

DOCUMENT

3rd Workshop on preparations for Sentinel-2 in Europe: Workshop summary

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3rd Workshop “Preparations for Sentinel-2 in Europe”

Workshop summary

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Introduction

The 3rd workshop on preparations for Sentinel-2 in Europe was completed at the Norwegian Space centre in Oslo October 9th and 10th 2018, with more than 50 participants from 14 countries. As the title says, it was so far the last workshop in a series of workshops held on preparations for the Sentinel-2. We started in 2014, where we had presentations focussed on plans for Copernicus and Sentinel-2. The second workshop gave us the first user experiences, and the early start of the National Ground Segments throughout Europe.

We have now reached a phase where both Sentinel-2 satellites are in orbit and are delivering data. The main goal for this workshop was to give the users the Sentinel-2 data the latest information from ESA Ground Segment and their archive and distribution services, but also knowledge about the Copernicus Data and Information Access Services (DIAS). One representative from the DIAS „ONDA“ was present at the workshop. In addition to experience gained from different national Collaborative Ground Segments (CGS), there were also several presentations from operational use of Sentinel-2 data. A break out session focussed on Quality on DEMs used for ortho rectification of Sentinel-2 data, and on a discussion of the role for DIAS vs. the national initiatives on Collaborative Ground Segments.

Invitation

EuroSDR, Norwegian Mapping Authority and Norwegian Space Centre invites you to the 3rd workshop on "Preparations for Sentinel 2 in Europe". The workshop will take place in Oslo 9th and 10th October 2018 at the premises of the Norwegian Space Centre.

This workshop, co-organized by EuroSDR, Norwegian Space Centre and the Norwegian Mapping Authority, aims to give the users of the Sentinel-2 satellites the latest information from ESA Ground Segment, but also knowledge and experience from different national Collaborative Ground Segments (CGS). Following the classical structure of EuroSDR workshops, this workshop will also be organized around presentations of participants' best practice from use of Sentinel-2 data, and of course break out discussions.

Registration will open soon!

General information

Date: October 9th - 10th, 2018 (Starting at noon the first day and finishing at 1:00 pm the second day)

Contact: Jon Arne Trollvik, Norwegian Mapping Authority, Chair Commision 3 EuroSDR (jon.arne.trollvik@kartverket.no)

Website: <http://www.eurosdrr.net/workshops/3rd-workshop-sentinel-2>

Venue: Norwegian Space Centre, , 6th floor Drammensveien 165, 0277 Oslo

Dates: October 9th and 10th 2018.

The workshop will be free of charge, coffee breaks and lunch both days included.

Deadline for registration: October 5th 2018

Maximum number of participants: 50

Program committee

Michael Hovenbitzer BKG-Germany, Clément Mallet IGN-France, Anja Strømme NSC-Norway, Trygve Halsne MET-Norway, Torgeir Ferdinand Klingenberg and Jon Arne Trollvik NMA-Norway

