Exhibit 1

System is a pulsed radar.

Pulses can be either rectangular, triangular, or Gaussian. In terms of half-power pulse duration, the rectangular and triangular pulses can be set between 100 μs and 2 ms, and the Gaussian pulse can be set between 3.8 μs and 1.1 ms. Note that Gaussian pulses are used exclusively for the shortest pulse lengths due to good spectral characteristics. A 3.8-μs Gaussian pulse has a spectral occupation of 560 kHz.

Normally, identical pulses are emitted one at a time for an indefinite amount of time, at repetition rates between 1 and 500 pulses per second. The maximum pulse rate available is 0.1 divided by the pulse length in seconds. In other words, the maximum duty cycle is 10 percent.

In addition to the normal operation described above, there are two ways of modulating the pulse sequence, as described below.

First, one can alternate between two pulse shapes on a pulse-to-pulse basis. For example, one can emit a 1 ms-long square pulse followed by a 5 μs-long Gaussian pulse and then repeat indefinitely. Pulse repetition rate is contrained by a 10 percent maximum duty cycle.

Second, one can use so-called pulse coding. Pulse coding involves forming a long pulse "code" from a contiguous sequence of short pulse "bits" of varying phase. For example, to form a 13-bit Barker code of duration 520 μs, one can assemble a sequence of 13 40-μs long bits, where the respective phases of the bits are given by 0, 0, 0, 0, 0, 180, 180, 0, 0, 180, 0, 180, and 0 degrees. The individual bits can be either rectangular, triangular, or Gaussian, with minimum lengths of 100 μs, 100 μs, and 3.8 μs, respectively. The maximum length of the code is 2 ms, and the maximum code repetition rate is constrained by a 10 percent maximum duty cycle.

Exhibit 2

The project involves operating a portable HF-VHF (10-60 MHz) ionospheric scatter radar at Millstone Hill, Westford, MA to diagnose the plasma turbulence caused by VLF whistler waves. The experiments are supported by the Air Force Office of Scientific Research (AFOSR) under grant number F49620-01-1-0481. The program manager is Dr. Kent Miller of AFOSR/NE, 703-696-8573.

11-7

Exhibit 3

(a) The project involves operating a portable HF-VHF (10-60 MHz) ionospheric scatter radar at Millstone Hill, Westford, MA to diagnose the plasma turbulence caused by VLF whistler waves. The radar consists of a single four-element Yagi antenna, with a beam directed at an elevation of 20 degrees above the horizon, at an azimuth of 344 degrees (clockwise from geographic north). The beam (half-power width) dimensions are 52 degrees horizontal and 23 degrees vertical.

(b) The radar must be at or near the requested frequency in order to observe ionospheric scatter from structures which are of a size one-half the radar wavelength (about 10 m). The radar must be oriented in the direction indicated above so that the beam direction is perpendicular to the earth's magnetic field lines. This maximizes the radar cross section of the observed structures. The minimum pulse length of 3.8 μs determines the range resolution; it can be lengthened if necessary to reduce spectral occupation at the expense of data quality.

(c) There does not exist another such radar which is under the contractor's control which can be used in the manner described above. On that basis, this radar was previously operated under a temporary frequency assignment obtained for the period 1 Feb 2002 – 30 Apr 2002 by the United States Air Force via the NTIA process. However, a recent rule change (NTIA manual paragraph 9.1.4) states that government contractors in possession of the transmitting equipment must now apply via the FCC process for future experimental/temporary assignments. For reference, the Air Force Standard Frequency Action Format (SFAF) data associated with the previous frequency assignment is given below.

