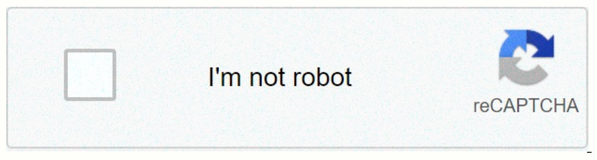

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Asteroid impact 2028 protecting our planet

Flyeye telescope in ESA's Near Earth Object Detection Asteroid Impact Exercise ESA Coordinates actions Space security references To detect asteroids threatening Earth is difficult partly because the sky is so large. But insects offer an answer, because they came up with a long time ago how to look in many directions at once. As part of a global effort to hunt risky celestial objects such as asteroids and comets, ESA is developing an automated telescope for nocturnal sky surveys. 1) This telescope will be the first in a future network to scan the sky completely and automatically identify any new earthy objects, i.e. neos, for monitoring and subsequent scanning by human scientists. But a network of traditional telescopes would be complex and expensive due to the amount needed. In addition to the problem, the system must be able to find objects that are many times weaker than can be seen with the naked eye. Although no net detects all potentially dangerous objects, under favorable conditions it should detect everything up to about 40 m in diameter at least three weeks before impact. The answer is a new European telescope called Flyeye, which divides the image into 16 smaller subimages to expand a field of view similar to the technique utilized by the fly's composite eye. The design is modular and enables mass and cheaper production, as well as lower maintenance costs. It is used to build a prototype that is used by the ENA Space Situational Awareness (SSA) program. This new technology will play a key role in the upcoming NEO research network, says Gian Maria Pinna from the SSA office. Performance corresponding to a large telescope In a telescope, one 1 m equivalent opening collects the size of light from a field of vision of 6.7º x 6.7º [about 45 square degrees; 6.7º is about 13 times the diameter of the moon seen from the ground (about 0.5º)] and feeds a pyramid-shaped ray divider with 16 sides. The entire field of view is then captured by 16 separate cameras. The red caps on the image are 16 cameras containing 16 detectors. The tubes contain a secondary lens. The new telescopes would provide the necessary resolution to determine the orbits of the detected objects, says Gian Maria. If the prototype confirms the expected performance, it will pave the way for the complete acquisition and deployment of the telescopes' operational network. In the summer of 2014, Esa signed a contract of approximately EUR 1 million with a consortium led by CGS S.p.A. (Italy), which included Creotech Instruments S.A. (Poland), SC EnviroScopY SRL (Romania) and Pro Optica S.A. (Romania) for the detailed design of the advanced telescope. (2) After detailed planning, a number of additional contracts are to be concluded with European companies with a value of up to 10 prototype telescope of the first study. The development of the first OPTICAL sensor specific to ESSA's NEO exploration and discovery activities is an essential step towards Europe's contribution to protecting our planet from potential collisions of dangerous objects, says Nicolas Bobrinsky, Director of the SSA Programme. The first Flyeye telescope is expected to be ready for installation at its final location on Mount Mufara in Sicily at the end of 2019. Figure 1: Artist's handover from the Flyeye telescope that detects an asteroid in the night sky (photo: ESA, A. Baker) 3) Flyeye telescope Figure 2: Artist's view of the ground-based Flyeye telescope on Mount Mufara in Sicily (image credit: ESA, A. Baker, CC BY-SA 3.0 IGO) 4) Figure 3: Schematic view of flyeye telescope design (image credit: ESA, A. Baker) ESA's automated Flyeye telescope helps Europe discover risky celestial objects such as asteroids and comets during its nocturnal period. sky surveys. It automatically identifies potential new down-to-earth objects that can be tracked and later reviewed by human scientists as part of the European Space Situational Awareness (SSA) programme. 5) Fig. 4: The equatorial stand that holds the Flyeye telescope heads around the correct direction of view and the landing shaft – heavenly coordinates. In this way, it compensates for the rotation of the earth with only one axis of motion and avoids the image rotating during exposure (image credit: OHB Italia) Legend figure 4: The black structure in the middle of the scoop of this image is for testing and will be replaced by the Flyeye telescope. Ohb Italia will now integrate a stand and telescope in Milan, Italy, ready for installation in the final location on Mount Mufara in Sicily at the end of 2019. Figure 5: Flyeye telescope infographic illustrates how ESA uses the first ever flyeye telescopes to support UN and international efforts to respond to asteroid reters (ESA) 6) ESA is developing new flyeye telescopes to conduct automated night sky surveys. Up to four Flyeye telescopes operate worldwide. Together with the observations of European and international astronomers, flyeye data is sent to the International Astronomical Union (IAU) Minor Planet Center (USA), a key world clearing house for all asteroid sightings. ESA asteroid experts are working with other space agencies and European civil protection authorities to plan mitigating measures. ESA also supports asteroid warning and risk assessment activities at the United Nations in cooperation with the IAU and global experts. Asteroid impact exercise • June 19, 2019: ESA participates in this year's Asteroid Day, a UN-backed global awareness campaign day with tiny rocky bodies scattered Sunday 30 June 7) - Agency share with the media and the public its various asteroid-related activities, which it considers to be a critical topic for scientific research, as time capsules of the early history of the history of the solar system and the birth of planets. Asteroids have contributed