Operation monitoring system

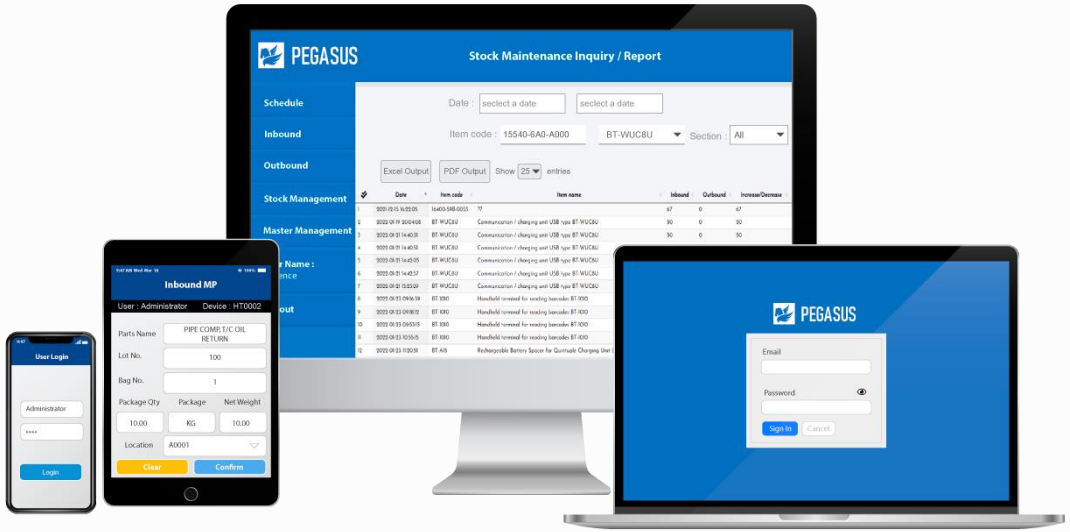
Proposed For SHIMIZU Manufacturing Co., Ltd.

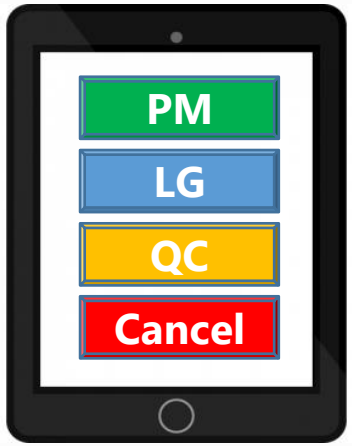
TOMAS TECH CO., LTD.

What is an operation monitoring system?

It is one of the modules of the package system PEGASUS. By collecting site information as data, it is possible to collect traceability data such as equipment operation information, abnormal ALARM, and measured values. **In addition to operation management, by installing various measuring instruments, it is possible to manage various information such as equipment frequency, temperature and humidity control, cutting oil and water management, and power consumption management**.
The PEGASUS operation management system visualizes the **situation at the site and visualizes the "Black box"**.

The Smart Watch system is one of the PEGASUS series modules.
By linking the server application and the Smart Watch device, it **can be used as a "Call system" for workers etc. from the site.**
In addition, drivers such as **forklifts can issue instructions for transportation work by wearing Smart Watch**.





Benefits of operation monitoring system

By utilizing the operation monitoring system, it is possible to solve various problems and obtain effects.
It plays a very heavy role in achieving digitization.

Inefficient work

By managing with paper, it takes time to "collect", "organize", and "analyze" information.
- Records by workers and accurate numerical values cannot be collected.
- The recording method is different for each worker, and it is not unified.
- Detailed description of start, stop, idle, and setup times

I haven't been able to record it.

Management cost

By managing with paper, "cost" is created.
- Man-hours recorded by people; man-hours checked by the administrator
- Printing machine, ink fee
- Storage area and equipment for managing paper

Business black boxing

By managing with paper, the business situation is not visualized.
- Because the operation and stop times are roughly written on paper

It is not useful as data for analysis.
- Because it is written on paper, it becomes an administrator in real time Information did not arrive.

Improvement of business efficiency

By digitization, management man-hours can be reduced, and efficient "collection", "organization", and "analysis" can be realized.
- Data can be viewed and modified from devices (PCs, smartphones, tablets).
- Data can be collected for operation, stop, idle, setup, OK number, NG number, stop factor, etc.
- Automatic data collection enables even data collection.

Reduction of management costs

By digitizing, "cost" can be reduced by reducing the management man-hours.
- Printing man-hours can be reduced because printing is not required.

Paper fee, printing machine, ink fee, printing labor cost
- Since data can be automatically collected from the site, the labor of the operator to record can be saved.
- The surplus time can be used for operation analysis.

