BBA.CA

Operational Technologies

OUR GOAL

We work with your teams
to create long-term value.

About BBA

One of Canada's leading private consulting engineering firms

+20

Offices across Canada, Chili and USA

+1.5 k

Employees

+40

Years of innovation

For over 40 years, BBA has been pushing the boundaries of engineering to support its industrial clients in the rapidly changing energy and natural resources sector.

Our multidisciplinary specialists combine ingenuity and practicality to provide clients with innovative, sustainable and flexible solutions.

Our growth is based on a culture of excellence, employee commitment and strategic expansion near client operations to build strong relationships.

CANADA BEST MANAGED COMPANIES

"As catalysts for change, we're committed to supporting the industry in its transition to a sustainable, mutually beneficial future."

Jérôme Pelletier, P.Eng., MBA – President and CEO

National and international reach with a local presence

Boisbriand
Calgary
Concord
Edmonton
Labrador City
Mont-Saint-Hilaire
Mont-Tremblant
Montréal
Quebec City
Rouyn-Noranda
Saguenay
Salt Lake City
Santiago, Chile
Sept-Îles
Sudbury
Terrace
Toronto
Trail
Val-d'Or
Vancouver

Driven by unshakeable values

In action

0

Onsite accidents.
We stay alert for
everyone's safety.

+91%

Client satisfaction

By 2030

Toward Net Zero

Our objective is a total reduction of our CO_2 equivalencies by 47% by 2030 compared to our 2019 baseline.

Our success is largely due to our highly engaged team members. Focusing on a culture of commitment, development and complementary talents, we build lasting relationships with our employees, clients and partners.

BBA's increased presence in the field provides team members with a rich professional experience, offering a broader and better understanding of operational activities.

People first

The health, safety and wellness of our employees, clients and the public are our responsibility. We treat them as family.

Ingenuity

Whatever the problem, we find the solution. We exceed expectations by tackling client challenges as if they were our own.

Eco-mindfulness

As we develop our projects, we respect, protect and care for the environment and its resources. They are our legacy to future generations.

Rigour

We aim for quality in everything we do. Working together with our clients from ground level, we do it right the first time.

Fun and collaboration

By collaborating and sharing our knowledge, we empower each other.

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Understanding today's challenges to build the future

Our world is changing fast. Technology is part of our daily lives. The urban population is growing exponentially, as is our consumption of energy and natural resources. As industrialists, you have a lot of challenges to overcome — we can help you. We have developed unique expertise in the following markets.

Energy

Mining and metals

Biofuels, oil and gas

Industrial and manufacturing
(pharmaceuticals, agri-foods, wood and forestry, and pulp and paper)

From strategy to the work site

We take pride in offering comprehensive multidisciplinary solutions that substantially reduce your operating costs, while maintaining an enviable track record when it comes to safety and the environment.

Strategic consulting

- ESG and sustainable development
- Digital transformation
- Cybersecurity
- Technical and economical analysis
- Strategic asset management
- Compliance and due diligence

Planning and engineering

- Studies, audits and assessments
- Regulatory compliance
- Design and optimization
- Equipment and technology selection, integration and optimization
- Project execution
- Operational readiness

