

TO: Federal Communications Commission

FROM: BAE SYSTEMS
1930 So. Vineyard Ave.
Ontario, CA 91761

Points of Contact: (909) 947-7600
Mark Gardner - Ext. 6928
Dutch Ruhl - Ext. 4237

SUBJECT: Application for a Special Temporary Authorization to Fly Drone Aircraft.
Reference FCC 47CFR Ch. 1 (10-01-98 Edition, 5.56 (a) – (c))

We have been contracted by the Egyptian Army to provide a new flight control system for use in the Skyeye R-50E drone aircraft. The new Expandable Flight Avionics System (EFAS) will require several test flights to thoroughly test the systems reliability and functionality. These flight tests will be conducted at El Mirage Dry Lake Bed in California.

Per instruction as outlined in FCC publication 47 CFR CH. (10-01-98 edition) the following information is submitted:

- a. Company name and address:
BAE Systems
1930 So. Vineyard Ave.
Ontario, CA 91761

Points of contact:
Mark Gardner, Egyptian Program Manager – 310-915-6928
Ervin (Dutch) Ruhl, Test Engineer - 909-947-7600, ext. 4237

- b. Need for special action: The new EFAS flight control box will require actual test flights to check functionality and reliability during actual flight.
- c. Type of Operation to be conducted: Flight tests.
- d. Time and date of proposed operation: Five (5) test flights to be conducted during the month of August 2000 with a launch time of 1000 hours local time. Duration of each flight estimated at 2 hours.

Five (5) test flights to be conducted during the month of September 2000 with a launch time of 1000 hours local time. Duration of each flight estimated at 2 hours.

Two (2) test flights to be conducted during the month of November 2000 with a launch time of 1000 hours local time. Duration of each flight estimated at 2 hours.

Two (2) test flights to be conducted during the month of June 2001 with a launch time of 1000 hours local time. Duration of each flight estimated at 3 hours

Power Requirements

Input Voltage: 115 VAC +/-10 VAC at 60 Hz
Input Power: 10 watts

Environmental Characteristics

Temperature: Operating: 0°C to +55°C
Non-Operating: -54°C to +85°C
Altitude: Unlimited

Mechanical Configuration

Dimensions: 19" rack mount x 1.75"H x 10"D including connectors
Weight: 4.5 lbs nominal
Finish: Clear chemical film

2.1.1.1.5

The Command Transmitter accepts the composite command and ranging data from the GCS-DLP and employs it to frequency modulate its RF carrier. The carrier center frequency is controlled by the DLP in accordance with JRDL system protocol and the setting of the CMP control switches.

Specifications

Output Characteristics

Frequencies: 5222 to 5478 MHz
Frequency Stability: +/- .002% of assigned frequency including effects of the operational environment and input voltage variations
Output Power: 20 watts nominal
Load Impedance: 50 ohms
Spurious Outputs: Conforms to IRIG 106-86 for spurious emissions

OPERATION AND MAINTENANCE

Dwg. No. 32691

JAM RESISTANT DATA LINK

Revision: A March 28, 1989

Incidental AM: 5% maximum
Incidental FM: 15 KHz RMS maximum (200 KHz Bandwidth)
Harmonic Distortion: 5% maximum over modulation bandwidth

Modulation

Type: True FM; AC coupled
Frequency Response: 20 Hz to 1 MHz, +1.5 dB
Peak Deviation: 170 KHz peak
Deviation Sensitivity: 170 KHz peak / VRMS
Input Impedance: 100 KOHMS shunted by 30 picofarads

Power Requirements

Input Voltage: 220 VAC
Input Current: 1.5 Amps nominal

Environmental Characteristics

Temperature: Operating: -20°C to +51°C
Non-Operating: -20°C to +71°C
Shock: Half sine wave shock of 15 G's for 11 mS duration along each of the three major axes
Vibration: 7 G RMS 5 Hz to 2000 Hz in any axis
Acceleration: Linear accelerations up to 5 G's along each of the three major axes
Humidity: 95% relative humidity including condensation per MIL-STD-810, method 507
Altitude: 10,000 feet

Mechanical Configuration

Dimensions: 27.75"L x 22.90"W x 14.25"H
Weight: 100 lbs nominal
Construction: Aluminum housing
Case Finish: Paint

2.1.1.1.6

This unit is connected to the command data modulating signal in parallel with the G-Band command transmitter. Should the G-Band uplink be impaired, the Backup Command Transmitter can be energized from the JRDL CMP in order to regain control of the UAV.

