

## Annex F Instrument Transformers Subcommittee

**Chair:** Thomas Sizemore

**Vice Chair:** David Wallace

**Secretary:** Nigel MacDonald (unable to attend)

### F.1 Introductions

Attendees were requested to introduce themselves and provide affiliations at the time of the meeting.

The table below shows the recorded attendees, affiliations at the time of the meeting and roles in the ITSC. A total of 59 people were in attendance.

Last name	First name	Affiliation	Role
Aguilera	Isacc	SRP	Guest
Betancourt	Edwin	Siemens Energy	Guest
Bolar	Sanket	Oncor	Guest
Carr	Deniss	GE Grid Solutions	Member
Chorzepa	Jaroslav	ABB	Member
Crockett	Daniel	Ameren	Guest
DeBiase	Tony	Tempel Canada	Guest
Edmond	Arauob	BPA	Guest
Ellis	William	Ameron	Guest
Erwin	Richard	Hitachi Energy	Guest
Euvrard	Eric	RHM International	Member
Fadi	Fayad	ASD	Guest
Ghosh	Rob	General Electric	Member
Hanson	Corey	Flex-core	Guest
Harden	Michael	H-J Enterprises	Guest
Herron	John	Raytech USA	Member
Hogg	Ryan	Bureau of Reclamation	Member
Huan	Dinh	Hitachi Energy	Member
Kaineder	Kurt	Siemens Energy	Member
Khalin	Vladimir	KV Consulting	Member
Knapp	Evan	Eaton	Guest
Konta	Ivan	Koncar	Member
Lee	Bigham	Instrument Trasformers Equipiment Corp.	Member
Lopez- Fernandez	Xose	Universidade de Vigo	Guest
Iovins	Colby	Federal Pacific	Guest
Mani	Balakrishnan	ITEC	Guest
Maratge	Swapnil	Megger	Guest
Marilia	Riberio	GE Grid Solutions	Guest
Matthews	Lee	Howard Industries	Guest
McCloskety	Scott	Amran Inc.	Member
Michael	Cravdn	Qualus Power Services	Member

Middleton	Robert	RHM International	Member
Mullikin	Randolf	ABB	Member
Naraunjo	Volney	Megger	Guest
Novko	Ivan	Koncar	Guest
Nunn	Shawn	Hitachi Energy	Guest
Oakes	Stephen	WEG Transformers USA	Member
Ogajanov	Rudolf	Hitachi Energy	Member
Oliveria	Jonas	Hitachi Energy	Member
Perkins	Jason	Moehn Sales	Guest
Plante	Sylvain	Hydro-Quebec	Guest
Radbrandt	Ulf	Hitachi Energy	Guest
Rashid	Adnan	Measurment Canada	Member
Robalino	Diego	Megger	Member
Rock	Patrick	American Transmission Corp.	Member
Rottenbacher	Andre	Ritz Instrument Transformers	Member
Shang	Bryan	ABB	Guest
Sizemore	Thomas	ABB	Chair
Snyder	Steven	Hitachi Energy	Member
Sonnenberg	Brian	Instrument Transformers Inc.	Member
Staley	Brad	Leeward Renewable Energy	Guest
Steineman	Christopher Steineman	Hubble	Member
Thomas	Scott	Hitachi Energy	Guest
Wallace	David	MS State	Vice-Chair
Wimberly	Barrett	GE Grid Solutions	Member
Zack	Zack	TLI	Guest
Zhao	Petter	Hydro-One	Guest
Ziger	Igor	Koncar	Member
Zoltan	Roman	GE Grid Solutions	Member

## F.2 Quorum

Quorum was met. 29 members were present while 22 were required. 29 guests were also in attendance. The total number of attendees was 59 and 12 requested memberships in the ITSC. These requests for membership will be reviewed for recent attendance to determine eligibility.

## F.3 Agenda

An agenda was displayed by the chair. Ryan Hogg made a motion to approve which was seconded by Vladimir Khalin. There were no objections to approving the agenda.

#### F.4 Approval of minutes – Spring 2023 meeting

Minutes were approved after a motion by Igor Ziger and a second by Scott McCloskey. There were no objections to approval.

