Exhibit 2 - FCC Form 442
HawkEye 360 Pathfinder Cluster
Technical Information

1. Ownership, Operations and Construction. HE360 is the owner and operator of the Pathfinder cluster. The company has selected Deep Space Industries, headquartered at NASA Ames Research Park in California and its sub-contractor UTIAS Space Flight Laboratory (SFL) as the manufacturer of the satellites. The satellites are expected to be launched on a Falcon 9 launch vehicle from Vandenberg, AFB in the 4th Quarter of 2017. Pursuant to Part 5 §5.64 of the Commission's Rules, construction of the proposed experimental satellites and associated facilities will begin prior to the Commission's grant of an authorization. This is necessary given the nature of satellite construction and technical requirements over long lead times. Such construction is entirely at HE360's risk without any assurances that its proposed experiment will be subsequently approved.

- **Space Station Name:** Hawk-1, Hawk-2 and Hawk-3 (the "Pathfinder cluster")
- **Estimated Construction Completion Date:** August 2017
- **Estimated Launch Date:** 4th Quarter 2017
- **Purpose:** Experimental, non-Common Carrier basis
- **Orbital Type:** NGSO

2. Orbital Requirements. The Pathfinder cluster will fly in proximate formation and work together to form a single observation platform. The satellites are designed to operate in circular sun-synchronous orbits with a nominal altitude of 575 km and inclination between 97 and 98 degrees. The satellites will be three-axis stabilized using an on-board closed-loop control system. The satellites are based on COTS technology that allows for small, lightweight and low-cost spacecraft.

The Hawk satellites will be separated from one another by up to 250 km. Typical inter-satellite distances will be between 125 and 250 km. Station-keeping maneuvers will maintain the relative formation of the cluster throughout the life of the mission. Maintenance maneuvers will be conducted relatively infrequently – approximately once per week. There will be variations in the satellites' inclination angles, apogees, perigees, and right ascension of the ascending node. Maintaining the desired geometry and spacecraft separation is the primary goal.

Total Number of Satellites (single cluster):	3
Total Number of Orbital Planes:	1
Celestial Reference Body:	Earth
Inclination Angle (degrees):	97 - 98
Orbital Period (seconds)	5770
Apogee	575 km
Perigee	575 km

3. **Service Area:** United States

4. **Satellite Payload.** The Pathfinder communications payload consists of two command and control systems. Each satellite is designed to receive commands from associated ground stations and to downlink telemetry data stored on board the satellite as well as RF survey data stored on board the satellite which has been collected by a software defined receiver (SDR). The collected, processed and stored data onboard the satellites will be downlinked in the 8025-8400 MHz band to the appropriate ground station while the satellites are visible from that particular ground station site at a five degree elevation angle or higher. The transmitter has three possible user data rates: 3 Mbps, 25 Mbps and 50 Mbps. The storage capacity for the payload on board each satellite is approximately 32 GB. The block diagram of the communication payload is shown in Figure 1 below.

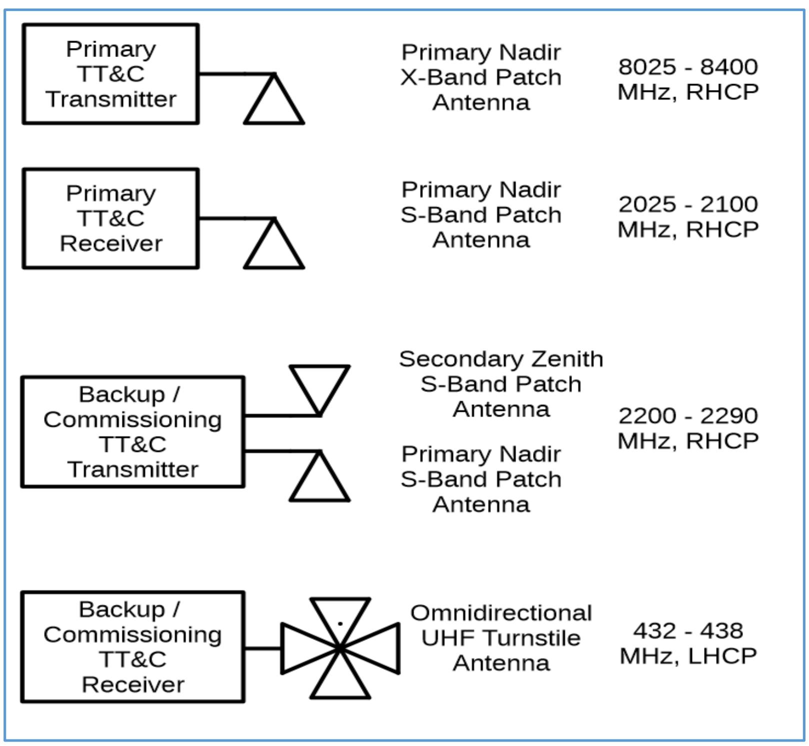


Figure 1
Communication Payload Block Diagram

5. Power Flux Density Calculation

(a) Power Flux Density at the Surface of the Earth in the band 8025-8400 MHz

Table 21-4 of the ITU Radio Regulations states that the PFD at the Earth's surface produced by emissions from an EESS space station in the 8025-8400 MHz band, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the following values:

- –150 dB(W/m2) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- –150 + 0.5(d -5) dB(W/m2) in any 4 kHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane;
- –140 dB(W/m2) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the PFD that would be obtained under assumed free-space propagation conditions. As shown in Figures 2 – 3 below, the PFDs at the Earth's surface produced by the cluster data and telemetry transmissions satisfy the PFD limits in the ITU Radio Regulations for all angles of arrival. In Figures 2 and 3 the gain contours are plotted at the intended 575 km altitude for the Pathfinder cluster. In several of the plots, contours beyond a certain distance from peak are not shown because they do not intersect with the Earth.

In addition, the transmit power for both the TT&C and payload data transmitters can be adjusted on orbit to a limited extent. This capability supports HE360's ability to manage the satellites' PFD levels during all phases of the mission.

