SHAPING SAFETY

TECH ISSUE

MOVE FAST AND PROTECT THINGS

N° 3 ▸ 2026
A MAGAZINE FROM CONSILIUM

CONTENTS

Publisher Malin Cardemar

Editorial Content Malin Cardemar & Rara Comms

Editorial Director Ramin Rahmani

Art Direction Magnus Klintström

Photo & Cover Jonas Gratzer

Project Management Hallvarsson & Halvarsson

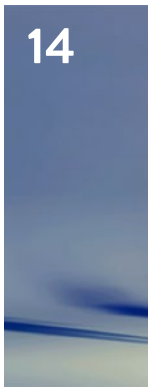
Contributors Theo Martins, Nathalie Andersson, Olivia Seilenz, Philip Bergendahl, Sara Lindgren, Jakub Zerdzicki, Tim Huang, Anish Aloysious, Matt Ridley, Dibakar Roy, Anastasiia Nelen, Gustavo Denuncio, Yanhao Fang, Alex Shuper, Aakash Dhage, Unsplash

Contact hej@raracomms.se

Printed by Larsson Offsettryck AB

The raw materials for this magazine originate from responsibly managed forests and other controlled sources. It is FSC® certified.

MIX Paper | Supporting responsible forestry FSC® C104421



DISRUPT OR BE DISRUPTED

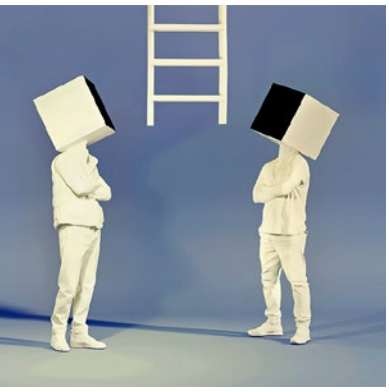
Productive paranoia at Formula 1 speed. Meet the CEO rewiring a 114-year-old company from the inside out in a cautious industry. *p.6*

THE EV SHIPPING DILEMMA

The world is going electric. As millions are shipped around the globe, how do you keep a floating car park full of batteries safe? *p.11*

THE GUARDIAN OF TRAIN SAFETY

Protecting millions of passengers every day takes complex engineering. Henrik Gjörloff shares why the best safety systems are the ones you never notice. *p.18*



THE END OF CRYPTIC SAFETY PANELS

Thobias Ernfridsson and Julia Burgén on designing a safety interface by focusing on one key question: what does the crew truly need to see? *p.14*

WHEN THE ALARM SPEAKS

For decades, a loud siren was the main option. Now alarms can use spoken messages, and that changes everything. *p.26*

MEET SENSEYE

A fallen crew member. A wisp of smoke. A missing fire extinguisher. Isak Nordberg shows how a camera can now spot all of these and respond. *p.28*

BRIDGING THE SUPPORT GAP

The ship is connected and the crew is skilled. Yet, between a broken system and a repair, there are ten people, three time zones, and a fax machine. *p.32*

BYE-BYE CABLE RUNS

Running a cable through an operational ship is like threading spaghetti through concrete. Consilium decided to find a better solution. *p.36*

WHERE PROOF MEETS PURPOSE

It's easy to promise sustainability, but proving it is harder. Two experts discuss the numbers, choices, and trade-offs behind responsible safety. *p.40*

THE SAFETY EQUATION IN GREENER SHIPPING

Cleaner shipping starts with choosing the right fuel. Magnus Gillberg explains why safety should be part of that discussion from the beginning. *p.46*

THE HABIT OF LEARNING

Safety engineering now involves more than just locks and alarms. At Campus Telge, industry and education are joining forces to build the skills needed for tomorrow's technology-driven safety needs. *p.48*

FIKA WITH PETTER WIDÉN

In mergers and acquisitions, buying a company usually means handing over the keys. Petter Widén has a different idea: have your cake, eat it too, and grow faster than ever. *p.50*

We're eager to hear your thoughts. Are there specific topics you are interested in exploring further? Share your opinions and suggestions with us.

SAFETY FOR A CHANGING REALITY

It may seem odd, but safety works best when it goes unnoticed. A train arrives at the station, a ship heads out to sea, a hotel guest walks down the hall. When everything runs as it should, there is no drama, just the calm of things going well.

But the world around safety is changing. Ships now transport electric vehicles and stay connected across oceans. Owners choose greener fuels, and buildings are becoming more complex.

Systems that once only detected and alerted now need to interpret, connect, and guide. This issue shares stories of thinkers and doers working where new risks, new technologies, and old assumptions intersect.

We look at safety panels built to match how people think under pressure, AI cameras that scan live video to spot problems early, and wireless detectors that use a ship's steel to send signals.

Philip Isell Lind af Hageby makes the case for challenging an industry that tends to be cautious. And Henrik Gjörloff takes us on a train ride and shows why train safety depends as much on human behaviour as on technology.

We also explore voice evacuation systems that keep people informed and guide their actions. And we meet students preparing for the next generation of safety engineering.

Together, these stories explore disruption as the careful work of improving safety.

I hope this issue inspires you to see the possibilities around us, both what they are now and what they could become.

Malin Cardemar
CMCO & Head of Sustainability
Consilium Safety Group

Imperial College London

TABLE OF DISRUPTIVE TECHNOLOGIES

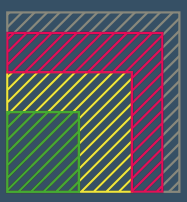
A dashboard of 100 wonderful, weird (and possibly worrying) ways the world might change in the foreseeable future

POTENTIAL FOR SOCIO-ECONOMIC DISRUPTION ↑ HIGH ↓ LOW

De Digital footprint eraser 91 DE	Ps Personal digital shields 92 DE	Ht Human head transplants 93 HA	Hc Human cloning & de-extinction 94 HA	Da Distributed autono-mous corporations 95 DE	Sp Space solar power 96 SP	El Space elevators 97 SP	Vr Fully immersive virtual reality (VR) 98 DE	Co Artificial consciousness 99 EA	Qt We can't talk about this one 100
Ci Conversational machine interfaces 81 MI	Le Life-expectancy algorithms 82 DE	Sa Stratospheric aerosols 83 SP	Br Battlefield robots 84 EA	Ad AI advisors & decision-making machines 85 DE	Ab AI board members & politicians 86 EA	Is Invisibility shields 87 SP	Ph Factory photosynthesis 88 SP	Th Transhuman technologies 89 HA	Te Telepathy 90 HA
Ss Planetary-scale spectroscopy 71 SP	Ip Implantable phones 72 MI	He e-tagging of humans 73 DE	Mp Male pregnancy & artificial wombs 74 HA	Dn DNA data storage 75 DE	Gv Genomic vaccines 76 SP	Qs Quantum safe cryptography 77 DE	Cp Cognitive prosthetics 78 HA	Ud Data uploading to the brain 79 HA	Rd Reactionless drive 80 SP
Gh Predictive gene-based healthcare 61 DE	Ak Automated knowledge discovery 62 EA	Rs Autonomous robotic surgery 63 EA	Em Emotionally aware machines 64 MI	Xx Humanoid sex robots 65 MI	Bh Human bio-hacking 66 HA	Me Internet of DNA 67 DE	Tc Thought control - machine interfaces 68 MI	Dr Dream reading & recording 69 HA	Wh Whole Earth virtualisation 70 DE
Md Mega-scale desalination 51 SP	Sw Self-writing software 52 EA	Mm Public mood monitoring 53 DE	Pb Programmable bacteria 54 SP	Et Peer-to-peer energy trading & transmission 55 DE	La Lifelong personal avatar assistants 56 MI	Sd Smart dust 57 DE	Lc Low-cost space travel 58 HA	Pc Planet colonization 59 HA	Sh Shape-shifting matter 60 SP
Mc Medical tricorders 41 DE	Sf Smart flooring & carpets 42 DE	Dt Diagnostic toilets 43 DE	Se Smart energy grids 44 SP	Bf Algal bio-fuels 45 SP	Op Human-organ printing 46 SP	Bs Artificial human blood substitute 47 SP	Nm New materials 48 SP	Fu Fusion power 49 SP	Mr Self-reconfiguring modular robots 50 SP
Dl Distributed ledgers 31 DE	Pa Precision agriculture 32 SP	Av Autonomous vehicles 33 EA	Id Intention decoding algorithms 34 MI	Df Drone freight delivery 35 EA	Ap Autonomous passenger aircraft 36 EA	Fp 3D-printing of food & pharmaceuticals 37 SP	Sr Swarm robotics 38 EA	Fd 4-dimensional materials 39 SP	Ze Zero-point energy 40 SP
Rc Robotic care companions 21 MI	Sc Smart controls and appliances 22 DE	Cm Cultured meat 23 SP	Ro Delivery robots & passenger drones 24 EA	As Autonomous ships & submarines 25 EA	Rg Resource gamification 26 SP	Wa Water harvesting from air 27 SP	Eb Broadcasting of electricity 28 SP	Bp Bio-plastics 29 SP	Be Beam-powered propulsion 30 SP
Cr Cryptocurrencies 11 DE	So Concentrated solar power 12 SP	Pp Predictive policing 13 DE	Eh Micro-scale ambient energy harvesting 14 SP	Wt Airborne wind turbines 15 SP	Ac Avatar companions 16 MI	Mh Metallic hydrogen energy storage 17 SP	Sg Smart glasses & contact lenses 18 HA	Pe Pollution eating buildings 19 SP	Ff Force fields 20 SP
Sn Smart nappies 1 DE	Dw Deep ocean wind farms 2 SP	Va Vertical agriculture 3 SP	We Wireless energy transfer 4 SP	Bi Balloon-powered internet 5 SP	Px Powered exoskeletons 6 HA	Cc Computerized shoes & clothing 7 DE	Vt Vacuum-tube transport 8 SP	Sj Scram jets 9 SP	Am Asteroid mining 10 SP

SOONER ← TIME* → LATER

Legend



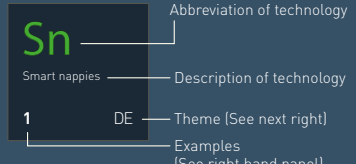
Ghost Technologies: Fringe science & technology. Defined as highly improbable, but not actually impossible. Worth watching.

Horizon 3: Distant future 20 years + (Explore).

Horizon 2: Near future 10-20 years hence (Experiment).

Horizon 1: Happening now (Execute).

How to read entries



Themes

Each of the 100 technologies has been subjectively categorised according to five broad themes, which are:

- DE Data Ecosystems
- SP Smart Planet
- EA Extreme Automation
- HA Human Augmentation
- MI Human-Machine Interactions

Examples and small-print sections removed for this editorial layout.

