DRONE READY

AERIAL RADIATION DETECTORS

DroneSENSOR™ Series
Model ~ DroneRAD-ST™ (Search Tool or Mapping) - Gamma
Model ~ DroneRAD-P™ (Air Monitor& Plume Detector) Particulate Alpha, Beta, Gamma & Airborne Chemicals

DroneSENSOR™ THE ULTIMATE TOOL FOR FIRST RESPONDERS©

Flycam UAV's
NEO (Octo 8 motor) Drone with DroneRAD Detector System

SITUATION:

The advent of data collection by drones is a great advance.

Cameras and other more specialized sensors are popular.

However, nuclear radiation sensor assembly instrumentation is important but hard to find.

US Nuclear Corp provides a DroneRad package.

INSTALL THE DroneRAD Detector System on your Drone

OR

Purchase DroneRAD Package

Includes:

Flycam UAV's
NEO OCTO Drone
OR
HEX Drone-Cypher 6

Controllers

DroneRAD Detector System

Optional: Piloting

OPTIONAL: Hard Shell Case for DroneRAD Package

TECHNICAL ASSOCIATES
OVERHOFF TECHNOLOGY

Divisions of US Nuclear Corp

Active Radsys

W:www.activeradsys.it Tel: 0544 408071
E: info@activeradsys.it Fax: 0544 201477

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD™ Detector System

EASY INSTALLATION

DroneRAD-ST & DroneRAD-P

- CONTINOUS CHECK MONITORING
- SMALL, RUGGED, SPLASH PROOF
- WIDE RANGE COVERED
- ON BOARD CAMERA
- GPS
- DETECTORS BATTERY OPERATED
  - ONBOARD DATA STORAGE SERIAL PORT
  - ENGINEERING UNITS USER SPECIFIED
- UNIQUE DATA COLLECTION SOFTWARE INCLUDED
- RS-232 PORT / **OPTIONAL:** USB PORT
- ELECTRONICS BASE STATION OPTIONS:
  LAPTOP & DroneRAD-E
  DroneRAD-E
  (Transponder & Software for User's Laptop)
  TBM-3D (Portable)
- WIRELESS IN FLIGHT INTERFACE
- **OPTIONAL:** DATA TRANSMISSION IN FLIGHT IN N4242 FORMAT
- **OPTIONAL** RADIATION PLUME MAPPING DATA SOFTWARE FOR POST-FLIGHT EVALUATION
- **OPTIONAL:** ALARM
- **OPTIONAL:** ENHANCED GPS
- **DETECTOR: IP64**
- **ELECTRONICS: IP 63**

DroneRAD-ST™

- GAMMA DETECTION
- SENSITIVE – 1 µR/HR RESOLUTION
- ISOTOPE IDENTIFICATION
- **OPTIONAL:** NEUTRON DETECTION
- **OPTIONAL:** GAMMA TELESCOPE/COLLIMATOR FOR PRECISELY LOCATING A SOURCE

DroneRAD-P™

- ALPHA, BETA, GAMMA, C-14 DETECTION
- SENSITIVTY – 1 x 10^{-10} TO 1 X 10^{-5} µCi/cc (OR Ci/m^3) - DEPENDS ON COUNT TIMES
- QUICK CHANGE FILTER
- MULTIPLE SPECIALIZED FILTER MEDIA ACCEPTABLE
- SNIFFER HOSE 3 FEET or USER SPECIFIED
- USB or OPTIONAL ETHERNET INTERFACE
- AUTOMATIC ADJUSTMENT OF ALPHA SPECTRUM BASED ON ELEVATION
- RECORDS CHANGES IN AIRBORNE CONCNETRATION BY LOCATION
- **OPTIONAL:** ALPHA SPECTRUM DETECTOR

AERIAL RADIATION DETECTORS

FEATURES
DroneRAD Detector System

CLICK TO SEE DroneRAD APPLICATIONS

DESCRIPTION:

DroneRAD-ST:

- Measures Gamma & X-Ray radiation & **OPTIONAL** Neutron levels.
- **OPTIONAL** downward looking Gamma & Fast Neutron spotters are available for building and facility air surveillance.
- Isotope identification.

