

Minutes

Space Data Coordination Group for GFOI MEETING (SDCG-15)

Version 1-0

27-28 March 2019, Hampton, VA, USA

Main discussion points and outcomes from the 15th SDCG meeting

- USGS Co-Chair is funded by SilvaCarbon and can help rebuild that collaboration with the CB component and SDCG
- CEOS agencies to look at GFOI Tools Registry & CALM
- Biomass topic with CB component offers significant potential
- EXEC will work on representation for SDCG, including from NASA
- Interest in platform collaboration with FAO/SEPAL and with GEE on Biomass Data
- Also interest in using ODC platform for ARD trial (Digital Earth Africa?)
- Will explore requirement for cloud-affected GFOI countries and space data strategy
- Interest in MGD-Compliant utilities in ODC Applications Library
- Early Warning next steps to be formulated with various opportunities
- WP topic leads actioned to take on developing Work Plan content within a month, with a view to a new SDCG Work Plan by around June
- Biomass day outcomes are reported separately but there is significant interest in pursuing CEOS collaboration on this topic to complement the CEOS Biomass Protocol work and make best use of the GFOI policy and user interface to accelerate the policy relevance of the CEOS data
- Next meeting will be in Anchorage 4-6 Sep 2019

1. Welcome and Introductions

Tom Maieresperger (USGS) welcomed participants to the 15th meeting of the Space Data Coordination Group for GFOI.

Participants introduced themselves, their affiliations and SDCG-GFOI roles in a *tour de table*.

Stephen Ward (SDCG Sec) [reviewed the overall status of GFOI and SDCG](#), noting that this meeting is an opportunity to do a stocktake of our overall progress and strategy.

- GFOI is still working to define the Data Component, and should include how and what SDCG engages in.
- GFOI is evolving into a more donor-user focused forum, with data remaining very important, but not expected to be as central for GFOI Phase 2. This will impact on how SDCG engages, and the role we can play.

There was a brief discussion, and it was noted we should follow-up

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SDCG-15-01	Brian	To follow-up with Kathy and Hank on NASA engagement in SDCG (e.g. Laura Duncanson from the GEDI mission team). This could be intermittent as the biomass tasks dictate.	April 2019
	<i>Rationale:</i> Pursue an increase in NASA representation in SDCG, in particular around the contributions to biomass observations.		

Status of Action Items

George Dyke (SDCG Sec) briefly reviewed the [SDCG-14 Actions](#), noting that most had been closed and progressed:

- There was an action (SDCG-14-13) on engagement with an ISSI workshop, which was a one-off event, but might be an opportunity to engage in these kinds of meetings in future. e.g. ESA 2020 Biomass Symposium, and this could be a useful follow-up. Laura also mentioned that there would be a GEDI meeting later this year which could be an opportunity.

SDCG-15-02	Stephen, Ake	Stephen and Ake to consider what events SDCG could engage with to progress biomass efforts. It could include engagement with the GEDI mission team, or an ESA 2020 Biomass Workshop, and perhaps in the context of the CEOS Biomass Protocol.	SDCG-16
	<i>Rationale:</i> Consider how SDCG can help support progression of discussion on Biomass topics..		

2. CEOS agency programmatic updates

ESA & Copernicus

Steven Hosford (ESA, CEO) [presentation](#), reviewing the status of the Sentinel-1 and Sentinel-2 missions, with both missions operating nominally.

- Sentinel-1 (A and B) are protecting data at a rate approximately 30% over the specification. Sentinel-2 (A and B) are doing global coverage every five days.
- L2A global on-demand service has started.
- The Sentinel-2 Global Reference Image (GRI) is progressing well after being somewhat sidetracked in February, and the expectation is to have the GRI delivered for all regions (global) in April.
- There is an open question around whether the advent of the GRI will mean that the Sentinel-2 SciHub Level-2 data will be reprocessed. There are no current plans to reprocess the full Sentinel-2 archive to surface reflectance.
- There are currently more than 200,000 registered users for the Sentinel Open Access Hub (aka SciHub).
- Currently the Sentinel-2 Surface Reflectance product is not available via the International Hub (SciHub only), and this would be a question for USGS to follow-up with ESA (Ferran).
- It is unclear why the [ESA Forest TEP](#) is not well linked to GFOI and SDCG coordination efforts. There are different business focuses (e.g. beyond forest carbon), and perhaps the CCI Biomass is more

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relevant. We should consider whether this is a candidate for the GFOI Tools Registry. Demo planned for GFOI Plenary as part of a GEF Project explanation.