Operational support

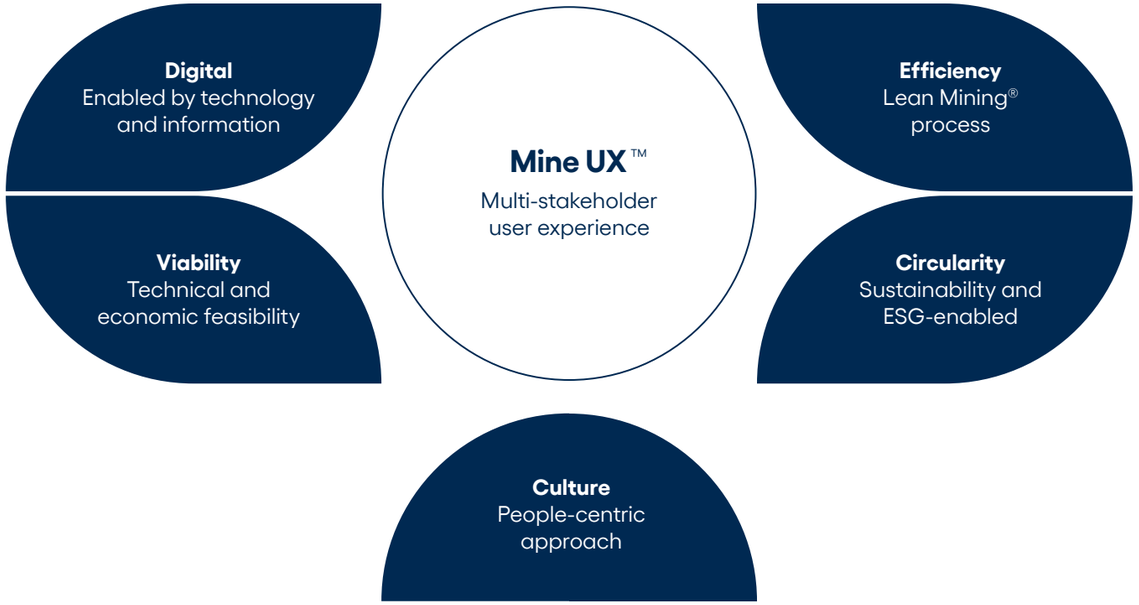
- Environmental monitoring and mitigation
- Field services and maintenance
- Data collection, valuation and reporting
- Testing and commissioning
- Site closure

Technology serving the mining industry

Operational Technologies

Mining knowledge and practices have greatly evolved in recent years. The search for sustainable solutions to social and environmental challenges is now geared toward using resources and technologies efficiently, with a focus on collaboration and agility across teams.

THE PILLARS OF OPERATIONAL TRANSFORMATION



Our multidisciplinary team enhances your mining projects

With over 40 years of operational experience, our multidisciplinary team will assist you, from strategy to execution, by combining:

- our business intelligence, focused on leveraging commercially available solutions
- the technical strength of our experts (SME)
- our agility in the field and our knowledge of your processes, equipment and operational challenges

Together, we create value at every stage of your project's life cycle.

Mine UX™: BBA's co-creation approach

This approach integrates people, processes and technologies to develop sustainable and effective business transformation. The term "UX," which stands for **u**ser e**x**perience, refers to a major objective of this approach, which is to offer all stakeholders an optimal experience: useful, creative, practical, pleasant and accessible. Involving multidisciplinary teams and multiple stakeholders is therefore a key factor in the success of this transformation. We make it easy to co-create with our clients in a hybrid environment, i.e., both physical and virtual.

Benefits of our approach:

- Stimulating and creative work environment that fosters the development of human capital
- Integration of the value chain that makes it easier to identify and resolve problems quickly
- Environment that facilitates the deployment of real-time financial management of critical activities
- Increased opportunities to standardize and integrate technology platforms and processes
- Accelerated update of integrated short-, medium- and long-term planning
- Increased proactive and predictive analytical capability
- Improved detail and sequencing of all mining activities according to the plan

A lever for your operations

Technology serving the energy industry

Operational Technologies

Today's society expects tomorrow's industries to be low-carbon. Many companies are already looking into converting to renewable energy sources and optimizing their energy efficiency. Fortunately, there are a number of readily available technologies — both emerging and proven — to help companies reach this goal.

A driving force for your energy transition

It pays off to make your power system “smarter”

By being well-equipped to understand the exact state of your power system, you’ll have all the relevant data to optimize the life of your equipment and maximize its use for better overall asset management, thereby making it easier to forecast your investments.

This will help you make the best investment decisions based on accurate and complete facts: real-time monitoring, data historization, customized reports and performance indicators, predictive maintenance, etc.

