



#askNASA

1
00:00:03,399 --> 00:00:09,240
>> HELLO AND WELCOME, I'M
KATHRYN HAMBLETON AND THANK YOU

2
00:00:09,240 --> 00:00:13,900
FOR JOINING US HERE IN VIRGINIA
TO TALK ABOUT THE SCIENCE

3
00:00:13,900 --> 00:00:17,420
LAUNCHING ABOARD THE SIGNA SPACE
CRAFT ALONG THE SPACE STATION,

4
00:00:17,420 --> 00:00:23,089
IT IS PACKED AND READY TO LAUNCH
ON TOP OF THE ROCKET, DURING A

5
00:00:23,089 --> 00:00:28,449
FIVE-MINUTE, WINDOW THAT OPENS
AT 8:03 TOMORROW NIGHT.

6
00:00:28,449 --> 00:00:30,689
WE WILL HAVE TIME FOR A FEW
QUESTIONS AFTER EACH OF OUR

7
00:00:30,689 --> 00:00:32,720
SPEAKERS TODAY.

8
00:00:32,720 --> 00:00:35,640
AS I BRING THEM EACH UP, FOR
THOSE ON THE PHONE IF YOU WILL

9
00:00:35,640 --> 00:00:39,430
PRESS STAR 1 TO BE ENTERED INTO
THE QUE AT ANY TIME.

10
00:00:39,430 --> 00:00:42,110
AND FOR THOSE FOLLOWING US
ON-LINE, PLEASE USE THE HASH TAG

11

00:00:42,110 --> 00:00:43,910

ASK NASA.

12

00:00:43,910 --> 00:00:49,020

>> HERE WITH HE TO GIVE US AN
OVERVIEW, IS PETE HASBROOK, WITH

13

00:00:49,020 --> 00:00:51,920

THE PROGRAM SCIENCE OFFICE FOR
THE INTERNATIONAL SPACE STATION.

14

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

PETE, COULD YOU GIVE US AN
OVERVIEW OF WHAT IS ON BOARD FOR

15

00:00:54,920 --> 00:00:55,920

THIS LAUNCH?

16

00:00:55,920 --> 00:00:56,920

>> SURE, THANK YOU.

17

00:00:56,920 --> 00:01:00,430

AND THANK YOU FOR BEING HERE AND
A SPECIAL THANK YOU FOR ALL OF

18

00:01:00,430 --> 00:01:03,600

YOU WHO ARE WATCHING ON NASA TV
AS WELL.

19

00:01:03,600 --> 00:01:08,670

ON BEHALF OF THE SPEAKERS WE ARE
PROUD TO BE HERE AND WE ARE GLAD

20

00:01:08,670 --> 00:01:11,940

FOR ATK RETURNING TO FLIGHT THIS
WEEK AND IT IS A GREAT THING FOR

21

00:01:11,940 --> 00:01:15,690

THE INTERNATIONAL SPACE STATION
AND FOR THE PROGRAM.

22

00:01:15,690 --> 00:01:18,770

THE SIGNAS CAN BRING A VARIETY
OF CARGO TO THE INTERNATIONAL

23

00:01:18,770 --> 00:01:21,540

SPACE STATION AND TOMORROW ON
THE VEHICLE.

24

00:01:21,540 --> 00:01:27,950

WE HAVE OVER 1,000 KILO GRAMS,
10046, KM OF SCIENTIFIC CARGO,

25

00:01:27,950 --> 00:01:33,970

THAT IS ABOUT 2300 POUNDS OF
CARGO, OR AS I UNDERSTAND IT, IT

26

00:01:33,970 --> 00:01:37,400

IS ABOUT A THIRD OF THE CARGO
BEING LAUNCHED TOMORROW.

27

00:01:37,400 --> 00:01:40,370

THE ISS IS A LABORATORY IN
SPACE, AND IT IS A VERY

28

00:01:40,370 --> 00:01:44,330

VERSATILE LABORATORY, UNLIKE THE
LABORATORIES THAT YOU SEE HERE

29

00:01:44,330 --> 00:01:47,670

ON EARTH, IT MAY SPECIALIZE IN
ONE DISCIPLINE AND PROBABLY

30

00:01:47,670 --> 00:01:51,200

FOCUS ON ONE VERY SMALL PART OF
THAT DISCIPLINE, THE ISS

31

00:01:51,200 --> 00:01:57,730

SUPPORTS A BROAD RANGE OF
SUPPORT AND RESEARCH, WE HAVE

32
00:01:57,730 --> 00:02:02,110
OVER 100 EXPERIMENTS GOING ON
DURING THE SIX MONTHS RIGHT NOW.

33
00:02:02,110 --> 00:02:03,970
EXPEDITION, 49 AND 50.

34
00:02:03,970 --> 00:02:07,110
WE HAVE OVER, 300 EXPERIMENTS IN
THE PLAN OVER THE COURSE OF

35
00:02:07,110 --> 00:02:08,520
THOSE SIX MONTHS.

