



## 2013 CAPABILITY STATEMENT

Asphar Survey Group Pty Ltd is at the forefront of Technology in the Surveying world. We have all facets of spatial solutions covered, from 3D Metrology to Hydrographic Surveying, including all other surveying disciplines.

Asphar Survey is a wholly owned Western Australia Company. We own offices in Karratha, Port Hedland, West Perth, Onslow, Exmouth, Geraldton, Darwin and Brisbane, with two Residential Properties in both Karratha and Pt. Hedland, and three houses in Onslow to accommodate staff. We recently established offices in Beijing and Tianjin (Peoples Republic of China). We are committed to our clients' successful outcomes on major projects such as Sino Iron Project, Roy Hill Iron Ore Project, FMG's Port Expansion, BHP Billiton's Macedon Project, and many more.

Asphar Survey has extensive experience with:

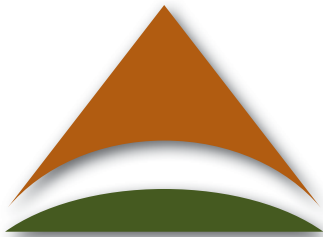
- Leica TPS & GPS systems from many construction projects including the FMG TPI Rail Project.
- Marine surveying experience with Wharf Projects including:
  - RGP3 for John Holland/BHP,
  - Marine & Civil's Public Wharf in Port Hedland
  - BAM Clough PNG LNG Load-out wharf
- We are also engaged as Auditing Surveyors for the BHP Billiton Macedon Project.

Asphar Survey has a large, diversified, skilled work force of 90+ employees with experienced personnel being a main focus.

We at Asphar Survey believe successful delivery of past and future projects lies with the mix of ingredients of Quality, Safety, Profitability, Staff Morale, Technology and more. Asphar Survey would deliver this work culture for your company's benefit.

One of the latest additions to our advanced technology at Asphar Survey is the Leica Absolute Laser Tracker. This instrument is the only one of its kind within any organisation throughout WA and the only organisation across Australia to be equipped with the T-Scan. This Allows Asphar to be able to measure up to a 20 microns (20/1000mm), making the organisation your absolute one stop shop for spatial data acquisition.

Another recent addition to our precision instrumentation is the Amberg Rail Track Trolley, the only one of its kind in Australia. This instrument allows us to provide unparalleled service and precision to all rail installations and maintenance projects in the country. In conjunction with our Hi-Rail vehicles, we can now offer our clients specialist rail services years ahead of our competitors.



# ASPCHAR SURVEY GROUP

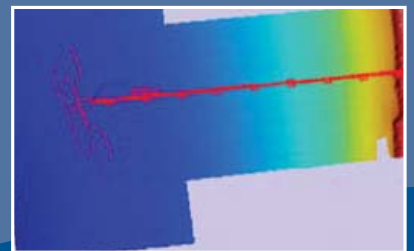
## ASPCHAR SURVEY SERVICES

Why choose Asphar Surveys as your main supplier of Licensed & Engineering Survey Services?

- Efficiency and cost effectiveness
- Accurate and timely services
- Quality of presentation to clients
- Professional, Experienced and Friendly Staff
- Ability to cover all your project needs
- Consistency of service in a tight labour market
- Ability to expand for larger scale, long term projects

## INDUSTRY SERVICES WE OFFER

- Sea Bed DTM – Hydrographic surveying of subsurface topography using multi-beam echo sounding, transformed into detail maps representing real world surfaces.
- Piping – Detail surveys of in situ pipe structures for reverse engineering, setout of position for pipe installation
- Mechanical – Precise detailed surveys and setout information for installation of Industrial machinery.
- Structural – Setout Information provided for precision construction of high tolerance structures and As Built plans.
- Volume Calculations – Volumes produced from detailed surveys of any surface, cut/ fill volumes for planning
- Earthworks – From Bulk Earthworks to final trimming setouts and supervision, including machine guidance solutions.
- Building Setouts – Accurate Positioning of Building corners, grid lines and baseline points





# ASP HAR SURVEY GROUP

- DTM – Detailed feature surveys of any surfaces mapped for client presentation
- As-Constructed Surveys – “As Built” surveys carried out precisely, transformed into electronic and hard copy formats for all your QA purposes
- Road Construction – Setout and As Built information acquired for every construction phase of the road and drainage formations.
- Tunnel Construction – Precise direction and formation applied during excavation processes
- Rail Formation – All aspects of rail construction from Bulk Earthworks to Rail Alignments
- Bolt Setouts – Setout to your projects specifications for concrete pours prior to structural installations
- Formwork Setouts – positioned in accordance with concrete construction plans and specifications





# ENGINEERING SURVEYS

Our Engineering expertise covers a large variety of solutions for the Construction and Mining Industry Surveying requirements. Using the latest technology provided by Leica Geosystems we can accurately and efficiently provide all spatial data needs for your project.

Qualified and Experienced Professionals will transfer information from Design to the Field with precision and detail that is second to none. This may include setout of Hold-down

Bolt positions, Bridge construction, Rail Formations, Tunnel Construction, Earthworks, Concrete Setout, Piping and much more.

With teams of surveyors and equipment unsurpassed in quality the cost saving can be enormous.



# LAND DEVELOPMENT

With a rapidly expanding community environment Land Development is an essential process in the need for new housing estates. By providing an efficient solution for all your Land Development needs, Asphar is your best choice.

Our spatial solutions are based on Geodetic Surveying principles and utilize the advancement in technology to accurately transfer data from designs to field. Autodesk Civil 3D is our mapping and drafting software that produces modern and quality plans for presentation requirements.

Efficiency and Accuracy is met by using Leica Geosystems equipment which include GNSS GPS Systems and 1 Man Total Stations that are rated up to 1mm in precision.

