International Association of Geodesy

Newsletter
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Contents

The *IAG Newsletter* is under the editorial responsibility of the *Communication and Outreach Branch* (COB) of the IAG.

It is an open forum and contributors are welcome to send material (preferably in electronic form) to the IAG COB (newsletter@iag-aig.org). These contributions should complement information sent by IAG officials or by IAG symposia organizers (reports and announcements). The *IAG Newsletter* is published monthly. It is available in different formats from the IAG new internet site: http://www.iag-aig.org

Each *IAG Newsletter* includes several of the following topics:

I. news from the Bureau Members
II. general information
III. reports of IAG symposia
IV. reports by commissions, special commissions or study groups
V. symposia announcements
VI. book reviews
VII. fast bibliography

General Announcements

The Global Geodetic Observing System (GGOS)

GGOS is the Observing System of the **International Association of Geodesy** (IAG).

GGOS works with the IAG components to provide the geodetic infrastructure necessary for monitoring the Earth system and for global change research. It provides observations of the three fundamental geodetic observables and their variations, that is, the Earth's shape, the Earth's gravity field and the Earth's rotational motion.

GGOS integrates different geodetic techniques, different models, and different approaches in order to ensure a long-term, precise monitoring of the geodetic observables in agreement with the Integrated Global Observing Strategy (IGOS).

GGOS provides the observational basis to maintain a stable, accurate and global reference frame and in this function is crucial for all Earth observation and many practical applications (Fig. 1).

GGOS acts as the interface between the geodetic services and external users such as the **Group on Earth Observation (GEO)** and United Nations authorities.

Structure of GGOS

GGOS leadership is headed by a chair and vice-chair, who liaise with the GGOS Consortium, which serves as the steering and election committee. These are supported by the GGOS Coordinating Board (the decision-making body) and the GGOS Executive Committee (the management board). In turn, all of the aforementioned leadership elements work in concert with the IAG Scientific Services. The GGOS Coordinating Office supports outreach (including a provisional website ggosdays.com), internal and external coordination, and the daily management of GGOS.

At the heart of GGOS are its Bureaus, each containing working groups and other IAG support services. The Bureau of Networks and Observations (BNO) contains working groups on satellite missions, simulations, and data and information systems. Meanwhile, the Bureau of Products and Standards (BSC) oversees working groups on Earth system modelling and standards, and promoting the development of new geodetic products associated with the three GGOS Themes: Unified Height System, Geohazards Monitoring, and Sea Level Change.

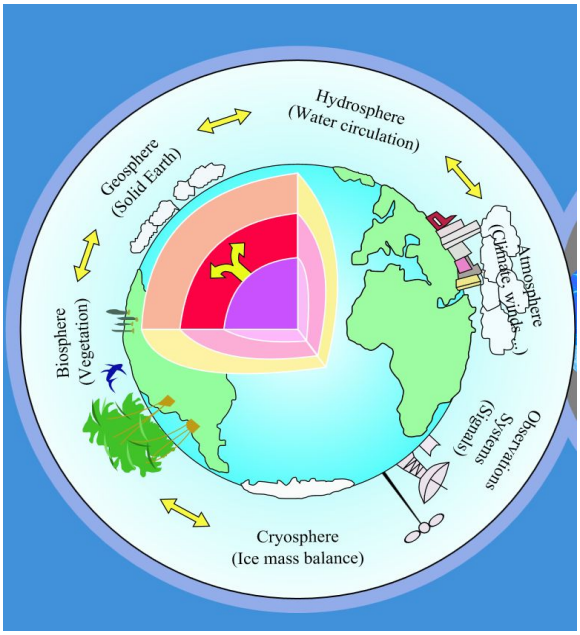


Fig. 1. The impact of GGOS and its observation systems on the Earth's components.

Activities of GGOS

The GGOS components meet at least annually during the GGOS Days, while the Coordinating Board and the Bureaus meet at least semi-annually during the GGOS Days and the EGU General Assembly. The GGOS Executive Committee has a monthly teleconference to cover the current business. The different observing systems and the standard committees have their own meetings according to their needs.

