



INTRODUCTION TO SANRAL WIMe PROJECT

9 July 2026



www.satc.org.za

6 - 9 July 2026

Developing and sustaining transport
systems in an uncertain world.



Michelle van der Walt
SANRAL

RESEARCH TEAM

PROJECT MANAGER

MICHELLE VAN DER WALT
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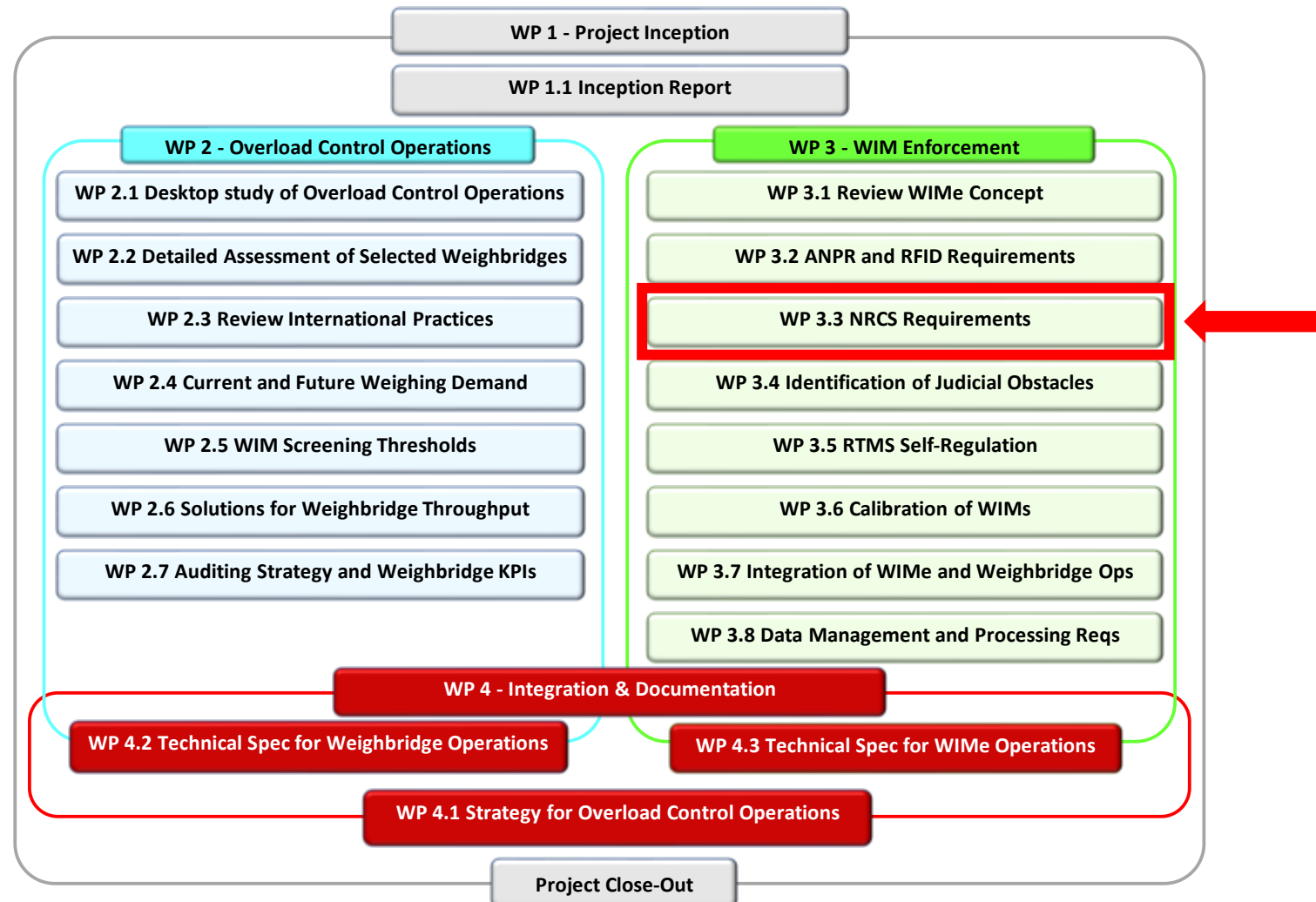
LEAD RESEARCHER

