AEROSPACE & FLIGHT TEST RADIO COORDINATING COUNCIL
616 E 34th Street North, Wichita, KS 67219
Telephone: (316) 821-9516 Fax: (316) 838-0015

EXPERIMENTAL LICENSE or SPECIAL TEMPORARY AUTHORITY

All requests for frequency coordination by AFTRCC are subject to the Coordination Terms and Conditions. A **MEMORANDUM** describing the purpose and duration of the license, the make and model of all transmitters and transmitting antennas and their Geographical Coordinates, the desired frequency and all of its associated emissions, **MUST** accompany a completed and signed copy of this form. A copy of the FCC license application should be included with the memorandum whenever possible.

NOTE: PROPRIETARY DATA/CLASSIFIED INFORMATION SHOULD NOT BE SUBMITTED.

If the applicant received this form in response to a coordination request**, it must be completed, signed and returned per the included instructions **before AFTRCC can continue processing the request.

Date of Request:	2/2/2019	Identity Control No.	
Name of Applicant:	UP Aerospace Inc.	Address:	469 Mockingbird Court Highlands Ranch, CO 80129
Phone Number:	(720) 596-4430	Email:	Jay@ReactiveTechnologies.com
Coordination Site(s):	Truth or Consequences, NM Highland Ranch, CO	Dates of Operations:	7/1/2019 12/1/2019

Requested Bands:

- ☐ HF Band (2851.0-21931.0 kHz)
- ☐ VHF Band (123.125-123.575 MHz)
- ☐ C-Band (5091-5150 MHz)
- ☐ L-Band (1435-1525 MHz)
- ☒ S-Band (2360-2395 MHz)

COORDINATION TERMS AND CONDITIONS

AFTRCC provides recommendations to the Federal Communications Commission (FCC) for non-government use of flight test voice and telemetry frequencies. AFTRCC's role is strictly advisory; in all cases the FCC makes the decision whether to issue a license.

Applicants are advised that no representations or warranties, express or implied, are made as to the interference-free nature of any given frequency or frequencies which AFTRCC coordinates, or as to whether any given frequency recommendation is best suited for the Applicant's purposes.

Applicants should also be aware that frequencies coordinated by AFTRCC are shared with other users; no one user is entitled to exclusive use of a frequency in any given area. Multiple users may be, and often are, licensed or have government assignments for use of the same frequencies. Hence, notwithstanding FCC issuance of a license to the Applicant, transmission or any given frequency may be subject to day-to-day, hour-by-hour scheduling with Government Area Frequency Coordinators (AFCs) or other agencies.

In return for AFTRCC's processing of the Applicant's request, the Applicant agrees to release and hold harmless AFTRCC, its officers, directors, agents, representatives, and member companies (and their respective officers, directors, employees, owners, and agents) from and against any and all claims, losses, liabilities, damages or expenses which may arise now or in the future as a result of the Applicant's acceptance of AFTRCC's recommendation, or its use of the recommended frequency(ies).

Information supplied in support of a coordination request represents part of the FCC application process. Accordingly, this information is considered public record material.

Signature: ☒ By checking the signature box, the applicant confirms that they are the duly authorized official named below; and that they accept and acknowledge the above limitations and conditions.

Print Name: Jay Francis

Title: Engineer (consulting for UP Aerospace)

Date: 2/2/2019

UP Aerospace Inc. is requesting coordination of telemetry frequencies to be used in a sounding rocket launch between July and December of 2019.

Pre-launch system integration testing includes powering on the telemetry transmitter along with all other avionics and payload systems to verify interoperability. These tests would be performed at our Highlands Ranch, CO facility and are tentatively scheduled for mid-July. The duration of telemetry transmitter tests would be an hour or less. These tests may be required to repeat up to four times per day over a two-day period during the integration testing.

The launch will take place at Spaceport America in Truth or Consequences, NM with a tentative schedule of early October. The vehicle is expected to reach an apogee of approximately 100 km, and will be recovered within White Sands Missile Range, NM. During the week prior to launch, the telemetry system will need to be tested while the vehicle is on the launch pad. The duration of telemetry transmitter tests would be an hour or less. These tests may be required to repeat up to twice a day. On day of launch, starting approximately 2 hours prior to the opening of the launch window, the telemetry system will be operational. Once the vehicle is launched, the flight time is approximately 15 minutes. The telemetry system is designed to power down approximately 45 minutes after launch.

Our Primary partner for both launches is NASA. Due to recent disruptions in government operations, there is a high probability that pre-launch integration and actual launch dates will need to be adjusted. We are requesting a window of operation between July 1 and December 1, 2019 that should provide enough flexibility given the uncertainties.

