IEEE P1547.10 Working Group Meeting

"IEEE P1547.10 Recommended Practice for DER Gateway Platforms"

IEEE P1547.10 Houston WG Meeting
Minutes (DRAFT)
Wednesday, April 5th, 2023, 1:00pm – 4:00pm CT
Thursday, April 6th, 2023, 8:00am – 12:00pm CT
Burns & McDonnell, 1700 West Loop South, Suite 1500, Houston TX 77027

Chair: Abrez Mondal
Secretary: Daniel Freeman
Vice Chairs: Yashar Kenarangui, John Berdner
IEEE SA Liaison: Michael Kipness

1. Call to Order

- Start at 1:04 PM with reminder to record attendance (room sign-in sheet, and iMAT)

A. Meeting Goals and Context

- Approval of minutes from Kick-off meeting
- Coordination with P1547 revision and other WG
- Introduce Working Group Secretary and Sub-group Facilitators
- Discuss on draft versions of scope for Sub-Groups (may be adjusted later as needed)
- Develop timeline, frequency for meetings & calls

2. Roll call of Individuals and Declaration of Affiliation

The audience in the meeting room introduced themselves to the working room, while the virtual attendees completed their introductions through the Teams chat.

3. IEEE Policies (Slides 12-25)

a. **IEEE SA** Call for Patents
b. **IEEE SA** Copyright Policy Presentation
c. **IEEE SA** Individual Participation
d. **eTools: myProject, Listserve, iMeet Center, WorkSpace**

Mike Kipness reviewed the IEEE SA Call for Patens, Copyright Policy, and Individual Participation slides, then opened the floor for essential patents. No essential patents were claimed. The WG Chair, Abrez Mondal, presented an overview of the eTools being used for P1547.10 activities, as well as the rules for obtaining voting rights.

4. Check for Quorum

At 1:20pm, the WG secretary, Daniel Freeman, confirmed that quorum was established.

5. Approval of Agenda

Hawk Asgeirsson made the motion to move forward with the agenda and Mamadou Diong seconded the motion. No further discussion requests were raised. No opposition and no abstained votes were made, and Agenda was approved for the meeting at 1:21 PM.

6. Approval of Minutes from Kick-off Meeting

The WG chair, Abrez Mondal, presented the meeting minutes from the previous meeting held on January 9, 2023 at Jacksonville, FL. An error in the spelling for Mark Siira on page 2 of the draft minutes was pointed out by one of the WG members. Brian Lydic made the motion to move forward with the agenda and Ben Ealey seconded the motion. No further discussion requests were raised. No opposition and no abstained votes were made, and minutes from the kick-off meeting were approved at 1:32 PM.

7. Introductions for secretary and sub WG leads (Slides 30-37)

The sub-group structure and the corresponding Listserver mailing lists were presented by the WG Chair. This was followed by the introductions of the WG Secretary and SG facilitators to the audience.

8. Break

It was decided by WG members to postpone the break.

9. Technical presentations

A. Overview on DER Gateways (Slides 39-46)

The WG Chair presented on this topic, which led to further discussions among the audience. The presentation included the need and purpose for DER gateways and context for P1547.10 project. The discussions mainly revolved around the need to focus on the functionalities of DER gateways and establish a definition for DER gateways, separate from plant controllers and other similar devices. Another comment from the audience included whether there is a need to look at the definition of DERs for P1547.10, separate from what is defined under 1547 base standard. The use of gateways for legacy DERs versus new DERs meeting 1547 compliance was also touched upon. The discussions are captured as follows:

B. Relationship to DER Interoperability/P1547 (Slides 47-55)

Ben Ealey, facilitator for Interoperability and Cybersecurity Sub-group for P1547Rev presented on this topic. He presented a recap of interoperability requirements and breakdown of interoperability clauses in 1547-2018 and 1547.1-2020 standards. The next item included discussions on possible scopes for P1547 Rev and P1547.10 and the relationships between them. He also emphasized the need for coordination between the two activities and other related activities. The audience engaged in some discussions at the end of this presentation which included topics around the possibility of inclusion of additional features for interoperability which get better over time as the industry involves, beyond what is defined as minimum requirements in 1547 base standard.

C. Privacy and Security Impacts of DER and DER Aggregators (Slides 56-74)

John Skeath, affiliated with NERC and Jose Cordova, affiliated with EPRI, presented on a NERC joint SPIDERWG/SITES whitepaper. John Skeath gave an overview on NERC SPIDERWG and other related whitepapers. Jose Cordova presented on the current whitepaper titled “Privacy and Security Impacts of DER and DER Aggregators,” which is being drafted. He emphasized the need for DER gateways on this topic. The audience engaged in further discussions on the various aspects covered in the whitepaper at the end of this presentation.

10. Closing discussions for the day

The meeting was closed for the day at 4:03 PM.

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11. **Recap of Day 1 and review of agenda/call to order**

The activities on Day 2 started at 8:03 AM with reminder to record attendance (room sign-in sheet, and iMAT). The agenda for the day was presented by WG Chair.
The audience in the meeting room introduced themselves to the working room, while the virtual attendees completed their introductions through the Teams chat.
Next, the WG chair presented the slide 6 on recap from Day 1. Comments from the audience included explicitly mentioning that DER Gateways would only facilitate any DER management applications and not extend DERMS or ADMS systems. Another discussion centered around the cybersecurity aspects which is limited in 1547 base standard scope.

12. **Sub WG 1 Discussions (Slides 7-13)**
    A. **Scope and participation**
    B. **Meeting schedules and polling**
    C. **Discussions**

Abrez Mondal presented on the sub-group 1 activities on "Overall Document and General Requirements." Discussions included the need to determine the location of DER gateway (local site versus cloud). The following topic of discussion was the aspect of cybersecurity based on the DER gateway location and relevant standards such as 1547.3 was mentioned to look into for guidance. Other topics that were brought up included data model for DER gateway as well as the limitations of functionalities that a DER gateway can support for legacy units. The use of language (should versus shall) for the IEEE Recommended Practice was reiterated by the audience, and the term "smart inverter" was decided not to be used in P1547.10. Lastly, the importance on referencing the relevant existing standards, as well as those undergoing revision was highlighted for P1547.10.

13. **Break:** 9:17 AM - 9:23 AM

14. **Sub WG 2 Discussions (Slides 15-20)**
    A. **Scope and participation**
    B. **Meeting schedules and polling**
    C. **Discussions**

The facilitators presented on the sub-group 2 activities on "DER Grid-Intelligence Functions in Gateways." The discussions that happened included topics around metering/telemetry data models requirements for the scope of DER gateways, and any possible control features and DER Management functionalities for DER gateways. Lastly, a poll was conducted for frequency and time of Subgroup 2 meetings.

15. **Break:**

It was decided by WG members to postpone the break.

16. **Sub WG 3 Discussions (Slides 22-27)**
    A. **Scope and participation**
    B. **Meeting schedules and polling**
    C. **Discussions**

The facilitators presented on the sub-group 3 activities on "Security Functions in Gateways" followed by discussions with audience. The comments from the audience included the need for scoping out the security aspects relevant to the DER gateway and utilize proven security functions and principles and avoid covering all the cybersecurity tasks in a gateway, as the security should be distributed as per 1547. It was mentioned that DER security aspects are covered in the ongoing 1547.3 guide and could serve as a reference for creating a subset of security function relevant to DER gateways. Lastly, a poll was conducted for frequency and time of Subgroup 3 meetings.

17. **Break:** 10:40 AM - 10:50 AM

18. **Sub WG 4 Discussions (Slides 29-38)**
    A. **Scope and participation**
    B. **Meeting schedules and polling**
    C. **Discussions**

    The facilitators presented on the sub-group 4 activities on "Communications." The discussions that followed included topics about the physical layer of communication, role of a DER gateway as a protocol translator and the number of protocols it can support. Another comment discussed about the availability of DER gateway interface in the event of a reboot. Finally, a poll was conducted for frequency and participation in Subgroup 4 meetings.

19. **Future Meetings**

    It was announced by the WG chair that future meetings will follow the schedule of P1547 Revision WG with hybrid participation allowed. Proposed meetings dates are a virtual-only meeting in early summer 2023, and a hybrid meeting in fall 2023 in West Coast. Pending dates will be specified later.

20. **Adjourn**

    Jens Boemer moved the motion to adjourn the meeting. Brian Lydic seconded the motion. No discussion nor objections or abstinence votes were made. Meeting was adjourned at 12:02 PM.

Appendices

- **Appendix 1. Meeting Attendance List**
- **Appendix 2. Meeting Slides**

Appendix 1. Meeting Attendance List

First Name	Last Name	Affiliation	In-person	Virtual	Voting
Bora	Akyol	Self		x	
Syed Qaseem	Ali	Quanta Technology LLC		x	Yes
Fares	Aljajeh	Eaton Corporation		x	
Galina	Antonova	Hitachi Energy		x	
Haukur	Asgeirsson	Pacific Northwest National Laboratory		x	Yes
Hawk	Asgeirsson	PNNL	x		Yes
Jedidiah	Bartlett	Schweitzer Engineering Laboratories, Inc.		x	
John	Berdner	Enphase energy	x		Yes
Nedim	Besirevic	Dominion Energy		x	
Jens	Boemer	Electric Power Research Institute, Inc. (EPRI)		x	Yes
George	Bolos	Duke Energy Corporation		x	Yes
Branislav	Brbaklic	Schneider Electric		x	
Bruce	Campbell	Eaton Corporation		x	
Sean	Carr	ComEd/Exelon		x	
Meredith	Chee	Hawaiian Electric Company		x	
Frances	Cleveland	Xanthus Consulting International	x		
Nancy	Connelly	Duke Energy	x		Yes
Jose	Cordova	Electric Power Research Institute, Inc. (EPRI)	x		Yes
Brian	Dale	Duke Energy Corporation		x	
Mamadou	Diong	Dominion Energy	x		Yes
Benjamin	Ealey	Electric Power Research Institute, Inc. (EPRI)	x		Yes
Christian	Eder	Fronius USA LLC		x	Yes
Peter	Evans	self		x	Yes
Normann	Fischer	Schweitzer Engineering Laboratories, Inc.		x	Yes
Jason	Fisher	Solar Technical Consulting		x	Yes
Logan	Fowler		x		
Robert	Fox	SunSpec Alliance		x	Yes
Daniel	Freeman	Schneider Electric		x	Yes
Kamal	Garg	Schweitzer Engineering Laboratories, Inc.		x	Yes
Hailegebriel	Gashaw	Georgia Power Company		x	Yes
Prasanth	Gopalakrishnan	Kalkitech / ASE	x		
Emile	Gregoire	Eaton Corporation		x	
Craig	Groeling	Xcel Energy		x	
Luca	Guenzi	Solar Turbines	x		
Amirhossein	Hajimiragha	Schneider Electric		x	
Kyle	Hawkings	Hawk's Aerial and Technical Solutions Inc.		x	Yes
Eric	Herman	EPC Power		x	