Land Development Services that we cover:

- Subdivisions – Survey from initial planning to final pegging and plan lodgment.
- Amalgamations – Setout of Marine piling for Bridges, Wharfs, Jetties, Harbor Extensions, Groynes and canals.
- Survey Strata – Field Pegging and Plan Lodgment for your survey strata subdivision.
- Building Strata Boundary – Survey Planning and Pegging for your new title needs.
- Re-establishment – Whether you are building a new home or expanding your existing one we can re-peg your boundaries whatever the obstacle.
- BOMA Surveys – For Leasable area agreements and correct leasing rates, we will dimension and map you property.
- Boundary Disputes – For any confirmation of the location of your boundary as well as property information
- Other Legal Surveys – We can provide you with assistance in any property matter that is under dispute.



*Subdivisions*





# TOWN PLANNING

Our specialists can guide and assist you at each step of your project, from planning preparation to effective construction. We have extensive experience in all phases of the planning and property development cycle.

- Coordination and consulting , Re-zoning, Council approval, Land titles, Survey services
- Value-adding through rezoning and subdivision

We can assist you in each of the following task:

- Co-ordination
- Planning
- Study & Designing
- Strategy and decision making
- Virtual Photorealistic Representations



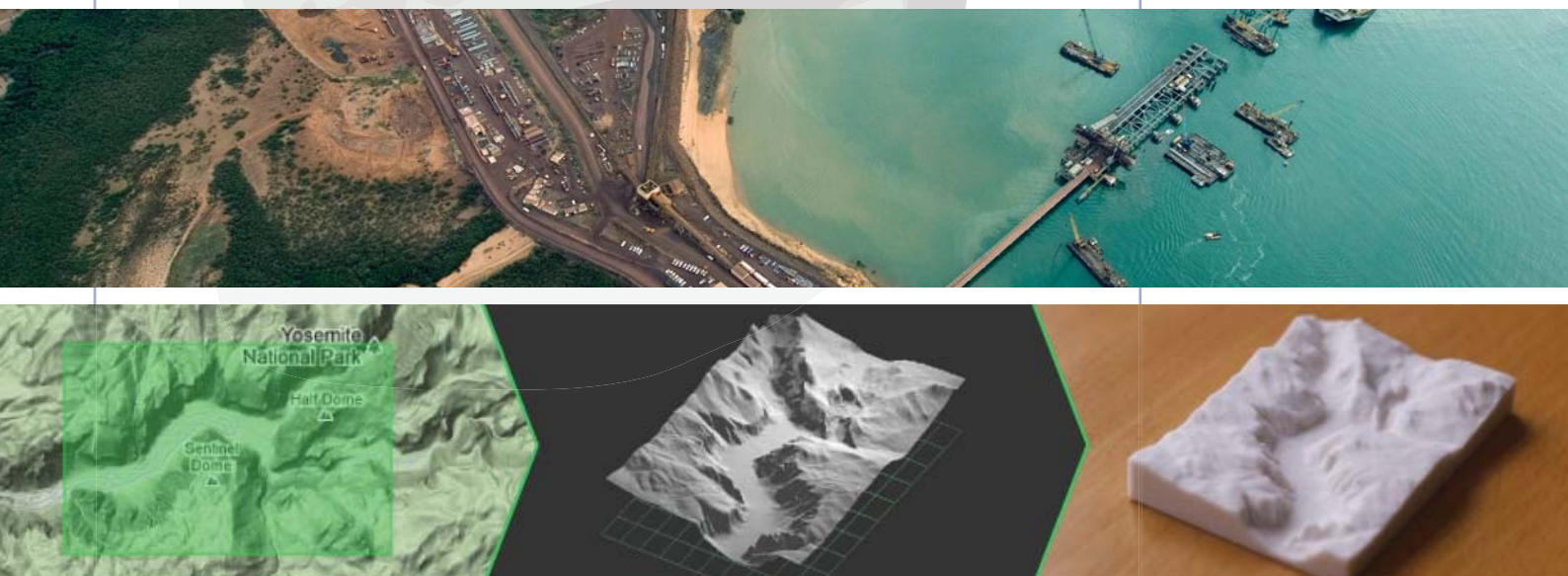
*Photorealistics renderings*



# ENVIRONMENTAL SURVEYS

Our Surveying expertise covers a large variety of solutions for the Environmental Industry from the creation of a detailed terrain image to the monitoring of coastal erosion. Using the latest technology provided by Leica Geosystems, AutoCAD 3D and Z Drive 3D printers we can accurately and efficiently provide all of the spatial information needed for your project.

Qualified and Experienced Professionals will transfer information from the Field with precision and detail that is second to none. With teams of surveyors and equipment unsurpassed in quality the cost saving can be enormous.





# DRAFTING / MAPPING

Purpose-Built Surveying and Design Tools Streamline project workflows by automating time-consuming tasks.

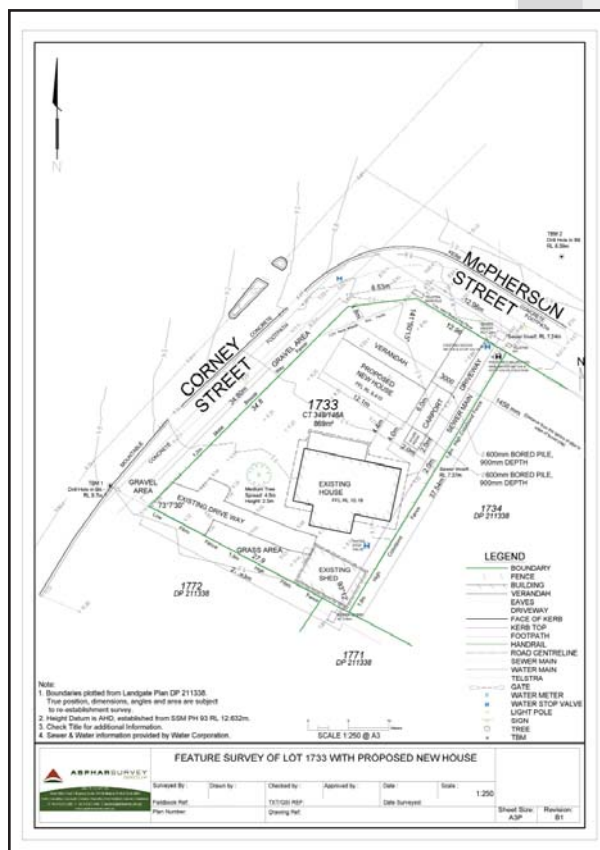
Asphar Survey utilises the latest in Autodesk software, Autodesk Infrastructure Design Suite 2013, which includes:

