
MIRION
TECHNOLOGIES

Continuous and Unattended Spectroscopic Operation and Analysis with the Mirion Data Analyst

Eric Tischenbach

Application support manager

Europe, Africa, Middle East & India

T3.3-01

MIRION TECHNOLOGIES

SnT 2019

CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

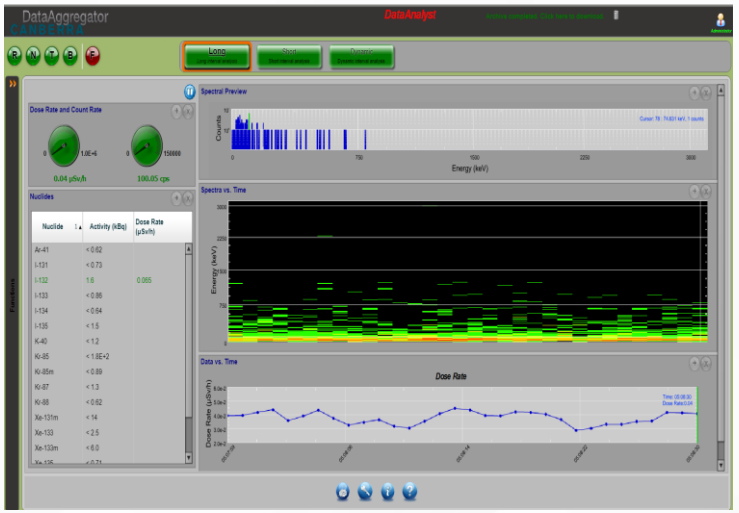
Data Analyst

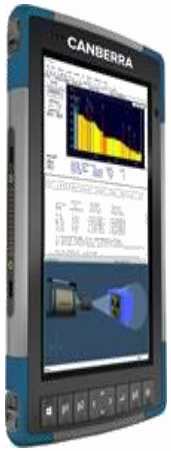
- WHAT IS THE DATA ANALYST
- DATA ANALYST APPLICATIONS

DA (Data Analyst) – What is it?

It is a platform neutral continuous spectroscopy software system

- **Embedded Spectroscopy Software:** Software designed to run on a variety of platforms for various solutions
- **Continuous:** Acquires & analyzes spectra continuously
- **Web UI:** Access data via USB, Ethernet, wireless connection via browser or desktop Adobe Air application

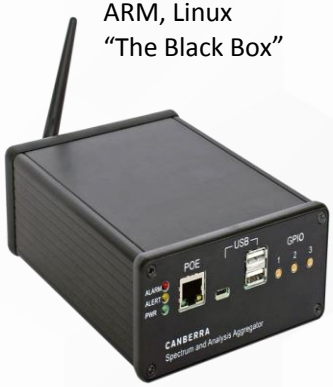




Mesa2
Rugged Tablet
Intel CPU
Win10
(Mil Spec)

Industrial PC
-40°C to 70°C,
Intel CPU, Win10

SyD Custom
ARM, Linux
"The Black Box"