Program



Title	Preparations for the Sentinels in Europe
Objective	Initiate contact and collaboration among European mapping agencies, institutes and companies involved in work to support national users of data from the fleet of Sentinel satellites, with special focus on Sentinel-2.
Goal	This workshop, co-organized by EuroSDR, Norwegian Space Centre and the Norwegian Mapping Authority, aims to give the users of the Sentinel-2 satellites the latest information from ESA Ground Segment, but also knowledge and experience from different national Collaborative Ground Segments (CGS). There will also be presentations from operational use of S-2 data, and finally break out discussions.
Venue	Premises of the Norwegian Space Centre, Oslo, Norway 6th floor, Drammensveien 165, 0277 Oslo (http://www.romsenter.no/eng).
Dates	October 9th and 10th 2018
	<i>Day 1 October 9th</i>
11:30 – 12:30	Registration and lunch
12:30 – 12:40	Welcome address and practical information
12:40 – 12:45	Introduction to EuroSDR
	<i>Session 1: Update from ESA on the Sentinels /ONDA DIAS / Sentinel 2 Global</i>
12:45 – 13:40	Copernicus Sentinel-2 Mission Status and DIAS overview <i>Ferran Gascon, ESA</i>
13:40 – 14:00	ONDA-DIAS Service Solution Overview <i>Enrico Cadau, Serco-It</i>
14:00 – 14:30	<i>Coffee break</i>
14:30 – 14:50	The Copernicus Sentinel 2 Global Mosaic (S2GM) Service. <i>Carsten Brockmann, Brockmann consult, Ger</i>
	<i>Session 2: CGS in operation - Commercial contracts vs. National initiatives</i>
14:50 – 15:10	The Norwegian National Ground Segment; Preservation, Distribution and Exploitation of Sentinel data. <i>Trygve Halsne, MET-No</i>
15:10 – 15:40	<i>Coffee break</i>
15:40 – 16:00	CODE-DE - Sentinel Data Supply and Processing for Germany <i>Christoph Reck, DLR-Ger</i>
16:00 – 16:20	The French land data and service centre (Theia) : Current outcomes of value-added products using Sentinels <i>Arnaud Sellé, CNES-Fr</i>
16:20 – 16:40	Austrian Data Cube: An EODC service for the Austrian EO user community <i>Tim Ng, EODC-Au</i>
	<i>Session 3: Break out</i>
16:40 – 16:50	Introduction to break out - Quality on DEMs and DIAS vs. NCGS <i>Torgeir Ferdinand Klingenberg, Norwegian Mapping Authority</i>
16:50 – 17:50	Break out discussion in groups
17:50 – 18:00	Practical information and closure of workshop day 1
20:00 - 00:00	Common dinner (no host)

	<i>Day 2, October 10th</i>
08:45 – 09:00	Coffee
09:00 – 09:05	Introduction and practical information
09:05 – 09:35	Wrap up from group discussions
	<i>Session 4: Use cases / Best practice</i>
09:35 – 09:55	Water Quality products from Sentinel 2 and Sentinel 3 <i>Carsten Brockmann, Brockmann consult-Ger</i>
09:55 – 10:15	Temporal Structured Classification Using Sentinel Image Time Series for Crop Type Mapping. <i>Sebastien Giordano, IGN-Fr</i>
10:15 – 10:35	Using the Sentinels to map the state and changes of Norwegian glaciers <i>Liss M. Andreassen, NVE-No</i>
10:35 – 11:00	<i>Coffee break</i>
11:00 – 11:20	Experiences at NIBIO with Sentinel for forest and agriculture mapping and monitoring. <i>Arnt Kristian Gjertsen, NIBIO-No</i>
11:20 – 11:40	The Copernicus emergency service <i>Ola Norbeck, NSC-No</i>
11:40 – 11:55	Copernicus-EMS-Activation in Germany <i>Michael Hovenbitzer, BKG-Ger</i>
11:55 - 12:00	Wrap up /recommendation for further work /end of workshop
12:00 – 13:00	Lunch

