



## Group D2 Session Papers

2004

### D2

- |               |   |   |
|---------------|---|---|
| <b>D2-101</b> | Practical experiences from running a large scale SCADA/EMS/BMS project  | P. FORSGREN, J-O. LUNDBERG (Sweden)   |
| <b>D2-102</b> | Operational performance and security implementation in the Italian SCTI control system  | D. BISCI (Italy), B. ENGEL (Germany)  |
| <b>D2-103</b> | The generation coordination system at Vattenfall Sweden   | E. SANDSTROM, R. SIDENBLA(Sweden)   |
| <b>D2-104</b> | Communication architecture for the new substation of Red Electrica de Espana  | C. SAMITIER, J.C. SANCHEZ (Spain)   |
| <b>D2-105</b> | Basic concept and verification of distributed real-time computer network architecture for power systems   | T. TANAKA, T. TSUCHIYA, S. KATAYAMA, Y. SERIZAWA, F. FUJIKAWA, T. OTANI (Japan) |
| <b>D2-106</b> | Using digital certificates to secure the access to RTE's information system / Sécurisation des accès au système d'information de RTE par certificats numériques | V. GAUGE, M. BERRIER, C. RODIONOFF (France)                                     |
| <b>D2-107</b> | DRISS - Customer benefits systematically realized   | T. NILSSON (Sweden)   |
| <b>D2-201</b> | Data communications in Romanian power network (Romania)   | M. MESBAH (France), I. NEDELICU   |
| <b>D2-202</b> | An analysis on the marketability of broadband powerline communication (PLC) access business   | G.W. LEE, M.H. YOO, Y.H. KIM (Korea)  |
| <b>D2-203</b> | Strategies and access technologies for offering new services to utility consumers in Japan  | S. MURAI, M. SAIKAWA, S. TASHIMA, A. KUWAHATA, S. INOUE, K. SAWADA (Japan)      |
| <b>D2-204</b> | Telecontrol and telephony on an IP transmission network / Téléconduite et téléphonie sur un réseau de transmission IP   | J. NOUARD (France)  |

## 2002

### Group / Groupe 35 Power System Communication and Telecontrol *Télécommunications et télécommande des réseaux d'énergie*

<b>35-101</b>	New tools to observe and control large networks	G. DANIÉLS - G. BEISSLER -B. ENGEL (Germany)
<b>35-102</b>	Application of Multicast Transport Protocols in Telecontrol	F. PEREZ - V. MEDINA -R. GONZALO - J. LUQUE (Spain)
<b>35-103</b> (Spain)	Virtual distributed instrumentation in the substation environment.	C. SAMITIER - E. TRULLOLS -A. MANUEL - J. DEL RIO
<b>35-104</b>	New SCADA/DMS/EMS integrated control system architecture W. for IBERDROLA.	J. CORERA - J. MARTI - J. ARRIOLA W. LEX - A. KUHLMAN - SCHMITZ (Spain)
<b>35-105</b>	Substation migration into an IP Network.	On behalf of Working Group 35.07
<b>35-106</b>	Potential applications of resilient packet ring technology for power utilities	On behalf of Working Group 35,07
<b>35-107</b>	Using standard protocols for SCADA master-station and Remote Terminal Units (RTUs).	A. R. AL-SALEEM (Saudi Arabia)
<b>35-201</b>	Adoption of mobile communication technologies by electric power utilities in Japan.	T. MAKINO - Y. ECHIGO - Y. YAMASHITA - H. HORIUCHI - T. TOGOSHI - R. ITOU - (Japan)
<b>35-301</b>	Technical and economical aspects of telecommunications development in conditions of power utilities restructuring and electricity market deregulation.	A.V. MARCHENKO - V.Kh. ISHKIN - B.I. MEKHANOSHIN - V.A. SHKAPTSOV - (Russia)
<b>35-302</b>	A practical approach to the design of a power utility multiservice telecommunication network.	A. BRKANIC (Bosnia & Herzegovina) K. SAMARDZIC (Slovenia)

## 2000

35-101 THE PIA SOLUTION - COST EFFECTIVE ACQUISITION AND DISTRIBUTION OF INFORMATION BETWEEN ELECTRICAL POWER SUPPLY COMPANIES IN ONE INTEGRATED NETWORK: J Germann, A Willimann, Switzerland

35-102 ONLY AN ORDINARY AMR SYSTEM OR A WIDER BUSINESS OPPORTUNITY FOR THE UTILITY?: V Mocnik, Slovenia

35-201 EXPERIENCE IN THE IMPLEMENTATION OF A TELECONTROL NETWORK BASED ON THE IP TECHNOLOGY: R Cabezas, J M Selga, V Giménez, C Samitier, Spain

