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esa ministerial COUNCILS

INTERVIEW

TERESA RIESGO ALCAIDE

SECRETARY GENERAL FOR INNOVATION

OPINION

JOSEF ASCHBACHER

ESA DIRECTOR GENERAL

The Webb telescope reveals dust structures in the Pillars of Creation

This is not an ethereal image of a long-forgotten mausoleum, or soot-covered fingers reaching out. These pillars, packed with large amounts of gas and dust, are home to stars that have slowly but surely been forming over millennia. NASA/ESA/CSA's James Webb space telescope has capture this mesmerizing and extremely 'dusty' shot of the Pillars of Creation in mid-infrared light, regaling us with a new version of this familiar landscape.

© Webb's portrait of the Pillars of Creation (MIRI)

The space sector is part of our everyday life, improving citizen safety and quality of life

"It is of vital importance to support our sector, guaranteeing and maintaining its momentum toward the development of innovative technologies in our country"

editorial

THE SPACE SECTOR is unequivocally strategic, embracing like no other a 'new economy' model characterized by innovation, high added value, the generation of quality jobs and exports. In addition to being the driver of great scientific breakthroughs, space has a clear impact in sectors such as communications, transportation, the environment, energy, agriculture and defense & security.

Bestowed with significant versatility and a power for transformation, the space sector is part of our everyday lives, improving citizen safety and quality of life, while at the same time enabling us to specialize in solutions that help us overcome the great challenges we face, such as climate change, natural disasters, wildfires, etc.

This sector has exhibited a robust progress, being competitive at a world level and resisting recession cycles, which makes it a refuge for the economy during periods of economic decline.

As Spanish companies of this sector, we share an unwavering enthusiasm and dedication for Space, which has driven us to create a high-value industrial and professional network by means of continuous investments and a long-term vision. The ESA has always been the main pillar whereon the national space industry relies, being its main source of technological development, training and consolidation across multiple fields, such as telecommunications, Earth observation and navigation, just to name the ones that have the highest impact in citizen quality of life and safety. In no small measure, ESA's programs support the development and competitiveness of our companies and their outstanding growth in the value chain, which has enabled us to create jobs and export in commercial and international markets.

"THIS SECTOR HAS EXHIBITED A ROBUST PROGRESS, BEING COMPETITIVE AT A WORLD LEVEL AND RESISTING RECESSION CYCLES"

The European Space Agency's Council Meeting CM22 has taken place at a moment of exceptional significance, with major programs that are seeing the light and will largely determine the future of the sector. The foundations are being laid out for the sector to evolve and reach a better position both at a national and international level, and our country should increase its level of contribution to where it should be, lest we see our importance dwindle among our ESA partners.

During CM22, the Government of Spain has approved a 20% increase to Spain's contribution to the ESA, which reached a total of 300 million Euros per year. This increase, however, does not bring Spain nearly close to the level of contribution that it should have based on its GDP.

In today's geopolitical landscape, the space program of the European Union and the ESA imply an opportunity for Spain to secure a clear footing among the main EU countries in a sector as strategic as space, which will allow us to strengthen our current space infrastructure and assets, and generate powerful industrial opportunities. We hope that the increased contribution made official in the Council Meeting of 2022 is a first step that sees further development in the near future by means of national and bilateral programs that increase the weight of our country and, by extension, of our industry in the realm of space, bringing us closer to the level of our traditional competitors.

It is of vital importance to support our sector, guaranteeing and maintaining its momentum toward the development of innovative technologies in our country, with the resulting competitive advantages for other sectors of the economy. The Spanish space industry is firmly determined to play a leading role, and we are confident that our Governments will strengthen their support for the sector.

Jorge Potti

Vice President for Space of TEDAE

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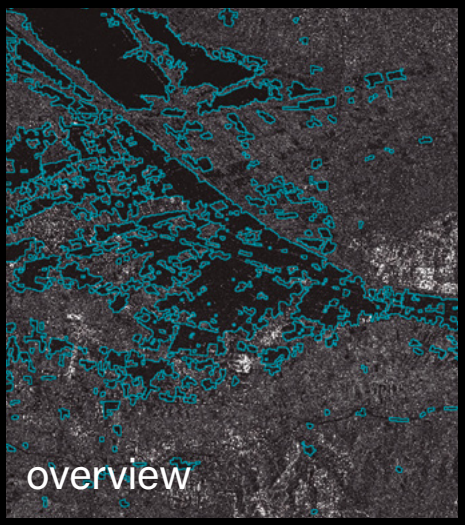
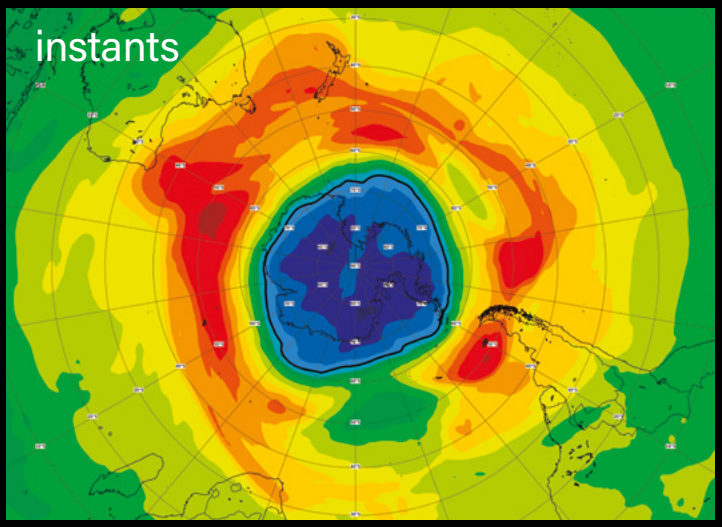
NEWS OUTLET OF TEDAE'S SPACE COMPANIES

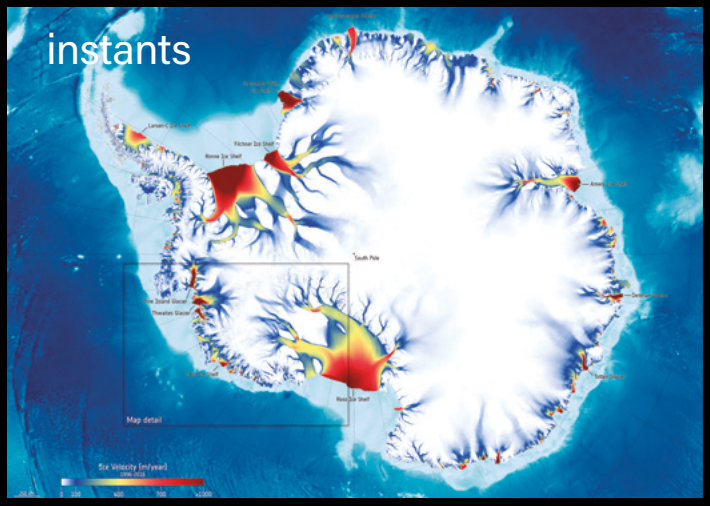
Aicox Soluciones, Airbus DS, ALTER Technology, ARQUIMEA, Crisa (Airbus DS), DAS Photonics, Elecnor DEIMOS, GMV, GTD, Hisdesat, Hispasat, HV Sistemas, IberEspacio, Indra, INSTER, INTEGRASYS, Inventia Kinetics, ORBITALCS, PLD Space, SATLANTIS, SENER Aeroespacial, Tecnalia, Telespazio Ibérica, Tecnobit-Grupo Oesía and Thales Alenia Space España

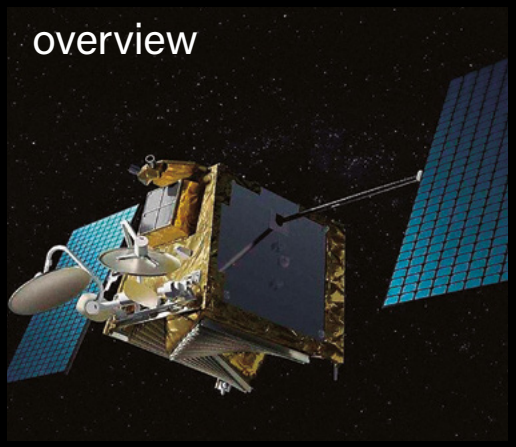
TEDAE Defensa, Seguridad, Aeronáutica y Espacio

Comisión espacio de TEDAE









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> "It has been a highly successful Ministerial Council both for the ESA and for Spain, and this is despite existing strains in the international landscape, such as high inflation and component shortages"

Teresa Riesgo Alcaide

Secretary General for Innovation

Since 2003, she has held the position of full professor of Electronic Technology at the Higher Technical School of Industrial Engineering of UPM (ETSII-UPM), where she worked during her entire career as an educator and researcher until her appointment as director general and, later, secretary general for Innovation at the Ministry of Science and Innovation.

Working experience
She has been the director of the Center for Industrial Electronics, assistant director of Research and International Affairs at the ETSII-UPM and, later, director of the Department of Automation, Electrical and Electronics Engineering and Industrial Computing.

In 2018 she was appointed as director general of R&D at the Ministry of Science, Innovation and Universities, and in January of 2020 she was appointed secretary general for Innovation at the Ministry of Science and Innovation. Due to her position, she is the president of the CDTI and the president of the Board of Trustees of FECyT.

Education
PhD in industrial engineering by the Polytechnic University of Madrid (1996).

Bachelor of Industrial Engineering by the UPM (1990).

WHAT IS YOUR ASSESSMENT OF THE ESA MINISTERIAL COUNCIL?

I believe that, overall, we could say that it has been a highly successful Ministerial Council both for the ESA and for Spain, and this is despite existing strains in the international landscape, such as high inflation and component shortages.

First and foremost, I believe it is important to highlight that the proposal of the director general of the European Space Agency has been very attractive and ambitious, exceeding even the one of Seville 2019, which has already been a major investment success.

For its part, the Government has made a great effort for Spain to strengthen its position in an area that is as strategic as Space. While already during the Seville Ministerial Council in 2019 a 25% increase was approved for our ESA contribution, this year in Paris this increase has been an additional 20%, meaning that in just three years, the cumulative rise has been 50%, going from 200 to 300 million euros per year.

For Spain, this has been a Ministerial Council that has arrived at a particularly 'exciting' moment since, as you are aware, we are taking our final steps toward the creation of the Spanish Space Agency. Furthermore, it has been a Ministerial Council under the umbrella of the Aerospace PERTE, which opens up excellent opportunities to seek synergies between investments and maximize the ROI for the sector.

As for specific programs, with a total investment of 1.5 billion in 5 years, 932 of which are allocated to new programs, one would be hard-pressed to highlight specific items without forgetting to mention key proposals.

However, I believe that, most of all, we could say that it has been the Ministerial Council of space exploration and astronauts, with a resounding success in Spain, which has succeeded in getting two Spaniards selected into the astronaut corps for the first time since Pedro Duque managed to do so in 1992.

Additionally, due to its ambition for leadership supported by our great capabilities, Spain has invested in strategic programs that offer us opportunities toward this end, such as the new LEO PNT navigation program, the EU-ESA Copernicus program, the DRACO space defense mission and the scientific leadership of the mission of the Arrakihs science program. But, as I already said, there are undoubtedly many others that I could mention.

WHAT CAN SPAIN DO TO SEIZE AS MUCH AS POSSIBLE THE OUTCOME OF THIS MEETING, SO IMPORTANT FOR THE INDUSTRY?

In addition to the aspects that I already mentioned related to extraordinary matters, such as the creation of the Spanish Space Agency and the Aerospace PERTE, the success of our participation in the Ministerial Council, where Spain has been represented at the highest level by the minister of Science and Innovation, it opens up opportunities for the national space ecosystem. We have two new ambassadors—Sara García and Pablo Álvarez—who will undoubtedly help create and attract new talent.

We are also in a great position to leverage the new initiatives presented by ESA that Spain has helped put forth.

