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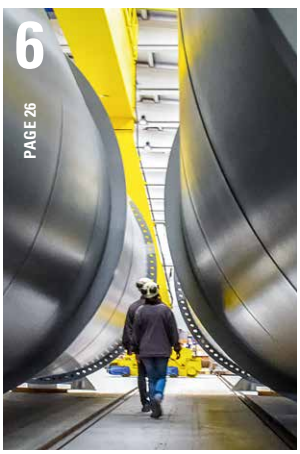
CONTENTS

HUMAN & MACHINE

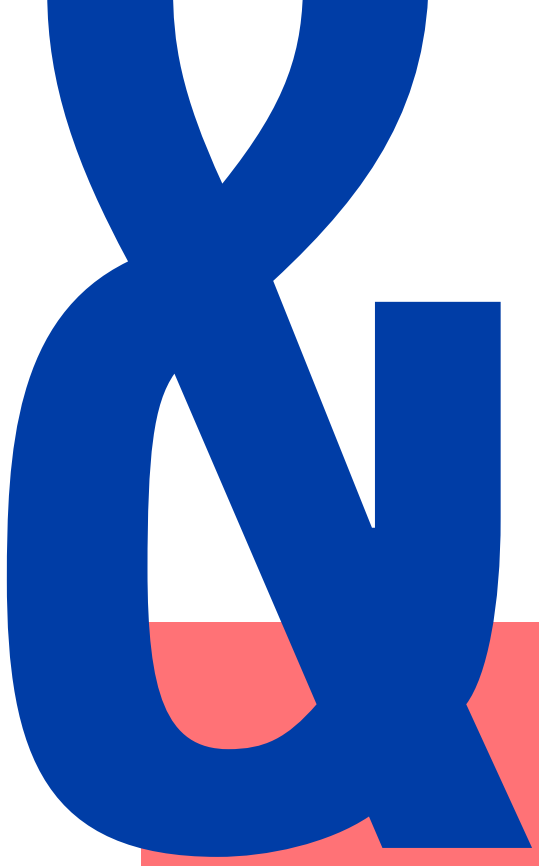
TEAM SPIRIT

DYNAMICS & METALL

TUBE CONVEYANCE



MIND & MAGIC



“The Next Level. Together.” Under this slogan, TÜV SÜD is setting the strategic course for further development of the company. In a highly complex world, “together” has a special meaning: Only together, within TÜV SÜD’s global network of experts and in close cooperation with researchers, scientists, and high-tech companies, can current and future challenges be mastered using new technologies.

This magazine is dedicated to the idea of partnership in all its diversity. Here at TÜV SÜD we are adamant that we want to work jointly and bring together know-how, experience, and good ideas – and that we will nevertheless avoid compromise when it comes to issues of technical safety. That is TÜV SÜD’s promise. Yesterday, today, and tomorrow.

HUMAN X MACHINE

MORE ABOUT THIS SPECIAL HUMAN-MACHINE PARTNERSHIP

www.annualreport.tuvsud.com/2018/magazine/human-machine

This young man stands out. Neil Harbisson had a new sense designed for him – and everyone can see it. Harbisson entered into an unusual partnership between his body and digital technology. We met this cyborg in his adopted home of Catalonia.

NE

Neil Harbisson arrives on time to our meeting on an afternoon in Barcelona. He didn't need to travel far from the district in which he resides, El Raval. From some distance, I can already spot him standing in the middle of the Ramblas at metro station Liceu – and not just because of his blond hair and bright blue quilted windbreaker. The thin, flexible antenna which seems to grow out of the back of his head takes me by surprise for a moment. Harbisson is conspicuous, but he doesn't really want that. The 34-year-old Briton rather sees himself on a mission to achieve general awareness of cyborgs and the recognition of artificially designed senses in humans.

On a brief tour of the city in the direction of Plaça de Catalunya, Harbisson begins to explain how he became what he is today: a human-machine hybrid and avant-garde artist who is the living embodiment of a very special direct partnership between humans and technology. "I've been color-blind since birth. I never perceived that as a handicap, but as a child I was curious about the colors that surrounded me. In 2004 I had an antenna implanted in my head that allows me to transform the colors of the surroundings into audio tones. I can therefore hear colors, like the red and green of the flowers at the shop over there."

His antenna picks up the light waves of the colors and sends them to his skull bone as vibrations. The vibrations are transformed into internal sounds, so that Harbisson hears different notes for different colors. In order to be able to visualize the sounds for himself, he memorized a color for each pitch before the device was implanted. "By the way, the red of the flower sounded very deep to me just now.

This union between my body and technology has worked very well for more than 15 years now. The antenna is therefore no longer a device for me, but an organ."

Once we arrive at Plaça de Catalunya, Harbisson says he has to get something. Without hesitation, he heads in the direction of the famous El Corte Inglés department store directly on the square, and I quickly understand why. A smile is on his face as we enter the basement with its fashion and perfume articles in all colors. "I like coming here. For me, it's what visiting a nightclub is like for other people. A lot of exciting soundscapes." Harbisson dives into this spectrum of sound and almost forgets about his purchase, but he never gets to the point of sensory overload. He's long since gotten used to getting all this information that the antenna transmits – day and night, whether he's standing in the shower or sleeping.

CYBORG AS A LIFESTYLE

We want to continue our conversation in a bar. Harbisson leads me to the cozy restaurant of L'Ovella Negra Ramblas in the historic district of El Raval very close by. Over a glass of wine and some tapas, he explains that for him it is about much more than just his own cyborg existence. He wants to encourage more people to adopt this lifestyle. "That's why I co-founded the Cyborg Foundation and the Transpecies Society, which are to encourage more people to become cyborgs. What I care about is a close partnership not only between humans and technology but also with other like-minded people."

