DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE OHIO

03 March 2017

MEMORANDUM FOR: AFLCMC/WIIE
ATTENTION: MR. BRIAN HAGERTY

FROM: 88 CG/SCXP
2435 5th Street, Area B, Building 676
Wright Patterson AFB, OH 45433

SUBJECT: Release of Foreign Spectrum Support Document to the Government of France.

1. The attached Foreign Disclosure Document for the AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR) has been coordinated for release to Government of France. This file is being released under the Predator France program.

2. Please contact Mr. David Lewis at (937) 255-2268 or DSN 785-2268 with any question pertaining to this matter.

Keith B. Garrett

Keith Garrett, Civ, USAF
Chief, Spectrum Management Office
Plans and Implementation Division

Attachment:
88CG/SCXP letter on the AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR), dated 09 February 2017, with AFLCMC/WFNJA Foreign Disclosure Approval Case Number, US-17-224.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE OHIO

09 February 2017

MEMORANDUM FOR: AFLCMC/WFNJA
ATTENTION: MS. BARBARA JONES

FROM: 88 CG/SCXP
2435 5th Street, Area B, Building 676
Wright Patterson AFB, OH 45433

SUBJECT: Foreign Disclosure Request on the AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR), AFLCMCW 1714H.

1. The Predator France Program Office has a requirement (Under an LOA with the Government of France) to release information within attached Application for Foreign Spectrum Support (DD 1494) to the appropriate government officials in France.

2. The AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR) is used to provide ground mapping of high-resolution photographic-like products through clouds, rain, and fog.

3. Please contact Mr. David Lewis at (937) 255-2268 or DSN 785-2268 with any question pertaining to this matter.

Keith B. Garrett

KEITH GARRETT, Civ, USAF
Chief, Spectrum Management Office
Plans and Implementation Division

Attachment:
Stage 4, DD Form 1494 for Foreign Spectrum Support on the AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR), J/F 12/08268F

2 Mar 17 — US-17-224
DATE — CASE NO.

DISCLOSURE ACTION: Approve/Concur.
AUTHORITY AFMC Basic DDL
FDO SIGNATURE Barbara Jones

APPLICATION FOR FOREIGN SPECTRUM SUPPORT	CLASSIFICATION UNCLASSIFIED	PAGE 1

FOREIGN COORDINATION GENERAL INFORMATION

1. APPLICATION TITLE (U) AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR)

2. SYSTEM NOMENCLATURE (U) Lynx Synthetic Aperture Radar (SAR)

3. STAGE OF ALLOCATION (U)
- [ ] a. STAGE 1 CONCEPTUAL
- [ ] b. STAGE 2 EXPERIMENTAL
- [ ] c. STAGE 3 DEVELOPMENTAL
- [X] d. STAGE 4 OPERATIONAL

4. FREQUENCY REQUIREMENTS

a. FREQUENCY(IES)	(U)	16.4025 GHz - 16.9975 GHz	15.260 GHz - 18.240 GHz	(See Remarks)	
b. EMISSION DESIGNATORS	(U)	295MQ3N	636MQ3N	1G56Q3N	1G88Q3N

5. PROPOSED OPERATING LOCATIONS OUTSIDE US&P (U) France

6. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS
(U) Ground mapping and reconnaissance by synthetic aperture radar mounted on unmanned aircraft. Provides high resolution photographic-like products through clouds, rain, or fog.

7. INFORMATION TRANSFER REQUIREMENTS None (Linear FM Pulsed Radar) (U)

8. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT (U) 1

9. REPLACEMENT INFORMATION (U) NA

10. LINE DIAGRAM (U) See Page(s) # 7

11. SPACE SYSTEMS (U) See Page(s) # NA

12. PROJECTED OPERATIONAL DEPLOYMENT DATE (U) ASAP

13. REMARKS (U)

"This information is furnished on the condition that it will not be released to another nation without specific authority of the Department of the Air Force of the United States, that it will be used for military purposes only, that individual or corporate rights originating in the information, whether patented or not, will be respected, that the recipient will report promptly to the United States any known or suspected compromise, and that the information will be provided substantially the same degree of security afforded it by the Department of Defense of the United States. Also, regardless of any other markings on the document, it will not be downgraded or declassified without written approval of the originating US agency."

