



A Textron Company

May 20, 2020

**Federal Communications Commission 445 12th Street SW
Washington, DC 20554**

Title: Bell Textron Coordination Request – STA – Fort Worth, TX

Appendix A: Hardware Specifications

Appendix B: FCC Grant of Equipment Specifications

Dear FCC,

This request for Special Temporary Authority (STA) is submitted pursuant to 47 CFR 5.61 to request authorization to perform a series of short flight tests for ground-based radar evaluation in support of a NASA contract. The proposed operations are planned for two separate locations between August 1, 2020 through October 30, 2020. The other location, Wrangler Airfield (Bell Textron) near Graford, TX will be submitted in a separate request.

The STA is for a temporary installation of a ground-based surveillance system (GBSS) to support NASA research in See and Avoid technologies.

Location:

Bell Helicopter – Floyd Carlson Field
Fort Worth, TX
Tarrant County
9601 Trinity Blvd, Hurst, TX 76053
Test Area Center Point (32° 48' 17.5" N, 97° 08' 57.8" W)
MIRAD: 3.7 miles (6 km)
Reference Figure 1 below.

Dates of Operation: 08/01/2020 to 10/30/2020
Frequency: 24450.000-24650.000 MHz, Emission Designator – 45M0FXN
Power: 3.2 Watts/ 246.0 Watts Peak ERP
Height Above Ground: 40 feet (12 meters)

Number of radar panels active at one time is 4 sets of 4 equaling 16 total.

Figure 1 depicts location area of deployment. The blue sectors define the location of each radar and the direction it is pointing. Figure 2 depicts additional views to clarify radar mast arrangement. Figure 3 shows areas of trees and structures surrounding test area that would

help to attenuate or contain the radio frequency emissions. Figure 4 depicts the frequency license coverage area.



