FOR EVALUATION DOC TORUS-CCISRT-DS-001 REV 2026-07 PacketFive

TORUS FACILITY SENSING • COMMAND LAYER

TORUS-CCISRT

PRELIMINARY

TORUS-CCISRT-DS-001

Command • Control • Infrastructure • Security • Response • Tier

The operator layer of TORUS provides a common facility picture for the operations room and a tasking app for facility teams. One live picture, two vantage points.

1 Description

TORUS-CCISRT turns a facility sensor network into an operations decision. It ingests prioritised event streams from every TORUS-MEG gateway, fuses them into a single geospatial common operating picture (COP), and presents that picture to the operations room and facility teams at once. Both see the same live state; each sees it in the form their job needs.

The same environment is used before deployment and during it. Data center facilities are rehearsed as digital twins in NVIDIA Isaac Sim, and the validated plan (node positions, gains, alert policies) is promoted straight into the live CCISRT picture.

Unlike the rest of this datasheet suite, TORUS-CCISRT is not concept-only. A runnable reference application exists in the `torus-ccisrt` repository and is verified end-to-end (43 automated checks). It implements the event schema, node roster, transducer interlock, capability-based login, a live web console (map, alarm meter, security-event radar, ISAAC scenario view), OpenTelemetry telemetry, and a controllable facility simulator. The fusion/correlation core ships as an explainable rule-based engine today, with a learned-model interface defined for Phase 3. Production hardening (real identity provider, database backend, packaged desktop/mobile installers) remains open work.

2 Two operator vantage points

OPERATIONS ROOM • COORDINATE & PLAN

Common operating picture

- Map/GIS wall with live node, gateway, and mast state
- Fused alerts with class, confidence, and location
- Triage & prioritisation queue; acknowledge / escalate
- Thermal and video tiles cued from the visual masts
- Timeline scrub & forensic replay of any event
- Deployment planning and Isaac Sim rehearsal link
- Node health, battery, and link dashboards
- Multi-operator collaboration with role-based views

FACILITY TEAM • ACT ON SITE

Rugged tasking app

- Handheld / tablet map with own position, node ring, and data hall zones
- Prioritised push alerts with bearing and distance
- Cue a sensor or mast; request a snapshot on demand
- Confirm, dismiss, or reclassify an event on site
- Offline-tolerant sync over the gateway / mesh
- Shared picture with the room in near real time

3 Control-plane architecture

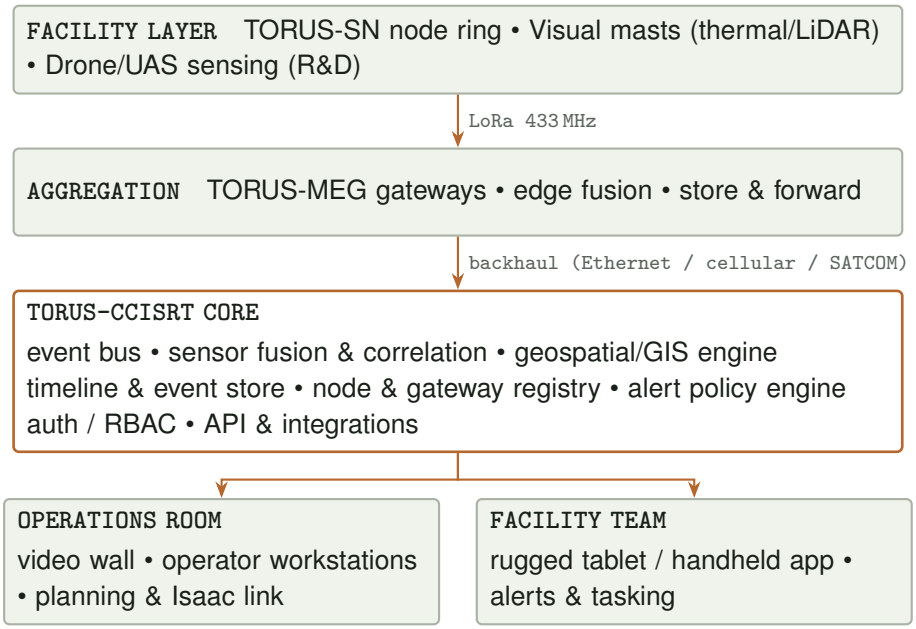

Figure 1: TORUS-CCISRT control-plane architecture.

4 Capabilities

Area	Capability
Infrastructure	Live common operating picture; node/mast state; thermal & video tiles cued by facility events
Detection	Fusion of seismic, acoustic, and (roadmap) visual/drone cues into single tracks with confidence
Security	On-demand sensor cueing, snapshot requests, and mast slew-to-cue from the operations room or facility teams
Response	Timeline, forensic replay, post-incident review, and event history across the deployment
Control	Node configuration, gain and threshold policy, alert rules, arm/disarm zones, BKC firmware upgrade/downgrade
Transducer	Facility response actuation under safety interlock, from arm to safety-validate to trigger; trigger refused until validation passes; every action audited
Tier	TIA-942 and OCP-aligned deployment planning in Isaac Sim; promote validated plan to the live picture
Collaboration	Multi-operator, role-based access, shared annotations, hand-off room↔facility team
Integration	Northbound REST API, webhooks, and OpenTelemetry to push tracks and metrics to PSIM / DCIM / BMS / VMS / SIEM systems, with Redfish, BACnet, ONVIF, and MQTT adapters

5 Roles and capabilities

Access is capability-based. A role is a set of capabilities, not a linear rank. A machine role (`gateway`) is distinct from operator roles.

Role	Capabilities
`viewer`	view the common operating picture (read-only)
`field-operator`	view + cue sensors and masts from the facility
`operator`	view + cue + command (transducer interlock, node enable/disable/sync)
`analyst`	view + data + telemetry (read-only; no command capability)
`admin`	view + cue + command + telemetry + audit log + manage

Role	Capabilities
`root`	full access (all capabilities); development default account
`gateway`	machine role to ingest events and write telemetry

6 Deployment and platform

Aspect	Approach
Hosting	On-premises, private cloud, or Azure Container Apps (container image provided); offline option for controlled AI/HPC data center environments
Display system	Operations-room video wall + operator workstations; browser-based clients (desktop via Electron)
Facility clients	Rugged tablets / handhelds (roadmap: React Native); interoperable with PSIM / DCIM / BMS / VMS workflows through the northbound API
Security	Capability-based RBAC, interactive login, encrypted transport, signed updates, full audit log
Maps	Configurable basemap (OpenStreetMap, Mapbox, Google, or fully offline tiles) for controlled facilities; optional campus imagery layer
Resilience	Store-and-forward at the gateway; the facility app degrades gracefully when offline

7 Status

TORUS-CCISRT has a runnable reference implementation (see §1); the operations-room and facility applications continue to mature toward production hardening (identity provider integration, database-backed persistence, and packaged installers) as the ground domain hardware is finalised.