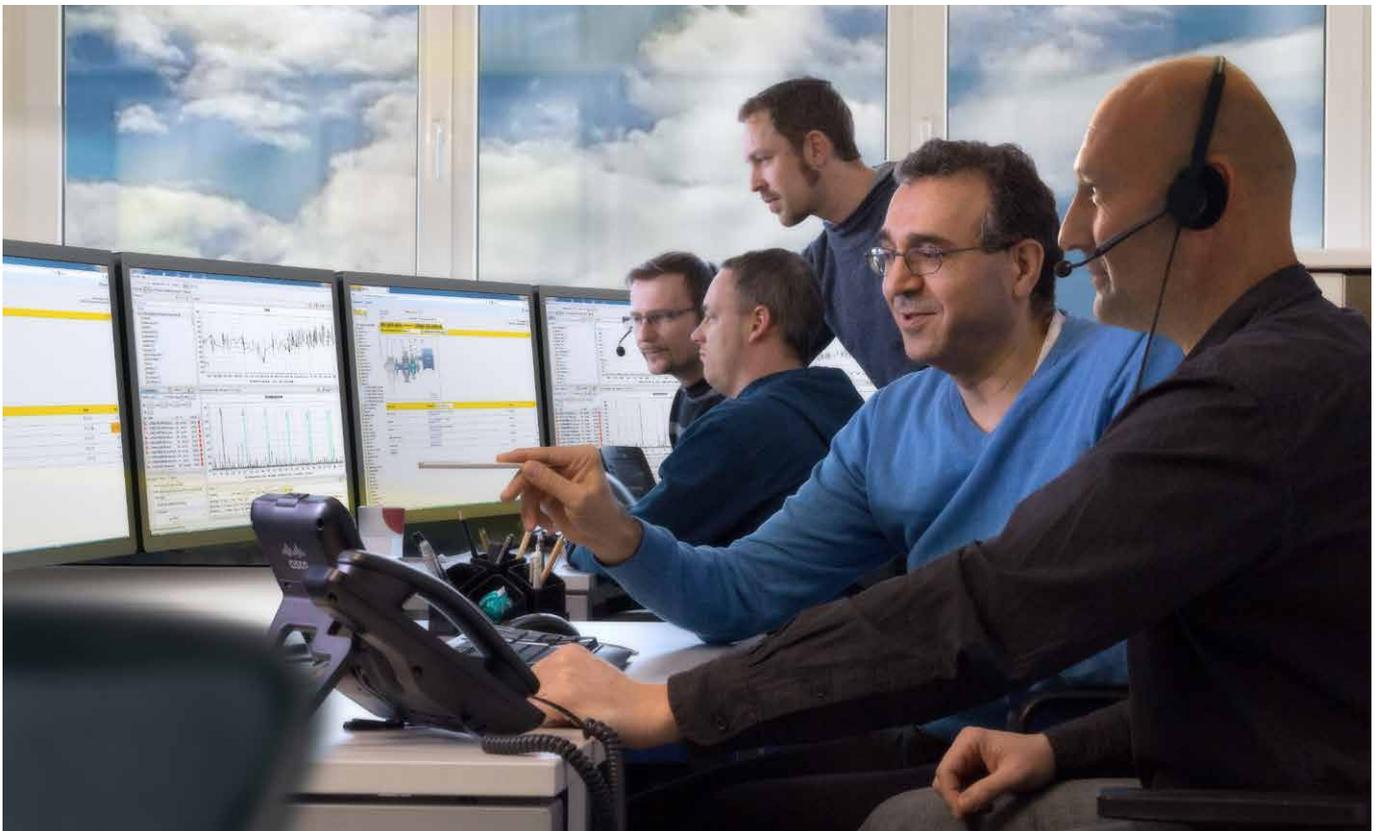


# Establishing the Cape Canaveral of Condition Monitoring

Machinery and plant manufacturers are finding it increasingly difficult to set their hardware apart from the competition. As a result, USPs are increasingly being offered through software and value-added services. One such example is Condition Monitoring (CM), a now widely established concept in which Bachmann Monitoring has around 20 years' experience. We spoke to Managing Director Holger Fritsch about how the market, customer requirements, and range of solutions have evolved during this time. His personal goal is to establish the Cape Canaveral of Condition Monitoring.

