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IEICE Global Plaza

no.8

Monthly community plaza in English for students, faculties and engineers

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Memoir

International Collaboration on Advancing Microwave Radar Remote Sensing and Stress-change Monitoring of the Terrestrial Covers from Space for the Benefit of Sustaining the Biosphere in which We Reside

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Professor Emeritus, University of Illinois, Chicago, USA
IEICE Fellow

With the un-abating global population increase our natural resources are stressed as never before, and the global day/night monitoring of the terrestrial covers from the mesosphere to the lithosphere becomes all the more urgent. Microwave radar sensors are ideally suited for space imaging because those are almost weather independent, and microwaves propagate through the atmosphere with little deteriorating effects due to clouds, storms, rain, fog and haze. Globally humidity, haze, and cloudiness are increasing at a rather rapid pace, whereas only 20 years ago all of those covered only 48% of the globe, today those have increased to about 62% and within another 20 years may exceed 80% for irreversible reasons; thus optical remote sensing from space especially in the tropical and sub-tropical vegetated belts will
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become rather ineffective, and microwave remote sensing technology must now be advanced strongly and most rapidly because operationally it is more rapidly available especially for disaster mitigation assistance.

Fig.1 Early non-polarimetric Space-SAR Satellite sensors

The basic radar technologies to do the job are the multimodal Synthetic Aperture Radar (SAR) sensors, first developed for air-borne sensing implemented as for example in 1978 with the first space-borne digital Sea-Sat SAR which enjoyed great popularity and implementation until these days. However, the NASA Sea-Sat L-Band SAR had severe limitations in that it was of fixed wide swath-width at a single arbitrary polarization (HH) and of rather poor 25m resolution. Sea-Sat SAR was followed by several non-polarimetric space SAR sensors such as the ESA ERS-1 (C-Band, 1991 – 2000), NASDA J-ERS-1 (L-Band, 1992 – 19980, CSA Radar-SAT-1 (C-Band, 1995 –ongoing), ESA ERS-2 (C-Band, 1995 – ongoing) and the polarimetrically limited Dual-Pol ESA ENVISAT/ASAR (c-Band, 2002, 0ngoing) as presented in Fig. 1. In the meantime, fully polarimetric multi-modal high resolution SAR systems at multiple frequencies were introduced first with the multi-band AIRSAR of NASA-JPL culminating in the once-only pair of SIR-C/X-SAR shuttle missions of 1994 April and October, which laid the ground work for true day/night space remote sensing of the terrestrial barren and vegetated land and ocean covers using multi-band polarimetric SAR. Thereafter, NASA suspended further development of the basic need for further advancing airborne and space-borne multi-modal SAR imaging techniques except for the SRTM shuttle mission of 2000 February (which may soon be re-awakened), as shown in Fig. 2.

Fig. 2 Shuttle SAR Systems SIR-C/X-SAR'1994 and SRTM'2000

Swiftly the Canadian CCRS, the Danish EMI, the German DLR, the French ONERA and the Japanese NASDA & CRL {now JAXA & NICT} took over introducing and steadily advancing the Convair-580, the EMI-SAR, the E-SAR, the RAMSES and the Pi-SAR airborne highly advanced fully polarimetric sensors platforms, respectively, as shown in Fig. 3.

Fig. 3 The 3 airborne SAR platforms Convair-580, E-SAR and PI-SAR

These separate international multi-modal fully polarimetric and also interferometric SAR developmental efforts culminated in a well coordinated group effort of these three independent teams eventually launching and operating Fully Polarimetric Satellite SAR Sensors at L-Band (ALOS-PALSAR launched by JAXA/Japan in 2006 January), at C-Band (RADARSAT-2 launched by CSA-MDA in 2007 December) and at X-Band (TerraSAR-X launched by DLRAstrium in 2007 July).

Table 1. Comparison of High-Level Parameters

Parameter	PALSAR	RADARSAT-2	TerraSAR-X
Orbit: LEO, circular	Sun-synchronous	Sun-synchronous	Sun-synchronous
Repeat Period (*days*)	46	24	11
Equatorial Crossing time (*hrs*)	22:30 (ascending)	18:00 (ascending)	18.00 (ascending)
Inclination (*degrees*)	98.16	98.6	97.44
Equatorial Altitude (*km*)	692	798	515
Wavelength (*Band*)	23 cm (*L*)	5.6 cm (*C*)	3 cm (*X*)
Fully polarimetric mode	Yes	Yes	Yes

