

Simulating Stakeholder Engagement: A Virtual Human Approach to Upskilling the Systems Engineering Workforce

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Outline

- **Foundational Perspectives**
- **Motivation**
- **Platform Introduction**
- **Module Overviews**
- **Recap and Next Steps**

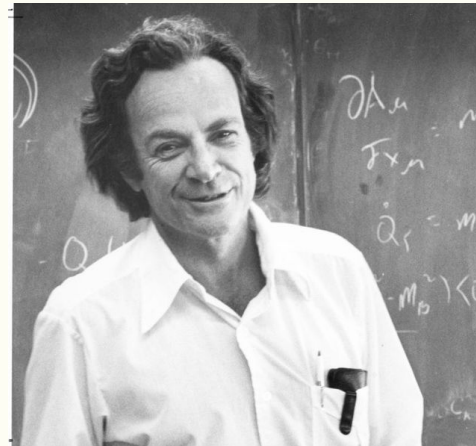
Foundational Perspectives - Inspiration

"We're trying to prove ourselves wrong as quickly as possible, because only in that way do we find progress."



Dr. Richard Feynman

"Science doesn't teach anything; experience teaches it."



Dr. Richard Feynman

*"Experience acceleration is the intentional design of learning environments that expose students to the **ambiguity, tradeoffs, and failures** defining real practice."*



Dr. Alejandro Salado

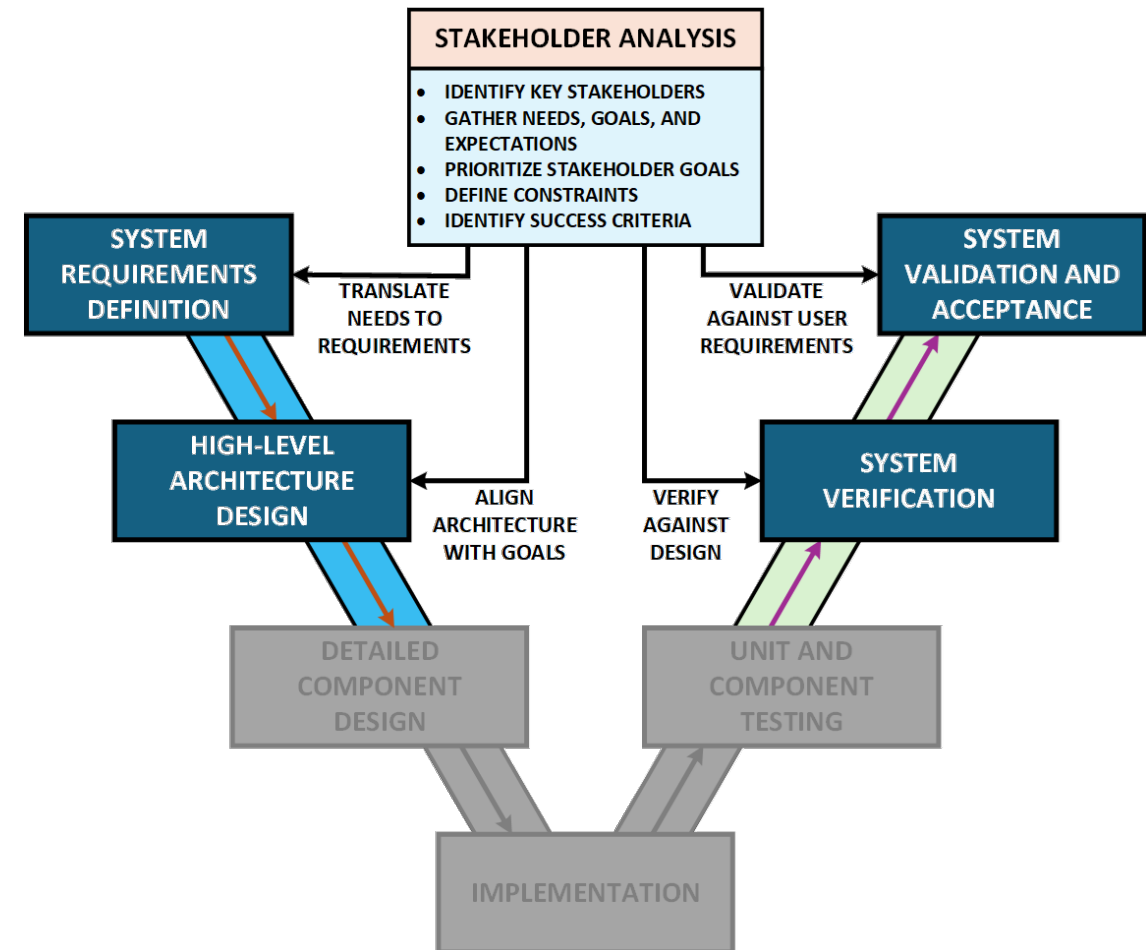
Motivation: Stakeholder Needs Drives System Development

