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ABSTRACT

Utility of Virtual Operation Support Teams: an international survey

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Introduction

Adapting to a highly dynamic, polycentric information environment is increasingly resource-intensive. Unlike in the past, as events occur, the number of eyewitness reports, videos and opinions uploaded and shared on social media can quickly overwhelm the resources of authorities. The risk exists that important information may be missed (Paris & Wan 2011). Disaster risk managers face difficulties when managing information from social media channels especially in large-scale incidents. For example, during Hurricane Sandy, extensive resources of people, technologies and time were diverted from traditional emergency management activities to deal with misinformation during the incident (Hughes *et al.* 2014). Virtual Operation Support Teams (VOSTs) have been established in many countries to help authorities manage information in high-pressure information environments. These teams monitor social media, support situational awareness, counter rumours and disseminate official communication (Reutter 2012).

VOSTs are highly interesting organisations for study, as their recent emergence reflects some pressing and most debated challenges in disaster management. First, VOSTs are a prime example of the effects of digitalisation on emergency management. The broad socio-technological trend of digitalisation is changing all aspects of emergency and disaster management from risk analysis to resource planning (Meier 2015). Secondly, VOSTs represent a new form of civic engagement driven by the desire to help in non-bureaucratic ways (Whittaker, McLennan & Handmer 2015). The downside of this is that the rise of VOSTs may exemplify the slow decline of traditional forms of volunteerism that has been observed in many countries. Reasons for this decline have been analysed in much depth (Putnam 2000, Hustinx & Meijs 2011, McLennan, Whittaker & Handmer 2016). Finally, VOSTs are an example of the ongoing and fundamental transformation in emergency and disaster management practices, from hierarchical and static organisation forms to dynamic, network-based arrangements (Cobb *et al.* 2014). This explains why established disaster managers express a level of suspicion towards these new organisational forms, even though most observers generally agree that 'digital volunteers' are an asset for disaster risk management, especially for communication.

The VOST movement originated out of perceived gaps between civil society and emergency management professionals in the United States. It started as a volunteer movement by people formally employed by emergency agencies and governments. On a typology of top-down versus bottom-up participation

No other disaster management practice has undergone as much change than has emergency communication. The components of emergency communication, from situational awareness, to response coordination and public information provision are influenced by factors that are fundamentally different from 20 or even ten years ago. It is a fast-evolving environment, involving new technologies and changing communication preferences. Adapting to a highly dynamic and demanding information environment takes up resources from other activities. One response to this rapid change has been the establishment of Virtual Operation Support Teams to monitor social media, support situational awareness, counter rumours and disseminate official communication. To date, the establishment, utility and added value of these teams has not been the subject of research. This paper examines the evolution of Virtual Operation Support Teams across the globe and how they are being used in seven countries. The paper suggests ways that governments and emergency management authorities can support similar teams and how integration with formal operations might be managed. This may assist countries where Virtual Operation Support Teams are not yet established or where teams are only activated during an emergency event.

in disaster engagement (Turner & Dynes 1975), VOSTs fall somewhere in the middle. They are largely self-organised, but also seek formal recognition from the emergency management sector. Importantly, teams are typically activated only on request by authorities. Many VOST members are participants in emergency management organisations and these connections are often what distinguishes VOSTs from other digital volunteer organisations (Starbald & Palen 2011, McLennan, Whittaker & Handmer 2016).

To date, there has been little research on the conditions under which VOSTs have flourished nor on the ways these teams might be best used. This paper examines the evolution of VOSTs at an international scale and presents results of a survey of VOST teams responded to by seven countries. The paper identifies ways to encourage authorities to support VOSTs and how teams can be integrated with more formal operations. This work aims to build understanding of the characteristics, historical development, relationships and advantages of these teams and their contribution to emergency management and response.

