

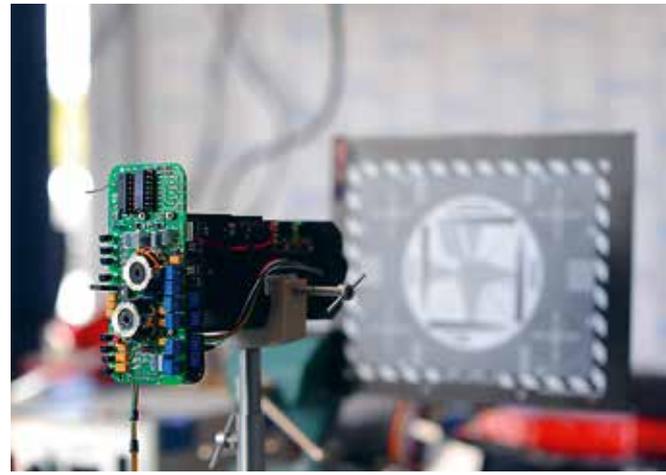
# THE NEXT BIG THING FROM THE ALLGÄU

visatec story  
01.2017



## A BUS FOR PHASE III

Around a year ago a central interim storage facility for the nuclear waste from Ukraine was opened – not far from the reactor that was destroyed in 1986. Over the next 50 years, among other things spent fuel elements will be dismantled into individual fuel rods, safely glazed and put into storage. This is a gigantic undertaking, because spent fuel elements have the highest radiation potential of all types of radioactive waste. For protection against the dangerous radiation, we have developed and manufactured a brand new and highly complex BUS system. **60 high-tech, high-precision cameras, one control centre and several mobile and fixed operating panels** are now ready for use at our site in Allgäu for the third, delicate phase of decommissioning nuclear power stations – or **the next big thing**.



←----- Precision – this is our strength.

## IN JUST 9 MONTHS

After more than 20 years working in the development of radiation-resistant monitoring systems, our engineers understand the performance strengths and limits of modern high-end systems. The pre-meetings were correspondingly relaxed, as were the individual planning stages for this project, which dragged out over a period of nearly 3 years. Then, all of a sudden everything had to be done quickly. We were given exactly 9 months to ensure long-term and highly precise monitoring in a wide range of different radiation-exposed areas. So we had just 9 months to find a solution that would represent the future of visual monitoring.

And, of course, all of this taking into account a huge range of different dependencies on the interfaces of selected systems, including countless tests and quality controls. And before we forget – from the design and components to the mechanical systems and electronics, the entire system had to be newly developed from the ground up. There were no standard modules that we could take as a starting point. The only thing we had was our know-how and expertise. And the drive to implement this project to the highest standards on time – and all this while looking out onto the greenery.

## OUR BABY

So, for 9 months, everything revolved solely around our baby: the perfect union of technical and mechanical engineering. Day and night the lights were on at our headquarters in Allgäu. In all of our departments. Purchasing, Mechanical Systems, Electronics. Of course, it took the full concentrated know-how and expertise of visatec to deliver this project.

We knew that this project marked the launch of a new generation of visual inspection systems – and a completely new **spirit** within the around 17 members of our team, headed by our “captain”, Project Manager Franz Eder. And we won it – the race against time, which allowed everyone to show off exactly what they are capable of. “We really enjoyed ourselves and were able to draw on our full potential”, explains Bernd Bischoff, the technical director who helped birth the development and construction of the first prototypes. In the process, we managed to fuel this new spirit with genuine excitement about the technical challenge – right up to the end.



↑  
Last fine tuning of the prototype. →

A work place looking out onto the greenery.

## AT THE END OF THE DAY, IT IS ALL ABOUT PROTECTING PEOPLE

Modules, assemblies and even wiring harnesses – everything was pre-assembled, followed a time-optimised construction schedule and was then tested. “Up to 3 people looked after Quality Assurance alone. This happened both alongside production, but also in the test laboratory. Swivel range and tilting range up to 360°, extremely high specific requirements for the image resolution, radiation-resistant cameras, in fact the entire environment for quality assurance in the disassembly process – everything had to fit exactly”, remembers Bischoff. After all, the main objective behind this project was personal protection and radiation protection – i.e. to protect people. He estimates that the qualification process for the entire project accounts for more than 5% of the total outlay.