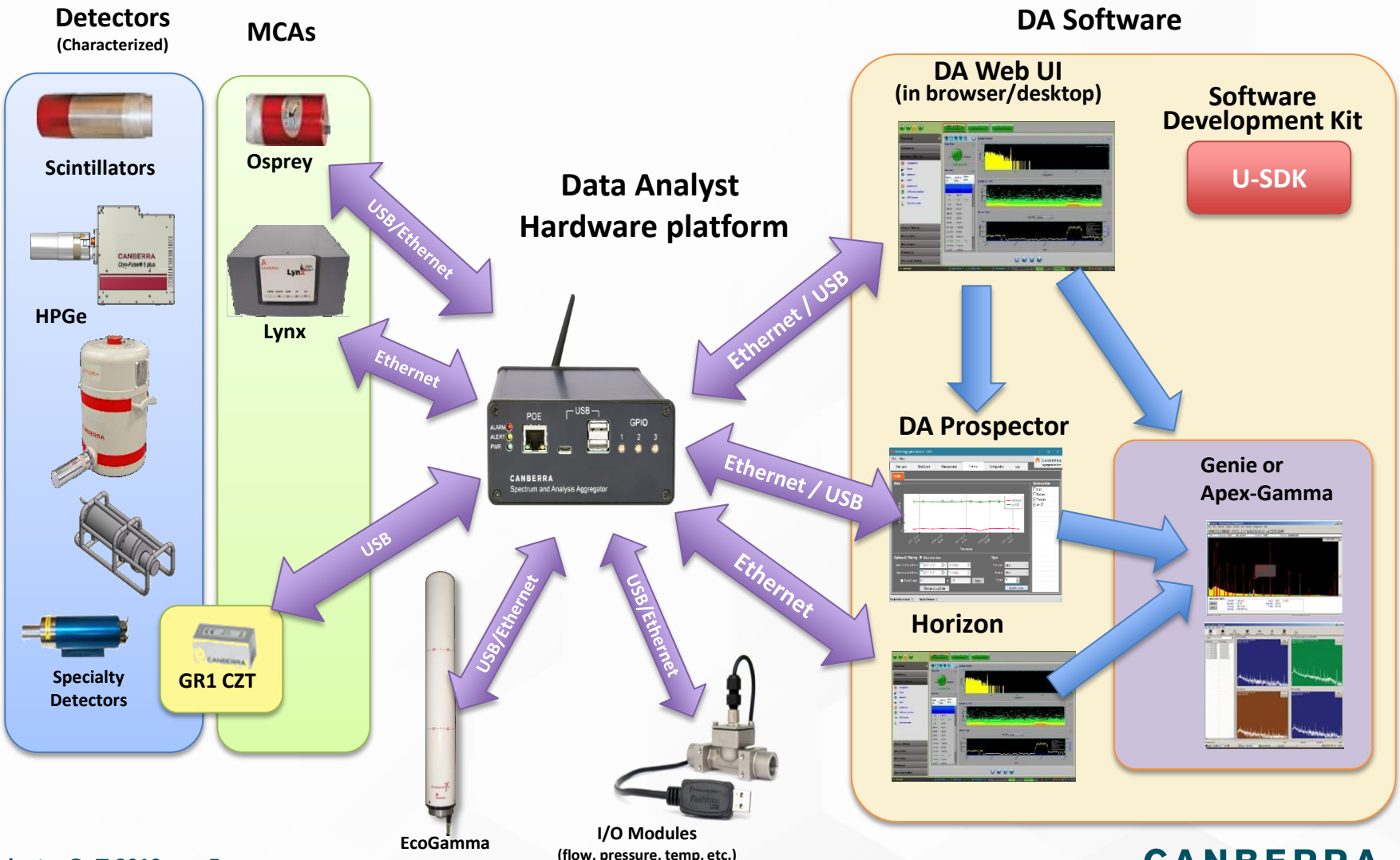


IGT-20
ARM A8
Linux

Raspberry Pi 3 B+
ARM, Linux

NOTE: example of platforms subject to Change

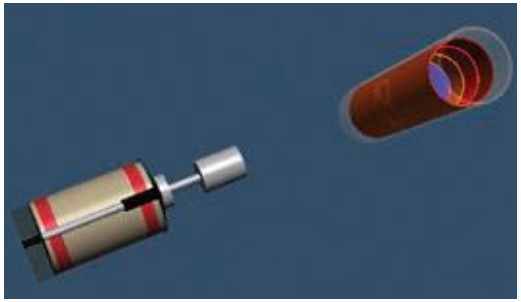
DA - Leverage SyD Core Components

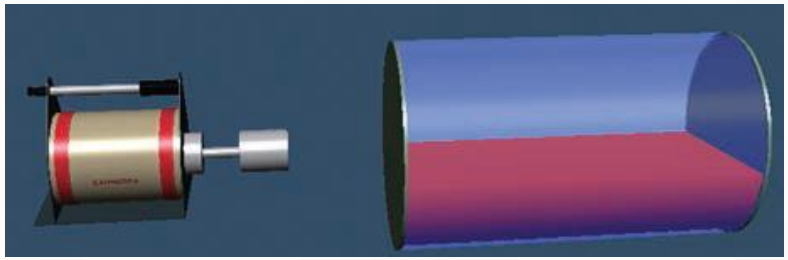


DA – A Versatile "Solutions" Tool

Key Features:

- **Genie Analysis Engines** – familiar, trusted, and proven analysis algorithms
- **ISOCS** Efficiency Calibrations
- Continuous Acquisition Mode using MSS Acquisition
- Multiple Simultaneous Analysis Workflows
- Displays & Communicates Alarms on Analysis Results
- GPIO to triggers to/from Analysis Workflows
- I/O For Additional Sensors (Pressure, Temp, Flow, etc.)
- GPS Input for Mobile Instruments