HERE, THERE, AND STILL TO COME

In 2018, researchers at Imperial College London created a table of disruptive technologies, offering a peek at what the future might hold. As often happens, things have not quite gone to plan. Some of these marvels have entered daily life at an astonishing pace because the world went a bit mad and demanded them. Others remain stubbornly just out of reach, much as they were when the table was first published.

Full table:
imperialtechforesight.com

DISRUPT OR BE DISRUPTED

••• With Formula 1 ambitions and a healthy dose of paranoia, Consilium's CEO is pushing the 114-year-old industrial firm to move like a Silicon Valley start-up.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

Standing on the rooftop of Consilium Safety Group's headquarters in Gothenburg, Philip Isell Lind af Hageby looks entirely at ease despite the drop. In a sharp azzurro-blue suit matching the company's logo, he grips the metal supports of the Consilium sign towering against the sky.

Fifteen metres below, the photographer balances on a narrow pedestal and leans back to get the perfect shot.

Philip watches him. "You know," he says over the wind, "where he is standing is probably much riskier than where I am now."

His casual remark cuts straight to the core of his philosophy: to outpace the industry without losing sight of the possibilities worth pursuing.

Founded in 1912, Consilium operates in the marine, energy, rolling stock, and critical infrastructure sectors, where reliability is non-negotiable, and systems are built to last.

In four years under his leadership, Consilium has doubled its size. →

”What usually happens is that we cook up something entirely new. A failed experiment might lead to a different technology, and eventually, we have a brand-new product”, says Philip Isell Lind af Hageby.

Yet Philip’s ambition to lead in Safety Tech drives the company at a pace he calls ‘testing the laws of nature’.

“We are always pushing the limits of what we can achieve in speed and impact,” Philip says once we are seated in a glass-walled meeting room.

“It’s easy to compare yourself to last year, last quarter, or your previous product. We rather look at industry neighbours and focus on what the full potential performance could be if all stars were aligned,” he says. “Companies with similar characteristics but a better pace and performance.”

BREAKING BOTTLENECKS

His approach is to break processes into parts, identify bottlenecks, and fix them. He illustrates this with a Formula 1 analogy.

“If a car’s speed is limited by one component,” he says, “you do not accept the limit. You replace the part, redesign it, or find a way to cut it out entirely.”

“We do the same with our work,” he says. “If developing a product took a year before, why shouldn’t it take six months now?”

I push the Formula 1 analogy a step further and mention Dutch world champion Max Verstappen, who recently complained about new regulations and hinted he might quit racing.

If we put ourselves in his shoes, how flexible does Consilium need to be when technology shifts or new regulations change the game?

“He might want to quit because others are catching up and winning is not as easy anymore,” Philip says.

“But the point is this, humans have an amazing ability to adapt. Even under pressure and tight deadlines, people still get the job done. They find ways. You remove slack. You remove inefficiencies.”

He moves the analogy from drivers to the regulations that guide them.

“New rules don’t just appear suddenly, they come after long talks, negotiations, and compromises.”

AHEAD OF THE CURVE

For Philip, adaptation alone is not enough. He believes Consilium should help shape industry changes.

“We should ideally be influencing these regulations. We must be in the forums. We always say that we love regulations, and we do, but we make sure we stay one step ahead so we can drive them in a direction that creates the best safety for our customers.”

He does not see technology as the main barrier. “If we hit a wall, it usually means we have not pushed ourselves far enough.”

A PRODUCTIVE PARANOIA

To avoid limits, Philip says Consilium needs to notice details that might seem unimportant at first. That instinct stems from what he describes with a slight smile, tapping his head:

“Call it my own paranoia,” he says, looking briefly at the empty chairs around the conference table as if checking for intruders. “I see ghosts everywhere.”

“If we keep thinking about how to disrupt ourselves,” he says, his tone turning more serious, “I am convinced no one else will disrupt us.”

It is a mindset that has changed how Consilium sees itself. “We used to act as a steady, traditional industrial company. Now, we move with the energy of a start-up.”

He gives a broader example and remembers Steve Ballmer laughing at the first iPhone because it didn’t have a physical keyboard. The lesson is that being too sure about today can make you miss how fast things change.

“If you only focus on the two or three pixels in the middle of a picture, you will miss what the larger image is actually becoming,” he explains.

TESTING GROUND

Philip mentions the company’s work with wireless detection technology and its investments in AI-based camera detection. Both, in different ways, sit slightly to the side of what a more cautious company might define as the core business.

“We need to get into these cases, even if they seem indirect or less relevant. We have to understand how they work, how they connect, and where potential challengers might come from.”

The payoff, he suggests, rarely appears where the work began.

“What usually happens is that we cook up something entirely new. A failed experiment might lead to a different technology, and eventually, we have a brand-new product. Success often arises from unexpected innovations and the freedom to experiment.”

We say that we love regulations, and we do, but we make sure we stay one step ahead so we can drive them in a direction that creates the best safety for our customers.«

Philip Isell Lind af Hageby, ***President and CEO at Consilium***

He points to SMiG, Consilium's interactive safety management system, which was already in place when he arrived. "We reworked, refined and made it easier to install, more modular and with an unparalleled user interface."

It took time for both the company and the market to fully accept it.

"Now it is the best thing that has happened to us," he says.

TRUSTED ADVISER

When it comes to customers, he is direct. Everything Consilium builds is for them, and guiding them towards better, safer solutions is at the core of the work.

"Our customers carry real responsibility", Philip says. "They manage operations where failure is not an option. Naturally, they can be sceptical of new technology, and they should be."

"Nobody should feel uncertain", he adds. "We need to show them, step by step, how simple it really is, prove that it works, and provide ongoing support so they remain confident. If they are not, it is our fault."

THE CONDUCTOR

As Philip keeps talking, we notice our planned thirty-minute chat has turned into almost an hour.

Before wrapping up, I ask him one last question:

How do you get over 1,200 employees on board when the pace starts to feel almost too fast?

"The first step is to make the future visible," he explains. "What should Consilium look like in a few years? The answer had to be concrete enough for everyone in the organisation to picture it"

"You should almost be able to see and feel the company in that target state," he says.

From there, Consilium broke the work into clear initiatives, assigned responsibilities, and set priorities. They built the plan by starting with the future they wanted and working backwards.

He uses strategic terms like target state visualisation, value-creation plans, and must-win battles, but the process itself remains straightforward.

"People move faster when they know where they're going, and even faster when they know exactly what part they're responsible for," he says. "If you're clear about what you want to become, it becomes a self-steering company."

His role now, he says, has also changed.

"Now I am more like the conductor, making sure everyone plays in time and at the same speed." «

WINCH
ONLY

THE EV LOAD

HYUNDAI GLOVIS AND CONSILIUM'S PUSH FOR SAFER EV SHIPPING

••• Electric vehicles are being shipped globally in record numbers, but battery fire risks remain challenging. Hyundai Glovis is teaming up with Consilium Safety Group to implement innovative safety tech solutions across its fleet to address this.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

There is no doubt about that the world is going electric.

Last year, global sales of electric vehicles (EVs) surged by 25 per cent. From South Korea alone, 350,000 units were shipped: three times the figure three years ago. Yet with this shift comes a risk receiving growing attention: lithium-ion battery fires.

Hyundai Glovis, a key player in this sector, transports more than half of South Korea's EV exports. Each of its car carriers is essentially a floating parking lot packed tightly with thousands of EVs.

Since last year, Hyundai Glovis has been rolling out Consilium Safety Group's Safety Management Interface Graphics (SMiG) fire control system across its fleet. It's not just a better alarm system: it's a whole new proactive approach to fire safety.

The system streamlines safety operations by integrating data from the ship's safety systems and mapping smoke and heat levels in real time. Crew members can view smoke and heat build-ups on a digital map and take immediate action.

"Data from across the ships is translated into something visual and actionable," Isak Nordberg, Head of Product Line - Software Solutions, explains. "It's designed to give early warnings when every second counts, often giving crews up to four extra minutes."

DRILL ABOARD THE SUNRISE

SMiG demonstrated its potential during a recent fire drill aboard the Hyundai Glovis' Sunrise,' a 65,000-ton vessel. The ship's 14 decks stand 46 metres above the waterline, each the size of a soccer field. About 1,000 fire detectors and alarms are installed according to the ship's size.

The drill began with a crackling voice over the intercom: "Fire, please move to the emergency holding area!" Crew members moved swiftly to their posts. In the control room, the captain stood over a large monitor displaying a map of the ship's compartments. A red dot blinked steadily on the screen, indicating the fire's location.

Without SMiG, the captain might have received vague coordinates—such as 'Area A on the 5th floor'—wasting precious minutes. But with real-time data streaming, the crew could act immediately, guided by continuous smoke and temperature updates.

"Decisions that once depended on guesswork were now grounded in data", Nordberg states.

> *The more systems you integrate and data you collect, the more accurate your safety system will be.«*
>
> Isak Nordberg, *Head of Software Solutions*

Following the drill, Nordberg visited Hyundai Glovis headquarters in Seoul and reflected on the importance of collaboration. He saw how deeply committed the company is to improving fire safety.

And that's the right way to go, Isak explains.

"The more systems you integrate and data you collect, the more accurate your safety system will be".

SHARED DATA MATTERS

Now, SMiG is impressive; it maps real-time data like a digital guardian for ships. But there's always something more. Nordberg sees untapped potential in cross-industry data sharing.

"Vehicle manufacturers already have the next piece of the puzzle. They have data on battery temperatures, which could be crucial in detecting anomalies early," Nordberg states and continues:

"Those four minutes of early detection might stretch to 12 if we had that data. In the world of fire response, that's a significant advantage. This is the kind of innovation we must continue pursuing through collaborations to make places safer," Nordberg says, his tone practical but hopeful. He's not just talking about ships anymore.

