

TENTH ABLOS BUSINESS MEETING

ANNEX 1

*Agenda
International Hydrographic Bureau, Monaco
October 26-27, 2003*

TIMETABLE

Sunday, October 26: Begin at 1400; end around 1700
Monday, October 27: To be determined

DISCUSSION TOPICS (numerals in brackets refer to Annexes containing documentary material)

1. Welcoming address and meeting arrangements
2. Designation of the Rapporteur
3. Review of the Agenda and suggestions for new topics (1)
4. Review of documentary material (2)
5. Review and approval of Minutes of the 2002 Business Meeting (3, 8)
6. ABLOS Membership
 - Current members, including new appointees (4)
 - Vote of thanks to retiring members
7. Preparations for the Third ABLOS Conference
8. Revisions to the TALOS Manual (10)
9. Chairman's Report: attendance at international meetings (5)
10. Follow-up: CLCS confidentiality (6, 7, 9)
11. Follow-up: determining focal point(s) for ABLOS activities in 2003-2005, e.g.
 - Forging a scientific consensus on ridge issues in different parts of the world
 - Impact of Article 76 on Marine Scientific Research
 - Global Vertical Reference Network (11, 12)
 - International cooperation in Ocean Mapping
 - Invited participation in training initiatives
 - Other ideas
12. Topics and recommendations for inclusion in report to parent bodies of ABLOS
13. ABLOS executive changes
 - Accession of new Chairman Chris Rizos
 - Election of new Vice-Chairman
14. Other business
15. Date and time of next meeting
16. Close of meeting

Annexes containing documentary material

1. Agenda
2. Annexes containing documentary material (this list)
3. Minutes of Ninth ABLOS Business Meeting (minus annexes)
4. Current ABLOS membership list, revised October 27, 2003
5. Chairman's report - Attendance at international meetings
6. Paragraph 86 extracted from SPLOS/103 (Report of 13th Meeting of States Parties)
7. Page 6 extracted from the Fall 2003 Newsletter of the International Law Association
8. Suggested amendment to Minutes of 2002 Business Meeting, submitted by Alexei Zinchenko
9. Legal Nature and purpose of the recommendations of the CLCS, submitted by Alexei Zinchenko
10. TALOS 4th Edition - Questions/Actions for ABLOS, submitted by Steve Shipman
11. Commission 1: Reference Frames, submitted by Chris Rizos
12. Inter-Commission Project 1.2: Vertical Reference Frames, submitted by Chris Rizos

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*Chairman's Report: attendance at international meetings***GEBCO Centenary Conference; Monaco, April 14-16, 2003**

The Conference was attended by a broad cross-section of bathymetric specialists. Abstracts are posted at <http://www.ngdc.noaa.gov/mgg/gebco/centenaryabstracts.pdf>. Conference Proceedings are available on CD-ROM from the IHB. Some presentations underscored the importance of accurate bathymetric maps for implementing Article 76. Others noted the need for improved maps of global bathymetry, and argued for better coordination between regional mapping programs (particularly those undertaken for purposes of continental shelf delimitation) with a view to combining observations and to constructing coherent data bases.

IOC Advisory Body of Experts on the Law of the Sea; Lisbon, May 12-15, 2003

The Meeting was attended by legal and scientific experts. A report is available for downloading at <http://ioc.unesco.org/iocms/files/ABE-LOSIII%20final%20report%20English.pdf>. Discussion focused on three main topics: (1) IOC criteria and guidelines on the transfer of marine technology to developing countries; (2) establishment of an internal procedure for obtaining authorization to conduct scientific operations under the auspices of IOC, within the EEZ or continental shelf of a member state; (3) analysis of the results of a questionnaire circulated to member states, concerning practice in marine scientific research and in the transfer of marine technology.

Legal and Scientific Aspects of Continental Shelf Limits; Reykjavik, June 25-27, 2003

The Conference attracted a wide spectrum of specialists from government, industry, and academia, some of whom had played prominent roles in the creation of the Convention. The program is available at virginia.edu/colp/iceland1.pdf. Sessions were devoted to: Geomorphology and Geology, Ridge Issues, the Role of the CLCS, Current Issues, and Resources of the Shelf. Proceedings will be published in book form by the University of Virginia.

