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STARTUP
4 new, ambitious companies
introduce themselves

PORTRAIT OF A CEO: Sarah Montani
"Creativity and the desire to create
new things inform everything I do."

HIDDEN CHAMPION: afca AG
Mixed reality – best of both worlds

DIGITALIS: Backup ONE
Secure data storage for SMEs

Metaverse – the world is not enough

Your company has nothing to do with Metaverse?
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Content

Dear reader,

Have you ever had the opportunity to try out virtual reality? Immersed yourself in an animated world with a VR headset? How did you find it? My first experience was both fascinating and confusing at the same time. My brain couldn't quite engage with this virtual world and forget about reality. And I feel the same way about the hype surrounding the metaverse: my critical mind doesn't want to surrender completely to the prophecies being made about it. Don't get me wrong – I don't doubt that some kind of metaverse will exist. But I am yet to be convinced that it will really have the disruptive effect many are promising. There are still a lot of questions to be answered, such as what the effective energy demand of the metaverse will be and how it will be met, how data protection issues will be handled, or how the various worlds will interface with each other.

It is quite right to raise and discuss these and other questions. They won't stand in the way of the development of the metaverse or of technological progress in general.

But we don't have that crystal ball that enables us to peek into the future. So in this issue we take you on a journey looking at how various Bernese companies are approaching the metaverse.

Happy reading!

Yours truly,
Dr. Sebastian Friess
Head of the Office of Economic Affairs
President, Bern Economic Development Agency

Publication details

Metaverse – the world is not enough

Discovering and creating new worlds seems to be deeply rooted in the human DNA. The metaverse is the latest incarnation of this primal drive. But are these digital parallel worlds really the future – or are they just hype?

The metaverse – the buzzword of the hour – is the logical next step in the evolution of the internet, if the press and Silicon Valley gurus are to be believed. There's no getting around it, they say. But what is the metaverse aiming to achieve? Can it really do that? And where does it stand today?

The metaverse's equivalent of the Big Bang could be said to be the 1992 sci-fi novel "Snow Crash" by Neal Stephenson. It's where the term "metaverse" in the sense of a virtual parallel world appears for the first time. And in fact the word is still used the same way today. This parallel world is more than just a chat room or an online game. It is a three-dimensional, immersive VR universe that can't be put on pause and is interconnected with the real world. Just as the internet consists of multiple pages, the metaverse is made up of multiple worlds. Among the best known metaverse worlds are Horizon Worlds by Meta, Old Space VR, Sandbox by Microsoft and Decentraland. Very much in their infancy, these worlds can best be described as prototypes, including in terms of their populations. They can't be compared with gaming platforms such as Fortnite, Minecraft or Roblox, which already attract several million players on a daily basis. For now, these gaming platforms are self-contained worlds, just like the metaverse prototypes. But the big question is whether they will eventually evolve into a single permeable, compatible universe. Only then will the metaverse be in a position to revolutionize the internet.

At least another ten years
Probably the most vociferous disciple of the metaverse is Mark Zuckerberg. Not only has he changed the name of his company Facebook to Meta, but he also has a fairly precise vision of the kinds of things he thinks we should be doing in the metaverse in the future. True to form, he presented his vision in a highly media-effective and easily understandable way in the form of a marketing video. In it, he meets friends, or rather their avatars, in a futuristic conference room, experiences street art in 3D, and journeys through a forest riverscape where fish can fly. He also predicts that we will have virtual homes complete with home offices and wardrobes filled with vir-

tual clothes, and that we will be able to teleport or click from world to world to shop, game, play sports, and lots more besides. And if we don't find a world we like, then we can always create one of our own. Exciting? Maybe, but it doesn't really sound all that new. According to Zuckerberg, what is new is that unlike today's internet, the metaverse will be designed to feel real and create what he calls a feeling of presence – something he refers to as the defining quality of the metaverse. Key to this experience are devices that allow us to immerse ourselves in these worlds, such as VR glasses. But they are clearly a work in progress. Although the glasses are a lot lighter than they used to be in the early days, they aren't suitable for wearing for hours on end every day. Other developments are also needed, such as full-body suits that add the sensory dimension to a visit to the metaverse. Zuckerberg and other experts reckon it will take around another ten years for the necessary hardware and software to be developed and for the metaverse to transition from hype to reality.

Wild West
One issue that is as yet largely unresolved is that of ethics. There have recently been reports in various news media of visitors to the metaverse experiencing sexual harassment, leading to calls for regulators and protective mechanisms. And these are by no means new problems. Second Life, a multi-player online game launched in 2003 in which people interact with each other through avatars and that is often described as the precursor of the metaverse, was unable to solve them. Crime, pornographic content, and the lack of protection for minors ramped up the criticisms, turning the virtual world into an increasingly lonely place.

Invest or hold off?
The metaverse therefore still has a lot of developmental and evolutionary stages to work through. That said, as a completely new economic system it is already firing people's imaginations. A study by McKinsey & Company predicts that the metaverse could reach a potential value of as much as

USD 5 trillion by 2030, with half generated by e-commerce, and virtual learning, advertising, and gaming driving the rest. More than USD 120 billion has already been invested in the metaverse, according to the report, the major factors being technical progress, demographic tailwinds and increasingly consumer-led marketing and engagement. The question that remains unanswered as yet, though, is which world or which currency is worth investing in.

What does all this mean for businesses? Should they already be on the front foot, or is it enough to watch from the sidelines for now? On the next double page spread we introduce you to several players who are taking up their positions.

Avatars are our representatives in the virtual world.

Almer Technologies

The future of the metaverse not only lies in VR headsets but also in augmented and mixed reality headsets, according to Zuckerberg. A unique AR headset – the only one of its kind in the world – is being developed in Bern by startup Almer Technologies. The Arc is a compact, lightweight system complete with an integrated camera, a unique display and specialized remote maintenance software. It can be used to solve problems remotely in real time in a matter of seconds: the wearer can call up an expert and share what they can see, and the expert can then superimpose their knowledge straight onto the wearer's field of vision. Completely hands-free.

It all started at Federal Institute of Technology (ETH), where Sebastian Beetschen worked on the development of Microsoft's HoloLens as a student. "Right from the start I knew that what we were making there worked better," the mechanical engineer says. This led to a dedicated project that took shape in 2020, the year when microengineer Timon Binder, now CTO, also joined the team. A grant from the Swiss Innovation Agency Innosuisse and support from the Canton of Bern enabled the young startup to rent premises and take on staff. At their base at Marktgasse 46 in Bern, their hardware team is now fine-tuning the Arc. "We produce at least one new model a week." The versions are manufactured and tested in the in-house design lab. "The time we invest in prototyping will save us a lot of time and money

"It takes a certain naïveté to tackle something like this."