to Earth's development, as millions of impact craters scar our world. They are also a promising source of future resources, and – last but not least – they pose a proven threat to Earth and mankind. ESA is taking action as part of an international effort to mitigate this risk. - Over the past two decades, ESA has been conducting detection and analysis of asteroids whose orbits bring them close to Earth, known as near-Earth objects. Over 10,000,000 neos organisations over 10 metres are estimated to be 10,000,000 – a threshold above which damage on site can occur. - As part of its space security activities, ESA coordinates observatories and astronomers worldwide through its NEO coordination centre at the ESRIN facility in Italy. - Based on this experience, ESA has developed a new type of automated telescope for night sky studies. This Flyeye telescope divides its images into 16 smaller submaxes to expand a field of view similar to the technique utilized by the fly's composite eye. - A network of these Flyeye telescopes scans the sky completely and automatically detects possible neos for monitoring and subsequently checking human scientists. - The first Flyeye telescope is installed on top of the 1865-m Monte Mufara mountain in Sicily; The same island where the first asteroid was discovered in 1801. - European space ministers are proposed for approval of the Flyeye telescope network at Space19+ in November as part of the ENA Space Security Initiative. • April 29, 2019: In imaginary dramatization, ESA has followed an asteroid on its way to strike Earth, although the crucial information - where it may hit - is not yet clear. It is 2028, and the European Space Agency has carefully monitored the worrying situation: a huge asteroid is on its way to strike Earth, although the exact point of impact is not yet clear. 8) - National governments plan to evacuate millions of people, causing countless human misery and disruption on a huge scale. If the asteroid's impact zone can be repaired, perhaps such chaos can be avoided. - Within valuable hours, find out how esa's Planetary Defence Agency is able to obtain conclusive information about this potential disaster as part of the Agency's space security activities. - Back to the present day: Learn more about how ESA is preparing to protect our light blue indignation, residents and the vital satellite systems on which we have become so dependent. Figure 6: Asteroid Impact 2028: protection (video credit: ESA) • • April 2019: For the first time through social media, ESA covers a major international asteroid impact exercise highlighting the efforts of scientists, space agencies and civil protection organizations. 9) - Every two years, asteroid experts from around the world gather to simulate a fictional but credible immediate asteroid impact on Earth. During the ongoing scenario of the week, participants – such as the national government, space agency, astronomer and civil protection agency – do not know how the situation will develop day after day and must make plans based on the daily updates they are given. - For the first time, ESA will cover the progress of the hypothetical impact scenario from 29 April to 3 May @esaoperations of 29 April 2005. - The exercise will be produced by experts from NASA's Office of Planetary Defense Coordination, working with the U.S. Federal Emergency Management Agency at the 2019 Planetary Defense Conference in Washington DC. The conference is the world's most important gathering of asteroid experts and is strongly supported by ESA, NASA and other agencies, organizations and scientific institutions. The first step to protecting our planet is to know what is out there, says Rüdiger Jehn, Director of Planetary Defense at THE ENA. - Only then, with sufficient warning, can we take the necessary steps to prevent the impact of the asteroid completely or to minimise the damage it causes on Earth. 20,000 asteroid milestones - Since April 2019, 20,000 asteroids have been discovered whose orbit brings them close to Earth. Currently, about 150 new discoveries per month, this number is growing rapidly. - With the planned deployment of ESA's new Flyeye and Test-Bed telescopes, Europe's ability to discover, strengthen and understand ancient rocks passing through space is growing – which is essential for mitigating measures. Figure 7: Asteroid Itokawa visualization. This artist's impression, based on detailed spacecraft observations, shows the strange peanut-shaped asteroid Itokawa. By conducting highly accurate timing measurements using ESO's New Technology Telescope, a team of astronomers has found that different parts of this asteroid have different densities. In addition to revealing secrets about the formation of an asteroid, revealing information beneath the surface of asteroids can also shed light on what happens when bodies collide in the Solar System, and give clues as to how planets form [video credit: JAXA, ESO/L. Calçada/M. Kornmesser/Nick Risinger (skysurvey.org),Published April 26, 2017] Follow an asteroid impact exercise live - @esaoperations Twitter channel shares updates on the asteroid's impact exercise in real time, including daily press releases revealing how the asteroid the scenario evolves, so followers find out the news as experts do. Figure 8: Estimated risk corridor for the impact of a hypothetical asteroid. The graphic shows the hypothetical collision risk corridor of the Asteroid 2019 Planetary Defense Conference (PDC) when its orbit is still not fully known (image credit: 2019 PDC Exercise) Legend figure 8: The uncertainty zone of the asteroid at the time of a possible impact is much longer than earth's diameter, but its width is only about 70 km (45 miles). The confluence of the uncertainty area with Earth creates a so-called risk corridor over earth's surface. The corridor wraps over the middle of the globe, stretching from Hawaii at the western end, across the United States and the Atlantic Ocean, and at the eastern end as far north as central and southern Africa. The red prettys in the Google Earth image trace the risk aisle. On Esa's Facebook, you can participate in two live streaming videos directly from the Planetary Defense Conference. The first is on Sunday 28 April. 