SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

The System Name is : GA-ASI Detect & Avoid System (DAA), Due Regard System (DRS) Radar

The overall classification of this application is : **UNCLASSIFIED**

Refer to your Security Manual for further guidance.

The Application Level Special Handling is : A

Approved for public release; distribution is unlimited (DoD Directive 5230.24)

DOWNGRADING INSTRUCTIONS

Special Handling Instruction : A

CLASSIFICATION

UNCLASSIFIED

FULL RECORD PRINT FOR GA-ASI DETECT & AVOID SYSTEM (DAA), DUE REGARD SYSTEM (DRS) RADAR

SELECTED FREQUENCIES

(U) 8750.000 MHz - 8850.000 MHz

System Name (Nomenclature) (U) GA-ASI Detect & Avoid System (DAA), Due Regard System (DRS) Radar	**Stage** (U) 4 - Operational
Coord. ID/Coord. Num. J/F 12/	**NTIA Certified** (U) No
Agency (U) DHS - Department of Homeland Security	**Date Of Import** 9/24/2020 10:52:45 PM (GMT)
Overall Security Unclassified	**Date/Time Last Mod.** 9/24/2020 10:57:05 PM (GMT)

GEOGRAPHIC AREAS FOR STAGE 4

(U)
, (U) USP
Location Type : (U) Polygon

Control Numbers: SPS- 24562/1	**Predefined Trunking?** (U) No

SYSTEM INFORMATION

System Description:

(U) The Due Regard System Radar will detect targets in its field of regard (FOR) of +/- 110 deg in Azimuth and +/- 15 deg in elevation, and a range 5-7 nm for a 0 dB square meter target . It can be utilized in unmanned aircraft to avoid collisions with aircraft that do not carry any means of identifying themselves. It can be utilized on its own in a Due Regard function or as part of Detect and Avoid System defined in FAA and RTCA documents. It has both civilian and military applications. The output of the radar is a track for every target in its FOR updated every second for up to 20 tracks.

The system has been flying with an FCC experimental license for the past few years and has accumulated >6000 flight hours with no reported interference 4.b

The radar utilizes the first emission designator for the Detect and Avoid (DAA) functionality. The second emission designator is for precipitation detection (PD) mode.

System Relationship and Essentiality:

(U) The DRR is essential for Unmanned Aircraft Systems (UAS) to avoid collisions and stay well clear of other aircraft in the airspace. It can track aircraft that do not carry any means of identifying themselves such as IFF, ADSB or Active surveillance. It is typical used as part of a Detect and Avoid (DAA) system (See LINE DIAGRAM Attachment).

FULL RECORD PRINT FOR GA-ASI DETECT & AVOID SYSTEM (DAA), DUE REGARD SYSTEM (DRS) RADAR

ATTACHMENTS

File Name	SPS Number	Date of Attachment
(U) DRS LINE DIAGRAM.pdf		
(U) DUE REGARD RADAR_DETECT_AND_AVOID_DATA SHEET.pdf		
(U) RTCA_Minimum Operational Performance Standards (MOPS)_DO366.pdf		

TARGET DATES

System Termination: **System Activation:** (U) 4/1/2021 **System Approval:**

NSEP Use: (U) Yes

ITU Waiver: (U) No

Number Of Units: (U) 2

Estimated Cost of the System: (U) $ 1000000

Replacement Information:
(U) The system is new and not replacing any existing equipment

STATIONS

Station Name : (U) GA-ASI Due Regard System (DRS)

Transmitters

Nomenclature : (U) GA-ASI Due Regard Radar (DRR)

Receivers

Nomenclature : (U) GA-ASI Due Regard Radar (DRR)

Antennas

Nomenclature : (U) Active Electronically Scanned Array

Station Name : (U) Airborne Object - Cooperative and Uncooperatve - Generic

STATION INFORMATION

Transmitting Station:	Receiving Station:
(U) GA-ASI Due Regard System (DRS)	(U) Airborne Object - Cooperative and Uncooperatve - Generic
Station Class: (U) MR	Radio Service: (U) Radiodetermination

