

Minutes of the SITSat Task Team Side Meeting at WGCV-54

Sioux Falls, South Dakota, USA

18 October 2024

Attendees: Yolanda Shea, Nigel Fox, Philippe Goryl, Cody Anderson, Medhavy Thankappan, Paolo Castracane, Kurt Thome, Brian Terry, Slawomir Blonski, Manik Bali*, Larry Flynn*, Danika Wellington* (* = virtual participants)

WGCV-54 SITSat TT actions:

WGCV-54-01	<p>In support of the SITSat Task Team’s communication strategy, WGCV members are asked to help gather examples/case studies regarding ‘real world’ impacts of the reduction in uncertainties that are facilitated by SITSats.</p> <p>We seek to show the unique value of these types of missions and highlight differences between usual calibration practices and those provided by SITSats. Examples should be accompanied by clear, transparent metrics (financial, improved decision-making, etc.).</p> <p>These examples will be presented at a dedicated session at the Living Planet Symposium in June 2025.</p>	June 2025
WGCV-54-02	<p>WGCV members are asked to identify for priority target missions of SITSats a list of their products and associated uncertainties.</p>	June 2025

Side Meeting Actions:

1. Harvey to distribute the Living Planet Symposium 2025 abstract to encourage contribution to the session.
2. Paolo and the SEO team to improve the connection of SITSat content between the CEOS website and Cal/Val Portal.
3. Nigel and Yolanda to provide the SEO team with TRUTHS and CLARREO-PF parameters for inclusion in COVE.
4. SEO team to add TRUTHS and CLARREO-PF parameters to COVE.
5. SEO team to generate examples of satellite overpasses provided by TRUTHS and CLARREO-PF in COVE.
6. All to propose ideas for SITSat images and animations that would draw people in.
7. Yolanda to come up with a simplistic policymaker message of why they should care about SITSats.
8. All to consider alternate names to SITSats.
9. Paolo to draft the website framework.
10. Yolanda to reach out to Odell to begin developing the solar irradiance success story.

11. Leads to coordinate regular monthly meetings of the Task Team.

Notes:

- Yolanda welcomed all to the meeting and presented the agenda:
 1. Welcome
 2. Review prior action items
 3. SITSats demonstration in COVE: Our specific asks to the SEO team.
 4. Near term activities: Initial foci within our ToR.
 5. Organise website structure
 6. Collate actions
 7. Closing
- Yolanda first suggested revisiting the task team’s meeting cadence.
- The Living Planet Symposium session on the applications of using higher accuracy data is implicative but not limited to SITSats. Nigel sent the session abstract to Harvey to distribute as a call for submissions. It will be within a half-day session.

COVE

- Nigel explained that COVE is an orbit propagating tool that can display any satellite orbit with predictions for overpasses of any sensor. One can define what is counted as a passover in terms of temporal space. We would use the tool as a demonstration to potential users, so should slim down the tool’s functionality to embed it in a website. Instead of picking any sensors, limit it to TRUTHS and CLARREO-PF as the reference sensors, which a user can compare overpasses to.
- Kurt suggested limiting the tool to nadir view only. Nigel aims for the tool to be nadir-viewed with the option of an angular window. One colour strip could represent a nadir overpass, then a shaded window could show the pointing capabilities of SITSats.
- Kurt asked if TRUTHS would arbitrarily point. TRUTHS could do so if we have time in advance to task for some target missions. Emphasis would more be that they can point +/- 40 deg on occasions, and probably never for smallsat operators.
- Medhavy recalled the previous example of SCR and Landsat 9 cross-calibration opportunities.
- Yolanda noted that nadir-view will be most relevant. TRUTHS will be in SSO and CLARREO-PF will be in a precessing orbit, so visualising the orbit differences will be interesting. Nigel added that any time spent off nadir will lose data from the nominal benchmark.
- Brian suggested treating these options as two different options: Nadir or fully-accessible.
- Nigel saw COVE as just an illustration of what we’re able to do, and doesn’t want to oversell what we’re able to do. Although Philippe pointed out that if we don’t show pointing, it’s the contrary.
- Nigel noted that we should be clear in text what constitutes default, normal, and exceptional circumstances.
- Larry noted that talk in CEOS about supersites suggests having SITSats fly over and characterise TOA radiances and compare them to a model using the supersite information as a validation of forward models. Lunar calibration also presents a value-add for SITSats.
- For a statistical range of measurements, it’s useful to know maximum and minimum values that we expect to see over a range of geophysical observational parameters. Even if it doesn't match up exactly, defining the statistical nature of radiances will provide benefits to the other instruments to compare.