Fig. 4 Comparison of the three fully polarimetric satellite sensors with images

During the past eight years the development of these satellite SAR sensors had been discussed during the annual IEEE IGARSS meetings, the bi-annual EUSAR conferences and were reviewed most recently in detail during the fourth bi-annual ESA-ESRIN POLinSAR Workshop at Frascati, Italy (also see POLinSAR 2003, 2005, 2007) most recently during 2008 January 26 to 30, http://earth.esa.int/workshops/polinsar2009

Fig. 5 POLinSAR 2009 participants with author next to Chair Yves-Louis Desnos YLD WMB

The impressive images obtained, represented the greatest advancement in space remote sensing since the launch of the NASA/JPL Sea-Sat Mono-polarization SAR of thirty years ago. All of these three satellite sensors provide high-resolution

images at close to or better than 1 meter, respectively, and are fully polarimetric in order to be able to differentiate next to shape and scatterer orientation also dielectric parameters of vegetated natural and/or man-made scatterers.

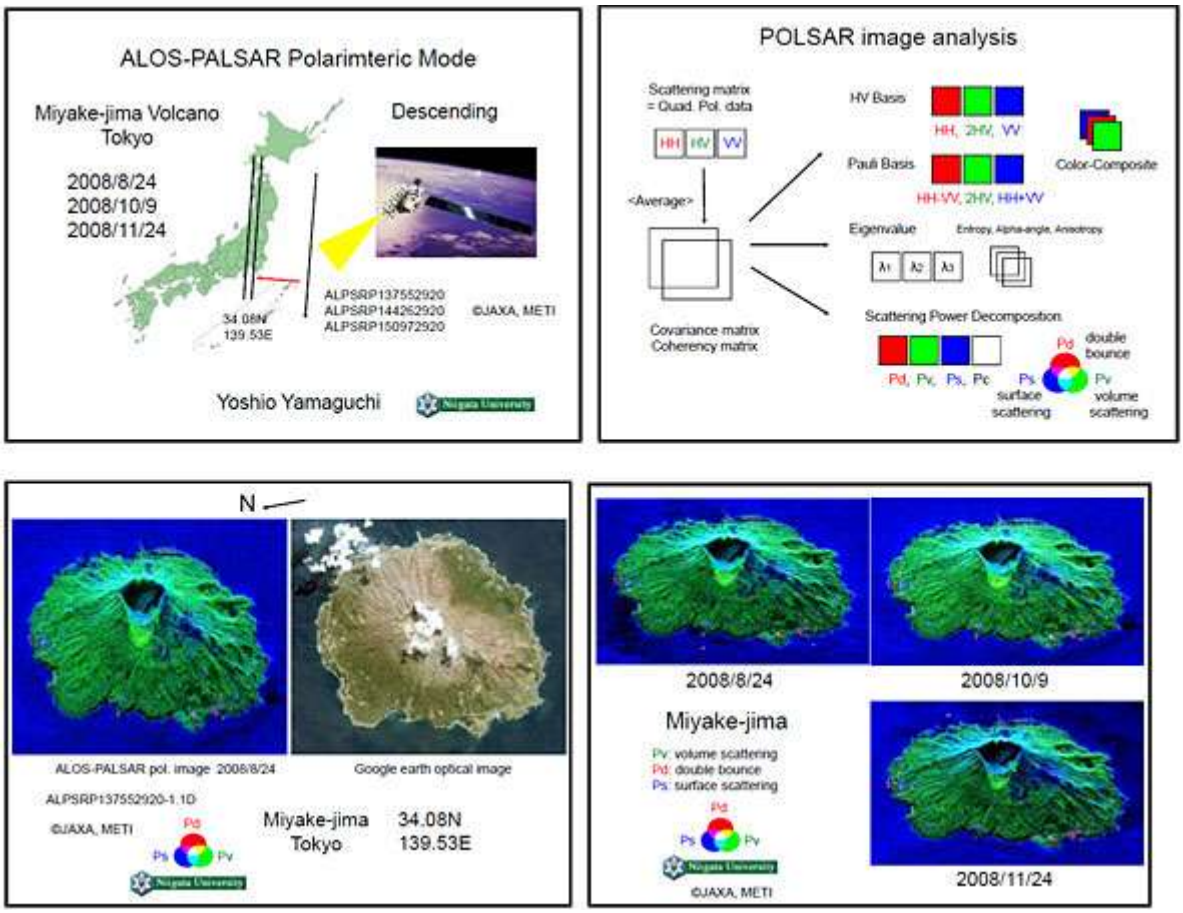

Fig. 6 Representative Example of Fully Polarimetric ALOS-PALSAR Images using the Yamaguchi 4-Scatterer Decomposition Method

Such detailed 3-D images cannot be achieved even with the most sensitive highest-resolution Mono-polarization SAR sensors as for example with Cosmo-Sky-Med or the SAR-Lupe, possessing only very limited or no polarimetric capabilities, respectively.

