Adtran | 40 YEARS OF INNOVATION | 10 AIM

Turning Rayleigh into Reality

9 March 2026, Vincent Sleiffer, Director Product Line Management

NET NOD meeting 2026

How much fiber do we have deployed worldwide?

(Round-trip earth to the moon is about 768,800km)

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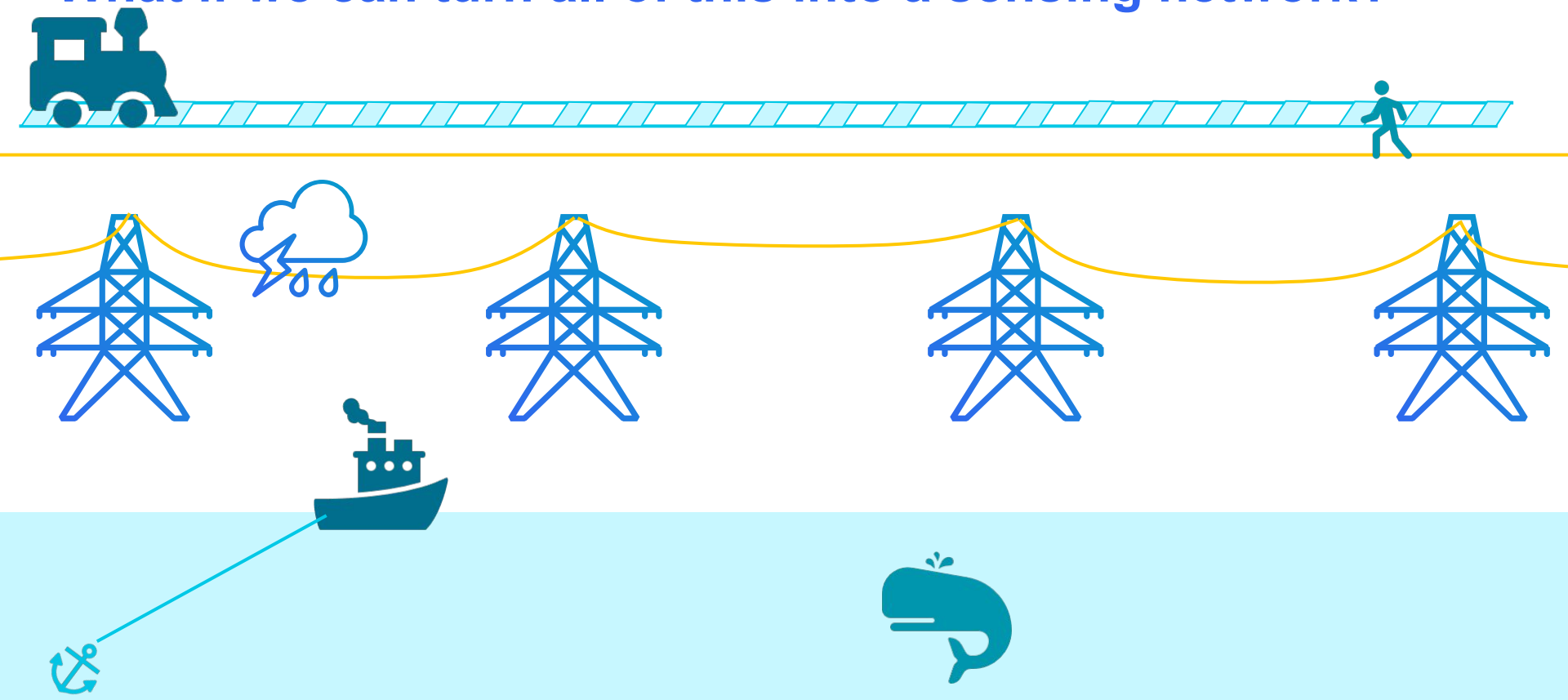
(Round-trip earth to the moon is about 768,800km)

