



**EPISODE THREE:**  
**TRAINING THE ASTRONAUTS**

1  
00:00:01,167 --> 00:00:02,402  
>> HI, I'M TERRY VIRTS

2  
00:00:02,402 --> 00:00:03,636  
AND I WANNA TALK ABOUT

3  
00:00:03,636 --> 00:00:05,071  
FLOATING IN SPACE.

4  
00:00:05,071 --> 00:00:06,239  
ONE OF THE FIRST THINGS

5  
00:00:06,239 --> 00:00:07,107  
YOU NEED TO REALIZE

6  
00:00:07,107 --> 00:00:08,174  
WHEN YOU GET INTO SPACE

7  
00:00:08,174 --> 00:00:09,442  
IS THAT EVEN THOUGH

8  
00:00:09,442 --> 00:00:11,111  
YOU FEEL LIKE YOU'RE FALLING,

9  
00:00:11,111 --> 00:00:12,178  
YOU'RE NOT.

10  
00:00:12,178 --> 00:00:13,580  
YOU CAN LET GO

11  
00:00:13,580 --> 00:00:14,647  
AND YOU FLOAT.

12  
00:00:14,647 --> 00:00:15,548  
THAT'S NOT A PROBLEM.

13  
00:00:15,548 --> 00:00:16,383

IT'S SOMETHING YOU REALLY

14

00:00:16,383 --> 00:00:17,484

HAVE TO TRAIN YOUR BRAIN

15

00:00:17,484 --> 00:00:18,618

TO THINK ABOUT.

16

00:00:18,618 --> 00:00:19,486

ANOTHER THING THAT YOU

17

00:00:19,486 --> 00:00:20,653

NEED TO LEARN WHEN YOU

18

00:00:20,653 --> 00:00:21,788

FIRST GET INTO SPACE

19

00:00:21,788 --> 00:00:23,556

IS HOW LITTLE FORCE

20

00:00:23,556 --> 00:00:24,657

IS REQUIRED TO MOVE YOU.

21

00:00:24,657 --> 00:00:26,593

AND ANOTHER COOL THING IS

22

00:00:26,593 --> 00:00:28,027

YOU COULD BE ON THE CEILING.

23

00:00:28,027 --> 00:00:29,362

IT MAKES IT VERY EASY

24

00:00:29,362 --> 00:00:30,330

WHEN YOU'RE WORKING,

25

00:00:30,330 --> 00:00:31,097

YOU HAVE TO GET--

26

00:00:31,097 --> 00:00:32,031

DO SOME WORK DONE UP HERE,

27

00:00:32,031 --> 00:00:32,799

YOU JUST GO UP ON THE CEILING

28

00:00:32,799 --> 00:00:33,833

AND GET YOUR WORK DONE.

29

00:00:41,841 --> 00:00:42,876

>> OUR TEAM OF SCIENTISTS IS

30

00:00:42,876 --> 00:00:44,043

BUSY GETTING THEIR EXPERIMENT

31

00:00:44,043 --> 00:00:45,378

READY FOR LAUNCH.

32

00:00:45,378 --> 00:00:46,246

AT THE SAME TIME,

33

00:00:46,246 --> 00:00:47,113

NASA IS PREPARING

34

00:00:47,113 --> 00:00:48,715

THE SPACE SCIENTISTS WHO WILL

35

00:00:48,715 --> 00:00:50,183

OPERATE THE EXPERIMENT ABOARD

36

00:00:50,183 --> 00:00:52,118

THE INTERNATIONAL SPACE STATION.

37

00:00:52,118 --> 00:00:53,052

>> SO AS ASTRONAUTS ON BOARD

38

00:00:53,052 --> 00:00:53,887

THE SPACE STATION,

39

00:00:53,887 --> 00:00:55,121

WE ARE THE HANDS AND EYES

40

00:00:55,121 --> 00:00:56,389

OF RESEARCHING.

41

00:00:56,389 --> 00:00:57,357

THEY ARE TELLING US

42

00:00:57,357 --> 00:00:58,525

HOW BEST TO DO THE SCIENCE,

43

00:00:58,525 --> 00:00:59,926

BUT IT'S UP TO US TO MAKE SURE

44

00:00:59,926 --> 00:01:01,795

THAT SCIENCE RUNS CORRECTLY.

