QMCA

QUEENSLAND MAJOR CONTRACTORS ASSOCIATION

SiteSee

Digitise | Analyse | Optimize

UTILISING UAV TECHNOLOGY & SOFTWARE FOR TOWER AUDITS AND MANAGEMENT

21st JUNE 2017

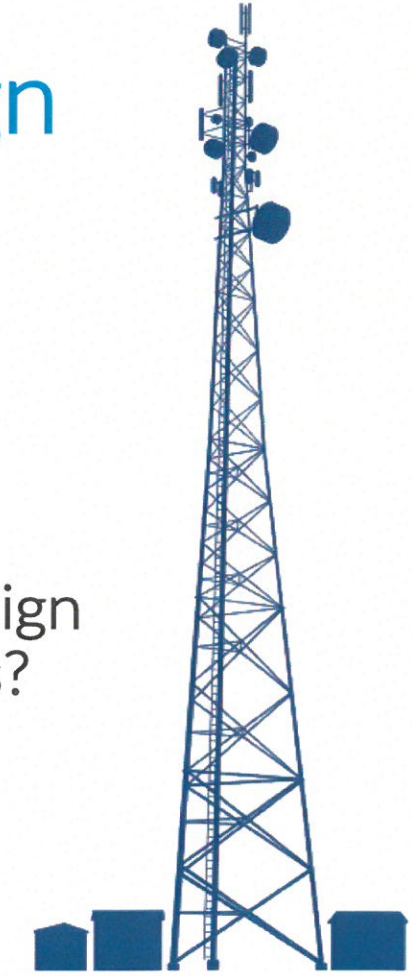
Problem

Disjoint between reality & design

What's on the tower?

What condition is the site in?

Does reality align with records?



Manual Data Collection

Inefficiency

Human Error

Risk & Safety

Tower Climbs

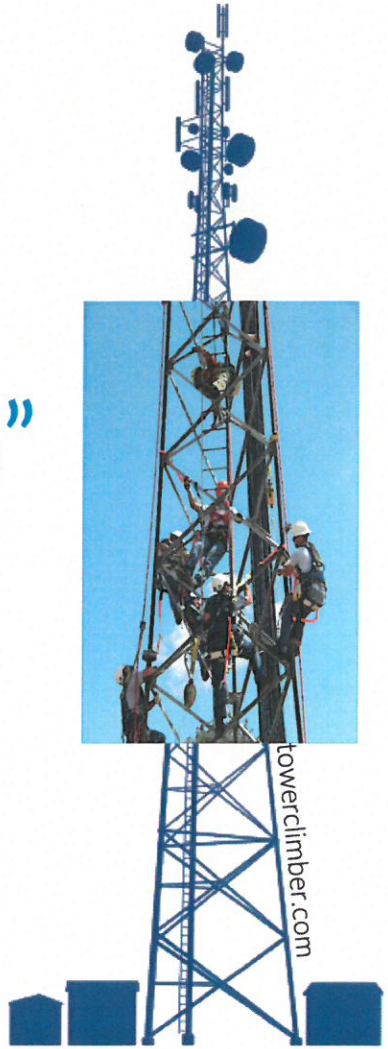
Estimated 49 to 468 injury-related deaths
per 100,000 employees

"The most dangerous job in the US"

Edwin Foulke - OHSA

"11,000 deaths worldwide"

