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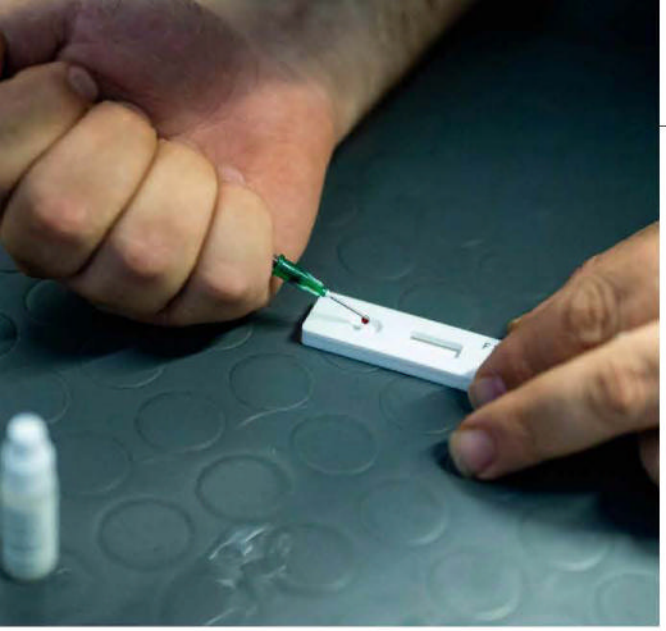

ABOVE Blood tests can diagnose feline infectious peritonitis, a fatal disease that can be caused by the new coronavirus strain

→ of COVID-19. Add cats into the equation, bearing in mind their unpredictable behaviour – roaming widely and socialising freely – and it's not difficult to see how things could escalate very quickly.

At the moment, we're still in the 'monitor and stay alert' phase. It's not outside the realms of possibility that there are unusual drivers involved in the spread of this disease in Cyprus, with its large and genetically distinct population of feral cats.

It's also possible that this coronavirus may not pose the same sort of threat to cat populations in the UK and other countries that don't have the same number and density of feral cats. Pets are, of course, far more likely than feral cats to be taken to the vet and to receive treatment.

That's not something we should rely on, however, and this is definitely a time when we should implement the precautionary principle. Bolstering the rationale for that approach, reports have emerged that the virus is now circulating in mainland Greece and Lebanon, though numbers of infections or deaths are difficult to determine.

Given these latest developments, calls from several commentators to ban the importation of cats to the UK from countries where this virus is circulating seem reasonable.

If you own a cat in the UK that becomes unwell, and if your cat hasn't recently been to Cyprus or been in contact with a cat from Cyprus, your index of suspicion that it has FIP should be quite low at the moment. In other words, it's very unlikely to be infected with this new coronavirus.

Watch this space closely, though. Once again, we may find ourselves waiting for vaccines to be developed to save us – or, in this case, our cats – from a deadly disease.

by **PROF HASSAN VALLY**
Hassan is an epidemiologist based at Deakin University, Australia, where he investigates responses to disease outbreaks and epidemics.

COMMENT

WOODEN SATELLITES: LIGNOSAT PROJECT MAY REDUCE SPACE JUNK

US and Japanese space agencies are teaming up to launch lumber in an effort to reduce space litter

In 1957, the first human-made object successfully launched into space was placed in orbit around Earth. This was Sputnik 1, a beautifully simple, Soviet-made spherical satellite with just four antennas.

But this historic event also marked another, more unsettling first: humanity had deposited its first piece of space debris. Part of the 267-tonne, 30m-tall rocket that launched Sputnik was stuck in orbit. Suddenly the world had a problem that we didn't know we needed to solve: the littering of outer space.

Thankfully, Sputnik and that rocket remnant de-orbited and burned up in our atmosphere fairly quickly after launch. That hasn't always been the case, however – far from it. Over the course of just 66 years of space exploration, a vast amount of detritus has been left in orbit around Earth.

Now NASA and the Japan Aerospace Exploration Agency (JAXA) have an idea to help solve this issue: satellites made from a widely available, biodegradable material – wood.

The problem the agencies aim to address is a big and complex one – and finding out just how big was the first stage of the project. We know that at least 130 million pieces of human-made debris orbit Earth, most of them whizzing around at over 7km/s – eight times faster than a typical bullet. Although that's a staggering number, some scientists think it's a conservative estimate.

Most objects sent into space stay there until they either de-orbit and burn up during re-entry, or are moved away from Earth and pulled into a graveyard orbit where they'll circle for hundreds of years. The majority of such objects are actually very small – less than 1cm (0.3in) wide – from chips of paint to small bits of electronics and fragments of insulation foam or aluminium. This tiny debris can't be seen from Earth, even with powerful telescopes. So we must look for the evidence it leaves behind when colliding with other objects in space. This is no easy task.

Work on evaluating the scope of this issue began in earnest after five special objects repeatedly went into orbit and returned home: the NASA Space Shuttles. Between 1981 and 2011, NASA launched 135 shuttle missions. After each shuttle returned to Earth, it was evaluated to identify any damage caused by orbiting debris, enabling NASA to get a clearer picture of the problem of small bits of defunct spacecraft flying through space.