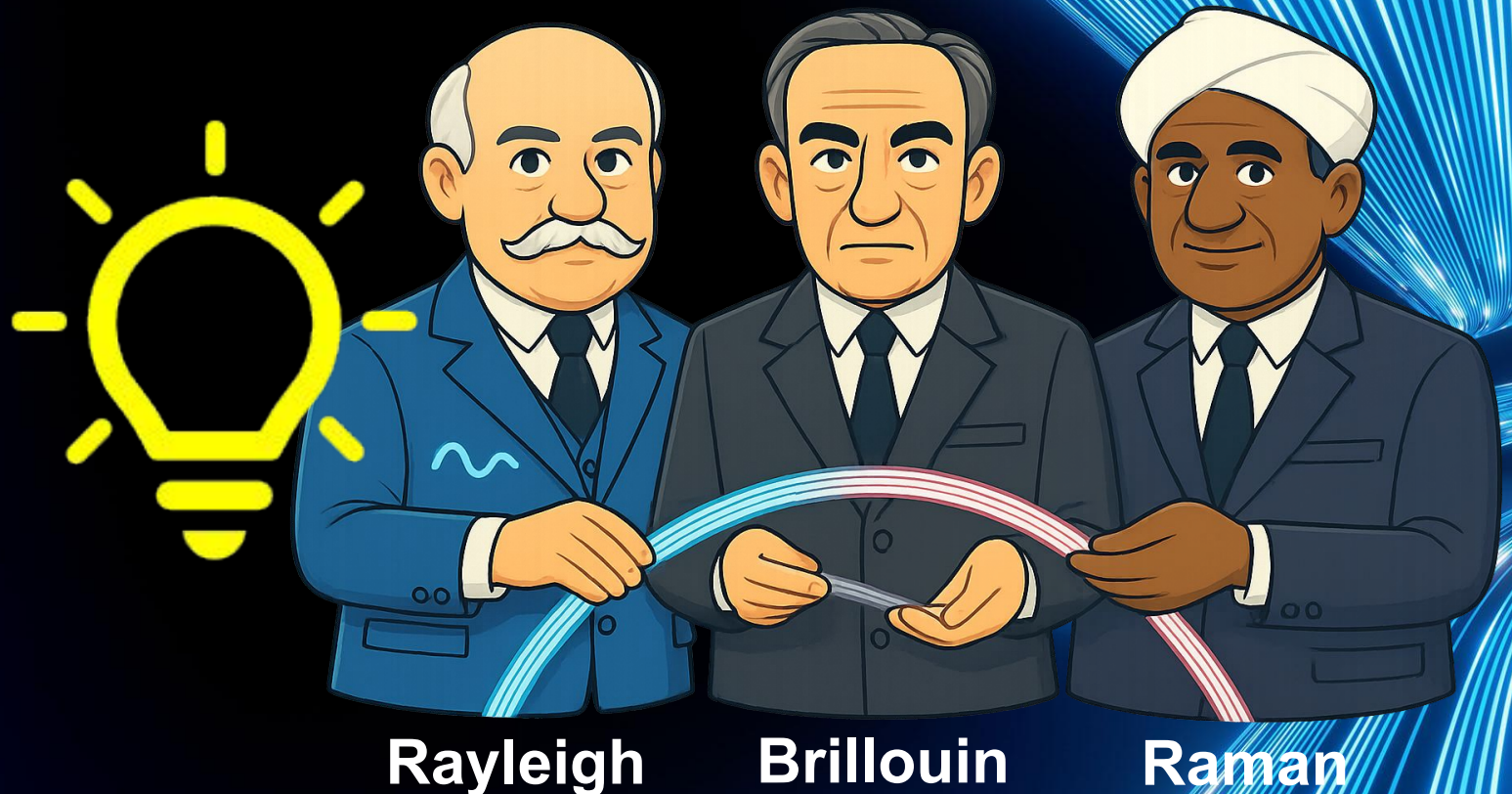
C 6500x = 5 billion km!

(Relax, it is only ~17x round-trips to the sun)