DroneRAD-P:

- Measures radiation levels of Alpha, Beta, Gamma for airborne gases and particulates.

SELECT THE DroneRAD PACKAGE
OR
SELECT A DRONE TYPE &
EASILY MOUNT THE DroneRAD DETECTOR System.

APPLICATION:

DroneRAD-ST

- Ground-based Gamma source detection
- Cosmic ray and solar wind measurements

DroneRAD-P

- Airborne radioactive plume mapping (Alpha, Beta, Gamma)

DATA:

DroneRAD-ST

- Gamma Spectra, from NaI or LaBr detector with MCA

DroneRAD-P

- Alpha, Beta Gamma Particulate plume concentration

DroneRAD-ST & DroneRAD-P

- Dose Rate
- Data points & time are logged with GPS coordinates.
- Data storage of both Spectra & Dose Rate ~ **DroneRAD-ST**
- Particulate Levels. ~ **DroneRAD-P**

DroneRAD-P

Air Pump, Filter Holder & Detector

DroneRAD-ST & DroneRAD-P
DETECTOR FLIGHT PACKAGE

AERIAL RADIATION DETECTORS

FEATURES
DroneRAD Detector System

DESCRIPTION: DroneRAD-ST

- Identify Isotopes Instead Of Quantify Isotopes.
- GPS & Optional Mapping Software Provides Site Identification

DroneRAD-P

- Measures levels of airborne gases & Particulates: Alpha, Beta, Gamma, C-14
- Plume mapping with unique software

ON BOARD – DroneRAD-ST™
Detector: 2” x 2” NaI(Tl) Gamma Scintillator
Electronics:
Pre Amp
High Voltage
1000+ Channel MCA
Microprocessor
Transmitter
Camera
GPS
Battery Pack

ON BOARD – DroneRAD-P™
Detector: 1” diameter Thin Window GM
Electronics:
Pre Amp
High Voltage
Counter
Air Pump – 3 lpm
Transmitter
Particulate Filter
Flow Meter
Camera
GPS
Battery Pack

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

DESCRIPTION: DroneRAD-P

- The **Drone-RAD-P** uses standard or charcoal filters in TA's unique quick change, no leak holders to trap any airborne radio-nuclides. The filter is under constant surveillance via a GM detector.
- Air is drawn by a high volume pump through the filter and exhausted through an optional hose.
- Power is controlled by a rocker switch.

SPECIFICATIONS: DroneRAD-P

Air Flow Pump: Miniature 1-3 Liter/min Pump and Filter holder.

Range: 1×10^{-10} to 1×10^{-5} µ Ci/cc (or Ci/m^3) (Depends on count time)

Air Flow Meter: Displays flow rate 0.5 – 3.0 LPM.

Filters: Includes package of 100 glass Fiber and 10 charcoal filter papers. (Can also use membrane filters.)

OPTIONAL: **Sniffer Hose:** Up to 3 Feet

Case: Air Pump & Detector housed in polished blue aluminum.

Weight & Dimensions:

Pump & Detector Assembly: 1.75" Diameter x 8.5" Long

NOTE: Supplied with 10 charcoal and 100 glass fiber filter disks.