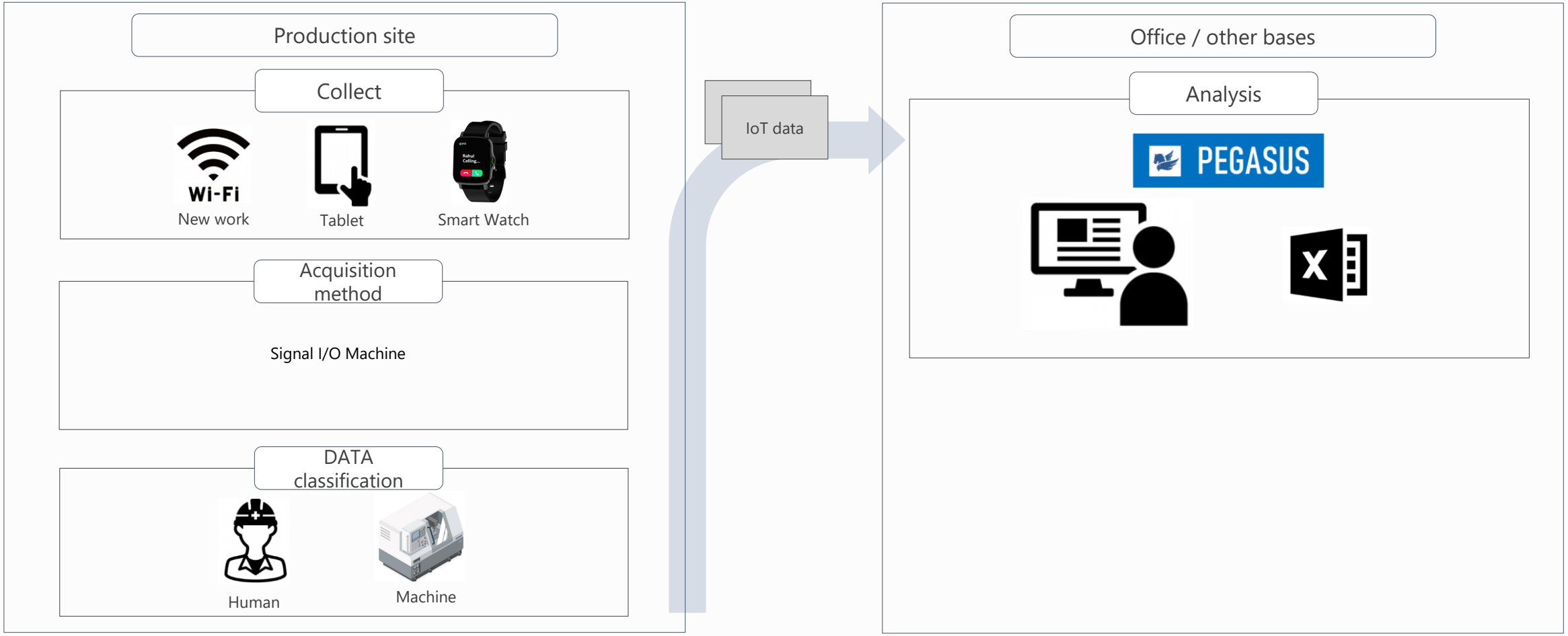
Visualization of the entire business

By digitizing, the business situation can be visualized.
- The administrator can always grasp the situation at the site. Smooth response to production delays

Because it can be done, the risk of delay in delivery can be reduced.
- By collecting data for the entire process, bottlenecks can be found. Productivity can be expected to improve by improving the target process.

Operation monitoring system configuration diagram

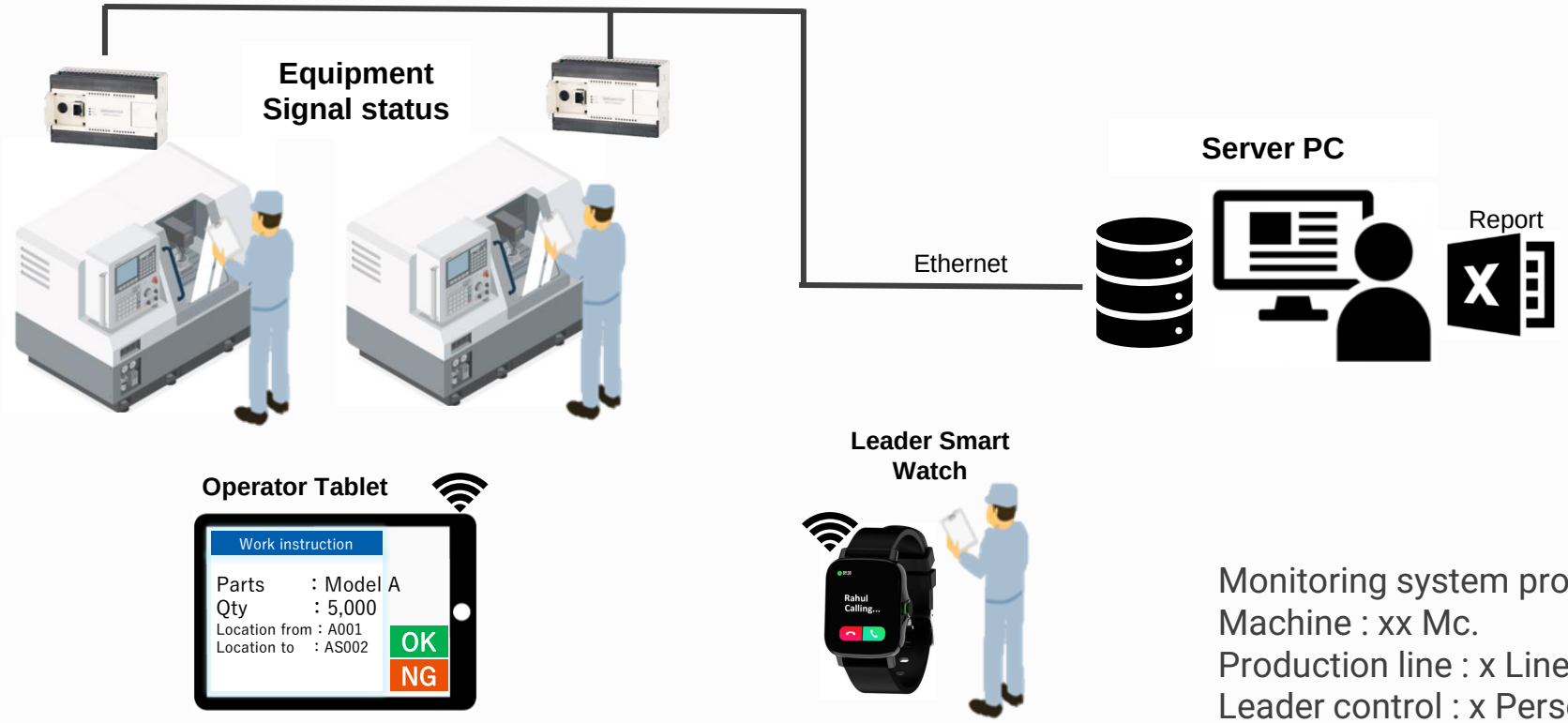
The operation monitoring system can collect various current information. In addition, since it is compatible with both on-premises, it is possible to access data from inside and outside the factory with PC , and tablet devices.



Information System Outline.#1

Collection method cooperation to Server

By using I/O, operation management can be easily achieved.
By attaching an information collection unit to an existing , information on the I/O can be obtained.
Because of the simple settings, the system can be used immediately.

