ENTERPRISE EVALUATION FRAMEWORK

A Practical Framework for Comparing Wearables and Computer Vision AI

MĀKUSAFE

> **Executive Decision Matrix:** This evaluation guide assists Corporate Risk, EHS, and Legal teams in assessing the operational readiness, financial deployment friction, and jurisdictional compliance profiles of body-worn environmental/ergonomic sensors versus static overhead fixed camera computer vision AI solutions.

CORE SOLUTION DESCRIPTIONS

1. Mobile Connected-Worker Sensors (MākuSafe Safety Ecosystem)

An integrated, workforce-centered safety platform that balances physical ergonomics with complete mobile flexibility. The ecosystem consists of the arm-worn **MākuSafe Ally** wearable to capture high-velocity ergonomic strains, slip/trip force anomalies, and environmental exposure. It seamlessly integrates with **Scout** hardware to deliver real-time pedestrian-vehicle proximity awareness for forklift safety in chaotic hubs. For mobile, transient, and off-site operations, **Field Kits** connect directly to a smartphone app to safeguard remote logistics personnel. The application of **MākuSmart AI** helps eliminate dashboard fatigue by allowing risk management teams to instantly query complex cross-site metrics using natural language.

> ***MākuSmart AI Enterprise Query Example:***
> *"I'm visiting our Los Angeles site this week, help me understand trends and hazards that may be developing."*

2. Fixed Camera Computer Vision AI Solutions

A facilities-tethered infrastructure platform that applies machine learning algorithms to stationary overhead security and CCTV camera feeds. These solutions monitor facility floors from an aerial perspective to identify structural safety deviations, un-flagged forklift lane incursions, and general PPE non-compliance. While effective for continuously tracking visible behaviors within highly controlled indoor environments, they operate as a top-down surveillance layer entirely dependent on fixed lines-of-sight and local hardware infrastructure.

HEAD-TO-HEAD CAPABILITY MATRIX

EVALUATION CRITERION	MOBILE CONNECTED-WORKER SENSORS (MĀKUSAFE)	FIXED CAMERA COMPUTER VISION AI SOLUTIONS
Deployment Timeline & IT Friction	• **Immediate (1–3 Days):** Out-of-the-box deployment via plug-and-play base stations or mobile Field Kits. • **Flexible Cloud Sync:** Base stations utilize standard **Ethernet or Wi-Fi** configurations to cleanly communicate data to the cloud dashboard.	• **Extended (6–12 Weeks):** Requires extensive hardware audits, localized edge-gateway installation, and manual calibration. • **Heavy IT / Engineering Load:** Demands complex camera mapping, firewall provisioning, and high-bandwidth network alignment.
Network & Facility Dependencies	• **Low Network Demand:** Does not require specialized camera architectures or continuous massive streaming video bandwidth. Operates entirely on standard plant **Ethernet or Wi-Fi**. • **Edge Data Buffering:** Wearable stores data internally until it regains connectivity.	• **Severe Infrastructure Tax:** Requires widespread high-definition IP camera coverage and pristine lighting. • **Bandwidth Bottlenecks:** Mandates constant, uninterrupted high-bandwidth upload streams to prevent dropped frames and missed risks.
Employee Privacy & Legal Liability	• **No Surveillance Pushback:** Strictly gathers outward-looking environmental and macro-motion data. No biometrics or PII. • **Regulatory Shield:** Avoids HIPAA and strict biometric privacy laws, enabling legal and union approvals.	• **"Big Brother" Friction:** Constant video recording often creates strong workforce pushback and union grievances regarding monitoring. • **Legal Data Liability:** Storing video recordings of employee movements introduces complex legal exposure and data privacy compliance risks.
Field & Transit Capabilities	• **Total Last-Mile Visibility:** For remote/field workers, a mobile device and app are required to sync and transmit dynamic leading indicator data from off-site environments. • **Environmental Mapping:** Explicitly captures heat index, toxic noise levels, and localized atmospheric strain directly at the worker.	• **Absolute Field Blindspot:** Completely limited to fixed facilities. Zero tracking when a worker steps outside the camera's view. • **No Ambient Context:** Cannot measure physical heat, localized sound exposure, or air quality forcing workers into high-risk conditions.
Visibility Beyond Observation	• Designed for needed visibility into work processes and actual conditions; Heat exposure, Noise exposure, Air quality, Ergonomic strain, Physical workload, Environmental stressors. • Realtime visualization of forklift proximity to pedestrian interactions for PIV operators.	• Designed to observe behavior.