Managing your operations and workforce more efficiently

By opting for digital power systems, you’ll gain greater guaranteed performance, based on using industry-recognized standards and technologies. You’ll also benefit from increased flexibility through system modularity, interoperability and easier modifications along the way.

Decarbonize your operations with renewable energy

Wind and solar power, energy storage, geothermal and biomass solutions — you have plenty of options! And technologies are becoming increasingly affordable. When including renewable solutions in your energy mix, look for options that are reliable, sustainable and flexible. This will increase your chances for long-term success. Opting for green energy management solutions isn't just good for the environment, it's also a smart economic choice.

Adapting your infrastructures to energy decentralization

Much of today’s infrastructure was designed decades ago and was based on the needs and technologies of the time. As energy sources become more decentralized, aging infrastructure now needs to be adaptable to increasing and diverse power flows. The intermittent power flows that are inherent in renewable energy must also be taken into account. Modernizing and optimizing your infrastructure is therefore key to achieving performance and sustainability objectives.

BBA's holistic approach

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Our experts approach digital transformation as an engaging journey that puts people first. Drawing from extensive experience while working with a variety of companies, they understand that balanced integration of teams, processes and technologies is what makes a lasting transformation possible.

From strategy to execution, we create value for your projects.

Enhanced teams: Better cohesion and performance

Digital solutions are a great asset when there's a shortage of skilled labour or when working in remote locations. These solutions can be used to improve employee safety (i.e., by avoiding exposure to hazardous conditions) or to enhance training activities. Used as a decision-support tool, they can mitigate the risk of human error, downtime, inconsistencies and repetitive operator tasks.

Adapted technologies: Better access to data

There are many appealing technological solutions on the market. But above all, they need to meet your strategic objectives, integrate effectively with your existing facilities and equipment, and adapt to your changing operations. To fully benefit from the potential of digital technologies, your infrastructure and systems must also provide optimal access to reliable, high-performance, timely and cybersecure data.

Integrated processes:A circular, efficient and sustainable vision

Implementing an integrated and efficient operating model is a good example of how digital transformation supports overall business transformation. In particular, it optimizes performance by strategically using data while continuously improving processes across the value chain. This supports sustainable development within a circular economy.

Collaborative and proven solutions: Increased project viability

Being technology agnostic, we use and offer state-of-the-art laboratories to pre-test technologies and work with your teams. Our involvement and practical know-how means we can offer you the best possible solutions that add value to your business while integrating perfectly with your operations.

Optimize the life cycle of your corporate data

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Digitalization has generated a new source of wealth: data. By mastering the art of making this data speak, by connecting systems and by applying innovation, we have the means to move your business forward and help you meet your ESG, economic and performance challenges.

A holistic view helps unlock the full potential of technology.

- Drones
- Geomatics
- Industrial telecommunications and infrastructures
- 3D laser scanning
- Status monitoring with smart sensors and the Internet of Things (IoT)

- Data warehouse
- Historian
- Cloud computing
- Manufacturing execution systems (MES)

- 3D simulation, virtual reality and augmented reality
- Scanning a work environment (digital twin)
- Artificial intelligence and advanced data analysis
- Interactive visualization tools, performance indicators and reports
- Software development

- Automation, advanced control and alarm management
- Control centres

Governance and cybersecurity

Operational Technologies

A key step in successfully completing your transformation is to perform a digital assessment (or audit). Doing so allows you to fully understand your organization's strategic and operational priorities and identify the gap between the current situation and target conditions. The resulting plan is designed to ensure that selected technologies will help you achieve these goals effectively.

Innovation is the art of turning change into opportunity.

Smart management

Process
Value chain
Data-driven management
Sustainable development

Organization

Health and safety
Performance and capability
Culture

DIGITAL ASSESSMENT

Client experience

Communication and stakeholder satisfaction
Product and service development

Technologies

IT/OT infrastructure
Cybersecurity
Telecommunications
Virtualization
Data management
Etc.

