



# ICA Reports

2015–2019



## TABLE OF CONTENTS

ICA Officers 2015–2019 .....	4
President’s report.....	6
Secretary General’s report.....	16
Treasurer’s report .....	18
Auditors’ report .....	23
Publication Committee report.....	24
Commission on Art and Cartography .....	26
Commission on Atlases .....	28
Commission on Cartography and Children.....	31
Commission on Cartography in Early Warning and Crisis Management .....	35
Commission on Cartographic Heritage into the Digital.....	45
Commission on Cognitive Issues in Geographic Information Visualization.....	47
Commission on Education and Training.....	50
Commission on Generalisation and Multiple Representations .....	55
Commission on Geospatial Analysis and Modeling.....	57
Commission on GI for Sustainability.....	59
Commission on the History of Cartography.....	64
Commission on Location Based Services .....	69
Commission on Map Design.....	75
Commission on Map Production and Geoinformation Management .....	79
Commission on Map Projections.....	86
Commission on Maps and Graphics for Blind and Partially Sighted People.....	92
Commission on Maps and the Internet .....	100
Commission on Mountain Cartography .....	101
Commission on Open Source Geospatial Technologies.....	105
Commission on Planetary Cartography .....	106
Commission on SDI and Standards .....	108
Commission on Sensor-driven Mapping .....	112
Commission on Topographic Mapping.....	117
Commission on Toponymy .....	122
Commission on Ubiquitous Mapping .....	127
Commission on Use, Users, and Usability Issues.....	133
Commission on Visual Analytics .....	138
Working group on Marine Cartography .....	141

## ICA Officers 2015–2019

### Executive Committee:

- President: Menno-Jan Kraak (The Netherlands)
- Secretary-General and Treasurer: László Zentai (Hungary)
- Vice-President: Sara Fabrikant (Switzerland)
- Vice-President: David Forrest (Great Britain)
- Vice-President: Yaolin Liu (China)
- Vice-President: Pilar Sánchez-Ortiz Rodríguez (Spain)
- Vice-President: Monika Sester (Germany)
- Vice-President: Lynn Usery (USA)
- Vice-President: Vít Voženílek (Czech Republic)
- Past-President: Georg Gartner (Austria)

### Commissions:

Commission	Chairperson
Art and Cartography	Sébastien Caquard (CAN)
Atlases	René Sieber (SUI)
Cartographic Heritage into the Digital	Evangelos Livieratos (GRE)
Cartography and Children	Carla Sena (BRA)
Cartography in Early Warning and Crisis Management	Milan Konečný (CZE)
Cognitive Visualization	Amy Griffin (AUS)
Education and Training	David Fairbairn (GBR)
Generalisation and Multiple Representations	Dirk Burghardt (GER) 2015–2017 Guillaume Touya (FRA) 2017–
Geospatial Analysis and Modeling	Xiaobai Angela Yao (USA)
GI for Sustainability	Vladimir Tikunov (RUS)
History of Cartography	Imre Josef Demhardt (USA)
Location Based Services	Haosheng Huang (CHN)
Map Design	Kenneth Field (GBR)
Map Production and Geoinformation Management	Peter Schmitz (RSA)
Map Projections	Miljenko Lapaine (CRO)
Maps and Graphics for Blind and Partially Sighted People	Alejandra Coll (CHL)
Maps and the Internet	Rex Cammack (USA)
Mountain Cartography	Dušan Petrovič (SLO)
Open Source Geospatial Technologies	Silvana Comboim (BRA)
Planetary Cartography	Henrik Hargitai (HUN)
SDI and Standards	Serena Coetzee (RSA)
Sensor-driven Mapping	Jonathan Li (CAN)
Topographic Mapping	Alexander Kent (GBR)

Toponymy	Paulo Menezes (BRA) 2015–2017 Peter Jordan (AUT) 2017–
Ubiquitous Mapping	Masatoshi Arikawa (JAP)
Use, User and Usability Issues	Kristien Ooms (2015–2018) Robert Roth (USA) 2018–
Visual Analytics	Anthony C. Robinson (USA)

**Working groups:**

Working group	Chairperson
Body of knowledge	Georg Gartner (AUT)
International Map Year	Bengt Rystedt (SWE)
Marine Cartography	Ron Furness (AUS), Lysandros Tsoulos (GRE)

**Committees:**

Committee	Chairperson
Award	David Fairbairn (GBR)
Statutes	Derek Clarke (RSA) and Tim Trainor (USA)
Publication	Monika Sester (GER)

**Honorary Auditors elected for the 2015–2019 term:**

- Harold Moellering (United States)
- Swarna Subba Rao (India)

**ICA News editor:**

- Igor Drecki (NZE)

**Editors of the International Journal of Cartography:**

- William Cartwright (AUT)
- Anne Ruas (FRA)

**Webmasters:**

- Felix Ortag (AUT)
- Manuela Schmidt (AUT)

## President's report

### Introduction

As soon as location is involved maps will come into action. Maps allow us to compare tangible physical phenomena such as hours of sunshine, or intangible human phenomena such as level of education amongst different locations. They allow us to see geographical processes evolving over time such as land use changes. The map has moved beyond the static window to the world, and become an interactive, mobile, dynamic and collaborative interface between a human, groups of people, and the dynamically evolving environment. We only can comprehend the mapped data effectively if the maps are attractive, and well designed. In other words, maps that matter should raise interest, be engaging, instantly understandable, and relevant to society. It is the discipline of Cartography that aims to realize and facilitate this. The International Cartographic Association (ICA), founded in 1959, has as its aim is to promote the discipline of Cartography internationally. It offers its expertise and knowledge of technological developments to other organizations via events, meetings workshops, and publications. Its activities happen through the work of its Commissions and Working Groups, that deal with a wide range of topics that cover nearly the whole discipline. Together we are faced by all kind of societal and technological development with often are both a challenge and opportunity for our discipline. To name a few at the time of writing: artificial intelligence, big geo data, real time data structures, cloud infrastructures, data driven visualizations, augmented and virtual reality. As cartographic community, together with related sciences we are well places to face these and future new developments.

### Governance

In the period 2015-2019 the Executive Committee (see also <https://icaci.org/executive-committee/>) was composed of:

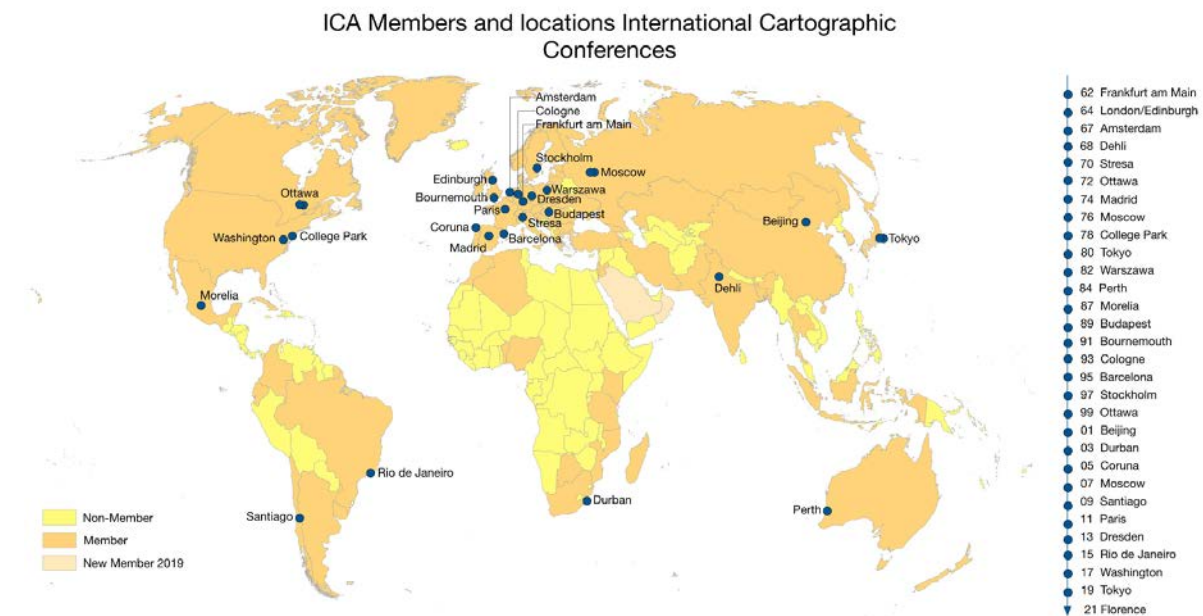
- Sara Fabrikant (CH) vice-president
- David Forrest (UK) vice-president
- Georg Gartner (A) past-president
- Menno-Jan Kraak (NL) president
- Yaolin Liu (CN) vice-president
- Pilar Sanchez-Ortiz Rodriguez (SP) vice-president
- Monika Sester (D) vice-president
- Lynn Usery (US) vice-president
- Vit Vozenilek (CZ) vice-president
- Laszlo Zentai (H) secretary-general



The executive members each had their own portfolio to improve the governance and operations of ICA. Laszlo Zentai was our global contact point as secretary-general and treasurer and looked at our internal administrative procedures. Sara Fabrikant was responsible for the research agenda, David Forrest studied our internal organization, Georg Gartner looked at membership issues, Yaolin Liu took care of capacity building, Vit Vozenilek looked at our conference policies, Lynn Usery took care of our relation with National Mapping Agencies, Pilar Sanchez-Ortiz Rodriguez linked to the International Map Year, and Monika Sester reformed our publication policy. Menno-Jan Kraak took care of external relations (International Science Council and the United Nation's Global Geographical Information Management).

## Members

The map below shows our current national membership (see also <https://icaci.org/national-members/>) and the location of past International Cartographic Conferences. Next to national member ICA also has affiliate members (see <https://icaci.org/affiliate-members/>). During the period 2015-2019 three new members joined: Georgia, Estonia, Bangladesh. Three more are likely to join in Tokyo: Armenia, Oman and Saudi Arabia.



## Commissions and Working groups

Commissions are core to ICA's success. They Association's major activities happen because of the Commissions. These activities are guided by their Term of Reference to reach ICA's objectives. Our Commissions act globally and might execute specific ICA tasks incorporated in their Terms of Reference. For the period 2015-2019 the General Assembly in Rio de Janeiro approved the following Commissions. In between [] you find the name of the EC member acting as liaison.

- Commission on Art and Cartography, Chair Sébastien Caquard [SF]
- Commission on Atlases, Chair René Sieber [VV]
- Commission on Cartographic Heritage into the digital, Chair Evangelos Livieratos [PS]
- Commission on Cartography and Children, Chair Carla Cristina Reinaldo Gimenes deSena [PS]

- Commission on Cartography in Early Warning and Crisis Management, Chair MilanKonečný [YL]
- Commission on Cognitive issues in Geographic Information Visualization, Chair AmyGriffin [SF]
- Commission on Education and Training, Chair David Fairbairn [LZ]
- Commission on Generalisation and Multiple Representation, Chair Dirk Burghardt >>Guillaume Touya [MS]
- Commission on Geospatial Analysis and Modelling, Chair Xiaobai Angela Yao [YL]
- Commission on GI for Sustainability, Chair Vladimir Tikunov [M]
- Commission on the History of Cartography, Chair Imre Josef Demhardt [LU]
- Commission on Location Based Services, Chair Haosheng Huang [GG]
- Commission on Map Design, Chair Kenneth Field [VV]
- Commission on Map Production and Geoinformation management, Chair PeterSchmitz [GG]
- Commission on Map Projections, Chair Miljenko Lapaine [LU]
- Commission on Maps and Graphics for Blind and Partially Sighted People, ChairAlejandra Coll [PS]
- Commission on Maps and the Internet, Chair Rex Cammack [SF]
- Commission on Mountain Cartography, Chair Dušan Petrovič [GG]
- Commission on Open Source Geospatial Technologies, Chair Silvana Philippi Camboim[LU]
- Commission on Planetary Cartography, Chair Henrik Hargitai [LZ]
- Commission on SDI and Standards, Chair Serena Coetzee [DF]
- Commission on Sensor driven Mapping, Chair Jonathan Li [MS]
- Commission on Topographic Mapping, Chair Alex Kent [LU]
- Commission on Toponymy, Chair Paulo Menezes >> Peter Jordan [DF]
- Commission on Ubiquitous Mapping, Chair Masatoshi Arikawa [MS]
- Commission on Use and User and Usability Issues, Chair Kristien Ooms >>Rob Roth [DF]
- Commission on Visual Analytics, Chair Anthony Robinson [MJ]

(EC Liaison: [SF] Sara Fabrikant; David Forrest [DF]; Georg Gartner [GG]; Menno-Jan Kraak [MJ]; Yaolin Liu [YL]; Pilar Sanchez-Ortiz Rodriguez [PS]; Monika Sester [MS]; Lynn Usery [LU]; Vit Vozenilek [VV]; Laszlo Zentai [LZ])

- Working Group on Body of Knowledge on Cartography, chair Georg Gartner
- Working Group on International Map Year, chair Bengt Rystedt
- Working Group on Marine Cartography, chair Ron Furness

In addition the ICA has three committees:

- Award Committee, chaired by David Fairbairn
- Statutes Committee, composed of Derek Clarke and Tim Trainor
- Publication Committee, chaired by Monika Sester.

Auditors Harold Moellering and Subbarao Rao keep an eye on our financial operations.



## Communication

To communicate with members and those interested in cartography we do have several media available. Our main means of communication is our website, kept up-to-date by our webmasters Manuela Schmidt and Felix Ortig. ICA News Editor Igor Drecki guaranteed a bi-annual newsletter. David Fraser is responsible for our eCARTO News, a monthly collection of the latest cartographic news and developments from around the world. David Fairbairn made sure ICA had a monthly column in GIM.

During the 2015-2017 period the reform of our publication policy under the guidance of Monika Sester is the largest change in our communication, but it fits well with the open science policy that get a wider attention everywhere. With the new policy nearly all our publication of conferences and workshops are now open access.

The ICA publishes the outcomes of its conferences and workshops in three series:

- Advances in Cartography and GIScience of the International Cartographic Association (short: Advances of the ICA, eISSN 2570-2084): single-blind peer review based on a fullpaper;
- Proceedings of the International Cartographic Association (short: Proceedings of the ICA, eISSN 2570-2092): single-blind peer review based on submitted abstracts, developed to full paper;
- Abstracts of the International Cartographic Association (short: Abstracts of the ICA, eISSN 2570-2106): single-blind peer review based on submitted abstracts; publication of abstract only.



Proceedings of the ICA



| ICA | ICA Publications | Imprint

Conference Publications of the Int. Cartographic Association

**Volume 1, 2018**  
**28th International Cartographic Conference**

2-7 July 2017, Washington DC, USA  
 Editor(s): C. A. Brewer

Author index Keyword index

09 May 2018  
**Ptolemy's Britain and Ireland: A New Digital Reconstruction**  
 Corey Abshire, Anthony Durham, Dmitri A. Gusev, and Sergey K. Stafeyev  
 Proc. Int. Cartogr. Assoc., 1, 1, <https://doi.org/10.5194/ica-proc-1-1-2018>, 2018

16 May 2018  
**Modeling Groundwater Flow System of a Drainage Basin in the Basement Complex Environment of Southwestern Nigeria**  
 Akinola S. Akinwumiju and Martins O. Olorunfemi  
 Proc. Int. Cartogr. Assoc., 1, 2, <https://doi.org/10.5194/ica-proc-1-2-2018>, 2018

16 May 2018  
**Incorporating Geographic Information Science in the BSc Environmental Science Program in Botswana**  
 Felicia O. Akinyemi  
 Proc. Int. Cartogr. Assoc., 1, 3, <https://doi.org/10.5194/ica-proc-1-3-2018>, 2018

16 May 2018  
**Identifying and Allocating Geodetic Systems to historical oil gas wells by using high-resolution satellite imagery**  
 Gabriel O. Alvarez  
 Proc. Int. Cartogr. Assoc., 1, 4, <https://doi.org/10.5194/ica-proc-1-4-2018>, 2018

16 May 2018  
**Revelation of 'Hidden' Balinese Geospatial Heritage on A Map**  
 Dicky A.S. Soeria Atmadja, Ketut Wikantika, Agung Budi Harto, and Daffa Gifary M. Putra  
 Proc. Int. Cartogr. Assoc., 1, 5, <https://doi.org/10.5194/ica-proc-1-5-2018>, 2018

Volumes  Copernicus Publications  
 The Innovative Open Access Publisher

**Search articles**  
 Search   
 Author

**Search web pages**  
 Search

About  
 Articles  
 Review process  
 Licence & copyright  
 Publication ethics  
 Article level metrics  
 ICA Word template  
 ICA LaTeX template  
 Imprint  
 Data protection

However, the International Journal of Cartography, edited by William Cartwright and Anne Ruas, and published by Taylor and Francis is our flagship journal, which has in its fifth year.

Taylor & Francis Online

Access provided by Universiteit Twente

Log In | Register | Cart

International Journal of Cartography

Journal

Enter keywords, authors, DOI etc. This Jour...

**International Journal of Cartography >**

Submit an article | Journal homepage | New content alerts | RSS | Subscribe | Citation search

Current issue






This journal

> Aims and scope  
 > Instructions for authors  
 > Society information  
 > Journal information  
 > Editorial board

Sign in here to start your access

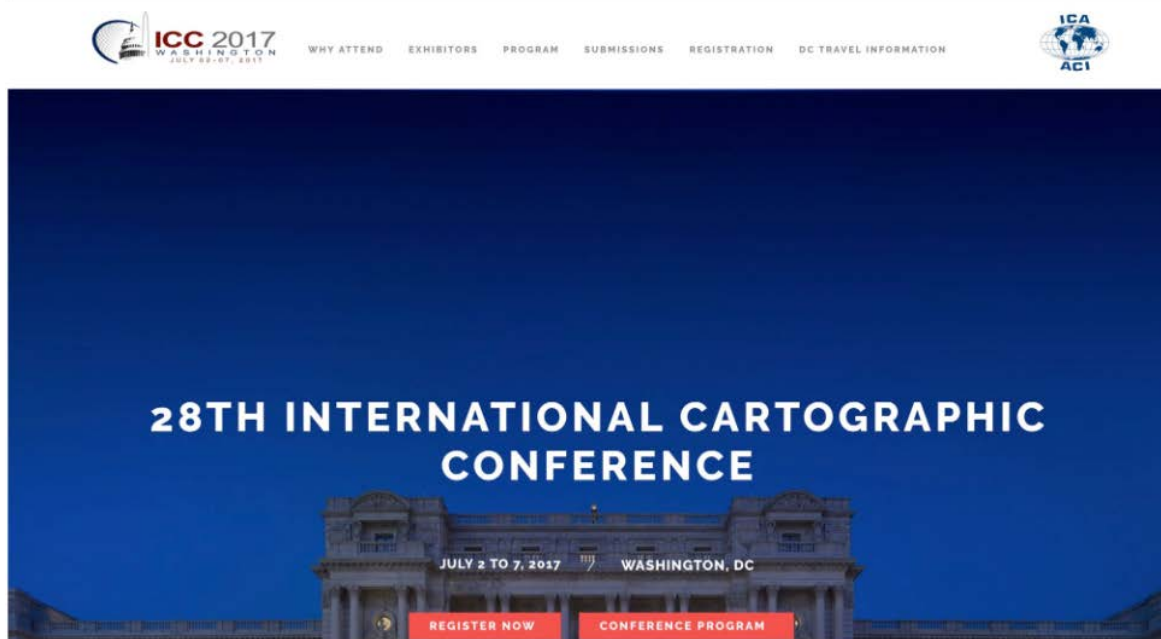
**List of issues**

Latest articles

Volume 5 2019	
Volume 4 2018	
Volume 3 2017	
Volume 2 2016	
Volume 1 2015	

## Conferences

After the successful ICC in Rio de Janeiro in 2015, 2017 saw yet another successful ICC in Washington DC, while we are currently preparing for the ICC in Tokyo in 2019.



## Focus

### International Map Year



## INTERNATIONAL MAP YEAR 2015–2016

The start of the 2015-2019 period was dominated by the global activities around the successful International Map Year (<https://mapyear.icaci.org/index.html>).

The website says: "The International Map Year (IMY) is a worldwide celebration of maps and their unique role in our world. Supported by the United Nations, IMY provides opportunities to demonstrate, follow, and get involved in the art, science and technology of making and using maps and geographic information. The purposes of the International Map Year was:

- making maps visible to citizens and school children in a global context,
- demonstrating how maps and atlases can be used in society,
- showing how information technology can be used in getting geographic information and producing one's own maps,
- displaying different types of maps and map production,
- showing the technical development of mapping and atlas production,
- showing the necessity of a sustainable development of geographic information infrastructures,
- increasing the recruitment of students to cartography and cartography-related disciplines".

### SDG Posters

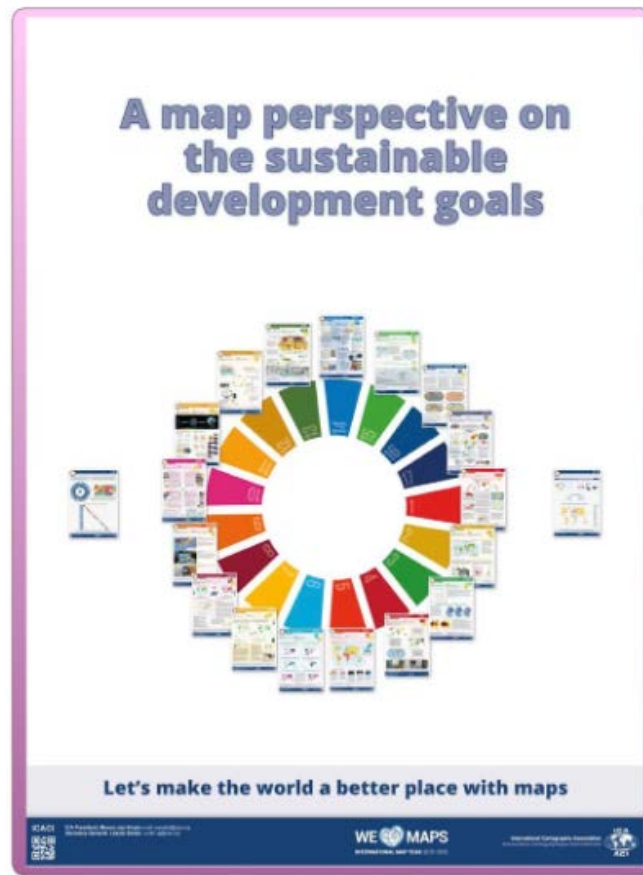
As a follow-up of the international map year we, the Commission and Working Groups of ICA, created a set of posters for the Sustainable Development Goals (<https://icaci.org/maps-and-sustainable-development-goals/>). The accompanying catalogue writes:

"How can ICA help realize United Nations' 2030 agenda for sustainable development. The 17 sustainable development goals and their targets should improve economic, social and environmental aspects of humanity and our planet. The targets are judged based on over 300 indicators. For instance, for the education development goal one of the targets is to ensure that all children have free and good primary and secondary education. Its success is measured by two indicators 'Percentage of children proficiency in reading and mathematics' and the 'Completion rate (primary, lower secondary, upper secondary)'.

How can we cartographers be relevant to society in helping to reach these targets? First, well-crafted maps can effectively visualize currently known facts, and online mapping technology can disseminate these facts globally to increase awareness of the current state of affairs. Interactive map dashboards connected to geographic databases at multiple scales and equipped with space-time analytical functions will allow decision makers on various decision levels to monitor and compare indicators for policy development and action at various geographical scales."

The posters were exhibited at the United Nations Headquarters in New York during the 7th UNGGIM meeting.





**Book: Mapping for a sustainable world**

The poster effort developed into the book Mapping for a sustainable world. The book is a co-publication between ICA and the United Nations Geospatial Information Section. It will be published in both hardcopy and as epub during the summer of 2019. From the preface:

“Maps help us to better understand the relationship between humans and their environment, and to monitor SDG indicators and communicate their uneven global footprints. These visualizations support decision-making by local and national authorities as well as promote public awareness of global issues to encourage these authorities to act. However, many of the maps and diagrams about the SDG indicators are produced without awareness of established cartographic design guidelines. Flawed and misleading designs often result. Problems also regularly originate from inappropriate data-handling, distracting base maps, inappropriate map elements, and the (mis)use of software defaults. Cartography describes the art, science and technology of making and using maps. Drawing from cartography, this book offers guidelines for mapping geographic datasets related to the SDGs by introducing basic principles of map design and use, discussing established best practices and success stories, and explaining how different mapping techniques support understanding of the SDGs.”

## Representation

As President I have been active both inside and outside ICA to foster our mission. The map on the next page summarizes these activities. I visited 32 different countries, most of them members. These travels are split in four categories.

- ICA activities: Executive Committee board meetings, participation in ICC conferences and in Commission and Working Group activities.
- ICA members: participation in cartographic activities of national members.
- Conferences: participation in conferences of ISPRS, IHO, AAG, AGILE and others.
- UNGGIM / ISC: Participation UN-GIM activities, because of our focus on the Sustainable Development Goals. Currently, ICA holds the chair of the UN-GGIM Geospatial Societies, which makes me an active member of the Expanded Bureau of the UN-GGIM. Our membership of the International Science Council (before ICSU) gets ICA involved in the ISC- GeoUnions.

I have written 16 columns in ArcNews on the "The Relevance of Cartography"

<https://www.esri.com/esri-news/arcnews/relevance-of-cartography-series>

- Where to go from here - Summer 2019
- Local perspectives at global conferences - Spring 2019
- Defining a Cartographer—Winter 2019
- Can We Do It Again?—Fall 2018
- To See or Not to See—Summer 2018
- Don't Shrug Off the Atlas—Spring 2018
- Evaluating Maps for Usability—Winter 2018
- Can Cartographers Do Maps?—Fall 2017
- Inspiring Lifelong Learning in Cartography—Summer 2017
- Maps, Facts, and Opinions—Spring 2017
- The Mapping Challenges of Big Data—Winter 2017
- Cartography Contributes to Meeting Sustainable Development Goals—Fall 2016
- Cartographers Gain Outside Perspective—Summer 2016
- Blurry Borders—Spring 2016
- The Importance of Context—Winter 2016
- The Magic of the Map—Fall 2015



## Epilogue

The activities reported in this document would not have been possible without help of the international cartographic community. But foremost I have to thank Laszlo Zentai, our Secretary-General and Treasurer. He was always available and we had almost daily contacts. Also I have to mention our Past-President who I now and then troubled with the question: “How would you have done it?”. Also thanks to the other members of the Executive Committee. However, the SDG focus would not have been possible without the enthusiastic input of the Commission and working Groups (co)chairs to make the poster project a success. It has been an honor and pleasure to serve as ICA president for the period 2015-2019. Thanks also to my employer, the University of Twente /ITC who gave financial and time support, and of course my wife Marijke who counted the weekends I was traveling. Thanks everyone.

Let's make the world a better place with maps

## Secretary General's report

This report presents an account of activities undertaken by the Secretary-General and some of the associated work of the Executive Committee during 2015-2019.

### **Executive Committee and other committees**

The Secretary-General was elected for the second four-year term at the General Assembly in Rio de Janeiro in 2015. It was not originally planned to nominate me for this position in 2011, but in 2015 Menno-Jan Kraak, the presidential candidate also asked me to continue as a Secretary-General, so I was seeking for re-nomination. The support from the Hungarian ICA National Board and that of my employer, Eötvös Loránd University, Budapest that I be nominated is acknowledged here too. The most difficult part of my term started in 2017, when I was also elected for Vice-Rector of my university. I offered my resignation, but the ICA Executive Committee asked me to complete my term.

It is clear that the relationship between the President and the Secretary-General is crucial to the success of the ICA, and I have benefited from the input, direction and personal contact offered by both the current President, Menno-Jan Kraak and the Past-President, Georg Gartner. The work of the other committees appointed by the ICA – the Awards Committee under David Fairbairn, the Statutes Committee under Tim Trainor and Derek Clarke, and the Publications Committee under Monika Sester – must also be acknowledged. I always had the opportunity to ask for their advice and contribution.

### **Communication**

Much of the day-to-day work of the Secretary-General in fact relies on contacts with people other than those listed above. Maintaining communication and ensuring effective information flow with the members of the ICA is clearly the priority of the Secretary-General. I have been pleased to engage with helpful and interested members of the cartographic community from various countries from all over the world. It has been a pleasure to receive messages from around the world each day: I tried to reply them quickly, but sometimes the valid answer required more time. The number of e-mails received has increased steadily in recent years. Wherever I travelled, I always tried to be on-line and check and respond my e-mails continuously.

The traditional letter circulation is very low: only a few national and affiliate members request traditional paper letters, but the invoices and the important messages were also sent out in postal letters when it was appropriate.

Several mailing lists were created to support the communication with national members, affiliate members and commission chairs.

### **Commissions and Working Groups**

The other major correspondence for the Secretary-General has been with the Commissions and Working Groups of the Association. These organizations are the driving force behind the ICA's commitment to advancing the discipline of cartography. I am grateful to the chairs of Commissions and Working Groups for their voluntary participation and valuable contribution to the ICA, and for responding to my requests for information when asked. The regular reports from Commissions and Working Groups to the EC form a useful summary of the progress of our discipline, and their websites (linked to the main ICA website) reflect this activity.

### **Website and outreach**

It is through the ICA website that we advertise ourselves to the world. The ICA must be constantly indebted to our webmasters, Felix Ortig and Manuela Schmidt from the Technical University of Vienna, who have, from 2007, re-designed, launched, managed and maintained an



exemplary website of which the ICA should be proud. They also successfully moved the website service to a professional company to guarantee more stable and powerful access to our website. We created an internal section on the ICA website, where commission chairs can access travel reports, commission reports and commission expenditures' statistics. I have got access to the website and the ICA Facebook page, so sometimes I myself make changes, updates on the website or publish photos on the Facebook page.

Of equal importance to the website is the regular publication of ICA News. The ICA has been fortunate in retaining the services of Igor Drecki, University of Auckland, who has edited a significant number of volumes of ICA News. Igor's skills in initiating, requesting and presenting material about the ICA are exceptional and the end product of his efforts is a shining example of the creativity and attention to detail, which is the hallmark of all cartographers. David Fairbairn, my predecessor was so kind and managed the regular, bi-monthly submission of the ICA page in the GIM International magazine. This opportunity to promote the ICA in this leading international trade journal in geomatics is very useful for our association. Menno-Jan Kraak, ICA President has submitted similar columns to ESRI's ArcNews. David Fraser edited our monthly electronic newsletter on cartographic news.

### **Visits and meetings**

Each Commission and Working Group of the ICA has a liaison member from the Executive Committee to ensure that their activities are being undertaken effectively. The ICA is grateful that Commissions and Working Groups have invited EC liaison members to their meetings, and many such visits have been made by colleagues. I had the opportunity to represent ICA in various countries, and I was also invited to several national and regional cartographic events: Czechia, Austria, Australia, India, Italy, Russia, Bulgaria, China, Argentina, United Arab Emirates, Algeria, New Zealand, Spain, Croatia, USA and Greece. The ICC 2017 was and 2019 will be a very challenging event for the Secretary-General. Being responsible for so many different issues, keeping deadlines on my mind, solving problems, meeting ICA officers and national delegates were always not only challenging but inspiring too.

### **Strategic work**

The work of the ICA Secretary-General is often channelled through the Executive Committee. The EC members have taken responsibility for and reported on the working 'environments' of cartography. We were working together on the new Strategic Plan of the ICA. In many other ways, the 2015-2019 EC worked effectively on behalf of the Association. Diverse tasks such as refereeing conference papers, promoting the ICA in specialist meetings (including United Nations, International Council for Science), undertaking outreach in workshops, and liaising with national and regional mapping agencies are further evidence of the role of the EC members. We have advised conference organizers, we have initiated, approved or endorsed successful regional cartographic symposia, we have signed Memoranda of Understanding with various organizations, and we have agreed to promote cartography through a wider use of the Solidarity Fund – maintaining ICA Scholarship winners' attendance at international conferences, but also setting aside funds to support outreach workshops to less developed countries. Although the EC meets together infrequently (nine times in four years), we have been able to correspond regularly by electronic means: the geographical distribution of the EC members has spanned all continents, and the ICA benefits from this diversity. The use of chat, e-mail and the web has ensured efficient management of ICA business. We started our scientific journal with Taylor and Francis, we created our new publication policy.

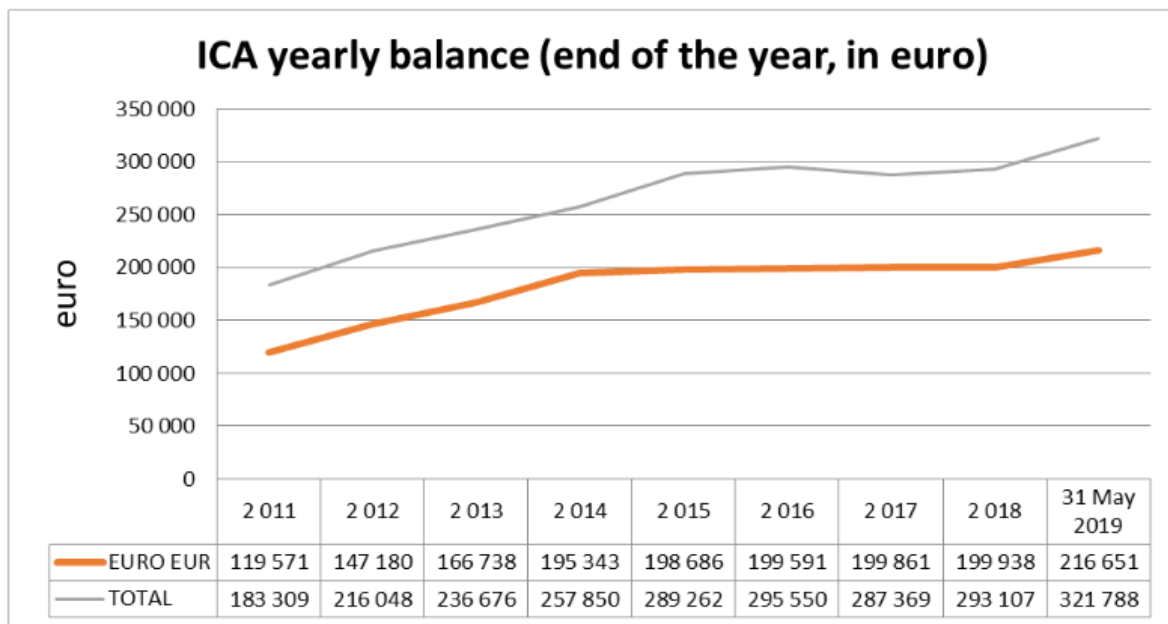
*Budapest, 15 April 2019*

## Treasurer's report

As I have presented in details the financial procedures of the ICA in my previous report (GA 2015, see <https://icaci.org/files/documents/generalassembly2015/13-treasurer-report.pdf>), I will not repeat it now. I was controlled by the same Hungarian accounting company, and their regular reports were presented to the ICA Executive Committee and were forwarded to the ICA Honorary Auditors too.

The elected ICA Honorary Auditors got all financial documents digitally at the end of the financial period, and they had the right to check all financial documents any time. In addition, a form for tax declaration has been provided annually to the Swedish Tax Authority (with the assistance of Bengt Rystedt, former ICA President), in the form of an annual balance of assets, revenue and expenditure. In the last years, thanks to the positive balance, we have to pay tax on our publications (which was not predicted when this budget was proposed).

The ICA bank is still the Dutch ABN AMRO Bank. The ICA Honorary Auditors got all financial documents in digital form soon after the end of the financial term (31 May 2019), and this full term report has been submitted to the elected ICA Honorary Auditors too, when it was completed.



The following conditions/factors were changed after 2015 (and most of these changes were unpredictable when the budget was planned):

- There is no interest on EUR accounts since 2017, and the ICA bank even changed its conditions, which now allows negative interest – however, this was not implemented. The situation is similar in all banks of the Euro zone.
- It was not possible to take into consideration the financial consequences of releasing the ICA journal with Taylor and Francis (the International Journal of Cartography) when the budget for the 2015–2019 period was planned. The new publication regime has also financial consequences.
- Although our Working Group on International Map Year was closed, the planned book on Sustainable development goals will be published only in the next term. The IMY budget will cover the publishing costs (it will be published together with the UN).

**Details of the budget 2015–2019 (3 July 2015 – 31 May 2019)**

	Budget	2015	2016	2017	2018	2019	2015-2019 total	%
<b>INCOME</b>								
national members fees	140 000	8 347	33 060	35 556	23 661	35 634	136 259	97,33%
affiliate members fees	65 000	9 466	14 526	11 574	5 965	11 859	53 389	82,14%
publications	40 000	1 070	7 763	9 775	8 919	8 086	35 613	89,03%
interests on investments	8 000	0	1 023	2	0	0	1 025	12,81%
from the funds	30 000							
<b>TOTAL</b>	<b>283 000</b>	<b>18 883</b>	<b>56 372</b>	<b>56 907</b>	<b>38 545</b>	<b>55 578</b>	<b>226 285</b>	<b>79,96%</b>
exchange difference						264	264	
	<b>283 000</b>	<b>18 883</b>	<b>56 372</b>	<b>56 907</b>	<b>38 545</b>	<b>55 842</b>	<b>226 549</b>	
<b>EXPENDITURES</b>								
offices and travel	100 000	-1 299	25 375	15 711	18 115	12 950	70 851	70,85%
website management	20 000	3 433	4 409	4 412	4 698	0	16 952	84,76%
international membership	20 000	0	1 238	1 275	1 313	1 339	5 165	25,83%
International Map Year	30 000	1 370	4 972	1 316	0	0	7 659	25,53%
commissions & w.groups	55 000	11 822	9 044	7 132	6 146	3 290	37 434	68,06%
publications	25 000	5 013	6 037	10 088	7 798	1 666	30 602	122,41%
Solidarity Fund	30 000	5 000	3 153	12 118	1 250	9 800	31 321	104,40%
miscellaneous	5 000	0	0	0	0	0	0	0,00%
<b>TOTAL</b>	<b>285 000</b>	<b>25 339</b>	<b>54 228</b>	<b>52 052</b>	<b>39 320</b>	<b>29 045</b>	<b>199 984</b>	<b>70,17%</b>

**Income (actual to 31 May 2019: € 226 285; budgeted: € 283 000)**

- Membership fees:** Most of our recent national members can be considered as ‘in good standing’ and we are grateful to those countries that have paid on a regular basis. We continue to receive subscriptions from our generous affiliate members also; these funds support the work of the ICA.