Figure 1: Location 1 Radar sites in Fort Worth, TX

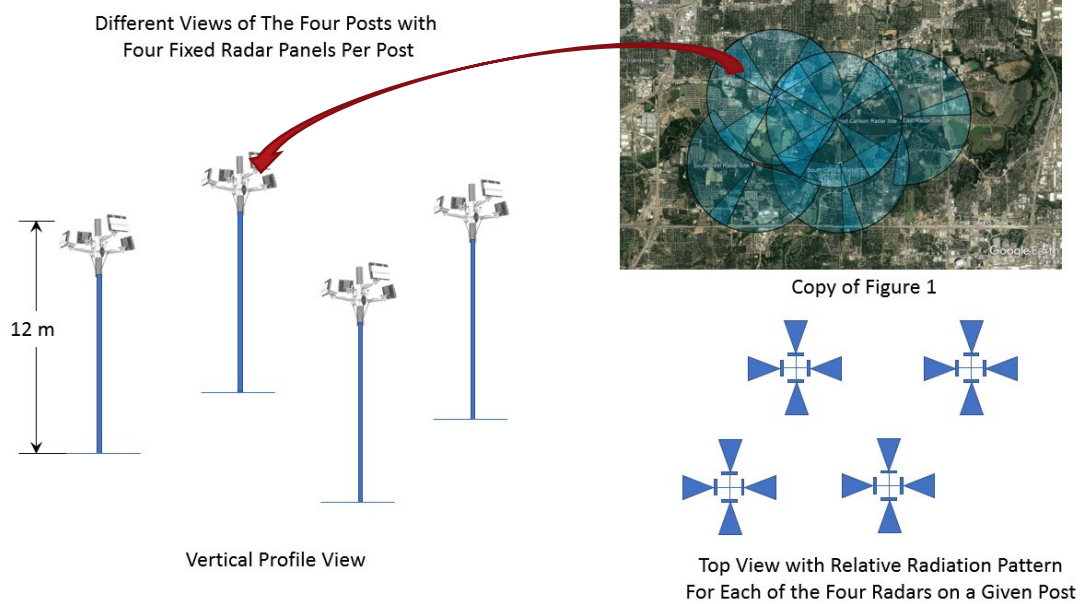


Figure 2: Additional Views Showing Radar Mast Arrangements

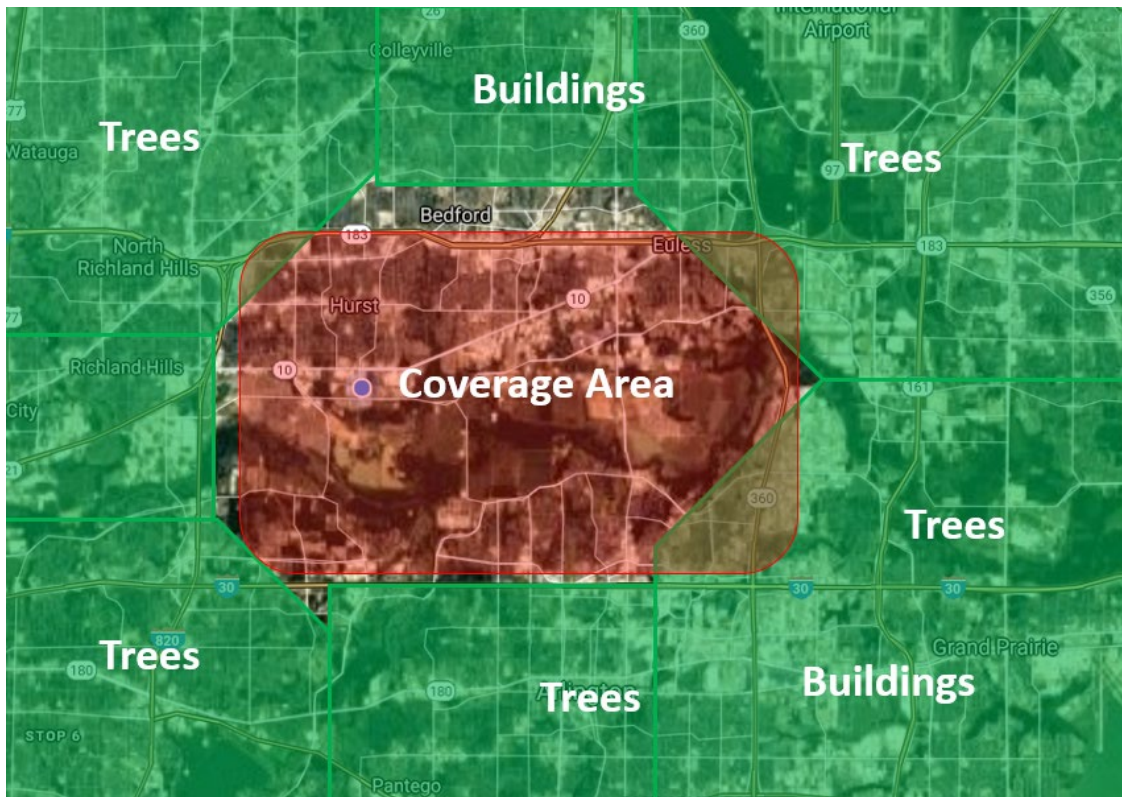


Figure 3: Coverage Area Showing Areas of Trees and Structures in the Surrounding Area

