Engage. Explore. Empower.

Connecting Visionaries in Radiation Safety, Science and Industry

MIRION Connect 24

Annual Users' Conference

July 29 - August 2 | Omni Dallas Hotel, Dallas, TX

MIRION TECHNOLOGIES

Contamination Monitors
Innovations & Applications

Tobias Baer

Product Line Manager – Contaminiaton & Clearance

Mirion Connect | Annual Users' Conference 2024

Dallas, Texas

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Agenda

- Whole Body Contamination Monitors

- Hand Foot Monitors

- Gamma Portal Monitors

- Tool & Object Monitors

- Conveyor Monitors

- Vehicle Monitors

- Connectivity Solutions

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Agenda

- **Whole Body Contamination Monitors**
- Hand Foot Monitors
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Argos™-3/-5 Whole Body Contamination Monitors

Applications

Whole body surface contamination monitors to clear personnel from Radiological Controlled Areas (RCAs) and Boundary Zones in nuclear facilities, such as nuclear power plants, laboratories, etc.

Key Features

- **Alpha, Beta and/or Gamma Monitoring** (including discrimination)
- **Gas Flow or Gasless detectors**
- **Resolving Issues with Radon Progeny**
- **Outstanding body coverage** and radiological performance

NEW **Comprehensive Monitor Software** based on Windows 10 IoT LTSC v9.10.1 now available.
Functional improvements include: **new outlier filter** to reduce aborted occupant measurements due to "Background is Changing" (caused by spurious outliers, e.g. microphonics).

Over **2000 Argos-3/5** monitors delivered worldwide.

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Argos versions

Argos™ Standard Product Versions & Detector Configurations

			ARGOS-5	ARGOS-3	ARGOS-3 Compact
Gas Flow	**AB** LFP-579 Three Chamber Low Flow Proportional Detectors		25 × α/β Detectors	18 × α/β Detectors	15 × α/β Detectors Compact Footprint
Thin Plastic Scintillation (Gasless)	**PAB** TPS-579-PAB Gasless Thin Plastic Scintillation Detectors		25 × α/β Detectors	18 × α/β Detectors	15 × α/β Detectors Compact Footprint
	PB TPS-579-PB Gasless Thin Plastic Scintillation Detectors		25 × β Detectors	18 × β Detectors	15 × β Detectors Compact Footprint
	PBG TPS-579-PBG Gasless Thin Plastic Scintillation Detectors		25 × β/γ Detectors	18 × β/γ Detectors	15 × β/γ Detectors Compact Footprint

Additional detectors can easily be added to ARGOS-3 and ARGOS-3 Compact

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LFP & TPS Detector Technology

Low Flow Proportional (LFP) Detectors

- **α/β** monitoring with discrimination, best efficiency and Minimum Detectable Activity for the **shortest count times overall**
- Exceptional detection capability resulting from patented triple zone detector design
- A variety of gas mixtures can be used (P-5, P-7.5, P-10, Ar/CO2 etc.)
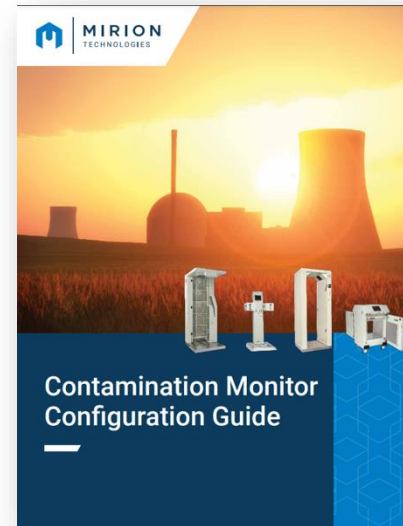- Uniform response across detector face

Thin Plastic Scintillation (TPS) Detectors

- Gas-free - no cost or worry associated with handling gas
- **α/β**, **β/γ** or **β** monitoring with discrimination
- Reduced count time even in high γ background environment compared to other gasless detectors.
- In addition: TPS-BG detectors feature unique **β/γ anti-coincidence** processing → outstanding β measurement performance in elevated gamma backgrounds