I have no good explanation on the much lower income from national and affiliate members in 2018, but some arrears were paid in 2019, even after closing the financial books for the 2015–2019 term.

The lower income rate on affiliate member subscriptions is only illusory. If I had closed the financial record some days after 31 May, we would reach the 100% (firms prefer to pay in various dates and our largest affiliate members paid their subscription and arrears in the beginning of June).
- Publications revenue:** Our publication regime was changed in this term. This was a decision of the ICA Executive Committee and it has a financial consequence. The balance on this item is positive. The financial support of Taylor and Francis to our journal (International Journal of Cartography) is practically paid to our editors, so this item appears in both the expenditure and income side (this was not foreseen when the budget was planned). We are no longer publishing our proceedings at Springer; we have a new contract with Copernicus to publish our proceedings and commission workshop papers. The royalty income on books will decrease, but the royalty income on our journal

papers will increase in the future. This is the less predictable item both of the income and the expenditures section.

- **Interest:** When the budget was defined in 2015, we predicted that interest rates would be on a downward trajectory, so we planned less income on interest in the future. However, we have not foreseen the 0% interest on EUR accounts. This is the reason of the much lower income compared with the budget.

### **Expenditures (actual to 31 May 2019: € 193 984; budgeted: € 285 000)**

- **Costs** for the main office holders (President, Secretary-General) were kept below budget, mostly because of the ability to call on funds other than ICA (travel costs were sometimes covered by their home institutes or project grants). Some remarks:
  - We tried to increase our outreach activities and the President complied with these invitations even in more remote countries to increase the visibility of the ICA and attract potential new members ( see the President's report and his report in the last volume of the ICA News at [https://icaci.org/files/documents/newsletter/ica\\_news\\_72\\_2019\\_1\\_lq.pdf](https://icaci.org/files/documents/newsletter/ica_news_72_2019_1_lq.pdf)).
  - We have increased activities in large international scientific bodies, especially in the International Science Council (ISC, former ICSU) and in the UN GGIM.
  - It should be noted that the ICA's tax-free status is dependent on following the rules of the Swedish Tax Authorities, so in the last two years we had to pay some tax (mostly due to the larger income on publications).

Other travel and meeting costs covered the main Executive Committee meetings, including the annual financial contribution paid to vice-presidents.

Office costs include accounting costs, translation fees, expenses related to the ICA bank (which is continuously increasing), postage and printing costs, and the costs of assisting with the ICA conferences.

- Three sub items were listed in the budget:
  - The **website management** was quite predictable as we have a contract with the two experts (Manuela Schmidt and Felix Ortog). However, the fee for the last half year (2019 first part) will be paid only in July. This item also includes the website hosting and domain name registration costs. We decided to cancel the separate IMY website and integrate the content into the ICA website to save costs.
  - The **international membership** costs were much lower than we planned. Practically, our participation is only paying the fee for membership (as a union member) in the International Science Council (ISC, former ICSU). The yearly subscription is based on the membership income of the organisation. Concerning this income, the ICA is very close to the upper category where the subscription is much higher. Finally, due to the transformation of the ICSU (which now integrates both the natural and social sciences) the subscription fee became a sensitive issue. The subscription fees are lower in the international organisations of social sciences (some of these organisations have only individual membership), so the revision of the ISC subscriptions was delayed).
  - The International Map Year expenditures were also much lower than we planned, but we are reserving the money for the publication of our book on Sustainable development goals together with the UN (read more in President's report).
- **Commissions and Working Groups:** Of the budgeted €55 000 only a two third was spent, (but most of the pre-ICC 2019 workshop costs were paid and will be paid after 31 May 2019). This is a much better result than in the previous term, when only half of the money was spent.

This means our commissions were much more active, although some commissions did not even ask for financial support.

The ICA Executive Committee decided not to allocate certain budget to each commission, but all commissions can apply for support for their projects. This was also communicated with the commission chairs. The more successful projects and events the commissions have, the more support they can get.

Insufficient claims were made on the Treasurer to use these funds fully, and Commission and Working Group chairs should be continually encouraged to make use of the budgeted amount available to them. Our policy during this period has been to be as flexible as possible within the ICA guidelines concerning the costs incurred by Commissions. During 2015–2019 term, I was able to support other activities, including web site development, catering at Commission and Working Group meetings, meeting costs, a very limited contribution to travel for the Commission or Working Group chairs, and liaison with related organisations. The decisions on these requests were made by the Treasurers (four-eye policy), but in case of requesting higher amount of financial support we asked the opinion and vote of the whole Executive Committee. Practically, we have not refused requests.

- **Publications expenditure:** see also the income section. The ICA EC decided to stop printing the ICA News, thus printing and distribution costs were saved (this was not the key factor to discontinue the printed version).

- **Solidarity fund (ICA Scholarship):** The maintenance of the ICA Research Scholarship (which was re-structured as ICA Scholarship during this period based on the President's suggestion which was approved by the Executive Committee) scheme is a vital part of ICA activity. We have awarded much more participants than in the previous scheme, when we paid all costs. Now the awardees can get cash award only after their presence and active participation in the conference or workshop, but they have to manage the participation in the event themselves. We also had much more applications than previously. The number of awards in this term:

Year	ICC	workshop
2016	0	3
2017	17	2
2018	0	9
2019	20*	5*

\* -- *planned*

Due to the large number of very good applications, the ICA Executive Committee decided to over-spend the budget on this item (taking into consideration the positive balance of our budget). Some pre-conference workshop ICA Scholarship applications will also be awarded, but they are not part of the 2015–2019 budget because of the later deadline.

- The item **Miscellaneous** constitutes very few unclassifiable expenditures (which is really difficult to predict in advance). We did not have such expenditures in this term.

After reviewing the summary table and the above details, it is clear that the ICA is in a healthy financial position. However, this position is not only because Commissions and Working Groups, the main working parts of the ICA, are not claiming their full budgeted amounts from ICA funds, but mostly because our members paid their subscriptions and supported financially our activities.

The ICA Executive Committee discussed the financial status of the organization at every meeting and discussed the membership fee too. Finally we have not suggested an increase for the next period (except slight adjustment of the subscription of few countries). The EC asked the Statutes Committee to revise the membership fee table and make a suggestion for the next General Assembly. Finally, the Statutes Committee approved the recent membership fee table and has not suggested changes.

I can hand over the financial administration of the ICA after eight years. I offer my help to my successor and the new Executive Committee on all administrative and financial issues.

*Budapest, 30 June 2019*

## Auditors' report

### Statement of the ICA Honorary Auditors

Ohio State University, Geography Department, June 30, 2019

We have reviewed and analyzed the ICA financial records for the July 3, 2015 to May 31, 2019 ICA period, since the General Assembly in Rio de Janeiro, sent to us by ICA Secretary General Laszlo Zentai.

We have also reviewed the professional auditing report and cover letter by the QLICONS Consulting and Service LLC.

We have reviewed all four years of the ICA financial spreadsheets and associated records. We have sampled a number of specific financial items in those records, and they appear to be well documented.

We agree with the 2015-19 Auditing Report by the Hungarian accounting firm and their assessments.

We appreciate the thoroughness and transparency of the Secretary General during this ICA auditing process.

Respectfully submitted,

Signed by the ICA Honorary Auditors

Harold Moellering  
Honorary Auditor  
United States

Subbaro Swanra Rao  
Honorary Auditor  
India



## Publication Committee report

A major effort in the last 4 years was to establish a new publication policy. It was introduced in 2017 and especially focuses on the **conference proceedings**. In order to give them an adequate visibility and reputation, a conference publication series was established, which is administered and hosted by a professional publisher, Copernicus GmbH. There are three publication options, which are distinguished according to the review and the extent of the papers: *ICA Advances* (full paper review) and *ICA Proceedings* (abstract based review, extended to full paper) and *ICA Abstracts* (abstract based review, publication of abstract). The benefits will be manifold:

- *Visibility*: one single point of contact for the publications of ICA events
- *Reliability*: the publications will be available at the time of the conference, and findable on the ICA webpages (as well as at Copernicus)
- *Open Access*: the publications are published online and under the Creative Commons licence
- *Reputation*: the publisher will suggest the ICA Advances and Proceedings for inclusion in several data bases and indices (e.g. Scopus Web of Science)
- *Standardization*: one standardized format of the publications

Starting in 2017, the ICA records the outcomes of their Conferences like ICC, RCC as well as all other ICA events in three official publication outlets.

The new policy replaces the Springer book as the publication form of the conferences. This new policy does not interfere with publications in ICA related journals; in contrast, it will provide an excellent basis for developing high-level journal publications.

After the Washington meeting in 2017 it was decided to publish the papers which had been accepted, but which were not included in the Springer Book in the new series. This implied, that all 132 papers had to be typesetted in the new template. Hence, the first publication in the new series are the *Proceedings Vol. 1* (<https://www.proc-int-cartogr-assoc.net/1/index.html>). For the ICC in Tokyo, papers in all three series will be published.

The goal is that in the future, also workshops and other events will publish their papers in the new series.

### **ICA News:**

ICA News is a biannual newsletter documenting the activities of the ICA and its members and commissions. It is edited by Igor Drecki. For financial reasons, but mainly also due to changing habits of readers, EC decided to stop the printing and distribution of the ICA News. Thus, the ICA News are only available in digital form. Also in this form, this communication medium continues to be highly attractive.

### **International Journal of Cartography:**

Each year, three issues of the International Journal of Cartography have been published. In 2019, issues 2 and 3 are devoted to 14 selected publications from the ICC in Tokyo.

Hannover, 3.7.2019

Monika Sester



**Presentation of  
commissions and working  
group activities  
2015 - 2019**

## Commission on Art and Cartography

During the period 2015 – 2019, the commission on Art and Cartography has organized a series of events and published two special issues of academic journals. For these events and publications, the commission on Art and Commission has been collaborating with two other ICA commissions: The commission on Cognitive Issues in Geographic Information Visualization and the commission on Topographic Mapping. Below are the details of the activities of the commission on Art and Cartography for the last four years.

### 2015

The commission on Art & Cartography organized two events at the 27<sup>th</sup> International Cartographic Conference in Rio de Janeiro.

A **pre-conference workshop entitled MAPPING EPHEMERALITIES / EPHEMERAL CARTOGRAPHIES** that took place in August 21-22, 2015 at the University of the State of Rio de Janeiro. During this workshop about 25 students, artists, cartographers and researchers from all around the world discussed issues related to the ephemerality of maps and to the mapping of ephemeral phenomena. A report of the different activities and presentations is available here: <https://ephemeralcartographies.wordpress.com/traces/>

A **screening of “Unmappable”** (dir. D. Hodson & J. Luoma, 2014), a short documentary that weaves together the life and work of Denis Wood, one of the most influential and controversial critical cartographer.

### 2016

Publication of the **first part of a special issue** of the French academic journal M@ppmonde #118 on “**Narrative Cartography**” (<http://mappemonde.mgm.fr/rubriques/118/>) (co-editors: T. Joliveau & S. Caquard). Papers in this special issue were presented during the 2014 workshop on “Narrative Cartography” organized in Montreal.

Designing a **poster entitled “Mapping Gender Issues”** as part of UN-GGIM Mapping Sustainability goals project.

### 2017

Publication of the **second part of the special issue** of the French academic journal M@ppmonde #121 on “**Narrative Cartography**” (<http://mappemonde.mgm.fr/rubriques/121/>) (co-editors: T. Joliveau & S. Caquard).

Organization of a **preconference workshop on Maps & Emotions** (July 1-2, 2017). The workshop was held in Washington DC and was organized in collaboration with two other ICA Commissions: Cognitive Issues in Geographic Information Visualization, and Topographic Mapping. About fifty persons, including practicing artists, university researchers and students from map design, geographic information science and the design community, attended the workshop during the two days, coming from all countries over the world. 25 papers were received by the organizers for review and 18 talks and 3 activities were given.

### 2018

Publication of a **special issue** of Cartographic Perspectives #91 on **Maps and Emotions** (<https://cartographicperspectives.org/index.php/journal/issue/view/cp91>) (co-editors: A.

Griffin & S. Caquard). Papers in this special issue were presented during the 2017 workshop on “Maps and Emotion.”

**2019**

Organization of a preconference workshop entitled “Reclaiming Through Mapping: The Olympic Sites of Tokyo” (Tokyo, July 13-14, 2019) co-organized by Taien Ng-Chan and Sharon Hayashi.

A new chair and vice-chair will be elected for the Commission Art and Cartography.

*Sébastien Caquard, outgoing chair of the commission on Art and Cartography  
June 2019*

## Commission on Atlases

Commission on Atlases  
<https://atlas.icaci.org/>

During the ICC conference 2015 in Rio de Janeiro, the chair of the Commission on Atlases (CoA) was handed over from *Peter Jordan (AUT)* to *René Sieber (SUI)*, while *Eric Losang (GER)* and *Qingwen Qi (CHN)* were appointed as vice-chairs.

For the CoA term 2015–2019, a novel focus for the commission work was set: *Establish a fresh and novel image of Atlas Cartography*. The implementation of this slogan should be attained by means of:

- + building an atlas community with new ideas,
- + discussing and re-defining the term and content of atlases,
- + offering guidelines and advice to atlas authors,
- + conducting workshops and seminars with a specific thematic focus,
- + motivating members to communicate and present their current work,
- + gathering information about atlas theory, techniques, distribution, and
- + contributing to historical and actual information sources on Atlas Cartography.

To depict the CoA activities during the last term, we present just some highlights; further information was delivered on a semi-annual basis to the ICA Executive Committee.

### CoA-Website

A new release of the CoA-Website was launched by the end of 2015 and is updated regularly. It contains, among others, sections of *Atlas World* (with definitions and examples of digital and printed atlases), current and former *Activities*, and *Awards and Publications*.

### Meetings and Workshops

One of the goals of this term was to conduct one meeting per year, focusing on a specific topic. Depending on the topic, the meetings were organized as joint workshops with other ICA commissions, or as internal CoA events.

2015 *Pre-Conference Joint Meeting Rio de Janeiro*

Symposium on Atlases, Toponymy and the History of Cartography

2016 *Atlas-Zukünfte?*

Workshop at IfL Leipzig: A core group of cartographic and visualization experts discussed the potential development of atlases.

2016 *Atlas and Education – Concepts for the Future*

Joint meeting and workshop of the ICA Commissions on Atlases and on Education and Training at ETH Zurich.



Fig. 1: Joint commission meeting in Zurich, impressions from the excursion to Uetliberg.

#### 2017 *Charting the Cosmos of Cartography*

Pre-Conference Joint Meeting in Washington DC: The focus of the meeting was on historical maps in all kind of digital and printed atlases.

#### 2018 *Atlases, Cognition, Usability*

Joint Workshop of the three ICA Commissions on Atlases, on Cognitive Issues in Geographic Information Visualization and on Use, User and Usability Issues in Olomouc (CZE).

### Publications

2016 *Joint Commission Seminar on Historical Maps, Atlases and Toponymy* (ed. Jana Moser, IfL) Proceedings Pre-Conference ICC Dresden 2013, at IfL Leipzig

2017 *Symposium on Atlases, Toponymy and the History of Cartography* (eds. Ana Resende, Janos Jeney) Proceedings Pre-Conference ICC Rio de Janeiro 2015, at IBGE Rio

### Atlas Cookbook

As stated in the 2015 report by Peter Jordan, the cookbook project for editing atlases is a long-term issue of the commission. In fact, the book is not finished yet, but will be published in 2019. Eight out of ten chapters and an introductory part are completed and updated, while two chapters are still “under construction”. Currently, the text and figures of the eight chapters being available are formatted and integrated in Adobe Indesign (see Fig. 1).

The book is structured – according to the editing workflow – into the following chapters:

1) *Editorial Aspects*, 2) *Organization and Marketing*, 3) *Atlas Use*, 4) *Thematic and Geographic Content*, 5) *Data Management*, 6) *Multimedia Elements*, 7) *Atlas GUI and Layout Design*, 8) *Map Design and Visualization*, 9) *Atlas Functionality*, 10) *Prototyping and Evaluation*.

During this reporting period, the publisher has been changed: the contract with Springer was cancelled, mainly due to the lack of landscape format availability and of full-color publication options. The CoA plans to publish the Atlas Cookbook as a printed version; later on, a PDF document of each chapter will be available for Website download.



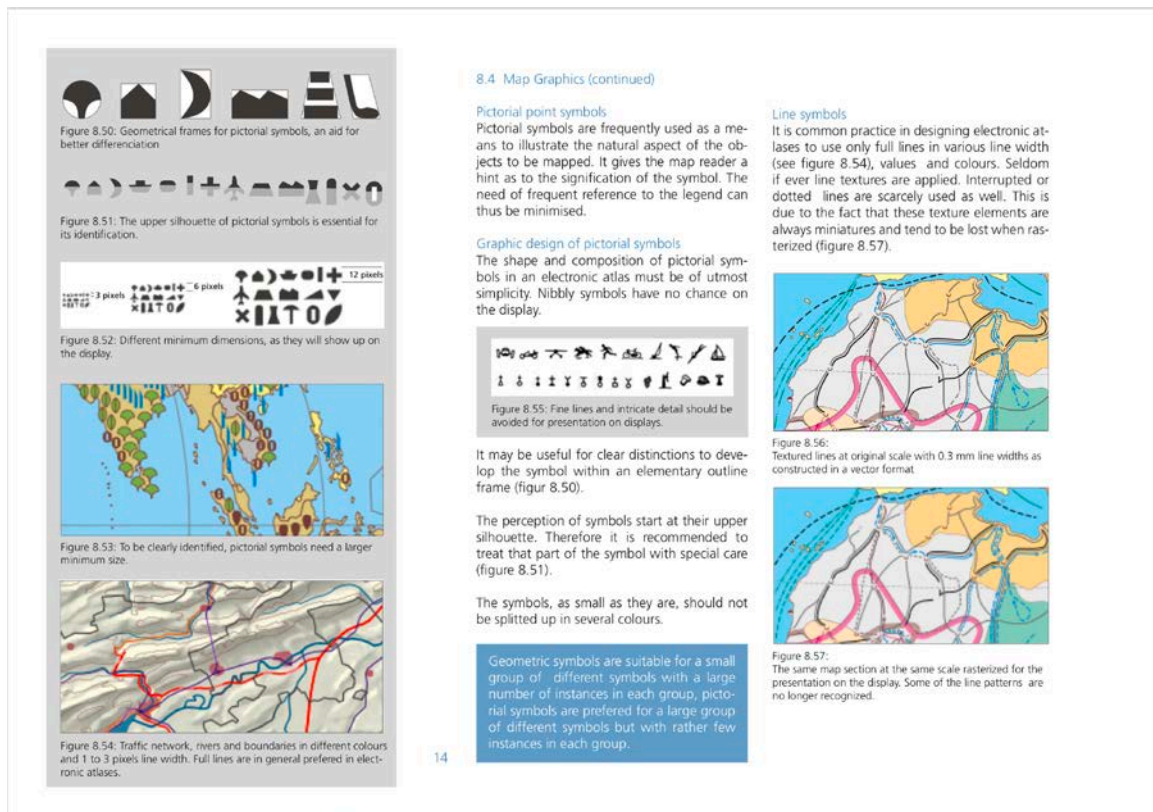


Fig. 2: Atlas Cookbook, sample page of chapter 8.

## ATLAS2 project

Initiated by the Leibniz Institute for Regional Geography (IfL Leipzig, Prof. Francis Harvey), the project intends to establish a new atlas approach: 1) Create an architecture based on actionable spatial stories concepts to create digital atlases and atlas-like products. 2) Provide curation tools to facilitate the organization and integration of diverse information sources and demonstrate the curation of an example atlas, complete with data. 3) Create training materials for the use and creation of actionable spatial stories, including an example atlas.

Project research and implementation will be made possible by a new interdisciplinary and international collaboration of eight leading European research institutes, seven successful enterprises with complementary expertise and three third-country research institutes. Regular intensive interactions in retreats and workshop organize the relatively short project duration of 36 months. The international and cross-sectoral collaboration of the project is the precursor to further developments of research and development that the project ATLAS2 starts with support for collaboration.

The proposal was submitted in April 2019 to the Horizon 2020 Research and Innovation Staff Exchange (H2020-MSCA-RISE-2019) program.

## Future Activities

The plans for the upcoming events are already set, as the core team of the CoA will apply for a second term. In 2019, the topic *Atlases and Infographics* will be discussed at a Pre-Conference Meeting at ICC Tokyo. The publication of the *Atlas Cookbook* is also planned for 2019. In 2020, a meeting on *National Atlases* in Madrid is on the CoA track, which will be the starting point of an *Inventory on National Atlases*.

René Sieber, Chair, ICA Commission on Atlases

## Commission on Cartography and Children

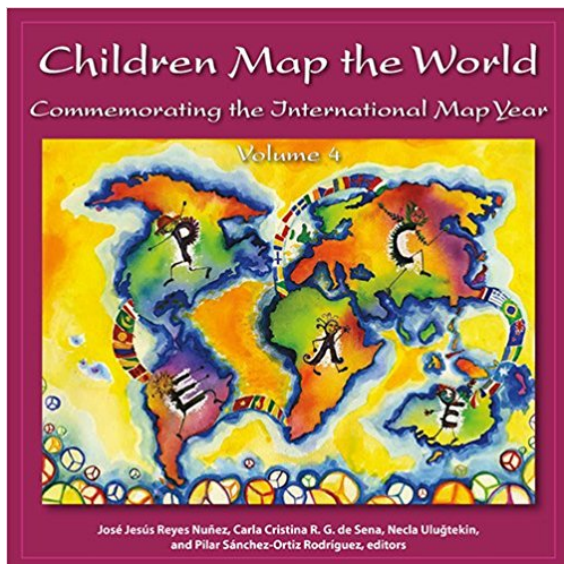
### Commission meetings:

- 6th International Conference on Cartography and GIS was held in Albena, Bulgaria, 2016.
- Cartography for School and Children Colloquium happened on Goiania, Brazil, 2016.
- 28th International Cartographic Conference in Washington D.C, July 2017
- Joint ICA meeting (Cartography and Children, Planetary Cartography, IMY Working Group) a day before the 28th International Cartographic Conference, 2017.
- 10th Colloquium on Cartography for Children and Students and 1 st International Meeting on School Cartography and Spatial Thinking, 2018.
- Next meeting: 29th International Cartographic Conference in Tokyo, Japan, 2019.

**Newsletters:** 29th Newsletter with a resumee of the main activities realized on 2016 and 2017 and the 2018's meetings and events presentations on:

<http://lazarus.elte.hu/ccc/ccc.htm>

### Publications:



Children Map the World: Commemorating the International Map Year, volume 4, presents 50 maps created by children ages 5 to 15 for the 2015 International Cartographic Association map design competition, held in Brazil. These drawings convey powerful messages and emotions that reflect the competition's theme, "My Place in Today's World." This Volume includes a special atlas of 50 additional maps selected from previous competitions and dedicated to the international Map Year. Featured in part two of this book, the atlas reflects a worldwide celebration of these creative maps. Book published by ESRI Press.

Website of the book:

<https://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=333&moduleID=0>

Article entitled Tactile Cartography: the role of technologies in Inclusive Education, written by Person Chair, Carla C. R. G. de Sena and Waldirene R. do Carmo, during the 10 th Colloquium on Cartography for Children and Students and 1 st International Meeting on School Cartography and Spatial Thinking (July, 2018) in the Bolteim Paulista de Geografia (BPG). Web version:

<https://www.agb.org.br/publicacoes/index.php/boletim-paulista/article/view/1470/1342>

Article entitled "Ideas y experiencias sobre el uso de servicios de mapas web en la educacion", written by Vice-Chair José Jesús Reyes Nuñez and Judit Kiss during the 10 th Colloquium on Cartography for Children and Students and 1 st International Meeting on School Cartography and Spatial Thinking (July, 2018) in the Bolteim Paulista de Geografia (BPG). Web version:

<http://www.agb.org.br/publicacoes/index.php/boletim-paulista/article/view/1469/1341>

**Representation of the Commission in international events and relations with sister organizations:**

**THE CARTOGRAPHY FOR SCHOOL AND CHILDREN COLLOQUIUM**

- The IX Cartography for School and Children Colloquium happened on Goiania, Brazil, between October 04th and 7th . Is the most important Cartography and Children event on Brazil with the participation of renowned researchers from the area. The Commission Chair, Carla Sena, did the opening conference presenting the 20 years of colloquium and discussed with the Professor Livia de Oliveira and Professor Rosângela Doin de Almeida who are the pioneers on Cartography and Children research in Brazil and are considered world references on this theme. During the event the National Exhibition of drawings was held, those drawings will be selected for 2017 Barbara Petchenik Competition. On day 7th, The Commission Chair explained the theme of BPC - “We love maps” – dedicate to the International Map Year. Lastly, the 2017 ICC website was present and the themes for the papers were released beyond the deadline for submission (october 26th, 2016).
- **10th Colloquium on Cartography for Children and Students and 1st International Meeting on School Cartography and Spatial Thinking**  
The Cartography for School and Children Colloquium happened on São Paulo, Brazil on 2018's July during the 10 th Colloquium on Cartography for Children and Students and 1 st International Meeting on School Cartography and Spatial Thinking "different languages in the contemporary world". During the event the National Exhibition of drawings was held, those drawings will be selected for 2018 Barbara Petchenik Competition.



**Organization of ICA events:**

- “Sharing knowledge” Joint ICA Symposium (Washington D.C., 01/7/2017) Participating commissions: Cartography and Children, Education and Training, Maps and Graphics for Blind and Partially Sighted People and Planetary Cartography. The list has been expanded with the participants of the Joint ICA Workshop and the Commission meeting during the ICC in Washington. The last open meeting brought together more than 30 people who discussed the Barbara Petchenik Competition, the importance of disseminating research conducted in the Middle East and Southeast Asia and holding more scientific events on cartography and children.
- Next event: “Joint ICA Workshop Cartography for specific users” to be held on July 15th in Tokyo, Japan. The event is being disclosed to all members of the committee and to interested in the theme, also in social networks. Web site: <http://icaworkshop2019.elte.hu/>



**Facebook profile of the Commission on Cartography and Children:**

- It was made public on July 21, 2012. Main aim to make known the Commission activities for a wider spectrum of people and dissemination of materials related to Cartography and Children. Current number of likes (20/06/2019):1337; Current number of followers (20/06/2019): 1378. The address of the profile is:  
<http://www.facebook.com/icaccc>

**Instagram of the Commission on Cartography and Children:**

- It was made public on September 8, 2018. Aims to popularize the commission's information. The name of the profile is:  
@cartographyandchildren

**Barbara Petchenik Competitions in 2015 and 2018:**

- The last open meeting of the Commission took place during the ICC in WashingtonD.C and brought together more than 30 people who discussed the Barbara Petchenik Competition, the importance of disseminating research conducted in the Middle East and Southeast Asia and holding more scientific events on cartography and children. USA, July/2017
- 10th Colloquium on Cartography for Children and Students and 1st International Meeting on School Cartography and Spatial Thinking, São Paulo, Brazil, was designed to play an important role in the process of appreciating the academic work developed in this line of research in Brazilian postgraduate programs. The meeting also has the purpose of fostering the most recent pathways in school cartography, the ones that will lure our attention in the years to come, considering the demands in geography education. One of the newest and most promising perspectives is the interdisciplinary field called Spatial Thinking. Focused on the theme “Different Languages in the Contemporary World”, brings up the discussion about how cartography for young students can contribute to identify the challenges and demands related with teaching and learning in different spaces, whether they are physical or virtual ones. In Brazil, school cartography studies have increased more and more in post-graduation programs related to geographic education. Therefore, such an effort has enlarged our understanding regarding teaching and learning the subject and has brought us closer to international discussions and international investigations related to spatial thinking and geospatial analysis in education.



*Photos showing the Exhibition of Bulgarian map drawings that participated in previous national competitions, the meeting of ICA Commission on Cartography and Children, and awarding the Bulgarian winner of the Barbara Petchenik Competition 2017 during the Opening Ceremony to the VII ICC&GIS Conference in Sozopol (Bulgaria, June 2018), and the Brazilian map drawings that participated in “Prêmio Livia de Oliveira”, also the previous national competition in this country in two events: 10th Colloquium on Cartography for Children and Students and 1st International Meeting on School Cartography and Spatial Thinking, USP, São Paulo, and JGeotec, UFRRJ, Rio de Janeiro.*

Organization of both competitions, collaboration in the organization of the International Exhibitions and in the organization and development of the judging process.

São Paulo, 03 July 2019

Carla Cristina R. G. de SENA  
Chair  
Professor  
Universidade Estadual Paulista (UNESP)  
Campus de Ourinhos  
Avenue Vitalina Marcusso, 1500.  
Ourinhos – São Paulo  
Tel: +55 14 3302-5712  
cacrisusp@gmail.com,  
carla.sena@unesp.br  
BRAZIL

José Jesús REYES NUÑEZ  
Vice Chair  
Associate Professor  
Department of Cartography and  
Geoinformatics  
Eötvös Loránd University  
Pázmány Péter sétány 1/A, Budapest,  
H-1117  
Tel: +36 1 372 2975 Fax: +36 1 372 2951  
jesusreyes@caesar.elte.hu  
HUNGARY

## Commission on Cartography in Early Warning and Crisis Management

Chair: Prof Dr. Milan KONECNY (Czech Republic)

Vice-Chair: Prof. LIU Jiping (P.R. of China)

Vice-Chair: Dr. Christophe LIENERT (Switzerland)

Executive Committee liaison: Prof. LIU Yaolin (ICA)

### COMMISSION HISTORY

ICA was first between sister organizations - members of JBGIS which started to deal with the problem of usage spatial information in EW and CM. The topic was also incorporated into the 2005 Memorandum of Understanding between the United Nations Office for Outer Space Affairs and the ICA. At the 13th ICA General Assembly, in ICC, La Coruna (2005) was agreed to establish a WG on EW and CM, which was approved for commission in ICC, Moscow (2007).

### AIMS - During the period 2015-2019 the Commission aimed to:

- Contributing in the mapping aspects of the development of concepts, ontologization and standardization (developing new e.g. for automatic metadata extraction from existing data) for disaster risk reduction (DRR), crises/disaster management (DRM), and early warning (EW) through the hazard, risk and vulnerability mapping.
- Emphasize aspects of cartographic communication in the context of early warning and disaster management such as the use of remotely sensed and other geospatial data, including concepts of Volunteer Geographic Information (VGI) and Public participation Geographic Information Systems (PPGIS), psychological conditions of users, cartographic modelling of state-of-the-art visualization technologies, geospatial processing and publishing tools, dynamic and real-time cartographic visualization for enhanced operational early warning activities through active collaboration with governmental authorities.
- Participate and contribute to global initiatives in early warning and crisis management through the maintenance of a website, newsletters and social network channels and establish and cultivate professional networks for exchange of information among stakeholders in the domains of crisis management and early warning.
- Prepare concept of a contemporary book on Cartography for DRR.
- Develop cooperation with world leading initiatives and organizations in DRR efforts, such as UN-ISDR, ICSU-IRDR and regional organizations, further GEO, GEOS, COPERNICUS, ISDE, IEAS, CODATA and sister organizations in JB GIS.
- Keep world network of commission conferences and promote cooperation with above mentioned organizations and initiatives in international, regional and local levels.

**All above mentioned topics have been used in Commission activities.** E.g. links and active collaboration were established with "Steering Committee Intervention Natural Hazard" (LAINAT) of Swiss Federation; or cooperation with Shenzhen University and Shenzhen City Hall, Municipal Planning & Land Real Estate Information Center which organized together with commission conference devoted EW and DRM in big cities; or in Nanjing Normal University with School of Geography and Key Laboratory of Virtual Geographic Environment, Ministry of Education of China and contemporary with the Scientific Data Center of Yangtze River Delta,

and National Data Sharing and Service Infrastructure of Earth System Science commission solved many aspects of dynamic mapping in Big Data era; cooperation was developed with Fire Rescue Service of the Czech Republic, General Directory and Morava River catchment which highlighted new approaches in the Framework of Big Data applied in solutions of Smart Cities and Environmental problems in several Commission member countries (e.g. Brno Town Hall); deals with Laboratory on Cartography in UACEG, Sofia and Bulgarian Red Cross in Sozopol, Bulgaria opened and widen new tasks in EW and CM; commission also participates in **UNESCO** program for megacities, and activities of **U.N. GGIM and DBRS** which have been accepted and applied; one of the most important event was cooperation with **U.S. FEMA, NASA, GEO and GEOSS** in pre-ICC Washington Joint workshop, where all shared newest knowledge in activities organized by commission. Also realization and go-Live of mobile cartographic WebGIS "EnVIS" (Environmental Data Management and Visualization, [www.envis.ch](http://www.envis.ch)) were open.

From organizational point of view, there have been established the permanent **Secretariat of the ICA Commission on Cartography in Early Warning and Crisis Management based on the Chinese Academy of Surveying and Mapping** to assist the Commission Chair and vice chairs in accomplish the job.

### **Commission Conferences, Seminars and Workshops (title, place, organizer and commission representatives)**

#### **1. Novosibirsk April 2016**

VII International Workshop "Early Warning and Crises Management in the Big Data Era" in XII International exhibition and scientific congress "Inter Expo GEO - Siberia", April 20, 2016, organized in cooperation with International Seminar "Digital Earth role in sustainable development of territories influenced by significant global climate changes" (activity of ISDE) and with International Student and Young Researcher Summer School "GI Support of Sustainable Development of Territories in the Conditions of Global Climate Change" (Vladimir Tikunov). Organizing by SSUGT, ICA, and ISDE in cooperation with IEAS, ISPRS, and FIG

#### **2. Albena June 2016**

International Seminar on Early Warning and Disaster/Crises Management in The 6th International Conference on Cartography and GIS, 13-17 June 2016, organized by the Bulgarian Cartographic Association and the University of Architecture, Civil Engineering and Geodesy (UACEG), Sofia with support of the Department of Geography, Masaryk University in Brno, Czech Republic and ICA. M. Konecny, Liu Jiping, T. Bandrova

#### **3. Zdíby September 2016**

The visit to Research Institute of Geodesy, Topography and Cartography organized by the International Cartographic Association (ICA) - Commission Cartography for Early Warning and Crises Management (CCEW&CM) and Czech Office of Surveying, Mapping and Cadastre (CUZK), 22-24 September 2016. M. Konecny

#### **4. Nanjing October 2016**

The International Conference on Cartographic Visualization of Big Data for Early Warning and Disaster/Crisis Management (EW&CM), Oct 27-28, 2016, Nanjing, China. Organized by the International Cartographic Association (ICA) - Commission Cartography for Early Warning and Crises Management (CCEW&CM) and School of

Geography Science of Nanjing Normal University, and Laboratory on Cartography, Faculty of Science, Masaryk University, Brno, Czech Republic. M. Konecny, Liu Jiping, Jie Shen

**5. Hyderabad January 2017**

Program Stream was organized in Geospatial World Forum 2017 in Hyderabad, India Symposium Climate Change and Disaster Management initiated by ICA Commission Cartography for Early Warning and Crises Management and organized together with India Meteorological Department, and Ministry of Earth Sciences, Government of India.

