

Ninth Algorithm Development for Security Applications Workshop (ADSA09):

New Methods for Explosive Detection for Aviation Security

Workshop Objectives



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Conclusions / Questions

- What new methods exist to detect explosives?
- What methods should have been presented?
- What are their strengths and weaknesses?
- How to accelerate their deployment?
- Why are x-rays commonly used?
 - What happened to neutrons?
- How to involve parties in addition to the equipment vendors?

Bin Laden Dead, But ...



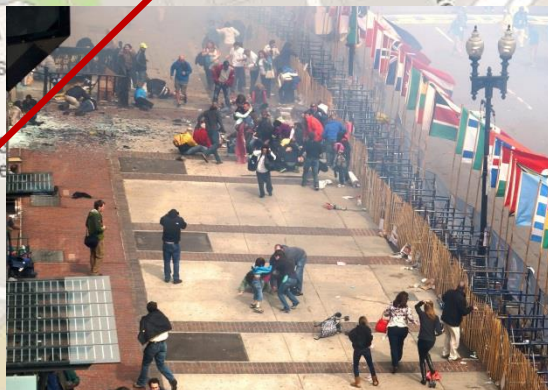
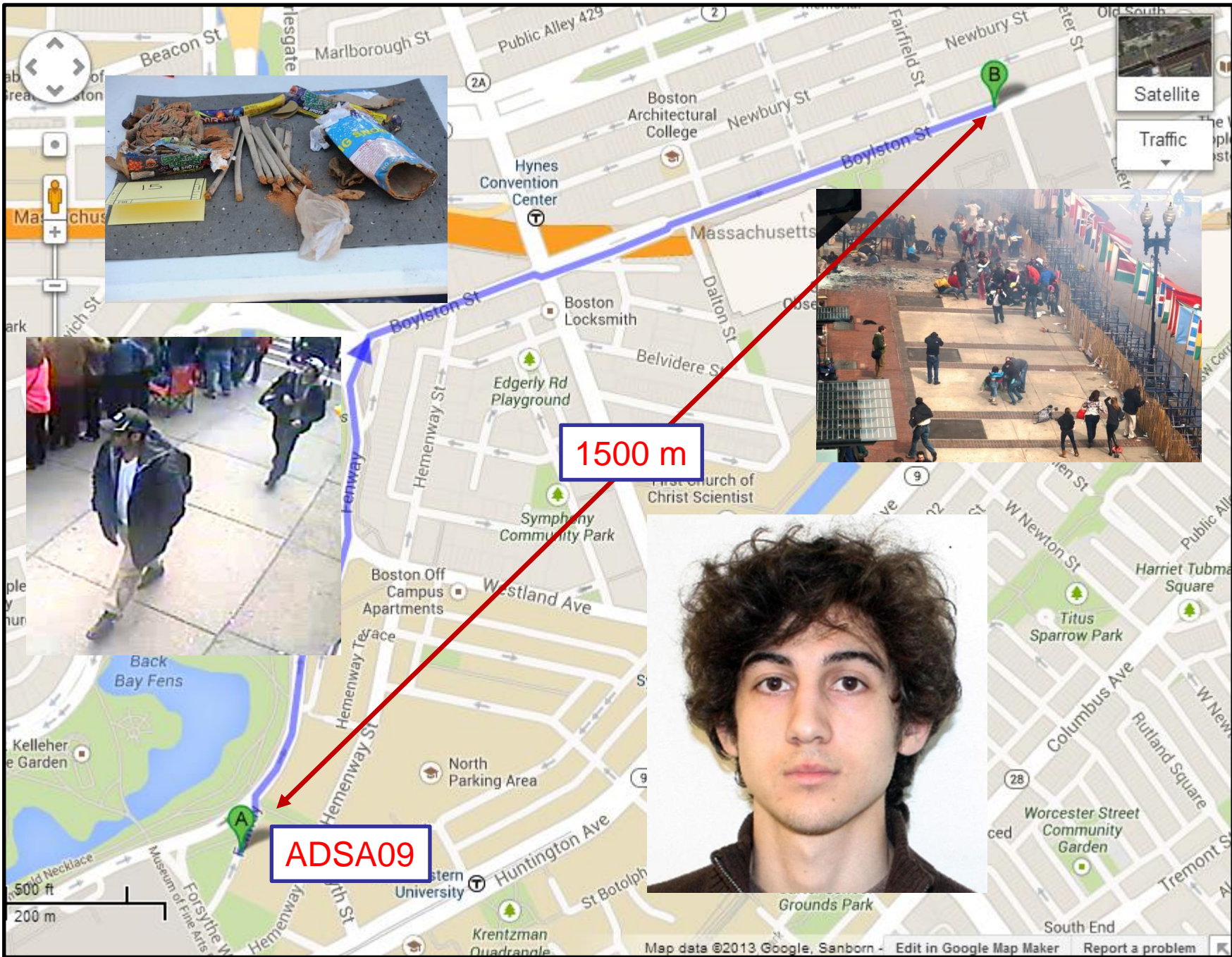
10 News Investigators find memo warning about terrorist "dry-runs" on airplanes



Orlando, Florida -- It was a flight bound for Florida, and some airline pilots believe it also may have been a dry-run for terrorists.

