
STS-134
LEGACY OF ENDEAVOUR
ANDREW
FEUSTEL
MISSION SPECIALIST 3
HOMETOWN: LAKE ORION, MICHIGAN
EDUCATION: Ph.D. GEOLOGICAL SCIENCES
QUEEN'S UNIVERSITY, KINGSTON, ONTARIO, CANADA
SELECTED BY NASA IN 2000
MARRIED
ENJOYS AUTO RESTORATION, GUITAR AND SKIING

1
00:00:45,910 --> 00:00:44,950
we're gonna go for engine start six five

2
00:00:46,950 --> 00:00:45,920
four

3
00:00:48,150 --> 00:00:46,960
three

4
00:00:49,350 --> 00:00:48,160
two

5
00:00:51,670 --> 00:00:49,360
one

6
00:00:53,910 --> 00:00:51,680
booster ignition and liftoff of the

7
00:00:56,470 --> 00:00:53,920
maiden voyage of endeavor on a satellite

8
00:00:58,389 --> 00:00:56,480
rescue engine

9
00:01:00,470 --> 00:00:58,399
for the past two decades

10
00:01:02,790 --> 00:01:00,480
space shuttle endeavour the youngest

11
00:01:04,710 --> 00:01:02,800
vehicle in nasa's shuttle fleet has

12
00:01:28,550 --> 00:01:04,720
symbolically carried the torch for

13
00:01:32,870 --> 00:01:30,550

nasa is preparing for the final flight

14
00:01:34,789 --> 00:01:32,880
of endeavour a trip to the international

15
00:01:36,789 --> 00:01:34,799
space station during a time frame in

16
00:01:39,190 --> 00:01:36,799
which astronauts and cosmonauts are

17
00:01:41,190 --> 00:01:39,200
celebrating the 50th anniversaries of

18
00:01:43,990 --> 00:01:41,200
the first human space flight by yuri

19
00:01:46,469 --> 00:01:44,000
gagarin and the first american space

20
00:01:48,550 --> 00:01:46,479
flight by alan shepard as well as the

21
00:01:52,870 --> 00:01:48,560
30th anniversary of the first space

22
00:01:55,510 --> 00:01:52,880
shuttle flight sts-1 columbia

23
00:01:57,270 --> 00:01:55,520
this historic 25th flight of endeavor

24
00:01:59,749 --> 00:01:57,280
will include delivery of the alpha

25
00:02:01,910 --> 00:01:59,759
magnetic spectrometer a unique

26
00:02:04,230 --> 00:02:01,920
instrument that is hoped to unveil clues

27
00:02:06,870 --> 00:02:04,240
to the origin of our universe as it

28
00:02:09,270 --> 00:02:06,880
searches for antimatter dark matter and

29
00:02:18,309 --> 00:02:09,280
exotic cosmic particles from the space

30
00:02:23,030 --> 00:02:21,030
when endeavor launches on nasa's 36th

31
00:02:26,390 --> 00:02:23,040
mission to the iss

32
00:02:28,229 --> 00:02:26,400
the sts-134 crew of six astronauts will

33
00:02:30,229 --> 00:02:28,239
begin a mission to stock the station

34
00:02:32,710 --> 00:02:30,239
with spare parts and a world-class

35
00:02:34,710 --> 00:02:32,720
stellar research instrument just months

36
00:02:35,750 --> 00:02:34,720
before the shuttle program comes to an

37
00:02:40,790 --> 00:02:35,760
