



# Satellite Mega-Constellations Policy Update

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# AAS

- First Starlink tranche was much brighter than expected by the relatively few [non-DOD] O/IR astronomers who participate in the satellite and space debris domain
- Strong community reaction...at least in the Twitterverse
- SpaceX (Patricia Cooper) reached out immediately
- AAS formed working group under our Light Pollution, Radio Interference, & Space Debris Committee
  - See Jeff Hall's remarks
  - Links to IAU & IDA
- Key choice for AAS group: no NDA

# AAS con't

- Immediately clear that O/IR community was starting from zero compared to the history/culture/regulatory framework in the radio part of the spectrum
  - See Harvey's remarks
- AAS Board position statement on June 8th:  
<https://aas.org/press/aas-issues-position-statement-satellite-constellations>

# Vera Rubin Observatory

- The tall pole in the tent
- Small team, led by Tony Tyson, signed NDA
  - this allows them to get into design weeds with SpaceX
  - they've actually been included in company design reviews for new mitigation concepts
  - Some AURA folks (e.g., Phil Puxley) inside NDA, but other key people (e.g., Pat McCarthy) outside NDA
- Critical to hammer home message that this isn't about just one telescope (no matter how wonderful) in Chile
  - It's about the system!

# Operator Landscape

- SpaceX/Starlink – relationships well established
  - Musk direction to “solve” problem (DarkSat & VisorSat)
- OneWeb just declared bankruptcy
  - Musk at SAT20: his goal is “having more than zero in the ‘not bankrupt’ category” for LEO constellation companies (NB: but Iridium found new life thanks to DOD)
- Amazon Kuiper – design stage; not very responsive
- TelesatLEO – ops in 2022; haven’t contacted yet
- Lot of other smaller

**OneWeb files for bankruptcy amid coronavirus chaos, leaving satellite network’s fate up in the air**

GeekWire Alan Boyle

GeekWire March 27, 2020



# Public Modeling

- Pat Seitzer, Umich
  - January AAAC Mtg:  
[https://www.nsf.gov/attachments/299316/public/12\\_Satellite\\_Constellations\\_and\\_Astronomy-Pat\\_Seitzer.pdf](https://www.nsf.gov/attachments/299316/public/12_Satellite_Constellations_and_Astronomy-Pat_Seitzer.pdf)
- Jonathan McDowell, CfA
  - <https://arxiv.org/abs/2003.07446>
- Olivier Hainaut, ESO
  - <https://arxiv.org/abs/2003.01992>

# Community/Legal/Regulatory Issues

- Lots of press attention (benefit of no NDA is speaking freely)
- Some in our community have questioned whether the AAS working group unwittingly going down a path of appeasement and coziness (even invoking Chamberlain)
- Vanderbilt U law student paper got some press attention claiming that astronomers could sue FCC over its Starlink agreement using environmental (NEPA) angle
- The AAS is NOT spending time/energy worrying about suing anyone
  - Complete agreement with Tony Beasley's (NRAO) sentiments at recent Congressional briefing: "Partnership, not confrontation."
- BUT, where there are clear regulatory benefits that both our community and industry can agree on, we should pursue those
- AND, we should be driven by evidence

# Europe

- AAS and RAS keeping in touch
  - RAS organized meeting with SpaceX & OneWeb
- ESO modeling in response to some of the chicken little demands for them to “do something”
  - Spherical cow paper with lots of assumptions
  - ESO reached out to AAS to coordinate, which was very welcome
  - But predictably, some press coverage not reflective of U.S. view
- Sets up a Europe vs U.S. dynamic
  - Understandably confusing to constellation operators