## IN THEORY IT IS QUITE STRAIGHT-FORWARD. BUT IN PRACTICE? INCREDIBLY COMPLEX!

So what exactly is “the project”? The monitoring of the complete process line. “So really it is quite straightforward”, explains Eder, “drive in the complete fuel elements, separate the fuel rods in the fuel elements,

bring a drum back out with the separated parts”. Simple. In theory. If it wasn’t for the slight issue of radioactivity. “The task of our cameras is therefore, in particular, to display the scaling of the distances during the cutting process in real time”, explains Eder. Only then we can perform the cuts accurately, without damaging the fuel elements, thereby keeping contamination as low as possible.

So this brand new, complete monitoring system visualises the process. Accurate in every detail, with 3- to 10-times zoom and completely new swivelling angles. But there is more to this system than meets the eye. Loads more. For example, the seamless documentation, the optimised BUS timing, the module development, the extended service life in radiation exposed areas, the assignment of authorisations and fault-free transmissions. “Video signals are particularly susceptible to interference and faults. We had to ensure that the acquired image signals and the necessary control signals did not get in each other’s way”. All combined in a specially manufactured control centre. The heart of the system. Which also differs in these points from the mainstream visual inspection in the nuclear sector: It is designed, manufactured and suitable for long-term use in radiation-exposed areas. A building block in the decommissioning process, and an essential piece of the jigsaw.



Pre-manufacturing with 8 km of cable.



Our core piece – the specially manufactured control centre.

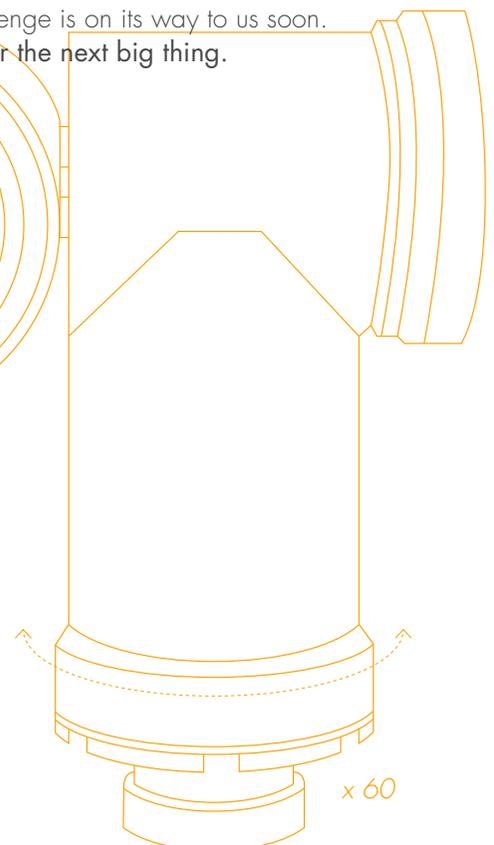
## 17 PEOPLE, 60 CAMERAS, 8 KM OF CABLE

The complexity of the system is not immediately obvious, although it was clear from the outset that an element of high-performance could not be absent. On request from the customer, the combined total of 38 highly radiation-resistant cameras was manufactured with various lenses ranging from 3 to 6-times zoom to the 22 CCD cameras with 10-times zoom for the outdoor monitoring, which were made of stainless steel. With all of the trimmings, each of these cameras weighs up to 12 kg. However, with the robot arms they are easy to manipulate and can be easily placed. In order to ensure full monitoring, every monitor can be actuated by every camera. And what may seem a little "retro" at first glance is nothing more than the tried and tested and similarly radiation-resistant, good old-fashioned TV tube technology. So it is quite right that the sight of the screens is more than a little reminiscent of 1970s TV screens.

