VOL.2 2024

AKKODiS

Thinkers & Makers

A Smart Industry tech magazine, sharing insights and stories from the people who make incredible happen through their ideas and actions.

Efficiency Gains:

How AI is Shaking Up Everything from Medicine to Manufacturing

Plugging in to the Future:

Developing Electric Vehicle Chargers for an Evolving Grid

People at the Heart of Design

How Human-Centered Design Improves Performance and Well-being of First Responders

AKKODIS

Make Incredible Happen

Welcome to Thinkers & Makers, the Smart Industry Tech Magazine

Thinkers & Makers is an inclusive concept that humanizes the approach to engineering and technology. It encompasses the breadth of our people and how we identify and solve problems at Akkodis. We are Thinkers who stretch outside their comfort zones to drive innovation, and Makers who team up with clients and partners to turn those innovations into tangible solutions. Together, we enable a smarter, more sustainable tomorrow. This is the 'Smart' in Smart Industry...and it will be brought to life over and over again in this, and every issue of Thinkers & Makers magazine.

Welcome to our latest issue of Thinkers & Makers – the Smart Industry tech magazine brought to you by Akkodis.

Editorial

Technology's Human Touch

Jan Gupta
President Akkodis

At the heart of the Smart Industry is the concept of technology and human ingenuity coming together to solve some of the most pressing global challenges.

This issue of Thinkers & Makers showcases several examples of how innovation thrives at the intersection of tech experts' curiosity and technical know-how.

You'll read about four tech experts and their real-life AI innovations that have the potential to revolutionize the world of coding, boost productivity, and even help manage chronic illnesses.

In addition to these advancements, you'll learn about an approach rooted in Human-Centered Design that can transform emergency response. This exemplifies how the prioritization of the human perspective can lead to digital innovations that enhance, support, and simplify the work of first responders and their most critical responsibilities.

You'll also get a glimpse into how we're enabling a brighter and more sustainable future (today!), with digital solutions that can mitigate coastal flooding with autonomous submersible vehicles, drive the circular economy by converting waste into valuable resources using a rotary kiln and promote a dynamic and evolving energy grid with a next-generation EV charger.

Heart-driven Innovation

During your deep dive into the articles that follow, I hope you'll see that true innovation goes beyond making things easier and more convenient; it's something that deeply resonates with us as human beings, enriching our lives and fostering meaningful connections. This is really the 'magic' that is created when our tech experts develop and implement **advanced technologies.**

By bringing together diverse skill sets and fostering interdisciplinary collaboration, our Thinkers & Makers infuse innovation with empathy and understanding, ensuring that solutions are not only cutting-edge but also **genuinely address human needs and the needs of our planet.**

By putting people first, Smart Industry solutions can do much more than help organizations drive their digital transformation, they can enhance our collective well-being and drive positive change.

Now that's what I call technology with heart!

Plugging in to the Future

Developing Electric Vehicle Chargers for an Evolving Grid

Next generation electric vehicle chargers are set to play a key role in the smart electricity grid of the future.

Demand for electric vehicles (EV) is on the rise, and ensuring that charging infrastructure can meet that growing demand and keep growing numbers of zero emission cars on the roads is a challenge. There's more to it than simply installing extra plug sockets.

As the world strives to decarbonize, electricity is playing an increasingly important role. And the electricity grid is evolving.

To keep pace with the growth of fluctuating renewable energy sources such as wind and solar, the grid needs to become more dynamic and flexible. Meanwhile, digitalization is enabling the interconnection of systems and infrastructures, and new digital e-mobility services are shaking up the world of transportation and logistics.

Changing Role

The role of EVs is evolving. They are no longer just energy consumers but active participants in the electricity grid. Researchers predict that by 2050 the collective storage capacity of European car batteries will be around 3 GWh – capacity that could be put to good use to store fluctuating renewable energy flows.

But for that to happen several pieces of the electricity puzzle need to fall into place. The cars need to be capable of delivering current from their batteries, through the charging cable into the grid. Charging stations need to be able not only to transform the power from alternating current to direct current for the car, but also to change the direct current coming from the car to alternating current for the grid.

Cars need to be able to communicate with the demand side of the grid so grid management can establish an overview of storage capacity and energy demand.

A secure and precise billing system is crucial for tracking and compensating for the energy exchanged between vehicle and grid.

All that … and the complex technology that underpins it ,should under no circumstances make for a complex user experience. Gone are the days when the average EV buyer was a person with a special interest in technology, willing and able to handle a demanding device interface.

As EVs become more widespread, ease-of-use and intuitive design are prerequisites.

Future-oriented Standards

EV charging has a crucial role to play in the electricity system of the future but making that role a reality is technically complex.

Akkodis Norway has developed the state-of-the-art DEFA Power EV charger, offering the latest, most future-oriented standards with simple and intuitive handling. DEFA Power is designed to function across most of the world, as it will be marketed internationally, with different versions meeting local regulations and requirements.

The team, led by project owner Marianne Holmstrøm, set out to develop a whole new product generation from scratch. The technical platform had to be future-proof and ready to handle all the new functionality needed in the coming years and the charger itself had to be as easy to operate as possible.

The DEFA Power charger is designed to provide a more intuitive and seamless charging experience than its competitors, with its integrated display giving the user step-by-step information about the charging process. It comes with an app, which among other things calculates the optimal charging procedure to save both time and money.

Such a complex project requires collaboration between supplier and customer, and Holmstrøm's team has worked closely with hardware and mechanics experts from DEFA, who gave Akkodis experts the freedom to develop the best solutions, she said.

"Electronics and mechanics must align well. In the first phase of the project, we contributed to the electronics, while DEFA worked with the mechanics. Afterwards we worked together writing the high-level application code that lets the charger communicate with the backend systems it interacts with."

Software Focus

The two partners have been working closely on software development, a vital part of the project.

“Software controls the interaction between a group of chargers, when they are part of a larger installation at a shopping center or in a residential area,” Holmstrøm said.“Here, Load Balancing becomes important. The current available locally is distributed evenly between chargers, optimizing the use of the local network.”

“The Akkodis Norway team has been closely involved and we feel that we really have contributed to this project, both in electronics design and software. It has been a great collaboration, not least because DEFA has such a strong skillset within mechanics and software and because they are very serious about designing robust and complex high-quality products,” Holmstrøm added.

Security and Performance

The charger complies with all current standards for electronics safety and is secured against hacking, preventing unauthorized charging. It is also designed to deliver its maximum charging capacity of 22 kW, which sounds obvious, but in fact makes it unique.

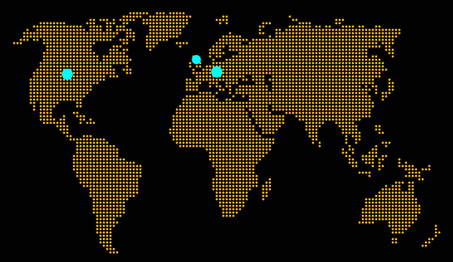
Many existing chargers on the market are known to derate (or operate below their stated maximum capacity) in warm weather or direct sunlight because in hot temperatures, the charger automatically reduces the current and charges at a slower speed to avoid overheating.

