



# SC C2 Meeting 2006

## Cigre SC C2 Meeting

Date: Thursday, August 31, 2006

Place: Paris, Palais de Congrès, Room 341

### List of Participants

#### Members, Observers, Convenors and Guests

Sture Larsson , Sweden , Chairman

Ajan Bose , United States

Saulo Cisneros , Brazil

Paulo Gomez , Brazil

Daniel Julio Kaller , Argentina

Bernard Malfiet , Belgium

Hubert Lemmens , Belgium

Christian Fontaine , Belgium

Alberto Arnaiz , Spain

Ken Brown , Australia

Rui Pestana , Portugal

Frederik Nilsson , Sweden

Shinta Fukui , Japan

Hiroaki Sugihara , Japan

Yutaka Kokai , Japan

Gerhard Krost , Germany

Udo Spanel , Germany

Didier Beny , France

Jean Pierre Desbrosses , France

Riyadh Alumair , Saudi Arabia

Ninel Cukalevsky , Serbia-Montenegro

Michel Armstrong , Canada , In coming  
Chairman

Xin Yaozhong , China

Timo Kaukonen , Finland

Dov Strulovici , Israel

Ole Gjerde , Norway

Tom Tellefser , Norway

Valentin Gerikh , Russia

Jean Constantinescu , Romania

Jerzy Dudzik , Poland

Hugh Jones , Ireland

Micheal Power , Ireland

Joo-Cheon Bae , Korea

Rolf Knopfel , Switzerland

Rudolf Baumann , Switzerland

Nisheeth Singh , Switzerland

Erica Johnson , South Africa

Teresa Carolin , South Africa

Ian Welch , United Kingdom

Carlo Sabelli , Italy

Peter Yuin Hong Lin , Taiwan

Jean-Marie Gagnon , Canada

**Table of Contents**

<b>Introduction.....</b>	<b>3</b>
<b>1. Approval of Agenda .....</b>	<b>3</b>
<b>2. Minutes from the SC Meeting in Paris 2002.....</b>	<b>3</b>
<b>3. Personalia, New Members and Observers,.....</b>	<b>3</b>
<b>4. Experiences from the Paris session 2006.....</b>	<b>3</b>
4.1 Large disturbance workshop: .....	3
4.2 Poster session 4 .....	4
4.3 SCC2 Technical meeting .....	4
4.4 Power system Stability and Control workshop on Friday august 25th.....	5
<b>5. Report from the Technical Committee meeting Interlaken 2006.....</b>	<b>5</b>
<b>6. Implementation of the SC C2 Working structure.....</b>	<b>6</b>
Activities and results from the working groups .....	6
6.1 WA C2.1 Real time System operation and control .....	6
6.2 WA C2.3 Control Centre infrastructure and human resources .....	6
6.3 JWG C2/C5.05 Development and changes in the buiseness of system operators.....	7
6.4 TF 38.02.24 Defence plan against extreme contingencies .....	7
Future work, Strategic and Action Plans.....	8
6.5 WA C2.1 Real Time System Operation and Control .....	8
6.6 WA C2.2 System Operational Planning and Performance Analysis.....	9
6.7 WA C2.3 Control Centre Infrastructure and Human Resources for System Operation .....	10
6.8 JWG C2/C5 Development and changes in the Business of System Operators	10
<b>7. The Paris Session 2008 .....</b>	<b>11</b>
7.1 Preferential Subjects .....	11
7.2 Special Reporters .....	12
7.3 Large Disturbance Workshop.....	12
<b>8. Cigré Regional Meeting in Estonia in June 2007. SC C2 Annual Meeting ....</b>	<b>12</b>
<b>9. Information on other coming events .....</b>	<b>13</b>
<b>10. SC C2 Website.....</b>	<b>13</b>
<b>11. Any other business.....</b>	<b>13</b>
<b>12. End of meeting. ....</b>	<b>13</b>