- AutoCAD® 2013
- AutoCAD® Map 3D 2013
- AutoCAD® Raster Design 2013
- Autodesk® Storm and Sanitary Analysis 2013
- Autodesk® Infrastructure Modeler 2013
- AutoCAD® Civil 3D® 2013
- Autodesk® 3ds Max® Design 2013
- Autodesk® Navisworks® Simulate 2013



Autodesk Infrastructure Design Suite 2013

These are just some of the functions Asphar Survey can complete efficiently and effectively with our proficient staff. Available throughout your project or just sporadically we are here to help.





# 3D LASER SCANNING

Another Facet of Asphar Survey is the Laser Scanning Department where our Key Person Dr. David Sproule (B Eng – Geomatics, PhD Geodesy) is the Head of Department. His Previous experience with surveying and laser scanning in the heritage and architecture field is invaluable, coupled with an ever increasing development team, and makes Asphar an absolute one stop survey firm.

Asphar Survey has the facilities to complete a range of tasks in the field of 3D Laser scanning and can be useful in various applications like documentation of:

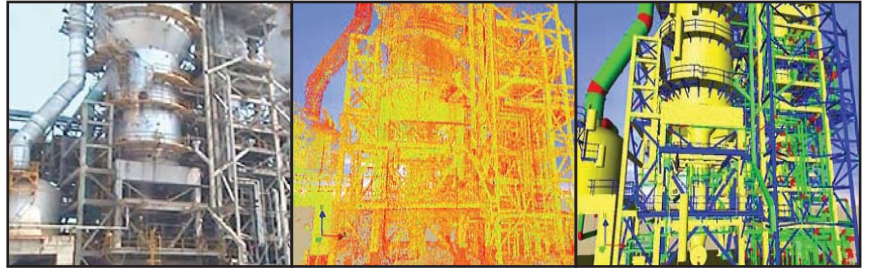
- Industrial facilities
- Infrastructure
- Mining
- Buildings and architecture
- Cultural heritage and archaeology
- Forensic sites
- Prototypes
- Virtual reality objects
- Accidents
- Modules and engineering models.



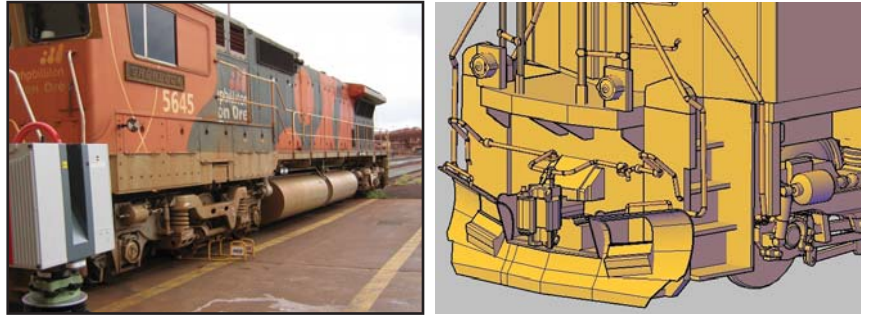
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## 3D TERRESTRIAL LASER SCANNING FOR AS-BUILT MODELLING

*Plant: object - pointcloud - 3D model*



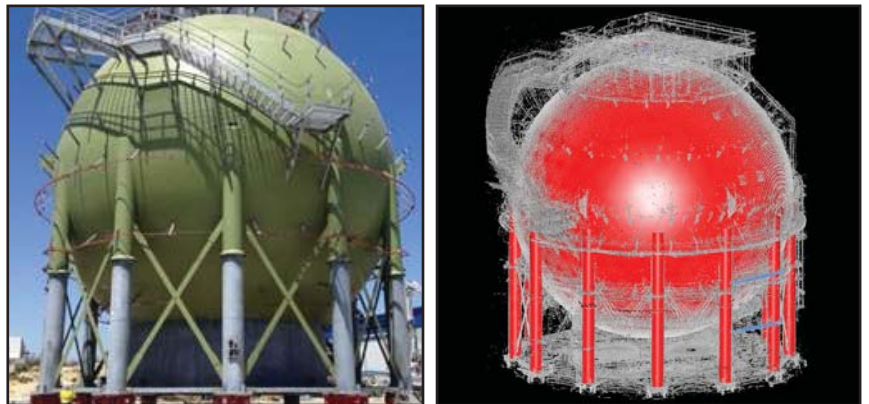
*Rail Application - Scan of a locomotive for clash detection*



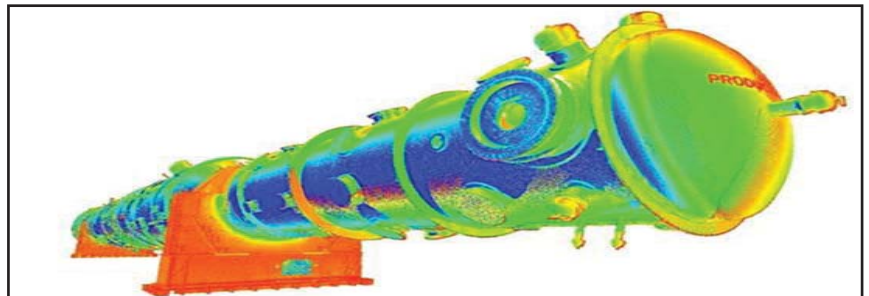
*Mining applications - 3D modelling of concentrator plant*