Emergence of Virtual Operation Support Teams

The first occurrence of VOSTs appeared in 2011 when Jeff Phillips (an emergency management coordinator from Los Ranchos de Albuquerque, New Mexico) introduced the VOST concept at the annual conference of the National Emergency Management Association. Phillips envisioned the VOST as a resource-efficient means of monitoring social media, collecting, aggregating and verifying crisis-related information; similar to existing forms of local citizen engagement in the offline world, like the Community Emergency Response Teams (CERTs).

In 2011, organised groups of virtual volunteers were nothing new. Employing new technologies and new media to distribute emergency communication and receive information had been debated since the early 2000s (Palen & Liu 2007). Grassroots groups had most prominently demonstrated the practical value of virtual collaborations in the wake of the devastating 2010 earthquake in Haiti. The value of this work lay largely in the virtual execution of local community needs assessments and developing 'crisis maps' illustrating real-time, on-the-ground necessities (Meier 2010, Heinzelman & Waters 2010, Ziemke 2012).

Emergency and disaster managers were unsure as to what they could expect from the volunteers and how reliable their information was. Consequently they found it difficult to estimate the potential added value of the crisis mappers' potential contributions (Waldman & Kaminska 2016). To overcome this, VOSTs were designed to stand on the shoulders of 'trusted agents' (Reutter 2012); people with backgrounds in emergency or disaster management who could coordinate the support actions undertaken by the virtual teams.

In recent years, the VOST concept has spread quickly, first within the United States and now to other regions including South America, Europe and Oceania (VOSG 2018). As the VOST idea has spread, a lively and international community has grown. While this growth has been accompanied by a wealth of anecdotal evidence concerning the benefit of VOSTs, little systematic research has been conducted to examine the growth and formal utility the movement presents to emergency and disaster management.



The VOST in Germany during a deployment for the Tour de France cycling race in 2017.

Image: THW, Nicolas Hefner

Methodology

A survey consisting of 16 open-ended questions was distributed to all active VOSTs around the world. The survey examined the personal backgrounds of VOST members, the history of the VOST in the region, including the possible trigger events, deployments and exercises. The survey collected information on the operational processes of the VOST (activation, personnel development) and how the VOST was connected to other virtual teams, local and international disaster management authorities and academia. VOST coordinators were asked to indicate how the future development of the VOST was planned. The survey was distributed in English and Spanish. The Virtual Operation Support Group database was used to inform the case selection process. The Virtual Operation Support Group is the international association of VOSTs and, in 2018, listed 49 VOSTs across 14 countries.

VOSTs with no contact information or with inactive online accounts were excluded from the study. Thus, 27 teams were contacted via email, Facebook and Twitter during February and March 2018. Eleven responses were received (40 per cent). Figure 1 gives the location of the 27 contacted teams with green dots highlighting teams that participated in the survey. Most surveys were completed by the primary VOST organiser, whose anonymity is maintained in the presentation of the results. Responses received in Spanish and French,

