EXHIBIT 1

Description of the Application

By the instant application, 4-D Security Solutions, Inc. (“Applicant”) is seeking Commission authorization to establish a new experimental license.

Specifically, Applicant proposes to establish the proposed radar facilities as described in the application at Stevens Institute of Technology (“SIT”) in Hoboken, New Jersey. It should be noted that SIT is a research institution, and the proposed facilities will be utilized to test a suite of equipment.

The MR2020 equipment is a radar which will be installed at SIT. Applicant has a research contract with SIT to develop the MR2020 radar equipment into radar facilities which will be capable of detecting small watercraft on inland waterways such as the Hudson River. The facilities will be experimental in nature and will be intended to develop radar operations to prevent terrorist attacks which would utilize small watercraft like rubber boats and Zodiac boats. The objective is to develop radar equipment which would protect the United States against the type of terrorist attack which was recently experienced in Mumbai, India. The MR2020 radar will be tested to operate on an experimental basis for use in maritime operations.

It is believed that the experimental facilities will allow Applicant and SIT to develop radar equipment which will be of great value to the United States in preventing maritime terrorist attacks utilizing small watercraft on inland waterways. Applicant and SIT believe that the experimental facilities hold great promise to contribute to the state of the art to prevent such maritime attacks. Under these circumstances, Applicant respectfully requests that the Commission grant the proposed experimental facilities for a period of five (5) years.

Questions regarding these plans should be directed to:

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1.1. MR-2020 -GROUND SURVEILLANCE RADAR

Fig. 10-3 MR 2020 radar

1.1.1. Technical Description

The MR-2020 is a highly reliable Radar surveillance system that can be exposed to hard field environment conditions, working to an intensified mission profile either by day or night, and in adverse weather conditions. The radar can be rapidly deployed and can be operated as a portable unit, as a stationary fixed based operation or mounted on a vehicle of choice. The unit can be operated remotely or locally.

The radar operates with high reliability, even when exposed to harsh field environment conditions, working according to an intensified profile of mission, day or night.

The optional lightweight Radar Control Display Unit (CDU) of the MR-2020 system contains the systems control panel and radar display for stand-alone operation. The CDU provides the operator a convenient means for operation of the system under different work conditions (sitting at a stationary post, laying or kneeling in the field). The CDU’s screen readouts and control panel are distinct and readable under various lighting conditions (artificial light, sunlight, or darkness).

The MR-2020 Ground-based Battlefield Surveillance Radar is intended to provide coverage of the local area, detecting all targets of interest out to the near horizon.

Typical targets would be:

- Heavy/light moving vehicles
- Personnel
- Helicopters

The MR-2020 is a Pulse Doppler Radar providing good clutter rejection, radial velocity target classification and target range measurement.

Movement by the target towards or away from the radar results in a frequency change in its echo, caused by the Doppler Effect. In the radar receiver, this target echo is compared directly with a reference waveform from the transmitter, and any difference in frequency is extracted. The value of this difference is then measured in the bank of filters. Echoes from stationary clutter are not Doppler shifted and consequently do not produce a frequency difference to be measured and detected by the filter bank. Hence moving targets are detected by virtue of their motion, while the competing clutter echo is suppressed. This type of radar detecting is known as internally coherent detection.

However, it should be noted that the target echo is subject to the time delay caused by the echo time. Therefore it is very important that the transmitter frequency does not change between transmission and reception. If this does happen, then the Doppler measurement would contain an error that would cause stationary targets to appear to have non-zero Doppler. This places a severe stability requirement on the transmitter. Nowadays, this requirement is easy to meet, and so all modern systems are internally coherent, since this is by far the best method.

1.1.1.1. Sub-clutter Visibility

Since Doppler radars can remove stationary clutter while retaining targets, thus enabling target detection at levels that are weaker than the clutter. But only when the clutter echo is removed by suitable filtering does the target become detectable. This ability to detect target that are well below the strength of the competing clutter is known as sub-clutter visibility capability of the radar.

For an internally coherent radar, the sub-clutter visibility can be as high 30 dB. That means that targets can be 1000 times weaker than the clutter, and still be satisfactorily detected. The actual value depends on how much the ratio of target echo to clutter background can be improved. This is limited by the performance of the filter bank, the linearity of the detection process, and the antenna scan rate. Practical values may be found in the region of 40-50 dB (an improvement of 10,000 to 100,000). This means that a target echo that is initially 30 dB below the clutter background can be brought to 10-20 dB above the clutter background by this process.

1.1.1.2. Velocity Resolution

The ability of the radar to separate very small radial velocities is known as the velocity resolution of the radar. In practice, this depends on the scan rate of the radar, coupled with its antenna beam-width.

