1NR Blocks

A2 Debris

1] Space debris is non-unique and will continue to be generated as countries test launch anti-satellite missiles

Rincon & Amos 21. Paul Rincon is a British journalist specialising in science and technology. Jonathan has been a science correspondent with the BBC since 1994. Rincon, Paul, and Jonathan Amos. "Russian Anti-Satellite Test Adds to Worsening Problem of Space Debris." BBC News, BBC, 16 Nov. 2021, https://www.bbc.com/news/science-environment-59307862.

Russia has carried out a missile test, destroying one of its own satellites. The action has caused international outrage because the debris could threaten the International Space Station (ISS) and satellites in low-Earth orbit. Russia's test of an anti-satellite (A-Sat) missile system is not the first of its kind. Back in 2007, **China** tested its own missile system against one of its own weather satellites in orbit. The explosion created more than **3,000** pieces of debris the size of a golf ball or larger - and more than **100,000** much smaller pieces. Of the orbiting fragments considered a threat to the ISS, about **a third** are from this Chinese test. And at the speeds these objects travel in orbit, even small pieces can threaten spacecraft with destruction. The A-Sat tests fit into the wider issue of space debris, which is being made worse by our continued activities in space. There is now a wild jungle of junk overhead - everything from old rocket stages that continue to loop around the Earth decades after they were launched, to the flecks of paint that have lifted off once shiny space vehicles and floated off into the distance.

2] Turn: Companies have incentive to recycle space debris for profit

Roosegaarde 18. Daan Roosegaarde is a Dutch artist and innovator. Roosegaarde, Daan. "Here's How We Can Put All of Humanity's Space Debris to Good Use." WIRED UK, WIRED UK, 29 Dec. 2018, https://www.wired.co.uk/article/space-debris-clean-up.

Nations and private enterprise are already beginning to address the problem in practical ways. Luxembourg is planning a startup sector that will harvest and recycle space waste. CisLunar Industries, which is based there, plans to begin reprocessing space debris into metals for reuse in new space equipment. The company will develop and operate a group of orbital platforms called "space foundries" that will recycle space debris and non-functioning spacecraft to produce refined metal and salvaged components. It will achieve its long-term objectives through a steady progression: from Earth-side prototype to a small-scale space foundry in low-Earth orbit to a full-scale foundry in geosynchronous orbit in under **ten years**.

A2 Rockets Pollute

1] The ozone has recovered: the situation isn't as bad as the Aff puts it

Piper 21. Kelsey Piper is a senior writer at Future Perfect, Vox's effective-altruism-inspired section on the world's biggest challenges. Piper, Kelsey. "The Shrinking Ozone Hole Shows That the World Can Actually Solve an Environmental Crisis." Vox, Vox, 3 Oct. 2021, https://www.vox.com/future-perfect/22686105/future-of-life-ozone-hole-environmental-crisis. Updated October 27, 2022.

Fast-forward to today: The ozone is on the path to recovery, if not fully restored. New data released on October 26 by NASA indicates that the annual ozone hole over the Antarctic reached an average area of 8.9 million square miles over the past year. That's slightly smaller than last year, and continues a trend toward overall shrinking over the past several years. "Over time, steady progress is being made, and the hole is getting smaller," Paul Newman, chief scientist for earth sciences at NASA's Goddard Space Flight Center, said in a statement. "The elimination of ozone-depleting substances through the Montreal Protocol is shrinking the hole."

2] Turn: Private entities are developing greener ways for space travel, minimizing the impact of climate change

Whittaker 22. Matt Whittaker is a writer for Fortune. Whittaker, Matt. "Meet the Companies Revolutionizing Cleaner Rocket Fuel Alternatives." Fortune, Fortune, 5 Dec. 2022, https://fortune.com/2022/12/05/space-travel-is-heating-up-and-so-are-rocket-fuel-emissions-these-companies-are-developing-cleaner-alternatives-to-protect-earth-first/.

There are several efforts afoot to produce rocket fuel in a more environmentally friendly way. Energy startup Green Hydrogen International is developing a green hydrogen project in South Texas. Researchers at the German Aerospace Center are working on a fuel that only produces nitrogen, oxygen, and water when heated. Canadian company Hyox is developing technology for production of net-zero aviation fuel and rocket propellants that will use low-cost solar power and electrolysis to produce methane and kerosene, both of which can propel rockets into space. New York–based Air Company is working with direct air capture, a technology that removes carbon dioxide from the air. The company mixes that CO_2 with hydrogen made with renewable energy to create Rocket Propellant-1 (RP-1), the type of kerosene used by Space X's Falcon 9 rocket. The process to make the kerosene is not only carbon negative but could one day be replicated on Mars—where the atmosphere largely consists of carbon dioxide—to make fuel for return trips. Thus, the fuel won't have to be carried from earth for missions to the red planet. The company's process removes about 2.8 kilograms of CO_2 from the air per liter of RP-1, while traditional production with fossil fuels emits more than three kilograms of CO_2 per liter, Air Company CEO Gregory Constantine said.