List of participants

Surname	Name	Organisation	Country
Aas	Christina	Science [&] Technology AS	Norway
Andras	Zelenka	eNET Internetkutato Kft.	Hungary
Andreassen	Liss	NVE	Norway
Balazs	Melykuti	Topoxel Kft	Hungary
Brockmann	Carsten	Brockmann Consult GmbH	Deutschland
Budewitz	Nico	MET	Norway
Cadau	Enrico Giuseppe	ESA	Italy
Cumiskey	Marina	Office of public Works	Ireland
De Joinville	Olivier	DGAC (French Civilian Aviation Direction)	France
De Stefano	Matteo	NINA	Norway
Dehls	John	Geological Survey of Norway	Norway
Dick	Øystein B.	NMBU	Norway
Ekholm	Anders	Lantmäteriet	Sweden
Engelhardt	Suruchi	NVE	Norway
Foss	Solfrid	Norwegian Ministry of Climate and Environment	Norway
Gascon	Ferran	ESA	Italy
Giordano	Sébastien	IGN	France
Gjertsen	Arnt Kristian	NIBIO	Norway
Groesz	Floris	Blom Norway	Norway
Halsne	Trygve	MET Norway	Norway
Hopkins	Jason	Ordnance Survey	UK
Hovenbitzer	Michael	Federal Agency for Cartography and Geodesy	Germany
Johansen	Bernt	Norut	Norway
Johansen	Bernt	Norut Tromsø	Norway
Jozefiak	Maria	Science [&] Technology	Norway
Kamper	John	Agency for Data Supply and Efficiency	Denmark
Kjekshus	Ole Christian	Kartverket	Norway
Kjærside	Theresa	Danish Agency for Data Supply and Efficiency	Denmark
Klingenberg	Torgeir Ferdinand	Norwegian Mapping Authority	Norway
Korsnes	Andreas	Norwegian Mapping Authority	Norway
Kristensen	Søren	NVE	Norway
Langkaas	Line	Norwegian Mapping Authority	Norway
Ledang	Anna Birgitta	Niva	Norway
Moldestad	Dag Anders	Norwegian Space Centre	Norway
Moquet-Stenback	Agnès	Miljødirektoratet	Norway
Nesje	Øystein	Ministry of Climate and Environment	Norway
Ng	Wai Tim	EODC - Earth Observation Data Centre for Water Resources Monitoring	Austria
Nordbeck	Ola	European Commission	Belgium
Orthe	Nils Kristian	NVE	Norway
Pöchtrager	Markus	University of Vienna	Austria

Reck	Christoph	DLR Oberpfaffenhofen	Germany
Rolstad Denby	Cecilie	NMBU	Norway
Rostad	Stian Rostad	Blom Norway AS	Norway
Sandbo	Hilde C.	Statens vegvesen, Norwegian road administration	Norway
Sellé	Arnaud	CNES	France
Steinnes	Margrete	Statistics Norway	Norway
Strømme	Anja	Norwegian Space Centre	Norway
Sørensen	Kai	NIVA	Norway
Trollvik	Jon Arne	Norwegian Mapping Authority	Norway
Tuokko	Jurkka	NLS Finland	Finland
Ytre-Eide	Martin	Statens strålevern	Norway
Zesiger	Mathias	swisstopo	Switzerland

Photos



Participants at the workshop. Photo: Marianne Moen Norwegian Space Centre



All photos: Marianne Moen, Norwegian Space Centre

Break out discussion summary

The summary is based upon the outcomes of discussions in the four working groups. The discussion was divided into two different topics: (1) Quality of Digital Elevation Models (DEMs) and (2) Data and Information Access Services (DIAS) and National Collaborative Ground Segments (NCGS).

Summary of the first topic: Quality of DEMs:

Q1: Definition of good enough DEM – what do we need?

- 30m resolution elevation model is probably good enough for Sentinel-2. Should use best available elevation model for basic processing
- The relief is a concern regionally/nationally and not on a European level. 30 meters is enough for most of the areas.
- Quality needs to be well defined not only the horizontal resolution
- The main objective is the accuracy and precision of the geolocation of a pixel.
 - o The resolution of the DEM is only one aspect; its accuracy is likewise important
 - o The knowledge of location of S2 (orbit state vector) and its observation geometry are a second contributor which finally determine the accuracy of the pixel. This set limits to where further improvement of the DEM has an impact.
 - o ESA has studied this in detail; the report has been delivered to Copernicus and interested people should request it from their national delegates
- The main issue is at high latitudes where PlanetDEM90 is not based on SRTM but other, less good sources, e.g. Norway (with Svalbard), Sweden and Finland, all countries that contain land above 60° north latitude.

Q2: DEM from InSAR: high resolution

- Layover is a problem for areas with considerable relief – side looking angle – high resolution is for these areas of importance
- InSAR based DEMs needs quality control to remove artefacts and gaps related to layover and shadow effects caused by the radar sensor and imaging geometries.