Foundation: Clear stakeholder needs define the system baseline.

The Dilemma: Early-career staff need exposure to learn, but customer-facing mistakes carry severe project risk.

- *“How do I know I am truly prepared to lead an interface review or stakeholder engagement independently?”*

The Solution: A safe, low-stakes simulation environment that lets junior staff develop communication judgment and fail forward without endangering program resources.



Text - Based Simulation Module to Support Engagement Framework Development

Initial Deployment (v0) features:

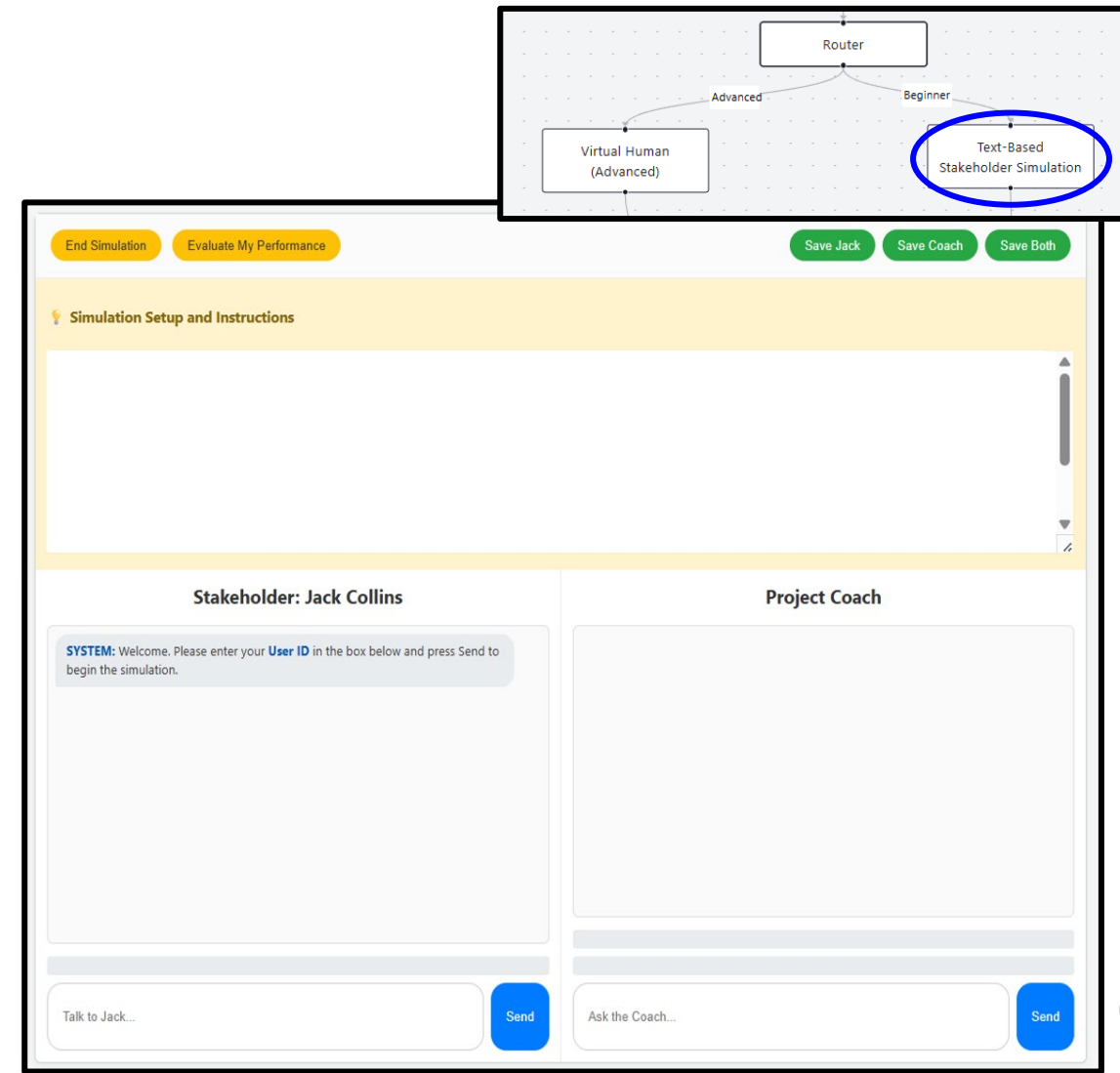
- Elicit stakeholder needs through dialogue
- Negotiate constraints and requirement trade-offs
- (Optionally) Receive active guidance, feedback, real-time scaffolding
- Receive performance feedback