With programs such as LEO PNT, Copernicus, Aeolus-2 and Secure Connectivity, we need to boost the use of Space. The time has come to dive deeper into the integration of space in other fields, of focusing more on the end user, of fostering synergies with the scientific community.

The aspects are shared by all of Europe: at ESA, member states have adopted a resolution aimed at accelerating the use of Space in Europe, and the issue will also be the subject of the political debate in the upcoming European Union competitiveness council. Spain must, and can, spearhead this important evolution.

The structure, financing and opportunities are there. Now, the industry, in cooperation with the rest of the domestic stakeholders, must seize this opportunity.

The Spanish space sector is experiencing a time of growth. **WHAT IS, IN YOUR OPINION, THE ROLE THAT SPAIN MUST PLAY?**

I consider—and I believe this is good news—that Spain is already consolidated and recognized as one of the great European space powers (the fourth in the EU landscape and the fifth, jointly with Belgium, in the realm of the ESA). And this position is not only related to its investment, where there are countries that allocate a higher GDP percentage than us to Space or even to overall investment, but also to its capabilities, talent, competitiveness, industrial network, etc. In other words, to the entire space ecosystem.

In this regard, Spain has the chance to leverage the strong points that are already paying off in other economic areas, such as its role as a bridge for cooperation with Ibero-America. In relation to this, as an example, the creation of the Spanish Space Agency opens a door to advance toward the implementation of shared initiatives or even to a prospective partnership with the Latin American and Caribbean Space Agency (ALCE), which was also recently created.

Our industry makes significant investments on innovation and development. In your opinion, **WHERE DOES SPAIN NEED TO FOCUS MORE EFFORTS OR TECHNOLOGICAL INNOVATION?**

Traditionally, space has been an environment where technological advances, while quite relevant, have come at a much slower pace than in other sectors.

However, this has been considerably changing during the last few years, where advances have significantly accelerated. In addition to this, Space –and this is a positive thing—has become more permeable to advances accomplished in other technological areas.

For this reason, I believe that we should take a look at the advances that are taking place around the world in fields such as artificial intelligence, quantum developments, advances related to instrumentation and production improvements such as those related to additive manufacturing. Space breakthroughs will undoubtedly come from these fields. All of this is accomplished thanks to a close collaboration between different stakeholders: scientists

and academia, major corporations, mid-caps, startups and, naturally, the Administration, which will continue to support the ecosystem.

In your opinion, **WHAT DOES HAVING A CUTTING-EDGE SPACE SECTOR OFFER TO A COUNTRY LIKE SPAIN AND ITS ECONOMY?**

Space is a strategic sector for many reasons. These reasons are related not only with the development of the sector itself (which incentivizes technology, offers highly-qualified jobs and generates direct and ancillary industries), but also with the use of data and of the services that we have thanks to satellites and their impact on addressing the great challenges we face as a society.

The role that space has had in certain events of the last few years, such as the war in Ukraine, the volcano eruption in La Palma and the diagnosis of the effects of the fires we have seen this last summer, has been of major importance. For these exceptional services and for the ones that we use in our everyday lives (geopositioning, weather forecast, communications, etc.), we need to both take part of major European projects, and to have the ability to develop new constellations tailored to our needs. Projects such as the Atlantic Constellation, in collaboration with Portugal, are an example of initiatives that add capabilities to Spanish companies and open up an array of space uses tailored to the needs of the country in regard to agriculture, fire detection and prevention, climate change monitoring, low data rate communications, etc.

But beyond that specific aspect, space is a driver of the economy and a vector for the creation of value. While it is a relatively small sector in terms of GDP, it offers a high added value to scientific, technological and innovation-related aspects. Moreover, the workers that it employs are mostly composed of higher education graduates and PhDs, which evidences its role as a driver of technological and industrial development. This sector is also highly resilient, as proven during the various crises of the last few years, continuing to grow in terms of employment and turnover.

Additionally, space, with its increasingly important role in the day-to-day of the citizenry—let's not forget that every day we connect to dozens of satellites and as a tool for the implementation and control of public policies—, has slowly gained weight in European initiatives, where the participation of countries can only be accomplished thanks to a strong and competitive industrial network, as ours is.

HOW DO YOU SEE THE FUTURE OF SPAIN IN THE SPACE SECTOR?

I am very positive in that which pertains to the future of the space sector. I believe that we have built a very solid foundation with a highly important institutional effort, and I have no doubt that the major advances achieved throughout these years imply the consolidation of our leadership role in Europe.

In addition, in the medium term, I am certain that the Aerospace PERTE and the creation of the Spanish Space Agency will serve to bestow Spain with the structure and funding required by the sector to grow stronger, have a greater stability and continue its growth.

I would like to highlight the incipient space sector that is emerging driven by different highly-innovative startups with a high potential for growth. They were born and are growing in Spain within the framework of the sometimes mistakenly called 'New Space.' From launch vehicle manufacturers, through satellite integrators, cameras and sophisticated instruments, onboard computers and microthrusters, to those who work with the data generated in Space, the sector in Spain has great potential. We must turn this potential into a reality, with strong, well-established companies. Without a doubt, the Aerospace PERTE and other actions such as the collaboration in the European realm will be essential for the advancement of the sector in Spain.

IS IT POSSIBLE TO BOLSTER THE SHARING AND COLLABORATION BETWEEN UNIVERSITIES AND COMPANIES TO ATTRACT AND RETAIN TALENT?

It is not only possible, but also paramount, to strengthen the relationship between universities, research centers and companies, as well as to try to foster synergies and sharing (technology, knowledge, data, talent, etc.) And toward this fundamental goal, in the next few days we will approve the 'Plan for the Transfer of Knowledge and Collaboration' with the purpose of strengthening the relationships between the public and private sectors in order to increase the impact of public investment on research and encourage the innovative capabilities of Spanish companies.

This cooperation is a virtuous circle where interest is created over STEM (science, technology, engineering and mathematics), the academic institutions train this talent and it generates research activities in collaboration with industry, which, in turn, takes advantage of that research activity and the increase in students of those fields, which are critical for space, as a source of talent. Both due to its most inspiring aspect, such as, for example, exploration, and due to its wide range of applications on our day-to-day, it is everyone's duty to foster and strengthen that process.

At the Ministry of Science and Innovation, we are deploying assistance packages based on both grants for joint projects and on the funding of high technological value startups to foster sharing and collaboration in fields as important as Space is. Furthermore, we actively participate in social networks and initiatives to foster STEM among girls and young women, in order to help and inspire the female tech workers and users of space.

At the MCINN, our aim is to offer new tools that facilitate the development of joint projects between universities, leading research centers and, also, the excellent national Space industry. To this end, we have tools such as the State Plan for Scientific, Technological and Innovation Research and ESA's PRODEX program, led in Spain by the CDTI—a program dedicated to the development of instruments for science missions.

"The major advances achieved throughout these years imply the consolidation of our leadership role in Europe"

esa MINISTERIAL councils

an example of Spain's commitment to Space

Space in Europe is mostly managed under the umbrella of the European Space Agency (ESA). The member states that compose the ESA find in the Agency a shared space where they can capitalize their ambitions in the space sector. In addition, it is the space where all of their efforts are combined toward a greater participation of Europe in the international arena. The Ministerial Councils are where the road that Europe intends to follow in regard to Space is decided, and they are held at the highest levels.

ESA MINISTERIAL COUNCILS

The Council is the governing body of the ESA and it establishes the political guidelines followed by the ESA as it carries out the European space program. Each member state is represented in the Council and has one vote. The ESA is led by a director general, who is elected by the Council every four years.

The ESA Council meets as required and at least twice a year at delegate level and regularly at ministerial level. From time to time, joint and concomitant meetings of the ESA Council and the European Union Council are organized, and are referred to as "Space Council."

The main goal of the Ministerial Council meetings is to define the role of Space in Europe in regard to key areas of developments and applications. The ministers in charge of the space sector from the 22 ESA Member States and Canada meet every two to three years to put into practice the European Space Policy, commence future programs and make decisions about the next stages of ongoing programs.

Decisions are made in the Council about new proposals and the funding for the upcoming years of work at ESA. The previous ministerial council, 'Space19+', was held in November 2019 in Seville (Spain) to define ESA's vision regarding the future of Europe in space, backing this ambitious plan with record funding. The next one is planned for November 2022, in Paris.

Furthermore, Ministerial Councils are a reflection of a greater ambition, bringing Europe together through Space.

During these macro-meetings, the ambitions for the 'next generation' of Europe in Space are defined, and the challenges faced not only by the European space sector, but also but the European society as a whole, are addressed. This proposal includes the director general's plan for the space programs to be undertaken by the Agency, and it includes all aspects of the space activities: science and exploration, applications, access to Space, operations, research and development. It also puts ESA in a position of world leadership in the emerging field of space safety.

SHAPING THE FUTUREOF SPACE IN EUROPE

The four great pillars of Space that are subject to analysis and funding are:

SCIENCE AND EXPLORATION
Exploring our Solar System and revealing the secrets of the Universe

- Science
- Exploration

SAFETY AND SECURITY
Space surveillance and protection of our planetary surroundings.

- Space forecasting
- Near-Earth Objects
- Space debris
- Clean space
- Safety and security applications

APPLICATIONS
Connecting and benefiting citizens and facing Earth's future challenges.

- Earth Observation
- The future of telecommunications
- The future of navigation
- *Downstream*

ENABLING AND SUPPORT
Design and operation. Making space accessible and developing the technologies of the future.

- Access to space
- Operations
- Technology
- Basic activities

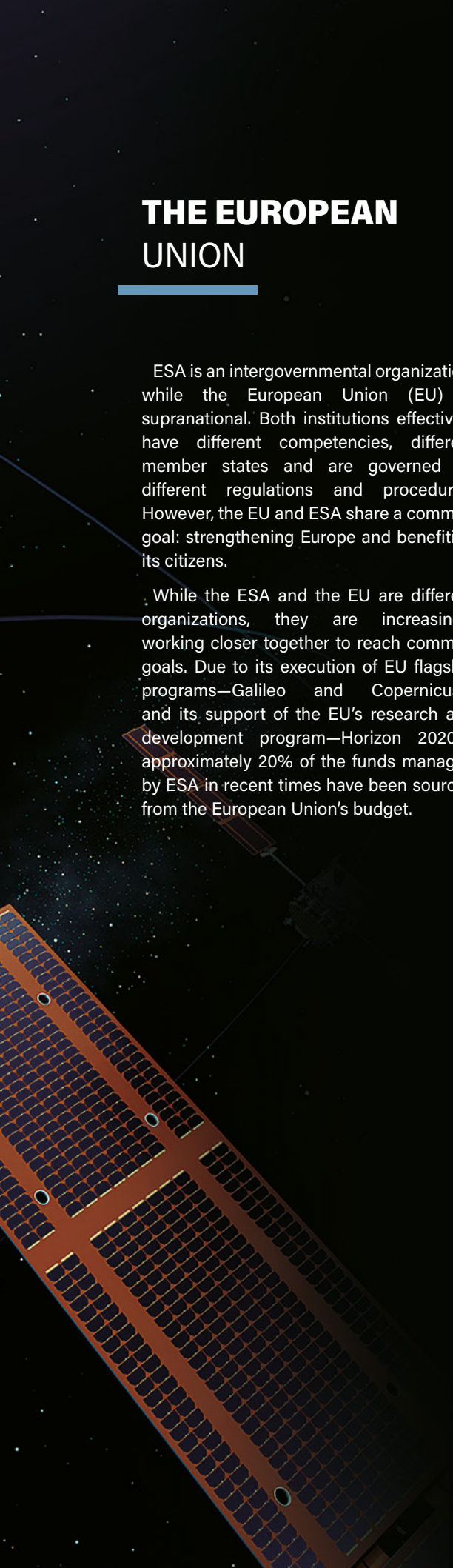
Each member state financially supports all the areas that it deems essential for the development of its industry and the interest of its citizens.