> »The union between my body and technology has worked very well for more than 15 years now. The antenna is therefore no longer a device for me, but an organ.«
>
> **Neil Harbisson,**
> **Cyborg activist & avant-garde artist**

In addition to his commitment to the recognition of cyborgs, Harbisson sees himself above all as an artist, with his body as his primary work. He also creates his own works of art, for example by translating the music of famous songs into "color scores."

He tells us that his next project will again focus on his own body. He wants to have another artificial organ implanted, with which he will be able to feel time. Now there is time for that in reality, because a developer meeting is planned for today. Harbisson smiles as he says goodbye: "That's the good thing about being a cyborg. In contrast to my traditional senses, my new senses can get better and better with age, because technology is constantly evolving." While lost in thought as I watch him leave, I ask myself: Is this what humans of the future will look like?

NEIL HARBISSON

Born
July 27, 1984,
in Belfast, Northern Ireland

Grew up
in Catalonia

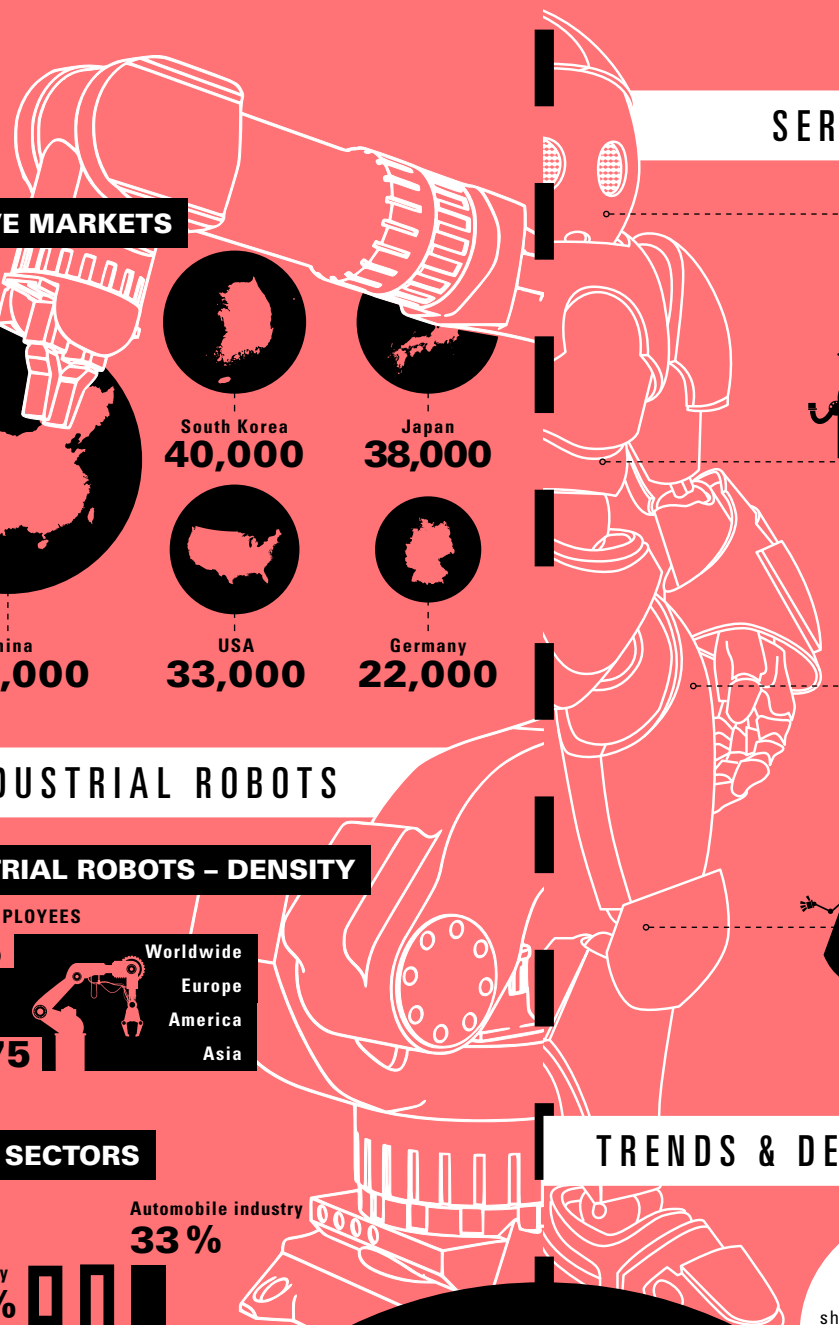
Occupation
Cyborg activist and avant-garde artist

What sets him apart
– Color-blind from birth
– Since 2004, the first person worldwide to have an antenna in his skull with which colors can be heard
– Since 2004, official recognition by the British government as the first cyborg.

"Amy Winehouse – Rehab" as a work of art: Harbisson "hears" the hit with his antenna in this way.

MY PARTNER, THE ROBOT

Robots have become an indispensable part of our everyday lives. People and machines have to learn to work as a team.



TOP FIVE MARKETS

MEASURED IN SALES VOLUME

- China 138,000
- South Korea 40,000
- Japan 38,000
- USA 33,000
- Germany 22,000

SERVICE ROBOTS

LOGISTICS ROBOTS

In logistics, the use of driverless transport vehicles is on the rise. They have become an integral part of fully automated logistics systems.

MEDICAL ROBOTS

The most important applications are robot-assisted surgery or therapy and rehabilitation robots. The latter specifically support people with disabilities.

FIELD ROBOTS

In addition to their use in the area of milking, robots are also getting more popular in cultivation of land. Agricultural robots for planting crops, killing weeds, and harvesting are gaining wider use.

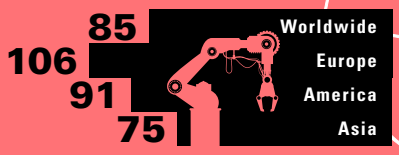
PRIVATE ROBOTS

In the private sector, more and more people are reluctant to be without their service robot anymore, whether in the household, for education and training, or for entertainment.

