

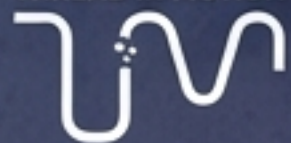
B/S/H/

SUCCESS STORY

Driving Operational Excellence in Home Appliance Manufacturing

Takt Time Optimization and Ergonomic Transformation at BSH
via Hands-Free Intelligence

THREAD IN MOTION



| 2025

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From Manual Operations to Intelligent Automation

BSH requires flawless part traceability across its global manufacturing footprint to uphold premium quality standards.

As Europe's largest home appliance manufacturer, BSH operates approximately 40 factories worldwide, with its largest manufacturing hub located in Tekirdağ, Turkey.

Within these high-volume facilities, strict component traceability is non-negotiable. Every individual part must be scanned and logged to create a comprehensive **digital audit trail**, ensuring product reliability and compliance.

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Client:

BSH (Bosch Siemens Hausgeräte)



Facility Location:

Tekirdağ, Turkey (Largest global hub)



Core Imperative:

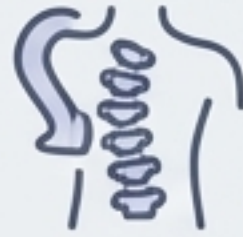
Achieve 100% component traceability without compromising production velocity or Takt Time.

The Hidden Costs of Legacy Traceability: Handheld scanners created severe operational bottlenecks and physical strain.



Throughput Degradation

The manual 'pick-up/put-down' workflow injected dead time into every assembly cycle. These micro-delays compounded, significantly elongating overall Takt Time and capping peak production capacity.



Cumulative Workforce Fatigue

Operators repeatedly lifted 500–800g scanning devices. Across a single shift, this translated to an unnecessary cumulative lifting burden of approximately 1.5 tons per worker, escalating ergonomic risks.



Latent Quality Risks

The physical disconnect between holding a heavy scanner and assembling a delicate part increased the probability of mis-scans or skipped components, elevating downstream rework costs.

Legacy Workflow Segmented Timeline



From **Manual Operations** to **Intelligent Automation**: Deploying **VEGA-X smart gloves** for frictionless, hands-free assembly.



Before: Segmented Operation (5 Steps)



(Hands temporarily occupied)



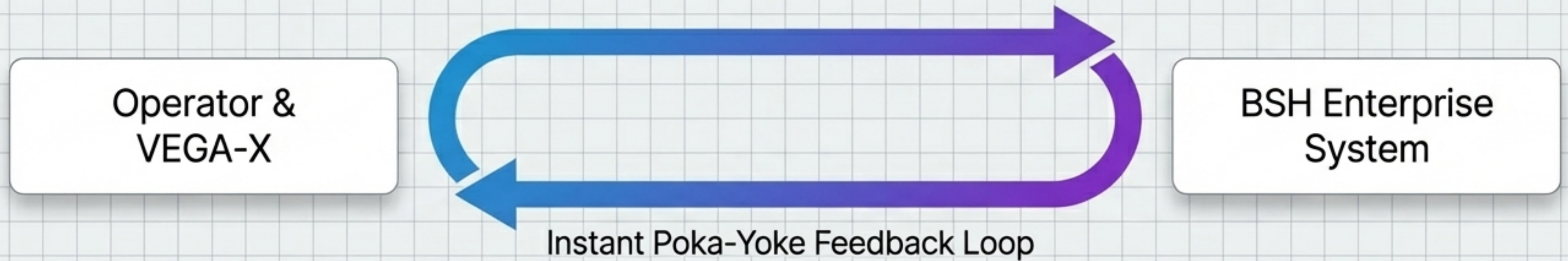
After: Continuous Operation (2 Steps)



(Hands remain 100% free)

VEGA-X Wearable Terminal —
Merges IoT connectivity with
natural human movement.

Zero-friction integration and active 'Poka-Yoke' error prevention secured quality at the source.



Plug-and-Play Scale

The 50-unit deployment across the Tekirdağ facility was completed in just two weeks. Requiring zero IT architectural overhauls, the devices paired directly with existing shop-floor infrastructure to establish instant digital continuity.

Active Quality Control (Poka-Yoke)

VEGA-X cross-references scanned data against the real-time Bill of Materials (BOM). If an incorrect component is selected, the device instantly triggers a multi-modal alert (Haptic vibration, Acoustic beep, Optical LED), preventing assembly errors before they occur.

Quantifiable Impact: The VEGA-X integration yielded immediate, highly scalable returns across efficiency, quality, and human capital.

Accelerated Takt Time

~5.5 Hours

*Reclaimed Production
Time / Day*

Based on conservative 2-second savings per scan across high-volume 1,000-unit lines, drastically increasing increasing daily throughput.

Defect Eradication

**Immediate
Poka-Yoke**

First-Pass Yield Secured

Multi-sensory feedback prevented incorrect parts from entering the assembly stream, slashing downstream rework and scrap costs.

Ergonomic Relief

1.5 Tons

Lifting Strain Eliminated

Replacing heavy handhelds with featherweight smart gloves removed massive cumulative lifting burdens, elevating OHS standards.

Strategic Impact: A proven blueprint for **agile, human-centric** smart manufacturing.

The successful deployment at the Tekirdağ facility proves that robust digital traceability does not have to come at the expense of physical ergonomics or production speed. By merging IoT connectivity with human workflow, BSH has unlocked a new paradigm for operational excellence.

Global Scalability

A proven, plug-and-play template requiring **zero complex** IT overhauls, ready for rapid rollout across BSH's global network of 40+ factories.

Operational Agility

Untethered, hands-free operators can now be dynamically **reallocated** across lines without the logistical constraints of legacy hardware.

Workforce Empowerment

Investing in lightweight wearable technology reinforces a systemic commitment to employee well-being, elevating operators into augmented digital workers.

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