36
00:02:08,520 --> 00:02:16,129
OUR EXPERIMENTS RANGE FROM THE
MICRO BIOLOGY TO EARTH AND SPACE

37
00:02:16,129 --> 00:02:19,639
SCIENCES, HUMAN RESEARCH,
TECHNOLOGY, DEMONSTRATION AND

38
00:02:19,639 --> 00:02:21,090
EDUCATION AND OUT REACH.

39
00:02:21,090 --> 00:02:23,930
AS WELL AS PHYSICAL SCIENCES.

40
00:02:23,930 --> 00:02:28,129
WE HAVE TO DATE, OVER 2,000
DIFFERENT EXPERIMENTS THAT HAVE

41
00:02:28,129 --> 00:02:29,870
BEEN DONE ACROSS THE
PARTNERSHIP.

42
00:02:29,870 --> 00:02:32,249
AND AROUND THE WORLD ON THE ISS.

43

00:02:32,249 --> 00:02:36,330

WE HAVE OVER, 2900 SCIENTISTS
WHO HAVE BEEN PARTICIPATING IN

44

00:02:36,330 --> 00:02:37,330

RESEARCH.

45

00:02:37,330 --> 00:02:40,470

AND WE HAVE HAD OVER 95
DIFFERENT COUNTRIES.

46

00:02:40,470 --> 00:02:42,499

WE ARE SEARCHING OR DOING
ACTIVITIES WITH THE ISS.

47

00:02:42,499 --> 00:02:45,239

AND IN THE RESEARCH THAT WE ARE
DOING AND THE OUT REACH THAT WE

48

00:02:45,239 --> 00:02:47,769

ARE DOING, ARE ADVANCING OUR
KNOWLEDGE TOWARDS THE

49

00:02:47,769 --> 00:02:50,819

EXPLORATION, AND THE FUTURE
EXPLORATION OF THE OTHER PLANETS

50

00:02:50,819 --> 00:02:53,459

AS WELL AS BENEFITING OUR LIFE
HERE ON EARTH.

51

00:02:53,459 --> 00:02:56,650

NOW IN THE SPEAKERS THAT YOU
WILL HEAR AFTER US.

52

00:02:56,650 --> 00:02:59,060

I AM GOING TO SORT OF PREVIEW
TWO OF THOSE FOR YOU AND BOTH OF

53
00:02:59,060 --> 00:03:00,410
THEM HAVE TO DO WITH COMBUSTION.

54
00:03:00,410 --> 00:03:03,540
YOU ARE GOING TO HEAR ABOUT A
FIRE THAT IS GOING TO BE

55
00:03:03,540 --> 00:03:10,749
INITIATED ON THE SIGNAS VEHICLE
AFTER IT FINISHES AND UNBIRTHS.

56
00:03:10,749 --> 00:03:13,579
IT IS GOING TO BECOME ANOTHER
LABORATORY FOR US.

57
00:03:13,579 --> 00:03:18,629
THIS KIND OF A FIRE WE COULD NOT
CONDUCT IN A HUMAN ENVIRONMENT.

58
00:03:18,629 --> 00:03:22,030
SO BEING ABLE TO TEST THESE
MATERIALS AND DO THIS KIND OF

59
00:03:22,030 --> 00:03:26,090
TEST AFTER SIGNA SUN DOCS, GIVES
YOU ANOTHER IDEA OF THE BENEFIT

60
00:03:26,090 --> 00:03:27,090
OF THE SIG.

61
00:03:27,090 --> 00:03:30,689
NAS VEHICLES FOR US, ANOTHER
SPEAKER IS GOING TO TALK ABOUT A

62
00:03:30,689 --> 00:03:34,079
PHENOMENA CALLED COOL FLAMES,
WHERE THE FLAMES ACTUALLY BURN

63
00:03:34,079 --> 00:03:36,579

AT A LOWER TEMPERATURE THAN WE
ARE USED TO.

64

00:03:36,579 --> 00:03:39,699

A LOWER, LIGHT LEVEL, AND SO IT
IS HARDER TO SEE, AND VERY HARD

65

00:03:39,699 --> 00:03:42,569

TO RECREATE ON THE GROUND, BUT
IN THE MICROGRAVITY, WE CAN

66

00:03:42,569 --> 00:03:45,780

STUDY IT, WHICH WILL BRING
BENEFITS FOR US IN COMBUSTION

67

00:03:45,780 --> 00:03:49,109

ENGINES AND DETECTING FIRES.

68

00:03:49,109 --> 00:03:52,290

SOME OF THE OTHER SCIENCE
LAUNCHING ON THE SIGNAS

69

00:03:52,290 --> 00:03:56,639

TOMORROW, FOR THE EUROPEAN
PARTNERS AND THE SPACE AGENCY,

70

00:03:56,639 --> 00:04:00,169

THEY ARE LAUNCH S EXPERIMENTS TO
SUPPORT THEIR CREW MEMBER WHO IS

71

00:04:00,169 --> 00:04:04,999

LAUNCHING IN NOVEMBER, TAMA,
FROM FRANCE IS PART OF THE

72

00:04:04,999 --> 00:04:07,439

EUROPEAN SCIENCE AND ASTRONAUT
CORE.