Timon Binder, CTO Almer Technologies

when we start large-scale production later on." But perfection is not a prerequisite for the product launch: "We offer the system on a subscription basis. Our customers will get updated models regularly."

"Although producing hardware is hard work and programming software is never-ending, we do both," Binder explains – just as their role model Apple does. "The main functions should already

be available on the headset." These core applications, along with an app store, are being developed by the Almer software team in Romania. "Our aim is that other developers will create better apps for our headset in the future. When that happens, we'll have nailed it."

But essentially they already have: the Arc is currently available to customers in a pilot project. Another 200 will be produced this year, most of which have already been sold. To begin with, no one thought they could do that. "You'll never crack it, is what we heard from experts and gurus at every milestone we set," Binder says. And there should be plenty more milestones to come, as Almer Technologies also has plans to develop consumer products to replace cell phones, for example. Almer Technologies looks set to nail that too.

The Arc is lightweight, compact, and also suitable for glasses wearers.

mindcraft AG

Whether in video games, the metaverse, or online stores, more and more virtual worlds are emerging in which products are shown in three dimensions. This is an opportunity the Langenthal-based software company mindcraft AG is grabbing with both hands.

CEO and co-founder Josua Hönger has been programming software since his high school days: "Manipulating pixels is something I have always found fascinating." His hobby turned into a vocation, leading him to drop out of his computer science degree course at ETH to found a company to distribute his software for mixing music and images. After initial marketing difficulties, he sold the software to a company in London. Today it is used at major events such as the Super Bowl in the USA. "That first episode taught me that it pays to persist."

Hönger first encountered virtual reality in 2013 when a company hired him to write software for their 3D scanning technology. This inspired him to found mindcraft AG in 2018, a company dedicated to programming complex 3D solutions. Instead of entering the highly competitive market of 3D content production, they have produced what all manufacturers need: a cloud-based platform for distributing 3D content. Sharing 3D content is a lot more complicated than sharing photos: "You can't just take a 3D scan and send it. The data have to be edited so that the geometry, the mirroring, and the reflection of an object are displayed correctly. It's an art in itself."

mindcraft have pulled off this feat with their Meshvalley platform. Customers have been able to post their content on the cloud since August. Once there, the content is improved and prepared for sharing on a wide range of platforms, for example in a video call as part of a product demo, as a product in an online store, or as an augmented reality artwork for display on your own desk. Although he believes firmly in his product, Hönger is not anticipating rapid success: "We are very pragmatic because it is not yet clear how fast and how large the metaverse will be. But what is certain is that the worlds will need to be filled with data, and we are ready for that."
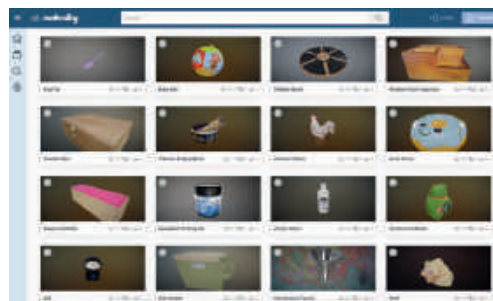
Meshvalley is a platform that allows customers to share their products in 3D with the entire world.

"We don't want to mine gold; we want to sell the shovels to the gold diggers."

Josua Hönger,
co-founder and CEO, mindcraft AG

SO REAL Digital Twins AG

SO REAL Digital Twins AG, or SO REAL for short, is entrepreneur Charles Flükiger's latest startup that produces virtual representations of objects known as digital twins. To achieve this, Flükiger developed and patented a process that allows digital images of objects to be created fully automatically. The name says it all, as Flükiger explains: "The digital twins look real, they can be viewed from the inside and outside, and they know their own physical properties. This allows the objects to be inspected in the same way as their real-world counterparts, and they behave like them, too. It's a world first!" For example, the digital image of a bag can not only be viewed from all sides but can also be opened. "It's a dimension that most other manufacturers of digital twins haven't thought of," Flükiger proudly explains. So how does this SO REAL technology work? "We scan the real-world products with industrial X-ray scanners. The images are then processed by SO REAL software so that the objects, along with all the information, run as plug-ins in all applications and can be easily shared worldwide via the internet or 5G." Twins can be produced in bulk. "This is a particularly interesting option for museums that have large collections but can only exhibit five percent of them," says Flükiger. SO REAL wants to help museums bring their treasures out of the archives and exhibit them online so that they can be experienced virtually. "Our scans will not only enable works of art to be examined from all sides. They will bring them to life on a whole new level, for example by getting you so close to the 'Mona Lisa' that you can even get a feel for the different layers of paint."

Another focus market for SO REAL is the fashion industry, which suffers from high rates of returns on online orders – a situation that is neither ecologically nor economically sustainable. With SO REAL's clothing twins, customers can try on clothes virtually using avatars, giving them a much better idea of what the item will look like on their body. Flükiger can't yet say for certain which market SO REAL will achieve its breakthrough in: "We have seen that we are still ahead of the curve with our technology. It remains to be seen which market will be ripe for our product first." He is in no doubt that the SO REAL digital twins' time will come. And his track record speaks for itself: the self-made man has already built up several companies and is an expert in innovation. "Large leaps in innovation don't usually come from industry experts but from people or companies that make connections across industries that help them come up with new business ideas. Tesla, Uber, and Airbnb are great examples of this."

> "To come up with good innovations you need a good mix of industries."
>
> Charles Flükiger,
> co-founder and chairman, SO REAL Digital Twins AG

SO REAL digital twins behave like their real-world counterparts.

UniBE Virtual Reality Lab

Research into virtual reality is also happening at the University of Bern, including at its Institute of Psychology. Professor Fred Mast, head of the Department of Cognitive Psychology, is using virtual reality in various studies to investigate cognitive knowledge acquisition and thought processes. "During my time at the Massachusetts Institute of Technology, we used virtual reality to train astronauts. When gravity is absent, new dimensions open up in space. We used virtual reality to simulate that," Mast says, reflecting on his first experiences with VR. When he joined the University of Bern, he set up a Virtual Reality Lab: "We used virtual realities to study behavior. Because we can manipulate these realities ourselves, they are the ideal test environment for exploring and treating different scenarios such as fear of heights or arachnophobia." The biggest insight he has gained so far is that virtual reality lends itself particularly well to learning: "We have seen how avatars in the virtual world can make good learning partners. Avatars are perceived as present." According to Mast, the ability to engage with the new world leads to better learning effects than when the same material is learned from a screen, for example. It can also be used to bring about behavioral change. This experience of the perception of presence in virtual reality is also confirmed by other studies which suggest that study participants perceive simulated limbs as part of their own body.