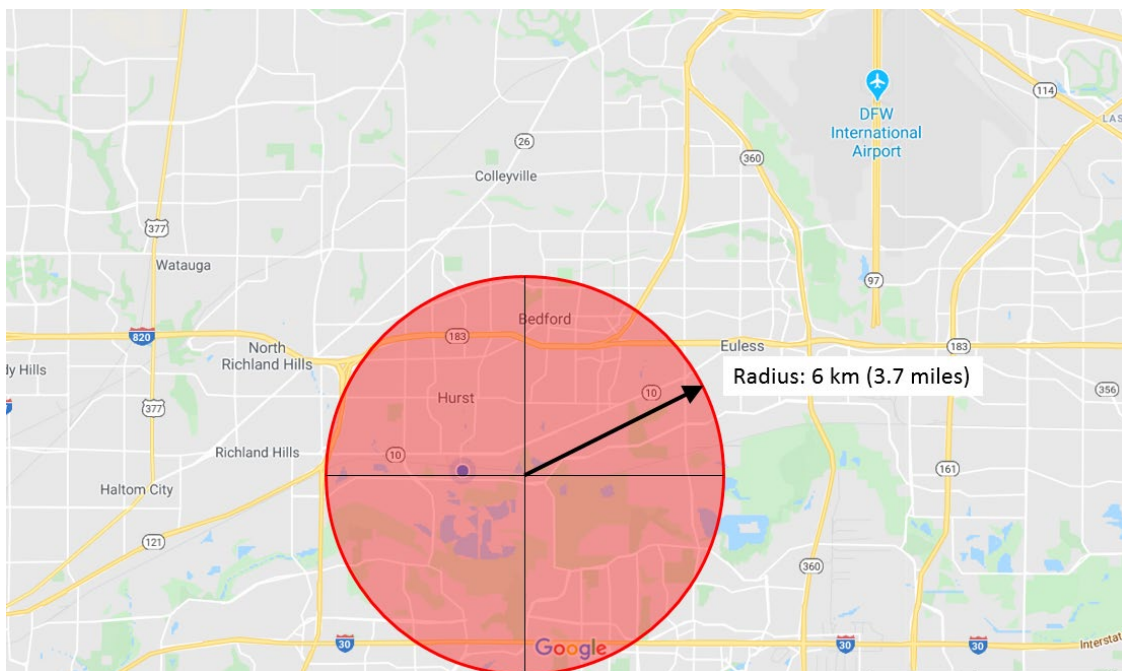


Figure 4: Frequency License Coverage Area

The GBSS will utilize Echodyne EchoGuard™ radars running EchoGuard™ UI for observing local airspace. The coverage area will have four EchoGuard™ radars on each of four temporary quick setup/takedown portable masts. The radars will utilize the "A6/PRISM" configuration. This configuration, A6 Field Programmable Gate Array (FPGA) enables the use of Echodyne's new interference mitigation method called PRISM (PRI Skewing Method). This method helps to mitigate interference between the radars in a dense urban environment.

The radars will be mounted to an extendable pole with brackets about 12 meters above ground level. The radars will be powered by temporary power such as a local generator. The radars will be connected to an Echodyne-designed control box. The Echodyne-designed control box is a ruggedized box which allows the ability to control up to four radars at each station. Each radar panel will be monitored by an operator when in use.

Stop Buzzer Contact:

Mark Stoufflet
Bell Textron
(817) 280-7984

Kind Regards,



Mark Stoufflet
Bell Frequency Coordinator

EXHIBIT A:

Hardware Specifications

EchoGuard

3D Surveillance Radar

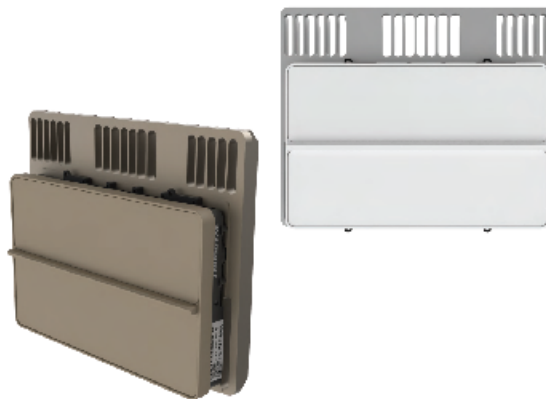
Market-leading surveillance radar for robust ground and airspace perimeter security

 Vehicles
> 3.5 km

 Humans
> 2.2 km

 Inspire II
> 1 km

 Phantom 4
> 900 m



OVERVIEW

High-performance small Electronically Scanned Array (ESA) radar detects and tracks ground and air threats simultaneously in all conditions. Based on proprietary MESA® technology, EchoGuard delivers ESA performance at orders of magnitude lower size, weight, power, and cost (ultra-low SWaP-C). Industry-leading features include wide field-of-regard, real beam scanning in azimuth and elevation, search while track, and excellent range and accuracy. EchoGuard's software suite, Acuity, offers calibration-free plug-and-play integration, digital configurability to suit different operators and missions, and multiple data output options, including rich raw data that only an ESA radar can generate.

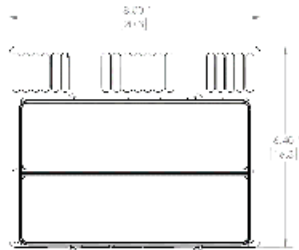
ECHODYNE

CONTACT info@echodyne.com
+1.425.454.3246

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EchoGuard

3D Surveillance Radar



Performance

Instrumented range	6 km
Range (sUAV)	> 900 m (Phantom 4) > 1 km (Inspire II)
Range (vehicles)	> 3.5 km
Range (humans)	> 2.2 km
Field of view	120° azimuth x 80° elevation
Angular Resolution	±1° (azimuth) x ±3° (elevation)
Frequency	24.45 - 24.65 GHz (multi-channel)

Search While Track

Scan volume	User configurable with FOV
Scan update rate	~1 Hz for 120° (azimuth) x 20° (elevation) volume
Track acquisition rate	New tracks acquired in < 1 second
Search While Track	Tracks updated up to 10 Hz while radar intelligently scans rest of FOV
Max tracks	Up to 20 simultaneous tracks
Modes	Operational modes enable quick simple tracking of humans and UAVs

SWaP and Environmental

Size	20.3 cm x 16.3 cm x 4 cm
Weight	1.25 kg
Power	DC +15 V to +28 V <50 W (Operating) <15 W (Hot standby)
Operating temp	-40°C to +75°C
Weather Protection	IP67