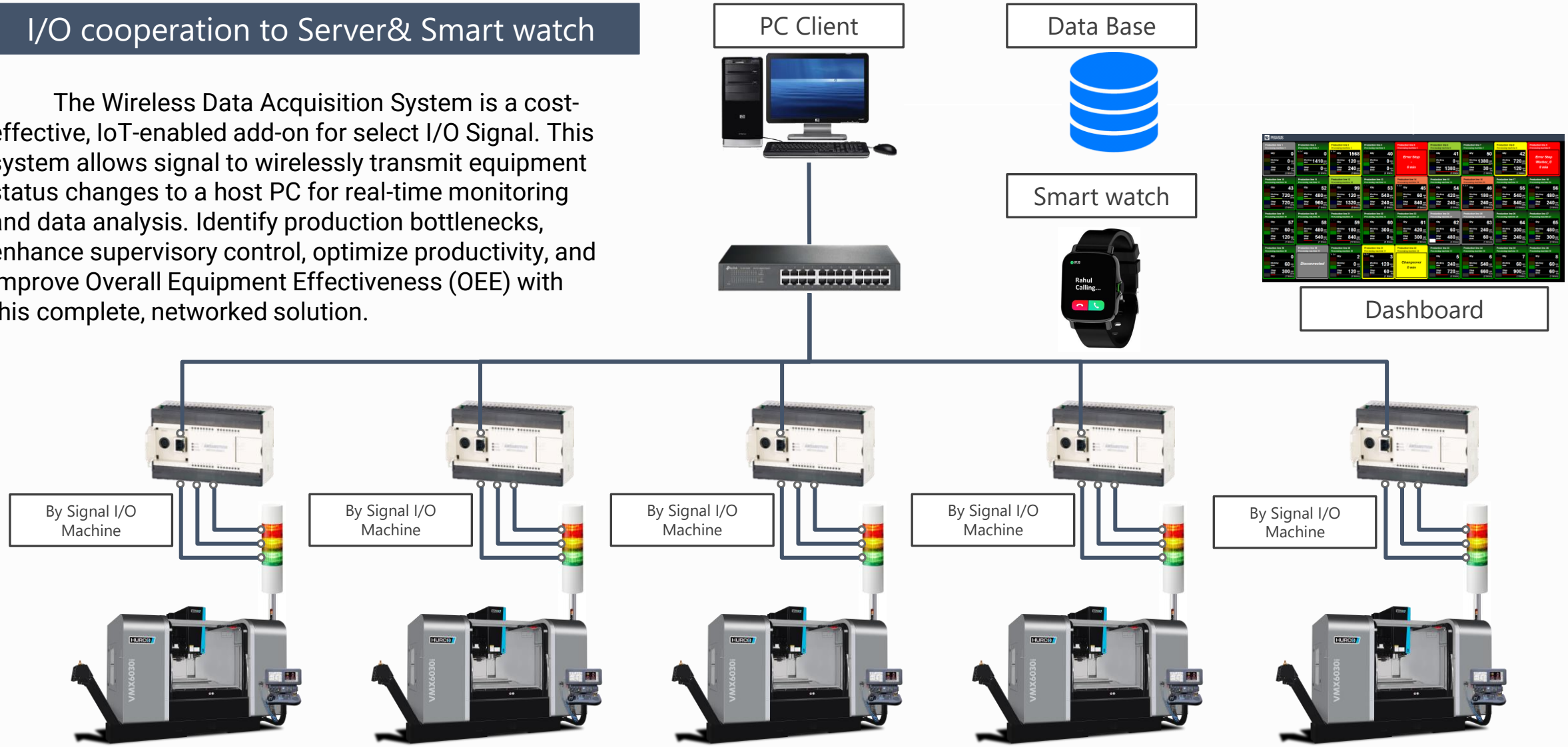


Monitoring system production
Machine : xx Mc.
Production line : x Line
Leader control : x Person

Information System Outline #1

I/O cooperation to Server& Smart watch

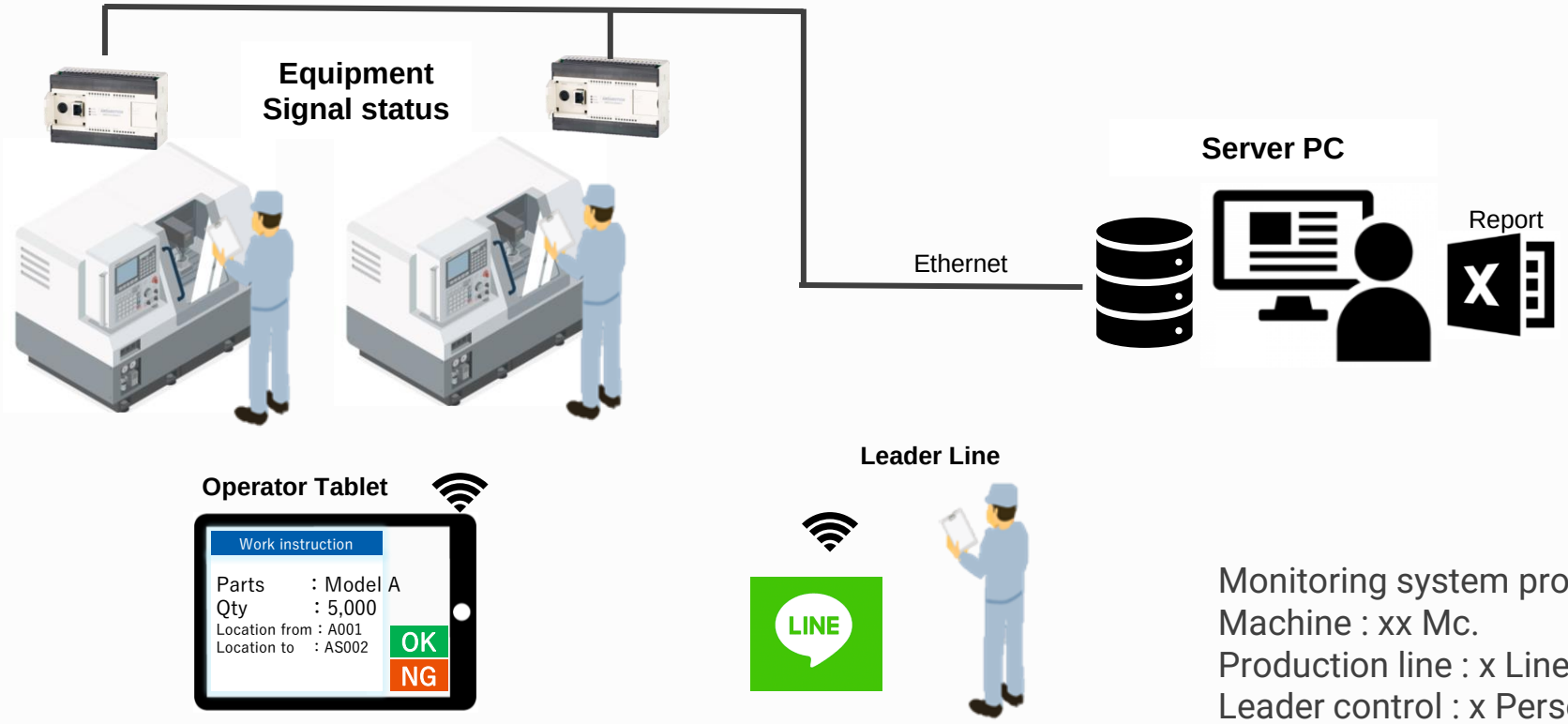
The Wireless Data Acquisition System is a cost-effective, IoT-enabled add-on for select I/O Signal. This system allows signal to wirelessly transmit equipment status changes to a host PC for real-time monitoring and data analysis. Identify production bottlenecks, enhance supervisory control, optimize productivity, and improve Overall Equipment Effectiveness (OEE) with this complete, networked solution.



Information System Outline.#2

Collection method cooperation to Server

By using I/O, operation management can be easily achieved.
By attaching an information collection unit to an existing , information on the I/O can be obtained.
Because of the simple settings, the system can be used immediately.

