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 37 people were in attendance.

First Name	Last Name	Affiliation	Role
Mubarack	Abbas	Siemens Energy	Guest
Jeffrey	Britton	Doble	Guest
Deniss	Carr (Villagran)	GE Grid Solutions	Member
Jaroslaw	Chorzepa	ABB Inc.	Member
Michael	Craven	Qualus Power Services	Guest
Herton	de Oliveira Filho	PSEG&M	Guest
Sami	Debass	Electric Power Research Institute (EPRI)	Guest
Rolando	Demes	Arteche	Member
Huan	Dinh	Hitachi Energy	Member
John	Eastman	ZTZ Services	Guest
Eric	Euvrard	RHM International	Member
Reto	Fausch	RF Solutions	Guest
Dora	Gazivoda	KONCAR - Instrument Transformers	Guest
John	Herron	Raytech USA	Guest
Ryan	Hogg	Bureau of Reclamation	Guest
Ivan	Konta	KONCAR - Instrument Transformers	Member
Marek	Kornowski	Polycast International	Member
John	Kutula	Dominon Energy	Guest
Colby	Lovins	Federal Pacific	Guest
Lee	Matthews	Howard Industries	Guest
James	McBride	JMX Services, Inc.	Guest
Daniel	Mulkey	Mulkey Engineering Inc.	Guest
Stephen	Oakes	WEG Transformers USA Inc.	Member
jonas	oliveira	Hitachi Energy	Guest
Adnan	Rashid	Measurement Canada / ISED	Member
Benjamin	Riggins	Xcel Energy	Guest
Diego	Robalino	Megger	Member

Zoltan	Roman	GE Grid Solutions	Member
Thomas	Sizemore	ABB Inc.	Member
Steven	Snyder	Hitachi Energy	Member
Muhammad Abdullah	Sohail	Trench Group	Guest
Brian	Sonnenberg	Instrument Transformers, LLC	Member
Mauricio	Soto	Hitachi Energy	Guest
Risto	Trifunoski	Trench Limited	Member
Barrett	Wimberly	GE Grid Solutions	Member
Mana	Yazdani	Trench Limited	Member
Igor	Ziger	KONCAR - Instrument Transformers	Member

F.2 Quorum

18 of 46 members where present and quorum was not attained. 19 guests were also in attendance. The total number of attendees was 37 and 7 requested memberships in the ITSC. These requests for membership will be reviewed.

F.3 Agenda

An agenda was displayed by the chair. While no objections were noted to the agenda it was not approved due to the lack of a quorum.

F.4 Approval of minutes – Fall 2021 meeting

Minutes were not approved as there was no quorum.

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

Attendees: 26 people attended the meeting with 18 members present. Quorum was met.

The table below shows all recorded attendees and affiliations at the time of the meeting.

Last Name	First Name	Affiliation
Bigham	Lee	Instrument Transformer Equip Corp
Brannen	Randy	Southern Company Services
Burk	David	Xcel Energy
Craven	Michael	Phoenix Engineering Services
Davis	Eric	
Demes	Rolando	Arteche
Dinh	Huan	Hitachi Energy
Dolloff	Paul	East Kentucky Power
Fausch	Reto	RF Solutions
Gazivoda	Dora	KONCAR - Instrument Transformers
kaineder	kurt	Siemens Energy
Konta	Ivan	KONCAR - Instrument Transformers
Kotula	John	Dominion Energy
Leal	Gustavo	Dominion Energy
Matthews	Lee	Howard Industries
McBride	James	JMX Services, Inc.
Oakes	Stephen	WEG Transformers USA Inc.
Oliveria	Jonas	Hitachi Energy
Rashid	Adnan	Measurement Canada / ISED
Riggins	Benjamin	Xcel Energy
Roman	Zoltan	GE Grid Solutions
Roussell	Marnie	Entergy
sohail	Muhamad	Trench Ltd.
Sizemore	Thomas	ABB Inc.
Skinger	Kenneth	Scituoto Consulting
Snyder	Steven	Hitachi Energy
Sonnenberg	Brian	Instrument Transformers, LLC

Trifunoski	Risto	Trench Limited
Carr	Deniss	GE Grid Solutions
Wimberly	Barrett	GE Grid Solutions
Yazdani	Mana	Trench Limited
Ziger	Igor	KONCAR - Instrument Transformers

Essential Patent Claims: Was discussed by the Chair. The membership was inquired as to if anyone knew of essential patent claims. None were brought up.

