FISC Bulletin Board
IAAI Fire Investigation Standards Committee (FISC)

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Organization of Scientific Area Committees for Forensic Science: OSAC 2.0

Preface and Outline

Due to its length, this article is published partly in print (in this issue of the Fire & Arson Investigator Journal). The entire article is published online. Below is the article outline. Sections 1 to 4 (with the accompanying endnotes) are reproduced in the Spring 2021 edition of the Journal, Volume 71, Issue 4. The entire article is available to IAAI members at the IAAI website (sign-on required). Go to the IAAI website at https://www.firearson.com/; click the "Publications" tab; and then scroll down and click the "Fire & Arson Investigator Journal" link. Scroll down to the 2021 Journals section and open the link to this article.

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1. Introduction

To stay current on standards activities for fire investigations, it is necessary to track the activities of the Organization of Scientific Area Committees for Forensic Science (OSAC). To sum up, OSAC has recognized fire investigations as a forensic science discipline. OSAC works to develop and promote forensic science standards, which include standards and guides that apply to fire investigations such as those promulgated by the National Fire Protection Association (NFPA). It encourages the use of these standards by forensic science practitioners to improve the reliability of their opinions. It urges the legal system to use OSAC approved standards to improve the reliability of expert testimony. For each forensic science discipline that falls under the OSAC umbrella, including fire investigations, OSAC also assesses weaknesses in their scientific foundations and identifies research needs to fill these gaps. Therefore, the fire investigation community stands to benefit from OSAC's expertise, resources, and initiatives. The first step in utilizing these benefits is to learn more about OSAC.

OSAC has been a topic of this column on prior occasions.

- In the April 2016 issue, we introduced OSAC in the context of how it was working alongside the National Commission on Forensic Science to implement the 2009 report published by the National Research Council of the National Academy of Sciences entitled Strengthening Forensic Science in the United States: A Path Forward[1] (the NRC/NAS Report).[2]
- In the January 2017 issue, we explained how fire investigations had evolved into a forensic science discipline. Further, we explored OSAC's role in implementing recommendations of the NRC/NAS Report, which includes reviewing fire and explosion investigation scientific literature and developing a research agenda addressing the needs, methodologies, and processes for fire and explosion investigations.[3]
- In the October 2017 issue, we described how two organizations, with OSAC being one, had identified deficiencies in the foundational research for fire investigations.[4] The OSAC reports on these issues are called "Research Needs Assessments."

These and other FISC Bulletin Board articles are available at no cost for IAAI members to download on the IAAI website, Fire & Arson Investigator Journal webpage.[5] While this is a stand-alone article, those looking for further information about OSAC as it pertains to fire investigations are invited to consult these earlier FISC Bulletin Boards.

This article outlines information about OSAC, highlights changes in effect with the launching of OSAC 2.0, and provides updates on its projects relating to fire investigations. OSAC 2.0 is restructuring of the organization based on the experience in operations. The reorganization slims down the organization and makes the processes more efficient. We begin with a brief summary of how fire investigations became identified as a forensic science discipline.

2. Fire Investigations is a Forensic Science Discipline Encompassed by OSAC

OSAC was formed to help implement the NRC/NAS Report. That report used the term "forensic science" to include a broad arrange of activities[6] recognizing that some of them "might not have a well-developed research base, are not informed by scientific knowledge, or are not developed within the culture of science."[7] The report did not address fire investigations as among the major forensic science disciplines selected for specific review.[8] However,

the report did contain an explicit reference to the need for arson investigations to be put "on a more solid scientific footing,"[9] especially with respect to the "natural variability of burn patterns and damage characteristics and how they are affected by the presence of various accelerants."[10] In other words, the report questioned the reliability of some of the fire effects and patterns investigators use as indicators of an incendiary fire.

It might be argued that the NRC/NAS Report is ambiguous about whether its authors intended to treat fire investigations as a forensic science discipline. Nevertheless, OSAC has clearly embraced it as such, with "Fire & Explosion Investigation" being one of OSAC's discipline-specific forensic science subcommittees.

In the next sections, we begin by outlining the organizational structure of OSAC and presenting its component entities. Next, we describe OSAC's mission to develop and promote scientifically sound forensic science standards. Only standards that are technically reliable and of high quality are published on the OSAC Registry.[11] This article then explains the benefits of OSAC to the fire investigation community. Finally, we introduce the OSAC subcommittees whose activities involve fire investigations, with a focus on the Fire & Explosion Investigation Subcommittee.

3. OSAC 2.0 Organizational Structure

OSAC was originally founded in 2014 through a collaborative effort of the National Institute of Standards and Technology (NIST) and the U.S. Department of Justice. In 2020, OSAC 2.0 was launched, incorporating modifications to improve OSAC processes while fortifying the technical review of proposed standards.[12]

OSAC is a hierarchical organization of five hundred forensic science experts (volunteers) supported administratively by NIST. OSAC 2.0 is composed of a Forensic Science Standards Board (FSSB), seven Scientific Area Committees (SACs), twenty-two discipline-specific subcommittees, and FSSB Resource Task Groups.[13] The FSSB coordinates the activities of the SACs, subcommittees, and interdisciplinary committees.[14] It also addresses issues related to the development and promulgation of OSAC standards.[15] Below is a diagram of OSAC's new organization.

