



ICES

International Committee on Electromagnetic Safety

Approved Minutes

TC 95 Meeting

**Dublin Castle
Dublin, Ireland
June 26, 2005
1300 – 1700 h**

1. Call to Order – Petersen

The meeting was called to order by Chairman Petersen at 1318 h. Each of the attendees introduced him/herself and the attendance sheets were circulated. [See Attachment 1 for list of attendees]. Chairman Petersen then expressed his profound thanks to Tom McManus and his colleagues for organizing all of the ICES meetings, including the Dublin Castle venue, the lunches and beverage breaks, the projection equipment and personnel, the Thursday evening social, assistance with housing, and many other matters. Those of us who came to Dublin agreed that this was our best meeting ever.

2. Approval of Agenda – Petersen

Item 6 of the agenda was modified by the addition of a second subcategory b) to include balloting, appeals, and SASB. Item 10 of the agenda added three subcategories to cover the following: a) Meetings, b) Liaisons, and c) Presentations by McManus, Johnston, and Chadwick. Following a motion by Meltz that was seconded by D'Andrea, the modified agenda was approved. [See Attachment 2 for modified Agenda].

3. Approval of December 5, 2004 Minutes - Petersen

Chairman Petersen asked for a motion to approve the Minutes of the December 2004 ICES minutes [see <http://grouper.ieee.org/groups/scc28/>]. John D'Andrea moved and Brad Roberts seconded the motion. The minutes were approved unanimously.

4. Executive Secretary's Report - Adair

- 1) The ICES ExCom has held 5 teleconferences since the December meetings in San Antonio. Three of these were 2-hour conferences, while the other two were informal.

All of these conferences were arranged through the Raytheon teleconference facilities. Topics of concern to the ExCom were many and varied and included the following:

- a) Details of the reorganization of ICES;
 - b) Arrangements for meetings in Dublin, provided by Tom McManus;
 - c) New members of ICES;
 - d) Appeals to the SASB;
 - e) Progress in standards-setting, especially SC-2 draft Recommended Practice for RF Safety Programs – C95.7, and SC-4 final draft of C95.1 undergoing balloting;
 - f) Matters relating to the SC-3 Short Course on C95.6 to be held in Dublin and given by Pat Reilly and Kent Jaffa;
 - g) Meetings in non-U.S.A. countries, especially in the EU;
 - h) New literature concerning cell phones and masts; and
 - i) Attempts to interact with ICNIRP members.
- 2) A short report was given of progress on the “Proceedings” of papers from participants at the IEEE ICES/COST 281 Workshop in Paris held on 22-25 September 2004. At this time, 13 complete manuscripts are in hand and 2 are still pending. Initial reviews by the co-editors of the Proceedings [Foster/Adair] are ongoing. Each submitted manuscript is being sent to a colleague for editing. The expectation is that all papers will be reviewed by 1 September. Our plan is to publish the Proceedings in the on-line Biomedical Engineering Journal, Alvin Wald, Editor.
- 3) Serious Matters: The loss of 3 valued members of the ICES team. The Executive Secretary read brief obituaries of two of the 3 members.
- a) Very recently George Marmaro passed away. George had retired after the IEEE meetings that were held in St. Petersburg Beach, Florida. Details will be provided at a later date.
 - b) Herman Paul Schwan, renowned scientist and engineer, loving and devoted husband and father, died quietly in his home on March 17, 2005. He was born in Aachen, Germany in 1915 and studied mathematics, physics and engineering in Goettingen. He obtained his Ph.D. in biophysics in 1940 in Frankfurt. He became a research associate with the Max Planck Institute, an assistant professor with the University of Frankfurt, and then Director of the Institute in 1946. In 1947 he came to the United States, working at the Aeromedical Equipment Laboratory of the U.S. Naval Base in Philadelphia. He joined the University of Pennsylvania in 1950. He served as head of the Electromedical Division of the Moore School (1952), then Chairman of the Graduate School (1961), and finally Chairman of the Bioengineering Department (1972). He retired as the Alfred Fitler Moore Professor Emeritus in 1983. Over the course of his long career, Schwan published more than 300 scientific papers and gave countless lectures. He received numerous awards including the Edison Medal of the IEEE, the first D’Arsonval Award of the Bioelectromagnetics Society, membership in the National Academy of Engineering, and several honorary degrees. Schwan is best known for many biophysical studies related to electrical properties of cells and tissues, and of non thermal mechanisms of interaction of fields with biological systems. He discovered or provided important theoretical insights into phenomena such as the large low-frequency dielectric dispersion that is found in biological material, and electrically induced forces on cells. He was also deeply involved in the issue of

possible health effects of non-ionizing electromagnetic fields. His letter to the U.S. Navy in 1953, proposing a safe limit for human exposure to microwave energy of 100 W/m² (based on thermal analysis) became the basis for exposure standards in the U.S. and elsewhere. He chaired the committee that established the first (1965) U.S. exposure limit for RF energy, for the American National Standards Institute. This standard evolved into the present IEEE C95.1 standard and was widely influential in the development of exposure limits around the world. A man of integrity, Schwan influenced the lives of many, including his wife and children, and his many students and colleagues. [Thanks to Kenneth R. Foster for this material].

- c) Louis N. Heynick. Born on March 17, 1919 in Brooklyn, NY and died on April 6, 2005 in Palo Alto, CA after a brief fight with cancer. He was 86 years old. The youngest of 7 siblings, Lou attended Brooklyn College on a scholarship where he majored in physics. It was there he met Yetta Milstein, a History/Economics major, whom he married in 1941. Lou was a Lieutenant in the US Army Signal Corps during World War II, serving in the Pacific for two and a half years as a radar officer. He attended Columbia University on the GI Bill and then did graduate work at NYU, completing all course work towards a Ph.D., but did not finish his thesis. Lou worked at the Brooklyn Navy Yard before moving to Fort Monmouth, NJ, where he managed a program in the area of electron tubes. Lou moved to California in 1963 to work as Director of the Physical Electronics Laboratory at SRI International. He made significant contributions on field-emission devices and also was Editor of the IEEE Transactions on Electron Devices. In 1974, he became a Senior Staff Physicist in the Electromagnetic Techniques Laboratory at SRI and began working in a new area, the biological effects of microwaves. He did this for the next 30 years, continuing past his retirement from SRI in 1984. Lou was best known in the bioelectromagnetics research community for his long-running and meticulous efforts on the committee responsible for setting microwave human-exposure standards. He was Chairman of the Literature Surveillance Working Group from 1978 until his death, first for ANSI Committee C95.1, next the IEEE SCC28 SC-4, then the ICES SC-4, as C95.1 moved from one “home” to another. Over this period, Lou identified significant papers from the peer-reviewed scientific literature, indexed, collated, and organized them into relevant groups in a database for other committees to review, and kept current with the state of the art. He was a highly valued contributor to standards set during this time. Lou also contributed to numerous critical reviews of the bioelectromagnetics scientific literature, the first being for the Office of Telecommunications Policy in 1976. The last were three chapters in Supplement 6, 2003 of the journal *Bioelectromagnetics*, the Special Issue commissioned by IEEE ICES SC-4. In between, he contributed to critical reviews for Environmental Impact Statements for major RF emitting systems in the USA including 4 US Air Force PAVE PAWS Installations; the feasibility study for the DOE Solar Satellite Power System; 4 Over-The-Horizon Backscatter Radar Installations; the National Weather Service’s Programmatic EIS for the Next-Generation Doppler Radar System (NEXRAD, later called WSR88D); the Ground-Work Emergency Network (GWEN); the National Weather Service’s Vertical Profiler; the Relocatable Over-the-Horizon Radar System (ROTHER) in Puerto Rico; and others. Lou was a totally balanced individual with active interests ranging from music, painting, science fiction, folk dancing, languages, a monthly

book club, and travel around the globe, all of which he kept up with until the time of his death. [Thanks to Peter Polson for this material.]

We will miss them all.

5. IEEE Standards Activities Report – Ash/Petersen

Petersen reported that according to Bill Ash there are problems with the “IEEE MyBallot” and it is often difficult to figure out how to use it. **ACTION ITEM:** If you are having trouble with this file, send an e-mail to Ron Petersen and he will point you in the right direction for help. There is another very new IEEE program called “myProject” that is still in its infancy. Bill believes that this program is a great idea and he promises to provide more information about it at the December ICES meetings in San Antonio.

6. Chairman’s Report – Petersen

a) Brief history of IEEE/ANSI Standards [See Attachment 3]

In 1960, the USASI (now ANSI) Committee C95 was sponsored by the AIEE and the US Navy Dept. The Committee had 6 members with Herman Schwan as Chairman. The resulting standard generated in 1965 was 1.5 pages long and lasted for almost 2 decades. In the mid 1980’s it became the ANSI Accredited Standards Committee C95. In 1990, it became the IEEE Standards Coordinating Committee 28 (SCC-28) under the sponsorship of the IEEE Standards Board. The IEEE is the world’s largest technical professional society and includes a number of societies that sponsor standards development. Standards that address those issues that overlap the scope of more than one society are developed by Standards Coordinating Committees sponsored by the IEEE-SA Standards Board, e.g., RF safety standards. The “International Committee on Electromagnetic Safety” (ICES) was approved by the IEEE-SASB in 2000 for use by SCC-28. ICES has ~120 members on the main committee representing more than 24 countries, and almost 300 total members including the subcommittees. The scope of ICES: SCC-28 is the development of standards for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the potential hazards of exposure of man, volatile materials, and explosive devices to such energy. SCC-28 develops standards, recommended practices, and guides that apply to people, e.g., exposure limits. SCC-34 was established and approved by the IEEE Standards Board in 1995 and its scope is the development of product performance standards for specific products that emit EM energy. Thus, SCC-34 develops standards, practices, and guides that apply to products, e.g., emission limits.

b) Internationally recognized organizations with similar scope:

SCC-28 is similar to the “International Commission on Non-Ionizing Radiation Protection” (ICNIRP) which develops exposure guidelines across the non-ionizing radiation portion of the spectrum; the scope of SCC-38 is from 0 to 300 GHz. SCC-34 is similar to IEC TC106 but the scope of TC106 is narrower than that of SCC-34, and is limited to exposure assessment. Some important issues should be noted. There is a lack of an open international forum for the development of rational, science-based standards for the safe use of electromagnetic energy (EME). At this time there is no means for international harmonization of standards for the safe use of EME. Furthermore, there is limited recognition of the IEEE as a developer of EME safety standards for international use.