PAUL NORDENGEN
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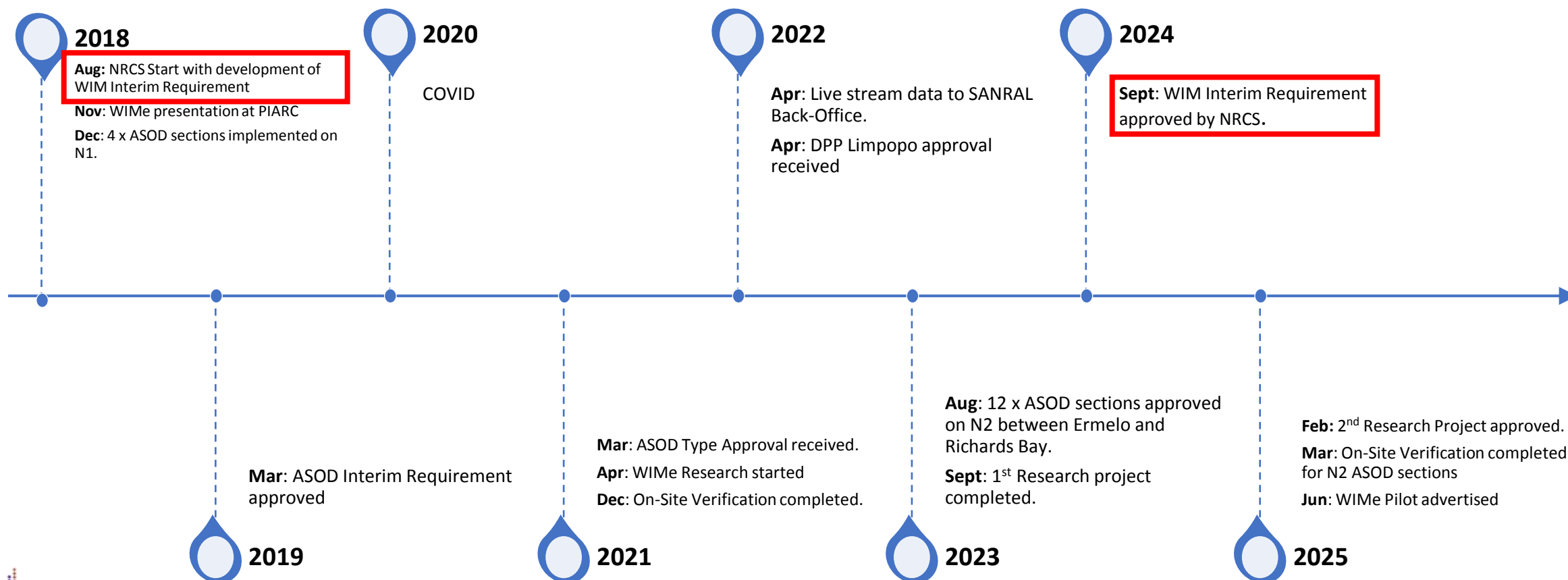
RESEARCHER

