

Unmanned aerial vehicle-deployed sensor data fusion and analysis

Problem statement

How can the use of unmanned aerial vehicle-deployed sensor data in mine action be optimized for greater effectiveness and scalability? What steps are required to bridge the communication and information gap between solution developers, end users/operators, and national authorities?

Key barriers include inconsistent testing and validation, inconsistent methods to define case studies and testing solutions, and lack of accreditation processes within national mine action authorities.

Key factors/requirements

- Clear use cases: define needs based on realistic hazard scenarios.
- Certification and validation: ensure access to facilities and streamline certification.
- Continuous feedback: establish a feedback loop with operators to refine performance.
- Data quality: ensure high-quality data for AI development and sensor fusion.
- Legal compliance: address issues such as operational permissions and data ownership.
- National capacity building: develop skills and infrastructure for understanding and managing new technologies.
- Quality assurance: ensure technologies meet required standards for implementation.

Proposed response

Creation of an open-access library with use cases, requirements, case studies, and a glossary, alongside a technology forum for discussing tested technologies. A clear testing process will be implemented, with access to test facilities, standardized performance descriptions, and defined metrics and protocols. A curated data library with ground truth and multimodal data will support diverse testing.

Road map for implementation

- Phase 1 – Portal development: create an online portal for use cases, case studies, and templates tailored to humanitarian demining needs.
- Phase 2 – Stakeholder input: engage operators and national authorities for content development and outreach, with a vetting process and moderated forum.
- Phase 3 – Test strategies: define test strategies based on use cases and identify suitable test sites.
- Phase 4 – Standardization: establish metrics, scoring criteria, and performance specifications for consistent evaluation.
- Phase 5 – Field testing: coordinate test site access, organize testing events, and collaborate with operators for accurate field testing.