

Distilling Institutional Memory: A Human-AI Symbiosis Framework for Cartographic Quality Assurance in UN Peace Operations

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Abstract:

The United Nations Department of Peace Operations (DPO) and the UN Operations and Crisis Centre (UNOCC) have accumulated over eight years of operational cartographic outputs — country Factpacks, Watch Room situation maps, and associated metadata spanning 193 country workspaces. This archive constitutes a substantial body of institutional memory: encoded decisions about crisis representation, thematic prioritisation, and cartographic convention accumulated across successive generations of GIS analysts. Yet this knowledge largely remains latent, inaccessible to incoming staff, and vulnerable to loss through the high staff rotation characteristic of the UN system.

This paper argues that artificial intelligence offers a structurally new mechanism for distilling and surfacing institutional memory — and proposes a Human-AI Symbiosis framework for cartographic quality assurance (QA) grounded in this principle. Rather than treating AI as an automation tool, we conceptualise it as an institutional memory layer: capable of learning from historical product patterns, flagging deviations from established practice, and reminding human analysts of precedents and past errors they could not otherwise access. The human analyst, in turn, provides the contextual judgement and situational awareness that AI cannot replicate. The relationship is explicitly complementary rather than substitutive.

Drawing on a systematic inventory of the UNOCC GIS archive and SOP v3, we operationalise this framework across five QA dimensions: file and naming convention compliance, cartographic element completeness, cross-version layer consistency, boundary accuracy relative to authoritative sources, and visual accessibility. For each dimension, the AI role is defined as memory-informed flagging — surfacing how analogous products were constructed historically — while the human role encompasses exception handling and final approval.

A prototype evaluation across 15 country case pairs demonstrates that AI-mediated memory retrieval reduces inconsistencies in routine product review and surfaces recurring error patterns that were previously undocumented. Critically, this approach offers a mechanism for knowledge continuity that survives staff transitions — a structural vulnerability in international organisations where institutional knowledge has historically been treated as a personal rather than organisational asset.

This work makes an early but substantive contribution to the intersection of AI, organisational learning, and humanitarian cartography. The framework is transferable to OCHA, WFP, and other UN geospatial units, and proposes a replicable model for treating operational archives not merely as records, but as living knowledge systems amenable to AI-mediated distillation.