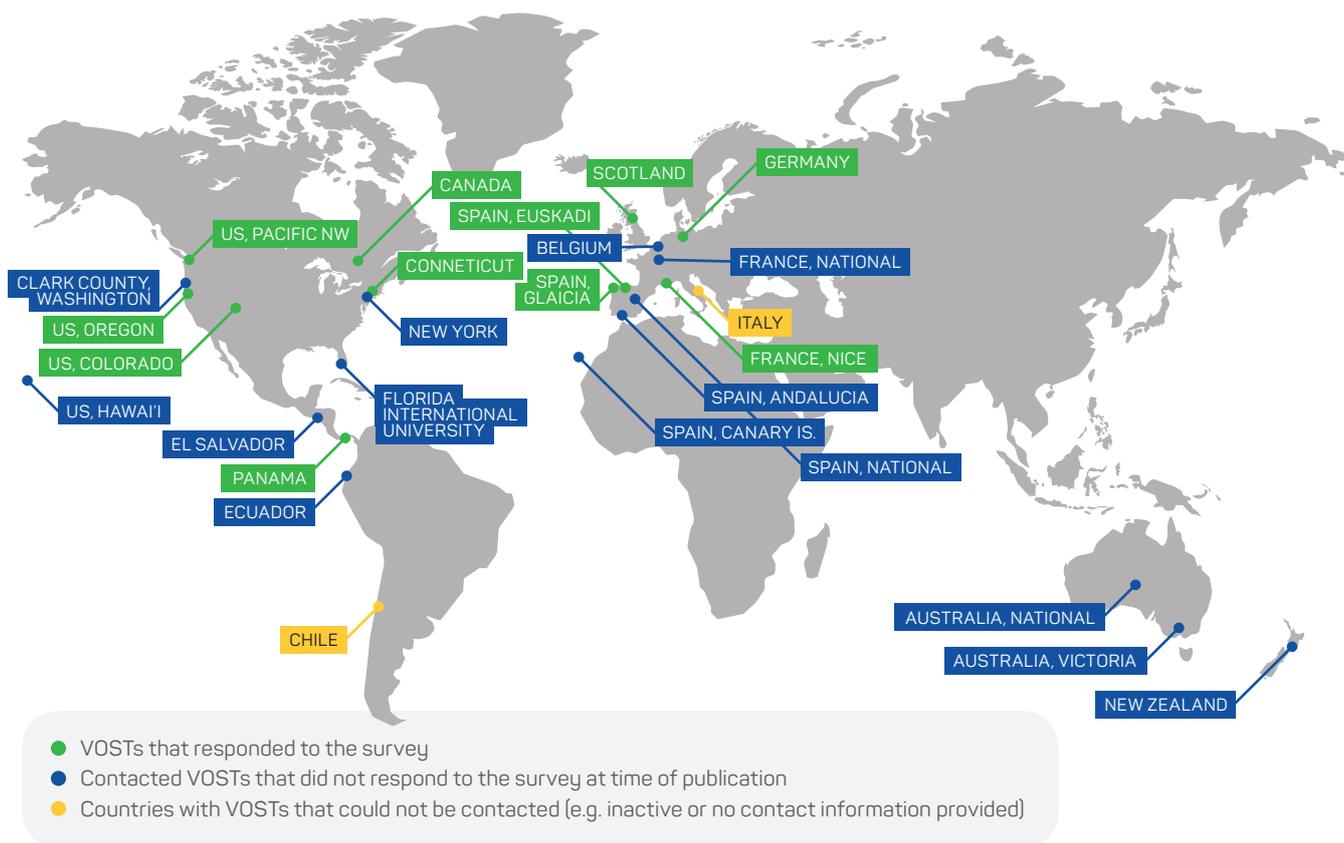


Figure 1: Locations of the teams contacted and their participation in the survey.

including any extra material or documents about the organisation, were translated into English. All information was analysed qualitatively using MaxQDA data analysis software. Ethics approval for the research was covered under the Swiss Federal Institute of Technology’s blanket ethics arrangement for low risk research.

Results and discussion

Results show that the development of the VOST movement has occurred in a fundamentally practical way, driven by local groups and individuals who are connected through virtual networks. Since 2011 and across a broad range of deployments, VOSTs have proven to add valuable capabilities to authorities’ communications and to the amount of information available to the public during disasters. Even so, the utility of VOSTs as sources of complementary information remains underestimated.

Three important challenges identified by the survey respondents were:

- a lack of buy-in from formal disaster management organisations
- delayed granting of political legitimacy
- challenges recruiting respected VOST contributors or members.

The results also provide a better understanding of the organisational characteristics, historical developments

and the relationships between VOSTs and other disaster management actors.

