Spatial Inference-Time Skill Routing

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What Spatial Inference-Time Routing Specifies

When an operating unit faces an inference at a specific location, in a specific environment, with specific peer-unit attestations available, the unit's admissibility evaluator selects which adaptation artifacts are admissible. Spatial context becomes a first-class admissibility factor: the unit's current location, the credentialed observations available about the local environment, and the credentialed peer-unit attestations within scope all modulate which skills can fire.

The architecture extends inference-time admissibility from generic context (the consumer's policy, current operational state) to spatial context (geographic location, environmental conditions, peer-unit attestations). A medical-decision-support skill admissible in a credentialed hospital may be inadmissible at the same operator in a different setting; a navigation-skill admissible in benign roadway conditions may be inadmissible in degraded conditions; the architecture supports the structural distinction.

Why Generic Inference Routing Misses Spatial Constraints

Current inference-routing architectures evaluate skill activation against the consumer's policy plus the request context. The evaluation is location-agnostic: a skill admissible at one location is admissible at all locations the consumer operates in. The pattern works for cloud-hosted inference where location is largely uniform; it fails for spatial-mesh deployment where location matters.

Spatial inference routing handles the location-aware case. A drone operating in restricted airspace evaluates skills differently from the same drone in unrestricted airspace. A vehicle operating at a port evaluates skills against port-authority policy in addition to its baseline operator policy. The architecture supports the structural distinction that location-aware operation requires.

How Spatial Context Composes With Inference Routing

The composite admissibility evaluator consumes spatial context as additional credentialed observations: the unit's credentialed location estimate, the credentialed environmental observations from the surrounding mesh, the credentialed peer-unit attestations available. These contributions are evaluated alongside the consumer's policy and the request context.

The output is a graduated routing decision: full activation under permissive spatial context, restricted activation under partial spatial admission, deferred activation pending additional spatial observations, refused activation when spatial context excludes the skill. Each decision is recorded in lineage with the supporting spatial observations.

What This Enables for Mobile Autonomous Operation

Autonomous vehicles, drones, and mobile robots operating across heterogeneous geographies gain inference behavior that matches operating context. The same software stack produces different inference outcomes in different locations because the spatial context affects admissibility.

Cross-jurisdictional operation handles transitions structurally. A vehicle entering a new jurisdiction consumes the local authority's policy and the local environment's credentialed observations; inference routing adjusts accordingly. The patent positions the primitive at the layer where mobile autonomous operation has been operating with location-agnostic inference.