



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

MC24 – Breakout Session

Dosimetry

BLEUSE Olivier

Dosimetry & Telemetry – Product Line Manager

Mirion Connect | Annual Users' Conference 2024

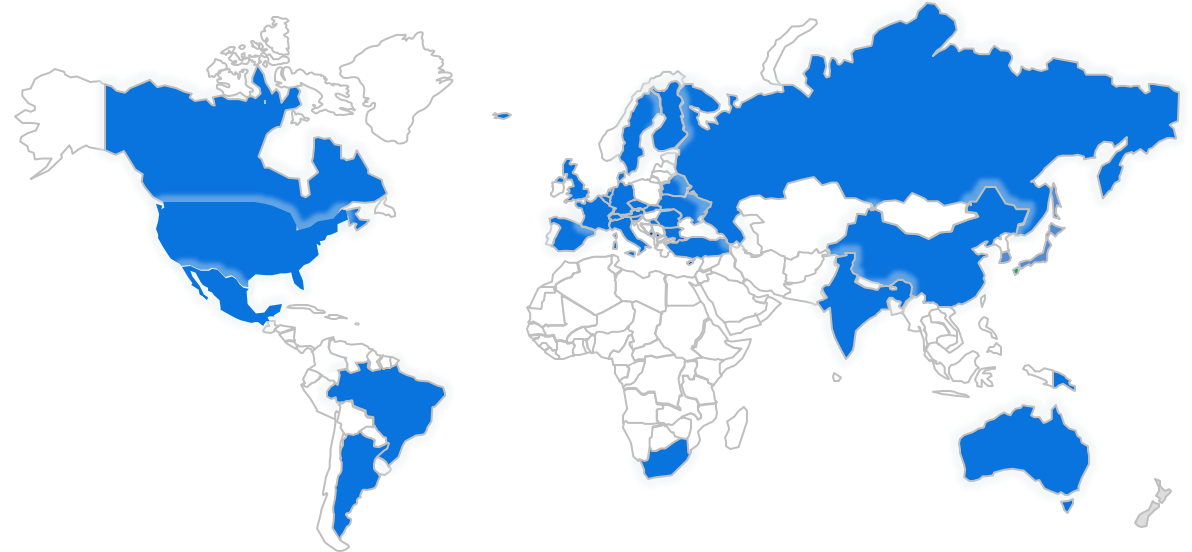
Dallas, Texas

Agenda

- **DMC 3000 & The Modular Approach**
- **G2 Protocol & Upgrade to G3**
- **DMC 3000 & Modules**
- **Measurement Modules / Telemetry Modules**
- **DMC 3000 Bluetooth & Connected Ecosystem**
- **C&C - Dosimetry Integration**
- **DosiServ Convergence Project**
- **Updates & News on The Dosimetry Line**

Mirion Technologie : Dosimetry Solution Provider since 1980

- **1 Million** of DMC **civils & military in service**
- Dosimeter Design **for Everyone & all Purposes**
- Used in more of **70% of Reactors** W/W
- **Full & Complete** Ecosystem
- **Robust, Recognized & Qualified** with Market Standard (IEC & Other)



Electronic Dosimetry Development Timeline

DM-20

DM-60

DMC-90

DMC-100

DMC-2000S

DMC-2000GN

SOR/RF

DMC-3000



Commercial version derived from NATO SOR



- Enhanced detector for wider energy range
- Vibration
- Enhanced EMI immunity
- Larger display
- Brighter LED
- Modular

- Gamma & Neutron version

- Enhanced EMI immunity

1980 1982 1988 1993 1996 1998 2002 2004 2010 2013 to present.....

SOR/R

SOR/T

DMC-2000X

DMC-2000XB

Telemetry Module

Beta Module

Neutron Module

Neutron Tx Module

Location Tx Module

BLE Module



- NATO ambient & tactical
- Surface mounted board components

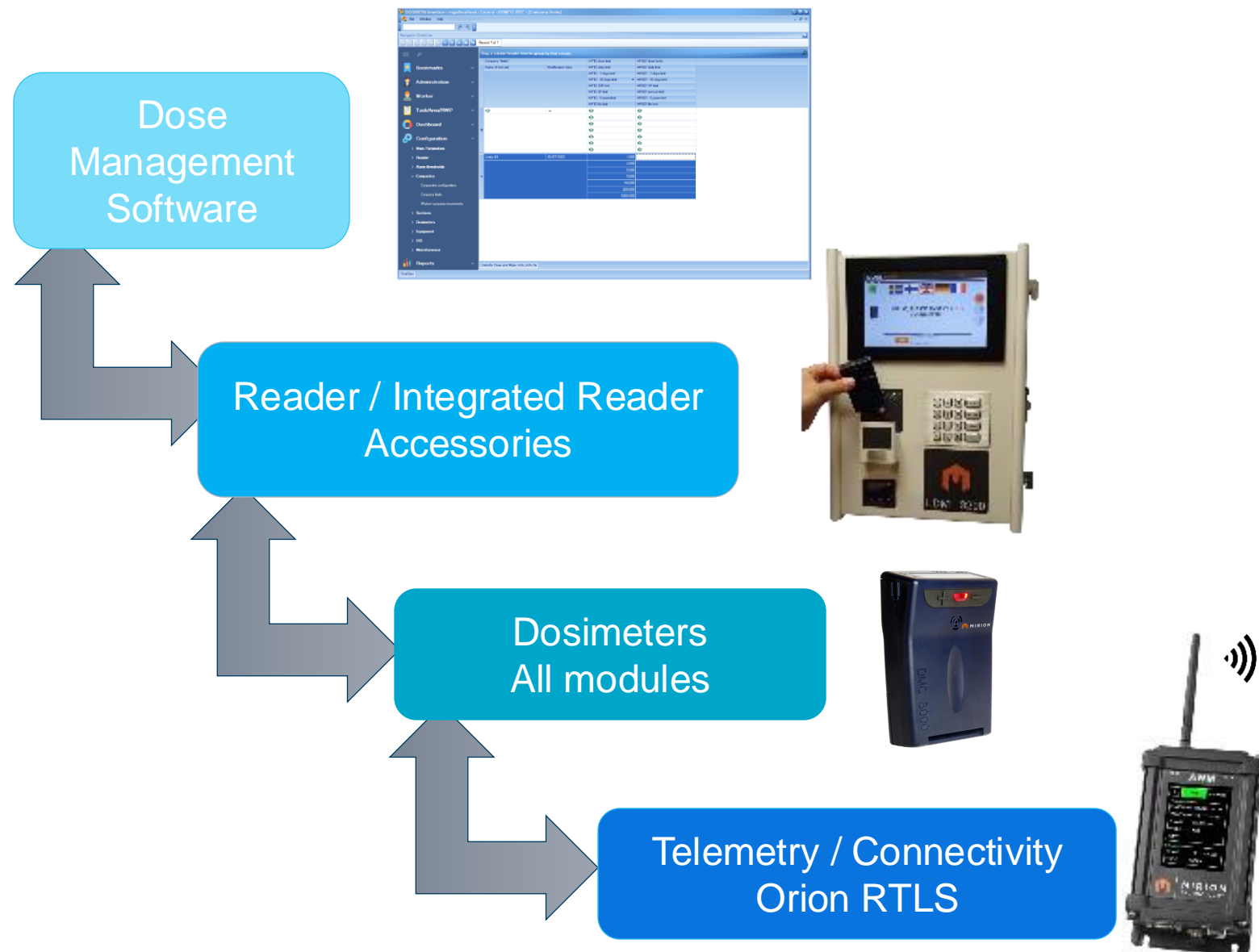
- X-Ray and Beta versions

- WRM2 Remote monitoring system

- Smart modules
- Interchangeable

Mirion Electronic Dosimetry

An Integrated Solution



Electronic Dosimetry Product Line



Highlight: DMC 3000 More than 350 k units sold

- **Ruggedness and Durability**
- **Loud audible, ultrabright visual and tactile vibration alarms**
- **Best in class metrological performance**
- **Best in class battery life**
(12 calendar months with standard COTS AAA battery)
- **Highly visible backlit display**
- **IP67 waterproof & easily decontaminated**
- **Excellent EMI immunity**
- **Modular Design**
- **Complete Ecosystem**
- **TTRs available & done by third party lab**

