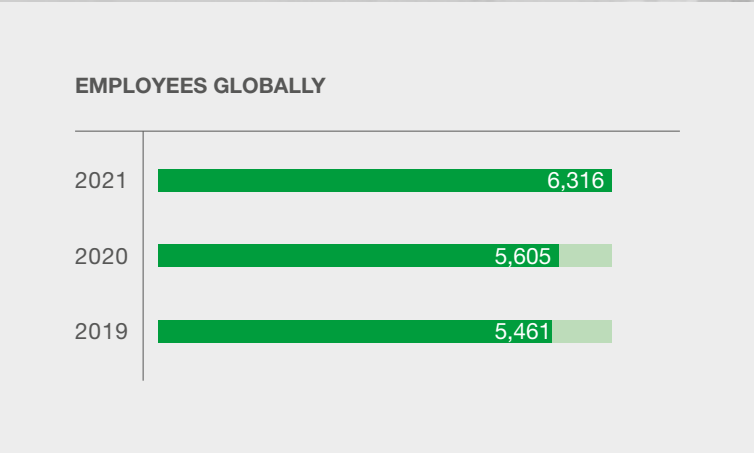
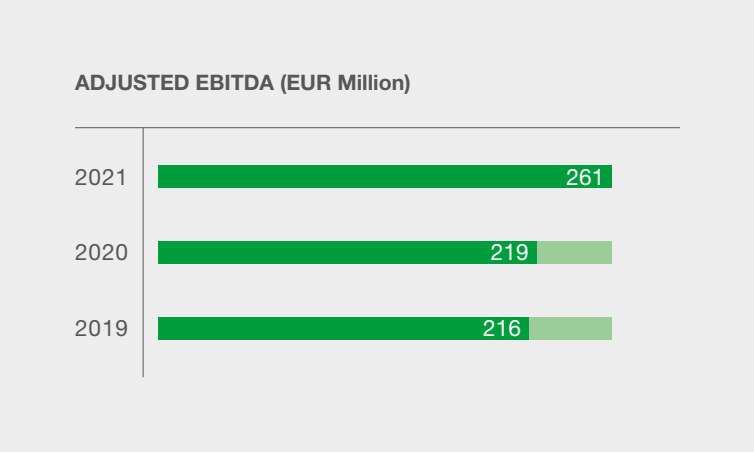
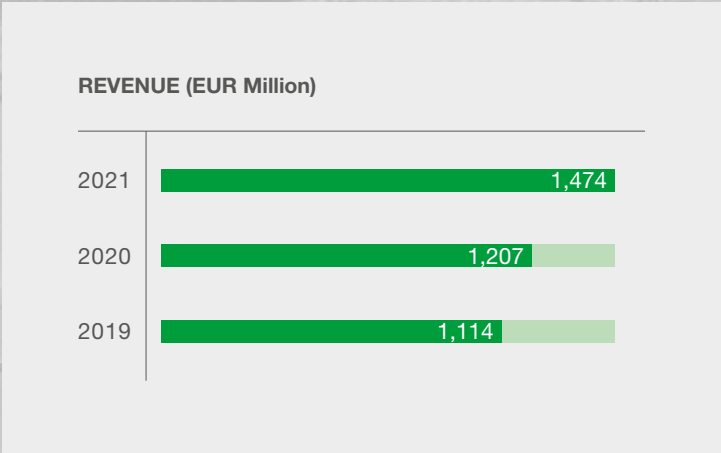
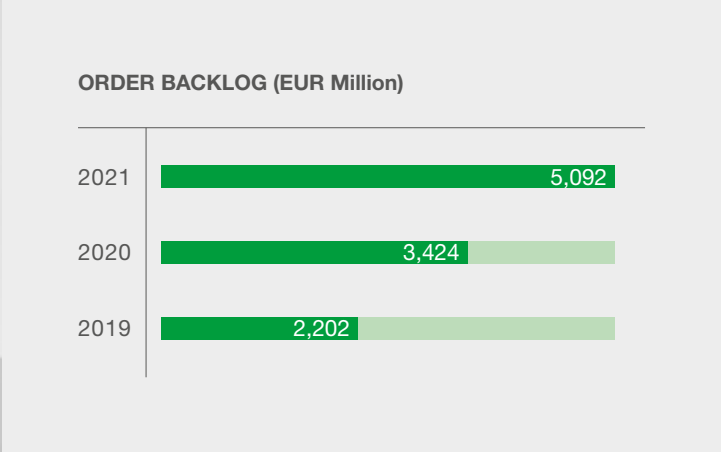


Annual Report **2021**

Detect and Protect

Vision

HENSOLDT at a Glance



Contents

PAGE	CHAPTER	TITLE
003		HENSOLDT at a Glance
005		Contents
006	1	The HENSOLDT Vision
008	2	Foreword Johannes Huth, Head of KKR EMEA, Chairman of the Supervisory Board, HENSOLDT AG
010	3	Letter to shareholders Thomas Müller Chief Executive Officer, HENSOLDT AG
016	4	Responsibility in Geopolitically Challenging Times Dr. Christoph Heusgen in Conversation with Thomas Müller, Chief Executive Officer of HENSOLDT AG
022	5	Strategic Business Development
022	5.1	Celia Pelaz, Chief Strategy Officer, HENSOLDT AG: “We Are Expanding Our Operations in Four Strategic Vectors”
028	5.2	Vector 1: Developing Integrated Solutions
030	5.2.1	Eurofighter Typhoon
038	5.2.2	Future Combat Air System
044	5.2.3	Main Ground Combat System
054	5.2.4	HENSOLDT in Space
058	5.3	Vector 2: Spearheading the Technologies of Tomorrow
060	5.3.1	HENSOLDT Cyber
068	5.3.2	HENSOLDT Analytics
074	5.3.3	Green Hydrogen
080	5.3.4	The Unmanned Aviation of the Future
084	5.4	Vector 3: Strengthening Global Presence
086	5.4.1	International Business Operations of HENSOLDT
088	5.4.2	European Growth
092	5.4.3	International Expansion
096	5.5	Vector 4: Fostering Security
098	5.5.1	HENSOLDT Security Solutions
100	5.5.2	Xpeller counter-UAV system
104	5.5.3	Wildlife Protection
120	6	Shaping the Future: the HENSOLDT Team
124	7	Imprint

The HENSOLDT Vision

HENSOLDT Spearheads Innovations That Make the World a Safer and More Sustainable Place.

All activities at HENSOLDT serve the company's overarching vision and therefore respond to fundamental challenges of our time:
safeguarding peace and life – for society, our environment, and our planet.

As a high-tech company in the defence sector, HENSOLDT develops powerful sensor systems and digital solutions that detect danger and protect people and the environment.

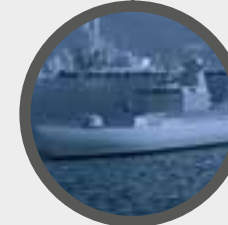
With around 6,300 highly qualified employees, the company develops these intelligent and integrated technologies for all fields of deployment: in the air, at sea, on land, in space, and in cyberspace. Building on the company's leading market position in Europe, the strategic ambition of HENSOLDT is trained on the global defence industry.

HENSOLDT SOLUTIONS

LAND



SEA



AIR



SPACE



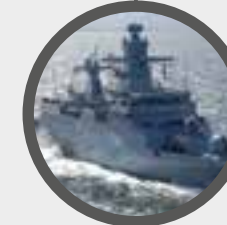
CYBER



HENSOLDT DIVISIONS



Optronics and
Land Solutions



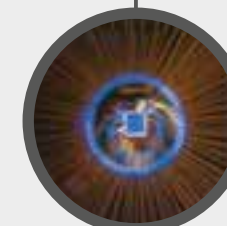
Radar and
Naval Solutions



Spectrum Dominance
and Airborne Solutions



Service and
Space Solutions



HENSOLDT
Ventures

Foreword

Johannes Huth
Head of KKR EMEA
Chairman of the Supervisory Board
HENSOLDT AG



It is time to take a look back at 2021, an exciting and successful year in which optics pioneer Moritz Carl Hensoldt would have celebrated his 200th birthday. To this day, his name stands for outstanding entrepreneurship, innovative strength, and inventive spirit – attributes that are still at the centre of HENSOLDT's values and mission. These values are critical drivers of the continued growth of HENSOLDT against the backdrop of a turbulent environment. Due to the exceptional commitment delivered by every employee of the company last year, HENSOLDT is comfortably ahead of its strategic goals and continues to achieve strong top-line growth and high profitability. For this commitment and the outstanding results, I would like to thank all employees on behalf of the Supervisory Board.

With its IPO in 2020, the company laid the foundation for its next phase of growth. A lot has already been achieved since then; the company has a record order book, and has secured landmark contract wins, including the Pegasus order for airborne reconnaissance technology. Of particular strategic importance is the recent investment by Leonardo which joins the Federal Republic of Germany and KKR as an anchor shareholder. This investment will provide good opportunities for strategic and collaborative cooperation. These investments are a testament to the company's accomplishments and reflect the importance of coordination and cooperation within the industry as well as with governments in both a national and European context. Together with its anchor investors, HENSOLDT will be better able to respond to the evolving defence and security market and the challenges that face its business.

HENSOLDT is a technological leader as evidenced by its portfolio and R&D focus; analytics, autonomy, and AI play an increasingly important role in both products and production processes. HENSOLDT is committed to continuing its path as a driver of innovation in the industry, which is reflected in the significant increase in R&D expenditure in 2021, which has nearly doubled since 2017. Furthermore, the company will continue to build on its track record of successful acquisitions as an additional means of expanding its capabilities and solution set.

One of the dominating topics for the defence industry and the broader economy is ESG, an area that is becoming ever more prevalent for HENSOLDT. Being a sustainable business is extremely important to HENSOLDT and its partners; safety, security, and defence of people as well as fundamental rights of democracy are basic requirements and the very foundation of sustainability. While the defence industry must take responsibility for its own share of greenhouse gas emissions, it can also provide critical technologies and solutions to reduce climate change. HENSOLDT takes this responsibility extremely seriously and has established a new ESG strategy with specific commitments and targets for the coming years. The persistent work is paying off. HENSOLDT was recently accredited the lowest ESG risk factor in an industry ranking by Sustainalytics.

HENSOLDT still upholds and represents today what Moritz Carl Hensoldt was known for: entrepreneurship, innovation, and excellence. Our strategic alignment over the last year, the significant continued investments in technology and R&D, as well as in people, plants, and equipment globally, including in our core market Germany have led to the largest order book in the history of HENSOLDT and led to the creation of more than 700 new jobs globally. It is proof that the company is on the right track, and it positions us very strongly for the years to come.

Johannes Huth

Letter to shareholders

Thomas Müller
Chief Executive Officer
HENSOLDT AG



Dear Shareholders
and Readers,

The dramatic geopolitical developments of the last few weeks and months have put a very clear focus on a fundamental human need: security.

Russia's assault on Ukraine is a seismic shift on a scale that we in Europe have not seen since the Cold War. It represents the climax of a long-running shake-up of international order and will leave deep marks in many ways, from politics to business and, above all, for people in the regions concerned. While it is currently impossible to gauge the long-term fallout from Russia's waging of war, it is clear that they have brought the NATO member states back together again very closely. New life has undeniably been breathed into the alliance's mission. Now it is more important than ever that Europe is strong, stands together, and is able to exercise full sovereignty over its security policy. This demands a greater deepening of political and industrial cooperation in Europe. What's more, the war in Ukraine clearly shows how large an influence that cyberspace manipulation and disinformation have in determining war and peace these days. Today's security, peace, and liberty are almost always threatened in digital spheres as well and require defence in them.

In Germany, the lightning-fast end of Europe's post-war order in just a few days has led to a new era in security policy. The government's ambition to beef up the country's army quickly and comprehensively and future-proof it for a new defence reality will demand an enormous joint effort. HENSOLDT is ready for this. We are aware of our exceptional role as a leading technology company in the defence industry. We make it possible to detect threats in analog and virtual spheres thanks to our sensor solutions, electronic-warfare technologies, and expertise in data analytics and cybersecurity. HENSOLDT is committed to key pan-European projects such as FCAS, MGCS, and the Eurodrone which now have a stronger focus than ever. With our international development and manufacturing network and a workforce that has grown significantly in recent years, we are also able to ramp up the production of existing technologies and systems to meet short-term and medium-term demand.

Speaking on behalf of everyone here at HENSOLDT, I wish to express that the tragedy in Ukraine has demonstrated just how vital the mission of our company actually is. Our work creates the technological foundations for maintaining people's peaceful coexistence. There is also a second aspect to what we do which remains fundamental for us in these extraordinary times: security is an indispensable precondition for environmental sustainability and, by extension, the preservation of our planet. This is another reason why our operations at HENSOLDT have such special relevance.

By publishing this Annual Report, we want to describe to you the path that our company will take into the future and, of course, look back on the fiscal year that recently ended. The year 2021 was a very successful one for HENSOLDT. We achieved all our targets and even exceeded some of them while continuing to develop strategically.

During the last fiscal year, HENSOLDT reached a further crucial milestone on its journey to being a solution provider and system integrator, with a contract from our German key client for the PEGASUS airborne reconnaissance system

at a value of roughly €1.3 billion. PEGASUS is going to form the core of a sovereign reconnaissance network and the basis for the German military's future capability development in the fields of self-protection and electronic warfare. In terms of our high-performance sensor technology, the Eurofighter will remain one of the most important platforms. In 2021, we successfully acquired more than €350 million worth of contracts for radars and self-protection systems for Germany's Quadriga program. Other contracts of high strategic relevance include ones for long-range radars on F124 frigates and for Germany's air defence system, with these radars having initial ballistic-missile defence capabilities. In our Optronics segment, we sold further reconnaissance sensors to the Netherlands and are equipping Germany's and Norway's jointly procured submarines with our groundbreaking, fully digital optronic mast systems.

With these developments and many other positive ones, we continued to pursue the path charted by our global growth strategy with determination during 2021, even in a market environment made extremely challenging by the COVID-19 pandemic. We further strengthened our brand that has become globally recognized. The company and its portfolio kept developing in all markets and we created a stable, future-proof shareholder structure with our anchor investors.

We are proud of the strategic equity interests held in HENSOLDT by the Federal Republic of Germany and LEONARDO. They emphasize our importance as a key technology partner and strategic player for Germany and as a core partner for the consolidation that is needed within the European defence industry. As a leading provider of electronic sensor solutions, we develop critical elements for next-generation security and defence applications. We are looking forward to furthering the expansion of our enduring and very trusting partnership with the Federal Republic of Germany, our most important client for the coming years. The same applies to LEONARDO, a partner with which we closely cooperate in a variety of pan-European programs.

The year 2021 became a shared success for all employees of HENSOLDT, wherever they were in the world. I would like to express to them my deepest thanks for their commitment during the persistently unfavorable conditions of the pandemic. Together, we again demonstrated last year the strength and extraordinary

agility that HENSOLDT possesses. Our business model remains resilient and we have done an excellent job overcoming the fallout of the global supply-chain crisis. By applying the extensive measures coordinated by our dedicated COVID-19 task force, we were able to ensure the health of our staff, clients, and partners, while simultaneously maintaining full business operations. We are particularly proud of our in-house COVID-19 vaccination campaign, through which we administered over 2,500 vaccine doses in Germany alone. This further increased the protection of our workforce.

HENSOLDT very successfully combines outstanding innovation with a robust, crisis-proof business model, as corroborated by the figures for the 2021 fiscal year. Having received orders of a value of €3.2 billion, we now have a record €5.1 billion worth of orders on our books and a book-to-bill ratio of 2.2x. HENSOLDT was able to boost its revenue by 22 percent in 2021, bringing it to almost €1.5 billion, with EBITDA rising by 19 percent to €261 million. Something that is particularly pleasing in this context is the 28 percent rise in the adjusted free cash flow before taxes and interest to €252 million, through which we were able to reduce our debt-to-equity ratio to 1.6x.

Our excellent operational performance is the basis for HENSOLDT's ongoing profitable growth and is the launching pad for the corporate strategy that we continued developing in 2021. We wish to begin the next chapter of HENSOLDT's history, actively influence transformation, and push our business successfully over the coming years.

The global security situation is becoming more and more complex with almost every day that passes, with new threats, increasingly asymmetric conflicts, and numerous simmering conflicts. Alongside them are the growing challenges resulting from civil unrest and migration flows. Global cybersecurity threats are a danger for critical infrastructure, can bring entire supply chains to a standstill, and destabilize our societal coexistence in many different ways.

These are precisely the threats that are pushing military and security forces worldwide to develop new operational concepts. Their efforts are focused on platforms that are better connected and more intelligent, on greater autonomy, and on stronger collaboration – between nations and traditional players in the defense and security sector as well as within heavy industry.

At HENSOLDT, we want to offer the right responses to our clients' challenges, both now and in the future.

This is why we will:

- Continue developing our portfolio of products and solutions to provide the optimal fit for the changing operational challenges and concepts of our clients
- Drive targeted innovation that anticipates future threats
- Expand our international presence and accelerate our cooperative partnerships to support the development of standardized technological platforms
- Expand our business in markets that are adjacent to the defence sector

This is a journey that we started long ago. Our ultramodern technology portfolio has been a cornerstone of our success and a key growth vector for HENSOLDT since the very beginning. We master next-generation technologies and turn them into long-term business.

Last year, for example, we put the new Quadome naval surveillance radar, developed by our colleagues in South Africa, on the market. This cyberattack-resistant, software-defined radar for air and surface surveillance is a trailblazing expansion of our product portfolio in the sensor segment. It offers outstanding performance characteristics at a very attractive price and we are very sure that it will appeal to many clients in the offshore patrol ship class.

We are also gaining new clients with our groundbreaking Twinvis® passive radar. This will pave the way for an entire array of applications of this revolutionary technology, from air defense in conventional and asymmetric conflicts to support for air traffic management.

When it comes to the increasing relocation or expansion of conflicts into cyberspace, we are seeking to make HENSOLDT one of the leading data analytics companies in Germany's security and defence sector. While our current portfolio specializes in the classic electromagnetic spectrum with radar, electronic warfare, and optoelectronic sensor solutions, it will be crucial that we expand this spectrum into cyberspace further and further and continuously enhance our capabilities of transforming enormous volumes of data from digital contexts into usable information.

Consequently, data analytics and cybersecurity are crucial fields of growth for HENSOLDT.

We gained key capabilities for our tech stack through our acquisition of SAIL LABS in 2021, taking another step toward complementing our sensor portfolio with open-source intelligence. By combining our sensors from the electromagnetic spectrum with additional, digital sources of data, we can create reconnaissance systems with an unprecedented level of quality.

Sustainability is a core element of the HENSOLDT corporate culture. As a company guided by the motto of "Detect and Protect," we practice a very special degree of responsibility and strong commitment to sustainability. HENSOLDT stands for protection and security, two crucial requirements for our society's transformation into something more sustainable. On the other hand, we are seeing initiatives under the EU Taxonomy for Sustainable Activities that label businesses in the security and defence industry as neutral or even negative in relation to sustainability. In my opinion, this is an improper approach and may prove harmful to the development of a more sustainable society.

Our company's response to ESG-related issues, that is sustainability in terms of the environment, society, and governance, is of critical importance to us as it ensures that we make a genuine difference to the world in which we operate. ESG has become an important distinguishing feature for our appeal as an employer, particularly for our new generation of talent. It is our direct responsibility to use resources in an environmentally friendly manner and to support the sustainable development of our societies in peace and freedom. A determined focus on sustainability delivers dividends in a commercial sense, too.

It is for these reasons that we launched our Group-wide ESG Strategy 2026 last year, an ambitious plan with which we wish to become the ESG benchmark for the defence industry within five years. We are on the right path and our first ESG rating from Sustainalytics is impressive evidence of this. We have become the number one for sustainability in the aviation and defence industry in the blink of an eye and are the only company in this industry to be listed as "low risk."

HENSOLDT presently employs roughly 6,300 staff globally. We recruited more than 700 new colleagues in just the last year alone. Our motivated and high-performing

workforce is the key to delivering the many major projects acquired in recent years on time, on budget, and at the high quality that is expected of us. It is our firm belief that our workforce needs to be diverse in order to maintain HENSOLDT's successful track record. For me, it is clear that diverse teams are more creative and successful. For this reason, we wish to significantly increase the proportion of women in the global leadership team to 25 percent and the proportion on the Executive Committee to 35 percent. Our Management Board team has already gained a more diverse footing with the appointment of Celia Pelaz as Chief Strategy Officer. We have established numerous initiatives in order to achieve our goals. These initiatives include endeavors such as ELEVATE, our internal diversity and inclusion program with over 250 participants. HENSOLDT is also a member of the UN Global Compact and takes part in the UN's Target Gender Equality program. Furthermore, we are an active member of Initiative CHEFSACHE, a network of 20 corporations in Germany. HENSOLDT promotes openness to diversity and integration.

Our workforce is highly motivated and works passionately on HENSOLDT's future. It was therefore very important to us that we offer our employees an opportunity to acquire stock in our company. We began our ECHO employee stock option plan for this purpose last year, with resounding success. There are now 3,755 HENSOLDTIANS – more than 65 percent of our workforce globally – who hold shares in HENSOLDT AG and, in doing so, are demonstrating their trust in and commitment to the company.

In addition to ensuring security, HENSOLDT solutions are used to protect endangered species, often on the personal initiative of our HENSOLDTIANS. There is an exceptional example of our employees' personal dedication and of the HENSOLDT culture that can be mentioned in this regard: We launched a joint pilot project with the Polar Bears International NGO in Manitoba, Canada in October 2021. The conflict between humans and polar bears is becoming more and more critical in this province as a result of climate change. The lives of humans as well as polar bears are in danger, as multiple fatal incidents have shown in recent years. Using our high-tech

products as a basis, we developed an early-warning system consisting of a radar and thermal-imaging cameras to track down polar bears and keep them away from human communities in a peaceful way. We are currently training the artificial intelligence of our system in Canada before we bring it to Norway for a pilot project. As you can see, this is but one example of HENSOLDT products helping to protect nature.

We are naturally aware of our company's own responsibility in the battle against climate change and we accept this responsibility. Last year, we analyzed our Scope 1 and 2 emissions and are currently calculating our carbon-emission targets based on the 1.5-degree guidance issued by the Science Based Targets initiative. We are also going to take a second step of expanding this to incorporate our Scope 3 emissions. We have committed to being carbon-neutral by 2035 or even earlier, which at HENSOLDT means reducing emissions first and offsetting them last.

As part of our journey toward this goal, we have set up a pilot project that demonstrates the direct connection between ESG and our core business. It involves in-house hydrogen technology that enables us to operate the HENSOLDT site in Kiel independently of the local power grid. This showcase project uses the latest technology for sustainable purposes, and for us it is just the start. ESG is increasingly becoming a driver and pillar of entrepreneurial value creation at HENSOLDT.

On behalf of all the leadership team, I would like to assure all shareholders that we are very aware of our responsibility toward you every day. During the first full year since HENSOLDT's IPO, we achieved all our targets, brought our projects to fruition, and thus reciprocated your trust. I wish to explicitly thank all shareholders who took a leap of faith and have been with us since our IPO. We will continue doing everything possible to justify your faith in us.

With the warmest regards,

Thomas Müller



Thomas Müller
Chief Executive Officer
HENSOLDT AG

Responsibility in Geopolitically Challenging Times

Dr. Christoph Heusgen
in Conversation
with Thomas Müller,
Chief Executive Officer
of HENSOLDT AG



Against the backdrop of a dramatically changing world order which is increasingly dominated by polarization between different centers of power, it is more important than ever that HENSOLDT identifies geopolitical developments at an early stage and makes decisions with foresight.

Key influencing factors include the recent confrontation between Russia and the West, along with the growing strategic rivalry between the United States and China as well as the European Union's strategic position on foreign and security policies in a changed global environment. Russia's attack on Ukraine as well as significant national elections and new governments in Italy, Germany, and France have resulted in fresh momentum for a European security architecture, with strong implications for industrial policy. The same applies to NATO, where there is now a considerably stronger focus on its role and importance for the alliance's partners.