## **Introduction**

Mr Sture Larsson welcomed the participants and opened the meeting. He mentioned that the Secretary, Erik Ek, could not be present due to the birth of his first child. The baby is a boy and the mother and child are in good health. The C2 participants congratulate Erik and Michel Armstrong will forward him and his wife a congratulations card. Sture Larsson mentioned that it was his last meeting as the C2 Chairman and Michel Armstrong and himself had agreed that he would chair the first part of the meeting, until item 6a, and Michel Armstrong would continue from item 6b. Michel Armstrong thanked Mr Sture Larsson for his dedicated work and valuable contributions in the previous SC 39 and the present SC C2 He was warmly thanked by the all the participants and welcome to continue to follow and support C2 activities. Mister Larsson thanked the members and observers for their appreciation. At the end of the meeting Michel Armstrong presented Mr Sture Larsson a gift of appreciation from the SC C2 Members and Observers.

### **1. Approval of Agenda**

The meeting approved the proposed agenda.

### **2. Minutes from the SC Meeting in Paris 2002**

The minutes of the meeting of 2005 in San Antonio were approved without modifications.

### **3. Personalia, New Members and Observers,**

Mr Sture Larsson introduced the new members and observers and invited them to participate actively to the various C2 working groups, task forces and activities.

He thanked the Members and Observers that had come to the term of their assignment for their valuable contribution and participation. Michel Armstrong invited them to continue to participate to SC C2 activities to share their knowledge and experience with the new participants.

Mister Saulo Cisneiros thanked Mr Larsson and expressed his satisfaction for the eight years he contributed to SCC2. He also congratulated Mister Paulo Gomez the new Brazilian member for his nomination to the SC C2

Mr Larsson announced that mister Philip Mesta who had been convenor of C3/B2 died of cancer .He expressed his sympathies to those that knew him.

Note: TC award not discussed at the meeting. Sture Larsson and Michel Armstrong proposed Ken Brown, from Australia and Saulo Cisneiros, from Brazil for the 2006 TC award.

### **4. Experiences from the Paris session 2006**

#### **4.1 Large disturbance workshop:**

Mister Ken Brown convenor for this year workshop expressed that time for discussions with the audience would have been appreciated. He also noticed that the workshop was well attended and a larger room would have been preferable. He also mentioned that the Monday afternoon was an appropriate time to hold this event.

Michael Power would prefer to start the workshop before two o'clock.

Gerhard Krost mentioned that the subject of the Opening session was very close to the workshop, duplication and some redundancy in the presentations diluted the interest.

Saulo Cisneros suggested that spontaneous contributions be invited from the audience.

## **4.2 Poster session**

Ajan Bose appreciated the experience. It is the only forum for the attendants to discuss directly the papers with the authors. The session would benefit from being more publicised, not all the papers were posted. Sture Larsson reminded that this year session was a pilot project and the authors were invited to post their paper on a voluntary basis.

Udo Spaniel mentioned that an effort should be made to attract participants from the other SC. It was mentioned to consider to hold the poster session the day after the C2

Session. It might attract the participants of the session that did not have the opportunity to make a contribution and might generate specific questions.

Daniel Kaller thought it was a useful experience, some guidelines on the format of the posting should be given. Some had elaborate poster others had photocopies of their papers or presentations.

Michel Armstrong from the feedback he heard in general from the participants at the session, recognizing the logistics needs improvement the experience was worth doing. With the Poster Session, there is a better recognition of the effort spent by authors

## **4.3 SCC2 Technical meeting**

In general the participants agreed that the meeting went very well and the special reports and contributions were of high technical quality

The following observations and comments were shared among the participants:

- the work of three special reporters was efficient and contributed to a dynamic session
- the used of electronic presentations went very well. The concentration of all presentations into one computer ahead of time was a factor of success.
- to get as many views and contributions as possible and to be fair between the presentations it is essential to focus the message of the presentation and limit the number of slides projected.
- there should be a power point template to standardize the presentations and limit the use of companies logos.
- for the continuity of the presentation once a speaker was on stage it was a good idea to let him address all the questions he had prepared for a given preferential subject.
- the attendance was not as numerous as the previous years.

#### **4.4 Power system Stability and Control workshop on Friday august 25th**

The workshop was well attended and the presentations were interesting .C2 should be attentive to the use of wide area measurements technology in real time control.