Babak	Hosseini	Duke Energy Corporation		x	Yes
Mohammad	Huque	EPRI		x	Yes
Anthony	Johnson	Southern California Edison		x	
Joshua	Joseph	National Grid		x	
Harshad	Joshi	Lunar Energy, Inc		x	
Rosanna	Kallio	Consumers Energy Company		x	Yes
Yashar	Kenarangui	Xcel Energy		x	Yes
Jaime	Kolln	Pacific Northwest National	x		
Ibukunoluwa	Korede	Dominion Energy		x	Yes
Bruce	Kraemer	Independent		x	
Stuart	Laval	Eaton Corporation		x	Yes
Cathy	Le	Schneider Electric		x	Yes
Thomas	Lee	Derapi, Inc.		x	
Christopher	Lee	EPC Popwer	x		
Brian	Lydic	Interstate Renewable Energy Council, Inc.	x		Yes
Daniel	Marquis	PNM Resources Electric utility		x	
Todd	Martin	Basler Electric Company		x	
James	Mater	QualityLogic, Inc.	x		
Charles	McGaughy	Schneider Electric		x	
Brian	McMillan	McMillan Distribution Engineering and Consulting Limited		x	
Jeremiah	Miller	Sense		x	Yes
Stephen	Miller	Energy Emissions Intelligence		x	
Trent	Miller	Duke Energy Corporation		x	
James	Mirabile	Exelon Corporation		x	
Abrez	Mondal	Electric Power Research Institute, Inc. (EPRI)	x		Yes
Lyman	Morikawa	Morikawa & Associates, LLC		x	
Patrick	Murray	IEEE	x		
David	Narang	National Renewable Energy Laboratory		x	Yes
Farzam	Nejabatkhah	Eaton Corporation		x	
Jason	Page	Xcel Energy		x	
Marc	Patterson	Idaho Power Company		x	Yes
Prasad	PMSVVSV	Bloomenergy	x		Yes
Chelsea	Quilling	National Renewable Energy Laboratory		x	
Guruprasad	Ramani	Schneider Electric		x	
Daniel	Sabin	Schneider Electric	x		
Ajmal	Saeed	PG&E	x		Yes
Nicolas	Salazar	NextEra Energy - FPL	x		
Janette	Sandberg	Portland General Electric	x		Yes
Joe	Schaefer	FPL	x		Yes
Parag	Shah	Enchanted Rock Electric	x		
Mehrdad	Sheikholeslami	Quanta Technology	x		Yes
Neil	Shepard	Oak Ridge National Laboratory		x	Yes
Bonian	Shi	Beijing Sifang Automation Co., Ltd		x	
George	Shu	QPS EVALUATION SERVICES		x	Yes

Charles	Simpson	DER Security Corp		x	
John	Skeath	North American Electric Reliability Corporation		x	
Glenn	Skutt	Fermata Energy		x	
Wayne	Stec	Distregen, LLC		x	Yes
Hongling	Sun	HydroOne Networks Inc.		x	
Humayun	Tariq	aep		x	
Nirmal	Thaliyil	ASE systems, Kalkitech		x	
Kiran	Thomas	ASE systems, Kalkitech; Kalki Communications Technologies Pvt Ltd		x	
Justin	Turner	GE Grid Solutions	x		
Benton	Vandiver	Hitachi Energy		x	Yes
Charlie	Vartanian	Pacific Northwest National Lab	x		
Brian	Waldron	Schweitzer Engineering Laboratories, Inc.		x	
Matthew	Wallace	PPL Corporation	x		
Nathan	Walsh	National Grid		x	
Kevin	Whitener	Portland General Electric	x		Yes
Stephen	Wurmlinger	SMA America		x	Yes
Timothy	Zgonena	UL		x	

Appendix 2. Meeting Slides

IEEE SA
STANDARDS ASSOCIATION

IEEE P1547.10 WORKING GROUP MEETING

RECOMMENDED PRACTICE FOR DER GATEWAY PLATFORMS

ABREZ MONDAL, WG CHAIR
DANIEL FREEMAN, SECRETARY
MIKE KIPNESS, IEEE SA PROGRAM MANAGER

BURNS & MCDONNELL, HOUSTON, TX
APRIL 2023

IEEE

AGENDA

April 5, 2023

Wednesday 4/5/23: 1PM – 4PM		
12:45-13:00	Arrival	
13:00-13:10	Welcome & Call to Order	Chair
13:10-13:20	Introductions (Name, Affiliation) & Roll Call	On- and Off-site Participants
13:20-13:35	IEEE SA Policies & Procedures & WG Logistics	IEEE SA Program Manager/ Chair
13:35-13:40	Check for Quorum	Secretary
13:40-13:45	Approval of Agenda	Chair
13:45-14:00	Review & Approval of Minutes from Kickoff Meeting on January 9 in Jacksonville, FL	Chair
14:00-14:15	Introductions to Secretary and sub-WG facilitators	Secretary and SG Facilitators
14:15-14:30	Break	
14:30-15:45	Technical Presentations (25 mins each) • Relationship to DER Interoperability/P1547 • Overview on DER Gateways • Coordination efforts with NERC SPIDER WG	 Ben Ealey Abrez Mondal John Skeath/ Jose Cordova
15:45-16:00	Closing discussions for the day	All

AGENDA

April 6, 2023

Thursday 4/6/23: 8AM – 12PM		
7:45-8:00	Arrival	
8:00-8:15	Recap of Day 1 & review of Day 2 Agenda	Chair
8:15-8:55	Sub-Working 1 (Overall Document) discussions	SG 1 Lead and Facilitators
8:55-9:10	Break	
9:10-9:50	Sub-Working 2 (DER Grid-Edge Intelligence Functions) discussions	SG 2 Lead and Facilitators
9:50-10:05	Break	
10:05-10:45	Sub-Working 3 (Security Functions) discussions	SG 3 Lead and Facilitators
10:45-11:00	Break	
11:00-11:40	Sub-Working 4 (Communications) discussions	SG 4 Lead and Facilitators
11:40-12:00	Future Meetings	Chair
12:00	Adjourn	

FACILITY SAFETY AND EMERGENCY PROCEDURES

- **Emergency exits**
- **Assembly location**
- **Defibrillator location**
- **Dial 911 in emergency**

MEETING GOALS

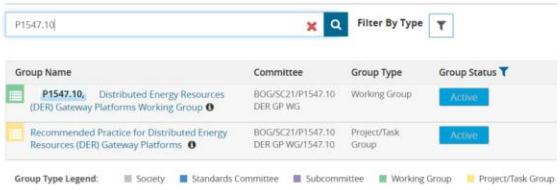
- **Approval of minutes from Kick-off meeting**
- **Coordination with P1547 revision and other WG**
- **Introduce Working Group Secretary and Sub-group Facilitators**
- **Discuss on draft version of scope of Sub-Working Groups (may be adjusted later as needed)**
- **Develop timeline, frequency for meetings & calls**

USE OF IEEE MYPROJECT AND IMAT

How To Log WG Meeting Attendance via IEEE iMAT?

Pre-requisite to use iMAT: Need to express interest in list on IEEE myProject!

- Anyone with a (free) IEEE account can sign up at https://development.standards.ieee.org/my-site/home to receive P1547.10 Working Group updates ("Participant").

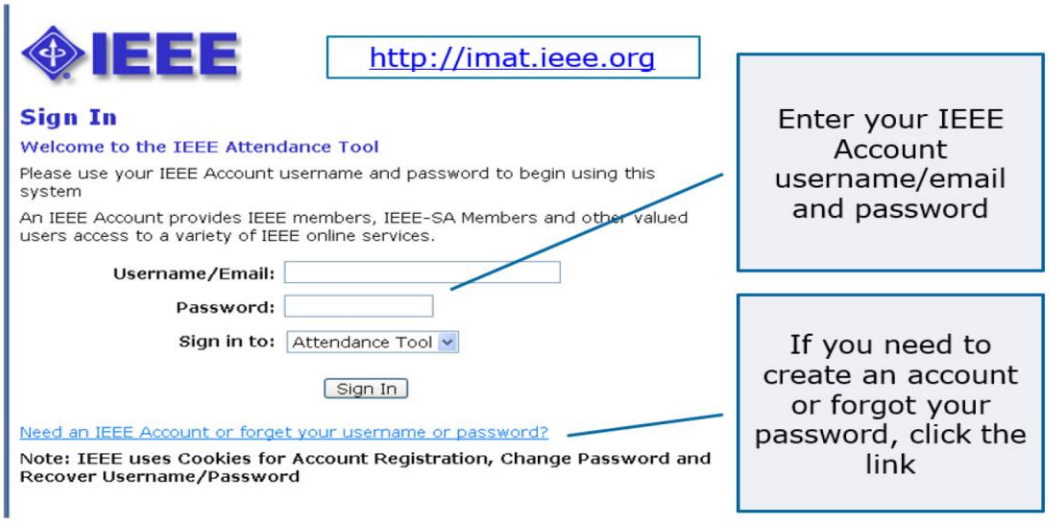


- Participants can attend WG meetings and log their attendance via https://imat.ieee.org/.

How to *Express Interest in IEEE myProject* to Receive the Invitation to Joint the Ballot Group for IEEE-SA Ballot

1. On the myProject™ Home Screen, click on Menu and then on Manage Profile and Interests.
2. Click on the Interests tab and then on Add Groups.
3. On the Add/Search Interested Groups screen enter "WSPI" into the Search box and click the search button.
4. Click in the Groups I am Interested In column to indicate interest in the applicable group and project.
5. On the Add Interested Group I want to follow screen, indicate if you want to *Participate* or *Follow* the group. Then click Declare Affiliations.
6. On the next screen, confirm your current affiliation and add additional affiliations as necessary.
7. Click Save or Return to Level of Interest to change your selection. Then click OK and then click DONE.