005.	SECURITY CLASSIFICATION	UE
010.	TYPE OF ACTION	N
020.	PROPOSAL REFERENCES	T20
102.	AGENCY SERIAL NUMBER	AFT 023501
110.	FREQUENCY	K14670
113.	STATION CLASS	XC
114.	EMISSION DESIGNATOR	560K00V7N
115.	TRANSMITTER POWER	K32
116.	POWER TYPE	P
130.	TIME	3HX
140.	REQUIRED DATE (YYYYMMDD)	20020131
141.	EXPIRATION DATE (YYYYMMDD)	20020430
144.	RECORD INDICATOR	N
200.	AGENCY	USAF
202.	UNIFIED COMMAND SERVICE	AFMC
204.	COMMAND	AFMC
205.	SUBCOMMAND	AFMC
206.	INSTALLATION FREQUENCY MANAGER	HANSCOM
207.	OPERATING UNIT	MIT
208.	USER NET/CODE	RDTE
300.	TX STATE/COUNTRY	MA
301.	TX ANTENNA LOCATION	WESTFORD
303.	TX ANTENNA COORDINATES	423622N0712947W
340.	TX EQUIPMENT NOMENCLATURE	C,TOMBT8B
343.	TX EQUIPMENT ALLOCATION NUMBER	J/F 12/07717
346.	PULSE DURATION	2.7-1.1M
347.	PULSE REPETITION RATE	1-500
354.	TX ANTENNA NAME	YAGI
357.	TX ANTENNA GAIN	10
358.	TX ANTENNA ELEVATION	145
359.	TX ANTENNA FEED POINT HEIGHT	14
360.	TX ANTENNA HORIZONTAL BEAMWIDTH	56
361.	TX ANTENNA VERTICAL BEAMWIDTH	76
362.	TX ANTENNA ORIENTATION	344

11-8

363.	TX ANTENNA POLARIZATION	H
400.	RX STATE/COUNTRY	MA
401.	RX ANTENNA LOCATION	WESTFORD
403.	RX ANTENNA COORDINATES	423622N0712947W
440.	RX EQUIPMENT NOMENCLATURE	U,BT8B
500.	IRAC NOTES	S144
502.	DESCRIPTION OF REQUIREMENT	EXPERIMENT WILL INVESTIGATE BASIC
502.	DESCRIPTION OF REQUIREMENT	ATMOSPHERIC PLASMA PHENOMENA.
502.	DESCRIPTION OF REQUIREMENT	EXPERIMENTS WILL BE RUN FROM 1800 - 0600
502.	DESCRIPTION OF REQUIREMENT	EST DURING WEEK (MAX 4 DAYS WEEK) TO
502.	DESCRIPTION OF REQUIREMENT	INCLUDE WEEKENDS. WE WILL EXCEPT
502.	DESCRIPTION OF REQUIREMENT	BLANKING OR COORD PRIOR TO USAGE.
511.	MAJOR FUNCTION IDENTIFIER	OTHER OPERATIONS
512.	INTERMEDIATE FUNCTION IDENTIFIER	EXPERIMENTAL
520.	SUPPLEMENTARY DETAILS	MONOSTATIC RADAR FOR IONOSPHERIC RESEARCH.
520.	SUPPLEMENTARY DETAILS	MINIMUM PULSE LENGTH CAN BE MODIFIED IF
520.	SUPPLEMENTARY DETAILS	NECESSARY TO REDUCE SPECTAL OCCUPATION.
520.	SUPPLEMENTARY DETAILS	ANTENNA VERTICAL ORIENTATION MAIN LOBE OF
520.	SUPPLEMENTARY DETAILS	ANTENNA HAS 20 DEG ELEVATION.
520.	SUPPLEMENTARY DETAILS	COORD. W/FCC KAM, N EPPS, USCG BRADY,
520.	SUPPLEMENTARY DETAILS	FEMA TURK, J FARMER
701.	FREQUENCY ACTION OFFICER	T20
702.	CONTROL/REQUEST NUMBER	AFMC 2002-001
705.	SYSTEM IDENTIFIER	MISC,RDTE
803.	REQUESTOR DATA	BILL MORGAN, DSN 986-0782

Exhibit 4

This is an environmental assessment. Item numbers correspond to 47 CFR 1.1311.

(1) A vertical profile of the antenna tower is given in Exhibit 5. The tower is 13.6 m high, and the antenna is mounted on a horizontal boom at a height of 12.6 m. The antenna is guyed by three dacron ropes spaced at 120-degree intervals, attached to galvanized steel anchors buried to a depth of 0.8 m. The tower base is a square drive-in base style with a galvanized steel spike about 0.6 m in length. The site consists of an open field approximately 100 m by 100 m in size, surrounded by forest. The antenna tower has been standing since 20 Mar 2002. There is no lighting affixed to the antenna tower. The nearest residential dwelling is 600 m to the south of the antenna.