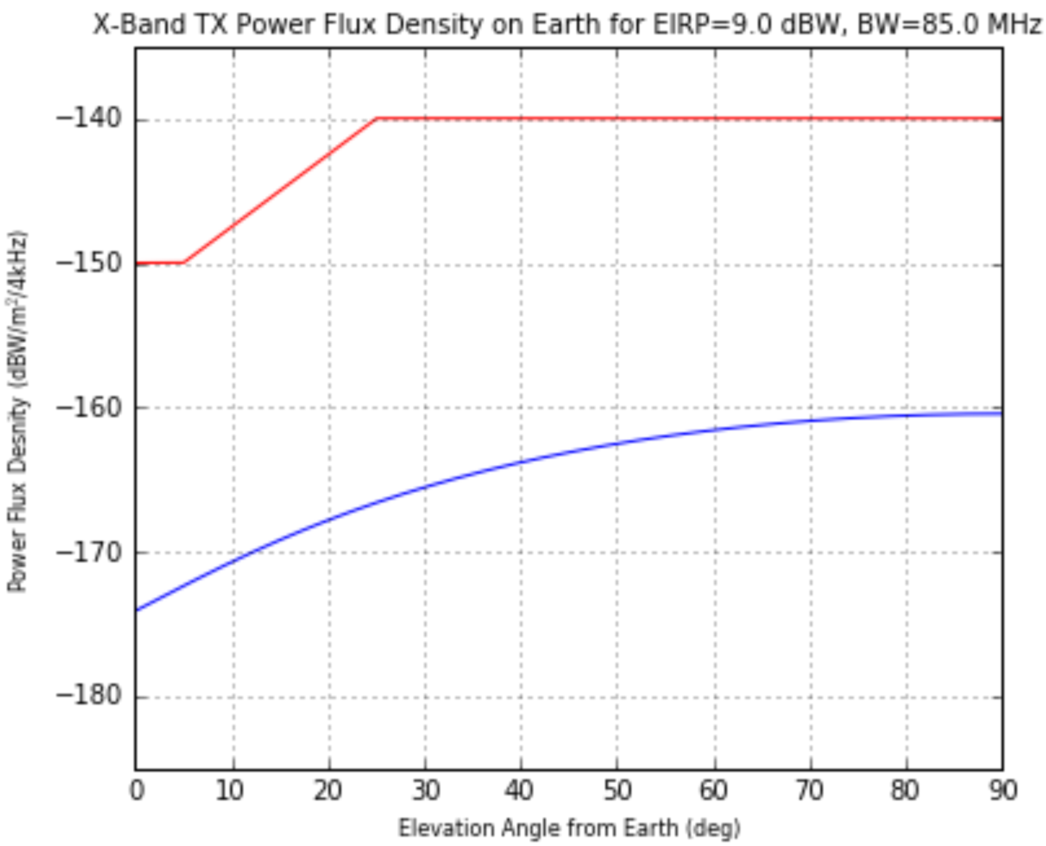


Figure 2
PDF at the Surface of the Earth produced by Hawk satellites TT&C Downlinks
Shown for 575 km Pathfinder cluster orbit

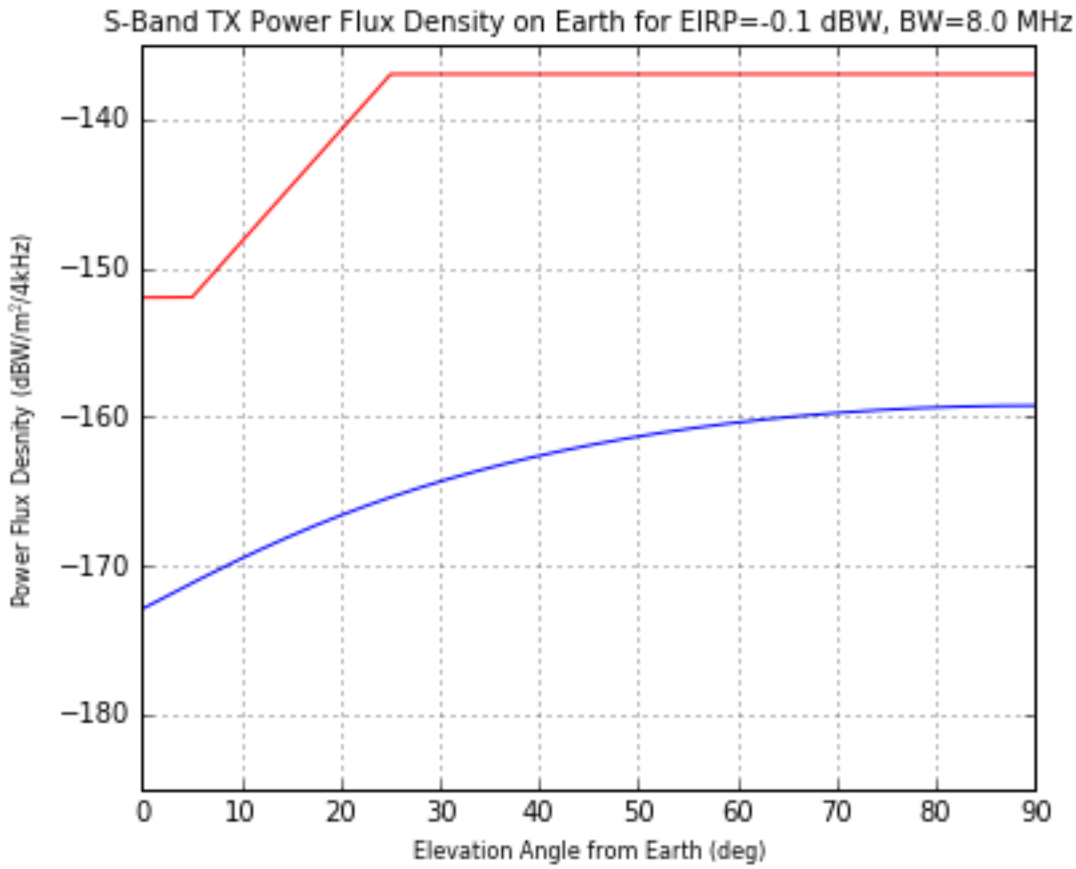


Figure 3:
PFD at the Surface of the Earth produced by Hawk Commissioning / Backup Downlinks
Shown for 575 km Pathfinder cluster orbit altitude

