Cost-effective and safe inspections of assets as diverse as water towers, reservoirs, telecommunications towers, power-line towers, bridges, buildings and dam walls are often an enormous challenge to councils and utilities. The use of drones for these types of high-risk inspections has become more common in the last few years, using photogrammetry to create measurable, high-resolution 3D models that allow detailed analysis and other benefits to engineers and asset maintenance managers.

Some of the benefits this provides are to:

- **Improve Safety** – Reduce tower climbs and reliance on access equipment
- **Reduce Costs** – drone scanning is efficient and comprehensive with whole assets scanned without the need for high cost access equipment such as man baskets or scissor lifts.
- **Reduce Downtime** – track asset condition over time and proactively schedule maintenance.
- **Identify and Tag Defects** within a 3D model with fine detail.
- **Accurately Measure** defects such as crack length, corrosion areas, change over time etc. Sub-centimeter accuracy delivers confidence when planning installations / retrofits / route access.
- **Insurance and Disaster Management** – capture asset condition before the storm season to avoid disputes.
The challenges involved in effectively implementing the use of drones means the council or utility needs to have some understanding of the legislative framework that drone operators are legally obliged to work within.

The safe and legal operation of a drone for this kind of work is critical and should be a fundamental criterion for vendors to comply with. There are a number of drone operators who cut corners and a blind eye is often turned to this in pursuit of a cheaper cost.

Drone technology is so ubiquitous and readily available at prices that are continuing to fall, that costs are seen to be related only to the price of the drone itself and not the value of the training, experience, qualifications and systems that benchmark the legally compliant operators.

One of the key developments over the past few years has been the arrival of web-based 3D visualisation software with no need to purchase or install software. This has created opportunities for easy collaboration and data sharing with stakeholders. Drone operators can scan an asset, process the data into a 3D model (‘digital twin’) and share it online via secure login for analysis by engineers. This simplified workflow greatly simplifies the path to

The interactive 3D model shown above was produced from a pre-programmed drone scan. It is geo-referenced for accurate measurements. Digital models such as this can be accessed online without installing software. The following images illustrate the items tagged 1 to 4 at the top of the tower in the image above.
adoption by councils and utilities. And for those who prefer to work offline, solutions are available for that as well.

Asset inspections via high resolution 3D models enable maintenance engineers to:
• Efficiently perform desktop condition assessments with ability to zoom, rotate, swipe, interact and inspect whole assets.
• Share and collaborate with team members and stakeholders, improving engagement.
• Create and export inspection databases and reports through a developed workflow.

Tag #1 – Inspect asset condition from multiple angles using the interactive 3D model. Rotate and zoom for thorough inspection.

Tag #2 – Safely inspect the integrity and security of equipment and cabling (e.g. after storm) without working from height.

Tag #3 - Easily identify and measure defects to track deterioration over time, or to plan repair work.

Tag #4 - Safely measure items to troubleshoot or to ensure compliance (e.g. antennae separation distance).

Inspect and measure inaccessible cracks and compare over time for engineering assessment.

Safely inspect the security and condition of out-of-reach access doors and critical locks using the high-resolution 3D model.