DARK & QUIET SKIES

EUTELSAT'S BEST PRACTICES

Panel 2 - Satellite Industry Mitigation: Who tried what?

UN/SKAO Workshop on Dark and Quiet Skies for Science and Society 2025

Eutelsat Overview

A PIONEER IN SPACE

Originally set up in 1977 as an intergovernmental organization (IGO) and merged with OneWeb in 2023

+45

years of experience in satellite industry

LEO-GEO OPERATOR

34 geostationary satellites

A fully launched LEO constellation of 654 satellites

LEO

DEPLOYEMENT COMPLETED

OPERATIONAL EXCELLENCE

Leverage of our long-standing experience to maintain high technical and operational standards while taking concrete steps to further advance space sustainability

RESPONSIBLE AND SUSTAINABLE OPERATOR

eutelsat

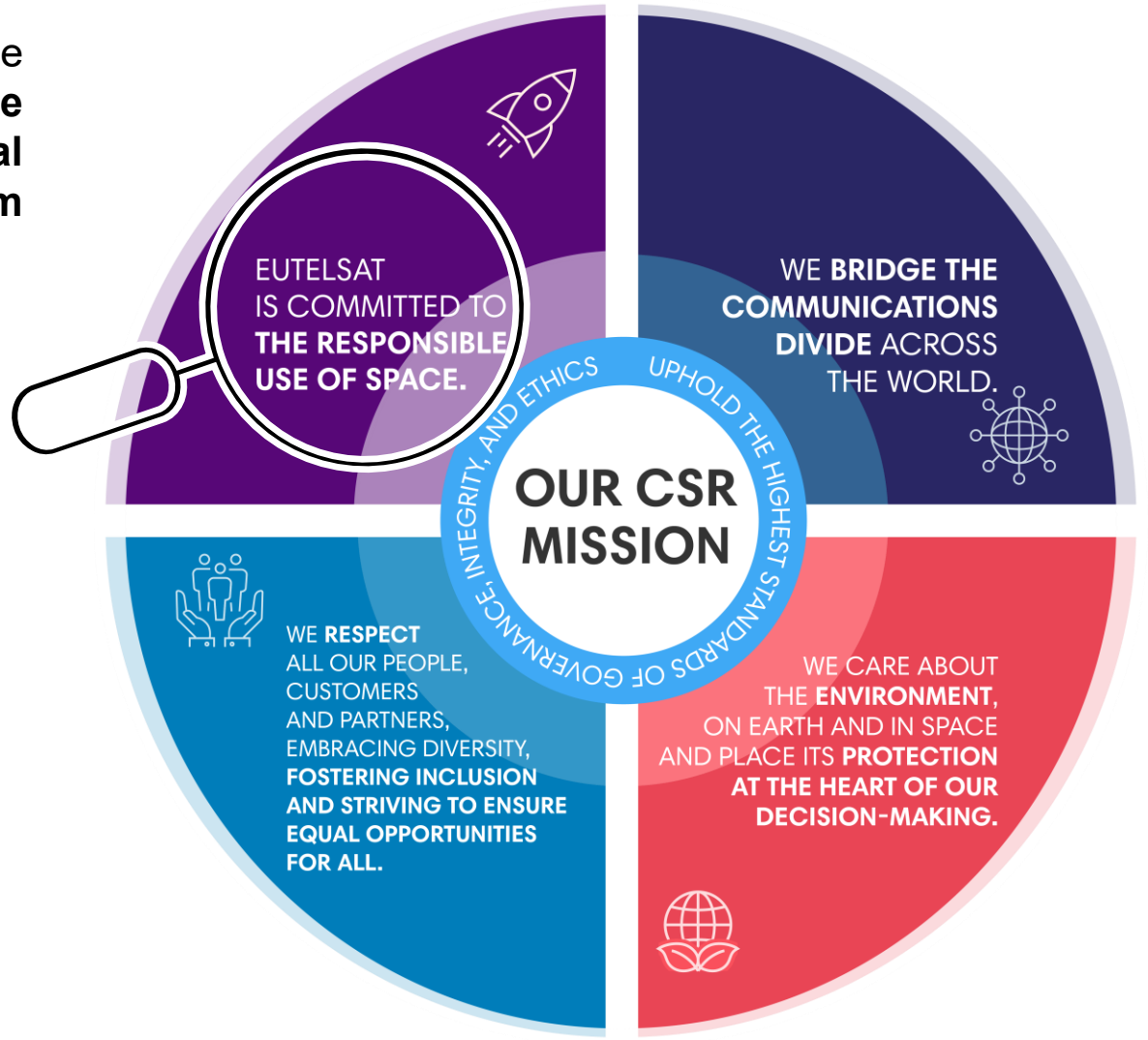
OUR CSR MISSION

Our CSR mission revolves around four primary pillars all of which are in perfect alignment with our business model

We are a member of the United Nations Global Compact since 2019

SUSTAINABLE DEVELOPMENT GOALS

The integration of sustainable development is **a cornerstone of both our operational success and our long-term strategy**.