DEFA wanted to eliminate that problem and the company’s engineers developed a thermic design ensuring that the charger could dispose of excess heat, even in direct sunlight on a hot day. Instead of encapsulating its electronics in plastic, DEFA’s engineers chose to leave the charger open at the back, to deflect heat away from the device.

Image Source: https://www.defa.com/de/defa-power/

> Such a complex project requires collaboration between supplier and customer, and our team worked closely with DEFA's hardware and mechanical experts, who gave the Akkodis experts the freedom to develop the best solutions

Marianne Holmstrøm
R&D Manager & Project Owner
Akkodis Nordics



Since the Nordic launch of DEFA Power in May 2023, the charger has captured about a quarter of the home charging market, and it was launched in Germany, the Netherlands, Austria, and Switzerland at the end of 2023.

Plans are afoot for further expansion into other countries in 2024, including the United Kingdom and United States. The company is also working on launch plans for selected markets in Asia.

Get in touch with our Experts in
Automotive & Transportation

Protecting Our Coastline

With Autonomous Marine Vehicles

Akkodis has come up with an innovative and environmentally friendly way to protect the shoreline from the increased risk of coastal flooding that comes with rising sea levels.

Global warming is leading to higher sea levels. And a rise in average sea levels means that when storms hit, extreme sea levels, storm surges, and coastal flooding are more likely. That puts people living by the sea in danger and threatens their homes and livelihoods – not to mention precious natural habitats too.

As the world scrambles to decarbonize, governments are also looking for ways to mitigate the damage already being done by climate change, and one important area of focus is improving flood defenses.

Increasing Flood Risk

It's getting urgent: The Intergovernmental Panel on Climate Change's (IPCC) latest estimates warn that in the best-case scenario, average sea levels could increase by 30-60cm (or 60-110cm in the most pessimistic scenario), by 2100.

In many Atlantic and Mediterranean coastal locations in Europe, the storms that used to devastate the coast once in a century are now expected to increase by a factor of ten before 2050, the European Environment Agency has warned. Images of violent waves crashing over seawalls, flooded homes and displaced people may dominate the headlines when storms hit, but their impact goes far beyond the obvious effects – coastal flooding can destroy precious biodiversity along the shoreline by flooding wetlands or sand dunes. Agricultural land that becomes salinated after submersion in seawater for long periods is less productive for farmers.

The US Environmental Protection Agency has also noted flooding becoming more frequent along the country's coastline, with nearly every site measured experiencing an increase in coastal flooding since the 1950s, and the rate accelerating in many parts along the East and Gulf Coasts.

The existing storm surge and flood barriers in place in many coastal locations that allow water to pass in normal conditions and close, to lessen the impact on the coast, when storms hit, are simply no longer up to the job. Akkodis experts set out to develop a cost-effective and flexible solution that would better protect coastal communities and natural environments.

Zoran Adam-Gaxotte, a marine engineer by training and R&D project leader and specialist in innovation and coastal preservation within the Applied R&D department at Akkodis, is leading the SABRES project.

"I'm passionate about innovations that can help preserve the coastline", he said. "I started the SABRES project in 2019 because I could see that the risk of coastal flooding would become a big concern for coastal communities in the coming years."

Submersibles Step Up

The aim of the SABRES project was to develop an environmentally friendly way of creating a barrier against the waves in areas at risk of coastal flooding, while minimizing the impact on the local marine ecosystem and sediment dynamics.

Adam-Gaxotte and his team came up with an innovative solution:
Submersible and **A**utonomous **B**reakwater based on a **R**emovable and **E**cofriendly **S**ystem.

The fleet of autonomous submersible vehicles is designed to have a breakwater effect and combat coastal flooding in an intelligent and adaptable way.

SABRES Prototype for Proof of Concept of innovative algorithm for autonomous navigation with obstacle avoidanc

The vehicles can be deployed when there is a high storm risk and removed once the risk has passed, reducing local environmental footprint compared to permanent flood defenses. The flexibility of the SABRES system means it can adapt to different storm scenarios, making it more effective at protecting the coastline.

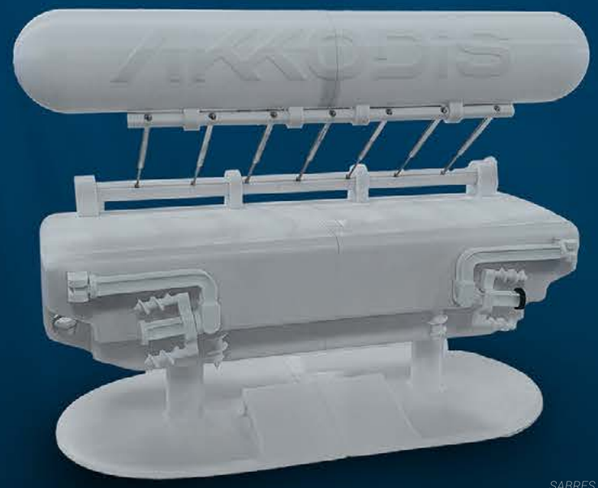
When the storm alert comes, each craft navigates autonomously, avoiding any obstacles, to a strategic position out at sea, before diving down and anchoring itself to the seabed, finally deploying its breakwater device. Once the storm has passed, the SABRES submersibles retract their breakwater solution, rise to the surface and return to port base.

Zoran Adam-Gaxotte
R&D Project Leader at Akkodis

> “Traditional ways of combatting coastal flooding have big drawbacks – they are cumbersome and permanent, so they have a significant long-term impact on marine ecosystems, driving away populations of some species or encouraging invasive ones that harm local biodiversity. But we just had to put up with them as there were no alternatives.

These fixed, old-style solutions also cannot adapt to individual storms or to natural evolutions of the coastline itself. They are expensive too – often needing to be rebuilt after a big storm. Worst of all, they don’t completely rule out the risk of coastal flooding, as recent storms have demonstrated.

For all those reasons, combined with intensifying warnings about rising global temperatures and sea levels, authorities have been calling for a more intelligent, sustainable, made-to-measure and budget-friendly solution to protect the coast.



SABRES Demonstration model

Multi-skilled Project

The project makes use of a wide skillset, building on knowledge of marine biology, coastal hydrodynamics, meteorology, economics, and social sciences and with specialists in mechanics and naval design, robotics, geotechnics, and eco-design working alongside IT experts who brought their skills in embedded systems, artificial intelligence, automation, and cybersecurity to the table.

The team has also been working with other researchers seeking answers in the same field, including the Gladys laboratory at the University of Montpellier, which tested its innovative coastal hydro-morphodynamic modeling algorithm Opti-Morph, with the case study of a storm swell hitting the coast of Palavas-les-Flots, on the Mediterranean coast of France, protected by SABRES craft.

