Gmail by Google

Evan Zaugg <evan@artemisinc.net>

FW: **Update** RE: FOUO\\RE: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

1 message

Ramirez, Edwin J CIV USARMY CCDC C5ISR (USA) <edwin.j.ramirez.civ@mail.mil> Thu, Mar 5, 2020 at 1:26 PM
To: Evan Zaugg <evan@artemisinc.net>, Yuly Margulis <yuly@artemisinc.net>
Cc: "Deroba, Joseph C CIV USARMY CCDC C5ISR (USA)" <joseph.c.deroba.civ@mail.mil>, "Swindell, James T (Ph.D) CIV USARMY CCDC (USA)" <james.t.swindell.civ@mail.mil>, "Welch, Ronald F Jr CIV USARMY CCDC C5ISR (USA)" <ronald.f.welch2.civ@mail.mil>, "Spak, Jeffrey S CIV USARMY CCDC C5ISR (USA)" <jeffrey.s.spak.civ@mail.mil>

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Dear Evan,

Eglin AFB just responded to the frequency allocation request. The fastest route is to update your FCC license ASAP.

V/r,

Edwin J Ramirez
RSTA Radar Team
Airborne Radar Branch
DEVCOM|C5ISR|I2WD|RSID
COMM: 443.395.0498 | DSN: 648-0498
iPhone: 443.307.1955
NIPR: edwin.j.ramirez.civ@mail.mil
SIPR: edwin.j.ramirez.civ@mail.smil.mil
JWICS: edwin.j.ramirez.civ@army.ic.gov

-----Original Message-----
From: HEISE, DANIEL K MSgt USAF AFMC 46 TS/CCS [mailto:daniel.heise@us.af.mil]
Sent: Thursday, March 5, 2020 2:10 PM
To: Dulle, Todd T CIV USAF (USA) <todd.dulle.1@us.af.mil>; Ramirez, Edwin J CIV USARMY CCDC C5ISR (USA) <edwin.j.ramirez.civ@mail.mil>
Subject: **Update** RE: FOUO\\RE: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

Update: The information I'm getting from my spectrum leadership is that the FCC Experimental License for ARTEMIS, Call Sign WI2XXH, File Number 0233-EX-CR-2019, will need to be updated to reflect Eglin AFB (centered on C-72) as an operating location. The Note-to-Holder to have Eglin added for the J/F 12 will take too long since this test is in 30 days. The best route is to just update the Experimental License through the FCC asap.

v/r

MSgt Daniel Heise
Spectrum Manager/Superintendent
46 Test Squadron
Eglin AFB, FL 32542
Comm 850-882-5642

-----Original Message-----
From: DULLE, TODD T GS-12 USAF AFMC 46 TS/TGBB <todd.dulle.1@us.af.mil>
Sent: Thursday, March 5, 2020 12:54 PM
To: EDWIN RAMIREZ (edwin.j.ramirez.civ@mail.mil) <edwin.j.ramirez.civ@mail.mil>
Cc: HEISE, DANIEL K MSgt USAF AFMC 46 TS/CCS <daniel.heise@us.af.mil>

Subject: FW: FOUO\\RE: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

Mr. Ramirez,

Please see below response concerning RFA for Artemis Radar. Please go via direct with MSgt Heise, don't want to hold up progress since I'm TDY.

Todd Dulle
46TS/TGBB
850-882-7651
DSN: 872-7651
Fax: 850-883-1216
SIPRnet: todd.t.dulle.civ@mail.smil.mil
JWICS: todd.dulle@af.ic.gov

-----Original Message-----
From: HEISE, DANIEL K MSgt USAF AFMC 46 TS/CCS <daniel.heise@us.af.mil>
Sent: Thursday, March 5, 2020 12:31 PM
To: DULLE, TODD T GS-12 USAF AFMC 46 TS/TGBB <todd.dulle.1@us.af.mil>
Subject: FOUO\\RE: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

This e-mail contains FOR OFFICIAL USE ONLY (FOUO)

Mr. Dulle,

For the MicroHardpDDL2450, we are good to go with an existing Eglin assignment.

For the Artemis Radar, on the FCC Experimental License, it lists 9525 MHz and 34.4 GHz. I found J/F 12 10552 for the X-Band Radar operating at the 9525 MHz (but not for Eglin which we can request), but the 34.4 GHz is not listed at all.