Controversial Scientific Issues in the Context of UNCLOS Article 76 [in the Arctic]; St. Petersburg, June 30 - July 4, 2003

Sponsored by the Russian Ministry of Natural Resources of the Russian Federation, this Conference was called to provide Russian and international scientists an opportunity to discuss the scientific underpinnings of Article 76 implementation in the Arctic. Thirty-six papers were presented over five days, articulating a range of viewpoints and exposing significant differences of opinion between two camps: those who considered the Lomonosov and Mendeleev Ridges as 'natural prolongations' of the Russian landmass, and those who didn't. A summary of the presentations is available from the All-Russia Institute for Geology and Mineral Resources of the World Ocean, St. Petersburg. A particularly enlightening presentation was delivered by a senior

member of the Russian continental shelf team, who was authorized to describe certain aspects of the internal process that was followed by the CLCS in its review of the Russian submission.

**International Law Association Committee of Legal Issues of the Outer Continental Shelf;
Hamburg, September 5-6, 2003**

Chaired by Judge Dolliver Nelson, President of the International Tribunal for the Law of the Sea, this Committee comprises nineteen experts in international law, and two specialists in hydrography and marine geoscience (ABLOS members Chris Carleton and Ron Macnab, respectively). Discussions lasted two days and fell into two broad categories: Delimitation Issues, and the Legal Regime of the Outer Continental Shelf. Topics covered in the first category included: functions and competence of the CLCS; dispute settlement; deadlock between the CLCS and a coastal state; transparency of the submission process; and issues of interpretation. Topics in the second category included: non-living resources of the seabed and subsoil; sedentary fisheries; navigation; pollution, marine scientific research; and submarine cables and pipelines. Deliberations will be summarized in a report to be presented at next year's meeting of the International Law Association in Berlin.

**Fourth International Conference on Arctic Margins; Dartmouth, Canada, September 30 -
October 3, 2003**

This Conference featured a session on *Science Issues Relating to UNCLOS Article 76*, which attracted seven papers and a full audience. Some papers consisted of elaborations of reports that had been presented at the St. Petersburg meeting in July. The discussions did little to reconcile the contrasting viewpoints that had been articulated in St. Petersburg, concerning the characterization of the Mendeleev and Lomonosov Ridges as 'natural prolongations' of the adjacent landmasses. Abstracts may be viewed at <http://www.icamiv.org/index.html>

Paragraph 86 extracted from SPLOS/103, Report of the 13th Meeting of States Parties

In response to concerns regarding the need of States for some factual information about the scientific data and material in the submissions and the Commission's analysis of them in terms of the requirements of Article 76 of the Convention, the Commission decided that its recommendations should in future include an executive summary, containing a general description of the extended continental shelf, as well as a set of coordinates and illustrative charts, if appropriate, to identify the line describing the outer limits recommended by the Commission. The Secretary-General would then be in a position to publicize the executive summary at his discretion.

*Paragraph extracted from the Fall 2003 Newsletter of the International Law Association
(Prepared by Martin Glassner, member of the USA Branch of the ILA,
following attendance at the 13th Meeting of States Parties)*

Perhaps the most controversial issue derived from the growing concern over the policy of the Commission on the Limits of the Continental Shelf to maintain "confidentiality" (read secrecy) in its consideration of States' submissions concerning the outer limits of their continental shelves which extend beyond 200 nautical miles from the relevant baselines, and of the Commission's recommendations to such States. The Commission concluded at its Twelfth Session in April 2003 "that the recommendations should include a general description of the extended continental shelf, as well as a set of coordinates...Such a summary would not contain information which might be of a confidential nature or which might affect the proprietary rights of the coastal State over the data and information provided in the submission..." (CLCS/36, 2 May 2003, para. 10). It seems to me unlikely that this compromise has laid the issue permanently to rest.