The strategic rivalry between competing political systems and global power blocs has many consequences, for both security policy and industrial policy, and they go far beyond the current conflict with Russia. The key elements include:

- The formation of new alliances beyond established structures and pacts such as NATO, for instance AUKUS between Australia, the United Kingdom, and the United States in the South Pacific
- Rising danger from international terrorism due to increasing instability in light of the gradual withdrawal of the United States from former key regions such as Afghanistan and the Middle East and North Africa; this also includes the threat associated with the prospect of Iran holding nuclear weapons in the years ahead
- Tightened sanction regimes that have the potential to impact both entire industries and individual companies and people
- Military operations conducted by mercenary units that do not come under the direct responsibility of individual governments
- Increasing competition for resources as well as stability risks in supply chains and at production sites outside Europe
- New regional conflict lines and migration movements caused by climate change, such as conflicts over resources like water, food, and energy
- Asymmetrical warfare with information technology and cyberattacks
- Competition between different standards and for an advantage in key technologies such as artificial intelligence, communications technology, satellite technology, and military technology

HENSOLDT is keenly aware of its global responsibility in this increasingly complex geopolitical situation. As a major player in the European security and defence industry, the company seeks to contribute to reducing stability risks and uncertainties by means of innovations in critical technological fields and to laying the technological foundation for the European ambition of stronger strategic autonomy.

With this in mind, HENSOLDT engages in continuous dialog with international experts from a wide variety of fields. Dr. Christoph Heusgen is one of the German-speaking countries' most renowned and experienced experts on foreign and security policy. Thomas Müller, Chief Executive Officer of HENSOLDT AG, met him for a conversation in the aftermath of Germany's federal election.

“Who Else Is Going to Do It?”



Dr. Heusgen, where do you anticipate the major conflicts in the years ahead?

Dr. Heusgen: We are witnessing Russia’s invasion of Ukraine as well as China’s threats toward Taiwan. There are many other conflicts across the world and the instruments used for this warfare are changing. Armed drones may prove to be crucial, but cyber warfare is also becoming increasingly significant.

What do you expect from the new German federal government in respect of its foreign and defence policy?

Dr. Heusgen: I expect an active policy. Russia’s attack has prompted a new era in Germany’s foreign and security policies and made one thing clear: Given the withdrawal of the United States and the aggressive stance of China and Russia, Germany has to play a more active role. This is especially true when it comes to developments in our neighboring countries, including Eastern Europe, the Western Balkan countries, the Middle East, and North Africa. As the world’s fourth-largest economy, we have to shoulder more responsibility. Who else is going to do it?

Müller: In my view, “responsibility” is the absolute key term in this regard. Germany can only take on this responsibility, however, if German foreign policy is coordinated more effectively across the board than was previously the case. The commitment of the new German government to significantly increase the budgets for diplomacy, development, and defence represents an important step toward taking more responsibility and achieving the best equipment possible for our soldiers, bringing about the necessary modernization of the military, and meeting the legitimate expectations of our allies. Responsibility also means working toward multilateral and cooperative objectives. Therefore, Germany should make much more effort to achieve collective positions within the European Union, including in dealings with China and in the Indo-Pacific region. We should then consult closely on these positions with the United States and local partners and play a more prominent role in international alliances and institutions.

Dr. Heusgen, you frequently talk about conflicts between nations that adhere to an international rules-based system and nations that do not. How can a weakening of multilateralism be combated?

Dr. Heusgen: Throwing in the towel is not an option. Our history and the history of Europe teach us just how important it is to enforce international law. We cannot allow the principle of “might is right” to gain the upper hand. We also need to demonstrate that our rules work, which is why we need a highly capable government in Germany and a well-functioning European Union.

You advocate a mix of dialog and robustness. What does that mean exactly?

Mr. Müller, as the CEO of a major European industry player in the security and defence sector, what are your experiences of multilateralism reaching its limits increasingly frequently?

How should Europe specifically prepare itself for this new order? Are you in favor of a European army?

How can the European defence and security industry contribute to this effort?

Dr. Heusgen: We should never cut off communication with nations such as China. Global problems such as climate change and the pandemic can only be solved through global cooperation. At the same time, we can’t afford to sacrifice our principles and need to call out breaches of international law, including those involving human rights. Examples include the Russian invasion of Ukraine and the inhuman treatment of Uighur and Tibetan minorities by the Chinese government.

Müller: We were, of course, used to multilateralism being the key tenet of international relations over many decades. But areas of interest have been defined and claimed autonomously for several years now, and not only since Russia’s attack on Ukraine. Many times in the past, the West just stood by passively and watched this happen. At the same time, we are seeing a return to a bipolar world order, characterized by systemic rivalry between the United States and China as well as simultaneous confrontation and conditional cooperation between the two countries. In this context, many nations are realigning themselves and prioritizing their own interests. In my opinion, ad hoc coalitions — most recently the AUKUS format between Australia, the United Kingdom, and the United States, for example — constitute an effective response to this new situation. Germany and the European Union also need to find their place within such coalitions and, through cooperative formats, a new kind of multilateralism.

Dr. Heusgen: It is high time that we implement the decisions made. Twenty years ago, we decided to set up so-called battle groups, but they have proven to be paper tigers. We need a fast-acting European intervention force. It needs to be quickly deployable, for instance to save the lives of European citizens. The evacuation operation in Kabul was only possible thanks to the massive commitment made by the United States. When we talk about “European sovereignty,” we have to be able to act in a correspondingly sovereign manner.

Müller: And that can only work through profound industrial and political cooperation between all EU states. No EU member state is in a position to keep all its capabilities at the ready for a variety of scenarios — and certainly not to safeguard “sovereignty” on its own. In this regard, I am currently relatively optimistic for the first time: With the EU Strategic Compass, the bloc is developing a common vision for the first time; industrial cooperation is being strengthened through the European Defence Industrial Programme (EDIP) and the European Defence Fund (EDF) and, at a political level, there are now 60 PESCO projects that foster military cooperation. Gradually, many things are starting to come together.

Müller: As an industry, we must, on the one hand, develop capabilities to meet the various scenarios and threats and, on the other hand, work even more closely with partner companies. Once again, cooperation is the key to success. We want to, and can, make our contribution to delivering the best possible kit for soldiers and achieving interoperability with our partner forces via Europe-wide industrial cooperation. However, this cannot succeed without political cooperation.

With the digitalization of conflicts touched upon by Dr. Heusgen, we are also seeing changes in the battle to interpret events. What are the implications for the use of technology?

What might a European agenda against cyber warfare look like?

Finally, how should the defence industry contribute to the most important battle of our era — the one against climate change?

Dr. Heusgen: I regard limiting the number of different European weapons systems as eminently important. It would be a highly regrettable waste of resources if each country were to manufacture its own planes, own tanks, and own weapons. Genuine cooperation is needed here. And we have to do more in terms of developing cutting-edge armed drones, defending against the latest generation of rockets, repelling cyberattacks, and harnessing artificial intelligence.

Müller: There can be no doubt that cyberspace and the information realm have opened up unprecedented potential for conflict in terms of both quantity and quality. The battle to interpret events and the conscious manipulation of people can take place in a much more targeted and effective manner, as well as on a global scale, in cyberspace. We have reached a new crescendo for this with Russia's attack on Ukraine, though we have not seen the end of this development whatsoever. Many actors have only just begun developing these sorts of capabilities and are intent on using them to damage others. We Europeans also have to equip ourselves.

Dr. Heusgen: Two things are required: We need to keep pace in a technical sense in order to successfully repel attacks from cyberspace, for example those targeting our infrastructure. We also need to remain vigilant against content attacks on our communication systems. Russia and China are attempting to influence public opinion through false information and manipulation on a massive scale; in fact, they are seeking to undermine our democracies.

Dr. Heusgen: The same applies to the defence sector as to all other industries. We cannot afford to take climate change lightly and we all have to play our part. I am aware of the specific challenges facing the arms industry, but the increasing use of green energy holds the key.

Müller: Here at HENSOLDT, we are fully committed to setting standards in this area and championing industry-wide efforts in order to improve our carbon footprint and develop sustainable energy concepts. We are working at high tempo on hydrogen capabilities, for both military and civilian use. Our site in Kiel already runs fully on electricity from renewable energy sources, with all other locations set to follow suit. It is also clear, however, that we as a society cannot even pursue this quest for ambitious climate and sustainability targets if we do not have security. This is why our industry also has a key role to play in this regard.



Since February 2022, **Dr. Christoph Heusgen** is chairman of the Munich Security Conference. Most recently, he served as the Permanent Representative of Germany to the United Nations in New York from July 2017 to June 2021. Prior to that, Dr. Heusgen was the chief foreign and security policy advisor to Chancellor Angela Merkel from 2005 to 2017. From 1999 to 2005, he headed the Policy Unit of Javier Solana, the European Union's High Representative for Common Foreign and Security Policy.



“We Are Expanding Our Operations in Four Strategic Vectors”

Celia Pelaz
Chief Strategy Officer
HENSOLDT AG

FOUR VECTORS

Developing
Integrated
Solutions

Spearheading
the Technologies
of Tomorrow

Strengthening
Global
Presence

Fostering
Security

How would you describe HENSOLDT's operations to your family and friends?

It's quite simple: We help our customers satisfy a basic human need – security. At the product and technology level, I often compare our services with the five senses and the nervous system that we humans use to perceive and process the world and external impressions and convert them into responses. Ultimately, we supply these five senses and the nervous system for various defence and security platforms.

What is your role as Chief Strategy Officer?

Together with my team, I am responsible for the strategic vision and business development of HENSOLDT. Here, the focus is often on tomorrow and beyond. On the one hand, we need to develop technologies and solutions for threats and scenarios that are constantly evolving – and that will continue to do so over the next 10 or 20 years. On the other hand, we cannot afford to develop in a way that ignores the needs of our customers; in other words, we have to understand the geopolitical dimension. What challenges is a country facing? What capabilities does it need to tackle these challenges? What technologies can fundamentally change our business model? In this complex world, we need to steer the development of our portfolio and our industrial presence in the right direction and prepare the company for the future.

You have now rolled out a strategic update under the title “Episode II.” Why? And why now?

The short answer is that we had reached all milestones in our first chapter much more quickly than anticipated. Given the pace of our development, it is sometimes easy to forget that the HENSOLDT brand didn't even exist five years ago. We have enhanced our operational excellence, invested in our portfolio, substantially expanded our team every year and secured major contracts as a general contractor. You could say that everything is already geared toward growth at HENSOLDT. Nevertheless, we must – and indeed want to – get to grips with the question of how we want HENSOLDT to look in 10 years. Therefore, we have defined in greater detail how we plan to grow in our four strategic vectors and fleshed out how we intend to translate this into specific corporate initiatives – and then put these initiatives into practice.

How would you categorize HENSOLDT using the “start – stop – continue” method?

We should continue 90 percent of all activities completely unchanged. These include our spirit of invention, systematic customer focus, rapid decision-making ability, ambitious goals, and outstanding implementation. These are our success factors. In order to achieve our ambitions, however, we need to think and act in an even more integrated way. We are no longer just a supplier of individual parts, but a general contractor for complete solutions. We need this mindset across the company. To put it another way: “Stop thinking in your box.” In terms of our identity, we should place far more emphasis on the value added that we provide to our customers and society in general. We have previously been too cautious in this regard, but that is going to change.

What are the key pillars of the strategy?

We are expanding our operations in four strategic vectors: We develop integrated solutions, spearhead the technologies of tomorrow, expand our operations globally, and foster security. The first aspect can be summarized under

Digital technologies are becoming increasingly important in the security and defence industry. How do we need to improve in this area in Europe?

the term “Sensor Solutions House.” Security and defence platforms are becoming increasingly intelligent; they need to collect and process huge quantities of data and make decisions based on this data – and this process has to be in near real time and automated, as a human brain would simply not be capable of processing these kinds of data quantities. This is why our customers need a partner who doesn't just provide partial answers, but rather complete answers. We have the ability to connect the individual parts, thereby developing complete solutions. We therefore no longer merely develop and sell the five senses, but rather supply the entire nervous system. Moreover, we want to be a driving force for future markets; we want to serve our customers around the world even more effectively by expanding our international partnerships and our own footprint, as well as by growing within the security sector.

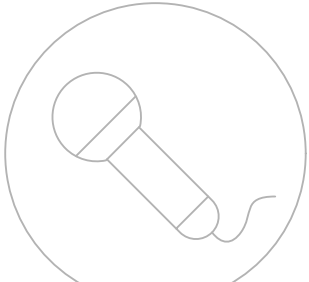
Is AI already used in your products?

From a purely technological standpoint, we are in an excellent position in some areas in Europe. However, we still find ourselves having to deal with reservations that stifle development. In my view, we need to demystify these technologies. Many Europeans immediately think of killer robots or killer drones when they hear “defence plus AI.” But the reality is very different. The use of such technologies is governed by numerous laws before we even start developing the technologies in the first place. As a European, I have a clear moral compass. We should, however, have a debate on the basis of facts. Ultimately, the aim is to implement a sovereign digital defence infrastructure in Europe. This can only be made possible if we develop the corresponding technical capabilities here and keep them in Europe.

What direction is AI development taking?

Of course. AI is the logical next step for intelligent algorithms and already forms an integral part of many of our products. Our self-protection systems for fighter jets and helicopters, for instance, and our air defence systems have long been autonomously guided by intelligent algorithms. The human brain is much too slow to recognize and understand certain threats at an early stage and to respond accordingly. However, our signal detection and video analysis algorithms also need to be able to keep pace with the speed of new threats. AI algorithms are, for example, used in our KALAETRON radar warning system for signal detection, as well as in our counter-UAS systems. Here, the objective is to detect and track other drones and to perform high-precision image analysis. In the HENSOLDT Analytics division, we are working to generate sensible decision-making bases for missions from a large quantity of open-source data. Without AI, none of this would be possible.

We will continue to invest extremely heavily in machine learning and our prediction capabilities. We currently collect and analyse data, thus facilitating faster and more effective decision-making. In the future, we want to be able to make accurate predictions about what happens next.



Besides, we finally also need to make our digital infrastructure in Europe more secure, which is why we will be putting cyber protection at the core of our products. Across industries, we work much too frequently on patches in order to cover technological gaps and vulnerabilities, even though it is much more important to secure the foundation. Here, we are setting standards, for instance with the secure operating system that we have developed at HENSOLDT.

Are there not far too many competitors in the field of AI?

Sure. But it's a good thing, as competition drives development. But what good are intelligent AI algorithms without expertise about how to apply them and how to access relevant data? Here at HENSOLDT, we not only have data from the electromagnetic spectrum of traditional sensors at our fingertips, but we also boast the ability to collect data from cyberspace. What's more, we also possess experience of collecting big data in order to develop applications for dealing with security and defence threats. In other words, we are familiar with the challenges and concepts of operations of our customers and are able to transform technologies into solutions. Not many other companies can do this.

Why is HENSOLDT seeking to expand its footprint in the United Kingdom, United States, and Australia?

First and foremost, I firmly believe that our technologies can add value to potential customers in these countries. The markets are attractive to HENSOLDT on account of their sheer size alone. At the same time, it is virtually impossible to export to these Five Eyes countries, which is why we plan to operate as a local player, enter partnerships, and build up our presence. The first steps have already been taken; we already have branches in all three countries. In the United States, in particular, we are also considering the option of acquisitions.

How important are security operations for HENSOLDT and how important will they continue to be?

Security operations at the interface to the military sector represent one of our four strategic vectors; we see numerous growth opportunities within this vector, as – thanks in large part to digital technologies – there are more and more areas in which defence and security issues overlap or become very similar. One example is the Xpeller counter-UAV system, which can be used to guard military camps, but also airports. Hydrogen solutions and airborne solutions (such as mission management systems and flight data recorders) can be deployed in both sectors. We certainly aim to grow in this area.

Is the security and defence sector on the whole a “late follower” when it comes to sustainability?

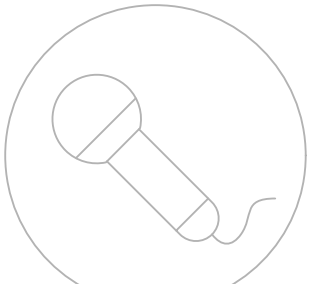
Not at all. Security is the basis for sustainability. It would be absurd to label the industry as non-sustainable by definition. I would therefore advocate that our industry be taken on a case-by-case basis.

At HENSOLDT, for example, we have always taken all three ESG dimensions extremely seriously. We are working to manufacture our products in a more carbon-saving way. We source an ever-increasing share of the energy for

our in-house sites from green electricity. In addition, we make a significant contribution to environmental protection through various nature and wildlife conservation initiatives. In fact, many of these initiatives are instigated by employees. We attach great importance to the “S.” We help our employees harness their full potential. As you can see, we want to be the industry benchmark in this area, too. According to the Sustainalytics rankings, we are already the best in the sector. And we are going to continue working on ourselves.

Where will HENSOLDT be at the end of the decade?

By then, at the latest, we will be an integrated solution supplier for sensor systems and data analytics, with technologies that are deployed around the globe. The three Pegasus aircraft will have been taking to the skies for a few years, the Eurofighter Common Radar System (“ECRS”) Mk1 will be operational, and cyber/AI/data analytics technologies will be an integral component of all security and defence platforms in Europe. We will also be a technological trailblazer of future markets (e.g., unmanned aerial vehicles) and will have contributed to ensuring that hydrogen is the main energy source for missions and relevant civilian applications. From what I know about our company, however, we will achieve all this much more quickly.



Vector 1

Developing Integrated Solutions



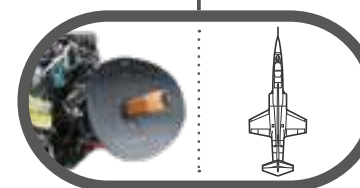
Through its transformation into a solution provider, HENSOLDT creates true value for its existing and future customers. That is because integrated solutions play a vital role in terms of overcoming the increasingly complex challenges of tomorrow, whether on water, on land, in the air, in space, or in cyberspace. As the Sensor Solutions House, HENSOLDT systematically

brings together its technological expertise from the standpoint of the user. As a result, sensor fusion supplies more than just data, but rather superior information across increasingly interconnected platforms. This is how HENSOLDT products and systems help find solutions.

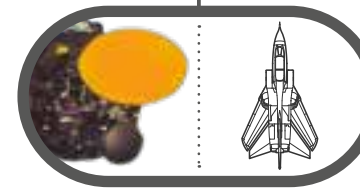
Fit for the Future

As a key pillar of the German, European, and other international air forces, the Eurofighter is one of the leading multipurpose fighter jets. With integrated sensor solutions from HENSOLDT, it is entering the next development stage for the coming decades. The same goes for HENSOLDT, as the company is, for the first time, handling the entire radar system in its largest contract to date.

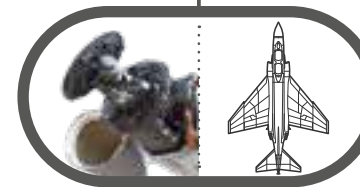
RADAR DEVELOPMENT



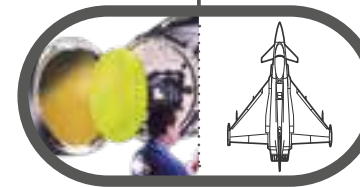
1960 **NASARR** Starfighter



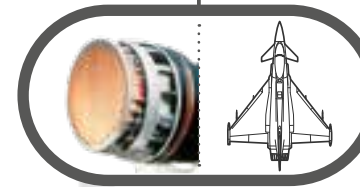
1970 **TNR** Tornado



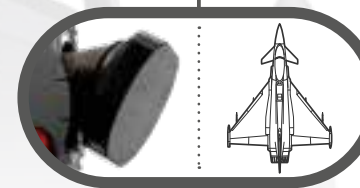
1980 **APG-65** Phantom



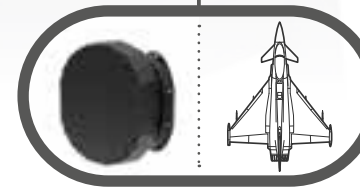
1990 **CAPTOR-M** Eurofighter



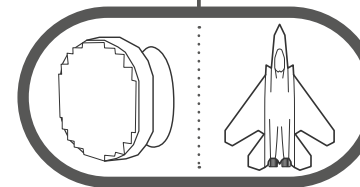
2000 **AMSAR** Eurofighter



2010 **CAPTOR-E/Mk0** Eurofighter



2020 **ECRS Mk1** Eurofighter



2030 **Digital radar** NGF

Long Term Evolution – or LTE for short – is the name of the program that seeks to make the Eurofighter fit for the future until well into the 21st century, with integrated sensor solutions set to play a pivotal role in this regard. The intelligent networking of electronics and sensors will not only boost the performance capability compared to previous systems but will also open up completely new deployment scenarios in the medium term.

HENSOLDT – already the technology partner for numerous sensor, optoelectronic, navigation, and self-protection components of the Eurofighter – will now be taking on a much greater role. In respect of the new electronically scanned Mk1 radar, the company is, for the first time, responsible for the entire system design in tandem with industry partner Indra – and has also assumed the lead role for the project within the German-Spanish industry consortium. In addition, the potential for future self-protection systems is currently being analysed by HENSOLDT in a study on behalf of the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) that will run for several years. In order to face the threats of tomorrow – including those due to new networked anti-aircraft systems, highly agile radars, and from cyber-space – the systems need to interact in the most interconnected way possible, which is currently also being analysed in companion studies.

The new Eurofighter Common Radar System (“ECRS”) Mk1 is underpinned by more than two decades of experience and development work on the part of the Eurofighter partner countries. As the logical successor to the Mk0 generation, this new electronically scanned radar offers numerous advantages in terms of surveillance, operation, and target detection/tracking, especially when compared to the CAPTOR-M previously used in most craft. Its modular design, powerful multichannel receiver, and pioneering architecture reduce repair and maintenance costs and facilitate step-by-step hardware and software upgrades starting from the Mk0 generation.

HENSOLDT will also be handling production of major components of the new radar system, including probably more than 250,000 transmitter/receiver modules (TRMs) for the future Mk1 antennae, as well as the multichannel receiver – the linchpin of the new radar. With an investment volume of some €1.5 billion, this represents the largest contract in the company’s history to date and is going hand in hand with an expansion in workforce and production capacity, especially at the highly specialized plant in Ulm. Here, the team is set to grow to up to 400 employees in the years ahead. Overall, HENSOLDT is planning to supply some 150 Mk1 radars for the Eurofighter fleet of the German air force alone.

The pioneering innovations of HENSOLDT are paving the way for the future of this fleet. Geared toward new requirements and equipped with the necessary data connectivity, the Eurofighter will become a central component of the Future Combat Air System (“FCAS”). Within the context of the Eurofighter Long Term Evolution program, HENSOLDT is able to contribute further technological expertise and thus put itself in an excellent position for FCAS – in line with the company’s own strategic direction and with a focus on integrated system solutions.

Eye of the Typhoon

Alongside the aircraft of the next Eurofighter tranche, “Quadrige,” many other current-generation Eurofighters, still fitted with the CAPTOR-M mechanical radar, will also be receiving the new Mk1 radar from HENSOLDT via hardware and software updates over the next few years. Instead of a mechanically scanned antenna, it boasts an electronically scanned antenna with more than 1,500 radiating elements. The ASEA (active

electronically scanned array) technology underpinning the ECRS Mk1 combines ultra-high-resolution surveillance of the entire airspace with faster automatic detection and tracking of far more targets, as well as enhanced missile guidance. At the same time, it offers increased resistance against attempted interference, thus improving the survival prospects of the Eurofighter, even in intense conflict situations.



Rapid On-Site Assistance

If a Eurofighter is grounded due to a technical fault involving the radar or the self-protection system, action must be taken swiftly. Therefore, highly specialized HENSOLDT experts from the Technological Diagnostic Cell support the German air force by providing diagnostic, maintenance, and repair services at the Eurofighter squadron bases in Neuburg an der Donau and Laage, near Rostock. Thanks to their experience, which encompasses many years of close cooperation with the air force and the diagnostic teams of other Eurofighter nations, they are able to get the jets airborne again in next to no time. The diagnostic equipment RATE (radar automatic test equipment) – developed by HENSOLDT and expandable on a modular basis – is also used by other Eurofighter nations around the world; alongside fault detection, it also facilitates recertification for the aircraft’s next mission.



Built-In Life Insurance

Self-protection systems issue a warning as soon as the jet is picked up by a radar; they also detect hostile threats and can initiate countermeasures. In addition, the Euro Defensive Aids Sub System (“EuroDASS”) PRAETORIAN records and classifies all radar signatures using specific national mission data. Depending on the scenario, the pilot will be made aware of threats such as anti-aircraft systems and rockets as part of the situation report, with countermeasures taken either manually or automatically. These measures range from simple

electronic interference techniques and the launching of decoy flares through to complex 3-D flight manoeuvre sequences and false-target techniques. In order to further optimize these essential protective features, HENSOLDT is working with consortium partners on the new PRAETORIAN eVolution self-protection system. Its technologies, modular system architecture, and far-reaching integration with the electronic Mk1 radar provide pilots in the German and Spanish fleets with effective self-protection at all times – from the equipping through to the decommissioning of the Eurofighter.



