REALITY CAPTURE AND VISUALIZATION FOR ENGINEERING SUPPORT

ADOLFO ALLEGRO

VICE PRESIDENT

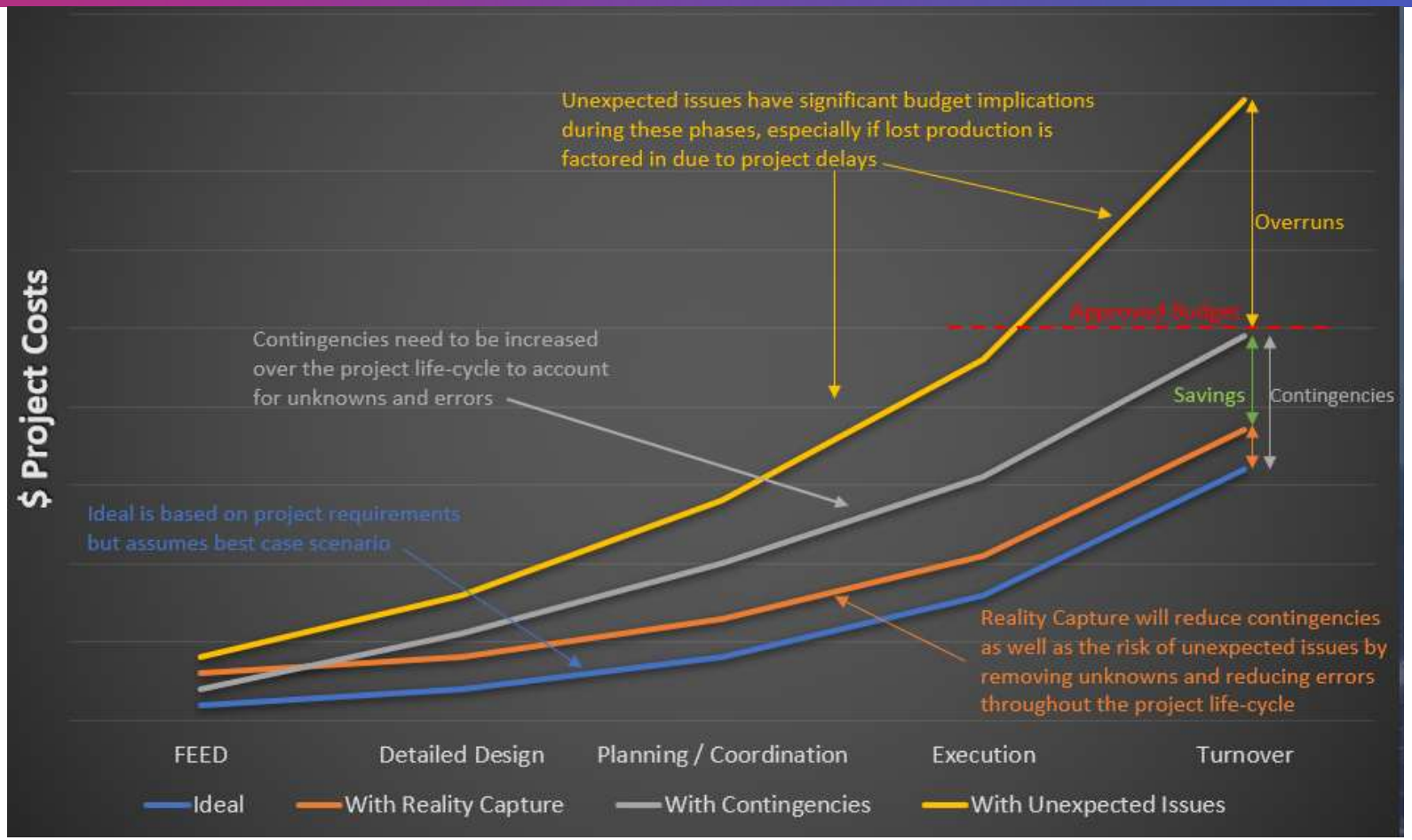
MIRACAD TECHNOLOGIES INC.

Gulf Downstream Association presents

TRANSFORM Virtual Event

The Evolving Future of Leadership and Project Management

Brownfield Project Life-Cycle Budget Vs Actual



Why use Reality Capture & Visualization for Project Design, Planning & Execution?

