Southern African Transport Conference 2025

International Workshop on Weigh-In-Motion
for Direct Weight Enforcement

Introduction to the WIMe Project

SANRAL SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD Reg.No.1998/009584/30

ISWIM

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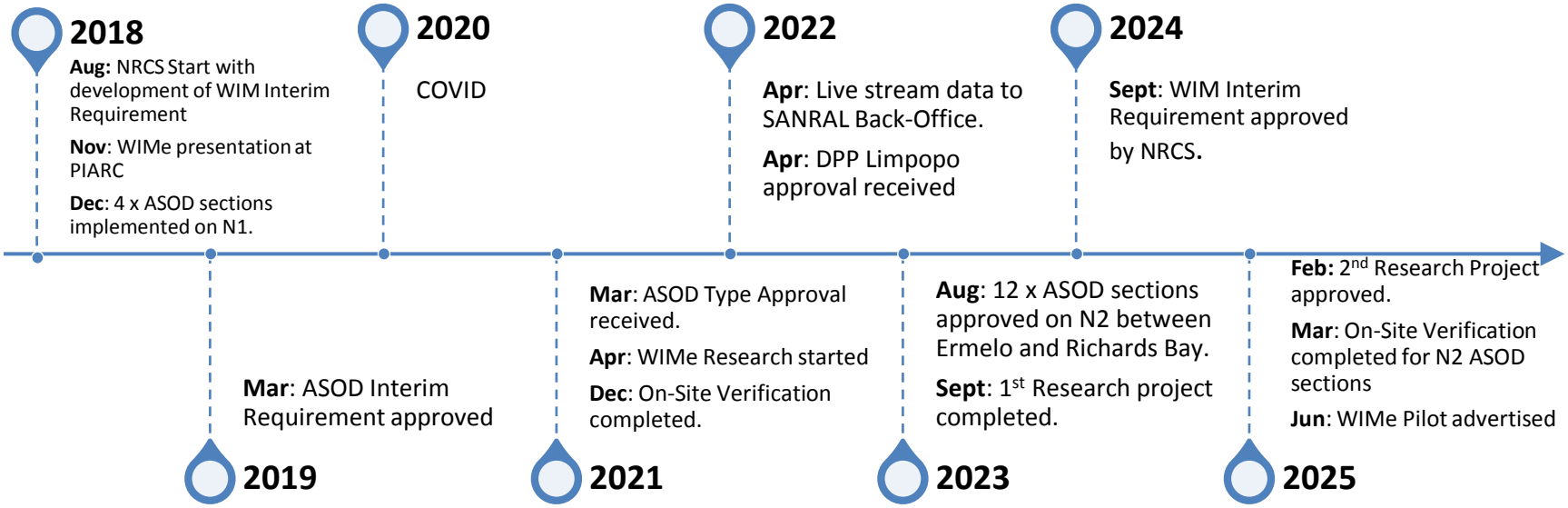
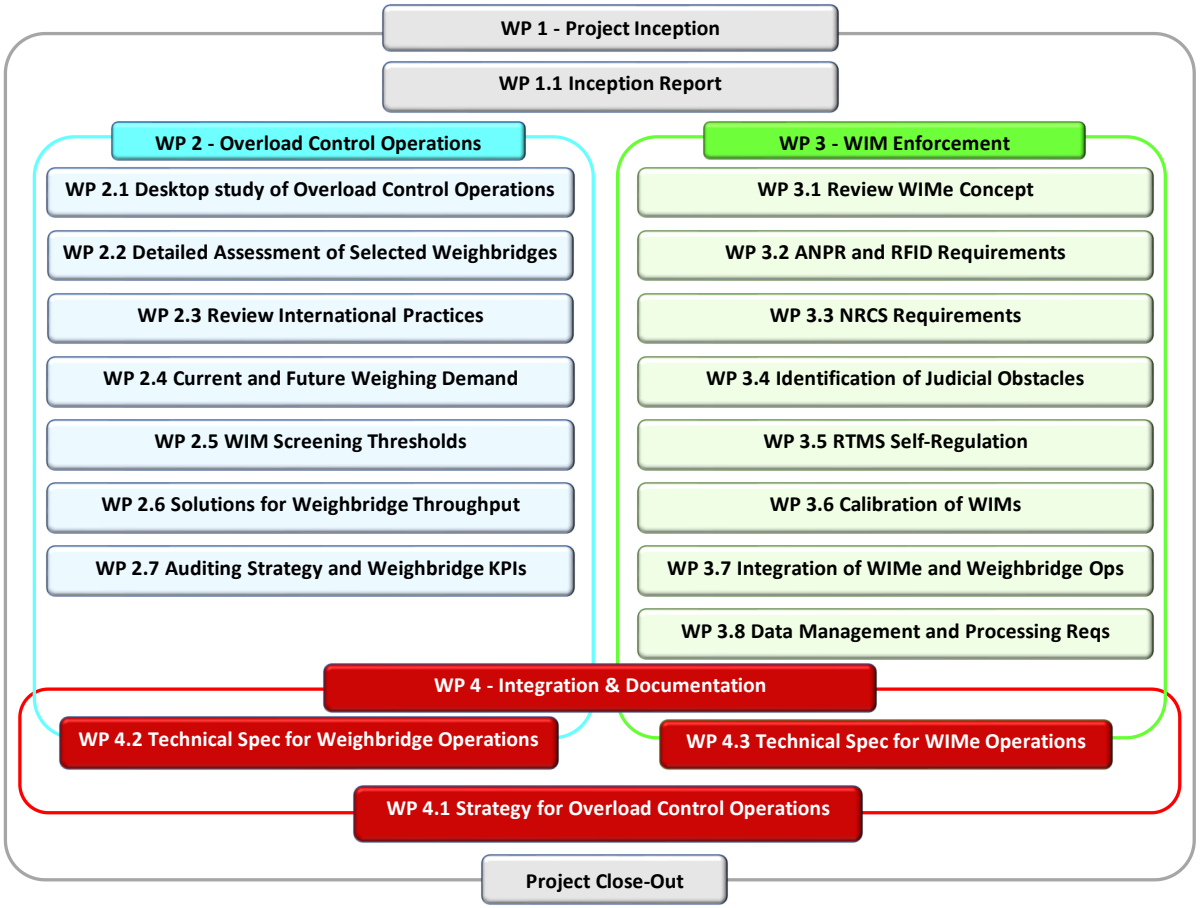
Introduction - Background

