

January  
2023



Corporació Catalana  
de **Mitjans Audiovisuals, SA**



# **Catalunya Ràdio & TV3 - *Starlink* enabled content- contribution literally from the end of the earth**



# About CCMA - Corporació Catalana de Mitjans Audiovisuals

- The Corporació Catalana de Mitjans Audiovisuals (CCMA) is the Catalan public organization that manages the audiovisual media of the Generalitat de Catalunya.
- Its mission is to act as a public service with a firm commitment to quality, independence and the promotion of Catalan language and culture.
- Its audiovisual offer includes:

- TV: **TV3**, 33, Super3, 3/24, Esport3 and TV3Cat.



- Radio: **Catalunya Ràdio**, Catalunya Informació, CatMusica & iCat FM

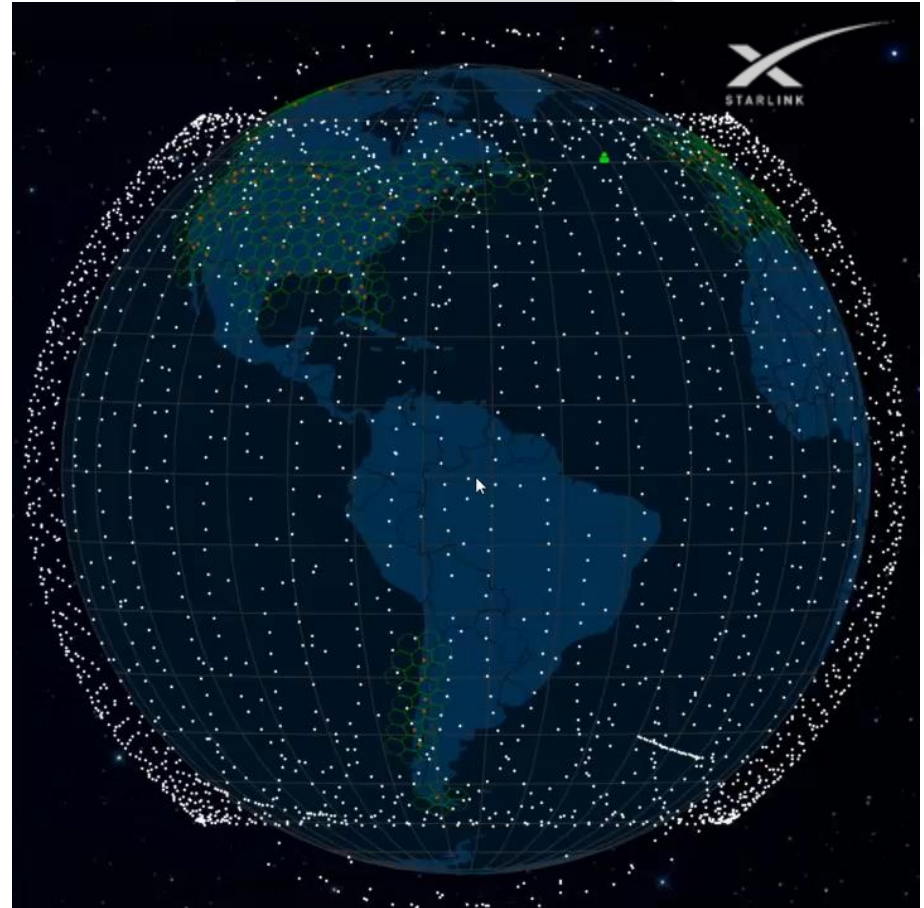


- Digital Media: website, mobile apps, Connected and Hybrid TV, social networks, etc...



# About Starlink

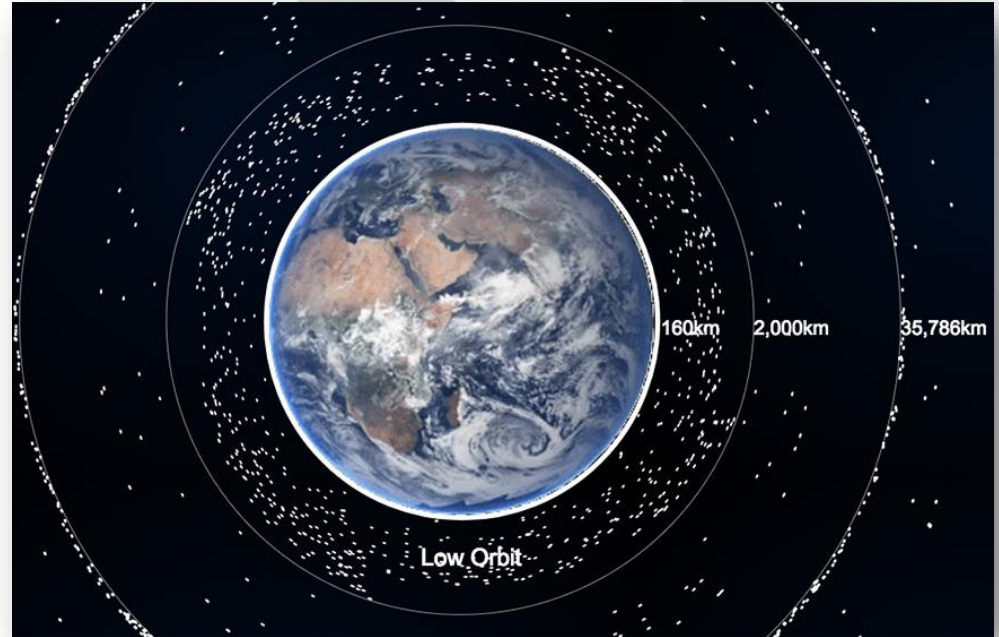
- *Starlink* is a satellite network operated by SpaceX to provide **low-cost internet coverage** in remote locations.
- It's the first and largest satellite constellation using low Earth orbit.
- Almost 3400 working satellites in orbit.