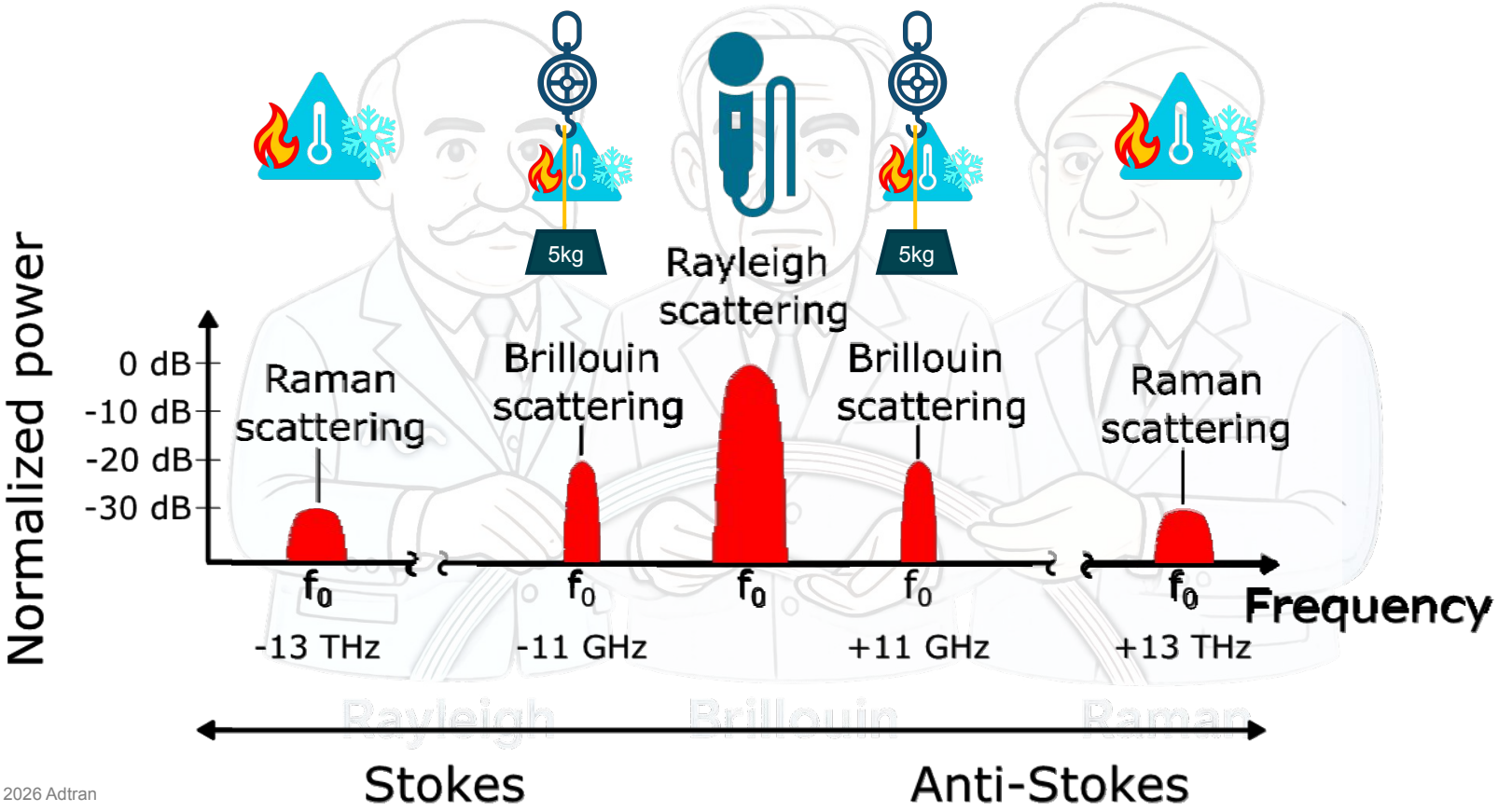
What if we can turn all of this into a sensing network?



Can fiber really listen?



Scattering effects in glass core fiber



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INTERROGATE

Using fibre optics to listen in on whales

Bioacoustics

USING FIBRE OPTICS TO LISTEN IN ON WHALES

In the remote Arctic, the ability to repurpose infrastructure has become a boon for scientists. Emerging fibre optic sensing technology uses existing telecommunications equipment to eavesdrop on whale sounds so researchers can monitor baleen whales on an ecologically significant scale. As **KYRIN POLLOCK** and **LÉA BOUFFAUT** tell us, this technique is poised to be a game-changer in conservation.

BENEATH THE WATER'S surface, there is a conductor-less symphony in the depths of the Arctic Ocean. Marine mammals bellow and sing, deep-sea vents provide bass, invertebrates use steady snaps to warn off predators, and cracking sea ice sends gongs reverberating through the waves. But this oceanic orchestra is quickly transforming as the climate warms and human activity increases. To study these changes, scientists are tuning into marine sounds. An emerging technology using fibre optic cables is a promising method to study baleen whales and their ecosystem at the habitat scale, from fjords or bays to entire migration routes. This technology may provide unique perspectives into Arctic dynamics and prove vital for conservation.

Retreating sea ice is exposing previously inaccessible Arctic areas to shipping routes and marine tourism. At the same time, global energy pressures make the rich and largely untapped Arctic an alluring prospect for oil and gas exploitation. Beyond human industrial intrusion, the Arctic is seeing transient baleen whale populations spend more time at higher latitudes, including humpback, blue and fin whales that have historically visited the region in the short summer months to feed in the ice-free, nutrient-rich waters. The bowhead, a year-round resident of the Arctic, relies on the unique soundscape to navigate, communicate and feed. While this species increasingly contends with competition from transient boreal whales, they all face physical threats from industrial shipping and associated noise pollution across the Arctic.

