PREFACE: THE 2021 EDITION OF THE XXIVTH ISPRS CONGRESS

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ICWG

1. INTRODUCTION

We report key elements and figures related to the proceedings of the 2021 edition of the XXIVth ISPRS Congress. Similarly to 2020, the COVID-19 pandemic caused global travel challenges and restrictions for the first half of 2021. Consequently, the physical Congress re-scheduled from June 2020 to July 2021 was again postponed to June 2022, still in Nice (France). Papers were already submitted and the ISPRS Council decided to carry out the review process and the publication of the proceedings of the papers submitted under the label "*2021 Edition*". The authors of published papers had the opportunity to present their work during a Digital Event, this year scheduled the same week as the planned Congress (5-9 July 2021).

2. KEY ELEMENTS

The International Program Committee (IPC) established in 2020 was kept in order to prepare and implement this 2021 edition. The IPC includes the Congress Director, the ISAC Chair, the Program Chairs, the Chair of the ISPRS Student Consortium, Technical Commission Presidents and Vice Presidents (TCP). In order to efficiently handle the large expected amount of papers related to the Thematic sessions (see below), Michael Ying Yang was nominated as *Thematic Session Chair* and integrated the IPC.
The templates for paper submission (both abstracts and full papers) were refined in order to clarify the review process of abstracts and ease the publication of the accepted papers. They are available on the ISPRS website.

2.1 Tracks & submission process

Authors had the possibility to submit their work through different tracks:

- Technical Commission tracks (5): one track for each Technical Commission, managed by the TCP and with topics corresponding to the TC Working Groups (WG);
- Youth Forum: managed by the ISPRS Student Consortium;
- Thematic Sessions (19): managed by the organisers of these sessions, either by invitation or open to everyone (more details in Section 2.3).

Same deadlines were decided both for abstracts and full papers (see Section 2.2). The main difference remains the format (2 pages with authors' names VS 6-8 anonymous pages, respectively).
The submission and the review processes of each TC were monitored by seven TC Correspondents (1 for each TC, except for TCIII with 2), that were also dedicated to help TCP and WG officers with the Conference Managing System (Conftool).

2.2 Important dates

The main drawback of large events is the significant time lapse between paper submission and the event. We reduced the global time frame mainly by minimising the reviewing period. This allowed to shift the submission deadline by more than one month without steadily modifying the notification date. As a consequence, authors of accepted abstracts have sufficient time to extend their paper.

- **4 February**: Deadline for abstracts & full papers;
- **7 March**: Notification of authors for abstracts;
- **5 March**: Notification of authors for full papers;
- **22 April**: Deadline for camera ready papers.

2.3 Thematic sessions

Thematic Sessions (TS) were created for the 2020 edition in order to promoting emergent and cross-discipline topics not covered by the ISPRS Working Groups (Mallet et al., 2020). 19 topics were selected among the 2020 TS and new proposals. They are listed in Table 1. Same deadlines and formats applied as for the TC tracks. Several of them only welcomed invited papers.
Each TS was linked to a specific TC. Final papers are published on the Volumes corresponding to this TC.

3. THE REVIEW PROCESS

3.1 Organisation

The overall workflow is described in (Mallet et al., 2018). Depending on the number of papers, TCPs either directly handled themselves the papers of their commission (TC I, II, V and Youth Forum), or they decided to involve Area Chairs for reviewer assignment and decision taking (TC III and IV). Area Chairs were selected among Working Group officers. Thematic