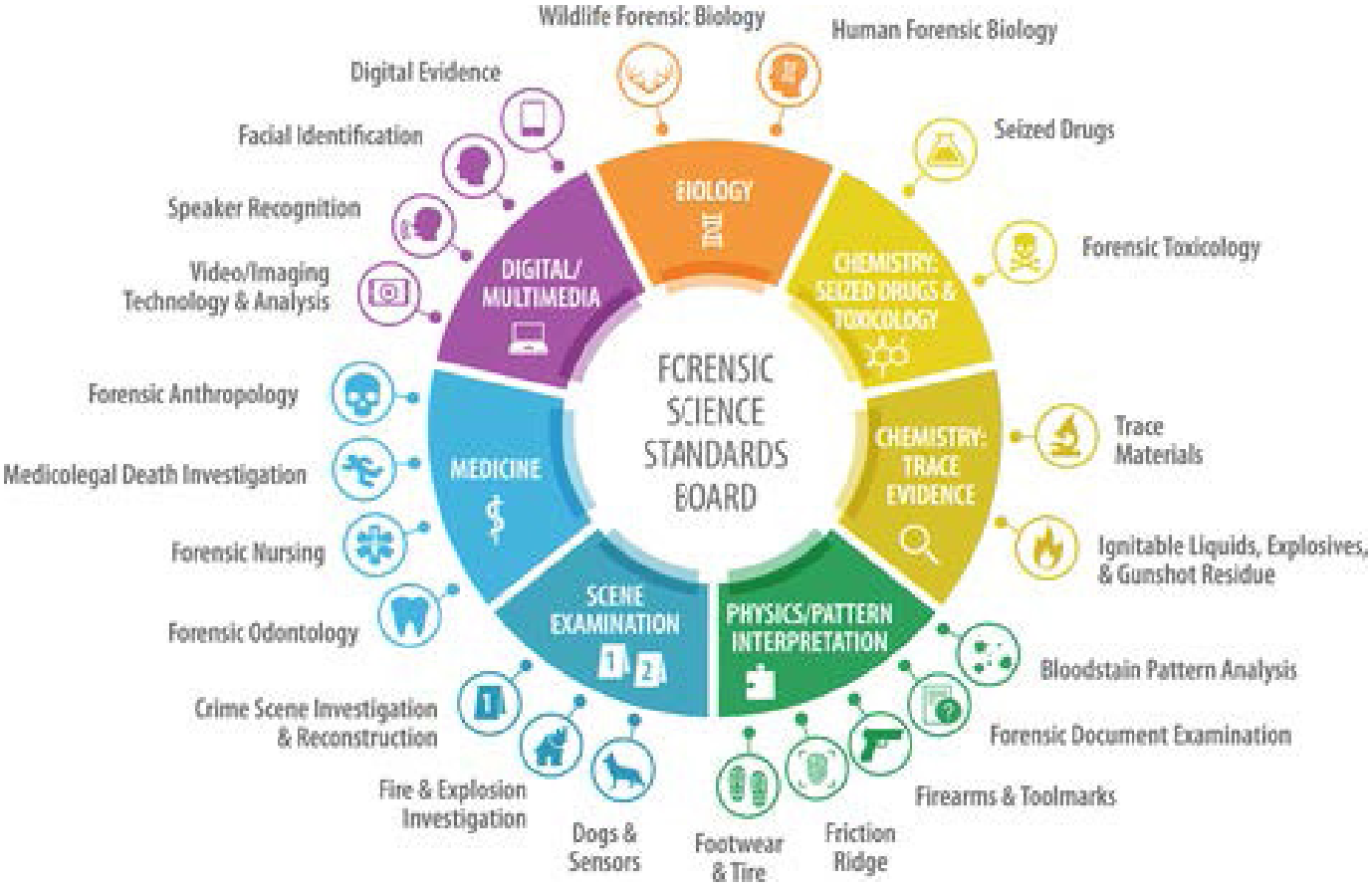

Figure 1: OSAC Organizational Structure[16]

The diagram shows the FSSB in the center, surrounded by the SACs. The subcommittees are listed in the outer ring of the circle.

OSAC subcommittees consist of experts in each forensic science discipline who concentrate on standards and guidelines relating to their specific discipline. Two of the subcommittees of interest are the Fire & Explosion Investigation

and the Dogs & Sensors subcommittees, both part of the Scene Examination SAC (shown at the bottom of the diagram). The third subcommittee fire investigators will want to track is the Ignitable Liquids, Explosives & Gunshot Residue subcommittee, which is part of the Chemistry: Trace Evidence SAC (shown on the center-right of the diagram). We will talk about these three subcommittees in Parts 7 and 8 of this article.