The length of time that the radar illuminates the targets (known as dwell time), depends on the scan rate and the beam-width of the antenna. Slower scan rate and wider beam-width will provide longer dwell times and will give more precise measures of radial velocity. This means that closer values can be separated, allowing smaller target velocities to be separated from the stationary background. For good velocity resolution, therefore, slow scan rates and wide antenna beam-width were selected allowing the radar velocity resolution so to separate walking or strolling persons from one another.

1.1.1.3. Power

The required detection range of the MR-2020 radar is 6-25 km. These ranges are achieved with very low transmitter powers. The low power level makes the use, maintenance and installation of small equipment simpler. In particular, it allows the use of minimal power supply while having superb anti-ESM characteristics.

1.1.1.4. PRF

The Radar PRF is 5000PPS thus, enabling maximum range detection of 25Km unambiguous range derived from the equation:

$$c/2R_{max}$$

For a maximum detection range of 25 km, this means a PRF of no more than 6 kHz. Similar arguments apply to velocity measurement. Here the key thing is to avoid blind speeds, which occur at frequency intervals equal to the PRF. At 10 GHz, the Doppler shift from a moving target is 66 Hz/m/s. Hence if the target velocities are limited to 30 ms-1 max, then blind speeds will be avoided provided that the PRF is higher then 2 kHz. Thus a 5000PPS PRI provides the proper performances.

1.1.1.5. Processing

Fast Fourier Transform (FFT) is being used to increase radar performance in target detection. The main receiver processing is performed using a Fast Fourier Transform (FFT). The FFT allows rapid computation of the outputs that would obtained from a "real" filter bank.

In addition to FFT, the radar also uses other processing techniques; instead to cope with the fact that clutter echoes tend to vary from place to place. Variable detection threshold allows the radar to make automatic adjustment of its detection threshold from moment to moment in response to local clutter conditions. This technique is commonly known as Constant False Alarm Rate (CFAR) processing witch is being used in the radar as well.

1.1.2. Radar Units

The system is comprised of three main units, and some accessories. The main units are:

- **Transceiver/Antenna (TRA)**- consisting of most of the electric parts including the solid state transmitter, the receiver, the power supply, the azimuth control and the digital signal processor all mounted on the back of the planar array antenna. All of the above functional units are packaged in two RF modules and one digital board. The Transceiver (Transmitter - Receiver) utilize a special pulse compression technique which allows transmitting of a very low peak power (5W - nominal), still providing long detection ranges. Thus, the radar is considered as Low Probability of Intercept (LPI) radar.

- **Pedestal** to support the TRA and drive the Antenna, while scanning.

- **Radar remote Control Display Unit (CDU) - optional**- A durable portable color PC used to meet the harsh operating requirements while maintaining low weight and low power consumption. The display size is 10.5". The CDU includes standard external interfaces for integration with external systems such as electro-optical system or remote station based on RS-422. The CDU enables to enter the radar coordinates based on GPS or other data source. The radar detection and track data is presented on the background of a digital map.

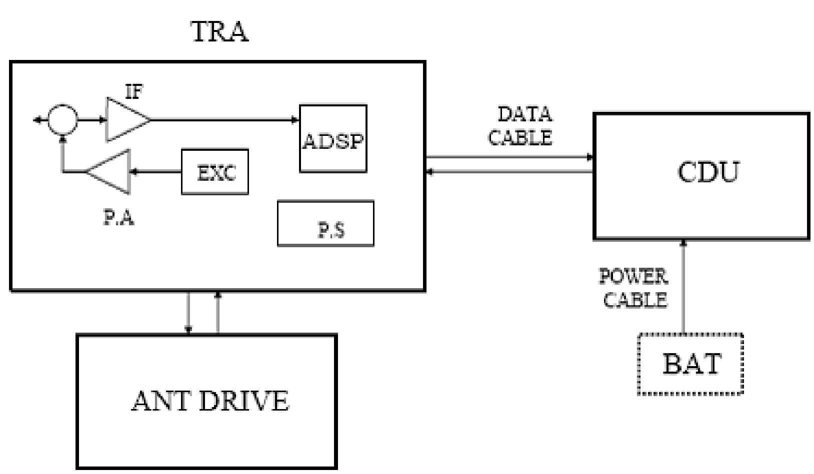

Fig. 10-4 Radar Block diagram

1.1.2.1. A Radar Set contains the following:

- Transceiver – Antenna (TRA) unit
- Pedestal
- Power & Data cable

1.1.2.2. Operational Characteristics

The radar operates in the following major modes:

- Standby Mode
- Surveillance Mode (including Track While Scan)
- Single Target Track (STT) Mode.

