

# One day, a cartwheel in space

By GEOFFREY HUGH LINDOP

**The science fiction space world of Arthur C. Clarke comes a step nearer with the successful conclusion of the mission by Russian cosmonauts Col Vladimir Kovalenok and Alexander Ivanchenkov.**

They spent a record 139 days in orbit in Salyut 6.

Clarke envisages space stations like huge cartwheels which would rotate rapidly to stimulate a gravity similar to earth's so that the occupants living and working in them would be more comfortable.

Such projects are be-

Such projects are beyond man's ability with present technology but the day is not too far away when it will be possible to construct stations in space, with the builders housed in spacecraft like Salyut.

Possibly larger stations will be made by joining two or three Salyuts together.

The Russians have made immense strides in the last year towards their goal of a permanent manned station.

Kovalenok and Ivanchenkov have demonstrated that man is able to live and work in space for long periods without apparently suffering any ill effects.

They seem to have solved many problems associated with long duration manned flight. Salyut 6 has two docking ports so that two crews can arrive at the station.

TWO CREWS CAN ARRIVE  
at the station.

During the recent mission, two pairs of astronauts joined Kovalenok and Ivanchenkov for periods of one week.

The next step will be to man the station continuously, but it is unlikely that more than four cosmonauts will inhabit Salyut 6 at any one time, since

it has only two docking ports, and enough Soyuz ferry craft will have to be docked to the station in order that the crew can be quickly evacuated in case of emergency.

The problem of replacing fuel and supplies has been solved with the Progress automatic ferry ship.

Although it is of the same basic design as Soyuz, Progress is specially designed for automatic docking, facilities to carry

facilities to carry cargo. Three Progress craft have docked during the recent mission.

It is only a matter of time before the Russians launch a large Salyut capable of holding a dozen, or maybe twenty crew.

The next Salyut is likely to have docking ports compatible with the American Space Shuttle to facilitate international rescue missions.

The Russians have not equipped Salyut 6 with such compatible docking ports, since the American Space Shuttle will not be launched for another year.

Soviet Space officials expect another manned crew to occupy Salyut 6 because of the quantities of supplies that have been put on board.

Technologically there is no limit to the

IS NO limit to the length of time a manned mission can be supported. The only question mark over manned space-flight is man himself.

The biggest problem to be overcome is the body's acclimatisation to the weightless en-

vironment. After a prolonged stay in space the strain of re-entry, whose forces make a man weigh many times his normal weight, becomes a problem.

This was noticeable for the Americans even as long ago as their Gemini program of the mid '60's, but like all problems it has its solution.

The Salyut 6 contains a running track and a bicycle so that the cosmonauts can do physical exercises to maintain their strength. But the most significant development has been the Orbis

has been the Chibis suit.

The Chibis suit is made of an elastic crimed material, the trousers of which are absolutely pressurised to create a vacuum.

It creates a negative pressure in the lower parts of the body thus causing a flow of blood to the lower extremities in a pattern similar to that in a person walking upright on earth.

Yuri Romanenko and Georgi Grechko held the previous space endurance record — 96 days in Salyut 6. Grechko also spent 29 days in space on Salyut 4.

He commented after his Salyut 6 mission that he felt better and able to cope with normal gravity easier because of the Chibis than after the Salyut 4 mission despite the difference in the lengths

ference in the lengths of time.

Romanenko and Grechko were able to lead normal lives only four days after their return to earth.

The United States does not at present have ambitious projects in manned space-flight. Their plans are centred around the Space Shuttle, an economical method of getting into space and back.

The first manned orbital flight is targeted for Sept 28, 1979.

It is possible that joint flights between the Space Shuttle and the Russian Salyut will take place, although Russia has its own plans for a Space Shuttle which they call Kosmolyot — literally "space plane".

During the next decade manned space-

ade manned space-flight will tend to be in low earth orbits like the US Skylab and Salyut, for durations of a week. The Russians will probably aim to push the Space endurance record further.

So far, nobody has suffered from the harmful effects of cosmic radiation but very long-stay missions will have to consider some form of screening against such radiations.

Clearly if man can survive a space ship for more than four months a prolonged stay on the moon is feasible in the future. But what of Mars?

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As yet, nobody has new plans for a manned Martian land-

maned Martian land-  
ing, but scientists will  
have to prove that it  
is safe for man to live  
in the environment of