GDA
الإتحاد الخليجي للتكرير
Gulf Downstream Association

Reduce site visits by up to 80% during the design and planning phases

Reduce costs from rework and field fit from 15% to < 1% of a projects budget

Significantly reduce or eliminate the costs of 3rd Party Progress Monitoring

Reduce the costs of generating as-built documentation by up to 80%

Reality Capture with Visualization is used to remove unknowns, reduce errors, improve collaboration and realize new efficiencies

Project Workflow with Reality Capture & Visualization

GDA
الإتحاد الخليجي للتكرير
Gulf Downstream Association

FEED Study

- Overall project site captured
- As-built point cloud modelling & classification
- Cloud360 virtual site created
- 3D concept model ingestion (LOD200)
- 3D model-to-point cloud interface checks
- Model reviews
- Reduce Unknowns

Detailed Design

- Specific areas and equipment captured
- Captured data used for detailed design by EPC
- Cloud360 site updated with design information
- 3D design model ingestion (LOD300)
- Model reviews
- Project ENG. data appended to 3D virtual site
- Reduce engineering costs

Planning / Coordination

- Cloud360 site access provided to stakeholders
- 3D Model ingestion from EPC & vendors (LOD400)
- Model reviews (30/60/90%)
- Online collaboration tool
- Virtual construction planning
- Identify hold points for QA/QC dimension inspections
- Reduce contingencies and improve collaboration

Execution

- Critical assets captured for QA/QC
- Fabrication-to-design checks
- Scheduled field captures for progress monitoring
- Construction reporting
- Virtual construction checks
- Remote access tool for site collaboration
- Reduce construction costs from rework and field fit
- Improve collaboration

Turnover

- As-built site captured
- Design model updated to as-built (LOD500)
- Cloud360 as-built site created for facility team
- Project data archived
- Cloud360 site and model handover to facility team
- Reduce costs of generating as-built documentation

Reality capture & visualization

Terrestrial 3D survey

Terrestrial Survey Grade 3D Laser Scanning

- Leica P40 survey grade instrument
- 1 million measurements per second
- Millimeter accuracy
- Unobtrusive and safe
- Highly cost effective
- Only survey grade 3D laser scanner