SDCG-15-03	Frank-Martin	To look at SNAP and TEP as candidates for GFOI Tools Registry	SDCG-16
	<i>Rationale:</i> Bridging the gap between these agency activities and GFOI		

Sentinel Expansion

It is assumed that the following Sentinels are confirmed as a result of the user consultation process and following a gap analysis:

- Sentinel-7: a anthropogenic CO₂ monitoring mission
- Sentinel-8: a **Thermal Infrared Imager** (companion to Sentinel-2 C/D)
- Sentinel-9: components:
 - S-9 ICE: Enhanced Ice and Snow Continuity mission
 - S-9 HEO: Polar Weather Payload on a Highly Elliptical Orbit
- Sentinel-10: a **Hyper-spectral mission**
- Sentinel-11: **L-band SAR mission**

Forestry - Thematic Exploitation Platform

"One-stop shop for forestry remote sensing services for the academic, public and commercial sectors"

- Flipping the data access paradigm – from transferring Terabytes of raw data to moving Megabytes of results / products
- Moving away from model where each user works in their own 'silo'
- Community centric work environment
- Reduce the costs of data acquisition from miscellaneous sources with varying formats and processing levels
- Self-service environment with support

→ <https://forestry-tep.eo.esa.int/>

ESA UNCLASSIFIED - For Official Use | PM Sentinel | 27/03/2019 | Slide 9 | ESA UNCLASSIFIED - For Official Use | PM Sentinel | 27/03/2019 | Slide 19

JAXA

Ake Rosenqvist (JAXA) [reported](#):

- ALOS-2 working nominally and will in May have completed its nominal (5 year) operational phase. It will then enter a post-operational phase with a reduction of the PALSAR-2 duty cycle and subsequent revision to the acquisition strategy.
- The revision will impact the PALSAR-2 10m fine beam global observations with a reduction to a single global coverage per year.
- The current PALSAR-2 50m ScanSAR observations at 42-day repeat over pan-tropical zone are planned to remain unchanged.
- ALOS AVNIR-2 10m data will be made available freely soon, as well as ALOS PALSAR 10m data. Both will be available for bulk download (e.g. via FTP). We should recognise this in the GFOI Plenary presentation.
- Ake noted that there hasn't yet been consideration, or a request, to process and release the ALOS PALSAR ScanSAR data, and this is something that SDCG could request. Brian suggested a request could be linked to support to Africa.
- We should explore the DEAfrica demo to GEO Ministerial showing a mangrove change product from the ALOS time series data (refer to the Global Forest Watch site).

SDCG-15-04	Stephen, Brian and Ake	To develop the case for a GEO Ministerial announceable around the provision of ALOS-1 and -2 time series in the Digital Earth Africa platform	July 2019
	<i>Rationale:</i> Ensuring credit and incentive for JAXA to release data		

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USGS, inc SilvaCarbon

Tom Maiersperger (GFOI) [presented](#):

- The continental acquisition strategy (~740 scenes/day) is now a part of Landsat-9 requirements. Landsat 9 as a rebuild of Landsat 8 with targeted upgrades is on track for launch in December 2020 with transition-to-operations in March 2021.
- The NASA/DOI/USGS Sustainable Land Imaging Architecture Study Team (SLI AST) has kicked off a study for the design and implementation a broader approach for spaceborne global, continuous Landsat-quality multispectral and thermal infrared measurements for approximately a fifteen-year period starting in 2026. This study will be holistic, and include the ground segment and international partnerships. The report will be delivered in ~September 2019, but is pre-decisional and is not likely to be released publically in whole.
- Noel Gorelick from the GEE team will attend GFOI Plenary.
- There was a discussion around the SilvaCarbon-GEE collaboration, as well as around the potential for confusion and tension between tools (e.g. GEE, ODC, etc.). Communication to countries and end users around options, as well as understanding current country tool selections could be very important for coordination (e.g. in the GFOI country needs assessment process).

SDCG-15-05	Brian	Follow-up with USGS on the parameters and settings USGS is planning to use in their COG generation process	April 2019
	<i>Rationale:</i> Ensuring compatibility between Data Cube COG indexing and USGS COG generation		
SDCG-15-06	SDCG Sec	Follow-up with GEDI team and GEE/Noel on plans (OBI-WAN?) for lidar data and tools in GEE	June 2019
	<i>Rationale:</i> WB indicated preference for GEE support for the lidar data		

 <p>Sustainable Land Imaging (SLI) Architecture Study Team (AST)</p>	 <p>Collection 2 Definition Summary Level-2 Products</p>
<ul style="list-style-type: none"> • NASA/DOI/USGS SLI AST kicked off a study for the design and implementation approach of a spaceborne system to provide global, continuous Landsat-quality multispectral and thermal infrared measurements for approximately a fifteen-year period starting in 2026 • Oversight provided by the NASA Associate Administrator for Science and the DOI Assistant Secretary for Water and Science • AST-2019 will inform NASA and DOI/USGS acquisition strategies on options for both the space and ground segments, potential contributions from international partners and commercial Earth Observation data suppliers, and business model alternatives • Ground System a major driver for AST-2019 (and USGS) • Recommendation report to be delivered in August 2019 => September 2019 	<ul style="list-style-type: none"> • Level-2 products will be processed from all Level-1 inputs (Tier 1 and Tier 2) that meet the Solar Zenith Angle (SZA) constraint and that have required auxiliary data <ul style="list-style-type: none"> - LEDAPS (L4-7) and LaSRC (L8-9) being integrated into the current processing system flows - Auxiliary bands associated with Surface Temperature (ST) processing will be included with the product <ul style="list-style-type: none"> • Ancillary data source is ongoing investigation (NARR vs. MERRA-2 vs. GEOS-5 FP vs. GEOS-5 FP-IT vs. split window) - Including both L7 bands 6H and 6L still under discussion • Updated, consistent Quality Band specification for both Level-1 and Level-2 products • Landsat Collection 2 Level-1/2 products (SR/ST) to be global and CARD4L-compliant <ul style="list-style-type: none"> - Coordinating interoperability efforts with ESA (Landsat/Sentinel-2) - Global cloud-enabled data access (EarthExplorer, AWS, ODC, STAC, Enhanced visualization tool) <ul style="list-style-type: none"> • Cloud Optimized GeoTIFF (COG) format - Targeting production in September 2019 => December 2019 <ul style="list-style-type: none"> • Landsat 9 LPGS availability shifted from May 2019 to July 2019 • Early 2019 partial U.S. Government Shutdown

