

Fiber Optic Sensors
Industry Connections Activity Initiation Document (ICAID)
Version: 3.0, 6 May 2019
IC15-001-03 Approved by the IEEE-SASB 11 June 2019

Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- **Shaded Text** indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE-SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: David Krohn

Email Address: dkrohn@lightwaveventure.com

Phone: 203-248-1475

Employer: Light Wave Venture LLC

Affiliation: Light Wave Venture LLC

2. Type of Activity

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

The activity will be "Entity-Based"

3. Purpose

3.1. Motivation and Goal

Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

As fiber optic sensing systems emerge, there is a significant level of customization which has a high impact on cost. High cost has been a negative driver for expanded growth. Understanding and defining where standards can decrease cost and facilitate applications can greatly expand market opportunities.

This ICAID is a renewal to build on work completed by the activity participants. A whitepaper was completed discussing the standards landscape for fiber optic sensors. Several fiber optic sensing technologies have been developed and are commercially available. The initial focus of the Fiber Optic Sensor activity was Bragg grating sensors due to their broad application functionality. Gaps in how Bragg grating sensor interrogators are specified were identified. Work on providing definitions to resolve gap issues is in progress. Continuation of this activity will focus on prioritizing gaps in other fiber optic sensor technologies and needs for new standards, and developing proposed scope content that can be used for future PARs.

3.2. Related Work

Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

Below is a list of related work. For the initial Bragg grating sensor activity. Relevant standards were identified. The objective was to expand standardization coverage and not duplicate existing standards.

Current Standards Activities

- **Photonic Sensors Consortium**
- **ISIS Canada: Civionic Standards**
- **NSF/NIST: FOS Standard for SHM**
- **POSC: DTS Standard**
- **IEEE Std. 952-1997: IFOG Standard**
- **ASTM:**
 - Subcommittee E13.09 (FO chem sensing)
 - Electrical strain gage tests
- **IEC: 60044-7 & 60044-8 (Optical CT & VT)**
- **ISA: SP12.21 (FOS for hazardous locations)**
- **SAE: ARD 50024 (FOS for Avionic use)**
- **SIIS (Subsea Instrumentation Interface Standard)**
- **IWIS (Intelligent Well Information Standard)**
- **POSC/WITSML (Petrotechnical Open Standards Consortium/ Wellsite Information Transfer Standard Markup Language)**
- **IDOPTS (International Distributed Optical Performance Testing Standard)**
- **Telcordia GR-63 – operating conditions tests**
- **Fire detection**
 - EN 54-5 or EN 54-22 (Europe)
 - FM (USA)
 - cUL521 (Canada)
- **SEAFOM-Subsea Fiber Optic Monitoring Group**

3.3. Previously Published Material

Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity.

Specific documentation from each of the organizations list above is available. Sensor specific documentation would be included in the proposed deliverables in the form of an integrated standards overview.

A whitepaper on the fiber optic sensor standards landscape was completed by this activity (Fiber Optic Sensor Standards Report, 2017) and is available via the IEEE-SA Industry Connections website.

3.4. Potential Markets Served

Indicate the main beneficiaries of this work, and what the potential impact might be.

The markets served include:

- Oil & gas seismic
- Oil & gas in-well
- Oil & gas pipelines
- Wind energy turbines
- Geothermal
- Utility power lines
- Military – hydrophone
- Military – security
- Military – shipboard / avionic

IC15-001-01 Fiber Optic Sensors

- Homeland security – intrusion / chemical*
- Infrastructure
- Industrial process control
- Bio-photonic
 - Drug discovery
 - Medical
- Spectroscopy that is fiber optic enabled
- Transportation

4. Estimated Timeframe

Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

Expected Completion Date: 10/2019 for standard recommendations related to fiber optic Bragg grating sensor interrogators. Gaps for standards in other fiber sensor technologies will be identified by 6/2020.

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICom and the IEEE-SA Standards Board. Should an extension be required, please notify the ICom Administrator prior to the two-year mark.

