

# GammaRay X Webinar

## Aegis™ Field Measurement

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# Aegis – The New Portable HPGe Spectrometer



**Portable,  
Multi-Use,  
HPGe gamma-spectroscopy  
instrument,  
For lab-quality readings  
In the field.**

# Agenda

- The Aegis Portable HPGe Spectrometer
  - What is it and what can it do?
    - Ingress Protection
    - Optional backshielding
    - Models, configurations, FWHM performance
  - Applications: In-Situ, Lab, Emergency ... and their combinations

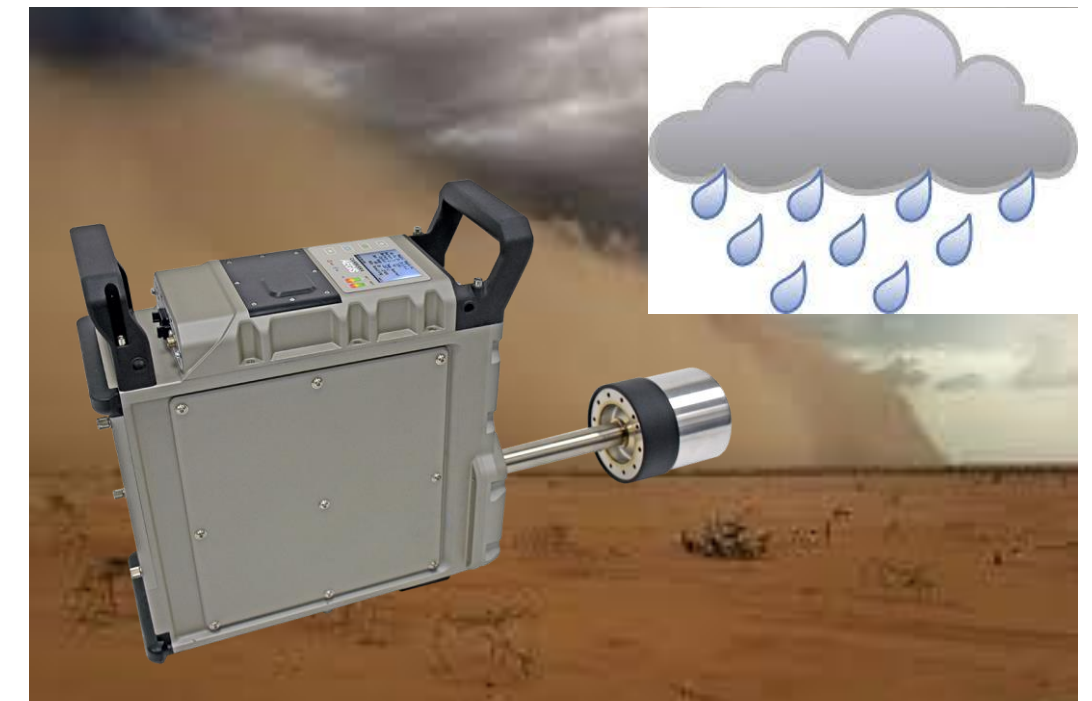
# What is it and what can it do?

## Key Features

# IP65 Ingress Protection Rating



- Completely sealed design **(without cooling fans)**:
  - Ideal for use in (potentially) contaminated areas: no risk for internal contamination of the unit
  - No need to worry about sudden rainstorms or dusty conditions
  - No need to wrap in plastic or set up large tents
- Advanced **passive cooling** system:
  - No radiator: enabling easy surface decontamination
  - Efficient passive heat-dissipation management: enabling laboratory-grade energy-resolution performance



