

### **SUPPORTING STATEMENT**

Pursuant to Sections 5.3(b), (d), (e), (f), and (i) and 5.61 of the Federal Communications Commission ("FCC") rules, 47 C.F.R. §§ 5.3(b)(d)(e), (f) & (i), 5.61 (2005), BAE Systems ("BAE") respectfully requests special temporary authority (STA) for a limited six-month period commencing **January 2, 2007**, to conduct design verification testing of Ultra High Frequency (UHF), C-Band, and X-Band Satellite Communications (SATCOM) systems at the company's land-based test facility in support of the United States Navy (USN) Littoral Combat Ship (LCS) program. The systems tested will subsequently be installed on the LCS-2, USS Independence, the lead ship of the Independence Class of Littoral Combat Ships.

In support of this request, the following is shown:

**1) Applicant's Name, Address, and FRN:**

BAE Systems  
1601 Research Blvd.  
Rockville, MD 20850

FCC Registration Number (FRN): 0010674976

**2) Need for STA:**

BAE is engaged in testing new generation communications systems for the United States Navy. Specifically, it is acting as a subcontractor responsible for the integration of communications systems being designed and developed for the USN under United States Government Contract No. N00024-03-C-2310.

BAE requires an STA so that it may install and test a temporary land-based test facility for verification of LCS communications system operation for the lead ship of the USN's Independence Class prior to shipboard installation. Ship production schedules were recently expedited due to an adjudication of the Navy's Build Specification requirements for the LCS. To meet these changed schedules, BAE must commence operational testing prior to delivery to the USN. Moreover, the reduction in available shipboard test time has increased the need to perform testing at land-based facilities than originally anticipated.

**3) Purpose and Description of Operation:**

The experimental authority requested herein will allow BAE to (a) test performance of the systems, (b) demonstrate system operation and functionality, and (c) determine the acceptability of the systems. Commencing such efforts as soon as possible will significantly enhance the company's ability to ensure the systems meet the needs of USN.

UHF SATCOM system testing will be performed using: (a) PSC-5D (RT-1672D) multi-band multi-mission radio (MBMMR) equipment manufactured by Raytheon and (b) AN/ARC-210 (RT-1794D) radio equipment manufactured by Rockwell Collins. This equipment has been type-certified for UHF SATCOM Demand Assigned Multiple Access (DAMA) and non-DAMA UHF SATCOM operations by the Joint Interoperability Test Center (JITC).

The UHF SATCOM system for the LCS also includes: (a) high power amplifiers (AM-7565/ARC) manufactured by Raytheon, (b) a SATCOM modem (MD-1324B) and a quad diversity combiner (QDC-100) manufactured by Viasat, (c) antennas (AV-2075-9) manufactured by Trivec Avant, and (d) a variety of switches, diplexers, and attenuators.

The integrated UHF SATCOM radio system will be deployed to access existing USN 5 kHz and 25 kHz DAMA and non-DAMA circuits for voice and data transmissions. The test will allow BAE to verify the design and integration of the SATCOM radios, amplifiers, diplexers, switches, receive diversity combiners, and antennas through operability testing.

The C-Band and X-Band test will be performed using the AN/WSC-6(V)9 Multi-Band Satellite Communications Terminal (MSCT) manufactured by Harris and provided to the LCS program as Government Furnished Equipment (GFE) by the Space and Naval Warfare Systems Center, San Diego (SPAWAR).

The MSCT will be deployed to access commercial Intelsat circuits over C-Band channels and military Defense Satellite Communication System (DSCS) circuits over X-Band channels. The manufacturer has already obtained Defense Information Systems Agency (DISA) terminal certification for DSCS satellite access capability. The test at BAE's land-based test facility will allow the company to verify the design and integration of the MSCT with LCS cryptographic systems, multiplexers, and routers, and interoperability of the integrated system with the Navy shore facilities.

**4) Dates of Proposed Operation:**

January 2, 2007 through July 2, 2007

**5) Location(s) of Proposed Operations:**

44420 Pecan Court  
California, MD 20619

Coordinates: 38-18-38.0N, 076-32-27W (NAD 83)

**6) Class of Station:**

The FCC station class code for the proposed operation is "FBT." A limited number of base stations will be located at temporarily fixed locations as described below.