Technical Contact:

Jay Francis
Consulting Engineer for UP Aerospace Inc.
Jay@ReactiveTechnologies.com
(603) 429-0377

UP Aerospace Contact:

Jerry Larson
President, UP Aerospace Inc.
jlarson@up-aerospace.biz
(720) 596-4430

Frequency Requests:

a) **PRIMARY:** 2370.5 MHz
M (dBc) of -65dBc or better at 2368 MHz and 2373 MHz

b) **SECONDARY:** 2382.5 MHz
M (dBc) of -65dBc or better at 2380 MHz and 2385 MHz

S-Band Transmitter
Manufacturer: Teletronics
Part Number: TTS-5549-1
Frequency: 2200.5 to 2399.6 MHz,
Carrier Stability: +/- 0.002% over -40C to +85C
Power: 10W
Harmonics and Spurious Levels: In accordance with latest IRIG specifications
Modulation: PCM/FM
Bit Rate: 1Mb/s
Emission Designator: 1M0F1D

Modulated RF Power Spectrum complies with the IRIG-106 mask
(per TTS-5549-1 documentation):

$$M\ (dBc) = \text{Max}\ (\ \{K - 100 \log |\ f - fc\ | + 90 \log (R)\},\ \{-(55 + 10 \log (P))\}\ ),\ |\ f - fc\ | \geq R/m$$

M = power relative to unmodulated carrier (i.e., units of dBc) at frequency f (MHz)
f = frequency in MHz
fc = the carrier frequency in MHz
R = the bit rate in Mb/s
P = the rated power output of the UUT, in Watts

For PCM/FM:
K = -28
m = 2

S-Band Antenna
Manufacturer: Haigh-Farr
Part Number: 13585
Description: Stripline Full Wraparound
RHCP
Gain -3.5dBi nominal +/- 3dB (ripple)

EIRP
The wraparound antenna is designed to be isotropic with best case gain of approximately 0dBi. At 10W, our EIRP would be 40 dBm.

System Integration Test Site (ground testing):

469 Mockingbird Court
Highlands Ranch, CO 80129

39° 31' 58.2" N 104° 59' 34.0" W

Launch Site:

Spaceport America
Truth or Consequences, NM

32° 56' 24.9" N 106° 54' 23.9" W

Subject: Fwd: [Non-DoD Source] AFTRCC ICN 1189-19/7699 (UP Aerospace INC XT Request/Ground Testing & Launch-Highlands Ranch, CO/T or C, NM) (UNCLASSIFIED)
From: Wayne Morris <5600wayne@gmail.com>
Date: Sat, 2 Mar 2019 11:36:41 -0600
To: "Jay Francis (Reactive Technologies)" <Jay@reactivetechnologies.com>
CC: "'Hankins, Danny' (dhankins@txtav.com)" <dhankins@txtav.com>, Chriss Brown <dataentry@aftrcc.org>, Don Hoehn <treasurer@aftrcc.org>

Please note all comments by AFTRCC, DoD AFC White Sands, and DoD AFMO-US&P

This email is your AFTRCC coordination.

This coordination includes this header information, DOD Area Frequency Coordinator comments and AFTRCC comments. These messages must not be separated.

This coordination is advisory only and not binding on the FCC. Applicants are advised that this coordination does not constitute a judgment that the frequency(ies) is best suited for the applicant's purpose nor that the frequency(ies) is exclusive to the applicant. Flight Test frequencies are shared and may require scheduling with other users.

In return for AFTRCC's processing of the applicant's coordination request, the applicant agrees to release and hold harmless AFTRCC, its officers, directors, agents, members, and representatives from any claims, losses or expenses that may arise from the use of the frequency.

This coordination is not an authorization to transmit. A copy of this coordination must accompany application to the FCC.

Signed:
Wayne Morris
AFTRCC Telemetry Coordinator
903-450-5942

---------- Forwarded message ---------
From: **Sanchezreyes, Edwin CIV USARMY NETCOM (USA)** <edwin.sanchezreyes.civ@mail.mil>
Date: Thu, Feb 28, 2019 at 2:07 PM
Subject: RE: [Non-DoD Source] AFTRCC ICN 1189-19/7699 (UP Aerospace INC XT Request/Ground Testing & Launch-Highlands Ranch, CO/T or C, NM) (UNCLASSIFIED)
To: Wayne Morris <5600wayne@gmail.com>, Sanchez, Luis G (Guillo) CIV USARMY NETCOM (USA) <luis.g.sanchez10.civ@mail.mil>, Wyman, Richard J CIV USARMY NETCOM (US) <richard.j.wyman2.civ@mail.mil>
Cc: Austin, Gary L CIV USARMY NETCOM (US) <gary.l.austin.civ@mail.mil>

CLASSIFICATION: UNCLASSIFIED

AFMO concurs with part 1 of ICN 1189-19/7699 (UP Aerospace INC XT Request/Ground Testing & Launch-Highlands Ranch, CO/T or C, NM). Your coordination number is AFMO190229.