Integration and Data

Control I/O	Gigabit Ethernet
Power I/O	Snap lock 12 pin connector
Data Outputs	RVMs (40 MB/s) Detections (1 MB/s) Measurements (~1MB/s) Tracks (24 kB/s)
Mounting	VESA 75 & 100 mm; AMPs

Ordering Information

Color: WHITE	700-0005-003
Color: TAN	700-0005-004

FCC Identifier 2ANLB-MESASSR00053

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CONTACT info@echodyne.com
+1.425.454.3246

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EchoGuard

Tower Mounting Kit

Complete kit for mounting EchoGuard radars to achieve 360° airspace situational awareness

 Vehicles
> 3.5 km

 Humans
> 2.2 km

 Inspire II
> 1.2 km

 Phantom 4
> 900 m



OVERVIEW

All-weather 24/7 airspace situational awareness solution for securely mounting up to 4 EchoGuard radars (*not included*) for 1 km sUAS radial tracking range (2 km diameter). Precisely position radars on a central column for overlapping coverage to support 360° azimuth by 80° elevation airspace surveillance without the inherent track update delay from rotational radar systems. Enables camera slew-to-cue coordination, track hand-off, and data fusion with other sensor modalities (ADS-B, RF direction finding, etc). Fully customizable solution that adapts to your site plans and mission requirements.

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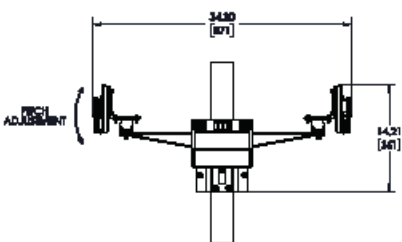
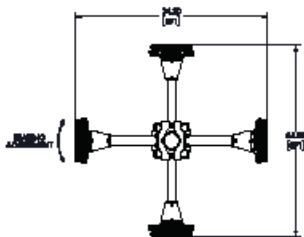
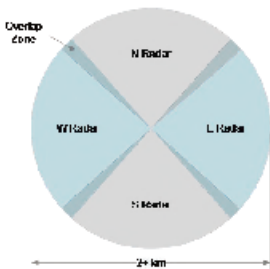
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EchoGuard

Tower Mounting Kit

Key Features

- 4 EchoGuard radars on a pole provide 1 km radial coverage for sUAS
- Modular system includes separate arm brackets and pole adapters
- Easily configurable for mounting 1, 2 or 4 radars
- Powder coated, solid aluminum construction with mounting hardware
- Accommodates pole diameters from 65 to 225+ mm (2.6" to 8.6"+)
- Arm brackets include swivel for customized radar orientations.
- Additional options for building parapet and corner mount solutions.
- Cabling solutions for any scenario



	Part Number	Pole Diameter Range	Weight [kg]*	Nominal Dimensions
Small Kit	700-0016-001	65 - 110 mm [2.6 - 4.3"]	7.6	34.3" W x 14.2" T
Medium Kit	700-0016-002	80 - 150 mm [3.1 - 5.9"]	16.8	39.4" W x 18.0" T
Large Kit	700-0016-003	210 - 225 mm [8.3 - 8.6"]	11.2	42.7" W x 18.1" T

* Weight for 4-up bracket kit, not incl. radars or cabling

	Part Number
2" Interface Cable	570-0001-001
8" Interface Cable	570-0001-002
20' Customizable Interface Cable	570-0001-003
Pole-mount interface junction boxes	Call

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EXHIBIT B:

FCC Grant of Equipment Authorization

TCB**GRANT OF EQUIPMENT
AUTHORIZATION****TCB**

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

Nemko North America, INC.
303 River Road
Ottawa, Ontario, K1V 1H2
Canada

Date of Grant: 07/30/2019

Application Dated: 09/15/2018

Echodyne Corp.
12112 115th Ave NE
Kirkland, WA 98034

Attention: Andrea Radosevich

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is
VALID ONLY for the equipment identified hereon for use under the Commission's
Rules and Regulations listed below.

FCC IDENTIFIER: 2ANLB-MESASSR00053
Name of Grantee: Echodyne Corp.
Equipment Class: Licensed Non-Broadcast Station
Transmitter
Notes: Security and Surveillance Radar

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
	87	24467.5 - 24512.5	3.16	10.0 PM	45M0FXN
	87	24527.5 - 24572.5	3.16	10.0 PM	45M0FXN
	87	24587.5 - 24632.5	3.16	10.0 PM	45M0FXN

Power output listed is conducted. Approved according to fixed RF exposure conditions. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 1 m from all persons. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

FCC authorization does not signify FAA Approval for use of this system as an airborne DAA radar. Users should check with the Federal Aviation Administration (FAA) for guidance and authorization as necessary prior to use of the radar in aircraft.