



British Antarctic Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Halley Automation

Contact:

Dave Hunt: Halley Station Operations Manager: dahu@bas.ac.uk

Thomas Barningham: Halley Station Leader: simbar@bas.ac.uk

Nicholas Gregory: Halley Facilities Engineer: nieg@bas.ac.uk



Natural Environment Research Council

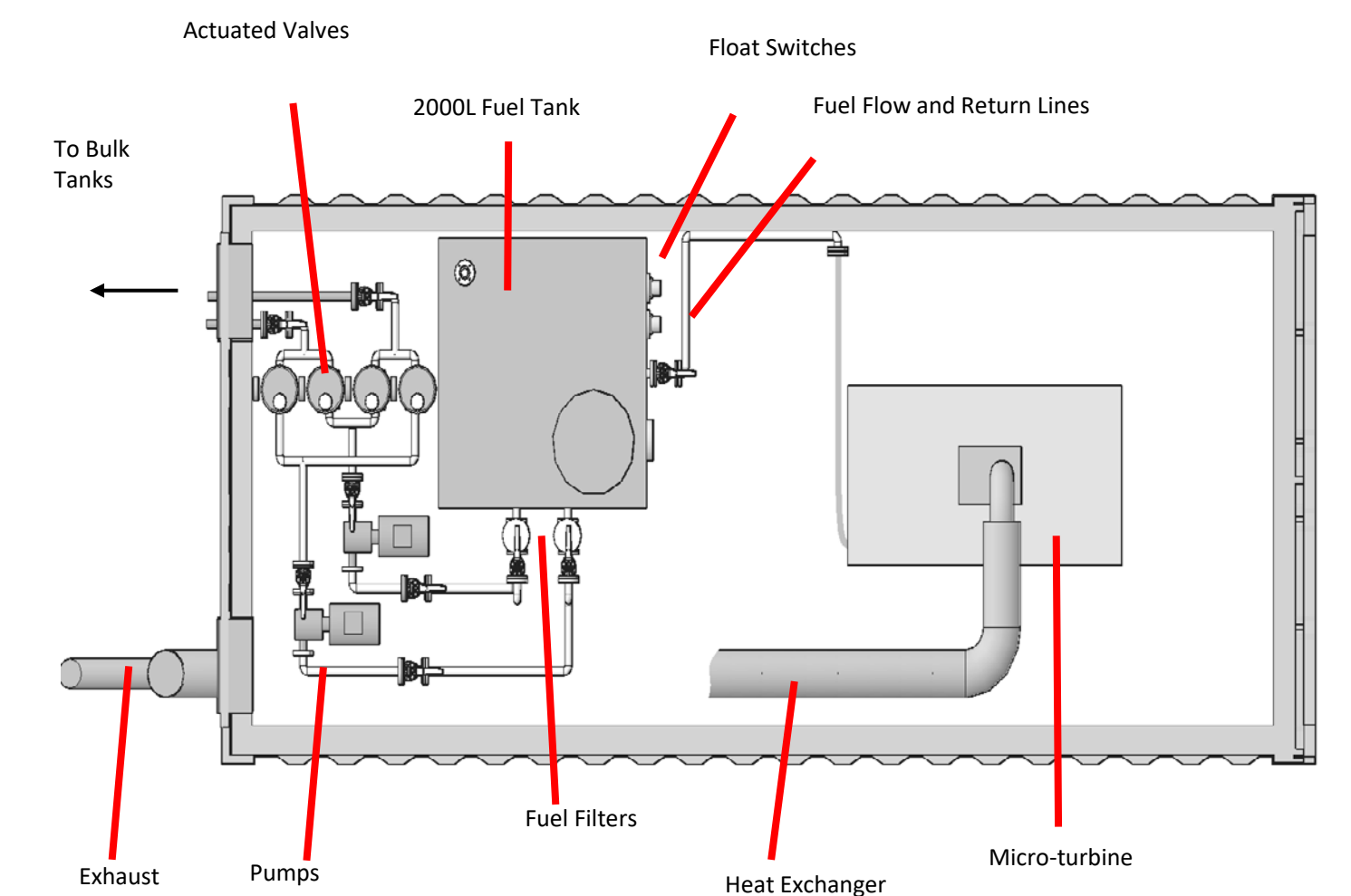
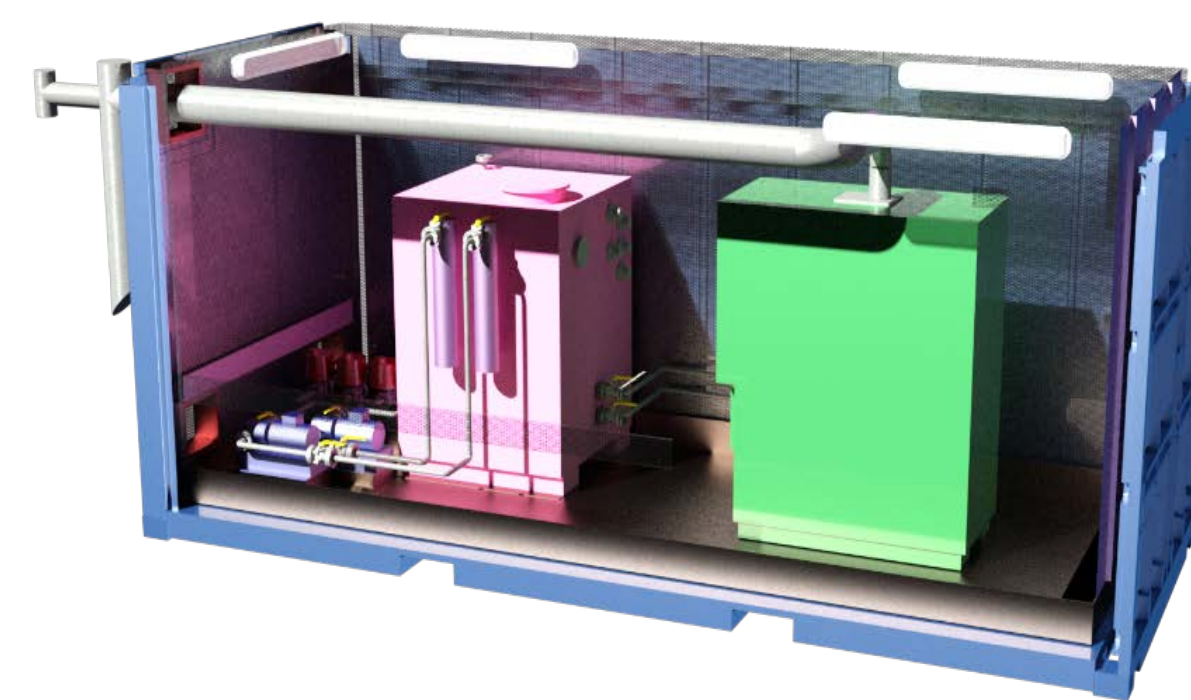