#### F.5 Essential Patent Claims & IEEE Copyright Policy

A slide was displayed as a reminder to all WG/TF leaders that it is necessary to display the essential patent claim and IEEE copyright policy slides.

#### F.6 Status of C57.13 Standards

The chair briefly presented the status of the various standards handled by the ITSC including both those being actively worked on at this time as well as those not yet due for revision.

#### F.7 Working Group Reports

##### F.7.1 JWG on Station Service Voltage Transformers, IEC-IEEE 63253-5713-8 – David Wallace & Ross McTaggart (unable to attend)

This working group did not meet at the Transformers Committee meeting. However, it has been active in comment resolution from both IEEE and IEC voters. The status of the comment resolution and latest balloting results were presented.

##### F.7.2.3 Working Group Instrument Transformer Requirements C57.13 – David Wallace

**Attendees:** There was 61 total participants. 21 members (out of 32, quorum was met), 14 people requested membership (7 met criteria) and 1 member was moved to guest status.

First Name	Last Name	Affiliation	Role
Kayland	Adams	Protec GE Wohkesha	Guest
Carlos	Alonso	Arteche	Guest
Vivek	Bhatt	Prolec GE	Guest
Lee	Bigham	Instrument Transformer Equip Corp	Member
Sanket	Bolar	Oncor	Guest
Susan	Bonfiglio	WAPA	Guest
Lorin	Bratu	Trench Limited	Guest
Deniss	Carr	GE Grid Solutions	Member
Fabiana	Cirino	OMICRON electronics Corp USA	Guest
Daniel	Crockett	Ameren	Guest
Juan Carlos	Cruz Valdes	Prolec GE	Member
Huan	Dinh	Hitachi Energy	Member
Eric	Euvrard	RHM International	Member

Rob	Ghosh	GE	Guest
Michael	Gonzales	Southern California Edison	Guest
Andrew	Gregory	ITEC	Guest
Ravi	Gupta	Megger	Guest
John	Herron	Raytech	Guest
Ryan	Hogg	Bureau of Reclamation	Member
Derek	Hollrah	Burns & McDonnell	Guest
Darren	Hoppins	Sensori Ink	Guest
Kurt	Kaineder	Siemens Energy	Guest
Will	Knappek	OMICRON electronics Corp USA	Guest
Ivan	Konta	KONCAR - Instrument Transformers	Member
Luis	Machain	Prolec GE	Guest
Kornowski	Marek	Polycast	Guest
Lee	Matthews	Consultant	Guest
Scott	McCloskey	Amran	Guest
Robert	Middleton	RHM International	Member
Francis	Mills	Power Engineers	Guest
Randy	Mullikin	ABB Inc.	Guest
Frank	Neder	Trebbach Germany	Guest
Stephen	Oakes	WEG Transformers USA Inc.	Member
Rudolf	Ogajanov	Hitachi Energy	Guest
Jonas	Oliveira	Hitachi Energy	Member
Dipakkumar	Patel	ITEC	Guest
Caroline	Peterson	Xcel Energy	Guest
Sylvain	Plante	Hydro Quebec	Guest
Issack	Ramadan	AEP	Guest
Adnan	Rashid	Measurement Canada / ISED	Member
Patrick	Rock	American Transmission Company	Guest
Zoltan	Roman	GE Grid Solutions	Member
Andre	Rottenbacher	RITZ Usa	Guest
Thomas	Sizemore	ABB Inc.	Vice - Chair
Kenneth	Skinger		Guest
Steven	Snyder	Hitachi Energy	Member
Muhammad Abdullah	Sohail	Trench Limited	Member
William	Solano	Reinhausen	Guest
Brian	Sonnenberg	Instrument Transformers, LLC	Member
Chris	Steineman	Delta Star Inc	Guest
Charles	Sweetster	OMICRON electronics Corp USA	Member
Samuel	Tekle	WEG Transformers USA Inc.	Guest

Jacob	Thielbar	WAPA	Guest
Scott	Thomas	Hitachi Energy	Guest
Risto	Trifunowski	Trench Limited	Member
Cody	Vanwyck	Commonwealth Associates	Guest
Mike	Waldrop	MLGW	Guest
David	Wallace	Mississippi State University	Chair
David	Ward	ITEC	Guest
Barrett	Wimberly	GE Grid Solutions	Member
Igor	Ziger	KONCAR - Instrument Transformers	Secretary

**Essential Patent Claims:** Text was displayed, and the Chair inquired as to if anyone knew of essential patent claims. None were brought up.

