

# EARSel Newsletter

ISSN 0257-0521

Bulletin of the  
European Association of Remote Sensing Laboratories  
Http://www.earsel.org  
December 2004 - Number 60

## EARSel Newsletter Editor

Niall McCormick  
Institute for Environment and Sustainability  
Commission of the European Communities  
Joint Research Centre  
I-21020 Ispra (VA), Italy  
Tel: +39 0332 789136  
Fax: +39 0332 785461  
E-mail: niall.mccormick@jrc.it

## Editorial Assistant

Mme. M. Godefroy  
EARSel Secretariat  
2 avenue Rapp, 75340 PARIS Cedex 07, France  
Tel: +33 1 45567360  
Fax: +33 1 45567361  
E-mail: earsel@meteo.fr

Published by: EARSel Secretariat  
Desk Top Publishing by: GITC bv, Lemmer,  
The Netherlands  
Printing by: Giethoorn Ten Brink,  
Meppel, The Netherlands  
Nr of copies printed: 550

## Subscription rates 2004

Members receive the Newsletter as part of the annual membership fee. For non-members rates are as follows:  
(4 issues) within Europe 77€  
including airmail postage outside Europe 84€  
personal subscription from  
EARSel member laboratories' staff 31€

## EARSel membership fees 2004

Individual observer 290€  
Laboratory/company member or  
observer having up to 10 researchers 290€  
Laboratory/company member or  
observer having 11 or more researchers 450€  
Laboratory from Eastern Europe  
(for first two years membership) 145€

The Newsletter is a forum for the exchange of news and views among our members and opinions expressed do not necessarily reflect the views of the editor or the EARSel Bureau. Articles published in the EARSel Newsletter may be reproduced but the relevant credit should be given.

## CONTENTS

<b>1. EDITORIAL</b>	<b>3</b>
<b>2. NEWS FROM THE ASSOCIATION &amp; ITS MEMBERS</b>	<b>4</b>
2.1 25th EARSel Annual Symposium in Portugal	4
2.2 RS of coastal zones in developing countries	4
2.3 1st Workshop on RS of Land Use & Land Cover	6
2.4 Conference: laser scanning of forests	6
2.5 Symposium: Trends in Geo-Information	7
2.6 News from the Special Interest Groups	8
2.6.1 RS of Forestry	8
2.6.2 RS of Forest Fires	9
2.6.3 RS of Land Ice & Snow	9
2.6.4 RS of the Coastal Zone	9
2.6.5 Imaging Spectroscopy	9
2.6.6 3D Remote Sensing	9
2.7 MODIS antenna at University of Cagliari	9
2.8 Revamped EARSel web-site: www.earsel.org	10
<b>3. NEWS FROM ESA, THE EC, &amp; INTERNATIONAL ORGANISATIONS</b>	<b>10</b>
3.1 News from ESA	10
3.1.1 ESA gives green light to funding for GMES	10
3.1.2 Contract for GOCE data analysis & modelling	11
3.1.3 Report on ESA's Envisat Symposium	12
3.2 News from the EC	14
3.2.1 JRC's innovative work on RS of vegetation	14
3.3 EEA's first digital change map of Europe	15
3.4 Centre for Satellite Communications & RS	16
3.5 EuroSDR: eLearning Distance Courses in GI	16
<b>4. RS DATA, PRODUCTS &amp; PROJECTS</b>	<b>17</b>
4.1 Paper: Radar RS for urban planning	17
4.2 Mobile phones damaging microwave RS signals	20
4.3 Aura satellite monitors Earth's atmosphere	21
4.4 Free InSAR software package from JPL	22
<b>5. REVIEWS, PUBLICATIONS &amp; REPORTS</b>	<b>23</b>
5.1 AARSE: RS & African sustainable development	23
5.2 Report: 2004 Meeting of RSPSoc, in Aberdeen	24
5.3 Report: 1st Göttingen GIS & RS Conference	25
5.4 Report: Natural Hazard Management Symposium	25
5.5 Workshop: OASIS Science Plan	27
5.6 EURISY Symposium: RS for Maritime Users	27
5.7 UK's Forestry Research Programme web-site	27
<b>6. FORTHCOMING MEETINGS &amp; COURSES</b>	<b>27</b>
6.1 RGLDD Conference on Desertification (Trier)	27
6.2 45th ERSA Congress: modelling land use change	28
6.3 ISPRS's 2005 Hannover Workshop	29
6.4 19th Int'l Conference "EnviroInfo 2005"	30
6.5 Int'l Symposium "ISPMSRS", in Beijing	30
6.6 Calendar of forthcoming meetings	30

# EARSel Bureau

## **CHAIRMAN**

Prof. Dr. Eberhard Parlow  
MCR Laboratory, Department of Geography  
University of Basel, Klingelbergstr. 27  
CH-4056 Basel, Switzerland  
Tel: +41 61 2670701, Fax: +41 61 2670689  
Email: eberhard.parlow@unibas.ch

## **VICE-CHAIRMAN**

Prof. Dr. Rudi Goossens  
Geography Department  
University of Gent, Krijgslaan 281 (S8-A1)  
B-9000 Gent, Belgium  
Tel: +32 9 2644709, Fax: +32 9 2644985  
Email: rudi.goossens@Ugent.be

## **SECRETARY-GENERAL**

Dr. Rainer Reuter  
Physics Department  
Carl von Ossietzky Universität  
D-26111 Oldenburg, Germany  
Tel: +49 441 798 3522, Fax: +49 441 798 3201  
Email: rainer.reuter@uni-oldenburg.de

## **TREASURER**

Prof. José-Luis Casanova  
Laboratorio de Teledeteccion  
Dpto. Fisica Aplicada I  
Universidad de Valladolid  
47071 Valladolid, Spain  
Tel / Fax: +34 983 423 130  
Email: jois@latuv.uva.es

## **EAST-WEST RELATIONS**

Dr. Tomas Benes  
CAGI - Czech Association for Geoinformation  
Novotneho  
lavka 5, I 1668 Praha I, Czech Republic  
Tel / Fax: +420-221-082374  
Email: tajemnik@cagi.cz

## **Representatives of the Sponsoring Organisations**

### **EUROPEAN SPACE AGENCY**

Dr. L. Marelli / Dr. Stefano Bruzzi  
Applications Programmes  
European Space Agency  
8-10, rue Mario Nikis  
75738 Paris Cedex 15, France  
Tel: +33 1 5369 7383, Fax: +33 1 5369 7674  
Email: mcuvelie@esa.int

### **COUNCIL OF EUROPE**

Mr. J. P. Massué  
EUR-OPA Major Hazards Agreement  
Council of Europe  
67075 Strasbourg Cedex, France  
Tel: +33 3 88 41 26 15, Fax: +33 3 88 41 27 87  
Email: jean.pierre.massue@coe.int

# 1 EDITORIAL

This issue (somewhat delayed, for personal reasons) of the EARSel Newsletter provides, as usual, a synoptic view of the salient news and developments in the field of remote sensing (RS), throughout Europe and beyond, from the last three months of 2004. Some important issues which have arisen in early 2005 – notably, the major contribution of satellite RS to international damage assessment and relief efforts following the recent Indian Ocean tsunami disaster, as well as the outcome of the 3rd Earth Observation Summit in Brussels, and plans for an independent European Research Council to fund science in the EU – will be covered in the March issue of the Newsletter.

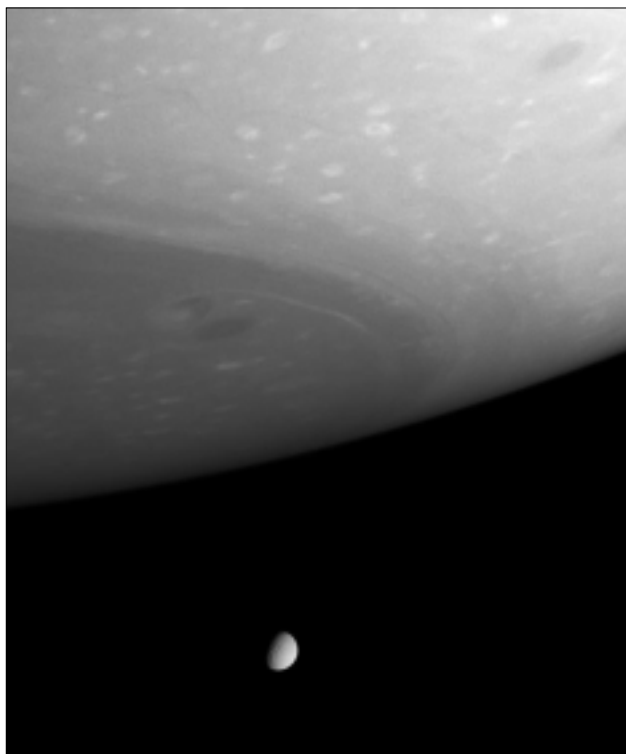
Technical highlights from this issue of the Newsletter include: reports from scientific workshops, symposia, and conferences, on a wide variety of applications (e.g. land use and land cover, laser scanning of forests, geo-information, Envisat, sustainable development in Africa, GIS and RS, natural hazard management); news of an

important new processing method for RS of vegetation, developed by the European Commission's Joint Research Centre; a research paper on radar RS for urban planning in Canada.

The agreement by European Space Agency (ESA) Member States, in September 2004, on funding for the next phase of the EU's GMES (Global Monitoring for Environment and Security) initiative, as well as the launch by the European Environment Agency (EEA), in November 2004, of the complete updated satellite-derived digital database of land cover types and land cover changes in Europe, resulting from the Corine Land Cover 2000 Project, are also reported on in this issue.

Though not mentioned elsewhere in this Newsletter, it should be noted that an extra-terrestrial application of RS, in which Europe is playing a leading role – namely, the Cassini-Huygens mission to explore the planet Saturn and its moons – reached a successful and stunning climax at the end of 2004 and beginning of 2005. On 25 December 2004, the ESA-built Huygens probe separated from the Cassini spacecraft (in orbit around Saturn since July 2004) and, 21 days later, on 14 January 2005, touched down on Titan, one of Saturn's 34 known moons.

Before and since then, many spectacular images and analysis results, from instruments on both Cassini and Huygens, have been beamed back to Earth. One such image (see below), showing Saturn's southern pole, with the moon Tethys (1,060 kilometres across) in the background, was taken by Cassini's narrow angle camera, on Monday 18 October 2004 – coincidentally the same day that the soul of my father was speeding towards the stars, on its way to heaven.



*View of Saturn's southern pole and moon Tethys, as seen by Cassini, on Monday 18 October 2004.*

The Editor

## 2 NEWS FROM THE ASSOCIATION & ITS MEMBERS

### 2.1 25th EARSel Annual Symposium in Portugal

The 25th EARSel Annual Symposium will be hosted by the University of Porto, Portugal, on 6-11 June 2005. The theme chosen for our 2005 symposium is "Global Developments in Environmental Earth Observation from Space". The preliminary programme will be available in March 2005, at the EARSel web-site ([www.earsel.org](http://www.earsel.org)). The deadline for full papers is 6 June 2005.

### 2.2 RS of coastal zones in developing countries

*RS for integrated coastal zone management in developing countries: some thoughts on a possible role for EARSel*

*Paul Geerdens (paul@pgcons.nl), P. Geerdens Consultancy, Kobaltpad 16, 3402 JL IJsselstein, the Netherlands. Phone / fax: +31-30-6884942. Web-site: [www.pgcons.nl](http://www.pgcons.nl)*

#### **Background:**

This note is based on the author's experience in countries in South America and the Caribbean, and mainly relates to applications in the field of marine and coastal science and management in that part of the world, where he has provided advice and training related to these applications.

#### **Coastal zones:**

The coastal zones of the world are becoming the focus of human settlements and industrial activity. It is estimated that in the coming decade more than 70% of the world's population will live in the coastal zone. This will result in a further increase of activities such as tourism and leisure, fisheries and aquaculture, construction and coastal defence, ports and maritime transport. As a consequence coastal zones increasingly face the impact of these activities and the resulting conflicts. In many cases, natural resources and biodiversity are sacrificed to economic necessities and profits, thus jeopardising the very basis for long-term continuity of tourism and fisheries.

In many countries, national and local governments do not have information on the present status of their own coastal zones, the environment and on-going processes. The information is not updated, not complete and often not correct, and therefore forms an unreliable basis for planning and decision-making. Another consequence of the lack of information is that environmental impact statements, submitted by industries before implementing their plans, cannot be evaluated in an objective, scientific manner.

#### **Technologies:**

RS technologies provide a unique way to observe the environment and its resources. Besides RS from space, this includes RS observations from platforms such as aeroplanes, ULVs, kites, balloons and high buildings. These alternative platforms could be of great importance for the region, as they provide an independent and affordable means to acquire RS data.

Besides the obvious advantages of overview and repeatability (amongst others), RS technologies have limitations (cloud cover, cost, delays, special interpretation, need for trained staff). Therefore they are best applied in conjunction with other technologies and sources of data, such as field data (in-situ observations) and model data (for continuity, early warning, forecasting and simulation).

An integrated system including RS (at the appropriate level for the country) as well as appropriate technologies for in-situ observations and models, would form a welcome tool for scientists and managers (government) in the field of marine and coastal environment and resources in developing countries. This should include a flexible user interface allowing assessment of the present situation (security, protection), as well as making forecasts and simulations. The latter is especially important to investigate the possible consequences of actions and measures before they are implemented.

