Update on the GNA-G Global LEOSat WG

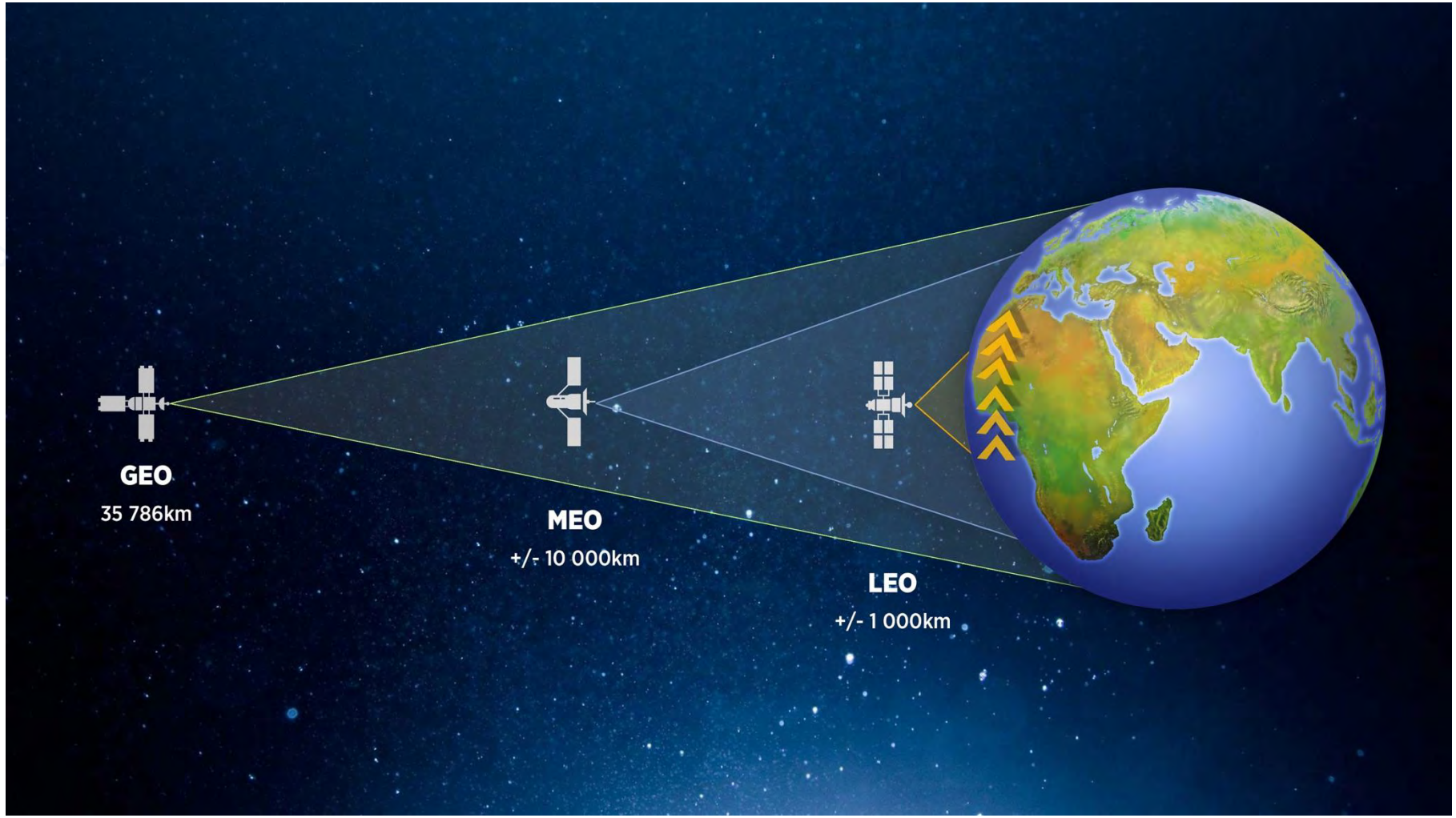
SC24

Atlanta, GA, USA

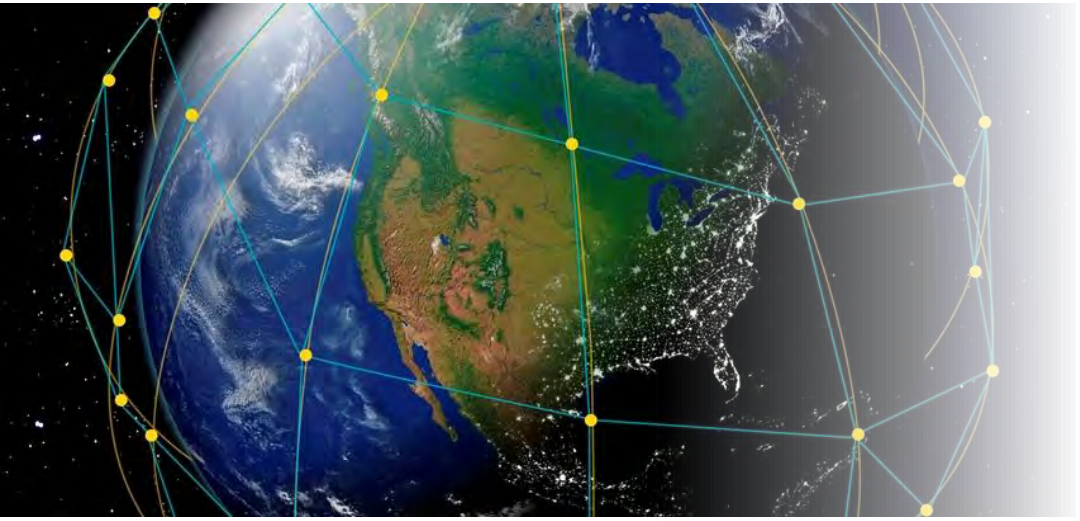
NORDUnet
Nordic Gateway for Research & Education

Erik-Jan Bos (NORDUnet)

Satellites 101



The promise of LEOSat



- Global coverage (soon)
  - **Also, for (fast) moving objects**
- Acceptable roundtrip times
  - **10s of milliseconds, in stead of 600 ms with GEO**
- High bandwidth
  - **100M – 1G range, and 10G premium access**