Introduction

Initiated in March 2017, the Halley Automation Project aims to provide a duty and standby microturbine power supply and datalink to a suite of autonomous scientific instruments that operate throughout the unoccupied Halley winter (February-November). The microturbine has been operating successfully since 2019, reducing fuel consumption by approximately 75% compared to an occupied wintering station.

Operation

The microturbine power generation system (Capstone C30) was chosen due to its infrequent service schedule (approximately every 8000 hours). The system has a bespoke autonomous fuelling system that draws fuel from external tanks into a temperature regulated container hosting the microturbine, a suite of internal monitoring systems, as well as control and data acquisition technologies.



Remote Fuel Monitoring

Telemetry data and webcam imagery are remotely accessible at HQ in Cambridge, UK in near-real time. This allows continuous monitoring of the performance of the microturbine and the remote fuelling system, preempting faults. Importantly, we have the ability to shut off parts of the fuelling system, to protect the environment from potential fuel spills. A significant amount of engineering development has gone into minimising the possibility of, and the severity of, a fuel spill, if a fault were to occur.

Future Plans – Duty and Standby

The next phase of the project is to increase the resiliency of the electrical network, data capture systems and ensure a duty and standby micro-turbine system to enable full power redundancy. Concurrently, the project will increase the winter science output, primarily focusing on radar instrumentation and optical instruments (Space Weather and Upper Atmospheric Observations) alongside bespoke Greenhouse gas monitoring equipment (Tropospheric Chemistry and Climate).