According to Mast, the future for the use of virtual reality lies in particular in learning appropriation and behavioral change. "We do not necessarily need virtual reality for meetings; tools such as Zoom or Skype are perfectly adequate for that, as the pandemic has shown. But if what is needed is a presence – a feeling of being immersed in the virtual world – then the virtual world can be very useful, for example for learning sequences of movements." The question of what happens to us humans when we spend a long time in virtual reality is not something he is able to comment on as yet. "But it will be exciting to investigate this."
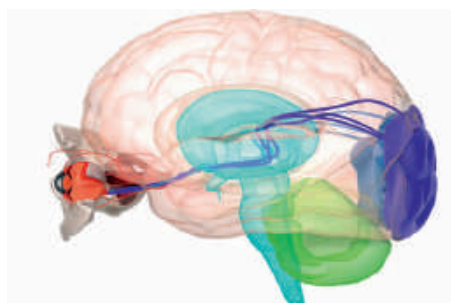
> "Avatars are perceived as present."
>
> Professor Fred Mast,
> head of the Department of Cognitive Psychology
> at the University of Bern

STARTUP

BREATH OF FRESH AIR

machineMD

The Bern-based startup machineMD has developed the NeurOphthalmoscope, a non-invasive diagnostic tool for early detection of brain diseases such as MS, brain tumors, Alzheimer's disease, etc. It involves high-precision pupil movement tracking using special VR glasses.

Instead of being done manually by a specialist, the examination can be performed by a medical assistant in a fraction of the time. The NeurOphthalmoscope also provides objective, reproducible, and quantitative results and is therefore more reliable than the current method. In short, machineMD is revolutionizing ophthalmological diagnostics with its standardized and automated methodology.

The medtech startup was founded in 2019 as a spin-off from the University of Bern and is based at the new startup hub at sitem-insel. This development is being supported as part of an Innosuisse project in collaboration with the University of Bern, the development partner Helbling Technik Bern AG, and CSEM in Neuchâtel.

hypt

The startup hypt brings word-of-mouth advertising into the digital age. With hypt's tools, customers can quickly share their enthusiasm for a product or service with their social circles on WhatsApp and Co. in a fun way. So friends and acquaintances only need send each other ads for things that inspire them personally. Hypt's aim is to complement already inundated social media advertising with more effective personal media advertising.

Hypt also picks up on negative experiences and allows providers to respond to them directly, helping to greatly reduce negative comments on the internet.

Besides a bank, various e-commerce customers, and users in the catering and hotel industry, hypt's solution has recently been implemented by publishers, enabling readers to recommend books to each other quickly and easily.

According to the startup's three founders, Pascal Sollberger, Tobias Wegmüller, and Roger Ellenberger, hypt is suitable for use wherever existing customers can attract new ones, therefore deliberately avoiding an industry focus for once.

Ideas, new technologies and inquiring minds constantly inspire new business ideas that give rise to startups. We present four examples in our startup parade.
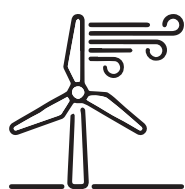
FACTs

Startup stage	Startup stage
Up and running	Up and running
The inventors	**The inventors**
A seven-strong team of founders headed by CEO Dominic Senn	Three Bernese specialists, each in their own field: media, marketing, and IT
Bern	**Worblaufen**
machinemd.com	**join-hypt.com**

Virtual Discovery AG

Virtual Discovery AG specializes in developing and implementing breathtaking virtual worlds. In addition to location-based virtual reality (LBVR) experiences, the startup in Matten bei Interlaken also creates XR apps, games, entertainment, edutainment, and interactive visualizations for businesses. Its tailor-made solutions can be purchased as a package that includes all the necessary hardware and software. With its specially developed Web XR and free-roam VR platforms, Virtual Discovery AG can offer its tailor-made services quickly and cost-effectively.

So far, virtual discovery has primarily been the preserve of the entertainment segment, with the company's LBVR technology already in use in various VR arenas at home and abroad. In the near future it intends to shift the focus more towards mission critical training, which will entail providing training programs for police, fire services and armed forces. Also in development, in collaboration with ETH, is a novel positioning system that will enable VR to be used on unlimited surface areas and in nature.

airtime AG

As specialists in promotional videos and video communications, airtime AG offers the world's first user-friendly film studio on wheels. The stable, infinitely height-adjustable desk contains everything you need for successful video recordings: two cameras, portrait light, studio microphone, screens, green screen for virtual backgrounds, and intuitive touchscreen operation for all functions. One single mains power cable and one single USB-C cable for your laptop are all you need to record professional videos in real time quickly and easily. Videos are recorded as universally compatible MP4 files for easy use in any application. With happy customers from a wide range of sectors including education, banking, healthcare, watches, and industry, airtime is making a name for itself as an innovative all-in-one solution for marketing, presentations, training courses, and video conferencing. The The mobile studios are Swiss-made and distributed in Tavannes by Zesar.ch AG, specialists in ergonomic classroom and industrial furniture.

Startup stage	**Startup stage**
Up and running. Investors sought for further development	Up and running
The inventors	**The inventors**
Gerrit Schneider and Sébastien Broggi, two ambitious coding enthusiasts	A film production company, an ergonomics expert, and a furniture manufacturer
Matten bei Interlaken	**Ittigen**
vi-di.ch	**airtime.swiss**

"Creativity and the desire to create new things inform everything I do."

Sarah Montani is an artist, lawyer, co-founder of Weblaw AG, and co-editor of Switzerland's largest legal journal, *Jusletter.* She is a metaverse pioneer and advises executives on topics such as the metaverse and mixed reality. She also works as a lecturer in art and is a happiness researcher.

The artist

I call myself first and foremost an artist. My specialty is encaustics, a 3,000-year-old technique in which color pigments bound in wax are applied hot to the painting surface. It is very sensuous and challenging work. I love the excitement of creating a link to the present and the future, and I also find it extremely satisfying to have a physical manifestation of my own work. I exhibit my works at the Venice Biennale and at Skulptura, but also in galleries in the metaverse, which enables me to create a link to the digital world. Each artwork has a QR code, and part of each work can only be seen with augmented reality.

