



THE **ADVANCED 3D LASER**
SOLUTIONS GROUP PRESENTS:

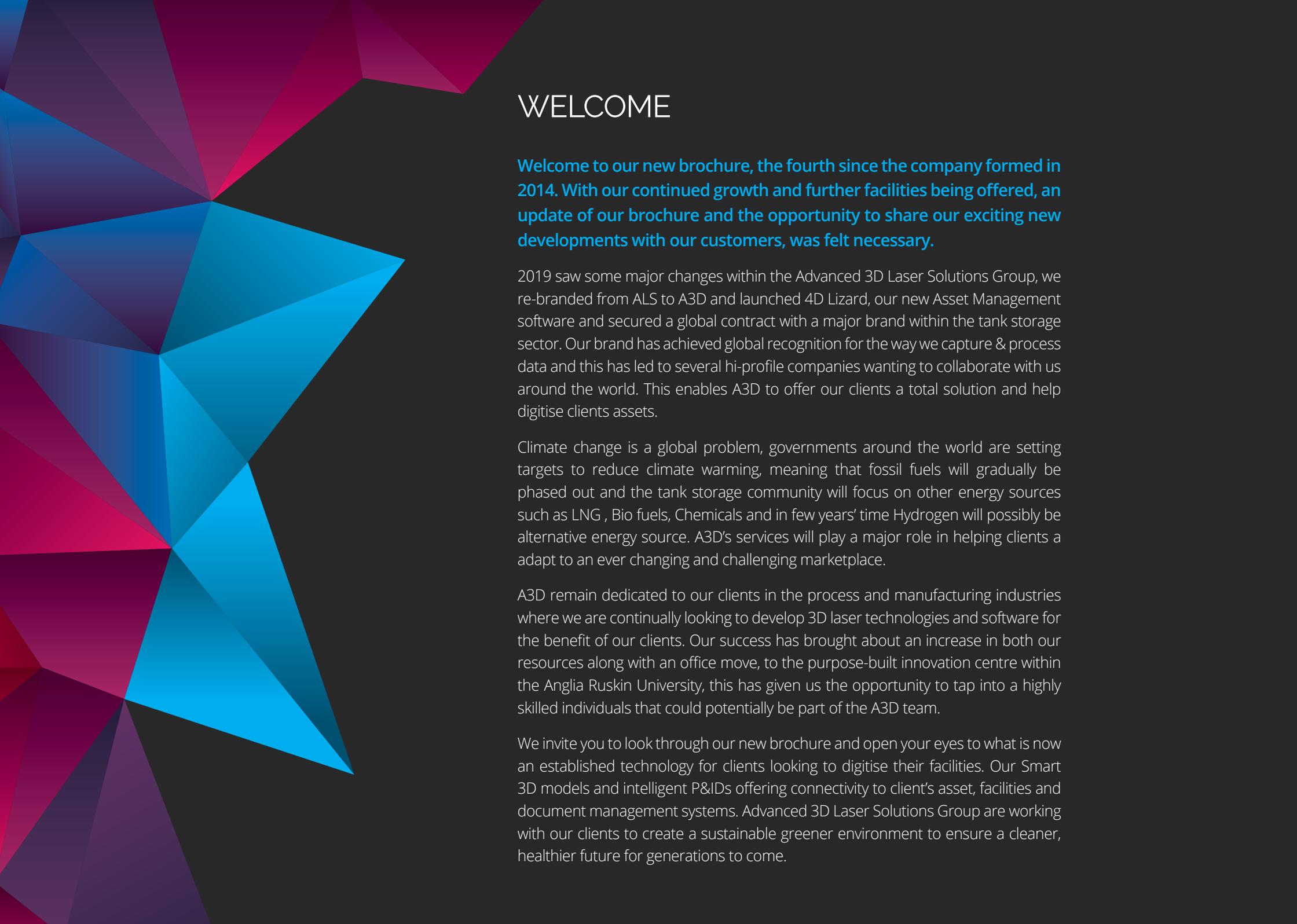


Digitising your Industry
lasersurveying.com



Your EAM Smart Hub
4dlizard.com





WELCOME

Welcome to our new brochure, the fourth since the company formed in 2014. With our continued growth and further facilities being offered, an update of our brochure and the opportunity to share our exciting new developments with our customers, was felt necessary.

2019 saw some major changes within the Advanced 3D Laser Solutions Group, we re-branded from ALS to A3D and launched 4D Lizard, our new Asset Management software and secured a global contract with a major brand within the tank storage sector. Our brand has achieved global recognition for the way we capture & process data and this has led to several hi-profile companies wanting to collaborate with us around the world. This enables A3D to offer our clients a total solution and help digitise clients assets.

Climate change is a global problem, governments around the world are setting targets to reduce climate warming, meaning that fossil fuels will gradually be phased out and the tank storage community will focus on other energy sources such as LNG , Bio fuels, Chemicals and in few years' time Hydrogen will possibly be alternative energy source. A3D's services will play a major role in helping clients a adapt to an ever changing and challenging marketplace.

A3D remain dedicated to our clients in the process and manufacturing industries where we are continually looking to develop 3D laser technologies and software for the benefit of our clients. Our success has brought about an increase in both our resources along with an office move, to the purpose-built innovation centre within the Anglia Ruskin University, this has given us the opportunity to tap into a highly skilled individuals that could potentially be part of the A3D team.

We invite you to look through our new brochure and open your eyes to what is now an established technology for clients looking to digitise their facilities. Our Smart 3D models and intelligent P&IDs offering connectivity to client's asset, facilities and document management systems. Advanced 3D Laser Solutions Group are working with our clients to create a sustainable greener environment to ensure a cleaner, healthier future for generations to come.

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ABOUT A3D

With an engineering background extending back over 30 years, we have provided engineering, design, draughting and surveying services across a whole spectrum of process and manufacturing industries. During 2012 we embarked on the 3D laser scanning / point cloud related technologies and as a result, the decision to form A3D during 2014 enabled us to bring on board the specialist marketing skillset Colin provided in introducing this new technology to the process industries.

It is now widely accepted that A3D are established leaders in 3D laser technologies within the process industry. Our enviable status only possible through working for so long within process industries and being able to fully appreciate our client's challenges. A3D are regularly called upon to conduct webinars across the globe, to advise on how best to use these technologies. With our success, A3D have enjoyed new relationships with both our customers and suppliers, invaluable in our growth. Part of this growth included the strategic move during 2017 to our specialist engineering facility within the Anglia Ruskin University in Chelmsford, Essex. This coincided with being awarded our global contract to a major chemical storage company in providing 3D laser scanning and modelling services across their portfolio. This success in was further enhanced when Rene van Eerten joined A3D to lead with our Benelux area marketing.

Moving forward A3D have as a result of our clients desire to digitise their facilities, developed bespoke software solutions linking our 'smart' 3D model and P&ID files to offer graphical user interface to client's asset, inspection and document management systems. As we embrace these new challenges, A3D will continue to look forward to future challenges in an industry that is now looking to move towards digitising their facilities.

**LEADERS IN THE PROCESS INDUSTRY
PROMOTING 3D LASER TECHNOLOGIES ALIGNING
PROCESS FACILITIES FOR COMPLIANCE RECORDS
AND AS-BUILT DOCUMENTATION.**



THE DIRECTORS



▶ **GRAHAM BOXER**
OPERATIONS DIRECTOR

Instrumentation and Controls engineer with over 30 years' experience working in Oil, Gas, detergent and Pharmaceutical industries. Previously a director of DCG Consulting Engineers, Graham managed for BP Europe projects in Turkey and for BP Oil UK, a major refinery HAZOP. This along with refinery-based upgrade projects included a major refinery controls upgrades project affecting a complex of refining units. Being an accomplished controls and instrumentation engineer, Graham is well placed to develop A3D products that both enhance our client's businesses and our company's development.



▶ **COLIN PITTMAN**
COMMERCIAL DIRECTOR

Commercial and Marketing specialist with wealth of experience in both the publishing and Energy sectors; his vision and determination has helped establish A3D as a global brand. Collaboration with other companies and support from the media has played a very important part of our global recognition, in a very short timeframe we have developed an excellent client base that has given us the pleasure of working with some of the biggest and most respected brands in our industry. We have a saying at A3D, why wait until tomorrow when it can be done today!!



▶ **LEWIS BOXER**
TECHNICAL DIRECTOR

Drawn from 15 years' experience working in the Oil & Gas sector, Lewis gained considerable experience in surveying and preparation of engineering records including P&IDs using both 2D & 3D CAD packages. This experience, coupled with his own software driven projects enabled Lewis to embrace point cloud technologies, working with large software companies looking to develop products. Indeed, Lewis has become an authority in presenting these software systems via Skype, representing these companies as A3D look towards promoting our company globally. Lewis now leads his modelling team in our modern university-based offices, continually looking at new developments in software systems targeting the point cloud sector.



▶ **RENE VAN EERTEN**
COMMERCIAL DIRECTOR (BENELUX)

Maintenance specialist offering a broad experience as a mechanical engineer with more than 20 years' experience in both operations as well as change management for contractors, engineering firms and asset owners. Specialising in the maintenance of bulk storage tanks Rene has co-written the EEMUA 159 (and 183) standard and taught at the associated Tank Integrity Assessor Course of the EEMUA. These services being added to the services of A3D and available to our clients.

THE TEAM



▶ **JOSHUA HOLLAND**
OPERATIONS MANAGER

Accomplished 3D laser surveyor, file processor and 3D modeller, Josh manages our site planning and client liaising regarding RAMS. Extensive experience on large process sites leading our surveying and modelling projects within office.



▶ **BEN PITTMAN**
COMMERCIAL MANAGER

Bens role is to support the Commercial Director across all aspects of marketing on print and social media platforms also maintaining the website developments. With Bens hands on experience being a successful Surveyor / 3D Modeller for a number of years has given him a great understanding on what services A3D have to offer.



▶ **ELLIS BIRNIE**
3D MODELLER

Our latest recruit Ellis has completed his 3D laser site surveying training and has already completed 3D modelling projects across many industries, supporting both the Technical Director and Operations Manager.



▶ **LEE PECK**
SENIOR P&ID DESIGNER

As our senior P&ID designer, Lee supports the team with development of both traditional and Smart P&IDs working alongside of our 3D models. On occasion this will also require the conversion of client's existing files.



▶ **PETER REVELL**
PIPING DESIGNER

As a senior piping engineer, Peter provides technical support for both the company and retained clients across all industries with involvement in FEED studies as well as specialised surveys.



▶ **ROBIN HOLLAND**
3D MODELLER

Our latest recruit Robin has recently joined the A3D Team with previous onsite experience, which meant he would be a great fit for the role. Robin has already completed 3D modelling projects, supporting both the Technical Director and Operations Manager.



▶ **JOANNE McGRATH**
GRAPHIC DESIGNER

With the ever demanding requirement for marketing material, Joanne brings graphical and website design expertise to the company, supporting the Commercial Director.



LASER SCANNING

A3D are proud to have established point cloud technologies, now recognised as the preferred method for accurately capturing measured site data in using 3D laser scanning instruments. Traditional methods being time consuming and subject to error, are being consigned to history in regards surveying practice. 3D laser scanning instruments continue to improve with their accuracy and streamlining of scan file registration a cost-effective solution. These improvements alongside A3D developing our surveying methods, has resulted in our accomplished surveyors being able to complete large scan surveys using multiple instruments efficiently. Large sites, for instance 100-200 tank storage terminals requiring 1000-2000 scans, are now completed in days, to the benefit of our clients.

A3D process modelling projects are undertaken by our in-house team who return from surveying to process client's 3D models and P&IDs. This approach along with our engineering background and training, ensures A3D deliver the quality of scan data and accuracy in 3D modelling that is the envy of our competitors. Added to this, where A3D are contracted for P&ID deliverables, our trained surveyors will also record equipment specific data using our Go-Pro cameras.

Our internal training videos cover all aspects of both laser surveying and modelling, ensuring a consistent approach unrivalled by other companies. As the laser scanning market grows, A3D are proud to have established ourselves as the 'go-to' competitive company who deliver the best results for the process industries.

◀ For the typical laser scan, the 3D laser scanner completes two phases. Phase 1 collecting measured points, recording X, Y & Z location, point intensity and colour. Selectable Phase 2 captures 70 Megapixel high resolution pictures used by the 'Webshare' image. (Further information about 'Webshare' can be found on pages 8 & 9)



▲ A snapshot of RAW point cloud data, using RGB data for colour

► FASTER

Hands down 3D Laser scanning is widely accepted as the fastest measured surveying method. It's ability to record up to 960k points per second up to a 1mm accuracy, enabling A3D to record your site assets in a fraction of time traditional methods take.

► COST EFFECTIVE

Due to its speed recording your sites assets becomes incredibly fast and detailed, offering our clients considerable savings. With our range of bolt on applications A3D can offer tank analysis, 3D models, facilities management and plant videos.