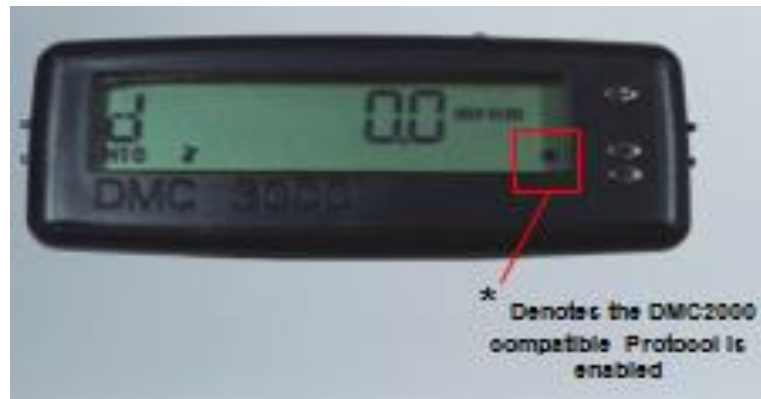
DMC 3000

- One DMC 3000 dosimeter for the several uses
- Extend measures & connectivity
- Easy Plug and Play
- Be prepared for the future ...



G2 Protocol:

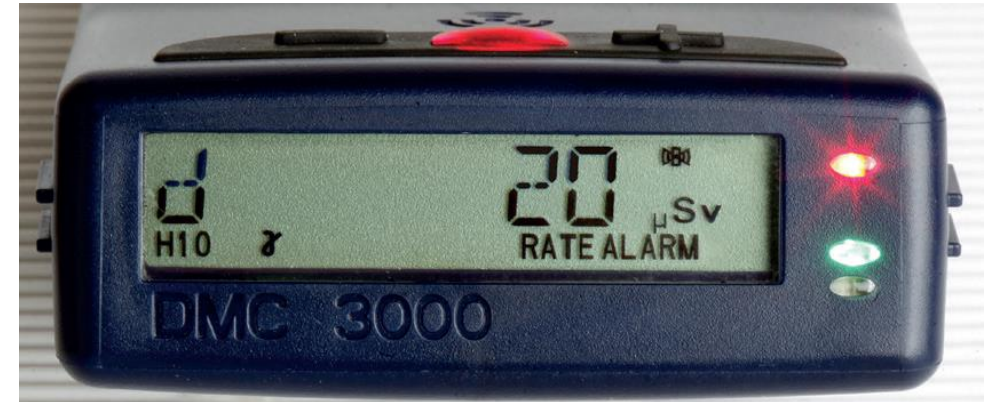
- Minimize the impact of change for existing installations
- Introduce the new Dosimeter without a new qualification of the existing installation (software and hardware qualifications)
- DMC 3000 with G2 Protocol:
- Most standard functions identical to DMC 2000
- Backwards Compatible with existing reader
- Generally compatible with older software
- Fully compatible with:
 - Sentinel
 - His-20
 - DosiServ



DMC 3000: Why to upgrade to G3

G3 Protocol:

- **Native DMC3000 Protocol**
- More features:
 - **Compatible** with all modules
 - Enhanced dosimeter **self check**
 - Enhanced secured **communication protocol CRC 32bits**
 - **Additional features** Histogram (dose/dose rate; raw pulse; auto adaptive; etc..)
 - More **display options** (customizable)
 - More **options** (calibration factor, configurations, data resolution, data stored, speaker self test, speaker volume option, etc..)



DMC 3000: Why to upgrade to G3

			Dose	Rate
95	13:18:55	Measure	22.2	14.9
94	13:19:50	Measure		
93	13:19:55	Measure	22.6	41.9
91	13:20:11	Measures after rate alarm	23	67.5
90	13:20:12	Measures after rate alarm	23	67.5
89	13:20:13	Measures after rate alarm	23	67.5
88	13:20:14	Measures after rate alarm	23	67.5
87	13:20:15	Measures after rate alarm	23.1	108.6
92	13:20:16	Event	Primary rate alarm	
86	13:20:16	Measures after rate alarm	23.1	108.6
80	13:20:16	Measure		
85	13:20:17	Measures after rate alarm	23.1	108.6
84	13:20:18	Measures after rate alarm	23.1	108.6
83	13:20:19	Measures after rate alarm	23.1	108.6
82	13:20:20	Measures after rate alarm	23.1	108.6
81	13:20:24	Event	Primary rate alarm end	
79	13:20:55	Measure	23.3	21.8
78	13:21:40	Measure		
77	13:21:55	Measure	23.6	24.7

DMC 3000: How to upgrade to G3



DMC 3000 Tx



DMC 3000 B



DMC 3000 N



DMC 3000 Ntx



DMC 3000 eTx



DMC 3000 LTx



DMC 3000 BLE

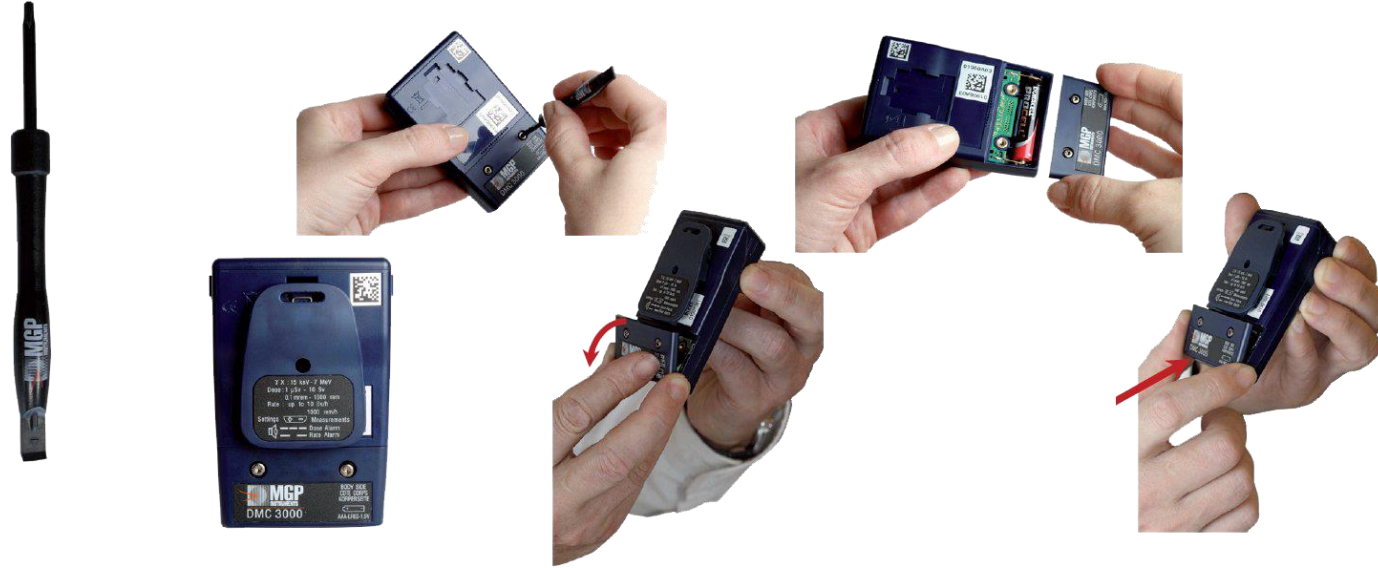
Evolution to G3 Protocol (FW: V7.8.6)

