SYSTEMS ENGINEERING RESEARCH CENTER | AIRC ACQUISITION INNOVATION RESEARCH CENTER | SERC RESEARCH REVIEW 2026

AIRC's Policy Test Lab

WRT-2507.18.3 and WRT-2604.02

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Overview: Policy Test Lab (PTL)

> *"Essentially, all models are wrong, but some models are useful."*
>
> – George Box

- **Use simulations to test policies**
  - Optimize policy benefits
  - Avoid negative side effects before implementation
  - Builds on Dr. Bill Rouse's seminal "Policy Flight Simulator" SERC research & prototyping
- **Use agentic AI to speed development of policy test simulators**
  - Leverage existing literature models
  - Dramatically speeds identifying & coding models to test policies
- **Now required by the HASC** *(H.R. 119-698 accompanying the FY27 NDAA)*
  - Acquisition Policy Experimentation Lab (APEL)
  - Initial topics: contractor surge incentives; resilient industrial base
- **Very close to a Minimal Viable Product (MVP)**
  - Prototyped in the AWS cloud (Public Policy Experimentation Lab or PPEL) for alpha testing
  - PPEL MVP into VaTech's DARCIE CUI Environment (Acquisition Policy Experimentation Lab or APEL)

PTL Workflow

1 A gov't sponsor identifies a problem with a proposed policy solution

2 Problem is communicated via a new policy statement with rules and guardrails

3 Stakeholders and data are identified (scenario)

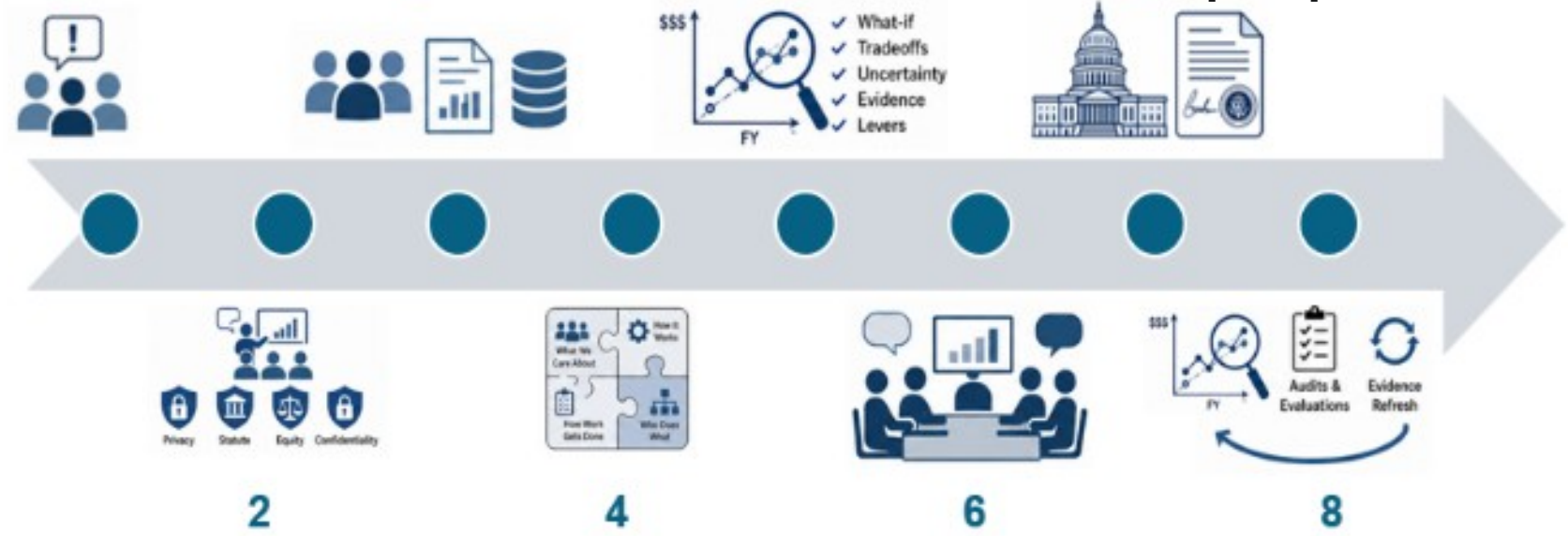
4 Lit search for public policy models & data or local database of archived models