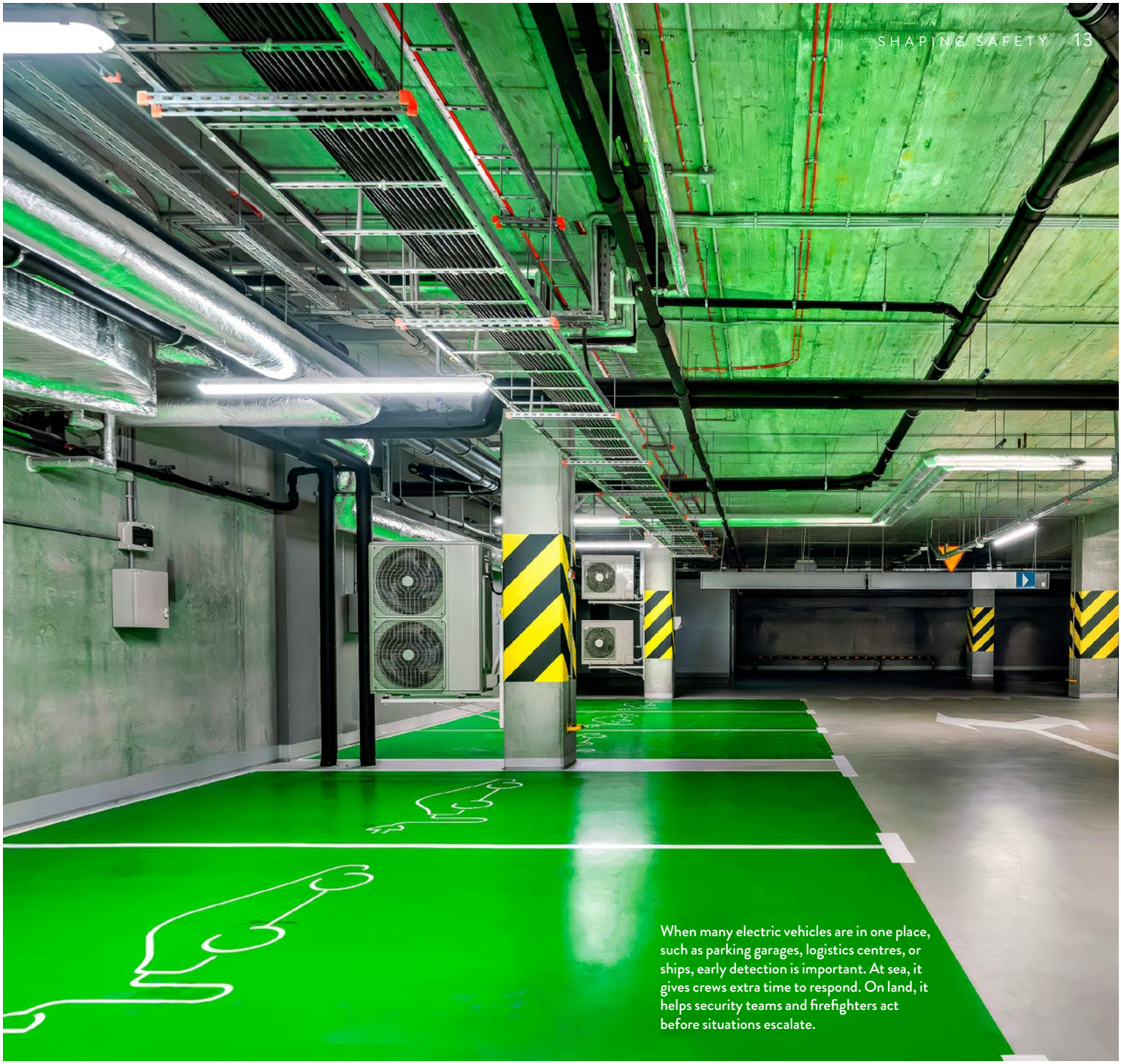
WHERE SMIG CAN GO NEXT

He believes SMiG could transform fire safety in places like parking garages and land logistics hubs. Fires spread differently in these environments, but time is just as crucial.

He acknowledges the limitations of response time. On ships, trained crew members are on-site and can act immediately, making four extra minutes critical. On land, response times might be slower due to external factors.

"In a garage, four minutes might not be enough to act," Nordberg explains. "But if we could stretch that to 12, firefighters might have a realistic chance of reaching the location on time. Security teams on-site could use that window to evacuate or contain the situation before it spreads. In these environments, the dynamics are different". «

Isak Nordberg met the Hyundai Glovis team at their Seoul headquarters to discuss collaboration, integrated systems, and using data to enhance fire safety at sea.



When many electric vehicles are in one place, such as parking garages, logistics centres, or ships, early detection is important. At sea, it gives crews extra time to respond. On land, it helps security teams and firefighters act before situations escalate.

Integrate SMiG with all safety-related systems

- Fire Detection System
- Gas Detection System
- Fire Door System
- Temperature Monitoring System
- Oil Mist Detection System
- Fire Fighting System

- Sprinkler
- CO_2 Release
- Fire Damper System
- General Alarm System
- Line Heat Detection System
- Low Location Lighting
- Fire Patrol System

THE END OF CRYPTIC SAFETY PANELS

••• For decades, safety panels looked like they were built to confuse. Consilium's new C2P has read the manual on humans.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER & NATHALIE ANDERSSON

Thobias Ernfridsson stands at a table in Consilium's lab, unveiling the company's newest creation, C2P – a control panel built on the same grey, Lego-like components that formed the backbone of its predecessor, CCP.

"It's the same modular system and building blocks," he says. "The difference lies in how people use it, and how it communicates with them."

C2P is the brain of Consilium's new safety systems. It links detectors, alarms, and networks on ships and buildings, monitoring and controlling them in real time. Its updated interface and design prepare it for a digital, connected future.

"We built the platform around usability," Thobias says. "When you're about to invest heavily in a new panel, you should aim high and make something excellent. With C2P, we're setting a new standard, one that anyone can understand."

He challenges convention: "Fire safety has focused on the technical side, how systems work, how quickly they respond. Too little attention has been paid to how information reaches the person behind the panel."

THE ART OF LESS

This new focus guided the development of C2P. The traditional clutter of buttons and lights has been replaced by a 10-inch touchscreen with clear, colour-coded menus that direct user attention in any environment.

Thobias is especially proud of the panel's restraint: "Anyone can show lots of information," he says. "What's really hard is showing just the one thing you need, a single red blip, an exact location, and plain instructions."

He continues, "You don't need the temperature of 200 detectors. You need one clear alarm and simple text: Where is it, and what do I do?"

Experience shaped that view. "Think of a ship's engine room," Thobias says. "You've got a thousand other systems around you. The fire alarm should never add confusion. When it speaks, it has to be clear."

He points to another setting: a hotel receptionist unfamiliar with fire alarms. “When an alarm sounds, they need immediate clarity, without codes or manuals, just a clear message explaining what’s happening and what to do”.

Achieving clarity was intentional. Consilium expanded the design process to include diverse expertise.

“I’m an engineer,” Thobias says. “I like square boxes and clear text. Honestly, I had no problem with our old display. But when we brought in people who study how the brain handles information, that changed everything.”

DESIGNING FOR DECISIONS

One of them is Julia Burgén, User Experience Designer at Consilium. Before joining the company, she worked as a researcher at RISE, Research Institutes of Sweden, where she took part in a large EU project that aimed at improving fire safety on RoRo ships.

“We studied how people perceive alarms, what happens under stress and what helps them act faster,” she says. ”That project was insightful for my design approach. You can’t just make something look nice; you have to make sure the right information appears at the right time.”

For C2P, she and her innovation team spent a lot of time testing, analysing, and shaping a user interface meant to change how people use fire alarm systems. ”Revolutionise might be too strong,” she says, “but it will definitely move things forward.”

Clarity, Julia says, comes from removing the unnecessary. “The worst case is when you need a manual to understand the screen,” she says. “We’ve simplified the navigation and structure, and used a visual language - symbols, colours and buttons that guide attention.”

Those choices save time and prevent confusion.

“Sometimes it’s just seconds,” she says. “But in a critical situation, that’s everything. You see what’s happening and know what to do.”

Still, some things can´t be changed. “Much of what we do is defined by rules, how signals look, how fast they blink, and what →

timings are allowed. We can't rewrite the standards, but we've changed how users meet the system."

A SHARED LANGUAGE

C2P shares its design logic with SMiG, Consilium's cloud-based platform for monitoring and guidance. Together, they provide customers with a unified view of safety data across ships and facilities.

"If you know one, you recognise the other." That familiarity helps people stay calm, and that's what good design should do," says Julia.

The worst case is when you need a manual to understand the screen.«

Julia Burgén, *User Experience Designer at Consilium*

C2P is designed with cybersecurity at its core. It uses encrypted communication and controlled data flows to protect every signal. Alarms can reach control rooms, tablets, or phones, always through secure channels.

RULES AND REALITY

Connectivity, however, also brings risks. Thobias acknowledges this. "As safety systems become connected, they also become targets," he says. "We build C2P for that reality. It must be safe all the way."

The birth of C2P highlights a bigger challenge for the safety industry: regulatory frameworks have not kept pace with how people actually use technology.

"Our field is driven by rules, and that's part of the challenge," says Thobias. "The regulators need to focus more on how users absorb information."

He explains that the standards focus on system behaviour.

"Historically, the focus has been on how the system functions, on timings, delays, and when the bells start ringing. But there's very little about how information should be presented, or how people understand it," he continues.

"We should work towards clearer guidelines and more standardisation."

Looking ahead, Thobias sees C2P as a turning point. "A decade from now, people will see this as the moment the industry moved away from unclear, overloaded information," he says.

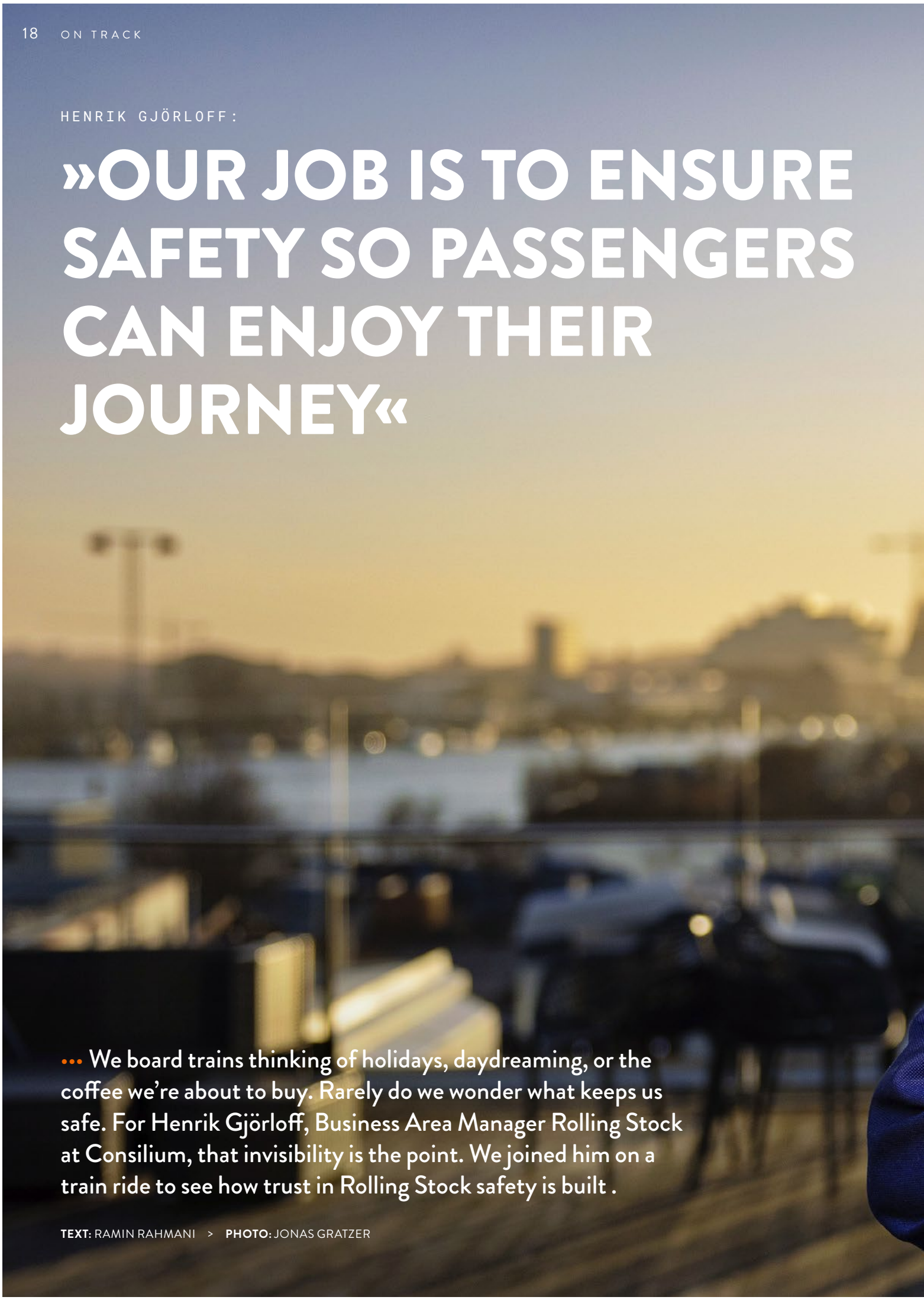
"We're not alone in doing it, but we're early. And we're doing it best. With C2P, we're setting the standard for what a modern fire or gas alarm panel should be." «