The State of Play of LEOSat

- Four LEOSat vendors/initiatives:
  - Eutelsat OneWeb
  - Starlink
  - Telesat
  - Project Kuiper

- Furthermore, organizations from the United Kingdom, China, Japan, the European Union, etc. are all proposing LEOSat mega constellations
- Analysts project that up to 50,000 LEO satellites could orbit the Earth in the next decade

Some examples from R&E Networks using LEOSat

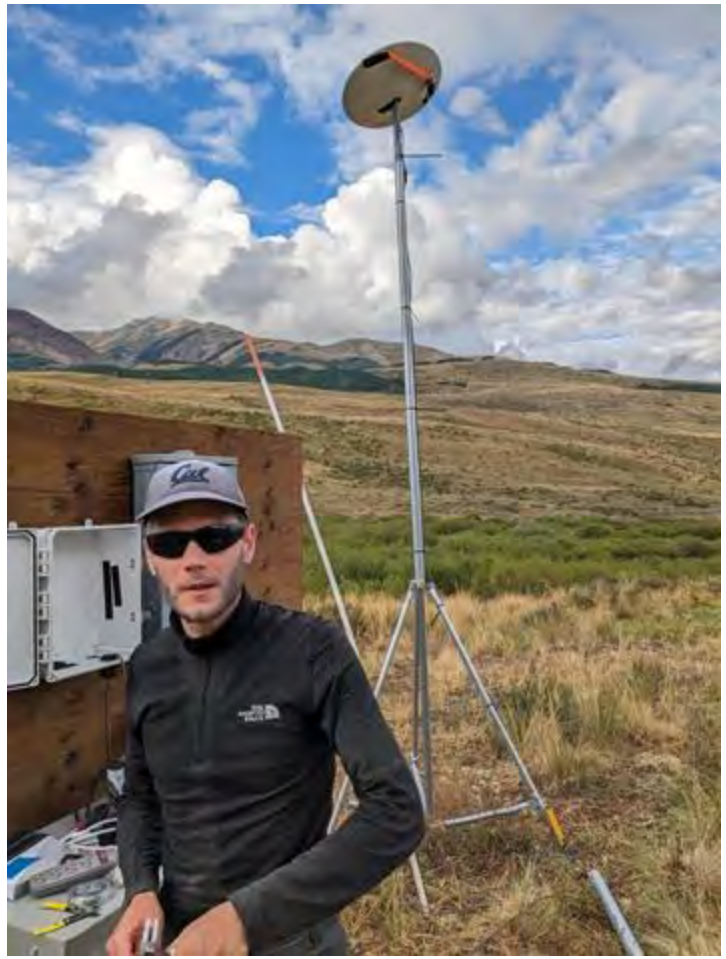
- Sikt (Norway)
- ESnet (USA)
- CANARIE (Canada)

