"para-empiricism" of the data produced by spatial imaging technologies—in particular her analysis of their claims to objectivity—in dialog with the rich body of historical literature on the politics of quantification and objectivity across fields of scientific and technological inquiry. Her observations about the growth of military support for commercial satellite operations would fit nicely with recent work on new models of procurement such as the "military-entertainment complex" described by Timothy Lenoir and Henry Lowood. And her call to interrogate the "military-political origins" of technologies now in the civilian domain might have benefited from engagement with John Cloud's work on the history of military geographic information systems—in particular his discussion of how imagery from classified data-collection systems long ago made their way into the civilian realm, even as the reconnaissance equipment itself remained a state secret.

The second front for Kurgan's analysis, which reflects her professional training outside of the history of science and technology, will likely strike *Technology and Culture* readers as the most innovative contribution here. For the next nine chapters move beyond textual analysis of her subject and associated images to present a new analytic method. Kurgan uses spatial technologies to explore the politics of those very spatial technologies, and does so with a writing style whose accessibility makes her claims easy to digest. These chapters span topics from mapping the area around the former World Trade Center site to satellite imaging of Kuwait. Each, the subject of an art installation or related project, is presented in its original form, accompanied by updated reflections that nicely link it back to the major themes of the book.

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NASA in the World: Fifty Years of International Collaboration in Space.

By John Krige, Angelina Long Callahan, and Ashok Maharaj.
New York: Palgrave Macmillan, 2013. Pp. xviii+353. $35.

Congress embedded international collaboration in NASA's founding legislation, but as this book reveals, carrying out that objective is far from a simple task. The Space Act of 1958 sets as the agency's other goal the preeminence of the United States in aerospace science and technology, leaving it the challenge of reconciling the two objectives. Working with, and often building up, foreign space programs, while supporting U.S. foreign policy and preventing unwanted technology transfer that could threaten American national security or corporate competitiveness enmeshes NASA in a complex web of relations with the State, Defense and/or Commerce Departments, even as it engages in often complicated negotiations with national partners or international organizations like the European Space Agency (ESA).

The book is divided into five parts: an introductory unit and a section on Western Europe by John Krige, a unit on the Soviet Union and Russia by Angelina Long Callahan, a section on India and Japan by Ashok Maharaj, and finally "Into the Twenty-First Century" by Krige. Krige notes that the authors were forced to be selective, as NASA has had thousands of agreements with over one hundred countries. In this official, NASA-funded history, they cover the major players and programs only, or most of them. If there is one nation missing that I think deserves more than passing treatment, it is Canada, due to its prominent role in the space shuttle and International Space Station (ISS) programs. However, in general the authors cover what is most important and in a way that is independent and critical, even as they praise NASA for its considerable achievements.

International collaboration began primarily in space science, in NASA's offer to launch the satellites of other nations. Agreements were made according to the principles set forth by Arnold Frutkin, who headed the responsible office for the first two decades of the agency's existence. The two most critical conditions were "clean interfaces" and "no exchange of funds" (p. 12). The foreign partner would provide the satellite or instrument at its cost and NASA would launch it. The complications of giving money to a foreign nation would be avoided. The early space-science collaboration with Western Europe fit this model, but as Krige, Arturo Russo, and Lorenza Sebesta have already written about this topic extensively in their ESA history, Krige passes over it lightly. Matters got more complicated when the agency tried to help Western Europe develop launch capability, as rocket technology was dual use: a launch vehicle could easily become a ballistic missile, and vice versa. NASA battled with the State and Defense Departments and the Europeans became frustrated, notably the French, who spearheaded the eventual creation of an independent satellite-launching capability.

At the time of the 1969 moon landings, then NASA administrator Thomas Paine attempted to break with "clean interfaces" and involve Europe deeply in the post-Apollo program. Krige describes these negotiations in excruciating detail, but the material is genuinely new. As usual, his research is impeccable and soundly situated in American and European diplomatic history. In the end, NASA got only the shuttle, and Europe paid for Spacelab modules to be carried in the cargo bay on some missions, a reversion to Frutkin's original principles.

The fundamental, and exceptional, break came in the 1990s for the ISS, when the Clinton administration supported the integration of the Russian modules, and gave billions to Russia to support its industry, in order to prevent an exodus of ex-Soviet rocket engineers and technology to "rogue states." This episode is told in two different sections, Callahan's and Krige's

final unit, although the authors try to minimize overlap and repetition. Callahan notes that the usual narrative about U.S.-Russian space relations—cold war competition contrasted with intense cooperation afterward—is too simple, as there were collaborative programs even during the period of rivalry.

Maharaj's section looks at the parallel cases of NASA in Japan and India. The United States wanted to build up the space capability and prestige of these two countries, especially after the Communist Chinese nuclear test in 1964, while again trying to restrain ballistic missile technology transfer. In the end, both Japan and India pursued an indigenous launch capability while simultaneously working with NASA on space science and technology projects. But those required not only complex negotiations with several actors in those countries, but also complicated battles inside the U.S. government.

NASA in the World is at times dry and extremely detailed, but it is a study of importance to the history of spaceflight and American diplomacy, European, Russian, Japanese, and Indian area studies, and transnational science and technology since 1958. It breaks with the nationally focused, cold war narrative that dominates space history. I recommend it.

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Michael J. Neufeld is a curator at the National Air and Space Museum, Smithsonian Institution. Smithsonian Books has reissued in paper and e-book editions his *The Rocket and the Reich* (1995), which won the Dexter (now Edelstein) Prize. He recently published two articles about planetary exploration since 1989, on the origins of the Discovery Program and on the New Horizons mission to Pluto.