(b) Power Flux Density at the Surface of the Earth in the band 8400-8450 MHz

ITU-R Recommendation SA-1157 specifies a maximum allowable interference power spectral flux-density level at the Earth's surface of -255.1 dB(W/(m^2·Hz)) to protect ground receivers in the deep-space research band 8400-8450 MHz. HE360 does not operate in this frequency range, so no special precautions are warranted. The highest band edge for the Hawk with the highest operating frequency (8300 MHz) will have an upper band edge more than 100 MHz lower than the lower edge of the DSN band.

(c) Power Flux Density at the Geostationary Satellite Orbit

No. 22.5 of the ITU Radio Regulations specifies that in the frequency band 8025-8400 MHz, which the EESS (using non-geostationary satellites) shares with the fixed-satellite service (Earth-to-space) and the meteorological-satellite service (Earth-to-space), the maximum PFD produced at the geostationary satellite orbit ("GSO") by any EESS space station shall not exceed

–174 dB(W/m2) in any 4 kHz band. The calculation below shows that the PFD produced by the transmissions from the proposed HE360 satellites does not exceed the limit in No. 22.5, even in the worst possible hypothetical case.

The PFD at the GSO produced by the HE360 transmission is:

PFD [dBW/m2 /4 kHz] = EIRP (dBW) - 71 - 20log10(D) - 10log10(BW) – 24

Where:

- EIRP is the Maximum EIRP of the transmission, in dBW;
- D is distance between the HE360 satellite and GSO, in km;
- BW is the symbol bandwidth of the transmission, in MHz.

The minimum possible distance between a HE360 satellite and the GSO is 35,786 - 575 = 35,211 km for the highest possible HE360 satellite orbit of 650 km. Under a hypothetical assumption that the HE360 satellite antenna is radiating at its peak EIRP toward the GSO, the TT&C transmission with the peak EIRP = 9 dBW and BW = 85 MHz produces a PFD at the GSO of -196.22 $dBW/m^2/4$ kHz.

6. Principle specifications. The HE360 satellites are nearly identical. Each microsatellite measures 200 mm x 267 mm x 440 mm with a total mass of less than 13 kg. It has body-mounted solar panels on 5 sides that generate approximately 23 watts of power in sunlight. Battery bus voltage is 12 Volts and consists of 3 cells with 6.8 Ah capacity. The satellite has no deployable mechanisms. The satellite has a single electro-thermal propulsion system that uses liquid water as the working fluid. The unit has an estimated I_{sp} of 200 seconds. Over the mission life all three satellites will have a minimum of 50% of their water propellant left. It has an estimated lifetime of 7 years at a nominal orbit altitude of 575 km.

7. Telemetry, Tracking and Command. For TT&C, the HE360 satellites have both primary and secondary links as outlined in the table below. The satellites will receive command communications from a gateway earth station using the primary uplink band of 2025-2110 MHz, which is authorized in the EESS subject to such conditions as may be applied on a case-by-case basis. FCC experimental authorization is being requested for one earth station equipped with a 3.7m dish antenna. Command signals will be issued from the mission operations center in Herndon, VA, and uplinked to the satellites via the primary earth station. The satellites will transmit telemetry data to the earth station using the primary downlink band of 8025-8400 MHz. The telemetry will be received at the Herndon earth station and relayed to the Herndon operations center for processing. As is typical of EESS operations, earth stations in the network will also have the capability of issuing limited commands in the 2025-2110 MHz band that direct the tasking operations of the satellites. HE360 alone will issue telecommand signals to command the spacecraft.

8. Radio equipment. HE360 is applying for experimental use of the downlink frequency band of 8025-8400 MHz and the uplink frequency band of 2025-2110 MHz. The maximum satellite output power is 2 Watts through a patch antenna, resulting in a power flux density on the ground of -255.1 dB(W/(m^2·Hz)) for the nominal space station altitude of 575 km. Additionally, HE360 is applying for secondary downlink frequencies of 2200-2290 MHz and the uplink frequency between approximately 435 and 437 MHz which will be used for the early commissioning phase and emergency backup.

Band	*Frequency Band*	*System*	*T/R Mode*	*System Description*
X-Band	8025-8400 MHz	Primary Payload Downlink & TT&C	TX	OQPSK Modulation ½ Rate Convolutional Encoding, K=7 with concatenated RS code TBD 3 – 50 Mbps 2 Watts max output power
S-Band	2025-2110 MHz	Primary TT&C Uplink	RX	OQPSK Modulation ½ Rate Convolutional Encoding, K=7 with concatenated RS code Nominally 256 kbps Up to 1 Mbps
S-Band	2200-2290 MHz	Secondary TT&C Downlink For redundancy & emergency backup	TX	QPSK ½ Rate Convolutional Encoding 32 kbps – 2 Mbps
UHF	432 - 438 MHz	Secondary TT&C Uplink For redundancy & emergency backup	RX	GFSK 4 kbps

9. Interference Analysis

8025-8400 MHz (Primary Downlink)

The 8025-8400 MHz band is allocated for a number of different uses including non-Federal use for EESS (Earth-to-space) subject to such conditions as may be applied on a case-by-case basis. Further, transmissions from the satellites operating in this band shall not cause harmful interference to Federal and non-Federal stations operating in accordance with the U.S. Table of Frequency Allocations. HE360 will coordinate with Federal and non-Federal operators in this band to ensure compliance with this requirement.

HE360 has taken time to understand and include mitigation techniques outlined in the ECC Report 155, for operating its satellite downlink in the 8025 - 8400 MHz band. Below are the key steps taken to minimize risk of interference.