I need to know if you need the 34.4 GHZ at all. If so, Artemis would need to amend that Experimental License to add Eglin AFB as an operating location for bother frequencies. If you only need the X-Band, I can have Brian Franklin do a Note to Holder (NTH) to add Eglin as a location on the J/F 12 and then I would submit a frequency proposal. When I put that in, you know it can take a couple months but Brian can authorize it locally as long as the NTH is approved and the proposal is moving along.

v/r

MSgt Heise

-----Original Message-----
From: DULLE, TODD T GS-12 USAF AFMC 46 TS/TGBB <todd.dulle.1@us.af.mil>
Sent: Wednesday, March 4, 2020 10:12 PM
To: HEISE, DANIEL K MSgt USAF AFMC 46 TS/CCS <daniel.heise@us.af.mil>
Subject: FW: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

MSgt Heise,

The ALE program office requested that we add the Artemis Radar to our collection 6-17 April. Attached is their documentation for the data link and the radar. Is this possible for us to add to our RFA?

Todd Dulle
46TS/TGBB

850-882-7651
DSN: 872-7651
Fax: 850-883-1216
SIPRnet: todd.t.dulle.civ@mail.smil.mil
JWICS: todd.dulle@af.ic.gov

-----Original Message-----
From: Ramirez, Edwin J CIV USARMY CCDC C5ISR (USA)
<edwin.j.ramirez.civ@mail.mil>
Sent: Wednesday, March 4, 2020 2:57 PM
To: DULLE, TODD T GS-12 USAF AFMC 46 TS/TGBB <todd.dulle.1@us.af.mil>
Subject: FW: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

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Dear Todd,

Please see attached.

V/r,

Edwin J Ramirez
RSTA Radar Team
Airborne Radar Branch
DEVCOM|C5ISR|I2WD|RSID
COMM: 443.395.0498 | DSN: 648-0498
iPhone: 443.307.1955
NIPR: edwin.j.ramirez.civ@mail.mil
SIPR: edwin.j.ramirez.civ@mail.smil.mil
JWICS: edwin.j.ramirez.civ@army.ic.gov

-----Original Message-----
From: Evan Zaugg [mailto:evan@artemisinc.net]
Sent: Wednesday, March 4, 2020 3:13 PM
To: Ramirez, Edwin J CIV USARMY CCDC C5ISR (USA)
<edwin.j.ramirez.civ@mail.mil>; Deroba, Joseph C CIV USARMY CCDC C5ISR (USA)
<joseph.c.deroba.civ@mail.mil>; Corriveau, Jonathan P CIV USARMY CCDC C5ISR
(USA) <jonathan.p.corriveau.civ@mail.mil>; Swindell, James T (Ph.D) CIV USARMY
CCDC (USA) <james.t.swindell.civ@mail.mil>; Welch, Ronald F Jr CIV USARMY CCDC
C5ISR (USA) <ronald.f.welch2.civ@mail.mil>; Spak, Jeffrey S CIV USARMY CCDC
C5ISR (USA) <jeffrey.s.spak.civ@mail.mil>
Cc: Alex Margulis <alex@artemisinc.net>; Alexander Kozak
<akozak@artemisinc.net>; Joshua Bradley <jbradley@artemisinc.net>; Jason Peach
<jpeach@artemisinc.net>; Yuly Margulis <yuly@artemisinc.net>; Max Margulis
<max@artemisinc.net>
Subject: [Non-DoD Source] Re: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)

All active links contained in this email were disabled. Please verify the
identity of the sender, and confirm the authenticity of all links contained
within the message prior to copying and pasting the address to a Web browser.

Edwin,

I have attached our frequency paperwork for the radar and for our datalink.
We have a ground segment and the aircraft segment for the data link:

Ground Station:

Radio: Microhard pDDL2450
Amplifier: Microhard DLL Amp 2400
Antenna: L-com HG2420P-120

Aircraft:
Radio: Microhard pDDL2450
Amplifier: Microhard DLL Amp 2400
Antenna: Antcom 9B-2.20-2.50XT-1-6dB

Let me know what additional information you need regarding frequency approval.

Airworthiness documentation is coming in a separate email.

Here are answers to your questions:

1. Provide thefollowing information about your aircraft to support the Army test planning:

a. Airspeed

120 knots

b. Estimated timeto arrive on station

15 min

c. Maximum datacollection duration

3 hours

d. Estimatednumber of passes per flight

Approximately 25

2. Targetlayout: The test area will be a 1 km x 1km area. There will be nine different, large military vehicle targets. Therewill be three quad trihedral corner reflectors and three top hat reflectors.The sizes of these calibration reflectors are provided on an accompanying Excelspreadsheet.

a. What would bea desirable target layout?

Targets evenly spread out. The proposed layout looks fine.

b. What would beyour worst-case layout, e.g. the minimum distance between the vehicle targetsand calibration reflectors?