SIGN IN TO ATTENDANCE TOOL



IEEE SA STANDARDS ASSOCIATION

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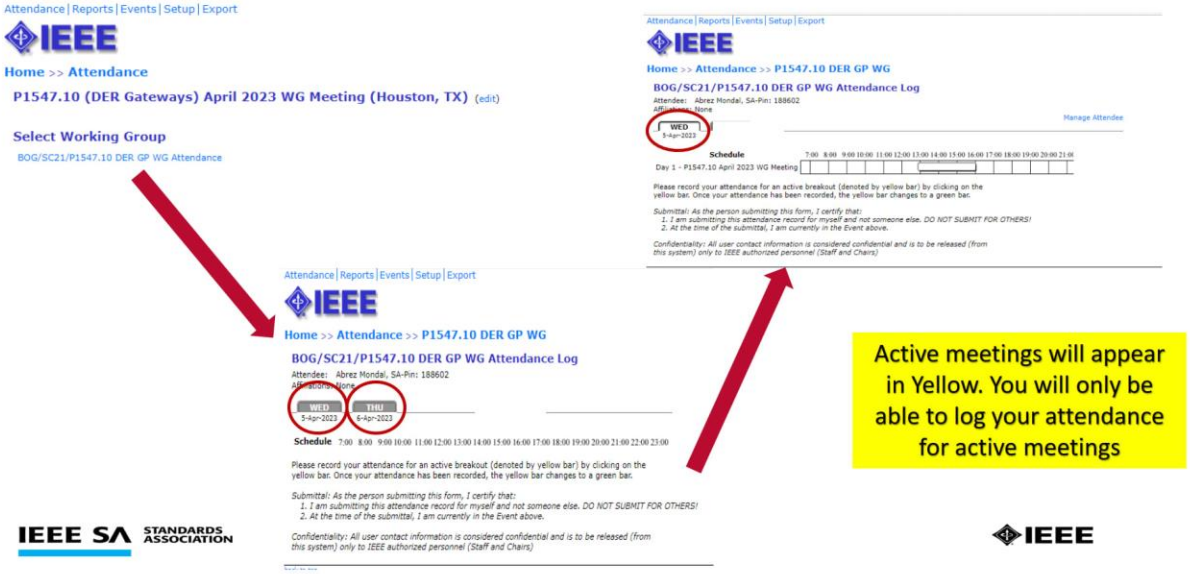
SELECT THE MEETING YOU ARE ATTENDING

Scroll to the bottom of the page

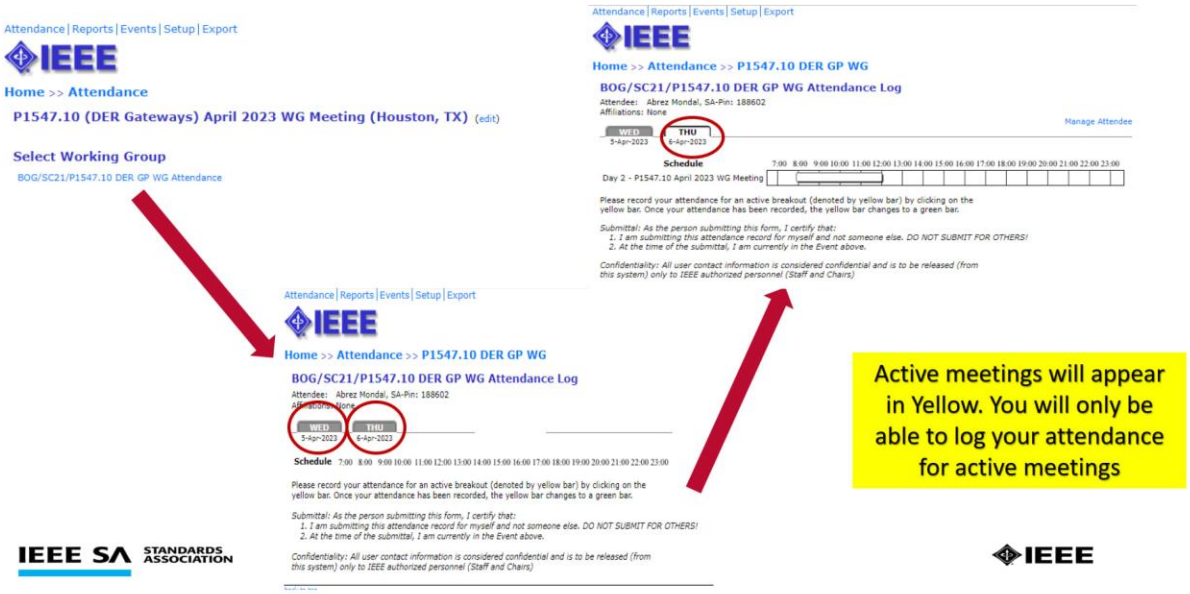
IEEE SA STANDARDS ASSOCIATION

IEEE

SELECT WG THEN CLICK TO LOG ATTENDANCE



SELECT WG THEN CLICK TO LOG ATTENDANCE



INTRODUCTIONS

Name, Employer, Affiliation

Please keep it short!

*****Virtual Participants – Please enter Name and Affiliation in Chat***

PARTICIPANTS HAVE A DUTY TO INFORM THE IEEE

- Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
- Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims

Early identification of holders of potential Essential Patent Claims is encouraged

WAYS TO INFORM IEEE

- Cause an LOA to be submitted to the IEEE SA (patcom@ieee.org); or
- Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or
- Speak up now and respond to this Call for Potentially Essential Patents

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

OTHER GUIDELINES FOR IEEE WORKING GROUP MEETINGS

- All IEEE SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.
  - Don't discuss the interpretation, validity, or essentiality of patents/patent claims.
  - Don't discuss specific license rates, terms, or conditions.
    - Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
      - Technical considerations remain the primary focus.
  - Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.
  - Don't discuss the status or substance of ongoing or threatened litigation.
  - Don't be silent if inappropriate topics are discussed. Formally object to the discussion immediately.

For more details, see *IEEE SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at http://standards.ieee.org/develop/policies/antitrust.pdf

IEEE SA STANDARDS ASSOCIATION IEEE

PATENT-RELATED INFORMATION

The patent policy and the procedures used to execute that policy are documented in the:

- *IEEE SA Standards Board Bylaws*
  (http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6)
- *IEEE SA Standards Board Operations Manual*
  (http://standards.ieee.org/develop/policies/opman/sect6.html#6.3)

Material about the patent policy is available at *http://standards.ieee.org/about/sasb/patcom/materials.html*

If you have questions, contact the IEEE SA Standards Board Patent Committee Administrator at patcom@ieee.org

IEEE SA STANDARDS ASSOCIATION IEEE

IEEE SA COPYRIGHT POLICY

By participating in this activity, you agree to comply with the IEEE Code of Ethics, all applicable laws, and all IEEE policies and procedures including, but not limited to, the IEEE SA Copyright Policy.

- Previously Published material (copyright assertion indicated) shall not be presented/submitted to the Working Group nor incorporated into a Working Group draft unless permission is granted.
- Prior to presentation or submission, you shall notify the Working Group Chair of previously Published material and should assist the Chair in obtaining copyright permission acceptable to IEEE SA.
- For material that is not previously Published, IEEE is automatically granted a license to use any material that is presented or submitted.

IEEE SA STANDARDS ASSOCIATION IEEE

IEEE SA COPYRIGHT POLICY - LINKS

- The IEEE SA Copyright Policy is described in the IEEE SA Standards Board Bylaws and IEEE SA Standards Board Operations Manual
  - IEEE SA Copyright Policy, see
    Clause 7 of the IEEE SA Standards Board Bylaws
    https://standards.ieee.org/about/policies/bylaws/sect6-7.html#7
    Clause 6.1 of the IEEE SA Standards Board Operations Manual
    https://standards.ieee.org/about/policies/opman/sect6.html
- IEEE SA Copyright Permission
  - https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/permissionltrs.zip
- IEEE SA Copyright FAQs
  - https://standards.ieee.org/faqs/copyrights/
- IEEE SA Best Practices for IEEE Standards Development
  http://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/best_practices_for_ieee_standards_development_051215.pdf
- Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
  - https://standards.ieee.org/about/policies/opman/sect6.html

IEEE SA STANDARDS ASSOCIATION IEEE

QUESTIONS?

stds-copyright@ieee.org

For requests to use material from approved IEEE standards:
https://standards.ieee.org/ipr/copyright-permissions-form.html

IEEE SA STANDARDS ASSOCIATION IEEE

PARTICIPANT BEHAVIOR IN IEEE-SA ACTIVITIES IS GUIDED BY THE IEEE CODES OF ETHICS & CONDUCT

- All participants in IEEE-SA activities are expected to adhere to the core principles underlying the:
  - IEEE Code of Ethics
  - IEEE Code of Conduct
- The core principles of the IEEE Codes of Ethics & Conduct are to:
  - *Uphold the highest standards of integrity, responsible behavior, and ethical and professional conduct*
  - *Treat people fairly and with respect, to not engage in harassment, discrimination, or retaliation, and to protect people's privacy.*
  - *Avoid injuring others, their property, reputation, or employment by false or malicious action*
- The most recent versions of these Codes are available at http://www.ieee.org/about/corporate/governance

PARTICIPANTS IN THE IEEE-SA "*INDIVIDUAL PROCESS*" SHALL ACT INDEPENDENTLY OF OTHERS, INCLUDING EMPLOYERS

- The IEEE-SA Standards Board Bylaws require that "*participants in the IEEE standards development individual process shall act based on their qualifications and experience*"
- This means participants:
  - **Shall act & vote** based on their personal & independent opinions derived from their expertise, knowledge, and qualifications
  - **Shall not act or vote** based on any obligation to or any direction from any other person or organization, including an employer or client, regardless of any external commitments, agreements, contracts, or orders
  - **Shall not direct** the actions or votes of other participants or retaliate against other participants for fulfilling their responsibility to act & vote based on their personal & independently developed opinions
- By participating in standards activities using the "*individual process*", you are deemed to accept these requirements; if you are unable to satisfy these requirements then you shall immediately cease any participation

IEEE-SA STANDARDS ACTIVITIES SHALL ALLOW THE FAIR & EQUITABLE CONSIDERATION OF ALL VIEWPOINTS

- The IEEE-SA Standards Board Bylaws (clause 5.2.1.3) specifies that "*the standards development process shall not be dominated by any single interest category, individual, or organization*"
  - This means no participant may exercise "*authority, leadership, or influence by reason of superior leverage, strength, or representation to the exclusion of fair and equitable consideration of other viewpoints*" or "*to hinder the progress of the standards development activity*"
- This rule applies equally to those participating in a standards development project and to that project's leadership group
- Any person who reasonably suspects that dominance is occurring in a standards development project is encouraged to bring the issue to the attention of the Standards Committee or the project's IEEE-SA Program Manager

ETOOLS

1 **myProject** — It is the IEEE Standards Association's web-based tool used by IEEE members, staff, and other individuals who want to participate in the standards process.

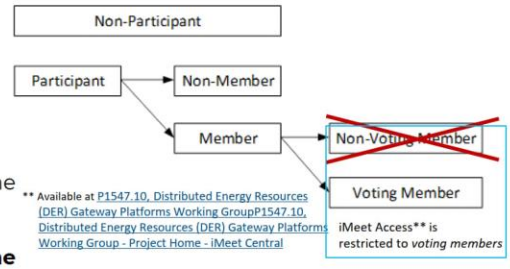
2 **iMeet Central** — A web-based, password-protected collaboration platform offered to standard development groups. iMeet provides many tools including secure file sharing, forum, project management and more.
P1547.10, Distributed Energy Resources (DER) Gateway Platforms Working GroupP1547.10, Distributed Energy Resources (DER) Gateway Platforms Working Group - Project Home - iMeet Central

3 **WordPress** — WordPress is an online, open source website creation tool.
P1547.10, Distributed Energy Resources (DER) Gateway Platforms Working Group (ieee.org)

4 **Listserv** — IEEE Listserv is the preferred email list management tool for Working Group email communication. Through this list, the WG can communicate with individuals interested in the WG activities.

VOTING MEMBERSHIP

- ❑ A participant becomes a voting member, **upon request,** by **attending 2 of the last 4 meetings**.
- ❑ Once attended 2 of last 4 meetings, **ask the Secretary** to become **"Voting Member"** and get **iMeet** access.
- ❑ The participant's voting status will be **effective at the start of the next meeting**.
- ❑A voting member who has not attended at least 2 of the last 4 meetings may become a non-member.
- ❑For simplicity, all members of the Working Group are considered voting members. **The category of non-voting member is not used.**
- ❑Only **IEEE SA members** can **ballot P1547.10**



IEEE or IEEE-SA membership is not required to participate

BUT: IEEE-SA membership is required for SA sponsor ballot!