The current activities focus on the following items:

- Unified Height Systems, covered by a special Focus Area
- Precision of observations towards 1 mm, common activities of all observations and the modelling groups within the Bureaus and the Science Panel

- Providing observations and models to understand and probably mitigate geohazards with a special Focus Area and all observations
- Generating standards and metadata for comparing observations and informations

GÜNTER STANGL

Inter-Commission Committee on Theory (ICCT)

The International Association of Geodesy (IAG) is organised into Commissions, Services, the Global Geodetic Observing System and Inter-Commission Committees. Currently, there is only the Inter-Commission Committee on Theory (ICCT) active within the IAG structure. ICCT was formally approved and established after the IUGG XXI Assembly in Sapporo, 2003, to succeed the former IAG Section IV on General Theory and Methodology as theories and methodologies matters to all IAG components. ICCT joint study groups interact actively and directly with IAG Commissions, Services and the Global Geodetic Observing System. In accordance with the IAG by-laws, the initial two periods were reviewed in 2011 at the IUGG XXIII Assembly in Melbourne where IAG approved the continuation of ICCT. At the IUGG XXIV Assembly in Prague, 2015, ICCT became a permanent entity within the IAG structure.

Recognizing that observing systems in all branches of geodesy have advanced to such an extent that geodetic measurements (i) are now of unprecedented accuracy and quality, can readily cover a region of any scale up to tens of thousands of kilometres, yield non-conventional data types and can be provided continuously; and (ii) consequently, demand advanced mathematical modelling in order to obtain the maximum benefit of such technological advance, ICCT (1) strongly encourages frontier mathematical and physical research, directly motivated by geodetic need and practice, as a contribution to science and engineering in general and theoretical foundations of geodesy in particular; (2) provides the channel of communication amongst different IAG commissions, services and GGOS on the ground of theory and methodology, and directly cooperates with and supports these entities in the topical work; (3) helps IAG in articulating mathematical and physical challenges of geodesy as a subject of science and in attracting young talents to geodesy. ICCT strives to attract and serve as home to all mathematically motivated and oriented geodesists as well as to applied mathematicians; and (4) encourages closer research ties with and gets directly involved in relevant areas of Earth sciences, bearing in mind that geodesy has always been playing an important role in understanding the physics of the Earth.

The overall objectives of the ICCT are to act as international focus of theoretical geodesy, encourage and initiate activities to advance theory in all branches of geodesy and to monitor developments in geodetic methodology. To achieve these objectives, ICCT interacts and collaborates with the IAG Commissions, Services and GGOS.

The structure of ICCT is specified in IAG by-laws. The ICCT steering committee for the period 2015-19 consists of the President (P. Novák, Czech Republic), the Vice-President (M. Crespi, Italy), the Past-President (N. Sneeuw, Germany) and representatives from IAG Commissions, Services and GGOS. ICCT activities are undertaken by its study groups. By the inter-commission nature of ICCT, the study groups are joint study groups, affiliated to one or more of Commissions, Services and/or to GGOS.

In the structure of ICCT for the 2015-19 period, there are 13 joint study groups:

1. *High-rate GNSS* (M. Crespi, Italy)
2. *Multiresolutional aspects of potential field theory* (D. Tsoulis, Greece)
3. *Advanced computational methods for recovery of high-resolution gravity field models* (R. Čunderlík, Slovakia)
4. *Integral equations of potential theory for continuation and transformation of classical and new gravitational observables* (M. Šprlák, Australia)
5. *Fusion of multi-technique satellite geodetic data* (K. Sośnica, Poland)
6. *Regional geoid/quasi-geoid modelling – theoretical framework for the sub-centimetre accuracy* (J. Huang, Canada)
7. *Earth's inner structure from combined geodetic and geophysical sources* (R. Tenzer, China)
8. *Multi-GNSS theory and algorithms* (A. Khodabandeh, Australia)
9. *High resolution harmonic analysis and synthesis of potential fields* (S. Claessens, Australia)
10. *Time series analysis in geodesy* (W. Kosek, Poland)
11. *Space weather and ionosphere* (K. Börger, Germany)
12. *Geophysical modelling of time variations in deformation and gravity* (Y. Tanaka, Japan)
13. *Definition of next generation terrestrial reference frames* (C. Kotsakis, Greece)

ICCT's activities include participating as conveners of geodesy sessions at major international geoscientific conferences such as IAG, IUGG, EGU and AGU, organizing regular Hotine-Marussi symposia on mathematical geodesy, initiating summer schools on theoretical geodesy and maintaining a website for dissemination of ICCT related information (http://icct.kma.zcu.cz).