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Options

- **Moveable Head Detector**
- **ZEUS option** gamma detection capability
- **Gamma foot** or **gamma head detector** options
- **Small item monitors**
- **Automatic UVC disinfection**
- **Uninterruptible Power Supply**
- **Camera Option**
- **Casters/wheels**
- **Dosimetry Reader Integration for DMC3000**
- **Frisker probes**
- **Card/Barcode readers**
- **Beacon Tower**
- **Purge Detector**
- **CeMoSys™ Client License**

and many more… see our Contamination Monitor Configuration Guide

Special needs? Contact us!

Contamination Monitor Configuration Guide

Moveable Head Detector

Gamma Plastic Scintillator Detector

Zeus gamma detectors are mounted behind TPS detectors in an Argos-PB or Argos-PAB or behind LFP detectors in an Argos-3/-5AB.

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Argos-3PBG Modular

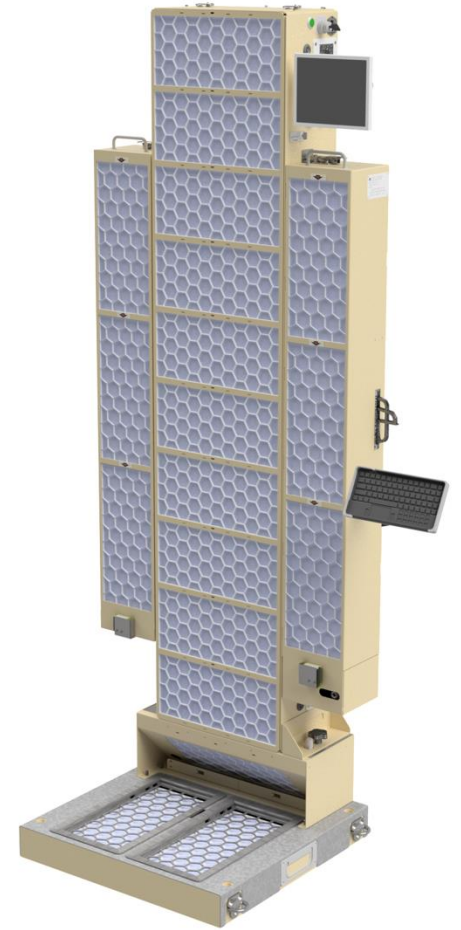## Application

Transportable body contamination monitoring with requirements for easy movability and quick assembly/disassembly into subcomponents.

Key Features

- All elements are transportable in separate transport cases

- Quick assembly/disassembly (~15 minutes)

- Based on 19x TPS-BG-579 detectors (+2 optional side of shoe detectors) with unique beta/gamma anti-coincidence processing Design also compatible with TPS-AB-579 or TPS-B-579.

- Uses comprehensive and well-proven Monitor Program software platform, including WebRemote® and Dashboard (identical to Argos™-3/-5, Sirius™-5, Cronos®-1/4/11 and GEM™-5)

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Argos-3 Compact

Application

(Mobile) Contamination monitor for locations with size constraints.

Key Features

- **Compact dimensions: ~30.8 x 86.0 x 33.3 in.³** (W x H x D)
- 15 detectors for coverage of body, head, legs, arms, hands & feets. Potential to **add detectors up to a total of 24** for improved body coverage.
- Various detector combinations possible:
  - Argos-3AB Compact with LFP-579 **alpha/beta gas-flow detectors**
  - Argos-3PB Compact with TPS-B-579 **beta plastic detectors**
  - Argos-3PAB Compact with TPS-AB-579 **alpha/beta plastic detectors**
  - Argos-3PBG Compact with TPB-BG-579 **beta/gamma plastic detectors**
- Can be equipped with casters for easy transportation
- Integrated 8.4" touch display
- Featuring the identical comprehensive monitor software platform used on other Argos-3/5, Sirius™-5, Cronos®-1/4/11 and GEM™-5 contamination monitors
- Based on Windows 10 IoT operating system

