the Government Printing Office on the Joint Electronic Library CD-ROM.

11. Effective Date. This instruction is effective upon receipt.

S. A. FRY
Vice Admiral, U.S. Navy
Director, Joint Staff

Enclosures:
A--Organizational Responsibilities
B--Procedures
C--Restrictions
GL--Glossary

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ENCLOSURE A

ORGANIZATIONAL RESPONSIBILITIES

1. The Joint Staff. The Director for Command, Control, Communications, and Computer Systems (J-6), Joint Staff, is assigned primary responsibility for ensuring compliance with pulse deconfliction restrictions. The Joint Staff J-6 will:

a. When necessary, specify the JTIDS/MIDS deconfliction authority (DA) for joint or combined JTIDS/MIDS operations.

b. Serve as final DA when deconfliction cannot be achieved at a lower level.

c. Monitor execution of policy to ensure pulse deconfliction restrictions are met by JTIDS/MIDS equipped units.

2. Combatant commands, Services, and Defense agencies (C/S/A) will:

a. Ensure subordinate commands using JTIDS/MIDS terminals have adequate guidance and resources to deconflict operations at the lowest level possible. This includes assignment of user privileges on the JTIDS/MIDS Deconfliction Server for use during premission planning (see Enclosure B for detailed procedures).

b. Assign deconfliction coordinators as required. Coordinator assignments should be made to maximize efficiency in deconflicting training and to eliminate the possibility of uncoordinated events (i.e., events that have not been entered in the JTIDS/MIDS Deconfliction Server). Deconfliction coordinators may be assigned geographically (preferred USN procedure) or by unit (preferred USAF procedure).

c. Serve as final DA when deconfliction cannot be achieved at a lower level.

d. Assign JTIDS/MIDS Deconfliction Server privileges. If a JTIDS/MIDS user lacks access or user privileges they will be assigned to a deconfliction coordinator with the necessary access/privileges. All commands using JTIDS/MIDS terminals will have JTIDS/MIDS Deconfliction Server viewing privileges.

e. Ensure acquisition programs designed to provide Link-16 capability (e.g., Joint Tactical Radio System) are designed to enable users to comply with this instruction.

3. JTIDS/MIDS DA. The JTIDS/MIDS DA is the first joint operational commander common to both units. Should there be no common commander (e.g., conflicts arising between an operational unit and a test and evaluation unit), the Joint Staff (J-6) will serve as deconfliction authority. The JTIDS Network Design Library (JNDL) will provide technical advice and recommendations to any JTIDS/MIDS DA when requested.

4. JTIDS/MIDS Deconfliction Coordinators. Deconfliction coordinators schedule JTIDS/MIDS operations within a geographic area encompassing one or more frequency assignment authorization areas. Deconfliction coordinators will:

a. Promulgate frequency assignments, clearances and deconfliction procedures as required to units planning or conducting JTIDS/MIDS operations within their area of responsibility.

b. Coordinate with units planning or conducting JTIDS/MIDS operations within their area of responsibility to ensure compliance with the deconfliction requirements specified in this instruction.

c. Ensure JTIDS/MIDS Deconfliction Server entries are made for every unit conducting JTIDS/MIDS operations within their geographic area to facilitate overlapping and adjacent area coordination.

5. Unit/Staff Communications Planners. Unit/staff planners responsible for planning JTIDS/MIDS operations, exercises, tests, or evaluations will:

a. Contact the Joint Frequency Management Office (JFMO) or Service Frequency Management Office for specific requirements and to ensure an adequate permanent frequency assignment for the desired area of operations has been approved.

b. In cases where no permanent assignment exists, submit a frequency assignment request in accordance with frequency management directives. If the existing permanent assignment is insufficient for the scope of operations, or operations are required prior to approval, submit a temporary frequency assignment request until an appropriate permanent assignment can be obtained. Although frequency assignment requests are similar to airspace coordination requests in format and routing, approval of one does not imply approval of the other.

c. Comply with frequency assignment restrictions. DA coordination and JTIDS/MIDS Deconfliction Server entry is required even when complying with an existing permanent frequency assignment. This ensures unused margin is available for other units within the same geographic area (further explanation may be found in Enclosure B under "Coordination Procedures").

d. Ensure participating JTIDS/MIDS units are included in the coordination process and are briefed regarding specific frequency assignment restrictions.

