DIGITAL WORKER: EMPOWERING FIELD WORKERS WITH EASILY ACCESSIBLE DATA
Digitalization has transformed consumer behavior, revolutionizing everything from entertainment to shopping. But for many heavy-asset companies and their field workers, it’s as though this transformation never happened. Until now.

Much has been written about the Industrial Internet of Things (IIoT), the network of internet-connected devices that, when paired with software, forms the technological infrastructure for digitalization initiatives. Without a carefully defined IIoT strategy, heavy-asset companies may find themselves struggling to move beyond case studies, pilot projects, and proofs of concepts, and toward a digital ecosystem.

Less has been written about this human side of digitalization – in particular, the approach companies should take to involve field workers as they rethink and reshape routines. This represents a major pitfall for heavy-asset companies. Failing to engage field workers risks alienating the very people whose routines are being altered, potentially putting the success of the entire digitalization initiative in jeopardy.

In other words, for digitalization to succeed, heavy-asset companies also need to adopt a design philosophy that involves end users at every step of the process.

This paper will explain how Cognite’s Digital Worker solution helps companies in heavy-asset industries achieve greater efficiency, remove waste, and boost worker safety by optimizing planning and execution of day-to-day operations and maintenance activities.

Our approach combines subject-matter expertise and technology such as Cognite Data Fusion (CDF), a data package that supplies contextualized data to drive industrial applications that increase efficiency and drive revenue, and Operation Support, which empowers field workers by making relevant information available everywhere and by supporting key, routine work processes.

With these elements, Cognite lays the foundation for companies to unlock the value of a digitalized workforce and create environments in which field workers can do their jobs safely and more efficiently.
FROM ANALOG TO DIGITAL

digital worker [dij-i-tl] [wur-ker]: noun
1. a field worker who is empowered by technology that makes relevant information available everywhere, connects work orders to related data, and supports key work flows by complementing existing tools.

Picture the average day for a field worker on an offshore installation.

He sets out in the morning with his pockets stuffed with printouts containing important information about the equipment on the installation. While out in the field, he will scribble down notes by hand, using his body to shield the paper from rain and wind. At the end of the day, he consults those notes during the daily risk assessment meeting, during which he prepares to do it all again the next day.

The field worker relies on data in order to do his job efficiently. But too often, the data is not where he needs it to be. It may be contained in a system that is slow to update and produce the requested information, stuck on a computer back in the office, or written on a piece of paper that was swept out to sea by a gust of wind.

It is not uncommon for some field workers to walk tens of thousands of steps in an average day as they move back and forth between the field and the office, navigating installations that in some cases stretch more than a mile end to end.
These issues manifest themselves across different groups of field workers, including:

- **Process technicians:** The primary eyes and ears in the field, process technicians often spend much of their day walking between the field and office to retrieve information, their pockets stuffed with rain- and wind-battered papers, and sometimes struggle with locating equipment and identifying how different pieces of equipment are connected.

- **Instrument technicians:** In addition to ensuring that instruments and transmitters on an installation are calibrated correctly and send the right values to the process system, instrument technicians also perform preventive maintenance at regular intervals. However, their work is often impeded by data that may or may not be up to date and spread across cumbersome legacy software systems.

- **Mechanics:** Whenever equipment is leaking, vibrating, or showing signs of wear and tear, mechanics show up to fix it. They need rotating equipment dashboards and access to documents, trends, and work history in order to maximize their time in the field and the workshop, but they frequently find themselves spending too much time grappling with complex digital tools. At the same time, they often lack a holistic view of the data collected from the equipment they are working on.

- **Electricians:** To troubleshoot power issues and otherwise maintain the integrity of the electrical equipment on an installation, electricians depend on tight coordination with other disciplines. Like other field workers, they also need access to information spread across multiple systems.

While their job descriptions may be different, these different groups of field workers also collaborate frequently and in different ways. In some cases, collaboration may be as simple as two workers deciding to split a list of maintenance tasks between them, or a worker handing off a list of tasks that he was unable to complete before heading home. In other cases, collaboration may be sequential – for example, a mechanic waiting for an electrician to finish her job before he can start his.

These challenges are in many cases variants of the same theme: making the right information available whenever and wherever it is needed. And addressing the challenges requires both a robust technology infrastructure and a design philosophy that targets the pain points that field workers experience in their daily routines.