The happiness researcher

Studies have shown that happy people are healthier and have a better immune system. They live longer, feel strong and creative, and have more energy. It has also been scientifically proven that 50 percent of our feeling of happiness is genetically predisposed, 10 percent depends on external life circumstances, and the remaining 40 percent is in our own hands. So what do you have to do to fill that 40 percent with happiness? Personally, simply immersing myself in the subject matter makes me happy. I give talks on happiness research in order to bring the subject to a wider audience and raise awareness of the positive. Of particular interest to me is whether the metaverse can make people happy. I have come to the conclusion that it can, provided we use it to do something rather than just consuming it passively. Playing sports in the metaverse, for example, or connecting and sharing ideas with other people, or discovering new things activates our feeling of happiness for a sustained period of time. The metaverse will make us happy if we don't seek happiness in it.

Artist through and through. During the pandemic, she got to grips with ancient painting techniques and now combines them with virtual and augmented reality to create experimental art experiences.

A successful duo: Franz Kummer and Sarah Montani founded Weblaw AG together.

The first five augmented reality artworks by Sarah Montani are on display at the 16th edition of Skulptura, one of the largest sculpture exhibitions in the German-speaking world, until the end of November. The digital artworks can only be seen through the eye of the smartphone camera. It is an open art form that invites the viewer to play and can be shared.

In addition, Montani is building two venues in the metaverse: a gallery and an arena for holding her company Weblaw's events such as the Metaverse Summit.

More on the Skulptura project
sarahmontani.com/events/ skulptura-2022

The metaverse pioneer

I love exploring, trying things out, and co-creating, so I was drawn to the metaverse at an early stage. In particular, I am interested in the new opportunities it offers – for business, for communication, but also for art. Another aspect that fascinates me is what the metaverse does to our perception and our minds. Even after spending a short time in the metaverse, I start to wonder if I am in the real world or in a parallel universe – or both at the same time. I appreciate the "now" in the "here" even more since the metaverse came into being, because it invites us to perceive our reality as it is – it's like an awakening.

Nonetheless, I do wonder what all that effort and expense is for. You don't even need the glasses: simply close your eyes and let your mind wander. We humans do this about 6,000 times a day – it's our own individual world, so to speak. Our minds wander for about half our waking hours. We don't concentrate on our work all the time; we cause accidents. And yet this state of mind engenders creativity and flashes of inspiration. So from that point of view we are also a metaverse. What's more, our brains only use 20 watts of power, the energy of a light bulb – nothing like the vast quantities of energy needed for blockchain or metaverses.

The entrepreneur

I always wanted to build a business, so I dropped out of medical school and switched to studying law. This gave me the freedom I needed to set up my company, Weblaw, working with a good entrepreneurial partner. Weblaw is an online portal that supplies lawyers with all kinds of information and news. We are also one of the first companies in Switzerland to offer courses on the metaverse, answering questions like: how do you hold a meeting with avatars? What equipment do you need? "Meta-working" is a very impressive experience. Today, Weblaw is a market leader in IT and law and publishes the biggest Swiss legal journal, Jusletter. We worked incredibly hard to make our dreams a reality. Was it a gamble? We definitely took risks and also went through some difficult times, but we worked out solutions together and have made a lot of customers very happy. I love working and always try to be present in what I am doing.

The learner

Education, whether as a learner or a lecturer, shapes the course of my life. The desire to keep on developing is simply in my DNA. Even in my role as a lecturer I learn from the diversity of questions and views put forward by my students.

"The metaverse invites us to perceive our reality as it is – it's like an awakening."

Mixed reality – best of both worlds

Mixed reality is being used to create completely new applications. Afca AG in Zollikofen has been working with this technology for many years and already has a substantial portfolio of projects to its name. Dip into the world of mixed reality with afca founder Paul Affentranger as he explains what it is and what it can do. At a timber construction company, afca has taken the world of work into a whole new dimension.

To put it simply, mixed reality (MR) blends the real world with digital objects. A market leader in this field, afca AG gives us an insight into how mixed reality is created and what it takes to achieve it.

Mr. Affentranger, could you start off by explaining what mixed reality is?

Mixed reality is the merging of the real world with the digital world. It brings three-dimensional objects into the room in the form of holograms, creating a spatial interaction between the two worlds – hence the name. The user can see these holograms in the room through their MR headset.

Can you give us an example of how mixed reality is used?

Yes, take the timber construction company schaerholzbau ag in Altbüron, for example. They do all the planning for their construction projects digitally. The digital construction drawings are then used to produce a wide range of wooden components that can be very different in shape and vary in complexity. In the past, staff would need printed drawings to work from. But with the planning work for the buildings and components now done digitally and spatially, the drawings are displayed spatially in mixed reality and can be seen in the MR headset's field of vision, keeping hands free for the actual assembly work (see diagram on the right).

How long have you been developing mixed reality applications?

We have been working with MR for more than five years, which is a long time in terms of this technology. In that time we have already implemented 50 projects for a range of clients. For the city of Zurich, for example, we are working on a project for digital urban planning using HoloPlanning. Overall, we have considerable experience in MR. But it is still very much a niche area.

Do you operate internationally?

We do, but our main market is Switzerland. There are two main reasons for this. Firstly, we want to be able to look at things in situ together with the client. Secondly, we tend to be too expensive for other countries due to labor costs. But we do have the know-how needed to work internationally. For example, we solved a difficult problem for a French energy company with a relatively simple application, which involved making sure the protective suits were put on properly.

How do your customers find you?

Mainly through LinkedIn or our website. We are also active members of MR communities, where word of our expertise is getting around. Additionally, we were the first Microsoft MR partner in Switzerland.

What skills do people need if they want to work at afca?

Above all, we want our team to be diverse. Only some of our people are software developers. We also have designers and people who work with 3D models or with sound and the user experience. Even though everyone here is a specialist in their own field, we all need to know a bit about everything. Teamwork and an open error culture are key. For us, it's important not to blame and shame, because every project is a learning process.

Why are you a Hidden Champion?

I think it is MR technology that is hidden: these are still specialist applications that not many people know about. On top of that, there are only a few MR apps and MR headsets are still relatively expensive.

What does being based in the Canton of Bern mean to you?

A big bonus of being in Bern is the lower office rental prices. We need a lot of space for our applications, and that would be almost unaffordable in Zurich. The geographical location is definitely also an advantage: it is important to us to be central. Plus, as a Bernese company we have a local cachet. Many people think that a company that develops MR applications must be based in Zurich, so they are quite surprised to discover that this kind of thing is also happening in Bern.

So where will we be in ten years' time?

I think we are at the beginning of a new paradigm. Today, we carry computers around with us in the cell phones in our pockets. The next step will be the computer disappearing altogether. I am convinced that in five or ten years' time, we will be communicating directly with objects connected to computer intelligence via the cloud using gestures and speech.

"We are expanding realities and building interactive bridges between the digital and the real world."

Paul Affentranger, afca founder

Documentation
After completion of the work, the joints are documented and checked to ensure they have been installed correctly. The MR headset guides the user to the right places. They can then take pictures and dictate text using voice commands, and a PDF is produced for documentation purposes.

