

Telemetry Source Map

The Telemetry Source Map is the authoritative inventory of every sensor, device, API, log, stream, and external feed that a sensor-fusion pipeline is permitted to ingest. Nothing enters the normalization layer or fusion logic that is not registered here first. Each row classifies the source by its latency class, reliability grade, emission frequency, and confidence_band (reusing the C4 enum from s3-source-inventory-template), enabling downstream artifacts — e5-normalization-layer, e5-alert-design-spec, and e5-sensor-ops-package — to make trust-aware decisions without re-examining the raw source each time. A source that appears in telemetry but has no row in this map is a provenance violation and must be quarantined, not silently passed through.

Register Schema

Field	Type	Required	Notes						
source_id	string (kebab-case)	yes	Stable across versions; never renumbered.						
name	string	yes	Human-readable label.						
source_type	enum	yes	sensor \	api \	log \	device \	stream \	feed	
owner	string	yes	Role or system accountable for the source.						
protocol	string	yes	Transport/API: MQTT, HTTP-REST, ModBus, CSV-push, webhook, etc.						
emission_frequency	string	yes	realtime \	sub-minute \	minutely \	hourly \	daily \	event-driven \	static
latency_class	enum	yes	streaming (<5 s) \	near-realtime (5 s–2 min) \	batched (>2 min)				
reliability_grade	enum	yes	A (≥99.5% uptime, documented SLA) \	B (90–99.5%, informal) \	C (<90% or undocumented)				

Field	Type	Required	Notes						
authoritative	bool	yes	True only if this is the system-of-record for its measurement type.						
last_validated	date (ISO 8601)	yes	Last confirmed fit-for-purpose by owner.						
permissions	string	yes	public \	internal \	restricted \	regulated			
confidence_band	enum	yes	high \	medium \	low \	unknown — reuses C4 enum.			
band_rationale	string	yes	One sentence per C4 contract justifying the assigned band.						

Optional fields: pii_flag, jurisdiction, cost_per_call, rate_limit, change_log_url, calibration_due, known_outage_pattern.

Operating Rules

1. Register before ingest. A new telemetry source gets a row in this map before its first datum enters the normalization layer.
2. Stale validation demotes band. If last_validated is older than two times the emission_frequency window (e.g., a daily source not validated in 48+ hours), the confidence_band is automatically treated one notch lower by the fusion logic until re-validated.
3. Reliability-grade C sources are never used as the sole input for a critical or high severity alert. They may participate as a corroborating signal.
4. authoritative: true is exclusive per measurement type. Two authoritative sources for the same measurement is a governance defect — resolve before production.
5. Deprecation is a row update (add status: deprecated, date, reason), never a deletion. Fusion and alert records reference historical source_ids.

6. Quarterly attestation: owners re-confirm last_validated, and any source not re-attested is downgraded to confidence_band: unknown until cleared.

Worked Example — EcoGuardian 30A Coastal Stormwater Network (illustrative)

The following register covers a representative sensor network monitoring the stormwater drainage corridor behind the South Walton beachfront communities, including the Point Preserve parcel at 725 J D Miller Road. Values are illustrative; an actual deployment would populate calibration dates, rate limits, and jurisdiction references from verified field data.

source_id	name	source_type	owner	protocol	emission_frequency	latency_class	reliability_grade	authoritative	last_validated	permissions	confidence_band	band_rationale
sw-water-level-j1	Stormwater pond level sensor — J District node 1	sensor	EcoGuardian. AI ops	MQTT/TLS	sub-minute	streaming	B	true	2026-05-27	internal	medium	Authoritative for pond-level measurement at this node; downgraded from high because calibration cycle is pending (last calibration >90 days).

source_id	name	source_type	owner	protocol	emission_frequency	latency_class	reliability_grade	authoritative	last_validated	permissions	confidence_band	band_rationale
sw-rain-gauge-nwfl-01	NWFL rain gauge network node 01 (Walt on Co.)	feed	FDEP / NWS upstream	HTTP-REST	minutely	near-realtime	A	true	2026-05-20	public	high	Published, SLA-backed NWS cooperative network feed; independently validated by FDEP; authoritative for rainfall accumulation at 1-mile resolution.
sw-tide-noaa-destin	NOAA tide gauge — Destin station 8729108	api	NOAA CO-OPS	HTTP-REST	sub-minute	streaming	A	true	2026-05-25	public	high	NOAA CO-OPS is the federal system-of-record for tidal measurements; sub-minute polling available; well-documented outage history and SLA.