towerclimber.com



Impact

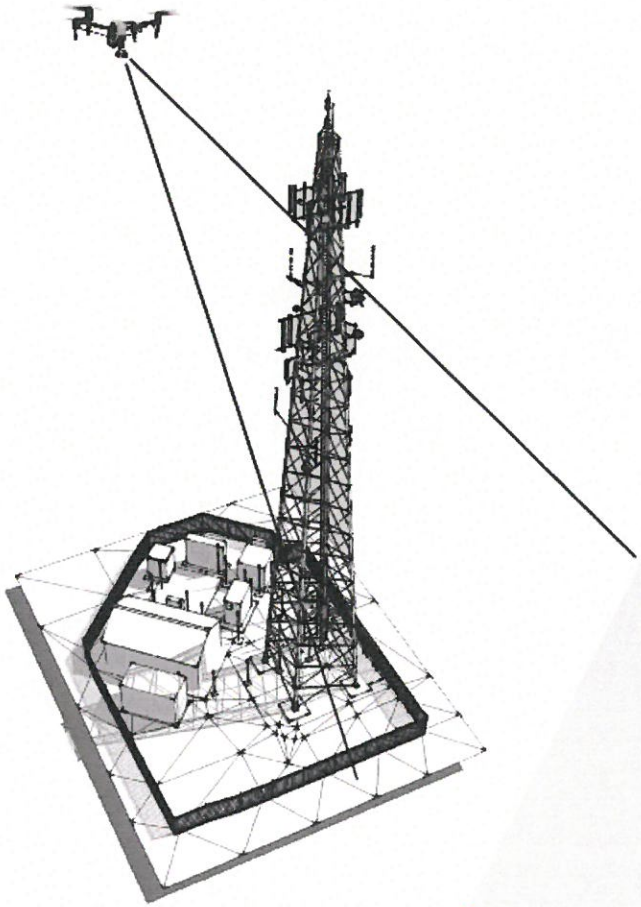
TowerCos

1. Inaccurate DBORs
2. Underutilisation of towers
3. Lost Revenue
4. Suboptimal ROA

Telcos

1. Inaccurate DBOR
2. Slow & costly rollouts
3. EME compliance risk
4. Less competitive

Solution



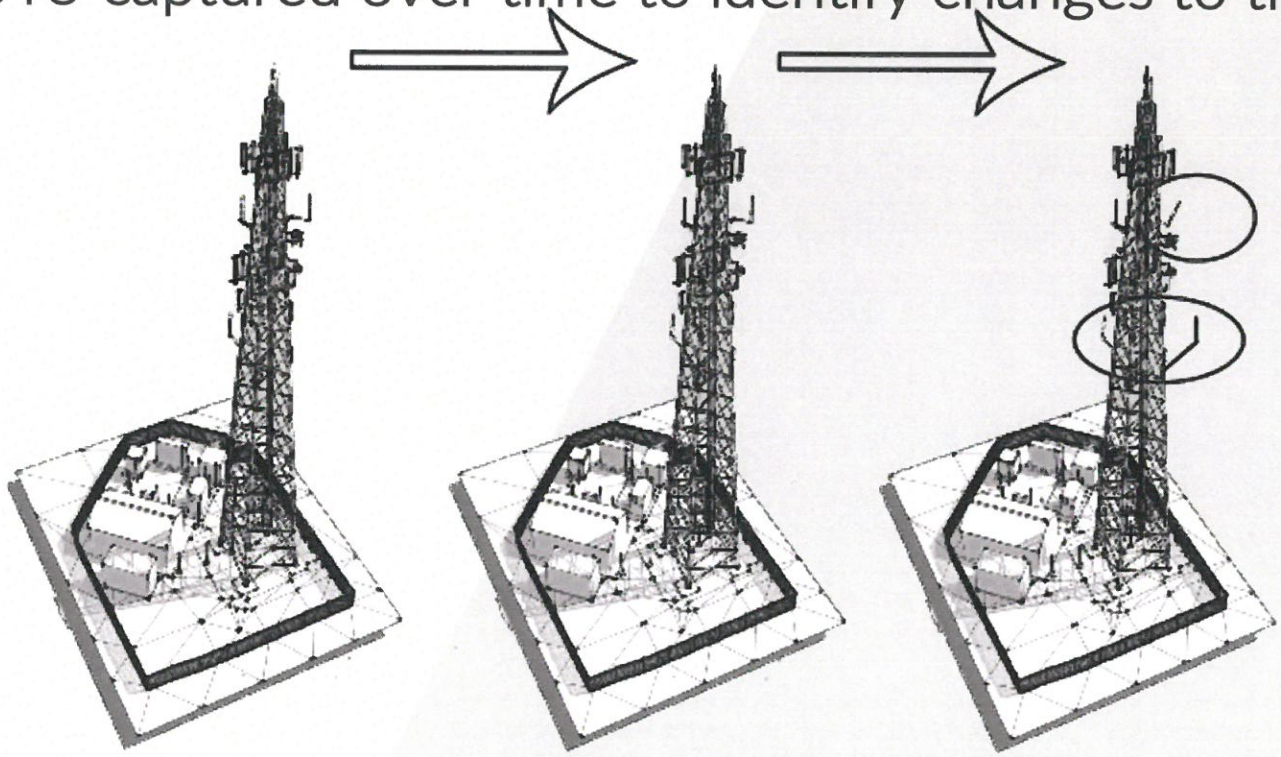
- UAV asset survey
- 3D model generation & analysis
- Web based collaborative viewing