Sikt's use of Starlink for last-resort backup on Svalbard

Images by Svein Ove Undal
Slide courtesy of Sikt

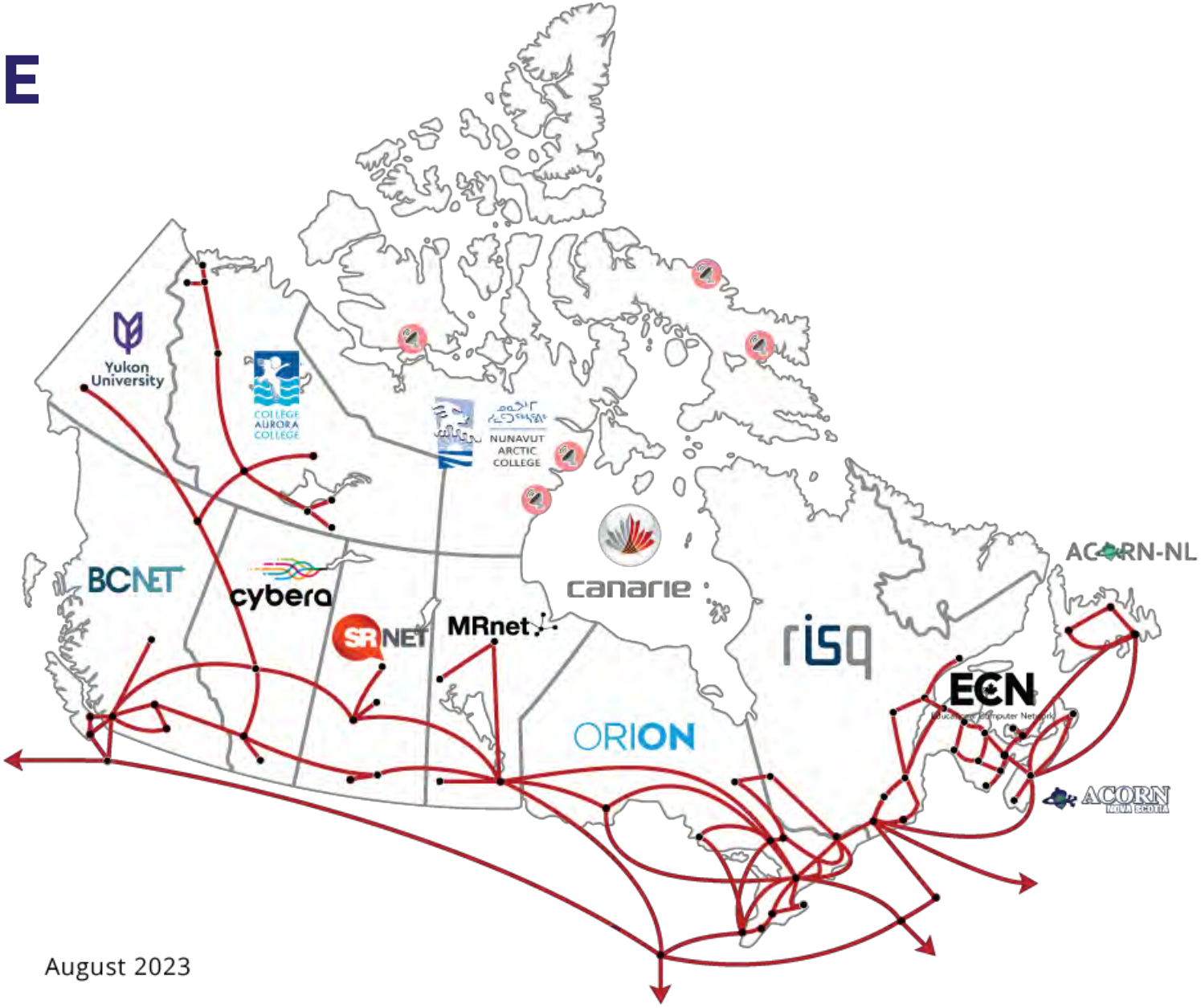
ESnet

- ESnet has been exploring the use of LEOSat, to expand the ‘ESnet Wireless Edge’
- Discoveries include:
  - **Absolutely a no-brainer for single point sites, with a clear view of the sky, and electrical power**
- As these uses grow, ESnet plans to expand and optimize peering with LEOSat providers as needed



Information courtesy of Andrew Wiedlea (ESnet)

CANARIE


Yukon University
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BCNET
cybera
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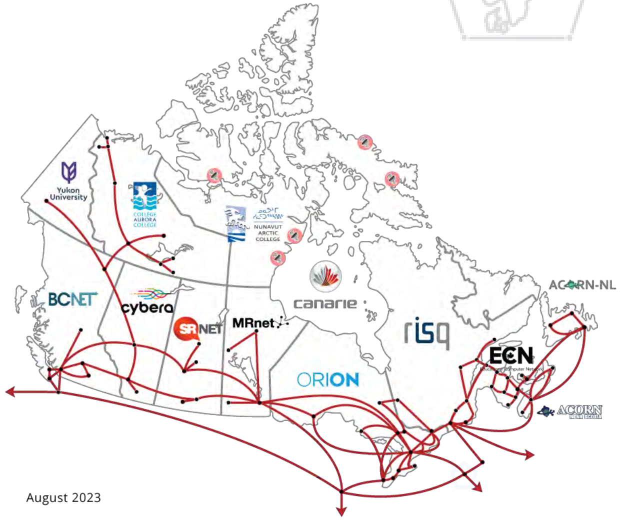
