

# **The Relationship Between Planetary Spatial Data Infrastructure and the Planetary Data System**

J. Laura, R. E. Arvidson, and L. R. Gaddis

# Quick Aside: Where are we operating from?

- Spatial data should just work
- Terrestrial communities are finding success with spatial data infrastructures
- The PDS is critical - we want to work with the PDS

# Lessons from Terrestrial SDIs

- Single source solutions fail
- Distributed solutions (grass roots) with long term support flourish
- Tight coupling between data and tools fail

# What is the PDS?

- ‘the formal archive for the planetary sciences’
- seeks to preserve and make data available
- works with mission teams and individual providers to plan and implement ingestion in the PDS-4 format into an archive

*courtesy of the PDS roadmap*

# What is the PDS *not*?

National Aeronautics and Space Administration



## Planetary Data System Roadmap Study for 2017 – 2026



**“There is a mismatch between the services and functions PDS is equipped to provide and the very high expectations of its users and NASA management.”**

*– Finding II*

**“There is a need for more translation programs that transform data from the PDS4 archive file formats to more usable analysis-ready formats.”**

*– Finding IX*

**“The PDS is not an appropriate archive or repository for software”**

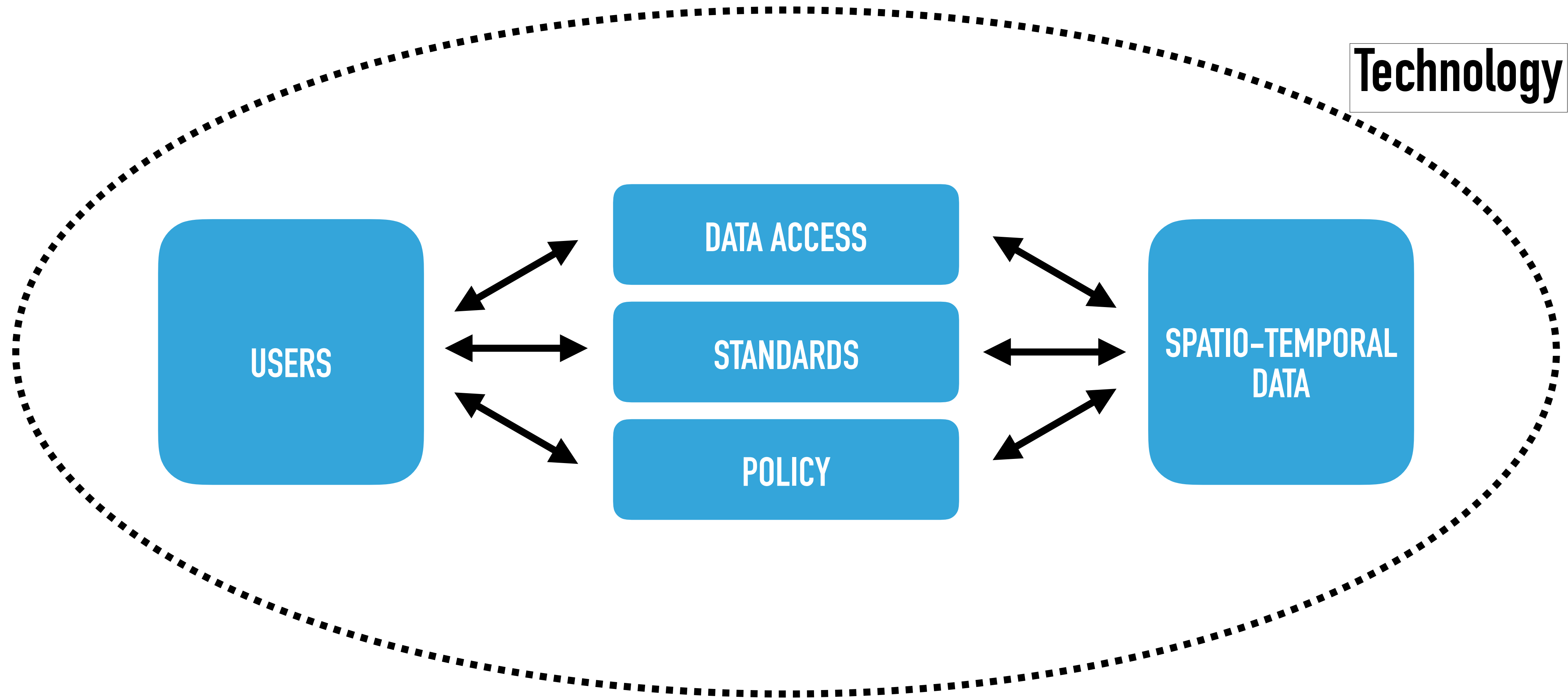
*– Finding X*



**“Higher-order products produced by mission teams... are extremely valuable...but are not always included due to lack of resources...”**

*– Finding XIII*

# What is PSDI?



# Yeah, yeah...what is it really?

- The mechanism or framework that makes data usable in an efficient and flexible way (`interoperability`):
- a coordinating effort so that data and metadata are **not** centrally managed, but are managed by the data creator (or a custodian)

# What is a PSDI *not*?

- Realized in a planetary context - we have no 3rd generation planetary SDIs
- a cookbook
- a mission website
- a tool tightly coupled to data
- an ArcGIS project
- the PDS in isolation (though efforts within the PDS can be seen as nascent PSDIs)

# Defining Usability

We suggest that one major point of differentiation between PSDI and PDS is in how each defines *usability*.

# Usability: PDS

- medium to long term accessibility
  - discoverability: tight data/metadata coupling is great for this
- *the system is usable when the user can find data via search mechanisms and convert them into an interoperable format*

# Usability: PSDI

- short(er) term interoperability
- discoverability: tight data/metadata coupling is great for this - *hey, that looks familiar!*

*– the system is usable when the user can discover standards compliant, interoperable data and use it immediately in off the shelf tools*

# How is usability supported in the PDS?

- tight data/metadata coupling
- limited number of data formats
  - this forces tools to be developed to the format or for users to convert the format to an interoperable one
- data are available and readable long term
- **we call this an 'engineering' view**



# How is usability supported in a PSDI?

- tight data/metadata coupling
- discovery to support technical and non-technical (e.g., fitness for use) metadata
- data available in standard (transient!) formats that work in current spatial tools without user conversion
  - spatial formats have a 'shelf-life' of ~15 years
    - shapefile (early 90s release, pretty long in the tooth today)
- **we call this a 'user-centric' view**

# PSDI Depends on the PDS

- PDS is a critical source of data
  - ‘Analysis Ready’ - Where does the burden for this processing fall?
  - Discoverable comes (in part) from archived metadata

# PDS Benefits from Functional PSDIs

- PSDI help address the mismatch in community expectations (PDS Roadmap, Finding II)
- Frees the PDS from worrying about archiving software (PDS Roadmap, Finding X)

# Steps Towards an PSDI

- Mars ODE, Mars Analyst Notebook (Geosciences Node)
- PILOT, Annex (Imaging Node)
- Treks (JPL)
- LunaServ (ASU)
- CRISM MTRDR (example higher order mission products that are GIS ready)
- Mission Webpages (as stop gaps)

# Knowledge Inventories

- What data are available in spatial formats that are ready for interoperable use?
  - In what formats?
  - From whom and how can the providers be engaged?
  - How can back- / front-ends be separated?

# Conclusion

- PDS and PSDI are not in competition
- PDS and PSDI are critical to fulfilling users' needs
- We (the technical community) need to start:
  1. developing knowledge inventories
  2. split infrastructural data access from front-ends
  3. implementing interoperable solutions