Thanks!

Ed Sanchez
210-221-2050

-----Original Message-----
From: Wayne Morris [mailto:5600wayne@gmail.com]
Sent: Thursday, February 28, 2019 10:47 AM
To: Sanchez, Luis G (Guillo) CIV USARMY NETCOM (USA) <luis.g.sanchez10.civ@mail.mil>; Wyman, Richard J CIV USARMY NETCOM (US) <richard.j.wyman2.civ@mail.mil>
Cc: Sanchezreyes, Edwin CIV USARMY NETCOM (USA) <edwin.sanchezreyes.civ@mail.mil>; Austin, Gary L CIV USARMY NETCOM (US) <gary.l.austin.civ@mail.mil>
Subject: [Non-DoD Source] AFTRCC ICN 1189-19/7699 (UP Aerospace INC XT Request/Ground Testing & Launch-Highlands Ranch, CO/T or C, NM)

AFTRCC concurs with and requests DoD AFMO-US&P and DoD WSMR AFC concurrence/coordination on the following FCC XT request.

Part 1 for AFMO-US&P

Applicant:
UP Aerospace Inc.
469 Mockingbird Ct
Highlands Ranch, CO 80129
POC: Jay Francis (603-429-0377)

Frequencies: (MHz) 2370.5 / 2382.5

Station Class: MOEC

Emission: 1M00F1D

Power: 10 watts (40dBM ERP)

Location: Highlands Ranch, CO (39-31-58 N 104-59-34 W)

MIRAD: Fixed

Dates: 2019-07-01 thru 2019-12-31

AFTRCC comments: Ground testing only. User must notify AFTRCC Telemetry Coordinator at least 3 days in advance prior to testing. Frequencies requested IAW NTIA US276 Footnote.

Please reply via return email as to concurrence, non-concurrence, additional scheduling if required or further comments. Please CC DOD WSMR AFC on your reply.

Part 2 for DoD WSMR AFC

Applicant:
UP Aerospace Inc.
469 Mockingbird Ct
Highlands Ranch, CO 80129
POC: Jay Francis (603-429-0377)

Frequencies: (MHz) 2370.5 / 2382.5

Station Class: MOEA/MOEC

Emission: 1M00F1D

Power: 10 watts (40dBM ERP)

Location: Truth or Consequences, NM (32-56-24 N 106-54-34 W)

MIRAD: 120 miles (193 KM)

Maximum flight altitude 100KM 3274,AGL

Dates: 2019-07-01 thru 2019-12-31

AFTRCC comments: Vehicle will be launched from Space Port NM located at Truth or Consequences, NM with recovery within the boundaries for WSMR. Currently launch is anticipated in October. Ground testing will be conducted during the week prior to launch and must be coordinated/scheduled with DoD WSMR AFC prior to transmitting. All launch transmissions must be coordinated/ scheduled in advance with DoD WSMR AFC prior to launch. Frequencies requested IAW NTIA US276 Footnote.

Please reply via return email as to concurrence, non-concurrence, additional scheduling if required, scheduling POC information, or further comments. Please CC DOD AFMO-US&P on your reply.

Signed:
Wayne Morris
AFTRCC Telemetry Coordinator
903-450-5942

CLASSIFICATION: UNCLASSIFIED

Subject: Your Question
From: Wayne Morris <5600wayne@gmail.com>
Date: Tue, 5 Mar 2019 12:55:44 -0600
To: "Jay Francis (Reactive Technologies)" <Jay@reactivetechnologies.com>

The statement below was transmitted with your coordination (or should have been)

AFC-WSMR concurs with AFTRCC ICN 1189-19/7699, Part 2, UP Aerospace INC at T or C, NM, provided the requestor adheres to the following coordination
requirements.

The location identified in AFTRCC STA request ICN 1189-19/7699, Part 2, 32-56-24 N 106-54-34 W, is at Spaceport America. As such, all operations must be scheduled and coordinated with the Spaceport America Technical Operations Manager, who, in turn, will schedule and de-conflict spectrum, and airspace (if applicable) with White Sands Missile Range (WSMR), through the WSMR Test liaison.

AFC-WSMR Control Number is WS-19-002.
V/R
Wayne