'A full picture': Montreal company to use satellites to prevent space junk

collisions Jackie Dunham CTVNews.ca Writer

According to Newscaf.com there are roughly 130 million pieces of space debris orbiting Earth's atmosphere. The majority of the space debris is in the upper atmosphere called the thermosphere (the layer in the Earth's atmosphere directly above the mesosphere and below the exosphere.) (NASA, n.d.-b) The world (specifically, the US Air Force) tracks only the biggest ones, about 22,300 pieces of debris larger than 10 centimeters (four inches), since they pose the biggest threat (Dunham, 2020). With this number increasing daily, the concern for space collisions with satellites and space debris is also on the rise. Humans are reliant more today than ever on the satellites that orbit around the Earth. Telecommunications, GPS, and weather forecasting are just a few of the ways we are dependent on them. We receive daily if not hourly or even by the minute communications and would be put into chaos if they stopped working. NorthStar Earth and Space have plans to launch a series of satellites equipped with telescopes to detect and track space debris. By being in space they will avoid problems of ground-based telescopes used to track space junk. They will not have to deal with clouds or inclement weather and will be closer to the object. They will be able to have a better view of what is in orbit around the Earth and allow them to provide more accurate information to private and public organizations. They can then make early evasive action to avoid space collision. This information could save billions of dollars in lost equipment. It could also open the door to a company or organization that wants to collect and remove all the garbage that space missions have left

NASA, US and European Partners Launch Mission to Monitor Global Ocean

A joint U.S.-European satellite built to monitor global sea levels lifted off on a SpaceX Falcon 9 rocket from Space Launch Complex 4E at Vandenberg Air Force Base in California Saturday at 9:17 a.m. PST (Potter, S, 2020), on board this rocket was the Sentinel-6 Michael Freilich satellite. The satellite will monitor conditions in the hydrosphere (the total amount of water on a planet.) (NASA, n.d.-b) and atmosphere (a layer or a set of layers of gases surrounding a planet). It will provide a continuous stream of data that has been being collected since 1992. Sentinel-6 will gather data on changing sea level, ocean currents and conditions. This cycling of water is intimately linked with energy exchanges among the Atmosphere, Cryosphere, Hydrosphere, and Geosphere (*My NASA Data*, n.d.). The information gathered will be used in improve short term 2-4-week (hurricane intensity) and long term (El Niño) weather forecasts. (NASA Jet Propulsion Laboratory, n.d.) The Copernicus Programme (Copernicus EU, 2016, 03:15–05:21) managed by the European Commission will use the data collected from the Sentinel-6 for critical for climate monitoring and weather forecasting, which will be of unprecedented accuracy. The Copernicus Programme is also partnered with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), and National Oceanic and Atmospheric Administration (NASA Jet Propulsion Laboratory, n.d.) This international collaboration is important to note as it shows how many countries are working together to understand global issues including weather, climate, and climate change.

3 satellites will improve data monitoring of environment, Canada's coasts and a changing Earth

Avery Zingel · CBC News

In June 2019 Canada launched its newest Earth observation satellites. They named them the RADARSAT Constellation Mission (RCM). The RCM is made up of three different satellites that are capable of scanning Earth’s atmosphere, biosphere (includes all life on Earth including life living on the Earth's Geosphere and in Hydrosphere, including humans and all organic

