ADVANCED DEVELOPMENTS IN RADAR
4-7 December 1995, Washington, D.C. Continuing Engineering Education Program, George Washington University, Academic Center, Room T-308, 801 22nd Street NW, Washington, DC 20052. Tel: (800) 424-9773 (US); (800) 535-4567 (Canada); Fax: (202) 872-0645; e-mail: ceepinfo@seas.gwu.edu.

MODERN TARGET SIGNATURE MEASUREMENT, EXPLOITATION AND COHERENT SIGNAL PROCESSING
8-10 January 1996, Washington, DC.
27-29 March 1996, Washington, DC. Johns Hopkins University, Whiting School of Engineering, Organizational Effectiveness Institute, 14515 Barkwood Drive, Rockville, MD 20853. Tel: (800) 683-7267, or (301) 871-9608; Fax: (301) 871-4942; E-mail: info.oei@apl.jhu.edu.

COMPUTATIONAL TECHNIQUES FOR EM APPLICATIONS
1-4 April 1996, Cambridge, England (Lecturers: J. B. Davies, R. D. Graglia, R. Mittra, D. R. Wilton). J.B. Davies, Dept. of Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, England. Tel: (+44/0) 44-171-388-7849; e-mail: b.davies@eleceng.ucl.ac.uk; or Dr. Raj Mittra, Dr. Raj Mittra, Tel: (217) 333-1200; Fax: (217) 333-8986;
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Database Of "In Vivo" Measurements for Quantitative Microwave Imaging and Reconstruction Algorithms Available

[Editor's note: The availability of the following experimental data, appropriate for use in testing quantitative imaging and reconstruction algorithms, was announced at the joint AP-S/URSI-AB Special Session on "Image Reconstruction from Real Data," organized at the Newport Beach Symposium by Bob McGahan, Ralph Kleinman, and Mike Fiddy. The data set used as a common test for the algorithms discussed–the so-called "Ipswich Data"–may still be available from Bob McGahan (see his address, etc. in the Chapter News column in this issue). Such data sets, particularly when based on carefully made and documented measurements, are very valuable for testing both direct- and inverse-scattering prediction and reconstruction algorithms. The *Magazine* invites those workers who have such data sets, and are willing to share them, to submit an announcement and description, such as that given below, for publication in the *Magazine*. WRS]

Workers in Spain and France have developed equipment and a series of reconstruction algorithms for microwave imaging purposes. Special attention has been devoted in this work to non-invasive control of deep hyperthermia treatments. These workers are currently engaged in a program aiming to integrate a 434 MHz circular scanner for the coaxial TEM applications of the Academic Hospital of Utrecht (NL). Both groups have developed experimental prototypes, namely a planar-microwave camera [1], operating in France, and a circular scanner, in Spain [2]. They have also developed the corresponding tomographic-reconstruction algorithms for qualitative spectral and quantitative spatial iterative purposes [3-5]. As a result, a series of simulated and measured data are available. It seems interesting to extend these data to other workers for assessing the overall robustness of quantitative reconstruction algorithms. At present, this database contains near-field data from Spain. If you want to use it, please contact us at the e-mail addresses below. Details on how to access the database, along with a description of the data, follow.

How to access the data

The data files can be retrieved from an FTP server by the following scheme (the README.DOC file contains text similar to the above, describing the data):

$ ftp voltor.upc.es
220 voltor FTP server (Version 16.2 Mort Apr 29 20:45:42 GMT 1991) ready.
Connected to VOLTOR.UPC.ES.
Name (VOLTOR.UPC.ES:nadine): anonymous
331 Guest login ok, send ident as password.
Password:
230 Guest login ok, access restrictions apply.
FTP> **cd pub/BIOIMA**
250 CWD command successful.
FTP> ascii

200 Type set to A.
FTP> **get README.DOC**
200 PORT command successful.
150 Opening ASCII mode data connection for README (5046 bytes).
226 Transfer complete.
local: README.DOC remote: README.DOC
5046 bytes received in 00:00:15.35 seconds

The data

You should obtain the following files:

README.DOC
FANTCENT. ASC
BRAGREG.ASC

Each of the files with the .ASC extension are scattered fields measured in the cylindrical system. The data in FANTCENT.ASC were obtained from a phantom consisting of two Plexiglas cylinders, filled with different concentrations of ethyl alcohol, as explained below. Dimensions are given in millimeters. Figures 1 and 2 show the phantom for which the measurements were taken, and a reconstruction obtained from it. Cylinder A was filled with a 96% solution of ethyl alcohol, with $\varepsilon^* = 10.-j8.3$. Cylinder B was filled with a 4% ethyl alcohol solution, with $\varepsilon^* = 73.-j11$. The data in BRAGREG.ASC were taken from a human forearm.

File format

All data flies contain a matrix of 64×64 complex data values. The files are written in ASCII text, so you can inspect the data with a text editor. There is no header: just data. Each complex element is written in a line as floating-point text, in the format

[real part]	[imaginary part]	pair of antenna numbers
0.0	0.0	(0,0)
0.0	0.0	(0,1)
....	....	....
2.301653e-1	-6.499484e-1	(0,17)
....	....	....
0.0	0.0	(64,64)

Note that the number of the pair is not included in the file.

Illumination

The field amplitude corresponds to an incident cylindrical wave, produced by an axial current of $I = 1\,\text{A}$:

$$E_{inc} = -(1/4)\omega\mu_0 I H_0(k_0 r)$$

where $I = 1$; r is the distance between the emitter and the point where the field is evaluated; k_0 is the wavenumber for the immersion medium; ω is the pulsation; H_0 is the second-order Hankel function; and μ_0 is the vacuum permeability.

