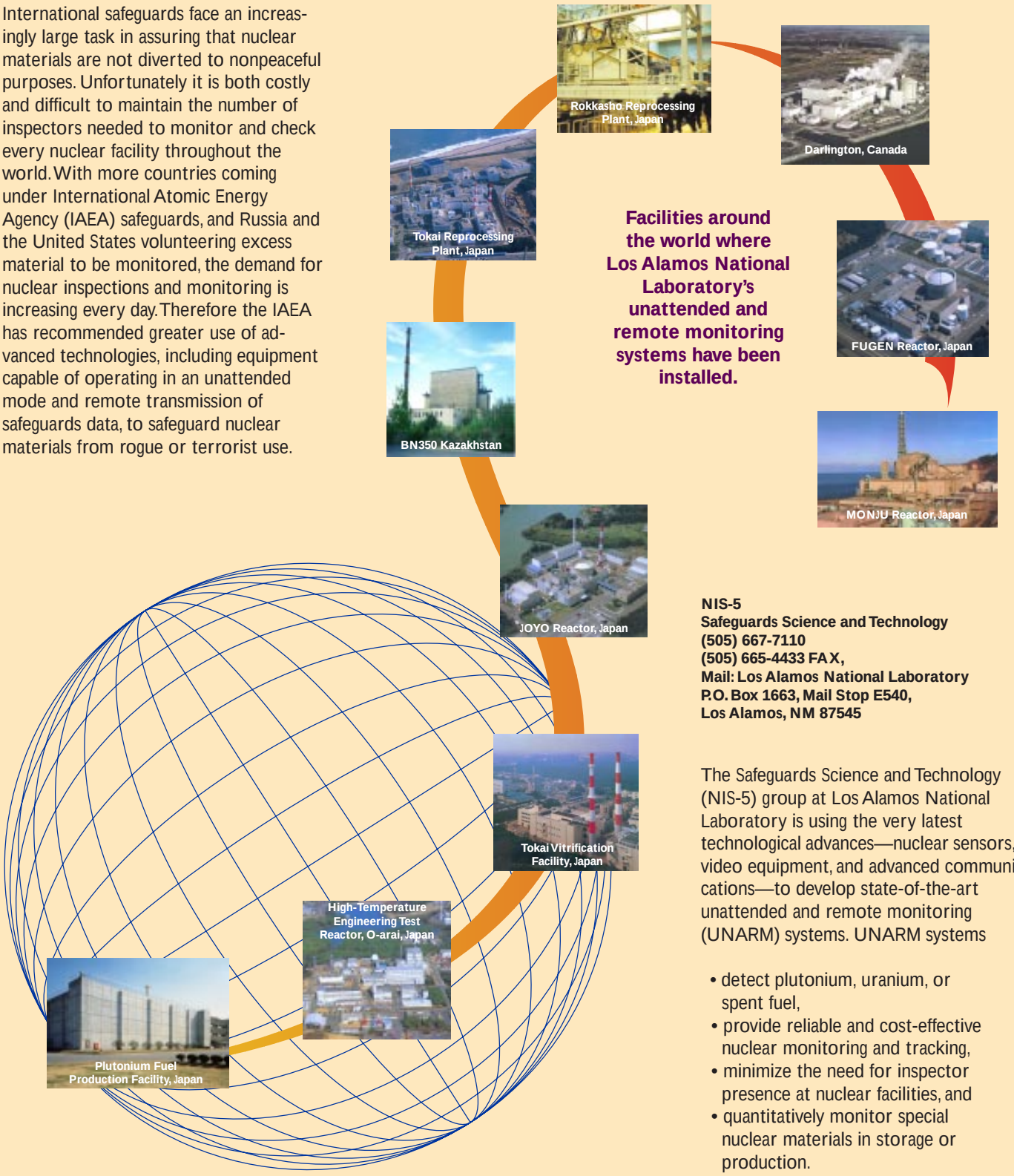
Unattended and Remote Monitoring Systems

Leading the Way in 21st Century Nuclear Materials Control

International safeguards face an increasingly large task in assuring that nuclear materials are not diverted to nonpeaceful purposes. Unfortunately it is both costly and difficult to maintain the number of inspectors needed to monitor and check every nuclear facility throughout the world. With more countries coming under International Atomic Energy Agency (IAEA) safeguards, and Russia and the United States volunteering excess material to be monitored, the demand for nuclear inspections and monitoring is increasing every day. Therefore the IAEA has recommended greater use of advanced technologies, including equipment capable of operating in an unattended mode and remote transmission of safeguards data, to safeguard nuclear materials from rogue or terrorist use.