- Intelligent, integrated monitoring network by integrating High Speed Weigh-in-Motion traffic monitoring (HSWIM) systems with Automatic Number Plate Recognition (ANPR) devices
- HSWIM on all access roads around identified major cities
- ANPR gantries placed at intervals of 100km
- Integrated system at all border posts
- SANRAL network = 169 WIM Enforcement (WIMe) systems
- ANPR only systems = 117
- Average Speed Over Distance and weight enforcement
- Possible extension to provincial road network

ASOD & WIM Enforcement Timeline

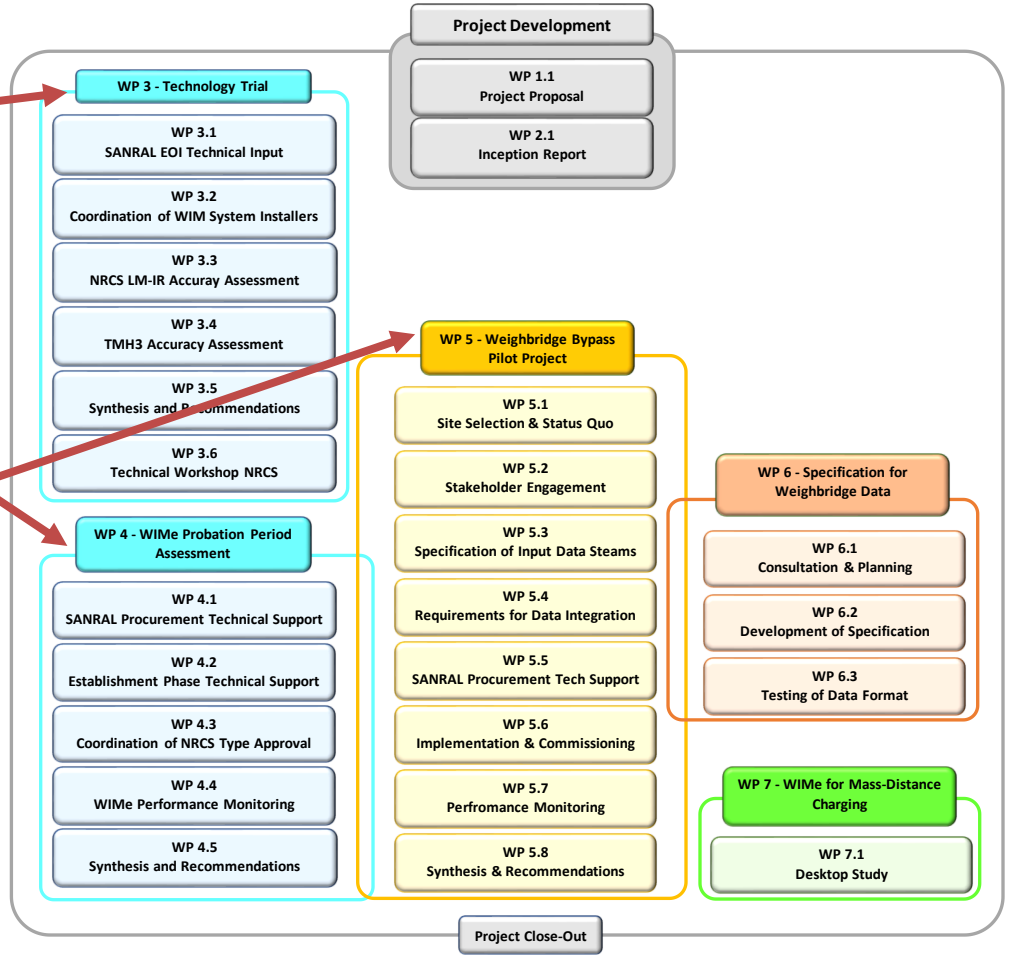


1st Research Project



2nd Research Project

- **Phase 1** = Technology Trial
- **Phase 2** = WIMe Tender & Implementation
- **Phase 3** = Weighbridge Bypass Pilot Project



