# Paris Session 2022





## A Study For Digital Twins for Substation Control Circuits

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Group Discussion Meeting

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### **Question and our contribution**

## Question PS3.2

• What examples and return of experience can be provided on <u>digital substations</u> and digital twins? Which <u>emerging digital technologies</u> will improve substations for the grid of the future?

## <u>Answer</u>

#### ✓ The Examples and return of experience regarding digital twins

 We developed on digital twins used to work on connecting/disconnecting control cables.

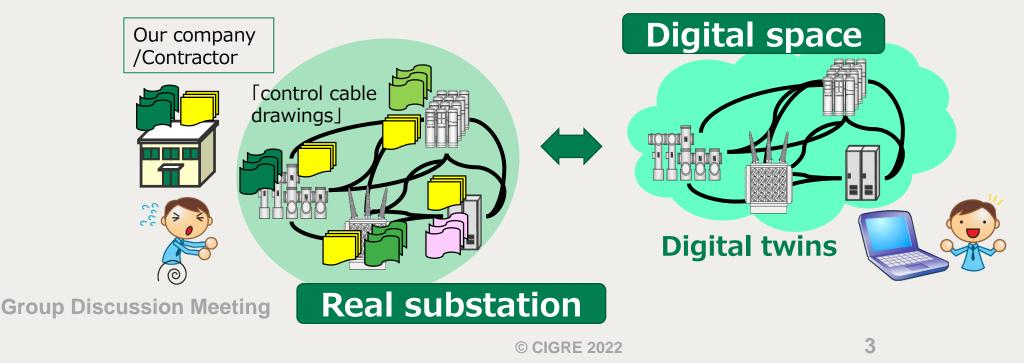
### ✓ The emerging digital technologies

- Digital twins of control circuit.

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### **Utilizing the digital twins in substations**

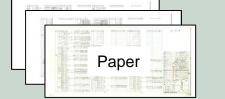
- Digital twins are aggregates information on objects that exist in the real substation, and reproduces and manages them in digital space.
- As a situation management for control circuits in substations, the prototype tool was created to link the real substation with the digital space and its practicality was verified. We created a prototype tool for digital twinning, which links the real substation with the digital space, and verified its practicality.



### **Concept of improving work efficiency through system utilization**

#### Changes due to systemization

#### Before starting construction



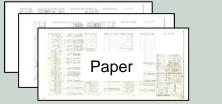
Cable connection status is recorded on paper called "control cable connection table".

#### **Under construction**

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Create a cable connection/disconnection checklist using the control cable connection table, and work by using it.

#### After completing construction



Update to the latest connection status.



**Digital twins of control cables** 

#### Semi-automated creation



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#### Impact on Operations

- Many tables can be checked on a PC
- Quick confirmation of connection points
- Prevention of HE(human error) due to misreading
- Reduction of time required to prepare forms
- Prevention of HE due to copying errors
- Paperless(No need to print drawings)

- No work to update drawings
- Prevention of HE due to omission of correction



Automatic update

### **Conclusion**

- In control cable connection work in electrical construction, checking disconnection and connection points and revising connection tables have become a burden for contractors and utilities.
- In order to carry out improving level of work with a limited number of personnel, it is necessary to improve work efficiency using DX technology.
- We developed a prototype tool for a "control cable connection table" to link the real substation and the digital space as a status management tool for control circuits in substations and verified its practicality.

# Thank you

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