NASA scientists found that small pieces of debris, only millimetres across, could create small, but powerful impacts

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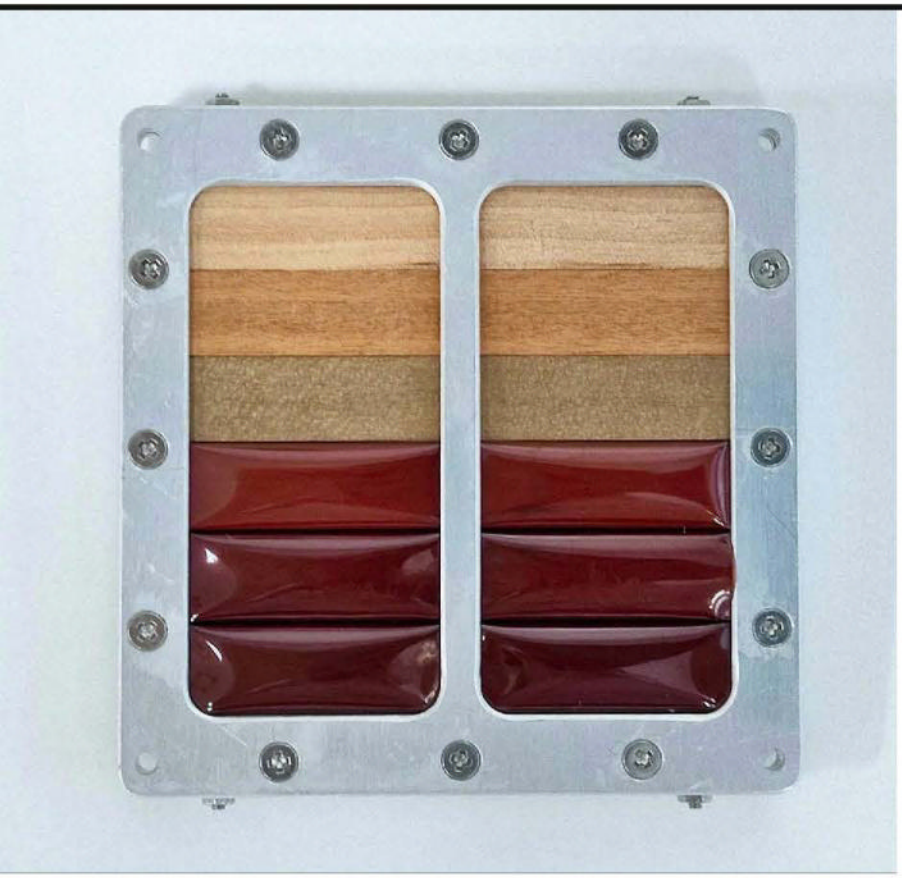
“Another upside to wooden satellites is their reflectivity or, rather, lack of it”



and produced the first estimates of just how bad the debris environment was becoming.

Earlier, in 1978, NASA scientists Don Kessler and Burton Cour-Palais had proposed a scenario named the Kessler Syndrome. The phenomenon they mooted is a catastrophic chain of events triggered by a satellite getting splintered by a piece of space junk. The debris created destroys more satellites, producing yet more junk, and so on, in a never-ending cascade.

Clearly, this is a huge issue. So how do we slow the rate of debris creation, or eliminate it altogether? Solutions proposed include de-orbiting spacecraft within five years of launch, using radiation-hard materials (less susceptible to damage from exposure to high levels of radiation and extreme temperatures) and launching with reusable rockets.

ABOVE
The durability of various types of wood was tested in 2022 on the International Space Station. Magnolia proved most suitable for making satellites

Or we could try wooden satellites. LignoSat, as NASA and JAXA’s project is named, is a 10 x 10 x 10cm (4 x 4 x 4in approx) wooden box constructed using traditional Japanese joinery techniques to house electronics and other materials required for a space mission – much like current CubeSats.

Wood samples were tested for suitability on the Japanese Experiment Module Kibo of the International Space Station for over 290 days in 2022. Magnolia performed best, coping well when bombarded with intense cosmic rays and subjected to extreme temperature changes in that harsh environment. It doesn’t rot, crack or deform, and has the critical property of burning up into a fine ash when it re-enters the atmosphere, leaving behind little debris.

Another upside to wooden satellites is their reflectivity – or, rather, lack of it. Currently, reflections from aluminium satellites can be extremely bright, spotted easily by the naked eye from Earth. Crucially, this reflected light can reach sensitive areas and interfere with astronomical observations.

The test launch of the LignoSat is currently pencilled in for 2024. If successful, it could pave the way for further missions. So will all satellites be made from wood in the near future? Unfortunately, it’s unlikely. Most satellites are privately owned so, unless large companies quickly embrace this new technology, it’s unlikely to be widely adopted. In addition, it might not be suitable for certain types of satellites – those carrying sensitive scientific equipment that needs significant radiation shielding, for example.

On the plus side, projects such as this encourage researchers to think outside the box, and could have more impacts down the line. If LignoSat is successful, more research groups may try implementing biodegradable materials in an effort to curb the creation of more debris.

For now, however, we must work to track as many objects in orbit around Earth as possible, to mitigate future collisions with material in space. **SF**

by **DR SARA WEBB**
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