GERHARD DE WET
STATIC MOTION

1st RESEARCH PROJECT



ASOD & WIM ENFORCEMENT TIMELINE

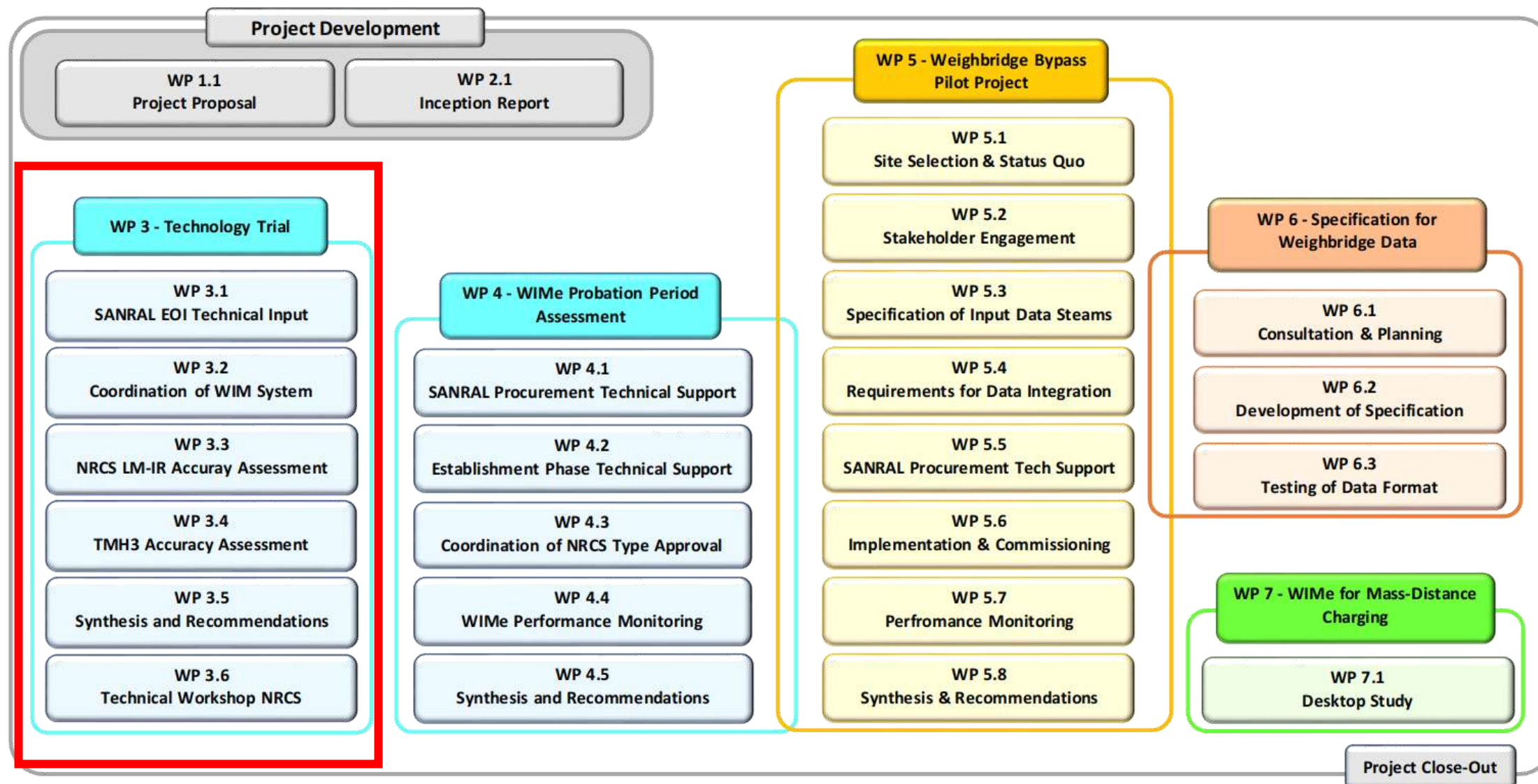


WIM ACCURACY REQUIREMENTS - NRCS

Z 1	2
Table 1	
	maximum permissible error (MPE) rounded to the nearest scale interval
	Type Approval and Verifications
Gross vehicle mass	$\pm 5\%$
Axle group load (T.3.1.11)	$\pm 8\%$
Axle Load (single axle) (T3.1.10) (excl. driving/steering axles)	$\pm 10\%$

