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VIA ELECTRONIC DELIVERY

June 25th, 2017

TO: Experimental Licensing Service (ELS) / Office of Engineering and Technology (OET)
Federal Communications Commission (FCC)
445 12th Street, SW
Washington, DC 20554

RE: Request for Special Temporary Authority for Arkyd 6A/6B Earth Station Coverage

To Whom It May Concern:

This memorandum is to formally request special temporary authorization (STA) from the FCC for Earth station coverage related to its Arkyd 6A and 6B experimental satellites. The Arkyd 6B satellite is currently scheduled to launch in October 2017 and will be operating under experimental authorization 0025-EX-PL-2016. The Arkyd 6A satellite is currently scheduled for launch in December 2017 and will be operating under experimental authorization 850-EX-PL-2014, pending approval of extension request 0285-EX-CR-2017. The requested STA will be used to provide expanded Earth station support during the critical launch and commissioning phases of each of the satellites' missions. PRDC requests the STA to cover activities between September 2017 and March 2018, spanning the commissioning phase for both satellites.

As part of the documentation of this change, PRDC has attached the following updated document to this memorandum:

- Technical addendum related to requested Earth station capabilities

Thank you in advance of your timely support on this matter. If you have any questions concerning the foregoing, please do not hesitate to contact me directly.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Chris Voorhees'.

Chris Voorhees
Chief Engineer
Planetary Resources Development Corporation
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TECHNICAL ADDENDUM: PRDC ARKYD 6 EARTH STATION STA REQUEST

25-Jun-2017

1.0 Purpose

Planetary Resources Development Corporation (PRDC) is a Redmond, Washington based space technical development company developing systems and tools for commercial deep space exploration and space resource development. PRDC requests a Special Temporary Authority to provided expanded Earth station support for its Arkyd 6A and 6B experimental satellite missions, currently scheduled for launch in October 2017 and December 2017. The requested additional short-term Earth station support will be used to provide critical telemetry, tracking, and command (TT&C) coverage during both satellites' launch and commissioning phases. Currently, this coverage is needed between September 2017 and March 2018.

The primary objectives of the Arkyd 6A and 6B experimental satellites are as follows: 1) Successful launch and on-orbit demonstration of core Arkyd spacecraft elements developed in-house at PRDC, including avionics, attitude determination and control, power and energy management, and space-based imaging; 2) Demonstration of spacecraft communication to PRDC Earth stations, including command uplink, telemetry and payload data downlink, and software updates; 3) Demonstration of PRDC mission operations, including strategic and tactical planning, command execution, and anomaly resolution.

2.0 Ground Station Radio

The low data rate radio (PRDC part number 1005315) is a half-duplex FSK transceiver based on the popular CC1101 from Texas Instruments paired with a custom RF front end. It is intended for A6 satellite operations, specifically engineering telemetry, commanding, and threshold mission data product return. Both the satellite and the ground system will use this radio. It operates within the 401-402 MHz Space Operations Service allocation for downlink and the 449.75-450.25 MHz Space Telecommand (Footnote US87) allocation for uplink. The radio is capable of a data rate up to 512 kilobits per second; however, for this mission, it makes use of up to 50 kHz of bandwidth, providing a net data rate of up to 40 kilobits per second using 2FSK modulation. This radio will be used on both the spacecraft and the ground system and is capable of a maximum of 2.5 W transmitted RF power. To increase output power, the radio is paired with an external UHF power amplifier, which results in a maximum output power of 100W RF.

3.0 Ground Station Antenna

The ground system low data rate radio is attached to a two-bay, Az /El gimbaled Yagi antenna array. One of the Yagi antennas is resonant at the uplink frequency (449.75-450.25 MHz) while the other is resonant at the downlink frequency (401-402 MHz). Both antennas are 2.8 meters long and provide 16 dBi of gain. Polarization is right-hand circularly polarized. The antenna's radiating pattern results in a half-power beamwidth of approximately 30 degrees and a transmit beam pattern as shown in Figure 3.1. Resultant peak transmit power of the system, with a 100 W RF input from the radio/PA and 0.75 dB of system loss, is 2040W RF.

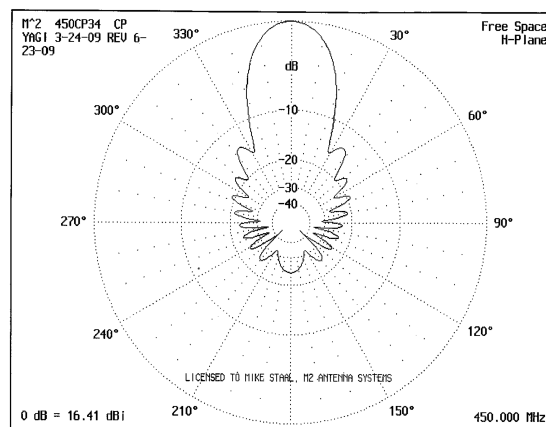


Figure 3.1: Arkyd 6 Earth Station UHF Gain Pattern