

Behavioral Validation as the Missing Layer in Virtual-Worlds Hardware

Osman Seraceddin Sesliokuyucu, Ph.D.

Assistant Professor, School of Civil Aviation · Director, LEARC
Süleyman Demirel University, Türkiye

Partner team on site: Prof. Myung Ja Kim (AirStas, KASA) · NEURO-SPAXR, Korea–Türkiye bilateral programme

Validation is treated as a test step, not a design input

The SRIA's technology gaps should drive the concept; the space-tourism scenario should demonstrate and validate it — not the reverse.

Symptom	Consequence	Where we open a path
Validation starts from the use case, not the technology gap	Hardware requirements stay vague; the call funds hardware innovation, not scenario-building	Behavioral KPIs derived from the SRIA's technology gaps, then tested through the space-tourism scenario
Passive-exposure protocols	Weak, low-diversity behavioral signal; users just sit through a scene	Gamified elicitation design — goal/feedback/challenge loops that provoke reproducible response
AI treated as background software	Trust, acceptance and human–AI interaction dynamics go unmeasured	AI-as-Actor behavioral modeling — AI as a social actor in the scenario, not a tool
Multisensory integration judged by engineering metrics alone	Cross-modal synchronisation may be technically correct yet perceptually wrong	Perceptual thresholds and comfort criteria measured across diverse user groups

Osman Seraceddin Sesliokuyucu, Ph.D.

I study how people — as customers and as employees — respond to new technology, and turn that response into design requirements.

Gamification

Goal-feedback-challenge design applied to service, work and tourism settings

Artificial intelligence

AI-mediated service design; algorithmic management and human appraisal of AI

XR / AR / VR

Immersive scenario design for behavioral elicitation and acceptance research

Space & aviation tourism

NEURO-SPAXR: Korea–Türkiye bilateral programme, submitted June 2026

17 yrs

teaching, technology marketing & management

h-index 7

SSCI / Scopus record

LEARC

Director — dedicated centre & advisory board

3 countries

active research ties — Türkiye, Korea, USA

What the call requires, mapped to what we bring

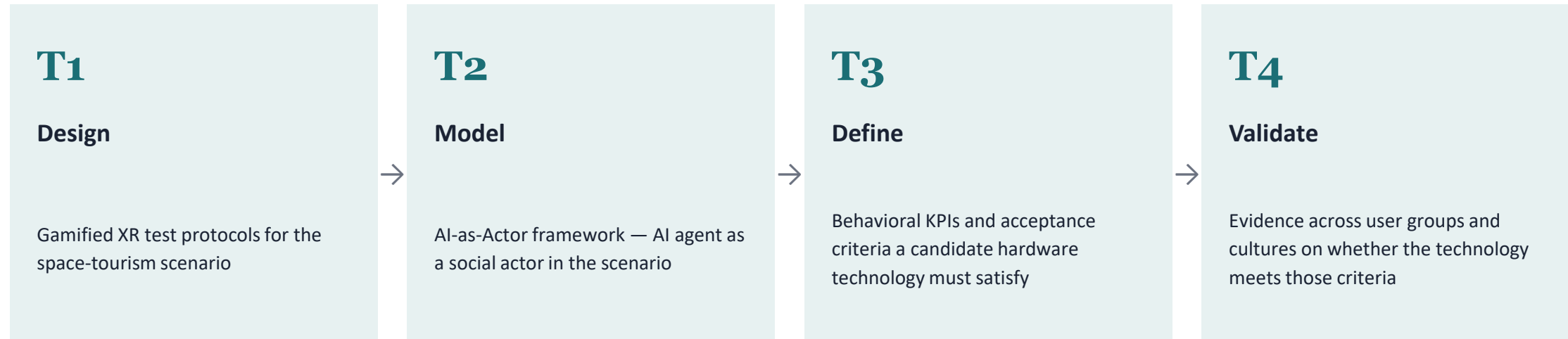
Quoted requirements from the HUMAN-01 topic text — not inferred needs.

The call text requires	What we contribute
"Effective contribution of SSH disciplines and the involvement of SSH experts" — a stated requirement of the topic	SSH lead: behavioral, acceptance and human–AI interaction research embedded as a work package, not an annex
"Improve the synchronisation and integration of the different modalities" across all senses	Perceptual and behavioral criteria for judging whether multisensory synchronisation actually works for users
"Inclusivity ... at the centre of concerns"	Validation across diverse user groups — students, aviation trainees and 60+ users via our existing VR programme
Devices "demonstrating usefulness and efficiency in illustrative scenarios in the industrial and societal contexts"	Two scenarios in one partner: space tourism (societal) and aviation training (industrial)

Note: *neuro-measurement here is a validation and requirement-definition tool. The hardware innovation itself (non-invasive BCI, haptics, advanced optics) is the contribution of a technology partner — we define what it must achieve and validate whether it does.*

A ready-to-integrate work-package module

Behavioral Requirements & Validation — four tasks, one deliverable chain.



Deliverable chain: Test protocols → AI-actor behavioral model → hardware acceptance-criteria specification → cross-cultural validation report

What the university brings, beyond one researcher

Validation at TRL 5 needs test environments, participants and governance — these are institutional assets.

Test environments

Metaverse studio with existing XR equipment; Space & Aviation Lab under LEARC as the long-term host for this work

Participant access

University students, aviation trainees, and 60+ users through our running VR programme — the diversity inclusivity claims require

Two demonstration contexts

Space tourism as the societal scenario; the School of Civil Aviation's training environment as the industrial one

Research governance

Institutional ethics committee and data governance for human-participant studies across sites

Standardisation: the call asks proposals to contribute to ongoing standardisation work. Behavioral acceptance criteria — comfort thresholds, perceptual synchronisation tolerances, accessibility baselines — are exactly the kind of output that can feed it.

Built on one partnership — open to the wider effort

HUMAN-01 is shaping up as a Korea-led consortium. This is what we bring to it.

Track record

- NEURO-SPAXR — Korea–Türkiye bilateral with AirStas (Prof. Myung Ja Kim); TÜBİTAK–NRF submitted June 2026
- LEARC — dedicated centre & advisory board at Süleyman Demirel University
- Space & Aviation Lab — long-term institutional home for this work

What we bring to a Korea-led HUMAN-01 consortium

- SSH work-package leadership — a requirement of the topic text, and the role most hardware-led consortia have yet to fill
- Behavioral KPIs and acceptance criteria that turn a technology gap into testable design targets a hardware partner can build to
- Gamified elicitation protocols generating richer behavioral signal than passive exposure
- Two demonstration contexts and diverse participant access, including 60+ users for inclusivity validation

Preferred role: WP Leader — Behavioral Requirements & Validation, under Korean-led coordination

Let's define what the hardware needs to sense — before we decide how to build it.

Osman Seraceddin Sesliokuyucu, Ph.D.

Süleyman Demirel University · School of Civil Aviation · LEARC

osmansesliokuyucu@sdu.edu.tr

Partner team on site: Prof. Myung Ja Kim (AirStas, KASA) — find us during Consultation Sessions 1 & 2