Governance

Strategy
Innovation management
Financial investment

Data acquisition

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Get an overview of our expertise and technology solutions that help you collect quality data quickly and efficiently.

Drones

Our teams use drones, agile tools that are easily deployed, to quickly understand ground features and to get to locations that are hard to reach. Using drones instead of putting people at risk represents significant health and safety benefits. Our experts can also provide support in helping you incorporate drones into your business processes.

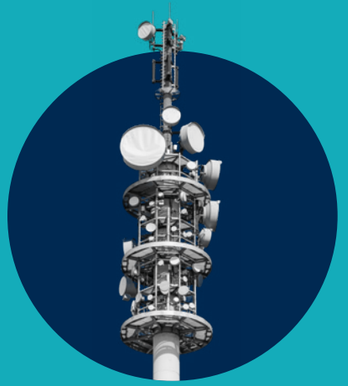
A few applications: highly accurate imaging, multispectral imaging, photogrammetry and volume calculation, inspection and measurement, and 2D and 3D geo-referenced videos.

Geomatics

Our experts use a geodesign approach based on the real-time use of diverse geospatial and mapping data to design a project with an integrated multidisciplinary vision. Based on data democratization, geodesign gives all your collaborators — internal teams, consultants, contractors and others — access to the same information to improve your project design. This allows you to reflect the environmental, technical, geographic and social constraints associated with it, for example, whether it's to determine the optimal route for a power line or the location of future mining facilities.

Industrial telecommunications and infrastructures

Our experts design and deploy technological infrastructures based on industry best practices and by focusing on long-term system evolution. This is one of the key advantages of working with our multidisciplinary industrial teams: they're familiar with the latest predictive maintenance and operational intelligence applications, manufacturing execution systems (MES) and quality management systems. Our specialists are well aware of industry needs and are constantly on the lookout for emerging technologies, building flexible, scalable and, above all, cybersecure technological infrastructures.



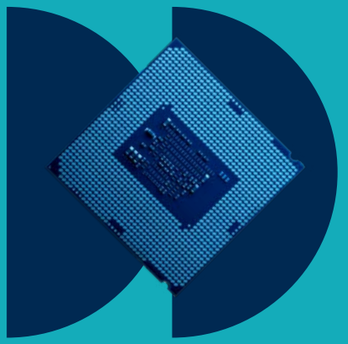
3D laser scanning

This technology enables us to get the information we need to produce high-quality surveys or technical studies quickly and accurately. Using the latest 3D laser scanning technology, combined with 3D point cloud and high-resolution as well as 360-degree photography, we can assess safety risks and present our team with the environment they'll be working in. We also use 3D laser scanning on construction sites to produce high-quality "as-built" drawings at the end of a project.

Status monitoring with smart sensors and the Internet of Things (IoT)

Smart sensors improve operational efficiency by increasing data collection and accelerating data processing through automation and the Internet of Things (IoT). Greater visibility into business activities promotes better management across different production sites. Businesses then have all the information in hand to help them make informed real-time decisions quickly to reduce operating costs, improve asset efficiency, make productivity gains and generate additional revenue.

Benefits include: reduced repair costs and downtime with better monitoring, real-time inventory tracking, improved product life cycle management and much more.



Data storage and processing

Operational Technologies

Here's an overview of our expertise and technology solutions for storing and processing your data in a secure, efficient and cost-effective manner.

Data warehouse

To get the most out of data, best practices are to group it together, document it, standardize it and ensure its validity. This is the role of the operational data warehouse, a tool that has four main modules:

- **The ETL module** (extraction, transformation, load)
- **The database**
- **The data marts**
- **The visualization toolbox**

A valuable ally
The warehouse allows anyone to make decisions based on a common and accepted version of what constitutes operational data "truth" and, ultimately, to perform advanced analysis.

