

DOSER: A 360° Integrated Digital Ecosystem for Road Crash Data Management and Evidence-Based Policies in Cameroon

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Background

Road traffic injuries represent a major public health and development challenge in Africa, particularly in low- and middle-income countries where institutional capacity and information systems remain limited. In Cameroon, official statistics report more than 1,500 road deaths per year, but the actual figures are likely significantly higher due to fragmented, largely paper-based data collection systems.

Crash-related data are dispersed across multiple institutions Police, Gendarmerie, hospitals, and insurance companies with no interoperability or consolidation mechanisms. This fragmentation results in widespread underreporting, a lack of granular information on crash causes and circumstances, and an inability to consistently track victims from the crash scene through medical and legal outcomes.

In the absence of reliable, timely, and comprehensive data, public authorities struggle to identify high-risk locations, prioritize investments, evaluate interventions, and design evidence-based road safety policies. Strengthening road safety data systems therefore represents a critical prerequisite for transitioning from a reactive approach to a proactive and preventive road safety governance model, in line with the principles of the Safe System and the objectives of the UN Decade of Action for Road Safety.

Aim

The objective of DOSER is to design and deploy an integrated, multisource digital road safety data system capable of significantly improving the quality, completeness, and timeliness of crash data, while supporting:

- advanced data analysis,
- evidence-based decision-making,
- and the development of more effective and measurable public policies.

Method

DOSER is built on a multi-layered technological approach, integrated within the DITROS ecosystem, to bridge the gap between crash occurrence, operational response, and policy decision-making.

1. Standardized Field Data Collection

The project deploys the DOSER Data Capture mobile application to first responders (Police and Gendarmerie). This tool enables standardized, GPS-referenced crash data entry, including multimedia evidence, digital sketches, and harmonized reporting forms. It operates in offline mode with automatic synchronization, ensuring continuity of data collection even in low-connectivity areas.

2. AI-Driven Crowdsourcing – VAAR Module

To address structural underreporting, the VAAR module (Vigilance and Alert on Road Accidents) leverages artificial intelligence to analyze social media platforms and public data streams in real time. Using natural language processing and computer vision (YOLOv5), the system detects, deduplicates, and standardizes crash reports, generating early alerts for emergency services sometimes even before official reports are filed.

3. Cross-Sectoral Integration and 360° Monitoring

A centralized web portal ensures interoperability among law enforcement agencies, health services (injury tracking and death certification), insurance companies (claims data), and transport authorities. This integration provides a continuous 360° view of each crash, from the point of impact to hospital care and subsequent administrative and legal processes.

4. Advanced Analytics and GIS Mapping

DOSER integrates Business Intelligence dashboards and Geographic Information Systems (GIS) to identify crash clusters, high-risk locations (“black spots”), and temporal trends. These tools support predictive modelling of high-risk areas and periods, directly informing engineering, enforcement, and prevention strategies.

Results

The implementation of DOSER generates several structural impacts:

- a drastic reduction in data fragmentation, leading to more accurate estimates of road mortality and morbidity;
- faster emergency response times enabled by real-time alerts from the VAAR module;
- objective identification of black spots, with precise geographic coordinates for the majority of reported crashes;
- optimization of public policies through a three-tier governance model: reactive, proactive, and predictive;
- enhanced transparency and innovation, supported by an Open Data portal providing access to non-sensitive road safety data.

Conclusion

DOSER demonstrates that digital integration is a central lever of modern road safety governance. By combining digitalization, artificial intelligence, and institutional interconnection, the platform delivers the 360° visibility required for effective, evidence-based decision-making.

Designed to address the specific constraints of the African context, DOSER constitutes a scalable and replicable model, capable of supporting other countries in modernizing their road safety data systems and contributing to the global objective of reducing road traffic deaths by 50% by 2030.