► SAFER

3D scanners use a safe pulse laser, allowing persons to move in and around our survey areas. And since we do not need to actually touch any of your onsite assets to 3D laser survey, we significantly reduce risks from slips and trips that traditional methods expose surveyors to. Elevated details otherwise inaccessible without temporary platforms, A3D skilfully capture process details from ground level.

► ACCURATE +/-1mm

Laser scanning still captures data with same level of accuracy you would find with other traditional surveying methods. However, with 3D Laser scanners the level of human error is dramatically reduced as the scanner is automatically records it's overall surroundings, capturing all site data beyond that originally intended thereby reducing the need to re-visit sites where traditional studies had overlooked.

WEBSHARE VIEW

Webshare is freely available software offering powerful facilities for use with scan files. An intuitive overview map presents scans arranged as a 'birds-eye' view of your plant. Webshare enables you to walk your site from your PC, record measurements, annotate with site specific data or carry out simple calculations.

Scan data is held behind the 360° high resolution digital images the scanner records at end of each scan using its 70-megapixel camera, but these photographs hold point cloud data behind them, which makes them incredibly accurate to measure from.

Clients already using this are making huge saving in time and money as well as increasing safety, by reducing the risk of having people walking around your site.

► SITE MEASUREMENTS

Using Webshare to record accurate measurements from your site scan files. This facility remains popular with clients saving considerable time and reducing exposure to sites. A3D use 'Webshare' to calculate tank storage pit bund volumes, calculating 'dead-wood' allowances and base slope angles, producing reports in a fraction of the time otherwise taken using traditional methods.

► ANNOTATIONS

Aside to measurements, scan datafiles can be used to add annotations. Equipment tag numbers, facilities management system identifiers or references to vendor equipment. The annotation can even contain 'hyperlinks' allowing direct connection to vendor sites are indeed your own asset management systems. Or simply notes relating to previous maintenance or repairs, handy for orientation and training.

There are several software options, including:

2GO: This allows you to store the files directly on a USB, so you can plug and play into any machine, without the need to reinstall software on new machines.

LOCAL SERVER: This goes onto your companies' server and allows your allocated staff to access the data, through there internet explorer.

CLOUD SERVER: This goes onto a secure based outside server, which allows you to grant access to whoever around the world to your data via the internet.

► ASSET MANAGEMENT

For simple annotation, A3D Webshare provides a facility to add notes to equipment depicted on individual scan files.

Alternatively consider using an A3D 'Intelligent' 3D model or P&ID updated from your asset, facility or document management system.

► DOCUMENT MANAGEMENT

If you are not running with an established asset management system, simply attach documentation of any format against equipment like pumps, valves, flanges everything. Vendor information can be scanned and linked to the viewed image, as well as notes and references all accessed with a simple click.

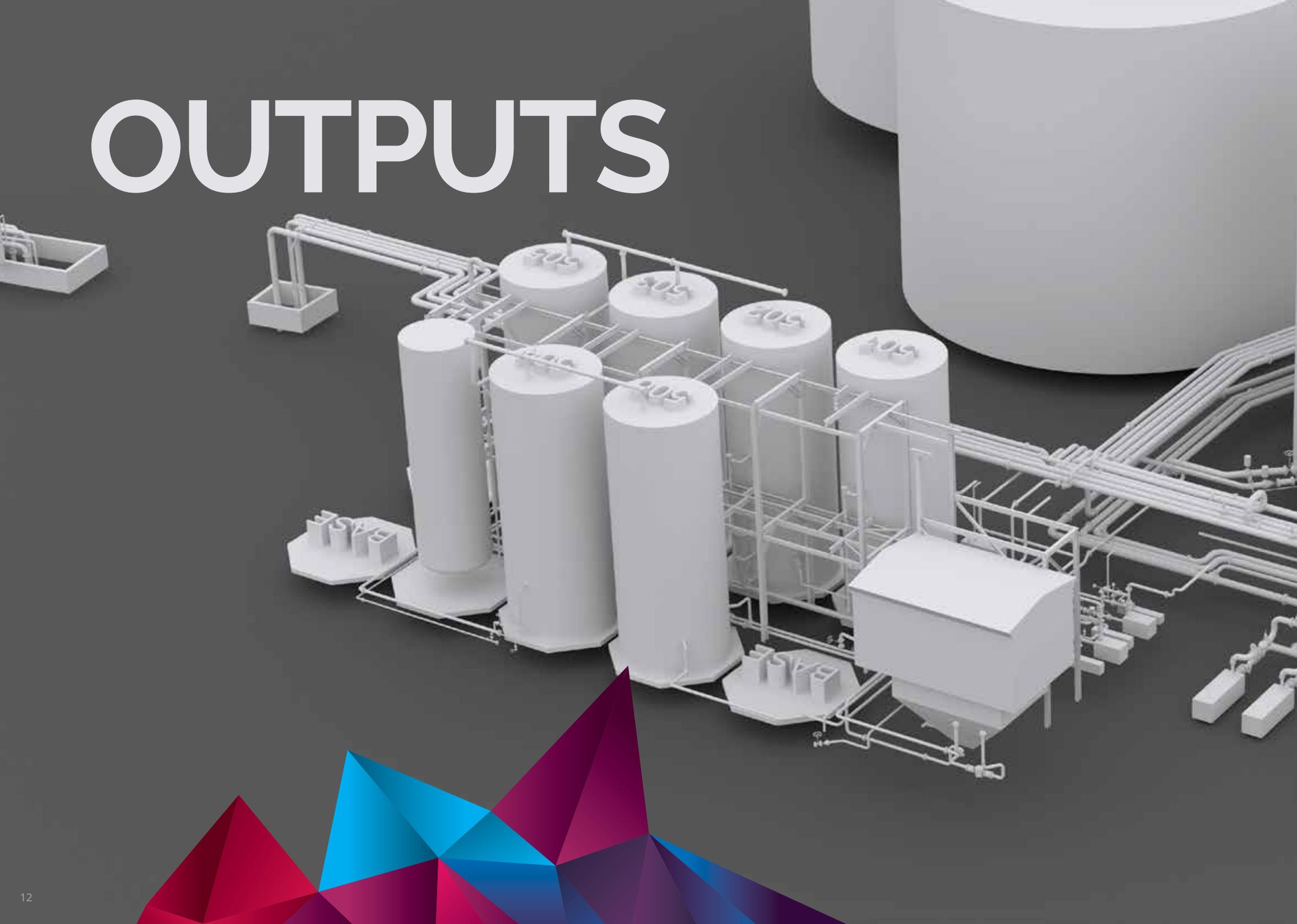
► Client example: "For a crane to come on to our terminal, we needed to establish heights of our lampposts for access. Capturing the heights using traditional methods would have required a cherry picker to come in, requiring a hot work permit to be prepared, complete induction of our operatives in using cherry picker and expose them to working from height. Using the A3D 'Webshare' we were able to quickly record height measurements within 5 minutes without leaving my desk."





998 mm

OUTPUTS

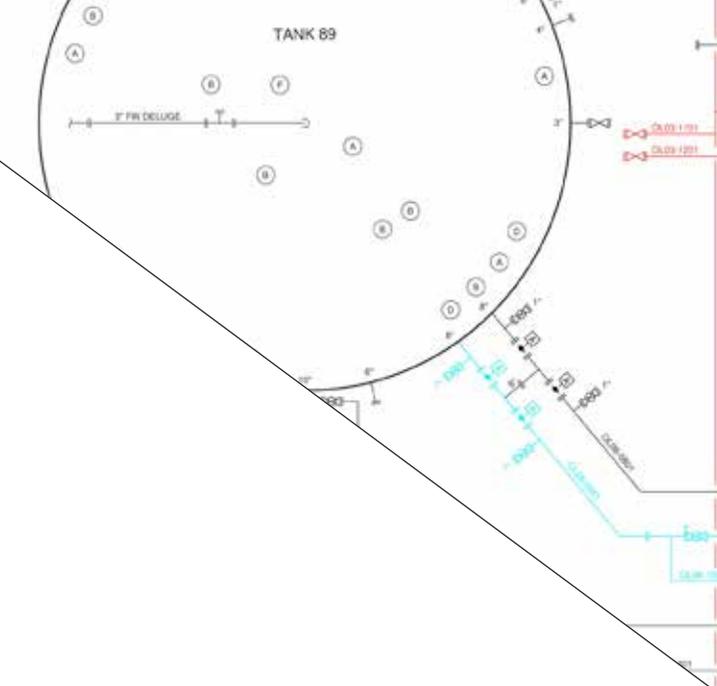




SMART P&ID DRAWINGS

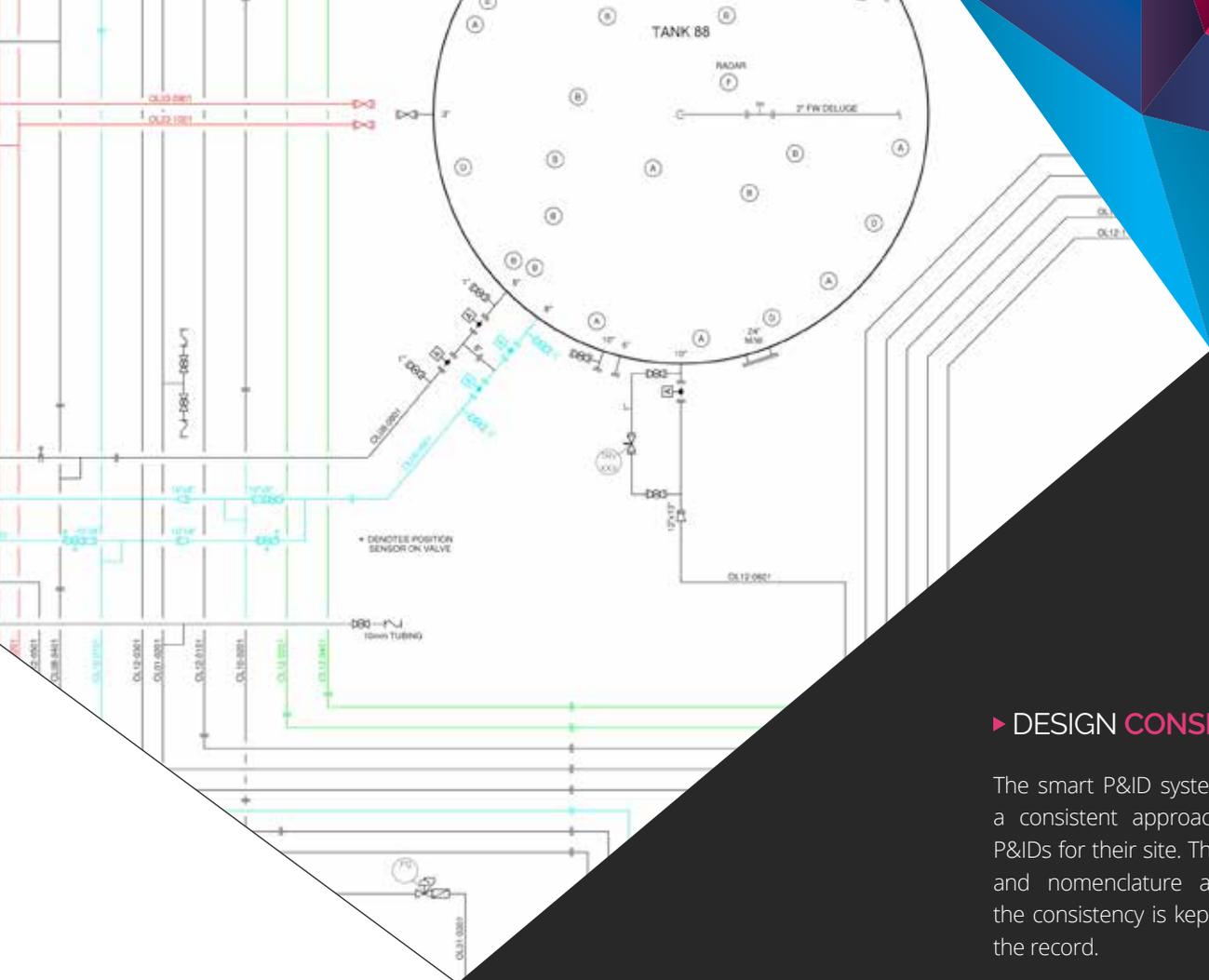
Piping and instrumentation diagrams (P&IDs) are considered a fundamental requirement for companies operating a process operation. P&IDs play a significant role in the maintenance and modification of the process that it describes and should be maintained to reflect an up to date status. These drawings are critical in demonstrating the physical sequence of equipment and systems, as well as how these systems connect. During design the P&ID provides a basis for the development of control systems allowing safety and operational investigations including a hazard and operability study commonly known as a HAZOP.

