Digital Transformation of Visual Management Boards

Whitepaper

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IGEAR

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Executive Summary

This whitepaper examines the digital transformation of visual management boards, including SQDC, FMDS, 3-Pillar, and Gemba Walk. It highlights advancements and insights into how digital technologies are revolutionizing visual management boards to enhance efficiency, reliability, and integration capabilities, thereby advancing overall company priorities and continuous improvement initiatives.

As industries navigate workforce challenges and the complexities of the digital era, the need for effective management tools that enhance visibility, streamline processes, and foster continuous improvement has never been more critical. Digital visual management boards facilitate real-time communication, problem-solving, and decision-making. By providing a clear and immediate overview of production status, performance metrics, and potential bottlenecks, visual management boards empower teams to respond swiftly to issues, optimize workflows, and drive sustained improvements.

CORE FUNCTIONALITIES OF VISUAL MANAGEMENT BOARDS

This whitepaper discusses the significance of visual management boards, their applications, and core functionalities, whether paper-based or digital. It briefly addresses the limitations of paper-based systems, including time wastage, lack of easily accessible information, manual editing processes, absence of real-time connectivity to machines, the requirement for team members to be physically close to the board, and the inability to integrate with other applications.

BUSINESS DRIVERS FOR DIGITAL TRANSFORMATION

Digital visual management boards significantly enhance employee efficiency and collaboration. They achieve cost efficiencies by reducing paper usage, printing expenses, and manual labor. These boards provide a modern, efficient, and collaborative solution for huddle and stand-up meetings on the production line, utilizing real-time data to improve accessibility and communication. This helps teams remain agile and responsive. Furthermore, digital boards enhance floor management, development, team leader and team member engagement, decision-making, and overall productivity by delivering more reliable information, keeping employees well-informed, and driving actionable insights.

TYPICAL USE CASE AND IMPLEMENTATION STRATEGIES

This document outlines the key considerations shared across various IGear installations within manufacturing and material handling operations. It introduces a well-established, systematic phased strategy for transitioning from paper to digital systems, ensuring a smooth and successful progression from initial implementation to extended capabilities that can be integrated over time. The transition from paper to digital systems involves significant changes in both personnel and organizational culture, necessitating patience and careful management of the rollout.

Core Functionalities of Visual Management Boards

Visual management boards are integral to manufacturing, supporting daily operations, problem-solving, and continuous improvement. Traditionally, these boards are paper-based and manually updated, reflecting the status of various production metrics and activities since they were last printed.

- VISUALIZATION OF STANDARDS AND PERFORMANCE: Visual management boards help visualize the gap between current performance and standards, making abnormalities in the process more visible. This is all about keeping track of performance versus daily, monthly and annual goals. Common examples of Visual Management Boards include FMDS Boards and SQDC Boards to cite a few.

- ROLE AND RESPONSIBILITY DEFINITION: Visual management boards define and develop roles and responsibilities for all members, supporting on-the-job learning and development through continuous improvement efforts and activities like QC Circles.

- PROBLEM SOLVING: An important component of floor management boards is keeping track of activities and countermeasures associated with specific problems that have occurred. Visual management boards drive problem-solving activities and continuous improvement through visual management – by drawing attention to a KPI that has fallen short of goal, along with what can be done to turn it around, who is involved, when tasks are due, and what state the activities are in now.

> *Visual management boards are integral to manufacturing, supporting daily operations, problem-solving, and continuous improvement. They display essential production data, help in problem-solving, promote communication, and define roles and responsibilities.*

- BUILD CULTURE: At the end of the day, these Boards (whether paper-based or digital) are about building culture – helping team leaders and team members maintain high standards of safety, quality, and efficiency and reinforcing other organizational values – and act as a team building tool.

- ALIGNMENT WITH COMPANY GOALS: Visual management boards connect the team member with company performance and success; while emphasizing they make a difference each day and their decisions have an impact – good or bad. Visual Management Boards ensure that the company's vision and goals are effectively communicated and implemented at all levels.