*Suggested revisions to Minutes of Ninth Business Meeting
Submitted by Alexei Zinchenko*

9. CLCS confidentiality

The Chairman circulated a copy of a communication that he submitted earlier in the year (acting in a personal capacity) to the Chairman of the ILA Committee and to the International Boundaries electronic discussion group (Annex IX). This message followed a flurry of electronically-posted queries and comments that appeared to be prompted in large part by the mixed outcome of the recent submission of the Russian Federation. These postings reflected an emerging concern about the nature of confidentiality in the work of the CLCS and lack of publicity as to the contents of its recommendations.

The Chairman's communication touched upon three effects of these confidentiality provisions that he considered undesirable: (1) lack of an opportunity for other States to examine the basis of any given continental shelf submission and to assess the rationale behind the Commission's recommendations; (2) the lack of public knowledge of the details of CLCS recommendations puts the developers of submissions by other States into a disadvantaged position; (3) conferring to members of the Commission the advantage of possessing inside knowledge that could be used to their benefit.

As an illustration of the sort of legal attention that this issue is beginning to attract, the Chairman circulated a copy of an article that was published recently by Judge Dolliver Nelson of the International tribunal for the Law of the Sea, discussing at some length the operation of the CLCS (Nelson, L.D.M., *The Continental Shelf: Interplay of Law and Science*, in N. Ando et al. [eds], *Liber Amircorum Judge Shigeru Oda*, 1234-1253, 2002, Kluwer Law International).

In the ensuing discussion, it was acknowledged that CLCS confidentiality may pose problems in the future, and that the obscure outcome of the Russian submission may be a harbinger for the future.

*The legal nature and purpose of the recommendations of the Commission
Submitted by Alexei Zinchenko*

Recently, an issue has arisen with respect to the nature of the recommendations of the Commission to a coastal State after the examination of its submission. One of the important aspects of this issue is the question of whether publicity should be given to the recommendations of the Commission. This question is especially relevant when the Commission recommends that the coastal State revisit some of the data and material in certain areas of the submission, and then makes a revised or new submission to the Commission.

Marked interest has been expressed in scientific circles, primarily among marine geologists, geophysicists and lawyers who assist coastal States in the preparation of their submissions to the Commission. They ask how the Commission has come to its conclusions. They wonder whether data and other material in specified areas of the submission were sufficient to satisfy the scientific requirements of the Convention. Interest is also keen regarding which scientific principles contained in the Convention have been successfully applied by the submitting State in certain areas, and which have not.

The question arises as to what are the parameters of the rights to such information enjoyed by the scientific community and the international community in general. There is also a question as to whether the allegations that the Commission is in some way "withholding scientific information" have any basis, considering that the Scientific and Technical Guidelines were adopted by the Commission on 13 May 1999ⁱ, in order to assist coastal States in preparing their submissions.

It should be noted that the importance of the Guidelines of the Commission was reaffirmed by the Meeting of States Parties when it adopted the decision regarding the date of commencement of the 10-year period for making submissions to the Commission set out in article 4 of annex II to the Conventionⁱⁱ. The 10-year time period referred to in article 4 of annex II is now understood to have commenced on 13 May 1999, the date of the adoption of the Guidelines, for those States that ratified the Convention before that date.

To satisfy the requirements of article 76 a coastal State has to conduct a thorough survey of its continental shelf. In fact it has to prove that the adjacent seabed is the submerged prolongation of its land territory. Typically, a survey of this kind requires significant time and the investment of substantial financial resources. The coastal State, therefore has rights of a proprietary nature over the data and information obtained during the survey. Other information may be obtained through contractual agreements between States and commercial companies, such as firms exploring the seabed for hydrocarbon reserves, and become the property of the State as a result of those contracts.

Such data and information, in fact, can be, and often are, used not only for supporting the submission but for other - e.g. commercial, scientific or defense - purposes as well. Nothing prevents the coastal State from publicizing the recommendations, if it deems fit. However, this is the logical prerogative of the coastal State - inherent in the proprietary nature of its rights over the data and information - and one that is unlikely to be utilized by coastal States. The recommendations of the Commission provided to the coastal State after the examination of its submission may contain an analysis of that data and information that reveals their content, at least insofar as they are relevant for the purpose of the recommendations.