For clients looking towards digitising their process operation, A3D have moved forward to offering Smart P&IDs. Unlike their traditional 2D counterparts, our Smart P&IDs hold the component details within a linked database that can be modified and / or updated from client asset, facility or document management systems using easy to use menu driven displays.



► Component listings are client selectable, holding as much or as little information as necessary but easily updated as further records become available.

From	To	DWG Number
Tank 222		AVO-PID-006
Pump 01	A-108-VAP-12"-CS	AVO-PID-011
A-108-VAP-8"-CS	A-108-VAP-12"-CS, A-108-VAP-12"-CS	AVO-PID-011
?-?	A-108-VAP-12"-CS	AVO-PID-011
A-108-VAP-8"-CS	A-108-VAP-12"-CS	AVO-PID-011
A-108-VAP-12"-CS		AVO-PID-011
A-500-VAP-14"-CS	FL456	AVO-PID-004
	FL595	AVO-PID-004
	A-500-VAP-14"-CS	AVO-PID-004
	FL598	AVO-PID-004
	VRU2	AVO-PID-004
	VRU2	AVO-PID-004
	A-112-VAP-6"-CS	AVO-PID-004
	A-501-VAP-14"-CS	AVO-PID-004
	A-501-VAP-14"-?	AVO-PID-004
	A-508-PU-3"-CS	AVO-PID-004



► **DESIGN CONSISTENCY**

The smart P&ID system is setup to allow a consistent approach across all client P&IDs for their site. The blocks, templates, and nomenclature are all built in so the consistency is kept through the life of the record.

► **DATA EXTRACTION**

A Smart P&ID clearly identifies asset tags for individual items including line numbers, equipment numbers, valve numbers and instrumentation tags held in a database that can be extracted by client operating systems.

► **CAD SPEED**

Due to the built-in consistency, asset numbering and extensive library of components, smart P&IDs allow for a fast-efficient preparation, for new and for converting existing P&IDs.

► **3D VALIDATION**

A particular feature of the Smart P&ID product is the ability to automatically cross validate with our Plant 3D process model files. This simple automated feature eliminates the time-consuming traditional methods associated with checking.

8458			
5838			
8511	CS150		
6005	CS150		
5969	CS150	Yes	
6087	CS150	Yes	
6204	CS150	Yes	
5947	SS150	No	No
8035	SS150	Yes	No

3D MODELS

The vast engineering experience from over 30 years working within process industries has resulted in A3D now leading in the production of 'brown field' technical process models. A3D recognised the importance of our skilled 3D laser surveyors site familiarity being utilised when producing technical process models. Their job specific training, for which A3D have prepared over 400 training videos, ensures our modelling team prepare good quality technically correct process models. As a company we rejected the use of overseas modelling companies, concentrating on developing our own modellers skill set to identify site assets and recognise assets requiring new component build within our growing component library.

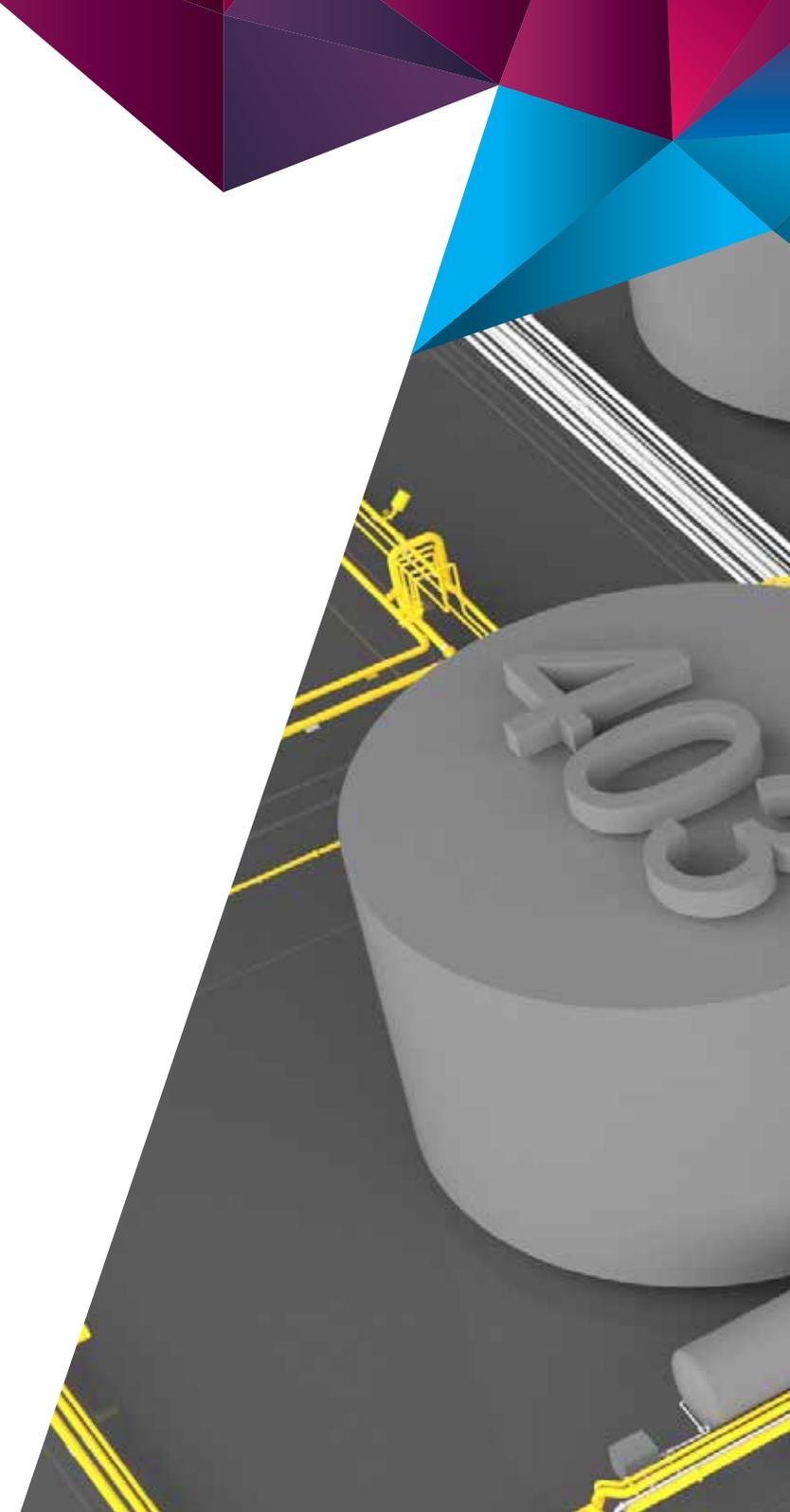
It is this ability to give the attention to technical details that sets A3D apart from would be competitors and key to development of our 'Intelligent' models and P&IDs being linked to client asset management systems.

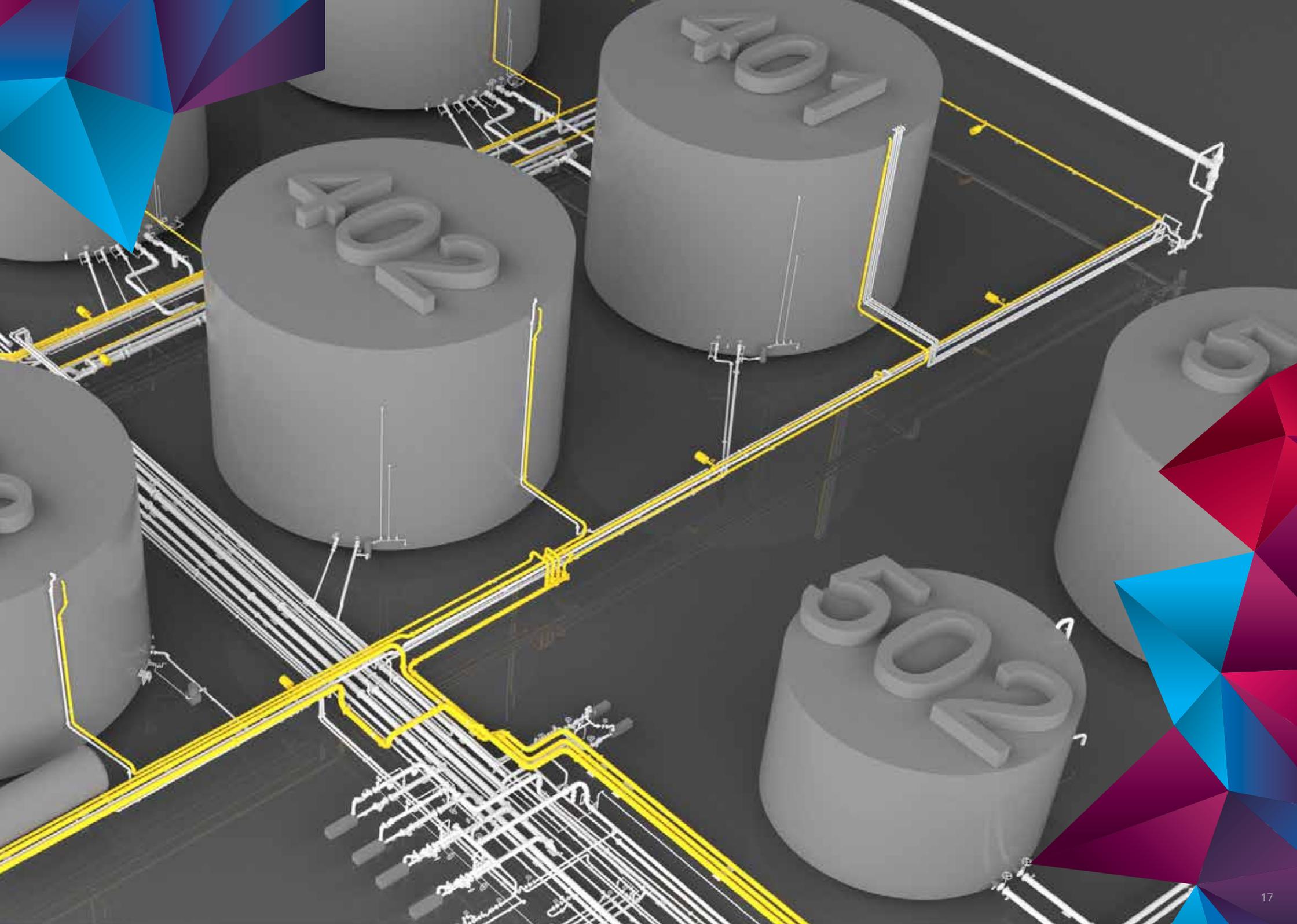
Our policy of continual development ensures A3D maintain a principal role with software companies in our supply chain. As a result, A3D offer our clients a technical point of reference where new client challenges are addressed and solutions provided. Our client relationships are fundamental in our company's growth and remain core to all new developments.

► AUTODESK NAVISWORKS

With freely available software such as Autodesk's Navisworks, our clients can view our 3D technical models without the need for high performance PCs. Navisworks has further functionality which A3D can support clients.

► Pipework models that include pipe supports, fittings, valves and equipment can all be drawn from the 3D catalogues that cover all mainstream pipe specifications. Where client specific assets are discovered, A3D build specific components, updating our libraries and allowing A3D to work across a broad spectrum of process industries.