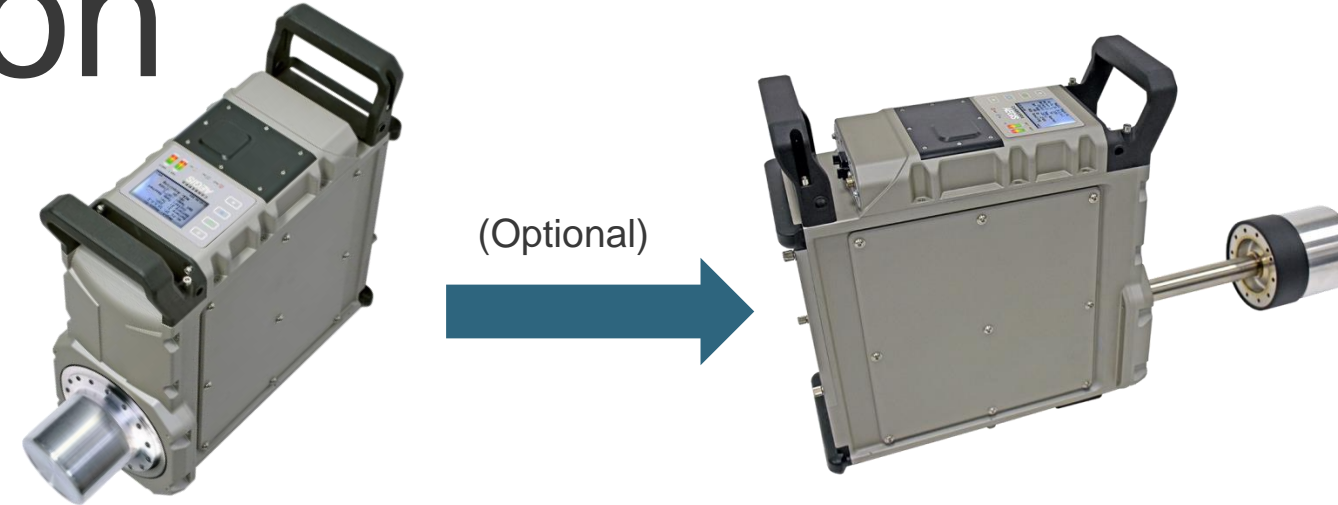
## IP65

Protected from total dust ingress

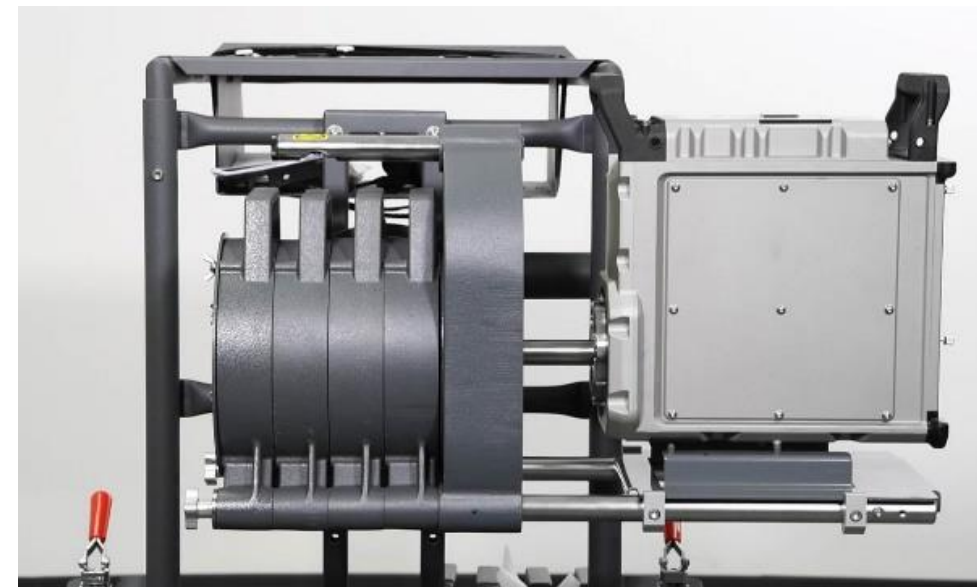
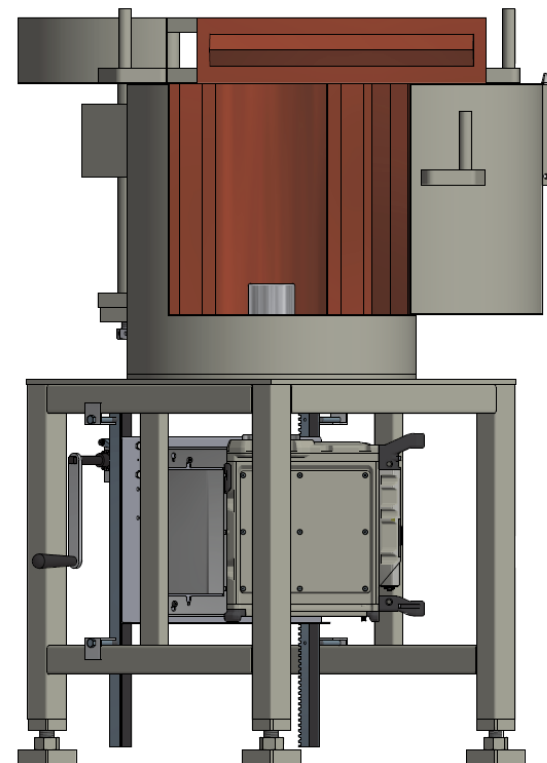
Protected from low-pressure water jets from any direction



