



1
00:00:07,520 --> 00:00:22,230

[Music]

2
00:00:22,240 --> 00:00:27,600

so

3
00:01:07,910 --> 00:00:38,810

[Music]

4
00:01:13,270 --> 00:01:10,310
you are looking live at launch site 31

5
00:01:16,149 --> 00:01:13,280
at the baikonur cosmodrome in kazakhstan

6
00:01:18,390 --> 00:01:16,159
where a soyuz 2.1a booster stands fully

7
00:01:20,870 --> 00:01:18,400
fueled ready for launch to send an

8
00:01:23,350 --> 00:01:20,880
american astronaut and two roscosmos

9
00:01:24,710 --> 00:01:23,360
cosmonauts into orbit on a fast track

10
00:01:26,310 --> 00:01:24,720
two orbit journey to reach the

11
00:01:27,350 --> 00:01:26,320
international space station that will be

12
00:01:29,590 --> 00:01:27,360
their home

13
00:01:31,030 --> 00:01:29,600

for the next six months

14

00:01:32,789 --> 00:01:31,040

good morning from mission control in

15

00:01:35,190 --> 00:01:32,799

houston and the international space

16

00:01:36,870 --> 00:01:35,200

station flight control room as countdown

17

00:01:39,510 --> 00:01:36,880

clocks are ticking backward for the

18

00:01:43,590 --> 00:01:39,520

launch of the soyuz ms-22 spacecraft

19

00:01:45,749 --> 00:01:43,600

atop its soyuz booster at 8 54 and 49

20

00:01:49,670 --> 00:01:45,759

seconds am central time

21

00:01:52,149 --> 00:01:49,680

6 54 and 49 seconds p.m in baikonur

22

00:01:54,389 --> 00:01:52,159

about seven minutes after sunset in the

23

00:01:57,670 --> 00:01:54,399

central asian desert the weather in

24

00:02:00,789 --> 00:01:57,680

baikonur is ideal 85 degrees fahrenheit

25

00:02:02,630 --> 00:02:00,799

cloudless sky for today's launch

26

00:02:04,230 --> 00:02:02,640

earlier today the soyuz booster was

27

00:02:06,469 --> 00:02:04,240

fueled for launch by engineers in

28

00:02:09,109 --> 00:02:06,479

baikonur a process that was completed a

29

00:02:11,350 --> 00:02:09,119

few hours ago the launch control team in

30

00:02:14,070 --> 00:02:11,360

baikonur reporting that all systems are

31

00:02:17,510 --> 00:02:14,080

go for launch working no issues as the

32

00:02:19,110 --> 00:02:17,520

countdown enters its final phase

33

00:02:21,510 --> 00:02:19,120

here in mission control the team is

34

00:02:23,350 --> 00:02:21,520

watching over the expedition 67 crew and

35

00:02:25,910 --> 00:02:23,360

station systems on the international

36

00:02:28,070 --> 00:02:25,920

space station the orbit two team having

37

00:02:30,470 --> 00:02:28,080

just completed a shift handover from the

38

00:02:33,670 --> 00:02:30,480

overnight orbit one team preparing to

39

00:02:34,869 --> 00:02:33,680

support the arrival of soyuz ms-22 later

40

00:02:36,790 --> 00:02:34,879

today

41

00:02:39,589 --> 00:02:36,800

the station population will increase

42

00:02:42,150 --> 00:02:39,599

temporarily from 7 to 10 with the

43

00:02:44,470 --> 00:02:42,160

addition of nasa astronaut frank rubio

44

00:02:47,270 --> 00:02:44,480

and his rose cosmos crewmates soyuz

45

00:02:48,550 --> 00:02:47,280

commander sergey prokopyev and dimitri

46

00:02:50,070 --> 00:02:48,560

patellan

47

00:02:51,670 --> 00:02:50,080

the crew is all set to begin its

48

00:02:54,150 --> 00:02:51,680

three-hour flight to the international

49

00:02:57,190 --> 00:02:54,160

space station docking scheduled at 12 11

50

00:02:59,110 --> 00:02:57,200

p.m central time to the rassvet module

51
00:03:01,110 --> 00:02:59,120
on the earth-facing side of the russian

52
00:03:02,470 --> 00:03:01,120
segment of the international space

53
00:03:04,229 --> 00:03:02,480
station

54
00:03:07,110 --> 00:03:04,239
once the hatches are opened between the

55
00:03:09,110 --> 00:03:07,120
newly arrived soyuz and the station the

56
00:03:11,670 --> 00:03:09,120
new residents will be greeted by station

57
00:03:14,630 --> 00:03:11,680
commander oleg artemia varos cosmos and

58
00:03:16,470 --> 00:03:14,640
his roscosmos crewmates denise madvayav

59
00:03:18,309 --> 00:03:16,480
and sergey korsakoff

60
00:03:21,350 --> 00:03:18,319
along with nasa astronauts chell

61
00:03:23,430 --> 00:03:21,360
lindgren bob hines and jessica watkins

62
00:03:25,430 --> 00:03:23,440
and european space agency astronaut

63
00:03:27,589 --> 00:03:25,440

samantha christopher reddy

64

00:03:29,270 --> 00:03:27,599

she will take over as expedition 68

65

00:03:31,190 --> 00:03:29,280

commander during a change of command

66

00:03:33,830 --> 00:03:31,200

ceremony next week

67

00:03:37,350 --> 00:03:33,840

before artemyev madvayev and korsakov

68

00:03:39,270 --> 00:03:37,360

depart in their soyuz ms-21 spacecraft

69

00:03:41,190 --> 00:03:39,280

headed for a parachute assisted landing

70

00:03:43,990 --> 00:03:41,200

on september 29th

71

00:03:45,670 --> 00:03:44,000

on the steppe of kazakhstan

72

00:03:47,830 --> 00:03:45,680

frank rubio today becomes the first

73

00:03:50,149 --> 00:03:47,840

american to launch on a soyuz spacecraft

74

00:03:51,910 --> 00:03:50,159

since mark vanderheid did so in march of

75

00:03:54,550 --> 00:03:51,920

2021.

76

00:03:57,110 --> 00:03:54,560

rubio is flying on the soyuz ms-22

77

00:03:59,350 --> 00:03:57,120

vehicle and roscosmos cosmonaut anna

78

00:04:02,309 --> 00:03:59,360

kikena is flying to the station as part

79

00:04:04,390 --> 00:04:02,319

of the spacex crew dragon crew 5 crew

80

00:04:06,949 --> 00:04:04,400

that includes nasa astronauts nicole

81

00:04:09,270 --> 00:04:06,959

mann and josh cassida and japan

82

00:04:10,869 --> 00:04:09,280

aerospace exploration agency astronaut

83

00:04:13,110 --> 00:04:10,879

koichi bakata

84

00:04:15,110 --> 00:04:13,120

this ensuring a reciprocal method of

85

00:04:17,670 --> 00:04:15,120

maintaining maximum launch and landing

86

00:04:18,949 --> 00:04:17,680

capability for safe space station

87

00:04:21,030 --> 00:04:18,959

operations

88

00:04:22,469 --> 00:04:21,040

the crew 5 crew is in quarantine now

89

00:04:27,030 --> 00:04:22,479

preparing for their launch to the

90

00:04:31,110 --> 00:04:28,870

here in mission control as mentioned

91

00:04:32,790 --> 00:04:31,120

shift handover just completed at the

92

00:04:34,790 --> 00:04:32,800

bottom of your screen is flight director

93

00:04:36,870 --> 00:04:34,800

allison bollinger she will be the flight

94

00:04:38,950 --> 00:04:36,880

director on console throughout the day

95

00:04:40,710 --> 00:04:38,960

today for launch docking and the

96

00:04:43,030 --> 00:04:40,720

subsequent hatch opening later this

97

00:04:46,230 --> 00:04:43,040

afternoon that will enable ruby oprah

98

00:04:48,629 --> 00:04:46,240

copiev and patellin to take residents on

99

00:04:50,390 --> 00:04:48,639

board the international outpost at the

100

00:04:52,790 --> 00:04:50,400

top of your screen veteran astronaut

101
00:04:54,870 --> 00:04:52,800
jessica mear she'll be talking to the

102
00:04:56,629 --> 00:04:54,880
space station crew throughout the day

103
00:04:58,629 --> 00:04:56,639
when required

104
00:05:00,469 --> 00:04:58,639
half a world away at the russian mission

105
00:05:03,030 --> 00:05:00,479
control center on the outskirts of

106
00:05:05,670 --> 00:05:03,040
moscow the russian flight controllers

107
00:05:07,830 --> 00:05:05,680
are carefully watching all the data on

108
00:05:10,550 --> 00:05:07,840
their consoles they will take over

109
00:05:12,950 --> 00:05:10,560
control of the flight of the soyuz ms-22

110
00:05:15,749 --> 00:05:12,960
to the international space station about

111
00:05:17,990 --> 00:05:15,759
8 minutes and 45 seconds after launch

112
00:05:20,550 --> 00:05:18,000
after third stage shutdown on the soyuz

113
00:05:22,629 --> 00:05:20,560

booster and spacecraft separation they

114

00:05:24,710 --> 00:05:22,639

will then be in control of soyuz

115

00:05:26,870 --> 00:05:24,720

operations all the way through its

116

00:05:30,230 --> 00:05:26,880

planned automated docking to the

117

00:05:36,230 --> 00:05:34,150

[Music]

118

00:05:39,670 --> 00:05:36,240

that you're hearing music that is being

119

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

piped into the soyuz spacecraft by

120

00:05:44,469 --> 00:05:41,600

launch controllers at the block house in

121

00:05:47,350 --> 00:05:44,479

baikonur a time-honored tradition

122

00:05:49,510 --> 00:05:47,360

the launch now less than 50 minutes away

123

00:05:53,029 --> 00:05:49,520

will get a final go no go for launch in

124

00:05:55,749 --> 00:05:53,039

about 20 minutes from now this is a live

125

00:05:58,230 --> 00:05:55,759

view of soyuz ms-22 on the launch pad at

126
00:06:01,510 --> 00:05:58,240
baikonur site 31 is the launch site for

127
00:06:05,350 --> 00:06:01,520
today liftoff again scheduled for 8 54

128
00:06:07,350 --> 00:06:05,360
and 49 seconds am central time 6 54 and

129
00:06:09,830 --> 00:06:07,360
49 seconds p.m

130
00:06:12,469 --> 00:06:09,840
in baikonur the countdown proceeding on

131
00:06:14,950 --> 00:06:12,479
schedule no issues being reported by the

132
00:06:17,909 --> 00:06:14,960
engineers down in baikonur

133
00:06:20,070 --> 00:06:17,919
atop the soyuz 2.1a booster strapped

134
00:06:21,749 --> 00:06:20,080
into their seats in the descent module

135
00:06:24,550 --> 00:06:21,759
or center section of the soyuz

136
00:06:27,110 --> 00:06:24,560
spacecraft are nasa's frank rubio and

137
00:06:28,469 --> 00:06:27,120
sergey prakopiev and dimitri patellan of

138
00:06:31,029 --> 00:06:28,479

roscosmos

139

00:06:33,590 --> 00:06:31,039

brocopia of as soyuz commander is in the

140

00:06:35,990 --> 00:06:33,600

center seat of the descent module

141

00:06:38,309 --> 00:06:36,000

flanked on his left by patellin serving

142

00:06:40,870 --> 00:06:38,319

as board engineer number one and to

143

00:06:43,909 --> 00:06:40,880

procopies right nasa's frank rubio

144

00:06:45,350 --> 00:06:43,919

serving as board engineer two for rubio

145

00:06:47,990 --> 00:06:45,360

and patellin this will be their first

146

00:06:50,390 --> 00:06:48,000

flight into space for procopio his

147

00:06:51,670 --> 00:06:50,400

second flight into space

148

00:06:52,870 --> 00:06:51,680

from time to time through the

149

00:06:55,029 --> 00:06:52,880

interpreter

150

00:06:56,870 --> 00:06:55,039

that you'll be hearing

151

00:06:59,830 --> 00:06:56,880

regarding ascent performance calls

152

00:07:01,830 --> 00:06:59,840

you'll hear the soyuz call sign of altai

153

00:07:04,550 --> 00:07:01,840

that is a mountain range in central and

154

00:07:06,950 --> 00:07:04,560

eastern asia each soyuz commander

155

00:07:09,110 --> 00:07:06,960

selects a call sign for their soyuz

156

00:07:12,390 --> 00:07:09,120

vehicle from launch to docking and again

157

00:07:15,110 --> 00:07:12,400

from undocking through landing altai is

158

00:07:16,550 --> 00:07:15,120

procopia's call sign for his soyuz

159

00:07:18,309 --> 00:07:16,560

vehicle

160

00:07:20,469 --> 00:07:18,319

if you're just joining us again you're

161

00:07:23,029 --> 00:07:20,479

looking live at site 31 of the baikonur

162

00:07:26,070 --> 00:07:23,039

cosmodrome in the central asian desert

163

00:07:28,309 --> 00:07:26,080

as we stand 48 minutes and 17 seconds

164

00:07:30,070 --> 00:07:28,319

away from liftoff of the three new

165

00:07:31,029 --> 00:07:30,080

residents to the international space

166

00:07:33,990 --> 00:07:31,039

station

167

00:07:35,340 --> 00:07:34,000

frank rubio sergey prokopyev and dimitri

168

00:07:54,340 --> 00:07:35,350

patellan

169

00:07:59,749 --> 00:07:56,950

[Music]