In 2022, scientists found that baleen whales could be monitored using a technology known as distributed acoustic sensing.

USING ACOUSTIC DATA TO SUPPORT CONSERVATION

Collecting data on baleen whales in the Arctic is challenging, but there have been notable local successes. For example, a collaboration between Iñupiat, researchers and the US government has yielded a reliable census of the Bering-Chukchi-Beaufort bowhead whale population. The visual and acoustic data collected helped to establish subsistence hunting quotas and enact required protections. After this collaboration began in the 1970s, the Bering-Chukchi-Beaufort bowhead population began to rebound, reaching more than 16,000 individuals by 2011 (the most recent survey) from fewer than 5,000 when the study began. This outcome also protects Iñupiat food sustainability and cultural sovereignty. Successes like these make compelling cases for using acoustics at scale.

Acoustics has proven to be an effective mode of research because baleen whales are chatty: they make frequent identifiable vocalizations that can be heard tens of kilometres away underwater. Acoustic data can serve a dual purpose, providing baseline information that will help us understand changes over time in whale movements and habitat use for marine management while also acting as a method for near-real-time monitoring to mitigate potential anthropogenic threats.

However, there are some drawbacks to the technologies currently used in acoustic monitoring. Researchers typically monitor sound using autonomous archival hydrophones (underwater microphones), but the data these collect are accessible only after scientists have retrieved the instruments. In addition, deployments of these devices are associated with high operational costs, such as for fuel, boat rental, crew, and the potential risk of instrument failure or loss of the equipment at sea. An alternative is near-real-time recording platforms, but these also pose operational hurdles, such as the need to source low-power data processing for autonomous mobile platforms (such as gliders) and high infrastructural costs for fixed installations (e.g., cabled hydrophones). Overall, these methods are also challenged by the spatial scale associated with the conservation of large migratory species.

Acoustics has proven to be an effective mode of research because baleen whales are chatty.

MAKING USE OF FIBRE OPTIC CABLES

In 2022, scientists found that baleen whales could be monitored using a technology known as distributed acoustic sensing (DAS). DAS uses telecommunication fibre optic cables that are already present in the ocean to provide internet access around the globe. This approach works by connecting an instrument, known as an interrogator, to a fibre on land. The interrogator enables real-time, continuous monitoring—creating thousands of virtual acoustic sensors uniformly spread across the length of the fibre optic cable—without disrupting data transfers.

This means that researchers can monitor whales from the comfort of land, without needing to go to sea. Observations can be made from up to 170 kilometres from shore at a resolution as fine as a metre. Leveraging the opportunities created by submarine cable landings across the Arctic to create several DAS arrays could support coastal monitoring along migration corridors, contributing to both baseline science and real-time risk mitigation.

While there are still challenges to overcome with DAS, such as processing massive datasets and understanding responses, the potential benefits are intriguing. The concept of a mobile marine protected area—an ocean sanctuary with shifting boundaries protecting species as they follow ocean features that can change rapidly due to the climate crisis—was introduced as early as 2000, but at the time, the technology to implement it was in its infancy. DAS is a step towards making such dynamic habitat protection measures a reality. It can also be complemented by other acoustic technologies to provide additional coverage in coastal and offshore areas that are under-served by fibres or out of the recording range for DAS, reducing the overall burden of Arctic acoustic data collection.

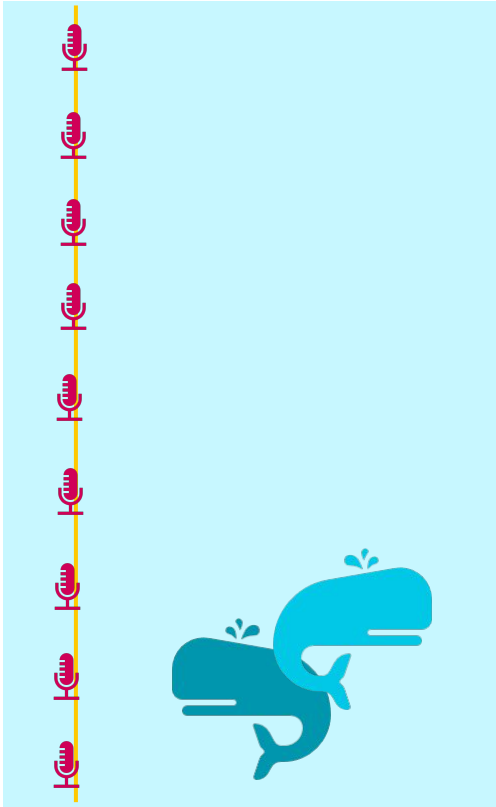
Bowheads' lifespans can extend more than seven human generations, meaning that individuals from a single generation are experiencing an outsized shift in the dynamics of their habitat in response to changing sea ice conditions, which are reflected as increased competition from boreal species and intensification of human industrial activities. A better understanding of their ecology combined with migration monitoring in a rapidly changing environment is crucial to their conservation. Listening in can help preserve the sounds of life in all its forms. ●