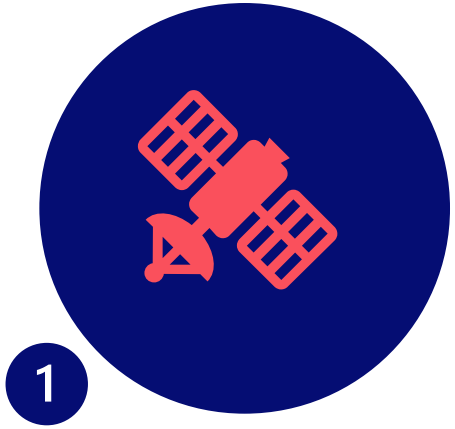
Two D&QS material IROs* identified by our stakeholders:

- Optical interference from Eutelsat satellites
- Minimisation of Radio Interference

**IROs (Impacts, Risks and Opportunities) refer to the most significant sustainability matters identified through the 2025 double materiality assessment, conducted in line with the European CSRD requirements and based on input from internal and external stakeholders.*

Check out our latest Sustainability Statement for more information

Eutelsat’s mitigation strategies for Dark and Quiet Skies



DESIGN
CONSTELLATION

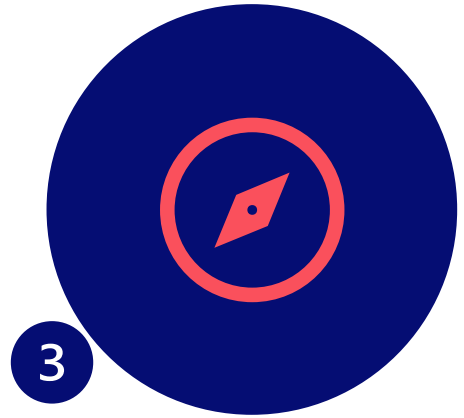
Working with manufacturers to consider the impact of a constellation as early as its design starts

Collaborating with space agencies and organisations for the development of standards and guidelines

UNDERSTAND & INNOVATE
MAGNITUDE

Developing capabilities to predict satellite magnitude before launch (Satellite brightness tool)

Developing our understanding of the overall impact of constellations on astronomy (Constellation Impact tool)

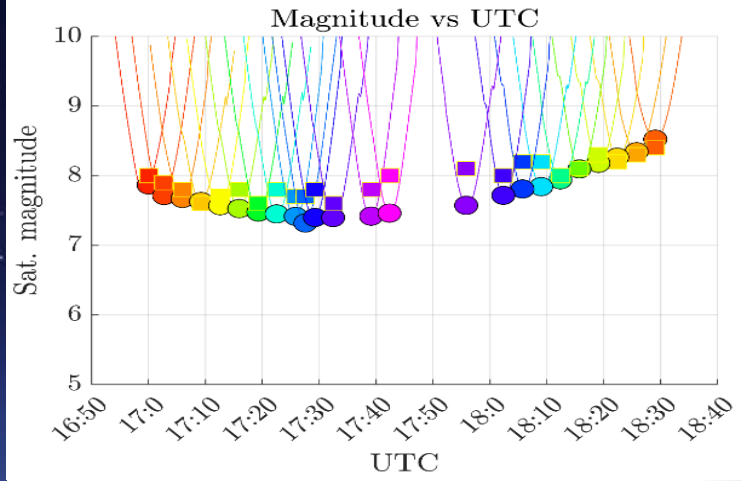


SHARE
SATELLITE EPHEMERIS

Providing observatories with high-quality satellite position data through Special TLEs (CelesTrak)

Promoting the improvement and standardisation of satellite orbital position data sharing

