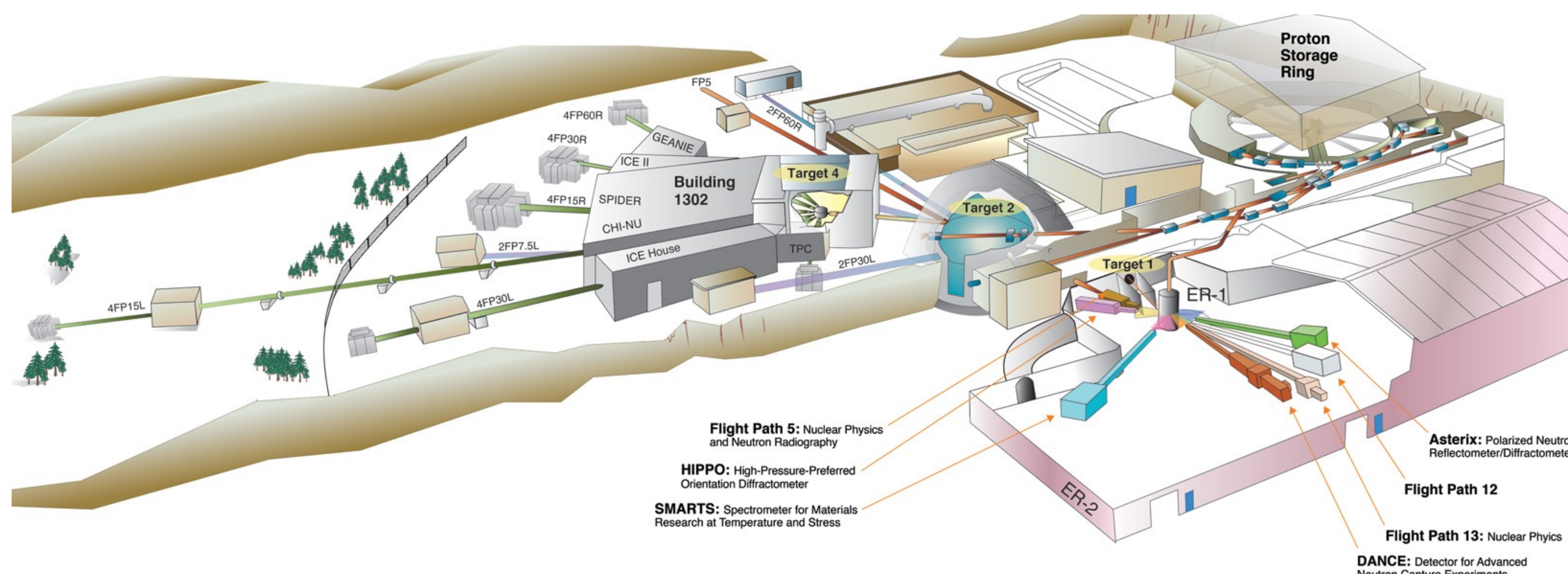# Establishing Data Pipelines and Provenance for Neutron Scattering

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LANSCE Los Alamos Neutron Science Center

LANSCE: A Partial Overview

Flight Path 5: Nuclear Physics and Neutron Radiography

HIPPO: High-Pressure-Preferred Orientation Diffractometer

SMARTS: Spectrometer for Materials Research at Temperature and Stress

Asterix: Polarized Neutron Reflectometer/Diffractometer

Flight Path 12

Flight Path 13: Nuclear Phyics

DANCE: Detector for Advanced Neutron Capture Experiments

What is LANSCE?
Founded in 1972, the Los Alamos Neutron Science Center is one of the most powerful linear accelerators in the United States. It is unique due to the intensity and energy spectrum of the particles it produces.

The Lujan Center
The Manuel Lujan Jr. Neutron Scattering Center is one of five user facilities supported by the LANSCE accelerator, which is stewarded by the NNSA. Together, these instruments provide capability for basic and applied neutron science relevant to academia, national security, and industry.

The Types of Data we Collect
- Time-of-flight neutron diffraction data
- Energy-resolved x-ray diffraction
- High energy x-ray diffraction
- Small angle x-ray scattering
- Neutron radiography

The Problem
Pipelines for data collection, processing, and analysis are conceived of and tailored to specific experiments and typically result in inconsistencies between the quality of insights, unFAIR data, and lack of provenance.

The Solution
Learn from other data management systems to realize identifiers within LANSCE's data to create program and experiment-specific pipelines

Persistence in the Pipeline

| User Office Software | Experimental Control | Stream Events & Metadata | Data Reduction & Visualisation | Data Analysis | FAIR Data Management |

UOS   kafka *A distributed streaming platform*   Technique Specific   SciCat

EPICS   NICOS *Networked Instrument COntrol System*   scipp   NeXus

"Consensus on Persistent Identifiers – PIDs – is the key to operational efficiency!"

Proposal Submission
- Proposals
- Users
- Facilities
- Instruments
- Funding
- Research Areas
- Hazards
- Waste

Everything in Between
- Research Objects
- Research Events
- Data
- Meta-Data
- Scientific Software

Proposal Submission
- Publications
- Everything else in the pipeline

PIDs Worth Looking Into
- https://arks.org/
- https://orcid.org/
- https://www.crossref.org/
- https://ror.org/
- https://www.rrids.org/
- https://www.doi.org/