Symposium was held on January 24 in 3 sessions: Geoinformation and cartography in early warning and disaster management, Geo-information as actionable information for disaster and climate change resilience and Securing habitats and resources. M. Konecny

**6. Novosibirsk April 2017**

International conference “Early warning and crises management in the Big Data era”, April 20,2017, Inter Expo Geosiberia Organized by SSGUT Novosibirsk, and ICA CEW&CM commission. M. Konecny

**7. Kunming May 2017**

Forum on United Nations Global Geospatial Information Management (UN-GGIM) titled Cities of the Future: Smart, Resilient and Sustainable, 10-12 May 2017 in Kunming, China. Liu Jiping, M. Konecny, Wang Yong

**8. Washington July2017**

Joint Workshop of ICA Commission Cartography for Early Warning and Crises Management and GEO (Group of Earth Observations), 2 July 2017, Washington D.C., USA. Pre-ICC Washington activity entitled Disaster Management, Big Data, Services, and Carto-graphic Representation. M. Konecny, Liu Jiping, T. Bandrova

**9. Selce September 2017**

13th International Conference on Geoheritage, Geoinformation and Cartography, 7-9 September 2017, Selce, Croatia, organized by The Croatian Cartographic Society and the Faculty of Geodesy of the University of Zagreb, organised the in Selce, Croatia. M. Konecny, M. Lapaine, T. Bandrova

**10. Brno October 2017**

The international Seminar Cutting Edge of Dynamic Mapping for Crises Management in Big Data Era, 17-18 October 2017, Organized by Department of Geography, Faculty of Science, Masaryk University, ICA and Nanjing Normal University, China. M. Konecny, Jie Shen

**11. Nanjing November 2017**

International and China-Czech Workshop Dynamic Mapping for Risk and Crisis Management in Big Data Era. Nanjing Normal University, China on November 20-21,2017. M. Konecny, Jie Shen, Yaolin Liu

**12. Shanghai November 2017**

The International 2017 Summit Forum for Urban Disaster Risk Managemen, 24 November, Shanghai, China. M. Konecny



**13. Novosibirsk March 2018**

The International Forum GEOBUILDING 2018, the conference Geospatial Solutions for Structural Design, Construction and Maintenance and an exhibition, Novosibirsk, 21–23 March 2018. M. Konecny

**14. Novosibirsk April 2018**

9th International Conference of ICA Commission Cartography on Early Warning and Crises Management in the Big Data Era. April 26, 2018, Novosibirsk, Russia in Interexpo -GEO-Siberia 2019. Organized by Siberian State University of Geosystems and Technologies(SGUGiT) and ICA. M. Konecny

**15. Sozopol June 2018**

The International Conference Cartography and GIS, June 19 2018, Sozopol, Bulgaria, Seminar with EU cooperation on Early Warning and Disaster Management. Organized by Bulgarian Cartographic Association, UACEG Sofia and ICA Commission on CEW&CM. T. Bandrova, M. Konecny, S. Marinova, S. Bonchev, Liu Jiping, Wang Yong

**16. Beijing August 2018**

International Seminar New trends in Geoinformatics and Cartography, organized by the Chinese Academy for Surveying and Mapping (CASM) and ICA CEW&CM, August 30, Beijing, China. Liu Jiping, Wang Yong, Che Xianghong, M. Konecny, T. Reznik

**17. Shenzhen, November 2018**

ICA Commission Cartography for EW and CM conference titled DRR Challenges and Smart Cities, Shenzhen, China, November 28 2018, organized by Shenzhen University (SZU), City Hall Shenzhen and ICA. Li Qingquan, GUO Renzhong, M. Konecny, Jian Jincheng, Jizhe (Michael) Xie, Jie Shen, Yue Yang

**18. Prague October 2018**

Special Round table at the Future Forces Forum (FFF), Geospatial, Hydrometeorological and GNSS Conference (GEOMETOC) 17-19 October 2018., Prague, Czech Republic. M. Konecny

**19. Perm, November 2018**

International Scientific Conference From the maps of the past – to the maps of the future, 28-30 November 2017, Perm, Russia. Organized by Department of Cartography and Geoinformatics of Perm State National Research University, and The International Cartographic Association, the ICA Commission on Cartography in Early Warning and Crisis Management. M. Konecny, S. Pyankov

**20. Murmansk January 2019**

The joint International Conference InterCarto/InterGIS-25 GIS Support of Sustainable Development of Territories and the 3rd International Conference SilkGIS 2019, Murmansk, Russia, 30 January 30 – 2 February 2019. Organized by ICA Commission on GI for Sustainability. M. Konecny, V.S. Tikunov, W. Kainz, H. Kremers

**21. Novosibirsk March 2019**

Conference Geobuilding-2019, "Geospatial support of design, construction and operation engineering structures, March 27-29, 2019 in Novosibirsk, Russia. Organized by Novosibirsk State University of Architecture and Civil Engineering (NGASU), Association of construction organizations of the Novosibirsk region (SRO ASONO), Ministry of Construction of the Novosibirsk Region ISPRS Working group VII, etc. M. Konecny, V. Seredovich, A. Novitskaja

**22. Novosibirsk April 2019**

Jubilee 10th International Conference of ICA Commission Cartography on Early Warning and Crises Management in the Big Data Era. April 24-26, 2019, Novosibirsk, Russia in GEO-Siberia Interexpo 2019. Organized by Siberian State University of Geosystems and Technologies (SGUGiT). M. Konecny, I. Musichin, S. Jankelevich, D. Lisickij

**23. Beijing May 2019**

International Conference on Silk-road Disaster Risk Reduction and Sustainable Development (SiDRR), May 11-12, Beijing, China, two invited speeches. M. Konecny

**24. Shanghai May 2019**

IAEM Asia-Pacific Annual General Meeting AGM 2019, May 22-23, Shanghai, China, two keynote speeches. M. Konecny

**Important keynote and invited papers of Commission representatives (datum, place, event name, title of keynote(s), name of speaker(s))**

1. **August 24th to 29th 2015: Rio, Brazil;** International Cartographic Conference 2015. Research and Prospect on Multi-source Geo-spatial Data Integration for Emergency Services. Jiping Liu
2. **September 29 2015: Urumqi, Xinjiang, China;** CASM Seminar. Early Warning and Crises Management in Big Data Era: Geoinformatics Challenges. Milan Konecny
3. **October 21st to 23rd, 2015, Beijing P.R. China,** Chinese Academy of Governance (CAG) International Seminar on Jointly Addressing Challenges to Humanitarian Aid: Organization of the disaster relief and prevention system in EU, M. Konecny
4. **October 25, 2015, Beijing, P.R. China,** University of Geosciences, Early Warning and Crises Management in Big Data Era: Geoinformatics Challenges, Milan Konecny
5. **December 26, 2015, Chongqing, P.R. China,** Urban Planning Bureau, The Emergency Service and Disaster Mapping Technologies Based on Big Data analysis, Liu Jiping
6. **April 20, 2016, Novosibirsk, Russia,** Inter-Expo GeoSiberia, Research Agenda of EW and Disaster /Crises Management: Geoinformatics and Cartographic Role, Milan Konecny
7. **April 22, 2016, Novosibirsk, Seminar ISDE.** Inter Expo-GeoSiberia, ISDE, United Nation Disaster Risk Reduction Concept and Digital Earth Potentials, Milan Konecny
8. **June 14, 2016 Berlin,** WISKI-Conference, Visualizing & Analyzing Real-Time Precipitation Radar Data using the WISKI Raster-Extension; Christophe Lienert
9. **May 30 – June 2, 2016, Lucerne,** Switzerland Interpraevent 2016; A new data management infrastructure for improved analysis and real-time publication of flood events in the Canton of Aargau, Christophe Lienert
10. **June 13-17, 2016, Albena,** Seminar on Early Warning and Disaster/Crises Management in The 6th International Conference on Cartography and GIS, From Big to Smart Spatial

- Data for Decision Making in Disaster Management (Geoinformatics and Cartographic Role, Milan Konecny
11. **August 22, 2016, Beijing**, International Geographical Congress, Beijing, From Big to Smart Spatial Big Data with Support of VGEs, Yaochen QIN, Fun QIN, Milan Konecny
  12. **October 27-28, 2016, Nanjing, P.R. China**, The International Conference on Cartographic Visualization of Big Data for Early Warning and Disaster/Crisis Management, keynotes topics Contribution of Big Data and Geo-information to Reducing Disaster Risk, Challenges of modern cartography and Discovery and Integration of Disaster-related Geospatial Data from Web, Contribution of Big Data and Geo-information to Reducing Disaster Risk, Challenges of modern cartography and Discovery and Integration of Disaster-related Geospatial Data from Web, Sálvano Briceño, László Zentai, Jiping Liu, Temenoujka Bandrova
  13. **November 7 2016, Amsterdam**, Computing and Control for the Water Industry Conference CCWI2016, Automation and control for lake level control and hydrometric networks, Christophe Lienert, Daniel Lussi
  14. **November 29, 2016, ZhengZhou, Henan University**, From Big to Smart Data in Disaster Risk Reduction: Geoinformatics and Cartographic Aspects, Milan Konecny
  15. **January 24, 2017, Hyderabad, India**, Symposium Climate Change and Disaster Management, Geoinformation and cartography in early warning and disaster management, in Geospatial World Forum 2017, The Strategic Challenges of Early Warning and Crises Management in the Advent of Big Data Era: Geoinformatics and Cartographic Ambitious. Milan Konecny
  16. **April 20, 2017, Novosibirsk, Russia**, 8th International conference “Early warning and crises management in the Big Data era” Inter Expo Geosiberia 2017 The role of geoinformatics and cartography in disaster risk reduction (based on the Sendai Framework) , M. Konecny
  17. **May 10-12, 2017, Kunming, China**, Forum on United Nations Global Geospatial Information Management (UN-GGIM), Cities of the Future: Smart, Resilient and Sustainable, Selected Smart Cities Geospatial Challenges in the Big Data Era, Milan Konecny and Technologies and Application in China’s National Geographic Conditions Monitoring for Urban Development, Liu Jipping
  18. **July 2, 2017, Washington D.C.**, USA Joint Workshop of ICA Commission Cartography for Early Warning and Crises Management and GEO (Group of Earth Observations), entitled Disaster Management, Big Data, Services, and Carto-graphic Representation, Disaster Risk Reduction Agenda in Big Data Era: the Role of Cartography, •Milan Konecny and Think Big, Go Big, Go Fast, Be Smart•, Craig Fugate, and International Collaboration and Hyper-Partnering for Disaster Risk Reduction, Barbara Ryan; Discovery and Integration of Disaster-related Geospatial Data from Web Jiping Liu
  19. **September 7-9 2017, Selce, Croatia**, 13th International Conference on Geoheritage, Geoinformation and Cartography, Cartographical Challenges in Disaster Risk Reduction Efforts, Milan Konecny
  20. **October 3 2017**. The integration, visualization, and use of real-time precipitation radar CombiPrecip in the Canton of Aargau; networking-lunch MeteoSwiss; invited presentation, Christophe Lienert
  21. **October 17-18, 2017, Brno, Czech Republic**, CCEW&CM also participated in two meetings. The first was the Czech-Chinese Seminar titled Cutting Edge of Dynamic Mapping for Crises Management in Big Data Era, with participation of European Union (EU) experts: T. Bandrova, M. Campagna and W. Reinhardt.
  22. **20-21 November 2017, Nanjing, China**, Dynamic Mapping for Risk and Crisis Management in Big Data Era, Disaster Risk Reduction Agenda the Role of Cartography,



- Milan Konecny  
November 28-30 2017, Perm, International Scientific Conference From the maps of the past – to the maps of the future, Digital Earth in Big Data Era Smart and with People  
Milan Konecny
23. **March 21–23, Novosibirsk, 2018**, the conference Geospatial Solutions for Structural Design, Construction and Maintenance, Smart Cities: How to Deal and Improve Disaster Risk Reduction? Milan Konecny
  24. **April 26, Novosibirsk, Russia, 9th International Conference of ICA Commission Cartography on Early Warning and Crises Management in the Big Data Era**, Crises Management, Disaster Risk Reduction, Global Challenges And Big Data, Milan Konecny
  25. **June 19 2018, Sozopol, Bulgaria**, Seminar with EU cooperation on Early Warning and Disaster Management, Cartography for Disaster Risk Reduction: Research Agenda in the Dawn of Big Data Era, Milan Konecny, Temenoujka Bandrova; The Top-level Design of The Integrated Disaster Reduction Intelligent Service(IDRIS) Liu Jiping
  26. **July 24- 28 2018, Bonn**, InterCarto-InterGIS 24 , Interdisciplinary Conference on Geoinformation and Sustainable Development. Organized by CODATA-Germany the German National Committee for CODATA, Committee on Data for Science and Technology of the International Council for Science (ICSU), Disaster Risk Reduction and Sustainable Development: New Challenges in the Big Data Era, Milan Konecny;
  27. **August 30, 2018, Beijing, China**, Seminar New Challenges of Geoinformatics and Cartography, New Challenges of Geoinformatics and Cartography in Disaster Risk Reduction Smart Solutions, Milan Konecny, and Novel Geoinformatic Approaches Enhancing the Concept of Precision Agriculture, Tomas Reznik
  28. **October 17-19, 2018, Prague, Czech Republic**, Special round table at the Future Forces Forum (FFF), Geospatial, Hydrometeorological and GNSS Conference (GEOMETOC) 2018, Prague, Czech Republic, Strategic level topics Understanding of Environmental and Technological Risks• Civil-Military Cooperation to Improve Disaster Preparedness and Prevention• Sendai Framework Disaster Risk Reduction (2015-2030) were observed under chairmanship of Milan Konecny
  29. **October 30 2018, Birmensdorf Switzerland**, Swiss Federal Institute for Forest, Snow and Landscape research, Multi-use of raingauges for longterm forest-monitoring and flood management; invited presentation, Christophe Lienert
  30. **November, 2-4 2018, Sofia**, The Bulgarian Geographical Society (celebrating its 100th anniversary), International Conference “Smart Geography”,Sofia, Bulgaria. Disaster Risk Reduction: The Challenges and Smart Solutions in Big Spatial Data Era, Milan Konecny
  31. **November 28 2018, Wuhan, China**, Cartography and GIS Conference, organized by Chinese Society of Geodesy, Photogrammetry, and Cartography, Chinese Association of GIS, Disaster Risk Reduction Agenda: Challenges for Modern Cartography in Big Data Era, Milan Konecny
  32. **November 28 2018, Shenzhen, China**, ICA Commission Cartography for EW and CMr conference tiled DRR Challenges and Smart Cities, Shenzhen, Risk Reduction Challenges and Concepts for Smart Cities, Milan Konecny; Intelligent Emergency Service in the Era of Big Data Jiping Liu
  33. **January 30-February 2 2019, Murmansk, Russia**, The joint International Conference InterCarto/InterGIS-25 GIS Support of Sustainable Development of Territories and the 3rd International Conference SilkGIS, Cartography for Disaster Risk Reduction: new potentials in Big Data Era.Milan Konecny
  34. **February 19, 2019, Zurich**, Conference on Swiss Lake level regulation. Lake level regulation, uncertainties in forecasts and technical methods of downstream actors; invited presentation, Christophe Lienert

35. **March 27-29, 2019, Novosibirsk, Russia**, conference Geospatial support of design, construction and operation engineering structures, Emergency Management in the Cities, Milan Konecny
36. **April 18, 2019, ETH Zurich**, Overall Rapport Board with Directors Steering Committee Intervention Natural Hazard (LAINAT): Flood response: challenges in the fields of technological changes, increase of extreme events and real-time communication; invited presentation, Christophe Lienert
37. **April 26 2019, Novosibirsk, Russia**, Jubileum 10th International Conference of ICA Commission Cartography on Early Warning and Crises Management in the Big Data Era, Disaster risk reduction challenges: Cartography and Geoinformatics agenda to support complex solutions, Milan Konecny
38. **May 11-12, Beijing, China**, International Conference on Silk-road Disaster Risk Reduction and Sustainable Development (SiDRR), two invited speeches, Disaster Risk Reduction and Sustainable Development: how to share and apply international knowledge for better solutions (session 5) and Disaster Risk Reduction: how design spatial data and knowledge strategy for Silk Road? (session 10), both Milan Konecny
39. **May 22-23, Shanghai, China**, IAEM Asia-Pacific Annual General Meeting AGM 2019, Geospatial Data Support of Emergency Operations in Mega Cities and for Emergency Operations.and New Concepts and Technologies. Milan Konecny

## NEXT ACTIVITIES

1. **July 13-15, Tokyo and Tsukuba, Japan** pre-ICC Workshop “Disaster Risk Reduction Challenges for Cartography in Big Data Era. Milan Konecny, Jiping Liu, Hiroshi Une, Wang Yong, Che Xianghong
2. **September 3-6, Prague, Czech Republic**, Gi4DM conference “Geoinformation for Disaster Management”. Lena Halounova, Orhan Altan, Milan Konecny

## MEETINGS OF COMMISSION

In every ICC - Rio, Washington are organized Business Meetings of Commission Cartography for Early Warning and Crises Management.

In all conferences are organized Round Tables and public commission meetings (Sozopol, Riviera, Nanjing, Shenzhen, Washington, Murmansk, etc.). In all people commission recognized big interest about its activities. Often participants of such meetings recommended topics for solutions with commission support.

## AWARDS

### *Milan KONECNY*

Award for development of ISDE, Beijing, China, 2016;

Life Fellowship of ISDE, Sydney, Australia, 2017;

PangeaWorld Fellow, Irvine, California, USA, 2018

Honorary Fellow of the Czech Cartographic Society, 2018;

Big Silver Medal of Comenius University, Bratislava, Slovakia, 2018;

Diploma of ICA Commission for Cartography Heritage for Prof. Milan Konečný efforts and support offered for the creation of ICA commission in 2005; 2019.

**Jiping LIU**

Second Class Prize of The State Scientific and Technological Progress Award : Key technology and Application of State E-government collaborative Spatial Decision services(J-25201-2-01) with Liu Jiping, Zhang Fuhao, Guo Qingsheng, et al.

Special Class Prize of The Scientific and Technological Progress Award of Surveying and Mapping : Development and application of Internet geospatial information detection and security supervision platform (2018-01-00-01) with Wang Yong, Du Qinyun, et al.

**Christophe LIENERT**

Laudator for Prix Carto Switzerland, Muttenz, Switzerland, November 2015;

Winner of 2015 Innovation Award of Canton Aargau for project EnVIS, Environmental Data Management and Visualization.

**PUBLICATIONS**

- [1] LIN Hui, Milan Konecny, et al. Virtual Environments Begin to Embrace Process-based Geographic Analysis. *Transactions in GIS*, 2015, 19(4), 493-498. © John Wiley and Sons Ltd. Doi 10.1111/tgis-12167.
- [2] Štěrba, Z., Č. Šašinka, M. Konečný, Research on Usability Testing and Cognitive Issues of Cartographic Visualizations in the Context of Different Groups of Users. In *FIG Working Week 2015*. Sofia, Bulgaria: International Federation of Surveyors, 2015. s. 1-11, 11 s. ISBN 978-87-92853-35-6.
- [3] LI Bin, LIU Bin, LIU Ji-ping, et al., The research progress review and prospect on Geo-ontology [J]. *Science of Surveying and Mapping*, 2015, 40(4).
- [4] ShengHua Xu, Jiping Liu, Fu-Hao Zhang, et al. A Combination of Genetic Algorithm and Particle Swarm Optimization for Vehicle Routing Problem with Time Windows[J]. *Sensors*, 2015, 15(9):21033-21053.
- [5] Milan Konecny, D.V. Lisitskij, S.S. Dysljuk, eds., Raneje predupreznenije i upravljenje v krizisnych situacijach v epochu „bolshich danych“. In Russian. (Early Warning and Crises Management in the Era of Big Data). Proceedings of 7th International Scientific Conference. XII International Scientific Congress and Exhibition InterExpo-Geo-Siberia-2016. SGGGA, Novosibirsk. 65 p. 2016. ISBN 978-5-87693-915-9
- [6] Jiping Liu, Yi Yang, Shenghua Xu, et al. A Geographically Temporal Weighted Regression Approach with Travel Distance for House Price Estimation[J]. *Entropy*, 2016, 18(8): p. 303.
- [7] Wang Yong, Liu Jiping, Guo Qingsheng, et al., The Standardization Method of Address Information for POIs from Internet Based on Positional Relatio[J]. *Acta Geodaetica et Cartographica Sinica*, 2016, 45(5):623-630.
- [8] YU Wenhao, AI Tinghua, YANG Min, LIU Jiping. Detecting “Hot Spots” of Facility POIs Based on Kernel Density Estimation and Spatial Autocorrelation[J]. *Geomatics and Information Science of Wuhan University*, 2016, 41(2):221-227
- [9] Stachoň, Z., P. Kubíček, R. Štampach, L. Herman, J. Rusnák, M. Konečný, Cartographic Principles for Standardized Cartographic Visualization for Crisis Management Community. In Bandrova T., Konecny M.. *Proceedings, 6th International Conference on Cartography and GIS, Vol. 1 and Vol. 2*. Sofia: Bulgarian Cartographic Association, 2016. s. 781-788, 8 s. ISSN 1314-0604.
- [10] Lienert C., A new data management infrastructure for improved analysis and real-time publication of flood events in the Canton of Aargau. In: *Proceedings of Interpraevent 2016*, Lucerne, Switzerland.

- [11] Lussi D., Lienert C., Huggler J., Lukes R., Environmental data acquisition, control and monitoring based on industry standards. In: Proceedings of CCWI 2016, 14th International Conference on Computing and Control for the Water Industry, Amsterdam, The Netherlands.
- [12] Farshi D., Lienert C., Verification of stage-discharge-relationship at measuring gauges in the Canton of Aargau (in German). *Wasser Energie Luft* (4), pp 291-296. 2016.
- [13] Lienert C., Angehrn P., Cartographic Visualization of Big Data for Early Warning and Disaster/Crisis Management (EWCIM): Methodology, Techniques and Applications - Nanjing / P. R. of China. Internal conference report for Steering Committee Intervention Natural Hazards (LAINAT). Federal Office for the Environment, Berne, Switzerland. 2016
- [14] Jiping Liu, Xu Shenghua, Zhang Fuhao, Liang Wang. A hybrid genetic-ant colony optimization algorithm for the optimal path selection[J]. *Intelligent Automation & Soft Computing*, 2017, 23(2): 235–242.
- [15] Jiping Liu, Yangyang Zhao, Yi Yang, et al., A Mixed Geographically and Temporally Weighted Regression: Exploring Spatial-Temporal Variations from Global and Local Perspectives[J]. *Entropy*, 2017, 19(2):53.
- [16] Demetriou, D., M. Campagna, I. Racetin, M. Konečný, Integrating Spatial Data Infrastructures (SDIs) with Volunteered Geographic Information (VGI) for creating a Global GIS platform. In Giles Foody, Linda See, Steffen Fritz, Peter Mooney, Ana-Maria Olteanu-Raimond, Cidália Costa Fonte and Vyron Antoniou. *Mapping and the Citizen Sensor*. London: London: Ubiquity Press, 2017. s. 273-297, 25 s. ISBN 978-1-911529-16-3. doi:10.5334/bbf.l
- [17] Demetriou, D., Campagna, M., Racetin, I., & Konecny, M., A discussion for integrating INSPIRE with volunteered geographic information (VGI) and the vision for a global spatial-based platform. Paper presented at the Proceedings of SPIE - the International Society for Optical Engineering, 10444 doi:10.1117/12.2277194. Issue: 1 Pages: 93-103 Published: MAR 2017
- [18] Jiping Liu, Xiaochen Kang, Chun Dong, et al. A Stream Tilling Approach to Surface Area Estimation for Large Scale Spatial Data in a Shared Memory System[J]. *Open Geosciences*, 9(1). 2017.
- [19] Kang Xiaochen, Jiping Liu, Chun Dong, et al. Using High-Performance Computing to Address the Challenge of Land Use/Land Cover Change Analysis on Spatial Big Data[J]. *ISPRS International Journal of Geo-Information*, 2018, 7(7): p. 273
- [20] LIU Jiping, ZHANG Yongchuan, XU Shenghua, et al. Top-Level Design Study for the Integrated Disaster Reduction Intelligent Service[J]. *Geomatics and Information Science of Wuhan University*, 2018, 43(12):2250-2258.
- [21] LI Pengpeng, LIU Jiping, YAN Haowen, LU Xiaomin. An Improved Model for Calculating the Similarity of Spatial Direction Based on Direction Relation Matrix[J]. *Journal of Geomatics Science and Technology*, 2018, 35(2):216-220.
- [22] LI Xiang, LIU Jiping, LUO An, WANG Yong. Weibo-oriented Address Extraction and Spatial Positioning Method for Disaster Events: Take Seismic Events as an Example[J].
- [23] Lienert C. (2018). SMS-Service for discharge thresholds (in German). *Umwelt Aargau* (77), pp 13-14. *Geomatics & Spatial Information Technology*, 2018, 41(4):128-131.
- [24] Kubíček, Petr, Milan Konečný, Zdeněk Stachoň, Jie Shen, Lukáš Herman, Tomáš Řezník, Karel Staněk, Radim Štampach, Šimon Leitgeb. Population Distribution Modelling at Fine Spatio-temporal Scale Based on Mobile Phone Data. *International Journal of Digital Earth*, Taylor & Francis, 2018, pp. 1-22. ISSN 1753-8947. doi:10.1080/17538947.2018.1548654.

## Commission on Cartographic Heritage into the Digital



<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Home.html>

The Commission's targets in 2015-2019 were:

- to introduce the Heritage of Cartography and Maps as an important part of World's Cultural Heritage,
- to access, treat and diffuse the Cartographic Heritage by using all available digital tools,
- to transform and reference all available assets of Cartographic Heritage in digital form,
- to advance innovative cooperation with partners who curate and provide the Cartographic Heritage assets, who transform into the digital, who analyze, interpret and promote Cartographic Heritage, who use the Cartographic Heritage data and meta-data,
- to publish the results of the Commission's work.

The working tools used by the Commission are:

- the annual **Conferences** "Digital Approaches to Cartographic Heritage" (<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Conferences.html>)
- the focused **Workshops** (<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Focused.html>)
- the thematic **Tutorials** (<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Tutorial.html>)
- the strategic partnership with the **MAGIC Group** (<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Tutorial.html>)
- the cooperation with the **Supporting Institutions** (<http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/Support.html>) backing the Commission
- the publishing of the Commission's work in the web journal **e-Perimtron** (<http://www.e-perimtron.org/>)

Papers referring to the Commission's Terms of Reference were presented by commission members and other researchers in the 4 annual Conferences held from 2015 to 2019 (195 papers in 4 years):

- Riga, 2016 (Joint conference with MAGIC Group)
- Venice, 2017
- Madrid, 2018
- Thessaloniki, 2019

These papers were published in digital form, in the Conference Proceedings (ISSN 2459-3893). The major characteristic of these collections of papers is the strong interdisciplinarity of the issues, showing the multifaceted content of Cartographic Heritage, especially when embodied into the Digital mainstream. The contributions related to cartography associated GLAM are also numerous proving the relation of cartoheritage with the general domain of Cultural heritage. The interdisciplinarity of the issues and the big interest of the researchers on cartographic heritage are also apparent by the participation of researchers with relevant issues to the



International Cartographic Conferences organized every two years by the international Cartographic Association (ICC2017, ICC2019).

Additional activities which realize the current Terms of Reference:

<b>The Terms of Reference of the Commission for the 2015-2019 working period are:</b>	<b>Realization of the Terms of Reference - Additional activities</b>
Elaboration and promotion of the issue of Cartographic Heritage Ecosystems and of cartodiversity legacy embedded into the Digital.	Relevant papers and presentations by commission members e.g. E. Livieratos, <i>Cartographic Heritage Ecosystems: new challenges and perspectives in the Digital Environment</i> , Rio de Janeiro, 2015 C. Montaner, <i>Disseminating Digital Cartographic Heritage: standards and infrastructures</i> , Working Report
Addressing methodologies, techniques and standards for proper 2- and 3-D digitization of cartodiversity in terms of image capturing, processing, visualization and transfer.	Plenty of papers on commission conferences, e.g. Milan Talich, <i>Digitizing of old maps and on-line tools for using them</i> , 2017 Ian Fowler, David Neikirk, <i>Digital preservation of globes as three-dimensional cultural and educational artifacts</i> , 2016
Addressing georeferencing and applying analytical tools on the comparative research concerning the geometric and thematic content of cartodiversity. The issue and use of cartodiversity metadata.	Focused workshop: “The early 17th Century Giulio Aleni Chinese World Map”, Brescia, 2018
Cooperation and interaction with cartodiversity stakeholders in the context of GLAM (Galleries, Libraries, Archives, Museums).	Focused workshop: “Mapping Tools for Non-Mapping Experts”, Washington DC, 2017 Strategic partnership and cooperation with the <b>MAGIC Group</b>
Evaluation and re-modelling of web-based providers of cartographic heritage assets.	Papers on commission conferences, e.g. Esteban Arevalo, <i>Quality assessment criteria for cartographic heritage dissemination: a preliminary analysis of 300 websites</i> , 2019
Linking the Cartographic Heritage digital assets with Digital Humanities.	Focused workshop: “Explorations in Digital Humanities. Case studies and problem-solving”, Lisbon, 2016 Supporting activities: Seminar on “Maps in Libraries”, Thessaloniki, 2016
Documentation of the reference work carried out by the ICA Commission on Digital Technologies in Cartographic Heritage in the period 2006-2015.	Publications: <ul style="list-style-type: none"> <li>- <b>e-Perimeton:</b> papers presented in the annual conferences and others submitted for review to the e-journal were published in <b>40</b> issues from 2006 to 2015</li> <li>- <b>Cartoheritage Abstracts:</b> Searchable database of all the papers of the 14 Cartoheritage Conferences <a href="http://terkeptar.elte.hu/ch">http://terkeptar.elte.hu/ch</a></li> <li>- <b>Conference Proceedings:</b> Published in digital form, ISSN 2459-3893, available to the public</li> </ul>

## Commission on Cognitive Issues in Geographic Information Visualization

The CogVis Commission was established at the 25<sup>th</sup> ICC in Paris in 2011 and renewed in Rio de Janeiro in 2015. We continue to be an active commission, holding at least one event each year in a variety of locations, typically in conjunction with at least one other Commission.

The overall goals of our Commission in the current term were set through our terms of reference. For each term below, we provide a non-exhaustive list of examples of Commission activities that have worked towards achieving each of these goals.

### Progress Against Terms of Reference: 2015-2019

- Promote the awareness of cognitive issues in cartography, developing human-centered cartographic theory and practice based on sound empirical findings on the use of cartographic displays for spatiotemporal inference and decision-making.

Our commission now includes 216 members from over 34 countries, including all six inhabited continents, making it a truly international Commission. Nevertheless, we are underrepresented in some areas of the world, so improving that situation is an explicit term of reference of the next term of the commission, should our commission be renewed by the General Assembly. We are committed to expanding access to the activities of our Commission both in person by making sure activities are held in different regions and through technological support to enable remote participation in whatever form is possible. To that end, we try to publish our scientific proceedings in open access outlets and will pioneer the use of Zoom videoconferencing technologies at the 2019 workshop on Mobile UX for interested participants who are not able to join us physically and to record at least some components of the meeting.

After the ICC 2019 pre-conference workshops, we will have organized scientific events on four continents, as we are cooperating to hold two workshops in different countries in Asia (Beijing, China and Tokyo, Japan) before ICC 2019. We have assisted with organizing CogVis sessions at ICC 2017 (16 papers, 8 posters) and ICC 2019 (16 papers).

We have organized several workshops or scientific meetings on particular topics, often in collaboration with other commissions (France, 2 x USA, Czechia, China, Japan). We also supported organisation of special sessions at larger meetings in some years (AAG in the USA).

We use various publication types and our website to further disseminate scientific knowledge presented at and/or developed in our workshops and meetings.

Peer-reviewed special issues that have been produced in this term of the commission include:

- Christophe, S. and Çöltekin, A. (eds). (2015). Papers from GeoVIS '15 at ISPRS Geospatial Week ISPRS Annals and ISPRS Archives. [open access]
- Griffin, A.L., Robinson, A.C., and Roth, R.E. (2017). Special issue including a research agenda for interactive cartography. *The International Journal of Cartography*, 3(Supp1), [open access].



- Griffin, A.L. and S. Caquard. (eds). (2018). Special Issue on Maps and Emotions. *Cartographic Perspectives*, 91, <https://cartographicperspectives.org/index.php/journal/issue/view/cp91>, [open access].
- Kubiček, P., and A.L. Griffin. (2019, forthcoming). Special issue of *Geografie Journal* based on papers presented at the ICA Commissions' joint workshop "Atlases, Cognition, Usability" held in Olomouc (CZ) at Palacký University in April 2018. [open access]

Tutorial materials are also made freely available for reuse by members of the community through our webpage at: <https://cogvis.icaci.org/tutorials.html>.

The tutorials page will be updated with new materials following the ICC2019 Pre-conference Mobile UX Workshop in Beijing.

- In conjunction with the Commission on Geovisualization, Commission on Use and User Issues, and Commission on Map Design, develop and publish a research agenda for that outlines major research challenges for interactive cartography that we should work towards addressing as a community.

This ToR was successfully completed with the open-access publication of a special issue of *The International Journal of Cartography* in 2017 (Volume 3, Issue Sup1). The 2015/2016 workshops led to the production of three research agenda papers and an introduction written by the Chairs of the CogVis, Use Users and Usability, and Visual Analytics commissions. Two additional papers written outside of the workshop framework by members of the four commissions and that related to broad research challenges for interactive cartography were also included in the special issue.

- Define short and medium term research goals that fall within the scope of this research agenda and that address key issues associated with building a sound theoretical base to support the construction and use of cognitively adequate and perceptually salient visual displays of geographic information.

The special issue of *The International Journal of Cartography* that included the research agenda papers outlined a number of research goals that can be focused upon in the short- and medium-term.

Some of the papers presented at the 2017 pre-ICC workshop on Maps and Emotion engaged with one of the research goals identified in the Griffin et al. (2017) research agenda paper.

[Opportunity #3: How are individual differences associated with affective and emotional responses to maps? Which design factors are effective in arousing emotional responses that lead to a map user changing his or her attitudes and behaviors?]

These workshop papers have been subsequently published in the recent *Cartographic Perspectives* special issue.

A second research goal identified in the Griffin et al. (2017) research agenda paper was the topic of a commission meeting within the 2018 workshop on "Atlases, Cognition, Usability".

[Opportunity #4: Systematize individual difference definitions to allow studies to be more easily comparable and support meta-analysis of individual difference effects.]

Together with the Use User and Usability Commission, we have discussed practical community actions that could be taken to achieve this research goal and are working towards additional activities to be undertaken at a workshop in 2020 or 2021 that help to could achieve this outcome, should our commission be renewed.

- Encourage interdisciplinary and international collaboration with cognate disciplines and relevant stakeholders, including other ICA commissions and working groups.

During this term, the commission has collaborated with a number of other ICA Commissions (Art and Cartography, Atlases, Generalisation and Multiple Representation, Location Based Services, Map Design, Topographic Mapping, Use User and Usability Issues, and Visual Analytics) as well as the ISPRS Working Group on Geovisualization, Augmented and Virtual Reality.

### **Flagship results, 2015-2019**

While a full accounting of our Commission's activities can be found on our website (see: <https://cogvis.icaci.org/activities.html> and <https://cogvis.icaci.org/publications.html>), two activities that we would particularly like to highlight include the following:

- The development and publication of the Interactive Cartography Research Agenda special issue. This involved a series of workshops and collaborative writing exercises and included scholars from four continents in the author list. We provided opportunities for both junior and senior scholars to participate and contribute to the shaping of these research agenda papers.
- The Maps and Emotion workshop we ran in collaboration with the ICA Commissions on Art and Cartography and Topographic mapping in Washington DC before ICC 2017 was very successful. It attracted more than 50 participants from a range of countries and disciplines including practicing artists. It has now resulted in a scientific publication that includes papers presented at and based upon activities conducted at the workshop.

## Commission on Education and Training

### ADMINISTRATION

The Commission on Education & Training (CET) was re-elected by the ICA General Assembly in Rio de Janeiro in 2015, with Dr David Fairbairn (UK) as chair and Dr Stefan Peters (Malaysia) as vice-chair. Prof Necla Ulugtekin (Turkey), previous vice-chair indicated her wish to step down, and was thanked for her contribution to the Commission during the 2011-2015 period.

New terms of reference (ToRs) were approved by the General Assembly in 2015. Some of these were aspirational – for example, to **promote and deliver workshops**; and to **work with the education commissions of sister societies and with the UN GGIM**. Some of the ToRs continued the long-term commitments of successive CETs throughout the long and distinguished history of ICA – for example, to **maintain a record of educational courses which include cartography**; and to note *ad hoc* courses to **record the widening scope of cartographic education**. Some of the ToR were tabled as new initiatives for the Commission during the 2015-2019 period – for example, to **explore the possibilities of developing a Body of Knowledge (BoK) for cartography**; and to examine the **formalisation, notably the accreditation, of cartographic qualifications**. The remaining ToR is a generic approach taken by all Commissions – to work towards the overall **aims of ICA**, long term as indicated in the Statutes, shorter term such as International Map Year, and ongoing, including contributing to the new *International Journal of Cartography* and to International Cartographic Conferences.

CET (2015-2019) has addressed its ToRs to varying degrees, and with differing levels of success, and submits this report to the General Assembly indicating that an overview of cartographic education worldwide has been maintained; presentations, papers, workshops and reports have been delivered; investigations on concepts related to the ToRs have been undertaken.

### ACTIVITIES

At the start, the main ongoing task of the CET was to regenerate and maintain the web pages of the Commission, notably the directory of educational courses. This was to be of specific interest as one of the commission's contribution to the **International Map Year (IMY) 2015-16**. The Chair of CET was on the IMY Working Group, and contributed a chapter, with exercises, on 'Education in cartography' in the online textbook *The World of Maps* (also translated into French, Spanish, Italian, Portuguese and Hungarian) ([www.mapyear.org](http://www.mapyear.org)). A further ICA-wide initiative during the period of the commission was the launch of the UN Sustainable Development Goals: the CET contribution was managed alongside the Commission on Cartography and Children, in the form of contributed maps to the poster illustrating ICA impact on SDG No. 4, 'Inclusive and Quality Education'.

The commission **web site** was managed by the vice-chair during 2015-19, and allowed for organisation of members, publicity, and recording of the directory. An interactive map was prepared with the assistance of students and staff at Eotvos Lorand University, Budapest, Hungary, and this can be accessed on the website to give a picture of degree level provision for cartography around the world. This is a work in progress, as the list of courses does need updating.