Others

Ake briefly reviewed the status of NovaSAR on behalf of CSIRO, noting that NovaSAR is a commercial experimental S-band SAR satellite with several partners including the UK, Australia, and India. The commissioning phase will end in early April, and operations will begin.

3. GFOI developments, CEOS role and scope

GFOI Framework Updates

Evan Notman (GFOI Office) [reported](#):

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- 3 pillars for GFOI are: country needs assessment; harmonised work planning; joint implementation;
- Identification of places where GFOI components and contributors can work together under one umbrella, e.g. Early Warning.
- GFOI office has expanded in staffing and will have a new position based in Rome.
- Question from Stephen Ward: what the new Data Component is, what it will do, and who will do it. The reason the World Bank is co-leading the Component is unclear
- The idea of the Data Component is that it might expand beyond the old Space Data Component, and address ground truth data, though it is not yet clear in practice how this could be coordinated across countries.
- Neither The World Bank, nor FAO have committed to identify component managers to the Data Component.
- Stephen Ward provided input: The GFOI Capacity Building Component is likely the main point of interaction for SDCG, and this is something that we have done in the past but have drifted away from.
- GFOI's Criteria for consistently Assessing Levels of Maturity (CALM) is a mechanism for helping countries interact with new tools and technology. SDCG can further define how it interfaces with this process.
- A couple of regional country needs assessment pilots have taken place, with several lessons learned to help drive the process forward.

Country Needs Assessment

Lessons learned from regional pilots:

Two regional meetings were held in Asia (5 countries) and Africa (6 countries) to trial an interactive card based system for using the REDDcompass to pilot the methods. Workshop included small country teams with the goal of these teams following up with other nationals in country.

1. A holistic process will generally take time and involve multiple steps working with relevant country institutions
2. Active follow up required with country teams
3. Further development of templates or tools to improve communication of results to national stakeholders and funders and capacity building organizations.

Further follow up will take place during GFOI plenary

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  gfoi_forest
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- The way forward is going to require coordination across Components, in particular the Capacity Building component.

GFOI Plenary & Data Component - Upcoming Meetings & ACTIONS

Stephen Ward [reviewed](#) the objectives and Data Component and SDCG-related topics.

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- SDCG will need to provide inputs into the Data Component meeting on the Monday of GFOI Plenary week.
- The topic of coordination of geospatial platforms has been deleted, and Evan noted this has been replaced by a discussion in the Capacity Building Component meeting.
- SDCG should consider how the role we could play in [relevant GFOI Work Plan tasks](#), including a focus on 2.3.
- We should ensure that SDCG-related tools are reflected in the GFOI Tools registry, including a (re-)submission of the ODC.

SDCG-15-07	Brian	To contribute ODC and COVE into the GFOI Tools Inventory.	July 2019
	<i>Rationale:</i> Ensuring CEOS SEO tools are reflected in the GFOI Tools Inventory		

- The CEOS MIM could be added as a potential tool in the GFOI Tools registry.
- Tom suggested that the USGS [AppEEARS tool](#) could also be useful and considered for submission. Steve suggested that LCMAP could also be considered in future, as well as tools associated with Collection 2.
- Ake suggested that CNES register the [Orfeo toolbox](#).

SDCG-15-08	SDCG Sec	To follow-up with SDCG agencies to consider whether there are tools they should be contributing to the GFOI Tools Inventory	May 2019
	<i>Rationale:</i> Ensuring SDCG tools are reflected in the GFOI Tools Inventory		

- Digital Earth Africa (DE-Africa) could be an important platform for leverage by communities like GFOI. Pilots using CEOS ARD on DE-Africa are being discussed and considered. GEO Ministerial may also provide visibility for activities associated with DE-Africa.
- Landsat Collection 2 presents an opportunity as it will provide a global surface reflectance and surface temperature dataset which is not something that's available today. It will also offer integration with Sentinel-2 (via the GRI) which will improve interoperability.
- The intention is to keep Collection 1 current for one year after Collection 2 is available, and it will be kept in 'glacier' (AWS) storage long-term.
- Steve noted that the initial CEOS CARD4L specifications have been endorsed and are now being promoted. The execution of self-assessment of datasets for CARD4L compatibility is currently being developed.

Discussion on scope and representation of CEOS forest sector coordination activities & links to CEOS Carbon Strategy

George Dyke [led the discussion](#):

- a need to re-engage the CB component with SDCG efforts
- Julian of WB has raised the opportunity to get biomass capabilities and information across to countries via the CB component. SDCG could help provide that content, and work with WB on what's needed.

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- There is a need to ensure that SDCG prepares for the relevant GFOI Plenary discussions and sessions ASAP.