ICCT will participate at a number of sessions at the upcoming IAG Scientific Assembly to be held in Kobe, Japan, 31 July – 4 August 2017 jointly with the International Association of Seismology and Physics of the Earth's Interior (IASPEI). However, next ICCT activities will be focused on organizing the IX. Hotine-Marussi Symposium on Mathematical Geodesy in 2018. This will be the next symposium in a series which started back in 1954 since there were international symposia promoted by Antonio Marussi and organized under the umbrella of IAG like Hotine Symposia on Mathematical Geodesy in memory of the well-known English Geodesist Martine Hotine. At these symposia theoretical problems of geodesy and advances in geodetic knowledge, research and technology were discussed. After the death of Marussi these meetings are named Hotine-Marussi Symposia on Mathematical Geodesy.

PAVEL NOVÁK

IAG-IASPEI Scientific Assembly, Kobe, Japan, July 30 – August 4, 2017

The International Association of Geodesy (IAG) holds its Scientific Assemblies traditionally midterm between two IUGG-IAG General Assemblies. The next one will be held middle of the General Assemblies 2015 (Prague, Czech Republic) and 2019 (Montreal, Canada) together with the International Association of Seismology and Physics of the Earth (IASPEI) in Kobe, Japan, from July 30 to August 4, 2017. There will be nine joint symposia of IAG and IASPEI, and seven IAG specific symposia. The titles are:

Joint Symposia

J01 Monitoring of the cryosphere
J02 Recent large and destructive earthquakes
J03 Deformation of the lithosphere: Integrating seismology and geodesy through modelling
J04 Geohazard early warning systems
J05 Crustal dynamics: Multidisciplinary approach to seismogenesis
J06 The spectrum of fault-zone deformation processes (from slow slip to earthquake)
J07 Tracking the sea floor in motion
J08 Imaging and interpreting lithospheric structures using seismic and geodetic approaches
J09 Geodesy and seismology general contributions

IAG Symposia

G01 Reference frames
G02 Static gravity field
G03 Time variable gravity field
G04 Earth rotation and geodynamics
G05 Multi-signal positioning: Theory and applications
G06 Geodetic remote sensing
G07 Global Geodetic Observing System (GGOS) and Earth monitoring services

Most important dates for contributions to the symposium are:

December 7, 2016:	Abstract submission and registration open;
February 8, 2017:	Deadline for abstract submission and travel support application;
April 5, 2017:	Notification of acceptance;
May 10, 2017:	**Closure of early bird registration**;
July 7, 2017:	Closure of pre-registration.

All interested persons are invited to submit abstracts for oral presentations or posters. For more details of the assembly please visit the Homepage http://www.iag-iaspei-2017.jp.

HERMANN DREWES, IAG Secretary General

IERS Technical Note on ITRF2014 is available online

Dear ITRF Users and Colleagues,

The ITRS Center at IGN has the pleasure to announce to the community the availability of an IERS Technical Note describing the analysis and results of the ITRF2014 solution, available at the following link:

https://www.iers.org/TN38

The ITRF2014 Technical Note includes the summary descriptions of the contributions of the four Technique Services (IDS, IGS, ILRS IVS), to be acknowledged here for their enormous efforts in providing their reprocessed solutions.

Also appended to the Technical Note the full open access article on ITRF2014 that can be retrieved here:

http://onlinelibrary.wiley.com/doi/10.1002/2016JB013098/full

Many thanks to colleagues at the IERS Central Bureau at BKG for their efficient assistance and cooperation in finalizing the ITRF2014 Technical Note.

Cordially
Zuheir Altamimi
Head, ITRS Center

SOURCE: IERS MESSAGE NO. 329

Meeting Announcements

International school on space geodesy in La Plata

Dear Geodesists,

We cordially invite you to the 5th La Plata International School on Astronomy and Geophysics (LAPIS): "Space geodesy applied to geodynamics and atmospheric research" to be held on October 29th - November 04th, 2017, in the Facultad de Ciencias Astronomicas y Geofisicas, Universidad Nacional de La Plata, in the city of La Plata, Argentina.

The School

- addresses post-graduate and doctoral students in Geodesy, Astronomy, Geophysics, Engineering and related disciplines of Geosciences and Atmospheric science; advanced graduate students may also be admitted.
- comprises lectures and exercices which familiarize the participants with the geometrical space-geodetic observation techniques (GNSS, SLR, VLBI) as data sources for research related to geodynamics and the atmosphere.
- is free of charge for the particpants. Course language is English.