Some members of the Commission have different views regarding the publicizing by the coastal State of the recommendations made to it by the Commission. In that respect, I would like to note once again the

disclaimer at the beginning of this paper: the views expressed in this paper are those of the presenter and do not necessarily reflect the views of the United Nations or the Commission.

Publicity given to the recommendations would go against such proprietary - and therefore exclusionary - prerogatives of the coastal State. In addition, the reading of the recommendations would make it possible to draw conclusions on the level of the technology and scientific knowledge possessed by the coastal State with regard to something it considers "its own" - the underwater area that the State claims to be the natural prolongation of its land territory and that extends beyond 200 nautical miles.

The publicity given to the recommendations of the Commission appears to be an issue that goes beyond the mandate of both the Commission and the Secretary-General, as determined by the Convention, and spelled out by the Rules of Procedure of the Commission.

The circulation of the recommendations would publicize the data and information contained in the submission by the coastal State. The publicity of such data and information is a coastal State's prerogative, which derives from its proprietary rights.

At the last session, the Commission addressed the issues of confidentiality in the consideration of the submissions and the contents of the recommendations made by the Commission to the coastal States. In particular, the Commission considered it useful to address potential concerns of States which might have an interest in determining whether the coastal State had in fact applied the Commission's recommendations in the delineation of the outer limits of its continental shelf.

The Commission concluded that a solution would be for the Commission to establish, in its document dealing with the *modus operandi* for the examination of a submission, that the recommendations should include an executive summary, which would contain a general description of the extended continental shelf, as well as a set of coordinates to identify the line describing the outer limits recommended by the Commission and illustrative charts, if appropriate. Such a summary would not contain information that might be of a confidential nature or which might affect the proprietary rights of the coastal State over the data and information provided in the submission.

The Secretary-General would then be in a position to publicize the summary at his discretion, without causing any prejudice to the requirements of confidentiality as established in annex II to the Rules of Procedure. This could be done at the time that due publicity was to be given, in accordance with article 76, paragraph 9 of the Convention, to charts and relevant information, including geodetic data, permanently describing the outer limits of its continental shelf, deposited by the coastal State with the Secretary-General. It could also be done at the request of any Stateⁱⁱⁱ.

ⁱ CLCS/11.

ⁱⁱ SPLOS/72.

ⁱⁱⁱ CLCS/36, paras 9-10.

*TALOS 4th Edition - QUESTIONS / ACTIONS FOR ABLOS
Submitted by Steve Shipman*

This a summary of the questions raised in the report of the Editorial Committee Meeting held at the IHB on 23 / 24 October 2003. Further information may be found in the attached meeting report.

1. A chairman for the Editorial Committee is required.
2. What is the target audience?
3. Is ABLOS happy with the proposed structure? Are other topics needed? Should some topics be deleted?
4. Assuming the answer to 5 is yes then volunteers required to review / update:
 1. Prepare Introduction to Geology
 2. Prepare Introduction to Geophysics
 3. Prepare Introduction to Oceanography
 4. Prepare Introduction to UNCLOS history
 5. Chapter 4 – Baselines (based on existing Part II Chapter4)
 6. Chapter 5 - Outer Limits (based on existing Part II Chapter 5)
 7. Chapter 6 - Bilateral Boundaries (based on Part II Chapter 6)
 8. Prepare Chapter 7 – Nomenclature
 9. Note that Lars Sjoberg (IAG) will work on Chapter 2 - Geodesy and Carlo Dardengo (IHO) will work on Chapter 3 - Nautical Charts and their relevant sections of Chapter 1 - Introduction. Steve Shipman (IHB) will work on Appendices 1 – 4. All may require further assistance depending on the scope of the work to be determined.
5. The TALOS Manual is currently an IHO publication S-51; it acknowledges the contribution of GALOS of the IAG. Should this continue or should it now be clearly an IAG – IHO – IOC publication?
6. Is a hard copy required? (IHO policy would be no.)
7. English, French and Spanish Versions? (IHO policy would be yes.)
8. Some diagrams used in the 3rd Edition are copyrighted. Can they be used in a 4th Edition without further approval or does permission need to be re-obtained? Does ABLOS have any experience of this?

