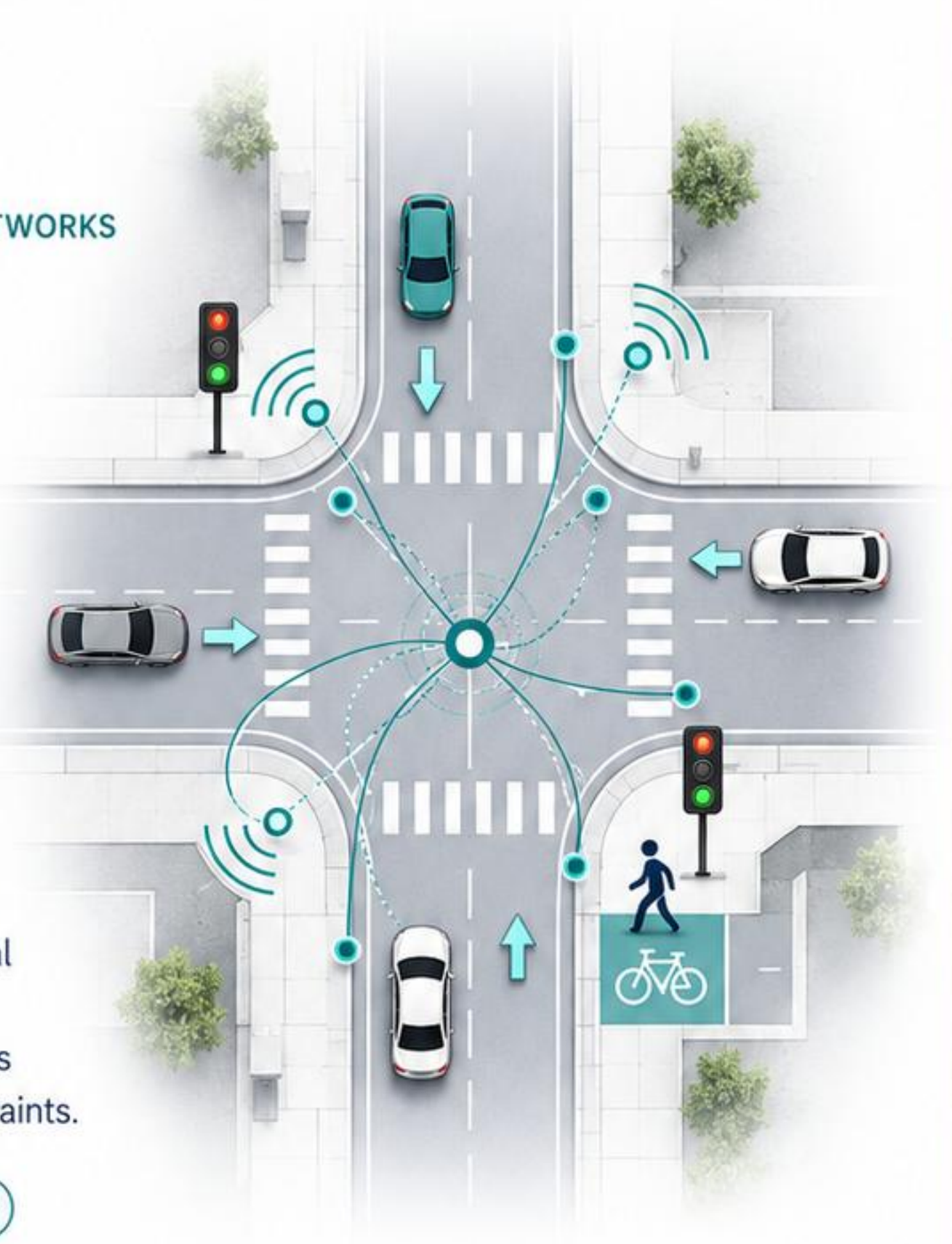
SIPD-M

CORE v1.0.2

COORDINATED INTELLIGENCE FOR SIGNALISED NETWORKS

Validate before deployment. Measure before scaling.



SIPD-M is a developing traffic-network intelligence system designed to observe demand, interpret local conditions, assess short-term opportunities and coordinate decisions across signalised intersections while treating safety and uncertainty as hard constraints.