#### **Applications – science and management:**

Both science and management related to

the coastal zone and its resources need updated, reliable and complete information, but both applications have different needs. Science needs detailed (in space and time) information on a wide range of aspects including physics, chemistry, biology and geophysics. The time-frame of availability is mostly not critical and generally there is sufficient time to process widely differing types of data. Management (planning, decision-making), on the other hand, needs synthesised information, integrated and condensed, and part of an operational information product providing dedicated advice or a timely status report for decision-making and planning. Moreover, besides environmental information, the integrated information product for management often needs to include information on sociology, economy, demography, etc., since all planning and decision-making relates to society, and translates into investment and return of funds.

In several countries in South America and the Caribbean, RS data are used in the form of NOAA satellite data (both low and high resolution). These data are acquired either through local receiving stations or through the Internet. To a lesser extent Landsat or SPOT data (mostly not very recent) are used, purchased through one of the receiving stations or data distributors in the region or acquired in the context of projects. In some countries, digital aerial photography is used locally for updating of maps and monitoring purposes.

In most countries some form of in-situ observations and monitoring of coastal zones is implemented and the Navy plays an important role in this context, given its responsibility for coastal territorial waters. The level of monitoring depends strongly on the country and its economic situation. There is often only limited organisation of the data and resulting information. While mostly tuned to maritime applications (defence, security, navigational charts, forecasts) the monitoring focuses on winds, waves, currents and tides; other environmental aspects often are considered less important.

Coastal science and management in the region have limited access to RS data and in-

formation. This is due to limited awareness and / or resources (technology, manpower). In some cases, and for projects with European or US partners, recent satellite data are obtained but this hardly ever translates into operational usage or application after the project's termination.

#### **Conclusion:**

There is an urgent need for updated information as a basis for integrated coastal zone management in developing countries. RS can play an important role to provide such information in the form of operational, dedicated data and information products, tuned to the various applications in this context. This type of service can only be achieved through an integration of RS data with data from other sources (in situ instruments, models) in an adequate environment (GIS), which allows not only for static analysis but especially provides capabilities of forecast and simulation.

Although in many developing countries, there is already some awareness of the "blessings" of RS, very little has been achieved regarding operational application at national scales. Many of the currently available products and services derived from RS are set up and managed by countries from outside the region, especially by the countries operating Earth-observing satellites. This creates a certain dependency as well as uncertainty as to quality and continuity. This situation needs to be transformed into a relation of mutual trust and balanced co-operation by transfer of knowledge and technology, thus creating independent capability in the countries.

EARSel can play a valuable role in the process of transferring knowledge and awareness on the potential of RS technology and applications for developing countries. This can be done in various ways: through the development and distribution of dedicated promotional and educational material, by facilitating expert and trainee visits, and by increasing EARSel's presence in the developing world through participation in regional events (congresses, Symposia). These contacts could lead to joint projects of EARSel laboratories in Europe and counterparts in the developing world, which could include some technology

transfer. The major objective in these projects should be to create and improve independent capacity on RS in developing countries, aimed at providing updated, complete and reliable information for science and management.

### **2.3 1st Workshop on RS of Land Use & Land Cover**

*Report on the 1st Workshop "Remote Sensing of Land Use and Land Cover", in Dubrovnik, Croatia, 28-29 May 2004.*

*Matthias Braun (matthias.braun@uni-bonn.de), Centre for Remote Sensing of Land Surfaces, University of Bonn, D-53113 Bonn, Germany*

Land use and land cover mapping has been a core application of RS from the beginning. The emerging field of new sensors, multi-temporal and multi-sensor data, and increasing spatial resolutions, open up new applications and increase demand for new and enhanced analysis methods. After the EARSel Symposium in Dubrovnik, the SIG Land Use and Land Cover held its 1st Workshop, on 28-29 May 2004. The aim was to bring together scientists of different countries and disciplines, and form a core group for the SIG. Hence broad thematic and methodological topics were chosen, to appeal to as many as possible interested researchers and institutions.

There were 80 registered attendees and more than 50 oral and poster presentations. This underlines the interest of the community on the theme, and the need for such regular meetings. The Workshop was subdivided into 7 thematic sessions on methods, model integration, Mediterranean landscapes, agricultural applications, CORINE Land Cover, state-wide land use mapping, and environmental applications, as well as an interactive poster session. In the opening session two invited talks were presented. Jacques Delincé (Head of the MARS programme at JRC, Ispra) gave an overview of opportunities, demands and challenges for RS in land use / land cover mapping and agricultural applications. The second talk by Mort Canty (Forschungszentrum Jülich) had a strong

methodology focus on unsupervised classification of changes in multi-spectral satellite imagery. The NASA Land Cover / Land Use Change Programme was then presented, using several case studies.

The distribution of authors and topics emphasised the present focus of European research in RS for of land use and land cover. A strong tendency towards the use of high-resolution satellite imagery was evident, as was the predominant use of data from optical sensors. Microwave-based analysis was only presented in a few contributions. Operational application of RS was particularly presented in the agricultural session and in the session on CORINE land cover. However, it was also pointed out that there are still many open questions and plenty of room for further research.

After review, the Workshop manuscripts will be published in the EARSel e-Proceedings series. The next Workshop is planned for 2006, probably in Bonn. Details will be announced in due time, and published via the SIG's web-site ([www.zfl.uni-bonn.de/earsel/earsel.html](http://www.zfl.uni-bonn.de/earsel/earsel.html)).

### **2.4 Conference: laser scanning of forests**

*Håkan Olsson, Swedish University of Agricultural Sciences, Chairman of EARSel SIG Forestry*

The EARSel co-sponsored Conference Laser Scanners for Forest and Landscape Assessment, which was held in Freiburg, Germany on 3-6 October 2004, marked the end of the NATSCAN project on laser-scanning of forests and landscapes, run by the Institute of Forest Growth, and the Department of RS and Landscape Information, at the University of Freiburg. The Conference was a follow-up to the 2003 ScandLaser Workshop in Umeå, Sweden. Before that, similar meetings were held in Australia and Canada in 2002. Thus, the Freiburg meeting was the 2nd international meeting of its kind in Europe, and probably the 4th in the world. The Freiburg meeting was larger than the forest-oriented ScandLaser meeting and a bit broader in scope. NATSCAN also included landscape assess-

ment in general, and had an equal focus on airborne and ground-based laser-scanning.

There were 50 oral presentations and 18 posters. The first communication from NATSCAN, already printed, is a 344-page Proceedings (Thies et al., 2004. ISPRS International Archives Series, Volume 36, part 8/W2, available from GITC, the Netherlands / fax +31-51456185). A special issue of the European Journal of Forest Research with selected papers from the conference is also planned.

The contributions at the Conference clearly show that laser-scanning is a very powerful technology for capturing precise information of forests and vegetation in general. Since last year, more operational forest mapping projects have been started in Norway. Operational use of laser-scanning in forestry has not yet been reported from other countries.

It appears that laser-scanning is sufficiently accurate for measuring, for example, vegetation height, and deriving tree size variables such as stem volume on stand level, especially in coniferous forests. However, the costs must be cut. Consequently, the final discussion stressed the need for specifications for systems that are "good enough". Another way to make the new technology more cost-efficient is to obtain more information from the data. Many studies presented at the conference were based on the analysis of single trees, using laser scanner data with a density of 5 pulses m<sup>-2</sup>, or more, and it was shown for example how the combination of laser-scanner data and data from digital cameras could be used for discrimination of tree species on the level of individual trees.

Other applications of laser-scanning might be less cost-sensitive than traditional forest mapping, such as strip-sampling for large-area forest resource surveys. Prof. Erik Næsset (Norway) announced that this will be his new research area. Ecological applications (e.g. bird-habitat mapping) were also presented, and illustrated in presentations by Hill, Hashimoto and Blaschke.

Many presentations also showed how terrestrial laser-scanners could be used for

measuring vegetation in general and stem-forms in particular. In the final discussion, it was concluded that terrestrial laser-scanning is already a valuable research tool, but that there is a need for smaller, and less expensive instruments before it will be really useful for operational forest inventories.

The series of dedicated forestry laser-scanner meetings will continue with: SiliviScan – Lidar Applications in Forest Assessment and Inventory, which will be held in Blacksburg, Virginia, USA, in 16-18 October 2005. Contact Ross Nelson (Ross.F.Nelson@nasa.gov) at NASA GSFC.

Laser-scanning is also one of the central techniques that will be covered in the EARSeL Workshop "3D Remote Sensing in Forestry", held at BOKU, Vienna, on 13-15 February 2006. For more information visit the web-site [ivfl.boku.ac.at/3DRSForestry](http://ivfl.boku.ac.at/3DRSForestry).

## 2.5 Symposium: Trends in Geo-Information

*Michael Schaepman, Centre for Geo-Information, Wageningen University, the Netherlands*

On 7-8 October 2004, the Centre for Geo-Information (CGI) at Wageningen University and Research Centre (WUR) organized an International Symposium on recent trends in geo-information. The event had three special characteristics. First, it marked 15 years of international geo-information and RS education in the frame of a Master of Science programme in Geo-Information Science (MGI), which has so far resulted in 169 diplomas. Second, the 5-year existence of CGI at WUR was celebrated. Currently, CGI consists of two full regular chairs (Prof. Dr. Arnold Bregt and Prof. Dr. Michael Schaepman) for Wageningen University, as well as the manager for the CGI part of the Wageningen research institute Alterra (Gerard Nieuwenhuis); together they manage a group of about 85 researchers. Finally, following the appointment of Michael Schaepman in October 2003, the day was also used for celebrating his inaugural address.

After having welcomed over 180 participants from all over the world, the Sympo-

sium opened with an introduction of Wageningen University and in particular the organisation of the Environmental Sciences Department ([www.dow.wur.nl/UK/](http://www.dow.wur.nl/UK/)), by its managing director, Prof. Dr. Wim van Vierssen. The participants were then introduced to CGI by Gerard Nieuwenhuis, explaining the centre's various activities, and its international position in the field of geo-information science.

The next session focussed on future trends in geo-information, presented by the first three professors that worked with CGI in the past and present. Prof. Dr. Steven de Jong (Utrecht University) discussed five examples of trends, focussing on spatio-dynamics, coastal processes, visualization trends and educational matters. Then, Prof. Dr. Arnold Bregt (WUR) emphasised three major trends: the geodetic, topographic and geo-informatics framework. The session was completed by Prof. Dr. Martin Molenaar (ITC), discussing the geo-information cycle behind the map.

During the coffee break there was plenty of opportunities to visit an exhibition, where the tools used by CGI and prominent results were displayed. The morning session continued, with Dr. Michael Rast (ESA/ESTEC) discussing the key contributions of ESA to the understanding of our planet. He was followed by Prof. Dr. Klaus Itten and Dr. Jens Nieke (University of Zurich) explaining the significant contributions of airborne imaging spectroscopy to the field of RS.

The afternoon session opened with Dr. Thomas Painter (NSIDC, Boulder, Colorado) and co-authors shedding more light on RS of mountain snow-cover. The next talk focussed on information technology, and Dr. Andrej Vckovski (Netcetera AG, Zurich) sought answers to the question "Does Spatial Matter?" He gave some striking examples that geo-information is about to become a real commodity and has already been embedded in the mainstream of current IT developments.

The day ended with the inaugural address of Prof. Dr. Michael Schaepman (WUR), in the university's main hall. In his address, he reviewed the development of spectro-

directional RS and discussed the prospects of this young science for future land-biosphere model interaction.

The Symposium's second day was specifically arranged for PhD students doing research on RS in agro-ecosystems. Dr. Frederic Baret (INRA, France), in his keynote address, introduced the 28 international PhD students and 12 specialists members to the four most important dimensions (spatial, spectral, directional, temporal) of RS for land monitoring. Following this, the PhD and specialists divided into four discussion groups, each exploring a specific topic in agro-ecosystem research. With the support of the participating specialists, four review papers on these topics will be printed in a book, to appear in 2005, as an outcome of the Symposium.

The Symposium was considered by the participants to be a big success. The variety of topics and the quality of the speakers were highly appreciated. The concept of organizing a master class, on the second day, for PhD students, was also very well received and the output of the Symposium will be published in due time. An information booklet of the past achievements of CGI is available from the author (Michael.Schaepman@wur.nl), and the presentations are available at the web-site [www.dow.wur.nl/UK/cgi/wks/wks\\_schaepman/](http://www.dow.wur.nl/UK/cgi/wks/wks_schaepman/)

## **2.6 News from the Special Interest Groups**

### **2.6.1 RS of Forestry**

- ForestSat2005: Workshop on "Satellite Remote Sensing for Forest Monitoring", on 30 May – 1 June 2005, in Borås, Sweden. Followed by: Workshop on RS and GIS for Forest Authorities, and field excursion, on 2-3 June 2005. Contact: Prof. Håkan Olsson (Hakan.olsson@resgeom.slu.se). Web-site: [www.svo.se/forestsaf](http://www.svo.se/forestsaf)
- Workshop on "3-D Remote Sensing in Forestry" organised by the EARSel SIG Forestry, on 13-15 February 2006, in Vienna, Austria. Contact: Prof. Werner Schneider (Werner.Schneider@boku.ac.at).



### 2.6.2 RS of Forest Fires

5th International Workshop on RS and GIS Applications to Forest Fires Management: Fire Effects Assessment, on 16-18 June 2005, at the Department of Geography, University of Zaragoza, Spain.