August 2023

CANARIE

- Agreement with a communications solution provider for a resilient network featuring Starlink and OneWeb LEO satellite, and geostationary satellite
  - Resilient LEO capabilities
  - Cost effectively best match data to satellite communication options
  - Managed networking security services, important to optimize IT/security staff
- CANARIE peers with the communications solution provider in southern Canada



NUNAVUNMI INIRNIRIT ILIHARVIAT
COLLÈGE DE L'ARCTIQUE DU NUNAVUT
NUNAVUT ARCTIC COLLEGE

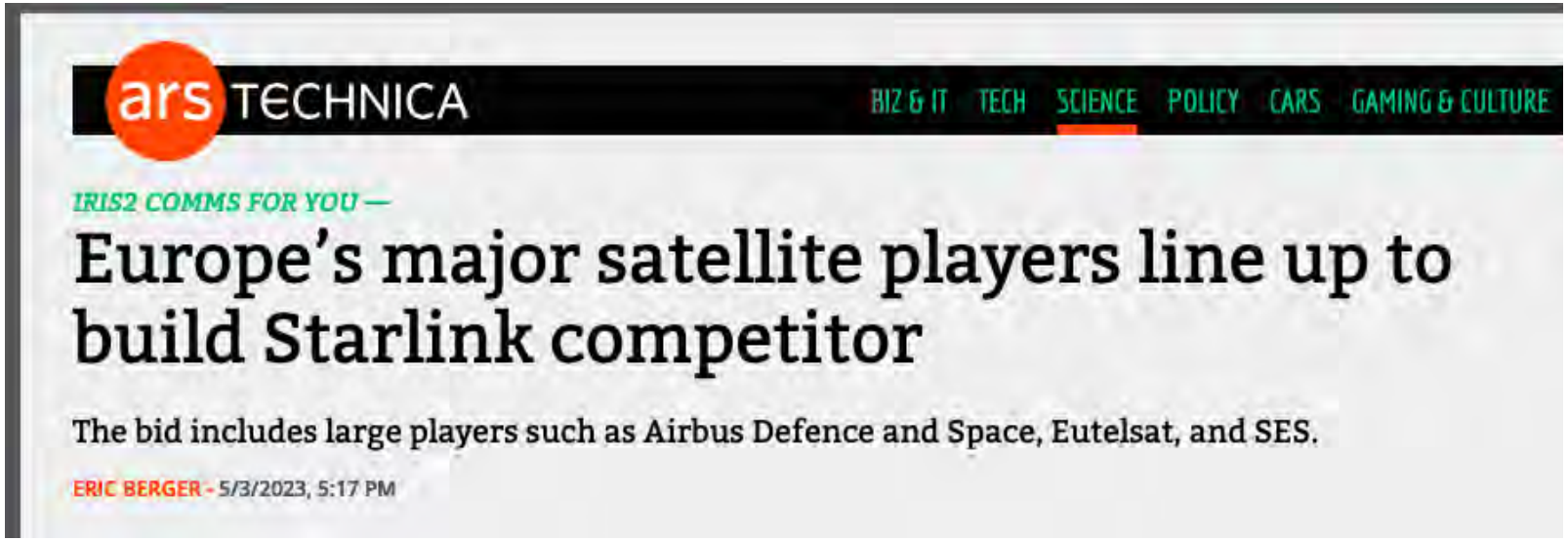
Information courtesy of Mark Wolff (CANARIE)

