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Defending Earth  
against Asteroids

Upheaval in  
the Arctic

100-Million-Year-Old  
Microbes Resurrected

## ***THE NEXT DEADLY PLAGUE***

The growing worldwide threat  
of fungal disease



Text and Graphic by Katie Peek

**Crewed Space Launches (1961–2020)**

By the end of 2020 humans had crossed into space—a boundary defined here as 80 kilometers above sea level—on 343 different voyages. They appear here on a time line, each as a distinct arc colored by vessel type. Any flight that carried crew across that 80-km line is included—space planes and lunar landers alike.

Arc direction indicates space agency type

- Private enterprises Right-leaning arc
- Government programs Left-leaning arc

Color denotes vessel class

Arc height marks mission destination

- Deep space 2,000 km+
- Low-Earth orbit 250–2,000 km
- Suborbital 80–250 km

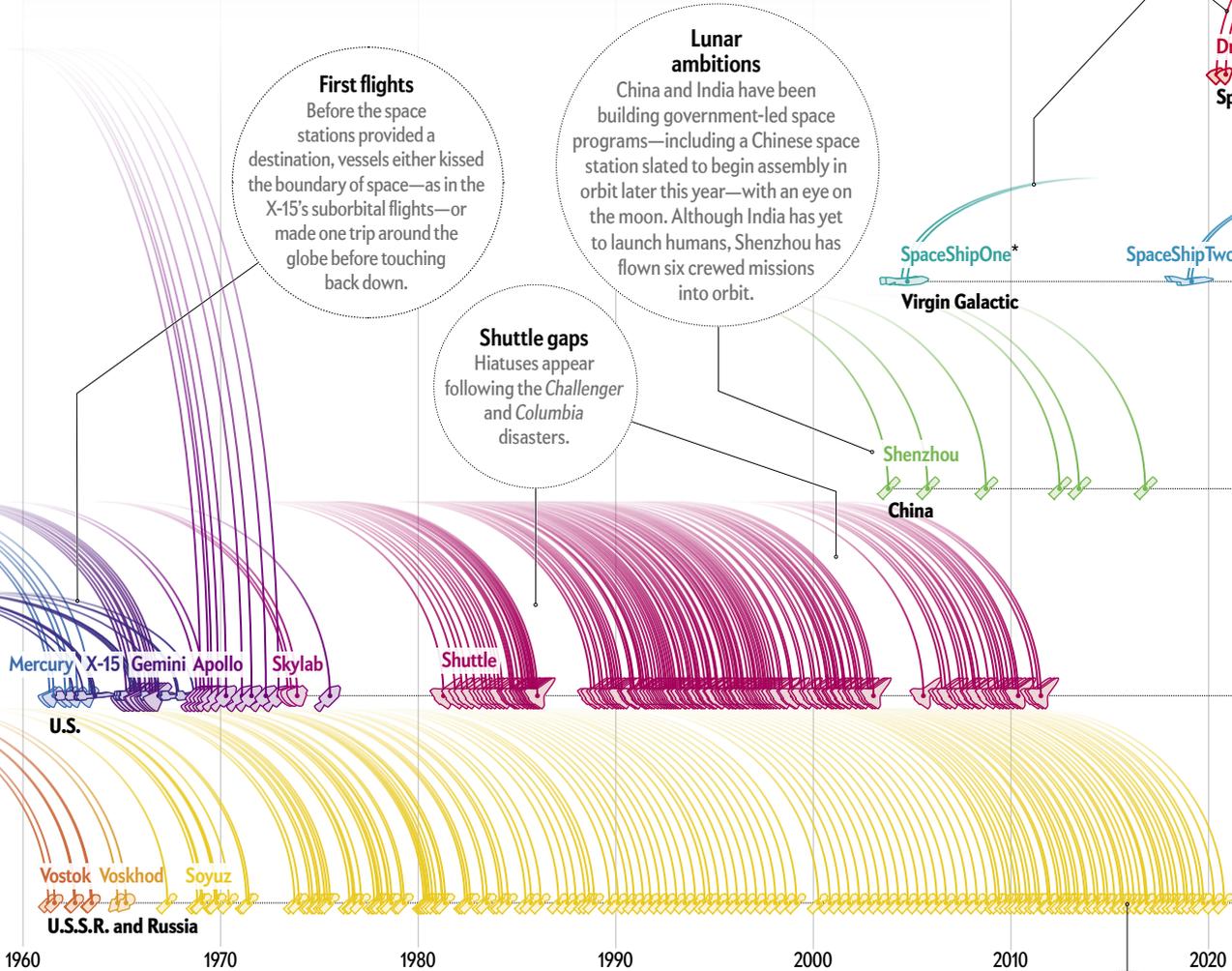
**Private practice**  
Virgin Galactic space planes flew across the boundary to space in the early 2000s. Today SpaceX and Boeing are developing programs that will carry astronauts and tourists to orbit.

**First flights**  
Before the space stations provided a destination, vessels either kissed the boundary of space—as in the X-15's suborbital flights—or made one trip around the globe before touching back down.

**Lunar ambitions**  
China and India have been building government-led space programs—including a Chinese space station slated to begin assembly in orbit later this year—with an eye on the moon. Although India has yet to launch humans, Shenzhou has flown six crewed missions into orbit.

**Shuttle gaps**  
Hiatuses appear following the Challenger and Columbia disasters.

**Soyuz, workhorse**  
The Russian standby has carried humans to orbit 143 times—representing 40 percent of all crewed launches—since its first flight in 1967. Design upgrades have kept Soyuz vessels safe and efficient, although they remain single-use capsules.



# The New Final Frontier

Human spaceflight diversifies

We are entering a new era in sending people beyond Earth. After the Apollo moon program, U.S. space shuttles and Russian Soyuz flights were the only game in town. Those ferries carried astronauts to and from low-Earth orbit, where space stations Skylab, Mir and the ISS hung around the planet. Today there is far more diversity among launchers and destinations, says astronomer Jonathan C. McDowell of the Harvard-Smithsonian Center for Astrophysics. SpaceX, Boeing and other private companies are getting off the ground and plan both astronaut flights and space tourism. Deep-space travel is again on NASA's horizon. "For a long time, U.S. human spaceflight was in postshuttle doldrums," McDowell says. "That's definitely over now."

\*SpaceShipOne was made by Scaled Composites, which was later acquired by Virgin Galactic.