The Workshop will be organised as four invited lectures, three poster sessions, and four round-table discussions. The lectures will cover the following topics: burned scar mapping and fire severity discrimination; environmental dynamics after fire (regeneration, fire soil effects, landscape patterns); new sensors for fire detection (UAV, geostationary satellites, fire-dedicated satellites, etc.); modelling efforts for fire danger estimation. For more information, visit the SIG web-site ([www.geogra.uah.es/earsel](http://www.geogra.uah.es/earsel)), or contact the Workshop organiser ([emilio.chuvieco@uah.es](mailto:emilio.chuvieco@uah.es)).

### 2.6.3 RS of Land Ice & Snow

The 4th Workshop on "RS of Snow and Glaciers: Important Water Resources of the Future", was held on 21-23 February 2005, in Bern, Switzerland. For more information, visit the web-site: [dude.uibk.ac.at/lis-sig](http://dude.uibk.ac.at/lis-sig)

### 2.6.4 RS of the Coastal Zone

The 2nd Workshop on RS of the Coastal Zone, chaired by Dr. Rainer Reuter (University of Oldenburg) will be held on 9-11 June 2005, in Porto, Portugal, in the framework of the 25th EARSel Symposium and General Assembly. Web-site: [las.physik.uni-oldenburg.de/workshop.html](http://las.physik.uni-oldenburg.de/workshop.html)

### 2.6.5 Imaging Spectroscopy

The 4th EARSel SIG Workshop on Imaging Spectroscopy, "New Quality in Environmental Studies", will be held on 25-27 April 2005, at the University of Warsaw, Poland. The main topics of the Workshop will be: sensors and missions; data enhancement and calibration; terrestrial ecosystems; vegetation; environmental modelling; geology and mining; limnology. The working lan-

guage at the Workshop will be English. The preliminary programme will be available on the web-site: [www.wgsr.uw.edu.pl/zts/workshop/index.htm/](http://www.wgsr.uw.edu.pl/zts/workshop/index.htm/)

### 2.6.6 3D Remote Sensing

The two-day Workshop of the EARSel SIG "3D-Remote Sensing", chaired by Dr. Karsten Jacobsen (University of Hannover), will be held on 10-11 June 2005, as part of the EARSel Symposium in Porto, Portugal. Web-site: [www.ipi.uni-hannover.de/html/aktivitaeten/earsel.htm](http://www.ipi.uni-hannover.de/html/aktivitaeten/earsel.htm)

### 2.7 MODIS antenna at University of Cagliari

*Prof. Alberto Marini, University of Cagliari, Italy*

Since 1982 the TeleGIS Laboratory at the Department of Earth Sciences of the University of Cagliari (Italy) has been conducting research on methods of analysis and interpretation of RS data, in combination with GISs and their use for environmental management applications (desertification and natural resource mapping). Recently TeleGIS has activated a system of direct reception of data from the MODIS sensor, supplied directly by the SeaSpace TeraScan system. These data, derived from the satellites Terra and Aqua, consist of 36 spectral bands available on a daily basis, specifically for the analysis of the atmosphere, monitoring variations in vegetation cover, temperature anomalies, dust transport and the observation of water bodies.

The disciplines that may be interested include physical geography, oceanography, biology, and meteorology. The images cover the entire Mediterranean Basin. The sensitivity allows the reception even of signals of low passes on the horizon and therefore extends the overall reception coverage from the Azores to the Black Sea (west-east) and from Norway to Mali (north-south).

At present a database is being developed in the frame of an INTERREG New Technologies Project and is based on the Internet /

GIS platform Guardian™, which allows remote access to raster and GIS data, their browsing, visualization and processing to a widely distributed audience. Spectral signatures are managed by a specific multi-point GIS layer, allowing the direct comparison between in situ measurement and the spectrum derived by satellite hyper-spectral images of the same point. This database will be freely available via the Internet.

This service is dedicated to research, providing researchers with the ability to read, process and update archived data, and compare them with their own existing data. TeleGIS seeks to create a network of laboratories and institutional bodies interested in receiving these data for free and develop a common programme of research partnership. For further information please get in touch with the Director of the TeleGIS Laboratory Prof. Alberto Marini (marini@unica.it). We are also interested in any form of collaboration for research and teaching purposes.

#### **2.8 Revamped EARSel web-site: [www.earsel.org](http://www.earsel.org)**

Have you consulted the EARSel Web pages recently? You will have seen the new layout and ease of consultation of our members' Directory and other headings. If you find that the details entered concerning your laboratory / company need updating, please inform the Secretariat as

soon as possible, since our aim is to ensure that information provided is as accurate as possible.

The Volume 3, Number 3 (2004) issue of the eProceedings is now ready, and the CD-ROM of this volume is being distributed.

We should like to remind you that the eProceedings are not just for publication of papers from our specialist Workshops, but may also include articles on new science and applications, as well as advanced methodologies, modelling studies and ground truth methods and measurements. This on-line, refereed journal is free for all readers with access to an up-to-date browser and Adobe Acrobat Reader. All EARSel Member Laboratories receive a free copy on CD-ROM of each issue. We are aiming for a fast publication time of no more than six months after submission of a paper.

Another service that we plan to undertake is to open a digital library of recent PhD theses that have been defended by students of our Member Laboratories. Quite often these reach a limited audience, which is a pity considering the hard work involved, and the expense of reproduction on paper. So please provide us with a link to the "PDF" (Portable Document Format) file where your thesis may be found or send us an abstract with a contact address so that interested persons may order a copy.

## **3 NEWS FROM ESA, THE EC, & INTERNATIONAL ORGANISATIONS**

### **3.1 News from ESA**

#### **3.1.1 ESA gives green light to funding for GMES**

On 21-22 September 2004 ESA's Earth Observation Programme Board met at the Eden Project in Cornwall. An agreement was reached among ESA's Member States to release a total of 80m to fund the next

stage of the ESA component of the European GMES (Global Monitoring for Environment and Security) initiative.

Part of this funding will cover a socio-economic assessment of the benefits of GMES and the follow-on to the work already done by ESA on definition and demonstration of the services to be provided by GMES. More importantly, the Board gave the green light to the start of work on the space component

of GMES, by approving 30m for preparatory activities comprising architecture studies, ground segment design and initial definition studies for the five "sentinels" which will be the backbone of the future European Earth Observation System to monitor the environment. These activities will pave the way to the decision to be taken at the next ESA Council meeting at ministerial level, in late 2005 or early 2006, on full implementation of GMES.

Professor José Achache, Director of Earth Observation at ESA, said: "Natural disasters, such as the hurricanes in the Caribbean in 2004 and the floods which devastated Eastern Europe in 2002, are becoming increasingly frequent and violent. In order to understand their connection with man-induced global changes and mitigate their impact, there is an increasing need for better global monitoring and forecasting capabilities. That is what GMES will provide. I am particularly pleased at this decision, which comes at the end of my term at ESA, where I have worked hard to build the foundations of this programme".

Dr Steven Wilson, Chairman of the ESA Programme Board and Director of Earth Observation at the British National Space Centre, said: "ESA Member States have now agreed on the provision of key information services for critical aspects of our environment, and the underpinning technologies to guarantee comprehensive monitoring of our environment from space. The UK is playing a leading role in both the science and engineering capabilities in this field as well as developing ground-based services to utilise satellite data."

Global Monitoring for Environment and Security (GMES) is a joint initiative of the European Commission (EC) and ESA. It is a response to growing concern among European policy-makers to have reliable access to information on the environment on the global, regional and local scales, with the emphasis on global change, environmental stress and natural and man-made disasters. While GMES is looking to expand the use of space-based systems, the development of operational GMES services will also incorporate the advanced technical and operational capability offered by

terrestrial and airborne observation systems.

The initial phase (2001-2003) ended in December 2003 with publication of a joint final report and an EC Communication laying the basis of a way forward for GMES. Currently, GMES is funded through two separate ways: subscriptions by ESA Member States and EC Framework calls. An action plan for the next (interim) period, 2004-2005, has been proposed, to be managed through a GMES Programme Office set up in early 2004 that brings together EC and ESA staff and a number of key stakeholders, such as the European Environment Agency and Eumetsat. The Programme Office and an Advisory Committee of Member States are supported by the EC Directors General for Environment, Research, Information Society, and JRC, and the ESA Director General.

A key requirement during this next stage is to identify the priorities for GMES services through a number of preparatory activities, including a study on the socio-economic case for GMES themes. This could lead to a proposal for implementation of the GMES Earth observation space component in time for ESA's next ministerial-level Council meeting.

### **3.1.2 Contract for GOCE data analysis & modelling**

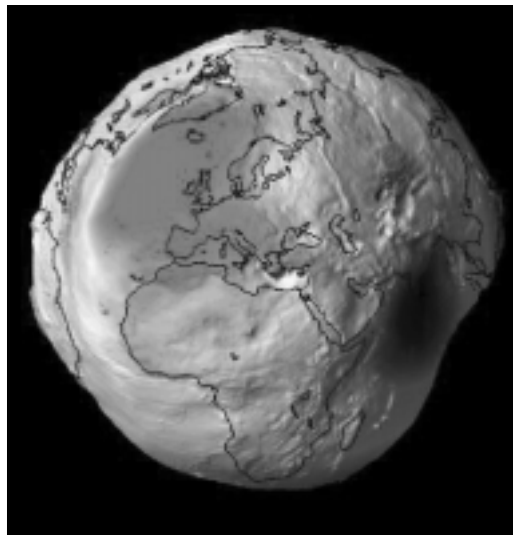
On 26 October 2004, an important milestone was reached in the development of ESA's Gravity Field and Steady-State Ocean Circulation Explorer (GOCE) mission, when a contract, worth 7.8 million, was signed between ESA and the Institute for Astronomical and Physical Geodesy (IAPG) from the Technical University of Munich.

The contract means that the scientific data resulting from the GOCE mission will be analysed by a consortium of 10 European universities and research institutes led by the IAPG. The consortium will then use the data to produce an unprecedented high-accuracy and high spatial-resolution global model of the Earth's gravity field and the geoid. Scientists from Switzerland, Ger-

many, Denmark, the Netherlands, Austria, Italy and France will all co-operate in this project. The work will be managed by IAPG as prime contractor with the help of the National Institute of Space Research in the Netherlands (SRON).

The ceremony took place at the Technical University in Munich, Germany, when the contract was signed by Prof. Wolfgang Herrmann, President of the Technical University of Munich, and Dr. Volker Liebig ESA's Director of Earth Observation. Subsequently, all project partners signed their contracts with the prime contractor.

GOCE, due for launch in 2006, is the first Earth Explorer Core mission to be developed as part of ESA's Living Planet Pro-



*The Earth's gravity field (geoid) as it will be seen by GOCE.*

gramme. GOCE is entirely dedicated to exploration of the Earth's gravity field, and will significantly advance our knowledge in solid-Earth physics, geodesy, oceanography, as well as climate-change research. GOCE will measure high-accuracy gravity gradients and provide a global model of the Earth's gravity field, and of the "geoid". This is the surface of equal gravitational potential of a hypothetical ocean at rest, and the classical reference for all topographical features. The accuracy of its determination is important for surveying and geodesy, and in studies of Earth interior processes, ocean circulation, ice motion and sea-level change.

The primary GOCE instrument is the newly developed gravity gradiometer. In order to attain the required sensitivity it is combined with precise GPS tracking, and active drag-free control of the spacecraft. Because the gravitational signal is stronger closer to the Earth, GOCE has been designed to fly in a particularly low orbit (just 250 km). The satellite has no mechanical moving parts since it has to be completely stable and rigid to ensure the acquisition of true gravity readings.

The signing of the contract for the "GOCE High-Level Processing Facility" ensures that the data acquired by the mission will be expertly translated into valuable information that will further our understanding of the planet.

### **3.1.3 Report on ESA's Envisat Symposium**

*Report on ESA's Envisat Symposium Report Day 3: "Satellites supporting Kyoto – our future is in our forests"*

The greatest single strength of Earth Observation (EO) is its wideness of view: the 10 instruments aboard ESA's Envisat spacecraft allow scientists simultaneous looks across large expanses of our planet. The topic under discussion on Day 3 (i.e. 8 September 2004) of the Envisat Symposium was how researchers use this ability to peer further through time, addressing the leading scientific question of our time – the likely extent of climate change.

Human activities have been changing the chemical composition of the atmosphere, leading to an increased retaining of heat popularly termed the "Greenhouse Effect". Successfully predicting the long-term effects of this change requires enhanced characterisation and understanding of the complex processes making up the Earth System. The multi-sensor Envisat is well matched for such an aim, and has demonstrated its ability directly to measure greenhouse gases.

Teams from the University of Heidelberg, Bremen and the National Institute for Space Research (SRON) in the Netherlands

showed how they are using data from Envisat's Scanning Imaging Absorption Spectrometer for Atmospheric Cartography (SCIAMACHY) instrument to track trace gases in the atmosphere and produce daily global maps of atmospheric methane. CO<sub>2</sub> is the best known greenhouse gas, but methane is able to trap more than 21 times more heat per molecule.

"Accurately characterising methane sources and distribution is very important to increase the accuracy of climate models," said Christian Frankenberg of the University of Heidelberg. "Methane comes from natural sources such as wetlands, but human activities produce a lot as well. For example, the image shows methane given off from rice fields in the Ganges Valley in India."