# About Starlink

## Satellite constellation

- SpaceX proposed a constellation of almost 42,000 satellites circling the globe in low orbit.
- Increasing satellites constellation will allow a better service.
- Very low latency (about 20-40ms) thanks to the use of LEO (about 350 and 550km from the earth surface).



# About Starlink Services

- It currently offers 6 different services:
  - Residential (fixed positions)
  - Business (better performance)
  - **RV (portable) → interesting for *broadcasters, streamers...***
  - Maritime
  - Aviation
  - IOT





# TV/Radio Contribution with Starlink

The alternative when you have no alternative

**Starlink RV** is an interesting communication option for live audio/video transmission/contribution.

- Live broadcasts → in areas where you have no signal coverage.
- *Bonding broadcasts* → For example as a backup or BW increase in 4G/5G connections.

## Advantages:

- Very light, portable & easy to connect (plug&play)
- Low price communication link



# TV/Radio Contribution with Starlink

## History

CCMA has always been aware of last technologies applied to live contributions.



2006 – 3G live video  
with a Nokia N90



2008 – Flyaway Ku  
satellite connection



2010 – Driveway IP  
satellite connection

# TV/Radio Contribution with Starlink

## Test proposal

Use cases of Starlink network for radio and TV contribution.

- Radio  
(audio contents)
- TV  
(video contents)



Both live and recorded test considered the possibility to use Starlink as a **single** communication or as a **backup** of a second communication link.



# TV/Radio Contribution with Starlink

## CATALUNYA RÀDIO – Test results



**CATALUNYA**  
RÀDIO



# TV/Radio Contribution with Starlink

CATALUNYA RADIO – Test results



# TV/Radio Contribution with Starlink

## TV3 – Test results



# TV/Radio Contribution with Starlink

## TV3 – Test results

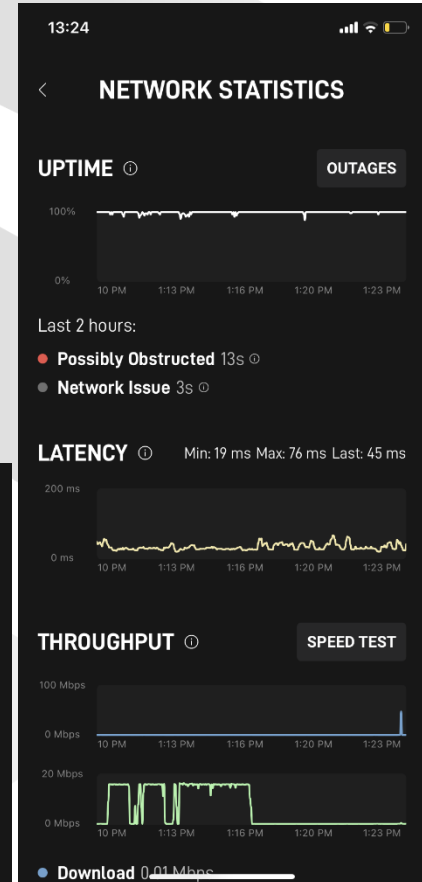
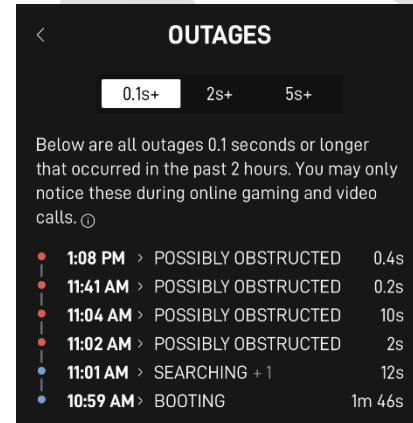