35-202 AN ADVANCED DATA ACQUISITION SYSTEM FOR THE NEW ITALIAN TRANSMISSION GRID CONTROL SYSTEM: D Bisci, R Gordano, A DeBellis, Italy

35-203 TECHNOLOGICAL MERGING OF PROCESS AUTOMATION, INFORMATION TECHNOLOGY, BUSINESS OBJECTIVES AND THE INTERNET IN THE ELECTRICAL INDUSTRY - A MALAYSIAN PERSPECTIVE: S Vignaeswaran, Malaysia

35-204 ARCHITECTURES FOR INTERNET WORKING: Working Group 35.07

35-205 SIMPLE AND ROBUST IP ACCESS SOLUTION WITH GUARANTEED QOS: R Udd, Finland

35-301 DEVELOPMENT OF BUILT-IN OPGW AND WINDING OPGW APPLICATIONS AT POWER UTILITIES IN JAPAN: Y Yamada, M Tanido, K Hayashi, S Ikeo, S Yoshida, K Shimoi, Japan

35-302 LIGHTNING CURRENT WITHSTAND CAPABILITY OF OPTICAL OVERHEAD GROUND WIRES: L Karpinski, R Malewski, J Dabrowski, J Mikulski, B Koch, Poland

35-303 THE EXPERIENCE OF RED ELÉCTRICA DE ESPANA IN THE CONSTRUCTION AND MAINTENANCE OF ITS OPTICAL FIBRE NETWORK: J Munoz, J Mn López, Spain

34/35-01 APPLICATION OF BROADBAND TELECOMMUNICATIONS AND TIME TRANSFER SYSTEMS FOR TELEPROTECTION: Y Serizawa, A Takeuchi, E Ibaragi, F Iwatani, T Matsushima, Y Obata, Japan

34/35-02 POTENTIAL OF NEW TELECOMMUNICATIONS TECHNOLOGIES FOR POWER SYSTEM PROTECTION: Working Group 35.07

## 1998

35-101 DISASTER RESISTANT COMMUNICATION SYSTEMS AND DISASTER PREVENTION INFORMATION SYSTEM: K Wakayama, H Hosokawa, M Kazumori, K Kouda, T Togosi, K Shimoi, A Fujisawa, Japan

35-102 ESB NATIONAL GRID'S BACKUP STRATEGY FOR ITS CONTROL AND COMMERCIAL SYSTEMS: W Kinsella, P O'Donnell, Ireland

35-103 BACK-UP/EMERGENCY CONCEPT AND PROVISION OF OPERATION SECURITY IN EMS/SCADA PROJECT FOR THE ROMANIAN POWER SYSTEM: I Nedulcu, I Ignat, Romania

35-104 DEVELOPMENT OF FIBRE OPTIC COMMUNICATION LINES FOR ELECTRIC POWER UTILITIES IN RUSSIA: V H Ishkin, B I Mekhanoshin, Russia

35-201 APPLICATION OF WEB TECHNOLOGY TO NETWORK MANAGEMENT: C Samitier, F Gonzalo, Spain

35-202 INTERNET TELEPHONY - A NEW APPROACH TO OPERATIONAL TELEPHONE SERVICE: C Samitier, J Viapiana, Spain

35-203 POTENTIALS OF INTERNET PROTOCOL TECHNOLOGIES: T Jordan, WG35.07

35-204 EFFICIENT IMAGE COMPRESSION FOR TRANSMISSION OVER BANDWIDTH LIMITED DATA NETWORKS: R A El Hamid Sadek, Egypt

35-205 IMPACT OF INTRANETS ON POWER SYSTEM DIGITAL TRANSPORT NETWORKS: J Komulainen, J Jääskeläinen, E Salo, Finland

35-206 INTERNET TECHNOLOGY AND ITS POTENTIAL FOR INTEGRATION WITH EXISTING CORPORATE LEGACY SYSTEMS IN A POWER UTILITY ENVIRONMENT: K Morar, Zimbabwe, A Helberg, South Africa

35-207 INTERNET TECHNOLOGY USE FOR NON-DISCRIMINATORY PUBLICATION OF CAPACITY INFORMATION IN AN ELECTRICAL NETWORK: D Monceau, J L Coullon, France, N Peterson, USA

## 1996

35-101 BUSINESS OPPORTUNITIES AND THREATS FOR POWER UTILITIES IN DEREGULATED TELECOMS INDUSTRY: R Koskinen, J Tervo, Finland