SDCG-15-09	Joanne, Frank Martin, Tom, Stephen	To ensure SDCG inputs are prepared for GFOI Plenary discussions and sessions. Reach out to Andrea on SDCG inputs to the GFOI Plenary Data Component presentation	ASAP
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		

- Coordination around contributions to the CEOS Chair Mekong Basin Initiative is ongoing, and they are claiming some contribution to GFOI via their forest pilot as a part of this Initiative.
- How to leverage investment in Data Cubes (ODC) by countries for GFOI (REDD+) monitoring activities is an open question. Is it possible that FAO/GFOI could contribute to awareness and engagement here, along with the Capacity Building group.
- Can we have SilvaCarbon invest in use of ODC as a backend to SEPAL instead of GEE? Worth piloting with a country? With MGD-compliant tools. **Worth having a meeting for this purpose?**

SDCG-15-10	Brian & Tom	To explore the idea of collaboration with SilvaCarbon and FAO to consider a SEPAL integration with an ODC implementation	ASAP
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		

- Future global coverage stewardship role shifts to future mission design, as well as uptake of data streams such as SAR which can help address cloud cover issues, and also the application of future data streams and more advanced applications.

SDCG-15-11	SDCG SEC & Evan Notman	Explore need for persistent cloud covered country strategy for space data acquisitions for GFOI. First step is to establish if this is worthy of attention	Jul 2019
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		

- With the new capacity of SAOCOM, CONAE may feel they have more to contribute to the SDCG.

SDCG-15-12	SDCG SEC	Put call for representation in SDCG in the SIT-34 PPT	ASAP
	<i>Rationale:</i> In order to promote agency contributions		

- There is a CEOS Plenary action to provide a paper from CEOS in biomass for submission to SBSTA. There will be a carbon-related meeting at JRC next summer, and SDCG will be asked to be represented. The action for this group is to provide contributions to the CEOS biomass paper.

SDCG-15-13	SDCG SEC	Coordinate SDCG input into the CEOS paper on biomass	June 2019
	<i>Rationale:</i> Ensure that discussion at SDCG-15 and follow-up is reflected in the paper		

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4. Space Data Services

Brian Killough (CEOS SEO) reviewed the status of the space data services activities.

- Key question is efficient data access, in particular to Sentinel-1 and Sentinel-2, and especially in the cloud. Brian and his team have been working to progress this via a couple of European companies.
- Shaun provided an update on COVE, how it has evolved since 2017, and how it might evolve going forward from now.
- Brian will speak with Kristi Kline to get the COVE team in the loop around changes that would break the API.

SDCG-15-14	Brian	To discuss COVE API issues with Kristi Kline of USGS	
	<i>Rationale:</i> USGS coverage API changed which impacted COVE functionality		

- Four major updates in 2019: improved acquisition forecaster (Jun); custom missions (Aug); coverage and revisit performance (Dec); updated country archive reports. Coincident observation calculations will be added in future also.
- Could consider pulling data directly from AWS archives also.
- Brian suggested several areas for SDCG data services contributions: data cubes; the ARD workflows for Sentinel-1 and Sentinel-2; COVE’s new features; ALOS data for forest change detection.
- Steven noted that engagement from Albrecht at ESA (who is connected to the DIAS) is recognition that Sentinel ARD solutions are required, e.g. along the lines of what Brian has been investing in.
- Brian suggested a review of the MGD to try and identify how Data Cube could support user workflows. This is something that perhaps George and Ake could look into. Evan suggested that linking this with FAO and SEPAL, this might help refine the interpretation and opportunities.

SDCG-15-15	Brian, George, Ake	Explore development of an MGD-compliant set of utilities for the Data Cube Applications Library. With possible links to SEPAL.	
	<i>Rationale:</i> Inclusion in DCAL presents an opportunity to build a link between MGD and Open Data Cube		

5. R&D

Frank Martin Seifert (ESA, remote) reported:

- ESA in discussions with Wageningen University for management of the 3 years R&D coordination for GFOI, as well as for GOF-C-GOLD. Should be announced in 2 weeks.
- Hoping to identify gaps in R&D needs for GFOI and also to establish a funded R&D programme within GFOI. Frank-Martin will follow up with the Leads group of GFOI. Will be raised in Maputo.
- Funding is critical for progress.
- Ake and Sarah Carter have developed a Phase 1 achievements report.
- There will be a side event on Biomass at the next SBSTA.

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Ake [spoke about the plan for closure of the Element-3 tasks](#) within the SDCG Work Plan. There is no new material for an update to the Element-3 document. Sees good opportunities to get access to NovaSAR data for GFOI purposes. The Technical Summary report will be provided as an attachment to the SDCG PPT for SIT-34 as a closure for the Element-3 work.

SDCG-15-16	SDCG SEC	Attach the SDCG-3 Technical Progress Report for Element-3 to the SIT-34 PPT from SDCG - and reference in the SDCG slides therein	SIT-34
	<i>Rationale:</i> Provide progress report to CEOS SIT agencies for reference and information		

Ake noted the lack of science meetings really hampered the collective progress for Phase 1 and **this should be addressed in Phase 2. Frank Martin confirmed that these were planned as well as expert meetings twice a year.**

Ake and JAXA are stopping their Element-3 coordination and ESA as R&D Component Lead will take over. Frank Martin noted the challenge of getting aid donors to fund R&D work - it may be better raised through Country Needs Assessment processes. There may be related support from within ESA.