# TV/Radio Contribution with Starlink

## TV3 – Test results

Test results during a 2h long video contribution:

- FullHD Video Bandwidth about 6Mbps (using *TVUNetworks* streaming app)
- Video delay about 2,5s
- Satellite latency about 50ms
- Good behaviour (only affected by short outages)
- **Negative Point: it CAN be affected by short outages**



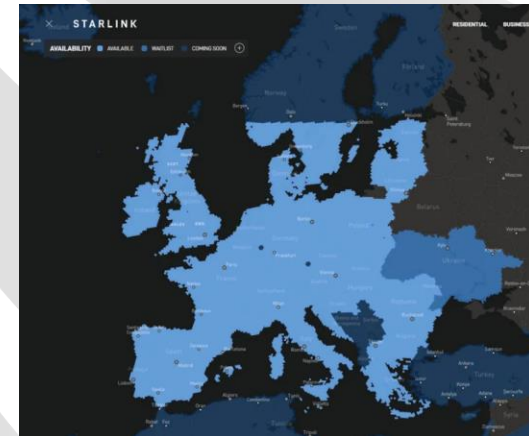
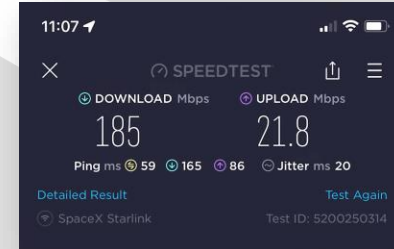


# TV/Radio Contribution with Starlink

## TV3 – Test results

Results may vary based on:

- Location
- Vision of the sky  
(and number of satellites)
- Predictable improvement of the service  
due to the update and increase in the  
number of satellites



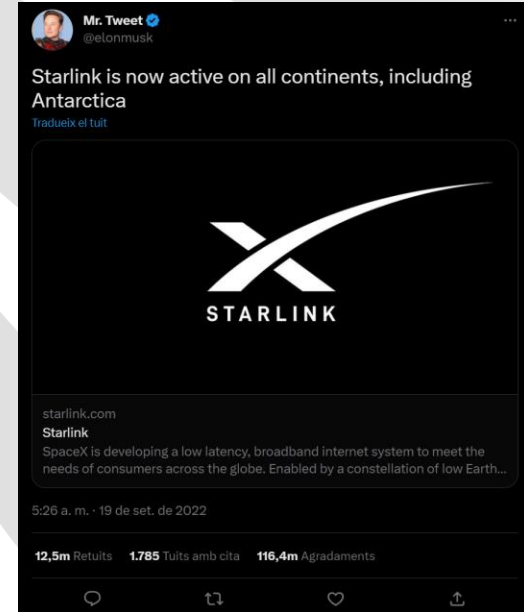
European Starlink Coverage

# TV/Radio Contribution with Starlink

## Let's go further...

On September 19 Elon Musk announced that **Starlink works** on all continents, even in **Antarctica**.

Also on September Catalunya Ràdio had the **challenge of traveling on an expedition to Antartica**, specifically to the Spanish base on Livingston Island.



# TV/Radio Contribution with Starlink

Let's go further...

So we thought... Why not testing a live TV/Radio HD contribution from “the end of the world” and using Starlink LEO satellites?



Is there satellite coverage?

# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica

Spanish Antarctic Base Juan Carlos I



# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica

Really easy to deploy the antenna.  
But not so easy to get good coverage !