2nd RESEARCH PROJECT

Approved
Feb 25



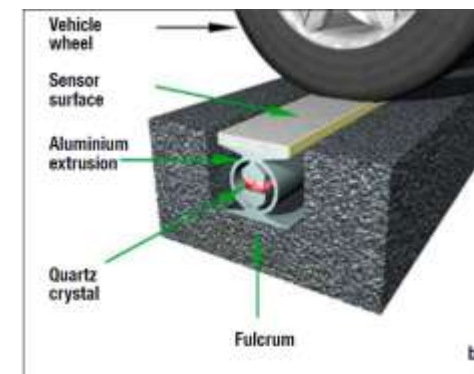
TECHNOLOGY TRIAL PROGRAMME

Activity	Planned	Actual
Advertisement of EOI	30 Jun 2025	30 Jun 2025
Clarification Briefing	7 Jul 2025	7 Jul 2025
Submission of EOI	21 Jul 2025	21 Jul 2025
Evaluation of EOI submissions	4 Aug 2025	4 Aug 2025
Notification of successful participants for Technology Trials	18 Aug 2025	1 Sept 2025
Completion of procurement, installation and commissioning	18 Nov 2025	3 Feb 2026
Initial Verification in terms of NRCS Standard	25 Nov 2025	23 Feb – 1 Mar 2026
Completion of uninterrupted operation for 90 days (data quality management systems testing phase)	18 Feb 2026	1 Mar – 31 May 2026
Conclusion and sharing of trial outcome	27 Feb 2026	Jul 2026

WIME SYSTEM CAPABILITIES

Core/essential capabilities:

- Weigh-in-motion of axles with bar/strip sensors
- Sensor straddling detection
- Single/dual tyre detection
- Vehicle identification using ANPR front and rear
- Self-diagnosing of reliability/usability of vehicle records
- Auditing and general-purpose camera system



WIME SYSTEM CAPABILITIES

Additional/beneficial requirements:

- Traffic monitoring and reporting in terms of TMH3 and TMH14
- Two-way communication with a central data server.
- Tyre pressure detection (vehicle tyre footprint)
- Identification of additional signage
- Over-height detection system

LOCATION: N1 MANTSOLE TRAFFIC CONTROL CENTRE

**74 Km
from
Pretoria**



PARTICIPANTS

NO	PARTICIPANT	WIM SENSOR SUPPLIER	COUNTRY	WIM SENSOR TYPE	ANPR SUPPLIER	ANPR CAMERA
1	Bona Electronic Solutions	Nortech Systems	South Africa	Roadtrax BL piezo	Neology	NeoForce 810mm
2	DVM (Pty) Ltd	Envico	China	CET8312 AQUARTZ	Milesight	TrafficX camera
3	Instatoll	Q-Free	UK	QFQ piezo quartz sensor	Tattile	Vega Smart 2HD ANPR Camera
4	Magna BC & Camea	Camea	Czech Republic	US-PQ.1 Quarts	Camea	UC-D2
5	Mass Measuring Systems	Cross Zlin	Czech Republic China	Envico CET8312-A Quartz	Adaptive Recognition	Vidar Smart HDx
6	Mikros Traffic Monitoring	Intercomp	USA	Intercomp Strain Gauge	MTM-KZN	AM3
7		Kistler	UK	Lineas Digital	MTM-KZN	AM3
8	TMT Services & Supplies	Kistler	UK	Lineas Digital	Tattile	Vega 53
9		Intercomp	USA	Intercomp Strain Gauge	Raven	RavenX
10	Tollink	Quarterhill	Canada	Intercomp Strain Guage	Adaptive Recognition	Vidar Smart 2xFHDx LT

PREPARATION

LOCATIONS MARKED



220V POWER INSTALLED



TRANSFORMER



GUARDRAILS



COMMUNICATION



**PtOps TRAFFIC
ACCOMMODATION**



INSTALLATIONS - SENSORS



INSTALLATIONS - ANPR



VERIFICATION PROCESS VEHICLES

Proposed NRCS Reference Vehicles

- One three/four-axle rigid (leaf or air suspension)
- One four-or more axle articulated (leaf or air suspension);
- One two/three-axle rigid vehicle and a two/three-axle draw-bar trailer.

