

## **Info needed for DART-T Special Temporary Authorization (STA)**

### **Purpose of Operation:**

Raytheon NE Engineering shall design, integrate, test, and demonstrate the capabilities of two proof-of-concept Dual-mode All-band, Re-locatable Terminals (DART). Two DART terminals shall be built for demonstration purposes. At a minimum the DART Terminals shall demonstrate up to 20 Mbps Ku- band SATCOM and TROPO communication capabilities.

### **STA Explanation:**

The US Air Force and the US Marine Corps have each separately requested NDI solutions to their particular communications needs. Raytheon is proposing that the DART-T terminal will in one of its many configurations fulfill the needs of each of these customers. To validate the design, and prove that each government contracting office's requirements are met, Raytheon must demonstrate the functionality of the terminal solution as it would be used in the field. This need to validate the design necessitates that Raytheon radiate in Troposcatter mode and Satcom mode at Ku- band frequencies and at distances similar to those anticipated in the field.

### **Equipment Information:**

See attached DART-T Parts List.

### **Transmitter info:**

	<b>Satcom Mode</b>	<b>Tropo Mode</b>
Manufacturer	iDirect	Radyne
Model	NetModem II	TM-20
Number of units	1	2
Experimental (Y/N)	N	Y

### **For each frequency band:**

Troposcatter Communications 14.9 – 15.4 GHz

Satcom Communications 13.75 – 14.5 GHz

### **RF output at the transmitter terminals.**

Tropo - 600 W peak, about 300 W mean.

SATCOM - 40 W peak

### **Effective radiated power from the antenna**

Tropo - 77 dBW, peak.

### **List each type emission separately for each frequency**

The terminal will transmit identical waveforms simultaneously on two RF carriers separated by less than 100 MHz.

### **List as appropriate for the type of modulation:**

**Maximum speed of keying in bauds:** Less than approximately 15 M bauds/sec

**Maximum audio modulating frequency:** Not applicable to digital transmission

**Frequency deviation of carrier:** 99% power spectral confinement will be less than 17.5 MHz

**Pulse duration and rep rate:** Constant duty cycle digital transmission using QPSK modulation

**Necessary bandwidth.**

Require two carrier frequencies with less than 17.5 MHz bandwidth each (defined as the 99% power spectral confinement) and spaced by less than 100 MHz (but not overlapping).

**Location:**

Geographic coordinates of sites exact to nearest second. Specify NAD 27 or NAD 83.

Location	State	Lat	Long
Camp Pendelton	California	33 <sup>0</sup> 20'57 North	117 <sup>0</sup> 24'57 West
29 Palms	California	34 <sup>0</sup> 18'50 North	116 <sup>0</sup> 07'31 West
Marlborough	Massachusetts	42 <sup>0</sup> 20'43 North	71 <sup>0</sup> 29'27 West
Pelham	NewHampshire	42 <sup>0</sup> 4'07 North	71 <sup>0</sup> 19'33 West
Ft Dix	New Jersey	40 <sup>0</sup> 01'49 North	74 <sup>0</sup> 37'09 West
Ft Monmouth	New Jersey	40 <sup>0</sup> 18'51 North	74 <sup>0</sup> 02'33 West
Orange	Connecticut	41 <sup>0</sup> 16'41 North	73 <sup>0</sup> 01'33 West

Actual site locations at each base to be determined at the time of emplacement.

**Is a directional antenna (other than radar used)?**

Yes

**If yes, give the following info:**

**Width of beam in degrees at the half-power point:** Beamwidth is 0.6 degrees

**Orientation in horizontal plane:** Depends on orientation of antenna

**Orientation in vertical plane:**

SATCOM - 0 to 80 degrees depending on application and satellite.

Tropo – 0 – 5 degrees

Will the antenna extend more than 6 meters above ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building?

No

**Confidentiality:**

Confidentiality is not required.