6. JTIDS Network Design Library (JNDL). The JNDL is assigned to the Operations Support Branch of the US Joint Forces Command Joint Interoperability Division and is the repository for all JTIDS/MIDS networks. The JNDL will:

a. Receive, store, and catalog all C/S/A JTIDS/MIDS networks to assist with spectrum deconfliction and appropriate network selection.

b. Provide C/S/A and joint task force commanders with an on-line repository for all JTIDS/MIDS network descriptions and an initial point of contact for assistance with JTIDS/MIDS network selection, generation, and deconfliction issues. The JNDL will coordinate with the Joint Network Design Team for technical, operational, and analytical support to meet operational requirements and compliance with deconfliction restrictions.

c. Assist Joint Staff in developing deconfliction policies and monitoring execution to ensure compliance for JTIDS/MIDS operations, exercises, and tests.

d. Provide technical advice to the Joint Staff J-6 in the accomplishment of pulse deconfliction responsibilities as outlined in this instruction.

e. Operate, maintain, and administer the JTIDS/MIDS Deconfliction Server and assist users in its operation.

7. Joint Multi-Tactical Digital Information Link School. The Joint Multi-Tactical Digital Information Link School (JMTS) is assigned to Forces Command Joint Interoperability Division and will ensure appropriate courses incorporate JTIDS/MIDS deconfliction training for frequency managers, operators, and technicians.

8. Joint/Service Frequency Management Organizations. FMOs will provide pertinent information to users, deconfliction coordinators and deconfliction authorities regarding frequency assignments.

9. Deconfliction Organization Relationship. See Figure 1 for block diagram of the descriptions contained within this enclosure.

