Autonomous Radiological Surveys

Pacific Northwest
NATIONAL LABORATORY

Pacific Northwest National Laboratory develops solutions to complex technical and regulatory issues using autonomous radiological surveys to collect continuous, real-time data.

U.S. DEPARTMENT OF
ENERGY

Increased Radiological Survey Efficiency With Drones, While Meeting Health Standards

Research and Development

Autonomous surveys, via drones and land-based rovers, can be conducted in relatively short amounts of time, reducing operational costs and providing real-time monitoring. Pacific Northwest National Laboratory's (PNNL) leading researchers develop and test innovative autonomous survey methods.

These surveys can sweep large areas of land or inside buildings, which allows more sophisticated and informative representations of the surveyed areas. Autonomous surveys also improve safety because they replace humans in difficult to access or dangerous areas.

Adherence to Technical Standards

Built off decades of expertise supporting the Nuclear Regulatory Commission and the U.S. Department of Energy, PNNL researchers have extensive knowledge of the critical health and safety standards that new autonomous techniques must meet or exceed.

PNNL offers technology and expertise to develop and implement radiological drone surveys. This includes, radionuclide surveys, site inspections, site security, site closures, and more.

Broad Applications

PNNL expertise with autonomous surveys extends to a wide range of potential Nuclear Regulatory Commission and the U.S. Department of Energy applications, such as:

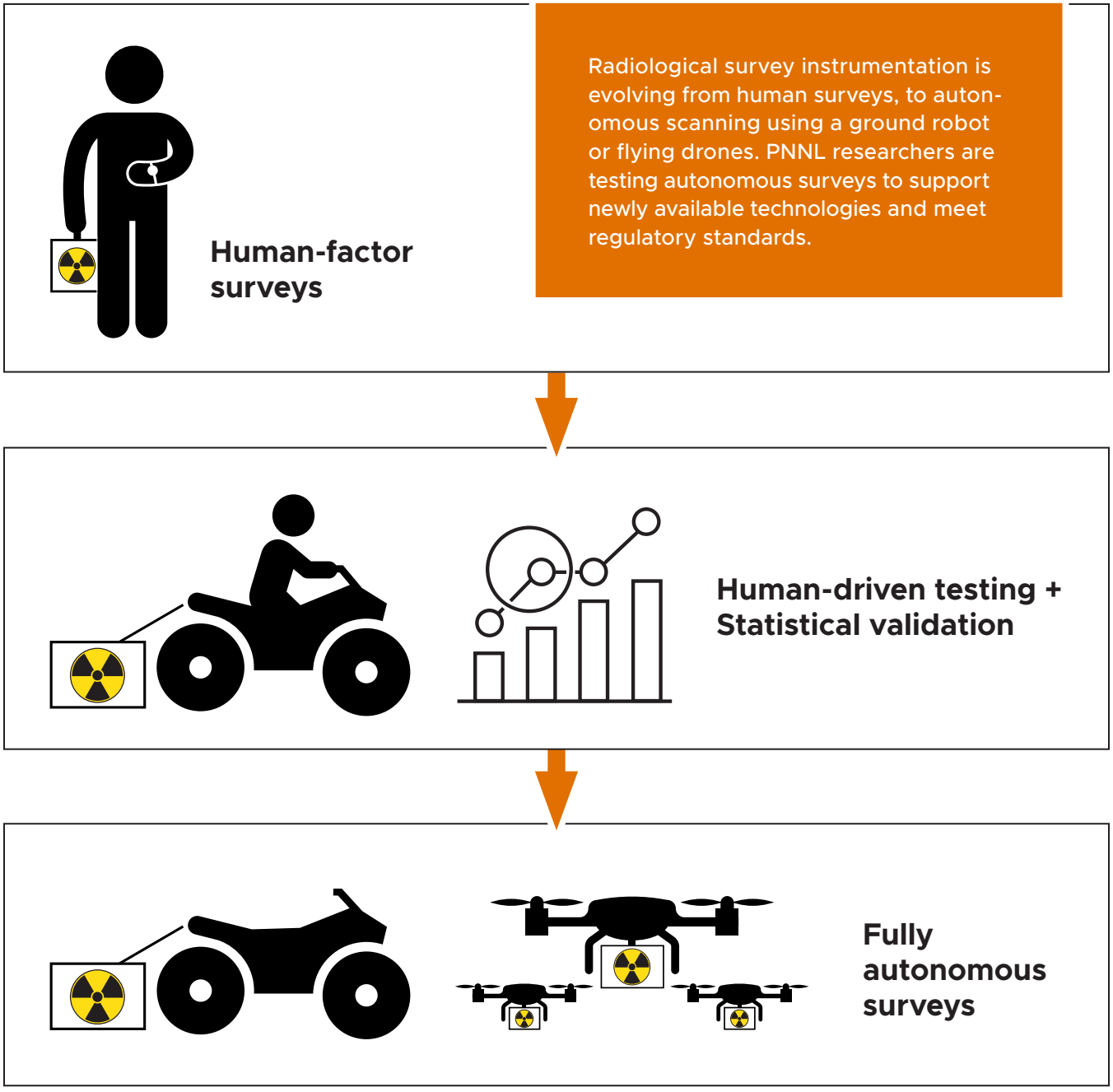
- Radionuclide surveys
- Site inspections
- Site security
- Site closures.

