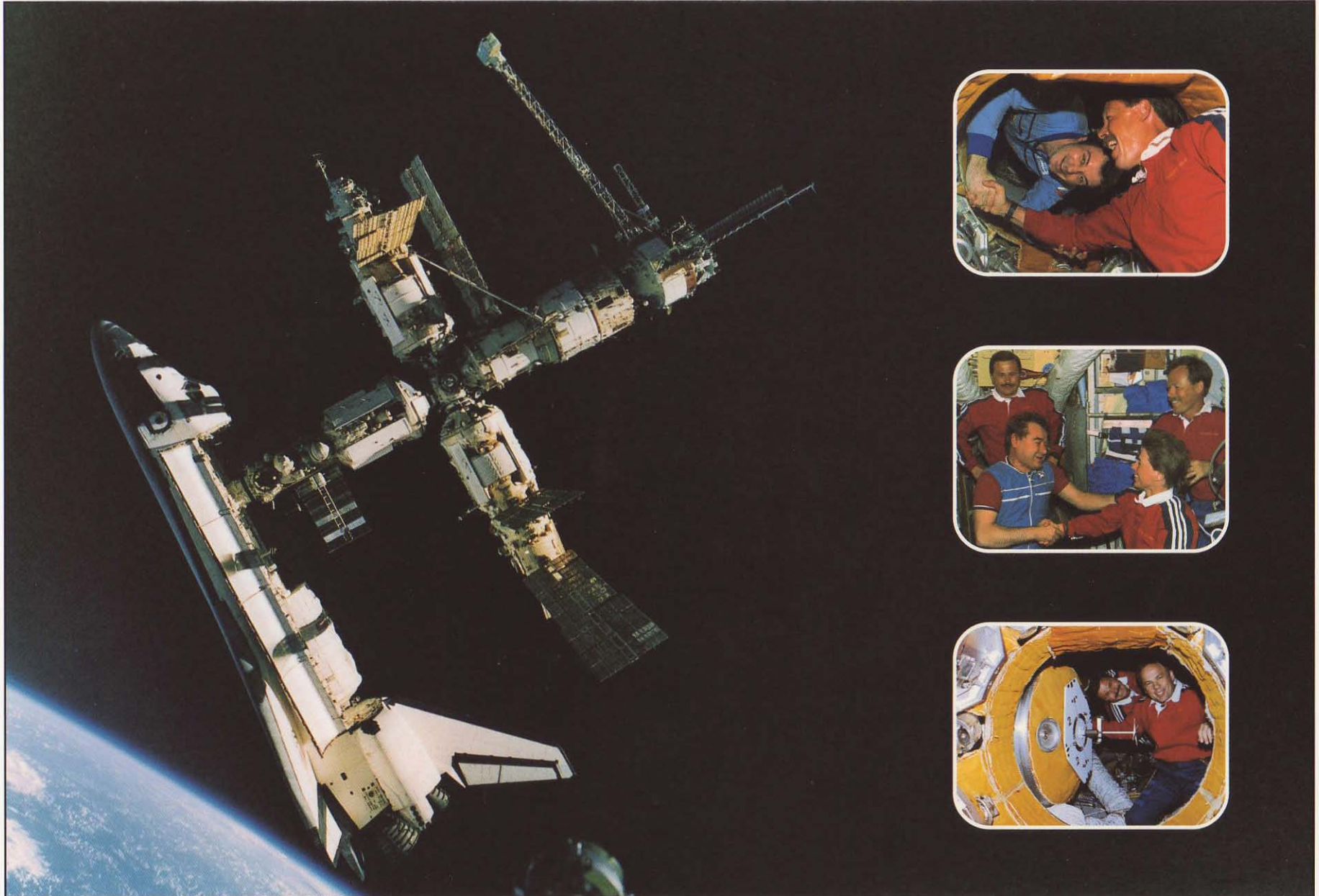




National Aeronautics and
Space Administration

Shuttle Docking with Russian *Mir* Space Station





Shuttle *Atlantis* Docks with Russian *Mir* Space Station

On June 29, 1995, the Space Shuttle *Atlantis* made history when it docked with the Russian *Mir* space station, as shown in this photograph. The STS-71 mission marked the first time US and Russian spacecraft linked up in orbit since the Apollo-Soyuz Test Project 20 years before. The STS-71 mission was also the 100th US human spaceflight.

(Top Inset) *Atlantis* Commander Robert L. Gibson (r) and *Mir* 18 Commander Vladimir Dezhurov shake hands in the docked vehicle. Together, they commanded the largest spacecraft ever assembled, with a mass of nearly 225 tons, for five days of joint operations and science research.