- HE360 satellites operate in a non-broadcast mode, only radiating when transmitting data to one or more of our planned earth stations
- HE360 satellites operate in the lower portion of the 8025 – 8400 MHz band.
- HE360 satellites operate well within the power flux density requirements.

(a) Interference between EESS systems operating in the band 8025-8400 MHz

Interference between the HE360 satellites and those of other systems is unlikely because EESS systems operating in the 8025-8400 MHz band normally transmit only in short periods of time while visible from the dedicated receiving earth stations (typically less than 10 minutes for a single pass). HE360 satellites are designed to be non-broadcast satellites. For interference to happen, satellites belonging to different systems would have to travel through the antenna beam of the receiving earth station and transmit at the same time and at same frequency. In such a very unlikely event, interference can be still be avoided by coordinating the satellite transmissions so that they do not occur simultaneously. In addition, orbital parameters can also be adjusted such that phasing of the contacts can be offset over time. HE360 satellites provide a propulsion system which will allow additional maneuverability and phasing throughout their life. Our system design life provides 50% margin of propellant at end of life. This provides budget for orbital phasing if interference does occur. Our modulation format is OQPSK with three selectable data rates (3, 25 and 50 Mbps). This configurability allows for operation at lower bandwidths to provide another option to resolve interference if it would occur.

(b) Interference with the Fixed Service and the FSS in the band 8025-8400 MHz

HE360 demonstrates above that the Hawk satellite transmissions will meet the limits specified by the ITU for protection of the Fixed Service in the 8025-8400 MHz band, as well as the geostationary FSS satellites using this band for their uplinks. See Section 16(a) above.

(c) Protection of the deep-space research in the band 8400-8450 MHz

HE360 also demonstrates above that the protection criterion recommended by the ITU for deep-space research in the 8400-8450 MHz band is met. See Section 9 (a) above.

<u>2025-2110 MHz (Primary Uplink)</u>

The 2025-2110 MHz band is allocated for Federal/non-Federal use for EESS (Earth-to-space) subject to such conditions as may be applied on a case-by-case basis. Further, transmissions from the satellites operating in this band shall not cause harmful interference to Federal and non-Federal stations operating in accordance with the U.S. Table of Frequency Allocations. HE 360 will coordinate with Federal and non-Federal operators in this band to ensure compliance with this requirement.

2200-2290 MHz (Secondary Downlink)

The 2200-2290 MHz band is allocated for Federal use for EESS (Earth-to-space) subject to such conditions as may be applied on a case-by-case basis. Further, transmissions from the satellites operating in this band shall not cause harmful interference to Federal and non-Federal stations operating in accordance with the U.S. Table of Frequency Allocations. HE 360 understands that use and coordination of this band may not be possible for its ground location in Herndon, VA. HE 360 will work coordinate with Federal operators in this band to ensure compliance with this requirement and determine if its use is possible. As part of early coordination HE360 evaluated different frequencies as alternatives to this band; however due to operational needs, hardware development timelines and limited options of other frequencies in we are keeping our secondary downlink in this band. HE360 satellites operate in a non-broadcast mode, only radiating when transmitting data to one or more of our planned earth stations. Our ability to operate in this band is controllable. The use of this band is only for commissioning and early orbit operations as well as emergency backup.

432 - 438 MHz (Secondary Uplink)

The 432-438 MHz band is primarily allocated for amateur use for radiocommunication service and secondarily for EESS service subject to such conditions as may be applied on a case-by-case basis. HE360 satellites will operate a UHF low rate uplink for early commissioning.

10. Link Budget. The coverage area diameter from an altitude of 575 km is approximately 5,000 km. Each satellite will pass over the U.S. about 4 times a day for approximately 10 minutes. The satellite transmitters are only active while communicating with user terminals. Below is the HE360 Satellite Link budget followed by the estimated footprint for the X-band downlink, S-band downlink and UHF uplink.

HawkEye 360 Pathfinder Satellite Link Budget

Pathfinder Cluster Primary TT&C Uplink Analysis

Parameter	Channel	Unit
General		
Orbit Altitude	575	km
Elevation angle	5	deg
Slant range	2,658.22	km
Frequency	2.075	GHz
Earth Station Transmitter		
Amplifier output power	100	W
Circuit loss	3	dB
Radome loss	0	dB
Antenna diameter	3.7	m
Antenna efficiency	65	%
Antenna peak gain	36	dBi
Antenna HPBW	2.73	deg
EIRP	53.00	dBW
Channel Losses		
Free space loss	165.90	dB
Atmospheric loss	1	dB
Pointing loss	3	dB
Polarization loss	2	dB
Satellite Receiver		
Antenna gain	7	dBi
Antenna HPBW	60	deg
Antenna circuit loss	0	dB
Carrier at the antenna output	-83.28	dBm
LNA noise temperature	288.63	K
System noise temperature	661.16	K
Receiver noise power density (N0)	-170.40	dBm/Hz
Carrier power-to-noise density ratio (C/N0)	88.50	dBHz
Earth Station Demodulator		
Modulation	PCM/PM	
Symbol rate	256	ksps
Composite code rate	1	
Uncoded data rate	256	kbit/s
Target BER	10^{-5}	
Demodulator implementation loss	2.5	dB
Required Eb/N0 at target BER	14.4	dB
Received Eb/N0	34.42	dB
Link Margin	**17.52**	**dB**