- COMMUNICATION AND COLLABORATION: Meetings at the line need to be concise, but effective at communicating what happened yesterday or the precious shift. Visual management boards promote communication between different levels of management and team members. They serve as a focal point for team leaders and members to discuss performance and coordinate actions.

Limitations of Paper-Based Visual Management Boards

The image below depicts a typical configuration of a paper-based visual management board – an approach still prevalent in many operational environments. While these boards serve as foundational communication tools, they introduce several challenges that hinder efficiency and adaptability:

- MANUAL DATA ENTRY AND UPDATES: Paper-based systems require frequent manual updates, which are labor-intensive, time-consuming, and prone to human error. As a result, there may be delays in information dissemination and increased risk of data inaccuracies.

- ABSENCE OF REAL-TIME INSIGHTS: Lacking digital connectivity, these boards do not support real-time information sharing. This limitation can delay issue resolution and impede timely, data-driven decision-making as teams often work with outdated or incomplete information.

- RESTRICTED ACCESSIBILITY AND COLLABORATION: Information displayed on physical boards is confined to on-site personnel, creating silos and limiting visibility for remote stakeholders. This geographical constraint can hinder cross-functional collaboration and reduce organizational agility.

- STATIC CONTENT AND LACK OF INTERACTIVITY: Paper boards present static, pre-printed materials that cannot accommodate dynamic content such as multimedia, web-based resources, or live data feeds. Additionally, they lack interactive features such as drill-down capabilities, integrated annotations, and direct linkage to data sources.

Challenges in Early-Stage Digital Transformation Initiatives

The following abstract representation illustrates typical characteristics and limitations encountered during the initial phases of digital transformation, particularly with visual management systems. Organizations often adopt technologies such as Human Machine Interfaces (HMIs), digital signage, and custom in-house web applications as entry points into digitization. However, these early efforts frequently expose several constraints:

- DEPENDENCE ON TECHNICAL RESOURCES: Developing digital visual management platforms – whether through HMI systems or proprietary web applications – requires a broad spectrum of technical expertise, including software developers, engineers, and IT professionals. Even minor system updates may necessitate input from an already overextended technical team, leading to bottlenecks.

- INCREASED SECURITY COMPLEXITY: As organizations transition from physical boards to digital solutions, new challenges arise around safeguarding sensitive content – especially with the expansion of remote access. Implementing robust authentication mechanisms, access controls, and user permissions becomes essential, yet often introduces added complexity.

- SCALABILITY AND DEPLOYMENT BARRIERS: Early-stage digital implementations often rely heavily on technical personnel for configuration and customization. This dependency can hinder the ability to scale solutions uniformly across departments or facilities, limiting the broader impact of the transformation.

- LIMITED INTEGRATION CAPABILITIES: Many initial digital solutions support only a limited range of file types or data inputs. As operational demands evolve, the need for seamless, real-time integration with diverse data sources grows – necessitating additional development and system adaptability.

Business Drivers for "Digital" Transformation

Digital transformation presents a significant opportunity to enhance the effectiveness of visual management boards.

Improved Efficiency

Traditional visual management boards, often paper-based and manually updated, can be inefficient (wasted time and resources) and prone to errors. Digital Visual Management Boards, on the other hand, offer improvements in efficiency.

- ELIMINATE WASTED TIME: Digital eliminates wasted time finding, printing, posting and editing information is more aligned with proven manufacturing principles of eliminating waste. Digital boards lead to long-term cost savings by reducing paper usage, printing costs, and manual labor.

- LIVE INFORMATION: Digital Visual Management boards offer real-time data, ensuring all team members have access to the latest information. Edits made at the production line or in the office appear instantly, enhancing decision-making and responsiveness. This immediate data availability reduces delays, improves operational efficiency, and is crucial for addressing issues promptly.

Digital transformation enhances visual management boards by eliminating waste and engaging employees. Digital boards offer real-time updates and data integration, reducing manual input errors and inefficiencies. They also improve employee engagement through interactive features, fostering a culture of continuous improvement and operational efficiency.