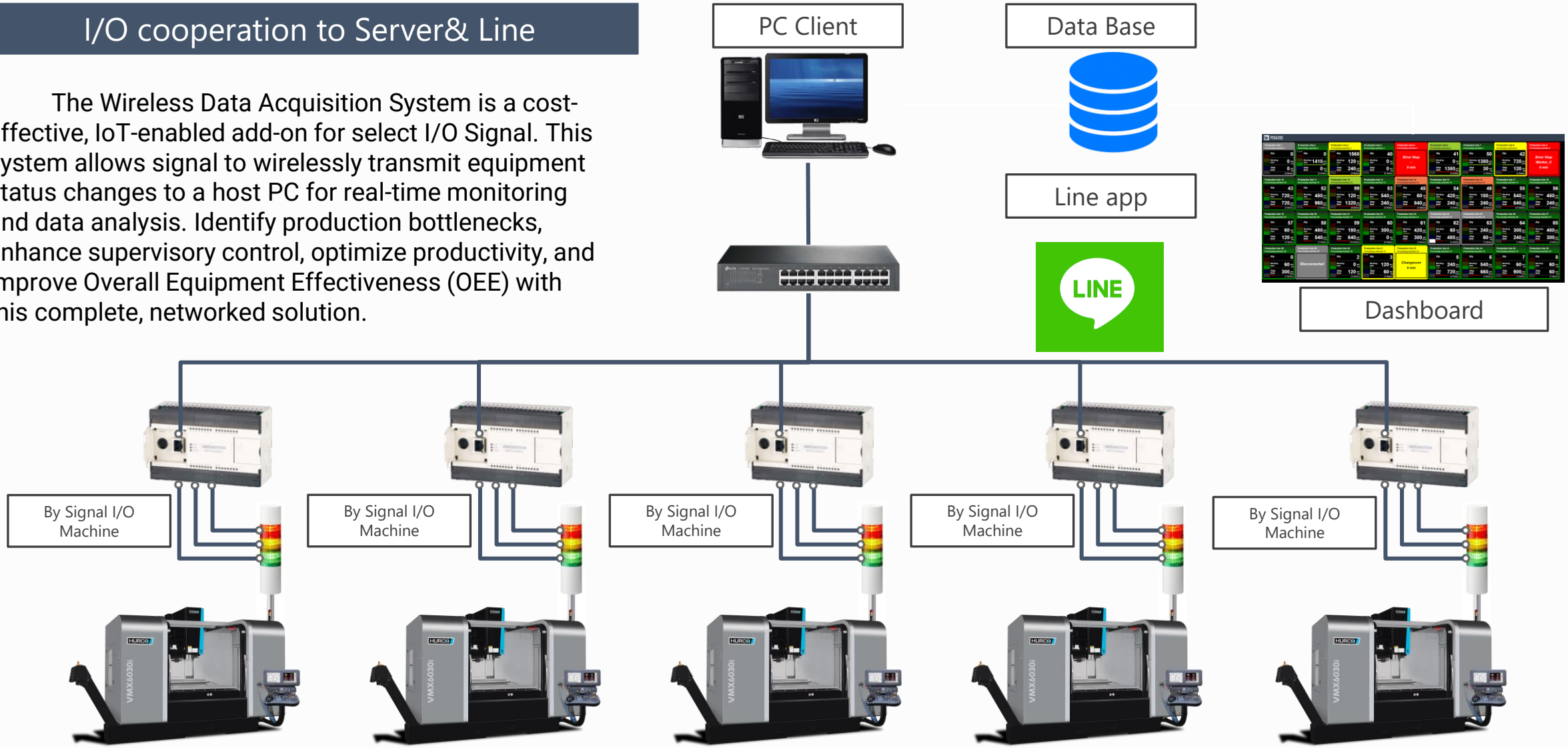


Monitoring system production
Machine : xx Mc.
Production line : x Line
Leader control : x Person

Information System Outline #2

I/O cooperation to Server& Line

The Wireless Data Acquisition System is a cost-effective, IoT-enabled add-on for select I/O Signal. This system allows signal to wirelessly transmit equipment status changes to a host PC for real-time monitoring and data analysis. Identify production bottlenecks, enhance supervisory control, optimize productivity, and improve Overall Equipment Effectiveness (OEE) with this complete, networked solution.

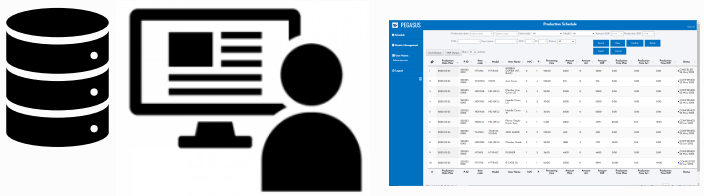


System Operation Flow. #1

This is a system configuration diagram assuming monitoring system start from production plan.
It is possible to catch (working , complete and error signals details) from equipment and send out to Server for record and send information to necessary teams and groups according to the ok and error details.

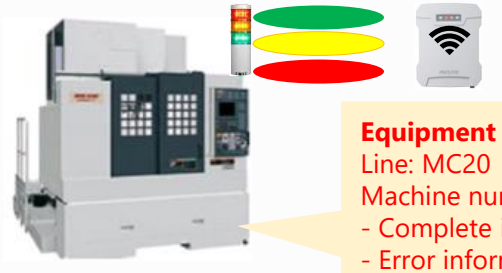
1

Create or import production plan to monitoring software. The information will update to every line production.



2

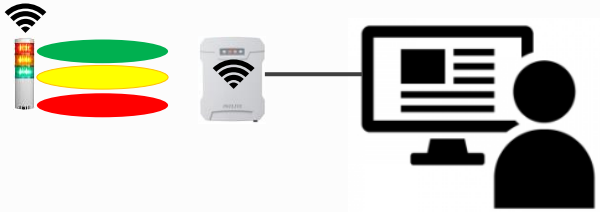
Complete , Error has occurred in the equipment. Transfer information to the server for line, machine number and information.



Equipment
Line: MC20
Machine number: OP10
- Complete information
- Error information

3

Server receive and record machine information.
1 Machine working cycle time
2 Machine stop time
3 Machine brake down.
4 Production complete count product quantity.

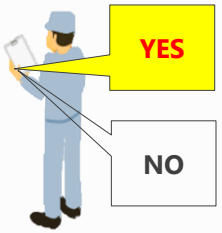


4

Production schedule update to Production line tablet , When machine have product NG , Worker will record NG qty to tablet refer schedule .

5

When machine have error information , System will send update to leader.



6

By collecting the rush time, response start time, and response completion time, each work time can be recorded as a log report..