IEEE Copyright Policy: Was discussed by the Chair.

Agenda: The agenda was displayed by the Chair. Steven Oakes made a motion to approve the minuets and Kenneth Skinger seconded the motion. The agenda was approved with no objections made.

Minutes: Minutes of the Fall 2021 Virtual meeting were presented. Tom Sizemore made a motion to accept the minuets and Igor Ziger seconded the motion. The minutes were approved by the members of the working group with no objections.

David Wallace presented the latest status of the draft and laid out the timeline for the next steps. These steps consisted of:

- Complete CD3 comment review & resolution of related issues: done
- TC38 review of comments: April 13
- Submit resolved comments to IEC Central Office for circulation to National Committees: April 20
- Vote in IEEE WG & SC for Sponsor Ballot: April 27
- Submit draft to IEEE for editorial review: April 30
- IEEE ballot invitation: May 18
- Submit draft to IEC for CDV: May 18
- IEEE Ballot initiation: May 25

David Wallace agreed to post the latest revision of the draft to the Transformer Committee Website and send an emailed copy to the work group.

Huan Dinh made a motion to adjourn the meeting, Barrett Wimberly seconded the motion. No objections were made.

The meeting was adjourned at 8:40 am.

Next Meeting: The WG will meet at the Fall 2022 meeting in Charlotte, NC.

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

Attendees: The number of participants was 37. 32 people requested membership. The attendees, affiliations and if they requested membership is listed below.

First Name	Last Name	Affiliation	Role/Membership request
Lee	Bigham	Instrument Transformer Equip Corp	Yes
Randy	Brannen	Southern Company Services	Yes
Jeffery	Britton	Phenix Tech. Division of Doble Engineering	Yes
Deniss	Carr	GE Grid Solutions	Yes
Jaroslaw	Chorzepa	ABB Inc.	Yes
Michael	Craven	Phoenix Engineering Services	No
Juan Carlos	Cruz Valdez	Prolec GE	Yes
Rolando	Demes	Arteche	Yes
Maggi	DeMillon	Trench Limited	Yes
Huan	Dinh	Hitachi Energy	Yes
Eric	Euvrard	RHM International	Yes
Reto	Fausch	RF-Solutions	No
Dora	Gazivoda	KONCAR - Instrument Transformers	Yes
Ryan	Hogg	Bureau of Reclamation	Yes
Evan	Knepp	Eaton Corp.	Yes
Ivan	Konta	KONCAR - Instrument Transformers	Yes
John	Kotula	Dominion Energy	Yes
James	McBride	JMX Services, Inc.	Yes
Robert	Middleton	RHM International	Yes
William	Munn	Southern Company Services	No
Stephen	Oakes	WEG Transformers USA Inc.	Yes
Jonas	Oliveira	Hitachi Energy	Yes
Harry	Pepe	Phenix Technologies	No
Adnan	Rashid	Measurement Canada / ISED	Yes
Diego	Robalino	Megger	Yes
Zoltan	Roman	GE Grid Solutions	Yes
Thomas	Sizemore	ABB Inc.	Vice - Chair
Steven	Snyder	Hitachi Energy	Yes
Muhammad Abdullah	Sohail	Trench Limited	Yes
Brian	Sonnenberg	Instrument Transformers, LLC	Yes
Charles	Sweetster	OMICRON electronics Corp USA	Yes
Risto	Trifunoski	Trench Limited	Yes
Robert	van Tol	Commonwealth Associates	No

David	Wallace	Mississippi State University	Chair
Barrett	Wimberly	GE Grid Solutions	Yes
Mana	Yazdani	Trench Limited	Yes
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

WG Scope and purpose
The text was displayed by D. Wallace and briefly discussed

Action items – some action items were brought forward by the chair

- The absorption of the mA standard IEEE C57.13.7
- Incorporation of outputs from accuracy TF
- The current document ("Draft zero") will be circulated among the WG body along with a comment sheet to initiate comments, changes and hot topics. Some of these may result in dedicated TFs

The floor was opened for different topics to be brought forward

- Altitude rating was brought forward by R. Hogg. Some discussion was initiated and some comments point out to more concurrent standards such as the SSVT standard and the new CDV of IEC 61869-1

- J. Kotula brought forward failures due to switching transients as an item that needs to be addressed. This was added on by performance in vicinity of renewables. Z. Roman added to this topic with the intent to bring in the results by the Cigre WG on this topic

- Z. Roman brought up harmonic measurements, which was a point also commented by J. Kotula and I. Ziger. IEC was again mentioned as a source of reference

- R. Hogg brought up alternative dielectric gasses and liquids

- I. Ziger brought up that it is a good time to look at IEC 61869-1 for some contributions and good practices as the standard is in the final stages of completion. The same was confirmed by Z. Roman, who did the same in the CCVT WG.

