**ESA Highlights 2021**

Today we are almost ready to say goodbye to 2021, a year in which the European Space Agency once more succeeded to continue its operations and created some important milestones in the field of European spaceflight. As always, ESA has been at the forefront of science with the impending launch of the James Webb Space Telescope, and several science mission en route or being prepared such as BepiColombo, Solar Orbiter, JUICE and ExoMars. The European Copernicus programme continues to be the largest Earth observation programme in the world and ESA is even preparing more Earth observation missions. In 2021 ESA Astronauts Thomas Pesquet and Matthias Maurer went to the ISS. And a new Director General has taken the helm, with the ambition to accelerate the use of space in Europe. Meanwhile, the Vega rocket’s last flight has paved the way for Vega-C, and the Ariane 6 launchpad has been inaugurated.

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| 10:00:00 | ESA leader |
| 10:00:10 | Title: ESA Highlights 2021 |
| 10:00:08:00   * young-guy-rides-on-bus-with-medical-mask-on-his-face-protecting-health-in-an-epidem-SBV-338298623- unknown date [credit: Storyblocks] * a-sign-on-a-sidewalk-of-a-large-city-warns-passers-by-to-stay-2-meters-away-from-ea-SBV-338251805-unknown date [credit: Storyblocks] * black-female-doctor-injecting-painful-medication-into-arm-of-wincing-boy-during-vac-SBV-339011996 - unknown date [credit: Storyblocks] * storyblocks * Establishing shot ESA/ESTEC - ESTEC, Noordwijk, The Netherlands - 12/03/2013 [credit: ESA/NASA] * GVs Matthias Maurer training, Johnson Space Center, Houston, USA, July 2020 [credit: ESA/NASA] * Footage of Ariane 6 Early combined tests - Europe Spaceport, Kourou, Fench Guiana - 2020 [credit: ESA/CNES/ArianeGroup] * ExoMars Droptest vehicle and parachute preparations in hangar - Esrange, Kiruna, Sweden - 05/06/2021 [credit: ESA] * JWST after being rraised vertical – European Spaceport, Kourou, French Guiana – 15/10/2021 [credit: ESA/Arianespace/CNES] * Impression of Webb’s journey to space – October 2021 [credit: ESA/ATG medialab] – 5 shots * Combined animation of BepiColombo and Solar Orbiter Venus Flyby – unknown date [credit: ESA/ATG medialab] * JUICE moving to Large Space Simulator- ESTEC, Noordwijk, The Netherlands - May 2021 [credit: ESA] – 4 shots * ANIMATION JUICE AT JUPITER [credit: ESA/ATG medialab] * IMAGE JUPITER AND MOONS STILL IMAGES - [credit: NASA] * ANIMATION JUICE GANYMEDE FLYBY [credit: ESA/ATG medialab] * Exomars Spacecraft and rover animation - 2016 [credit: Thales Alenia Space] * ExoMars parachute high-altitude drop test - june 2021 [Vorticity] * Exomars Spacecraft and rover animation - 2016 [credit: Thales Alenia Space] | 2021 was another year gravely impacted by Covid, but at the European Space Agency work has continued and ESA can look back on a year in which the agency once more showed its excellence and outstanding ambition.  In science, ESA’s year ends on a high note with the long-anticipated launch of the James Webb Space Telescope, in partnership with NASA and CSA. This cutting edge Space telescope will be launched on top of an Ariane 5 from Europe’s Spaceport. Webb is designed to answer questions about our Universe and to make breakthrough discoveries in all fields of astronomy.  2021 also saw the double Venus flyby of Solar Orbiter and BepiColombo, whereby both spacecrafts en route to their destinations did a flyby of our hottest planet only 33 hours apart, a first.  But on the ground new missions are being prepared as well, this summer ESA’s new space probe JUICE, which stands for JUpiter ICy moons Explorer, successfully completed rigorous thermal tests at ESA’s ESTEC facility. The mission will launch to Jupiter in 2023 and it will study the planet and its icy moons Europa, Callisto and Ganymede.  For ESA’s exciting ExoMars mission, high-altitude drop tests were successfully executed in Kiruna Sweden and later in Oregon, in the US. Testing the parachutes needed to ensure a gently touchdown for ExoMars on the surface of the red planet. |
