



1
00:00:08,310 --> 00:00:06,230
and the handoff has occurred ground law

2
00:00:09,990 --> 00:00:08,320
sequencer has handed off to atlantis's

3
00:00:18,150 --> 00:00:10,000
onboard computers

4
00:00:25,429 --> 00:00:19,670
sales impression water system is

5
00:00:30,550 --> 00:00:28,230
t-minus 10 9 8

6
00:00:32,150 --> 00:00:30,560
7 may menu

7
00:00:33,030 --> 00:00:32,160
five four

8
00:00:34,069 --> 00:00:33,040
three

9
00:00:37,670 --> 00:00:34,079
two

10
00:00:40,150 --> 00:00:37,680
one and liftoff of space shuttle

11
00:00:43,590 --> 00:00:40,160
atlantis to assemble the framework for

12
00:00:46,630 --> 00:00:43,600
the science laboratories of tomorrow

13
00:00:49,670 --> 00:00:46,640

houston now controlling

14

00:00:54,549 --> 00:00:49,680

atlantis roll program

15

00:00:59,029 --> 00:00:57,029

atlantis roll maneuver is complete the

16

00:01:03,349 --> 00:00:59,039

orbiters in a heads down position on

17

00:01:11,510 --> 00:01:03,359

course for a 51.6 degree 137 by 36

18

00:01:11,520 --> 00:01:15,429

all systems in good shape

19

00:01:19,109 --> 00:01:17,109

engines throttling down as atlantis

20

00:01:21,270 --> 00:01:19,119

prepares to maneuver through the area of

21

00:01:24,390 --> 00:01:21,280

maximum dynamic pressure on the vehicle

22

00:01:25,910 --> 00:01:24,400

in the lower atmosphere

23

00:01:27,590 --> 00:01:25,920

already seven miles away from the

24

00:01:43,830 --> 00:01:27,600

kennedy space center at an altitude of

25

00:01:47,190 --> 00:01:45,510

one minute ten seconds into the flight

26
00:01:50,550 --> 00:01:47,200
the three liquid fueled engines are back

27
00:01:54,310 --> 00:01:52,469
at liftoff the fully fueled shuttle

28
00:01:56,709 --> 00:01:54,320
boosters and external tank weighed four

29
00:01:58,870 --> 00:01:56,719
and a half million pounds it now has

30
00:02:04,870 --> 00:01:58,880
burned half that liftoff weight in

31
00:02:08,389 --> 00:02:06,870
one minute 30 seconds all hydraulic

32
00:02:11,110 --> 00:02:08,399
systems in good shape

33
00:02:13,030 --> 00:02:11,120
electricity producing fuel cells also in

34
00:02:14,150 --> 00:02:13,040
excellent shape as atlantis heads down

35
00:02:15,990 --> 00:02:14,160
range

36
00:02:22,470 --> 00:02:16,000
18 miles from the kennedy space center

37
00:02:26,869 --> 00:02:24,550
the next event is burnout and separation

38
00:02:28,869 --> 00:02:26,879

of the twin solid rocket boosters which

39

00:02:48,229 --> 00:02:28,879

are burning propellant at a rate of 11

40

00:02:52,869 --> 00:02:50,470

srb separation is confirmed two minutes

41

00:02:54,949 --> 00:02:52,879

15 seconds into the flight

42

00:02:56,550 --> 00:02:54,959

atlantis is traveling 3 000 miles per

43

00:03:05,990 --> 00:02:56,560

hour downrange from the kennedy space

44

00:03:09,270 --> 00:03:07,910

ignition of the twin orbital maneuvering

45

00:03:11,589 --> 00:03:09,280

system engines on the tail of the

46

00:03:13,350 --> 00:03:11,599

orbiter providing an additional boost

47

00:03:19,830 --> 00:03:13,360

toward ascent and heading off toward the

48

00:03:19,840 --> 00:03:30,550

two minutes 45 seconds into the flight

49

00:03:30,560 --> 00:03:35,430

atlantis two-engine tower

50

00:03:39,830 --> 00:03:37,509

two engine tower

51
00:03:41,509 --> 00:03:39,840
atlantis can reach zaragoza and spain in

52
00:03:43,589 --> 00:03:41,519
the event of a single engine failure

53
00:03:47,750 --> 00:03:43,599
however all three engines are continuing

54