Design
Timber construction companies work with a lot of components drawn by architects or designers in CAD. MR enables these drawn components to be seen in 3D.

Documentation

Design

Cloud

Manufacturing
Computer-controlled manufacturing is carried out with CNC machines.

Fitting

Manufacturing

Fitting
The right connection pieces must be fitted in the right place. When the fitter looks at the connection point through the HoloLens (eye tracking), it tells them which components to use (brackets, screws, etc.).

Assembly

Assembly
Assembly can be a complex process. Each component has a number. The fitter says the number of the wooden component and the HoloLens shows where it goes (red in the picture). This speeds up the process by around seven percent.

HoloLens MR headset
As a certified Microsoft partner, afca uses the Microsoft HoloLens 2. This mixed reality device is a holographic computer that is worn on the head, with lenses over the eyes that project holograms and place them in the real world in the user's field of vision. The MR headset is equipped with a range of sensors and cameras with functions such as eye tracking and gesture, object, and speech recognition. In addition, rooms are captured in three dimensions so that the user can recognize the position and location of objects in these rooms.

About afca AG
- Founded in 1995
- Self-managed following the principles of holocracy
- 14 staff
- 50 MR projects completed

afca.ch

Secure data storage for SMEs

The young Bernese company Backup ONE was founded in 2015 with the aim of offering businesses secure data storage in the cloud. Today the company is one of the established names in this branch of IT, not least thanks to its two highly secure georedundant data centers.

In April 2016, a few months after it was set up, Backup ONE started operating via the domain www.backup.ch. "Our website is designed as a hub for all backup matters involving data protection," explains Tobias Undeutsch, co-founder and CEO of the young company. Backup ONE offers complete solutions for backup and cloud storage, including cybersecurity and disaster recovery, in other words rescue and recovery of lost or deleted systems and data. For this purpose, its IT and system engineers have developed a central admin console and a number of its own software applications. Server Backup, for example, is an all-rounder that securely manages physical and virtual servers, Microsoft 365, Google Workspace, and other cloud applications via a central web portal.

Doubling up – georedundancy

Two years ago Backup ONE launched Backup ONE Swiss Cloud, a new service that forms the basis for all its current and add-on services. This cloud is housed in two georedundant data centers in Zurich and Geneva. These centers are so far apart that even banks can securely store their data there in compliance with strict Swiss Financial Market Supervisory Authority (FINMA) guidelines. In this case, georedundancy means that a copy of all the data in the one data center is stored in the other and is mirrored in real time. If one data center were to drop out following a hacker attack, for example, the data would still be seamlessly available in the other.

On the subject of hacker attacks, the area of cybersecurity in which Backup ONE operates is in a constant state of flux. Until recently, one of the most common forms of cybercrime was ransomware. Gangs of hackers would infiltrate IT systems and paralyze entire companies by threatening not to release the blocked systems unless a ransom was paid. Nowadays many companies are better protected against attacks of this kind with security solutions such as those offered by Backup ONE in the Swiss cloud.

New methods of attack

That said, there's no chance of the twelve-strong Backup ONE team at Belpstrasse running out of work. "Demand is increasing, for several reasons," Undeutsch says. First, cloud storage itself is still expanding at breakneck speed. The entrepreneur points to the volume of data stored, which "more than tripled in the past year alone on our servers." Second, cybercriminals are constantly looking for new ways to outsmart security solutions. At the moment, for example, attacks are often designed to secretly extract sensitive data, following which the data owner is threatened with publication if a ransom is not paid. But classic attacks such as DDoS or hacks using social engineering are also keeping Swiss SMEs on their toes.

> "Data protection must begin where the data originates."

Tobias Undeutsch,
co-founder and CEO, Backup ONE

So boredom is definitely not on Backup ONE's system engineers' radar – especially given that there are some strong competitors out there. One of them – Swisscom in Bern – is right on their doorstep. Other well-known players are Mount10 and Infomaniak. Backup ONE differentiates itself from its close neighbor, the Blue Giant, as Swisscom is known locally, by going for a clear niche orientation. "We are an SME that mainly works with other SMEs," Undeutsch explains. Most of the 800 or so companies in his customer base employ between 25 and 200 people. But they also have the capacity to serve larger corporations with several thousand employees.

Teamwork and swarm intelligence are the most effective weapons in the development of secure storage solutions.

Backup ONE in numbers

Status: February 2022

2.2 billion

objects and encrypted records stored and secured for our customers.

218,003 backup jobs

Daily average running fully automatically for servers, vServers and Microsoft 365 / Google Workspace

200+ partners and resellers

from across Switzerland work with us. Our partners resell our solutions and obtain attractive leads from their regions.

100% Switzerland

We see Switzerland as the optimal data location for our services. We operate our infrastructure entirely in Switzerland.

42 petabytes

We store and manage 42 petabytes, or 42,000 terabytes, of data for our customers.

2 data centers

For our Backup ONE Swiss Cloud, we operate two data centers to the highest Tier IV/III standard in Switzerland, one in Zurich and one in Geneva. This enables us to store the data georedundantly.

Direct customer contact

But ultimately, the reason why the bulk of the company's customers are SMEs is because SMEs rarely have their own security and cloud specialists in-house and usually outsource all their IT. SMEs therefore need the kind of support that Backup ONE can provide with its complete package of advice, software, installation, security, data storage, updates, maintenance, and so on.

Compared with larger competitors that handle almost everything digitally and automatically, Backup ONE scores highly with SMEs because of their personal customer contact. "We don't just communicate through a tool or an app. We talk to our customers on the phone and visit them." Their data protection and cloud storage solutions are sold both directly to end customers and to specialist IT service providers as intermediaries.

With the kind of personal service it provides, Backup ONE's operations may be more time- and capital-intensive than those of some of its competitors, but this is exactly what has enabled the young company to get off to a successful start. When asked about growth plans, the CEO's response is slightly guarded: "Of course we want to grow, but as organically as possible." Acquisitions are also very much on the cards, provided the companies are a good fit. Undeutsch refers to Informatio GmbH, another Bern-based company: Backup ONE acquired this Swiss expert in DELL EMC cloud storage together with its entire workforce last year. Backup ONE had been working closely with Informatio since the early days. Now Informatio founder Holger Jakob is a member of the Backup ONE management board and the board of directors and is also a shareholder.

