



# SYSCADE

RADIOACTIVE WASTE INSPECTION AND  
CHARACTERIZATION



LE FONDS EUROPÉEN DE DÉVELOPPEMENT RÉGIONAL  
ET LA WALLONIE INVESTISSENT DANS VOTRE AVENIR





DSi is a world leader in the use of radio-isotopes and radiation sources in the industry.

Our services cover a variety of applications in the industry: on-line measurement of engine wear, oil consumption, and oil aeration in the automotive, aeronautics and oil companies.

This includes the development of customized radiation detection systems for characterisation of radioactive materials.

[www.deltabeam.net](http://www.deltabeam.net)



Scannix is a leader in the development and sales of radioprotection solutions for research and medical laboratories, and radio-isotope production centres.

Scannix field of expertise covers the monitoring of alpha, beta, x-ray, gamma and neutron radiations.

Scannix develops customized solutions to make nuclear facilities safer and to better protect workers against ionizing radiations.

[www.scannix.com](http://www.scannix.com)

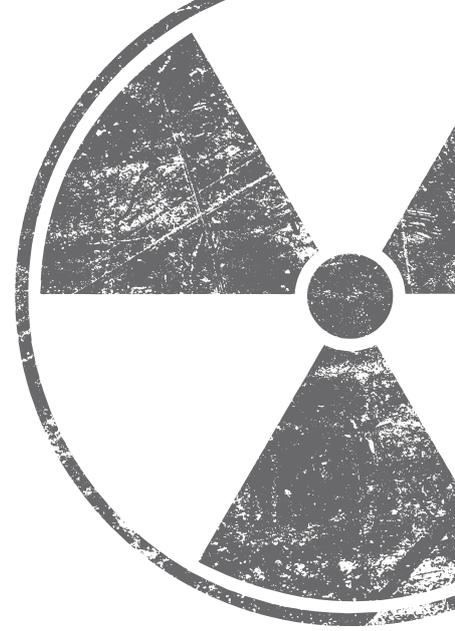
In 2020, DSI and Scannix joined their **expertise** to develop site remediation equipment and services combining x-ray inspection and radio-isotopic characterization of radioactive wastes.

A **new solution** is born for Non-Destructive Inspection and for Characterization of nuclear wastes produced by the nuclear industry.



# SYSCADE

## A MOBILE LABORATORY FOR INSPECTION AND CHARACTERIZATION OF NUCLEAR WASTES.



Our mobile lab is equipped with **2 state-of-the art technologies** :

**A high-definition Non-Destructive Evaluation (NDE) radiography equipment** to inspect and characterize the composition of drums and box contents and to provide detailed images and analysis. It applied to the nuclear industry for the characterization of low-level waste (LLW) and transuranic waste (TRU). The equipment is available with a 320 kV (450 kV as an option) X-Ray source and a digital linear detector for Real-Time Digital radiography.

**A high-resolution gamma spectroscopy system with HPGe (High Purity Germanium) detector** to determine which isotopes are present in the inspected wastes and evaluate the activity levels. This characterisation system can be used in 3 modes: "In Situ" measurement mode to estimate the total activity content in each drum, SGS (Segmented Gamma Scanning) mode to determine the activity content from bottom to top of each drum, or SGS mode combined with angular measurement to localise hot spots in waste drums. High resolution spectroscopy and Isotope Identification is also available whatever the operating mode.