Thus, it is now possible to provide high resolution accurate images and simultaneous characterization of the terrestrial vegetated overburden by implementing the three fully polarimetric Space-SAR sensors as shown in Figs, 5a, 5b and 5c, which is of direct use in agriculture, forestry, nature preservation and in coastal region fisheries, ocean surface mapping, and so on. In addition by implementing repeat-pass co-registrated SAR imaging, it is possible to recover from the resulting interferograms height profiles DEM of the underlying structure as was for example achieved with the single-baseline SRTM Mission (Shuttle Radar Topographic Mission) Fig. 7; and unfortunately its polarimetric capabilities were not fully exercised.

Fig. 7 SRTM DEM

However, by combining polarimetric and interferometric imagery, it is then possible to recover the 3-D structure of vegetated covers in forestry and also in agriculture at resolutions of 1 meter for X-Band from space since SAR imaging resolution depends only on the bandwidth and is independent of the satellite operating height above ground as shown in Fig.8.

Fig. 8 SIR-C/X-SAR, 1994 Oct-11 C-Band POLinSAR Optimization

Advancements in radar and SAR polarimetry require subtle knowledge of applied vector and spinorial wave analysis, vector electromagnetic and antenna theory, scattering matrix optimization as well as a solid understanding of radar electronic principles and SAR systems technology. This requires rather broad but deep background knowledge and a comprehensive multidisciplinary graduate research education. In order to capitalize on the enormous gain in information recovered on geo-electromagnetic properties of the terrestrial as well as planetary covers, additional pertinent knowledge of geology, geophysics, astronomy and flora is relevant; this in essence defines a multidisciplinary field of expertise in vector (polarization) electromagnet wave sensing and imaging and geo-environmental remote sensing, best described as *"Differential Interferometric SAR Polarimetry".* Although enormous progress has been made with results published in many journals, monographs and workshop proceedings, the desired sets of updated text books were missing for either the practicing engineer or for the more advanced research experts. Therefore, based on the historical development of radar and SAR polarimetry, of the existing pertinent monographs, dissertations, handbooks and guides, the aim is to identify the most relevant as well as shortly to appear research and practitioner text books; and in particular addressing topics that need still to be covered and with it the associated sets of books which have now been forthcoming:

Compendium of relevant text books

Harold MOTT, *Remote Sensing with Polarimetric Radar,* Wiley-IEEE Press, 1st ed., January 2007, pp309 , ISBN: 978-0470074763 {also see previous books by late Harold Mott, 1986 & 1992}

Boerner, Wolfgang-Martin, *Introduction to Synthetic Aperture Radar (SAR) Polarimetry*, Wexford Press (reprinted *without permission* from W-M. Boerner (April 2007), Basics of SAR Polarimetry 1, *In Radar Polarimetry and*

Interferometry (pp. 3.1- 3-40), Educational Notes RTO-EN-SET-081bis, Paper 3, Neuilly-sur-Seine, France RTO, available from: http://www.rto.nato.int/abstracts.asp

Yamaguchi, Yoshio, *Radar Polarimetry from Basics to Applications: Radar Remote Sensing using Polarimetric Information (in Japanese)*, IEICE Press, Dec. 2007, (soft cover), ISBN: 978-4-88552-227-7, http://www.ieicepress.com/

Masonnett Didier & Souyris Jean-Claude, *Imaging with Synthetic Aperture Radar*, EPFL/CRCPress, Engineering Sciences/Electrical Engineering, Taylor & Francis Group, 2008, (hard-cover), ISBN 978-0-8493-8239-4; http://www.crcpress.com

Ya-Qiu JIN & Feng XU, *Theory and Approach for Polarimetric Scattering and Information Retrieval of SAR Remote Sensing (In Modern Chinese)*, Beijing: Science Press, 2008, (hard cover), ISBN978-7-03-022649-5; http://www.sciencep.com

Lee Jong-Sen & Pottier, Eric, *Polarimetric Radar Imaging – from basics to applications*, CRC Press – Taylor & Francis Group, January 2009, ISBN 978-1-4200-5497-2 (hard-cover), TK6580.L424.2009, 621.3848- -dc22; http://www.crcpress.com {Chinese version to be published by 2009 October}

Cloude, Shane Robert, *Polarisation: Applications in Remote Sensing*, Oxford University Press, UK & EU, August 2009, ISBN 978 -0-19-9569731-1 (352p, 260 line-ill: hard-copy), http://www.oup.com.contact/

vanZyl Jakob-Johannes & Kim Yun-Jin, Introduction *to SAR Polarimetry* – in progress and to be completed by 2009 December: To be published with the JPL Series, John Wiley.
Cumming I. G. and F. W. Wong, "*Digital Processing of Synthetic Aperture Radar Data".* Artech House, 653-pages, January 2005. (Published in Chinese, October 2007).