**7) Equipment To Be Used:**

|                             |                  |                        |
|-----------------------------|------------------|------------------------|
| V/UHF Radio                 | Raytheon         | RT-1672D (Qty. 3)      |
| UHF Amplifier               | Raytheon         | AM-7565/ARC (Qty. 4)   |
| V/UHF Radio                 | Rockwell-Collins | RT-1794D (Qty. 1)      |
| SATCOM Modem                | Viasat           | MD-1324B (Qty. 1)      |
| C/X-band Satellite Terminal | Harris           | AN/WSCV-6(V)9 (Qty. 1) |

The company does not propose to use prototype equipment during this trial.

**8) Frequencies Desired:**

|                       |                           |                           |
|-----------------------|---------------------------|---------------------------|
| <u>UHF SATCOM:</u>    | <u>C-Band:</u>            | <u>X-Band:</u>            |
| Uplink: 292-312 MHz   | Uplink: 5.850-6.425 GHz   | Uplink: 7.900-8.400 GHz   |
| Downlink: 249-270 MHz | Downlink: 3.700-4.200 GHz | Downlink: 7.250-7.750 GHz |

**9) Power Levels:**

|                          |                          |                           |
|--------------------------|--------------------------|---------------------------|
| <u>UHF SATCOM:</u>       | <u>C-Band:</u>           | <u>X-Band:</u>            |
| TPO: 125 Watts (via HPA) | TPO: 800 Watts (via HPA) | TPO: 1000 Watts (via HPA) |
| EIRP: 20 dBW (Peak)      | EIRP: 63.25 dBW (Peak)   | EIRP: 66.69 dBW (Peak)    |
| ERP: 60.26 Watts (Peak)  | ERP: 1.28 MW (Peak)      | ERP: 2.83 MW (Peak)       |

Additional technical information regarding the proposed operations in the C-Band is provided on the attached pages prepared by Comsearch in connection with its frequency coordination of BAE's test.

**10) Type of Emission, Modulation Technique, and Bandwidth Required:**

|                    |                |                |
|--------------------|----------------|----------------|
| <u>UHF SATCOM:</u> | <u>C-Band:</u> | <u>X-Band:</u> |
| 7K20G1D, 5K00G1D   | 2M64G7W        | 3M98G7W        |
| 25K0F1D, 25K0G1D   |                |                |
| 25K9F1D            |                |                |

Other emission modes and modulation techniques may be utilized, but in no event will the emissions extend beyond the frequency bands requested.

**11) Overall Height of Antenna(s) Above Ground:**

HAAT: UHF SATCOM: 30 feet  
HAAT: C/X-Band : 8 feet

**12) Restrictions on Operation:**

As noted above, BAE does not propose to use prototype equipment during this test. The STA will support testing to be conducted under United States Government Contract No. N00024-03-C-2310. BAE is acting as a subcontractor for the integration of communications systems into a ship to be built for the United States Navy under this contract. As such, the equipment will not be marketed to non-federal entities. BAE understands that: (a) permission to operate the units has been granted under experimental authority issued by the Federal Communications Commission, is strictly temporary, and may be cancelled at any time and that (b) operation is subject to the condition that it not cause harmful interference.

**13) Interference Protection/Stop Buzzer Contact Information:**

BAE recognizes that the operation of any equipment under experimental authority must not cause harmful interference to authorized facilities. It therefore will coordinate its activities with any licensees in the proposed bands in accordance with FCC requirements. Should interference occur, the company will take immediate steps to resolve the interference, including if necessary arranging for the discontinuance of operation. In any event, BAE submits that its experimental operations are unlikely to cause interference. The company proposes to limit the power and transmitting times to the minimum necessary to evaluate the equipment.

BAE advises the Commission that Tina Green (BAE Systems - GD LCS Team, Communications IPT, Chief Engineer) will be personally responsible for the tests and will be available at her office at (301) 863-1562 or by mobile telephone at (240) 538-8351. Ms. Green will act as a "stop buzzer" if any issues regarding interference arise during testing.