Specifications

Output Characteristics

Frequency: 1433 MHz
Frequency Stability: +/- .002% of assigned frequency including effects of the operational environment and input voltage variations
Output Power: 20 watts nominal
Load Impedance: 50 ohms; rated power developed with up to 1.5:1 VSWR; open or short circuit across output, for an indefinite period, will not damage transmitter
Spurious Outputs: Conforms to IRIG 106-86 for spurious emissions
Incidental AM: 5% maximum
Incidental FM: 5 KHz RMS maximum (200 KHz bandwidth)
Harmonic Distortion: 3% maximum over modulation bandwidth

OPERATION AND MAINTENANCE

JAM RESISTANT DATA LINK

Dwg. No. 32691 Revision: A March 28, 1989

Modulation

Type: True FM; AC coupled

Frequency Response: 20 Hz to 5 MHz, +/-3 dB

Peak Deviation: 170 KHz peak

Deviation Sensitivity: 170 KHz peak / VRMS

Input Impedance: 100 Kohms shunted by 30 picofarads

Linearity: +/- 3% of best straight line over modulation bandwidth

Power Requirements

Input Voltage: 28 VDC +/- 4 VDC, reverse polarity protection

Input Current: 5 A maximum

Environmental Characteristics

Temperature: Operating: -20°C to +70°C (baseplate)
Non-Operating: -54°C to +85°C

Vibration: 20 G RMS, 20 Hz to 2000 Hz in any axis

Shock: Half sine wave shock of 100 G's for 11 millisecond duration along each of the three major axes

Acceleration: Linear accelerations up to 100 G's along each of the three major axes

Humidity: 95% relative humidity including condensation per MIL-STD-810

Altitude: Unlimited

Mechanical Configuration

Dimensions: 4" x 6" x 2" excluding connectors

Weight: 36 ounces nominal

Finish: Gold chemical film finish

OPERATION AND MAINTENANCE
Dwg. No. 32691

JAM RESISTANT DATA LINK
Revision: A March 28, 1989

Harmonic Distortion: 5% maximum over modulation bandwidth

Power Requirements

Input Voltage: 28 VDC +/-4 VDC, reverse polarity protection

Input Current: 200 mA maximum

Environmental Characteristics

Temperature: Operating: -20°C to +70°C
Non-Operating: -54°C to +85°C

Vibration: 20 G RMS, 20 Hz to 2000 Hz in any axis

Shock: Half sine wave shock of 100 G's for 11 ms duration along each of the three major axes

Humidity: 95% relative humidity including condensation per MIL-STD-810

Altitude: Unlimited

Mechanical Configuration

Dimensions: 3" x 4" x 1.95" excluding connectors and mounting flange

Weight: 20 ounces maximum

Finish: Gold chemical film finish

2.1.1.2.4

This unit produces the 6.8 MHz subcarrier which, after being modulated by the telemetry/range composite is added to the RS-170 video for application to the modulator in the downlink transmitter.

Specifications

Output Characteristics

Subcarrier Frequency: 6.8 MHz

Frequency Stability: +/- .25% of assigned frequency

OPERATION AND MAINTENANCE
Dwg. No. 32691

JAM RESISTANT DATA LINK
Revision: A March 28, 1989

Load Impedance:	Provides rated output into any load impedance down to 50 ohms
Output Protection:	Output short circuit proof
Subcarrier Level:	Amplitude externally adjustable. Factory set for B-.1 unless otherwise specified.
Incidental FM:	500 Hz RMS maximum
Incidental AM:	1% maximum
<u>Modulation (SCO)</u>	
Type:	True FM, AC coupled
Frequency Response:	10 Hz to 500 KHz (+/-3 dB)
Peak Deviation:	5% maximum of operating frequency
Deviation Sensitivity:	Up to 5% (of operating frequency) peak/volt peak
Input Impedance:	20 Kohms, unbalanced
Harmonic Distortion:	4% maximum over modulation bandwidth with SD8143 demodulator

Video Filter Characteristics

Input Level:	1 V p-p
Input Impedance:	75 ohms unbalanced, +/-2%
Insertion Loss:	0 dB (active filtering)
Response (-3 dB):	10 Hz - 4.5 MHz
Linearity:	+/-1% of best straight line over modulation bandwidth
SCO Re-radiation:	-50 dB minimum