The Mandatory Basic Activities are essential for the adequate long-term functioning of the ESA, and in general, they require an increase in resources in line with a greater demand. These include the General Studies Program; the Technology Research Program; the Basic Technical Activities; the Technology Harmonization process; Earthnet, which supports the collaboration with other space agencies and partnerships such as the International Disaster Charter, among others; the Education activities, which include a number of projects for primary and secondary school students; and lastly, the Administrative and Corporate Activities, which are currently being reformed to achieve a higher effectiveness. The technology program is also an ideal environment that fosters the development of existing technologies and the improvement of proprietary products, in addition to technological innovation.

THE EUROPEAN UNION

ESA is an intergovernmental organization, while the European Union (EU) is supranational. Both institutions effectively have different competencies, different member states and are governed by different regulations and procedures. However, the EU and ESA share a common goal: strengthening Europe and benefiting its citizens.

While the ESA and the EU are different organizations, they are increasingly working closer together to reach common goals. Due to its execution of EU flagship programs—Galileo and Copernicus—and its support of the EU's research and development program—Horizon 2020—, approximately 20% of the funds managed by ESA in recent times have been sourced from the European Union's budget.



During the last few years, the European Union has increased its influence on space applications of interest at a European level.

GALILEO

Galileo is a Global Navigation Satellite System (GNSS) developed by the European Union that provides navigation services: positioning and timing. This program is of great strategic importance for the independence of the European Union, since it avoids the reliance on services such as GPS and GLONASS, the information of which is controlled by third-party countries. From an economic standpoint, this program will imply an investment of 10 billion euros per year and the creation of several highly qualified jobs. The existence of Galileo means having a civilian system owned and controlled by EU institutions.

COPERNICUS

Copernicus is the Earth Observation Program of the European Union that analyzes our planet and environment to the benefit of European citizens. It provides information services that rely on satellite-based Earth observation data and non-space data. The information services that it provides are free to access and open for its users.

The European Commission coordinates and manages the program and collaborates with member states, the ESA, Eumetsat, the European Centre for Medium-Range Weather Forecasts, EU agencies and the Mercator Ocean company.

CONSTELACIÓN TELECOM

The European Union is expected to launch a new satellite constellation that aims to provide government and commercial services for the protection of critical infrastructure, and for surveillance and support in external actions and crisis management. The first of these satellites, included within the framework of the Strategic Compass, will be operational by 2024.

The program's objective is to establish a secure and sovereign space connectivity system for the provision of satellite-based communication services, as well as to bolster the competitiveness of communication services over European satellites.

SPACE COUNCIL

On June 14, the Council of Ministers approved the project of the Royal Decree for the creation and regulation of the composition and functioning of the Space Council (Consejo del Espacio). This is an inter-ministerial group charged with developing the by-laws and initial plan of action of the future Spanish Space Agency, which will streamline the commissioning of this public body.

Administratively, the Space Council will exist under the wing of the Ministry of Science and Innovation, through the Commissioner for the Aerospace PERTE, and will have representatives from the Cabinet of the President of Government and of the Ministry of the Presidency, Relations with the Cortes and Democratic Memory; Defense; Transportation, Mobility and Urban Agenda; Industry, Commerce and Tourism; Interior; Ecological Transition and the Demographic Challenge; Economic Affairs and Digital Transformation; Agriculture, Fisheries and Food; Finance and Civil Service; Foreign Affairs, European Union and Cooperation and the National Intelligence Center.

It is the first step toward the creation of the future Spanish Space Agency, headquartered in Seville, which will effectively coordinate all activities related to space both in regard to their technological development and to the use of space in fields such as security, Earth observation, geopositioning, communications, etc.

SPAIN IN CMIN22

The latest ESA ministerial council was held in November in Paris, and was attended by notable representatives from Spain, such as the minister of Science and Innovation, Diana Morant; the secretary general for Innovation, Teresa Riesgo, and the commissioner for the Aerospace PERTE, Miguel Belló.

The agreements reached as part of this meeting included Spain's commitment to provide funds for 1.5 billion euros for the 2022-2027 period—the highest amount ever reached by our country. Furthermore, since 2019, the Government has increased its annual share in ESA by 50%, reaching 300 million euros per year. Currently, at 5.5%, Spain is the sixth country with the highest contribution. Overall, ESA Member States have committed to provide funds for 16.9 billion euros—17% higher than in Space19+.

Below is a breakdown of the most important projects:

- *In regard to the scientific program, based on its GDP, Spain increases its budget by 19%.*
- *In regard to the basic activities, our country increases its budget by 21% based on its GDP.*
- *For the CSG project, Spain increases its contribution budget by 28% as per the mandatory scale.*
- *Passed resolution enabling the use of small commercial launch vehicles.*
- *In regard to S2P Safety, the encompassing character of the program is consolidated based on four cornerstones (Cosmic, Vigil, Hera and Adrios). In relation to this, Spain increases its contribution by over 150% when compared to Space19+.*
- *In addition, one of the most important milestones for our country is the selection—for the first time since Pedro Duque back in 1992—of two Spanish Astronauts: Pablo Álvarez, aerospace engineer, and Sara García, doctor of biotechnology. In this field of Exploration, Spain's contribution increases by 29% and focuses on the activities of Humans Beyond LEO and Mars Robotic Exploration.*
- *The budget allocation is also increased by 30% in relation to 2019 for the Prodex project, which offers a tool for developments involving bilateral cooperation and the continuity of habilitation processes.*
- *172 million euros have been allocated to activities related to Earth observation, which increases the chances of leadership in the Copernicus program.*
- *ARTES 4.0 is joined by the EU's Secure Connectivity program.*
- *With clear possibilities for leadership, LEO PNT positions itself as a main priority for Spain.*
- *Support for Ariane and Vega competitiveness. Spain increases its budget allocation by 50%.*
- *Technology: Continuity of Spain's investment and completion of Proba-3.*
- *New commercialization directorate (CIP) and program (ScaleUp!). Spain becomes third top contributor (second for "Innovate").*

It is clear that the interest generated for studying climate change and secure connectivity in Europe will also be joined by the interest for space exploration.

Josef Aschbacher

ESA DIRECTOR GENERAL

Doctor Aschbacher currently holds the position of ESA director of Earth Observation Programs and director of ESRIN, the ESA Earth observation center near Rome.

Born in Austria, Doctor Aschbacher studied at the University of Innsbruck, where he earned a Master's and PhD in Natural Sciences. His career has spanned over three decades at international organizations, including ESA, the European Commission, the Austrian Space Agency and the Asian Institute of Technology.

Three years ago, it was next to unconceivable that the world would suffer the shockwaves of a global pandemic and that one of our space partners would commit an act of aggression against a sovereign state. The Covid-19 crisis highlighted the vital importance of critical network infrastructures, and the war in Ukraine is now revealing the fragility of our dependencies, affecting several key domains for the strategic autonomy of Europe.

At the same time, while we are witnessing the onset of a space rebirth, the European space sector is indispensable to address some of the most urgent challenges of our times, such as understanding climate change and its effects, establishing reliable and secure communications, assessing risks and threats... while encouraging technological innovation and scientific breakthroughs.

As the space sector is transformed, governments and policymakers undertake an important role in enabling the transition and, at the same time, fostering innovation and a corporate spirit. In order to leverage all of the benefits from current and future space activities and guarantee a sustainable and equitable growth, political actions and investments are fundamental. If Spain expects to maintain its competitiveness, it needs to create a mechanism that allows for the blossoming of critical technologies. Otherwise, technologies for Earth observation, navigation, space exploration, space resource exploitation and the development of space structures will remain as mere concepts for its space industry.

One of the greatest challenges faced by humanity today is the current climate crisis. In this Ministerial Council, we propose leveraging space to clear the way for a green future, supporting the political objectives of Europe's climate neutrality and decarbonization. Space is an indispensable tool to better understand the current state of the Earth and to offer solutions for a sustainable life on Earth. The Spanish participation in programs will strengthen an already-robust space ecosystem and guarantee that Europe will remain a leader during the upcoming years in terms of technology, innovation and scientific excellence.

With a body count in the hundreds and damages estimated at billions of euros, the continuous increase in the number and intensity of the disasters caused by climate change have raised the alarm in Europe about the fact that we are not adequately equipped to offer fast, specific responses to help citizens and civil protection workers. We need to build a fast and resilient response based

on space that is more robust, for real-time crisis management so as to strengthen land-based systems that could be compromised by malicious actions or natural disasters. With an important Spanish subscription to Future NAV to significantly strengthen space-based detection, robotics and mission planning & execution, the deployment and a strong support of LEO-PNT with sights on a demonstration mission to develop and implement Spanish and European navigation systems and cutting-edge technology, in CM22 Spain can help expand and take advantage of past efforts related to ARTES, GENESIS and ESA-EU's Copernicus and Galileo programs which have been successful, combining a fast observation using Earth observation constellations, a precise navigation and a link with a fast, reliable and streamlined telecommunications network, which enables the development of national and European projects that will expand and strengthen Spain's commercial applications.

At CM22, ESA member states will also face a historic decision. Should Europe join a sustainable exploration of the Moon and enjoy the scientific, technological and political benefits of participating in this international challenge? If the answer is yes, with the support of Terrae Novae and, in particular, the development of the European Large Logistic Lander as a key element, we could achieve the first European footprint on the Moon by the end of this decade and inspire generations that are yet to be born. By supporting the E3P program and leading the development of the European Large Logistic Lander, Spain will be able to play a major role in the preparation of future Moon missions, securing ESA astronaut seats in the next Artemis missions.

In addition to the program-related research that is part of the ESA programs, Europe must also foster scientific excellence, innovation and competitiveness. The missions of the Scientific Program help in making Europe an attractive destination for scientists and engineers from outside of Europe and encourage the young generation to participate in STEM courses. For countries with space ambitions such as Spain, innovations are indispensable drivers of social and economic progress. Thanks to it, Europe can still claim to be leaders in the world arena across a several fields, creating fertile grounds to encourage innovation, which drips down to industry and supports the economic development.

Europe must take advantage of the substantial economic opportunities that come with and from space. This year's ESA ministerial council offers Spain a great opportunity to strategically help in shaping the European space policy for the upcoming decades and spearhead the development of a new space strategy.

When space advances, other industries benefit. By investing wisely now, at CM22, Spain is addressing the future needs of its citizens.

"WHEN SPACE ADVANCES, OTHER INDUSTRIES BENEFIT"

Polar Regions

Polar Regions are of paramount importance in the balance of global climate. Due to its geographic isolation, difficult access and large surface, Earth Observation satellites are particularly well-suited to study and monitor its environmental parameters. Among these parameters, the changes in the depth and area of polar ice are crucial to understand the phenomena associated with climate change, given its influence in Earth's temperature regulation, ocean currents and sea level fluctuations.

The efforts to comply with international agreements to limit the rise of global temperature are essential in maintaining the conditions in the Poles, and therefore, to control the effects of climate change.

In line with this, the progressive restoration of the ozone layer shows what agreements like these can accomplish when implemented at a global scale. ESA has been monitoring the ozone layer for over twenty years, and current forecasts point to its complete recovery in the next few decades, ending in the recovery of the Polar Regions by 2060.

