1
00:00:08,230 --> 00:00:05,749
t-minus one minute and counting the

2
00:00:23,509 --> 00:00:08,240
soyuz now on internal power and we have

3
00:00:29,750 --> 00:00:26,950
vehicle to internal power

4
00:00:32,069 --> 00:00:29,760
so at t minus 35 seconds the first

5
00:00:36,310 --> 00:00:32,079
umbilical tower has separated from the

6
00:00:41,110 --> 00:00:38,389
that second tower will go at about 15

7
00:00:43,270 --> 00:00:41,120
seconds away from launch we're at 24 and

8
00:00:45,190 --> 00:00:43,280
counting now

9
00:00:53,029 --> 00:00:45,200
the ground umbilical to the third stage

10
00:01:02,790 --> 00:00:57,110
second umbilical tower now separating

11
00:01:02,800 --> 00:01:06,710
ramping up to flight speed

12
00:01:11,990 --> 00:01:09,590
and liftoff liftoff of tim copper yuri

13
00:01:19,749 --> 00:01:12,000

malenchenko and timothy peake on their

14
00:01:24,870 --> 00:01:21,590
so far getting good first stage

15
00:01:27,109 --> 00:01:24,880
performance the soyuz delivering 930 000

16
00:01:29,590 --> 00:01:27,119
pounds of thrust from its four boosters

17
00:01:31,749 --> 00:01:29,600
and single core engine

18
00:01:34,069 --> 00:01:31,759
first stage of the soyuz 68 feet in

19
00:01:35,749 --> 00:01:34,079
length 24 feet diameter it's gonna be

20
00:01:44,950 --> 00:01:35,759
burning liquid fuel for the first two

21
00:01:49,350 --> 00:01:47,190
be getting regular launch performance

22
00:01:51,749 --> 00:01:49,360
calls from the engineers out there at

23
00:01:53,270 --> 00:01:51,759
the launch pad in baikonur 48 seconds

24
00:01:54,870 --> 00:01:53,280
and counting after launch everything

25
00:02:01,510 --> 00:01:54,880
continuing to go well with the first

26
00:02:01,520 --> 00:02:14,390
chamber pressure nominal

27
00:02:17,990 --> 00:02:16,309
now one minute and 10 seconds into the

28
00:02:20,150 --> 00:02:18,000
flight the soyuz rocket already

29
00:02:23,270 --> 00:02:20,160
traveling at a velocity of 1

30
00:02:25,110 --> 00:02:23,280
100 miles per hour on board malenchenko

31
00:02:27,350 --> 00:02:25,120
cobra and peak

32
00:02:29,270 --> 00:02:27,360
one minute and 22 seconds into their

33
00:02:31,030 --> 00:02:29,280
planned eight minute 45 flight into

34
00:02:32,550 --> 00:02:31,040
orbit

35
00:02:33,990 --> 00:02:32,560
everything continuing to go well with

36
00:02:35,990 --> 00:02:34,000
the first stage the four strap-on

37
00:02:40,869 --> 00:02:36,000
boosters and the core engine performing

38
00:03:03,350 --> 00:02:41,990

90

39
00:03:08,550 --> 00:03:06,149
and just there we see the four strap on

40
00:03:10,149 --> 00:03:08,560
boosters jettison the first stage and

41
00:03:12,229 --> 00:03:10,159
the bootstrap on boosters completing

42
00:03:14,710 --> 00:03:12,239
their job dropping away at an altitude

43
00:03:17,229 --> 00:03:14,720
of 28 statute miles at this point the

44
00:03:20,790 --> 00:03:17,239
soyuz is traveling at about 3

45
00:03:22,949 --> 00:03:20,800
350 miles per hour

46
00:03:24,550 --> 00:03:22,959
you can see the four strap-on boosters

47
00:03:26,550 --> 00:03:24,560
all separated from the soyuz

48
00:03:32,070 --> 00:03:26,560
successfully that core stage continuing

49
00:03:37,190 --> 00:03:34,149
second stage will continue until about

50
00:03:39,430 --> 00:03:37,200
four minutes 43 seconds into the flight

51
00:03:46,229 --> 00:03:39,440
at which point it will shut down shortly

52
00:03:49,830 --> 00:03:48,229
and then uh shortly we should get

53
00:03:57,270 --> 00:03:49,840
confirmation that the launch round has

