

ACTIVITY REPORT AND RESEARCH PORTFOLIO

THE INTEGRAL MANAGEMENT SOCIETY

TEGRITY.AI — AI INTEGRITY MANAGEMENT

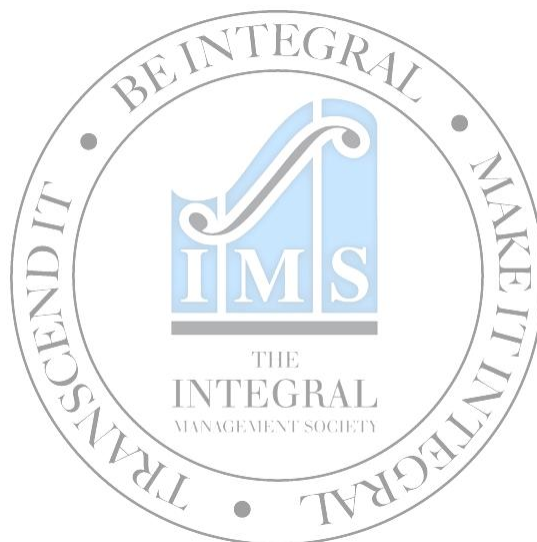
APPLIED RESEARCH • FIELD SYSTEMS • PRE-STANDARDIZATION

Research and technical activity developed across operational integrity, agentic AI, adaptive systems, information architecture and standards-facing work.

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— Geneva —

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EXECUTIVE OVERVIEW

Tegrity.AI is the applied research and technology programme of The Integral Management Society. It develops architectures, operational concepts and research for the integrity of AI-enabled complex systems: systems that must remain observable, bounded, challengeable and governable while their operating context changes.

The programme is research-led rather than a generic AI implementation practice. Its work combines original theoretical development, reconstruction of deployed systems, field-derived engineering studies, academic dialogue and participation in international pre-standardization and public-policy initiatives.

During the period covered by this report, Tegrity.AI expanded its Structural Awareness research corpus; developed Ecosystem Awareness, Minimum Sufficient Control Architecture, Regime Awareness and Delegated Authority; published multi-article research series; reopened the xSeil and Phylons technical lineages for new study; and brought these ideas into ITU, UNECE, UN CSTD, JRC, IGF, WIPO and university-facing work.

1. RESEARCH PROGRAMMES

1.1 Structural Awareness for Operational Integrity

Structural Awareness is the umbrella research programme. It studies the gap between the formal map used to govern a system and the structure through which the system actually operates. The programme connects information economics, organizational decision capacity, attribution, systems feedback and adaptive control, and translates those perspectives into testable research questions.

1.2 Ecosystem Awareness

Ecosystem Awareness develops a candidate architecture for reasoning across independently governed systems and agents. The work addresses local operational closure, inherited indeterminacy, system capacity, non-fungible composition, requalification of risk and capacity, and the handoff of qualified state between components. It is the principal Tegrity.AI line within ITU-T FG-TIDA.

1.3 Minimum Sufficient Control Architecture

Minimum Sufficient Control Architecture (MSCA) asks what intervention is sufficient to keep an adaptive system within a declared Objective Envelope without assuming that maximum control is possible or

desirable. It integrates observation, operating mechanisms, escalation, human authority and proportional intervention. The architecture was submitted to ITU-T FG-AI4SSC as contribution FGAI4SSC-I-097.

1.4 Regime Awareness and Sufficiently Good Early Warning

Regime Awareness studies how to identify when the assumptions that justified a system's present operating regime are losing validity. The programme develops semantic-context selection, contextual boundaries, re-anchoring and a Sufficiently Good detector evaluated against warning horizon, reliability, resource burden and available response capability. The work includes a mathematical validation route and field-derived cases.

1.5 Delegated Authority

Delegated Authority develops an operating architecture for granting, bounding, observing, challenging, revoking and returning authority exercised by AI agents. The research links identity and permission to actual decision rights, operating limits, escalation conditions and human recovery of control.

1.6 Formación Integral 3.0

Formación Integral 3.0 studies human–AI knowledge transmission in master–apprentice, community and intergenerational settings. It focuses on practical and tacit knowledge, legitimate knowledge holders, multilingual and oral-first interaction, local memory, permission, attribution, withdrawal and the preservation of human capability when AI participates in learning.

2. ARTICLES AND RESEARCH SERIES

Structural Awareness corpus

Four independent research series approach the same structural problem from different foundations and are brought together through bridge papers and shared tests.