Used Reference Vehicles

- Rigid 2 axle (1-1)
- Rigid-drawbar (1-2-1-1)
- 6 Axle Articulated (1-2-3)
- 7 Axle Interlink (1-2-2-2)



VERIFICATION PROCESS TEST SCENARIOS



Proposed NRCS Requirement

- Each vehicle shall undertake:
 - Five runs
 - Three runs over the centre of the load receptor (**9 used**)
 - one test run made to the left side of the load receptor (**3 used**)
 - one test run made to the right side of the load receptor (**3 used**)

Three different speeds

- near maximum operating speed (85km/h) (**80km/h used**)
- near minimum operating speed (**50km/h**)
- near the centre of the range of operating speeds (**70km/h**)

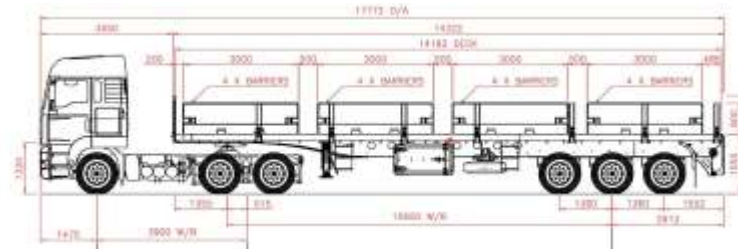
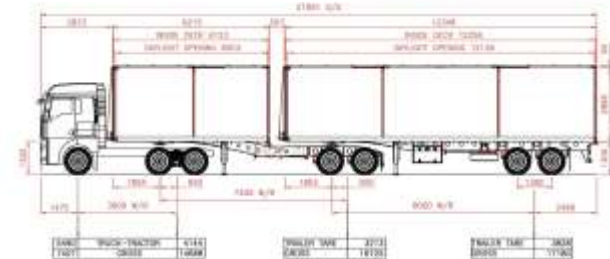
Two load cases

- Unloaded (**half loads were used in verification**)
- Fully loaded

VERIFICATION PROCESS

Preparations

- Hiring of trucks from DP World
- Training drivers
- Clearly marking vehicles
- Loading vehicles
- Briefing Weighbridge personnel
- Weigh-in after refueling
- Weigh-out after each day



VERIFICATION PROCESS REFERENCE LOADS

Two load cases

- Full load
- Half load

Loading

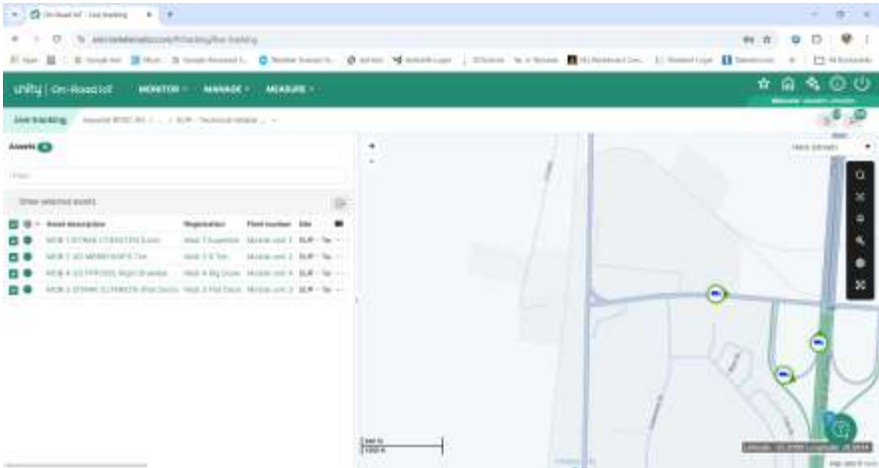
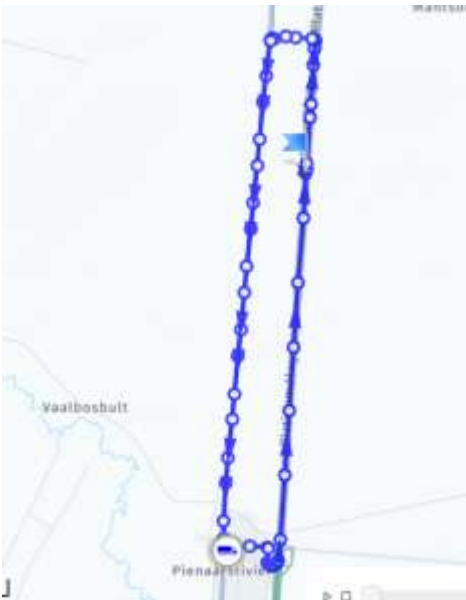
- Gross Vehicle Mass with axle loads
- Weighing axle groups
- Weighing wheel loads
- Adjusting loads where required