**14) Compliance With Human Exposure Limits:**

BAE certifies that it will operate under this STA in full compliance with IEEE C95.1 - 1991, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

**15) Application Contact Information:**

Company Contact:

Collin S. Campbell  
Director, Coast Guard Programs  
BAE Systems  
Integrated Electronics Solutions  
23481 Cottonwood Parkway  
California, MD 20619  
Telephone: 301-862-9355  
Facsimile: 301-862-9330  
[collin.s.campbell@baesystems.com](mailto:collin.s.campbell@baesystems.com)

Legal Contacts:

David E. Hilliard  
Kurt E. DeSoto  
Wiley Rein & Fielding LLP  
1776 K Street, N.W.  
Washington, DC 20006  
Telephone: (202) 719-7000  
Facsimile: (202) 719-7207  
[dhilliard@wrf.com](mailto:dhilliard@wrf.com)  
[kdesoto@wrf.com](mailto:kdesoto@wrf.com)

FREQUENCY COORDINATION REPORT  
Temporary Earth Station – Operation Dates 1/02/2007 – 07/02/2007

Prepared for  
BAE Systems  
CALIFORNIA, MD  
Satellite Earth Station

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
October 30, 2006

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Verbal and written coordination was conducted with the below listed carriers on October 27 and October 30, 2006.

Company

AT&T Communications of Maryland Inc  
AT&T Corp  
Bay Broadband Communications LLC  
Baltimore Gas and Electric Company  
College Of Southern Maryland  
Cellco Partnership - Virginia  
Cellco Partnership-Newark-Dallas Verizon  
Charles, County of  
Cingular Pennsylvania, LLC  
Delaware State – DTI

Enoch Pratt Free Library  
Federal Communications Commission  
First Television Corp.(Mid-Atlantic)  
Hanover County  
Maryland Public Broadcasting Commission  
MCI Communication Services, Inc.  
Maryland, State of - DBM  
New Cingular Wireless PCS - VA, MD, DC  
New Cingular Wireless PCS LLC - DC  
Prince William County  
Stafford County Sheriffs Dept  
State of Maryland, Miemss  
Southern Maryland Electric Cooperative  
Virginia Commonwealth State Police  
Verizon Maryland, Inc.  
Verizon Virginia, Inc.  
Virginia Electric & Power Company  
Washington D.C. SMSA L.P.  
Wireless Strategies, Inc.

There are no unresolved interference conflicts involving this earth station

I hereby certify that I am the technically qualified person responsible for the preparation of the frequency coordination data contained in this application. I am familiar with Parts 101 and 25 of the FCC Rules and Regulations. I have either prepared or reviewed the frequency coordination data submitted with this application, and that it is complete and correct to the best of my knowledge and belief.



Timothy O. Crutcher  
Frequency Planner  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: October 30, 2006

The following 3 pages present the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

**COMSEARCH**  
**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5665 <http://www.comsearch.com>

Date: 10/30/2006  
Job Number: 061030COMSTC01

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**Administrative Information**

Status TEMPORARY (Operation from 01/02/2007 to 07/02/2007)  
Licensee Name BAE Systems

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**Site Information** **CALIFORNIA, MD**

Venue Name CDIS FACILITY  
Latitude (NAD 83) 38° 18' 38.0" N  
Longitude (NAD 83) 76° 32' 27.0" W  
Climate Zone A  
Rain Zone 2  
Ground Elevation (AMSL) 33.53 m / 110.0 ft

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**Link Information**

Satellite Type Geostationary  
Mode TO - Transmit-Only  
Modulation Digital  
Satellite Arc 24° W to 56° West Longitude  
Azimuth Range 115.4° to 148.9°  
Corresponding Elevation Angles 20.4° / 40.7°  
Antenna Centerline (AGL) 1.1 m / 3.6 ft

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**Antenna Information** **Transmit - FCC32**

Manufacturer WSC-6  
Gain / Diameter 39.1 dBi / 1.52 m  
3-dB / 15-dB Beamwidth 1.00° / 2.00°

Max Available RF Power (dBW/4 kHz) 38K4G7W - 4M91G7W  
-8.6 -8.6  
(dBW/MHz) 15.4 15.4

Maximum EIRP (dBW/4 kHz) 30.5 30.5  
(dBW/MHz) 54.5 54.5  
(dBW) 40.3 61.4

Interference Objectives: Long Term -154.0 dBW/4 kHz 20%  
Short Term -131.0 dBW/4 kHz 0.0025%