KYRIN POLLOCK is a climate and environment consultant with a focus on Arctic conservation and science storytelling.

LÉA BOUFFAUT is a researcher specializing in marine conservation bioacoustics with a focus on baleen whales and technology.

Both work with the K. Lisa Yang Center for Conservation Bioacoustics at the Cornell Lab of Ornithology, Cornell University, US.

Source: WWF The Circle Magazine 2.2024



Read more:
https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2023.1130898/full

India express train kills seven elephants

BBC

India express train kills seven elephants crossing tracks

21 December 2025

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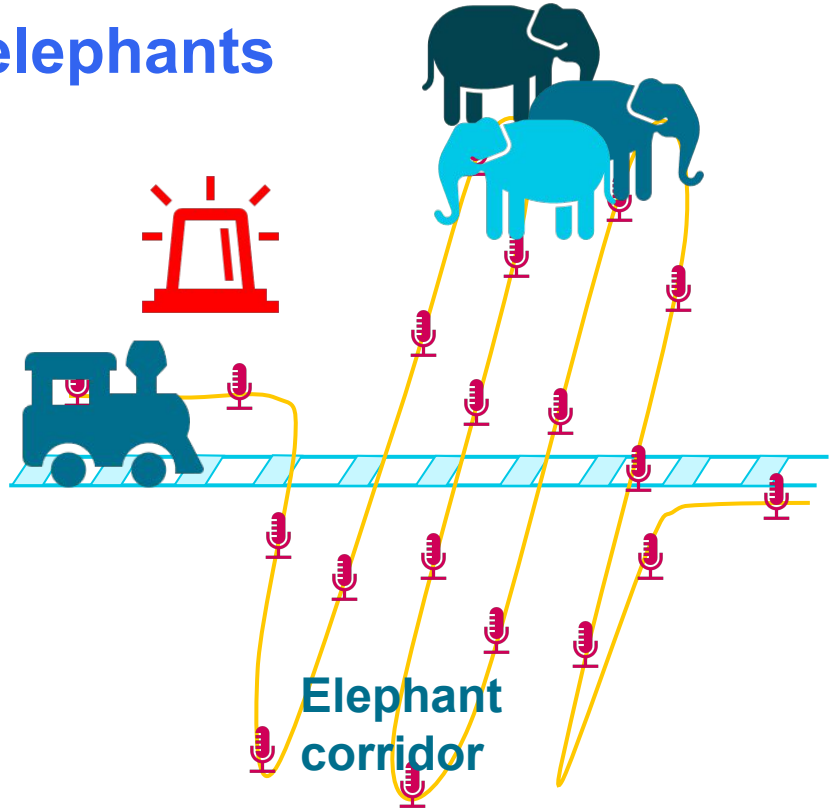
Jaroslav Lukiv

A covered elephant's body lies by the track in Hojai district, Assam state, as police and railway officials examine the scene

Source: https://www.bbc.com/news/articles/c9qe2yln2nlo



See more: https://www.sensonic.com/en/blog/elephants-get-rail-protection-with-fiber-optics-and-ai--3259/