The Surveillance Mode facilities radar surveillance of zones defined by the operator in order to detect moving targets and determines their range and bearing relative to the radar location. Targets detected in Surveillance will be subject to continued observation and subsequent designation (at the operator's option) for tracking using the Track-While-Scan function (in Surveillance Mode) or Single Target Tracking (in STT Mode). The Track While Scan (TWS) function provides the operator with complete awareness of the tactical situation by simultaneously tracking up to 100 targets. It accurately displays the position, speed, and heading of each target.

The Single Target Tracking (STT) Mode provides the operator with continuously updated graphic and text information about a designated target's position and movement. The radar provides the operator with audio output that facilities recognition of the target by interpretation of its Doppler signature.

1.1.3. Specifications

1.1.3.1. Detection Performance

- The radar detection range is 100 meters to 30 km.
- The detection ranges, when there is a line of sight between the radar and target (detection probability Pd=0.9 for a single radar scan, false alarm rate better than 10E-6, clear weather, standard land clutter, no Jammer presence) are:
- Moving pedestrian ($1m^2$) 8 Km
- Light Vehicle ($10\ m^2$) 15 Km
- Heavy Vehicle ($50\ m^2$) 24 Km

1.1.3.2. Artillery Fire Registration (Optional)

1.1.3.2.1. The Radar has an Indirect Fire Adjustment (IFA) Mode for artillery fire-registration.

The IFA enables artillery fire correction. The Radar detects artillery shells (155 mm) up to distances of 10 Km.

1.1.3.2.2. The overall radar measurement accuracy, for all the above mentioned targets and ranges, in all operational modes is:

- Range accuracy (1 sigma): 20 m
- Azimuth accuracy (1 sigma): 0.5 º (9 mils)

1.1.3.2.3. The resolution between two close targets of similar type for all ranges and operational modes is:

- Range resolution: 100 m for two targets at the same azimuth and velocity
- Azimuth resolution: 6 º for two targets at the same range and velocity
- Doppler resolution: 15 Km/h for two targets at same range and azimuth

1.1.3.2.4. Antenna parameters

- Horizontal beam width (3 dB): 3.8-º +/- 0.25 º
- Vertical beam width (3 dB): 5.35 º +/- 0.25 º
- Gain 31 dB
- Horizontal far sidelobe: -32 dB
- Vertical far sidelobe: -30 dB
- Polarization: Vertical

1.1.3.2.5. Digital and data processing

- The signal processing is based on coherent integration (FFT) with Doppler filtering using weighted window.

- Plot extraction is done by taking in account a ground clutter map and constant false alarm rate (CFAR) algorithms. A tracking filter based on Kalman filter is provided with plots using a generalized nearest neighbor correlation algorithm.

  - The radar produces an audio signal from the Doppler frequency of moving targets. Sound is of high quality to enable the operators to recognize and classify moving targets by their Doppler sounds.

  - The radar also detects and displays signals in its receiving frequencies without transmitting (receive only mode).

1.1.3.2.6. Scanning

- The radar will enable an automatic horizontal scan with a sector width of 10 degrees to 350 degrees.

- The width of the scan sector is linearly adjustable. The operator may select any sector.

- The radar displays a clear error message in any case of incorrect sector that does not comply with the mechanical scan limits.

- The radar has a horizontal scan motor that can scan at chosen speeds. Slow scan to direct the antenna accurately to the target, and fast scan to bring the antenna quickly to the target's azimuth.

- The radar has a narrow scan sector of 10 º centered at the azimuth of the display cursor (local scan).

- The radar has 3 fixed speeds (1.3, 2.6, and 3.8 RPM) for the scan mode.

- The radar has a manual horizontal scan mode for the alignment procedure. In this mode, the radar will manually scan in one of two chosen speeds: slow to direct the antenna accurately to the north reference and fast to bring the antenna quickly to the north reference azimuth.

