

# A REFERENCE ARCHITECTURE FOR A POLICY TEST LABORATORY

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## ACQUISITION INNOVATION RESEARCH CENTER



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**UC1:** Government has a policy question that could be answered using the Policy Test Laboratory (PTL)

**UC2:** A (policy) researcher wants to leverage the PTL

**UC3:** A researcher wants to integrate their work in the PTL

**PRECONDITIONS for success:**

Government must trust the results of the PTL

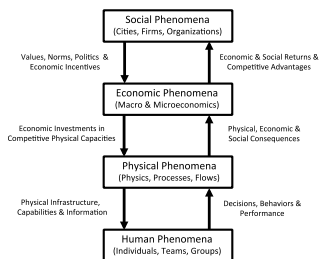
By design of the PTL →

The researcher must have an incentive to work with/contribute to the PTL → Data

Who/what am I trusting	Modeler (track record of interacting with stakeholder or reputation)	Model (previously used/accepted or careful V&V in this context)	Inputs (provenance e.g., census, vs careful look at representativeness for this application)
Validity (solve my problem)	Gut of senior stakeholder	Classic model V&V Depends on generation (block 1 different than n)	Good data vs. right data for this application
Acceptability (in ways I prefer)	Comfort/confidence in understanding (and they way they talk to me)	Type of models used (understand representation e.g., pde vs. econometrics) Explainability	Support credibility of the data (available in community and has been vetted by other experts)
Viability (worth my time to learn how to do)	Cost-effort to work with expert vs. use their tool (either learning to work together or learning the tool)	Effort to develop my own comfort (learning curve) (Less of an issue in later iterations of blocks)	Effort to compile/clean. Proprietary/classified/expensive?



## IEEE Std 1516-2010



CSF

MATRE



Open Geographic Modeling and Simulation (OpenGMS)

Background, goal, and maturity

Types of research questions it supports, including application domain

Kinds of disciplinary models, data, and tools, including integration capabilities

Architecture

Technical governance

Organizational governance

# Open Geographic Modeling and Simulation (OpenGMS)

OpenGMS supports sharing of your modeling and simulation resources for geographic applications. Also, this platform provides a virtual community for collaboration among researchers from various domains. Through open web-distributed resource sharing and collaboration, this platform further contributes to open geographic modelling and simulation to enable broader participation and exploration.

Explore more >

Join us



Environmental Modeling and Software (iEMSs) and Chair of the Geographic Information Modeling Committee of the International Geographic Union (IGU)

OpenGMS leading a position paper with ten more fa

## Main Functionalities



### SHARING

Sharing models, data and computing resources as reusable resources.



### REUSING

Reusing models, data and computing resources as services in web environment.

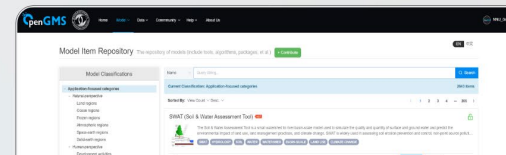


### INTEGRATING

Integrating different models, data and computing resources to solve real world problems.

## Model Repository

The model repository collects model resources to build a dictionary where all models (also include related tools, algorithms, etc.) are organized in a formal way. Users can find a model with its detailed information, conceptual and logical descriptions, computable resources, developing history, and applications. This repository



A reference architecture:

- a set of guidelines and constraints that will **enable (1) the sharing and use across acquisition research projects of data, models, and tools, and (2) the construction and composition of multi-disciplinary models of government acquisition.**
- Address both technical and governing aspects.
- Living artifact & guidelines for evolution

Application

How organizations and infrastructure engage (e.g., security, UI/UX)

Problem class/Research question

Can the PTL (as an integrated assessment tool) be used for the desired study? This includes reorganizability.

