Exploring Design Opportunities for Context-Adaptive Collaborative Tools to Support and Enhance Drone-assisted Search and Rescue (SAR) Operations

**Highlights**

- Investigating the coordination challenges in Search and Rescue operations
- Co-designing and evaluating innovative and interactive socio-technical prototypes with multiple stakeholders
- Exploring various modalities (eg audio, visual, haptic feedback) and interaction techniques to support Search and Rescue operations

**Overview**

Every year hundreds of people are reporting missing in mountains and national parks in the UK. The extreme changes in weather conditions, reductions in statutory services budgets as well as the lack of resources and training make rescuing operations more challenging. For instance, the Brecon Mountain Rescue team in Wales, as many search as rescue teams in the UK, have increased the demand of their emergency services. In their operational report from Jan 2018 they highlight a 42% increase in call outs between 2015 and 2017.

Apart from searching for lost hill walkers throughout the upland areas of mid, south and west Wales, SAR operations have extended to rivers and lowland (rural and urban) areas due to the increase of suicidal missing people and those living with dementia. Any delays or breakdowns in SAR practices can result in detrimental situations in the health of lost people.

In recent years, digital technologies and in particular drones and tracking devices are being introduced to support SAR operations. However, a man with a drone approach is not suitable for these operations and collecting more data by air does not necessarily enable teams to work more efficiently if they lack tools to make sense of data and help them support the cooperative work between multiple teams, locations, physical and digital artifacts, etc. Thus, creating and sustaining situational awareness during SAR practices is challenging.
Aims
This project seeks to understand the coordination challenges of SAR operations and explore how technology can support the complex nature of SAR practices where distributed teams inspect the environment. This interdisciplinary project combines expertise from social, medical and computer sciences.

Research Questions
- How does the coordination take place during SAR operations?
- What physical and digital artefacts are used to support SAR practices and coordination?
- What opportunities arise for technology to address the identified SAR challenges and to provide medical assistance and initial assessment?
- What is the potential impact in terms of feasibility and acceptability of the emerged socio-technical prototypes?

Larger Team
TrailMed Ltd, Brecon Mountain Rescue (BMR) charity, and Informatics Department – The “SkyTrails” team
https://www.trailmed.co.uk/drones

Methodology, Critical Skills and Training and Development

Methodology
Through qualitative research (Year 1 - interviews, focus groups, observations), this project will unpack the coordination challenges in SAR operations between multiple stakeholders. This understanding will be supported by an iterative research-through-design process (Year 2 – design workshops) aiming to co-design a set of socio-technical prototypes and determine what features would be the most valued, getting iterative feedback. The most valued prototype (up to two) will be further implemented and will test its acceptability and potential impact to optimize workflows and decision-making practices using mixed methods.

Critical Skills & Training Development
- Experience planning, conducting and documenting field-based qualitative research.
- Experience unifying and analyzing multiple forms of data from diverse research activities.
- Experience planning and facilitating participatory design activities and synthesizing insights through visual forms e.g., scenarios, etc.
- Knowledge and experience in design and prototyping skills.
- Open to work with multidisciplinary teams of researchers.

Further Reading
Additional Entry Requirements

- Masters level degree in Computer Science/Informatics, Human-Computer Interaction, Design or similar preferable
- Prior experience with drones, wearables, physical computing, and/or DoItYourself (DIY) initiatives

Funding

This research project is one of a number of projects in the College. It is in competition for funding with one or more of these projects. Usually the project which receives the best applicant will be awarded the funding.

Home/EU Applicants

This project is eligible for a fully funded EPSRC studentship which includes:

- A full UK/EU fee waiver for 3.5 years
- An annual tax free stipend of £14,777 (2018/19)
- Research Training Support Grant (RTSG)

Studentships are available to UK/EU applicants who meet the EPSRC Residency Criteria; if you have been ordinarily resident in the UK for three years you will normally be entitled to apply for a full studentship.

If you are an EU student and do not meet the residency criteria, please contact csepgr@le.ac.uk for more information on the funding options available.

International Applicants

- Unfortunately, there is no funding for international students on this project.

Application Instructions

The online application and supporting documents are due by Monday 21st January 2019.

Any applications submitted after the deadline will not be accepted for the studentship scheme.

References should arrive no later than Monday 28th January 2019.

Applicants are advised to apply well in advance of the deadline, so that we can let you know if anything is missing from your application.

Required Materials

1. Online application form
2. Two academic references
3. Transcripts  
4. Degree certificate/s (if awarded)  
5. Curriculum Vitae  
6. EPSRC Studentship Form  
7. English language qualification

Applications which are not complete by the deadline will not be considered for the studentship scheme. It is the responsibility of the applicant to ensure the application form and documents are received by the relevant deadlines.

All applications must be submitted online, along with the supporting documents as per the instructions on the website.

Please ensure that all email addresses, for yourself and your referees, are correct on the application form.

For more information, please visit our website at:  
https://www2.le.ac.uk/colleges/scieng/research/postgraduate-opportunities/epsrc-2019/instructions