I like square boxes and clear text. Honestly, I had no problem with our old display. But when we brought in people who study how the brain handles information, that changed everything.«

Thobias Ernfridsson, *CTO at Consilium*

HENRIK GJÖRLOFF:

»OUR JOB IS TO ENSURE SAFETY SO PASSENGERS CAN ENJOY THEIR JOURNEY«



••• We board trains thinking of holidays, daydreaming, or the coffee we're about to buy. Rarely do we wonder what keeps us safe. For Henrik Gjörloff, Business Area Manager Rolling Stock at Consilium, that invisibility is the point. We joined him on a train ride to see how trust in Rolling Stock safety is built .

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

You can manage the train. The materials. The systems. But you can't control what people bring onboard.«

Henrik Gjörloff, *Business Area Manager for Rolling Stock at Consilium Safety Group*

The loudspeakers crackle over Gothenburg Central Station, announcing the next departure to Kungsbacka, a journey of about 28 minutes.

On the platform, I meet Henrik Gjörloff, Business Area Manager for Rolling Stock at Consilium.

This stretch of track carries him through his childhood, commuting to school or heading north for ski trips. Wherever Henrik travelled, the train was a familiar thread, pulling towns and cities together.

"There's a calm to train travel," he says.

He describes the ritual precision of Japan's railways and the more chaotic charm of southern Europe and India.

Yet, one expectation remains, whatever the culture: travellers trust complex safety systems they neither see nor question, and that must never fail.

Henrik joined Consilium in 2008 after earning his engineering degree from Chalmers University of Technology and working a few early jobs. His career path sounds ordinary until you realise it protects millions of passengers worldwide.

"Safety shouldn't be noticed," he says. "It should be part of the experience —invisible, but critical."

With a kind of boyish enthusiasm, he talks about the bullet-fast trains linking cities, the tiny trams weaving through crowded streets, and the tough diesel trains hauling across isolated mining regions that battery locomotives could replace soon.

"Each comes with its safety demands," he says.

"Battery-operated trains bring a new fire risk," Henrik says as the train pulls out of the station. "Batteries can ignite themselves through thermal runaway. Converters that lower onboard voltage can also spark fires inside compartments."

Henrik leans back, thoughtful. "The type of train matters," he says. "High-speed trains need strict control. Underground trains face evacuation problems because of tunnels. Safety systems must be designed to fit each train and its route."

"And that's just the technical side. Every material used on a train must be fire-safe, non-toxic, and environmentally friendly."

HUMAN FACTOR

He shifts forward slightly. "You can control technical regulations," he says. "But human behaviour? That's one of the biggest risks — and the hardest to predict."

Across the aisle, he discreetly points to an electric scooter wedged into a corner between two bags on the floor.

"That's the real challenge," he says.

Henrik ticks off examples: "flammable liquid, power banks, laptops".

Stazione Centrale di Milano, Italy.

Chennai Central railway station, India. Around 1,200 trains and 730,000 passengers pass through every day.

Enoshima Electric Railway, Kamakura, Japan.

In some countries, cooking occurs onboard, and open flames are part of the travel experience in others.

"Today, the fire risk is passenger-driven. In the eighties, we only had to ask whether a seat could ignite. Now, the threats are much less predictable," he states.

BY DESIGN, TOGETHER

He compares the work to tending a living organism.

"You have to keep an eye on today's challenges and the ones coming tomorrow," he says. "Passenger habits change. Technology changes. The travel environment evolves along with them."

Working closely with operators, Henrik says, is crucial.

"We collaborate to find where smoke might start or heat could build, and plan protections before anything happens."

Consilium Safety Group has carved out a central role in this dynamic landscape. Known for its expertise in marine and land-based fire safety, the company has steadily expanded its footprint in the rail sector.

Henrik is proud of the company's journey, which has taken it from a minor player to a global leader in Rolling Stock over 18 years.

In a tight-knit sector like rail, reputation carries weight. "We grew because we put the customer's best interests first," he says. "Even if that meant recommending a competitor's solution."

MODULAR SAFETY

Consilium's solutions are based on a clear philosophy of modularity and scalability. Instead of overengineering, they reuse proven building blocks and adapt them.

"You build a foundation that can grow and stay flexible. If a customer needs eight inputs and eight outputs, we give them eight. Not twenty. No waste. No burden."

You must prove your system works today and will keep working predictably, reliably, efficiently, and safely for decades.«

Henrik Gjörloff

This modular approach is crucial in a world where no two trains are identical. Some hide equipment in the roof to free up passenger space, and others pack it under the floor. And their speeds and power systems vary.

"We make it easy for clients to integrate what they need," Henrik says. "We reuse what works. It's safer, smarter, and more stable."

Consilium sharpened its expertise further by acquiring Italian safety specialist ISE.

"ISE brings deep knowledge from working in one of the world's toughest fire safety environments," Henrik says. "In Italy, trains must have water-based suppression systems and meet UNI standards, some of the strictest anywhere."

The ISE acquisition also brought 48 railway specialists into Consilium's team. "These are people who know trains in a way you can't teach quickly," Henrik states.

Their strength in SIL-2-certified systems allows Consilium to meet the highest international standards while offering tailored solutions.

"We can now build both top-end and more affordable systems," Henrik says. "Whatever fits the customer's train."

SMARTER NETWORKS, SAFER RAILS

Looking ahead, Henrik sees technology playing an even larger role in shaping the future of train safety. He explains that artificial intelligence and IoT technologies change how safety risks are detected and managed.

"Imagine if we could integrate fire detection into the CCTV cameras already onboard," Henrik says. "With AI, you could recognise how smoke behaves, how heat patterns move — and catch the earliest signs of a problem before a traditional sensor even reacts."

Trains are more connected than ever, and cybersecurity has become a top priority. →

Every material used on a train must be fire-safe, non-toxic, and environmentally friendly.«

Henrik Gjörloff

"You can't just install it and forget it," Henrik says. "It's like antivirus software; it needs constant updates to keep up with new threats."

As automation grows, safety systems must detect faults and respond fast, without human help. Driverless metros and airport shuttles rely on technology to prevent accidents before they happen.

"It's like in aviation," Henrik says. "You need backup systems that kick in right away."

Henrik believes new technology will make trains safer and more reliable. But to keep pace, the industry must adapt faster than it has in the past.

At the same time, greener energy brings new fire risks. Hydrogen, batteries, and hybrid systems behave differently in emergencies.

"Batteries can release gas before they catch fire," Henrik says. "If we can catch that early, we can take actions to limit the damage."

To tackle these risks, Consilium draws on its experience from the marine industry. Gas detectors first built for ship engine rooms are now being adapted for trains.

"It's about cross-pollinating ideas," he says. "If we can monitor for leaks on a container ship, we can adapt that to protect hydrogen tanks or battery compartments. The principle stays the same, even if the environment changes."

But adapting technology isn't simple. Systems must be lighter and smaller and meet strict railway standards. "We have to rethink, redesign, and certify everything for the realities of rail," Henrik says.

DECADES IN SERVICE

Trains are built to last. A new set can run for 30 or 40 years, facing harsh weather, heavy use, and constant technology shifts. Supporting them through decades of service is a challenge.

"It's like trying to find spare parts for a mobile phone from the 1990s," he says, smiling.

Consilium's work extends far beyond installation. Their

Estação da Luz, São Paulo, Brazil. A historic station at the heart of the city, opened in 1901, remains one of the city's busiest, connecting all metro lines and several rail services.

Japan's Doctor Yellow, an inspection train, never carried passengers. Instead, it helped keep them safe by diagnosing track faults at speeds of up to 270 km/h.

systems are designed to stay serviceable for decades, with parts, upgrades, and support available as long as the train runs.

Operators today demand complete cost control across the train's life. They want clear plans that map every expense, from brake wear to part replacements.

"Life Cycle Cost is a major driver now," Henrik says. "You must prove your system works today and will keep working predictably, reliably, efficiently, and safely for decades."

TRADITION AND TRANSFORMATION

Even as technology pushes the industry forward, Henrik describes the railway sector as conservative.

"If something worked for thirty years, people trust it," he says. "You don't gamble with reliability."

That caution means new ideas move slowly and are tested carefully. But the pace of change is speeding up. Artificial intelligence, new energy systems, and demands for greater connectivity are pushing the rail industry to a crossroads.

This tension between tradition and transformation shapes much of Consilium's work.

"You have to respect the culture," Henrik says. "But you also have to help it move forward."

The train begins to slow as we approach our destination. Henrik glances out the window. "Every train you see carries layers of engineering, regulation, and hard-learned lessons," he says.

"Our job is to ensure all that stays intact so passengers can simply enjoy their journey."

When asked how he would inspire young engineers to consider rail safety, Henrik grins slightly.

"You protect millions of people every day," he says. "You keep them moving, meeting, living safely. It's invisible work, sure, but it's what holds everything together. And when you go home at the end of the day, you know you've built something that makes a difference." «

Find out more about Consilium's Rolling Stock solutions.

SAY IT CLEARLY

THE CASE FOR THE SPEAKING ALARM

••• The sound of a siren tells you something is wrong. VES tells you what to do.