- Instead of simultaneous and nadir, look at the same latitude band at the same time of day. Ascending and descending satellites over certain locations will see SNOs at the same solar zenith angles.
- Yolanda noted that overpasses over RadCalNet sites have been discussed. COVE may not be the correct tool for the other two suggestions, although they perhaps could be included in the descriptive texts.
- On our proposed SITSat website, Nigel noted that we'll want a section on how SITSats can be helpful to other satellites, and within, sub bullets on each cross-calibration methodology that the SITSats can help enable. With graphics and texts to illustrate the realisation of these benefits.
- Brian suggested embedding the COVE application in the website. They'll have a forum for these calculations and a pre-populated link. You'd have to register to the tool to enter your own missions though. Yolanda noted that there is already an extensive list of satellites available, and users could find something similar to their requirement.
- Brian suggested as a demonstration, we choose some default missions for visual purposes.
- Nigel noted that having orbits representative of complex constellations designed for temporal coverage would be good, and have it displayed from our website.
- Yolanda noted that CLARREO-PF is very similar to EMIT, with a 1 degree difference in FOV.
- Kurt noted that the animations will depend on their start times. We need to make sure there's enough run length so that slow and high cycles don't lead users to think there are no overlaps. We could run a simulation until you get X number of crosses. Nigel added that we should make clear in the front end that the tool is indicative, to illustrate what *might* happen. Medhavy added that as the number of cross calibrations increases, the uncertainty decreases.
- Yolanda: Larry also noted Solar Irradiance time series, but CLARREO-PF is not making these measurements.
- Nigel: The first thing is to keep it as generic as possible, rather than picking and choosing. Keep high level.
- Kurt liked the COVE idea, as it answers questions and links us to SEO.
- Yolanda decided that the nadir implementation be the initial demonstration. The second step is to show vicarious calibration sites. We already have RadCalNet and PICS sites in COVE.

Near term activities

- Near-Term Activities include:
 1. Website
 2. Communications strategy
 - a. Refining content for presentations/agency and org leadership (30 second and 2 min elevator overview)
 3. First objective within the ToR: *"Establish clear definitions of what constitutes a SITSat and minimal requirements needed to evidence this status"*
- For the Comms strategy, Yolanda was thinking of the types of things used frequently in venues when engaging with agency leadership, like 30 second descriptions and elevator pitches.
- Many people ask 'why am I not a SITSat?', so having our definition concrete in our group will be valuable.
- Kurt suggested a website section on how we do things now, and why we're trying to improve it? Nigel thought it would be valuable to say what we're changing. What's the status quo, and why we need something different.

- Yolanda suggested that we could include something in short overviews, but it would be hard to fit in. Nigel remembered Libby's mention of CEOS booths, which could serve as a vehicle for posters.
- Brian noted that there is often a dearth of material to present and give out. Having posters to hand out is good. Nigel agreed; it would be high profile, low effort, and linking to the website.
- Paolo could help provide a short video as a few seconds of explanation.