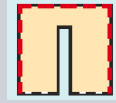


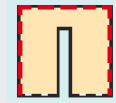
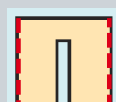

# The RDC Option



- RDC: Remote Detector Chamber
- Turning Aegis into a lead-shield mountable device
  - Designed to fit ISOCS and 4" shields for optimal backshielding
  - Excellent background conditions for each application







# Models and Configurations

Model	Lead-shield mountable?	HPGe crystal	Description
AEGIS-GC40	No	40% SEGe 	Standard Electrode Germanium with diffused outer contact
AEGIS-GX40	No	40% XtRa 	Extended Range Germanium with <b>stable thin</b> front contact: - Extra and stable low-energy sensitivity
AEGIS-BE5030	No	BE5030: 50 cm <sup>2</sup> , 30 mm 	<b>Broad Energy Germanium</b> with <b>stable thin</b> front window and <b>signal point</b> contact: - Extra and stable low-energy sensitivity - Premium energy-resolution, efficiency and background performance
AEGIS-GC40-RDC	Yes	40% SEGe 	Standard Electrode Germanium with diffused outer contact
AEGIS-GX40-RDC	Yes	40% XtRa 	Extended Range Germanium with <b>stable thin</b> front contact: - Extra and stable low-energy sensitivity
AEGIS-BE5030-RDC	Yes	BE5030: 50 cm <sup>2</sup> , 30 mm 	<b>Broad Energy Germanium</b> with <b>stable thin</b> front window and <b>signal point</b> contact: - Extra low-energy sensitivity - Premium energy-resolution; efficiency and background performance



**STRUCTURE CODE:**

-  Active Volume
-  Diffused Contact (N+)
-  Implanted or Barrier Contact (P+)
-  Passive Surface

# Energy Resolution Specifications

	AEGIS-GC40(-RDC)	AEGIS-GX40(-RDC)	AEGIS-BE5030(-RDC)
FWHM* (122 keV) [keV]	1.4	1.4	1.0
FWHM* (1332 keV) [keV]	2.1	2.1	2.0
Low-energy sensitivity [keV]	40	15	15
Endcap diameter [inch]	3.25	3.25	4.0

\*Guaranteed FWHM specifications at 23°C (73°F) ambient temperature.