20 m

c. Are the sizesof the calibration reflectors suitable for your system?

Yes

d. How should thequad corner reflectors be oriented? NSEW

The corner reflectors are quad-type,so they point in four directions, separated by 90 degrees. I would recommend having them centeredpointing at true-north, east, south, and west.

3. Governmentdesires SAR imagery collected at 1.0, 2.5, 5, 8 and 15

degree grazing anglesfor collecting target signature data. The data collection will be broken downas primarily spotlight mode with 0.3 m resolution, spotlight mode with thevendors' finest resolution, and circle SAR mode with the vendors' mostappropriate resolution for imaging the target area. It is desired that at leasttwo passes be made for each imaging geometry and resolution.

a. Assuming 6days of data collection (for comparison purposes), how many passes can yoursystem collect?

Approximately 150

b. What is yourtypical time allocation during a pass, e.g. time to reach the starting pointafter completing the previous pass, the time to align the aircraft for the datacollection, the time to collect the data, the time to move the data topermanent storage, etc.?

We can only image out the left sideof the aircraft, so in repeating flight passes, it takes the time of the collectionpass plus 1 minute to turn on each end. So, for a 1 minute collection period, we can fly the same line about 4minutes later. For different aspectangles, we can set up the planned flight paths such that we can begin a newcollect a few seconds after the end of the previous collect.

c. How will yoursystem change the grazing angle, e.g. changing altitude, changing standoffrange, a combination of each? Note that the airspace is limited to altitudes ofbetween 500 and 5000 ft. AGL, and to a maximum distance from the target area of20 km.

We will use altitudes between 1000feet and 5000 feet AGL while adjusting the standoff range in order to get thedesired grazing angle to the target. If thereis a preferred standoff range, we will do what we can to maintain that range.

4. The Government is planning on themajority of the SAR image collection passes being made in linear spotlight andcircle modes. However, the collection of a wider area stripmap mode is also ofinterest. The stripmap mode images would be made, for example, by flying northto south and looking to the west, and then flying south to north and looking tothe east. Desired grazing angles of 1, 2.5 and 15 degrees. Given thisinformation, how much time would you need for 12 stripmap data (3 grazingangles x 2 aspect angles x 2 repeats) collection passes? What resolution stripmode can you collect (ideally no coarser than 1.0m).

We can do stripmap imaging at asfine a resolution as 0.3 meters. To do12 stripmap collects would take approximately 1 hour, depending on how long youwant each image to be.

5. Do you haveany flight time restrictions to work around potential airspace restrictions?Essentially, outside normal work hours (0800-1600).

Yes, we only fly during daylight hoursin VFR conditions.

Thanks,
-Evan

On Wed, Mar 4, 2020 at 10:30 AM Yuly Margulis <yuly@artemisinc.net < Caution-mailto:yuly@artemisinc.net > > wrote:

---------- Forwarded message ---------
From: Ramirez, Edwin J CIV USARMY CCDC C5ISR (USA)

<edwin.j.ramirez.civ@mail.mil < Caution-mailto:edwin.j.ramirez.civ@mail.mil >
>
Date: Wed, Mar 4, 2020, 12:20 PM
Subject: Small Form Factor Radar (SF2R) Demonstration information (see in HTML) (UNCLASSIFIED//FOUO)
To: Yuly Margulis <yuly@artemisinc.net < Caution-mailto:yuly@artemisinc.net >
>, Max Margulis <max@artemisinc.net < Caution-mailto:max@artemisinc.net > >
Cc: Deroba, Joseph C CIV USARMY CCDC C5ISR (USA) <joseph.c.deroba.civ@mail.mil < Caution-mailto:joseph.c.deroba.civ@mail.mil >
>, Corriveau, Jonathan P CIV USARMY CCDC C5ISR (USA) <jonathan.p.corriveau.civ@mail.mil < Caution-mailto:jonathan.p.corriveau.civ@mail.mil > >, Swindell, James T (Ph.D) CIV USARMY CCDC (USA) <james.t.swindell.civ@mail.mil < Caution-mailto:james.t.swindell.civ@mail.mil > >, Welch, Ronald F Jr CIV USARMY CCDC C5ISR (USA) <ronald.f.welch2.civ@mail.mil < Caution-mailto:ronald.f.welch2.civ@mail.mil > >, Spak, Jeffrey S CIV USARMY CCDC C5ISR (USA) <jeffrey.s.spak.civ@mail.mil < Caution-mailto:jeffrey.s.spak.civ@mail.mil > >

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Dear Yuly and Max,

Here are the responses to the questions provided by Artemis:

1. Schedule - The Demonstration is slated to happen April 6 – 17th. We will not be doing flights on Easter weekend. Please the table below for the actual schedule of collections.