Intelligent Helmet

The helmet tracking system (HTS) developed by HENSOLDT South Africa detects in real time the direction in which the Eurofighter pilot is currently looking. As such, it is able to aim or set targets simply through eye contact. All fed-in information automatically follows the line of sight. On request, the helmet can also be fitted with a night vision device. Since the start of series production in 2008, HENSOLDT has supplied more than 700 helmets with night vision capability – just one example of the many items of kit and equipment that the company tailors to the requirements of the Eurofighter.



“Our Missions Are Not Quite Like Those You See in Top Gun”

What does it take to be a Eurofighter pilot?

The pilots of Eurofighters and other fighter jets are not highfliers. We simply do a very unusual job that requires a specific set of skills. The Eurofighter itself is extremely easy to fly. The exciting challenge is actually keeping track of so much information, so many tactics, and so many highly specialized systems during a mission.

And what does the Eurofighter bring to the table?

The Eurofighter is a multipurpose fighter jet that is suitable for a broad range of highly diverse deployment scenarios. As a generation 4.5 fighter jet, it already provides the pilot with excellent computer assistance. We fly the aircraft alone, without a weapon systems officer on board, and are required to handle highly complex missions and scenarios, both air to air and air to ground. To do so, we need excellent sensors and information processing to enable swift and precise implementation.

When does this sensor and radar technology become the difference between success and failure?

Our missions are not quite like those you see in Top Gun. We don't just lock eyes with our enemies at a distance of 50 meters. The process begins when there are some two, three, four hundred kilometres between us and the enemy. That is why the radar acts as our eye. The better its range, resolution, presentation of information, and ease of use, the better I am as a pilot. A mission without radar would be akin to coming under attack in a building at night, with someone suddenly switching off the lights.

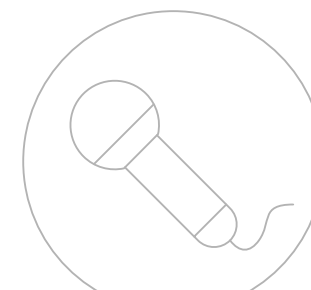
What stages have you seen for yourself in the evolution of radar technology and how have they changed the way in which people and sensors interact?

I still know Phantom pilots who would sit in the cockpit with pen and paper, making crosses to indicate the location of enemies. In the Tornado, I then had a radar on board with a relatively short range – and that was solely designed to identify targets on the ground. In the air, I was reliant on others telling me where my enemies were. In those days, the radar was operated by a weapon systems officer, who would adjust all kinds of cogs in order to manually set the width of the radius, the various frequency bands, the range, and the different radar modes. In the Eurofighter, this is all done automatically.

From a technological standpoint, what would you like to see in the next radar generation? Where is there still room for improvement?

Definitely in terms of user-friendliness. We still spend a considerable amount of time learning how to operate the cockpit and the individual sensors. This could be even more intuitive, which would make it easier for me as a professional to use in stressful situations. The second challenge lies in sensor fusion – that is, the collation of information from the radar, network, infrared sensor, and more to form an integrated report. In both regards, system design under one roof makes sense in terms of developing solutions even more closely in line with the user's perspective.

Nicola Winter was Germany's second-ever female fighter jet pilot and one of only three female Eurofighter pilots in the German air force. She now flies helicopters and works as an aerospace engineer at the German Aerospace Center (DLR e.V.).



HENSOLDT is currently developing an electronically scanned radar for the next generation of the Eurofighter. What advantages does this offer the pilot?

It represents a further significant improvement in terms of target resolution and range. It tells me at an earlier stage that enemies are heading toward me and how many of them there are. While I may only gain about ten extra seconds, these are extremely valuable, allowing me to determine my own tactics and respond correctly. What's more, an electronic radar can detect and track far more targets simultaneously. This makes it easier to see the whole picture, especially when facing enemies who have a numerical advantage.

What is your view on the use of AI in fighter jet missions?

As a fighter jet pilot, I currently have to memorize hundreds of different hostile aircraft, antiaircraft systems, tanks, and ships – and then recognize and evaluate them on my screen. Here, AI can help us with visual detection patterns, especially when it comes to compliance with our rules of engagement. These form a highly complex set of rules that accounts for the majority of our work as pilots. For example, it may be the case that I am only authorized to pick up an enemy aircraft on my radar if it is heading toward me at a speed of more than 420 knots, at an altitude of over 10,000 feet, and at a 30-degree angle. Currently, I have to analyse all this myself in the air and save the information accordingly. Here, AI could potentially make an extremely valuable contribution, allowing me to concentrate on making decisions.

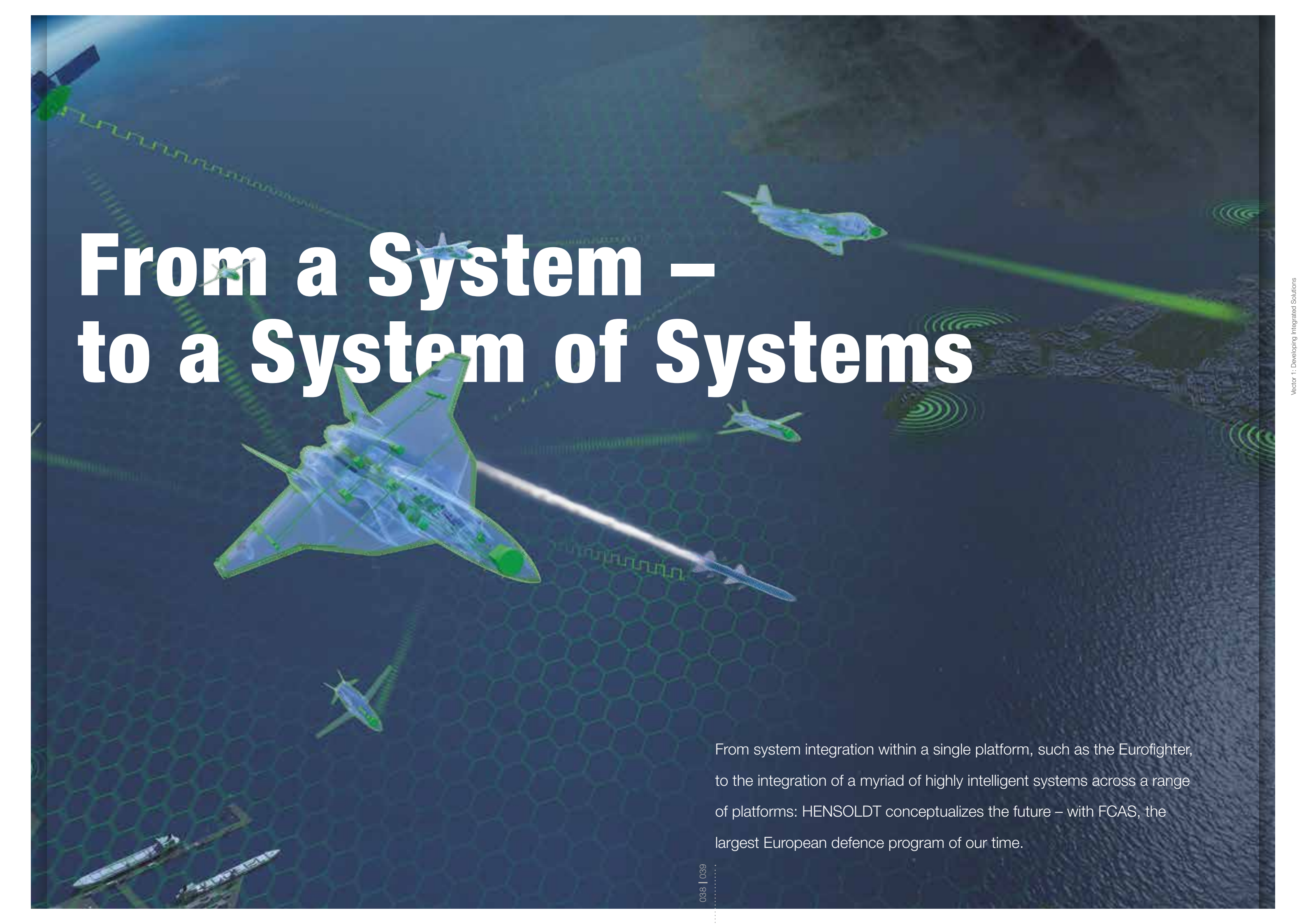
Among other things, HENSOLDT is working on the Future Combat Air System ("FCAS"). This is scheduled to become fully deployable around the year 2040. Why is it taking so long to develop?

We are now making a direct leap to the sixth generation of fighter jets. This will be a "system of systems," that is, an interconnected military system comprising manned and unmanned system components that can be flexibly deployed within the network. This requires a very great number of technological quantum leaps – and that takes time. On top of that, this is an international program involving many different partners from a variety of nations. A mammoth task.

In your opinion, how will fighter jet missions change over the next few years?

The fundamental problems that we are seeking to solve with the military and fighter jets are not going to change. There are probably always going to be people who wish to inflict violence on others or drive them from their homes. The more precisely we can prevent them – while keeping outlay and, most importantly, damage to a minimum – the more successful we will be. That has to be our aim. We should endeavour to be so capable and effective that others don't have any inclination to engage in conflict. Then we will have done our job.





From a System – to a System of Systems

From system integration within a single platform, such as the Eurofighter, to the integration of a myriad of highly intelligent systems across a range of platforms: HENSOLDT conceptualizes the future – with FCAS, the largest European defence program of our time.

A Successful Network

What will the fighter jet of the future look like? What challenges does it need to be able to overcome? Will it be manned or unmanned? Will it operate alone or as part of a wider system? Countries and manufacturers around the world are currently considering questions such as these. Europe's solution goes by the name of FCAS. In fact, the Future Combat Air System already holds many of the answers to the questions above in its name. That's because FCAS will be more than just a fighter jet, but rather a system that sees a broad spectrum of manned and unmanned aircraft acting together as the Next Generation Weapon System ("NGWS"). From the Eurofighter and a next-generation fighter ("NGF") through to autonomous drones, multiple platforms will be integrated and interconnected via a planned air combat cloud that is highly flexible, scalable, and interoperable. It will be protected against all kinds of threats in highly complex mission environments, including threats from cyberspace, thus making it future-proof for the next 50 years.

Based on a German-French initiative, FCAS is currently the largest European defence program with a project volume of more than €300 billion. On the German side, the Future Combat Mission System ("FCMS") consortium holds national responsibility for the FCAS sensor prototype. In the HENSOLDT-led industrial consortium, Diehl Defence, ESG, and Rohde & Schwarz are jointly developing the flexible and networked sensors and effectors for the future NGWS.

In 2021, the consortium successfully completed its preliminary conceptual work, thus marking the end of the first project phase. In 2022, the project will move into phase 1B, which will be focusing on the development of the first sensor prototype.

HENSOLDT already offers globally proven air-assisted radar and signals intelligence systems; fire control sensors; and technologies for Identification Friend or Foe ("IFF"), target detection/combat and threat defence for numerous manned and unmanned aircraft types. Day and night, these technologies supply on-the-ground military leaders with all necessary and relevant information in the airspace and ground terrain of an operation.

The Maker of the System of Systems

HENSOLDT recognized at an early stage that the true power of these technologies lies in the fact that they are interconnected – because, in response to increasingly complex deployment scenarios and threat situations, the mission systems of the air need to be fitted with increasing levels of intelligence. This is why HENSOLDT is powering forward with its own transformation into the Sensor Solutions House, whose integrated system solutions provide a comprehensive picture of all relevant information. In the Eurofighter, the HENSOLDT sensor system already collates mission data within the platform.

With FCAS, HENSOLDT will take this expertise to the next level: The idea is that the data from the sensor systems of all participating platforms will be merged and made available for all systems within the network on a decentralized basis – within the system of systems. That is the responsibility of the national research and technology project Multi-Platform-Sensor Data Fusion and Sensor Resource Management.

The most significant challenge lies in the fact that the quantity of data that needs to be processed, analysed, and presented in real time will continue to increase. After all, every fraction of a second counts in fighter jets traveling at supersonic speeds. HENSOLDT is responsible for the necessary software, which – along with its protection against cyberattacks – will be developed as part of the second national FCAS research and technology project, "Electronic Warfare."

It is the intention of all partners involved that FCAS will be the world's most cutting-edge system of its kind. As a provider of integrated system solutions, HENSOLDT will play a pivotal role in developing not only the individual subsystems, but also the overarching system.

Success in the Clouds

The fighter jet of the future and its companion systems will be a central element of the Future Combat Air System (“FCAS”). However, it owes its true superiority to the interconnected sensor and effector systems in tandem with the planned air combat cloud. HENSOLDT technologies play a vital role in each of these development areas.

Even the name Next Generation Weapon System (“NGWS”) grabs attention in its own right. The idea is a next-generation fighter jet that operates in harmony with autonomous systems, known as “remote carriers.” With previously unprecedented system properties and a wealth of sensors and effectors, some of which can perform multiple tasks simultaneously. Together with existing fighter aircraft such as the Eurofighter, the future Eurodrone, and other unmanned support drones, the NGWS forms the visible core of FCAS. Figuratively in the clouds and therefore not visible at first glance is the second component, which is at least as important – that is, the interaction between networked sensor and effector systems in the air combat cloud. As an ultra-high-speed application based on the principle of edge computing, it gathers and analyses all information in a decentralized manner on the periphery of the system before suitably presenting this information to the various automated decision-making systems and users on the ground and in the air.

It builds on the networked sensor subsystem from HENSOLDT, not only collecting and analysing sensor data, but also performing ultra-high-speed operations and tasks. In the future, data from a variety of sources will be brought together in real time in the air combat cloud. This data will not only originate from the Next Generation Weapon System, the Eurofighter, and drones, but also from other units on the water, on the ground, and in the air – not to mention from satellites and cyberspace.

Artificial intelligence (AI) will play a vital role in this respect by automatically transforming huge quantities of data into tactical information in the space of milliseconds; with the help of augmented reality (AR), this information will be made visible and therefore usable for all, thus facilitating strategic leadership of the mission and in the cockpit. Here, it will assist pilots with decision-making, particularly in demanding and time-critical situations, and relieve them of routine tasks.

Until this stage is reached, there are still some tough challenges to overcome on the road to FCAS. Integration within parallel developments of the partner nations needs to be ensured. The system and all components must be protected against hackers while still remaining highly flexible. After all, numerous technological quantum leaps will be witnessed before the planned launch in 2040. Where possible, these need to be factored in today – and it needs to be possible to integrate them in the future by means of enhanced components. What’s more, deployment scenarios may change in the future.

With its extensive expertise, HENSOLDT will play a key role in this regard, both in tandem with its partners in the German FCMS consortium and with its international network, which has already proven its mettle on many occasions. The first milestones on the road to the most important European defence project of the coming decades have been reached. The future has begun.



Superiority through Information



Recent years have shown that conflict and threat scenarios, especially those on the ground, are increasingly becoming highly complex and asymmetrical. In order to overcome the resulting challenges, Germany and France are currently working on a successor for the current Leopard 2 and Leclerc battle tanks. The Main Ground Combat System (“MGCS”) project seeks to develop a cutting-edge ground combat system with armoured vehicles as the central platforms. The first prototypes for specific MGCS technologies are to be developed for real-life deployment settings since 2020. A prototype is planned for 2028 that will illustrate the entire ground combat system.

AI Assistance

Artificial intelligence and augmented reality assist with the analysis and presentation of the data in the form of a comprehensive situation report and are able to provide concrete recommendations for action.

Protection by Self-Protection

Multiple sensors enabling navigation in restricted visibility and autonomous driving on difficult terrain, as well as highly automated self-protection and interference systems, keep vehicles safe – including from cyberattacks.

More Than “Just” a Tank

The MGCS integrates various manned and unmanned platforms within an overarching system. In addition to a new tank, these platforms include further armoured vehicles and multiple UAVs (Unmanned Aerial Vehicles).

Information Creates Superiority

The data from all platforms and sensors is consolidated within a single system and can be accessed and used by all participants in real time. What is perceived as a threat from inside the tank can be identified by the drone as a civilian; what is not visible, on the other hand, can be classified as a potential hazard. The virtual situation report – which integrates a plethora of data sources and presents them in a clear way – thus delivers information superiority.

Value Added through Manifold Systems

MGCS harnesses all available technologies and all those under development: optronic periscopes and cameras, short- and long-range radars, self-protection sensors, jammers, navigation systems, laser communication, and a myriad of other sensors, both on the ground and in the air.



Patrick Mayer
Sales Manager
Naval & Ground Radars

“Here, I have much more creative freedom which enriches my work. An incredible amount of ideas and inspiration occurs through direct communication with a whole host of colleagues.”

Jan Erbe
Head of Ground Based Systems

“In Aalen, we are exceptionally advanced. And beyond Aalen, we have also grown together across sites by virtue of closer digital cooperation in recent months. Communication with our customers is now also more flexible and situational.”



Thomas Welzenbach
Project Manager MGCS

“The Innovation Hub has become a place of dialogue that is getting us even closer to our customers. Here, we are developing a kind of living exhibition. Our customers always see the very latest progress in our developments – in a true-to-life way. And their feedback is immediately incorporated into the ongoing process. What’s more, we are experiencing the ONE HENSOLDT ethos in the close cooperation between divisions.”

Mathias Laich
Program Leader
Networked Systems

“There has been a start-up spirit in Aalen from day one. We are exploring new ideas together. External visitors sense this too and share their innovative ideas with us. Here, we are taking the notion of networking to the next level.”



Consolidated Expertise

MGCS poses a challenge for all HENSOLDT divisions. At the new Innovation Hub in Aalen, the company is directly consolidating its expertise from the relevant departments, thereby creating scope for the development of integrated solutions. New interfaces are emerging, including with partners and customers.

The strength of MGCS lies in the integration and networking of optoelectronics, radar, self-protection, electronic combat capabilities, and laser communication across all vehicles to form what is – thanks to augmented reality – a clear and user-friendly overall system. To this end, HENSOLDT is developing virtually all the necessary electronic, sensor, and optoelectronic solutions. Automated data analysis using artificial intelligence is also currently being developed by HENSOLDT. Drawing on intelligent algorithms, it will be capable of continuous learning, including in terms of analysing the current deployment profile.

Therefore, a considerable part of the Main Ground Combat System (“MGCS”) revolves around interfaces, with cooperation in the company and beyond evolving with a similar degree of fluidity. Indeed, interfaces with the partners involved are also becoming more numerous and complex. Take the suppliers, for instance, who will deliver technologies such as meteorological sensors. Or the other systems providers, who are responsible for aspects such as the tracks and the weapons themselves. And, of course, future MGCS customers.

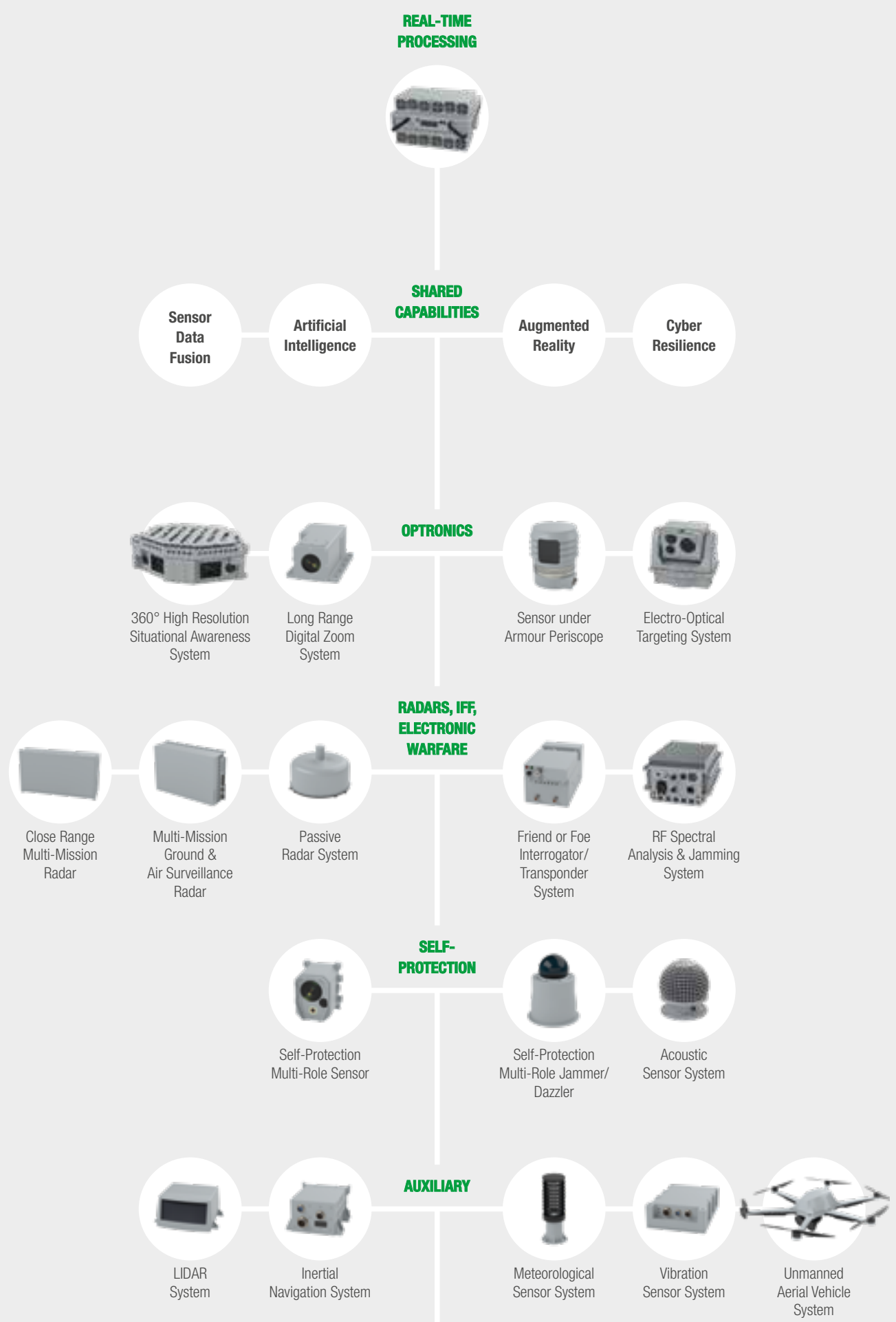
With this in mind, HENSOLDT has consolidated all required expertise within its new Innovation Hub in Aalen, thereby ensuring streamlined cooperation. On the basis of the open-door principle, partner companies and customers are involved in development at an early stage here. Regular feedback paves the way for the network – both on the partner level and internally – that will be so critical to the success of the future MGCS. After all, the comprehensive situation reports that make MGCS so unique can only be produced by networking all technologies and their data.

The Innovation Hub brings to life the development of this overall picture: In the simulated situation room, a wall of 16 video screens shows the situation report. Here, employees and visitors see their precise location in satellite images within the context of a simulated threat scenario. Also visible, for instance, are images showing a tank with the See Through Armour System (“SETAS”). Visitors can operate the SETAS cameras using a controller while the vehicle on which the cameras are fitted drives through Aalen.

Many Technologies – One System

With its extensive integration of numerous technologies within a multi-mission sensor system, MGCS offers a blueprint for the solutions of Sensor Solutions House HENSOLDT.

That is because MGCS bridges the gap between the myriad of electronic and optoelectronic sensors. Between the multi-mission radars, which scan a radius of up to 40 kilometres, and the 360-degree panoramic view in the short-range scope. Between self-protection systems – including those guarding against explosive devices – and friend-or-foe detection. Between signal interference systems and the defences against cyberattacks, interference-resistant laser communication, and much more.





Real-time
Processing



CIPU

The central information processing unit analyses the information from all sensors together. In the next development stage with the HENSOLDT CERETRON, data sharing between the platforms involved will be performed in near real time, partly thanks to artificial intelligence. As such, the CIPU will become the electronic brain.



Multi-Mission
Ground &
Air Surveillance
Radar



SPEXER

Whether pedestrians, drones, birds, helicopters, tanks, or projectiles: The SPEXER 2000 3D MkIII radar identifies and distinguishes between any kind of object, whether large or small, whether fast or slow. It can handle up to 300 targets simultaneously at a range of 40 kilometres. The latest version of the radar even enables this capability while the vehicle is traveling.

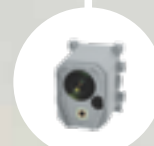


360° High Resolution
Situational Awareness
System



SETAS

Thanks to the See Through Armour System, the crew of an armoured vehicle can see through its armour. People can be detected at distances of up to 300 meters, with the crew automatically alerted by means of intelligent algorithms.