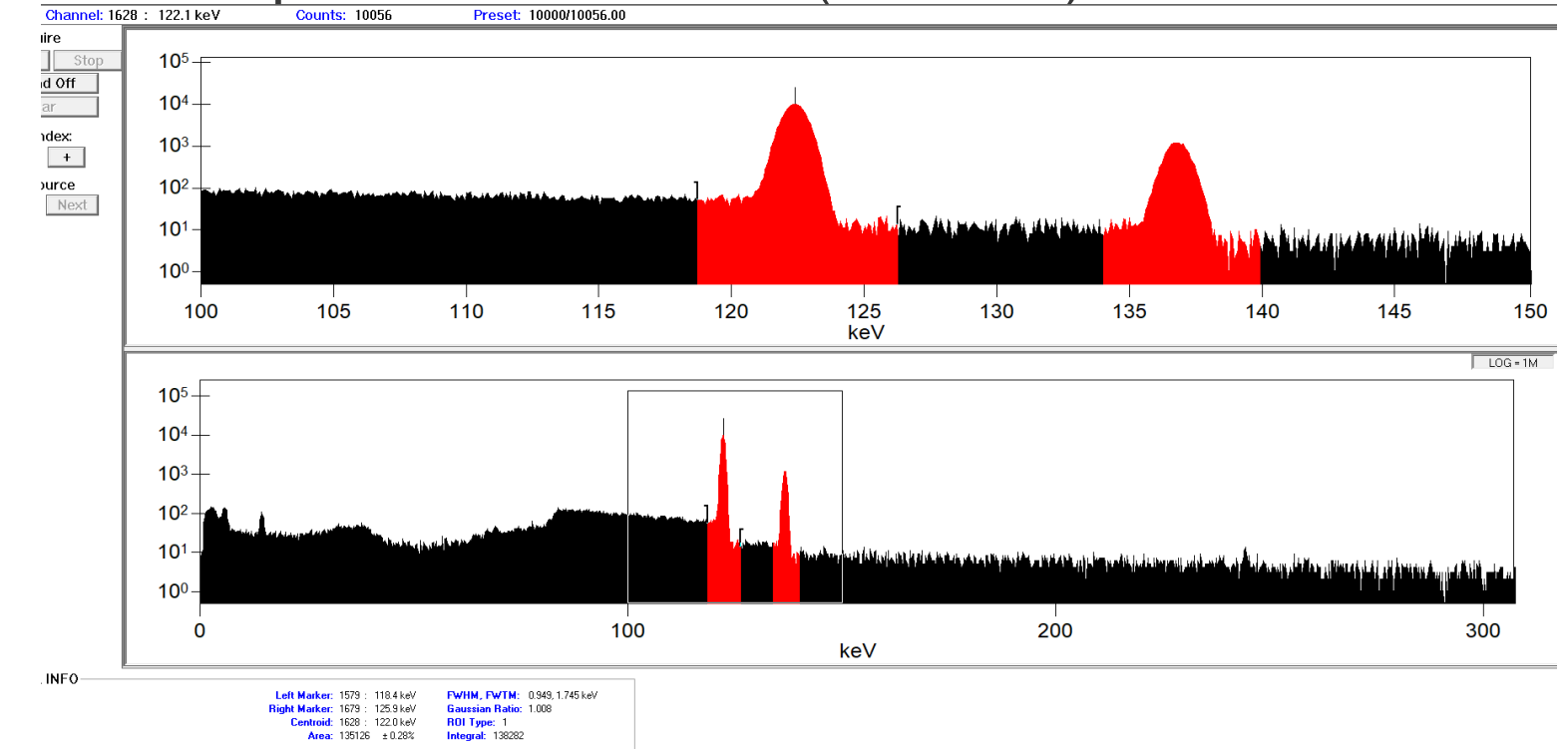
- Laboratory-grade energy resolution
- XtRa and BEGe low-energy sensitivity driven by rugged 0.5-mm Al end cap
- End-cap diameters fit Mirion lead shields, 7413-425 tripod and standard ISOCS shield



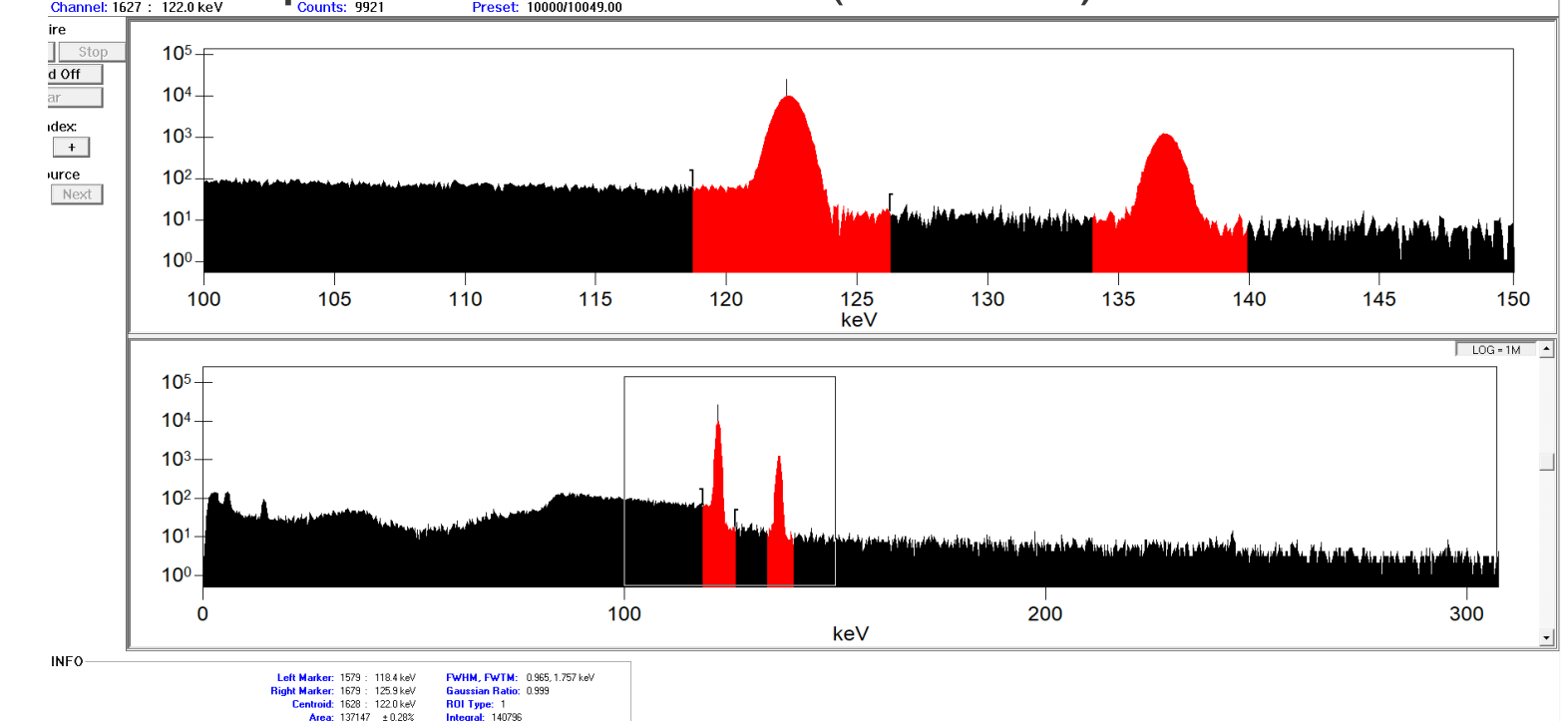
# AEGIS-BE5030-RDC Energy-Resolution Performance: Co-57