00:03:51,350 --> 00:03:49,830
hydraulic systems in excellent shape as

55
00:03:53,350 --> 00:03:51,360
are the fuel cells producing the

56
00:03:55,270 --> 00:03:53,360
electricity for the vehicle three

57
00:03:57,750 --> 00:03:55,280
minutes 20 seconds into the flight

58
00:04:00,470 --> 00:03:57,760
atlantis is 97 miles downrange at an

59
00:04:04,149 --> 00:04:00,480
altitude of 51 miles traveling 6 000

60
00:04:10,789 --> 00:04:06,390
views from the external tank camera

61
00:04:13,990 --> 00:04:12,470
very quiet here in mission control as

62
00:04:16,069 --> 00:04:14,000
the flight control team continues to

63
00:04:18,229 --> 00:04:16,079

watch over all systems everything

64

00:04:20,229 --> 00:04:18,239

continuing to go very smoothly with

65

00:04:25,189 --> 00:04:20,239

atlantis voyage to the international

66

00:04:25,199 --> 00:04:34,310

three minutes 50 seconds into the flight

67

00:04:34,320 --> 00:04:41,350

atlantis negative return

68

00:04:44,550 --> 00:04:42,950

atlantis can no longer return to the

69

00:04:46,070 --> 00:04:44,560

kennedy space center in the event of an

70

00:04:47,990 --> 00:04:46,080

engine failure but all three are

71

00:04:49,909 --> 00:04:48,000

continuing to perform well

72

00:04:53,590 --> 00:04:49,919

as are the hydraulic systems and the

73

00:04:56,870 --> 00:04:53,600

electricity producing fuel cells

74

00:04:59,670 --> 00:04:56,880

four minutes 20 seconds into the flight

75

00:05:02,469 --> 00:04:59,680

atlantis is 175 miles downrange from the

76

00:05:13,510 --> 00:05:02,479

launch site at an altitude of 62 miles

77

00:05:16,469 --> 00:05:15,110

the twin orbital maneuvering system

78

00:05:18,390 --> 00:05:16,479

engines continue to provide an

79

00:05:20,390 --> 00:05:18,400

additional boost to atlantis as it heads

80

00:05:22,629 --> 00:05:20,400

toward the international space station

81

00:05:26,150 --> 00:05:22,639

that ohm's assist should wrap up in the

82

00:05:27,990 --> 00:05:26,160

next 15 seconds or so

83

00:05:29,909 --> 00:05:28,000

all continuing to go very smoothly with

84

00:05:33,350 --> 00:05:29,919

atlantis trip to the international space

85

00:05:35,590 --> 00:05:33,360

station on board rick sterko in the

86

00:05:37,670 --> 00:05:35,600

forward left seat

87

00:05:39,670 --> 00:05:37,680

lee archambault in the forward right

88

00:05:41,590 --> 00:05:39,680

seat pat forester the flight engineer

89

00:05:43,350 --> 00:05:41,600

between them

90

00:05:45,189 --> 00:05:43,360

steve swanson serving as mission

91

00:05:50,230 --> 00:05:45,199

specialist number one

92

00:05:54,070 --> 00:05:51,670

clay anderson on his way to the

93

00:05:56,550 --> 00:05:54,080

international space station to replace

94

00:06:01,510 --> 00:05:56,560

sonny williams

95

00:06:05,909 --> 00:06:04,070

copy houston presta ato

96

00:06:07,990 --> 00:06:05,919

five minutes 30 seconds into the flight

97

00:06:10,469 --> 00:06:08,000

atlantis can reach orbit on two engines

98

00:06:16,150 --> 00:06:10,479

now should one fail however all three

99

00:06:27,749 --> 00:06:21,350

atlantis single engine ops three

100

00:06:33,830 --> 00:06:31,749

five minutes 55 seconds into the flight

101
00:06:35,830 --> 00:06:33,840
atlantis beginning to roll to a heads up

102
00:06:37,430 --> 00:06:35,840
position the onboard guidance system

103
00:06:43,830 --> 00:06:37,440
putting atlantis on our trajectory

104
00:06:51,270 --> 00:06:49,670
atlantis single-engine zaragoza 104.