Facilities around the world where Los Alamos National Laboratory's unattended and remote monitoring systems have been installed.

NIS-5
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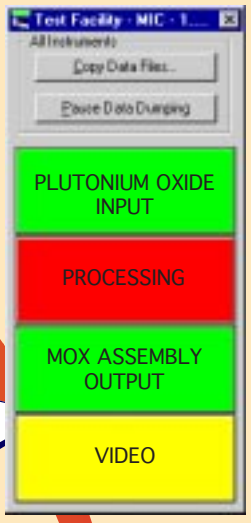
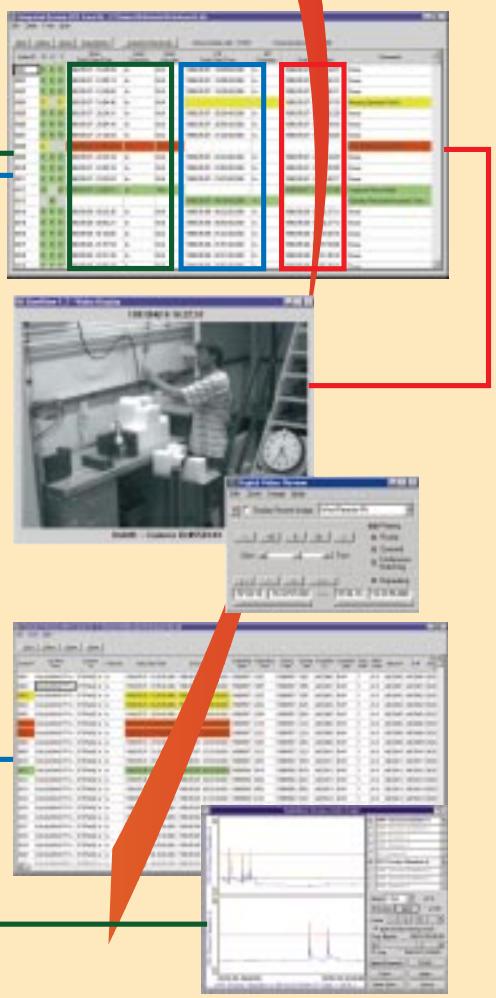
The Safeguards Science and Technology (NIS-5) group at Los Alamos National Laboratory is using the very latest technological advances—nuclear sensors, video equipment, and advanced communications—to develop state-of-the-art unattended and remote monitoring (UNARM) systems. UNARM systems

- detect plutonium, uranium, or spent fuel,
- provide reliable and cost-effective nuclear monitoring and tracking,
- minimize the need for inspector presence at nuclear facilities, and
- quantitatively monitor special nuclear materials in storage or production.

UNARM systems are made up of different components and modules. Featured in this example is the Plutonium Fuel Processing Facility (PFPF) in Japan, which uses the most advanced UNARM system in the world. Neutron coincidence counter detectors are used to quantitatively monitor special nuclear materials going in and or out of the facility; radiation detectors track the movement of radioactive materials; and video equipment provide extra safeguards security.

Each of the UNARM components at PFPF transmits its stored data over a network to a master multi-instrument collector computer that monitors the performance and communication status of each component. The data sent to the collector computer can be stored or sent to a regional IAEA inspection office in Tokyo, routinely or upon request.





At the IAEA office in Tokyo, a computer compares the different sensor information against "operator declarations" and against itself. For example, moving a plutonium canister may be declared by an operator, captured on video, measured by neutron detectors and followed by the motion sensors. The computer detects and compares all the relevant signals—a missing signal may indicate a malfunction or possibly a diversion scenario. The computer alerts an inspector, who can then investigate the flagged events.

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