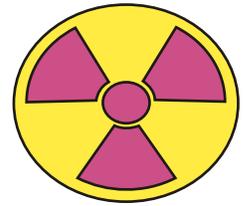




T W I S



Detection &
Defense Security
in partnership w/

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TWIS has designed and is producing a single system that detects:

Chemical Agents (Nerve Gas, Blister Agents, Blood Agents, & Toxic Industrial Chemicals)

Nuclear Materials: (Alpha, Beta, Neutron, Gamma and X-rays).

The system is called the **Weapons Of Mass Destruction Detection and Analysis System (WOMDDAS)**. The system reports alarms for all sensors verbally to the operator, freeing the operator's hands and eyes for other tasks.

The instrumentation package is a custom designed container for single person operation. The container can be attached to a belt or carried on a shoulder strap. The package can also be camouflaged and carried in a bag, suitcase, luggage, briefcase, vehicle, etc for covert operations.

The system can be used for counter terrorism in chemical attacks, nuclear smuggling/ accidents and counter proliferation.

WOMDDAS was designed for simple deployment by a relatively unskilled operator. The system reports directly to the operator with voice alarms over a speaker, headset or a wireless earpiece. All data are recorded every 5.0 seconds for documentation and playback immediately after the operation.



Training & Operation:

The WOMDDAS has ONE button, power ON/OFF. A one-page document gives the operator instructions on power-up procedures and system initialization. The system checks itself every three minutes to see if any detector has failed. WOMDDAS tells the operator what has been detected and at what level. The system gives the operator verbal messages through a speaker, headset, or wireless ear piece. It can then be used without operator intervention.

Maintenance:

WOMDDAS can be maintained with a simple internet connection, or the system can be operated for a year before calibration should be performed by TWIS personnel.

Physical Size:

The system is rectangular, approximately 6 inches by 8 inches, and 12 inches in height.

Weight:

The total system weighs approximately 17 pounds (8.5 Kg). This includes all of the detectors, electronics/data storage device, and batteries.

Power Requirements:

The system can operate from 8 to 30 Vdc. The portable system is powered by is supplied by 8 Lithium ion batteries and records data for periods of over 8 hours. The system can also use 8 standard "D" cell batteries, but operational time will be reduced. The system can operate indefinitely if power is supplied from vehicle or aircraft.

Radiation Detection Systems:

1. Gamma Ray and Neutron

The Gamma ray detector is a 4 by 4 inch square and 1 inch thick NaI(Tl) crystal.

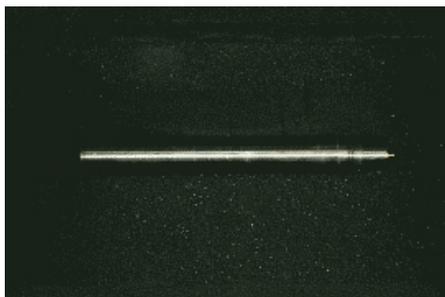
The Neutron detectors are four He-3 tubes each 1 inch diameter by 8 inch long.

The gamma ray detector is self-calibrating on natural radiation photopeaks, with a low powered 1024 Multi-Channel Analyzer (MCA) that acquires data every 1.0 seconds. In the standard mode of operation, the MCA acquires data from 20 keV to 3000 keV.

NOTE: The term keV is a measurement of gamma ray energy in thousands (k) of electron Volts (eV) used to identify the particular isotope or isotopes emitting the gamma rays.

The MCA can be programmed to look for only man-made radioisotopes, Special Nuclear Material (SNM), or specific isotopes. SNM is the material used to build an atomic bomb.

Exposure rate and total exposure are announced to the operator with verbal messages in real-time.



A single Neutron tube (He-3) is pictured above

Right: Sodium Iodide Detector (NaI) with a photomultiplier tube.



2. Alpha and Beta Detection Systems

This detection system consists of an external scintillation probe that gives the operator an audio indication of the alpha or beta activity. The alpha and beta activity levels are displayed on two separate LED bar graph displays on the probe. These displays are semi-quantitative, giving activity levels by the number of segments illuminated.

The activity levels are also Recorded every 5 seconds, for post mission analysis. The scintillation probe is detachable when not needed.

The activity levels of the four Different types of radiation are announced individually to the operator in real-time.



Above: Alpha/Beta Probe



Above: ISD Voice Programmer

Hazardous Chemical Detection System:

The chemical detection system can detect Chemical Warfare(CW) agents, Blood agents and Toxic Industrial Compounds without operator modification. The system uses a solid-state Surface Acoustic Wave (SAW) detector and Electrochemical Cells. The performance of the system is summarized as follows:

CW Agents VX,GA,GB,GD,GF,HD,HN3

Blood (Any one of the following): Hydrogen Cyanide (AC), Phosgene (CG), Cyanogen Chloride (CK).

Toxic Industrial Compounds (TICS)(Any three of the following): Arsine, Chlorine, Diborane, Flourine, Ethylene Oxide, Ammonia, Hydrogen Sulfide.

Alarm Levels	Fast Mode	Sensitive Mode
CW Agents, Nerve & Blister	0.2 to 1 mg/m ^{**3}	0.03 to 0.15 mg/m ^{**3}
Blood Agents	20 mg/m ^{**3}	< 20 mg/m ^{**3}
TICs	20 mg/m ^{**3}	< 20 mg/m ^{**3}

Response Time	Fast Mode	20 seconds
	Sensitive Mode	120 seconds

Warm-up Time 90 seconds

Data Logging Alarm, level, time, and date

Shelf Life SAW sensors 5 years

Electrochemical cells 1 year

Op. Temperature -10 to 50 degrees C

Op. Humidity 0 to 95%, non-condensing

Data Storage:

Data are recorded as a function of time, chemical alarms and nuclear radiation levels for alpha, beta, gamma and neutron intensity. All information is recorded at 5 second intervals for periods up to 10 hours. An optional GPS instrument can be added to document the location and elevation every 5 seconds. A standard laptop computer is used for data analysis and playback.

History:

Most of our personnel have been involved in the Nuclear Emergency Search Team (NEST) since its inception and have extensive experience in designing and operating radiation detection systems. The chemical detection expertise comes from years of development of the SAW detectors used in our systems.

The modular design of the system makes it easy to reconfigure the detectors to meet the customers demands. It is also simple to replace detectors whenever new technology becomes available.
