USING PORTABLE RADIOS TO OPERATE MOBILE DATA TERMINALS

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Current Situation:
Police Cars in United States

- Mobile data terminal (MDT) – typically Panasonic Toughbook laptop with touchscreen
- Wireless connection to Law Enforcement Databases (DMV, NCIC)
  - Provides vehicle, registered owner, driver information
  - Obtain warrant and officer safety information
  - Computer-Aided Dispatch

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Problems

- Out-of-car, officer MDT access is by contacting Dispatch using portable "packset" radio
  - contributes to voice band saturation
  - may result in response delay
  - packset may not work in remote areas
- Need access to the officer's in-car MDT *for routine services* when he is out of the car – for example, foot patrol.

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Constraints

- Officer safety requires undivided attention (no PDAs or wireless keyboards)
- 15kg of equipment now (so no more)
  - gun (maybe two) and extra ammunition
  - flashlight
  - baton and pepper spray
  - packset radio
  - handcuffs
  - body armor

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Project 10-9

- Voice command
- Voice response
- RF Relaying
- I/O via packset

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Sample Dialog – Routine Traffic Stop

- Officer: Seven-Tom-Five, traffic
- Dispatch: Seven-Tom-Five, go ahead
- Officer: Adam Boy David one four six, I-205 north at exit two
- Dispatch: Copy. Twenty twenty-five
- **Officer: Computer - By number, seven six eight seven nine nine two**
- **MDT Client: John Smith is clear**
- Officer: Seven-Tom-Five, code four
- Dispatch: Copy. Twenty-twenty-seven

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Prototype Configuration

Officer Packset — MDT Transceiver — Relay

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Project 10-9 Service Request Features

- Personal RF channel from Packset to MDT transceiver
- MDT application processes voice input from MDT transceiver
  - if an MDT command, execute request on MDT, translate filtered text output to speech and transmit back to packset using MDT transceiver
  - otherwise, transmit *to* Dispatch using Relay
- Communications *from* Dispatch are transmitted from the Relay, to the MDT, and then to the packset using the MDT transceiver

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Project 10-9 RF Transmission Relay Features

- Packset transmissions that are not requests for MDT service are relayed to Dispatch
- Traffic from Dispatch is relayed to packset
- Allows VHF packsets to transmit and receive via UHF equipment in the car
- Extends service life and capabilities of older packsets
- Increases transmission range and reduces power consumption

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Project 10-9 Vehicle Manipulation Features

- MDT is connected to vehicle wiring system
- Allows control of emergency electrical equipment (light bar, alley and take-down lights, emergency flashers, etc.) as well as vehicle electronics (door locks) via voice commands issued from the packset

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Current Status

- VoiceXML grammars defined for a subset of the input space
- VoiceXML proof of concept recognizer developed using telephone access – recognizes voice commands and grammar over POTS

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Voice XML Grammar: *terminals*

- <alpha> = Adam, Boy, Charles, David, Edward, Frank, George, Henry, Ida, John, King, Lincoln, Mary, Nora, Ocean, Paul, Queen. Robert, Sam, Tom, Union, Victor, Willy, X-Ray, Yellow, Zebra,
- <digit> = Zero, Oh, One, Two, Three, Four, Five, Six, Seven, Eight, Nine
- In issuing commands, the character "**,**" indicates the speaker pauses and waits for a "click" or "ping" from the system to indicate it recognizes the command

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Voice XML Grammar: *sample production scenario*

Requesting information on a vehicle and registered owner based on license plate number.

- <u>Officer Says</u>: Oregon plate, <plate number> | Oregon custom plate, <custom plate number>
- <u>System Responds</u>: Clear, expires 11-26-06, RO clear | Clear, expires 11-26-06, RO has 1035 Info | Clear, expires 11-26-06, RO has no ODL | Clear, expires 11-26-06, RO has suspended ODL | Reported Stolen | Unable to locate
- <u>Grammar</u>:
  - <plate number> = $<alpha>^3<digit>^3$ | $<digit>^3<alpha>^3$ | <alpha> over <alpha> $<digit>^5$
  - <custom plate number> = $(<alpha> | <digit>)^{1-6}$

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Summary

- Novel approach to
  - improving field access to MDT
  - improving communication with dispatch
  - controlling vehicle features remotely
  - extending service life of legacy equipment
- Benefits
  - improved officer safety
  - increased efficiency
  - facilitates community policing

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