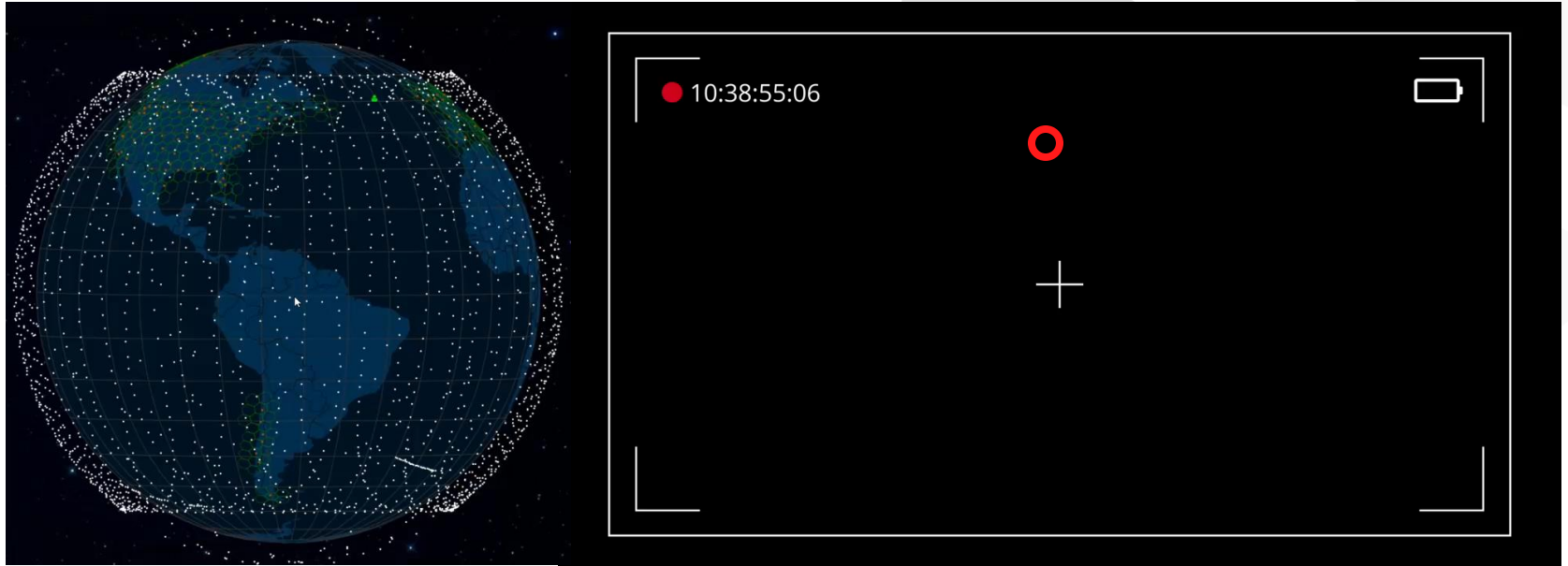




# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica

Why long outages? Only a few rings of satellites pass through Antarctica

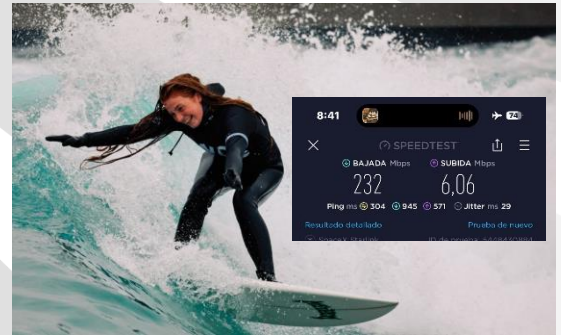
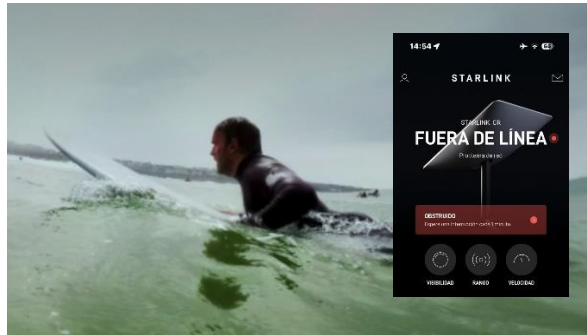


Movement of rings could be predictable!

# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica

Keep waiting the wave !



the wave !



# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica



# TV/Radio Contribution with Starlink

## Catalunya Ràdio – Test results from the Antarctica

The screenshot shows a live broadcast interface. At the top left, a teal banner reads "Directe Tromsø, Noruega". At the top right, it says "POLÒNIA Avui, 22.05" and features the number "3" logo. Below the top left is a video feed of a female reporter in a dark jacket and hood. Below that is a video feed of a male reporter wearing a headset and a yellow microphone with the "3" logo. The main background image is a wide shot of a massive, layered ice formation under a cloudy sky. At the bottom, a red banner contains the text "Viatgem als dos extrems del planeta". Below this, a purple banner contains the text "A l'illa Livingston, a l'Antàrtida, hi ha la base científica espanyola BAE Joan Carles I". On the far left, there is a large white number "3" on a red background.

Directe Tromsø, Noruega

POLÒNIA Avui, 22.05

#PlantaBaixaTV3

Directe Illa Livingston, Antàrtida

**Viatgem als dos extrems del planeta**

A l'illa Livingston, a l'Antàrtida, hi ha la base científica espanyola BAE Joan Carles I



# TV/Radio Contribution with Starlink

## Conclusions

Is Starlink interesting for Broadcasters? **Yes:**

- Starlink constellation delivers **global internet coverage**.
- The service is good enough to **allow TV/Radio/Streaming contributions** with low latency and at a low cost.
- It can be used as a **backup** for communications or as a stand alone link.
- It allows **live transmission from nearly anywhere**, and only 3 minutes needed to deploy (really plug & play).

But:

- Requires a **100° cone unobstructed view of sky**.
- It may suffer of **short outages** affecting the video/audio transmission.
- The **coverage at Antarctica is still not good enough nowadays**.

(Starlink Business service was not available when CCMA started the testings. It is supposed that the results could be better with the new service)