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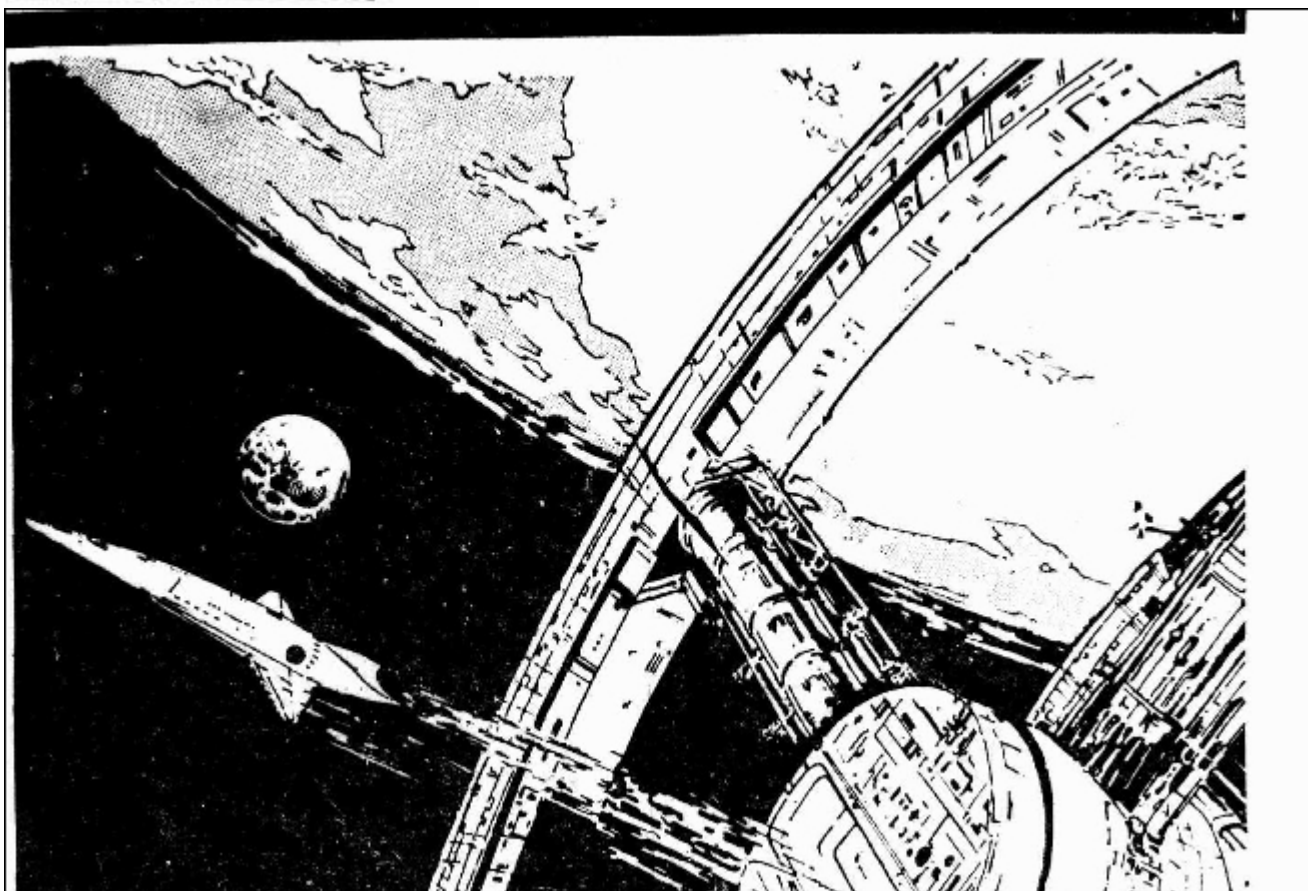
a weightless space ship  
for a period of two  
years before one can  
be considered.

We are a long way  
short of that goal, but  
one day it will be  
reached.—

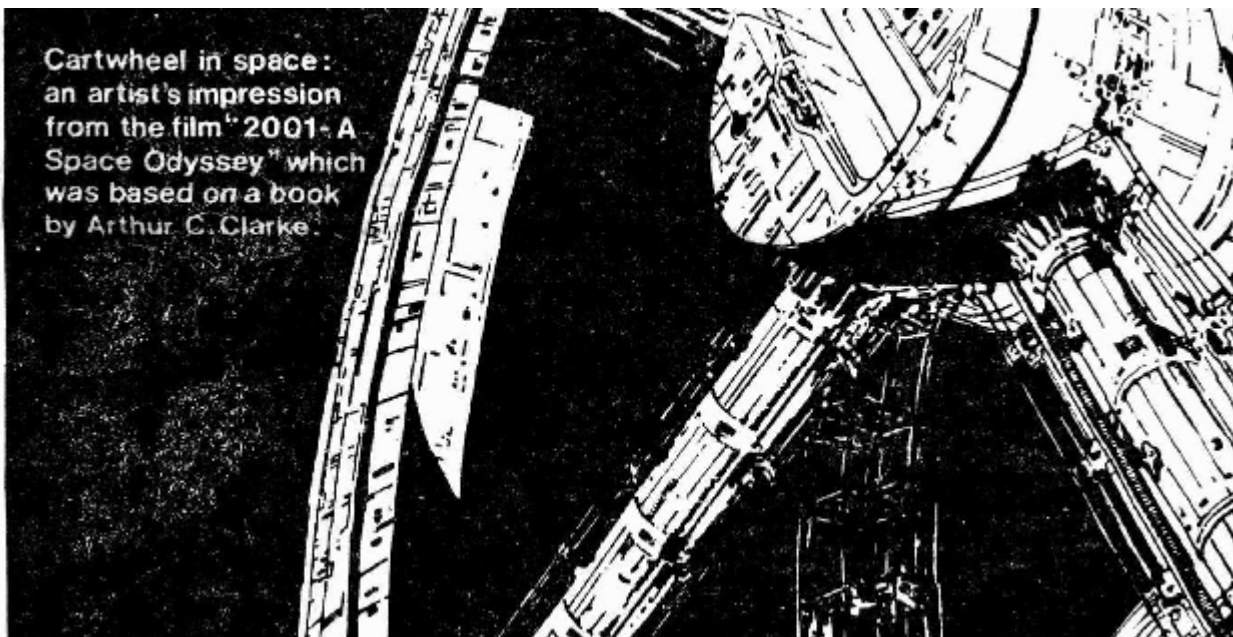
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Cartwheel in space:  
an artist's impression  
from the film "2001-A  
Space Odyssey" which  
was based on a book  
by Arthur C. Clarke.



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identified flying ob-

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ject. "Is the earth  
the destination for a  
reconnaissance expe-

reconnaissance expedition from some far-off galaxy?" he asks.