The Cost of Clarity — information economics

- When the Problem Isn't the Technology
- When Asking the Question Changes the Answer
- When You Have to Decide Before You Can Discover
- When Cleaning Up Means Betting Blind

- How to Measure the Cost of Not Knowing
- Is Clarity Getting More Expensive?
- The Minimal Information a Transformation Needs
- What Goes Unpriced Is Paid in Human Intelligence
- About Cats, Boxes and Enterprise Management Decisions

The Attribution Gap — economics of capability and recognition

- The Attribution Gap and Capability Loss
- Attribution Gap Measurement Protocol
- Bridge: The Attribution Gap and Capability Loss

Human Intelligence Debt — organizational theory

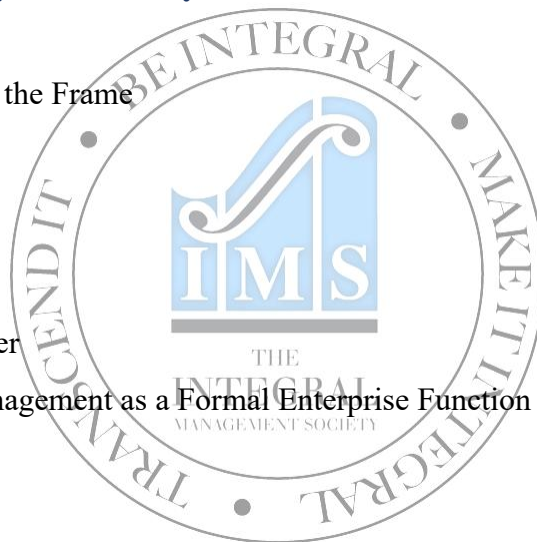
This series studies the distance between the human contribution made feasible by current technology and the contribution that actually occurs when scarce human intelligence is consumed as organizational middleware. Measuring Human Intelligence Debt develops its empirical direction.

Informational Friction — systems theory

- The Map and the Flow
- Optimization, Coherence, and the Frame
- Why Selection Cannot See It
- The Outlook

AI Integrity Management

- AI Integrity: A Critical Frontier
- The Case for AI Integrity Management as a Formal Enterprise Function
- One Function or Many?
- The Semantic Tug-of-War



AI Operational Integrity Architecture

- Toward Expert-System Envelopes Around Statistical AI
- Structural Limits of Current AI Integrity Under Regime Change
- From Complicated to Complex: The AI Safety Paradox

Regime Awareness in Adaptive Systems

- Minimalistic Regime-Aware Early Warning Systems
- Regime Awareness: Capability Development Field Cases Study
- Regime-Aware Semantic Windows Mathematical Validation

Cross-series work

- The Limits of AI Oversight
- What Cannot Be Recovered Must Be Managed
- Structural Awareness — Synthesis and Reader's Index

3. FIELD AND DEPLOYED-SYSTEMS RESEARCH

3.1 xSeil: operational intelligence under fully committed demand

Tegrity.AI reopened xSeil as a major deployed-systems research line. xSeil was a logistics planning and execution platform used in 2016–2017 for passenger transport under fixed commitments, hard capacity constraints, heterogeneous vehicles, transfers, time windows and dense propagation effects. The system combined route-library construction, compatibility relations, scenario pricing, bounded allocation and repair, dynamic route reconstruction, pacing and human-governed escalation.

The current programme studies xSeil as an industrial architecture rather than as a historical software description. It examines how a mission-critical system made very large search spaces operational through persistent decision memory, offline/online separation, selective widening, explicit economic objectives, localized replanning and bounded machine authority.

xSeil research outputs

- Vehicle Routing Under Fully Committed Tourism Demand — reconstruction of the industrial rich-VRP architecture and a historical replay protocol.

- The xSeil Problem, Deployed Architecture, Functional Substrate, and Quantum Research Boundary — system substrate and candidate computational questions.
- Pre-Agentic Orchestration: Closed-Loop Logistics Control Before the Agent Era — pacing, simulation, escalation and bounded actuation interpreted against modern agent architectures.
- Quantum Formulation and Resource-Accounting Note — regime-candidate selection and xSeil-derived search, estimation and optimization problems.
- Quantum Objects, Oracles, and Resource Accounting — technical companion specifying objects, oracles, baselines and resource questions.
- Large Problems Without Large Hardware — functional efficiency and architectural advantage in a mission-critical platform.
- Functionally Rich, Technologically Minimal — study of the business value created by complete functional architecture, disciplined data structures and simple operational mechanisms.

The xSeil work also produced technical code annexes and research designs for route-pool construction, concordance, scenario scoring, simulation, rollback events, localized replanning, centralized-versus-multi-agent comparison and quantum eligibility.

3.2 Phylons: semantic context, revision and shared-resource coordination

The Phylons programme reopens a 2018–2021 operational-intelligence architecture that made context computationally explicit. It studies multiresolution predictive factors, overlapping predicates, materialized state, specialized detectors, interpretable combinations, causal event confirmation, selective revision and the separation between local proposals and shared-resource commitment.

