



OSAC Research Needs Assessment Form

Title of research need: Use of Technology for Crime Scene Documentation

Keywords: documentation, paperless, mobile, wireless, laser scanning, digital, photography, measurement uncertainty

Submitting subcommittee(s): Crime Scene Investigation **Date Approved:** Sep. 30, 2016

(If SAC review identifies additional subcommittees, add them to the box above.)

Background information:

1. Description of research need:

A wide range of technological advances have further the ability of investigators to document crime scenes. Access to these advances may be limited by budget, personnel, security, and/or training. Putting aside potential limitations how can crime scene personnel harness advances in technology that pertains to mobile, paperless, electronic, and/or digital documentation. How does digital technology compare to traditional analog or physical means of scene documentation in terms of precision, accuracy, efficiency, efficacy, margin of error, reproducibility, general limitations, and limitations due to environmental incompatibility?

2. Key bibliographic references relating to this research need:

1. Agosto, E., Ajmar, A., Boccardo, P., Tonolo, F. G., & Lingua, A. (2008). Crime scene reconstruction using a fully geomatic approach. *Sensors*, 8(10), 6280–6302.
2. Baber, C., Smith, P., Butler, M., Cross, J., & Hunter, J. (2009). Mobile technology for crime scene examination. *International Journal of Human-Computer Studies*, 67(5), 464-474.
3. Baltasvias, E. P. (1999). A comparison between photogrammetry and laser scanning. *ISPRS Journal of Photogrammetry and Remote Sensing*, 54(2), 83–94.
4. Bolic, M., Borisenko, A., & Seguin, P. (2012). Automating Evidence Collection at the Crime Scene Using RFID Technology for CBRN Events. *Forensic Science Policy & Management: An International Journal*, 3(1), 3-11.
5. Cavagnini, G., Scalvenzi, M., Trebeschi, M., Sansoni, G. (2007). Reverse engineering from 3D optical acquisition: Application to crime scene investigation. London, UK: Taylor and Francis Group
6. Haag, M. (2008). The accuracy and precision of trajectory measurements. *Association of Firearm and Tool Mark Examiners (AFTE) Journal*, 40, 145–182.
7. Komar, D. A., Davy-Jow, S., & Decker, S. J. (2012). The use of a 3D laser scanner to document ephemeral evidence at crime scenes and postmortem examinations. *Journal of Forensic Sciences*, 57(1), 188–191.
8. RTI International. (2016). Landscape Study on 3D Crime Scene Scanning Devices. The National Institute of Justice’s (NIJ’s) Forensic Technology Center of Excellence (FTCoE).
9. Sansoni, G., Trebeschi, M., & Docchio, F. (2009). State-of-the-art and applications of 3D imaging sensors in industry, cultural heritage, medicine, and criminal investigation. *Sensors*, 9(1), 568–601.

3a. In what ways would the research results improve current laboratory capabilities?

Research in this area would improve crime scene documentation by modernizing current practices and improving workflow. An overarching goal of this research is to reduce human error and expedite data transfer. Other goals include improved note-taking, evidence tracking, the elimination of transcription / hand-drawn sketches, and general interfacing with computer systems to simplify back-end work and data distribution. Improving accuracy of measurements and the ability to create reproducible results from scene documentation would infuse scientific rigor into crime scene examination.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

This area of research would infuse the latest technological advances into crime scene documentation to enable streamlined data interpretation. Research would provide a better understanding of error within crime scene documentation.

3c. In what ways would the research results improve services to the criminal justice system?

Research results could provide solutions for real-time data for investigators, minimize error in data collection and transfer, and produce better products for presentation in court as well as streamlining the peer-review process of reports.

4. Status assessment (I, II, III, or IV): II

| | Major gap in current knowledge | Minor gap in current knowledge |
|--|--------------------------------------|--------------------------------------|
| No or limited current research is being conducted | I | III |
| Existing current research is being conducted | II | IV |

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.

Subcommittee

Approval date: Sep. 30, 2016

(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)

SAC

1. Does the SAC agree with the research need? Yes No

2. Does the SAC agree with the status assessment? Yes No

If no, what is the status assessment of the SAC:

Approval date: Feb 9, 2017

(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)