- Performance of unit 13000034:
  - RT/FT: 5.6/1.2 us.
  - Room Temperature
  - Wall powered
- Note on ion pump:
  - Needed for maintaining adequate vacuum level
  - Direct measure of vacuum level
  - Minor degradation of spectral performance due to noise
    - Low energies most sensitive to noise
    - FWHM Co-57 122-keV line:
      - Ion pump OFF: 950 eV
      - Ion pump ON: 965 eV
  - Possible to operate with ion pump off
  - Required to switch on ion pump at least once per month for vacuum health

Ion Pump: **OFF** FWHM(122 keV): **950 eV**



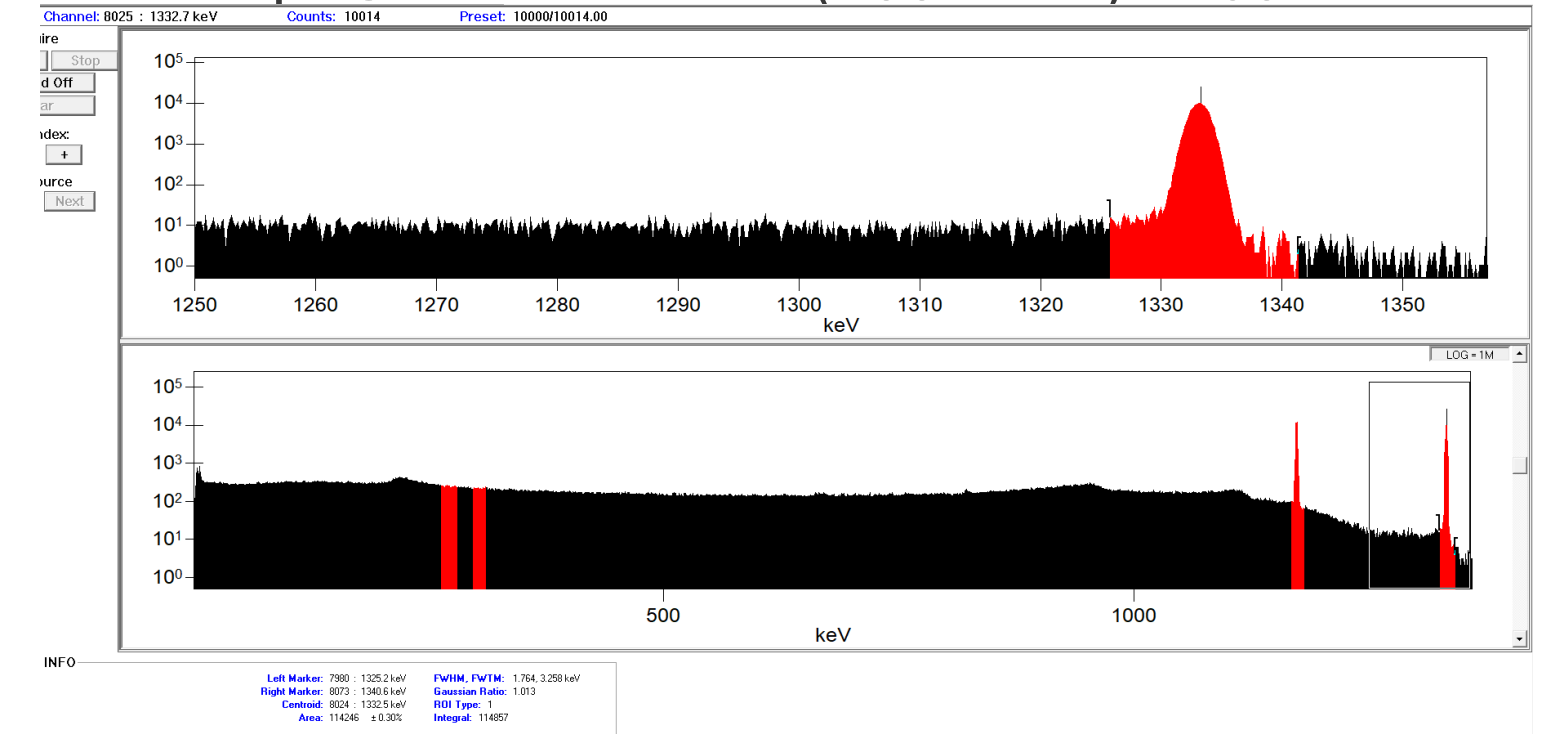
Ion Pump: **ON** FWHM(122 keV): **965 eV**