2pm CEST (08:00 EDT) with ENA's Director of Planetary Defence Rüdiger Jehn and another on Thursday 2 May. around noon European time. Daily updates on the asteroid crash scenario can be found on the ENA Rocket Science blog on the ENA Rocket Science blog, which begins on the first day of the conference on Monday, April 29. Asteroid 2019 PDC hypothetical impact scenario: The scene is set for this year's hypothetical impact scenario. Although realistic, it is completely fictional and does not represent the actual asteroid effect. • The asteroid was discovered on March 26, 2019, and was named '2019 PDC' by minor planet center. • Very little is known about the physical characteristics of this newly discovered asteroid. Magnitude (brightness) 21.1 – invisible to the naked eye, but viewable by professional astronomers – can be classified as a potentially dangerous asteroid, and experts have determined that its average size can be anywhere from 100 to 300 meters. • After the discovery of the 2019 PDC, ESA and NASA impact control systems identified several future dates when the asteroid could hit Earth. At this early stage, when not many observations have yet been recorded, both systems agreed that the asteroid is most likely to strike on April 29, 2027 – more than eight years away – and the probability of an impact is about one in 50,000. • Astronomers continued to monitor the asteroid for a month after its first detection, which gave them more information about the target's trajectory, and have now found that the chance of an impact is growing rapidly. By April 29, 2019 (day one of the Planetary Defense Conference), the probability of an attack has risen to 1:100. ESA coordinates European action The Planetary Defence Conference is the sixth such conference organised by the International Astronauty Academy (IAA); and ESA has been closely involved in all of them. In accordance with previous years, ESA sponsors the event and co-chairs the conference. A large number of ESA experts are also present, including members of the agency's Middle-Earth Target Coordination Center and the Hera asteroid's bending mission. During the hypothetical asteroid impact scenario, ESA experts will participate in discussions on the potential risks of the asteroid 2019 PDC and what answers might be considered. Fortunately, the effects of medium-sized and large asteroids are not very common, explains Detlef Koschny, senior asteroid expert at ECA, who participates in the hypothetical scenario. This means, however, that we have little chance of practicing our response to this very real – albeit unlikely – danger. This year's impact scenario is a very unique opportunity to drive through an asteroid impact in real time. Figure 9: The ESA-designed Hera mission will test asteroid bending techniques. With a laser tester, Hera scans didymoon's surface. Esa's Hera mission concept currently under investigation would be mankind's first mission to a binary asteroid: Didymos, which is 780 meters in diameter in diameter, is followed by a secondary hull 160 meters in diameter (image credit: ESA - ScienceOffice.org) Space security at ESA Solar activity, asteroids and artificial space debris are all threats to our planet and space use. SA's space security efforts aim to secure the society and critical satellites on which we depend by identifying and mitigating threats from space, for example through Flyeye telescopes, the Lagrange space weather mission and the Hera asteroid mission. As asteroid experts gather for the International Planetary Defense Conference, ESA focuses on the threat of space rocks. How likely is an asteroid impact? What is ESA doing to reduce the risks of impact? Follow the hashtag #PlanetaryDefense more information. Figure 10: As we learn more about the glorious scale and nature of the universe, the earth's blue oceans, green forests and glittering city lights look even more unique and even more fragile. Many dangers from space have been identified that are unlikely, but which continue to pose real dangers to our way of life and, in the worst cases, to human health and safety. It is only in recent decades that we have had the opportunity to understand the potential dangers of our position in our solar system, and as technologies progress, we are entering a time when we can actually act. As technologies evolve, so does our dependence makes us more vulnerable to threats from both man and nature in space. Read more about ESA's space security activities here (image credit: ESA) 1) bug-eyed telescope to locate high-risk asteroids, ESA, September 10, 2014, URL: 2) CGS awarded ESA contract for NEOSTEL – July 2014, CGS, July 2014, URL: 3) Flyeye telescope, ESA, 27 Oct 2016, URL: 4) Flyeye Observatory, ESA, ESA 14 February 2017, URL: 5) Steady Pointing, ESA, 03 May 2018, URL: 6) Flyeye telescopes infographic, ESA operations image of the week, 14 June 20 18, URL: 7) ESA celebrates Asteroid Day 30.6.2019, ESA, 19.6.2019 , URL: 8) Asteroid Impact 2028 : Protecting Our Planet, ESA, Asteroid Impact 2028, April 29, 2019, URL: 9) The day an asteroid might hit, ESA, April 26, 2019, URL: The information compiled and edited in this article was provided by Herbert J. Kramer for its documentation : Earth and Its Environment Observation: Mapping with Missions and Sensors (Springer Verlag) and many other sources after the 4th U.S. - Comments and corrections in this article are always welcome for additional updates (herb.kramer@gmx.net). Asteroid impact exercise ESA coordinates efforts space safety references back to the top

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