





# **Embracing the Future**

Digital Data & Technology

## **Connected Worker**



### IMPACT

### Productivity Savings

- Work multiple tasks by not traveling
- Meeting Schedule during COVID
- Schedule improvement
- Reduced CO2 footprint
- "New Normal"

### **CUSTOMER'S CHALLENGE**

Progress driven by COVID – 19

Restricted Travel and Social Distancing for-site based teams limiting

- Factory Acceptance Testing
- Onshore site visit
- Offshore site visit
- Alignment of models and reality for brownfield integration

#### SOLUTIONS

- HoloLens / TEAMS to remote host fabrication acceptance testing
- Overlay 3D model in field to visually compare the physical with the design to determine if there are any clashes.
- Site Audits with wearable tech using local operations teams
- Mobilization of kit to clients' locations globally
- Atex headset for offshore site visits/inspection/audits, participation in toolbox talks/RA, Competence assessments, response to queries, etc
- Integration of digital workpacks via iSafe Tablet

# **End-to-End solutions**



# Gas turbine anomaly detection and maintenance optimization



### IMPACT

- Early warning detection (12-20 hours) for turbine anomalies
- Recommendations for maintenance tasks with % confidence scores for deferment
- USD 2-3 M savings in maintenance costs for 14 turbines delivering 100 MW

#### **CUSTOMER'S CHALLENGE**

- How to detect anomalies in gas turbines before they trip?
- How to ensure reliability of power plant turbines in case of deferred maintenance?
- How to optimize maintenance tasks and frequency to operate multiple trains of generators/turbines?
- How to reduce overall maintenance costs without negatively impacting performance for turbines ?

#### SOLUTION

- Created database with Mark V vibration data, process data from Aspen historian, and SAP maintenance logs
- Built deep-learning model to identify patterns of anomalies across large data sets when turbines were operated in different conditions, and provided maintenance recommendations (e.g. when to change lube oil)
- Trained model on 80 GB of structural data, including quantitative and qualitative parameters

# DataSeer – where AI and industrial drawings meet



**IMPACT** 

- 85% reduction in time spent locating, labeling, and extracting symbols/text
- Up to 63 times faster at extracting tables vs. traditional methods
- 25% reduction in time for the digital conversion process

#### **CUSTOMER'S CHALLENGE**

- Useful data is often stranded in inaccessible documents/drawings (i.e. scanned images, paper copies, etc.)
- Quick and accurate data extraction is difficult, but very important
- Drawing conversion is a daunting task, requiring multiple hours of repetitive drafting

#### SOLUTION

- DataSeer is a cloud-based application that can extract text and symbols from traditionally inaccessible documents in order to expediate the process of creating deliverables like tag-to-document registers, instrumentation indexes, etc.
- The highly interactive application utilizes machine learning and computer vision algorithms to automatically label, process, and extract a wide range of industry-standard engineering symbols.
- Alongside providing an optimized QA/QC process, DataSeer accelerates the digital conversion of drawings in non-intelligent formats.





#### What is Forecaster?

- Model an asset's emissions and energy requirements, with detailed predictions on equipment utilisation, fuel requirements and indicative costs.
- Supported energy & emission assessments worldwide across multiple companies and projects
- Provides a quick, consistent and accurate solution for prediction and verification of energy and emission trends
- Annual licenses held by clients who rely on Forecaster for annual reporting requirements.

#### Value for asset owners:

- **Improved Efficiency** Can be used to reduce incumbent time and labor costs associated with performing annual regulatory submissions. Once model is set up for an asset, updates for next year can be added very quickly, with results in seconds.
- **Better Consistency** Forecaster's calculations are protected from accidental change. Model files can be shared between team members, so each is working off the same base model. Moves team away from personal spreadsheets onto a more robust application.
- Accuracy in Predictions with sufficient and care in developing the model Forecaster has been proven to be better than 90% accurate











### LNG Decarbonization Blockchain Application

Development of a cloud-based SaaS (software as a service) application powered by blockchain technology that will track, report and audit carbon emissions in the LNG value chain, from exploration to use, and also provide the platform to offset carbon emissions.

Worley is involved in this currently active project.



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BLOCKCHAIN FOR ENERGY

B4E is a network of business partners to create industry solution frameworks and guidelines leveraging blockchain technologies to maximize opportunities to optimize costs, increase efficiencies, and discover new business paradigms which are safe and responsible.

### Worley recently joined the board of B4E.



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