- I. Ziger brought up the inclusion of gapped cores from C57.13.5 and C57.13.2

- Z. Roman brought up ferroresonance and I. Ziger pointed out to GOST standard as a good practice

Next Meeting: This WG will meet to continue work at the Charlotte, NC USA, Fall 2022 meeting.

F.7.5 TF for Instrument Transformers Accuracy – Igor Ziger

Attendees: The number of participants was 39. 19 members present and quorum was obtained. Paper rosters / sign-in sheets were circulated. 5 people requested membership. All fulfill the minimal requirements. 1 member asked to be removed from the member list. The table below shows all recorded attendees, affiliations at the time of the meeting and roles in this task force.

First Name	Last Name	Affiliation	Role
Mubarate	Abbas	Siemens Energy	Guest
Lee	Bigham	Instrument Transformer Equip Corp	Member
Randy	Brannen	Southern Company Services	Member
Jaroslaw	Chorzepa	ABB Inc.	Guest
Michael	Craven	Phoenix Engineering Services	Guest
Herton	de Oliveira Filho	PSEG	Guest
Samson	Debass	EPRI	Guest
Rolando	Demes	Arteche	Guest
Jonathan	Deverick	Dominion Energy	Guest
Huan	Dinh	Hitachi Energy	Member
Eric	Euvrard	RHM International	Member
Dora	Gazivoda	KONCAR - Instrument Transformers	Guest
Ryan	Hogg	Bureau of Reclamation	Guest
Ivan	Konta	KONCAR - Instrument Transformers	Member
Marek	Kornowski	Polycast International	Member
John	Kotula	Dominion Energy	Guest
Colby	Lovins	Federal Pacific	Member
James	McBride	JMX Services, Inc.	Guest
Robert	Middleton	RHM International	Member
William	Munn	Southern Company Services	Guest
Stephen	Oakes	WEG Transformers USA Inc.	Guest
Jonas	Oliveira	Hitachi Energy	Guest
Tihomir	Pandža	Siemens Energy	Guest
Goran	Plišić	Siemens Energy	Guest

Adnan	Rashid	Measurement Canada / ISED	Member
Diego	Robalino	Megger	Member
Zoltan	Roman	GE Grid Solutions	Member
Thomas	Sizemore	ABB Inc.	Member
Muhammad Abdullah	Sohail	Trench Limited	Guest
Brian	Sonnenberg	Instrument Transformers, LLC	Member
Charles	Sweetster	OMICRON electronics Corp USA	Guest
Risto	Trifunoski	Trench Limited	Member
Deniss	Villagran	GE Grid Solutions	Member
David	Wallace	Mississippi State University	Member
Barrett	Wimberly	GE Grid Solutions	Guest
Mana	Yazdani	Trench Limited	Member
Peter	Zhao	Hydro One	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 pervious meeting: Unanimously approved with motion brought forward by Marek Kornowski and seconded by David Wallace.

Agenda: Unanimously approved with motion brought forward by Zoltan Roman and seconded by Lee Bigham.

Review of the action items for this task force:

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Change of TF "status"

- It was brought forward by I. Ziger and T. Sizemore that the TF will report to the newly formed C57.13 revision working group instead of the Instrument Transformer Subcommittee directly.
- There was a short discussion initiated by Z. Roman on what the output of the TF was. It was conducted that Annex A, extended range and other spillovers from the main standard will be handled by the taskforce
  Further conversation will take place in the ITSC meeting.

2 Presentations of the results based on application of methodology from "Annex A" to different unit types

- The 1st was held by B. Sonnenberg

- The application of the method was showcased on units ranging 600 V– 69 kV
- A very good correlation of results was observed

- The approach was based on measurements made at 0 VA and maximum burden
- Z. Roman commented that other power factors should be considered. However, only standard burdens were able to be used in this case
- It was noted that used 0 VA values were actually very close to “true” 0 VA.