Upgrade
Kit Tool



- Self Service
(Weekly rental base – 50 DMC/hour)
- Mirion On-Site Update
- Mirion Factory Return

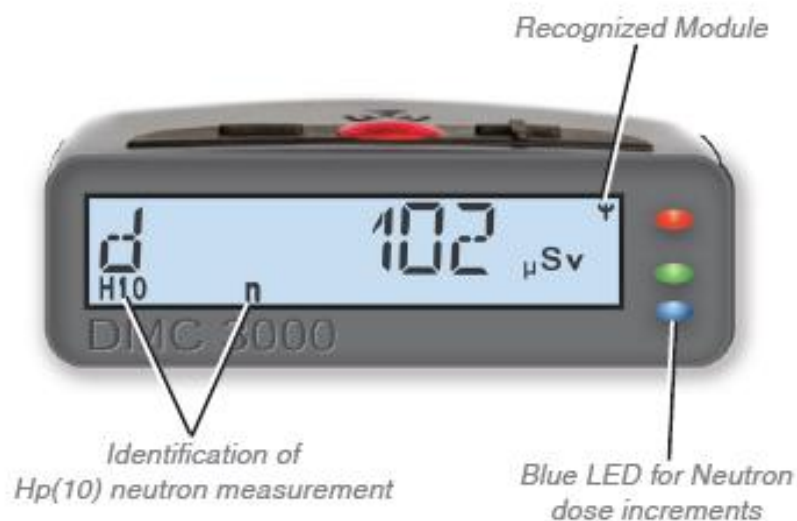
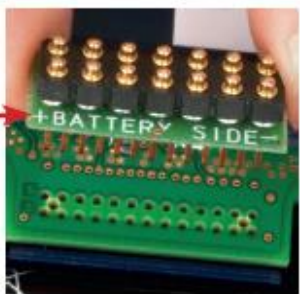
DMC 3000: How to add/remove a module



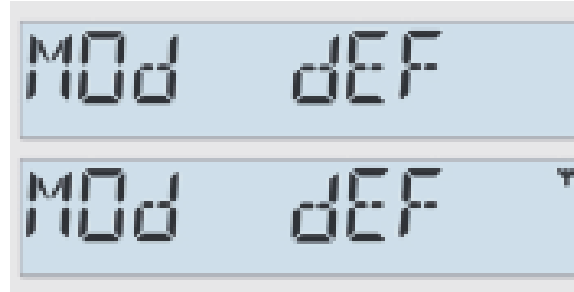
Connector



DMC 3000: How to add/remove a module



DMC 3000: How to add/remove a module



- Faulty/removed Module

- Wrong Module connected

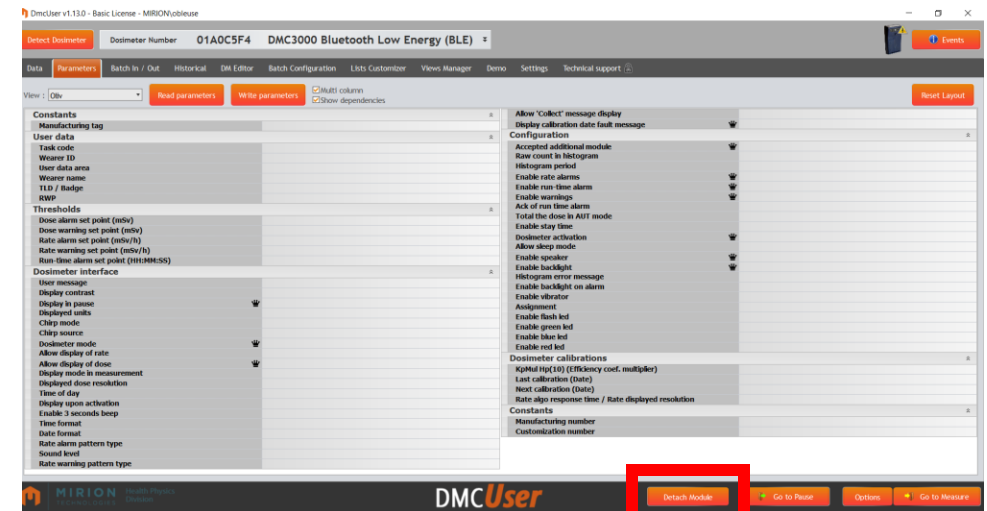
DMC 3000:

How to remove a module and clear the mod Def ?