The project has drawn on expertise beyond the project team itself. Thanks to an artificial intelligence study[1] focused on the potential of "SWARM" (decentralized) approaches in optimizing fleet navigation tasks in space environments, the SABRES solution is based on a particularly innovative fleet management algorithm.

The SABRES work has been taking place in France, which with its approximately 1,200km of Atlantic coastline, is particularly at risk from coastal flooding, but the innovative technology could help protect other coastlines around the world, keeping local inhabitants safe and protecting their homes, safeguarding important industries such as fishing, tourism, and cargo transportation as well as protecting valuable natural environments such as wetlands and dunes.

1/ M. Mounsif, K. Zehnder, Y. Motie and Z. Adam-Gaxotte, "SwarMind: Harnessing Large Language Models for Flock Dynamics," 2023 10th International Conference on Soft Computing & Machine Intelligence (ISCMI), Mexico City, Mexico, 2023, pp. 171-177, doi: 10.1109/ISCMI59957.2023.10458573.

Breakwater Demonstrator

The solution will also save governments money. A recent study published in Nature Climate Change found that coastal flooding could result in economic damage of nearly €1 trillion per year by 2100 without investment in adaptation measures.

The team is now working on developing two small-scale prototypes to show what the technology is capable of, with a view to attracting investment. The first model will use artifically generated swell to demonstrate the breakwater capabilities of the submersibles and help estimate how many are needed in a fleet, depending on what kind of storm is predicted and the local coastal configuration.

The second demonstrator makes use of made-to-measure remote-control boats to test the innovative Akkodis algorithm that will control the automatic piloting of the SABRES fleet and allow the craft to dodge obstacles and optimize their routings.

Learn about our
Research & Innovation

Efficiency Gains:

How AI is Shaking Up Everything from Medicine to Manufacturing

Artificial Intelligence (AI) is not only changing the way many businesses operate – it's evolving quickly itself, with recent advances as well as the availability of increasing quantities of data, opening up the possibility of developing new capabilities.

In the three articles that follow, find out how Akkodis tech experts are using their technical skills and knowledge to explore new ways in which AI will be put to even better use in the long-term and tracking the trends that are shaping the AI sector today.

Just Talk to the Database:

Boosting Salesforce Productivity With AI

Teaching people how to talk to a database – that is one of the things Akkodis Salesforce Business Analyst Baptiste Poilblanc and Salesforce developer Eliott Mischler are doing, utilizing Einstein, a suite of AI-based services offered by Salesforce to its users.

As an example, the average salesperson is not able to extract complex data from the CRM without involving a data analyst to write the queries that will produce the requested data.

Ask Einstein Directly

Now they can ask the Einstein Copilot the exact same question and receive the same data. No more waiting for the data analyst to be available. Instead, salespeople are empowered by Einstein to access their data directly.

> For instance, you can ask it for a closing plan for an opportunity. You give it the name of an account and ask it for help to figure out what the next steps should be, said Mischler.

As consultants, he and Poilblanc are implementing and customizing the Salesforce AI tools to suit the specific requirements of their clients. That expertise is invaluable, as the Salesforce package can be extended in numerous ways.

Baptiste Poilblanc
Salesforce Business Analyst at Akkodis

Eliott Mischler
Salesforce developer at Akkodis

Controlling the Ecosystem

Poilblanc stated, "We pride ourselves in having control over the entire ecosystem and trying to make the solutions we build as efficient as possible for the client. We want to give them the best experience possible with these new AI tools.".

The two have connected the Salesforce chatbot feature to an additional knowledge base, consisting of small articles with little bits of information. The articles contain information the LLM couldn't know by itself without querying the client's own data, such as information about custom discounts based on regions.

"When the chatbot receives a question, it can provide the answer by finding the most relevant knowledge articles, thus being able to give contextualized information to the client. Having such a chatbot giving answers based on knowledge articles, is not a default feature. Over the last few months, we've connected the two and succeeded in building a more efficient and precise chatbot", said Poilblanc.

The Salesforce Einstein suite is not an LLM on its own. It communicates with an LLM, and can be plugged into any LLM of the user's liking. On top of that, Einstein can query records, for instance accounts, leads or contacts from the Salesforce database. Users can simply talk to it, and it will generate a query as a result and produce a set of records that match whatever parameters it was given it in natural language.

Engaging with Clients

Mischler and Poilblanc are looking specifically at those elements of the Salesforce ecosystem that take the most time and are really painstaking for their clients to engage with. And they are now developing AI tools to minimize that pain and visiting clients to showcase what they have built based on Salesforce Einstein products. The aim of these workshops is not only to show clients what they've already accomplished, but also to learn how to customize their solutions to clients' specific needs.

"It is all very new, and we haven't yet discovered all the possibilities", said Mischler.

> Imagine giving a smartphone to a person living in the 1960's and asking them to do something with it. It is the same thing with AI. The way we approach this is to go out and meet our clients. Together we can find use cases that we wouldn't have thought of on our own.

Looking Forward to new Einstein Features

According to Mischler and Poilblanc, the Salesforce Einstein AI suite is only in its very early stages, but already quite powerful. They are now looking forward to seeing even more AI functionality on the Salesforce platform, for them to adapt to their clients' needs. One such much anticipated feature is direct voice input.

"Voice input will be a total gamechanger", Mischler said. "Users will be able to control the CRM with their voice. Let's say a salesperson just had a meeting with one of their clients and they are on the way back home in their car. Using voice input, they can tell the CRM via their phone to create a lead with such name and such values, schedule a meeting at this date, et cetera."

"It's not a feature that's out yet, but it's something Salesforce has got planned. And because it is a huge time saver, we just know that salespeople would do anything to lay their hands on something like that", he added.

"That is yet another example of how companies and especially salespeople can achieve significant gains in productivity by turning to Einstein for help. And our most important task is to build the bridges between their needs and the power of these new AI technologies".

2

AI Connects the Dots:

Using Data to Better Manage Chronic Illnesses

With ever-increasing amounts of health data come new possibilities for making everyday life easier for people with chronic illnesses. The STAYWELL project (Sustainable Technology to Analyze Wellness Among Chronically Ill Patients), led by AI and IoT expert Asma Gasmi, is exploring the potential.

The project is developing a wearable device for people with chronic conditions. The device is equipped with sensors that collect real-time data about their physical condition, cross-referencing it with their medical history, and presenting the data to doctors and other caregivers.

One early area of focus is diabetes.

Detecting Drifts

The aim of STAYWELL is to detect drifts in health metrics that could point to the worsening of a patient's condition.

That could be sleep patterns or heart rate but in the early phases of the project, the team is focusing on measurements including levels of sugar and glutamine – which helps to control sugar levels – in the blood of patients with diabetes, explained Gasmi, who is managing the STAYWELL project as well as acting as lead tech in AI and IoT.

She has a PhD in IoT and AI on top of a degree in electromechanics and systems control engineering – not to mention a background in medical technology research that helps her understand what is at stake, and how the new technologies can help.

"To begin with, we are focusing on diabetic patients. Among other things we are measuring sugar and glutamine in their blood. In particular, we are concentrating on monitoring type 2 diabetes patients. That diabetes type is often not treated properly, because many patients discover it too late."

