Evaluation of GammaGuard Radiation Measurement System for First Responders

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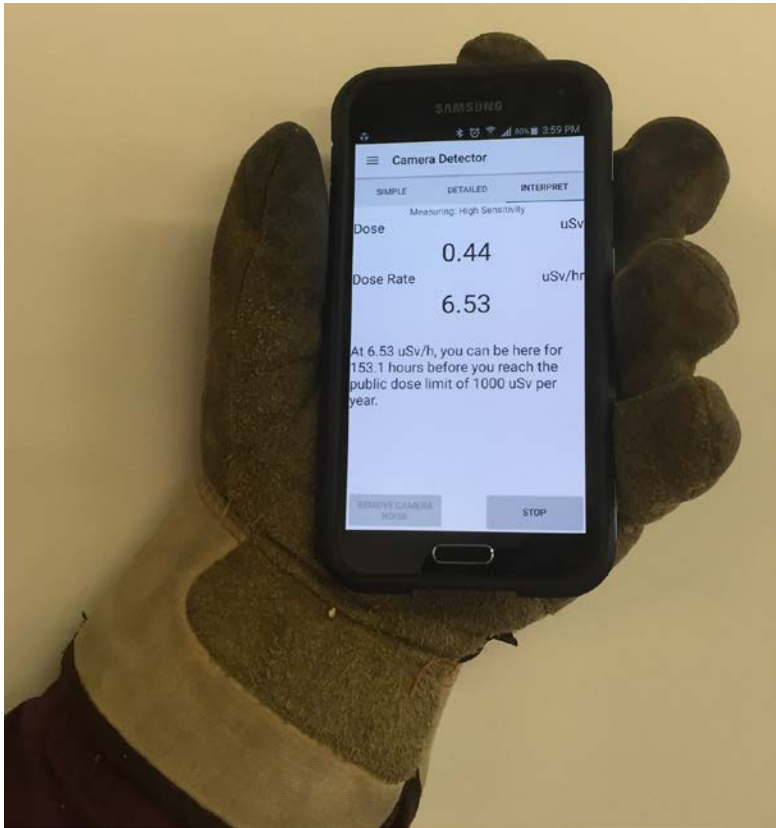
GammaGuard

Radiation Detectors for First Responders

Is it safe to rescue the driver? If you have a phone, you can find out!

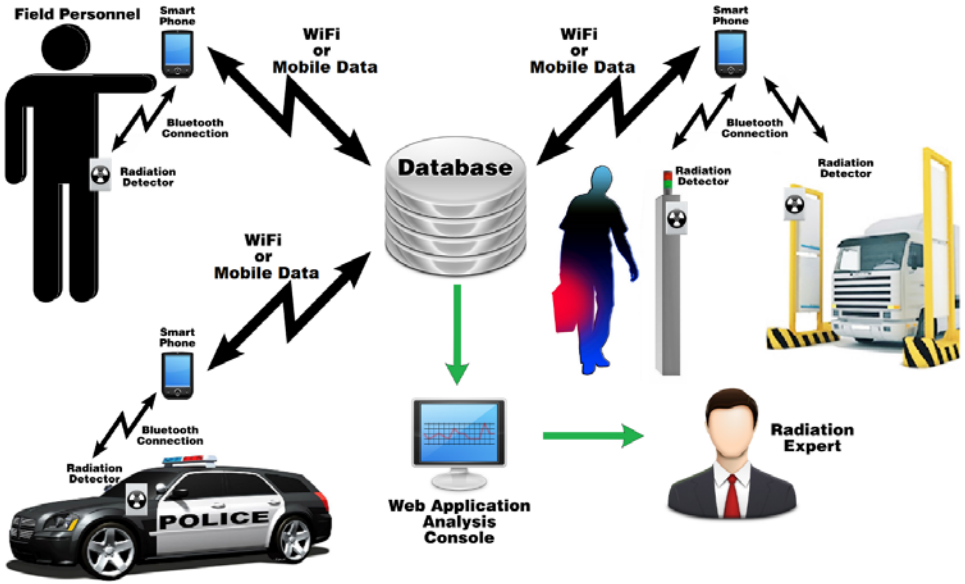
What is GammaGuard?

- Smartphone App that uses phone's camera as radiation sensor.
- Can connect to more sophisticated sensors by Bluetooth.



Imagine the Possibilities!