**Copyright:** Text was displayed at the meeting

**Agenda:** The agenda was presented to the WG. Agenda Approval: 1<sup>st</sup> Barret Wimberly, 2<sup>nd</sup> Ryan Hogg. No objections.

**Minutes:** The minutes from the Spring 202 meeting were presented. Minutes approval: 1<sup>st</sup> Scott McClosky, 2<sup>nd</sup> Barrett Wimberly. No objections

#### **Resolution of comments on Draft 0:**

A number of comments were reviewed by the WG. This took place over multiple sessions as a portion of the CCVT meeting slot was allocated to this effort in addition to the slot allocated for the WG to revise C57.13.

Online meetings of this working group were discussed but specific dates were not set at this meeting.

David will send out a survey to the workgroup to schedule web meetings in the upcoming months to get through all the comments.

Thomas Sizemore presented that work has been started on creating a section for VT/CT combination units and asked for additional people to review, comment and modify the document that has been started. Between the Spring and Fall 2023 no comments were received on this subject so additional meetings will be required.

**Motion to adjourn:** A motion was put forth by 1<sup>st</sup> Zoltan Roman and 2<sup>nd</sup> by Igor Ziger.

**Next Meeting:** This WG will meet to continue work at the Vancouver, Canada Spring 2023 meeting.

#### **F.7.5 TF for Instrument Transformers Accuracy – Igor Ziger**

**Attendees:** The number of participants was 53. 21 members present and quorum was obtained. Paper rosters / sign-in sheets were circulated. 5 people requested membership which will be reviewed.

First Name	Last Name	Company	Role
Isaac	Aguilera	SRP	Guest
Edmond	Areulo	BPA	Guest
Lee	Bigham	Instrument Transformer Equip Corp	Member
Robert	Bracun	Končar - Power Transformers	Guest
Deniss	Carr	GE Grid Solutions	Member
Jaroslav	Chorzepa	ABB Inc.	Guest
Michael	Craven	Qualus Corp.	Guest
Daniel	Crockett	Ameren	Guest
Huan	Dinh	Hitachi Energy	Member
Janko	Džodan	Končar- D&ST	Guest
William	Ellis	Ameren	Guest
Richard	Erwin	Hitachi Energy	Guest
Dragana	Gašić	Končar- D&ST	Guest
Rob	Ghosh	General Electric	Guest
Corey	Hanson	Flex-core	Guest
Saramma	Hoffman	PPL	Guest
Ryan	Hogg	Bureau of Reclamation	Member
Jeremy	Johnson	Burns & McDonnell	Guest
Vladimir	Khalin	KV Consulting	Member
Ivan	Konta	KONCAR - Instrument Transformers	Member
Matija	Koprivnjak	Končar- D&ST	Guest
Colby	Lovins	Federal Pacific	Member
Luis	Machain	Prolec GE	Guest
Blarkrisnan	Mani	ITEC	Guest
Daniel	Martinez		Guest
Lee	Matthews	Howard Industries	Guest
James	McBride	JMX Services, Inc.	Guest
Scott	McCloskey	Amran Inc.	Member
Randolph	Mullikin	ABB Inc.	Member
Volney	Naranjo	Megger	Guest
Ivan	Novko	Končar - IET	Guest
Shawn	Nunn	Hitachi Energy	Guest
Stephen	Oakes	WEG Transformers USA Inc.	Guest
Rudolf	Ogajanov	Hitachi Energy	Member
Jonas	Oliveira	Hitachi Energy	Guest
John	Owen	Powertech Labs	Guest
Tihomir	Pandža	Siemens Energy	Guest
Bojan	Popović	Končar - Power Transformers	Guest
Adnan	Rashid	Measurement Canada / ISED	Member
Marilia	Ribiero	GE Grid Solutions	Guest

