SAMIO™ | Intelligent Spatial Sensing

SAMIO

Spatial Clinical Intelligence Platform

Product Development Overview — Inpatient vs. Outpatient Use Cases,
Shared Infrastructure & Future Opportunities

PRODUCT STRATEGY | CLINICAL AI | WORKFLOW AUTOMATION | ANALYTICS

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Introduction

SAMIO is being developed as a spatial clinical intelligence platform that uses room-based devices, provider/staff badges, location tracking, ambient audio, and AI workflows to automate documentation, improve operational efficiency, and generate valuable clinical and operational insights.

The platform has use cases across both outpatient and inpatient environments, as well as workflows unique to each setting. This document breaks down those opportunities categorically to support product development priorities, feature architecture, and expansion paths.

Core Platform Concept

- ✓ Identify who is in a room, when they entered, how long they stayed
- ✓ Understand what kind of interaction occurred
- ✓ Generate the appropriate clinical or operational action from that encounter
- ✓ Evolve over time from documentation automation to full workflow, staffing, and data infrastructure

SECTION I

Cross-Setting Use Cases

The following features are relevant to both outpatient and inpatient environments.

1. Real-Time Translation / Interpreter Need Identification

SAMIO can identify language needs in real time and trigger translation-related workflows. In eClinicalWorks, fields already exist for preferred language and whether a translator is needed. Because those fields are often captured during registration, SAMIO can interface with that data to automate downstream actions.

Possible Functionality

- ✓ Detect or retrieve the patient's preferred language from the EMR
- ✓ Flag language mismatch between patient and staff
- ✓ Automatically notify staff that translation support is needed before the encounter begins
- ✓ Connect to third-party translation APIs or interpreter workflows
- ✓ Surface language needs on room dashboard, provider dashboard, or badge-driven workflow

Potential Value

- ✓ Reduced delays in care and fewer missed interpreter needs
- ✓ Improved compliance, patient safety, and communication quality
- ✓ Better experience for both staff and patients
- ✓ Future: voice-based language detection from ambient interaction

2. Advanced Analytics

Because SAMIO tracks staff presence, room transitions, dwell time, and workflow activity, it can generate a very rich analytics layer — potentially one of the most valuable parts of the platform over time.

Time-with-Patient Analytics	Path & Movement Analytics
• Provider actual face-to-face time per patient • Nurse time per patient • Medical assistant time per patient • Cross-role time during a single encounter • Total care-team time per encounter	• Staff walking paths and bottleneck zones • Frequency of unnecessary back-and-forth • Distance traveled per shift / encounter type • High-traffic location patterns • Room utilization patterns

Additional high-value analytics categories include workflow efficiency, staffing and productivity, operational and facility metrics, clinical process metrics, and quality and safety analytics. This layer supports internal optimization, staffing redesign, quality improvement, enterprise reporting, and potential data monetization opportunities.

3. Automatic Payroll / Passive Timekeeping

If staff members wear personal tags, SAMIO can track entry and exit from work zones, serving as the basis for automated timekeeping — reducing reliance on manual clock-in/clock-out. This would need careful policy, privacy, HR, and legal review, and should be positioned initially as passive time-assist rather than full autonomous payroll.

4. AI Voice-Activated Clinical Agent

A major future-facing feature is an AI voice agent integrated into the room device. While a clinician is present, they can interact with SAMIO hands-free to retrieve information, initiate actions, and reduce EMR navigation time.

Example Voice Requests

- ✓ "Hey SAMIO, create a work note for patient X."
- ✓ "Hey SAMIO, order a CBC, CMP, and lipid panel."
- ✓ "Hey SAMIO, what was this patient's last A1C?"
- ✓ "Hey SAMIO, prepare Augmentin 875 mg BID for UTI." (drafts for physician review)

Initially, the AI agent should retrieve information, draft actions, prepare orders and notes, and route tasks for review — rather than autonomously executing higher-risk clinical actions.

SECTION II

Outpatient-Specific Use Cases

Outpatient environments have shorter encounters, faster room turnover, and a provider-centric workflow. The greatest value here comes from documentation automation, real-time clinical assistance, room flow analytics, and administrative efficiency.

1. Automated Encounter Capture and Documentation

Because SAMIO knows when a provider enters and exits a room, it can define encounter windows automatically. Audio captured during that window can be transcribed and used to generate documentation drafts.

- SOAP note draft
- HPI capture
- Assessment/plan draft support
- Visit summary support
- Follow-up instructions draft
- Work note draft

2. Rooming and Visit Flow Optimization

SAMIO can measure and optimize patient room wait time, provider delay time, total room occupancy, staff utilization, turnover between patients, and variation across providers and locations.

3. Front-Office / Back-Office Coordination

By connecting registration, rooming, provider presence, and visit completion states, the platform improves operational coordination between front desk, medical assistants, nurses, physicians, and checkout staff.

4. Interpreter and Special-Needs Workflow Triggers

Outpatient care is especially vulnerable to support-need breakdowns when identified too late. Preferred language, translator need, and mobility limitations can be surfaced proactively before the encounter starts.

SECTION III

Inpatient-Specific Use Cases

Inpatient settings likely represent the broader long-term opportunity because of the scale of documentation burden, staffing complexity, patient requests, and continuous workflow activity.