That principle of an early warning system could potentially help to avoid complications for patients, cut down on unnecessary procedures and reduce the time they spend in hospital.

And AI has an important role to play.

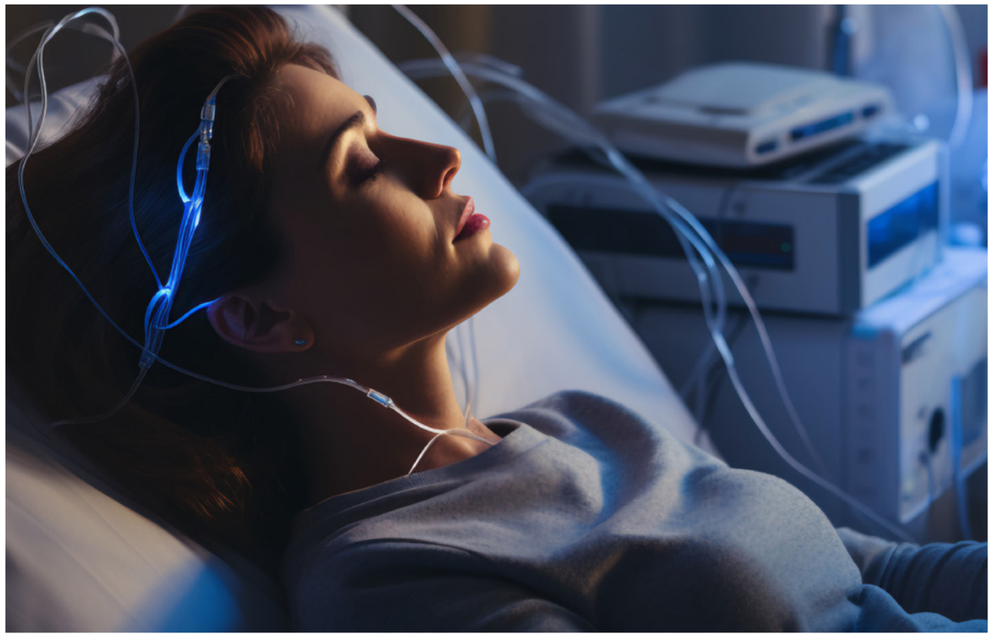
"AI is particularly adept at connecting the dots between health patterns and chronic illnesses," Gasmi said. "For individuals with chronic illnesses, even minor deviations from the norm, such as changes in sleep patterns, could indicate underlying issues."

The AI program analyzes patterns in the data collected by the wearable device to create a model of the patient. In addition to detecting and alerting deviations in a patient's real time condition compared to the baseline, using a predictive algorithm, the program could give an indication of the patient's future condition if the same anomalies persist.

AI can also help the project's team members work smarter, Gasmi explained. "As an engineer, it is not only about how much you know; it is also about how effectively you can integrate AI into your work. I believe AI will become a part of our daily routines, saving us a significant amount of time. For example, I use AI to help me find errors in my code and to prepare elements for my presentations, allowing me to focus more on truly challenging tasks."

Asma Gasmi
R&D Project Manager at Akkodis

> AI is particularly adept at connecting the dots between health patterns and chronic illnesses. For individuals with chronic illnesses, even minor deviations from the norm, such as changes in sleep patterns, could indicate underlying issues.



Data Potential

Even though the team could see the potential for data and AI to build a smart solution straightaway, the path to achieving it was not without obstacles. Data is a key element in the STAYWELL solution, but health data is sensitive and well protected and initially difficult to access.

Through Gasmi's work with key institutions and the strength of her concept, she managed to secure permission to work with some real data and begin modelling it into a patient for study.

That hard work is paying off.

"It was challenging to establish the causality between real-time monitoring data and the risk of a patient falling into a diabetic coma, but we managed it," Gasmi said. "Currently our precision is at 74 %. That's promising and I'm sure it will improve further.

> I think there are many areas in which it makes good sense to have a sensor system that connects real-time monitoring with the patient's history and the ability to make predictions. Giving doctors and caregivers such a tool will improve their work and help patients.

Non-invasive Sensors

STAYWELL builds on Gasmi's PhD thesis in medical technology which was funded by a company that produces hospital beds and sought to develop a smart bed that could analyze a patient's sleep, in an efficient and non-invasive way. Unlike conventional diagnostic tools in sleep medicine that require multiple sensors attached to the brain and body, the smart bed gathered similar sleep data, using non-invasive sensors.

During her studies, Gasmi succeeded in achieving 94% precision in data collection, compared to common polysomnography (sleep study) tools. On top of that data, she developed AI-powered prediction algorithm for elderly people living in nursing homes.

An Extra Tool for Doctors

"Building on my thesis I decided to develop technology to make life easier for people with chronic illnesses, and for their caregivers as well, so I came up with the STAYWELL project," she said.

The STAYWELL project is also looking into other applications. The team is partnering with a hospital in Calais in the north of France to find a way to use monitoring data from the STAYWELL device on other pathologies such as post cancer treatment care.

"I think there are many areas in which it makes good sense to have a sensor system that connects real-time monitoring with the patient's history and the ability to make predictions. Giving doctors and caregivers such a tool will improve their work and help patients," Gasmi said.

The first working prototype of STAYWELL's device will be ready at the end of 2024, while the ultimate proof of concept is planned for the end of 2026. After that, plans to commercialize STAYWELL will get underway.

3 AI Advances Herald Coding Changes . . .

The recent high-profile launch of the world's first AI software engineer could mark the start of the process of AI and software convergence, said Danny Hucke, team lead and software engineer at Akkodis Germany, but it also raises many questions.

With a PhD in theoretical computer science from the University of Siegen, Germany and a keen interest in AI – both theoretical and hands-on – Hucke is well placed to assess the potential of the tool, known as Devin and launched by Silicon Valley start-up Cognition AI in March.

Hucke's role includes the creation and implementation of AI solutions and he also acts as a point of contact between Akkodis and the world of academic research, which helps him keep in touch with developments on the theoretical side.

The Devin launch caught his attention – and that of the entire coding community – but for now, it is difficult to assess the full potential of the AI tool's coding capability, Hucke said. In any case, Cognition AI is far from alone: AI-powered software agents are emerging left, right and center. They are the future. But the future is now.

Making Problems Smaller

Cognition AI's focus on reasoning, rather than simple coding, defined in this context as a system's ability to reflect on a problem and divide it into smaller sub-tasks that are easier to solve, is particularly interesting, Hucke said.

"Coding is a very pure application of reasoning, compared to the complexity of talking to humans and solving real-world problems. When it comes to coding, there is a precise definition of the problems you must solve. Therefore, coding is the company's initial approach to tackling the broader issue of performing reasoning with AI systems."

The system also needs the ability to find and fix mistakes it makes. He compares the LLM (Large Language Model) inside the system to raw intelligence, while the concept of reasoning is akin to building a brain around the intelligence for it to work properly.