VOSTs have evolved as a practical solution to problems recognised by emergency managers. Since the first VOST was established, the concept has quickly spread. In some cases, the formation of teams was in direct response to a recent disaster event. More often, however, it was the motivation of individual emergency management practitioners, with experience of the ways authorities had been overwhelmed by the increasingly challenging communication environment during their operations (either in response to disasters or in the context of other large public events, such as sport tournaments, public appearances of political and religious leaders), who have initiated VOSTs. In these cases, the individuals identified the potential of the idea beyond its original setting, sparking the establishment and adaptation of new VOSTs to the specific geographical, social and political contexts they were operating. For the respondents, the specific value of the VOST concept lies in four main areas.

Unburdening authorities

Many VOST organisers had first-hand experience of how authorities could be overwhelmed by the amount of information exchanged on new media networks such as Facebook, Twitter and YouTube. They recognised the advantages to authorities of establishing ways to monitor social media that could support active and credible responses to situations or redirect misinformation. Respondents explained:

[Our VOST] was created after a series of wildfires that created a high impact on social media. During these wildfires, many people shared hoaxes that complicated the work of emergency services.

(Respondent 03)

Being able to provide real-time information from a trusted source, on platforms the public are comfortable with was the key driver for the foundation of [the] VOST.

(Respondent 08)

The [VOST] is specifically designed to be a resource that will be available to the state and any local agency that wishes to fully experience the dual benefits of engaging with, and listening and responding to, the modern virtual landscape.

(Respondent 07)

The early proponents of the VOST idea saw that while new ICTs might pose some challenges for disaster management authorities, the very same technologies also provided great opportunities to support crisis communication professionals. The principle of employing volunteers with an emergency management background, functioning as 'trusted agents' on the side of public information officers, has been a central characteristic of VOSTs that sets the movement apart from other forms of digital volunteerism (like crisis mapping, for example).

Integration of volunteers

Involvement in incident response strongly influenced the development and organisation of VOSTs. A VOST structure that mirrors that of the local emergency management authority can optimise integration of the VOST in formal emergency management activities. The survey responses showed that many VOSTs have well-established partnerships with local agencies, which provides important support for the team's activities. As one respondent indicated:

Nowadays we support the administration. We are considered like another civil protection entity and we help in the management of information on social media, monitoring, detecting critical information and stopping hoaxes. All the relevant information is passed to the competent authorities and we generally have regular contact.

(Respondent 03)

VOST volunteers benefit from relevant training and feedback from emergency services organisations. A few teams receive some financial support that allows them to conduct training and exercising for volunteers or to buy computer software and equipment. A number of law enforcement authorities support local VOSTs with free background checks for new volunteers.

Skill set and motivation

Survey results showed that VOSTs draw on the skills of volunteers who have backgrounds in computer science,

journalism, law enforcement, public health and other fields. In addition, most VOST members were involved in volunteer fire brigades, community organisations like CERTs or other emergency-related organisations and they had skills that were desirable. In countries where VOSTs were most numerous and well integrated into civil protection practices, like Spain, team organisation is largely driven by middle management officials with a personal interest in achieving high-level capabilities to effectively manage disaster communication. In these cases, official support for teams is positive.

Networks of networks

The majority of VOSTs had participated in deployments and disaster exercises that provided valuable experiences. The types of deployments vary between countries and between teams. Most frequent were activations of VOSTs by local or regional authorities in response to natural hazard-related events including wildfires, floods and tornados. In the US, VOSTs have also been activated in response to security incidences, such as school shootings. This latter role was not the original intent of the VOST movement and one team explicitly stated that it would not support law enforcement activities. VOSTs have also been activated in preparedness operations to support local authorities prior to a potential emergency. Table 1 provides a summary of when countries have used a VOST.

National and international VOSTs are generally well connected with each other, either through bilateral collaborations or through regional associations such as VOST Europe or the global Virtual Operation Support Group. These connections allow teams to learn from other teams operating in diverse geographical and political contexts. Also, many VOST members are active in more than one team, which facilitates the expansion and exchange of experiences. These benefits play out during larger emergencies when these relationships allow access to skills, experience and additional volunteers. Collaboration is heavily reliant on online tools such as Slack, GoogleDocs and Noysi. These platforms allow easy sharing of skill matrices to manage human resources, organise and document activities in specific VOST workbooks, and to enable virtual meetings and training.