d) Reorganization of ICES:

A new entity (SCC-39), called ICES, comprised of an AdCom and technical committees (SCC-28 → TC-95, and SCC-34 → TC-34), was approved by the IEEE SASB at the March 2005 meeting. The New Scope of ICES is recognized here. “Development of standards for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the potential hazards of exposure of humans, volatile materials, and explosive devices to such energy, standards for products that emit electromagnetic energy by design or as a by-product of their operation, and standards for environmental limits. The new structure of ICES is displayed in a figure of the Chairman’s report [cf. [Attachment 3](#)] and shows the overarching IEEE SASB structure, ICES and the TC 95/TC34/, and TC/XX for future designation. Each TC generates standards through its subcommittees (TC-95: SC-1 through SC 5) and (TC-34: SC-2 through TC-3), and potential environmental standards through TC34, TC-XX.

e) Technical Committee 95:

ICES TC-95 is the Parent Committee and consists of 5 Scientific/Technical Subcommittees. These are listed as SC-1 Measurements/Computation; SC-2 Warning symbols/Hazard Communication; SC-3 Safety levels 0 to 3 kHz; SC-4 Safety levels 3 kHz to 300 GHz; and SC-5 Electroexplosive devices. Administrative Subcommittees include the Executive Committee, Membership, International Liaison, and Interpretations. In the reorganization of ICES, the following is advised: The AdCom provides oversight and manages the Technical Committees (TC-34 and TC-95). The TCs develop and approve draft standards, but with oversight from the AdCom. The TC subcommittees remain the same. Draft standards approved by the TCs are submitted directly to the SASB for approval. There is no additional level of balloting. The proposed leadership of the AdCom is as follows: Chair, Vice Chair, Past Chair, Secretary, Treasurer, TC Chairs, Members at large, and Representatives of IEEE Societies, other supporting entities, the general public, etc.

f) ICES Features:

The ICES process is open and transparent at every level. The participation is broad with a large committee and open membership. Procedures are formal and supervised by the SASB. There is a logical division of standards types, i.e., exposure standards and product standards. Rules for implementation of standards are explicitly described. There are clear processes for appeals and interpretation of the documents created by these committees. There is also a formal link to measurement and assessment standards.

g) Summary:

ICES fulfills the need for a truly open international forum to develop standards for the safe use of electromagnetic energy. The structure proposed ensures the important logical and separate development for exposure, product, and related standards. ICES leads the way towards rational harmonized standards that will both protect people and support the advancement of technology.

h) Review of Activities (past 6 months) – Balloting and Appeals:

- C95.1: A revision of IEEE Std C95.1-1991 was approved by the balloting group. A recirculation ballot addressing comments will be conducted this summer.
- C95.2: IEEE Std C95.2-2002 (RF energy and current flow symbols) was balloted and reaffirmed for 5 more years (March SASB meeting).

- C95.7: A new standard, IEEE Std C95.7 (RF safety programs) was approved by the balloting group. A recirculation ballot addressing comments will be conducted this summer.
- Appeals: An appeal of Amendment 2 to IEEE Std C95.1-1991 (SAR limits for the pinnae) was heard at the December SASB meeting and denied. A challenge of the Appeal Panel’s decision and a request to re-open the appeal of Amendment 2 of IEEE Std C95.1-1991 was reviewed and denied at the March SASB meeting. This appeal, which raised technical issues and code of conduct issues, is leading to a revision of the SASB Policies and Procedures (P&Ps) to make it absolutely clear that appeals are to be based on presumed violation of SASB and Sponsor balloting procedures, e.g., openness, due process, etc., and not technical issues.

i) Going Forward:

Activities will include the population of the AdCom, the establishing of a fund-raising program, and a drafting of a new Policy and Procedures document, although the P&Ps for the TCs will remain largely unchanged.

7. Vice Chairman’s Report – Bodemann [See [Attachment 4](#)]

- a) Ralf Bodemann introduced his report with a Search for an appropriate Domain Name for ICES. He first suggested www.ices.org, which is currently the International Cake Exploration Société. A second suggestion was www.ices.net, which is currently the Industrial Cleaning Equipment & Supply. A third suggestion was www.ices.com, which was blocked by a company filter and classified as pornography. A final suggestion was www.ices.int, which is still open!
- b) Getting down to more serious matters, Ralf described the activities of the WHO meetings in Geneva, which he attended. The International Advisory Committee (IAC) of the WHO met on June 13 – 14, 2005. The IAC is an advisory body to the WHO EMF project (national governments, authorities, international scientific/standardization organizations, etc.). The IAC approves each document to be published by the WHO. The IAC meeting was followed on June 15 – 16 by a Workshop on “Mobile base stations and wireless networks”. General observations by Ralf included the number of attendees as ~ 60 – 80. The meeting was generally quiet, peaceful, and non-controversial. Michael Repacholi announced that he will retire in 2006, even though the prolongation of the WHO EMF project is still not settled. The Draft Environmental Health Criteria (EHC) for ELF is still incomplete, but is scheduled to be published in autumn of 2005. Both the IARC and the WHO Health Risk Assessment for RF are scheduled to be accomplished in 2006. Some highlights of the meeting are as follows: 1. Eric van Rongen provided a Draft Static Fields Health Risk Assessment Discussion and concluded that MRI machines need a cost-benefit-analysis rather than a formal limit value for all employees. 2. The “Precautionary Framework” has been renamed a “Framework to Guide Public Health Policy in Areas of Scientific Uncertainty”, and has been circulated through other WHO departments. 3. A Russian study on microwaves (2.45 GHz, 5 W/m²) altering antigenic structure in the brain tissue of rats is to be replicated by a joint French-Russian research project. These studies will form the rationale for the Russian exposure limit of 0.1 W/m². 4. Bodemann presented an update on ICES activities, with a main focus on the status of the IEEE Std C95.1 revision. He also mentioned the progress on the IEEE Std C95.7, IEEE Std C95.3.1, the ELF short courses based on IEEE Std C95.6, and the IEEE ICES/COST 281 “Thermal Physiology Workshop”, held in Paris, September

2004. Michael Repacholi was much interested in the draft of IEEE Std C95.7 concerning RF safety programs.

- c) Ralf Bodemann also attended the WHO-sponsored workshop on Electromagnetic Hypersensitivity (EHS) held in Prague, Czech Republic. The official WHO conclusions were as follows: EHF patients suffer from real symptoms and sometimes they have to change their lifestyle. However, these patients are not able to detect EMF any better than other people, i.e., their symptoms cannot be related to EMF exposure. Ludek Pekarek's conclusions were summarized by Bodemann as follows: "The 'electrically hypersensitive' persons do not exist. [...] These persons suffer not due to their exposure to EMF fields, but because they develop a psychosomatic syndrome. [...] All known facts can be explained by the ESS syndrome (Environmental Somatization Syndrome). [...] Nevertheless, the complaining people may be hypersensitive indeed, but not to electromagnetic fields. They are hypersensitive to rumors, alarming messages, false reports, false alarms and fictitious news. They do not trust to the scientific results and develop a psychosomatic syndrome, often quite serious. Their troubles should be treated by a psychologist or by a psychiatrist, not by lowering the EMF limits or by removing the alleged sources of EMFs."
- d) There followed a lively discussion of the Prague meeting. Swicord urged that rumors not be published, else RF will be elevated by IARC to category 3. Sheila Johnston asked for fact sheets and the proceedings from the Prague meeting. Tom McManus said there was no follow up for these meetings and Murphy said that the Information Sheet from the Istanbul meeting had not yet appeared. He also noted that EHS is controversial (e.g., Gro Harlan Brundtland) and is partly based on a COMAR document. Meltz proposed a motion regarding IARC's position on the matter, to which Cohen stated that such a motion was unnecessary. Tom McManus said he understands both points of view, but the ICES process has no place for rumors. He suggested that perhaps ICES could assist IARC in this matter and offer our support. After Meltz withdrew his motion, Tom moved that the present ICES meeting should request the ICES ExCom to contact Elizabeth Cardis of IARC concerning the fact that the services of ICES are available to IARC's RF endeavors. He suggested we send a brief, polite, diplomatic letter to IARC and attach the ICES membership list. When Murphy suggested we send a copy of the BEMS special issue, Tom replied that they can ask for it. The ICES membership is at their disposal. The question was called and the vote was 2 opposed, no abstentions, and the remaining votes were positive.

ACTION ITEM:

The ICES ExCom will draft a letter to Elizabeth Cardis of IARC as soon as possible.

8. Treasurer's Report – Art Varanelli [[See Attachment 5](#)]

a) Balance Sheet (12/1/2004)

- Balance = \$19,217.93
- (6/26/2005) Advanced Registration, Dublin
- Income = \$1470 = €6,525
- Receipts Dublin = €1,050
- Total Meeting Receipts = €7,575 = \$1,470
- Short Course Receipts = €4,425

- Meeting Expenses, Dublin:
- Gifts: €100.00 (flowers)
- Honoraria, etc. Not yet received.
- Invoicing and validation not yet done

b) Website:

Art Varanelli has discussed the website layout with several people. It is important that the site be kept in good taste. Good graphics are welcome. Art plans to buy a domain name and find a host and will undertake this as an **ACTION ITEM**. He opined that download amounts may be limited. However, Ian said he holds several domain names at ~ \$15 to \$20/ year and will send some to Art. Phil Chadwick said he has 12 domain names and they are not costly.