CLIENT CONSULT:
ADDRESSING INFRASTRUCTURE COSTS & EMPLOYEE PUSHBACK

1. What if you do NOT have an enterprise-grade CCTV system and network?

If you lack modern, networked IP cameras, marketing claims like "deploy in minutes using your existing infrastructure" no longer apply to fixed camera computer vision AI platforms. Implementing them will require substantial upfront capital expenditures (CapEx):

- **The Hardware Gap:** They will need to purchase and install PoE (Power over Ethernet) IP cameras. Industry-grade safety cameras typically run $300 to $1,000+ per camera (though some platforms offe r their own proprietary hardware lines to help bridge this gap).
- **The Infrastructure/Network Gap:** Running hundreds of feet of industrial CAT6 ethernet cabling, purchasing managed network switches, and installing on-premise AI edge servers/gateways can easily add $10,000 to $50,000+ per facility in electrical and IT installation labor.
- **The Bandwidth Tax:** Streaming continuous high-definition video to the cloud requires massive, uninterrupted outbound bandwidth. If their network is weak, they will either experience severe facility internet lag or have to pay for a costly dedicated fiber upgrade.
- **Further Investment:** Existing camera infrastructure often does not provide high enough resolution, requiring further investments in higher quality cameras.

> **The MākuSafe Contrast:** If infrastructure is poor, MākuSafe is vastly easier to deploy. It only requires a single internet connection (via Wi-Fi or a standard Ethernet drop) at the centralized base station plug-in kiosk. The individual wearables sync locally to the base station, avoiding network strain.

2. Is there a risk of employee pushback regarding "all the time" camera surveillance?

Yes, this is a very real psychological and cultural risk. Employees frequently push back on computer vision AI, labeling it a "Big Brother" tool used by management for micro-management, write-ups, or punitive surveillance.

If your client chooses a fixed camera-based system, they must proactively counter this pushback using the platforms' built-in privacy architectures:

- **Anonymization by Default:** Advanced computer vision platforms feature strict "Privacy by Design" protocols. Their AI models automatically blur faces, strip out personally identifiable information, and use 3D "ghosting/anonymization" algorithms. They track behaviors (e.g., "a person is walking in a forklift lane"), not identities.
- **No Biometrics:** It is crucial to emphasize to workers and unions that these systems do not use facial recognition or biometric tracking.
- **Cultural Framing:** Management must establish a strict policy that AI data is used purely for systemic facility fixes (e.g., re-engineering a dangerous intersection or buying better PPE) rather than punishing individual workers. If workers see a colleague get fired because an AI caught them without safety glasses, trust will evaporate permanently.

> **The MākuSafe Contrast:** Wearables face their own minor pushback ("Am I being tracked?"), but it is often easier to overcome. Because the device is worn on the arm and does not track biometric data, location, or identities—focusing purely on environmental hazards like heat, noise, and forceful motion—workers tend to view it more like a piece of personal protective equipment (PPE) designed for their direct comfort and safety.

STRATEGIC OPERATIONAL TAKEAWAY

The Realist Appraisal: Fixed camera computer vision AI platforms offer a compelling concept for modern, highly controlled corporate hubs that already feature multi-million dollar fiber-optic and camera networks. However, for real-world industrial footprints, network irregularities, and high-risk last-mile transit operations, computer vision introduces massive blindspots and a heavy infrastructure tax.

May require monitoring hours of video to train the AI model so that it knows what you want to pay attention to and what you want it to disreguard.

The Wearable Advantage: By processing risk data right on the worker's body and allowing flexible Ethernet/Wi-Fi base communication or mobile app-based field syncing, mobile sensor ecosystems completely bypass streaming network bottlenecks, shield the enterprise from employee privacy legal battles, and protect remote personnel where the vast majority of high-deductible claims actually happen.