The circular array is composed of 64 detectors. Hence, a maximum of 64 views can be used for the reconstruction. A view is obtained by using one antenna as an emitter, and 33 as receivers located on the opposite side, on a semicircle, as shown in Figure 3. The radius of the array is 0.125 m; the frequency is 2.33 GHz; and the complex permittivity of water at 25° C is taken to be $77.3 - j8.66$.

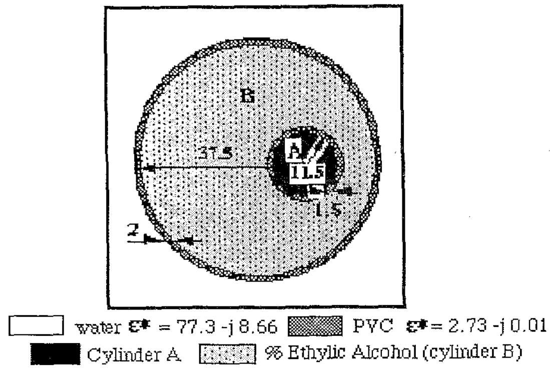

Figure 1. The phantom used for the measurements.

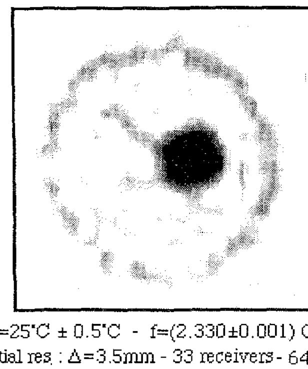

Figure 2. A reconstruction obtained from the phantom data.

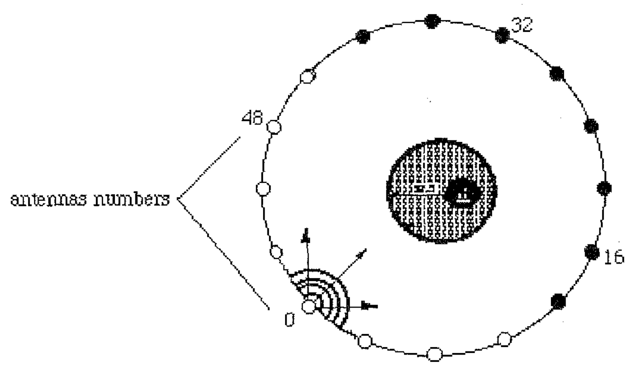

Figure 3. The arrangement of the transmitting and receiving antenna locations around the phantom. Note that when each antenna is used as a transmitter, 33 of the antennas are used as receivers.

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Report on 15th International Symposium on Electromagnetic Theory

Every three years, Commission B of URSI (Fields and Waves) organizes a symposium dedicated to the theory of electromagnetism. It is the leading event–worldwide, but for the US–for all researchers active in the field. The 15th symposium was held in Saint Petersburg, Russia, May 23-26, 1995. This year's event was formed from 32 sessions, which covered the following main areas:

• Wave propagation in a wide variety of media, linear and nonlinear, anisotropic and bi-anisotropic, chiral, composite, with periodic and stochastic inhomogeneities, enclosed within waveguides, etc.;

• Forward and inverse scattering, including microwave imaging, with various kinds of reflecting obstacles and surfaces;

• Computation techniques: numerical, asymptotic, FDTD, transient responses;

• Basic electromagnetic theory;

• Most varieties of antennas: apertures, horns, reflectors, slots, patches, dipoles, arrays, resonators, together with analysis and synthesis techniques.

The event lasted four days, with four morning and afternoon sessions in parallel, including two poster sessions. The Technical Program Committee had selected some 300 papers among the 456 proposed contributions. Participants, numbering 349, came from 38 countries. Among them were 25 "young scientists," supported by URSI (the International Radio Scientific Union).

There were many novel and original presentations, and I invited several authors to prepare surveys about their activities for feature articles in this *Magazine*. The book of *Proceedings*–849 pages thick–contains a wealth of information that would be difficult to find elsewhere, covering, in particular, original developments made in CIS institutions (orders can be placed with Professor David Olver, E-mail: adolver@qmw.ac.uk).

The decision to organize the 15th symposium in Russia was made during the 1992 symposium, in Sydney, in the hope of promoting better relationships with Russian colleagues. Since most of these only have limited means to travel, it was felt suitable to go there and visit with them the next time. The scheme was partially successful. It was possible, in this way, to attract more participants from Russia and the CIS to the symposium, and thus to establish contacts which would be difficult to realize otherwise.

However, in the present economic situation, even travel from Moscow to St. Petersburg, and lodging during the symposium, were too expensive for many, and a number of Russian authors could not make it–the situation being even worse for Ukraine and Belarus contributors. Salaries in the range $100 to $200 per month are not uncommon for engineers and academic personnel, and they are often are paid after long delays. As usual, some persons seem to manage much better than others....

The Symposium was to have taken place at the Palace of Friendship, on the shore of the Fontanka (one of the most famous canals of St. Petersburg), and close to the Nevski Prospekt (avenue), the main shopping artery of the city. Unfortunately, because of the horrendous rates requested ($10,000 for the four days of the symposium), an alternate facility had to be found. Our Russian colleagues proved most effective in locating one, obtaining from the City of St. Petersburg the *free* use of the necessary meeting and dining rooms in the historical and monumental "Smolny" building. This was at first a boarding school for girls of noble families, becoming much later the first headquarters of Lenin. A huge painting of Lenin still adorns the main meeting hall, in which all the plenary sessions were held. Not so long ago, it would have been impossible for a foreigner to enter this administrative building and, still now, strict security measures are enforced: participants had better not have forgotten their authorization, visa, and passport whenever entering, and also when exiting, the building.