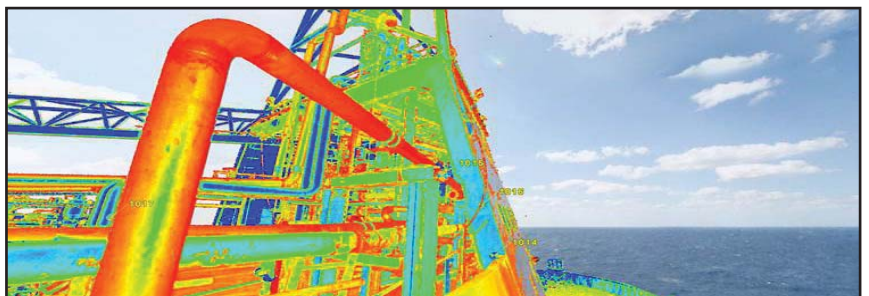
*Engineering application - Propane Sphere*



*Engineering application - Cryogenic unit*



*Oil & Gas - Offshore plants & drilling ships*

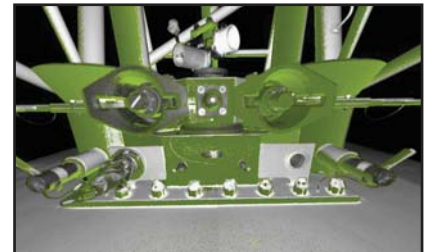
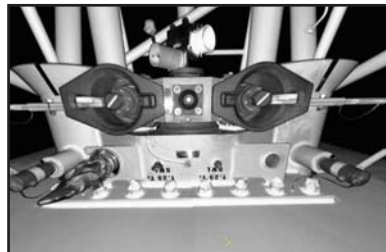
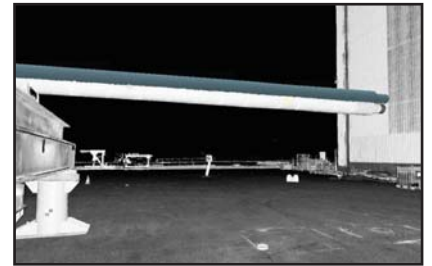
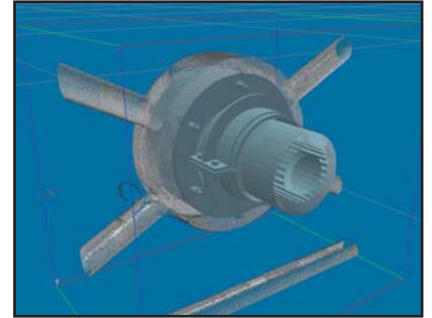
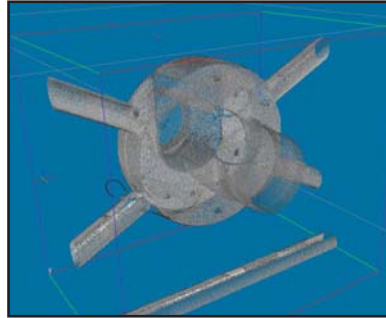




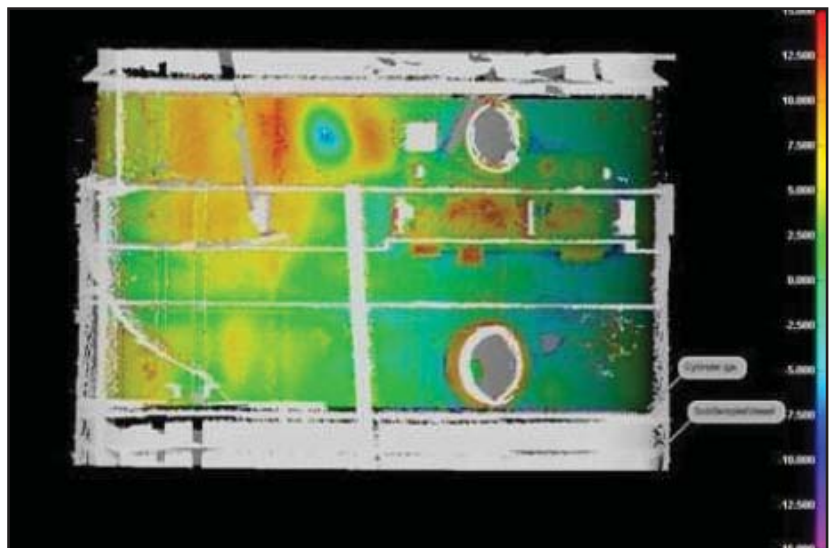
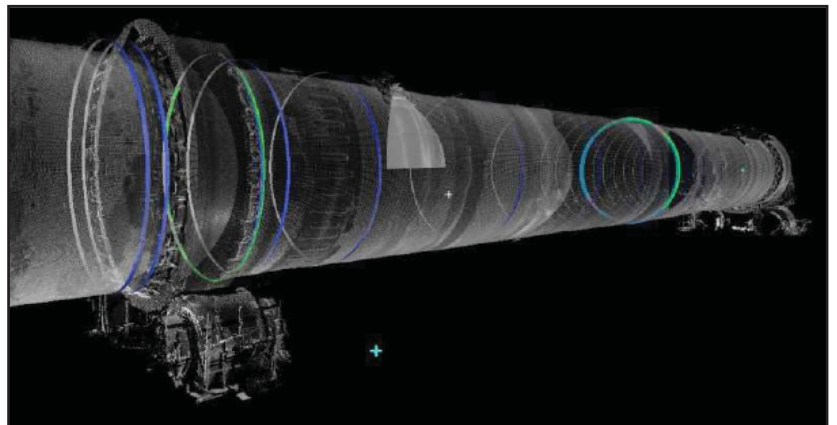
## COMPARISON OF AS-BUILT TO DESIGN