45

00:01:01,795 --> 00:01:02,862

>> ASTRONAUTS TRAIN

46

00:01:02,862 --> 00:01:04,130

ALL OVER THE WORLD,

47

00:01:04,130 --> 00:01:05,064

INCLUDING AT NASA'S

48

00:01:05,064 --> 00:01:06,099

JOHNSON SPACE CENTER

49

00:01:06,099 --> 00:01:07,834

IN HOUSTON, TEXAS.

50

00:01:07,834 --> 00:01:09,102

HERE THEY LEARN NOT JUST

51  
00:01:09,102 --> 00:01:10,470  
HOW TO LIVE IN SPACE,

52  
00:01:10,470 --> 00:01:11,504  
BUT ALSO HOW TO CONDUCT

53  
00:01:11,504 --> 00:01:13,573  
SCIENCE IN MICROGRAVITY.

54  
00:01:13,573 --> 00:01:14,574  
>> SO MANY FOLKS ASK,

55  
00:01:14,574 --> 00:01:15,475  
"HOW MUCH TRAINING DID YOU DO

56  
00:01:15,475 --> 00:01:16,242  
BEFORE LAUNCHING

57  
00:01:16,242 --> 00:01:17,277  
TO THE SPACE STATION?"

58  
00:01:17,277 --> 00:01:18,144  
AND THE ANSWER IS

59  
00:01:18,144 --> 00:01:19,279  
MANY YEARS!

60  
00:01:19,279 --> 00:01:20,046  
SO WE TRAIN IN

61  
00:01:20,046 --> 00:01:21,147  
A LOT OF BIG AREAS.

62  
00:01:21,147 --> 00:01:22,248  
NUMBER ONE IS SYSTEMS

63  
00:01:22,248 --> 00:01:23,383

ONBOARD THE ISS,

64

00:01:23,383 --> 00:01:24,751

ROBOTICS,

65

00:01:24,751 --> 00:01:25,952

HOW TO DO SPACEWALKS,

66

00:01:25,952 --> 00:01:28,054

AND ACTUALLY SCIENCE ITSELF.

67

00:01:28,054 --> 00:01:28,955

NOW WE DON'T LEARN ABOUT

68

00:01:28,955 --> 00:01:29,789

A LOT OF THE SCIENCE

69

00:01:29,789 --> 00:01:30,623

EXPERIMENTS WE'RE DOING

70

00:01:30,623 --> 00:01:32,091

UNTIL WE GET UP THERE.

71

00:01:32,091 --> 00:01:32,992

BUT WHAT THEY ARE TEACHING US

72

00:01:32,992 --> 00:01:35,395

IS SCIENTIFIC TECHNIQUES.

73

00:01:35,395 --> 00:01:36,663

THE TECHNIQUES ASTRONAUTS LEARN

74

00:01:36,663 --> 00:01:38,264

RANGE FROM USING TOOLS

75

00:01:38,264 --> 00:01:40,099

LIKE PIPETTES AND MICROSCOPES

76

00:01:40,099 --> 00:01:41,501  
IN MICROGRAVITY TO

77

00:01:41,501 --> 00:01:43,069  
OPERATING SCIENTIFIC HARDWARE

78

00:01:43,069 --> 00:01:44,571  
ABOARD THE SPACE STATION.

79

00:01:44,571 --> 00:01:46,172  
FOR EXAMPLE, WE STUDY

80

00:01:46,172 --> 00:01:47,674  
COMBUSTION ABOARD THE STATION

81

00:01:47,674 --> 00:01:48,808  
BECAUSE IT BEHAVES DIFFERENTLY

82

00:01:48,808 --> 00:01:50,109  
IN MICROGRAVITY.

83

00:01:50,109 --> 00:01:51,277  
YOU WOULDN'T WANT FIRE

84

00:01:51,277 --> 00:01:52,645  
TO GET FREE INSIDE YOUR HOME

85

00:01:52,645 --> 00:01:53,847  
IN SPACE, THOUGH.