1. Nursing Documentation Automation

Nurses may spend 3–4 hours of a shift on documentation alone. SAMIO can use room presence, ambient audio, and interaction context to infer documentation type and generate drafts automatically — reducing repetitive typing and chart navigation without replacing nursing judgment.

Assessment Domains

• Wound assessment	• Skin assessment	• Fall risk
• Neuro checks	• Functional mobility	• Respiratory assessment
• GI/GU assessment	• Pain assessment	• Cardiac assessment
• IV location / assessment	• Care plan updates	• Telemetry documentation

High-Value Use Case: New Admissions. New admissions are especially documentation-heavy. SAMIO can support skin assessment intake, medication and allergy verification, history collection, belongings inventory, emergency contact verification, and initial care plan and nursing note generation.

Two Workflow Models

✓ **Model A — Passive Inference:** System detects nurse entering room, captures interaction, infers documentation type, and creates a draft automatically.

✓ **Model B — Post-Encounter Prompting:** System detects room presence, then prompts nurse with structured menu of likely documentation tasks after the encounter.

This same framework can later support physical therapy, occupational therapy, speech therapy, respiratory therapy, social work, case management, dietitian documentation, and physician rounding support.

2. Smart Call Light / Voice-Based Patient Requests

Current call light systems require two steps: wait for someone to field the request, then wait for fulfillment. If the patient speaks directly to the room device, the system can route requests immediately to the appropriate fulfillment workflow, skipping the traditional fielding stage.

Example Patient Requests

✓ "Hey SAMIO, I need some water."

✓ "Hey SAMIO, I need help getting up."

✓ "Hey SAMIO, how long until I can get my next pain medication?"

✓ "Hey SAMIO, I feel short of breath." → Escalation trigger

Requests route to a centralized dashboard for triage and assignment. Smart features include urgency categorization, role-based routing, automatic escalation for unaddressed requests, estimated wait times, and alerting for concerning phrases.

SECTION IV

Future Development Opportunities

1. Remote Patient Monitoring / RF-Based Sensi

A future expansion could incorporate non-contact physiological monitoring using RF-based methods (e.g., approaches similar to Tapestry) to derive biologic parameters from room-based hardware. This would move SAMIO from documentation and workflow infrastructure into continuous passive monitoring.

- Heart rate
- Respiratory rate
- Motion and sleep patterns
- Presence / absence
- General physiologic trend detection

2. Video Monitoring Layer

Once devices are broadly deployed, selective or permission-based video monitoring could support patient safety use cases. This is a sensitive area requiring major privacy review, legal review, consent framework, and facility policy design.

- Fall and agitation detection
- Wandering detection
- Mobility decline detection
- Delirium/confusion pattern recognition
- Behavioral change detection suggestive of clinical deterioration

SECTION V

Product Architecture — Core Engines

For architectural clarity, SAMIO can be thought of as five core product engines:

Spatial Intelligence Engine	Ambient Clinical Intelligence Engine	Workflow Automation Engine	Analytics Engine	AI Agent Layer
• Badge detection & role identification • Room geofencing & dwell time • Encounter detection & zone transitions	• Room audio capture & speaker attribution • Context & interaction-type detection • Documentation-type inference & command recognition	• Documentation draft generation • Task routing & request dashboards • Action preparation & queue management	• Time, movement & utilization analytics • Compliance & response-time analytics • Staffing and throughput analytics	• Information retrieval & voice commands • Action drafting & order preparation • Note generation & task completion assistance

SECTION VI

Development Prioritization

From a product strategy standpoint, development should proceed in five phases:

PHASE 1 Core Infrastructure	PHASE 2 Documentation Support	PHASE 3 Workflow Automation	PHASE 4 Advanced Intelligence	PHASE 5 Future Sensing / Monitoring
• Badge tracking & room presence • Encounter timing • Basic analytics • Patient/staff context matching	• Outpatient note drafting • Inpatient nursing documentation prompts • Admission workflow support • Structured documentation generation	• Smart prompts & request routing • AI assistant for retrieval & drafting • Payroll/timekeeping assistance • Interpreter need triggering	• Smart call light • More autonomous agent workflows • Deeper EMR action support • Predictive operational analytics	• RF-based physiologic sensing • Video-based monitoring • Deterioration & behavior detection • Passive continuous monitoring

SECTION VII

Key Design Principles

As SAMIO is developed, the platform should follow these core principles:

1

Assistive Before Autonomous

Especially with clinical actions, the system should initially draft, prepare, and recommend rather than independently execute.

2

Low-Friction Workflow

The product should reduce clicks and documentation burden — not create more prompts or administrative work.

3

Role-Aware Logic

The system must understand whether the person in the room is a physician, nurse, MA, PT, social worker, etc., because documentation and workflows differ by role.

4

Encounter-Aware Intelligence

The platform should infer what kind of encounter is taking place and adapt its behavior accordingly.

5

Safe EMR Integration

Anything touching orders, pharmacy, or chart data must be permission-based, reviewable, and auditable.

6

Analytics as a Product

The data layer itself may become one of the most valuable long-term assets — analytics should be designed intentionally from the start.