end

38
00:02:43,110 --> 00:02:40,800

spectrometer 2 and the express logistics

39
00:02:44,869 --> 00:02:43,120
carrier 3 to the station

40
00:02:47,430 --> 00:02:44,879
this will also be the first shuttle

41
00:02:49,830 --> 00:02:47,440
flight to conduct a re-rendezvous but

42
00:02:51,670 --> 00:02:49,840
not docked to the space station to test

43
00:02:53,509 --> 00:02:51,680
the performance of new navigation

44
00:02:56,150 --> 00:02:53,519
sensors designed for the orion

45
00:02:58,390 --> 00:02:56,160
spacecraft

46
00:03:00,470 --> 00:02:58,400
during four scheduled space walks

47
00:03:02,790 --> 00:03:00,480
endeavour's crew will conduct the last

48
00:03:05,509 --> 00:03:02,800
spacewalks by shuttle crew members to

49
00:03:15,270 --> 00:03:05,519
prepare the iss for its next decade of

50
00:03:18,390 --> 00:03:16,869
i've flown on endeavor before so i'm

51
00:03:20,229 --> 00:03:18,400
excited to fly on it again

52
00:03:22,550 --> 00:03:20,239
and my brother's flown on endeavor navy

53
00:03:25,589 --> 00:03:22,560
captain mark kelly is the commander of

54
00:03:27,670 --> 00:03:25,599
endeavour's crew of six astronauts

55
00:03:31,830 --> 00:03:27,680
he flew on endeavour as the pilot of his

56
00:03:34,710 --> 00:03:31,840
first space flight sts-108 in 2001.

57
00:03:36,949 --> 00:03:34,720
in january 2011 kelly's wife

58
00:03:38,869 --> 00:03:36,959
congresswoman gabrielle giffords was

59
00:03:41,509 --> 00:03:38,879
critically wounded during a community

60
00:03:44,229 --> 00:03:41,519
outreach event in tucson arizona

61
00:03:45,990 --> 00:03:44,239
kelly took a brief leave from the agency

62
00:03:47,990 --> 00:03:46,000
but returned to mission training a few

63
00:03:50,149 --> 00:03:48,000

weeks later

64
00:03:52,869 --> 00:03:50,159
the pilot of endeavour is retired air

65
00:03:55,110 --> 00:03:52,879
force colonel greg h johnson making his

66
00:03:57,429 --> 00:03:55,120
second space flight he will be at the

67
00:03:58,789 --> 00:03:57,439
controls as endeavour undocks from the

68
00:04:00,789 --> 00:03:58,799
station

69
00:04:02,470 --> 00:04:00,799
he flew on endeavor as the pilot of

70
00:04:04,630 --> 00:04:02,480
sts-123

71
00:04:06,869 --> 00:04:04,640
in 2008.

72
00:04:08,390 --> 00:04:06,879
air force colonel mike fink is mission

73
00:04:10,630 --> 00:04:08,400
specialist one

74
00:04:12,789 --> 00:04:10,640
a veteran of two long duration missions

75
00:04:14,630 --> 00:04:12,799
on the international space station he

76
00:04:16,390 --> 00:04:14,640
commanded the station complex on

77
00:04:18,469 --> 00:04:16,400
expedition 18.