170

00:08:02,629 --> 00:07:59,759

again that's uh music being piped into

171

00:08:04,629 --> 00:08:02,639

uh the spacecraft uh for the cosmonauts

172

00:08:07,350 --> 00:08:04,639

uh procopia and patellin and for the

173

00:08:09,670 --> 00:08:07,360

nasa astronaut frank rubio to listen to

174

00:08:11,350 --> 00:08:09,680

basically uh keeping them relaxed in the

175

00:08:12,869 --> 00:08:11,360

final minutes of the countdown that will

176

00:08:16,150 --> 00:08:12,879

lead to launch

177

00:08:18,309 --> 00:08:16,160

about 47.5 minutes from now

178

00:08:20,550 --> 00:08:18,319

the crew flew to the baikonur cosmodrome

179

00:08:22,629 --> 00:08:20,560

from their training base at star city on

180

00:08:24,950 --> 00:08:22,639

september 5th for final pre-launch

181

00:08:27,909 --> 00:08:24,960

training and inspections of their soyuz

182

00:08:30,469 --> 00:08:27,919

spacecraft while that was ongoing the

183

00:08:32,310 --> 00:08:30,479

soyuz ms-22 was encapsulated into the

184

00:08:34,790 --> 00:08:32,320

upper stage of the soyuz booster in the

185

00:08:36,230 --> 00:08:34,800

integration building and after the three

186

00:08:38,310 --> 00:08:36,240

stages of the booster were mated

187

00:08:40,709 --> 00:08:38,320

together late last week the soyuz rocket

188

00:08:43,269 --> 00:08:40,719

as you see in this video began its trek

189

00:08:46,070 --> 00:08:43,279

to the launch pad last sunday hauled to

190

00:08:47,990 --> 00:08:46,080

the pad horizontally on a rail car and a

191

00:08:49,110 --> 00:08:48,000

process that took about 40 minutes to

192

00:08:51,190 --> 00:08:49,120

complete

193

00:08:53,670 --> 00:08:51,200

once at the pad the soyuz was raised

194

00:08:57,030 --> 00:08:53,680

hydraulically to its vertical position

195

00:08:58,790 --> 00:08:57,040

for final pre-launch preparations

196

00:09:00,630 --> 00:08:58,800

we continue to watch countdown clocks

197

00:09:02,550 --> 00:09:00,640

ticking backward for the launch of the

198

00:09:05,910 --> 00:09:02,560

next crew to the international space

199

00:09:08,070 --> 00:09:05,920

station 46 and a half minutes from now

200

00:09:10,470 --> 00:09:08,080

out on the launch pad at site 31 of the

201
00:09:12,870 --> 00:09:10,480
baikonur cosmodrome the soyuz booster is

202
00:09:15,590 --> 00:09:12,880
poised for launch fully fueled with

203
00:09:16,790 --> 00:09:15,600
kerosene and liquid oxygen as the

204
00:09:19,430 --> 00:09:16,800
propellant

205
00:09:21,509 --> 00:09:19,440
the soyuz 2.1a is the ticket to ride for

206
00:09:22,870 --> 00:09:21,519
crews launching from the baikonur

207
00:09:25,110 --> 00:09:22,880
cosmodrome

208
00:09:28,150 --> 00:09:25,120
let's take a closer look at that soyuz

209
00:09:33,590 --> 00:09:30,870
the soyuz rocket stands 162 feet tall

210
00:09:35,350 --> 00:09:33,600
weighs about 640 000 pounds and consists

211
00:09:37,269 --> 00:09:35,360
of the soyuz spacecraft inside a

212
00:09:41,190 --> 00:09:37,279
protective shroud at the top and the

213
00:09:43,110 --> 00:09:41,200

three-stage soyuz 2.1a booster below

214

00:09:44,870 --> 00:09:43,120

the first stage has four liquid engines

215

00:09:46,870 --> 00:09:44,880

strapped to the side of the core vehicle

216

00:09:48,829 --> 00:09:46,880

each will burn for one minute and 58

217

00:09:51,430 --> 00:09:48,839

seconds before they drop

218

00:09:53,030 --> 00:09:51,440

away the core engine of the first stage

219

00:09:55,350 --> 00:09:53,040

also serves as the second stage and

220

00:09:57,430 --> 00:09:55,360

continues to burn until 4 minutes and 57

221

00:09:59,110 --> 00:09:57,440

seconds into the flight

222

00:10:00,630 --> 00:09:59,120

the third stage has a single engine that

223

00:10:02,790 --> 00:10:00,640

will ignite before the separation of the

224

00:10:04,949 --> 00:10:02,800

second stage helping to push it away

225

00:10:07,509 --> 00:10:04,959

safely it will burn until the 8 minutes

226

00:10:08,949 --> 00:10:07,519

and 46 seconds mark of the flight and at

227

00:10:10,470 --> 00:10:08,959

that point the soyuz spacecraft will

228

00:10:18,750 --> 00:10:10,480

separate from the third stage having

229

00:10:24,230 --> 00:10:21,269

[Music]

230

00:10:25,990 --> 00:10:24,240

on site uh 31 at the baikonur cosmodrome

231

00:10:27,030 --> 00:10:26,000

in kazakhstan is what you're looking at

232

00:10:29,350 --> 00:10:27,040

right now

233

00:10:31,190 --> 00:10:29,360

in the central asian desert again the

234

00:10:33,430 --> 00:10:31,200

weather is ideal

235

00:10:35,030 --> 00:10:33,440

as we are approaching sunset at the

236

00:10:39,430 --> 00:10:35,040

launch site

237

00:10:42,150 --> 00:10:39,440

sunset will occur at about 6 47 p.m in

238

00:10:44,870 --> 00:10:42,160

baikonur about seven minutes before

239

00:10:46,790 --> 00:10:44,880

liftoff we'll talk a bit more about the

240

00:10:49,509 --> 00:10:46,800

orbital mechanics of this two-orbit

241

00:10:53,330 --> 00:10:49,519

rendezvous for rubio procopio

242

00:10:55,110 --> 00:10:53,340

and patellin in just a moment

243

00:10:56,310 --> 00:10:55,120

[Music]