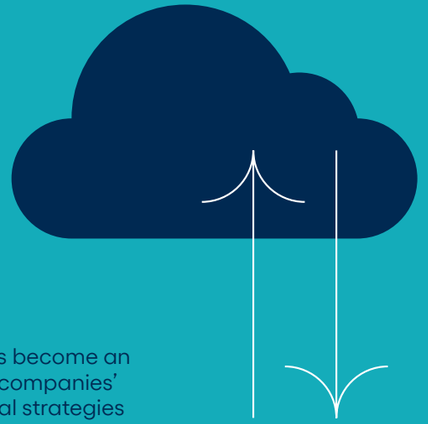
Historian

The historian is an ideal solution for real-time archiving, compression, archiving by exception and buffering in case of breakdowns during data acquisition. All of these features ensure optimal use of storage infrastructure while preserving the integrity of the collected information over time.

Our experts assist you at every stage:

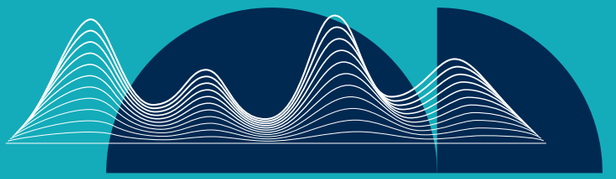
- Deployment and implementation of systems to archive your data
- Dashboard creation
- Development of performance indicators based on historical data
- Real-time analysis

OSIsoft. Partner



Cloud computing

Cloud technology has become an integral part of most companies' business and technical strategies and can provide economies of scale. Our cloud consultants can guide you in selecting software package providers, solutions and services for technical support and data storage, as well as secure access to the critical data required for your operations.



Manufacturing execution systems (MES)

The need to increase the rate of production while still offering high quality is the new norm; implementing digital tools like MES can lead to significant improvements, particularly in terms of processes and maintenance.

A few applications:

- Measure productivity
- Implement traceability strategies
- Produce the right product at the right time with the right equipment
- Control and increase the quality of finished products
- Detect machine anomalies before they occur
- Extend the useful life of industrial equipment
- Reduce downtime

Benefits
An MES helps businesses be proactive in making structured decisions. Other benefits help you:

- standardize operations and processes.
- measure production rate consistently.
- eliminate manual data entry on paper.
- make decisions in real time.
- adjust production according to real-time demands.

Visualization, analysis and valuation

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There are various solutions available to analyze, visualize and leverage data. Our experts can help you make the right choices.

3D simulation, virtual reality and augmented reality

Whether you're reviewing the design of a new plant, designing digital twins with real-time data, adding assets to a production line or combining new technology with legacy systems, you may want to consider 3D virtual models, augmented reality and virtual reality. They offer unparalleled flexibility, reduced risks and an almost immediate return on investment.

A few applications: real-time operational decision making, decreased industrial maintenance in hostile environments, improved employee health and safety, mitigated risks when implementing a process, simplification of complex processes, social licensing and communication to the public.

Scanning a work environment (digital twin)

When our experts incorporate digital work environments into their methodology, so-called digital twins, they can use them to add value to your project. This applies both at the design stage and in the longer term, during operations.

A few applications: remote plant visits, training for new employees, health and safety training, predictive analysis, simulation and operational monitoring.

Artificial intelligence and advanced data analysis

Artificial intelligence and advanced data analysis solutions are only valuable if they address a specific operational need. And investments should deliver returns as quickly as possible. To make this happen, our technology team will take an iterative approach to quickly create value with one of your most valuable assets: your data.

Our AI startup program
This three- to four-week program will help you find out where your organization stands in terms of artificial intelligence and then clearly identity the steps you need to prioritize to get the maximum return on your investment as quickly as possible. Contact us to find out more.

Interactive visualization tools, performance indicators and reports

There are various tools available to make it easier to leverage data for decision making. Interactive dashboards mean that data doesn't have to be modified at the source, which speeds up access to information. Another beneficial tool is establishing key performance indicators (KPIs) that provide an accurate picture of the effectiveness of each action taken to achieve business objectives. Presented as performance reports, the time-based information is then contextualized based on the target audience. Additionally, reports based on advanced analytics can provide valuable additional information, combining information from multiple sources and adapting to industry requirements.