Thus, the next step in the advancement for true polarimetric-interferometric satellite imaging is the development of tandem POL-SAR-Satellite interferometer operations, and because of the required baseline, it is at this state of satellite development not possible to place two SAR antennas with sufficient separation on one and the same platform (space, weight, data-transfer) which was possible for shuttle operation, especially with the extended parasitic antenna boom for SRTM. The first satellite tandem pair is that of DLR-Astrium launching the TerraSAR-Tandem X-Band (TanDEM-X) towards the end of 2009; to be followed by the ALOS-PALSAR-2 in summer of 2010 by forming the ALOS-PALSAR-Tandem 1&2; and then to be complemented with the RADARSAT-3 by forming the RADARSAT-Tandem 2/3 in late 2010. In order to cover the total globe, all of these three satellites and/or pairs are operated in polar orbits with finite swath-width and such that every other orbit is shifted so that after a few days the entire globe is covered by connected image-swaths. The higher the resolution and the more complete the polarimetric scattering matrix acquisition becomes towards Quad-SAR operation, the smaller the swath-width because of the currently available antenna and electronic image data take limitations. For example, operating at only one polarization and with very low resolution of about 100m2 may allow a swath-width of about 400km similar to Sea-Sat, whereas for full Quad-Pol operation at highest resolution of less than 1m2 the swath-width my reduce well below 10 km, and make this mode impractical for continuously covering the terrestrial covers.

Fig. 9 TerraSAR-X-Tandem

This more recently contemplated permanent-looking limitation, has now also been overcome with an ingenious innovation at DLR together with NASA-JPL by using a large reflector with antenna beam-shaping techniques, which will allow for simultaneous multi-band 400km swath width operation at highest resolution and with full Quad-Pol SAR operation; and the horrendous task of quinta-byte (1015) per second image data transfer to ground will be accomplished by new distributed satellite optical data down-link procedures. Some of these new technique will be applied to and tested with the novel L –Band DESDynI/ Tandem-L mission with DLR operating one and JPL the other of these two novel SAR satellite systems (where a similar reflector antenna technique had earlier on be proposed), marking the most remarkable, definite breakthrough since the advent of Sea-Sat in 1978, Fig. 10. This drastic advancement comes precisely at a time when it is now required more than ever before. It will now be possible to register instantaneously, characterize and provide measures for reducing catastrophes following such natural or manmade hazards like the volcano eruption of Pinatubo; the earthquakes in Sichuan province; the Irrawaddy floods of Myanmar; the

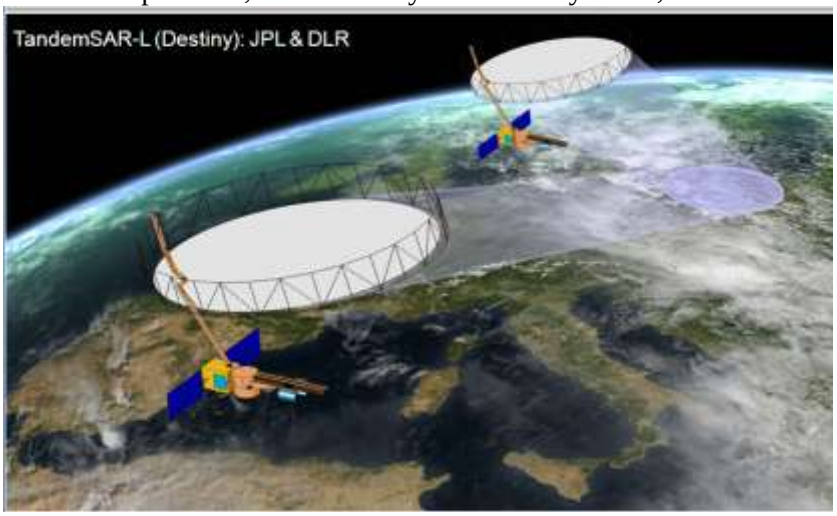

Fig. 10 DESDynI/Tandem-L with expected images

rapid movement of the Antarctic glaciers, mudslides in the Philippines and major avalanches in the Himalayas or the precise detection of oil-spills by tankers illegally cleaning their containers on open sea, and the assessment of the sources of the recent tragic fires in SE-Victoria, Australia; urban sprawl all around the globe and with it wetland destruction; and so on. All of these past dreams are now within our grasp, and as an example some results of the recent Indonesian INDIREX-II Campaign are depicted for the ALOS-PALSAR sensor implementation Fig. 11.