**Inge Hübner**, Editor, Digital Factory Journal



▼ With its Remote Service Team, Bachmann Monitoring offers its customers expert support in all matters relating to remote plant monitoring. Bachmann's remote monitoring systems ensure that all diagnostic data is passed on to the team.



▼ The Cantilever Sensor enables technicians to measure the bending of rotor blades on wind turbines. It also functions as an ice detection system and helps to improve the turbine's operational reliability.

*Mr. Fritsch, Condition Monitoring (CM) has enjoyed a surge in popularity in recent years. Has it also become more important? What do you believe are the reasons behind this trend?*

**H. Fritsch:** Mega-trends like this are indeed always caused by several factors coming together. The foundations for the first conditioning monitoring based on structure-borne sound in machines and plants – a core aspect of today's CM – were already laid back in the 19th and 20th Century. However, it was the rapid developments in computing technology, resulting in powerful, state-of-the-art industrial computers, that really enabled Condition Monitoring Systems (CMS) and their much improved performance to also become an affordable option for many new applications.

What's more, machines are now almost always designed with the aid of computers, meaning engineers can optimize safety allowances required as part of the design. However, the requirements governing the efficiency of machines and plants are also growing. This means they are being operated at their limits more often, which can cause severe damage to occur more quickly.

Another aspect to consider is that sales of modern machines and plants barely ever achieve a notable margin. Customer loyalty is fostered by things like new business models as part of a global service. Condition Monitoring has evolved into one of the cornerstones of innovative service-based business models. A further consideration is that when machinery and plant manufacturers start their development work nowadays, they often don't yet know the specific conditions in which their plants will be operating.

The measurements that a CMS supplies in different operating conditions could also be used to improve the design, which would give machinery manufacturers an edge on the market. It's not just machinery manufacturers who benefit from the use of a CMS – investors and the companies operating the machines do as well, as the CMS safeguards not only the investment, but also the processes and their quality.

*You have around 20 years' experience in the field of Condition Monitoring, of which a good ten years have been gained with Bachmann. How has the general CMS portfolio on the market changed/improved during this time?*

**H. Fritsch:** The general answer would be that global competition has also increased in this field and prices have continued to drop, despite the fact that the performance – things like the memory and computing power of the CMS – has significantly improved over the same period. The requirements governing system connectivity and secure communications have also grown. Another factor is that we need to connect a whole host of new sensors, and even offer wireless sensor solutions. Plus, the IT security requirements have also grown steadily over the last few years.

*How has your portfolio evolved since then?*

**H. Fritsch:** Our hardware has become much more powerful. For example, Bachmann has developed various new measurement modules such as the AIC206 and AIC214 vibration sensor input modules, the GIO212 universal input/output module, and the GMP2XX grid measurement and protection modules, which can be deployed with a multi-core CPU if required. What's more, the GIO212 enables various industrial sensor systems to be combined with vibration measurements.

We offer our customers modular, holistic Condition Monitoring solutions. This means that we're not only able to monitor moving components – our portfolio now also covers the monitoring of buildings and structures, known as Structure Health Monitoring (SHM). We have developed the extremely robust Cantilever Sensor (CLS) rotor blade sensor for use on wind turbines. The sensor can be used for IPC controller purposes, but can also detect anomalies in the blades and can even come with integrated ice detection if required. As such, we have brought together three key functions in a single sensor component – which is unparalleled on the market!

*Would you be able to give us a brief overview of your current CM portfolio and how customers benefit from it?*

**H. Fritsch:** Our portfolio includes the following:

- Certified hardware solutions for different drive trains in onshore and offshore wind turbines – with and without transmissions (currently 79 different types)
- CMS standalone versions
- Systems integrated into the controller system for DIN rail mounting
- In-house sensor solutions and software for data analysis
- Web-based customer portals

Over 20 highly qualified experts work in our certified remote monitoring center, which means we can also offer our customers tailored services to suit their specific circumstances.