Possible 4th Edition Structure

Preface

1. Introduction

Scope of the Manual
Hydrography
Geodesy
Geology
Geophysics
Oceanography
Other disciplines?
UNCLOS history and background

2 Geodesy

The Geoid
The Ellipsoid
Geodetic Datums
Vertical Datums
Area determination
Surveys

3 Nautical Charts

Introduction
Paper charts
ENCs
Historical Data
Reliability
Projections
Units
Scale
Straight lines
Distance
Area
Bearings
Working on a chart

4 Baselines

Based on 3rd Edition?

5 The Outer Limits

Based on 3rd Edition? (Samuel Betah has provided some additional material in hard copy)

6 Bilateral Boundaries

Based on 3rd Edition?

7. Nomenclature?

Appendix 1 Glossary
Appendix 2 UN Convention
Appendix 3 Bibliography
Appendix 4 Membership of TALOS working groups

TALOS EDITORIAL BOARD MEETING - 23 –24 October 2003

1. The President of the IHB, Vice Admiral Maratos, opened the meeting at 0930 on 23 October. He wished the participants well in their endeavours. PAH, Steve Shipman, outlined the domestic arrangements.

The following were present. Steve Shipman, IHB, (SS), Carlo Dardengo, IHO, (CD) and Lars Sjoberg, IAG, (LS). Apologies were received from Samuel Betah, IOC, (SB) and Shin Tani, IHO, (ST). Two representatives from Algeria who had expressed an interest in attending were unable to do so. SB provided, by post, some additional material for the development of the existing Part II Section 5 – Outer Limits.

2. The draft agenda was accepted without modification.

3. SS explained that it was IHO policy that IHB staff should not chair Committees and Working Groups. Neither CD nor LS were prepared to accept the position of Chairman of the Editorial Board, as they believed that someone with a broader knowledge of LOS matters was required. They were both happy to contribute within their specialist fields. SS agreed to act as chairman for this meeting in order to move the project on as far as possible.

4. SS introduced his proposed structure for the 4th Edition and this was accepted with some minor amendments. The proposal from Ron Macnab that a section on Nomenclature used in Article 76 was accepted although some further guidance on this would be required.

Discussion then took place on the scope of revision required / possible, the timescale and the availability of resources to complete such a task given that it had taken 2 years to get the first editorial committee meeting together. The following is a summary of the points agreed:

SS stated that his understanding was that the book was aimed at introducing non-professionals in this arena to the issues involved and point them in the direction of more detailed information. It was agreed to ask ABLOS for more guidance on this matter, as this would have an impact on other issues to be discussed later.

Resources to re-write the book would be hard to find unless there was money available to fund such work. Without committed resources the timescale for completion could be several years and this was felt to be too long. The IHB **might** be able to fund some work from its consultancy budget but the scope and costs would have to be clearly identified. *(NB. These funds would probably also be required for the translation of the Manual into French and Spanish – discussed later.)* LS stated that he did have people who could work on sections of the book but that funding for such tasks would have to be provided.

It was considered that much of the existing material was still perfectly valid and that with the inclusion of some additional material from other publications (e.g. IHO M4 and the draft Manual of Hydrography plus Peter Vanicek's Geodetic Commentary) and a rearrangement of the material, a very useful new edition could be produced with a much-reduced workload. It was agreed that LS and CD would spend much of the meeting time reviewing Chapter 2 Geodesy and

Chapter 3 Nautical Charts, respectively, to see what could be collated and what additional material would be required. It hoped thereby to have a fairly clear idea of the work required.