6. Biomass Day

Stephen [reviewed](#) the outcomes from Biomass Day. There appears to be good potential for CEOS to support the multi-mission collaboration role, possibly through a Virtual Constellation, however this remains to be discussed and there is a lot of uncertainty around the concept.

A brief discussion followed.

- Ake noted that JAXA has expressed an interest in participating in bilateral or multilateral mission coordination on biomass.
- DLR is heavily involved in the ESA Biomass mission, and are likely also interested in contributing.
- Tom noted that the ODC needs additional tooling (e.g. sample applications) in order to make it a useful tool.
- Tom noted that SilvaCarbon didn't appear to be focused on biomass, but was focused on land cover change - though they could adjust to cover biomass. There is a lot of technical capacity development that will need to happen, and packaging data into something like the African Data Cube could also be helpful. Incorporation of biomass information into the MGD will also be helpful.
- Stephen noted that Julian from The Work Bank was keen to promote biomass dataset uptake.

Stephen reviewed the potential draft actions from the Biomass Day, and a discussion followed.

- **Ghana** is a potential common country for a Data Cube and biomass data pilot.
- **Steven noted that there doesn't appear to be much outreach beyond the science community for the ESA Biomass mission. Outreach beyond science has much potential.**
- Tom noted that his archive will hold the GEDI datasets, and so there are likely associated outreach efforts that can be leveraged.
- Action SDCG-15-01 was opened to follow-up on NASA representation in SDCG.

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Record of Actions SDCG-15-Biomass Day

No.	Actionee	Action	Due date
SDCG-BMD-01	JAXA	JAXA to follow up representation in the Multi-Mission Biomass Cal/Val Group.	Jun 2019
	<i>Rationale: Currently not represented</i>		
SDCG-BMD-02	SDCG EXEC	Follow-up with Julian/WB on training materials for the country MRV and lidar data handling and processing activities	Apr 2019
	<i>Rationale: Need for biomass data understanding in countries</i>		
SDCG-BMD-03	SDCG EXEC	Follow-up with Julian on sharing a list of countries and their potential (maturity) for uptake of biomass data	Apr 2019
	<i>Rationale: Need to begin to develop understanding of requirements</i>		
SDCG-BMD-04	SDCG EXEC	Joanne to share the list of ESA validation/accuracy criteria with Laura	May 2019
	<i>Rationale:</i>		
SDCG-BMD-05	SDCG EXEC	Follow-up with Laura on the update of the GFOI MGD and how the biomass (protocol) could be codified in this document. Laura suggested that a few of the MGD reviewers (e.g. Ake) to review the protocol - Ake happy to be the contact.	May 2019

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<i>Rationale: MGD is a key tool for promoting good practice in GFOI</i>			
SDCG-BMD-06	SDCG EXEC	To follow-up on CEOS input to SBSTA on developments in biomass, and some of this content could be drawn from the biomass protocol and mission handbooks	Oct 2019
	<i>Rationale: Existing CEOS action needs to be addressed</i>		
SDCG-BMD-07	Brian Killough	Follow-up with Laura on suggestion that maybe the COVE tool could help out - is GEDI in there...? can you add a plane mode...? Laura suggested the NISAR team may be interested.	Apr 2019
	<i>Rationale: SEO wants COVE to be comprehensive</i>		
SDCG-BMD-08	SDCG and NASA CEOS reps	Consider what kind of representation NASA should have in SDCG based on the coming investment in forest-related missions - the ideal rep would represent these missions. Ideally SDCG would have clear biomass-related work plan tasks first to support the discussion.	Jun 2019
	<i>Rationale: SDCG membership must reflect the key missions</i>		

7. GFOI Early Warning

Ake [presented](#) a set of slides from Mikaela Weisse of WRI summarising the most recent status of the GFOI Early Warning activity.

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- With the advent of GFOI, the focus turned to reporting, however re-including Early Warning in the efforts (it was included in the early GEO-FCT scope) may help provide other, actionable, near real time information.
- A User Needs Assessment was completed which identified a few areas for potential fit (e.g. integration of different types of data, ARD, Data Cubes, etc.).
- There is a long distance between detection and on ground action, and bridging this distance requires working closely with countries.
- Norway is providing funding to WRI to coordinate these efforts, but there is not currently any additional funding for implementation (e.g. of pilots). (Some countries are implementing on their own.)
- The timeliness is correlated inversely with errors, with the most timely requirement being on the order of days.

A brief discussion followed.

- Ake will meet WRI at GFW Summit in June and discuss the way forward.
- Data Cube is an ideal platform as a basis for an EW system with automatic feeds of all new pixels. Demos could be based on historical data. Ghana could be a good focus. Ake could float this with WRI. WRI could perhaps support with validation data etc.
- Steve noted that USGS has a site where they have done validation for LCMAP which could be a useful place to do a demonstration.