244

00:10:59,590 --> 00:10:56,320

again

245

00:11:01,590 --> 00:10:59,600

atop that soyuz 2.1a booster strapped

246

00:11:05,350 --> 00:11:01,600

into their seats in the descent module

247

00:11:07,750 --> 00:11:05,360

of the soyuz our nasa's frank rubio and

248

00:11:09,190 --> 00:11:07,760

sergey procopio and dimitri patellan of

249

00:11:12,870 --> 00:11:09,200

roscosmos

250

00:11:16,470 --> 00:11:12,880

as the countdown is uh now 44.5 minutes

251
00:11:20,470 --> 00:11:18,949
the soyuz spacecraft the ms-22 which

252
00:11:22,389 --> 00:11:20,480
will be headed to the international

253
00:11:24,870 --> 00:11:22,399
space station a short time from now is

254
00:11:26,470 --> 00:11:24,880
comprised of three sections

255
00:11:28,470 --> 00:11:26,480
let's take a look at the soyuz

256
00:11:30,790 --> 00:11:28,480
spacecraft that soon will be delivering

257
00:11:35,350 --> 00:11:30,800
rubio procopia and patellin to the

258
00:11:40,630 --> 00:11:37,910
the whole soyuz spacecraft is 24.5 feet

259
00:11:42,870 --> 00:11:40,640
long with an overall volume of 177 cubic

260
00:11:44,870 --> 00:11:42,880
feet and comprised of three modules the

261
00:11:46,949 --> 00:11:44,880
descent module situated in the middle of

262
00:11:48,550 --> 00:11:46,959
the soyuz vehicle contains customized

263
00:11:50,389 --> 00:11:48,560

seats for the crew members during launch

264

00:11:51,990 --> 00:11:50,399

entry and landing and contains all the

265

00:11:54,150 --> 00:11:52,000

controls and displays necessary for the

266

00:11:55,990 --> 00:11:54,160

flight it also houses life support

267

00:11:57,590 --> 00:11:56,000

systems batteries for the re-entry and

268

00:11:59,110 --> 00:11:57,600

landing and the parachute and soft

269

00:12:00,790 --> 00:11:59,120

landing rocket engines that slow the

270

00:12:03,430 --> 00:12:00,800

soyuz just before touchdown as a

271

00:12:05,110 --> 00:12:03,440

spacecraft lands in kazakhstan

272

00:12:07,110 --> 00:12:05,120

there are eight hydrogen peroxide

273

00:12:08,710 --> 00:12:07,120

thrusters located on the module which

274

00:12:10,710 --> 00:12:08,720

are used to control the spacecraft's

275

00:12:13,350 --> 00:12:10,720

orientation or attitude during the

276
00:12:14,870 --> 00:12:13,360
descent until parachute deployment

277
00:12:16,470 --> 00:12:14,880
the descent module also contains a

278
00:12:18,230 --> 00:12:16,480
guidance navigation and control system

279
00:12:20,150 --> 00:12:18,240
used to maneuver the vehicle during the

280
00:12:22,230 --> 00:12:20,160
descent phase of the mission

281
00:12:24,470 --> 00:12:22,240
this descent module is 7.3 feet long

282
00:12:27,750 --> 00:12:24,480
with a diameter of 7.1 feet and a

283
00:12:29,030 --> 00:12:27,760
habitable volume of 124 cubic feet it is

284
00:12:30,790 --> 00:12:29,040
the only portion of the soyuz that

285
00:12:33,110 --> 00:12:30,800
survives the return to earth

286
00:12:34,949 --> 00:12:33,120
the orbital module at the top is 9.8

287
00:12:37,030 --> 00:12:34,959
feet long it connects to the descent

288
00:12:38,389 --> 00:12:37,040

module via pressurized hatch this is

289

00:12:39,910 --> 00:12:38,399

where the crew has a small amount of

290

00:12:42,069 --> 00:12:39,920

room to move around following launch

291

00:12:43,990 --> 00:12:42,079

during the flight to the space station

292

00:12:45,990 --> 00:12:44,000

it has a docking mechanism hatch and

293

00:12:47,990 --> 00:12:46,000

rendezvous antennas located at the front

294

00:12:49,509 --> 00:12:48,000

end the docking mechanism is used to

295

00:12:51,110 --> 00:12:49,519

dock with the space station and the

296

00:12:53,590 --> 00:12:51,120

hatch allows entry into the orbiting

297

00:12:55,190 --> 00:12:53,600

complex the rendezvous antennas are used

298

00:12:57,190 --> 00:12:55,200

by the automated docking system which

299

00:12:58,949 --> 00:12:57,200

uses radar to maneuver toward the

300

00:13:00,550 --> 00:12:58,959

station for docking

301
00:13:02,230 --> 00:13:00,560
there's also a forward-looking window in

302
00:13:03,910 --> 00:13:02,240
the module that the crew can use to take

303
00:13:05,990 --> 00:13:03,920
manual measurements of distance and

304
00:13:07,509 --> 00:13:06,000
closing speed with a laser rangefinder

305
00:13:09,910 --> 00:13:07,519
in the event of failure of the

306
00:13:11,910 --> 00:13:09,920
rendezvous radar system

307
00:13:13,829 --> 00:13:11,920
the propulsion module houses the oxygen

308
00:13:16,150 --> 00:13:13,839
storage tanks the main engine and the

309
00:13:17,910 --> 00:13:16,160
attitude control thrusters avionics and

310
00:13:19,590 --> 00:13:17,920
communication and control equipment the

311
00:13:21,350 --> 00:13:19,600
propulsion portion of this module

312
00:13:22,790 --> 00:13:21,360
handles all orbital maneuvers including

313
00:13:25,030 --> 00:13:22,800

those needed for the rendezvous with the

314

00:13:26,629 --> 00:13:25,040

space station and the orbit burn at the

315

00:13:28,230 --> 00:13:26,639

end of the spacecraft's mission before

316

00:13:29,509 --> 00:13:28,240

they are deployed the two solar arrays

317

00:13:31,590 --> 00:13:29,519

are folded against the body of the

318

00:13:33,350 --> 00:13:31,600

propulsion module which along with the

319

00:13:35,509 --> 00:13:33,360

orbital module separates from the

320

00:13:38,470 --> 00:13:35,519

descent module after the orbit burn the

321

00:13:40,310 --> 00:13:38,480

solar panels span almost 35 feet

322

00:13:41,910 --> 00:13:40,320

the entire spacecraft serves not only as

323

00:13:43,670 --> 00:13:41,920

a crew transport vehicle to and from the

324

00:13:45,509 --> 00:13:43,680

space station but also as an emergency

325

00:13:46,949 --> 00:13:45,519

returned vehicle in the unlikely event

326

00:13:54,790 --> 00:13:46,959

the crew needs to leave the station

327

00:13:59,110 --> 00:13:56,870

and you'll be seeing a lot more of that

328

00:14:00,790 --> 00:13:59,120

soyuz spacecraft a few hours from now as

329

00:14:02,710 --> 00:14:00,800

it approaches for a docking to the

330

00:14:04,230 --> 00:14:02,720

rassvet module of the international

331

00:14:06,790 --> 00:14:04,240

space station

332

00:14:08,790 --> 00:14:06,800

this is a split screen morning on the

333

00:14:12,949 --> 00:14:08,800

left side of your screen

334

00:14:15,430 --> 00:14:12,959

nasa's space launch system 322 feet tall

335

00:14:16,550 --> 00:14:15,440

sitting on launch pad 39b at the kennedy

336

00:14:19,030 --> 00:14:16,560

space center

337

00:14:22,230 --> 00:14:19,040

in the process of undergoing a cryogenic

338

00:14:24,150 --> 00:14:22,240

propellant tanking test that could pave

339

00:14:26,870 --> 00:14:24,160

the way if successful

340

00:14:29,910 --> 00:14:26,880

for the maiden launch of the sls on

341

00:14:33,110 --> 00:14:29,920

september 27th to send the orion

342

00:14:35,670 --> 00:14:33,120

spacecraft on a 40-day mission

343

00:14:38,230 --> 00:14:35,680

around the moon and back to earth

344

00:14:41,670 --> 00:14:38,240

everything so far going well the go for

345

00:14:44,310 --> 00:14:41,680

tanking occurred about 6 25 a.m central

346

00:14:47,030 --> 00:14:44,320

time with cryogenic propellant loading

347

00:14:48,150 --> 00:14:47,040

starting just before 7 a.m central time

348

00:14:49,910 --> 00:14:48,160

8 a.m

349

00:14:51,750 --> 00:14:49,920

eastern time on the right side of your

350

00:14:53,990 --> 00:14:51,760

screen of course in the baikonur

351

00:14:58,150 --> 00:14:54,000

cosmodrome at site 31 is the fully

352

00:15:00,150 --> 00:14:58,160

fueled soyuz 2.1a booster so halfway

353

00:15:03,110 --> 00:15:00,160

around the world from each other

354

00:15:06,629 --> 00:15:03,120

nasa extending its reach both with the

355

00:15:08,870 --> 00:15:06,639

future artemis program operations and

356

00:15:11,189 --> 00:15:08,880

the replenishment uh and extension of a

357

00:15:14,069 --> 00:15:11,199

crew to the international space station

358

00:15:19,160 --> 00:15:14,079

with today's soyuz launch of frank rubio

359

00:15:33,189 --> 00:15:19,170

sergey procopio and dimitri patellin

360

00:15:34,970 --> 00:15:33,199

[Music]

361

00:15:47,829 --> 00:15:34,980

foreign

362

00:15:50,020 --> 00:15:47,839

[Music]

363

00:15:57,430 --> 00:15:50,030

me

364

00:15:59,509 --> 00:15:57,440

[Music]

365

00:16:01,110 --> 00:15:59,519

again the music you're hearing is being

366

00:16:04,230 --> 00:16:01,120

piped in from the block house in

367

00:16:06,949 --> 00:16:04,240

baikonur by launch controllers to the

368

00:16:08,870 --> 00:16:06,959

soyuz ms-22 spacecraft and its three

369

00:16:11,030 --> 00:16:08,880

occupants who are strapped into the

370

00:16:13,430 --> 00:16:11,040

center section of the soyuz the descent

371

00:16:15,430 --> 00:16:13,440

stage sergey procopia of the soyuz

372

00:16:17,590 --> 00:16:15,440

commander is in the middle seat flying

373

00:16:20,829 --> 00:16:17,600

to his left by demetri patellan of rose

374

00:16:24,069 --> 00:16:20,839

cosmos and to his right by nasa's frank

375

00:16:26,870 --> 00:16:24,079

rubio the countdown is proceeding toward

376

00:16:28,710 --> 00:16:26,880

a launch just over 39 minutes from now

377

00:16:31,749 --> 00:16:28,720

we should get a final go no go for

378

00:16:32,949 --> 00:16:31,759

launch within the next 10 minutes

379

00:16:35,910 --> 00:16:32,959

the launch

380

00:16:38,710 --> 00:16:35,920

again will be 8 minutes and 45 seconds

381

00:16:40,949 --> 00:16:38,720

between liftoff and third stage shutdown

382

00:16:43,590 --> 00:16:40,959

of the soyuz booster and spacecraft

383

00:16:44,710 --> 00:16:43,600

separation placing the soyuz in its

384

00:16:47,749 --> 00:16:44,720

initial

385

00:16:50,470 --> 00:16:47,759

preliminary orbit to begin the chase to

386

00:16:52,470 --> 00:16:50,480

reach the international space station

387

00:16:54,790 --> 00:16:52,480

the way uh today's orbital mechanics

388

00:16:56,790 --> 00:16:54,800

work is that the soyuz booster will

389

00:17:00,550 --> 00:16:56,800

launch into a narrow phase angle of

390

00:17:03,110 --> 00:17:00,560

about 13 degrees it's basically like

391

00:17:05,829 --> 00:17:03,120

going up an off-ramp

392

00:17:07,909 --> 00:17:05,839

or an on-ramp onto a freeway making sure

393

00:17:09,829 --> 00:17:07,919

you're in the correct lane with the

394

00:17:12,069 --> 00:17:09,839

launch time calculated for this

395

00:17:13,829 --> 00:17:12,079

fast-track two-orbit rendezvous to

396

00:17:15,270 --> 00:17:13,839

ensure that the

397

00:17:17,590 --> 00:17:15,280

rotation of the earth carries the

398

00:17:19,909 --> 00:17:17,600

baikonur cosmodrome into the plane of

399

00:17:22,390 --> 00:17:19,919

the international space station's orbit

400

00:17:24,789 --> 00:17:22,400

at the precise moment there is only a

401
00:17:26,870 --> 00:17:24,799
10-second launch window available for

402
00:17:28,950 --> 00:17:26,880
the soyuz vehicle

403
00:17:31,270 --> 00:17:28,960
once a third-state shutdown and orbital

404
00:17:33,590 --> 00:17:31,280
insertion occurs for soyuz along with

405
00:17:35,430 --> 00:17:33,600
spacecraft separation the soyuz will

406
00:17:37,669 --> 00:17:35,440
automatically deploy its

407
00:17:39,909 --> 00:17:37,679
twin solar arrays and its navigational

408
00:17:41,750 --> 00:17:39,919
antennas and will begin the chase to

409
00:17:44,310 --> 00:17:41,760
catch up to the international space

410
00:17:47,190 --> 00:17:44,320
station a series of automated rendezvous

411
00:17:50,950 --> 00:17:47,200
burns will take place over the next two

412
00:17:52,710 --> 00:17:50,960
hours or so following launch to place

413
00:17:55,110 --> 00:17:52,720

the soyuz in the neighborhood of the

414

00:17:57,270 --> 00:17:55,120

international space station for final

415

00:17:59,830 --> 00:17:57,280

approach a fly around

416

00:18:02,870 --> 00:17:59,840

that will begin at about 11 50 a.m

417

00:18:05,590 --> 00:18:02,880

central time that will precisely align

418

00:18:08,710 --> 00:18:05,600

the soyuz forward docking probe with the

419

00:18:11,110 --> 00:18:08,720

rassvet module on the earth-facing side

420

00:18:12,710 --> 00:18:11,120

of the international space station's

421

00:18:14,470 --> 00:18:12,720

russian segment

422

00:18:16,150 --> 00:18:14,480

there will be a brief period of station

423

00:18:18,470 --> 00:18:16,160

keeping to allow

424

00:18:21,110 --> 00:18:18,480

the flight controllers at the control

425

00:18:23,110 --> 00:18:21,120

center and current off to

426

00:18:26,310 --> 00:18:23,120

assess the precise alignment of the

427

00:18:28,470 --> 00:18:26,320

soyuz with the rassvet module before

428

00:18:30,390 --> 00:18:28,480

approval is given for final approach if

429

00:18:33,029 --> 00:18:30,400

everything is going as planned this

430

00:18:34,950 --> 00:18:33,039

should be an automated approach although

431

00:18:36,950 --> 00:18:34,960

procopia will be standing by to take

432

00:18:39,430 --> 00:18:36,960

over manual control of the flying of the

433

00:18:41,110 --> 00:18:39,440

soyuz in the event there should be a

434

00:18:42,390 --> 00:18:41,120

problem with the core's automated

435

00:18:44,549 --> 00:18:42,400

rendezvous system

436

00:18:46,390 --> 00:18:44,559

on the soyuz vehicle

437

00:18:49,350 --> 00:18:46,400

if everything goes as planned docking is

438

00:18:52,070 --> 00:18:49,360

scheduled at 12 11 pm central time 1 11

439

00:18:54,950 --> 00:18:52,080

pm eastern time followed by the closing

440

00:18:57,270 --> 00:18:54,960

of the hooks to form a hard mate between

441

00:19:00,990 --> 00:18:57,280

the soyuz and the international space

442

00:19:20,640 --> 00:19:11,530

[Music]

443

00:19:29,190 --> 00:19:20,650

[Applause]