Phylons research outputs

- From Predictive Factors to Semantic Windows — reconstruction of the multiresolution context architecture and its relationship to contextual sufficiency.
- Dynamic Combinatorial Search for Semantic Windows — predicate lattices, support pruning, interaction constraints, exceptions, residual search and selective maintenance.
- Revision-Aware Event Semantics and Relabeling Cascades — event time, knowledge time, causal confirmation, dependency-aware rebuilding and cascade analysis.
- From Expert-System Knowledge Sources to Exchange-Level Liquidity Orchestration — multi-actor coordination, resource authorization, commitment and feedback.

- Optimization Methods Across the Lineage — cross-system synthesis of structure-first search, reusable state, explicit heuristics, bounded commitment and selective adaptation.

Together, xSeil and Phylons provide the principal field research base for present work on Regime Awareness, Semantic Windows, Ecosystem Awareness, Minimum Sufficient Control and Delegated Authority.

4. INTERNATIONAL RESEARCH AND PRE-STANDARDIZATION ACTIVITY

ITU-T Focus Group on AI for Smart Sustainable Cities and Communities

Developed and submitted FGAI4SSC-I-097, Minimum Sufficient Control as an Architectural Property of AI-enabled Urban Systems, together with a historical mobility case and an extensibility architecture for wider ecosystems, production environments and constrained-capacity services.

ITU-T Focus Group on Trustworthy Intelligent Digital Agents

Developed the Ecosystem Awareness working contribution around Theme 13, with interfaces to local verdict, human oversight, case-based validation and system-level capacity handoff. Additional work created a lightweight structure for comparing and reusing independently owned trustworthy-agent cases.

ITU-T SG17 secure agentic AI workshop

Participated in the technical workshop on secure agentic AI, with attention to decision-time enforcement, on-device trust control planes and security architecture relevant to Delegated Authority and Ecosystem Awareness.

UNECE Working Party on Transport Trends and Economics

Prepared From Historical Mobility Orchestration to Minimum Sufficient Control, using the Riviera Maya mobility case to examine bounded fleet coordination, network externalities, cascading commitments, criticality thresholds and transparent scenario planning.

UNECE WP.6 Education on Standardization Initiative

Contributed the Formación Integral case to work on standards as accumulated good practice outside formal standardization channels, especially for community education, tacit knowledge and AI-supported learning.

UNECE risk management activity

Developed a Regime Awareness contribution route on risk management, regulatory cooperation, assurance expiry and embedded AI.

UN CSTD Working Group on Data Governance at All Levels

Prepared Information Outside the Readiness Sampling Frame, addressing tacit and distributed knowledge, institutionally undeclared information, declarative burden, retrieval friction and persistent human mediation in data-governance and AI-readiness work.

European Commission Joint Research Centre

Submitted a contribution on AI-assisted data collection and process-mining analysis of administrative acts linked to local public investment, introducing information readiness, human-owned ontology, contradiction resolution, traceability and differentiated treatment of documented, tacit and institutionally undeclared information.

WIPO CDIP/37

Prepared and transmitted an IMSV ad hoc observer application package connecting capability preservation, attribution, technology transfer, cultural industries, SMEs and local value creation.

European Commission Apply AI Alliance

Completed the programme's membership route and established participation in the European AI policy and implementation community.

5. ACADEMIC AND TECHNICAL DIALOGUES

Universitat de València — QAVA

Research dialogue on Regime Awareness, semantic windows, sufficiently good early warning, optimization and the potential quantum or quantum-inspired treatment of concrete xSeil and Phylons problem structures.

TalTech and Enterprise Estonia / EIS

Developed an applied research route around The Cost of Clarity and The Minimal Information a Transformation Needs, including tacit and undeclared information, transformation risk and retrospective and prospective testing.

University of Guadalajara / Frontier2

Research dialogue on technology transfer, applied case development and university-ready studies covering infrastructure transformation, industrial operations and constrained routing under changing feasibility.

Cybernetica / EIS

Technical dialogue on trustworthy digital infrastructure, risk and resilient public systems.

European Commission JRC / DigComp

Technical exchange on distinguishing human competence from capability supplied by AI, informing the Formación Integral challenge model around observable competence, transparency and accountability.

Europeana Foundation

Technical exchange on tacit knowledge, AI-assisted cultural representation, hallucination risk, learner relevance, pacing, craftsmanship assessment and governance of knowledge reuse.

6. IGF AND FORMACIÓN INTEGRAL ACTIVITY

Formación Integral 3.0 and the IGF Lab direction

Developed the Formación Integral 3.0 proposal for practical and tacit knowledge transmission through bounded human–AI challenges, trusted practitioner roles, portable context and locally governed memory. A compact discussion edition and a substantive proposal corpus were produced for international consultation.