SDCG-15-17	Ake	Raise with WRI the prospect of an ODC-based EW demo	ASAP
	<i>Rationale:</i> Potential opportunity to progress the development of EW systems		

- Brian suggested that Ghana could be a good potential country demonstration given the datasets and Data Cube capabilities that are currently in place.
- Ake noted that discussion to date has been around supporting countries to develop their own national systems meeting their own national needs, and also reflecting best approaches arising in the MGD.
- Tom noted that the concept of near real time detection in (e.g.) GEE is something that is being discussed.
- Steve noted that USGS is doing an analysis of near real time capabilities for Landsat, and this may be an additional new requirement.

SDCG-15-18	Ake	Ake to look into sharing the GFOI Early Warning User Needs Assessment with USGS (Steve Labahn, Tom Maiersperger)	April 2019
	<i>Rationale:</i> USGS is conducting an internal study on near real time Landsat applications, and GFOI Early Warning may provide new requirements to investigate		

SDCG-15-19	Ake	Follow-up on the broken link to the EW report on the GFOI website	April 2019
	<i>Rationale:</i> Report link currently broken		

8. Update on GFOI MGD component

Ake Rosenqvist (JAXA) [presented](#).

- MGD plans to update the 2016 version and to upgrade and extend REDDCompass. They are looking for consistency with the new IPCC 2019 Good Practice Guidelines edition. They are waiting for this release to initiate the MDG update.
- Country Needs Assessment workshops will be the focus for the update, and it will be user driven. This could be a challenge for space agencies, given that not all the feedback is necessarily related to EO data.
- The current MGD EO content is very out of date.
- **MGD V3 will be modular and on-line. Complete by June 2020.**
- A side meeting of MGD AG will be held at GFOI Plenary. A catch-up call will be organised by Carly Green after the Plenary. Ake will join.
- **We need to be proactive to get our space data content included:** new missions; CEOS Biomass Protocol; Global datasets; CARD4L process; cloud computing and datacubes.

9. Update on GFOI Data Component

Stephen [presented](#).

- There is a lot of uncertainty around the Data Component, and this is compounded by a lack of clarity within the GFOI Leads. It will be important for Osamu to represent CEOS views as the CEOS representative to the Leads.
- The GFOI Data Component work plan remains to be determined, but there are at least two tasks that we should consider engaging on: tools registry and CALM; and, EO data acquisition and availability. There is some risk of continued drift between CEOS and GFOI, in particular around the Data Component management.
- There are opportunities to [engage](#) across Components, though there is still some uncertainty / doubt about the GFOI R&D Component.
- Not physically participating at GFOI Plenary does mean that SDCG is less connected to both GFOI overall and the Data Component but it is likely sufficient and more cost-effective that we have a small delegation in attendance rather than try to force whole SDCG meetings coincidentally if this proves difficult.

A brief discussion followed.

- There may be useful coordination that can be done by CEOS around potential contributions of SAOCOM data by CONAE. There is still a lot of uncertainty around the processing and accessibility of the SAOCOM data.

SDCG-15-20	Stephen	Follow-up with Osamu include a point in the GFOI presentation at SIT-34 noting the potential interest in SAOCOM data for GFOI	April 2019
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Rationale: Encouraging the uptake of SAOCOM for GFOI applications

10. SIT-34 Topics and Preparations

Stephen [presented](#).

- The list of topics for the SIT-34 presentation [was reviewed](#).
- There is a discussion around CEOS reorganisation which will take place next week, with the outcome remaining uncertain.
- There is a [draft CEOS ARD Strategy paper](#) which has been circulated for discussion at SIT-34. There may be an opportunity for SDCG to provide inputs to the CARD4L self assessment process.

11. SDCG & CEOS Work Plan & GFOI Space Data Strategy

George [reviewed](#) the three main planning documents relevant to SDCG work planning: the CEOS Strategy for GFOI; the SDCG Work Plan; and, the CEOS Work Plan.

- Stephen [reviewed the SDCG Work Plan threads](#), including the leads: Global Baseline (Frank Martin, Tom), Biomass from Space (Joanne confirmed she'd lead this thread); Space Data Tools & Services (Brian); CEOS ARD (Stephen confirmed he'd lead this thread); MGD (Ake) & Early Warning (Ake confirmed he'd lead); R&D (Frank-Martin); and, GFOI Interface & Country Engagement (SEC).

SDCG-15-21	SDCG Work Plan Task Leads	Provide Stephen with inputs on their SDCG Work Plan tasks	April 2019
	<i>Rationale:</i> Progress plan to completed by end of June		

SDCG-15-22	Stephen	Release the updated SDCG Work Plan based on task lead inputs	June 2019
	<i>Rationale:</i> Release plan to completed by end of June		

CEOS Work Plan

Steven presented, suggesting that the deliverables from the SDCG Work Plan should map clearly to the CEOS Work Plan deliverables. He reviewed the SDCG-related CEOS Work Plan items.

- **CARB-20:** Updated CEOS Space Data Strategy for GFOI
- **CARB-21:** Phase II R&D Programme for GFOI
- **CARB-22:** Early Warning Module for GFOI. Ake suggested updating the deadline to Q3 2020.
- **CARB-23:** Forest Biomass measurements for GFOI countries
- **CARB-24:** Forest applications in the 2019 CEOS Chair Initiative and CEOS ARD Pilots.