Q3: Pan-European high-accuracy DSM: data from EEA-39* countries

- EU-DEM was an approach in this direction; it was completed in 2012 without much success
 - o (Almost) all countries have a national DEM with <10m resolution.
 - o It is worth to make another try, capitalise on lesson-learned and taking recent developments into account
 - o Boundaries between countries was the biggest problem; hydrological studies were affected
- In principle it is a good idea to merge the existing datasets
 - o It is considered to be mostly a political question, not a technical
 - o Maybe a „closed data“ approach, with application only for S2 ortho-rectification, helps
- EuroSDR should have a leading role in this undertaking

Q4: Update frequency

- The need for continuously update of elevation models for certain applications can be difficult to handle in a common European approach. An alternative solution where the end user can provide their own elevation model, either through provide L1B products or a processing framework where the user can upload their own elevation model for L1b to L1C processing. L1B products should be available anyway because for validation purposes (i.e. on demand).
- For the first DEM update – all older data should be reprocessed with new DEM.
- For future DEM updates the needs differs with various frequency – depending on the needs

Q5: When ESA does not meet our needs, what do we do?

- Push for 1B data

Q6: DSM vs. DTM

- For S2 a DSM is clearly needed. The satellite is measuring top of canopy and an ortho-rectification to ground would be wrong.
- For Sentinel-2 a DSM should be used because of the imaging characteristics of the sensor

Summary of the second topic: DIAS and NCGS:

Q1: DIAS vs. different NCGS

- The answers to the question about DIAS vs. NCGS are at the moment unclear because nobody at the moment knows what DIAS will provide. The final decisions about these questions will also consider questions related to national control of capabilities, which DIAS consortium which will survive and for Norway also its future partnership in the Copernicus program.
- DIAS vs NCGS: NCGS could go thematically beyond DIAS
 - o DIAS is basically the infrastructure
 - o NCGS should go towards generating analysis ready data (ARD), on national grid, provide higher-level products.
 - o Nationally hosted archive is a domain for NCGSs
 - o NCGS could be hosted on DIAS

Q2: What do you/we want from DIAS

- Expectation from DIAS: working on large data is awful when I need to download all data
 - o But: one user is happy so far, as long as he can script things, even downloading. And script should delete the data afterwards (comparably small scale)
 - o Confirmed by experience from C3S: 80% application of Climate Data store toolbox is via scripting (and not interactive via Web-interface), and by far most common use of scripting is to just select and download.
- The users of DIAS will be probably need to pay for their own use of the infrastructure for processing and storage. We don't think this is a big problem. In the future, we think this will be more affordable for the users than investing in their own infrastructure. It is more a question about moving money from investment to operating expenses. For users needing only a few products, they will probably download the products and handle them in the same way as today.

Q3: Other providers of data, such as Amazon/Google and ESRI – Experience?

- Privacy of data is an issue (crop, farmers).
 - o It can be handled on public DIAS or NCGS but not on Amazon Web Service (AWS) or Google

Q4: How to collaborate between countries building the NCGS

- There are NCGS fora but we don't know what they do and agree (ESA explained that these are working on internal, technical issues not directly applicable to end-users)
- Advantage would be to exchange experiences and coordinate efforts.
 - o If there are NCGS doing the same product over the same area, these should be compared.
 - o A RadCalNet (Radiometric Calibration Network) for Validation is needed.
- In general, there is a lack of coordination of the land community.
 - o NCGS could play a role.

Workshop recommendations

Apart from the different recommendations mentioned in the break out discussion summary, the workshop recommendations are:

1. With the fast growing archive size of Sentinel-2, users are recommended to use their algorithm on the server side, minimizing the amount of downloaded data. Different DIAS providers are bringing different solutions for virtual machine processing, with direct access to the Sentinel-2 archive.
2. NCGS should go towards generating analysis ready data (ARD), on national grid, provided higher-level products.
3. A hub for Sentinel-2 Level 1B (L1B) should be provided for experts users.
4. Water (quality) is an important issue in many European countries. Sentinel-2 is opening up many new possibilities. Sentinel 2 and 3 are used by many organisations for water quality monitoring, science and other applications. Of that reason, topics and use cases focussing on water quality should be put on the agenda for future workshops.
5. Several participants proposed again a follow-up workshop in two year time to report national status, progress, and discuss common challenges.
 - a. After three workshops with “preparation” the follow-up workshop should go towards “operational” use of Sentinel-2 and perhaps include other Sentinel sensors as well (Sentinel-1 and -3).