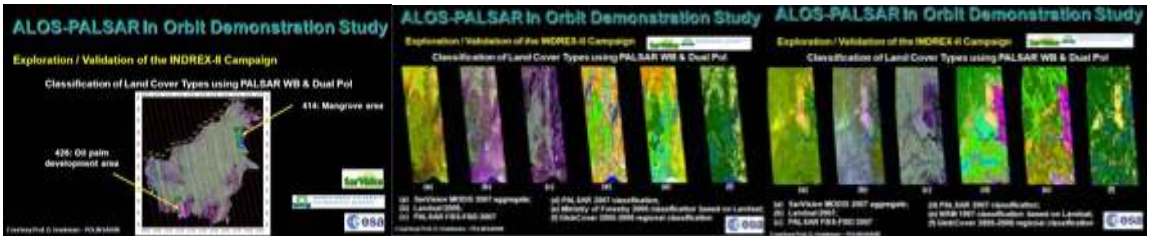

Fig. 11 Results of INDIREX-II Campaign

In conclusion, international collaboration on advancing day/night global monitoring of the terrestrial covers was demonstrated with the launch of the three fully polarimetric multi-modal SAR Satellites at L-, C-, X-Band, and its tandem satellite-pair updates are forthcoming very swiftly. All of this will be topped by the near-future DESDynI/Tandem-L wide-swath, highresolution fully polarimetric sensor implementation, which in due time will be enlarged to accommodate next to the L-, C-, X- also P-Band sensors using one and the same reflector.

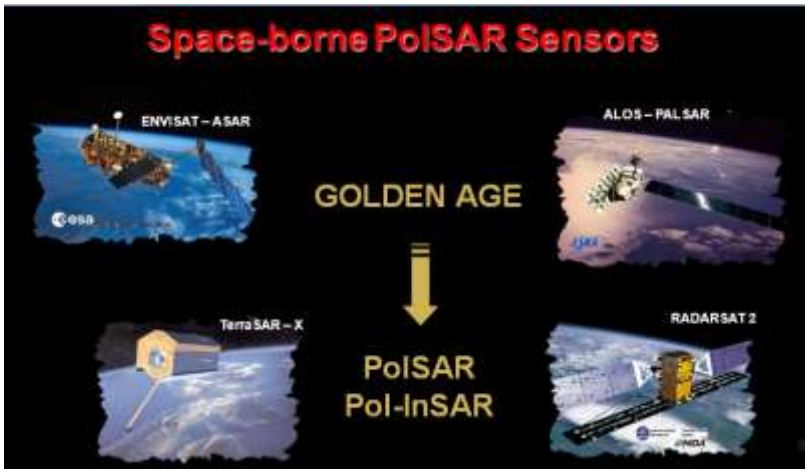

Fig. 12 Multiband fully polarimetric Space-SAR Remote Sensing

The applications will be truly manifold, for example then enabling full assessment also of dense tropical forests which will for example result in curtailing illegal deforestation, Fig. 13

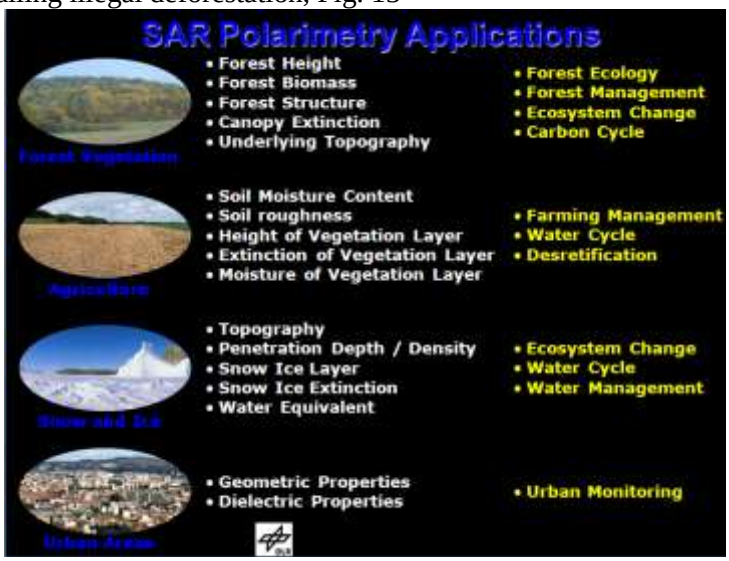

Fig. 13 Manifold Applications of fully polarimetric Space-SAR Remote Sensing

In essence, we have created a silent watchful microwave eye in space assisting us in analyzing our biosphere in which we live or in other words microwave remote sensors are becoming the radiologists for providing input to the multi-disciplinary diagnosticists for assessing the health of Mother Earth.