9. Membership Chairman's Report – McManus

- a) Tom gave a short report on each of three ICES members who passed away this spring. He said he had met George Marmaro who had worked for NASA. He will try to find a NASA employee who would like to be a member of ICES. Tom agrees with all of us that Herman Schwan was a giant and said we need an IEEE Hall of Fame for the likes of Herman. Lou Heynick's passing was so quick and we all miss him terribly. Tom said that Lou and Yetta had been married over 64 years. What a record!
- b) Tom announced the new members elected to ICES in the past 6 months, including one approved yesterday. These are:
 - Jeff Holley
 - David Nelson
 - Max Amman
 - Nan Kim (Korea)
 - Dun Sik Yoon (Korea)
 - Leon duToit
 - Paolo Ravazzani
 - Ng Kwan-Hoong (Maylasia)

10. International Liaison Chairman's Report – Murphy [[See Attachment 6](#)]

a) Recent International EMF Meetings:

- Mobile Communication & Health, 20-23 Sept 2004 Moscow
- Molecular & Cellular Mechanisms, UNESCO/WHO Seminar, 2-5 March, 2005, Yerevan, Armenia
- ElectroMed 2005, 15-18 May, 2005, Portland, Oregon
- WHO Workshop on Base Stations & Wireless Networks, 15-16 June, 2005, Geneva, Switzerland
- AF Workshop at BioEM2005: Molecular Biology for EMF Bioeffects Assessment, 19 June, Dublin

- BioEM2005, 19-24 June, Dublin
- ICES Meetings, 24-26 June 2005, Dublin

b) Upcoming Meetings

- Coherence & Electromagnetic Fields in Biological Systems, 1-4 July, 2005, Prague, Czech Republic
- Applying Precautionary Measures to EMF Public Health Policy, 11-13 July, Ottawa, Canada
- Progress in Electromagnetics Research Symposium – PIERS 2005, 22-26 August, 2005, Hangzhou, China
- Biological Effects of Electromagnetic Fields: WHO 4th International EMF Seminar in China, 12-16 September 2005, Quenming, China
- 28th International Union of Radio Sciences (URSI) General Assembly: (Commission K = EMF Bioeffects, health & safety, etc.), 23-29 October 2005, New Delhi, India
- Application of Proteomics & Transcriptomics in EMF Research, 30 Oct – 1 Nov 2005, Helsinki, Finland
- Australasian Radiation Protection Society Conference. WHO Workshop – RF Fields: Health effects and Policy options for Protection, 14-18 November, Melbourne, Australia.
- International Conference on Electromagnetic Fields, Health and Environment, 27-29 April 2006, Madeira Island, Portugal.
- Bioelectromagnetics School at Erice, 1-8 October 2006, Erice, Sicily, Italy

c) Liaison: BEMS/EBEA, URSI

- WHO Annual International Advisory Committee – Geneva, 13-14 June 2005, Ralf Bodemann
- BioEM2005 – 23 June 2005, “Status of IEEE C95.1 RF Safety Standard Revision,” C-K Chou
- The International Committee on Electromagnetic Safety (ICES): Safety Standards for Electromagnetic Energy,” M.R. Murphy
- Union of Radio Science International (URSI) – “IEEE ICES Safety Standards for Exposure to EM Energy,” New Delhi, 27, October 2005, M.R. Murphy.

d) Invited Presentations:

- Tom McManus: “Electromagnetic Fields: Past, Present and Future”
- Sheila Johnston: “European RF Conference Updates”
- Phil Chadwick: “Update on CENELEC Activities”

Before the invited presentations, there was a brief discussion of other meetings, not contained in the lists (a to c) above. ICNIRP met in San Antonio in April, 2005. Mike Murphy and Mike Repacholi were the prime contributors to the meeting. A draft of the current revision of the IEEE C95.1 standard was sent to Paolo Vecchia. Also at this meeting the WHO drew 2 conclusions: Hypersensitivity is not EMF related, and

Base Station signals are harmless. Repacholi announced that he will retire in 2006. There is also a concern by ICNIRP that funding is decreasing.

Mike Murphy said the BEMS Board will meet in February, 2006. The BEMS is scheduled to hold their annual meeting in Cancun, Mexico in June, 2006. He urges that the ICES meetings should be held close to BEMS, both temporally and logistically.

Bob Cleveland discussed Mobile Technology meetings that were started in 1997. Added to this was an EU group plus a US group (Brussels) plus the FCC (DC) plus Dr. Patt who arranged meetings in Korea in November 2005. China, Australia, and South Africa were all invited.

Ralf Bodemann attended a 1-day workshop in Athens: There were 150 attendees (including 6 activists), one break, and no lunch!

i. Invited Presentation by Tom McManus: “Electromagnetic Fields, Past, Present and Future” [See [Attachment 7](#)]

“The theme of this presentation is to chart the changing attitudes towards science and technical innovation over the past 150 years, particularly among the public, governments and the scientists themselves, using electromagnetic fields as an example. The role of the media in heightening public fear and concern is discussed, as is the public’s poor appreciation of risk. The presentation concentrates more on social issues than on specific research.”

Tom gave a prologue concerning ‘conference fatigue’, ‘how to suspend a spoon on the end of a knife’, ‘1 man and 1 dog in the cockpit next year’, and suitable background music, the “Electromagnetic Polka” by Strauss. He then traced the attitudes to science and how they have changed over nearly 200 years, starting with the Battle of Waterloo in 1815. The only way to report the result of the battle was for a knowledgeable person to carry the result by ship to the USA, which took 2 weeks. At that time, there were only 5 sources of energy: manpower, animal power, fire, water, and ultimately gaslight, thanks to Michael Faraday who produced movement without contact. Then enter Gladstone, Marx, etc., Henry Wheatstone and the electric telegraph. Two events occurred in 1844: Queen Victoria gave birth to a second son and it only took 2 hours for a special edition to be spread throughout the land; on the other hand, the Duke of Wellington forgot his dress suit for the banquet. In England, about 12,000 miles of telegraph wires were strung and a dish of sauerkraut was given to a soldier (??).

In 1882, Thomas A. Edison invented the electric light. Shortly thereafter, Marconi perfected a radio signal that connected England to Cornwall. In 1910, a dentist named Dr. Krippen murdered his wife and ran away from France. He boarded a ship in Antwerp and a telegram sent to the ship served to effect the arrest of Dr. Krippen.

Also in 1910, the ship Titanic sailed out of Galway on her maiden voyage to the New World. When in close proximity to Newfoundland, 7 warnings of huge icebergs in the vicinity were sent by radio to the ship. These warnings were ignored. We all know the fate of this beautiful ship and so many of those who lost their lives.

In 1920 the Netherlands and U.S. interacted (?). In 1924 George V held a special broadcast in which the signals were diverted from Japan. That same year the dustbowl in the United States was terrible, but the Swiss learned that electricity could be generated from hydro-power. Then there was the Y2K episode that predicted that computers would crash at midnight on 1 January 2000.

Certain scary incidents began to bother people, starting with the appearance of Halley's comet in 1910. H.G. Wells began to write science fiction stories that were frightening. In 1938 Orson Welles broadcasted a terrifying radio program called the "War of the Worlds" and people in the United States were certain that aliens had arrived and the populace would be doomed. In 1976, the Russians began to irradiate the U.S. Embassy in Moscow with microwaves at 0.15 W/m^2 and this continued for 23 years. An ambassador who lived in the upper floor of the Embassy was diagnosed with cancer, which he attributed to the irradiation. Soon Canada began to install high voltage DC power lines. In Minnesota an under-ground-based signal system for the Navy was installed, which worried many people. In 1982, a report stated that everything was fine, but people did not believe it. The system was ultimately disbanded.

In the state of New York an \$8 M Powerline Project was initiated, resulting in a series of studies, the first of which was by David Savitz and many others followed on. During this period, the WHO and ICNIRP came into being and were followed by the U.S. Rapid Program, many Epidemiological studies, and ELF studies that continue to be conducted today. In the early 1990's, the first mobile phones were invented. On 13 January, 1993 a Larry King Live Show featured David Reynard whose wife had died of a brain tumor attributed to the use of her cell phone for 2 months. Also present was Louis Slesin (editor of Microwave News), who provided doom and gloom, and Eleanor Adair (physiologist), who tried to provide some common sense. It is of interest that today 95% of the world population own cell phones and most use them all the time. In 1993, phone masts (base stations) began to proliferate and NIMBY prevailed. Many states now ban the use of cell phones while driving but only 0.005% of problems are due to the use of a phone.

Y1K was the territory of flagellants in Europe, but greenhouse gases have now taken over the world. Then there are wayward asteroids that may slam into our planet. It is clear that sex is dangerous; even thinking about it is dangerous. We now live in a cultural climate of unusual suffering and we are certain that "EMF is going to get ya!" Many health problems are clearly associated with EMF and contribute to risk factors for heart disease. Professor Alice Stewart prohibits X-rays of pregnant women. A measles inoculation produces leukemia in children. As for risk reporting, a CNN Report costing \$12M considers the California EMF Program and contains absolutely no science or statistics. Finally, an astounding conference under UNESCO, held in Armenia 2002, was concerned with a Polish bird.

ii. Invited Presentation by Sheila Johnston: European EMF Activities [See [Attachment 8](#)]

The first meeting was held in Zurich by COST 281/FGF on February 17 - 18, 2005. The topic of concern was modulated signals. Details of the meeting can be found on the COST 281 website at www.cost281.org. There was no evidence provided at this meeting that modulation matters. Future research is required on new signals because of variations in the power envelope and frequencies, e.g., UMTS, 4G.

A WHO/FGF/COST281 Base Station Workshop was held in Geneva on June 15-16 2005. Other meetings, before and after this workshop were closed. The first day was devoted to a series of presentations by attendees:

- Mobile Revolution 4g and Beyond by Mike Walker
- ITU WiFi Human Experiment by Kevin Hughes
- WiFi Home and Office by Niels Kuster

- Modulated Radio Frequency Energy by Peter Valberg
- Review of RF Non-thermal Effects by Bernard Veyret
- Hypersensitivity Symptoms in Human Research by Elaine Fox
- BS Epidemiology Available; Studies give weak test by Anders Albohm
- Dosimetry Critique for Epidemiology Base Stations by G. Neubauer
- Personal RF Exposure Assessment by Joe Wiart
- A Pilot Study at 10 Meters by Elizabeth Cardis
- Occupational Exposure with no Standard Signage by Sjell Mild

The second day was devoted to Base Station Policy Options, including the Precautionary Principle:

- Regulating Risks:
 - Of 5 nations, is France the best? By D. Salomon
 - Base Station Exposures are above the Russian Standard by Yuri Grigoriev
 - Swiss Regulatory Applications are Happy and Stable by J. Baumann
 - New Zealand is Happy, Australia less so, therefore try harder by D. Black
 - Italy is in Chaos by P. Vecchia
- Local Decision-Making Options: P. Vecchia
- Stakeholders Session:
 - EMF network by P Ravazzani
 - Base Station Sleep by N. Leitgeb
 - Wireless Stations: Regulating Good Practices by J. Rowley
 - Catania Revisited by E. Marsalek
- Risk Perception and Communications:
 - Public response to precautionary action and precautionary advice causes fear by J. Barnett [WHO]
 - Strategy for Base Station Risk Communications by O. Renn

As noted above, the third day was a private meeting. Slides may be downloaded from the WHO Conference Website and will be published. €200 M have been allocated for further research. Base station research and dosimetry were featured in this meeting. Other slides may be found in Attachment 8 to these minutes.

iii. Invited Presentation by Philip Chadwick: CENELEC EMF/RF Activities at June 2005 [See [Attachment 9](#)]

CENELEC, the European Electrotechnical Standardization Committee, has 28 members: Austria, Belgium, Cyprus, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Latvia, Luxembourg, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Slovenia, Slovakia, Sweden, and the UK. It also has 7 associates: Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Romania, Turkey, and Ukraine. In producing

CENELEC product standards there are 2 European Directives (Low Voltage Directive and Radio Telecommunications Terminals Equipment Directive) which require that equipment made, sold or (in some cases used) in the EU is “safe”. CENELEC product standards are used to fulfill the RF/EMF safety requirements of those Directives. They refer to the 1999 EU Recommendation, and hence to ICNIRP public exposure guidelines.

