ACCESSORY TO WAR — A Brief Book Talk by Author #2

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ACCESSORY TO WAR: The Unspoken Alliance Between Astrophysics and the Military, is about the age-old partnership between skywatchers and warfighters, and how this partnership has facilitated *both* important scientific endeavors *and* important aspects of war. It is a long-range historical overview from the civilian perspective.

"Accessory" is a legal term, meaning a person who enables or abets, someone who contributes to the achievement of an action but does not actually carry it out. Astrophysicists themselves are not the warriors, but they have proved indispensable to those who are. What we have investigated is one of the multiple abiding alliances between science and power—in this case, between those who seek to know the cosmos and those who seek to control parts of it.

The alliance between sky science and Earth war dates back millennia, long before the pursuit called astrophysics came into existence. Since ancient times, stargazers and space scientists have been conscripted by the rulers of every empire the world has known. Their purpose: to provide arcane cosmic knowledge to kings, explorers, colonizers, war planners, and industrial magnates alike, so that those who were already powerful and wealthy could safeguard their power and wealth and expand the reach of their authority and territory.

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Our saga begins with the earliest attempts at calendars and clocks, useful tools for managing a workforce and inducing societal order. Over the course of the millennia, projects and perpetrators proliferated: a British clockmaker solved the longitude problem, the American military developed GPS, global entrepreneurs now hope to mine asteroids for precious metals.

Astronomy, the basic mapping of the sky, has been around ever since individuals began to track heavenly objects and events visible to the unaided eye. In the mid-13th century, more than three centuries before the earliest telescopes were devised, a Franciscan friar conceived the idea of the telescope and foresaw its dual usefulness—that it could not only bridge the distance to a far-off enemy army but could also cause the sun, moon, and stars to appear within reach.

The telescope—which Galileo improved but did not invent—marked the first major shift toward conquering the limits of the human eye, which on its own sees only so-called visible light, a minuscule band of the full spectrum of radiation. When Galileo gave his sales pitch in late 1609 to the Senators of Venice, at that time a major seafaring power, he said nothing about astronomy. What he stressed was military utility.

Think of the 17th-century telescope as an emblem of increase, of expansion, not merely of knowledge but of the contents of the jewel box, the supper table, and the palace reception hall. Entrepreneurs were on the lookout for opportunities. Europe's rulers were seeking greater dominion and greater luxury. Armies, navies, and merchant ships were on the go. Getting a good view was strategically necessary.

Frederick the Great and George Washington—both of them renowned 18th-century military commanders—regarded their telescopes as essential military equipment. In the 19th century, the telescope was an indispensable element in the "optical telegraph" systems that were used for wartime communication by Napoleon and also by both sides in America's Civil War. And the immediate predecessor of the 20th century's Hubble Space Telescope was full-fledged military equipment. Hubble is a knockoff of a spy satellite, adapted to look out at the cosmos rather than down at Earth.

As we write in chapter 4,

> Space—the astrophysicist's turf—is the new high ground, the new command post, the new military force multiplier, the new locus of control. But whether an astrophysicist's work is done at the behest of the military or for the sake of science, the tools are the same. The techniques are the same.

The telescope, however, is only one piece of the modern partnership between space scientists and warfighters.

The development of radar during the Second World War depended on understanding the nature and effects of the ionosphere—the dynamic, electrically charged upper layers of our atmosphere. During the Cold War, surveillance spacecraft were launched to detect the gamma rays that would inevitably result from the detonation of a nuclear bomb. But what came to light during those detections was a previously unknown cosmic phenomenon—the gamma-ray burst, associated with the explosion of stars in distant galaxies. How about infrared radiation? Everything warmer than absolute zero radiates in the infrared part of the spectrum. And so (also during the Cold War) the US Air Force contracted astrophysicists to do huge infrared sky surveys so that warfighters could quickly distinguish the infrared signature of an incoming ballistic missile from the infrared signature of a cosmic object. Finally, defending our entire planet against an incoming asteroid cannot be done without astrophysicists, because it is they who understand trajectories and can differentiate between threatening and nonthreatening asteroids.

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The opening salvo of the original space race was the Soviet Union's launch of Sputnik on October 4, 1957. Now, sixty-plus years later, four dozen countries operate satellites, and more than a dozen have their own launch facilities. We're in a new and intensifying version of the space race. While the US does the lion's share of military space spending, the rest of the world does 2/3 of the space launches.

From the early years of the space race through the early years of this new millennium, the declarations of US politicians, the doctrine documents of the US military, and the classified reports of the US security apparatus communicated one idea: that a world in which the United States was not the leader in space would be unthinkable, intolerable.

Nevertheless, today the majority of clear-thinking US politicians and war planners understand that space does not and cannot have a supreme leader. They also understand that anything terrible that happens in space—whether natural or anthropogenic—would rain disaster on all of us. Back in 1967, space war was preemptively prohibited by the Outer Space Treaty, signed and/or ratified by two-thirds of the nations of the world. And yet. And yet. Fantasies of space war persist—even though, if implemented, they would send every modernized nation back to the days of manual typewriters, paper maps, hand-pumped water wells, and door-to-door salesmen. And that is a best-case scenario.

Let me leave you with a shortened passage from chapter 7:

> In 1935, Sinclair Lewis wrote the dystopian novel *It Can't Happen Here*, which forecasts the US presidential election of 1936—an election that transforms the nation into a repressive, heavily militarized dictatorship. Very early in the novel the reader meets a retired brigadier general who is delivering after-dinner remarks at a Rotary Club fête in small-town Vermont. His topic is "Peace through Defense." But then the other after-dinner speaker, a rabid campaigner against subversion, urges him to admit that "a war might be a good thing." And indeed he does:
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> > I better confess that while I do abhor war, yet there are worse things. Ah, my friends, far worse! A state in which college professors, newspapermen, and notorious authors are secretly promulgating seditious attacks on the grand old Constitution! A state in which the People are flabby, cowardly, lacking in the fierce pride of the

> warrior! No, such a state is far worse than war at its most monstrous!
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> . . . What I'd really like us to do would be to come out and tell the whole world: "Now you boys never mind about the moral side of this. We have power, and power is its own excuse!"

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Back in 1935, power was less powerful than it is today. It had fewer weapons at its disposal. It could do less damage. Today we have both megalomaniacs and megaweapons. We have elected officials who talk about "not taking any cards off the table." We have a president who has demanded a separate new branch of the military, the purpose of which would be securing "American dominance in space."

Fortunately, we also have astronauts from many nations living, talking, and doing science cheek by jowl on the International Space Station for months at a time—a test case for peace through cohabitation and collaboration. The space station is their little world. Unlike their mobile contemporaries here on Earth, they can't up and leave at a moment's notice. And when these spacefarers look down at Earth, the separate countries of the schoolroom globe are nowhere to be found. All they see are blue seas, green and tan landmasses, and the white of cloud tops and glaciers: one world, indivisible, humanity's only home thus far.

Some of us may be hungry for the chance to colonize Mars. Not happening tomorrow. In the meantime, maybe we could try pretending that we, too, are astronauts, confined to our spacecraft—because in fact, considered in terms of the galaxy, not to mention the universe, that's what earthlings are. As the futurist Marshall McLuhan said way back in 1965, "There are no passengers on Spaceship Earth. We are all crew."