73

00:04:07,439 --> 00:04:12,590

AND AMONG THE EXPERIMENTS THE

AQUA MEMBRANE EXPERIMENT IS A

74
00:04:12,590 --> 00:04:17,780
TECHNOLOGY DEMONSTRATION, WHICH
IS IMPROVED FOR PURIFYING WATER

75
00:04:17,780 --> 00:04:18,780
THROUGH A MEMBRANE.

76
00:04:18,780 --> 00:04:21,400
IT WILL BE EVEN BETTER THAN THE
ENVIRONMENTAL SYSTEMS AND THE

77
00:04:21,400 --> 00:04:25,139
RECYCLABLE, SYSTEMS THAT WE HAVE
ON BOARD.

78
00:04:25,139 --> 00:04:28,030
THERE IS SOMETHING CALLED AQUA
PAD, WHICH IS ABLE TO MEASURE

79
00:04:28,030 --> 00:04:30,610
THE QUALITY OF WATER IN SPACE.

80
00:04:30,610 --> 00:04:34,470
THERE IS THE I AM SORRY THE
EVERYWHERE APPLICATION ON A

81
00:04:34,470 --> 00:04:35,470
TABLET.

82
00:04:35,470 --> 00:04:38,860
AND ON SAY AN IPAD TO BE AIBLE
TO TAKE THE DATA VERY EASILY FOR

83
00:04:38,860 --> 00:04:42,580
THE ASTRONAUT, AND THEY TAKE
LESS TIME TO TAKE THE DATA AND

84

00:04:42,580 --> 00:04:45,560
WRITE IT DOWN AND RECORD IT AND
SEND IT, WHICH ALLOWS THEM TO DO

85
00:04:45,560 --> 00:04:47,120
OTHER THINGS.

86
00:04:47,120 --> 00:04:50,710
WE HAVE A COUPLE OF EXPERIMENTS
IN THE PHYSICAL SCIENCES AREA.

87
00:04:50,710 --> 00:04:56,970
TWO OF THEM STUDYING CRYSTALS
AND SOLIDIATION OF METALS.

88
00:04:56,970 --> 00:05:06,530
IT IS A PARTNERSHIP OF NASA WITH
THE FRENCH SPACE AGENCY.

89
00:05:06,530 --> 00:05:10,210
AND IT IS STUDYING ALLOYS THAT
ACT LIKE METALS BUT THESE ARE

90
00:05:10,210 --> 00:05:14,860
CLEAR ALLOYS AND AS THEY FREEZE
OR SOLIDIFY THEY CAN LOOK AT THE

91
00:05:14,860 --> 00:05:20,060
CRYSTALS AND THE BOUNDARY AS WE
CALL IT AND APPLY THAT TOWARD

92
00:05:20,060 --> 00:05:22,240
OUR COMPUTER MODELS ON THE
GROUND AND GET A BETTER

93
00:05:22,240 --> 00:05:26,560
SIMULATION AND PREDICTION OF HOW
METALS SOLIDIFY AND WHAT IS

94
00:05:26,560 --> 00:05:29,240

THEIR STRENGTH AND THE
PROPERTIES OF THE CRYSTALS.

95

00:05:29,240 --> 00:05:36,411
OOLT ONE IS CALLED THE SOLIDIFY
OF USING THE AMPUELS AND IT IS

96

00:05:36,411 --> 00:05:41,599
STUDYING THE MATERIALS THAT ARE
USED IN SEMICONDUCTORS AND

97

00:05:41,599 --> 00:05:43,590
COOLING THEM AT VERY HIGH
TEMPERATURES.

98

00:05:43,590 --> 00:05:47,240
BUT AGAIN, IMPROVING OUR
ELECTRONIC DEVICES AND

99

00:05:47,240 --> 00:05:50,270
BENEFITING US HERE ON EARTH AS
WELL AS SMALLER COMMUNICATION

100

00:05:50,270 --> 00:05:53,830
AND SMALLER TRANS-SISTER FOR THE
FEWER SPACE CRAFT.

101

00:05:53,830 --> 00:05:59,139
I WOULD LIKE TO REFER TO THE
FIRST SLIDE, ONGOING WE HAVE

102

00:05:59,139 --> 00:06:02,040
SEVERAL SUCCESSES AND WHICH OF
WHICH IS THE FLUID SHIFT

103

00:06:02,040 --> 00:06:04,090
EXPERIMENT.