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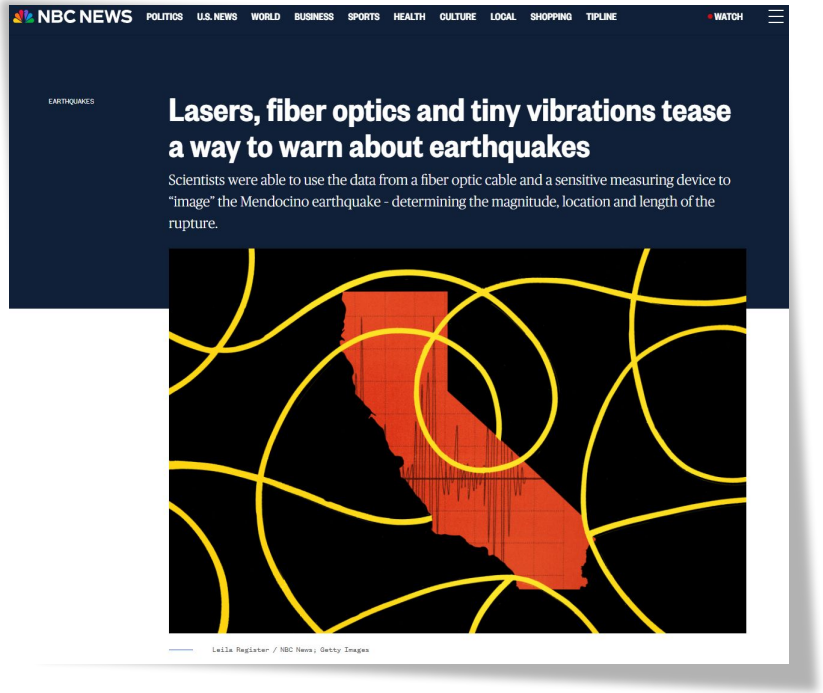
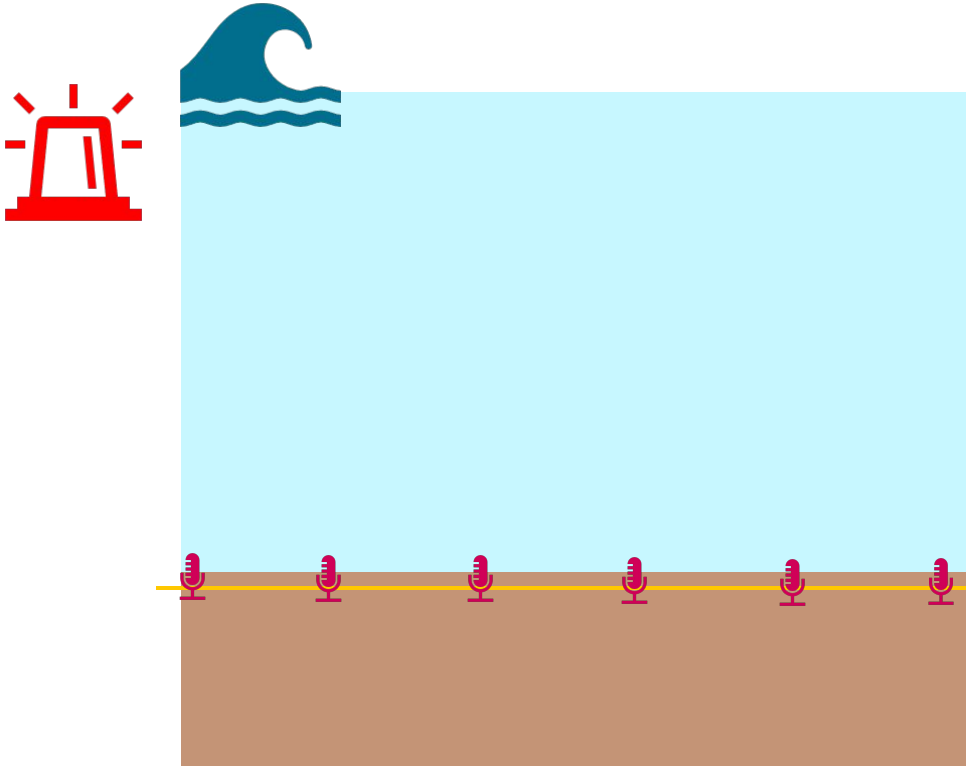
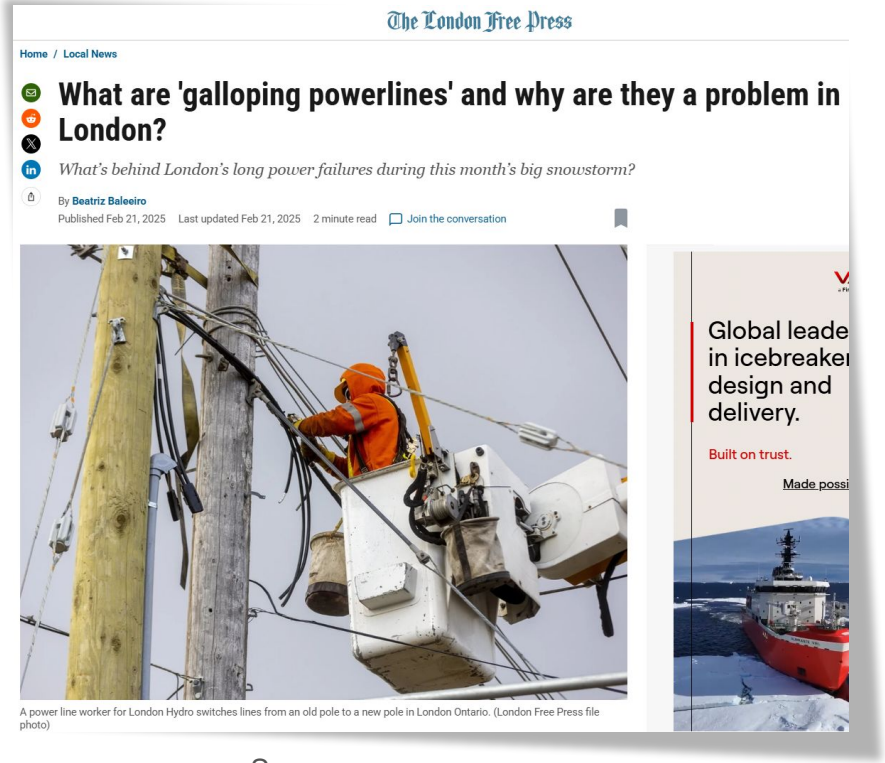
Lasers, fiber optics and tiny vibrations tease a way to warn about earthquakes