5 Models modified to assess the policy question (V&V)

6 Stakeholder agents pre-Negotiate a policy solution (human reviewed)

7 Negotiated options with sensitivity & uncertainty bounds report provided

8 Statute or rule changes provide monitoring for future action if necessary



PTL's Implementation Status

Prototyped | ***In Devel. / Integration***

Workflow Management Assistant *(The "Rouse Navigator")*

IMPLEMENTED FOUNDATION

Assistant guidance + approved task handoffs in dev

WMA EXPANSION / INTEGRATION

Adding WMA to the full workflow; SNE & Report

1 — Create the policy *scenario*

Objectives + terms + stakeholders

Chat

2 — Research the *scenario*

Research sources (online lit & archive)

Research

3 — Analyze & build models

Analyze docs & generate model code

Parameters

4 — Run + inspect results

Run models + do result reviews

04 Models

5 — Stakeholder Negotiations

Counteroffers + agent responses

6 — Sens/Uncert. →

Sens/Uncertainty runs + report & review

Other tools

Policy Tools

Document Relationships

Archive

OTHER IN DEVELOPMENT / INTEGRATION

Local GPU OCR • Source-model + data → validation • Worker + archive integration

Obtaining Trust: Independent Scholar Testing

- Alpha testing PPEL and beta testing APEL in DARCIE CUI enclave
  - Interdisciplinary team of DCTC scholars at VaTech
  - Also working on one of our “hard” problems.

Scholars



Bethany Thompson

Mathematics



Adam Chan

Data Science



Marissa Muñoz

Secure Computing



Andrew Tabor

Aerospace Engineering



Eeshika Singh

Business IT

Obtaining Trust: IV&V Quality Assurance (pending)

- Independently test PPEL and APEL
- Dr. Eric Dano and a student, George Washington Univ.



Eric Dano

Associate Professor of Practice

Department: Engineering Management and Systems Engineering

Contact:

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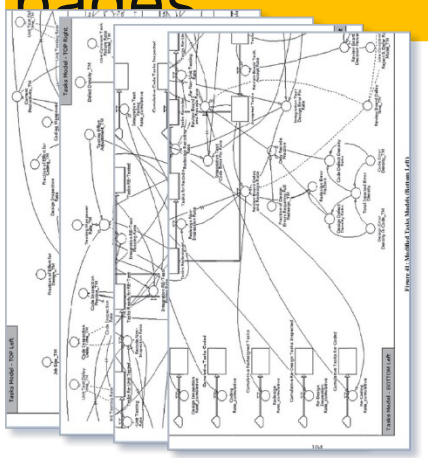
SEH 2630 | Office hours: By appointment

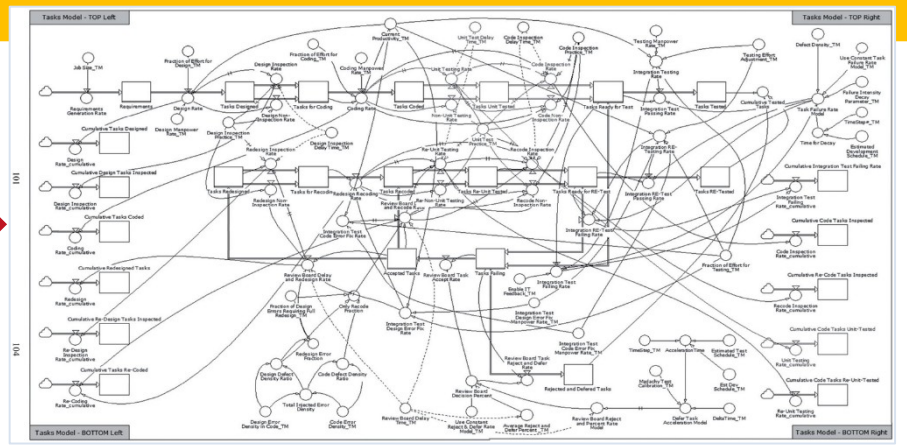
Professor Eric Dano comes from over 25 years in the defense industry with his primary focus on improving the practice of system architecture for complex engineered systems. Prior to industry, Professor Dano served as an Electronics Countermeasures Officer in the United States Marine Corps, flying in the EA-6B Prowler. His research interests include the introduction of system thinking principles into undergraduate education, defining data exchanges to tie together various domain models for assessing architectural alternatives, implementation of model-based engineering, and the use of system optimization techniques to assess system modularity, resiliency, supportability or other desired system attributes over the system lifecycle.