Each participant has to bring an own notebook.

The pre-inscription is open until May 31, 2017, the number of participants is limited. Pre-inscription and further information are available at:

http://www.maggia.unlp.edu.ar/lapis2017
school2017@fcaglp.unlp.edu.ar

Sincerely,

LAPIS 2017 Local Organizing Committee
Laboratorio MAGGIA
Facultad de Ciencias Astronomicas y Geofisicas
Universidad Nacional de La Plata, Argentina

SOURCE: IERS MESSAGE NO. 330

Meetings Calendar

Ninth IVS Technical Operations Workshop

April 30 – May 4 , 2017, Westford, MA, USA
URL: https://www.iers.org/IERS/EN/NewsMeetings/ForthcomingMeetings/forthcoming.html

ENC 2017

May 9-12, 2017, Lausanne, Switzerland
URL: http://www.enc2017.eu/

23rd Working Meeting of the European VLBI Group for Geodesy and Astrometry (EVGA)

May 15-19 , 2017, Gothenburg, Sweden
URL: https://www.chalmers.se/en/conference/EVGA2017

EUREF 2017 Symposium

May 17 – 19, 2017, Wroclaw, Poland
URL: http://www.euref.eu/euref_symposia.html

JpGU-AGU Joint Meeting 2017

May 20 – 25, 2017, Makuhari Messe, Chiba, Japan
URL: http://www.jpgu.org/meeting_e2017/

DORIS Analysis Working Group meeting

May 22 – 24, 2017, London, United Kingom
URL: http://ids-doris.org/ids/reports-mails/meeting-presentations/ids-awg-05-2017.html

FIG Working Week 2017

May 29 – June 2, 2017, Helsinki, Finland
URL: http://www.fig.net/fig2017/

TransNav 2017

June 21 – 23, 2017, Gdynia, Poland
URL: http://transnav2017.am.gdynia.pl

Baltic Geodetic Congress 2017

June 22 – 25, 2017, Gdańsk, Poland
URL: http://www.bgc.geomatyka.eu/2017/

ICC 2017

July 2 – 7, 2017, Washington, DC, USA
URL: http://icc2017.org/

IGS Workshop 2017

July 3 – 7, 2017, Paris, France
URL: http://kb.igs.org/hc/en-us/articles/216574478-IGS-Workshop-2017

1st IUGG Symposium on Planetary Science (IUGG-PS2017)

July 3 – 5, 2017, Berlin, Germany
URL: http://www.dlr.de/iugg-ps2017

IAG/GGOS/IERS Unified Analysis Workshop (UAW)

July 10 – 12, 2017, Paris, France
URL: http://ggosdays.com/en/conferences/unified-analysis-workshop/

WCRP/IOC Conference 2017: Regional Sea Level Changes and Coastal Impacts

July 10 – 14, 2017, New York, USA
URL: http://www.sealevel2017.org

IAG and IASPEI Joint Scientific Assembly

July 30 – August 4, 2017, Kobe, Japan
URL: http://iag.dgfi.tum.de/index.php?id=291

AOGS 14th Annual Meeting

August 6-11, 2017, Singapore, Singapore
URL: http://www.asiaoceania.org/aogs2017/

Fifth International School on "Least Squares Approach to Modelling the Geoid"

August 21-25, 2017, KTH, Stockholm
URL: https://www.kth.se/en/abe/inst/som/avdelningar/geo/geodesi/handelser-1.78120

EUGEO 2017

September 4-6, 2017, Brussels, Belgium
URL: https://eugeo2017.sciencesconf.org/

ESA/JRC International Summerschool on GNSS 2017

September 4-15, 2017, Longyearbyen, Svalbard-Spitzbergen, Norway
URL: http://www.esa-jrc-summerschool.org

Workshop on Glacial Isostatic Adjustment and Elastic Deformation

September 5-7, 2017, Reykjavik, Iceland
URL: http://www.polar.dtu.dk/english/Workshop-on-Glacial-isostatic-adjustment-and-elastic-deformation-2017