104

00:06:04,090 --> 00:06:08,680
IN SPACE, OUR FLUID WOULD SHIFT

FROM OUR LEGS WHERE IT WILL BE

105

00:06:08,680 --> 00:06:11,930

ON EARTH UP INTO OUR TORSO, AND
OUR HEAD AND WE BELIEVE THAT IS

106

00:06:11,930 --> 00:06:15,870

CONTRIBUTING TO THE VISUAL
ISSUES THAT WE HAVE SEEN AND

107

00:06:15,870 --> 00:06:20,120

REALIZED IN THE ASTRONAUTS IN
THE COURSE OF TIMES, AS YOU

108

00:06:20,120 --> 00:06:26,430

STUDY THE FLUID SHIFT IN THE
EYES AND THE EAR DRUMS AND THE

109

00:06:26,430 --> 00:06:29,500

PRESSURE AND WE HOPE TO LEARN
MORE ABOUT WHAT IS KAUDZING

110

00:06:29,500 --> 00:06:33,310

THESE VISUAL IMPAIRMENT ISSUES
VERY IMPORTANT TO US AS WE GO ON

111

00:06:33,310 --> 00:06:37,030

TO PLANETS AND LONGER MISSIONS
ON TO MARS, AND YOU CAN SEE

112

00:06:37,030 --> 00:06:40,490

SCOTT KELLEY THERE, ONE OF THE
TWO ONE YEAR CREW MEMBER

113

00:06:40,490 --> 00:06:41,490

MISSIONS.

114

00:06:41,490 --> 00:06:47,210

SCOTT AND HIS CREW MATE FROM
RUSSIA LANLDED IN MARCH.

115

00:06:47,210 --> 00:06:49,250

BUT WE ARE CONTINUING THIS JOINT
EXPERIMENT.

116

00:06:49,250 --> 00:06:52,830

IT IS A JOINT EXPERIMENT WITH
THE RUSSIAN PARTNER AND SO THE

117

00:06:52,830 --> 00:06:55,580

CREW ON BOARD RIGHT NOW,
EXPEDITION 49 IS FINISHING UP

118

00:06:55,580 --> 00:06:56,699

THEIR FINAL MEASUREMENTS.

119

00:06:56,699 --> 00:06:59,620

AND IN FACT WE WILL HAVE THE
NEXT SLIDE PLEASE.

120

00:06:59,620 --> 00:07:04,389

WE HAVE HAD GREAT SUCCESSES IN
USING THE ISS AS A

121

00:07:04,389 --> 00:07:06,919

MICROBIOLOGICAL LABORATORY.

122

00:07:06,919 --> 00:07:10,970

WE HAVE THE GREENS IN SPACE, THE
STUDENTS EXPERIMENT THAT HAS

123

00:07:10,970 --> 00:07:17,439

BEEN ABLE TO REPLICATE DNA AND
TO IDENTIFY WHAT THE DNA IS.

124

00:07:17,439 --> 00:07:22,150

WE HAVE THE WET LAB SMART
CYCLER, WHICH IS ALSO ABLE TO

125

00:07:22,150 --> 00:07:25,181
AMPLIFY, WHEN YOU HEAR
AMPLIFYING DNA, I AM AN,

126

00:07:25,181 --> 00:07:31,960
ENGINEER AT HEART BEING ABLE TO
ANALYZE IT AND EXTRACT THE DNA

127

00:07:31,960 --> 00:07:36,840
FROM IT AND AND FINALLY THE
SEQUENCER THAT IS ABLE TO

128

00:07:36,840 --> 00:07:41,699
IDENTIFY THE MICROS AND THE DNA
AND WHAT THAT DOES FOR US IS

129

00:07:41,699 --> 00:07:44,780
AGAIN FOR THE FUTURE
EXPLORATION, WE WANT THE SMALLER

130

00:07:44,780 --> 00:07:49,050
EQUIPMENT AND WE WANT TO BE ABLE
TO ANALYZE THE RESULTS RIGHT

131

00:07:49,050 --> 00:07:52,580
THERE WITHOUT HAVING TO BRING
HOME THE SAMPLES.

132

00:07:52,580 --> 00:07:57,300
AND SO THESE ARE EXAMPLES OF THE
GREAT SCIENCE WE HAVE GOING ON

133

00:07:57,300 --> 00:08:01,099
BRINGING US BENEFITS TO EARTH
AND IMPROVING OUR EXPLORATION

134

00:08:01,099 --> 00:08:04,240
FOR OUR JOURNEY TO MARS.

135

00:08:04,240 --> 00:08:07,349

AND BEFORE THE NEXT SPEAKERS
COME UP, IF YOU WANT TO LOOK

136

00:08:07,349 --> 00:08:14,460

MORE ABOUT THE RESEARCH WE ARE
DOING, IF YOU DO TWITTER, GIVE

137

00:08:14,460 --> 00:08:18,290

US A SHOUT OUT AT ISS UNDER
SCORE RESEARCH, AND WE HAVE AN

138

00:08:18,290 --> 00:08:25,220

APP FOR THAT ON OTHER PHONES AND
ANDROID, SPACE STATION EX-MROSER

139

00:08:25,220 --> 00:08:27,620

AND IT HAS THE GREAT INFORMATION
ABOUT ALL OF THIS.

140

00:08:27,620 --> 00:08:30,009

AND SO THANK YOU FOR THE
COUNTRY.

141

00:08:30,009 --> 00:08:31,180

>> THANKS, PETE.