LINK INFORMATION

Transmitter:	Transmitter Antenna:
(U) GA-ASI Due Regard Radar (DRR)	(U) Active Electronically Scanned Array

FULL RECORD PRINT FOR GA-ASI DETECT & AVOID SYSTEM (DAA), DUE REGARD SYSTEM (DRS) RADAR

Receiver:	Receiver Antenna:
(U) GA-ASI Due Regard Radar (DRR)	(U) Active Electronically Scanned Array

SELECTED MODES

Frequency	Emission Designator	Power	Notes
(U) 8750.000 MHz - 8850.000 MHz	(U) 31M8Q1N	(U) 640 W Peak	PRI

TRANSMITTER EQUIPMENT CHARACTERISTICS

Nomenclature: (U) GA-ASI Due Regard Radar (DRR)	**Manufacturer:** (U) General Atomics Aeronautical Systems
NTIA Approval Status: (U) Unapproved	**Coordination ID:** J/F 12
Date of Import: 9/24/2020 10:52:45 PM (GMT)	**Date/Time Last Mod.:** 8/31/2020 8:16:48 PM (GMT)
Fcc Acc. Number:	**Radar/Comm:** (U) Radar
Model Name: (U) GA-ASI Due Regard Radar (DRR)	**Output Device:** (U) Transistor
Tuning Method: (U) Digital Synthesizer	**Supp. of Harmonics:** (U) No
Freq. Stability: (U) 5ppm	

POWER

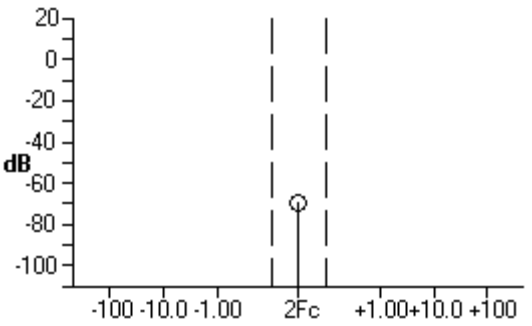
Power Type: Peak Envelope	
Power: (U) 640 W	

2ND HARMONIC CURVE

(UNCLASSIFIED)

Atten.
(U) -70.0 dB

Offset (Fo)
(U) 0.00000 kHz

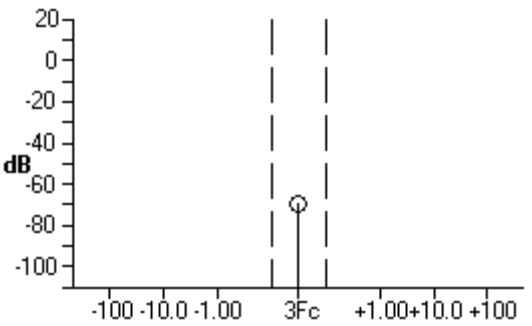


3RD HARMONIC CURVE

(UNCLASSIFIED)

Atten.
(U) -70.0 dB

Offset (Fo)
(U) 0.00000 kHz



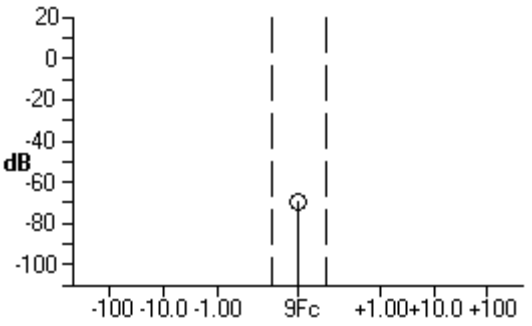
TRANSMITTER EQUIPMENT CHARACTERISTICS

OTHER HARMONIC CURVE

(UNCLASSIFIED)