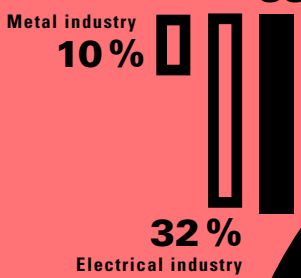
INDUSTRIAL ROBOTS

INDUSTRIAL ROBOTS – DENSITY

PER 10,000 EMPLOYEES



MAJOR SECTORS



TRENDS & DEVELOPMENTS

HOUSEHOLD

Current designs show that future household robots are already becoming significantly more complex and efficient.

INDUSTRY 4.0

Machines are lightening the workload for employees more and more. People are being transformed from workers into problem solvers, decision makers, and innovators.

TRANSPORT ROBOTS

In the hospital sector, it will be transport robots that increasingly take up the slack in nursing services in the future.

WHAT GERMAN EMPLOYEES THINK ABOUT ROBOTS

62 % see artificial intelligence as a technology that turns machines into better assistants in the workplace.

78 % assume that digital helpers cannot replace human social skills.

70 % see robotics and automation also as an opportunity to learn to do work requiring more advanced qualifications.

TEAM SPIRIT

What does “together” actually mean to a company with more than 24,000 employees and approximately 1,000 locations around the world?

We took a very close look and focused on the people who work for TÜV SÜD. This led to the discovery of all kinds of exciting partnerships – as diverse and distinctive as the company itself. In teams of two or larger groups, they provide new impetus, overcome existing boundaries, and tap new opportunities. And they demonstrate that more can be accomplished together.

EXPERIENCE MORE TEAM SPIRIT – IN OUR TÜV SÜD VIDEOS

www.annualreport.tuvsud.com/2018/magazine/team-spirit

HOW'S IT GOING, BRO?

Sometimes even a global player can be a family business: In their work over the last 13 years, everything has revolved around engines, exhaust emissions, and vehicle safety for Jürgen Adelfinger and his brother Stefan, who is one year younger. Why TÜV SÜD? "The company has the highest quality standards in the industry – that persuaded both of us."

STEFAN ADELFINGER
SERVICE CENTER NEUMARKT
TÜV SÜD AUTO SERVICE

JÜRGEN ADELFINGER
HEAD OF THE BRANCH OFFICES
BAYREUTH/BAMBERG
TÜV SÜD AUTO SERVICE

THROUGH EVERY SEASON

As a rule, a safety check must be performed once annually on the ski lifts of Bavaria's Sudelfeld, about an hour's drive south of Munich. TÜV SÜD has been responsible for the inspections since the early 1950s. A traditional partnership – for safe skiing fun in Germany's largest ski region.

ANDREAS BAUER
OPERATIONS MANAGER
SUDELFELD MOUNTAIN LIFTS

LUDWIG NEUHAUSER
INSPECTOR OF CABLEWAYS AND AMUSEMENT PARKS
TÜV SÜD INDUSTRIE SERVICE

CITY RIVALS

In sports they are opponents: Santiago Cabanas is an avid fan of the FC Real Madrid soccer team, and for Miguel Garcia-Escudero, nothing trumps local rival Atlético. Cheer for your colleague's favorite club? No way. Professionally, however, both play on the same team: They share responsibility for TÜV SÜD's finances in Spain.

SANTIAGO CABANAS
CHIEF FINANCIAL OFFICER
TÜV SÜD ATISAE

MIGUEL GARCIA-ESCUDERO
HEAD OF ACCOUNTING
TÜV SÜD ATISAE

DIGITAL & LIMITLESS

The brightest minds for intelligent systems: For complex projects such as the development of automated test methods for self-learning systems, TÜV SÜD needs a lot of software. In Singapore, the best experts are working together to make this happen. The diverse team in Southeast Asia demonstrates: the digital and the global are closely intertwined.

From left to right

The software development team of the Digital Service Competence Center in Singapore

MANORANJAN DEVAGNANA
HEALTHCARE EXPERT/
SMART HEALTHCARE SEGMENT LEAD

JIN SOHYEON
SMART LIFT SOLUTION EXPERT

XIN XIN
SYSTEM AND SOLUTION ARCHITECT

LIANG ZHAO
SENIOR SOFTWARE ENGINEER

SIMON PUESCHEL
GERMAN STUDENT TRAINEE

GURURAJAN GANESAN
PRINCIPAL SOFTWARE ENGINEER

YIRAN ZHANG
CYBERSECURITY EXPERT

WOMEN'S EMPOWERMENT

Learning from others, sharing success stories, discussing relevant issues, and providing mutual support to each other: The "Women International Network at TÜV SÜD" was launched in June 2017. In the meantime, more than 600 women from all over the world have joined the network. They've shown great individual initiative and created a strong basis for more gender equality.