SATELLITE MITIGATIONS



BRIGHTNESS PREDICTION

Tool developed in-house

Positively guide satellite design

Offer a solution to predict satellite trails

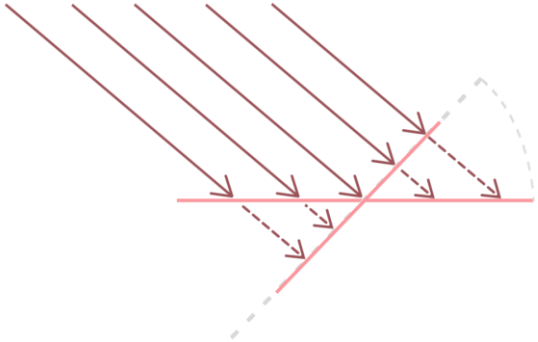
FULLY STEERABLE SOLAR ARRAYS

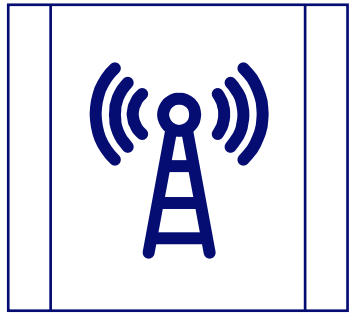
Solar arrays of OneWeb satellites constantly face the sun

Reflection direction is optimised for Earth observers

Plus, such an operational strategy reduces array surface

As a result, solar arrays brightness is above 9th magnitude





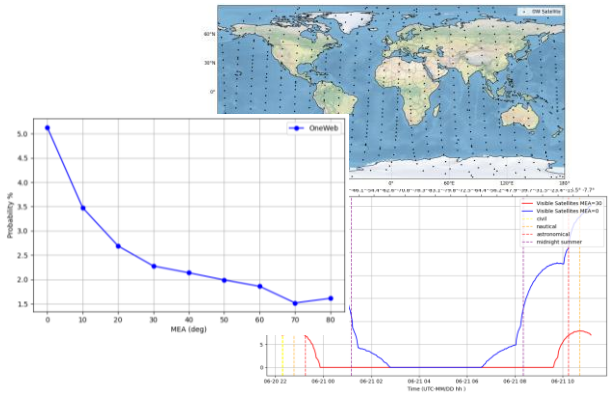
PROTECTION ON RADIO INTERFERENCE

Stringent requirements to protect RAS band at 10.6 - 10.7 GHz

Avoid operational use of lower channel closer to RAS band

Specific filters to minimise Payload out-of-band emissions

EM self-compatibility requirements for satellite design



AGGREGATE IMPACT COMPUTATION

Tool developed in-house

Assess constellation as a whole system

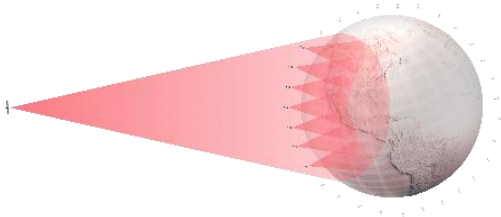
Overall metrics: total time in visibility, probability of trails

ALTITUDE TO REDUCE CONSTELLATION SIZE

At constant coverage, higher altitude means fewer satellites

However, higher altitude implies slower satellites in the telescope's FoV

A trade-off assessment concluded that higher altitude can be an efficient mitigation strategy



A VERY CHALLENGING PROBLEM…

Extreme complexity to find a single-for-all solution

Large diversity of scientific observational program with different needs

CONSTELLATION MITIGATIONS

Eutelsat engages with the Ecosystem

Operators & Manufacturers

✓Specific D&QS requirements for manufacturers

✓GSOA study on satellite brightness

SATELLITE INDUSTRY

UK Space Agency

✓Active collaboration

✓Contributor to the study “Optical interference from satellites: prospects for standardization”

IAU CPS

✓Co-chairing the FG of the GoF

✓Member of the CPS I&T Hub

✓Participation in CPS SatHub

✓Astronomer Guide Program

SPACE AGENCIES

ASTRONOMY

ESA

✓SUNRISE Dark Skies Program

✓Zero Debris Booklet

✓Participation in DQS studies

Astronomical community

✓Ongoing dialogue

✓Open to discuss

✓Recent workshop on Quiet Skies

POLICYMAKERS

Standardisation

✓Proactive in development of standards

Conclusions – Pursuing the mission

RAISING AWARENESS

The increasing number of space objects in Low Earth Orbit **affects the night sky and presents challenges for astronomical research and amateur astronomers**.

LEADING BY EXAMPLE

Eutelsat Group is committed **to playing a leading role in addressing both current and future challenges, ensuring the sustainable use of outer space, and preserving Dark and Quiet Skies for generations to come**.

CALLING FOR ACTION

An open, inclusive and multi-stakeholders dialogue between the astronomy community, satellite operators and manufacturers, policy makers and regulators is of primary importance to enable the implementation of pragmatic and realistic solutions.

THANK YOU

Enrique Allona – enrique.allona@eutelsat.net