Software development

Your business operations are unique and complex. If market products don't meet your needs, we can design a custom solution (e.g., web, mobile; databases; data warehouses; legacy applications). And no matter the challenge, the complexity of the problem, the technology or the language used, our team is qualified to adapt. We can integrate with your company's development to push it even further.

Data-driven decision-making

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Having spent thousands of hours in control rooms with operators and process engineers, our experts have practical knowledge of plant start-ups.

This vast experience translates into solutions that are tailored to your operational reality and pre-tested to get it right the first time and make the right decisions. That's the value of operational experience.

Our solutions include:

- Architecture design
- Detailed engineering of control systems
- Optimization of operator work environments
- Cybersecurity

Control centres

It's common to find a lack of communication and insight among operational groups when faced with a given situation, as everyone is making decisions on their own without considering the collateral impacts. Obviously, you want to decompartmentalize teams and unify your processes.

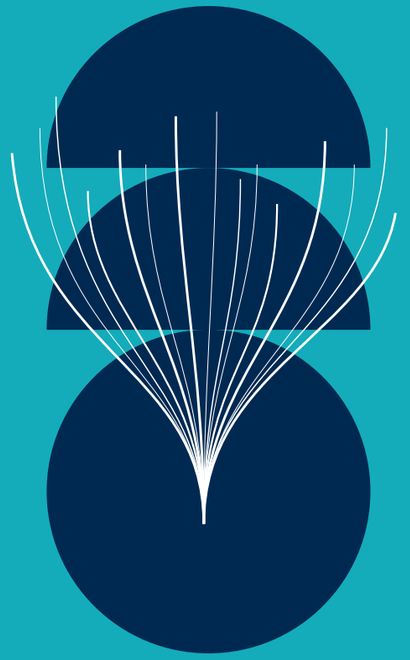
The first step will be to automate processes to remove the need for local action. Then, by consolidating your various control systems into a central point, you can make joint upstream and downstream decisions, ensuring better operational continuity. Organizational transformation is a key factor in implementing this type of centre.

Automation, advanced control and alarm management

You want to mitigate risks of human error, downtime, inconsistencies and repetitive operator tasks. By implementing decision support systems, you'll help your operators make better use of their time and optimize their focus. The same goes for onboarding new staff members, who'll be more efficient quickly thanks to a simple, agile and, above all, safe transfer of skills.

Additionally, many gains in performance and reliability can be had from simple maintenance and adjustments that will significantly lower your costs. This is why our experts prefer to approach challenges with a view to overall optimization. Sometimes, simply optimizing your process alarms and adjusting your control loops can make all the difference.

We work with your teams to identify and quantify the improvements that will have the greatest impact on your business.



Transparency and sustainable development

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The energy and natural resources industry is profoundly transforming: sustainability has taken centre stage. As such, expectations on companies to demonstrate strong and measurable ESG performance are escalating daily. This movement is driving companies to evolve their business model and innovate.

BENEFITS OF TRANSPARENCY ACCORDING TO YOUR PROJECT'S STAKEHOLDERS

Employees

Better collaboration among work groups

User experience

Increased productivity

Valuing their roles and skills

Engagement in a common project

Communities

Better understanding of your project

Easier social licensing

Climate of trust

Improved communications

Financial partners

Meeting ESG criteria

Trusting relationship

Demonstration of your project's viability and the benefits

Legal and government bodies

Meeting regulations and obtaining permits

Improved communications

The availability of reliable data improves the transparency of industrial companies.

Cybersecurity

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Digital transformation offers many opportunities to optimize processes, but it also carries risks. As a result, companies must prioritize industrial cybersecurity to protect their operations, their workers and the environment.