86

00:01:53,847 --> 00:01:54,714  
SO WE'VE CREATED SPECIAL

87

00:01:54,714 --> 00:01:56,683  
FACILITIES TO CONTAIN IT.

88

00:01:56,683 --> 00:01:58,551

IF IT LOOKS COMPLICATED,

89

00:01:58,551 --> 00:02:00,186

IT'S BECAUSE IT IS.

90

00:02:00,186 --> 00:02:00,987

AND IT'S JUST ONE OF

91

00:02:00,987 --> 00:02:02,121

THE PIECES OF EQUIPMENT

92

00:02:02,121 --> 00:02:03,490

ASTRONAUTS MUST MASTER BEFORE

93

00:02:03,490 --> 00:02:06,759

THEY GO TO THE SPACE STATION.

94

00:02:06,759 --> 00:02:07,660

>> HI, I'M TRACEY NEFF

95

00:02:07,660 --> 00:02:09,128

AND THIS IS SHARON REINKE

96

00:02:09,128 --> 00:02:10,864

AND WE'RE IN PDL2 RIGHT NOW.

97

00:02:10,864 --> 00:02:14,133

AND WE'RE DOWN HERE AT JSC TO DO

98

00:02:14,133 --> 00:02:16,035

THE FLUIDS AND COMBUSTION

99

00:02:16,035 --> 00:02:17,170

FACILITY TRAINING FOR

100

00:02:17,170 --> 00:02:18,505

THE COMBUSTION INTEGRATED RACK

101  
00:02:18,505 --> 00:02:20,707  
AND THE FLUIDS INTEGRATED RACK.

102  
00:02:20,707 --> 00:02:21,808  
>> SO BASICALLY, PDL2

103  
00:02:21,808 --> 00:02:24,210  
IS A MOCKUP OF THE US LAB.

104  
00:02:24,210 --> 00:02:25,712  
SINCE 2008 WE'VE BEEN

105  
00:02:25,712 --> 00:02:27,480  
COMING DOWN AND TRAINING

106  
00:02:27,480 --> 00:02:28,481  
ALL THE CREW MEMBERS

107  
00:02:28,481 --> 00:02:30,617  
WHO WILL DO PAYLOADS

108  
00:02:30,617 --> 00:02:32,986  
ON THE SPACE STATION.

109  
00:02:32,986 --> 00:02:33,553  
WE'VE BEEN TRAINING

110  
00:02:33,553 --> 00:02:35,255  
COSMONAUTS AS WELL.

111  
00:02:35,255 --> 00:02:36,055  
>> HOW MANY CREW DO YOU THINK

112  
00:02:36,055 --> 00:02:37,056  
YOU TRAINED AT THIS POINT?

113  
00:02:37,056 --> 00:02:38,525

>> PROBABLY...

114

00:02:38,525 --> 00:02:39,993  
50?

115

00:02:39,993 --> 00:02:40,827  
PROBABLY OVER 50

116

00:02:40,827 --> 00:02:42,729  
CREW MEMBERS WE'VE TRAINED.

117

00:02:42,729 --> 00:02:43,763  
>> TODAY, TRACEY AND SHARON

118

00:02:43,763 --> 00:02:44,531  
ARE BACK AT WORK

119

00:02:44,531 --> 00:02:45,832  
WITH A FORMER STUDENT.

120

00:02:45,832 --> 00:02:48,234  
NASA ASTRONAUT, MIKE FINCKE.

121

00:02:48,234 --> 00:02:49,202  
THIS ISN'T MIKE'S FIRST RODEO

122

00:02:49,202 --> 00:02:50,236  
WITH THE STATION,

123

00:02:50,236 --> 00:02:51,137  
OR THIS EQUIPMENT

124

00:02:51,137 --> 00:02:52,805  
FOR THAT MATTER.