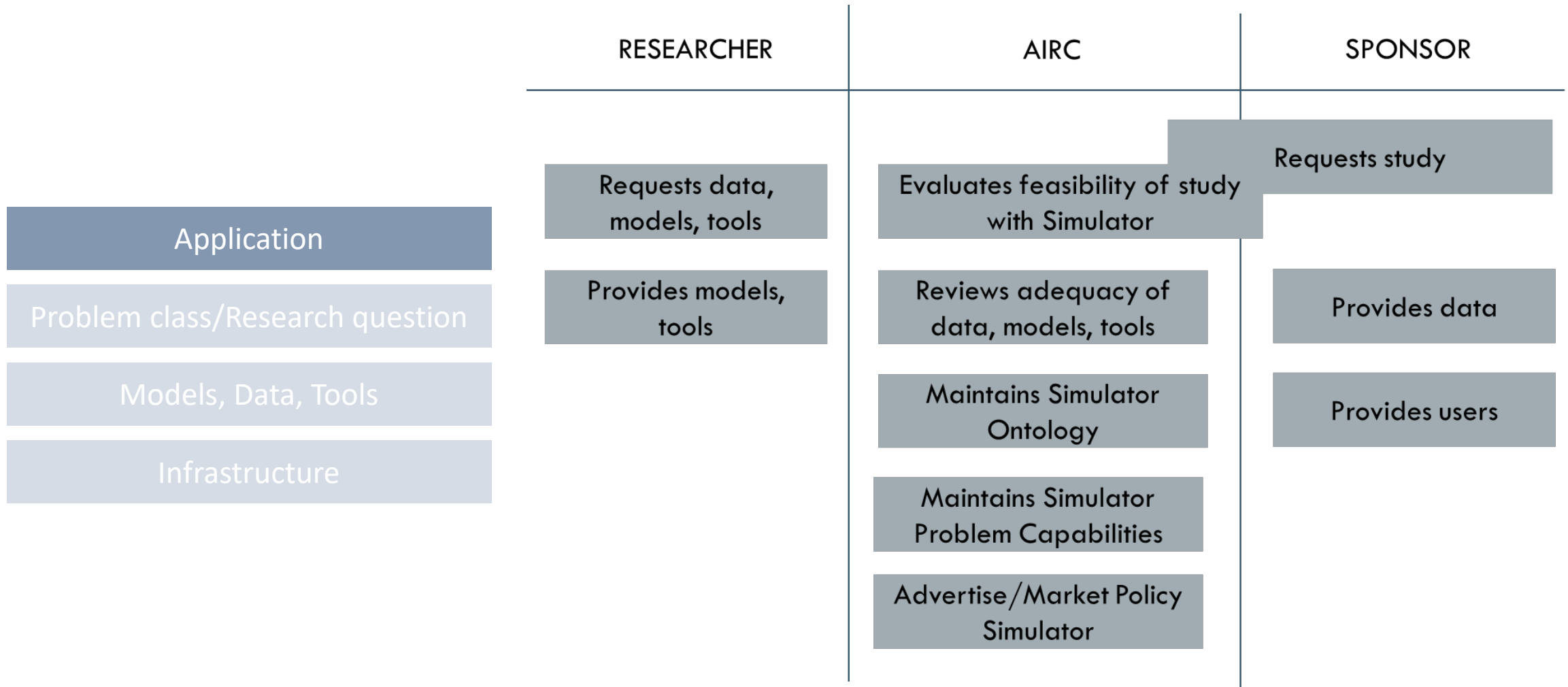
Models, Data, Tools

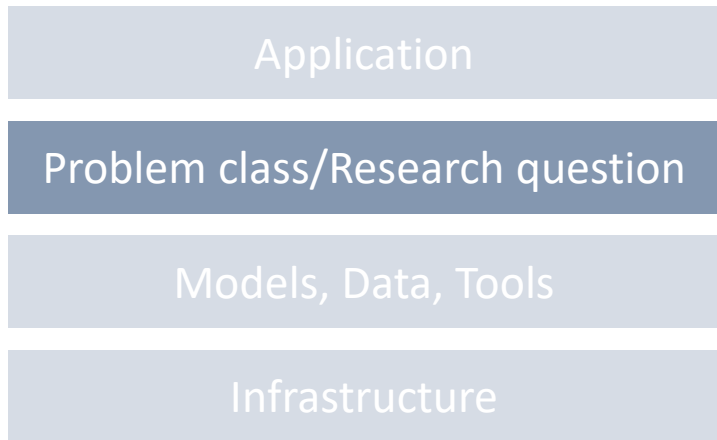
Research artifacts. Requires: conceptual, technical, and data integration

Infrastructure

Where everything is hosted, available.

***PTL: What is it?***





Explore **tension**:

Reusability (overmodeling) vs targeted (efficiency)

PTL for wide range of questions vs Infrastructure for a policy problem

Taxonomical elements (trust driven)

Scale issues (e.g., from successful pilot to large-scale

application)  
Tipping points projection (e.g., confidence on organizational or social change)

Risk assessment per model/data confidence

Control mechanisms



## Acquisition ontology

FAIR Data standard (Findable, Accessible, Interoperable, Reusable)

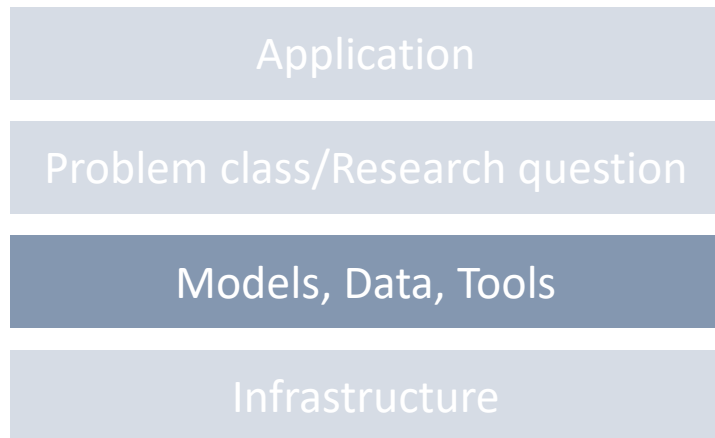
“Interface Control Document”

Open Modelling Interface

ODD Protocol

IEEE Std

UI/UX



O	1. Purpose and patterns
	2. Entities, state variables and scales
	3. Process overview and scheduling <i>Submodel A</i> <i>Submodel B ...</i>
D	4. Design concepts
D	5. Initialization
	6. Input data
	7. Submodels <i>Submodel A (Details)</i> <i>Submodel B (Details) ...</i>

Basic principles
Emergence
Adaptation
Objectives
Learning
Prediction
Sensing
Interaction
Stochasticity
Collectives
Observation

Application

Problem class/Research question

Models, Data, Tools

Infrastructure

## OPTIONS

Existing (e.g., CyVerse)

Custom

Distributed, with  
requirements

**Appendix** to all AIRC projects, to deliver:

ICD on models, data, tools  
(incl. UI/UX)

Ontology

Repository

T0

Future



Bottom-up creation

*First draft in next 2 weeks,  
and update every new  
simulator project*

# THANK YOU

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