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| Title | **Use Case of Digital Twin for Disaster Management** |
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| Re: |  |
| Abstract |  |
| Purpose | To discuss and define the terminology for digital twin |
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# Introduction

In the last meeting, based on the various definitions of digital twins suggested by industries, organizations, standard body(consortium) and researcher, we proposed to express an objects/systems/processes that exist in the physical world as virtual objects/virtual systems/virtual processes existing in the virtual world rather than expressing all of them exists in physical world in terms of " things".

And there were a lot of discussion of what is process and system, and we agreed to discuss the use case of digital representation for invisible physical things.

Therefore, we would like to share the concept of invisible physical things by taking the project of digital twin-based disaster management integrated platform technology development we are currently working on as an example.

# Use Case of Disaster Management Platform

Figure 1 shows simplified disaster management platform architecture. The disaster management platform of Fig.1 consists of four systems. From a data flow point of view, first, data is acquired from various sensors installed. Second, it detects whether an abnormal case has occurred through data analysis. Third, it infers information to help users make decisions about what to do in unusual situation. In this process, not only the sensor data but also standard operating procedure, patrol inspection report, and equipment maintenance records, etc. are used to infer decision-making support information. Finally, the decision-making support information is displayed on the monitoring screen.

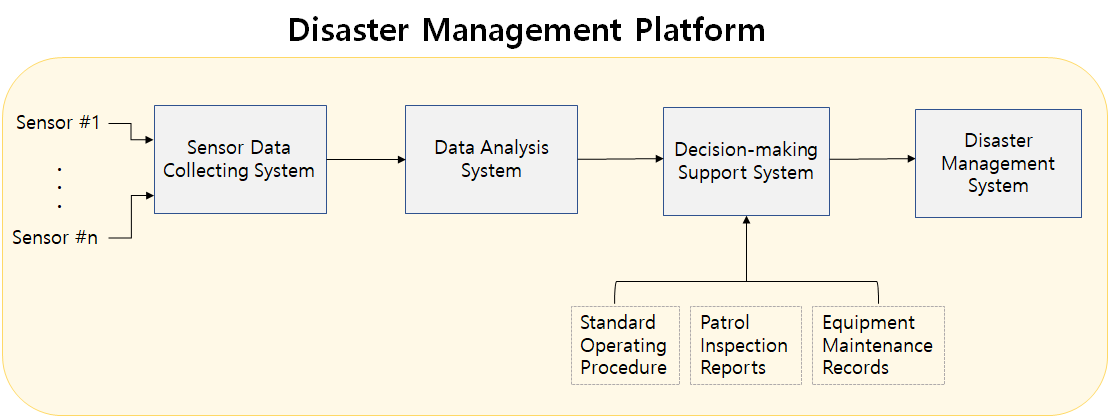


Figure 1. Use Case of Disaster Management Platform

According to Wikipedia's definition, a system is a group of interacting or interrelated elements that act according to a set of rules to form a unified whole. In Fig.1, the system consists with some physical hardware and program etc.

However, systems can be divided into abstract(invisible) and physically(visible) based on properties. Communication systems and transportation systems belong to physical systems, and things like science and thinking systems belong to abstract systems.

In our application, process means turning sensor data into decision-making support information through use of data collecting, preprocessing, transmission and analysis, etc.

# Conclusion

In this contribution, we presented some of examples of invisible physical things using a disaster management platform. We would like to propose to revisit the use of the term of virtual thing to represent everything in physical world.

# Reference

[1] IEEE P2888.3 “Draft Standard on Orchestration of Digital Synchronization between Cyber and Physical Worlds”, July 2021.

[2] IEEE P2888.3 2888-21-0042-01-0003, “Proposal for Complex Digital Objects of the Digital Twin Framework”, October, 2021.

[3] IEEE P2888.3 2888-21-0093-00-0003, “2888.3 TG Meeting Summary”, October, 2021.