source_id	name	source_type	owner	protocol	emission_frequency	latency_class	reliability_grade	authoritative	last_validated	permissions	confidence_band	band_rationale
sw-soil-moisture-j2	Soil moisture array — J District parcel cluster 2	device	EcoGuardian. AI ops	ModBus/TC P	minutely	near-realtime	B	true	2026-05-15	internal	medium	Authoritative for parcel-level moisture but validated 14 days ago; seasonal soil drift means calibration should have been refreshed; pending.
sw-weather-stn-pp	Point Preserve weather station (Davis Envoy8X)	device	STR Ops / Point Preserve	HTTP-push	minutely	near-realtime	B	false	2026-05-29	internal	medium	Local supplementary station; not authoritative (does not replace NWS gauge) but useful for parcel-resolution delta against network average.

source_id	name	source_type	owner	protocol	emission_frequency	latency_class	reliability_grade	authoritative	last_validated	permissions	confidence_band	band_rationale
sw-flow-culvert-c4	Culvert flow sensor — Drainage Culvert C4	sensor	District Infrastructure	MQTT/TLS	sub-minute	streaming	C	true	2026-04-10	internal	low	Authoritative measurement type but reliability grade C due to documented clogging events and a 49-day validation gap; must be corroborated before use in critical alerts.
sw-tide-backup-ofs	NOAA Operational Forecast System surge model	api	NOAA OFS	HTTP-REST	hourly	batched	A	false	2026-05-22	public	medium	High-quality forecast model but inherently predictive rather than observed; medium band appropriate for planning triggers, not real-time action.

source_id	name	source_type	owner	protocol	emission_frequency	latency_class	reliability_grade	authoritative	last_validated	permissions	confidence_band	band_rationale
sw-satellite-ndwi	Sentinel-2 NDWI flood proxy (30A corridor)	feed	Copernicus / EU satellite	event-driven	event-driven	batched	B	false	2026-05-10	public	low	Useful for post-event ground-truth but 3–5 day revisit latency means it cannot drive real-time alerts; low band for operational fusion use.

Why these confidence bands

- sw-rain-gauge-nwfl-01 and sw-tide-noaa-destin are published, SLA-backed systems-of-record with independent validation. High.
- sw-water-level-j1 and sw-soil-moisture-j2 are authoritative for their measurement type but both carry pending calibration cycles. Medium until re-calibrated; promote to high upon calibration sign-off.
- sw-weather-stn-pp is a supplementary station, not the authoritative rainfall source. Medium as a corroborating signal.
- sw-flow-culvert-c4 has reliability grade C and a 49-day validation gap. Low — valid only as corroborating evidence, never as a sole input to a critical alert.
- sw-tide-backup-ofs is forecast/modeled output, not observation. Medium.
- sw-satellite-ndwi has multi-day latency and is post-event only. Low for operational fusion.

Template (blank)

Copy and populate for each new deployment.

```
- source_id: <kebab-case>
  name: <human-readable>
  source_type: <sensor|api|log|device|stream|feed>
  owner: <role or system>
  protocol: <transport protocol>
  emission_frequency: <realtime|sub-minute|minutely|hourly|daily|event-driven|static>
```

```
latency_class: <streaming|near-realtime|batched>
reliability_grade: <A|B|C>
authoritative: <true|false>
last_validated: <YYYY-MM-DD>
permissions: <public|internal|restricted|regulated>
confidence_band: <high|medium|low|unknown>
band_rationale: <one sentence per C4 contract>
# optional
pii_flag: <true|false>
jurisdiction: <e.g., fl-walton-county>
cost_per_call: <USD or free>
rate_limit: <calls/min or N/A>
calibration_due: <YYYY-MM-DD or N/A>
known_outage_pattern: <description or none>
```