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Advanced Dosimetry Integration
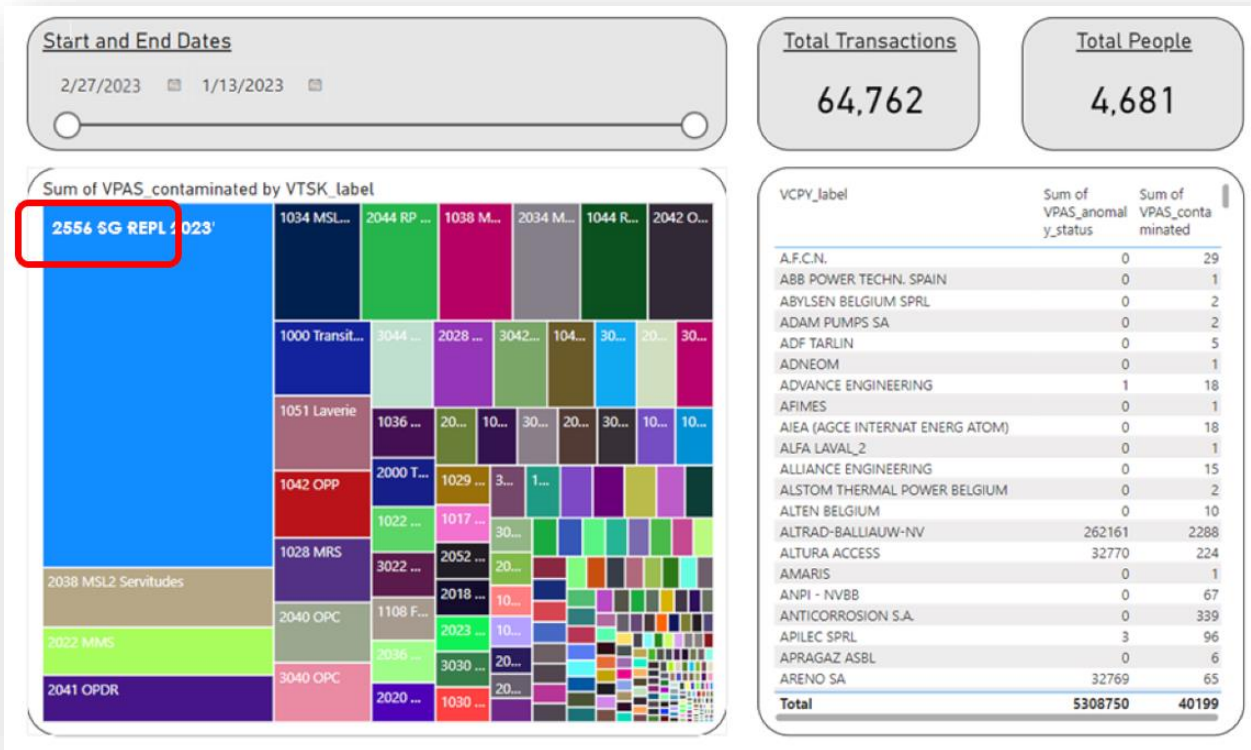

NEW

Mirion is proud to present a direct integration of LDM320 dosimeter reader for DMC3000 into Argos and Sirius contamination monitors

- **Proof** that individuals have been properly monitored for contamination

- **Save time** at exit of RCA (read-out & switch-off dosimeter in parallel to contamination monitoring)

- **Save space** (combination of dosimetry and contamination monitoring stations)

- **Identify potential sources/areas for contamination** (through analysis of job-code vs. contamination events)
  → **Understand & reduce contamination events**

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Advanced Dosimetry Integration

Key Features

- User ID is stored with contamination measurement result
- Result of contamination monitoring (contam/clean) available in DosiServ
→ Allows reports based on job-code and contamination events
- Management of sequences including configuration possibilities
- LDMAccess software for control of dosimeter reader is running on Argos embedded computer

Miscellaneous

- Advanced C&C-Dosimetry integration requires **DosiServ** dose management software
- Upgrade kits for Argos and Sirius are available

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- **Hand Foot Monitors**
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Sirius-5 Compact

NEW

Applications

Detection of radioactive contamination on hands, cuff and feet.
Suitable for confined locations. Easily movable.