444

00:19:33,990 --> 00:19:30,789

some of the events you'll be seeing in

445

00:19:36,310 --> 00:19:34,000

the final minutes before launch will

446

00:19:38,070 --> 00:19:36,320

include the purging a few lines and

447

00:19:40,710 --> 00:19:38,080

other elements of the rocket engines at

448

00:19:43,510 --> 00:19:40,720

about the t-minus four minute mark

449

00:19:46,150 --> 00:19:43,520

those rocket engines will be purged with

450

00:19:48,870 --> 00:19:46,160

nitrogen to fire proof them removing

451
00:19:51,750 --> 00:19:48,880
vapors of fuel and oxidizer

452
00:19:52,789 --> 00:19:51,760
before the key to drainage call is made

453
00:19:55,029 --> 00:19:52,799
by the

454
00:19:57,270 --> 00:19:55,039
launch controllers at baikonur that

455
00:19:59,270 --> 00:19:57,280
basically uh places uh

456
00:20:01,430 --> 00:19:59,280
the valves through which evaporated or

457
00:20:03,750 --> 00:20:01,440
gaseous oxygen escapes from the fuel

458
00:20:05,430 --> 00:20:03,760
tanks into the atmosphere at the same

459
00:20:08,230 --> 00:20:05,440
time the valves are providing liquid

460
00:20:11,110 --> 00:20:08,240
oxygen to replenish the fuel supply lost

461
00:20:13,830 --> 00:20:11,120
by the boil off or evaporation

462
00:20:16,270 --> 00:20:13,840
through the normal course of the fueling

463
00:20:19,350 --> 00:20:16,280

of the rocket at the t-minus two-minute

464

00:20:21,830 --> 00:20:19,360

45-second mark in the countdown

465

00:20:23,830 --> 00:20:21,840

the first stage fuel and oxidizer tanks

466

00:20:26,470 --> 00:20:23,840

will be pressurized to optimize fuel

467

00:20:28,789 --> 00:20:26,480

flow and to provide structural rigidity

468

00:20:31,510 --> 00:20:28,799

to the launch vehicle as it sits on the

469

00:20:34,789 --> 00:20:31,520

launch pad as you see there in baikonur

470

00:20:36,549 --> 00:20:34,799

and at the t-minus 45 second mark the

471

00:20:39,029 --> 00:20:36,559

activation of the s-band ground-to-air

472

00:20:41,750 --> 00:20:39,039

radio command link channel will be made

473

00:20:42,750 --> 00:20:41,760

for the three crew members on board the

474

00:20:45,190 --> 00:20:42,760

soyuz

475

00:20:46,950 --> 00:20:45,200

ms-22 spacecraft

476

00:20:49,029 --> 00:20:46,960

there are two umbilicals that are

477

00:20:51,669 --> 00:20:49,039

buttressed up against the side of the

478

00:20:53,990 --> 00:20:51,679

soyuz vehicle one of those umbilicals

479

00:20:55,590 --> 00:20:54,000

will retract at about the t minus 30

480

00:20:57,350 --> 00:20:55,600

second mark or so

481

00:20:59,830 --> 00:20:57,360

the second of the two umbilicals will

482

00:21:01,990 --> 00:20:59,840

retract at the t minus 12 second mark

483

00:21:04,870 --> 00:21:02,000

and that will initiate the auto sequence

484

00:21:07,669 --> 00:21:04,880

start for engine ignition and eventually

485

00:21:09,750 --> 00:21:07,679

for liftoff

486

00:21:11,590 --> 00:21:09,760

and now you see the gantry arms

487

00:21:14,870 --> 00:21:11,600

beginning to spread

488

00:21:18,230 --> 00:21:14,880

right on schedule at the t-minus 34

489

00:21:20,549 --> 00:21:18,240

minute 30 second mark into the countdown

490

00:21:23,190 --> 00:21:20,559

this obviously exposes the vehicle for

491

00:21:25,909 --> 00:21:23,200

the first time on top as the launch

492

00:21:27,510 --> 00:21:25,919

escape system in the unlikely event

493

00:21:29,590 --> 00:21:27,520

there would be a technical issue that

494

00:21:30,390 --> 00:21:29,600

would require the soyuz to be pulled

495

00:21:33,270 --> 00:21:30,400

free

496

00:21:36,430 --> 00:21:33,280

from the upper stage of the soyuz 2.18

497

00:21:36,440 --> 00:21:45,590

[Music]

498

00:21:49,970 --> 00:21:48,070

i not get to heaven

499

00:22:11,590 --> 00:21:49,980

but i won't

500

00:22:14,950 --> 00:22:13,350

and about three minutes from now uh the

501
00:22:16,549 --> 00:22:14,960
flight control team here in mission

502
00:22:18,549 --> 00:22:16,559
control in houston led by flight

503
00:22:20,789 --> 00:22:18,559
director allison bollinger

504
00:22:21,750 --> 00:22:20,799
will be pulling the team for a go for

505
00:22:24,630 --> 00:22:21,760
launch

506
00:22:26,470 --> 00:22:24,640
she will relay that to her counterpart

507
00:22:30,970 --> 00:22:26,480
of the russian mission control center in

508
00:22:47,590 --> 00:22:30,980
karilov half a world away

509
00:22:53,590 --> 00:22:51,190
inside 33 minutes now before launch

510
00:22:55,350 --> 00:22:53,600
we should be receiving from baikonur

511
00:22:56,390 --> 00:22:55,360
about three minutes from now

512
00:22:59,510 --> 00:22:56,400
a uh

513
00:23:00,950 --> 00:22:59,520

video b-roll package of launch morning

514

00:23:03,190 --> 00:23:00,960

activities

515

00:23:05,430 --> 00:23:03,200

that the three crew members engaged in

516

00:23:07,270 --> 00:23:05,440

before they arrived and at the point

517

00:23:08,390 --> 00:23:07,280

that they arrived at the launch pad at

518

00:23:10,630 --> 00:23:08,400

site 31

519

00:23:12,870 --> 00:23:10,640

so we'll be standing by for that

520

00:23:15,270 --> 00:23:12,880

all the launch preparations continue to

521

00:23:17,830 --> 00:23:15,280

go well and again down at the Kennedy

522

00:23:20,870 --> 00:23:17,840

space center on launch pad 39b the

523

00:23:23,430 --> 00:23:20,880

cryogenic propellant tanking test for

524

00:23:25,510 --> 00:23:23,440

the space launch system on pad 39b

525

00:23:28,230 --> 00:23:25,520

continues so far

526

00:23:29,990 --> 00:23:28,240

uh that could if all goes well lead to

527

00:23:36,149 --> 00:23:30,000

the launch of the space launch system on

528

00:23:40,710 --> 00:23:39,750

any additional formats or displays on ae

529

00:23:43,350 --> 00:23:40,720

and

530

00:23:43,360 --> 00:23:47,909

the accelerometer is on

531

00:23:47,919 --> 00:23:59,990

we copy

532

00:24:04,950 --> 00:24:01,830

as we mentioned at the top of the

533

00:24:07,350 --> 00:24:04,960

broadcast it is uh an ideal

534

00:24:08,950 --> 00:24:07,360

evening for launch for the three crew

535

00:24:10,070 --> 00:24:08,960

members to the international space

536

00:24:12,230 --> 00:24:10,080

station

537

00:24:13,990 --> 00:24:12,240

the temperature in baikonur is about 85

538

00:24:15,350 --> 00:24:14,000

degrees fahrenheit not a cloud in the

539

00:24:17,669 --> 00:24:15,360

sky

540

00:24:19,909 --> 00:24:17,679

the launch to occur about

541

00:24:22,950 --> 00:24:19,919

seven minutes after sunset it should be

542

00:24:25,430 --> 00:24:22,960

spectacular as the soyuz arcs out to the

543

00:24:27,110 --> 00:24:25,440

northeast headed for the international

544

00:24:30,230 --> 00:24:27,120

space station

545

00:24:32,470 --> 00:24:30,240

this is a two orbit uh rendezvous today

546

00:24:34,950 --> 00:24:32,480

precisely calculated it will take just

547

00:24:37,750 --> 00:24:34,960

over three hours for rubio procopia and

548

00:24:39,830 --> 00:24:37,760

patellin to reach their destination

549

00:24:43,029 --> 00:24:39,840

through a series of pre-programmed

550

00:24:44,149 --> 00:24:43,039

automated engine firings that will first

551
00:24:45,990 --> 00:24:44,159
elevate

552
00:24:48,470 --> 00:24:46,000
and increase their altitude toward the

553
00:24:50,390 --> 00:24:48,480
station after third stage separation on

554
00:24:52,789 --> 00:24:50,400
the soyuz booster

555
00:24:54,549 --> 00:24:52,799
and separation of the soyuz spacecraft

556
00:24:57,190 --> 00:24:54,559
from the third stage

557
00:24:59,430 --> 00:24:57,200
the stair-step fashion that they will

558
00:25:01,590 --> 00:24:59,440
undertake to reach the vicinity of the

559
00:25:04,070 --> 00:25:01,600
international space station will be

560
00:25:07,190 --> 00:25:04,080
undertaken through a series of so-called

561
00:25:08,470 --> 00:25:07,200
impulse burns of the soyuz engine that

562
00:25:11,269 --> 00:25:08,480
will steadily

563
00:25:13,110 --> 00:25:11,279

close the gap between themselves and the

564

00:25:15,909 --> 00:25:13,120

international outpost

565

00:25:19,050 --> 00:25:15,919

over the three-hour plus period that

566

00:25:32,710 --> 00:25:19,060

will follow liftoff

567

00:25:33,750 --> 00:25:32,720

[Music]

568

00:25:59,350 --> 00:25:33,760

my

569

00:26:03,830 --> 00:26:01,510

and here's our video

570

00:26:05,590 --> 00:26:03,840

b-roll feed from earlier today launch

571

00:26:07,190 --> 00:26:05,600

day for the three crew members beginning

572

00:26:09,190 --> 00:26:07,200

several hours ago after they were

573

00:26:11,350 --> 00:26:09,200

awakened at their cosmonaut hotel crew

574

00:26:13,510 --> 00:26:11,360

quarters to begin final pre-launch

575

00:26:15,909 --> 00:26:13,520

activities

576
00:26:17,430 --> 00:26:15,919
the crew departed the cosmonaut hotel

577
00:26:19,590 --> 00:26:17,440
and boarded a bus

578
00:26:21,269 --> 00:26:19,600
for their 40-minute ride to the

579
00:26:23,669 --> 00:26:21,279
integration and suit-up facility at

580
00:26:25,510 --> 00:26:23,679
building 254 inside the baikonur

581
00:26:27,590 --> 00:26:25,520
cosmodrome you see them

582
00:26:29,430 --> 00:26:27,600
in their traditional and familiar

583
00:26:31,990 --> 00:26:29,440
walkout

584
00:26:34,470 --> 00:26:32,000
from the cosmonaut hotel the backup crew

585
00:26:39,370 --> 00:26:34,480
following them oleg kononenko laurel

586
00:26:39,380 --> 00:26:49,029
[Music]

587
00:26:54,070 --> 00:26:51,190
in the parking lot to the cosmonaut

588
00:26:56,950 --> 00:26:54,080

hotel the usual crowd of well-wishers

589

00:26:59,110 --> 00:26:56,960

and you see uh frank rubio on the right

590

00:27:07,750 --> 00:26:59,120

sergey procopio in the middle dimitri

591

00:27:07,760 --> 00:27:10,890

hey

592

00:27:43,029 --> 00:27:25,550

[Music]

593

00:27:44,549 --> 00:27:43,039

again the three crew members are posing

594

00:27:46,310 --> 00:27:44,559

for pictures to the crowd of

595

00:27:48,789 --> 00:27:46,320

well-wishers in the parking lot of

596

00:27:51,110 --> 00:27:48,799

cosmonaut hotel

597

00:27:52,630 --> 00:27:51,120

as they prepared to board the bus which

598

00:27:53,990 --> 00:27:52,640

they're doing

599

00:27:56,710 --> 00:27:54,000

this again

600

00:27:58,950 --> 00:27:56,720

took place several hours ago

601
00:28:00,230 --> 00:27:58,960
at the cosmonaut hotel in the town of

602
00:28:02,789 --> 00:28:00,240
baikonur

603
00:28:04,549 --> 00:28:02,799
as they departed for about a 40-minute

604
00:28:07,029 --> 00:28:04,559
ride to the integration and suit-up

605
00:28:11,850 --> 00:28:07,039
facility in building 254

606
00:28:41,990 --> 00:28:29,930
[Music]

