

*A powerful, spatial-identification tool developed by researchers at PNNL enables you to locate anything—anytime, anywhere—by creating unique identifiers for each asset you want to track, such as parcels, buildings, floors, critical infrastructure, or property.*

# IDENTIFY N-D

*Geolocation made simple in all dimensions*

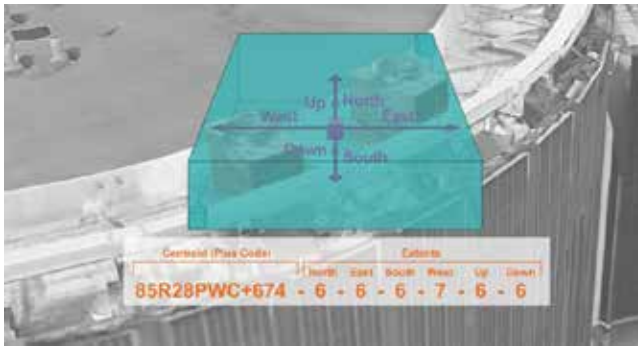
## LOCATE ANYTHING—ANYTIME, ANYWHERE

The number of sensors and Internet of Things (IoT) devices is exploding as cities, homes, and businesses increasingly create and track large amounts of spatial-related data. But this brave new world could be held back by a fundamental problem: spatial and temporal identification. For the data generated to connect, the devices must be able to identify the location of a particular space and its extent, sometimes down to the room or even sensor.

Pacific Northwest National Laboratory's Identify n-D is the only technology of its kind to represent the location and extent of a physical space anywhere on the Earth's surface at a moment in time with a simple code string (a geocode). The software platform leaps well beyond a two-dimensional view, calculating volumetric center of mass and providing temporal information for each asset you need to track. Identify n-D uses a new generalized grid reference system developed for use in n-dimensions. This new system enables users to identify—and describe—things, such as building volumes, floors of buildings, individual suites, rooftop assets, and subterranean structures. It is simple to use and doesn't require advanced computing.

## TECHNOLOGY FEATURES

- With 100% accuracy, locate and communicate the following:
  - Building boundaries and land parcels
  - Floors, rooms, and physical infrastructure (IoT devices, elevators, restrooms, HVAC, and more)
  - Valuable property or assets within space and time
  - Any virtual space—without physical boundaries
  - Temporal applications such as impacts from a natural disaster and existing assets
- Cross-reference two data records in less than a millisecond with nearly double the accuracy of other approaches.



*A unique code string identifies a space and its extent, enabling Identify n-D to cross-reference various spatial data in less than a millisecond with nearly double the accuracy.*

## A FLEXIBLE, INTELLIGENT, CUSTOMIZABLE SOLUTION

Identify n-D puts the right data in the right hands at the right time. It converts a space footprint into a standardized identifier that is a string of characters specific to the location and extent of the space at a particular time.

The first component of the Identify n-D string identifies a grid cell that contains the location. Cells lie within a recursively subdivided grid of successfully finer resolution that allows coding to narrow in on buildings, rooms, and portions of rooms at a moment in time. The smaller the space, the higher the resolution of the grid layer and the longer the string of characters needed for identification.

The software can compare and determine the geospatial and temporal relationship between two Identify n-D strings in less than a millisecond. This power allows Identify n-D to quickly collect, integrate, and cross-reference data sources for a variety of heuristics using low computational resources. For example, a 10+ million cross-reference operation can be completed in under 5 minutes on a laptop computer.

## INDUSTRY APPLICATIONS

Using the patented technology, federal, state, and city agencies can jointly track building information for multiple government functions like law enforcement and emergency medical services, which can then react much faster in time-critical situations. Commercial real estate managers can leverage various data sources to evaluate and manage their building assets more quickly and accurately. Utilities can link meter data to building data to better understand where and how energy is being used or generated.

The technology can create a digital twin—a virtual representation of real-world people, processes, and products—all located in time and space—and confirm the efficacy of changes before implementing them.

Identify n-D can help build safer, more resilient cities. The tool's computationally efficient code makes it easy to connect data from disparate sources—such as building permit data, flood maps, and weather records to estimate properties that might be affected by an impending hurricane so resources can be pre-positioned to help.

But Identify n-D goes beyond identifying specific buildings and linking their data. When used in tandem with industrial tracking systems such as (GPS or RFI), it can locate where fixed or movable physical assets, such as HVAC equipment, data sensors, museum collections, and hospital or lab instruments, are stored. This capability is important for creating asset inventory and optimizing management and emergency response.

Identify n-D is the crucial missing link that ties all space-related data streams together. It provides real-time analytics for decision making that can be leveraged by any market segment and ushers in the future of smart cities and communities. Specific markets that would benefit include the following:

- building & energy management
- commercial real estate
- first response
- insurance and disaster relief
- geographic information systems
- IoT and asset tracking
- mapping and location.

## LET'S CONNECT

If you have questions, regarding this technology, please send inquiries to [commercialization@pnnl.gov](mailto:commercialization@pnnl.gov). You can view all PNNL technologies available for licensing at [www.pnnl.gov/available-technologies](http://www.pnnl.gov/available-technologies).