| 10:01:44:23   * GV the ISS in orbit [credit: ESA/NASA] * GVs Thomas Pesquet onboard the ISS [credit: ESA/NASA] * GV Matthias Maurer in crew dragon capsule – November 2021 [credit: ESA/NASA] * GV Matthias Maurer in ISS – Novmeber 2021 [credit: ESA/NASA] * GV Thomas Pesquetin ISS – 2021 [credit: ESA/NASA] * GV’s Thomas Pesquet Cre dragon launch – march 2021 [credit: NASA/SpaceX] – 4 shots * ERA and NAUKA, assembly room, TsENKI - Baikonur, Kazachstan - 02.02.2021 [credit: TsENKI]- 3 shots * ANIMATION: ERA operations on ISS – June 2021 [credit: ESA/ATG Medialab] * GVs Thomas Pesquet and Shane Kimbrough EVA, June 2021 [credit: ESA/NASA] – 2 shots * GVs Thomas Pesquet onboard the ISS [credit: ESA/NASA] * GVs ISS change of command ceremony, October 4th 2021 [credit: ESA/NASA] * GV Thomas Pesquet returning to France – November 2021 [Credit: ESA] * Crew dragon capsule approach – November 2021 [credit: NASA/SpaceX] * Matthias Maurer inside dragon capsule – November 2021 [credit: NASA/ SpaceX] * Matthias Maurer arriving at ISS – November 2021 [credit: NASA/ESA] * Images from ESA recruitment video – 2021 [credit: ESA] – 9 shots * slow-motion-shot-of-a-traveling-man-with-a-backpack-in-wheelchair-walking-on-the-em-SBV-307762491- unknown date [credit: Storyblocks] * side-view-jogger-with-artificial-limb-exercising-on-running-surface-close-up-of-run-SBV-338177071 [credit: Storyblocks] * businesswoman-in-wheelchair-with-smartphone-sitting-at-the-desk-making-notes-SBV-320850268[credit: Storyblocks] * male-traveller-with-disabilities-is-hiking-in-nature-walking-over-river-shore-in-mo-SBV-346715163 - unknown date [credit: Storyblocks] * Images from ESA recruitment video – 2021 [credit: ESA] – 4 shots | For human spaceflight ESA astronauts Thomas Pesquet and Matthias Maurer both made the journey to the International Space Station, ISS, in 2021. Thomas departed in April for his second long duration mission, named Alpha and he was the first ESA astronaut to fly in the SpaceX crew dragon capsule. During his stay another marvel of European technology came to the international space station, the European Robotic Arm, ERA. This robotic arm can move hand-over-hand on the outside of the Russian laboratory module, Nauka, and can be used for inspections, bringing scientific instruments outside of the airlock and aid astronauts during spacewalks. On board of the ISS Thomas was involved in the set-up of ERA and in October he became the fourth European commander of the space station. He returned to earth in November, a few days before German astronaut Matthias Maurer launched to the ISS for his six-month mission named Cosmic Kiss.  Ever looking forward to the future, ESA opened applications for a new class of astronauts on the 31st of March and by the time the vacancies closed in June over 22000 aspiring astronauts had applied. It was also the first time ESA had a vacancy for an astronaut with a physical disability, to which over 200 people replied. Now the candidates will go through several screening stages and in 2022 a new class of astronauts will be revealed to the world. |
| 10:03:18:13   * Artemis I and European Service Module on way to the moon – unknown date [credit: ESA]- 2 shots * Timelapse ESM-2 arriving at Kennedy space centre, Florida, USA – October 2021 [credit: ESA/NASA]- 2 shots * GV’s Orion/ESM-1 in cleanroom NASA’s Plumbrook Station, Sandusky, Ohio, USA – Decmeber 2019 [credit: ESA]- 2 shots * Timelapse, EMS-1 with orion, Final stacking with SLS in Vehicle Assembly Building – Kennedy Space centre, Florida, USA – 20 october 2021 [credit: ESA/NASA] | The ambition of ESA is to bring the first European to the surface of the Moon before the end of the decade. To achieve this, ESA continues to work closely with NASA in the development of the Artemis programme. In 2021 a second European Service Module, ESM-2 arrived at Kennedy Space Center in Florida, while the ESM-1 was integrated with the Orion capsule and stacked in preparation for next year’s maiden flight. |