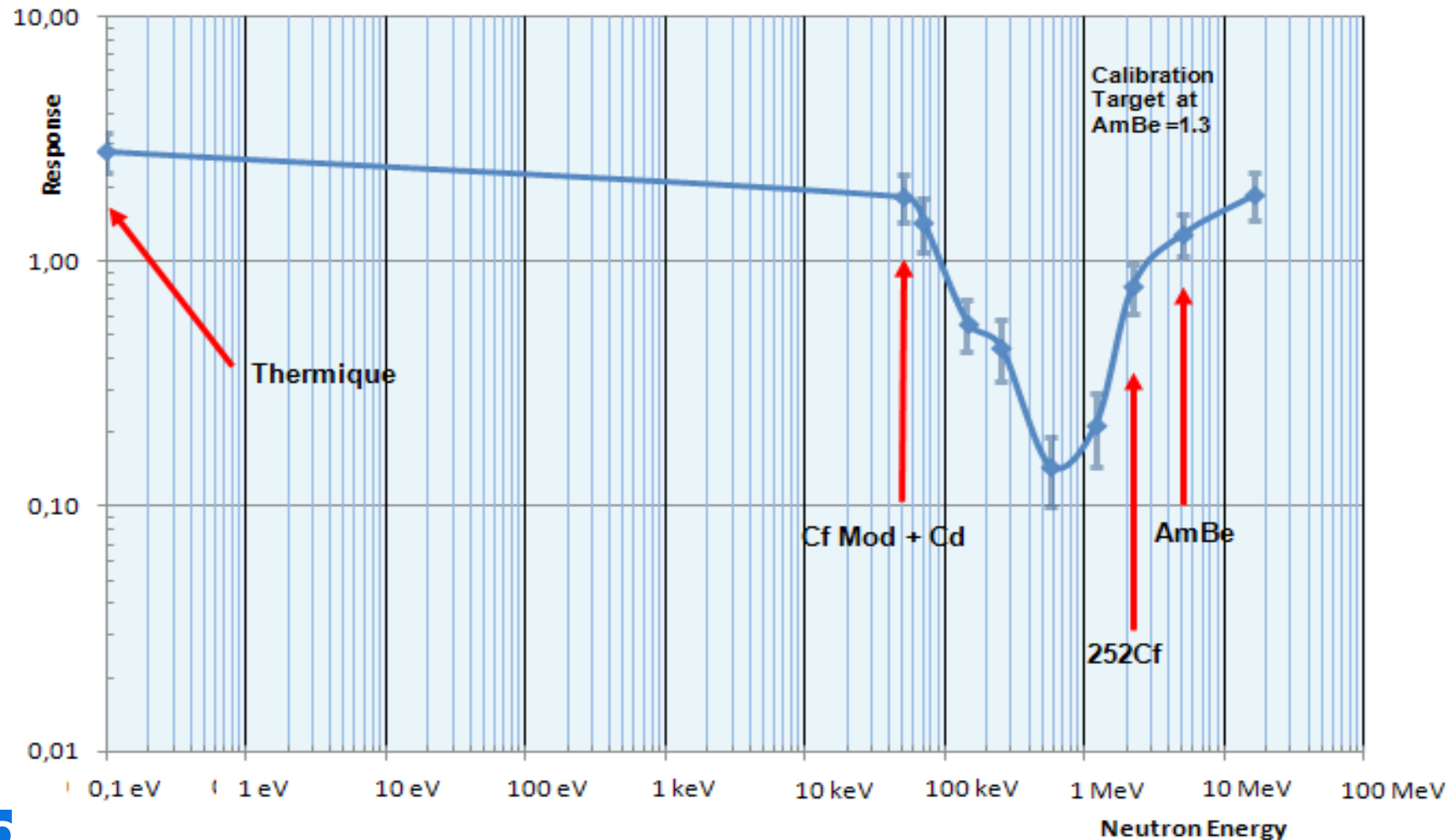


- Remove /Replace the battery to clear the MOD_DEF

- Or detach the module by DMCUser



DMC 3000 Neutron module



DMC 3000 Telemetry module



- WRM compatibility
 - WRM2 / WRM3
 - Provides real-time readouts and statuses of transmitter
 - Enables a supervisor outside a radiation work area to be instantly alerted to alarm conditions happening inside.
 - Compact and rugged equipment for indoor or outdoor applications.
 - Roughly 6000ft Line-of-Sight range, extendable with the use of MESH Repeaters
- AAA Battery
- Autonomy ~ 30 hours + 8 hours guaranty
- IP 67, Ruggedness and Durability, Excellent EMC Immunity



DMC 3000 Telemetry module

- Orion RTLS utilizes the established technology of the DMC 3000 dosimeter, fitted with a DMC 3000 Telemetry module
- The LTx module provides real-time **information** and visualization of the location of the dosimeter
- LTx module features
 - Ultra Wideband (UWB) technology
 - **WRM2/3** for real-time **information**
 - Communication for radiological protection
 - Powered in real-time (module features a battery)

Breakout Session Dedicated

Today – Orion RTLS

4:00 – 5:00

Demo Room

Thursday - Telemetry

11:30 – 12:30

Dallas A



DMC 3000 Bluetooth & Connected Ecosystem



An additional DMC 3000 Bluetooth® module what for ?



“Enhance your **safety**
with connectivity”

New Bluetooth® Module

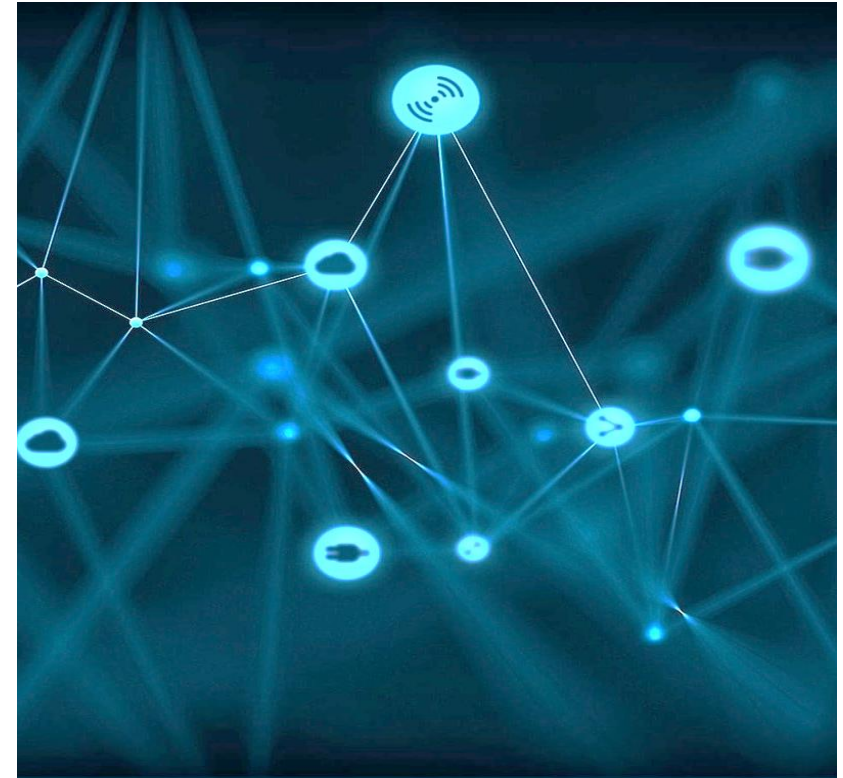
What is connectivity ? Whats is the value proposition for RP ?

Connectivity:

- ability to connect systems or application program
- do not require many changes to the application or the systems they run on
- helping to **reduce worker exposures**
- telemetry is reducing **around 20% dose exposure**

Connecting workers offers a more sophisticated system to ensure safety

- Autonomous monitoring
- Supervised monitoring
- Get the data you need
- Receive instant update
- Increase reaction
- Reduce the risk



Enhance dosimeter alarm for challenging environment

Increase the alert

- Visualize the alert
- Transmit the alert

Have ease of use

- To have correct form factor
- To be used on daily tasks & integrated on current procedures

Ensure the dosimeter is being **worn**

DMC 3000 BLE & Connected Ecosystem

"Enhance your **safety** with connectivity"



**New Bluetooth
module**

+



Mirion Watch
additional remote alarm

+



ConnectStudio
Connectivity
Management

DMC 3000 BLE: Form Factor



Battery Cover

Maintains DMC 3000 current form factor

- Designed for an easy pairing
- Compatible with all DMC 3000*
- A simple extended battery cover



Back View



Inside View



Bluetooth
Battery Cover
Module

DMC 3000 Bluetooth® Module, How Does it Look Like ?

Perform a quick & easy pairing operations with dosimeter and connected devices

What's pairing ?

Association between the dosimeter and one peripheral to initiate communication

What's NFC ?

NFC: Near Field Contact
Very shortrange communication



Each Mirion device is able to **exchange data** through NFC, which permits the exchange of the necessary information to perform devices association

