



**Richard Maxwell, Ph.D. and Toby Miller, Ph.D.**  
Greening the Media

# Litterbugs in Outer Space

Space exploration needs to clean up its act, or it will fail abjectly

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Much is being made in China about its second space station, Tiangong 2 (“Heavenly Vessel 2”), following the launch last month of a massive, unmanned space freighter, the Tianzhou 1, which will automatically dock and deliver supplies for the station’s ongoing construction and eventual operation (anticipated for 2020).<sup>1</sup>

Successive Tianzhou will also deposit food, water, and fuel, then depart, carrying waste that will be tossed into the Earth’s atmosphere and burn up. Before each Tianzhou descends toward atmospheric destruction, it will conduct experiments and tests, which may also be part of a military project to track the motion of nuclear-powered submarines.<sup>2</sup> The plan furthers China’s independence from technology developed in Europe and the US. It is strategically important as a route towards becoming a superpower.<sup>3</sup>

Referencing the divine in Chinese space craft names is not unusual in the rhetoric of space exploration.<sup>4</sup> And like the former endeavors of spacefaring nations, the latest Chinese space station elicits some romantic fantasies: the colonization of a new world that can form an apolitical utopia; a site for self-reinvention without the constraints of earthly origins; and even a solution to population and environmental issues.

But real space exploration is rather more prosaic, and is yet to live up to such metaphysical niceties. Dreams of transcendence have been continuously disrupted by military-industrial rivalries, techno-scientific arrogance, and regulatory incoherence.

We can illustrate this point by looking at the extraterrestrial pollution of space created by humans.

A mountain of debris has accumulated since the launch of the first satellite in 1957, most of it since the 1980s, when the satellite industry was deregulated, commercial interests prospered, and direct-satellite broadcasting won customers away from cable. A “debris belt,” predicted in the 1970s, now encircles the planet.

There are about 7,000 tons of space junk in that belt, orbiting around us at thousands of miles an hour—everything from “flecks of paint and used rockets, to dead satellites and debris from past collisions of space junk.” A space station could be destroyed if it collided with a tiny bit of this detritus, communications satellites that carry TV and internet signals are vulnerable, and technologies for observing weather and monitoring disasters are also at stake.<sup>5</sup>

This year’s European Conference on Space Debris made the point very clearly: “Since 1957, more than 4,900 space launches have led to an on-orbit population today of more than 18,000 tracked objects. Only 1,100 are functional spacecraft. The remaining 94% are space debris, i.e. objects that no longer serve any useful purpose. About 64% of the routinely tracked objects are fragments from some 250 breakups, explosions and collisions of satellites or rocket bodies. In addition, there is evidence of a much larger population of debris that cannot be tracked operationally. An estimated number of 700,000 objects larger than 1 cm and 170 million objects larger than 1mm are expected to reside in earth orbits”<sup>6</sup>

If we don't mitigate the space junk problem, the risks of even leaving our own atmosphere may soon be unacceptably high.<sup>7</sup> We must alter the way we think about outer space by acknowledging the disastrous role our historic romance with space exploration has played. What are the roots of that romantic attachment?

In his famous 1962 speech at Rice University, President John F. Kennedy spoke passionately of scientific knowledge and its apparent peak in space technology: "This is a breathtaking pace, and such a pace cannot help but create new ills as it dispels old, new ignorance, new problems, new dangers. Surely the opening vistas of space promise high costs and hardships, as well as high reward. ... the United States was not built by those who waited and rested and wished to look behind them. This country was conquered by those who moved forward—and so will space" <sup>8</sup>

Today, the seeming high-mindedness of JFK's speech cannot be read without recognizing its undertones of manifest destiny—the expansionist ideology used to justify imperial US aspirations. (After all, the framing metaphor of his administration was 'The New Frontier').

The space program inherited key characteristics of this ideology: the language of conquest; the dispossession of Native Americans; and the implied racial superiority (things most of us abjure today—though perhaps not some recent visitors to the White House).<sup>9</sup>

And pride in human achievement has made it easy to forget the habitats destroyed in the name of progress and growth. Consider the hubris that built so many technologies, from the transcontinental US railroad to our space program, to the detriment of non-human nature.

The challenge of exploration, of the unknown, of newness, which engages us so powerfully, is not worth it if we can't learn from the mistakes of our rapacious past and proceed with caution and care.

Unfortunately, modern legal tools that help us reduce litter on the ground are not available in space. The treaties that underpin current space law make it difficult to design and implement a workable space-junk reduction program. Unlike flotsam floating in international waters under maritime law, space debris cannot be gathered by random scavenging.<sup>10</sup>

Without international cooperation, proprietary rules and national security apply. This extends to intellectual property rights over the technological debris—hands off my stuff. But that said, liability is hard to determine when one nation's spacefaring debris rams into another's working spacecraft. It would be like trying to figure out who's responsible for each piece of plastic floating in the great Pacific garbage patch.<sup>11</sup>

Before contemporary space law was written, JFK said "space science, like nuclear science and all technology, has no conscience of its own." Following the resolution of the Cuban missile crisis, he even told the UN that "[s]pace offers no problems of sovereignty" in announcing a new era of cooperation with the Soviet Union.<sup>12</sup> But problems of sovereignty persist, as space junk shows us. This is bound to become even more complicated as private corporations and non-governmental organizations enter the space business.<sup>13</sup>

The utopia of a new world in space that can elude the hierarchies and empires of the old seems very far away indeed when we've almost destroyed access to it.

Our desires for innovation, exploration, discovery, and all those exciting concepts need to be tempered by an appreciation of the damage done in the past by human arrogance, from dispossession of indigenous peoples to thoughtless space pollution.

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2. <https://www.nasaspaceflight.com/2017/04/tianzhou-1-china-debut-cargo-res-...>
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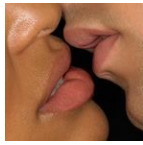
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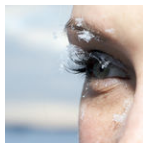
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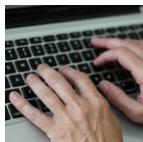
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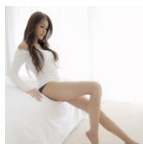
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