105
00:06:55,990 --> 00:06:51,280
copy single engine

106
00:07:00,469 --> 00:06:58,070
and that call means that atlantis can

107
00:07:08,710 --> 00:07:00,479
reach zaragoza and spain on one engine

108
00:07:13,270 --> 00:07:10,870
and that call uh indicates atlantis can

109
00:07:15,029 --> 00:07:13,280
reach a safe orbit on two engines now

110
00:07:18,390 --> 00:07:15,039
all three continuing to perform as

111
00:07:21,029 --> 00:07:18,400
expected your shutdown plan is nominal

112
00:07:23,510 --> 00:07:21,039
you are go for the plus x go for the

113
00:07:31,270 --> 00:07:25,830

copy houston nominal shutdown go for the

114

00:07:34,550 --> 00:07:33,189

the flow of fuel from the external tank

115

00:07:36,309 --> 00:07:34,560

into the three space shuttle main

116

00:07:38,710 --> 00:07:36,319

engines is equal to that of draining an

117

00:07:42,230 --> 00:07:38,720

average backyard swimming pool in 25

118

00:07:50,309 --> 00:07:47,270

atlantis single-engine press 104.

119

00:07:52,230 --> 00:07:50,319

happy houston single engine press

120

00:07:54,070 --> 00:07:52,240

and that call from tony antonelli here

121

00:07:56,230 --> 00:07:54,080

in mission control indicating atlantis

122

00:07:58,550 --> 00:07:56,240

can reach orbit on one engine now should

123

00:08:00,710 --> 00:07:58,560

two fail all three engines are still

124

00:08:03,029 --> 00:08:00,720

performing as expected approaching seven

125

00:08:05,029 --> 00:08:03,039

minutes thirty seconds into the flight

126

00:08:07,110 --> 00:08:05,039

atlantis is traveling nineteen thousand

127

00:08:10,790 --> 00:08:07,120

miles per hour downrange from the

128

00:08:16,550 --> 00:08:10,800

kennedy space center 640 miles altitude

129

00:08:21,430 --> 00:08:18,950

awaiting atlantis as a rival and with

130

00:08:22,550 --> 00:08:21,440

great anticipation is the expedition 15

131

00:08:24,150 --> 00:08:22,560

crew

132

00:08:25,909 --> 00:08:24,160

aboard the international space station

133

00:08:28,390 --> 00:08:25,919

commander fyodor yurchikhin flight

134

00:08:30,629 --> 00:08:28,400

engineer oleg kotov and flight engineer

135

00:08:38,550 --> 00:08:30,639

sunny williams who will come home aboard

136

00:08:41,350 --> 00:08:39,990

eight minutes into the flight the

137

00:08:43,029 --> 00:08:41,360

engines are now throttling back to

138

00:08:45,030 --> 00:08:43,039

maintain the structural limits on the

139

00:08:46,710 --> 00:08:45,040

orbiter as it approaches loads near

140

00:08:48,389 --> 00:08:46,720

three times gravity

141

00:08:50,230 --> 00:08:48,399

we're standing by for the main engine

142

00:09:08,230 --> 00:08:50,240

cut off confirmation from the booster

143

00:09:26,949 --> 00:09:10,150

main engine cutoff confirmed 8 minutes

144

00:09:30,630 --> 00:09:28,870

separation of the fuel tank has also

145

00:09:33,030 --> 00:09:30,640

been confirmed the crew handheld

146

00:09:34,949 --> 00:09:33,040

photography setup will be underway

147

00:09:36,870 --> 00:09:34,959

shortly with a plus x maneuver that's

148

00:09:42,310 --> 00:09:36,880

managed by the commander on board rick

149

00:09:46,470 --> 00:09:44,630

atlantis uh following away you can see

150

00:09:48,470 --> 00:09:46,480

the thruster jets firing as the orbiter

151

00:09:50,630 --> 00:09:48,480

is being maneuvered for the

152

00:09:54,310 --> 00:09:50,640

handheld photography