Key Features

- **Compact Footprint**
  H × W × D: approx. 1465 mm × 640 mm × 844 mm (57.7" × 25.2" × 33.2")

- **Excellent radiological measurement performance** with various detector combinations possible:
  - Sirius-5AB Compact with LFP-579 **alpha/beta gas-flow detectors**
  - Sirius-5PB Compact with TPS-B-579 **beta plastic scintillation detectors**
  - Sirius-5PAB Compact with TPS-AB-579 **alpha/beta plastic scintillation detectors**
  - Sirius-5PBG Compact with TPB-BG-579 **beta/gamma plastic scintillation detectors**

- **Integrated casters and handle** for easy transport

- Uses **comprehensive** and **well-proven Monitor Program software platform,** including **WebRemote®** and **Dashboard** (identical to Argos™-3/-5, Sirius™-5, Cronos®-1/4/11 and GEM™-5)

- Based on Windows® 10 IoT LTSC operating system

- Designed for **365/24/7 operation for high uptime** and **minimum maintenance** with several common spare parts shared with Argos™-3/5, Sirius™-5, Cronos®-1/4/11 and GEM™-5 contamination monitors.

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Options

- **Alpha/Beta Frisker** 100 cm² alpha/beta frisker probe

- **Uninterruptible Power Supply** Li-ion UPS for ~30 minutes autonomous operation

- **Dosimetry Reader Integration for DMC3000**

- **Beacon/Light Tower**

- **Purge Detector**

- **Gas Pressure Monitor**

- **Barcode Card Reader**

- **Magnetic Card Reader**

- **Proximity Card Reader**

- **CeMoSys™ Client License** for interfacing with CeMoSys™ Central Monitoring System.

and many more… contact us!

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GEM-5

Applications

Gamma contamination monitoring in nuclear facilities, such as nuclear power plants, laboratories, radiopharma production, etc. Passive monitoring for internal contamination.

Key Features

- Bi-directional operation: Walkthrough, Wait-in and two step.
- 8 large volume gamma plastic scintillation (side, top and bottom)
- Opening widths of 61 cm (24 in.), 80 cm (31.5 in.), 93 cm (36.6 in.), and 100 cm (39.4 in.)
- Comprehensive lead-shielding options available
- Based on the identical comprehensive monitor software platform used on Argos-3/5, Sirius-5 and Cronos®-1/4/11 contamination monitors
- Similar spare parts as Argos-3/5, Cronos®-1/4/11 and GEM™-5 contamination monitors

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MiniSentry 2

Application

Screening of pedestrians or vehicles for gamma emitting radiation in **emergency scenarios** or for **security applications**

Key Features

- **Quick and Easy Setup and Operation**
  - Weight: <43kg / 95 lb
  - Rapid deployment and set-up: Single person 5 Minutes
  - Automatic start-up and operation / Very little training needed
- **Flexible Solution**
  - In- and outdoor operation (IP54, -25°C to +50°C / -13°F – 122°F)
  - Powered by battery (up to >65 hours autonomy[1]), USB or 110 / 240V
  - Connection of CSP probes possible (e.g. for SAB-100 or SN-S)
  - Options: vehicle monitoring kit, extended passage width, etc.
- **State-of-the-art Radiological Performance**
  - Detection: 1 µCi ^{137}Cs-137 in walk-through mode
  - High sensitivity plastic scintillation detectors with 10.6 litres active volume
  - Wide nergy range: 30keV – 2 MeV
  - Compliant with FEMA-REP-21 from US Federal Emergency Management Agency and IEC 62244