OPERATION AND MAINTENANCE
Dwg. No. 32691 Revision: A March 28, 1989

Dwg. No. 32691

Revision: A March 28, 1989

JAM RESISTANT DATA LINK

Power Requirements

Input Voltage: 28 VDC +/-4 VDC, reverse polarity protected

Input Current: 100 mA maximum

Environmental Characteristics

Temperature: Operating: -20°C to $+70^{\circ}\text{C}$ (baseplate temperature)
Non-Operating: -54°C to $+85^{\circ}\text{C}$

Vibration: 20 G RMS, 20 Hz to 2000 Hz in any axis

Shock: Half sine wave shock of 100 G's for 11 ms duration along each of the three major axes

Acceleration: Linear accelerations up to 100 G's along each of the three major axes

Humidity: 95% relative humidity including
condensation per MIL-STD-810

Altitude: Unlimited

Mechanical Configuration

Dimensions: 3.75"L x 2"W x 1.51"H (not including connectors)

Weight: 8 ounces maximum

Finish: Gold chemical film finish

This E-band transmitter accepts RS170 video plus subcarrier modulation and generates a frequency modulated RF carrier of 20 watts.

Specifications

Output Characteristics

Frequencies: 2010 MHz to 2100 MHz

OPERATION AND MAINTENANCE

JAM RESISTANT DATA LINK

Dwg. No. 32691 Revision: A March 28, 1989

Frequency Selection: 10 MHz steps, remote control

Frequency Stability: $\pm .002\%$ of assigned frequency including effects of the operational environmental and input voltage variations

Output Power: 20 watts nominal

Load Impedance: 50 ohms; rated power developed with up to 1.5:1 VSWR. Open or short circuit across output, for any indefinite period, will not damage transmitter