TEXT: THEO MARTINS > **PHOTO:** SHUTTERSTOCK

The traditional fire alarm's continuous siren is still the common way to signal that something is wrong. But in the midst of an emergency, it often raises more questions than it answers. Is there a fire, or is it some other issue? Should I evacuate or shelter in place? This is why voice alarms are becoming increasingly popular. A message like "There is a fire! Evacuate through the emergency exits!" is clear and cannot be misunderstood.

Voice Evacuation System, or VES, is an alarm system that has become a bestseller at Consilium on the Swedish market.

"It's no surprise that many customers now want voice alarms. VES offers so many advantages. Unlike sirens, voice alarms provide clear information about what's happening and what actions to take. Voice messages are often perceived as calmer and more controlled than loud sirens, reducing the

risk of panic. The messages can be pre-recorded or live, allowing customised instructions depending on the situation," says Ulf Petersson, Senior Vice President Nordics at Consilium.

CLEAR INSTRUCTIONS

VES works particularly well in complex buildings, where different zones can receive tailored messages based on the location of the hazard. Voice instructions improve compliance during evacuation, as people are more likely to follow specific directions and avoid heading toward danger.

Several studies have evaluated the effectiveness and optimisation of VES. In one test at a large grocery store, the message "A fire has broken out. Please exit the premises via the emergency exits." was broadcast. Customers complied, but a new issue arose: many instinctively took their shopping carts with them, leading to congestion near the emergency exits. When the message was modified to begin with "Leave your shopping cart and exit via the emergency exits," the problem was resolved. This also makes VES particularly suitable for environments where evacuation drills cannot be practiced, such as in shopping malls.

"It's critical to be thorough when designing a VES system. But when you tailor both hardware and software, the result is a safe and efficient solution," says Stefan Tornström, National Sales Manager VES at Consilium.

SCALABLE SYSTEMS

VES is added as a supplementary system to an existing fire alarm and is adapted to each building's specific layout. Factors such as floor plans, furnishings, and acoustics are taken into account.

"Our VES system also includes a unique scalability solution. We use a patented short-circuit isolator that allows us to expand the system without increasing the speaker output. Many of our clients continuously reconfigure their facilities and require cost-effective flexibility, which we can provide. Moreover, we manage all the technology in-house and have nationwide coverage, which is crucial for minimising downtime," Tornström adds.

VES is ideally suited for public spaces where many people may be unfamiliar with the layout, such as shopping centres, restaurants, schools, hotels, and conference venues.

"VES is definitely trending, no doubt about that. And it's clear that demand will continue to rise, both because of the system's many benefits and due to increasingly stringent regulations. But most importantly, it saves lives," concludes Ulf Petersson. «

Find out more about Consilium's safety technology for buildings.

MEET SENSEYE

SAFETY CAMERAS JUST GOT SMARTER

••• In safety, time matters. A false alarm wastes it; a missed one can cost lives. Consilium has a solution that sharpens both ends of that dilemma, turning camera feeds into reliable guidance.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

Isak Nordberg opens his laptop with the kind of enthusiasm usually reserved for unveiling a secret. While he jokes, "Now you can see my acting skills," he is aware of the urgency crews face in real-time decisions.

A grainy video appears on the screen, showing him collapsing to the floor. He lies still for a moment, acting as a crew member who could experience this in a ship's engine room.

The camera records the fall and raises an alert. A live feed then shows whether the person remains on the ground. In seconds, the crew has both the warning and the context to act.

The demo reveals SensEye, Consilium's new safety solution that links cameras to SMiG, the company's safety platform. Instead of just recording, cameras become the eyes of a network that reacts instantly, like body nerves.

DIGITAL NERVOUS SYSTEM

According to the International Maritime Organisation, many incidents are traced to delayed emergency responses. SensEye represents a shift from passive surveillance to active monitoring in an industry where delayed responses can prove catastrophic.

To explain further, Nordberg stands up, takes a pen, and draws a comparison. "Think of it like a brain," he says, sketching two halves.

Each half represents a function: fire detection, gas sensing, temperature monitoring, and oil mist detection. At the bottom, he adds SensEye, the newest feature. "It's like our eyes built into the camera," he says.

SMiG works as the brain, making sense of what the cameras see. Doors, alarms, and suppression units act as the hands that put decisions into action.

A CCTV camera only records, leaving someone in the crew to watch the feed and decide what to do. SensEye notices and passes the information to SMiG, which compares it with other sensors and provides the crew with a clear picture.

How SensEye works

ANALYSIS: Live camera feeds are analysed in real time, trained to spot anomalies such as smoke, missing equipment, or a fallen crew member.

DETECTION: SensEye instantly flags important events, helping to avoid delays.

INTEGRATION: Detected events are sent to SMiG, Consilium's safety platform, where data from all sensors comes together.

VERIFICATION: SMiG cross-checks the video alert against fire, gas, temperature, and oil mist sensors before sending a verified warning to the crew.

This way, the crew can decide whether to close a door or ignore a false alarm. "That's the strength," Nordberg says, "the system helps the crew act on the right things."

CATCHING WHAT'S MISSED

The same principle applies to equipment. A missing fire extinguisher, for instance, should be visible to a crew member but can be easily overlooked.

Here, SensEye picks it up through the camera and logs the absence. "For the crew, it cuts a step. Instead of walking the ship to check every station, they can focus on solving problems the system has already identified," says Nordberg.

It can also support maintenance. "It might tell you it's time to service something," Nordberg says. "The camera has seen a condition that signals you should act before it becomes a bigger issue."

He plays another clip. This time, the camera catches a wisp of smoke. The system flags it, then checks against other sensors in the fire detection network. If both agree, the alarm goes forward. If not, the signal is muted, sparing the crew a false alarm.

Nordberg stresses that SensEye is not a replacement for fire detection but a complement. They strengthen the ability to detect incidents early and identify conditions that could lead to them. "It might be an oil leak, something that could turn into one."

SAFETY PATTERNS

In another clip, a crew member walks past without a helmet. SensEye notices, but instead of plastering blame across the screen, it anonymises the face and logs the lapse.

"We're not interested in pointing out that someone forgot their helmet," Nordberg explains.

"Instead, our solution gathers statistics. Over time, those records turn into patterns: how often lapses occur, where they happen, and what measures might reduce them."

The same logic can apply to passenger movement. "Cameras can raise an alert if someone enters a crew-only area, a feature several clients have shown strong interest in," says Nordberg.

In an urgent situation, such as during an evacuation, if a stairwell becomes blocked and people stop moving, SensEye can send an alert in seconds. The crew can then redirect passengers before the situation becomes dangerous.

"In such moments, it might deliver many signals at once, but the aim is to turn that flood of information into clear guidance," he states.

Each demonstration follows a consistent pattern: SensEye observes through the camera, SMiG processes the information, and the crew gets the right details to take action.

Nordberg pauses to make his point clear. "It is not about replacing human judgment, but about giving crews better tools for making decisions when every second counts."

What sets SensEye apart, Nordberg insists, is its integration. "This is where we stand out. Others have AI-powered cameras too, but SMiG integration is our edge."

The goal is not to replace human judgment, but to give crews better tools for making decisions when every second counts.«

Isak Nordberg, *Head of Product Line, Software at Consilium*

LEARNING LOOP

Imagine a gas alarm sounding in the engine room. On its own, the camera might keep watching passively. Integrated with SMiG, SensEye changes the logic: the moment the gas detector signals danger, it arms the camera feed to trigger an alert if anyone appears in the space.

This creates a learning loop: gas sensor spikes trigger the camera to auto-arm, and the crew is warned. It is a dynamic layer of intelligence, tuned not just to what the eye sees but to what the whole system knows.

"It's when everything works together that the solution becomes truly powerful," Nordberg says.

Nordberg admits that no system is perfect from the beginning. AI can sometimes be "trigger-happy," sending too many alerts.

Setting up the system is like a tuning session. Crews and engineers decide where SensEye should focus, how long a movement should last before it triggers, and which events are worth waking the bridge for.

"It's very much about working together with the crew," Nordberg says. "We sit down, fine-tune the settings, and make sure it will fit their reality."

WHERE SENSEYE CAN GO NEXT

The technology has already been tested in office settings and has been integrated on board at sea.

The main focus is on maritime settings like ferries, RORO, ROPAX ships, and cruise vessels, where safety and passenger movement are crucial.

But Nordberg points to other settings. Parking garages face the same risk from EV fires. Offshore wind farms sit empty for long stretches yet still require immediate alerts.

"Whatever the camera sees, SensEye can learn to respond."

And then he circles back to the core of it all, Consilium's Early Detection.

"Early Detection is already among the most advanced in the industry. SensEye is not meant to replace it, but to reinforce it." «

Kenth and Patrick participated in a cross-industry study on maritime support. The study found that disconnected systems can turn a single issue into a chain of manual tasks, phone calls, emails, and faxes across multiple time zones.

BRIDGING THE GAP IN SUPPORT FUNCTIONS

••• A recent study underscores the need for smarter, more integrated support functions in shipping. We discussed these with Patrick Olander and Kenth Sandell, who contributed to the research.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

"You can still hear it in old sailors' songs," says Patrick Olander, Vice President of Customer Insights at Consilium Safety Group. "The rhythm of a different time. Ships in port for days, sometimes weeks. One could load, unload, or repair at a different pace".

He sips his coffee and looks at his three-decades-long colleague, Kenth Sandell, who leads technology innovation at Consilium. The kind of look that comes from years of solving problems together.

"There was more time back then", Sandell adds, "Today, global trade moves faster; a ship may have just hours in port. Turnarounds are tight."

Digitalisation has enabled much of this progress; ships are quicker, smarter, and more automated. But it has also added complexity.

"Now, every minute counts," says Olander. "You have to respond fast."

UNITING THE INDUSTRY

The Swedish Transport Administration funded a research project on maritime support to understand how these challenges affect daily operations. The Swedish Shipowners' Association led the work in cooperation with researchers at Chalmers University of Technology.

They carried out the project in close collaboration with industry representatives and stakeholders, collecting data, discussing findings and their relevance, and disseminating results.

Olander and Sandell participated in the study for Consilium, a company that works with some of the ships' most critical onboard systems—fire, gas, and flame safety technology. These systems form part of the ships' operational backbone, alongside navigation and engine operation, and must work together to keep vessels moving.

They are pleased with how the project brought the industry together.

Data we gather from a ship while it's at sea can help us build a to-do list before it reaches port.«

Patrick Olander, *Vice President of Customer Insights at Consilium*

Needing new training just because you switch supplier isn't sustainable. It's like needing a new driver's license every time you change car brands. That has to be more streamlined.«

Kenth Sandell, *Head of Innovation at Consilium*

"We had everyone around the table," says Sandell. "Shipping companies, authorities, researchers, insurers, technical bodies, suppliers—everyone brought knowledge and listened."

