Conclusion

In any characterization of the future of the Soviet space program, caution is the rule. Western forecasters during the past 5 years expected a more dynamic effort than the Soviets actually put forth. Still, the Soviets have shown considerable perseverance, and their predictions about even bigger space stations—capable of housing "large collectives" rather than small crews—should be taken seriously. Modularized space facilities—carrying equipment for astronomical, physical, and chemical experiments, and for technology development purposes, adapted for multidisciplinary programs for both civilian and military purposes—can be expected. [69] It *is* possible that useful and marketable products and services could be provided. Such stations, situated in various orbits, would be a straightforward extension of demonstrated Soviet capabilities. Eventually, these same facilities could involve international teams.

With a sufficient commitment of resources, the Soviets may be able to maintain a continued human presence in space through the use of heavy-lift launchers and/or expanded use of currently available boosters. A shuttle-type vehicle would permit routine access to platforms in near-Earth orbit. A large Salyut complex could serve as a space transportation node or base camp.

As recently as late November 1983, the Soviet newspaper *Pravda* asserted that the main thrust of Soviet cosmonautics is "the creation of [sophisticated] orbital manned complexes, which can be improved during lengthy use and be reconstructed depending on the nature of the tasks being tackled. [70] The next step in the Soviet space program will aparently be "the transition from long-term orbital stations regularly visited by replacement crews to a multi-team, permanently manned orbital complex. "

From a permanent foothold in near-Earth orbit, the next step might bean extension to geostationary orbit. Soviet scientists have argued that a series of orbital stations might one day stretch for hundreds of miles in a given orbit. [72]

Salyut operations are one step in the Soviet drive toward mastery of space. It is quite conceivable that, by the end of the century, they cound put cosmonauts on the Moon. [73]

[69] Comments of Anatoly Skripko, Science and Technology Attaché to the Soviet Embassy in Washington, D. C., at a luncheon of the American Astronautical Society, Feb. 12, 1982. See also "Soviets Initiating Program on Modular Space Station, " by Craig Covault, *AW&ST*, July 20, 1981, p. 22; and "Soviets Move Toward Space Operations Center, " James Oberg, *Aeronautics and Astronautics*, May 1982.

[70] "Quotation from *Pravda, Nov. 25, 1983,* appearing in *Aerospace Daily*, Dec. 1, 1983, p. 155.

[71] *Pravda, Nov. 28, 1983,* quoted in *Aerospace Daily, Dec. 1, 1983,* p. 155. The article continued as follows: "*Pravda* said the size of such a complex 'will be impressive even by the standards of construction on Earth. For instance, the parabolic antenna alone should have an effective aperture . . . [o]n the order of 300-350 meters. In addition, it must be geared to a *long* period of operation—15-20 years as a minimum. '

"*Pravda* said that '[t]oday, this complex is conceived as a unified system of large-scale installations in orbit at an altitude of *200-400* kilometers, linked to Earth by freight and passenger transport spacecraft. The complex will include specialized scientific research laboratories, comfortable housing modules, powerful energy installations, a refueling station, repair workshops, and even construction sites for producing and installing standardized construction components. The real potential of orbital flight for the *ad hoc* solution of urgent national economic tasks will also be expanded many times over. ' "

[72] Yuri Zaitsev, "Orbital Stations—The Present and Future, " *Moscow News,* #45 (2825), Nov. 19-26, 1978, p. 11.

[73] The Soviets think that in about 20 years a journey to Mars may be possible. By this time, spaceships may incorporate centrifuges that simulate the conditions of living under gravity. " Smolders, op. cit., p. 944.