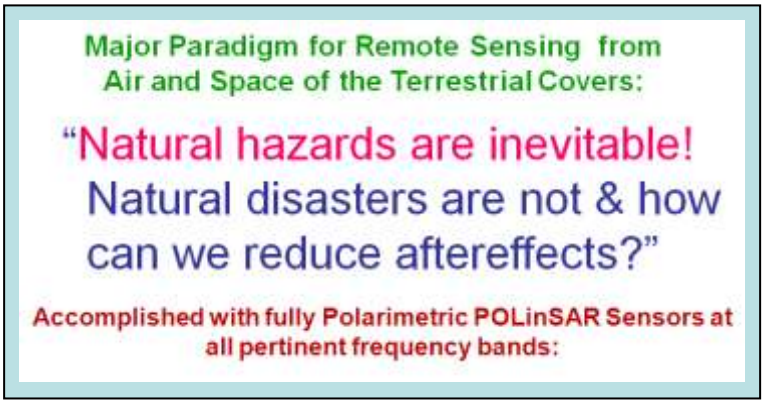

Fig. 14 The ultimate goal

Without question, we will continue suffering from natural hazards, which are unavoidable as long life on Earth exists, but the resulting natural disasters are avoidable, and by discovering and assessing the hazards in time, will assist in mitigating the ensuing catastrophes due to these new microwave SAR sensors more than ever before for the benefit of sustaining the health of the biosphere in which we reside.

Acknowledgment: The author wishes to thank the editor of the IEICE Global Plaza, Professor Kenzo Takahashi, for inviting him to contribute this overview; and he also thanks his former student and co-struggler, Dr. Oliver Stebler, for providing inspirations with his excellent recent article in the *Neue Zürcher Zeitung (NZZ)*, Section *Forschung und Technik*, 2009 February 18, No. 40, p.9 on *"Stille Wächter über uns - Bessere Radarsatelliten für die kontinuierliche Erdbeobachtung" (in German: http://www.geoimage.ch/includes/pdf/nzz_sar_180209.pdf).*

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Essay

Your comments to improve IEICE Communications Society are most welcome !
- useful for your academic activities –

Kunio Sawaya, Prof., Dr.
Tohoku University
President, IEICE Communications Society

It is my great honor to serve as president of the IEICE Communications Society (IEICE-CS) for the year until May 2010. Of the four societies and one group of the IEICE—the Engineering Sciences Society, the Communications Society, the Electronics Society, the Information and Systems Society, and the Human Communication Group—the IEICE-CS remains the largest, with more than 12,000 members including around 1,600 members overseas. The IEICE-CS is constantly active in improving the quality of services provided to society members. This article introduces the current activities provided by the IEICE and IEICE-CS.

The IEICE-CS covers a wide range of research fields related to communications systems, with 19 regular technical committees and 10 fixed-term technical committees. Each committee forms a professional community and supports the activities of the IECE-CS through the planning of many events such as keynote lectures, symposia, and panel discussions held at IEICE General and Society Conferences. Some committees formulate plans for international symposia in their respective research fields, and technical meetings held jointly with overseas institutions outside Japan.

Technical committees hold their meetings monthly or several times a year at various academic and research institutions in Japan, where the latest research developments achieved by universities, research institutes, and companies are presented and hot topics are discussed. The proceedings of each meeting are published as a "IEICE Technical Report," which is very helpful for those looking to obtain information on recent progress in the research fields. The IEICE-CS recognizes the importance of "Technical Report" and plans to establish a website as a new service from which subscribers can download copies of "Technical Report."

The IEICE General Conference organized by all societies and held in March, and the IEICE Society Conference organized by societies— excluding the Information and System Society—which is held in September, are also important activities of the IEICE. The total number of man-day participants of IEICE General and Society four-day Conferences is around 13,000 and 5,500, respectively. The IEICE-CS will soon establish a web page called "CS Archives," which will provide the proceedings of these conferences for their participants. Proceedings published more than two years ago will be available for all CS members.

In the last IEICE Society Conference, the IEICE-CS held its first "Welcome Party" for new members of the CS, which is a new service intended to provide greater interaction and extended exchanges of information among young and established CS members.