Using Prior Models for Initial Validation

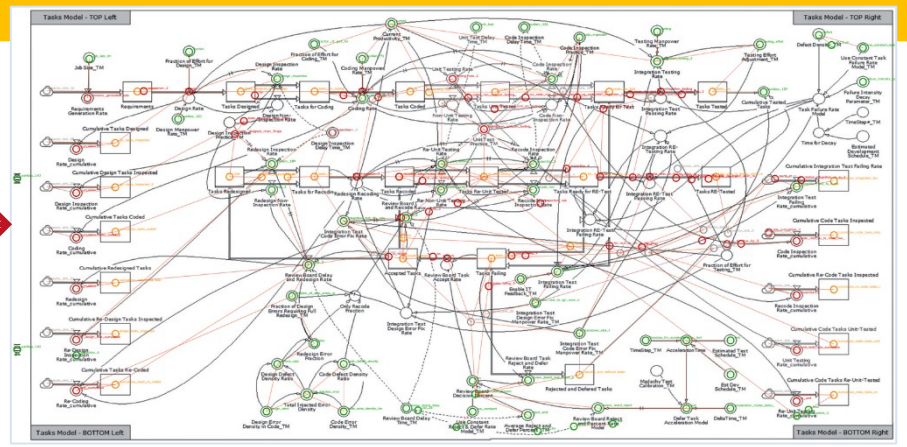
Successfully reassembled Buettner's Task Model, printed across four rotated pages



IN book pp. 101–104

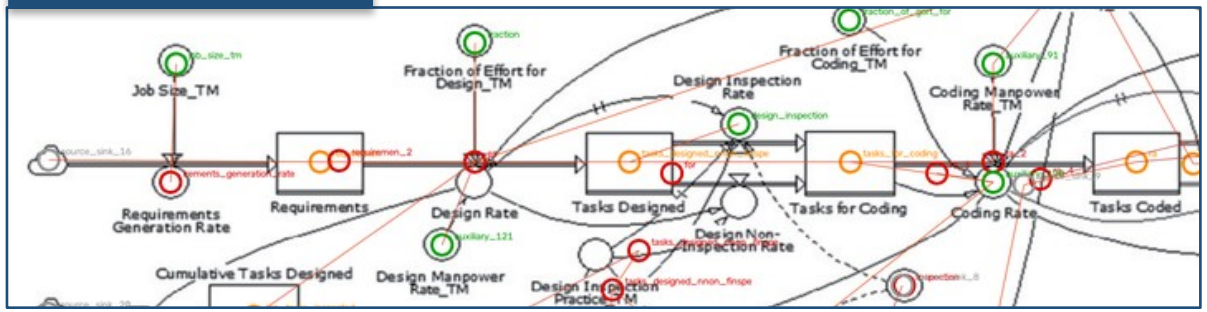


1 **2** **Find + Stitch:** locate the figures, rotate them, join the quadrants into one model



3 **4** **OCR + Rebuild:** read every label, tie it to a stock (orange), flow (red) or variable (green)

Zoom: what OCR read



Read: Job Size_TM → job_size_tm, Tasks for Coding → tasks_for_coding, Design Inspection Rate → design_inspection

Missed: Design Manpower Rate_TM fell back to auxiliary_121; Requirements was cut to requiremen_2

A picture gives structure, not coefficients. A missed label leaves a variable nameless, so the next slide's agent can't match it to the paper's equation.

Picture + Text → System Dynamics Simulation

SDS The rebuilt diagram gives the structure; the paper's text gives the data.

