GMSPAZIO Maritime Domain Capabilities

GMSPAZIO provides a suite of interoperable capabilities that cover the full life cycle of maritime and underwater information, from sensor tasking to the generation of an actionable common operating picture, allowing commanders and analysts to understand, anticipate and react to events at sea with minimal latency. The solutions have been evaluated in coalition trials and national programmes, proving their readiness for operational deployment and their ability to interconnect surface, sub-surface, air and space assets within the same decision support chain.

The surface domain situational awareness environment ingests telemetry streams in standard mission formats, performs parsing and consistency checks, writes them to a secure repository and exposes them through a low latency service layer. Tracks are visualised in synchronised 2D and 3D views enriched with bathymetry, coastal data and exclusion zones. All information is available both in continuous monitoring mode and in post mission exploitation, enabling rapid debriefs and lessons-learned sessions without the need for separate applications.

For the sub-surface domain, an acoustic propagation module reconstructs sound speed profiles from temperature, salinity and current measurements down to two kilometres and beyond, using updated near real time oceanographic data or user-supplied casts. A ray-tracing engine explores thousands of rays per emission, quantifying path dependent losses, multipath effects and signal to noise ratios across frequency bands commonly employed by underwater modems. Outputs include ray charts and tabular results exportable for further analysis, allowing planners to compare operating areas, choose transmission depths or define guard zones around sensitive platforms.

During operations with unmanned vessels and vehicles, the system captures and stores mission data directly from the exercise or operation network and populates a live synthetic scenario. Operators follow air, surface and underwater platforms on a single console, enriched with health and status reporting and timeline controls that let them pause, rewind or fast-forward any phase for training or forensic review. The identical interface in live and playback modes reduces operator workload and shortens certification cycles.

In addition to solutions aimed at analytical support, GMSPAZIO offers its capabilities in the field of Border Patrol Control. Wide area maritime surveillance is addressed through an orbital resource planning component that selects optical and synthetic aperture radar satellites, simulates revisit rates in successive slots and generates figure of merit maps that quickly reveal where additional coverage is required. The same module produces pass schedules, sensor tilt recommendations and acquisition orders, then correlates the delivered imagery with automatic identification system data and extracted vessel features to flag non reporting or suspicious contacts across thousands of square nautical miles.

These capabilities have been field tested at REPMUS NATO’s annual trial dedicated to remote and autonomous maritime systems and at OPEX, an Italian Navy exercise focused on multi domain integration. In both venues GMSPAZIO provided the primary data collection and visualisation backbone, enabling participants to stream telemetry in real time, observe cross domain interactions as they unfolded and obtain quantitative performance metrics minutes after each serial. The feedback gathered during the trials has directly informed the current feature set and certified the robustness of the architecture in contested, bandwidth-limited environments.

Beyond the ready-to-deploy modules described above, GMSPAZIO maintains an agile development process that turns new mission requirements into working functionality through short iterative cycles and continuous user involvement. Mature components can be extended, repackaged or embedded within the customer’s existing infrastructure, while entirely new algorithms and interfaces are engineered on the same open framework, ensuring future interoperability and controlled life cycle costs.