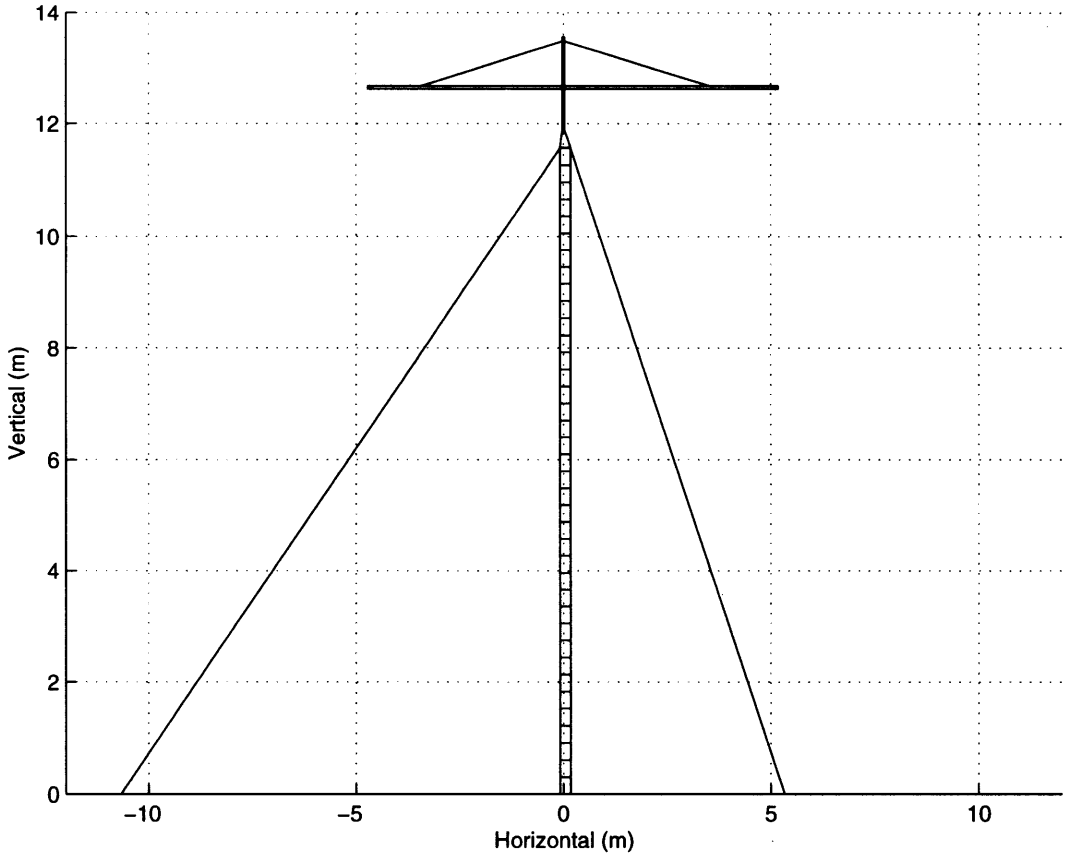
(2) The antenna is located on land privately owned by the Massachusetts Institute of Technology (MIT). MIT conducts radiation surveys of the radar before periods of operation to determine that the radiation levels in all areas of the ground around the antenna are below the limits specified for maximum permissible exposure in 47 CFR 1.1310.

(3) There is no known controversy pertaining to this particular radar.

(4) The main consideration for selection of this site is that it is on property owned by the contractor (MIT) and as such is available for free use. The weeds in the field are normally kept trimmed to a reasonably short length with lawn mowers. This trimming has been happening for many years prior to the installation of this antenna. Thus the antenna itself is not responsible for the adverse environmental effect of weeds being trimmed with a lawn mower. Furthermore, the antenna base and anchors are buried without any concrete, and thus can be installed/removed without disturbing the terrain.

11-10

Exhibit 5



Above is a vertical profile sketch of the radar antenna tower. The axis units are meters. The antenna is a four-element Yagi. The elements are not visible in this sketch because they are being viewed head-on. The element locations are shown by black dots in the figure. The maximum element length is 10.6 m. The antenna tower is guyed at three points, spaced 120 degrees apart. The guy anchors are 10.7 m from the tower base and attached to the tower at a height of 11.6 m. The guy to the left of the antenna tower in the figure is in the plane of the page, while the other two guys are not, and thus the guys in the picture do not appear symmetric.

The entire antenna structure as shown in the figure has been standing since 20 Mar 2002. There are no lights of any kind affixed to the antenna tower.

11-11