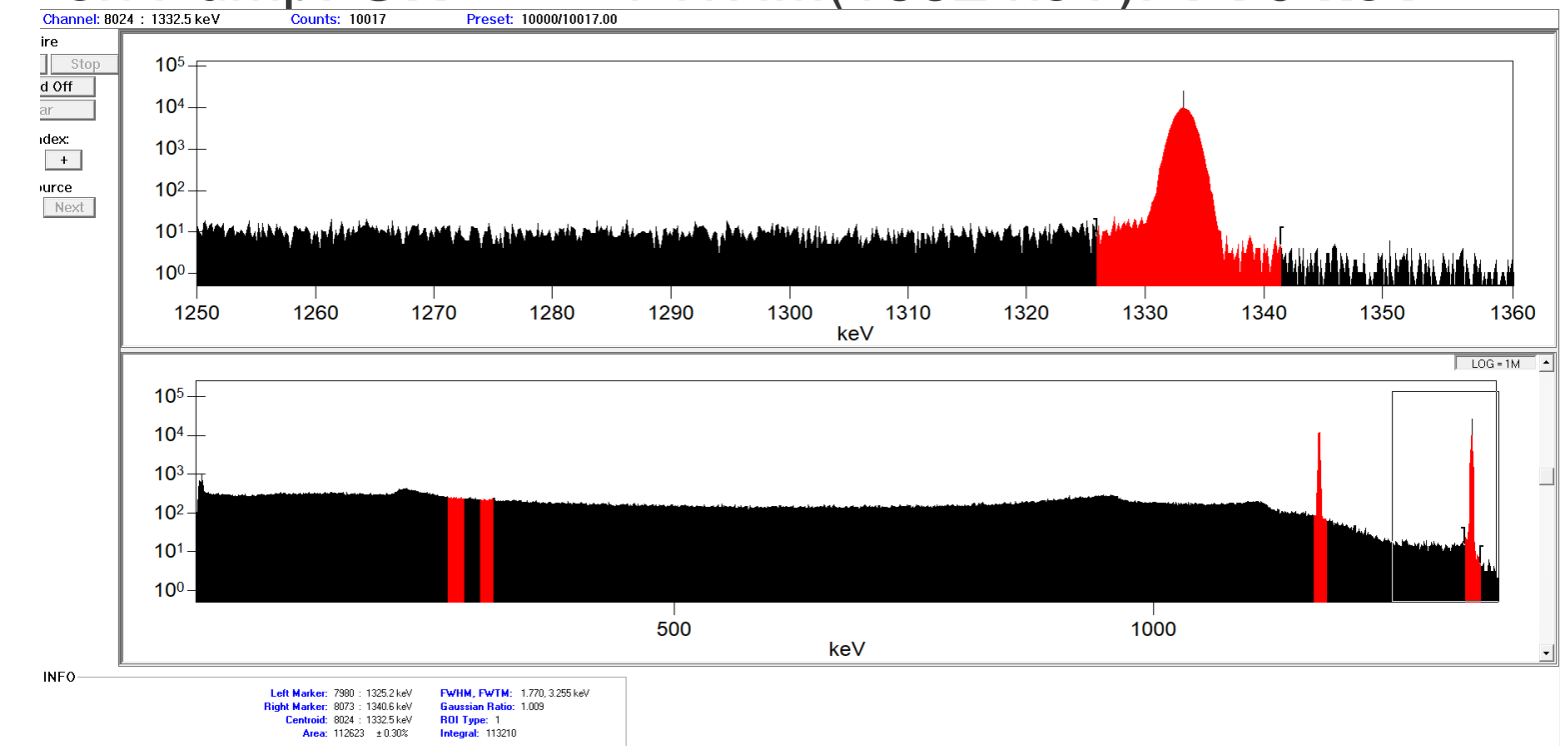
# AEGIS-BE5030-RDC Energy-Resolution Performance: Co-60

