



ANTI-CRISIS DIGITAL TECHNOLOGY

A few years ago, SIBUR launched a large-scale digital transformation programme to upgrade its production and business processes. Amid the pandemic, digital instruments have become much more popular.

IIoT: accurate and safe

One of the Company's digitalisation projects is the industrial internet of things (IIoT), which has been rolled out at our sites in Tobolsk, Voronezh and Tomsk. Last year, for instance, 190 proprietary ExT sensors were installed at ZapSibNeftekhim to monitor the temperature of heat tracing cables at steam cracking facilities. The sensors scan equipment and transmit the data to control units, thus relieving employees of loads of routine work, saving their time and improving health and safety.

ExT sensors connected to heat tracing cables can measure temperature from -55 to +125 C°, remaining operational at external temperatures between -56 and +50 C°, which is of utmost importance given the temperature fluctuations of the West Siberian climate. What is more, these devices are explosion-proof and prevent sparking.



ExT sensors monitoring temperature of heat tracing cables at steam cracking facilities and transmitting data to control units.

Vasily Ezhov, Product Owner of Industry 4.0, on the ExT sensors: “They work like Outlook notifications. After a sensor transmits data into the system, a number of events of various severity levels appear in the user interface, such as excessively high temperature, low battery, etc. The event remains “unread” and an alarm keeps beeping until the operator takes action. The sensor’s battery will normally last five years. All settings can be done remotely via a dedicated app designed by our in-house team.”

IN THE CURRENT EPIDEMIOLOGICAL CONDITIONS, THE REMOTE ASSISTANT HAS BEEN USED FOUR TIMES MORE FREQUENTLY

AR: digital reality

During the lockdown, SIBUR facilities saw a spike in demand for AR solutions. The Remote Assistant (</en/article/news/leveraging-augmented-reality-to-empower-production/>) platform is based on augmented reality and can do what conventional digital communication tools cannot. While Skype and Zoom work well for round-table discussions, they are ill-suited for conveying practical skills or communicating with employees at production sites. With the AR technology at hand, we can perform a real-time demonstration of equipment and get feedback from our colleagues. AR glasses can project flowcharts onto real objects or provide textual and visual tips on how to apply certain tools.

In the current epidemiological conditions, the Remote Assistant has been used four times more frequently. Maintenance shutdowns of some production lines require external expertise on a regular basis, but contractors’ representatives are sometimes unable to ensure their physical presence at the facility. In March, we ran the Remote Assistant at the propane dehydrogenation unit eight times to get input from experts in Serbia, Italy, Korea, Belgium, France, and Russian regions.



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Going forward, developers are planning to introduce new elements to the platform: a Check-list Constructor that would create a sequence of actions and check compliance against it, and an image recognition tool to provide tips on equipment without resorting to experts' help.

Drones: aerial surveillance

SIBUR is actively adopting unmanned aerial vehicles (UAV) across its production sites. They are used in the monitoring of construction works at the Amur Gas Processing Plant (GPP) and help ensure compliance with health and safety rules for work at heights. Drones transmit the footage to the responsible employee's tab in real time. Then the video and the date of footage are saved into the database to be available in case of an incident investigation.

Some of the Amur GPP production units reach 90 m in height, and with over 800 ha of the construction area and ca. 29,000 workers, it would be very labour intensive and time-consuming to conduct traditional audits and checks of compliance with safety guidelines.

DIGITALISATION AND INFORMATION TECHNOLOGY CAN TAKE US TO A COMPLETELY NEW LEVEL OF EFFICIENCY IN TERMS OF PRODUCTION AND BUSINESS PROCESSES, AND IT REMAINS AMONG OUR TOP PRIORITIES

In addition, drones are used to monitor fire safety around the plant's construction site: they can detect and forecast the spread of grass fires. The health and safety management project is being implemented by NIPigaspererabotka, the general designer of the Amur GPP.

This is not the first time SIBUR employs UAVs. Drones have been in use for the purposes of environmental safety monitoring at the Tobolsk facility for over a year now. This technology has become even more helpful in the context of the pandemic, enabling ecologists to still perform the environmental monitoring in full while working remotely. Air and underground water measurements, overseeing waste management – all conducted by drones.

UAVs inspect SIBUR's pipeline, identify heat, cold and flange leaks, and weak insulation points. They are used to monitor flare units, one of the most hard-to-access spots of the production facility. In construction, drones create 3D infrastructure models and control earthworks and ground movement. They save us a lot of time with inspecting hard-to-reach sites: what takes hours for an employee, can be done within 10–15 minutes using a drone.



Drones ensuring compliance with health and safety rules, inspecting SIBUR's pipeline, identifying heat, cold and flange leaks, weak insulation points, etc.

SIBUR's UAVs are equipped with IR imagers, laser scanners, magnetometers, hyper- and multispectral HD cameras, 30x optical zoom cameras and other devices. They weigh 6 kg and can travel up to 5 km from the starting point, reach 3 km heights and spend nearly 40 minutes in the air.

The pandemic acted as a catalyst for the Company's digital transformation resulting in fast-tracked implementation of the solutions already available. Digitalisation and information technology can take us to a completely new level of efficiency in terms of production and business processes, and it remains among our top priorities. Thanks to the programmes for digital transformation and internal upgrade that kicked off earlier, we have found ourselves better prepared for the new conditions. Moreover, on 30 April SIBUR announced that in order to achieve maximum efficiency from digitalisation the IT development and operation, process digitisation, advanced analytics, Industry 4.0 and corporate data management functions will all be united as part of its subsidiary SIBUR Digital.