Patrick	Rock	American Transmission Co.	Guest
Zoltan	Roman	GE Grid Solutions	Member
Andre	Rottenbacher	Ritz Instrument Transformers	Guest
Thomas	Sizemore	ABB Inc.	Member
Steven	Snyder	Hitachi Energy	Guest
Muhammad Abdullah	Sohail	Trench Limited	Guest
Brian	Sonnenberg	Instrument Transformers, LLC	Member
Chris	Steineman	Meramec Instrument Transformer Co.	Guest
Dragan	Tabaković	Hubbel	Guest
Risto	Trifunoski	Trench Limited	Member
Peter	Werelius	Megger	Guest
Barrett	Wimberly	GE Grid Solutions	Guest
Igor	Ziger	KONCAR - Instrument Transformers	Chair

**Essential Patent Claims:** Text was displayed, and the Chair inquired as to if anyone knew of essential patent claims. None were brought up.

**Copyright:** Text was displayed at the meeting

**Minutes of the Spring 2023 meeting:** Unanimously approved with motion brought forward by Vladimir Khalin and seconded by Steve Snyder.

**Minutes of the Interim meeting:** Unanimously approved with motion brought forward by Rudolf Ogajanov and seconded by Barret Wimberly.

**Agenda:** Unanimously approved with motion brought forward by Zoltan Roman and seconded by Vladimir Khalin.

#### **Review of the action items for this task force:**

##### **Completion of the extended range clause(s)**

- After a short discussion, a motion was brought forward to bring extended range clauses as defined in the final document version to the main standard C57.13 working group. The motion was brought forward by Zoltan Roman and seconded by David Wallace
- A vote was held with 20 members approving, 0 opposing and 0 abstaining.

##### **New business**

- Zoltan Roman mentioned that this TF explicitly lists the list of topics it handled in the past and define the next action items and deliverables going forward.
- Ryan Hogg added a new business item of looking at accuracy of relaying cores at currents lower than nominal. This will be added as a new work item in the future meeting. Ryan volunteered to make a presentation that will deal with this topic in more detail.

- Two comments left over from the interim meeting minutes will be included into the comment pool for C57.13 and handled there.

### **Presentation on non 5A CTs by Randy Mullikin**

- Randy Mullikin presented the modifications to the clauses dealing with accuracy at non 5A secondaries and the clauses dealing with the mA CT standard (C57.13.7)
- There was a short discussion on the topic from multiple attendees.
- A motion was brought forward to make the CTs with non 5A secondaries a new work item and merge the efforts with material already developed, as well as to look on integrating the mA standard either as main text or an Annex if need be.
- A vote was held with 21 members approving, 0 opposing and 0 abstaining.
- Several volunteers stepped forward to work on the effort. An email will be sent after the meeting to round up the final volunteer list to start work on this topic before the next meeting.

### **Presentation on meter solutions capable of measuring the signal from extended range units by Zoltan Roman**

- A presentation showcased the capability of meter (one specific meter was included) to measure currents at the low end of the extended range accurately
- There was a discussion on the topic by multiple contributors and several issues were brought forward, such as field testing, importance of LV connections, etc.
- Future work may include other relay solutions tested / calibrated in the same vein.

All material presented in the meeting will be posted on the committee website and sent out to the TF body,

**Motion to adjourn:** A motion was put forth by David Wallace and seconded by Vladimir Khalin

**Next Meeting:** This WG will meet to continue work at the Vancouver, BC Spring 2024 meeting.

### **F.7.6 WG for PLC capacitors and Coupling Capacitor Voltage Transformers (C57.13.9) – Zoltan Roman**

The Working Group Chair, Zoltan Roman, started the meeting with Mike Craven as Secretary and introductions were made.

The Chair provided an update concerning online meetings to resolved remaining comments of this balloted standard. No official business took place for this WG in this meeting. Upon completion of this update the remaining time in the meeting was utilized by the WG to revise C57.13.



### F.7.7 TF to integrate C57.13.5 into C57.13– Zoltan Roman

The Working Group Chair, Zoltan Roman, started this initial meeting.