Items 4a/4b. Lynx SAR Frequencies and Emissions:
(Frequency band includes the bandwidth of the widest radiated signal.)

Mode	Frequency Band	Emission
GMTI	16.4025-16.9975 GHz	295MQ3N
Spotlight & Stripmap	16.202-17.298 GHz	636MQ3N
Spot & Strip 'Reserve'	15.882-17.618 GHz	636MQ3N
High Resolution GMTI	15.420-18.080 GHz	1G56Q3N
High Resolution Spotlight	15.260-18.240 GHz	1G88Q3N

DOWNGRADING INSTRUCTIONS

J/F 12/08268F

CLASSIFICATION UNCLASSIFIED

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Lynx SAR Transmitter

2. MANUFACTURER'S NAME
(U) General Atomics

3. TRANSMITTER INSTALLATION
(U) Unmanned Aircraft

4. TRANSMITTER TYPE
(U) Linear FM Pulse

5. TUNING RANGE
(U) 16.55 GHz - 16.85 GHz 16.52 GHz - 16.98 GHz
16.20 GHz - 17.30 GHz

6. METHOD OF TUNING
(U) Direct Digital Synthesizer

7. RF CHANNELING CAPABILITY
(U) (See Remarks)

8. EMISSION DESIGNATORS
(U) 295MQ3N (U) 636MQ3N (U) 636MQ3N

9. FREQUENCY TOLERANCE
(U) 5 ppm

10. FILTER EMPLOYED
(U) [X] a. YES [ ] b. NO

11. SPREAD SPECTRUM
(U) [ ] a. YES [X] b. NO

12. EMISSION BANDWIDTH
[ ] CALCULATED [X] MEASURED

a. -3 dB	(U) 289.0 MHz	(U) 610.0 MHz	(U) 610.0 MHz
b. -20 dB	(U) 295.0 MHz	(U) 636.0 MHz	(U) 636.0 MHz
c. -40 dB	(U) 1.67 GHz	(U) 2.28 GHz	(U) 2.28 GHz
d. -60 dB	(U) 3.97 GHz	(U) 4.40 GHz	(U) 4.40 GHz
e. OC-BW	(U) 295.0 MHz	(U) 636.0 MHz	(U) 636.0 MHz

13. MAXIMUM BIT RATE
(U) NA

14. MODULATION TECHNIQUES AND CODING
(U) Linear FM Pulse. Scans across tuning range at PRF of mode selected.

15. MAXIMUM MODULATION FREQUENCY
(U) NA

16. PRE-EMPHASIS
(U) [ ] a. YES [X] b. NO

17. DEVIATION RATIO
(U) NA

18. PULSE CHARACTERISTICS

a. RATE	(U) 2200 pps - 3968 pps	(U) 667 pps - 4180 pps	(U) 667 pps - 5320 pps
b. WIDTH	(U) 64 us - 140 us	(U) 18 us - 116 us	(U) 20 us - 300 us
c. RISE TIME	(U) 3.5 ns	(U) 3.5 ns	(U) 3.5 ns
d. FALL TIME	(U) 3.5 ns	(U) 3.5 ns	(U) 3.5 ns
e. COMP RATIO	(U) 41300	(U) 11000	(U) 18300

19. POWER

a. MEAN	(U) 81.3 W - 98.6 W	(U) 24.1 W - 24.8 W	(U) 34.0 W - 64.0 W
b. PEP	(U) 320 W - 320 W	(U) 320 W - 320 W	(U) 320 W - 320 W