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- **CARB-25:** Updated space data content in the 2019 GFOI Methods and Guidance Documentation (MGD). Ake noted that the MGD update is due by mid-2020, and he suggested making the deadline Q2 2020.

Steven will update the task contacts in the CEOS Work Plan tracking spreadsheet based on the discussion here at SDCG. Ake noted that his affiliation should be listed as JAXA for these tasks.

CEOS Space Data Strategy for GFOI

Stephen Ward [reviewed](#) the 2011 Space Data Strategy for GFOI, which has served us well, but is pretty old now.

- It was agreed that it would be valuable to present an updated GFOI Space Data Strategy to CEOS Plenary in Hanoi for endorsement to update participation and provide a basis for engagement of agencies with new data streams (CONAE, DLR, JAXA, NASA..).

SDCG-15-23	SDCG Sec	Circulate a draft update to GFOI Space Data Strategy to SDCG for review comments - with a view to endorsement at CEOS Plenary	Before SDCG-16
<i>Rationale:</i> CEOS agency engagement at Plenary			

Relevant developments in LSI-VC, ODC, GEOGLAM

George Dyke reported:

- WP task VC-42SR tool is relevant for GFOI Tools library?
- AGRI-4: CEOS response to GEOGLAM requirements will be interesting for USGS
- There is a description of the [Essential Ag Variables](#) here.

12. Wrap-up

Stephen [led the wrap-up](#), noting that the joint meeting is being planned for **4-6 September 2019** in Anchorage, Alaska. Other known planning dates and locations were reviewed.

- GFOI Plenary for 2020 TBD - likely developed country.
- SIT-35 March-April 2020 will be Tasmania.
- EC discussing CEOS-wide Carbon strategy (inc GFOI) at JRC Q2 2020
- Jenn has a block of rooms booked at the Sheraton Anchorage Hotel.

The draft actions were reviewed.

Tom closed the meeting noting that this meeting was useful for building context and connection from his perspective as the newcomer.



13. List of Participants

Organization	Participant
CEOS CEO/ESA	Steven Hosford
CEOS SEO	Brian Killough
CEOS SEO/AMA	Sanjay Gouda
CEOS SEO/AMA	Kim Brooks
CEOS SEO/AMA	Shaun Deacon
ESA	Frank-Martin Seifert* (R&D session only)
GFOI Office/FAO	Evan Notman
JAXA	Ake Rosenqvist
SDCG SEC	Stephen Ward
SDCG SEC	George Dyke
UKSA	Joanne Nightingale
USGS	Tom Maiersperger
USGS	Steve Labahn

** - joined via GoToMeeting*

14. Record of Actions from SDCG-15

SDCG-15-01	Brian	To follow-up with Kathy and Hank on NASA engagement in SDCG (e.g. Laura Duncanson from the GEDI mission team). This could be intermittent as the biomass tasks dictate.	April 2019
	<i>Rationale:</i> Pursue an increase in NASA representation in SDCG, in particular around the contributions to biomass observations.		
SDCG-15-02	Stephen, Ake	Stephen and Ake to consider what events SDCG could engage with to progress biomass efforts. It could include engagement with the GEDI mission team, or an ESA 2020 Biomass Workshop, and perhaps in the context of the CEOS Biomass Protocol.	SDCG-16
	<i>Rationale:</i> Consider how SDCG can help support progression of discussion on Biomass topics..		
SDCG-15-03	Frank-Martin	To look at SNAP and TEP as candidates for GFOI Tools Registry	SDCG-16
	<i>Rationale:</i> Bridging the gap between these agency activities and GFOI		
SDCG-15-04	Stephen, Brian and Ake	To develop the case for a GEO Ministerial announceable around the provision of ALOS-1 and -2 time series in the Digital Earth Africa platform	July 2019
	<i>Rationale:</i> Ensuring credit and incentive for JAXA to release data		
SDCG-15-05	Brian	Follow-up with USGS on the parameters and settings USGS is planning to use in their COG generation process	April 2019
	<i>Rationale:</i> Ensuring compatibility between Data Cube COG indexing and USGS COG generation		
SDCG-15-06	SDCG Sec	Follow-up with GEDI team and GEE/Noel on plans (OBI-WAN?) for lidar data and tools in GEE	June 2019
	<i>Rationale:</i> WB indicated preference for GEE support for the lidar data		
SDCG-15-07	Brian	To contribute ODC and COVE into the GFOI Tools Inventory.	July 2019
	<i>Rationale:</i> Ensuring CEOS SEO tools are reflected in the GFOI Tools Inventory		
SDCG-15-08	SDCG Sec	To follow-up with SDCG agencies to consider whether there are tools they should be contributing to the GFOI Tools Inventory	May 2019
	<i>Rationale:</i> Ensuring SDCG tools are reflected in the GFOI Tools Inventory		