Mirion Watch: Reinforce Dosimetry Alarm for Challenging



VIBRATION

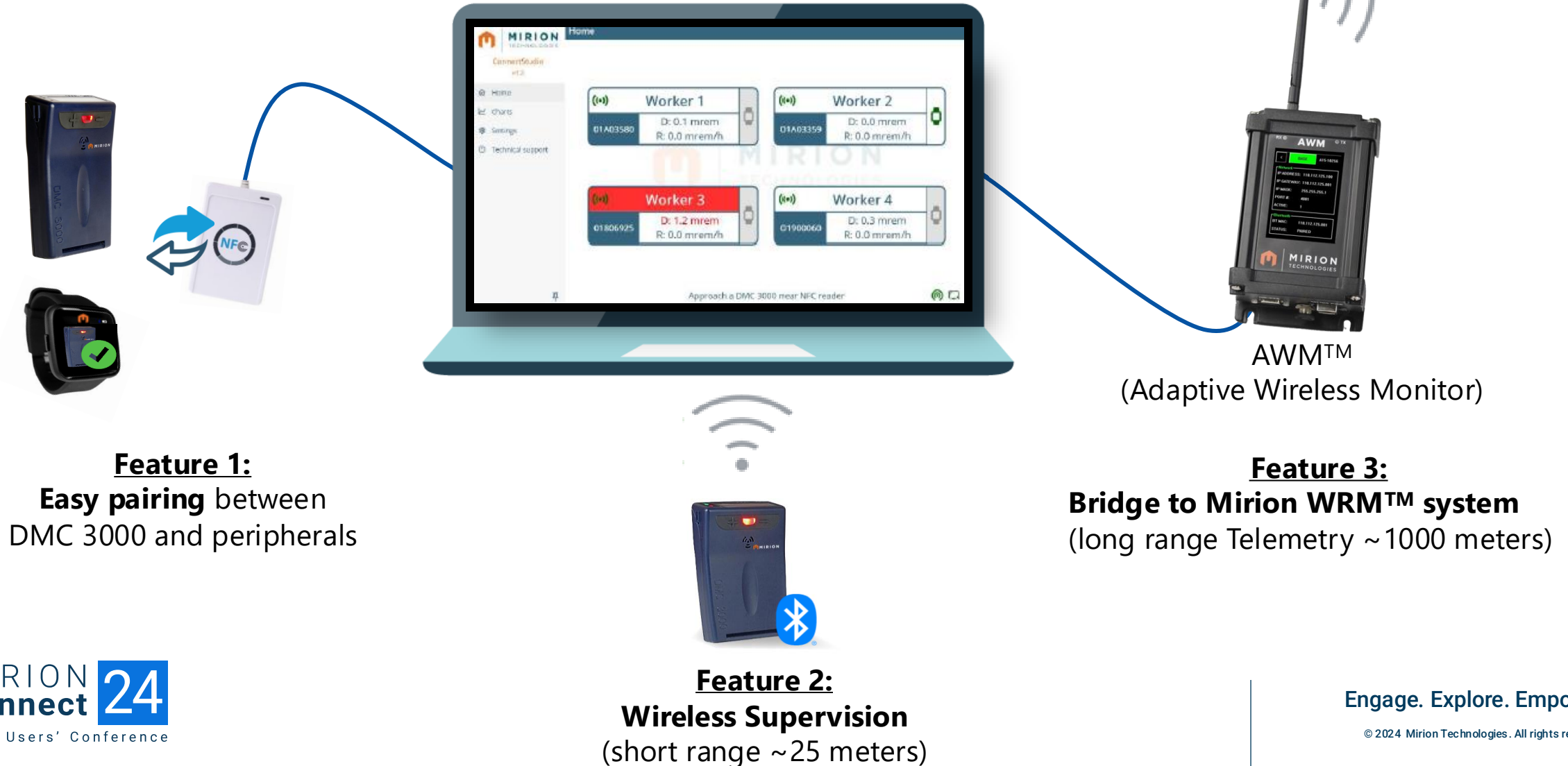
Advantages:

- **Easy pairing & Easy to use**
- **Vibrating device** in case of alarm
- Display information on alarm type



ConnectStudio & Connected Ecosystem

ConnectStudio



Mirion Watch: Reinforce Dosimetry Alarm for Challenging

Controlled area



LDM 3200™ NFC
Dosimetry Reader



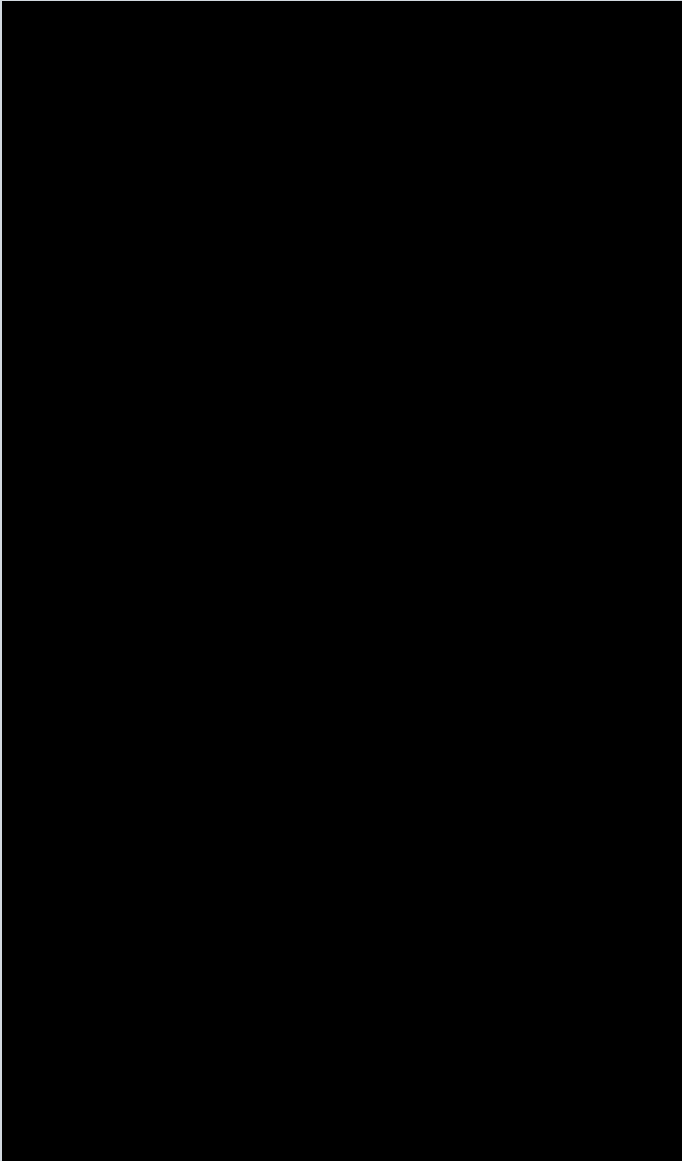
VIBRATION

Designed to enhance safety for any tasks
(Time alarm / Dose Alarm / Dose Rate Alarm)
Easy decontamination

**Vibration & Display Alarm
Reinforcement for Challenging
Environment**



Mirion Watch Association at RCA entry

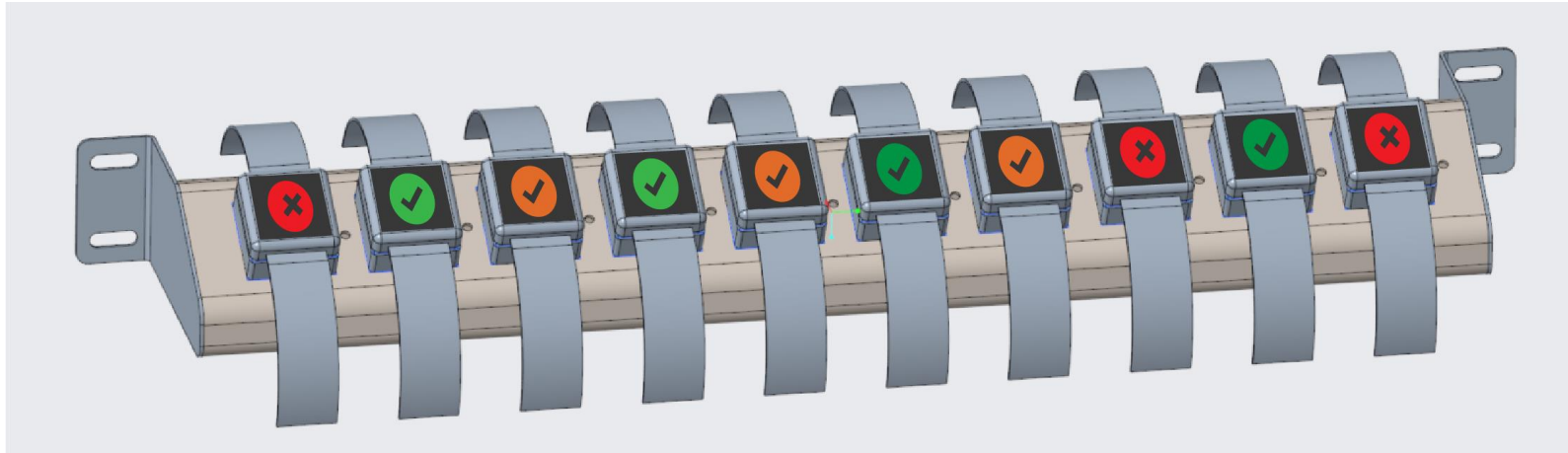


LDM 3200 NFC updated
for **an easy use on daily task**

- Quick & Easy Pairing
- Quick & Easy Unpairing

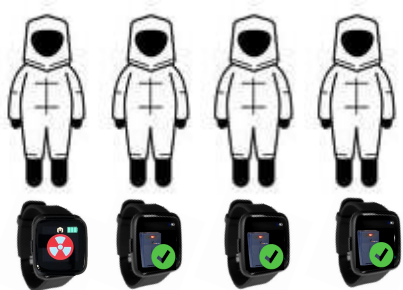
MirionWatch association at RCA entry: Charging Rack solution