## DART-T Parts List

DSGN	P/N	Mfg by	Description	Supplied by
A24	8563E	AGILENT	Spectrum Analyzer	Raytheon
A26	TBD	TBD	4 Breaker PDU 2 - 20 A, 2 - 15 A	Raytheon
	TBD	TBD	Power distribuiton plug strip	Raytheon
	TBD	TBD	Signal Entry Panel	Raytheon
	TBD	TBD	Power Entry Panel	Raytheon
A14	Linux PC	Nagasaki	Terminal Controller	Raytheon
	TBD	Vertex RSI	NETMAC Terminal controller	Vertex RSI
A21A	123T	Vertex RSI	Antenna Controller	Vertex RSI
A21B	123T	Vertex RSI	ACU PowerDrive Unit	Vertex RSI
A1	TM-20	Vertex RSI	Tropo Modem	Vertex RSI
		Vertex RSI	Tropo Channel Simulator	Vertex RSI
A2	LT3600	Vertex RSI	70 2 L- Band Converter	Vertex RSI
A3	LT3600	Vertex RSI	70 2 L- Band Converter	Vertex RSI
A4	LT3600	Vertex RSI	70 2 L- Band Converter	Vertex RSI
A5	LT3600	Vertex RSI	70 2 L- Band Converter	Vertex RSI
A23	TBD	TBD	+15V, 5 A Volt Power Supply	Raytheon
A32	3825	CISCO	Router	Cisco
A12	VZU-6996V5	CPI	HPA #1	CPI
A13	VZU-6996V5	CPI	HPA #2	CPI
A6	BUC-XXXX-XX	Vertex RSI	L 2 Ku Block Up Converter	Vertex RSI
A7	BUC-XXXX-XX	Vertex RSI	L 2 Ku Block Up Converter	Vertex RSI
A8	BDC-XXXX-XX	Vertex RSI	Ku 2 L Block Down Converter	Vertex RSI
A9	BDC-XXXX-XX	Vertex RSI	Ku 2 L Block Down Converter	Vertex RSI
A10	BDC-XXXX-XX	Vertex RSI	Ku 2 L Block Down Converter	Vertex RSI
A11	BDC-XXXX-XX	Vertex RSI	Ku 2 L Block Down Converter	Vertex RSI
A15	TBD	Vertex RSI	FL1 (WR-75)	Vertex RSI
A16	TBD	Vertex RSI	FL2 (WR-75)	Vertex RSI
A17	TBD	Vertex RSI	FL3 (WR-75)	Vertex RSI
A18	TBD	Vertex RSI	FL4 (WR-75)	Vertex RSI
A25	2.4 SMLT	Vertex RSI	SMLT - for Pallet Config (Antenna)	Vertex RSI
	2.4 HMT	Vertex RSI	Transportable Antenna	Vertex RSI
A19	TBD	Amplitech	LNA #1 (WR-75 / SMA)	Vertex RSI
A20	TBD	Amplitech	LNA #2 (WR-75 / SMA)	Vertex RSI
A22	TBD	TBD	GPS Antenna	Vertex RSI
A28	TBD	TBD	COMPASS	Vertex RSI
	TBD	TBD	Tilt Sensor	Vertex RSI
A29	TBD	Vertex RSI	Antenna Feed Plate (P/O 2.4SMLT)	Vertex RSI
	TBD	Vertex RSI	TROPO FEED	Vertex RSI
	TBD	Vertex RSI	SATCOM Feed	Vertex RSI
A30	TBD	TBD	WR-62 to WR-75 WG Transition	Vertex RSI
A31	TBD	TBD	WR-62 to WR-75 WG Transition	Vertex RSI
A43	NetModem II	iDirect	IDIRECT Modem	Raytheon/iDirect
A44	TBD	TBD	Bias Tee	Raytheon
A45	TBD	TBD	Bias Tee	Raytheon
A46	TBD	TBD	DC Block	Raytheon
A47	TBD	TBD	DC Block	Raytheon
A48	TBD	Vertex RSI	Satcom BUC	Vertex RSI
A49	TBD	Vertex RSI	Satcom LNB	Vertex RSI
A50	TBD	TBD	Waveguide Hybrid	Raytheon
A51	TBD	TBD	Waveguide Hybrid	Raytheon
A52	TBD	Vertex RSI	Satcomm Antenna Feed Plate	Vertex RSI