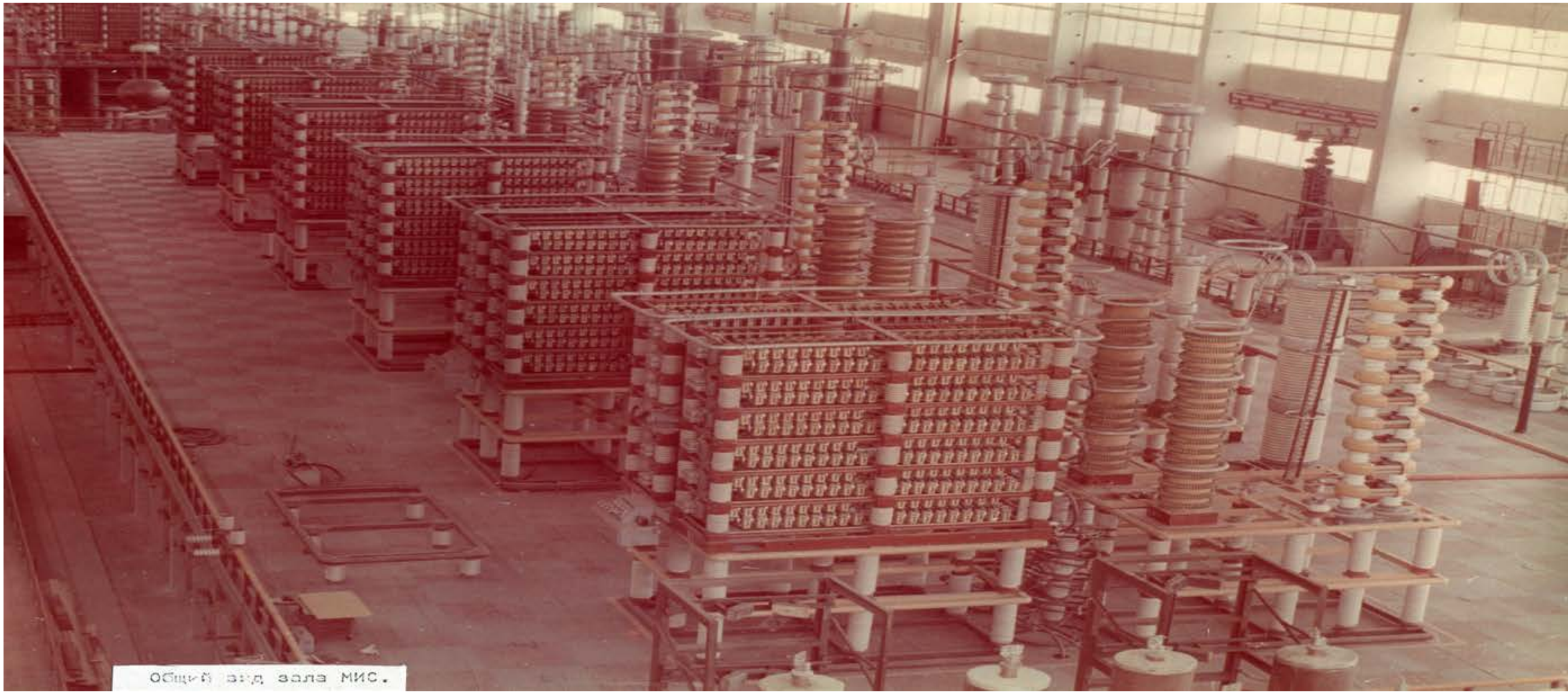

Lev Travin, Secretary of IEC/SC 22F, All-Russian Electrotechnical Institute, Moscow, Russia

IEC SC22F — Power electronics for electrical transmission and distribution systems – 2015-2016

IEC SC22F Power electronics for electrical T&D systems — General information

- Established in 1970

  Converters for high-voltage direct current (HVDC) power transmission

- Renamed in 1985

  Power electronics for electrical transmission and distribution systems

  - Secretariat — Russian Federation
  - **Chairman: Mr. Huigao Zhou, China**
  - **Secretary: Mr. Lev Travin, Russian Federation**

- Membership
  - **10 P-members (Participate actively in the work) countries: China, Finland, France, Germany, Japan, Korea (Republic of), Netherlands, Russian Federation, Sweden, UK**
  - **24 O – members (Kept informed of the progress) countries: Australia, Austria, Belarus, Belgium, Bulgaria, Croatia, Czech, Denmark, Hungary, India, Iran, Italy, Malaysia, New Zealand, Norway, Poland, Portugal, Romania, Serbia, South Africa, Spain, Switzerland, Thailand, Ukraine**

IEC SC22F Power electronics for electrical T&D systems — Scope

Standardization of electronic power conversion and / or semiconductor switching equipment and systems including the means for their control, protection, monitoring, cooling and other auxiliary systems and their application to electrical transmission and distribution systems.