SHADOW_ONLY | NO_REAL_WORLD_CONTROL

OBSERVE

Use available traffic, signal and geometry data to reconstruct current conditions and demand.

COMPARE

Build a documented baseline and compare it with SIPD-M outputs using common operational KPIs.

DECIDE

Produce evidence for a municipal decision on whether a next validation phase is justified.

A low-risk first step for cities

Start with 3–5 intersections or one short corridor, ideally using existing infrastructure and available data. Typical initial duration: 30–60 days. The first phase does not modify real signal control.

01 · WHY NETWORK AWARENESS MATTERS

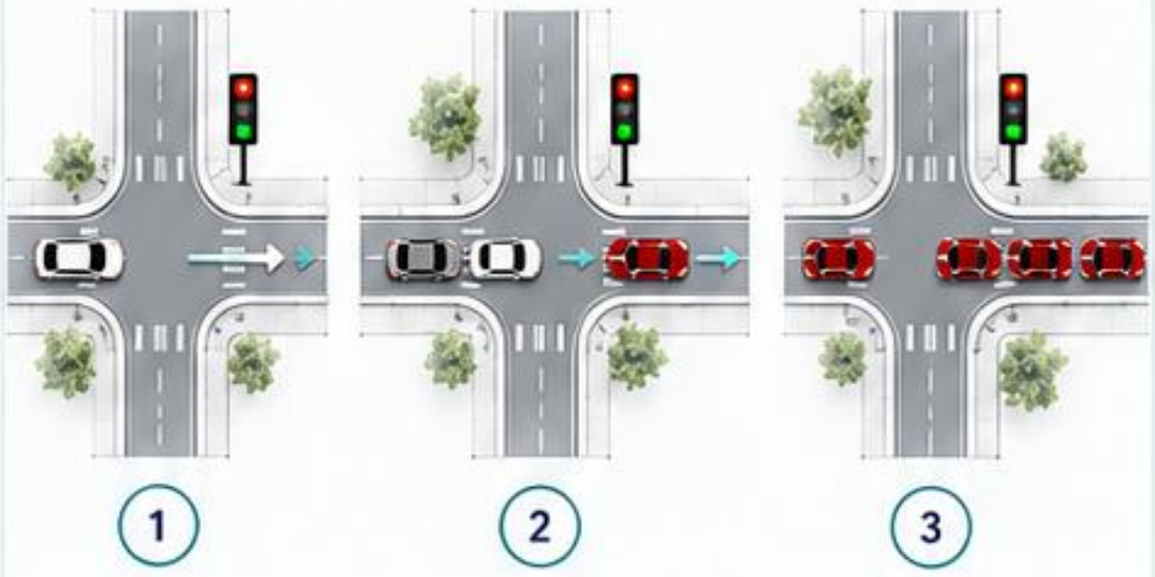
A local gain can simply shift congestion to the next node.

Improving one junction in isolation does not necessarily improve mobility. If the next segment cannot absorb the released demand, the problem changes location, grows and eventually affects a wider corridor.

Isolated management

THE PROBLEM PROPAGATES

Each junction clears its own queue without considering the receiving capacity that remains available downstream.