A “Digital Twin” is created and analysed

Digitise | Analyse | Optimise

Solution

Sites are re-captured over time to identify changes to the asset



Digitise | Analyse | Optimise

Solution

Digitise | Analyse | Optimise

Side By Side Comparison

Deliverables	SiteSee	Current methods
Online 3D Site View	YES	
HD Imagery	YES	YES
Automatic Antenna ID	YES	
Automatic Rust Detection	YES	
As-Built database alignment	YES	
Fewer Tower Climbs	YES	
In situ EME Analysis	YES	

Hosted Online

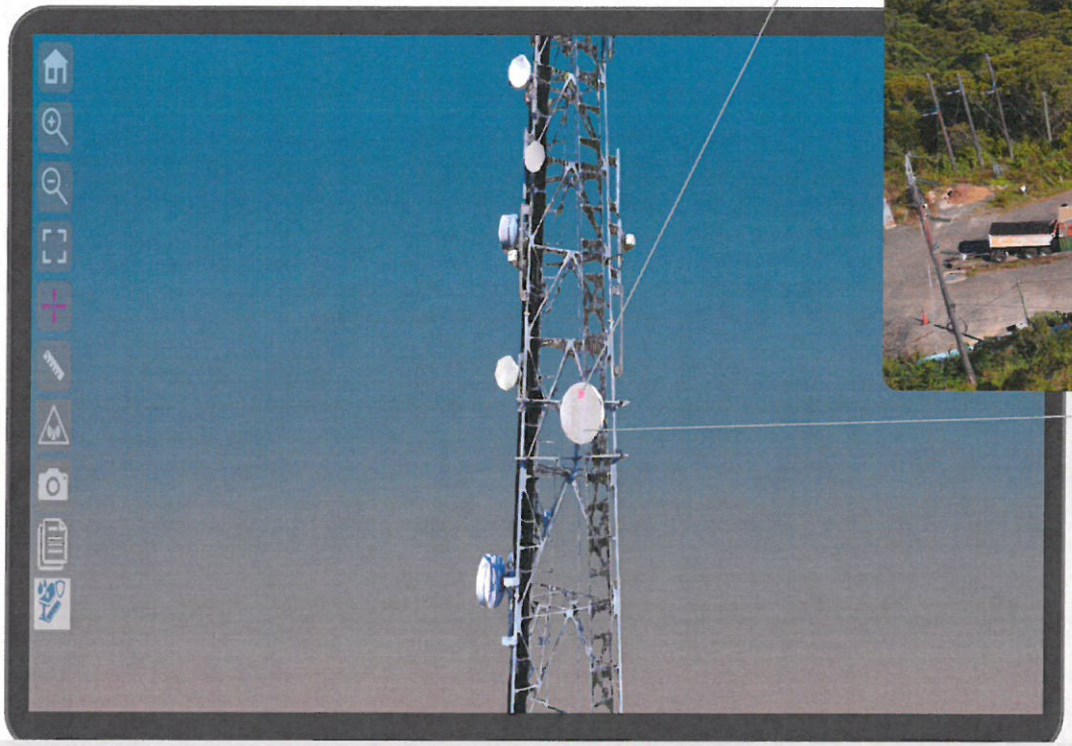
Remotely view,
inspect & analyse

- Collaborative

- Inspect & measure

- Safety Audit

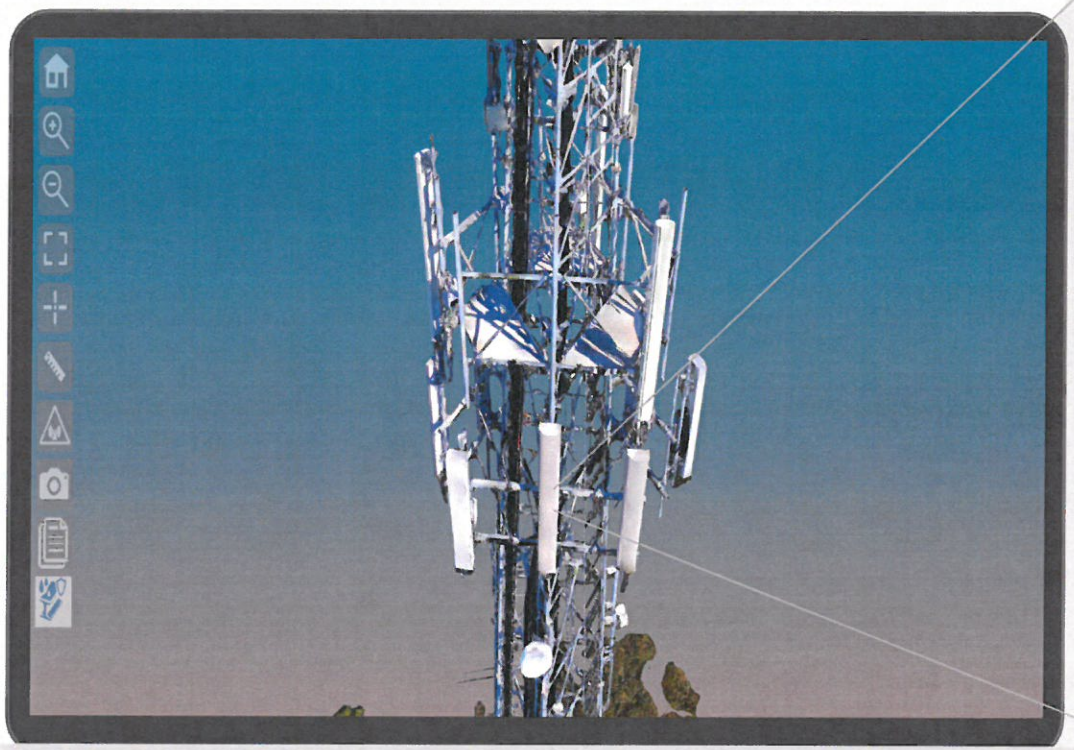
Eyes on Tower



- Click 3D model to inspect
- Eliminate folders of photos

Automatic Antenna ID

Identify antenna, model, height, azimuth & tilt



Antenna Data