Cross-cultural learning architecture

Developed a portable architecture for Totonacapan and West African contexts, organized around legitimate knowledge holders, multilingual and oral-first interaction, offline operation, local memory, permission, attribution and withdrawal.

International consultation

Conducted focused exchanges with African research, innovation, diplomatic, youth and multilingual-AI communities on community-grounded knowledge, agency, justice, oral meaning, non-extractive reuse and practical learning cases.

IGF MAG Chair Office Hours

Participated in the session and raised the question of how trust in an AI system should be revisited when its operating context changes, linking the IGF Lab theme to Regime Awareness.

IGF Second Open Consultations and MAG Meeting

Participated online in the open consultations and followed the workshop-selection discussion on thematic coherence, quality, gaps and representation.

Procedural and programme-shaping work

Integrated guidance on connecting the practical mechanism to Internet use, openness and governance, and studied the thematic-input and Lab processes relevant to future programme contributions.

7. APPLIED CASE AND CAPABILITY RESEARCH

Frontier2 research packages

Prepared distinct university-facing study packages on airport-megaproject transformation, industrial logistics and energy operations, and constrained routing under changing feasibility.

Totonacapan and capability preservation

Produced a consolidated sociotechnical research report on intellectual property, practical knowledge, cultural industries, technology transfer and local capability development. This line also informed Formación Integral and the contribution on standards education.

Distributed American Innovation

Published field notes on distributed innovation, cross-border know-how, operational intelligence and productive capability, including historical mobility and enterprise cases.

Research communication

Developed the public diagrams, programme maps and explanatory materials used to communicate Structural Awareness, Regime Awareness, Ecosystem Awareness and Minimum Sufficient Control across research and institutional settings.

8. PROFESSIONAL AND ECOSYSTEM ACTIVITY

Tegrity.AI participated in selected international and business-facing events to connect its research with operational, technology and institutional contexts.

- FITUR Madrid — tourism, mobility and international ecosystem learning.
- Mobile World Congress Barcelona and related technical activity — agentic AI, infrastructure, platforms and technology-market developments.
- Talent Arena Barcelona 2025 — developer, deep-technology, careers and European talent-ecosystem engagement.
- Latitude59 Tallinn 2025 — direct observation of the Estonian innovation, investment and digital-government ecosystem.
- CyCon Tallinn 2025 — technical, legal and strategic work on cybersecurity and cyber conflict, informing the security dimension of AI Integrity Management.
- Smart City Expo World Congress Barcelona 2023, Valencia Digital Summit 2023 and 2024, and Mobility Innovation Valencia — urban systems, technology ventures, applied innovation and mobility.
- Forinvest Valencia 2026 — finance, investment, geostrategy and the business implications of AI-enabled transformation.
- Quantum-technology activity at Universitat Politècnica de Catalunya — emerging-computation research scanning and links to applied system architectures.
- Hub Empresa: AI, Data and Useful Knowledge — application of data and AI to operational value.
- Hub Empresa: Marketing and Sales — communication, positioning and market access.
- Hub Empresa: Start-ups and Investment — technology venture and innovation ecosystem learning.
- Conecta MX — Europe–Mexico education, careers, mobility and professional networks.

The programme also maintained its public research portal, research-contribution index and Field Notes corpus so that articles, technical work and institutional contributions remain accessible through a coherent programme map.

9. CONTINUITY AND FUTURE DIRECTION

The activities described above establish the basis for the next stage of Tegrity.AI. Future development will continue through:

Independent scientific review and experimental validation of Regime Awareness, Semantic Windows and Sufficiently Good Early Warning.

Continued publication and comparative testing of xSeil and Phylons research, including classical, agentic and quantum-inspired problem formulations.

Deeper participation in international research and pre-standardization on trustworthy, secure and governable agentic AI.

New academic and field collaborations connecting Tegrity.AI architectures with concrete operating cases.

Development of a selective Industry Reference Group contributing technical challenge, real-use cases and early engagement with research outputs.

Institutional patronage and public-interest backing from foundations, technology leaders and aligned organizations seeking stronger independent European capability in AI trust, transparency, security and shared technical development.

The intended result is broader scientific scrutiny, stronger public-interest relevance and sustained international contribution. These are programme directions rather than a commercial execution plan.

PUBLIC RESEARCH LINKS

Tegrity.AI programme: <https://tegrity.ai/>

Publications and Field Notes: <https://tegrity.ai/articles/>

Research contributions: <https://tegrity.ai/research-contributions/>

Structural Awareness corpus: <https://tegrity.ai/structural-awareness-program/>

Regime Awareness roadmap: <https://tegrity.ai/case-studies/>

Deployed-systems research: <https://jubap.net/field-notes/>

The Integral Management Society: <https://imsv.org/>

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