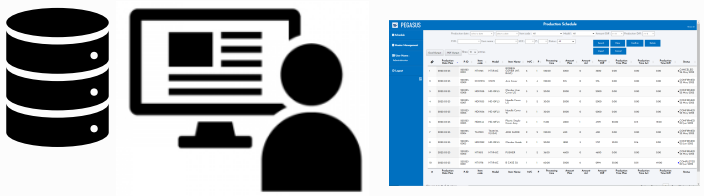
Response time	02-Aug-2022 14:00:00
Start time	02-Aug-2022 14:05:00
Finish time	02-Aug-2022 15:05:00
Arrival time	00:05:00
NG record	25 unit

System Operation Flow. #2

This is a system configuration diagram assuming monitoring system start from production plan.
It is possible to catch (working , complete and error signals details) from equipment and send out to Server for record and send information to necessary teams and groups according to the ok and error details.

1

Create or import production plan to monitoring software. The information will update to every line production.



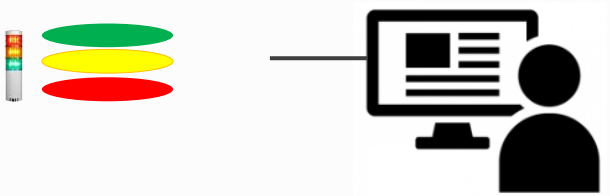
2

Complete , Error has occurred in the equipment. Transfer information to the server for line, machine number and information.

Equipment
Line: MC20
Machine number: OP10
- Complete information
- Error information

3

Server receive and record machine information.
1 Machine working cycle time
2 Machine stop time
3 Machine brake down.
4 Production complete count product quantity.



4

Production schedule update to Production line tablet , When machine have product NG , Worker will record NG qty to tablet refer schedule .

5

When machine have error information , System will send update to leader.

6

By collecting the time, each work time can be recorded as a log report.

REPORT

Start time	02-Aug-2022 14:05:00
Finish time	02-Aug-2022 15:05:00
NG record	25 unit

Operation monitoring system Function

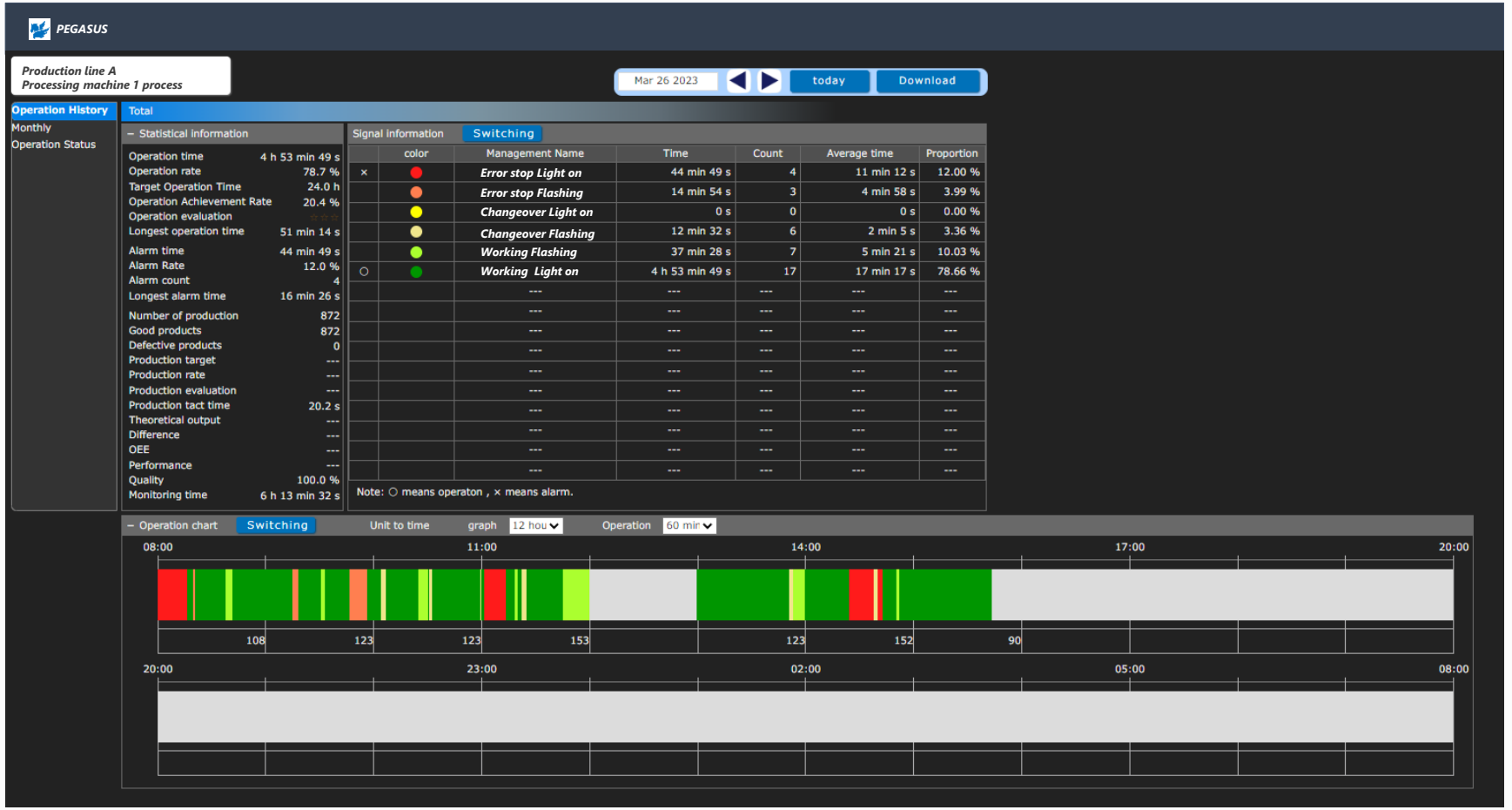
Andon display board

Displays the operation status of each facility in ANDON. In addition to understanding the status of each facility, it can display the production quantity, operating time, total stop time, and number of times. Workers and managers can check the data on the TV display or PC.

Operation monitoring system Function

Detailed equipment operation information

It can check the detailed data by clicking the information of each facility on the Andon display board. it can analyze the lighting time and the number of lighting times for each lamp unit.
By selecting the target date, it can check the past data.