- No extra equipment to carry
- No or low cost
- Rapid mass deployment
- Rich, meaningful display
- Connectivity
- Will not saturate



The Partners

- Build in Canada Innovation Program (BCIP)
- Defence Research and Development Canada (DRDC) Emergency Responder Test and Evaluation Establishment (ERTEE)
- Canadian Nuclear Safety Commission (CNSC)
- Fire Departments (Saskatoon, Regina ….)
- University of Regina Collaborative Centre for Justice and Safety (CCJS)
- Environmental Instruments Canada Inc. (EIC)

Project was scheduled to be completed June 1. Extended to December 1, 2017.

The Gap

Emergency Response Guidebook (ERG) provides good guidance

Instrumentation can complicate things:

- Inappropriate instrument
  - wrong measurement range
  - wrong type of radiation
- Lack of guidance
  - "Run if it goes 'beep'"
  - "Can't put a contaminated person in the ambulance and the hospital won't take him anyway"
  - "A dead Responder can't help anyone"

Our Approach

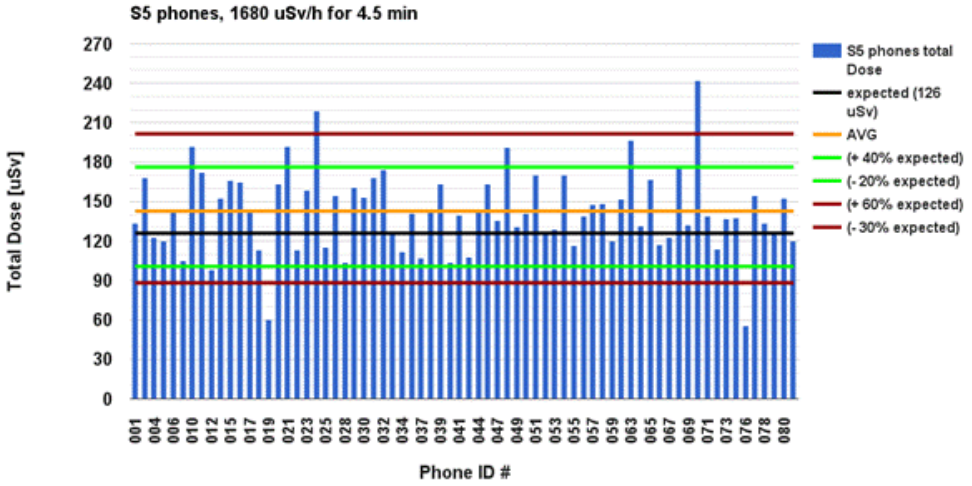
- Provide various equipment and see what is useful
  - High dose rate gamma meter (GammaGuard app, using camera) - very useful
  - Pancake - very useful
  - General purpose gamma meter - somewhat useful
  - Energy compensated gamma meter - too specialized for first response
  - High sensitivity gamma meter (~3cm x 5cm NaI) - too specialized
- Provide training
  - ½ day course
  - Use existing credible material. Use as little original material as possible.
  - Demonstrate equipment on every day materials (e.g. NoSalt)

Tests

- Type testing
  - In-house
  - Acsion Industries Inc.
  - Spencer Manufacturing
- Field testing
  - CNSC
    - 30 Inspectors
    - 5 First Response Training Group
    - 3 RSO
  - Fire Departments

Type Test Results

- Using phone's camera
  - Very low background
  - Does not saturate (tested to 300 Gy/h)
  - Reproducible results
- Using external detectors
  - Performance as expected from sensor (GM tubes, NaI(Tl)...)
  - Typical 'new product' issues (e.g. replaced tubes in the Energy Compensated detectors.)



CNSC Results (Preliminary)

- Overall satisfied, very likely to recommend
- Many good improvement suggestions
- We were able to incorporate suggestions quickly
- Without external detector, GammaGuard provides a go/no-go indication and good response in high dose rates.

Fire Dept Results (Verbal)

- Responded to 8 'white powder' calls
  - Radiation is checked first
  - Use camera based mode as initial go/no-go indication
  - Use pancake to see if there is any radiation
- Very receptive to Smartphone technology
  - Like the interpretation capability
    - Calculate stay time
    - Green, red yellow indicators
    - Make it even easier (e.g. recorded verbal instructions)
- Invited 5 rural Fire Departments to participate in the project

Summary

- Need for an easy to use, inexpensive, always available radiation detector
- Use external detectors to supplement functionality
- One UI, one learning curve
- Smartphone platform very well received