3D APPLICATIONS

► FEED STUDIES & CAPITAL INVESTMENT

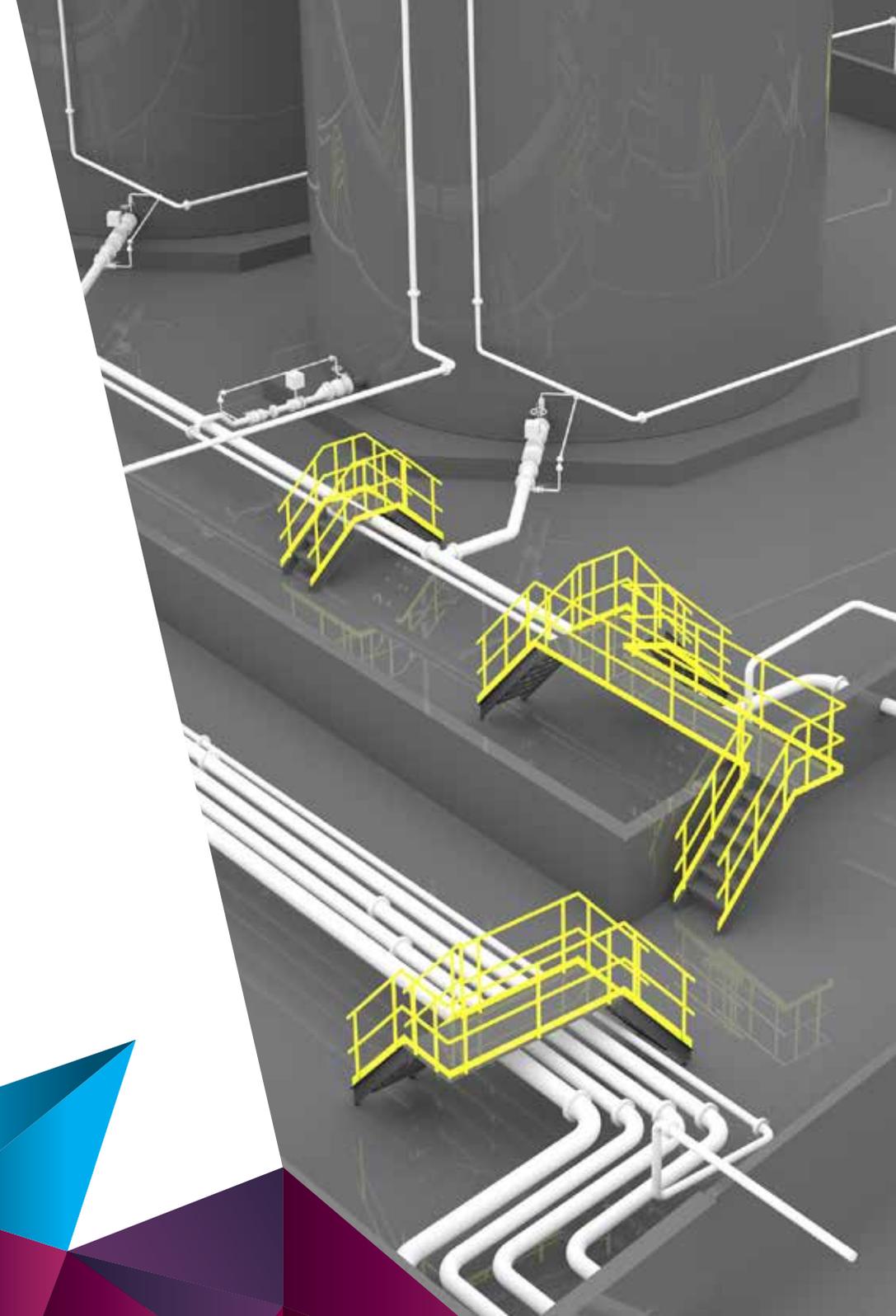
A3D offer a cost effective alternative where clients for considering new capital investments on their sites. A3D 3D technical models and Smart P&IDs reflecting the existing or 'brown field' site, can be quickly developed to reflect inclusion of proposed equipment and services. Often, suppliers of equipment will have a 3D model available for A3D to incorporate in to the existing site model, check for site clashes within the proposed site and extend services to the new equipment. Pipework tie-ins to existing services are quickly incorporated in to the model file.

A3D can demonstrate where these modern modelling facilities achieve savings for our clients, as an alternative to engaging EPC contract companies. A3D advise clients during the management of change (MOC) process which once completed, the model will then export fabrication drawings, allowing client to utilise their supply chain of local fabricators.

► SUPPORTING EQUIPMENT SUPPLIERS

Our growth in the process industries has been punctuated by inclusion of both new clients and equipment manufacturers looking for cost effective alternatives where installations of their skid mounted equipment. A3D offer the full service, scanning of their client site, creating topographical data to allow siting of their equipment, modelling in tie-ins and routing of new services as part of the MOC process. Again, once approved our development model will export fabrication drawings allowing efficient installations, having checked for local clashes and other site conditions.

At each stage of the process A3D can export the developing model using Navisworks, allowing both the equipment supplier and their client inclusion in the MOC process.





► CLASH DETECTION

A3D with our policy of continual improvement offer our clients a growing number of uses from the 3D technical models. Clash detection being a fundamental benefit along with the site scan data, clients can interrogate every aspect of their sites, taking measurements from otherwise difficult to access locations and an ability to share this knowledge readily with their teams both on site and beyond.

Extent to which A3D model varies dependant on client's needs but can include ground data, steel work, walkways, cable trays, fences, buildings, pipework and equipment, indeed everything that our 3D laser scanners capture with the security of mind of a clash free installation.

► INTELLIGENT 3D MODELS

A3D process models can also be used as a basis of an engineering management system, recording individual asset information on a viewing platform that allows client's operations to identify easily, individual site assets without the need to leave their offices. The extent to which information is linked is entirely at the client's discretion and as editing is via recognisable drop-down menus, does not require the specialised resources and training normally associated with asset management systems. As a client site develops A3D can re-scan developments and easily update your process model to reflect changes.

4D LIZARD

Feedback from established clients has always provided the inertia for A3D development of new products using the 3D laser technologies. On completion and handover of our 3D technology projects, our forward-thinking clients are always asking A3D the question, how else can we utilise the 3D model or P&ID. This feedback brought about the decision to adopt the Autodesk Smart P&ID product for all new projects, allowing cross validation of our 3D process model files and to facilitate linking of client's asset systems as an easy to use graphical interface for engineers.

The client requirement being that the graphical interface must be easily maintained without need of a specialised resource. Being linked to clients existing asset management software, our 3D model file can be used to identify a field asset even when the current asset number is unknown. A3D extended the graphical 3D model interface option to include our Smart P&ID file, heralding the introduction of 4D Lizard.

BUILT BY ENGINEERS FOR THE BENEFIT OF ENGINEERS!

From our research, client's asset management systems are accounting biased. 4D Lizard provides an engineering biased extension, purpose built specifically for the process industry. 4D Lizard uses cloud-based technology allowing seamless collaboration with all current asset systems. For those clients not having an established asset database, 4D Lizard has the ability the run its own database.to provide the engineering functionality.

► **ASSET MANAGEMENT**

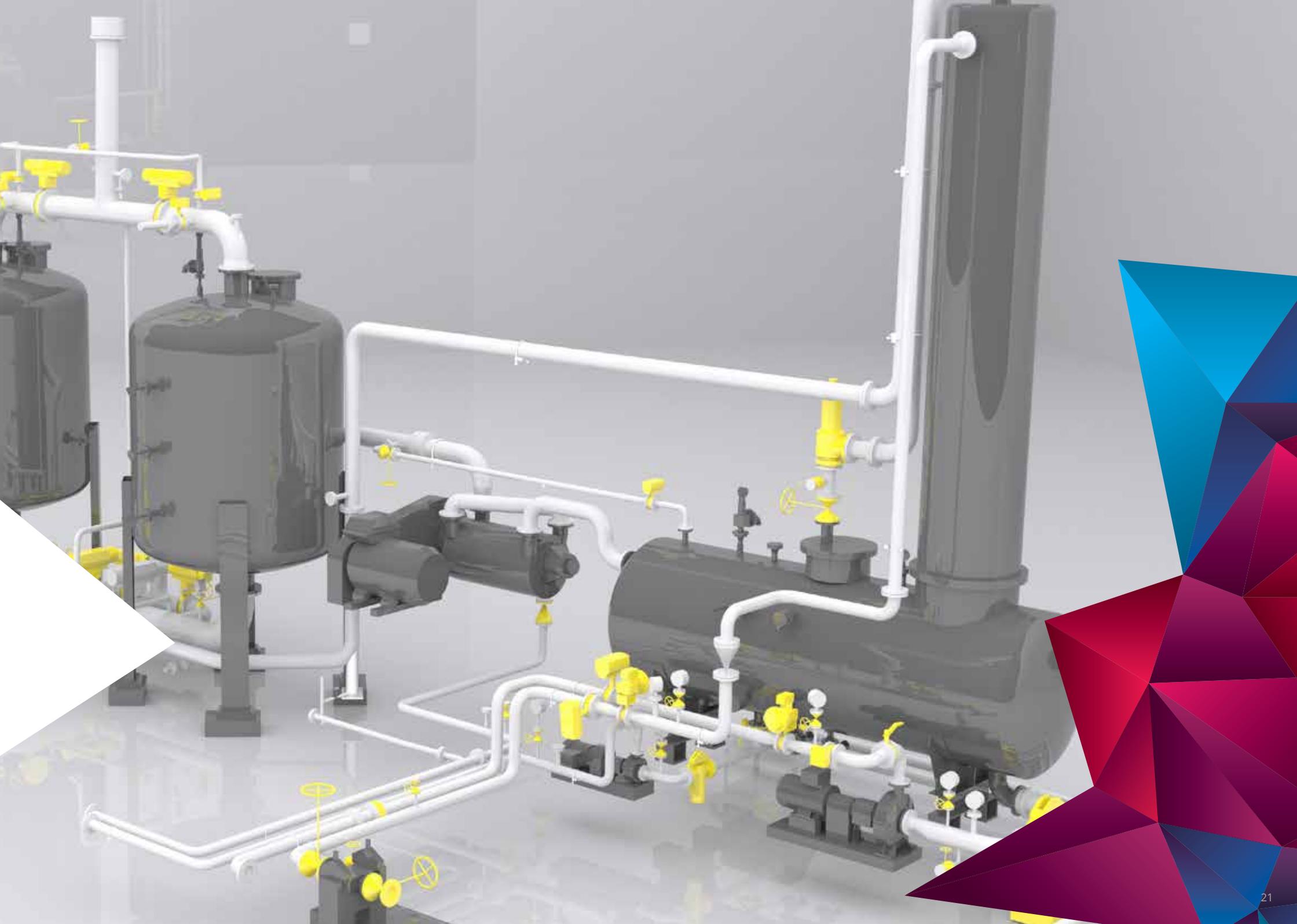
4D Lizard allows client held asset information including service, make, model, serial no, asset owner, work orders, scheduled tasks and test results to be linked to A3D 3D models and P&IDs. Being process industry specific, each asset category will be built with equipment specific fields, easily selectable as information for a tank record will not have the same data fields required for a valve or process line.

► **DOCUMENT MANAGEMENT**

Even though we are in the 21st century, clients still store records and drawings as paper copies, often in multiple locations creating the possibility of out of date information being used. 4D lizard not only allows you to easily file documentation to an asset or an area, but also allows you to file against a specific process category i.e. DSEAR, COSHH, P&ID, Risk Assessment etc. with a clear document history, avoiding use of out of date records.

► **MAINTENANCE MANAGEMENT**

Keeping on top of scheduled maintenance is time consuming. Interrogating database held records to prepare scheduled inspection records all adds to your workload, especially as you need to know where every line and valve is on site merely by its unique asset number. 4D Lizard links to your systems to export colour coded schedules, the colour being dependent on its maintenance due date, viewed on the 3D process model, P&ID or as a simple report.

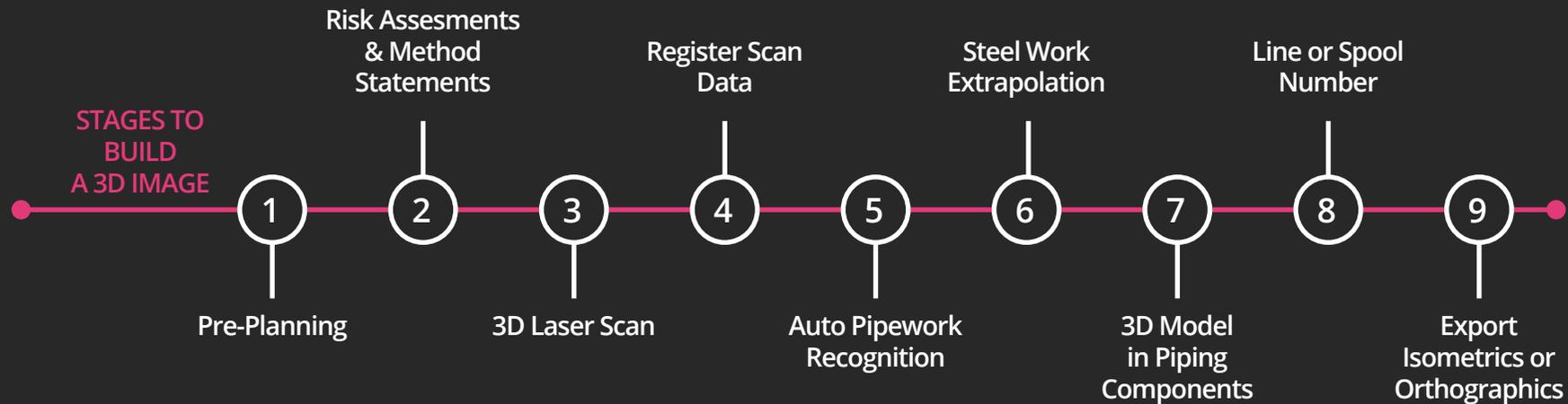


TRADITIONAL VS 3D SCANNING

The limitations imposed on traditional surveying methods have been well documented. Gaining access to high level equipment and structures, human errors in recording data and omitting to complete measurements resulting in revisits to the surveyed site. A3D operate a selection of laser scanning instruments, the selection influenced by factors including accuracy requirements and access limitations.

