

Introduction

This document chronicles dockings, module additions, configuration changes, and major events of Mir Principal Expeditions 17 through 21, November 1994 through August 1996. It provides a follow-up to David S. F. Portree's "Mir Hardware Heritage" (NASA RP-1357), which described the history of Soviet/Russian space stations, beginning with precursor space modules and continuing through the mid-November 1994 configuration of the Mir space station complex.

Although Mir has hosted international crews since its early days, increasing focus was placed on international cooperation beginning in 1995. In the period covered by this document, a series of joint missions with the United States began as part of International Space Station Phase I. The first was the rendezvous of the Space Shuttle Discovery with Mir in February 1995, followed in March by the first mission (Mir 18) in which a U.S. astronaut, Norm Thagard, launched on a Soyuz-TM vehicle and served as a Mir crew member. In June of the same year, during U.S. mission STS-71, the Space Shuttle Atlantis docked with Mir for the first time. It brought with it the Mir 19 crew of two and took the Mir 18 crew of three home to Earth; during this docking the ten members of the combined crews set a record for humans aboard a single space complex. Mir 20 hosted European Space Agency (ESA) astronaut Thomas Reiter for Euromir 95 and was visited by Atlantis again on mission STS-74. During Mir 21, Atlantis docked with Mir a third time (STS-76), bringing the second U.S. astronaut to serve as a Mir crew member, Shannon Lucid. In August, while Lucid was still aboard, Mir 21 hosted French cosmonaut-researcher Claudie Andre-Deshays and her Cassiopee scientific experiments.

The three new modules added to Mir during this period also reflected the trend of international cooperation:

- Spektr, a habitable science module added in May 1995, bore an international complement of instruments for Earth observation and sampling and analysis of Earth's atmosphere and the orbital environment.
- The Docking Module, built by Russia with U.S. cooperation, was added to Kristall during the November 1995 (STS-74) Atlantis docking to eliminate the need to move Kristall to the -X port each time Atlantis docked with the station.
- Priroda, the last permanent habitable module, with experiments designed by 12 nations to gather data on the Earth and its atmosphere, was added in April 1996.

In addition to the three Atlantis dockings and the initial dockings of Priroda and Spektr, seven Progress-M and four Soyuz-TM dockings occurred between November 1994 and August 1996. Soyuz-TM 20, Soyuz-TM 21, and Progress-M 32 were each undocked and redocked once. Six relocations of Kristall, Spektr, and Priroda brought the total number of dockings for the period to 23. Using the icon concept developed for "Mir Hardware Heritage," each configuration is depicted at the left of the narrative description of mission events. A key to the individual icons is given in figure 1.

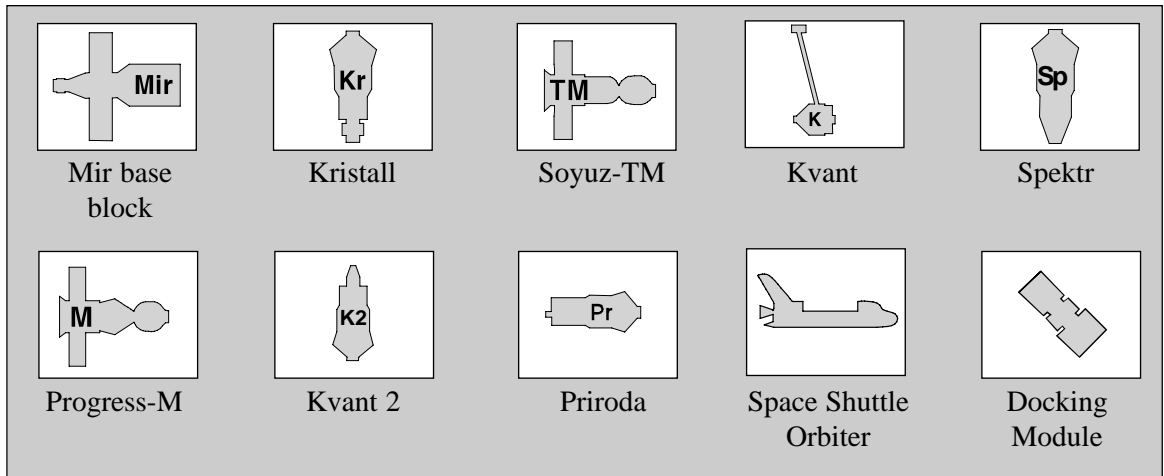


Figure 1. Key to Icons

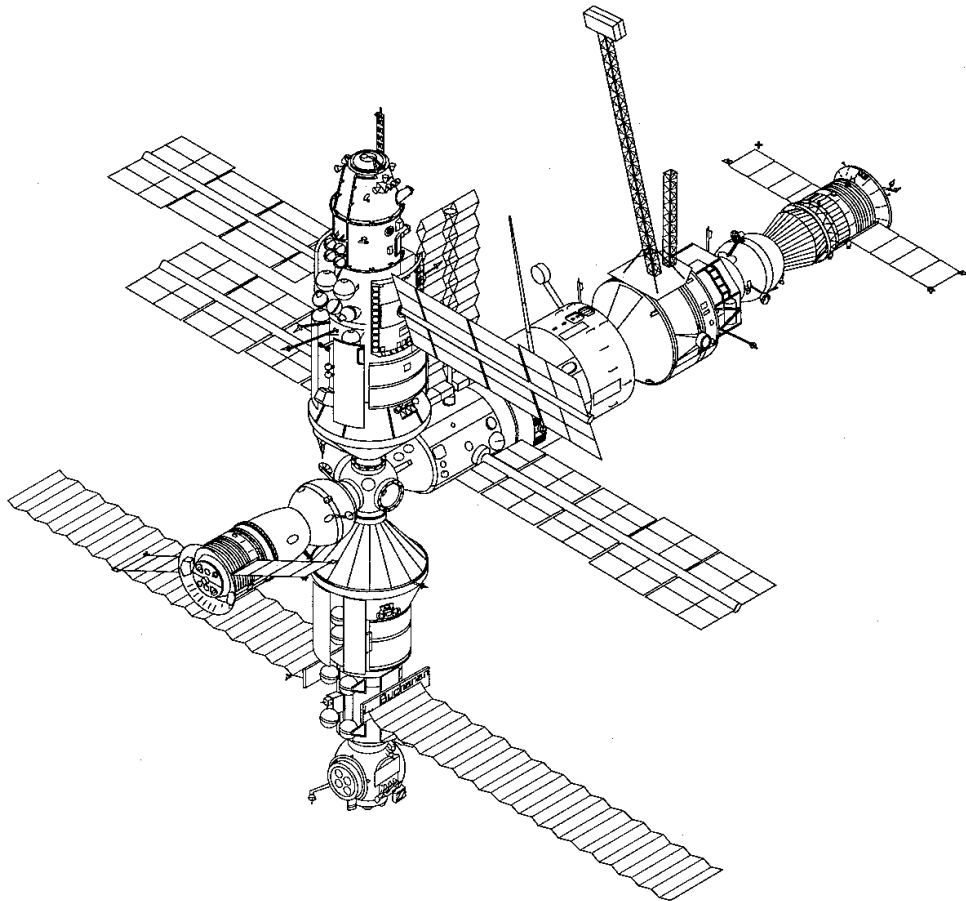


Figure 2. The Mir complex at the end of 1994. Shown left to right are Soyuz-TM 20, the Mir base block, Kvant, and Progress-M 25. Shown vertically, top to bottom, are Kvant 2 and Kristall. This was still the station's configuration at the time of the Space Shuttle Discovery rendezvous on February 6, 1995.