78
00:04:22,069 --> 00:04:18,479
during this mission is first aboard the

79
00:04:24,310 --> 00:04:22,079
shuttle he will conduct three spacewalks

80
00:04:26,870 --> 00:04:24,320
mission specialist two is italian air

81
00:04:29,590 --> 00:04:26,880
force colonel roberto vittori twice

82
00:04:31,590 --> 00:04:29,600
flown aboard a russian soyuz as an iss

83
00:04:33,990 --> 00:04:31,600
visitor and part of the crew that

84
00:04:35,510 --> 00:04:34,000
delivered fresh soyuz spacecraft to the

85
00:04:37,670 --> 00:04:35,520
outpost

86
00:04:40,070 --> 00:04:37,680
as the last non-american astronaut

87
00:04:42,070 --> 00:04:40,080
scheduled to fly on the shuttle vittori

88
00:04:45,270 --> 00:04:42,080

will meet up with paolo nespoli on the

89
00:04:47,350 --> 00:04:45,280
iss for two italian astronauts on orbit

90
00:04:50,230 --> 00:04:47,360
at the same time

91
00:04:53,270 --> 00:04:50,240
dr drew feustel mission specialist three

92
00:04:55,350 --> 00:04:53,280
is making his first voyage to the iss

93
00:04:57,189 --> 00:04:55,360
after performing three spacewalks during

94
00:04:59,030 --> 00:04:57,199
sts-125

95
00:05:00,710 --> 00:04:59,040
the final hubble space telescope

96
00:05:02,629 --> 00:05:00,720
servicing mission

97
00:05:06,469 --> 00:05:02,639
on this flight he will serve as lead

98
00:05:08,830 --> 00:05:06,479
spacewalker for three additional evas

99
00:05:11,670 --> 00:05:08,840
mission specialist four is dr greg

100
00:05:13,430 --> 00:05:11,680
shamatoff he served as an iss flight

101
00:05:16,629 --> 00:05:13,440
engineer for six months during

102
00:05:18,870 --> 00:05:16,639
expeditions 17 and 18 returning to earth

103
00:05:25,990 --> 00:05:18,880
on endeavor he will perform two

104
00:05:29,510 --> 00:05:27,510
we've got a whole list of mission

105
00:05:30,469 --> 00:05:29,520
objectives probably 30 things on the

106
00:05:32,550 --> 00:05:30,479
list

107
00:05:35,430 --> 00:05:32,560
but the big objectives is to get the

108
00:05:37,029 --> 00:05:35,440
alpha magnetic spectrometer installed on

109
00:05:39,510 --> 00:05:37,039
the outside of the space station the

110
00:05:41,990 --> 00:05:39,520
alpha magnetic spectrometer 1 a

111
00:05:45,590 --> 00:05:42,000
simplified cosmic ray detector flew on

112
00:05:48,310 --> 00:05:45,600
sts-91 in june 1998.

113
00:05:49,909 --> 00:05:48,320

the ams-2 is a first-of-its-kind

114
00:05:52,150 --> 00:05:49,919
instrument designed to study the

115
00:05:54,150 --> 00:05:52,160
fundamental nature of the universe and

116
00:05:56,390 --> 00:05:54,160
will allow us for the first time to

117
00:05:58,230 --> 00:05:56,400
search for antimatter and dark matter

118
00:06:01,189 --> 00:05:58,240
theorized to exist

119
00:06:04,230 --> 00:06:01,199
nobel physicist dr samuel ting leads the

120
00:06:05,350 --> 00:06:04,240
team of over 500 scientists from 16

121
00:06:09,430 --> 00:06:05,360
countries

122
00:06:11,830 --> 00:06:09,440
i started studying physics soon after i

123
00:06:15,270 --> 00:06:11,840
achieved my degree as a test pilot i

124
00:06:16,790 --> 00:06:15,280
went back and complete my degree and

125
00:06:20,629 --> 00:06:16,800
ironically

126
00:06:23,270 --> 00:06:20,639
my teacher was a professor batistan

127
00:06:26,629 --> 00:06:23,280
that is the deputy chief of the ams

128
00:06:29,189 --> 00:06:26,639
experiment they may appear as a

129
00:06:31,670 --> 00:06:29,199
very strange coincidence that today i

130
00:06:33,909 --> 00:06:31,680
will be the one to take this unique

131
00:06:36,790 --> 00:06:33,919
piece of hardware take it from the bay

132
00:06:39,670 --> 00:06:36,800
of the shuttle and give it to install on

133
00:06:42,070 --> 00:06:39,680
the on the station on flight day four

134
00:06:44,870 --> 00:06:42,080
victorian feustel operating the shuttle

135
00:06:47,909 --> 00:06:44,880
arm will grapple the ams2 and hand it

136
00:06:49,990 --> 00:06:47,919
off to the greggs johnson and shamatoff

137
00:06:53,670 --> 00:06:50,000
operating the station arm for robotic

138
00:06:55,350 --> 00:06:53,680

installation onto the station's s3 truss

139
00:06:57,990 --> 00:06:55,360
the second of two components that

140
00:07:01,029 --> 00:06:58,000
endeavors crew will attach to the iss is

141
00:07:03,110 --> 00:07:01,039
the elc3 pallet the express logistics

142
00:07:06,870 --> 00:07:03,120
carrier 3.