607
00:29:09,110 --> 00:28:43,200
is

608
00:29:19,830 --> 00:29:09,120
[Music]

609
00:29:23,430 --> 00:29:21,830
two buses uh the first bus with the

610
00:29:26,710 --> 00:29:23,440
prime crew the second bus with the

611
00:29:29,269 --> 00:29:26,720
backup crew exiting the parking lot at

612
00:29:31,590 --> 00:29:29,279
the cosmonaut hotel on route to the

613
00:29:33,830 --> 00:29:31,600

integration and pseudo facility at

614

00:29:35,830 --> 00:29:33,840

building 254 inside the baikonur

615

00:29:37,430 --> 00:29:35,840

cosmodrome and now

616

00:29:39,029 --> 00:29:37,440

after arriving at the integration

617

00:29:41,350 --> 00:29:39,039

building each of the crew members

618

00:29:42,870 --> 00:29:41,360

underwent final medical exams and suited

619

00:29:44,389 --> 00:29:42,880

up in their so-called launch and entry

620

00:29:46,789 --> 00:29:44,399

suits

621

00:29:48,789 --> 00:29:46,799

and uh as you'll see here momentarily

622

00:29:51,510 --> 00:29:48,799

one by one the crew members moved to a

623

00:29:54,230 --> 00:29:51,520

mock-up of a soyuz spacecraft seat

624

00:29:55,830 --> 00:29:54,240

allowing technicians to conduct pressure

625

00:29:57,750 --> 00:29:55,840

checks on their suits

626
00:30:06,310 --> 00:29:57,760
ensuring that the suits would be free of

627
00:30:17,590 --> 00:30:12,520
[Music]

628
00:30:21,430 --> 00:30:20,389
was the first to undergo his suit leak

629
00:30:23,990 --> 00:30:21,440
checks

630
00:30:25,190 --> 00:30:24,000
embarking today on the second flight of

631
00:30:27,990 --> 00:30:25,200
his career

632
00:30:30,310 --> 00:30:28,000
dimitri patellan and frank rubio of nasa

633
00:30:33,580 --> 00:30:30,320
beginning the first flights of their

634
00:30:44,400 --> 00:30:33,590
space flight careers

635
00:30:44,410 --> 00:30:52,070
[Music]

636
00:30:57,669 --> 00:30:54,870
again the music you're hearing uh

637
00:31:00,230 --> 00:30:57,679
is being piped into the soyuz ms-22

638
00:31:02,310 --> 00:31:00,240

spacecraft from engineers at the block

639

00:31:06,789 --> 00:31:02,320

house in baikonur

640

00:31:08,950 --> 00:31:06,799

this is a video that was uh received

641

00:31:10,870 --> 00:31:08,960

and acquired several hours ago at the

642

00:31:13,350 --> 00:31:10,880

integration and suit-up facility at the

643

00:31:17,269 --> 00:31:13,360

baikonur cosmodrome as uh sergey

644

00:31:20,870 --> 00:31:17,279

procopia first then dimitri patellin

645

00:31:22,070 --> 00:31:20,880

underwent leak checks to their soyuz uh

646

00:31:24,549 --> 00:31:22,080

sokol

647

00:31:26,149 --> 00:31:24,559

launch and entry suits and then had an

648

00:31:27,110 --> 00:31:26,159

opportunity

649

00:31:29,110 --> 00:31:27,120

to

650

00:31:30,789 --> 00:31:29,120

exchange final remarks with their

651
00:31:33,110 --> 00:31:30,799
families

652
00:31:36,710 --> 00:31:33,120
as you'll see a short time from now also

653
00:31:39,110 --> 00:31:36,720
exchanging uh a final opportunity

654
00:31:45,020 --> 00:31:39,120
for remarks with nasa and roscosmos

655
00:31:45,030 --> 00:31:57,269
[Music]

656
00:32:06,040 --> 00:31:59,350
several hours ago for the leak checks on

657
00:32:34,230 --> 00:32:22,470
[Music]

658
00:32:35,909 --> 00:32:34,240
part of the nasa delegation uh

659
00:32:38,070 --> 00:32:35,919
in the audience there across the

660
00:32:40,830 --> 00:32:38,080
protective pane of glass to maintain

661
00:32:43,350 --> 00:32:40,840
quarantine uh restrictions for the

662
00:32:46,549 --> 00:32:43,360
crew johnson space center deputy

663
00:32:48,789 --> 00:32:46,559

director steve kerner the iss program

664

00:32:50,630 --> 00:32:48,799

manager joel montalbano reid wiseman

665

00:32:52,549 --> 00:32:50,640

nasa's chief astronaut

666

00:32:54,470 --> 00:32:52,559

norm knight the director of flight

667

00:32:58,950 --> 00:32:54,480

operations here at the johnson space

668

00:33:03,750 --> 00:33:01,669

ken bowersox of the nasa deputy

669

00:33:08,300 --> 00:33:03,760

associate administrator also on hand in

670

00:33:08,310 --> 00:33:20,710

[Music]

671

00:33:24,549 --> 00:33:22,180

oh

672

00:33:27,029 --> 00:33:24,559

[Music]

673

00:33:28,710 --> 00:33:27,039

again uh the three crew members who are

674

00:33:29,990 --> 00:33:28,720

now strapped inside their soyuz

675

00:33:32,149 --> 00:33:30,000

spacecraft

676
00:33:34,230 --> 00:33:32,159
exchanging uh well wishes with their

677
00:33:38,220 --> 00:33:34,240
family members across the protective

678
00:33:38,230 --> 00:33:44,149
[Music]

679
00:34:13,250 --> 00:33:45,640
is

680
00:34:14,479 --> 00:34:13,260
[Music]

681
00:34:14,979 --> 00:34:14,489
[Applause]

682
00:34:16,550 --> 00:34:14,989
[Music]

683
00:34:18,399 --> 00:34:16,560
[Applause]

684
00:34:20,070 --> 00:34:18,409
it

685
00:34:21,000 --> 00:34:20,080
[Applause]

686
00:34:21,649 --> 00:34:21,010
[Music]

687
00:34:23,590 --> 00:34:21,659
[Applause]

688
00:34:25,070 --> 00:34:23,600

[Music]

689

00:34:35,709 --> 00:34:25,080

[Applause]

690

00:34:38,069 --> 00:34:35,719

[Music]

691

00:34:39,540 --> 00:34:38,079

[Applause]

692

00:34:40,240 --> 00:34:39,550

wow

693

00:34:43,860 --> 00:34:40,250

[Music]

694

00:34:51,750 --> 00:34:43,870

[Applause]

695

00:34:55,829 --> 00:34:53,909

and with the family members having had

696

00:34:59,430 --> 00:34:55,839

an opportunity to talk to the crew

697

00:35:02,069 --> 00:34:59,440

members it was time for rose cosmos and

698

00:35:04,870 --> 00:35:02,079

nasa managers to exchange final well

699

00:35:07,349 --> 00:35:04,880

wishes uh with the uh crew

700

00:35:10,470 --> 00:35:07,359

you see at the top of your screen uh

701
00:35:13,670 --> 00:35:10,480
sergey kriegeloff

702
00:35:18,550 --> 00:35:15,910
twice on space shuttle missions to the

703
00:35:25,190 --> 00:35:18,560
international space station

704
00:35:29,030 --> 00:35:26,069
these

705
00:35:31,750 --> 00:35:29,040
this exchange of pleasantries between

706
00:35:33,990 --> 00:35:31,760
the crew and the rose cosmos managers

707
00:35:36,550 --> 00:35:34,000
essentially amounts to a report on the

708
00:35:39,510 --> 00:35:36,560
readiness of the vehicle for launch

709
00:35:40,710 --> 00:35:39,520
and final well wishes uh before the crew

710
00:35:42,870 --> 00:35:40,720
departs

711
00:35:48,220 --> 00:35:42,880
the integration building to head for the

712
00:36:01,680 --> 00:35:57,720
[Music]

713
00:36:12,680 --> 00:36:01,690

[Applause]

714

00:36:15,220 --> 00:36:12,690

[Music]

715

00:36:19,670 --> 00:36:15,230

[Applause]

716

00:36:23,110 --> 00:36:19,680

[Music]

717

00:36:26,890 --> 00:36:23,120

[Applause]

718

00:36:27,940 --> 00:36:26,900

[Music]

719

00:36:30,550 --> 00:36:27,950

[Applause]

720

00:36:33,270 --> 00:36:30,560

[Music]

721

00:36:35,670 --> 00:36:33,280

and there's a ken bowersox

722

00:36:37,190 --> 00:36:35,680

former astronaut and nasa's deputy

723

00:36:39,510 --> 00:36:37,200

associate administrator and joel

724

00:36:42,470 --> 00:36:39,520

montalbano the iss program manager

725

00:36:44,710 --> 00:36:42,480

offering their final well wishes

726
00:36:47,910 --> 00:36:44,720
for a successful launch

727
00:36:55,589 --> 00:36:47,920
that is now just 18 minutes and 50

728
00:37:01,470 --> 00:36:56,820
thank you

729
00:37:20,810 --> 00:37:19,030
[Music]

730
00:37:26,710 --> 00:37:20,820
i can't believe

731
00:37:30,630 --> 00:37:28,790
with the pleasantries having been

732
00:37:33,510 --> 00:37:30,640
completed

733
00:37:35,750 --> 00:37:33,520
the crew members then left the site 254

734
00:37:37,750 --> 00:37:35,760
integration building

735
00:37:39,510 --> 00:37:37,760
and you'll see in a moment uh procopia

736
00:37:41,190 --> 00:37:39,520
of the soyuz commander

737
00:37:42,790 --> 00:37:41,200
uh reporting

738
00:37:55,320 --> 00:37:42,800

that he and his crewmates were ready to

739

00:37:55,330 --> 00:38:02,470

[Music]

740

00:38:17,510 --> 00:38:03,930

3

741

00:38:21,430 --> 00:38:17,520

[Music]

742

00:38:24,390 --> 00:38:21,440

with that uh the trio boarded their bus

743

00:38:27,270 --> 00:38:24,400

about uh three and a half hours ago

744

00:38:32,980 --> 00:38:27,280

for the ride to launch site 31 a trip

745

00:38:36,790 --> 00:38:35,030

[Music]

746

00:38:38,710 --> 00:38:36,800

here you see uh the bus with the crew

747

00:38:41,109 --> 00:38:38,720

arriving at the pad

748

00:38:42,710 --> 00:38:41,119

uh the crew uh climbing a few stairs

749

00:38:44,630 --> 00:38:42,720

that you'll see in a moment waving

750

00:38:46,870 --> 00:38:44,640

goodbye to well wishers and entering the

751
00:38:49,750 --> 00:38:46,880
elevator for the ride to the top of the

752
00:38:51,190 --> 00:38:49,760
soyuz rocket to board their spacecraft

753
00:38:54,580 --> 00:38:51,200
which they've now been aboard for the

754
00:39:37,240 --> 00:38:54,590
past two plus hours

755
00:39:37,250 --> 00:39:44,950
[Music]

756
00:39:49,750 --> 00:39:48,150
again this is video that was uh taken

757
00:39:51,829 --> 00:39:49,760
several hours ago

758
00:39:53,990 --> 00:39:51,839
as the three crew members arrived at

759
00:39:56,470 --> 00:39:54,000
launch site 31

760
00:39:58,950 --> 00:39:56,480
at the launch pad

761
00:40:01,670 --> 00:39:58,960
having an opportunity to say goodbye one

762
00:40:05,910 --> 00:40:01,680
final time to well-wishers at the pad as

763
00:40:08,630 --> 00:40:05,920

well as managers from nasa and roscosmos

764

00:40:10,710 --> 00:40:08,640

before boarding the elevator at the pad

765

00:40:13,910 --> 00:40:10,720

for the ride up to the top of the soyuz

766

00:40:16,230 --> 00:40:13,920

2.1a booster to board their spacecraft

767

00:40:19,370 --> 00:40:16,240

which they've now been aboard for

768

00:40:50,069 --> 00:40:19,380

a little over two hours

769

00:40:52,630 --> 00:40:50,079

[Music]

