cigre
For power system expertise

To Realize Automated Control
-Scheme to Verify Grid Model-

SC C2

PS2 Question 2.6

How can artificial intelligence be harnessed to provide further support such as recommending courses of action for operational decision-makers?

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Summary

- In Japan, **automated control (gen. tripping, load shedding, Q control) is realized** in some domains so called SPS or RAS, not only providing insights to assist operation staff.

- This enables **enhancement of power grid usage** to the thermal limit **without operation staff's additional burdening**.

- In order to realize this, we have a **scheme to check whether the difference** between the calculation result of the system and the actual operation result **is within the tolerating error**.

- The ISC system (Integrated Stability Control system) is one of the implemented example.


Group Discussion Meeting

ISC-P (Processing)

ISC-C(Control)

ISC System's responsibility

- When an N-2 fault event occurs in grid, the **ISC system automatically performs**, if necessary, to keep transient stability, to control voltage, and to initially control frequency.

- To achieve this, the **ISC system reproduces grid status as a calculation model in real time**, calculates the consequence when risk actualizes, and sets necessary countermeasures for each contingency.
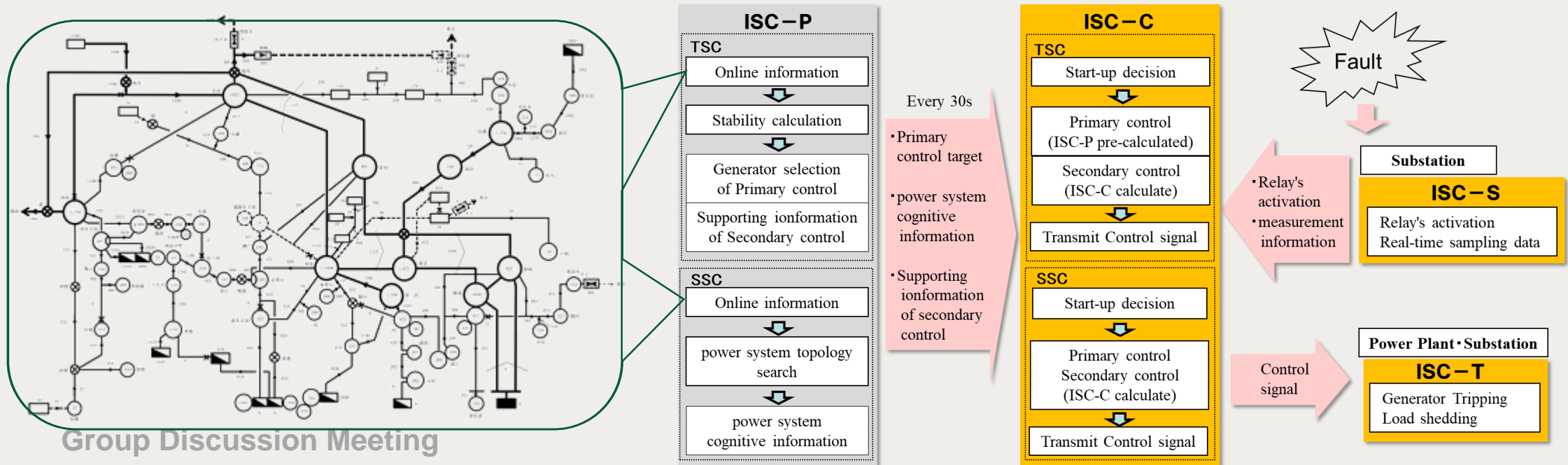
Verification of calculation model

- To ensure the accuracy of the automated control, **the difference of calculations are verified in 2 steps** as a figure below.

- Such **scheme is constructed to be checked periodically**, for example, when the grid main circuit get changed, when a new generator connects, or when major fault occurs in the grid.

Built on Japanese standard power system analysis tools.
More accurate but more time to calculate.
Not suitable for real-time calculations.

Fast enough to calculate in real time.

Lots of measurement equipment are installed in grid.

Simple model	Verify whether within tolerating	Detailed model	Detailed model	Verify whether within tolerating	Acquired data (P, Q, V, F)

Group Discussion Meeting

Same model but different grid configuration

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