Is this AGI?

That is starting to sound like the definition of Artificial General Intelligence, a type of AI that can perform on par with or better than humans on various cognitive tasks.

Many scientists say AGI is generations away but Hucke is not so sure.

"We really don't know. The pace is so incredibly fast, nobody can make reasonable assumptions about the future of AI anymore. It might be that in two years we'll see AI hitting the roof and not going anywhere, until there is a new breakthrough. Or we might never achieve it at all."

On the other hand, he said: "It could also be that we're having AGI systems in a couple of years. We just don't know."

> "We really don't know. The pace is so incredibly fast, nobody can make reasonable assumptions about the future of AI anymore.
>
> **Danny Hucke**
> Team Lead & Software Engineer at Akkodis Germany

Magic Ingredient

Hucke is not crowning Devin the new king of coding. Not yet at least.

It does have one magic ingredient, however: agents, or software programs designed to receive data from their environments and take actions based on that data.

Agent systems can divide up a problem into smaller parts and work on them separately, learning from their mistakes along the way, before putting everything together to solve the initial problem. This sets them apart from ChatGPT-style systems, which address the whole problem right away.

Agent systems can also use tools, for instance a browser searching the internet for information about the problem it is asked to solve, as well as writing code but to execute it as well. If it is not running properly, it can find and fix mistakes.

A number of open-source projects are working on similar solutions. Improvements in the field come from both closed companies like Cognition AI and from the open-source community. Not to mention giants like Microsoft and Google.

AGI aside, the potential for narrow AI agents – ones that are focused on specific tasks – to beat humans at specific tasks such as coding is huge, and according to Hucke, a much closer prospect than was expected even a few years ago.

News of the Devin launch came as a surprise. “As a software engineer and AI enthusiast I’m prepared for what’s coming, but that news kept me on my toes,” Hucke said.

Change is Coming

But the details of the system have not yet been made public and although it is very good at solving particular types of problems, it is not able to solve complex problems autonomously.

So for now, it is too early to declare Devin the Holy Grail of AI software engineering. But Hucke is convinced that his job and that of many other software engineers is bound to change profoundly.

“In future, we humans will be working together with a team of bots or agents. We will do the planning, the architecture and talk with stakeholders. The big picture will be our responsibility, and the coding tasks will be performed by AI agents.”

Humans will be there to review and correct, but their coding role will shrink, Hucke said.

> In the future, programmers will focus more on the high-level stuff. On top of that, we need people with other skill sets like philosophers, linguists, and logicians. I read in the future, the most profitable university degree will be a masters in English, because we communicate with these AI models via language. I’m not sure that’s literally true but there might be something in it.

Teamwork Evolves

Hucke is not suggesting that every developer go back to school to earn an advanced English Language degree, but he believes that profound change is coming to software development teams everywhere. The nature of teamwork will change. People will have to adapt to using AI coding tools, and to tackling problems differently.

“My approach to that challenge is to use AI tools as much as I can, even if I know I could finish a task faster by myself. If I only use it for problems that I'm not comfortable with, I cannot say how good it really is. When I know the exact output, I’m able to better evaluate what the AI did well and where it performed less well. That gives me the opportunity to learn how to make the AI perform even better.”

Get in touch with our Experts on
Data Analytics & Artificial Intelligence

Getting the Circular Economy Rolling

With a Rotary Kiln

An innovative thermolysis process refined and optimized by Akkodis can put waste to good use, turning it into condensates, raw materials, heat, and power using a rotary kiln able to light a fire without oxygen.

Imagine not having to dig into the ground to find precious metals and other raw materials. Instead, you feed waste into a custom-built oven. With the right amount of indirect heat, it produces new materials, which can be used in a factory or sold to the highest bidder.

Even the nastiest types of waste can be used. Scrap tyres, dry sewage sludge, contaminated soil, chicken manure – take your pick. All these waste materials contain value in some form, whether as liquid or solid substances, or in gaseous form

For instance, dry sewage sludge from the tanning and dying of leather contains about up to 10 % chromium. Feed it into a custom-built rotary oven and the end result is a condensate with a 35 % chromium content. That is high-yielding, compared to mining, where good chromium ore contains only 5 %.

Trash to Treasure

“Here in Germany, we have around 5,000 old waste dumps that have been closed and covered,” said Dirk Gerlach, leading expert in rotary kiln pyrolysis technology and member of the chemical plant engineering group at Akkodis Leipzig. “When they were in operation, waste sorting was non-existent, so these dumps contain large amounts of raw materials that could be processed and reused.”

He points to battery recycling as a possible use case. With a scarcity of metals for car batteries, harvesting new raw materials from waste has obvious potential.

> The rotary kilns are fundamentally different from a conventional incineration process. Instead of a surplus of oxygen, the kilns’ oxygen deficiency provides a totally different chemistry.

Different Chemistry

If you ask Gerlach to explain the technology behind the waste incineration plants he is an expert in designing, you’ve already made your first rookie mistake. Because, as he patiently points out, what happens in one of his rotary kilns is fundamentally different from a conventional incineration process. According to him, the difference is Oxygen.

“Conventional incineration has a surplus of oxygen. But inside the kiln, there is oxygen deficiency, which gives you a completely different chemistry. In our plant you can run various processes, with low or high temperatures and with or without steam. Depending on how you set the process parameters, that enables you to generate liquid or solid raw materials or gas,” he said.

While conventional waste incineration turns waste to energy, the pyrolysis and thermolysis processes Gerlach is dealing with, turn waste to products, such as hydrogen, methane, sulphur, heating oil, acetic acid and more – all with a potential for being put to good use in the circular economy. Waste is collected and sorted, fed into the thermolysis and carbon capture plant, which then produces new CO_2-free raw materials.

Innovative Combinations

According to Gerlach, pyrolysis and thermolysis are well-known technologies that have existed for decades. What he and his colleagues are now doing is to combine existing components and processes to create an innovation that could be labelled a Swiss army knife of waste-to-resources technology.

To achieve that versatility, Gerlach unites the two worlds of water and fire. In the fire world of a furnace, you have temperatures up to 1.200°C. In the water world of a chemical plant, the typical operating temperatures are below 500°C and the pressures are upwards of 0.5 bar. Gerlach merges the two extremes into a new rotary kiln thermolysis design, able to produce gas, coke, raw materials and more, making the technology suitable for a range of purposes.

“It can be combined with a conventional coal-fired power plant,” Gerlach said. “These plants cannot process plastic waste or biomass. But by connecting them to a thermolysis plant, you can use these materials to produce gas and coke, which can be fed into the coal boiler.”

Research Meets Reality

The broader topic of thermolysis still needs more research but the Akkodis next generation thermolysis technology is nearly ready to be put into full-scale production.

The team has so far designed standard facilities in three different sizes, MINI, MIDI and MASTER, for operational flexibility.

In Bavaria, Gerlach and his colleagues are participating in a development project focusing on the production of raw materials. The H2-Reallabor Burghausen project converts chemical waste to new materials and with a prototype of the kiln under construction, it should start operations at the beginning of 2025.