It was suggested to hold the workshop on the Saturday instead of the Friday to give the opportunity to more participants to attend.

### **5. Report from the Technical Committee meeting Interlaken 2006**

Sture Larsson and Michel Armstrong attended the meeting in march 2006.Sture Larsson presented a short review of the subjects that were discussed.

The SC C2 Strategic Plan was approved. The TC Chairman observed that the new structure was in line with the model and insisted on the need for the working bodies to report to the SC Chairman not to the Advisory Groups. He concluded by asking to report at the next TC on the progress of the implementation of the organisation. And to report the intentions regarding the SC C2 Strategic plan updates.

Concerning the evolution of working groups, the importance for a WG to have an approved terms of reference and provide deliverables on time was reminded to all SC's.

National Committees would like to be informed on the creation of new WG or TF to be able to propose experts to become members.

The problem of recruitment of young experts within CIGRE was addressed .Some of the points discussed were: graduate student targeting, encourage participation to National Committees, presentation of tutorials at CIGRE events, A more detailed set of actions will be presented at the next TC meeting.

The TC concluded the revised scope of C6 with reference to the integration of the wind farms. When connected directly to the transmission system their impacts should be dealt by SC C1 and SC C2. When connected to the distribution system C6 should address their impact on that system and also assess the indirect impacts resulting on the transmission system.

The format of CIGRE Symposia has been changed to allow authors to make short presentation of their papers. And Jean Kowal reminded to consider using the SC website to disseminate selected documents and reports of technical interest.

Ajan Bose, US C2 member, stated that the US National Committee do not seem to get feedback on the level of participation of their participants. Sture Larsson explained that some National Committee are not as active as others to give this feedback.

## **6. Implementation of the SC C2 Working structure**

### **Activities and results from the working groups**

#### **6.1 WA C2.1 Real time System operation and control**

The convenor Nisheeth Singh reported the following activities:

There are 25 active members. The group maintain liaisons with IEEE, ETSO and UCTE

There were 4 meetings held :

Paris August 2004, Denmark, 2005, San Antonio 2005, Paris August 2006

Progress of work since CIGRE 2004 session

- A report and a technical brochure were published on wind power integration
- A technical report on the Denmark disturbance was produced
- Contribution to the tutorial on Congestion management in San Antonio USA.
- A survey on the installation of PMU and WAMS was published
- Contributed to the lessons learnt from large disturbances at Paris Session 2004
- JWG D2/B3/C2.1 produced in 2006 a technical report on Security for information systems and intranet in electric Power systems.

#### **6.2 WA C2.3 Control Centre infrastructure and human resources**

The convenor Prof Gerhard Krost reported the following activities:

There are 22 full members and 9 corresponding members from 24 countries represented.

There were 5 meetings held:

Paris August 2004, Duisburg March 2005, San Antonio USA October 2005,

Sweden April 2006, Paris September 2006.

Progress of work since CIGRE 2004 session.

Papers presented:

- Innovative approaches in human machine interaction for power system operation CIGRE Symposium, Ljubljana, Slovenia, April 2004
- Consequences of Control Centre reorganization for operators and their performance CIGRE Session ,Paris 2004
- Lessons learnt from the 2003 blackouts from the view point of operators and control centre performance Workshop on large disturbance CIGRE Session, Paris 2004
- Impact of new Control centre technologies on system operation, CIGRE Session Paris 2006

Oral presentations:

- Methods of maintenance of power supply reliability in world power systems history and presence, contribution based on WG work at RAO Moscow, November 2005
- Black out restoration, workshop of CIGRE GEC in DOA/Qatar, November 2005.

Professor Krost announced that after 11 years as convener of this group and also taking into account that he has new responsibilities, he asked the members to consider replacing him. He confirmed that he will assure a smooth transition with the new convener.

### **6.3 JWG C2/C5.05 Development and changes in the business of system operators**

The convener Ole Gjerde reported the following activities:

There are 18 full members from 14 countries and 10 corresponding members from 10 countries represented.