142

00:08:31,180 --> 00:08:32,760

I WOULD LIKE TO WELCOME
DR.

143

00:08:32,760 --> 00:08:37,240

JITENDRA JOSHI TECHNOLOGY
AND LEAD FOR THE ADVANCED

144

00:08:37,240 --> 00:08:42,540

EXPLORATION SYSTEMS AT NASA
AHEAD QUARTERS TO SPEAK ABOUT

145

00:08:42,540 --> 00:08:48,250

THE NASA SAFETY PROJECT, KNOWN

AS SAFE FIRE AND THIS IS THE

146

00:08:48,250 --> 00:08:54,040

SECOND IN INVESTIGATIONS TO LOOK
AT STUDY FIRE INSIDE OF AN

147

00:08:54,040 --> 00:08:57,300

SIGNAS, AFTER IT DEPARTS THE
SPACE STATION AT THE END OF ITS

148

00:08:57,300 --> 00:08:58,760

MISSION, DR.

149

00:08:58,760 --> 00:09:02,150

JOSHI WHY ARE YOU
DOING MORE MISSIONS?

150

00:09:02,150 --> 00:09:06,850

>> GREAT QUESTION, AND I WILL
GIVE YOU THE ANSWER IN FIVE

151

00:09:06,850 --> 00:09:07,850

MINUTES.

152

00:09:07,850 --> 00:09:11,090

SAFETY IS THE TOP PRIORITY,
WHETHER IT IS A HUMAN MISSION OR

153

00:09:11,090 --> 00:09:15,430

A ROBOTIC MISSION WHEN WE LAUNCH
THEM.

154

00:09:15,430 --> 00:09:18,370

IT IS ESPECIALLY WHEN IT COMES
TO HUMAN SPACE CRAFT, SAFETY IS

155

00:09:18,370 --> 00:09:20,690

OUR NUMBER ONE GOAL.

156

00:09:20,690 --> 00:09:24,440
IN ORDER TO HAVE SAFE HABITATION
SYSTEMS, MANY TIMES WE HAVE THE

157

00:09:24,440 --> 00:09:27,720
TENDENCIES BUILT INTO THE SPACE
CRAFT, FOR THE LIFE SUPPORT

158

00:09:27,720 --> 00:09:32,130
SYSTEMS WE WILL HAVE THE SPARES
OR THE OTHER REDUND ANTIES AND

159

00:09:32,130 --> 00:09:35,940
THERE ARE SOME SYSTEMS THAT CAN
DO THIS AND SOME THAT ARE

160

00:09:35,940 --> 00:09:40,370
EXTREMELY CONSERVATIVE SO THAT
NOTHING BAD HAPPENS.

161

00:09:40,370 --> 00:09:43,890
ONE OF THE LEAST UNDERSTOOD
RISKS IN SPACE IS HOW FIRE

162

00:09:43,890 --> 00:09:49,420
PROPAGATES, STARTS, HOW DO YOU
CONTROL THE FIRE, HOW DO YOU

163

00:09:49,420 --> 00:09:54,270
DETECT THE FIRE, ALL OF THESE
THINGS ARE SOMETHING THAT YOU

164

00:09:54,270 --> 00:09:57,930
CANNOT FROM TO MAKE A CALL, 911
COME, I WILL FIRE, RIGHT?

165

00:09:57,930 --> 00:10:00,780
AND YOU ARE TO BE PROACTIVE IN
BUILDING YOUR MATERIAL.

166

00:10:00,780 --> 00:10:03,970
AND AS WHAT WE HAVE BEEN DOING
WHEN BUILDING THE SPACE CRAFT,

167
00:10:03,970 --> 00:10:06,570
WE HAVE BEEN EXTREMELY
CONSERVATIVE AND WE HAVE BEEN

168
00:10:06,570 --> 00:10:09,490
USING THE MATERIALS FOR 30 OR 40
YEARS.

169
00:10:09,490 --> 00:10:11,220
AND THEY ARE HEAVY.

170
00:10:11,220 --> 00:10:14,200
AND THE FOOTPRINT IS LARGER THAN
WE WOULD LIKE.

171
00:10:14,200 --> 00:10:17,400
THEY ARE COMING INTO PLAY NOW.

172
00:10:17,400 --> 00:10:20,710
WE USE THOSE MATERIALS HERE IN
THE FIRST TO QUALIFY THEM AS

173
00:10:20,710 --> 00:10:23,940
SAFE FOR USE IN SPACE.

174
00:10:23,940 --> 00:10:27,930
WE HAVE CONDUCTED EXPERIMENTS
FOR FIRE FOLLOW OVER TWO DECADES

175
00:10:27,930 --> 00:10:29,820
IN SPACE.

176
00:10:29,820 --> 00:10:37,370
MOSTLY THEY HAVE BEEN THE SIGHS
OF THIS PARTICLE AND THAT.

177

00:10:37,370 --> 00:10:40,940

AND BECAUSE THERM THEY WERE
CONDUCTED WITH THE HUMANS YOU

178

00:10:40,940 --> 00:10:44,800

HAVE TO DO WITH IN THE GLOW BOX.