35-102 DEREGULATION OF TELECOMMUNICATIONS IN SOUTH AFRICA WITH PARTICULAR RELEVANCE TO ESKOM : A J Bester, A F Pollard, T C Lambert, South Africa

35-103 THE INFLUENCE OF DEREGULATION OF THE TELECOMMUNICATIONS MARKET UPON THE POWER UTILITIES: Working Group 35.08

35-104 BUSINESS OPPORTUNITIES FOR ELECTRIC UTILITIES IN THE TELECOMMUNICATIONS MARKET: Working Group 35.08

35-105 AVAILABLE TECHNOLOGIES TO LINK CUSTOMERS WITH TELECOMMUNICATIONS HIGH CAPACITY: Working Group 35.08

34/35-01 WIDE-BAND COMMUNICATION FOR TRANSMISSION LINE RELAYING: H Hupfauer, M Kling, G Koch, M Mainka, Germany

35/34/02 ADVANCED COMMUNICATIO SYSTEMS FOR POWER SYSTEM STABILIZATION AND PROTECTION SYSTEMS: H Hosokawa, S Shibano, T Nezu, T Ito, S Okamura, S Sato, Japan

35/34-03 EXPERIENCE IN THE USE OF DIGITAL COMMUNICATION LINKS FOR PROTECTION: I J Hall, S Potts, United Kingdom

## 1994

35-101 SDH TRANSMISSION SYSTEMS FOR ELECTRIC POWER COMPANIES: T Kubo, T Itabashi, H Takahashi, Y Nozoe, T Togoshi, K Shimoi, Japan.

35-102 EXPERT SYSTEMS IN THE MANAGEMENT OF TELECOMMUNICATIONS NETWORKS: F Gonzalo on behalf of Working Group 35.02.

35-103 INTEGRATION OF A DIGITAL OPTICAL COMMUNICATION NETWORK INTO THE INDONESIAN ELECTRICAL POWER SYSTEM: S Bredel, M Mesbah, France, M Rumahlewang, Indonesia.

35-104 POWER UTILITY INTEGRATED TELECOMMUNICATION NETWORK, BASED ON CORPORATE ISDN CONCEPT: I Lovrek, B Mikac, E Sehovic, A Bobanovic, Croatia.

35-105 THE FIRST GENERATION DIGITAL POWER LINE CARRIER, FUNCTIONALITY AND PERFORMANCE: T Jordan, T Olsen, Norway.

35-201 RESULTS OF STANDARDIZATION OF THE SICC CONTROL SYSTEMS IN HYDROQUEBEC POWER STATIONS AND FUTURE TRENDS: P Chenevert, A Gascon, P Martin, R Tawa, B Weber, Canada.

35-202 GUIDELINES FOR SOFTWARE PROJECT CONTROL: C Enckell, E Bitetti, T C Carolin, A De Carvalho, Q L Nguyen, J M Thorsen Jr, M Virlogeux on behalf of Working Group 35.01.

35-203 RENEWAL OF THE SWEDISH OPERATIONAL DATA NETWORK: J-O Lundberg, J-E Brask, L Asplund, Sweden.

35-204 NEW TELECONTROL SYSTEM ARCHITECTURE : OPEN SYSTEMS: B Holmgren, R Podmore, J Thorson, P G F J Ligtoet, on behalf of Working Group 35.01.

35-205 STANDARDIZATION OF COMMUNICATION PROTOCOLS - ACTIVITIES IN THE NETHERLANDS: W Strabbing, Netherlands.

35-206 SATELLITE TRANSMISSION : EXPERIENCES IN VSAT TECHNOLOGY: B Lopez, N Arcauz, Spain.

35-207 INTRODUCTION OF AN OPEN SYSTEM PHILOSOPHY IN THE CONTROL CENTER ENVIRONMENT: J Hegge, T Sannes, Norway.