Pathfinder Cluster Primary Payload Downlink and TT&C Analysis

Parameter	Channel	Unit
General		
Orbit Altitude	575	km
Elevation angle	5	deg
Slant range	2,268.03	km
Frequency	8.2	GHz
Satellite Transmitter		
Amplifier output power	2	W
Circuit loss	1	dB
Antenna peak gain	7	dBi
Antenna HPBW	60	deg
EIRP	9.01	dBW
Channel Losses		
Free space loss	177.84	dB
Atmospheric loss	2.5	dB
Pointing loss	0.25	dB
Polarization loss	1	dB
Earth Station Receiver		
Antenna diameter	3.7	m
Antenna efficiency	0.65	%
Antenna peak gain	48.18	dBi
Antenna HPBW	0.69	deg
Radome loss	0	dB
Carrier at the antenna output	-94.15	dBm
LNA noise temperature	58.66	K
System noise temperature	112.21	K
Station G/T	27.42	dB/K
Receiver noise power density (N0)	-178.10	dBm/Hz
Carrier power-to-noise density ratio (C/N0)	83.70	dBHz
Earth Station Demodulator		
Modulation	QPSK	
Symbol rate	25	Msps
Composite code rate	0.5	
Uncoded data rate	50	Mbit/s
Target BER	10^{-5}	
Demodulator implementation loss	1	dB
Required Eb/N0 at target BER	9.6	dB
Received Eb/N0	9.72	dB
Coding gain	5.10	dB
Link Margin	**4.22**	**dB**

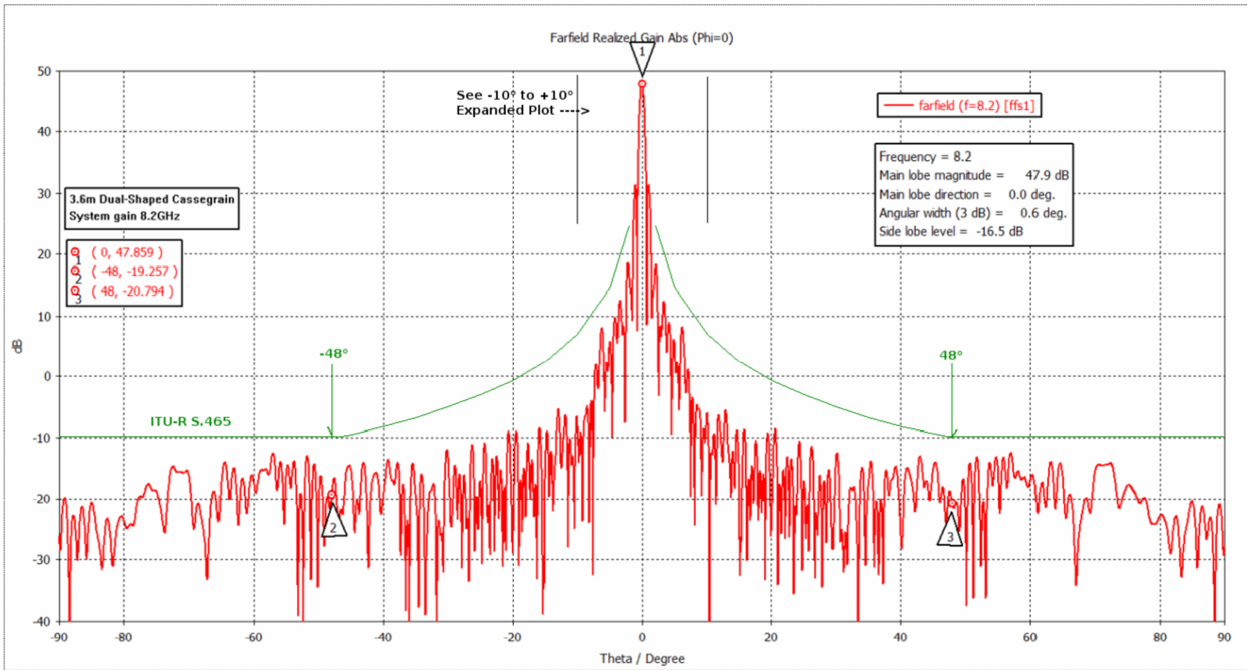
Pathfinder Cluster Secondary TT&C Uplink Analysis/Emergency Backup

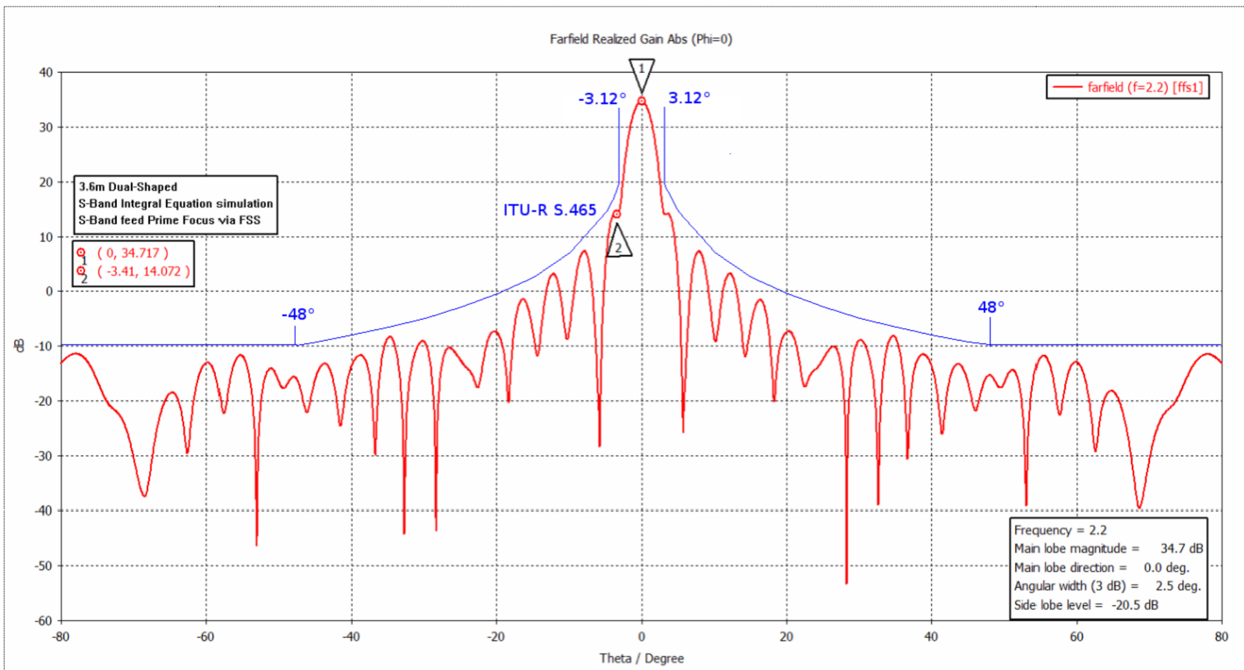
Parameter	Channel	Unit
General		
Orbit Altitude	575	km
Elevation angle	5	deg
Slant range	2,267.07	km
Frequency	450	MHz
Earth Station Transmitter		
Amplifier output power	100.0	W
Circuit loss	3.0	dB
Radome loss	0	dB
Antenna peak gain	12.0	dBi
Antenna HPBW	15.00	deg
EIRP	29.00	dBW
Channel Losses		
Free space loss	152.62	dB
Atmospheric loss	1.0	dB
Pointing loss	3.0	dB
Polarization loss	2.0	dB
Satellite Receiver		
Antenna gain	0.0	dBi
Antenna HPBW	90	deg
Antenna circuit loss	0.0	dB
Carrier at the antenna output	-99.62	dBm
LNA noise temperature	225.70	K
System noise temperature	598.24	K
Receiver noise power density (N0)	-170.83	dBm/Hz
Carrier power-to-noise density ratio (C/N0)	71.21	dBHz
Earth Station Demodulator		
Modulation	GFSK	
Symbol rate	4	ksps
Composite code rate	1	
Uncoded data rate	4	kbit/s
Target BER	10^{-5}	
Demodulator implementation loss	1.0	dB
Required Eb/N0 at target BER	12.0	dB
Received Eb/N0	35.19	dB
Link Margin	**22.19**	**dB**