Source: https://www.nbcnews.com/science/earthquakes/lasers-fiber-optics-tiny-vibrations-tease-way-warn-earthquakes-rcna233568

What are 'galloping powerlines' and why are they a problem in London?



The London Free Press

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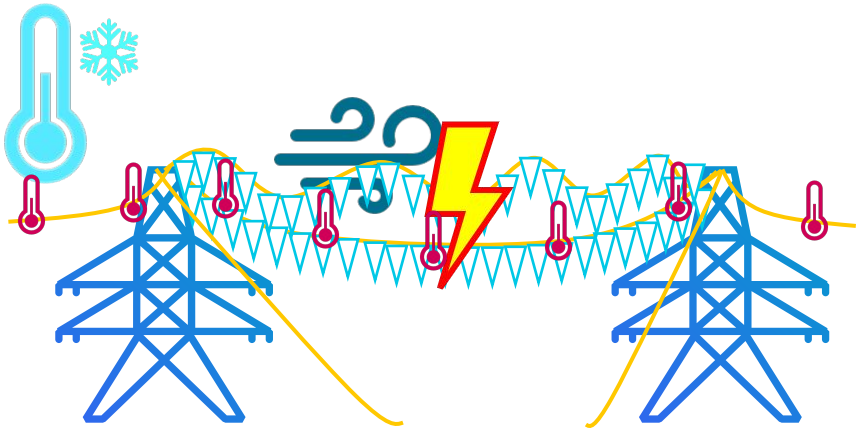
What are 'galloping powerlines' and why are they a problem in London?

What's behind London's long power failures during this month's big snowstorm?

By Beatriz Baleeiro

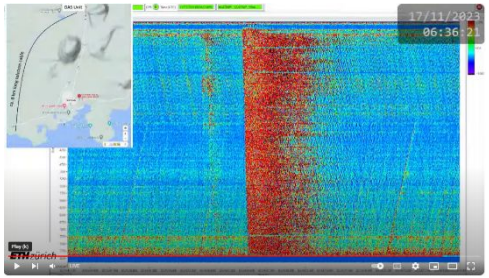
Published Feb 21, 2025 Last updated Feb 21, 2025 2 minute read Join the conversation

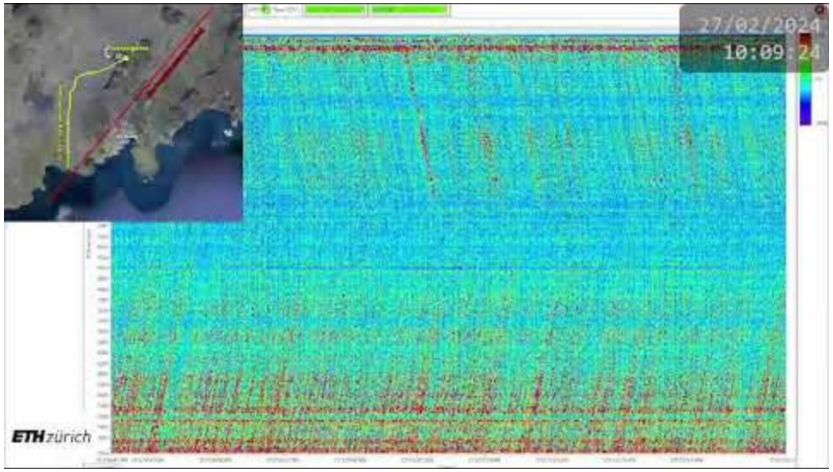
A power line worker for London Hydro switches lines from an old pole to a new pole in London Ontario. (London Free Press file photo)



