Questions and Answers

The audience was encouraged to pose questions via the session Slack channel and the Blue Jeans chat. This document records that discussion.

Meredith Rawls 10:59 AM

BlueJeans for this session: https://bluejeans.com/255584794/7771

🙌1

Rachel Street 11:01 AM

Hello **@here** If you would like to ask questions, please do so at any time. You can post questions on this Slack channel or on the chat screen for the Blue Jeans channel linked above.

George Beckett 11:02 AM

I think the link in the online programme might be wrong. The link took me to a different room, when I clicked it.

> **Rachel Street** 11:04 AM
>
> Apologies for that, I will try to get it corrected.
>
> **Ranpal Gill** 22 hours ago
>
> which link is it?
>
> **Rachel Street** 22 hours ago
>
> We are using this one: https://bluejeans.com/255584794/7771
>
> **Ranpal Gill** 22 hours ago
>
> this is the one in the online agenda
>
> **Ranpal Gill** 22 hours ago
>
> https://project.lsst.org/meetings/rubin2022/agenda/satellite-constellations
>
> **Márcio Catelan** 22 hours ago
>
> It worked fine for me!
>
> **George Beckett** 22 hours ago
>
> Yes, it looks correct now. Not sure why I got sent to wrong room. Perhaps it was a mistake on my part. Sorry, if it was.
>
> ✅1
>
> **Rachel Street** 22 hours ago
>
> No worries, glad you can join us!

Márcio Catelan 11:21 AM

Question for Meredith: Are you aware of any ongoing mitigation efforts on the part of relevant foreign actors, such as China?

Meg Schwamb 11:24 AM

Given cosmic rays can likely be identified in single images without the need for snaps, is it likely that the DM algorithms could flag most satellite streaks in single 30s snaps? Does work need to be done on algorithms to do that in single snaps? I ask because gaining back from overheads the ~8% time on-sky for collecting photons is preferred by most of the community.

7 replies

> **Clare Saunders** 21 hours ago
>
> The algorithm that DM is currently using doesn't rely on snaps; it just requires 3 or more images of the same patch of the sky at some time.
>
> **Clare Saunders** 21 hours ago
>
> The figure Meredith showed of an image with and without masking was using our current algorithm.
>
> ✚ 1 🙏 1
>
> **Meg Schwamb** 21 hours ago
>
> Ah thanks.
>
> **Meg Schwamb** 21 hours ago
>
> So if we say year 1 incremental templates were made from 3 images - then in the first time the difference image is made, there would be the ability to use the 3 images that went into the templates to identify satellites (as bast as can be done with incremental templates)? (edited)
>
> **Clare Saunders** 21 hours ago
>
> The required three images is including the one with the satellite.
>
> **Meg Schwamb** 21 hours ago
>
> Thanks
>
> **Clare Saunders** 21 hours ago
>
> Satellite masking is not currently being done in alert production, but there is nothing technically blocking it. Satellites can even be identified with only a single image, it is just faster and more certain if you can make a difference image.

Robert Lupton 11:24 AM

We have code to look for satellites. @Clare Saunders can tell you more

Rachel Street 11:26 AM

We will have a Q&A session at the end of session - I will raise all questions posted here during that time

A. Emery Watkins 11:27 AM

"Orbital space is a human environment in need of protection"; brings to mind, aside from human impact, does anyone know what's the potential environmental impact of flooding the night sky with satellites? I know there are many species of insect/other animals that use the night sky to navigate, so I'm sure there's plenty of things that could go wrong if all of the sudden the pattern of stars up there drastically altered night to night.

> **Meredith Rawls** 20 hours ago
>
> Check out the bio environment report within this larger report
> https://zenodo.org/record/5874725
> Dark and Quiet Skies II Working Group Reports
> This Report presents the main results of the Conference "Dark and Quiet Skies for Science and Society II" which took place on-line on 3–7 October 2021. This conference was the logical follow-up of the first one, organized as an on-line workshop with the same title on 5–9 October 2020. Both conferences were co-organized by UNOOSA, IAU and the Government of Spain and were well attended. The focus of the second conference was about the feasibility of implementing the recommendations presented by the first one in its extensive report. The main qualifying difference between the first and the second conferences was a more explicit involvement of the industrial stakeholders and of space policy experts, whose contributions were instrumental in presenting a credible review of the proposed mitigating measures as well as of possible regulatory guidelines.

Peter Yoachim 12:12 PM

Question for Andrew. How does satellite streak crosstalk removal compare with diffraction streaks from bright stars? Seems like there are enough bright stars we should expect a diffraction streak in a majority of visits.

