University of North Carolina at Wilmington Center for Marine Science
SOCON Project

FOR REFERENCE ONLY

As required by the Commission, the following technical parameters are provided for SeaHawk-1 and SeaHawk-2 communications with an earth station operated outside the United States, its territories and possessions as well as earth stations licensed to an entity other than the University of North Carolina at Wilmington Center for Marine Science ("UNCW/CMS"). This information is also included in the NTIA Space record data form submitted separately which gives the full picture of both ends of the transmit receive link.

Clyde Space, Glasgow, Scotland, UK: Uplink to SeaHawk-1 and SeaHawk-2

Transmit Frequency: **VHF --- 140 – 150 MHz**		
State (XSC)	XSC = G	
City Name (XAL)	XAL = Glasgow	
Latitude (DDMMSS)	Lat = 555744	
Longitude (DDDMMSS)	Lon = 0041649	
Antenna Polarization (XAP)	XAP = T	POLARIZATIONS: H = HORIZONTAL, T = RIGHT AND LEFT HAND CIRCULAR,
Antenna Azimuth (XAZ)	XAZ = V00	THE EARTH STATION Transmitter ANTENNA AZIMUTH (XAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, XAZ01 V00
Antenna Dimensions (XAD)	ANTENNA GAIN 10.2 dBi, BEAMWIDTH 52 degrees, AZIMUTHAL RANGE 0 – 360, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 30 m THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 25 m XAD = 10G052B000-360A00030H025	EXAMPLE ASSUMING NONGEOSTATIONARY, XAD01 16G030B000-360A00357H006
Satellite Receive Specifications **UHF --- 140 - 150 MHz**		
Polarization (RAP)	RAP = R	POLARIZATION: R = RIGHT HAND CIRCULAR,
Azimuth (RAZ)	RAZ = V00	STATION RECEIVER ANTENNA AZIMUTH (XAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, RAZ01 V00
Dimension (RAD)	ANTENNA GAIN 0.0 dB BEAMWIDTH 30 degrees RAD = 00G030B	(NTIA format (RAD), EXAMPLE, RAD01 16G030B)
Type of satellite (State = SP) City = G/No	Type = NO	Nongeostationary

NASA Near-Earth Network Stations for 8100 MHz Receive Only

Primary

Wallops Flight Facility -- WG1 11.28-m

- Location 37° 55' 28" N; 75° 28' 35" W
- 11.3-m antenna for receiving at X-band.

WG1 X-band Telemetry Characteristics

Characteristic	Value
Frequency	8000-8500 MHz
G/T	34.5 dB/K (clear sky & 10° elevation angle)
Polarization	RHC or LHC
Antenna Beamwidth	0.23 deg
Antenna Gain	56.8 dBi
Modulation	BPSK, QPSK, OQPSK, UQPSK, 8PSK, GMSK, (16,32,64 APSK)
Demodulator Data Rate Dual Ch	500 Kbps – 240 Mbps (BPSK) per ch 1 Mbps – 350 Mbps (QPSK, OQPSK) per ch 1 Mbps – 2X240 Mbps (UQPSK) per ch 1 Mbps – 350 Mbps (8PSK) per ch
Data Format	NRZ-L, M, S. Biϕ-L, M, S, DNRZ
Decoding	Derandomization, Viterbi, and or Reed-Solomon (Section 1.3, ref o), 7/8 LDPC

Secondary

AS1 Alaska Satellite Facility -- ASF 11.28-meter:

- Location: 64° 51' 31" N; 147° 51' 27" W
- 11.3-m antenna for receiving at X-band.