- Available solution for charging Mirion Watch (10 units)
- Visible at a glance of Mirion Watch battery status when on rack
- 8 hours of use guaranteed by color displayed ( or )



Local supervision in RCA by team leader for special operation

Controlled area



Local supervision by team leader

Pairing on site
By simple touch, visualization
of ongoing worker exposure

Enhanced safety with
local feedback

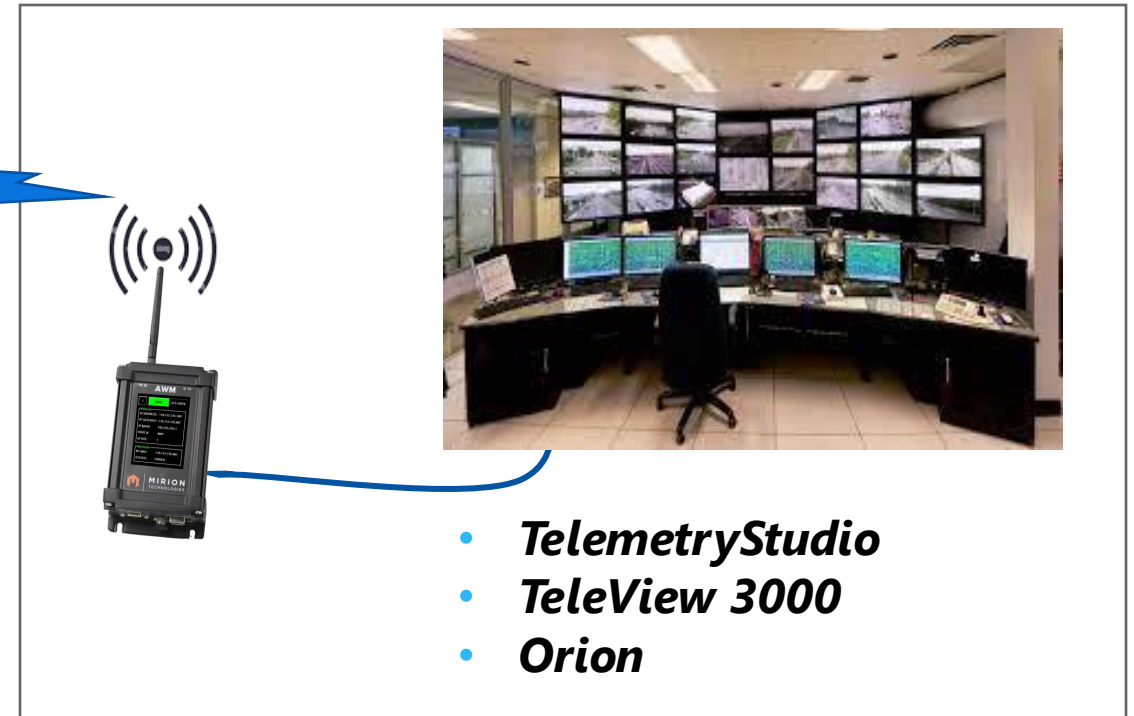
Local & Long Range Wireless Supervision (Bluetooth and WRM Network)

Local Telemetry by Bluetooth®



- **ConnectStudio** as a bridge to WRM Network
- Control room has access to local supervision data
- Leverage your existing Telemetry System

Long Range Telemetry by WRM™ Network

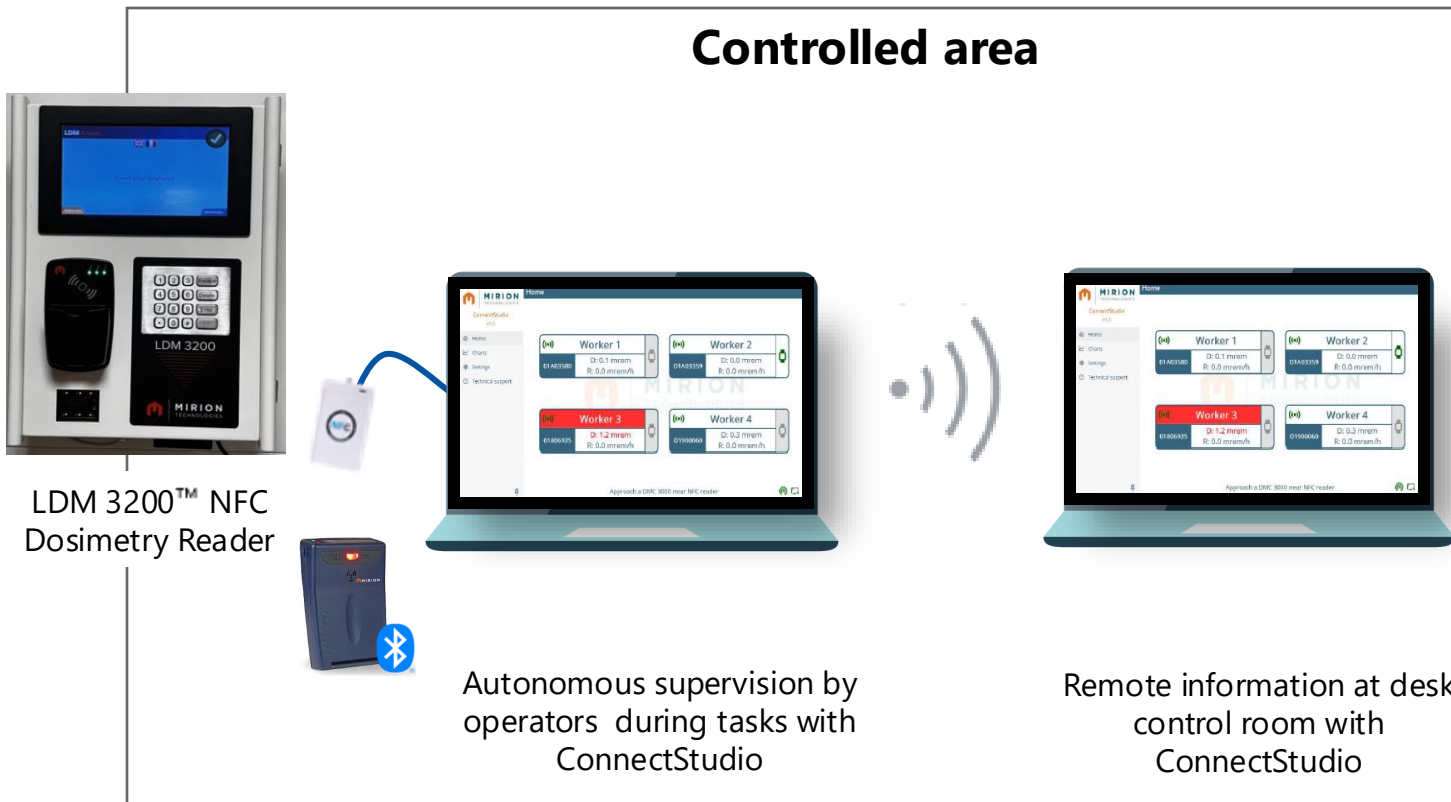


Control Room Supervision

Nuclear Glove Box & Wireless supervision

Single & Dual monitoring solution

Controlled area



**Pairing on site by simple touch,
Visualization of paired worker
exposure simultaneous with
wearer & team leader**

Enhanced local feedback

With Mirion Watch, Never Forget your Dosimeter in RCA



Range
~ 25 meters



VIBRATION

Mirion Watch Wearer is warned in case of lost contact with dosimeter
(Automatic reconnexion)



