Summit in space: The first step taken

Back on launch day, at Cape Canaveral's Kennedy Space Center, it had been in part a time for nostalgia, as the last Saturn rocket carried Tom Stafford, Deke Slayton and Vance Brand into orbit aboard the last Apollo spacecraft. But this week, the focus was different. Cosmonauts Aleksey Leonov and Valeriy Kubasov landed Monday following nearly two days of living and working in space with the U.S. crew, and the astronauts, off on a scientific research program of their own, were looking back on a rendezvous envisioned as the first major step in easing an international rivalry that has lasted nearly 18 years in space—and on the ground.

It didn't go without a hitch—no space flight ever does. But the "glitches" were minor, and in all its major aspects, the Apollo-Soyuz Test Project (SN: 7/5/75, p. 10) went as well as the space officials, diplomats, engineers, public relations types and flight crews who planned it could have wanted. The major technical item on the flight, a tunnel-like adapter that would couple the two dissimilar spacecraft together by their hatches, turned out to provide the smoothest docking ever, according to Stafford, who should know: In 1966 he was commanding Gemini 9 when a stuck shroud prevented docking with an unmanned practice target, and three years later docked Apollo 10 with a lunar module, an exercise which, while eminently successful, was hardly the flowing encounter of last week's mission.

(One docking that Stafford could not evaluate was that of a Soyuz vehicle and a Soviet Salyut space station, a task that has ranged from difficult to impossible on several occasions. One successful example, however, was that of Soyuz 18 and Salyut 4 on May 25, still in orbit last week and setting new Soviet space records every day, including a contribution to the record number of men in orbit, described by Salyut cosmonaut Pyotr Klimuk as "the Magnificent Seven.")

But the importance of the Apollo-Soyuz mission must be calculated on several different levels. "Without a doubt," says flight director Don Puddy, "it's an exercise in two-way communications." And indeed, one of the most complex and trying aspects of the whole operation was the melding of two launch sites, two control centers, two spacecraft (with several communications posts in each), numerous tracking stations, alternative transmission frequencies (one of which kept picking up interference from air traffic controllers on the earth below)—and two languages. When conversing with one another, astronauts spoke Russian and cosmonauts, English. Key flight officials in both countries had translators at their elbows. Yet in the main, it all seemed to work.

NASA

The first step: Kubasov, Leonov, Stafford and Slayton meet in orbit as Brand stands watch in the Apollo command module.

From the standpoint of developing cooperation, in fact, the years of exhaustive preparation for such complexities were perhaps more important than the actual mission. "I think the greatest part of our learning," said Slayton, "has been in our training which preceded this flight." Personnel exchanges, joint training sessions, policy meetings and technical conferences began as early as two years before the flight was officially agreed to in 1972. Some observers, in fact, have argued that NASA is "giving away technology" to the less sophisticated Soviet program.

The U.S. space agency, however, understandably takes a different view. "Our program is so open," says one ASTP official, "that the Russians could get information through a number of other ways." Yet there have undeniably been some gains. "I think that some of our operational flexibility is rubbing off on them,"

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Clustering globularly around a black hole

Black holes are all around us, it seems. Some theorists would pepper the entire universe with a dust of miniature black holes even into the inner reaches of the solar system. Black holes of a more stellar size appear to be associated with certain X-ray sources found in binary star systems. (There is even a somewhat way-out theory that a black hole fell on Siberia, the Tunguska event of 1905.) Now, in the July 3 NATURE, two prominent astrophysical theorists, John N. Bahcall of the Institute for Advanced Study and Jeremiah P. Ostriker of Princeton University Observatory, propose that the X-ray sources recently discovered in some of the globular star clusters that form a kind of halo around our galaxy are associated with black holes.

The globular clusters contain the oldest stars associated with the galaxy. At 10 billion years or so they represent some of the earliest forms of organized matter in the evolution of the universe. It seems theoretically possible that the cores of the globular clusters could evolve, by collapses and collisions of stars, into extremely massive black holes (several hundred times the mass of the sun).

Such is what has happened, Bahcall and Ostriker suggest, to the four clusters known to be X-ray sources, NGC1851, NGC6441, NGC6624 and M15. The X-rays would be produced by hot gas falling into the black hole. The gas could be matter ejected during evolution of stars in the cluster or it could be pulled from stars that passed too near by the black hole's gravity.

The theory makes two "unambiguous" predictions. First, the X-ray emission should look as if it comes from a point at the center of the cluster. It should show no fluctuations due to eclipses or orbital or spin periods of large bodies. (There could be some periodicities caused by small particles orbiting the black hole in some circumstances, but these could be distinguished because the theory tells what their periods ought to be.) It seems like a clear-cut program to place before observers. □