EGSIEM Autumn School for Satellite Gravimetry Applications

September 11-15, 2017, Potstdam, Germany
URL: http://www.egsiem.eu/autumn-school

COSPAR 2017

September 18-22, 2017, Jeju Island, South Korea
3rd Symposium of the Committee on Space Research (COSPAR): Small Satellites for Space Research
URL: http://cospar.kasi.re.kr/cospar-symposium-2017/

IAG Workshop: Satellite Geodesy for Climate Studies

September 19-21, 2017, Bonn, Germany
URL: http://www.igg.uni-bonn.de/apmg/index.php?id=ws2017

Journees 2017

September 25-27, 2017, University of Alicante, Spain
URL: http://web.ua.es/journees2017/

ION GNSS+ 2017

September 25-29, 2017, Portland, Oregon, USA
URL: http://www.ion.org/gnss/index.cfm

Geodätische Wochhe / INTERGEO 2017

September 26-28, 2017, Berlin, Germany
URL: http://www.intergeo.de/

ILRS Technical Workshop 2017

October 4-7, 2017, Riga, Latvia
URL: http://www.ilrstw2017.lu.lv

9th ABLOS Conference

October 10-11, 2017, IHB, Monaco
URL: http://www.ablosconference.com/

International Workshop on the inter-comparison of space and ground gravity and geometric spatial measurements

October 16-18, 2017, Strasbourg, France
URL: http://geodesy.sciencesconf.org

OSTST 2017

October 23-27, 2017, Miami, FL, USA
URL: https://sealevel.jpl.nasa.gov/science/ostscienceteam/scienceteammeetings/

6th International Colloquium on Scientific and Fundamental Aspects of GNSS / Galileo

October 25-27, 2017, Valencia, Spain,
URL: http://esaconferencebureau.com/2017-events/17a08

LAPIS 2017 School

October 29 – November 4, 2017, La Plata, Argentina
URL: http://www.maggia.unlp.edu.ar/lapis2017

AGU 2017 Fall Meeting

December 11-15, 2017, New Orleans, LA, USA
URL: https://meetings.agu.org/

LBS 2018

January 15-17 , 2018, Zurich, Switzerland
URL: http://lbsconference.org

EGU General Assembly 2018

April 8-13 , 2018, Vienna, Austria
URL: http://www.egu2018.eu/

AOGS 15th Annual Meeting

June 3-8, 2018, Hawaii, USA
URL: http://www.asiaoceania.org/society/public.asp?view=up_coming

10th IVS General Meeting

June 3-8, 2018, Longyearbyen, Spitsbergen, Norway
URL: http://www.iers.org/IERS/EN/NewsMeetings/ForthcomingMeetings/forthcoming.html

42nd COSPAR Scientific Assembly

July 14-22, 2018, Pasadena, CA, USA
URL: http://cospar2018.org/

IAU XXXth General Assembly

August 20-31, 2018, Vienna, Austria
URL: http://astronomy2018.univie.ac.at/

21st International Workshop on Laser Ranging

October 27-31, 2018, Canberra, Australia
URL: http://www.iers.org/IERS/EN/NewsMeetings/ForthcomingMeetings/forthcoming.html

AGU 2018 Fall Meeting

December 10-14, 2018, Washington, D.C., USA
URL: https://meetings.agu.org/

EGU General Assembly 2019

April 7-12 , 2019, Vienna, Austria
URL: http://www.egu2019.eu/

27th IUGG General Assembly

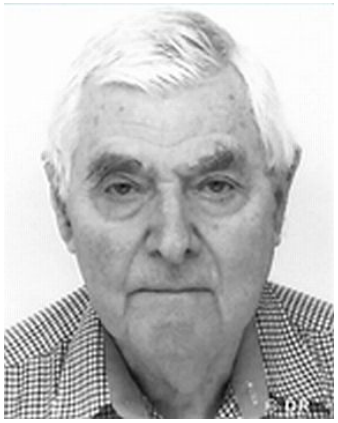
July 8 – 17, 2019, Montreal, Canada
URL: http://www.iugg.org/assemblies/

AOGS 16th Annual Meeting

July 28 – August 2, 2019, Singapore, Singapore
URL: http://www.asiaoceania.org/society/public.asp?view=up_coming

Obituary

Bernard Guinot (1925-2017)



Bernard Guinot, honorary astronomer of the Observatoire de Paris, died on March 6, 2017, aged 91. He was Correspondent of the French Académie des sciences, Honorary Member of the Bureau des longitudes and Member of the Academia Europaea.