Self-Protection
Multi-Role Sensor



MUSS

The Multifunctional Self-Protection System ("MUSS") for armoured vehicles detects threats and enemy fire at a sufficiently early stage and can automatically initiate the necessary countermeasures. The second generation of MUSS, which HENSOLDT is currently developing, will once again boast significantly enhanced capabilities in terms of aircraft, projectile, and laser detection.

©Bundeswehr/Wilke

HENSOLDT in Space: a Look into Infinity



HENSOLDT technology has been delivering images of and insights into space ever since the first Moon landing. HENSOLDT has now made its latest achievement, with its special optics enabling the James Webb Space Telescope to observe galaxies billions of light-years away.

After about 25 years of planning and development, the James Webb Space Telescope (JWST) was launched into space on an Ariane 5 rocket from the Guiana Space Center at the end of 2021. Roughly one month later, JWST reached its final position approximately 1.5 million kilometers away from Earth, where the successor to the famous Hubble telescope will now orbit the sun in parallel with Earth. JWST, named after the former NASA administrator, is considered the most complex unmanned space project of all time. This is not least because of its 6.5-meter primary mirror, which is pieced together in orbit using the greatest level of precision. Scientists expect that JWST will give them new, groundbreaking findings about the creation of galaxies, stars, and planets in the universe.

The key elements on board are two instruments for looking at galaxies billions of light-years away. HENSOLDT collaborated closely with the Max Planck Institute for Astronomy Heidelberg (MPIA) to make significant contributions for both these instruments, which are called the Mid-Infrared Instrument (MIRI) and Near-Infrared Spectrograph (NIRSpec). The technology from HENSOLDT consists of cryomechanisms, which are moving parts that can be operated at extremely cold temperatures, as well as spectrally splitting optics, which when combined with selective imaging are what enable a look into the depths of space.

When developing them, HENSOLDT was able to draw on decades of space experience dating back to the first Moon landing. As a key European industry supplier of optical, optoelectronic, and electronic space-travel technologies, HENSOLDT has the technology needed for the development and comprehensive testing of these technologies at its sites in Ulm and Oberkochen.

Once a spacecraft has lifted off, it is too late for repairs and maintenance. That is why each element is tested beforehand in thermal vacuum chambers with optical access and vibration- and electromagnetic-testing equipment and in environmental chambers. These elements are then manufactured in class 100 clean rooms. Each individual component as well as the systems as a whole are highly sensitive and must be precisely calibrated and able to withstand extreme stress. After being subjected to vibration at speeds many times more than Earth's gravity, they are then used for decades-long missions in utterly inhospitable conditions and at temperatures close to absolute zero (-273 degrees Celsius).

JWST is, currently, the pinnacle of a series of space missions that HENSOLDT has been and is involved in. Thanks to its optical instruments for weather satellites, radar sensors for modern SAR satellites, components for reconnaissance satellites, and instruments for research missions, the company is now a sizable force in Earth's orbit and far beyond. An experience that space agencies such as NASA in the US, ESA in Europe, CNES in France, and DLR in Germany appreciate.

The next project has already reached the final stretch: the ESA's JUICE orbiter, which will lift off for its journey to Jupiter in 2023. The objective for the "JUperiter ICy moons Explorer" will be to investigate the surface of our solar system's largest planet and its three icy moons, Ganymede, Europa, and Callisto, which will include studying their inhabitability and potential landing sites for future missions. Space technology from HENSOLDT will then again be on board.

HENSOLDT
Business Fields in Space



Planet and Space Observation

Whether surveying the Earth's surface, analysing ecological interdependencies or monitoring the weather. Whether investigating the planets and moons of our solar system or looking at distant galaxies. The special technologies from HENSOLDT are developed for the exceptional challenges of space missions and deliver new insights and crucial findings.



Optical Communication in Space

The future of data transmission is optical. This is the only way it will be possible to manage ever-growing streams of data. Laser-light data-transmission systems from HENSOLDT enable secure communication for any civil or military application and can transmit over distances of more than 5,000 kilometers, from Earth into space and back.



Protection in Space

There are currently 20,000 objects larger than ten centimeters and 700,000 objects larger than one centimetre orbiting the Earth, which makes them a potential danger for active satellites. HENSOLDT technology helps to identify these threats sufficiently far in advance. Meanwhile, electronic and cyberattacks present risks of a completely different kind. The secure IT foundation provided by HENSOLDT combines hardware and software into a single system with comprehensive protection.



Space Consulting

The extensive experience that HENSOLDT has gained from numerous space missions also offers benefits for its new Space Consulting field of business. It features the three core areas Product Security, System Competence, and Management Consulting – and specialists who provide support in all the technical areas associated with complex space technology: systems, optics, electronics, software, thermal and mechanical technologies, and production and design.

A SELECTION
OF HIGHLIGHTS



1969 **APOLLO 11** NASA

A wide-angle lens provides photographs of the Moon's surface during the first Moon landing.



1972 **APOLLO 16+17** NASA

Special lenses enable new photographs of Earth and the lunar landscape.



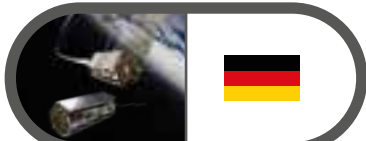
2000 **Shuttle Radar** DLR

Images for a high-resolution, digital topography of Earth are created using a special Synthetic Aperture Radar (SAR).



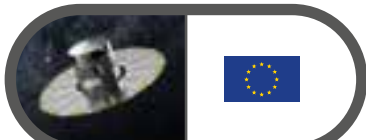
2006 **MetOp** EUMETSAT

Higher image resolution and the measurement of temperature and humidity improve weather forecasts.



2007 **TerraSAR-X/TanDEM-X** DLR/Airbus

Radar sensors provide high-quality data for research, science, and commercial usage.



2013 **Gaia** ESA

An extensive 3-D space catalog is created using HENSOLDT mirrors.



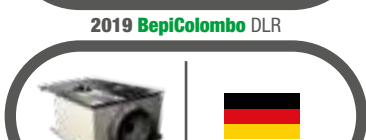
2018/19 **PAZ/NGSAR** Hisdesat/German armed forces

SAR provides high-resolution images of Earth's surface regardless of light and weather.



2019 **BepiColombo** DLR

An elevation model of Mercury is created with a laser altimeter.



2020 **EnMAP** DLR

A hyperspectral satellite studies the Earth's ecosystem.



2021 **James Web Space Telescope**
NASA/ESA/CSA/STSI

The James Webb Space Telescope makes it possible to explore the universe, galaxies, and the creation of stars and planets.

Vector 2

Spearheading the Technologies of Tomorrow

In most cases, transformation of the way in which defence and security scenarios are handled usually has a common denominator: digitalization. With its pioneering spirit and ever-growing portfolio of digital solutions, HENSOLDT is a driving force behind this trend. Consequently, sensors are becoming increasingly smaller, lighter, more secure, and more intelligent.

Taking the form of smart and networked systems, they are capable of producing qualitative analyses and predictions in real time on account of AI. As a result, digital sovereignty emerges within a secure cyber environment. HENSOLDT also opens up new room to manoeuvre through the self-sufficient supply of sustainable energy to critical missions.



No Chance for Hackers

The threat level from cyberspace is rising on an almost daily basis, with this trend further driven by increasing networking and greater use of digital processes due to the pandemic. This represents a unique challenge, particularly in the high-security environments in which HENSOLDT operates. The solutions to this challenge are being developed by HENSOLDT Cyber under the auspices of HENSOLDT Ventures – the agile innovation hub with an extremely demanding mission.

Many things used to be less complex – or at least more manageable. A HENSOLDT radar would once – quite literally – be isolated in the desert. Software updates would be loaded directly from a laptop, using local data. Potential damage was always contained locally. Nowadays, systems are deeply interconnected, both within their own subsystems and with the outside world. Future projects such as the air combat cloud within the Future Combat Air System (“FCAS”) and the interconnected Main Ground Combat System (“MGCS”) are prime examples of how this trend is set to accelerate still further in the years ahead. After all, this interconnectivity provides system users with whole new potential on the basis of information superiority.

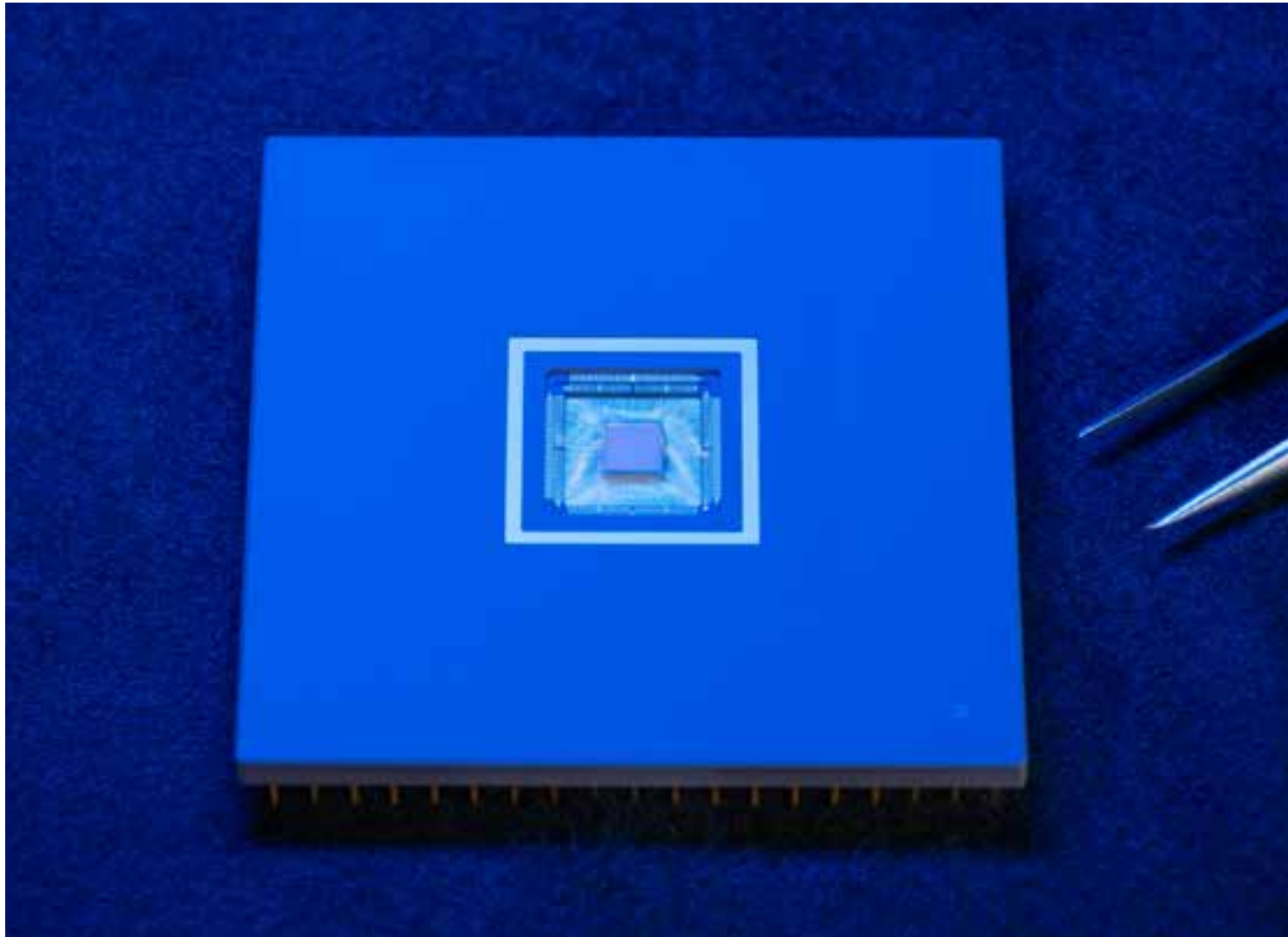
At the same time, however, this potentially leaves an open goal for cyber-attacks, both in a military and civilian context. First, due to the human factor. Entire companies and infrastructures can be incapacitated, particularly during the pandemic and due to the resulting increase in mobile working. But also, as a result of the technology used. In the case of mass-produced hardware and software, you can never be sure of its vulnerabilities – and it is almost impossible to check for them.

HENSOLDT Cyber identified this problem at an early stage and set about working on solutions, specifically for components that are incorporated within systems with particularly high security requirements. Within a very short space of time, a young team developed the processor MiG-V (a processor based on RISC-V called MiG-V “Made in Germany”-V) – the first of its kind in Europe. HENSOLDT Cyber also developed a new high-security operating system: TRENTOS. HENSOLDT Cyber also takes a safety-first approach when it comes to the software running on this operating system and advises third parties to ensure that such applications are developed in line with the same stringent security mechanisms. This gives rise to an overall system that is highly secure across all security-critical software and hardware levels – and that is globally unique at this quality standard. It does not give hackers a chance, as all

components can now be inspected in detail and therefore protected. The key to success is therefore “secure IT” rather than “IT security”. HENSOLDT Cyber is addressing the root cause of the problem instead of subsequently securing vulnerable IT by merely tackling symptoms.

The vision is that hardware and software will be gradually integrated within new HENSOLDT products and that existing products will be brought right up to date, for example by replacing processors. At the same time, all components are continuously updated, new dangers evaluated, and new methods developed to defend against them. To this end, HENSOLDT Cyber participates in joint research projects with the Technical University of Munich, other universities all over Germany, and non-university research institutions such as Fraunhofer. Thanks to the early involvement of young academics and technology experts, HENSOLDT Cyber is already engaging with future users and developers.

Under the auspices of HENSOLDT Ventures, HENSOLDT Cyber is an impressive illustration of the power of the in-house innovation incubator. HENSOLDT Analytics and the joint venture J.A.M.E.S (Jetted Additively Manufactured Electronic Sources) – set up with an Israeli 3-D printing specialist in 2021 – also make HENSOLDT Ventures a crucial strategic pillar within the company, true to its own divisional slogan: “revolutionary, not evolutionary.”



Marian Rachow

Alongside his position as Head of HENSOLDT Ventures, Marian Rachow is also Managing Director of HENSOLDT Cyber GmbH. In a career spanning more than 20 years and several management positions within the Airbus Group, the electronic engineering graduate also completed an executive management program at Harvard Business School. Following the establishment of multiple start-ups, Rachow returned to the HENSOLDT senior management team in 2017 and has since been continuously growing HENSOLDT Ventures and its subsidiaries.

Sascha Kegreiß

Sascha Kegreiß was appointed Chief Technical Officer of HENSOLDT Cyber GmbH in 2019. As an engineering graduate specializing in information technology, he previously worked as a senior software engineer and developer, including at Airbus Defence. In his current role, he focuses solely on cybersecurity.

Three Questions for Marian Rachow

Head of HENSOLDT Ventures and Managing Director of HENSOLDT Cyber

Idea – Start-Up – Innovation

What role does HENSOLDT Ventures play in today's HENSOLDT family?

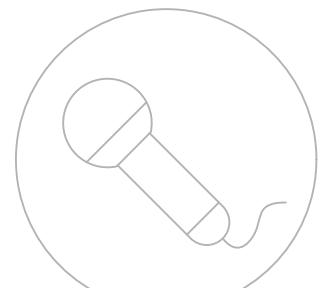
Here at HENSOLDT Ventures, we aim to be one of the major drivers of innovation at the company. Our focus is on disruptive and less incremental developments, particularly in the areas of big data, cybersecurity, artificial intelligence, and robotics. As a company within a company, we can develop independently yet closely in line with the portfolio of the Products and Solutions Group, which adds considerable value within the overall context. To this end, we are establishing agile divisions such as HENSOLDT Cyber and HENSOLDT Analytics, where we develop key technologies in the two areas of “highly secure basic IT” and “artificial intelligence” – and these technologies will be integrated into many, if not all, future products of HENSOLDT. In order to accelerate this process, we are building prototypes in Ventures labs, for example a drone that captures another drone using AI. With prototypes such as these, we impress customers and generate new projects, the aim being to incorporate these key technologies within the HENSOLDT Group.

Do you have completely free rein at HENSOLDT Ventures?

We are team players, which is why we have been able to establish ourselves so quickly and firmly within the company. We think outside the box and always in an entrepreneurial way, in keeping with the ONE HENSOLDT ethos. We focus on what takes HENSOLDT to the next technological level. We therefore pitch all our projects to the Executive Committee and the Management Board in order to secure investment. Here, HENSOLDT acts as an internal investor in a corporate start-up. The future value added for HENSOLDT and, most importantly, for our customers must be at the forefront. We have more freedom on the process side when implementing these projects, which certainly gives us an advantage in terms of speed. In particular, the overarching solutions of HENSOLDT Cyber and HENSOLDT Analytics prove how an idea can soon grow into innovations and even separate companies that benefit the entire HENSOLDT Group.

How do you attract the necessary skilled and talented personnel?

The entire defence and security industry is facing the challenge of attracting young talent. Since we were founded in 2018, we have hired some 100 highly qualified employees despite a highly competitive recruitment market – and received roughly 3,500 applications for these positions. After all, we work on exciting topics that appeal particularly to young people with a lot of potential. We also offer, of course, a modern and collaborative open-plan office and numerous opportunities for flexible mobile working. The average age of our team is about 30, which is considerably lower than the average age at HENSOLDT. Nonetheless, we always ensure that our teams are able to draw on the expertise of experienced employees. The combination of deep tech, considerable freedom (which inspires each and every employee to help shape their division), flexible working, a modern office environment, internationality, personal and professional development, and the security offered by the HENSOLDT parent company seems to be the recipe for success, which is why young talents choose us and therefore the defence industry.



Three Questions for Sascha Kegreiß

CTO of HENSOLDT Cyber

Processor – Software – Security

How is the danger posed by hackers evolving? And how does HENSOLDT protect itself and its products against this danger?

The risk is growing exponentially. On the one hand, increasing connectivity leads to a rise in the number of potential weak points; on the other hand, hackers can often gain access to an organization's entire system, including all its components, if their attack is successful. Here at HENSOLDT Cyber, we therefore diverge from the usual approaches, for example firewalls. We address the problem a stage earlier by developing our own secure processor and our own secure operating system, with critical software for our systems and devices running on this operating system. We call this “secure IT” rather than “IT security”.

Why is this now so important for HENSOLDT?

It is a prerequisite for being able to sell secure and integrated solutions as a systems provider. Previously, one of the greatest weaknesses lay in system components that were used as “black boxes”, such as processors, operating systems, and firmware. This is because these components originate from different sources, are closed systems, and – whether intended or not – often exhibit vulnerabilities that can be attacked. We will therefore gradually replace these elements with our own secure alternatives, the security of which we are familiar with and able to verify. Connecting hardware and software gives rise to a highly secure overall system that raises the bar in terms of its excellent security.

How can you guarantee this security, and in which fields will the solutions be deployed?

By virtue of our processor, our operating system, and secure application software, we can use formal methods to demonstrate that there is no single non-specified critical state in the entire system that would enable an attack. The key point is to design these three levels consistently and completely as a secure IT landscape. This package is, of course, ideally suited to all high-security fields within the defence sector, but also for critical infrastructure or applications in space, where it is often not possible to repair damage simply because of the distances involved. Integration within our own products has only just begun, but the possible areas of application go well beyond.



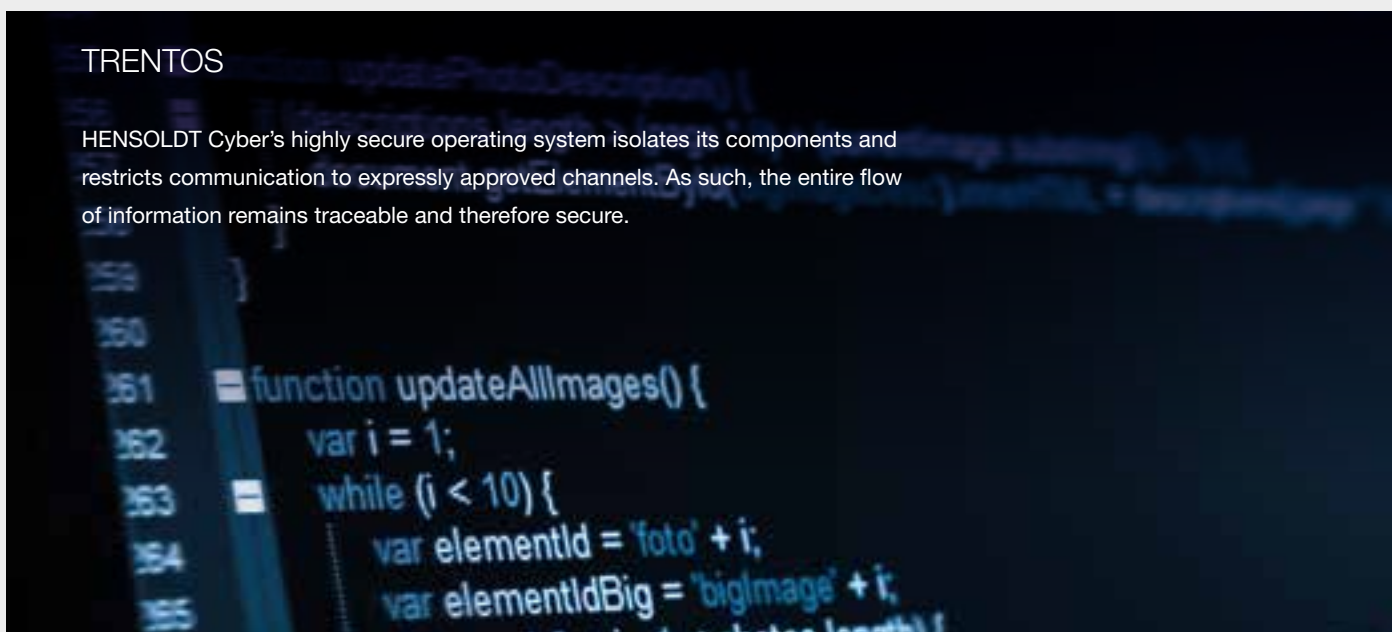
SECURITY CONSULTING SERVICES

With a customised consulting service and secure application software, IT can be designed seamlessly and securely.



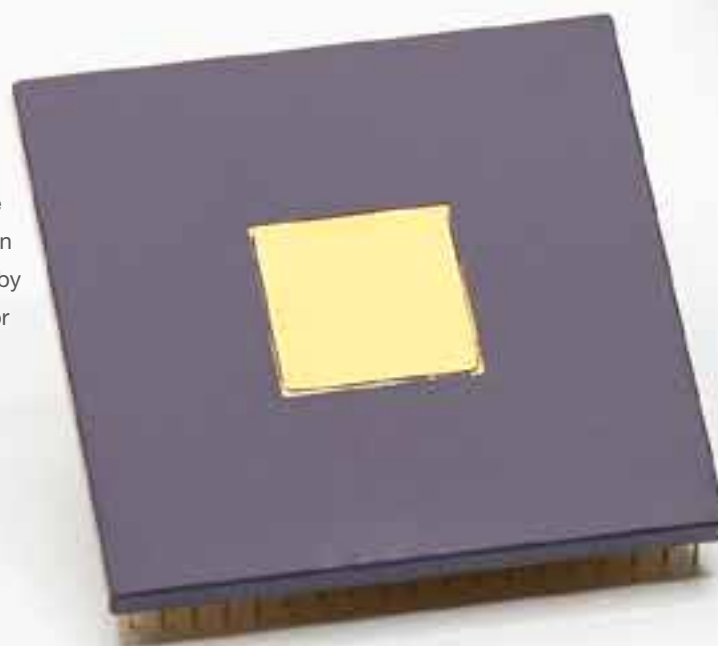
TRENTOS

HENSOLDT Cyber's highly secure operating system isolates its components and restricts communication to expressly approved channels. As such, the entire flow of information remains traceable and therefore secure.