**Vibration & Display
Alarm for forgotten
dosimeter**

DMC 3000 Bluetooth & Connected Ecosystem

Long Range Telemetry

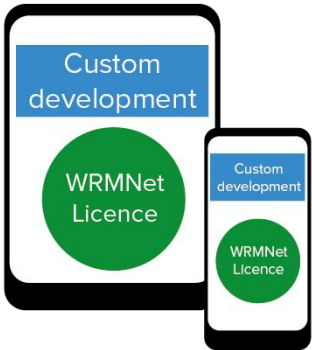
Mirion WRM System



900 MHz (US market)
2,4 GHz (EU market)
WIFI / WIRED communication

Short Range Telemetry

ConnectStudio



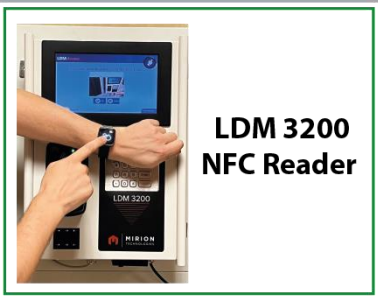
Mobility

DMC 3000 Bluetooth®



Bluetooth Module

Dosimeter Alarm Reinforcement



LDM 3200
NFC Reader



Mirion Watch

Connected Alarm
Report Wristband

- Mirion Product
 - Mirion Upgrade
 - Mirion based provided, ready for customization
 - Wired link
 - - - Local Network
- Engage. Explore. Empower.

DMC 3000 BLE & Ecosystem

DMC & MirionWatch Automatic Pairing



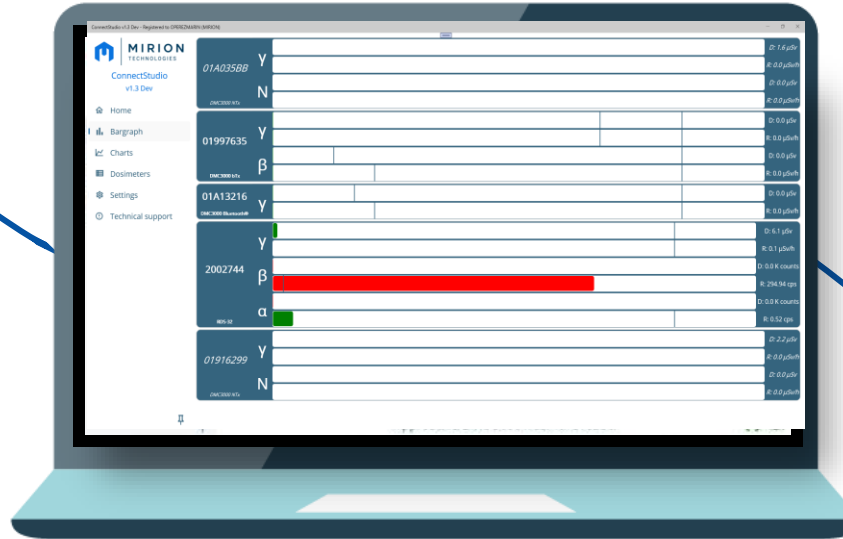
Feature 1:
Easy pairing between
DMC 3000 and peripherals



Feature 2:
Wireless Supervision
(DMC short range
~25 meters)

DMC & RDS 32+probes
Automatic Pairing

ConnectStudio



Wi-Fi / Network



AWM™
(Adaptive Wireless Monitor)

Feature 3:
Bridge to Mirion WRM™ system
(long range Telemetry ~1000 meters)
Bridge to local network
(Wifi, Lan, other technology)

DMC 3000 BLE & Ecosystem



Advantages:

- **Easy pairing & Easy to use**
- **Vibrating device** in case of alarm
- Display information on alarm type
- **Alarm / Information easily reported**



New Information Features

- **Autopairing to last DMC**
 - Time / Time in run
 - Dose / Dose Rate
- **Dose Alarm / Dose Rate Alarm**
 - Wearer Name / RWP
 - A lot more...



DosiServ Convergence Project





DosiServ is enhancing to be Best in Class Dose Managt SW

- HIS 20 is maintained, developed, supported & still proposed

Creation of DosiServ User Group (2025)

- Publication bi semestrial on Use Cases / Advantages
- Other actions to follow

Communication to follow (Sept-Oct 2024)