| * GV’s Vega-C interstage - Airbus Defence & Space, Leiden, The Netherlands - November 2020 [credit: ESA]- 2 shots * Vega launchpad, Europe Spaceport –Kourou, French Guyana - 2019 [credit: ESA] * Vega launch 20 -Europe Spaceport, Kourou, French Guiana – November 2021 credit: [ESA/CNES/Arianespace] * Animation of Vega-C Launch – unknown date [credit: ESA] * Animation Ariane 6 launcher – 2019 [credit: ESA] – 2 shots * Ariane 6 upper stage integration at test bench - DLR Lampoldshausen, Germany - March 2021 – [credit: DLR]   Aerial Ariane 6 launch complex - Europe Spaceport, Kourou, French Guiana - 2019 [credit: ESA/Arianegroup/CNES]   * Animation Ariane 6 launcher – 2019 [credit: ESA] – 2 shots | It is also ESA’s responsibility to keep securing independent access to space for Europe with two new upcoming launchers. In November the last Vega was launched from Europe’s Spaceport to be replaced from 2022 onwards by the new and improved Vega-C launcher.  The development of the new Ariane 6 launcher is also well underway, with more test across several sites in Europe and in Kourou. In September the Ariane 6 launchpad was inaugurated, bringing the maiden flight of this flexible heavyweight launcher ever closer. |
| 10:04:24:03   * Galileo sat 13&14 transfer - Europe Spaceport, Kourou, French-Guiana - 06/04/2016 [credit: ESA] * GV's Galileo Ground control center - Oberpfaffenhofen, Germany - 18/12/2013 [credit: ESA] – 2 shots * Galileo launch 11 – November 2021 – Europe Spaceport, Kourou French-Guiana [credit:ESA/CNES/Arianespace]- 2 shots * GV's Fitcheck Galileo sat 23-24-25-26 launch campaign - Europe Spaceport, Kourou, French-Guiana - 07/06/2018 [credit: ESA] * Animation: Galileo constellation with satellites - 2014 - [credit: ESA] * Animation: Galileo 360 fly around - unknown date [credit: ESA] * Stills: Galileo 2nd generation satellites [credit: Airbus Defense & Space] | 2021 was another important year for Galileo, the most accurate and only publicly owned satellite navigation system in the world. In November a Soyuz launched from Europe’s Spaceport carried two more Galileo satellites into orbit. These satellites were the first of 12 more first generation Galileo satellites known as ‘Batch 3’ and fill in empty spots in the constellation and offer replacements for satellites which are end of life. Meanwhile ESA continues to work on a second generation of more powerful and versatile software-defined Galileo satellites. |
| 10:05:01:21   * Eutelsat Quantum Antenna Test - Compact Antenna test range CATR, Airbus Defence and Space, Toulouse, France - 15/07/2020 [credit: ESA] * Quantum launch, Europe Spaceport, Kourou, French-Guiana – July 2021 [credit:ESA/CNES/Arianespace] * Eutelsat Quantum animations - Giving you control of your satcoms - unknown date [credit:Eutelsat]- 3 shots | The way towards this innovative software-defined satellite design was paved by Eutelsat Quantum, which was launched in July onboard an Ariane 5. Quantum is the first of these software-defined satellites which can be reprogrammed in orbit responding to changing market demands during their lifetimes. |
| 10:05:22:05   * - ESCAT telecoms teams - Harwell, united Kingdom - 1706\_019\_BR\_002 - 2019 [credit: ESA] * Quantum coupling of payload and service modules - Airbus Defence and Space, Toulouse, France - 20/09/2019 [Airbus Defence and Space SAS] * Quantum programme manager in cleanroom - Airbus Defence and Space, Toulouse, France - June 2021 [credit: ESA] * detail Fitcheck Galileo sat 23-24-25-26 launch campaign - Europe Spaceport, Kourou, French-Guiana - 07/06/2018 [credit: ESA] * GV Josef Aschbacher – ESA Agenda 2025 promotional video – 2021 [credit: ESA]- 2shots * Josef Aschbacher and EU Commissioners Thierry Breton and Viginijus Sinkevicius video call with Thomas Pesquet - 2021 [credit: ESA] * ESA Agenda 2025 animated slides – 2021 [credit: ESA]- 2shots * strasbourg-france-august-2019the-entrance-to-the-modern-seat-of-the-european-parlia-SBV-337927141[credit: Storyblocks] * flags-around-the-european-parliament-in-brussels-SBV-311483231[credit: Storyblocks] * Still: Singing of FFPA – 2021 [credit: ESA] * Berlaymont building,Brussels, Belgium – 2015 [credit: ESA] * Animated logo’s ESA, EU commission, EUSPA * Satellite Dish at Redu, Belgium – unknown date [credit: ESA] * GV cleanroom – ESA Agenda 2025 promotional video – 2021 [credit: ESA] * GV’s intermediate ministerial meeting 2021,Matosinhos, Portugal- November 2021 [credit: ESA] – 2shots * Title from ESA promotional video Accelerate the Use of space in Europe – 2021 [credit: ESA] * Animation Sentinel-2 – 2015 [credit: ESA] * Animation Sentinel-1 – 2014 [credit: ESA] * Animation Space debris collision – 2021 [credit: ESA] | In all these missions ESA is at the forefront of space technology, it has the ambition to remain there and to excel even more. This aspiration is shared by ESA’s new Director General Josef Aschbacher, who took the helm on the first of March.  