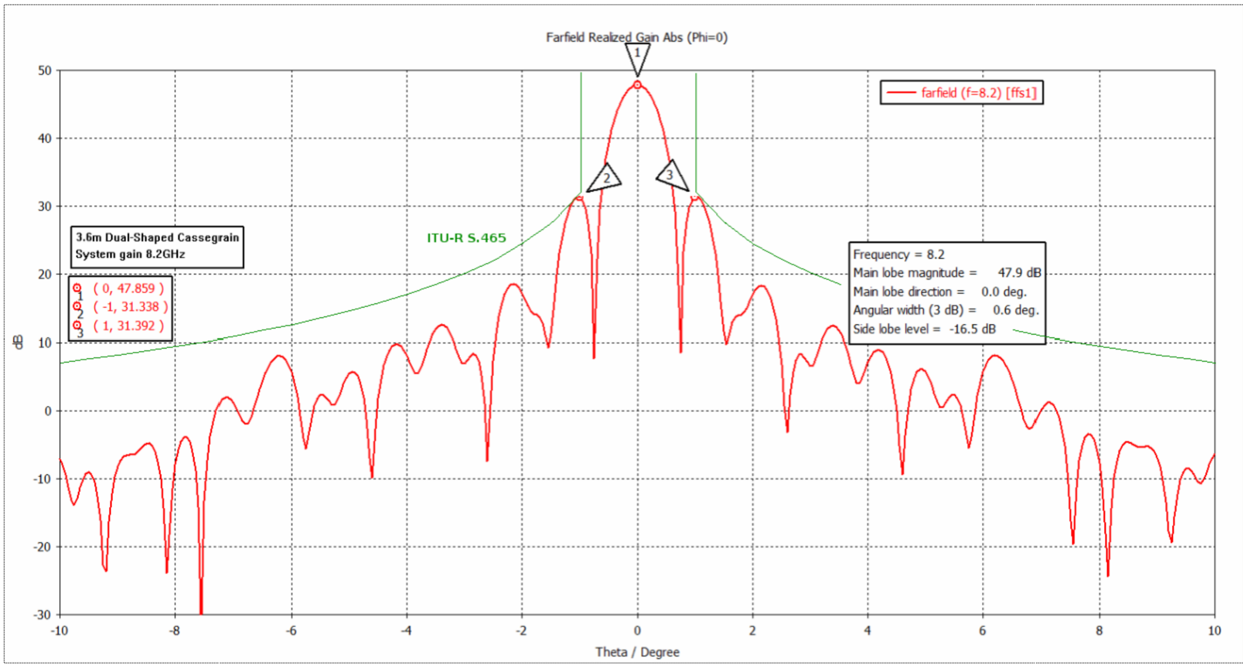
Pathfinder Cluster Secondary Downlink Analysis/ Commissioning/Backup