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**Frequency Information** **Transmit 6.1 GHz**

Emission / Frequency Range (MHz) 38K4G7W - 4M91G7W / 5925.0 - 5989.4  
38K4G7W - 4M91G7W / 6019.6 - 6245.0

Max Great Circle Coordination Distance 164.3 km / 102.1 mi  
Precipitation Scatter Contour Radius 100.0 km / 62.1 mi

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5665 <http://www.comsearch.com>

|                                    |                          |
|------------------------------------|--------------------------|
| <b>Coordination Values</b>         | <b>CALIFORNIA, MD</b>    |
| Licensee Name                      | BAE Systems              |
| Latitude (NAD 83)                  | 38° 18' 38.0" N          |
| Longitude (NAD 83)                 | 76° 32' 27.0" W          |
| Ground Elevation (AMSL)            | 33.53 m / 110.0 ft       |
| Antenna Centerline (AGL)           | 1.1 m / 3.6 ft           |
| Antenna Mode                       | Transmit 6.1 GHz         |
| Interference Objectives: Long Term | -154.0 dBW/4 kHz 20%     |
| Short Term                         | -131.0 dBW/4 kHz 0.0025% |
| Max Available RF Power             | -8.6 (dBW/4 kHz)         |

| Azimuth (°) | Horizon<br>Elevation (°) | Antenna<br>Discrimination (°) | Transmit 6.1 GHz      |                               |
|-------------|--------------------------|-------------------------------|-----------------------|-------------------------------|
|             |                          |                               | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) |
| 0           | 0.00                     | 113.72                        | -10.00                | 147.60                        |
| 5           | 0.39                     | 109.13                        | -10.00                | 132.24                        |
| 10          | 0.35                     | 104.46                        | -10.00                | 134.29                        |
| 15          | 0.39                     | 99.78                         | -10.00                | 132.24                        |
| 20          | 0.32                     | 95.08                         | -10.00                | 136.56                        |
| 25          | 0.25                     | 90.38                         | -10.00                | 143.19                        |
| 30          | 0.00                     | 85.70                         | -10.00                | 147.60                        |
| 35          | 0.00                     | 81.01                         | -10.00                | 147.60                        |
| 40          | 0.00                     | 76.34                         | -10.00                | 147.60                        |
| 45          | 0.00                     | 71.68                         | -10.00                | 147.60                        |
| 50          | 0.00                     | 67.04                         | -10.00                | 147.60                        |
| 55          | 0.00                     | 62.42                         | -10.00                | 147.60                        |
| 60          | 0.00                     | 57.84                         | -10.00                | 147.60                        |
| 65          | 0.00                     | 53.31                         | -10.00                | 147.60                        |
| 70          | 0.00                     | 48.84                         | -10.00                | 147.60                        |
| 75          | 0.00                     | 44.45                         | -9.20                 | 150.28                        |
| 80          | 0.00                     | 40.17                         | -8.10                 | 154.07                        |
| 85          | 0.00                     | 36.04                         | -6.92                 | 158.29                        |
| 90          | 0.00                     | 32.13                         | -5.67                 | 162.94                        |
| 95          | 0.27                     | 28.33                         | -4.31                 | 160.41                        |
| 100         | 0.33                     | 25.07                         | -2.98                 | 159.41                        |
| 105         | 0.33                     | 22.47                         | -1.79                 | 164.30                        |
| 110         | 0.42                     | 20.62                         | -0.86                 | 157.81                        |
| 115         | 0.43                     | 19.92                         | -0.48                 | 158.44                        |
| 120         | 0.37                     | 20.48                         | -0.79                 | 163.85                        |
| 125         | 0.46                     | 22.00                         | -1.56                 | 151.92                        |
| 130         | 0.36                     | 24.57                         | -2.76                 | 157.12                        |
| 135         | 0.36                     | 27.70                         | -4.06                 | 152.30                        |
| 140         | 0.35                     | 30.90                         | -5.25                 | 149.09                        |
| 145         | 0.28                     | 33.95                         | -6.27                 | 152.43                        |
| 150         | 0.22                     | 36.75                         | -7.13                 | 155.65                        |
| 155         | 0.00                     | 39.40                         | -7.89                 | 154.81                        |
| 160         | 0.00                     | 41.53                         | -8.46                 | 152.80                        |
| 165         | 0.22                     | 43.06                         | -8.85                 | 148.99                        |
| 170         | 0.48                     | 44.59                         | -9.23                 | 126.91                        |
| 175         | 0.79                     | 46.49                         | -9.68                 | 110.65                        |
| 180         | 1.29                     | 48.61                         | -10.00                | 100.00                        |
| 185         | 1.41                     | 51.32                         | -10.00                | 100.00                        |