Antenna A1

System: NONE

Power: --

Bearing: 50N

Height - Phase Centre (m): 38.9

Electrical Downtilt (deg) : 10

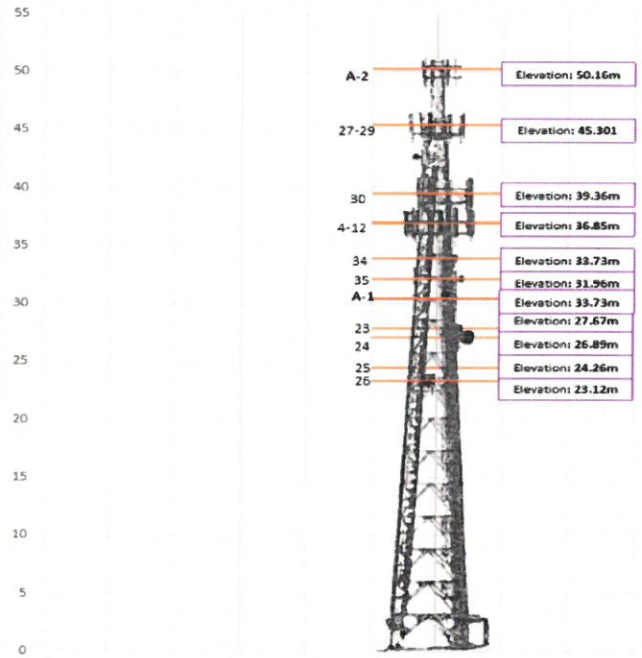
Mechanical Downtilt (deg) : 0

Port Details : Single Port

As-Built Alignment

Align designed records to reality

1-3: View from Eastern Direction



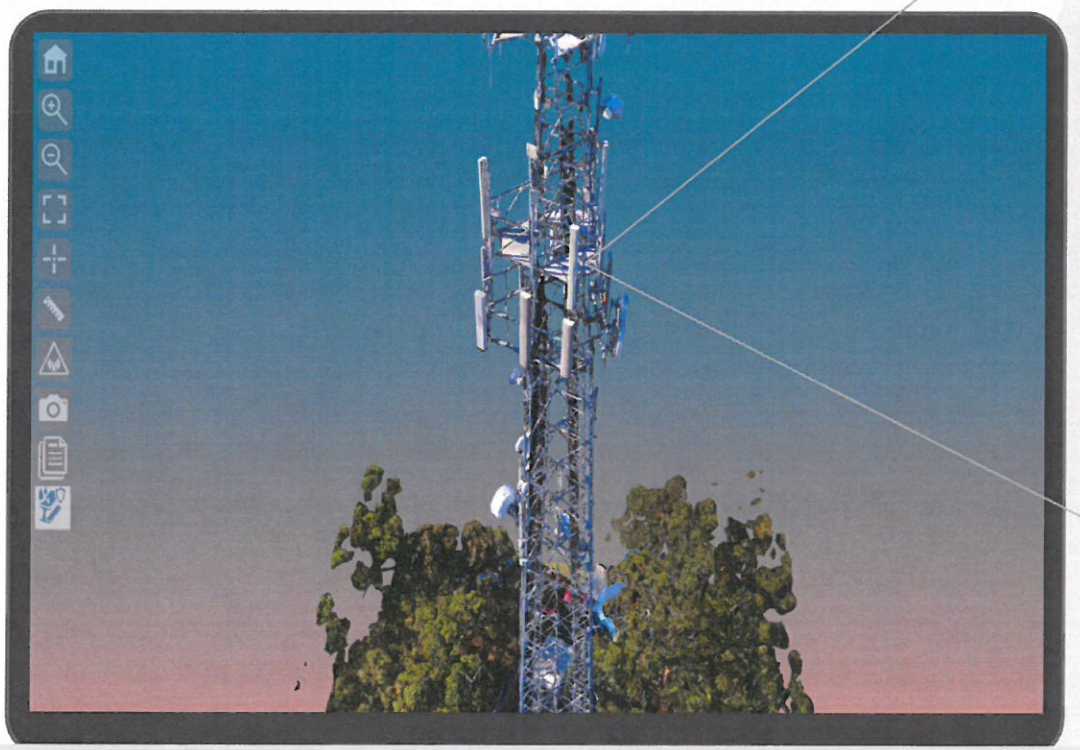
Section 3: Installed Equipment and Geometric Features