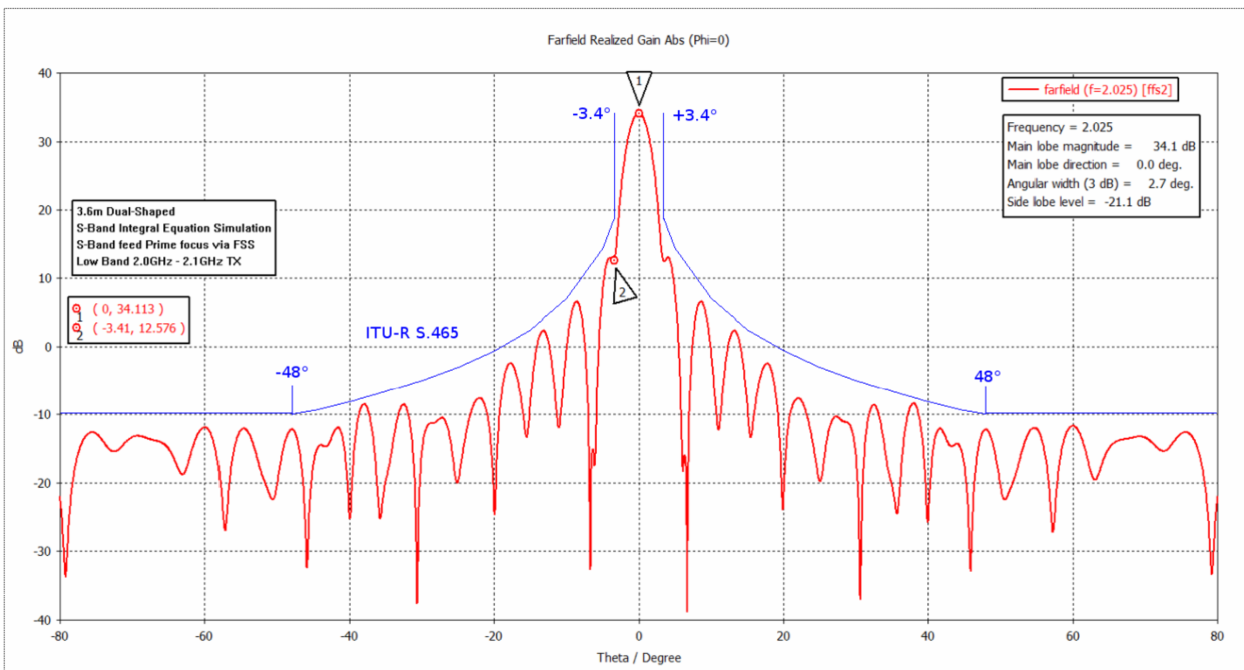
Parameter	Channel	Unit
General		
Orbit Altitude	575	km
Elevation angle	5	deg
Slant range	2,267.07	km
Frequency	2.252	GHz
Satellite Transmitter		
Amplifier output power	0.35	W
Circuit loss	0.5	dB
Antenna peak gain	7	dBi
Antenna HPBW	60	deg
EIRP	1.94	dBW
Channel Losses		
Free space loss	166.61	dB
Atmospheric loss	1	dB
Pointing loss	0.47	dB
Polarization loss	1	dB
Earth Station Receiver		
Antenna diameter	3.7	m
Antenna efficiency	65	%
Antenna peak gain	36.95	dBi
Antenna HPBW	2.52	deg
Radome loss	0	dB
Carrier at the antenna output	-99.72	dBm
LNA noise temperature	58.66	K
System noise temperature	128.45	K
Station G/T	15.39	dB/K
Receiver noise power density (N0)	-177.51	dBm/Hz
Carrier power-to-noise density ratio (C/N0)	77.32	dBHz
Earth Station Demodulator		
Modulation	BPSK	
Symbol rate	4	Msps
Composite code rate	0.5	
Uncoded data rate	4	Mbit/s
Target BER	10^{-5}	
Demodulator implementation loss	1	dB
Required Eb/N0 at target BER	9.6	dB
Received Eb/N0	13.31	dB
Coding gain	5.10	dB
Link Margin	**7.81**	**dB**