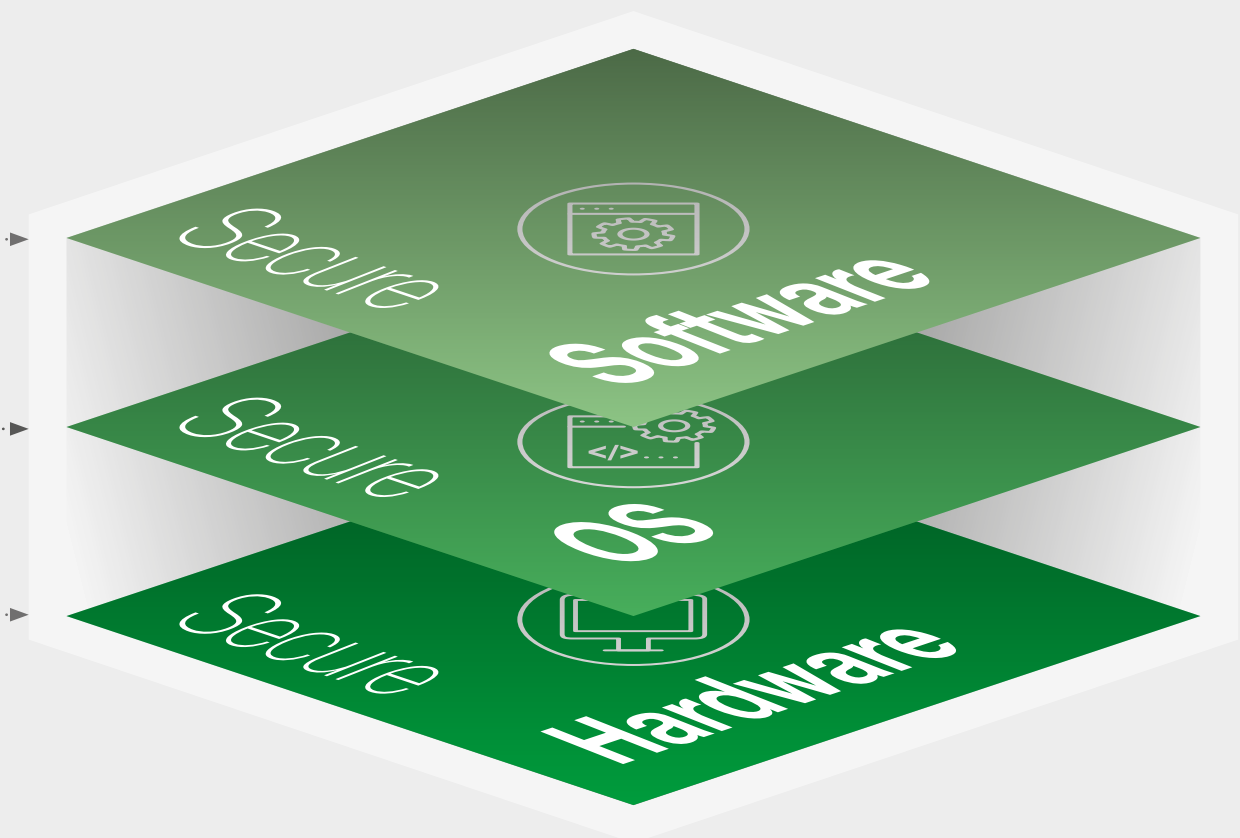
RISC-V

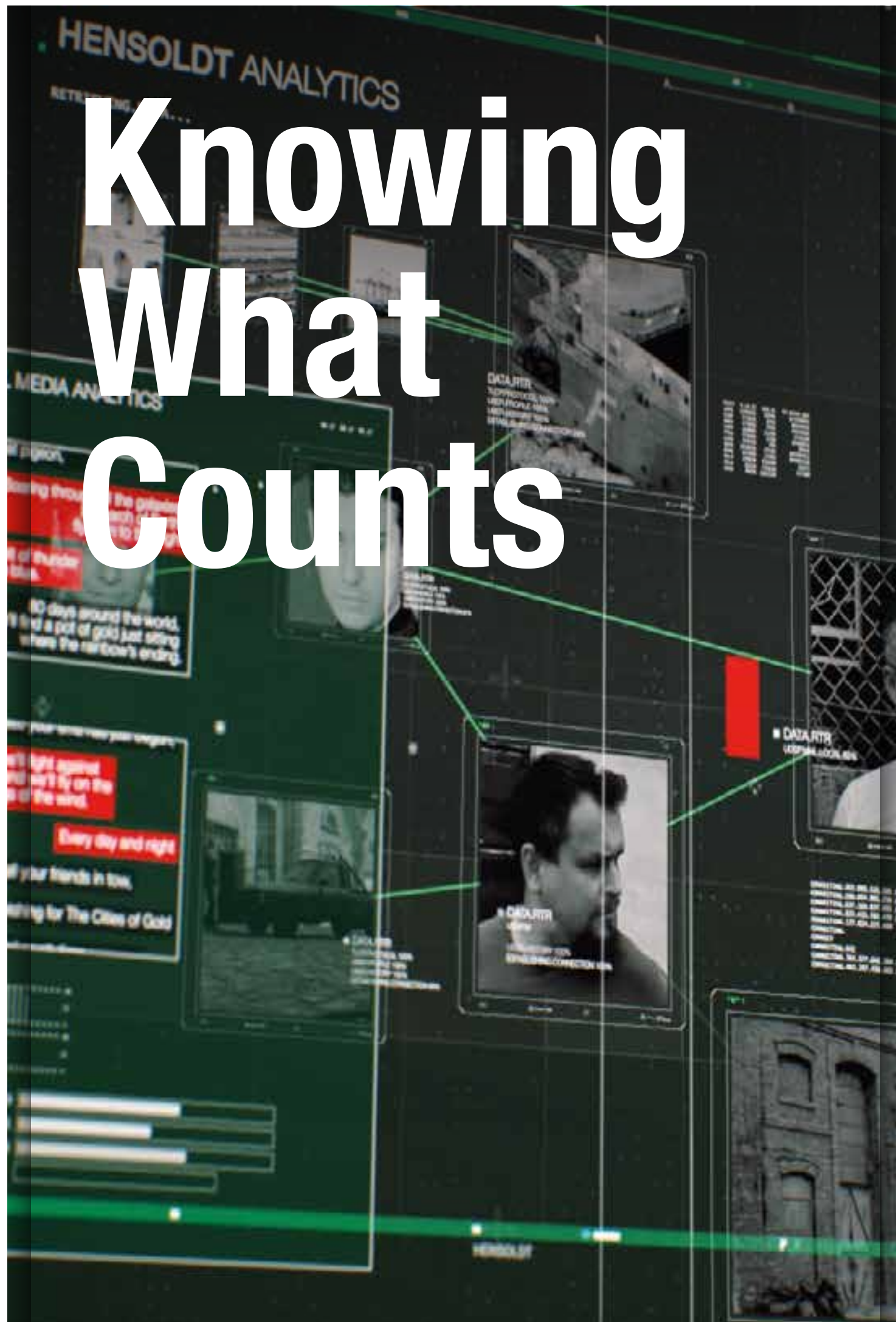
This all-purpose processor, developed by HENSOLDT Cyber and based on an open-source architecture, enables complete control over the development and production chain. Logic encryption prevents infiltration by hardware Trojans, thus making the processor ideal for high-security applications.



Triple Play

Designing the processor, operating system, and software consistently and completely as a secure IT landscape is the hallmark of HENSOLDT Cyber.





Knowing What Counts

A European champion for big data is emerging. Under the auspices of HENSOLDT Ventures, HENSOLDT Analytics is developing solutions that make it possible to strategically harness data from a large variety of available sources. In order to combat security and defence threats, HENSOLDT combines information from traditional sensors with information from publicly available sources, depending on the application concerned. Artificial intelligence uses this data to generate operationally relevant insights and consolidates these insights in the form of an integrated situation report. As such, solutions tailored to the customer's unique deployment scenario give rise to superior knowledge, which makes the difference. Against a backdrop of increasingly hybrid threats, it is becoming increasingly critical to know what counts.

Today's 24/7 information culture and the "always-on" mentality result in an unprecedented flow of information and a wealth of available data. At HENSOLDT Analytics, big data encompasses everything that is available from public sources: online and in traditional media, from news sites through to CNN and Tagesschau, as well as on social media, video, streaming, and photo sharing platforms and in newsletters. Whether copy, images, or videos. Whether written or spoken. And not just in German and English, but in 30 languages including Russian, Arabic, Farsi, Urdu, and Pashto. An infinite treasure trove of data that grows day by day and that is waiting to be harnessed.

But how can all this information be utilized and translated into relevant knowledge? And where does it add specific value?

The answer to the first question is clear: by means of artificial intelligence. This comprises a multitude of technologies, with HENSOLDT Analytics not only relying on existing solutions, but also developing new ones. In 2021, the company acquired SAIL LABS – a market leader in AI-based open-source intelligence (OSINT) solutions, the processing of (big) data, language recognition, and language comprehension. The firm has been carrying out intensive research and development work for more than 20 years. In conjunction with the AI-based image/data processing and machine learning team set up at HENSOLDT Ventures in 2018, the firm's experts are developing new capabilities, enabling them, for instance, to automatically spot fake news or manipulated images. As such, HENSOLDT Analytics is developing sensor technology for the virtual

realm, which complements conventional systems for other areas within the HENSOLDT portfolio.

HENSOLDT already utilizes artificial intelligence in a plethora of sensor applications, for example image analysis and the Xpeller counter-UAV system, where it is used to detect drones at an early stage and distinguish them from other objects such as birds. By virtue of intelligent algorithms, the information received is filtered and processed for improved situational awareness. Radar images and aerial photographs are automatically analysed, with important points identified and unimportant aspects disregarded.

With HENSOLDT Analytics, the idea is that traditional and “virtual” sensors will form a coherent whole, thus paving the way for a completely new and overarching set of insights and knowledge. This is presented via an integrated situation report that summarizes all operationally relevant insights in a clear and user-friendly way.

All the technology required for the multimedia, multisource collection, and analysis of data is handled by HENSOLDT Analytics itself. To this end, the team can draw on the original experience of HENSOLDT as a sensor solutions house in order to develop superior solutions using intelligent algorithms and the extensive domain expertise of the specialist departments, i.e., many years of experience in collecting huge quantities of data and harnessing this data for critical situations based on the highly specialized concepts of operations of different customers.

And this brings us to the second question, which is about application. In the core business of HENSOLDT Analytics – i.e., the military, but also intelligence services and public administrations – linked information from classic and “virtual” sensor systems provides additional knowledge in terms of situational analysis that can make all the difference, especially when facing increasingly hybrid threats. This knowledge may, for example, come in the form of filtered social media photos of the future mission location. Or language fragments that allow important inferences about a potential threat scenario. Or the discovery of deliberately or inadvertently false information that has the potential to manipulate the population and destabilize the security situation. Or an overall tactical overview of the current situation. Available virtually in real time, HENSOLDT Analytics applications enable decision-makers to act quickly on the basis of facts and sound information.

HENSOLDT Analytics solutions are dynamic and constantly evolving. The team is currently working on the expanded integration of satellite images, with language recognition and analysis also enhanced on an ongoing basis. Because language is constantly evolving – and in order to be able to identify and understand cultural linguistic factors and propaganda more effectively using AI.

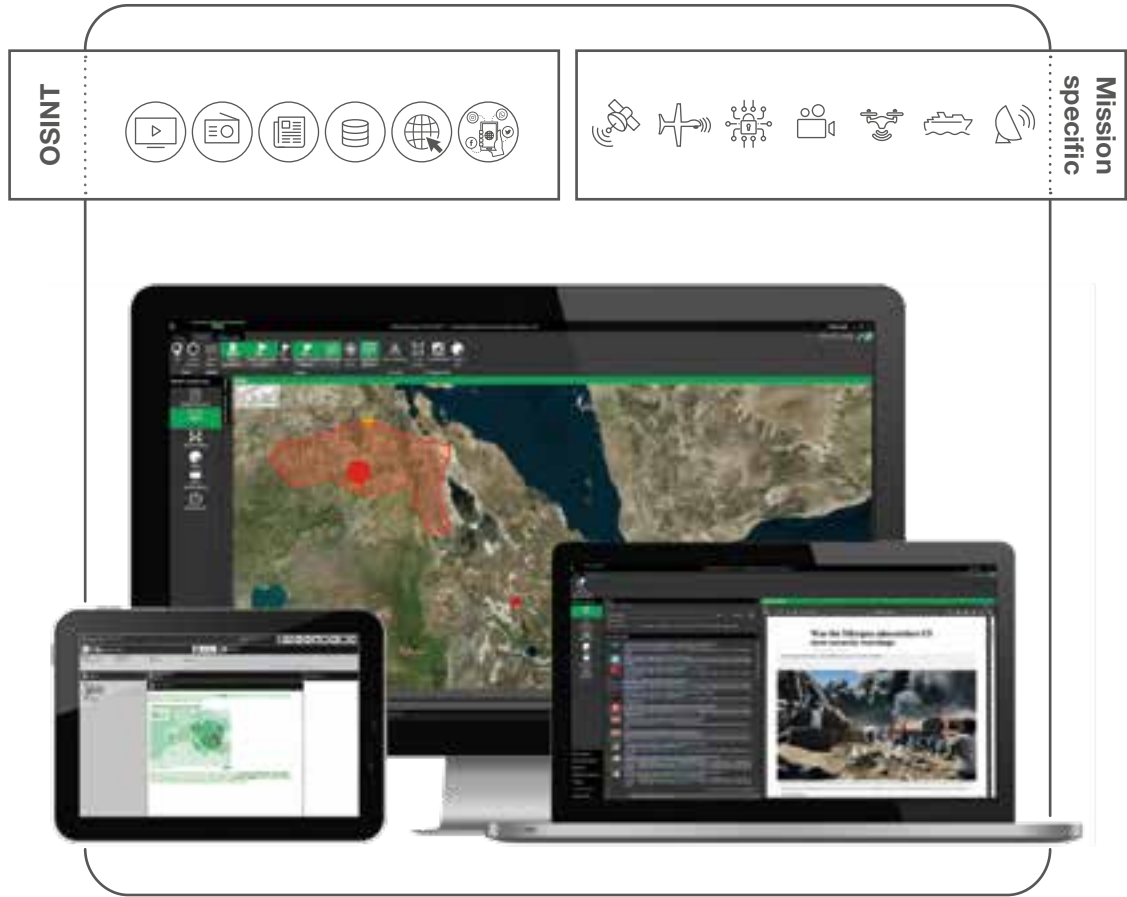
In summary, HENSOLDT thereby generates strategic advantages – in the interests of its customers.



Three Steps to a Knowledge Advantage:

Analysis of traditional sensors – for example aircraft radars and aerial images – provides an overview of the physical environment (e.g., through imagery intelligence “IMINT” and signal intelligence “SIGINT”). At the same time, data from the entire spectrum of publicly accessible sources is recorded and analysed (open source intelligence “OSINT”). In the third and decisive step, intelligent algorithms and machine learning distil the key insights, which are then presented intuitively in an integrated situation report. The result is knowledge that makes all the difference.

HOLISTIC Situational Awareness



HENSOLDT Analytics



HENSOLDT Analytics
on YouTube



An explanation of how HENSOLDT
Analytics harnesses big data for
its solutions, using the Crimean
crisis as an example



More information on the
HENSOLDT Analytics website:



More information on the HENSOLDT
Analytics LinkedIn page:

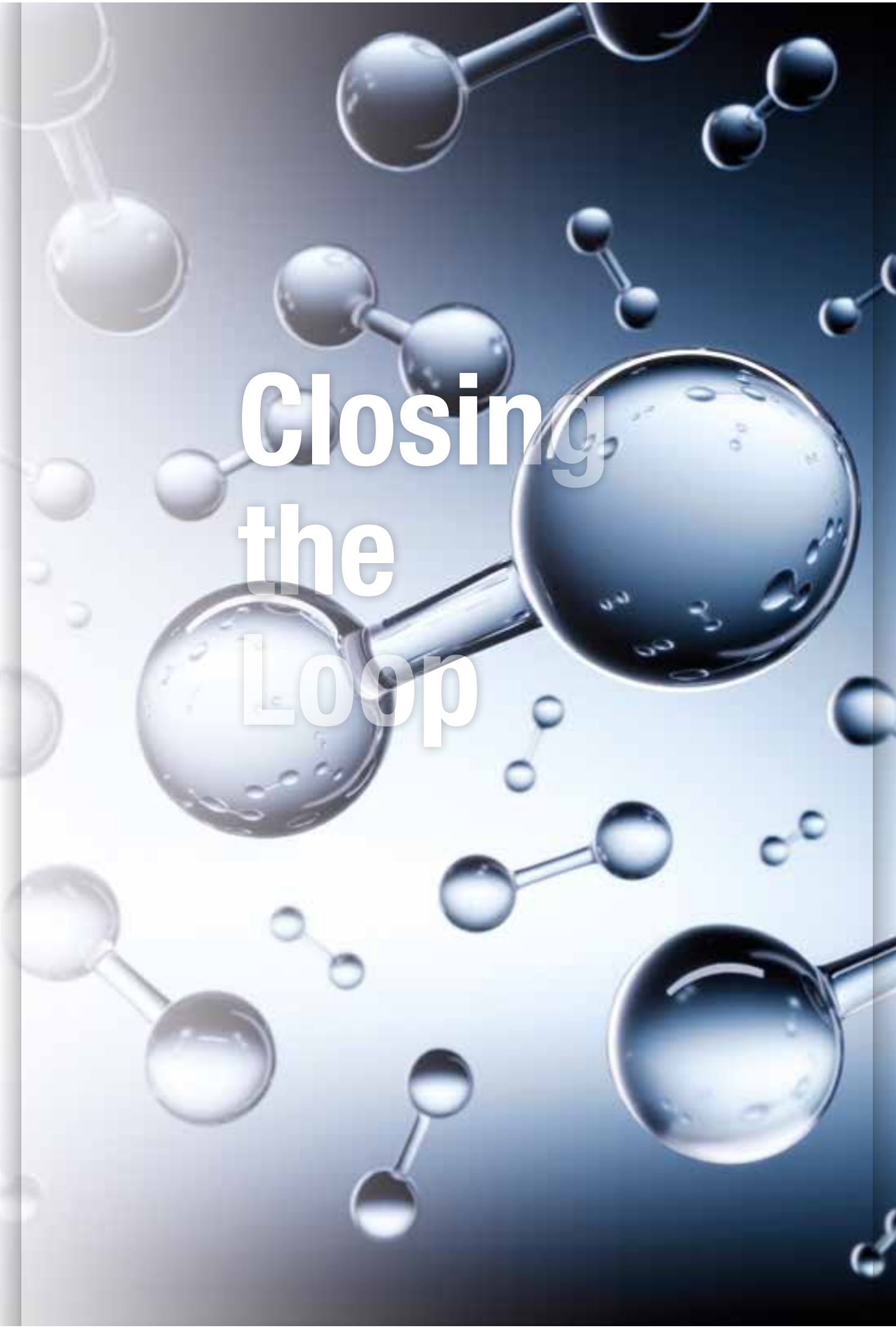
Effective Assistance in the Event of (Natural) Disasters

Going beyond military applications, HENSOLDT Analytics can also offer valuable additional insights when responding to civilian disasters. The 2021 floods in Germany were a strong example of how dramatically natural disasters can threaten the population’s safety and security, even in Central Europe.

The immediate systematic analysis of traditional media reports on the ground provides the emergency services and official agencies with the first key additions to their own information. Comprehensive big data analysis, for example of social media, provides much more specific information. Any photos posted offer additional insights into the current situation and, with disasters such as flooding, can indicate whether critical infrastructure has been impacted. Often, information from social media reveals the true needs of the local population. As part of a HENSOLDT Analytics research project, it was also possible to quickly detect and debunk fake news, such as a report about a fountain that had supposedly been contaminated with E. coli bacteria during the 2013/2014 Danube flooding. The same is true for photographs circulated online of previous floods in the same location, which give a false impression of the current situation and the rescue work required.

The decoding of big data through intelligent algorithms supports disaster relief management and benefits rescue workers and victims on the ground, with the latter group receiving targeted and therefore more effective assistance.





Closing the Loop

The 2021 UN Climate Change Conference in Glasgow once again highlighted the necessity of concrete carbon reduction measures in all areas of life.

Renewable energies are set to play a crucial role in this regard, but wind and solar power are subject to considerable fluctuations. One solution is hydrogen storage. With this technology, green energy can be stored and reliably retrieved as needed. The principle is akin to that of a rechargeable battery. Eco-friendly and highly flexible – even in extreme weather conditions – as well as mobile.

HENSOLDT identified the importance of this technology at an early stage, i.e., its relevance for the ever greater appetite for energy from ground stations and entire mission locations in the defence sector; here, HENSOLDT is thus able to ensure the energy supply and therefore the operational usability of its products, including in mobile applications and under extreme conditions. And safeguard sustainable energy management at individual HENSOLDT sites.

However, the potential of hydrogen technology extends far beyond these applications – all the way to green energy provision to meet civilian needs in remote regions, where electricity is still mostly produced using diesel generators. It could also be used, for example, to power ships in port, by entire (industrial) sites and, in the future, be deployed more frequently in locations where renewable energy is generated or needed in tough conditions.

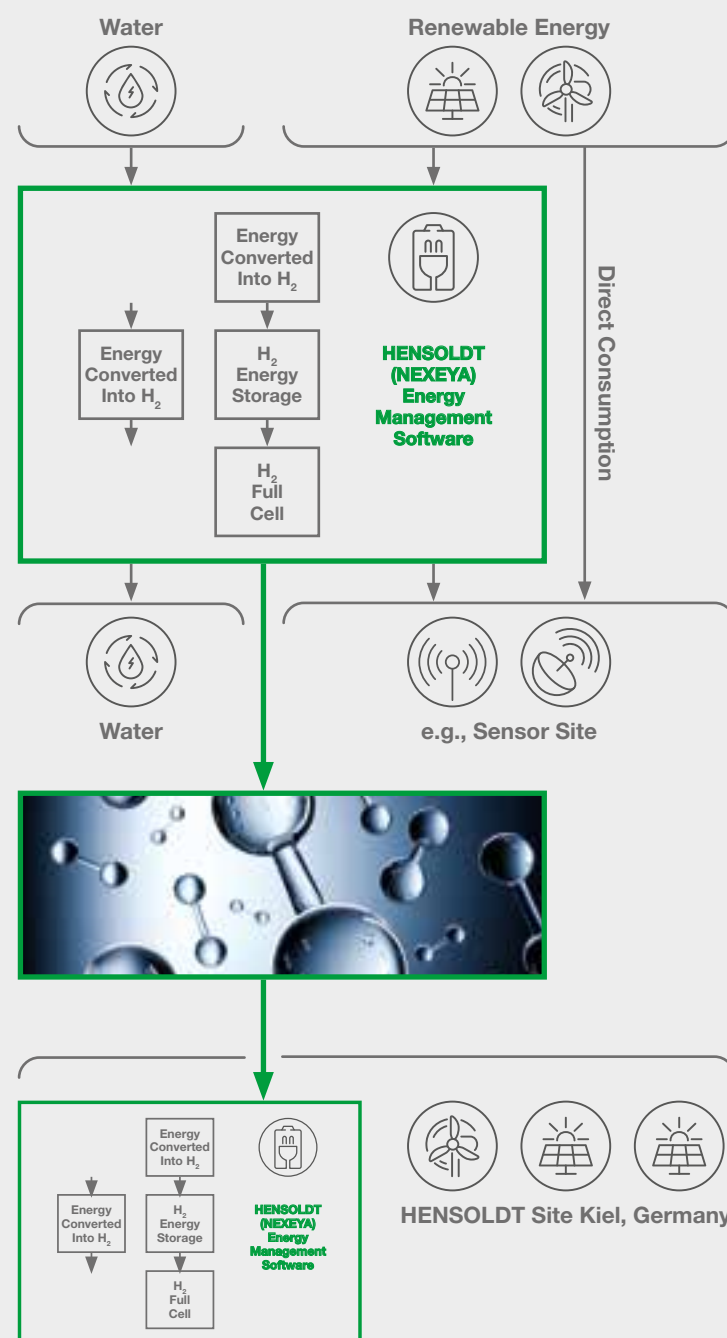
NEXEYA – which became part of HENSOLDT in 2019 – already has ten years of experience in the development and production of hydrogen-based storage units, supply stations, and hydrogen for industrial needs. This expertise was expanded considerably with the acquisition of MAHYTEC – the leading French manufacturer of hydrogen tanks – in 2021. HENSOLDT has been partnering with the company since 2015. MAHYTEC develops and manufactures storage systems for renewable energies on the basis of carbon and glass fibres. The French sites of Angoulême and Dole therefore constitute the HENSOLDT Competence Centre for hydrogen technologies. At the Dole Research and Development Centre, HENSOLDT NEXEYA France cooperates closely with the French National Centre for Scientific Research (“CNRS”). The next generation of hydrogen storage systems is currently under development in Dole and Angoulême; this generation combines sustainability with a greater storage density and is designed for specialized applications.

In order to set a good example and demonstrate the performance capability of hydrogen storage, HENSOLDT also uses the technology at its own sites. At the HENSOLDT site in Kiel, a pilot project is currently being developed for the German market, with the goal to demonstrate to politicians and business the importance of hydrogen for the energy transition.