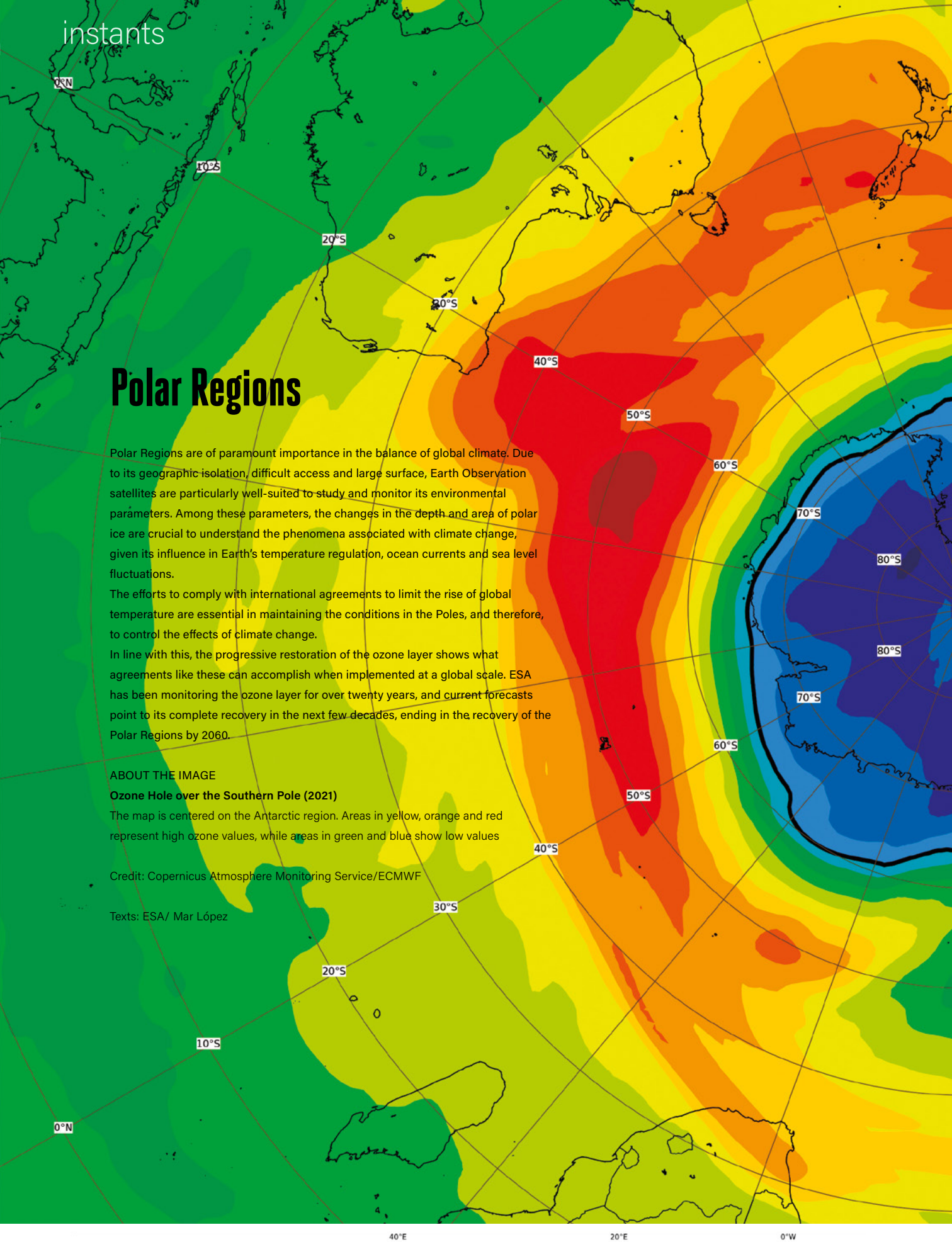
ABOUT THE IMAGE

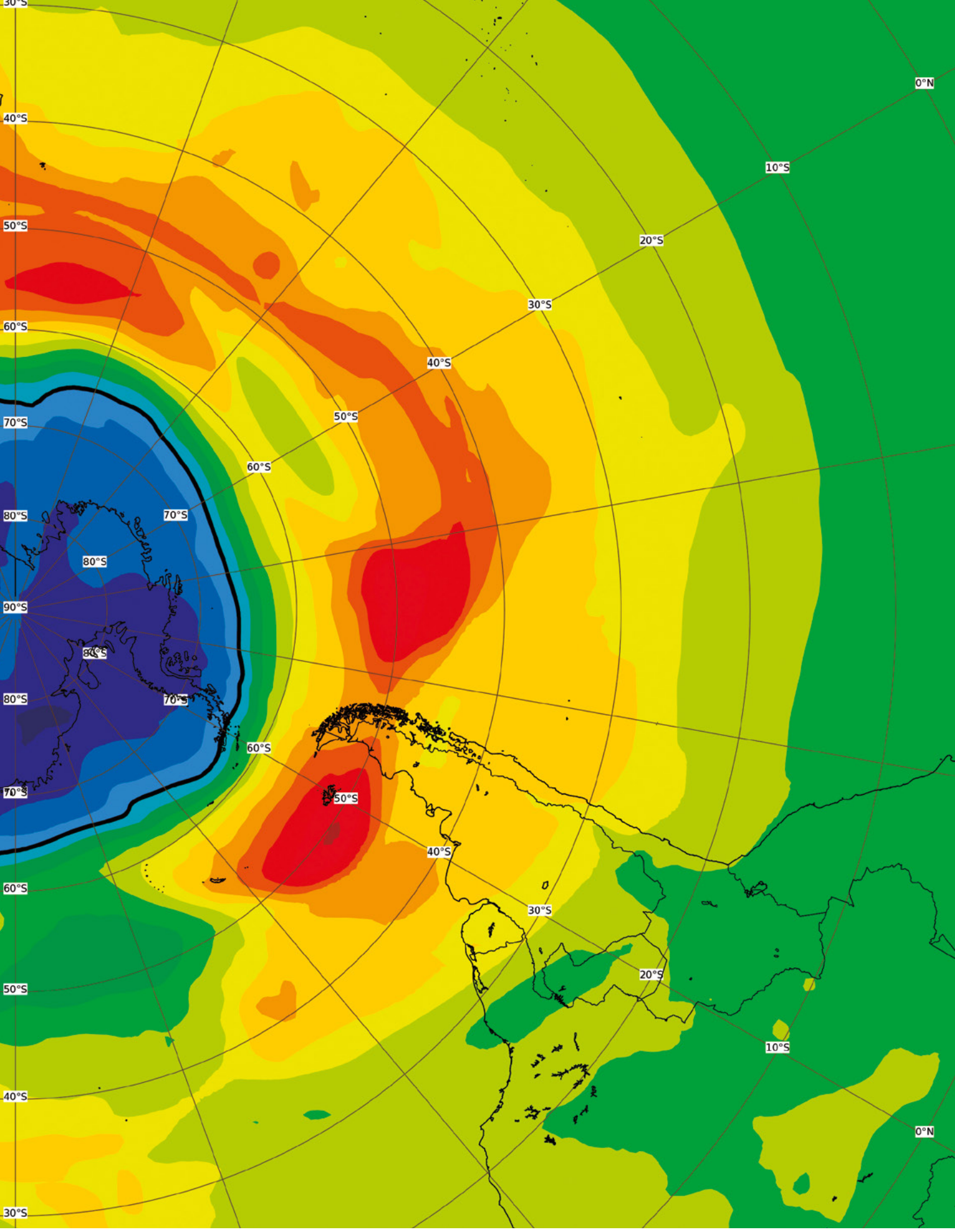
Ozone Hole over the Southern Pole (2021)

The map is centered on the Antarctic region. Areas in yellow, orange and red represent high ozone values, while areas in green and blue show low values

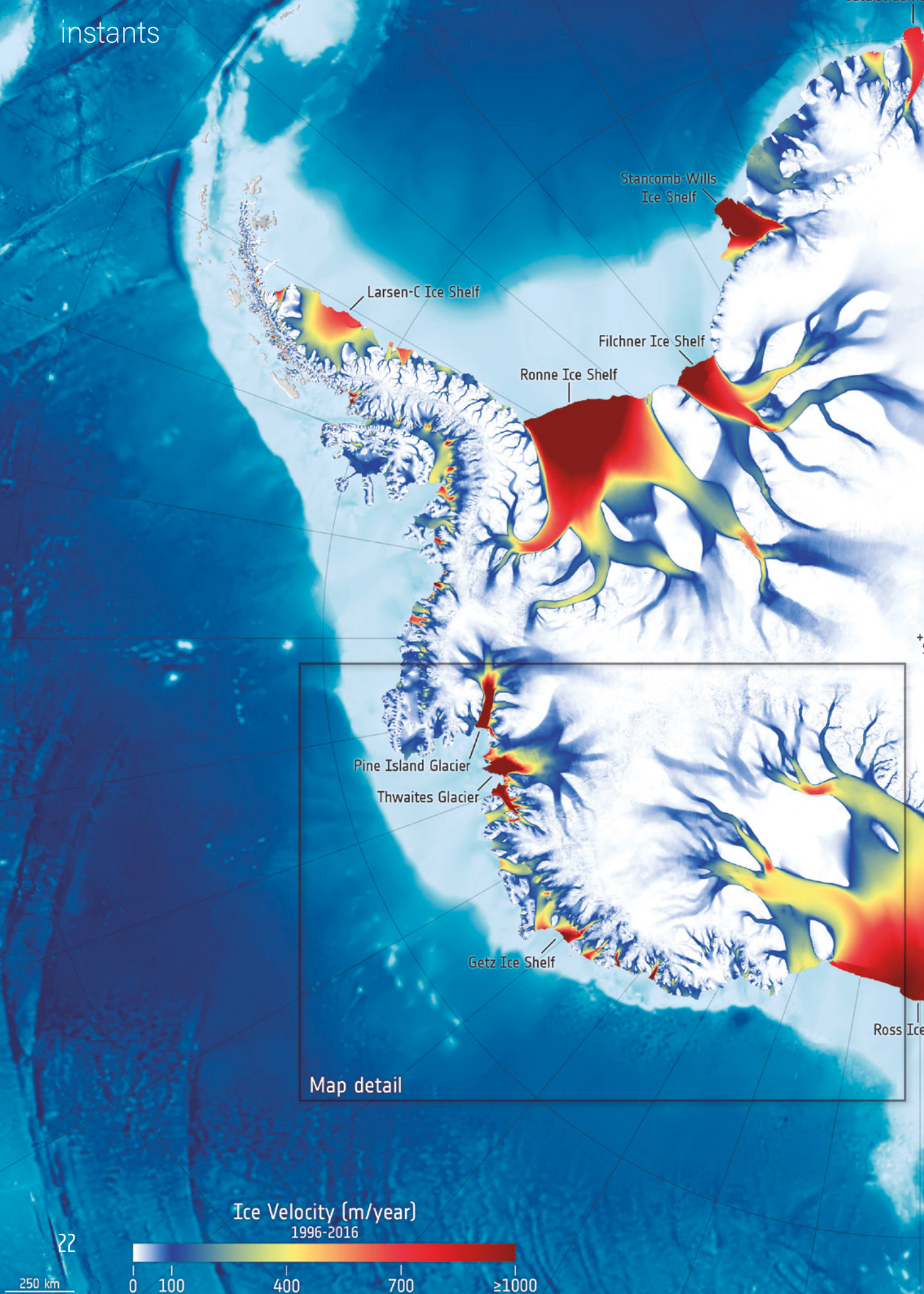
Credit: Copernicus Atmosphere Monitoring Service/ECMWF