## BODY OF KNOWLEDGE

The **Body of Knowledge** was approached with the following initial thoughts:

- the BoK is intended to advertise the subject of cartography to higher education curriculum planners. It should also inform current cartographic educators who wish to maintain their courses, educators who teach related subjects (especially in geosciences), and accrediting bodies and industry who need to know the capabilities of a professional cartographer. A fundamental purpose of the BoK is to define the ‘territory’ of cartography, and establish its identity in relation to other disciplines.
- the issue of accreditation is important: procedures differ from one nation to another. We need to ensure that the BoK is well-presented to persuade accrediting agencies of its rigour and validity. Some experiences from other BoKs must be examined to assist in this exercise, and the views of government/industry (who will be the end users of the outputs from the BoK scheme) must be considered.
- the development of the BoK must be led by a number of people from diverse backgrounds. We shall start with contributions from any Commission members; specific invited experts will be consulted also; drafts will be open for wide consultation.
- there are successful, closely related, BoKs, e.g. the UCGIS GIS&T Body of Knowledge, and its associated European GIN2K. The Commission has already had representation with the UCGIS, and is planning to engage with the GIN2K. A major decision to be made by the Commission is the extent to which we promote cartography in these existing BoK, compared to developing our own.
- the content of the BoK will result in the definition of the scope of the subject of cartography; and (using the GIS&T BoK as a model) the presentation of a set of sub-disciplines, exercises, skill sets, knowledge outcomes etc. This will involve defining ‘core’ components, a logical framework for knowledge accumulation, and relationships with other disciplines.
- the schedule will be to offer a first draft of the BoK at the Washington 2017 ICC, with comments open for a significant period after, and the final version to be submitted at the next General Assembly in Tokyo, 2019.
- we need to implement a realistic plan for maintaining and updating the BoK: it is expected that this will be a major responsibility of the future CET.

Preparatory work was undertaken by the Chair of the Commission from 2015 to understand how a Body of Knowledge (BoK) can be created. Several existing BoKs in other disciplines were examined, and a number of issues needed clarification: what is the nature of ‘knowledge’ itself? how can we claim the ‘territory’ of cartography? what is a BoK for? what is the community which should be consulted to develop the BoK and how is it to be asked? what is the form of the deliverable? The BoK developed for Geographic Information Science and Technology (GIS&T) by UCGIS in 2006, and currently under revision (<https://gistbok.ucgis.org/>) is an excellent model to follow, and it is clear from this and from other BoK initiatives that the Delphi model ([http://en.wikipedia.org/wiki/Delphi\\_method](http://en.wikipedia.org/wiki/Delphi_method)) is an optimal means of gathering and compiling content for the BoK. The intention was to launch such a consultation process from 2016 onward.

Unfortunately, work has stalled in addressing the Body of Knowledge. Initial attempts to widen participation and develop the BoK were frustrated by i) the lack of interest and engagement on the part of many in the cartographic community; ii) the perceived overlap and duplication with other initiatives; iii) the antipathy of some close to (but outside) our discipline; iv) the recognition that cartography is a democratised and unfocussed activity that should not, perhaps, have a restrictive BoK; v) a view that the creation of a BoK cannot be a ‘top-down’ activity; and vi) a

realisation that there is such a vast range of material available to inform and instruct people in cartography, that putting cartography into a 'box' marked 'BoK' may deny the wide-ranging, diverse and vigorous nature of our discipline.

The Commission still retains the opinion that a BoK would be useful. Among the negative current developments which suggest that a formal BoK is necessary are i) the replacement of in-depth *instruction* in cartography by pursuit of short-term *competency* attainments; ii) the dilution of cartographic practice and a de-skilling of its practitioners; iii) the divergence of definitions of the nature of cartography, and consequent difficulties in demonstrating its value. The initiative for pursuing a BoK has been passed to the Executive Committee, although the Commission retains an interest and is willing to assist in such endeavours.

Some of the exploratory work in addressing the BoK was undertaken at **meetings**, both organised by the Commission and attended by commission members. A range of meetings addressed this topic, and others related to the ToRs during the 2015-2019 period. Notably, each of the international cartographic conferences (ICCs) – Rio de Janeiro 2015, Washington DC 2017, Tokyo 2019 - allow for the presentation of a 'business meeting' for the CET, at which members could join discussion on the working of the commission.

## MEETINGS 2015

2015 was a busy year for the commission, with contributions to the annual April **American Association of Geographers conference** (a special session on cartographic education was contributed to, and engagement with the UCGIS BoK was explored).

A joint symposium of CET, with the ICA Commission on Maps & the Internet, was presented as a pre-conference (ICC) event in Curitiba, Brazil, in August 2015. Titled '**Advances in Cartographic Practice in the Classroom and on the Web**', this incorporated a first day workshop on Mapping in the Cloud, delivered by Prof Michael Peterson, and, on the second day, a range of presentations on common topics related to the web and education.

The programme addressed a wide range of topics including 3D Mapping and Animation using SVG; VR-modelling using Free and Open Source Software; Using Internet geobrowsers to improve hydrology teaching; Testing toponymy using an online system; Device independent Map apps; Interactive web maps using layered animation; Using the geoweb to deliver GIScience education; Cartographic education in Parana State, Brazil; Developing a textbook for Mapping in the Cloud; Maps, Ontologies and University Courses; The value and validity of accreditation; Computer Science topics for cartographic education.

The subsequent ICC in Rio has published conference proceedings ([https://icaci.org/files/documents/ICC\\_proceedings/ICC2015/papers.html](https://icaci.org/files/documents/ICC_proceedings/ICC2015/papers.html)) with a section (T22) on '**Education and Training in Cartography and Geotechnologies**' presenting 33 papers covering all aspects of cartographic education.

## MEETINGS 2016

The major meeting for 2016 was a September joint meeting with the ICA Commission on Atlases on '**Atlases and Education – Concepts for the Future**'. This was held at ETH Zurich, with the kind support of the institution and the Swiss Cartographic Society. The first day examined state of the art in the areas of atlases, education, and the juxtaposition of these. Common issues for the two commissions include contemporary changing concepts of atlases, the nature of

educational atlases, the development of educational curricula through a proposed Body of Knowledge, and the future of the atlas as a data integration device and as an educational tool.

A range of practical examples of national and educational atlas cartography was considered by several speakers, along with more theoretical investigations of atlas content and structure. The use of atlases, both in schools and in wider society, was covered also. A session on the education of cartographers included accounts of the history of cartographic education, what is needed for cartographers to face the challenges and opportunities in digital atlases, the role of contextual education in maths for cartographer, and, most wide-ranging, the nature of the Body of Knowledge (BoK) project for cartography being run by the Commission. The role of design in the education of cartographers was also considered, as were specific presentations on the educational role of the iconic *Atlas of Switzerland*, and the role of mapping in schools in East Africa.

It was concluded that both technological and pedagogical change can be driven by, and reflected by, maps and atlases in the classroom.

Also in September 2016, the CET promoted a session on **the Body of Knowledge** at the British Cartographic Society / Society of Cartographers Annual Symposium, Cheltenham, UK. This well attended meeting was introduced to the Body of Knowledge concept and each attendee was then asked to respond to a questionnaire asking their opinions about the subject matter of cartography and its delivery. The range of cartographers present was wide, from archivists to web designers, from government scientists to technical support staff, so responses varied significantly. The questionnaire also asked about their education in cartography and their experiences in the workplace. The intention of this ‘Delphi’ approach was that the responses would contribute to the process of developing the BoK.

In 2016, preparatory work by Dr David Fraser (Australia) laid the groundwork for two **regional cartographic workshops** to be held successively in Tonga and in Fiji, in November 2016. Despite full organisation and curriculum development, these events did not take place, due to limitations of financial commitment on the part of the local organisers. An exploratory approach from the Maldives for such a workshop also failed to result in an event.

## MEETINGS 2017

The Commission contributed to a **joint workshop** (with the Maps and the Internet Commission) in Williamsburg, Virginia, USA prior to the main ICC conference in Washington DC in July 2017. Combining practical sessions on coding with presentations on contemporary internet cartography and its educational implications, this meeting was an excellent taster for the 28<sup>th</sup> ICC immediately after.

The **Washington DC conference** presented six full conference sessions (19 orally presented papers) devoted to aspects of education and training, with presentations from CET members from all around the world, along with several posters. The presentations are gradually being placed online.

The biennial **Business meeting** of the CET, at the ICC in Washington DC, was a valuable ‘mid-term’ check on progress. This meeting, attended by many Commission members, included open discussion on the tasks of keeping the directory of courses up-to-date, and discussion with Commission members and others at the ICC on the **Body of Knowledge** (BoK). It was



resolved there to set up a small working group which would meet for a concentrated task of drafting a first attempt at the BoK sometime in 2018.

It should be noted that there was some CET input into the **ESRI Education Summit** in San Diego, during 2017, and the annual user conference of ESRI in that location has, through the years, been a useful venue for educational insight and discussion.

### **ACTIVITY 2018**

The stalling of progress on the BoK was indicative a slowing of activity of the commission during 2018. Regular reports were written for the EC, and other requirements were acknowledged, but the prime activity during this year was to firm up succession planning, and decide on the nature and location of the usual pre-conference workshop for July 2019.

### **ACTIVITY & MEETINGS 2019**

The **29<sup>th</sup> International Cartographic Conference** will be held in Tokyo, Japan, in July 2019, and will present six full sessions (22 papers from around the globe) and poster presentations related to the themes of education and training.

The traditional pre-conference workshop will be scheduled immediately before the ICC, and will take place at the Capital Normal University, Beijing, China, 11-12 July 2019. Titled **‘Geospatial and cartographic education – contemporary challenges and opportunities’** this symposium has an exciting programme of contributions from educators in China and internationally. The programme at <http://cet2019.cnu.edu.cn/> shows that 14 presentations will be made on a range of topics, whilst open discussion on the BoK will form a centrepiece of the meeting.

### **COMMUNICATION**

The activities of the Commission have been reported regularly in ICA News and in the ICA page of *GIM International* magazine. **Reporting** of issues related to education and training is also evident in the monthly editions of *eCarto News*, still prepared by previous CET chair Dr David Fraser and incorporating items trawled from the web, of general interest to all cartographers around the world.

### **FUTURE PROSPECTS**

The chair of the commission will be stepping down in July 2019 after a period of seven years. The vice-chair has indicated that he is willing to continue only in that position. However, some succession planning has been undertaken, such that at least one active proposal to renew the Commission with new terms of reference, and under a new chair, will be tabled in Tokyo. As this is now the only such proposal, it is hoped that the General Assembly will support the continuation of the commission under the chair of Dr Tao Wang, Capital Normal University, Beijing, China. A long-term friend of ICA, Dr Wang has collaborated with the current chair to organise the pre-conference workshop in his institution, and to develop Terms of Reference which are progressive and realistic. Further information about the nomination from China for CET 2019-2023, and its proposed chair, will be made available to General Assembly delegates in due course.

*David Fairbairn, CET Chair, June 2019*

## Commission on Generalisation and Multiple Representations

### **Progress Against Terms of Reference: 2015-2019**

*To foster research and practical experience in multi-scale issues and automated map generalisation and to form a network and focal point for researchers and practitioners in this domain.*

One or two workshops per year were (co-)organised by the commission. Some workshops were "thematic" in order to put a focus on specific topics (automation at NMAs, ontologies for generalisation, generalisation of VGI).

*To foster and maintain a liaison with related commissions and working groups within the ICA as well as in related national and international organisations (e.g. ISPRS, IGU, EuroSDR):*

- *identification of contact persons*
- *timely mutual updating on planned activities*
- *organisation of joint conference sessions and/or workshops*

Eric Guilbert for ISPRS, Jantien Stoter and Peter Mooney for EuroSDR were identified as contact persons for the other international organisations. A timely mutual updating exist with Eric Guilbert, chair of the ISPRS WG IV/1 on Multi-dimensional modelling, which is the working group identified as the closest to the topics of our commission. Eric Guilbert is invited in all our events, and he invites us at the events organised by the ISPRS. The 2015 workshop was jointly organized with ISPRS, while the 2015 NMA Symposium was jointly organized with EuroSDR. The 2018 workshop was jointly organized with the VGI group of MAGIS CNRS (French research organization).

*To maintain a World Wide Web site for electronic dissemination of research on multiscale issues and map generalisation*

- *a membership database*
- *a bibliographic database*
- *examples of research projects and test data*
- *links to related web sites*
- *and (optionally) an electronic discussion list*

The website of the commission is still regularly updated (<http://generalisation.icaci.org>) and contains all the items of the terms of reference of the commission. A mailing list is active, [info\\_ica\\_generalisation@ign.fr](mailto:info_ica_generalisation@ign.fr) (190 subscribers) to promote events related to the commission.

*To organise sessions and meetings for exploring the issues named above:*

- *workshops held every two years in conjunction with international cartographic conferences*
- *special sessions and/or panel sessions at international cartographic conferences, in collaboration with local organisers*

Workshops were by the commission organized in Rio in 2015, in Washington in 2017, and one is being organized in Tokyo this year (<https://icc2019abstraction.wordpress.com/>).

Sessions on the commission topics were organised by the commission chairs at ICC'17.

*To produce publications for dissemination of the above efforts, including one special issue of a peer-reviewed scientific journal or a book every two years*

A special issue of the International Journal of Cartography is under process, started in late 2017. Some papers are still under review, but the issue should be published by the end of the year. A book on the practical use of map generalisation is being prepared, but this preparation just started.

**Flagship Results, 2015-2019**

Generalisation for paper map production keeps on progressing in national or regional mapping agencies, with new automated solutions presented at the 2nd NMA Symposium (<https://generalisation.icaci.org/prevents/88-nma-symposium-2015-general.html>).

An ontology on map generalisation was designed by members of the commission and made available to the community. It provides a shared vocabulary on the concepts used to automate map generalisation and could foster the interoperability on map generalisation processes: <http://generalisation.icaci.org/generalisation-ontologies.html>.

## Commission on Geospatial Analysis and Modeling

*Chair: Xiaobai Angela Yao*

*Vice-Chair: Bin Jiang*

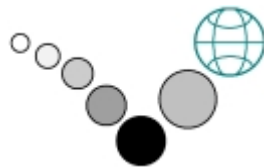
The table below summaries the commission's TOR and the corresponding activities and achievements in the past term (2015-2019) for each objective.

TOR objectives	Corresponding Activities/Achievements
1. foster a research community on spatial analysis, modeling, and data mining, with strong links to geovisualization and visual analytics:	/
<ul style="list-style-type: none"> <li>• develop and maintain a membership database and a mailing list for dissemination of information;</li> </ul>	<ul style="list-style-type: none"> <li>✓ A membership database is constructed and a mailing list (<a href="mailto:ica-gam@listserv.uga.edu">ica-gam@listserv.uga.edu</a>) was created and has been actively used.</li> <li>✓ New members can join the commission easily by filling out a sign-up form online.</li> </ul>
<ul style="list-style-type: none"> <li>• develop and maintain a commission website for news updates and share of information;</li> </ul>	The website ( <a href="http://gam.icaci.org">http://gam.icaci.org</a> ) has been up and running with frequent updates of information.
<ul style="list-style-type: none"> <li>• organize academic events for community members to share ideas and research findings.</li> </ul>	Professional activities were organized every year. More details of the activities can be found at <a href="https://gam.icaci.org/activities/">https://gam.icaci.org/activities/</a> .
2. develop and maintain connections and joint efforts with other ICA commissions as well as other related GIScience and geographic academic organizations:	/
<ul style="list-style-type: none"> <li>• organize special sessions and workshops at ICC as well as other GIScience or geography conferences;</li> </ul>	<ul style="list-style-type: none"> <li>✓ The GAM commission organized or co-organized themed symposiums in 2015, 2016 and 2017 respectively.</li> <li>✓ It also organized special sessions at AAG 2018, and a workshop in 2018.</li> <li>✓ These activities were held in different parts of the world, including USA, Europe, and Asia, and are associated with various disciplines such as geography, GIScience, and urban planning.</li> </ul>
<ul style="list-style-type: none"> <li>• collaborate with commissions within ICA or other academic associations to organize joint workshops on topics of shared interest;</li> </ul>	<ul style="list-style-type: none"> <li>✓ The GAM commission joined other commission to finish the Mapping Sustainability project in 2016. The commission created the poster for Goal-2.</li> <li>✓ The commission collaborated with the Fudan University for the 2016 conference mentioned above.</li> <li>✓ The commission collaborated with the ICA LBS commission for the 2017 symposium mentioned above.</li> </ul>

<p>3. encourage concerted efforts on new research topics related to the analysis and modeling of emerging location-based social media data and other big data.</p>	<p>Open discussions are facilitated during all commission business meetings. Also, open calls are made via the commission's mailing list to solicit suggestions of research agenda items. Interested commission members have formed a committee to organize more discussions on new research topics.</p>
<p>4. edit and publish research findings through various academic publication outlets, such as special issues on journals, particularly the new International Journal of Cartography.</p>	<p>In the past 4 years, the commission has edited two journal special issues to disseminate research findings.</p>



## Commission on GI for Sustainability



<http://SusGIS.net>

The Commission are included 22 persons from 17 countries.

**The activities of the Commission in 2015 was to organize an annual conference InterCarto/InterGIS-21 «Sustainable Development of Territories: Cartography and GI Support»: November 12-13, 2015 - Krasnodar (Russia), November 14, 2015 - Sochi (Russia) and November 16-19, 2015 - Suva (Fiji).**

It was attended by 168 participants from Australia, Austria, Belgium, Germany, Greece, Finland, France, Lebanon, Kazakhstan, Republic of Korea, Russia and Uzbekistan. The number of papers presented during the conference amounted to 114. Official declared conference languages were Russian, English, French, Spanish, Chinese and Arabic. The articles presented in the Proceedings were in Russian (mainly), English, French and Chinese. English and Russian were used as official languages during the conference.

Participants from research and educational institutions were dominated. The age structure of the participants was balanced - besides 50-60-year-olds participants there was a significant number of 30-year and even more younger scholars. The wide range of issues relating to both traditional and innovative areas of modern cartography and geo-informatics, was presented at the conference. Both scientific and methodological innovations in Geoinformatics and Cartography were considered – in particular, geoportal technologies, mapping applications for mobile devices, methods for microscale mapping, laser scanning for precise modeling of natural objects, “futuristic” GIS-modelling of society within Sustainable Development context, cognitive graphics and semantic modelling. Also at the conference were widely and deeply presented methodical, research and theoretical aspects already developed areas of modern cartography and GIS technologies. Particularly noteworthy are the original results in the field of theoretical and methodological support of sustainable development, including research on remote sensing, environmental sustainability and environmental impact assessment, risk management and assessment of developmental potential of the territory. A variety of ways to use information for decision-making have been proposed. It is necessary to point out the obvious interest of many researchers in the social, economic and geographical issues in the context of a wide range of theoretical and applied problems (demography problems of formation of language, poverty, crime, terrorism, etc.) that can be solved by means of GIS technology. The conference helped to achieve the above and other relevant scientific theoretical, methodological and applied problems. Undeniable progress has shown in dealing with the theoretical and technological problems related to using of geospatial information for decision-making. The new generation of map applications for mobile devices is reached; new concepts of its utilizing have been proposed.

**InterCarto/InterGIS-22 « GI support of sustainable development of territories in conditions of global climate change»: August, 31-September, 14, 2016.**

It was attended by 153 participants from Australia, Austria, Check Republic, Germany, Greece, Finland, Indonesia, Kazakstan, New Zealand, Russia, South Africa, USA. The number of papers presented during the conference amounted to 82.

The conference outcomes are summarized as follows:

- GIS and cartographic support for the environmental, economic and social dimensions of sustainable development
- Ensuring sustainable development of “cities of science” (Naukograds) and priority development areas
- Mobile geographic information systems
- Virtual geographical environment
- New technologies of spatial-temporal visualization
- Geoinformatics and public participation in the protection of environment and risk management
- Spatial data infrastructure
- Standards, interoperability and open access
- Geoinformation assistance for preservation of cultural and natural heritage
- Geoinformation assistance of climate researches
- Ecological and sustainable tourism
- Urban ecology and planning
- Problems of education

Seminars and Round Tables

- Pan-Eurasian Experiment Program (PEEX) and Sustainable Development
- Sustainable development of Russian “cities of science” (Naukograds)

Information about the conference in Russian - <https://youtu.be/fcZJ43DsVjM?t=2m40s>

**InterCarto/InterGIS-23** « GI support of sustainable development of territories in conditions of global climate change»: August, 31-September, 14, 2017.

It was attended by 153 participants from Australia, Austria, Check Republic, Germany, Greece, Finland, Indonesia, Kazakstan, New Zealand, Russia, South Africa, USA. The number of papers presented during the conference amounted to 82.

The conference outcomes are summarized as follows:

- GIS and cartographic support for the environmental, economic and social dimensions of sustainable development
- Ensuring sustainable development of “cities of science” (Naukograds) and priority development areas
- Mobile geographic information systems
- Virtual geographical environment
- New technologies of spatial-temporal visualization
- Geoinformatics and public participation in the protection of environment and risk management
- Spatial data infrastructure
- Standards, interoperability and open access
- Geoinformation assistance for preservation of cultural and natural heritage
- Geoinformation assistance of climate researches
- Ecological and sustainable tourism
- Urban ecology and planning
- Problems of education

Seminars and Round Tables

- Pan-Eurasian Experiment Program (PEEX) and Sustainable Development
- Sustainable development of Russian “cities of science” (Naukograds)

Information about the conference in Russian - <https://youtu.be/fcZJ43DsVjM?t=2m40s>  
Next conference will be held in Yuzhno-Sakhalinsk, Russia (June 26-28, 2017),  
Seoul, Republic of Korea, (July 1, 2017).

**InterCarto/InterGIS-24** « GI support of sustainable development of territories»: July, 19 – August 1, 2018.

The conference was attended by 68 participants from Russia, who made 54 presentations. Among 41 presentations planned for Bonn's part of the conference, there are Daniel M. Lopez L. and Arsitides Saavedra G. (Mexico), Rachida Houssa, Hassan Rhinane, Karim Hilmi and Mehdi Maanan (Morocco), Mirko Hauswirth, Matthias Bluhm and Judith Stagl (Germany), Tengiz Gordeziani, Tedo Gorgodze and Sergo Kvizhinadze (Georgia), Andreas Fritsch and Stefanie Betz (Germany), Horst Kremers (Germany), Andreea Calugaru, Alexandru Vasile, Diana Cosmoiu and Andreea Danciu (Romania), Zurab Laoshvili (Georgia), Xiaobin Hua, Ralf Ohlemüller and Pascal Sirguy (New Zealand), Fabio Cian, Carlo Giupponi and Mattia Marconcini (Italy), Andrea Baraldi, Dirk Tiede, Martin Sudmanns and Stefan Lang (Italy, Austria), Peter Fischer (Germany), Milan Konecny (Czech Republic), Thomas Esch, Felix Bachofer, Hubert Asamer, Jakub Balhar, Martin Boettcher, Enguerran Boissier, Andreas Hirner, Emmanuel Mathot, Mattia Marconcini, Annkatrin Metz-Marconcini, Hans Permana, Tomas Soukup, Soner Uereyen and Vaclav Svaton (Germany), Mario Hernandez (Mexico), Manik Lama (Nepal), Kwangseob Kim and Kiwon Lee (South Korea).

The conference outcomes are summarized as follows:

- Digital Earth and ensuring environmental, economic and social aspects of sustainable development of territories;
- Digital Earth and geography of the world economy, including digital economy;
- Geoinformatics and the mapping in the field of environmental protection and ensuring environmental safety;
- GI and cartographic support of preservation of cultural heritage and tourism,
- Remote methods of research of the Earth;
- Virtual geographical environments and the concept of Digital Earth,
- Education for sustainable development and the concept of Digital Earth.

Panel Discussion on cooperation of ICA GI & SD Commission with Digital Earth and another sisters international organizations was held on July 26 in Bonn:

*Daniel M. Lopez L. (CentroGeo, Mexico)*

*Horst Kremers (CODATA-Germany, Berlin)*

*Mario Hernandez (International Society for Digital Earth)*

*Vladimir S. Tikunov (ICA GI & SD Commission, Moscow)*

*Moderated by Mattia Marconcini (Germany)*

**InterCarto/InterGIS-24** « GI support of sustainable development of territories was held in Murmansk, Russia (January 30 - February 2, 2019) and will be in Tokyo (July 20, 2019) in cooperation with ICC.

2015

### **Organization of schools of young scientists (Educational and Training Workshops for students and young scientists).**

Previously, these schools were carried out in Sevastopol (Ukraine), Istanbul (Turkey), Urumqi (China, 5 times), during a cruise on the Volga River (Perm, Kazan, Saratov, Astrakhan, Volgograd, Samara), as well as in Barnaul (2 times). The last schools were held on 23 June - 2 July 2015 in the Skopje (FYR Macedonia), Pristina (Kosovo), Tirana (Albania) and Thessaloniki (Greece). Trainings were conducted in Cyril and Methodius University (Skopje, Macedonia), in University of Prishtina (Kosovo), Faculty of Engineering of University of Tirana and Polytechnic University of Tirana (Albania), as well as in the School of Spatial Planning and Development, Aristotle University of Thessaloniki (Greece).

In order to attract leading experts scientific communities of Southern Balkans, previously had little involvement in ICA activities, were encouraged to participate in activities, scientific research and projects. Great assistance in the organization of the school made a member of our commission Bashkim Idrizi (Macedonia).

Also from November 10 to 14, 2015 the school “GI support of sustainable development of territories in conditions of global climate change” was held in Krasnodar. The school was attended by over 100 participants.

2016

Next Workshop was held in July 2014 in the city of Kigali (Rwanda) - trainees from 10 different government organizations and higher education institutions. Such as Ministry of Education of Rwanda, Rwanda Natural Resources, total 53 trainees attended and got certificates. The last year schools was held in June-July 2015 in FYR Macedonia, Kosovo, Albania and Greece and in November 2015 in Krasnodar (Russia). The schools in 2016 was held in April in St.-Peterburg and Novosibirsk (Russia). At the end of 2017 short school held in Perm and Kudymkar.

### **Geographical Information Science in environmental management and planning**

conference as part of 5-th International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE) was organized in Mykonos Island, Greece, from June 14 to 18, 2015 (Organizer - member of our commission N.Karanikolas).

There are activities continued in 2015

- 1) establishing links with other international sister organizations - CODATA, IGU, Digital Earth, IEAS, that, in particular, was manifest in participation in the next conference InterCarto-22 (It will be held in 2 cities - Protvino, Russia and Melbourne, Australia).
- 2) preparing the book GI for Sustainability
- 3) long-term projects:
  - “Digital Great Altai”- a GIS support for ecosystem sustainability in Great Altai Ecoregion
  - Collected existed GIS data about the region
  - Digitized paper maps for GIS database.
  - Investigated all neighbor countries spatial data sharing policy, special focused on topographic maps and thematic maps control policy (classifying policy)
- 4) Mapping Sustainability Goals (2 posters – Health and Cities will be prepared by members of our commission)

## 2. Workshop on Service-Oriented Mapping

The Commission cooperated with the ICA Commission on Map Production and Geoinformation Management in a workshop on Service Oriented Mapping held on June 13th 2016 at the HassoPlattner Institute at the University of Potsdam (Germany), see <http://mapproduction.icaci.org/>

## 3. RIMMA2016 – Risk Information Management, Models and Applications

The commission is continuous partner in the RIMMA series of international interdisciplinary workshops.

The 2016 event was mainly characterized by the demands that the UN Framework for Risk Reduction 2015-2030 – UN SENDAI Framework – formulates for adequate science, technology, data and cartography/geoinformation research and development.

The RIMMA workshop series is a close cooperation with CODATA-Germany, the German National Committee for the ICSU Committee on Data for Science and Technology.

Furthermore, these activities of the commission are not only relevant to topics in UN ISDR but also for UN SDGs (Sustainable Development Goals) and UN Habitat lines of action.

Summary of cartographic and geoinformation aspects from RIMMA2016 presentations and plenary discussions:

1. Natural, Technical, Chemical Risks From Local To International Level
2. Risk Databases, Risk Information Interoperability, Standards Development
3. Disaster Management And Emergency Preparedness, Prevention, Alert, Response And Mitigation
4. Health and Biological Risks Issues for Humans, and The Environment
5. Urban Neighborhood Risk Information And Mapping
6. Risk Information Processes Modelling And Applications, Services And Service Composition
7. Collection, Documentation, Archiving, And Open Access to Risk and Disaster Information (including issues of completeness, missing data etc.)
8. Risk Communication (decisionmaking, actors, public awareness etc.)
9. Social Media, Volunteered Information
10. User-Group Specific Risk Management Issues
11. Metadata, Semantic Networks, Semiotic Networks
12. Thresholds
13. Data Quality
14. Scalability
15. Big Data / Data Streams Analysis
16. Risk And Multi-Risk Cartographic / Visualization Issues
17. Cross-Organization Information Management
18. Complexity Management Issues

## 5. A book on GI for Sustainability- 3 chapters of the book are written by experts from Russia .

- Commission meeting in conjunction with ICC2019.
- Eurasian Journal of Digital Earth will be published and members of our commission were invited to submit their papers in this journal.

See <http://InterCarto24.net>

The commission publishes its organizational details and calls for events participation on its homepage <http://SusGIS.net>

Contact: Chair V.S. Tikunov  
Vice Chair H. Kremers

[tikunov@geogr.msu.su](mailto:tikunov@geogr.msu.su)  
[office@Horst-Kremers.de](mailto:office@Horst-Kremers.de)



## Commission on the History of Cartography

Acknowledging that the assessment of current developments and future trends in cartography and GI Sciences needs an understanding of their evolution, ICA already in 1985 created a Standing Commission on the History of Cartography – one of just four at that time. When the ICA General Assembly abolished Standing Commissions in 1999, the Commission on the History of Cartography (HoC) was formed and continued to function as such ever since.

### Terms of Reference

At the 27th ICC in Rio de Janeiro in August 2015 the leadership team changed and the following aims were adopted by the ICA General Assembly:

- Promote research and scholarly publication on the history of cartography in all of its aspects, but with special consideration to the 19th and 20th centuries and the impact of technological innovations;
- Examine the changing role of maps worldwide as cartographical (as opposed to historical) documents in history;
- Investigate and develop Monumenta Cartographica Moderna as a framework for a book series and database to analyse major achievements of regional cartography in 19th and 20th centuries;
- Hold annual meetings, alternatingly as Workshops in conjunction with the International Cartographic Conference and as International Symposia;
- Promote the spirit of co-operation both within ICA (sister commissions and working groups) and beyond to related societies and institutions;
- Maintain a website to facilitate contact between researchers in the field and make source material and literature available to the community and the general public alike.

### Activities

In line with the Terms of Reference, the Commission organized several Workshops and Symposia, some of which in co-operation with ICA sister commission and/or significant institutions in the field. In response to the needs of the community, especially the desire to have meetings with a more stringent regional agenda, the HoC flagship bi-annual conference series *International Symposia on the History of Cartography* got a new occasional companion conference series *Regional Symposia on the History of Cartography*.

#### 1. Meetings

##### 1.1 Workshops

- **Pre-28th ICC Workshop**

##### „Charting the Cosmos of Cartography: History – Names – Atlases”

Washington D.C. (USA) – <https://history.icaci.org/washington-dc-2017/>

June 28-30, 2017

Co-hosted with the ICA Commissions Toponymy and Atlases as well as the Library of Congress' Geography & Map Division.

The history of cartography acted as the overarching motif connecting all the presentations, while toponymy and atlases formed its main subthemes. The papers on toponymy highlighted the symbolic power of place names, especially their role in space-related identity

building, by focusing on non-dominant cultural groups and what representation of their own place names on maps and in public space means for them. Likewise, atlases have very often been treated as nothing more than volumes of bound maps, whose main purpose was to keep precious maps together and to shelter them from the wear and tear of storage. However, besides being a protective device for contents, atlases also became precious status icons in the 16th century and one of the most iconic teaching resources from the 19th century onwards. The digital revolution opened up the atlas concept for numerous disciplines, turning their focus towards spatial organisation of knowledge. Against this brief but very complex history, exploration in atlases touches on many, though diverse topics in cartographic research.

24 papers were presented in nine sessions (see publications).

- **Workshop**

- **„Controlling the Waters: Seas, Lakes and Rivers on Historic Maps and Charts“**

- Utrecht (Netherlands) – <https://history.icaci.org/utrecht-2019/>

- July 12, 2019

Workshop held in connection with Imago Mundi's the 28th International Conference on the History of Cartography (28th ICHC) in Amsterdam; co-hosted with Utrecht University, Special Collections.

Complemented by a special map exhibition from the map collection of the Utrecht University Library, the workshop investigates cartographic aspects of water management from the Netherlands and around the globe.

9 papers were presented in three session.

- **Pre-29th ICC Workshop**

- **„Cartography as Cultural Encounter: How East and West have Mapped and Influenced Each Other“**

- Tokyo (Japan) – <https://history.icaci.org/tokyo-2019/>

- July 15, 2019

- Co-hosted with ICA Topographic Mapping.

Five papers will explore how western and eastern cartographic practice developed over time, how they understood and mapped their own space but also how they mapped and saw others, and how these diverse cartographic cultures and practices around the globe contributed to the dissemination of geographic knowledge.

## ***1.2 International Symposia***

- **6th International Symposium on the History of Cartography**

- **„The Dissemination of Cartographic Knowledge: Production – Trade – Consumption – Preservation“**

- Dubrovnik (Croatia) – <https://history.icaci.org/dubrovnik-2016/>

- October 13-15, 2016

Co-hosted with the ICA Commission Map Production and Geoinformation Management, the ICA Commission on Use, User, and Usability Issues, and the Institute of Social Sciences “Ivo Pilar” (Zagreb, Croatia).

The general theme was the dissemination of cartographic knowledge and the effectiveness thereof in diverse cartographic cultures and their related user groups around the globe. This included the technological and conceptual aspects of cartographic production (maps, charts, globes, atlases, educational tools etc.), the usability of these techniques and the resulting products, as well as the conditions of the map trade as a changing network of private

enterprises and official institutions, and the role of diverse audiences in the creation, circulation, consumption and ultimate preservation of knowledge.  
37 papers were presented in nine sessions, including one poster session (see publications).

- **7th International Symposium on the History of Cartography**

- **„Mapping Empires: Colonial Cartographies of Land and Sea“**

Oxford (United Kingdom) – <https://mappingempires.icaci.org/>  
September 13-15, 2018

Co-hosted with the Bodleian Library of the University of Oxford and the ICA Commission Topographic Mapping.

The general theme investigated the cartography of Africa, Asia, Oceania and the Americas as influenced by cosmopolitan exploration and imperialistic activity during, but not limited to, the 'long nineteenth century'. The rise of European hegemony coincided with a scientific turn that underpinned the evolution of topographic mapping and hydrographic charting, and led to the emergence of thematic mapping. These colonial cartographies brought forth a legacy of mapping that continues to influence the aesthetics and authority of mapmaking today. 39 papers were presented in ten sessions, including two poster sessions (see forthcoming publication).

### *1.3 Regional Symposium*

- **1st Regional Symposium on the History of Cartography**

- **„Mapping Asia: Cartographic Encounters between East and West“**

Leiden (Netherlands) – <https://history.icaci.org/leiden-2017/>  
September 15-16, 2017

Co-hosted with Leiden University Library to mark the „Asia Year“ of the Leiden University.

The central theme of the conference was the mutual influence of Western and Asian cartographic traditions. Geographically the focus was on South Asia, East Asia and Southeast Asia with special attention to India, China, Japan, Korea and Indonesia.

29 papers were presented in ten sessions (see publications).

## *2. Publications*

- **Altic, Mirela / Demhardt, Imre Josef / Vervust, Soetkin (Eds.):**

- **“Dissemination of Cartographic Knowledge”.**

Heidelberg et al. (Springer) 2017, XIII, 390 pages.

This proceedings volume contains 22 papers presented at the 6<sup>th</sup> International Symposium on the History of Cartography in Dubrovnik 2016. Until June 2019 from the digital version 6,033 chapters have been downloaded.

<https://www.springer.com/us/book/9783319615141>

- **Storms, Martijn / Cams, Mario / Demhardt, Imre Josef / Ormeling, Ferjan (Eds.):**

- **“Mapping Asia: Cartographic Encounters Between East and West”.**

Heidelberg et al. (Springer) 2018, X, 299 pages.

This proceedings volume contains 16 papers presented at the 1<sup>st</sup> Regional Symposium on the History of Cartography in Leiden 2017. Until June 2019 from the digital version 2,777 chapters have been downloaded.

