

Space station refuelling craft is out of control and plunging to earth

April 30 2015, by Michael J. I. Brown



An unpiloted Russian Progress vessel used to resupply the International Space Station is similar to the Progress M-27M currently spinning out of control.
Credit: NASA

A Russian spacecraft designed to carry supplies to the [International Space Station](#) is spinning out of control as it orbits Earth.

The Progress M-27M cargo vessel – which thankfully has no crew onboard – was launched from Kazakhstan on Wednesday but soon after things quickly went awry.

Unless control is regained of the stricken spacecraft, it will plunge back to Earth in an uncontrolled re-entry. We may be in for a spectacular and unplanned show of fireworks.

Progress missions

[Progress spacecraft](#) have been regularly ferrying supplies to space stations since 1978. Although the Progress spacecraft are automated and carry no crew, they are based on the [Soyuz crewed spacecraft](#).

Equipment required for crewed spacecraft, such as the vital [heat shield](#), has been stripped from the Progress, so it can carry as much cargo as possible. Progress M-27M was carrying 2,357kg of fuel and supplies up to the International Space Station.

After blasting into space, a Progress spacecraft usually enters orbit below and behind the Space Station. Orbits become progressively slower and longer with increasing altitude, so the initial low orbit allows the Progress to catch up to the Space Station. The Progress then raises its orbit for rendezvous and docking.

Progress M-27M was launched on a [Soyuz rocket](#) (not to be confused with the [Soyuz spacecraft](#)), which has been a workhorse of the Russian (and Soviet) space program since the 1960s.

While the launch initially seemed flawless, communication with the Progress became sporadic just as it reached orbit. Video footage received from the Progress showed it tumbling end-over-end every six seconds.

In a spin



Russian Soyuz (left) and Progress (right) spacecraft docked to the International Space Station. Credit: NASA

Several mishaps could have sent the Progress spinning. In 1966, the [Gemini VIII](#) spacecraft was sent into a violent spin when a rocket thruster didn't shut down. It took Neil Armstrong's renowned piloting skills to save Gemini VIII.

A sudden release of gas or an explosion, either on the Progress or the Soyuz 2-1A rocket, could also have sent the Progress spinning. The US Joint Space Operations Center has detected [44 pieces of debris](#)

associated with the Progress, which could be suggestive of an explosion, although definitive answers will take time.

More technical details on what happened may become available in the coming days, via sites such as RussianSpaceWeb.com.

Currently Progress M-27M is in an orbit roughly 200km above the Earth, and during each orbit it travels between latitudes of 52 degrees north and 52 degrees south (and back). The Earth spins on its axis while the Progress is in orbit, so the Progress travels over much of the Earth's surface throughout the day.

You may get an opportunity to see the tumbling spacecraft. Several websites including N2YO and Heavens Above provide information on when you can spot Progress M-27M from your home. Take care not to confuse the bright International Space Station with the fainter tumbling Progress.

What are the risks?

Progress M-27M cannot collide with the Space Station, as they are at very different altitudes. The Space Station is also stocked with several months of supplies, so the loss of Progress M-27M won't endanger the Space Station crew. Furthermore, supplies can be delivered to the Space Station with [American](#) and [Japanese](#) cargo vessels.

That said, Soyuz spacecraft share technology with the Progress spacecraft, and they are both launched with Soyuz rockets. Until the cause of Progress M-27M's problems are determined, there may be risks associated with flying on the Soyuz.

This may delay the [launches](#) of Soyuz TMA-17M and Soyuz TMA-18M, the later of which will carry singer [Sarah Brightman](#) into orbit.

As the Progress is only 200km above the Earth, there is enough air drag to gradually slow the spacecraft and lower its orbit. In the next week or two, its [orbit](#) will have decayed to 100km and it will re-enter the Earth's atmosphere.

Progress spacecraft are normally disposed of via controlled re-entries over the Pacific. At the time of writing we don't know exactly when or where the Progress will re-enter the Earth's atmosphere, but predictions should [become available soon](#).

That said, the Progress travels at 8km every second, so a two minute error in the re-entry prediction corresponds to 1,000km distance travelled by Progress. It will be hard to predict exactly where the Progress will come back to Earth.

Meanwhile, back on Earth

The big question people are no doubt asking is: does Progress M-27M pose a hazard to us on Earth?

As it lacks a heat shield, most of Progress M-27M will be destroyed and very little of it will reach the Earth's surface. Indeed, many [spacecraft](#) re-enter the atmosphere each year without incident.

Chances are any debris will fall into the ocean or over sparsely populated areas. If we are lucky, a few people may get to safely view a spectacular (and rather expensive) fireworks show.

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