20. OUTPUT DEVICE
(U) CPI VTU-5010W Traveling Wave Tube

21. HARMONIC LEVEL

a. 2nd	(U)	-80 dB
b. 3rd	(U)	-80 dB
c. OTHER	(U)	-80 dB

22. SPURIOUS LEVEL
(U) -40 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U)

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Item 7. GMTI mode (295MQ3N)                    16.55 GHz, Continuous Sweep
        Spotlight & Stripmap modes (636MQ3N)   16.52 GHz, Continuous Sweep
        Spotlight-Stripmap Reserve mode (636MQ3N) 16.20 GHz, Continuous Sweep
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TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
Lynx SAR High Resolution Transmitter

2. MANUFACTURER'S NAME
(U) General Atomics

3. TRANSMITTER INSTALLATION
(U) Unmanned Aircraft

4. TRANSMITTER TYPE
(U) Linear FM Pulse

5. TUNING RANGE
(U) 16.20 GHz - 17.30 GHz

6. METHOD OF TUNING
(U) Direct Digital Synthesizer

8. EMISSION DESIGNATORS
(U) 1G55Q3N (U) 1G88Q3N (U)

7. RF CHANNELING CAPABILITY
(U) 16.200 GHz, Continuous

12. EMISSION BANDWIDTH
[ ] CALCULATED [X] MEASURED

a. -3 dB	(U)	1.538 GHz	(U) 1.770 GHz	(U)
b. -20 dB	(U)	1.561 GHz	(U) 1.880 GHz	(U)
c. -40 dB	(U)	3.232 GHz	(U) 4.000 GHz	(U)
d. -60 dB	(U)	4.425 GHz	(U) 4.420 GHz	(U)
e. OC-BW	(U)	1.561 GHz	(U) 1.880 GHz	(U)

9. FREQUENCY TOLERANCE
(U) 5 ppm

10. FILTER EMPLOYED
(U) [X] a. YES [ ] b. NO

11. SPREAD SPECTRUM
(U) [ ] a. YES [X] b. NO

13. MAXIMUM BIT RATE
(U) NA

15. MAXIMUM MODULATION FREQUENCY
(U) NA

14. MODULATION TECHNIQUES AND CODING
(U) Linear FM Pulse. Scans across tuning range at PRF of mode selected.

17. DEVIATION RATIO
(U) NA

16. PRE-EMPHASIS
(U) [ ] a. YES [X] b. NO

18. PULSE CHARACTERISTICS

a. RATE	(U)	2200 pps - 4030 pps	(U)	1970 pps - 4180 pps	(U)
b. WIDTH	(U)	60 us - 140 us	(U)	18 us - 116 us	(U)
c. RISE TIME	(U)	3.5 ns	(U)	3.5 ns	(U)
d. FALL TIME	(U)	3.5 ns	(U)	3.5 ns	(U)
e. COMP RATIO	(U)	215000	(U)	31900	(U)

19. POWER

a. MEAN	(U)	77.4 W - 98.6 W	(U)	24.1 W - 73.1 W	(U)
b. PEP	(U)	320 W - 320 W	(U)	320 W - 320 W	(U)

21. HARMONIC LEVEL

a. 2nd	(U)	-80 dB
b. 3rd	(U)	-60 dB
c. OTHER	(U)	-80 dB

20. OUTPUT DEVICE
(U) CPI VTU-5010W Traveling Wave Tube

22. SPURIOUS LEVEL
(U) -40 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U) Items 7/8. High Resolution Range GMTI mode uses 1.55 GHz instantaneous bandwidth and scans across the band 16.200-17.300 GHz.

High Resolution Spotlight mode uses 1.88 GHz instantaneous bandwidth and scans across the band 16.200-17.300 GHz.

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Lynx SAR Receiver

2. MANUFACTURER'S NAME
(U) General Atomics

3. RECEIVER INSTALLATION
(U) Unmanned Aircraft

4. RECEIVER TYPE
(U) Triple Conversion Superhetrodyne

5. TUNING RANGE
(U) 16.52 GHz - 16.98 GHz 16.20 GHz - 17.30 GHz

6. METHOD OF TUNING
(U) Direct Digital Synthesizer

7. RF CHANNELING CAPABILITY
(U) 16.2 or 16.52 GHz, Continuous Sweep

8. EMISSION DESIGNATORS
(U) 295MQ3N 636MQ3N See Data Overflow Page

9. FREQUENCY TOLERANCE
(U) 5 ppm

10. IF SELECTIVITY

	1st (U)	2nd (U)	3rd (U)
a. -3 dB	155 MHz	116 MHz	50 MHz
b. -20 dB	520 MHz	125.1 MHz	54.1 MHz
c. -60 dB	1180 MHz	146.7 MHz	64.3 MHz