Confirmation of conformance and identification of non-conformance:

1. At the first level, the point cloud and design model are overlaid and non-conformance is visually noted



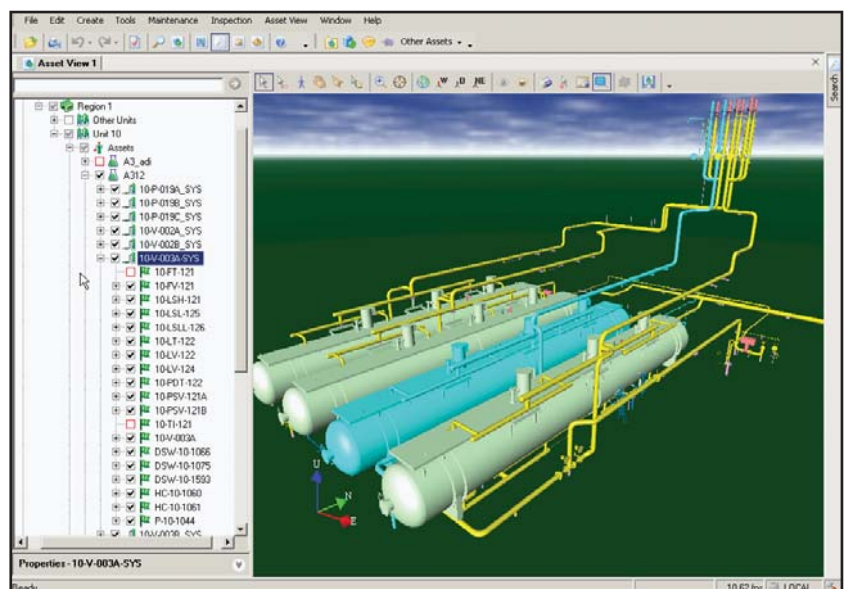
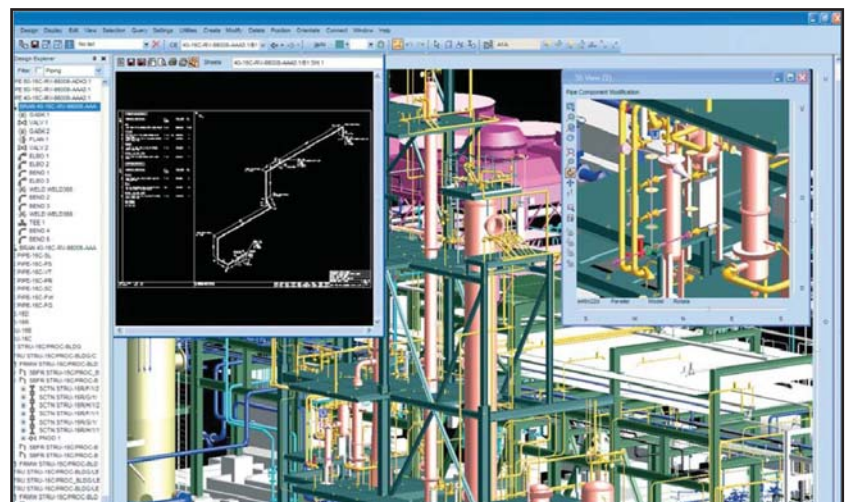
2. Individual structures can be subjected to more detailed analysis of deformation. Deviations of as-built from design can be displayed as colour-coded deformation map



## INTELLIGENT MODEL

The highest level of model available from 3D laser scanning is the intelligent model driven by component specifications and spatial information.

- Specification driven modeling
- Derived from scan data (spatial information), and design data (component information)
- Component attribute details fully enquireable
- Component documentations are associated to design component tags





# METROLOGY

With the purchase of the complete Leica Absolute Tracker System consisting of T-Probe, T-Cam and T-SCAN (the only Absolute Laser Tracker in Western Australia and the only T-Scan System in Australia), Asphar Survey is now in a position to offer measurement services with accuracy levels starting from 0.01 mm and Laser Scanning in a 30 m radius within 0.06 mm

A large, white and black Leica AT901-LR Absolute Laser Tracker. It features a large, adjustable arm with a camera and laser sensor at the end, mounted on a sturdy base with a red Leica logo.

Leica AT901-LR

A black and red Leica T-Probe, a handheld probe used for measuring surfaces. It has a long, thin probe tip and a handle with several buttons and a red trigger.

Leica T-Probe

A black and red Leica T-Scan, a handheld laser scanner. It has a large, rectangular body with a red display screen and a black handle with a red trigger.

Leica T-Scan

# 3D PRINTING

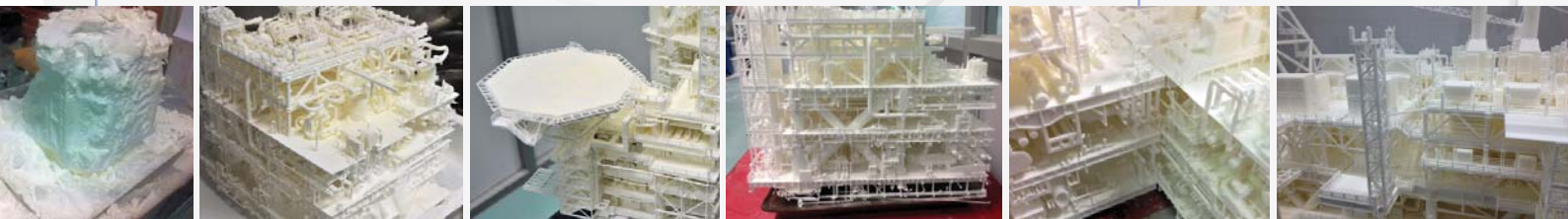
Produce scale models of design or as-constructed. Asphar Survey has the only Z650 3D Printer in WA – the largest, fastest, 3D printer available; with full colour spectrum. Board room displays, clash detection for new design, communication tool between departments, prototyping, staged development displays.