Spurious Outputs: Conforms to IRIG 106-86 for spurious emissions

Incidental AM: 5% maximum

Incidental FM: 3 KHz RMS maximum

Harmonic Distortion: 4% maximum over modulation bandwidth

Modulation

Type: True FM; AC coupled

Frequency Response: 20 Hz to 5 MHz, +1.5 dB

Peak Deviation: 4 MHz

Deviation Sensitivity: 8 MHz p-p/V p-p

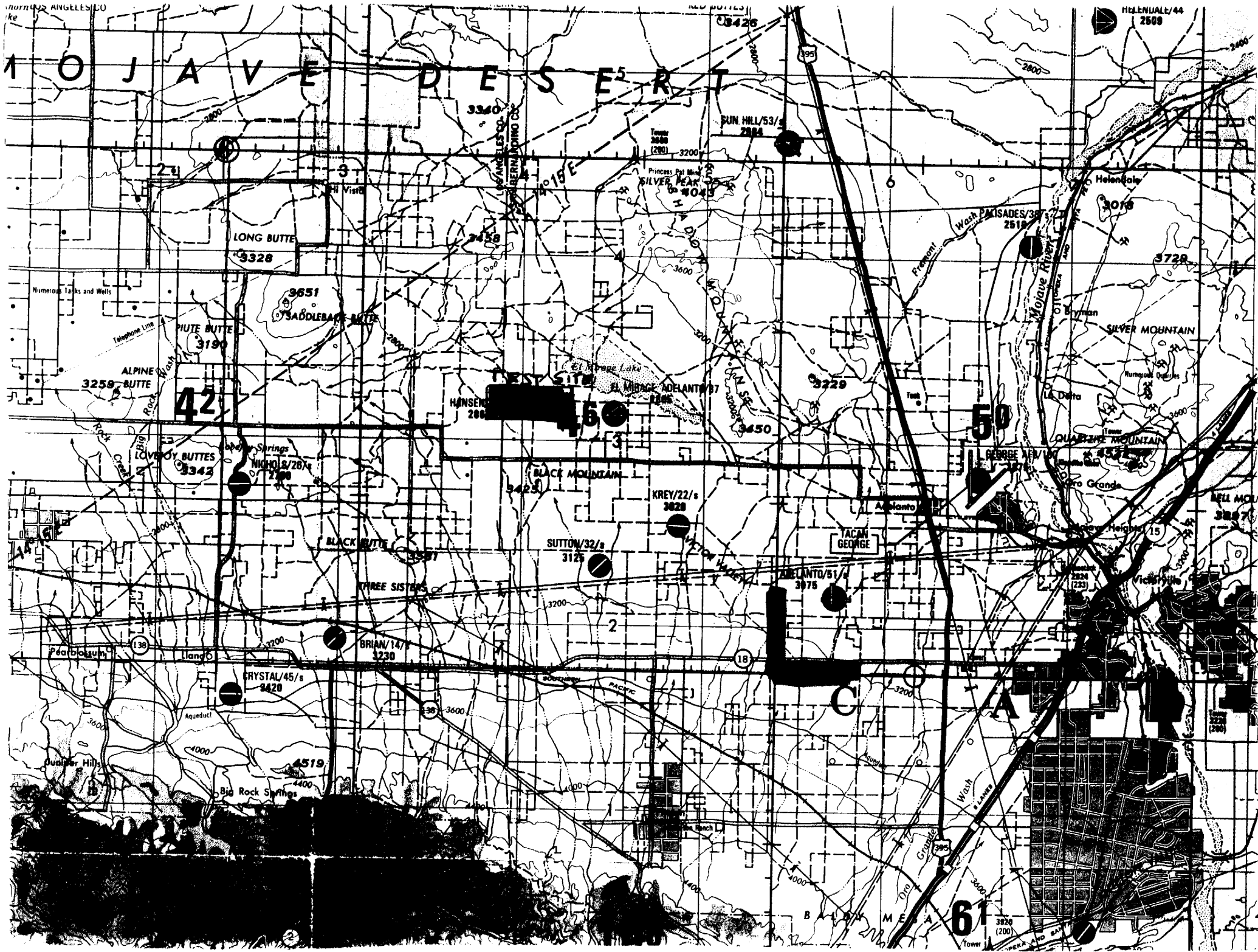
Input Impedance: 75 ohms

Linearity: $\pm 2\%$ of best straight line over modulation bandwidth

Power Requirements

Input Voltage: 28 VDC ± 4 VDC

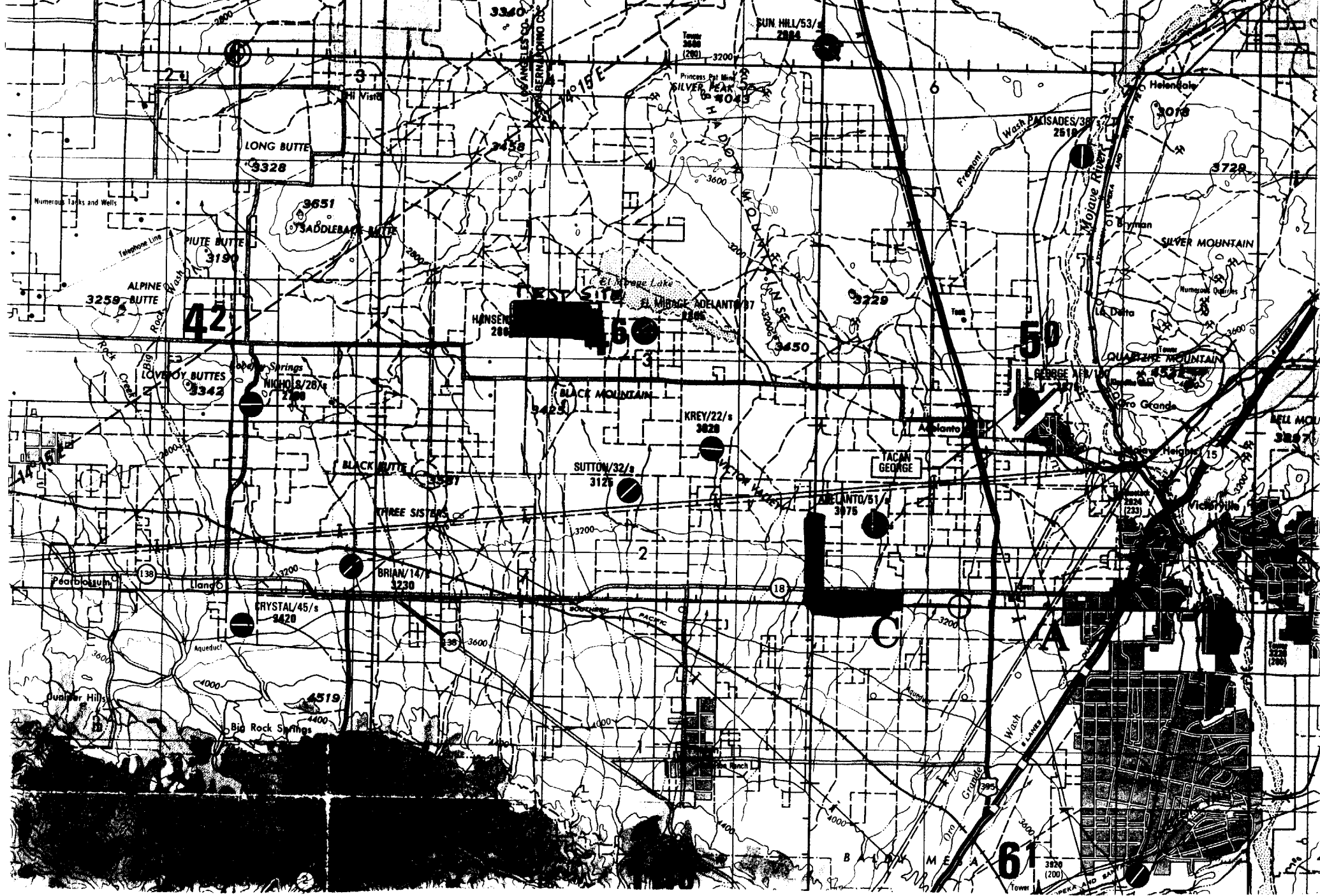
Input Current: 5 Amps at 20 W nominal



NORTH ANGELES CO

HELENDALE/44
2568

MOJAVE DESERT



TO: Federal Communications Commission

FROM: BAE SYSTEMS
1930 So. Vineyard Ave.
Ontario, CA 91761

Points of Contact: (909) 947-7600
Mark Gardner - Ext. 6928
Dutch Ruhl – Ext. 4237

SUBJECT: Application for a Special Temporary Authorization to Fly Drone Aircraft.
Reference FCC 47CFR Ch. 1 (10-01-98 Edition, 5.57 (a) (c) (d))

1. Reference contract number CAIRO/ST.LSI/MINI RPV/85/1 at which time we were awarded a contract to furnish the Arab Republic of Egypt with 23 each R4E-50 drone aircraft along with a Ground Control Station (GCS) and support equipment to operate the system. This project was completed and equipment was delivered to the Arab Republic starting in 1988.
2. Reference contract number CAIRO/F/ST/LEAR/97/1 at which time we were awarded a contract to upgrade the Flight Control System on each drone aircraft on the original contract. The new upgrade to the R PV aircraft is the Expandable Flight Avionics System (EFAS). This upgrade is scheduled for delivery in September 2001, which will require test flights commencing in August of 2000 and extending through September 2001. These test flights are absolutely critical to the EFAS program to prove reliability and functionality.