To secure this and other publicly funded research for thermolysis, the chemical plant engineering group at Akkodis Leipzig has collaborated with Akkodis Research, the link between publicly funded research activities and Akkodis Centers of Expertise. Akkodis Research combines applied research with the short-term innovation needs of Akkodis clients.

Thinking Outside the Kiln

Gerlach is noting a growing interest from many actors in the industrial sphere as more and more companies look for ways to reduce their carbon footprint.

But some challenges to wider adoption of thermolysis remain, including difficulties in building a precise business case because of uncertainties regarding the price of the material going into the kiln and the market value of the substances it produces.

New raw materials produced from scrap tyres could be recycled into new tyres, for example, but if companies could broaden out their vision of potential value streams, these materials might also command greater value for other purposes.

But Gerlach believes the market needs to evolve to keep up with the technological innovations. And he is confident that evolution is underway.

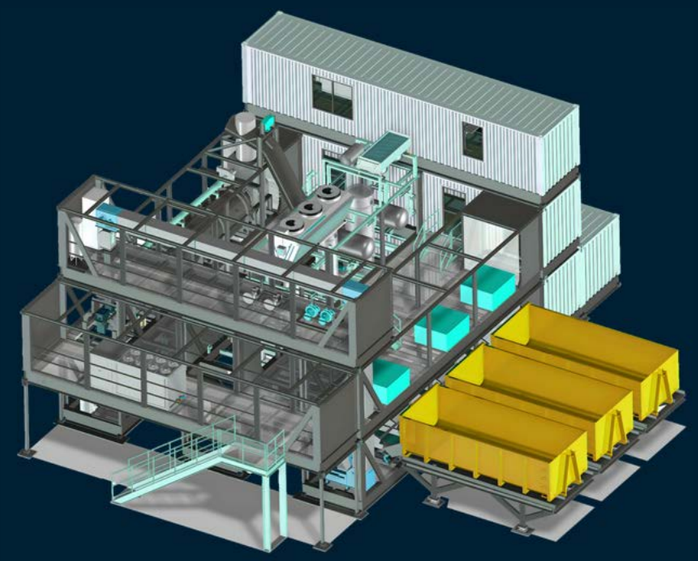
“I predict the waste-to-resources market will step up the pace even further. As CO_2 taxes are rising, the demand for technology to reduce CO_2 footprint is growing. And that is where we can help.”

The MIDI Plant Design

The MIDI plant design is a standard turnkey unit for 24/7 operations with a capacity of 1 t/h. It is equipped with four-step condensation for various condensate qualities and coke post-processing. Including all additional services and storage, the plant site measures 130 x 150 m.

The MIDI system is a modular system using 40' HQ containers for a semimobile operation. After 3-5 years, when an operation has been completed, the plant can be moved to another location.

The design input is 1 t/h and four lines can be stacked as part of one system, which has a fully automatic control system (AutomationX).The system's inputs and end products can change as markets evolve to focus on solid (carbon or ore), condensates (oils and acetic acid) or syngas (CO/H_2 or CH_4/CO_2).



Get in touch with our Experts in
Energy & Clean Technology

People @ the Heart of Design

How Human-Centered Design Improves Performance and Well-being of First Responders

Imagine the intense stress of a first responder arriving at the scene of a car accident. In that situation it is crucially important that the tools to save lives and alleviate pain are at hand, and designed to serve their purpose as well as they possibly can.

The need for adapted design goes both for emergency medical equipment like trauma kits and defibrillators, and for the digital tools to monitor the injured, communicate with other members of the rescue team or to establish an overview of the crash site.

But these digital tools come with an inherent dilemma; as they increase their capabilities with ever growing amounts of data, computing power and high-speed connectivity, they can become more and more complex to operate. Too many options, too much information, and too many clicks needed for the tool to do the task.

No Extra Stress Needed

Digital complexity can increase stress, and that is the last thing first responders need in a high-stress emergency situation. To the contrary, they need their tools to be intuitive and easy to use.

To illustrate the complexity of digital tools, let us for a moment look at an indispensable emergency medicine device, the crash cart. It was invented by US nurses and doctors in the 60's, frustrated by the time it took to gather supplies for cardiac arrests. Among them emergency department nurse Anita Dorr. In 1967, together with her husband, she built a prototype in their garage. It looked much like the ones used today, on wheels and carrying all the supplies for emergency response, stored in one place.

Now imagine a 2024-style "crash cart", filled to the brim with digital technology, like screens, sensors, computers, mobile phones etc. The challenge of designing such a sophisticated device to be just as efficient and intuitive to use, is infinitely more demanding than it was building its 60's predecessor.

Such a device can only be built effectively by involving the people that will be using it. Only then can engineers succeed in designing a tool that makes a difference, instead of just a magnificent machine, however complex or elegant that machine might be.

Humans at the Heart of Tech Development

An answer to that inherent dilemma of digital and computerized tools originates at the intersection of engineering, psychology, anthropology and the arts. Labelled Human-Centered Design (HCD), its aim is to put humans at the heart of the development of new technology. How? By involving them every step of the way.

Typically, the Human-Centered Design (HCD) process starts with observing work routines, doing workshops for users and developers to meet and exchange ideas. Together they build for instance cardboard prototypes of how a new device could look, or design digital mock-ups of an application. Then building increasingly more advanced versions, with each iteration returning to users for evaluation.

To some, the HCD approach may sound like common sense. But as interactive systems become increasingly complex, there is a growing risk of developers losing sight of the context in which they are used. The direct engagement and user research methods applied by HCD secure technology solutions that address the unique challenges and requirements of users and consider their emotional engagement with the solution.

Almost Invisible

Jeremy Dennis, Global Söze Product Owner at Akkodis Australia, has worked in the Public Service & Justice (PS&J) sector for over a decade.

“Whilst it is easy to become enamored with technology, the successful adoption of the systems we develop for the PS&J sector comes down to HCD principles; ensuring the technology is effective and enables users to get the job done with minimum effort”, says Dennis.

“The best designed systems should be almost invisible to the end user in the context of the task they are trying to accomplish”.

An example of this approach is the work Akkodis has done with the Western Australia Police Force: co-developing award-winning technology solutions that address core operational challenges and reduce organizational burdens.

> The best designed systems should be almost invisible to the end user in the context of the task they are trying to accomplish.

Yarning and Söze

These solutions include the Yarning app and the Söze data analytics platform.

Yarning, a first of its kind Aboriginal language translation app, allows officers to select and convey essential messages to Aboriginal People in their native language. It facilitates meaningful communication between police officers and speakers of Aboriginal languages and increases awareness and understanding of important matters in Aboriginal communities.