NOTE Typical examples are:

- **power electronic equipment for flexible a.c. power transmission (controlled series capacitors, unified power flow controllers, etc);**
- **converters and associated equipment for high-voltage direct current (HVDC) systems irrespective of d.c. voltage level;**
- **reactive power compensation means (static VAR compensators, STATCOM, etc), power electronic equipment for smart grids;**
- **connection to electrical transmission and distribution systems of renewable and distributed power generation (wind farms, solar stations, etc) including the standardization of system-related features of d.c. systems with d.c. voltages 100 kV and lower;**
- **as well as other applications where power electronics is used, e.g., phase shifters and active filters.**

IEC SC22F General information
— Statistics

- Number of IEC publications developed: **36**

(2015 – 5 publications, 2016 – 9 publications)

- Number of Working Groups (WG) and Maintenance Teams (MT): **17**
- Number of experts: **80/126**
- Number of new projects submitted in the past 5 years: **7**
- Number of current active projects: **15**
- Number of meetings since the last 5 years: **5**

IEC SC22F
Relationship of SC22F and other committees

IEC TC1	Terminology	O
IEC TC8	Systems aspects for electrical energy supply	C
IEC TC14	Power transformers	S
IEC SC17A	High-voltage switchgear and controlgear - Equipment	S
IEC SC17C	High-voltage switchgear and controlgear - Assemblies	S
IEC TC20	Electric cables	S
IEC TC28	Insulation co-ordination	O
IEC TC33	Power capacitors	S
IEC SC36A	Insulated bushings	S
IEC SC36C	Insulators for substations	S
IEC TC37	Surge arrestors	S
IEC TC38	Instrument transformers	S
IEC SC47E	Discrete semiconductor devices	S
IEC TC57	Power system management and associated information exchange	C
IEC TC64	Electrical Installations and protection against electric shock	O
IEC TC73	Short circuit currents	O
IEC TC 89	Fire hazard testing	O
IEC 115	High voltage direct current (HVDC) transmission for DC voltages above 100kV	C
IEC 120	Electrical Energy Storage (EES) Systems	C

C: Customers (3) S: Suppliers (10) O: Other related (5)

IEC SC22F
Established liaisons

Internal

- **IEC/TC89 – Fire hazard testing** (SC 22F/TC 89 JWG2 – IEC/TR 62757, ED.1)
- **IEC/TC115 – High Voltage Direct Current (HVDC) transmission for DC voltages above 100 kV**
- **IEC/TC120 - Electrical Energy Storage (EES) Systems** (not yet established, the first contact and negotiations on the liaison with SC 22F were carried on at TC 120 meeting in Tokyo on November 8, 2014)
- **IEC/TC 99 - System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects** (possible liaison with TC 99 will be discussed at SC 22F meeting in Frankfurt, Germany, September 27-29, 2016)

External

- **CIGRE SC B4 – HVDC and Power Electronics (**Many IEC Publications produced by SC 22F are based on CIGRE B4 Reports/Brochures.).
- **CENELEC TC 22X** - Mr. Colin Davidson has been appointed by SC 22F secretariat as the SC 22F Liaison Officer in order to report at CLC/TC 22X level.