5. Proposed Deliverables

Outline the anticipated deliverables and output from this IC activity, such as documents, proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

The deliverables for this IC activity are expected to include:

1. Identify any gaps in the existing standards and a plan to address these gaps (Bragg grating interrogator – gaps identified and plan to address gaps is complete)
2. Development of standards recommendations/proposals based on gap assessment (in process for Bragg grating interrogators)

6. Funding Requirements

Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICom.

This activity does not anticipate requiring any funded services beyond the basic services provided by Industry Connections. Based on activity progress and needs during that period, longer term funding requirements will be discussed and evaluated by the group. A revised ICAID will be submitted for approval if it is found that additional funded services are necessary for the activity to accomplish its objectives.

7. Management and Procedures

7.1. IEEE Sponsoring Committee

Indicate whether an IEEE sponsoring committee of some form (e.g., an IEEE Standards Sponsor) has agreed to oversee this activity and its procedures.

Has an IEEE sponsoring committee agreed to oversee this activity? Yes

If yes, indicate the sponsoring committee's name and its chair's contact information, and skip the remaining parts of this section (skip 7.2 and 7.3, below).

Sponsoring Committee Name: Photonics Society

Chair's Name: John Kulick

Chair's Email Address: John.kulick@siemens.com

Chair's Phone: 609-734-3302

Additional sponsoring committee information, if any. None

7.2. Activity Management

If no IEEE sponsoring committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc).

The activity will be managed by an executive committee as defined in the activity's policies and procedures.

7.3. Procedures

If no IEEE sponsoring committee has been identified in 7.1 above, indicate what documented procedures will be used to guide the initial operations of this activity (e.g., the baseline *Industry Connections Activity Policies and Procedures*).

The activity will follow the baseline Industry Connections Activity Policies and Procedures (P&P).

8. Participants

A list of participating companies is supplied (19 companies).

8.1. Stakeholder Communities

Indicate the stakeholder communities (the types of companies or other entities, or the different groups of individuals) that are expected to be interested in this IC activity, and will be invited to participate.

Companies that manufacture fiber optic sensing systems or components for fiber optic sensing systems are invited to participate.

8.2. Expected Number of Participants

Indicate the approximate number of entities (if entity-based) or individuals (if individual-based) expected to be actively involved in this activity.

IC15-001-01 Fiber Optic Sensors

19 companies have participated in the activity.

8.3. Initial Participants

Provide a list of the entities or individuals that will be participating from the outset. It is recommended there be at least three initial participants for an entity-based activity, or five initial participants (each with a different affiliation) for an individual-based activity.

Use the following table for an entity-based activity:

Entity	Primary Contact	Additional Representatives
Lightwave Venture	David Krohn dkrohn@lightwaveventure.com	
Petrospec Engineering	Trevor MacDougall trevor.macdougall@petrospec.com	
MCH Engineering	Alexis Mendez alexis.mendez@mchengineering.com	
OZ Optics	Omur Sezerman osezerman@ozoptics.com	
Lios Technology	Thomas Oldemeyer thomas.oldemeyer@lios-tech.com	
OFS Optics	Hansson, John jhansson@ofsoptics.com	
IFOS	Behzad Moslehi bm@ifos.com	
Optiphase (Halliburton)	Jeff Bush jbush@optiphase.com	
Weatherford	Christopher Baldwin (CHRISTOPHER.BALDWIN@Weatherford.com)	
Luna	Dawn Gifford (giffordd@lunainc.com)	
Agiltron	Lewis Liu liliu@agiltron.com	
FAZ Technology	Selwan Ibrahim selwan.ibrahim@faztechnology.com	
Smart Fibres	Crispin Doyle Crispin.Doyle@smartfibres.com	
OTM Consulting	Tate Francesca Francesca.Tate@otmconsulting.com	
Gould Fiber Optics	Saeed Pilevar spilevar@gouldfo.com	
Arkwright Technologies	John Arkwright john.arkwright@arkwright-technologies.com	
Micron Optics	Tom Graver tom.graver@micronoptics.com	

IC15-001-01 Fiber Optic Sensors

Fibercore	Brian Herbst Brian.herbst@fibercore.com	
Columbia Gorge Research	Eric Udd ericudd@cgresearchllc.com	