from left
to right

LIZ FENDT
CHIEF MARKETING OFFICER
TÜV SÜD AG

SILVIA IMRAN
DIRECTOR STRATEGIC SALES
DIVISION INDUSTRY SERVICE

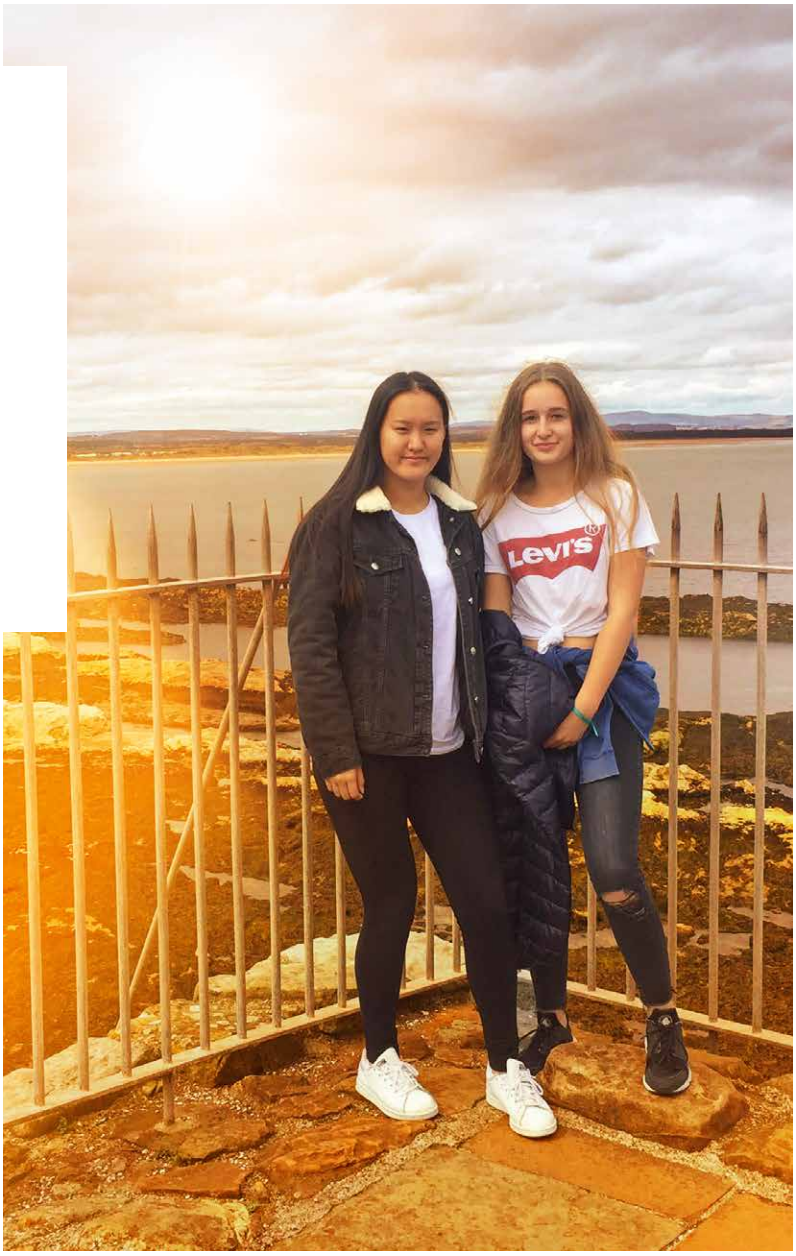
DR. JULIA SAUERBREY
INHOUSE CONSULTANT &
PROJECT MANAGER
TÜV SÜD INDUSTRIE SERVICE

LIFE COACHING

The JOBLINGE initiative offers new perspectives to young people who are finding it difficult to obtain a job or training position. TÜV SÜD employees are a central building block in this process. On a voluntary basis, they act as mentors to help young people find jobs and provide advice and assistance. Alexandra Hanner says it's worth the effort: "When my mentee was accepted for a training position, I was elated."

FRIENDS FOR LIFE

HORIZONTE is the name of the TÜV SÜD AG's international exchange program, which brings together the children of employees. For two weeks, 60 young people from Germany, America, and Asia each visit a host family comprising colleagues from other countries, getting to know foreign cultures and ways of life on this basis. It's an initiative that transcends borders and supports the diversity of TÜV SÜD.



from left
to right

JENNI YANG
GREAT BRITAIN

MELISSA MACHOI
GERMANY

from left
to right

DAVID HÖLLENREINER
WHOLESALE TRADER TRAINEE

ALEXANDRA HANNER
HEAD OF EVENT MARKETING
TÜV SÜD MANAGEMENT SERVICE

&MIND MAG·-C

They live together and conduct research together. The neuroscientist couple Susana Martinez-Conde and Stephen Macknik have an unusual interest in common: neuromagic. This literally "enchanting" field of research and their close cooperation require a special partnership.

SUSANA MARTINEZ-CONDE

Born
Oct. 1, 1969
La Coruña, Spain

Occupation
Neuroscientist and author

Professor of Ophthalmology, Neurology, and Physiology & Pharmacology at the Downstate Medical Center of the State University of New York

Head of the Laboratory for Integrative Neurosciences

What sets her apart
In 2008, she developed the new field of neuromagic research together with Stephen Macknik.

They developed neuromagic as a research field in order to gain new insights into processes in our brain in response to the tricks of magicians. When did it all start?

MARTINEZ-CONDE In 2008, we published an article about this new field of study on the neural bases of magic, that is, why magic tricks work in the brain. We also wanted to showcase the interests that magicians and neuroscientists have in common. Both professions want to understand the human mind and behavior.

And you discovered the topic together as partners?

MACKNIK Yes. We had already dealt extensively with illusions before, such as at large conferences where visual perception was being discussed. We later organized a conference ourselves, where we sponsored a competition for the best visual illusion. We followed that up with a conference on the topic of consciousness. Since this conference took place in Las Vegas, where there are many magic shows, we noticed that magicians are also true artists of consciousness. In 2007, some of the best magicians in the world took part in our conference. The New York Times ran a front-page story about it, and that's what ultimately got the ball rolling.

After working a while in Arizona, you have now ended up in New York with three children, as you have also been a team in your private lives for 17 years.

MARTINEZ-CONDE Yes, we're both at the State University of New York now, where each of us is running our own lab. Nevertheless, we continue to work closely together, because many research projects involve both laboratories.

What is the secret of your partnership? I would guess that professional conflicts come up from time to time.

MACKNIK I think our secret lies in our personal relationship. In a scientific collaboration, it is only natural that one person sometimes experiences more success than the other. It was the same with us – with the difference that we chalk it up in such a way that Susana's success is also my success. And the success of either of us is in turn a success for our family.

NEUROSCIENCES

1. The neurosciences deal with how the nervous system functions and include the specialized field of brain research.
2. Due to the diversity of methods, a wide variety of scientists conduct research in this subject area, including psychologists, physicians, and mathematicians.
3. In addition, the experts often cooperate with related scientific fields such as computer science.