- **CENTRALIZED INFORMATION – SYNCHRONIZED WITH EXISTING SOURCES:** Information can be organized and linked to existing locations, making access and review seamless for team members. In addition, information sources such as pre-production checklists, problem resolution documents, etc. can be linked to messaging platforms for quicker troubleshooting. The illustration below shows the variety of sources of information that you can bring into a digital board.

- **ENHANCED ACCURACY AND REDUCED ERRORS:** Manual updates on paper-based boards are prone to human error, which can lead to inaccuracies and miscommunication. Digital boards automate data collection and updates, minimizing the risk of errors and ensuring that information is accurate and reliable.

- **CUSTOMIZATION AND FLEXIBILITY:** Digital boards can be customized to mirror any paper system. They can display different types of information based on the needs of the team or the specific meeting. They offer flexibility in layout and content presentation. No-code platforms allow team leaders to create boards in a drag and drop fashion without the need for technical support.

- **MACHINE CONNECTIVITY:** Digital platforms can automatically update information using data transport systems that move data directly from machines and sensors on the factory floor, reducing manual data entry and minimizing errors.

- **COST EFFICIENCY:** While the initial investment in digital boards may be higher, they lead to long-term cost savings by reducing paper usage, printing costs, and manual labor. The decreasing prices of smart TVs, mobile devices, and interactive displays make digital platforms increasingly affordable.

Enhanced Collaboration

Digital Visual Management Boards enhance employee engagement through interactive features that empower immediate action, fostering ownership and responsibility. They improve communication and collaboration, accelerate training and development, and help employees solve problems quickly. This alignment with proven manufacturing principles enhances operational efficiency and fosters a culture of continuous improvement.

Digital Visual Management Boards offer real-time data updates, enhancing decision-making and operational efficiency. They reduce errors through automated data collection and improve accessibility by allowing remote access. Integration with other software platforms provides a comprehensive view of operations and fosters better collaboration.

- IMPROVED ACCESSIBILITY: Digital visual management boards can be accessed remotely, allowing team members to view and interact with the data from anywhere. This improved accessibility fosters better collaboration among teams, including those working in different locations or remotely.

- ENHANCED EMPLOYEE ENGAGEMENT AND EMPOWERMENT: Digital boards empower employees by providing them with real-time data and interactive features that enable immediate action. This empowerment fosters a sense of ownership and responsibility, enhancing employee engagement and motivation. Furthermore, digital boards can enhance training and development programs, enabling employees to gain a clearer understanding of how to perform their tasks more efficiently. Digital boards support interactive features such as comments, annotations, and file sharing, which foster better collaboration and communication during huddle meetings.

- INTEGRATION WITH OTHER SOFTWARE PLATFORMS: Digital visual management boards seamlessly integrate with industry-standard collaboration platforms like Microsoft Teams, enhancing visibility and collaboration. They also connect with various manufacturing software systems, including HMI Systems, PowerApps, ERP, MES, and cloud-based solutions like Microsoft Azure, PowerBI, SharePoint, Grafana, and Qlik. This integration provides a holistic view of operations, facilitating comprehensive data analysis and keeping everyone connected and aligned.

- VISUAL AND INTERACTIVE ELEMENTS: Digital boards are as easy to use as paper. They incorporate charts, graphs, and other visual elements that make data easier to understand and analyze. Interactive elements like touchscreens enhance engagement and participation.

- ENHANCED SECURITY: Digital boards can be secured with passwords and encryption, ensuring that sensitive information is protected. Access controls can be implemented to restrict viewing and editing rights.

Typical Use Case and Implementation Strategies

This document addresses the key considerations shared across various manufacturing operations and other organizations that have successfully implemented digital visual management boards. It highlights the benefits achieved, including improved reliability, reduced wasted time, decreased downtime, enhanced quality, and cost savings.

