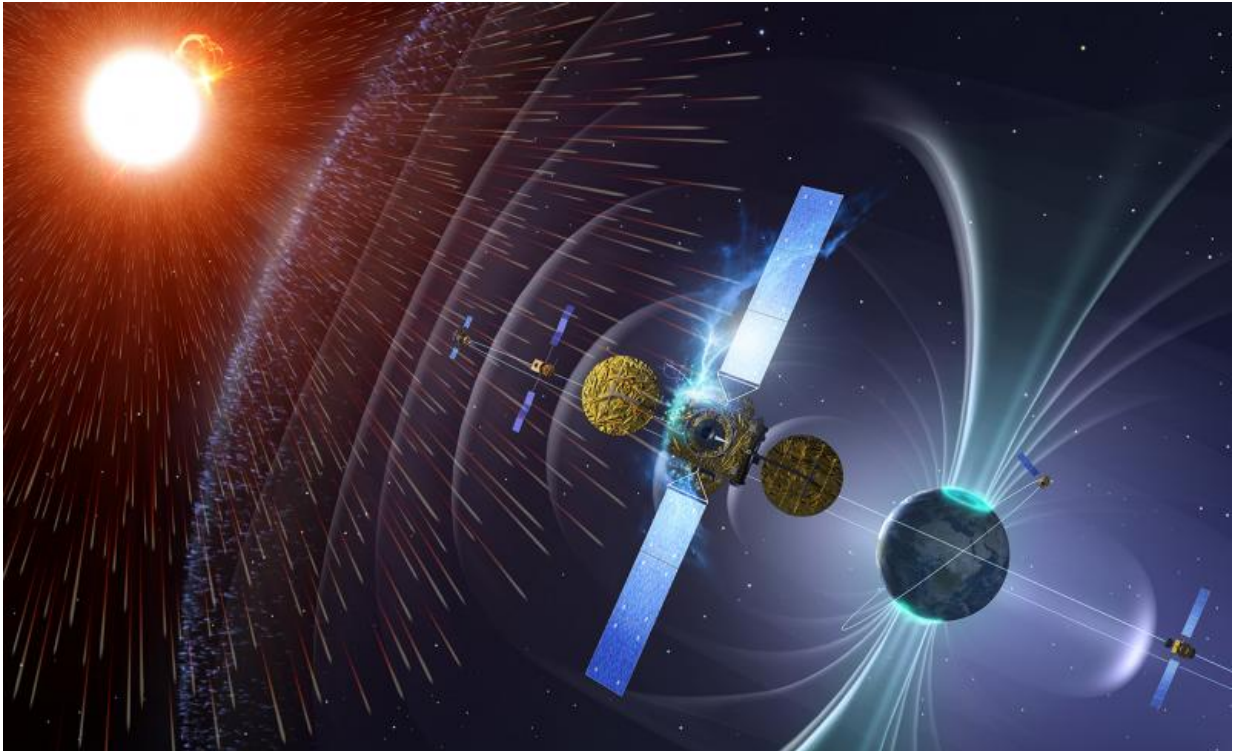


Europe comes together for space weather

November 5 2015



As part of ESA's Space Situational Awareness programme, the Space Weather segment is focussing on services for owners and operators of satellites in space and infrastructure on the ground. The services will enable end-users in a wide range of affected sectors to mitigate the effects of space weather on their systems, reducing costs and improving reliability. In Europe's economy today, numerous sectors are potentially affected by space weather, ranging from space-based telecommunications, broadcasting, weather services and navigation through to power distribution and terrestrial communications, especially at northern latitudes. Each of these sectors has a need for space weather data and services, together with a further requirement for those services to be tailored to their particular application. Credit: ESA/P.Carril - CC BY-SA IGO 3.0

Working with scientists in 14 countries across Europe, ESA is developing a warning network that will help protect us from the effects of our Sun's activity.

ESA's Space Situational Awareness efforts now generate almost 60 'products' – including high-quality measurements, forecasts, alerts and expert analysis – from teams participating in the Agency's space weather [network](#), heading for over 140 next year.

Many use realtime data on our Sun and the resulting disturbances detected in the environment around Earth, our atmosphere and down to the surface.

The raw information is gathered from a large and increasing number of ground and space sensors, and delivered through a network of Expert Service Centres, established by ESA to combine and build on existing facilities in Member States.

"The Centres federate the wealth of space weather expertise and capabilities that exist at the national level," says ESA's Alexi Glover, responsible for network development.

"This provides a large added value not only to our Member States and their industries but to Europe as a whole."

Watching out for space weather

Numerous sectors are potentially affected by space weather in Europe's economy, ranging from telecoms, broadcasting, drilling, exploration, navigation and power distribution, the latter especially at northern latitudes.



The Northern Lights above Finnish Lapland near Sodankylä during ESA's space weather-themed social space event in 2013. Northern Lights occur when charged particles from the Sun hit Earth's atmosphere. The green vertical stripe is a laser beam from the Finnish Meteorological Institute's Arctic Research Centre to measure cloud particles and aerosols in the upper atmosphere. Credit: Kate Arkless Gray

The Sun causes 'storms' within Earth's magnetosphere when giant eruptions from the Sun's outer atmosphere – coronal mass ejections (CMEs) – wash across our planet. The most recent very large event occurred in 2012, though it missed Earth. Lesser CMEs happen regularly and do reach the planet, affecting daily economic activities.

ESA launched its space awareness effort in 2009 in part to develop a Europe-wide capability to monitor, study and warn about such space weather effects.

Building a robust European network

"The current expansion of the network, interconnected via ESA's Space Weather Coordination Centre in Brussels, Belgium, brings to fruition several years of work," says Juha-Pekka Luntama, ESA's space weather manager.

ESA's Proba-2 Sun-watching satellite also contributes. In the near future, instruments on satellites operated by a number of ESA partners will be flown, and the Agency is studying a dedicated mission for early warning of [coronal mass ejections](#) and other [space weather events](#).

In 2016, ESA's space weather network will grow to encompass over 140 separate products providing scientific and pre-operational applications as part of 39 services provided to users.

"The development of space-weather precursor services in Europe is a growing success, and also promises commercial opportunities that we could not foresee just a few years ago," says Juha-Pekka.

In addition to business and government agency uses of [space weather](#) data, he points to opportunities for application developers who could use realtime information to serve, for example, the tourist industry, as many Nordic hotels and tour operators would like to offer predictable aurora viewing.

Provided by European Space Agency

Citation: Europe comes together for space weather (2015, November 5) retrieved 26 April 2024 from <https://phys.org/news/2015-11-europe-space-weather.html>

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