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STAYING ON TOP OF AUTOMATION

In an era of rapid technological change, maintaining control over automated systems is increasingly complex. Sebastian Daeunert explores the impact of 'little assistants' and the challenges we face in staying in control, from manual skills to learning from reporting. Are we in control of technical systems, or are they in control of us?

KEY POINTS

- **Rapid technological advancements:** Automation and artificial intelligence are rapidly transforming our world, especially within high-risk organisations, introducing new challenges in maintaining control and understanding technical systems.
- **Operator dilemmas:** Operators often face dilemmas when automated systems provide recommendations that could lead to bad outcomes, balancing following automation and relying on training and experience.
- **The role of reporting:** Continuous reporting of system issues by operators is crucial, even if they are unsure of the nature of the problems. Management must encourage reporting and act on these reports to improve system reliability.
- **Reversion to manual:** Practising operations without automated assistance is essential to ensure that users can effectively switch to manual control when necessary and to understand the overall system's functioning.
- **Communication and collaboration:** Effective communication and collaboration between operators, safety specialists, and management are vital to staying in control of increasingly complex systems.

It feels like times have never been as turbulent as they are these days. As I write this, new developments in automation and artificial intelligence are changing our world at lightning-fast speed. I am not referring to full automation (autonomy), but the 'little assistants' that start to invade our lives, often without us thinking too much about them. What does this mean to the operators in so-called high-risk organisations, and how do we cope? How do we stay 'on top', or in control?

Those of us who are 'old school' may remember trying to insert a coin into the public phone, vending or ticket machine. It would sometimes fall through, coming back out via a little compartment at the bottom of the machine. We tried again and again, eventually rubbing it on the machine next to the slot, the place where the scratches showed we were not the first to do that and certainly not the last. Suddenly – voila! – the machine accepted it. By rubbing the coin against the machine, we believed we had beaten the machine, as it finally recognised our payment. Did we just experience a miracle of static electricity? No. Vending machines work mechanically so scraping the coin doesn't have any effect other than inserting the coin in a slightly different way, which statistically increases to chances of success. However, we erroneously attributed the success to 'getting rid of the static electricity'. This is a fine example of a placebo effect: a positive result is attributed to a fake intervention.

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From this small example, I wonder whether we are deceived in our complex working environments, believing we are actually in control of systems, or even understand them. Let us take a look into an imaginary radar system at an imaginary centre operated by an imaginary ATC provider. I am deliberately not using names as I am inventing this scenario. It could be an area control centre, railway operational facility, or intensive care unit – anywhere where automation plays a major part in our work.

Let us imagine a new software, not very different from what we are used to, but with additional functions and some small changes. Software developers have programmed it, operators have given their input, it has been tested (of course in sandbox mode, disconnected from reality so it could do no harm) and assessed as being safe. Additionally, people have been thoroughly trained on how to use it. In other words, everything should be working fine. And it does!

So, we are all set. Apart from the usual bout of complaints by operators ('those who always complain about everything'), it all works. Most people are happy.

Then suddenly, after having worked flawlessly for months, the system recommends an action to the operator that could lead to disaster.

What will the operator do? He or she may follow the recommendation and if things go wrong, will have to face the *"Why did you not recognise this?"* question, followed by: *"Why did you follow the automation, we trained you at great expense to be a competent person. You should have known from experience!"*

Alternatively, the person may decide not to follow the recommendation and, based on their experience do what they were trained for. If the outcome is positive, the person may receive a *"Great job!"* and a pat on the shoulder. But if the outcome is negative the question likely will be: *"Why did you not follow the automation? That's what we installed it for!"*

This places the operator in a dilemma. Before the outcome is known, neither path is clear. So which path to choose?

For those who grow up with new systems, never having experienced previous ways of working, these possibilities might be limited even further. Even though their gut feeling says that something is not right, they may not have experienced or have been trained in possible alternatives. And so, they do not know what to do.

CONSIDER THE FOLLOWING ADDITIONAL SCENARIOS:

- An error in the system has been known for many months. The operators developed a workaround that worked fine, but they never reported it.
- An error in the system has been known for many months, but since it occurred so rarely, was untraceable, and could not be reproduced, it was impossible to fix.
- An error in the system has been known for months and has been reported many times. Eventually operators give up, thinking their reports are not taken seriously and stop reporting, which leads those supposed to fix it into believing that the error is no longer present.
- An error has been fixed but the fix leads to new errors in the system or slight changes in how to operate the system, which are not explained, as it is only a small update.

These are some of the practical dilemmas of 'staying in the loop' for 'people in control'.

So, what can we do about this? When it comes to automation support, it is important to practise our work without using the available new automation aids on a regular basis so we still have competence in performing our work when those 'little helpers' fail, or do things that are not as they should be done. We can only identify false inputs by automation if we know the original system. This way, when things go wrong we are still able to switch to 'Plan B'.

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If we have never worked without automation, or only on a very rare basis, we might lose our competence to *"save the day"* when it fails. This manual practice can help to understand 'the big picture' so that we do not limit our vision to our small piece of the puzzle. This is not easy as cost reduction pressures tend to erode training opportunities.

When it comes to reporting, it is important for operators, safety specialists, and management that operators continue to report things they find awkward or difficult, even if they are not sure that these are errors inside the system. This must be encouraged, even if reporting brings frustration and workload for all. Many factors can discourage reporting, and so a constant effort is needed to keep in mind why it is so important to keep up the motivation to report, understand the issues, and act on them.

Those in non-operational roles may face problems from a different perspective and rely on the information that operators give them. For those who oversee the business, it is important to listen and take things seriously. Keep in contact with those at the 'sharp end' and actively seek to exchange information. Take reports seriously but relay your thoughts, measures and reactions regularly to those who made the reports. They need the feedback, even if it is a *"negative"* or *"it takes time, but we are on it"*.

Do not leave operators in the dark. Without a fundamental understanding of how things work, and why things go wrong, we tend to make assumptions, as with the coin-operated machine. And if, as a technical specialist, you notice something amiss yourself but are unsure whether to report it or not, speak to the operators and get their views. Taking each other seriously, working together between disciplines and teams, and looking beyond our own parts of the system helps us all to stay 'on top', and more in control of what we do.

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