Detector:	T-1210 GM Tube
Window:	Mica 1.5 - 2.0 mg/cm^2
Detector: Radiation	Alpha, Beta, Gamma
Biological Hazards:	User Specific Filter
Chemical Hazards:	User Specific Filter
Iodine:	Carbon Filter
Detects Particulates:	YES
Detects Aerosol & Reactive Gases*:	YES
Filter: Glass Fiber -	YES
Charcoal Filter Paper- 1" dia	YES
Iodine Sensitivity: (30 min)	5×10^{-8} µCi/cc
Public Release: (1 x 10^{-10} µCi/cc)	10 Hour exposure
Detects all airborne activity EXCEPT - H-3,Fe-55 and Noble Gases	YES

AERIAL RADIATION DETECTORS

DRONERAD-ST PERFORMANCE with NO SHIELDING

Using Cs137 & 2" NaI(Tl) Detector

- 1 Curie Cs-137 source is 0.38184 Rem/hr at 1 meter (3.8184E5 µRem/hr)
- 2 inch diameter (2 inches thick) NaI(Tl) Detector sensitivity to Cs-137 is 900 cpm per µR/hr.
- Typical background at 10 uR/hr induces a count rate of about 9,000 cpm in an unshielded detector.

For good MDA a 60 second Background count time is recommended.	4.65 $(9{,}000)^{1/2}$	441 cpm	
	RADIATION LEVEL FOR 1 Ci Cs-137	**COUNT RATIO FOR 1 Ci Cs-137**	
DRONE ALTITUDE	**ABOVE BACKGROUND**		**EASILY DETECTABLE**
500 Meters (1,640 feet) above the ground. The cone of sensitivity is essentially infinite and the inverse square rule dominates the detection capability.			0.33 Ci if detector is directly over the source
500 Meters	1.5 µR/hr	1,350 cpm	0.33Ci
250 Meters	6.1 µR/hr	5,490 cpm	80 mCi
100 Meters	38.2 µR/hr	34,380 cpm	12.8 mCi
50 Meters	152.7 µR/hr	137,430 cpm	3.2 mCi
30.48 Meters	411.0 µR/hr	369,900 cpm	1.2 mCi
	10 µCi Cs-137	**10 µCi Cs-137**	
1 Meter	3.82 µR/hr	3,438 cpm	10 µCi

- These calculations are based upon a 2 inch by 2 inch NaI(Tl) detector.
- The 2 x 2 NaI(Tl) detector's sensitivity for Gamma emitters from 50 KeV to 1.3 MeV ± 15% for Curies detected.
- Other sizes and materials of detectors are available. LaBr has about a 30% higher efficiency and much better energy resolution than a NaI(Tl) detector.
- A 1 x 1 inch NaI(Tl) detector or a 3 x 3 inch NaI(Tl) detector are also available.

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

DroneRAD™ GROUND STATION ELECTRONICS OPTIONS	
GROUND STATION INCLUDES	**TBM-3D** **ALTERNATIVE – Simple Read Out** **DroneRAD-P ONLY**
DRONERAD-E Electronics	Display: 2” 8 Digit LCD
DroneRAD-E Software	2 Separate Scale Factors for Rate & Total
LAPTOP (Ours or Yours)	Power: Portable Battery Operated
ELECTRONICS	**OPTIONAL:** Alarm: Audio / Visual (User Settable)
DroneRAD-E	
Transponder	
Amplifier & Signal Conditioner	
Data Archive & Retrieval	
Power: Rechargeable Battery Pack	
Isotope Identification – **DroneRAD-ST**	
Spectrum Receiver – **DroneRAD-ST**	
USB Port & Cable	
Alarm: Audio / Visual (User Settable)	
OPTIONAL: Mapping Software for Post Flight Evaluation	

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

SPECIFICATIONS:

DETECTOR WEIGHT & DIMENSIONS:

Approximate Volume: 144 cu. inches

Approximate Weight:

Gamma spec: <4 lbs – **DroneRAD-ST**

Alpha/Beta/Gamma spec: <6 lbs – **DroneRAD-P**

Approximate Dimensions: 4" High10"x Long Widex2"-**DroneRAD-ST & DroneRAD-P**

COMMUNICATION:

Integrates into Existing Formats.

POWER REQUIREMENTS - DroneRAD-ST & DroneRAD-P

Rechargeable Batteries Included.

