

Service
Definition Document

Autonomous Systems Assurance

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Autonomous Systems Assurance

About Safeguard Engineering

Safeguard Engineering Limited is an independent, employee-owned engineering consultancy delivering impartial safety, environmental and engineering expertise across Defence, Maritime, Land, Aviation, and Commercial sectors. We integrate best practices and foster innovation, building enduring collaborative relationships with our customers and enabling them to reduce risks, increase sustainability and make informed decisions.

Service summary

Independent assurance of safety, performance and compliance for AI-enabled and autonomous systems across defence and critical infrastructure domains. Safeguard Engineering's team of experts applies proven safety, functional safety and systems assurance methods, adapted to meet the unique challenges of autonomy, AI and data-driven behaviour within highly regulated environments.

Service features

- Combines proven functional safety standards with modern AI assurance frameworks.
- Structured assurance using GSN, STPA, CAST and lifecycle evidence frameworks.
- Experience in integrating IEC 61508, ISO 21448, and DefStan 00-56.
- Experienced in application of IEC TR 5469 and PAS 8800.
- Independent review and validation of safety assurance evidence.
- Integrated safety, cybersecurity, and data assurance assessment.
- Grounded, robust lifecycle assurance aligned to defence and safety governance.
- Tailored and reusable assurance approaches supporting multi-platform deployments.
- Demonstrating dependable, ethical, compliant AI-enabled technology in safety-critical environments.
- Aligns assurance evidence with programme objectives without hindering innovation.

Service benefits

- Builds confidence in autonomous and AI system safety.
- Reduces programme and certification risk through methods proven in defence.

- Provides auditable traceability from hazard to assurance evidence.
- Enables credible engagement with regulators and authorities.
- Provides independent, authoritative assurance for complex autonomous systems.
- Demonstrates trustworthy, ethical and responsible autonomous system performance.
- Aligns assurance evidence with programme objectives without hindering innovation.
- Provides autonomy knowledge transfer spanning the defence and maritime sectors.
- Applies lessons learned from previous maritime and defence programmes.
- Embeds assurance into agile development for early risk identification.

Value proposition

Safeguard Engineering provides independent assurance that autonomous and AI-enabled systems are safe, reliable, and trustworthy. Our approach combines proven functional safety standards with modern AI assurance methods to bridge the gap between traditional safety engineering and emerging autonomy. We deliver confidence to our clients, regulators, and end users through transparent, evidence-based assurance frameworks that demonstrate control of complex, data-driven behaviour across the full system lifecycle.

Detailed service definition

Safeguard Engineering Ltd provides independent assurance for autonomous and AI-enabled systems operating in safety-critical and mission-critical environments. Drawing on deep experience in autonomy regulations, functional safety, systems engineering, and digital assurance across the defence and critical infrastructure sectors, we help clients build, verify, and demonstrate trust in autonomous technologies. Our team has successfully delivered assurance and safety cases for autonomous maritime, air, and land platforms, combining domain expertise with a rigorous understanding of both traditional and emerging assurance standards.

Our approach integrates established safety methodologies such as IEC 61508, ISO 21448 (SOTIF), and Def Stan 00-56 with AI-specific frameworks including IEC TR 5469 and PAS 8800. Using systems-theoretic techniques such as STPA and CAST, and structured argumentation frameworks like Goal Structuring Notation (GSN), we deliver clear, evidence-based reasoning that links autonomy design intent to verifiable safety outcomes. This method ensures that assurance is not just retrospective documentation, but an integral part of the engineering lifecycle or agile development; enabling early risk identification, efficient verification planning, and consistent engagement with certification authorities and regulation alike.

Safeguard's value lies in combining technical credibility with pragmatic delivery. We work collaboratively with design teams to align assurance evidence with programme objectives, ensuring compliance without hindering innovation. Our consultants bring extensive experience from UK defence acquisition, certification, and assurance bodies, providing clients with an informed bridge between engineering development and regulatory expectation.

By partnering with Safeguard Engineering, clients gain a trusted, independent, assurance partner capable of translating complex autonomy and AI behaviours into structured, defensible safety arguments. Our service helps organisations accelerate the safe adoption of autonomy by providing the confidence, transparency, and governance needed to assure systems that learn, adapt, and decide.

Why Safeguard Engineering?

Safeguard Engineering Limited is an independent safety and environmental engineering consultancy providing specialist engineering advice and cloud consultancy services across Defence, Maritime, Land, Aviation, and Commercial sectors. We are completely impartial, cost effective and always operate with integrity and trust.

We employ a dedicated team of over 60 consultants consisting of highly experienced data scientists, engineers, environmentalists and ex-defence personnel from diverse disciplines, including safety engineering, marine engineering, aviation safety, weapons and explosives safety, nuclear power systems, digital systems, Air Traffic Management, Artificial Intelligence, Autonomy, and environmental sciences.

The vast majority of our staff are security cleared to at least SC, with a number holding DV clearance. Our processes enable us to handle sensitive and classified information, and to separate teams as necessary to ensure compliance with security and any potential conflict of interest requirements. Our IT systems are certified to Cyber Essentials Plus.

Our capability

Our capabilities span the full project lifecycle, from early-stage concept and feasibility studies through to design, assessment, operation, and eventual decommissioning and disposal. We deliver systems safety and environmental management, including specialism in assurance of autonomous systems and other systems with complex digital requirements. We also provide expertise in a wide range of related services, including cyber risk assessment, data cleansing and migration, data governance and AI assurance, and independent safety audits. Our consultants possess deep knowledge of relevant standards, regulations, and best practices, ensuring that our clients achieve compliance while not compromising on innovation and operational effectiveness. We are independent of any solution or hardware provider, ensuring that our advice is always impartial.

In addition to our core staff, we are able to reach back into our network of trusted associates and specialist partners, ensuring that we can scale our services and bring in additional niche expertise as required to meet any client challenge

Our experience

Safeguard's expertise includes supporting complex Defence acquisition, upgrade and in-service projects for land, sea, and air platforms. We have a proven track record in delivering support for military vehicles, ships, submarines, aircraft, weapon systems, unmanned systems, and a range of Defence facilities. Our consultants are adept at navigating MOD and international defence standards, supporting equipment certification, and working closely with both government and industry stakeholders. We provide specialist assurance support for digital and software-intensive systems, addressing emerging risks associated with automation, autonomy, cyber security, and system integration.

Our delivery

It is of utmost importance to us that we always keep our commitments and ensure that customer expectations are met - and wherever possible, exceeded. Every project has an assigned project manager who takes responsibility for delivery, supported by senior members of our team who ensure that quality processes are being followed and that the delivery approach is appropriate. Our blend of expertise and experience enables us to bring a practicable but forward-thinking approach to all of our work, underpinned by highly motivated team. Our quality management system is certified to ISO 9001. Our high rates of repeat work and continued strong rate of growth as a business stand testament to the quality of our output.



Safeguard Engineering

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