Few companies have successfully digitalized their workforce. Of the many obstacles they face, one stands out: a lack of liberated, meaningful, shareable industrial data.
Cognite Data Fusion (CDF) was developed specifically to tackle the issue of data availability. With CDF, contextualized data is available as a service, easily shareable through a secure Application Programming Interface (API).

CDF integrates seamlessly with existing IT and OT infrastructures to liberate a wide variety of industrial data from separate, siloed source systems, collecting it all as a comprehensive set in the cloud, securely and without space limitations. It then automatically structures the sensor data in relation to other relevant data (e.g., process diagrams, 3D models, event data, and more). This contextualization process effectively creates an operational digital twin of an asset or system, making data available in a way that’s intuitive to humans and machines.

Industrial companies can use this data fabric to equip more robust and reliable machine learning applications for optimization and automatization, as well as human-facing applications, such as advanced visualizations and apps for the digital field worker.
Contextualized data is only one part of the equation, however. In order to channel that data toward increasing efficiency and safety, Cognite believes in a design philosophy that combines academic and practical insights, an emphasis on continually testing products in development, and an overall goal of creating value.

In the consumer market, users can in most cases choose from a wealth of products that perform the same task. If one application fails to provide the necessary functionality, then there likely exists an alternative. Users in heavy-asset industries, however, rarely have that luxury. Many field workers experience that decisions about which applications to use are often taken several levels above them, and that their introduction to the application occurs when they first sit down for an onboarding session.

Our solution to this disconnect between those who purchase the applications and those who use them is to involve end users throughout the entire design process.

The idea is at the core of our design philosophy, which consist of five guiding principles:

- **Human-centered design**: We focus on user needs, designing alongside workers, not for them. By shadowing field workers and identifying the problems they encounter during the day, we develop solutions that actually address field workers’ needs.
• **Human factors research**: We tap into the wealth of best practices, human factors research, and industry standards relevant to heavy-asset companies to make sure that we present information in the best possible way for users to comprehend and engage with it.

• **Context- and task-aware design**: We test our solutions on field workers’ own devices and in the spaces where they will be used. to ensure that they will fit into

• **User journey mapping**: Before we develop a new solution, we visualize workflows to see how activities are connected, who performs what tasks, where dependencies, pain points, and wait times exist, and which solutions field workers already use. This helps us focus our development resources on solutions that complement existing options and offer new functionality.

• **Obsessing over value**: We test early and often, collecting experiences from the field that tell us whether or not a solution is on track to generate value.

**OPERATION SUPPORT**

Operation Support, Cognite’s flagship Digital Worker application for computers and handheld devices, exemplifies the potential in combining contextualized data and a design philosophy that puts end users first.

**With Operation Support, field workers can:**

• Scan or look up an equipment tag to quickly pull up documentation, contextualized data, and other information stored in Cognite Data Fusion (CDF)

• Navigate complex installations with detailed 3D models

• Keep track of corrective and preventive maintenance work with shared checklists

• Document equipment status with image- and video-sharing functionality
Operation Support is built for two main workflows:

1. A field worker observes a potential abnormality in the field, such as a piece of equipment vibrating too much or emitting a strange noise. By using Operation Support to scan the equipment tag, the worker can look up information about the equipment, including documentation and time series data. Once back in the office, the worker can create a notification in the work management system, ensuring that the potential issue will be checked.

2. A field worker takes an object list of equipment tags from a work order and turns it into a checklist in Operation Support. The worker can then navigate to the equipment using the application’s 3D model of the installation and validate problems. Once the task has been executed in the field, the worker can report back to the system and document the state of the equipment.
How Cognite improved onsite efficiency by making all data easily accessible to operators

Challenge: Traditional operations are tedious and slow. To complete a single maintenance task, for example, an onsite operator may need to access seven separate systems to get the required data. Sometimes they don’t have the necessary permissions to use those systems. Without the data readily available, projects that should take days end up taking weeks. This contributes to overall inefficiency, as well as an increase in hours workers must spend in challenging conditions.

Solution: Cognite ingested and contextualized all maintenance information from Ivar Aasen and made the data available for field technicians via the Operation Support application.

Engineers and technicians on the Ivar Aasen now have instant access to:

• Live sensor data and historic equipment performance data;

• All documentation related to maintenance, including procedures, work orders, drawings, P&IDs and maintenance logs;

• Interactive 3D models of installation and equipment.