<https://www.springer.com/us/book/9783319904054>

- **Demhardt, Imre Josef / Jordan, Peter / Losang, Eric (Guest Editors):**  
**Cartographic Journal, Volume 58, Issue 2 (May 2018), 94 pages**  
**„Charting the Cosmos of Cartography: History – Names – Atlases”**  
This themed issue of the *Cartographic Journal* contains 9 papers presented at the Pre-28<sup>th</sup> ICC Workshop in Washington D.C. in 2017.  
<https://www.tandfonline.com/toc/ycaj20/55/2?nav=tocList>

- **Demhardt, Imre Josef (Guest Editor):**  
**International Journal of Cartography, Volume 4, Issue 3 (November 2018), 115 pages**  
**„Cartography and World War I”**  
This themed issue of the *International Journal of Cartography* contains an editorial and 8 papers to commemorate the centenary of the armistice ending World War I and the cartographic advances triggered by the needs during that conflict with an emphasis of trench warfare and the new aero-cartography.  
<https://www.tandfonline.com/toc/tica20/4/3?nav=tocList>

### **3. Forthcoming Activities in 2019 & 2020**

#### **3.1 Meetings**



- **8th International Symposium on the History of Cartography**  
**„Mapping the Ottoman Realm: Travelers, Cartographers and Archaeologists“**  
Istanbul (Turkey) – <https://history.icaci.org/istanbul-2020/>  
April 21-23, 2020  
Co-hosted with the German Archaeological Institute – Department Istanbul.  
The first ever international symposium on the modern cartography of the (former) Ottoman countries will focus on two main themes:  
1) Cartography of the Ottoman Countries in Europe, Asia and Africa  
2) Mapping Archaeological Sites, Landscapes and Excavations in the Ottoman Empire in the 19th and 20th Centuries  
The Call for Papers is still open until November 1, 2019. Abstracts for either conference theme can be submitted under <https://history.icaci.org/istanbul-2020-abstract-submission/>

- **2nd Regional Symposium on the History of Cartography**  
**“Caring for the Continents: Collecting and Collections”**  
Arlington (Texas, USA)  
September 29 – October 1, 2020

Co-hosted by the Garrett Chair in the History of Cartography and Library Special Collections, University of Texas at Arlington.  
Further information and the Call for Papers will be circulated towards the end of 2019.

### 3.2 Publication

- **Kent, Alexander / Vervust, Soetkin / Demhardt, Imre Josef / Millea, Nicolas (Eds.):**

#### **„Mapping Empires: Colonial Cartographies of Land and Sea“**

This proceedings volume will contain 17 papers presented at the 7<sup>st</sup> International Symposium on the History of Cartography in Oxford 2018.

Heidelberg et al. (Springer) 2019, ca. 330 pages – to be published in III. quarter of 2019.

<https://www.springer.com/gp/book/9783030234461>

### Membership

In line with ICA's mission to promote the discipline and profession of cartography in an international context, the Commission encourages everybody with an active interest to in the historic dimensions of the discipline to join the by way of free online registration (<https://history.icaci.org/become-a-member/>) and participate in the meeting and publication activities. During the term 2015-2019 the membership has significantly grown from 71 just before the 27th ICC in Rio de Janeiro to 115 just before the 29th ICC in Tokyo. Besides about two dozens members active in or leading other ICA Commissions, thus emphasizing the key service role of the ICA Commission on the History of Cartography on the genetic perspective of cartography, many other members actively engaged in more than one of the Commission's activities.

### Website

In January 2016 the Commission migrated its website from the commission held address [www.icahistcarto.org](http://www.icahistcarto.org) to the central ICA domain at the University of Vienna (<https://icai.org/>) under <https://history.icaci.org/>

*Imre Josef Demhardt (Chair)*

*Mirela Slukan Altić (Vice-Chair)*

*Soetkin Vervust (Executive Secretary)*





## Commission on Location Based Services

<http://lbs.icaci.org/>

### 1. Introduction

On 28 August 2015, the 16th ICA General Assembly in Rio de Janeiro established the ICA Commission on Location-Based Services (LBS). Since then, we have been dedicated to building a community of researchers and other stakeholders of different backgrounds (scientific, engineering and humanistic) to advance the research on LBS in all its interdisciplinary fields, with the aims to enable “anywhere, anytime, for anyone and anything” (4A) services.

LBS is an interdisciplinary research field. Within the LBS commission, we have been interested in any research topics related to LBS, including (without being limited to) outdoor and indoor positioning, context and user modelling, location tracking and processing, user interfaces, usability, privacy and social issues, smart cities, mobility and transportation applications, health applications, and so on.

This short report first summarizes the main activities of the LBS Commission in the last four years, as well as introduces some on-going activities during ICC 2019 and beyond. We then highlight our main achievements addressing the Terms of Reference (ToR).

### 2. Activities 2015-2019 – A Summary

During the last four years, the LBS Commission has been very active in promoting research and collaboration related to all aspects of LBS, as illustrated by a list of activities at <https://lbs.icaci.org/activities/>. The following summarizes some of the main ones.

#### 2.1 LBS Conferences 2015-2019

Since its initiation in 2002, the LBS conference series has become one of the most important scientific events decided to LBS. In the past years, the LBS conferences travelled around the world – with venues in Hong Kong, Salzburg, Nottingham, Guangzhou, Munich, Shanghai, Vienna, Augsburg, and Zurich.

Since 2015, the LBS conference series has become the annual conference of the LBS Commission. For more details of the conference series, please refer to <http://lbsconference.org>.

- 12<sup>th</sup> International Conference on Location Based Services (LBS 2015), Augsburg, Germany, 16-18 September 2015, <http://lbs2015.lbsconference.org/>
- 13<sup>th</sup> International Conference on Location Based Services (LBS 2016), Vienna, Austria, 14-16 November 2016, <http://lbs2016.lbsconference.org/>
- 14<sup>th</sup> International Conference on Location Based Services (LBS 2018), Zurich, Switzerland, 15-17 January 2018, <http://lbs2018.lbsconference.org/>



*Participants of LBS 2015; Oral session at LBS 2016; Award ceremony of the ICA Scholarships and ESRI travel awards at LBS 2018*



## 2.2 ICC Sessions and pre-ICC Workshops

- **LBS Sessions at ICC 2017:** 5 oral sessions dedicated to LBS, covering wayfinding, indoor and outdoor navigation, mobile cartography, mobility analysis and privacy. Furthermore, a dedicated session was held on July 3, discussing the LBS research agenda.
- **ICC2017 Pre-Conference Symposium on Location-Based Social Media and Tracking Data (LSMTD 2017)**, 1-2 July 2017, <https://gam.icaci.org/symposium-2017/>, jointly with the Commission on Geospatial Analysis and Modelling: the symposium program featured 24 oral presentations in 6 oral sessions, covering “theories and data models”, “participation and user tasks”, “traffic modelling”, “analyzing human dynamics”, “research applications using location-based big data”, and “place modelling”.



*Group photo at LSMTD 2017*

## 2.3 Publications

During the last four years, several publications were developed by the LBS Commission. They provide a general picture of recent research activities within the domain of LBS. Such activities emerged in the last years, especially concerning issues of outdoor/indoor positioning, smart environment, spatial modeling, personalization, context-awareness, cartographic communication, novel user interfaces, crowdsourcing, social media, big data analysis, usability and privacy.

- Yao, X., Huang, H., Jiang, B., Krisp, J. (eds) (2019): Special Section “Social Media and Tracking Data”, *International Journal of Geographical Information Science*, 33(4).
- Gartner, G., Huang, H. (eds) (2018): Special Issue “Location-Based Services”, *ISPRS International Journal of Geo-Information*.
- Kiefer, P., Huang, H., Van de Weghe, N., and Raubal, M. (eds.) (2018): *Progress in Location-Based Services 2018, Lecture Notes in Geoinformation and Cartography*, Springer, Cham (DOI: 10.1007/978-3-319-71470-7).
- Kiefer, K., Huang, H., Van de Weghe, N., Raubal, M. (eds.) (2018): *Adjunct Proceedings of the 14th International Conference on Location Based Services*. ETH Zurich, doi:10.3929/ethz-b-000224043.
- Gartner, G. and Huang, H. (eds.) (2017) *Progress in Location-Based Services 2016, Lecture Notes in Geoinformation and Cartography*, Berlin/Heidelberg, Springer.
- Gartner, G., Huang, H. (eds.) (2016): *Proceedings of 13th International Conference on Location Based Services*, Vienna, Austria, November 14-16, 2016, ISBN 978-1-907075-02-5.
- Krisp, J. (eds) (2016): Special issue on *Progress in Location-Based Services 2015*. *Journal of Location Based Services*, 10(1).



*Selected Publications of the LBS Commission*

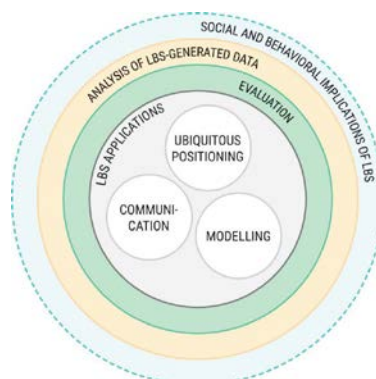
## 2.4 LBS Research Agenda

In May 2016, the LBS Commission started the initiative to develop a cross-cutting research agenda, identifying key research questions and challenges that are essential for the LBS development in the next 5 or 10 years. The process of producing this research agenda was designed as a joint activity of the LBS research community:

1. As a first step, everyone was invited to write a one or two paragraph proposal to describe what she/he believes are the “big problems” that should be addressed to bring LBS into a higher level, and why (optional). The deadline was August 5, 2016. In total, we received 31 one-paragraph proposals.
2. On August 2016, based on the 31 proposals, we compiled a first list of “key problems”. This list was published at the Commission website to seek comments and feedback.
3. A workshop was organized on November 13, 2016 at 13:30-18:00 in Vienna (Austria) to refine and improve the list of “key problems”, immediately before LBS 2016. In total, 22 participants joined the workshop. On July 3, 2017, another dedicated session at ICC 2017 (Washington DC, USA) was organized to further discuss the list of “key problems”. A revised list of “key problems”, based on the comments/suggestions of the workshop and conference session, was published in July 2017 at the Commission website.
4. In the 2nd half of 2017, the Commission chairs together with several invited experts summarised all the “key problems”, and prepared a draft manuscript. The manuscript also provided a state-of-the-art review of the scientific field of LBS. The manuscript was submitted to the Journal of Location Based Services (JLBS) for double-blind peer review.

After revision, the manuscript was then accepted and published in JLBS as an open access paper at the end of August 2018.

- Haosheng Huang, Georg Gartner, Jukka M. Krisp, Martin Raubal & Nico Van de Weghe (2018): Location based services: ongoing evolution and research agenda, Journal of Location Based Services, DOI: 10.1080/17489725.2018.1508763



*The ‘key research challenges’ within LBS*

For more detail of the LBS research agenda, please refer to <https://lbs.icaci.org/research-agenda/>. As the research agenda isn't set in stone, you are encouraged to provide any comments at the above link.

### 2.5 Website and Mailing List

The LBS Commission maintains a blog-like website for the commission (<http://lbs.icaci.org/>). The website, which is updated regularly, aims to allow the commission members to exchange information, as well as to disseminate information on activities in this field to a wider public. Currently, the website also contains information regarding the LBS Research Agenda, as well as the LBS conference series.

Meanwhile, a moderated E-Mail list ([ica\\_com\\_lbs@googlegroups.com](mailto:ica_com_lbs@googlegroups.com)) was also set up to facilitate the communication between the commission members. Currently, 158 members from all over the world have registered as the commission members, and the number is still increasing.

### 3. Ongoing Activities During ICC 2019 and Beyond

Several activities have been planned for the coming months.

- **Pre-ICC 2019 workshop on “Mobile Map User Experience (UX) Design”**, Beijing, China, July 11-12, 2019: Together with the Commission on Use, User and Usability Issues, Commission on Cognitive Visualization, and Commission on Visual Analytics; More details are available at <https://use.icaci.org/user-experience-design-for-mobile-cartography-setting-the-agenda/>
- **Pre-ICC 2019 Symposium on Location-Based Big Data 2019 (LocBigData 2019)**, Tokyo, Japan, July 15, 2019: Organized jointly by the LBS Commission and the Commission on Geospatial Analysis and Modelling; More than 25 oral submissions have been accepted for the symposium; Authors of selected submissions will be invited to submit full papers for considerations for publications in the Special Issue on “Geospatial Big Data Analytics for Smart Cities” of Computers, Environment and Urban Systems (CEUS); More details are available at <https://lbs.icaci.org/locbigdata/>.
- **LBS sessions at ICC 2019**: In addition to the regular oral sessions dedicated to LBS, we will also hold a business meeting at ICC 2019.
- **LBS 2019**, Vienna, Austria, November 11-13, 2019: It will be hosted by TU Wien at Vienna, Austria. The Call for Papers is currently open. We call for full papers, work in progress, and showcases. High-quality full paper submissions are intended to be published in the Advances in Cartography and GIScience of the ICA Series. Deadlines for submission are June 1 for full papers, July 15 for work in progress, and September 15 for showcases. We are looking forward to your contributions! Please refer to <https://lbs2019.lbsconference.org> for more information.

#### 4. Main Achievements Addressing the Terms of Reference

In the following, we briefly highlight the main achievements of the LBS Commission, with respect to the Terms of Reference.

Terms of Reference (2015-2019)	Main Achievements
Promote research on Location-based Services (LBS) in all its interdisciplinary aspects.	A series of activities (conferences, workshops, publications) has been organized to foster research and collaboration related to all aspects of LBS. See below for some main ones.
Define short and medium term research goals that address major challenges associated with LBS, such as positioning, modelling, communicating context-based geoinformation preferably through maps, privacy and social issues, with the aim to facilitate users' daily activities and decision-making in space.	During 2016-2018, a series of events has been organized to develop a cross-cutting research agenda for LBS, which was published as an open access paper in JLBS at the end of August 2018. For more details, please refer to the above and <a href="https://lbs.icaci.org/research-agenda/">https://lbs.icaci.org/research-agenda/</a>
Organise ICC sessions, workshops and international conferences on LBS for colleagues from various disciplines to meet, interact and exchange knowledge, experience, plans and ideas on how LBS can and could be improved and on how it will influence both science and society.	Conferences/workshops/ICC sessions organized: <ul style="list-style-type: none"> <li>• International Conferences on LBS: LBS 2015, LBS 2016, LBS 2018 and LBS 2019 (<a href="https://lbs.icaci.org/lbs-conferences/">https://lbs.icaci.org/lbs-conferences/</a>)</li> <li>• LBS sessions at ICC 2017 and ICC 2019</li> <li>• Pre-ICC 2017 Symposium on Location Based Social Media and Tracking Data (<a href="https://gam.icaci.org/symposium-2017/">https://gam.icaci.org/symposium-2017/</a>)</li> <li>• Pre-ICC 2019 Symposium on Location Based Big Data (<a href="https://lbs.icaci.org/locbigdata/">https://lbs.icaci.org/locbigdata/</a>)</li> </ul>
Publish LBS-related reports, books and special issues with scientific journals.	<ul style="list-style-type: none"> <li>• 4 journal special issues (see above): IJGI, IJGIS, IJGI, JLBS</li> <li>• 2 Springer book proceedings: “Progress in Location Based Services 2016”, “Progress in Location Based Services 2018”</li> <li>• 2 Online conference proceedings</li> </ul>
Maintain a commission website and update it regularly to allow commission members to exchange information, as well as to disseminate information on activities in this field to a wider public.	<ul style="list-style-type: none"> <li>• Commission website: <a href="http://lbs.icaci.org/">http://lbs.icaci.org/</a></li> <li>• Commission E-mailing list: <a href="mailto:ica_com_lbs@googlegroups.com">ica_com_lbs@googlegroups.com</a></li> </ul>
Foster interdisciplinary and international collaboration with cognate disciplines and relevant stakeholders, including other ICA commissions and working groups, and other allied research communities (e.g., ISPRS, FIG, IAG).	<ul style="list-style-type: none"> <li>• Collaboration with other ICA Commissions on “Geospatial Analysis and Modelling”, “Use, User, and Usability Issues”, “Cognitive Visualization”, “Visual Analytics” for organizing pre-ICC workshops at ICC 2017 and ICC 2019</li> <li>• Collaboration with ISPRS, FIG, IAG, AGILE, and DGfK for the organization of LBS conferences</li> <li>• Organizing dedicated sessions on LBS at ISPRS Congress 2016, Prague, Czech Republic</li> </ul>

## 5. Summary

Overall, between 2015-2019, the LBS Commission has fulfilled the list of tasks and activities defined in the Terms of Reference. We have now built a strong and comprehensive platform for colleagues from various disciplines and practice to meet, interact and exchange knowledge, experience, plans and ideas on how LBS can and could be improved and on how it will influence both science and society.

Haosheng Huang (Chair) and Jukka Krisp (Vice-Chair)



**ICA Commission on  
Location Based Services**



## Commission on Map Design

The Commission on Map Design has built upon the success of its first four year term with another successful four year term 2015-2019. While map design is implicit in the work of many Commissions (and cartography more generally), the Commission on Map Design was formed to make these ideas explicit and to bring focus to design as a core component of cartography and map-making more generally.

The Commission provides a forum for discussion, exchange of ideas and the development and spread of the principles and practice of high quality, effective cartographic design. The Commission was established to focus attention on establishing effective patterns for new map makers; to encourage excellence in design; and to bring together a wide variety of people from different disciplines to help shape cartographic design.

The terms of reference for 2015-2019 were:

1. To maintain, expand and improve the content on our web site and across our various social media platforms;
2. To add to the MapCarte initiative and develop the content into a book;
3. To prepare a major book that explores the interface of cartography, graphic and information design;
4. To take a leading role in the organization of awards at ICA conferences (at the request of the ICA Executive);
5. To organize sessions at ICA conferences in 2017 and 2019 focused on map design theory and practice;
6. To organize, sponsor or co-host Commission meetings either independent of or in conjunction with other cartographic events to promote map design discourse and practice;
7. To prepare one Special Issue of a leading journal of cartography to explore map design for new mapmakers; and
8. To collaborate with colleagues in other ICA Commissions as appropriate in complementary areas of interest.

The Commission was chaired for its second term by Kenneth Field (Esri, Redlands, CA). Vice-Chair was Ian Muehlenhaus (University of Wisconsin – Madison). The Commission website [mapdesign.icaci.org](http://mapdesign.icaci.org) was created in 2011 and populated with core information and useful resources and has been further developed throughout the second term with additional content. Rather than a formal membership structure, the Commission used the web site (blog) and social media (e.g. @ICAMapDesign on Twitter and ICAMapDesign on Pinterest) to communicate with participants. At the time of writing there are over 850 subscribers to the Map Design web site and blog, and the twitter account has over 450 followers. All Terms of Reference (except item 7, which will be explained herein) were achieved and exceeded.

The Map Design Commission co-organised (with the Commissions on Cognitive Visualisation, Use and User Issues and Geovisualization ) a very successful ICC2015 pre-conference in Curitiba to explore new agendas for cartographic research in the broad areas of the Commission's interests. Participants enjoyed a stimulating day of discussions and debates as we looked at how we might shape research going forward. There were a number of useful strands explored and tangible outputs already in preparation including a paper published in the *International Journal of Cartography* (Robinson *et al*, 2016)

The Commission was privileged to play a key role in the Map Gallery at the ICC 2015 in Rio, and also the ICC 2017 in Washington DC with Chair Kenneth Field leading a committee of judges selected by ICA and the Local Organising Committees. We also hosted themed sessions in Rio, Washington DC (and will, again in Tokyo) around themes of Map Design.

In the first few months of the second term, Commission Chair attended the ICC European Symposium on Cartography in Vienna, Austria to present as well as contribute to the pre-conference joint meeting of the ICA Executive Committee and Commission Chairs. The meeting effectively cemented the terms of reference.

Commission members continue to support many conferences such as AAG, NACIS, British Cartographic Society, GeoCart, Society of Cartographers with papers, presentations and map design workshops. Commission Chair and vice-chair have both delivered keynote presentations at a number of conferences.

The Phaidon Press book MAP was published in 2016 and contains about 40 entries from the Commission's 2014 MapCarte series.

Field and Muehlenhaus prepared a template for a new web site initiative to create style guides and templates. The intent was to bring together ideas and resources to assist cartographers and map-makers to design their work in a specific way. For instance, if a map is to be produced using an Art Deco style, the resources would demonstrate a range of appropriate fonts, colours and artistic styles that will help to bring the design to fruition. Unfortunately, this initiative didn't take-off despite excellent feedback at several conferences. The Chair and co-chair decided they would not be moving forward with the idea if the community remained unwilling to build out the content.

The Commission prepared a poster in support of President Menno-Jan Kraak's initiative to support the UN-GGM initiative on sustainable development. Map Design was responsible for Sustainable Development Goal 14 Life Below Water.

Chair Kenneth Field was a member of the steering committee for the 2016 Cartographic Summit jointly hosted by ICA and Esri in Redlands. Field and Muehlenhaus hosted a social networking event during the Cartographic Summit. Sponsored by the Map Design Commission, the event provided an informal setting for a selected group of invited guests at the summit to continue their discussions and ideas on the future of mapping.

A new paper on the mapping of elections was published in International Journal of Cartography by Field and Danny Dorling. We specifically selected IJC to continue to support its development on behalf of the Commission. Field is also a co-author on one of the ICA research position papers (lead author Anthony Robinson).

The Commission was invited to take part in a panel session on cartography as part of the Rumani-Huria project in Dar es Salaam, Tanzania in November 2016. This major World Bank funded initiative was an opportunity to have ICA representation and offer cartographic advice on developing the project further.

Commission members were heavily involved in preparing and delivering a MOOC (Massive Open Online Course) on Cartography through Esri's MOOC programme. The focus of the course is on map design and we designed and delivered short films (6 in total) alongside workbooks, exercises and quizzes. The course was delivered entirely online and provided free of charge to over 110,000 students who signed up.

The Commission's major landmark project for the current four year term was a book called Cartography. It was published in June 2018 and is 550pp long with over 300 illustrations, maps and diagrams. The book has been a labour of love, many years in the making and has been supported by many in ICA. It is designed as a compendium of design advice for cartographers and mapmakers; to support those more experienced as a reminder and desk companion; and also for novice mapmakers to give them a modern insight into the fascinating, rich and varied world of making maps. The book is available via Amazon and with the ICA logo prominently displayed on the cover, the association between the author and the wider work of the ICA is explicitly made and contributions from the ICA President and many officers and members of ICA Commissions were included. The intent is to not only see the book as contributing to the long history of ICA supporting the dissemination of cartographic knowledge through books and other forms, but also to identify ICA as the authoritative body on cartography. Badging the book in this manner establishes that idea in the minds of the reader and suggest ICA as a place to further explore. Reviews have been overwhelmingly positive. Professor Mark Monmonier said it was "an impressively creative and useful scholarly contribution" and Chris Wesson, writing in the Bulletin of the Society of Cartographers exclaimed "what Kenneth Field has created here is a brilliant reference book on behalf of our field of cartography. Finally! A book that truly represents cartography in 2018."

While it's been a successful four-year terms the Commission does have some concerns. The ICC in Washington DC and Tokyo both take place back-to-back with the Esri User Conference. This has meant the current Chair had no scope to organize any pre- or post- conference activities. This is unfortunate and it's worth noting that, in future, conference organisers do need to be more aware of similarly themed conferences and their impact on many people who will want to (or have to) attend both. We also have not produced a Special Issue of a Journal. It has become apparent that traditional models of publishing are becoming outdated. Far more people engage with web-based content, free at the point of use. We instead made efforts to publish and share work across many different platforms. For instance, an article on map design was published on the blog Medium, which resulted in many thousands of page views. This will become a more important way of sharing the ideas and work of the Commission going forward. Additionally, we have seen exposure in many non-academic forms such as being interviewed by the media a number of times to discuss thematic map design, most notably by WIRED, Tech Republic, GeoHipster and National Geographic.

At the recent AAG meeting in Washington DC the Commission has been vocal in expressing the view that ICA does not need a Body of Knowledge. The world of cartography already has a Body of Knowledge and many ICA Commission Chairs and members are have already shared their work to support the democratization of the discipline. It is the view of this Commission that more effort should be given to supporting the good work already being done, not to try and redo it. It's questionable whether anyone would actually value an ICA-led Body of Knowledge. Who would actually refer to it in a practical sense?

Finally, the Commission has got on with its work almost solely without any support from the ICE Executive Committee. There has been no contact at all with the EC liaison. It is the strong view of this Commission that the relationship between EC and Commissions needs reviewing. There has to be a stronger purpose for Commissions. They do not simply exist to do work assigned by EC members. And equally, there should be some expectation that EC supports and undertakes work that promotes and values the work of Commissions. Currently, there is very little dialog between EC and Commissions. This has to change.

Succession plans for the Commission have been finalised. Co-Chair Ian Muehlenhaus will be the proposed new Chair for the period 2019-2022. The Commission will be proposed by the United States committee who I hope will give the Commission far more support than the UK Cartographic Committee did. Plans for projects are already being developed for the next four-year term.

*Kenneth Field*  
*Redlands, CA*  
*Chair, ICA Commission on Map Design*

*Ian Muehlenhaus*  
*Madison, WI*  
*Vice-chair, ICA Commission on Map Design*

## Commission on Map Production and Geoinformation Management

### Terms of Reference

1. Enhance the study on map production- and process management, geoinformation logistics and geobusiness;
2. Research on the impact of modern communication methods on map production, business models, change management and design thinking;
3. Research the impact of Service Oriented Architectures and future technologies on Map-Production, Publishing and Archiving.
4. Research the methods of Service-Oriented Mapping maturity evaluation and SOMAP management.
5. Encourage international collaboration on the study of map production and geoinformation management with particular emphasis on bridging research, government and commercial sectors;
6. Participate and contribute to activities of other relevant ICA interest groups (e.g. relevant ICA Commissions, National Mapping Organisations, NGO's, Enterprises, URISA).
7. The applications thereof in Developing Countries.
8. Publications in and support of the International Journal of Cartography

### 2015

Open meeting was held during the ICC 2015 in Rio de Janeiro, Brazil, 23 to 28 August 2015. Started with the planning of the book, "Changing Paradigm in Map Production". The intention of the book "Changing Paradigm in Map Production" was to discuss state-of-the-art developments/paradigm in map production, exchange experience reports and evaluate the impact of new methods in map production, map distribution and map archiving. Several aspects are related to the development in map production, which may affect processing chains, change management, map requirements, distribution or archiving methodologies.

A workshop called "Hands-On Cultural Heritage Geospatial Infrastructures - a fundament for collaboration and exchange" will be held during the 20th International Conference on Cultural Heritage and New Technologies from November 2nd to 4th 2015 in the city hall of Vienna.

### Papers

This subsection and the subsections in the subsequent years present various papers, presentations and chapters generated by the commission chairs during each year.

Schmitz P, Cooper A, Kruger T, Speed K, Barkhuizen M, Lochner T and Linnen C 2015: Space Time Visualisation for Investigative and Forensic Purposes. 27<sup>th</sup> International Cartographic Conference, 23 to 28 August 2015, Rio de Janeiro, Brazil.

Schmitz, P, Eksteen, S and de Bruin, S. 2015, Towards a new way of measuring service delivery in Gauteng: Calculating a Fortunate Index. Poster presented at the 27th International Cartographic Conference, 23 to 28 August 2015, Rio de Janeiro, Brazil.

Schmitz, P., Cooper, A., de Jong, T. and Rossmo, D., 2015: Mapping Criminal Activity Space. *Journal of Intelligence Analysis*, 22(2).

### 2016

Workshop on Service-Oriented Mapping: from SDI to thematic webmaps (in German language) was held as a preconference hands-on workshop during the 64th German day of cartography on June 13<sup>th</sup>, 2016 in Potsdam.



The commission proposed a track for the Geomatics Indaba 2016 that was held from the 2<sup>nd</sup> to 4<sup>th</sup> of August 2016 in Ekurhuleni, near Johannesburg, South Africa. Although the track was approved by the conference organisers, too few papers were received to justify a track on its own and the papers were incorporated into other streams of the conference. Created a poster for Sustainable Development Goal 12: Responsible Consumption and Production.



**Papers**

Paper by the commission chair in the South African Journal of Geomatics, Vol. 5. No. 2, September 2016. Title: The Use of Supply Chains and Supply Chain Management in the Production of Forensic Maps Using Data from a Fraud Case. (<http://dx.doi.org/10.4314/sajg.v5i2.5>)

**2017**

The hands-on workshop "Supporting sustainable development with geoinformation management and modern maps: things you hardly consider" was held as pre-conference event of the International Cartographic Conference 2017 in Washington D.C. on 1 July 2017 together with URISA.

The workshop looked at whenever one is concerned with geoinformation management and map production procedures, questions for appropriate technologies arise. Is an aimed IT structure good for production? Can the sources be used, combined and analysed? Does the resulting geovisualisation reach the communication aim? Therefore, the workshop focused on three parts: service-oriented mapping, supply chain for map production and maturity assessment evaluation. Although quite a few conference participants indicated that they would attend the workshop, only a small group of conference participants attended the workshop.

The content of the workshop held in Washington focused on:

- Service-Oriented Mapping is one possible paradigm to embed big data and distributed sources in modern map production, without owning the sources. This architecture requires specific tools and procedures in order to be stable and reliable. Beside the technological structures, the aspects of supply chain and GIS capability maturity provide powerful tools to make modern geoinformation management successful but are hardly considered.
- The map production path is followed from establishing the production plans and how it fits within the organisation (Plan); identifying the sources of data, the acquisition of the data (Source); the creation of the various maps or geospatial data (Make); and to the final product (Deliver). Faulty data and maps or the maintenance thereof are dealt with the return process (Return). The production path is based on supply chains and supply chain management using the Supply-Chain Operations Reference (SCOR) model as a guideline. The aim of this part of the workshop is to illustrate the use of supply chains and supply chain management to guide the production of maps or geospatial data.
- A program assessment evaluates a program's operations and helps managers redirect resources to improve performance. The URISA GMI GIS Capability Maturity Model (GISCMM) assessment tool and service enables organization to evaluate, visualize, and compare the capability maturity of their GIS programs and operations and understand which areas need improvement. In this workshop section we will discuss and demonstrate the use and results of the GISCMM tool and service.

A workshop called "Archaeological Geospatial Infrastructures" was held during the 22th International Conference on Cultural Heritage and New Technologies from November 8th to 10<sup>th</sup>, 2017 in the city hall of Vienna with the following motivation: we are producing a variety of information in our daily work. Especially in archaeology the complexity of describing findings, their relation to time, culture, manufacturing and location leads to specific models that help to structure this information. The CIDOC Conceptual Reference Model (CRM) is one example for standard cultural heritage ontology. But what if, we know how to structure our information, but cannot easily distribute it with our colleagues and other experts in the community?

We assume that location is a key indicator in cultural heritage and mapping is a central concept for documenting, structuring and communicating information. In order to make our information and knowledge structures accessible, metadata are needed to promote them. We do not only need to create descriptions of our information, but also need to publish these metadata in accessible online catalogues. These catalogues enable exploration of existing findings, publications, in situ characteristics and so on. If location is part of this information, we could easily create maps to transmit our knowledge.

This hands-on workshop on Archaeological Geospatial Infrastructures led through the basic paradigm of these modern mapping technologies. Simple examples in a well-prepared software framework (totally based on open source components) explained the basic methods of the Web, Service-Oriented Mapping and its services, metadata management, publishing of content and the

creation of Spatial Data Infrastructures. The aim of this workshop was to provide an easy access to Spatial Data Infrastructures for Cultural Heritage topics and to understand their impact for management issues as well as world-wide initiatives for infrastructure harmonisation (like INSPIRE, UN-GGIM or NSDI).

We were able to represent ICA at the ICSU-CODATA Commission on Standards (<http://www.codata.org/>) Inter Union Meeting at the Royal Society in London in order to discuss "Science and the digital revolution: data, standards and integration". This workshop focused on the digital revolution with its profound implications for natural and social sciences by deepening the potential for new understanding of complex systems at all scales and in all areas of human concern.

The commission had an information session at the 28th International Cartographic Conference in Washington D.C. in July 2017 in order to introduce to its activities and to discuss on open topics.

During 2017 was the continuation of the book project as mentioned in 2015 section of this report. The provisional title of book is: "Changing paradigm in map production and geoinformation management". The editors were Jürgen Döllner, Markus Jobst and Peter Schmitz. During 2017 the provisional content of the book had been established and an invite to possible contributors were e-mailed. To the latter part of 2017 the chapters were received by the editors which then reviewed the chapters and provided feedback to the authors to revise their submissions. The revised chapters were received by the editors.

### **Papers**

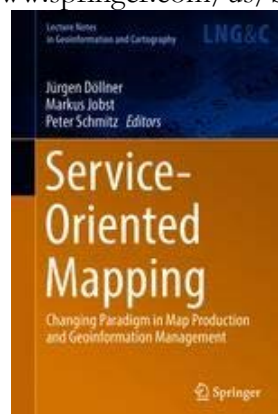
Schmitz, P. 2017, Displaying Voter Gains and Losses: Local Government Elections in South Africa for 2011 and 2016. Paper presented at the 28th International Cartographic Conference, 2 to 7 July 2017, Washington DC, USA.

Schmitz, P., Goncalves, D. and Jacobs, M. 2017 Mapping Community Vulnerability to Poaching: A Whole-of-Society Approach. Paper presented at the 28th International Cartographic Conference, 2 to 7 July 2017, Washington DC, USA

Schmitz, P., Holloway, J., Dudeni-Thlone, N., Ntlangu, B. and Koen, R. 2017 Could the outcome of the 2016 US elections have been predicted from past voting patterns? Paper presented at the 28th International Cartographic Conference, 2 to 7 July 2017, Washington DC, USA.

### **2018**

A Springer book in the series Lecture Notes in Geoinformation and Cartography has been published in 2018. The final title of the book was: "Service Oriented Mapping - Changing paradigm in map production and geoinformation management" Editors: Jürgen Döllner, Markus Jobst, Peter Schmitz Link: <https://www.springer.com/us/book/9783319724331>



The book addresses a range of aspects, including the implementation of the semantic web in geoinformatics, using big data for geospatial visualization, standardization initiatives, and the European spatial data infrastructure. The book offers a comprehensive introduction to decentralized map production. Its primary focus is on the new paradigm of “sharing and reuse,” which is based on decentralized, service-oriented access to spatial data sources. The contributing authors have a diverse background, spanning from government and the UN to academics and spatially driven companies.

Pre-conference joint commission workshop on Collaborative custodianship through collaborative cloud mapping – Challenges and opportunities. ICA Commission on SDI and Standards; ICA Commission on Map Production and Geoinformation Management as well as the Committee for Spatial Information, Subcommittee on Education & Training (South Africa) during AfricaGeo 2018 conference. The workshop was held at the University of Pretoria before the said conference on 14 and 15 September 2018.

### **Papers**

Schmitz, P., Pillay, L. and Moul, D. 2018 Fortunate Index and Food Security: City of Tshwane Case Study using GIS. Paper presented at the AfricaGEO 2018 Conference, 17 to 19 September 2018, Emperor’s Palace Convention Centre, Ekurhuleni, South Africa.

Schmitz, P. 2018 Geoprofiling of vulnerable communities and of criminals. Paper presented at the biannual Society of South African Geographers 2018 conference. 1 to 5 October 2018 at the Free State University in Bloemfontein and QwaQwa, South Africa.

Holloway, J.P., Ittmann, H.W., Dudeni-Tlhone, N. & Schmitz, P.M.U., 2018: From SA to the USA: Election forecasting. *Orion* 34 (2), pp. 83-106.

### **2019**

#### **A national geopackage hackathon**

At the invitation of the ICA Commission on Map Production and Geoinformation Management and the Austrian INSPIRE MIG delegates (INSPIRE Maintenance Implementing Group; <https://inspire.ec.europa.eu/inspire-maintenance-and-implementation/>), 52 Austrian geoinformation experts met on May 6<sup>th</sup>, 2019 in the Federal Office for Metrology and Surveying to conduct a hackathon on the technology geopackage. The intention of the Geopackage Hackathon was to put hands on a specific database technology with simple examples, in order to evaluate the applicability of geopackage and to build a common understanding of the geopackage encoding.

Geopackage is a file-based database technology (SQLite, <https://www.geopackage.org/>) that is widely used in mobile devices. With this technology, data is cached on the devices to provide the user with the data in situations without Internet connection. In the case of geo-information management, in addition to these crisis situations, the packaging of geodata, the embedding of visualization styles and metadata concerning the content are of high interest for map production. Thus, in addition to a geometry, thematic data can also be stored in several tables within a single file, thus incorporating the normalized data structures in accordance with e.g. the specifications of the spatial data infrastructure INSPIRE or even requirements of spatial archiving.

In the ten agenda items of the Geopackage Hackathon, the current OGC Geopackage Encoding Standard was introduced, the pragmatic advantages and disadvantages of a geopackage listed, the embedding of geopackage in QGIS, ArcGIS and FME checked, the integration of styles, (INSPIRE) metadata and rasters evaluated. Both, the use of a geopackage as data source for map servers, as well as geopackage as a source in Office applications or in automated processes for the protection of water sources were presented and set up in examples.



With the hackathon a common picture of the geopackage abilities has been built up. Both, possible perspectives and currently existing disadvantages were pointed out. Geopackage standardization is still at an early stage of applicability with version 1.2 (<http://www.geopackage.org/spec/>). With purposeful requirements and participating workgroups useful extensions in terms of map production processes could be further introduced into the standard.



*Image 1: Opening of the Geopackage Hackathon, photo by @SquatBird (Karin Wannemacher for ICA Com on Map Production)*



*Image 2: Lukas Kuenzel from MS-GIS (<http://www.msgis.com>) introducing into a mapping procedure with Geopackage, photo by @SquatBird (Karin Wannemacher for ICA Com on Map Production)*

## Papers

Peter, X.K., Jiba, Z., Schmitz, P., Ramaloko, P. & Stipinovich, J., 2019: Effects of TNT contaminated soil on vegetation at an explosive range by probing UPLC-qTOF MS profiling method. *Ecotoxicology and Environmental Safety* 167 (2019) pp 324–330.