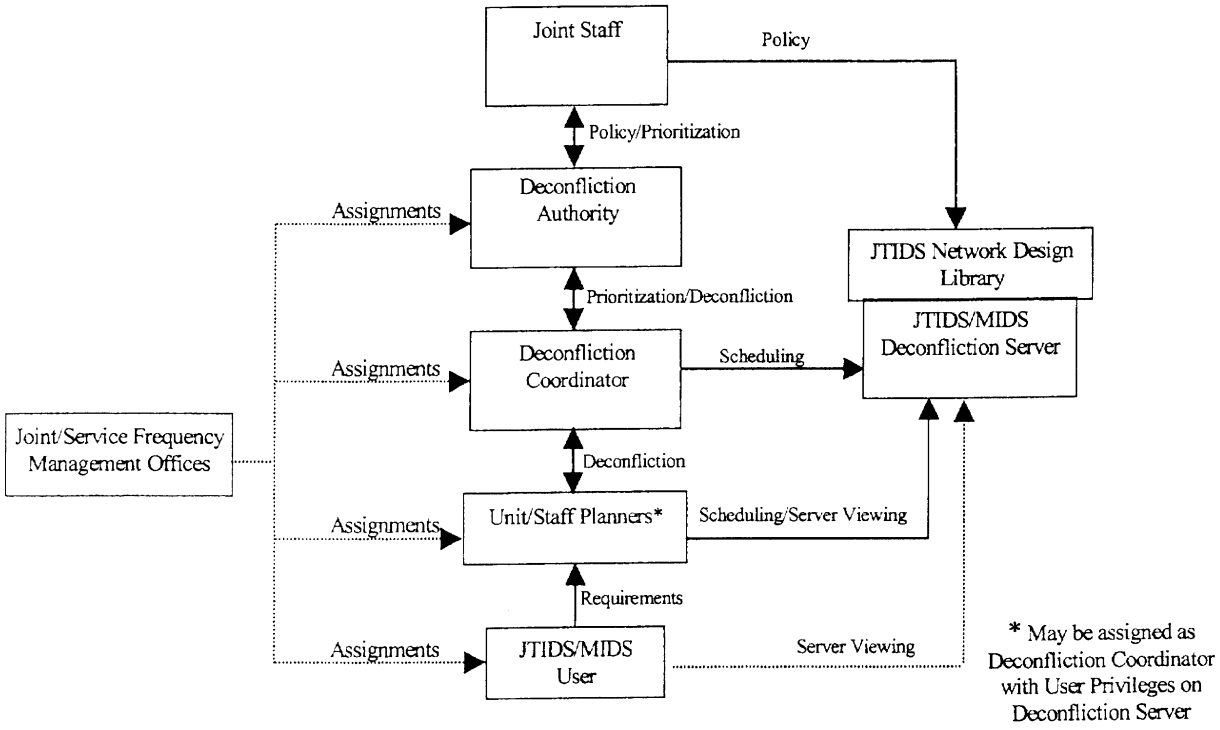

FIGURE 1 - ORGANIZATIONAL RELATIONSHIPS

ENCLOSURE B

PROCEDURES

1. The JTIDS/MIDS Deconfliction Server. JTIDS/MIDS pulse deconfliction is most effectively accomplished by keeping coordination at the lowest level possible. Future increases in the number of JTIDS/MIDS equipped units will result in an increase in geographic overlap for terminal operations and a corresponding increase in the requirements for and complexity of coordination. The JTIDS/MIDS Deconfliction Server is an automated system to support the coordination process.

a. All JTIDS/MIDS activity will be coordinated through the JTIDS/MIDS Deconfliction Server. The appropriate deconfliction coordinator (or unit/staff planner when authorized) will make JTIDS/MIDS Deconfliction Server entries for JTIDS/MIDS usage.

b. JTIDS/MIDS Deconfliction Server access is available at various levels. The Services will determine which user/viewer level will be assigned to their units.

c. For routine operations, coordination/scheduling is handled by inputs from each unit's planned activity into the JTIDS/MIDS Deconfliction Server. As training opportunities are identified, users may coordinate directly with each other to establish networks that adhere to the pulse density limitations for the intended operational areas.

d. For complex exercises, tests, demonstrations, and special operations, the appropriate deconfliction coordinator (or unit/staff planner when authorized) will ensure adherence to pulse deconfliction restrictions and procedures and make appropriate JTIDS/MIDS Deconfliction Server entries.

(1) Deconfliction coordinators (or unit/staff planner when authorized) will ensure JTIDS/MIDS operations are coordinated with their appropriate C/S/A counterparts and entered into the JTIDS/MIDS Deconfliction Server. Entries will be completed as part of the normal planning process and should be accomplished at least as far in advance as airspace coordination. Unit/staff planners must incorporate appropriate frequency assignment restrictions into planned JTIDS/MIDS operations.

(2) If mission requirements exceed the restrictions of the existing frequency assignment, temporary assignments may be granted on a case-by-case basis. Unit/staff planners should request temporary

JTIDS/MIDS frequency assignments through the appropriate frequency management office.

e. In the case of conflicting operations, deconfliction coordinators will deconflict operations to ensure compliance with local frequency assignments. Conflict between deconfliction coordinators not resolved locally will be elevated to the DA.

2. Coordination Procedures

a. JTIDS/MIDS users will generate JTIDS network operational requirements that can either be satisfied through existing network designs or the creation of a new network. Documentation accompanying the existing or new network design will include a Time Slot Duty Factor (TSDF) table with individual platform TSDF for use in scheduling operations on the JTIDS/MIDS Deconfliction Server. The JNDL and Service Network Design Facilities are valuable resources for accurately and completely establishing the TSDF requirements. An additional resource is the JTIDS/MIDS Spectrum Users Guide, published by the Naval Electromagnetic Spectrum Center and available on the web at https://totn.acc.af.mil.

b. Unit/staff planners must accurately define operational requirements to ensure complete TSDF calculations can be made for a given network and specific participants. TSDF requirements should be sufficient to satisfy operational requirements without overstating them. Doing so will ensure maximum use of available TSDF by all requesting users within the same geographic area.

c. Unit/staff planners will review existing frequency assignments (available from the JFMO and Service Frequency Management Offices) to determine if they are adequate for the proposed operation or training event. The JTIDS/MIDS Deconfliction Server and JNDL can assist in determining pulse deconfliction requirements.