Operation monitoring system Function

Status graph

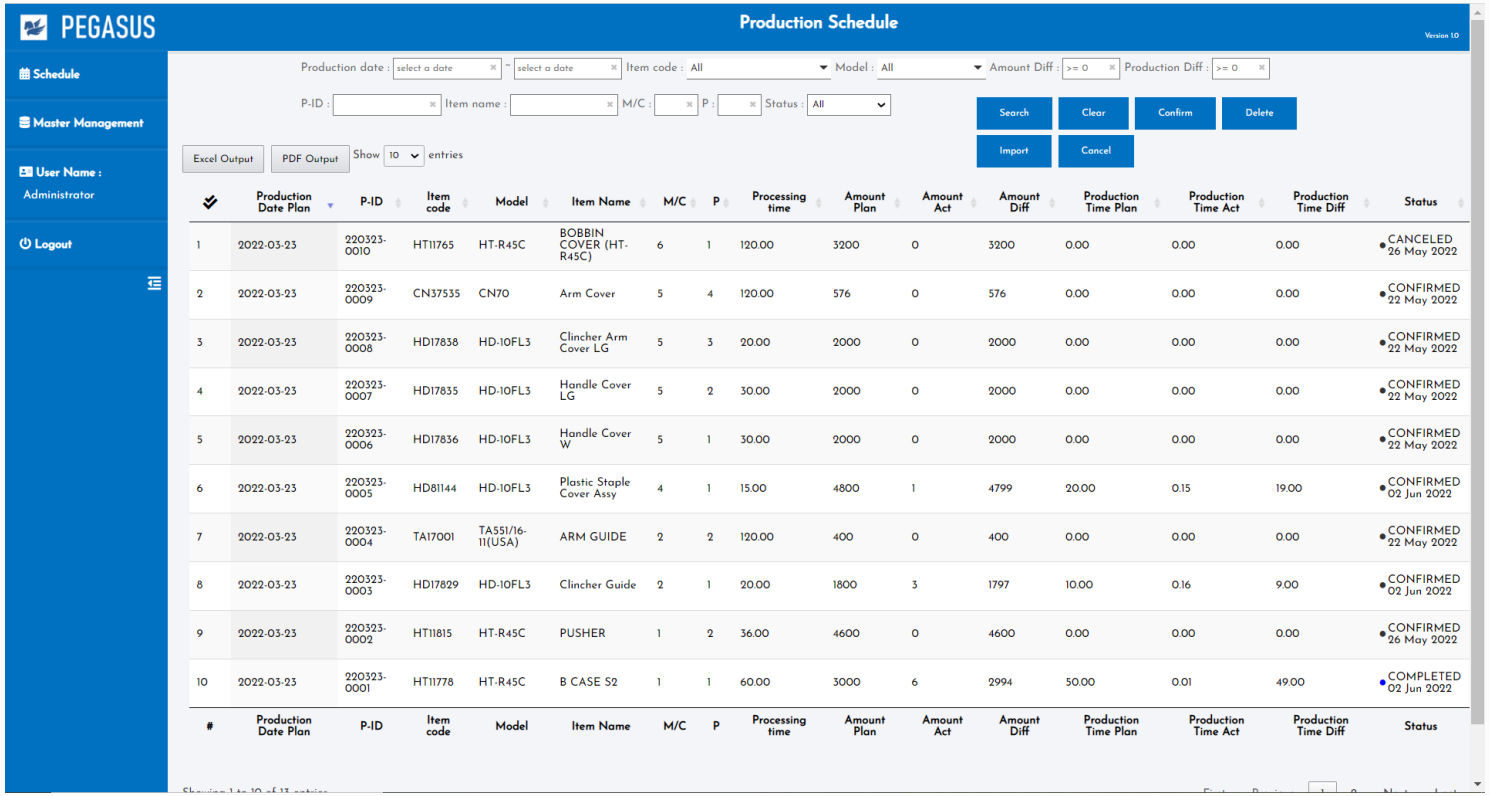
It can check the past operation status in a bar graph with the percentage of each color. It can be displayed in units of hours, days, and months.
Since the completed quantity can be expressed in a bar graph, the usage of data can be expanded.

Operation monitoring system Function

Progress management

By inputting the production plan data, it is possible to manage the progress against the plan. By managing the status of each schedule, it can grasp the overall progress.