- Performance of unit 13000034:
  - RT/FT: 5.6/1.2 us.
  - Room Temperature
  - Wall powered
- FWHM Co-60 1332-keV line:
  - Good charge collection required for good spectral performance at higher gamma energies
  - Ion pump OFF: 1.65 keV
  - Ion pump ON: 1.70 keV

Ion Pump: **OFF** FWHM(1332 keV): **1.65 keV**



Ion Pump: **ON** FWHM(1332 keV): **1.70 keV**

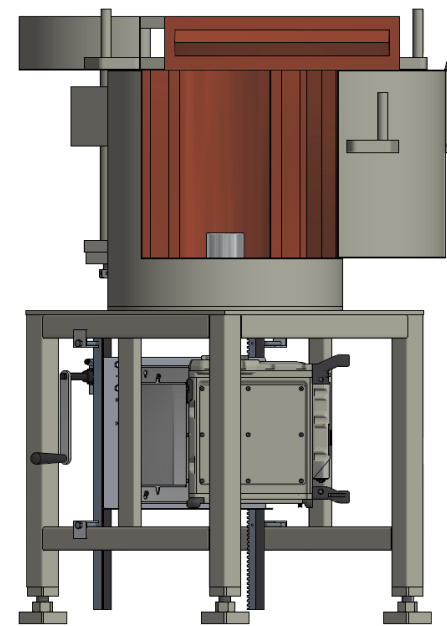


# Deployable as Multi-Use Device

- IP65 rated, All-In-One package
- Laboratory-grade E resolution
- Lead shield mountable
- Mechanical adapter solutions