3D Printing is the latest high performance, low cost, fast turnaround technique for creating solid 3D representations in the engineering, mechanical, and architectural worlds. Designs are 'printed' layer by layer by the injection of coloured (full 24-bit colour) binder into a composite powder substrate, producing a high definition, fully-coloured 3D model. At the conclusion of the print, an infiltrant is applied which toughens the model.

Asphar provides the fastest, most economic 3D model creation in WA.



*3D printed model of Wheatstone Platform  
Scale 1:125*



## Z650 Specifications

*Colour: Full 24-bit colour*

*Resolution: 600 x 540 dpi*

*Vertical Build Speed: 28 mm/hour*

*Build Size: 254 x 381 x 203 mm*

*High Performance Composite*

*Layer Thickness: 0.089 - 0.102 mm*

*File Formats for Printing: STL, VRML, PLY, 3DS, ZPR*

*3D print text labels, logos, design comments, or images directly onto models*

*High-definition 3D printing produces models with complex geometries and small, detailed features*

*Any size object can be made up of a number of interlocking blocks*

*Minimum printing thickness for walls, pipes etc. = 1.75mm*

*All objects can be rescaled to allow for presentation in the print model if required.*





# PRE ASSEMBLED MODULE INSTALLATION

PAM Installation is another area in which Asphar specialises. Used in conjunction with traditional survey techniques and also laser scanning, installation of very large pre assembled modules can be a problematic-free process.

Installing PAM's requires pre-ground works for sufficient ramps/roads etc for the Mammoets (multiple wheeled hydraulic flat beds), then marking either cardinal positions on footings or having multiple jiggers setup positioning points on the structures simultaneously while they are moved into position.

Bolt, Pedestal, Concrete Pads, Structural Steel and other bases will be verified, marked and adjusted, Shims will be installed and levelled prior to the installation process. Then verticality monitoring will be carried out during installation with the dual jiggers which monitor reflective targets (which we positioned on the modules prior to movement) and also after the bases are in position.

Laser scanning can also be carried out, which will identify any problem areas before installation allowing for rectification works to be completed, avoiding time and cost delays.



*Transportation and installation of PMA*



# AMBERG RAIL TRACK TROLLEY

The GRP 5000 is the powerful system solution for comprehensive route and infrastructure documentation and assessments. It is also first choice for detailed visual condition surveys of tunnels for subsequent structure inspections.

GRP 5000 defines the new industry standard for:

- Complete route surveys and line-side structures for clearance and design purposes
- Design surveying
- Documentation of tunnel structures

Key features of GRP 5000:

- Hi-speed kinematic scanning system integrating laser scanner Amberg Profiler 5002
- Automatic acquisition of track position and line side structures and objects of interest
- Very high measuring density with up to 500'000 measured points per second
- Modular hardware design allowing flexible and cost-saving operation. Hardware fully expandable for other railway surveying tasks



AMBERG Track Trolley GRP5000





# HI-RAIL TRUCK

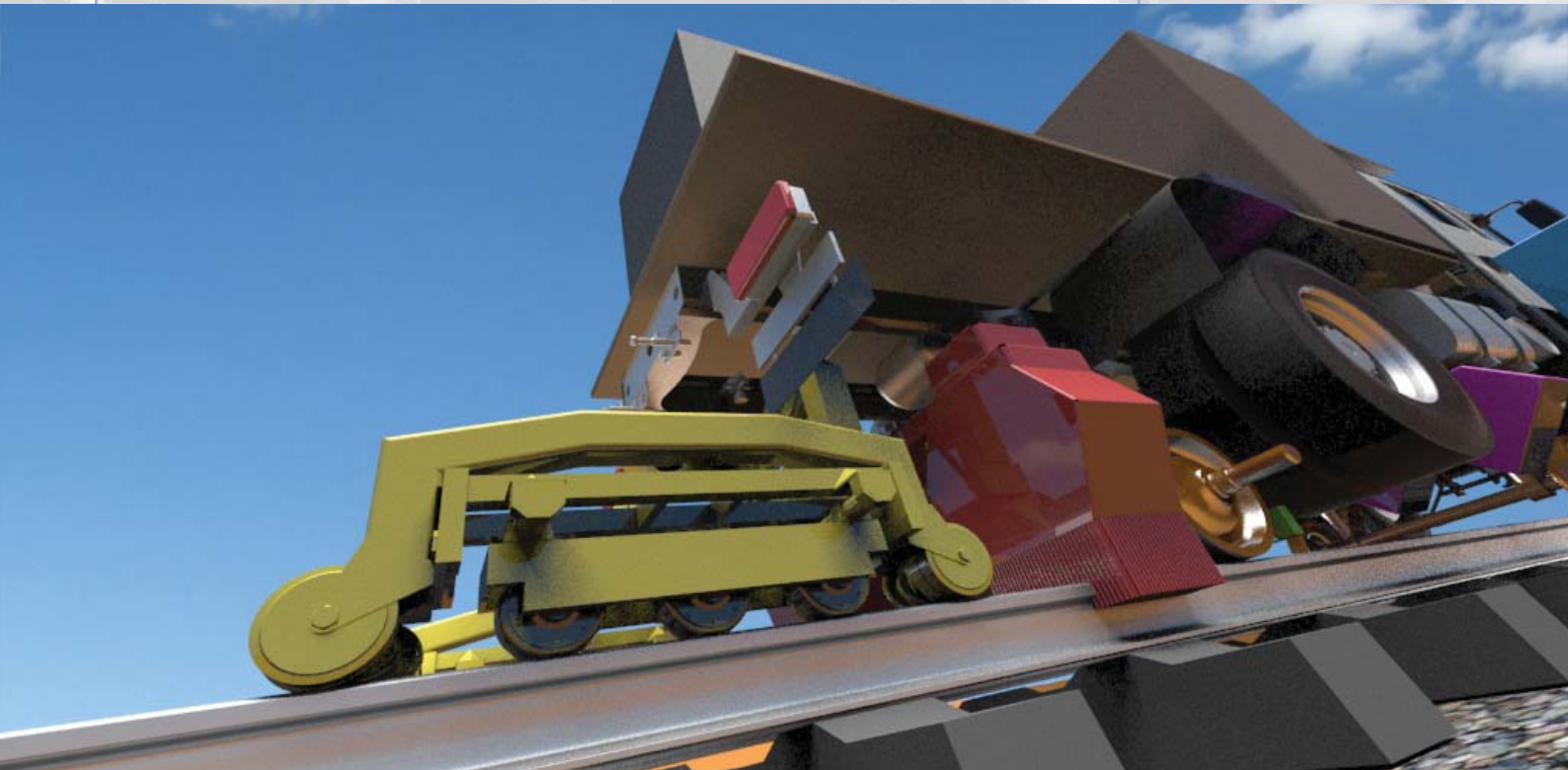
Hi-Rail Vehicles fitted with a full range of Instrumentation including for:

- Rail Track Geometry
- Trackside Visual Inspection
- Verge side Vegetation
- Ultrasonic
- GPR
- Ballast & Rail Profiling



*Hi Rail Vehicle*

***“TWO YEARS AHEAD OF THE INTERNATIONAL MARKET”***

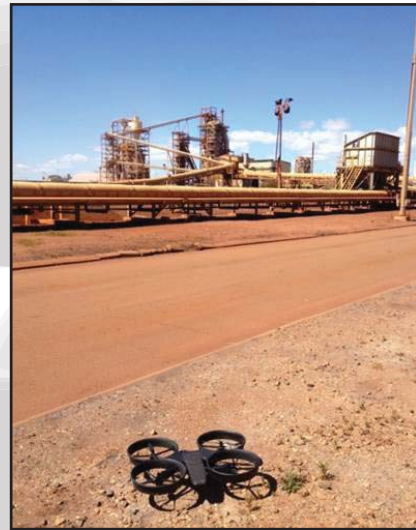


# UAV - AERIAL MAPPING

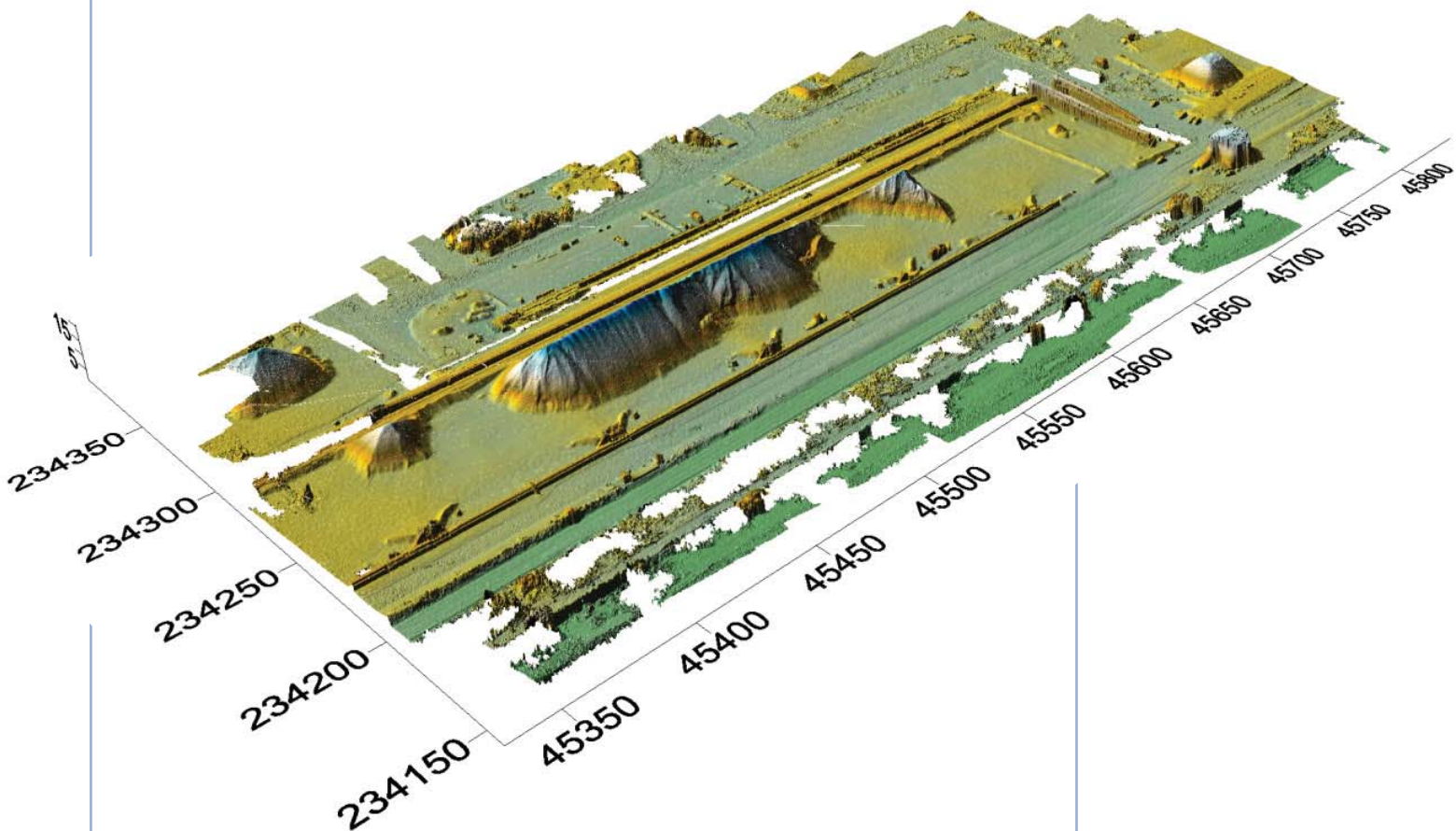
UAV is the acronym for Unmanned Aerial Vehicle. Due to the versatility and low operational costs these systems represent a valid alternative to the classical aerial survey when the areas are smaller than 4 km<sup>2</sup>

UAVs are a viable alternative for surveying mining stockpiles and small open pits

- Products obtainable are highly detailed digital orthophotos and dense digital surfaces models DSM
- DSM allows contour and breaklines generation and volume calculations
- All this is achieved while minimising personnel access to the mining area.