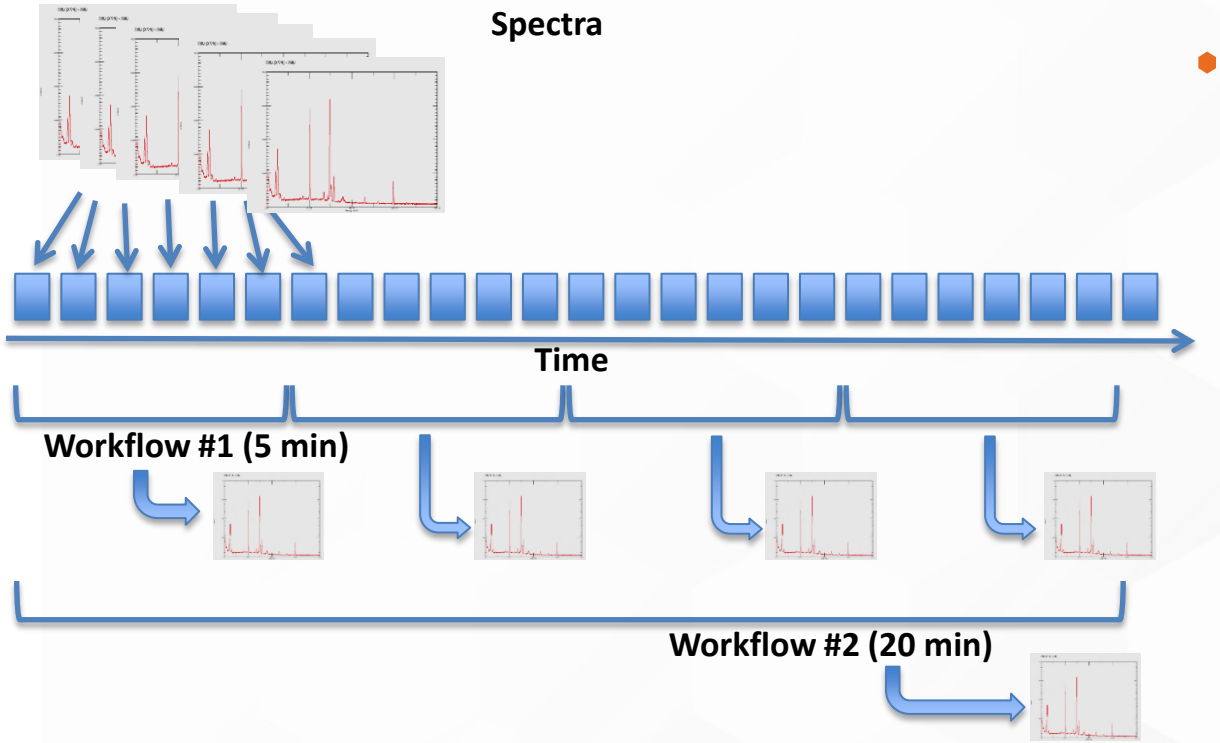


Example: ISOCS Efficiency Calibrations

DA Web User Interface

DA Analysis

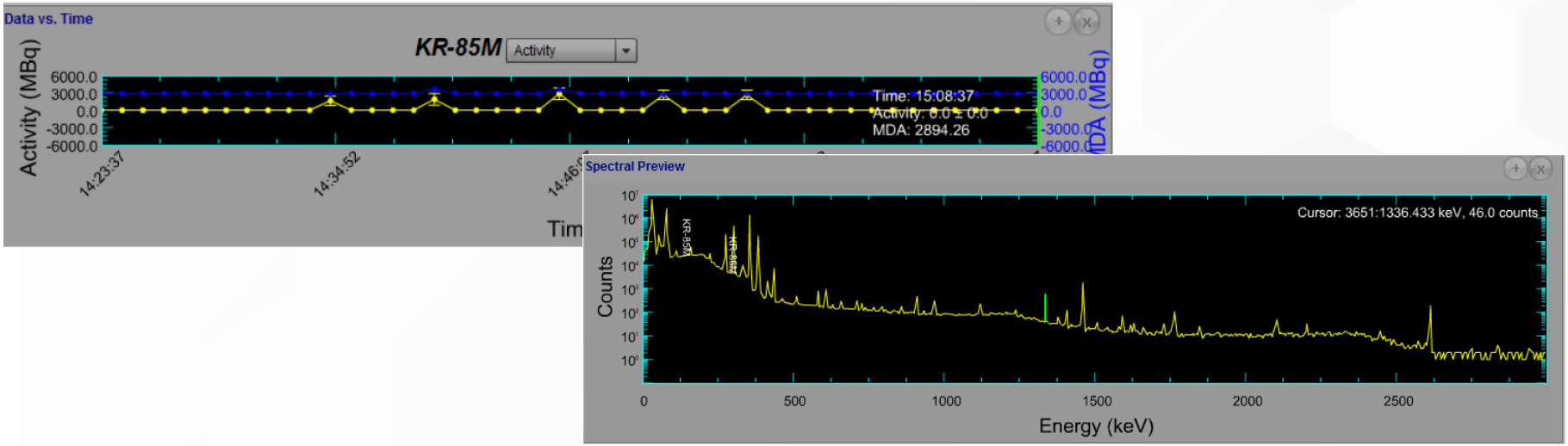
- It is a <u>continuous</u> spectroscopy system (saving 1 spectra every second)
- It has "Workflows" which will aggregate & analyze this data at preset interval(s)



- **What is a workflow?**
  - Each workflow is an independent analysis stream
  - Acquires a spectrum for a preset time
  - Automatically performs analysis sequence at the end of preset time
  - Stores results in CAM file and in historical file
  - Automatically begins a new acquisition and repeats the process
  - Runs completely unattended after initial setup