The 10 News Investigators have obtained an internal memo that details a frightening incident that brings back memories of the September 11, 2001 terrorist attacks.





1500 m

ADSA09



Problem

- Terrorists still trying to take down airplanes
- Terrorists are making home-made explosives (HME)

DHS Goals

- Vendors doing an excellent job
- But, need
 - Increase probability of detection (PD)
 - Decreased probability of false alarm (PFA)
 - Detect more threats including wide-variation of home-made explosives (HMEs)
 - Reduced mass
 - Reduced labor costs
 - Eliminate human in the loop if possible
 - New algorithm ideas
 - New people working in the field

DHS Tactics

- Augment abilities of vendors with 3rd parties
 - Academia
 - National labs
 - Industry other than the vendors
- Create centers of excellence (COE) at universities
- Hold workshops to educate 3rd parties and discuss issues with involvement of 3rd parties
 - Algorithm Development for Security Applications (ADSA)

Detection Requirements

- Probability of detection (PD)
- Probability of false alarm (PFA)
- # types of threats
- Minimum mass
- Minimum sheet thickness
- Total cost of ownership
 - Purchase price
 - Siting
 - Labor
 - Maintenance
- Extensibility
- Ability to fuse
- Compatible with risk-based screening
- False alarm resolution methodologies
- Siting
- HVAC, space, weight shielding
- Throughput
- Safety

Questionnaire

- Request for everyone to answer questions preferably during the workshop
- Hand in at end of workshop or email
- Typed or handwritten acceptable
- Name is optional
- Also available via Survey Monkey
 - <https://www.surveymonkey.com/s/ADSA09Survey>



SurveyMonkey.com
because knowledge is everything

Reception and Dinner

- Reception and dinner tonight part of workshop
- Student poster session during the reception before dinner
- ALERT Phase II kickoff before dinner

Minutes & Participant Identification

- Minutes will be taken, but edited for final report
- Please identify yourself and institution first time you speak or ask questions

Internet Access

- Most invitees will be fine with the *NUwave-guest* access
- Run into problems (e.g., VPN) - use the following SSID: *adsa_guest*
 - Individual usernames and passwords will be provided by front desk staff

Acknowledgements

- Northeastern University (NEU)
- Awareness and Localization of Explosives-Related Threats (ALERT) DHS Center of Excellence
- Department of Homeland Security (DHS)
- Presenters
- Participants
- Students



Logistics

- Melanie Smith^{***}
- Deanna Beirne
- Kristin Hicks
- Teri Incampo
- Seda Gokoglu
- Can Yegen
- Anne Magrath

Let them know if you need support during or after workshop.

Rule #1 – Open Discussions

- This is a workshop
- Conversation and questions expected at all times, especially during presentations
- Moderator responsible for keeping discussions focused
- Not grip-and-grin



Rule #2 – Public Domain

- Do not present classified, SSI, FOUO and proprietary material
- Presentations, minutes and proceedings will be placed in the public domain
 - After review for SSI and classified material

Rule #3 – Speaker Instructions

- 2nd slide has to be “so what who cares”
 - State how technology will improve explosive detection
 - Optimum presentation: stop at 2nd slide
- Expect discussion during presentation
- Allocate 50% of time slot for discussion
- Do not repeat material from prior speakers
- Delete math
- Concentrate on results
- Details into backup slides
- Delete slides now if necessary
- Put presentation on ALERT laptop in advance.

Beware of Moderators!



Vendors*

- DO's
 - Clearly communicate your expectations
 - Be Open: Accept new ideas
 - Share Data
 - Actively manage the project (find your 'Man from Milwaukee'). Invest more than money!
- DON'T 's
 - Don't be paranoid about protecting your IP, you're not that unique!
 - You're Not!
 - Don't expect 3rd parties code/design to work right out of the box, invest in learning and applying/improving the idea. There are no free lunches.



Academics/3rd Party

- DO's
 - Research the Problem before you approach vendors
 - Communicate/Manage expectations
 - Insist on involving the vendor in your research group
 - Get approval for publications
 - Work on a schedule, deadlines are real!
- DON'T 's
 - Stop solving problems that are only problems because they make good papers but hold no practical merit.
 - Don't solve problems that don't need to be solved (Research)
 - Don't ignore the vendors' experience. You really do not understand the problem better than they do. You really don't!
 - Under-promise and over-deliver
 - Talk to your technology transfer people, not every idea is worth \$10M

*Slide from Richard Bijjani's ADSA07 presentation

Final Remarks

- “Terrorism causes a loss of life and a loss of quality of life,” Lisa Dolev, Qylur
- Need improved technology
- Thank you for participating