The first activity of the IEICE-CS is the publication of the "Global News Letter" written in English, which was introduced in August 2002, as a service for overseas CS members as well as domestic members, which is published four times a year.

Another service, "CS Magazine," was launched in August 2007, and provides interesting articles such as research history written by senior researchers, reports on international conferences, and review papers of the latest communications technologies. Unfortunately, CS Magazine is available only in Japanese and translation into English is desired for overseas members.

New activities of the CS include the Welcome Party held at Society Conferences, the creation of new websites for proceedings of technical meetings and domestic conferences as described above. In addition to these websites, "IEICE
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Explorer," which provides proceedings of several recent international conferences organized by the IEICE, was started by IEICE headquarters in last September. These services will provide more information for domestic and overseas CS members.

Many efforts have been made by the members of the Steering Committee of the IEICE-CS to improve services for CS members based on the self-support accounting and independent system initiated three years ago. However, we know that there are issues remaining to further activate the IEICE-CS, such as tighter collaboration with overseas institutions—especially in Asia and Pacific regions—at the society level as well as at the technical committee level**.** We believe that the activities of the IEICE should be supported by members and technical committees in a bottom-up manner rather than a top-down manner. Comments and suggestions by the members of IEICE-CS are invited and highly appreciated to help the further future actions of the IEICE-CS.

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Evolving research and education activities at Hanoi University of Technology

Dr. Vu Van Yem
Head, Dept. of Telecommunication Systems,
Faculty of Electronics and Telecommunications,
Hanoi University of Technology, VIETNAM

Hanoi University of Technology (HUT), established in 1956 and located in the south-east center of Hanoi city, is the top university of technology in Vietnam with 2,100 academic staff and 35% of them obtained Ph.D. degree. There are 13 faculties and 8 schools in our campus; those are Faculty of Electronics and Telecommunications, Faculty of Electrical Engineering, Faculty of Information Technology, Faculty of Applied Mathematics and Informatics, Faculty of Mechanical Engineering, Faculty of Economics and Management, Faculty of Textile, Garment Technology and Fashion Design, Faculty of Chemical Technology, Faculty of Materials Science and Technology, Faculty of Foreign Language, Faculty of Part-time Training, School of Engineering Physics, School of Environmental Science and Technology, School of Biological and Food Technology, School of Heat Engineering and Refregeration, School of Transportation Engineering, International Training Institute for Materials Science (ITIMS), School of Nuclear Engineering and Environmental Physics, Hanoi Advanced School of Science and Technology - HAST. HUT is providing training programs for over 40,000 undergraduate students, master students and PhD candidates following 67 undergraduate majors, 37 master majors, and 57 doctoral ones. For more details, please see the HUT homepage at *http://www.hut.edu.vn/web/en/home.*

Over more than a half century of development and growth, HUT has established and would like to establish long - term cooperative ties with many educational and research institutions, international organisations, and industrial enterprises in the world. HUT has cooperative training and research programs with more than 200 international universities, research centers, institutes and educational institutions of 32 countries such as Japan, U.S.A., France, Belgium, Italy, Canada, England, the Netherlands, Singapore, Finland, Australia, Germany, China, Laos, Russia, Korea, New Zealand, Austria, Sweden, Ukraine Thailand etc. and it is a member of eight international university networks as Association of Universities of the Francophonie (Agence Universitaire de la Francophonie, AUF), Association of Universities of Asia and the Pacific - AUAP, The Austrian South-East Asian University Partnership Network (ASEA-UNINET), ASEAN University Network (AUN)/Southeast Asia Engineering Education Development Network(SEED – NET), Greater Mekong Subregion Academic and Research Network (GMSARN), The Greater Mekong Sub-region Virtual University (GMSVU).

With the rapid increase of scientific and technological progress in recent years and in order to realize its strategic goal of becoming not only a multi-disciplinary, multi-domain, and high quality training center but also an international and national advanced scientific research and technological transferring center, HUT has extended its communications and collaborations with more and more institutions of higher education all over the world. Cooperative activities include exchange of students, faculty and researchers, collaborative research projects, joint/dual degree education programs and co-organization of international conferences and workshops. Many international conferences have been organized at HUT or by HUT, such as APSITT'97 (1997 Asia Pacific Symposium on Information and Telecommunication Technologies) that was organized by IEICE and HUT in commemoration of the 40th Anniversary of HUT. Please see *http://www.ieice.or.jp/cs/c4p/APSITT97/.*

Following this Symposium, the international conference on communications and electronics ICCE-HUT has been organized by HUT twice in 2006 and 2008. Further, ICCE2010 will be held in the beautiful and historical city on the south central coast of Vietnam, Nha Trang in 2010. Please see *http://www.hut-icce.org/.*
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The best way for HUT to reach an international level in order to make greater and more effective contribution to national industrialization and modernization is to open its port for international students as well as for international partners. HUT is an attractive address for investors from industry, a best choice for students to pursue higher knowledge and a believable partner in collaborations to progressive universities and institutions over the world.