For any planned 3D laser survey, A3D will complete pre-planning in order to determine the most efficient and therefore, cost effective solution for our clients. A3D recognise that any form of site work on an operating site must be subject of both RAMS along with planning documents in order to expedite an efficient and safe survey. A3D have successfully completed surveys across refineries, storage terminals, chemical manufacturers, pharmaceutical and water industry installations as well as commercial buildings. Added to this A3D have worked on MOD installations requiring even higher levels of security than our industrial clients.

Whatever our client's restrictions for working on their sites, A3D have the procedures in place to achieve compliance.



	Traditional Surveying	3D Laser Scanning
Survey Time	12+ Months	4 Days
Webshare Creation	n/a	Yes
3D Model Creation	12+ Months	3 Months
Safety	Hands on, contact surveying	Fast non-contact survey
Accuracy	Human Error	0% Human Error & +/-1mm
Extended Applications	3D Models	Accurate 3D Models
	API570 NDT Isos	API570 NDT Isos
	Orthographics	Orthographics
	-	Project Clash Detection
	-	Used for Design work
	Asset Reporting	Asset Reporting
	-	Tank Analysis
	-	Bund Analysis
-	Virtual walk your site Webshare	
Survey Cost	£50 - 100K	< £10K
Modeling Costs	£30 - 40K	< £40K

* Figures based on a 70,000m2 terminal, with 26 tanks, 22 pumps and 10 road loading bays



VIDEO FLYTHROUGHS

A3D are proud to have been instrumental in advancing the engineering industry from traditional 2D to the growing opportunities afforded by our 3D technologies.

As a result of our marketing, the majority of engineers and managers working in manufacturing, construction and process industries have an insight into 3D laser scanning and to a varying degree, the benefits of processing scan files into our smart / intelligent 3D models.

Few however, maybe aware that A3D produce video files directly from our captured 3D laser scans. Our video files are not expensive and can be designed to follow client selected routes to cover all required operational areas. A3D videos have used to market client facilities, assist with health and safety, operational and induction training.

▶ MARKETING

From local sites to corporate headquarters, marketing takes on a whole new dimension. Imagine being able to promote your business using live files covering your key operations.

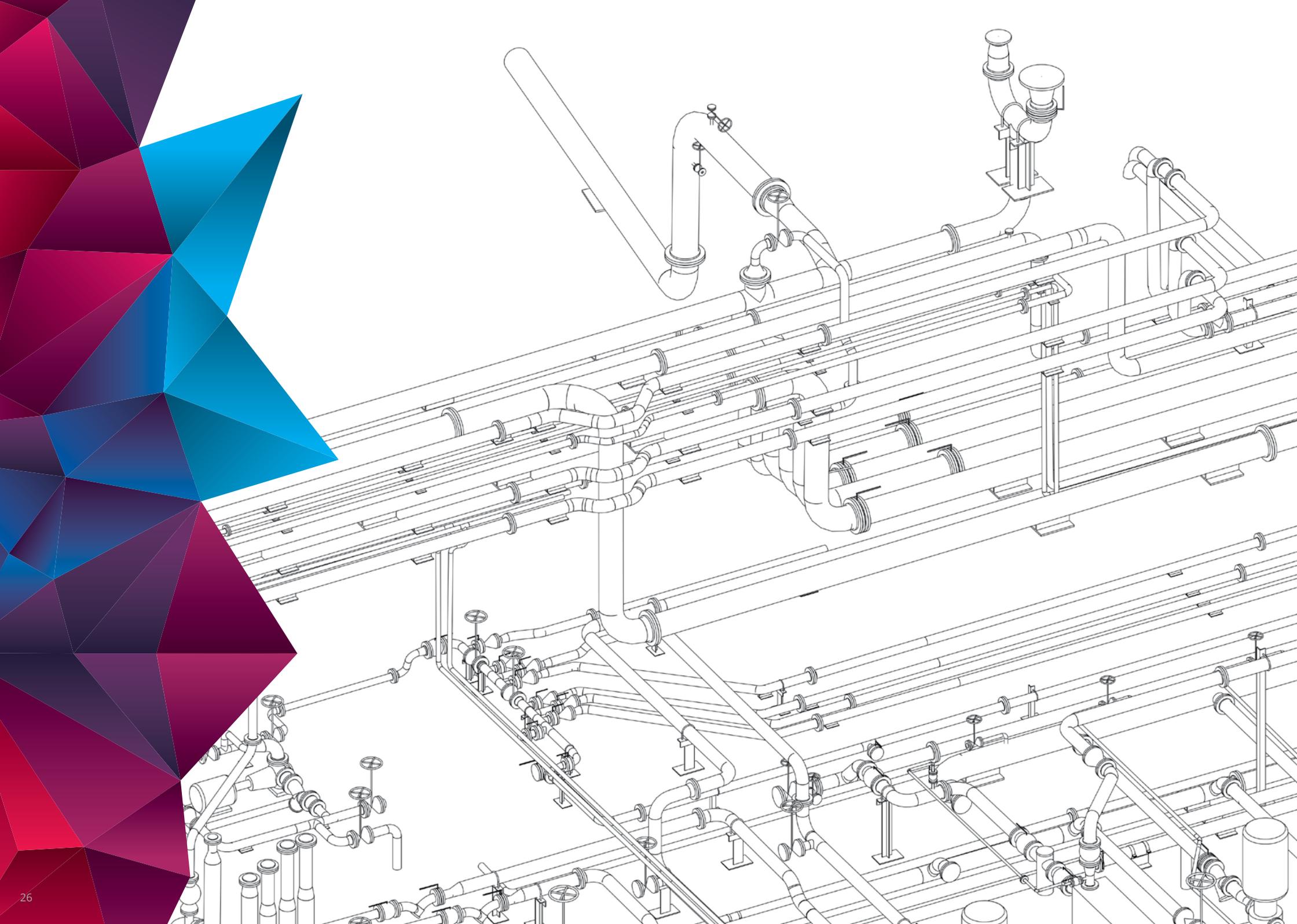
If a picture saves a thousand words, how powerful is a video file as a marketing tool?

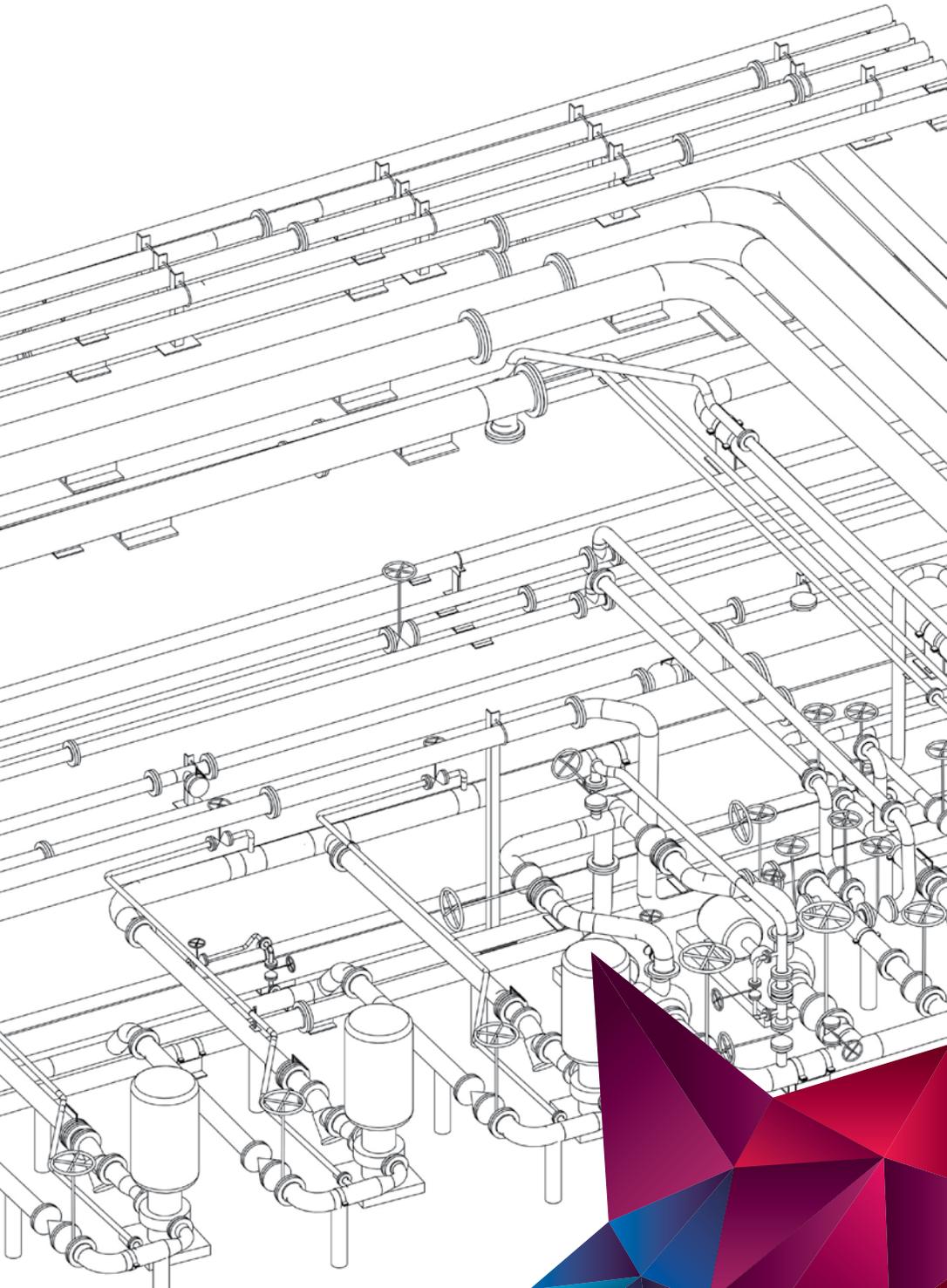
▶ TRAINING

Whoever your trainees, a video file is a powerful aid to your operations. From initial site induction, health and safety, operational training and permit control, A3D video files are inexpensive.

▶ Video outputs can be used on a range of devices including IPADs, Phones, TV and on-line social like YouTube.







API570 NDT INSPECTION **DRAWINGS**

From the huge amount of data captured by our 3D laser instruments, A3D have the range of processing software that allows us to quickly and accurately model out our 3D Plant Models. For processes A3D use Autodesk Plant 3D, which allows us to model out specific pipework from all recognised piping catalogues along with speciality specifications A3D download from suppliers.

Once A3D have created your 3D model, we can automatically export a full range of piping isometrics, fully dimensioned and with a full list of bills of materials as required. Isometrics are all customised around our client's standards including drawing sizes and borders and can be tailored to align with NDT inspector's data entry fields.

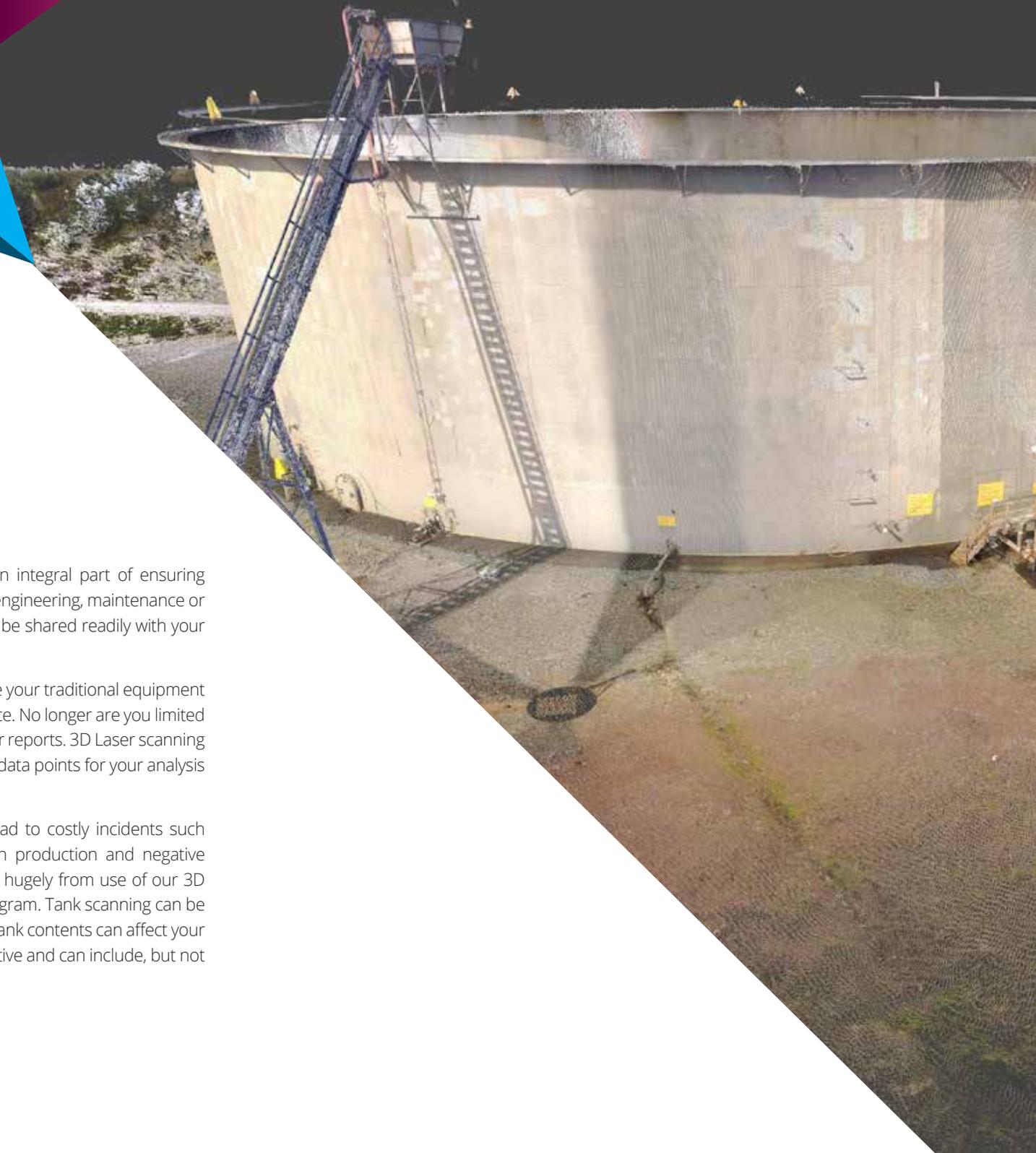
Alternatively, A3D can offer piping orthographics, a 2D snapshot from the 3D model that holds more information including surrounding features to add clarity. The greatest benefit though, is that we can reduce to around 10-20%, the total number of piping isometrics required to cover any process.