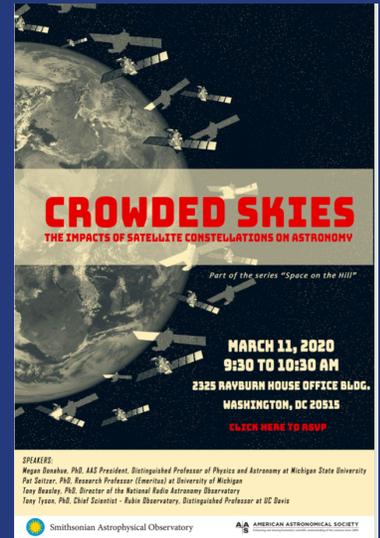


# IAU & Other Int'l Bodies

- Press release in response to community interest
  - <https://www.iau.org/news/pressreleases/detail/iau2001/>
- What about companies not as forthcoming/helpful as SpaceX has been to date?
- What about companies/countries with no plans to operate their constellations in the U.S.?
- How can AAS, RAS, major observatories, etc. best interact with and support the IAU?
- At governmental level, how does our community best work with the UN Office of Outer Space Affairs and the General Assembly's Committee on the Peaceful Uses of Outer Space

# Congressional Outreach

- Committee staff meetings and updates ongoing
- AAS/SAO briefing on House side on March 11<sup>th</sup>
  - Megan Donahue, Pat Seitzer, Tony Beasley, & Tony Tyson
- Specific member interest
- NSF reauthorization bill an avenue for policy and programmatic changes that make sense
  - Also an avenue for studies (NASEM, GAO, etc.)
- Also making it clear that this isn't just an NSF issue: it's the system that's at stake



# Administration Outreach

- WH Space Council → OSTP (Pat Looney)
  - STPI study
- Dept. of Commerce
  - Office of Space Commerce & NIST
- FAA
- FCC
- DOD & the IC (mission interference?)
- NASA (ground/space interdependence)
- DOE (given Vera Rubin's LSST survey)

# NSF

- Finalized radio coordination agreement with SpaceX & NRAO shortly after first launch
  - [https://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=298678](https://www.nsf.gov/news/news_summ.jsp?cntn_id=298678)
- Some NSB member interest (Alan Stern)
- Expanded mandate for spectrum managers
- OIR Lab charged with front line responsibility
  - Do they need a position equivalent to Harvey's?
- JASON study underway
- Key agency for international discussions

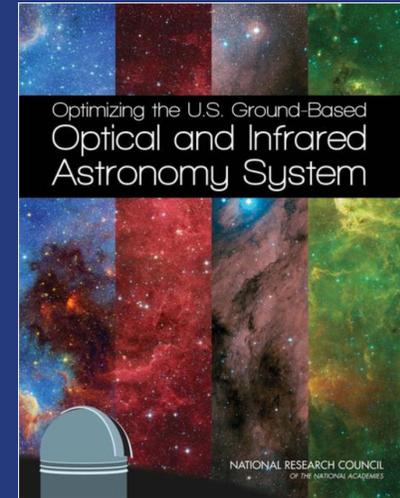
# Next Steps

- OIR Lab/AAS Workshop this summer
  - Technical focus aimed at solutions from both ends
- More industry outreach
  - Joint webinar(s) with Satellite Industry Association
  - SATELLITE 2021 and other industry conferences post COVID
- AAS focus will continue to be on policy and public affairs
- AAS also considering equivalent of a *Good Housekeeping* seal of approval for operators
- Vera Rubin Obs focus will continue to be on detailed technical problem solving
- IAU/UNOOSA/IAC dark skies conference in October
  - <https://www.iau.org/news/announcements/detail/ann200003/>
- **KEY OUTCOME:** Development of voluntary guidelines: “LEO constellation design w/o damaging astronomy”

# Suggestions for NASEM

## (from a former staffer)

- Past O/IR system report as keystone for system approach to ground-based
- Astro2020
  - Double down about science case for systems approach to deep & wide, transient, ground/space in multi-messenger era
  - Be explicit that this isn't just about Vera Rubin Obs
  - Our technology push to answer many big science questions on a collision course with interference from LEO megacons
- CAA
  - Co-convene policy-centric workshop to follow OIR Lab/AAS technical workshop?
  - Study to recommend policies and programs?
- CORF
  - Unique role to play w/ FCC and perhaps other regulatory bodies
  - Expand scope (and membership) or duplicate



# Questions? Discussion?

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