

A Total Solution for Radiological Security

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Radiological Security - the prevention of undocumented and potentially threatening shipment of radioactive and nuclear materials - is a problem at seaports, border crossings, rail yards, airports and similar locations. While the fundamental task may be the same, the implementation environments are totally different. Until now each organisation has been required to come up with its own system, integrating components from many different vendors to produce a total solution.

Today, TSA Systems Ltd, the world's leading supplier of portal monitors, has teamed up with other vendors to provide clients with a complete yet cost effective radiological security package, whatever the location.

The basic concept is quite simple. In order to achieve adequate levels of security and to have a realistic probability of preventing illegal shipments, it is necessary to adopt a systems approach. In security, this means using multiple layers of inspection/detection equipment and integrating the results into a format so that the person responsible for making the final decision can easily interpret them. This requires all information to be transmitted to a central location where it can be processed and archived.

At the very heart of the total solution is RAVEN, or Radiation Alarm and Video Event Notification. This computer system collects and correlates all the

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data from all of the sensors in the system. When the data set is complete, it can be sent to human operators at a local alarm station generally located near the portal, to a central alarm station and can be packaged for transmission to a regional, national, or international data centre. RAVEN also provides redundancy and local archiving capabilities, as well as local language support.

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The first tier of detection consists of primary portal monitors based on plastic scintillators. These systems are available to cover applications such as pedestrians, vehicles, containers and rail cars. They provide very high degrees of sensitivity coupled with low acquisition and maintenance costs. They do, however, suffer from a significant level of nuisance alarms caused by naturally radioactive materials as they can not easily distinguish different materials.

At the second tier, used for follow on inspection of any target that causes an alarm at the first tier, a Sodium Iodide (NaI) based spectroscopic portal monitor is used. This type of portal can determine what radioactive isotopes are in the target. Since the portal monitor is operated in the 'stand-in' mode as opposed to 'pass-through', counting time can be increased to allow the use of a less expensive system while maintaining a high degree of confidence in the analysis. While the cost of this type of portal monitor is much higher (over five times) than the cost of the plastic scintillator type, the total number of secondary monitors is significantly less than the number of primary monitors. The exact ratio of primary to secondary monitors depends on many factors such as the types and locations of installation, as well as on the materials that are usually being transported through this location.

Train monitoring is a somewhat unique problem simply because it is not usually possible to redirect a single rail car to secondary inspection. In practice, in these cases, it may be necessary to use a handheld isotopic identifier or a very sensitive (and expensive) spectroscopic portal monitor.

To offer a total solution, the system can integrate with handheld isotopic identifiers, x-ray imagers, and portable/mobile systems. Portable and mobile systems can be connected to RAVEN via wireless as required based on radio frequency availability.

In summary, the TSA Systems approach has many advantages to the user:

- The system is pre-engineered which reduces the amount of time required on-site to bring the system up
- The use of multiple detection technologies arranged in tiers provides much higher levels of security than possible with a single detection technology
- Using the tiered approach results in higher throughput combined with greater confidence in the scanning results
- Modular system design allows the integration of new technologies as they become available
- Dissemination of data, in local language, to local, central, or mobile alarm stations allows all personnel responsible to be kept up to date on the situation
- There is no preset limit on the number of alarm stations that can be used with the system
- Connection to regional, national, or international data centres as required
- All components in the system are connected using Ethernet and TCP/IP. The physical interconnection may be copper, fibre optic, or radio
- Data encryption is available (subject to export regulations)
- The system is available today. ■



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