SPECIFICATIONS ~ BASE STATION ELECTRONICS OPTIONS:

LAPTOP - (INCLUDED OR USER'S OWN)

DroneRAD-E

Software

ELECTRONICS: DroneRAD-E (TRANSPONDER):

Isotope Id:	**DroneRAD-ST ONLY**
Spectrum Receiver:	**DroneRAD-ST ONLY**
Power:	Rechargeable Battery Pack
Output Ports:	USB & Cable
Case:	Gasketed Case
Alarms:	**OPTIONAL Visual / Audio – User Settable**
Mapping Software:	**OPTIONAL – for Post Flight Evaluation**
Dimensions:	3" x 2" x 6"
Weight:	3 lbs

DroneRAD-E
RECEIVER / TRANSMITTER

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

ALTERNATIVE ELECTRONICS & DISPLAY – DroneRAD-P ONLY

TBM-3D – Lightweight, Simplified Read Out – DroneRAD-P ONLY

Face Plate:	On/Off Toggle Switch
	Battery Test Push Button
	Low Battery Alert Red Light
Display:	2” 8 Digit LCD
	2 Separate Scale Factors for Rate & Total
Power:	6 AA Batteries
Case:	Gasketed Aluminum Case
Alarms:	**OPTIONAL Visual / Audio – User Settable**
Read Out:	**DroneRAD-P:** uCi/l of Airborne Contamination
Dimensions:	3” x 5.3” x 3”
Weight:	21 oz

TBM-3D

TBM-3D
MANUAL PLUG IN FOR IN-FIELD SIMPLE DATA READ OUT

TBM-3D ELECTRONICS

ELECTRONICS OPTIONS: RS-232 serial circuit

In-place rechargeable batteries

Enhanced GPS

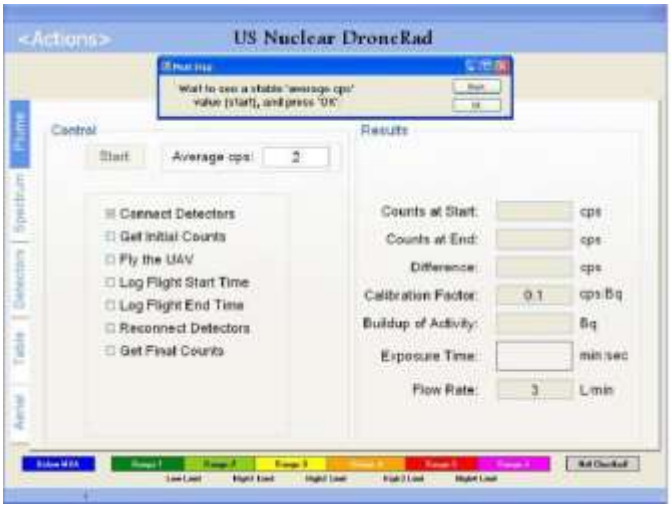
FlyCam’s CYPHER 6 DRONE with DroneRAD DETECTOR
10 POUND LOAD CAPACITY