Backup ONE currently manages more than 12,000 hard drives. But this impressive number is no reason for Undeutsch to rest on his laurels. Cash flow is mainly put towards further development. Any business wanting to remain a player in this field in the future must stay vigilant and agile. Various new technologies for secure cloud storage, and therefore other competitors, are already appearing on the horizon. Zurich-based startup Decentriq, for example, works with confidential computing. This technology enables data to be protected in hardware-based enclaves in large providers' clouds as it is being used, allowing businesses to work with and process their encrypted data in these secure data clean-rooms without having to reverse the encryptions. Undeutsch: "Data protection must begin where the data originates." He is confident that there will still be enough room in the market for multiple providers and multiple solutions in the future, however. "Although the market is growing dramatically, it is not yet over-crowded, and we are really only just getting started with the highly data-intensive IoT."

Swisscom and Backup ONE

Backup ONE's most powerful competitor is Swisscom. This provider offers comprehensive advice and management as well as secure connections for cloud, security, and IoT solutions, along with the matching business applications. "We work with both SMEs and large corporations," says Swisscom spokesman Armin Schädeli. Swisscom has eight data centers in Switzerland which play a key role in data storage, distributed in such a way that data from all over the country can always be stored georedundantly. Opened in 2014, the Wankdorf Bern Data Center, in which Swisscom invested CHF 60 million, is the most modern of its kind. It is Tier-IV-certified by the Uptime Institute and therefore meets the highest standards in terms of availability, security, and efficiency.

According to Schädeli, Swisscom uses tried-and-tested solutions from specialized partners to ensure maximum security for their cloud backup and business continuity solutions at all times. This means that the telecom giant can also collaborate with small competitors such as Backup ONE if they are able to offer the best available solution in a particularly sensitive area of security, for example. How the two companies actually work together is, understandably, not something they are keen to reveal.

backup.ch

From vision to opening in 3 years

Brigitte and Marc A. Trauffer outside the entrance to the *Bretterhotel* and the World of Experience in Hofstetten near Brienz.

Hofstetten boasts a newly added tourist attraction. In June 2022, entrepreneur and Swiss dialect musician Marc A. Trauffer opened his *Bretterhotel,* a hotel made of wood, along with the World of Experience, restaurants, and event spaces right next door to the Ballenberg Open-Air Museum. Trauffer's famous wooden cow is now afforded the scale it deserves. Standing 5 m high and weighing in at 30 tons, what is probably the largest wooden cow in the world greets guests outside the entrance.

It all began in Hofstetten near Brienz in 1938, when professional bear carver Alfred Trauffer and his wife Rosa opened a wooden toy shop where they sold the wooden carved cows and other farm animals he made. Whether it was down to their charm or their simplicity, the cows sold in their millions and are still hugely popular the world over today. Now in its third generation, the company produces a wide range of products – but the traditional red-spotted cow is still the undisputed star.

Since 2008, the company has been run by Alfred's multi-talented grandson Marc A. Trauffer, known locally as *"dä mit de Chüeh"* (the guy with the cows). Besides running a business, he is also a Swiss dialect musician who charms audiences all over the Alpine region. *"Doch Heiterefahne, miis Härz ghört da hi" ("I just can't help it – this is where my heart belongs")* is something he not only sings but also puts into practice. In his hometown of Hofstetten, the plucky, out-and-out entrepreneur has invested several million Swiss francs in a hotel complete with the World of Experience, a restaurant and a bistro, and event spaces – all made out of wood.

The idea came about because his company was unable to meet the high demand for factory tours and woodcarving courses. As the concept took shape during the planning stage, it also gained in size. On June 4, 2022 – Trauffer's 43rd birthday – , he and his wife Brigitte opened the World of Experience which, alongside woodcarving courses, a shop and tours, also boasts a hotel with a bistro and a restaurant. It took them just three years to get from vision to reality. In addition, the Trauffers incorporated the village shop and post office into the buildings, now also a popular meeting place for locals. Trauffer even rolled up his sleeves and lent a hand during the building phase, and as this was a project that was very close to her heart, Brigitte took over as director.

Fun in the World of Experience: learn to carve your own wooden cow (top) or treat yourself in the restaurant or the bistro (bottom).

The Trauffer World of Experience

Bretterhotel
31 bedrooms, 102 beds

Experience tour
Non-guided tours of "Planet Cow"

Event floor
Woodcarving classes for up to
180 guests, Weddings, parties, seminars

Shop
Wooden toys and merchandise

Food and drink
Rosa's Bakery Bistro
Alfred's à la carte restaurant
Village shop and post office

www.trauffer.ch

Top left and center: There's no end of craftsmanship to discover on the tour. Top right: Blending modern and traditional: the bedrooms in the *Bretterhotel*. Below: The wooden cow at center stage: it goes through 24 processing stages before it reaches the shelves.

From wood board to wooden cow

Hofstetten is an idyllic woodworking village with beautiful timber buildings and trades such as carpenters, chalet builders, a turning shop, a flooring supplier, and a construction company. There used to be a carpentry shop on the site of the Trauffers' World of Experience. And the new buildings almost look as if they were made from the stacks of boards that would have stood there – although much of the wood the hotel is built from comes from a forest in Eastern Switzerland owned by Brigitte Trauffer's parents.

Wood also features extensively in the interior of the World of Experience – as does the cow. Visitors can take a tour and discover step by step how a board of certified Swiss wood is transformed into a cow. The non-guided tour is visually beautifully designed, with display cases in the form of bird nesting boxes, a sawmill, and, at the end, a hall of mirrors with cows reflected to infinity and beyond. Each piece is meticulously worked 24 times before it can be sold as a cow in the shop. Visitors can even try their hand at carving and painting one of their own in the carving boutique and the painting workshop.

Visitor experience

The tour is not the only place you get to see craftsmanship at work. Artisan skills are also on show in the restaurants. Potatoes are cut into fries before your very eyes, and you can also watch the baker baking bread. Then you can make yourself at home in one of the spacious restaurants and feast on raclette, fondue and burgers all year round.

Every aspect of the architecture combines tradition, modernity, energy efficiency, and experience. Not least in the hotel bedrooms, where an alpine chalet atmosphere is tastefully blended with modern furnishings and fittings. Some rooms feature special extras such as a family room with a tunnel slide or a double room with a Swiss pine sauna. There are solar panels on the roof that supply the World of Experience with clean electricity. This win-win situation was made possible thanks to the Solarify crowdfunding model, in which single panels can be bought by individuals, grouped together and installed on the large roof of one of its partners. Solarify then sells the solar power to the partner and pays out the proceeds to the individual panel investors.