CENELEC EMF/RF product standards include mobile phones, RFID/EAS, base stations, base stations putting into service (2005?), Broadcast (30 MHz – 40 GHz), domestic appliances, generic, basic (vote), and low power. Standards under preparation include:

- Base stations *in situ* (2007?)
- Broadcast (3 – 30 MHz)
- Broadcast – putting into service (3 – 30 MHz)
- Broadcast – putting into service (30 MHz – 40 GHz)
- Studio devices (radio mikes, etc.)
- Cordless cameras and vision links (1 – 50 GHz).

Occupational Exposures:

A Directive on occupational exposure to electromagnetic fields was published in 2004. It is based on ICNIRP, but does not consider static magnetic fields. It will require assessment of all significant RF/EMF exposures in the EU, in all workplaces. It applies to people, not products. The use of CENELEC/IEC etc. standards will be mandatory.

Standards under preparation include:

- “Umbrella” workers’ exposure assessment standard
- Industrial heating, including induction heating and dielectric heating.
- Welding – arc, spot, etc.
- Broadcast including high power TV and radio transmission and studio equipment (radio microphones, video links, etc.)
- Trains
- Workers with active implanted medical devices.

For additional information, see [Attachment 9](#).

11. Reports from the Subcommittees – Petersen

a) Subcommittee TC-95/SC-1 Report – Presented by Petersen in Bassen’s absence [See [Attachment 10](#)]

Progress is being made on C95.3.1, “Draft Recommended Practice for Measurements and Computation of Electric, Magnetic and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 to 100 kHz.” This standard will update IEEE Std 1460-1996 – “IEEE Guide for the Measurements of Quasi-Static Magnetic and Electric Fields” – which was developed by SC-1, published in 1996, and reaffirmed in 2002. IEEE Std C95.3.1 together with IEEE Std C95.3 – 2002 will provide

measurement/computation techniques over the frequency range covered by the scope of ICES TC-95, i.e., 0 – 300 GHz. Drafts of most sections are complete. All sections will be completed by July 2006 and distributed to the subcommittee members for comment.

With regard to definitions of possible EMF metrics for C95.6, Joseph Bowman (NIOSH) and Wolfgang Kainz (FDA) are studying the need for more well-defined exposure metrics for measuring compliance with the Maximum Permissible Exposures (MPEs). After some discussion with members of SC-1 and SC-3, members of SC-1 developed detailed descriptions of three metrics that could be used to measure E and H fields instantaneously. These metrics are peak vector magnitude, root mean square (RMS) vector magnitude (also known as the resultant), and the maximum RMS component. These metrics are now being evaluated by the entire subcommittee and will be sent to SC-3. Evaluation will be performed for the practicality and accuracy of each metric with respect to determining compliance with the basic restrictions and MPEs of IEEE Std C95.6-2002.

b) Subcommittee TC-95/SC-2 Report – Richard Tell

SC-2 has completed the Recommended Practice for RF Safety Programs and it was sent out for balloting by the entire committee. The Subcommittee members are now incorporating ~400 comments derived from this ballot. The target date for the Recirculation ballot is on or before 12 August after which the new Recommended Practice will be sent to the IEEE SASB for approval. The Subcommittee would like to design and hold a Short Course or Workshop on the new standard so that other groups can learn how to apply it to their special needs. The Subcommittee is also planning to prepare an Application Guide to the standard, which can be either Web-based or paper-based.

c) Subcommittee TC-95/SC-3 Report – Phil Chadwick

SC-3 has a new Secretary, Ian Booker, who joined the subcommittee at this meeting. Chadwick noted that 20 people attended the meeting on Sunday, 26 June. Kent Jaffa reported on the C95.6 Short Course to which 21 students applied. A good discussion was held at the end, especially by attendees from EU countries. It seems that every time this Short Course is offered, it gets better and better. Congratulations to Kent and Pat for their hard work. Thanh Dovan is in charge of the Application Guide but there has been little progress to date. Most tasks have yet to be assigned. Kent Jaffa wants to find a new way to connect the two standards, C95.1 and C95.6. Phil reported that the Interpretation Working Group for SC-3 should be implemented now so that it will be prepared for the first requests for interpretation of the standard. Another topic for discussion concerned occupational exposures, with a heavy emphasis on pregnant women. Should women of child-bearing age be in the work place? Is a low frequency safety program feasible? Chadwick discussed medical devices in CENELEC and areas an employer must take care of. It is clear that more work is needed on dosimetry for pregnant women. It is also clear that the Application Guide is the vertical component of the standard, and it will promote the standard when it is completed.

d) Subcommittee TC-95/ SC-4 Report – John D’Andrea.

65 people were present at the all-day meeting of SC-4. The Chairmen reported that SC-4 now has 136 members. The recent ballot results were 96% affirmative. The committee reviewed and discussed all of the comments that had been made. Legal Review recommendations were earlier submitted by the IEEE. Petersen has interacted

with the project editor who says these are recommendations only and we should be able to negotiate a reasonable compromise with some of the suggested changes in wording. Final conclusions were drawn and the draft will be sent to the Editorial Working Group that will meet at NEMA on 7 - 8 July. The final revised standard will be balloted no later than 12 September and the Standard will then be submitted to the IEEE SASB for consideration/approval at their September meeting. We should have a new C95.1 Standard by the next ICES meeting.

e) **Subcommittee TC-95/SC-5 Report – Robert Needy and Drew Koban [See [Attachment 11](#)]**

The status of the IEEE Recommended Practice for Determining Safe Distances from Radio Frequency Transmitting Antennas When Using Electric Blasting Caps During Explosive Operations: C95.4 – 2004. There is no change in the status of this standard and there are no new or proposed projects. Some issues have arisen with regard to this standard. There is continuing concern by the Institute of Manufacturers of Explosives (IME) that certain C95.4 recommendations are too restrictive and inconsistent with the “best practices” of the blasting industry. Examples in C95.4-2002 that IME is challenging are:

- Both persons should be grounded before passing electric detonator lead wires to one another.
- Electric blasting caps should not be exposed to direct sunlight.
- Firing lines should not be dragged.

There has been considerable recent correspondence between an IME representative and the ICES Chair and SC-5 Co-Chairs. It should be noted that these issues were raised and addressed during balloting (by the same person). The issue now appears to be resolved and additional IME representatives have been invited to join SC-5. The standard will not be changed now and it looks good. It will be reaffirmed in 2 years (2007) or revised.

12. New Business - Petersen

There was no new business.

13. Plans for Future Meetings - Petersen

The meetings of ICES/TC-95 and its Subcommittees will be held December 8 – 11, 2005 at the Doubletree Hotel, 37 NE Loop 410, San Antonio, Texas. All SCs will meet except SC-1. No decision has been made for the June 2006 meetings. Cancun, where BEMS will meet in June, does not seem appropriate to many ICES members. The Chairman asked for any ideas, other meetings, etc. David Black suggested the ICOH meetings in Milan and will send information on this meeting to the Executive Secretary

ACTION ITEM:

There is a possibility of meeting with EMBS in New York City in late August. Meltz remarked that it is tough to go away from BEMS. Members are asked to submit suggestions/opinions.

14. Adjournment - Petersen

There being no further business, the meeting was adjourned at 1700 h.

LIST OF ATTACHMENTS TO DRAFT ICES MINUTES 6-26-05

ATTACHMENT 1: List of Attendees

ATTACHMENT 2: Modified Meeting Agenda

ATTACHMENT 3: Report of ICES Chairman, Petersen

ATTACHMENT 4: Report of ICES Vice Chairman, Bodemann

ATTACHMENT 5: Treasurer’s Report, Varanelli

ATTACHMENT 6: International Liaison Chairman’s Report, Murphy

ATTACHMENT 7: McManus’s Abstract

ATTACHMENT 8: Sheila Johnston’s Slides

ATTACHMENT 9: Philip Chadwick’s Slides

ATTACHMENT 10: SC-1 Report

ATTACHMENT 11: SC-5 Report

List of Attendees**IEEE ICES Meeting**

**Dublin Castle
Dublin Ireland
June 26, 2005
1300 – 1700 h**

	Last Name	First Name	Affiliation	Country	Status	E-mail
1.	Adair	Eleanor	Independent Consultant	US	M	eadair@comcast.com
2.	Adlkopher	Franz	VerUm Foundation	DE	O	prof.afkofer@verum-foundation.de
3.	Ammann	Max	Dublin Inst of Technology	IE	M	amann@ieee.org
4.	Baron	Dave	Holaday EMF Measurement	US	M	d.baron@ieee.org
5.	Black	David	Gillies Clinic	NZ	M	drblack@itmedical.com
6.	Bodemann	Ralf	Siemens AG	DE	M	ralf.bodemann@siemens.com
7.	Brooker	Ian	TCCO Safety Products	IE	O	ibrooker@tycoint.com
8.	Chadwick	Phillip	MCL	UK	M	phil.chadwick@mcluk.org
9.	Chou	C.K.	Motorola, Inc.	US	M	ck.chou@motorola.com
10.	Cleveland	Robert	FCC	US	M	robert.cleveland@fcc.gov
11.	Cohen	Jules	Independent Consultant	US	M	jcohen@denny.com
12.	Curtis	Bob	OSHA-USDOL	US	M	curtis.bob@dol.gov
13.	D'Andrea	John	Naval Health Res Ctr.	US	M	john.dandrea@navy.brooks.af.mil
14.	Haes	Donald	Independent Consultant	US	M	haes@mit.edu
15.	Hatfield	Jim	Hatfield & Dawson	US	M	hatfield@hatdaw.com