DroneRAD DETECTOR INSTALLATION

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

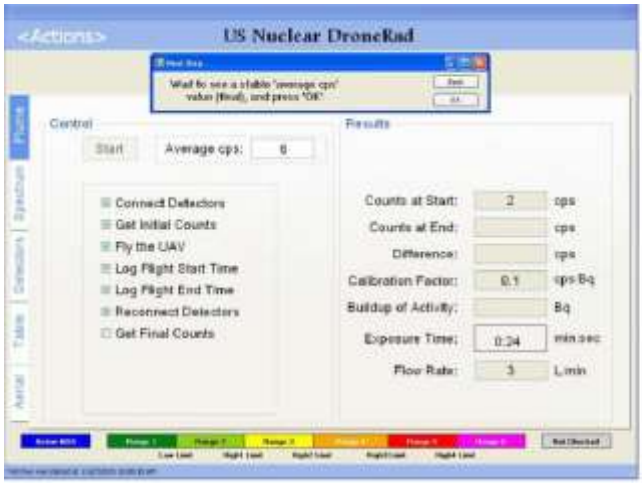


DroneRAD-P

BEFORE FLIGHT

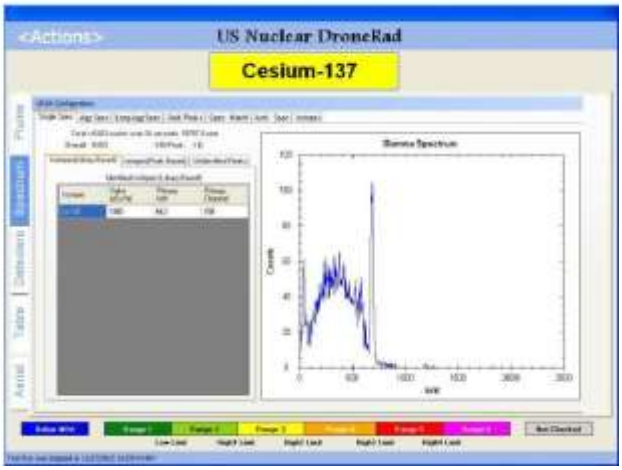
DroneRAD-P

BEFORE PLUME



DroneRAD-P

AFTER FLIGHT



DroneRAD-ST

SEARCH TOOL RESULTS

SOFTWARE SCREEN SHOT SAMPLES

AERIAL RADIATION DETECTORS

FEATURES
DroneRAD Detector System

DroneRAD PACKAGE INCLUDES:

- **FlyCam UAV's NEO or Cypher 6 - Drone**
- **Hi Definition Camera**
- **GPS**
- **Controllers**
- **DroneRAD Detector System**
- **Training**
- **OPTIONAL Hard Shell Case for DroneRAD Package**

DroneRAD™ DECTOR SYSTEM INCLUDES:

- **DroneRAD-ST Detector** (User Specified)
- **DroneRAD-P Detector** (User Specified)
- **Electronics** (User Specified)
- **Unique Data Collection Software**
- **Wireless Interface**
- **USB Port**
- **Necessary Cords, Cables & Connectors**
- **Charcoal & Glass Fiber Filters for DroneRAD-P**

DroneRAD DETECTOR SYSTEM OPTIONS:

- ELECTRONICS: (User Specified)
  - DroneRAD-E
  - TBM-3D – DroneRAD-P ONLY
- ENHANCED GPS
- ALPHA SPECTRUM DETECTOR – DroneRAD-P
- ALARM – AUDIO/VISUAL
- PLUME MAPPING SOFTWARE
- IN-PLACE RECHARGEABLE BATTERIES – TBM-3D

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

DroneRAD-ST Detector Set

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

DroneRAD-P Detector Set Up

POST FLIGHT QUICK CONNECT READ OUT TBM-3D Electronics

DroneRAD-P ONLY

AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

NEO

OCTO DRONE by FlyCam UAV

DESIGN

- 8 Motor Copter (Octocopter)
  - Commercial Grade Heavy Lift UAS Motors
  - Commercial Grade Carbon Fiber Frame
  - 18" Carbon Fiber composite Propellers
  - Easy Breakdown Frame for Travel
  - Weather Proof Canopy
  - All Weather
  - Wind: 35 mph
  - Flight Speed: 40-50 mph
  - Max Altitude: 9,000 feet

FLIGHT CONTROLLER

- Precision Commercial Grade GPS Flight Controller with GPS Position Hold
  - Intelligent Flight Modes
  - Automatic Return to Home
  - Flight Telemetry Overlay

POWER

- Flight Times – Up to 30 Minutes
- 8 Commercial Grade Motors for Redundancy
- Bearings Provide 100s of Hours of Flight Time
- 19 Pound Payload
- Dual Lithium Polymer Batteries for Redundancy & Longer Flight Time