(1) If an existing frequency assignment is adequate, the event will be scheduled through the JTIDS/MIDS Deconfliction Server.

(2) If a frequency assignment does not exist for the area of operations, or existing assignments are inadequate, the unit/staff planner will submit a frequency assignment request (see Enclosure C for typical frequency assignment restrictions).

d. The deconfliction coordinator (or unit/staff planner when authorized) will make appropriate entries to the JTIDS/MIDS Deconfliction Server for the planned event.

(1) Multiple operations within a single geographic area may be scheduled as a single event, or each deconfliction coordinator (or unit/staff planner when authorized) may make individual JTIDS/MIDS Deconfliction Server entries. The JTIDS/MIDS Deconfliction Server will alert the deconfliction coordinator if submitted TSDF exceeds limits specified in the frequency assignment or conflicts exist with other JTIDS/MIDS activity in overlapping/adjacent areas.

(2) Options are available in cases where mission requirements exceed pulse density restrictions. The JNDL or appropriate Service NDF can provide technical advice to reduce the composite TSDF. Options include:

(a) Providing different operating times to units within a single geographic area.

(b) Establishing operational procedures to limit the use of network capacity by individual units, so total pulse density in any given area complies with restrictions.

(c) Changing the geographical disposition of forces to reduce the pulse density in an area where JTIDS/MIDS use is particularly heavy.

e. The deconfliction authority and Joint Staff J-6 will not normally be involved in the deconfliction process. When deconfliction cannot be achieved at a subordinate level, these authorities will establish priorities and direct deconfliction as necessary.

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ENCLOSURE C

RESTRICTIONS

1. Background. JTIDS/MIDS operates in the frequency band reserved for aeronautical radionavigation service systems, including Tactical Air Navigation (TACAN), Distance Measuring Equipment (DME), and Identification, Friend or Foe, among others. The restrictions included here are designed to prevent harmful interference to these systems and are typical of a JTIDS/MIDS frequency assignment. Users should verify through their respective FMO the actual restrictions for specific operating areas. Restrictions contained in a frequency assignment always take precedence over the restrictions provided here. Approval for operations exceeding these restrictions or those contained in a frequency assignment must be submitted through the appropriate FMO with sufficient justification and are handled on a case-by-case basis. The JTIDS/MIDS Spectrum Users Guide (JSUG) contains detailed information for planning and requesting frequency support for JTIDS/MIDS events. Copies may be obtained by contacting the JTIDS programs office (PMW-159) or the JNDL. The JSUG is also available at https://totn.acc.af.mil.

2. Geographic Area. No more than 100 percent TSDF is authorized within a 200 nm radius drawn around each JTIDS/MIDS terminal.

a. One hundred percent TSDF is defined as 396,288 pulses per 12 second frame, regardless of number of pulses per time slot. This definition may result in 100 percent TSDF even when fewer than 100 percent of the time slots are programmed for use with some packing structures.

b. TSDF is based on assigned time slots, regardless of whether transmissions occur.

3. TSDF Limitations For Individual Terminals

a. Prime control/relay aircraft operating above 18,000 feet.

(1) No more than 50 percent TSDF may be assigned to any single aircraft.

(2) Each aircraft must maintain a minimum 3 nm separation from all other aircraft.

b. For all other participants, no more than 20 percent TSDF can be assigned to any single participating unit.

4. Multinet Operations. Multinet operations are permitted, provided that the geographic area restriction (100 percent TSDF in 200 nm radius) is not exceeded.

