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industry and policy to
address air quality challenges**

SAQN Scoping Study End of Project Report

Project Title	
A UAV-ready sensor package for rapid deployment during volcanic crisis	
Project Team	
Name	Role (PI / Co-I)
Dan Peters	PI
Jean-François Smekens	Co-I
Connor McGurk	Co-I
Cunjia Liu	Co-I
Stefano Rolfo	Co-I
Proposed activities (copy from your project proposal)	
The aim of this project will be to build a prototype sensor package suitable for monitoring concentrations of sulphur dioxide (SO ₂) and particulate matter, to be mounted on an Unmanned Aerial Vehicle (UAV) platform. The project will focus on the design and assembly of the sensor package and will give particular consideration to how the sensor package should be configured in order to minimise particulate sampling biases resulting from the motion of the UAV.	
Please report on the activities completed in the project	
A prototype instrument has been built and is currently going through bench testing. CFD modelling was used to model the flow field around a UAV body to find the best position for the particulate sampling inlet. The instrument carries sensors for CO ₂ , SO ₂ and H ₂ S, gases which are relevant for both volcanology and local air quality.	

What are the next steps for this research? Will you be applying for further funding? What will you need to continue researching this topic?

The package is being considered for further use as a standalone instrument, such as for monitoring indoor air quality. We are aiming to carry out testing of the package on a moving platform ready for possible field applications of the instrument in future.

Please outline the role of STFC in this project

Design and assembly of the instrument was carried out at STFC in order to tie this in with the STFC UAV facility. CFD modelling was carried out using the STFC Scientific Computing department.

Please list a brief list of all outputs and impacts below. These may include papers, articles or blogs, presentations at events or conferences, meetings about future plans for the research. Please include links wherever possible

SAQN Guest Blog - <https://www.saqn.org/2021/05/27/feature-scoping-study-a-uav-ready-sensor-package-for-rapid-deployment-during-volcanic-crisis/>

We have been in discussions with commercial and academic partners to exploit this technology on board sea-based buoys for monitoring ship emissions in port.

Were there any unexpected outcomes as part of the project?

Elements of the design of the air flow control are set to be re-used in another SAQN-funded project – the DELTA-Mi Scoping Study. This project also requires a steady air flow through a sensor.

What are your plans to share the outcomes of this research with others? (Give details of any future meetings, conferences, papers or other dissemination planned)

Present at SAQN Annual meeting – we would like to find funding for test flights and publication of these tests.

Project Impact: What is the most significant output/impact from this project?

We now have a sensor package assembled at STFC that is ready for testing with an eye to future field deployments.