NEUROMAGIC

1. In brain research, neuromagic is a relatively new discipline that deals intensively with the art of magic.
2. The scientific goal is to gain insights into the neuronal processes in the brain of the audience by observing magicians.
3. In turn, these insights help to gain a better understanding of how deceptions in the form of cognitive tricks work in everyday life, such as those found in advertising, at meetings, or in interpersonal relationships.

MORE ABOUT THIS SPECIAL PARTNERSHIP BETWEEN SCIENTISTS

www.annualreport.tuvsud.com/2018/magazine/mind-magic

Eye-tracking test: Studying eye movements during the presentation of images or videos is a typical research area for this pair of scientists.

attention to a specific spot while using the other hand to pull something out of your pocket. If you take the subway and someone presses against you from one side, they can take your wallet from the other side. Pickpockets thus use targeted deception to manipulate your attention in a manner quite similar to what magicians do. Both benefit from the fact that people have selective attention.

When you occasionally get into a professional disagreement, are you able to separate your work from your private life?

MARTINEZ-CONDE That's the flip side, of course. When it's very stressful at work because an experiment is perhaps not going so well, then it's very hard to forget about this at home and completely focus on family life. That's part of our very intertwined lives. On the other hand, this is also associated with great advantages. We are much more flexible and can ultimately better reconcile work with our private lives.

What would you advise other couples to do in order to stay happy over the long term?

MARTINEZ-CONDE Professionally, we have always worked on the same hierarchical level. We only moved on when we had equivalent job offers; otherwise, one of us would have had to sacrifice their career for the other in order to follow the more successful partner. We never got into this situation, and we have been very careful to remain on the same level and to support each other to the effect that the other person advanced just as quickly with their career.

Let's return to the topic of your work. What do pickpockets in real life and magicians on stage have in common? You give attention to both professions.

MACKNIK When it comes to stealing someone's belongings, pickpockets have techniques similar to magicians on stage. They confuse you or use one hand to direct your

Would you two as experts still be able to be deceived with such tricks?

MACKNIK Yes, absolutely. Even if you seem to know all the tricks, you can still fall for them, because many of them work with a combination of different methods. And if the magicians or pickpockets do it well, you as a member of the audience or victim of a theft never know exactly which methods were used. Even we as neuroscientists don't have a "better" brain.

STEPHEN MACKNIK

Born
Aug. 9, 1968
Dayton, Ohio, USA

Occupation
Neuroscientist and academic journalist

Professor of Ophthalmology, Neurology, and Physiology & Pharmacology at the Downstate Medical Center of the State University of New York

Head of the Laboratory for Translational Neurosciences

What sets him apart
Has spent virtually his entire professional career alongside his partner Susana Martinez-Conde. The two have also been in a private relationship for 17 years

Reconciling career and family: Susana Martinez-Conde and Stephen Macknik have found their very own manner of partnership in order to make this possible.

DYNAMIC METAL

Hard-fought, quick-paced, spectacular: Wheelchair basketball incites a unique fascination all its own. It is based on a very special cooperation concept resulting from the wheelchair as a sporting device and the unusual constellation of the team. It can be experienced firsthand at a Bundesliga match of the RBB Munich Iguanas playing against the BG Baskets Hamburg.


HOME
60
00:32
PERIOD 4
GUEST
75
FOULS
03
SHOT CLOCK
:17
FOULS
05

1

Laura Fürst reacts quickly to loss of the ball. She swings her wheelchair around, picks up speed with a few powerful arm strokes, and is back in her own zone defending the basket in a flash. Her team, the RBB Munich Iguanas, are already nine points behind the BG Baskets from Hamburg in the third quarter. At the mid-court line, she collides with a teammate and tumbles over along with her wheelchair. Lying on her back, she can't scramble back into the chair on her own. Two teammates roll up from behind, each grabbing an outstretched arm to pull Laura up.


2

THE ULTIMATE TEAM SPORT

Scenes like these are part and parcel of this dynamic sport, but they also stand for values that are important in wheelchair basketball, perhaps more important than in other team sports: cooperation. Wheelchair basketball is the ultimate team sport; only working together can you win a game. At first glance, the teams appear to be inhomogeneous, with women and men, non-disabled and disabled persons with various limitations all playing on the same team. An ingenious point system (see box on the right) ensures that the playing level of the five court players is comparable with that of their opponents. "One can do this better, the other can do that better," says Florian Mach. On this Saturday in December, he is playing on the Iguana squad as one of three non-disabled players, referred to as pedestrians. His girlfriend, Laura Fürst, is the only woman. "Everyone has to work for everyone," says the 27-year-old, who won silver with the German wheelchair basketball team at the 2016 Paralympics in Rio de Janeiro.

»Everyone has their role in the team.«

Laura Fürst, wheelchair basketball player

The Munich players are outsiders in the Bundesliga match against the strong Hamburg team, but for now they are holding their own. They win the first quarter 13:12 thanks to a cohesive team performance. Because the wheelchairs make for smaller gaps and the players are less agile than in pedestrian basketball, team play is even more crucial. "We have to function as a collective," says Florian Mach. Laura Fürst succeeds in blocking again and again, thus preventing taller opponents from shooting the ball. She is not bothered by the fact that she rarely takes a shot at the basket herself and has only scored two points for her team in this game. "Everyone has their role in the team," she says. Scoring points is someone else's job.

