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**Reportage #2**

**The ‘Unknown World’ Above Our Heads**

**by John Devine**

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*Satellites hang above us, silent and steady, like watchful sentinels at night. They map the vast oceans, track storms, and guide lost*

*ships to safe harbours. Their eyes see what we cannot—mountains hidden under clouds, the shifting of deserts, the pulse of the Earth's green heart. They are the unsung heroes of modern life, unseen but vital, connecting voices across the world, delivering news from distant lands, and warning of dangers yet to come. In their quiet, tireless orbit, they remind us of the tininess of our own lives and the grandeur of the world we inhabit.*

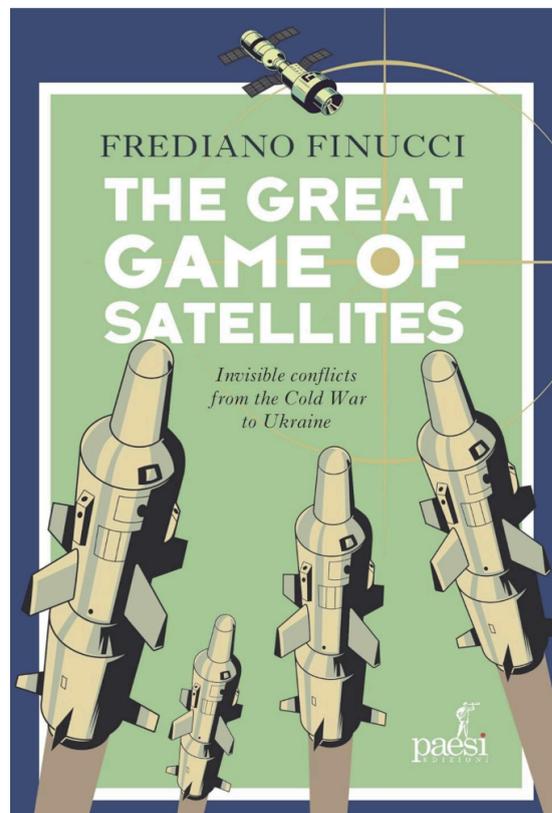
Whenever I go to a new city, I give myself the courtesy of getting lost entirely. It's a simple pleasure. Whether it be in London, Verona, or anywhere else I have yet to pay heed to the street I have just turned onto or where I am heading. I am safe knowing that with just a click of my phone, I can open an app that can direct me back to my hotel. Yet, I had never honestly considered the technological marvel that had just occurred thousands of kilometres above my head.

With over 30 Global Positioning System (GPS) satellites orbiting our planet, my phone's GPS receiver has listened to a signal, determined my location with the help of 4 satellites, and determined my location within a 4.9-meter radius anywhere in the world. This *small* act is just one of an uncountable number that many will let go unnoticed or, worse, take for granted. And yet, despite the whole swathe of other services which utilise satellites, from communications to

searches on our smartphones, how many of us genuinely have pondered this technological marvel that is right above our heads? Probably wager very few. We are content to go about our days with no regard to thinking about it.

This was different for Frediano Finucci. In the spring of 2020, while most of us were under lockdown due to the COVID-19 pandemic, people found ways to pass the time. Many turned to their screens to binge-watch TV shows, but Frediano looked up at the sky and wondered what was flying overhead. On a clear night, he saw light spots moving across the blackness—satellites.

Frediano enrolled in an open university course to learn more about what he called 'an unknown world.' It made him deeply engrossed in the world above our heads. He wrote a book that does more than explain. It shows the reader the crucial role



of satellites in wars over the past forty years and their growing importance in the wars to come. *Operazione satellite. I Conflitti invisibili dalla Guerra Fredda all'Ucraina* (Operation Satellite: The Invisible Conflicts from The Cold War to Ukraine) helps explain the world and the coming wars above our heads. For the 'unknown' world goes well beyond opening maps. Frediano discovered a world of satellites, missing articles, and cautious strategists as he learned more about these tools, which are invaluable to military strategists and generals worldwide.

Satellite warfare is a vital part of modern military strategy. It focuses on controlling and manipulating space-based assets—communication, navigation, surveillance, and weather satellites—crucial for civilian and military operations. As our dependence on satellites has grown, so has the push to develop technologies to protect or destroy them. Satellite warfare includes anti-satellite weapons, cyber-attacks, electronic warfare, and space platforms for offence and defence. It's a new battlefield, high above, silent but deadly.