European Oil Storage Depot

Size	70,000 m2
Tanks	26
Pumps	22
Road Loading Bays	10
3D Survey Time	4 Days
3D Model Time	3 Months
Piping Isometrics	900+
Piping Orthographics	90+
Total Cost	<40,000 Euros

► DELIVERABLES

Once finished remember, you will be left with a fully functioning 3D model, which can later be used for projects such as project work, clash detection and asset / document management integration; we are also able to export our models into programs such as Navisworks enabling you to freely access, measure and mark-up your models using this freely available software.



TANK ANALYSIS

For bulk storage operators capturing accurate tank data is an integral part of ensuring efficient day to day running of your facility. Be it for production, engineering, maintenance or health & safety, having a level of recorded information that can be shared readily with your colleagues across the globe can be invaluable.

No longer will you require temporary access platforms to elevate your traditional equipment into position in order to collect information about the tank surface. No longer are you limited to a few hundred data points offering limited information for your reports. 3D Laser scanning is cost effective and in a short period, provides many millions of data points for your analysis and reporting.

In worst-case scenarios, inaccuracy or absence of data can lead to costly incidents such as a storage tank rupture, with consequential repairs, loss in production and negative environmental impact. The Storage sector is already benefiting hugely from use of our 3D Laser scanning technology, backed ably by our tank analysis program. Tank scanning can be completed before influencing factors including temperature or tank contents can affect your results. Our tank analysis reports are both versatile and informative and can include, but not limited to the following outputs:-



▶ ROLLOUT GRADIENT MAP

Taking snapshots of the tank's gradient deviation map, from four elevations (North, East, South & West) giving the report analyst an overall picture of the tank's integrity.

▶ TANK SETTLEMENT

Looking at the skirt of the tank we take measurements, using the 3d scan data, of its height around the whole tank. Giving us an idea of its height in relationship to the rest of the tank.

▶ TANK FLOOR LEVEL ANALYSIS

Surveying within the tank with 3D laser scanners, we are able to map the whole tank floor to accurately calculate the lowest point within the tank, allowing a water draw of line to be added at the optimal place.

▶ RADIAL DEFLECTION

Taking radial cuts horizontally through the middle of each tank plate (or more if required) we can take a look at the radial deflection of a tank compared to a true cylinder (an accurate 3D model of the tank)

▶ BUND VOLUME ANALYSIS

With those operators still using earth bunds for containment, our scan files now offer the most accurate approach for calculating bund volumes. We can not only assess ground levels, but can interrogate the variances that occur with natural bunds.

▶ SHELL VERTICALITY

Taking a cut through the side of the tank, vertically, at regular intervals usually every 10M around the circumference of the tank we are able to gauge the tank vertical integrity.

▶ TANK CALIBRATION

With scan data from either inside or outside the tank we are able to take area measurements, every 1mm up the tank, taking volumes from tank nozzles, manways. Bearing in mind traditional methods, which would use total stations to record 160 points we are able to record over a million per second.

CASE STUDIES



3D P&ID VALIDATION

There is a growing momentum for operators of process sites especially those managing bulk storage terminals, to DIGITISE both their assets and documentation records. With our extensive engineering background, A3D is at the forefront in the development of SMART 3D process models and P&IDs that can be linked to existing client systems. Our lifetime experience of implementing projects across Petrochemical, chemical, pharmaceutical, water and detergent industries is unrivalled. Our process engineering background makes A3D an obvious choice for process operators looking to DIGITISE their operations in the 21st century.

BUILT BY ENGINEERS FOR THE BENEFIT OF ENGINEERS!

A3D Smart Autodesk 3D Process models and P&IDs are powerful tools in supporting our client's process sites. These dynamic files can not only be used for linking with client asset management systems, but also in supporting our clients site inspection programs with the 2D output files. A3D (ALS) expertise with designing and updating of client PFDs and P&IDs sets us apart in an industry looking to digitise their assets. Our surveyors are trained to recognise assets to be included in our PFD/ P&IDs and using data collected by our 3D laser scanning team enables structuring of PFD/ P&IDs. Only now with the Autodesk Smart P&ID format, A3D can automatic cross validate these files alongside the 3D model files to ensure an accurate record of client sites. Unlike traditional 2D CAD files, A3D Smart PFD / P&ID files are built around a component database, adding intelligence essential for clients intending to digitise their assets. Structured reports from these Smart files providing clients an ability to upload asset information from their asset management system. Using our oil and gas background, A3D can advise clients with other facilities driven from our Smart files, providing further savings in improved operating efficiencies.

► LASER SCANNING

Using 3D Laser scanners we were able to 3D map the oil storage depots using multiple scanners within a week, with minimal disruption on site.

► SMART P&IDS

Working from our 3D model file the initial development begins, moving to add equipment items from our catalogue of components in to a spec driven Smart P&ID file.

► 3D MODEL

Directly from the 3D scan data we process through an automated procedure of extrapolating 3D pipework from the RAW point cloud data and add spec driven components.

► VALIDATION REPORTS

A particular feature of our models and P&IDs is the ability to automatically cross validate between them. This simple automated feature eliminates the time consuming traditional methods of checking.



PHARMACEUTICAL 3D DESIGN

For this project our client required A3D to complete 3D laser scanning and 3D modelling of a specific process area ahead of a new capital initiative. This initiative would require process changes to enable removal of gas from the top of existing two vessels, compressing the removed gas and returning liquid down-stream. A new gas compressor, tank and heat exchanger would be added to achieve this, however due to complexity of existing process and limited access, a 3D model was chosen to site new installations and provide client management with an easy to understand layout.

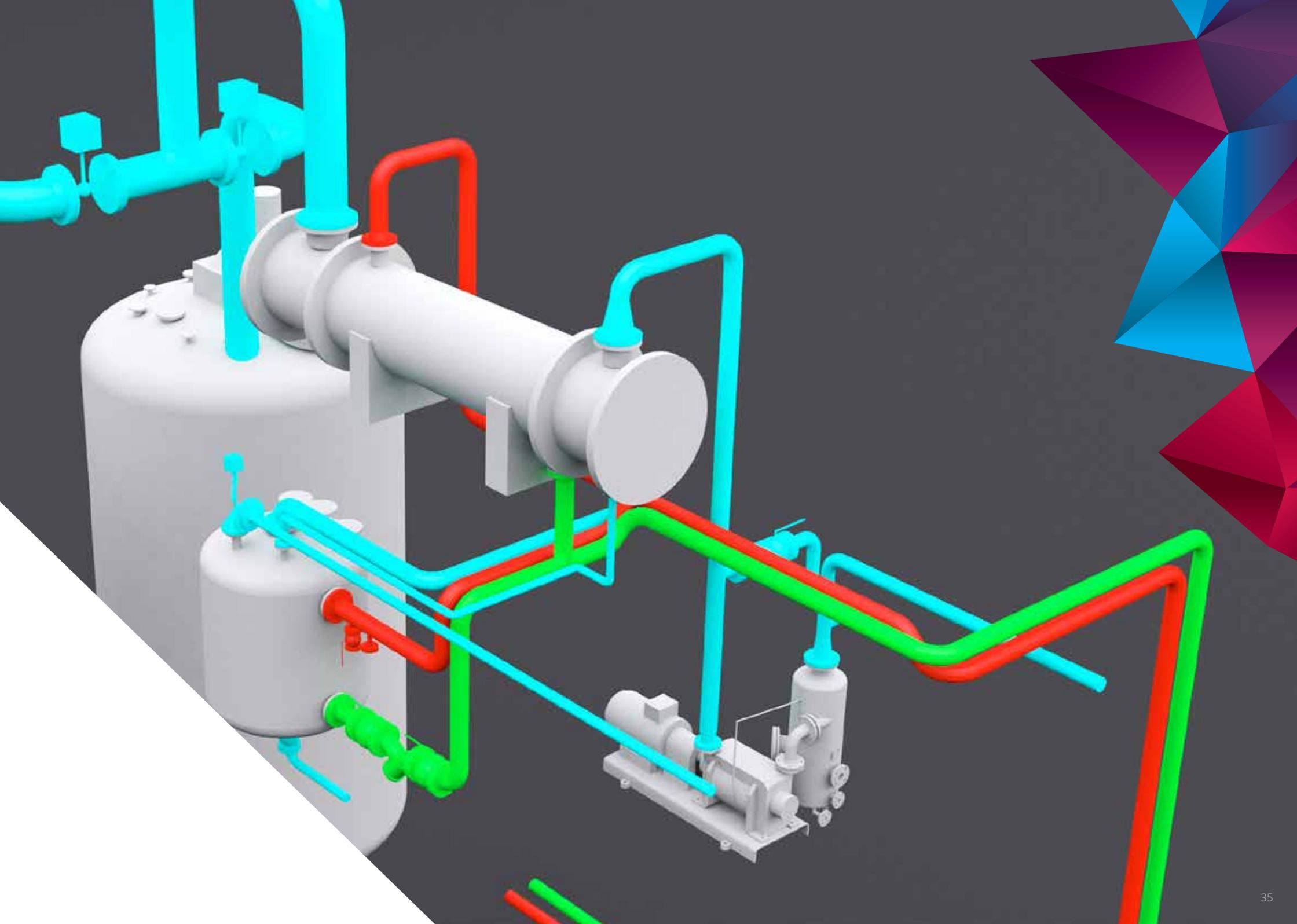
A3D completed the 3D laser scanning within one day before returning to office to complete the 3D process model. Having the original scan data available to view with the new 3D process model ensured no clashes would occur during the modelling in of the new equipment and pipe lines. The benefit of modelling with full view of scan data cannot be underestimated as A3D were to route new 6" lines through floors, avoiding existing pipe lines, steelwork and cabling.

Once the existing plant was modelled, we were able to contact his vendors about documentation on his new compressor and heat exchange, expecting to receive traditional 2D General Arrangements, A3D were pleasantly surprised to discover the equipment vendor had an accurate 3D model for the equipment already. Once received A3D were able to import this equipment model into our 3D process model and complete the pipe routing.

The whole process took a matter of days opposed to taking weeks or months and we were able to quickly produce a Bill of Materials, enabling client to quickly and accurately budget for his future project. The installation being completed without fuss, on cost and within the tight schedule this process dictated.

► With 3D we are able to easily take into account all site surrounding features, finding clashes and restrictions before fabrication.