matter that has not yet decomposed), geosphere (associated with solid portions of the Earth. It includes the continental and oceanic crust and all other layers of the Earth's interior.) and hydrosphere (the total amount of water on a planet.) (NASA, n.d.-b) at any time of day, this is an advantage over previously used satellites as well as telescopes on earth. According to the Canadian Space Agency's third generation of satellites are expected to transmit six times more data than now available (“New Canadian Satellites to Improve Data Collections across the North,” 2019). The trio of satellites will work together to provide much faster updates to not only Canada but also to 90% of the world’s surface and the Arctic up to four times a day according to The International Charter Space and Major Disasters Newsletter. The newsletter also states that “the constellation is designed to be effective for maritime surveillance (ice, surface wind, oil pollution and ship monitoring), disaster management (mitigation, warning, response and recovery), ecosystem monitoring (agriculture, wetlands, forestry and coastal change monitoring.” The new “constellation” can provide a much more effective and efficient revisit time as well, 4 hours compared to the 24 days it took the previous model, RADARSAT-2. All previous RADARSAT satellites have been used to assist in relief efforts around the world. The hope is that with the newest technology orbiting our earth, providing much more detailed and time sensitive data then before allow us to respond and be warned of weather systems and other important information earlier than previously capable. The Canadian observation satellites can assist around the world in preparing for natural disasters and assisting with their search and rescue teams afterwards. This trio of satellites launched by Canada have advanced observation abilities far beyond their previous counterparts.

What this demonstrates is that the earth’s spheres do not know borders. The spheres are all changing and there is a need to continually enhance our data collection to reflect these changes. The different sets of data can be used in numerous ways. For example, the ocean levels can be used to discuss how it effects the weather (atmosphere) as well as the geosphere (coast lines). The hydrosphere is directly connected to the other spheres, this connection can be seen in how the ocean and water levels on earth impact the other spheres. Often in life we only see the issues that are visible to us such as pollution and global warming. It is important that we learn about the unintended consequences of our actions even if we cannot

see them. Not only do humans have to deal with keeping our environment in the biosphere liveable and clean, but they(we) also need to be concerned about the other spheres we invade. Just as on Earth, if we forget to look after and respect the places we go, we could lose all the great benefit we gained by going there.

REFERENCES

Canada's newest Earth observation satellites: improved support of disaster relief around the world. (2020). *International Charter Newsletter April 20, 2020, April 20*(20), 7–8. https://disasterscharter.org/documents/10180/14458/International-Charter-Newsletter-20-April-2020.pdf

CBC. (2019, June 11). *New Canadian satellites to improve data collection across the North*. CBC News. https://www.cbc.ca/news/canada/north/canadian-earth-monitoring-satellite-launch-1.5170069

Copernicus EU. (2016, July 1). *What is the Copernicus Programme?* [Video]. YouTube. https://www.youtube.com/watch?v=MGJss4lDaBo

Dunham, J. (2020, November 19). *"A serious danger": Montreal company plans to prevent space collisions using satellites*. CTVNews. https://www.ctvnews.ca/sci-tech/a-full-picture-montreal-company-to-use-satellites-to-prevent-space-junk-collisions-1.5195753

International Charter on Space and Major Disasters. (n.d.). *Home - International Disasters Charter*. Retrieved December 7, 2020, from https://disasterscharter.org/web/guest/home

NASA. (n.d.-b). *My NASA Data*. My NASA Data. Retrieved December 11, 2020, from https://mynasadata.larc.nasa.gov/

NASA. (2019, July 1). *Space Debris*. https://www.nasa.gov/centers/hq/library/find/bibliographies/space_debris/

NASA Jet Propulsion Laboratory. (n.d.). *Summary | Jason-CS (Sentinel 6)* –. Ocean Surface Topography from Space. Retrieved December 7, 2020, from https://sealevel.jpl.nasa.gov/missions/jason-cs-sentinel-6/summary/

Potter, S. (2020, November 21). *NASA, US and European Partners Launch Mission to Monitor Global Ocean*. NASA. https://www.nasa.gov/press-release/nasa-us-and-european-partners-launch-mission-to-monitor-global-ocean/

This company wants to deal with space junk by… sending more stuff into space. (2016, August 16). Newscaf.Com. https://www.newscaf.com/technology/this-company-wants-to-deal-with-space-junk-by_1194848.html

What is the RCM? (2019, June 12). Canada.Ca. https://asc-csa.gc.ca/eng/satellites/radarsat/what-is-rcm.asp