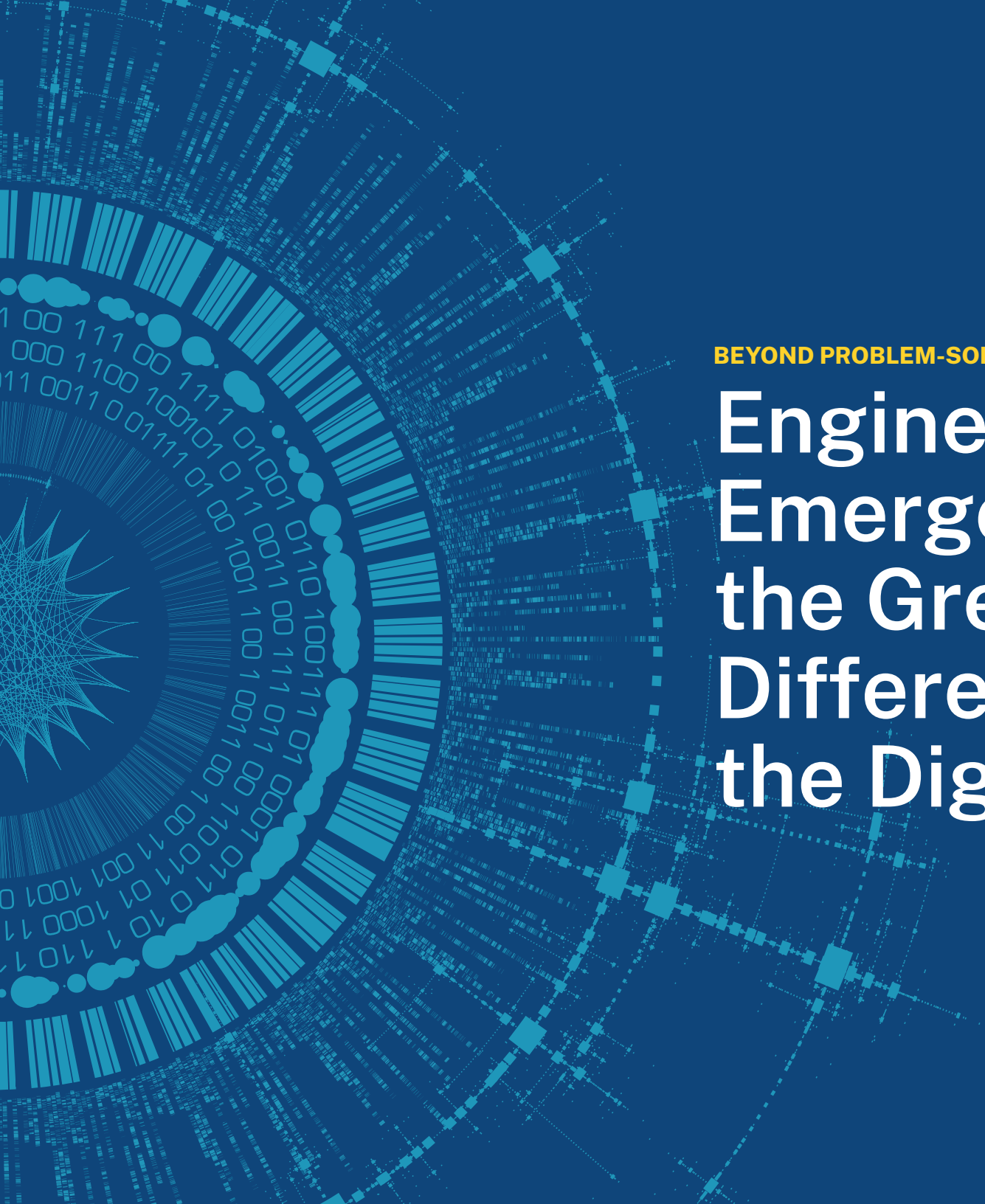


BEYOND PROBLEM-SOLVING

Engineers Emerge as the Great Differentiators in the Digital Age

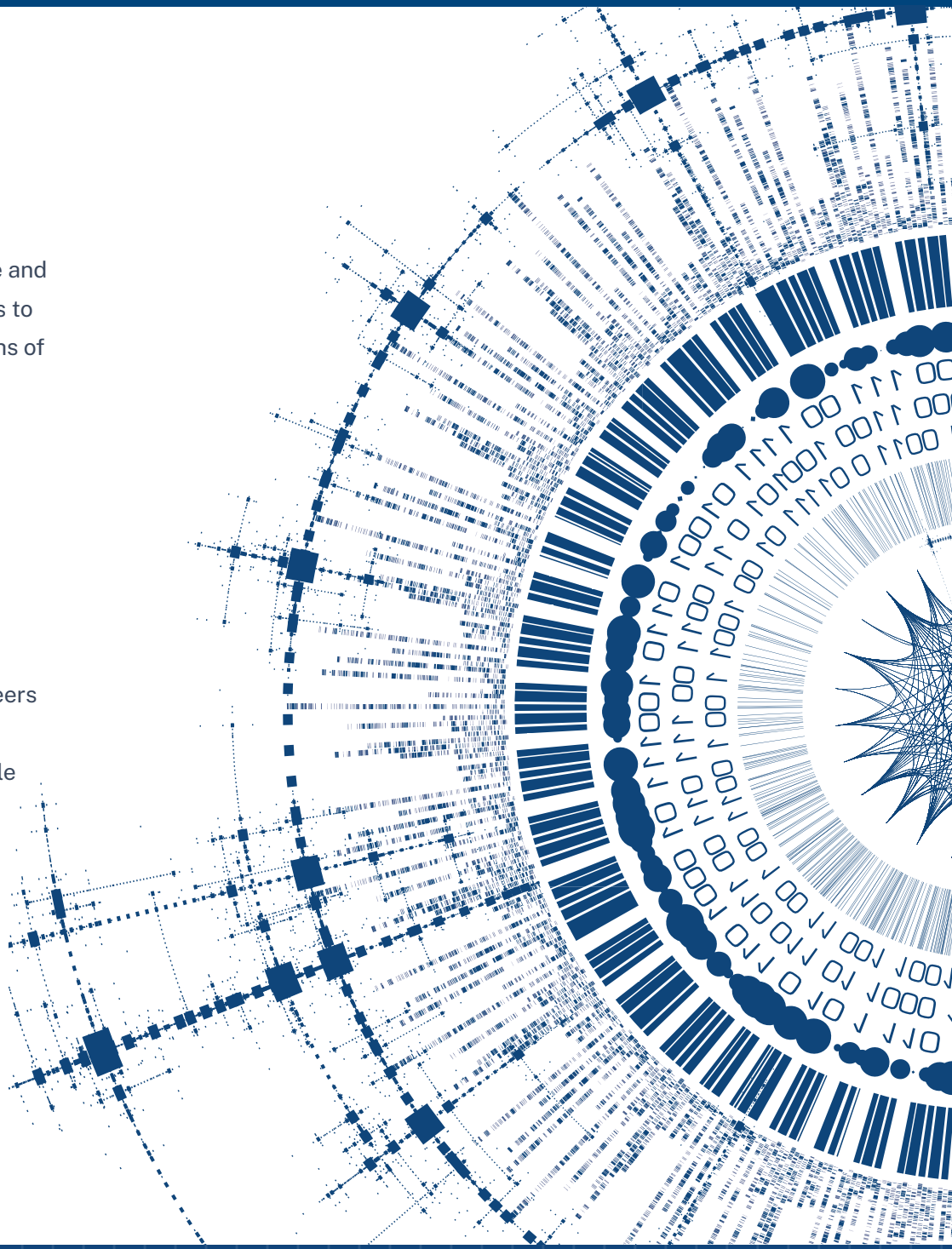
MINCO

INTRODUCTION

The pandemic accelerated digital transformation for almost every organization in the world. There are varying opinions about how extensive and rapid the progress was, but the consensus among credible experts seems to be that we crammed 6.5 years of digital progress into the first nine months of 2020 alone..

This rapid progress we continue to see isn't just about the connectivity required for remote work. In addition to solving day-to-day problems, companies are accelerating their use of cloud computing, artificial intelligence (AI), augmented reality and other digital tools to speed innovation processes.

This is good news for engineers. Because the long-held belief that engineers simply drove incremental improvements in existing devices, systems and infrastructures is becoming exposed as erroneous. While most are capable problems-solvers, it's the ability to collaborate with fellow engineers to identify futuristic problems — problems that don't yet exist — that distinguishes the modern engineer.