**Attendees:** The number of participants was 38. 33 requested membership and 5 requested guest status. Paper rosters / sign-in sheets were circulated.

First Name	Last Name	Company	Role
Isaac	Aguilara	SRP	M
Edmundo	Arevalo	Bonneville Power Administration	M
Lee	Bigham	Instrument Transformer Equip Corp	M
Sanket	Bolar	Megger	M
Deniss	Carr	GE Grid Solutions	M
Jaroslav	Chorzepa	ABB Inc.	M
Michael	Craven	Qualus Power Services	G
Huan	Dinh	Hitachi Energy	M
Richard	Erwin	Hitachi Energy	M
Rob	Ghosh	General Electric	M
Corey	Hanson	flex-core	M
Kurt	Kaineder	Siemens Energy	M
Vladimir	Khalin	KV Consulting	G
Ivan	Konta	KONCAR - Instrument Transformers	M
Balakrishanan	Mani	ITEC	M
Scott	McCloskey	Amran Inc.	M
Robert	Middleton	RHM International	M
Jose Luis	Muchain	GE	G
Randolph	Mullikin	ABB Inc.	G
Volney	Naranjo	megger	G
Rudolf	Ogajanov	Hitachi Energy	M
Jonas	Oliveira	Hitachi Energy	M
Adnan	Rashid	Measurement Canada / ISED	M
Marilia	Ribeiro	GE	M
Patrick	Rock	American Transmission Co.	M
Andre	Rottenbacher	Ritz Instrument Transformers	M
Bolar	Sanket	Megger	M
Bryan	Shang	ABB Inc.	M
Thomas	Sizemore	ABB Inc.	M
Steven	Snyder	Hitachi Energy	M
Muhammad Abdullah	Sohail	Trench Limited	M
Brian	Sonnenberg	Instrument Transformers, LLC	M
Christopher	Steineman	Meramec Instrument Transformer Co.	M
Risto	Trifunoski	Trench Limited	M
David	Wallace	Mississippi State University	M

Barrett	Wimberly	GE Grid Solutions	M
Igor	Ziger	KONCAR - Instrument Transformers	M
Zoltan	Roman	GE	Chair

**Agenda:** Unanimously approved.

The task force created to integrate the HV IT standard into the C57.13 met for the first time. Leadership for this effort was determined and a model (CCVT standard) was picked to provide guidance for the restructuring process. Zoltan Roman of GE will chair this effort.

Online meetings are expected throughout this effort.

**Next Meeting:** This WG will meet to continue work at the Vancouver, BC Spring 2024 meeting.

## F.8 Old Business

No old business was discussed.

## F.9 New Business

Discussion for introduction of sensor technology into the transformer standard was open for discussion Kurt Kainer discussed the approach the work being done in IEC. He believes that we should follow the dsame approach as IEC and bring it into the Instrument Transformer sub-committee.

Zolton Roman agreed with Kurt Kainer brings up that the topic is widely discussed Peter (Hydro one) discussed that we need to be cautious how we approach the topic. We need to look at what topics we should cover.

Ryan Hogg discussed looking into optical sensors years ago, they preferred staying with tradition sensors. He feels that it is important for there to be a standard for end users to have. Ryan has a paper that was published on the topic that he can submit to the group.

David Wallace discussed work that he is doing on the topic of sensors at MSU High Voltage Lab. Thomas called for anyone to lead the effort for the taskforce.

Zolton made the motion, Igor seconded that a taskforce be created to investigate the work that PISM is doing to determine if it can be incorporated into the Instrument Transformer subcommittee Ryan, Zolton, Kurt, Thomas, David agreed to be part of the taskforce. 23 voted to form the committee. It was approved.

Ryan Hogg brought up the idea of creating a working guide for C57.13. This would be done near the closure of C57.13.

## **F.10 ITSC Adjournment**

The meeting concluded and was adjourned after a motion by Pat Rock and seconded by Ryan Hogg at approximately 9:15 AM.

The next meeting is to be held in Vancouver, British Columbia, Canada, in the Fall of 2024.