## 1992

35-101 REPORT BASED ON A QUESTIONNAIRE ON TELECOMMUNICATIONS NETWORK MANAGEMENT IN POWER UTILITIES: P Somervuo, E Anderson, On behalf of Working Group 35.02

35-102 REPORT BASED ON A QUESTIONNAIRE ON MOBILE RADIO SYSTEMS IN POWER UTILITIES: P Somervuo, B Toet, On behalf of Working Group 35.02

35-103 THE PLANNING, DESIGN AND INSTALLATION OF ESB'S X.25 NETWORK: P Lynch, P O'Doherty, P O'Griofa, K O'Brien, J O'Reilly, Ireland

35-104 DEVELOPMENT OF A LINEAR MODULATION TRUNK RADIO SYSTEM WITHIN A UK 'ALL PURPOSE' ELECTRICITY COMPANY: G Carlton, W B Henderson, J P McGeeham, United Kingdom

35-105 DEVELOPMENT OF A DIGITAL TELEPROTECTION SYSTEM: M Tulkki, J Tormanen, J Komulainen, Finland

35-106 PLANNING AND CONSTRUCTION OF A SPECIALIZED NATIONAL TELECOMMUNICATION NETWORK: A Gonzalez, J A Garcia, J M Delapena, G Novales, Spain

35-107 38 GHz RADIO LINKS FOR HIGH SPEED DATA TRANSMISSION IN THE LANs OF THE DISPATCHING CENTRES: F Schindele, D Knoll, Federal Republic of Germany

35-108 INSTALLATION OF VIDEO TRANSMISSION SYSTEMS IN ELECTRIC POWER COMPANIES IN JAPAN: A Ifukube, K Matsui, Y Kanai, H Takahashi, A Shousu, A Tamura, A Ikeda, Japan

35-109 THE USE OF THE TRANSPORT LAYER IN TELECONTROL SYSTEMS: J M Selga, J Hegge, C Bochu, On behalf of Working Group 35.03

35/39-01 THE FUTURE REGIONAL CONTROL CENTRES OF EDF: G De Montravel, Y Tadec, France

35/39-02 A TELECONTROL SYSTEM: ARTERE: A SCHEME BASED ON ISO STANDARDS: B Henry, D Zone, D Le Roux, F Winkler, France

35/39-03 POSSIBILITIES AND EXPECTATIONS FOR IMPROVED MAN MACHINE INTERFACE IN POWER SYSTEM CONTROL: H Asal, R K Burrow, K Lindstrom, M Mocenigo, G Schellstede, G Schaffer, A Serrani, Working Group 39.02, On behalf of the Chairman of Study Committee 39

35/39-04 UPGRADED CONTROL CENTRE AND ORGANIZATIONAL REFORM TO MEET THE REQUIREMENTS OF TODAY'S INFORMATION - ORIENTED SOCIETY: T Minakawa, K Yokota, A Imamura, J Toyoda, M Kunugi, K Suzuki, Japan

35/39-05 UPGRADING OF SYSTEM CONTROL CENTRE FUNCTIONALITY: A Bose, R Podmore, I Thurein, H Van Meeteren, United States

35/39-06 TRANSMISSION SUBSTATION CONTROL AND COMMUNICATION  
STANDARDS - APPLICATION OF INTEGRATED DIGITAL TECHNIQUES: Working Group

35.06

35/39-07 MMI INTERFACE USING FULL GRAPHICS: Working Group 35.01

## 1990

35-101 MANAGEMENT OF AN INTEGRATED SWITCHED DIGITAL NETWORK WITHIN UK ALL PURPOSE ELECTRICITY COMPANY: G Carlton, W B Henderson, D Goodall, C Marr, United Kingdom.

35-102 AN AUDIO-VISUAL OBSERVATION METHOD OF EVALUATING THE MULTIPATH FADING PHENOMENA IN DIGITAL MICROWAVE TRANSMISSION SYSTEM: Li Xiao, Jia Xiaotie, China.

35-103 OPTICAL FIBRE TELECOMMUNICATIONS OF THE ELECTRICITY TRANSMISSION SYSTEM (TELEPROTECTION, TELEOPERATION, TELECONTROL) EQUIPMENT AND OPERATING EXPERIENCE: P Kouteynikoff, M Pays, A Pannier, Mme Y Moller, J P Bonicel, P Trombert, France.

35-104 APPLICATION OF DATA COMMUNICATION SYSTEM ON THE LOOP-TOPOLOGY NETWORK IN THE ELECTRIC POWER COMPANIES: K Horikawa, T Tomioka, T Nambu, H Mizukami, A Ikeda, S Kobayashi, T Nakazawa, T Ryugo, Japan.

35-105 COUNTRYWIDE TRUNKED MOBILE RADIO NETWORK FOR POWER UTILITIES: J Tervo, P Somervuo, Finland.

35-106 QUALITY OF DATA TRANSMISSION OVER PLC LINKS IN STATIONARY AND TRANSIENT STATES OF ELECTRIC POWER NETWORK OBTAINED ON THE BASIS OF SEVERAL YEARS' EXPERIMENTAL RESEARCH: V V Draskovic, N Simic, Yugoslavia.