There were 5 meetings held:

Paris August 2004, Athens Mai 2005, San Antonio USA October 2005  
Crete March 2006, Paris August 2006

Progress of work since CIGRE 2004

Paper presented at the CIGRE Symposium in Ljubljana, March 2004

Paper presented at the CIGRE/IEEE Symposium in San Antonio, October 2005

Three presentations were done at the tutorial “The fundamental of international congestion management practices” San Antonio, October 2005

Paper presented “Interfaces between System operators, Market operators and other market actors” based on responses to a questionnaire survey, CIGRE Session Paris , August 2006.

### **6.4 TF 38.02.24 Defence plan against extreme contingencies**

The convener Jean Marie Gagnon presented to C2 members a summary of the report.

The scope “Develop guidelines for the design and deployment of defence plans against extreme contingencies” was completed in the fall of 2006.

The technical brochure is a roadmap that leads power system professionals to improve electric system reliability and security of the grid. Integrating the latest advances in sensing, communication, computing, visualization, and algorithmic techniques into defence plans provides cost effective solution to increase system security and with training makes an acceptable solution to system operation.

The report also proposes potential subject for future work for C2 in the areas of :

- inter-company communication and sharing of data among various control centres
- improvements in large computational efforts
- the role of innovative strategies to forecast climatic events
- the dynamic loading of power equipment.

The document is well structured and it addresses an exhaustive analysis of defence plans.

Sture Larsson thanked Jean Marie Gagnon and all the contributors for this immense contribution and the excellent work. An Electra paper will be submitted to CIGRE.

## **Future work, Strategic and Action Plans**

At this point on the agenda the chairmanship was handed over from Sture Larsson to Michel Armstrong. The new chairman introduced the workforce proposals from the convenors of the three Working Areas of the Working Structure.

### **6.5 WA C2.1 Real Time System Operation and Control**

Nisheet Singh presented a proposal of five Working Groups according to:

- **WG C2.1.01 Substation Control systems in light of recent developments**  
Convenor Michael Power. The scope of work is to identify advances in substation control and the impact on system operation from the new IEC standards (61850). It is also to survey best practices and potential improvements in operations and propose recommendations and guidelines for SCS integration. A technical brochure is planned for publication in December 2007.
- **WG C2.1.02 Applications of Synchronised Phasor Measurement in Power Systems**  
Convenor Louis Wehenkel. The scope of work covers to survey the use of wide area monitoring devices, identify the most used applications, analyse the trends and perform cost/benefit and business cases for the use of WAMS. Work is started now to result in a final report in December 2007 that can be published as a technical brochure and announced in Electra.
- **WG C2.1.03 Voltage/Var support in Large Power Systems**  
Convenor to be determined. The work is intended to address the voltage and Var support problems in increasingly loaded systems and the need to develop market functions in this area. The work will cover voltage control techniques and modelling as well as reactive power management in normal and emergency conditions. Work will start in October and a final report is planned for March 2008.
- **WG C2.1.04 Requirement on design and implementation of Restoration Tools and Procedures**  
Convenor to be determined. Previously published work will be recapitulated and updated and the requirements analysed as a basis for research and development. The work will address the need to establish best practices in a bench-marking process. Work is to start in October and deliver a final report in March 2008.
- **WG C2.1.05 Common Information Model and its prospective use in power system operations**  
Proposed convenor Tanja Kostic. Based on the established IEC Standard (WG 19) work is started to catalogue the current use of CIM, to analyse requirements applications and possible updates and improvements from a system operations perspective. Best practice should be established as well as cooperation with CIM user groups. The further deliverables and timing of a final report is to be determined.



In the following discussion, Anjan Bose and Hugh Jones expressed concerns that the timescales of work may be too short. The Chairman pointed out that the scopes and deadlines for delivery should be adjusted to be realistic. Sture Larsson referred to the requirements from the Technical Committee on deliveries in time and the need for approval by the TC Chairman to avoid any unintentional overlap with work in other Study Committees. Michael Power emphasized the importance of the interest of the SC and WG members for good working results.

