



# Maritime autonomous systems

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## Frazer-Nash

At Frazer-Nash, our consultants are applying their expertise and know-how to develop, enhance and protect our clients' critical assets, systems and processes.

Many of the world's leading companies and organisations use us to solve their systems and engineering problems. We work for clients across a range of sectors including aerospace, transport, nuclear, marine, defence, renewable energy and oil and gas. The depth of our knowledge base means we can transfer the skills, experience and best practice from one area to benefit our clients in other fields.

## Why Frazer-Nash?

At Frazer-Nash our experts are supporting the development of effective, reliable and safe autonomous systems. We add value at all stages of the project life cycle – from capability and system requirements through to in-service support and disposal.

Our independence from equipment designers and manufacturers ensures that we provide impartial advice. We deliver our technical expertise across a diverse range of markets, enabling our clients to benefit from the latest autonomy developments and lessons learned across the air, land and sea domains.

## What we offer

Frazer-Nash offers a range of technical skills and expertise for the design and assessment of maritime autonomous vehicles. We provide design support and independent assessment of both surface and sub-surface autonomous platforms. Our skills include:

### Unmanned system design

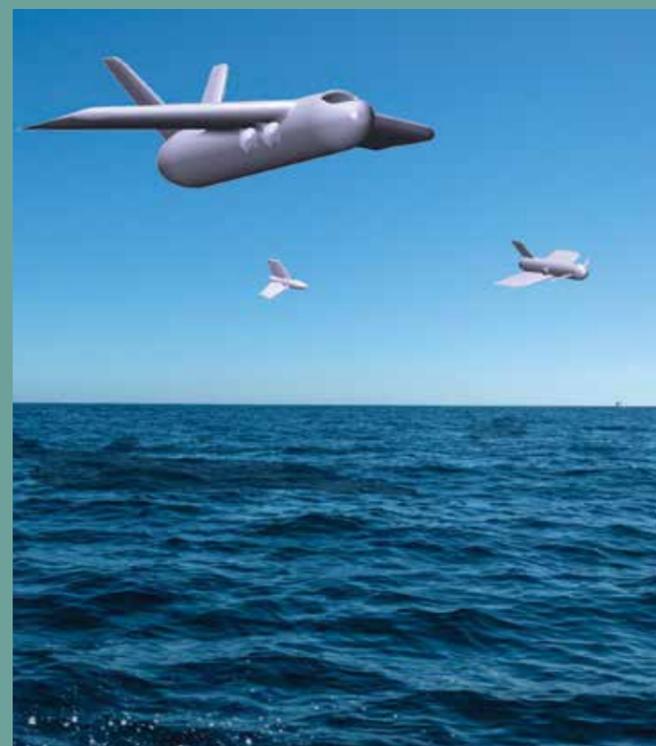
- Concept design and innovation
- Hydrodynamics and hydrostatics
- Electrical power and control systems
- Materials selection
- Structural design
- Human interface development
- Supportability engineering

### Unmanned system analysis

- Independent technical evaluations
- Requirements development
- Safety and environmental assessment
- Software certification
- Shock and signatures assessment
- Computational fluid and structural modelling

### Unmanned system operation

- Performance analysis
- Policies and regulation
- System certification
- Trials methodology
- Interoperability



## Radical concepts for future unmanned systems

Frazer-Nash, in partnership with Cranfield Aerospace, undertook a six month concept study on behalf of the Ministry of Defence into radical concepts for future maritime unmanned air systems.

We led the systems engineering aspects, developing the requirements, and researching and road-mapping the contributing technologies. An assessment was undertaken of different concepts in terms of performance, risk, survivability and through-life cost.

A structured evaluation and down-selection process ensured that the rationale for the selection of the final preferred concept was robust and auditable. The chosen concept was then developed and matured, and detailed technology roadmaps were prepared for the development of a flying demonstrator.



## Safely operating unmanned maritime vehicles over the horizon

Working in conjunction with a system supplier and a government research organisation, Frazer-Nash produced a generic assessment of the safety of operating unmanned systems autonomously, over the horizon.

For the benefits of unmanned systems to be fully realised, the accelerated adoption of technology should be accompanied by appropriate risk management. Depending on the circumstances, the risks and the risk management methodology may change.

To identify the risks associated with unmanned systems we examined five different mission scenarios, a selection of vehicle types and a variety of potential targets. This process enabled us to identify a range of mitigation measures and produce appropriate guidance for regulators, designers and operators. Our guidance ensures the safe exploitation of even the most sophisticated systems.



To find out more about our work  
and how we can add value to your business,  
email [defencesub@fnc.co.uk](mailto:defencesub@fnc.co.uk) or visit our website:

[www.fnc.co.uk](http://www.fnc.co.uk)