35-107 A POWER SYSTEM APPROACH TO DIGITAL COMMUNICATIONS: U Hanselmann, K Morf, Switzerland.

35-108 TECHNICAL REPORT ON A QUESTIONNAIRE ON FIBRE OPTIC APPLICATIONS IN POWER UTILITY COMMUNICATIONS: U Hanselmann, Paper presented in the name of Working Group 35.04.

35-201 THE INTEGRATION OF TELECONTROL SYSTEMS WITH OPERATIONS INFORMATION SYSTEMS AND SUBSTATION AUTOMATION: G Van Welie, T N Carolin, South Africa.

35-202 THE RENEWING OF VATTENFALL NATIONAL CONTROL CENTRE'S COMPUTER SYSTEM: J E Brask, E Hellstrom, N Linden, Sweden.

35-203 TECHNICAL REPORT ON REQUIREMENTS AND PERFORMANCE OF PACKET SWITCHING NETWORKS WITH SPECIAL REFERENCE TO TELECONTROL: J M Selga, J Hegge, Paper presented in the name of Working Group 35.03.

35-204 RENEWAL OF EXISTING TELECONTROL SYSTEMS: Paper presented in the name of Working Group 35.01.

## 1988

**35-01 DIGITAL CIRCUIT SWITCHED NETWORK APPLICATIONS FOR ELECTRIC POWERS COMPANIES IN JAPAN: K Suzuki, H Hosokawa, T Tomioka, Y Hirashima, N Ohtsuka, S Kobayashi, T Nakazawa, Japan.**

35-02 INVESTIGATION OF SOME PROBLEMS OF DATA TRANSMISSION FOR THE DISPATCH CONTROL OF THE ELECTRIC POWER SYSTEM: L Pospichal, V Bayer, M Dylik, Z Driml, L Kocian, Czechoslovakia.

35.03 PERFORMANCE OF THE BAHRAIN SYSTEM CONTROL CENTRE UNDER AVALANCHE CONDITIONS AND PROPOSALS FOR IMPROVEMENTS: N Al-Jameah, Bahrain, P Lynch, K Hanson, Ireland, V Nguyen, N Singh, Switzerland.

35.04 FIBRE OPTICAL POWER CABLE SUPERVISION SYSTEM: M Damandersen, J Maaloe, N La Cour Bentzon, Denmark, C Larson, O Ravn, Sweden.

35.05 DEVELOPMENT OF COMMUNICATIONS TRANSMISSION NETWORKS WITHIN A UK ALL-PURPOSE ELECTRICITY BOARD: G Carlton, W B Henderson, P Higgs, P Kiddle, United Kingdom.

35.06 DATA COMMUNICATION AND INTERCHANGE IN HYDRO UTILITY ENVIRONMENT: B Stene, O Kruger, O Huseby, N Eggen, Norway.

35-07 A COMMUNICATION SYSTEM FOR HIGH LEVEL DATA EXCHANGE BETWEEN AND WITHIN NORWEGIAN CONTROL CENTRES: A Indrehus, J Hegge, Norway.

35-08 MULTI-LEVEL TELECONTROL SYSTEM FOR DISPATCH CONTROL IN THE UPG OF THE USSR: V H Ishkin, K G Mitjushkin, V G Ornov, USSR.

35-09 PROTOCOLS AND INTERFACES BETWEEN THE COMPONENTS OF DISTRIBUTED CONTROL SYSTEMS: B D Gortz, W Marz, Federal Republic of Germany.

35-10 OPTICAL FIBRE TELECOMMUNICATION NETWORK: A G W M De Jongh, B S Warlich, H Timmerman, Netherlands.

35-11 A NEW GENERATION OF TELECONTROL EQUIPMENT BASED ON DISTRIBUTED ARCHITECTURE: D Bisci, P Leto, Italy.

## 1986

35-01 COMMUNICATION REQUIREMENTS IN THE EMS-SYSTEM FOR THE CITY OF STOCKHOLM: N H Stork, B Nilsson, Sweden.

35-02 A MULTI-LEVEL TELECONTROL SYSTEM FOR TRANSMISSION AND DISTRIBUTION CONTROL: D R Booth, G H Robinson, N S Murray, W Watson, N J Anderson, A Crewe, United Kingdom.

35-03 CO-ORDINATED SUBSTATION CONTROL AND MONITORING: R A Lilley, C Seymour, P G Bishop, F D Pullen, United Kingdom.

35-04 DIGITIZATION OF MICROWAVE RADIO SYSTEM FOR ELECTRIC POWER SYSTEMS: T Yamazaki, M Aizawa, O Saitou, Japan.

