
Dan Burbank
EXPEDITION 30 COMMANDER

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00:00:00,726 --> 00:00:06,256
NARRATOR: It took more than 12 years to launch
all the pieces and put them together on orbit;

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00:00:06,856 --> 00:00:11,766
today, the work for the International
Space Station crew is focused on building

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00:00:11,766 --> 00:00:14,916
for the missions still to come: MIKE
FOSSUM: What we're doing today, though,

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00:00:14,916 --> 00:00:19,796
is we're learning how to build those
systems to last longer, we're learning how

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00:00:19,796 --> 00:00:25,746
to keep the people healthy so that we can last
longer, be effective and get the job done.

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00:00:25,886 --> 00:00:28,706
NARRATOR: "The job" is building the capability

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00:00:28,706 --> 00:00:33,606
to send people beyond low earth orbit while
improving life on earth in the process.

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00:00:34,276 --> 00:00:38,946
Longer missions, farther away from earth
than ever before, will raise new challenges,

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00:00:39,256 --> 00:00:41,766
and mission planners need
to know how the hardware

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00:00:41,796 --> 00:00:44,076
and the humans can handle those challenges.

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00:00:44,676 --> 00:00:49,186

For example: a person's bone
density decreases very rapidly while

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00:00:49,186 --> 00:00:54,276
in microgravity -ten times the rate of
decrease in a person with osteoporosis-and

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00:00:54,276 --> 00:00:57,846
that means greater risk that an
astronaut could suffer a broken bone.

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00:00:58,386 --> 00:01:04,636
SATOSHI FURUKAWA: So in order to prevent that
astronauts exercise every day, one to two hours.

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00:01:05,396 --> 00:01:15,126
In addition to that, we as guinea pigs
take pills which is used for treatment

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00:01:15,656 --> 00:01:20,056
to cure the osteoporosis on the
ground, for preventive purposes.

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00:01:20,056 --> 00:01:26,226
NARRATOR: Bone loss is one negative effect
of being in space; crew members are subjects

18
00:01:26,226 --> 00:01:28,946
for research designed to discover more precisely

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00:01:29,066 --> 00:01:32,876
and in what ways the space
environment impacts a human body.

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00:01:32,986 --> 00:01:37,746
DAN BURBANK: ...we collect samples-urine,
blood, things like that-and those get returned

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00:01:37,746 --> 00:01:40,866
to laboratories on the ground and

they help the scientists there

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00:01:40,866 --> 00:01:45,716
with much more sophisticated laboratory
resources to be able to figure out how to, to,

23
00:01:45,816 --> 00:01:47,646
to further mitigate those kinds of effects.

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00:01:47,746 --> 00:01:54,306
So in short, NASA's primary goal for the
human research on space station is basically

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00:01:54,706 --> 00:01:56,336
to make it safer for us to go further.

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00:01:56,336 --> 00:01:59,486
NARRATOR: These same people who are subjects

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00:01:59,486 --> 00:02:04,096
for some science research are also the
hands-on helpers for other experiments,

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00:02:04,436 --> 00:02:07,976
working with researchers on earth
to take advantage of the facilities

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00:02:07,976 --> 00:02:13,706
in the station's several laboratory modules
and of being in orbit more than 200 miles high.

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00:02:13,706 --> 00:02:18,346
ANTON SHKAPLEROV: It can be
medical/biological experiments,

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00:02:18,346 --> 00:02:23,516
experiments that study the production
of different materials in space,

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00:02:23,516 --> 00:02:29,136
geophysical experiments,
experiments on the study of Earth.

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00:02:29,136 --> 00:02:35,256
NARRATOR: For example, in the laboratory
crew members monitor plant growth facilities

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00:02:35,296 --> 00:02:39,936
where seeds are grown inside canisters
which are rotated at different rates,

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00:02:39,936 --> 00:02:41,966
to simulate different levels of gravity;

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00:02:42,456 --> 00:02:45,226
the seeds will be analyzed
and compared later on earth.

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00:02:45,226 --> 00:02:49,156
MIKE FOSSUM: All these seeds started
at the same time, you know; what,

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00:02:49,156 --> 00:02:53,416
what do they look like in zero g and
what is one-quarter or one-tenth of a g?

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00:02:54,196 --> 00:02:55,326
What does that do to the plant?

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00:02:55,756 --> 00:02:58,606
Zero g plants are kind of weak, actually,
'cause they don't know where to grow,

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00:02:58,886 --> 00:03:02,926
they just grow toward the light, and
that's another variable in that experiment.

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00:03:03,226 --> 00:03:09,156
NARRATOR: In another experiment, crew members

focus a combination camera and spectrum analyzer

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00:03:09,376 --> 00:03:14,356
on the sunlight reflected off of the earth,
to refine the procedure for measuring levels

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00:03:14,356 --> 00:03:17,426
of carbon dioxide and methane
in earth's atmosphere.