				RFNSA	SiteSee		RFNSA	SiteSee	RFNSA	SiteSee
Diagram Ref.	Owner Ref.	Owner	Type/Make/Model	Height (m)	Height (m)	Difference (m)	Bearing (°TN)	Bearing (°TN)	Mech. Tilt (°)	Mech. Tilt (°)
4	A1	TELSTRA	Argus CNPX308.10DRCF Panel	38.21	36.85	**1.36**	50	54.55	0	-0.22
5	A2		Argus RVVPX308.10B2 Panel	38.21	37.88	**0.33**	54	55.30	0	1.14
6	A3		Argus CNPX308.10DRCF Panel	38.21	36.87	**1.34**	176	174.99	0	0.42
7	A4		Argus RVVPX308.10B2 Panel	38.21	37.79	**0.42**	179	170.41	0	0
8	A5		Argus CNPX308.10DRCF Panel	38.21	36.77	**1.44**	292	298.82	0	0
9	A6		Argus RVVPX308.10B2 Panel	38.21	37.89	**0.32**	292	296.35	0	0
10	A13		Argus CPX310R1 Panel	38.37	38.16	**0.21**	54	58.59	0	0
11	A14		Argus CPX310R1 Panel	38.37	38.12	**0.25**	179	183.72	0	0
12	A15		Argus CPX310R1 Panel	38.37	38.16	**0.21**	292	297.64	0	0
22	OA	OPTUS	RFS SBX2-190CB DISH	48.00	46.05	**1.95**	35	35	0	0
23	OB		ANDREW VHLP2-23-CR1 DISH	28.52	27.67	**0.85**	35	35	0	0
24	OC		RFS SUX4-142BZ DISH	27.80	26.89	**0.91**	33	33	0	0
25	OD		ANDREW VHLP4-142 DISH	23.90	24.26	**-0.36**	135	135	0	0
26	OE		RFS SB1-190BB DISH	23.00	23.12	**-0.12**	218	218	0	0
27	OV01	OPTUS/VODAFONE JOINT VENTURE	Kathrein 742 215 Panel	46.90	45.32	**1.58**	110	110	0	0
28	OV02		Kathrein 742 215 Panel	46.90	45.32	**1.58**	200	200	0	0
29	OV03		Kathrein 742 215 Panel	46.90	45.32	**1.58**	330	330	0	0
30	V01	VODAFONE	Kathrein 742 266 Panel	40.84	39.36	**3.11**	35	35	1	1
31	V02		Kathrein 742 266 Panel	40.84	39.57	**1.34**	205	205	1	1
32	V03		Kathrein 742 266 Panel	40.84	50.16	**1.24**	295	295	1	1
34	VB		ANDREW VHLP2-15 DISH	35.07	33.73	**1.34**	36	36	0	0
35	VC		ANDREW VHLP2-15 DISH	33.2	31.96	**1.24**	40	40	0	0
A-1			ANDREW VHLP1-370 DISH		**30.57**					
A-2			Argus MPX312DR-CX Panel		**50.16**					

Auto-Rust Detection

- Automatic rust detection
- Catalogue and track changes
- Click to inspect
- SiteSee generated rust report

Rust Report



Corrosion Report- Kuring Gai tower

Tower details:

Location:
15-23 Beaumont Rd MOUNT KURING-GAI NSW 2080
Latitude: -33.64339 or (-33° 38' 36")
Longitude: 151.13117 or (151° 07' 52")
Elevation: 216.99m

Details of rust spots detected:

The following Table 1 summarizes the potential rust spots on the tower. It also gives details about location of spots on the tower, size of the spots, degree of degradation and the potential risk on a 10 scale.

Rust Spot ID (x, y, z of centroid)			Size (cm^2)	Degree of degradation (on a 5-scale)	Overall Risk (on a 10-scale)
-4654882.124787	2566331.599750	-3513700.104000	50.721	2	7
-4654874.885800	2566328.175240	-3513694.164280	28.878	5	10
-4654872.504725	2566323.218775	-3513690.935275	32.477	2	5

Table 1: Summary of rust spots.