Until we get to that point, of course the signals first need to be transmitted without interference – via optical fibres. Around 8 km of special cable with a thickness of up to 13 mm was manufactured especially for this – in just 12 weeks. Of this total, around 6,500m runs from the control cabinet to the cameras and 1,300m to the operating panels.

On top of this, there are around 200 plug-in connectors. Beforehand, in between and at the final presentation, a constant personal exchange took place with our client. "For us, this is simply part of the engineering services we provide", stresses Eder. The best part: This technology to go is not simply a one-off solution. With the exit from the nuclear industry in Germany, a gargantuan challenge is on its way to us soon.

**We are ready – for the next big thing.**



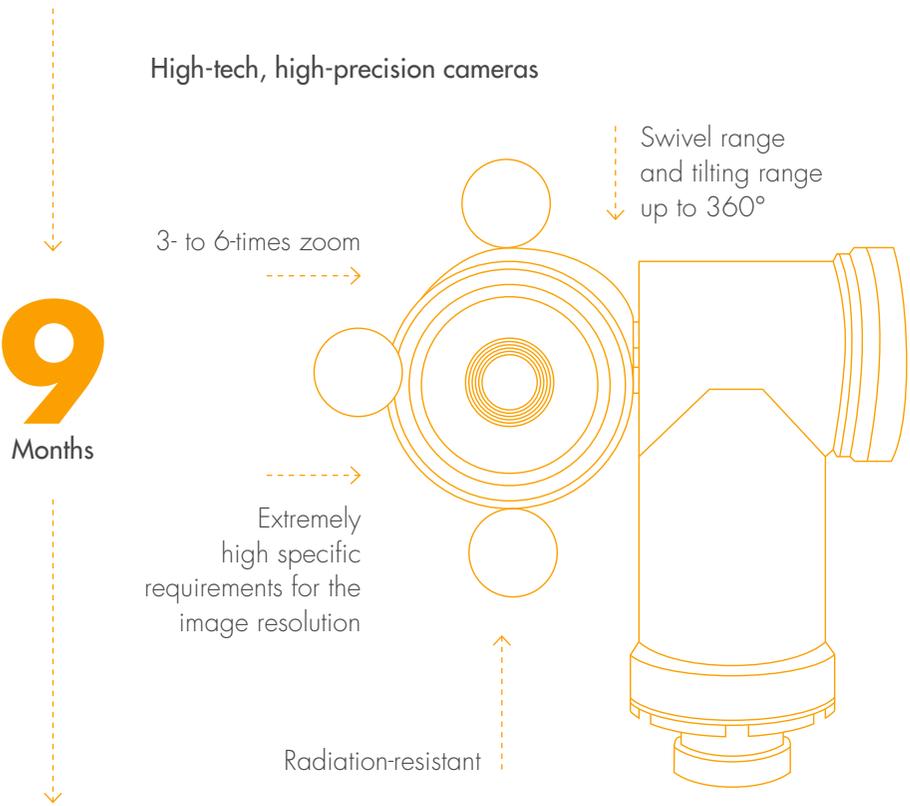
# PROJECT FACTS: THE NEXT BIG THING FROM THE ALLGÄU

## THE TASK

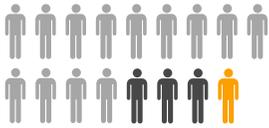
Precise monitoring of the complete process line in radiation-exposed areas for the disposal of fuel elements.



## THE REALISATION



**17** Engineers



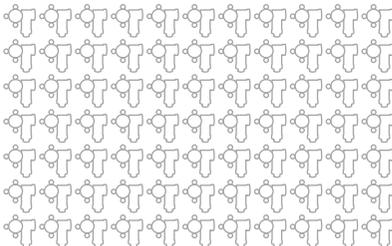
- Engineers
- Quality Assurance
- Franz Eder (Project Manager)

**8** Kilometers Cable

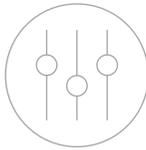


## THE RESULT

**60** High-tech, high-precision cameras



**1** Control centre



**10** Mobile and fixed operating panels



# Challenge us – become a part of the »visatec stories«.

We develop innovative and individual  
all-in-one solutions for visual inspection.



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