By leveraging lessons learned and best practices, we present a proven, logical phased approach to seamlessly transition visual management boards from paper to digital. This approach ensures a successful transformation journey from start to finish, acknowledging that cultural change is a gradual process.

The illustration below highlights how you may get started with the digital transformation of paper-based boards, with the first step referred to as the movement from paper to glass. Once this process is completed, you can extend the capabilities of the digital board in any number of directions, leveraging the added functionalities made possible with the digital platform.
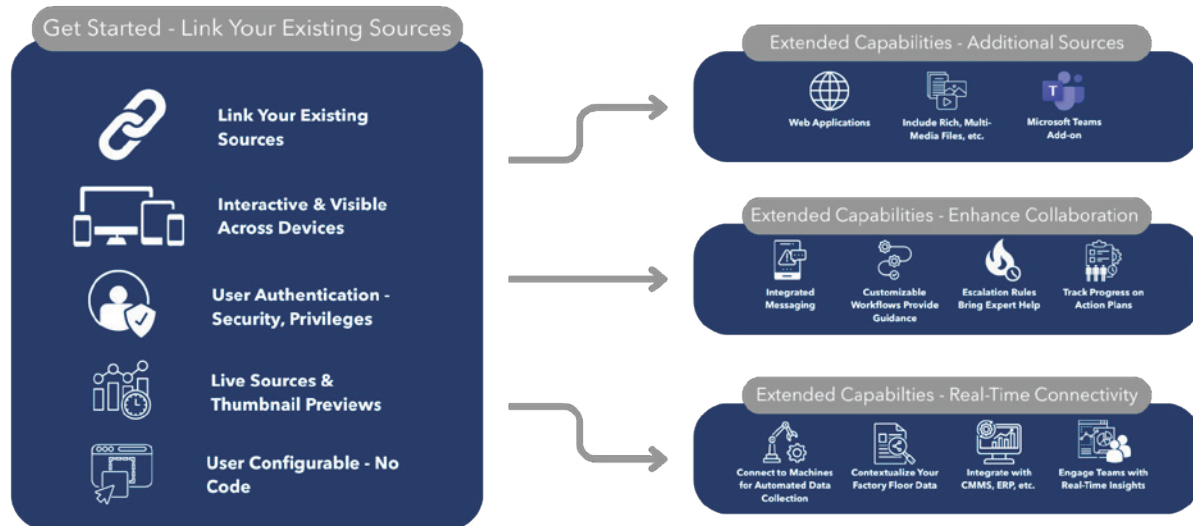
Get Started with Paper-to-Glass

The first phase of the digital journey is simply moving from paper to glass.

- LINK YOUR EXISTING SOURCES OF INFORMATION: The first step in the digital transformation is straightforward – link your existing sources of information, currently printed and posted on paper boards, to an interactive touchscreen display. Instead of printing files and posting outdated information on a board, simply link the actual source to the display. Once the source is linked, edits can be made directly to the file from your desktop or at the board itself. These edits are synchronized, ensuring everyone works with the latest information and makes decisions or pivots during the shift rather than afterwards.

- INTERACTIVE AND VISIBLE ACROSS DEVICES: Digital visual management boards must be interactive, utilizing touchscreens to allow team leaders and members to drill down into details of concerning metrics or enter comments and give praise. In addition to the large, interactive touchscreen at the production line, digital information is visible across all devices, including desktops, tablets, and mobiles, ensuring accessibility and engagement from anywhere, regardless of a team member's physical location.

- USER AUTHENTICATION – SECURITY, PRIVILEGES: Digital visual management boards display sensitive information that should not be accessible to everyone. It's crucial to incorporate security measures and credentials for viewing and editing boards, ensuring that information is seen only by authorized personnel. This helps maintain confidentiality and integrity of the data.

- LIVE SOURCES AND THUMBNAIL PREVIEWS: The information displayed is live and current. Thumbnail previews on the digital visual management board provide immediate, at-a-glance feedback on key performance indicators (KPIs) or areas needing attention. Everyone works with the most up-to-date information.