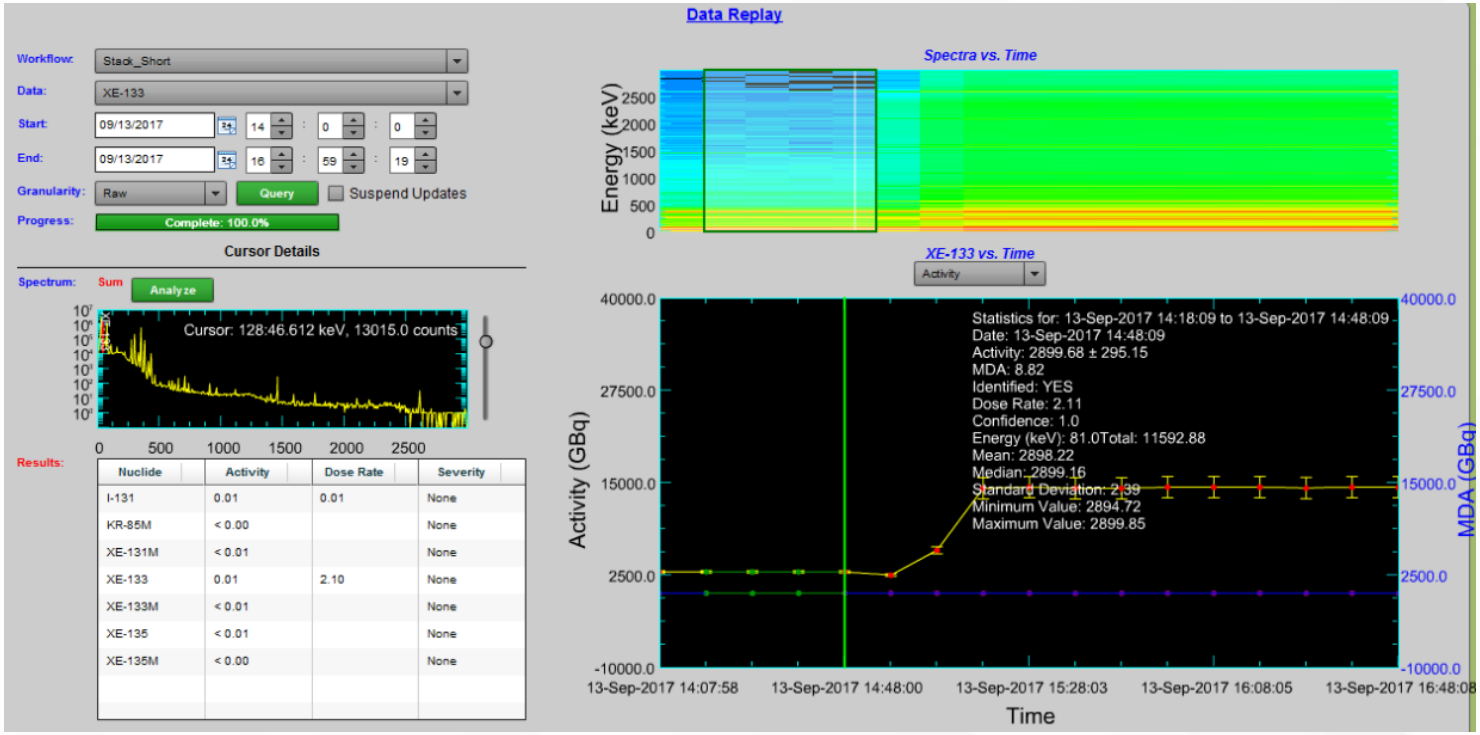
DA - Nuclide activity time series plot

- Time series of activity displayed for nuclide highlighted in the activity list
- Both activity and MDA shown
- Click on a data point for detailed information
  - Time stamp
  - Activity with uncertainty
  - MDA
- Clicking on data point also displays the corresponding spectrum in the spectral display