Revision v1 (Fall 2026):

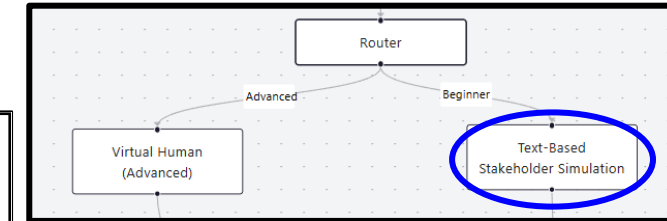
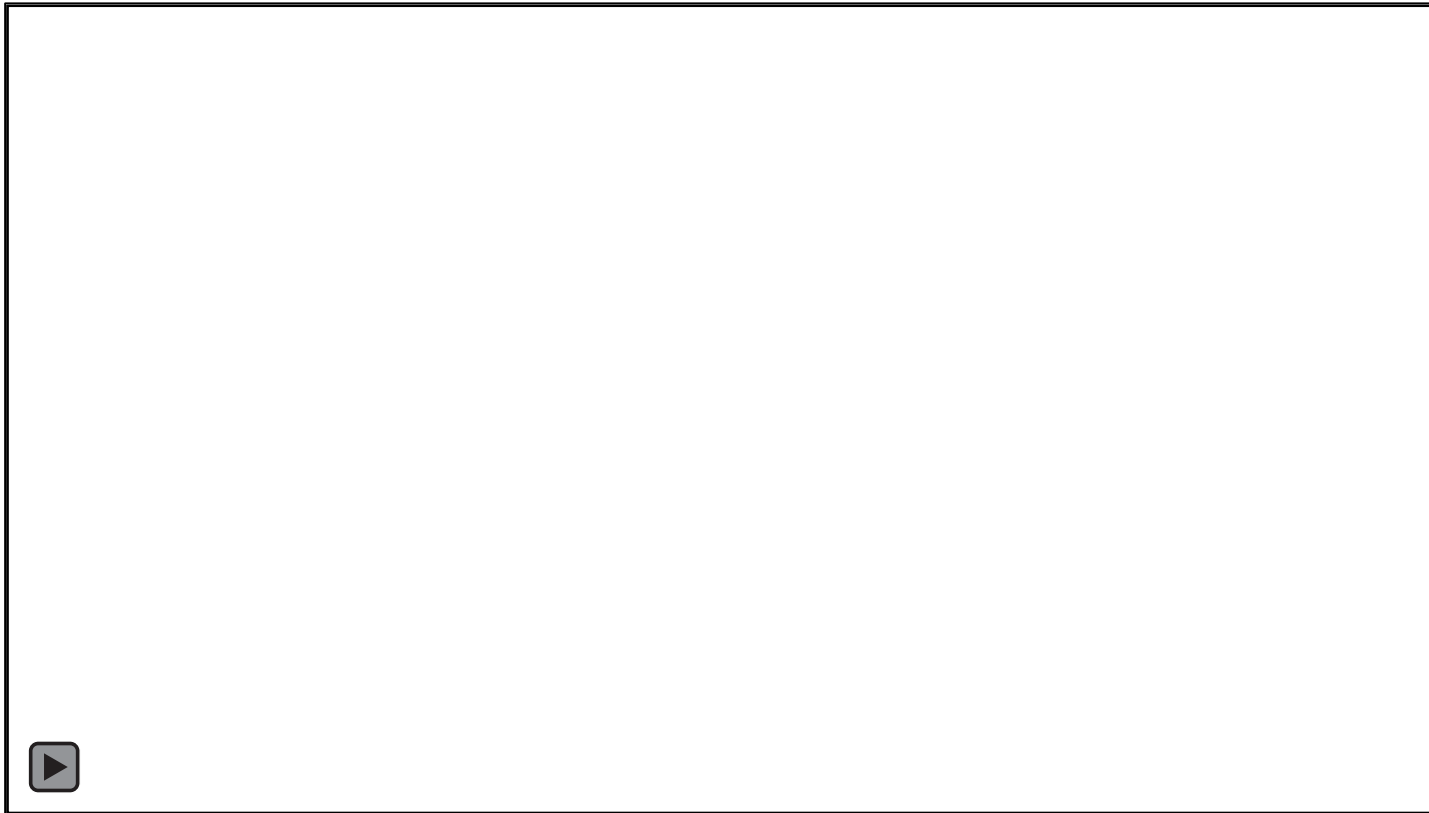
- Incorporates user feedback from first deployment
- Includes dynamic co-modeling driven by learned scenario context
- Enforce formal verification checks and consistency rules

ASEGT: Adaptive Systems Engineering Guidance Tool

(Draft) ASEGT Architecture



Text - Based Simulation Module to Support Engagement Framework Development



Insights Gained from Initial (v0) Deployment

Preliminary Study (n = 18)