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Title	**Organiser(s)** (Country/Organisation)	**TC**
AI for knowledge discovery in geosciences	Anca Popescu (ESA) Diego Fernández Prieto (ESA)	II
CIPA	Fulvio Rinaudo (IT)	II
Cultural Heritage	Michal Younan (PS) Bayt Al Handasa (PS)	II
Deep Learning in Remote Sensing	Christian Heipke (ISPRS) Paolo Gamba (IEEE GRSS)	–
Deep learning for Satellite Image Time Series Analysis	Charlotte Pelletier (FR) Marc Russwurm (DE) Marco Körner (DE) Romain Tavenard (FR)	II
Digital twins: Vision papers	Arzu Çöltekin (CH) Chris Pettit (AU) Sidonie Christophe (FR) Victoria Rautenbach (ZA)	IV
EO challenges and opportunities for the SDGs	Marc Paganini (ESA)	–
EuroSDR/NMCAs	Fabio Remondino (IT) Jon Mills (UK)	V
Global Urban Observation and Information Initiative and the UN SDG 11	Qihao Weng (USA) George Xian (USA)	–
ISPRS Scientific and Educational & Capacity Building Initiatives	Songnian Li (ISPRS)	V
Image-to-Image translation in remote sensing	Michael Schmitt (DE) Naoto Yokoya (JP)	III
LULC Change Detection and Updating	Ammatzia Peled (IL)	III
News Approaches in Radio Sciences for Disaster Management and Remote Sensing	Tullio Tanzi (FR) Madhu Chandra (DE) Orhan Altan (TR)	III
OGC Standards - Driving Reproducibility of Scientific Workflows	Ingo Simonis (OGC)	–
Polarization Remote Sensing and Photogrammetry	Lei Yan (CN) Ruihua Zhang (CN)	–
Processing of multi-satellite and bi-static SAR constellation data	Timo Balz (CN) Robert Wang (CH)	I
Simulation & Visualization	Sidonie Christophe (FR) Arzu Çöltekin (CH)	IV
Towards Resilient and Ubiquitous Navigation	Dorota Grejner-Brzezinska (US) Allison Kealy (US) Charles Toth (US)	I
Unconventional applications for geo-spatial deep learning	Matthieu Molinier (FI) Devis Tuia (NL)	III

Table 1. Thematic Sessions of the 2021 edition of the ISPRS Congress. ”–” means no papers were published in the proceedings.

Session organisers directly acted as Area Chairs under the supervision of the Thematic Session chair.
In order to preserve the double-blind pee-review process for full papers and to guarantee objectivity in decision taking, we adopted the following strategy:

- Papers co-authored by TCPs and Area Chairs were directly handled by the Program Chairs;
- Papers co-authored by TS organisers were handled by another organiser or by the Thematic Session Chair.

Again, the IPC decided to use the "*Conditionally Accepted*" status for abstracts without sufficient evidence of scientific quality. This let the possibility to reject them if the camera-ready paper did not sufficiently take reviewers' remarks into account (see below for the detailed statistics). Many authors with this status provided a rebuttal letter with their camera-ready paper to explain how they extended and improved their contribution. 87 papers were under this status. After the withdrawal of 11 papers, 13 were eventually rejected (17%) and the other ones published.

3.2 Plagiarism detection

All accepted papers were scrutinised by the iThenticate software in order to detect cases of plagiarism. The software provides a full report for each paper. In particular, it computes a *similarity score* by comparing the contribution with iThenticate proprietary database, databases of other content providers, and documents retrieved through standard Internet search. A global similarity score is retrieved by agglomerating individual matching scores. High scores corresponded to either a strong overlap with preprints (which does not violate the ISPRS policy on preprints) or with journal papers. In the latter case, authors withdrew their contribution.

3.3 Statistics

667 papers were submitted (431 abstracts and 236 full papers). 620 were conditionally accepted (92.9%) and 466 were eventually published (69.8%). This initially corresponds to 268 abstracts (62.1%) and 198 full papers (84%). 353 papers are published in 5 volumes of the ISPRS Archives while 113 are published in the ISPRS Annals (57.1% of the published full papers, 24.4% of the published papers and 17% of the submitted papers). We notice a slight decrease with respect to 2020.
Due to the announcement of a 2021 edition, we registered multiple withdrawals, either officially or unofficially (no upload of camera-ready papers). The trend remains less impactful than in 2020 (18.5% of the submitted papers instead of 30.5). This corresponded to 122 papers (106 abstracts and 16 full papers).