- The 2nd was held by H. Dinh

- The application of the method was showcased on two units (69 kV single ratio and 115 kV dual ratio) with different power factors
- Again, a good correlation was observed. It was pointed out that a better result certainty was achieved when Maximum and 0 burdens are used in the method.
- Z. Roman pointed out whether theoretical or actual burdens were used. A small discussion ensued on the topic, with T. Sizemore pointing out that it is critical to accurately assess the 0 burden as the failure to do so can lead to some errors
- J. Oliveira pointed out that the differences in presented results are negligible for practical applications

The results of the planned 3rd presentation by Z. Roman will be distributed to the WG after they are received.

I.Ziger asked for volunteers to work on the Annex A and implementing the changes in the main text of the standard. Several people volunteered directly (R. Trifunoski, M. Kornowski, H. Dinh, Z. Roman, D. Wallace). This group of people will be contacted after the meeting to perform the work on the annex and main text implementation.

Presentation of experiences on CTs with extended range – held by T. Sizemore

- A presentation was given with basic concerns on extended range, laboratory and field implications, as well as approaches to take when implementing it in the standard
- A very fruitful discussion ensued. The main points (and contributors) are listed below:
- It is important to give explanatory text which explains extended range and its implications (more expensive, different materials….) - M. Kornowski, T. Sizemore, R. Trifunoski
- It is necessary to put an additional clause for extended range – D. Wallace
- Extended range does not apply to Multi Ratio units – J. Oliveira
- Some customers cannot “afford” RF 4.0 due to meter limitations – L. Bigham
- Some meters see very low currents as noise. It is a question of what meters can actually sense – J. Kotula
- A question of test system calibration and traceability – B. Wimberly
- It will be important to clearly indicate the extended range on the nameplate – R. Hogg
- Two ideas were brought forward on how to do that. The first is to define extended range classes (Z. Roman). The other is to specify the range the accuracy is

applicable to – either in percentage or amps of primary current (L. Bigham, I. Ziger, J. Kotula)
- We have to carefully specify expected accuracy. It is a question how to address the “double” accuracy limits for class 0.15. (I. Ziger). R. Trifunoski suggested that “double” accuracy limits should be removed from extended range applications
- Some other minor comments and observations were brought forward regarding field testing, available equipment and calibration

I.Ziger asked for volunteers to work on the wording for extended range. The first step is the explanatory text, and based on that the final approach will be determined . Several people volunteered directly (A. Rashid, R. Trifunoski, M. Kornowski, J. Oliveira, J. Chorzepa,T. Sizemore, H. Dinh, Z. Roman). This group of people will be contacted after the meeting to perform the work on the wording regarding extended range CTs.

Motion to adjourn: A motion was put forth by Zoltan Roman and seconded by Marek Kornowski

Next Meeting: This WG will meet to continue work at the Charlotte, NC, USA, Fall 2022 meeting.

F.8 Old Business

No old business was displayed or discussed.

F.9 New Business

Zoltan Roman presented an update on the C57.13.9 standard, no working group meeting was held. The ITSC had previously approved moving this standard into the balloting stage. Draft 16 was created and on 3/21 PSCC approved it. The draft was circulated and 20 people voted, 18 approved, 2 abstained. 13 people volunteered to be part of the ballot resolution group. The ITSC membership will be surveyed for approval to go to the balloting stage. If approved the plan is by 4/15, the ballot will be sent out for balloting. 30 days will be provided for comments. The 1st comment resolution is targeted to completed by the end of May.

Thomas Sizemore provided a brief update for the document being developed in China. “Guide for live line calibrator of current transformer in distribution networks”. A chair for this effort has been selected and meetings will start soon. Periodic updates will be provided to the ITSC. Zoltan Roman questioned the why we have line calibration. Ryan Hogg discussed the use of NERC for continuous monitoring.

A question had been posed to Thomas Sizemore between meetings regarding creation of a sensor device standard. This subject was discussed primarily to gauge the level of interest in the membership. Zoltan Roman expressed hesitancy to cover these devices under the ITSC. Jeff Britton and Jim McBride summarized related work being done by

PSIM regarding accuracy measurement of sensor under various conditions. PSIM primarily deals with measurement methods not device standards and thus in the opinion of Jeff and Jim PSIM would not look to lead such an effort. It was indicated that PSIM would likely be willing to provide significant input into the accuracy sections of a device standard should another part of IEEE take up the effort to develop such a standard. Jim indicated that he would consider if this topic could be taken to the Technical Council who may have input as to who should work on such a standard.

F.10 ITSC Adjournment

The meeting concluded and was adjourned at approximately 9 AM.

The next meeting is to be held in Charlotte, North Carolina, USA, in the Fall of 2022.