Thales Avionics, Inc.
FCC Form 442 Exhibit 1
(Modified April 5, 2018 – changes in shaded *italics*)

Request for Experimental Authority

Thales Avionics, Inc. ("Thales") herein requests experimental authority to demonstrate and test earth station facilities in connection with Iridium Constellation LLC's non-geostationary satellite orbit space station constellation (Call Sign S2110) in the manner described below. Thales plans to begin testing on September 7, 2017 and seeks authority for a period of twenty-four (24) months.

The *eleven (11)* earth station terminals are prototype terminals that will be divided among *six* fixed locations. The proposed experimental earth station terminals will use electronic beam forming technology. The project will enable Thales to validate this electronic beam forming technology, and waveforms and extended waveforms on the space station constellation.

Necessary Bandwidth Description

The necessary bandwidth is determined by the frequency channelization that Iridium uses, and is filed with other Iridium licenses. The frequency of a center of an Iridium channel can be calculated by this equation. There are 270 channels numbered 1 to 270 for transmit and 7 more that are receive only.

$$chan_{frequency} = 1616 \times 10^6 + ((41.6666 \times 10^3)) \times ((chan_{number} - 1) + 0.5))\ MHz$$

The Iridium frequency allocation thus defined spans 1616.0 to 1626.5 MHz.

Directional Antenna Information – High Gain Antenna

The antenna consists of multiple beams electronically switched in azimuth. The typical beam width is 60° and there are a minimum of 18 switched beams. The array is designed with symmetry about the z-axis so that there is no variability in EIRP nor beam shape as a function of azimuth. Each beam is shaped in elevation as shown in Table 1 below. The gain is the total gain from the Transceiver Modem (BCX) component (input to antenna) which is max of 6 dBm to reach the EIRP (dBW) the specified antenna gain is used.

Antenna Gain (dBi)	Angle over Horizon (degrees)	EIRP (dBW)
41.2	90 (overhead)	16.8
41.0	80	15.8
40.4	70	13.8
41.1	60	16.3
41.1	50	16.3
40.4	40	14.0
40.9	30	15.6
40.9	20	15.6
40.4	10 and below	13.8

Table 1 - Elevation Pattern

Ground Station Locations

1) Thales Avionics, Inc. – 3 terminals
   700 S. Babcock St.
   Melbourne, Brevard County, FL 32901
   (28° 06' 00'' N 80° 37' 12" W)

2) Thales Avionics, Inc. – 3 terminals
   1110 W. Hibiscus Blvd.
   Melbourne, Brevard County, FL 32901
   (28° 05' 11'' N 80° 38' 44" W)

3) Honeywell – 1 terminal
   21111 North 19th Avenue
   Phoenix, Maricopa County, AZ 85027
   (33° 40' 55'' N 112° 05' 53" W)

4) Dassault – 1 terminal
   1 Airport Drive (LIT)
   Little Rock, Pulaski County, AK 72202
   (34° 44' 08'' N 92° 13' 57" W)

5) Boeing – 1 terminal
   7501 12th Avenue South
   Seattle, King County, WA 98108
   (47° 32' 05'' N 122° 19' 05" W)

6) General Atomics – 2 terminals
1403 General Atomics Way
Poway, San Diego County, CA 92064
(32° 56' 19" N 117° 01' 12' W)

Waveform Modulations

Waveform ID	Modulation Scheme	Antenna Type	Number of Carriers
B1 (Block 1)	DEQPSK	LGA	1
C1 (NEXT)	QPSK	LGA	1
C2 (NEXT)	QPSK	LGA	1
1XC8 (NEXT)	16 APSK	HGA	1
2XC8 (NEXT)	16 APSK	HGA	2
B8 (open port)	DEQPSK	HGA	8[3]
B16 (open port)	DEQPSK	HGA	16[4]

[3] **Note:** Transmits 7 carrier signals. The highest carrier (8th) is not used on uplink.
[4] **Note:** Transmits 14 carrier signals. The 8th carrier and 16th carrier are not used on uplink.