Methane is eventually broken down by chemical reactions in the atmosphere, but CO<sub>2</sub> is a longer-lived greenhouse gas. Surface vegetation stores a vast amount of carbon, only released into the atmosphere when land is cleared or burnt. So mapping land cover and land cover change is a crucial part of climate studies, and also for implementing the 1997 Kyoto Protocol, which seeks to stabilise greenhouse gas emissions at 1990 levels. Participating nations are given the option of planting new forests, forming "carbon sinks" that can be set against their overall carbon emissions.

Peter Curran from the University of Southampton explained how he has used another Envisat instrument, the Medium Resolution Imaging Spectrometer (MERIS), to infer global levels of land-based chlorophyll – the compound that plants use for photosynthesis – enabling a calculation of the amount of vegetable biomass and the development of a new vegetation index, called the MERIS Terrestrial Chlorophyll Index (TCI). The results were tested for accuracy against the actual chlorophyll content of sites in the UK's New Forest, and also compared to forest sites in southern Vietnam that were contaminated with "Agent Orange" defoliant during the Vietnam War. Agent Orange leaves lasting effects on plant life, so even fully re-grown forest still has lowered levels of chlorophyll. Records of the amounts of Agent Orange sprayed on the forest in 1965-1971

were compared to current MTCI values, and a relationship was indeed found.

Another team from the German Aerospace Centre (DLR) recounted how they have used MERIS data to develop a vegetation index for a German brewery, predict barley yields. The product is compatible with a former index acquired via the US Advanced Very High Resolution Radiometer (AVHRR) instrument, but has a higher resolution. Other speakers addressed the subject of forest mapping using MERIS, but also Envisat's Advanced Synthetic Aperture Radar (ASAR) along with radar data acquired from Envisat's predecessor missions ERS-1 and 2.

Shaun Quegan (Sheffield University) discussed use of interferometry coherence data from the ERS-tandem mission to estimate tree-age in the UK's Kielder forest – an important variable in terms of estimating carbon flux, as young forests in temperate regions actually emit more carbon than they take in for their first decade of life – it takes another decade to achieve a carbon "break-even".

Growing forests are carbon sinks, but forests that are logged or burnt down become carbon sources. A team from Italy's Tor Vergata University dealt with using radar data to detect fire damage – Envisat's cross-polarisation gives it an enhanced ability to detect burn scars.

Another group from the German-based Remote Sensing Technologies has been assessing ASAR's Wide Swath Mode to see burn scars across the vast forests of Russia – two thirds of the world's boreal forests are sited within its borders, but they are often affected by fires. In one vast fire east of Lake Baikal in 2003, some 202,000 km<sup>2</sup> were burnt. MERIS and other optical sensors were used to home in on affected areas, then ASAR was used to peer through clouds and smoke, successfully detecting fire scars of up to two years old, particularly when snow melt or rainfall enhanced the signal contrast, making May to July the best time for burn scar detection.

These scientific studies show the potential of EO to support the forest reporting

mandatory for advanced nation signatories to Kyoto; France has already used ASAR data to map forest coverage across the whole of French Guiana.

José Romero of the Swiss Federal Office of the Environment explained his country's participation in a pilot ESA Data User Programme project called Kyoto Inventory, using satellite data in support of forest Kyoto reporting. Also participating are

### 3.2 News from the EC

#### 3.2.1 JRC's innovative work on RS of vegetation

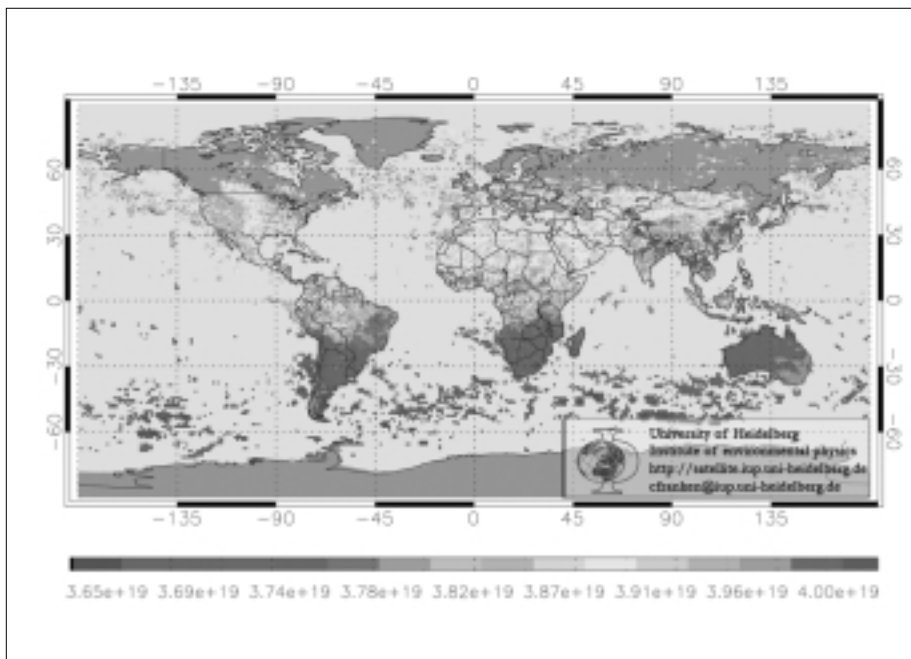
Scientists working at the Joint Research Centre (JRC) of the European Commission (EC) have developed a new way to interpret data from satellites monitoring the nature, state and evolution of the Earth's vegetation. This enhanced monitoring capacity will make it more possible to determine the impact of major climatic events, such as the severe drought and heat-wave in Europe in 2003. The new method involves use of practical algorithms to interpret RS data from satellite sensors.

"As our world faces greater environmental degradation and accelerating climate change, a new development like this ensures that policy decisions in Europe and throughout the world are made on the basis of sound scientific advice. And that's the best way to get the right decisions" said Janez Potočnik, Commissioner for Science and Research.

The practical usefulness of this innovative approach was amply demonstrated during the drought of Spring-Summer 2003.

This was the hottest summer in 500 years, with 35,000 casualties due to the heat-wave, and economic damages estimated at over €10 billion. Analysis of the data leading up to, during and after the drought period, using the new method, shows that indications were detectable as early as March 2003 in some agricultural regions (e.g. Northern France, Benelux, and Germany). This methodology could therefore be used in the future to monitor effects of such climatic events.

A prototype methodology was developed and tested, including with international partners. This methodology was then transferred to ESA for implementation. It will be used to propose new indicators of environ-



Map of global atmospheric methane distribution, based on data from Envisat's SCIAMACHY instrument. It depicts the vertical column density of methane (CH<sub>4</sub>) measured in molecules per square centimetre. Note the concentration of methane over the Indian sub-continent due to rice cultivation in the Ganges valley. Credits: University of Heidelberg.

partners in Finland, Italy, Norway and the Netherlands. Romero said: "We're interested in investigating this technology to fill in the gaps in current practices. We want to learn how space-borne products can be applied to carbon reporting."

As the Symposium heard, ESA is also carrying out a scientific project called GLOB-CARBON, combining the results from all available space-based instruments to monitor global carbon flux over a seven-year period from 1997. In addition, a forest monitoring service is included in ESA's GMES Services Element, addressing Kyoto reporting needs as well as serving as a tool for woodland management and monitoring environmental indicators.

mental stress for monitoring by the European Environment Agency.

On 13 December 2004, Commissioner Potočnik presented Ms. Nadine Gobron, the young scientist associated with the development of these new methods, with the JRC award for "Best Young Scientist 2004" for her outstanding scientific contribution. For more information, visit the JRC website: [www.jrc.cec.eu.int](http://www.jrc.cec.eu.int).

### 3.3 EEA's first digital change map of Europe

The first digital map of the multiple changes that have occurred in Europe's landscapes since 1990, which was unveiled in Brussels by the European Environment Agency (EEA) on 17 November 2004, enables policy-makers to draw lessons on how their decisions in areas such as agriculture and transport are impacting on the region's finite land resources and the wider environment.

The EEA presented the results of its Corine Land Cover (CLC) 2000 project at a high-level event, for representatives from several European Commission (EC) departments (including regional policy, agriculture, research and environment), ESA, and the EEA's current and prospective member countries.

Using a common methodology, CLC2000 provides the first standardised survey of Europe's land cover for the year 2000, and of the changes over the decade since the first CLC was undertaken in the late 1980s. Both products are publicly available at no cost through the EEA's web-site ([org.eea.eu.int](http://org.eea.eu.int)). CLC2000's combination of geographical breadth and local detail is unmatched by any other land cover information programme in the world. The project already covers 30 countries and the number is expected to expand in 2005.

The EEA's Director, Prof. Jacqueline McGlade, said: "CLC2000 will help policy-makers make better policies and plan a more viable future for Europe. It is a unique tool that makes it possible to measure the dynamic relationship between the

many uses of our landscapes and the impacts (and unfortunately all too often the conflicts) from different policies, such as agriculture, regional policy, and transport."

The EEA has produced CLC2000 from IMAGE2000, a satellite imaging programme undertaken together with the EC's Joint Research Centre. Aerial photos and near-ground imaging were also used. From IMAGE2000, experts from across Europe have produced detailed maps showing 44 different land cover types, such as "continuous urban fabric", "pasture" and "non-irrigated arable land".

CLC2000 is expected to find a wide range of users. The 1990 CLC survey has been accessed by people working in, for example, research, agriculture, physical planning, forestry, education, transport, demography, tourism, energy and health, besides environment. It has also been employed in some commercial applications, for example atlases and in-vehicle navigation systems. In the policy domain, CLC2000's uses include providing support for protecting ecosystems, halting the loss of biological diversity, tracking the impacts of climate change, assessing developments in agriculture and implementing the EU's Water Framework Directive. It will thus aid implementation of key priority areas of the EU's 6th Environmental Action Programme.

CLC2000 can show, for instance, where fragmentation of the landscape by roads and other infrastructure is worsening and thus increasing the risk that ecosystems can no longer connect with each other, putting the survival of their flora and fauna in danger. In agriculture, it can highlight where major structural changes are continuing or intensifying, such as the conversion of pasture to arable land (or the contrary), expansion or reduction in the area of fallow land and land taken out of production ("set aside"), or the abandonment of farming altogether.

The EEA plans to undertake a thorough analysis of the changes revealed by CLC2000 over the next two years. Among initial findings is an expansion of urban sprawl during the 1990s in many areas, including Italy, the Netherlands, eastern Ger-

many and Ireland. Prof McGlade said: "The huge growth in urban sprawl in eastern Germany is a warning of how neighbouring Poland could develop, now that it qualifies for EU regional development funding, unless action is taken to make such development more benign. Meanwhile we can see that in Ireland the urban sprawl is developing not around cities but mainly in remote countryside areas. This socio-economic development may be being encouraged by rural development funding provided under the EU's Common Agricultural Policy."

CLC2000 is available at the web-site [dataservice.eea.eu.int](http://dataservice.eea.eu.int), where illustrative maps highlighting the changes between 1990 and 2000 in selected areas can also be found. IMAGE2000 data can be accessed from the web-site [image2000.jrc.it](http://image2000.jrc.it).

The development of CLC2000 involved some 300 experts from about 100 organisations across Europe and cost around 13 million Euro. Creating the CLC2000 database took some 150 person-years of work.

CLC2000 will provide input to the EC's "Inspire" (Infrastructure for Spatial Information in Europe) initiative. This aims to set up a database of consistent geographical information to support environmental protection policies, infrastructure development, agriculture and maritime navigation ([www.ec-gis.org/inspire](http://www.ec-gis.org/inspire)). CLC2000 also contributes to the EC / ESA initiative on Global Monitoring for Environment and Security (GMES), which from 2008 will provide environmental information from a combination of air- and space-based observation systems and field monitoring. Corine (Coordination of Information on the Environment) was set up in 1985, before the EEA was created.

The EEA is the leading public body in Europe dedicated to providing sound, independent information on the environment to policy-makers and the public. Operational in Copenhagen since 1994, the EEA is the hub of the European environment information and observation network (Eionet), a network of around 300 bodies across Europe through which it collects and disseminates environment-related data and information. An EU body, the EEA is open to all nations that share its objectives.

It currently has 31 member countries: the 25 EU Member States, three EU candidate countries (Bulgaria, Romania and Turkey) and Iceland, Liechtenstein and Norway. A membership agreement has been initiated with Switzerland. The West Balkan states (Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, and Serbia and Montenegro) have applied for membership of the Agency. This article is from a report on the EEA web-site ([org.eea.eu.int](http://org.eea.eu.int)) on 17 November 2004.

### 3.4 Centre for Satellite Communications & RS

Dear Colleagues,

Istanbul Technical University (ITU) - Centre for Satellite Communications and Remote Sensing (CSCRS) is one of the foremost institutions in the world with a highly capable ground-receiving station unit. ITU-CSCRS has the capabilities for acquiring images from SPOT 2/4, RADARSAT, and ERS-2 satellites, processing data, and sending the products via satellite links to resident and foreign users. The station can receive images of the Earth's surface within a radius of 3,000 km. centred at Turkey, covering from Sweden to Sudan, and England to Kazakhstan.

You can reach to extensive information about the Centre in our new web-site and our on-line archive from [www.cscrs.itu.edu.tr](http://www.cscrs.itu.edu.tr). It will be a pleasure and honour collaborating with you in the projects on satellite communications and RS. You are kindly invited to fill in our "Customer Form" (at [www.cscrs.itu.edu.tr/page.en.php?id=17](http://www.cscrs.itu.edu.tr/page.en.php?id=17)) which is prepared in order to strengthen our relationships. Thanks for your co-operation.