	Last Name	First Name	Affiliation	Country	Status	E-mail
16.	Ikehata	Masateru	Railway Tech Res Inst	JP	M	ikehata@rtri.or.jp
17.	Ishii	Hideo	Tokyo Electric Power Co	JP	O	ishii.hideo@tepcoco.jp
18.	Johnston	Sheila	Independent Consultant	US	M	sajohnston@btclick.com
19.	Lotz	Gergory	NIOSH	US	M	wlotz@cdc.gov
20.	McManus	Tom	DCMNR	IE	M	mcmmanustom@eircom.net
21.	Meltz	Martin	Univ of TX, Hlth Sci Ctr	US	M	meltz@uthscsa.edu
22.	Moore	John	DCMNR	IE	O	john.moore@dcmnr.gov.ie
23.	Murphy	Michael	AFRL/HEDR	US	M	michael.murphy@brooks.af.mil
24.	Nakao	Kori	The KANSAI Elec Pwr	JP	O	nakao.kaori@c5.kepcoco.jp
25.	Needy	Robert	Naval Surface Warfare Ctr.	US	M	robert.needy@navy.mil
26.	O'Connor	Roger	DCMNR	IE	O	roger.oconnor@dcmnr.gov.ie
27.	Petersen	Ronald	Independent Consultant	US	M	r.c.petersen@ieee.org
28.	Roberts	Brad	US Army CHPPM	US	M	brad.roberts@us.army.mil
29.	Scanlon	William	Queens University Belfast	UK	M	w.scanlon@qub.ac.uk
30.	Swicord	Mays	Motorola	US	M	mays.swicord@motorola.com
31.	Tell	Richard	Richard Tell Assoc. Inc.	US	M	rtell@radhaz.com
32.	Thuroczy	Gyorgy	Nat Res Inst for Radiobio	HU	M	thuroczy@hp.osski.hu
33.	Varanelli	Arthur	Raytheon Company	US	M	a.g.varanelli@ieee.org
34.	Wagenaar	F-Michelle	PhoneVision	NL	M	mailher@heroffice.org
35.	Willyard	Cassandra	Gateway Information Serv	US	O	cassiew@rs-inc.com
36.	Ziriaux	John	Naval Health Res Det	US	O	john.ziriaux@navy.brooks.af.mil

M =Member
O =Observer

Approved Agenda

TC 95 Meeting

Dublin Castle

Dublin, Ireland

June 26, 2005

1300 – 1700 h

- | | |
|---|---------------------|
| 1. Call to Order: | <i>Petersen</i> |
| 2. Approval of Agenda: | <i>Petersen</i> |
| 3. Approval of December 5, 2004 Minutes: | <i>Petersen</i> |
| 4. Executive Secretary’s Report: | <i>Adair</i> |
| 5. IEEE Standards Activities Report: | <i>Ash/Petersen</i> |
| 6. Chairman’s Report: | <i>Petersen</i> |
| a) Reorganization of ICES | |
| b) Balloting, Appeals, SASB | |
| 7. Vice Chairman’s Report: | <i>Bodemann</i> |
| 8. Treasurer’s Report: | <i>Varanelli</i> |
| 9. Membership Chairman’s Report: | <i>McManus</i> |
| 10. International Liaison Chairman’s Report: | <i>Murphy</i> |
| a) Meetings | |
| b) Liaisons | |
| c) Presentations by McManus, Johnston, Chadwick | |
| 11. Reports from the Subcommittees: | <i>Petersen</i> |
| 12. New Business: | <i>Petersen</i> |
| 13. Plans for Future Meetings: | <i>Petersen</i> |
| 14. Adjournment: | <i>Petersen</i> |

IEEE International Committee on Electromagnetic Safety

TC-95

Chairman's Report

R. C. Petersen

26 June, 2005



Reorganization of ICES

Brief History:

- Established in 1960 as USASI (now ANSI) Committee C95 (Sponsored by the IRE and the US Navy Dept)
 - Small committee (6 members)
- Became ANSI Accredited Standards Committee C95 in the mid 1980's
- Became IEEE Standards Coordinating Committee 28 (SCC-28) under the sponsorship of the IEEE Standards Board in 1990



Standards Coordinating Committee 28 (SCC-28)

Standards Coordinating Committees

The IEEE is today the world's largest technical professional society with more than 365,000 members in more than 150 countries.

- Within the IEEE are a number of professional societies, e.g., MTT, EMC, EMB, AP, VT , PES that sponsor standards development
- Standards addressing subjects that are of interest to more than one society, e.g., RF safety standards, are developed by *Standards Coordinating Committees* sponsored by the IEEE-SA Standards Board. ICES is one such committee



ICES: SCC-28

- Title “International Committee on Electromagnetic Safety” (ICES) approved by the IEEE-SASB in 2000 for use by SCC-28
 - Large committee (~120 members on the main committee representing 24 countries)
 - Almost 300 members total – including the subcommittees

ICES: SCC-28

Scope:

Development of standards for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the potential hazards of exposure of man, volatile materials, and explosive devices to such energy

- Develops maximum permissible exposure values for human exposure, generic measurement standards, and standards for RF safety programs, warning symbols, etc.,

SCC-34

History:

Established/approved by the IEEE Standards Board in 1995

Scope:

Development of product performance standards for specific products that emit EM energy

- Develop product performance standards, e.g., emission limits, expressed in terms of easily measured parameters that are directly derived from the basic restrictions and safety criteria of IEEE C95.1, C95.6, ICNIRP, etc.
- Develop standards for assessing product compliance



Distinctions

SCC-28

Develops standards/practices/guides that apply to people, e.g., exposure limits

SCC-34

Develops standards/practices/guides that apply to products, e.g., emission limits

Internationally Recognized Organizations with Similar Scope

- SCC-28 ⇒ International Commission on Non-Ionizing Radiation Protection (ICNIRP)
 - ICNIRP develops exposure guidelines across the NIR portion of the spectrum; SCC-28 from 0 to 300 GHz
- SCC-34 ⇒ IEC TC106
 - The scope of TC106 is narrower than that of SCC-34 (limited to exposure assessment)



Issues

- Lack of an open international forum for the development of rational, science-based standards for the safe use of electromagnetic energy (EME)
- No means for international harmonization of standards for the safe use of EME
- Limited recognition of IEEE as a developer of EME safety standards for international use

Reorganization of ICES

- A new entity (SCC-39), called ICES, comprised of an AdCom and technical committees (SCC-28 ⇒ TC-95, and SCC-34 ⇒ TC-34), was approved by the IEEE SASB at the March 2005 meeting

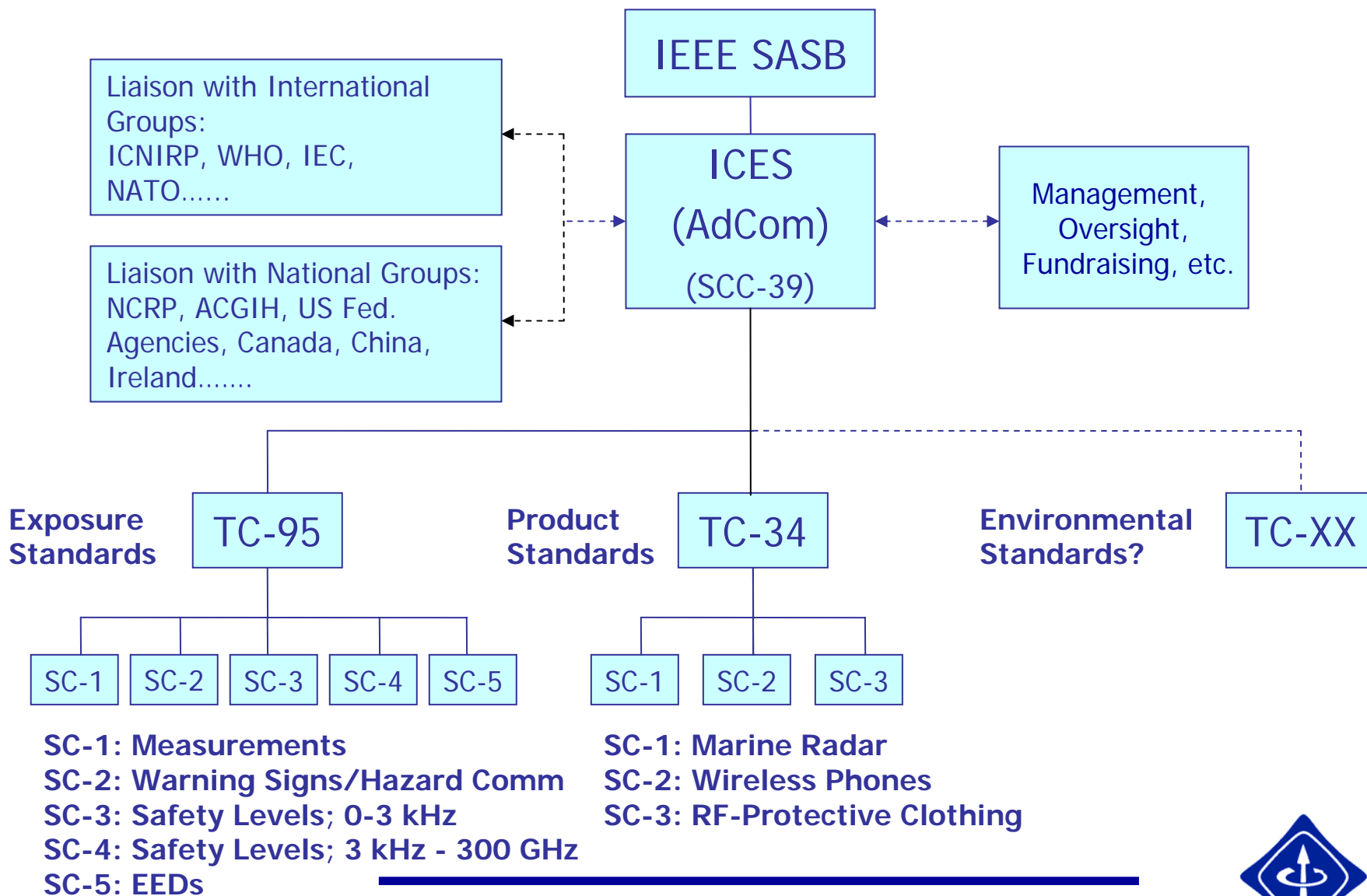
Reorganization of ICES

New Scope:

Development of standards for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the potential hazards of exposure of humans, volatile materials, and explosive devices to such energy, standards for products that emit electromagnetic energy by design or as a by-product of their operation, and standards for environmental limits



ICES: Structure



Technical Committee 95

ICES TC-95 Parent Committee

Scientific/Technical Subcommittees

SC-1 Measurements/Computations

SC-2 Warning Symbols/Hazard Comm.