770

00:40:54,470 --> 00:40:52,640

and we are now uh back live uh with a

771

00:40:57,190 --> 00:40:54,480

view of the uh

772

00:40:59,670 --> 00:40:57,200

soyuz ms-22 rocket on the launch pad at

773

00:41:01,030 --> 00:40:59,680

site 31 at the baikonur cosmodrome in

774

00:41:03,589 --> 00:41:01,040

kazakhstan

775

00:41:05,109 --> 00:41:03,599

launch is scheduled just 14 and a half

776

00:41:09,589 --> 00:41:05,119

minutes from now

777

00:41:13,510 --> 00:41:09,599

at 8 54 and 49 seconds am central time 6

778

00:41:15,109 --> 00:41:13,520

54 and 49 seconds p.m in baikonur

779

00:41:16,630 --> 00:41:15,119

about seven minutes

780

00:41:19,190 --> 00:41:16,640

after sunset

781

00:41:21,589 --> 00:41:19,200

atop the 2.1a booster strapped into

782

00:41:24,230 --> 00:41:21,599

their seats in the descent module of the

783

00:41:26,630 --> 00:41:24,240

soyuz nasa's frank rubio along with

784

00:41:28,069 --> 00:41:26,640

sergey prokopyev and dimitri patellan of

785

00:41:30,150 --> 00:41:28,079

roscosmos

786

00:41:32,550 --> 00:41:30,160

as mentioned earlier procopia of the

787

00:41:35,589 --> 00:41:32,560

soyuz commander is in the center seat of

788

00:41:38,550 --> 00:41:35,599

the descent module of the soyuz ms-22

789

00:41:39,670 --> 00:41:38,560

patella into his left and rubio to his

790

00:41:41,670 --> 00:41:39,680

right

791

00:41:43,270 --> 00:41:41,680

at the time of launch the international

792

00:41:45,430 --> 00:41:43,280

space station will be flying over

793

00:41:47,750 --> 00:41:45,440

northwest uzbekistan

794

00:41:49,670 --> 00:41:47,760

the station and the expedition 67 crew

795

00:41:53,030 --> 00:41:49,680

will pass directly over the baikonur

796

00:41:55,270 --> 00:41:53,040

cosmodrome one minute 58 seconds after

797

00:41:57,430 --> 00:41:55,280

launch and will leapfrog past the

798

00:41:58,390 --> 00:41:57,440

ascending soyuz vehicle as it heads to

799

00:42:00,470 --> 00:41:58,400

orbit

800

00:42:02,630 --> 00:42:00,480

eight minutes and 45 seconds after

801
00:42:04,790 --> 00:42:02,640
launch the third stage engine of the

802
00:42:06,710 --> 00:42:04,800
soyuz booster will shut down

803
00:42:09,109 --> 00:42:06,720
and the soyuz will separate from its

804
00:42:10,950 --> 00:42:09,119
launch vehicle in a preliminary orbit

805
00:42:13,109 --> 00:42:10,960
deploying its solar arrays and its

806
00:42:14,630 --> 00:42:13,119
navigational antennas

807
00:42:16,390 --> 00:42:14,640
at that point the three crew members

808
00:42:18,870 --> 00:42:16,400
will be trailing the space station by

809
00:42:21,030 --> 00:42:18,880
about a thousand miles the chase will

810
00:42:22,870 --> 00:42:21,040
begin resulting in a docking to the

811
00:42:26,230 --> 00:42:22,880
rassvet module of the international

812
00:42:29,780 --> 00:42:26,240
space station at 12 11 pm central time

813
00:42:50,309 --> 00:42:47,430

[Music]

814

00:42:52,790 --> 00:42:50,319

as you saw earlier a nasa delegation is

815

00:42:54,710 --> 00:42:52,800

in baikonur at this hour preparing to

816

00:42:56,550 --> 00:42:54,720

watch the launch of the crew to the

817

00:42:58,470 --> 00:42:56,560

international space station

818

00:43:01,829 --> 00:42:58,480

nasa's deputy associate administrator

819

00:43:04,230 --> 00:43:01,839

ken bowersox iss program manager joel

820

00:43:06,309 --> 00:43:04,240

montalbano johnson space center deputy

821

00:43:07,910 --> 00:43:06,319

director steve kerner

822

00:43:10,150 --> 00:43:07,920

norm knight the director of flight

823

00:43:11,910 --> 00:43:10,160

operations here at the johnson space

824

00:43:14,309 --> 00:43:11,920

center and nasa's chief astronaut reid

825

00:43:16,309 --> 00:43:14,319

wiseman all in baikonur to watch frank

826

00:43:17,270 --> 00:43:16,319

rubio begin his mission

827

00:43:19,510 --> 00:43:17,280

and

828

00:43:24,550 --> 00:43:19,520

nasa public affairs officer dan hewitt

829

00:43:30,069 --> 00:43:27,430

thanks rob and greetings from baikonur

830

00:43:32,230 --> 00:43:30,079

as you said a small group of medical and

831

00:43:33,990 --> 00:43:32,240

support personnel along with some nasa

832

00:43:36,390 --> 00:43:34,000

leadership are on hand here in

833

00:43:39,270 --> 00:43:36,400

kazakhstan to support frank's launch

834

00:43:40,790 --> 00:43:39,280

today the delegation includes nasa's

835

00:43:43,349 --> 00:43:40,800

international space station program

836

00:43:45,190 --> 00:43:43,359

manager joel montalbano and he sat on

837

00:43:47,190 --> 00:43:45,200

the state commission on tuesday to give

838

00:43:48,150 --> 00:43:47,200

formal approval to move forward with

839

00:43:49,910 --> 00:43:48,160

launch

840

00:43:51,750 --> 00:43:49,920

several of our key personnel including

841

00:43:54,150 --> 00:43:51,760

our chief astronaut reid wiseman have

842

00:43:56,150 --> 00:43:54,160

been living in quarantine alongside

843

00:43:58,069 --> 00:43:56,160

rubio just during all of his final

844

00:44:00,150 --> 00:43:58,079

preparations here which have all

845

00:44:02,550 --> 00:44:00,160

continued along smoothly

846

00:44:04,630 --> 00:44:02,560

it's been clear skies throughout the

847

00:44:06,470 --> 00:44:04,640

week's events and is shaping up to be

848

00:44:09,510 --> 00:44:06,480

picturesque with liftoff coming in the

849

00:44:11,670 --> 00:44:09,520

twilight hours here at the cosmodrome

850

00:44:13,589 --> 00:44:11,680

we're all gathered within sight of the

851
00:44:15,910 --> 00:44:13,599
launch pad and have some additional

852
00:44:18,790 --> 00:44:15,920
personnel stage with sar forces to

853
00:44:21,430 --> 00:44:18,800
support any contingency situations

854
00:44:23,270 --> 00:44:21,440
now rubio's looking to join his 2017

855
00:44:25,190 --> 00:44:23,280
astronaut class colleagues jessica

856
00:44:27,430 --> 00:44:25,200
watkins and bob hines on board the

857
00:44:30,150 --> 00:44:27,440
station and he's had fellow classmate

858
00:44:32,230 --> 00:44:30,160
laurel o'hara here on hand as part of

859
00:44:33,829 --> 00:44:32,240
the backup crew in advance of her own

860
00:44:35,990 --> 00:44:33,839
launch next spring

861
00:44:38,470 --> 00:44:36,000
so everything remains go here in

862
00:44:41,190 --> 00:44:38,480
baikonur good luck to the crew of soyuz

863
00:44:43,190 --> 00:44:41,200

ms22 and i'll hand it back over to rob

864

00:44:46,020 --> 00:44:43,200

in mission control houston to continue

865

00:44:51,589 --> 00:44:48,390

[Music]

866

00:44:53,349 --> 00:44:51,599

thanks dan dan hewitt uh who's at the

867

00:44:55,990 --> 00:44:53,359

viewing site

868

00:44:58,309 --> 00:44:56,000

just a couple of miles away from the

869

00:45:00,150 --> 00:44:58,319

2.1a booster that you see on the launch

870

00:45:01,990 --> 00:45:00,160

pad as the sun

871

00:45:04,230 --> 00:45:02,000

begins to set over the baikonur

872

00:45:06,630 --> 00:45:04,240

cosmodrome sunset actually about three

873

00:45:07,829 --> 00:45:06,640

minutes from now with the launch taking

874

00:45:09,910 --> 00:45:07,839

place

875

00:45:14,470 --> 00:45:09,920

just over 10 minutes from now

876
00:45:17,589 --> 00:45:14,480
at 8 54 and 49 seconds am central time

877
00:45:20,510 --> 00:45:17,599
6 54 and 49 seconds p.m

878
00:45:23,670 --> 00:45:20,520
in baikonur

879
00:45:25,750 --> 00:45:23,680
[Music]

880
00:45:28,630 --> 00:45:25,760
all of the launch preparations have gone

881
00:45:33,160 --> 00:45:28,640
off without a hitch to this point

882
00:45:33,170 --> 00:45:41,829
[Music]

883
00:45:47,430 --> 00:45:46,069
this is number three I minus five close

884
00:45:49,620 --> 00:45:47,440
virus

885
00:46:04,390 --> 00:45:49,630
visors

886
00:46:14,390 --> 00:46:05,990
are closed

887
00:46:21,030 --> 00:46:17,589
second camera is on we are

888
00:46:28,920 --> 00:46:21,040

watching the flight engineer too

889

00:46:32,069 --> 00:46:30,230

[Music]

890

00:46:34,550 --> 00:46:32,079

we're approaching the t-minus nine

891

00:46:37,030 --> 00:46:34,560

minute mark in the countdown

892

00:46:39,430 --> 00:46:37,040

uh preparations are continuing uh in

893

00:46:43,430 --> 00:46:39,440

good fashion at the baikonur cosmodrome

894

00:46:52,069 --> 00:46:50,630

[Music]

895

00:46:55,430 --> 00:46:52,079

we're about two minutes away from the

896

00:46:57,190 --> 00:46:55,440

completion of pre-launch operations

897

00:46:59,910 --> 00:46:57,200

at this point in the countdown the

898

00:47:01,990 --> 00:46:59,920

soyuz's first and second stage engines

899

00:47:04,550 --> 00:47:02,000

uh ready for launch telemetry having

900

00:47:06,710 --> 00:47:04,560

been received from the rocket indicating

901
00:47:11,990 --> 00:47:06,720
that all primary and backup systems are

902
00:47:16,550 --> 00:47:14,790
once again at the time of launch

903
00:47:19,030 --> 00:47:16,560
the international space station will be

904
00:47:20,870 --> 00:47:19,040
flying 259 miles over northern

905
00:47:24,470 --> 00:47:20,880
uzbekistan

906
00:47:27,190 --> 00:47:24,480
some 335 statute miles behind the soyuz

907
00:47:28,950 --> 00:47:27,200
as it leaves the launch pad

908
00:47:30,870 --> 00:47:28,960
a very narrow

909
00:47:32,870 --> 00:47:30,880
phase angle for launch

910
00:47:34,950 --> 00:47:32,880
for orbital insertion that will ensure

911
00:47:36,710 --> 00:47:34,960
the beginning of a two orbit three plus

912
00:47:38,790 --> 00:47:36,720
hour rendezvous to reach the

913
00:47:41,589 --> 00:47:38,800

international space station

914

00:47:45,270 --> 00:47:41,599

and during the soyuz climb to orbit the

915

00:47:48,790 --> 00:47:45,280

iss will leapfrog ahead of soyuz and

916

00:47:50,630 --> 00:47:48,800

soyuz will then be catching up to

917

00:47:52,790 --> 00:47:50,640

the

918

00:47:54,390 --> 00:47:52,800

international space station

919

00:47:58,380 --> 00:47:54,400

through a series of pre-programmed

920

00:47:58,390 --> 00:48:16,790

[Music]