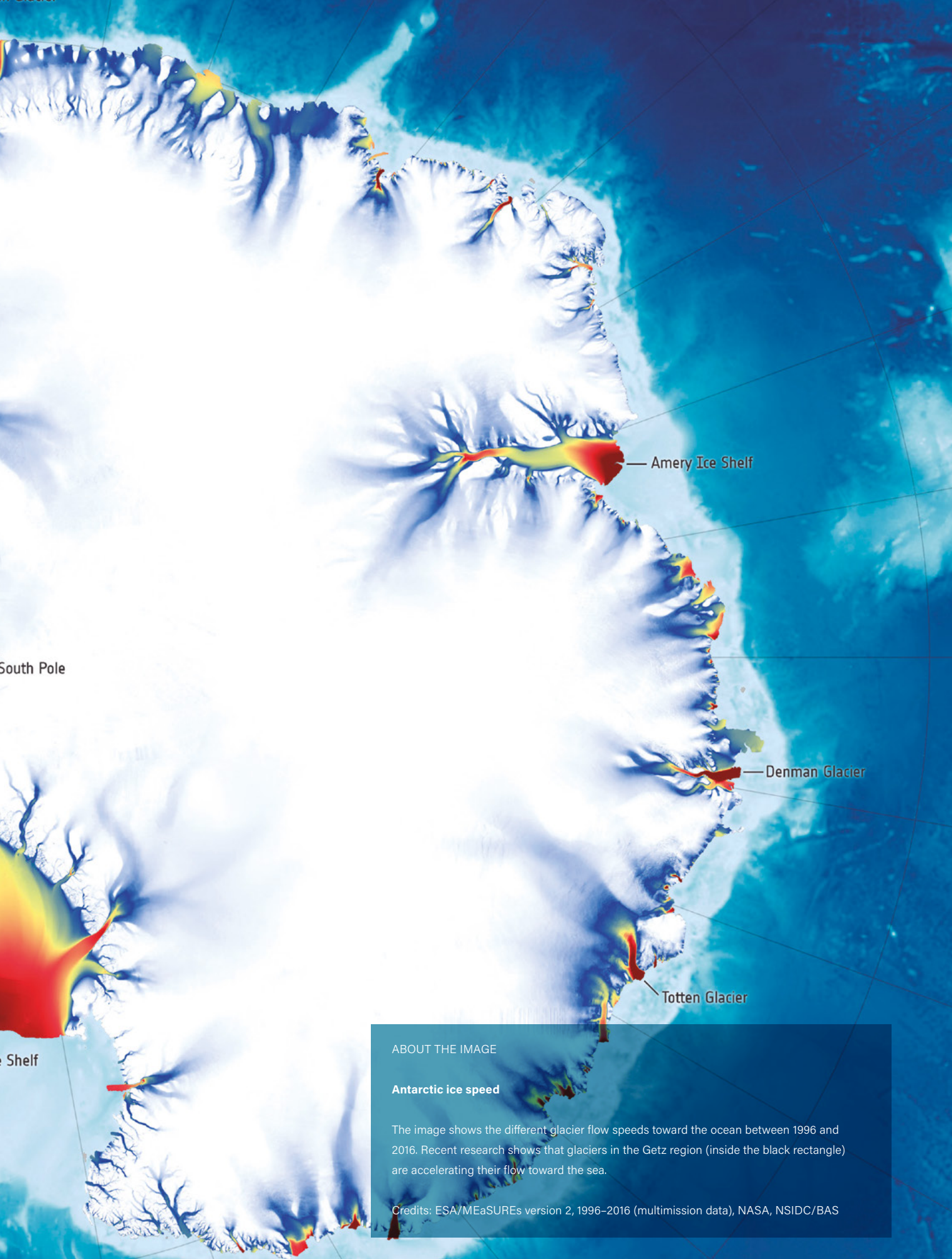
Texts: ESA/ Mar López





Total Column of ozone [DU] (provided by CAMS, the Copernicus Atmosphere Monitoring)


Stancomb-Wills
Ice Shelf
Larsen-C Ice Shelf
Filchner Ice Shelf
Ronne Ice Shelf
Pine Island Glacier
Thwaites Glacier
Getz Ice Shelf
Ross Ice
Map detail
Ice Velocity (m/year)
1996-2016
0
100
400
700
≥1000
250 km

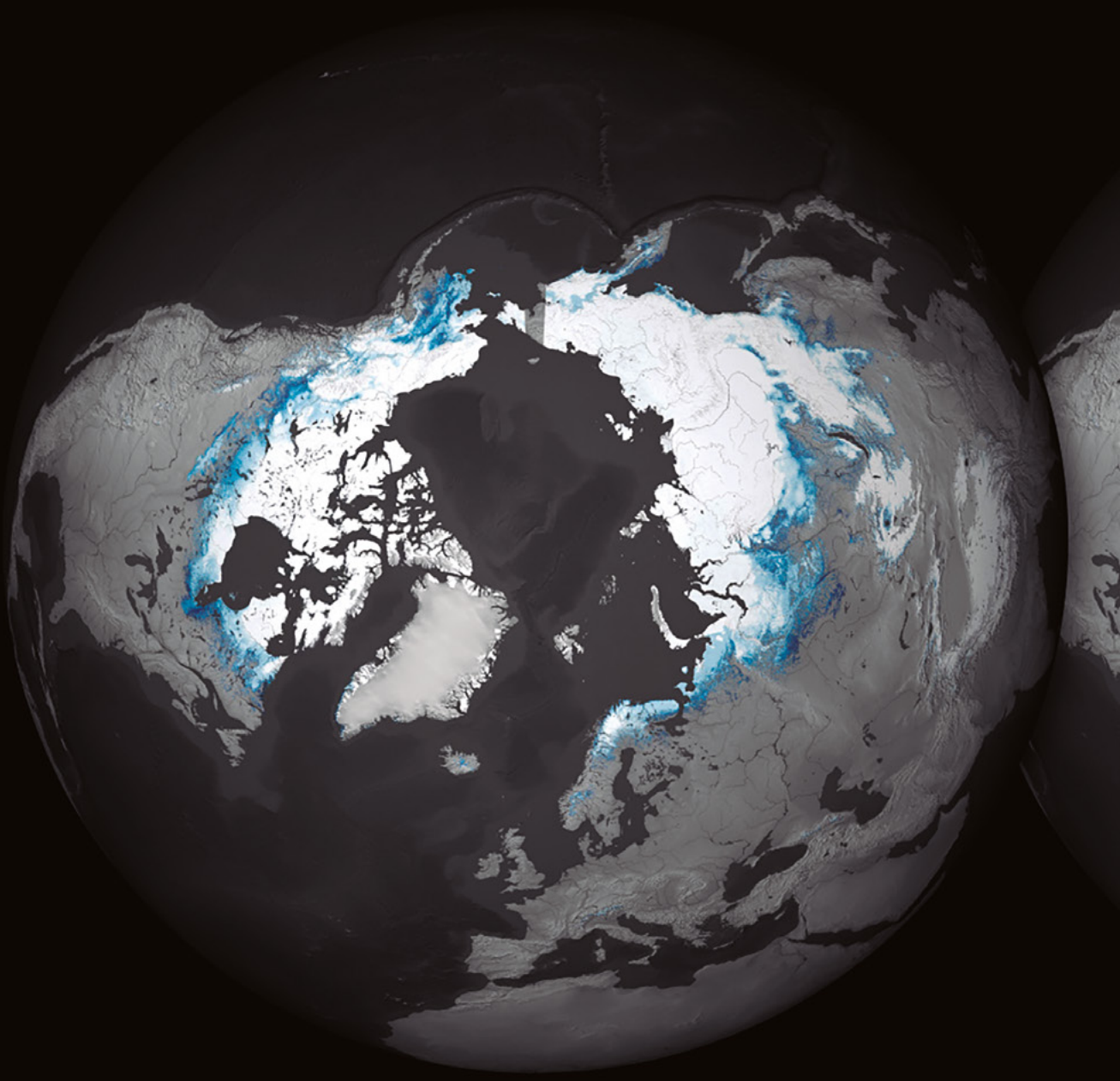


ABOUT THE IMAGE

Antarctic ice speed

The image shows the different glacier flow speeds toward the ocean between 1996 and 2016. Recent research shows that glaciers in the Getz region (inside the black rectangle) are accelerating their flow toward the sea.

Credits: ESA/MEaSUREs version 2, 1996–2016 (multimission data), NASA, NSIDC/BAS

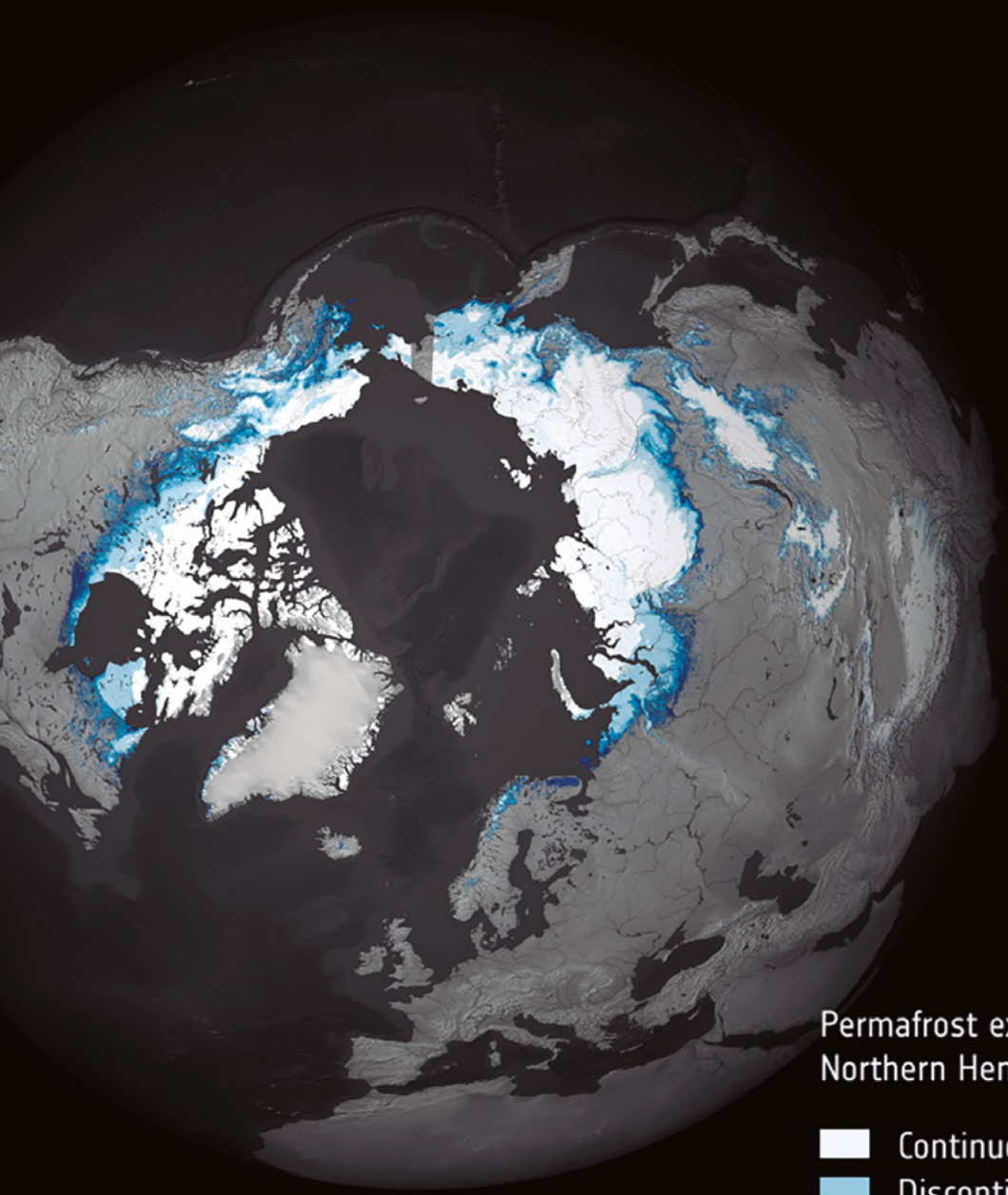


ABOUT THE IMAGE

Permafrost cover in the Northern Hemisphere

The maps generated by the ESA's Climate Change Initiative offer new information about the melting of permafrost in the northern hemisphere. The image shows the permafrost cover in 2003 compared with 2017.