35-05 A DISTRIBUTED SYSTEM FOR LOCAL CONTROL AND TELECONTROL IN A PUMPED-STORAGED POWER PLANT: J Xampeny, J M Selga, A Casals, J A Garcia-Lopez, J Rivera, J Ventosa, Spain.

35-06 APPLICATION OF INTEGRATED DIGITAL NETWORK FOR ELECTRIC POWER SYSTEM: R Koskinen, J Komulainen, E Salo, Finland.

35-07 AMERICAN ELECTRIC POWER'S VOICE AND DATA TELECOMMUNICATION SYSTEMS: B J Renz, H N Scherer Jr, D B Trego, USA.

35-08 EDF-GDF NEW RADIOTELEPHONE NETWORK RAMAGE: G Banquet, M Coudreuse, France.

35-09 THE ENEL REMOTE CONTROL CENTERS: A NEW GENERATION BASED ON A DISTRIBUTED PROCESSING CONFIGURATION: E Bitetti, L Camerini, N Dall'orto, M Londei, Italy.

35-10 EXPERIMENTAL INVESTIGATION OF PLC COMMUNICATION ON A TRANSPOSED 1150kV POWER LINE: V H Ishkin, S I Kecher, R Q Knizhnik, V F Matveev, Z A Poltoratskaya, Yu P Shkarin, USSR.

## 1984

35-01 SIMULCAST-NETWORK WITH RECEIVER-SELECTION FOR MOBILE RADIO VOICE AND DATA TRANSMISSION: H Benndorf F Schindele, B Heynisch, W Schaller, Federal Republic of Germany.

35-02 RIAM: AN INTEGRATED MULTIPLE ACCESS RADIO NETWORK SYSTEM FOR ELECTRIC POWER UTILITIES: D Ongaro, E Pace, Italy.

35-03 APPLICATIONS OF THE PACKET EXCHANGE METHOD TO THE COMMUNICATION NETWORKS FOR ELECTRIC POWER SYSTEMS: T Yamazaki, M Tsukiyama, T Taguchi, T Kai, T Yamauchi, Japan.

35-04 OPTICAL COMMUNICATIONS USING OVERHEAD POWER TRANSMISSION LINES: K A Austin, M D Barnett, B Gaylard, United Kingdom.

35-05 HELIOSTAT FIELD CONTROL IN SOLAR POWER PLANTS PHILOSOPHIES AND CONCEPTS DEALING WITH THE COMMUNICATION SYSTEM: J E Marcos, L Crespo, Spain.  
35-06 NEW NETWORK OF DIGITAL RADIO LINKS OF THE BELGIAN ELECTRICITY COMPANIES: A Debeys, J P Evrard, J Jonniaux, P Lecrenier, O Spiessen, Belgium.

35-07 RELIABILITY EVALUATION FOR POWER NETWORK COMPUTER BASED SCADA SYSTEMS: I Pivniceru, Romania.

35-08 OUTAGE CONSIDERATIONS ON DIGITAL RADIO LINKS: C D'Sa, Brazil.

35-09 25KM OPTICAL AERIAL CABLE LINK ON 110kV OVERHEAD LINE: S Bruggendieck, R Herff, M Mainka, Federal Republic of Germany.

35-10 EXPERIMENTAL STUDY OF HIGH FREQUENCY PARAMETERS OF 1150kV POWER LINES: Yu P Shkarin, R G Kniznik, A N Zeltser, B G Kotelnikov, USSR.

## 1982

35-01 OPTICAL COMMUNICATION USING OVERHEAD POWER TRANSMISSION LINES: P Day, B Gaylard, G Holden, J E Taylor, C N Carter, B J Maddock, P Smith, A H Kent, United Kingdom.

35-02 COMMUNICATION NETWORK SECURITY USING OPTICAL FIBRE: F Crofts, United Kingdom.

35-03 APPLICATION OF OPTICAL FIBRE COMMUNICATION SYSTEMS FOR ELECTRIC POWER UTILITIES: M Yamanoi, S Kubota, G Hirao, M Kajitani, T Kudo, Japan.

35-04 AN EMERGENCY PLAN OF TELECOMMUNICATIONS: M A Monteiro De Sa, Brazil.

35-05 TELECONTROL SYSTEM SURVEY RESULTS. DEVELOPMENT OF A SIMULATION MODEL OF AVAILABILITY. ECONOMIC IMPACT AND MAINTENANCE COST: F Gonzalo, A Rivera, Spain.