921

00:48:26,470 --> 00:48:17,980

he's

922

00:48:32,950 --> 00:48:30,150

I minus one everything for the schedule

923

00:48:35,589 --> 00:48:32,960

uh the vehicle is nominal the launch

924

00:48:38,870 --> 00:48:35,599

will be broadcast

925

00:48:40,950 --> 00:48:38,880

i'll taiwan scorpio

926
00:48:42,630 --> 00:48:40,960
everything is nominal on board we are

927
00:48:44,870 --> 00:48:42,640
ready for lunch

928
00:48:46,549 --> 00:48:44,880
sergei procopia the soyuz commander

929
00:48:47,270 --> 00:48:46,559
reporting back

930
00:48:49,030 --> 00:48:47,280
to

931
00:48:51,270 --> 00:48:49,040
launch controllers in baikonur that

932
00:48:54,230 --> 00:48:51,280
everything is in readiness aboard the

933
00:48:57,430 --> 00:48:54,240
soyuz ms-22 spacecraft you see the

934
00:48:59,829 --> 00:48:57,440
booster on the launch pad again

935
00:49:02,470 --> 00:48:59,839
the two umbilical towers that are

936
00:49:04,870 --> 00:49:02,480
buttressed up against the soyuz the

937
00:49:08,069 --> 00:49:04,880
first will retract at about the t-minus

938
00:49:10,309 --> 00:49:08,079

30 or 35-second mark the second of those

939

00:49:13,190 --> 00:49:10,319

two umbilicals will retract at about the

940

00:49:15,750 --> 00:49:13,200

12-second mark before launch initiating

941

00:49:19,510 --> 00:49:15,760

the auto-sequence start for engine

942

00:49:21,190 --> 00:49:19,520

ignition and ultimately for liftoff

943

00:49:23,430 --> 00:49:21,200

inside six and a half minutes from

944

00:49:31,670 --> 00:49:23,440

launch

945

00:49:33,589 --> 00:49:31,680

automatic mode

946

00:49:35,349 --> 00:49:33,599

and uh launch controllers down at

947

00:49:37,270 --> 00:49:35,359

baikonur reporting that the range is

948

00:49:39,109 --> 00:49:37,280

clear the soyuz rocket ready to begin

949

00:49:49,109 --> 00:49:39,119

its journey

950

00:49:52,710 --> 00:49:51,030

the three crew members strapped into

951
00:49:55,270 --> 00:49:52,720
their seats in the center section the

952
00:49:58,230 --> 00:49:55,280
descent module have closed their visors

953
00:50:01,109 --> 00:49:58,240
for launch sergey procopia of reporting

954
00:50:02,470 --> 00:50:01,119
that everything is in readiness on board

955
00:50:05,190 --> 00:50:02,480
the soyuz

956
00:50:07,030 --> 00:50:05,200
flanked to his right by nasa's

957
00:50:10,150 --> 00:50:07,040
uh frank rubio and to his left by

958
00:50:13,109 --> 00:50:10,160
roscosmos cosmonaut dimitri patellan

959
00:50:14,950 --> 00:50:13,119
five and a half minutes until launch

960
00:50:17,190 --> 00:50:14,960
onboard systems will be switching to

961
00:50:43,190 --> 00:50:17,200
onboard control the commander's cockpit

962
00:50:48,790 --> 00:50:45,109
passing now the five minute mark into

963
00:50:53,109 --> 00:50:50,630

strip chart recorders in the launch

964

00:50:55,430 --> 00:50:53,119

control center now activated

965

00:50:57,829 --> 00:50:55,440

they will be recording telemetry from

966

00:51:02,630 --> 00:50:57,839

the launch vehicle during liftoff and

967

00:51:06,230 --> 00:51:04,470

the sun's setting on the central asian

968

00:51:09,589 --> 00:51:06,240

desert everything in readiness for

969

00:51:13,670 --> 00:51:09,599

launch at 854 and 49 seconds am central

970

00:51:23,750 --> 00:51:13,680

time 6 54 and 49 seconds pm baikonur

971

00:51:28,470 --> 00:51:26,710

the soyuz 2.18 booster fuel lines and

972

00:51:30,950 --> 00:51:28,480

other elements of the rocket engines now

973

00:51:33,430 --> 00:51:30,960

being purged with nitrogen to fire proof

974

00:51:35,349 --> 00:51:33,440

them to remove vapors of fuel and

975

00:51:48,069 --> 00:51:35,359

oxidizer for the final minutes of the

976

00:51:52,870 --> 00:51:50,630

moments from now a key uh will be placed

977

00:51:54,790 --> 00:51:52,880

in the drainage position

978

00:51:56,790 --> 00:51:54,800

the valves through which evaporated or

979

00:51:58,710 --> 00:51:56,800

gaseous oxygen escapes from the fuel

980

00:52:00,069 --> 00:51:58,720

tanks into the atmosphere

981

00:52:02,230 --> 00:52:00,079

are closed

982

00:52:04,390 --> 00:52:02,240

as the fuel begins to drain back into

983

00:52:07,030 --> 00:52:04,400

the tanks at the same time the valves

984

00:52:10,069 --> 00:52:07,040

providing liquid oxygen to replenish

985

00:52:14,950 --> 00:52:10,079

those tanks will be lost by the natural

986

00:52:43,270 --> 00:52:16,710

coming up on the t-minus three-minute

987

00:52:43,280 --> 00:52:53,349

the drainage has now been completed

988

00:52:57,750 --> 00:52:55,670

t-minus 2 minutes 45 seconds until

989

00:53:00,230 --> 00:52:57,760

launch the fuel and oxidizer tanks now

990

00:53:01,990 --> 00:53:00,240

being pressurized to optimize fuel flow

991

00:53:03,990 --> 00:53:02,000

to provide additional structural

992

00:53:21,510 --> 00:53:04,000

rigidity to the launch vehicle on the

993

00:53:27,510 --> 00:53:24,390

booster propellant tank pressurization

994

00:53:29,190 --> 00:53:27,520

initiated tank pressurization underway

995

00:53:35,349 --> 00:53:29,200

everything in good shape as we approach

996

00:53:43,349 --> 00:53:37,990

vehicle is nominal

997

00:53:46,790 --> 00:53:45,349

passing through two minutes

998

00:53:48,710 --> 00:53:46,800

coming up on the termination of the

999

00:54:10,549 --> 00:53:48,720

ground propellant feed to the soyuz

1000

00:54:35,349 --> 00:54:13,109

t-minus 1 minute 30 seconds until launch

1001
00:54:39,670 --> 00:54:37,670
this in cabin view showing uh at the

1002
00:54:41,910 --> 00:54:39,680
bottom of your screen sergey procopia of

1003
00:54:44,950 --> 00:54:41,920
the soyuz commander and at the top of

1004
00:54:46,790 --> 00:54:44,960
your screen dimitri patellan frank rubio

1005
00:54:49,430 --> 00:54:46,800
on the right of procopia out of the

1006
00:54:59,510 --> 00:54:49,440
field of view here we are now 50 seconds

1007
00:55:05,510 --> 00:55:01,990
vehicle switch to internal power first

1008
00:55:07,430 --> 00:55:05,520
umbilical tower separation

1009
00:55:09,750 --> 00:55:07,440
first umbilical should be retracting and

1010
00:55:12,069 --> 00:55:09,760
there it goes the second umbilical will

1011
00:55:22,390 --> 00:55:12,079
retract at about the t-minus 15 second

1012
00:55:22,400 --> 00:55:25,829
[Music]

1013
00:55:30,870 --> 00:55:28,630

the second umbilical has retracted this

1014

00:55:45,910 --> 00:55:30,880

will initiate the auto sequence start

1015

00:55:50,230 --> 00:55:48,230

a sunset start to the mission of rubio

1016

00:55:53,990 --> 00:55:50,240

procopia and patellin to the

1017

00:55:59,270 --> 00:55:57,430

10 seconds light is nominal

1018

00:56:00,870 --> 00:55:59,280

good first stage performance reported

1019

00:56:03,750 --> 00:56:00,880

from the block house in baikonur the

1020

00:56:05,670 --> 00:56:03,760

soyuz delivering 930 thousand pounds of

1021

00:56:11,670 --> 00:56:05,680

thrust from its four boosters and single

1022

00:56:15,589 --> 00:56:13,190

arcng out to the northeast from the

1023

00:56:17,990 --> 00:56:15,599

baikonur cosmodrome

1024

00:56:20,230 --> 00:56:18,000

35 seconds into the flight everything

1025

00:56:27,190 --> 00:56:20,240

looking good so far good roll pitch in

1026
00:56:31,910 --> 00:56:29,670
a vehicle reported structural stability

1027
00:56:33,750 --> 00:56:31,920
is good

1028
00:56:34,630 --> 00:56:33,760
approaching the one minute mark into the

1029
00:56:37,430 --> 00:56:34,640
flight

1030
00:56:40,470 --> 00:56:37,440
is feeling well vehicle is nominal

1031
00:56:57,270 --> 00:56:40,480
coffee velocity now about 1100 miles per

1032
00:57:01,910 --> 00:57:00,069
of reporting the crew is feeling well

1033
00:57:03,589 --> 00:57:01,920
coming up on the one minute 20 second

1034
00:57:05,349 --> 00:57:03,599
mark into the flight

1035
00:57:07,990 --> 00:57:05,359
now passing through the area of maximum

1036
00:57:17,750 --> 00:57:08,000
dynamic pressure

1037
00:57:17,760 --> 00:57:36,470
one minute 35 seconds into the flight

1038
00:57:36,480 --> 00:57:49,990

correct affirmative

1039

00:57:50,000 --> 00:58:06,630

and we've had first stage separation

1040

00:58:13,190 --> 00:58:09,430

please report pressure eight

1041

00:58:17,990 --> 00:58:14,950

eight three four

1042

00:58:22,950 --> 00:58:18,000

two minutes 35 seconds into the flight

1043

00:58:25,190 --> 00:58:22,960

second stage engine operating nominally

1044

00:58:28,230 --> 00:58:25,200

the second stage engine is operating

1045

00:58:30,069 --> 00:58:28,240

normally now a view from the upper stage

1046

00:58:33,349 --> 00:58:30,079

of the soyuz booster

1047

00:58:37,030 --> 00:58:33,359

as it continues to climb up hill

1048

00:58:39,510 --> 00:58:37,040

launch shroud now has been jettisoned

1049

00:58:44,789 --> 00:58:39,520

vehicle is normal the soyuz booster

1050

00:58:51,430 --> 00:58:46,390

traveling about

1051
00:58:51,440 --> 00:58:57,610
some 72 miles down range

1052
00:59:00,270 --> 00:58:59,030
[Music]