SC-3 Safety Levels 0 - 3 kHz

SC-4 Safety Levels 3 kHz - 300 GHz

SC-5 Electro-explosive Devices

Administrative Subcommittees

Executive Committee

Membership

International Liaison

Interpretations



Reorganization of ICES

- The AdCom provides oversight and manages the Technical Committees (TC-34 and TC-95)
- The TCs develop and approve draft standards, but with oversight from the AdCom. The TC subcommittees remain the same.
- Draft standards approved by the TCs are submitted directly to the SASB for approval - there is no additional level of balloting



AdCom Leadership

- Chair
- Vice Chair
- Past Chair
- Secretary
- Treasurer
- TC Chairs
- Members at large
- Representatives*

* Representatives of IEEE Societies, other supporting entities, the general public, etc.



ICES: Features

- **Process**
 - open/transparent at every level
- **Participation**
 - broad/large committee
 - open membership
- **Procedures**
 - formal/supervised (SASB)
- **Logical division of standards**
 - exposure standards
 - product standards
- **Rules for implementation**
- **Process for appeals/interpretation**
- **Formal link to measurement/assessment Stds**



Summary

- ICES fulfills the need for a truly open international forum to develop standards for the safe use of Electromagnetic energy
- Proposed structure ensures the important logical and separate development for exposure, product, and related standards
- Leads the way towards rational harmonized standards that will both protect people and support the advancement of technology

Going Forward

- Populate AdCom
- Establish fund-raising program
- Draft new P&Ps
 - The P&Ps for the TCs will remain largely unchanged

IEEE

**International
Committee on
Electromagnetic
Safety**

Report on

WHO IAC meeting June 13-14, 2005

Ralf Bodemann



In Search for a Nice Domain Name for ICES

www.ices.org

- International Cake Exploration Societé

www.ices.net

- Industrial Cleaning Equipment & Supply

www.ices.com

- *Blocked by Company Filter
Classified as Porn*

www.ices.int

- still free

WHO Geneva meetings

- International Advisory Committee (IAC)
June 13-14
- IAC is an advisory body to WHO EMF project.
(national governments, authorities, international scientific/standardisation organisations)
- IAC approves each document to be published by WHO.
- Workshop „Mobile base stations and wireless networks“, June 15-16

General observations

- ~ 60-80 attendees
- a quiet, peaceful, non-controversial meeting
- Repacholi will retire in 2006, prolongation of WHO EMF project is not settled yet
- Draft Environmental Health Criteria (EHC) for ELF still incomplete, to be published in autumn 2005
- 2006: both IARC and WHO Health Risk Assessment for RF to be accomplished

Some Highlights

- E. van Rongen: Draft Static Fields Health Risk Assessment Discussion: MRI machines need cost-benefit-analysis rather than a formal limit value for all employees.
- "Precautionary Framework" renamed "Framework to Guide Public Health Policy in Areas of Scientific Uncertainty" – circulated through other WHO depts.
- Russian study on microwaves (2.45 GHz, 5 W/m²) altering antigenic structure in brain tissue of rats to be replicated by a joint French-Russian research project. These studies form rationale for Russian RF limit 0.1 W/m².
- Bodemann: Update on ICES activities
Main Focus: Status of C95.1 revision
mentioned: C95.7, C95.3a, ELF short courses, „Thermal physiology“-workshop in Paris
Repacholi was interested in C95.7 draft

Electromagnetic Hypersensitivity

- WHO-sponsored workshop held in Prague
- Official WHO conclusions:
 - EHS patients suffer from real symptoms. Sometimes, they have to change their lifestyle.
 - However, these patients are not able to detect EMF better than others. Their symptoms cannot be related to EMF exposure.

EHS: Ludek Pekarek's conclusions

„The „electrically hypersensitive“ persons do not exist. [...] These persons suffer not due to their exposure to EMField, but because they develop a psychosomatic syndrome. [...] All known facts can be explained by the ESS syndrome (Environmental Somatization Syndrome). [...] Nevertheless, the complaining people may be hypersensitive indeed, but not to electromagnetic fields. They are hypersensitive to rumors, alarming messages, false reports, false alarm and fictitious news. They do not trust to the scientific results and develop psychosomatic syndrome, often quite serious. Their troubles should be treated by a psychologist or by a psychiatrist, not by lowering the EMF limits or by removing the alleged sources of EMFs.“

ATTACHMENT 5

ICES				
ICES / SCC28	As of:	26-Jun-05		
DATE	DESCRIPTION	DEBIT US\$	CREDIT US\$	BALANCE US\$
11/1/2000	Balance			11,154.78
12/4/2000	San Antonio Receipts		2,865.00	14,019.78
1/25/2001	San Antonio Expenses	1142.05		12,877.73
6/15/2001	Minneapolis Receipts		3,840	16,717.73
6/15/2001	Munich Expenses (LATE)	5482.64		11,235.09
9/25/2001	Minneapolis Expenses	3719.63		7,515.46
11/27/2001	Luxembourg Receipts		1760	9,275.46
11/27/2001	Luxembourg Expenses	2020		7,255.46
1/18/2002	San Antonio Receipts	3610		10,865.46
1/20/2002	San Antonio Expenses	6372.17		4,493.29
5/15/2002	San Antonio COMAR Receipts		313.98	4,807.27
6/21/2002	EEA Donation to ICES		2785.14	7,592.41
6/30/2002	Quebec Receipts		7540	15,132.41
8/5/2002	EXCOM Brochure expenses	317.56		14,814.85
12/10/2002	Quebec Expenses (A/V)	4473.12		10,341.73
12/10/2002	Quebec Expenses (Catering)	3235.02		7,106.71
1/13/2003	Piscataway Receipts		3240	10,346.71
1/13/2003	Piscataway Expenses	3329.05		7,017.66
1/13/2003	EEA Donation to ICES Final		3.22	7,020.88
1/13/2003	COMAR Reimbursements (Q&P)		664.6	7,685.48
1/13/2003	R.Petersen ICES Gift Cert.	35		7,650.48
7/31/2003	R.Petersen ICES Brochures	\$590.17		7,060.31
7/31/2003	Maui Receipts		8310	15,370.31
7/31/2003	EEA Dontion to ICES additional		23.08	15,393.39
12/9/2003	BEMS Maui Expenses	7550.19		7,843.20
12/7/2003	San Antonio Receipts		2960	10,803.20
12/7/2003	San Antonio Expenses	4013.1		6,790.10
7/17/2004	Brochures	752.02		6,038.08
7/17/2004	Washington DC Receipts		8395	14,433.08
7/17/2004	Washington DC Expenses	\$4,821.41		9,611.67
7/17/2004	Washington Short Course RECEIPTS		9085	18,696.67

7/17/2004	Washington Short Course Expenses	5553.66		13,143.01
7/17/2004	CEA Short Course Profit		1888.49	15,031.50
9/17/2004	COST 281 Collected Registration Receipts		\$5,100	20,131.50
12/1/2004	COST 281 reimburs. E.Adair	\$5,000		15,131.50
12/1/2004	San Antonio Meeting Receipts		\$3,905	19,036.50
12/1/2004	San Antonio Meeting Expenses	\$3,007.21		16,029.29
12/1/2004	A. Varanelli Badge supplies	\$109.16		15,920.13
12/1/2004	Residual Washington BEMS	\$62.39		15,857.74
12/1/2004	Short Course Profit		\$3,360.19	19,217.93
6/26/2005	Late received invoices for 12/04 AV	\$649.74		
6/26/2005	Advanced Registration Dep. Dublin		€6525 \$1470	
6/26/2005	At the Meeting - Receipts Dublin		€ 1,050	
6/26/2005	Total meeting receipts		€ 7,575	
	"		\$1,470	
	Misc. meeting expense	€ 100		
			(~\$11317)	
	Invoicing and validation not yet done			
PENDING	COMAR Reimbursement Maui		314.1	
PENDING	COMAR San Antonio		170.78	
			484.88	
	By: Arthur Varanelli, ICES Treasurer			
	SCC 34			

SCC34	As of:	10-Dec-02		
DATE	DESCRIPTION	DEBIT US\$	CREDIT US\$	BALANCE US\$
1/1/1999	Balance - starting fund			3000
7/20/1999	Howard Bassen Expenses	765.83		2234.17
3/12/2001	Robert Cleveland Expenses	1266.31		967.86
3/14/2001	Lucent Donation		5000	5967.86
9/25/2001	Minneapolis Expenses	2046.9		3920.96
	Kwok Chen Expenses			
10/1/2001	David Means Expenses	409.24		3511.72
10/12/2001	CTIA Donation		409.24	3920.96
	C95.6 Short Courses			
C95.6 Short Course				
CANADA	Canadian Electric Association			
14-May-04	Pat Riley expenses	2114.96		
14-May-04	Kent Jaffa expenses	1996.55		
Total expenses		4111.51		
2-Jun-04	CEA Payment		6000	
BALANCE				1888.49
WASHINGTON DC				
16-Jun-04				
	June 16 Short Course			
	Marriott Expenses	3419.29		
	Handouts	244.54		
	postage	41.2		

	TOTAL	3705.03		
	REGISTRATIONS		9085	
	Sub Total			5379.97
	Instructor Expenses			
	Pat Reily	500		



ICES

ATTACHMENT 6

International Liaison Report

Dublin, Ireland

26 June 2005

Michael R. Murphy, PhD

Air Force Research Laboratory



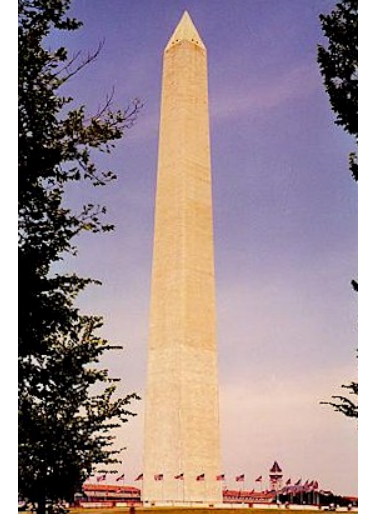
Outline

- **Recent International EMF Meetings**
- **Upcoming EMF Meetings**
- **Liaisons**
 - ICNIRP, WHO, BEMS/EBEA, URSI
- **Invited Presentations:**
 - Tom McManus
 - Sheila Johnston
 - Phil Chadwick