3. We will operate the drone aircraft out of Hansen's Airport which is located at El Mirage, California (coordinates 34-37-45N 117-39-30W)
 - a. Flight altitude will be from 4,000' to 12,000' MSL
 - b. Flight radius will be 10NM from Hansen's airport
 - c. Flight speeds will be between 65 – 100 kts per hour
 - d. Flight duration will be approximately 2 hours each
 - e. Each flight will be accompanied with a chase aircraft
 - f. All flights will be flown with a transponder on the air vehicle and the chase aircraft
 - g. All RPV flights will be coordinated with the FAA and other agencies operating in the El Mirage area

**FCC
600**

FEDERAL COMMUNICATIONS COMMISSION
SCHEDULE E
Station Location Data
(all services except those for which Schedule A is required)

Approved by OMB
1080-0823
Expires 2/28/96
Est. Avg. Burden Hours
Per Response: 4 Hrs.

FCC Use Only

Licensee Name BAE Systems, ATTN: E. Ruhl 1930 So Vineyard Ave. ONTARIO, CA 91761	Radio Service IG	Call Sign or Station Location (City, State) SAN BERNARDINO, CA
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E1. Specify the datum used to determine all coordinates on this filing: () NAD27 NAD83 Other (Specify NAD 27)

FIXED OR PERMANENT LOCATIONS

LOC	E2. Station Address / Geographic Location	E3. City	E4. County	E5. State
A				
B				
C				
D				
E				
F				

LOC	E6. Latitude (degrees, minutes, seconds)	E7. Longitude (degrees, minutes, seconds)	E8. Ground Elevation (meters)
A			876
B			
C			
D			
E			
F			

CONTROLS MEETING THE 20 FOOT CRITERIA, MOBILE OR TEMPORARY LOCATIONS

LOC	E9. Radius (km)	E10. Area of Operation Code	E11.				E12. Operations (S) South of Line A and/or (W) West of Line C
			LATITUDE	LONGITUDE	COUNTY	STATE	
G	1.00	P	34-37-51	117-39-15	San Bernardino	CA	
			- -	- -			
			- -	- -			
			- -	- -			
			- -	- -			
			- -	- -			