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SDCG-15-09	Joanne, Frank Martin, Tom, Stephen	To ensure SDCG inputs are prepared for GFOI Plenary discussions and sessions. Reach out to Andrea on SDCG inputs to the GFOI Plenary Data Component presentation	ASAP
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		
SDCG-15-10	Brian & Tom	To explore the idea of collaboration with SilvaCarbon and FAO to consider a SEPAL integration with an ODC implementation	ASAP
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		
SDCG-15-11	SDCG SEC & Evan Notman	Explore need for persistent cloud covered country strategy for space data acquisitions for GFOI. First step is to establish if this is worthy of attention	Jul 2019
	<i>Rationale:</i> Need to be prepared to promote SDCG interests, and coordinate SDCG inputs		
SDCG-15-12	SDCG SEC	Put call for representation in SDCG in the SIT-34 PPT	ASAP
	<i>Rationale:</i> In order to promote agency contributions		
SDCG-15-13	SDCG SEC	Coordinate SDCG input into the CEOS paper on biomass	June 2019
	<i>Rationale:</i> Ensure that discussion at SDCG-15 and follow-up is reflected in the paper		
SDCG-15-14	Brian	To discuss COVE API issues with Kristi Kline of USGS	
	<i>Rationale:</i> USGS coverage API changed which impacted COVE functionality		
SDCG-15-15	Brian, George, Ake	Explore development of an MGD-compliant set of utilities for the Data Cube Applications Library. With possible links to SEPAL.	
	<i>Rationale:</i> Inclusion in DCAL presents an opportunity to build a link between MGD and Open Data Cube		
SDCG-15-16	SDCG SEC	Attach the SDCG-3 Technical Progress Report for Element-3 to the SIT-34 PPT from SDCG - and reference in the SDCG slides therein	SIT-34
	<i>Rationale:</i> Provide progress report to CEOS SIT agencies for reference and information		
SDCG-15-17	Ake	Raise with WRI the prospect of an ODC-based EW demo	ASAP
	<i>Rationale:</i> Potential opportunity to progress the development of EW systems		
SDCG-15-18	Ake	Ake to look into sharing the GFOI Early Warning User Needs Assessment with USGS (Steve Labahn, Tom Maiersperger)	April 2019

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	<i>Rationale:</i> USGS is conducting an internal study on near real time Landsat applications, and GFOI Early Warning may provide new requirements to investigate		
SDCG-15-19	Ake	Follow-up on the broken link to the EW report on the GFOI website	April 2019
	<i>Rationale:</i> Report link currently broken		
SDCG-15-20	Stephen	Follow-up with Osamu include a point in the GFOI presentation at SIT-34 noting the potential interest in SAOCOM data for GFOI	April 2019
	<i>Rationale:</i> Encouraging the uptake of SAOCOM for GFOI applications		
SDCG-15-21	SDCG Work Plan Task Leads	Provide Stephen with inputs on their SDCG Work Plan tasks	April 2019
	<i>Rationale:</i> Progress plan to completed by end of June		
SDCG-15-22	Stephen	Release the updated SDCG Work Plan based on task lead inputs	June 2019
	<i>Rationale:</i> Release plan to completed by end of June		
SDCG-15-23	SDCG Sec	Circulate a draft update to GFOI Space Data Strategy to SDCG for review comments - with a view to endorsement at CEOS Plenary	Before SDCG-16
	<i>Rationale:</i> CEOS agency engagement at Plenary		

For completeness the Biomass Day actions are tabulated below:

Record of Actions SDCG-15-Biomass Day

No.	Actionee	Action	Due date
SDCG-BMD-01	JAXA	JAXA to follow up representation in the Multi-Mission Biomass Cal/Val Group.	Jun 2019
	<i>Rationale:</i> Currently not represented		
SDCG-BMD-02	SDCG EXEC	Follow-up with Julian/WB on training materials for the country MRV and lidar data handling and processing activities	Apr 2019

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	<i>Rationale: Need for biomass data understanding in countries</i>		
SDCG-BMD-03	SDCG EXEC	Follow-up with Julian on sharing a list of countries and their potential (maturity) for uptake of biomass data	Apr 2019
	<i>Rationale: Need to begin to develop understanding of requirements</i>		
SDCG-BMD-04	SDCG EXEC	Joanne to share the list of validation/accuracy criteria (from Copernicus?)with Laura	May 2019
	<i>Rationale:</i>		
SDCG-BMD-05	SDCG EXEC	Follow-up with Laura on the update of the GFOI MGD and how the biomass (protocol) could be codified in this document. Laura suggested that a few of the MGD reviewers (e.g. Ake) to review the protocol - Ake happy to be the contact.	May 2019
	<i>Rationale: MGD is a key tool for promoting good practice in GFOI</i>		
SDCG-BMD-06	SDCG EXEC	To follow-up on CEOS input to SBSTA on developments in biomass, and some of this content could be drawn from the biomass protocol and mission handbooks	Oct 2019
	<i>Rationale: Existing CEOS action needs to be addressed</i>		
SDCG-BMD-07	Brian Killough	Follow-up with Laura on suggestion that maybe the COVE tool could help out - is GEDI in there...? can you add a plane mode...? Laura suggested the NISAR team may be interested.	Apr 2019
	<i>Rationale: SEO wants COVE to be comprehensive</i>		



<p>SDCG-BMD-08</p>	<p>SDCG and NASA CEOS reps</p>	<p>Consider what kind of representation NASA should have in SDCG based on the coming investment in forest-related missions - the ideal rep would represent these missions. Ideally SDCG would have clear biomass-related work plan tasks first to support the discussion.</p>	<p>Jun 2019</p>
<p><i>Rationale: SDCG membership must reflect the key missions</i></p>			