Overall risk metric definition:

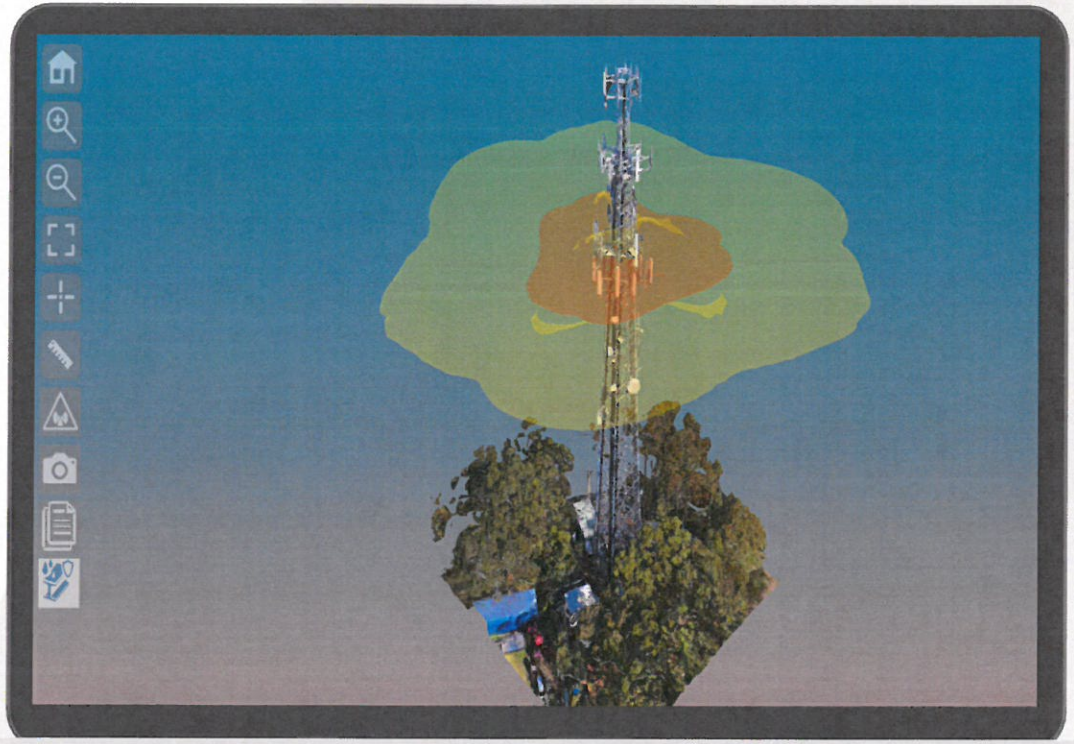
The Overall Risk metric is used to classify the risk posed by each rust spot into one of the three categories namely low, moderate and high risk categories. The metric is calculated based on the size of the spot and degree of degradation of the spot. The different colours represent different classes as defined in Table 2.

Overall risk class	Overall risk metric range	Colour code
High Risk	8-10	RED
Moderate Risk	4-7	YELLOW
Low Risk	1-3	GREEN

Report prepared by:
SiteSee

EME

- 3D Reality captured environment
- Combined with in situ RF Hazard simulation
- Rapid RF compliance checks
- Eliminate errors & improve safety