Recent EMF Meetings

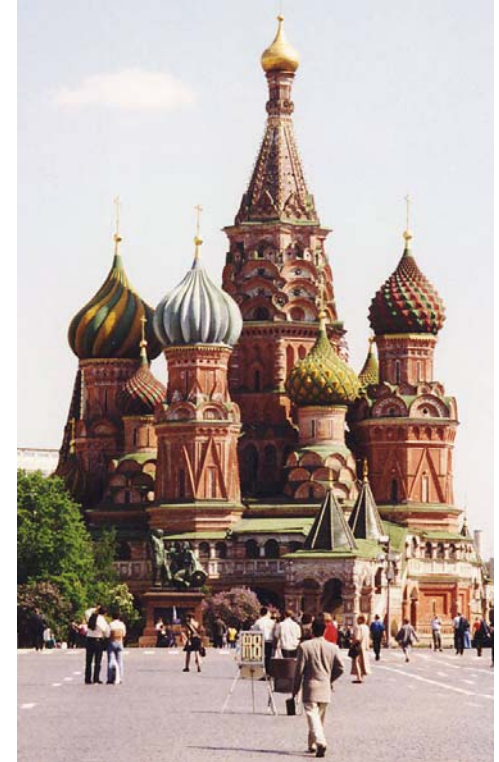
- **Air Force Workshop at BEMS**
 - Measuring and Modeling Thermal Responses to Directed Energy
 - Washington D. C., 20 June 2004
- **BEMS 2004 - 21 - 24 June 2004, Washington D. C.**
- **Combined meeting of ICES and COST Action 281**
20-22 Sept 2004, Paris
- **COST 281 Workshop RF EMF Exposure Assessment and Dosimetry**
23 – 24 Sept 2004, Paris





Recent EMF Meetings

- **Mobile Communication & Health. Medical, Biological & Social Problems, 20-23 Sept 2004, Moscow**
- **Molecular and Cellular Mechanisms of Biological Effects of EMF, UNESCO/WHO Seminar, 2-5 March, 2005, Yerevan, Armenia**





Recent EMF Meetings

- **ElectroMed 2005, Fourth International Symposium on Nonthermal Medical/Biological Treatments Using EMF and Ionized Gases, 15-18 May 2005, Portland, Oregon**
- **WHO Workshop on Base Stations and Wireless Networks: Exposure and Health, 15-16 June 2005, Geneva, Switzerland**

The poster features a Mexican flag at the top. Below it, the text reads: "ElectroMed is Joining with the Bioelectromagnetics Society (BEMS)". The main event information is: "Cancun, Mexico June 12 to 15, 2006 MAKE YOUR PLANS!". There are three small images: a Mayan stone carving, a modern building, and a colorful sailboat on the water. At the bottom, contact information is provided: "For additional information, please contact Gloria Parsley, BEMS Executive Director, 2412 Cobblestone Way, Frederick, MD 21702-2626 USA. Phone: (301) 663-4252 • Fax: (301) 694-4948, BEMSooffice@aol.com. Or visit our website at <http://www.bioelectromagnetics.org/>".



Recent EMF Meetings

- **AF Workshop at BioEM2005: Molecular Biology for EMF Bioeffects Assessment, 19 June, Dublin, Ireland**
- **BioEM2005, 19-24 June, Dublin**
- **ICES Meetings, 24-26 June 2005, Dublin**





Upcoming Meetings

- **Coherence & Electromagnetic Fields in Biological Systems, 1–4 July 2005, Prague, Czech Republic**

www.ure.cas.cz/events/cefbios2005

- **Applying Precautionary Measures to EMF Public Health Policy, 11-13 July 2005, Ottawa, Canada**

www.who.int/peh-emf

- **Progress in Electromagnetics Research Symposium – PIERS 2005, 22-26 Aug 2005, Hangzhou, China**

www.piers.org

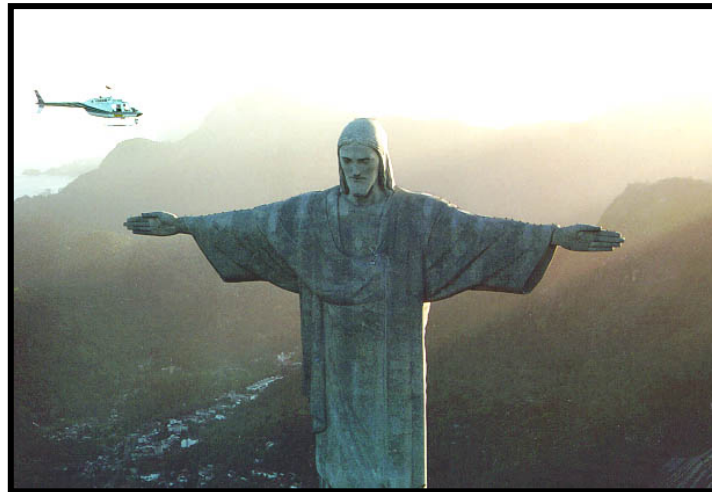




Upcoming Meetings

- **Biological Effects of Electromagnetic Fields: WHO 4th International EMF Seminar in China, 12-16 Sept 2005, Kuenming, China**
www.who.int/peh-emf
- **ICNIRP Dosimetry Workshop, 19-21 Sept 2005, Nuremberg, Germany**
- ~~South American Regional Meeting on Health Effects of EMF Fields, 26-30 Sept 2005, Brazil~~
~~www.who.int/peh-emf~~

delayed





Upcoming Meetings

- **28th International Union of Radio Science (URSI) General Assembly: (Commission K = EMF bioeffects, health & safety, mechanisms, applications, epidemiology, standards, ...), 23-29 Oct 2005, New Delhi, India www.usnc-ursi.org**
- **Application of Proteomics & Transcriptomics in EMF Research, 30 Oct – 1 Nov 2005, Helsinki, Finland www.who.int/peh-emf**
- **Australasian Radiation Protection Society Conference. WHO Workshop – RF Fields: Health effects & Policy Options for Protection, 14-18 Nov 2005, Melbourne, Australia www.who.int/peh-emf**





Upcoming Meetings

- **International Conference on Electromagnetic Fields, Health and Environment, 27-29 April 2006, Madeira Island, Portugal** www.apdee.org/ehe06/
- **Bioelectromagnetics School at Erice, 1-8 Oct 2006, Erice, Sicily, Italy**





Liaison: ICNIRP

IEEE
~~Spy~~
Liaison



ICNIRP Meeting
April 2005
San Antonio, River Walk



ICES Meetings - Summer 2005

(Presented to BEMS Board – 5 Feb 05)

- Scheduled after the BioEM2005
 - 24 – 26 June
- Location: Dublin, Castle, Downtown Dublin, Ireland.
 - Hotel: Yet to be determined
- Arrangements made through ICES Irish members:
 - Tom McManus
 - Bob Hanna
- Future plans: Hold summer ICES meetings in nearby location & adjacent times as BEMS, with independent arrangements
 - Issue: High and increasing costs for meeting arrangements
- ICES POCs: Art Varanelli, Treasurer, a.g.varanelli@ieee.org
Ron Petersen, Chair, r.c.Petersen@ieee.org





Liaison: BEMS/EBEA, URSI

- **WHO Annual International Advisory Committee**
 - Geneva 13-14 June 2005, Ralf Bodeman
- **BioEM2005 – 23 June**
 - “Status of IEEE C95.1 RF Safety Standard Revision,” C.K. Chou
 - “The International Committee on Electromagnetic Safety (ICES): Safety Standards for Electromagnetic Energy,” M. R. Murphy
- **Union of Radio Science International (URSI)**
 - “IEEE ICES Safety Standards for Exposure to EM Energy,” New Delhi 27 Oct 2005, M. R. Murphy





Invited Presentations

Tom McManus

"Electromagnetic Fields: Past, Present
and Future"

Sheila Johnson

"European RF Conference Updates"
Sheila Johnston PhD

Phil Chadwick

"Update on CENELEC Activities"



Electromagnetic Fields, Past, Present and Future

T. McManus,

The theme of this presentation is to chart the changing attitudes towards science and technical innovation over the past 150 years, particularly among the public, governments and the scientists themselves, using electromagnetic fields as an example. The role of the media in heightening public fear and concern is discussed, as is the public's poor appreciation of risk. The presentation concentrates more on social issues than on specific research.

**ICES/SCC-28 Meetings –
June 26, 2005
European EMF Activities**

**Sheila Johnston PhD
Neuroscience Consultant
10 Queens Mews London W2 4 BZ, UK**

Zurich COST281/FGF Feb 17-18 2005 Modulated signals

- On COST281 website
www.cost281.org
- No evidence modulation matters
- Future research required on new signals because of variations in power envelope and frequencies - UMTS, 4G

WHO/FGF/COST281 Geneva: IAC 13-14 CLD

Basesites 15-16/06/05 OPN WKP17 CLD

Mobile Revol 4g & beyond [Mike Walker](#)

ITU-R Wifi Human exp [Kevin Hughes](#)

WiFi-home & office [N Kuster](#)

Modulated RF energy: [P Valberg](#) NHE

Rev RF non-thermal effects [B Veyret](#) NHE

Hypersens symp human res [Elaine Fox](#) NHE

BS Epid available; studies give weak test [A Ahlbom](#) NHE

Dosi crit -epi base station [G Neubauer](#) NHE

Pers RF Exp Assess [Joe Wiart](#) NHE

Lab & Volunteer Trials RF PersDos [S Mann](#) NHE

Pers RF Exp Assess [Joe Wiart](#) NHE 70% undetected

Pilot Study -10 meters [E Cardis](#)

Occup Exp -No Std Signage [K Mild](#)