Credit: Permafrost CCI, Obu et al, 2019 via the CEDA archive

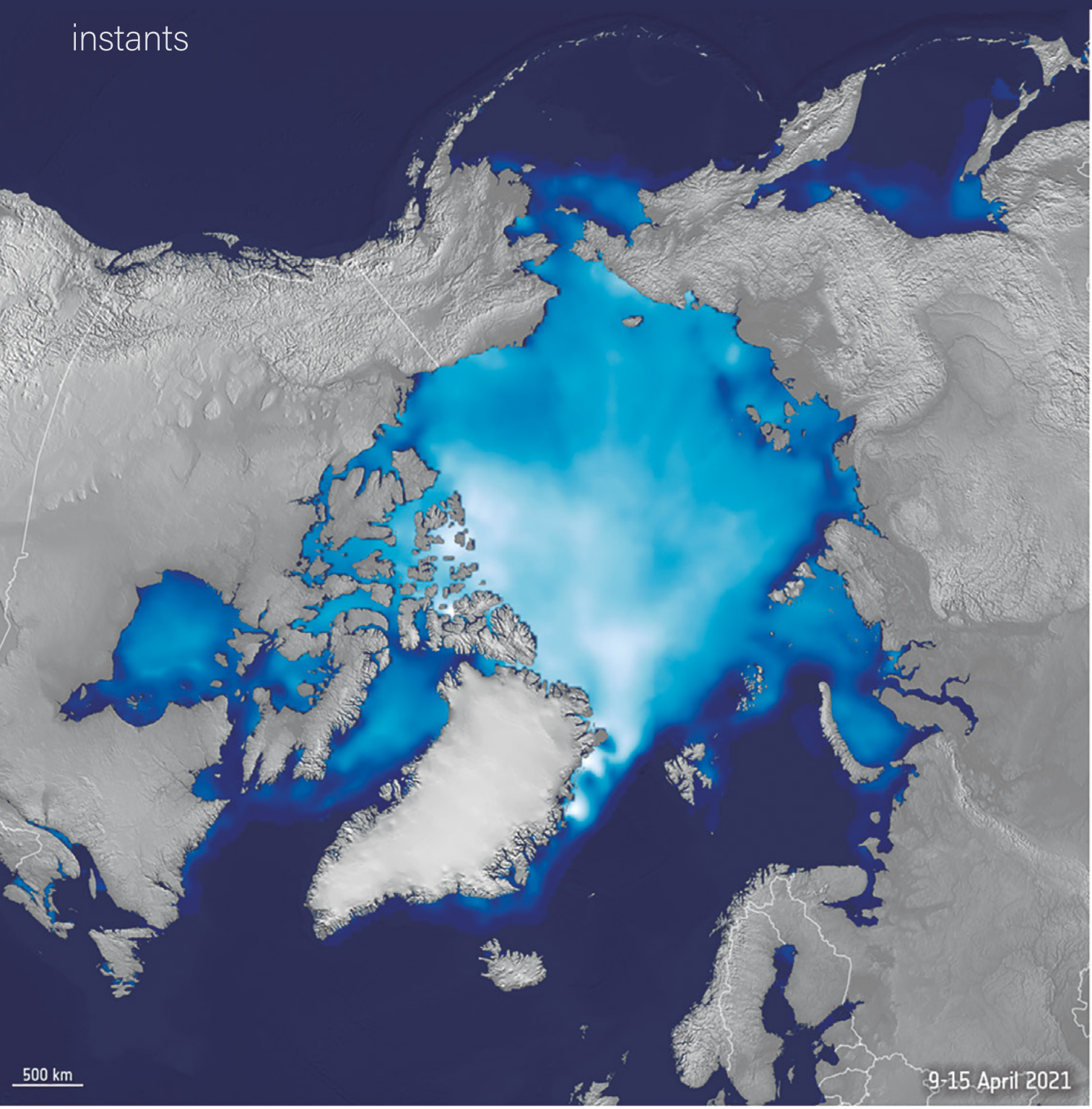


2017

Permafrost extent for the Northern Hemisphere

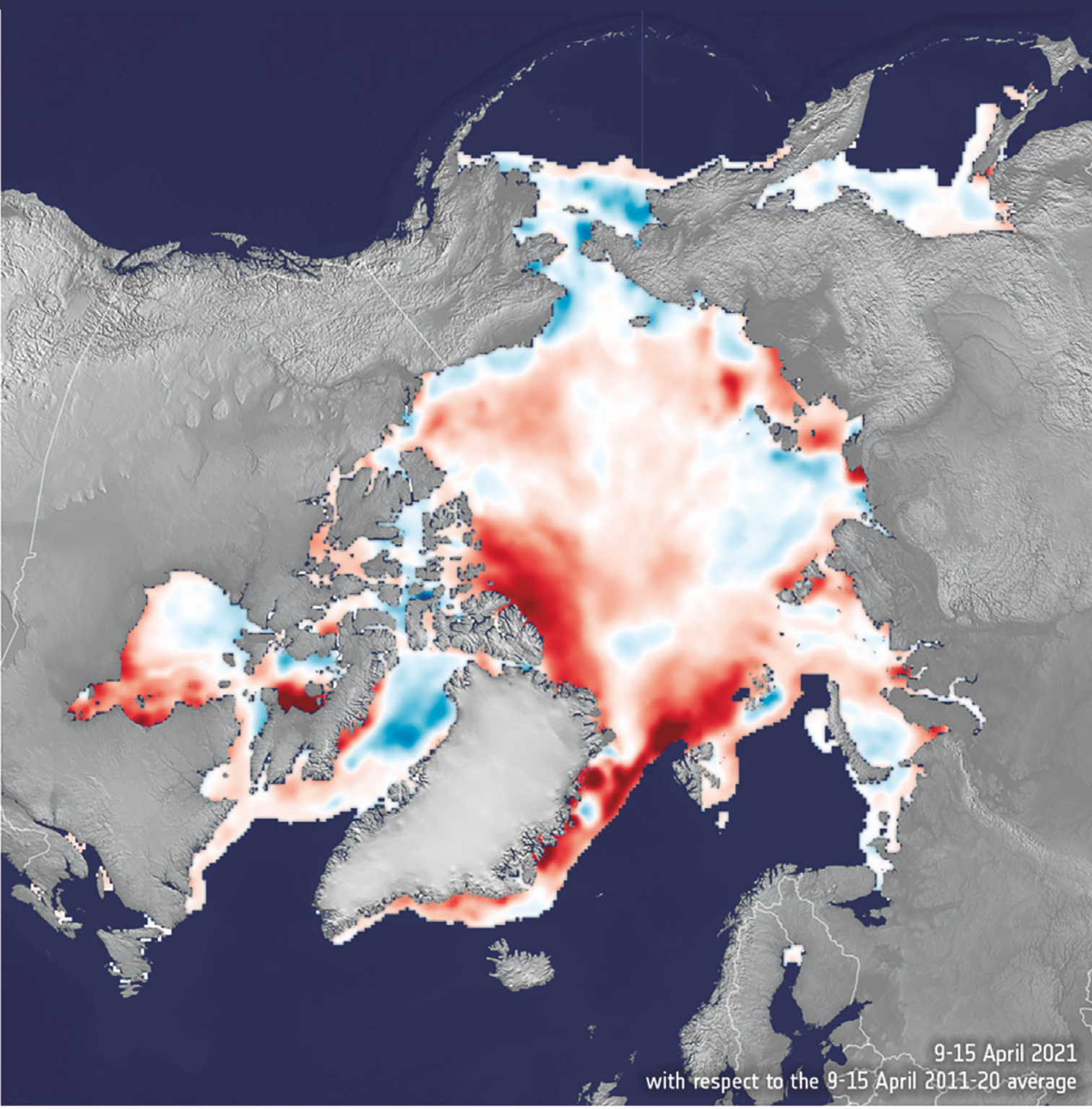
- Continuous
- Discontinuous
- Sporadic
- Isolated

Data source: Permafrost CCI, Obu et al., 2019 via the CEDA archive



Sea ice thickness (m)

0 1 2 3 4



Sea ice thickness anomaly (m)

-1.5 -1 -0.5 0 0.5 1 1.5

ABOUT THE IMAGE

Ice in the Arctic Ocean "atlantifies"

A combined analysis of data from Cryosat and SMOS allows us to compare the width of sea ice in April 2021 with the average for the same month in the years 2011-2020.

Credits: ESA/AWI

SPAIN INCREASES ITS PARTICIPATION IN ESA BY 20%

The Council of Ministers has approved an agreement by which the Ministry of Science and Innovation will increase by 20% the Spain's contribution to the European Space Agency (ESA) by 2023, up to 300 million euros. Since 2019, the Government of Spain has increased its ESA contribution by 50%.

The minister of Science and Innovation, **Diana Morant**, has stressed that the ESA share "allows us to take part of the development of space missions and programs as important as the European Union's Copernicus, an Earth observation system that contributes to the tracking and control of emergencies such as that of the La Palma volcano and fires."

The minister has also pointed to the fact that, pursuant to ESA's georeturn concept, "this investment will translate into more opportunities for the Spanish industry and companies of the Space sector in our country." Morant also reminded that ESA has just approved the ARRAKIHS mission—the first mission of the European Space Agency's program to be led by Spain. Currently, Spain is the fourth-largest ESA contributor among European Union countries. The return rate in contracts for Spanish companies has been 106% in the last few years, which implies a 74 million euro surplus for Spain.

Source: www.ciencia.gob.es

CORPORATE SUSTAINABILITY

Promoting sustainable investments is a political and strategic goal of the European Union, and is aligned with the commitments of the Paris Accords, the UN's 2030 Agenda and the Green Deal that aims for the EU to be carbon-neutral by 2050.

These goals need to be broken down into direct, collateral and indirect and addressed individually, but with consideration to the closely-knit network of relationships that turn them into a whole.

This bottom-up approach is the only feasible one to guarantee the sustainable growth of organizations—in particular, of a key and strategic sector such as Space—, but, moreover, it is the only possible path to guarantee a sustainable life for human beings of planet Earth.

Our sector needs to be a role model and a creator of leadership on the matter, with joint efforts between the Administration, Major Trailblazing Companies, and all the SMEs that are part of the value chain.

The Space sector is a sector 'of' technology, 'with' technology and 'for' technology, and it is the catalyst par excellence of the interconnection between science, technology and innovation, with an unmatched power for transforming society and thereby improve the quality of life of humans.

In order to contribute toward those goals, TEDAE has put in motion a training program for its members that reflects the efforts of the industry to be more sustainable. Two training sessions have been held, titled 'ESG governance and the most immediate obligations' and 'The Environment – Company pair', with two others to be held during the next few months.

Text: José Antonio García Gallego

SEVILLE: HOME OF THE SPANISH SPACE AGENCY

The Council of Ministers has chosen Seville as the future home of the Spanish Space Agency among 21 participating candidates. The minister of Science and Innovation, Diana Morant, has highlighted that the Spanish Space Agency is included as part of the Aerospace Strategic Projects for Economic Recovery and Transformation (PERTE), which will allocate over 4.5 billion euros to the generation of major opportunities and benefits across different areas of our country. "We make a better Spain from all of Spain," she claimed.

The Spanish Space Agency, with a division dedicated to National Security, will enable the coordination of national activities and policies related to Space, as well as the participation of Spain in international programs related to this field.

The space sector provides essential services for our society in the fields of communications, Earth observation, navigation, security, the fight against climate change and the monitoring of phenomena such as droughts and fires, in addition to services of vital importance for the two-pronged digital and green transformation, which are strategic goals of the European Union. Space is an indispensable tool for the advancement of science and exploration; it answers the most basic questions of humanity and boosts innovation.

With the creation of the Agency, as recognized in the modification of the Law of Science, Technology and Innovation, in the 2021 National Security Strategy and in the Aerospace PERTE, Spain rises up to the level of its surrounding countries, which have similar bodies and organizations aimed at managing and directing Space strategies and activities.

Source: Ministry of Science and Innovation

CHINA COMPLETES ITS SPACE STATION

China has completed in November the docking of the Mengtian laboratory to its Tiangong space station, put into orbit in April of 2021. This module completes the main section of the station, composed of the central part of the terminal, named Tianhe, and two laboratories, Wentian and Mengtian, set up in a T-shaped configuration.