Through its commitment to green hydrogen, HENSOLDT is reducing its carbon footprint by means of technological advancement as it pursues its goal of carbon neutrality by 2035. The company is also illustrating how sustainability can become a business model in its own right, such as in the form of mobile energy systems that power HENSOLDT products in use. And thereby closing the loop.

Hydrogen power is becoming a HENSOLDT business.

HENSOLDT Energy Storage System + photovoltaic + wind (option) to operate Kiel site mainly autonomously as valuable ESG contribution.



A Flagship Project in Kiel

At its Competence Centre in Kiel, HENSOLDT currently employs some 50 people, primarily in system support for first- and third-party products in the areas of radar, intelligence, and communication, especially for the German military.

Since 2019, the site has been running completely on energy from renewable sources, making it almost fully carbon-neutral. All other German sites are already following this example. In the next stage, green energy will be generated via on-site solar installations in Kiel and fed into the site via a hydrogen storage system. In fall 2022, a hydrogen energy system will therefore be installed on the company premises by HENSOLDT NEXEYA France; this system will have a modular, container-based structure.

It is intended that the energy generated on-site will be used to split water into hydrogen and oxygen. The hydrogen gas is extracted and stored. It can then be converted into electrical energy in a fuel cell when required. Without harming the environment, hydrogen and oxygen come together in the fuel cell to produce electricity, water, and process heat, which can also be utilized. The plan is that the site's entire electricity needs will be met in this way.

In total, this enables an annual saving of some 40 metric tons of CO₂ at this site alone. At the same time, a flagship hydrogen project is being implemented in Kiel, with solutions that will soon "sail over" to other HENSOLDT sites.



Green Power in the Outback

Remote regions make up roughly two-thirds of Australia's land area. Two percent of the Australian population live off-grid in small, remote communities where electricity is generated locally. These isolated communities, some of which are mining operations, account for more than six percent of annual Australian energy consumption. Although these communities have more than enough wind and sun despite the often extreme weather conditions, they mainly rely on diesel generators to meet local electricity needs, which makes Australia an ideal testing ground for hydrogen energy systems.

Therefore, HENSOLDT Australia has launched its Total Renewable Energy Enterprise ("TREE") program. In partnership with the Australian government, as well as universities and research institutions, the focus is on developing systems that harness cutting-edge hydrogen technologies. The TREE solutions from HENSOLDT cover all aspects of local energy generation and storage, as well as the extraction and use of hydrogen. The project may also create local jobs and income streams for communities, such as through the sale of the green electricity, but also by selling the hydrogen directly to consumers for use in fuel cells. What's more, this process gives rise to clean water, which is often exceptionally scarce in these drought-afflicted regions.

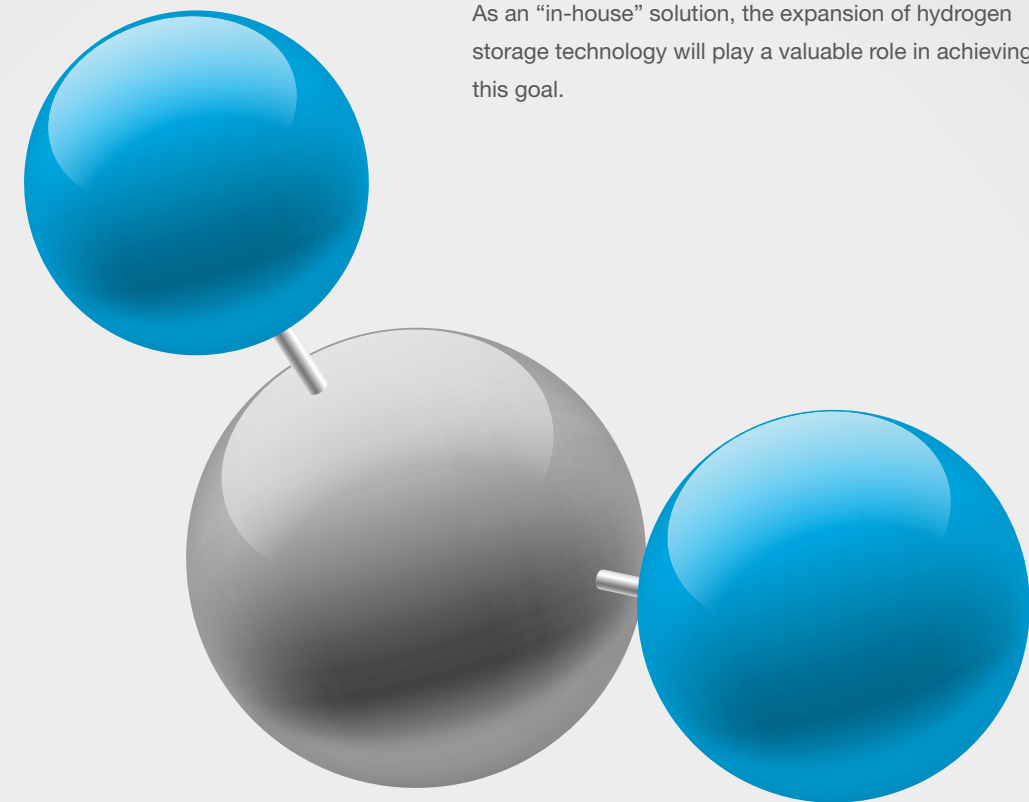
At the same time, the insights gained in the outback provide HENSOLDT with vital knowledge for the ongoing development of its hydrogen energy systems. After all, military field operations also frequently exhibit extreme conditions, just like those seen in civilian contexts. But power and water are always needed. Here, technologies that enable a mobile and independent energy supply have the potential to become a vital extension to the HENSOLDT portfolio of customised solutions.



2035=0 | CO₂

Zero Carbon by 2035

In 2021, HENSOLDT set up an ESG (Environmental, Social, and Governance) committee comprising members of the Management Board and other selected executives. The committee focuses on central sustainability management topics such as carbon neutrality, supply chain optimization, and diversity. One of its stated aims is the HENSOLDT commitment to safeguard the planet and its resources. On account of the continuous reduction of the carbon footprint, the company aims to be completely carbon-neutral by 2035. As an "in-house" solution, the expansion of hydrogen storage technology will play a valuable role in achieving this goal.





Safety

First

Drones and other unmanned aircraft – already widespread in a military context – are still mostly remote-controlled by pilots. However, the true potential of the unmanned aviation of the future stretches all the way to autonomous flying – with mission-critical technologies from HENSOLDT.

The drones of tomorrow will fly themselves, whether for optical military intelligence, to monitor security-relevant environments, or for purely civilian purposes. Here, they have the potential to revolutionize not only the freight and logistics sector, but also urban air mobility (e.g., with air taxis). The next stage required in the development of platforms for unmanned aviation is currently being explored in a host of pilot projects at established technology firms and start-ups alike. While such aircraft still almost always have a pilot on board, this will not be necessary in the future. Instead, the pilot's role will be performed by technology, thus opening up an important future market.

HENSOLDT is already active in various segments of this growing market and is therefore contributing to improved aviation security – from autonomous intelligence systems to counter-UAV equipment. But when it comes to the civilian and military use of unmanned aircraft, almost all nations are faced with the same hurdle: the lack of (international) standards and approval procedures for the so-called “certified” category in which larger drones fly in accordance with generally accepted aviation rules and whose stringent safety standards they are required to meet. Here, the precision and reliability of on-board technologies are more important than ever. HENSOLDT offers such technologies – and also makes an important contribution to official standardization processes for unmanned aircraft via its participation in the European Organisation for Civil Aviation Equipment.

Detect and Avoid

One of the major tasks for secure unmanned aviation is that large drones – whether carrying freight or people – need to replace the pilot's perception with a technical system. In order to avoid potential collisions with other flying objects and when flying close to the ground, these systems actually have to be superior to the human eye. They also have to present information in such a way that it can either be used by a remote pilot or by automated systems – including in the event that the remote pilot loses their connection.

The solution is a “detect and avoid system,” the core component of which is a powerful yet lightweight radar sensor. Currently, HENSOLDT is also working on solutions for detect and avoid systems for a raft of different applications as part of international research and development projects. These comprise not only prototypes for the Eurodrone and unmanned civilian transport aircraft, but also future one-person-cockpit solutions in the airliner segment. And when it comes to the highly promising segment of air taxis and transport drones, the company is partnering with numerous young tech firms who value its experienced support and aviation expertise for their developments.

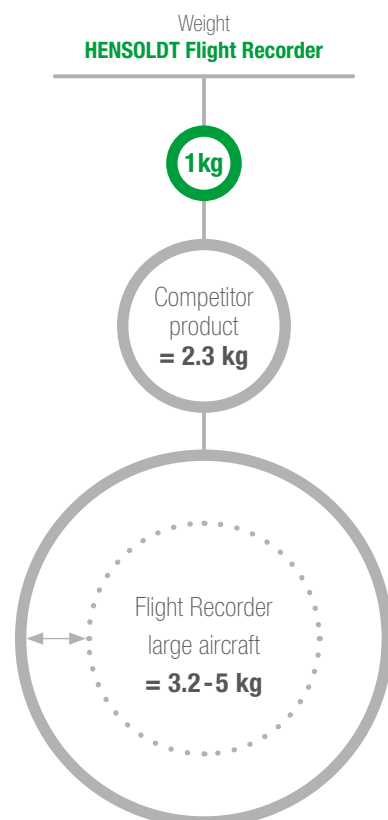
For drones, DAA radars have to detect aircraft at much greater distances than the eyes of a pilot on a manned aircraft. Despite being of minimal size and weight, and offering low energy consumption, HENSOLDT solutions also boast bad-weather recognition, turbulence avoidance, and navigation assistance. As such, detect and avoid solutions with HENSOLDT technology enable the seamless integration of unmanned aircraft in the aviation of the future.

Record and Analyse

In manned aviation, flight data recorders – also known as “black boxes” – are fitted to planes as standard. Due to official regulations, such as those issued by the European Aviation Safety Agency, it recently also became mandatory to install these devices in light airplanes and helicopters used for commercial passenger transportation. HENSOLDT has a more than 35-year tradition of supplying flight data recorders for a variety of military, civil, and surveillance airplane and helicopter types. The latest models in the SferiRec® LCR (lightweight combined voice and flight data recorder) range offer an all-in-one recording solution and integrate numerous sensors, GPS receivers, and a microphone in a device that is extremely stable despite weighing just one kilogram.

This technology doesn’t just help in investigating the cause of an accident and therefore preventing similar potential incidents, but also makes it easier to identify problems in day-to-day flight operations thanks to corresponding data evaluation and analysis. To this end, all voice, video, image, and data recordings can be read on board without the need for an additional electricity supply.

Therefore, the HENSOLDT SferiRec® LCR is ideal when it comes to increasing safety in the unmanned aviation of the future. Here, the comprehensive recording and monitoring of flight data will play a particularly pivotal role, both in terms of certification and subsequent operations. As will the technologies and the compact, weight-minimizing design.



Innovative and Sustainable

The unmanned aviation of the future brings together so many benefits that its development will be unstoppable. In the freight sector, it can ease the burden on ground traffic. In the logistics industry, it has the potential to revolutionize entire production sites. It saves money and offers additional security, in both the military and surveillance fields. It is energy-efficient and therefore sustainable.

With its innovative products for the deployment and control of unmanned aircraft – products that have already proven their mettle in manned aviation – HENSOLDT already offers solutions that will drive further development. At the same time, the company is in an excellent position to embrace one of the largest growth markets in aviation.

Lightweight Combined Voice and Flight Data Recorder (SferiRec® LCR) – a Multifunctional Recorder

- Already in use in manned aircraft, will also be made obligatory for drones
- Crash recorder (records all flight data, noises, voice, images/videos) + data transfer (universal interface with other flight management systems and the ground station) + analysis (mobile evaluation of all recorded flight data)
- The lightest recorder on the market (1 kg), with low electricity consumption (< 10 watts)
- All-in-one solution that integrates multiple sensors, a camera interface, GPS receivers, and microphones; event button function, suitable for all standard interfaces, quick-access recording
- Crash-proof: storage unit can survive fire of 1,110°C for 20 minutes and deep-sea pressure of 60 megapascals for 90 days



Detect and Avoid Radar (“DAA”) – an Electronic Eye

- Able to identify both cooperative and non-cooperative aircraft and generally detect all flying objects and ground obstacles by means of radar and electrooptics or infrared cameras
- Weather recognition and warning, completely weather-resistant
- The field of vision of +/- 110° azimuth and +/- 15° elevation is at least as good as that of a pilot



Vector 3

Strengthening Global Presence

HENSOLDT has its roots in Germany. The company's strong presence in France and the United Kingdom represents a further key pillar of HENSOLDT's European foundation. The company realizes complex key projects in tandem with European partners. These projects pave the way

for a strong Europe and for further growth – both within and beyond European borders. As such, HENSOLDT is evolving into an internationally renowned and trustworthy global partner, also as a result of intelligent partnerships and cooperation with local providers.



Jonathan Dorfmann,
Customer Support Manager
NEXEYA Canada
"What is special about HENSOLDT in Canada is that our product is a niche solution that fills a unique challenge in almost all high-tech industries."



Jeannie Romain,
Export Compliance Manager
HENSOLDT North America
"I like working at HENSOLDT Inc. because the company is great at promoting teamwork through creating collaborative opportunities. HENSOLDT Inc. empowers you to make decisions and its culture celebrates individuality."



Erika Rubyte,
Project Manager
HENSOLDT UK
"For me, HENSOLDT means a professional company that makes a difference across the world."



Marie Caovansanh
Chief Procurement Officer at
HENSOLDT NEXEYA France
"I like working for HENSOLDT in France, because the projects are varied and fascinating, and the entire team is passionate about being part of a defence company with a strong innovation profile."



Fabrice Page
Sales & Marketing Manager at
HENSOLDT NEXEYA France
"What is special about HENSOLDT in France is that we open the door to new marketplaces in terms of civil applications and renewable energies."



Melanie Wessely, Assistant
HENSOLDT Office Berlin
HENSOLDT Germany
"For me, HENSOLDT embodies a combination of tradition and innovation. We proudly look back on a long-standing history of entrepreneurship and excellence, while taking the right steps to ensure these qualities for our future. HENSOLDT provides me with the opportunity to work in a highly professional environment, which also allows me to develop my skills."



Daniel Wagner,
Electronics Technician Trainee
HENSOLDT Germany
"For me, HENSOLDT means a future-proof job with career opportunities and talent development programs as well as the chance to work with unique technology and systems."



Ann-Lynn Dudenhöfer,
Open Source Intelligence Analyst
HENSOLDT Analytics, Vienna
"I like working for HENSOLDT because the firm allows me to continuously train and learn. It is important to me to work independently, and I appreciate that this is actively supported and encouraged."



Levent Dünya,
Business Development
HENSOLDT Turkey
"What is special about HENSOLDT in the Middle East is the end users are keen to collaborate with HENSOLDT for long-term partnership and also business partnering."



Tae Choon Park,
Business Development
HENSOLDT South Korea
"In Korea HENSOLDT stands for Germany's leading defence industry company and is well-known for having a history and tradition of more than 100 years. In particular, it is recognized as a very reliable company by providing solutions that have been proven in the battle fields in the area of electric warfare and optical sensors."

International Business Operations of HENSOLDT



Edgar Montes Lopez,
Director
HENSOLDT Mexico
"In Mexico and Central America, HENSOLDT represents ultramodern solutions that use innovation to identify and protect precious goods."

Luis Guerrén Vargas,
LATAM Regional Marketing Manager
"For me, HENSOLDT means care, empathy, and protection. The company's purpose is to protect people and countries, so I am very happy to help make the world a safer and more peaceful place. I believe that with our professionals and our technology we can positively affect the lives of millions of people."

Elmien Mattheus,
Junior Electronic Engineer
HENSOLDT South Africa
"I like working for HENSOLDT in South Africa because HENSOLDT cares both about quality products and personal development amongst employees."

William Ramatshela,
Senior Software Engineer
HENSOLDT South Africa
"What is special about HENSOLDT in South Africa is that it is strategically positioned to service both South Africa and other sub-Saharan African markets."

Ghassen Hattab,
Business Development
HENSOLDT Middle East
"For me, HENSOLDT means a major player in the defence & security market having a great legacy behind and a big future ahead. Personally, it is a part of my identity."

Supratik Biswas,
Engineer
HENSOLDT India
"My personal 2021 highlight at HENSOLDT were the site visits and the exposures to the end product. I got an idea where actually the work we are doing is getting deployed and how it is helping our customers in fulfilling their requirements."

Annie Lim,
Office Manager
HENSOLDT Singapore
"My personal 2021 highlight at HENSOLDT is despite the COVID situation globally, the team/company is still closely knitted like a family without seeing each other face to face."

Ash Boys,
Chief Technician
HENSOLDT Australia & New Zealand
"My personal 2021 highlight at HENSOLDT is being given the opportunity to move to Hobart, Tasmania and open our new office."

Max Alchin,
Health, Safety, Environmental Manager
HENSOLDT Australia & New Zealand
"HENSOLDT is a company that has exponential growth, and I am excited to be a part of that at the ground level."

Noel Marriott,
Deputy GM Programs
HENSOLDT Australia & New Zealand
"I like working for HENSOLDT in Australia, because it allows and encourages me to explore new challenges whilst making full use of my experience and knowledge built up over 40 years of working on military technology."





Jointly and Cooperatively – for a Strong Europe

For HENSOLDT, the key to a technologically sovereign European Union lies in greater cooperation. This represents the only way to develop critical capabilities and ensure a competitive industrial base in the European Union.

A new era has begun in Brussels: with the upcoming EU Strategic Compass, the 27 EU member states are developing a shared security policy and military vision for the European Union for the first time. What threats will the European Union face in the future? What capabilities will the Union require in order to overcome these threats? What is the best way to develop and fund these capabilities? On the basis of questions such as these, a joint foundation is emerging, the aim being to define the defence and security policy that will be pursued by the European Union over the next decade.

Running alongside these efforts are pan-European programs – such as the successful EDIDP (European Defence Industrial Programme) pilot program and its successor EDF (European Defence Fund) – that are focused more than ever on cooperation. Not only between defence ministries, but also at industrial level. Coupled with multinational projects such as the Future Combat Air System (“FCAS”) and the Main Ground Combat System (“MGCS”), which are already underway, such programs constitute a new kind of European cooperation.

HENSOLDT is a prime example of this European cooperation. The company is already involved in a multitude of European projects, often as the lead partner of up to 30 other companies. One example of a complex pan-European project is the FCAS Consortium, in which HENSOLDT plays a central role. Around 80 HENSOLDT employees are involved in this project alone, with this number set to double in 2024.

But FCAS also clearly illustrates another paradigm shift in the defence sector – one that benefits HENSOLDT in particular: the shift from a platform-centred approach to a system- or even data-centered approach. As a result, the amount of defence electronics within the various platforms will increase considerably in the years ahead. In addition, increasingly data needs to be intelligently recorded, analysed, and evaluated, as the human brain is hardly able to identify and understand certain threats at an early stage, let alone respond accordingly.

HENSOLDT Analytics is a European market leader in both areas – defence electronics and AI-assisted data analysis. Self-learning algorithms are already an integral part of many HENSOLDT products and solutions, from self-defence systems and signals intelligence through to image analysis and radar warning systems. A particular strength of HENSOLDT Analytics in this field lies in the intelligent fusion of traditional and virtual sensor systems with a view to further enhancing decision-making capabilities.

EDIDP: 24 Countries — 223 Companies — 1 Goal

In 2019, the European Union launched the two-year pilot program **EDIDP (European Defence Industrial Development Programme)** with funding of €500 million. This program strengthens and financially supports the competitiveness of the European defence sector, the improved use of research results, and the cooperation between companies and member states in terms of the development of new defence technologies. A few figures already illustrate the stunning success of the program: 223 companies from 24 EU countries have already gotten involved in the 26 subprojects – each of which is unique and innovative in its own right – in order to work together on solutions and key technologies for the future of Europe.

HENSOLDT is involved in a total of eight projects:
The latest projects are:

EDIDP – ODINs EYE

The aim of ODINs EYE is to develop a European ballistic missile warning system in space. The “multinational Development INitiative for a Space-based missile early-warning architecture” – to give the project its full title – is designed to heighten awareness of the rising threat posed by ballistic and hypersonic missiles. Through its involvement in the project, HENSOLDT Optronics is evaluating the technical feasibility of orbiting sensor solutions in space.

EDIDP-ACC-SPS-2020 (CARMENTA)

CARMENTA is all about developing a new European self-protection system for helicopters, transport aircraft, and other platforms. The resulting system, which will be adaptable to mission-specific requirements, is designed to offer optimum protection in a vast array of mission conditions. As the European technology leader in the airborne sensors segment, especially in missile and laser warning systems in the field of directed infrared countermeasures, HENSOLDT defines existing and new threats for transport aircraft and helicopters. The company is also developing new concepts for the next generation of self-protection systems.

EDIDP-CUAS-2020 (JEY-CUAS)

With drones set to become central platforms in the military conflicts of the future, active and passive mastery of them will be pivotal within the context of a pan-European security and defence strategy. In light of the fast-paced developments in this area and the increasing threat, especially due to armed mini drones and those used by intelligence services – a counter-UAV system needs to be developed that fully harnesses all technical and tactical possibilities. It needs to be able to recognize, classify, pursue, and neutralize drones – for the purpose of protecting individual soldiers, but also everything from vehicles and locations through to critical infrastructure. HENSOLDT contributes its counter-UAV expertise to the definition of the concept of operations and is also responsible for cybersecurity.

EDF Strategic Autonomy

On account of the considerable success of the EU EDIDP pilot program, the European Union launched the follow-up EDF (European Defence Fund) program in 2021. In the period until 2027, this program supports cooperative projects in an amount of €7.9 billion; these projects focus on new and groundbreaking technologies as well as current security threats – and seek to close gaps in terms of technologies and capabilities. With its longer time horizon and a larger budget than its predecessor programs, the EDF will fundamentally revolutionize the development of defence technologies and capabilities.

The EDF will center around a broad spectrum of capabilities and basic prerequisites – from ISR (intelligence, surveillance, reconnaissance), AI, and (big) data through to the fostering of potential synergies between aerospace and defence. In the process, dual-use technologies for both civilian and military purposes will grow in importance. Here too, HENSOLDT is in an excellent position by virtue of pioneering technologies in the areas of cyber, AI, data analysis (“OSINT”), and 3D-printed electronics.

International Expansion: Growth Based on Added Value

Alongside its strong presence in its domestic European market, HENSOLDT also aims to continue growing outside the European Union. Here, the focus is on the United Kingdom, the United States, and Australia. All three countries are members of the Five Eyes group, originally formed as an intelligence sharing alliance (which also includes Canada and New Zealand).

Not only are these markets relevant on account of their sheer size, but HENSOLDT can also add genuine value in these countries. To do so, however, it is imperative to operate as a local actor, which is exactly what HENSOLDT is doing: The company is already represented in all three countries with local business entities. On this basis, HENSOLDT is now seeking to expand strategic partnerships, enter into new cooperative agreements, and grow further.

United Kingdom – Tradition Means More Potential

As the second-largest financial contributor to NATO, the United Kingdom regularly exceeds the target of investing two percent of its gross domestic product in defence. Moreover, Brexit has further strengthened the position of British companies in local procurement processes in the defence and security sector.

And this is precisely the advantage held by HENSOLDT UK: Under its former name of Kelvin Hughes, the company built up a formidable reputation in the United Kingdom. Acquired by HENSOLDT in 2017, this renowned British company, which now operates as HENSOLDT UK, specializes in maritime navigation and sensors. “In the United Kingdom, we are fortunate to be able to build on the heritage and strong reputation of Kelvin Hughes, which enables us to offer the entire portfolio of HENSOLDT solutions,” explains Russell Gould, Head of International Business Development at HENSOLDT.

This positioning represents a strong foundation for the corporate development of HENSOLDT: In 2021, HENSOLDT launched its first ground-based surveillance radar – the SPEXER 600 – on the British market and is thus planning to strengthen its position in the area of civilian and military ground surveillance. At the same time, exciting new markets are opening up for the affordable yet powerful AESA X-band radars. HENSOLDT Avionics also offers various software solutions for flight planning and operation. Russell Gould sums up the mission of HENSOLDT UK: “Our aim is to build up a strong industrial presence so that we can compete in and win major invitations to tender, thereby strengthening the HENSOLDT brand and its reputation in the region.”

HENSOLDT UK employs almost 200 people across all four of the Group’s divisions, both at its headquarters in Enfield (north London) and at HENSOLDT Avionics UK in Slinfold, West Sussex.