Not depicted on the diagram are the interdisciplinary task groups. As of March 2021, there are five of them, serving as resources for the FSSB, SACs, and subcommittees. They have expertise in certain subject matters as suggested by the title of each task group:

- **FSSB Human Factors Task Group**: Provides perspectives on human factors issues such as human judgment, decision making, observer effects, communication, and cognitive bias.[17]
- **FSSB Legal Task Group:** Provides input on standards, technical publications, definitions, and other OSAC and FSSB publications with a focus on their legal impacts and on the presentation of forensic science results within the legal system.[18]
- **FSSB Quality Task Group:** Provides guidance and resources on issues of quality, such as quality assurance/control (e.g., root cause analysis, problem solving, and risk management), and the use of tools to perform assessments or audits on quality control requirements. It also submits comments concerning the quality aspects of standards and other OSAC and FSSB documents.[19]
- **FSSB Statistics Task Group:** Is available to consult on statistics related issues and to provide comments on standards and other OSAC and FSSB documents having to do with statistical issues related to forensic science results.[20]
- **FSSB Terminology Task Group:** Is responsible for the overall management of the OSAC Lexicon[21] (which contains over 4,000 terms organized by forensic discipline), and provides training and consultation to the FSSB and OSAC committees on terminology related issues.[22]

For those who were familiar with OSAC's original structure as outlined in previous FISC Bulletin Board articles, changes in OSAC 2.0 include:[23]

1. The creation of a SAC for forensic medicine;
2. Separating the chemistry SAC into two SACs, each focused on a different aspect of forensic chemistry: The Chemistry: Seized Drugs and Toxicology SAC and the Chemistry: Trace Evidence SAC. The latter SAC will now oversee the work of the newly re-formed "Explosives, Ignitable Liquids and Gunshot Residue Subcommittee," formerly the "Fire Debris and Explosives Subcommittee."
3. Closely related subcommittees have been combined, reducing their number from 25 to 22.
4. Interdisciplinary subcommittees are now formed to address topics that extend over multiple forensic science disciplines.[24]

More information about OSAC's mission, organizational priorities, and the roles and responsibilities of its various entities is available on the NIST-OSAC website (https://www.nist.gov/osac). Those interested in applying to join OSAC or wanting to learn more about OSAC roles and responsibilities should consult the "Apply to Join OSAC" webpage, available here: https://www.nist.gov/osac/apply-join-osac. OSAC membership positions have three-year terms and are eligible for reappointment to a second three-year term. For members who want to continue their membership must step down for at least a year before requesting reappointment.

4. Representation from Fire Investigations on The FSSB

As is apparent from the organizational structure, the FSSB is a very influential part of OSAC. Therefore, a fair question is whether the FSSB is attuned to the issues and concerns of the fire investigation community. In this respect it is noteworthy that in 2020 Dr. Craig Beyler was promoted to Chair the Scene Examination Scientific Area Committee (SAC). This SAC oversees the work of the Fire and Explosion Investigation Subcommittee, the Dogs and Sensors Subcommittee, and the Crime Scene Investigation Subcommittee. As the Chair of the SAC, Beyler is also a member of the FSSB. Beyler was promoted from his former position as Chair of the OSAC Fire & Explosion Investigation Subcommittee. Phil Crombie, Jr., 2nd Vice President, Forensic Laboratory, Travelers, replaced Beyler as the Chair of the OSAC Fire & Explosion Investigation Subcommittee.

Dr. Beyler, now Technical Director Emeritus of Jensen Hughes, is a well-known leader in fire investigations. He has served on the Advisory Boards for three universities with fire protection engineering programs, was Editor-in-Chief for two journals, and also co-Editor for one edition of the *SFPE Handbook*. He is a former member of the technical committee responsible for NFPA 921 *Guide for Fire and Explosion Investigations* and has served on committees for other NFPA standards.

Our readers may be most familiar with Dr. Beyler in his game-changing role as the author of the report commissioned by the Texas Forensic Science Commission (TFSC) on the criminal convictions of Ernest Ray Willis and Cameron Todd Willingham.[25] The TFSC hired Dr. Beyler to review the evidence resulting in the convictions of these two men after the Innocence Project lodged a complaint with the TFSC concerning their convictions. In his report, Dr. Beyler concluded that the investigations of Willis and Willingham did not comport with the scientific method or the standard of care expressed by NFPA 921, and that the investigators' findings of arson were unsupportable.[26]

Due to the work of Dr. Beyler and others, including the experts originally retained by the Innocence Project, the extent that junk science was being used in fire investigations was brought to light. The TFSC ultimately made seventeen ground-breaking recommendations to improve the field of fire investigations,[27] which the Texas State Fire Marshal's

Office ultimately put into practice under the leadership of Chris Connealy.[28] These initiatives were supported by the IAAI Board of Directors.[29]

Dr. Beyler's report in the Willis/Willingham investigation helped to highlight the importance of the industry standard, NFPA 921 and the role of science in fire investigations. It was due in part to his work in this matter, together with his distinguished career in fire investigations, that brought about Dr. Beyler's appointment as the first chair of the OSAC Fire & Explosion Investigation Subcommittee. His success in that position contributed to his elevation to the FSSB. It is fortuitous for the fire investigation community that Dr. Beyler now serves in this leadership role in OSAC.