## **6.6 WA C2.2 System Operational Planning and Performance Analysis**

Erica Johnson explained her approach in structuring the workforces into two main Working Groups with underlying Task Forces according to:

- **WG C2.2.01 Lessons learnt from recent Emergencies and Blackout Incidents**
  - TF C2.2.01.01 An analysis of Recent Power System Vulnerabilities Observed
  - TF C2.2.01.02 Climatic changes impact on the operating environment
  - TF C2.2.01.03 Organisational competencies required for crisis management
- **WG C2.2.02 Resilience in Preventing Disturbances and Blackouts**
  - TF C2.2.02.01 An evaluation of accident models and incident investigation techniques utilised in power systems.
  - TF C2.2.02.02 An evaluation of the effective barriers established to prevent future power outages.

*Note the minutes need to be further completed in describing these proposals*

Convenors for the proposed workforces are yet to be determined. Members are invited to contribute to the work. The further organisation and coordination will be carried out by e-mail supported by information on the SC Website

As several items such as crisis management are related to human resource aspects dealt with by Working Area 3, Hugh Jones pointed out the need for coordination whilst Gerhard Krost did not see this as a big problem.

The Chairman brought up the interrelation of operating the markets and operating the power systems. Ole Gjerde commented that congestion management is attended to in many Study Committees and the risk of overlapping in this subject. Hugh Jones reminded not to forget the large area of operational planning under normal conditions.

Jean-Mari Gagnon referred to the work in TF 38.02.24, proposing development of new tools for remedial actions to handle critical situations emerging from climatic changes. Erica Johnson responded that the approach was made from a different angle, focusing not so much on tools but rather on the need to evaluate and change the way operators handle situations as the climatic conditions change.

## **6.7 WA C2.3 Control Centre Infrastructure and Human Resources for System Operation**

Gerhard Krost referred to discussions during the latest meeting held in April when several ideas had been raised but two main topics had emerged as regarded the most relevant ones to be attended to by two Task Forces:

- **TF C2.3.01 Combined training**

The appointed convenor, Udo Spanel, presented the proposed scope for this WG focusing on the need of training across national and company borders observing market effects, state-of-the-art, training modalities and tools used as well as experiences made.

The work is meant to be divided in four phases, ending with a contribution to the Paris Session in 2008. The TF was to hold its first meeting on September 1st.

No special comments were raised at the meeting and the scope was generally accepted.

- **TF C2.3.02 Emergency Organisation and Crisis Management in System Operation**

Mr Christian Fontaine is appointed to convene this TF. He presented the main topics focusing on the demands in crisis situation on leadership and coordination, mobilising workforces, a good personnel management, the debriefing and feed-back process as well as the reliance on communication equipment.

The work is intended to result in a report for the Paris Session in 2008.

Members and Observers are invited to participate in this TF. The first meeting was to be held on Friday September 1<sup>st</sup>

Hugh Jones and Ken Brown pointed out the need to introduce new people into the work of this TFs from various countries and other WGs, and to find new ways to participate.

The presented approach was accepted by the meeting.

## **6.8 JWG C2/C5 Development and changes in the Business of System Operators**

The convenor Ole Gjerde presented the proposed work plan after discussions at the JWG meeting on Sunday 27 August. The following items are intended to be prioritised for work in three Task Forces:

- **Market operators – how are they organised**

Juan Bogas in charge of the work

- **An evaluation of risk management philosophies in the system operation control centres**

Erica Johnson in charge. Results from a questionnaire evaluation will be ready in

January 2007. Preparations will be made for a paper for the Paris Session 2008.

- **Interface System Operators – Regulators**

Olav Fosso in charge together with Paul Giesbertz. Efforts will be made for preparing a report for the Paris Session 2008

Work is going on to specify Terms of Reference for the Task Forces to be ready in October.

A voice was raised questioning if risk management really is a business for SC C5. It was explained that in this context it was referring to economic risks that market operators face due to various system operation conditions.

## **7. The Paris Session 2008**

### **7.1 Preferential Subjects**

The Chairman opened a brainstorming discussion with the objective to determine preferential subject for the 2008 Paris Session.

Saulo Cisneiros suggested focus on:

- Power system security and reliability, standards, performance indices, real cases
- Cyber security to prevent interruptions
- Impact of dispersed generation on the transmission system

Gerhard Krost commented that Preferential Subjects should be in line with what the WG/TFs are working with.