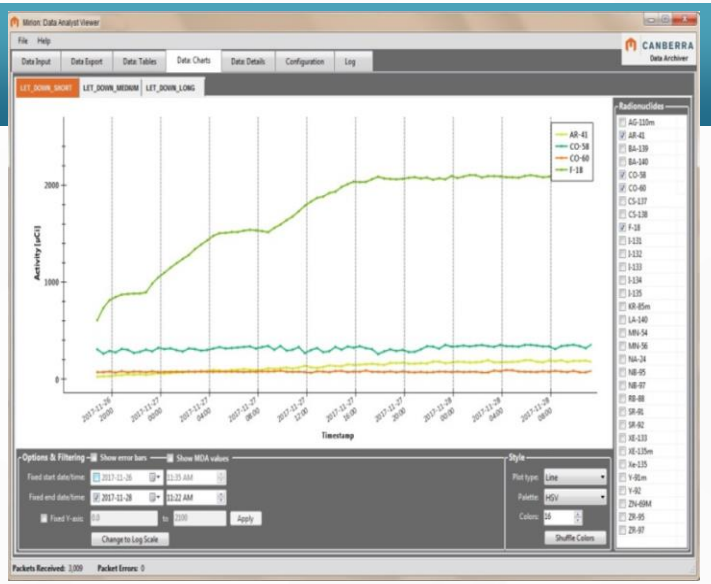


DA - Data replay

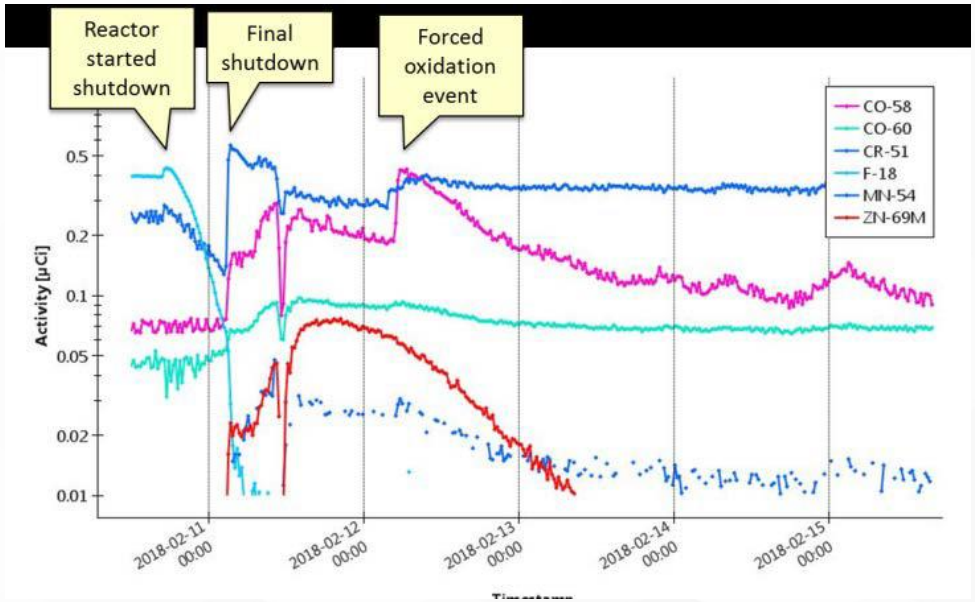
- Select workflow, time/date range, and nuclide – then view time series and spectral data
- May also view system health data for each point
- Drag cursor across multiple points to sum them
- Display summed spectrum and re-analyze to find activities for the summed spectrum