[1] with optional battery extension module

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Tool & Object Monitors

Cronos® Family

- **Cronos-1** Gamma Object/Tool Monitor
  - 43 L (1.5 cu. ft.) internal volume
- **Cronos-1PBG** Beta /Gamma Object/Tool Monitor
  - 42 L (1.4 cu. ft.) internal volume
- **Cronos-4**, Gamma Object/Tool Monitor
  - 129 L (4.5 cu. ft.) internal volume
- **Cronos-11**, Gamma Object/Tool Monitor
  - 345 L (12 cu. ft.) internal volume

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Cronos Family and Options

Key Features

- 6x large volume gamma plastic scintillation detector (Cronos-1/-4/-11)

- 25mm or 50mm epoxy-coated lead shielding

- 2 doors (for single of dual side operation)

- Weight scale for activity/mass measurements* and mass attenuation correction

- Heavy duty casters, fork lift channels

- Calibration fixture

- Large full color LCD display and annunciator lights

- Digitized voice prompts and visual prompts on the LCD display

- **NEW** Camera option for picture and object detection

- Based on the identical comprehensive monitor software platform used on
  Argos-3/5, Sirius-5 and GEM™-5, including management of nuclide vectors, weight-specific activity limits, etc.

- Similar spare parts as Argos-3/5, Sirius-5 and GEM™-5 contamination monitors

* Optional for Cronos-1

Large Item Monitors

NEW

RTM662-460C
Volume: 460 liters / 16.2 cu. ft.

- Measurement of 200l drums
- 6 gamma plastic detectors
- Automatic Conveyor system

RTM662-460
Volume: 460 liters / 16.2 cu. ft.

- Measurement of, large objects, tools, bags
- Innovative Smart Technology, with gamma spectrometry based on plastic scintillators
- Improved "Leading Nuclide Correlation" for easy handling of complex nuclide vectors

NEW

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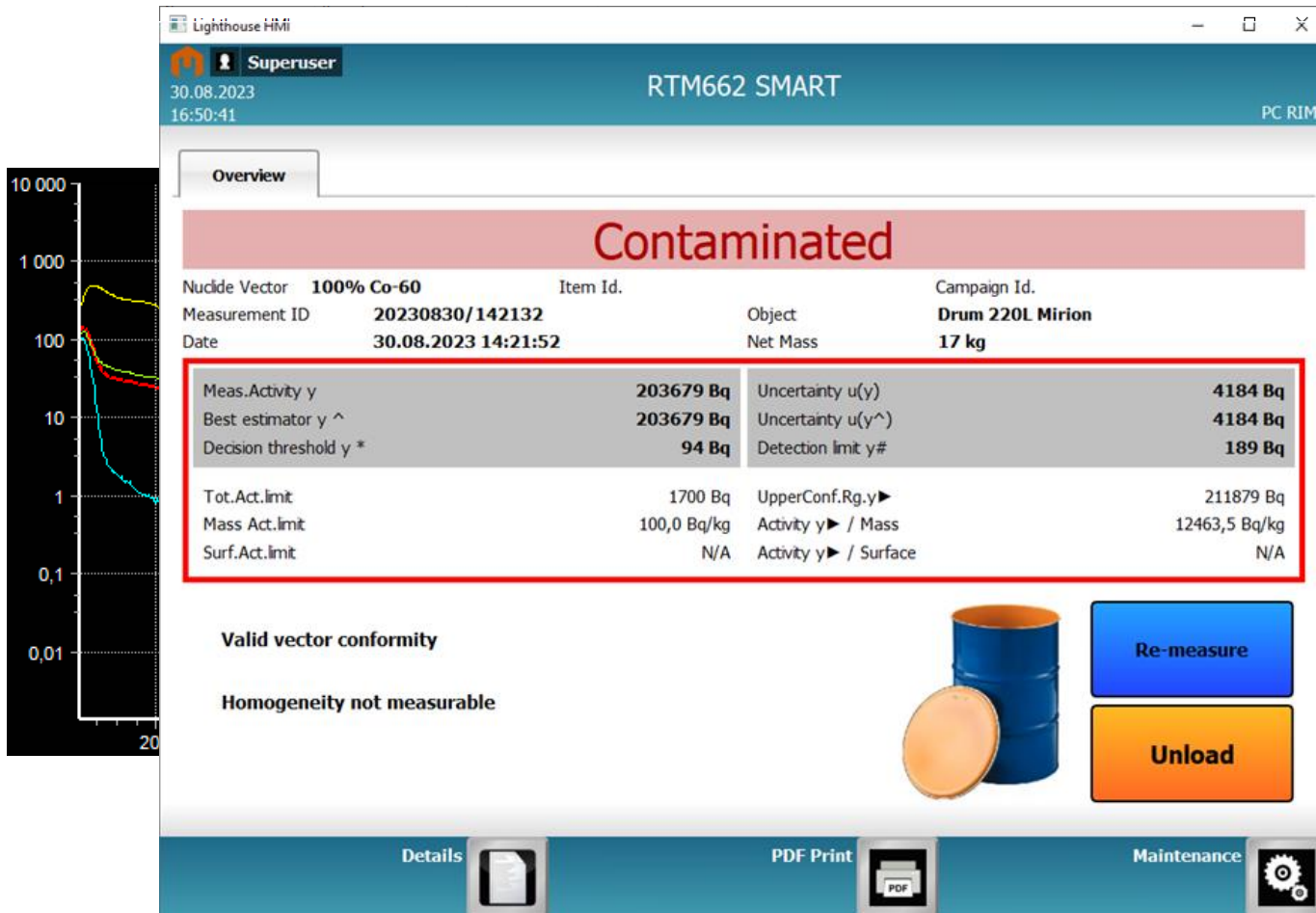**Engage. Explore. Empower.**