PC screen



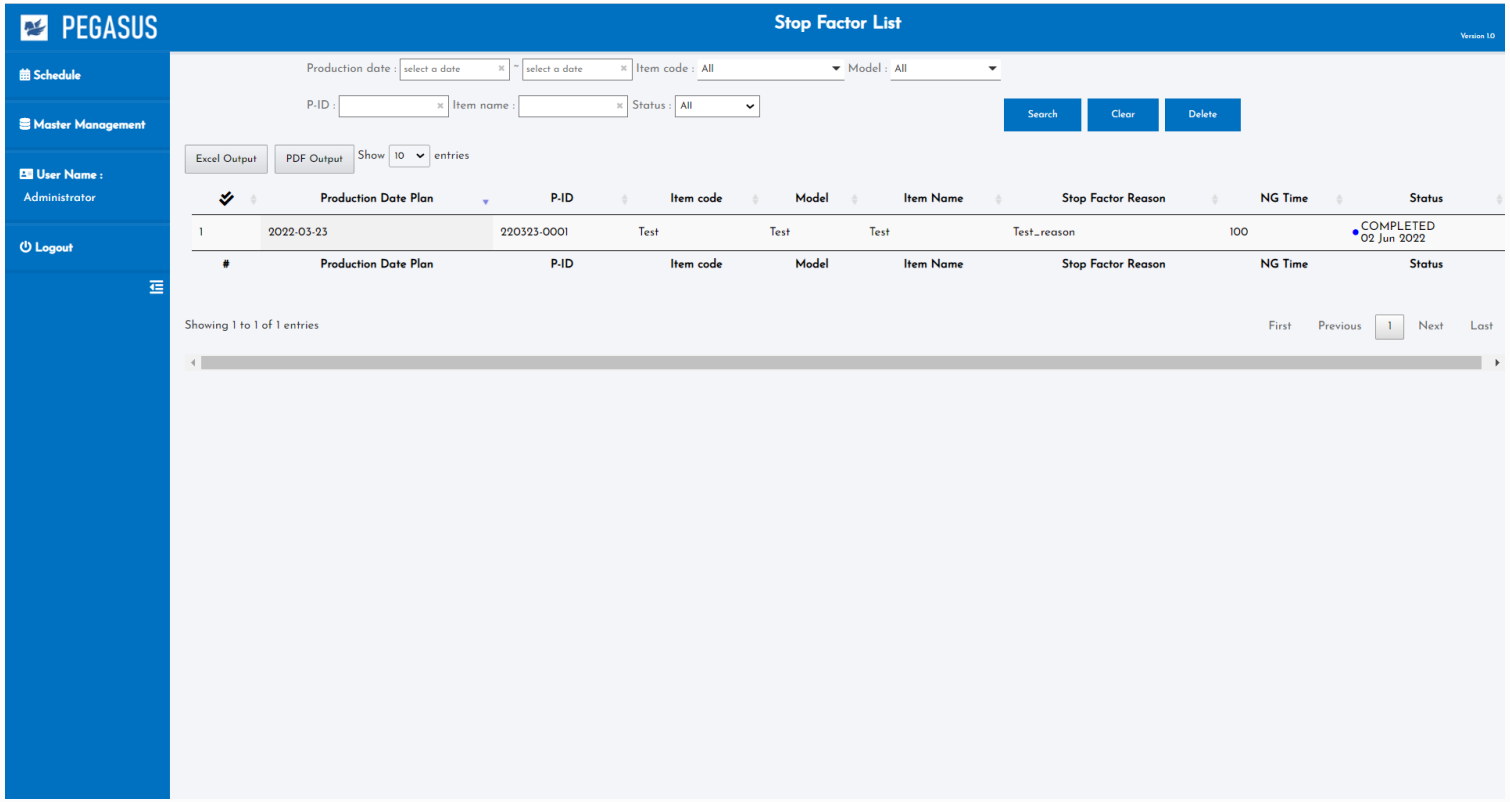
#	Production Date Plan	P-ID	Item code	Model	Item Name	M/C	P	Processing time	Amount Plan	Amount Act	Amount Diff	Production Time Plan	Production Time Act	Production Time Diff	Status
1	2022-03-23	220323-0010	HT11765	HT-R45C	BOBBIN COVER (HT-R45C)	6	1	120.00	3200	0	3200	0.00	0.00	0.00	CANCELED 26 May 2022
2	2022-03-23	220323-0009	CN37535	CN70	Arm Cover	5	4	120.00	576	0	576	0.00	0.00	0.00	CONFIRMED 22 May 2022
3	2022-03-23	220323-0008	HD17838	HD-10FL3	Clincher Arm Cover LG	5	3	20.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
4	2022-03-23	220323-0007	HD17835	HD-10FL3	Handle Cover LG	5	2	30.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
5	2022-03-23	220323-0006	HD17836	HD-10FL3	Handle Cover W	5	1	30.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
6	2022-03-23	220323-0005	HD81144	HD-10FL3	Plastic Staple Cover Assy	4	1	15.00	4800	1	4799	20.00	0.15	19.00	CONFIRMED 02 Jun 2022
7	2022-03-23	220323-0004	TA17001	TA551/16-11(USA)	ARM GUIDE	2	2	120.00	400	0	400	0.00	0.00	0.00	CONFIRMED 22 May 2022
8	2022-03-23	220323-0003	HD17829	HD-10FL3	Clincher Guide	2	1	20.00	1800	3	1797	10.00	0.16	9.00	CONFIRMED 02 Jun 2022
9	2022-03-23	220323-0002	HT11815	HT-R45C	PUSHER	1	2	36.00	4600	0	4600	0.00	0.00	0.00	CONFIRMED 26 May 2022
10	2022-03-23	220323-0001	HT11778	HT-R45C	B CASE S2	1	1	60.00	3000	6	2994	50.00	0.01	49.00	COMPLETED 02 Jun 2022

Operation monitoring system Function

Data collection function

Data can be collected by various methods from Signal Tower and Production plan import or create.
Since it is possible to collect time and factors for NG information and STOP information, analysis for improvement is possible.

PC screen

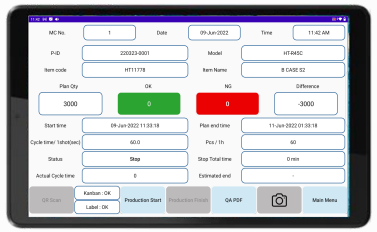


Operation monitoring system Function

Data collection function

Data can be collected by various methods from machine and send information to server and update Production information to tablet.
Since it is possible to collect time and factors for NG information and STOP information, analysis for improvement is possible.

Tablet screen



11:55

Schedule

Production date : To Item code : All Model : All

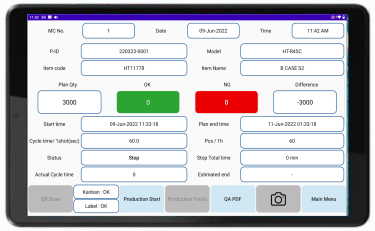
P-ID : Item name : Status : All Search Clear

No.	P-ID	Itemcode	Model	Item Name	M/C	P	Processing time	Amount Plan	Status
1	220323-0013	23047655	640A	OUTER LENS SID...	7	2	70	1656	CONFIRMED
2	220323-0001	HT11778	HT-R45C	B CASE S2	1	1	60	3000	CONFIRMED
3	220323-0002	HT11815	HT-R45C	PUSHER	1	2	100	4600	CONFIRMED
4	220323-0003	HD17829	HD-10FL3	Clincher Guide	2	1	180	1800	CONFIRMED
5	220323-0004	TA17001	TA551/16-11(US...	ARM GUIDE	2	2	30	400	CONFIRMED
6	220323-0005	HD81144	HD-10FL3	Plastic Staple Co...	4	1	240	4800	CONFIRMED
7	220323-0006	HD17836	HD-10FL3	Handle Cover W	5	1	120	2000	CONFIRMED
8	220323-0007	HD17835	HD-10FL3	Handle Cover LG	5	2	120	2000	CONFIRMED
9	220323-0008	HD17838	HD-10FL3	Clincher Arm Co...	5	3	180	2000	CONFIRMED
10	220323-0009	CN37535	CN70	Arm Cover	5	4	30	576	CONFIRMED
11	220323-0010	HT11765	HT-R45C	BOBBIN COVER (...	6	1	30	3200	CANCELED
12	220323-0011	HT11733	HT-S45E	TAPE HOLDER B...	6	2	60	2000	CONFIRMED
13	220323-0012	23047654	640A	OUTER LENS SID...	7	1	60	1656	CONFIRMED