ENGINEERS:
EVOLVING FROM PROBLEM-SOLVERS TO PROBLEM-IDENTIFIERS AND INNOVATORS

A cursory view of disruptive digital technologies might indicate that some engineering roles would disappear and be assumed by AI-driven systems. But a closer look reveals that AI, machine learning, robotics, augmented reality and other digital tools are actually elevating the role of engineers.

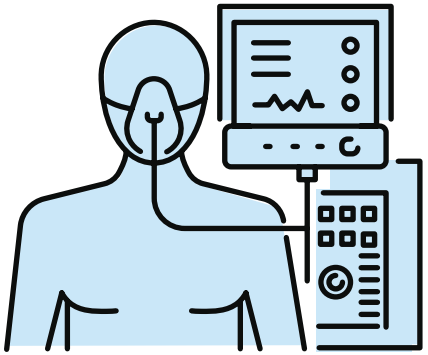
While there is still a large problem-solving component to most engineering roles, the greatest value engineers offer is an increasing responsibility — to both companies and societies — to identify the problems that need to be solved. While marketers, sales teams and customers can be relied upon to point out improvements they want or deficiencies that need to be remedied, collaborative engineering teams are the ones who are best suited to see opportunities to identify unsolved problems or conceptualize things that don't exist.

The word "engineer" itself points to this evolution. The word evolved from the Latin terms "ingeniare" and "ingenium." The definition of these Latin terms are all about ingenuity, creativity and disruptive thinking. The speed of innovation and product development in the world — and the onslaught of new competition — is elevating the value of engineering talent for corporations in every vertical market.

EXAMPLES:

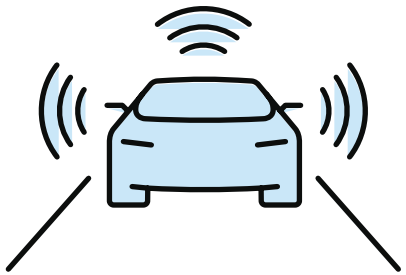
ENGINEERING INNOVATIONS IN RESPONSE TO GLOBAL TRENDS

The role of the engineer as a problem identifier and innovator is generally accelerated and magnified by global challenges. Here are seven anecdotes of this problem-solving in action, with issues prompted by the pandemic environment. In each case, engineers rose above the stereotype of problem-solver to identify opportunities for innovation and meaningful change.



1. Supporting the COVID Response with Innovative Ventilators

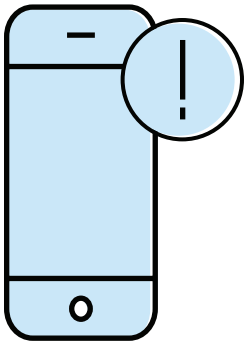
Early in the COVID pandemic, ventilator supplies dwindled as thousands of patients were hospitalized with breathing problems. Despite limited experience in medical manufacturing, Babcock brought together specialists from across Europe to get a working prototype up and running in just five days. While the new ventilator, the Zephyr Plus, has not yet been called into action, the low-cost, high-quality ventilator can be manufactured quickly should it be needed. In a span of six weeks, Babcock projects it can turn around as many as 10,000 ventilator units.



2. Connecting Autonomous Vehicles to a 5G Network

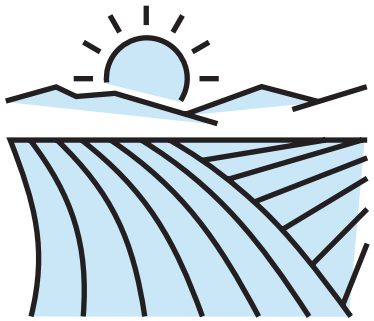
Led by Dense Air, a UK-based data network operator, the Auto Air project is bringing connected and autonomous vehicles (CAVs) one step closer to the road. Staged at a 700-acre racetrack site in Bedfordshire, England, the Auto Air project site consists of an immense network of radios and 5G masts strategically placed throughout the property to assess and track the potential capabilities afforded by this new technology — including monitoring and gathering vehicle test data and controlling on-board applications in real time.

