A key challenge was the lack of public GIS information on which to base a larger site plan. Accurate and reliable reality capture solutions traditionally carry substantial capital costs, but also contribute significantly to project timelines. Arup required a new approach to address limitations of existing methodologies in order to meet the challenges of their project.

**CHALLENGE:**

China’s city of Shenzhen is at the forefront of sustainable urban planning, with an International Low-Carbon City competition that annually showcases the best new development ideas. Sustainability is a key priority in a country urbanizing as rapidly as China, where an additional 300 million people – the equivalent of the entire population of the United States – is projected to relocate to urban areas by 2025. Since such a migration has never been achieved before in human history, urban municipalities are actively engaged in evaluating new approaches, exemplified by this competition.

Never shy to a challenge, the international design, engineering, planning and consulting firm Arup won the top prize in 2015, and quickly got to designing and implementing long-term operation strategies for a 53-hectare (131-acre) industrial site. This included commercial, residential and infrastructure plans to build a scalable urban environment that can accommodate the rapid rates of urbanization China’s cities are experiencing.

Arup’s immediate challenge was to understand the area’s existing conditions – its elevations and slopes, its bridges and gullies, its buildings and marshes and the makeup of the surrounding neighborhoods. With little current geographic data in hand, traditional methods would have taken two to three people more than a week to collect 2D data and build it into 3D models, or required an outside surveying crew to walk as much of the site as it could while carrying heavy equipment. In addition, traditional surveying methods require teams to manually take readings at various points, meaning they need to walk or drive to all the relevant locations. This can present significant challenges in areas where roads are limited, or health and safety risks on active construction sites.

Regardless of the methodology, all traditional options would require too much time evaluating the site – while Arup needed that time to begin analyzing and planning.

When Arup won the top prize of a global competition to design the master plan for the Shenzhen International Low-Carbon City, the British firm had just one month to model a sustainable industrial park on a 53-hectare (131-acre) site.

**CUSTOMER:**

ARUP

**FOCUS:**

Digital, Advanced Tech, Planning

**SOLUTION:**

DJI Inspire 1 with Pix4D Image Processing software
Arup pursued a third option. The Advanced Technology Group (ATG) in Arup’s Shenzhen office collaborated with DJI’s drone team, who helped Arup fly and capture data with Pix4D image processing software. In less than a day, Arup designers had material in hand to begin an in-depth analysis of the site’s conditions. With their modeling time shortened from a week to a day, they were freed to do what they do best – solve problems using new, innovative approaches.

As the project progressed, Arup was able to use its 3D model as a spatial reference for its designers, planners and engineers to immediately evaluate new ideas and visualize how they would work in the real world. The DJI Inspire 1 and Pix4D software allowed them to minimize time spent on gathering data, and focus on developing a robust plan to accommodate industrial growth while protecting the environment.

“Arup is dedicated to designing a world that is more resilient, more efficient and more enjoyable to live in. We invest heavily in research and development of advanced technology to help our clients achieve ambitious goals. In some recent projects, DJI drones provided precise and quickly mapped 3D site contours and environmental conditions. This enables us to shape new, smart and sustainable communities knowing we can confidently rely on accurate baseline information.”

-Dr. Alex Han
Engineer, Advanced Technology Group, Arup

Using the Inspire 1 and Pix4D software, Arup’s Advanced Technology Group generated a 3D textured mesh (left) of the industrial site to properly visualize and evaluate how their designs will fit into the real world.

SOLUTION:

A DJI Inspire 1 with Pix4D’s image processing software shortened Arup’s modeling time from a week to one day. Dr. Alex Han (left) and Mark Richardson, Associate and South China Architecture and Planning Leader at Arup, were interviewed by local media at the Pingdi exhibition.
RESULTS:

When it came to displaying its ideas to the public at a subsequent international forum and exhibition, Arup was able to move far beyond posterboard and physical models. It put the full capabilities of its 3D model to work, with Oculus Rift virtual reality goggles giving participants the opportunity to walk through Arup’s vision for the low-carbon industry park.

The immersive virtual reality process transformed the process of displaying Arup’s plans, allowing participants to visualize how smart planning can ensure smarter, more sustainable growth. It also generated lively marketing materials for Arup, which was able to showcase the impact of its ideas in a vivid representation of how they can work in the real world.

By using new tools such as drones for data capture and virtual reality to create new experiences, Arup demonstrates the role new technologies are playing in not only shaping the built environment, but also how we experience and navigate these environments. As technology continues to evolve we should look to morph existing methodologies to harness the full potential that innovation promises.

PARTNER:

Pix4D

simply powerful

FLYING PLATFORM:

DJI INSPIRE 1

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