The survey demonstrated that several teams had been formally recognised as resources within official emergency management response systems. France and Spain, in particular, have established formal associations between the local emergency management authorities and the VOST. Such formal integration allows team members to participate in emergency exercising and receive training, and to add capabilities in official emergency responses. Most survey respondents stressed the importance of integration of their team into formal emergency management structures as an important step.

Table 1: VOST deployments as reported by survey respondents.

Event	Country	Year	Type
Shadow Lake Fire	United States	2011	Natural hazard response
Santiago de Compostela train accident	Spain	2013	Technical hazard response
Calgary Floods	Canada	2013	Natural hazard response
Ebola scare	United States	2014	Public health preparedness
Umpqua Community College shooting	United States	2015	Security incidence response
Storm Frank	United Kingdom	2015	Natural hazard response
Fandicosta industrial fire	Spain	2016	Technical hazard response
Nice terrorist attack	France	2016	Security incidence response
Fort McMurray Fire	Canada	2016	Natural hazard response
Hurricane Harvey	United States	2017	Natural hazard response
Tour de France cycling race	Germany	2017	Public event preparedness
G 20 Summit	Germany	2017	Public event preparedness

Challenges

Respondents indicated that positive developments had occurred in most countries, but challenges remain. In general, the VOST community contends that the VOST concept lacks the attention it deserves. As a consequence, many social media users have trouble understanding how VOSTs function during crises, and emergency managers remain unsure of the VOSTs' trustworthiness as information brokers. The survey revealed several obstacles that many VOSTs struggle with. Three main areas stand out in this regard being:

- coordination and integration
- legitimacy and visibility
- recruiting and motivation.

Coordination and integration

Coordination with, and integration in, the formal emergency management method remains a challenge for most of the responding teams. At first glance, this appears surprising, given that VOSTs have been established mostly by people actively employed by, or with backgrounds in emergency management organisations. According to respondents, even though VOSTs are recognised as a resource, actual integration has been largely *ad hoc*. For example, few teams have been included in official exercises. Most respondents identified that involvement in emergency exercises is a route to formal integration and a way VOSTs could improve their processes and practices. One respondent indicated:

Volunteers who are outside of official purview are still looked on with suspicion and we are building policies for verification and background checks. Building trust is critical.

(Respondent 04)

In France and Spain, integration of a VOST has been smoothest at the lowest jurisdiction level (municipal or local government level). Local governments in Spain, France and the UK appear well organised to integrate VOSTs. However, several respondents remarked that effective integration of VOSTs necessitates support from the authorities that is more than symbolic.

Eventually, agencies need to add funding and more resources to support teams. Some agencies - especially in states that are known to have lots of natural disasters - should consider hiring VOST experts and team leads and also some team members in order to have reliable resources available when needed.

(Respondent 04)

Respondents emphasised that the contribution VOSTs make is not cost-free. Transferring emergency-related knowledge and building capacity of volunteers requires an investment from professionals. This investment is not just financial, but a contribution by governments for activities with volunteers should be considered.

Legitimacy and visibility

Largely a consequence of non-systematic integration into emergency management practices, many VOSTs

lack visibility and legitimacy. Survey respondents raised the problem of official 'buy-in' and that officials lack confidence that VOSTs contribute additional and important capability. Respondents acknowledged that having the chance to demonstrate the way in which VOSTs could act as mediators between the public and emergency management information providers would help to raise awareness of their during crises and crisis response. To gain official recognition, it is important that VOSTs provide situational awareness analytics that complement the type and style of information that authorities are already using and disseminating to the public.

The [VOST] is not meant to replace or substitute any social media response or plan. The [VOST] is a resource that can be activated to supplement or enhance a community's existing social media for emergency management plan.