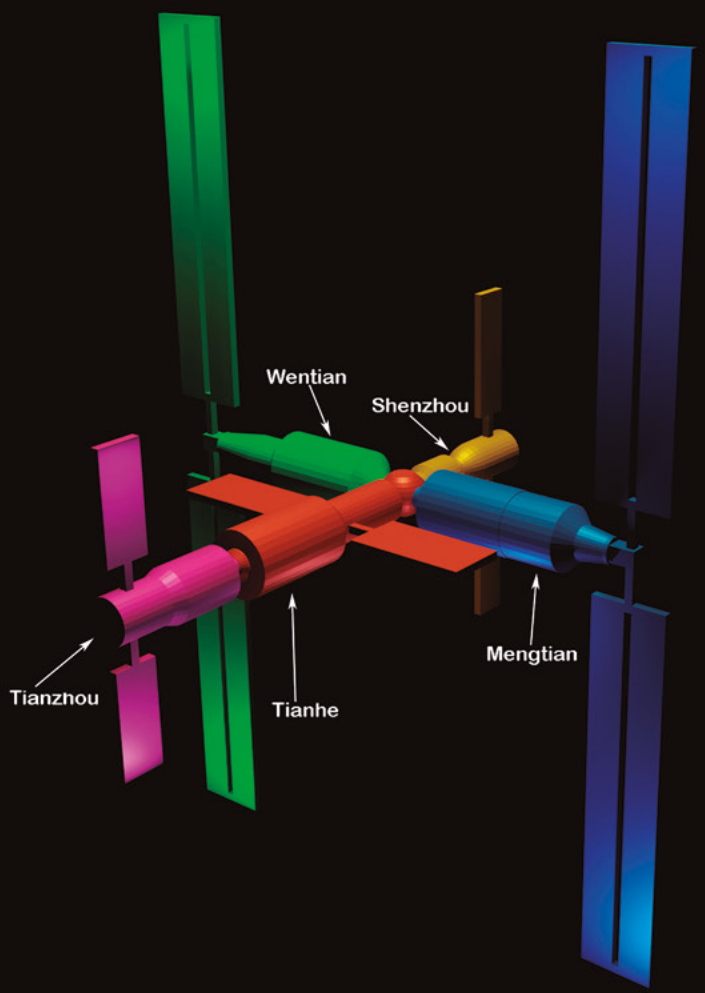
The station is orbiting at approximately 400 kilometers from Earth and is much smaller than the International Space Station (ISS). It is designed to house three astronauts during long stays to conduct research work.

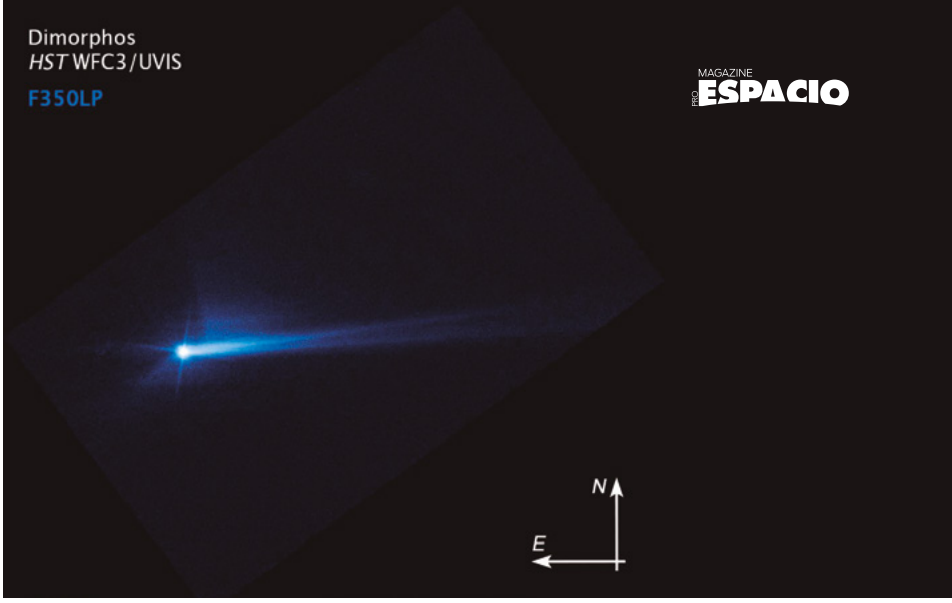
Tiangong means "heavenly palace" and, as of now, it has been home to the three first taikonauts—among them the first female Chinese astronaut, Liu Yang.

The new Mengtian module ("dreaming of paradise") will be used to perform experiments in microgravity, complementing the biological studies conducted in the Wentian laboratory ("quest for the heavens"). Its objectives include the development of a controlled ecosystem.

Mengtian has a mass of 23 tons, a length of 17.88 meters and a maximum diameter of 4.2 meters. With this successful docking, China continues its development as a space power.

Source: Europa Press, Xinhua, El País





NASA SUCCESSFULLY REDIRECTS AN ASTEROID AS PART OF ITS DART MISSION

In late September, NASA carried out the first planetary defense technology demonstration the world has seen with its DART mission—the Double Asteroid Redirection Test. With this mission, NASA was aiming to demonstrate that it is possible to redirect an asteroid from its trajectory in the event it is expected to impact Earth. On September 26, NASA successfully moved the Dimorphos asteroid in space, thereby demonstrating a viable mitigation technique, known as kinetic impact, to protect the planet from an asteroid or comet that approaches Earth, in the event one is discovered.

DART was focused on the Dimorphos asteroid, a small body of just 160 meters in diameter that orbits a larger asteroid of 780 meters, called Didymos. Neither of the two asteroids is a threat to Earth.

These past weeks, the research team at NASA has observed the Dimorphos asteroid with Earth-based telescopes, confirming that DART's impact has effectively altered the orbit around Didymos by 32 minutes, shortening it from 11 hours and 55 minutes to 11 hours and 23 minutes.

In the words of Bill Nelson, NASA administrator, "All of us have a responsibility to protect our home planet. After all, it's the only one we have." "This mission shows that NASA is trying to be ready for whatever the universe throws at us. NASA has proven we are serious as a defender of the planet. This is a watershed moment for planetary defense and all of humanity, demonstrating commitment from NASA's exceptional team and partners from around the world."

Source: NASA

SPAIN AND PORTUGAL AGREE TO CREATE THE ATLANTIC CONSTELLATION

Spain and Portugal have entered an agreement for the development of a constellation of Earth observation satellites. This constellation will consist of 16 microsatellites with a weight ranging from 20 to 30 kilograms each, which will be able to provide data about any place on Earth every three hours. In this regard, the minister of Science and Innovation, Diana Morant, stated that his constellation, which will complement the Copernicus satellites of the European Union (EU), may be used for applications that require high-frequency imaging such as firefighting and the mitigation of the effects of natural disasters.

Each of the two countries will be expected to independently build and operate half of the satellites of the Atlantic Constellation, which will involve a total investment of 60 million euros thanks to the funds of the Recovery, Transformation and Resilience Plan.

The agreement has been reached as part of the XXXIII Spanish-Portuguese summit and there are already another five countries interested in joining: United Kingdom, South Africa, Mexico, Brazil and Norway. The addition of more countries will allow an increase in the data rate up to the point where satellite information is available every hour, improving the performance of the system without incurring a higher cost for the participating states.

This initiative is included as part of the Aerospace Strategic Projects for Economic Recovery and Transformation (PERTE), coordinated by the Spanish Ministry of Science and Innovation, which will allocate over 4.5 billion euros to foster science and innovation in the aerospace sector.

Source: La Moncloa

SPAIN TO LEAD
THE FIRST MISSION OF THE EUROPEAN SPACE AGENCY'S SCIENCE PROGRAMME

On November 2, the European Space Agency (ESA) officially approved the ARRAKIHS mission—the first mission of ESA's Science Programme led from Spain with sights on being launched in 2030.

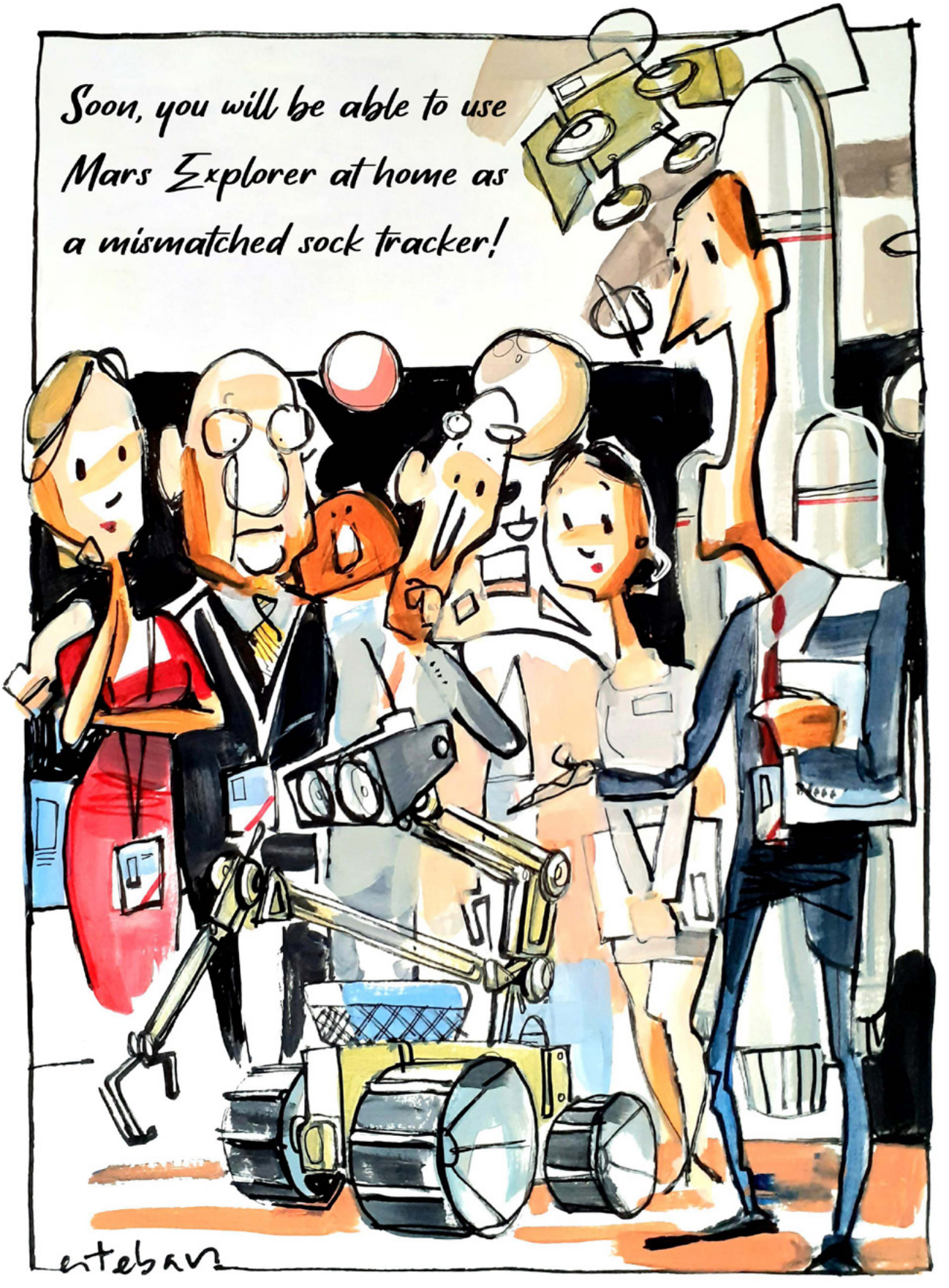
The ARRAKIHS mission (which is an acronym that stands for "Analysis of Resolved Remnants of Accreted galaxies as a Key Instrument for Halo Surveys") was submitted for ESA's F-Missions (Fast Missions Opportunities) in February of this year, and its performance involves the participation of an international consortium that includes research centers in Spain, Switzerland, United Kingdom, Belgium, Sweden, Austria and the United States, in response to the announcement of opportunity published by ESA in December of 2021. Later, in July, it received the support of the Ministry of Science and Innovation after its approval as part of ESA's PRODEX program, managed by the Centre for the Development of Industrial Technology (CDTI).