Website

- Yolanda and Nigel's suggestions for the website are available in the SITSat repository on the Cal/Val Portal.
- Yolanda's suggestions are:
 - Page: Landing Page
 - SITSat Description (brief summary)
 - Mission of Task Team
 - Terms of Reference
 - Membership (CEOS WGCV & GSICS collab)
 - Leadership & Contact
 - Related Links
 - GSICS, GSICS Wiki
 - SITSats Operational & in Development
 - CEOS, WGCV
 - Sub-Page: What is a SITSat (sub-page)
 - More detailed definition
 - Underpinning challenge (& how SITSats support it)
 - Within this include how instruments currently calibration and differences for SITSats
 - SI-Traceability & what is enables
 - What they do (and don't do)
 - Information to be provided & method
 - Sub-Page: SITSat Expected Impact
 - Success Story (Solar Irradiance and downstream impact)
 - Other potential benefits (applications supported)
 - Climate sensitivity, cloud properties trends, etc)
 - Sub-Page: Vision
 - Observation system with SITSats as the backbone
 - SITSats under development (repeat) with some summary
 - Timeline (preferred)

Landing Page

- Paolo suggested that the landing page has a menu. The page should be appealing and sexy that lets you navigate.
- Nigel noted that the mission and ToR need to be there somewhere. We want to sell the SITSats, but many won't be interested in the 'who' and the structure. We should be promoting the SITSats and not the task group. Kurt added that the page should primarily be what SITSats are and what they do. It's worthwhile to keep them clear.

- Brian suggested tying outputs to economic outputs, and how increasing accuracy shows potential impacts. Something broad and outside of the community.

Subpages

- Manik added that some kind of repository link or related datasets would be a good addition.
- Yolanda noted that we have a bullet on SITSats under development. We could have a link easily accessible to repositories for users. Maybe it should be closer to one of the top pages.
- Kurt suggested a tutorial subpage on what you get out of intercalibration. If you have a CLARREO-PF dataset, that does not mean you get to 0.3% uncertainty. Nigel agreed, and that we should have some precursor information describing the things you can and can't do.
- Kurt hopes to have this website up by the time CLARREO-PF launches.

Subpage: What is a SITSat?

- Yolanda suggested a more detailed definition here on what is a SITSat. This would include the underpinning challenge (including how instruments are currently calibrated), what SI-traceability enables, what they do and don't do, and information from SITSats to be provided.
- To expand on the underpinning challenge, Nigel noted that the intent was to go back to a simple message to the policymaker on why we want to calibrate anything. To start from the beginning to say we're doing Earth Observation for knowledge on the planet for climate and how we make changes. Simple messages there for people to grab onto. We could include that we're making measurements for sustainable agriculture and understanding pollutants. Start at lay level, recognising that it's not inconceivable. Targeted to a politician with no scientific background.
- Kurt suggested something as simple as 'SITSats help ensure we understand the causes of Earth or Earth system changes' as the ten second message. Brian noted that we'd have the whole argument for metrology on our side.
- Cody asked if there has been any attempt to say how much money missions could save from elimination of solar diffusers ect? Kurt noted that analogies get you in trouble. We want something broad but true, graspable and understandable.
- Yolanda agreed with the idea of simple messages used for policymakers. A challenging message to condense. Seems as though the hook is 'applications on the ground'.
- Kurt has been to 3 reviews at NASA HQ that refer to the BBQ pitch. They'll only listen for 20 seconds, so a tight message is a challenge.

Subpage: Sub-Page: SITSat Expected Impact

- Brian asked if the most compelling pitch is around climate change. Kurt noted that it is because the climate community did homework, however it didn't stop the US government from cutting CLARREO out.
- Larry noted that earlier statements described how chains of instruments are homogenised, which Nigel added, enables an integrated EO system. Yolanda however added that the more instruments you add in this chain, the muddier the message gets. We need to pull out the tight message.
- Yolanda suggested a shorter description, as the broader definition isn't EO or EO measurements. One could argue that TSIS is a SITSat for solar irradiance. As an example, it would provide a better understanding of the output from the Sun, and being able to link solar irradiance measurements could be a potential success story. Nigel added that other datasets from solar irradiance missions

have normalised themselves to TSIS, so it does serve as a cross calibration system. Kurt noted that this would make a great subpage description describing why we care about the output of the Sun.