## Conclusion

The commission on Map Production and Geoinformation Management had a successful 2015 to 2019 term, with the second half of the term being the most productive. Various activities and publications were generated by the commission and their chairs. From the activities,



presentations, workshops and papers delivered the commission has wide range applications and interests. The papers may not all be directly linked to the commission's work, but all have one aspect in common, namely maps. The commission works on core group of persons that are active and co-opt commission participants on a needs basis. The commission chairs are of the opinion that this model works the best with participants owing to their busy schedules and that they, the participants, are obliged to participate in commission activities that are not directly in their speciality fields. This model was successfully applied to the publication of the books and in workshops that were held under the auspices of the commission.

The commission chairs, Peter Schmitz and Markus Jobst would like to acknowledge the International Cartographic Association for their guidance, comments and above all the opportunity to host this commission. The commission chairs look forward to another productive term between 2019 and 2023.

*Prof Peter Schmitz*

*Commission Chair*

*Dr Markus Jobst*

*Commission Co-chair.*

*Pretoria, South Africa and Vienna, Austria 6 June 2019*

## Commission on Map Projections

*ica-proj.kartografija.hr*

### **Chair contact details:**

Prof. Emer. Miljenko Lapaine  
University of Zagreb  
Faculty of Geodesy  
Kaciceva 26  
10000 Zagreb  
Croatia  
Phone: +385 1 4639-273  
Fax: +385 1 4828-081  
E-mail: [mlapaine@geof.hr](mailto:mlapaine@geof.hr)

### **Vice-Chair contact details:**

Prof. Keith C. Clarke  
Professor of Geography, University of California, Santa Barbara  
Department of Geography, 1720 Ellison Hall University of California  
Santa Barbara CA 93106-4060  
Location: 11S KU38488 11890 (NAD83)  
phone: 805-456-2827  
fax: 805-893-2578  
e-mail: [kclarke@geog.ucsb.edu](mailto:kclarke@geog.ucsb.edu)  
web: <http://www.geog.ucsb.edu/~kclarke>

The CoMP had 16 regular members in 2015. In 2019, we have 25 regular members, who have discussed Commission's activities during meetings and by e-mail between meetings. Unfortunately, we lost our most distinguished member, Prof. Emer. Waldo Tobler, who passed away in 2018. All regular members are listed on the CoMP web-site. The list of CoMP members or interested people consists of about 100 e-mail addresses.

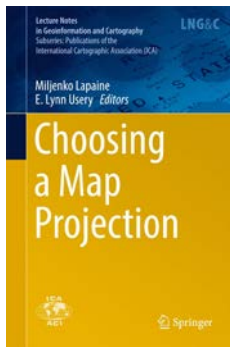
The CoMP web-site address is [ica-proj.kartografija.hr](http://ica-proj.kartografija.hr) and is maintained regularly.

### **CoMP open meetings in the period 2015–2019**

- Corfu, Greece, 10<sup>th</sup> Jubilee International Conference+Workshop on Digital Approaches to Cartographic Heritage, ICA CoMP meeting on 29 May 2015
- ICC2015, Rio de Janeiro, Brazil, ICA CoMP meeting on 25 August 2015
- Albena, Bulgaria, 13–17 June 2016, CoMP session as a part of the 6th International Conference on Cartography and GIS
- Albuquerque, New Mexico, USA, 14 September 2016, AutoCarto 2016, ICA CoMP meeting and workshop
- ICC2017, Washington D.C., USA, Preconference workshop on 2 July 2017, and ICA CoMP meeting on 5 July, 2017
- Selce, Croatia, 13th International Conference on Geoheritage, Geoinformation and Cartography, ICA CoMP meeting on 8 September 2017
- Sozopol, Bulgaria, CoMP session as a part of 7th International Conference on Cartography and GIS, 18–23 June 2018

- Zagreb, Croatia, SDI Days and 14th International Conference on Geoinformation and Cartography, 27–29 September 2018, ICA CoMP meeting on 28 September 2018
- ICC2019, Tokyo, Japan. The International Cartographic Conference with two sessions on map projections with four lectures each. The Pre-Conference Workshop on Map Projections, Sunday, 14 July 2019, 16:00–19:00 local time, in Teikoku-Shoin Co., Ltd. Premises. ICA CoMP meeting, Friday, 19 July 2019, 12:10–13:30

## Publications



The book *Choosing a Map Projection* was published by Springer in 2017 (<http://www.springer.com/gp/book/9783319518343>). The editors were Miljenko Lapaine and E. Lynn Usery, and the book belongs to Lecture Notes in Geoinformation and Cartography, Subseries: Publications of the ICA. Since its online publication on Apr 11, 2017, there have been a total of 7934 chapter downloads for the eBook on SpringerLink. The book was among the top 25% most downloaded eBooks in its respective eBook Collection in 2018.

On request by ICA WG for the International Map Year, a chapter on map projections and reference systems for the book *World of Maps* was prepared by M. Lapaine and E. Lynn Usery and published on the IMY web-site.

A world map was produced for the FIG Working Week 2015 Map Exhibition, for the ICC 2015 Rio de Janeiro Map Exhibition and as a gift to ICA past president Prof. Georg Gartner.

Chapters *Modelling the World* by M. Lapaine and *Understanding Map Projections* by E. Lynn Usery were prepared for *The Routledge Handbook of Mapping and Cartography* (<https://www.routledge.com/The-Routledge-Handbook-of-Mapping-and-Cartography/Kent-Vujakovic/p/book/9781138831025>). The Handbook was published in December, 2017

A poster on the sustainability goal no. 15: *Life on land* was prepared.

The *Cartography and Geoinformation* journal has been published regularly by the Croatian Cartographic Society. It includes reports from the Commission meetings, as well as papers dealing with map projections topics.

## Collaboration

The CoMP meeting held in Corfu, Greece, in May 2015, was a part of the 10th jubilee conference and workshop organized by the ICA Commission on Digital Technologies in Cartographic Heritage.

The CoMP meeting held in Albena, Bulgaria, in June 2016, was a part of the 6th International Conference on Cartography and GIS organized by the Bulgarian Cartographic Association.

The CoMP meeting held in Albuquerque, New Mexico, USA, in September 2016, was a part of AutoCarto 2016, organized by CaGIS.

The CoMP assisted the Local Organising Committee of ICC2015, ICC2017 and ICC2019 to manage the Programme, primarily in the review of submissions.

Voltage TV Productions Ltd from London requested a world map in the Winkel projection. They were preparing a TV programme "Inside the Factory" which was broadcasted on BBC UK and worldwide, and their Graphic Director and Producer wanted such a map. Miljenko Lapaine and Ana Kuveždić Divjak produced the needed map and it was accepted for the TV programme. The map was featured in a segment on tea, more specifically to illustrate the long journey tea makes from Kenya to the United Kingdom.

The Croatian Cartographic Society and the Faculty of Geodesy, University of Zagreb organized the 13th International Conference on Geoheritage, Geoinformation and Cartography, September 7-9, 2017 in Selce, Croatia. The conference was endorsed by ICA, and the keynote speakers were Prof. Menno-Jan Kraak, ICA President and Prof. Liqiu Meng from TU Munich. The conference included a CoMP meeting.

The collaboration with the Bulgarian Cartographic Association has continued. CoMP members were invited to Sozopol to attend the 7th International Conference on Cartography and Geoinformation. A CoMP Meeting was organized during the conference.



*Photo taken at the Commission meeting in Sozopol, Bulgaria, 2018*



*Krisztián Kerkovits received an ICA scholarship, which was handed after his speech at the Commission on Map Projections meeting in Sozopol, 2018*



*Photo taken at the Commission meeting in Zagreb, Croatia, 2018*

Collaboration with the Croatian Cartographic Society has been continued. CoMP members were invited to Zagreb to attend SDI Days and the 14th International Conference on Geoinformation and Cartography, as well as a CoMP meeting. The conference and the CoMP meeting were attended by Prof. Dr. Paulo de Menezes (invited lecturer), Vice-chair of the ICA Commission on Toponymy, and Prof. Dr. Rex Cammack, Chair of the ICA Commission on Maps and the Internet. Prof. Dr. László Zentai participated in the Opening Ceremony of the conference with a welcome speech.

### **Effectiveness**

The CoMP agenda included an item about a collection of papers on case studies in map projections to be prepared for a special issue of the *International Journal of Cartography*.

Unfortunately, it was not possible to collect enough material, and the authors of prepared papers were advised to contact the Editors of the Journal directly.

### CoMP web-site and wiki

Jan Smits (Koninklijke Bibliotheek) prepared a new feature on the CoMP web-site titled *For Librarians*, which consists of mathematical data for bibliographic descriptions of cartographic materials and spatial data.

The *Projections Terminology* section was updated with Spanish terms thanks to Rubén C. Rodríguez from Argentina.

Our *flagship project*: Web-based material as a guide to software capable of dealing with map projections and coordinate system conversions was prepared by the CoMP Vice-Chair K. C. Clarke and published on the Commission web-site.

### A Comparison of Terms of References and the results

ToR 2015-2019	Results
Promote and foster research on map projections, coordinate systems, transformations and conversions, and disseminate the research outcomes. <i>Expected result</i> : an enhanced set of online bibliographic tools and web links on map projections, coordinate systems, transformations and conversions using a wiki established by CoMP. <i>A flagship project</i> : Create web-based material as a guide to software capable of dealing with map projections and coordinate system conversions, soliciting input from all countries and CoMP members.	Done. A chapter on map projections and reference systems for the book <i>World of Maps</i> on request by ICA WG for the International Map Year, was prepared by M. Lapaine and E. Lynn Usery, and published on the IMY web-site. Two chapters <i>Modelling the World</i> by M. Lapaine and <i>Understanding Map Projections</i> by E. Lynn Usery were prepared and published in <i>The Routledge Handbook of Mapping and Cartography</i> . A poster on the sustainability goal no. 15: <i>Life on land</i> was prepared. Also see web-based material prepared by K. C. Clarke: <a href="http://ica-proj.kartografija.hr/map-projections.en.html">http://ica-proj.kartografija.hr/map-projections.en.html</a>
Organise sessions and meetings at least once a year to stimulate a debate on all aspects of map projections with the aims of collecting and publishing research results and promoting the International Map Year. <i>Expected result</i> : a collection of papers on case studies in map projections prepared for a special issue of the <i>International Journal of Cartography</i> as well as active participation in all International Cartographic Conferences organized by ICA.	Partially done. Open ICA CoMP meetings/workshops organized: Corfu, Greece 2015 Rio de Janeiro, Brazil ICC2015 Albena, Bulgaria 2016 Albuquerque, New Mexico, USA, 2016 Washington D.C., USA ICC2017 Selce, Croatia 2017 Sozopol, Bulgaria 2018 Zagreb, Croatia 2018 Tokyo, Japan ICC2019 There was not enough interest for a special issue of the IJC on map projections. Only five papers were offered, which was not enough.



ToR 2015-2019	Results
<p>Promote proper use and understanding of map projections at all levels of education. <i>Expected result:</i> a publication (e-book) with a recommended approach to map projections at different levels of education.</p>	<p>Partially done. The book <i>Choosing a Map Projection</i> was published by Springer in 2017 (<a href="http://www.springer.com/gp/book/9783319518343">http://www.springer.com/gp/book/9783319518343</a>). The editors were Miljenko Lapaine and E. Lynn Usery, and the book belongs to Lecture Notes in Geoinformation and Cartography, Subseries: Publications of the ICA. The book does not explicitly cover different levels of education. This topic should be considered and investigated in the future.</p>
<p>Study terminology on map projections and prepare an online multilingual dictionary for this area of cartography. There are many open questions in this field, such as the definition of map projection aspect, whether to use the auxiliary surface method, the notion of errors and their connection with map projection distortions, etc. <i>Expected result:</i> a dictionary in the form of an online glossary on map projections, coordinate systems, transformations and conversions. It will be produced after discussions between CoMP members and others linked to the CoMP wiki.</p>	<p>Done, but this is a never ending process. See <a href="http://www.kartografija.hr/proj-wiki/index.php/Projection_Terminology">http://www.kartografija.hr/proj-wiki/index.php/Projection_Terminology</a></p>
<p>Provide consultative support in relation to map projections. <i>Expected result:</i> appropriate support as required.</p>	<p>There were few requests. For example, the Voltage TV Productions Ltd from London requested a world map in the Winkel projection. They were preparing a TV programme "Inside the Factory", which was broadcasted on BBC UK and worldwide, and their Graphic Director and Producer wanted such a map. The map was featured in a segment on tea, more specifically to illustrate the long journey tea sourced from Kenya makes to the United Kingdom. M. Lapaine and A. Kuveždić Divjak produced the needed map and it was included in the TV programme.</p>

*Miljenko Lapaine*  
*ICA Commission on Map Projections, Chair*

## Commission on Maps and Graphics for Blind and Partially Sighted People

The current report is intended for making known the most relevant activities and actions achieved over the last four years of work, which has been made possible thanks to the collaboration of its Vice-President, Dr. Waldirene Ribeiro, the substantial support of its Technical Secretary, Edwin Hunt, and the contributions of the other members of the directing nucleus, MA. Teresa Barrientos and the Cartographer Jennifer Pinto.



### **I. Work Plan presented for the period 2015 – 2019; the Commission committed itself to:**

- 1) The modification of the name of the Commission to: “Accessible cartography for disabled persons” is justified by being based on the fact that the Commission relates to research and production of cartography that responds to the needs of persons with sensory disabilities, learning difficulties, reduced mobility, elderly and aged adults, among others. This cartography may be put into effect by means of using: tactile maps, audio maps, GPS or mobile maps, multisensory maps.

This initiative was requested on several occasions, such as at the ICA General Assemblies held in 2015 and in the year 2017 (in Washington, USA. On the 23rd of August, 2018, the Director of the Military Geographic Institute of Chile, Colonel Eduardo Cayul Aristondo, sent an official letter numbered 2662-77 to the President of the ICA, Dr. Menno-Jan Kraak, which indicated the proposal for the change of name. The General Secretary of the ICA responded to this, stating that this decision will be ratified at the General Assembly of the ICA in 2019, in Tokyo.

- 2) Maintaining the network of contacts that has been achieved as established in the years 2013 and 2015. New contacts have been added in the ICC events of 2015, 2017 and 2019. This effort has continued, adding some new contacts after the previous period (2012 – 2015), although not in the quantities hoped for.
- 3) Keep the digital newsletter of the Commission for at least one issue each year. During the period being reported, the commission has managed to distribute the newsletter of the Commission regularly, including technical articles, and to draft and distribute it once a year by e-mail to the list of contacts. In response to the call for articles, papers have been

included especially during the years 2017 and 2018 and there have been some reports about activities related to cartography for the blind, provided by relevant organizations.

- 4) Work in conjunction with other ICA commissions. At ICC 2017, this Commission cooperated with the Maps for Children Commission on a pre-conference event and also contributed through the participation of its Chair at the meetings of the latter commission at ICC2017. At ICC2019 it will contribute as moderator in the sessions of papers to be presented. In this way it has shared experiences and has been able to complement, adapt and strengthen geo-cartographic knowledge in its various forms of multisensorial expression.
- 5) Active participation of the Commission in the International Map Year of 2015/16. The ICA published the book: "The World of Maps", in which authors of the whole world participated, and on this occasion our commission has contributed with Chapter 18, titled: "Tactile Cartography: Essential for the visually disabled", from the authors MSc. Alejandra Coll Escanilla and the Cartographer Jennifer Pinto Soto, of Santiago, Chile.
- 6) Preparation of a book about tactile cartography. Between 2007 and 2018 se preparó el the book: "Teaching and Learning about Geographic Space through Touch: Methodological Guide" from the authors MA. Teresa Barrientos, the Sociologist Víctor Huentelemu and MSc. Alejandra Coll. It was a publication project backed by the ICA (since the year 2005) and the Pan-American Institute for Geography and History - PAIGH. It was edited and published by the Metropolitan Technological University of Chile - UTEM, with the aim of providing methodological guidance to educational specialists about the way to use tactile cartography for teaching geographic concepts to blind students and pupils. The book was published in the year 2017 and distributed in 2018.
- 7) Dr. and geographer Waldirene Ribeiro do Carmo, of Brazil, has held the responsibility of being Vice-Chair and of assisting the Commission Chair in each of the activities and goals that have been indicated in the Work Plan and that are detailed, by each year, as follows.

## **II. Publications about the activities performed by the Commission in the Newsletters and in ICA NEWS**

During the period that the current Commission has acted, information has been prepared that became part of the various publications of the Newsletter and of the ICA News, where the following news items were of relevance:

- The project: "Proposal for the standardization of tactile symbology for Latin America: application in cartography for tourists", led by the Tactile Cartography Center (CECAT) of the Metropolitan Technological University (UTEM) of Chile and financed by the Pan-American Institute for Geography and History (PAIGH-OAS). Researchers from Argentina, Brazil, Chile and Peru participated.



- The publication of its Newsletter N° 2 featured in particular: the announcement by the commission of the tasks that the ICA had planned for the 27th International Cartographic Conference (ICC 2015, Rio de Janeiro), the review of abstracts, the pre-conference event set up together with the Commission on Cartography for Children in which the Commissions on Planetary Cartography and Cartography for Early Warning and Crisis Management also participated. It also covered the visit made in Chile by the Authorities and the Directing Council of the Pan-American Institute for Geography and History (PAIGH-OAS), together with a delegation from that institution, to the premises of the Tactile Cartography Center (CECAT) of the Metropolitan Technological University (UTEM).



- The Newsletter also contains information about the latest publications such as the: “Atlas of the World for the Blind and Visually Disabled”, por la “Główny Urząd Geodezji i Kartografii” of Poland, while the publisher named “Les Doigts qui rêvent” (“Fingers that dream”) of Dijon, France, has published the version in french of the book “Images that we can touch” by the author Dr. Pilar Correa of the CECAT – UTEM of Chile.
- The new company “Eye2021” of Spain has made known its supply of products and services intended for blind people; these include a personal navigation system for blind pedestrian and systems for recognizing texts and symbols.
- During the ICC 2015, the Vice-chair, Waldirene Ribeiro supported the ICA joint scientific symposium “CARTOGRAPHY BEYOND THE ORDINARY WORLD”. Through the co-authors Carla C. R. Gimenes de Sena and Bárbara Gomes Flaire Jordão, the presentation about work titled: “Tactile Cartography and Geography at elementary schools in the state of São Paulo” was given.
- At the General Assembly Plenary Session during the 27th International Cartographic Conference, Edwin Hunt, as Commission Technical Secretary, was responsible for giving the Commission’s report covering the main results over the years 2012 – 2015 and the activities planned for the following period of four years. The Commission also chaired the technical papers session titled “Mapping and Spatial Awareness for Disabled People”.

- It was of great relevance for the Commission to run a work meeting with participants from various parts of the world interested in the issue of disability within the area of cartography, also to participate as invited observers at the “Cartography and Children” Commission meeting.
- The Commission visited the “Benjamin Constant” Institute (IBC), which is the leading school for blind children in Brazil and which performs substantial work in the area of Tactile Cartography. Through this contact, subsequently the Commission representative at the ICC2015 in Brazil handed over to the executives of the IBC the tactile maps from the Tactile Cartography Centre of the UTEM of Chile, together with the Atlas created by the State Cartographic Agency of Poland, some tactile maps from Korea and one showing an island of France that had been exhibited at the ICC 2015 Cartographic Exhibition, most of them in the “Educational Products” sector.
- In the Newsletter N° 4 of the Commission, its activities over the years 2016 and 2017 were summarised; here the participation in the 27th International Cartographic Conference, held in Washington, USA was stated. Seventeen abstracts were reviewed and then finally presented in oral and poster modes, representing the countries of Norway, Canada, Germany, Chile, China, Japan, Brazil, United States, Russia, Korea and Botswana. Moreover, at the Cartographic Exhibition where atlases were exhibited, Chile and Poland presented products.
- The same newsletter announced the publication of the book titled “Teaching and learning about geographic space through touch: methodological guidance”, written in English and Spanish with the backing of both the ICA and the PAIGH. Financed by the Metropolitan Technological University (UTEM), 500 copies of the book have now been distributed to various countries of the world.



- The Newsletter has published news about the “Paula Souza” Center of Sao Paulo, Brazil and its Course in Tactile Cartography for Teachers, run partly with participants present, in association with the “Universidad Estadual Paulista” - UNESP, at the Rio Claro campus in São Paulo, and also the “São João del-Rei” Federal University in Minas Gerais. The activities centered on building tactile models for interactive uses in the “Sensory Gardens”, where the basic spatial notions and forms of cartographic portrayal were studied. The course was intended for developing and improving teaching methodologies and materials for the teaching of geography and related areas. The “Paula Souza” State Center for Technological Education in association with the Education Ministry, through the “Professional Brazil Program”, is committed to training its teachers in seeking as a right school education and quality teaching-learning for all.





- Also standing out in the 4th Commission Newsletter was news of a tactile model of south America made by 8th grade pupils of the “Juiz de Fora” Military School in Minas Gerais, Brazil. The work done was aimed at the needs of visually disabled people, making easier their inclusion and access. With interaction through different senses, the project also helped to teach pupils with attention deficit syndrome, with or without hyperactivity, and with the autism syndrom, to understand the tactile model through play.



- Among the various items drawn from the press, this Newsletter pointed out the work of Wanda Díaz, an extraordinary woman, who, despite losing her vision while studying natural sciences at the University of Puerto Rico, managed to obtain work assignments at NASA and at the Arecibo radio-telescope in Puerto Rico. Using data converted to sound, she can analyze phenomena detected in space and the universe such as solar winds and pulses from stars. Overcoming the limitations imposed by blindness, she has become a respected and active scientist in the field of astronomy. The full article by Carla Ruiz about Wanda Díaz was published in Santiago, Chile, in the October 14th 2017 issue of the “El Mercurio” newspaper.
- In Newsletter N°5, the last one from this Commission, the significance of the current name, “Maps and Graphics for Blind and Partially Sighted People” being changed to “Accessible Cartography for Disabled Persons” was stated, thus reflecting the growth and new direction of this Commission.

For the 19th International Cartographic Conference, to be held from the 15th to the 20th of July 2019, abstracts for the orally-presented papers have been reviewed. The ICC of 2019 promises to offer a good variety of interesting submissions related to research in the area of practical applications for disabled persons that involve spatially referenced materials.

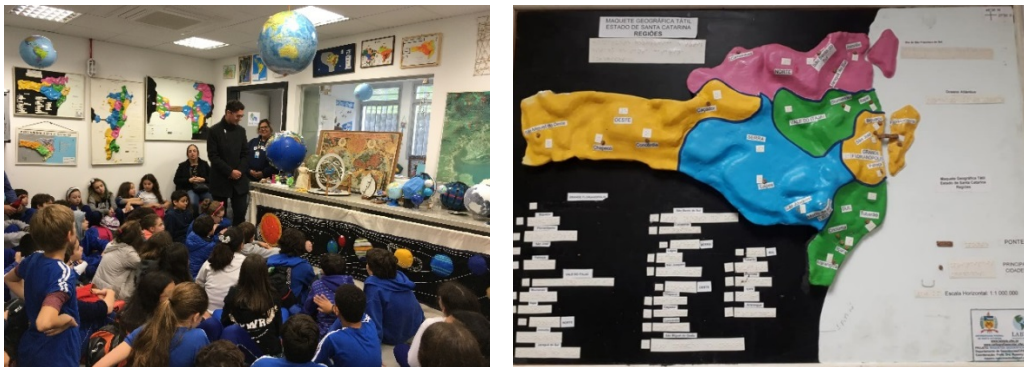
Another item in Newsletter N° 5, titled “Tactile and Educational Cartography Laboratory - A Methodology for Moving Beyond Educational Inclusion” covered the “LabTATE” of the



Philosophy and Letters Centre (CFH) at the Federal University of Santa Catarina (UFSC) in Brazil, designed in 2001 and built in 2007 with the aim of fulfilling the needs of research, education and public outreach concerning the issues of educational and tactile cartography. At this laboratory various strategies for consolidating educational and tactile cartography for education from basic to high-school levels have been developed.

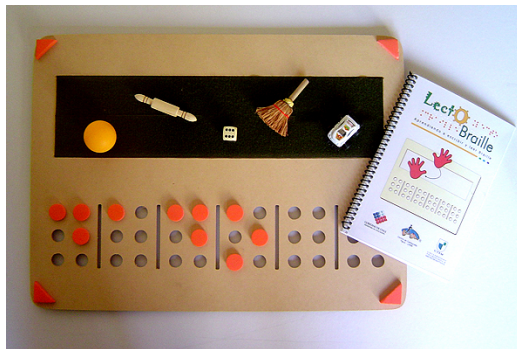


Visits to the Laboratory are intended to associate cartography for schools with tactile maps in order to spread awareness of the importance of access for everyone to cartographic information, both for mobility and for the geographic education.



The Tactile Cartography Center (CECAT) of the Metropolitan Technological University of the State of Chile has, since 1994, prioritized the practical use of materials that are within the reach of societies in developing countries of South America, more than the development of sophisticated technologies. Adapting the design of the materials to the needs and cognitive capabilities of disabled persons has been emphasized. In this way, the most effective symbolologies have been researched; so has the transmission of thematic information relevant mainly for users in visually disabled situations, although all the multi-sensory material produced is for the use of all those persons who can use their sense of touch.

Among its missions is that of making tactile plans and models with various kinds of materials that serve as aids to help disabled people find their way around public spaces.



Another is to adapt texts from various sources to Braille, macrotype and audio-tactile formats, concentrating especially on making the school texts that the Education Ministry of Chile distributes freely to visually disabled in the whole country.



Also, by means of technical workshops on pedagogical methods, to train specialists in education linked to disabled persons.



Another important piece of news referenced in Newsletter N° 5 was about the Perkins Corporation that manages the Perkins School for the Blind and a set of services and active research initiatives in the USA that collaborate with various countries of the world.

It is interesting to point out an article published by Jennifer Arnott in May of 2018 titled: "Tactile Maps and Teaching Map Skills", in which presents a list of the resources, publications and initiatives related to tactile maps intended mainly for the needs of learning and of mobility of blind persons.

### **III. Final Considerations for the Future of the Commission**

Over this period, this Commission has tried to diversify its contacts around the world, in order to fulfil its mission internationally. The task that the future active nucleus of the Commission faces consists of developing a continuous international collaboration in this area rather than some sporadic contacts.

Another challenge consists of diversifying the paths to follow by the work on geo-spatial media for disabled persons, from the research on technologically advanced solutions to simple, practical methods that are within the reach of communities with limited resources.

The most important challenge consists of diversifying the focus of the Commission so that, in parallel with keeping a primary interest on blind and partially sighted persons, there should also be a consideration for solutions referring to geographic space adapted to other forms of disability, such as deafness. The change of name would be only the beginning of this process.

Finally, the Commission unconditionally supports Dr. Waldirene Ribeiro from the University of Sao Paulo, Brazil, in her management of the directions this Commission will take over a new four-year period, moving from being Vice-Chair, currently, to taking over the role of Chair. At the same time, it is relevant to point out that Dr. Ribeiro, with her commitment and experience has participated actively in the ICA over the last ten years, keeping to her line of research in Tactile Cartography.

## **Commission on Maps and the Internet**

No report available.

## Commission on Mountain Cartography

### 0. Introduction, history

Based on a proposal made to the Executive Committee of the International Cartographic Association (ICA) during the International Cartographic Conference (ICC) in Barcelona in 1995 a preliminary Working Group on Mountain Cartography was formed in 1997. The goal was to focus on special topics in the field of mountain cartography in order to attract a larger group of participants from the international community. In 1998, the ICA Working Group organized the first mountain cartography workshop at Silvretta in the Austrian Alps. The workshop attracted 33 participants from seven countries, which demonstrated the breadth and necessity of this research area. Based on the successful Silvretta workshop, the General Assembly of the ICA at the ICC 1999 in Ottawa approved the ICA Commission on Mountain Cartography.

### 1. Chair / Co-chair

Assistant Prof. Dr. **Dušan Petrovič** (Chair), University of Ljubljana, Slovenia

**Tom Patterson** (Co-chair), USA

### 2. Members

There are more than 220 persons from 30 countries on the commission's information list.

### 3. Terms of Reference 2015–2019

1. Define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields.
2. Provide an updated, attractive web-portal with information about Commission activities, links to other events and theme-specific knowledge, related web-sites and bibliographic information.
3. Provide an updated web-portal with links to related web-sites and bibliographic information.
4. Discuss different issues about mountain cartography and map related representations in large-scale topographic mapping, as similarity and differences in symbolization and map design, technological issues, maps use, connections to Location-based Services (LBS).
5. Continue the well-established workshop series.
6. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities.
- 7.

### 4. Business Meetings

- August 28, 2015, Rio de Janeiro, Brazil
- April 28, 2016, Carl v. Stahl Haus, Berchtesgaden, Germany / Austria
- July 4, 2017, Washington DC, USA
- May 23, 2018, Hotel Amfora, Hvar, Croatia
- Minutes are published at:  
<http://www.mountaincartography.org/activities/meetings/index.php>



## 5. Workshops

### 5.1 10<sup>th</sup> Workshop Carl v. Stahl Haus, Berchtesgaden, Germany / Austria, 26 to 30 April 2016

In 2016, we celebrated the 10th “Jubilee” Workshop from April 26 to 30, at Carl-von-Stahl-Haus, a rustic mountain hotel on the Austria-German border. The venue was 1733 m above sea level and adjacent to Berchtesgaden National Park. The workshop organisers were Manfred Buchroithner and Benjamin Schröter from the Institute for Cartography, Technical University Dresden, Germany. Access to Carl-von-Stahl-Haus was only possible by hiking with a backpack for 30 to 40 minutes from the summit station of the Jennerbahn Cable Car. Since the weather at the time was wintery, including two days of whiteout conditions, getting to the site was an exciting challenge. The overall theme of the workshop was “Unbounded Mapping of Mountains.” The workshop brought together 46 participants from 18 countries, including all six permanently populated continents. All papers and contributions of the meeting were published in the workshop proceedings and are furthermore available on the commission homepage.

### 5.2 11<sup>th</sup> Workshop Hvar, Croatia, 21 to 25 May 2018

In 2018 the workshop venue did not follow the tradition of visiting high mountains. Instead, we met on a rugged island off the Dalmatian Coast. What 628 m Sveti Nikola, the highest peak on Hvar, lacks in altitude is compensated for with its cliffs, maritime setting, history, and human interaction with the natural environment. Dražen Tutić, Matjaž Štanfel and Ana Kuveždić Divjak from Faculty of Geodesy, University of Zagreb, together with Milo Tadic from Event&Travel Service, Stuttgart, Germany were main organizers of the workshop. The overall theme of workshop was “Mapping for Outdoor Activities in Mountains” with the idea to address local issues in the field of mountain cartography. Two days of the workshop featured 35 presentations divided into nine sessions with following topics: Mapping Mountains, Automation, Recreation, Caves, Volcanoes, Islands, and Oceans, Relief Presentation, Glaciers, Mountain Safety, Education, and Visualization. The workshop was attended by 44 participants from the USA, Canada, New Zealand, Russia, Austria, Switzerland, Romania, Norway, U.K., Germany, Philippines, Slovenia, and Croatia. Most papers and contributions of the meeting were published in the workshop proceedings and are furthermore available on the commission homepage.

## 6. Commission publications (proceedings, book chapters, special journal issues, web-sites)

- CMC (2019) ICA Commission on Mountain Cartography Homepage, <http://www.mountaincartography.org/> (accessed June 2019)
- Sustainable goal 13 Climate Action poster (2017)
- Buchroithner, M., Schröter, B., Heidig, U. (eds.) (2017) Proceedings of the 10th Mountain Cartography Workshop, 26 - 30 April 2016, Berchtesgaden, Germany / Austria
- Tutić D., Patterson T., Petrovič D. (eds.) (2019) Proceedings of the 11th Mountain Cartography Workshop, 21 - 25 May 2018, Hvar, Croatia

## 7. Website

The commission web-site <http://www.mountaincartography.org> has been entirely redesigned and updated to include all commission publications by Klemen Kozmus Trajkovski, cartographer and lecturer at the University of Ljubljana, Slovenia.





## Commission on Mountain Cartography

ICA – International Cartographic Association

**HOME**

News

Terms of Reference

Miscellaneous

**ACTIVITIES**

Meetings

Workshops

**PUBLICATIONS**

Reports

Papers

Posters

**LINKS**

Organisations

Mountain Links

**ABOUT US**

Contact

Members

Sitemap

Disclaimer

### News

May 7, 2019: The announcement of the 2020 Workshop: **April 14–18, 2020 in Snow Mountain Ranch, Colorado, USA**

---

**Review: 11th Mountain Cartography Workshop in Hvar, Croatia**

- ▶ Proceedings, pdf
- ▶ Official website of the Workshop
- ▶ Report, pdf
- ▶ Minutes of the Hvar meeting, pdf
- ▶ Photo gallery



Participants at the 11th ICA Mountain Cartography Workshop in Hvar, Croatia.

---

**Review: 10th Mountain Cartography Workshop near Berchtesgaden, Germany**

## 8. Financial planning

The commission has used the financial contribution provided by ICA within the reporting period, mainly for reservation fees at the workshop locations, printing costs and website design, as well as in supporting young scientists for workshop participation. For the next period, we propose spending the contribution on the same items.

## 9. Comments, lessons learned

During the last several years, the Commission and its activities has attracted a rather mixed group of cartographers, GIS specialists, geographers, remote sensing specialists and other professionals. Various interest groups can be observed: Specialist in the fields of topographic mapping and relief representation, thematic specialists with GIS applications in mountainous areas as well as 3D visualization specialists and artists. This interesting combination makes the workshops unique and always creates a real mountain cartography spirit.

## 10. Review of terms of reference 2015–2019

1. Define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields. **to continue**

2. Provide an updated, attractive web-portal with information about Commission activities, links to other events, theme-specific knowledge, related web-sites and bibliographic information. **achieved, to be continued**
3. Discuss different issues about mountain cartography and map related representations in large scale topographic mapping, as similarity and differences in symbolization and map design, technological issues, maps use, connections to Location-based Services (LBS). **to be continued**
4. Continue the well-established workshop series **to continue**
5. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities. **to continue**

#### **11. Proposed terms of reference 2019–2023**

Based on the experiences during the reporting period and the review comments, the commission proposes to focus on the following terms of reference for the period 2019–2023:

1. Define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields.
2. Provide an updated, attractive web-portal with information about Commission activities, links to other events, theme-specific knowledge, related web-sites and bibliographic information
3. Discuss different issues about mountain cartography and map related representations in large scale topographic mapping, as similarity and differences in symbolization and map design, technological issues, maps use, connections to Location-based Services (LBS).
4. Continue the well-established workshop series.
5. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities.
- 6.

#### **12. Future activities**

The commission is planning to continue its highly successful series of workshops with the next workshop in Colorado, USA in April 2020 (see <http://www.shadedrelief.com/workshop/> or <http://www.mountaincartography.org>). Further workshops are also envisioned. The commission is intending to cooperate with other ICA commissions, organizing joint workshops, publications and other activities.

Proposed chair/co-chair for the period 2019-2023 are Dušan Petrovič (Slovenia) and Tom Patterson (USA).

*Ljubljana, Washington DC, June 2019*

*Dušan Petrovič, Chair of the ICA Commission on Mountain Cartography*

*Tom Patterson, Co-Chair of the ICA Commission on Mountain Cartography*

## **Commission on Open Source Geospatial Technologies**

No report available.

## Commission on Planetary Cartography

**Commission Chair:** Henrik Hargitai

**Co-chair:** Irina Karachevtseva

The International Cartographic Association (ICA) Commission on Planetary Cartography was officially established as a continuation of the ICA Planetary Cartography Working Group (1995-1999) at the ICA Congress in Ottawa in August 1999. The working group was established during the 1995 ICA congress in Barcelona, initiated by Kira Shingareva (Russia), Manfred Buchroithner (Germany), and Jim Zimbelman (USA).

### Our goals were:

- connect planetary scientists working at different national agencies, universities and research institutes;
- encourage cartographers, researchers, graphic artists, and students to join the planetary cartographic community even in those countries that have no space mission.
- provide access to feature databases and base maps to map publishers and encourage them to publish planetary themed maps in their atlases and portfolio
- help the development of international standards in planetary cartography
- document and promote planetary cartographic products and activities
- focus on interpreted map products, such as geomorphic maps, physical geographic maps, geologic maps, thematic surface feature maps

### Goals set for 2015-19 and realized projects:

#### 1 - Strengthen Education and Public Outreach activities through the series of Multilingual Maps of Terrestrial Planets and their Moons and development of derived products

We introduced a new outreach map series for children. We added new titles, including Pluto and Charon and will and Ultima Thule this year. <https://childrensmaps.wordpress.com/>

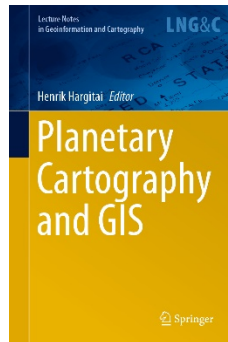


#### 2 - Development of online resources in professional planetary cartography (databases, symbology, landform classes), including participation in Specialized Planetary Cartography GIS projects and Planetary Nomenclature / Gazetteer supplements

We published the Encyclopedia of Planetary Landforms in 2015 and started updating this work with maps in the 2019+ edition

### 3 - Book or book chapter in planetary cartography related topics for use by researchers and university students

We published the book Planetary Cartography and GIS (editorial works 2016-2019) for students and professionals. The book is our major project during this term. It has 21 thematic chapter in 324 pages authored by 40 experts in different fields of planetary cartography.

