SPARCCS

Smartphone Assisted Readiness Command and Control System

By LT Niki Crewes

Disclaimer: The positions represented in the paper and the briefing are those of the authors and not necessarily those of NPS, the Navy, or the DoD.
Defense Budget 2013

- Technology Spending $37.2 Billion
- Science and Technology Investments $11.9 Billion
- Command and Control $8.2 Billion
LT Crewes

- Undergraduate Computer Science US Naval Academy
- 8 Years Navy Active Duty Experience
- Masters Degree Computer Science from the Naval Postgraduate School
- Engineering Duty Officer currently working for SPAWAR
Outline

- Command And Control Problems
- SPARCCS as a Solution
- SPARCCS Requirements
- Command and Control Evolution
- SPARRCS Architecture
- SPARRCS Implementation
- SPARRCS Current Status and Limitations
Command And Control (C2) Problems

- Competition between multiple agencies
- Interoperability
- Jurisdiction
- Technology
- Communication
- Information Dissemination
- Unclear Chain of Command
SPARCCS Solution

- Smartphones in conjunction with cloud computing
- Benefits of collaborative mapping to mobile users
- Command Centers receive accurate real time data
SPARCCS Requirements

- Quick Set up – COTS smartphones, cloud-web infrastructure
- Tight-Loop/Frequent Communication – sync of video, text and pictures automatically
- Light-Weight Equipment
- Scalability
- Extended Battery Life
C2 Evolution

- World Wide Command and Control System (WMCCS)
- Global Command and Control System (GCCS)
- Blue Force Tracking
- Next Generation Incident Command System
- SPARCCS: uses the evolution of smartphone technology as a force multiplier in an academic endeavor
SPARCCS Architecture

- Highly distributed cell phone network
- Cloud-based data base system aggregates information
- Web Service at the Command Post displays information
SPARCCS Key Features

- Login to prevent unauthorized access
- Create, join, edit and view missions
- Create, edit view and delete points of interest (POI)
- Capture, edit, view and delete images
- View all missions, POI's and images on a map
- View all mission, POI's and responder information in a list format
- Retrieve GPS location (HTML 5/Smartphone)
- Store all information locally on android or cloud database
- Syncing between android and cloud databases
(1). The HTTP request interacts with the HTTP servlets using HttpServlet Requests (2). These servlets form Java components in our case Objectified Data objects (3) to perform CRUD operations with cloud database (4). The servlets then create the appropriate HTTP Servlet Response (5) back to the requesting client (6). The information is then displayed in the client.
The overall system architecture from the web client perspective. The only difference being the remote procedure calls instead of the HTTP posts and requests.
SPARCCS Implementation

- System Revolves around 4 main classes
  - Responder
  - Mission
  - Point of Interest
  - Image/Video

- Syncing
  - Application multi-threading
  - Data stored locally then marked for upload
  - Thread sleep and wake process to maximize battery life
Cloud Implementation

SPARCCS Headquarters Application
Smart Phone Assisted Rapid Command and Control System

Missions

<table>
<thead>
<tr>
<th>Name</th>
<th>Creator</th>
<th>Start</th>
<th>End</th>
<th>Show</th>
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<tbody>
<tr>
<td>Security Patrol</td>
<td>MNCrowes</td>
<td>03/01/2012</td>
<td>03/04/2012</td>
<td></td>
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<tr>
<td>Port Patrol</td>
<td>MNCrowes</td>
<td>02/24/2012</td>
<td>03/11/2012</td>
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<tr>
<td>Earthquake Relief</td>
<td>MNCrowes</td>
<td>03/03/2012</td>
<td>03/17/2012</td>
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</tr>
</tbody>
</table>

Add/Mission Options
Points Of Interest
Add/Point of Interest Options
Responders
Responder Options
Photos
Map Options

Last Updated Mon Feb 27 16:10:47 GMT-800 2012
Mission/POI Display and Flow
Mission/POI Display and Flow
Responder Display and Flow
Responder Display and Flow
Image/Video Display and Flow

Add/Mission Options
Points Of Interest
Add/Point of Interest Options
Responders
Responder Options

Photos
Missions
- Add Image to a Mission
- See Images From a Mission
- See All Mission Images

MISCMC000402282012 | Security Patrol
MISCMC000502282012 | Port Patrol
MISCMC000702282012 | Earthquake Relief

Points of Interest (POI's)
- Add Image to a POI
- See Images From a POI
- See All POI Images

POICMC000302222012 | Earthquake Relief Overflow
MISCMC000702262012 | Relief Station 1
POICMC00112022282012 | Weapons Cache Found
MISCMC000502282012 | Port
POICMC01122702282012 | Hostiles Encountered
MISCMC000402282012 | Security

Responders
- See Images From a Responder

NNCrewes
VLCrewes
NJAasche
NNNCrewes
Image/Video Display and Flow
# Mobile Implementation

<table>
<thead>
<tr>
<th>POIs</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missions</td>
<td>Image</td>
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</tbody>
</table>
Mobile Implementation

- Mobile implementation has the same capabilities as the web client
- Images/Video however can be taken directly from phone and uploaded
Current Status Limitations

- Ongoing project at the Naval Postgraduate School
- Field tests at Camp Roberts
- Native application only works for Android Phones
- Phone/Cloud Security issues
- Specializing SPARCCS for medical triage
Questions