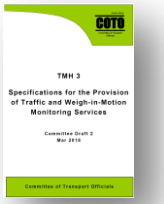
Technology Trial Programme

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

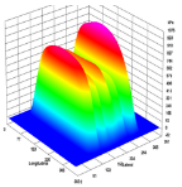
Estimated WIMe Programme

Advertisement of Tender	Jun 2026
Tender Period	4 weeks
Closing	Jul 2026
Evaluation of Tenders	2 months
Appointment of Service Providers	Sept 2026
9 Month Probation Period	Jun 2027
Installation of limited number of systems	6 Months
Contract Period	6 Years
Appointments	Multiple

WIMe System Capabilities



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



Enforcement Certification Requirements

- **Heigh Speed Weigh-in-Motion (HSWIM) Enforcement**
  - Normative Reference for Legal Metrology requirements for WIM used for TLE (LM-059-09-24)
  - Interim Requirement for WIM used for Traffic Law Enforcement (LM-IR-TLE)
- **Average Speed Over Distance (ASOD) Enforcement**
  - Normative Reference for Legal Metrology requirements for Long, Fixed-Distance Speed Meter (LM-P-038-03-19)
  - Interim Requirement for Traffic Law Enforcement for Long, Fixed-Distance Speed Meter (LM-RTLE-LFDSM)

NRCS national regulator for compulsory specifications

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	± 5%
Axle group load (T.3.1.11)	± 8%
Axle Load (single axle) (T3.1.10) (excl. driving/steering axles)	± 10%

Traffic Monitoring Accuracy Requirements – TMH 3

Table 3 Tolerance limits for invalid detection

Characteristics	Travel	Tolerance limits for various traffic monitoring types									
		A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
Vehicle detection											
Vehicle detection	Normal travel	0.5%	1%	0.5%	1%	1%	5%	5%	10%	1%	5%
	Straddling vehicles	5.0%	10%	5.0%	10%	10%	20%	20%	35%	20%	35%
	Wrong dir/reversing	0.5%	1%	0.5%	1%	1%	5%	5%	10%	1%	5%
Trailer, axle, wheel and tyre detection											
Trailer detection	Normal travel	1.0%	2%	1.0%	2%	-	-	-	-	-	-
Axle detection	Normal travel	0.5%	1%	0.5%	1%	-	-	-	-	1%	5%
Wheel detection	Normal travel	2.5%	5%	-	-	-	-	-	-	-	-
Single/dual tyre	Normal travel	0.5%	1%	-	-	-	-	-	-	-	-
Wrong number of axles per vehicle											
Light vehicles	Normal travel	0.5%	1%	0.5%	1%	-	-	-	-	1%	5%
Heavy vehicles	Normal travel	0.5%	1%	0.5%	1%	-	-	-	-	5%	20%

Traffic Monitoring Accuracy Requirements - TMH 3

Table 4 Tolerance limits for vehicle categorization

Vehicle category (class)	Tolerance limits for various traffic monitoring types									
	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
Vehicles not categorised, or which were wrongly categorised by the monitoring system	2.0%	3.5%	3.5%	7.0%	10%	15%	-	-	10%	15%
Vehicles that should have been categorised as light but which were not categorized or categorized as heavy	1.0%	2.0%	2.0%	4.0%	6.0%	10%	-	-	6.0%	10%
Vehicles that should have been categorized as heavy but which were not categorized or categorized as light	3.0%	6.0%	6.0%	12%	20%	30%	-	-	20%	30%
Heavy vehicles wrongly categorized into one of the heavy vehicle subclasses (excluding buses)	4.0%	8.0%	8.0%	15%	-	-	-	-	-	-

Traffic Monitoring Accuracy Requirements - TMH 3

Table 5 Tolerance intervals for vehicle speed, length and axle spacing

Characteristics	Range of reference values	Vehicle types (*)	Tolerance limits for various monitoring types			
			A1,A2,B1,B2,C1	C2	D1/D2	E1/E2
Vehicle speed	> 30 km/h	Light & Heavy	±5%	±10%	-	±10%
Vehicle length	3.0 to 5.0 m	Light only	±15%	±30%	-	-
	> 5.0 m	Light & Heavy	±10%	±20%	-	-
Axle spacing	1.0 m to 3.0 m	Light & Heavy	±10%	-	-	-
	> 3.0 m	Light & Heavy	±5%	-	-	-
(*) Excluding motorcycles, bicycles and animal drawn vehicles						

ANPR Accuracy Requirements Front and Rear Number Plates

	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%

Questions

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