Cordially yours,  
ITU-CSCRS

### 3.5 EuroSDR: eLearning Distance Courses in GI

Dear colleagues,

I would like to remind you to register for the EuroSDR (European Spatial Data Re-



search) eLearning distance courses in: (1) Digital Cameras / Sensors (from Ohio State University); (2) Coordinate Reference Systems (from Dublin Institute of Technology (DIT)); (3) Positional Accuracy Improvement in GI Databases (from DIT, OSGB and EuroSDR Commission 4).

The official closing date for receipt of application forms is Friday 4 March 2005. Details from [Stephney.moore@dit.ie](mailto:Stephney.moore@dit.ie) or

from the EduServ web-site ([www.dit.ie/geolearn](http://www.dit.ie/geolearn)).

With my very best regards,  
Kevin Mooney (Secretary-General EuroSDR, web-site: [www.eurosd.org](http://www.eurosd.org)), Department of Geomatics, The Dublin Institute of Technology, Bolton Street, Dublin 1, Ireland. Phone. +353-1-4023730. Fax. +353-1-4023999. E-mail: [kevin.mooney@dit.ie](mailto:kevin.mooney@dit.ie). Web-site: [www.dit.ie/geomatics](http://www.dit.ie/geomatics).

## 4 RS DATA, PRODUCTS & PROJECTS

### 4.1 Paper: Radar RS for urban planning

*Laying the Groundwork for a New Look at our Cities: Radar for Urban Planning*

*Katrin Molch ([katrin.molch@ccrs.nrcan.gc.ca](mailto:katrin.molch@ccrs.nrcan.gc.ca)), Canada Centre for Remote Sensing, Natural Resources Canada, 588 Booth Street, Ottawa, Ontario, Canada K1A 0Y7. Phone: +1-613-9471289. Fax: +1-613-9471385.*

#### Facing the challenges:

Radar remote sensing (RS) has firmly established its niche where reliability and all-weather, day-and night capabilities are a must, e.g. as an operational sea ice monitoring tool in Canada, or for military reconnaissance purposes. For other land applications its role is still not fully developed. This also applies to urban mapping, where in northern or tropical locations the all-weather capability would be a definite advantage.

With radar data having a reputation as being difficult to exploit, optical imagery is often preferred. Visual analysis of SAR data is made difficult by the presence of speckle, the reduction of which comes at the cost of reduced spatial resolution. Common pixel-based classifiers – though still applied frequently to untreated radar images – are bound to fail: SAR translates target geometries and material properties into complex SAR signatures. Their exploitation requires more sophisticated approaches, based on thorough knowledge of radar target-to-image principles and procedures.

Several promising tools such as texture and shape based segmentation algorithms and classifiers are now commonly available. However their integration into operational SAR exploitation work-flows lies ahead. In addition to exploring the usefulness of some of these tools, the ESA pilot project ECOMON looked more closely at SAR signatures, in order to find quantifiable characteristics which could be used in future feature extraction algorithms. A major task within the project was to explore, within an urban context, the contribution of interferometric coherence imagery.

Complementary to similar research conducted in an agricultural context, ECOMON focused on urban land use differentiation. Its operation principles should make SAR well-suited for planning related urban classifications. Not responding to spectral surface characteristics, it is sensitive to variations in surface roughness, which in an urban environment is the reflection of varying urban physiognomy – a composite of building structures and surrounding surface properties. This type of differentiation is an important input parameter for e.g. urban sprawl monitoring, the design of cellular networks or disaster mitigation measures.

Within an urban planning project this specific 3D urban topography will be used over the next few years to establish building typology databases for various urban centres. The information at the level of detail required for this type of urban typolo-

gy will be extracted from SAR and optical data in a multi-sensor approach. Within this framework, the goal of the study was to establish to which degree new approaches to SAR data analysis and the exploitation of interferometric information can contribute to these goals. In a European context, an additional challenge in satellite-based urban classification is posed by the commonly small extent of land use tracts within a city.

**From Data to information:**

Density slicing, piecewise colour-coding an unfiltered ERS-1 SLC intensity image (acquired 29 August 1995), and the extraction of co-occurrence based texture parameters, were used as an approach to enhance visual interpretability and to reveal land use specific backscatter patterns. As an example, the visual differentiation of industrial vs. medium density residential areas was improved on a colour-coded density slice vs. the black and white SLC image. Neither the image enhancements nor the texture analysis, however, facilitated the differentiation of high-density residential vs. industrial areas, or of forest and low density residential areas.

A definite step towards a clearly improved visual interpretability was achieved by integrating an interferometrically derived (phase) coherence image (from ERS-1 /-2 tandem pair 29-30 August 1995, perpendicular baseline 39 m) and the SAR intensity image in an RGB colour composite (Figure

1). Forest and low density residential areas are clearly delineated on the integrated image product. From a system perspective, this confirmed that phase coherence values indeed respond to the percentage of hard targets vs. volume scatterers within a SAR resolution cell.

No georeferencing or speckle filtering was applied, so as not to mask the original system-induced backscatter patterns. In detailed visual comparisons of land-use specific signature characteristics it was found that, in addition to shape and size of pixel aggregations, overall brightness, dynamics of pixel values in one land use type, their distribution, the number and ratios of pixels in a certain range of grey values, helped to discriminate between land use types. With the exception of shape-based criteria, most of these parameters can be quantified using local histograms.

Statistical analyses of local histograms extracted from unfiltered ERS SLC intensity, coherence, and difference images for several test sites of each relevant urban land use type confirmed that some of these parameters become apparent in the grey value distributions. For the coherence image, for example the skewness of the histograms changes from left-skewed to right-skewed, with decreasing mean and median for increasingly vegetated land uses. Therefore it allows a visual as well as numerical differentiation of e.g. forested vs. low density residential areas (Figure 2).

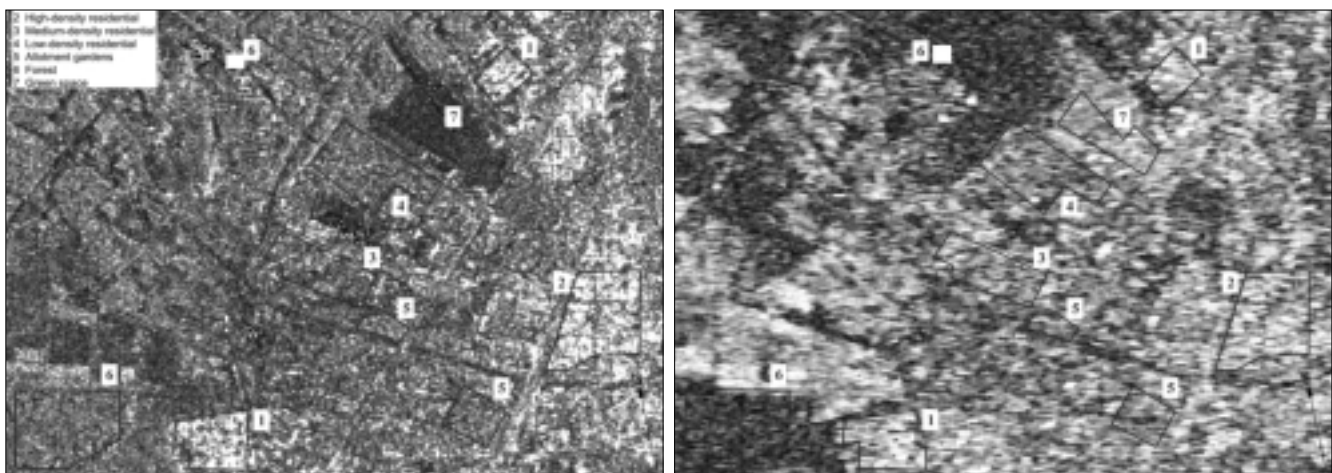


Figure 1: ERS unfiltered SLC intensity (above) and coherence images (below). Forested (6) and low-density residential areas with numerous mature trees (4) can be easily distinguished on the coherence image. Spatial delineation improves considerably in an RGB colour composite of both.

Having been used successfully for target discrimination on IRIS airborne SAR image data in the 1980s, the analysis of the distribution of secondary maxima surrounding a scattering centre, as well as local pixel statistics involving distribution and gradients of pixel values surrounding a target, did not reveal significant helpful discriminating parameters in case of the ERS SLC image data.

#### Where to go From Here?

The advent of new, higher resolution, interferometric and polarimetric satellite SAR sensors, coupled with the need to operationalise exploitation procedures for repeated large area coverage – for urban areas e.g. in the context of security and hazard related mapping tasks – justifies a new and closer look at the above mentioned procedures.

Several studies have looked at SAR texture and the contribution of coherence informa-

tion for urban classification using various approaches in exploring multi-baseline coherence behaviour or texture measures to improve image segmentation (e.g. Fanelli, 2000; Grey, 2000; Dekker, 2003). This study explored the nature of SAR and interferometric signatures for specific urban land uses by analyzing in detail the characteristic pixel patterns using dedicated quantitative methods.

ECOMON, as a reconnaissance study limited to a small number of sample test sites and methods employed, did provide a number of ideas for possible useful routes for future research concerned with automatic feature extraction. It provided some insight into the structural content of ERS SLC and coherence data. Knowing how SAR data "code" land use specific surface parameters into pixel signatures is more than likely going to be the key to developing algorithms for successfully segmenting and classifying SAR imagery in possibly multi-temporal or sequential approaches.

#### References:

- Dekker, R.J. 2003. Texture analysis and classification of ERS SAR images for map updating of urban areas in the Netherlands. *IEEE Transactions on Geoscience and Remote Sensing* 9, Vol. 41, (September): 1950-58.
- Geile, W., K. McVey and C. Willey. 1994. Sequential image processing of urban SAR-textures. In *EARSel: Book of Abstracts of the First International Airborne Remote Sensing Conference, Straßburg, August 1994*. Paris: EARSel-Publications.
- Geile, W., H.-G. Klaedtke and K. Molch, 2002. Using texture information for semi-automated classification of urban land use from high-resolution airborne radar data. *Proceedings of IGARSS '02, 24-28 June 2002, Toronto*.
- Fanelli A, et al. 2000. Understanding ERS coherence over urban areas. *Proc. of the ERS/ENVISAT Symposium, Göteborg, Sweden (October)*.
- Grey W. and A. Luckman. 2000. Deriving urban topography from multi-baseline SA interferometric phase coherence images. *Proc. of the ERS/ENVISAT Symposium, Göteborg, Sweden (October)*.

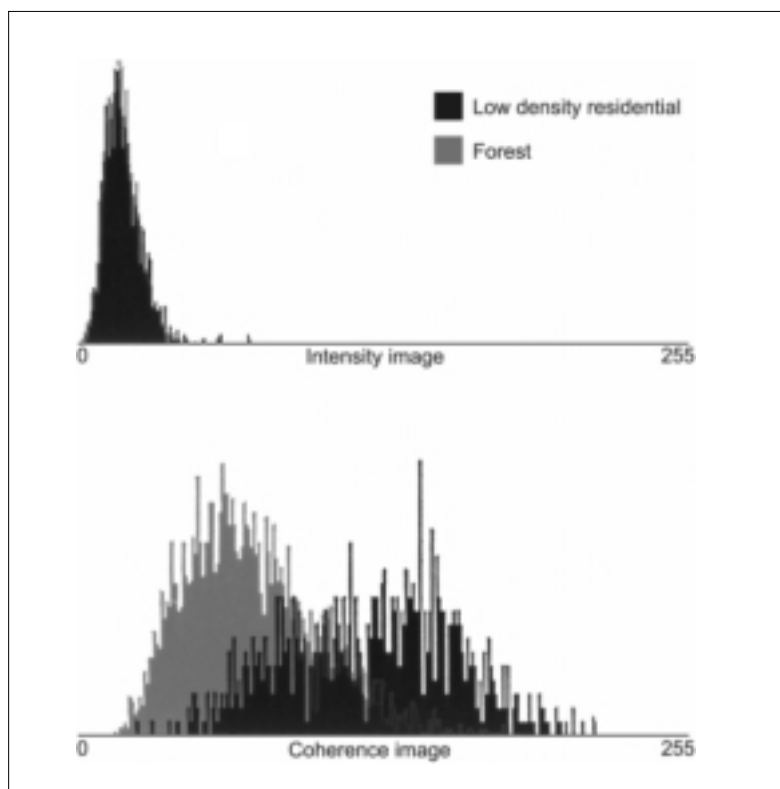


Figure 2: Comparison of local histograms generated from the SLC intensity and coherence images for a low density residential area and forest. On the intensity image the grey value distributions for both areas are nearly identical, whereas on the coherence image they are clearly different. Numerically this difference is reflected in statistical parameters such as minimum, maximum, range, mean, median, and skewness.