5. Message Structures. Use of all message structures (72, 258 and 444 pulses per time slot) is permitted, provided the geographic area restriction is not exceeded.

6. Adjacent Time Slots. Transmission in adjacent time slots is permitted.

7. Contention Transmissions. Contention transmissions other than round trip timing (RTT) are not generally permitted. However, exceptions have been approved on a case-by-case basis for Initial Net Entry, Precise Position and Location Indicator (PPLI), Fighter-to-Fighter and J-Voice transmsissions.

8. Restrictions Near DME/P Beacons. JTIDS/MIDS transmissions are not permitted within radio line of sight (LOS) of operational DME/P beacons. Note: Their are currently no DME/P beacons operational within the national airspace system.

9. Restrictions Near Mode S Sensors

a. Separation between a Mode S receiver and a ground-based JTIDS/MIDS terminal must be sufficient to ensure that no greater than -22dBm JTIDS/MIDS signal power level is present at the Mode S receiver. Separation distances necessary to stay below this signal threshold have been established by test data and vary by platform due to differences in antenna performance/gain. Variances are between 0.51 and 3.79 nm Detailed platform information available in Table C-1.

b. There are no restrictions on airborne JTIDS/MIDS terminals.

10. Restrictions Near TACAN/DME Beacons.

a. Separation between a TACAN/DME beacon and a ground-based JTIDS/MIDS terminal must be sufficient to ensure that no greater than -33dBm JTIDS/MIDS signal power level is present at the beacon. Separation distances necessary to stay below this signal threshold have been established by test data and vary by platform due to differences in antenna performance/gain. Variances are between 0.19 and 1.42 nm Detailed platform information is available in Table C-1.

b. A aggregate of 50 percent TSDF contribution from ground terminals is permitted within a 7 nm radius of any TACAN/DME beacon.

11. Restrictions Near Air Traffic Control Radar Beacon System (ATCRBS)/Identification, Friend Or Foe (IFF)

a. Separation between an ATCRBS/IFF beacon and a ground-based JTIDS/MIDS terminal must be sufficient to ensure that no greater than -20dBm JTIDS/MIDS signal power level is present at the beacon. Separation distances necessary to stay below this signal threshold have been established by test data and vary by platform due to differences in antenna performance/gain. Variances are between 0.20 and 2.78 nm Detailed platform information available in Table C-1.

b. No restriction on airborne JTIDS/MIDS terminals.