143
00:07:07,550 --> 00:07:06,880
elc 3 similar to elc's 1 and 2 delivered

144
00:07:14,629 --> 00:07:07,560
on

145
00:07:17,350 --> 00:07:14,639
assembly 2 sasses s-band antenna support

146
00:07:20,790 --> 00:07:17,360
assemblies and a spare arm for dexter

147
00:07:23,589 --> 00:07:20,800
the special purpose dextrous manipulator

148
00:07:26,150 --> 00:07:23,599
on flight day three victorian fink will

149
00:07:28,390 --> 00:07:26,160
unbirth the elc-3 with the shuttle arm

150
00:07:30,950 --> 00:07:28,400
and hand it off to station arm operators

151
00:07:34,749 --> 00:07:30,960
shamatov and johnson for installation on

152
00:07:40,550 --> 00:07:37,270
sts-134 will be the first shuttle flight

153
00:07:43,029 --> 00:07:40,560
to re-rendezvous with the iss and to fly

154
00:07:45,029 --> 00:07:43,039
a rendezvous trajectory to mimic orion's

155
00:07:47,510 --> 00:07:45,039
trajectory

156
00:07:50,230 --> 00:07:47,520
the purpose of storm sensor test for

157
00:07:52,230 --> 00:07:50,240
orion relnav risk mitigation is to

158
00:07:54,550 --> 00:07:52,240
evaluate the performance of orion

159
00:07:56,469 --> 00:07:54,560
relative navigation sensors for future

160
00:07:59,029 --> 00:07:56,479
spacecraft

161
00:08:01,510 --> 00:07:59,039
while kelly is flying endeavor feustel

162
00:08:03,909 --> 00:08:01,520
will monitor storm sensors from a laptop

163
00:08:06,390 --> 00:08:03,919

on the flight deck during rendezvous

164
00:08:09,510 --> 00:08:06,400
undocking and the re-rendezvous after

165
00:08:11,430 --> 00:08:09,520
the traditional iss fly around

166
00:08:13,510 --> 00:08:11,440
endeavour will pull away from station

167
00:08:15,830 --> 00:08:13,520
and execute several maneuvers before

168
00:08:17,670 --> 00:08:15,840
approaching on a different trajectory to

169
00:08:20,469 --> 00:08:17,680
allow the storm vision navigation

170
00:08:22,390 --> 00:08:20,479
sensors to gather data

171
00:08:25,670 --> 00:08:22,400
although endeavour will not actually

172
00:08:29,830 --> 00:08:25,680
re-dock with iss it will fly to a close

173
00:08:32,389 --> 00:08:29,840
approach of 1044 feet below and 300 feet

174
00:08:34,550 --> 00:08:32,399
behind the station before executing a

175
00:08:37,029 --> 00:08:34,560
third separation burn and departing

176
00:08:38,630 --> 00:08:37,039
station for the final time when we come

177
00:08:40,310 --> 00:08:38,640
up back in front of the space station

178
00:08:41,670 --> 00:08:40,320
again we're then going to do these

179
00:08:43,990 --> 00:08:41,680
series of burns where we're going to

180
00:08:47,829 --> 00:08:44,000
fall behind the space station

181
00:08:50,790 --> 00:08:47,839
you know a couple hundred thousand feet

182
00:08:52,790 --> 00:08:50,800
and then we're gonna come back in

183
00:08:54,630 --> 00:08:52,800
doing a profile that's actually quite

184
00:09:01,509 --> 00:08:54,640
similar to what apollo used for

185
00:09:05,670 --> 00:09:02,350
during

186
00:09:07,750 --> 00:09:05,680
sts-134 feistel fink and shamatof will

187
00:09:10,070 --> 00:09:07,760
take turns stepping outside the hatch

188
00:09:12,949 --> 00:09:10,080

for four scheduled spacewalks

189
00:09:15,509 --> 00:09:12,959
eva one on flight day five focuses on

190
00:09:17,269 --> 00:09:15,519
missy's materials international space

191
00:09:19,269 --> 00:09:17,279
station experiments

192
00:09:23,110 --> 00:09:19,279
voistel and shamatoff will return the

193
00:09:25,110 --> 00:09:23,120
missy 7a and 7b pallets from the elc 2

194
00:09:26,710 --> 00:09:25,120
and transfer missy 8 to the same

