

## STATUS REPORT OF ISPRS WG II/4 "IMAGE DATA STANDARDS", 2000 - 2002

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### Commission II, WG II/4

**KEY WORDS:** Standard, ISO, OGC, Remote Sensing

#### ABSTRACT:

The image data formats have been considered as an important area for standardization since the formation of ISPRS WG II/7 "Practical and implementation issues in digital mapping" in 1996. In year 2000 this working group was renamed and renumbered to WG II/4 "image data standards".

ISPRS WG II/4 is not the sole player in the standardization of remotely sensed image data in the world. However, WG II/4 has a unique position in this field because of

- Profound expertise in the geometric usage of image data based on a long photogrammetric tradition
- Good knowledge of the pros and cons of the latest remote sensing technologies because of close links to multiple manufacturers
- Good understanding of the needs of modern mapping and the production of digital imagery based on the membership of many leading companies

The WG II/4 maintains regular contacts with other organizations in the standardization business. A particularly close co-operation exists with ISO/TC211 project 19130 "Sensor and data models for imagery and gridded data". Thus the members of the ISPRS WG II/4 have been regularly informed about the work of the ISO project 19130. In June 2001 a joint meeting between WG II/4 and ISO 19130 project team took place in Berlin with experts from both sides who have never met before.

Information has been exchanged regularly with the OGC. Some important representatives of OGC are also members in the WG II/4. A part of the OGC 's efforts in the field of standardization also covers the fields of remote sensing and sensors. The WG II/4 has helped to integrate the different developments.

### 1. INTRODUCTION

The ISPRS WG II/4 "Image data standards" was formed at the ISPRS Congress 2000 in Amsterdam. It is the successor of the former WG II/7 "Practical and implementation issues in digital mapping". Presently the WG II/4 has 62 listed members from 13 countries. Since its inception, the WG II/4 has held two meetings, the first in October 2000 and the second in June 2001, both in Berlin, Germany. A total of 16 participants from 6 countries attended the meetings. In order to keep the other members informed, 9 newsletters were sent around the world.

### 2. TERMS OF REFERENCE

According to the terms of reference, the WG II/4 guaranteed close co-operation with the standardization efforts of ISO/TC211 in the field of photogrammetry and remote sensing. The WG II/4 also co-operates with OGC and OEEPE in the field of data exchange format standardization.

For the readers who are not familiar with the acronyms ISO/TC211, OGC, and OEEPE the full versions are: ISO stands for International Organization for Standardization, TC211 stands for Technical Committee 211 "Geographic information – geomatics", OGC stands for OpenGIS Consortium, and OEEPE stands for the French terms "Organisation Européenne d'Etudes Photogrammétriques Expérimentales".

ISPRS is a liaison member of ISO/TC211. This means that the members of ISPRS are allowed to directly participate in the process of the development of ISO/TC211 standards without being nominated as a member of a national standardization body. Personal links exist between ISPRS WG II/4 and ISO/TC211 and OGC. ISO/TC211 is subdivided into projects. Liping Di is project-leader and Wolfgang Kresse is editor of the ISO/TC211-project 19130 "Sensor and data models for imagery and gridded data". Both are members of the ISO/TC211-project 19129 "Imagery, gridded and coverage data framework" as well. Liping Di regularly attends the OGC-meetings.

The WG II/4 had the honour to represent the ISPRS at the session on standards during the FIG-congress in Washington in April 2002. Liping Di gave the presentation.

### 3. ISO/TC211 PROJECT 19130

The strongest impetus towards setting an international standard for photogrammetry and remote sensing comes from the two ISO/TC211-projects. The key players there are the United States, Canada, Germany, the International Hydrographic Organization (IHO) and, indirectly, the OGC. According to the present time frame, project 19130 is to be completed as an international standard in November 2004.

The standard ISO 19130 will be a content standard. On one hand it covers the field of remote sensing in a rather broad sense.