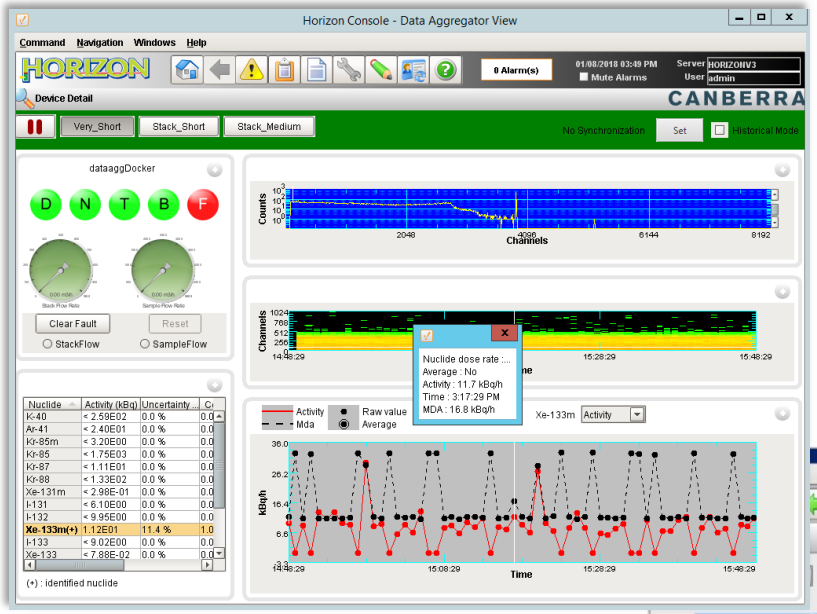
DA Prospector software



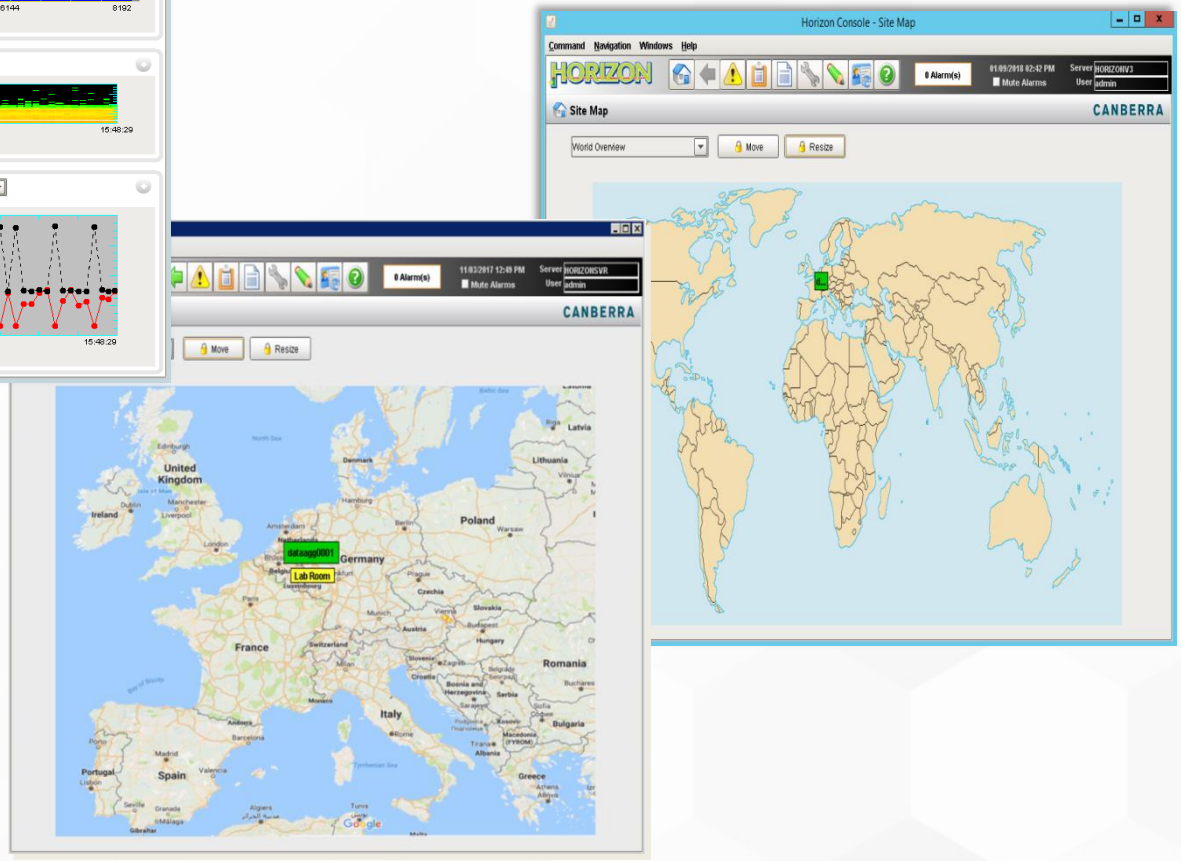
- Allows remote viewing of data for a DA
- Extract all spectra & analysis results collected from offline DA
  - Walk in, connect, download data, leave
  - View data back at your office
- Advanced plotting shows analysis results of individual nuclide activities
- Turn any combination of nuclides on/off to compare trends and perform in-depth analysis
- Filter data by date range
- Visual zoom of plots enable a close look at data in detail
- Export Data features



