
MISSION CONTROL CENTER

1
00:00:00,666 --> 00:00:01,556
>> With us today here

2
00:00:01,556 --> 00:00:04,046
in the flight control
room is a gentleman

3
00:00:04,046 --> 00:00:05,716
by the name of Tom Erkenswick.

4
00:00:05,716 --> 00:00:10,126
A very familiar face and
name in operations here

5
00:00:10,126 --> 00:00:11,236
in the flight control room.

6
00:00:11,236 --> 00:00:15,296
He is one of the visiting
vehicle officers whose post is a

7
00:00:15,506 --> 00:00:18,636
console in the very back
row here in Mission Control.

8
00:00:19,066 --> 00:00:21,496
Tom is one of the
experts of course

9
00:00:21,496 --> 00:00:23,466
in Russian vehicle operations.

10
00:00:23,676 --> 00:00:25,106
And Tom is with us today.

11
00:00:25,106 --> 00:00:27,756
He is the lead Visiting
Vehicle Officer

12
00:00:27,756 --> 00:00:29,216
for this Progress activity.

13
00:00:29,426 --> 00:00:32,496
Tom, first and foremost the
Progress almost 24 hours

14
00:00:32,496 --> 00:00:33,286
into its mission.

15
00:00:33,486 --> 00:00:35,146
How are all of its
systems operating?

16
00:00:35,516 --> 00:00:36,716
>> All of the systems
are nominal.

17
00:00:36,716 --> 00:00:37,936
We had a good launch yesterday.

18
00:00:38,286 --> 00:00:39,896
Good test of several

19
00:00:39,896 --> 00:00:41,746
of the onboard systems
yesterday as well.

20
00:00:41,746 --> 00:00:43,696
And two rendezvous burns
and all is nominal.

21
00:00:44,646 --> 00:00:47,736
>> So the Progress,
unlike recent Progress

22
00:00:47,736 --> 00:00:51,706
and Soyuz vehicles that took
a fast track of one day,

23
00:00:51,986 --> 00:00:55,976
six orbit journey to the
International Space Station

24
00:00:55,976 --> 00:00:57,396
over a six-hour period.

25
00:00:57,676 --> 00:00:59,976
This one is going to
prolong its journey.

26
00:01:00,026 --> 00:01:01,596
A slow trek to the Station

27
00:01:01,776 --> 00:01:04,726
with an interim flyby
scheduled for Wednesday.

28
00:01:04,886 --> 00:01:06,016
What is all that about?

29
00:01:06,016 --> 00:01:08,346
Explain this flyby,
the rationale

30
00:01:08,346 --> 00:01:09,806
for it, and what's involved.

31
00:01:10,026 --> 00:01:13,096
>> Sure. So this particular
Progress has a new rendezvous

32
00:01:13,096 --> 00:01:13,716
radar system.

33
00:01:13,716 --> 00:01:15,636
It's an upgrade to
their Kurs systems,

34
00:01:15,636 --> 00:01:16,996
which provides the
rendezvous radar.

35
00:01:17,466 --> 00:01:20,636
And they wanted to do a test
of it by flying by Station

36
00:01:20,636 --> 00:01:22,206
and testing that
system and interacting

37
00:01:22,206 --> 00:01:24,896
with its counterpart system on
the Station called Kurs Passive.

38
00:01:25,396 --> 00:01:28,456
So on Wednesday the Progress
will do a flyby about one

39
00:01:28,456 --> 00:01:30,536
and half kilometers to the
starboard of the Station.

40
00:01:30,806 --> 00:01:33,316
And they'll turn on both
systems both on the Progress

41
00:01:33,316 --> 00:01:35,346
and the Station and
allow them to interact,

42
00:01:35,346 --> 00:01:36,716
record all of that telemetry,

43
00:01:36,846 --> 00:01:38,256
and then check it
out on the ground.

44
00:01:38,596 --> 00:01:40,036
That will all happen Wednesday.

45
00:01:40,336 --> 00:01:42,246
They'll do the check out of
the data overnight and on

46
00:01:42,246 --> 00:01:43,566
in the day Thursday to
make sure they're happy

47
00:01:43,566 --> 00:01:44,496
with how it's operating.

48
00:01:44,616 --> 00:01:46,136
And then they'll come
back and rendezvous again

49
00:01:46,136 --> 00:01:47,506
and do the docking on Friday.

50
00:01:48,476 --> 00:01:51,346
>> The Kurs system has
been used year in and year

51
00:01:51,346 --> 00:01:53,316
out by the Russians
on both their progress

52
00:01:53,316 --> 00:01:58,376
and on their Soyuz man vehicles,
what is the impetus here?