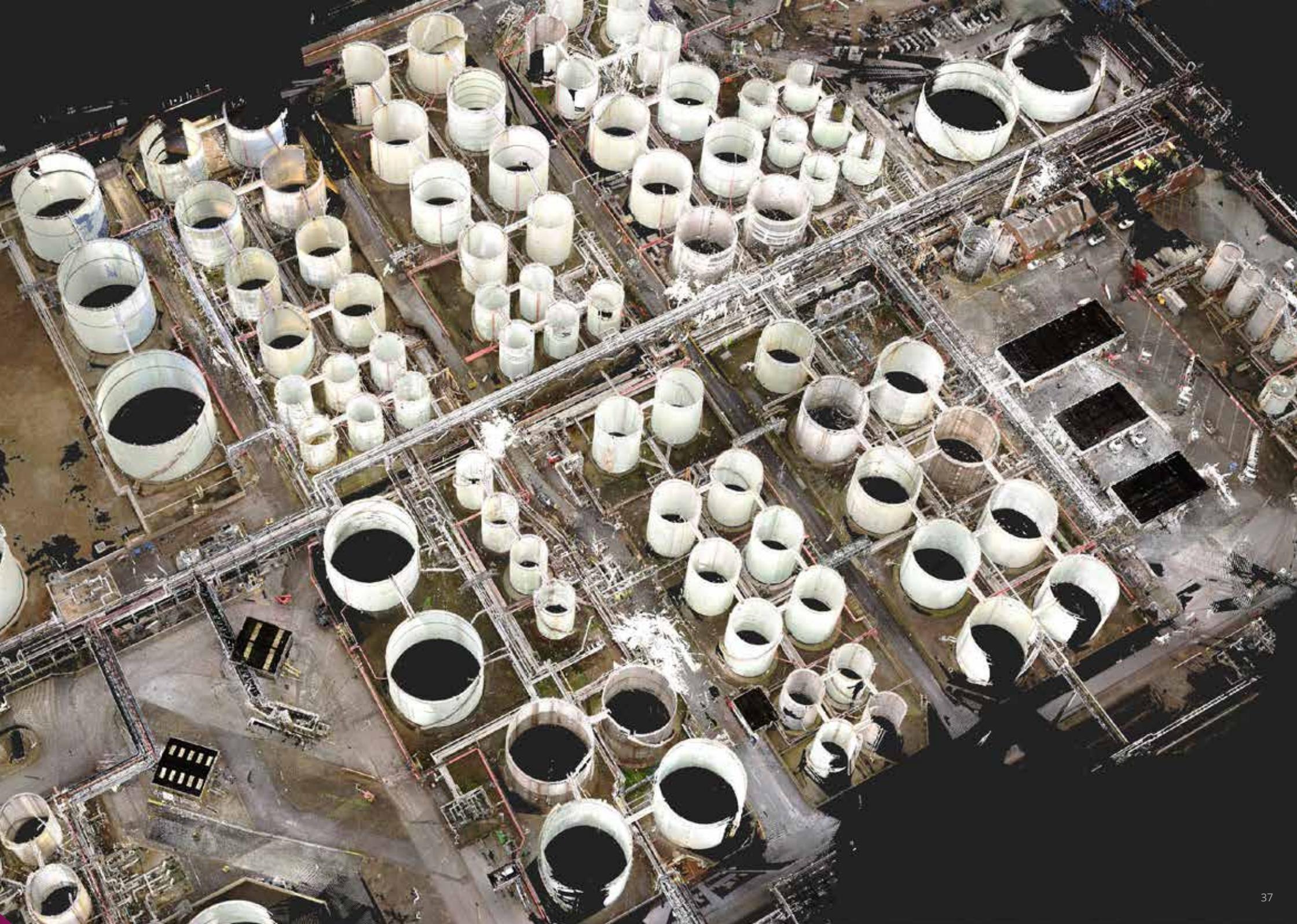
LARGE PETROCHEMICAL TERMINAL

A3D completed the 3D laser survey on a large upper tier COMAH chemical terminal in the North East of England. The client required A3D to prepare an Autodesk Plant 3D Process model where A3D would be exporting pipework orthographic drawings as part client's NDT inspection program in meeting their health and safety initiatives.

Prior to start of survey our Operations Manager prepared a detailed scan plan, necessary to ensure efficient progress during the survey given the multiple scanners the three-man team would be operating. A3D submitted RAMS (Risk Assessment + Method Statement) documentation to the terminal management team covering our site scanning activities and mobilisation commenced. A3D used FARO Focus 3D laser scanners, our preferred choice for field surveying as the reliable instruments are light and easy to use. The overall site would require over 1200 scans making the scan plan prepared at outset, essential in determining the daily schedule for the six days spent surveying. Given our experience in surveying large bulk storage terminals, A3D would divide the terminal in to logical areas, for instance tank bunds and loading racks. The individual areas would eventually be linked together using strategic reference scan points throughout the terminal. On completion of the site surveying, the individual scans were registered and processed in preparation for our 3D modelling team, each dedicated to their own areas in building the process models. This method enabling large terminals with over 100 bulk storage tanks, to be modelled efficiently.

A3D completed this project on time and within budget. From scanning site to completion of Orthographic NDT inspection pack, the overall project was completed within 12 weeks. Our impressed client being pleased with the efficient turnaround and the ongoing support A3D offered their team in adopting the modelling technology. For those client's not having accurate P&ID files, A3D can prepare Smart P&IDs using our specialist surveyors who use the smart P&ID package for many reasons including the ability to automatically cross validate our 3D modelling file as a checking facility.





WATER AUTHORITY DESIGN SERVICE

A3D recently completed a project for the water industry at one of their pumping and filtration sites. Our client for this project was an EPC contractor who required first a RECAP scan project file, Smart 3D process model and Smart P&IDs (Piping and Instrumentation diagrams). Although smaller in terms of number of laser scans than a typical bulk storage terminal, water industry installations present different challenges. For instance, a large proportion of the process pipework is below ground and for this project A3D would be using data from a buried services study to complete our 3D modelling.

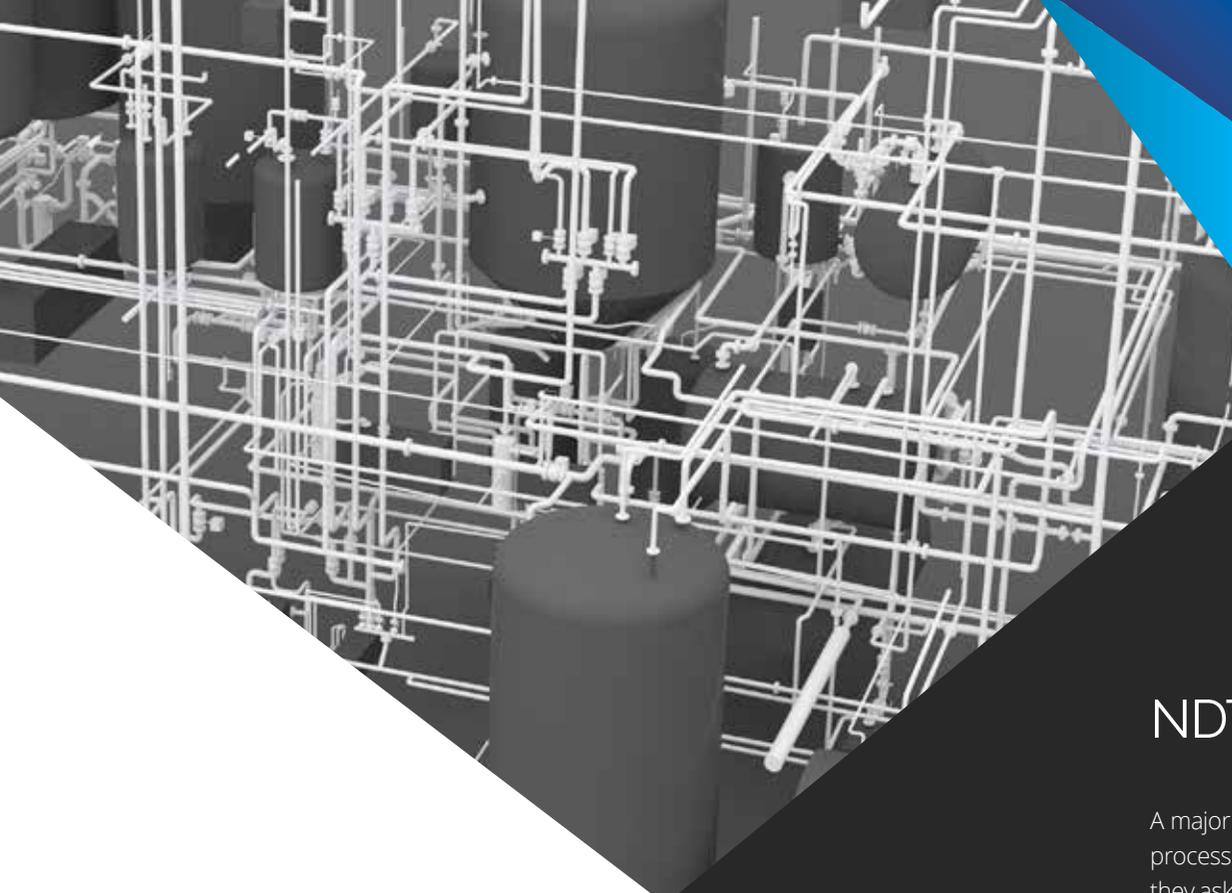
Having developed our scan plan and submitted RAMS (Risk Assessment + Method Statement) documentation to the client, our site scanning activities were completed in less than three days. Part of the scan would require surveying of green-field areas where ground profiling would be completed using the Autodesk Civils software. Within process buildings pipework was routed within covered trenches and access plates needed to be removed to gain vantage areas for scanning. A3D deployed our inverted tripod to allow the FARO Focus scanners to be lowered in to trench to gain process scan data to allow modelling of buried services. Our background in working on industrial sites enabled A3D to liaise with on-site operations to ensure safe access to exposed trenches.

On completion of the site surveying, the individual scans were

registered and processed in preparation for 3D modelling of all scanned process. The 3D modelling for this client would however extend beyond our captured 3D laser scan data to files covering the visible process. Files handed over from the buried services study would also be used by A3D to prepare a site model covering both the above and below ground process pipework. The client operations also required A3D to layer our model to reflect product colour coded pipework nomenclature consistent with coded pipework used across their network.

Another satisfied client looking to partner with A3D in future, across the water industry network.





NDT INSPECTION DRAWINGS

A major UK pharmaceutical firm, required piping isometrics for NDT purposes of their main process plant, because of the size of the process unit (over 6000m²) and their limited staff, they asked us to scan the unit and from the scan data produce isometrics. The unit consisted of two buildings (each roughly 500m²), which both had minimum of 3 floors and a roofing area, which consisted of a further few levels of steelwork walkways.

We went in with a three-man team, two scanners and a total of 24 reference spheres; we scanned around the perimeter of each building, including any chillers and storage tanks, then made our way into scan the inside of the buildings. The client was pleased that we were able to move quickly through the rooms, with minimal disruption to the everyday running of their plant.

The scan data was later registered together at a high accuracy, enabling the scan data to be taken and used for multiple applications including 3D Webshare, 3D BIM, 3D Steelwork, drainage floor plans, P&IDs and 3D pipework that would later be used to export the NDT (API570) isometrics.

The client was happy with the job we completed, they found the webshare, which we supplied for free an incredible tool; it has now enabled them to walk their site (even during production) safely and take accurate measurements.

SCANNING FOR DANISH DESIGN CO.

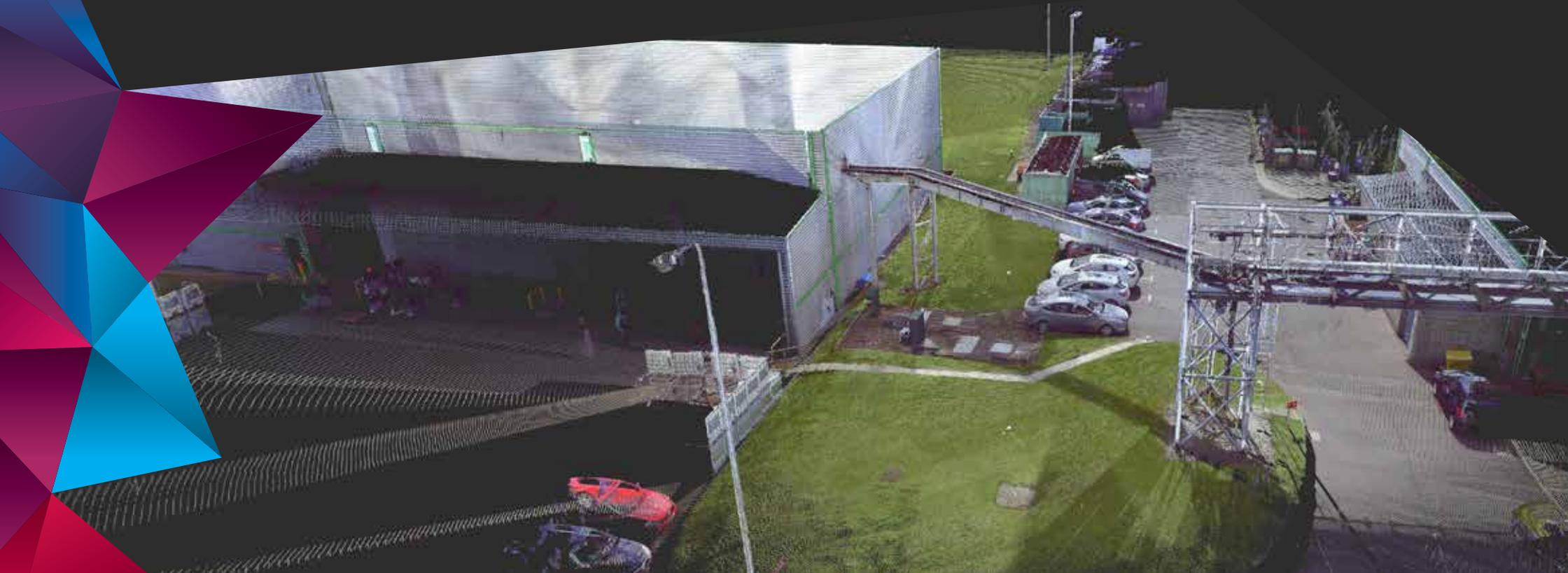
A large EPC company engaged to design and construct a new power plant in Newcastle, ordered A3D to scan surrounding land to be utilised for their project. The scan data was to be used to design a new pipe rack to be used for new pipework supplying steam for two pharmaceutical companies.