54
00:04:00,710 --> 00:03:58,869
and confirmed the launch route uh

55
00:04:02,550 --> 00:04:00,720
protecting the soyuz during the initial

56
00:04:05,990 --> 00:04:02,560
ascent has been jettisoned the rocket

57
00:04:08,710 --> 00:04:06,000
now at an altitude of over 48 miles in

58
00:04:12,470 --> 00:04:10,949
copy we can see that on board everything

59
00:04:14,869 --> 00:04:12,480
continuing to go well you can see

60
00:04:16,629 --> 00:04:14,879
british astronaut tim peake there

61
00:04:19,830 --> 00:04:16,639
over in the right seat in the center

62
00:04:21,270 --> 00:04:19,840
soyuz commander yuri malenchenko

63
00:04:23,749 --> 00:04:21,280

everything going well for the soyuz

64
00:04:25,830 --> 00:04:23,759
craft as it continues its climb

65
00:04:27,749 --> 00:04:25,840
the soyuz already traveling at a speed

66
00:04:31,670 --> 00:04:27,759
of over

67
00:04:35,430 --> 00:04:33,270
the thumbs up from peak there and a

68
00:04:38,070 --> 00:04:35,440
quick wave the soyuz core stage

69
00:04:40,710 --> 00:04:38,080
continuing to perform as expected

70
00:04:43,189 --> 00:04:40,720
the core stage of the soyuz rocket is 56

71
00:04:45,030 --> 00:04:43,199
feet in length 13 and a half in diameter

72
00:04:47,909 --> 00:04:45,040
with a single engine and four fuel

73
00:04:51,110 --> 00:04:47,919
chambers providing between 178 thousand

74
00:04:52,870 --> 00:04:51,120
and 222 thousand pounds of thrust for

75
00:05:07,990 --> 00:04:52,880
its three minutes and 28 seconds of

76
00:05:12,230 --> 00:05:09,590
so again this stage is going to continue

77
00:05:14,870 --> 00:05:12,240
to burn until the four minute 43 second

78
00:05:16,629 --> 00:05:14,880
mark the soyuz then uses what's called a

79
00:05:18,469 --> 00:05:16,639
hot stage technique

80
00:05:21,110 --> 00:05:18,479
the third stage will ignite while the

81
00:05:22,629 --> 00:05:21,120
second's still burning this is why if

82
00:05:24,710 --> 00:05:22,639
you ever look at a soyuz it has the

83
00:05:37,270 --> 00:05:24,720
small open area between the second and

84
00:05:40,550 --> 00:05:38,950
so in just about 10 seconds we'll be

85
00:06:00,469 --> 00:05:40,560
standing by for the third stage to

86
00:06:08,870 --> 00:06:01,510
third

87
00:06:13,670 --> 00:06:11,350
and second stage separation confirmed

88
00:06:16,790 --> 00:06:13,680

third stage now igniting the core

89
00:06:18,870 --> 00:06:16,800
booster separating an altitude of 105

90
00:06:20,790 --> 00:06:18,880
statute miles

91
00:06:23,510 --> 00:06:20,800
soyuz craft now being propelled by the

92
00:06:26,230 --> 00:06:23,520
single engine of the soyuz's third stage

93
00:06:28,070 --> 00:06:26,240
the engine provides 67 000 pounds of

94
00:06:30,110 --> 00:06:28,080
thrust and will burn for four minutes in

95
00:06:45,670 --> 00:06:30,120
two seconds

96
00:06:50,629 --> 00:06:48,870
and this right here actually a view from

97
00:06:53,270 --> 00:06:50,639
the international space station getting

98
00:07:00,830 --> 00:06:53,280
an unprecedented view of the soyuz as it

99
00:07:16,469 --> 00:07:04,390
happy currently six minutes since since

100
00:07:21,350 --> 00:07:18,710
copra malenchenko and peak inside the

101
00:07:23,189 --> 00:07:21,360
soyuz currently traveling on top of the

102
00:07:25,189 --> 00:07:23,199
third stage which again

103
00:07:35,589 --> 00:07:25,199
burns for a total of four minutes in two

104
00:07:38,550 --> 00:07:36,550
is

105
00:07:40,710 --> 00:07:38,560
stable copy the third stage will

106
