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SPARCCS – Smartphone-Assisted Readiness, Command and Control System

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SPARCCS – Smartphone-Assisted Readiness, Command and Control System

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SPARCCS - Smartphone Assisted Readiness, Command, and Control System - uses smartphones in conjunction with cloud computing to support distributed response to HA/DR (Humanitarian Assistance/Disaster Response) and military missions. SPARCCS enables real-time situational awareness among distributed teams of first responders while simultaneously ensuring that the command centers receive accurate, up-to-date reports from the field.

Maintaining situational awareness in HA/DR and military missions is critical to decision makers as it allows them to understand the current operating environment and make critical, real-time decisions based on what is occurring at the present time and what could occur in the future. In addition it gives them the ability to get immediate feedback on past decisions enabling them to make better choices in the future. Situational awareness is enhanced through the use of a common operating picture (COP). Usually when a disaster, emergency, or military response is needed, multiple agencies, often times both local and national, must get involved and cooperate. In order for the cooperating agencies to work together effectively they need a shared COP. With this COP, it becomes easier for agencies to communicate and resolve the issues they are facing more efficiently and effectively, saving both lives and resources in the process.

SPARCCS uses smartphones in conjunction with cloud computing to extend the benefits of collaborative maps to mobile users while simultaneously ensuring that the command centers receive accurate, up-to-date reports from the field. In addition enabling a real-time COP, SPARCCS pays attention to the following first-responder requirements:

1. **Quick Set-Up**. A key requirement of first responders, especially immediately after a disaster has struck, is to get going with their mission at the fastest speed possible. This means little time to set-up. SPARCCS is designed to work with COTS smartphones which can be easily provisioned with the mission information.

2. **Tight-loop, Frequent Communication**. An important task of first responders is to convey the ground reality to their co-workers and the control room. This needs to be done frequently and in real-time but without taking too much of their time and attention lest it start affecting their mission performance.

3. **Light-Weight Equipment.** SPARCCS uses state-of-the-art smartphones which are light-weight and small but still provide the compute, networking, storage and content capture power that is so critical to the mission success.

4. **Scale-up as Team/Requirements Grow**. SPARCCS can easily and rapidly be configured to start supporting a mission as the need arises. As the mission evolves, additional gear can be added to the SPARCCS configuration to support the expanded team.

5. **Battery.** Due to their short charge life and weight, batteries that operate the smartphones are an important issue. Often first responders have to carry spare batteries, which increase the weight they have to carry. We plan to address this problem by implementing smart energy management techniques in SPARCCS.

SPARCCS is implemented in a highly distributed fashion where smartphones act as the primary device used by the first-responders and a cloud-based database system aggregates information provided by first-responders for the command posts.
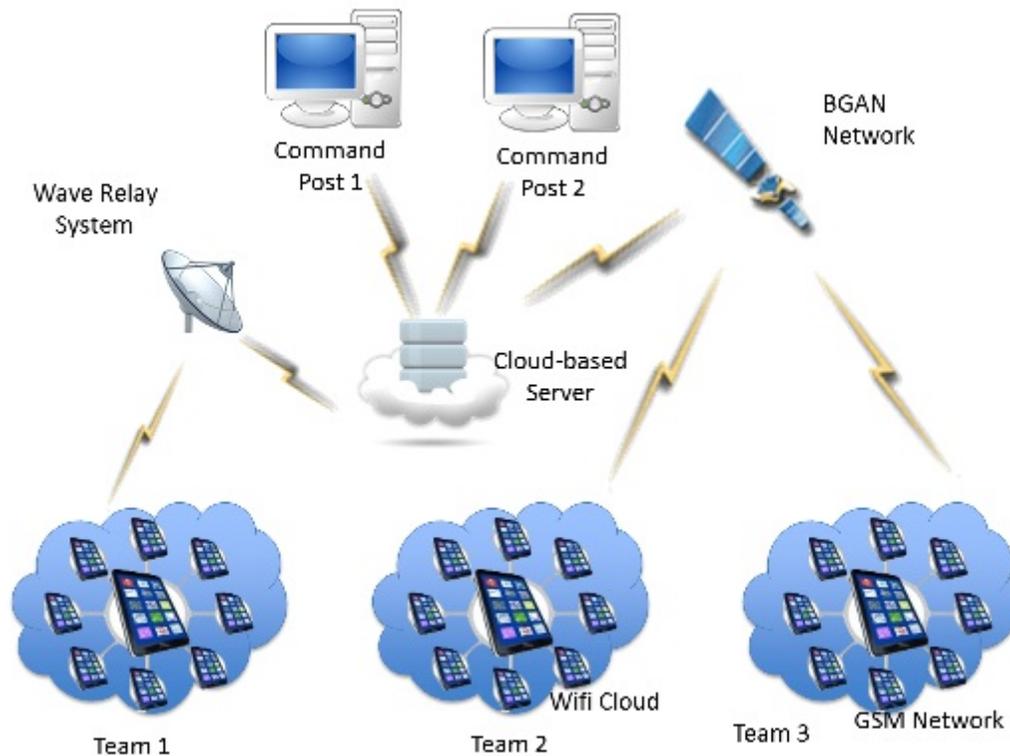
A mission in SPARCCS is typically spread across multiple small teams of first-responders. Each first-responder is equipped with a smartphone which is provisioned with SPARCCS mobile application. A first-responder uses this device to capture and share his/her situational information as a content feed (made up of pictures, video, location, messages etc) with the team lead's device, which can be another smartphone or a heavier duty device depending on the need of the mission. This content feed is maintained in a database system running in the team lead's device. The team lead can share this information with the other first-responders who may be a part of his team as well as forward the aggregated feed from all team members to the SPARCCS server located in the cloud.