Alaska AS1 X-band Telemetry Characteristics

Characteristic	Value
Frequency	8025 – 8500 MHz
G/T	37.2 dB/K (clear sky & 10° elevation angle)
Polarization	RHC or LHC
Antenna Beamwidth	0.23 deg
Antenna Gain	56.8 dBi
Modulation	BPSK, QPSK, OQPSK, UQPSK, 8PSK, GMSK, (16,32,64 APSK)
Demodulator Data Rate Dual Channel	500 Kbps – 240 Mbps (BPSK) per ch 1 Mbps – 350 Mbps (QPSK, OQPSK) per ch 1 Mbps – 2X240 Mbps (UQPSK) per ch 1 Mbps – 350 Mbps (8PSK) per ch
Data Format	NRZ-L, M, S. Biϕ-L, M, S, DNRZ
Decoding	Derandomization, Viterbi (R-½) or Reed-Solomon, Rate 7/8 LDPC

Secondary

AS2 Alaska Satellite Facility -- ASF 9.1- meter:

- Location: 64° 51’ 35” N, 147° 50’ 50” W
- 9.1-m antenna for receiving at X-band.

Alaska AS2 X-band Telemetry Characteristics

Characteristic	Value
Frequency	8025 – 8500 MHz
G/T	36.2 dB/K (clear sky & 10° elevation angle)
Polarization	RHC or LHC
Antenna Beamwidth	0.23 deg
Antenna Gain	56.8 dBi
Modulation	BPSK, QPSK, OQPSK, UQPSK, 8PSK, GMSK, (16,32,64 APSK)
Demodulator Data Rate Dual Channel	500 Kbps – 240 Mbps (BPSK) per ch 1 Mbps – 350 Mbps (QPSK, OQPSK) per ch 1 Mbps – 2X240 Mbps (UQPSK) per ch 1 Mbps – 350 Mbps (8PSK) per ch
Data Format	NRZ-L, M, S. Biϕ-L, M, S, DNRZ
Decoding	Derandomization, Viterbi (R-½) or Reed-Solomon, Rate 7/8 LDPC

Secondary

AS3 Alaska Satellite Facility -- ASF 11.0 - meter:

- Location: 64° 51’ 32’’ N 147° 51’ 15’’ W
- 11-m antenna for receiving at X-band.

Alaska AS3 X-band Telemetry Characteristics

Characteristic	Value
Frequency	8025 – 8500 MHz
G/T	36.2 dB/K (clear sky & 10° elevation angle)
Polarization	RHC or LHC
Antenna Beamwidth	0.23 deg
Antenna Gain	56.8 dBi
Modulation	BPSK, QPSK, OQPSK, UQPSK, 8PSK, GMSK, (16,32,64 APSK)
Demodulator Data Rate Dual Channel	500 Kbps – 240 Mbps (BPSK) per ch 1 Mbps – 350 Mbps (QPSK, OQPSK) per ch 1 Mbps – 2X240 Mbps (UQPSK) per ch 1 Mbps – 350 Mbps (8PSK) per ch
Data Format	NRZ-L, M, S. Biϕ-L, M, S, DNRZ
Decoding	Derandomization, Viterbi (R-½) or Reed-Solomon, Rate 7/8 LDPC

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Backup

Mc Murdo Ground Station – MGS1 10 m:

- Location: 77° 50’ 21” S; 166° 40’ 01” E
- 10-m antenna for receiving at X-band.

Mc Murdo MG1 X-band Telemetry Characteristics

Characteristic	Value
Frequency G/T include radome	7700 – 8500 MHz 32.0 dB/K (clear sky & 10° elevation angle)
Polarization	RHC or LHC
Antenna Beamwidth Antenna Gain	0.26 deg 56 dBi
Modulation Type Demodulator Data Rate – Mono Ch	BPSK, QPSK, OQPSK, UQPSK, 8PSK, GMSK, (16,32,64 APSK) 500 Kbps – 240 Mbps (BPSK) per ch 1 Mbps – 350 Mbps (QPSK, OQPSK) per ch 1 Mbps – 2X240 Mbps (UQPSK) per ch 1 Mbps – 350 Mbps (8PSK) per ch
Data Format	NRZ-L, M, S, Biϕ-L, M, S, DNRZ
Decoding	Derandomization, Viterbi and/or Reed-Solomon (Para 1.3 ref s.)