

Feature Article

Application

Establishment of the Application Business for Maintenances with a Cloud Network.

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The “H-1Link” that I proposed and designed changes water our quality instrument business from unit sales to the total service. HORIBA received contacts to supply products to some customers. The amount of sales is limited to a narrow range. It was necessary to make a new approach for potential customers with new solutions for maintenance and system control. The paper describes my new wireless application with “H-1Link” Some major companies accepted our proposal to use to H-1Link achieve a remote service with cloud networks.

Introduction

The world’s water business is predicted to reach 870 billion dollars in 2025.^[1] However, the investment is mainly for equipment and for things such as operation, maintenance, and management, and membranes, etc. for membrane filtration make up the majority of the device business, which is said to be 10 billion dollars, and not much demand is expected for water quality meters. Water quality meters are not benefiting from the explosive demand in the water business, and in Southeast Asia, which has particular demand for these, there are many businesses such as plant construction businesses, and it is difficult to get opportunities to sell water quality meter units. Furthermore, the operation, maintenance, and management fields in the water supply business have begun to privatize, and two French companies known as the ‘water majors’ have the majority of the world’s water supply market. Veolia Environment SA and Suez Environment SA are giants in the water treatment business, and are involved in many aspects, from facility operation to maintenance and management, and even collect usage fees from general homes. In Japan, in the water and sewage business, operation, maintenance, and management are public, and the maintenance and management of private plants are private, so the information and experience for competing overseas are divided between the public and private sectors, which is a factor that makes overseas implementation difficult. In this way, in selling water quality meters overseas, it is important to have product implementation, sales strategies, and to

build locations that are linked to systems, maintenance, and management.

The urgent problem for the HORIBA Group’s water quality meters is how to shake free of the business model like the one that currently exists, where implementation is only based on sales of water quality meter units. In this paper, we will explain the wireless H-1Link application that supports increased efficiency in maintenance and management, the fundamental technology for our new business model.

What is the Wireless H-1Link Application?

With the H-1Link, (Figure 1) we aimed to improve the efficiency of work for on-site workers, provide support for ongoing training, and solve the problems with the transfer of skills. In addition to compatible devices, H-1Link has functions that allow users to enter items to check and instruction values for competitor products, which makes it possible for users to follow simple procedures when doing maintenance and management work. It is also possible to reduce the burden when reading measurement values in places that are dangerous to enter and high places. Even in on-site locations where radio waves do not directly reach, it is possible to do multiple water quality meter checks in one location and relay them to another water quality meter. Collecting the experience and knowledge workers gain in a computer makes it possible to use it for training new employees, judge the validity of calibration based on the behavior of sensors during

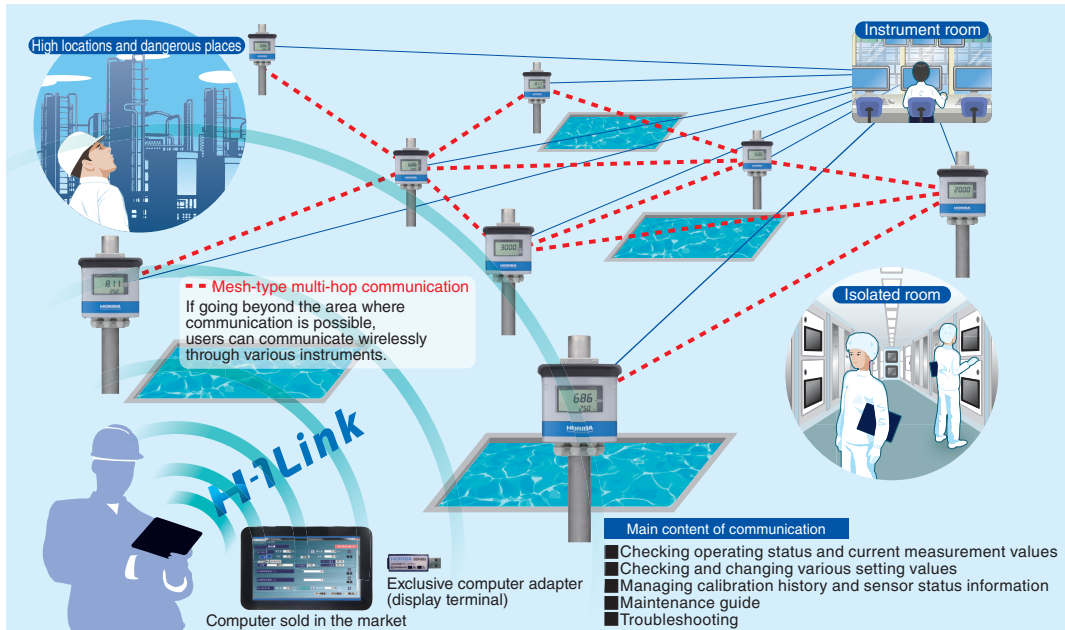


Figure 1 H-1Link conceptual diagram

calibration, (Figure 2) and use the data for things such as predicting the life based on the calibration result history. (Figure 3) By utilizing the H-1Link, we aimed to improve the efficiency of work for on-site workers, provide support for ongoing training, and solve the problems with the transfer of skills.