Horizon Supervisory for DA



Site Maps helps to keep track of multiple DA devices



- Device Detail screen in Horizon is similar to DA web UI
- Key data stored in database
- Alarms and Events combined with all other instruments
- CNF and N42 files stored in Horizon

Applications

- **Spectroscopic stack monitor**
- **Continuous spectroscopic monitor**
- **Other applications**

Spectroscopic stack monitor

- Designed to measure stack releases of noble gases e.g.:
  - Xe-131m
  - Xe-133
  - Xe-133m
  - Xe-135
- Release of gas from:
  - Medical isotope production facility stacks
  - NPP stacks
  - Research reactor stacks

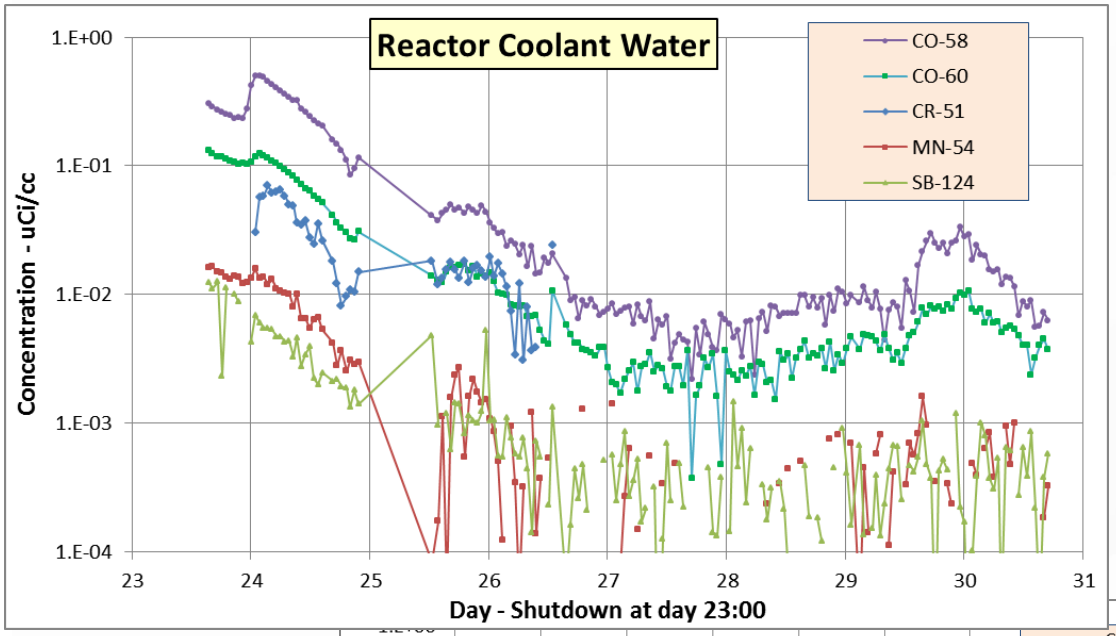
DA Combined with a portable shield

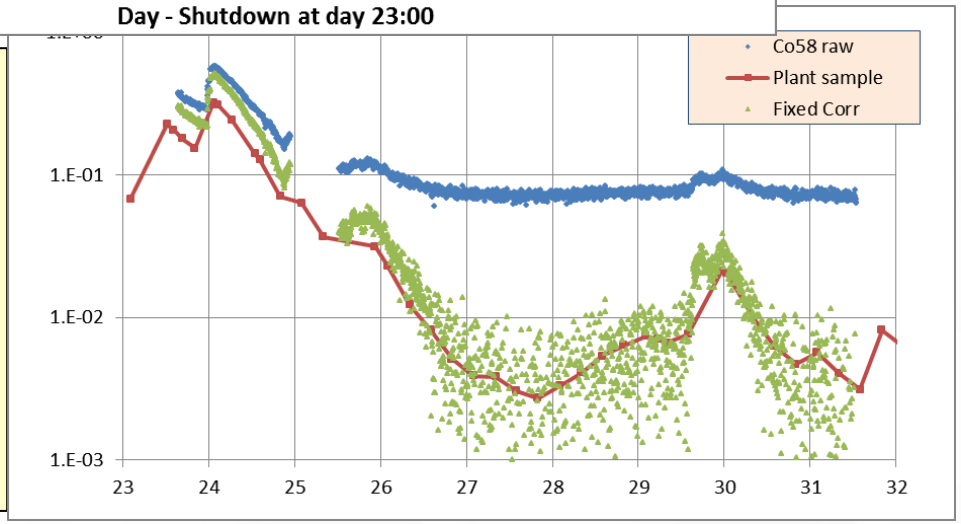
Continuous Spectroscopy Monitor (CSM)

- Versatile shield for In-Situ applications
  - 2 cm thickness Tungsten as standard
  - 8.4kg (19lbs) with maximum collimator
- Detector is low power and just needs a standard USB cable for power
- Shield can be small and light because the detector and integrated MCA is very small
- Quick and easy deployment
  - Light weight, no cooling-down time

