Tactical MANET Project Requirements

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Abstract

This document lists details of the graduation project requirements and specifications.

Project Description

A `mobile ad-hoc network` communication system for military, for operations in areas with no internet infrastructure. The system connects the command center(s) with deployed units in two-way communications.

Nodes

All nodes are provided with wireless communication modules that follow `IEEE 802.11` standards.

There are 2 types of nodes: - Units: Devices with deployed units, connected with sensors, dashcam, audio input, keybad, GPS (or other position detection system) and heartbeat sensor. + Low power consumption. + Running on battery. + Low wireless range. + High mobility. + Operated by one person. - Command Centers: Fixed number of pre-known command centers computers. + Capabale of high power consumption. + More powerfull CPUs. + Bigger storage and RAM. + Operated by multiple peeople with multiple and wide screens. + Have wide wireless range. + Installed nearby the operation field, and has a connection to devices in the field. + Low (or zero) mobility.

Functional Requirements

Units

Units can:

- Stream video from dash cams to command center(s) only if the latter requested them. Video streaming terminates if the unit received end stream request, or the start request wasn't refreshed after certain timeout.
- Stream the heartbeat of the device owner and their position every some time period.
- Store all the recorded video and sensors data locally, in a rolling db, where new data override old data when there is no left space.
- If the owner requested:
    - Send audio messages from microphones.
    - Send code messages (every code has its predefined meaning.)
- Receive audio messages from command centers into a queue.
- Play received audio messages from the queue instantly.
- Receive and show code messages.
- Temporarily store audio and code messages. They must self destruct after certain time.
- Access stored audio and code messages and delete them.

Command Centers

Command centers can:

- Be accessed from multiple computers.
- Send audio commands and command codes (every code has its predefined meaning) to one (unicast), some (multicast) or all (boradcast) of the

deployed units devices.

- Store all received messages, video streams and other data (position and heartbeat).
- Show old archieved data.
- Play any audio message and video stream. Received messages don't autoplay, but the UI shows if a received message was already heard or not.
- Group units.
- Show map of all units, their group color.
- Show no-heartbeat warning.
- Show

Non-functional Requirements

Speed

The system allows nodes to communicate with low latency and high throughput.

Routing

The system uses a complex routing protocol that utilizes redundancy in the topology to increase communication reliability.

Running Platform

Unit device software runs on devices with low-power microprocessors running linux.

Security Requirements

- All transmitted data are encrypted.
- Authentiction is required for accessing command center by its UI.
- All stored data in command centers are encrypted.
- Units don't persist any data, messages self destruct after a defined time period.

Deliverables

- Application source code.
- Routing protocol implementation.
- Instructions on how to:
  - Attach inputs.
  - Configure devices.

    - Install and run all software
- A paper that describes the modification(s) to the routing protocol, if any.
- Experiments' results about latency and throughput using different mobility models.