Is it all good news for LEOSat?

- Not exactly…
- Worries include:
  - More space junk/debris
  - Concerns about electromagnetic interference
  - Satellite constellations could have an impact on ground-based astronomy

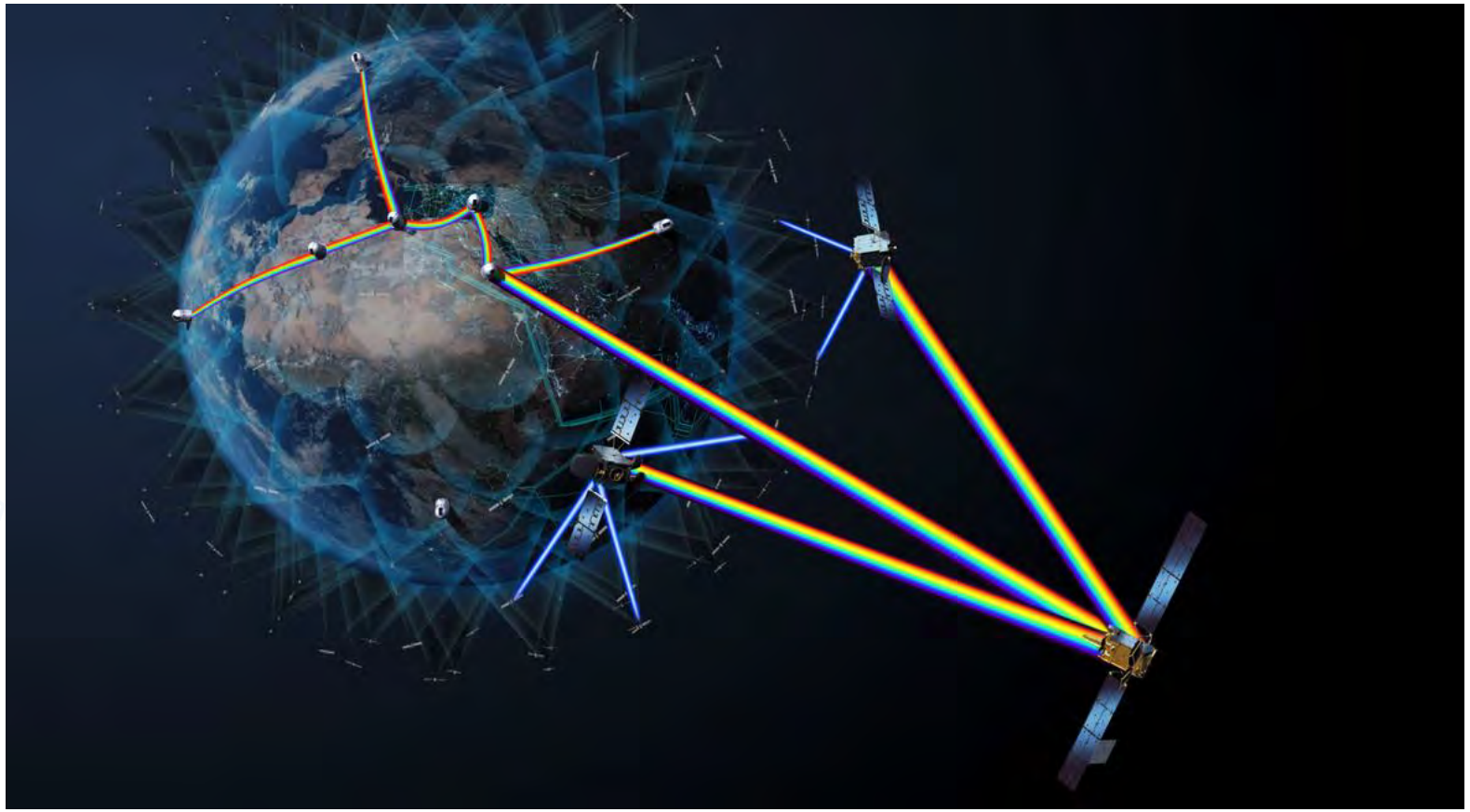
Picture of a bright satellite flare above the Very Large Telescope in the Atacama Desert in Chile