Operation monitoring system Function

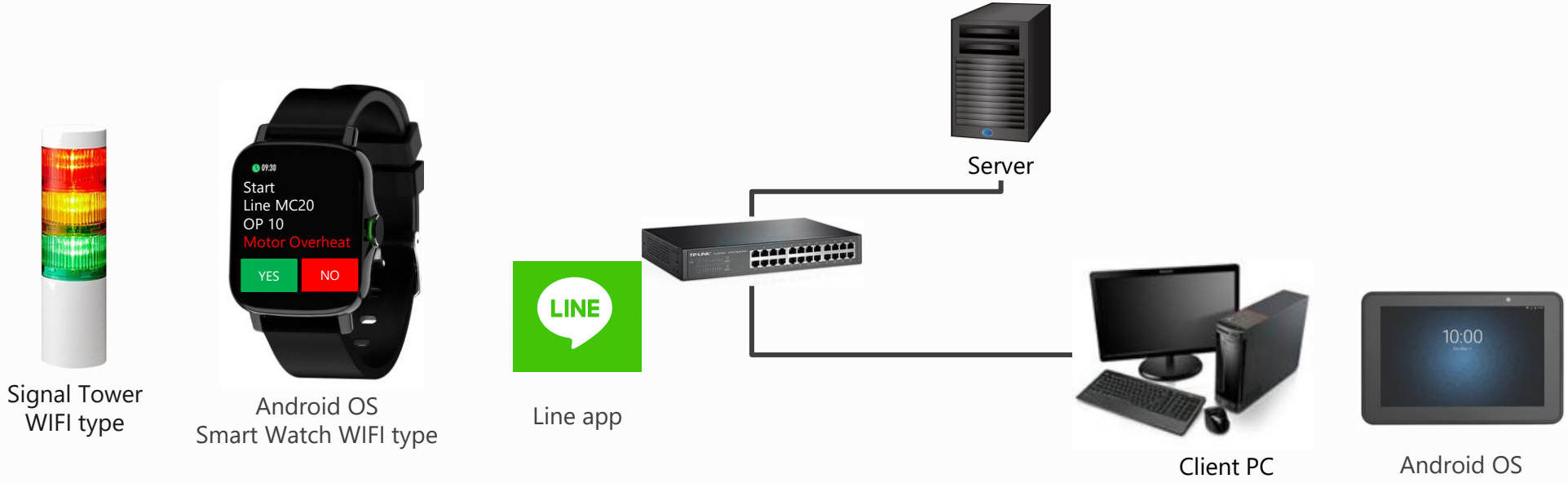
Standard time calculation

Data collection allows it to collect Worktime, downtime, setup, and idle time. Since OK count and NG count can be collected, the actual standard time can be calculated.



Tablet screen

System configuration



No	Item	Recommended specifications and models
1	On-premises / Cloud Server for AWS, Google	OS: Windows Server 2019R2 Standard / Memory: 8GB or more / Hard disk: Free space 50GB or more / Display: Resolution 1366 x 768 or more / Browser: Google Chrome (latest Ver) * Server machine with recommended model specifications or more
2	Client PC	OS: Windows 10 / Memory: 4GB or more / Display: Resolution 1366 x 768 or more Browser: Google Chrome (latest version) * PC machine with recommended model specifications or higher
3	Tablet	Android OS type
4	Smart watch WIFI type	Android OS type with WIFI
5	Signal Tower WIFI type	Wireless Data Acquisition System WDT-LR /LR Series

Maintenance

#	Software maintenance		Standard / Option
1	Operation support / recovery support	We will open a support window and provide operational support by phone and email, and recovery support in the event of a software failure.	Standard*1
2	Upgraded software provided	We will provide an upgraded version when the software functions are improved. We provide the latest software compatible with the latest OS free of charge. It can reduce it life cycle cost by eliminating the need to purchase software when updating the server.	Standard*1
#	**Software re-setup**		
1	Software re-setup	If it need to re-set up the software after repairing a server failure Perform restoration work. (Repair of inventory data is not included in software re-setup)	Standard*1

* 1) Service is provided at the system purchase fee in the first year of the contract. Contract on a yearly basis from the second year onwards

Schedule | Go live schedule

1. Current situation analysis	We will inspection the current business and the system being used, confirm the requirements, and analyze the customer's current situation. And will make an estimate based on customer requirements.	**Within sales**
2. Requirement definition	Detailed requirement definition will be performed based on the analysis result. Check the detailed requirements so that the system can be implemented in a manner that matches actual operation.	**1-4 weeks**
3. Design	While a process meeting, we will perform basic design, detailed design, and preparation for transfer based on the requirements.	**1-3 weeks**
4. Development / Test	Perform the test that fits with customer work and start the test. We will consider a transfer every method for let smooth working process.	**1-20 weeks**
5. Introduction support	We will have an operation training to introduce the system that is currently being used or work in parallel with the work, and after confirming the usability, etc., And the final acceptance will be continue to process.	**1 week**
6. Production operation	When start operation. We will provide a long-term support for safe and comfortable system by providing operation maintenance support, information provision, and revision edition.	**Min : 4 weeks** **Max : 28 weeks**

Appendix

Appendix | Tablet

Tablet 8" (4G,CALL,32GB) LENOVO TAB (TB-8505X) Black

- ดีไซน์ระดับ High-end ทำขึ้นสำหรับผู้ใช้ที่ชื่นชอบสไตล์และการออกแบบที่ดีพร้อมฝาหลังโลหะและขอบโค้งมนยกระดับความสง่างาม
- ดื่มด่ำกับระบบเสียง Dolby ล้อมรอบตัวคุณด้วยเสียงที่เฟื่องฟูเมื่อคุณฟังเพลงดูภาพยนตร์การแสดง และ วิดีโอ
- ทุกอย่างที่คุณต้องการ ด้วยโปรเซสเซอร์ Quad-Core และแบตเตอรี่ที่ให้การท่องเว็บนานถึง 18 ชม.
- เก็บบรรยากาศที่คุณชื่นชอบด้วยกล้องหน้า 2MP กับกล้องหลัง 5MP
- แบตเตอรี่สุดอึดในความจุถึง 5000 mAh ให้คุณใช้งานได้ยาวนาน
- มาพร้อมแรม 3GB และรอม 32GB
- ปฏิบัติการบนชีพียู MediaTek Helio A22 ที่ทรงพลัง

Appendix | Patlite

RATED VOLTAGE	- DC19.0V to DC26.4V
PROTOCOLS	- Telecommunication Protocols: IEEE-802.15.4 (Wireless Communications)
FUNCTIONS	- Connected Model: LR5 type Tiered Signal Tower Body unit top attachment - Communication Frequency: 2405 MHz - 2480 MHz (16 channels) - Communication distance: About 30m from source (Reference Value) - Number of Available Contacts: Six points (red, amber, green, blue, white, buzzer)
CONFORMITY STANDARDS	- Radio Law Authorized Country: Japan (ARIB STD-T66) United States (FCC) Europe (CE)

Model Code	Pre-assembled Model (Direct mount) LR6-3ILWMNW-RYG	Body Unit (Direct mount) LR6-ILWMNW	Body Unit (1/2" NPT pipe or direct mount) LR6-ILWCNW
Size	60mm		
Tier	LED Unit: Max. 5 tiers and one buzzer Unit		
LED Units	Red / Amber / Green (Adding or changing LED units is possible)	Sold Separately	Sold Separately
Light control	Continuous / Flashing		
Alarm Sound Pressure	Typ. 84dB (Use LR6-BW)		
Alarm Sound Selection	4 types (Selectable) (Use LR6-BW)		
Protection Rating	IP65 (NEMA typ. 4x, 13)		
Wiring	M12 Connector 5 pins		