1053
00:59:02,870 --> 00:59:00,280
I plus

1054
00:59:07,430 --> 00:59:02,880
119. three minutes 20 seconds into the

1055
00:59:09,910 --> 00:59:08,470
see

1056
00:59:12,470 --> 00:59:09,920
indication

1057
00:59:13,589 --> 00:59:12,480
control descent available vehicle is

1058
00:59:23,430 --> 00:59:13,599
nominal

1059
00:59:23,440 --> 00:59:27,510
well good reports uh so far

1060
00:59:31,270 --> 00:59:29,510
the flight reported as nominal as we

1061
00:59:33,430 --> 00:59:31,280
approach the four minute mark into the

1062
00:59:37,230 --> 00:59:33,440
flight pressure

1063
00:59:40,789 --> 00:59:39,030

1500

1064

00:59:49,190 --> 00:59:40,799

for a moment

1065

00:59:53,349 --> 00:59:52,390

second stage engine continues to burn as

1066

00:59:55,670 --> 00:59:53,359

planned

1067

00:59:57,829 --> 00:59:55,680

as we approach the 4-minute 15-second

1068

01:00:12,230 --> 00:59:57,839

mark into the flight about halfway

1069

01:00:16,950 --> 01:00:14,710

about 15 seconds away from second stage

1070

01:00:19,990 --> 01:00:16,960

shutdown and the ignition of the third

1071

01:00:37,829 --> 01:00:23,270

I plus two seven zero parameters are

1072

01:00:42,470 --> 01:00:40,390

second stage separation confirmed

1073

01:00:43,750 --> 01:00:42,480

second stage shutdown and separation is

1074

01:00:46,069 --> 01:00:43,760

confirmed

1075

01:00:48,230 --> 01:00:46,079

the soyuz now uh

1076
01:00:51,910 --> 01:00:48,240
climbing to orbit on the singular power

1077
01:00:55,270 --> 01:00:53,990
five minutes 12 seconds into the flight

1078
01:00:57,030 --> 01:00:55,280
about three and a half minutes of

1079
01:00:57,750 --> 01:00:57,040
powered flight remaining

1080
01:01:07,349 --> 01:00:57,760
|

1081
01:01:09,349 --> 01:01:07,359
crew

1082
01:01:11,829 --> 01:01:09,359
is feeling well

1083
01:01:13,030 --> 01:01:11,839
procopia reports that the crew is doing

1084
01:01:16,309 --> 01:01:13,040
well

1085
01:01:18,069 --> 01:01:16,319
this third stage engine providing 67 000

1086
01:01:19,990 --> 01:01:18,079
pounds of thrust

1087
01:01:37,030 --> 01:01:20,000
for the remaining three minutes of

1088
01:01:41,670 --> 01:01:39,589

350 years we've now hit the six minute

1089

01:01:44,630 --> 01:01:41,680

mark into the flight everything going as

1090

01:01:46,710 --> 01:01:44,640

planned a true trajectory so far for the

1091

01:01:49,990 --> 01:01:46,720

soyuz booster

1092

01:01:53,030 --> 01:01:50,000

now flying on the third stage propulsion

1093

01:01:55,030 --> 01:01:53,040

of its singular engine good roll pitch

1094

01:02:09,730 --> 01:01:55,040

and yaw reported good structural

1095

01:02:14,390 --> 01:02:11,349

[Music]

1096

01:02:29,109 --> 01:02:14,400

the engine of the third phase is working

1097

01:02:36,309 --> 01:02:29,910

the

1098

01:02:38,789 --> 01:02:36,319

is in place it is stable i'll say

1099

01:02:40,549 --> 01:02:38,799

good structural stability of the soyuz

1100

01:02:42,630 --> 01:02:40,559

vehicle at the seven minute mark into

1101
01:02:49,349 --> 01:02:42,640
the flight about one minute 45 seconds

1102
01:02:53,990 --> 01:02:51,430
yaw pitch and roll all reported to be

1103
01:02:56,069 --> 01:02:54,000
nominal at the time of third stage

1104
01:02:58,470 --> 01:02:56,079
shutdown and spacecraft separation

1105
01:03:01,430 --> 01:02:58,480
control of the soyuz vehicle through

1106
01:03:02,950 --> 01:03:01,440
docking will transition to the

1107
01:03:10,870 --> 01:03:02,960
flight control team at the russian

1108
01:03:16,230 --> 01:03:14,150
seven minutes 30 seconds into the flight

1109
01:03:19,029 --> 01:03:16,240
again this view from a camera on the

1110
01:03:21,349 --> 01:03:19,039
upper stage of the soyuz booster

1111
01:03:23,589 --> 01:03:21,359
which should also provide us a view of

1112
01:03:25,750 --> 01:03:23,599
the solar array deploy

1113
01:03:28,870 --> 01:03:25,760

shortly after spacecraft separation

1114

01:03:31,430 --> 01:03:28,880

nominal crew is feeling great the crew

1115

01:03:33,430 --> 01:03:31,440

reported to be feeling great

1116

01:03:35,589 --> 01:03:33,440

in the words of sergey procopia of the

1117

01:03:37,430 --> 01:03:35,599

soyuz commander

1118

01:03:39,589 --> 01:03:37,440

we have now reached the eight minute

1119

01:03:41,589 --> 01:03:39,599

mark into the flight 45 seconds away

1120

01:03:55,029 --> 01:03:41,599

from third stage shutdown and spacecraft

1121

01:03:57,349 --> 01:03:56,470

is nominal

1122

01:04:02,069 --> 01:03:57,359

and

1123

01:04:05,109 --> 01:04:02,079

crew is feeling great we're waiting for

1124

01:04:08,870 --> 01:04:05,119

the separation

1125

01:04:11,750 --> 01:04:08,880

the crew on board the soyuz ms-22

1126
01:04:13,670 --> 01:04:11,760
rubio procopium and patella now about 15

1127
01:04:25,109 --> 01:04:13,680
seconds away from third stage shutdown

1128
01:04:25,119 --> 01:04:35,349
520

1129
01:04:39,750 --> 01:04:37,670
and we have third stage shutdown

1130
01:04:43,270 --> 01:04:39,760
and spacecraft separation you see the

1131
01:04:47,270 --> 01:04:45,670
time tag commands now will deploy the

1132
01:04:52,870 --> 01:04:47,280
solar arrays and the navigational

1133
01:05:09,349 --> 01:04:58,710
outside moscow

1134
01:05:13,910 --> 01:05:11,670
and we now have confirmation of a

1135
01:05:15,349 --> 01:05:13,920
perfect solar array and navigational

1136
01:05:18,150 --> 01:05:15,359
antenna deploy

1137
01:05:20,309 --> 01:05:18,160
the soyuz ms-22 now in its

1138
01:05:22,150 --> 01:05:20,319

preliminary orbit

1139

01:05:23,990 --> 01:05:22,160

and the chase has begun to catch up to

1140

01:05:25,910 --> 01:05:24,000

the international space station with

1141

01:05:26,789 --> 01:05:25,920

docking planned just three hours from

1142

01:05:28,950 --> 01:05:26,799

now

1143

01:05:31,349 --> 01:05:28,960

after a two-orbit journey

1144

01:05:32,230 --> 01:05:31,359

docking scheduled at 12 11

1145

01:06:11,910 --> 01:05:32,240

p.m

1146

01:06:16,150 --> 01:06:14,390

yes what about the separation contact

1147

01:06:18,150 --> 01:06:16,160

how did it go

1148

01:06:21,190 --> 01:06:18,160

it went nominally how do you read me

1149

01:06:23,589 --> 01:06:21,200

this is outside one outside one read you

1150

01:06:25,670 --> 01:06:23,599

loud and clear and we copy

1151
01:06:26,470 --> 01:06:25,680
everything went nominally yes there was

1152
01:06:36,630 --> 01:06:26,480
a

1153
01:06:36,640 --> 01:06:40,789
yes

1154
01:06:44,630 --> 01:06:43,349
is complete right right now we'll be

1155
01:06:47,270 --> 01:06:44,640
working with

1156
01:06:50,710 --> 01:06:47,280
empl empl2

1157
01:06:55,190 --> 01:06:50,720
so you need to combat the display

1158
01:06:59,829 --> 01:06:58,230
along the roll axis is here

1159
01:07:01,349 --> 01:06:59,839
we confirm and we copy and we're

1160
01:07:04,069 --> 01:07:01,359
monitoring that

1161
01:07:06,470 --> 01:07:04,079
and the tv system

1162
01:07:09,430 --> 01:07:06,480
is on and we're waiting for the first

1163
01:07:12,630 --> 01:07:09,440

measurement from your first measurement

1164

01:07:18,870 --> 01:07:12,640

17 0 421

1165

01:07:22,230 --> 01:07:20,549

this is mission control houston back

1166

01:07:24,390 --> 01:07:22,240

here in the international space station

1167

01:07:26,630 --> 01:07:24,400

flight control room the orbit 2 team of

1168

01:07:29,270 --> 01:07:26,640

flight controllers uh

1169

01:07:32,069 --> 01:07:29,280

now proceeding on to

1170

01:07:33,349 --> 01:07:32,079

monitor the progress of the soyuz ms-22

1171

01:07:35,829 --> 01:07:33,359

spacecraft

1172

01:07:37,990 --> 01:07:35,839

to the international space station with

1173

01:07:40,390 --> 01:07:38,000

docking schedule just a little over

1174

01:07:43,510 --> 01:07:40,400

three hours from now

1175

01:07:44,710 --> 01:07:43,520

the launch uh as you just saw occurred

1176

01:07:55,029 --> 01:07:44,720

on time

1177

01:07:59,589 --> 01:07:57,750

54 and 49 seconds p.m at the baikonur

1178

01:08:01,190 --> 01:07:59,599

cosmodrome just a few minutes after

1179

01:08:04,870 --> 01:08:01,200

sunset

1180

01:08:07,430 --> 01:08:04,880

all of the ascent uh activities

1181

01:08:08,470 --> 01:08:07,440

uh occurred on time and were perfectly

1182

01:08:10,789 --> 01:08:08,480

normal

1183

01:08:12,470 --> 01:08:10,799

the perfect ascent to orbit uh third

1184

01:08:15,270 --> 01:08:12,480

stage shutdown occurring eight minutes

1185

01:08:16,789 --> 01:08:15,280

and 45 seconds after launch

1186

01:08:20,309 --> 01:08:16,799

right on time

1187

01:08:23,430 --> 01:08:20,319

enabling the three crew members on board

1188

01:08:25,510 --> 01:08:23,440

the soyuz spacecraft frank rubio

1189

01:08:28,309 --> 01:08:25,520

dimitri patellan and the soyuz commander

1190

01:08:30,550 --> 01:08:28,319

sergey prokopiev to begin uh

1191

01:08:32,309 --> 01:08:30,560

all the procedures that will lead uh

1192

01:08:34,390 --> 01:08:32,319

towards an automated rendezvous and

1193

01:08:37,349 --> 01:08:34,400

docking to the rassvet module of the

1194

01:08:39,910 --> 01:08:37,359

international space station at 12 11 p.m

1195

01:08:42,149 --> 01:08:39,920

central time

1196

01:08:43,349 --> 01:08:42,159

our docking coverage uh

1197

01:08:45,910 --> 01:08:43,359

will

1198

01:08:49,510 --> 01:08:45,920

begin a little over two hours from now

1199

01:08:52,630 --> 01:08:49,520

at 11 15 a.m central 12 15 p.m eastern

1200

01:08:54,550 --> 01:08:52,640

time on the public channel meanwhile

1201
01:08:56,950 --> 01:08:54,560
we're going to return the public channel

1202
01:08:59,189 --> 01:08:56,960
to the kennedy space center in florida

1203
01:09:01,749 --> 01:08:59,199
where the cryogenic tanking test of the

1204
01:09:04,229 --> 01:09:01,759
space launch system is continuing

1205
01:09:06,309 --> 01:09:04,239
out on launch pad 39b

1206
01:09:08,630 --> 01:09:06,319
so we have a double dip for you today

1207
01:09:10,870 --> 01:09:08,640
the soyuz launch and upcoming rendezvous

1208
01:09:12,950 --> 01:09:10,880
and docking of the three new residents

1209
01:09:15,749 --> 01:09:12,960
of the international space station

1210
01:09:18,789 --> 01:09:15,759
and the cryogenic tanking test that if

1211
01:09:20,550 --> 01:09:18,799
successful could lead to a launch

1212
01:09:23,590 --> 01:09:20,560
the maiden launch of the space launch

1213
01:09:25,590 --> 01:09:23,600

system on september 27th

1214

01:09:27,030 --> 01:09:25,600

for now that'll wrap up our coverage of

1215

01:09:29,749 --> 01:09:27,040

the launch

1216

01:09:31,590 --> 01:09:29,759

of soyuz ms-22 to the international

1217

01:09:34,070 --> 01:09:31,600

space station we'll see you back here in

1218

01:09:36,789 --> 01:09:34,080

two hours for the rendezvous and docking

1219

01:09:41,050 --> 01:09:36,799

coverage in the meantime this is mission