35-06 ENEL POWER GENERATION AND TRANSMISSION CONTROL (PGTC) SYSTEM. TECHNICAL AND MANAGERIAL ASPECTS OF THE DEVELOPMENT OF THE SOFTWARE FOR A LARGE SCALE SYSTEM: A Schiavi, A Varriale, Italy.

35-07 ADAPTIVE MICRO-COMPUTER TELECONTROL SYSTEM FOR OPERATION CONTROL OF THE USSR UNITED POWER GRID: K G Mityushkin, V G Ornov, USSR

35-08 TRANSMISSION OF INFORMATION BY MEANS OF OPTICAL FIBRES INCORPORATED IN AN OVERHEAD EARTH CONDUCTOR: R Ruchet, P Bongard, H P Koch, A Meier, C Weber, J F Zurcher, Switzerland.

35-09 OPERATIONAL EXPERIENCE CONCERNING MAINTAINABILITY AND AVAILABILITY OF COMPUTER-BASED CONTROL CENTRES: E Sandstrom, I Ofverholm, Sweden, W Smit, Netherlands.

35-10 THE HIERARCHICAL POWER SYSTEM CONTROL IN HUNGARY: O A Kerenyi, K Wierdl, M Szaniszló, M Madas-Dobler, G Pinz, A Szilagyi, Hungary.

## 1980

- 35-01 OPTICAL FIBRE COMMUNICATION USING OVERHEAD TRANSMISSION LINES: B J Maddock, N J Hazell, K L Callcut, B Gaylard, P Day, R J Slaughter and K Lawton, United Kingdom.
- 35-02 ERROR-RATE AND ERROR-DISTRIBUTION IN THE TRANSMISSION OF DATA IN A COMMUNICATION NETWORK OF THE ELECTRIC POWER SYSTEM: V Bayer, M Dylik, E Grec, B Trefil, Czechoslovakia.
- 35-03 NATIONAL LOAD DESPATCHING CENTRE FOR THE NATIONAL ELECTRICITY BOARD OF MALAYSIA: Lee Yee Cheong, F L Thompson, M Fleming, Paper presented in the name of Study Committee 35.
- 35-04 MOBILE RADIO IN ELECTRICITY NETWORKS: R E Martin, H Nocker, Paper presented in the name of Study Committee 35
- 35-05 SIGNAL TRANSMISSION OVER UNDERGROUND MEDIUM VOLTAGE CABLES: E Realp, M Serra, Spain.
- 35-06 INFLUENCE OF LINE FAULTS ON TRANSMISSION CONDITIONS OF HF SIGNALS: G V Mikoutsky and Yu P Shkarin, USSR.
- 35-07 REAL-TIME CONTROL OF THE EDF NETWORK. STRUCTURE OF THE REMOTE CONTROL AND DATA TRANSMISSION NETWORK: R Abella, G Simonnet, France.
- 35-08 A FLEXIBLE TELEPROTECTION SIGNALLING EQUIPMENT: S A Finnestad and CH S Magnus, Norway.
- 35-09 FIBRE-OPTIC SYSTEM FOR TRANSMISSION OF INFORMATION ON HIGH VOLTAGE OVERHEAD POWER LINES: H Benndorf & H Doering, H G Dagefoerde & Th Pfeiffer, Federal Republic of Germany.

## 1978

35-01 INVESTIGATION OF THE NOISE IN POWER LINE CARRIER CHANNELS AND ITS EFFECT ON SPEECH INTELLIGIBILITY: W H Ishkin, R G Knizhnik, Sh B Shehtman, Yu P Shkarin, USSR.

35-02 600 BD DATA TRANSMISSION OVER SPEECH-PLUS CHANNEL: F Gonzalo, G Senesi, A Llobet, Spain.

35-03 TRAME: A PACKET SWITCHING COMPUTER NETWORK FOR POWER SYSTEMS: J Selga, Spain.

35-04 INTRABUNDLE CARRIER COMMUNICATION USING THE INSULATED BUNDLE CONDUCTORS OF A POWER LINE: H Lautensach, R E Martin, H Nocker, E Schumm, Paper presented in the name of Study Committee 35.

35-05 REAL TIME DATA ACQUISITION SYSTEM FOR EVALUATING TRANSMISSION PERFORMANCE OF A MULTI-TERMINAL, RADIAL-TYPE OF MICROWAVE SYSTEM: C.D'Sa, R B Pastana, Brazil.

35-06 METHODS OF ASSESSING THE PERFORMANCE OF OPERATIONAL DATA LINKS: D Bisci, J R Martin, Paper presented in the name of Study Committee 35.