Results of CIGRE SC B4/IEC SC 212F cooperation in 2015-2016

CIGRÉ Technical Brochure	IEC Publication
TB 097 1995 SC 14 WG 14.12 System tests for HVDC installations	IEC 61975, Ed.1.0: High-voltage direct current (HVDC) installations - System tests
TB 139 1999 SC 14 WG 14.30 Guide to the specification and design evaluation of AC filters for HVDC systems. TB 553 2013 B4-47 Special Aspects of AC Filter Design for HVDC Systems	IEC/TR 62001-1, Ed.1.0 : High-voltage direct current (HVDC) systems - Guidance to the specification and design evaluation of A.C. filters (Parts 1-4)
TB 447 2011 B4-48 Components Testing of VSC System for HVDC Applications	IEC 62501, Ed.1.0: Voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) power transmission - Electrical testing (Amendment 1)
TB 223 2003 SC B4 WG B4.28 Active filters in HVDC applications	IEC TR 62544, Ed.1.0:High-voltage direct current (HVDC) systems - Application of active filters (Amendment 1)
TB 136 1999 SC 14 TF 14.01.04 Fire aspects of HVDC thyristor valves and valve halls	IEC/TR 62757, Ed.1.0: Fire Prevention Measures on HVDC, SVC and FACTS converters and their valve halls

CIGRE IEC INTERNATIONAL SYMPOSIUM

"DEVELOPMENT OF ELECTRICITY INFRASTRUCTURES
IN SUB-SAHARAN AFRICA"

CAPE TOWN – SOUTH AFRICA

SOMERSET WEST 26 – 30 OCTOBER 2015

International Council on Large Electric Systems

International standardization of power electronics for electrical systems based on CIGRÉ SC B4/IEC SC 22F/TC 115 cooperation

Lev TRAVIN - IEC/SC 22F Secretary

All-Russian Electrotechnical Institute, Russia

Marcus HAEUSLER – IEC/TC 115 Chairman

Siemens AG, Germany

Mohamed RASHWAN – CIGRÉ/B4 Chairman

TransGrid Solutions Inc., Canada

Paper Number 58

Session Number 1

Date 2015-10-27

IEC SC22F Publications 2015

New Publications

- **IEC/TR 62757, Ed.1.0** (2015-07) — Fire Prevention Measures on HVDC, SVC and FACTS converters and their valve halls (**JWG 2, SC 22F/TC 89** Convenor: Mr Baoliang Sheng, Sweden)
- **IEC 62823, Ed.1.0** (2015-08) Thyristor valves for thyristor controlled series capacitors (TCSC) – Electrical testing – (**WG 26** Convenor: Mr Baoliang Sheng, Sweden)

Updated Publications

- **IEC 60633, Am.2, Ed.2** (2015-07) - Terminology for high-voltage direct current (HVDC) transmission (**MT13** Convenor: Mr. Mr. Colin Davidson, UK)
- **IEC 60700-1, Ed.2.0** (2015-07) — Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing (**MT9** Convenor: Mr Shigeru Tanabe, Japan)
- **IEC/TR 60919-2, Am.1, Ed.2** (2015-06) — Performance of high-voltage direct current (HVDC) systems with line-commutated converters - Part 2: Faults and switching (**MT 11** Convenor: Mr Wanrong Zhang, China)

IEC SC22F
Publications 2016

New Publications

- **IEC 60700–2, Ed.1.0** — Thyristor valves for high voltage direct current (HVDC) power transmission - Part 2: Terminology, (**WG28** Convenor: Mr. Wanrong Zhang, China
- **IEC/TR 62001-1,** Ed.1.0 - High-voltage direct current (HVDC) systems - Guidebook to the specification and design evaluation of A.C. filters – Part 1: Overview (**MT 21** Convenor: Mr Gearoid Sean O'Heidhin, UK)
- **IEC/TR 62001-2,** Ed.1.0 - High-voltage direct current (HVDC) systems - Guidebook to the specification and design evaluation of A.C. filters – Part 2: Performance (**MT 21** Convenor: Mr Gearoid Sean O'Heidhin, UK)
- **IEC/TR 62001-3,** Ed.1.0 - High-voltage direct current (HVDC) systems - Guidebook to the specification and design evaluation of A.C. filters – Part 3: Modelling (**MT 21** Convenor: Mr Gearoid Sean O'Heidhin, UK)
- **IEC/TR 62001-4,** Ed.1.0 - High-voltage direct current (HVDC) systems - Guidebook to the specification and design evaluation of A.C. filters – Part 4: Equipment (**MT 21** Convenor: Mr Gearoid Sean O'Heidhin, UK)

IEC SC22F
Publications 2016 (Continued)