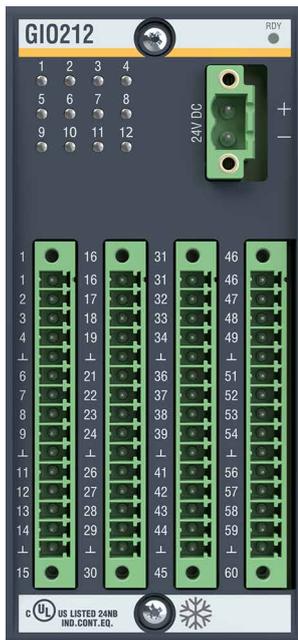
▼ Holger Fritsch, Managing Director of Bachmann Monitoring: "We offer our customers modular, holistic Condition Monitoring solutions"

*Following Bachmann's acquisition of  $\mu$ -Sen GmbH in 2010, you initially focused on CM for wind turbines. Which other industries have been added since then? And looking ahead to the next three years: Where does the greatest potential for new customers lie?*

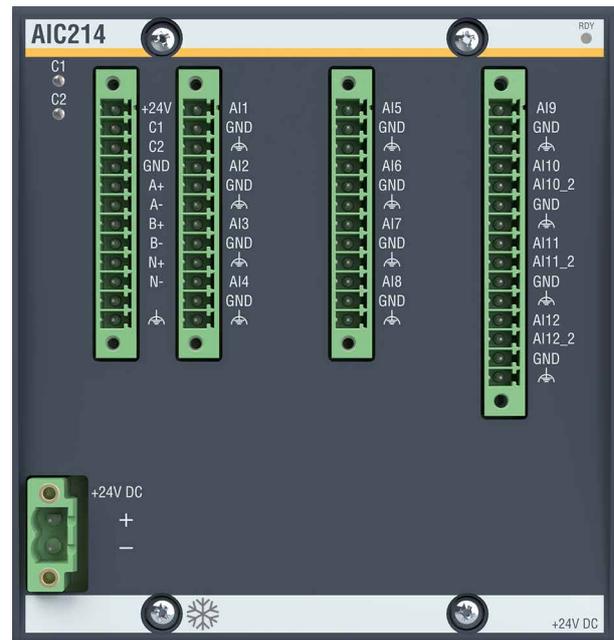
**H. Fritsch:** We initially developed modular solutions for the wind industry to monitor thousands of wind turbines across the globe. It goes without saying that these solutions can also be used in other decentralized applications. One such example is maritime applications. We have been well established in this field for years and have been able to win over some very well-known customers to our CM solutions. However, Bachmann has also been able to successfully handle challenging applications from a variety of industry sectors, such as large fans, vertical mills, cable cars, and punching machines.

From our perspective, the offshore wind industry is another, very promising sector within the field of renewable energy, as it offers the perfect conditions for bringing together all of Bachmann's modular concepts to create a holistic solution.

For example, you could combine the traditional drive train monitoring with Structure Health Monitoring, which is set to be hugely important for Floating Power Plants (FPP) in particular. Furthermore, plans are under way to equip such FPPs with other energy conversion systems



- ▼ The GIO212 universal input/output module offers twelve analog and digital I/Os



- ▼ The AIC214 vibration sensor input module offers twelve analog inputs with an IEPE interface for piezo vibration sensors, up to three of which with  $\pm 10$  V DC

that use the movements of the waves to generate energy for hydrogen production.

When it comes to comprehensive data analyses, our WebLog Interface gives customers a platform for integrating different data sources. As such, the WebLog Interface can provide service companies with information obtained from different CMS so that they can plan their service assignments.

*The need for CMS in the wind energy and maritime fields is clear. How open are customers from other industries to the idea?*

**H. Fritsch:** The overall picture is mixed, of course. However, other industries often also have to deal with very complex applications, and they are now discovering CMS for themselves. But it's also crucial here to define precisely what we mean when we talk about a CMS application.