ISOCS Lead Shield Mount



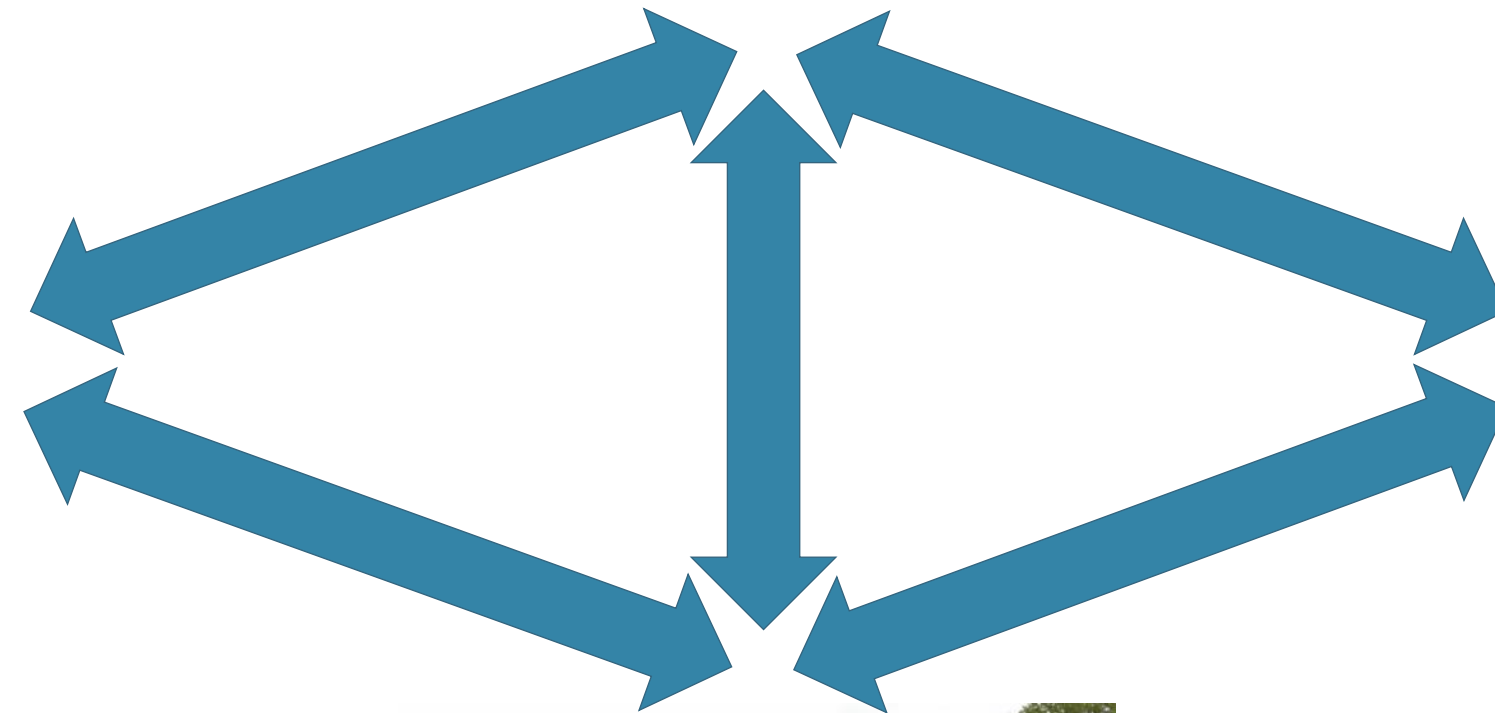
Fixed Lead Shield Setup



Tripod Mount



Mobile labs, survey vehicles



# Applications

In-Situ, Lab, Emergency... and their combinations



# Intended Applications

- **ISOCS** or other in-situ counting applications requiring transportable ruggedized HPGe detector:
  - Clearing objects, outdoor Box Counters, Field remediation, Plant Holdup measurements, Mapping radiological fields, Security & Safety applications, etc ...
  - Basically, all applications with any of following requirements:
    - No risk for internal contamination (IP65 – no fans);
    - Easy to decontaminate (smooth surfaces – no radiator, IP65);
    - Deployable in rain and dusty environments (IP65 – no fans);
    - Achieve premium MDA levels optimizing throughput (large detection efficiency, laboratory-grade energy resolution, background shielding using ISOCS shield).
- **Lab Applications** requiring ‘multi-use’ detectors, i.e. in lab or ‘**emergency response**’ in-situ measurements
  - Lead-shield mountable, all-in-one package => easy to switch between setups.
- Also **low ‘down time’** systems – due to thermal-cycle free design
  - Optimizing detector uptime

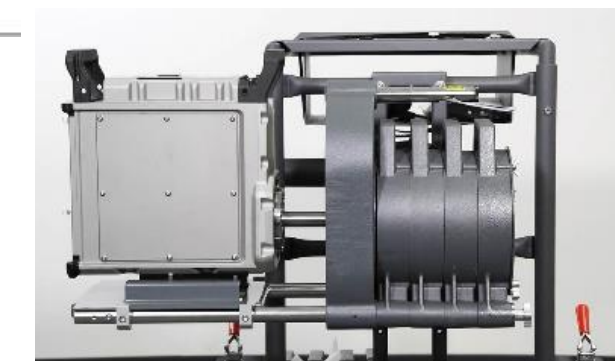




# In-Situ ISOCS Applications

- ISOXSHLD adapter kit available for:
  - All standard ISOCS carts
  - ISOCS lift
- 7413ADAPT adapter kit available for:
  - 7413-425 tripod
- Aegis with RDC option:
  - Replacement for (Big)MAC or CP5-Plus with MCA (IN2K)
- All-in-one Aegis package:
  - UPS, Wi-Fi, MCA, cooler with controller
  - Laboratory-grade energy resolution

➔ Only external PC needed w/wo ethernet cable  
Most compact solution 😊



# Aegis Summarized

- IP65 design
  - For use in rain & dusty environments (no cooling fans)
  - No risk for internal contamination
- Optional BE5030 detector configuration
  - 1.0 keV FWHM at 122 keV (BE5030)
  - 2.0 keV FWHM at 1332 keV (BE5030)
  - ~45% relative efficiency with optimized efficiency across full energy range for front-geometry measurements (large 50-cm<sup>2</sup> surface)
  - Optimized background performance (small 30-mm thickness)
- All-In-One with optional RDC:
  - For drastically improved background conditions
  - Enabling multi-use deployment
- Elaborate analysis features
  - Genie 2000
  - ISOCS/LabSOCS (option)





# Questions?