EXHIBIT 12, OPERATIONAL DESCRIPTION

1. Sentry 3000 General Description

The Sentry 3000 is a fully automatic, portable biological detection system capable of detecting and sampling aerosolized biological agents in real time. The system uses the principle of fluorescence particle detection, whereby particles are passed through a laser beam of a defined wavelength and, if biological in nature, generate fluorescence at a specific wavelength. The resulting emitted fluorescence is detected by photo-multiplier tubes and converted into voltages, which are processed by the internal processor. The processor uses a proprietary algorithm to determine whether or not the sampled aerosol is biological in nature. If it is, the processor automatically reports and alarm to the operator and initiates sample collection. A pump is turned on for a pre-defined time, which pulls air through a filter pad, trapping particles of interested on the pad. The pad can then be used for analysis and identification of the biological agent.

The aerosol is concentrated at a rate of 33 liters per minute using an MVC-33A microvic concentrator, filtering out unwanted particles leaving only those of interest for the sensor pump to pull through the optical cell. The optical cell houses the laser as discussed in the previous paragraph.

The Sentry communicates with the command and control computer (laptop) either by a wired Ethernet connection, or by wireless modems operating at 902-928 MHz (FHSS). The unit is cooled by two fans, one pulling air into the unit and one exhausting air from the unit. The fans are turned on and off by the processor depending on the temperature within the Sentry. The temperature is determined by a thermocouple connected to the processor stack.

The Sentry also provides for automatic positional reporting to the Command and Control system using an integrated GPS receiver.

The Sentry operates from 100-240 VAC power sources and uses two power supplies to convert these voltages into lower level DC voltages. The first is the AC/DC power supply that converts the AC voltage down to 24VDC. The 24VDC is distributed to various components, and also to another supply that further down converts it to $\pm$12VDC.

Each subsystem is discussed in more detail in the following sections.

2. PC-104 Processor

The PC-104 processor consist of several PC-104 cards including:

Promethius 100 MHz processor CCA – the processor contains the proprietary GD Canada software that analyzes the signals from the PMTs and determines whether or not the aerosol contains biological agents. It also provides for control and status reporting of

subsystems including power and laser. The processor also contains the network connection.

Fast A/D converter CCA – samples the analog signals from the PMTs via the I/O board and converts them into digital signal levels for the processor. Data is provided to the processor via the external ribbon cable connected to JP5.

GPS receiver CCA – receives positional data from GPS satellites. Data is provided to the processor via the PC104 bus.

Freewave RF modem CCA – transmits data from the processor to the remote control station and vice versa. Data transmitted at 902-928 MHz, FHSS. Data is passed to/from the modem via the internal PC104 bus.

HE104 power supply CCA – accepts power from the Sentry AC/DC power supply and converts it to the voltages required by the various PC104 CCAs.

Relay driver CCA – turns the power control board relays on/off via commands from the processor. Commands are sent through the internal PC104 bus.

I/O CCA – the interface to/from all external subsystems (except RF, Network and power control CCA).

3. MAF CCA

The Mass Air Flow CCA contains a differential pressure transducer that is interfaced to the air flow system. The pressure differential is fed into the processor through the I/O CCA and used to calculate air flow through the air system. The air flow is monitored and reported as a fault if out of range.

4. LED CCA

The LED CCA contains the following LEDs:

Fluorescence – flickers each time a fluorescent particle passes through the optical cell.
Particle - flickers each time a particle passes through the optical cell.
Power – illuminates when main power is applied
Air - illuminates when air flow is within specified limits.
Processor - illuminates when the processor is functioning correctly.
UV Laser - illuminates when the laser is operating within specified limits.

5. Hour Meter

Records elapsed operational-time.

6. Laser Electronics

Contains all the electronics to drive the laser diode and monitor status of the diode including temperature of the laser head.

7. Sampler

The sampler is a 12VDC pump that is turned on automatically by the processor whenever a biological agent is detected. The sample pulls air through a filter paper which collects a sample of the air for laboratory abnalysis.

8. MVC-33A (Concentrator) and Sensor Pump

The MVC-33A is a 24VDC pump that pulls air into the sensor intake. This air is further drawn into the sensor by the 12VDC sensor pump.

9. Enclosure Fan 1 & 2 and Thermocouple

The enclosure fans provide for cooling/air circulation inside the Sentry. The fans are turned on/off by the processor via the power control board using the temperature measured from the thermocouple.

10. DC Power Supply

The DC power supply accepts 100-240VAC and converts it to 24VDC for distribution to the DC/DC CCA.

11. DC/DC CCA

The DC/DC CCA converts the 24VDC voltage from the DC power supply to $\pm$12VDC for the various subsystems. It also passes 24VDC straight through for use by other components.

12. Power Control CCA

The power control CCA is used to turn the following equipment on/off via the processor/relay driver CCA:

a) Laser – is turned on upon processor boot-up.
b) Enclosure fans – turned on or off depending on the internal temperature of the Sentry, as measured by the thermocouple.
c) Sampler – turns on the sampler when a bio event is detected and turns it off after a pre-defined sample time.
d) MVC-33A – turns on the concentrator upon processor boot-up and can be turned off from the control program if required.

13. Scatter and Fluorescent PMT CCAs

The PMT CCA detects light within the optical cell and converts this to a voltage. This occurs each time a particle passes through the optical cell. Hence the frequency of the output signal from the PMTs depends on the number of particles passing through the cell at any given time. The voltage is filtered and amplified before it is fed into the processor via the I/O board. The output signal ranges from 0-10V (depending on the intensity of the light signal received) and ranges in frequency up to approximately 10 MHz.