Please send your requests for voting rights to:
Abrez Mondal, abrezmondal@ieee.org and Daniel Freeman, Daniel.freeman@se.com

QUORUM

Quorum shall be defined as **10% of the current total voting membership** or 26, whichever is greater.

APPROVAL OF AGENDA

APPROVAL OF MINUTES FROM KICK-OFF MEETING AT JACKSONVILLE, FL

Draft meeting minutes and post-meeting slides available at:

https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_KUu

SUBGROUP STRUCTURE AND MAILING LISTS

P1547.10 Working Group	**Abrez Mondal (WG Chair) Daniel Freeman (Secretary) Yashar Kenarangui, John Berdner (Vice-Chairs)**	STDS-P1547-10@LISTSERV.IEEE.ORG	**Click here to sign up for the P1547.10 listserver**

P1547.10 Subgroup	Overseeing WG Officers / SG Leads	Subgroup Facilitator(s)	Subgroup Mailing List (ListServ)	Sign-Up Link
#1 – Overall Document and General Requirements	**Abrez Mondal**	**Daniel Freeman**	STDS-P1547-10-SG1@LISTSERV.IEEE.ORG	**Click here to sign up for SG1 listserver**
#2 – DER grid-edge Intelligence functions in Gateway	**Yashar Kenarangui**	**Brian Waldron Jedidiah Bartlett**	STDS-P1547-10-SG2@LISTSERV.IEEE.ORG	**Click here to sign up for SG2 listserver**
#3 - Security functions in Gateway	**John Berdner**	**Kiran Thomas**	STDS-P1547-10-SG3@LISTSERV.IEEE.ORG	**Click here to sign up for SG3 listserver**
#4 - Communications	**Yashar Kenarangui**	**Galina Antonova Fares al Jajeh**	STDS-P1547-10-SG4@LISTSERV.IEEE.ORG	**Click here to sign up for SG4 listserver**

INTRODUCTIONS

DANIEL FREEMAN : Secretary

Technical Domain Leader - PCA, US Services Consulting

Daniel is responsible for technical governance and thought leadership for an engineering team of 150+ electrical engineers focused on Protection, Control, and Automation. He has 15 years of industry experience in these areas and has held multiple roles covering all aspects of the business including technical support, application engineering, business development, training manager, and product/offer management. He is a frequently requested speaker for IEEE meetings and internally across multiple lines of business. He holds a Bachelor of Science in Electrical Engineering, Math Minor, and Finance focused MBA from Tennessee Technological University.

INTRODUCTIONS

BRIAN WALDRON : Sub-Group 2 Co-Facilitator

- Senior Automation Engineer
- 12 years at Schweitzer Engineering Laboratories
- R&D Department work
  - Protocol specification/testing/compliance/interoperability/certification
  - IEC-61131 Application Development
  - Power Plant Control for inverter based generation(50KW to 100MW)

INTRODUCTIONS

JEDIDIAH BARTLETT : Sub-Group 2 Co-Facilitator

- Senior Automation Engineer
- 15 years at SEL
  - Microgrid systems under SEL Engineering Services - PowerMAX
    - “Microgrid” Generation Control (~1MW – ~1GW)
    - Load Shedding and perturbation recovery
  - Application Development Lead
    - SEL RTAC and SEL AcSELerator RTAC
    - SEL Blueframe Distributed Edge
- OpenFMB Standards Member

INTRODUCTIONS

KIRAN THOMAS : Sub-Group 3 Facilitator

- 18 years of experience in the energy & utility industry.
- Technical Architect, Leads R&D for Edge Software at ASE/Kalkitech
- Experience in design & development of communication products for the energy industry (Gateways, Phasor Data Concentrators, Low Power RF products)
- Areas of interest include developing system software for embedded systems, communication protocols, secure hardening of edge devices.

INTRODUCTIONS

GALINA ANTONOVA: Sub-Group 4 Facilitator

Galina S. Antonova

Galina S. Antonova serves as a Technical Sales Engineer with Hitachi Energy in North America. She has over 20 years of experience in the area of electrical engineering, data communications and time synchronization, which she applied to the electrical power industry. In her current role Galina is applying her expertise to substation automation and protective relay applications. Galina received her M. Sc. Degree with Honors in 1993 and a Ph.D. in 1997 in Electrical Engineering and Data Communications from the State University of Telecommunications, St. Petersburg, Russia, and spent one year at University of British Columbia (UBC) on a scholarship from the Russian President. She is actively involved with IEEE PSRC, PSCC and is a Canadian member of the IEC TC57 WG10. In her spare time Galina enjoys ice dancing, playing piano and growing lavender.

GALINA ANTONOVA

Selected Standardization Leadership Activities

- PSRC D47 Line Current differential Guide — Secretary / PSCCC Liaison
- PSRC H49 Application of packet switched networks — Acting Vice-Chair
- PSRC H Sub Committee Liaison to 1547.10

- Past Chair of PSRC Sub Committee H Relaying Communications, 2019-2021
- Past Chair of PSCCC P1 IEC/IEEE 61850-9-3:2016 and IEEE C37.238-2017
  Base and extended profile of Precision Time Protocol (PTP) for power system applications
- Past Chair of PSRC H24/SubC7 for IEEE C37.238-2011 PTP power profile
- Past Chair of PSRC C4 C37.242-2013 A guide for Phasor Data Concentrators (PDCs)
- Past Vice-Chair of H2 Protective Relaying Applications using Smart Grid Com Infrastructure, 2012

INTRODUCTIONS

FARES AL JAJEH: Sub-Group 4 co-Facilitator

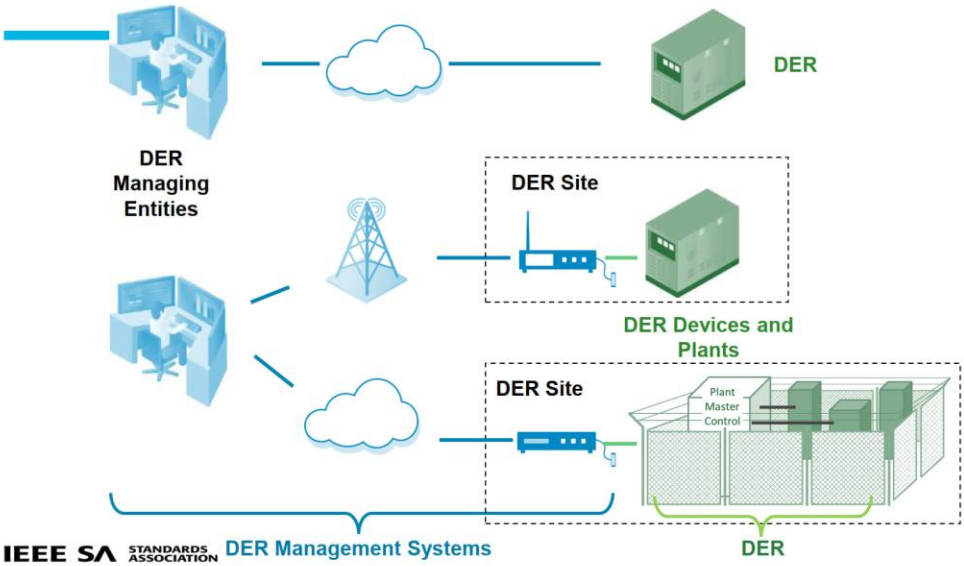
- Lead Controls Engineer at DERMS Center of Excellence at Eaton Corporation
- Active role: technical lead for grid codes development and testing for energy storage products
- Past role: Power Systems Simulation Specialist at OPAL-RT Technologies
- IEEE1547 revision workgroup co-lead in subgroup 2 (General Requirements - normal conditions, voltage regulation) and subgroup 7 (Test specifications & Requirements).
- Open Field Message Bus (OpenFMB) interoperability framework working group member.

DER GATEWAYS

Overview of Project

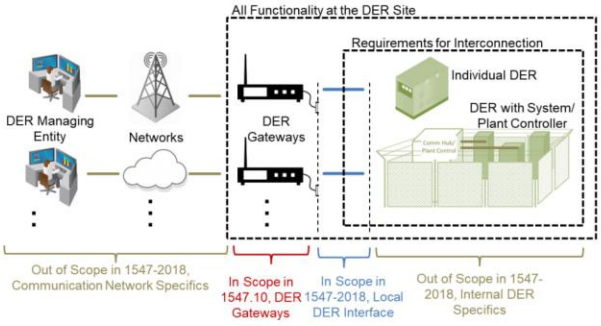
IEEE
Advancing Technology for Humanity

WHAT IS AT "DER SITE"



DER GATEWAYS

- A local platform – housing features and logic valuable to the DER managing entity
- Unavoidable in most sites as they connect DER onto the network
- Low-cost option as most functionalities are software (s/w) features

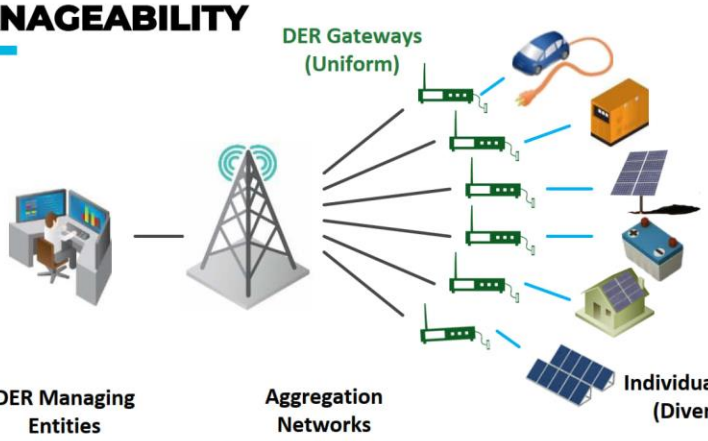


PURPOSE OF DER GATEWAYS

- Enable **distributed intelligence** that enhances grid reliability and safety
- Provide **protocol translation** for unified utility communication with DER speaking various languages at the system edge
- Enable trusted, cyber **secure** integration of un-trustable DER with DERMS

DER Gateway – Missing link for integrating DER

DER MANAGEABILITY



DER Gateways are readily-accessible targets for functional and firmware upgrades that can be centrally managed. They can be deployed at one time as a cohesive system, while integrating DER devices of diverse ages. They can be assets of the aggregating entity, managed and upgraded as desired

NEED FOR PROJECT P1547.10

- The smart inverter functionalities specified in IEEE 1547-2018, and the associated communication interfaces are not suitable for direct integration with the monitoring and control systems of grid operators
- Implementation logics or management features for DERs are not clearly defined in IEEE 1547
- IEEE 1547-2018 does not specify cybersecurity requirements for DER and its local networks because they are generally untrusted systems to the DER managing entity
- Other ongoing work (UL 1741, P2030 etc.) may stretch into functional requirements that relate to the DER Gateway, increasing the potential risk of bifurcated requirements

IEEE P1547.10 PAR

❑ Scope

This document defines recommended specifications for a Distributed Energy Resources (DER) gateway platform in grid applications across various domains. A description of DER gateway implementation options (local or distributed platform, for legacy or intelligent DERs) is included. Gateway platform functions and communications, including operational procedures and data collection recommendations are described. Recommended procedures for cybersecurity, centralized manageability, monitoring, grid edge intelligence and control, multiple entities management, error detection and mitigation, events tracking and notification, communication protocol translation, and communication network performance monitoring are also described.