Reality capture & visualization

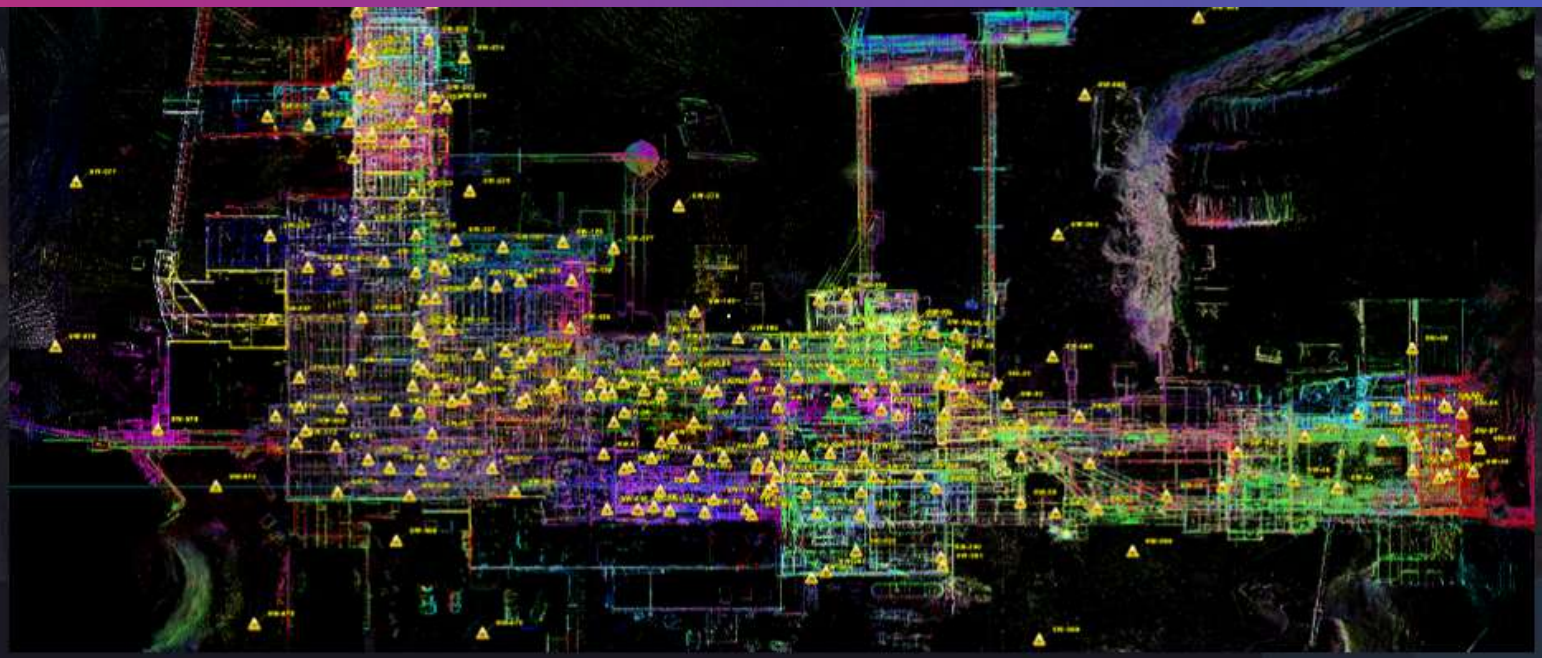
Panoramic HDR photography

High-Resolution with HDR Panoramic Photography

- 700+ Mega Pixel Spherical Images
- Orient Position to Point Cloud
- Fine details are very clear
- Unobtrusive and safe
- Highly cost effective
- OCR can be run on all images

Reality capture & visualization

Strategic asset capture

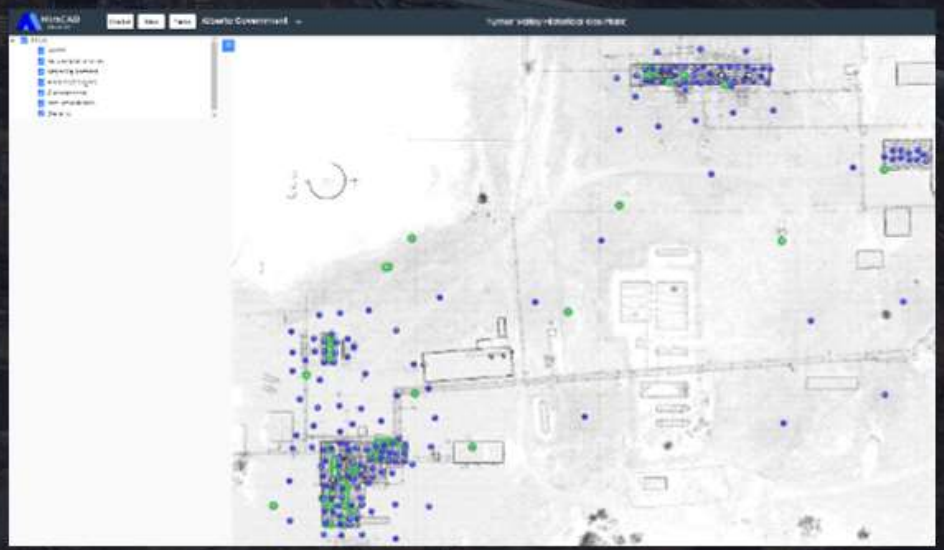


Building a Comprehensive Plan for Asset Digitization

- Industrial Facilities are complex
- Gaps in information
- Asset Digitization fills in the gaps
- Goals and Milestones
- Timeline and schedules
- Particular areas of interest

