

Atmosphere Control Services

Air Quality System Design & Optimisation Support

Analysing and modelling the dispersion of atmosphere contaminants by ventilation systems, and their removal by air purification equipment, using QinetiQ developed specialist software.

Ventilation System Design & Optimisation

Previously the design of an enclosed ventilation system has been limited to static studies of flow rates and volumes, relying on the designer's experience to avoid dead-spots and other design problems. Using QinetiQ's proprietary software, BREATH, we are able to create real-time simulations of the air flows through a proposed design. This visualisation of a design in operation can quickly highlight any flaws and importantly, and as the system is entirely virtual, multiple redesigns can be easily made and tested, long before it leaves the drawing board.

QinetiQ capabilities are not limited to the simulation of the simple air flows of a ventilation system. Our BREATH software also enables us to model the spread of heat and contamination through the vents. In this way we can simulate the performance of air conditioning and air treatment equipment within the wider system. Equipment can be sized and positioned to provide optimal performance before installation, saving both time and money for the end user.

With BREATH software's ability to model contaminant spread, we can populate a proposed ventilation system with a variety of manning levels, at rest or working. By treating each occupant as a discrete source of carbon dioxide and a sink for oxygen, we can model the essential life support processes necessary for enclosed environments.

While BREATH software can provide a dedicated tool for whole system design,

we can also combine the results with Computational Fluid Dynamics (CFD) studies to allow for detailed system optimisation. With CFD it is possible to focus on individual compartments within the system architecture and model the air flows through them. This enables optimum placement of vents and treatment equipment, eliminating dead-spots and other problems before construction commences.

System Design Change Impact Studies

Complex enclosed ventilation systems do not lend themselves to easy alteration. With high costs associated with the shutdown and change of any system, it is vitally important that any modifications work first time.

With QinetiQ's BREATH software we are able to model any proposed changes to a ventilation system, and determine their impact on its operation, before any modification costs are incurred. At a basic level we can carry out studies into simple changes to system architecture, vent geometry and ventilation flow regimes. However, we also have the ability to model heat flows and contaminant spread through a system, allowing us to simulate changes to air conditioning and air treatment equipment.

BREATH is a valuable tool, providing the end user with the opportunity to fine tune the design and operational parameters of a piece of equipment before it is purchased and installed, bringing significant cost and energy savings.



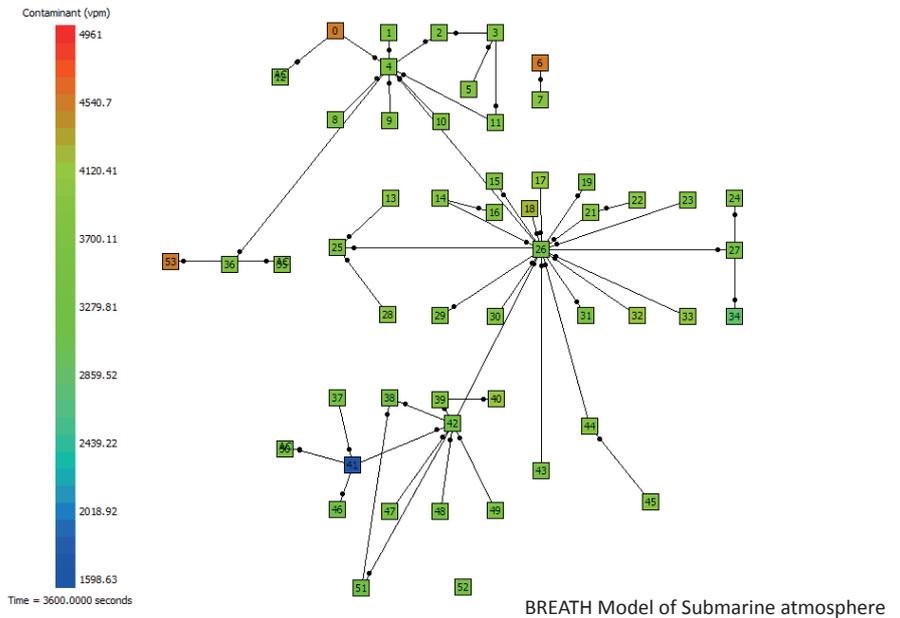
Testing for HALON fire extinguishants

Emergency Atmosphere Control Procedures Design & Development

In an enclosed environment an emergency, such as a fire or gas leak, will spread toxic contamination throughout the ventilation system. Knowing where this contamination will go and how quickly it will spread can be of vital assistance to the first responders of the incident. From finding safe evacuation routes for survivors to prioritising responsive action, including smoke clearance, pre-knowledge of system dynamics of an emergency can save lives.

Using QinetiQ's BREATH software we can provide a comprehensive model of an emergency in an enclosed environment, mapping not only the flow of smoke and other contaminants throughout the ventilation system, but also the spread of heat as well. The benefits of such computer simulation can extend past single starting parameters.

Once a ventilation system is mapped into the software, we can play out countless emergency scenarios with it, something that would be almost impossible to do with the real system. By covering all possible outcomes, the results from these multiple simulations can give emergency planners valuable foresight in the development of their action plans.



About QinetiQ Atmosphere Control Services

QinetiQ Atmosphere Control Services support defence and commercial organisations that operate in challenging enclosed environments including aircraft, submarines and submersibles, armoured fighting vehicles, ships, trains, spacecraft and pressurised tunnelling operations.

With over 30 years' experience, QinetiQ is a leader in the modelling and assessment of enclosed atmospheres. Based on our deep understanding of enclosed environments and associated safety issues we provide a comprehensive range of services that include:

- test and evaluation of air quality to identify issues and demonstrate compliance
- preparation and management of air quality field trials
- design and support of air quality equipment and systems
- advice on the removal of contaminants.

In the defence market we have supported a number of military services including those of the UK, Spain and Canada.

Specifically, for the UK Royal Navy we are the contracted test and evaluation partner for enclosed atmosphere control services. This includes providing a rapid response team to investigate urgent atmosphere control issues. We have also provided

support to the UK MOD for the design, testing and installation of equipment to facilitate the introduction of mixed manning into submarines.

QinetiQ is the only commercial organisation able to offer such a broad range of services, delivering advice and guidance on enclosed atmosphere control, independent of any supplier. Our services are supported by an extensive range of state of the art equipment, facilities and software. Our Environmental Sciences Laboratory has United Kingdom Accreditation Service (UKAS) accreditation for the analysis of compressed gases (e.g. air for breathing apparatus) and carbon dioxide absorbing materials.

We provide strategic support throughout the full lifecycle of an enclosed environment from design and acquisition through to operations and disposal. Our services are delivered by a team of scientists and engineers who are highly knowledgeable and experienced in the application of science and technology to all aspects of atmosphere control.

Maintaining a safe working environment is of critical importance to us in all testing and evaluation activities and we have a team of specialists with the expertise and resources to support major projects across all domains (land, sea, air and space).

Delivering world class Atmosphere Control Services to defence and commercial organisations operating in challenging environments

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