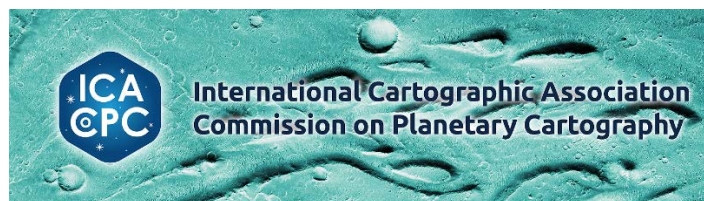


### 4 - Continuous updating of the Commission website, Facebook page and International Planetary Cartography Database.

We maintained the website, its Facebook page and published news about new planetary cartography products. We also added new historic maps in the website. We developed the almost Complete Database of Planetary Maps 1600-2018 at <http://planetarymapping.org>. This work (in progress) was presented at EPSC 2018, and Europlanet issued a press release that gave better visibility to the project across the planetary community.

ID	Cats	Type, cont	Country	T	Body	Lc	St	Date	Author, Pl, Edito	Na	Pro	ID	Title	Orig	Scale	Series tit	Numbr
2337	2337	Outreach	USA		Moon			1824	Green, J. draw/eng	Ameri			Telescopic apperance of the Moon				
2338	2338	Generic	Germany		Moon			1837	Littrow, J	Austri Astron			Mondk...				1
2339	2339	Outreach	Germany		Moon			1829	Frankenheim, M.L	Germa			Karte des Vollmondes nach Mayer Schr				
2340	2340	Outreach			Moon			1849	unknown								
2341	2341	Outreach	Germany		Moon			1847	Rodefeld, C.F, Engrs	Germa			Mond—Karte Nach dem besten Quelle			Meyers Har	
2342	2342	Outreach	England		Moon			1842	Blunt, C. F.	Englsh			The Nomenclature of the Lunar spots				
2343	2343	Sketch map	England		Moon			1864	Webb, T.W	Englsh Astron			Index Map of the Moon				1
2344	2344	Generic	Germany		Moon		Draw	1878	Schmidt J.F.J	Germa			Charte der Gebirge des Mondes				
2345	2345	Sketch Map	USA		Moon			1890	Young, Charles A	Ameri			Index map of the Moon				
2346	2346	Atlas	Germany		Moon			1897	Weinek				Photographischer Mond-Atlas				
2347	2347	Atlas	Germany		Moon			1912	Krieger, Johann N.	Germa Seleno			Mond Atlas Neue Folge with Übersichk				1
2348	2348	Generic	Germany		Moon			1906	Franz, J.	Germa Astron			Der Mond				
2349	2349	Observer	USA		Moon			1908	Serviss, G.P.	Ameri			The Moon as seen with the naked eye				
2350	2350	Atlas	USA		Moon			1903	Pickering, William H	Ameri			A photographic atlas of the moon				
2351	2351	Outreach	USA		Moon			1901	Serviss, Garrett Putn	Ameri			Lunar chart, No 1-4, Nortwest quarter				4
2352	2352	Coverage Map	USA		Moon			1987	Wilhelms, Don				Photographic coverage of the Moon				2
2353	2353	Geologic	USA		Moon			1987	Wilhelms, Don				Geologic map of the Ringed Basins				2

We maintained our commission website at [planetcarto.wordpress.com](http://planetcarto.wordpress.com) (Redesigned by Mateusz Pitura)





## Commission on SDI and Standards

### Terms of Reference (2015-2019)

1. In collaboration with other ICA Commissions, explore research on the impact and use in SDIs of cartography, standards, spatial semantics, ontologies, volunteered geographical information (VGI), data quality, virtual globes and other technological developments that might become relevant in future, and identify the associated education needs.
2. Continue the work on extending, improving and applying conceptual models of SDI using various modelling techniques, working in the areas of science, technology and standards.
3. In collaboration with other ICA Commissions, participate at the scientific level with other organizations active in SDI, standards and quality of geospatial data and services.
4. Develop reports, conference presentations and/or journal articles on our work and help to arrange workshops, conferences or other meetings on SDI and standards, and present tutorials at them.
5. One or more of the above activities will specifically focus on the International Map Year's purpose of showing the necessity of the sustainable development of spatial data infrastructures.
6. Organize reporting sessions on the Commission's activities at the 2017 and 2019 International Cartographic Conferences.
7. Organize and hold full Commission meetings in 2016, 2017, 2018 and 2019, and mini-meetings of the Commission at suitable meetings and conferences.
8. Continue to serve as the liaison for the ICA to ISO/TC211, Geographic Information/Geomatics, the liaison for the ICA to the Global Spatial Data Infrastructure Association (GSDI), and establish liaisons with other SDI and standards organizations.

Based on the above terms of reference, the Commission was engaged in the activities described below.

The Commission conducted business meetings at the International Conference in 2015, 2017 and there is one planned for 2019. In 2017, the Commission was also involved in the *Tribute to Dr. Harold Moellering: Collaborative Reflections on Dr. Moellering's Contributions to Cartography and GIScience*. The event was attended by invitation and was held on Wednesday, 5 July 2017, during the ICC2017 in Washington DC.

Commission members were involved in standards- and SDI-related research resulting in the following **publications**:

Coetzee S, Du Preez J, Behr F-J, Cooper AK, Odijk M, Vanlshout S, Buyle R, Jobst M, Chauke M, Fourie N, Schmitz P, Erwee F, **2019**. Collaborative Custodianship through Collaborative Cloud Mapping: Challenges and Opportunities. *29th International Cartographic Conference*, 15-19 July 2019, Tokyo, Japan.

Brodeur J, Coetzee S, Danko D, Garcia S and Hjelmager J, **2019**. Geographic Information Metadata—An Outlook from the International Standardization Perspective. *ISPRS Int. J. Geo-Inf.* **2019**, 8(6), 280; <https://doi.org/10.3390/ijgi8060280>

Coetzee S, Steiniger S, Köbben B, Iwaniak A, Kaczmarek I, Rapant P, Cooper AK, Behr F-J, Schoof G, Katumba S, Vatseva R, Sinvula K and Moellering H, **2017**. *SDI implementations at universities and research institutes*. Working Paper by the Commission on SDI & Standards of the International Cartographic Association (ICA).

Coetzee S, Steiniger S, Köbben B, Iwaniak A, Kaczmarek I, Rapant P, Cooper AK, Behr F-J, Schoof G, Katumba S, Vatseva R, Sinvula K and Moellering H, **2017**. The Academic SDI – Towards understanding spatial data infrastructures for research and education. In: *Advances in Cartography and GIScience - Selections from the International Cartographic Conference 2017*, edited by Michael Peterson, Springer, pp99-113.

Coetzee S, Camboim S, Cooper AK, Anand S, Taylor T, Borba R, Strauch J (eds), **2015**. *Spatial data infrastructures, standards, open source and open data for geospatial (SDI-Open 2015)*, ISBN 978-1-77592-117-2, Rio de Janeiro, Brazil, 21 August 2015, pp1-50.

The Commission organized the following workshops, some in collaboration with other Commissions:

- **SDI-Open 2015**, pre-conference workshop on spatial data infrastructures, standards, open source and open data for geospatial, jointly organized with the Commission on Open Source Geospatial Technologies and the Open Geospatial Consortium, 20-21 August 2015 at IBGE, Rio de Janeiro, Brazil, immediately before the 27<sup>th</sup> International Cartographic Conference.
- **Edit-a-thon** for the Standards Wiki together with the ISO/TC 211 Advisory Group on Outreach during the plenary meeting week of ISO/TC 211, Geographic information/Geomatics, in Tromsø, Norway, 15 June 2016. ISO/TC 211 experts who attended the meetings updated the standards information on the Wiki.
- A **Commission Meeting** took place on the weekend before the AGILE conference in Helsinki, Finland, 10-12 June 2016. Commission Members prepared content and outline for a conference paper.
- **SDI-Open 2017**, pre-conference workshop on spatial data infrastructures, standards, open source and open data for geospatial, jointly organized with the Commission on Open Source Geospatial Technologies, 1-2 July 2017 at the George Washington University, Washington DC, United States, immediately before the 28<sup>th</sup> International Cartographic Conference.
- Workshop on *OGC: Grundlagen, Standards und Anwendung* (English: OGC: Overview, Standards and Applications) by Franz-Josef Behr, Surveying Department of Stuttgart, Germany, 30 November 2017 and 13 December 2017.
- Under the leadership of EuroGeographics, together with EuroSDR, OGC and ISO/TC 211, the Commission co-organized the **2nd International Workshop on Spatial Data Quality**, 6-7 Feb 2018 in Valletta, Malta. A third workshop is planned for February 2020.
- A two-day workshop on **Open Geospatial Consortium standards and related aspect** by Franz-Josef Behr at the University of Kerala, India, 5-10 March 2018.
- **Workshop on Collaborative custodianship through collaborative cloud mapping – Challenges and opportunities**, jointly organized with the ICA Commission on Map Production & Geoinformation Management and the South African Committee for Spatial Information Subcommittee on Education & Training, held on 14 - 15 September 2018, Centre for Geoinformation Science, University of Pretoria. A workshop during the AfricaGEO 2018 conference reported on the results of the pre-conference workshop. This was held on 18 September in Kempton Park, South Africa.
- The Commission presented a two-day workshop on **OGC and its Geospatial Interoperability Standards**, 20-21 September 2018, at the University of Pretoria, South Africa, in collaboration with the South African Committee for Spatial Information Subcommittee on Education & Training. A similar workshop was held before the

Applied Geoinformatics for Society and Environment (AGSE) 2018, in collaboration with the conference organizers, 8-9 September 2018, in Windhoek, Namibia.

- **SDI-Open 2019**, pre-conference workshop on spatial data infrastructures, standards, open source and open data for geospatial, jointly organized with the Commission on Map Production & Geoinformation Management and the Commission on Open Source Geospatial Technologies, to be held on 15 July 2019 in Tokyo, Japan, immediately before the 29th International Cartographic Conference.

The Commission participated at the scientific level with other organizations active in SDI, standards and quality of geospatial data and services:

- Presentation by Franz-Josef Behr about the use of open source in the context of SDI was given at the Directorate:National Geospatial Information in Cape Town, 24 October **2018**.
- Presentation by Serena Coetzee on international addressing standards in the *Standards that Make Innovation Possible* session, at the United Nations World Geospatial Information Congress, Deqing, Zhejiang Province, China, 19 to 21 November **2018**.
- Keynote presentation by Serena Coetzee on “Evolving SDIs, maturing standards, emerging open data and open source. What are the implications for cartography?” at the *VIII Convención Agrimensura*, Havana, Cuba, 26-30 September **2017**.
- Presentation by Franz-Josef Behr on “Concept and implementation of an architecture for the immediate provision of geodata in disaster management” at the International CODATA 2017 Conference, St Petersburg, 10 October **2017**.
- Presentation by Franz-Josef Behr on “Global Challenges: Towards an Interoperability Manifesto” at the International CODATA 2017 Conference, St Petersburg, 10 October **2017**.
- Keynote presentation by Serena Coetzee on “SDIs, standards, cartography and local authorities” at the *GeoCart’ 2016*, Wellington, New Zealand, 2 September **2016**.

As contribution to the International Map Year, the Commission prepared a poster on Sustainable Development Goal 17. The poster was presented with other posters at the UN Head Quarters in New York, during the UN GGIM session in August 2016.

In support of education and training, the Commission prepared a Wiki on Standards, hosted at <http://wiki.icaci.org>. Students from the Stuttgart University of Applied Sciences helped to convert a report into the Wiki site. See also edit-a-thon above.

The Commission continued to serve as the liaison to the ISO/TC211, *Geographic Information/Geomatics*, and the Open Geospatial Commission (OGC). Regular Commission mini-meetings were held with other Commission members who attend ISO/TC 211 meetings. These members collaborated on the paper that was published in IJGI in 2019. Liaison reports were presented at the following ISO/TC 211 plenary meetings:

- 1 December 2016, Redlands, California, USA, (ISO/TC 211 document number N4461)
- 1 June 2017, Stockholm, Sweden (ISO/TC 211 document number N4557)
- 30 November 2017, Wellington, New Zealand (ISO/TC 211 document number N4709)
- 31 May 2018, Copenhagen, Denmark (ISO/TC 211 document number N4822).
- 15 November 2018, Wuhan, China (ISO/TC 211 document number N4993)
- 6 June 2019, Maribor, Slovenia (ISO/TC 211 document number N5109).

The Commission website is available at <http://sdistandards.icaci.org/>.

*Chairs*

*Prof Serena Coetzee  
Head of the Department Geography, Geoinformatics  
and Meteorology  
University of Pretoria  
Private Bag X20  
Hatfield 0028, South Africa  
phone: +27 12 420 3823  
e-mail: serena.coetzee@up.ac.za*

*Prof. Dr. Franz-Josef Behr  
Laboratory for Open Geospatial Software, Data and  
Standards  
Stuttgart University of Applied Sciences  
Schellingstraße 24  
70174 Stuttgart, Germany  
phone: +49 711 8926 2606  
e-mail: franz-josef.behr@hft-stuttgart.de*

## Commission on Sensor-driven Mapping

Prof. Dr. Jonathan Li, Chair  
Department of Geography & Environmental Management  
University of Waterloo, Canada  
[junli@uwaterloo.ca](mailto:junli@uwaterloo.ca)

### Outline

- Commission Officers
- Commission Activities
- Conferences and workshops organized
- Special issues edited and published
- Future activities to be organized
- Other business



### Commission officers

- During the term of 2015-2019, the Commission is chaired by
- Professor Jonathan Li, [junli@uwaterloo.ca](mailto:junli@uwaterloo.ca), University of Waterloo, Canada
  - and Co-chaired by
  - Professor Yifang Ban, [yifang@kth.se](mailto:yifang@kth.se), KTH Royal Institute of Technology in Stockholm, Sweden
  - Professor Jan Feranec, [feranec@savba.sk](mailto:feranec@savba.sk), Institute of Geography, Slovak Academy of Sciences, Slovakia
  - Commission has 25 members from 16 countries
  - <https://uwaterloo.ca/mobile-sensing/ica-commission>



### Conferences/Workshops Organized

- •EOEC 2019, <http://eoec2019.csp.escience.cn/dct/page/1>
- •Jonathan Li (Commission Chair) and GuoxiangLiu (Commission Member) served as Conference Co-Chairs;
- •Commission co-chairs YifangBan, Jan Feranec and members, Julian Smit, XianfengZhang, XiaojunYang served on the Scientific Committee;



**EOEC-GIT4NDM 2019**

第六届地球观测与环境变化国际会议 暨 第八届地理信息技术与自然灾害管理国际会议  
Chengdu, China June 24-26, 2019 中国·成都 2019年6月24-26日







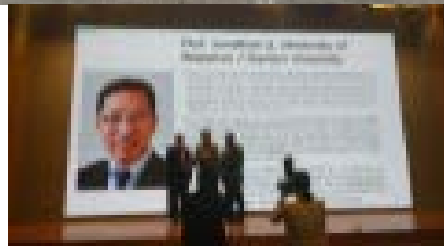


- 5th National LiDAR Conference, Xiamen, China, 24-26 May 2019
- Jonathan Li served on the Program Committee and the invited keynote speaker





- MMT 2019, Shenzhen, China, 6-8 May 2019
- Jonathan Li served on the Program Committee, as invited distinguished lecturer for pre-symposium tutorial



- International Workshop on Location-based Services, Xiamen, China, May 3, 2019
- Jonathan Li served as the Local Organizing Committee Chair



### **Special Issues Edited and Published**

- Jonathan Li, Guest Editor with Chenglu Wen, Ayman Habib and Charles Toth, 2019. Special Issue "3D Sensing in Intelligent Transportation", IEEE Transactions on Intelligent Transportation Systems, IEEE;
- Jonathan Li, Guest Editor with Saeid Pirasteh and Guoxiang Liu, 2019. Special Issue "Global Geospatial Information and Hazards Management for Smart Environments", Remote Sensing, MDPI;
- Jonathan Li, Guest Editor with Ayman Habib and Chenglu Wen, 2019. Special Issue "Mobile Laser Scanning Systems", Sensors (Remote Sensors Section), MDPI;
- Jonathan Li, Guest Editor with Zhizhong Kang and Cheng Wang, 2019. Special Issue "Indoor LiDAR/Vision Systems", Sensors (Remote Sensors Section), MDPI;

### **Future activities to be organized**

- Co-editor, Special issue on sensor-driven mapping, to be published by IEEE-JSTARS in 2020
- Co-editor, a book on Advances in Laser Scanning, to be published by Springer in 2020-2021;
- Co-organizer, ICA/ISPRS Joint Workshop on HD Maps for Smart Cities to be held either in Warsaw, Poland or Bratislava, Slovakia in 2020;
- Co-organizer, ISPRS/ICA Joint Workshop on Laser Scanning for Disaster Monitoring, to be held in Jakarta, Indonesia or Kuala Lumpur, Malaysia in 2020
- Co-organizer, EOEC- GiT4NDM 2021 Joint Conferences, to be held in Salzburg, Austria
- Co-organizer, MMT 2021, to be held in Padua, Italy, 26-28 May 2021.

### **Other Business**

1. Two nominations:
  - Nominating Dr. Ruisheng Wang, Associate Professor with the Department of Geomatics Engineering, University of Calgary, Canada to be a new Commission Co-Chair.
  - Nominating Dr. Xiaoxiang Zhang, Associate Professor with the Department of Geographic Information Sciences, Hohai University, China to be a regular commission member.
2. Two initiatives:
  - Jan Feranec will talk to Georg Gartner about future joint event together with LBS Conference.
  - Mamoru Koarai will talk to new ICA Council to organize a Commission Workshop on HD Maps for Smart Cities during ICC 2021.
  - Ruisheng Wang will talk to JSTARS EiC for a Special Issue in 2020.
  - Jonathan Li will talk to new ICA Council about Renaming the Commission to Sensor-driven Mapping for Smart Cities (2019-2023).

## Commission on Topographic Mapping

**Chair:** Dr Alexander Kent (UK)

**Vice Chair:** Dr Anja Hopfstock (Germany)

### Summary

The ICA Commission on Topographic Mapping was established by the 16<sup>th</sup> General Assembly at ICC2015 (Rio de Janeiro, Brazil). The Commission has since organized and participated in several international conferences and activities, issued a range of publications (including three books and a themed Special Issue of a peer-reviewed journal), and grown its membership base to around 60. The period 2015–19 is characterized by its strong degree of collaboration with other Commissions (Art & Cartography, Cognitive Issues in Geographic Information Visualization, History of Cartography), as well as consolidating its own identity. The Commission remains in excellent health at the end of its first four-year term and looks forward to its activities for the next four years. We thank Dr Anja Hopfstock (Germany) for her work in establishing the Commission and welcome Dr Lukasz Halik (Poland) who will succeed Dr Hopfstock as the new Vice Chair.

### 2015

Following the establishment of the Commission in August, several potential joint initiatives were identified with other Commissions at the Chairs' meeting in Vienna in November. These included a pre-conference workshop on maps and emotions with Art & Cartography and Cognitive Issues in Geographic Information Visualization for 2017 and a joint conference on colonial cartography with the History of Cartography in 2018.

### 2016

Participation at several conferences (AAG, AGILE, BCS-SoC, ICA Mountain Cartography Workshop and the Symposium on the History of Cartography) and talks and presentations (i.e. National Geospatial-Intelligence Agency and Canterbury Christ Church University), served to publicise the work of the Commission and to grow its membership. A series of meetings (Federal Office of Geodesy and Cartography, Frankfurt; IGN, Paris; and University of Ghent) was held to develop strategic plans for future publications, specifically a themed special issue of a peer-reviewed journal.

### 2017

A series of lectures on topographic mapping was delivered at Adam Mickiewicz University (Poznan, Poland) to contribute to undergraduate geoscience programmes and to publicise the work of the Commission. This was followed by jointly running a pre-conference workshop 'Maps and Emotions' with the Commissions on Art & Cartography and Cognitive Issues in Geographic Information Visualization. In the first day, the Commission on Topographic Mapping chaired a session and ran an afternoon activity in which participants walked around the neighbourhood with different topographic maps (including a formerly secret Soviet map from 1975). A successful workshop that drew around 50 delegates, the Commission contributed a paper based on the activity to the associated Special Issue on Maps and Emotions (published in *Cartographic Perspectives*).

Over 30 papers were reviewed for the Commission's three sessions in the main ICC2017 programme and the Commission held its first business meeting (attended by 28 delegates) in which activities were reported and future plans discussed. Later in the year, a special session on



topographic mapping took place at the joint British Cartographic Society-Society of Cartographers conference in Durham.

The year also saw the publication of two relevant books: *The Routledge Handbook of Mapping and Cartography* and *The Red Atlas: How the Soviet Union Secretly Mapped the World*, both of which incorporated elements of the theory and practice of topographic mapping.

## 2018

The main activity of the Commission in 2018 was the conference “Mapping Empires: Colonial Cartographies of Land and Sea” that was jointly organized with the Commission on the History of Cartography and with the Bodleian Library, University of Oxford. Held at the Weston Library in Oxford, the three-day event was very successful, attracting over 60 international delegates and involving 40 oral and poster presentations. The associated Springer volume of proceedings is currently in press.

The long-planned Special Issue on Topographic Mapping: Past, Present and Future was published as Vol. 55 No.4 of *The Cartographic Journal*, following a successful call for papers and joint editorship by the Commission chairs. The Special Issue features a range of papers that focus on historical and cultural aspects of topographic mapping as well as showcasing new technical developments in Virtual Reality and Augmented Reality that indicate new directions for this genre of mapping.

## 2019

The forthcoming ICC2019 in Tokyo will see another joint venture with the Commission on the History of Cartography. A pre-conference workshop entitled “Cartography as a Cultural Encounter: How East and West Have Mapped and Influenced Each Other” will take place ahead of the main conference. Two sessions are devoted to topographic mapping in ICC2019, which cover a range of topics including the mapping of the urban environment, VR/AR, and Soviet mapping. The Commission Business Meeting will take place on the same day.

Terms of Reference 2015–2019	Comment on Activities 2015–2019
Provide a forum for those whose primary focus is the design, production and use of topographic mapping and related geospatial data products, informing national mapping organisations on how they can better serve the interests of their users in an environment of changing methods of production and dissemination (e.g. from geoportals to print-on-demand)	Successfully achieved through the establishment of the new Commission and participation of 50–70 delegates at events within and beyond ICCs (business meetings, workshops, themed conference sessions, conferences), plus relevant publications. A wide range of topics relevant to topographic mapping were covered.
Establish best practice in assessing the national needs for topographic mapping (including topographic base data for deriving products such as geological and emergency planning maps) and how this impacts on their design and vice versa	Achieved through conference sessions and workshops, plus the publication of a Special Issue of <i>The Cartographic Journal</i> on the past, present and future of topographic mapping. Needs more engagement from NMCA in the next term.
Work in partnership with other ICA Commissions (e.g. Atlases, Map Design, Use and Usability, Map Production) to organise and participate in joint events – particularly with a view to sharing research on the design and production of topographic mapping and its use	Successful collaboration with Commissions on Art and Cartography, Cognitive Issues in Geographic Information Visualization, History of Cartography, and Mountain Cartography, with joint pre-conference workshops and publications (see list).

Collaborate with the Commission on Education and Training to identify the cartographic educational and training requirements of national mapping organisations and seek ways to meet these effectively, drawing on existing expertise within this and other Commissions	Initial discussions held after ICC2015 but not fully explored. Should be taken further in the next term.
Engage with the national mapping organisations of countries who are not yet members of ICA by outreach and invitation to Commission activities (particularly those involving other ICA Commissions, as mentioned above), effective sharing of published research, training, and explaining the wider benefits of ICA membership	Invitation to Commission activities publicized but there has been limited direct engagement with non-member countries. A strategic plan for outreach should be developed for the next term.
Organise and host a conference focusing on the relevance of cartography to topographic mapping, focusing on how national mapping organisations can preserve, develop and assert their identity through the cartography of existing and new products, and to publish the associated papers in an international cartographic periodical	Achieved through themed sessions at ICCs and other events held in collaboration with other Commissions (e.g. pre-conference workshops) instead of a dedicated conference, since participation and engagement in joint events was deemed sufficient.
Initiate and publish a special series of 'Survey' articles in an international cartographic periodical, each of which providing an expert assessment of the design and content of topographic mapping on a national (or regional) basis	Replaced by a Special Issue of <i>The Cartographic Journal</i> (55.4), which allowed academics and NMCAs to report on key issues. Plans to develop a web-based survey are underway.
Create, develop and maintain a Commission website that incorporates an online listing of the websites and/or geoportals of national mapping organisations to facilitate access for research and networking	Website established with an extensive bibliography relating to research on topographic mapping. Listing of NMCA websites still being compiled.
Organise sessions at the 2017 and 2019 ICA conferences that focus on presenting the latest research with regard to topographic mapping and pursue its publication and wider dissemination	Organization of themed sessions on topographic mapping and business meetings at ICC2017 and ICC2019. Key publications include <i>The Red Atlas</i> (2017), the Special Issue of <i>The Cartographic Journal: Topographic Mapping: Past, Present and Future</i> (2018) and <i>Mapping Empires</i> (2019).

### Commission Meetings 2015–2019

Date	Venue/Event	Details	Outcome
Aug. 2015	ICC2015, Rio de Janeiro	Formation of new Commission and gathering of initial members	Commission and associated website established
Nov. 2015	Vienna Technical University	ICA Meeting for all Commission Chairs	Plans for collaboration with several Commissions
Mar. 2016	San Francisco	Presentation of symbol research at Association of American Geographers (AAG) Annual Meeting	Work towards publication of journal article

Apr. 2016	Berchtesgaden	ICA Mountain Cartography Workshop	Networking and discussion of future plans
June 2016	Helsinki	AGILE meeting	Networking with NMOs
Jul. 2016	Federal Office of Geodesy and Cartography, Frankfurt; IGN, Paris; University of Ghent	Strategic planning of Commission activities	Plans for meetings and publications
Sep. 2016	Cheltenham	Session at BCS-SoC Conference	Dissemination of Research
Oct. 2016	National Geospatial-Intelligence Agency, Washington, DC	Session on Soviet topographic mapping	Podcast
Oct. 2016	Canterbury Christ Church University	Seminar series for International Map Year with a theme of Topographic Mapping	Dissemination of research
Oct. 2016	University of Zagreb	6th Symposium on the History of Cartography	Dissemination of research and planning for joint conference for 2018
Jan. 2017	Adam Mickiewicz University	Lectures on topographic mapping	Publicity of Commission's work amongst young scientists
Jul. 2017	George Washington University	Pre-conference workshop jointly organized with Commissions on Art & Cartography and on Cognitive Issues in Geographic Information Visualization	Activity and contribution to Special Issue on Maps and Emotions for <i>Cartographic Perspectives</i>
Jul. 2017	ICC2017, Washington, DC	Three sessions on Topographic Mapping organised as part of main conference	Presentation of work associated with topographic mapping
Jul. 2017	ICC2017, Washington, DC	Commission Business Meeting	Reporting on activities and planning for future
Sep. 2017	Durham	Session on Topographic Mapping at BCS-SoC Conference	Dissemination of Research
Sep. 2018	Oxford	Joint Conference 'Mapping Empires' held with History of Cartography Commission	Conference and Springer volume of Proceedings as part of ICA Lecture Notes series
Oct. 2018	Copenhagen	Conference at Royal Danish Defence Academy	Keynote

Jul. 2019	Miraikan, Tokyo	Joint pre-conference workshop with History of Cartography Commission	Presentation of research
Jul. 2019	ICC2019, Tokyo	Two sessions on Topographic Mapping organized as part of main conference	Presentation of work associated with topographic mapping
Jul. 2019	ICC2019, Tokyo	Commission Business Meeting	Reporting on activities and planning for future

### Commission Publications 2015–2019

Type	Details	Link
Online Resource	Reference Bibliography of 700+ items relating to topographic mapping	<a href="https://topo.icaci.org/resources/research-bibliography/">https://topo.icaci.org/resources/research-bibliography/</a>
Edited Book	The Routledge Handbook of Mapping and Cartography	<a href="https://www.routledge.com/The-Routledge-Handbook-of-Mapping-and-Cartography/Kent-Vujakovic/p/book/9781138831025">https://www.routledge.com/The-Routledge-Handbook-of-Mapping-and-Cartography/Kent-Vujakovic/p/book/9781138831025</a>
Book	The Red Atlas: How the Soviet Union Secretly Mapped the World	<a href="https://www.press.uchicago.edu/ucp/books/book/chicago/R/bo24760505.html">https://www.press.uchicago.edu/ucp/books/book/chicago/R/bo24760505.html</a>
Journal Special Issue	Topographic Mapping: Past, Present and Future (The Cartographic Journal)	<a href="https://www.tandfonline.com/toc/ycaj20/55/4?nav=toCList">https://www.tandfonline.com/toc/ycaj20/55/4?nav=toCList</a>
Journal Article	How Topographic Maps Affect: Experiencing Washington, DC through the maps of the “other”	<a href="https://cartographicperspectives.org/index.php/journal/article/view/1459">https://cartographicperspectives.org/index.php/journal/article/view/1459</a>
Edited Book	Mapping Empires: Colonial Cartographies of Land and Sea	<a href="https://www.springer.com/gp/book/9783030234461">https://www.springer.com/gp/book/9783030234461</a>

*July 2019*

*Dr Alexander Kent and Dr Anja Hopfstock*

## Commission on Toponymy

**Peter Jordan** (Austria), ICA Chair

**Cosimo Palagiano** (Italy), IGU Chair

**Paulo Márcio Leal de Menezes** (Brazil), Common Vice-Chair

### 1 On the Commission's foundation, mission and organization

The Joint ICA/IGU Commission on Toponymy was in 2011 established under the auspices of the contemporary chairs of UNGEGN (Helen Kerfoot), the International Cartographic Association, ICA, Georg Gartner), and the International Geographical Union (IGU, Ron Abler) as a joint venture of the two global umbrella organizations of cartography and geography, ICA and IGU.

The Commission's statutory goal is to foster toponymic research in geography as well as in cartography complementary to UNGEGN with its focus on standardization and the International Council of Onomastic Sciences (ICOS) with its focus on linguistics. This goal is to be achieved by organizing sessions in the framework of international conferences (mainly the biannual International Cartographic Conferences and the almost annual IGU conferences) as well as by separate symposia on specific topics, mostly in cooperation with a local institution.

The Commission is headed by a chair from the ICA side (currently Peter Jordan, Austria, past convenor of the UNGEGN Working Group on Exonyms and past chair of the ICA Commission on Atlases), a chair from the IGU side (currently Cosimo Palagiano, Italy), a common vice-chair (currently Paulo de Menezes, Brazil) as well as a steering board including the chairs and five additional members (Peter Raper, South Africa, former UNGEGN chair, Ferjan Ormeling, the Netherlands, past UNGEGN vice-chair and ICA general secretary, Sungjae Choo, Republic of Korea, UNGEGN vice-chair, Kohei Watanabe, Japan, convenor, UNGEGN Working Group on Exonyms, and Yaïves Ferland, Canada). In addition, as of 11 January 2019, the Commission has 144 Corresponding Members from 43 countries and all continents.

**Website:** [www.igu-icatoponymy.org](http://www.igu-icatoponymy.org)





*Fig.: Participants in the Commission's business meeting during the 1<sup>st</sup> (new) UNGEGN Session in New York, 29 April – 3 May 2019: Steering board members present are Sungjae Choo (7<sup>th</sup> from left), Cosimo Palagiano (8<sup>th</sup> from left), Peter Jordan (9<sup>th</sup> from left), and Kobei Watanabe (11<sup>th</sup> from left)*

## 2 Terms of reference

- To act jointly with IGU fostering the geographic and cartographic research on all fields involving toponymy;
- to disseminate the scientific knowledge on processing and use of toponyms within geography and cartography;
- to verify the use of other sciences' toponymy concepts, such as anthropology, linguistics and others, in favour of cartography and geography;
- to maintain contacts and scientific exchange with UNGEGN and ICOS, such as by organizing joint events;
- to support and encourage the elaboration and publication of gazetteers, toponymic data files and toponymic reference systems (such as EuroGeoNames);
- to organize regional joint IGU/ICA events (workshops, symposia and others) with IGU and ICA members;
- to participate in IGU and ICA Regional, Thematic and Main Conferences;
- to organize and maintain a website to facilitate contact between researchers in the field of toponymy and disseminate source material and literature available to the community and the general public alike;
- to organize and publish books, chapters and encourage paper publishing in specialized journals and the International Journal of Cartography.
- to establish a consortium of universities organizing training courses on toponymy
- to publish a study book on Critical Toponomastics
- to promote the representation of under-represented groups on the research agenda (e.g. female commemorative naming, indigenous names)

### 3 Symposia and sessions up to July 2019

Up to July 2019, the Commission organized or co-organized 19 symposia and sessions in the framework of conferences in 12 countries and at 5 continents. They are listed below in temporal sequence.

- (1) Session “Place names as markers and ingredients of space-related identity” in the framework of the **32<sup>nd</sup> International Geographical Congress, Cologne [Köln], Germany, 26-30 August 2012**
- (2) Session in the framework of the **IGU Regional Conference Kyoto [Kyōto], Japan, 4-9 August 2013**
- (3) Seminar “Historical maps, atlas maps, and toponymy”, Leipzig, Germany, 21-23 August 2013
- (4) Session in the framework of the **26<sup>th</sup> International Cartographic Conference (ICC) Dresden, Germany, 26-30 August 2013**
- (5) Session in the framework of the **4<sup>th</sup> EuGeo Congress Rome [Roma], Italy, 5-7 September 2013**
- (6) Session in the framework of the **IGU Regional Conference Cracow [Kraków], Poland, 18-22 August 2014**
- (7) **Symposium on place-name changes, Rome [Roma], Italy, 17-18 November 2014**
- (8) Session in the framework of the **IGU Regional Conference, Moscow [Moskva], Russian Federation, 17-22 August 2015**
- (9) **Symposium on Atlases, Toponymy and the History of Cartography, Rio de Janeiro, Brazil, 20-21 August 2015**
- (10) Sessions in the framework of the **27<sup>th</sup> International Cartographic Conference, Rio de Janeiro, Brazil, 23-28 August 2015**
- (11) Session in the framework of **EuGeo Budapest, Hungary, 30 August – 2 September 2015**
- (12) **Symposium “Place names, diversity and heritage”, Clarens, Free State, South Africa, 17-18 September 2015**
- (13) Session in the framework of the **33<sup>rd</sup> International Geographical Congress, Beijing, China, 21-25 August 2016**.
- (14) **International Panamerican Symposium on Toponymy, Rio de Janeiro, Brazil, 3-5 May 2017**.
- (15) **ICC Joint Pre-Conference Workshop: Charting the Cosmos of Cartography: History – Names – Atlases, Washington, D.C., USA, 28-30 June 2017**,
- (16) Sessions in the framework of the **28<sup>th</sup> International Cartographic Conference, Washington D.C., USA, 2-7 July 2017**.
- (17) **International Symposium on Place Names: Critical Toponymy – Place names in political, historical and commercial landscapes, Windhoek, Namibia, 18-20 September 2017**.
- (18) **IGU Thematic Conference, Moscow [Moskva], Russian Federation, 4-6 June 2018**. Session “Use of Place Names in Public Space”.
- (19) **IGU Regional Conference, Quebec, Canada, 6-10 August 2018**. Session “Place Names as Means of Structuring Geographical Space”.

### 4 Symposia and sessions in 2019

- (1) In the framework of the **29<sup>th</sup> International Cartographic Conference (ICC), Tokyo [Tōkyō], Japan, 15-20 July 2019**, the Commission will organize three sessions open for all toponymic issues.

- (2) Within a **pre-conference symposium of ICC Tokyo, [Tōkyō], Japan, 15 July 2019**, locally organized by Kohei Watanabe, the Commission will highlight role and structure of national names boards. This is to support considerations to establish a national names board of Japan, for which international models and benchmarks could be helpful.
- (3) Together with the University of the Free State, Bloemfontein, South Africa, the Commission will organize the **5<sup>th</sup> International Symposium on Place Names: Recognition, regulation, revitalisation: place names and indigenous languages, in Clarens, South Africa, 18-20 September 2019**. The theme of this symposium is inspired by the United Nations declaration of 2019 as the International Year of Indigenous Languages (<https://en.unesco.org/IY2019>). The toponymic landscape of any place is inscribed with names from different periods of human history. These place names are not only records of natural and social events, but also of indigenous languages and language contact. Very often, place names are all that remain of certain languages and even communities. However, place names are often not recorded in their original languages, but have been adapted or translated into other languages over time. Researching the etymology of place names is one way of uncovering this treasure of indigenous knowledge. The symposium aims to explore the link between the processes of researching, maintaining and restoring indigenous place names, and the preservation and promotion of the indigenous languages from which these place names originate.
- (4) **2<sup>nd</sup> Pan American Symposium on Toponymy, Rio de Janeiro, 11-13 October 2019**, organized by Paulo DE MENEZES in cooperation with the Pan American Institute of Geography and History (PAIGH).
- (5) At the occasion of the 50<sup>th</sup> anniversary of the Austrian Board's foundation, the Commission will organize together with the Austrian Board on Geographical Names, the UNGEGN Dutch- and German-speaking Division (DGSD), the Federal Office of Metrology and Surveying and the Austrian Geographical Society a symposium in **Vienna, Austria, 6-8 November 2019** on the general topic **"Place names and migration"**, where aspects and examples of historical and recent migrations with a focus on the question how newcomers dealt with the names they found can be highlighted. The symposium will figure under the DGSD trademark "GeoNames symposia", the last of which took place in Vienna in 2008. Migration is a global and all-time phenomenon. Ever since humankind exists, people were migrating – individually or in groups. Concerning place names, it is interesting to look on how people – often with a different linguistic and cultural background – deal with the existing namescape. Related to place names, this prompts a number of delicate questions: How do migrants deal with place names? Do they adapt them to their own language by translation, morphological or phonetic adaptation? Do they create new names (for already named places)? And how do long-term residents of the place react to these attitudes? Questions like these get addressed in traditional fields of onomastics as well as in recent fields of study like "critical onomastics" and "colonial onomastics". The symposium intends to highlight in this respect various historical situations as well as recent migration events in all parts of the world.