➢ **Add an efficiency calibration (ISOCS possible) and get immediate quantitative results in the field**

Example of Continuous Gamma Spectroscopy output from NPP





Other nuclides reported

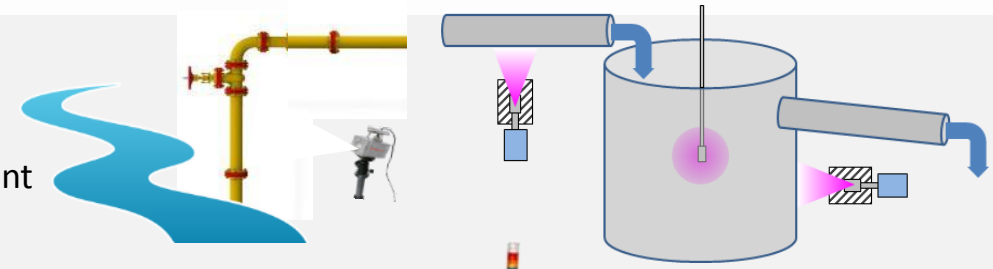
- Fe-59
- Sn-113
- Zr-95
- Nb-95
- Ag-110m
- Zn-69m
- A-41
- Na-24

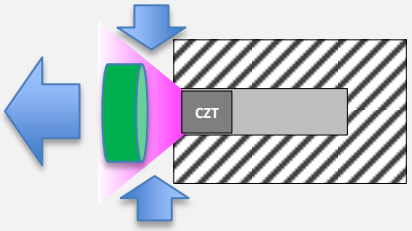
- Detector measures water plus pipe activity
- Pipe activity assumed to be fixed
- Results mirrored plant water activity when 6.7 kBq/cm2 subtracted

Other applications of the Data Analyst and Spectroscopy sensor

Water monitoring

- Municipal water intakes
- Facility liquid effluent monitors





Ad-hoc nuclide-specific Continuous Air Monitor

- Aim detector with DA at the filter of an operating air sampler

Conveyor monitoring applications – nuclide-specific screening and sorting

- Excavated soil
- Crushed concrete
- Containers of food
- Ad Hoc screening applications

Detector on moving platform

- Radioactivity on the ground, along with GPS coordinates
- In UAV for radioactivity in plumes or on ground

ANBERRA

Thank you!

Welcome to our stand
CANBERRA PACKARD
for more details