H-1Link Wireless Technology

Even if a wireless unit used for H-1Link is at a distance or in an installation location where the radio waves of the water quality meter unit do not reach, if a water quality meter that is compatible with H-1Link is at a point where wireless communication is possible, the multi-hop function can be used for communication, which is one feature of H-1Link. Another feature is the wireless group multi-channel access function, which sub-divides the frequency range used for wireless into 27 groups so that users can use a range of 3 frequencies within the group without interference. With these functions, if the

compatible water quality meters increase, if the communication cuts out during communication due to something obstructing the signal, the system can try other communication paths, and if the system is unable to communicate after trying this, it can automatically change the frequency range it is using and can try to restore communication.

These types of functions have been installed so that

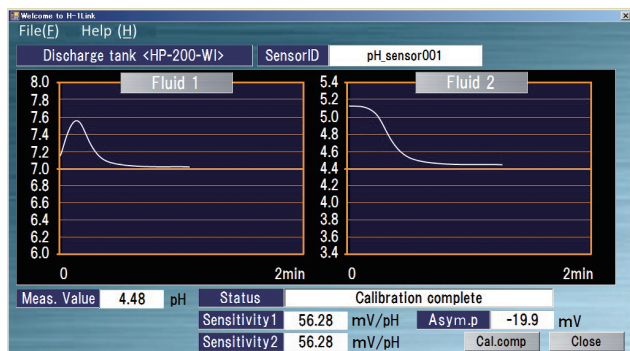


Figure 2 H-1Link (The judgment of calibration validity)

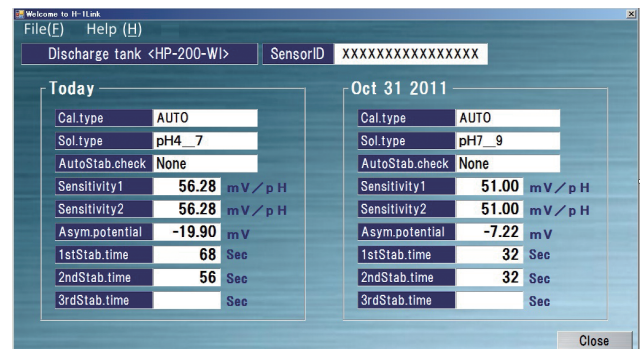


Figure 3 H-1Link (Calibration history)

wireless LANs, etc. that use the same 2.4 GHz bandwidth can co-exist with wireless units that use that bandwidth. Various different wireless standards apply to the 2.4 GHz bandwidth, so signal interference is often a problem. The standards have different communication speeds, data amounts, encryption methods, etc., but have similar methods for having frequency groups called wireless channels, and each one has an effect, such as decreasing communication speed, shortening communication distance, or in some cases, even possibly causing the unit to become unable to communicate. The wireless units used with H-1Link are set up to ensure communication even if the communication speed is slow, with few concerns about wireless signal interference due to signals from different standards, and are optimal for supporting on-site maintenance and management work.

H-1Link's Potential

H-1Link uses wireless units with multi-hop functions to support on-site work. However, if we look at it from a different perspective, based on interviews with customers, we have the potential to build a completely new business model. This refers to the new implementation in the water quality meter industry aiming to improve overall efficiency and reduce costs by connecting to a data cloud launched to help make maintenance and management go smoothly for plant management companies and maintenance and management companies. Plant management companies and maintenance and management companies are currently trying to implement data clouds for the objectives of reducing costs and improving the efficiency of maintenance and management, but it has been difficult for them to get the water quality data to use as indicators as wireless data.

Wireless technology for water quality meters (called 'instrumentation wireless') does exist, but the mechanism is to make the entire system wireless, and from the viewpoint of the costs of building the system for improving the efficiency of maintenance and management for the water quality meters themselves, the cost is too high to use it. To acquire data using methods other than this, the only way is to have a wired connection, which would have high costs for laying wiring, but building a network that can effectively utilize the H-1Link multi-hop function would make it very inexpensive, easy, and convenient to put data up on a cloud. H-1Link was a wireless application created for the objective of making on-site maintenance and management work more efficient, but it has a high compatibility with data clouds for maintenance and management built on the concepts of acquiring data to make things more efficient or reducing

overall costs, and HORIBA has begun cooperating with multiple companies regarding establishing links between different industries.

Application Examples of Utilizing H-1Link and Cloud Technology

Currently, in the water and sewage market in Japan, cost competition is expected to become even harsher in the future. Unmanned facilities are predicted to increase, and companies are looking for different applications than conventional water supply facilities for managing their operations. Companies such as maintenance and management companies that are trying to implement clouds are trying to gain business opportunities by proposing overall cost decreases to customers that involve receiving the large-scale consignment of facilities that have difficulty breaking even, such as facilities in depopulated villages where senior citizens make up more than half the population, or small-scale water supply systems. For that reason, it is important to increase the efficiency of maintenance and management and items for remote monitoring, and this led us to look for a sensor that we can connect to the cloud. This type of business model for maintenance and management companies is also very attractive for HORIBA, which has a service network throughout Japan. If we can receive consignment of multiple water purification facilities in the area around a service location, this would probably be a sufficient business, even if a single facility doesn't break even by itself. At that time, if we can diagnose degradation as well as water purification and calibration timing, we can use cloud applications for the maintenance and management schedule, which will allow us to establish our business model.