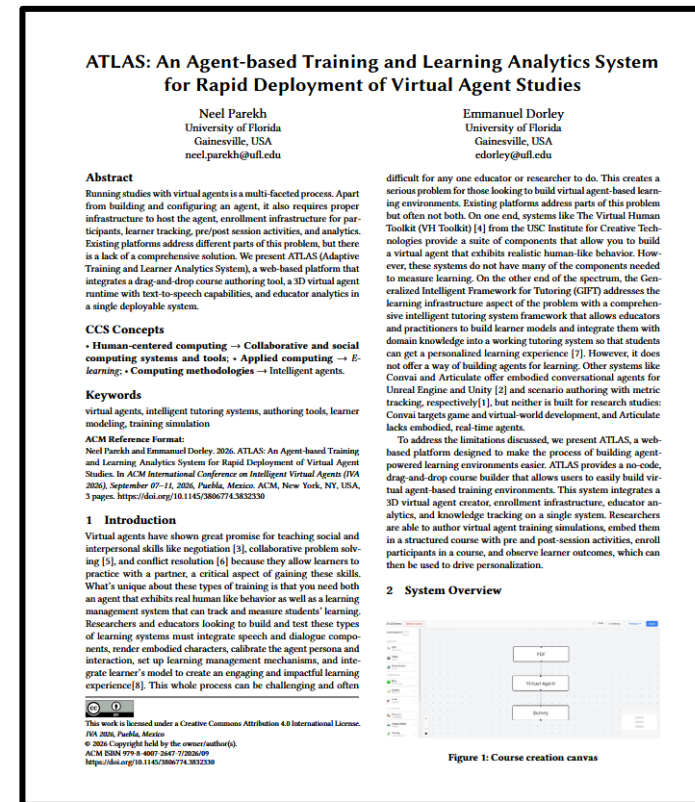
- **Participants Engagement:** Overall, **positive feedback** and **good precursor for users not familiar with Stakeholder Interactions**. Widespread interest in organizing and translate needs to system requirements.
- **Primary Coach Utilization:** Used primarily for requirements verification ("missed requirements" checks) and active guidance during stakeholder negotiations. Results suggest that programmed challenge was successful implemented.
- **Guidance Bypass & Shortcuts:** When the Coach bypassed its persona to provide direct answers, participants defaulted to copying and pasting solutions rather than engaging in dialogue.
- **Persona Integrity:** Maintained strong behavioral consistency across user interactions, though the Coach occasionally bypassed guide constraints to provide direct answers. Need new approaches to token management?