(Respondent 07)

Survey respondents provided information about how their teams could support two-way information flow between the public and emergency management agencies. For example, team members could compile public information, analyse it and provide relevant information to help decision-making. VOSTs could also distribute updated and accurate information to the public through the same channels. Finally, and significantly for the legitimacy of the VOSTs, VOST volunteers have typically not received training by emergency managers. Without formal training or experience, volunteers without a background in emergency management or related fields are unlikely to be recognised as suitable partners.

Recruiting, training and motivation

Like any volunteer organisation, VOSTs rely on the contribution of citizens' time and skills to support a cause. Demanding jobs, family life and other obligations limit the capacity of people to volunteer. One respondent noted:

Recruitment was and continues to be a major challenge for our VOST. Since the team is volunteer only, time commitments from members can be hard to schedule around.

(Respondent 01)

Local VOSTs rely on a relatively small pool of people who have the skills and training to fulfil their roles. In addition, some deployments are very time-consuming, often lasting several days or weeks. Such engagements can be physically and psychologically stressful. Since the teams are organised online, team members can experience isolation and require ways to maintain team spirit and motivation over longer periods. To unburden local VOSTs during emergencies, volunteers from other teams jump in and provide assistance. However, such collaboration among teams can be hampered by insufficient interoperability of structures and processes.

Conclusion

A central goal of this paper was to examine in how far online-based volunteer groups can support emergency and disaster managers cope with highly dynamic media environments. VOSTs were used as a case study because of their relatively recent appearance. The VOST concept reflects some of the key dynamics in emergency management practice, including the flattening of organisational hierarchies, changes in volunteerism and digitalisation. The challenges facing VOSTs include being accepted by and integrated into official emergency management communication activities. This highlights that although a body of research illustrates the how effective use of social media can benefit disaster management processes, communication by social media continues to be held at arm's length from traditional emergency communication practices. While the notion of collecting, analysing and disseminating information obtained through social media information channels is a potential game-changer in disaster communications, it remains a peripheral activity from a formal disaster management perspective.

VOSTs have successfully supported emergency managers in handling an increasingly challenging media environment during incident deployments. Drawing on individual skill sets and capabilities, teams have helped to filter relevant information from the abundance of social media content, improve situational awareness of emergency managers and engage actively with the public. However, recruitment and training remain a challenge for many VOSTs, and the organisation of most teams continues to rest on the shoulders of a few engaged individuals. Notwithstanding the value of the efforts these individuals take, this hardly represents a sustainable organisational solution that would match the importance of the digital information space in today's emergency management environment.

At the international level, VOSTs could become a central element of collaboration for emergency management organisations and could actively communicate with the public. However, this is unlikely to happen without a clear commitment from governmental agencies to support and integrate volunteer organisations like the VOSTs into existing emergency management structures. Integration of volunteers should be considered as an investment in improved emergency management, acknowledging that volunteers can make a significant contribution to how societies prepare for and respond to disasters. In the best case, they can unburden professional disaster managers and help to safeguard sufficient protection levels in times of changing hazards and tight budgets.

However, this voluntary contribution is not cost-free. Volunteers require instruction and training. Without sufficient planning they may pose more of a hindrance than help. Emergency services agencies could include a minimal budget for activities with VOSTs, including non-financial investments. Budgeting should be sufficient to cover training expenses, software and equipment and after-care (e.g. counselling, professional psychological

support). Optimally, volunteers should also receive at least partial compensation for travel, unpaid leave from work and minor personal expenses related to their volunteer work. Arguably and more important than financial investment, is the time emergency managers are ready to spend engaging with VOSTs. Getting to know volunteers, understanding their motivations, capabilities and requirements is a long-term prospect that takes time and energy. This investment is essential for building strong partnerships.

In a world characterised by advanced information and communication technologies, VOSTs could become a central element of collaboration between emergency management authorities and the actively communicating public. These organisations create information resources that provide practical value for communities struggling to cope with hazards.

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