5. OSAC's Mission and the OSAC Registry

OSAC is charged with providing practice-based scientific guidance to each forensic science discipline. The mission of OSAC is to, "strengthen the nation's use of forensic science by facilitating the development of scientifically sound standards, and by promoting the adoption of those standards in the forensic science community."[30]

We know that the word "standard" has different meanings. In the current context, the term "standards" refers to voluntary consensus standards that are developed by "standards developing organizations" (SDOs). Each of these SDOs must meet requirements for openness, balance, consensus, and due process, and adhere to rules that provide an opportunity for all interested parties to participate in a standard's development.[31] The SDOs that OSAC works with are:

1) The National Fire Protection Association (NFPA);
2) ASTM International (ASTM); and,
3) The American Academy of Forensic Sciences (AAFS) Academy Standards Board (ASB).

Before explaining how OSAC works with these SDOs, let us first consider standards each of these SDOs publish that are relevant to fire investigators. Examples of those published by the NFPA are NFPA 921 and NFPA 1033 *Standard for Professional Qualifications for Fire Investigator*. Even though NFPA 921 is a non-mandatory "guide" and NFPA 1033 is a mandatory "standard," both are classified as voluntary consensus standards. This is because they have both been produced through the standards development process of the NFPA, an accredited SDO.

Similarly, fire investigators use ASTM standards such as ASTM E860 *Standard Practice for Examining and Preparing Items that Are or May Become Involved in Criminal or Civil Litigation*, 2007 (2013)e2. This is a voluntary consensus standard published after undergoing the standards development process of ASTM, another accredited SDO.

The ASB is a relatively new SDO, having been established in 2015 by the American Academy of Forensic Sciences.[32] One of the impetuses for its creation was the need identified by the NRC/NAS Report and pursued by OSAC for reliable, scientifically, and technically sound standards. The ASB is dedicated to developing such standards for the forensic sciences.[33] Although standards promulgated by the ASB may not yet be familiar to fire investigators, the ASB is developing standards relating to dogs and sensors. Ignitible liquid detection canines and hydrocarbon detectors fall into this category.

The NFPA, ASTM, and ASB are separate entities, each accredited as SDOs. Next, we examine how OSAC works with these SDOs in developing forensic science standards for ultimate placement on its national registry of standards. This ties into OSAC's role in standards development and the growing influence of the OSAC Registry.

OSAC participates in the development of standards in several ways. One way is by drafting standards. Once OSAC (through one of its discipline-specific subcommittees) identifies a need, it drafts a new standard or revises an existing one. This draft standard makes its way through the "OSAC Registry Approval Process."[34] Detailing this well-regulated process is beyond the scope of this article. However, its hallmarks include: 1) scientific and technical review by experts in the subject of the standard, and; 2) soliciting comments from and developing consensus among interested OSAC entities and OSAC's community of stakeholders.[35]

Once the first part of OSAC's Registry Approval Process is complete, the draft standard is published and listed on the OSAC Registry as an "OSAC Proposed Standard."[36] The draft standard is then submitted to the appropriate SDO, where it moves through the SDO's specific standards development process.

So, for example, any draft standard OSAC develops for fire investigations are submitted to the NFPA and would go through NFPA's standards development process[37] as do NFPA 921 and NFPA 1033. Draft standards that are within the ASTM's purview, such as standards dealing with laboratory analysis of fire debris, are submitted to the ASTM to undergo its standards development process. Draft standards dealing with other forensic science issues, such as canines and sensors, will be submitted to the ASB for processing.

After the standard is published by the SDO, it is put through a further OSAC review and if approved, it becomes an "OSAC Published Standard," replacing the earlier "OSAC Proposed Standard" version on the registry.

Another way that OSAC can participate in developing standards is by contributing public input into standards already under development by an SDO. OSAC contributed to the development of NFPA 921, 2021 edition in this manner, by submitting public inputs and public comments through the NFPA standards development system. Once an SDO publishes a standard that serves a need identified by OSAC, OSAC reviews it through its approval process and if it meets OSAC's exacting requirements, it is posted to the OSAC Registry.[38]

6. How Fire Investigations Benefit From OSAC

Many of you will have at least a general familiarity with the NFPA's open, consensus-based standards development process[39] that is responsible for shaping each new edition of NFPA 921 every three or four years. This process

together with the committee of subject-matter experts that is responsible for NFPA 921, lend credibility to NFPA 921. These are among the reasons NFPA 921 is a widely accepted teaching guide and recognized by courts across the United States and Canada as an authoritative reference. The other SDOs that OSAC works with have their own standards development processes, and like the NFPA, they have accredited procedures for standards development that are open, consensus-based, and guided by subject-matter experts.

The OSAC Registry is a storehouse for "high-quality, technically sound published and proposed standards for forensic science."[40] They include a broad range of written documents that "define minimum requirements, best practices, standard protocols and other guidance to help ensure that the results of forensic analysis are valid, reliable and reproducible."[41] OSAC encourages forensic science practitioners (including fire investigators) to implement the standards in the OSAC Registry into their everyday practice. The benefits of following these standards are to promote consistency within and across forensic science disciplines and to improve the admissibility of expert testimony in courts of law.[42]

One might wonder what is gained from having a standard such as the NFPA 921 *Guide* go through the OSAC Registry Approval Process and be published on the OSAC Registry? In part, the answer is that OSAC provides further scientific and technical review, over and above that afforded by the SDO's standards development process. The additional OSAC procedures deliver focused input by others with expertise in various facets of fire investigations. Subjecting documents such as NFPA 921 to the OSAC scrutiny that is required to elevate them to the OSAC Registry is another level of peer review, offering further evidence that they rest on solid scientific foundations. Achieving OSAC Registry status therefore raises the reputation of standards that are used by fire investigators in the eyes of the fire investigation community and the courts.