125

00:02:52,805 --> 00:02:55,875  
>> SO BACK IN 2008 AND 2009,

126  
00:02:55,875 --> 00:02:56,576  
WE WERE ABOARD

127  
00:02:56,576 --> 00:02:58,044  
THE INTERNATIONAL SPACE STATION

128  
00:02:58,044 --> 00:02:59,078  
WHEN A SPACE SHUTTLE,

129  
00:02:59,078 --> 00:03:01,514  
STS-126 CHRIS FERGUSON AND CREW,

130  
00:03:01,514 --> 00:03:02,982  
DROPPED OFF A WHOLE BIG

131  
00:03:02,982 --> 00:03:04,183  
BUNCH OF PACKAGES.

132  
00:03:04,183 --> 00:03:05,184  
AND WE CAREFULLY AND SLOWLY

133  
00:03:05,184 --> 00:03:06,619  
PUT IT ALL TOGETHER.

134  
00:03:06,619 --> 00:03:07,387  
AND WHEN IT WAS ALL DONE,

135  
00:03:07,387 --> 00:03:08,721  
WE HAD A BRAND NEW,

136  
00:03:08,721 --> 00:03:10,790  
READY, FRESH-OUT-OF-THE-BOX

137  
00:03:10,790 --> 00:03:12,425  
COMBUSTION INTEGRATION RACK.

138  
00:03:12,425 --> 00:03:13,593

AND SINCE THEN, OUR FRIENDS

139

00:03:13,593 --> 00:03:14,727

AT GLENN RESEARCH CENTER

140

00:03:14,727 --> 00:03:15,728

HERE AT NASA

141

00:03:15,728 --> 00:03:16,696

HAVE BEEN ABLE TO GET SOME

142

00:03:16,696 --> 00:03:18,164

FANTASTIC SCIENCE ABOUT

143

00:03:18,164 --> 00:03:20,500

HOW THINGS BURN IN SPACE

144

00:03:20,500 --> 00:03:21,401

WITHOUT GRAVITY,

145

00:03:21,401 --> 00:03:22,602

WITHOUT CONVECTION,

146

00:03:22,602 --> 00:03:23,536

THINGS BURN.

147

00:03:23,536 --> 00:03:24,737

AND BY UNDERSTANDING THAT BETTER

148

00:03:24,737 --> 00:03:25,838

WE'RE ABLE TO MAKE MORE

149

00:03:25,838 --> 00:03:27,340

FUEL-EFFICIENT ENGINES

150

00:03:27,340 --> 00:03:29,709

AND THINGS HERE ON PLANET EARTH

151  
00:03:29,709 --> 00:03:31,578  
HELPING SAVE OUR ENERGY.

152  
00:03:31,578 --> 00:03:32,912  
SO YOU CAN SEE IT IN THE VIDEO.

153  
00:03:32,912 --> 00:03:34,681  
ALL THE HOSES, UH,

154  
00:03:34,681 --> 00:03:35,848  
ARE WITHIN THE RING.

155  
00:03:35,848 --> 00:03:37,417  
AND, UH, SO THEY ALL FIT IN

156  
00:03:37,417 --> 00:03:38,418  
NICELY SO THEY SHOULDN'T

157  
00:03:38,418 --> 00:03:39,786  
INTERFERE WITH US.

158  
00:03:41,754 --> 00:03:43,523  
>> SOUNDS GREAT AND LOOKS GREAT,

159  
00:03:43,523 --> 00:03:45,425  
THANK YOU.

160  
00:03:45,425 --> 00:03:47,060  
>> WELL A LOT HAD CHANGED IN

161  
00:03:47,060 --> 00:03:48,995  
11 YEARS SINCE HE WAS UP THERE.

162  
00:03:48,995 --> 00:03:50,163  
SO HE DID GET MOST OF

163  
00:03:50,163 --> 00:03:52,131

THE INFORMATION AGAIN.

164

00:03:52,131 --> 00:03:54,300  
AND IT WAS A NEW EXPERIMENT,

165

00:03:54,300 --> 00:03:56,502  
SO HE HADN'T SEEN THAT EITHER.

166

00:03:58,938 --> 00:03:59,939  
HE DID GREAT!

167

00:03:59,939 --> 00:04:01,374  
HE'S A QUICK LEARNER.