DosiServ: Dose Management SW

- Improved UX/UI
- Compliance with new SISERI export
- BLE module management

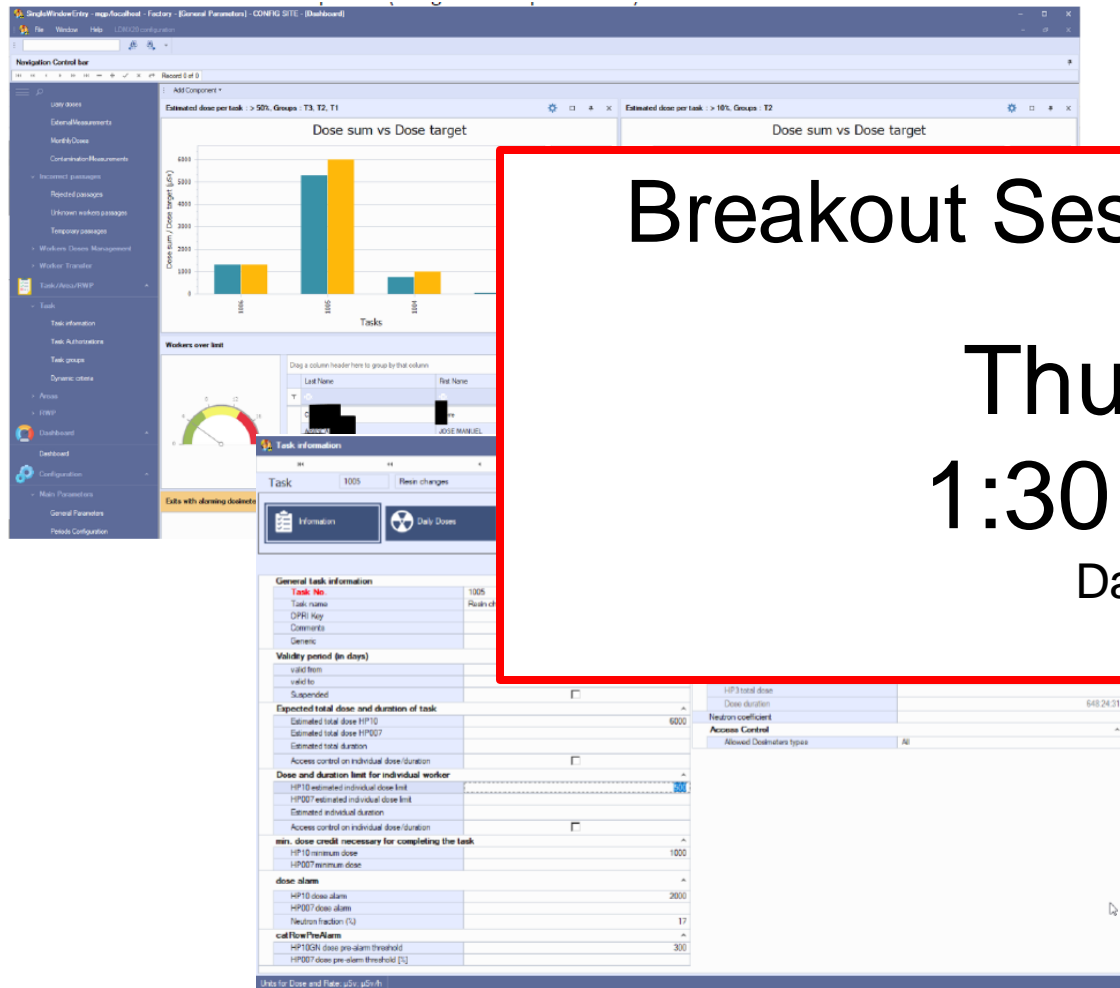
Breakout Session Dedicated

Thursday 1:30 – 2:30

Dallas A

Management improvement
Reader management
Contamination management
LDMAccess 2.0.2

- Improved Smart Offline Management
- Reader management improvement
- Contamination management improvement
- New webServices



C&C Dosimetry Integration



Dosimetry C&C Integration



Value Proposition:

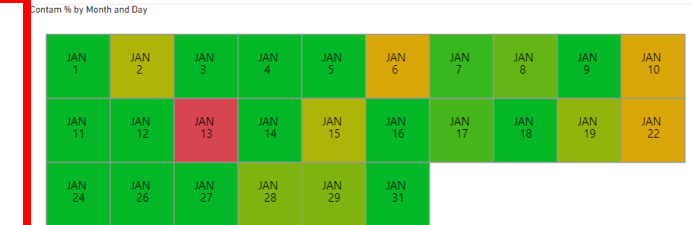
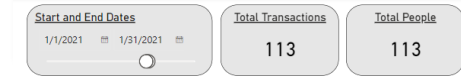
- **Proof** that individuals have been properly monitored for contamination
- **Save time** at exit of RCA (read-out & switch-off dosimeter in parallel to contamination monitoring)
- **Save space** (combination of dosimetry and contamination monitoring stations)
- **Identify potential sources/areas for contamination** (through analysis of job-code vs. contamination events)
→ **Understand & reduce contamination events**
- For some cases: C&C products can become an **RCA entrance**

Dosimetry C&C Integration

Key Features:

- Direct integration of LDMA for DMC3000 in Argos-5)
- **User ID is stored with measurement result**
- Management of sequence configuration possibilities
- LDMAccess software for reader is running on Argos embedded computer
- **Result of contamination monitoring (contam/clean) available in DosiServ**

Come to visit us
on the Demo room



Benefits

- **Time management**
- **Ability to analyze data**
=> Accelerate decisions & actions
- **Time saving / cost saving**
=> Productivity Gains

Updates



Product End of Life

- **RAD60/62 & Ecosystem LBO (End of 2024)**

- **Breakout Session Dedicated**
Thursday - Telemetry
11:30 – 12:30
Dallas A

- Customer Notification
- Last Buy Offer (End of 2025)

Information update

- **Webinar**

- Orion (9th October)
- DosiServ (22nd October)

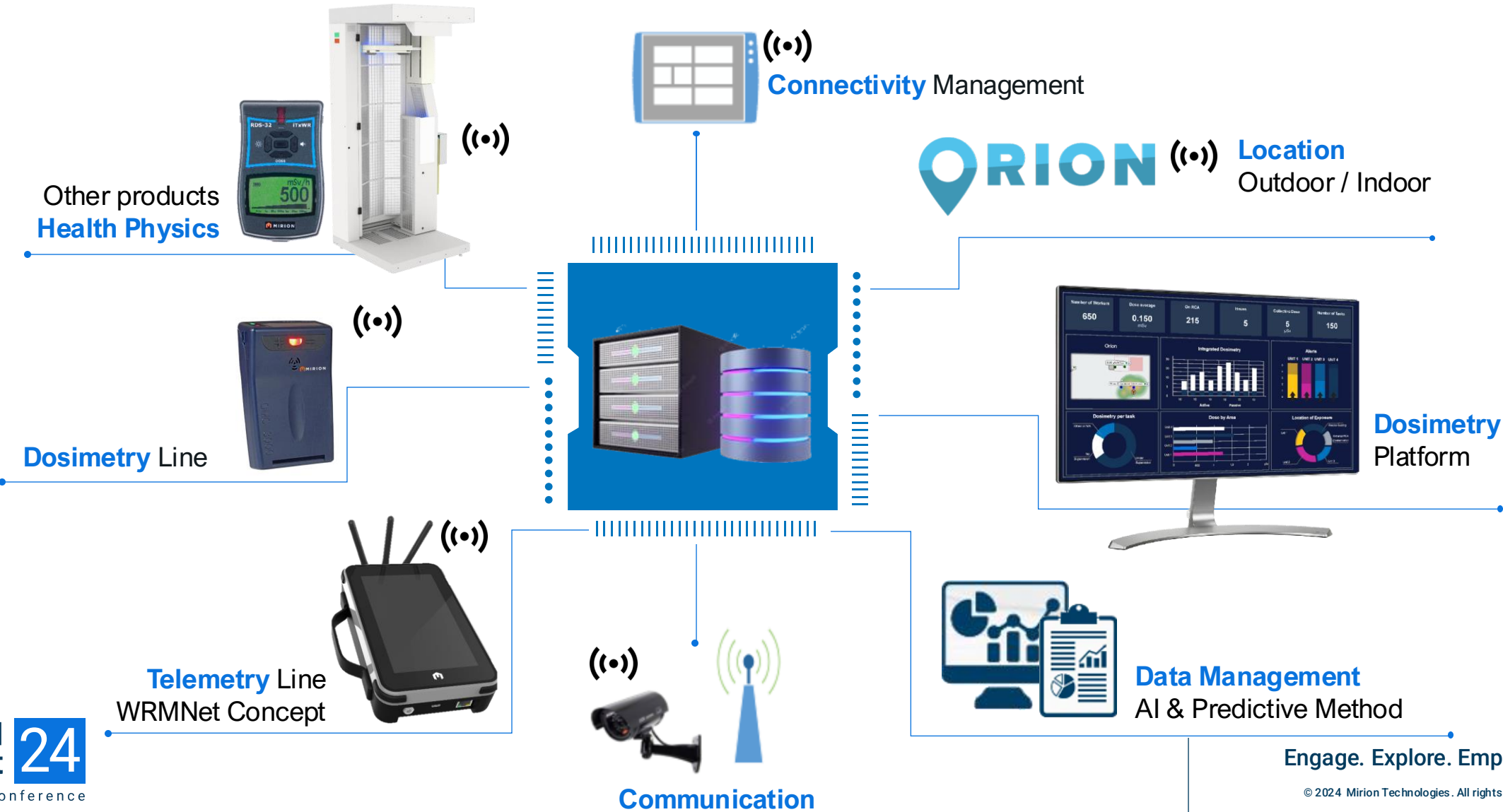
- **Support Orion RTLS**

- Customer references acquisition still ongoing

- **Passive Dosimetry**

- Discussion ongoing for DSD cross sell (Instadose / OSL / DIS)
- **DosiServ interface with DIS-1 / Instadose / BeOSL**
- **DosiServ Cross sell distribution with DSD (ongoing)**

Dosimetry & Telemetry : Vision 2030





Thank you
&
We look forward to
seeing you at
the HP booth