FRAGMENTATION IN SUPPORT

"You can have the smartest systems in the world," says Olander, "but if they're not supported properly if they don't talk to each other, or if help doesn't arrive in time, everything slows down."

One key finding from the research was how fragmented support has become. Crews may juggle a dozen systems from different vendors, each with a manual and contact point. When something breaks, solving it can mean chasing answers through phone calls, emails, or even faxes across time zones.

"You can end up with ten different actors in the support chain," Olander says. "In the simplest case, it's one engineer and one crew member. But if a part breaks, you suddenly involve logistics teams, port agents, and invoicing departments."

In more complex cases, support spans continents. Spare parts need to be sourced and shipped to the right port, and technicians must arrive on time with the right tools. "All of this happens manually," Olander says. "It works, but nothing is streamlined."

CLOSING THE DIGITAL GAP

Part of the reason is that digital systems vary worldwide. Some have fast, connected tools, while others rely on manual routines.

Consilium develops solutions to make support functions more seamless—helping crews solve issues faster and with fewer steps. Since 2018, the company has worked with digital twins. It is now implementing AI-driven fault analysis tools that spot recurring patterns, learn from past cases, and prepare crews before the ship docks.

"All the data we gather from a ship while it's at sea can help us build a to-do list before it reaches port," says Olander.

But technology alone doesn't solve the problem. The "First Time Fix," as Sandell calls it, depends on more than one thing. It takes preparation and local knowledge. It takes someone who knows the ship, has seen it before, and understands how the systems behave.

"It's something we've worked on for years," says Sandell. "To fix a problem in one visit, you need more than data. You need context. And you need to be close to the customer."

SUPPORT AS PART OF THE PROCUREMENT

Sandell and Olander point out that support should be part of the conversation long before a system is installed. It must be included in the procurement process with clear expectations and responsibilities.

"You can't define a system by its technical specs," says Sandell. "You need to ask what kind of support this requires and what kind of access, responsiveness, or diagnostic capabilities should come with it".

This is one of the shifts the findings from the Chalmers research pointed out. Support needs to be part of both safety and operations. The industry should start having earlier and clearer talks between shipowners and suppliers, including service, tools, and how support will work.

CAPTURING OPERATIONAL KNOWLEDGE

At the same time, researchers and industry professionals identified a recurring issue onboard: what Olander calls the "MacGyver effect." The crew solves problems creatively, a tweak here, a workaround there, but these improvised fixes are rarely documented or shared. The next technician, or even the same crew on a different ship, faces the same problem from scratch.

"We need to start capturing that knowledge," says Olander. "That's real operational insight."

He compares it to visiting a doctor. "The first thing they do isn't just look at your test results. They ask what you felt, what you saw, what changed. It's the same here. When a crew member says, 'there was a strange noise, something blinked,' that's the detail we need, but it's often never recorded."

Kenth Sandell and Patrick Olander say that support needs to be part of both safety and operations. They recommend the industry to have earlier and clearer discussions between shipowners and suppliers about service, tools, and how support will be handled.

THE ROLE OF AI

This is where Consilium sees potential in AI. By aggregating data across service logs, design specs, and sensor inputs, support teams can access live alerts and history of what's been tried before—what worked, what didn't, and under what conditions.

"Even a new technician could benefit from that context," says Olander. "It's like giving them a colleague who's seen it all before."

That kind of system could also ease another frequent request from the Chalmers study findings: a dedicated support contact. But as Olander puts it, having one trusted name on the other end of the line becomes more challenging to scale as staff rotate.

"AI might not replace that person," says Olander, "but it can help support teams deliver the same kind of continuity and accuracy."

MAKING SUPPORT MORE EFFICIENT

But even with more innovative systems, timing and context still matter. "If a ship is in port for two hours, there's no point delivering a solution in ten minutes if it doesn't fit the situation," he adds.

They also echo one of the study's more subtle conclusions: that the people using these systems must be more involved in their development.

"User-centred design is often where things go wrong," says Olander. "We need to ask the people who operate the systems what they need to do their jobs."

Respondents in the research, including shipping operators, point to standardisation as part of the solution, something Olander and Sandell also support.

"Needing new training just because you switch supplier isn't sustainable," says Sandell. "It's like needing a new driver's license every time you change car brands. That has to be more streamlined."

Olander fills in.

"Systems need to talk to each other seamlessly," he says. "It doesn't matter if it's navigation, safety, or engine control—support works when everything is connected."

Sandell nods. "System integration. A common language," he adds. "Something everyone in the supply chain—on board, on land, across suppliers—can understand and work with." «

BYE-BYE CA

••• The way ships are built has long made wireless fire detection difficult to use onboard. The solution may lie within those very same structures.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER

Installing a CCTV camera at the bow of a ship should be a small job. Mount it. Power it. Connect it. Move on.

Ships are rarely that cooperative. Even though a 300-metre ship may be an engineering marvel, to radio waves it is a floating Faraday cage.

If the camera needs to send data to the stern, someone may have to snake a cable across hundreds of metres into spaces never meant to host new visitors.

For as long as ships have relied on wired safety systems, there has been an interest in reducing the need for cabling. According to Thobias Ernfridsson, Chief Technology Officer at Consilium Safety Group, there are good reasons for that.

BLE RUNS

"Cables are expensive," he says, listing the raw ingredients: plastics, copper, aluminium – each a cost, a weight, a complication.

Then he taps his wristwatch. "Worse, installing them consumes the one thing shipowners value most. Uptime."

THE HULL AS WIRE

Yet the very bones of a ship pose a challenge. Steel bulkheads and thick compartments block traditional wireless signals, making reliable communication through the air almost impossible.

The answer, it turns out, is not to battle the steel, but to make it work for you.

Surface-wave technology does just that. It guides electromagnetic waves along the ship's metal skin instead of through the air. The concept is not new, but making it work on real ships has proven stubbornly elusive.

Traditional systems demanded spotless, bare-metal components, which are rarely found on ships that have weathered years at sea. A key step came from Seoul-based company Sunny Wave Tech, whose Aurora resonator technology works reliably regardless of what covers the ship.

"It can work even when the hull is painted, oxidised or rusted," Ernfridsson says.

This is where Consilium steps in, turning this science into something useful for onboard safety.

In partnership with Samsung Heavy Industries and Sunny Wave, Consilium has developed a new generation of battery-powered smoke and heat detectors. These devices talk wirelessly to central safety panels, using the ship's own metal as their pathway.

The system has earned Approval in Principle (AiP) from ABS, marking a step towards certification. →

"Once a ship is in use, adding extra cabling is like threading spaghetti through concrete," says Thobias Ernfridsson. Surface-wave technology addresses this by enabling data transmission through the ship's steel.

"We are developing detectors adapted to use this technology. The detectors at one end connect to our safety panel at the other, using wireless data transfer through the ship's structure instead of cables," says Ernfridsson and adds:

" We have started with smoke and heat detectors but will also develop gas and fire detectors that can communicate wirelessly."

These detectors fit seamlessly with both new and existing Consilium systems, allowing installation without extensive rewiring. They can also integrate with third-party safety systems, giving operators more flexibility to upgrade or expand their detection infrastructure.

MIND THE GAP

The technology offers value both in newbuild projects and later in a vessel's lifecycle.

"The more complex the vessel, the more systems it carries, and the greater the value of this solution. On a large LNG carrier, each metre of cable removed saves installation time, reduces weight and increases cargo capacity," Ernfridsson says.

The benefits also extend to ships already in service.

"Once a ship is in use, adding extra cabling is like trying to thread spaghetti through concrete," Ernfridsson says. "When a ship is operating and needs to expand a system, add coverage, or put a device in a hard-to-reach place, this technology lets us send data between those points with less disruption."

Ernfridsson sees an even bigger opportunity in how the wireless system can extend the infrastructure Consilium already uses.

"You could run our cable halfway through a ship on existing infrastructure, then switch to wireless to cover a new area without cable," he says.

"We fill in the gaps and can add temporary monitoring for certain cargo and expand safety networks without removing bulkheads. The result is lower installation costs, faster upgrades and more uptime."

LOOKING AHEAD

Ernfridsson sees possible use in vehicle transport. As the global transition to electric mobility accelerates, Pure Car and Truck Carriers (PCTCs) load thousands of EVs simultaneously.

The larger the vessel, the greater the gain. Every metre of cable removed saves installation time, reduces weight, increases cargo capacity, and protects what shipowners value most: uptime.

Monitoring battery health and fire risk across multiple enclosed decks is a top priority for fleet operators.

"Conventional wireless works reasonably well on open vehicle decks," says Ernfridsson. "The challenge comes when you need to communicate between decks, where the solid metal floors make signal transmission incredibly hard."

By using the metal decks as a signal path, surface-wave technology could make it easier to deploy larger numbers of sensors across the ship to monitor EV batteries in real time during transport.

For now, the technology is entering large-scale, rigorous testing. Consilium and its partners need to demonstrate that the system can withstand harsh sea conditions, including temperature swings, vibration and strict EMC requirements, before a full commercial launch.

"We need to run these trials on large ships, with more detectors and longer periods. No data lost. No alarm unheard," Ernfridsson says. "For us, leadership in safety technology means proving reliability before making promises. Only when the system behaves, hour after salty hour, will we call it trustworthy." «

"We are developing detectors that wirelessly transmit data through the ship's structure to our safety panel. We started with smoke and heat detectors and plan to add wireless gas and fire detectors," says Thobias Ernfridsson, CTO at Consilium.

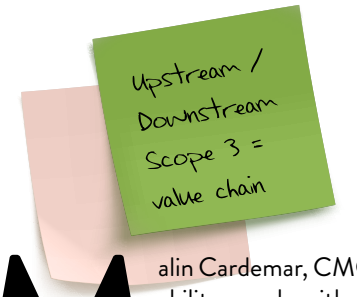
WHERE PROOF MEETS PURPOSE

»CONSILIUM'S BL FOR RESPONSIBI

UEPRINT LITY«

••• Sharareh Farshchiha and Malin Cardemar, two voices in sustainability reflect on the space between what can be measured and what simply matters.

TEXT: RAMIN RAHMANI > **PHOTO:** JONAS GRATZER



Malin Cardemar, CMCO and Head of Sustainability, speaks without slides or slogans. She gestures as she speaks, tracing the air as if mapping an invisible circuit.

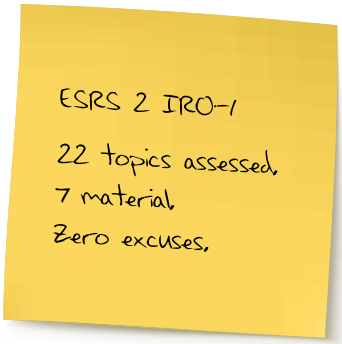
"Sustainability is in everything we do," she says. "We don't say it because it sounds good. We say it because lives, and the planet's future, depend on every decision we make."