EXAMPLES:
ENGINEERING INNOVATIONS IN RESPONSE TO GLOBAL TRENDS



3. Detecting Earthquakes Through Android Phones

While geologists have traditionally relied on immense networks of seismometers to track and predict earthquake activity, Google saw a much simpler solution. What if the accelerometers inside millions of Android users' phones could help detect earthquake activity at a much more granular level, with no need for expensive infrastructure? Now, when Android users opt into the program, their phones become one tiny sensor in the world's largest earthquake detection system. The data collected from each user's accelerometer is allowing geologists to track earthquakes with a whole new level of accuracy — improving safety in many of the most-high risk regions across the world.

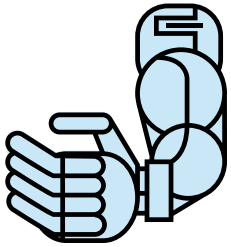


4. Pinpointing the Best Terrain for High Yield Crops

New Zealand's Landcare Research Institute needed a more efficient way to track the impact of agriculture and farming on biodiversity throughout the country. With this objective in mind, its engineering team designed an elaborate network of wireless sensors the Institute could deploy across farms throughout the country to pinpoint terrain that could deliver high yield crops. Once deployed, the wireless system will allow the Institute to better protect against over-farming and target biodiversity-friendly farming techniques for different ecological regions.

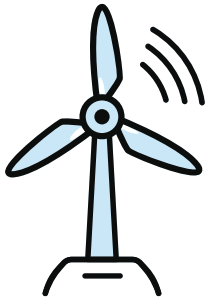
EXAMPLES:

ENGINEERING INNOVATIONS IN RESPONSE TO GLOBAL TRENDS



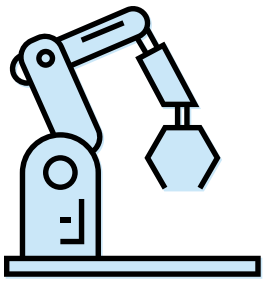
5. Giving Robotic Arms Greater Dexterity

Traditionally held back by their lack of an opposable thumb, robotic arms are evolving. The Tactile Robot collaborative, which includes the Shadow Robot Company, HaptX, SynTouch and Tangible Research, designed and built the world's first haptic telerobot hand, capable of replicating more of the movements and touch capabilities of the human hand and arm. The new robot's five-finger dexterity opens up a variety of new potential applications — ranging from high security uses like bomb disposal, to medical applications such as minimizing exposure to harmful chemicals or human contamination. An example of engineering collaboration at its finest.



6. Producing Cleaner Hydrogen Energy

The majority of hydrogen production methods rely on inefficient processes that result in millions of tons of CO2 emissions each year. ERM Dolphyn reimagined this outdated extraction process to produce green hydrogen using a network of electrolyzers and floating wind turbines located at sea. By leveraging offshore wind, and pairing it with onboard electrolyzers, ERM's process minimizes the energy losses associated with standard methods that produce energy offshore and then must transport it electrically to onshore electrolyzer facilities.



7. Replacing Human Pickers with Robotic Labor

For years, large manufacturing and ecommerce operations have depended on human labor to pick and sort — from parts to packages and everything in between. Until recently, the subtle differences in shape and handling requirements for hundreds or thousands of SKUs made programming robotic pickers to adjust on the fly an impossible task. Now, the Covariant Brain by Covariant is removing this final hurdle by leveraging reinforcement learning techniques to train itself to pick up anything. In a promising real-world trial study, the Covariant Brain handled 10,000 objects with a never-before-seen 99-percent accuracy rate.

BEYOND BASIC PROBLEM-SOLVING:
An E2E Collaboration Offer from Minco

When you look below the surface of each one of these impressive feats of engineering, you'll find they all share one important thing in common: collaboration. The most powerful improvements in performance, cost, space and technology are often discovered when great engineering minds get together.

At Minco, our team of cross-disciplinary engineers bring decades of experience to every engagement — providing in-house engineering teams with outside-the-box thinking that can help them effectively address problems in aerospace, industrial and commercial manufacturing, life sciences and electronics. From consultation, to design, simulation and prototyping, our engineer-to-engineer (E2E) approach augments your engineering capabilities to discover new solutions and drive meaningful change.

Interested in starting an E2E conversation with a Minco engineer? Visit minco.com/contact

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