

# NUCLEAR DIGITAL TECHNOLOGIES

## NUCLEAR DIGITAL TECHNOLOGY & BENEFITS



### 3D Laser scanning and photogrammetry

Faster than traditional surveying methods and collects more information for complete design and engineering.

- **Design:** Quickly collect data and produce a detailed model to develop designs from anywhere in the world. Our process removes the risk of relying upon inaccurate legacy site plans and drawings.
- **Construction:** Design changes or sub-contractor designs can be quickly checked against the base model – only visit site once to gather data.
- **Operation:** Reality capture can be used to monitor changes over the asset life.



### Drone Surveys

Specializing in aerial data capture from satellites, manned aircraft and drones, our geomatics team captures reality to bring the site to the client's desktop at survey grade accuracy.

- A faster, safer more reliable method for carrying out land surveys.
- Ultra-High-Resolution Imagery gives un-paralleled insight into visual condition surveys.
- Full site aerial imagery means that additional information can be captured from the desk instead of returning to site.
- In-house analysis and data processing capability to deliver engineering quality 3D models.



### Information Systems

We have a range of solutions to support every stage of the project lifecycle, from engineering through to operations and decommissioning.

- **TRAK** — Project Information Management for major work projects and programmes.
- **ACCIS** — SCADA based safety system for high hazard industries.
- **PSPs** — Helps plan and manage maintenance activities in safety critical environments on tablets or laptops at the workforce.
- **iCAPs** — Library of decommissioning cost estimated and program information for nuclear plants to produce site specific estimates.



### Project Data Hubs

Our project data hub approach captures reality and 3D model information to provide a visual platform for storage and information management.

Flexible, maintainable, accurate and a permanent record providing an environment for better stakeholder engagement

- Fewer assumptions for design and physical works pricing.
- Fewer site visits throughout the project lifecycle.
- Fewer Technical Queries (TQs) and improved design and delivery co-ordination activities.
- Better activity planning by conducting them virtually prior to on-site works.
- It's flexible, maintainable, accurate and a permanent record providing an environment for better stakeholder engagement.



### De-risked design delivery

By integrating a range of digital technologies into the entire project workflow, we can de-risk design delivery and better maintain schedule and budget.

- Laser scanning to captures a single source of truth for current site configuration.
- 3D designs developed from the outset results in greater cost certainty.
- Paperless manufacture through model-based definition, reduces cost and program for procurement and manufacture.
- Enabling modular design and offsite manufacture can reduce program installation.



### Virtual Reality

Immersive visualization technology enhances engineering design, delivery and operations by providing spatial context to data and assets.

- Increases efficiency and reduces cost across the lifecycle of a facility.
- Identifies clashes during design.
- Delivering more effective training and planning activities.
- Simulates dismantling and demolition.

When used in combination with BIM and 4D (scheduling), 5D (cost) and 6D (performance) data, this holistic view takes the art of de-risking activities, for both people and the bottom line, to a whole new level.

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### Model Based Definition

Enables contractors and fabricators to deliver designs directly from 3D models avoiding 2D drawing production and model replication.

- Designers issue 3D model to supply chain, with specifications linked to the file; this avoids the error trap associated with manual data transfer.
- Working with the wider supply chain de-risks designs and reduces project program.
- Proven process with high levels of assurance and verification in support of safe operations.

### Robotics

Mature and proven technology for systems integration and solutions delivery.

- Safe solutions that integrate off-the-shelf equipment in a nuclear setting.
- Digital engineering methods (3D laser scanning, 3D design) provides certainty of existing site conditions to safely integrate robotics into existing facilities.
- Robotics benefits operator safety and program efficiency.

### Asset Management & Operations

The vision is to enable digital twins for whole lifecycle asset management solutions from design through to decommissioning.

- We support with developing and delivering the three key pillars of a digital asset management strategy.
- Enterprise Asset Management—working with systems integrators and users to provide domain expertise to configure new and existing systems.
- Asset Performance Management—data collection and aggregation from enterprise asset management systems enables reliability centered maintenance, predictive analytics and condition-based maintenance.
- Asset Investment Planning—data to support investment strategies and long-term capital planning.

### 3D printing

Rapid solutions prototyping is enabled by integrating 3D printing capability in the project workflow.

- A natural extension of our digital engineering capabilities and enabled by 3D laser scanning and metrology experience.
- Parts can be printed and tested for fit on site prior to commissioning the final item for manufacture by traditional or 3D printed means.
- Provide project stakeholders a physical model of the engineering solution before it's built or manufactured.
- Reverse engineer obsolete or consumable parts and quickly produce bespoke 3D printed replacements.

### Augmented Reality

Overlay designs and modifications on-site prior to execution.

- On-site design review designs provide workers complete understanding of challenges and constraints.
- Enables better planning and identify key tools and resources to execute the project.
- Identifies hazard information, such as radiological sources or obstructions.
- Link in design specifications and method statements to reduce paper required.

### Data Analytics

Provides engineering insights using data science, artificial intelligence and machine learning to increase asset life and reduce operational costs.

- Agile development methodology to implement selected ideas with a combination of process and technology; domain expertise, advanced neural networks, open source software and cloud deployment.
- Cross functional teams comprising engineers, data scientists, data architects and developers.
- Idea-to-scale methodology to turn innovative ideas to deployable solutions.

### Robotic Process Automation

Automating data transfer to maximise efficiency and throughput by increasing staff productivity and reducing process timelines.

- We map current workflows to identify manual and repetitive tasks and their interfaces.
- Software 'robots' are developed to automate these tasks and interfaces.
- Automated workflows are integrated into existing systems.
- We provide ongoing support and review to drive operational efficiency.

### Cyber Security

World-class cyber security team that specializes in securing data and critical infrastructure.

- Developed methodologies that prevent and manage cyber threats.
- Identify unknown security vulnerabilities, weaknesses and risks in Information Technology (IT), Operational.
- Technology (OT) and Industry Control Systems (ICS).
- Robust security and resiliency providing cost-effective business or service continuity for sustained revenue.