VERIFICATION PROCESS

18KM
CIRCLE
ROUTE

±30
MIN



SANRAL-WIME-Accuracy-Certification

Truck-Type: ☐ Rigid ☐ 6-axle-Articulated ☐
☐ Rigid-Drawbar ☐ 7-axle-Interlink ☐
Loading: ☐ Full-Load ☐ Half-Load ☐

Speed	85km/hr			70km/hr			50km/hr		
Positions	Left	Middle	Right	Left	Middle	Right	Left	Middle	Right
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
TOTAL	3	9	3	3	9	3	3	9	3

Date	Time			

VERIFICATION PROCESS DATA ANALYSES

- **ONLY GOOD RECORDS USED**
 - Records were discarded in the following scenarios
 - Straddling detected on any of the sites
 - Significant speed differences over the sites
- F17 files obtained on daily basis from TCC Manager
- Data was loaded and evaluated in Excel
- Reference loads interpolated between refuelling and load change to accounts for fuel usage.
- Participants submitted files on a daily basis
- Feedback to participants

VERIFICATION CHALLENGES

- Hiring of good quality trucks with good suspensions
- Nine different file formats
- Driver training
 - Maintaining speeds
 - Lane discipline
- Truck and driver logistics
 - Refueling
 - Accommodation
 - Food
- Long procurement lead times on equipment
- Equipment stuck at customs
- Competent sensor installers
- Unstable electricity
- Incidents
- Illustrating complexity of verification process to NRCS



VERIFICATION CHALLENGES

- High rainfall during December 2025
- Embargo period – 15 December 2025 – 12 January 2026
- Flexible pavements –changing levels of deflections within the 500m pilot section
- Premature sensor failure due to no maintenance
- Implementing complicated calibration procedures from system suppliers



ANPR ACCURACY TEST

- **TEST = 13 MAY 2026 08:00 – 16:00**
- **REPORT SUBMITTED ON 30 MAY 2026**
- A minimum two-hour long continuous video containing at least **2000** vehicles for every front and back view camera will be utilized to audit the ANPRS Point. The audit shall analyse and account for every vehicle in the live video.

	DESCRIPTION	ACCURACY
1	Trigger rate for front cameras and rear cameras (for speeds greater than 0 up to 160km/h)	95.0%
2	Capture rate for front cameras and rear cameras (for speeds greater than 0 up to 160km/h)	92.5%
3	Correct read rate for front cameras and rear cameras (for speeds greater than 0 up to 160km/h)	90.0%

ANPR ACCURACY TEST CHALLENGES

- High percentage of straddling vehicles
- Only slow lane instrumented
- Different file formats
- ??