Around her, boards and prototype detectors line the walls, reminders that this is a company where ideas are tested in extreme conditions, including heat and saltwater.

"Fire safety," she says," is about prevention — and prevention, when you look closely, is the most sustainable act of all."

Beside her sits Sharareh Farshchiha and listens, just as focused but with a different gaze, one searching for how it can all be measured.

Where Malin talks about systems and values, Sharareh deals with numbers. As Consilium's Sustainability Manager, she turns vision into action — running the numbers, tracking carbon, translating data into real progress.



"Here, sustainability isn't an add-on," says Sharareh, who joined Consilium a year ago. "Leadership pays attention, there's a plan, a direction, and we move forward together."

WHERE VALUES MEET WORK

That sense of purpose runs through the entire company. In HR, it means working with human rights and equality, diversity and inclusion. In R&D, it means choosing materials that perform, last and waste less, even if they don't carry the greenest label.

"Sometimes we can't use the most sustainable material," Malin says. "It must be a certain type to function safely. But we keep it on the checklist, so we know exactly where we can improve."

Retrofitting is another decisive shift. "We design systems that can be upgraded," she says.

Governance follows the same logic. Strict business ethics, supplier responsibility, and a shift towards greener energy have already reduced emissions. "We have clear actions in each area," Malin says.

When asked for a concrete example, Malin replies, 'A product or a solution? '. Then she points to Consilium's remote digital platforms, systems that let technicians connect to ships or buildings from anywhere in the world.

"It means fewer trips for everyone. Fewer flights, less fuel, faster support. That's lower emissions and better service," she says. "Real progress you can measure."

But for Malin, the technology's deeper value lies in what it prevents. "If you detect an incident even minutes earlier, it can be the difference between a small issue and a disaster".

When the conversation turns to what makes their products sustainable, Malin gives a brief smile. "By being what they are — and doing what they do," she says.

PREPARED FOR WHAT'S NEXT

For her, sustainability is a question of adaptation, meeting each new safety challenge with a smarter response. "Look at what's happening, new fuels at sea, greener materials on land," she says. "Every shift creates new risks, and that means new solutions. Our job is to stay ahead of them."

That focus keeps Consilium close to its customers. "We work hand in hand with them," says Malin. "Every challenge is a chance to build something smarter and safer."

She mentions a new flame detector with a 160-metre range for large industrial sites. "It's all driven by safety needs that evolve with new technologies.

Electric vehicles are an example. "A parking garage for electric cars or buses needs new kinds of detection and warning systems," she says. "We're working closely with those challenges, how to detect an EV fire early, even down to the smallest spark."

Next to her, Sharareh listens intently. Where Malin talks about evolving risks, Sharareh's focus is on tracing their environmental impact.

One of Sharareh's priorities is the supply chain. "We're assessing our suppliers to see how they actually work with sustainability," she says. "Everyone signs our Code of Conduct, but we want to go beyond the paperwork."

That means action over promises. "We're mapping where they stand, how much they cut emissions, how much renewable energy they use, and then we keep the conversation going," she explains. "The goal isn't just to tick boxes. It's to help them reach the level we're aiming for."

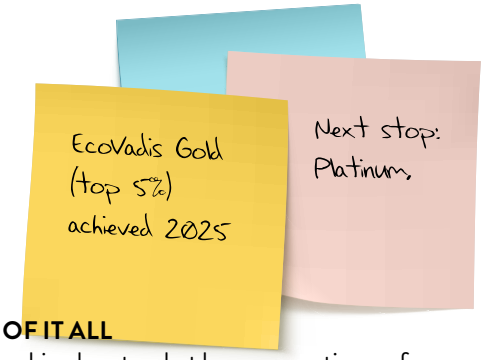
Her biggest challenge? The maths. "Measuring impact →

Here, sustainability is part of everything we do. Our leaders are committed, we have a clear plan and direction, and we work together to make progress.«

Sharareh Farshchiha, *Sustainability Manager at Consilium*

Fire safety is about prevention, and prevention, when you look closely, is the most sustainable act of all.«

Malin Cardemar, *CMCO and Head of Sustainability*



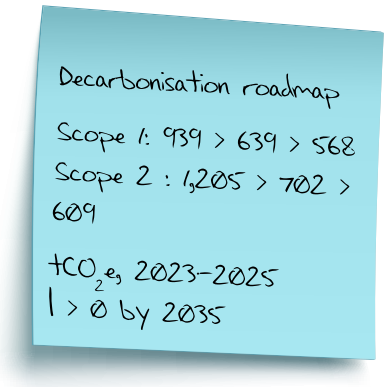
sounds simple," she says." But sometimes the data just isn't there."

She counts: "Old systems. New suppliers. Different levels of experience, these gaps take time to close."

Her approach is to stay patient, stay structured. "It's about teamwork across departments and constant dialogue with suppliers," she says. "Not everyone is at the same level yet. So, we move one step at a time."

When the numbers aren't there, the work doesn't stop. "We can use estimates, that's completely acceptable within sustainability standards," Sharareh explains.

"We document the methodology and compare consistently until we can measure more accurately. As long as we're transparent about how we did it, it helps us understand where we are and then become more mature step by step."



She laughs when I tell her it's interesting. "I'm glad you think so," she says. "Usually when I start talking about data, people just look at me and ask what I'm talking about."

Ask Sharareh where safety and sustainability clash, and she doesn't even pause. "In some industries, sure, that tension exists," she says. "But for us, safety is sustainability. The better the product, the safer it gets."

She leans forward. "Of course, there are choices, like when you want to use recycled plastic or a softer material. But if it hurts performance, we stop right there. You can't trade safety for a greener label. That's when our engineer's step in, they test, prove, and make sure every solution still protects."

MEANINGFUL TARGETS

At the mention of ongoing projects, Sharareh's face brightens. "SBTI," she says.

She laughs at my blank stare. "Science-Based Targets initiative, a framework for setting climate goals grounded in science".

She explains that it is a way to set targets for Scope 1, 2 and 3 emissions. It provides direction and guidance on how much their business should reduce each year to reach net-zero goals.

"It's exciting because it's not just a technical roadmap; it builds a mindset. Once you commit publicly, the whole organisation feels a sense of responsibility. It's a step further, a collective commitment."

AT THE HEART OF IT ALL

The talk shifts from big plans to what keeps operations safe, year after year.

"Our products have a long lifetime," says Malin. "Some people joke they last too long."

That longevity is by design. Instead of replacing whole systems, Consilium upgrades only what's essential. Key components get a modern update, while cables, sensors, and detectors stay as long as they work.

"We replace what's needed, but we don't waste what still works. If a system is twelve years old, retrofitting will keep its quality for at least another twelve."

It's hard to argue with the logic: less waste and a smaller environmental footprint by avoiding new production.

She goes on to describe the SMiG system, a network of sensors and cameras designed to detect danger minutes earlier than before.

"What I'd really like," she says, "is to know what those minutes are worth. For the customer, it's safety and value. But what about the planet? What does it mean, in real terms, when a fire or gas incident never happens?"

Sharareh jumps in. "We can model the scenarios. Depending on where the technology is used and the type of fire we're preventing, we can calculate its impact. And compare emissions or outcomes with and without the solution. Even those few seconds, those few minutes, they can be quantified."

For a few moments, they forget anyone else is in the room. They build on each other's thoughts, one talking in stories, the other in data, energy bouncing back and forth like a live circuit.

Still, some of Consilium's most meaningful results will never fit into a spreadsheet. They may never capture the moment when a fire is averted, a life is saved, or an emission that never occurs.

"The earlier we can detect, the better we can prevent," says Malin. "And that, in the end, is responsibility. It's what drives us. It's built into every product — preserving, protecting, creating long-term value for life itself."

Sharareh smiles, nodding, "Not everything can be measured," she says. "But responsibility is always part of our equation. It's what matters most." «

THE SAFETY EQUATION IN GREENER SHIPPING

••• As alternative fuels become more common, they bring new safety challenges, making it crucial to design safety into ships from the very beginning.

TEXT: RAMIN RAHMANI > **PHOTO:** NATHALIE ANDERSSON

The shipping industry is entering a transitional phase, driven by stricter environmental rules, rising demands from cargo owners, and the growing preference for cleaner operations from financial institutions.

For shipowners, the answer lies in alternative fuels. Five fuels are now on the radar: LNG, methanol, ammonia, hydrogen fuel, and battery power. But choosing the right fuel is only part of the challenge. Each option affects the ship's safety systems, which need to be addressed early in the planning.

"Safety, like propulsion, must be integral to the ship's design," argues Magnus Gillberg, Business Area Manager OEM/Merchant at Consilium Safety Group.

He and his team work with shipyards, designers, and operators to build safety into vessels from the outset.

WHY THE SHIFT IS HAPPENING NOW

Magnus Gillberg points to three reasons behind the current momentum.

The first is regulatory; Emission Control Areas (ECAs) are expanding.

"The Mediterranean became an ECA in 2025. And I just spoke with a colleague in the Canary Islands who said that they will become SECA in 2030. Ships entering these zones must comply with these standards".

Additionally, some companies, such as those in the automotive industry, are setting stricter standards for how their goods are shipped.

"They're setting demands for lower emissions so that the whole supply chain can become more sustainable in some way," says Gillberg. "Shipowners need to adapt to keep contracts."

Also, access to capital is becoming conditional. "Banks are asking for cleaner operations," Gillberg explains. "If you want a loan to build a ship, you have to show that it meets future requirements."

A WEB OF NEW RULES

Before picking a fuel, shipowners must understand the sustainability regulations.

For new ships, the Energy Efficiency Design Index (EEDI) sets the standard for emissions, measuring the emissions of a vessel per tonne-mile. This design-based formula allows flexibility in meeting the target if the ship is efficient enough on paper.

For existing ships, the Energy Efficiency Existing Ship Index (EEXI) has been applied since 2023, bringing similar rules but retroactively. This means that ships don't necessarily have to switch fuel, which can be expensive, but can make other adjustments to meet the standards.

"You can limit engine power, change the route and adjust the autopilot, or tweak the hull to cut drag", Gillberg says.

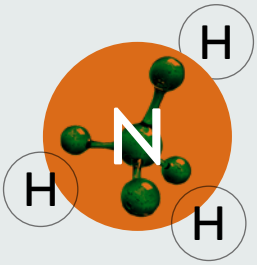
Then comes the Carbon Intensity Indicator (CII). It rates ships from A to E based on real emissions per cargo and distance sailed. C is the lowest passing grade.

"It's similar to the labels on washing machines," says Gillberg. "A means efficient. D and E means you need to improve."