UAV







# ASPHAR SURVEY GROUP

“

*Our name is ASPHAR SURVEY GROUP to be precise*

”

West Perth  
Karratha  
Onslow  
Exmouth  
Geraldton  
Port Hedland  
Darwin  
Brisbane

Now also in Beijing and Tianjin (China)

**Leaders in the Spatial Solutions industry**

# PROJECTS WON

AUDITING ROLES		
Site	Description	Client
Port Hedland	T155 Port Expansion	FMG
Onslow	Macedon LNG Plant	BHP Billiton - Technip
Cape Preston	Mine and Port Installation	Sino Iron – Citic Pacific
Karratha	Dampier Highway Duplication	Main Roads Dept.
Karratha	Lang Hancock Railway	Calibre (Rio Tinto)
Newman to Hedland	Control Install Minesite, Rail Corridor, Port	Roy Hill Iron Ore
Karratha	Apache O&G Devil Creek Project	John Holland Group
ENGINEERING PROJECTS		
Site	Description	Client
Kwinana	Hismelt Project	Thiess, UKG, Andreco Hurl
Pinjarra	Efficiency Upgrade	Thiess
Port Hedland	Turner River Bridge	John Holland Group
Kalgoorlie	Minara Resources Murrin Murrin Installation	Worley Parsons
Dampier	Woodside LNG Pluto Project	UGL
Newman	BHP FRCP10 Crane Rail Alignment	Buckland Engineering
Cape Lambert	Rio Tinto Stacker Reclaimer Installation	Laing O'Rourke
Cape Lambert	High Precision Stacker Rails Installation	Sandvik
Dampier	Burrup TAN Ammonia Plant	WBHO
Cape Preston	Sino Iron Conveyor	Diab Engineering
CIVIL LAND DEVELOPMENT SURVEYS		
Site	Description	Client
Exmouth	3,000 Lot staged release sub-division	Landcorp
Karratha	Rising Main & Water Treatment Upgrades	Tenix
Port Hedland	Rising Main & Water Treatment Upgrades	Tenix
Onslow	Onslow Salt Evaporation Pond Expansion	WBHO Civil
Wickham	Rio Tinto Housing Development-173 Houses	Pindan
Karratha	Rio Tinto 7 Mile Crystallizer Ponds	Conneq
Port Hedland	South Hedland Shopping Centre Upgrade	Cimeco
Onslow	Onslow Road Spotting	Main Roads Dept.
Onslow & Perth	Environmental Borehole Monitoring	URS
Geraldton	Mumbida Wind Farm	Leighton
Port Hedland	FMG Transmission Line	Lend Lease



# PROJECTS WON

DIMENSIONAL CONTROL & METROLOGY & 3D PRINTING		
Site	Description	Client
Henderson	Gorgon Modules	KBR/Civmec
Port Hedland	Car Dumper Interface Trials	BHP Billiton
Perth	Rail Bearing & Liners	Rio Tinto
Karratha	Woodside Train 4 Installation	UGL
Perth	Wheatstone Platform 3D Print Model	Chevron
Henderson	High Pressure Spool Measurement	Chevron
South Australia	Scan and Modelling of BHP Iron Duke Plant	Leighton
Port Hedland	BHP Stacker - Reclaimers	ThyssenKrupp
Henderson	FMG Pre-Assembled Modules	Goodline
Cape Preston	Sino Iron Desalination Rail Installation	Citic Pacific
Cape Preston	Sino Iron Crusher Slots	SNC Lavalin
Port Hedland	BHP Tripper Scan and Modelling	Goodline
Karratha	3D Model & Print of Rail Positioners	Rio Tinto
Henderson	Ship Unloader Storm Travel Restraint	UGL
Windimurra	Atlantic Vanadium	Kerman Contracting
Indian Ocean	Deepwater Frontier Scan & Modelling	Icon Engineering
East Timor Sea	Glas Dowl Scan & Modelling	Bluewater
Perth	Orvalho set - Scan & Model	OVO - Cirque Du Soleil
MARINE PROJECTS		
Site	Description	Client
Port Hedland	RGP3 BHP Wharf Expansion	John Holland Group
Port Hedland	FMG 3rd Berth Dredging Control Verification	Jan De Nul
Cape Preston	Sino Iron Service & MOF Wharfs	McConnell Dowell
Port Hedland	FMG Port Remedial Works	McConnell Dowell
Port Moresby	Exxon PNG LNG Wharf Marine Survey	BAM Clough
Onslow	Macedon Control Verification	Jan De Nul
MINE SURVEYS		
Site	Description	Client
Carusoe Dam	Mine Surveyors	Saracen Goldmines
Solomon	Mine Surveyors	Thiess
Sino Iron	Mine Surveyors	Citic Pacific
Yarrie	Mine Surveyors	Ngarda
Port Hedland	Atlas Mining Wodgina Mine Survey	MSP Engineers
RAIL INFRASTRUCTURE SURVEYS		
Site	Description	Client
Newman to Hedland	RGP 5 Rail Road Duplication	Macmahon Leighton JV
Newman to Hedland	TPI Fortescue Rail	FMG/NRW
WA	Infrastructure capture at all WA depots	Aurizon
Kwinana	Perth Freight Terminal	Rhomberg Rail
Newman	BHP Jimblebar Sandhill Siding Installation	Abigroup