- Yolanda suggested a high level description of the solar irradiance success story.

Subpage: Vision

- This subpage should let us display what we'd like to see, and link to SITSats under development/operations and link to their pages.
- The timeline would let us dream a bit. If we're going out 100 years, what does this look like? A fun graphic of our vision for SITSats. Medhavy referred to a slide presented yesterday on continuity.
- Nigel noted that we want SITSats to have recognition while they achieve objectives as one off missions. As a climate observing system, you'll then want a sequence of missions to top up the performance. Microwave, TIR, SAR missions etc - certainly the electromagnetic spectrum of at least passive sensors. It should be made clear that it should be built into the observing systems. The CEOS-CGMS doc on climate architecture from space has links to reference sensors from space, and so do the GCOS requirements too. We would benefit from a visualisation or graphic that shows this process of building them into the future from a pool.
- Kurt added that the multiplicity of observations gives us extra information and knowledge, and points out what we don't know and tells us what measurement we need to know better. For the under 30 crowd, it's how they use them to point out something broken that needs to be corrected.
- Paolo noted that websites are dynamic. We can start and with time we will increase its content. We don't need everything from the beginning.
- Brian is trying to figure out within SEO how these things fit together. They would prefer fewer click-throughs to get to the meaningful items.
- Some see the Cal/Val portal as a 'cleaning house' for everything.
- Yolanda noted that for this page, it's a longer term answer. We have a landing page and ToR. Figuring out the organisation of this information should be the first step, and figuring out where it should live may unfold better as we continue to populate this.
- Nigel added that the content is agnostic to where it sits, but it should not be perceived as either the CEOS or GSICS page.

Actions and AOB

- Nigel suggested everyone goes away to brainstorm high level examples of uncertainty reduction/case studies in support of SITSats, as well as ideas for a graphic.
- For an image animation, we can find people to make it.
- On the underpinning challenge, Yolanda is happy to make a start on this and bring some ideas to the group. We need a simplistic policymaker message of why they should care about SITSats.
- Kurt has not seen a diagram of what is a SITSat. Paolo added that we need a logo.

SITSat name

- Brian asked if we've considered something catchier than SITSat? Kurt added that it shouldn't be solely SI-traceable, but SI traceable at a certain level.
- Brian thought the name was a little bit acronym-y. There will be an opportunity cost as you go down the road if we decide to change the name at a later date.
- Nigel noted Tim Hewison and Greg Kopp came up with the name in a 2019 Workshop.

- Cody noted that certain people attribute Landsat's success to its name.
- Yolanda added that we're still getting the 'what is a SITSat' question, and Kurt is regularly getting questions on why their missions are not SITSats.
- Yolanda encouraged everyone on the team to think about whether to stick with the name SITSat.

Timeline

- To be provocative, Nigel asked what is the minimum we require in order to have a website we're comfortable with to show to someone. 3-4 month timeline. Will take us a long time to get all of this, so we should define a minimum starting point with few complex graphics.
- Philippe liked the animation of uncertainty chains, and how SITSats grab them back. They could make for a front page animation.
- Paolo could draft a structure on the web to try to understand where to put things and as a framework to develop content.
- Yolanda also suggested reaching out to Odell to develop the solar irradiance success story
- We should target mid-February as a time frame for the landing page and solar irradiance success story developed.
- Philippe thought it would be good to have a draft ready for the April GSICS meeting.

Regular Task Team telecons

- Yolanda and Harvey suggested having monthly virtual meetings of the group.
- Manik thanked all for the meeting, and would like to involve GSICS more in the SITSat Task Team.