There are other benefits of having a standard complete OSAC's approval process and be published in the OSAC Registry. OSAC and NIST promote the use of Registry standards by accreditation and certification bodies, and by the legal system. While each of the SDOs have their own methods of promoting their standards, OSAC provides a unifying force for those standards pertaining to its forensic science disciplines. For example, OSAC makes it easy to consult forensic science standards through its Access to Standards Page.[43] For the ASTM that does not provide free access to its standards, OSAC, through NIST, has entered into an agreement with ASTM that gives 30,000 public criminal justice agencies in the U.S. free access to standards published under ASTM Technical Committee E30 on Forensic Science.

OSAC is also efficient in its outreach efforts to the forensic science and the legal communities. Its representatives are readily available to make presentations at conferences and educate audiences about OSAC's activities and benefits in their particular discipline or area of interest.

One final benefit of OSAC is that it assesses the research and development needs of each forensic science discipline represented by its subcommittees.[44] Identified research needs are forwarded to NIJ as topics for research funding by NIJ and others. Some of the research needs OSAC has identified for the fire and explosion investigation discipline are thought-provoking. Directions for accessing these needs assessments are in Part 7 of this article.

To this point we have introduced OSAC's mission, the OSAC Registry, and its organizational structure. Next, this article covers topics of particular relevance to the fire and explosion investigation community. Each subcommittee has a webpage summarizing its accomplishments and works-in-progress. These webpages are accessible from the NIST-OSAC website (https://www.nist.gov/osac/osac-subcommittees). Internet addresses (URLs) for each webpage are included in the endnotes.

7. The OSAC Fire & Explosion Investigation Subcommittee

> **The Fire & Explosion Investigation Subcommittee** focuses on standards and guidelines related to the investigation, analyses and interpretation of crime scenes where arson or use of explosives is suspected.[45]

7.1. Membership

This subcommittee is composed of twelve members, four of whom are IAAI members including:

- Chair, Philip Crombie, Jr., 2nd Vice President, Travelers Forensic Laboratory, a fire protection engineer who is also a member of the NFPA 921 Committee on Fire Investigations;
- Randy Watson, IAAI-CFI®, IAAI-CI, CFEI, CVFI, SEA, Ltd. 2nd Vice President, IAAI 2nd Vice President, former chair of the NFPA 921 committee, current Chair of the NFPA 1321 Committee on Fire Investigation Units, and member of the NFPA 1033 Committee on Fire Investigator Professional Qualifications;
- John Lentini, CFI, D-ABC, President, Scientific Fire Analysis LL.C., member of the NFPA 1033 Committee, member and former Chair of the ASTM Committee E30 on Forensic Sciences, and former member of the NFPA 921 Committee; and,
- Brittany Brown CFEI, CVFI, CFII, FIT(V), ECT, CI, CHRS, Fire Marshal at the City of Lovington, New Mexico, and member of the NFPA committees responsible for NFPA 407 *Standard on Aircraft Fuel Serving* and NFPA 410 *Standard on Aircraft Maintenance Operations*.

In addition to the ten members who are experts in fire and explosion investigations, the subcommittee also has members of the FSSB Legal Task Group and FSSB Human Factors Task Group who act as resource persons in their respective fields.

7.2. OSAC Registry Documents

In terms of its activities, the Fire & Explosion Investigation Subcommittee has the distinction of being responsible for the second document to be added to the OSAC Registry: NFPA 921, 2014 ed. Since then, NFPA 921, 2017 ed. and NFPA 1033, 2014 ed. have also been added. The current edition of NFPA 921, 2021 ed. and the upcoming edition of NFPA 1033, 2022 ed. will go through the OSAC Registry Approval Process before they can be added to the registry. Expert witnesses who rely on NFPA 921 or NFPA 1033 as the foundation of their qualifications or opinions may want to refer to the elevated status that NFPA 921 and NFPA 1033 command for having been published on the OSAC Registry.

7.3. Draft Fire Investigation Unit Standard

Another important accomplishment of this subcommittee is its work in initiating a new NFPA project to develop a standard for fire investigation units. In 2017, Dr. Craig Beyler submitted a request to the NFPA Standards Council on behalf of the OSAC subcommittee, which he then chaired. The NFPA Standards Council approved the project in 2018 and established a new NFPA Committee on Fire Investigation Units (FIUs), with Randy Watson as its chair.[46] Here is the new FIUs committee's Scope and Responsibility:[47]

> **Fire Investigation Units (FIUs) Scope:** This Committee shall have primary responsibility for standards relating to the development and composition of Fire Investigation Units (FIU). This committee does not have responsibility for the development of standards relating to fire investigation techniques, methodologies, or fire investigator professional qualifications.
>
> **Responsibility:** *Standard for Fire Investigation Units* (NFPA 1321).