RTM644-Smart™

Volume: 1870l / 66 cu. ft.

- Measurement of crates, boxes, drums and other large objects
- 24 large volume gamma plastic detectors with spectroscopic read-out
- Improved "Leading Nuclide Correlation"
- High throughput: 16 tons per hour
- High precision: <34 Bq (Co-60 in 180s)
- Many options: Integration in container, cameras, analysis software, etc.

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Smart Technology

Technology Principles

- **Spectroscopy with plastic scintillation detectors:**
  - **Automatic Nuclide Vector analysis and validation**
  - Improved compensation of **NORM** and **background**
  - Improved **Energy correction of LNC-factors**
  - **Efficient quality assurance** (response check)
- **"Smart" background variation suppression** and quick background change recovery
- Quick decision algorithm
- Comprehensive monitor software features based on state-of-the-art Lighthouse Software

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Conveyor Monitors

RTM750

- Measurement of laundry, small items and scaffolds

- 2 detector trays (below and above belt)

- Height of upper detector tray adjustable

- Automatic speed control

- Various detector types/combinations available: beta gas-flow, beta plastic, gamma plastic

- Optional transverse sorting conveyor

- Optional configuration **for scaffolding and heavier items**

- Based on Lighthouse software and Windows 10 IoT operating system

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FastTrack-Vehicle™

Application

Screening of vehicle, cars, trucks, trains, bicycles and/or pedestrians for gamma emitting radiation

Key Features

- Available in two versions:
  - **FastTrack-Vehicle XL:** 6x GammaFibre™ detectors per monitor cabinet with 8 litres active volume each (total active volume: **96l**)
  - **FastTrack-Vehicle:** 3x GammaFibre detector per cabinet
- Advanced FastTrack algorithm to avoid false alarms **well-proven in millions of real-life measurements**
- High sensitivity: 40kBq (Co-60, FTV XL)
- Constant performance up to 20 km/h
- Neutron detector (optional)
- Web server interface for remote services
- Source localization within vehicle
- Mirion Lighthouse user software based on Windows 10 IoT operating system
- Many options and accessories available