179

00:10:44,800 --> 00:10:47,820

FOR MORE THAN A DECADE AGO, WE
WERE TRYING TO SAY HOW DO WE

180

00:10:47,820 --> 00:10:51,290

CONDUCT LARGE FIRE EXPERIMENTS
BECAUSE THAT IS WHAT MATTERS.

181

00:10:51,290 --> 00:10:55,160

SO, CAN YOU ROLL THE VIDEO,
PLEASE?

182

00:10:55,160 --> 00:10:59,020

SO THE SIGNAS, THE PREVIOUS
SIGNAS MISSION, CARRIED SAFFIRE

183

00:10:59,020 --> 00:11:04,190

ONE AND I WILL SHOW YOU THAT
PARTICULAR MISSION BUT IT IS

184

00:11:04,190 --> 00:11:08,611

BASICALLY A BOX THAT GOES IN
SAFFIRE BUT HAS TWO CHAMBERS AND

185

00:11:08,611 --> 00:11:12,660

ONE IS THE CHAMBER AND ONE IS
WHERE YOU THERE THE LARGE SAMPLE

186

00:11:12,660 --> 00:11:13,660

ONE.

187

00:11:13,660 --> 00:11:18,700

AND THE SIX SIGNS THROUGH THAT
AT A CERTAIN RATE, AND IT

188

00:11:18,700 --> 00:11:22,490
RESIDES IN THE SIGNAS AND IT
GOES UP THERE AND NOT TURNED ON

189

00:11:22,490 --> 00:11:26,300
WHILE IT IS ATTACHED TO THE
SPACE STATION.

190

00:11:26,300 --> 00:11:35,370
ONCE SIGNAS, DEDOCKS, THE
ORBITALS WILL ACTUALLY START THE

191

00:11:35,370 --> 00:11:39,320
EXPERIMENT INITIATED AND THEN
RESTART THE FIRE.

192

00:11:39,320 --> 00:11:42,710
THE EXPERIMENT GOES ON FOR TWO,
TWO AND A HALF HOURS, ALL OF THE

193

00:11:42,710 --> 00:11:43,920
DATA GETS COLLECTED.

194

00:11:43,920 --> 00:11:50,890
SIGNAS WHILE IT IS COMING BACK
TO EARTH, OR IN A SYSTEMATIC,

195

00:11:50,890 --> 00:11:55,210
ALL OF THE DATY GETS
TRANSFERRED.

196

00:11:55,210 --> 00:12:00,100
SO I WOULD BRIEFLY TELL YOU WHAT
HAPPENED DURING SAFFIRE ONE.

197

00:12:00,100 --> 00:12:06,190
>> WE HAD THIS PARTICULAR CLOTH,

WHICH IS A FIBER GLASS, WHAT YOU

198

00:12:06,190 --> 00:12:09,510

SEE THERE THE FLAMES TRAVELING
WAS MODERATELY NEW BASED ON

199

00:12:09,510 --> 00:12:11,680

FAIRLY SMALL SAMPLES.

200

00:12:11,680 --> 00:12:15,530

WHAT ACTUALLY HAPPENED WAS THE
FIRE BURNED A LITTLE BIT SLOWER

201

00:12:15,530 --> 00:12:21,841

WHEN WE HAD A CON VECTIVE FLOW,
IT WAS IN FACT, 64 PERCENT LESS

202

00:12:21,841 --> 00:12:26,360

THAN WHAT WE HAD EXPECTED THE
GROWTH OF THE FLAME, SO THAT

203

00:12:26,360 --> 00:12:30,370

FEATURES THE LESSON, IT IS NOT
THAT IT IS GROWING SLOWER, IT

204

00:12:30,370 --> 00:12:32,510

MIGHT HAVE A LILGS
RAMIFICATIONS.

205

00:12:32,510 --> 00:12:34,620

WE THINK THAT THOSE ARE BECAUSE
OF THE WALL EFFECTS AND WHERE IT

206

00:12:34,620 --> 00:12:36,110

WAS CONTAINED.

207

00:12:36,110 --> 00:12:40,120

AND SO THE NEXT PARTICULAR
MISSION, WHICH IS GOING TO

208

00:12:40,120 --> 00:12:48,000

LAUNCH TOMORROW IS SAFFIRE TWO,
IT HAS THE SAME SIZE, BUT WE

209

00:12:48,000 --> 00:12:51,860

HAVE NINE SAMPLES HERE, THERE IS
A RATIONALE OF WHY THE SAMPLES

210

00:12:51,860 --> 00:12:53,280

WERE CHOSEN.

211

00:12:53,280 --> 00:12:59,360

FOUR OF THEM ARE SIL CON SAMPLES
AND THEY ARE BASICALLY SAMPLES

212

00:12:59,360 --> 00:13:01,070

OF DIFFERENT THICKNESS.

213

00:13:01,070 --> 00:13:02,120

OKAY?