Michele Bannister 12:13 PM

Sound from room has dropped out

Márcio Catelan 12:14 PM

We could not hear the question or comment.

Michele Bannister 12:14 PM

Q for Jake Ankari - what is the brightness testing plan for the gen2 Starlinks - and if they do not meet mag fainter than 7, will they launch anyway, or hold and iterate until they meet design goal?

Katrin Heitmann 12:15 PM

Did you hear that question?

> Katrin Heitmann 21 hours ago
> or the answer? They are coming frm different mics.

Rachel Street 12:15 PM

Can you hear now?

Clare Saunders 12:16 PM

We can hear the main mic, but not the one used for questions

👍2

Rachel Street 12:16 PM

OK "low battery"! We will use the desk mic

Michele Bannister 12:18 PM

thanks, we can hear the q now 🙂

Wesley Fraser 12:19 PM

~~I'll repeat the question here instead of bluejeans chat:~~

~~Does Starlink have any plans to test in space the many improvements to v2 satellites before gen2 launches occur in vigor?~~

Addressed with Michele's question (edited)

Rachel Street 12:31 PM

Blue Jeans Q from Rob Seaman: If a satellite reflects light away from sites on Earth, won't it become more evident to other satellites, perhaps at higher altitudes or the Lagrange points? Have such impacts been modeled?

> Meredith Rawls 20 hours ago
> I too wonder about the ancillary impacts of directing light away from Earth...

Rachel Street 12:31 PM

Comment from Peter Yoachim: Would that be a problem for things like weather satellites? I imagine JWST doesn't point towards Earth too often.

Meredith Rawls 12:34 PM

Jake just made a very interesting point that SpaceX is a bit unique because their company does all aspects of design, build, launch, etc for their sats. Other operators may e.g. order sats manufactured by 3rd parties that don't design with darkening in mind at all

Rachel Street 12:36 PM

We have run out of time for this session folks, but please continue the discsussion here and the speakers will do their best to answer your questions in this channel. Thanks everybody !

Clare Saunders 12:37 PM

Another consideration in response to @Phil Marshall, in the current DRP processing we fit an average profile to the satellite streak, then mask out to a few sigma of the PSF, at which point the satellite profile is below the background noise level. For the static sky, any remaining wings of the satellite are then going to averaged with several-to-many other images on the same patch of the sky. If there are indeed spurious low surface brightness objects that are still detectable and problematic for DESC science, it is always possible to go back and do more conservative masking.

✅1

> [Adam Snyder](#)   [20 hours ago](#)
> Depending on the satellite geometry the wings of the satellite profile may vary on how far they extend and may require more flexibility in how many sigma of the PSF are needed to ensure the residuals are below background. I agree that it is possible to perform more conservative masking but with the proliferation of satellites and uncertainty in occurrence of bogus objects it may be difficult to detect bogus objects leaking into the catalogs.

> [Robert Lupton](#)   [19 hours ago](#)
> We can also think about subtracting the wings of the PSF (as we plan to do for bright stars).   We'd still mask the cores

> [Phil Marshall](#)   [19 hours ago](#)
> Thanks all. For now I will hold in my head that 1) crosstalk correction to cosmology analysis standards is possible and 2) it is likely to cost ~1 CPU hour per visit image, and I'll refer back to this thread and he session slides for caveats etc.

Michele Bannister 12:37 PM

Q for Adam: how long does it take to fit a mask to an individual trail, at the current levels of leftover residuals (eep)?

Michele Bannister Yesterday at 12:37 PM

Q for Adam: how long does it take to fit a mask to an individual trail, at the current levels of leftover residuals (eep)?

> **Adam Snyder** 20 hours ago
> I have not worked with fitting real individual trails, only with simulations, sweeping through mask width values. Maybe @Clare Saunders can comment on how satellite trail masks are currently determined?

> **Michele Bannister** 20 hours ago

Thanks. I think this somewhat folds together with the verbal q / its response and the thread with Phil above; I am envisioning a masking step having to run in processing after the crosstalk-removing step. Thoughts please @Clare Saunders & co. on the impact/need for additional processing time for release of alerts (for the transient sky) and post-hoc catalogue cleanup?

Clare Saunders 20 hours ago

The current masking takes ~1-5 seconds per patch of HSC data (about 2 ccds size) on NCSA. There are certainly opportunities for speeding it up, so I think it's possible to see that fitting into the overall AP budget.

🙌1👀