168

00:04:01,374 --> 00:04:02,241  
HE'S GREAT TO WORK WITH,

169

00:04:02,241 --> 00:04:03,710  
VERY METHODOICAL.

170

00:04:03,710 --> 00:04:04,544  
AND GOOD HUMOR,

171

00:04:04,544 --> 00:04:05,712  
WHICH IS ALWAYS-- WE LIKE TO

172

00:04:05,712 --> 00:04:07,347  
HAVE FUN WHEN WE'RE TRAINING.

173

00:04:07,347 --> 00:04:09,182  
>> THEN THE-- THE LAB CAMERA

174

00:04:09,182 --> 00:04:10,383  
WILL BE SHOWING--?

175

00:04:10,383 --> 00:04:11,951  
>> YES, WE HAVE THE CAMERA ON.

176

00:04:11,951 --> 00:04:13,186

>> AND I WILL BE LIKE, LOOKING

177

00:04:13,186 --> 00:04:14,354

AND I'M GONNA GO SLOWLY

178

00:04:14,354 --> 00:04:15,455

AND THAT WOULD BE YOUR CHANCE

179

00:04:15,455 --> 00:04:16,856

TO SAY, "NO!"

180

00:04:16,856 --> 00:04:18,257

>> YES.

181

00:04:18,257 --> 00:04:19,926

WE ARE WATCHING YOU, YES.

182

00:04:19,926 --> 00:04:20,994

AND...

183

00:04:20,994 --> 00:04:23,329

HELP YOU WHENEVER WE CAN.

184

00:04:23,329 --> 00:04:24,230

>> THIS ISN'T THE LAST TIME

185

00:04:24,230 --> 00:04:25,131

TRACEY AND SHARON WILL

186

00:04:25,131 --> 00:04:26,366

WORK WITH MIKE.

187

00:04:26,366 --> 00:04:27,600

WHEN HE LAUNCHES TO THE STATION

188

00:04:27,600 --> 00:04:28,568

AND WORKS ON COMBUSTION

189

00:04:28,568 --> 00:04:30,036

PROJECTS IN SPACE,

190

00:04:30,036 --> 00:04:31,371

THEY'LL WATCH OVER HIS SHOULDER

191

00:04:31,371 --> 00:04:32,805

THROUGH A CAMERA BROADCASTING

192

00:04:32,805 --> 00:04:33,940

TO GLENN RESEARCH CENTER

193

00:04:33,940 --> 00:04:36,175

IN CLEVELAND, OHIO.

194

00:04:36,175 --> 00:04:37,944

>> CHRISTINA, THIS IS SHARON

195

00:04:37,944 --> 00:04:39,612

WITH AN ANSWER TO YOUR QUESTION,

196

00:04:39,612 --> 00:04:41,114

SO THEY DO WANT YOU TO GO AHEAD

197

00:04:41,114 --> 00:04:43,182

AND INSTALL THE CABLE TIE.

198

00:04:43,182 --> 00:04:43,916

>> THAT'LL BE ALL.

199

00:04:43,916 --> 00:04:44,550

THANKS FOR HUNTING

200

00:04:44,550 --> 00:04:46,285

THAT DOWN FOR ME.

201  
00:04:46,285 --> 00:04:47,887  
>> ANYTIME!

202  
00:04:53,059 --> 00:04:53,926  
>> BEING ABLE TO OPERATE

203  
00:04:53,926 --> 00:04:55,461  
AND MAINTAIN THE SPACE STATION

204  
00:04:55,461 --> 00:04:56,129  
WHILE CONDUCTING

205  
00:04:56,129 --> 00:04:57,330  
CRUCIAL RESEARCH

206  
00:04:57,330 --> 00:04:58,765  
COULD GET OVERWHELMING.

207  
00:04:58,765 --> 00:05:00,400  
LUCKILY, ASTRONAUTS HAVE STRONG

208  
00:05:00,400 --> 00:05:01,934  
SUPPORT TEAMS ON THE GROUND

209  
00:05:01,934 --> 00:05:02,635  
AND OFTEN DEVELOP

210  
00:05:02,635 --> 00:05:03,469  
PERSONAL CONNECTIONS

211  
00:05:03,469 --> 00:05:05,204  
TO THE RESEARCH.

