

Annual Report 2003

Commission B (Fields and Waves)

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Preamble¹

I have been on Sabbatical (July 2003–Jun 2004) and have not actively pursued the “networking” of those involved in Commission B research. This has now been begun, and I hope certainly to have a more complete list by the time of next year’s meeting, and to be able to produce a more complete report on activities within Commission B in South Africa.

I note that a three-year list of publications is shortly required for the New Delhi meeting, which deadline I should be able to meet.

The simplest way to maintain this on an on-going basis is the establishment of a Bib_TE_X database on the Web. I shall establish this database after I get back from Sabbatical.

Due to lack of connectivity, the majority of this report is lacking in detail, but this will be fleshed out in time. It is available at ytdp.ee.wits.ac.za/ursi.

1 Active S.A. Researchers and Research Groups

Research that falls under the Commission B ambit is mainly performed at the major universities, and in associated research companies.

I would like to include a *short* list of areas of research for each of these individuals.

1.1 Council for Scientific and Industrial Research

Dr Dirk Baker, Mr L.Bothalbotha@aerotek.csir.co.za

1.2 University of Cape Town

1.3 University of Pretoria

Prof D.Baker dbaker@postino.up.ac.za and Prof J.Joubert jjoubert@postino.up.ac.za are of the School of EECS.

1.4 University of Natal

Prof Broadhurst?

¹ie An apology!

1.5 University of Stellenbosch

Prof J.Cloete , Prof D.Davidson and Prof H.C.Reader Keith Palmer (antenna analysis and design) and Petrie Meyer (waveguide propagation, filters) make up an active research group at Stellenbosch.

1.5.1 EMSS—ElectroMagnetic Software and Systems

G.Smith agsmith@emss.co.za. Involved with FEKO development, FEKO is a Finite Element based electromagnetics analysis package. Associated to the University by the fact that most of his engineers hail from it.

EMSS Antennas is an antenna prototyping facility.

1.6 University of the Witwatersrand, Johannesburg

The Computational Electromagnetics Research Group within the School of Electrical and Information Engineering consists of Prof A.P.C.Fourie a.fourie@ee.wits.ac.za and Prof A.R.Clark a.clark@ee.wits.ac.za. I am currently supervising 10 postgraduates.

Also, Prof G.Gibbon g.gibbon@ee.wits.ac.za has some interesting work in investigating the propagation of Electromagnetic fields that the Elasmobranchii (eg sharks) are sensitive to in sea-water (< 20Hz!).

Annual Reports of the group are compiled in September and are all to be found on the site www.ee.wits.ac.za/~em, or ytdp.ee.wits.ac.za/AnnualReport2003.html.

1.6.1 Poynting Innovations

Poynting Innovations www.poynting.com is headed by Prof A.P.C.Fourie, and has several active researchers in the fields of antenna design, Electromagnetic analysis software (SUPERNEC). SUPERNEC is a Method-of-Moments based package, and is continuously extended by research efforts.

Since it has had historic ties with Wits, it still has a culture of research, (as opposed to simple development). The main researchers are Dr D.C.Nitch derek.nitch@poynting.co.za and Mr R.Dreyer renier.dreyer@poynting.co.za. Most of the publications from Poynting are captured on the Wits site.

Poynting Antennas is a World-class manufacturing plant, with heavy export emphasis, from HF EW antennas to 6GHz WLAN dish feeds.

South African Publications in the field of Commission B

- [1] D M DeHaaij, J Joubert, and J W Odendaal. Diplexing feed network for wideband dual-frequency stacked microstrip patch antenna. *Microwave and Optical technology Letters*, 36(2):100–102, January 2003.
- [2] D M DeHaaij, J W Odendaal, and J Joubert. Increasing the bandwidth of a microstrip patch antenna with a single parallel resonant circuit. *Transactions of the South African Institute of Electrical Engineers*, 94(2):25–27, July 2003.
- [3] W P Du Plessis. A genetic algorithm for impedance matching. *Transactions of the South African Institute of Electrical Engineers*, 94(2):6–10, July 2003.
- [4] J P Jacobs, J Joubert, and J W Odendaal. Radiation efficiency and impedance bandwidth of conductor-backed cpw-fed broadside twin slot antennas on two-layer dielectric substrate. *IEE Proceedings—Microwaves, Antennas and Propagation*, 150(4), August 2003.

- [5] J Joubert. Spiral microstrip resonators for narrow-stopband filters. *IEE Proceedings—Microwaves, Antennas and Propagation*, 150(6):493–496, 2003.
- [6] P Niemand, J Joubert, and J W Odendaal. Practical considerations for interference suppression cylindrical arrays. *Transactions of the South African Institute of Electrical Engineers*, 94(2):37–39, July 2003.
- [7] A R Clark, A P C Fourie, and D C Nitch. Stationary, non-stationary and hybrid iterative Method of Moments solution schemes. *IEEE Transactions on Antennas & Propagation*, 49(10):1462–1469, October 2001.
- [8] B Orchard and A R Clark. Comparison of various Genetic Algorithm techniques for optimization of simple wire antennas. In *2003 IEEE International Antennas and Propagation Symposium*, Columbus, Ohio, June 22–27 2003.
- [9] R L Dreyer and A P C Fourie. Reduced coupling levels between a Radio Altimeter and Spiral Antenna Module at 4.3GHz. In *2003 IEEE International Antennas and Propagation Symposium*, Columbus, Ohio, June 22–27 2003.
- [10] R L Dreyer and A R Clark. Preliminary results for Simply Sparse as a preconditioner to SIM. In *2002 IEEE Antennas and Propagation Society International Symposium*, volume 2, pages 238–241, San Antonio, Texas, June 2002.