

Exhibit 1: Program of Research and Experimentation

Purpose

Space Data Corporation (“Space Data”) submits the instant application (the “Application”) for radio station authorization under Part 5 of the Federal Communications Commission’s (“FCC” or the “Commission”) rules to test and develop transmission equipment to be deployed in Space Data’s high altitude balloon-based telecommunications system.¹ Space Data holds a nationwide license covering Narrowband Personal Communications Services (“NPCS”) Channel 4 (call sign: KNKV204), and has pending applications for more than 200 NPCS licenses for which it was high bidder in the Commission’s recently closed Auction No. 41.² All of the frequencies identified in the Application are covered either under Space Data’s NPCS Channel 4 license or the NPCS licenses won by Space Data in Auction No. 41.

An experimental authorization will permit Space Data to continue to test and develop fully the technical, equipment, engineering and operational parameters associated with deploying a nationwide balloon-based telecommunications system.³

¹ Space Data holds an experimental authorization (call sign: WB2XGZ) to test and develop its system on Narrowband Personal Communications Services Channel 20 (930.75-930.80 and 901.8375-901.8500) on a nationwide basis (the “WB2XGZ license”). The WB2XGZ license expires on April 1, 2002. Over the past two years, Space Data has used the WB2XGZ license to demonstrate the feasibility of, and broadly develop, its unique balloon-based network. Space Data now must implement the final design and fabrication of the balloon-borne repeater and ground-based transmission equipment that will be deployed in its system. There is no commercially available equipment for Space Data’s balloon-borne repeaters or its ground-based transmission equipment.

² See ULS File Nos. 0000646751, 0000646753, 0000646785 and 0000646790.

³ In September 2001, the Commission adopted the *Space Data Waiver Order*, authorizing Space Data to operate its balloon-based telecommunications system on a nationwide basis. See *Petition for a Declaratory Ruling, a Clarification or, in the Alternative, a Waiver of Certain Narrowband Personal Communications Services (PCS) Rules as they Apply to a High-altitude Balloon-Based Communications System*, 16 FCC Rcd 16421 (2001) (the “*Space Data Waiver Order*”). The Commission required an environmental assessment (“EA”) for Space Data’s system based upon its discretionary authority under 47 C.F.R. § 1.1307(d). See *Space Data Waiver Order* at ¶ 27. The fully operational nationwide system for which the Commission required an EA in the *Space Data Waiver Order* is not analogous to the limited experimental operations contemplated in the Application. Specifically, the system authorized in the *Space Data Waiver Order* will be composed of between 70 and 100 launch sites throughout the United States with each site launching two balloons per 24-hour period. In contrast, the experimental operations contemplated under the Application will be limited to a regional geographic area

Further, because Space Data anticipates carrying other telecommunications providers' transmissions over its network -- allowing such providers to expand their overall coverage areas and bring badly needed telecommunications services to areas where traditional ground-based services are prohibitively costly -- an experimental authorization will further enable Space Data to more fully develop a system that is compatible with a range of telecommunications interface protocols. The proposed operation, therefore, qualifies for an experimental authorization as "[d]evelopment of radio technique, equipment, operational data or engineering data related to an existing or proposed radio service."⁴ The experimental authorization is not sought for any market study purposes.⁵

Overview of Experimental Operations

Space Data's system ultimately will consist of a network of high altitude, balloon-borne transceivers and necessary ground infrastructure to support the balloon operations. Numerous ground sites (approximately 70) will be located throughout the continental United States under the control of a central Network Operations Center ("NOC").⁶ Each ground site will control and communicate with one or more free-floating balloons launched from the various launch sites primarily located at each ground site. The balloon-borne repeaters rise and level off at approximately 100,000 feet. This structure is very similar to the balloons and launch sites used by the National Weather Service ("NWS") for atmospheric measurements.⁷

covering four to six western states. During this experimental period, the number of launches would be limited to twenty per day, based on a twice-daily launch interval at ten ground sites. Space Data expects to recover at least 75 percent of the balloon-borne repeaters that return to earth. The limited scope of operation contemplated under the Application does not implicate Section 1.1307 of the Commission's rules.