FCC 600 - Sched.
September

FCC 600

Main Form

FEDERAL COMMUNICATIONS COMMISSION

Approved by OMB
3000-0823
Expires 10/31/97
Est. Avg. Burden Hours
Per Response: 4 Hrs.FCC Use Only
(File Number)Application for Mobile Radio Service Authorization
or Rural Radiotelephone Service Authorization

FEE Use Only

FILING FEE

(a) Fee Type Code	(b) Fee Multiple	(c) Fee Due for Fee Type Code in (a)	(d) Total Amount Due	FEE Use Only
PALR	1	\$ \$80	\$ \$80	

APPLICANT

1. Legal Name of Applicant ERVIN C. RUHL		2. Voice Telephone Number (909) 947-7600 ext 4237	
3. Assumed Name Used for Doing Business (if any) BAE SYSTEMS Aircraft Controls Inc.		4. Fax Telephone Number (310) 915-6993	
5. Mailing Street Address or 1930 So. Vineyard Ave			
ATTENTION: E.C. RUHL ONTARIO, CA 91761			
6. City ONTARIO		7. State CA	8. Zip Code 91761
9. Name of Contact Representative (if other than applicant)		10. Voice Telephone Number ()	
11. Firm or Company Name		12. Fax Telephone Number ()	
13. Mailing Street Address or P.O. Box			
14. City		15. State	16. Zip Code

CLASSIFICATION OF FILING

17. This filing is a (an) (N) <u>New</u> application <u>Amendment</u> to a pending application	
18. Does the applicant believe that this filing should be classified as MINOR under 47 U.S.C. § 309? (D) <u>Yes</u> <u>No</u> <u>Does not apply</u>	
19. If not minor under 47 U.S.C. § 309, classification for purposes of competitive bidding: () <u>Initial</u> <u>Modification</u> <u>Renewal</u>	
20. If this filing is in reference to an existing station: Call sign of existing station:	21. If this filing is an amendment to a pending application: File number of pending application: Date Filed:

NATURE OF SERVICE

22. This filing is for authorization to provide or use the following type(s) of radio service: (P) <u>Commercial</u> mobile <u>Private</u> mobile <u>Both commercial and private</u> mobile <u>Fixed</u>			
23. Users are or will be: (I) <u>Public</u> subscribers <u>Eligibles</u> <u>Internal</u>		24. Status (N) <u>Profit</u> <u>Not for profit</u>	
25. Interconnected service? (N) <u>Yes</u> <u>No</u>	26. Radio Service code: ()	27. Type of operation code: (NA)	

ENVIRONMENTAL POLICY

Would a Commission grant of any proposal in this application or amendment have a significant environmental effect as defined by 47 CFR 1.1307?	(N)	Yes	No
* If "yes", attach environmental assessment as required by 47 CFR 1.1308 and 47 CFR 1.1311.			

ALIEN OWNERSHIP

3. Is the applicant a foreign government or the representative of any foreign government?	(N)	Yes	No
4. Is the applicant an alien or the representative of an alien?	(N)	Yes	No
1. Is the applicant a corporation organized under the laws of any foreign government?	(N)	Yes	No
2. Is the applicant a corporation of which any officer or director is an alien or of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	(N)	Yes	No
3. Is the applicant a corporation directly or indirectly controlled by any other corporation of which any officer or more than one-fourth of the directors are aliens, or of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?	(N)	Yes	No
* If "yes", attach exhibit explaining nature and extent of alien or foreign ownership or control.			

BASIC QUALIFICATIONS

4. Has the applicant or any party to this application or amendment had any FCC station authorization, license or construction permit revoked or had any application for an initial, modification or renewal of FCC station authorization, license, construction permit denied by the Commission?	(N)	Yes	No
* If "yes", attach exhibit explaining circumstances.			
35. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court?	(N)	Yes	No
36. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?	(N)	Yes	No
37. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items?	(N)	Yes	No
38. Does the undersigned certify (by responding "Y" to this question), that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862, because of a conviction for possession or distribution of a controlled substance?	(Y)	Yes	No
* See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.			

CERTIFICATION

The APPLICANT waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

39. Applicant is a (an) (I) Individual Unincorporated Association Partnership Corporation Governmental Entity			
40. Typed Name of Person Signing ERVIN C. RUHL		41. Title TEST ENGINEER	
42. Signature Ervin C. Ruhl		43. Date 7-17-00	

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).