- Haralick, R., K. Shanmugam and I. Dinstein. 1991. Texture features for image classification. In: IEEE Transactions on Systems, Man, and Cybernetics 3. 610-621.
- Henderson, F. 1983. A comparison of SAR brightness levels and urban land-cover classes. Photogrammetric Engineering and Remote Sensing 11, Vol. 49, (November): 1585-91.
- Molch, K. 1997. Die Verwendung von Intensitäts- und Kohärenzbildern aus ERS-1 / ERS-2 SLC-Daten zur Verbesserung von Flächennutzungsklassifikationen. Master's Thesis, University of Freiburg.
- Molch, K. 1997. ECOMON - Improving urban land use / land cover classification using ERS-1 / ERS-2 intensity and coherence images. ERS Project Report. Freiburg: Department of Physical Geography.
- Molch, K. 1997. Kohärenzbilder - ein neuer Weg zur Siedlungskartierung mit ERS-1? GeoBit 8 (December), pp. 38-9.
- Pfeiffer, B. 1985. Texturanalyse und Klassifizierung von Flugzeugradardaten mit synthetischer Apertur. Bildmessung und Luftbildwesen 53, 3: 100-107.
- Wegmüller, U. and C. Werner. 1995. Farmland monitoring with SAR interferometry. Proceedings of IGARSS '95, Florence, Italy, 10-14 July 1995.

#### 4.2 Mobile phones damaging microwave RS signals

Meteorologists fear they are losing one of their essential forecasting tools – microwave frequencies uniquely able to "see" through clouds from satellites. They say commercial applications, for example mobile phones and collision avoidance systems, are ruining them. The use of the bands in this way causes interference and contaminates the satellite data, making them useless. Not only weather forecasting is put at risk, but also a better understanding of how climate change is developing. Progress in both forecasting and climate studies depends on observations from space of the Earth's surface and atmosphere.

Many of these observations depend in turn on using microwave frequency bands,

which are increasingly in demand for terrestrial use. Examples include mobiles, wireless networking, other long-distance radio communications, and remote triggering devices. New military communications technologies are reported to pose another threat.

Dr Stephen English, manager of the satellite radiance assimilation group at the UK Met Office, said: "Microwave observations are vital because they see through cloud. This is not possible in any other frequency band. We only need a few narrow-frequency bands for Earth RS, but most of these are unique, so there is no alternative. These bands are primarily used for temperature, water vapour, sea ice, clouds (ice and liquid), and rainfall and snowfall estimation. We also use them to monitor surface snowpack, soil moisture and sea surface temperature." A meteorologists' working group on frequency management says protecting key regions of the microwave spectrum for passive RS is "a dramatic challenge", because of "the huge pressure of the commercial and military telecoms".

Two important bands (6.8 GHz and 10.7 GHz) have been lost already for use over land, but in the next few years the threat is likely to spread to other bands. There is particular concern about protecting the 23.6-24 GHz band, which has the unique property of being sensitive to water vapour but not to liquid water. Dr English said: "There is no other frequency where this occurs. But car radars will now be allowed to broadcast in this frequency band."

An instrument called the Advanced Microwave Scanning Radiometer, on NASA's Aqua satellite, monitors rainfall as it "sees through" the cloud above the rain. Land and sea look very different at this frequency. In an image, taken in mid-October, the ocean appears black where it is not raining, and magenta or blue where it is. Blobs of red and yellow over the main urban areas show radio frequency interference (RFI), which is much hotter than actual surface or atmospheric temperatures over the UK in October.

Dr English said: "The hot spots are easy to spot, but more worrying is the fact that

smaller variations may be RFI, or they may be due to rain. The truth is we can't tell. Therefore the channel is rendered useless not only in the hot spots but everywhere, because we can no longer uniquely interpret the variations in terms of rainfall. Of course, over the ocean man-made signals are limited, so we still regard this channel as useful over the ocean, but it's no longer useful over land." Experts say this band should not be jeopardised under any circumstances, and all emissions able to cause interference should be prohibited.

The UN body which is the final arbiter on frequency use is the International Telecommunication Union. Dr Steve Foreman of the Met Office told the BBC: "We're in a David and Goliath situation, arguing to the ITU for the safety and humanitarian uses of frequencies against some applications with very strong financial backing." This article is from a report on the BBC web-site ([news.bbc.co.uk/2/hi/science/nature/4104355.stm](http://news.bbc.co.uk/2/hi/science/nature/4104355.stm)) on 17 December 2004.

#### **4.3 Aura satellite monitors Earth's atmosphere**

The air around us seems abundant from Earth. But from space, our endless blue sky is only a thin shield around a massive planet. Our atmosphere is fragile; yet, it is a life-saver. Without it, the Earth would be frozen, lifeless, and pummelled by cosmic radiation. So it is in our interest to protect it. Now a recently launched satellite is beaming back information that may help.

In orbit since July 2004, to monitor ozone, climate change and air quality, NASA's, Aura satellite has already produced the first direct measurements of lower atmospheric - tropospheric - ozone from space, including chemicals that are a precursor to "bad ozone" at ground level, and those that form high levels of ozone over the tropics. It has also provided new images of the ozone hole over Antarctica. With colourful high-resolution images, and a bit of animation, scientists can watch chemical reactions in the atmosphere daily, such as the conversion of safe chlorine to the dangerous form that destroys stratospheric ozone. It is an unprecedented look at the health of

the swirling mix of trace gases that protect life on Earth, and also the chemical reactions that threaten it.

"Our results are exceeding our wildest expectations," said Phil DeCola, NASA's Aura Programme Scientist, at the autumn 2004 Meeting of the American Geophysical Union (AGU) in San Francisco. Dr DeCola said that the view of the atmosphere from space was essential to understand its composition and chemical dynamics. Current air quality measurements are limited by less sensitive ground-based instruments. "You'd need millions, perhaps billions of sensors on the surface to get this kind of information," said Dr DeCola.

Scientists say Aura will tell them if the ozone layer is recovering and if atmospheric treaties such as the Montreal Protocol - designed to reduce ozone-depleting substances in the atmosphere - are working. Aura monitored both the good stratospheric ozone that shields us from ultraviolet radiation, and the toxic ozone below, in the air we breathe, explained Aura Project Scientist Mark Schoeberl. "Ozone will attack your lung tissue and make you really sick. So we're interested in air pollution, a component of which is ozone. It's a critical issue for urban, mega-city environments." Car exhausts, chemical solvents and industrial emissions all can lead to bad ozone.

The satellite will also monitor the effect of climate change on atmospheric gases and tiny particles or aerosols. Aerosols add an uncertain element to climate change because they are highly variable in effect - either reflecting or absorbing heat, depending on their type and where they reside in the atmosphere. Their overall contribution to climate change is not clear.

While the Antarctic ozone hole seems to be on the mend, climate change could create a new hole at the North Pole. There is still about seven times the natural amount of chlorine in the atmosphere, left over from the chlorofluorocarbons (CFCs) of several decades ago, according to Joe Waters, a principal investigator from the NASA Jet Propulsion Laboratory (JPL). It will take 30 years or so to clean out that chlorine. At the same time, a cooling of the stratosphere

brought on by climate change, he said, could produce ice, which can convert that chlorine to the dangerous form.

Dr Waters said: "So one of the things we're watching, particularly in the Arctic, which is right on the threshold of more ozone destruction, is whether will there be more or less ozone destruction in the years ahead. Over the next decade there's going to be a very interesting race". Dr Schoeberl said that early Aura results detected high levels of tropospheric ozone over the tropics, but without the elevated levels of carbon monoxide usually associated with biomass burning, an otherwise likely source. "So where is this ozone coming from? It's kind of mysterious right now what's causing these high levels of ozone".

Scientists say they are pleased with Aura's performance, despite the earlier-reported partial obstruction of the aperture on the High Resolution Dynamics Limb Sounder (HIRDLS), by a piece of plastic, apparently dislodged during take-off. Scientists said they expected to clear the lens. All four highly sensitive instruments monitor ozone, but each also tracks specific chemicals according to their wavelengths, or frequencies. "Just as you can tune your radio to classical music or rock," said Dr Waters, "we build these fancy radio receivers and we tune into certain molecules."

For example, the Microwave Limb Sounder (MLS) uses microwaves to track the safe and ozone-destroying compounds of chlorine. The Tropospheric Emission Spectrometer (TES) scans molecules that are picked up in the infrared, such as nitrogen dioxide, which is belched out from cars and trucks, and is a precursor to ozone in the lower atmosphere. The Ozone Monitoring Instrument (OMI) detects chemicals in the visible and ultraviolet parts of the spectrum, while HIRDLS monitors the infrared. With four instruments sweeping the sky in different bands of the electromagnetic spectrum, "it's hard for an air parcel to escape detection", said Dr Schoeberl.

In the 90 minutes or so it takes Aura to complete its orbit, the satellite can determine the abundance of key molecules in

the atmosphere and compile a global map within a day. "All these instruments work together like in a symphony, to tell us more about the whole picture," said Dr Waters. The global picture is an important one. Pollution rarely respects national boundaries. Atmospheric currents will take an aerosol particle, or molecule of gas, whip it into the stratosphere, and send it circum-navigating the globe. Dr DeCola said: "You emit a molecule of CO<sub>2</sub> when you exhale in New York City, and in two weeks someone can be breathing that molecule of CO<sub>2</sub> in Beijing".

Scientists believe Aura could revolutionize air quality monitoring in the same way weather satellites transformed weather prediction in the 1960s and 1970s. Dr DeCola said: "We predict weather, but we can't change the weather. But we can, hopefully, predict air quality and also change air quality." This article is from a report on the BBC web-site ([news.bbc.co.uk/2/hi/science/nature/4112351.stm](http://news.bbc.co.uk/2/hi/science/nature/4112351.stm)) on 20 December 2004.

#### **4.4 Free InSAR software package from JPL**

A Repeat Orbit Interferometry Package (ROI\_PAC V2.2), developed by JPL, that allows researchers in the area of topography and surface change to apply Interferometric Synthetic Aperture Radar (InSAR) methods, is now freely available, through the Open Channel foundation.

ROI\_PAC, developed primarily to work with ERS data, currently supports ERS-1, ERS-2 and JERS data, and is configurable to work with "strip-mode" data from all existing satellite radar instruments. InSAR is the synthesis of conventional SAR techniques and interferometry techniques that have been developed over several decades in radio astronomy and radar RS, and in recent years has opened entirely new application areas for radar in the Earth system sciences, including topographic mapping and geodesy. The first release of ROI\_PAC (V1.0) was made quietly in 2000, and roughly 30 groups in the academic and research community currently use it.

ROI\_PAC uses raw radar data, ancillary information from telemetry and navigation solutions, and DEMs (externally provided or interferometrically derived) to derive a variety of data products, including the full resolution images, interferograms, phase images measured as principal value and continuously "unwrapped," DEMs, and error estimates. Each product is available in its natural radar coordinate system and georeferenced to a DEM. The software computes the interferometric baseline (i.e. the orbital separation of the satellite at the observation times) from the provided navigation solutions, and then refines the estimate to the millimetre level of precision

using the provided DEM and optional deformation model as reference. To remove the topographic signature from an interferogram, ROI\_PAC simulates an interferogram from the orbit data and the DEM, and subtracts the phase from the measured interferogram, leaving just the deformation phase.

ROI\_PAC implements its fundamental algorithms in C and Fortran 90 and drives each executable module with a Perl control script, running on SGI, Sun, and Linux platforms. Web-site: [openchannelsoftware.org/projects/ROI\\_PAC/](http://openchannelsoftware.org/projects/ROI_PAC/) Copyright 2002, 2003, 2004, 2005 Caltech / JPL.

## 5 REVIEWS, PUBLICATIONS & REPORTS

### 5.1 AARSE: RS & African sustainable development

*Report on the Experts meeting on "Access and use of available global Landsat data for supporting sustainable development in Africa", at UNEP Headquarters, Nairobi, Kenya, on 22 October 2004*

*Bancy M. Mati, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya*

This one-day meeting, held after the AARSE (Association of African Remote Sensing of the Environment) conference at the same venue, focused on the types of Landsat data freely available to African scientists and how to acquire them. The main objectives were to: enable better coordination between providers and users of Landsat data within and between national institutions, developing a common vision on how to enhance access and use of Landsat data, including at multiple levels in Africa; get a commitment from African stakeholders and institutions for dissemination nodes of data in countries and sub-regions; make recommendations on decision support tools.

It was clarified that UNOOSA (UN Office for Outer Space Affairs) is ready to respond

to ten proposals that utilize Landsat data. The need to provide free satellite data to Africa had agreed at during the World Summit on Sustainable Development in Johannesburg (2002), with a view to promote the development and wider use of Earth observation (EO) technologies, including satellite RS global mapping and geo-information systems. The Geographic Information for Sustainable Development (GISD) has been working with NASA, ESRI, Open GIS consortium, USAID, UNEP, FAO and the international Academy of sciences to support data with deliverables such as studies of the Congo Basin Forest, the Clean Energy Initiative, Cutting Hunger in Africa, and in education.

The meeting received high quality presentations from representatives from UNOOSA, the Regional Centre for Mapping and Remote Sensing (RCRMD), UNEP, SADC/RRSU and USGS. UNEP made a presentation of the GRID web-site which comprises a high capacity of 3.6TB of data and has been created in collaboration with ESRI, Clarke University, WRI, University of Maryland and FAO. These data are launched with the national and regional institutions such as the RCMRD. Other presentations also touched on platforms such as Corona satellite data, which generated a lot of interest from the participants. In ad-

dition, progress in the use of RS data in Eastern, Western, Southern, and Northern Africa were presented.

Towards the end, the way forward was formulated, which included among other things, the need to raise awareness in Africa on the existence of free and affordable satellite data, the importance of involving new, smaller diversity of stakeholders such as universities, research community and NGOs, the need to document success stories of where RS data has helped in sustainable development, the need to incorporate Landsat data in the teaching curricula and research initiatives, as well as capacity building to improve the use of satellite data. The following are some of the web-sites mentioned at the meeting: [www.earthsat.com](http://www.earthsat.com); [www.geocover.com](http://www.geocover.com); [www.fao.org/geonetwork](http://www.fao.org/geonetwork); [grid-nairobi.unep.org](http://grid-nairobi.unep.org); [maps.geog](http://maps.geog); <ftp://ftpcgceo@landsatftp.geo.msu.edu>.