214

00:13:02,120 --> 00:13:05,380

BECAUSE SICKNESS EFFECTS OF FIRE
HAPPENS, HOW WELL THE MATERIAL

215

00:13:05,380 --> 00:13:07,480

BOUNDS AND THE PARTICULAR
MATERIAL MIETD BOUND

216

00:13:07,480 --> 00:13:11,170

DIFFERENTLY, AND THIS IS ONE OF
THE MOST PREVALENT WHICH THEY

217

00:13:11,170 --> 00:13:13,250

USE WHICH IS FLAMMABLE.

218

00:13:13,250 --> 00:13:19,140

THEN, WE ALSO HAVE SOMETHING
CALLED NOMAX, IT IS A COMMERCIAL

219

00:13:19,140 --> 00:13:23,010

MATERIAL WHICH IS THE FIRE
RETARDANT MATERIAL THAT IS USED.

220

00:13:23,010 --> 00:13:27,820

WE ARE ALSO CARRYING THE FIRES
OF THE MATERIAL THAT WE USED IN

221

00:13:27,820 --> 00:13:33,080

THE FIRST ONE, THAT HELPS US AND
DOES THE SMALL MATERIAL BURN THE

222

00:13:33,080 --> 00:13:36,860

SAME WAY AS THE BIG ONE AND IN
THE SAME CONDITION?

223

00:13:36,860 --> 00:13:42,740

WHAT DO YOU SEE IN MY HAND HERE
IS AFTER THE GLASS.

224

00:13:42,740 --> 00:13:45,260

THIS MATERIAL IS USED IN THE
WINDOWS OF SPACE CRAFTS.

225

00:13:45,260 --> 00:13:51,760

AND THIS WAS BURNED IN ONE
GRAVITY, EARTH GRAVITY, AND IT

226

00:13:51,760 --> 00:13:55,540

DID NOT BURN FULLY WITH THE TIME
THAT WE EXPOSED IT.

227

00:13:55,540 --> 00:13:59,560

THE SAME WAS THE STRUCTURE OF
THE GLASS THAT WOULD BE USED IN

228

00:13:59,560 --> 00:14:01,410

POTENTIAL MISSIONS LATER ON.

229

00:14:01,410 --> 00:14:03,500

WITHOUT DOING THE SAME
EXPERIMENT.

230

00:14:03,500 --> 00:14:07,430

WE ARE GOING TO WITH THIS
SAFFIRE ONE A BIT BASED ON WHAT

231

00:14:07,430 --> 00:14:14,600

WE LEARNED IN TERMS OF THE SLOW
MOMENT, AND THAT IS THE GOAL.

232

00:14:14,600 --> 00:14:19,310

SO THIS GIVES US THE
UNDERSTANDING OF MORE MATERIALS

233

00:14:19,310 --> 00:14:23,750

AND GIVES US AN UNDERSTANDING OF
HOW WE CAN SCALE THINGS IN TERMS

234

00:14:23,750 --> 00:14:28,630

OF SAMPLE AND VOLUME AND SIZE
AND PREDICT FLAMBILITY AND IT

235

00:14:28,630 --> 00:14:31,500

WILL HELP TO MAKE THE MISSIONS
SAFE, AND ONCE YOU UNDERSTAND

236

00:14:31,500 --> 00:14:35,100

HOW THE FIRE PROPAGATES YOU CAN
HAVE THE STRATEGIES AND YOU CAN

237

00:14:35,100 --> 00:14:39,540

HAVE THE DETECTION STRATEGIES AS
MORE AND MORE MATERIALS ARE

238

00:14:39,540 --> 00:14:42,750

BEING PLANNED TO BE USED, WE
NEED TO DO THIS.

239

00:14:42,750 --> 00:14:45,670

AND IN ORDER TO INCREASE THE
LIABILITY WE ARE ALSO GOING TO

240

00:14:45,670 --> 00:14:47,910

HAVE THE MATERIALS THAT WILL
TAKE THE RAW MATERIALS AND DOING

241

00:14:47,910 --> 00:14:51,250

IN THE SPACE MANUFACTURING TO
FIX STUFF.

242

00:14:51,250 --> 00:14:53,860

ALL OF THESE THINGS NEED
QUALIFICATIONS.

243

00:14:53,860 --> 00:14:57,530

SO, THE MORE RELIABLE MISSIONS
TO BUILD MORE SUSTAINING

244

00:14:57,530 --> 00:15:03,220

MISSIONS AS WE MOVE FURTHER,
SAFFIRE WILL PLAY A LONG WAY.

245

00:15:03,220 --> 00:15:08,430

THIS WAS A TREMENDOUS EFFORT AND
PART OF THE ISS ENGINEERS AND

246

00:15:08,430 --> 00:15:11,870

THE SCIENCES AND THEIR ADVANCED
EXPLORATION SYSTEMS.

247

00:15:11,870 --> 00:15:19,440

DESIGNED TO SMART -- BECAUSE IT
WAS JUST RETURNING ON THE LAB.