❑ Purpose

The purpose of the project is to create and maintain coherency between P1547/.x, P2030/.x, and other related projects for DER and Distributed Energy Resources Management Systems (DERMS) within the evolving smart grid interoperability reference model (SGIRM) with a focus on Distributed Energy Resources (DER) Gateway Platforms. The recommended practice enables utilities deploying DERMS and other DER integration systems to integrate DER with grid edge intelligence, while DER devices serve their core functions focusing on simplicity, interoperability, and long-term stability.

RELATIONSHIP TO IEEE P1547 REV

- Coordination between P1547.10 activities with P1547, especially *Interoperability and Cybersecurity* Sub-group
- P1547 is a **standard** document, specifying mandatory requirements – uses mostly **"shall"** language
- P1547.10 is a **recommended practice** document in which procedures and positions preferred by the IEEE are presented – uses mostly **"should"** language

Agenda

- **Revisit Existing Works** *(a repeat for those who attended Mon)*
  - Re-Familiarize group with 1547-2018 interop requirements
- **Looking Forward**
  - DER Gateways – Acknowledged in 1547
  - Topics Best in 1547 Base Standard
  - Critical Topics Out of Scope of Base Standard
  - Making Coordination the Default
  - Top Questions

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Rapid Recap – Interoperability

- Designed to preserve access and configurability of the DER
- Base standard requires DER support either SunSpec Modbus, IEEE 2030.5, and/or DNP
- It requires standard information models for each of those
- Defines specific parameters, monitoring, points, and state information that must be available for communications
- It defines when a DER should be available for communications
- Does not address the networks

IEEE 1547-2018 interface is an ideal interface for a DER Gateway

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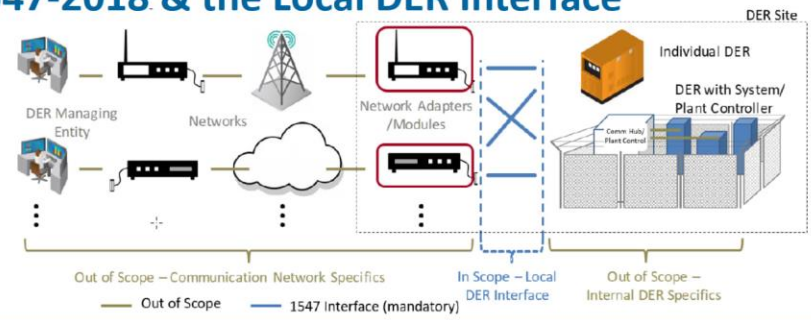
Breakdown of 1547-2018 Interop Clause

- **The intent & breakdown of the requirements**
  - 10.1 Interoperability Requirements
  - 10.2 Monitor, Control, and Information Exchange Requirements
- **Mandated parameters, requires information interoperability**
  - 10.3 Nameplate Information
  - 10.4 Configuration Information
  - 10.5 Monitoring Information
  - 10.6 Management Information
- **Location of interface & protocol (transport & physical interface)**
  - 10.7 Communication Protocol Requirements
- **Allowable interface response time & when interface must be available**
  - 10.8 Communication Performance Requirements
- **Cyber can be implemented based on mutual agreement, references cyber annex**
  - 10.9 Cyber Security Requirements

Breakdown of 1547.1-2020 Interop Clause

- **Introduces basics, references information model of each protocol**
  - 6.2 Overview
- **Establishes process for test, highlights value to testing in sync with functional tests**
  - 6.2 Interoperability testing approach
- **Protocol-agnostic test procedures**
  - 6.3 General test procedures
  - 6.4 Nameplate data test
  - 6.5 Configuration information test
  - 6.6 Monitoring information test
  - 6.7 Management information test
- **Defines the specific parameters required in each protocol using appropriate info model**
  - 6.8 Specific protocol mapping

IEEE 1547-2018 & the Local DER Interface



Scope of IEEE 1547 does not include the communication system nor the local network gateway

- Flexibility for utilities to choose any network type
- DER manufacturers can ship a common product not prescriptive of a utility/region
- Companies (DER and network providers) can focus on their core competencies
- Replace/update communications systems without obsoleting end devices

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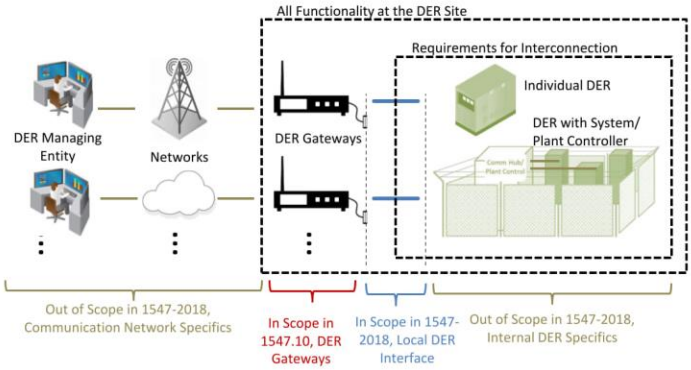
Topics Best Left to IEEE 1547 Base Std

- **1547 Scope?**
  - DER modes and capabilities
  - Local interface requirements
  - Local protocols / info models
  - "Local" Cyber Interface
- **1547.10 Scope?**
  - Cyber Security
  - Backhaul Protocols
  - Translation
  - Grid Edge Functions (e.g. scheduling implementation)



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The Key to Setting Coordination as the Default

- Coordination is a top subject in both .10 and 1547 revision
- Leverage lessons learned from coordination in .2, .3, and .9!
- Membership is shared between SG4 and IEEE 1547.10
  - Same process used between .2, .3, and .9 – created an inherent consideration of overlaps, cross reference, and alignment.
- IEEE 1547.1 amendment – TBD

Key Questions

- Will IEEE 1547.10 create new capabilities requiring new interop requirements?
- Is there a need to duplicate some requirements? Is that ok?
  - E.g. scheduling
- Unclear how cyber security will be implemented in revision – will need to coordinate.
- What is a "gateway"? Cloud, local, and BTM are architecturally different, not all use 1547 interfaces.

Do you see other coordination topics and needs?

Privacy and Security Impacts of DER and DER Aggregators

Joint SPIDERWG/SITES White Paper

Jose Cordova (EPRI), John Skeath (NERC)

IEEE
Advancing Technology for Humanity

NERC's Stakeholder Committees

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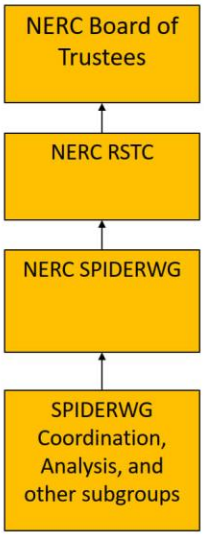
Current Workflow Structure



Approves Committees, Subcommittees, and Assessments.

Approves and publishes SPIDERWG white papers, reliability guidelines, etc.

Meets quarterly to approve work and circulate subgroup work to broader members. Typically 50 people per call, many more on distribution list.

Drafts content, gathers information, etc. to build products. Typically 5-10 people per call.

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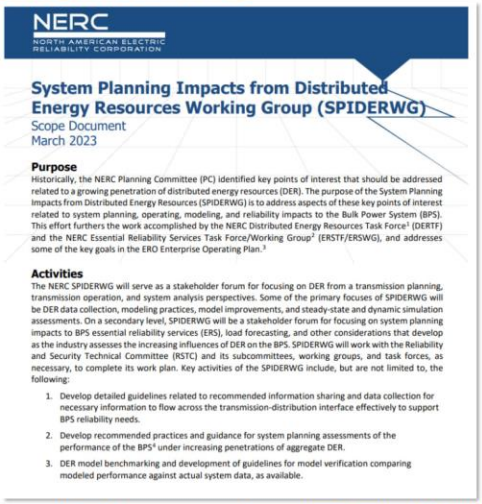
NERC SPIDERWG



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System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG)
Scope Document
March 2023

Purpose
Historically, the NERC Planning Committee (PC) identified key points of interest that should be addressed related to a growing penetration of distributed energy resources (DER). The purpose of the System Planning Impacts from Distributed Energy Resources (SPIDERWG) is to address aspects of these key points of interest related to system planning, operating, modeling, and reliability impacts to the Bulk Power System (BPS). This effort furthers the work accomplished by the NERC Distributed Energy Resources Task Force[1] (DERTF) and the NERC Essential Reliability Services Task Force/Working Group[2] (ERSTF/ERSWG), and addresses some of the key goals in the ERO Enterprise Operating Plan.[3]

Activities
The NERC SPIDERWG will serve as a stakeholder forum for focusing on DER from a transmission planning, transmission operation, and system analysis perspectives. Some of the primary focuses of SPIDERWG will be DER data collection, modeling practices, model improvements, and steady-state and dynamic simulation assessments. On a secondary level, SPIDERWG will be a stakeholder forum for focusing on system planning impacts to BPS essential reliability services (ERS), load forecasting, and other considerations that develop as the industry assesses the increasing influences of DER on the BPS. SPIDERWG will work with the Reliability and Security Technical Committee (RSTC) and its subcommittees, working groups, and task forces, as necessary, to complete its work plan. Key activities of the SPIDERWG include, but are not limited to, the following:

1. Develop detailed guidelines related to recommended information sharing and data collection for necessary information to flow across the transmission-distribution interface effectively to support BPS reliability needs.
2. Develop recommended practices and guidance for system planning assessments of the performance of the BPS[4] under increasing penetrations of aggregate DER.
3. DER model benchmarking and development of guidelines for model verification comparing modeled performance against actual system data, as available.

https://www.nerc.com/comm/RSTC/SPIDERWG/SPIDERWG%20Scope.pdf

Membership is open to those with:

- Modeling and/or implementing aggregate DER in BPS planning studies or real-time operations
- Assessing the reliability impacts of increasing penetration of DER on the BPS
- Load forecasting and load modeling with the inclusion of DER
- IEEE standards 1547-2003, 1547-2018, and related equipment standards

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Background White Paper

BPS Reliability Perspectives for Distributed Energy Resource Aggregators [link]

- Published July 2022
- Sets stage for SPIDERWG involvement in DER managing entities and equipment.