Even more to discover

The World of Experience makes the Brienz region even more attractive for tourists. It is also easy to access by public transport. The nearest bus stop, Kritz, is located right outside the main entrance at Holzkuhplatz 1. Parking is available at the Ballenberg Open-Air Museum. The western entrance of this popular museum is within walking distance of the Trauffer World of Experience. The Ballenberg museum runs a range of courses and guided tours that can be conveniently combined with a visit to Trauffer. This mix of different tourist offers in the immediate area is rated by tourism professionals as a success factor. For anyone staying in Hofstetten for a few days, Lake Brienz with its glittering turquoise waters, the pretty villages of Brienz and Meiringen, and the steam railway, the rack-and-pinion railway, and the cable cars into the mountains are all within easy reach.

Competition: win a voucher towards a stay at the *Bretterhotel* in Hofstetten near Brienz


When you stay at the *Bretterhotel,* it's worth taking a little extra time to explore the World of Experience or enjoy fine dining at the à la carte restaurant Alfred's.

All rooms feature a super king double bed (180×200 cm), free Wi-Fi and internet TV. Prices vary depending on the season; breakfast at Alfredo's is included.

Family rooms come with special extras, whether it's bunk beds for the kids, a bed with a slide tunnel, or a toybox. Families with four children can leave the experience room to the kids and stay in the adjacent double room, which has a connecting door. The Family Suite even boasts a Swiss pine sauna and a private roof terrace.

The competition prize is a voucher that can be put towards the cost of your stay.
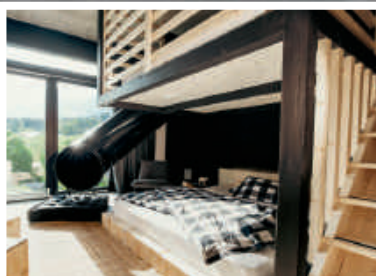
1 **Competition question 1:**
How much economic damage is cybercrime estimated to have caused?

2 **Competition question 2:**
How does the line from the famous song by entrepreneur and Swiss dialect musician Marc A. Trauffer end? *"Doch Heiterefahne, miis Härz ghört…*

3 **Competition question 3:**
Which image shows Almer Technologies' mixed reality headset?

☐ **$0.8–1 million**

☐ **$0.8–1 billion**

☐ **$0.8–1 trillion**

☐ *… da hi."*

☐ *… de Chüeh."*

☐ *… de Brigitte."*

☐ **Image A**   ☐ **Image B**

Feel free to ask the
Digital Crime Unit

Cybercrime is on the rise in both the private and business spheres. Tackling it is the task of the Bern Cantonal Police's 18-strong Digital Crime Unit. Ninety percent of digital crimes are financial cybercrimes, including fraud, money laundering, fraudulent misuse of data processing systems, and blackmail. These crimes affect large numbers of businesses.

**Question:** *What does the term cybercrime cover?*

Answer: There are two types of cybercrime: cyber-dependent crime, which encompasses criminal offences that exploit information and communication technology or explicitly attack these infrastructures through hacker attacks, DDoS, etc., and the far more common cyber-enabled crime, which involves conventional crimes such as fraud that are committed on the Internet.

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Question: *What kinds of threats and crimes are businesses most affected by?*

Answer: That is difficult to say, as there are many different techniques. CEO and BEC fraud and ransomware attacks are quite common. In CEO fraud, the attacker might claim to be a member of the company's management and order a payment to be made on behalf of the "boss," usually for an urgent or confidential transaction. The perpetrators very often find the CEO's or CFO's contact details on company websites.

In a BEC (Business Email Compromise) attack, cyber criminals hack into the company's communication system using emails that appear to be from that company's email addresses. Simply clicking on Reply can easily allow sensitive data to fall into the wrong hands. When replying, it is better to enter the recipient's email address manually. Particular care should be taken when a business partner suddenly appears to be changing their bank details. In such cases, it is best to phone them to check whether it is true.

In ransomware attacks, the perpetrator encrypts the affected company's data using malware and demands a ransom payment for the decryption key. Ransomware is often spread via email attachments.
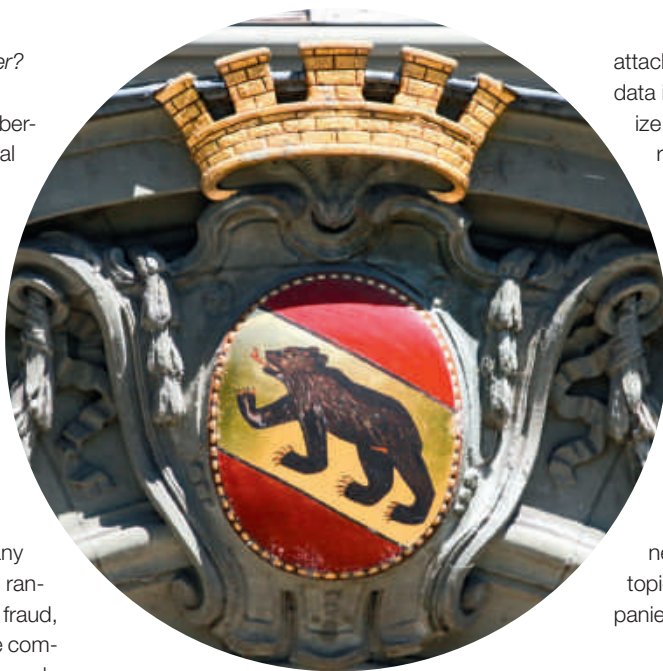
WAISENHAUS POLICE STATION

The baroque building was built in 1782–1786 and was an orphanage for boys until 1938. Since 1942 it has been used as police headquarters – of the city police to begin with and, since 2008, of the cantonal police.

Question: *Are large companies more vulnerable than SMEs?*

Answer: Any business can be affected. It is a misconception to assume that small businesses are less susceptible. Large companies usually have a larger budget to protect themselves. However, effective protection can also be achieved with a relatively small budget.

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Question: *What is the most effective way for a business to protect itself?*

Answer: When a business is affected, it can often be overwhelmed by the situation. We therefore recommend raising awareness among staff and establishing the procedure to follow in the event of a cyber attack. Regular data backups help to ensure that no data is lost. There are private providers who specialize in this area. Any cyber incident should be reported to the police immediately. We then work with specialists to try to secure evidence that will help us prosecute the perpetrators. The police has no interest in paralyzing the business in their search for evidence, or in trade secrets. We often work with incident response teams or IT managers.

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Question: *How does the police help to prevent cyber attacks?*

Answer: We hold prevention events, and businesses can find information on this extensive topic on our website. We want to ensure that companies are prepared for an attack.

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Question: *Working from home is very commonplace these days. Do you see a connection between this and the rise in digital crime?*

Answer: We do not keep statistics on this. However, we have seen a steady increase of around 20 percent for several years. This increase was therefore already happening before working from home became widespread.