53
00:01:58,376 --> 00:02:01,556
The rationale for the Russians
moving to an upgraded system.

54
00:02:01,766 --> 00:02:02,936
>> There are a couple

of reasons.

55
00:02:02,936 --> 00:02:07,106
The first part is that the
parts for the old system are not

56
00:02:07,206 --> 00:02:08,346
as easily available anymore

57
00:02:08,346 --> 00:02:10,676
because it has been
used for a long time.

58
00:02:10,706 --> 00:02:13,826
More importantly by invoking
a new system it provides some

59
00:02:13,826 --> 00:02:16,316
power savings and some mass
savings, which then, you know,

60
00:02:16,316 --> 00:02:18,266
correlate into additional
cargo they can carry up.

61
00:02:20,276 --> 00:02:24,396
So what they'll do is
they'll replace the avionics.

62
00:02:24,396 --> 00:02:26,276
And that's what they did in this
particular vehicle to test it.

63
00:02:26,276 --> 00:02:28,636
They'll replace the avionics
box inside the Progress

64
00:02:28,686 --> 00:02:30,776
and also several of the
antennas on the outside.

65
00:02:30,776 --> 00:02:32,966
So when you see video or
pictures of the outside

66
00:02:32,966 --> 00:02:35,256
of the Progress you'll notice
they're actually only three

67
00:02:35,256 --> 00:02:37,656
of these Kurs antennas on the
outside of the vehicle instead

68
00:02:37,656 --> 00:02:39,266
of what used to be six.

69
00:02:39,416 --> 00:02:42,026
That will allow them, in
particular, with one antenna

70
00:02:42,026 --> 00:02:44,466
that is out on the front of
the progress, it used to stick

71
00:02:44,466 --> 00:02:45,766
out beyond the docking
interface.

72
00:02:46,276 --> 00:02:48,376
Now the new antenna
no longer does that.

73
00:02:48,376 --> 00:02:49,796
So you no longer have to
worry about retracting

74
00:02:49,796 --> 00:02:50,946
that antenna before docking.

75

00:02:50,946 --> 00:02:53,016
So there are several
benefits of that type.

76
00:02:53,566 --> 00:02:57,566
>> So the Progress will fly
underneath the Station I presume

77
00:02:57,566 --> 00:03:00,156
at a distance of
about one statute mile

78
00:03:00,156 --> 00:03:02,116
or as you said about
1.6 kilometers.

79
00:03:02,416 --> 00:03:02,896
Then what?

80
00:03:02,896 --> 00:03:05,426
Johannes Kepler takes over
and it's all orbital mechanics

81
00:03:05,426 --> 00:03:07,816
to bring it back around
a couple days after that?

82
00:03:07,916 --> 00:03:09,946
>> Actually it requires
a set of maneuvers.

83
00:03:09,946 --> 00:03:12,136
And actually the flyby will be

84
00:03:12,136 --> 00:03:15,366
about 400 meters below
the Station and about one

85
00:03:15,366 --> 00:03:17,126
and a half kilometers or

one statute mile actually

86
00:03:17,126 --> 00:03:18,616
to the starboard
side of the Station.

87
00:03:18,616 --> 00:03:19,716
That's just the geometry

88
00:03:19,716 --> 00:03:21,466
of the trajectory they
use for their flyby.

89
00:03:22,196 --> 00:03:24,786
About three orbits after that
flyby they'll do a couple

90
00:03:24,786 --> 00:03:28,186
of maneuvers to basically stop
phasing away from Station.

91
00:03:28,486 --> 00:03:30,396
That will put them out
about 500 kilometers

92
00:03:30,396 --> 00:03:31,156
in front of the Station.

93
00:03:31,466 --> 00:03:32,546
They'll stay their overnight.

94
00:03:32,546 --> 00:03:33,866
They'll do another
maneuver the next day

95
00:03:33,866 --> 00:03:36,136
to come back towards station
and set up for the re-rendezvous

96

00:03:36,136 --> 00:03:37,086
and docking on Friday.

97
00:03:37,566 --> 00:03:39,656
>> And the docking
will be to the aft port

98
00:03:39,656 --> 00:03:42,616
of the Zvezda Service Module
once again putting four Russian

99
00:03:42,616 --> 00:03:45,306
vehicles at the Station
keeping not only you

100
00:03:45,306 --> 00:03:48,506
but your colleagues busy here
at the Johnson Space Center

101
00:03:48,506 --> 00:03:50,866
and over at the Russian Mission
Control Center in Korolyov.