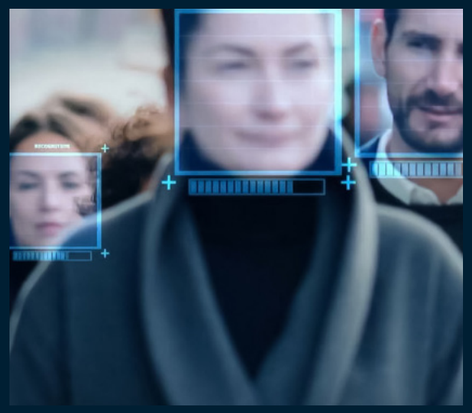
Söze, also developed in collaboration with the Western Australia Police Force, is a powerful data analytics platform that empowers police investigators to integrate and visualize vast amounts of data from multiple sources and devices. It identifies persons of interest, providing law enforcement with advanced analytical capabilities to enhance public safety and security by saving time and reducing risk.

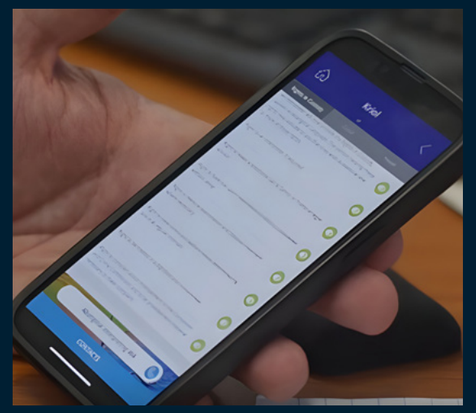
Söze has enabled investigations to be completed in a fraction of the time it would normally take. In one case, Söze enabled investigators to complete 24 months of analysis in only 6 months.

Inspired by these and other law enforcement partnerships, Akkodis continues to explore how to further deliver positive outcomes for law enforcement agencies, their workforces, and the communities they serve.

Dennis states, “Through a combination of ideation and HCD, we delve into current and emerging challenges faced by PS&J clients. This exploration helps us comprehend their needs, co-develop strategic roadmaps and implement fit-for-purpose technology solutions”.

“Our empathy-led approach ensures we center our strategy and solutions thinking on true user needs, and we contribute a holistic understanding of their activities and interactions with those solutions. Working closely with first responders has demonstrated how technology provides a powerful opportunity to impact both operational and organizational outcomes”.





How does Söze help solve crime?

Using 'yarning' to make connections

Never a Burden

Technology must never be a burden or an obstacle, and certainly not for emergency personnel dealing with extreme, life-or-death situations. In fact, first responders are especially uncompromising towards tech that works against and not with them. Not only because of the stress they're under in emergencies. Often driven by a sense of purpose or a desire to make the world a better place, they don't take kindly to technologies, tools or processes hindering them in fulfilling their purpose.

This is one of the findings provided by a recent Akkodis research project, "Unveiling the Strain: A Comparative Study of Organizational Stress in the Police Force. Can Smart Technology Help?, Akkodis Australia (2023)".

As part of the research project, Dr Kristen Hamling provided her clinical insights. Dr Hamling, a registered psychologist with over twenty years' experience, has worked extensively with first responders. In her PhD research, "Well-being in the Emergency Services", she identifies both operational and organizational stress as having a negative impact on the well-being of first responders.

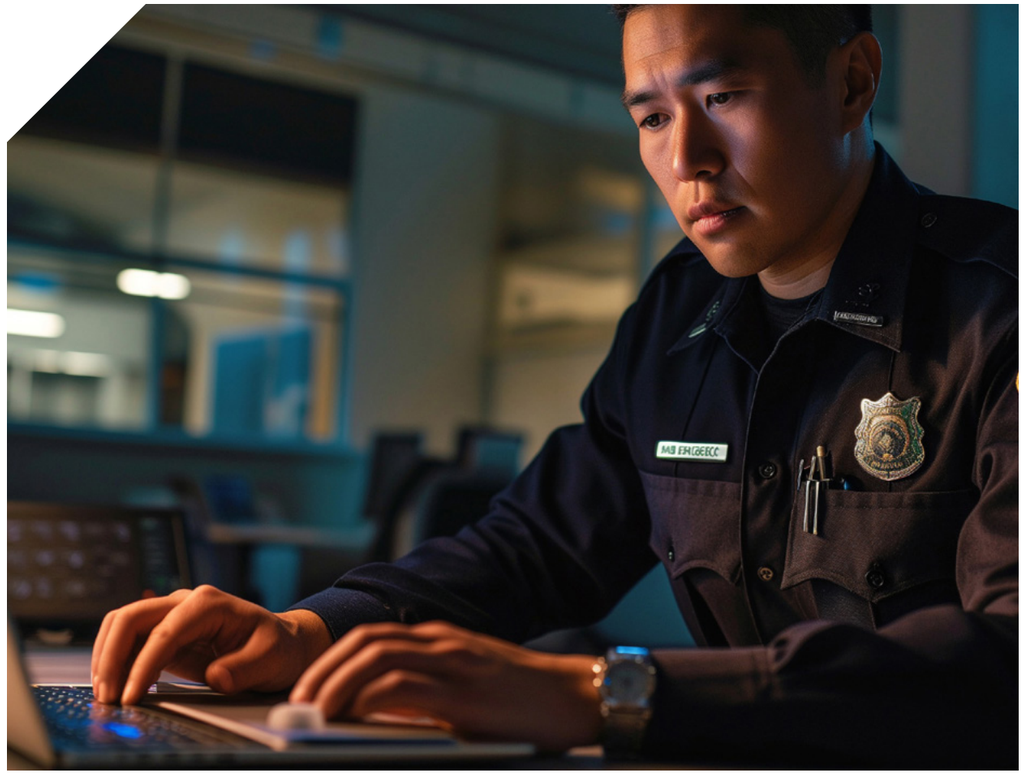
"Technology has got a lot to offer here", she says.

"Reducing organizational stress in emergency services workplaces requires a multi-modal approach. Akkodis is using HCD principles to investigate how technology can mitigate elements of organizational stress and thereby alleviate demands on first responders and their families."

HCD can make a huge difference for not only emergency personnel, but for other frontline workers in the Public Safety & Justice sector as well.

More so, technology can both help people do an even better job while in action, and to relieve stress and improve well-being before and after.

> HCD can make a huge difference for not only emergency personnel, but for other frontline workers in the Public Safety & Justice sector as well.

