

strategically as control of the sea. Pearl Harbor nearly cost the United States control of the sea in 1941. Conversely, the war in the 2050s will almost cost the United States control of space. The resulting obsessive fear of the unexpected, combined with an obsessive focus on space, means that enormous amounts of both military and commercial money will be spent on space.

The United States is therefore going to construct a massive amount of infrastructure in space, ranging from satellites in low earth orbit to manned space stations in geostationary orbit, to installations on the moon and satellites orbiting the moon. Many of these systems will be robotically maintained, or will be robots themselves. The disparate advances in robotics in the previous half century will now come together—in space.

One key development is that there will now be a steady deployment of troops in space. Their job will be to oversee the systems, since robotics, no matter how good, are far from perfect, and in the 2050s and 2060s this effort will be a matter of national survival. U.S. Space Forces, a new branch of the military separate from the air force, will become the biggest service in terms of budget, if not troop size. A range of low-cost launch vehicles, many derived from commercial versions developed by entrepreneurs, will be constantly shuttling from earth to space and between the space-based platforms.

The goal of all this activity will be threefold. First, the United States will want to guarantee enough robustness, redundancy, and depth in defense so that no power will ever again be able to disrupt U.S. space capabilities. Second, it will want to be in a position where it can shut down any attempt by another country to gain a foothold in space against American wishes. Finally, it will want to have massive resources—including space-based weapons, from missiles to new high-energy beams—to control events on the surface of the earth. The United States will understand that it won't be able to control every threat (such as terrorism or the formation of coalitions) from space. But it will make sure that no other nation can mount an effective operation against it.

The cost of building this kind of capability will be enormous. It will have almost no political opposition, will generate huge deficits, and will stimulate the American economy dramatically. As with the end of World War II, fear will override caution. Critics, marginal and without influence,

will say that this military spending is unnecessary and that it will bankrupt America, leading to a depression. In fact, it will cause the economy to su dramatically, as deficits normally have in American history, particularly during the centers of the fifty-year cycles, when the economy is robust.

REVOLUTION IN ENERGY

The American obsession with space will intersect another intensifying problem: energy. During the war, the United States will invest huge amounts of money to solve the problem of delivering power to the battlefield from space. It will be uneconomical, primitive, and wasteful, but it will work. The power Allied forces in Poland in the face of the Turkish-German invasion. The military will see space-based power generation as a solution to massive logistical problems on the battlefield. In particular, the delivery of energy to power new weapons involving intense energy beams will be a critical problem. The military will be prepared, therefore, to underwrite the development of space-based power generation, as a military necessity, as Congress will be prepared to pay for it. It will be one of the lessons learned from the war—and it will instill a sense of urgency into the project.

There are two other episodes in American history that are instructive here. In 1956, the United States undertook to construct the interstate highway system. Dwight Eisenhower favored it for military reasons. As a junior officer he had tried to lead a convoy across the United States—it took months. In World War II he saw how the Germans had moved entire armies from the eastern front to the west to launch the Battle of the Bulge using their autobahns. He was struck by the contrast.

The military reasons for the interstate system were compelling. But the civilian impacts were both unexpected and unintended. With the time and cost of transportation reduced, land outside of cities became usable. A massive decentralization of cities took place, leading to suburbs and the distribution of industry outside of urban areas. The interstate system reshaped the United States, and without the military justifications it might not have been built or seen as economically feasible.

A second example can be drawn from the 1970s, when the military was