Transitioning from paper to Digital Visual Management Boards simply starts with linking existing information sources to interactive displays and ensuring real-time updates. These boards are interactive, accessible across devices, and user-configurable without coding. Enhanced security measures protect sensitive information, ensuring only authorized personnel can access it.

- USER CONFIGURABLE – NO CODE PLATFORM: The digital platform should be as easy to use as paper, ensuring simplicity and accessibility. Digital visual management boards should be user-configurable with drag-and-drop functionality, requiring no coding or IT resources. The visual management board layouts are as flexible to build as paper, making the transition seamless and user-friendly.

Get Started: Interactive & Visible Across Devices

Extended Capabilities

Building on the digital foundation in place, extended capabilities focus on incorporating additional sources of rich multi-media content, enhanced collaboration among team members and real-time connectivity to machines for automated data collection to further improve employee efficiency and the reliability of information.

- INCLUDE RICH, MULTI-MEDIA FILES AND WEB APPLICATIONS: With a digital platform, you are no longer limited to paper. This allows you to integrate engaging and insightful content such as video files, streaming videos, web pages, and other manufacturing software applications like HMI Systems, MES, ERP, and Maintenance. These multimedia elements enhance the effectiveness and utility of visual management boards, providing a more comprehensive and interactive experience.
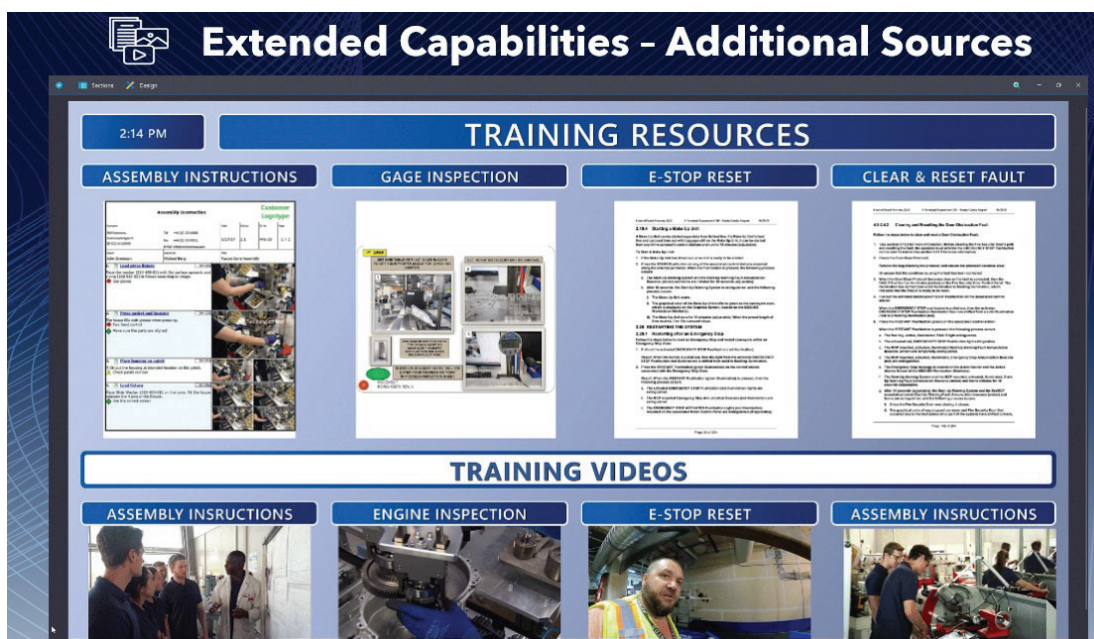
- MICROSOFT TEAMS ADD-ON: Enable mobile access to real-time data and visual management boards with a simple add-on to Microsoft Teams. This allows team members to stay connected and informed on the app they are on every day. Microsoft Teams integration ensures that communication is streamlined and centralized.