11. RF SELECTIVITY
[ ] CALCULATED [X] MEASURED

a. -3 dB	(U)	3.45 GHz
b. -20 dB	(U)	4.05 GHz
c. -60 dB	(U)	5.10 GHz
d. Preselection Type	(U)	WR62 Bandpass Filter

12. IF FREQUENCY
a. 1st (U) 4 GHz
b. 2nd (U) 500 MHz
c. 3rd (U) 0 Hz

13. MAXIMUM POST DETECTION FREQUENCY
(U) 50 MHz

14. MINIMUM POST DETECTION FREQUENCY
(U) 1 KHz

16. MAXIMUM BIT RATE
(U) NA

15. OSCILLATOR TUNED

	1st (U)	2nd (U)	3rd (U)
a. ABOVE TUNED FREQUENCY			
b. BELOW TUNED FREQUENCY	X	X	X
c. EITHER ABOVE OR BELOW THE FREQUENCY			

17. SENSITIVITY

a. SENSITIVITY	(U)	- 77 dBm
b. CRITERIA	(U)	S/N = 1 for a Single Pulse
c. NOISE FIG	(U)	2 5 dB
d. NOISE TEMP	(U)	NA

18. DE-EMPHASIS
(U) [ ] a. YES [X] b. NO

19. IMAGE REJECTION
(U) 100 dB

20. SPURIOUS REJECTION
(U) 100 dB

21. REMARKS (U) Items 7/8. Sweeps the 16.52 to 16.98 GHz band for GMTI (295MQ3N), Spotlight (636MQ3N), and Stripmap (636MQ3N) modes.
Sweeps the 16.2 to 17.3 GHz band for the Spotlight & Stripmap 'reserve mode' (636MQ3N), High Resolution Range GMTI (1G56Q3N), and High Resolution Spotlight (1G88Q3N) modes.

RECEIVER DATA OVERFLOW PAGE

NOMENCLATURE,
MANUFACTURER'S MODEL NO.

5. TUNING RANGE

8. EMISSION DESIGNATORS (U)

1G56Q3N 1G88Q3N

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Lynx SAR Antenna

3. MANUFACTURER'S NAME
(U) General Atomics

4. FREQUENCY RANGE
(U) 15 20 GHz - 18 30 GHz

5. TYPE (U) Parabolic Reflector

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) MECHANICAL (GIMBAL)
b. VERTICAL SCAN (U) Mechanical
(1) Max Elev (U) -5 deg
(2) Min Elev (U) -60 deg
(3) Scan Rate (U) None
c. HORIZONTAL SCAN (U) Mechanical
(1) Sector Scanned (U) (See Remarks)
(2) Scan Rate (U)
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 31 dBi
b. 1st MAJOR SIDE LOBE
(U) 7 dBi @ 10 deg

9. BEAMWIDTH
a. HORIZONTAL
(U) 2.7 deg
b. VERTICAL
(U) 7 deg

10. REMARKS (U)

Item 7b. The antenna is steered in a vertical plane, as a function of the platform profile. In the vertical plane, the antenna has a min/max depression angle from 5 degrees to 60 degrees below horizon.

Item 7c. Antenna is gimbal-mounted, down-looking, with horizontal scan and squint angle relative to the nose of the aircraft.

LINE DIAGRAM PAGE

AN/APY-8(V)20 Lynx Synthetic Aperture Radar (SAR)

- 16.4025-16.9975 GHz 295MQ3N
- 16.202-17.298 GHz 636MQ3N
- 15.882-17.618 GHz 636MQ3N
- 15.420-18.080 GHz 1G56Q3N
- 15.260-18.240 GHz 1G88Q3N