April - SF2R Demo

5

6

7

8

9

10

11

Arrival day

Calibration

Flights

Normal

collection

Normal

collection

Normal

collection

Easter

weekend

12

13

14

15

16

17

18

Easter

weekend

Normal

Collection

Normal

collection

/

Backup day

VIP Day

VIP Day

(backup)

Depart

Typical flight collections will occur following this schedule:

Dates and flight type

Time

Vendor

Day 1

0700-1000

1

1000-1300

2

1300-1600

3

1600-1900

4

Day 2

0700-1000

2

1000-1300

3

1300-1600

4

1600-1900

1

Day 3

0700-1000

3

1000-1300

4

1300-1600

1

1600-1900

2

Day 4

0700-1000

4

1000-1300

1

1300-1600

2

1600-1900

3

Note that each collection day will have multiple vendors (4) doing SAR collection flights over a 12 hour span. Each vendor will be assigned a time slot. These time slots will be rotating from day to day. The goal of the collection event is to collect a diverse set of imaging geometries (i.e. grazing angles). During the VIP day we are planning to show the results of the previous collections and any system specific capabilities such as a data downlink.

2. Telecon - I2WD open to hosting a teleconference tomorrow March 5, 2020

3. Flight questions

a. Is a hangar provided or do we have to find our own spot?

Answer: Artemis will have to find their own spot. Given the short turn around on this demo we were not able to secure hangar space at Eglin AFB. The majority of the vendors will fly out of Destin Executive Airport. It is located to the south of the test range with an estimated flight time of 15 minutes to get on station. Here is the private airports' website and information: Caution-https://www.flydts.com/ < Caution-https://www.flydts.com/ >

b. What area will we be flying?

Answer: We have been assigned range C-72. The figures below depicts Eglin AFB Test Range C-72 (approximate coordinates: 30°38'47.1"N 86°19'19.2"W)

C-72 zoomed in

Orange square= 1km2

Ground site (C-72) and Targets:

Ground site:

* Will be a flat open area (approximately 1km2)

* Will avoid large metal structures and wires in vicinity of targets

* Vendors, government personnel and other authorized parties will have access to target area

* Eglin work hours - 12 hour days max

Designated work area

* Eglin to provide temporary structure for VIP demo setup and execution

* Temporary structure will be available to vendors prior to VIP day

* Setup and display areas will be provided

* Operations room at Range – Will be adjacent to VIP area

Targets:

* I2WD will be provided survey data for all targets (GPS, photographs, location, etc.)

* Calibration targets: Corner reflectors – Will be provided by Eglin AFB (see attached spreadsheet for the reflector technical specifications)

* Military targets

* A list of 9 military targets has been created based upon requirements from the funding agency

* All targets have been identified in Eglin's storage facility and are available for the demo dates

c. Restricted airspace? Permits? Etc.

Answer: There are airspace restrictions that must be observed. Eglin AFB will coordinate with I2WD so that we are minimally affected by airspace restrictions.

* Eglin can create profiles to fit I2WD's needs for the demonstration.

* Eglin has complete control of the Yellow area in the figure below.

* Multiple restrictions for longer stand off ranges

* Majority of restrictions can be avoided after duty hours (0800 – 1600)

Here is a sample flight profile from Eglin AFB:

Yellow area : Restricted airspace: R2914A (controlled by Eglin AFB)

Red area: Avoid / restricted area – C-52.G001

d. What airport around there do we go to?

Answer: For your aircraft please see 3-a. Personal travel: Destin-Fort Walton beach

e. Fuel?

Answer: Arranged between Artemis and the private airport

f. TRB/SRB

Answer: All final reviews will be conducted the week prior the demonstration. A cursory technical and safety review was conducted last week with the other vendors.

g. Airworthiness

Answer: This will be handled through AED. This needs to be done immediately. Please remember to cc I2WD in all you communications with AED. Here is the contact information:

Brad Mason

Branch Chief, AED Fixed Wing

Bldg. 5681 Wood Rd

Redstone Arsenal, AL 35898

(256)313-2376

charles.b.mason12.civ@mail.mil < Caution-mailto:charles.b.mason12.civ@mail.mil >

Here are the items that must be addressed (AKA information Mr. Mason will request)

I. Please provide a summary detailing equipment that will be installed/carried on the aircraft to support the test event. If the equipment will not be a permanent installation, please address how the equipment will be secured during flight.

a. How many components and their physical characteristics (radar R/T, electronic/electric control/power supply/antenna, etc., Length/width/depth/weight, etc., power requirements of the equipment).

b. Where does the power come from - the airplane or some independent source.

c. How is this system integrated with the aircraft? (where will the special equipment be located, will the aircraft be modified in any manner, will the equipment be 'carried' on the aircraft and secured with straps/bolts/duct tape)

II. If the airplane will be modified will there be FAA approval (337/8110-3/STC/etc.) for the modification Will this test require that the aircraft be operated in an unusual manner or outside of its normal operating limitations?