"CHAIR SKILLS" IS ONE OF THE DECIDING FACTORS

Fürst has been partially paraplegic for some ten years now. On a high school exchange program in Michigan in 2008, she crashed into a tree in the woods in a snowmobile accident. She had previously played tennis and volleyball, but tried out wheelchair basketball during her rehabilitation at

MORE ABOUT
A UNIQUE TEAM SPORT

www.annualreport.tuvsud.com/2018/magazine/dynamics-metal

the hospital in Murnau. "I fell in love with the sport," she admits – and later she also fell in love with Florian Mach. The 22-year-old came to the Wednesday group of wheelchair basketball players because of his father, who works as a sports coordinator at the Murnau hospital. The sport that is "simply a great mix" enthralled him too. On the one hand, there is this unusual diversity within the team, he says. On the other hand, Mach is fascinated by "being able to constantly develop his skill in handling the sporting device further." These "chair skills" are part of the training, along with basketball-specific tactics. Mach, as a pedestrian, had a disadvantage in the beginning when compared to his teammates, who are also wheelchair dependent in their daily lives and therefore learned the abrupt changes of direction and the coordination of the device and ball more quickly, but now he has a good handle on all of these skills.

»Especially as a non-disabled person, you have to be constantly developing your skills in handling the sporting device.«

Florian Mach,
wheelchair basketball player

DEFEAT DESPITE TEAMWORK

After halftime, the Iguanas lost their momentum, the team from Hamburg pulled away, and in the end the score was 77:60 for the guests, who came to Munich occupying third place in the standings. "Up front, we just didn't play with our heads in it and didn't repeat the things that worked," says coach Benni Ryklin afterwards. You can see the disappointment written in Florian Mach's face after the end of the game. He seeks consolation from his family first and distances himself somewhat from his teammates. Even in a well-functioning team, sometimes a little distance doesn't do any harm. ☞ GAME OVER

1_Laura Fürst at the team meeting: Team tactics are even more important in wheelchair basketball than in pedestrian basketball.

2_The basket in his sights: Florian Mach has positioned himself well.

3_Tumult of wheelchairs: A rough-and-tumble struggle for the next basket.

TEAM-BUILDING AS AN ARITHMETIC PROBLEM

In order to create a balance between the different degrees of disability in the teams, each player in a team is assigned a value between 1.0 and 4.5. The official term for this is "functional classification."

1.0

WITH SEVERE DISABILITIES

Players with extreme handicaps receive the lowest score, since their play is restricted by an unstable trunk and their lack of balance in the seat.

3.0

WITH NORMAL TRUNK FUNCTION

3-point players have a leg amputated above the knee, for example. They have excellent trunk control during play.

4.5

POINTS ARE ALSO GIVEN TO THE NON-HANDICAPPED

Players with minimal disabilities and players without disabilities have the highest point number.

1.0 / 1.5

BONUS

Women receive a general point deduction of 1.0 or 1.5 points. As a consequence of this, they can also have a negative value.

EVALUATION CRITERIA

WHEELING AND STEERING

Among the crucial factors in the functional classification is the player's ability to wheel and steer the wheelchair.

BALL SKILLS

Further criteria are capabilities in shooting, passing, rebounding, and dribbling depending on the degree of disability. The assigned point value is entered onto the player card.

14

POINTS

In total, each team is usually allowed 14 points on the court, which gives the coach a little arithmetic problem to do every time they change out a player.

DIVERSE & LIMITLESS

Partnership has an infinite number of facets. Our diverse mix is the best proof of that.

INSEPARABLE

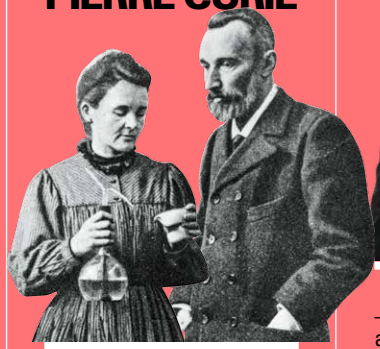
TIM & STRUPPI

——— Over the course of 24 albums, legendary comic hero Tim (French: Tintin) goes on adventures around the world as a roving Belgian reporter. Illustrator Hergé gives him a faithful sidekick in the form of Struppi (French: Milou). The French name given to the popular fox terrier came from Hergés first love, who went by the nickname Milou.

1929 was the year the shared adventure began

RESEARCHER COUPLE

MARIE & PIERRE CURIE



——— United in love and in research: Marie, born in Poland, and her French husband Pierre were passionate physicists. In 1903, the two received the Nobel Prize for their experiments on radioactivity.

ART FIGURES

ROSA LOY & NEO RAUCH

34 years together

——— Two artists, one pair: Rosa Loy and Neo Rauch are the Leipzig dream couple among artists – officially married since 1985. They paint separately and together, mutually inspiring each other. In this way their work also reflects a partnership that is truly lived. An outstanding achievement of their joint collaboration is the Bayreuth Festival 2018 stage design for the opera Lohengrin, which they painted together for months in the Dresden theater workshops.

LEGENDARY

QUEEN ELIZABETH II. & PRINCE PHILIP

——— Long-term relationships may be taken literally here. Prince Philip (98) has been married to the British Queen Elizabeth (93) for more than 70 years. Contrary to many rumors, this long period together also stands for a great love story.

NATURE THROUGH THE LOOKING-GLASS

YOUNG LEOPARD & TINY MOUNTAIN GOAT

——— Prey? No, friends! In a Russian zoo in 2014, a leopard just a few months old and a goat just as young formed a friendship that was likely to be limited in time but that was nevertheless quite close. Partnerships among non-equals like this occur again and again in the animal world.

GALACTIC BOSOM BUDDIES

LUKE SKYWALKER & R2-D2

1.09 meters is R2-D2's total height

The rebel pilot and the cutest beeping tin can in the universe: in the X-Wing Fighter, Jedi Knight Luke Skywalker and little droid R2-D2 are an unbeatable team in countless Star Wars battles. The irony of the story is that the astro-mechdroid was previously the faithful companion of Luke's father, Anakin Skywalker, who later became Darth Vader. Anakin also successfully modified R2-D2, including the addition of a highly intelligent computer unit. Thanks to these new abilities, he later was able to not only save Luke's life several times but also provide crucial support to the rebels.