It ranges from frame cameras and line scanning instruments to hydrographic surveys. It also includes devices like Synthetic Aperture Radar and Laser Scanning. On the other hand it only deals with the content necessary to the georeference the raw data. Nevertheless, the parameters are rather numerous as all relevant production levels of satellite images, data history, and many other attributive elements are included in the standard [Di, etal, 2002].

The ISO 19130 will not be an implementation standard. It has been deliberately limited to a content standard for two main reasons:

- The implementation techniques change at fairly short intervals. At present the extensible markup language (XML) is the most favourite tool for the implementation of descriptive parameters. More advanced techniques might show up sooner or later. It is hoped that ISO 19130 will have a much longer life cycle.
- The implementation of the standard involves a lot of programming work. This cannot be archived by the expert team of a standardization committee. The implementation is the task of the software companies. They have made extensive efforts to bring some solutions to market.

The Digital Photogrammetry Markup Language (DPML) was published a year ago. It is a joint effort between ZI-Imaging and PCI Geomatics and it mainly covers the parameters used in photogrammetric production flow [Fellah,2002]. The sensor markup language (SensorML) is also a year old, developed by NASA. In the remote sensing field it is used to cover all sensor specific parameters. The solution for in-situ sensors has been published already [Botts,2002]. ISO 19130 is to be like an umbrella standard for all of them making their contents exchangeable.

#### 4. JOINT MEETING ISPRS WG II/4 WITH ISO/TC211 PROJECT TEAMS

Customarily, most of the members are observers only. This is quite understandable because it is rather difficult to take part in the intensive discussion which is carried on almost simultaneously in the forums of ISO/TC211 and elsewhere.

The second meeting of WG II/4 in 2001 was therefore held as a joint meeting between the ISPRS WG and both project teams of ISO 19130 and ISO 19129. In the course of the meeting the ISPRS-members became acquainted with the rule-based procedure of ISO with its fairly short time frame and its intention to agree on a world wide basis.

The ISO-members took a great interest in hearing directly from the ISPRS-experts about the new developments in digital photogrammetry. According to the ISO-rules, international standards have to be approved in a democratic decision process by the majority of all member countries. In reality the contents of the ISO standards extends only as far as the expertise of the project teams does. Therefore co-operation with the technical experts of the ISPRS WG II/4 was and will be very important for the creation of an accepted and high-quality international standard.

Development is not at a stand-still. New spaceborne systems with high-resolution optical sensors or SAR- and InSAR-devices have just been implemented. The new airborne photogrammetric digital frame array camera and digital line

camera have recently proved their operability. Systems like them are not part of the present working draft. But the ISO 19130 sensor model and the related data models have been designed to allow for the integration of new sensors. The ISPRS WG II/4 is effectively the expert group which contributes the latest sensor systems to the standardization process.

#### 5. POSSIBLE TOPICS OF FUTURE STANDARDIZATION

The original goal envisaged by the former working group II/7 "Practical and implementation issues of digital mapping" was different from what has been developed in co-operation with ISO/TC211 to date. The original idea was to develop a complete software interface for the data exchange which could enable software suppliers to open their systems for the benefit of users. There is still strong demand on the application side for a flexible exchange of data at many stages of the production flow in photogrammetry and remote sensing.

The original group deliberately consisted of representatives from industry, from the application side and from science. This has turned out to be a successful mixture.

The current status of the group's work may be considered as being half way towards the original goal as the task of programming the software interface turned out to be far too big for a small standardization committee. On the other hand, the present size and depth of the content standard goes far beyond the ideas which the original group had in mind.

The development of the encoding stage may now follow step by step according to resources and demand.

Future discussion will bring up new fields where standardization could be desirable. The following examples may be given. So far ISO 19130 focuses on georeferencing imagery. Most of the peripheral instruments have not been taken into account. The interfaces to a GPS-receiver or to an Inertial Measurement Unit may require more metadata elements than presently supplied.

Furthermore ISO 19130 focusses on medium to small scale applications only. As everybody knows, the market for large scale applications is growing fast: high resolution satellites, 3D-city-models, location based services etc. The experts for standardization should keep a close eye on the development in these areas in order to help the industry and the user and to make the best use of the potentials of photogrammetry and remote sensing.

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