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Hot Topics

NOLTA 2009 will be held in Sapporo, on October 18-21
Subsociety of Nonlinear Theory and its Applications, IEICE Engineering Sciences Society

The 2009 International Symposium on Nonlinear Theory and its Applications (NOLTA 2009) will be held at Gateaux Kingdom Sapporo Hotel & Spa Resort, Sapporo, Japan, on October 18-21. The scope will be focused on the latest results in nonlinear theory and its applications. Plenary talks will be given by Prof.Toshiyuki Nakagaki(Hokkaido University) and Dr.Ferdinand Peper(NICT). The registration due date is September 15. Please see details at *http://lalsie.ist.hokudai.ac.jp/nolta2009/.*

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APSITT 2010 will be held in Malaysia next June!
IEICE Communications Society

The 8th Asia-Pacific Symposium on Information and Telecommunication Technologies, APSITT 2010 was decided to be held in Kuching, the capital city of Sarawak State located in East Malaysia, on June 15-18 in 2010. It will be sponsored by IEICE Communications Society and technically co-sponsored by IEEE Communications Society. Details will be informed in coming issues. Please see details at *http://www.ieice.org/cs/in/APSITT/2010/*.

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News Corner

This corner provides the updated information from public organizations related to overseas academic activities or studying in Japan with their kind supports.

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~ JSPS News ~

Japan Society for the Promotion of Science (JSPS) opened
"Japan-Asia Research Community Network (JARC-Net)"

Japan-Asia Research Community Network (JARC-Net)is a database of researchers and experts who are interested in the research cooperation between Japan and other Asian countries/areas. By registering, you will be able to search and browse other members' profiles and subscribe JSPS information service (e.g. news on JSPS programs and events).

JSPS welcomes your registration!

Tageted Users:

i)Asian researchers and experts who have studied and/or stayed in Japan

ii)Japanese researchers and experts who have interests in research cooperation with countries/areas in Asia

* JSPS welcomes registration by other interested people, such as current graduate students, staffs of universities/ research institutions, and policy experts. People from other regions of the world are also welcome.

For more detailed information and registration, please visit following website at *http://www.jsps.go.jp/english/e-astrategy/jarcnet.html.*

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~ JASSO News ~

Japan Education Fairs started !
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Japan Student Services Organization (JASSO) holds the annual Japan Education Fairs for students who wish to study in Japan. It was held in Kaohsiung and Taipei, Taiwan last month. In Asian countries, it will be held according to the following plan:

September 12-13: in Republic of Korea
October 3-4 : in Indonesia
November 21-22: in Vietnam
November 27-28: in Thailand

Another program of Japan Education Fairs (International Education Fairs) will be held according to the following plan as well:

October 24-25 : in China
December 12-13: in Malaysia

In parallel with the Fairs, JASSO also will hold Japan Education Seminars, in Thailand, Mongolia, Myanmar, Philippines and Singapore in cooperation with Japan almuni associations and Japanese overseas establishments abroad. For more information, please see the details at *http://www.jasso.go.jp/study_j/2009fair_e.html#_1*.

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Question/Answer Corner

This corner introduces questions or constructive opinions from IEICE members or general readers, and the corresponding answers of IEICE.

Q. Can we overseas members pay for our total membership fees to some multiple fiscal years at once so that we do not need pay the expensive bank commission fee required every wire transfer?
(from an overseas member)

A. Absolutely, you can, in advance, except Supporting Members according to Article 9 of IEICE Regulations. This rule is already available.

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Messages from IEICE-TFIPP, Organizer of IEICE Global Plaza

We are looking forward to your questions!

IEICE Task Force for International Policy and Planning (IEICE-TFIPP) in charge of IEICE Global Plaza also plans the improvement of overseas membership services. Whenever you have questions or difficulties on IEICE matters, please do not hesitate to contact Prof.Kenzo Takahashi, IEICE-TFIPP at global@ieice.org.

Your constructive opinions for the overseas membership service improvement are most welcome. Most articles of this issue will be published by IEICE Journal as well about two months later.

Edited by Prof.Kenzo Takahashi / IEICE-TFIPP //EOT