

OSAC RESEARCH NEEDS ASSESSMENT FORM



Title of research need:	Limitations of Digitally Captured Signatures (DCS) in Forensic Document Examinations
Keywords:	Digital capture, signatures, FDE

R&D Need Rank: Low, Medium, High	Medium	SAC Approved Date:	March 20, 2026
--	---------------	---------------------------	----------------

Submitting subcommittee(s):	Forensic Document Examination
------------------------------------	-------------------------------

Research Need Summary:

The purpose of these research needs is to build a stronger scientific foundation for forensic science standards. The information provided herein will help to evaluate and strengthen existing standards, and/or fill any standards related gaps. In the space below, please provide a brief narrative of the need to be addressed. This should include:

- The identity of any specific standards that would be affected/improved/evaluated
- A discussion on gaps that exist within the standards or standards related gaps that need to be filled
- How this work would fill those gaps
- An overview of any current or past research efforts that may be relevant to this effort
- A discussion regarding how this research might improve current laboratory capabilities and/or forensic services within the criminal justice system
- Any relevant references

<ul style="list-style-type: none">- While ASB Standard 197 Standard for the Examination of Digitally Captured Signatures (a standard for the examination of Digitally Captured Signatures (DCS) by forensic document examiners) is being developed there are no current published standards on Digitally Captured Signatures (DCS). Relevant research into the current state of DCS technology, especially in the United States, could affect this work.- Gaps currently exist in the knowledge about this subject as it is still a relatively new concept that is not fully exploited forensically and is not as widely adopted in the United States and other countries as it is in Europe (where most of the current research has come from).- This work could identify the current limitations that could potentially affect examinations that include or focus on digitally captured signatures (both in regard to questioned and known material). It could also offer solutions or alternative methods to improve these examinations, if or when they become more prevalent.- A large body of research has been undertaken, principally within Europe by members of the European Network of Forensic Handwriting Experts (ENFHEX). This work, and other relevant research, includes:<ul style="list-style-type: none">o <i>The Electronic Handwritten Signature (Digitally Captured Signature – DCS) as an Equivalent to the Traditional Pen & Paper Signature</i> (Nikolaos Kalantzis and Adrian Mitrofan)o <i>Using acceleration/deceleration plots in the forensic analysis of electronically captured signatures</i> Nicolaidis, K. A. (2012).. <i>Journal of American Society of Questioned Document Examiners</i>, 15(2), 29–43.o <i>Conducting a forensic examination of electrically captured signatures</i>. Flynn, W.J. (2012). <i>Journal of the American Society of Questioned Document Examiners</i>, 15(1), 3–10.o <i>Recommendations for Capturing Signatures Digitally to Optimize their Suitability for Forensic Handwriting Examination</i>, Geistová-Čakovská B., Kalantzis N., Dziedzic T., Fernandes C., Zimmer J., Branco M.J., Heckerroth J., Axelsson Spjuth K., Kupferschmid E., Vaccarone P.,

Kerkhoff A. (2020), Journal of Forensic Sciences, available at: doi.org/10.1111/1556-4029.14627

- *Examining authenticity: An initial exploration of the suitability of handwritten electronic signatures.* Heckerth, J., & Boywitt, C.D. (2017) Forensic Science International, 275, 144-154.
- *Features of Digitally Captured Signatures vs. Pen and Paper Signatures: Similar or Completely Different?* Heckerth J, Kupferschmid E, Dziedzic T, Kalantzis N, Geistová-Čakovská B, Fernandes C, Branco MJ, Spjuth KA, Kerkhoff A, Vaccarone P, Zimmer J, Schmidt P, Forensic Science International (2020), available at: doi.org/10.1016/j.forsciint.2020.11058
- *The challenge of comparing digitally captured signatures registered with different software and hardware,* Zimmer, J., Kalantzis, N., Dziedzic, T., Heckerth, J., Kupferschmid, E., Fernandes, C., Geistová Čakovská, B., Branco, M., Axelsson Spjuth, K., Vaccarone, P., & Kerkhoff, A Forensic Science International, Volume 327, 2021, 110945, ISSN 0379-0738, available at: doi.org/10.1016/j.forsciint.2021.110945
- *Appendix 6 - Overview procedure for forensic examinations and comparisons of Digitally Captured Signatures and Handwritten Entries* European Network of Forensic Handwriting Experts (ENFHEX) Best Practice Manual September 2022
- Further research into this subject would improve current laboratory capabilities by helping them determine what data (if available) would be relevant for signature examinations and how it could best be used in the examination process. There are several broader questions that the field would like to have answered:
 - What types of data associated with digitally captured signatures are relevant to forensic document examiners (FDEs)?
 - What are the appropriate methods for the collection and preservation of this data?
 - Where is the boundary between data relevant to FDE and information that falls under digital evidence analysis?
 - How can relevant data be effectively incorporated into FDE examinations of questioned and/or known signatures?
 - Are the current limitations only an issue for FDEs practicing in the United States or would FDEs in other countries find this research beneficial?
 - Are any identified limitations dependent on geographic or jurisdictional factors?
 - How can FDEs utilize digitally captured signatures when they are included within a body of known writing?
 - If DCS is accepted, would an FDE examine just the DCS to assist in rendering a handwriting/signature conclusion?
 - If relevant data is available, how could it potentially change a handwriting/signature conclusion?
 - What common problems might an FDE run into if DCS are included in or the focus of examinations given the current limitations?
 - What actions could examiners take to mitigate or prevent these issues before or during the examination process?

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