System digitalization changes the way you do business

You want a better overview of your operational data. You also need to share this useful information among your various production lines and with decision makers who previously couldn't access it. Data sharing volume is becoming increasingly important, cloud computing use is on the rise and connectivity across systems is intensifying.

These practices, now standard in your organization, are designed to ensure better cohesion among your teams and to benefit from data analysis so you can remain competitive and innovative. But these new practices come with risks.

Such a transformation means that your industrial control systems and supply chain management software are facing increased cybersecurity challenges and are making your processes more complex. So, adaptability becomes the watchword.

The importance of people

To successfully implement your cybersecurity strategy, all members of your team must commit to following existing work methods and sharing the responsibility.

Change management

Transforming long-standing practices is often necessary to encourage the development of new reflexes to protect against and prevent any potential cybersecurity breaches.

Our cybersecurity approach is adapted to the industrial sector

BBA's multidisciplinary teams have extensive experience in industrial control systems (ICSs) and operational technology (OT), as well as in-depth knowledge of regulatory and cybersecurity requirements.

This holistic vision, from automation to security governance, allows them to identify major issues and risks much more quickly, and to integrate proven and, most importantly, industrially applicable solutions.

Of course, our experts know that for an effective industrial cybersecurity program, it must reflect the company's vision and support its growth.

Some of the solutions BBA has developed

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Our experts are well aware of the needs of industrial companies and are on the lookout for emerging technologies. They develop flexible, cost-effective and cybersecure solutions and infrastructures.

Sol-OT

A solution for operational technology

Can you imagine a control centre designed to ensure that you and your people receive only relevant information? This is now possible with Sol-OT, a modular and flexible solution. Sol-OT modules are designed to segregate and consolidate data into useable information, allowing you to capitalize on it in real time and make the right decision at the right time.

Benefits:

- Integrated and modular solutions
- Web-based user interface
- Cybersecurity and industrial standard compliance

Our modules:

- Downtime management
- Operational reporting
- Operator log sheets
- Abnormal operational state
- General features

CAMaaS

Camera as a sensor

This technology uses your existing camera infrastructure combined with artificial intelligence and image processing as embedded sensors. These then provide real-time information, allowing it to be recorded in the historian for advanced analytics. Such a solution can signal a change in status and provide a snapshot to the local or remote operations centre.

Some examples of detection:

- Particle size distribution
- 3D stockpile level
- Leaks and equipment damage
- Blockages and obstructions
- Equipment performance

Benefits:

- Faster response times
- Improved operational awareness
- Critical asset protection
- Increased equipment life cycle
- Health and safety

TopAlarms

For efficient alarm management

BBA experts have developed an integrated and modular solution based on the main key performance indicators (KPIs) of the ISA-18.2 standard. This tool can be used to monitor performance, prevent operational downturns, make informed decisions, identify opportunities and much more. It's a stand-alone solution that can be installed on all platforms.

Included:

- Archiving and data structure (SQL)
- Power BI interface
- SSRS reports

Performance indicators:

- Alarm overload
- 10 most frequent alarms for a given period
- List of oscillating alarms
- Alarm average over time
- Sequence of events
- Alarm priority distribution