195
00:09:28,230 --> 00:09:26,720
location

196
00:09:29,190 --> 00:09:28,240
the idea is to expose these things to

197
00:09:30,710 --> 00:09:29,200
the

198
00:09:33,910 --> 00:09:30,720
harsh environment of space for a long

199
00:09:36,310 --> 00:09:33,920
period and see what happens for eva 2 on

200
00:09:38,070 --> 00:09:36,320
flight day 7 fink and feustel will

201
00:09:39,990 --> 00:09:38,080
refill one of the station's port

202
00:09:41,829 --> 00:09:40,000
radiators with ammonia

203
00:09:44,310 --> 00:09:41,839
they will also clean and lubricate the

204
00:09:46,150 --> 00:09:44,320
station's port sarge the solar array

205
00:09:49,430 --> 00:09:46,160
rotary joint

206
00:09:51,670 --> 00:09:49,440
prior to eva3 voystel and fink will test

207
00:09:53,990 --> 00:09:51,680
a new protocol combining the airlock

208
00:09:56,790 --> 00:09:54,000
campout pre-breathe the exercise

209
00:10:00,470 --> 00:09:56,800
pre-breathe and the spacesuit itself

210
00:10:03,670 --> 00:10:00,480
we were introduced to a pre-breathe

211
00:10:05,829 --> 00:10:03,680
option by mike gernhardt

212
00:10:08,310 --> 00:10:05,839
an astronaut in the core and it's called

213
00:10:11,509 --> 00:10:08,320

the in-suit light exercise pre-breathe

214
00:10:14,870 --> 00:10:11,519
protocol we call it aisle i-s-l-e for

215
00:10:16,870 --> 00:10:14,880
eva 3 on flight day 9 feustel and fink

216
00:10:19,190 --> 00:10:16,880
will install a power and data grapple

217
00:10:20,470 --> 00:10:19,200
fixture for the station arm on the zarya

218
00:10:22,630 --> 00:10:20,480
module

219
00:10:24,710 --> 00:10:22,640
they will also run two y cables for

220
00:10:27,910 --> 00:10:24,720
redundant power supply to the russian

221
00:10:33,670 --> 00:10:30,870
during eva four shamitof and fink will

222
00:10:35,670 --> 00:10:33,680
transfer and install the obss the

223
00:10:38,389 --> 00:10:35,680
shuttle arms extension boom to the

224
00:10:47,509 --> 00:10:38,399
station's s-1 truss for potential future

225
00:10:50,870 --> 00:10:49,430
we have come very far in the last 50

226
00:10:53,350 --> 00:10:50,880
years from not being able to fly in

227
00:10:55,030 --> 00:10:53,360
space to landing on the moon and

228
00:10:57,350 --> 00:10:55,040
building this incredible facility in

229
00:10:59,269 --> 00:10:57,360
orbit and routinely flying

230
00:11:00,870 --> 00:10:59,279
you know people up and down into low

231
00:11:02,790 --> 00:11:00,880
earth orbit it is amazing how much we've

232
00:11:05,190 --> 00:11:02,800
accomplished in 50 years and it took so

233
00:11:06,710 --> 00:11:05,200
many people to make all that possible

234
00:11:08,630 --> 00:11:06,720
it's an unbelievable water to kind of be

235
00:11:12,630 --> 00:11:08,640
the representative of that generation of

236
00:11:15,750 --> 00:11:12,640
dreamers for me we have a huge honor and

237
00:11:18,470 --> 00:11:15,760
responsibility to make this the best

238
00:11:22,870 --> 00:11:18,480

mission that we can to honor all of the

239
00:11:25,509 --> 00:11:22,880
engineers all the way from the pre-sts-1

240
00:11:27,590 --> 00:11:25,519
at the very beginning in the 1970s when

241
00:11:28,389 --> 00:11:27,600
we started to design the space shuttle

242
00:11:30,069 --> 00:11:28,399
all the

243
00:11:32,630 --> 00:11:30,079
effort the blood the sweat the tears

244
00:11:35,110 --> 00:11:32,640
that have gone into making the space

245
00:11:37,990 --> 00:11:35,120
shuttle program as wonderful as it has

246
00:11:40,790 --> 00:11:38,000
to to fly on the penultimate mission and