## 5 Publications

Papers presented at events organized or co-organized by the Commission have so far been published in the following books and journal issues:

Demhardt I., Jordan P., Losang E. (eds.) (2018), *Charting the Cosmos of Cartography: History – Names – Atlases*. (= *The Cartographic Journal*, 55, 2018, 2). London, The British Cartographic Society – Taylor & Francis.

Da Rocha Béranger Resende A.C., Jeney J. (eds.), *Symposium on Atlases, Toponymy and the History of Cartography*. Proceedings of the ICC 2015 Pre-Conference Rio de Janeiro, Brazil, 20–21 August 2015. Sine loco [Rio de Janeiro], ICA International Cartographic Association.

Jordan P., Woodman P. (eds.) (2016), *Place-Name Changes*. Proceedings of the Symposium in Rome, 17–18 November 2014 (= *Name & Place*, 5). Hamburg, Verlag Dr. Kovač.

Moser J. (ed.) (2016), *Joint Commission Seminar on Historical Maps, Atlases and Toponymy* (= *forum IfL*, 30). Leipzig, Leibniz-Institut für Länderkunde.

*Nomina Africana*, *Journal of the Names Society of Southern Africa*, 30, 1, 2016: special issue containing 10 papers presented at the Symposium “Place names, diversity and heritage”, Clarens, Free State, South Africa, 17–18 September 2015.

*Semestrare di Studi e Ricerche di Geografia*, XXV, 2, Roma 2013: Special issue including toponymy papers presented at the IGU Regional Conference Kyoto, Japan, 4–9 August 2013. (<http://www.semestrare-geografia.org/index.php/sdg/issue/view/3>)

## 6 Flagship project

**Establishing a geographical names consortium of several universities, where according to a common curriculum approved by the Commission and with lectors (among others) from the Commission courses in toponymy are offered.** This project evolves from an idea and initiative of Peter Raper and Theodorus Du Plessis (both South Africa) and started with some universities in Southern Africa and is later to spread to other countries and continents. This project conforms to the task “to disseminate the scientific knowledge on processing and use of toponyms within geography and cartography” in the Commission’s terms of reference. It has been initiated also with the consent and kind support of the former convenor of the UNGEGN Working Group on Training Courses in Toponymy, Ferjan Ormeling, and will complement UNGEGN courses, which will also be continued.

## 7 Conclusions

In its history of now already nine years the Commission has proved to be a valuable instrument of promoting toponymic research in cartography and geography, of cooperation with other toponymic bodies like UNGEGN and ICOS and of presenting cartographic and geographical aspects of toponymy to a wider public. The current set of co-chairs is ready to continue their function and to start into the new term of office with new ideas and energy.

## Commission on Ubiquitous Mapping

Spatial information technology and its applications are important and used in a wide variety of fields. Maps and mapping have been evolving fast recently, however there is a big question on the present direction of map evolution based on the environment of modern technology, culture and society. To explore the big question, the commission of ubiquitous mapping has researched on human-centered design for IT tools and services to develop human's spatial capability. Our main achievement will be explained from the following two aspects.

### **(A) Constructing the theories on ubiquitous mapping**

#### *[Original aim]*

Place the notion of Ubiquitous Mapping based on real-world map interaction and ICT-based context-aware mapping services in the domain of Theoretical Cartography; examining (1) Primal mapping between geomeia (real, graphic and language spaces) and human (cognitive space), and (2) Secondary or ICT-based mapping between geomeia (real, graphic and language spaces) and geodatabase.

Develop the theory of Map Evolution on ICT enabled socio-cultural environment, by (1) Clarifying similarity and difference in comparing variant systems to establish an evaluation scheme, (2) Revealing significant factors such as ubiquity and egocentrism for Map Evolution on ICT, and (3) Creating map evolutionary tree diagrams representing natural selection of maps in past, current and future according to real ICT-based ubiquitous mapping services and socio-cultural environment of different regions and countries.

#### *[Achievement]*

The commission have held meetings and constructed the theories on ubiquitous mapping. Some of the result are open in public as follows.

- [1] Hideki KAJI , Ken'ichi TSURUOKA, Ruochen SI, Min LU, Masatoshi ARIKAWA , Takashi OGUCHI, 2019. Digital archiving project of paper maps collected for International Map Exhibition 1980, Tokyo, International Cartographic Conference 2019, International Cartographic Association, July 15 to 20, 2019, Tokyo. (Poster Presentation)
- [2] Masatoshi Arikawa, 2018. Human-Centered Ubiquitous Mapping, an invited talk in Institute of Remote Sensing and Geographic Information System, Peking Univ., Sept. 20, 2018.
- [3] Masatoshi Arikawa, Ruochen Si, Min Lu, 2017. Collaborative Spatio-time Referencing for Sustainable Human-centered Digital Content Archive, PNC 2017 Annual Conference and Joint Meetings. Nov. 7-9, 2017, Tainan, Taiwan.
- [4] Masatoshi Arikawa, 2016. Prospect the future of Japan Cartographers Association, Symposium of IMY, Journal of Japan Cartographer Association, Vol. 54, No. 4, pp. 40 (In Japanese).
- [5] Masatoshi Arikawa, Kezo Imai, Hiroshi Ota, Junko Suzuki and Takashi Morita, 2016. Appreciate, Consider and Discuss Maps and Culture. IMY Memorial Symposium, Journal of Japan Cartographer Association, Vol. 54, No. 2, pp. 39-43 (In Japanese).
- [6] Masatoshi Arikawa, Semantics in the evolution of mapping - cooperative representation process design between human and machine -, ICA Workshop - Towards Evolutionary Cartography from Global Perspectives (TEC2015), Windsor Florida Hotel, Rio de Janeiro, Brazil - August 21st, 2015



**(B) Activating and leading a research community on ubiquitous mapping in the world**

*[Original aim]*

The commission are organizing regional workshops including site observation to comprehend contemporary situation of ubiquitous mapping. Particularly, this commission focuses on East Asian modern cultures such as visual style and storytelling tailored for various user groups in Cartography, which is important as a growing economic-center and clarifies the regional differences between Eastern and Western situations of Cartography. We will investigate the diversity and soundness in the evolution of Cartography in the world.

*[Achievement]*

We have held the following international symposium and workshops on ubiquitous mapping.

[1] The workshop on thinking map collection archives of ICA 1980's International Map Exhibition in Tokyo for future applications was held on April 23th, 2016 in Kashiwa Campus Library of the University of Tokyo as a IMY event in cooperated with Japan Cartographers Association. The number of participants are about 50. The result was introduced at the website of IMY Web site. Also, the articles on the workshop was published in the Journal "Map" of Japan Cartographers Association, Vol.54, No.2, 2016, pp.39-43 in Japanese.

[2] The exhibition workshop on history of interpretation of the world and Japan through maps and globes was held on Oct. 21st, 2016 at Kashiwa Campus Library of the University of Tokyo as an IMY event organized by Honorary Professor Osamu Nishikawa and the commission of Ubiquitous Mapping in cooperated with Center of Spatial Information Science, Kashiwa Campus Library and DNP (Dai-Nippon Printing Co., Ltd.). In addition to historical analogue maps, atlases and globes, an interactive digital historical globe of Behaim (1492) on a tablet computer was also exhibited in public as an highresolution 3D digital archive created by DNP and BnF (Bibliothèque nationale de France).

[3] There was a pre-conference in the conjunctions with ICC2017 at College of William and Mary, Williamsburg, Virginia from June 30<sup>th</sup> to July 1st, 2017 co-organized by ICA three commissions, Maps and Internet, Education and training, and Ubiquitous Mapping.

[4] We organized a special session on "Spatiotemporal Knowledgebase" as collaboration with ICA commission of Ubiquitous Mapping, Center of Spatial Information Science, the University of Tokyo, and Center for Southeast Asia Studies, Kyoto University in PNC2017 Annual Conference on Nov. 7 to 9, 2017 in National Cheng Kung University, Tainan City, Taiwan. The mission of the Pacific Neighborhood Consortium (PNC) is to facilitate information exchanges among institutions of higher education in the Pacific Rim through computing and communications technology.

[5] We held an outdoor workshop for children and their parents to create their own original maps around Kashiwanoha Area of Kashiwa City, Japan using mobile mapping and geofencing applications on Nov. 23, 2017. It was cooperated with Urban Design Center of Kashiwanoha, Kashiwa City, Japan.

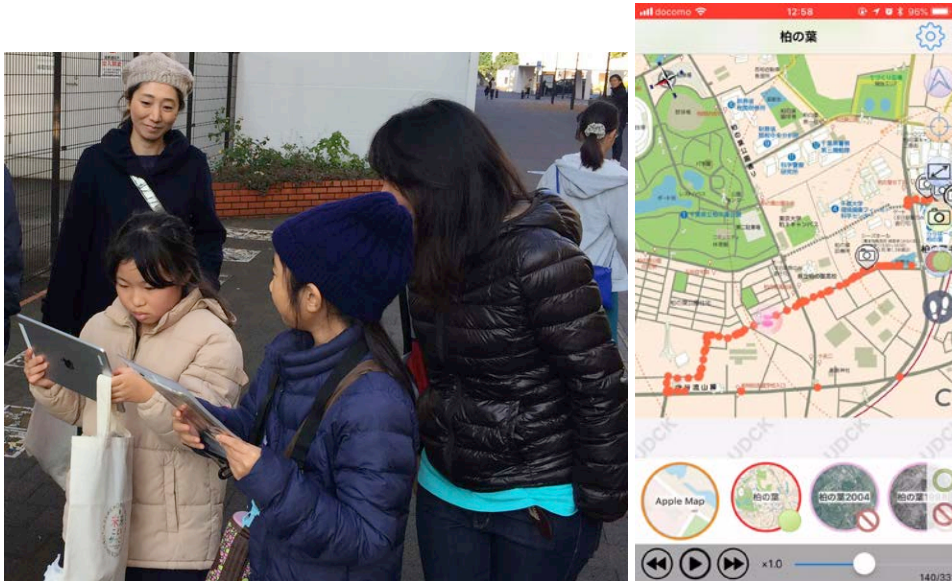


Figure 1. (left) A Scene of the workshop for children and their parents to learn and explore local history using mobile mapping and geofencing applications in Kashiwa City, Japan on Feb. 17, 2018. (right) An interface of the original smartphone application for recording trajectories and user generated spatial content for the workshop.

[6] We held an outdoor workshop for children and their parents to learn local history of the world war two around Kashiwa Airport using mobile mapping and geofencing applications in Kashiwa City, Japan on Feb. 17, 2018. The number of children joining it is 18.



Figure 2. (left) A Scene of the workshop for children and their parents to learn local history of the world war two around Kashiwa Airport using mobile mapping and geofencing applications in Kashiwa City, Japan on Feb. 17, 2018. (right) An interface of the original smartphone application for ubiquitous field experience and recording for the workshop.

[7] We organize a workshop for life long education to learn the principle of GPS and geofencing using smartphones as part of Open University of Japan at Akita University on July 21, 2018 in Akita City, Japan. The number of the participants is 17. The average age of the participants about 52 years old.



Fig. 3. Scenes of the workshop for adults to experience ubiquitous mapping to learn local history.

[8] ICA Joint Workshop on Future Internet and Ubiquitous Cartography 2019 (FIUCarto2019) in Akita, Japan during July 12 to 14, 2019

- Mapping sustainable evolution of maps and cartography between practice and theory –

Organized by ICA commissions of Maps and Internet, and Ubiquitous Mapping

Cooperated with Human-Centered Computing Course of Akita University

<Aims>

- Communication among researchers on latest technologies and theories in web, mobile and ubiquitous mappings and their applications and social problems
- Developing a research agenda on future internet and ubiquitous cartography for sustainable evolution of maps and spatial thinking based on IT society
- Mapping cartography, geography, history, technology, culture and society of Akita or local regions of Japan into our knowledge and media

<Dates and Place>

- Dates: July 12 to 14, 2019
- Place: Akita University, Tegata Campus, Akita City, Akita Prefecture, Japan
- Rooms 201 in Bldg. 5, Faculty of Engineering Science, Tegata Campus, Akita University





*Fig. 4 Group Photo of FIU2019 on July 12-14, 2019. Akita University, Japan.*



*Fig. 5 Group Photo of FIU2019 on July 12-14, 2019. Hachiro-gata Memorial Water Level Tower (140E, 40N), Japan.*

[Steering members:]

Chair: Masatoshi Arikawa (Akita University, Japan(2018-2019),

Center for Spatial Information Science, The University of Tokyo, Japan (2015-2018))

Vice-chair: Yuefeng Liu (Institute of Remote Sensing and GIS, Peking Univ., China)

Secretaries: Min Lu (Center for Spatial Information Science, The University of Tokyo, Japan (2015-2018)),

Ruochen Si (Center for Spatial Information Science, The University of Tokyo, Japan (2018-2019))

Advisors: Takashi Morita (Honorary professor of Hosei Univ., previous chair),

Yoshiki Wakabayashi (Tokyo Metropolitan Univ., Japan)

Executive Committee liaison: Monika Sester



## Commission on Use, Users, and Usability Issues

### About the Commission on Use, Users, and Usability Issues

The International Cartographic Association (ICA) has a longstanding interest in map use and user issues. The Map Use Commission first was established in 1984 and benefited from continual commission status since, excepting the 1999–2003 cycle. During this history, the commission has undergone multiple name changes, including Use & Usability and most currently Use, User, and Usability Issues (UUUI). A name change is proposed for the 2019–2023 terms of reference to the Commission on the User Experience (UX) to maintain our focus on user studies and usability research in cartography while exploring exciting new developments on user experience design in information visualization, human-computer interaction, usability engineering, and web design.

The 2015–2019 UUUI Commission terms of reference were approved with a Core Group of Kristien Ooms (Chair: University of Gent, Belgium), Artemis Skarlatidou (Vice Chair: University College London, UK), Alena Vondráková (Palaký University, Czechia), and Robert Roth (Vice Chair: University of Wisconsin-Madison, USA). Robert Roth relieved chairship duties from Kristien Ooms in 2018 due to a career shift from the University of Gent to industry.

### Flagship Results for 2015–2019

UUUI Commission activities resulted in **four** peer-reviewed publications and **eleven** organized events during the 2015-2019 terms of reference



Roth RE, A Çöltekin, L Delezari, HF Filho, A Griffin, A Hall, J Korpi, I Lokka, A Mendonça, K Ooms, and CPJM van Elzakker. 2017. User studies in Cartography: Opportunities for empirical research on interactive maps and visualizations. *International Journal of Cartography Special Issue on Envisioning the Future of Cartographic Research* (Eds: A Griffin, AC Robinson, and RE Roth). 3(Supp 1): 61-89. doi:10.1080/23729333.2017.1288534.

van Elzakker CPJM and K Ooms. 2017. Understanding map uses and users. In: *The Routledge Handbook of Mapping and Cartography* (Ed: AJ Kent and P Vujakovic). London: Routledge. p55-67.

Ooms K and A Skarlatidou. 2018. Usability engineering and evaluation. In: *The Geographic Information Science & Technology Body of Knowledge* (Ed: J Wilson). University Consortium of Geographic Information Science. doi:10.22224/gistbok/2018.1.9

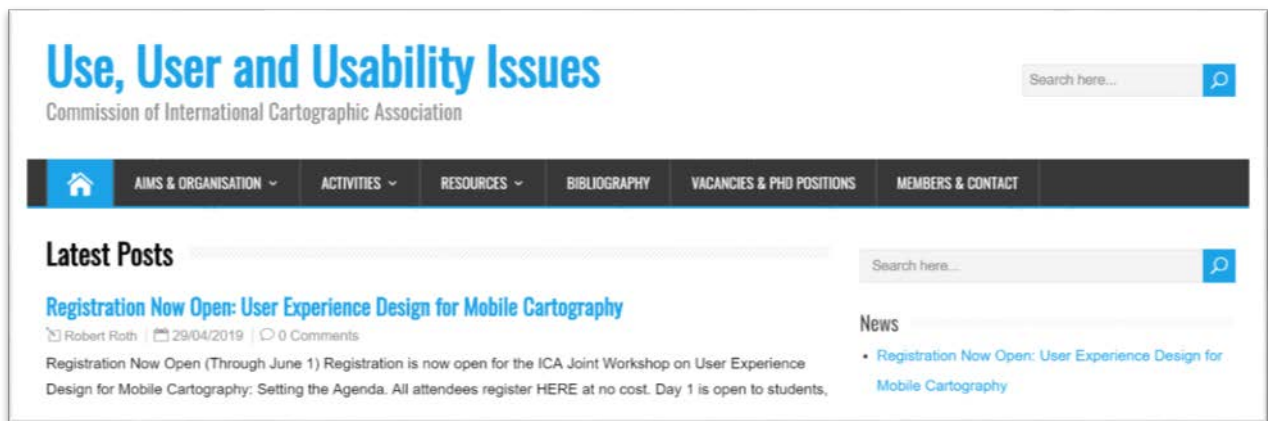
Roth RE. (forthcoming). How do user-centered design studies contribute to cartography? *Geografie, Special Issue from the 2018 Joint ICA Workshop on Atlases, Cognition, and Usability* (Eds: P Kubíček and A Griffin).



## Progress towards the Terms of Reference: 2015–2019

### 1. Update and Maintain a Commission Website:

The UUUI commission launched a new website in 2016. The purpose of the website is to promote exchange of knowledge, news, and information on use, users, and usability in cartography, geo-information processing, and related topics. The new website uses Wordpress drawing on style recommendations from the ICA template. All content on the prior website is archived on the new webpage. The website is accessible at <http://use.icaci.org>.



## 2. Maintain an Online Bibliography:

The UUUI commission launched an updated online bibliography in 2016. The bibliography collates research related to user studies in cartography for the purpose of sharing emerging research projects and facilitating graduate student research. Topics include: studies of user abilities and differences therein; use case studies with print, web-based, and mobile maps; map-based user interfaces (UI) and user experience (UX) design; user-centered design and usability engineering, as applied to map design and development; methods and techniques for evaluating products; the use of emerging mapping technologies. The bibliography is built on Zotero and is accessible online at <https://use.icaci.org/bibliography/>.

## 3. Develop a Review Paper from the Bibliographic Database:

The UUUI Commission along with the Commissions on Atlases and Cognitive Visualization organized a 2018 *Joint ICA Workshop* to discuss crosscutting research opportunities in cartography. The UUUI Commission contributed a review article on user-centered design methodology to a special issue from the workshop, drawing from the UUUI online bibliography. The paper will be published in a 2019 special issue of *Geografie* under the title “How do user-centered design studies contribute to cartography?” The UUUI Commission also contribute two peer-reviewed book chapters reviewing methods for user studies: one for the *Geospatial Information Science & Technology Body of Knowledge* titled “User-centered design and evaluation” and one for the *Routledge Handbook of Mapping and Cartography* titled “Understanding map uses and users”.

## 4. Generate an Online Reference for User Studies

The UUUI Commission continued discussion about the contents and structure for a handbook reference for user studies in cartography. The purpose of the handbook is to provide an overview of usability methods and techniques, including an FAQ, why/when to use the techniques, gold standards of experimental design, and tips for analysis and reporting. The handbook resource spans multiple terms of reference is a continued activity planned for 2019–2023.

## 5. Organize Sessions on User Studies at ICA Conferences

The UUUI Commission core group participated in the abstract review process and session organization for the 2017 and 2019 International Cartographic Conferences. The UUUI Commission accepted 21 papers for Washington, D.C., and 25 papers for Tokyo, although visa issues reduced the 2019 total to 17 papers. The UUUI Commission also participated in a special session in 2017 to introduce the collaborative research agenda, as discussed below.

## 6. International Training Workshops for Students and Non-specialists

The UUUI Commission organized six international workshops spanning four continents on use, user, and usability issues in cartography. These student and non-specialist sessions are included as additional, day-long events to other UUUI jointly held workshops. UUUI training workshops



since the inaugural 2012 workshop in Columbus (USA) include Curitiba, Brazil (2015), Albena, Bulgaria (2016), Olomouc, Czechia (2018), and both Nanjing and Beijing, China (2019). Training material is accessible online for adaptation and reuse at: <https://use.icaci.org/resources/modules-of-training-workshops/>.

## 7. Special Issue Article on User Studies in Cartography

The UUUI Commission along with the Commissions on Cognitive Visualization, Map Design, and Visual Analytics organized a special issue on “Envisioning the Future of Cartographic Research” published in the *International Journal of Cartography* in 2017. The UUUI Commission participated in the planning of two workshops supporting the special issue, the first in Curitiba, Brazil (2015) and the second in San Francisco, USA (2016). The special issue comprises five research agendas on the topics of (1) ICA history and trends, (2) geospatial big data, (3) user studies in cartography, (4) map use contexts, and (5) persistent issues in geovisualization. The UUUI Commission led development of the title “User Studies in Cartography: Opportunities for empirical research on interactive maps and visualizations” and contributed to planning and editing of all articles in the special issue.

## 8. External Workshops

In addition to the ICC special sessions, international training workshops, and IJC special issue workshops listed above, the UUUI contributed to four additional external workshops promoted under the ICA umbrella.

- *Workshop on User Experience Design for Mobile Cartography: Setting the Agenda*. 11-12 July 2019, Beijing, China. Organized jointly with the ICA Commission on Cognitive Visualization, Location-based Services, and Visual Analytics.
- *Workshop on Reproducibility in Cartography*. 27 April 2018, Olmouc, Czechia. Organized jointly with the ICA Commission on Cognitive Visualization and the ISPRS Working Group IX/9: Geovisualization, Augmented & Virtual Reality.
- *Workshop on Lessons Learned from Volunteers' Interactions with Geographic Citizen Science Applications*. 12 December 2017, London, UK. Organized jointly with the European Union COST Action Program and the ISPRS Working Group V/3: Promotion of Regional Collaboration in Citizen Science & Geospatial Technology

- *6<sup>th</sup> International Symposium on the History of Cartography*. 13–14 October 2016, Dubovnik, Croatia. Organized jointly with the ICA Commissions on History of Cartography, Map Production, and Geoinformation Management.

#### 9. Promote Students

The UUUI Commission maintains resources to involve young (PhD) and international researchers. To this end, the UUUI Commission maintains a list of PhD and faculty vacancies in the areas of user studies in cartography and geographic visualization, accessible at <https://use.icaci.org/vacancies-phd-positions/> . The UUUI Commission also maintains a membership list to promote networking for junior scholars and information dissemination regarding commission activities, accessible at <https://use.icaci.org/members-contact/>.



## Commission on Visual Analytics

**Co-Chairs:** Urška Demšar and Anthony C. Robinson

### Terms of Reference

In 2015, the ICA Commission on Visual Analytics proposed the following terms of reference for the period until 2019:

- Develop a new research agenda for visual analytics in cartography that couples key scientific and societal challenges in collaboration with related ICA Commission.
- Actively disseminate technical and methodological advances in cartographic visual analytics through workshops, seminars, and peer-reviewed publications – with linkages to other ICA Commissions and allied organizations in other fields.
- Conduct annual meetings to develop research in key thematic areas, partnering with international conferences and other ICA commissions to expand our reach beyond traditional venues and audiences.
- Maintain a dedicated web presence and engage with members via social media to highlight Commission activities and promote participation beyond attendance at in-person meetings through new forms of distance collaboration.

### Meetings & Workshops

Since 2015 the Commission on Visual Analytics has led the following meetings and workshops:

2018 - New Directions in Geovisual Analytics: Visualization, Computation, and Evaluation, a GIScience 2018 Conference Workshop held in Melbourne, Australia.

2016 - Understanding Spatial Data (Big and Small) with Visual Analytics, a GIScience 2016 Conference Workshop held in Montreal, Canada.

The Commission has also co-sponsored these events with other ICA Commissions and non-ICA sister organizations:

2019 - User Experience Design for Mobile Cartography: Setting the Agenda, an ICC 2019 pre-conference Workshop held in Beijing, China.

2017 - Early Career Researcher Workshop on Spatio-Temporal Analysis, Modelling, and Data Visualization for Movement Ecology held at the Lorentz Center in Leiden, the Netherlands.

2016 - Visually-supported Computational Movement Analysis, an AGILE 2016 Conference Workshop held in Helsinki, Finland.

2015 - Pre-ICC Workshop on Envisioning the Future of Cartographic Research held in Curitiba, Brazil.

## Publications & Journal Special Issues

The Commission on Visual Analytics has developed a range of articles to support the goals outlined in the 2015 Terms of Reference:

Griffin, A.L., Robinson, A.C., Roth, R.E. (2017). Envisioning the Future of Cartographic Research. *International Journal of Cartography*. 3(sup 1): 1-8. DOI: 10.1080/23729333.2017.1316466

Robinson, A.C., Demsar, U., Moore, A.B., Buckley, A., Jiang, B., Field, K., Kraak, M.-J., Camboim, S., Sluter, C.R. (2017) Big Data and Cartography: Research Challenges and Opportunities for Making Maps that Matter. *International Journal of Cartography*. 3(sup 1): 32-60. DOI: 10.1080/23729333.2016.1278151

Robinson, A. (2017). Geovisual Analytics. *The Geographic Information Science & Technology Body of Knowledge* (3rd Quarter 2017 Edition), John P. Wilson (ed.). DOI: 10.22224/gistbok/2017.3.6

Robinson, A.C. (2017) Visualization. *International Encyclopedia of Geography*. Douglas Richardson, et al. (ed.). DOI: 10.1002/9781118786352.wbieg0449

In addition, the Commission has edited and co-edited the following journal special issues:

2019 - *Information Visualization* - Special Section on Visual Movement Analytics:  
<https://journals.sagepub.com/toc/ivia/18/1>

2019 - *ISPRS International Journal of Geographic Information* - Special Issue on Geovisualization:  
[https://www.mdpi.com/journal/ijgi/special\\_issues/Geovisualization](https://www.mdpi.com/journal/ijgi/special_issues/Geovisualization)

2017 - *International Journal of Cartography* - Special Issue on Research Agendas in Cartography:  
<https://www.tandfonline.com/toc/tica20/3/sup1>

## Outreach & Web Presence

A new web presence was designed and implemented starting in 2015 with the goal of expanding the reach of the Commission through new avenues of digital engagement. In addition, the Commission launched a social media effort on Twitter to further support dissemination of Commission and Commission-related activities.

Commission Website: <http://www.viz.icaci.org/>

Commission Twitter Presence: <http://www.twitter.com/@icaviz>

ICA Commission on Visual Analytics co-chairs have been invited to present on Commission work at the following events:

Robinson, A.C. “Cartographic Connections Between Geospatial Humanities and Geospatial Education” Keynote address for the 2018 GI\_Forum Conference, University of Salzburg, Salzburg, Austria, July 16, 2018.

Demšar U., Context-aware Movement Analytics. Invited talk, Annual meeting/workshop of the British Ecological Society Special Interest Group on Movement Ecology: Swansea University, Wales, UK, 9 July 2018.

Demšar U., “Visual Movement Analytics” Keynote address at the 6th International Bi0-Logging Science Symposium BLS6, Konstanz, Germany, September 25-29, 2017.

Demšar U., “Visual Movement Analytics in 3D Conceptual Space” Keynote address at the GIS Ostrava 2017 symposium on Dynamics in GIScience, Technical University Ostrava, March 22-24, 2017.

Robinson, A.C. “Making Maps that Matter: New Challenges in Geovisual Analytics.” Keynote address for the 8th Geomundus Conference, Jaume I University, Castellón, Spain, November 4-5, 2016.

Robinson, A.C. “Challenges for Supporting Geovisual Analytics in Virtual Geographic Environments.” Invited lecture for the 6th Digital Earth Summit, Beijing, China, July 7-8, 2016.

Robinson, A.C. “Emerging Challenges for Geospatial Visual Analytics” Keynote address for the Korean Spatial Information Society, Seoul, Korea, September 17, 2015.

## Working group on Marine Cartography

**Chair:** Ron Furness (Australia)

**Vice-chair:** Lysandros Tsoulos (Greece)

**Secretary:** Shachak Pe'eri (USA)

**Background:** ICA has been active within the field of marine cartography through both Working Groups (WGs) and, until 2011, through the activities of an ICA Commission on Marine Cartography. The current Chair and Vice-chair proposed to the ICA Executive Committee at the General Assembly (GA) 16 in 2015 the re-establishment of the WG on Marine Cartography with a view to elevating it to Commission status at GA 17 (2019). The proposal was approved by the Executive Committee with the following broad aim and Terms of Reference.

**Broad aim:** Noting that the mission of the ICA is to promote the disciplines and professions of Cartography and GIScience in an international context, ensuring that both sciences are employed to maximum effect and full potential for the benefit of society, a significant and relevant field is defined as Marine Cartography and ICA supports the field representing the expert voice of cartography. The WG will seek GA approval in 2019 to become a Commission on Marine Cartography with revised Terms of Reference.

### Achievements against WG Terms of Reference:

*Establish (by end 2015) a cohort of interested members on the WG on Marine Cartography, working to consolidate the WG with the longer-term aim of re-establishing an ICA Marine Cartography Commission by the time of ICA General Assembly 2019.*

A cohort of interested cartographers representing some eighteen countries has been formed. While the work of the WG is aimed to be conducted primarily by correspondence, responding to opportunities supported by NOAA at their Nautical Charting Open Days in 2017 and 2018 allowed two meetings of the WG to be held at the NOAA Silver Spring office near Washington DC, the first contiguous with ICC 2017. Presentations were made and the work of the WG was publicised and promoted.

*Provide appropriate qualified and/or experienced occupants representing ICA membership (two persons) on the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.*

The Chair and Vice-Chair have both represented ICA as full members of the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) since 2002 and have thus attended eighteen annual meetings and at least five workshops during which the International Standards of Competence for Nautical Cartographers were drafted. The second and current edition (known as S-8 and available for download with Guidelines from [http://www.iho.int/iho\\_pubs/IHO\\_Download.htm](http://www.iho.int/iho_pubs/IHO_Download.htm)) was introduced in 2017. The Chair and Vice-chair were instrumental in drafting the Standards finally approved.

The IBSC maintains the internationally recognised standards of competence for hydrographic surveyors and nautical cartographers as well as assesses submissions of educational programs for recognition as meeting the standards. It meets annually in plenary as well as frequently in various member sub-sets as working groups. It has ten members: four representing the IHO; four, FIG

and two, ICA. Chairs of the IBSC are appointed in rotation for periods of three years and ICA has chaired the IBSC through Emeritus Professor Dr. Lysandros Tsoulos with Ron Furness assuming the Chair during the period commencing October 2019. Recent discussion within IBSC meetings has mooted the increase of ICA representation to four in recognition of increasing workloads. After what will become over 20 years of continuous service representing ICA on IBSC, the time approaches to find appropriately qualified and experienced replacements for the two current ICA representatives. This will be a priority task for the proposed Commission if created.

After more than five years of intensive work, it was pleasing that the Standards of Competence for Nautical Cartographers were finalized for both levels (Categories A and B) at the annual meeting of the IBSC meeting held in Wellington, New Zealand during March 2017. ICA was represented at the meeting by its ICA representatives who were closely involved as primary authors with the revision of the Standards from their previous versions. The International Hydrographic Organization (IHO) ratified the Standards during a meeting of its senior group, the Inter-regional Coordination Committee, which met in Paramaribo, Suriname between 12-14 June 2017. Subsequently the Standards were ratified unanimously by the IHO Member States through a voting procedure. The Standards have now been in full force for two submission years with two programs thus far recognised as meeting the relevant revised S-8 Standard, Category A or B. In the same period almost thirty hydrographic programmes have been recognized to which process the ICA representatives make significant contributions.

The new Standards have taken guidance from the curriculum approach known as Constructive Alignment (see for example Biggs and Tang, *Teaching for Quality Learning at University*, Open University Press (3rd Edition, 2007)). The focus is on describing Intended Learning Outcomes (ILOs) based on defined Content within an Assessment Regime designed specifically to test students' Knowledge against the ILOs. In the view of the IBSC, Competency equals Education and Training PLUS Experience.

The motivation behind the separation of the Category A and Category B requirements and the intended outcome of Category A and Category B education/training is as follows: Category A programmes introduce subjects from the beginning at the underlying principles level; and Category B programmes introduce subjects from a practical level. According to this framework, the Category B Standard is aimed at the basic educational and training requirements for nautical cartographers (S-8). The Category A Standard is aimed at the theoretical educational and foundational background necessary for nautical cartographers in-charge and cartographic managers who will develop specifications for nautical charts, establish quality control and quality assurance systems, and respond to the specific requirements of a full range of cartographic projects.

Bloom's taxonomy (Bloom, B.S. (Ed.) 1956, Anderson, L.W. et al. 2001) was applied to describe each intended learning outcome of the Standards and the associated verbs are an indication of the expected level of knowledge.

One of the three following levels of knowledge is associated with each element of the Standards.

- Basic - Basic knowledge of the subject provides familiarity with the concepts.
- Intermediate - Knowledge of the subject as far as theory and principles are concerned, sufficient to enable their application in practice.
- Advanced - Thorough knowledge of the subject in all its aspects to enable its application in all hydrographic and nautical cartography activities.



Why are Standards of Competence for Nautical Cartographers significant? The world's trade depends on shipping. One cannot, for example, fly across the Pacific Ocean unless shipping has stock-piled fuel at all airports along the route beforehand. Navigating the ocean environment is hazardous enough and nautical cartography plays a significant role in promoting safe maritime operations. The safety of shipping and lives at sea is an essential objective of nautical charting whether it be by traditional paper charts or by Electronic Navigation Charts (ENCs) integrated into the vessel's bridge systems, such as ECDIS (Electronic Chart Display and Information Systems).

Nautical cartographers have always needed to produce and present graphically complex ocean information that tests their professional competence. With the development of ENCs nautical cartographers have had to be even more highly competent as they compile multifarious data sets into a multiplicity of chart presentations. In an international context, adherence to approved international standards is critical but the underpinning of the applications needs to be founded on accepted cartographic principles and in this, ICA has a significant role to play.

It therefore follows that those cartographers working to deliver modern international chart services MUST be competent. As noted, the standards for nautical cartographers are published as International Hydrographic Organization (IHO) Special Publication S-8 and can be downloaded from the IHO website (see link above). The Standards are accompanied by a separate but extensive guidance document, the "Guidelines for the Implementation of Standards of Competence for Hydrographic Surveyors and Nautical Cartographers", also downloadable from the IHO website.

***Liaise with the CoastGIS Scientific Committee. (NB: the ICA Commission on Marine Cartography was a founding partner in the CoastGIS series of symposia).***

CoastGIS is a series of biennial symposia generally entitled GIS and Computer Cartography for Coastal Zone Management.

Originally conceived in 1995 as a "one off" symposium and supported by the then ICA Commission on Marine Cartography as well as now, this WG and in collaboration with the International Geographical Union's Commission on Coastal Systems, this now perennial meeting conducted its thirteenth manifestation in Ísafjörður, Iceland, September 27th – 29th, 2018. The theme, "Spatial Planning and Climate Change", was well addressed by participants and the meeting was attended by the Chair of this WG. The final day comprised a field trip through stunning coastal scenery from Ísafjörður to Reykjavik. Those persons interested in following up the programme may find details at [https://www.uw.is/conferences/coastgis\\_2018/](https://www.uw.is/conferences/coastgis_2018/). Of interest was a keynote presentation utilizing an Arctic SDI harmonized base map, using existing data from the Arctic Mapping Agencies, provides a unified view over the entire Arctic. See <https://geoportal.arctic-sdi.org/>

A previous CoastGIS meeting during this period was held in Cape Town, South Africa. ICA was represented by both events by the Chair of the WG.

***Maintain a positive ICA "voice" as the expert voice of cartography within the maritime industry.***

***Provide a focus group within ICA for harnessing authoritative cartographic advice pertaining to the maritime world, such as, but not exclusively, in the areas of navigation, ocean management and the depiction of ocean systems.***

*Liaise with IHO at the general working group level.*

*Liaise with the IGU Commission on Coastal Systems.*

*Articulate cartographic issues arising in the marine cartography industry sector and the ICA Commissions, suggesting areas where ICA cartographic expertise and research can be brought to bear on a specific issue or topic.*

Largely achieved through several correspondences but dominated by the significant workload arising from ICA representation on the IBSC. The Chair also represents ICA as an Observer on the IHO Nautical Cartography Working Group.

*Study the development of cartographic influence with special reference as a primary aid to the management of coastal regions of the world, including critical maritime incidents. (depends on interests of future WG members).*

Not yet achieved.

**Future:** A proposal is prepared for submission to ICA GA 17 in Tokyo for elevation to Commission status with simplified modified Terms of Reference.

**Chair:** Ron Furness (Australia) [rfurness@ozemail.com.au](mailto:rfurness@ozemail.com.au)  
**Vice chair:** Lysandros Tsoulos (Greece) [lysandro@central.ntua.gr](mailto:lysandro@central.ntua.gr)

22<sup>nd</sup> May 2019