

## **Ricky's Afterthought:**

### **Matters AMPERE**

**A.C. (Ricky) Metaxas**

Life Fellow St John's College Cambridge UK  
Contact E-mail: [acm33@cam.ac.uk](mailto:acm33@cam.ac.uk)



I was browsing through some of the AMPERE files and came across some of the activities that we were concerned with. It is perhaps worth updating our readers with some of these initiatives.

#### **Memoranda of Understanding (MoU)**

The first MoU that AMPERE instigated was with Union International de Electrothermie (UIE) starting in 2002 and is still ongoing. The latest collaboration entails a member of AMPERE being invited to present a plenary at the next UIE conference to be held in Nice in October 2024.

I then came across an MoU's with the UK's High Power RF Partnership (HPRF) signed in Nov 2003. This was a UK Department of Trade and Industry grant funded partnership formed to generate UK wealth from UK knowledge and know-how in High Power RF and microwave engineering, to encourage closer relationships between UK industrial sectors and to promote lifelong learning. It was for an initial period of four years after which it could be renewed if both parties agreed. I recollect that I took part in a number of projects where engineers and scientists discussed potential projects. As is usual in a government funded initiative a change of government in the UK coincided with the initial period of the MoU and HPRF being dissolved hence the termination of our MoU.

In 2006 shortly after the Microwave working Group was formed, under the leadership of Bernie Krieger, the following organisations IMPI, AMPERE, The Microwave Working Group and JEMEA got together to form an MoU called MAJIC which stands for **M**icrowave, **A**MPERE, **J**EMEA and **I**MPI. After initial discussions it was agreed that this MoU should manifest itself in a quadrennial series of conferences of the four associations called

**Global Congress Microwave Energy Applications (GCMEA)**. The original MoU stated that other associations such as the Chinese and Indian should subsequently join if they wish. As we are all aware the Chinese CAMSA has already joined.

Finally another MoU started with the European Microwave Association (EuMA) for the period between Oct 2019 and Sept 2021. I recollect the exchange of speakers with the EuMA at our respective conferences. To my knowledge no recent exchange with the EUMA has taken place.

#### **Standards, frequency spectrum and exposure guidelines**

When I was heavily liaising with industry over 30 years ago, I was often asked about hazards relating to personnel engaged in running high power microwave and RF equipment. I stated the then recommended hazards and advised the users to use a hazard meter and check for leaks particularly after modifications to their system. Moreover I made the point that any new equipment that was installed in our labs originally at the Research Centre (Now called CTech Innovation) and subsequently at the Engineering Labs in Cambridge was carefully tested for leakage which emanated from input and output ports on a conveyerized system or from flanges stacked together without proper seals. I insisted in operating below what was then the recommended standard of 5 mW/cm<sup>2</sup> at 5 cm from any aperture. In fact in a closed system involving, say, a resonant cavity the leakage was often below 1 mW/cm<sup>2</sup>.

AMPERE had a subcommittee which would often meet at our biennial conferences and one such meeting took place at Loughborough University in 2003 with **Peter Puschner** as a member of DIN/VDE working group K362 and convenor of

MT23 group 'Industrial Microwaves' within IEC TC27 and also as active link to SC61B 'Consumer, commercial and household microwave ovens', **David Sanchez** (then at Cartagena, Spain) as member of AEN/CTN-215 Spanish Committee "EM fields in the human environment" and a member of AEN/CTN-82 Spanish Committee "Electric & Electronic metrology" and also a member of CENELEC CLC/TC106X "EM fields in the human environment", **Walter Van Loock** as member of the Belgium Electroheat Technical Committee and **Cristina Leonelli** as member of Italian Technical Committee 27 (Electroheat). The minutes of the meeting made a fascinating read in that they considered not only RF and Microwaves but standards involving a host of other electroheat equipment such as plasmas, arc furnace, resistance heating and so on. They discussed the latest in **IEC TC27 (MT23) and CENELEC TC106X** and various other initiatives.

I am in no doubt that industrialists ask similar questions nowadays about hazards so as a prominent European association promoting the use of RF and microwaves at high power levels I ask whether we have kept abreast with the latest initiatives on standards and frequency allocation? Specifically, has anybody monitored the latest guidelines issued in reports published by the International Commission for Non-Ionizing Radiation Protection (ICNIRP) for limiting exposure to time varying electric, magnetic and electromagnetic fields (up to 300 GHz) and reports issue by its equivalent UK body, the National Radiological Protection Bureau (NRPB)?

Glancing at our Scientific Committee I cannot see a delegation relating to this topic. The closest might be the Industry link comprising five members. Perhaps they should be tasked to get themselves familiarised with the latest reports.

A recent paper updated the guidelines published in 1998 by the International Commission (ICNIRP) and is extremely comprehensive. The reference is given below and I advise many AMPERE colleagues who are involved with high power equipment to glance through that paper and absorbed the relevant sections applied to their operations.

However the latest report from NRPB dates back to 2003 when it reported on Health effects of radio frequency Fields written by the Independent Advisory Group on non-Ionizing radiation.

### **Founding members of AMPERE**

Of the original 27 founding members when AMPERE was set up in the mid 1990's the only ones that are still regularly attending the biennial AMPERE conferences are John Bows and myself.

### **For further reading**

Ramirez-Vasquez, R.; Escobar, I.; Vanderboch, G.A.E.; Arribas, E. Personal exposure to radiofrequency electromagnetic fields: A comparative analysis of international, national, and regional guidelines. Elsevier, Vol 246, 1 April 2024. Three of the authors are from University of Castilla-La Mancha while G.A.E. Vanderboch is with the Katholieke Universiteit in Leuven.