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BPS Reliability Perspectives for Distributed Energy Resource Aggregators
NERC System Planning Impacts from DERs Working Group
White Paper
July 2022

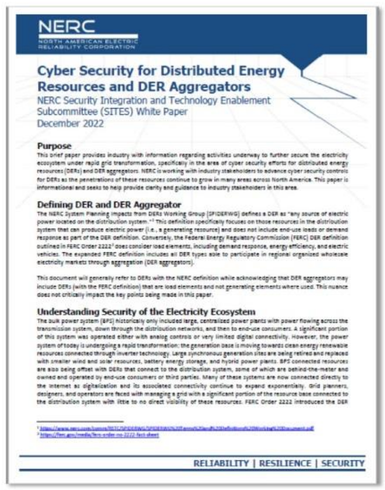
Purpose
This white paper provides bulk power system (BPS) reliability perspectives and considerations regarding distributed energy resource (DER) aggregation in light of Federal Energy Regulatory Commission (FERC) Order No. 2222,[1] which introduces the concept of DER aggregation in wholesale electricity markets. Subsequently, Order No. 2222-A and Order No. 2222-B have been issued.[2]

While NERC and its technical stakeholder groups are not directly involved in market-related activities, the NERC System Planning Impacts from DERs Working Group (SPIDERWG) recognizes that the introduction of DER aggregators[3] to the overall electricity ecosystem will have an impact on BPS planning, operations, design, and overall grid reliability. The introduction of DER aggregators specifically raises questions about how to plan for, model, and simulate the DER behavior contained in the aggregation operated by DER aggregators. As Transmission Planners (TPs) study the ability to serve load in their area, they will need to account for, as an example, the potential of any reduction of power from DERs or other load modifiers (e.g.,

Background White Paper

Cyber Security for Distributed Energy Resources and DER Aggregators [link]

- NERC Security Integration and Technology Enablement Subcommittee (SITES) White Paper
- Published in December 2022


NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Cyber Security for Distributed Energy Resources and DER Aggregators
NERC Security Integration and Technology Enablement Subcommittee (SITES) White Paper
December 2022

Purpose
This brief paper provides industry with information regarding activities underway to further secure the electricity ecosystem under rapid grid transformation, specifically in the area of cyber security efforts for distributed energy resources (DERs) and DER aggregators. NERC is working with industry stakeholders to advance cyber security controls for DERs as the penetrations of these resources continue to grow in many areas across North America. This paper is informational and seeks to help provide clarity and guidance to industry stakeholders in this area.

Defining DER and DER Aggregator
The NERC System Planning Impacts from DERs Working Group (SPIDERWG) defines a DER as "any source of electric power located on the distribution system."[1] This definition specifically focuses on those resources in the distribution system that can produce electric power (i.e., a generating resource) and does not include end-use loads or demand response as part of the DER definition. Conversely, the Federal Energy Regulatory Commission (FERC) DER definition outlined in FERC Order 2222[2] does consider load elements, including demand response, energy efficiency, and electric

Understanding Security of the Electricity Ecosystem

RELIABILITY | RESILIENCE | SECURITY

Joint SPIDERWG/SITES Paper

Purpose

- Privacy, cyber security, and physical security concerns for the DER and DER Aggregator impacts to the Bulk Power System.
  - Information sharing running into confidential data for use in the TP/PC studies, etc.
- Technical considerations and questions to answer on DER Aggregators.
- National Cybersecurity certification
  - Testing a Verification of certification (e.g., DOE and NREL)
- What current market rules exist to mitigate on the security risks?
  - Cyber security for aggregators is out of scope as per FERC Order 2222.
  - ISO/RTOs not directed, but what, if anything, is limiting this from being added to Tariff/market rules?

Definitions

- In FERC Order No. 2222, FERC amended the Open Access Transmission Tariff (OATT) by defining both "DER" and "DER aggregator" as shown here:

  - **Distributed Energy Resource (DER)**: any resource located on the distribution system, any subsystem thereof or behind a customer meter.
  - **Distributed Energy Resource Aggregator (DER aggregator):** the entity that aggregates one or more distributed energy resources for purposes of participation in the capacity, energy and/or ancillary service markets of the regional transmission organizations and/or independent system operators.

Key Recommendation

The SPIDERWG term for DER is considered appropriate for reliability-focused discussions and is used throughout this document unless otherwise noted. Regardless of any differences in the definition of DER, it is imperative that industry ensure a clear and appropriate definition of DER based on the specific context in which the term is being used for either reliability or market-related discussions.

FERC Order No. 2222, page 93, P114

FERC Order No. 2222, page 95, P118

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SITES/SPIDERWG Joint White Paper Draft Outline

- Background
- Interested Registered Entities
- Definitions
- Security Controls available to DER and DER Aggregators
  - Security and Network Monitoring Controls
  - IEEE 1547-2018
  - **Need for DER Gateways**
  - Carrier Controls Inherent in Communication
- Current Distribution Security Landscape of DER and DER Aggregators
  - Differentiation of Utility-scale DER versus Retail-scale DER landscape
  - Confidentiality of Data at the DER and DER Aggregator
- NERC Reliability Standards Relationships
  - Limitations on Assessment and Applicability of DER, DER Aggregators, or other Distribution Entities
  - BES Impact Test and Meaning
- Security Standards, Frameworks, or Alternatives in this Area
  - National and International Lessons Learned
- Recommendations to DER and DER Aggregators
  - Coordination of Implementation of Recommendations

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Security Controls available to DER and DER Aggregators

Need for DER Gateways

DERs face a variety of local threats and vulnerabilities which are likely outside of utility responsibility and control.

- DER itself can be exposed to a variety of different interfaces in addition to the utility's connection, including those for aggregator, owners, and OEM management.

IEEE 1547-2018 does not specify cybersecurity requirements for DER and its local networks because they are generally untrusted systems to the DER managing entity due to these risk exposures.

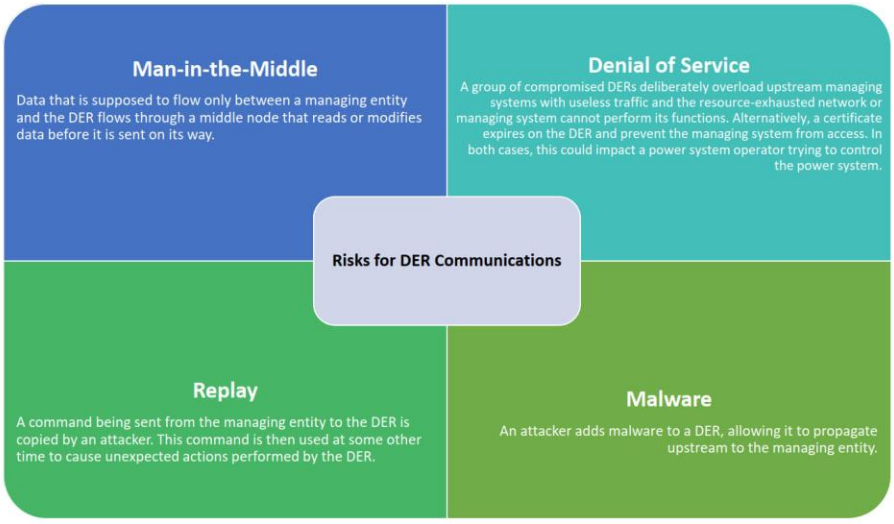
- The special case exception to this is when the DER managing entity is also the DER manufacturer.

Furthermore, current compliance and certification frameworks are limited in their scope of enforcement to ensure that necessary security controls are adequately met among owners of DER.

- Current ongoing efforts include Sunspec's Cybersecurity Certification and UL 2941

IEEE

Security Controls available to DER and DER Aggregators



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Security Controls available to DER and DER Aggregators

DER Gateways

- DER gateways can serve as local platforms housing features and logics important to the DER managing entity, but they can also perform several other important perimeter security functions that prevents against these attack scenarios. This local platform physically resides at the local DER site and as defined by IEEE 1547, includes a wired, physical interface that establishes a private connection to the DER only through the gateway.
- Because these and other security features are implemented on a gateway that is owned, implemented, maintained, and certified by the managing entity rather than the DER-owner, managing entities can ensure secure integration over public, untrusted networks with its DERMS operations

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Current Distribution Security Landscape of DER and DER Aggregato

IEEE P1547.3

- The *IEEE P1547.3 Guide for Cybersecurity of Distributed Energy Resources Interconnected with Electric Power Systems* is currently under industry comments recirculation and provides guidance and recommendations referring to cybersecurity features provided by communication protocols (IEEE Std 1815, IEEE Std 2030.5, SunSpec Modbus, and IEC 61850) specified in the IEEE 1547-2018.
- The guide includes the following cybersecurity challenges and recommendations:

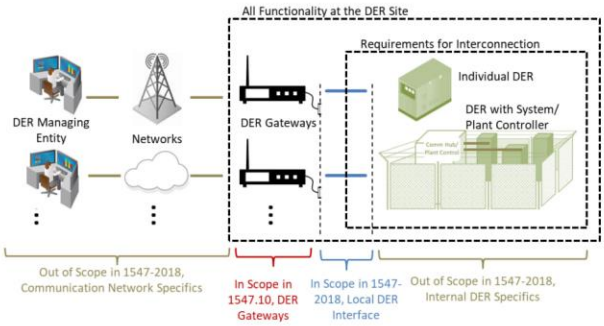
- Risk assessment and management,
- Communication network engineering,
- Access control,
- Data security,
- Security management,
- Coping and recovering from security events,
- Testing and Commissioning for Cybersecurity and Conformance with the IEEE 1547.3

IEEE

Current Distribution Security Landscape of DER and DER Aggregators

- **IEEE P1547.10**

- The scope of IEEE P1547.10 includes Gateway platform functions and communications, including operational procedures and data collection recommendations. Additionally, recommended procedures for cybersecurity, centralized manageability, monitoring, grid edge intelligence and control, multiple entities management, error detection and mitigation, events tracking, and notification, communication protocol translation, and communication network performance monitoring.



Getting Involved https://standards.ieee.org/ieee/1547.10/10940/

NERC Reliability Standards Relationships

- Overarching Question: "When are DERs and DER Aggregators acting like a BES Cyber Asset?"
  - Control of assets
  - What controls? How could they impact a BES? What risk could they pose? What are the cybersecurity considerations for these controls?
  - Other things included in FERC 2222 definition (i.e., load like Demand Response) versus the SPIDERWG definition (i.e., just generation, like small trash burners)

BES Cyber Asset

A Cyber Asset that if rendered unavailable, degraded, or misused would, within 15 minutes of its required operation, misoperation, or non-operation, adversely impact one or more Facilities, systems, or equipment, which, if destroyed, degraded, or otherwise rendered unavailable when needed, would affect the reliable operation of the Bulk Electric System. Redundancy of affected Facilities, systems, and equipment shall not be considered when determining adverse impact. Each BES Cyber Asset is included in one or more BES Cyber Systems.

Recommendations to DER and DER Aggregators

- Due to the various jurisdictions and standardizations on protocols and security measures, **strong collaboration and coordination is highly recommended**. The overall security posture of the bulk system can be impacted by the potential security risk associated with DER or DER Aggregators.