## 5.2 Report: 2004 Meeting of RSPSoc, in Aberdeen

*Report on the Annual meeting of the Remote Sensing and Photogrammetry Society (RSPSoc) in Aberdeen, UK, on 7-10 September 2004*

*Madeleine Godefroy, EARSel Secretariat*

The annual meeting of RSPSoc took place at the Aberdeen Exhibition and Conference Centre in Scotland, UK, on 7-10 September 2004. It was preceded by a two-day workshop on "Land Cover / Land Use Change Detection" at the Macaulay Institute, Aberdeen. The theme of the conference was "Mapping and Resources Management", which gave an opportunity to mix and blend papers addressing RS techniques and applications and those with a photogrammetric approach. Since the fusion of the two communities, this blend is gradually working more smoothly, with some parallel sessions more specifically aimed at one or the other community.

Some 170 delegates, mainly from the UK, but also some from Europe and other continents, gathered at the pleasant and modern Aberdeen Conference Centre, which

provided excellent services and catering. The meeting was also blessed with a week of fine, sunny weather, which also helps a meeting to go with a swing.

The main sponsors of the meeting were the British National Space Centre and the Ordnance Survey. Other sponsors included Qinetiq, BAE Systems, PCI Geomatics, Leica Geosystems, Z/I Imaging (Intergraph) and publishers Taylor & Francis, Blackwells and Whittles.

Invited speakers included Prof. Clive Fraser of the University of Melbourne, who spoke on "Modern Developments in Close Range Photogrammetry", and Dr. Vanessa Lawrence, Director-General of the UK Ordnance Survey, who presented "Mapping and Resources Management: The Ordnance Survey Vision".

The present Chairman of RSPSoc, Mr. Ian Dowman – a Scot by the way – who cut a dashing figure at the annual dinner in his full regalia, reached the end of his mandate at this meeting and is now succeeded by Dr. Stuart Marsh of the British Geological Survey, who is very active both in his sphere at home and on several international committees. A special event was entitled the "Chairman's Half Hour", a plenary session in which the outgoing and incoming Chairmen presented their views on achievements to date and their vision for the future policy of the Association. Questions and comments were invited from the audience and this addition to the programme was certainly helpful for Council in their policy discussions. Among conclusions reached was approval of holding one or maybe two specialist Workshops before the annual conference, which would attract more attendance and broaden the scope of fields of research thus presented.

Another special event was a vendors' workshop, organised by Mr. John Allan of BAE Systems. The aim of this was to allow the software vendors present to discuss, in a non-competitive atmosphere, the current trends in offer and demand of software, to talk about the problems they face and to stimulate ideas for offering better products and services.



No report on a meeting is complete without mentioning the Civic Reception and the Conference Dinner. Both these events took place in the prestigious Town House in Aberdeen, built in 1873, which was for many years the most prominent building in the city. It is a fine example of the Victorian architecture that makes the "granite city" famous. Delegates were treated to a very Scottish menu, including haggis, which was very much enjoyed. Dinner was preceded by the traditional awards ceremony, during which Prof. Ian Dowman, newly-elected President of the ISPRS, received the Society's gold medal for the outstanding contribution he has made throughout his career to both photogrammetry and RS.

The organiser of the conference, Prof. Arthur Cracknell, and the RSPSoc Secretariat in Nottingham are to be congratulated for organising a successful and enjoyable annual meeting. Next year, this event will take place in Portsmouth, organised by Dr. Richard Teeuw, on the theme: "Measuring, Mapping and Managing a Hazardous World".

### 5.3 Report: 1st Göttingen GIS & RS Conference

*Report on the 1st "Göttingen GIS and Remote Sensing Days" (GGRS2004) – Environmental Studies, in Göttingen, Germany, on 7-8 October 2004*

*Dr. Stefan Erasmi, University of Göttingen, Germany*

On 7-8 October 2004 the 1st "Göttingen GIS and Remote Sensing Days", GGRS2004, took place at the University of Göttingen, Germany. The conference was hosted by the Institute of Geography and jointly organised together with the Institute of Forest Biometrics and Applied Computer Science as well as the Institute of Forest Management of the University of Göttingen.

The topics of the conference were mainly related to RS applications in environmental sciences and forestry. Besides these applications, emphasis was on technical aspects of RS and GIS analysis. Summarizing, the

major topics of the conference were: local, regional and global environmental change; detection of forest attributes at single tree and stand scale; hazard forecasting and management; methods, models and instruments for spatially explicit land use systems.

GGRS2004 were attended by 220 participants from 29 European and non-European countries. During the two days 68 oral presentations were given. The oral sessions were conducted in plenary sessions with sophisticated keynote speeches as well as parallel sessions (thematic sessions) of high quality. The programme was completed by a poster session including more than 80 posters.

Publications of the conference full papers are now available, and will be distributed to all attendees. The conference proceedings may also be purchased from the conference secretary. For further information and contact: [ggrs@uni-goettingen.de](mailto:ggrs@uni-goettingen.de), [www.ggrs.uni-goettingen.de/](http://www.ggrs.uni-goettingen.de/) The next GGRS meeting is on 4-6 October 2006 (Göttingen, Germany).

### 5.4 Report: Natural Hazard Management Symposium

*Report on the International Symposium "Cartographic Cutting Edge Technology for Natural Hazard Management", in Dresden, Germany, on 21-22 October 2004*

*Prof. Dr. Manfred Buchroithner, Dresden University of Technology*

Starting with a "get together" in the evening of October 20, 2004, an International Symposium entitled "Cartographic Cutting Edge Technology for Natural Hazard Management" took place in Dresden, Germany, on 21-22 October 2004.

The meeting, which attracted a small but very qualified group of around 50 experts from Europe, North America and Asia was organised by the Institute for Cartography of the Dresden University of Technology, under the auspices of the German Cartographic Society (DGfK) and, mainly, the International Cartographic Association (ICA). The President of the latter, Prof. Milan Konecny, was present and gave an



*GGRS Conference committee (left to right): Stefan Erasmi, Christoph Kleinn, Bernd Cyffka, Martin Kappas, Jens Nieschulze, Branislav Sloboda, Ronald McRoberts.*

enlightening speech outlining the important role of cartography and GI science for various disaster aspects. He also reported about the recently installed ICA Commission on Early Warning, which clearly indicates ICA's commitment to the aspects of near real-time cartographic information transfer for the sake of destruction and death avoidance through natural disasters.

The presentations covered the whole range from more theoretical to application-oriented papers. Geo-data structures, geo-data modelling, (wireless) geo-data communication and visualisation (e.g. on PDAs) were addressed, as well as positioning (e.g. GPS), location-based services and decision support systems. The speakers dealt with the role of cartography and GI technology for mitigation, prevention, monitoring and rescue operations. Various cases of the management of both geological and meteorological disasters (e.g. snow avalanches) were reported. Geographically the examples reached from local (Saxonian) and German cases to the global view, the latter being mainly addressed by the representatives of the insurance industry.

The initial idea to trigger or foster the exchange of ideas, knowledge and skills

amongst leading GI and cartography experts, and between those and the actual data users, was achieved to a high degree of satisfaction. This goal will be further enhanced through the issuing of the Symposium proceedings in the form of an official ICA publication.

The response to the press conference well reflected the eager interest of the public to the whole issue of natural disaster management, especially because memories of the one-hundred-year Elbe River flood, in August 2002, were fresh in the minds of the locals. It was, however, new to many of the journalists that today both analogue and (most of all) digital display techniques - not to mention location-based services - are playing an increasingly important role in all catastrophe-related activities. Especially the statements of the geo-data expert of the Munich company Re, the world's biggest re-insurance company, captured the interest of the media. Dr. Andreas Siebert stated that all the various types of disasters show a notable increase at a global scale.

The reports of three East German newspapers and the German Press Agency (DPA), as well as of two TV channels, are evidence of the increasing public awareness about

the role of cartography and RS for disaster management.

### 5.5 Workshop: OASIS Science Plan

The Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) Project Planning Workshop was held in Rome, Italy, from 10-12 January 2005. OASIS is being formulated as a core project for the upcoming International Polar Year 2007-2008. The goal of the workshop was to produce an Implementation Plan for the coming 5-10 years. A road map for the project was developed and decisions on locations, platforms and experiments (including laboratory, field work and model development) were made. Further information is at the web-site [www.iaa.cnr.it/OASIS](http://www.iaa.cnr.it/OASIS). To view the OASIS Science Plan, visit: [www.chem.purdue.edu/arctic/OASISHomePage.htm](http://www.chem.purdue.edu/arctic/OASISHomePage.htm)

### 5.6 EURISY Symposium: RS for Maritime Users

The EURISY Symposium "New Space Services for Maritime Users: The Impact of Space Technology on Maritime Legislation" was held in Paris, France, on 21-23 February 2005. The Symposium had two objectives: assessing the state of the art using RS technologies for maritime transport security and safety, resources exploitation; providing recommendations for the preparation of a legal updating on maritime transport in Europe. Particular themes of interest to EARSel

members concerned maritime surveillance and coastal zone management. Further information is at the web-site [www.eurisy.asso.fr](http://www.eurisy.asso.fr).

### 5.7 UK's Forestry Research Programme web-site

The Forestry Research Programme (FRP) of the UK Department for International Development (DFID) has recently launched its completely re-developed web-site ([www.frp.uk.com](http://www.frp.uk.com)). A regularly updated news section keeps visitors up to date with developments of FRP projects. The web-site features information about research projects funded by FRP and provides access to a comprehensive collection of documents and outputs generated by UK Government-funded tropical forestry research projects since 1963. Via the web-site, visitors can also link easily to web-sites of related research institutions and international organisations. The web-site contains all project cycle management documents of relevance to current project teams. The FRP is one of ten competitive grant programmes within DFID's renewable natural resources research strategy (RNRRS) for 1995-2006. It supports research to improve the livelihoods of forestry- and tree-dependent poor people in developing countries. Research topics are prioritised following detailed demand surveys within partner countries and specific calls for concept notes published on the web-site.

## 6 FORTHCOMING MEETINGS & COURSES

### 6.1 RGLDD Conference on Desertification (Trier)

An International Conference on "Remote Sensing and Geo-Information Processing in the Assessment and Monitoring of Land Degradation and Desertification" (RGLDD) will take place in Trier, Germany, on 7-9 September 2005. The web-site for the conference, for registration, abstract submission etc., can be found under [www.feut.de/rgldd](http://www.feut.de/rgldd).

In past years, desertification and land degradation have been acknowledged as a major threat to human welfare worldwide. This has substantial environmental and societal implications, and has sparked the formulation of the UN Convention to Combat Desertification. While decision-makers and politicians are seeking solutions on national and global levels, land managers are actively tackling the problem on local areas with a strong

emphasis on prevention and mitigation strategies.

Notwithstanding the scale addressed, it is obvious that any measure taken against desertification, or the design of dedicated early warning systems, must take into account both the spatial and temporal dimensions of process-driving factors. Equally important, past and present reactions of ecosystems to physical and socio-economical disturbances or management interventions need to be understood. In this context, RS and geo-information processing support the required assessment, monitoring and modelling approaches, and hence provide an essential contribution to the scientific component of the struggle against desertification.

RGLDD aims at bridging the gap between methodological research and operational implementation by demonstrating how instruments and tools can be customized to serve the needs of organisations and land management authorities, to benefit local stakeholders. RGLDD will promote scientific exchange between specialists working on the interface of RS, geo-information processing, desertification / land degradation research and its socio-economic implications.

Although the Conference targets the scientific community, contributions with application perspectives are crucial, and we expect to have international bodies such as the UN Convention to Combat Desertification (UNCCD), Land Degradation Assessment in Drylands (LADA) project, and Land Use and Land Cover Change (LUCC) Project, involved in steering the event. Thus, both an overview of the state-of-the-art and operational opportunities will be presented. This is especially important to initiate a transfer of expertise from the scientific community to clients interested in applying these techniques. In this context, participation of scientists from the most affected countries is highly desired, and will be financially supported for eligible applicants.

The RGLDD Conference will comprise six sessions spread over three days:

- Session 1: RS-derived biophysical indicators of land surface properties.
- Session 2: RS-based monitoring of land degradation and desertification.

- Session 3: Integrated environmental modelling.
- Session 4: Early warning systems for drought and desertification.
- Session 5: Integration of physical and socio-economic domains.
- Session 6: Practical applications and implementation aspects.

The RGLDD conference is organised with the support of the European Commission – DG Research (Contract 5111007), under the EU's 6th Framework Programme.

## 6.2 45th ERSA Congress: modelling land use change

Dear colleagues,

It pleases us to invite you to the special session on Modelling Land Use Change, at the 45th Congress of the European Regional Science Association (ERSA), at Vrije Universiteit, Amsterdam, the Netherlands, on 23-27 August 2005.

Land use change is a key factor in the development of the human and physical environment. Models of land use change help understand this intricate system, and can provide valuable information on possible future land use configurations. This is crucial for policy-makers across the globe, dealing with such varied topics as urbanisation, deforestation, water management, erosion control, etc.