- **Text Density Trade-off:** High textual detail proved effective for requirements clarification, but introduced user disengagement during simulated dialogues.

Detailed Review is planned to be published in Summer / Fall 2027.

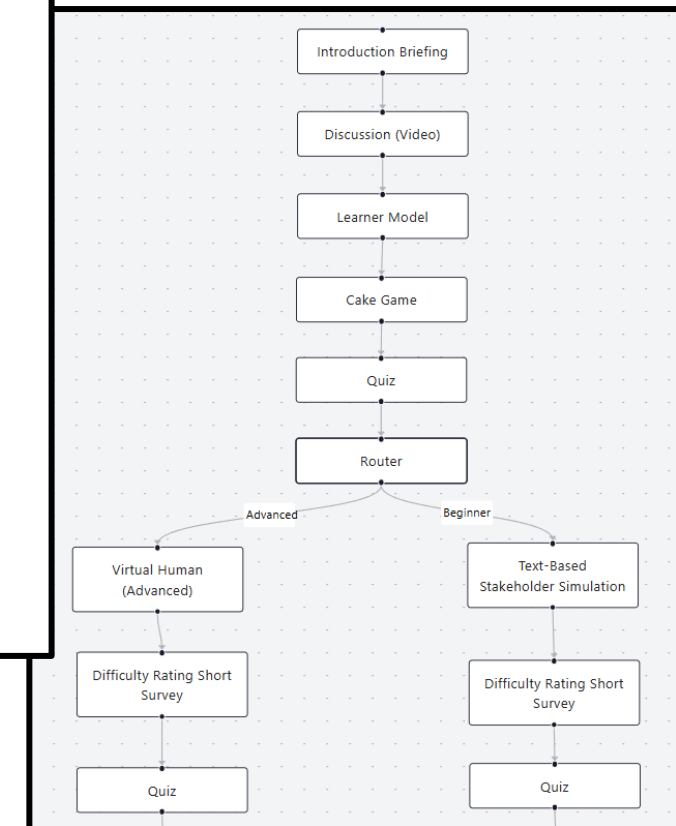
Takeaway: Text-Based Stakeholder Simulation (v0) deployment successful- lessons learned will inform Text-Based Stakeholder Simulation (v1) and Virtual Human Deployment

ATLAS: An ITS Platform to Deliver Dynamic Training

- **Platform Definition:** ATLAS (Agent-based Training and Learning Analytics System) for rapid deployment of virtual agent research.
- Web-based platform designed to facilitate the building of an agent-powered learning environment
- Executes adaptive scenario dynamics to deliver realistic, interactive stakeholder analysis training



(Draft) ASEG T Architecture



Takeaway: ATLAS is the engine that drives the Adaptive Systems Engineering Guidance Tool (ASEGT) to train stakeholder analysis.