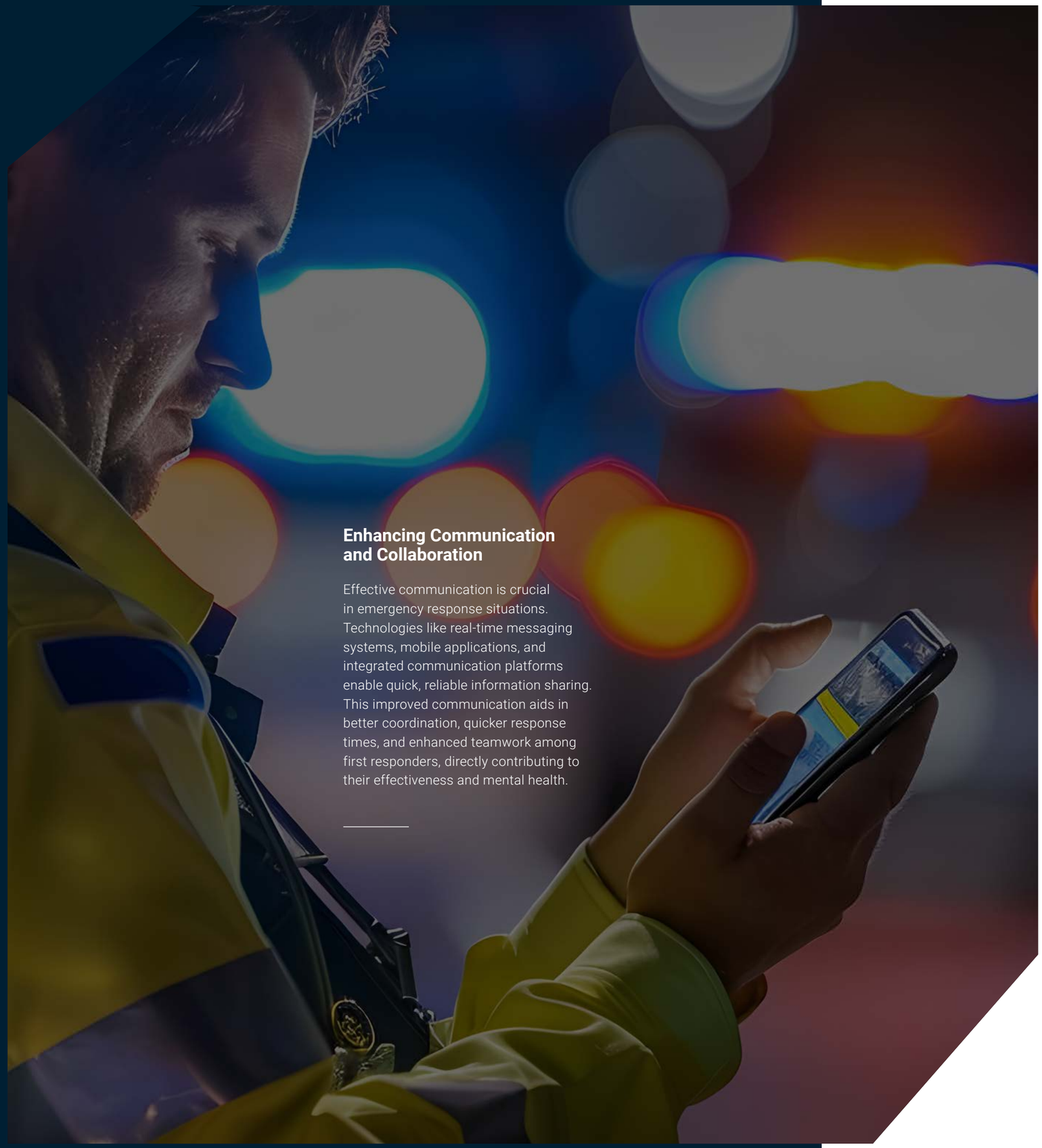


Situational Awareness

Arriving at the scene of an emergency, first responders must get an overview over the situation. Situational awareness can be supported quickly and efficiently by drones, robots and real-time monitoring systems.

Unmanned aerial vehicles (UAVs) and robots can assist first responders with situational awareness and communications in hazardous environments, minimising their exposure to risk.

Drones can provide real-time aerial views of the incident scene, while robots can perform tasks such as reconnaissance, search and rescue, or the handling of hazardous materials. These systems also provide real-time data to operations centres to optimise incident response management.



Enhancing Communication and Collaboration

Effective communication is crucial in emergency response situations. Technologies like real-time messaging systems, mobile applications, and integrated communication platforms enable quick, reliable information sharing. This improved communication aids in better coordination, quicker response times, and enhanced teamwork among first responders, directly contributing to their effectiveness and mental health.

Physical Safety

There is also considerable scope for technology to enhance the physical safety of field responders. Equipping first responders with wearable devices and sensors can provide real-time data on their vital signs, physical condition, and exposure to hazardous substances. This information can help monitor their health and well-being during operations, alerting them and their teams to potential risks and allowing for immediate intervention if necessary.

Innovative Training Through Virtual and Augmented Reality

Technology has also a lot to offer, when it comes to preparing for incidents, and to relieve stress afterwards.

For instance, virtual and augmented reality tools can simulate realistic high-stress scenarios for training purposes. This technology prepares first responders to handle real-world challenges efficiently, enhancing their decision-making skills and stress management. Such training not only improves their immediate response capabilities but also contributes to long-term resilience and well-being. These technologies can also support real-time situational awareness and communication, further supporting first responders in high-stress operational environments.

Integrated Well-being Support

According to Dr Hamling, in addition to other well-being interventions, there may be an opportunity to incorporate technology as part of a holistic support system for emergency services workers.

> “While technology should complement, not replace, traditional stress-reduction techniques like exercise, meditation, and relaxation exercises, there is an opportunity to explore its role in enhancing well-being outcomes”, she said.

Recognizing the intense nature of emergency services work, technologies that support mental health and well-being can be integrated directly into the workflow of first responders. Wearables and mobile apps provide proactive health monitoring, while platforms like telehealth services and online counseling offer accessible mental health support.

Biofeedback devices which monitor physiological markers such as heart rate variability can help users learn to regulate their autonomic nervous system and shift into a calmer state, while meditation, mindfulness and breathing apps and even virtual reality environments can promote a shift toward a calmer state of mind.

This comprehensive support system ensures that first responders have the resources to manage stress effectively and receive help whenever needed.

Not Limited to First Responders

The HCD concept considers the human perspective at every stage of the design process, leading to processes, products, services, and systems that align with the specific requirements and expectations of the people using them.

But their use is not limited to the emergency services – far from it. The HCD solutions that can help first responders can have much broader benefits for society and for businesses.

In the corporate world, HCD principles have an important role to play in reducing organizational stress and improving employee well-being – not to mention enhancing the performance of the companies that adopt them.

Rapid advances in areas such as data creation and analysis, AI and machine learning, automated processes and predictive modelling combined with HCD principles offer new ways to improve processes and boost employee well-being. Akkodis has developed an HCD approach to ensure that the development of innovative technology solutions does just that - for firefighters and finance directors alike.

For further information, please download the research whitepaper

Re-thinking Human Experience in Public Safety & Justice

About Akkodis

Akkodis is a global digital engineering company and Smart Industry leader. We enable clients to advance in their digital transformation with Consulting, Solutions, Talent, and Academy services. Headquartered in Switzerland and part of the Adecco Group, Akkodis is a trusted tech partner to the world's industries. We co-create and pioneer solutions that help to solve major challenges, from accelerating the clean energy transition and green mobility, to improving user and patient centricity. Empowered by a culture of inclusion and diversity, our 50,000 tech experts across 30 countries combine best-in-class technologies and cross industry knowledge to drive purposeful innovation for a more sustainable tomorrow. We are passionate about Engineering a Smarter Future Together.

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