CAMERA

- 3 Axis Gimbal Mounted
- High Definition – UHD4K
- Real-Time Video Downlink

AERIAL RADIATION DETECTORS

FEATURES
DroneRAD Detector System

CYPHER 6

HEX DRONE by FlyCam UAV

DEVELOPED & MANUFACTURED IN USA

DESIGN

- 6 Motor Copter (Hexacopter)
  - Commercial Grade Heavy Lift UAS Motors
  - Commercial Grade Carbon Fiber Frame
  - 15” Carbon Fiber composite Propellers
  - Folding Frame
  - Flight Speed: 30 mph
  - Wind: 15 mph
  - Max Altitude: 9,000 feet
  - **Optional:** Weather Proof Canopy

FLIGHT CONTROLLER

- Precision Commercial Grade GPS Flight Controller with GPS Position Hold
  - Intelligent Flight Modes
  - Autonomous Waypoint Capability
  - Automatic Return to Home
  - Flight Telemetry Overlay

POWER

- Longer Flight Times – Up to 20 Minutes
- 6 Commercial Grade Motors for Redundancy
- Bearings Provide 100s of Hours of Flight Time
- 6 Pound Payload
- Dual Lithium Polymer Batteries for Redundancy & Longer Flight Time

CAMERA

- 3 Axis Gimbal Mounted
- High Definition – UHD4K
- Real-Time Video Downlink

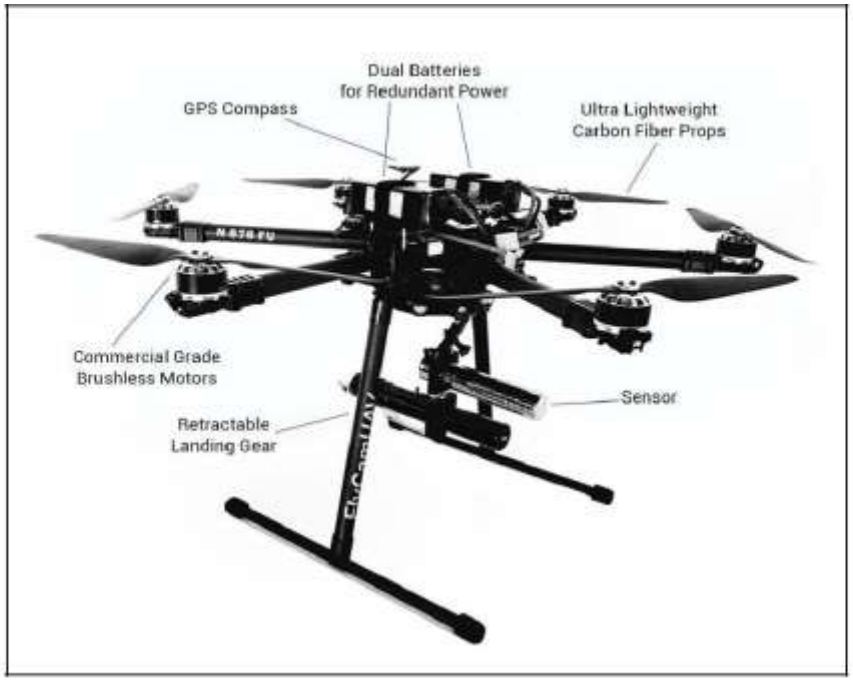
AERIAL RADIATION DETECTORS

FEATURES

DroneRAD Detector System

CYPHER 6 ~ HEX DRONE

The 6 Pound Payload Provides the Opportunity for Multiple Sensors: Radionuclide, Biological, Chemical, Thermal



CYPHER 6 HEX DRONE

- With 6 commercial/industrial grade motors the risk of crashing during operation is significantly reduced, unlike 4 motor copters.
- Utilizing commercial/industrial grade materials ensures quality and durability.
- With a dual battery system flight times can be extended for mission critical operations.
- The commercial/industrial grade GPS system provides exceptional location enhancement.
- The 3 axis gimbal mounted UHD 4K camera provides superb viewing.

TECHNICAL ASSOCIATES Divisions of US NUCLEAR CORP
OVERHOFF TECHNOLOGY

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