More specifically, the mission is coordinated from the Institute of Physics of Cantabria (IFCA), the combined center of the Spanish National Research Council (CSIC) and the University of Cantabria (UC). The research team in charge of ARRAKIHS will be led by Rafael Guzmán, CSIC researcher, member of the Observational Cosmology and Instrumentation group of the IFCA and a professor at the University of Florida, the Complutense University of Madrid (UCM), the Institute of Astrophysics of Andalusia (IAA-CSIC), the Institute of Space Sciences (ICE-CSIC), the Center of Astrobiology (CAB, INTA-CSIC) and the Centro de Estudios de Física del Cosmos de Aragón (CEFCA), in collaboration with the industry.

Its main goal is the study of dark matter in the universe, which might be up to five times more abundant than ordinary matter. Due to its properties, it is very hard to detect it directly and, for now, we are only aware of its existence through its gravitational effects. It is precisely these effects on the satellites orbiting the halo of galaxies such as our Milky Way the ones that ARRAKIHS will be able to discover and characterize in order to reveal the nature of dark matter.

The minister of Science and Innovation, Diana Morant, has stated that knowing dark matter will allow us to better comprehend our universe.

Source: La Moncloa


Soon, you will be able to use Mars Explorer at home as a mismatched sock tracker!
esteban

NEW PARTNERSHIP BETWEEN SATLANTIS AND ENCINO

April 2022: the US company Encino Environmental Holdings LLC (EEH) joined SATLANTIS' capital as a strategic partner. EEH is an investment holding company controlled by BP Energy Partners in partnership with EnCap Investments L.P. and Williams. EEH wholly owned subsidiary, Encino Environmental Services LLC is a Houston-based emissions monitoring company. This partnership will foster the satellite-based greenhouse gas (GHG) monitoring technology. This investment brings SATLANTIS' latest round of financing to 31M€, boosting SATLANTIS LLC' growth in the United States.

PLD SPACE COMPLETES A SUCCESSFUL ROCKET FULL MISSION TEST FOR THE FIRST TIME IN EUROPE

PLD Space has successfully completed the first qualification campaign of its suborbital vehicle, MIURA 1. The Spanish company is once again making history by performing for the first time in Europe a full mission test of an integrated microlauncher. After undergoing all the tests at its technical facilities in Teruel (Spain), the rocket is ready for its first launch from El Arenosillo (Huelva).

AIRBUS IN MADRID DELIVERS THE ICI INSTRUMENT FOR METOP-SG-B

The ICI (Ice-Cloud-Imager), a completely new instrument without any space precedent, has been delivered to Airbus in Friedrichshafen for integration on the MetOp-SG-B satellite for system-level testing. ICI is the first compact and high-resolution scanning radiometric system of its kind. It will improve weather predictions by measuring ice cloud profiles and various precipitation parameters that cannot be extracted with current instruments.

GMV WINNER IN THE CLEPA 'SMART & SAFE' AWARDS

GMV GSharp, the safe and precise positioning solution based on satellite navigation technologies (GNSS) from GMV, has been awarded the 'Smart & Safe' prize at the 7th edition of the European Automotive Suppliers Association (CLEPA) Innovation Awards. GMV has been participating in various international projects for over 20 years now, using satellite navigation technology in the automotive field and is now starting to apply it successfully to autonomous driving.

INDRA SATELLITE COMMUNICATIONS FOR NORWAY

Indra will provide the Norwegian Armed Forces with critical X-band and Ka-band, anchor stations to manage military operations. These nodes will act as a link to the Wideband Global SATCOM (WGS) satellite constellation, one of the most advanced in the world, offering the highest capacity for high-speed data exchange. Indra is positioned as a leading company ready to deliver certified stations for this constellation shared by several countries.

ELECNOR DEIMOS LEADS A NEW ESA MISSION: DRACO

The objective of DRACO - Destructive Re-entry Assessment Container Object - is to record the rupture sequence during a destructive re-entry, to better understand the process and improve risk assessment. Deimos is in charge of mission design and management, systems engineering, platform development, ground and user segments, with the Von Karman Institute VKI and RTECH as prime subcontractors and CNES as observer.

SENER AEROESPACIAL AND AERDRON TO DEVELOP A DRONE FOR MARS

ESA has awarded SENER Aeroespacial the AERIAL project to design an unmanned aerial vehicle (or drone) prototype capable of flying in the low density, pressure and temperature of the Martian atmosphere. The drone, which SENER Aeroespacial is developing with Aerdron, will be designed to take off from a platform on the rover, fly around to a range of one kilometer and land back on the rover. The rover would swap out and charge the battery.

ESA CERTIFICATION FOR SMALL SATELLITES

ALTER laboratories devoted to Small Satellites have just received the certification of compliance with the requirements of ECSS-Q-ST-20-07C as adapted from ESA-TECQQ-TN-024614 issued by the European Space Agency.

ALTER has adapted its test facilities to the demands of New Space to provide the test activities required to put a small satellite into orbit.

Small satellite testing improves time to market at a lower cost, contributing to the manufacturing process's profitability, ensuring the spacecraft's reliability, and securing the mission's success.

THALES ALENIA SPACE AND MICROSOFT WILL DEPLOY SPACE EDGE COMPUTING SOLUTION ONBOARD THE ISS

Thales Alenia Space in Spain will deploy a Space Edge Computing payload onboard the International Space Station comprising high performance Earth observation sensors along with powerful computing hardware embedding a software development framework. The project aims at providing an on-orbit operational development framework that will enable application developers to easily develop and deploy Earth observation data processing applications through Microsoft's Azure platform.

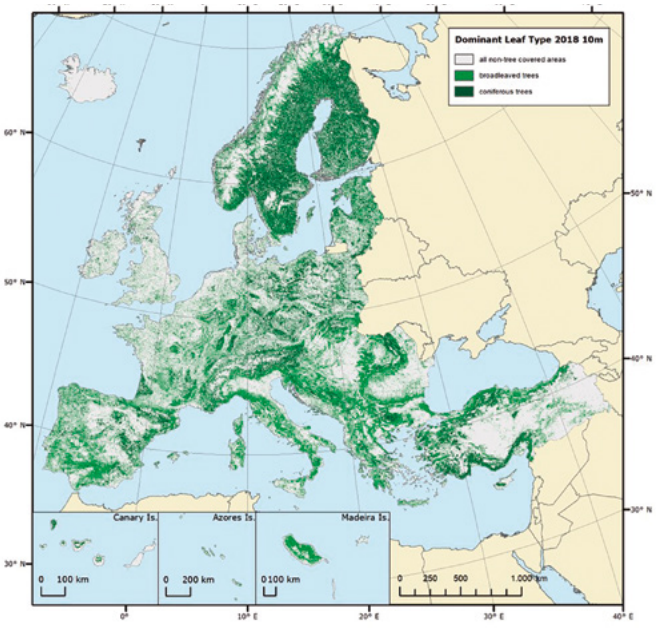
THE PAZ SATELLITE, KEY IN NATURAL DISASTERS AND EMERGENCIES

Natural disasters and those caused by human hands are occurring more frequently and with greater intensity today. To help combat these disasters, public organizations and government agencies with responsibility in these areas use data and communications from satellites, such as those provided by Hisdesat in the Observation and SATCOM areas, to be able to plan, mitigate risks and thus manage the efforts of disaster response and recovery.

TELESPAZIO IBÉRICA SIGNS A CONTRACT WITH IECA

Telespazio is carrying out for the Institute of Statistics and Cartography of Andalusia a project to improve the statistical and cartographic activities through the incorporation of products and a methodological guide for the use of the services of the Copernicus program. As a final result, the IECA will have a better use of the existing information and an improvement in its cartographic processes.

Telespazio Group is one of the leading companies in the field of advanced mapping services based on Copernicus.



INSTER WILL DEVELOP FOR MARITIME RESCUE AN INNOVATIVE ON-BOARD LEO SATELLITE COMMUNICATIONS SYSTEM WITH HIGH BANDWIDTH

This initiative is part of the iSAR project, an ambitious plan for the technological renewal of Spanish Maritime Safety Agency resources. Inster will deploy a low orbit satellite communications solution that will enable real-time two-way communication between maritime units at sea and coordination centers on land.

TECNOBIT-GRUPO OESÍA WAS PRESENT AT THE NEW SPACE SPAIN 2022 EVENT

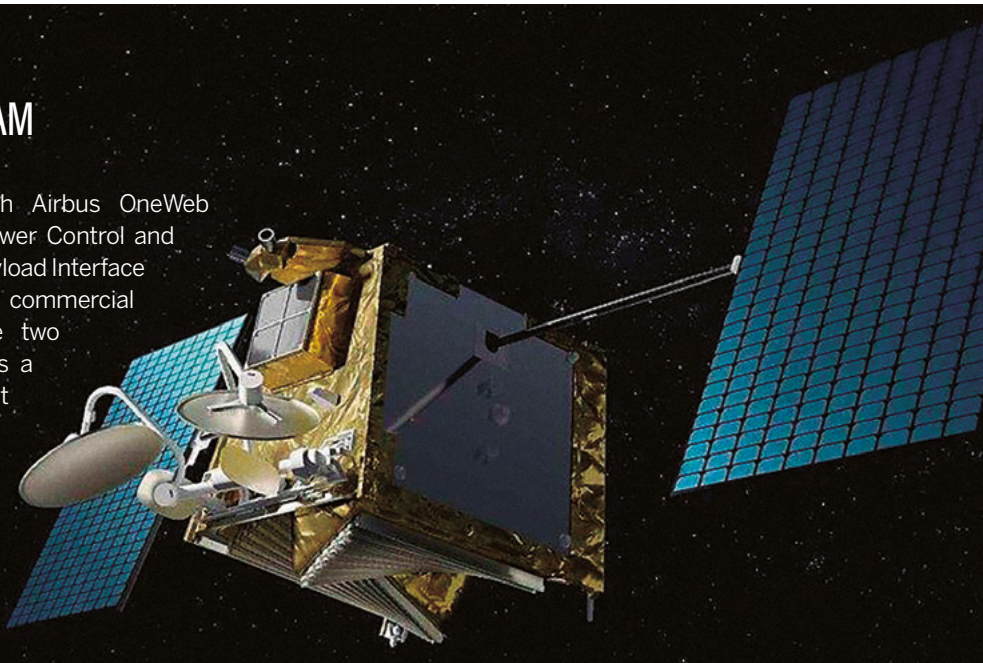
This event is focused on technologies applied to the new booming constellations of Nano and Small SATs. This type of constellations is booming. TECNOBIT has specific products for SmallSAT LEO constellations such as the On Board Computer (OBC) EBox, Power Units (PSU) or active antenna electronics, etc. which are also flight tested and are expected to be incorporated into some of the constellations that are in the making.

HISPASAT AND CFE TEIT COLLABORATE TO CONNECT THE UNCONNECTED IN MEXICO

Thanks to this agreement, more than 60 communities located in remote areas of Mexico will have a mobile telephone and Internet service in public places, schools or health centers, thanks to the satellite extension of the rural LTE network promoted by CFE TEIT and jointly promoting information and communication technologies for rural Mexican populations located in areas without insufficient connectivity.

AIRBUS CRISA IN THE USA GOVERNMENT SDA PROGRAM

Airbus Crisa has contracted with Airbus OneWeb Satellites, the development of the Power Control and Distribution Electronic Unit and the Payload Interface Unit for the evolution of the Arrow commercial platform for constellations. These two key units consolidate Airbus Crisa as a reference company in the development of Next Space electronics. These units will be first used in the constellation corresponding to Tranche 1 of the Transport Layer for the USA Government Strategic Development Agency (SDA).



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ESA ministerial COUNCILS

INTERVIEW
TERESA RIESGO ALCAIDE
SECRETARY GENERAL FOR INNOVATION

OPINION
JOSEF ASCHBACHER
ESA DIRECTOR GENERAL