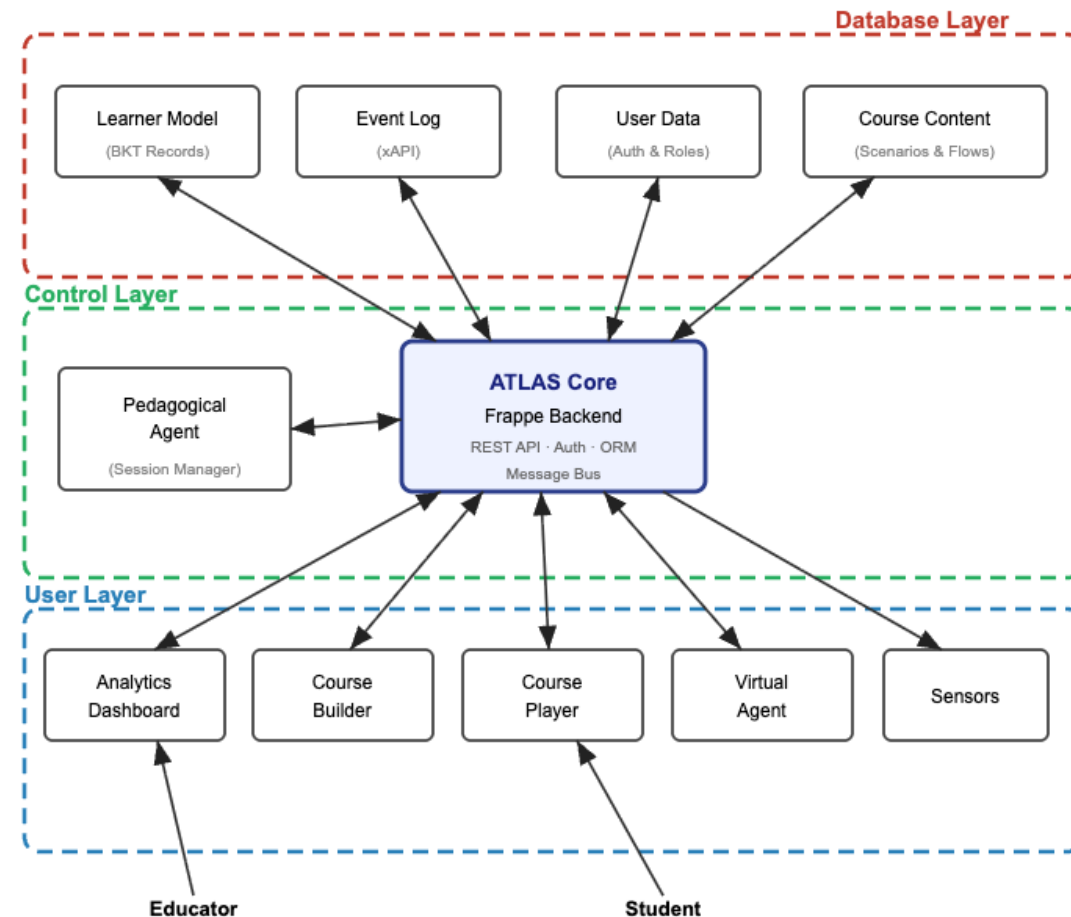
ATLAS Architecture

Initial Deployment (v0):

- Web-based scenario authoring and deployment.
- Modular virtual agent architecture.
- Conversational AI and learning analytics.

Revision v1:

- Adaptive scenario progression and learner modeling.
- Integration with Systems Engineering Guidance Tool.
- Automated performance assessment and feedback.