The ERSA 2005 Conference, entitled "Land Use and Water Management in a Sustainable Network Society", will host a special session on analysis and modelling of land use change. We encourage all contributions relating to recent work on this topic and are especially interested in papers on:

- Simulation of future land use scenarios.
- Land use simulation for spatial policy issues.
- Validation and calibration of land use models.
- Trends and driving factors in land use change.

Full papers can be published on the congress CD-ROM, if so wished. We also plan

a special issue in a relevant scientific journal, provided that sufficient high-quality contributions are submitted. More information on submission of papers, registration, the programme, accommodation and other practical issues, can be found at the website [www.feweb.vu.nl/ersa2005](http://www.feweb.vu.nl/ersa2005). If you are planning to contribute to this session, please indicate so specifically on the abstract submission form.

We hope to see you in Amsterdam.

Best regards, Aldrik Bakema and Ton de Nijs, the Netherlands Environmental Assessment Agency (MNP-RIVM)

*More information on the joint Dutch Land Use modelling activities can be found on: [www.lumos.info](http://www.lumos.info). Message forwarded by Eric Koomen ([ekoomen@feweb.vu.nl](mailto:ekoomen@feweb.vu.nl)), SPINlab-Vrije Universiteit Amsterdam.*

### **6.3 ISPRS's 2005 Hannover Workshop**

Earth imaging from air and space has undergone major changes in recent years. Examples of new and significant developments include the advent of digital aerial cameras, of high-resolution and hyper-spectral satellite imagery, and of laser scanning and SAR / InSAR data. With the integration of data from different sources, also calibration issues have become more important. Today, all these data are used for the production, refinement and updating of geospatial information. At the same time updating existing geospatial databases has gained more importance, while automation and the worldwide web have had a significant impact on the photogrammetric and RS processing chain.

These developments form the background for the ISPRS Hannover Workshop "High-Resolution Earth Imaging for Geospatial Information 2005", which will be held in Hannover on 17-20 May 2005, and to which you are cordially invited. This meeting is a follow-up Workshop of those held in Hannover in previous years, and also focuses on airborne issues, while giving due regard to developments in the satellite arena. The single-track Workshop

addresses experts in geospatial Earth Imaging from research, government, and private industry. It consists of high quality papers, presented orally or as posters, and will provide an international forum for discussion of leading research and technology developments and applications in the field.

The Institute of Photogrammetry and GeoInformation, University of Hannover, is proud to announce that the Intergraph company Z/I Imaging (web-site: [imgs.intergraph.de/imaging](http://imgs.intergraph.de/imaging)) has agreed to be the exclusive sponsor of this event. During the afternoon of 19 May, Z/I Imaging will conduct a master class in which the processing chain of photogrammetry and RS is illustrated through software demonstrations and real-life examples.

You are invited to contribute to the Workshop by submitting your latest research and development results in the areas of: digital aerial cameras; handling of high resolution space imaging; potential of small satellites for topographic mapping; airborne laser scanning; synthetic aperture radar (SAR) and interferometric SAR; sensor and system calibration and integration; direct geo-referencing and automatic image orientation; sensors and methods of DEM generation; aerial image analysis; GIS driven updating and refinement of geospatial databases, including quality assessment and quality control; from experimental systems for object acquisition and updating to commercial solutions; delivery mechanisms for photogrammetric products and services.

The conference language is English. All accepted papers will be published on CD-ROM which will be available at the workshop, and on the web. We strive to publish selected papers in the new ISPRS book series after the workshop. Deadline for full papers: 15 April 2005. For more information, please visit the web-site [www.ipi.uni-hannover.de/ISPRS\\_workshop\\_05](http://www.ipi.uni-hannover.de/ISPRS_workshop_05).

Looking forward to meeting you in Hannover.

Best regards, G. Boettcher

#### 6.4 19th Int'l Conference "EnviroInfo 2005"

The 19th international conference EnviroInfo 2005 - Informatics for Environmental Protection, will be held in Brno, Czech Republic, on September 7-9, 2005. It continues the successful series of conferences dedicated to environmental information exchange among scientists, public administrations, private and public companies as well as environmental informatics end-users. The forthcoming conference will cover the wide scope of environmental information systems topics. It will show current trends in research, development and application.

The 2005 conference will focus on networking environmental information as systematic approaches to information in the world for a sustainable development. For details see the web-site of the conference: [www.enviroinfo2005.org](http://www.enviroinfo2005.org)

#### 6.5 Int'l Symposium "ISPMSRS", in Beijing

The 9th International Symposium on Physical Measurements and Signatures in Remote Sensing (ISPMSRS) provides an international forum for advancing RS research with an emphasis on physical modeling, development of advanced inversion methods, and applications. It will be held at the International Conference Centre, Beijing, China on 17-19 October 2005. The official language of the Symposium is English.

This symposium series is affiliated with the ISPRS Commission VII/I Working Group on Fundamental Physics and Modeling. The previous eight meetings, beginning in

1981, covered a variety of topics comprehensively, and the 9th ISPMSRS will follow that tradition by soliciting both review and technical papers on the following suggested topics:

- Missions and sensors; land surface radiation modelling; sensor calibration and product validation; preprocessing techniques (e.g., atmospheric correction); data fusion and mining methods; data assimilation methods; super-spatial data analysis; hyperspectral data analysis and applications; SAR data processing and applications; Lidar RS and applications; inversion of surface radiation components; soil moisture and hydrological cycle; mapping snow / ice and geophysical properties; agricultural mapping and monitoring; carbon cycle and modelling; inversion of canopy biophysical properties; forest mapping and monitoring; land cover / use and change mapping; global environmental change and sustainable development.

Authors are invited to submit a one-page abstract of no less than 250 words in English. The submission deadline is 15 May 2005. Presenting authors must register by 30 August 2005. All abstracts will be posted on the web at [www.ISPMSRS2005.org](http://www.ISPMSRS2005.org) and [www.geog.umd.edu/ispmsrs2005](http://www.geog.umd.edu/ispmsrs2005). The deadline for full paper submission to the special issue of Remote Sensing of Environment, is 30 November 2005. Detailed instructions for the on-line submission of manuscripts are available at <https://www.editorialmanager.com/rse/>.

More details on this Symposium are available at [www.ISPMSRS2005.org](http://www.ISPMSRS2005.org) or [www.geog.umd.edu/ispmsrs2005](http://www.geog.umd.edu/ispmsrs2005).

#### 6.6 Calendar of forthcoming meetings

14-16 March 2005  
Tempe, Arizona,  
USA

**Joint Symposia: Remote Sensing & Data Fusion over Urban Areas (URBAN 2005) & Remote Sensing of Urban Areas (URS 2005)**  
Web-site: [www.urban-remote-sensing.org](http://www.urban-remote-sensing.org)

NEW  
14-18 March 2005  
Palazzo degli Affari,  
Florence, Italy

**Electronic Imaging & the Visual Arts**  
Web-sites: [www.vasari.co.uk/eva/florence](http://www.vasari.co.uk/eva/florence) & [lci.det.unifi.it](http://lci.det.unifi.it).

- 25-27 April 2005  
Warsaw, Poland  
**4th EARSeL Workshop on Imaging Spectroscopy: New Quality in Environmental Studies**  
Web-site: [www.wgsr.uw.edu.pl/zts/workshop/index.htm](http://www.wgsr.uw.edu.pl/zts/workshop/index.htm)
- NEW**  
17-20 May 2005  
Hannover,  
Germany  
**ISPRS Workshop on High-Resolution Earth Imaging for Geospatial Information**  
Web-site: [www.ipi.uni-hannover.de/ISPRS\\_workshop\\_05](http://www.ipi.uni-hannover.de/ISPRS_workshop_05)
- NEW**  
26-28 May 2005  
Estoril, Portugal  
**AGILE 2005: 8th AGILE Conference on GIS Science**  
Organised by AGILE (Association of Geographic Information Laboratories in Europe), & held in conjunction with GIS Planet 2005 (see below). Web-site: [www.agile-online.org](http://www.agile-online.org)
- NEW**  
30 May - 2 June  
2005  
Estoril, Portugal  
**GIS Planet 2005: 2nd Conference & Exhibition on Geographic Information**  
Held directly after AGILE 2005 (see above). Web-site: [www.gisplanet.org](http://www.gisplanet.org)
- 30 May - 3 June  
2005  
Borås, Sweden  
**ForestSat 2005: Operational Tools in Forestry using Remote Sensing Techniques**  
Programme: Workshop on Satellite RS for Forest Monitoring (30 May - 1 June), followed by Workshop on RS & GIS for Forest Authorities & field excursion (2-3 June). Contact: Prof. Håkan Olsson, Swedish University of Agricultural Sciences.  
E-mail: [Hakan.olsson@resgeom.slu.se](mailto:Hakan.olsson@resgeom.slu.se). Web-site: [www.svo.se/forestsafe](http://www.svo.se/forestsafe)
- 6-11 June 2005  
Porto, Portugal  
**25th EARSeL Symposium: Global Developments in Environmental Earth Observation from Space**  
Web-site: [www.fc.up.pt/earsel2005](http://www.fc.up.pt/earsel2005)
- 9-10 June 2005  
Porto, Portugal  
**2nd EARSeL Workshop on Remote Sensing of the Coastal Zone**  
Web-site: [las.physik.uni-oldenburg.de/workshop.html](http://las.physik.uni-oldenburg.de/workshop.html)
- 10-11 June 2005  
Porto, Portugal  
**1st EARSeL Workshop on 3D Remote Sensing**  
Web-site: [www.ipi.uni-hannover.de/html/aktuelles/workshop.doc](http://www.ipi.uni-hannover.de/html/aktuelles/workshop.doc)
- 16-18 June 2005  
Zaragoza, Spain  
**5th EARSeL Int'l Workshop - RS & GIS Applications to Forest Fires Management: Fire Effects Assessment**  
Web-site: [www.geogra.uah.es/earsel/](http://www.geogra.uah.es/earsel/)
- NEW**  
23-27 August 2005  
Amsterdam,  
the Netherlands  
**45th Congress of the European Regional Science Association (ERSA): Special Session on Modelling Land Use Change**  
E-mail: [ersa2005@feweb.vu.nl](mailto:ersa2005@feweb.vu.nl) Web-site: [www.feweb.vu.nl/ersa2005](http://www.feweb.vu.nl/ersa2005)
- 5-9 Sept 2005  
Lanshou, China  
**Int'l Symposium - High-Elevation Glaciers & Climate Records**  
Contact: International Glaciological Society ([igsoc@igsoc.org](mailto:igsoc@igsoc.org)). Web-site: [www.igsoc.org](http://www.igsoc.org)
- NEW**  
7-9 Sept 2005  
Trier, Germany  
**Int'l Conference - RGLDD / Remote Sensing & Geo-Information Processing in the Assessment & Monitoring of Land Degradation & Desertification: State of the Art & Operational Perspectives**  
Contact: Prof. Dr. Joachim Hill ([hillj@uni-trier.de](mailto:hillj@uni-trier.de)) or Dr. Achim Roeder ([roeder@uni-trier.de](mailto:roeder@uni-trier.de)), Remote Sensing Department Faculty of Geography / Geosciences, University of Trier, Behringstr., 54286 Trier, Germany. Phone / fax: +49-651-2014606 / 2013815.

**NEW**  
7-9 Sept 2005  
Brno, Czech  
Republic

**EnviroInfo 2005 / 19th Int'l Conference - Informatics for Environmental Protection: Networking Environmental Information**  
Organised by: Masaryk University in Brno, Centre of Biostatistics & Analyses, Czech Republic. Web-site: [www.enviroinfo2005.org](http://www.enviroinfo2005.org)

**NEW**  
9-13 Oct 2005  
Bonn, Germany

**Final Meeting of the Land Use & Land Cover Change project (LUCC)**  
Web-site: [www.geo.ucl.ac.be/LUCC](http://www.geo.ucl.ac.be/LUCC)

**NEW**  
16-18 Oct 2005  
Blacksburg,  
Virginia, USA

**SiliviScan – Lidar Applications in Forest Assessment & Inventory**  
Contact: Ross Nelson ([Ross.F.Nelson@nasa.gov](mailto:Ross.F.Nelson@nasa.gov))

**NEW**  
17-19 Oct 2005  
Beijing, China

**9th Int'l Symposium on Physical Measurements & Signatures in RS (ISPMSRS)**  
Web-site: [www.ISPMSRS2005.org](http://www.ISPMSRS2005.org)

30 Nov – 2 Dec  
2005  
Moscow, Russia

**2nd Int'l Conference on Earth from Space: the Most Effective Solutions**  
Contact: R&D Centre Scanex ([info@scanex.ru](mailto:info@scanex.ru)). Web-site: [www.transparentworld.ru/conference](http://www.transparentworld.ru/conference)  
Followed by 2 specialist Workshops: "Education for Sustainable Development: New Information Technologies" & "Access to Data for Environmental NGOs"

5-9 Dec 2005  
Dunedin,  
New Zealand

**Int'l Symposium on Sea Ice**  
Contact: International Glaciological Society ([igsoc@igsoc.org](mailto:igsoc@igsoc.org)). Web-site: [www.igsoc.org](http://www.igsoc.org)

13-15 Feb 2006  
Vienna, Austria

**Workshop on 3-D Remote Sensing in Forestry**  
Contact: Prof. Werner Schneider, EARSel SIG Forestry ([Werner.Schneider@boku.ac.at](mailto:Werner.Schneider@boku.ac.at)).