III. Please provide a copy of the proposed aircraft's FAA Certificate of Airworthiness and any applicable Form 337s, 8110s, etc. for the equipment that will be installed/carried on the aircraft to support the test event.

IV. If aircraft will be operating in a restricted category please provide any associated Operating Limitations and Program Letter.

4. Frequency coordination.

Answer: This needs to be done immediately. The equipment needs a current DoD certification (DD 1494), or if it is commercial it needs to be FCC Part 15 compliant, have and FCC experimental license (you need to provide the tracking number), or a special temporary approval to operate at a specific locations. Complete the attached document (3_Frequency Management Info) and return it to I2WD NLT 3/5/2020. Do not email to the POC on the form. We will personally forward to the 46 Test Squadron test engineer coordinating the demonstration.

5. Are we bringing datalink? Do we need approvals for that?

Answer: We encourage you to demonstrate all your system capabilities for the VIP day. This would include your data link. You need additional frequency authorization for your datalink. Please provide your data link information (equipment used, frequencies used, FCC ID numbers, additional licenses, etc.)

Questions for ARTEMIS: We require responses to these questions NLT 3/5/2020

1. Provide the following information about your aircraft to support the Army test planning:

a. Airspeed

b. Estimated time to arrive on station

c. Maximum data collection duration

d. Estimated number of passes per flight

2. Target layout: The test area will be a 1 km x 1 km area. There will be nine different, large military vehicle targets. There will be three quad trihedral corner reflectors and three top hat reflectors. The sizes of these calibration reflectors are provided on an accompanying Excel spreadsheet.

a. What would be a desirable target layout?

b. What would be your worst-case layout, e.g. the minimum distance between the vehicle targets and calibration reflectors?

c. Are the sizes of the calibration reflectors suitable for your system?

d. How should the quad corner reflectors be oriented? NSEW

Proposed Target Layout:

Legend:

Triangle – Military target

Circle – Top hat reflectors

Square – Quad trihedral corner reflectors

3. Government desires SAR imagery collected at 1.0, 2.5, 5, 8 and 15 degree grazing angles for collecting target signature data. The data collection will be broken down as primarily spotlight mode with 0.3 m resolution, spotlight mode with the vendors' finest resolution, and circle SAR mode with the vendors' most appropriate resolution for imaging the target area. It is desired that at least two passes be made for each imaging geometry and resolution.

a. Assuming 6 days of data collection (for comparison purposes), how many passes can your system collect?

b. What is your typical time allocation during a pass, e.g. time to reach the starting point after completing the previous pass, the time to align the aircraft for the data collection, the time to collect the data, the time to move the data to permanent storage, etc.?

c. How will your system change the grazing angle, e.g. changing altitude, changing standoff range, a combination of each? Note that the airspace is limited to altitudes of between 500 and 5000 ft. AGL, and to a maximum distance from the target area of 20 km.

Spotlight track:

Circle track:

4. The Government is planning on the majority of the SAR image collection passes being made in linear spotlight and circle modes. However, the collection of a wider area stripmap mode is also of interest. The stripmap mode images would be made, for example, by flying north to south and looking to the west, and then flying south to north and looking to the east. Desired grazing angles of 1, 2.5 and 15 degrees. Given this information, how much time would you need for 12 stripmap data (3 grazing angles x 2 aspect angles x 2 repeats) collection passes? What resolution strip mode can you collect (ideally no coarser than 1.0m).

5. Do you have any flight time restrictions to work around potential airspace restrictions? Essentially, outside normal work hours (0800-1600).

As previously stated all these questions and deliverables are needed

immediately.

We would like to host a teleconference with you tomorrow (3/5/2020). Please let us know your availability.

V/r,

Edwin J Ramirez

Radar Analyst

RSTA Radar Team

Airborne Radar Branch

Radar Systems and ID Division

C5ISR Center, Intelligence Information Warfare Directorate

U.S. Army Combat Capabilities Development Command (DEVCOM)

COMM: 443.395.0498 | DSN: 648-0498

iPhone: 443.307.1955

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Caution-mailto:edwin.j.ramirez.civ@mail.smil.mil >

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