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00:03:18,236 --> 00:03:23,416
ANOTOLY IVANISHIN: And having
this data, scientists will be able

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00:03:23,906 --> 00:03:29,766
to understand better the processes in
low troposphere which is very important

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00:03:29,766 --> 00:03:33,356
to understanding the changes
in the climate of the Earth.

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00:03:34,206 --> 00:03:37,586
NARRATOR: The International Space Station
is the place where the crew members work,

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00:03:38,086 --> 00:03:42,456
but it's their home, too, and they spend
part of each day tending to its needs.

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00:03:43,036 --> 00:03:48,516
Crew members are trained on all the systems, but
no one can know what might break down, or when.

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00:03:49,286 --> 00:03:53,606
SERGEI VOLKOV: That is why have
scheduled maintenance, of course,

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00:03:54,026 --> 00:04:02,126
'cause everything unfortunately that

man can build get the expiration date.

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00:04:02,276 --> 00:04:05,126
We need, we need perform the replacement.

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00:04:05,366 --> 00:04:09,336
NARRATOR: Burbank takes over as
Expedition 30 commander when Fossum,

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00:04:09,336 --> 00:04:14,016
Volkov and Furukawa come home in
November, and the crew grows in December

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00:04:14,276 --> 00:04:19,216
with the Soyuz arrival of former station
flight engineers Oleg Kononenko and Don Pettit,

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00:04:19,516 --> 00:04:22,736
and European Space Agency
astronaut Andre Kuipers.

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00:04:23,106 --> 00:04:26,546
Expedition 30 is expected to
greet the arrival of Dragon,

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00:04:26,806 --> 00:04:29,226
the world's first commercial supply ship.

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00:04:29,226 --> 00:04:34,196
DAN BURBANK: With the retiring of the space
shuttle we have now lost the ability for, uh,

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00:04:34,296 --> 00:04:38,496
to carry very big, you know, loads of
cargo to the station and to return cargo

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00:04:38,496 --> 00:04:44,426
from the station, so, so what we've done is
we phased into a, basically a new chapter here

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00:04:44,806 --> 00:04:50,976
where NASA is going to solicit and contract
with commercial providers to do exactly that.

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00:04:51,356 --> 00:04:58,556
ANOTOLY IVANISHIN: And Dragon is a spaceship
developed to, to carry cargo as well

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00:04:58,556 --> 00:05:07,956
as in the near future to go to the station,
and it can deliver up to six tons of supplies

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00:05:07,986 --> 00:05:15,316
to the station, and, what is important it can
return to Earth up to three tons of supplies.

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00:05:15,476 --> 00:05:19,146
NARRATOR: ...Which none of the station's
other uncrewed supply ships can do.

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00:05:19,806 --> 00:05:24,576
The Dragon spacecraft is being developed by
space exploration technologies corporation

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00:05:24,816 --> 00:05:28,276
under NASA's Commercial Orbital
Transportation Services program.

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00:05:28,986 --> 00:05:34,106
Similar to the Japanese HTV cargo ship,
Dragon will rendezvous with the station,

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00:05:34,376 --> 00:05:39,026
then hold position so the crew can
reach out with Canadarm-2 to grab it,

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00:05:39,306 --> 00:05:41,336
and plug it in to the harmony module.

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00:05:42,086 --> 00:05:47,326
Another commercial craft, named Cygnus, under development by Orbital Sciences Corporation,

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00:05:47,696 --> 00:05:52,496
is on the manifest for its first demonstration flight a couple of months behind Dragon.

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00:05:52,906 --> 00:05:58,546
Expedition 30 has a Russian segment spacewalk on the plan in early 2012.

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00:05:59,086 --> 00:06:03,836
Shkaplerov and Kononenko will install new debris shields on parts of the Zvezda module

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00:06:04,076 --> 00:06:07,436
and a materials exposure experiment on the Poisk module,

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00:06:07,946 --> 00:06:12,786
and Shkaplerov will collect bacteriological samples from the station's exterior hull.

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00:06:12,786 --> 00:06:21,486
ANTON SHKAPLEROV: I will take some kind of a swab from there and will send it to the ground,

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00:06:21,576 --> 00:06:24,066
to the scientists, so that they could study them

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00:06:24,416 --> 00:06:30,766
and determine whether there is a great corrosion going on or to determine

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00:06:30,766 --> 00:06:33,696
for how long the station can continue to be flying.

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00:06:33,696 --> 00:06:37,686

NARRATOR: The mission of the International
Space Station is planned to continue

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00:06:37,686 --> 00:06:43,016
until at least 2020, years when the station's
partner nations will add to the wealth

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00:06:43,016 --> 00:06:47,376
of knowledge about human spaceflight,
and use that knowledge to help the people

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00:06:47,376 --> 00:06:50,666
of earth while getting set to
launch the missions of the future.

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00:06:50,666 --> 00:06:55,546
DAN BURBANK: We have a toehold or a foothold
in, in space right now, but it's not deep space,

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00:06:55,996 --> 00:06:58,886
it's still largely shielded
by Earth's magnetic field.

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00:06:59,396 --> 00:07:05,276
And, um, and, but we still have great, great
things we can do in, in low Earth orbit