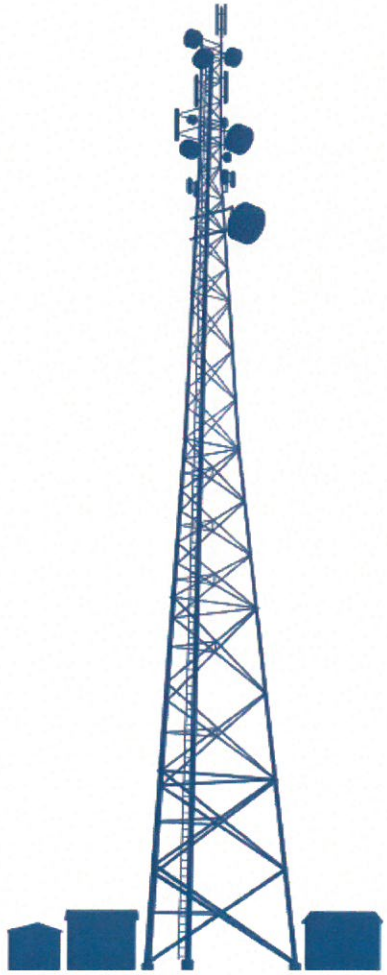
Result

Tower capture, analysis & reporting is

Standardised

Repeatable

Reliable



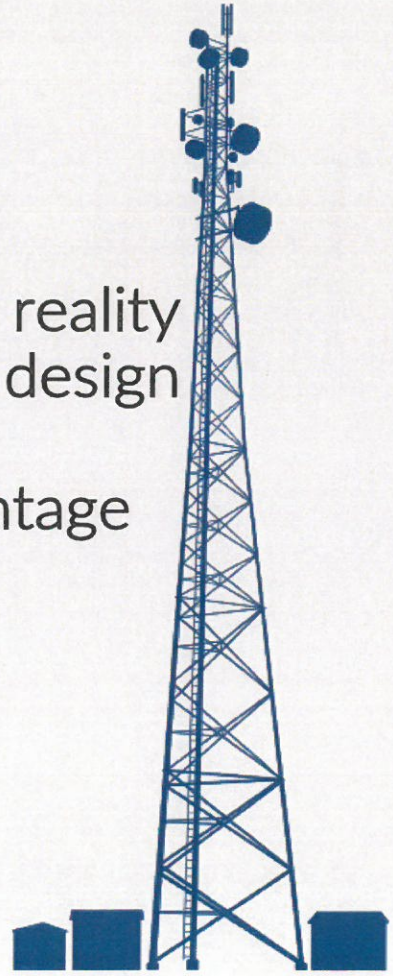
Result

TowerCos

1. Accurate records
2. Maximise tower utilisation
3. More efficient & safe
4. Optimised ROA

Telcos

1. Align records with reality
2. Accurate network design
3. Reduced risk
4. Competitive advantage



The Future

A Digitized Tower Portfolio Enables Network Wide Scenario Analysis

1. 4G to 5G scenario analysis
2. Cost and risk estimates
3. Executive planning reports

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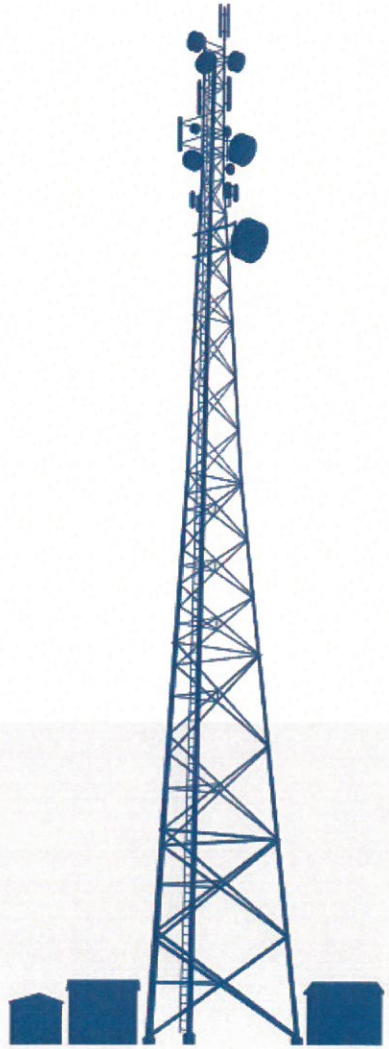

info@sitesee.com.au

@SiteSeeHQ