United States – Trust Based on Closeness

The United States is far and away the world's largest defence market – and therefore offers considerable potential for HENSOLDT. “It is important to have a strong local presence in the country, with a reliable network within the US Department of Defence and access to leading OEMs in the industry,” notes Russell Gould, Head of International Business Development at HENSOLDT.

This is precisely why the headquarters of HENSOLDT USA are located in Vienna, Virginia, just outside Washington, DC. In the United States, HENSOLDT operates under the terms of a special services agreement (“SSA”), which grants the company access to the classified US defence market. This facilitates the use and deployment of European technologies. *“The aim of HENSOLDT in the United States is to become an integral part of the industrial landscape, secure contracts for the HENSOLDT Group, and expand our local presence, both independently and with the support of partners,”* says Russell Gould.

This approach is already bearing fruit: In 2021, HENSOLDT signed a letter of intent with QinetiQ to form a partnership on the development, integration, testing, commissioning, and maintenance of HENSOLDT products in the United States. The two companies jointly unveiled the HENSOLDT SETAS sensor suite (See-Through Armor System) and the new SPEXER 2000 radar for armoured vehicles to the US Army. These solutions are designed to modernize the vehicle fleet. They were not only met with a large media response, but also demonstrate the enormous potential open to HENSOLDT in this area. Major American trade magazines have further raised the profile of HENSOLDT on the US market through their extensive reporting.



Australia – an Upward Trend Down Under

A radar overhaul for the navy, hydrogen energy storage systems, air traffic control, and space surveillance radars – HENSOLDT Australia reached some key milestones in 2021. What's more, the company has also set out ambitious future growth plans:

- 2021 saw HENSOLDT Australia put the MSSR 2000 I surveillance radars into operation for the new ships HMAS Stalwart and HMAS Supply of the Royal Australian Navy and concluded a new maintenance agreement for the MSSR antenna systems on the flagship HMAS Canberra and its sister ship HMAS Adelaide.
- Starting in 2022, HENSOLDT will gradually initiate operations of its new ASR-NG air traffic control radars for the Royal Australian Air Force. The radars provide ATC radar images for all operational military bases of the Royal Australian Air Force, the Royal Australian Navy, and the Australian Army, including three international civilian airports.
- Working hand in hand with the Australian government, universities, and research institutions, HENSOLDT has launched the TREE (Total Renewable Energy Enterprise) project. The aim is to facilitate the use of cutting-edge hydrogen technologies, e.g., local energy generation, storage, and usage for communities in the Australian outback.

The HENSOLDT site in the Tasmanian capital Hobart also serves as the headquarters of the Southern Guardian Space Domain Awareness System. Here, the intention is to develop a sovereign Australian capability for space surveillance.

Jon Wachmann, Managing Director of HENSOLDT Australia and New Zealand, summarizes the strategy down under: *“It is important to have a strong local presence here, since Australia – as a Five Eyes member – boasts a strong and reliably funded defence portfolio. What makes HENSOLDT Australia & New Zealand unique is that we are a leading global supplier with an established local presence.”*



Vector 4

Fostering Security

In light of technical advances, the boundaries between military defence and civil security – previously regarded as separate markets – are becoming increasingly blurred. Wherever shared technological challenges and customer needs are paramount, HENSOLDT bridges the gap with its innovative and variable portfolio of security solutions for a vast array

of requirements. These help identify threats at an early stage and resolve the hybrid conflicts of the future, thereby protecting people and wildlife, events, and critical infrastructure. As it pursues its goal of becoming a European champion, HENSOLDT often already provides a vital lift to security around the world.

Greater Security for People and Wildlife

In its Security Solutions division, HENSOLDT combines a number of different technologies across seven business areas to protect people and wildlife, large-scale events, borders, and critical infrastructure. To this end, HENSOLDT utilizes its proven military technologies and transfers them to related security segments.

HENSOLDT technologies protect and preserve in a multitude of different fields – broken down into the following seven business areas:

Infrastructure Protection



Critical National Infrastructure

Protection of critical (national) infrastructure such as power lines, gas pipelines, refineries, and dams.



Airport Protection

Securing airports against unauthorized access, for example by unmanned aircraft (including their neutralization).



Event Protection

Protection of major events on public holidays, sporting events, and political events at which participants need to be kept safe.



Wildlife Protection

Keeping threatened species safe in national parks and reserves, but also through predator warning systems in human settlements.

Border Protection



Military and Civil Border Protection

Border security to protect against unauthorized entry and smuggling.



Littoral and Coastal Surveillance

Securing coastlines and ports against a whole host of potential threats, such as unlicensed shipping, piracy, and illegal fishing.

Force Protection



Force Protection

Protecting bases, demarcated areas, and military facilities against unauthorized entry.



The Drone Hunter

Unmanned aerial vehicles are becoming increasingly smaller, faster, and more effective – and increasingly a serious threat to security in the air and on the ground. With Xpeller, HENSOLDT is fighting back.

There are more than 400,000¹ drones in Germany alone. Many of these are mini or micro drones that are freely available and can be flown without any training or certification. With the increasing number of unmanned aircraft systems (“UASs”), we are also witnessing a rise in the number of incidents in controlled airspace. In 2020, more than 500 incidents at airports² were reported in European airspace – and some such incidents, like the 2018 interference in the Christmas flight operations at London Gatwick, led to costly closures lasting several hours.

At the same time, technical capabilities of drones are constantly evolving. Drones are becoming smaller, faster, and more manoeuvrable. On a single flight, larger drones can now carry loads of up to 150 kilograms, whether passengers, drugs, or other dangerous substances. New and more intelligent drones are coming onto the market every day, along with modified, homemade, and military drones. Operated via mobile communication networks, they are able to cover huge distances.

And, last but not least, criminals have also discovered the potential of drones. Whether used for political ends or even to smuggle drugs as part of organized crime, drones are set to become a genuine threat. This is illustrated by two incidents that made the headlines in 2021: In September, a drone discharged several liters of flammable liquid over a police building in Minsk, Belarus. In November, the Iraqi prime minister narrowly survived an attack carried out by a bomb-carrying drone at his official residence.

As such, drones represent a security threat to major events, power lines, industrial facilities, and to military/civilian facilities if they get into the wrong hands. Drones in flight paths can shut down entire airports. Conventional geofencing technologies do not provide reliable protection against these kinds of drone-related incidents, partly because such technologies can be bypassed. Therefore, the risks can only be truly minimized with perimeter security that fits the individual situation and site characteristics.

For precisely this purpose, HENSOLDT has developed scalable multisensor solutions that can be deployed in a variety of configurations, depending on the drone type, situation, site conditions, and concept

¹ German Aviation Association (BDL)

² DFS Deutsche Flugsicherung GmbH

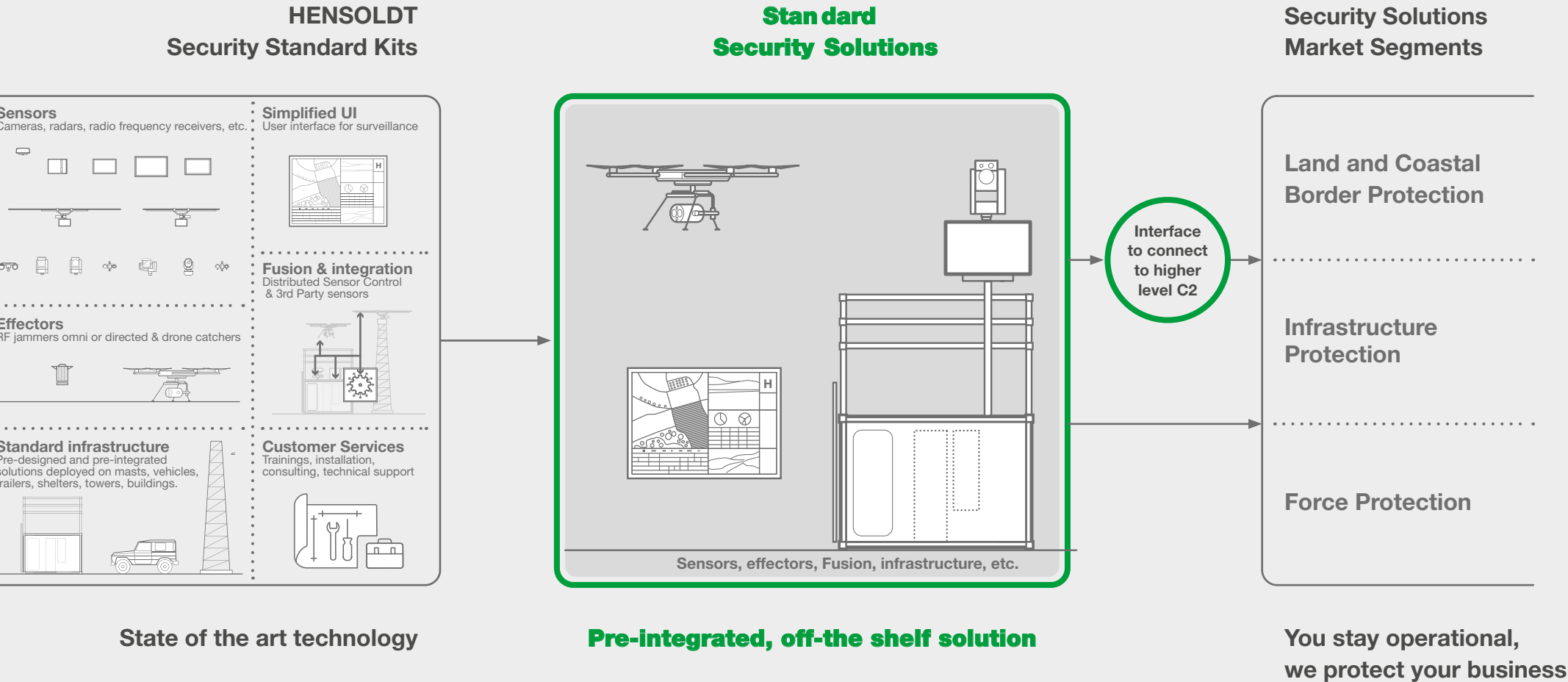
of operation. The Xpeller counter-UAV system uses existing and proven HENSOLDT technologies – and combines radars, cameras, and radio detectors. A powerful software program and AI image analysis algorithms for airspace surveillance gather and process the information required to detect and track drones. What’s more, Xpeller can also initiate and carry out the necessary countermeasures, which may involve jamming the radio signal via which the drone is operated. It may also mean locating the pilot – or even launching its own drones to capture the hostile drones in a net.

As a reflection of the continuous technological advancement of drones, Xpeller is updated on an ongoing basis to meet new requirements. First launched in 2019, this successful system already comprises multiple applications for stationary, mobile, and (since 2021) portable use that can be complemented with additional sensors on a modular basis. Even small “hobby drones” can be recognized and captured at distances of several kilometres, drone pilots located and detained, and larger drones forced to land through interference of their control channel, thereby making airspace considerably more secure.

NATO assigns drones to one of three categories by weight, maximum operating altitude (above ground level [AGL]), and line of sight (LOS), with Xpeller specializing in Class 1 drones. Within this category, drones are split into

- micro drones with a weight of less than 2 kg, up to 200 ft AGL, and 5 km LOS
- mini drones with a weight of 2–20 kg, up to 3,000 ft AGL, and 25 km LOS
- small drones with a weight of more than 20 kg, up to 5,000 ft AGL, and 50 km LOS

Class 2 drones weigh up to 600 kilograms, whereas Class 3 drones weigh more than 600 kilograms. Class 3 drones are mostly used for military purposes.





Ensuring Prehistoric Creatures

Have a Future

In South Africa, the world's largest white rhino farm is kept under surveillance using a specially developed HENSOLDT system – with success, **as not a single rhino has been poached in the last four years.**

Weighing up to 3.5 metric tons, rhinos are the largest land mammals after elephants. Despite their weight, these plant-eating mammals can reach speeds of up to 55 kmh. However, they only do so when absolutely necessary: They are much happier when looking after their young, enjoying mud baths, and reproducing.

The greatest threat facing these gentle giants is their horn, which is primarily made of keratin, the same material that human fingernails are made of. This horn is what makes rhinos one of the most endangered species on the planet. Their horns are ground down into powder in Asia, where they are believed to have various healing properties, including a potency-enhancing effect. However, none of these properties have ever been scientifically proven. Nonetheless, the population has declined from about 500,000 rhinos at the start of the 20th century to roughly 27,000. Due to the destruction of their natural habitat and the ever-increasing threat posed by poaching, three of the world's five rhino species are in critical danger of extinction. And unlike many other wild animals, they do not defend themselves against approaches or attacks by humans.

In South Africa – where some 80 percent of all rhinos live – more than 1,000 rhinos a year were killed between 2013 and 2017 alone. Since 2018, however, South Africa has made considerable progress in terms of protecting one of the world's few remaining prehistoric creatures. A plan was implemented to increase the population at the world's largest rhino farm – the Buffalo Dream Ranch – by 215 rhino young a year. And this has been successfully achieved. What's more, not a single rhino has been poached there in the last four years, meaning that the farm is now home to 2,000 rhinos in an area spanning 8,000 hectares.

This has been made possible by state-of-the-art HENSOLDT technology. The specially developed HENSOLDT Security Solutions System keeps watch over the rhinos themselves, as well as the ranch and the surrounding areas, using day-and-night cameras, radar technology, and sensors. As a result, poachers are detected before they even enter the reserve and get close to the animals. This means that rangers no longer have to wait until they hear a shot or an alarm before going to investigate. Instead, the poachers can be stopped as they attempt to enter protected areas. The rangers are therefore no longer hunting poachers, but rather saving animals.

This represents a blueprint for the ongoing fight against poaching at all nature reserves and national parks, i.e., sensible interaction between rangers and state-of-the-art technologies.

“Thanks to HENSOLDT technologies, we can save animals instead of hunting poachers”



Stefran Broekman has been combating the poaching of wild animals such as rhinos, elephants, and lions in South Africa for more than a decade. He was Head of Security at the Buffalo Dream Ranch (BDR) when the HENSOLDT technologies were installed at the reserve, and is therefore well versed in the use of such technologies to protect wild animals. He has witnessed first-hand how poaching has changed dramatically over the years and shared his experiences with us.

What made you become a ranger?

My love of the wilderness and the animals that live there. I started out at the Sabi Sands Game Reserve in 2010/11, which is where poaching really took off. It is something that I still fight against every single day. Anyone who has ever worked as a ranger simply can't do anything else.

How has poaching changed in recent years?

These days, poaching is a 24/7 undertaking. At first, poachers only used to be active during the day; they then started using the full moon and now operate around the clock. In 2013, I found myself standing next to 60 dead rhinos – not because we hadn't done our job, but because the poachers were so effective. Nowadays, we are dealing with heavily armed poachers. Whereas we used to set off with just a gun and a bottle of water, it is also now a matter of life and death for us, too. We therefore need to add other instruments to our tool kit if we are to combat poaching effectively.

Why can't the problem of poaching be brought under control?

This is due to a mixture of social conditions and political lethargy. We are engaged in court proceedings where the crimes were committed six or seven years ago. Accused poachers are often not convicted, because the cases can simply not be proven. They sometimes fail for trivial reasons, like the lack of a decent DNA sample on the weapon. This makes poaching a crime that comes with low risks, but high rewards. In Mozambique, there is a saying that is applied to poaching: “I'm going to get rich without working, but I might die without being sick.” That says it all.

What has to change in order to combat poaching effectively?

Laws have to be enforced in a robust way. We also have to be more proactive in how we tackle the problem: A ranger has already lost the fight if they only find the poachers after the rhino, elephant, or lion is dead. We have to change our approach, which is exactly where the HENSOLDT technologies come in: We no longer need to wait until we hear a shot being fired or an alarm going off; instead, we can prevent poachers from entering protected areas in the first place. The technology allows us to react more swiftly; in turn, this enables us to save animals instead of hunting poachers who already have their haul.

Why are technologies such as those from HENSOLDT not used more frequently?

First of all, it is not easy to find a technology that works reliably despite dust, moisture, and heat. What's more, the money often isn't there. The majority of the rhino population is on private land – and many of these technologies are not affordable for private individuals, as we are talking about military-grade equipment. HENSOLDT was the first company to say, “Let's do this together.”

Why are you fascinated by rhinos?

Rhinos are intelligent and laid-back animals that have everything it takes to survive. They are robust, straightforward, and can reproduce without any problems. The dilemma is that they have poor eyesight, fixed sleeping times, enjoy mud baths, and – unlike lions and other wild animals – do not defend themselves against attacks. It's easy to get close to them, which is why we need to protect them. As I always say, we need to let the rhinos do what they do.

Do you think that poaching can be stopped?

Definitely. There are enough people who fight against poaching every single day; people who have devoted their lives to the fight against poaching. Public awareness has also considerably reduced the amount of poaching by shining a spotlight on the problem. By the same token, however, we need to be careful: Rhinos are just the beginning. Poachers are already targeting elephants in some national parks. In the Kruger National Park, for instance, 70 elephants were poached once there were no rhinos left. If we don't nip the problem in the bud, the poachers will just move onto other species.



“We are the eyes that never sleep”



As Chief Executive, Werner Muller is responsible for Spectrum Monitoring and Security at HENSOLDT South Africa. Since 2017, he has been focusing more closely on protecting wildlife with HENSOLDT technologies.

How did the company's commitment to wildlife protection emerge?

A few years ago, we were visited by potential customers who were interested in a very different kind of HENSOLDT solution. One of the visitors told us about problems with poaching and said, with audible desperation in his voice, that the day will come when they will have to load the last rhino onto a truck and the species will never be seen again in the wild. This moved us to such an extent that we made a project proposal to the Buffalo Dream Ranch in South Africa the very next morning. And this is how the use of HENSOLDT technologies in the battle against poaching was born.

Did you not encounter any scepticism on the part of the anti-poaching community?

There were reservations, of course. The team at the Buffalo Dream Ranch were fed up with organizations never keeping their promises and never delivering. It is also important to point out that it is far from straightforward to integrate advanced technical solutions in the concept of operations for wildlife protection. We are operating here in the most remote wilderness and have to contend with challenges such as ambiguous borders, a lack of electricity, etc. But this is exactly why HENSOLDT was so predestined to help – we simply have all these fields of expertise in-house. Thanks to our radar experts, we are easily able to distinguish between the detection of people and animals. And our AI experts extract additional information from the images. Other employees focus on the question of how we can recruit even more supporters, put the topic on the public agenda, and raise more funds. In other words, it was a genuine team effort. The anti-poaching community now recognizes us as a key partner in the field of wildlife protection, partly because they know that we are passionate about the cause.

How can HENSOLDT technology help in the fight against poaching?

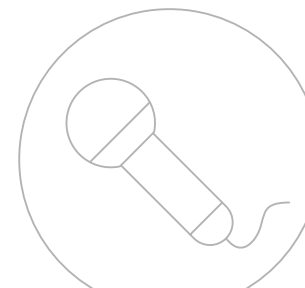
The fight against poaching will always be an interplay between people and technology. Rangers will always be needed on the ground. With our technologies, however, we can make their job much easier and more effective. Our technology provides them with information that they did not previously have. We are the eyes that never sleep.

Is it possible to measure the effects of the technology?

You bet! The system was installed at Buffalo Dream Ranch five years ago. Prior to that, poacher attacks would occur every month, sometimes even every week. Ever since we have been using HENSOLDT technology, not a single rhino at the reserve has fallen prey to poachers. The aim was to increase the population by 215 rhino young every year – a target that we have achieved at the Buffalo Dream Ranch. Today, the population stands at more than 2,000 rhinos. This is probably the largest white rhino population anywhere in the world, as poaching still continues at all other locations.

What does the project say about HENSOLDT?

We had the right idea at the right time. Thomas Müller and Celia Pelaz brought about a genuine culture shift. They both came to South Africa at the time to see the project for themselves. This was phenomenal and gave us considerable momentum for further projects. We can and should take care of these projects now, even if they are not blockbusters in terms of sales and profit. These would also be the wrong motivations. You can only make the projects a success if you handle them with care and integrity. And this is what we are doing. Everything came together at the right time.

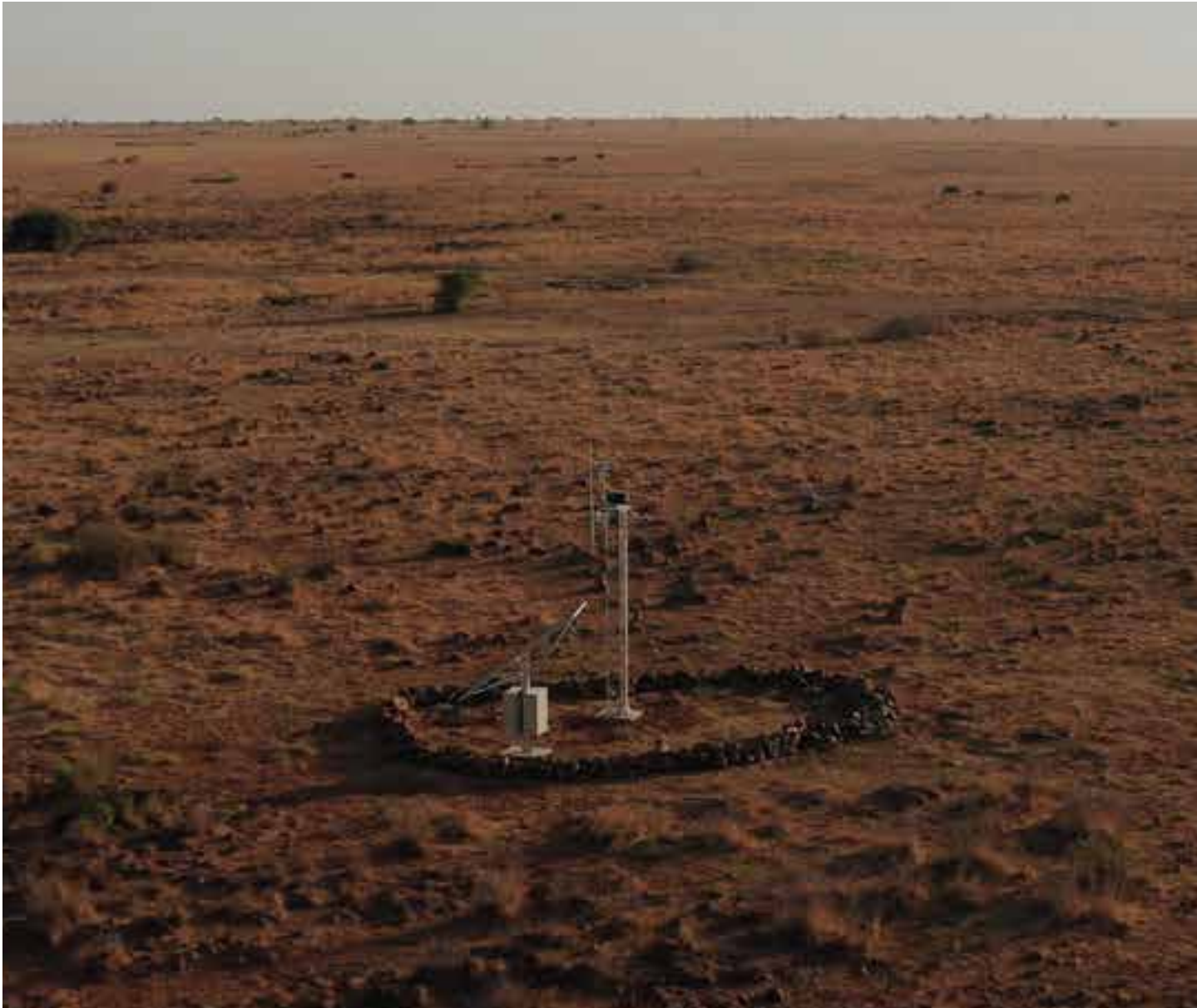
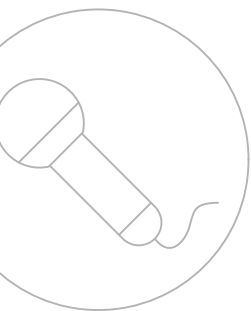


What does this project mean to people and to you personally?