*In the field of wind energy, you have doubtless benefited from the high number of installed wind turbines equipped with Bachmann controller systems, etc. and the data that has therefore already been obtained for analysis purposes. What features do you highlight to win over customers in other industries to your Condition Monitoring System and expertise? And given that the range on the market is*

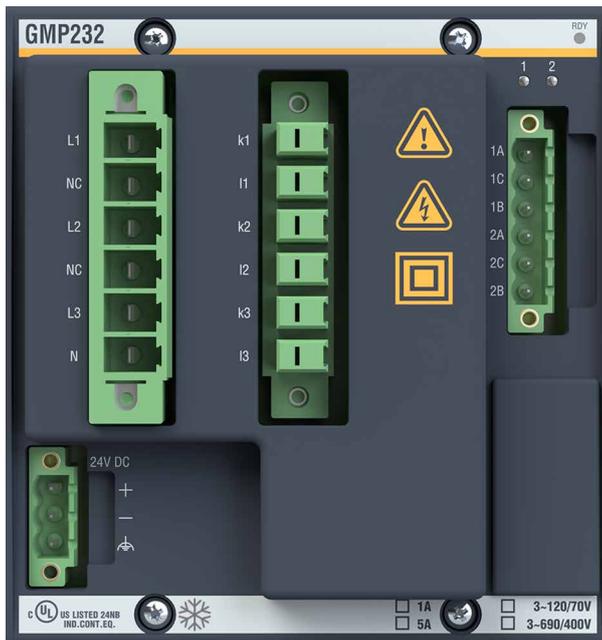
*now quite large, what advantages does your solution offer?*

**H. Fritsch:** You're correct in saying that. However, thanks to our standalone solutions, we're not just familiar with the plants that have been equipped with Bachmann controller systems, we're also familiar with a wide range of different plant types.

We see USPs mainly being offered through porting all CM technology onto a single controller system, with all the benefits that entails:

- Robustness
  - Systems are readily available, even in extreme operating conditions
  - Flexibility, for example in terms of the interfaces and different communication protocols
  - IT security
  - Special sensor systems, such as for components that run extremely slowly
  - CM remote monitoring services
- ... and all of this from a single source.

*Condition Monitoring usually falls under the mega-trend of digitalization. The coronavirus pandemic is predicted to drive digitalization forward. What are your predictions for digitalization and Condition Monitoring?*



▼ The GMP232 grid measurement and protection module measures the current, voltage, frequency, power, power factor, and phase angle

**H. Fritsch:** I can certainly reiterate that statement. In terms of the coronavirus pandemic, we can speak from our own experience. We were very quickly able to give our employees the technology they needed to monitor all the plants we look after worldwide while working from home. This meant we were able to continue fulfilling our service agreements. At the same time, we are providing our customers with key information they need to make decisions every day. For example, given the current travel restrictions, the information to decide which work (repairs, maintenance, etc.) to prioritize.

Over the next few years, the topics of digitalization and Condition Monitoring are set to be top of the agenda at many companies in many different industries. While this will entail a degree of loss, it also opens up major opportunities to deploy new business models based on a digitalized world and on Condition Monitoring. However, I believe there is one key aspect of these processes that cannot be overlooked, to ensure you don't run before you can walk: Standardization and the standardized implementation of new processes at the company, as this is crucial to ensuring success.

*As a final thought, could I ask you for a brief outlook from your own perspective: What goals have you set for BAM over the next three years?*

**H. Fritsch:** We will work to develop additional building blocks to provide holistic, modular Condition Monitoring, in particular for the offshore wind market. Generally speaking, we have set ourselves the ambitious goal of becoming one of the most innovative providers of solutions for “Health and Usage Monitoring Systems” (HUMS) as well as digital services based on them. In doing so, we want to help our customers get the most out of their machines and plants.

Specifically, this means:

- Reliable operation
- A high level of quality, including for the products and processes
- Energy efficiency
- Durability
- Environmental friendliness and sustainability

We have invested in this goal over the past 1.5 years and have taken on assets and new employees to lay the foundations for strategic further growth. Our focus is on Structure Health Monitoring (SHM), in particular in offshore applications; on Data Sciences (AI, above all for industrial applications); and on an accredited training center to train experts in the field of vibrations.

You'll probably laugh when you hear this, and as a goal for the next three years it's perhaps a bit much, but I personally would love to establish the “Cape Canaveral” of Condition Monitoring, starting with offshore applications.

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