2009 was the year the Hollywood movie with Richard Gere began its run

PASSIONATE ABOUT ANIMALS

HACHIKO & UENO

It's the true story from Japan of what was likely the most faithful dog in the world. Even after his death, the male dog of the akita breed named Hachiko waited daily at the Shibuya railway station for his master Hidesaburo Ueno to return for almost 10 years. His loyalty touched millions of people, and in 1934 he even received his own monument.

A ROMANCE AMONG DOLLS

BARBIE & KEN

Even the most famous doll in the world has a love life. Boy-toy Ken was the man at Barbie's side starting in 1961. In 2004, Mattel announced that the two were separating, only to reunite the dream couple again in 2011.

A pair for 51 years

"ADVANTAGE" LOVE

STEFFI GRAF & ANDRE AGASSI

The two tennis stars Steffi Graf and Andre Agassi are one of the dream couples from the international sports scene. They said "I do" in October 2001, and 18 years later they are still happily married. They support each other in raising their two children. Even though rumors of separation come up again and again, the relationship seems stable. In an interview, Steffi Graf reveals "respect and a sense of humor" as the secret behind their success.

TUBE CONVEYANCE

Fast, faster, Hyperloop: This visionary rail system could revolutionize our mobility. It can only be driven forward with original ideas and teamwork.

At first it was just a vague idea: Six years ago, Paypal founder Elon Musk presented his vision of a completely new **high-speed train network**, the Hyperloop. The company HyperloopTT was founded the same year. 01

How do your bring together investors, development partners, and government agencies to develop a completely new technology? By creating **confidence** in the feasibility of innovation and in its safety. 02

We need to work toward something that is not just very safe, but "the safest means of transport in the world" – that is the bar that the developers of the Hyperloop have set for themselves. It's clear that such a project requires experts and great **collaborators** who know exactly what technical safety means. 03

THINK BIG! THE REVOLUTIONARY HYPERLOOP TECHNOLOGY

THE VISION

From Munich to Berlin in 40 minutes? The Hyperloop could make it happen. The idea: Instead of traveling overland as in the past, trains would travel in tubes in a state of near-vacuum.

AS FAST AS SOUND

Up until now, air resistance and friction have limited extreme speeds in rail traffic. By contrast, speeds of over 1,200 km/h should be easily attainable in the Hyperloop vacuum with magnetic field technology.

Since 2018, TÜV SÜD has been working on safety for HyperloopTT. The task is to create guidelines for consistent **safety standards** that underpin future development in Hyperloop technology.

04

It's pioneering work, as Hyperloop technology does not yet extend beyond individual test tracks. To have the ability to nevertheless make assertions about **safety,** TÜV SÜD is first looking at established technologies from which standards can be transferred.

05

TÜV SÜD consolidates expert knowledge: In addition to the railway sector, colleagues with **expertise** in areas such as roller coasters, space travel, aerodynamics, and cable cars are being utilized. That's because knowledge from each of these areas can also be applied to the Hyperloop.