The Fire & Explosion Investigation Subcommittee prepared a draft "Standard for the Organization and Operation of Fire Investigation Units,"[48] which it submitted to the new NFPA FIUs committee. As of March 2021, the new NFPA standard is still in its developmental stages and has not entered its initial NFPA revision cycle when it will be available for public review and input. Once the new standard completes the NFPA standards development process and is published, it will be taken up by OSAC to complete the registry approval process. In the meantime, for anyone wanting to consider the direction of the new standard, the OSAC subcommittee has posted their draft of the FIU standard on their webpage, where it is available for download and review. It is an excellent document and well worth the time it takes to study.

7.4. Needs Assessments and Other Resources

In addition to its work in developing and reviewing fire investigation standards, the Fire & Explosion Investigation subcommittee has undertaken other projects. An important one is assessing research and development needs for fire investigations. Sixteen needs assessments have been prepared, addressing a broad range of issues in fire investigations. The issues covered by these assessments include arc mapping, ventilation impacts on fire patterns, the need to reduce bias, and the need for a repository of fire investigation research.

Each research need briefly describes the nature of the research need, key bibliographic references, and the benefits of the proposed research. They also implicitly identify areas where the scientific foundations of fire investigations are deficient. They are a "must read" for anyone seriously committed to the future of fire investigations.

Finally, you will find other resources on this subcommittee's webpage such as Bibliographic References specific to fire investigations and a Comparison of Fire Investigation Academic Programs. A strategic plan entitled *Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward* was recently approved by the FSSB and is now in editorial preparation. The webpage is available at https://www.nist.gov/osac/fire-explosion-investigation-subcommittee.

8. Other OSAC Subcommittees Relevant to Fire Investigations

8.1. Ignitable Liquids, Explosives, & Gunshot Residue Subcommittee

> **The Ignitable Liquids, Explosives, & Gunshot Residue Subcommittee** focuses on standards and guidelines related to the scientific examination and analysis of materials associated with fire and explosion investigations and the analysis of evidence that results from the deposition of or physical transfer of small or minute quantities of gunshot residue.[50]

Before the reorganization of OSAC 2.0, this committee was known as the Fire Debris & Explosives Subcommittee. This subcommittee's webpage is available at https://www.nist.gov/osac/ignitable-liquids-explosives-gunshot-residue-subcommittee. On it are: 1) a list of ASTM standards that have been published in the OSAC Registry, 2) other standards that are published by the ASTM but have not gone through the OSAC Registry Approval Process, and; 3) draft standards that have been prepared by OSAC and submitted to an SDO. There is also a wealth of other information on this webpage for anyone interested in fire debris analysis or explosives, including reference lists, bibliographies, and needs assessments.

8.2. Dogs and Sensors Subcommittee

> **The Dogs & Sensors Subcommittee** focuses on standards and guidelines related to performance of deployed dog/handler teams and optimization of their combination with electronic detection devices.[51]

Anyone interested in ignitible liquid detection canines will want to monitor this subcommittee's webpage. It has a "Canine Detection of Accelerants" standard under development. There are also links to the SWGDOG work

products, some of which are referenced in the new NFPA 921, 2021 edition canine section 17.7.5. The Dogs and Sensors Subcommittee webpage is available at https://www.nist.gov/osac/dogs-sensors-subcommittee.

8.3.Other Subcommittees

Fire investigations sometimes require expertise from other forensic disciplines. For example, for investigators who conduct investigations involving fire injuries or death, be aware that there are subcommittees on Forensic Toxicology and Medicolegal Death Investigation. The Crime Scene Investigation & Reconstruction subcommittee is also worth tracking as it shares some interests in common with fire investigations, including some ASTM standards cited in NFPA 921. The webpages for these and other OSAC subcommittees are available at https://www.nist.gov/osac/osac-subcommittees.

9. Conclusion

We recognize that it is difficult enough to stay current with developments in in the traditional parts of the fire investigation standards world, such as tracking revisions to NFPA industry standards. However, it is important to recognize that the forensic sciences, including fire investigations, are in a historic time of growth. OSAC is an important player in the world of fire investigation standards for reasons we have shared in this article. After reading about OSAC, we encourage you to track the activities of the Fire & Explosion Investigation Subcommittee and other subcommittees that are relevant to your career. Each subcommittee has a webpage with readily accessible links to most of its work products.[52] Happily, NIST and OSAC also make it easy to stay informed. You can join the NIST-OSAC email list to receive news and updates.[53] You can also follow OSAC on LinkedIn.

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ENDNOTES

1 Comm. on Identifying the Needs of the Forensic Sci. Cmty. *et al.*, Nat'l Research Council of the Nat'l Acads., Strengthening Forensic Science in the United States: A Path Forward (2009), *available at* https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf [hereinafter NRC/NAS Report].

2 Terry-Dawn Hewitt & Wayne J. McKenna, *Implementing the* NRC/NAS Report: *Introducing the National Commission on Forensic Science and The Organization of Scientific Area Committees*, 66 Issue 4 Int'l Assoc. of Arson Investigators, Fire & Arson Investigator J. 40 (Apr. 2016).

3 Terry-Dawn Hewitt & Wayne J. McKenna, *FISC Bulletin Board-Experts Beware: Are Your Foundations Open to Attack?*, Vol. 67 No. 3 FIRE AND ARSON INVESTIGATOR J., 30, (Jan. 2017).