WIMe DASHBOARD

WIMe dashboard

Station Verification Report

Global Verification Report

Station Axis Group Verification

Search

DuckDB file

F:\SANRAL\WIMe\Database*

Start date

2026/05/04

End date

2026/05/06

Number plate

HL82KBGP

Grouping / match window (seconds)

900

Search



QUBYTIX

Intelligent Software & Analytics

Proof of concept by Qubytix

Version v0.9.7

Deploy

WIMe Vehicle Passage Dashboard

Search a number plate across a date range, group the same vehicle across stations, and compare station weights against weighbridge data when available.

Rows in range

121,513

Plate matches

8

Grouped passages

1

Complete 9-station passages

0

Grouped passages

Passage	Date	Plate	Start	End	Duration (s)	Stations Found	Complete	Lane(s)	BONA	BONA Δs	Indatall	Indatall Δs	Magna	Magna Δs	Masskot	Masskot Δs	MTM Intercomp	MTM Intercomp Δs	MTM
P001	2026-05-05	HL82KBGP	2026-05-05 14:51:07	2026-05-05 15:06:07	900	8	☒	1, 2, LN1, PN-PL-W1	14:51:07	0	None	None	14:51:17	9.5	14:51:19	11.9	14:51:23	16.2	14:5

Raw matched observations

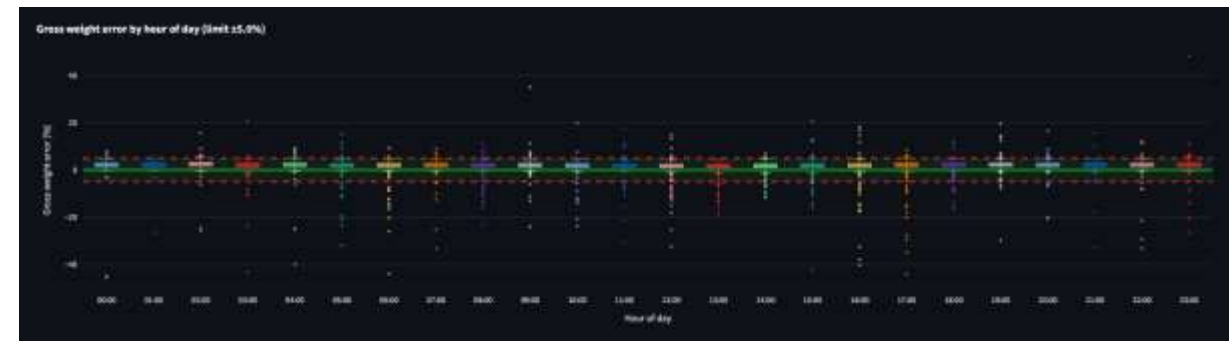
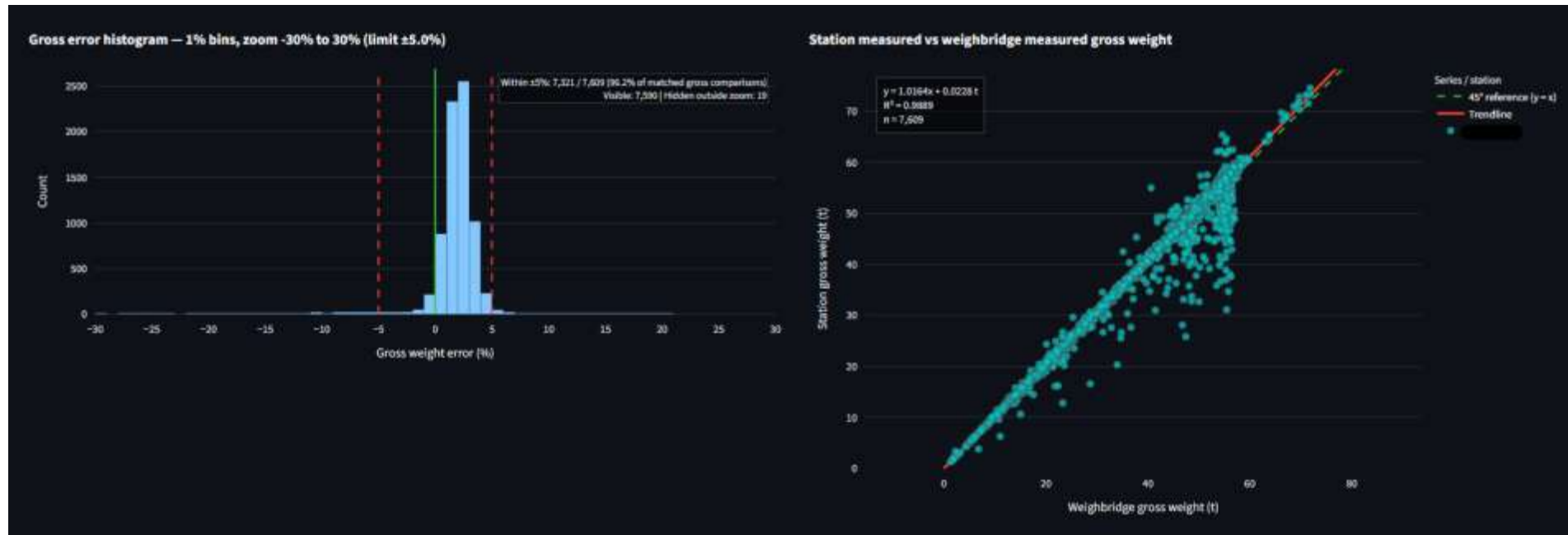
event_date_text	station_display	event_time_text	lane	front_plate	rear_plate	plate_side	speed_kmh	vehicle_class	axles	gross_weight_kg	source_system	source_filename	observation_id
2026-05-05	BONA	14:51:07	2	HL82KBGP	HR72FRGP	Front	75	16.0	7	52279	BONA	WIM01-20260510.csv	352595