Reality capture & visualization

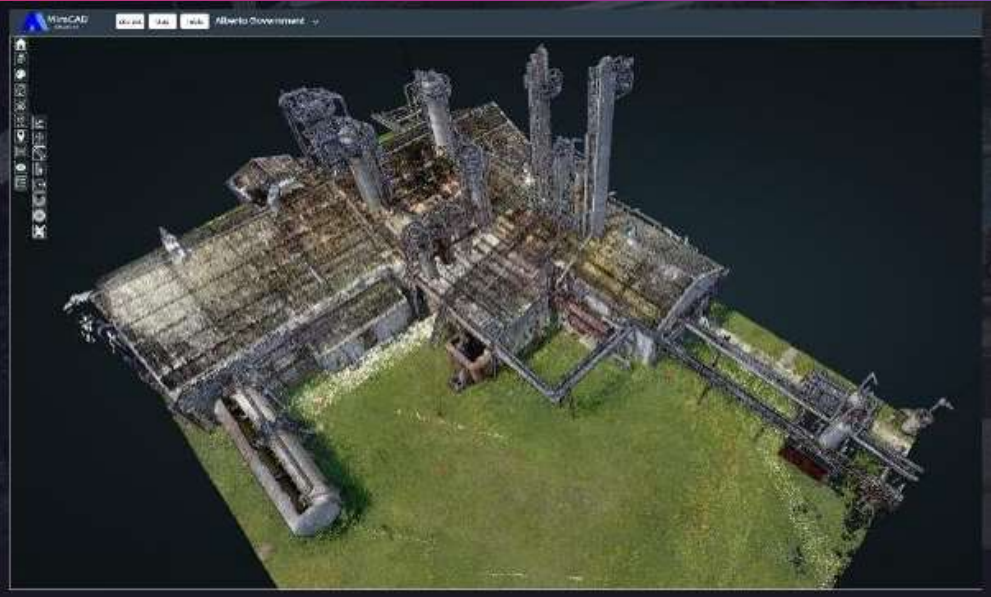
2D Visual Navigation



Point Cloud with High-Resolution Photography

- Navigate from Topographical View
- View Site from scan stations
- Similar to Google Earth
- Basic toolsets can be used ex. Measurements
- View point cloud with photo overlayed
- 12K Panoramic view also available

Reality capture & visualization
Advanced 3D navigation

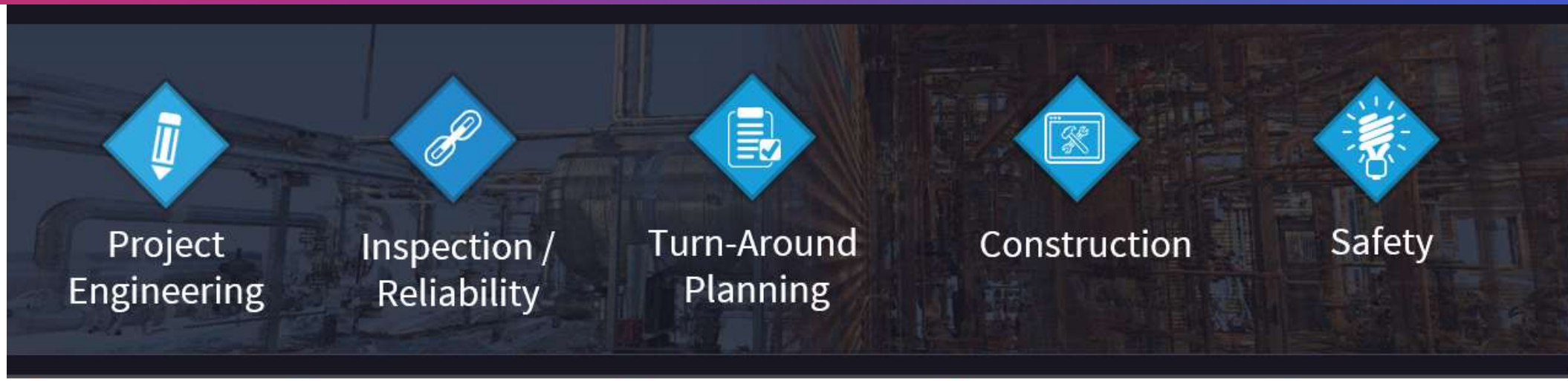


Point Cloud with Color from Photography

- Navigate from multiple views
- View site from any point in space
- Similar to 3D CAD Platforms
- Advanced toolsets can be used ex. Clipping
- View point cloud like a 3D model
- Various ways to manipulate data

Reality capture & visualization
Stakeholder identification

GDA
الإتحاد الخليجي للتكرير
Gulf Downstream Association



Reduce eng. costs
- MM accurate dimensional data
- Remove unknowns
- Virtual online collaboration site
- 3D model-to-point cloud interface

Reduce unexpected events
- Consolidate asset data
- Geo-locate inspection locations
- Hyperlink inspection data/reports
- Virtual inspection/ planning

Reduce downtime
- Rich virtual planning
- 4D operations tools
  - ID isolation
  - scaffold design
- Project Snapshots
- React faster to found work

Reduce contingencies
- Consistent & accurate site survey control
- Eliminate rework & field fit
- Dimensional checks of offsite assets
- Virtual construction

Reduce TRIF
- Geo-locate muster points, hydrants, safety showers, etc.
- Incident investigation
- 3D EPZ/audible noise boundaries/explosion radii

MiraCAD

https://www.miracad.com

aallegro@miracad.com