4 Terry-Dawn Hewitt & Wayne J. McKenna, *FISC Bulletin Board-Foundational Research Needs for Fire Investigations Identified by AAAS and OSAC*, Vol. 68 No. 2 FIRE AND ARSON INVESTIGATOR J., 30, (Oct. 2017).

5 *IAAI Publications and Resources*, INTERNATIONAL ASSOCIATION FOR ARSON INVESTIGATORS, https://www.firearson.com/Publications-Resources/Fire-Arson-Investigation-Journal/Default.aspx (member sign-in required). Go to the IAAI website at https://www.firearsoncom and log in with your Login ID and password. Next, click on the "Publications and Resources" tab, and then click the "Fire & Arson Investigator Journal" link from the drop-down menu. Scroll down to the issue of the journal you want to access and click on its image. Note that for the complete FISC Bulletin Board article for the January 2017 issue is available through a separate link on that page (under the images of the 2017 journal issues.)

6 *See FISC Bulletin Board-Experts Beware: Are Your Foundations Open to Attack?*, *supra* note 3, secs. 4-6.

7 NRC/NAS REPORT, *supra* note 1, at 38-39.

8 NRC/NAS REPORT, *supra* note 1, at ch. 5. The forensic disciplines reviewed in the report are: Biological Evidence, Analysis of Controlled Substances, Friction Ridge Analysis, Other Pattern/Impression Evidence: Shoeprints and Tire Tracks, Toolmark and Firearms Identification, Analysis of Hair Evidence, Analysis of Fiber Evidence, Questioned Document Examination, Analysis of Paint and Coatings Evidence, Analysis of Explosives Evidence and Fire Debris, Forensic Odontology, Bloodstain Pattern Analysis, Digital and Multimedia Analysis.

9 NRC/NAS REPORT, *supra* note 1, at 172-173.

10 Id.

11 *OSAC Registry*, NIST-OSAC, https://www.nist.gov/osac/osac-registry.

12 Further information about the changes being implemented in OSAC 2.0 are available on the NIST-OSAC website, *Changes to OSAC's Structure and Processes* page, available at https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/changes-osacs-structure-and.

13 *OSAC Organizational Structure*, NIST-OSAC, https://www.nist.gov/osac/osac-organizational-structure.

14 *OSAC FSSB*, NIST-OSAC, https://www.nist.gov/organization-scientific-area-committees-forensic-science/forensic-science-standards-board.

15 *Id.*

16 *OSAC Organizational Structure*, NIST-OSAC, https://www.nist.gov/osac/osac-organizational-structure.

17 *FSSB Human Factors Task Group*, NIST-OSAC, https://www.nist.gov/osac/human-factors-task-group.

18 *FSSB Legal Task Group*, NIST-OSAC, https://www.nist.gov/osac/legal-task-group.

19 *FSSB Quality Task Group*, NIST-OSAC, https://www.nist.gov/osac/quality-task-group.

20 *FSSB Statistics Task Group*, NIST-OSAC, https://www.nist.gov/osac/statistics-task-group.

21 *OSAC Lexicon*, NIST-OSAC, https://www.nist.gov/osac/osac-lexicon.

22 *FSSB Terminology Task Group*, NIST-OSAC, https://www.nist.gov/osac/terminology-task-group.

23 NIST-OSAC, NIST *Launches an Updated Organization of Scientific Area Committees for Forensic Science,* (Oct. 1, 2020) https://www.nist.gov/news-events/news/2020/10/nist-launches-updated-organization-scientific-area-committees-forensic.

24 There are interdisciplinary task groups and there are interdisciplinary subcommittees. Task Groups serve as resources. Interdisciplinary subcommittees act like the normal subcommittees but in matters that cross normal subcommittees boundaries.

25 After having been convicted of capital murder and sentenced to death in 1987, the evidence was reexamined and the fire investigation testimony was found to be flawed. Charges against Mr. Willis were dismissed and he was released from prison on October 5, 2004. Unfortunately, Mr. Willingham, also convicted for arson and murder on comparable junk science, was executed on February 17, 2004. The Innocence Project subsequently commissioned a panel of exerts to review the convictions of both men and filed a complaint with the Texas Forensic Science Commission (TFSC). See Paul C. Giannelli, *The Execution of Cameron Todd Willingham: Junk Science, An Innocent Man, and the Politics of Death*, SSRN ELECTRONIC JOURNAL (Aug. 2011). In response to the complaint, the TFSC commissioned its own expert, Dr. Craig Beyler, who prepared his report: CRAIG L. BEYLER, ANALYSIS OF THE FIRE INVESTIGATION METHODS AND PROCEDURES USED IN THE CRIMINAL ARSON CASES AGAINST ERNEST RAY WILLIS AND CAMERON TODD WILLINGHAM (August, 2009).

26 CRAIG L. BEYLER, ANALYSIS OF THE FIRE INVESTIGATION METHODS AND PROCEDURES USED IN THE CRIMINAL ARSON CASES AGAINST ERNEST RAY WILLIS AND CAMERON TODD WILLINGHAM (August, 2009), reprinted in TEX. FORENSIC SCI. COMM'N, FINAL REPORT WILLINGHAM/WILLIS INVESTIGATION Ex. 7 (April 15, 2009), *available* at http://www.fsc.state.tx.us/documents/FINAL.pdf.