Base Stations (BS) Policy Options

Regul'g Risks: 5 nat.-France best? D Salomon

BS exp-above Russian Std Y Grigoriev

Swiss reg- applic'n happy-stable J Baumann, NZ happy,

Aus less so -try harder D. Black, Italy- Chaos P Vecchia

Local Decision-Making Options: P Vecchia -chaos

Stakeholders Session: EMF-net-P Ravazzani,

BS Sleep-N Leitgeb, Wireless Stn: Reg good pract-J Rowley,

Catania revisit-E Marsalek,

**Risk Percept & Coms: Public resp to precaut action &
precaut advice causes fear-J Barnett, [WHO Sci Uncert]**

Strat for BS risk coms O Renn

Friday PRIVATE workshop BS

WHO Fact/Information Sheet –P Vecchia

WHO research needs base sites – B Veyret

WHO Local Authorities Booklet - S Mann

WHO Summary of International Technical Standards – ITU- G Neubauer

Slides will be on the WHO Conf website

Proceedings will be published in a JOURNAL

EU Nat'l Res Projects +100M euro

- GUARD2, EMF-NET WG reports-EU, FGF,
- Germany Bfs 17 M Euro, Risk comms and human cohort study, genotoxicity meta study, Further 9 million, total 26 M euro
- France AFSSE April 05, need for precaution -research 5 M euro -proposals Sept 2005. Pilot study- children exp/basesites 10 RF monitors CARDIS/WIART..70% undetected
- Fin HERMO Juut. 12 projects 2007 MMeur
- Denmark 6 projects human/TNO-repl /PET/ Cohort (9Mx5 Swed, Fin, Nor), juveniles
- UK +10M /10/05, cohort, Child leuk, risk com
- Swiss Gov't 5 M euro MOSER; ETH Durrenbg

BS Research Recommend

- **Most of the research into BS dosimetry PDM (cocktail, D-R) and**
- **Risk communications**
- **NO Biol low level research unless we find effects at med to high level exposures. DMBA?**
- **EPID pilot study by E Cardis, Wiart, in France VIMP trial use of the personal exposure meters.**

-
- **BS –TNO/ Ongoing Human acute: 4 EHS/Non-EHS 4 diff exp: (UK 1, DK?, Jpn 1, Swiss 2)**
 - **Ongoing Epi UK BS ecological**



CENELEC EMF/RF activities at June 2005

**Philip Chadwick
Chair, CENELEC TC106X**



CENELEC

The European Electrotechnical Standardisation Committee:

- **28 members:** Austria, Belgium, Cyprus, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Ireland, **Iceland**, Italy, Latvia, Luxembourg, Lithuania, Malta, Netherlands, **Norway**, Poland, Portugal, Slovenia, Slovakia, Sweden, UK
- **7 associates:** Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Romania, Turkey, Ukraine

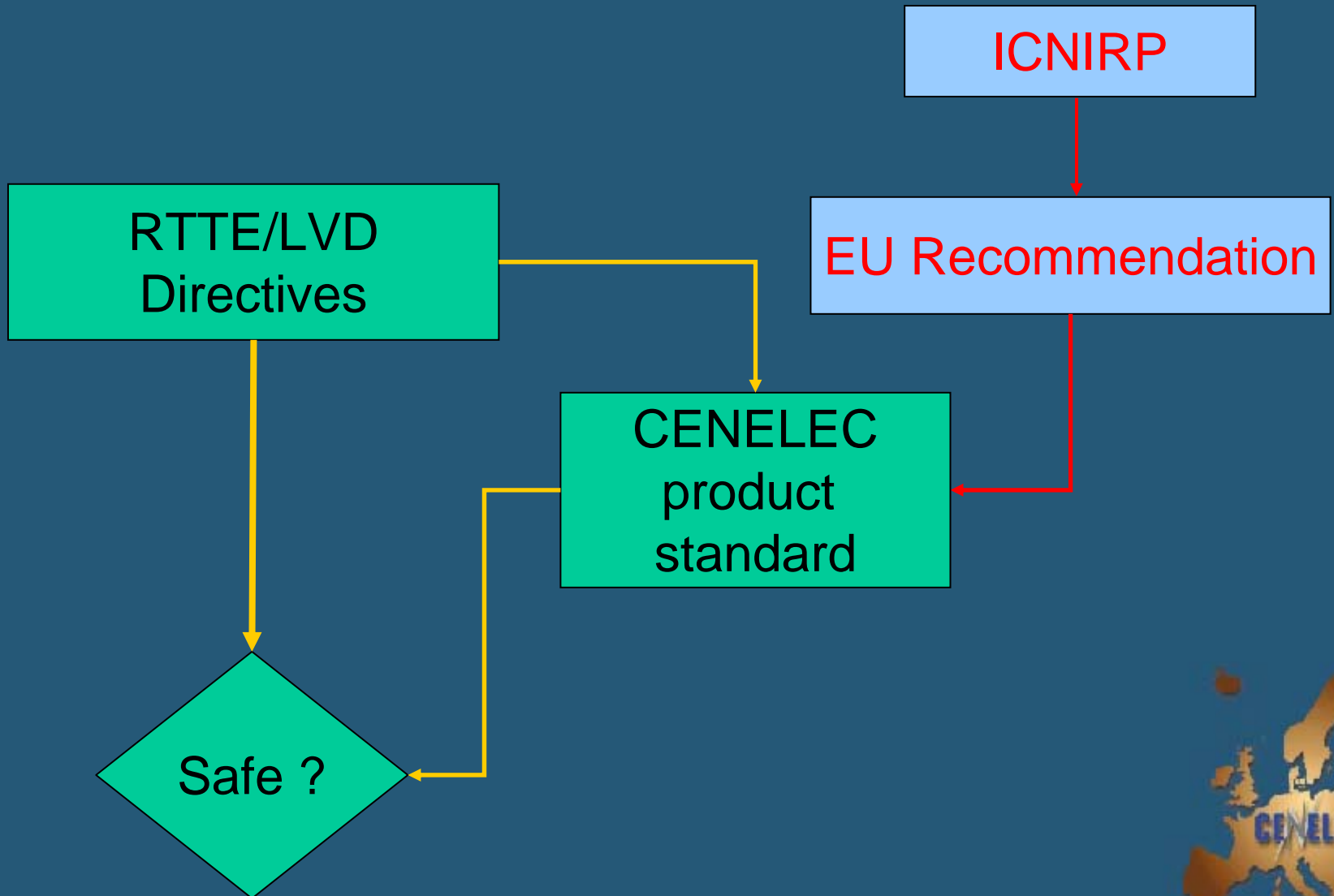


CENELEC product standards

- 2 European Directives (Low Voltage Directive and Radio Telecommunications Terminals Equipment Directive) require that equipment made, sold or (in some cases used) in the EU is “safe”
- CENELEC product standards are used to fulfil the RF/EMF safety requirements of those Directives
- They refer to the 1999 EU Recommendation, and hence to ICNIRP public exposure guidelines



Product standards: public



CENELEC EMF/RF product standards

- Mobile phones
- RFID/EAS
- Base stations
- Base stations - putting into service (2005 ?)
- Broadcast (30 MHz – 40 GHz)
- Domestic appliances
- Generic
- Basic (vote)
- Low power



Under preparation

- Base stations *in situ* (2007 ?)
- Broadcast (3 – 30 MHz)
- Broadcast – putting into service (3 – 30 MHz)
- Broadcast – putting into service (30 MHz – 40 GHz)
- Studio devices (radio mics etc)
- Cordless cameras and vision links (1 – 50 GHz)



Occupational Exposures

- A Directive on occupational exposure to electromagnetic fields was published in 2004
- It is based on ICNIRP, but does not consider static magnetic fields
- It will require assessment of all significant RF/EMF exposures in the EU, in all workplaces
- It applies to people, not products
- Use of CENELEC/IEC etc standards will be mandatory



EMF Directive

Single CENELEC “umbrella” standard
For the assessment of workplace/worker exposure

CENELEC/ETSI Joint WG

New standards,
eg industrial heating,
AIMD, work environment

Procedures from existing
product/measurement
standards
(IEC, ETSI, CEN, CENELEC)



Standards under preparation

- “Umbrella” workers’ exposure assessment standard
- Industrial heating
 - Induction heating
 - Dielectric heating
- Welding – arc, spot etc
- Broadcast
 - High power TV and Radio transmission
 - Studio equipment (radio microphones, video links etc)
- Trains
- Workers with active implanted medical devices



TC-95/SC-1 Report

Measurements and computational techniques

Howard Bassen

Chair

June 2005



Progress on C95.3-x,

C95.3-x, Draft Recommended Practice for Measurements and Computation of Electric, Magnetic and Electromagnetic Fields With Respect to Human Exposure to Such Fields, 0 - 100 kHz.

- This standard will update IEEE Std 1460-1996 – “IEEE Guide for the Measurement of Quasi-Static Magnetic and Electric Fields” – which was developed by SC-1, published in 1996, and reaffirmed in 2002
- IEEE Std C95.3-x together with IEEE Std C95.3-2002 will provide measurement/computation techniques over the frequency range covered by the scope of ICES TC-95, i.e., 0 to 300 GHz



Progress on C95.3-x,

- Drafts of most sections are complete - all sections will be completed by July 2005 and distributed to the subcommittee members for comment.

Definitions of Possible EMF Metrics for C95.6

- Joseph Bowman, PhD, (NIOSH) and Wolfgang Kainz, PhD (FDA) of SC-1 are studying the need for more well-defined exposure metrics for measuring compliance with the Maximum Permissible Exposures (MPE)

Definitions of Possible EMF Metrics for C95.6

- After some discussion with members of SC-1 and SC-3, members of SC-1 developed detailed descriptions of three metrics that could be used to measure E and H fields at a single moment. These metrics are:
 - Peak vector magnitude
 - Root mean square (RMS) vector magnitude (also known as the resultant)
 - Maximum RMS component

Definitions of Possible EMF Metrics for C95.6

- These metrics are now being evaluated by the entire subcommittee and will be sent to SC-3. Evaluation will be performed for the practicality and accuracy of each metric with respect to determining compliance with the basic restrictions and MPEs of IEEE Std C95.6-2002

TC-95/SC-5 Report

Safety Levels with Respect to Electro-Explosive Devices

Robert Needy

Drew Koban

Co-Chairs

June 2005



Status

Standard:

IEEE Recommended Practice for Determining Safe Distances from Radio Frequency Transmitting Antennas When Using Electric Blasting Caps During Explosive Operations: C95.4-2004

- No change in status of this standard
- No new or proposed projects



Issues

Concern by the Institute of Manufacturers of Explosives (IME) that certain C95.4 recommendations are too restrictive and inconsistent with the “best practices” of the blasting industry

- Both persons should be grounded before passing electric detonator lead wires to one another
- Electric blasting caps should not be exposed to direct sunlight
- Firing lines should not be dragged

Issues

- Considerable recent correspondence between IME representative and ICES Chair and SC-5 Co-Chairs
- Noted that these issues were raised and addressed during balloting (by same person)
- Issue appears to be resolved – additional IME representatives invited to join SC-5