Increasing need for T&D Coordination

Source: EPRI

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IEEE SA
STANDARDS ASSOCIATION

CLOSING DISCUSSIONS FOR THE DAY

IEEE P1547.10 WORKING GROUP MEETING

RECOMMENDED PRACTICE FOR DER GATEWAY PLATFORMS

ABREZ MONDAL, WG CHAIR
DANIEL FREEMAN, SECRETARY
MIKE KIPNESS, IEEE SA PROGRAM MANAGER

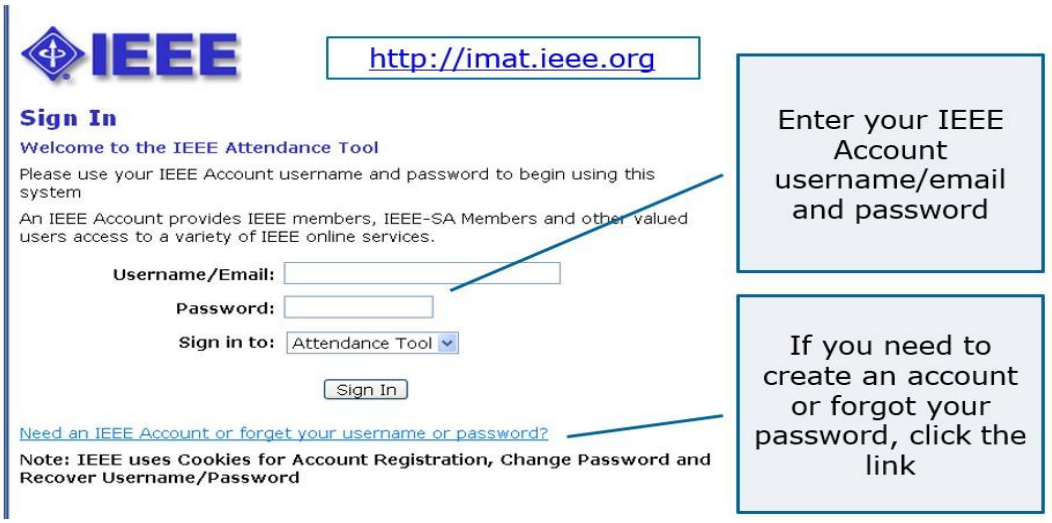
BURNS & MCDONNELL, HOUSTON, TX
APRIL 2023

AGENDA

April 6, 2023

Thursday 4/6/23: 8AM – 12PM		
7:45-8:00	Arrival	
8:00-8:15	Recap of Day 1 & review of Day 2 Agenda	Chair
8:15-8:55	SubGroup 1 (Overall Document and General Requirements) discussions	SG 1 Lead and Facilitators
8:55-9:10	Break	
9:10-9:50	SubGroup 2 (DER Grid-Edge Intelligence Functions) discussions	SG 2 Lead and Facilitators
9:50-10:05	Break	
10:05-10:45	SubGroup 3 (Security Functions) discussions	SG 3 Lead and Facilitators
10:45-11:00	Break	
11:00-11:40	SubGroup 4 (Communications) discussions	SG 4 Lead and Facilitators
11:40-12:00	Future Meetings	Chair
12:00	Adjourn	

SIGN IN TO ATTENDANCE TOOL



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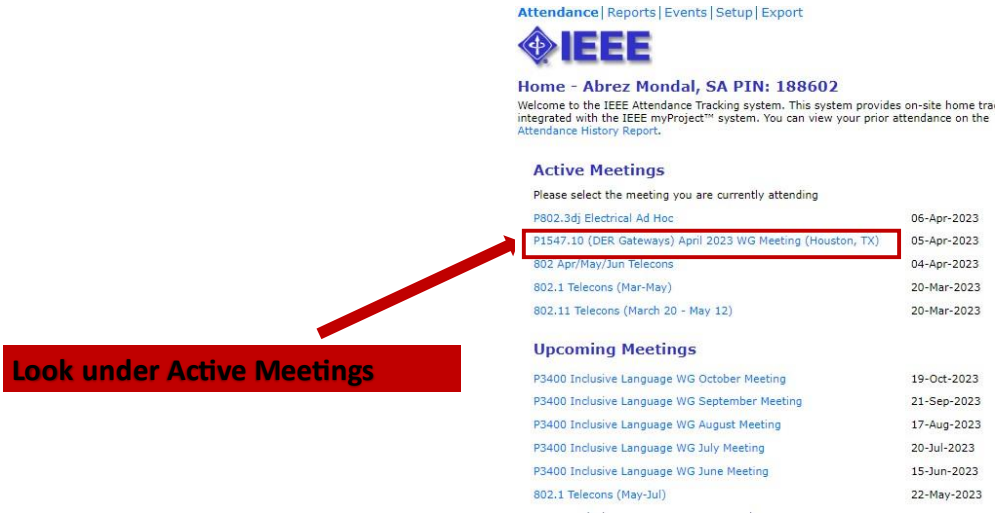
SELECT THE MEETING YOU ARE ATTENDING



Look under Active Meetings

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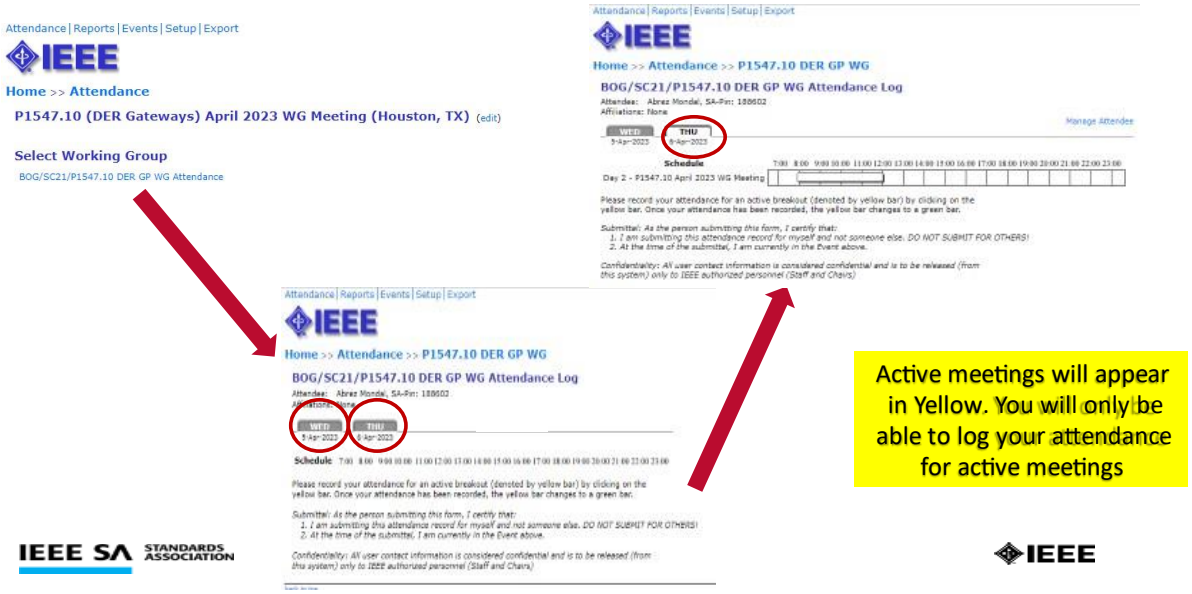
SELECT WG THEN CLICK TO LOG ATTENDANCE



RECAP OF DAY 1

- ❑ Need to define a DER Gateway
  - Should be distinct from other entities which might seem to have similar functionality (e.g. microgrid controller, plant controller)
- ❑ Need to focus on functionality, irrespective of physical implementation
- ❑ Load management may need to be considered
- ❑ What would be the controlling entity for DER gateways?
  - Reconcile roles
  - Should not be solely an extension of utility DERMS/ADMS systems
- ❑ Need to explore use cases/ application for grid edge intelligence
- ❑ Should not define new requirements beyond base standard, only provide recommendations

SUB-GROUP 1

Overview

Sub-Group : **Overall Document and General Requirements**

Sub-Group Lead : **Abrez Mondal**
Sub-Group Facilitator :**Daniel Freeman**

Sub-Group Mailing List:STDS-P1547-10-SG1@LISTSERV.IEEE.ORG

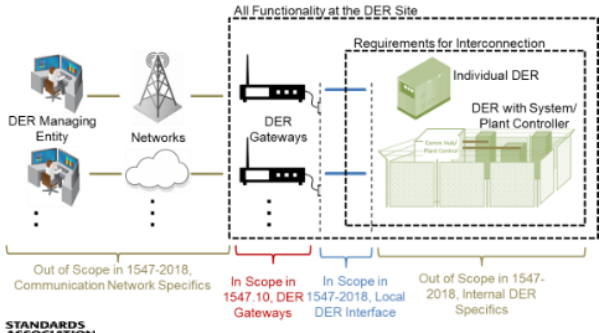
Click here to sign up for SG1listserver

iMeet Folder Link :https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_Nuj

SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Identify Scope and Overlap

- Applicability of P1547.10 in distinction to IEEE P1547 revision
  - Define a DER gateway
  - Requirements of a DER Gateway platform for DER integration for grid applications



SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Some existing definitions in other IEEE standards

- Distributed Energy Resource (DER) ** IEEE 1547 -2018

A source of electric power that is not directly connected to a bulk power system. DER includes both generators and energy storage technologies capable of exporting active power to an EPS. An interconnection system or a supplemental DER device that is necessary for compliance with this standard is part of a DER.

Controllable loads used for demand response are not included in the definition of DER ** IEEE 1547.1-2020

- Plant Controller ** IEEE 1547.1 -2020

A control system that manages and commands other devices in the DER system or DER composite, including the DER units and any supplemental DER devices, as well as collects measurement and status information of the aggregated DER units and other supplemental DER devices. The plant controller may function as the DER's interoperability interface. The plant controller may also perform any of the IEEE 1547 control functions as designed by the DER operator. Also referred to as system controller or master controller.

SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Some existing definitions in other IEEE standards

- Microgrid Control System** IEEE 2030.7 -2017

A system that includes the control functions that define the microgrid as a system that can manage itself, operate autonomously, and connect to and disconnect from the main distribution grid for the exchange of power and the supply of ancillary services; it includes the functions of the microgrid energy management system (MEMS); it is the microgrid controller if implemented in the form of a centralized system.

SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Potential Scope Items

- Applicability of Smart Inverter Functions and Logic
  - Transparent Smart Inverter Function Handling for Compliant DERs
  - New Smart Inverter Function for Legacy DERs
- Maintaining coherency between P1547/.x, P2030/.x, and other related projects for DER and Distributed Energy Resources Management Systems (DERMS) within SGIRM
  - Focus on Distributed Energy Resources (DER) Gateway Platforms
  - Clarify what is out of scope of this project
- Scoping for DER Gateway functionalities at the grid-edge
- Scoping for DER Gateway security
- Scoping for DER Gateway Communications
- Applicability of existing certification standards

SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Other Applicable Standards

- IEEE 1547-2018 (and IEEE 1547a-2020)
- IEEE 1547.1-2020
- IEEE P1547.2
- IEEE P1547.3
- IEEE 1686-2013
- IEEE 1815.1-2015
- IEEE P2688
- IEEE 2030-2011
- IEEE 2030.11-2021
- IEEE 2030.7-2017
- IEEE P2030.5
- IEEE P2030.4

- IEC 61968-5:2020
- IEC 62325 series
- IEC 61850-7-420:2021

- UL 1741

SUB-GROUP 1: OVERALL DOCUMENT AND GENERAL REQUIREMENTS

Poll Question

Given the SG scope, Facilitators suggest monthly SG1 meetings. Does any SG1 participant have objections or other suggestions ?