11. Antenna Patterns



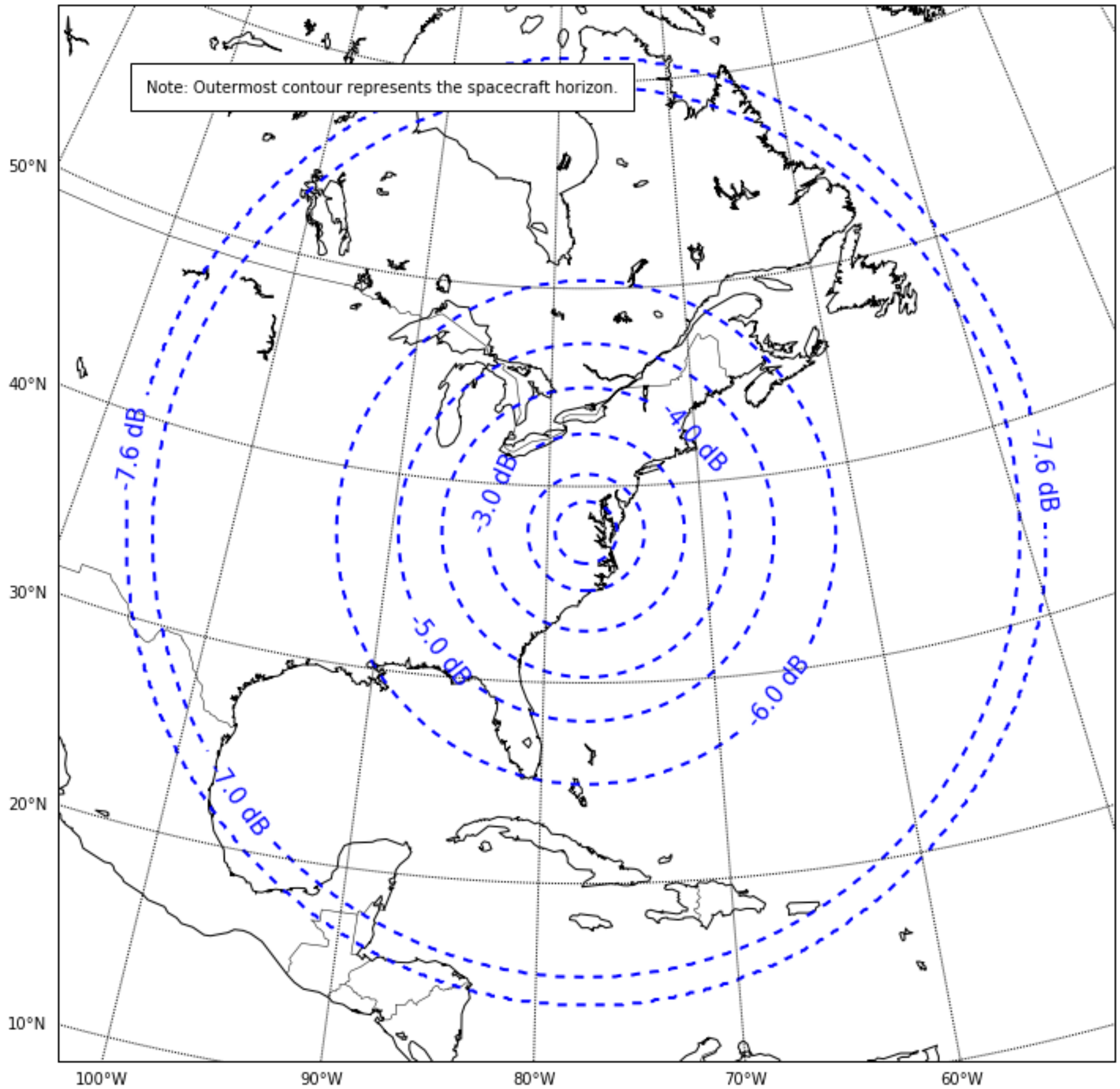


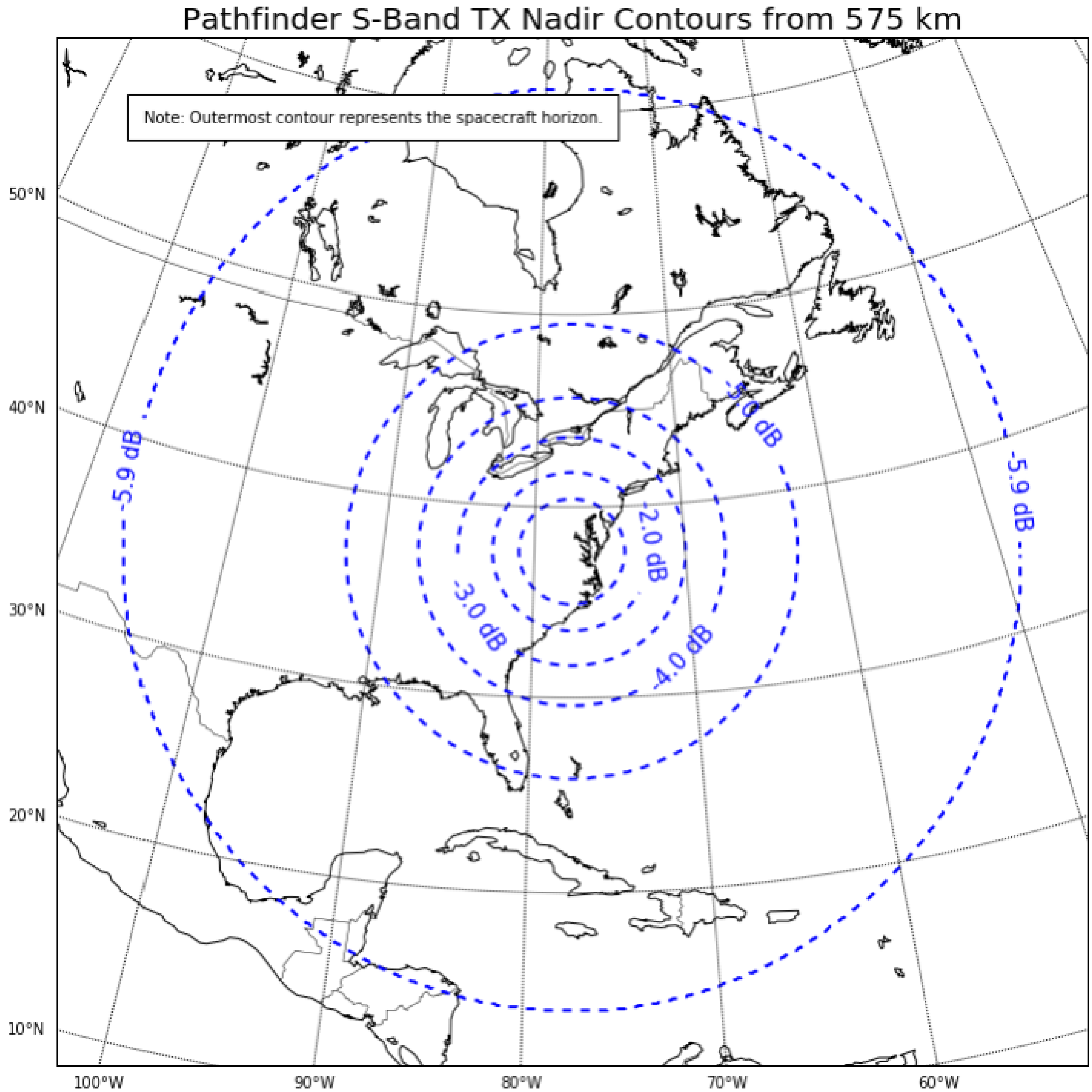

Farfield Realized Gain Abs (Phi=0)
farfield (f=8.2) [ffs1]
3.6m Dual-Shaped Cassegrain
System gain 8.2GHz
(0, 47.859)
(-1, 31.338)
(1, 31.392)
ITU-R S.465
Frequency = 8.2
Main lobe magnitude = 47.9 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 0.6 deg.
Side lobe level = -16.5 dB
dB
Theta / Degree


Farfield Realized Gain Abs (Phi=0)
farfield (f=2.025) [ffs2]
-3.4°
+3.4°
Frequency = 2.025
Main lobe magnitude = 34.1 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 2.7 deg.
Side lobe level = -21.1 dB
3.6m Dual-Shaped
S-Band Integral Equation Simulation
S-Band feed Prime focus via FSS
Low Band 2.0GHz - 2.1GHz TX
(0, 34.113)
(-3.41, 12.576)
ITU-R S.465
-48°
48°
dB
Theta / Degree

12. Beam Contours

Pathfinder X-Band TX Nadir Contours from 575 km





Pathfinder S-Band TX Nadir Contours from 575 km
Note: Outermost contour represents the spacecraft horizon.
50°N
40°N
30°N
20°N
10°N
100°W
90°W
80°W
70°W
60°W
-5.9 dB
-5.9 dB
-2.0 dB
-3.0 dB
-4.0 dB

Pathfinder UHF RX Nadir Contours from 575 km