212  
00:05:05,204 --> 00:05:06,005  
>> I WAS SO IMPRESSED

213  
00:05:06,005 --> 00:05:06,806

AT THE DIFFERENT THINGS

214

00:05:06,806 --> 00:05:08,041

WE'D BE WORKING ON--

215

00:05:08,041 --> 00:05:09,676

CANCER OR PARKINSON'S

216

00:05:09,676 --> 00:05:11,277

OR EVEN ALZHEIMER'S DISEASE.

217

00:05:11,277 --> 00:05:12,111

SO AS A PHYSICIAN,

218

00:05:12,111 --> 00:05:13,146

THESE MEANT A LOT TO ME.

219

00:05:13,146 --> 00:05:14,247

THESE PERSONALLY WERE VERY

220

00:05:14,247 --> 00:05:15,782

IMPORTANT EXPERIMENTS

221

00:05:15,782 --> 00:05:16,749

THAT WE NEEDED TO DO.

222

00:05:16,749 --> 00:05:17,984

BUT IN ALL HONESTY,

223

00:05:17,984 --> 00:05:19,452

THE ENTIRE CREW, NOT JUST

224

00:05:19,452 --> 00:05:21,087

MYSELF AS THE PHYSICIAN,

225

00:05:21,087 --> 00:05:22,055

WERE EXCITED ABOUT

226  
00:05:22,055 --> 00:05:24,390  
WORKING ON THESE EXPERIMENTS.

227  
00:05:24,390 --> 00:05:25,058  
YOU GET A LITTLE NERVOUS

228  
00:05:25,058 --> 00:05:26,859  
AT FIRST AS YOU BEGIN TO PIPETTE

229  
00:05:26,859 --> 00:05:28,928  
OR EVEN UTILIZE A MICROSCOPE,

230  
00:05:28,928 --> 00:05:31,130  
WHICH I HADN'T USED IN YEARS.

231  
00:05:31,130 --> 00:05:32,231  
BUT YOU QUICKLY LEARN BECAUSE

232  
00:05:32,231 --> 00:05:33,399  
YOU REALIZE HOW IMPORTANT IT IS

233  
00:05:33,399 --> 00:05:34,167  
TO THE SCIENCE

234  
00:05:34,167 --> 00:05:35,935  
AND THE INVESTIGATORS

235  
00:05:35,935 --> 00:05:37,403  
AND SCIENTISTS RUNNING YOU

236  
00:05:37,403 --> 00:05:38,404  
THROUGH ALL THESE EXPERIMENTS

237  
00:05:38,404 --> 00:05:39,405  
WERE FANTASTIC AND JUST

238  
00:05:39,405 --> 00:05:40,239

WALKED US THROUGH IT

239

00:05:40,239 --> 00:05:41,607

EVERY STEP OF THE WAY.

240

00:05:41,607 --> 00:05:42,909

YEAH JUST KEEP US POSTED BUT--

241

00:05:42,909 --> 00:05:44,644

DREW AND I ARE READY TO

242

00:05:44,644 --> 00:05:46,045

CONTINUE OPS!

243

00:05:46,045 --> 00:05:47,513

GOOD WORKING WITH YOU GUYS TODAY

244

00:05:47,513 --> 00:05:48,848

AND I'LL SEE YOU SOON!

245

00:05:52,518 --> 00:05:54,120

>> WE GOT HERE ON A THURSDAY

246

00:05:54,120 --> 00:05:56,289

AND IT'S CURRENTLY SUNDAY.

247

00:05:56,289 --> 00:05:57,390

WE'VE HAD A BIG DAY YESTERDAY

248

00:05:57,390 --> 00:05:58,591

FILLING UP THESE WELLS

249

00:05:58,591 --> 00:05:59,559

WITH GEL SOLUTION

250

00:05:59,559 --> 00:06:01,661

AND GETTING READY FOR HANDOVER

251

00:06:01,661 --> 00:06:04,464

AT 7:30 AM ON MONDAY.