Innovations in Sat: European initiative



https://arstechnica.com/science/2023/05/europes-major-satellite-players-line-up-to-build-starlink-competitor/

Innovations in Sat: ESA's HydRON (High thRoughput Optical Network)



The vision is part of ESA's Advanced Research in Telecommunications Systems (ARTES) 4.0 Strategic Programme Line on "Optical & Quantum Communications" - ScyLight programme

Demonstrators to be built by:

AIRBUS

THALES
Building a future we can all trust

https://www.esa.int/ESA_Multimedia/Images/2021/07/HydRON_optical_communication_for_broadband_in_space

To Summarize:

- LEOSat technology and services can be an important addition for R&E Networks connectivity in the local loop:
  - **Connectivity for a location that is hard to reach by fiber, e.g. a research station on Greenland**
  - **Connectivity for a moving object, e.g. a research vessel going into the Arctic**
  - **As a back-up for a remote but critical site that has its connection through one fiber path only**

Global Collaboration in R&E Networking

GNA-G
Global Network Advancement Group

- Global LEOSat WG:
  - Under the Global (R&E) Network Advancement Group (GNA-G)
  - Webpage: https://www.gna-g.net/join-working-group/global-leosat/
  - Co-chairs reachable at: <leosat-wg-co-chairs@lists.gna-g.net>

Mark Wolff CANARIE, Canada	Andrew Wiedlea ESnet, USA	Erik-Jan Bos NORDUnet, European Nordics
		

The Global LEOSat WG

GNA-G
Global Network Advancement Group

- Goal of the WG:
  - A platform for discussion on LEOSat developments, in areas of:
    - Technology
    - Service delivery
    - Commercial
    - Legal
  - Knowledge sharing by discussing deployments, use cases and user cases
- Topics of interest include:
  - Exploring possible mechanisms for joint procurement of LEOSat services
  - R&E Networking connectivity to LEOSat providers

As fiber is our currency, should R&E Networks be interested in LEOSat?

~Someone, from the R&E Network Community

Answer:

- There's a lot happening in LEOSat that is of interest for R&E Networks
- There's a lot of innovation and testing in the satellite realm to follow

So, YES, this is becoming more and more of interest to the R&E Networks, especially for expanding the 'wireless edge' (as ESnet calls this)
And… Sign up to the Global LEOSat WG, if you're interested

Next meeting of the Global LEOSat WG:
Monday, 2 December 2024 at 3pm UTC on Zoom

Join the WG by sending e-mail to: bos@nordu.net

Thank you!

SC24

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LEOSat resources

- Websites of operators or projects:
  - Eutelsat OneWeb: https://oneweb.net/our-network/
  - StarLink: https://www.starlink.com/
  - Telesat: https://www.telesat.com/leo-satellites/
  - Kuiper Systems: https://www.aboutamazon.com/what-we-do/devices-services/project-kuiper
- Testing and tracking:
  - Satellite Map: https://satellitemap.space/
  - LEOScope: https://leoscope.surrey.ac.uk/