Source: https://lfpress.com/news/local-news/what-are-galloping-powerlines-and-why-are-they-a-problem-in-london

Stort vulkanutbrott på Island – lavan sprutar ur spricka i marken

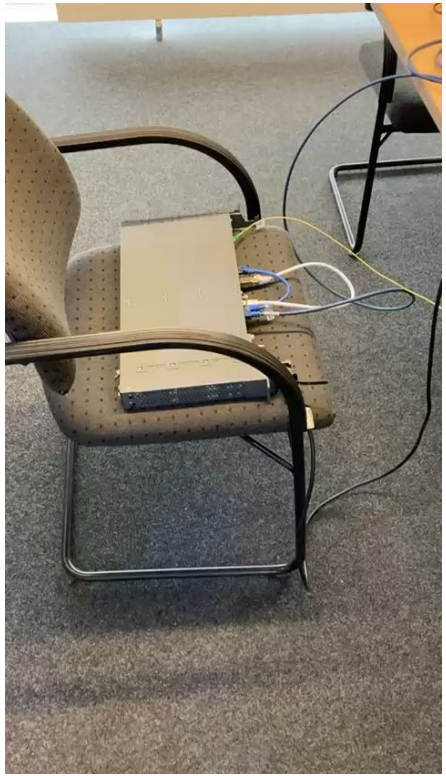


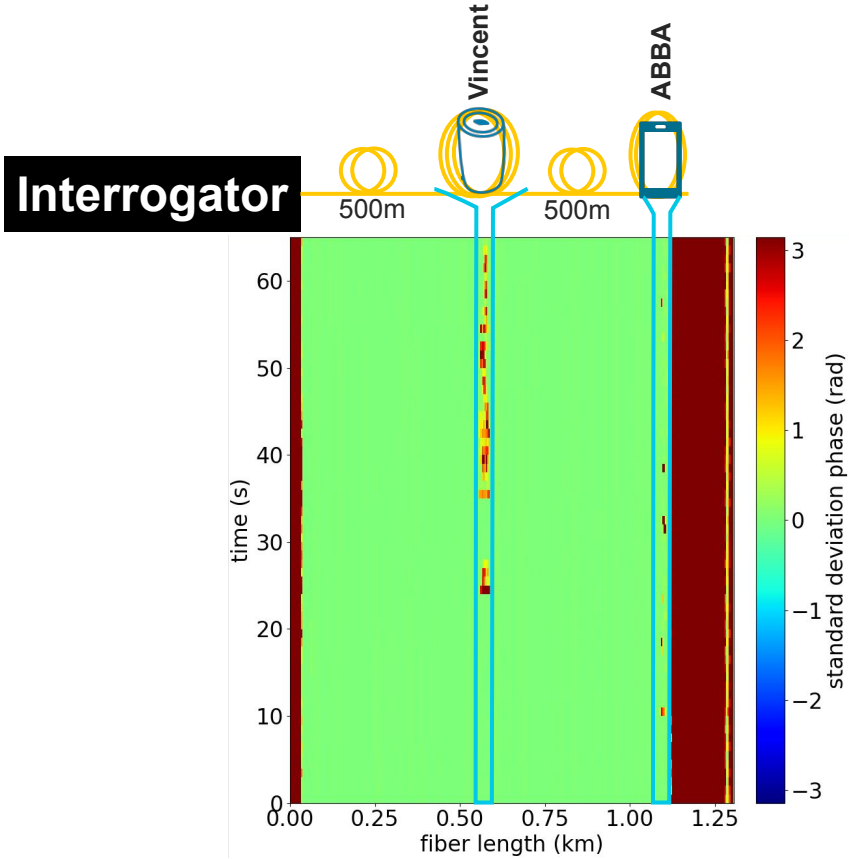


Live stream: https://youtu.be/LCQD_eDuovI

Source: https://www.svt.se/nyheter/utrikes/vulkanutbrott-pa-island

Nice, Vincent, but microphone-array is just a metaphor, right?





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Thank you