Other additional applications include homeland security and natural resource assessments.

Regulatory Compliance

Current autonomous regulations are a complex layer of differing state and federal policies. PNNL has the expertise to ensure that licensees are conforming with all levels of regulatory requirements.

PNNL also has the policy experience to help ensure that autonomous surveys can continue to be used into the future. As autonomous regulations become more restrictive and complex, navigating current policies becomes increasingly important.



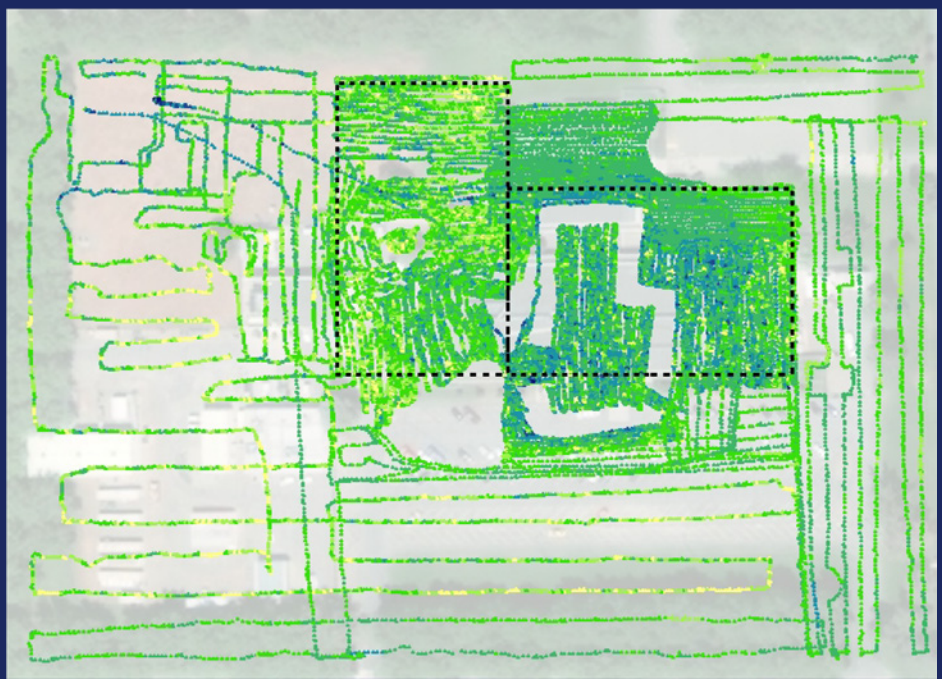
Case-Study: Transitioning Surveys with Human Factors To Advanced Autonomous Instrumentation

Radiological surveys today involve human factors that may limit instrumentation sensitivity, are time consuming, and provide incomplete coverage.

Radiological surveys to support decommissioning of sites and facilities are a prime example of how PNNL can create autonomous solutions to improve survey performance, increase safety, and reduce costs.

Currently, radiological surveys involve trained operators to walk down an area using sensitive, portable survey instruments to support decisions—a function of the instrument and the operator. Walkover surveys are very time consuming because they require thousands of static readings and can only be conducted in safe areas.

From human operations on foot, to driving a vehicle, or performing autonomous scanning using a ground robot or flying drones, PNNL researchers are working on new approaches to update statistical analyses for continuous survey methods and develop easy to use tools available for planning and analysis. This includes incorporation into PNNL's Visual Sample Plan (**https://vsp.pnnl.gov/**), supporting the development of defensible sample planning to support confident decision-making with new autonomous instrumentation.



For more information, contact:

Mark Nutt | Manager, Nuclear Market Sector | mark.nutt@pnnl.gov | (509) 375-2984

Tara O'Neil | Manager, Nuclear Regulatory Subsector | tara.oneil@pnnl.gov | (541) 738-0362