12. Output Power. JTIDS/MIDS terminals are limited to a maximum 200 watts +1 dB transmitter output power.

13. Electromagnetic Compatibility (EMC) Features. EMC features must be operational.

Table C - 1 JTIDS/MIDS Distance (in nautical miles) Separation Requirements						
Individual Platform	DME Beacons	TACAN Beacons	En Route ATCRBS	Terminal ATCRBS	En Route Mode S	Terminal Mode S
ATC Unit Receive Level Threshold (dBm)	- 33	- 33	- 20	- 20	- 22	- 22
ASIT/ADA/CRE	0.60	0.59	1.17	0.62	1.60	0.80
B - 1B	0.64	0.63	1.24	0.66	1.69	0.85
Boeing 737 (F22 Testbed, note 4)	0.46	0.46	0.9	0.48	1.23	0.61
C - 130	0.59	0.58	1.14	0.61	1.56	0.78
DC-9 (note 4)	0.47	0.46	0.91	0.48	1.24	0.62
DC-10 (note 4)	0.43	0.42	0.83	0.44	1.13	0.57
E - 2	0.37	0.37	0.73	0.39	1.00	0.50
E - 3	0.59	0.59	1.16	0.61	1.58	0.79
E - 8	0.52	0.52	1.02	0.54	1.39	0.70
F/A - 18	0.50	0.50	0.98	0.52	1.34	0.67
F - 14	0.69	0.68	1.34	0.71	1.84	0.92
F - 15	0.52	0.52	1.02	0.54	1.39	0.70
F - 16	0.96	0.95	1.88	1.00	2.56	1.28
G - 1	0.41	0.41	0.80	0.43	1.09	0.55
JLENS	0.54	0.53	1.04	0.55	1.42	0.71
JTAGS (note 3)	0.70	0.69	1.36	0.72	1.86	0.93
JVAN	1.42	1.41	2.78	1.47	3.79	1.90
King Air (note 4)	0.71	0.7	1.38	0.73	1.88	0.94
MCE/JM	0.54	0.54	1.06	0.56	1.44	0.72
MEADS (note 3)	0.70	0.69	1.36	0.72	1.86	0.93
OPFAC/JTD	0.90	0.89	1.75	0.93	2.39	1.20
P - 3	0.48	0.48	0.94	0.50	1.28	0.64
PATRIOT	0.70	0.69	1.36	0.72	1.86	0.93
RC - 135	0.44	0.44	0.86	0.46	1.17	0.59
RMP (note 4)	1.58	1.56	3.08	1.64	4.20	2.11
S-3 (note 4)	0.50	0.49	0.97	0.51	1.32	0.66
SH - 60	0.29	0.29	0.57	0.30	0.77	0.39
SHIPS	0.44	0.44	0.86	0.46	1.17	0.59
SHORAD/ FAADC2I	0.70	0.69	1.36	0.72	1.86	0.93
SJS	0.95	0.94	1.86	0.99	2.53	1.27
SUBMARINE	0.19	0.19	0.37	0.20	0.51	0.25
TAOM/AOC	0.60	0.59	1.16	0.62	1.59	0.80
THAAD	0.70	0.69	1.36	0.72	1.86	0.93
TSC - 131	0.77	0.76	1.50	0.80	2.05	1.03
TYQ - 82	0.89	0.88	1.73	0.92	2.36	1.18
UAV	0.43	0.42	0.83	0.44	1.13	0.57
USG - 48	0.54	0.53	1.04	0.55	1.42	0.71

Note 1: Distances are worst case theoretical JTIDS/MIDS to ATC equipment antennas main beam to main beam gain conversions. Distances are measured in nautical miles.

Note 2: Signal level with respect to the JTIDS/MIDS peak signal.
Note 3: Preliminary information.
Note 4: Platforms have not been incorporated within the DD-1494, and a specific authorization from the FAA is required for each use. After a platform is included in the DD-1494, it can operate wherever there is an existing JTIDS/MIDS frequency assignment.
Note 5: Separation distances apply only to ground operations such as ramps, runways and taxiways.

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GLOSSARY

PART I--ABBREVIATIONS AND ACRONYMS

ATCRBS	Air Traffic Control Radar Beacon System
C/S/A	Combatant Commands, Services and Defense Agencies
DA	Deconfliction Authority
dBm	decibels referred to 1 milliwatt
DME	Distance Measuring Equipment
DME/P	DME Precision
FAA	Federal Aviation Administration
FMO	Frequency Management Office
IFF	Identification, Friend or Foe
IRAC	Interdepartmental Radio Advisory Committee
JFMO	Joint Frequency Management Office
JMTS	Joint Multi-Tactical Digital Information Link School
JNDL	JTIDS Network Design Library
JSUG	JTIDS/MIDS Spectrum Users Guide
JTIDS	Joint Tactical Information Distribution System
LOS	line of sight
MCEB	Military Communications-Electronics Board
MHz	megahertz
MIDS	Multi-Functional Information Distribution System
NDF	Network Design Facility
nm	nautical miles
NTIA	National Telecommunications and Information Agency
PPLI	Precise Position and Location Indicator
RF	radio frequency
RTT	Round Trip Timing
TACAN	Tactical Air Navigation
TSDF	Time Slot Duty Factor

UHF	ultrahigh frequency
USAF	US Air Force
USN	US Navy
US&P	United States and Possessions

PART II--DEFINITIONS

Frequency Assignment. Approval to transmit on specified radio frequencies.

Frequency Clearance. Authorization for use of frequencies by a Radio Frequency (RF) system to operate and provide a specified class of service, (e.g., jamming, voice communications, radionavigation).