# APPLICATION

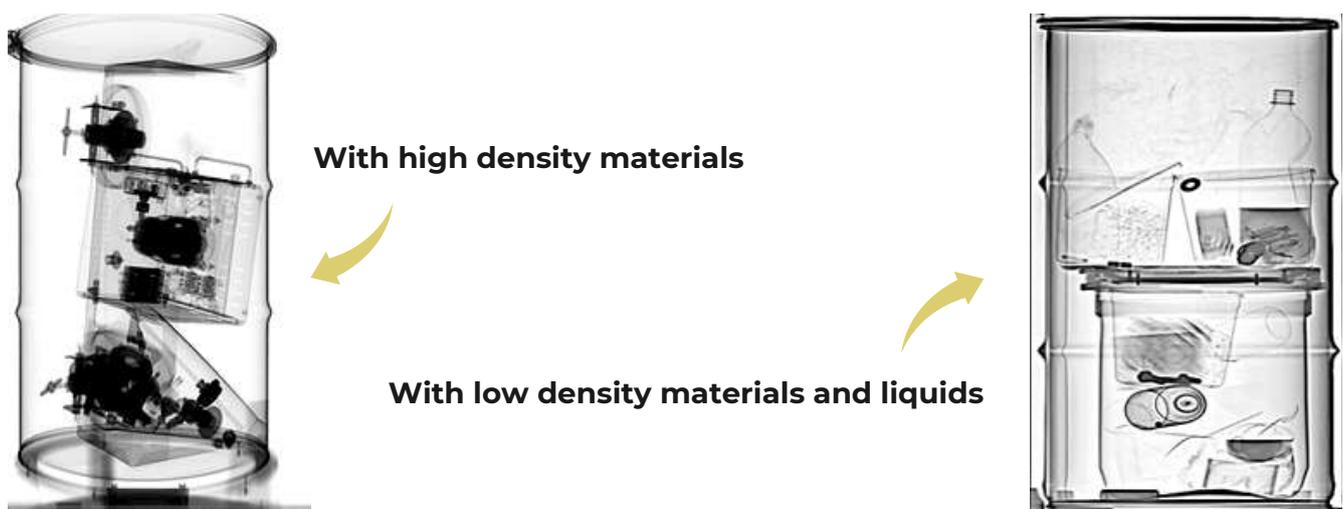
The combined measurements (inspection and characterization) are performed automatically and consecutively using a unique conveyor system with turntable for maximum throughput and minimal material handling by the operators.

A dedicated software allows analyzing measurement results to determine where radioactive sources (or contaminated materials) are located in the inspected wastes, What the associated contaminant(s) is(are) through isotope identification, and what the estimated activity is for each isotope present in the wastes.

For each drum the following data are recorded: date; time; operator name; drum identification number; gross weight; gamma dose rate measured at 1 m or for each segment; associated gamma spectrums with analysis report; calculated activities with measurement uncertainties; Minimum Detectable Activities (MDAs); as well as high resolution radiographs of each waste drum taken at various angles (selectable from 1 to 36).

The X-Ray inspection system reveals the presence of tools, plastics, papers, cables, glass, etc in real-time. It allows determining the volume of liquid present in each drum, as well as the average density of it. Imaging also reveals the presence of shielded containers made of lead or tungsten where radioactive sources could be hidden.

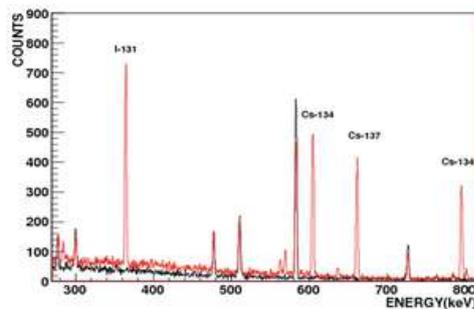
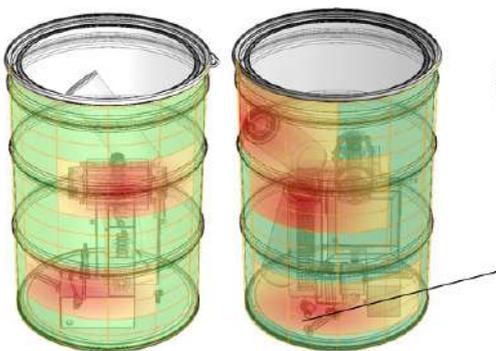
As alternative use, the mobile X-Ray system can also be used to tightly control dose rates and replicate specific exposure levels, and to achieve accumulated dose rates. This facilitates accelerated life-cycle testing of components used in environments where radiation levels are important.





## SPECIFICATIONS

- Real-time X-ray examination up to 450 kV to inspect dense or thick materials
- High-Resolution Digital Radiography to display waste package or drum content
- Selectable inspection angles from 0-360° with 10° steps
- Identification of liquids and estimation of their volume
- Identification of other materials and estimation of their densities
- High-Resolution (HPGe) Gamma Assay (“In Situ”, “SGS” and “Angular” modes)
- High Resolution gamma spectroscopy with Isotope Identification routine
- Dose Rate Monitoring for each waste package / drum
- Average and local Weight / Density Measurement
- Automated handling for consecutive multi-angle X-Ray inspection followed by gamma characterisation
- Accepts 80 to 220 Litre Drums or Large Boxes
- Waste Package Tracking & Data Management



Local gamma-ray spectrum

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