2026-05-05	Magna	14:51:17	PN-PL-W1	HL82KBGP	HR72FRGP	Front	75	TMH1408	7	54356	Magna	WIM04-20260510.xlsx	1608912
2026-05-05	Masskot	14:51:19	LN1	HL82KBGP	HR72FRGP	Front	74	13.0	7	54219	Masskot	WIM05-20260510.xlsx	2179626
2026-05-05	MTM Intercomp	14:51:23	1	HL82KBGP	HR72FRGP	Front	75	2-16-4	7	54001	MTM Intercomp	WIM6-20260510.RSV	2776618
2026-05-05	Tollink	14:51:24	1	HL82KBGP	HR72FRGP	Front	75	28-17-04	7	51362	Tollink	WIM10-20260505.RSV	4626453
2026-05-05	MTM Kistler	14:51:24	1	HL82KBGP	HR72FRGP	Front	74	2-16-4	7	53057	MTM Kistler	WIM7-20260510.RSV	3239754
2026-05-05	TMT Kistler	14:51:25	1	HL82KBGP	None	Front	75	C12	7	53809	TMT Kistler	WIM16-20260505.csv	3709958
2026-05-05	TMT Intercomp	14:51:26	1	HL82KBGP	None	Front	74.55	C12	7	54540.87	TMT Intercomp	WIM09-20260505.csv	4164504

Passage detail

Select a passage

P001 | 2026-05-05 14:51:07 - 15:06:07

STATION VERIFICATION REPORT



WAY FORWARD?

- Final evaluation and pre-qualification for national WIMe tender
- Presenting results to NRCS and make recommendations
- Finalise locations of WIMe stations
- Prepare 100m asphalt inlays at locations
- Formalising new TMH14 WIM data format
- Formalising new TMH3 specification document to include enforcement.
- Finalise tender documents
- Advertise tenders
- Multiple awards to spread risk



Acknowledgements

Research Team

Participants

Qubytix

Bakwena

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Belanet

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Operations

Zimele subcontractors