Sewage treatment plant facilities have not kept up with environmental changes such as the recent abnormal weather and decreases/increases in population, and need to be improved. Measurement items and management aspects will probably be improved in the future. At that time, developing a sensor after the request for it comes out of the market will be too late to match the speed of the market. We think it is possible to strengthen our links with research institutions such as universities and research possibilities for cloud sensors and cloud applications, reference operation data that we haven't seen before, and evaluate the empirical evidence to come out first in the market with a structure that can be used to propose items for monitoring.

In the private market, with the current business model, as long as Japanese demand for new facilities doesn't

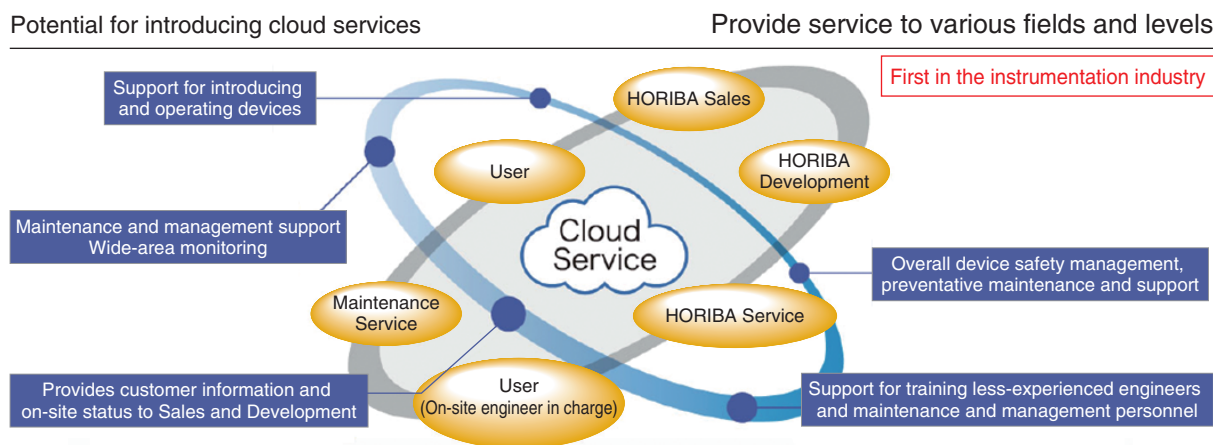


Figure 4 H-1Link (Cloud application business conceptual diagram)

increase, the market is unlikely to change much, except for legal regulations such as emissions regulations. The majority is competing for a share of the replacement market. One of the main reasons why private companies need water quality meters is for treating waste water, as part of the requirements for compliance with legal regulations. As such, with the goal of aiding in compliance, if we can reduce the costs by improving efficiency and improve efficiency further by receiving consignment for large-scale maintenance and management work, it will be possible to get sufficient motion in the market. Further efficiency improvements are also being sought in the overseas markets. Customers are also looking for operation know-how, and it will also be possible to do this type of business overseas for the first time after achieving a total support system involving plant operation, maintenance, and management, not just as a water quality meter manufacturer.

Conclusion

Water quality meters that are compatible with wireless technology have items that have been connected in a wired manner up until now, such as wireless instrumentation, that are being changed to wireless, and there are many types of units, such as units that only transmit analog output wirelessly, and the objective of these is to replace the current wired connection with a wireless connection. In this situation, the H-1Link can contribute in the category of water quality meter + wireless, for plant manufacturers and in different industries, and will lead to new business opportunities for HORIBA. We think that our business model for gaining profit by adding value to an application that is different from conventional water quality meter unit functions will be achievable. In doing so, we want to utilize information links with HORIBA Techno Service, maintenance and

management companies, plant management companies, and customers, and have an application business that can use a mutually cooperative form of cloud business that has not existed before. (Figure 4)

Currently, we are investigating evaluation tests for the prototype cloud sensor, from the perspective of linking with plant construction companies and maintenance and management companies. In addition, to link with our development plan for our next-generation water quality meter that we are planning at the same timing, we plan to have one variation of the model that is compatible with the cloud sensor in our line-up. The HORIBA Group's concept for developing our next-generation water quality meter is to not only have conventional functions that are expected, such as measuring, but to also make it possible to have applications centered around water quality meters. Achieving the concept for our next-generation water quality meters and commercializing them are essential for establishing the HORIBA Group's application business, and we are confident that this application business will be necessary for water quality meters in the future. We want to continue to make effort to promote this application business in the future.

References

- [1] Mizuho Corporate Bank, Ltd., "Japan's Position and Strategic Direction for Overseas Water Business" (2012).



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