SUB-GROUP 2

Overview

Sub-Group : **DER Grid-Intelligence Functions in Gateways**

Sub-Group Lead : **Yashar Kenarangui**
Sub-Group Facilitators :**Brian Waldron, Jedidiah Bartlett**

Sub-Group Mailing List:STDS-P1547-10-SG2@LISTSERV.IEEE.ORG

Click here to sign up for SG2listserver

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SUB-GROUP 2: DER GRID-INTELLIGENCE FUNCTIONS IN GATEWAYS

Identify Scope and Overlap

1. Identify and define the Scope of functionality this subgroup will cover
2. Find information and definitions for defined scope fromother standards IEEE 1547, IEEE 2030.5, IEEE P2688, UL 1741, ect...
3. Document relations between standards, identify gaps, and make recommendations

SUB-GROUP 2: DER GRID-INTELLIGENCE FUNCTIONS IN GATEWAYS

Metering/ Telemetry Data Model

- Instantaneous PCC information
  - references to other standards which discuss content
- PCC Power Quality – for example harmonics
- Site capacity nameplate
- Site current capability nameplate
- Composition of PV, Storage, Fossil Fuel
- Data logging
- Event logging and Alarms

SUB-GROUP 2: DER GRID-INTELLIGENCE FUNCTIONS IN GATEWAYS

Power Control System

- Power Control System vs Power Plant Controller
- Reactive power management
  - Volt-Var
  - Constant Voltage
  - Constand VAR setpoint
  - Ect…
- Frequency Regulation Curve
- Curtailment Setpoint
- Power Schedules
- Site Export Limits
- Ramp Rates

SUB-GROUP 2: DER GRID-INTELLIGENCE FUNCTIONS IN GATEWAYS

DER Asset Management

- Settings Monitoring and reporting
- Settings Management
- Engineering Access to DER
- RBAC to gateway functions

SUB-GROUP 2: DER GRID-INTELLIGENCE FUNCTIONS IN GATEWAYS

Poll Questions

- Poll 1: Frequency
  - 2 weeks
  - 3 weeks
  - 4 weeks
- Poll 2: Time Options
  - 9 AM PST/10 AM MT/11AM CT/ 12PM EST
  - 10 AM PST /11 AM MT/12 PM CT/ 1PM EST
  - 1 PM PST /2PM MT/3 PM CT/ 4PM EST

SUB-GROUP 3

Overview

Sub-Group : **Security Functions in Gateways**

Sub-Group Lead : **John Berdner**
Sub-Group Facilitator : **Kiran Thomas**

Sub-Group Mailing List: STDS-P1547-10-SG3@LISTSERV.IEEE.ORG

Click here to sign up for SG3listserver

iMeet Folder Link : https://ieee-sa.imeetcentral.com/p/ZgAAAAAA_Num

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

DER Gateway Architecture Scenarios

- Security must be end to end .
- Multiple gateway architecture scenarios are possible (Ownership, type of integration with DER).
- Consider these differences and provide recommendations relevant for different stakeholders.

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

Scoping for Cybersecurity Frameworks/ Models

- Frameworks can represent the guidelines in a common language.
- Recommendations can be mapped to/structured using the framework
- Don't re-invent the wheel –Select/reference existing frameworks/models wherever possible
  - NIST CSF, ES-C2M2 ...

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

Aspects of Security in DER Gateways

- Hardware/Physical Security
  - Physical hardening measures like lockable enclosures/tamper detection.
- Networks & Communications
  - Use of techniques/software to secure access to the DER gateway (network segmentation, firewalls, traffic monitoring)
  - Security of Communication Protocols – Consideration of security of protocols
  - Upstream of DER gateway
  - Downstream of DER gateway- Coordinate with P1547 revision
  - Recommendation on the state of unused ports .
- Access Control
  - Considerations on the use of role-based access to information and services.
- Data Security
  - Considerations for security of data at rest/transit.

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

Aspects of Security in DER Gateways (cont'd)

- Cryptographic Requirements
  - (Use of mutual authentication, password policy, policy on cipher suites....)
- System Audit/Monitoring
  - Consideration of features such as event logs that can assist in system audit & accountability.
- Manufacturer/Supply Chain Requirements
  - Use of hardening measures to secure the DER gateway.
  - Recommendations on software updates (Patch Management policy, Code Signing...)
- Testing & Certification – Guidance on testing and applicability of certification standards.
- Coordination with existing standards with the intention to create coherence in the recommendations
  - Draft IEEE 1547.3, IEEE 1686, IEC 62443 ...

SUB-GROUP 3: SECURITY FUNCTIONS IN GATEWAYS

Poll Question

- How often would you like the sub-group to meet ?
  - ➢Once every two weeks.
  - ➢Once every three weeks
  - ➢Once in a month.
  - ➢Other

SUB-GROUP 4

Overview

Sub-Group : **Communications**

Sub-Group Lead : **Yashar Kenarangui**
Sub-Group Facilitators :**Galina Antonova, Fares al Jajeh**

Sub-Group Mailing List:STDS-P1547-10-SG4@LISTSERV.IEEE.ORG

Click here to sign up for SG4listserver

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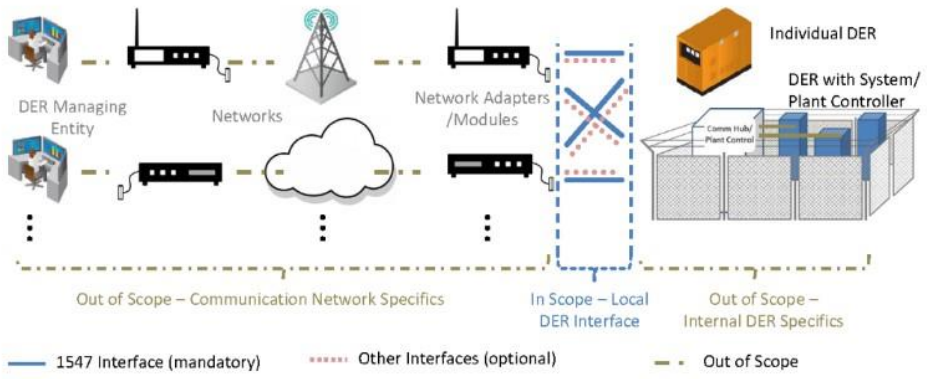
SUB-GROUP 4: COMMUNICATIONS

Background

IEEE 1547-2018 clause 10.7, Figure 4 defines mandatory 1547 interfaces



SUB-GROUP 4: COMMUNICATIONS

Background

At least one protocols from IEEE 1547-2018 Table 41 shall be supported

Table 41—List of eligible protocols

Protocol	Transport	Physical layer
IEEE Std 2030.5 (SEP2)	TCP/IP	Ethernet
IEEE Std 1815 (DNP3)	TCP/IP	Ethernet
SunSpec Modbus	TCP/IP	Ethernet
	N/A	RS-485

SUB-GROUP 4: COMMUNICATIONS

Background

IEEE 1547-2018 Note 118 clarifies

[118] For example, the Area EPS operator may deploy networks that utilize the IEEE 2030.5 protocol even if it is not the native protocol supported at the *local DER communication interface*. The standard protocol support requirement does not preclude the use of additional protocols such as the information model defined by IEC 61850-7-420 [B8] exchanged using IEC 61850-8-1 [B9] or IEC 61850-8-2 [B10], or profiles of the IEC 61850-7-420 information model mapped to IEEE Std 1815 (DNP3) or to SunSpec Modbus.

SUB-GROUP 4: COMMUNICATIONS

Background

IEEE 1547-2018 Clause 10.8 and Table 42 specify communication performance requirements

Parameter	Requirement	Description
Availability of communication	When DER is operational	The *local DER communication interface* shall be active and responsive whenever the DER is operating and in a *continuous operation region* or *mandatory operation region*.
Information read response time	≤ 30 s	The maximum amount of time to respond to read requests.

Communication performance requirements for the interface to DER are set forth in Table 42. These requirements do not constrain or define the performance of various communication systems that may be utilized to integrate DER, but only apply to the DER themselves.

SUB-GROUP 4: COMMUNICATIONS

Scope Discussion

- Communication protocols required by 1547-2018 (one shall be supported)
  a. IEEE Std 2030.5 (SEP2)
  b. IEEE Std 1815 (DNP3)
  c. SunSpec Modbus (over TCP/IP/Ethernet and over RS-485)

- Additional protocols not precluded by 1547-2018
  a. information model defined by IEC 61850-7-420
  b. exchange using IEC 61850-8-1
  c. profile of IEC 61850-8-2
  d. profile of IEC 61850-7-420 information model mapped to IEEE Std 1815 (DNP3)
  e. profile of IEC 61850-7-420 information model mapped SunSpec Modbus.

SUB-GROUP 4: COMMUNICATIONS

Scope Discussion

Interoperability, considering various protocols support, and 1547 Clause 10

SUB-GROUP 4: COMMUNICATIONS

Scope Discussion

- Protocol conversion (a classical communication gateway feature)
- Communication performance requirements (per Table 42 of 1547 -2018)
- Communication performance monitoring
- Communication testing considerations
- Networking management considerations

SUB-GROUP 4: COMMUNICATIONS

Poll Questions

- Poll 1: Participation

Assuming voting membership is established at the P1547.10 WG level, are you interested in participating in SubGroup 4 work ?

- Yes
- No
- Unsure

- Poll 2: Meeting Planning

Given the schedule and the SG scope (to be discussed in detail), Facilitators suggest monthly SG4 meetings. Does any SG4 participant have objections or other suggestions ?

SUB-GROUP 4: COMMUNICATIONS

Scope Discussion

Informative Annexes with Examples of

a. Applications with different communication performance requirements

b. Protocol conversion functions

c. More ideas ?

FUTURE MEETINGS

Planning Coordinated with P1547 REV WG

Proposal for full Working Group meetings in 2023 following April Meeting

2nd Full WG meeting – Online Only (Early Summer proposed)

- **Fully Virtual** WG Meeting, Joint Meeting with P1547 REV and possibly P1547.4
- Proposed dates and time for WG meeting: identification of potential conflicts in 2023

3rd Full WG meeting in WEST COAST – Fall 2023

- To be hosted by TBD – TBD (Point of Contact). Joint Meetings
- Proposed date for (full) WG meeting: October 2 -5, 2023

Proposal for full Working Group meetings in 2024 following last meeting in 2023

1st Full WG meeting in Chicago, IL or Atlanta, GA – Spring 2024 ? (Tentative)

- To be hosted by TBD – (To be confirmed). Joint Meetings
- Proposed dates and time for future (full) WG meeting: identification of potential conflicts in 2024

2nd Full WG meeting in Andover, MA– Summer 2024 ? (Tentative)

- To be hosted by Schneider Electric – (To be confirmed). Joint Meetings
- Proposed dates and time for future (full) WG meeting: identification of potential conflicts in 2024

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THANK YOU

MEETING ADJOURNED

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