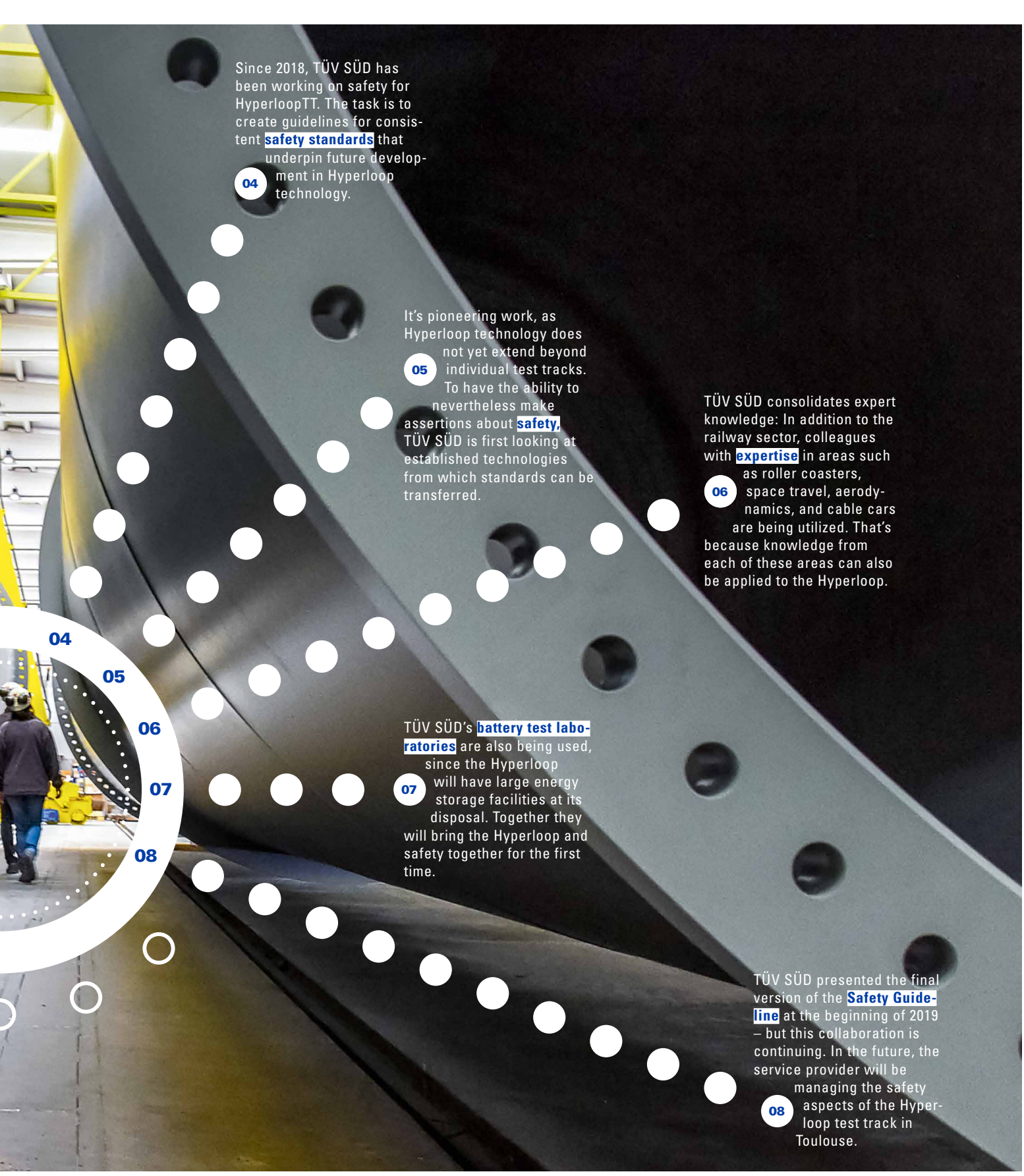
06

TÜV SÜD's **battery test laboratories** are also being used, since the Hyperloop will have large energy storage facilities at its disposal. Together they will bring the Hyperloop and safety together for the first time.

07

TÜV SÜD presented the final version of the **Safety Guideline** at the beginning of 2019 – but this collaboration is continuing. In the future, the service provider will be managing the safety aspects of the Hyperloop test track in Toulouse.

08



HUGE POTENTIAL

Each wagon will be able to carry 28 to 40 passengers. The system is designed so that a capsule can be launched every 40 seconds, resulting in a theoretical capacity of 164,000 travelers per day.

THE MOTOR

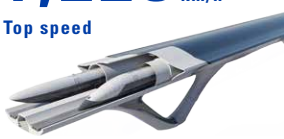
HyperloopTT is one of several companies worldwide attempting to get the technology ready for deployment. In the south of France, the company maintains a research center in Toulouse, where the first 320-meter-long test track will be opening soon.

A BREAKTHROUGH JUST AHEAD?

Specific plans for the first commercial routes are already being created. For example, HyperloopTT has concluded agreements with the Czech Republic, India, and South Korea. The first tube systems in Dubai and China could be ready in just three years.

1,223 km/h

Top speed



SECURITY NETWORK

Digitalization is changing all of our lives, but unfortunately, security in cyberspace is not always prioritized. An initiative wants to put a change to this.

EVERYONE'S TALKING WITH EVERYONE

Nobody knows for sure. One thing is certain: The number of devices linked through IT is increasing. Market research company Gartner is predicting 25 billion in the coming year. Industry, transportation, trade, and, last but not least, people's private sphere are becoming "smart." In addition to the number of completely new possibilities, the number of threats is also increasing in a digitalized world. One concern is the attacks by hackers in recent years, in which German hospitals and entire companies were brought to a standstill. A great deal of data falling into the hands of the attackers could just be the beginning.

BE CAREFUL!

Digitalization is the central driver of innovation – both today and in the future. However, "Every innovation is associated with risks that have to be monitored," says TÜV SÜD Chairman Axel Stepken. "Ensuring security in the digital age is therefore a key aspect of digitalization. Without security around IT systems and applications, it will not be possible to maintain trust in digital processes and technologies."

THE SECURITY EXPERTS

TÜV SÜD and security: They should be inextricably linked – especially in the digital environment. The Group has been building up specific competencies in this area for years – with its own cybersecurity unit, for example, which now comprises almost one hundred employees in Germany, Asia, and the USA.

STRONG PARTNERS

It all started with Siemens: Together with eight partners from industry, the technology group launched an initiative at the beginning of 2018 to establish globally binding rules and standards for more security in the IT sector. Since the summer of 2018, TÜV SÜD has been a member of the Charter of Trust, which currently comprises 16 members. In addition to numerous globally active companies from Europe, North America, and, in the future, Asia, the German Federal Office for Information Security, the CCN National Cryptologic Center of Spain, and the Graz University of Technology in Austria will also be taking part.

FIND MORE INFORMATION ABOUT THE 10 PRINCIPLES AT

https://sie.ag/2GDRgfe

GETTING THINGS DONE TOGETHER

The rise in interconnectedness is the topic – and only by being interconnected is it possible to make a difference. That is the credo of the "Charter of Trust." The initiative aims to raise awareness of the topic among the public and prominent decision-makers. In many governments, agencies, and companies, only the opportunities associated with digitalization are seen, and cybersecurity is not always taken seriously enough. However, the two aspects are inextricably linked. "To keep up with fast-paced technological advances and threats from the criminal world, business enterprises and governments must join forces and take decisive action," according to the preface of the joint declaration.

IMITATION DESIRED

Setting a good example – and thus encouraging others to join in. That's what the members of the "Charter of Trust" are focusing on. Together they have committed themselves to 10 principles for more cybersecurity and IT security. Principle 10 states that joint initiatives that include all relevant stakeholders should be promoted in order to implement the stated principles in the various parts of the digital world without undue delay.

Mr. Stepken, why is “together” so important for TÜV SÜD?

Prof. Dr.-Ing. Axel Stepken,
Chairman of the Board of Management
of TÜV SÜD AG

“Our society is standing before the huge challenge of making technological change more secure – in traditional fields of technology and in all areas shaped by the digital age. This requires enormous and broad-based expert knowledge.

Security can only be ensured for the future if the best minds work together – in our business enterprises as well as in networks and partnerships with universities, researchers, and visionaries. Our strategy is quite deliberately based on the slogan ‘The Next Level. Together.’”

Experience even more team spirit – in our TÜV SÜD videos about partnerships

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The strong TÜV SÜD network: coming together for equal opportunity

LIZ FENDT &
SILVIA IMRAN &
JULIA SAUERBREY

CITY RIVALS

Two TÜV SÜD employees from Madrid live their passion for soccer

SANTIAGO CABANAS &
MIGUEL GARCIA-ESCUDERO

DIGITAL & LIMITLESS

Better results as a diverse software development team

XIN XIN &
JIN SOHYEON &
MANORANJAN DEVAGNANA

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