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Question: *How great is the economic damage caused by cybercrime?*

Answer: According to a study by McAfee in 2020, the damage caused globally is estimated at between USD 0.8 and 1 trillion. That is more than the total for the entire global drugs trade. We do not have any figures for Switzerland. We recorded 3,496 cybercrime offences in the Canton of Bern in 2021.

cyber.police.be.ch
cybercrimepolice.ch

New arrivals
in the Canton of Bern

The Bern Economic Development Agency (BEDA) helps innovative international companies and undertakings to relocate and settle in the Canton of Bern – such as GeoInsight, NEVARIS and the W&K Group. BEDA works on this with the intercantonal partner Greater Geneva Bern area which has a network in selected target markets abroad.

GeoInsight

More and more geographic data are being supplied by more and more sources. But it is difficult to draw useful conclusions from these data because of the many formats they arrive in. GeoInsight has set out to remedy this with its Intelligent Earth platform. The platform is revolutionizing the world of geographic information systems by combining and analyzing data from different sources using machine learning and artificial intelligence.

GeoInsight's service portfolio ranges from data selection, standardization, and provision to comprehensive analyses. The World Health Organization (WHO) is just one international organization that uses GeoInsight to find answers to its questions.

GeoInsight consists of a top-notch team of researchers specializing in geographic information science. Having been supported in its startup phase by a competitive EXIST startup grant, Bern-based GeoInsight became a public limited company (AG) in 2022.

NEVARIS

NEVARIS Bausoftware GmbH develops and distributes integrated software for technical and commercial construction operations. Following the establishment of a strategic partnership with the Swiss Association of Master Builders (SBV), the company set up shop in the Swiss Canton of Bern.

With its new location in Bern, the technology leader in the field of software solutions for the engineering and construction industry is widening its footprint in Switzerland and is well positioned to accelerate the digitalization of the space.

NEVARIS is a brand of the globally operating Nemetschek Group, a pioneer in the digitalization of the architecture, engineering, construction, and operations (AEC/O) industry covering the full life cycle of construction and infrastructure projects.

W&K Group

The Faulbach-, Germany-based W&K Group has been an active player in the international industrial assembly market for over 35 years. During that time W&K has successfully completed over 15,000 projects in 135 countries, including in Switzerland, where the company has seen a significant increase in deliveries of industrial plants by its European customers in recent years. In addition, the export-oriented Swiss mechanical engineering sector is a major partner for the long term. The scope and magnitude of these areas of business led to the logical decision to open a Swiss branch in order to better meet its commitment to providing local customer service.

According to managing partner Martin Kratzer, the Canton of Bern is the perfect choice for W&K's Swiss branch, as it "has a high density of companies in the manufacturing industry, especially in medical technology, precision industry and mechanical engineering. Its excellent traffic links and central location also make this location ideal for covering the whole of Switzerland with our services."

geoinsight.xyz

nevaris.com

wk-industrietechnik.de

Escape into an adventure

Virtual reality escape and adventure rooms
whisk players away into new worlds.

Escape or adventure rooms have been booming for a while now.
The idea is to solve puzzles in a group, which requires ingenuity,
patience, and good teamwork. The basic features of this game
principle come from the adventure genre; the forefather of this
particular game concept is generally thought to be the online
game "Crimson Room," created by Japanese-born Toshimitsu
Takagi in 2004.

What is new is that these rooms are now also offered in virtual
reality. Virtual reality (VR) refers to a digital portrayal of reality created
on a computer. To immerse themselves in the virtual world, players
need to use virtual reality headsets. In mixed reality, the real and
virtual worlds are combined.

Virtual and mixed reality escape rooms generally work in the
same way: you have to solve a puzzle as a team. Unlike in a
real room, there are many more ways to interact with the world
and the challenges you face in the game.

The puzzles are set on different perception levels. Typically, optical
stimuli appear in the form of letters, numbers, colors, characters,
pictograms, or images. Speech, sequences of notes, and musical
art are used as acoustic stimuli. Tips and objects do not usually
provide useful information in the early stages of the game; instead,
players work out their meaning based on similarities with other
elements.

VR experiences in the Canton of Bern (see right)

Virtual Experience: VR Escape Rooms for Smart Groups

Virtual Experience offers excursions into virtual reality – more precisely
Virtual Reality Escape Rooms for groups of 2 to 6 people. Smartness
and teamwork are the most important requirements for mastering the
challenges in the virtual worlds (recommended from age 12 and up).

The selection is wide: a total of 18 adventures to choose from, offer
a variety of themes and sceneries – from easy to very high level of
difficulty.

The free roaming adventures feel particularly real: Here you move in a
physical space that corresponds exactly to the virtual space – completely
wireless and without a backpack PC, just like in the real world.

For those who prefer action to puzzles, the VR Arena – a dynamic
and very immersive multiplayer shooter – is the place where they can
put their skills to the test.

There is much to discover and experience in the virtual world –
physically right by the Hirschengraben in the middle of Bern.

More information and booking at
virtualexperience.ch

Fusion Arena Bern

Fusion Arena Bern offers a diverse range of VR games, with a choice of two adventure games and three shooters. Up to ten players at once can discover the virtual worlds of Fusion Arena wirelessly, complete with 4D effects. Kitted out in special VR suits that adapt to the size of the body, players can track every movement their friends make in real time.

Family packages are available at discounted prices every Wednesday, for children and young people up to 16 years of age accompanied by adults.

Fusion Arena can also be hired for group events with up to 50 guests. From team events and club outings to bachelor and birthday parties, Fusion Arena has plenty of space for large groups, including a comfortable lounge and event rooms. Full details from Fusion Arena.

Virtual Arena

Virtual Arena is the new experience for young and old at JungfrauPark Interlaken. Up to six players compete simultaneously in two teams with a playing time of 15 minutes. The paintball and laser tag games guarantee a fun-packed time for the whole family, while the state-of-the-art wireless VR technology makes for an unforgettable experience. The actual playing time is 15 minutes, but a total of around 30 minutes should be allowed for, including instruction and short breaks.

All games are non-violent and suitable for children from 7 years of age. Parental consent is required. The games cannot commence until the safety instructions have been signed on-site by an accompanying adult.

bern.fusionarena.ch/en/

virtual-arena.ch/en/home-e/

Your success is launched here!

In the Canton of Bern, innovative businesses deliver top performances, especially in medical, energy and environmental technologies, in the precision engineering industry, in ICT and in services. Our efforts to develop the Canton of Bern as a business location are also intended to pave the way to your success. If you are looking for a site or have financing questions, we are happy to help you. Are you planning a project? Contact us!

Bern Economic
Development Agency

www.berninvest.be.ch