Mir
Soviet base in space
T

wenty-three days after
the Challenger disaster,
on February 20, 1986, a
three-stage SL-13 Proton
lifted off into the night sky
over the Tyuratam Cosmo-
drome, carrying a new Soviet
space station into orbit. It was
christened Mir ("peace" or
"commune"), a predictable
counter to the US Star Wars
programme, to indicate its
peaceful intentions.
Mir was the beginning of
the transition from research
and experiments to large-
scale production activities in
space, said the Soviets. It
would be the core of a
permanently manned orbital
science station which would
be completed in five years.
The completed complex
would comprise an assembly
of modules, each almost as
large as the core station itself,
dedicated to many specific
areas of research; astro-
physics, Earth resources,
production, and life sciences.
Complete with a Soyuz TM
crew ferry, a Progress or
another unmanned tanker,
and four add-on modules, Mir
could weigh as much as 135
tonnes.

Almost two years after its
launch, Mir has one extra
module, Kvant, dedicated
to astrophysics. Another,
designed for remote-sensing
work, was expected to be
launched this autumn. The
slowness in building up the
Mir complex is not surprising;
it is exemplary of the steady
progress in space that the
Soviets have always demon-
strated. The pace contradicts
Western claims that the Sovi-
ets are set to dominate the industri-alisation of space within a matter of years. Mir is not fundamentally new, based as
it is on the Salyut space station first launched 16 years ago. Add-on modules are based on similar designs. The ferry and tanker vehicles are based on craft that flew 20 years ago. Again this is typical of the Soviet approach. No leaps, just steady progress using functional, relatively unso-phisticated, production-line spacecraft and launch vehicles that have been around for years.
It if had adopted a similar policy, the USA would have continued to launch Skylab space stations and Apollo ferry vehicles throughout the 1970s, and by now

On October 1 Soviet cosmonaut Yuri

Romanenko set a new endurance record of 237

days in space. As Romanenko heads towards his 300-day target, Tim Furniss takes a closer look at the Mir space station.

would have established a complex superior
to Mir's. The Soviet Union, however, is
gaining an inexorable lead in manned'
spaceflight experience while the USA,
which concentrated on developing the Shuttle in the 1970s, is now grounded.
The US astronaut endurance record is 84 days, set during the last Skylab mission in 1974. On October 1, Mir cosmonaut Yuri Romanenko set a new record of 237 days. On December 3 Romanenko will have endured 300 days in space. By this

The Soviet Union is now far ahead of the USA in gaining experience with men living and work-ing in space

time next year a new Mir crew
will be approaching a year in
space.
The Mir core is a Salyut-
class space station—a little
shorter, in fact. Instead of
Salyut's two docking ports,
Mir has six, one at the rear
and five more on a docking
pod at the front of the station.
The core, which has been
described as the "base
facility" and a "packed-up
gymnasium and wardroom,"
is 13 • lm long, with a
maximum diameter of 4 • 17m.
Mir has two primary solar
panels with a total span of
29-7m. Generating 9kW,
these panels rotate to point at
the Sun at all times during a
daytime pass, regardless of
Mir's alignment in orbit.
A third concertina-type
panel was erected by
Romanenko and colleague
Alexander Laveikin during
two spacewalks in June. This
increased power generation by
lkW. (For comparison, the
power generated by the US
Space Station when complete
in about 1996 will be 76kW).
Although the first add-on
module, Kvant, is powered by
chemical batteries, additional
modules are expected to be
equipped with solar panels.
Weighing 21 tonnes, the
heaviest payload yet lifted by
Proton, Mir could be
launched inside the payload
bay of the US Space Shuttle.
The core station comprises
a pressurised transfer com-
partment, a working area, and
an unpressurised service
propulsion system. One dock-
ing port is located on the
latter, between two nozzles of
the propulsion system. The forward five-port docking pod replaces the large trans-fer tunnel used on the Salyuts. Dockings take place at the axial port. Once ferries or modules have docked here, they can be moved to a side port.
Visiting craft are equipped with a short arm which will be locked on to a socket on the docking pod after docking. The module is then separated and the arm simply swings the module around to a side port.
Transfer to and from Mir is possible
through each docking port, via 0-78m-
diameter hatches. A similar master hatch
leads into the work compartment. The
docking pod also acts as an airlock for

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