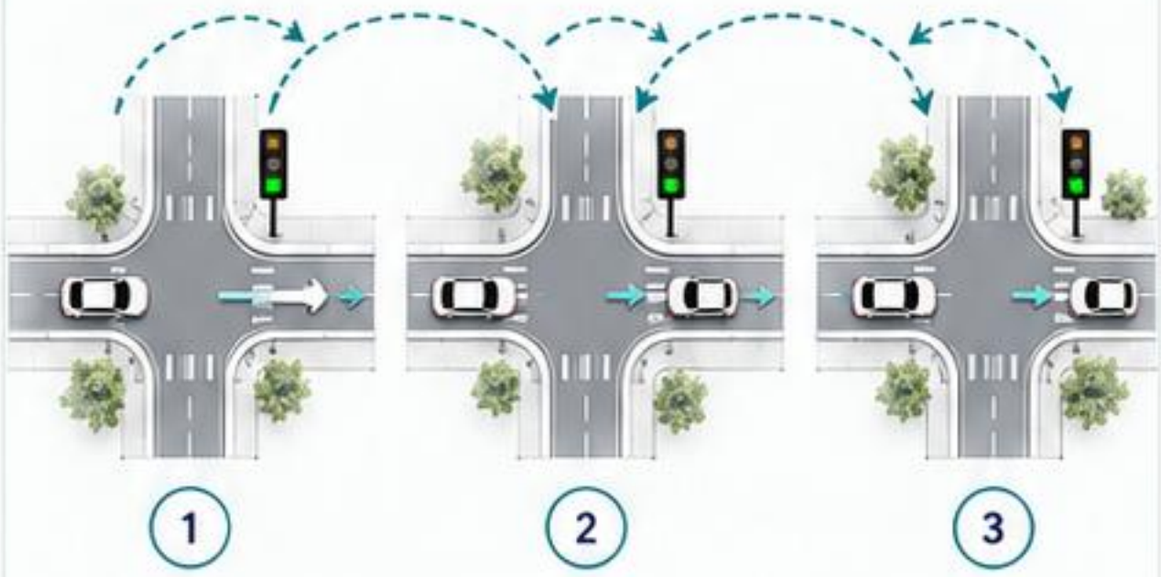


VS

Network-aware SIPD-M

THE CORRIDOR STAYS BALANCED

Each decision considers the next segment. Demand is released according to network capacity, not only the needs of the immediate junction.



It is not about clearing one junction.
It is about protecting network capacity.

SIPD-M coordinates local decisions so that one improvement contributes to the wider corridor rather than creating downstream overload.

02 · VALIDATION PATH

One corridor. Common metrics. A reproducible decision.

1 **SCOPE**
Select area, goals and available data.

2 **BASELINE**
Reconstruct demand, network and reference operation.

3 **SHADOW**
Observe and evaluate without real-world actuation.

4 **COMPARE**
Assess operational and safety-related indicators.

5 **REPORT**
Deliver technical and executive conclusions with next-phase options.

03 · CORE KPIS

FLOW & DELAY
Served demand, waiting time, progression and unnecessary stops.

QUEUES & SPILLBACK
Queue length, persistence, propagation and downstream receiving capacity.

NETWORK EFFECTS
Whether a local gain improves the corridor rather than shifting the problem elsewhere.

MULTIMODAL
Pedestrians, public transport and other modes when suitable data are available.

SURROGATE SAFETY
TTC/PET or similar indicators only when data quality and granularity support them.

UNCERTAINTY
No opportunity is treated as clear when arrivals or downstream conditions create uncertainity.



SIPD-M begins with the immediate situation of one intersection and progressively expands its view to coordinate related nodes, corridors and, over time, wider network structures.



Anticipate congestion before it propagates through the network.

04 · WHAT THE CITY PROVIDES / WHAT SIPD-M DELIVERS

Designed to fit existing city capacity.

CITY / TEST ENVIRONMENT

- Designated technical counterpart.
- Selection of pilot area or short corridor.
- Available traffic, detection or count data.
- Signal plans, phasing and geometry when available.
- Context: public transport, pedestrians, restrictions and events.

SIPD-M TEAM

- Baseline reconstruction and consistency checks.
- Shadow analysis and scenario evaluation.
- Queue, delay and network propagation analysis.
- Documented limitations and sensitivity notes.
- Technical report plus executive decision brief.

05 · CURRENT STATUS

INDUSTRIAL PROPERTY	Spanish patent application OEPM P202630825 · filed 09/06/2026.
TECHNICAL DEVELOPMENT	Advanced simulation and audit campaigns; progressive transition toward real-world validation.
PILOT SAFETY	Initial municipal validation proposed under SHADOW_ONLY / NO_REAL_WORLD_CONTROL.
ECOSYSTEM	Project supported through StartTIC / Zona Franca de Vigo innovation ecosystem.

Next step: select one representative urban environment.

We propose a short technical conversation to identify a suitable corridor, available data and the most appropriate municipal validation framework.

Alejandro Cacharrón Pacheco · SIPD-M project · Vigo, Spain · sctsolutionscontacto@gmail.com