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WebRemote®

Application

- WebRemote® allows to connect to a specific Argos/Sirius/Cronos/GEM monitor in order to access all functionalities of the Monitor Software (measurement re~~...~~
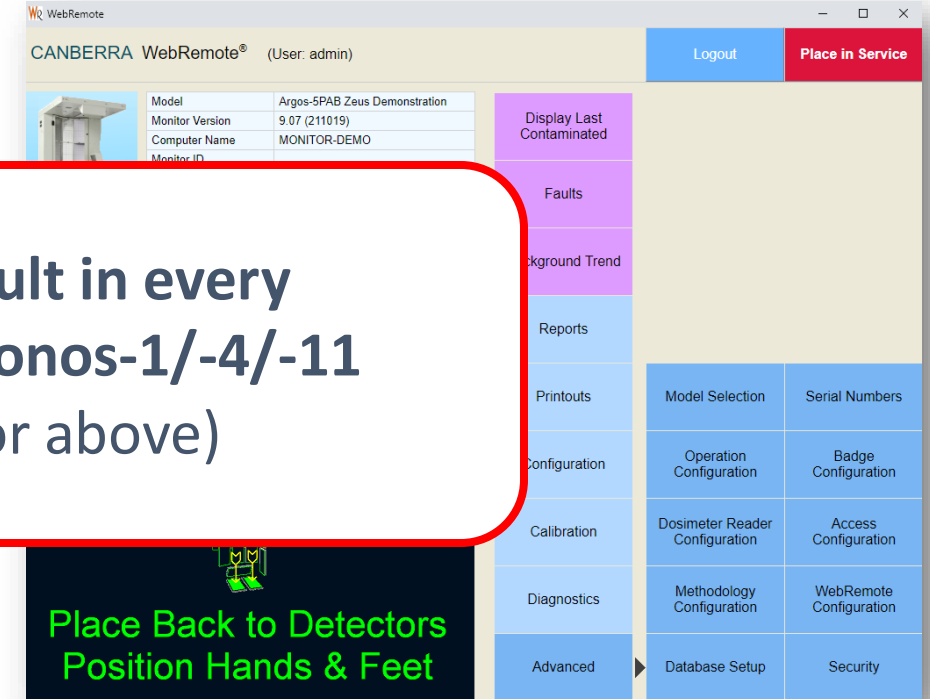- Available for rem~~...~~

Intuitive

- Find your setting~~...~~
- See the main me~~...~~

Modern and clean design

- Large buttons
- Easy selection of detector on the monitor layout
- Touch-screen friendly