IN

The rebuilt diagram, plus the paper's equation tables and Vensim / Stella listings

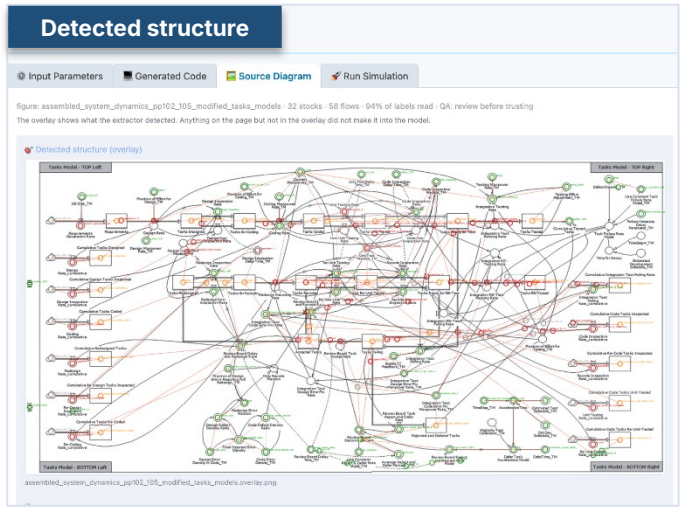
AGENT

Paper-equation agent matches each variable to the paper's equation and value; audits every match

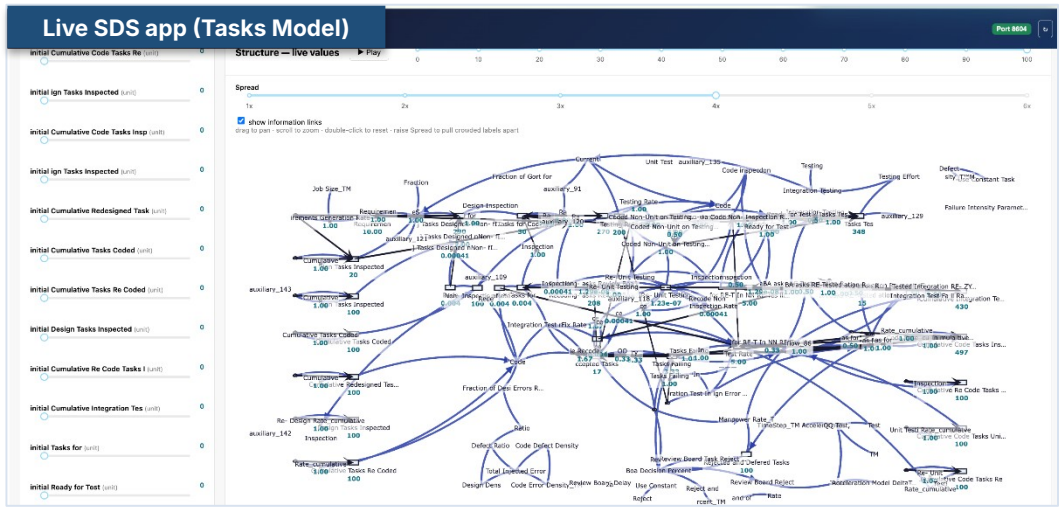
EMITS

A Dash SDS app on the paper's equations, with an editable diagram (Edit, Add, Drop, Link, Copy)

Detected structure



Live SDS app (Tasks Model)



Reviewer check

Every model is tagged **"paper"** or **"placeholder"** equations, so a reviewer sees which terms came from the source.

Buettner's Tasks Model, rebuilt from four book pages, running live with editable values.

Remaining ‘Hard’ Problems

- Model Validation
- ASOT Data for Model Calibration
- Agent and Modeling Bias
- Stakeholder Negotiation Agents Correctly Representing Stakeholders
- Gaining/Building Trust
- Facilitating/Coordinating ATO inside the Gov’t Cloud
- Frontier Model Differences in the Gov’t Cloud vs. Internet Version
- Getting the Phenomenology Right for each Policy Problem…

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Thank you!

Email the presenter

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