Scientific & Technical Review Panel Final Report for OSAC 2021-S-0037 Standard Guide for Forensic Photogrammetry

Organization of Scientific Area Committees (OSAC) for Forensic Science

STRP Final Report
OSAC 2021-S-0037 Standard Guide for Forensic Photogrammetry

Organization of Scientific Area Committees (OSAC) for Forensics Science
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Report Summary:

The Scientific and Technical Review Panel (STRP) for "Standard Guide for Forensic Photogrammetry" is an independent panel appointed by the National Institute of Standards and Technology (NIST). A STRP is established with a range of experts to consider how well a standard meets the needs of the forensic science, law enforcement, and legal communities, and to recommend improvements to the standards under review. The STRP appreciates the efforts of Wendy Dinova-Wimmer, Video/Imaging Technology and Analysis (VITAL) affiliate, while serving as the subcommittee liaison to this STRP during the review process.

The STRP began its review process with a kickoff meeting on October 26, 2021, and concluded with this STRP final report. The panel reviewed the draft standard and prepared comments for the Video/Imaging Technology and Analysis (VITAL) Subcommittee.

Report Components:

The STRP reviewed this draft standard against OSAC's *STRP Instructions for Review* which include the following content areas: scientific and technical merit, human factors, quality assurance, scope and purpose, terminology, method description and reporting results. The details below contain a brief description of each reviewed content area and the STRP's assessment of how that content was addressed in the Draft OSAC Proposed Standard.

1. **Scientific and Technical Merit:** OSAC-approved standards must have strong scientific foundations so that the methods practitioners employ are scientifically valid, and the resulting claims are trustworthy. In addition, standards for methods or interpretation of results must include the expression and communication of the uncertainties in measurements or other results.

1.1 The STRP believes that this document has scientific and technical merit, and it will have a significant impact in the field of forensic photogrammetry. References include standards and best practices developed by Scientific Working Groups, as well as peer-reviewed publications. The descriptions of the photogrammetric methodology and interpretation of results are adequately thorough for common forensic cases, covering both sensor/hardware and human sources of uncertainty. Multiple appendices have been provided as workflow examples, which will be useful for practitioners using this standard.

2. **Human Factors:** All forensic science methods rely on human performance in acquiring, examining, reporting, and testifying to the results. In the examination phase, some standards rely heavily on human judgment, whereas others rely more on properly maintained and calibrated instruments and statistical analysis of data.

2.1. The STRP believes that this standard adequately addresses human factors concerns. Of particular note, the standard: (a) explicitly prohibits exposure to task-irrelevant, and therefore potentially biasing, information; (b) stipulates that results should be reviewed by a second examiner who is blind to the original examiner's conclusion; (c) recognizes and accounts for sources of measurement uncertainty and potential error; and (d) requires the thorough and contemporaneous documentation of the analytic procedure, including any task-relevant contextual information that is considered -- all of which are consistent with recommended best practices derived from the social scientific research literature.

3. **Quality Assurance:** Quality assurance covers a broad range of topics. For example, a method must include quality assurance procedures to ensure that sufficiently similar results will be obtained when the methodology is properly followed by different users in different facilities.

3.1. The STRP believes that quality assurance topics are properly covered in this draft standard. Recommended photographic and video techniques, the proper production of working copies, and the protection, retention and storage of visual media are discussed throughout the document. Additional information concerning proper documentation of equipment, lenses, evidence assessments, observations, decisions, opinions, and measurement reporting requirements for technical review are also contained in this guide. Helpful appendices list considerations of measurement error and confidence when reporting quantitative analysis results, and examination "workflows" are included for typical photogrammetry questions in investigations.

4. **Scope and Purpose:** Standards should have a short statement of their scope and purpose. They should list the topics that they address and the related topics that they do not address. Requirements, recommendations, or statements of what is permitted or prohibited do not

belong in this section.

4.1. The STRP believes that the scope and purpose of the draft "Standard Guide for Forensic Photogrammetry" is appropriate. The scope includes three relevant statements. The first articulates the topical focus of the document, defined as basic information on conducting photogrammetric examinations. This is followed by two additional statements that caution the reader that the document is not intended to be used as a step-by-step practice, nor can it replace the training, education and experience needed to master the knowledge and skills relevant to photogrammetric examinations.

4.2. Although the basic scope and purpose are believed appropriate, the STRP asks that item 5.2 of the document be updated. Section 5 reports "Significance and Use" and item 5.2 states the following: *"This guide addresses image processing and related legal considerations in the following three phases of photogrammetric examination: Evidence Preparation, Methodology, Interpretation of Results."* Regarding statement 5.2, since neither specific image processing tasks, nor specific legal considerations

are directly addressed, the STRP recommends that this "purpose" statement be revised to ensure better alignment with the reported scope.

5. **Terminology:** Standards should define terms that have specialized meanings. Only rarely should they give a highly restricted or specialized meaning to a term in common use among the general public.

5.1. The STRP finds that the draft standard defines terms with specialized meaning appropriately and is consistent with terms associated with digital image processing in ASTM E2825 and E2916. Section 3 of the draft standard avoids defining commonly used terms and provides accurate, clear, and concise definitions of terms relevant to the specific field of forensic photogrammetry that are discussed throughout the standard.

6. **Method Description:** There is no rule as to the necessary level of detail in the description of the method. Some parts of the method may be performed in alternative ways without affecting the quality and consistency of the results. Standards should focus on standardizing steps that must be performed consistently across organizations to ensure equivalent results. Alternatively, standards can define specific performance criteria that are required to be demonstrated and met rather than specifying the exact way a task must be done. For example, it may be enough to specify the lower limit for detecting a substance without specifying the equipment or method for achieving this limit of detection.

6.1. The STRP believes that the description of the forensic photogrammetry methodology is both general enough to cover multiple use cases and detailed enough to allow examiners with variable hardware accessibility to perform their analyses. The

methods include using original recordings from a scene, reproducing the recording conditions if necessary, calibrating measurement devices, mitigating measurement uncertainty, and quality control.

7. **Reporting Results:** Methods must not only be well described, scientifically sound, and comprehensive but also lead to reported results that are within the scope of the standard, appropriately caveated, and not overreaching.

    7.1. The STRP believes that the Reporting Results section of the draft standard provides a comprehensive and scientifically sound discussion of reporting issues associated with photographic and video techniques used in forensic investigations. As noted in the human factors section, the recommended reporting of various sources of uncertainty provides sufficient information to allow report recipients to evaluate the merit of the results and to avoid over interpretation. Appendix 1 in the draft standard is particularly useful, clarifying the approaches to report writing and the need for context when reporting quantitative and analytical results.