00:07:42,230 --> 00:07:40,720
continue burning for about another two

107
00:07:44,230 --> 00:07:42,240
minutes or so

108
00:07:45,990 --> 00:07:44,240
until it cuts off and separates and then

109
00:08:09,430 --> 00:07:46,000
places the soyuz craft into its

110
00:08:09,440 --> 00:08:34,790
foreign

111
00:08:39,589 --> 00:08:36,949
coming up on seven minutes 30 seconds

112
00:08:41,350 --> 00:08:39,599
post launch the vehicle's velocity now

113
00:08:43,589 --> 00:08:41,360

at almost 13

114
00:08:45,670 --> 00:08:43,599
500 miles an hour

115
00:08:47,829 --> 00:08:45,680
once the third stage delivers the soyuz

116
00:08:50,070 --> 00:08:47,839
into orbit on the module gets separated

117
00:08:52,550 --> 00:08:50,080
a series of pre-programmed commands will

118
00:08:54,790 --> 00:08:52,560
execute in order to prepare the soyuz

119
00:08:57,430 --> 00:08:54,800
for orbital operations all these stored

120
00:08:59,590 --> 00:08:57,440
commands called time tagged commands

121
00:09:01,509 --> 00:08:59,600
allow many of the soyuz's systems to be

122
00:09:03,990 --> 00:09:01,519
automatically activated by onboard

123
00:09:06,070 --> 00:09:04,000
computers at very precise time stored

124
00:09:07,750 --> 00:09:06,080
inside of those computers

125
00:09:10,230 --> 00:09:07,760
again over eight minutes now since

126
00:09:12,870 --> 00:09:10,240
liftoff about 45 seconds remaining on

127
00:09:15,030 --> 00:09:12,880
the third stage operations once that's

128
00:09:18,630 --> 00:09:15,040
finished they'll be in their preliminary

129
00:09:20,630 --> 00:09:18,640
orbit and the vehicle will command the

130
00:09:22,630 --> 00:09:20,640
deployment of antennas and the solar

131
00:09:24,790 --> 00:09:22,640
array and will be in

132
00:09:26,310 --> 00:09:24,800
its initial altitude

133
00:09:28,230 --> 00:09:26,320
and everything continuing to go well

134
00:09:46,070 --> 00:09:28,240
with all three stages of the rocket

135
00:10:02,310 --> 00:09:48,389
now standing by for third stage cut off

136
00:10:04,790 --> 00:10:03,430
you can

137
00:10:06,710 --> 00:10:04,800
see the

138
00:10:09,829 --> 00:10:06,720

small jolt there for the crew members as

139
00:10:11,509 --> 00:10:09,839
the third stage cuts off and separates

140
00:10:13,350 --> 00:10:11,519
the single liquid-fueled engine shut

141
00:10:16,630 --> 00:10:13,360
down and dropping away at an altitude of

142
00:10:18,550 --> 00:10:16,640
about 125 statute miles

143
00:10:20,550 --> 00:10:18,560
the third stage performs an avoidance

144
00:10:22,710 --> 00:10:20,560
maneuver by opening a valve in a liquid

145
00:10:27,590 --> 00:10:22,720
oxygen tank to steer well clear of the

146
00:10:27,600 --> 00:10:43,590
unintelligible

147
00:10:48,310 --> 00:10:45,910
so hearing confirmation of spacecraft

148
00:10:49,990 --> 00:10:48,320
sep the soyuz capsule and the crew now

149
00:10:51,430 --> 00:10:50,000
safely in orbit

150
00:10:53,110 --> 00:10:51,440
executed all those pre-programmed

151
00:10:55,110 --> 00:10:53,120
commands hearing on the deployment of

152
00:10:56,870 --> 00:10:55,120
antennas and solar arrays went as

153
00:10:59,509 --> 00:10:56,880
planned

154
00:11:01,030 --> 00:10:59,519
so use orbiting at an altitude of about

155
00:11:03,350 --> 00:11:01,040
143

156
00:11:04,630 --> 00:11:03,360
by 118 miles

157
00:11:06,150 --> 00:11:04,640
this orbit is going to be raised

158
00:11:08,630 --> 00:11:06,160
systematically over the course of the

159
00:11:10,310 --> 00:11:08,640
next six hours placing it in close