The scanning required our team to have access to both the public area and within boundaries of two pharmaceutical sites along with a construction site in order to survey the entire route.

Our 3D laser survey data would give sufficient information for the designers in Denmark to calculate the required pipe support heights, pipe routing details and fencing for the public areas, without the need for their design team to visit the site in UK.

The scanning took 3 days and the processing of the data, which allowed the designers to import it directly into their design package took a further day.

The data, due to its size needed to be sent by post, loaded onto memory stick and encrypted for security purposes. The client was happy with the results and since then we have completed two further projects for this company.





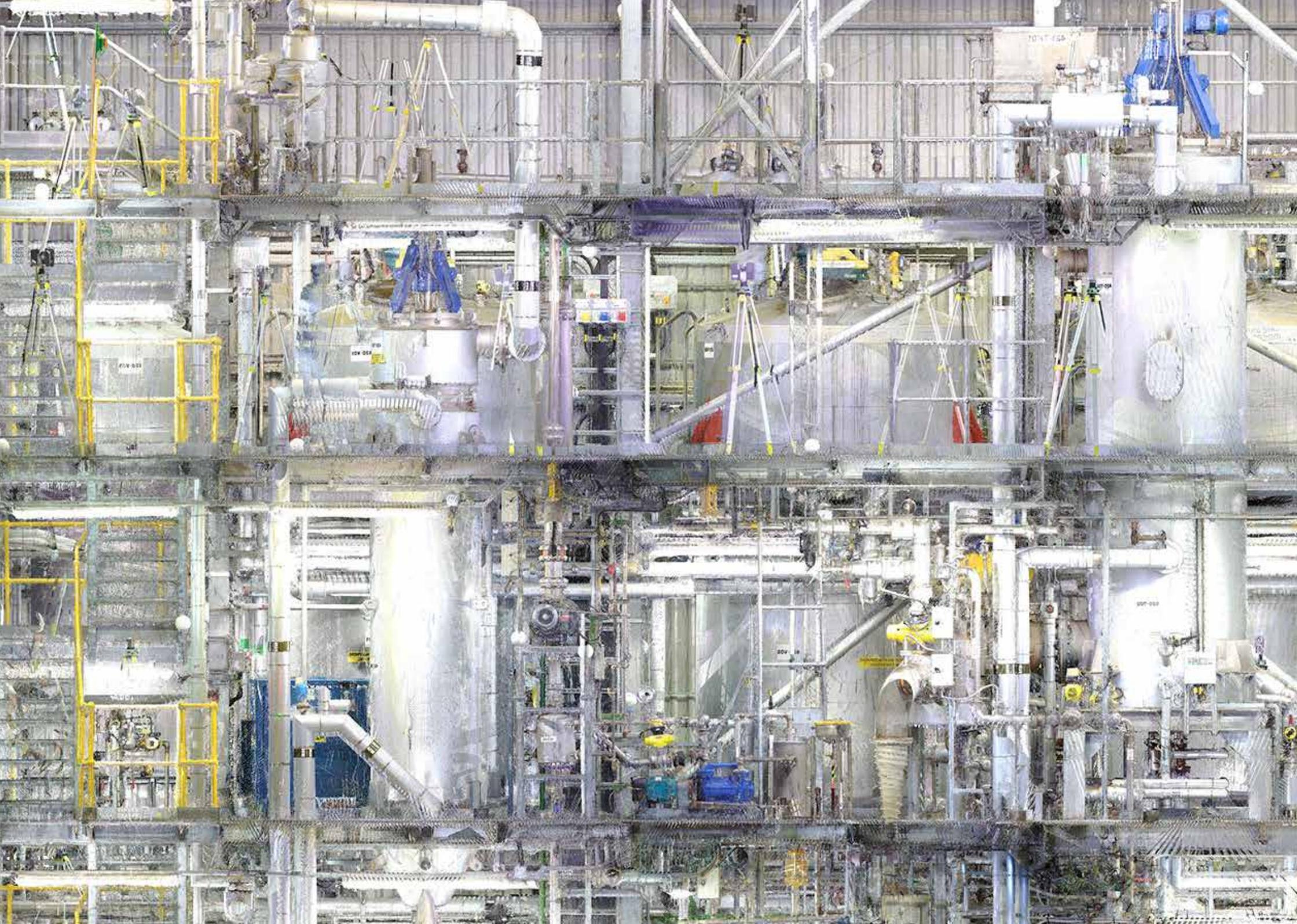
WORKING IN **THE NETHERLANDS**

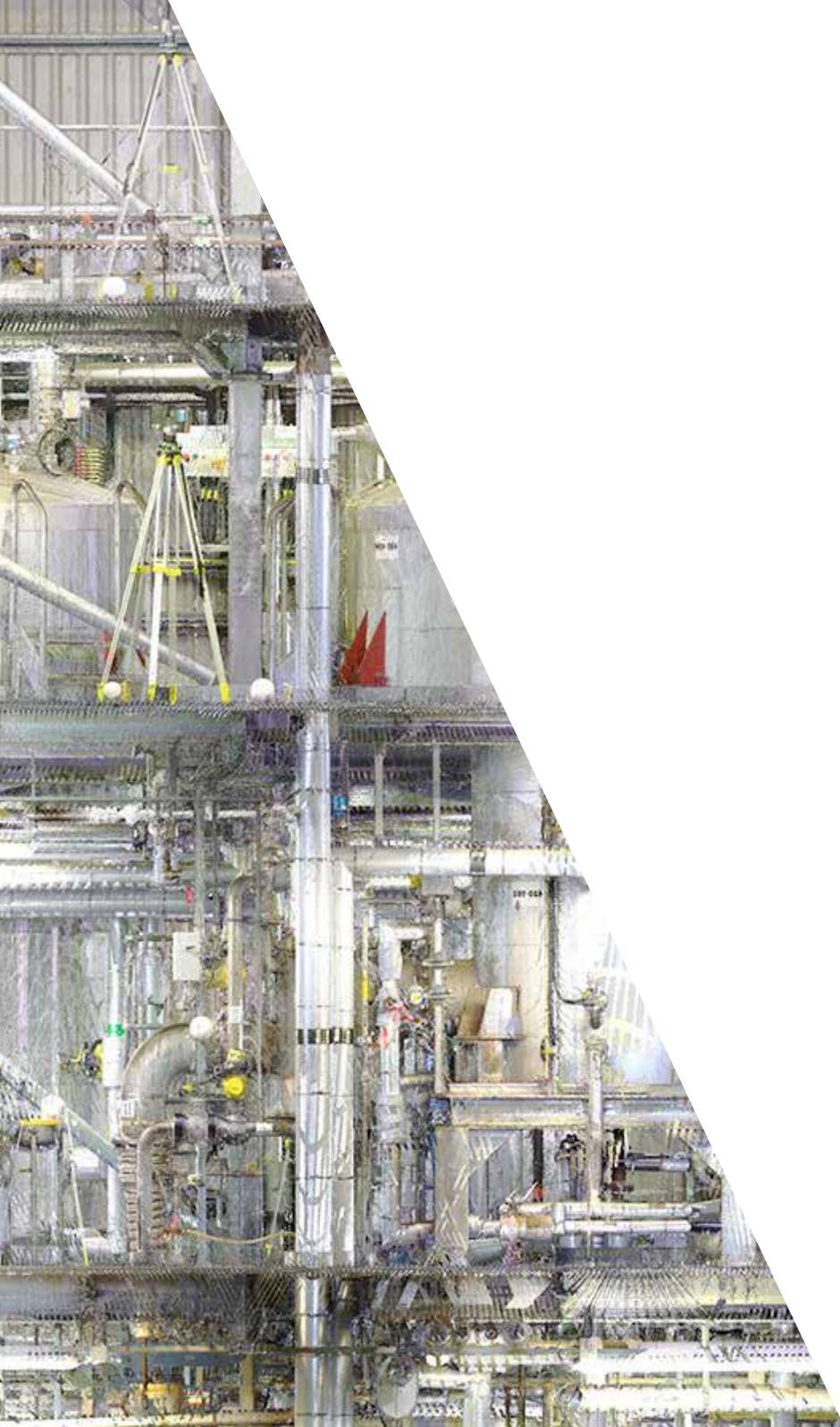
Our client had a job to design and build a replacement top loading gantry, which was to feed oil into a road tanker, they tried going in and surveying the area, but it was very congested and found they were constantly missing dimensions.

A3D went in with a 3D laser scanner, we took 14 scans within the area, which the client specified; we used 12 reference spheres to help triangulate ourselves around the road loading gantry and was able to produce a point cloud file accurate to +/-1mm. With this file we used specialist point recognition software to accurately model out the pipework within the area, including any pipework fittings, pipe supports and major equipment.

The client required the steelwork to be modelled out also, so using the same software we were able to match patterns of point cloud data against a UK steel catalogue and again accurately model out anything from I-Beams to Angle Iron.

The client later came back and requested the hand rails for the local steel work walk ways, this took A3D only a couple of hours, we already had all the survey data to be able to model this out.





PHARMACEUTICAL RECORDS

A3D's business is primarily with Oil and Gas, but on occasion A3D get the exciting opportunity to work in another industry, a pharmaceutical process unit. Our client had an ageing process unit, subject to many changes and alterations during its life cycle. Existing documentation had become too costly to try and update with their limited engineering resources and had therefore A3D if we could assist.

The process unit was roughly 40m x 30m arranged over 4 floors with congested pipework, tubing, steelwork, cabling and equipment. Visiting the site prior to laser survey, A3D were able to determine the level of scanning necessary to capture the congested process, a total of over 400 scans. The processing and modelling from the scan data took just under 12 weeks, the 3D model was used as a tool in upcoming HAZOP meetings and general project planning. From the 3D process model A3D created the new P&IDs, validated with the 3D process model file to ensure alignment.

A3D learnt a lot from this project, including scan techniques and general planning for this type of congested facility. The process model was completed using Autodesk Plant 3D which for this process required A3D developing new specialised pipe specifications including GRP and GLS. The completed files were shipped to client along with a Navisworks files and PDF copies of all 2D outputs.



GLOBAL MARKETING

Marketing is important to any business, especially one looking to introduce new technology. Advanced 3D Laser Solutions Group have invested considerable time, resource and revenue in building our brand. We have received tremendous support from both the trade press and carefully selected exhibitions, to achieve the global reach and client base A3D now enjoy. We have built a business and brand by continually investing in research and development, listening to our clients and in return being able to offer state of the art technologies in the field of 3D laser surveying & software development, hence the introduction of 4D Lizard our new asset management software.

Our client relationships built on honesty and integrity, being an invaluable contribution to building the A3D brand. Our marketing strategy is to maintain a presence in both print and online platforms with market leading trade magazines including Tank Storage and Storage Terminals Magazines, along with social media such as LinkedIn, Twitter and Instagram to showcase our services to a global audience. Exhibitions play a major role in growing our client base, each year we exhibit at the (TSA) Tank Storage Conference & Exhibition (UK), StocExpo, Rotterdam. With the phasing out of fossil fuels over the next ten years and the global concerns about global warming, we believe the tank storage market will move towards LNG, Chemicals, Biofuels and further down the line Hydrogen. A3D are exhibiting at this year's ChemUK (Manchester) where we are exhibiting and speaking at the conference, as well as exploring other exhibitions in Asia and North America, that we plan to exhibit at soon.

► CO-BRANDING

A3D have always understood the need to work with like-minded professionals / companies to achieve our commercial, environmental and social goals. This sharing of knowledge and experience with others being a valuable contribution in A3D being able to offer cost effective solutions for our clients. We believe Advanced 3D Laser Solutions along with our partners, are playing a leading role in digitising the process industry.





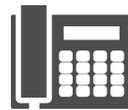


CONTACT US FOR FURTHER INFORMATION OR **QUOTATION**



Arrange an appointment to come
and meet the team.

01245 407551



Call to talk about any requirements or
technical questions you may have

01245 407552



Mail us and we will get back
to you the same day

colin@lasersurveying.com



Long distance but want to see us face
to face? Simply call us on.

Skype



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