## 1976

35-01 TELECOMMUNICATION BY MEANS OF MICROWAVES FOR AN ELECTRIC UTILITY: M G J Arce, B I P Guimaraes & M H Marui, Brazil.

35-02 ADAPTIVE SYSTEM FOR COLLECTION AND TRANSMISSION OF OPERATIONAL DISPATCHER INFORMATION IN POWER SYSTEMS: K G Mityushkin, USSR.

35-03 A NEW APPROACH TO DETERMINE THE CARRIER SIGNAL ATTENUATION ON HORIZONTAL HV LINES BOTH UNDER NORMAL AND ABNORMAL CONDITIONS: W H Senn, Switzerland.

35-04 THE SECURITY OF SUPERVISORY-CONTROL MESSAGES TRANSMITTED IN POWER LINE CARRIER CHANNELS: A Gaemers, A H Riesz, J A Coekin, Australia.

35-05 OVERHEAD COMMUNICATION POWER LINE AND COUPLING DEVICE FOR POWER AND INFORMATION TRANSMISSION SYSTEMS IN HIGH-VOLTAGE POWER LINE NETWORKS: H Benndorf & H Durrstein, H J Kirch & F K Levacher, Federal Republic of Germany.

35-06 COMMUNICATION AND TELECONTROL FACILITIES FOR POWER SYSTEM CONTROL IN GREAT BRITAIN: J W Dillow, J G Kelly, S A Soutter, United Kingdom.

## 1974

35-01 A MESSAGE SWITCHING NETWORK DESIGNED FOR DATA COMMUNICATION AND REMOTE CONTROL: T Jerlhagen & B Leander, Sweden.

35-02 OPTIMUM POWER LINE CARRIER (PLC) COUPLING ARRANGEMENT ON TRANSPOSED SINGLE CIRCUIT POWER LINES: W H Senn & K P Morf, Switzerland.

35-03 MEASUREMENT AND CALCULATION OF INTRABUNDLE HF COMMUNICATION PATHS: E E Brestkina, V H Ishkin, V G Kagan, R G Knijnic, M V Kostenko, L S Perelman, V V Sidelnicov, A S Sohransky & U P Shkarin, USSR.

35-04 MULTI-LEVEL SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM WITHIN A LARGE ELECTRIC NETWORK: F Galli & A Schiavi, Italy.

35-05 TELECOMMUNICATION BY MEANS OF MICROWAVES: A J Teerink, Netherlands.

## 1972

35-01 TELECOMMUNICATIONS BY MEANS OF AERIAL CABLES ON HIGH VOLTAGE LINES: E Alsleben, B Finckh and H Lautensach, Federal Republic of Germany

35-02 EVALUATION OF THE PERFORMANCE OF BINARY TELEPROTECTION SYSTEMS IN THE PRESENCE OF NOISE BY COMPUTER SIMULATION: F D Pullen, United Kingdom.

35-03 THE USE OF COMPANDORS IN TELEPHONE NETWORK: J K Carrothers, F Galli, R J Ritter and C Starace, Paper sponsored by Study Committee 35.

35-04 TELECOMMUNICATION DESIGN REQUIREMENTS FOR HVDC SYSTEMS: Y Picot and L K Wong, Canada.

35-05 MULTICHANNEL COMMUNICATION SYSTEM ON PHASE CONDUCTORS AND EARTH WIRES: K E Michailov, Ia L Bykhovsky, V G Kagan & co authors, USSR.

## 1970

35-01 PERFORMANCE OF POWER SYSTEM TELECOMMUNICATIONS IN THE PRESENCE OF NOISE: Report presented in the name of Study Committee No 35, H K Podszcek, Convener WG05.

35-02 HIGH SPEED SIGNALLING FOR POWER SYSTEM PROTECTION DESIGN APPLICATION TECHNIQUES WITH PARTICULAR REFERENCE TO NOISE AND INTERFERENCE PROBLEMS: W A Cowin, J G Kelly & F D Pullen, United Kingdom.

35-03 INVESTIGATION OF HIGH FREQUENCY CHARACTERISTICS OF 750kV LINES WITH CONDUCTING INSULATED EARTH WIRES: G V Mikutsky, L S Perelman, V V Sidelnikov and Yu P Shkarin, USSR.

35-04 THE USE OF MICROWAVE LINKS FOR THE OPERATION OF HYDRO-QUEBEC'S 735 kV SYSTEM : M Chmelevski, R Hill, F Roger and J G Gaudette, Canada