It was considered that Chapter 4 - Baselines, Chapter 5 – The Outer Limits (+SB's contribution) and Chapter 6 - Bilateral Boundaries could remain more or less the same as the relevant sections in the 3rd Edition. It was agreed to ask ABLOS to identify appropriate volunteers to review and amend these chapters. SS agreed to update the appendices as required (1 – Glossary, 2 – UN Convention, 3 – Bibliography, 4 – Membership of TALOS Working Groups). Chapter 1 is envisaged to provide a brief introduction to the various disciplines involved. CD and LS could provide the introduction to geodesy and nautical charts and ABLOS would be invited to identify authors for Geology, Geophysics Oceanography and UNCLOS history plus any other areas that ABLOS deemed appropriate.

The TALOS Manual is currently an IHO publication S-51; it acknowledges the contribution of GALOS of the IAG. Should this continue or should it now be clearly an IAG – IHO – IOC publication? This could impact on some of the following questions.

5. Some diagrams used in the 3rd Edition are copyrighted. Can they be used in a 4th Edition without further approval or does permission need to be re-obtained? Does ABLOS have any experience of this?

6. The IHO is moving away from printed publications, S-51 is currently available in printed and electronic formats. Does ABLOS require a printed copy? The intended audience might influence this decision, University / College Libraries? If the answer is yes then the cost of production will have to be addressed.

7. S-51 is currently available in English, French and Spanish. As an IHO publication it would continue to be published in these three languages. The IHB has limited translation facilities and the translation would have to be passed to a Member State or contracted out. This has cost implications. If the updating follows the process discussed above this would reduce some of the effort required for translation.

8. TBD

9. To be decided after discussion with ABLOS and the decision on how to proceed has been decided.

3 Nautical Charts

1. Introduction from draft copy of Manual on Hydrography and "NOAA Chart User's Manual" (page 1-7 and 1-8; We need permission)
2. Paper charts M-4 pages A-100.1 ad A-100.2 – to be improved
3. ENCs from IHO pubs (S-52)?
4. Historical Data S-51 pag 44 – to be improved
5. Reliability M-4 pages from 1-100.11 to 1-100.15 to be improved
6. Projections S-51 pages from 33 to 38
7. Units S-51 page 42
8. Scale M-4 page 1-200.2 and S-51 page 39
9. Graduation & graticule M-4 pages 1-200.2 and 1-200.3
10. Straight lines & distances see S-51 page 40
11. Area to be done (related to geodesy)
12. Bearings S-51 page 42 to be improved (less technical – Related to geodesy)
13. Working on a chart S-51 pages from 42 to 44- to be improved?

Commission 1: Reference Frames

<http://iag.dgfi.badw.de>

President: H. Drewes, Germany (drewes@dgfi.badw.de)

Vice-President: C.K. Shum, USA (ckshum@osu.edu)

Submitted by Chris Rizos

Terms of Reference

Geodetic reference frames are the basis for three-dimensional, time dependent positioning in global, regional and national networks, cadastre, engineering, precise navigation, geoinformation, geodynamics, sea level studies, and other geosciences. They are necessary to consistently estimate unknown parameters using geodetic observations, e.g., station coordinates, crustal motions, Earth orientation parameters. Commission 1 is focused on the scientific research associated with the definition and realization of global and regional reference frames as well as the development of analysis and processing methods for relevant geodetic observations. Different terrestrial and space-borne measuring techniques shall be investigated with respect to their strengths and weaknesses for parameter estimation, their respective precision, accuracy and reliability. The proper use of these techniques for geodetic research shall be coordinated and methods for the combination of heterogeneous measurements shall be studied and disseminated. The basis for globally unified reference frames for three-dimensional positioning and monitoring of motions, horizontal and vertical, over land, water and ice, shall be provided and disseminated among the scientific and users community as well as the appropriate IAG Services.

Commission 1 is identical with the Sub-commission '82 of the Scientific Commission B of the ICSU Committee on Space Research (COSPAR).

Objectives

The principal objectives of the scientific work of Commission 1 is the basic research on

- definition, establishment, maintenance, and improvement of geodetic reference frames;
- advanced development of terrestrial and space observation techniques for this purpose;
- analysis and processing methods for parameter estimation related to reference frames;
- theory and coordination of astrometric observations for reference frame purposes;

Additional objectives of the Commission are the international collaboration:

- for the definition and deployment of networks of observatories;
- with related scientific organizations, institutions, agencies, and IAG Services.