He set out to define new and ambitious priorities and goals for ESA in the coming years with ‘Agenda 2025’, outlining the challenges in maintaining and growing Europe’s role in the space economy. To achieve this close collaboration with the EU is essential, and in June, ESA and the EU signed the Financial Framework Partnership Agreement defining the roles and responsibilities of all partners, the European Commission, the new EU space programme agency, EUSPA and ESA, which has a proven track record of excellence and responsibility.  During the Ministerial Meeting of ESA Member States in November it was agreed upon that for Europe and to thrive they must act now and accelerate the use of space and 3 Accelerators to bring Europe’s space ambitions to the next level were defined. These three accelerators are “Space for a Green Future”, “Rapid and Resilient Crisis Response” and “Protection of Space Assets”. |
| 10:06:36:06   * Title from ESA promotional video Space For a Green Future – 2021 [credit: ESA] * Animation multiple rotating globes illustrating satellite measurements – 2019 [credit: ESA] * Animation Sentinel-1 – unknown date [credit: ESA] * Animation Sentinel-3 – unknown date [credit: ESA] * Animation SMOS – unknown date [credit: ESA] * Animated SMOS data on ice – unknown date [credit: ESA/Planetary Visions] * farmer-inspects-his-its-dry-field-young-man-with-tablet-looking-for-water-agricultu-SBV-346634351 [credit: Storyblocks] * burning-field-of-dry-grass-danger-of-grass-fires-SBV-346510052 [credit: Storyblocks] * shocking-flooded-vehicles-news-natural-disaster-victims-apocalypse-storms-climate-c-SBV-322577550 [credit: Storyblocks] * the-flooding-water-closed-the-chaudiere-bridge-and-set-records-for-water-levels-in--SBV-334539524 [credit: Storyblocks] * Tim Peake speaking at Space4Climate, Glasgow, UK – November 2021 [credit: ESA] | The Space for a Green Future accelerator is closely linked to Earth observation and climate change, one of ESA’s focal points. The measurements provided by the Sentinel satellites of Europe’s Copernicus programme or by the ESA Earth Explorers continue to give scientists and policymakers the information they need to assess climate change and the health of our planet. The importance of climate change on the future of humanity was also stressed at the climate conference in Glasgow last November where ESA was also present showcasing their space-based climate action. |
| 10:07:12:01   * GVs Matthias Maurer training on science experiments, Johnson Space Center, USA, August 2020 [credit: ESA/NASA] – 2shots * Ariane 6 upper stage integration at test bench - DLR Lampoldshausen, Germany - March 2021 – [credit: DLR] * Quantum coupling of payload and service modules - Airbus Defence and Space, Toulouse, France - 20/09/2019 [Airbus Defence and Space SAS] * Starry Night at the Ariane 6 Launch Base - Europe Spaceport, Kouou, French Guiana - 2021 - ESA/CNES   Music:   * explorer-SBA-346706313- unknown date [credit: Storyblocks] * inspiring-uplifting-motivational-corporate-extended-edit-430-SBA-346486790 [credit: Storyblocks] | ESA can end another year of keeping Europe at the forefront of space technology, using it to improve the lives of the people on the ground, innovate, and learn about the Universe and our own planet. |
| **10:07:25:22** | **B-roll** |
| 10:07:25:22 | **Starry night at the Ariane 6 launch base at Europe’s Spaceport**  **2021 - Kourou, French Guiana**  **Credits ESA/CNES** |
| 10:10:05:10 | **Animation: Solar Orbiter Venus Flyby**  **2021**  **Credits: ESA** |
| 10:10:58:10 | **Animation: BepiColombo Venus Flyby**  **2021**  **Credits: ESA** |
| 10:11:23:05 | **GV’s Vega launch VV20 liftoff**  **Europe Spaceport, Kourou, French Guiana**  **16 November 2021**  **Credits:**  **ESA/CNES/Arianespace** |
| 10:14:06:04 | **GV’s Ariane 5 launch - Eutelsat QuantumEurope Spaceport, Kourou, French Guiana - 30 July 2021**  **Credits:**  **ESA/CNES/Arianespace** |
| 10:14:45:23 | **ESA credits** |
| **10:15:00:23** | **END** |