Ole Gjerde made the following proposal:

- Wind power in a market environment, intermittent generation contribution
- Demand response, frameworks, Grid Codes
- Contradictions between market, security and environment objectives
- Legal situations for different markets leading to different solutions

Paulo Gomes proposed:

- Reliability of Special Protection Schemes, performance indicators
- Communication of critical or black-out situations to news media and the public

Xin Yao Zhong proposed:

- Primary Control, Ancillary Services agreements between TSOs and market actors

Anjan Bose referred to the major issue in US to find metrics for the Grid Codes as a basis for defining penalties for breaching NERC requirements.

Timo Kaukonen proposed a subject addressing the information exchange between TSO/ISOs and other parties with a reference to the EU transparency requirements.

Michael Power suggested having a standing Preferential Subject on “System Operation Control Technique” used in normal day to day business.

Daniel Kaller suggested:

- Lessons learnt from Black-outs
- New trends in System Operation due to developments in substation design and PMU technology

Carlo Sabelli suggested:

- Methods of testing the performance of the users of the grid subject to Grid Codes, including power stations

The area of operational use and experiences of the PMU technology for a Preferential Subject was addressed by Michael Power, Paulo Gomes, Hugh Jones and Anjan Bose.

Finally Gerhard Krost proposed:

- Intelligent technique to handle all data in System Operation
- IT-security, structural effects within the C2 activity area

The Chairman closed the discussion and thanked for the contributions. He will conclude the proposals into preferably three Preferential Subjects in order to prepare a first draft for the Technical Committee meeting on Saturday September 2.

## **7.2 Special Reporters**

The chairman encouraged members and observers to volunteer to serve as special reporters in 2008. The practice of one reporter per preferential subject will be continued.

## **7.3 Large Disturbance Workshop**

After a number of successful workshops during the Paris Sessions it is highly expected that C2 will be asked to arrange a workshop also in 2008.

Ken Brown volunteered to convene the workshop once again.

A discussion followed on how to give room for more spontaneous contributions after each presentation. Anjan Bose suggested that more information could be given by using a standard for how disturbances should be reported. Daniel Kaller proposed that some common features of the disturbances could be brought together for comparisons, for instance “how long time did the operators have available to react?”

## **8. Cigré Regional Meeting in Estonia in June 2007. SC C2 Annual Meeting**

Sture Larsson informed on the arrangements for the event. Call for papers and an information leaflet are available. Deadline for delivery of synopsis is January 15, 2007.

The theme for the Regional Meeting is “Security and Reliability of Electric Power Systems”.

The main topics to be addressed are the following:

- Large generation units in a small power system
- Distributed generation and power system security
- Interconnections for increasing of the security of the power system
- Design and operational tools for analyzing the power system security
- Lessons learned from the experienced black-outs
- Congestion management principles

Working Groups/Task Forces and individuals are encouraged to submit proposed contributions.

The Regional Meeting is scheduled for Monday to Wednesday, June 18 – 20. Taking into account that many people active in C2 also will participate in the EPCC-Workshop in Norway, it was decided to hold the C2 Annual Meeting on Sunday June 17. Then Saturday June 16 and Thursday June 19 are open for scheduling WG/TF meetings.

## **9. Information on other coming events**

Brief notifications were given on the following events:

- EPCC in Norway June 11-13 , 2007
- Workshop on Transient Phenomena in Croatia in                      organised by SCs A1 C1 and C4
- Symposium on System Development and Asset Management in Osaka Japan in September 2007 organised by SCs B1,C1 and B5

(Note for the minutes. Dates are to be confirmed.)

## **10. SC C2 Website**

## **11. Any other business.**

Information was given on other Working Groups in order to invite interested participants.

- JWG B3/C1/C2 – 14 on "Circuit Configuration Optimization".
- WG D2.22 on "Treatment of Information Security for Electric Power Utilities"

For further information the scopes are enclosed to these minutes and available on the websites of SC B3 and D2.

## **12. End of meeting.**

The chairman closed the meeting and thanked all participants for their attendance and contributions.