The papers were submitted by 2,147 authors from 56 countries (Africa: 2.7% - Asia: 28.7% - Europe: 56.7% - North America: 6.6% - Oceania: 1.1% - South America: 4.2%, see Figure 1) with a predominance for Technical Commission III (31.7%, Figure 4). The ratio between continents remains stable with respect to the 2020 edition except for Europe and Asia (+13% and -13%, respectively).

Papers were evaluated by 450 reviewers from 51 countries (Africa: 1.3% - Asia: 34.6% - Europe: 47.4% - North America: 10.3% - Oceania: 3.8% - South America: 2.6%, (Figure 2). reviews were provided. We noticed ∼8% of missing reviews:

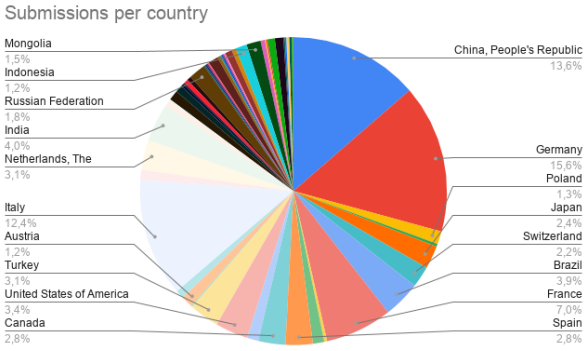

Figure 1. Submitted papers per country.

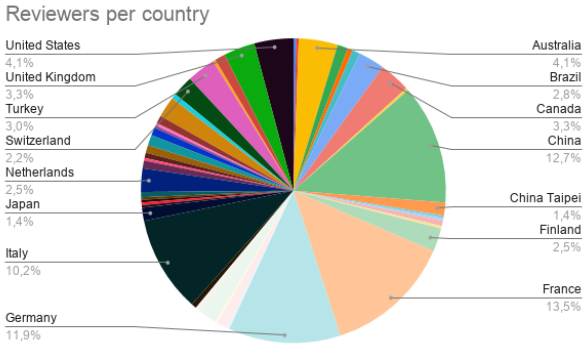

Figure 2. Reviewers per country.

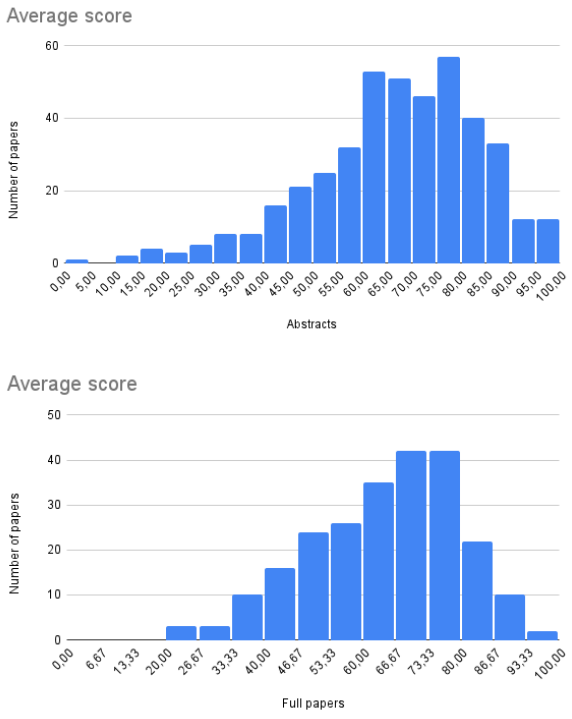

Figure 3. Average review scores for the submitted papers.

Track	Abstracts		Full papers			Published papers	
	Submitted	Archives	Submitted	Archives	Annals	% Archives	% Annals
Total	**431**	**268**	**236**	**85**	**113**	**52.9**	**16.9**
I	40	21	25	7	17	43.1	26.2
II	111	76	59	32	20	63.5	11.8
III	138	98	72	20	38	56.2	18.1
IV	66	44	42	12	24	51.9	22.2
V	7	3	4	1	3	36.4	27.3
Youth Forum	2	2	1	1	0	100	0
Thematic Sessions	67	24	33	12	11	36	11

Table 2. Detailed statistics for each track.

emergency reviews were directly performed by TCPs and Area Chairs.