HALF THE FLEET FALLS SHORT

The first public CII reports revealed that 48.1% of vessels, roughly 100,000 ships, scored D or E. Vessels falling into the D or E category must act quickly to avoid penalties or restricted access to ports.

"The challenge is, even if you want to improve, there aren't enough shipyards in the world to handle all upgrades", says Gillberg.



We've seen a real shift. But it's still easy to underestimate what a safety system involves.«

Magnus Gillberg, *Business Area Manager OEM/Merchant at Consilium*

While environmental rules are tightening, safety requirements lag, outpaced by the industry's push to implement new fuels.

"This means that we, as safety experts, have to support the customers and the shipyards in designing a system that will fulfil future regulations," Gillberg says. "It requires knowing how ships work, the daily environment on board, as well as how the rules are written and enforced."

Gillberg doesn't think one fuel will take over.

"It depends on the ship, the route, and the cargo. Different ship types need different safety solutions."

LNG remains strong because the infrastructure is already in place. Methanol is growing fast due to several benefits, such as low emissions, low cost, and excellent energy density. Ammonia and hydrogen have potential but come with risks.

"The toxicity and distinctive smell of ammonia make it more suitable for cargo vessels", says Gillberg.

"Hydrogen, on the other hand, is flammable and hard to store due to volume, but better suited for passenger ferries, tugs, workboats, and dredgers. Some cruise ships are now being built with hydrogen fuel cells for auxiliary power."

BUILDING OPERATIONAL COMPETENCE

Once the ship is sailing, crews and onshore teams must make fast, informed decisions, often with fuels they have limited operational experience with.

"Seafarers and onshore organisations need to develop new competencies. Knowledge, skill, and proficiency will be vital for safe operations with these fuels. Crews need to be confident and well-informed, especially when it comes to gas detection for fuels like ammonia and hydrogen", Gillberg says.

That's where the new generation of Safety Management System (SMiG) comes in, becoming essential for gaining better control and instant access to information to support decision-making.

"SMiG is a powerful tool for identifying potential hazards. It provides real-time data to monitor gas levels, and guides both crew and onshore staff to take the right action and stay safe", he says.

START EARLY TO STAY AHEAD

Gillberg argues that regardless of the fuel chosen, safety must be part of the early planning.

"We get involved from day one. It's the only way to minimise downtime and build long-term resilience," Gillberg explains.

Many still focus on upfront costs, but Gillberg cautions against short-term thinking.

"Uptime matters. Our systems are built to last 20 years. What you save today can cost you later."

WHAT EXPERIENCE TEACHES

Gillberg gives credit to the industry for recognising the risks that come with new fuels.

"We've seen a real shift. But it's still easy to underestimate what a safety system involves. From the outside, it might look like a simple box with wires. It's a complex system that must work flawlessly under harsh conditions," he states.

He adds: "Safety decisions affect everything, from system layout to crew training. If you wait too long, you risk delays and extra costs."

Gillberg offers clear advice for anyone ordering safety systems for gas-powered ships:

"Analyse the risk. Understand the real exposure on board, involve safety experts early, and look beyond price. A cheaper setup today can lead to costly downtime later."

He also calls for validation. "Do the real-world tests. You need to know how the system performs in real conditions." «

MONICA CARDOZO:

»THE MOST IMPORTANT THING WE TEACH IS TO KEEP LEARNING«

••• In Södertälje, Sweden, a short train ride south of Stockholm, Campus Telge prepares safety engineers for working life through hands-on learning and a partnership with Consilium Safety Group.

TEXT: RAMIN RAHMANI > **PHOTO:** CAMPUS TELGE

Behind the wooden facade of Campus Telge, future safety engineers apply their knowledge in real-world scenarios.

"There isn't one kind of safety engineer. The education must allow for different strengths", says Fredrik Ek.

At Campus Telge, learning and working are designed to bleed into each other. What happens here will matter the day you step onto a job site. Each course is steered by an industry committee – a constant feedback loop between employers and educators to keep relevance front and centre.

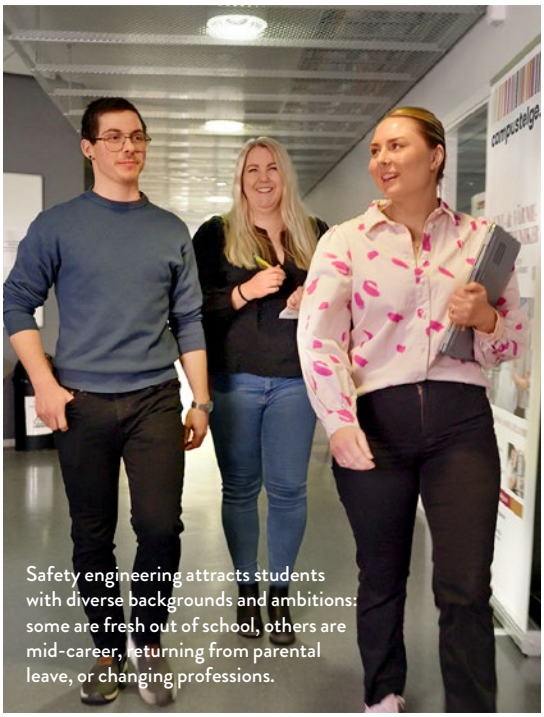
Mónica Cardozo saw this as both an opportunity and a challenge when she started at Campus Telge as Head of Programme for Safety Engineering two years ago. The ties were there, but they needed tightening.

"We can teach the theory," she says. "But it's the industry that shows how the work is done in reality."

That insight drove a new partnership with Consilium Safety Group, first sparked by the programme's in-depth workplace training in the company's offices and worksites. In those meetings, Mónica rebuilt her steering committee, inviting Fredrik Ek, Head of Project at Consilium Safety Sweden, to join.

The committee reviewed the curriculum and identified areas where students needed a clearer grounding. Some courses were rebuilt, others merged or refreshed, and a new application went in – expanding hands-on learning at the heart of the degree.

"When we joined, it was clear the programme had room to grow," Fredrik says. "Our role was to bring in real work perspectives. It's been a joint effort to align education and practice."



Safety engineering attracts students with diverse backgrounds and ambitions: some are fresh out of school, others are mid-career, returning from parental leave, or changing professions.

When education and industry work together, we build the knowledge that supports it.«

Mónica Cardozo, *Educational Director*

ONE PROFESSION, MANY PATHS

Safety itself, Fredrik notes, is a world of specialities. On one floor, students might be mastering technical systems: on another, regulatory compliance, risk analysis, or project planning.

"There isn't one kind of safety engineer," he says. "The education must allow for different strengths."

Students reflect that diversity too. Some are fresh out of school, others are in mid-career, and some are returning from parental leave or shifting professions entirely.

"What's special here," says Anders Holm Brisenheim, a student in the programme, "is that the teachers are fantastic, you can always ask for help. We learn things we'll use – and you really feel that jobs are waiting for you after this.

Take Nasir Adan, 26, who arrived after a spell in telecom sales, not planning on safety engineering – but finding a world he hadn't expected.

"The programme prepares us for the private or public sectors," he says. In hospitals, municipalities, or high-tech companies, the field is constantly changing. It's no longer just locks and alarms, it's complete systems that prevent, detect, and document incidents in real time."

SKILLS FOR A CHANGING INDUSTRY

During work placements at Consilium, students join real operational work – sometimes shadowing engineers on service visits, supporting documentation, and working on analysis and preparation.

Consilium has hired students in previous years, and from this programme, one student is now completing her second placement, a pathway that can lead to employment.

"There's a shortage of people who are both engaged and willing to develop," Fredrik reflects. "Meet the students early, nurture their curiosity, and you'll see them grow, finding confidence and belonging in industry."

That curiosity is needed. The profession is evolving, driven by digital tools, data-driven insights, and predictive analytics that redefine what's possible in safety. Yet core skills remain as old as the field: judgement to see risk, anticipate consequences, and take responsibility.

Mónica makes no empty promises. "You don't leave here fully formed. The most important thing we teach is the habit of continuing to learn."

When industry and education move together, graduates step into the world with real, needed skills. Companies like Consilium secure the capability they need. Society itself gets the ultimate reward: safer workplaces, safer hospitals, safer streets.

"Safety is everywhere," Mónica says. "When education and industry work together, we build the knowledge that supports it." «

FIKA WITH PETTER WIDÉN

»THE BEST EXIT IS STAYING IN«

••• Petter Widén is always on the lookout for promising companies. As Consilium's Vice President of M&A and Corporate Development, he scouts entrepreneur-led and niche-leading businesses worldwide and makes the case why joining a larger group is their smartest next move. We met him for tea to find out what he's looking for.

TEXT: THEO MARTINS > **PHOTO:** NATHALIE ANDERSSON

Why should a company join Consilium?
"Because we are building the leading global Safety Tech company, and this is an opportunity to be part of that journey. As a company within Consilium, you get to have the cake and eat it too. You benefit from our global reach, network, and an operational framework that lets you scale rapidly while staying involved. With our backing, you can achieve the growth you've envisioned."

What types of companies tend to thrive within the Consilium family?
"We look for companies led by committed founders with strong teams. Ideal candidates are leaders in their product or technology niche, or in their customer, geographic, or industry segment. We evaluate financial and operational performance, as well as the team's track record of delivering results."

What are you looking for right now?
"Our foundation is fire and gas detection, but what sets us apart is our drive to expand Safety Tech with new and complementary technologies. We are looking for motivated entrepreneurs who want to integrate their innovations into our global network and scale to new levels. For the right partner, this is the ultimate fast-track to growth inside our Safety Tech ecosystem."

Which recent acquisitions have been particularly successful, and how have you supported them?
"I can mention a few. Daspos has entered the new-build market in China and secured several major customers in Europe. Consilium Safety Türkiye, formerly Ares Marine, has secured a global agreement with a third-party supplier. They're all now part of the Consilium family, and it is rewarding to support their growth. Our recent acquisition of Insplorion is also exciting. It strengthens our position in gas sensing and hydrogen detection through proprietary nanoplasmonic sensor technology and supports our strategy to build a leading platform in safety and sensing technologies.

What would you say to entrepreneurs who are starting to consider joining a larger group?
"We don't acquire companies to fold them into a corporate structure. We invest in founders because their drive, their people and products fuel innovation and growth. You keep leading the business, with tools and resources that remove roadblocks and open doors you could never access on your own. Let's meet for lunch. We can see if our goals and values match. If they do, we can quickly explore how you can join Consilium and grow with us." «

Petter Widén believes the best companies rely on more than a single invention. He looks for strong teams, proven products and founders who want to keep building.

GOOD SAFETY RARELY MAKES HEADLINES.
IT PREVENTS THEM.

We keep the wheels of society turning,
in schools, on trains, in public buildings and at sea.

We do it with intelligent safety technology,
protecting lives, assets and the planet.

We are Consilium,
shaping the future of safety.

Join us,
we are always looking
for talented people.