Geographic Area. Radius drawn around each JTIDS/MIDS terminal. This area is used to establish TSDF limits for JTIDS/MIDS network operations. Within the US&P, the geographic area used for computation of TSDF is 200 nm, and the maximum authorized aggregate TSDF within that area is 100 percent (higher TSDF may be authorized on a case-by-case basis).

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS). High-capacity, antijam, secure, digital information transfer systems operating in the UHF band on 51 discrete frequencies between 969 MHz and 1206 MHz. MIDS is a technology insertion program to reduce component size and weight while maintaining all JTIDS functionality. The United States, France, Italy, Germany, and Spain are currently participating in the MIDS program.

JTIDS/MIDS Spectrum. JTIDS/MIDS operates on 51 frequencies within three sub-bands: 969 - 1008 MHz, 1053 - 1065 MHz, and 1113 - 1206 MHz at 3 MHz intervals. JTIDS/MIDS terminals are designed to exclude JTIDS/MIDS transmissions between 1008 MHz and 1053 MHz and between 1065 MHz and 1113 MHz. Since the JTIDS/MIDS terminal may also provide TACAN in some aircraft installations, those terminals are capable of using the entire 962 - 1213 MHz range for TACAN functions, but JTIDS/MIDS transmissions are restricted to the three sub-bands described above. The 960-1215 MHz band is used by civil and military aeronautical radionavigational systems. The Air Traffic Control Radio Beacon System (ATCRBS), Mode S systems, and Identification Friend or Foe (IFF) systems use 1030 MHz for interrogations and 1090 MHz for replies. Civil aviation Distance Measuring Equipment (DME) and Military Tactical Air Navigation (TACAN) system operates on frequencies from 962 MHz to 1213 MHz in 1 MHz increments. Each DME/TACAN channel uses two frequencies, one for interrogations from the aircraft for information and one for beacon replies.

JTIDS/MIDS Network Management. The process by which connectivity plans for JTIDS/MIDS operations are designed and coordinated and

platform loads are developed and disseminated to all of the platforms participating in that plan.

Pulse Density. The total effective TSDF resulting from the transmissions of all the JTIDS/MIDS terminals within a single geographic area. A geographic area is defined as a circular area with a radius defined in the Interdepartmental Radio Advisory Committee (IRAC) Spectrum Certification (currently 200 nm), around each JTIDS terminal within which the TSDF is counted.

Time Slot Duty Factor (TSDF). TSDF is a percentage figure relative to a base value of 396,288 pulses transmitted within a 12-second frame.

a. TSDF is used to measure contributions to Link-16 pulse density from individual participants, networks, and within a specified geographic area. When used to quantify pulse density within a geographic area, two TSDF figures are normally provided. The first figure represents the maximum percentage of pulses (relative to the base value) that may be transmitted within a specified geographic area. The second figure represents the maximum percentage of pulses that may be transmitted by any single user. A TSDF figure represented by 95/40 indicates that a maximum of 95 percent of the base value may be transmitted within the specified geographic area and that a maximum of 40 percent of the base value is assigned to a single participant.

b. Time Slots may contain 144, 258, or 444 pulses, depending on the use for the slot and the packing limit assigned. To calculate TSDF for a particular platform or network, multiply the number of assigned time slots by the maximum number of pulses in each time slot, divide the total pulses for all assigned time slots by the base value of 396,288 pulses, and multiply the result by 100. Example:

$$\text{TSDF (\%)} = \frac{\text{Total pulses in assigned T.S.}}{\text{Total pulses in base value}} = \frac{(A \times 258) + (B \times 144) + (C \times 444)}{396{,}288} \times 100$$

A = Number of timeslots with a limit of 258 pulses (Standard Packing and Packed 2 Single Pulse)
B = Number of timeslots with a limit of 144 pulses (Round Trip Timing)
C = Number of timeslots with a limit of 444 pulses (Packed 2 Double Pulse and Packed 4 Single Pulse)