

TEAMWORK IN THE FUTURE CONTROL ROOM

Signe Svensson¹, Anna-Lisa Osvalder¹, Jonas Borell²

¹ Chalmers University of Technology, Sweden; ² Lund University, Sweden

BACKGROUND

The energy system is undergoing significant changes. Energy demand and weather dependent energy capacity is anticipated to increase (IEA, 2023; Swedish Energy Agency, 2023). Changes in the energy landscape, digitalization and automation could shape future control room teamwork, potentially leading to new tasks and roles and impacting collaboration among control room crews and with remote centers, altering organizational structures.

THE AIM

Investigate how the future power control room system teamwork could be affected by technological and organizational developments.

METHOD

A semi-structured interview study was conducted with 16 individuals having expertise linked to process control in nuclear power plants and transmission grid operations.

THE QUESTIONS

Concerned today's control room operators teamwork, and anticipated future changes.

ANALYSIS

The interviews were transcribed and thematically analysed.

RESULTS

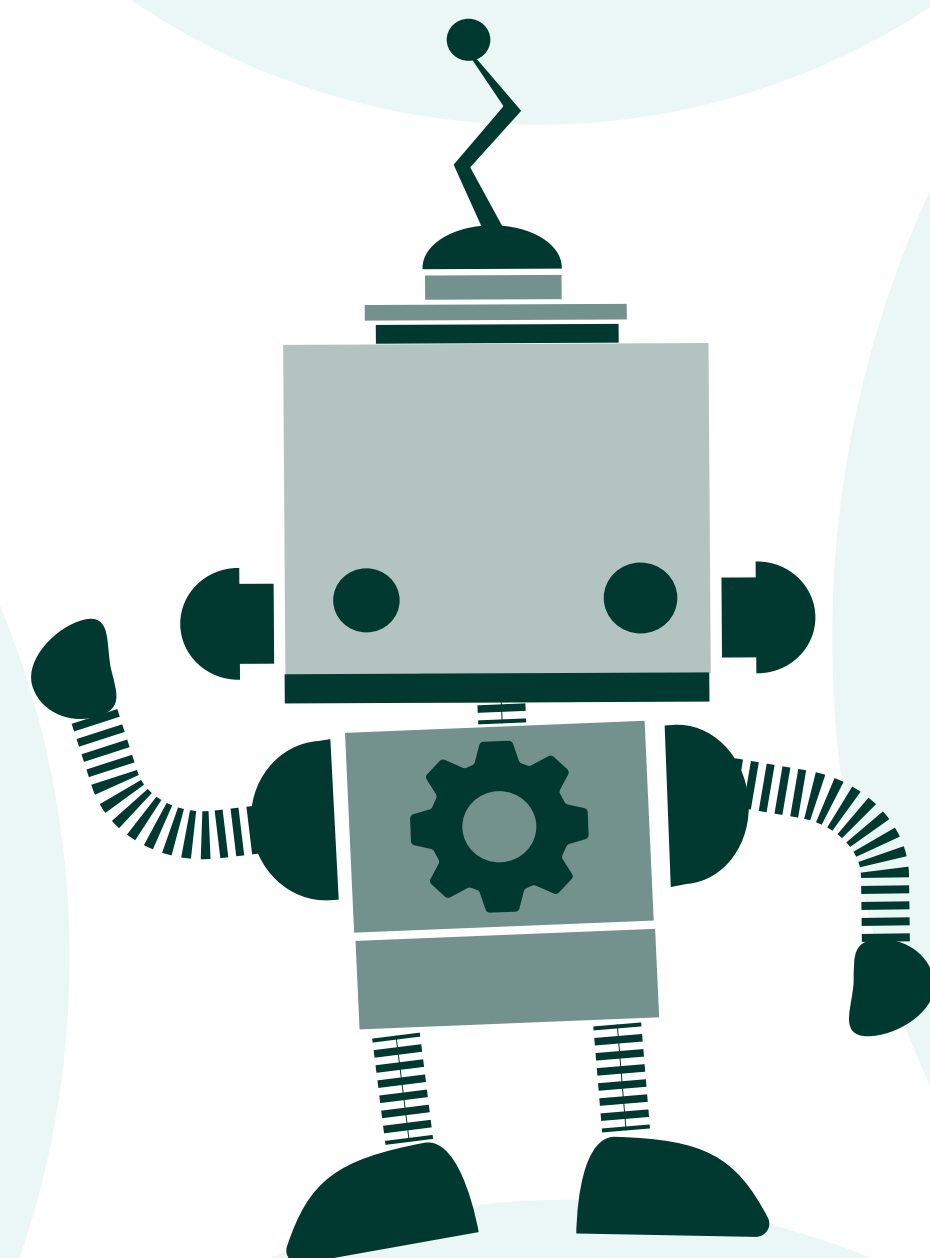
Decision supports

More decision supports was anticipated to be developed, enabling more **coherent decision making** in the crew.



AI as team mate

An autonomous agent or AI was described as a **'team mate'** in the future, whom would require (digital) information from the rest of the crew, necessitating the group to adapt and learn to effectively collaborate with it.



Crew size

A higher level of automation could lead to **smaller crews**, and decrease the amount of teamwork as we know it within the control room.



Remote teamwork

Remote operations could change organizational structures and routines. One interviewee said that **teamwork with control rooms on other sites is less efficient** than the teamwork on site, since they do not know each other as well. An organization with remote centers and less expertise on site raises questions on how and when to **include the remote experts** during disturbances, and to what degree the crew would be open to critique from an expert far away, especially in stressed situations, which is when they supposedly would cooperate.



Maintenance

In a future where more reliance is put on a system with higher level of automation and being run in a less predictable way due to higher level of weather dependent power, the **relative importance of maintenance** increases, and their role may become more analytical, cooperating closer to the operators.



Multiple units

In a future with higher level of automation, the operators might control **several units** or power plants from the same control room, affecting operator skills and teamwork, thus interviewees meant that you cannot expect one person to have the skills to control different power plants.



DISCUSSION & CONCLUSION

- If maintenance roles shift due to reliance on automated systems, collaboration between control room crew and maintenance personnel was anticipated to increase.
- Higher level of digitalization, and new support systems could affect where the operators direct their attention, possibly helping the team to coherent decisions.

- It is reasonable to assume that developing into high performing control room teams can be more difficult to achieve if remote teamwork with e.g. 'expert centers' becomes the reality. Thus, according to Wheelan (1990), interpersonal relations between group members are important for a crew to develop into a productive team.
- Future research is still needed to explore how automation ironies would affect the decision making process during disturbances. This issue was already highlighted by Bainbridge in 1983.

REFERENCES

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