The most popular Working Groups were: *Agriculture and Natural Ecosystems Modelling and Monitoring* (III-10, 35 papers)n *Point Cloud Processing* (II-3, 33 papers), *Thematic Information Extraction* (III-1, 31 papers), *3D Scene Reconstruction and Analysis* (II-4, 30 papers), and *Spatial Data Analysis, Statistics and Uncertainty Modelling* (IV-3, 28 papers). In TCI, this corresponds in the InterCommission Working Group on *UAS & Small Multi-sensor Platforms: Concepts Applications* (14 papers, with TCII). We are again very close to the trend of the 2020 edition (Mallet et al., 2020).

We collected 2.1 reviews per paper in average (2.0 reviews for abstracts and 2.4 reviews for full papers). Again, the evaluation criteria, leading to a score between 0 and 100, allowed to capture the main strengths and weaknesses of the submitted contribution and contributed to smoothly discriminate papers that should be rejected, accepted to the Archives or the Annals (Figure 3).

4. AWARDS

4.1 Young Author's Award

Based on the review process, each Technical Commission selected one paper for this award. The awardees are:

TC I: Sensor systems

- **Jiayuan Li**, Yongjun Zhang, Qingwu Hu (CN) for "*Robust estimation in robot vision and photogrammetry: A general model and its applications*".

TC II: Photogrammetry

- **Rahima Djahel**, Bruno Vallet, Pascal Monasse (FR) for "*Towards efficient indoor/outdoor registration using planar polygons*".

TC III: Remote Sensing

- **Milad Niroumand-Jadidi**, Francesca Bovolo (IT) for "*Water quality retrieval and algal bloom detection using high-resolution CubeSat imagery*".

TC IV: Spatial Information Science

- **Oskar Wage**, Monika Sester (DE) for "*Joint estimation of road roughness from crowd-sourced bicycle acceleration measurements*".

TC V: Education and Outreach

- **Clémence Dubois**, Boris Jutzi, Marc Olijslagers, Carsten Pathe, Christiane Schmullius, Martyna Anna Stelmaszczuk-Górska, Danny Vandenbroucke, Martin Weinmann (DE) for " *Knowledge and skills related to active optical sensors in the body of knowledge for earth observation and geoinformation (EO4GEO BoK)*".

4.2 Outstanding Reviewers

The Technical Commissions recognized the following reviewers as "Outstanding Reviewers" for their thorough reviews and deep involvement in the process:

- TC I: Jan Skaloud (EPFL, CH).
- TC II: Ronny Hänsch (German Aerospace Center, DE), Vladimir V. Kniaz (GosNIIAS, RU).
- TC III: Hussein Abdulmuttalib (Dubai Municipality, UAE), Orhan Altan (Istanbul Technical University, TR), Xianlian Liang (Finnish Geospatial Researc Institute, FI), Maria Teresa Melis (University of Cagliari, IT), Ammatzia Peled (University of Haifa, IL), Francesco Pirotti (University of Padova, IT), Wei Yao (The Hong Kong Polytechnic University, CN), Mitsunori Yoshimura (The University of Tokyo, JP), Yongnian Zeng (Central South University, CN).
- TC IV: Debaditya Acharya (RMIT University, AU), Jan Blachowski (Wroclaw University of Science and Technology, PL), Gorica Bratic (Politecnico di Milano, IT), Youness Dehbi (University of Bonn, DE), Dongyang Hou (Central South University, CN), Levente Juhasz (Florida International University, US), Éric Saux (École Navale, FR), Michail Vaitis (University of the Aegean, GR).
- TC V: Veraldo Liesenberg (Santa Catarina State University, BR).