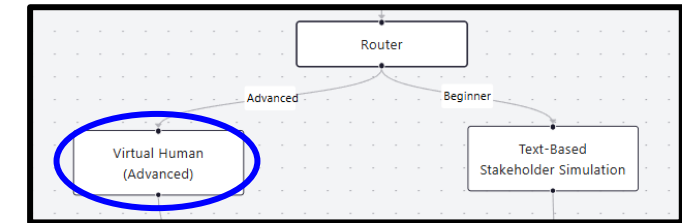
Virtual Human Approach to Deriving Stakeholder Needs

Initial Deployment (v0):

- Interactive stakeholder dialogue and negotiation.
- Realistic virtual human behaviors and personalities.
- Stakeholder needs elicitation and requirements gathering.

Revision v1:

- Incorporate pilot feedback.
- Adaptive stakeholder behaviors and scenario dynamics.
- Dynamic co-modeling and requirements verification



Next Steps

Upcoming Pilot Testing:

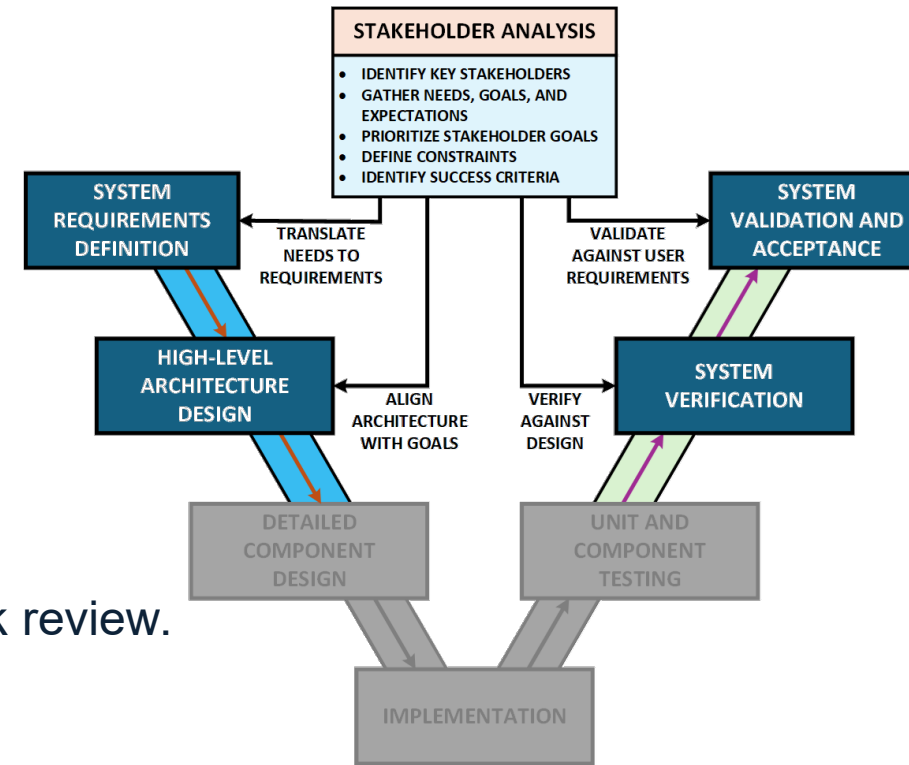
- Dynamic Text-Based Simulation v1 (Module)
- Virtual Stakeholder Agent v0 (Module)
- Adaptive Systems Guidance Tool (ITS) (Platform)

Projected Timelines:

- Phase 1 (Immediate): Module improvement
- Phase 2 (3 Months): Secondary cohort rollout and user feedback review.
- Phase 3 (Wrap-Up): Final trend analysis with evaluation report

Contact & Collaboration:

- Research Team: Dr. Seethambal Mani (Consultant / Advisor)
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Back-ups

Image References

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