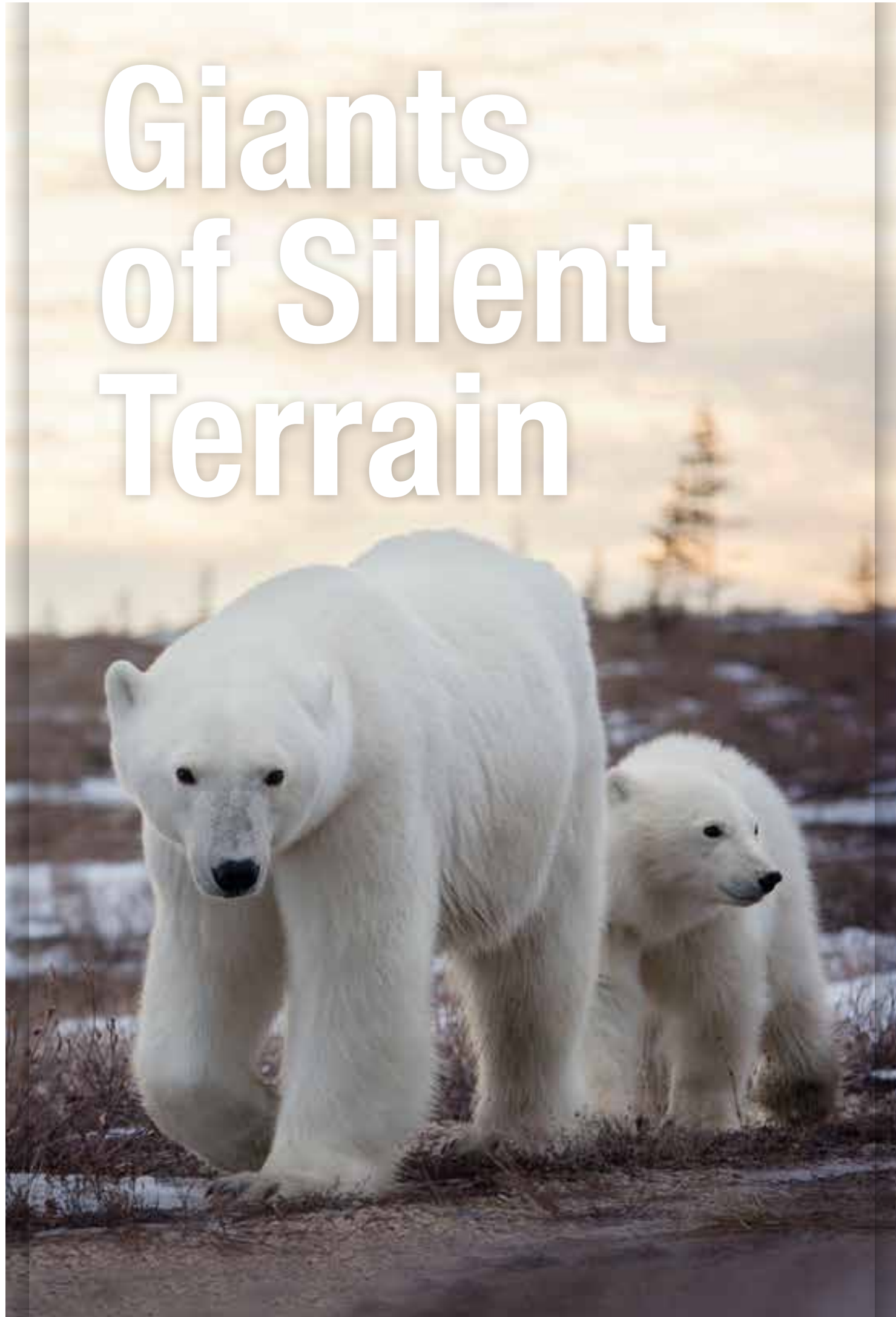
For some people, they are just rhinos. Others become very emotional when they hear about the project. We are all familiar with those decisive moments in life. For me, one such moment was the day on which it dawned on me that I could potentially witness the end of rhinos and lions in my lifetime. In my opinion, it is our duty to help. Otherwise, there will simply be nothing left for future generations. That's why I ask myself every day what I can do to stop this from happening. There is a phrase that we should all keep in mind: "The world is a dangerous place, not because of those who do evil but because of those who look on and do nothing." And that's the point.

Will rhinos survive in the wild?

It's down to us. If we can continue to bring together the right people, employ technology more frequently in the fight against poaching, and raise awareness for the urgency of the situation, we can succeed. That's why we are supporting the fight against poaching and working with people who champion the cause day in, day out. Ultimately, it is a team effort; each and every one of us and every single organization can get involved in order to bring about change that will last long beyond our lifetimes.



Giants of Silent Terrain



The Polar Bear Warning Radar (“PoWR”) developed by HENSOLDT protects this endangered species – and also keeps people in the Arctic safe from hungry polar bears.

Over the course of millennia, polar bears have adapted to the unique conditions of the Arctic. Today, they have come to symbolize climate change, with their habitat and hunting grounds dwindling. Their hunger often drives them into settlements, where encounters with inhabitants often prove fatal for the bears, especially as previous polar bear alert programs only issued warnings once visual contact was established. This is almost always too late to be able to drive away the bears in an animal-friendly manner.

But a solution is now on the horizon. In keeping with its motto “detect and protect,” HENSOLDT has developed the Polar Bear Warning Radar (“PoWR”). This system detects polar bears at a distance of several kilometers from the settlements, helping to warn people at an early stage and thereby protecting local people. Fitted with a day-vision and thermal-imaging camera, the SPEXER 360 radar offers a 360-degree panoramic view; it works around the clock under extreme weather conditions, even in the low-contrast setting of a snow-covered landscape, and can be operated remotely via a software program.

Following initial test runs in Greenland, the technology is now being enhanced in partnership with the non-profit organization Polar Bears International (“PBI”). Polar Bears International is committed to protecting polar bears in Canada and the Arctic (including Svalbard/Spitsbergen, Russia, and Alaska). The first project phase got underway in October 2021 in the small Canadian town of Churchill. The town is well known in Canada and beyond, as hundreds of polar bears congregate here every summer. The system is now being applied here, with the AI algorithms currently being trained by the HENSOLDT Analytics team.

On the basis of the insights already gained, the next stage will see the development of bear-friendly protective measures, with further installations in the Arctic – including in Norway – set to follow. The aim being to protect these giant creatures and the people of the Arctic circle.



“It was perfectly clear
that I had to,
and wanted to,
make a difference”

At HENSOLDT, Frank Kehrer is Design Engineer and responsible for the project management of various construction groups in the Digital Hardware Development department. Prior to that, he spent several years in the German army and completed a degree in electrical engineering, which included a master's thesis at Airbus. Fascinated by the Arctic and its exotic wildlife, Frank Kehrer has already been to Spitsbergen on many occasions, where he has observed polar bears in their natural habitat.

What gave you the idea of using HENSOLDT technology to protect polar bears?

I love the Arctic, the Arctic climate, and the fascinating people and animals who live there. On one of my visits, I witnessed how a polar bear died whilst being driven away by a helicopter. As a development engineer at the global market leader for sensor technology, I asked myself a couple of questions: Could this not be prevented using HENSOLDT technology? Can we not protect endangered species more effectively? It was perfectly clear that I had to, and wanted to, make a difference.

Why are you fascinated by polar bears? What particular characteristic of polar bears would you like to have?

The polar bear is one of our last surviving giants. What fascinates me is the simplicity and the silence that it experiences all alone out there, under such hostile climatic conditions.

How does it feel now that the technology is about to go into operation?

A feeling beyond words. I will do everything in my power to ensure that I am there when the device is installed in Longyearbyen. To return to the place where the idea first came to me two years later will inspire me to do so much more.

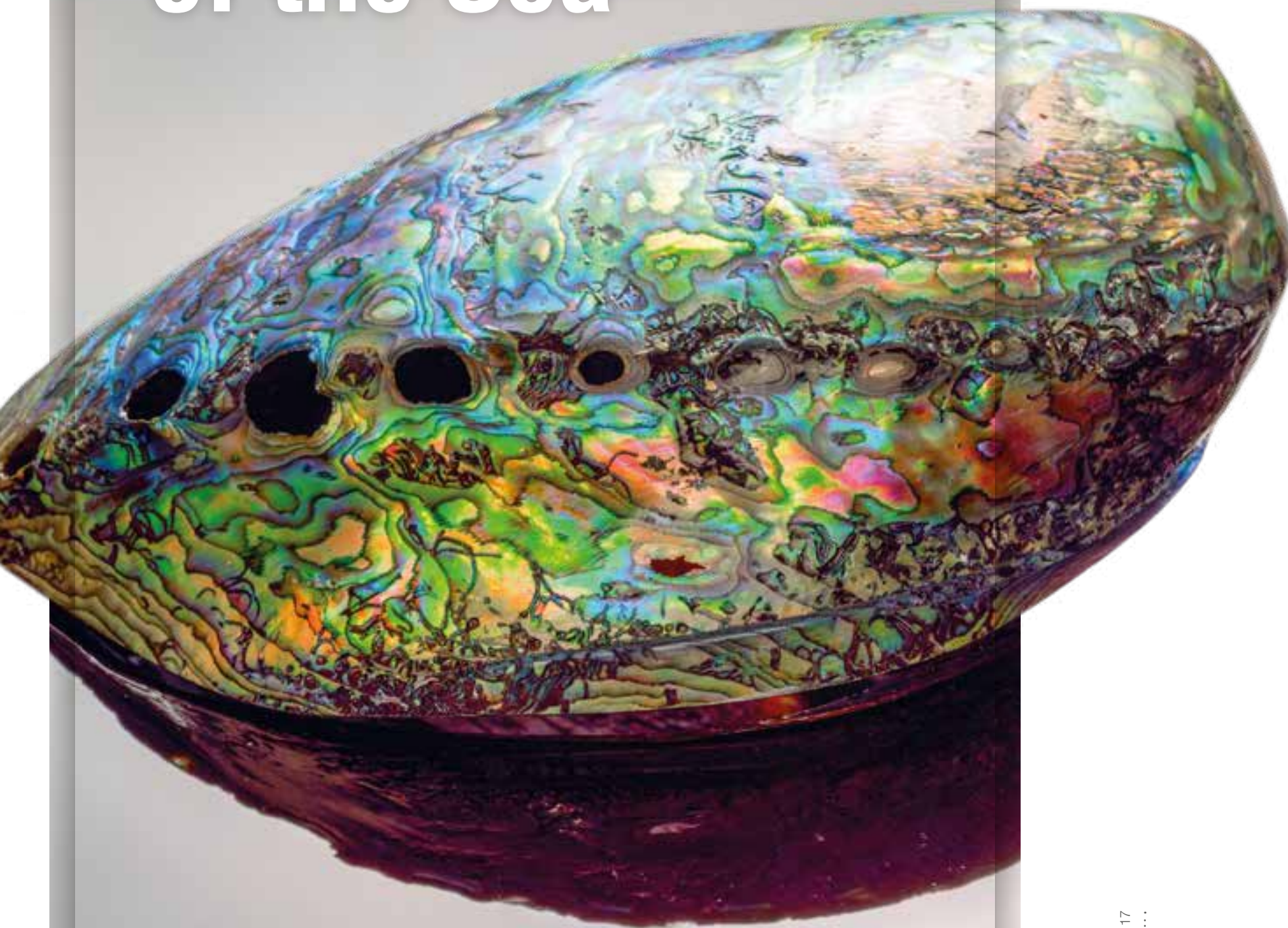
How have people reacted?

The idea alone has sparked the excitement of people at HENSOLDT and members of Polar Bears International, but also friends and relatives who have heard about the project. Using HENSOLDT technology for such amazing wildlife protection projects is met with universal excitement and recognition.

Thomas Müller, HENSOLDT CEO, on the use of HENSOLDT technologies in the field of wildlife protection:

“Here at HENSOLDT, we are committed to a shared goal: We want to protect the freedom and future of our planet, our natural environment, and our way of life with our technologies. So, when Frank Kehrer approached me with his idea, I was immediately excited. Moreover, precisely this spirit is part of our DNA: actively contributing ideas, boldly exploring new avenues, and embracing innovation every single day. We are extremely proud to be able to make a small contribution to protecting endangered species and fostering biodiversity with our technologies. The Polar Bear Warning Radar is one project among many that we are championing in the area of wildlife protection; other projects include the protection of rhinos and the abalone marine snail in South Africa.”

Protecting the “White Gold of the Sea”



A nature reserve on the South African coast is guarded by HENSOLDT technologies, thereby offering protection to the resident abalones.

Only a handful of people in Europe and the United States will have heard of abalone sea snails. In Asia, on the other hand, many people's eyes light up when they talk about these peaceful marine creatures, which can grow to sizes of up to 30 centimetres and weigh some two kilograms. Here, they are known as “white gold” and are regarded as a culinary delicacy; when ground down into a powder, they are also believed to be an aphrodisiac. Although they are found on many stretches of coastline in the southern hemisphere, very few of them ever achieve their full size or even their maximum age of 30 years.

The situation is especially critical in South Africa, where poaching and the illegal trade – often in exchange for drugs – sometimes even leads to shoot-outs. The problem is that abalones are an extremely easy target for poachers, as they usually attach themselves to cliffs close to the shoreline, staying just a few meters below the surface of the water.

Thanks to HENSOLDT, however, the poachers have been stopped in their tracks. At the Hangklip Conservancy near Cape Town, one of the most diverse coastlines in South Africa, a technology originally developed for border protection guards a nature reserve spanning 50 hectares. The system is part of the Security Solutions portfolio of HENSOLDT, which is designed to protect threatened species, and combines a variety of state-of-the-art sensors including lenses and radars, meaning that all data can be collated in a control centre. Cutting-edge analysis techniques give a full picture of the situation, meaning that potential poachers can be detected and detained at an early stage – and that legal harvesting can be monitored.

As many people in South Africa harvest the abalones illegally due to economic hardship, HENSOLDT has taken the initiative by joining forces with other investors to plan the setting up of legal abalone farms.





Shaping the Future: the HENSOLDT Team

At HENSOLDT, all the signs are pointing to growth. This is down to every employee at HENSOLDT. That’s because HENSOLDT innovations are born of the pioneering spirit of the company’s employees and their passion for continuously pushing back the boundaries of what is technically possible. HENSOLDT solutions are born of a willingness to find the best response to diverse and evolving customer needs and requirements in the context of complex projects. HENSOLDT markets are born of the ambition to continuously explore new ground and champion international cooperation. The commitments to nature and wildlife protection, which are rooted in the workforce, offer further proof that the company’s employees embrace the HENSOLDT mission and make the world a safer and more secure place through passion and high tech.

Around 6,300 people from 54 countries work for HENSOLDT across 43 sites. In the 2021 fiscal year alone, more than 700 new members joined the HENSOLDT team. Diversity and equal

opportunities – regardless of gender, nationality, sexual orientation, and culture – form part of the corporate strategy mission at HENSOLDT. The HENSOLDT workforce should be just as diverse and rich in different perspectives as the company’s customers around the world. It is also exceptionally important to the company to support all employees in maximizing their full potential. With this in mind, HENSOLDT is committed not only to training and professional development programs, but also aspects of physical and mental health. The company also has a strong focus on increasing the percentage of women in leadership positions.

High tech, relevance to society, and a modern corporate culture make HENSOLDT a highly attractive employer within the defence and security industry. This is not least demonstrated by the company’s employer ratings on independent sites such as www.kununu.de: With a rating of 4.2 and a recommendation rate of 93 percent as an employer (as of December 2021), HENSOLDT is well above the industry average.

4.2 ★★★★★

kununu Score

423 Reviews

93%

Recommendation

Last 2 years

“A flat hierarchy in which everyone’s opinion is valued! A pleasant working atmosphere!”

“I sometimes get the feeling that employees see the company as their family. We are certainly proud of our work.”

“I am delighted to have joined at this time and to be able to make a difference.”

“Unfortunately, the industry is very male-dominated, but the company is aware of this and promotes women and people with different backgrounds.”

“Excellent collaboration despite coronavirus, thanks to home working and online communication. This strengthens ties.”

“There are no one-size-fits-all roles. Here, you can really ‘go to town’ in your specialist field.”

“A brilliant mix that includes everything from new colleagues to old hands who still hold the odd course at the company, despite being retired.”

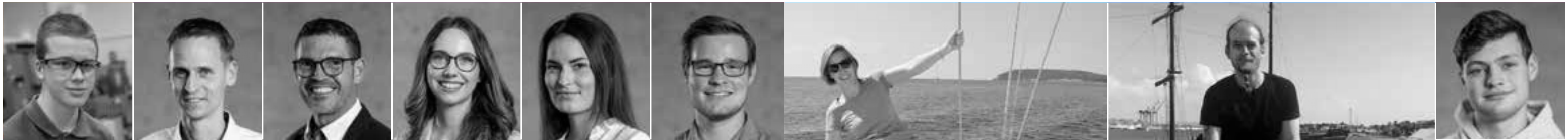
Quotes from Kununu: www.kununu.de

Echo – employee stock purchase plan

In the fourth quarter of 2021, HENSOLDT launched its first-ever **employee stock purchase plan** under the name of “Echo,” allowing employees to share even more closely in the future growth of the company. Employees in Germany, France, the United Kingdom, and South Africa were given the opportunity to purchase shares in HENSOLDT at a discounted price, thereby investing in shared future success.

“Echo” was met with an impressive response: Across all four countries, more than 65 percent of employees signed up – clear proof of the workforce’s strong identification with the company and their trust in its strategic direction.





The HENSOLDT Award – the Employee Prize for Team Players

HENSOLDT honors the high degree of identification and the dedication of its employees with the annual HENSOLDT Award. Presented for the first time in 2019, it recognizes exceptional contributions to the success of the company. Nominations and the choice of winner for the HENSOLDT Award follow an integrative process that involves all employees worldwide. Candidates can be nominated by their colleagues. A judging panel — which in 2021 comprised HENSOLDT Head of Communication Joachim Schranzhofer, the Head of Optoelectronics Development Michael Spieweck, Chairman of the Works Council at the Immenstaad site Thomas Höpfner, the Head of the International Setup department Celia Malahlela, and the Senior HR Business Partner Michael Huber, who sadly died in a tragic accident last year — selects the finalists from among the nominations submitted. The winners are then determined in a vote of all HENSOLDT employees.

The winners of the 2021 HENSOLDT Award all demonstrate particularly impressive entrepreneurship, team spirit, and passion. They were voted the best of the best from more than 200 nominations.



Frank Kehrer, a developer of digital hardware at HENSOLDT, has been a regular visitor to Spitsbergen for many years and is fascinated by the Arctic.

Here, he became aware of a problem that has since grown into a genuine threat to the region’s inhabitants: polar bears, facing the risk of starvation due to climate change, that have lost their natural fear of humans, causing them to scavenge for food in human settlements. To protect themselves, local residents attempt to violently disperse the polar bears or shoot at them, both of which often have fatal consequences for the bears.

Problem detected, problem solved — with a HENSOLDT radar system that picks up the polar bears at an early stage and warns residents, allowing non-lethal countermeasures to be taken in time. The company has already carried out a pilot project in Canada’s Hudson Bay in tandem with the NGO Polar Bears International (see also “Giants of Silent Terrain” on page 112).

With his commitment to the protection of wildlife, Frank Kehrer was the winner of the HENSOLDT Awards 2021. The comments in the congratulatory speech at the 2021 HENSOLDT Awards were particularly apt: *“Frank shows us that we can achieve amazing things when we consider the bigger picture and champion our ideas and beliefs with passion.”*

1st place: Frank Kehrer



2nd place: Claudia Wenke

“I look at the whole picture and solve problems as they arise.” Claudia Wenke, a project manager in the development of various HENSOLDT radar projects, describes her approach in an astonishingly matter-of-fact way.

However, she makes the impossible happen, time and again — just as she did in the middle of the pandemic, when the challenge was to ensure the punctual acceptance of the TRS-4D multifunctional radar for the second batch of K130 corvettes for the German navy. With tireless dedication and creative solutions, she managed to overcome all obstacles and safeguard a crucial project milestone for HENSOLDT. There were no delays whatsoever in the delivery of these corvettes, which are crucial for global surveillance and intelligence missions of the German navy.

A colleague used an analogy from the premier category of motorsports to describe her dedication. The following words at the 2021 HENSOLDT Award ceremony sum her up best: *“Claudia Wenke is like a Formula 1 race car. But what matters to her is not her personal victory — in fact, she doesn’t enjoy standing on the podium — but rather the success of the team.”*



3rd place: Markus Burdack

Markus Burdack’s motto is *“I’m satisfied when the customer is satisfied.”* As a commissioning and service engineer for periscope and optoelectronic mast systems, his job takes him around the world. But there is no distance too far, no journey too arduous when it comes to solving challenges with outstanding flexibility and creativity. The coronavirus pandemic made his job especially tough when several important service assignments needed to be carried out for a customer in Pakistan. Despite the challenging travel conditions and the 14-day quarantine requirement upon his return to Germany, Burdack made the journey multiple times.

As his wife and three small children are used to him often being away from home, even in normal circumstances, he found a particularly creative solution for his quarantine back in Germany, which he spent in an old borrowed trailer in the garden, at least allowing him to be close to his family. As the summer ended, the trailer was swapped for a heated camper (also borrowed).

Markus Burdack’s passion for customer care was recognized by the company with third place in the HENSOLDT Awards 2021.

To quote directly from the speech in his honor: *“Markus Burdack is an outstanding example of the HENSOLDT values. Markus actively shares these values with younger colleagues, making him a mentor and a role model.”*



Imprint

Published by

HENSOLDT AG

Willy-Messerschmitt-Straße 3

82024 Taufkirchen

Germany

Content written by

Finsbury Glover Hering Europe GmbH

Ludwigstraße 8

80539 Munich

Germany

Designed by

Guido Bentner Branding

Häldäckerstraße 11

78052 Villingen-Schwenningen

Germany

Printed by

Druckerei Leute GmbH

Wehrstraße 3

78050 Villingen-Schwenningen

Germany

Image Credits

pp. 1/2/28/29/58/59/84/85/96/97/118/119 – **your123** – [stock.adobe.com/Max Krasnov](#) – [stock.adobe.com/](#)

Lee – [stock.adobe.com/o_du_van](#) – [stock.adobe.com/ cehweh](#) – [stock.adobe.com/](#)

Thomas – [stock.adobe.com/RDVector](#) – [stock.adobe.com](#)

p. 6 **KMW/Bundeswehr/Naeblys** – [shutterstock.com/](#)

BepiColombo – National Aeronautics and Space Administration

p. 8 **Carsten Dammann**

pp. 6/10/15/22/23/60/61/62/63/66/98/100/106/108/109/110/120/121/122/123 – **Joachim Schranzhofer**

pp. 6/30/32/33/37/38/39/42/43/44/45/46/47/50/51/52/53/80/83/99 – **Büro Beder**

pp. 16/20/21 **Chris Haentges**

p. 31 **HENSOLDT/AN-APG 65** – Raytheon

p. 34 **Nicola Winter**

p. 48 **Lena Hopfenzitz**

p. 52 **Krauss-Maffei Wegmann GmbH & Co. KG**

p. 53 **KMW**

p. 53 **@Bundeswehr/Wilke**

p. 54 **Vadim Sadovski** – [shutterstock.com](#)

p. 56 **Naeblys** – [shutterstock.com](#)

p. 56 **NicoElNino** – [fotolia.de](#)

p. 56 **Yurchanka Siarhei** – [shutterstock.com](#)

p. 56 **3Dsculptor** – [shutterstock.com](#)

p. 57 **Quaoar** – [shutterstock.com/NASA/MarcelClemens](#) – [shutterstock.com/](#)

Vadim Sadovsk – [shutterstock.com/Metop](#) – [NASA/TerraSAR-X](#) – [DLR/TanDEM-X](#) – [DLR/](#)

[sdecoret](#) – [shutterstock.com/eyetronic](#) – [stock.adobe.com/ NGSAR](#) – [DLR/EnMAP](#) – [DLR/](#)

BepiColombo – National Aeronautics and Space Administration/JUICE – European Space Agency

p. 66 **REDPIXEL** – [stock.adobe.com](#)

p. 68 **HENSOLDT**

pp. 70/71 **HENSOLDT**

p. 72 **bloomicon** - [stock.adobe.com](#)

p. 73 **@mbruxelle** – [stock.adobe.com](#)

pp. 74/76 **peterschreiber.media** – [shutterstock.com](#)

p. 77 **WADII** – [stock.adobe.com](#)

p. 78 **structuresxx** – [shutterstock.com](#)

p. 79 **honglouwawa** – [shutterstock.com](#)

p. 88 **pict rider** – [stock.adobe.com](#)

pp. 90/91 **Peter Hermes Furian** – [stock.adobe.com](#)

p. 92 **Thomas** – [stock.adobe.com](#)

pp. 93/94/95 **It's design** – [stock.adobe.com](#)

p. 104 **Nick Dale** – [stock.adobe.com](#)

p. 112 **critterbiz** – [stock.adobe.com](#)

pp. 114/123 **Frank Kehrer**

p. 116 **elen31** – [stock.adobe.com](#)

p. 123 **Markus Burdack**

p. 123 **Claudia Wenke**