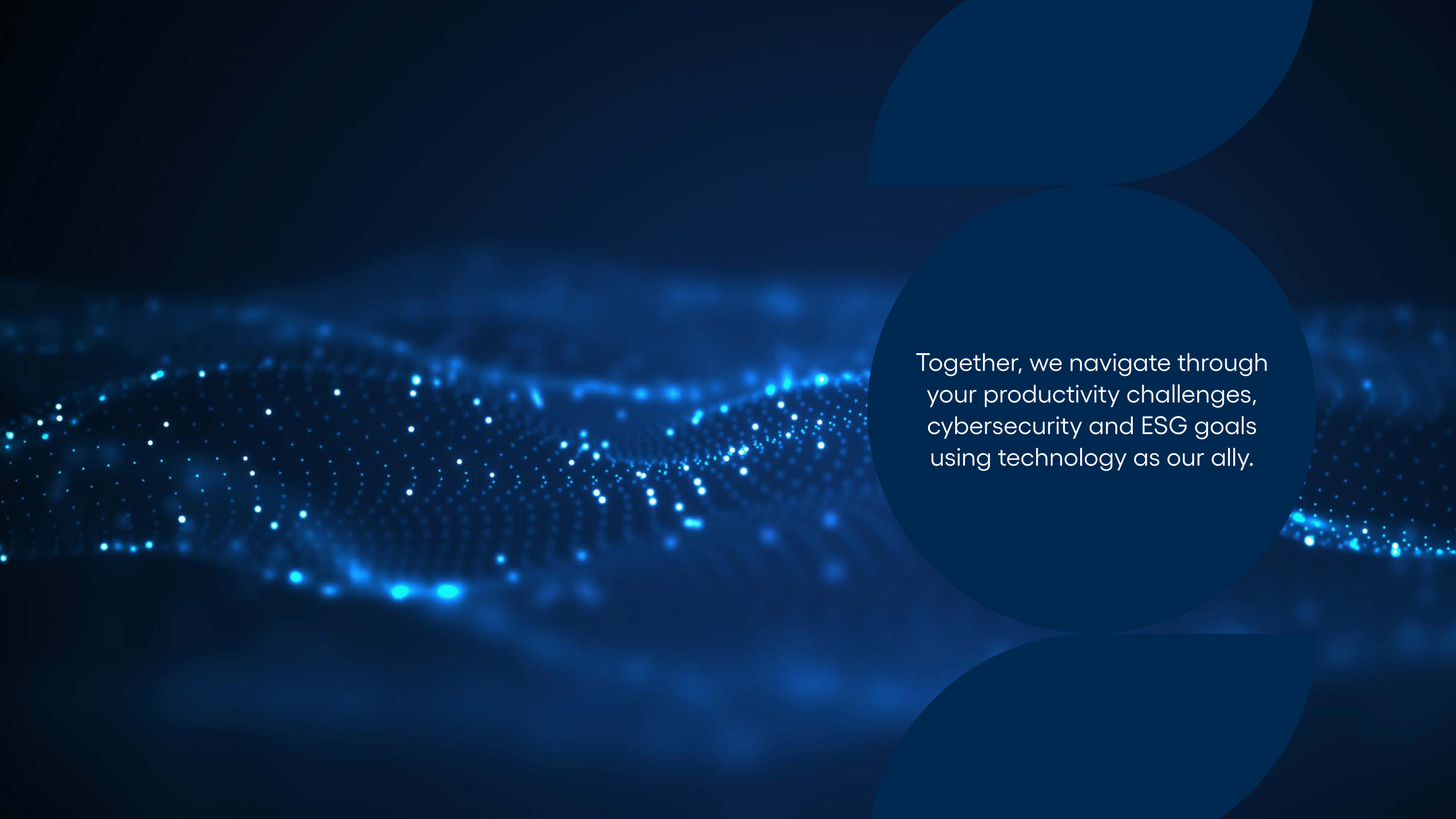
UGC

Automated conversion and migration for faster commissioning

BBA developed a unique tool to automate the conversion and migration of obsolete DCS and PLC control systems to new technology platforms. Our innovative approach minimizes human intervention, resulting in a more reliable and higher quality converted product. Moreover, the commissioning time is considerably faster than with conventional methods.

Our services cover all stages of the DCS upgrade project for successful integration:

- Unbiased technology comparisons and equipment selection
- Budget estimates
- Preliminary and detailed design
- Programming and commissioning
- Remote support and user training


Together, we navigate through
your productivity challenges,
cybersecurity and ESG goals
using technology as our ally.

Developing and testing new approaches by looking beyond is who we are. This fascination comes from our people who, above all, want to see their clients prosper and successfully transition to a sustainable future.

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