Structure

The Commission is formed by Sub-Commissions (SC), Inter-Commission Projects (ICP), and Study Groups (SG). These are at present:

SC1.1 Coordination of Space Techniques President: M. Rothacher Germany

SC1.2	Global Reference Frames	President: C. Boucher	France
SC1.3	Regional Reference Frames	President: Z. Altamimi	France
SC1.3 a	Europe	Chair: J.A. Torres	Portugal
SC1.3 b	South and Central America	Chair: LP. Fortes	Brazil
SC1.3 c	North America	Chairs: M.Craymer, R. Snay	Canada, USA
SC1.3 d	Africa	Chair: R Wonnacott	South Africa
SC1.3 e	Asia-Pacific	Chair: J. Manning	Australia
SC1.3 f	Antarctica	Chair: R Dietrich	Germany
SC1.4	Interaction of Celestial and Terrestrial Reference Frames	President: S.Y. Zhu	Germany
ICP1.1	Satellite Altimetry (Jointly with Commissions 2 and 3)	Chair: W. Bosch	Germany
ICP1.2	Vertical Reference Frames (Jointly with Commission 2)	Chair: J. Ihde	Germany
SG 1.1	Ionospheric Modelling and Analysis (Jointly with Commission 4 and COSPAR)	Chair: C. Brunini	Argentina
SG1.2	Use ofGNSS for Reference Frames (Jointly with Commission 4 and IGS)	Chair: R. Weber	Austria
SG 1.3	Quality measures, quality control, and quality improvement (Jointly with ICCT)	Chair: H. Kutterer	Germany

Inter-Commission Project 1.2: Vertical Reference Frames

(Jointly by Commissions 1 and 2)

*Submitted by Chris Rizos***Terms of Reference**

The Earth's surface may be characterized by its geometry and the potential of the Earth gravity field. The determination of heights includes both of these aspects, the geometric part and the geopotential part. Presently, space geodetic techniques allow an accuracy in geometric positioning of about 10^{-9} in global and continental scales. Gravity field parameters, including the physical height components, can at present be determined only 2 to 3 orders of magnitude less accurate than the geometric parameters. Moreover, the current height reference frames around the world differ in their vertical datum (e.g., the mean sea-level at the fundamental tide gauges) and in the theoretical foundations of the height systems. There is no global height reference system defined and realized like the International Terrestrial Reference System (ITRS). A considerable progress in the definition and realization of a global vertical reference system will be attained from the data of the new gravity field missions. Based on the classical and modern observations, the Project on Vertical Reference Frames shall study the consistent modeling of both, geometric and gravimetric parameters, and provide the fundamentals for the installation of a unified global vertical reference frame.

Objectives

- To elaborate a proposal for the definition and realization of a global vertical reference system (World Height System - WHS);
- To derive transformation parameters between regional vertical reference frames;
- To establish an information system describing the various regional vertical reference frames and their relation to a world height frame (WHF).

Structure**Chair:** Johannes Ihde (Germany)**Members**

Alireza A. Ardalan (Iran)	Bill Kearsley (Australia)
Canne Bruyninx (Belgium)	Roland Klees (Netherlands)
Milan Bursa (Czech Republic)	Gunter Liebsch (Germany)
Tonie van Dam (Luxemburg)	Markku Poutanen (Finland)
Gleb Demianov (Russia)	Laura Sanchez (Colombia)
Will Featherstone (Australia)	Tilo Schone (Germany)
Christopher Jekeli (USA)	Steve Shipman (UK)
Adolfientje Kasenda (Australia)	Jaroslav Simek (Czech Republic)

Program of Activities

- Harmonization of globally used height data sets;
- Study of combination procedures of height data sets from different techniques;
- Study of information on regional vertical systems and their relations to a global vertical reference system for practical applications;
- Unification of regional (continental) height systems.