1.1.3.2.7. Elevation Tilt

- The elevation tilt range is from –20 º to +10 º
- The elevation motor enables the operator to choose the optimal tilt angle according to the clutter reflections
- Elevation tilt angle change is continuous
- The measured tilt angle is displayed on the CDU with 10 mils resolution. (Remark: 6400 mils are equivalent to 360 º)
- Controlling the elevation tilt is done by a single operator from the CDU or from a control panel attached to the antenna, while watching through the telescopic sight

1.1.3.2.8. Range Window

- The range window on the display screen is 1 Km up to 10 Km size selected by the operator. The window can be placed at any range up to 30 Km
- The window's start range is set with 1 Km increments by the operator
- Ranges of the window edges are displayed on the CDU display

1.1.3.2.9. Transmission and Radiation

- The radar can transmit at 1 of 8 frequencies in X Band, with center frequency at 8.85 GHz
- The transmitter frequency is crystal oscillator controlled and has long term stability
- The transmitted bandwidth is 200 MHz
- The transmitted peak power is 5 W with a non-LFM modulation pulse expansion. Pulse width is 17 microseconds with a 50:1 compression ratio
- The radar does not start transmission automatically upon power up. The operating of transmission is by operator's selection. The transmission on/off indicator is displayed continuously to the operator
- The radar transmitter contains safeguards to secure the transmitter against high VSWR on the transmission channel to the antenna (including the case of transmission when antenna is disconnected)

1.1.3.2.10. Orientation

- The radar has the ability to display angles relative to the real north

1.1.3.2.11. Built in Test (BIT)

- The radar includes a Built in Test (BIT) function
- The BIT operates in parallel with the radar's operational functions without disturbing the operator. The radar performance will not be reduced during BIT operation
- The BIT results are displayed on the (optional) CDU screen and include:
  - Detection of failures in the radar unit and modules to the SRU level
  - Detection of communication failures between the radar unit and the CDU
  - Detection of failures in the power source

1.1.3.2.12. Reliability

The calculated MTBF is in the order of 7000 hours

1.1.3.2.13. Environmental Conditions

The radar will meet all the environmental specification requirements when it is subjected to any combination of the following conditions:

- High Temperature: MIL-STD-810E, Method 501.3, 65 ºC storage; 55 ºC operating
- Low Temperature: MIL-STD-810E, Method 502.3, -40 ºC storage; -30 ºC operating
- Vibration Secure cargo transport: random vibration for M113 armored personnel carrier (radar and accessories in cushioned pack)
- Altitude MIL-STD-810E, Method 500.3 Proc. I: 6,000 ft; Method 500.3 Proc. II: 15,000 ft
- Sun Radiation: MIL-STD-810E, Method 505.3 Proc. II
- Fungus: MIL-STD-810E, Method 508.4 materials only
- Wind 20 m/sec (36 knots)
- Rain: MIL-STD-810E, Method 506.2 Proc. I
- Sand and Dust: MIL-STD-810E, Method 510.3, Proc. I and II
- Humidity: MIL-STD-810E, Method 506.3, Proc. I, 95%
- Salt Spray: MIL-STD-810E, Method 509.3 materials only

1.1.3.2.14. Electro-Magnetic Compatibility

- The system is designed to meet the requirements of electromagnetic emissions and susceptibility of MIL-STD 461C part 4 as follows:

- **Conducted Emission:** CE03-conducted emission on DC or AC power lines, 15 KHz to 50 MHz, limit curve 1.

- **Conducted Susceptibility**

  - CS01- Conducted susceptibility on power lines, 30 Hz to 50 KHz

  - CS02- Conducted susceptibility on power lines, 50 KHz to 400 MHz

  - CS06- Conducted susceptibility, spikes (spike 1), on power lines

  - **Radiated Emission** RE02- Radiated Emission 15K Hz to 10 GHz.

  - Note: From 2MHz up to 100MHz relaxation from the limit (curve 1) of 6 to 10 dB

  - **Radiated Susceptibility** RS03- Radiated Susceptibility, 15 KHz to 10 KHz, with field intensity of 20 v/m

1.1.3.2.15. Safety

- The system is designed in accordance with the principles of MIL-STD-454N. Operators and service personnel at all maintenance levels are safe from electrical shocks, chemicals, sharp components, and other danger. The scanning system is designed to be safe from the dangers of catching fingers, hair, clothing, and cables in moving parts.

1.1.3.2.16. Radiation Safety

- The system’s average and peak power transmission is very low thereby decreasing any risk of radiation hazards for the users. The radiation safe zone starts at 1 meter in front of the antenna

1.1.3.2.17. Weights

- Transceiver - Antenna (TRA) unit - 11.5 kg

- Pedestal - 5.5 kg

- Cables - 8.5 kg

1.1.3.2.18. Dimensions

- Transceiver - Antenna (TRA) unit : 60X40X18 cm
- Pedestal - 16 cm diameter, 30 cm height

1.1.3.2.19. Power

- The radar is operated from a single 24V (nominal) power source. The radar’s energy source can be customer standard batteries, voltage supplies and/or converters. The steady state limits are 19V- 32V.
- Power consumption of the radar, in every operating mode, including maximum transmitted power, is not more than 60 watts. Typical power consumption is 50 watts.