- TARGETED ALERTS AND NOTIFICATIONS: When certain sources of information need attention, digital visual management boards can send instant alerts and notifications for critical events or deviations from expected performance to the right people. These alerts can be configured to notify relevant team members immediately, enabling swift responses to potential issues and minimizing downtime.

- INTEGRATED MESSAGING: Built-in messaging features allow team members to share or direct specific sources, such as concerning KPIs, to individuals, experts, or other teams. This targeted communication enhances problem-solving and ensures that the right people are engaged at the right time.

- CUSTOMIZABLE WORKFLOWS: Customizable workflows provide structured guidance following concerning situations, such as a drop in performance below goal. These workflows help team members quickly identify the root cause of issues and implement solutions more efficiently. By offering step-by-step processes tailored to specific scenarios, customizable workflows empower team members to succeed in solving problems faster and more effectively.

- ESCALATION RULES BRING IN EXPERT HELP: Should a concerning KPI remain below goal for too long or occur too frequently within a given time period, such as a shift, the visual management board can escalate the concern to the next tier of management or the next level of expertise. This escalation ensures that issues are addressed promptly and effectively, leveraging the knowledge and skills of higher-level experts to resolve problems more quickly.

Digital Visual Management Boards facilitate real-time collaboration, integrated messaging, and enhanced engagement, ensuring team alignment and responsiveness. They support collaborative problem-solving, customizable workflows, and escalation rules to address issues promptly. Teams can track progress on action plans, driving continuous improvement and accountability.

- TRACK PROGRESS ON ACTION PLANS: From the board, teams can create action plans or continuous improvement activities around a concerning source of information (e.g., KPI, production concern) and ensure that tasks agreed upon in the huddle meeting are completed on-time.

- REAL-TIME COLLABORATION: Digital visual management boards enable real-time collaboration, allowing team members to share updates, insights, and feedback instantly. This fosters a more dynamic and responsive environment, where issues can be addressed promptly and solutions can be implemented swiftly.

- REAL-TIME CONNECTIVITY TO MACHINES FOR AUTOMATED DATA COLLECTION: Connect the Boards to real-time data sources, including machines and manufacturing execution systems (MES) or Maintenance Systems (CMMS) that run the plant. This integration ensures that the information displayed on the boards is always current, allowing team members to monitor performance metrics and operational status in real-time. This automation reduces the risk of human error and ensures that data is accurate and up to date, providing a reliable basis for decision-making, while eliminating the need for manual data entry.

- **CONTEXTUALIZE YOUR FACTORY FLOOR DATA:** Incorporate valuable contextual information alongside metric data to provide deeper insights into factory floor operations. By including details such as shift information, product being manufactured, serial numbers, and other pertinent data, you enable more comprehensive analysis. This contextual data can be ingested by AI systems to identify patterns, predict issues, and optimize performance. It allows team members to dive deeper into understanding the factors influencing metrics like downtime, leading to more effective problem-solving and continuous improvement.

- **ENGAGE TEAMS WITH REAL-TIME INSIGHTS:** Digital visual management boards integrate advanced analytics and reporting tools to analyze real-time data and generate actionable insights. These tools help team members identify trends, predict potential issues, and make informed decisions to optimize floor management processes.

Digital Visual Management Boards connect to real-time data sources, ensuring current and accurate information for decision-making. They contextualize factory floor data for deeper insights and integrate advanced analytics to generate actionable insights – enhancing proactive decision-making and operational efficiency.

IGear Software Platforms

This whitepaper was created by IGear. The document was intended to be an educational document, a non-sales approach to the digital transformation of visual management boards. That said, IGear has built software platforms that enable this transformation.

The following provides a brief description of the IGear software platform's features to convey what is possible today with digital solutions. Everything discussed in this white paper is real and deployed in mission-critical production environments.

The following illustrations highlight the three software platforms from IGear that advance the digital transformation of visual management boards:

- **ONE-SOURCE:** Interactive Visual Management Platform delivers a new level of awareness and accountability around organizational priorities, including the management of daily KPIs. One-Team, One-Source™.