Take, for example, the response to the Russian annexation of Crimea in 2014. Not only was it not enough for the Russian authorities to show to the world that they had the support of the population of Crimea behind them, but the day after the referendum, an article published by CNN on their website was published with an anonymous source from the US air force official stating that Russian satellites were moving into proximity US satellites, putting the US Air Force into a state of alert. The article was then quickly removed. It could not be found on CNN or

any other website. Now, using Chat GPT and some specific word choices, Frediano could find the original article's IP address. Through its daily fishing of articles, chat GPT was able to recover the article. Now, for whatever reason, purpose behind the removal of the article is anyone's guess. Frediano theorises that the US administration at the time requested that the article be pulled down. But why?

Two weeks later, GLONASS (The Russian equivalent of GPS) went down. The once reliable satellites signals were scrambled, skewing positions, for thirteen hours. This was not only inconvenient for anyone wanting to find their way back to a hotel room, but this silent assault left the Russian military blind and confused. The attack did not come with guns or tanks but lines of code, striking from the shadows. The Russian authorities played down the disruption of the system. As Frediano states, this required special military tools and was the first of its kind. What this tool was and is remains unknown, but as Obama said when referring to the US response to Russia's annexation of Crimea in 2014: "We used the tools we had at that time."<sup>1</sup> As Frediano said, "If you consider America did nothing, except sanctions, they did nothing against the Russians. This leads me to question what other tools he meant."

Space has become a new battleground where the most minor disruption could have the most extraordinary consequences. Anti-satellite weapons, including

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<sup>1</sup> Nick Robertson, "Obama Defends 2014 Crimea Response: 'We Challenged Putin with the Tools We Had at the Time,'" The Hill, June 23, 2023, [https://thehill.com/blogs/blog-briefing-room/40639-39-obama-defends-2014-crimea-response-in-cnn-interview/#:~:text=Obama%20said%20that%20the%20sense,Ukraine%20was%2C"%20he%20said](https://thehill.com/blogs/blog-briefing-room/40639-39-obama-defends-2014-crimea-response-in-cnn-interview/#:~:text=Obama%20said%20that%20the%20sense,Ukraine%20was%2C).

ground-based missiles, directed-energy weapons, and satellite-on-satellite combat systems, are designed to destroy or incapacitate enemy satellites. Cyber-attacks, another form of satellite warfare, involve hacking into satellite control systems to disrupt operations or steal sensitive data for instance, Frediano's theory on GLONASS illustrates this. Electronic warfare tactics can jam (using microwaves, just like in our kitchen microwaves but far more powerful, as was seen when the Russians jammed GPS in 2018 during a NATO exercise)<sup>2</sup> or spoof satellite signals, causing disruptions in communication and navigation services crucial for military coordination.



Northern lights, the aurora borealis, and a satellite gazing

The implications of satellite warfare extend far beyond technology and military strategy. They have profound geopolitical implications. Major spacefaring nations like the United States, Russia, and China invest heavily in developing ASAT

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<sup>2</sup> Stan Goff, "Russia Jammed GPS Signals during NATO Military Exercise Involving US Troops," Inside GNSS - Global Navigation Satellite Systems Engineering, Policy, and Design, November 14, 2018, <https://insidegnss.com/russia-jammed-gps-signals-during-nato-military-exercise-involving-us-troops/>.

capabilities and countermeasures leading to a delicate balance of power in space, reminiscent of the Cold War nuclear arms race. The strategic importance of maintaining the operational integrity of satellite networks means that any conflict in space could have significant repercussions on global security and the functionality of critical infrastructure.

Moreover, the potential for debris creation from destroyed satellites poses a long-term threat to space operations. The cascading effect, known as the Kessler Syndrome, could render space increasingly hazardous, impacting all spacefaring activities. As nations navigate this new frontier, establishing international norms and treaties for warfare in space is becoming increasingly urgent to prevent escalations that could lead to uncontrollable consequences.

Yet not only the militaries and politicians worldwide have their say in satellite matters. The skies that had once been the domains of nations now host private enterprises with ambitions as vast as the cosmos. While the US remained the top dog with nearly 3,000 satellites in orbit, a new titan had emerged.<sup>3</sup> SpaceX, as of May 24th, 2024, had launched over 6,505 satellites, with 5,991 in operation.<sup>4</sup> These satellites were more than mere objects in

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<sup>3</sup> Ieva, "How Many Satellites Are in Space?," NanoAvionics, May 4, 2024, <https://nanoavionics.com/blog/how-many-satellites-are-in-space/#:~:text=As%20of%20March%207th%202024,to%20dominate%20low%20Earth%20orbit>.