27 TEX. FORENSIC SCI. COMM'N, FINAL REPORT WILLINGHAM/WILLIS INVESTIGATION Ex. 7 (April 15, 2009), *available* at http://www.fsc.state.tx.us/documents/FINAL.pdf; TEX. FORENSIC SCI. COMM'N, ADDENDUM TO THE APRIL 15, 2011 REPORT 3 (Oct. 28, 2011), *available* at http://www.innocenceproject.org/docs/2011/Willingham_Willis_Addendum_2011.pdf.

28 Chris Connealy, *Restoring Public Confidence in Fire Investigations,* presented at National Fire Protection Association Annual Conference and Expo, June 2015.

29 Email from Daniel Heenan, President of the International Association of Arson Investigators, to Terry-Dawn Hewitt dated August 5, 2015, (on file with the author).

30 Forensic Science Standards Board (FSSB), OSAC Charter and Bylaws, subsec. 1.1, Ver. 1.7 (Mar. 30, 2020), available at https://www.nist.gov/osac/governing-documents.

31 The SDOs that develop OSAC Registry standards accredited by the American National Standards Institute (ANSI), who accredits the procedures of the SDOs and approves their documents that are developed under these procedures as American National Standards. *See About ANSI-ANSI's Roles*, THE AMERICAN NATIONAL STANDARDS INSTITUTE, https://www.ansi.org/about/roles.

32 *About,* ASB AAFS Standards Board, http://www.asbstandardsboard.org/about-us/

33 *Home,* ASB AAFS Standards Board, https://www.asbstandardsboard.org/

34 *OSAC Registry Approval Process*, NIST-OSAC, https://www.nist.gov/osac/registry-approval-process.

35 OSAC's stakeholder community is a broad one and includes forensic science practitioners (such as fire investigators or laboratory analysts), forensic science service providers (such as laboratories or other organizations that employ forensic science practitioners), members of the justice system, academics, and others with an interest in improving the forensic sciences.

36 One of the changes made with OSAC 2.0 is that OSAC's *proposed* standards are now included on the OSAC Registry alongside standards published by an SDO and approved by OSAC. The publication of proposed standards in the Registry indicates that the proposed standards have undergone a rigorous quality review and can help fill the standards gap during the time it takes for an SDO to complete the standards development process. It also gives forensic science service providers such as labs and other institutions a head start on implementing these standards. See NIST-OSAC, *NIST Launches an Updated Organization of Scientific Area Committees for Forensic Science,* (Oct. 1, 2020) https://www.nist.gov/news-events/news/2020/10/nist-launches-updated-organization-scientific-area-committees-forensic.

37 For more information on the NFPA Standards Development Process, *see NFPA-Codes and Standards-How the Process Works*, NFPA.org, https://www.nfpa.org/codes-and-standards/standards-development-process/how-the-process-works.

38 *About* OSAC, NIST-OSAC, https://www.nist.gov/osac.

39 *NFPA-Codes and Standards-How the Process Works*, NFPA.org, supra note 37.

40 *OSAC Registry,* NIST-OSAC, https://www.nist.gov/osac/osac-registry.

41 *Id.*

42 *OSAC Registry Implementation*, NIST-OSAC, https://www.nist.gov/osac/osac-registry-implementation.

43 *OSAC Access to Standards*, NIST-OSAC, https://www.nist.gov/osac/access-standards.

44 OSAC Charter and Bylaws, *supra* note 30, subsec. 1.2.

45 *OSAC Fire and Explosion Investigation Subcommittee*, NIST-OSAC, https://www.nist.gov/osac/fire-explosion-investigation-subcommittee.

46 For background on this project, see Terry-Dawn Hewitt & Wayne J. McKenna, *FISC Bulletin Board—New Editions of NFPA 921 and 1033 Underway While NFPA Launches New Project*, Vol. 69 No. 4 FIRE AND ARSON INVESTIGATOR J., 32, (Apr. 2019).

47 *See* NFPA 1321 Document Information Page, available at https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1321.

48 OSAC Fire and Explosion Investigation Subcommittee, *Draft Standard for the Organization and Operation of Fire Investigation Units*, (August 2019) available at https://www.nist.gov/osac/fire-explosion-investigation-subcommittee.

49 *Id.*

50 *OSAC Ignitable Liquids, Explosives & Gunshot Residue Subcommittee,* NIST-OSAC, https://www.nist.gov/osac/ignitable-liquids-explosives-gunshot-residue-subcommittee.

51 *OSAC Dogs and Sensors Subcommittee*, NIST-OSAC, https://www.nist.gov/osac/dogs-sensors-subcommittee.

52 *OSAC Subcommittees*, NIST-OSAC, https://www.nist.gov/osac/osac-subcommittees.

53 To join NIST's email list or access your subscribed preferences, click this link and enter your email address in the field provided: https://service.govdelivery.com/accounts/USNIST/subscriber/new?topic_id=USNIST_230. You can also learn more about OSAC and follow its news from the NIST-OSAC home page available at https://www.nist.gov/osac.