Technical Description

Submitted by Joel Thorsheim on behalf of Insitu
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Frequency Management Services
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PURPOSE

This request is being submitted to support a short duration command and control link test. This Special Temporary Authorization request is required to test and operate a command and control data link in the S-Band.

OPERATIONS DESCRIPTION

The equipment will be installed in a Ground Control Station (GCS), and provide a command and control link from the GCS to the aircraft. Initial testing will be at Bingen, WA on the ground, followed up with airborne UAS testing at Boardman, OR, and then long range tests where the GCS will be located at various ground sites communicating with an airborne UAV flying in Boardman airspace. The equipment utilizes a small set of preset frequencies with limited flexibility in frequency selection.

EQUIPMENT

Command and Control (Ground Station)

Manufacturer:	Freewave Technologies
Frequency Band:	2306-2314 MHz for Boardman airborne use and all ground locations 2310-2314 MHz alternative frequency set for Boardman airborne use and all ground locations (less desirable) (See Frequency Hopping Preset Frequency List below)
Emission:	230KF1D
Transmit Output:	5 Watts
Power:	6.6 kilo Watts ERP
Antenna Gain:	33.3 dBi
Antenna Type:	2.7 Meter Parabolic Reflector
Note:	Antenna beam width is 3.3 degrees. Antenna will be pointing at aircraft flying in Boardman, OR, airspace.

Command and Control (Mobile Airborne)

Manufacturer:	Freewave Technologies
Frequency Band:	2306-2314 MHz for Boardman airborne use and all ground locations 2310-2314 MHz alternative frequency set for Boardman airborne use and all ground locations (less desirable) (See Frequency Hopping Preset Frequency List below)
Emission:	230KF1D
Transmit Output:	2 Watts
Power:	3.2 Watts ERP
Antenna Gain:	5 dBi
Antenna Type:	Omnidirectional Dipole antenna

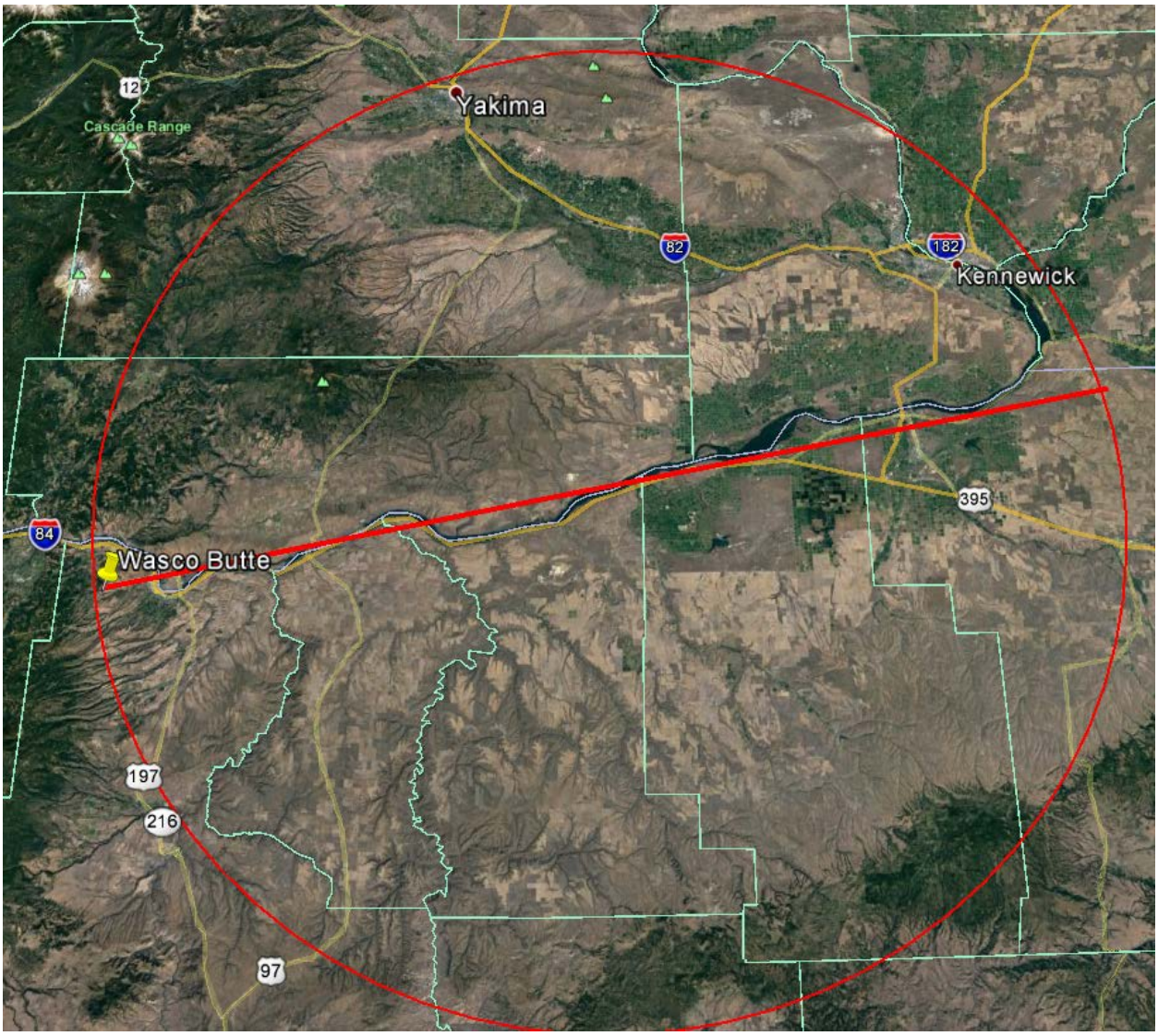
Preset Frequency Hopping Frequencies for Ground Station and Airborne Equipment

2306.3008	2306.5312	2306.7616	2306.9920	2307.2224
2307.4528	2307.6832	2307.9136	2308.1440	2308.3744
2308.6048	2308.8352	2309.0656	2309.2960	2309.5264
2309.7568	2309.9872	2310.2176	2310.4480	2310.6784
2310.9088	2311.1392	2311.3696	2311.6000	2311.8304
2312.0608	2312.2912	2312.5216	2312.7520	2312.9824

Stop Buzzer
Stop buzzer for this operation is Insitu the Operations Action Center at 509-637-4691.

SCHEDULE
Start Date; June 01, 2018
Stop Date: November 30, 2018

City	State	Latitude	Longitude	Radius (KM)	Station Type
Bingen Ground	WA	45-42-23N	121-27-23W	1	Fixed
Boardman Ground	OR	45-44-54N	119-47-38W	1	Fixed Ground Control Station
Boardman Airborne	OR	45-44-54N	119-47-38W	50	Mobile up to 5,000 Feet Flight Level
Wasco Butte Ground	OR	45-36-26 N	121-19-53 W	2	Fixed Ground Control Station
Bald Peter	OR	44-39-22 N	121-41-33 W	2	Fixed Ground Control Station
Long Branch	OR	45-34-31 N	121-46-12 W	2	Fixed Ground Control Station
Grey Butte	OR	44-25-04 N	121-05-50 W	2	Fixed Ground Control Station
Arlington (Center Point of flight Path) See Below Picture	WA	45-46-58 N	120-05-20 W	100	Cessna flight path from Wasco Butte location: heading +78 degrees with a +/- 5 mile corridor for 200 km, altitude 12,000 feet.


12
Cascade Range
Yakima
82
182
Kennewick
395
84
Wasco Butte
197
216
97