Atten.
(U) -70.0 dB

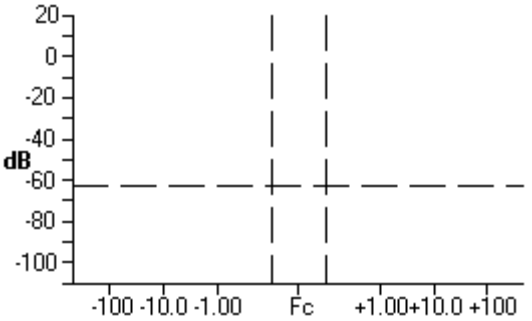
Offset (Fo)
(U) 0.00000 kHz



SPURIOUS EMISSION CURVE

(UNCLASSIFIED)

Maximum Spurious Emission
Atten.
(U) -63.0 dB



FREQUENCIES

Tuning Range:	(U) 8750.000 MHz - 8850.000 MHz	**Tuning Method:**	(U) Digital Synthesizer
Tuning Increment:	(U) 10000 kHz	**Freq Stability:**	(U) 5ppm
Number of Frequencies Required:	(U) 7	**Min. Separation:**	(U) 10.00000 MHz
Supp. of Harmonics:	(U) No		

EMISSION DESIGNATORS

Em. Designator:	(U) 31M8Q1N	**Necessary BW:**	(U) 31800 kHz
Measured/Calculated:	(U) Measured	**Occupied Bandwidth:**	(U) 200000 kHz
		Spread Spectrum:	No

TRANSMITTER EQUIPMENT CHARACTERISTICS

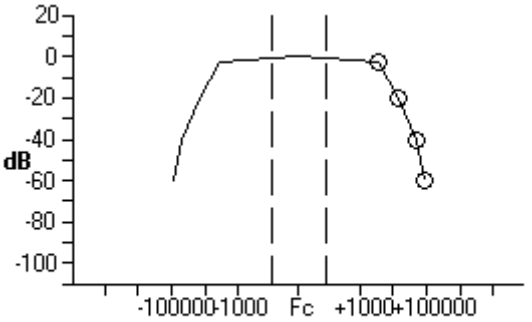
Radar Type: (U) Phase Coded Pulse

FUNDAMENTAL CURVE

(UNCLASSIFIED)

Meas/Calc: Measured

Level	**Offset (Fo)**
(U) -3.00 dB	(U) 3500.0 kHz
(U) -20.0 dB	(U) 14000 kHz
(U) -40.0 dB	(U) 48000 kHz
(U) -60.0 dB	(U) 90000 kHz



PULSE CHARACTERISTICS

Pulse Repetition Rate: (U) 50000 pps
Pulse Rise Time: (U) 0.00000200 ms
Pulse Fall Time: (U) 0.00000200 ms
Pulse Width: (U) 0.00260 ms
Pulse Duty Cycle: (U) 13.00 %
Subpulse Fall Time:
Subpulse Rise Time:
Subpulse Width:

RECEIVER EQUIPMENT CHARACTERISTICS

Nomenclature: (U) GA-ASI Due Regard Radar (DRR)

Manufacturer: (U) General Atomics Aeronautical Systems

NTIA Approval Status: (U) Unapproved

Coordination ID: J/F 12

Date of Import: 9/24/2020 10:52:45 PM (GMT)

Date/Time Last Mod.: 8/31/2020 7:48:21 PM (GMT)

Model Name: (U) GA-ASI Due Regard Radar (DRR)

Fcc Acc. Number:

Image Reject: (U) 70.0 dB

Oscillator Tuned: (U) Above

Cond. Undesired Em.:

Proxy: No

Homodyne: No

FREQUENCIES

Tuning Range: (U) 8750.000 MHz - 8850.000 MHz

Tuning Method: (U) Digital Synthesizer

Tuning Increment: (U) 10000 kHz

Freq. Stability: (U) 5ppm

EMISSION DESIGNATORS

Em. Designator: (U) 31M8Q1N

Sensitivities

Sensitivity: (U) -91.0 dBm
Necessary BW: (U) 31800 kHz
Perf. Value: (U) 10
Noise Figure: (U) 6.00 dB
Noise Temp.
Spur. Reject (U) 60.0 dB
Intermod. Reject: (U) 39.0 dB
Adj. Channel Sel.: (U) 55.0 dB
Perf. Crit.: (U) S/N - Signal to Noise Ratio (dB)

