



DGP/20-IP/19
31/10/05

DANGEROUS GOODS PANEL (DGP)

TWENTIETH MEETING

NEW TECHNOLOGY FOR MONITORING THE SHIPMENT OF RADIOACTIVE MATERIAL



Gravatom Engineering Systems Limited



RAD-Minder™



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RAD-Minder™

- Background
- Applications
- Interface to LEOS/SENS* Systems
- Summary

*LEOS Low Earth Orbit Satellite, SENS Sensor Enabled Notification System

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Background

RAD-Minder™

- RAD-Minder™ is a suite of monitors that can be applied to monitoring and control of radioactive materials during transport and storage.
- Parameters currently monitored:
 - Radiation levels
 - Evidence of tamper
 - Temperature
 - Location/Current Condition
 - Hydrogen (optional)
- RAD-Minder™ can interface with many compatible LEOS satellite systems



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- The genesis of RAD-Minder™ was based on a need to monitor location, current condition, tamper evidence and radiation levels of TRU-Shield® containers on a near real time basis.

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TRU-Shield® Package



- Uses recycled lead.
- Type A (solid) certified.
- Lower in-store dose.
- Less high risk radiation areas.
- Less expense to store material-no special structures required or nitrogen purging.
- Containers are stackable.
- Lower Surveillance and Maintenance.
- Manufactured under an accredited QA system.
- Containers can be loaded with retrievable packages (size of internal package depends on model).

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TRU-Shield® Cutaway



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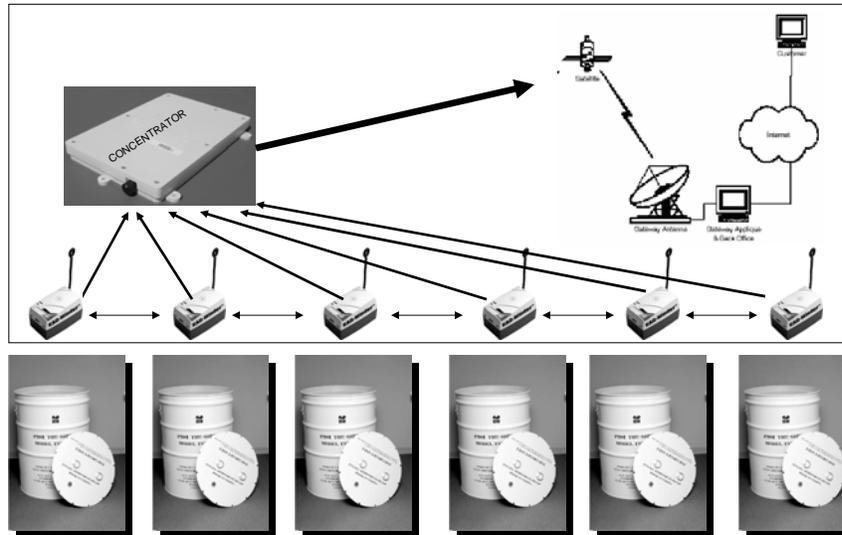
RAD-Minder™ Operation



- Individual units can communicate with each other during transport or storage of the TRU-Shield®
- Up to 1000 units (containers) can communicate between themselves and in turn to a single data concentrator to upload monitored parameters to the LEOS platform of choice

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RAD-Minder™ Arrangement



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RAD-Minder™ Applications



Monitor the following parameters on transport & long term storage of TRU-Shield® Containers

- Radiation levels
- Evidence of tamper
- Temperature
- Location
- Current Condition

RAD-Minder™ Installed



RAD-Minder™ Screenshot



The screenshot displays the RAD-Minder web interface. At the top, it features the General Atomics Electronic Systems Inc. logo and a navigation menu. Below the logo, there is a search bar and a list of messages. The main content area is dominated by a map showing a street grid with a specific location highlighted. Below the map, there is a table with columns for ID#, Time, Latitude, Longitude, Period, Altitude, Missed Altitude, Confidence, Missing, Fix, and Data. The table contains several rows of data points.

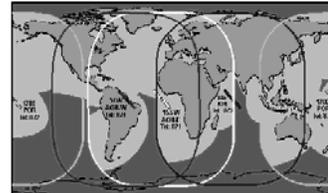
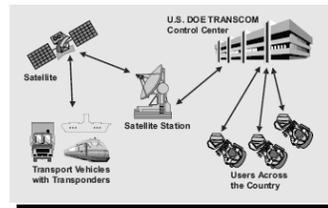
ID#	Time	Latitude	Longitude	Period	Altitude	Missed Altitude	Confidence	Missing	Fix	Data
0-32201	2005/03/04 00:02:43	32.217481	-110.875083	1111	0000	0000	0	N	3D	
0-32201	2005/03/04 22:57:36	32.217489	-110.875475							
0-32201	2005/03/04 22:53:36	32.217226	-110.875819	1111	0000	0000	0	N	3D	0832
0-32201	2005/03/04 22:30:06	32.217236	-110.875840							0401
0-32201	2005/03/04 22:04:09	32.217226	-110.875840							0401
0-32201	2005/03/04 21:52:41	32.217139	-110.875083	1111	0000	0000	0	N	3D	
0-32201	2005/03/04 19:58:02	32.217340	-110.875840	1111	0000	0000	0	N	3D	
0-32201	2005/03/04 17:55:19	32.217183	-110.875764	1111	0000	0000	0	N	3D	
0-32201	2005/03/04 17:08:04	32.217214	-110.875862							
0-32201	2005/03/04 16:01:48	32.217205	-110.875702							

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LEOS/SENS Interface



- RAD-minder™ can provide monitored parameter data to any LEOS platform:
 - TRANSCOM (DOE)
 - AERO ASTRO (COMM.)
 - SSS (COMM.)
 - INMARSAT D+ (COMM.)



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Summary;

“RAD-Minder™ is an option for Radioactive material shipments and storage situations where customers need real time information on location, current condition, tamper evidence and radiation levels.”



Advantages

- Will minimise in store surveillance and monitoring
- Minimise dose uptake and therefore fits ALARP policy
- Can be fitted to new build drums
- Can track trends