# COMSEARCH

## Earth Station Data Sheet

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|                                    |                          |
|------------------------------------|--------------------------|
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| Licensee Name                      | BAE Systems              |
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| Longitude (NAD 83)                 | 76° 32' 27.0" W          |
| Ground Elevation (AMSL)            | 33.53 m / 110.0 ft       |
| Antenna Centerline (AGL)           | 1.1 m / 3.6 ft           |
| Antenna Mode                       | Transmit 6.1 GHz         |
| Interference Objectives: Long Term | -154.0 dBW/4 kHz 20%     |
| Short Term                         | -131.0 dBW/4 kHz 0.0025% |
| Max Available RF Power             | -8.6 (dBW/4 kHz)         |

| Azimuth (°) | Horizon<br>Elevation (°) | Antenna<br>Discrimination (°) | Transmit 6.1 GHz      |                               |
|-------------|--------------------------|-------------------------------|-----------------------|-------------------------------|
|             |                          |                               | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) |
| 190         | 1.60                     | 54.25                         | -10.00                | 100.00                        |
| 195         | 1.27                     | 57.65                         | -10.00                | 100.00                        |
| 200         | 1.27                     | 61.02                         | -10.00                | 100.00                        |
| 205         | 1.27                     | 64.52                         | -10.00                | 100.00                        |
| 210         | 1.29                     | 68.11                         | -10.00                | 100.00                        |
| 215         | 1.11                     | 71.84                         | -10.00                | 100.00                        |
| 220         | 1.37                     | 75.53                         | -10.00                | 100.00                        |
| 225         | 1.37                     | 79.33                         | -10.00                | 100.00                        |
| 230         | 0.92                     | 83.21                         | -10.00                | 104.08                        |
| 235         | 1.00                     | 87.04                         | -10.00                | 100.39                        |
| 240         | 1.45                     | 90.89                         | -10.00                | 100.00                        |
| 245         | 1.20                     | 94.74                         | -10.00                | 100.00                        |
| 250         | 1.22                     | 98.58                         | -10.00                | 100.00                        |
| 255         | 1.37                     | 102.42                        | -10.00                | 100.00                        |
| 260         | 1.33                     | 106.19                        | -10.00                | 100.00                        |
| 265         | 1.29                     | 109.90                        | -10.00                | 100.00                        |
| 270         | 1.29                     | 113.55                        | -10.00                | 100.00                        |
| 275         | 1.39                     | 117.15                        | -10.00                | 100.00                        |
| 280         | 1.15                     | 120.48                        | -10.00                | 100.00                        |
| 285         | 1.08                     | 123.74                        | -10.00                | 100.00                        |
| 290         | 1.08                     | 126.86                        | -10.00                | 100.00                        |
| 295         | 1.08                     | 129.77                        | -10.00                | 100.00                        |
| 300         | 1.15                     | 132.47                        | -10.00                | 100.00                        |
| 305         | 1.11                     | 134.81                        | -10.00                | 100.00                        |
| 310         | 1.05                     | 136.77                        | -10.00                | 100.00                        |
| 315         | 0.87                     | 138.21                        | -10.00                | 106.11                        |
| 320         | 0.53                     | 139.03                        | -10.00                | 121.66                        |
| 325         | 0.37                     | 139.51                        | -10.00                | 133.59                        |
| 330         | 0.38                     | 139.66                        | -10.00                | 132.77                        |
| 335         | 0.41                     | 136.42                        | -10.00                | 130.61                        |
| 340         | 0.26                     | 131.98                        | -10.00                | 141.42                        |
| 345         | 0.00                     | 127.43                        | -10.00                | 147.60                        |
| 350         | 0.00                     | 122.90                        | -10.00                | 147.60                        |
| 355         | 0.23                     | 118.38                        | -10.00                | 144.44                        |