Updated Publications

- **IEC/TR 60919-3, Am.1, Ed.2.0** — Performance of high-voltage direct current (HVDC) systems with line-commutated converters, Part 3 – Dynamic conditions (**MT11** Convenor: Mr. Wanrong Zhang, China)
- **IEC 61803, Am.2, Ed.1.0** — Determination of power losses in high-voltage direct current (HVDC) converter stations with line-commutated converters (based on IEEE Standard 1158-1991)(**MT14** Convenor: Mr. Sanjay Mukoo, Germany)
- **IEC 61975, Am.1, Ed.1.0** — High-voltage direct current (HVDC) installations - System tests (**MT27** Convenor: Mr. Mingxin Wang, China)
- **IEC/TR 62544, Am.1, Ed.1 -** High-voltage direct current (HVDC) systems - Application of active filters (**MT29** Convenor: Mr Gearoid Sean O'Heidhin, UK)

IEC SC22F -
Projects for discussion 2016

New project

- **IEC 62927, Ed. 1.0** - Reactive Power Static Compensator (STATCOM) - Testing of converter valves (**WG 30** Convenor: Baoliang Sheng, Sweden) - **Committee Draft for Voting**

Updated projects

- **IEC/TR 60919-1, Am.2, Ed.3** - Performance of high-voltage direct current (HVDC) systems with line-commutated converters - Part 1: Steady-state conditions (**MT** 11 Convenor : Mr Wanrong Zhang, China) - **Committee Draft for Comments**
- **IEC 61954, Am.2**, **Ed.2** - Static var compensators (SVC) - Testing of thyristor valves
- (**MT10** Convenor: Marcio Magalhães de Oliveira, Sweden) – **Committee Draft for Voting**
- **IEC 62501, Am.2, Ed.1** - Voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) power transmission - Electrical testing (**MT 22** Convenor: Baoliang Sheng, Sweden) - **Committee Draft for Comments**
- **IEC/TR 62543, Am.2, Ed.1** - High-voltage direct current (HVDC) power transmission using voltage sourced converters (VSC) – (**MT 23**, Convenor: Colin C. Davidson, Great Britain) - **Committee Draft for Comments**
- **IEC 62751-1, Am.1, Ed.1** - Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems - Part 1: General requirements (**MT 31** Convenor: Colin C. Davidson, Great Britain) - **Committee Draft for Comments**

IEC SC22F
Objectives and strategic (5 to 8 years)

- Development of new IEC Publications and maintenance/update of the existing ones taking into account features inherent to UHV power electronic equipment and systems.
- Development of IEC Publications on power electronic equipment and systems intended for future Smart Grids;
- Development of IEC Publications on power electronic equipment and systems intended for the integration of renewable power source generation and other kinds of distributed power generation into existing power systems;
- Development of IEC Publications on power electronic equipment and systems intended for the power supply of isolated regions or islands;
- Development of IEC Publications on power electronic equipment and systems providing the energy efficiency increase in operation of electrical transmission and distribution systems;
- Development of IEC Publications on high-voltage power electronic/composite switching devices for d.c. grids.

IEC SC22F
Action plan / publication development

- Full set of standards (terminology; essential ratings and characteristics; testing methods; methods of measurement of characteristics, etc) describing the basic power electronic equipment such as HVDC line-commutated and voltage sourced converters, static VAR compensators STATCOMs, etc, as well as valves, control, protection, monitoring, cooling systems in accordance with the SC 22F scope;
- Series of power converter installations (autonomous and connected to electrical grids) for various renewable power sources (wind, solar, small rivers, etc);
- Control and protection facilities of high-voltage direct current (HVDC) transmission system – Part 1: Operator control system;
- Factory tests of controls and protection of converters for HVDC systems;
- Reactive power controlling installations such as SVCs, STATCOMs, etc.;
- Simulation studies of the application of power electronics equipment before site system tests.

Many thanks to SC 22F WG/MT Convenors:

Mr. Colin C **Davidson**, Great Britain

Mr. Marcus **Haeusler**, Germany

Mr Gearoid Sean **O'Heidhin,** Great Britain

Mr. Sanjay **Mukoo**, Germany

Mr. Baoliang **Sheng**, Sweden

Mr. Shigeru **Tanabe**, Japan

Mr. Mingxin **Wang**, China

Mr. Wanrong **Zhang**, China

Mr. Marcio **Magalhães** de Oliveira, Sweden

and to all experts participating in SC 22F work!

Thank you

Lev Travin