<sup>4</sup> Mike Wall, "SpaceX Launches 23 Starlink Satellites from Florida on May 28," Space.com, May 27, 2024, <https://www.space.com/spacex-starlink-launch-group-6-60#:~:text=Tuesday's%20launch%20was%20SpaceX's%2053rd,of%20nearly%206%2C000%20operational%20satellites>.

the sky; they were lifelines, and nowhere was this more evident than in the defence of Ukraine.

The Russian invasion of Ukraine was swift and brutal. Chaos reigned, and within 48 hours, the deputy prime minister of Ukraine sent a plea into the digital void. He tweeted Elon Musk for Starlink satellites' control panels and dishes. And Musk, the man with his eyes on the stars and his feet firmly planted in the realities of business and war, responded. The equipment arrived on the battlefield as if by some miracle of modern logistics.<sup>5</sup>

How can a truck with Starlink control panels and dishes get into a warzone? It seemed impossible, yet it happened. As Frediano said: "You plan it." It took weeks of preparation, clandestine routes, and covert operations to get the Ukrainian forces the relevant dishes and communications equipment. These dishes, connecting to the Starlink satellites above, became the arteries through which information flowed, keeping the Ukrainian resistance alive and coordinated.

But in war, nothing goes unnoticed. The Russian forces, keen to sever these vital links, targeted the dishes and, in some instances, used them for their communications when they captured the comms equipment. They knew that to blind the enemy, first cut their lines of communication. Yet the satellites themselves, high above the Earth and owned by a private company, presented a different question. Could they be considered legitimate targets? The answer

seems inevitable in the brutal logic of war, where every advantage is sought, and every asset is fair game.

These were not mere tools of commerce, but instruments of war woven into the fabric of the conflict. The implications were profound. The lines between civilian and combatant blurred by exporting battlefield communications to a private individual. What did it mean for the future of warfare when the tools of war were not solely in the hands of nations but of private companies and individuals?

Elon Musk, a man of industry and innovation, a genius to Frediano, found himself at the heart of this new kind of war. His satellites now played a pivotal role in a nation's fight for survival. The battlefield had expanded, stretching from the muddy trenches and bombed-out buildings of Ukraine to the cold vacuum of space. In this new theatre of war, satellites were no longer passive observers but active participants, their fates intertwined with the soldiers below. And without them, little can happen. Take, for example, the request of Ukrainian forces to launch an offensive attack into Crimea in the Autumn of 2023. Without Starlink, the operation could not have gone ahead.<sup>6</sup> The necessity of Satellites has made the lack of them unfathomable.

Thus, the development of many regional Global Navigational System Systems (GNSS) to give strategic antimony for countries around the world is an imperative. The European Galileo system was launched in 2016 by the EU and the

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<sup>5</sup> Mykhailo Fedorov, "X.Com," X (formerly Twitter), February 26, 2022, <https://x.com/FedorovMykhailo/status/1498392515262746630>.

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<sup>6</sup> Thomas Fazi, "Elon Musk Hasn't Betrayed Ukraine," UnHerd, September 19, 2023, <https://unherd.com/2023/09/elon-musk-hasnt-betrayed-ukraine/>.

European Space Agency. BeiDou, operated by the Chinese Space Administration. Each to ensure their reliable system.

In the end, the questions of legitimacy and ownership gave way to the stark realities of war. Like the men and women they served, the satellites were part of the struggle. It is modern warfare, and states need to be ready. A phrase which was repeated to Frediano during his research for the book was 'Pearl Harbour'. Experts are terrified of this scenario in space. As Frediano said: "If you start a war in space, it is going to be a mess."

Yet, the advent of wide satellite use does not need to be all worrisome and bellicose. The democratisation of satellites is occurring like never before. For instance, for those who can afford to pay 100 euros you can subscribe to a satellite service and observe events around the world. People can follow events going on on the ground worldwide to follow events and from observing troop movements, checking on forced labour, and preventing human rights violations.

However, Frediano is still determining whether it will be positive or negative for the world. "We can only see on the surface; we cannot see underneath." Frediano's insights remind us of the delicate balance of power in space and the far-reaching consequences of our reliance on satellites. As we look to the skies, navigating this new frontier wisely is crucial, ensuring that space remains a realm of opportunity and security for all.

May, 2024

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