102
00:03:51,146 --> 00:03:54,926
How do you interact with the
Russian Flight Control Team

103
00:03:54,926 --> 00:03:59,106
over there to make sure that
all of your data is synced

104
00:03:59,186 --> 00:04:04,346
up for the information that our
Flight Control needs as well

105
00:04:04,346 --> 00:04:05,856
as the Russian Flight
Control Team?

106
00:04:06,376 --> 00:04:07,956

>> Well, as with all
the visiting vehicles,

107
00:04:07,956 --> 00:04:09,386
a lot of the work
is done preflight.

108
00:04:09,666 --> 00:04:12,036
So there is a lot of work that
is done in advance in order

109
00:04:12,036 --> 00:04:14,296
to set up all of
our data exchange,

110
00:04:14,296 --> 00:04:16,316
what type of reports we need
to make to each other to make

111
00:04:16,316 --> 00:04:17,816
that overall process work well.

112
00:04:18,336 --> 00:04:22,226
In this case we'll basically
have our standard data exchange

113
00:04:22,226 --> 00:04:23,136
with our Russian colleagues.

114
00:04:23,136 --> 00:04:25,366
We'll talk to them about
how well did the test go,

115
00:04:25,366 --> 00:04:28,316
how well are their systems
working, and basically

116
00:04:28,316 --> 00:04:29,616
in this case we'll
just do it twice.

117
00:04:29,616 --> 00:04:31,956
We'll do it once on Wednesday
during the flyby and then again

118
00:04:31,956 --> 00:04:33,406
on Friday for the
docking itself.

119
00:04:33,406 --> 00:04:35,976
So in that case it's basically
just repeating the same

120
00:04:35,976 --> 00:04:36,826
process twice.

121
00:04:37,436 --> 00:04:40,416
>> And Tom, just going
back for a second

122
00:04:40,416 --> 00:04:43,136
to the expedited rendezvous
that has become sort

123
00:04:43,246 --> 00:04:46,826
of a staple item now
this year through process

124
00:04:46,826 --> 00:04:50,246
and Soyuz missions, it's
the started four orbit,

125
00:04:50,246 --> 00:04:54,216
six-hour approach from launch
to docking to the Space Station

126
00:04:54,496 --> 00:04:56,756
which has a great deal
of benefit for the crews

127
00:04:56,756 --> 00:04:58,976
on board particularly
for the Soyuz vehicles.

128
00:04:59,296 --> 00:05:02,716
The coordination for that,
to find that sweet spot,

129
00:05:02,716 --> 00:05:06,576
the right day in which to
launch a vehicle out of Balkonur

130
00:05:06,576 --> 00:05:09,806
so it can make that fast track
rendezvous to the station,

131
00:05:09,806 --> 00:05:11,326
how complex is all of that?

132
00:05:11,326 --> 00:05:12,646
>> It is pretty complex.

133
00:05:12,776 --> 00:05:16,776
It involves very detailed
planning of the ISS trajectory

134
00:05:16,776 --> 00:05:19,626
to support that four
orbit rendezvous

135
00:05:20,116 --> 00:05:23,666
which is done primarily by
our [inaudible] colleagues

136
00:05:23,666 --> 00:05:25,536
and their Russian colleagues
on the ballistic team.

137
00:05:26,226 --> 00:05:28,786

So, yeah, it requires quite
of a lot of advance planning

138
00:05:28,786 --> 00:05:31,216
to make sure that the
ISS trajectory meets all

139
00:05:31,216 --> 00:05:33,176
of the requirements in order
for the Progress to get there

140
00:05:33,176 --> 00:05:35,546
in just four orbits
as opposed to two days

141
00:05:35,546 --> 00:05:37,556
which was the old standard or,
for example, what we're doing

142
00:05:37,556 --> 00:05:39,486
with this progress where it's
going to be four days total.

143
00:05:40,076 --> 00:05:43,026
>> And that four
orbit rendezvous

144
00:05:43,026 --> 00:05:46,006
to the International Space
Station supplanted this week

145
00:05:46,006 --> 00:05:47,576
by a four-day rendezvous

146
00:05:47,816 --> 00:05:50,226
by the progress resupply
ship to the complex.

147
00:05:50,226 --> 00:05:52,306
Tom Erkenswick, Visiting

Vehicle Officer,

148
00:05:52,306 --> 00:05:53,796
thanks very much for
joining us today.