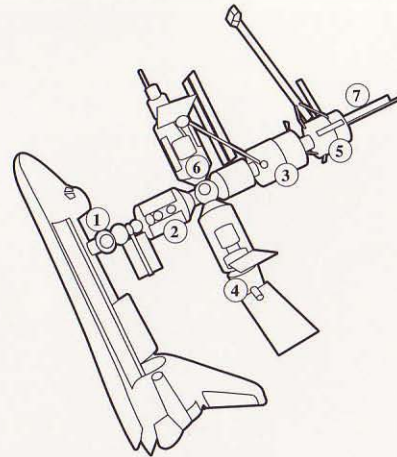
(Middle Inset) Mission specialist Bonnie Dunbar (lower right) greets cosmonaut Gennady Strekalov (lower left) while *Mir* 19 flight engineer Nikolai Budarin (top left) and Gibson look on. Dunbar helped conduct on-orbit science experiments to examine how the *Mir* 18 crew—US astronaut Norman Thagard, Commander Dezhurov and cosmonaut Strekalov—adapted to 115 days in microgravity.

(Bottom Inset) After five days of joint activities, the two vehicles undocked in what the crew called “a cosmic ballet.” The *Mir* 19 Commander Anatoly Solovyev (r) and flight engineer Budarin are pictured closing the hatch of the Russian space station in preparation for shuttle undocking. Later, Solovyev and Budarin entered the Soyuz spacecraft and undocked from *Mir* to photograph *Atlantis*' departure.

STS-71 was the first docking mission in Phase 1 of the International Space Station program. *Atlantis* will dock with *Mir* a total of nine times between 1995 and 1998. US astronauts will amass more than two years on orbit, conducting research and practicing operations for the international Space Station.

Mir Space Station

This graphic shows the *Mir* configuration at the time of the first docking with *Atlantis*. The Russian developed (1) **Androgynous Peripheral Docking System (APDS)** links the orbiter to the (2) **Kristall** module. The APDS is mounted atop a US developed



external airlock that connects to a modified tunnel section leading to the Spacelab module in the far aft of the shuttle payload bay.

The Kristall module, used for material processing research, has rotated to the forward docking port of the (3) **Mir Base Block**, the control center for the space station, to facilitate shuttle docking. (4) **The Spektr** module adds earth monitoring capability to *Mir*. Two Kvant spacecraft serve as research modules. (5) **Kvant 1** is an astrophysics module and (6) **Kvant 2** supports Earth observations and biological research. **Kvant 2** is equipped with an airlock for spacewalks. The (7) **Soyuz TM** transport vehicle, docked to **Kvant 1**, is used to ferry cosmonauts to the station and back to Earth. The station will be complete when the **Priroda** module (not shown) with remote sensing experiments docks in 1996. When completed, *Mir* will have a weight of more than 130 tons.

Facts & Figures

The *Mir* Base Block module was launched in 1986 with other modules launched separately over a nine year period.

Russians launched the first space station, *Salyut 1*, on April 19, 1971. Since then, Russians have lived and worked aboard seven different orbiting space stations, including *Mir*, the first permanently crewed space station.

Unpiloted resupply vehicles called *Progress* haul food, propellant and supplies to *Mir*. *Progress* vehicles rendezvous and dock with *Mir* automatically without crew involvement.

Russia holds the endurance record for humans in space. In 1995, Valeri Polyakov, a physician cosmonaut, set a new space record of 14 months onboard *Mir*. US astronaut Norman Thagard spent nearly four months on *Mir*. Prior to Thagard, the US space endurance record of 84 days was set by the *Skylab 3* crew, in 1974.

STS-71, the first shuttle docking mission with *Mir*, marked the 100th US human spaceflight.

Significant Dates

Date	Schedule	Payload/Milestone
2/94	STS-60 <i>Discovery</i>	Sergei Krikalev becomes first cosmonaut to fly on the US space shuttle
2/95	STS-63	Vladimir Titov becomes second cosmonaut to fly on the space shuttle; first rendezvous with <i>Mir</i>
3/95	<i>Mir</i> 18 Soyuz TM	Dr. Norman Thagard becomes first US astronaut to fly on Soyuz and to work aboard Russian <i>Mir</i> . Thagard sets US record for time on-orbit
6/95	STS-71 <i>Atlantis</i>	<i>Atlantis</i> docks with <i>Mir</i> , delivers <i>Mir</i> 19 crew and returns with <i>Mir</i> 18 crew
10/95	STS-74 <i>Atlantis</i>	<i>Atlantis</i> carries permanent Russian-built docking module and joint US-Russian solar array to <i>Mir</i>
3/96	STS-76 <i>Atlantis</i>	US astronaut Shannon Lucid delivered to <i>Mir</i> for five-month stay on <i>Mir</i> ; Experiments transferred from shuttle to <i>Mir</i>
8/96	STS-79 <i>Atlantis</i>	Lucid picked up and astronaut Jerry Linenger delivered to <i>Mir</i> ; US spacewalk
12/96	STS-81 <i>Atlantis</i>	Linenger returns to Earth and astronaut John Blaha replaces him; joint US-Russian spacewalk
5/97	STS-84 <i>Atlantis</i>	Blaha picked up and astronaut replaces him aboard <i>Mir</i>
9/97	STS-86 <i>Atlantis</i>	Astronaut picked up; joint spacewalk performed



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