Being at first an officer in the shipping department, he become an astronomer at the Paris Observatory in 1952, where André Danjon, then Director, associated him with his research on the astrolabe named after him. B. Guinot was actively involved in the further development of this instrument and of its scientific applications. In 1958, he obtained his doctoral thesis on this subject. In 1965 he became Director of the Bureau International de l'Heure (BIH), a position he held until 1985 at the Paris Observatory, in the Department of Fundamental Astronomy (now SYRTE). In this context, he devised new algorithms for the calculation of Universal Time UT1 and pole coordinates; he developed methods for the transition from optical measurements to space geodesy techniques and created a rapid service for the needs of space research. In 1979, he proposed the definition of a new equatorial origin which was adopted at the international level in 2000.

In 1980, he proposed the use of space geodesy observatories contributing to the measurement of Earth's rotation for the maintenance of the global geodetic reference system. He is thus the instigator of the geodetic reference system used worldwide - in particular by the space positioning systems - which gave birth to the current International Terrestrial Reference System (ITRS). This work was developed within the framework of a co-operation which he proposed to the IGN, which produced the publication of a first realization of this system in 1985, and later, in 1988, the creation of the International Earth Rotation and Reference System Service (IERS). In June 2015, he had the opportunity to present the genesis of this work during the scientific colloquium (Bureau des Longitudes, IGN, Observatoire de Paris), which celebrated the 30th anniversary of this system and its role in geodynamics, oceanography, climate and relativity.

As Director of the BIH, he was one of the most active authors of the transition from the astronomical measurement of time to its quantum measurement and one of the major players in the organization of world time metrology. He was strongly involved in the establishment of the global coordination of Coordinated Universal Time (UTC), the current basis of legal time. He created and developed the algorithm for the construction of the International Atomic Time (TAI) and made the TAI recognized as the unique and official basis for time and frequencies measurements. He improved its construction in order to make it the best approximation of the ideal time of physics. In 1985, he joined the International Bureau of Weights and Measures (BIPM) as a principal physicist, then as a consultant. He officially transferred the BIH activity on TAI to the BIPM in 1988 at the creation of the IERS, which replaced the IPMS and the earth-rotation section of the BIH. In addition to his activities on time scales, he devoted himself to the problem of the relativistic definitions of space-time references of which he assured the recognition by the IAU in 2000.

During the course of his career, he has been given many national and international responsibilities. At Paris Observatory, he was in charge of the Astrolabe Service (1962-1968) and the Service de l'Heure (1964-1976) and director of the Primary Time and Frequency Laboratory (LPTF, 1976-1979). He was also a member of the board of directors of the Bureau national de métrologie (BNM, 1972-1984), scientific and then executive director of the Groupe de recherche de géodésie spatiale (GRGS, 1979-1985), and President of the Bureau des longitudes (1984-1986). At the international level, he was President of Commission 19 (Rotation of the Earth) of the International Astronomical Union (IAU, 1961-1967), of the Scientific Council of the International Polar Motion Service (IPMS, 1962-1970), of the Federation of the Astronomical and Geophysical data analysis Services (FAGS, 1970-1973) and of the Consultative Committee for the Definition of the Second (CCDS, 1978-1984; now CCTF) and was also a Member of the International Committee of Weights and Measures (CIPM). In all these responsibilities, his competence, his rigor and his scientific authority have always been unanimously recognized.

B. Guinot wrote a large number of authoritative publications on space and time references, among which "La méthode des hauteurs égales en astronomie" with Suzanne Débarbat (Gordon & Breach 1970), and "Les fondements de la mesure du temps", with Claude Audoin (Masson 1998; English translation, Gordon & Breach

1981). He strongly emphasized the book "Les références de temps et d'espace", edited by the Bureau des longitudes, to appear in May 2017, which is dedicated to his memory.

The great scientific rigor and innovative concepts that Bernard Guinot has shown during his sixty years of scientific activity have allowed him to make astronomy and time measurements best benefit from the gain of precision brought by space geodesy and atomic clocks. We have lost with him a prominent personality and a great scientist.

NICOLE CAPITAINE, FELICITAS ARIAS, CLAUDE BOUCHER

and Colleagues from the Observatoire de Paris, Bureau des longitudes and Bureau international des poids et mesures