- **SQUEAKS:** Critical Event Management Platform ensures concerning alerts and notifications cannot be ignored. Following a critical event on the factory floor, SQUEAKS lets you know immediately. SQUEAKS maintains a digital trail of every action taken. The squeaky wheel gets the grease!

- **CONNECT:** Data Service Platform enables the reliable transport of data between technologies and systems – unlocking valuable data and insights directly from machines on the factory floor.

Detailed information on these platforms, architecture, videos, etc., can be found at www.igear.com

One-Source

INTERACTIVE VISUAL MANAGEMENT

IGear One-Source digitally transforms floor management by consolidating your most important sources of information within a single interactive platform, resulting in more effective problem-solving and improved performance of daily KPIs.

One-Source satisfies each of these diverse but essential visual management requirements within a single platform:

LINK TO A VARIETY OF SOURCES *to include Excel, PowerPoint, videos, PDFs, websites, web applications, Power BI, …*

SUPPORTS BOTH SHAREPOINT *(cloud) and local file shares*

NO-CODE USER CONFIGURATION *to create and organize boards the way you want*

LIVE THUMBNAIL PREVIEWS *of the underlying sources*

KIOSK MODE *for user-friendly distribution and management of boards on the factory floor*

VIEW BOARDS FROM ANYWHERE *to include iOS, Android, web browser, and Microsoft Teams*

INTEGRATED MESSAGING *brings others into the conversation*

ROBUST SECURITY MODEL *supports Microsoft AD and Entra ID*

squeaks™

CRITICAL EVENT MANAGEMENT

IGear SQUEAKS ensures a faster response to critical events, reducing downtime, scrap, and associated excess labor cost and employee turnover with a unique and effective approach not found in other applications.

SQUEAKS combines these innovative critical event management capabilities within one platform:

CLOSED LOOP COMMUNICATION *using Workflows that resolve every issue*

ESCALATION RULES *that expedite closure*

TEAM COLLABORATION AND TRANSPARENCY *for every event*

SELF-SERVICE, NO-CODE MANAGEMENT *of Users, Teams, Workflows, and Escalation Rules*

USER-CONFIGURED DASHBOARDS *that visualize "what's happening now" with all your data sources*

CAN RECEIVE EVENTS *from any data source to include machines, other applications, and people*

MAINTAINS A DIGITAL HISTORY *of every event*

COMPREHENSIVE SET OF USER EXPERIENCES *to include iOS, Android, web browser, and Microsoft Teams*

connect

DATA SERVICE PLATFORM

IGear CONNECT is a unique, protocol-agnostic software platform that collects and distributes information to virtually any device or system, enabling a rock-solid data transport infrastructure on which to build mission critical manufacturing solutions.

CONNECT is used not only to collect and move data on-premise and in the cloud but also to control a process on the factory floor with high-speed, fault tolerant connectivity between machines and software systems. For more than two decades, CONNECT has evolved to include these unique features within one platform:

PROTOCOL SUPPORT *to include Modbus, OPC UA, Ethernet/Serial devices, SFTP, Web Service, XML, …*

NATIVE DEVICE CONNECTIVITY *to Allen-Bradley, Siemens, Keyence, Koyo, Atlas Copco, Cleco, Bosch, DeSoutter, …*

SOFTWARE SYSTEM CONNECTIVITY *to Microsoft SQL, Oracle, IBM WebSphere MQ, .NET, OSI PI, IGear SQUEAKS & One-Source, …*

INTUITIVE MANAGEMENT CONSOLE *for creating and managing the data transport configuration*

ADVANCED TRIGGERING ENGINE *supports polling, recurring, event, combination/custom, and external trigger types*

FAULT TOLERANT QUEUEING AND RESUBMISSION *of failed transactions*

EXTENSIVE LOGS *for system health, connection health, transaction failures, and configuration errors*

HIGH SPEED MOVEMENT *of data measured at a millisecond level*

SCRIPTING ENGINE *for implementing complex business logic as data flows between devices and systems*