⁴ 47 C.F.R. § 5.3(i). In addition, all of the equipment used in Space Data's system must be tested and authorized pursuant to the Commission's equipment authorization rules, further qualifying the proposed operation for experimental authorization as "[t]esting of equipment in connection with production or regulatory approval of such equipment." 47 C.F.R. § 5.3(g).

⁵ See 47 C.F.R. §§ 5.3(j) and 5.87.

⁶ Space Data traffic is sent from the NOC to a ground site where it is transmitted to the balloon-based repeater. This information is retransmitted by the balloon-borne repeater to subscriber devices. Return traffic from subscriber devices follows a similar path from the subscriber's device to the balloon-borne repeater where it is relayed to the receivers at the ground site and retransmitted from there to the NOC.

⁷ As fully detailed in the *Space Data Waiver Order*, Space Data's balloon-borne repeaters operate in accordance with Federal Aviation Administration ("FAA") regulations governing both weight and density for unmanned free balloons. Moreover, the payloads operate above commercial airspace. Balloons are tracked using GPS and can be returned to the ground on

The experimental operation encompassed under the Application will consist of a small subset of the final system, utilizing a NOC and up to ten ground sites in order to test the system and its components.⁸ No more than ten balloon-borne repeaters will be operational in-flight at any given time.⁹ The experimental operations covered by the Application will be limited to a regional geographic area covering four to six western states, however, because of balloon drift and changing weather patterns, the precise geographic boundaries of the experimental operations will vary. Accordingly, for purposes of defining geographic coordinates for the experimental operation covered by the Application, Space Data proposes that the experimental operations will be conducted within the continental United States (*i.e.*, on a CONUS basis) and will conform to the operational constraints set forth in the *Space Data Waiver Order*.¹⁰

In addition to prototype equipment to be designed and fabricated by Space Data, the experiment will utilize commercially available, two-way pagers manufactured by Motorola and RIM. Paging infrastructure at the ground sites and NOC will consist of standard and prototype paging equipment (a switch, controller, transmitters, and receivers). The experimental operation will consist of various tests addressing link budgets, balloon constellation control, altitude maintenance, communications reliability, co-channel and adjacent channel interference, and other necessary testing to implement

command via parachute in a controlled descent when entering commercial airspace (below 60,000 feet) or when nearing programmed international border coordinates.

⁸ To account for the coverage areas and drift of its balloon-borne repeaters, Space Data requires a reuse factor of seven (*i.e.*, seven separate frequency pairs) to fully test and ensure that equipment designs are sufficient to protect against co-channel and adjacent channel interference between balloon-borne repeaters. Accordingly, the experimental operation encompasses the launch and operation of up to seven balloon-borne repeaters operating on discreet channels to fully test the anticipated operational scenario of the constellation and identify any related interference issues. Additionally, Space Data will evaluate co-channel interference by operating up to three balloon-borne repeaters on identical channel pairs at varying geographic separation. In contrast, full nationwide service requires approximately 70 balloon-borne repeaters and associated ground-based infrastructure.

⁹ Each of the ten ground sites will launch a maximum of two balloon-borne repeaters per 24-hour period. Because the average flight period (before parachuting back to earth) for each balloon-borne repeater is 12 hours, no more than ten balloon-borne repeaters are expected to be in operation at any given time.

¹⁰ The exact locations of the initial ground sites have not yet been determined. The ground site transmitters will be mobile for testing purposes. It may be necessary to test different ground sites throughout the term of the experimental license to allow the evaluation of different launch and operational control parameters. In any event, the experimental operation is limited to no more than ten balloons and their associated repeaters in operation at the same time.

an operational system. All equipment and operations undertaken pursuant to this experimental license application will conform to the technical requirements set forth in the Narrowband PCS service rules, Part 24, Subpart D of the FCC rules, as well as the operational limitations set forth in the *Space Data Waiver Order*.

Contribution to the Radio Art

As the Commission has recognized, large portions of the United States do not have access to adequate telecommunications services, including emergency support services, because provision of such services to these areas is prohibitively costly. The Space Data system specifically is designed to offer advanced telecommunications services to underserved and unserved areas on an affordable basis. Thus, the proposed experimentation also will assist the Commission in finding economically viable solutions to the complex problem of providing other types of advanced telecommunications services to underserved areas of the United States.