WebRemote is included by default in every Argos-3/-5, Sirius-5, GEM-5 and Cronos-1/-4/-11 (with Monitor Software 9.00 or above)
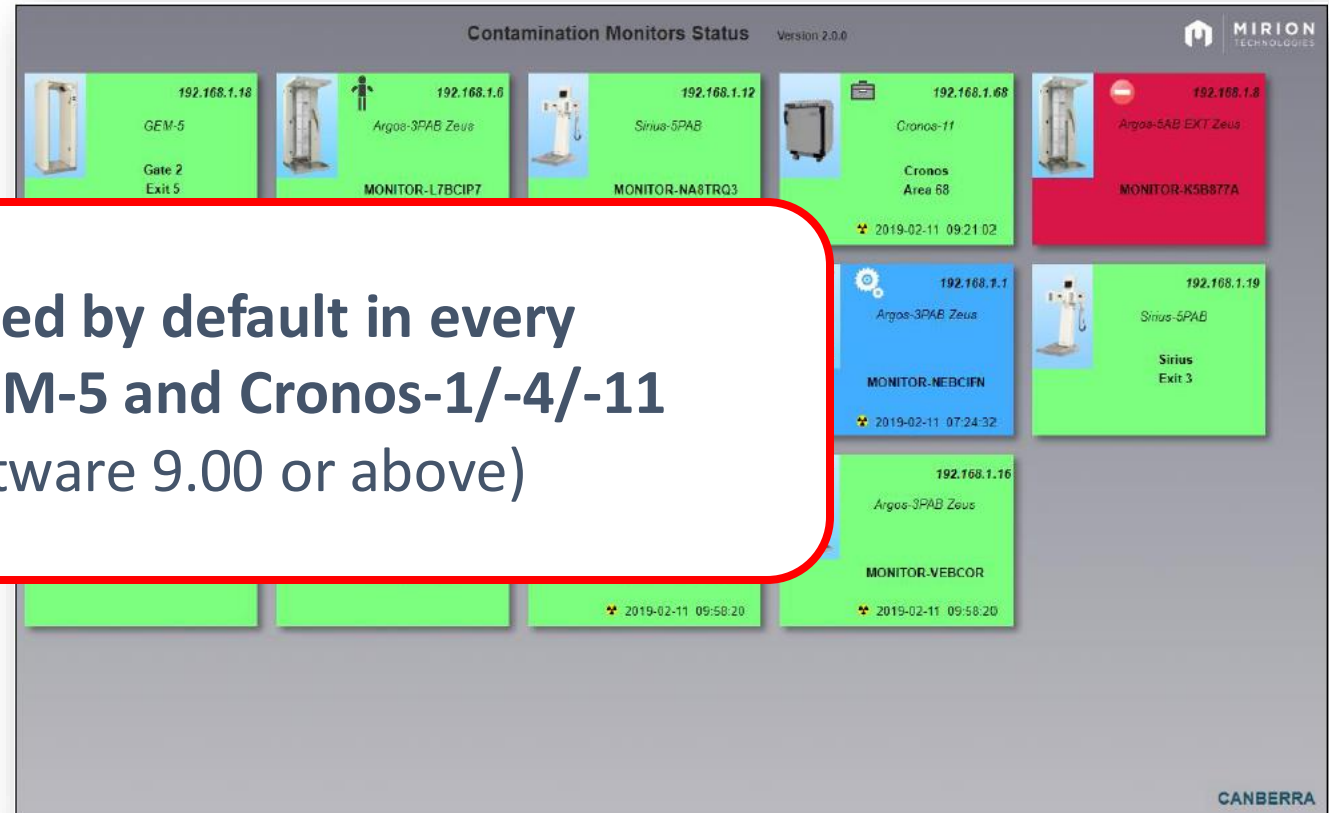
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Dashboard

Contamination Monitor Status Overview

- Dashboard provides a simple overview of your contamination monitors' status

- Easy drill [obscured] details

- Ability to [obscured] interface

- No centr[obscured] (one cont[obscured]

Dashboard is included by default in every Argos-3/-5, Sirius-5, GEM-5 and Cronos-1/-4/-11
(with Monitor Software 9.00 or above)

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CeMoSys™ 2.0

Argos-3/5

Sirius-5 (Compact)

TOM

Cronos-1/4/11

TwoStep™-Exit II⁺

CeMoSys™

HandFoot-Fibre™

RTM644lnc

FastTrack-Fibre™

FastTrack-Vehicle™ XL

GEM-5

RTM750

> CeMoSys is the Central Monitoring and Supervisory System for all Mirion Contamination & Clearance Monitors

and many more...

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CeMoSys™ 2.0

Application

Centralized supervisory, data analysis and reporting for contamination monitors

Key Features

- Central database for all Mirion contamination monitors:
  - Multi-layer status overview dashboard
  - Detailed state-of-health data
  - Measurement results
- Comprehensive analysis & export functionalities
- Remote access per web-browser
- Support for (almost) all C&C products: **Argos-3/5, Sirius-5, GEM-5 and Cronos**, TSE, HFF, FTF, TOM, RTM6xx, RTM750, FTV (XL), RTM91x, RTM662-36/300

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Thank you

Dr. Tobias Baer

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Contamination & Clearance

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