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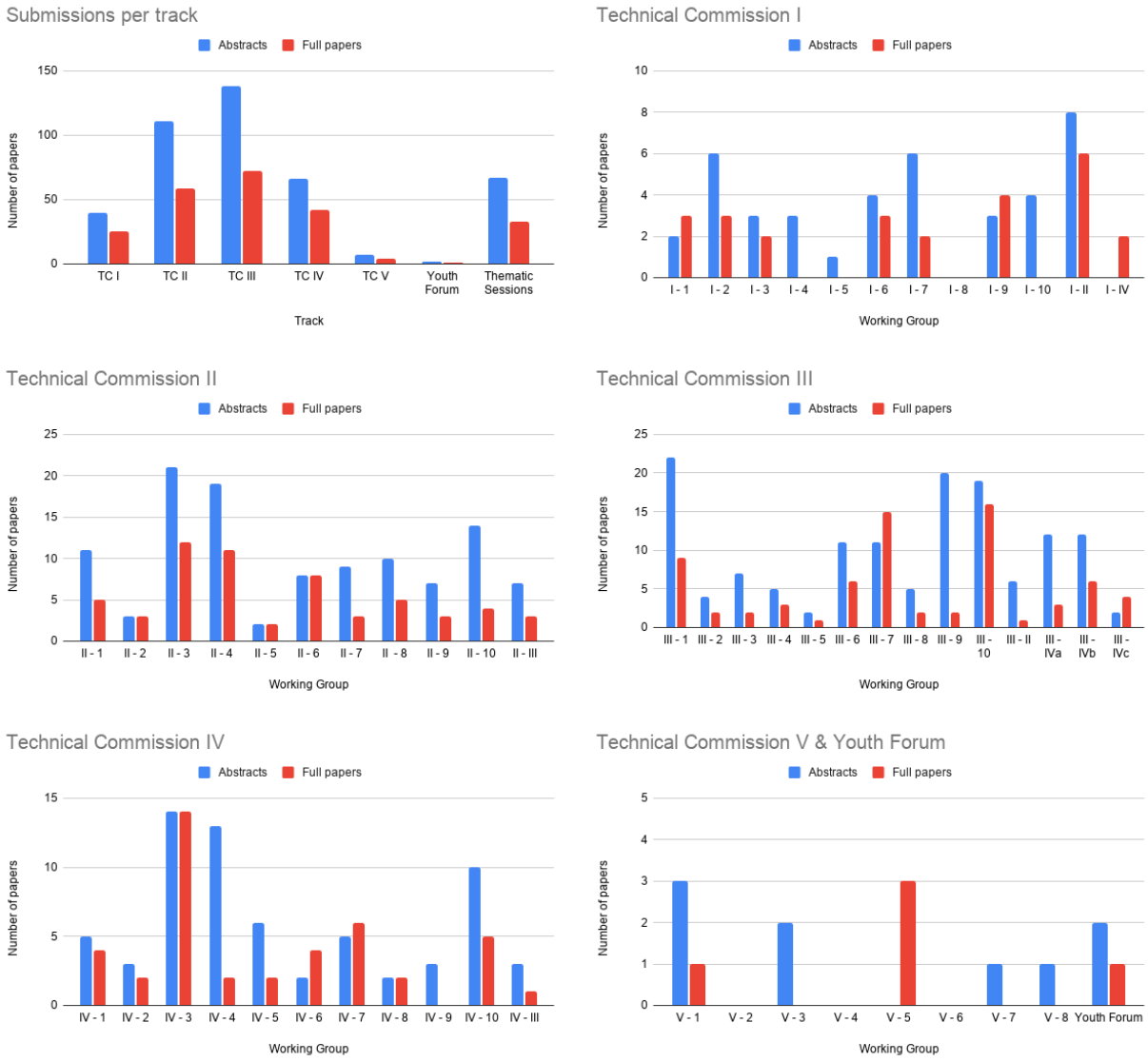

Figure 4. Paper submission statistics.