• They also have the capability to share pictures and notes with the crew, establish live video calls, and the use of computer vision to locate equipment tags and automatically provide related information.

Impact: According to Aker BP’s estimates, Operation Support increased efficiency for offshore workers. After only three months, the crew at the Ivar Aasen saw significant increases in the number of monthly maintenance jobs (up to 10% for certain tasks) and reduction of the time spent on certain routine inspections (in some cases up to 50%).
How Cognite helped Aker BP save time and costs by automating maintenance

Challenge: Undertaking PSD (Process Shutdown) valve testing on Aker BP’s Valhall field used to be time-consuming work. First, engineers had to obtain a work permit to access Aker BP’s offshore system. Then, they had to use the system to pull up data on each individual valve, going one by one in the slow system until every valve that was scheduled for maintenance during that session had been checked. This approach meant that engineers were spending part of their shifts testing valves in good working condition instead of those in need of maintenance.

Solution: Aker BP used Cognite Data Fusion (CDF) to automate and optimize the PSD valve maintenance process at the Valhall field. CDF captured data from Aker BP’s control system, logging when valves were used and comparing the results to travel time criteria. The data was then visualised in Asset Data Insight, an application for computers and handheld devices. The dashboard gave operators and first-line onshore support staff an easy-to-use dashboard for monitoring valve health.

Impact: By using Asset Data Insight to inform their maintenance routines, Aker BP’s engineers were able to move away from manually checking each valve and toward prioritising valves that were not meeting travel time criteria. This change was estimated to have reduced the number of hours that engineers spent on testing PSD valves a year by about 80 percent. It also cut the number of annual maintenance checks by two-thirds, and the duration of an average maintenance session in half.

By reducing the time it took to check safety-critical equipment, Aker BP was able to reinvest those resources toward maintaining production-critical equipment.
How Cognite Supports Your Pursuit of a Digitalized Workforce

+ BOOST SAFETY

- REDUCE WASTE

+ SAVE TIME

Pen and paper. Hazardous conditions. Long walks between the field and the office. Fieldwork is loud and messy, but it doesn’t have to be.

Cognite’s Digital Worker solution supports your transition to a digital workforce in the field by combining domain expertise with technology such as Cognite Data Fusion (CDF) and Operation Support.

Our subject matter experts (SMEs) will sit side-by-side with your own experienced staff to figure out what will deliver the most value for your organization. Together, we’ll streamline the Digital Worker use case process – from identification through delivery – so you can create end-to-end digital value in your operations as quickly as possible.

Your field workers are your experts. Our solutions tap into their knowledge. We design with field workers -- not for them. That’s why our solutions target existing pain points without creating new ones.

For an example of how digitalizing your workforce can transform your business, let’s return to the field worker going about his day on an offshore installation. This time, imagine how his day might unfold differently.
The field worker sets out in the morning with a single device in his pocket. Using Operation Support, he has access to any information he may need – whether it is sensor data streamed from CDF, maintenance logs, or work permits – no matter where on the installation he is located. As the day progresses, he may snap a picture of a leak and share it with others, conduct a live video call with a colleague in a different time zone, and use a shared checklist to collaborate with electricians and mechanics as they inspect equipment that was automatically flagged for maintenance.

For such a company, the term digital worker will be redundant. Digital will be the default. There will simply be workers.

LET’S START BUILDING TOWARD THAT FUTURE TOGETHER.
GET IN TOUCH WITH US TODAY TO START EXPLORING THE POSSIBILITIES.
ALL ABOUT COGNITE

Our Vision
An industrial world powered by data and algorithms, freeing human creativity to shape a productive and sustainable future

Our Team
Cognite is a global software company supporting the full-scale digital transformation of heavy-asset industries around the world, from the U.S. to Japan to Austria to New Zealand. Our impressive interdisciplinary team includes more than 250 of the best software developers, data scientists, designers, 3D specialists, and industry professionals.

Together, we have built Cognite Data Fusion (CDF), a software package that empowers companies in industries like Oil & Gas, Energy, Shipping, and Manufacturing to extract value from their wealth of existing data by transforming it into useful information. CDF supplies data contextualization as a service, delivering reliable, meaningful data to industrial applications that increase safety and efficiency and drive revenue.

Curious about Cognite? Call on us!
These are just a few of our 250+ industry and tech specialists, all proud to be shaping the future of Oil & Gas.

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