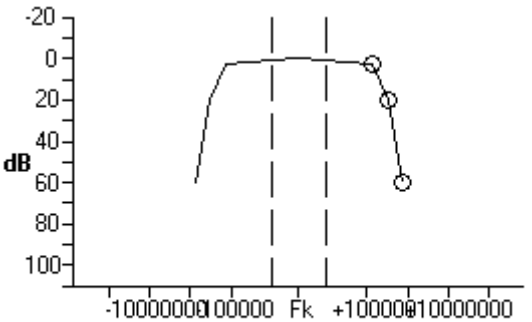
IF SELECTIVITY CURVE

(UNCLASSIFIED)

Measured/Calculated: Measured

IF Freq. (Fk): 4000.000 MHz

Atten.	Offset (Fo)
(U) 3.00 dB	(U) 135000 kHz
(U) 20.0 dB	(U) 350000 kHz
(U) 60.0 dB	(U) 750000 kHz



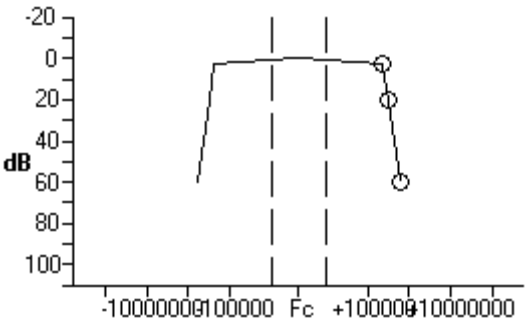
RECEIVER EQUIPMENT CHARACTERISTICS

RF SELECTIVITY CURVE

(UNCLASSIFIED)

Measured/Calculated: Measured

Atten.	Offset (Fo)
(U) 3.00 dB	(U) 237500 kHz
(U) 20.0 dB	(U) 325000 kHz
(U) 60.0 dB	(U) 600000 kHz



ANTENNA EQUIPMENT CHARACTERISTICS

Nomenclature: (U) Active Electronically Scanned Array

Manufacturer: (U) FIRST RF CORPORATION

NTIA Approval Status: (U) Unapproved

Coordination ID: J/F 12

Date of Import: 9/24/2020 10:52:45 PM (GMT)

Date/Time Last Mod.: 8/31/2020 7:37:00 PM (GMT)

Model Name: (U) FRF-240

Antenna Type: (U) Phased-array

Antenna Category: Phased Array

FREQUENCIES

Lower Frequency Limit: (U) 8750.000 MHz
Upper Frequency Limit: (U) 8850.000 MHz

ANTENNA CHARACTERISTICS

Polarization: (U) Linear

Atten. Rel/Act:

Vert. Min. Elev.: (U) -45.0 degrees

Vert. Max. Elev.: (U) 45.0 degrees

Num. Main Beam:

Num. Elements:

BEAMWIDTH

Horizontal: (U) 3.00 degrees

Vertical: (U) 13.0 degrees

SCAN CHARACTERISTICS

Vertical Scan Type: (U) Electronic Scan Sector

Vertical Scan Rate: (U) 60000 /min

GAIN

Main Beam: (U) 26.0 dBi

Frequency List

Tx Station	Rx Station	Frequency (MHz)	Em. Des.	Radio Service	Stn. Classes
(U) GA-ASI Due Regard	(U) Airborne Object -	(U) 8750.000 -	(U) 31M8Q1N	(U) Radiodetermination	(U) MR

Table of Contents For

(U) GA-ASI Detect & Avoid System (DAA), Due Regard System (DRS) Radar

Page	Section/Report	Equipment Highest Classification
1	Security Page	
2	Full Record Print	
	Detail Transmitters	
5	(U) GA-ASI Due Regard Radar (DRR)	UNCLASSIFIED
	Detail Receivers	
8	(U) GA-ASI Due Regard Radar (DRR)	UNCLASSIFIED
	Detail Antennas	
10	(U) Active Electronically Scanned Array	UNCLASSIFIED

ALSO:

Line Diagram

Frequency List

Line Diagram: GA-ASI Detect & Avoid System (DAA), Due