248

00:15:19,440 --> 00:15:24,050

SO WE WANT TO THANK ALL OF THE
FOLKS WHO HAVE MADE THIS

249

00:15:24,050 --> 00:15:25,050

POSSIBLE.

250

00:15:25,050 --> 00:15:28,730

AND WE HOPE TO GET THE RESULTS
YOU ARE LOOKING FOR.

251

00:15:28,730 --> 00:15:31,470

>> THANK YOU, WE WILL NOW TAKE
QUESTIONS FROM THOSE IN THE ROOM

252

00:15:31,470 --> 00:15:35,570

ABOUT SAFFIRE AS WELL AS THOSE
ON THE PHONE AND ON SPOESHL

253

00:15:35,570 --> 00:15:39,660

MEDIA, USING ASK NASA, I WILL
BRING THE MICROPHONE TO YOU AND

254

00:15:39,660 --> 00:15:42,170

IF YOU WILL STATE YOUR NAME AND
YOUR AFFILIATION.

255

00:15:42,170 --> 00:15:49,000

>> LET'S SEE, WE WILL GO THIRD
ROW OVER HERE.

256

00:15:49,000 --> 00:15:53,810

>> GENE TALKING SPACE, HOW MANY
TIMES DO YOU PLAN ON FLYING

257

00:15:53,810 --> 00:15:57,320

SAFFIRE AND WHAT OTHER MATERIALS
DO YOU PLAN ON USING?

258

00:15:57,320 --> 00:15:58,320

THANK YOU.

259

00:15:58,320 --> 00:16:01,030

>> SO, OUR CURRENT PLAN IS TO
HAVE IN THESE SERIES OF

260

00:16:01,030 --> 00:16:05,390
EXPERIMENTS THERE IS GOING TO BE
ONE MORE SAFFIRE THREE AND THEN

261

00:16:05,390 --> 00:16:08,910
WE WILL HAVE FOUR TO SIX, AND SO
LET ME TELL YOU WHAT THREE IS

262

00:16:08,910 --> 00:16:11,240
GOING TO BE, IT IS GOING TO BE
THE SAME MATERIAL THAT WAS USED

263

00:16:11,240 --> 00:16:15,530
LATER ON BUT SOME OF THE OTHER
MATERIALS IN ORDER TO UNDERSTAND

264

00:16:15,530 --> 00:16:18,620
THE FLAME PROPAGATION, AND SO
THAT WILL COMPLETE THAT STORY.

265

00:16:18,620 --> 00:16:22,290
WE HAVE NEVER COMPLETED THE BOOK
END OF STARTING A FIRE,

266

00:16:22,290 --> 00:16:26,080
EXTINGUISHING A FIRE AND
DETECTING A PRODUCT AND THE

267

00:16:26,080 --> 00:16:27,080
SAFE.

268

00:16:27,080 --> 00:16:31,810
SO THEN WE HAVE PLANS THE
SAFFIRE 4 TO 6, IN WHICH WE WILL

269

00:16:31,810 --> 00:16:34,560
ACTUALLY START THE FIRE AND WE

HAVE WILL THE TESTERS AT A

270

00:16:34,560 --> 00:16:39,380

DIFFERENT PLACE AND THE PRODUCTS
AND SO WE KNOW WHEN THE PLOW OF

271

00:16:39,380 --> 00:16:43,680

THE AIR, THAT IS A BASE LINE
FLOW, HOW DO THESE PRODUCTS

272

00:16:43,680 --> 00:16:44,680

TRANSFER?

273

00:16:44,680 --> 00:16:45,680

WHERE DO THEY REACH?

274

00:16:45,680 --> 00:16:46,680

WHERE DO THEY HAVE?

275

00:16:46,680 --> 00:16:51,690

WE WILL ALSO TEST THE SCRUBBING
MATERIALS FOR TAKING CARE OF THE

276

00:16:51,690 --> 00:16:54,240

COMBUSTION PART AND SEE HOW
EFFECTIVE THAT IS.

277

00:16:54,240 --> 00:16:57,980

AND PREPARING TO FLY SENSORS
WHICH ARE MORE OF THE STATE OF

278

00:16:57,980 --> 00:17:00,120

THE ART TO DETECT THAT.

279

00:17:00,120 --> 00:17:03,800

AND SO THAT IS A KEY SIX.

280

00:17:03,800 --> 00:17:05,289

>> NEXT QUESTION?

281

00:17:05,289 --> 00:17:07,289
RIGHT HERE.

282

00:17:07,289 --> 00:17:10,290
>> CHASE WITH SPACE LIGHT
INSIDER.COM.

283

00:17:10,290 --> 00:17:14,189
SAFFIRE ONE AND DID THE STUDIES
BEFORE, AND CAN YOU TELL US WHAT

284

00:17:14,189 --> 00:17:18,630
IF ANY OF THE ELEMENTS FROM THIS
MISSION ARE FOLLOW ONES TO THE

285

00:17:18,630 --> 00:17:20,470
ORIGINAL MISSION?

286

00:17:20,470 --> 00:17:24,329
>> THE ORIGINAL, A QUESTION, AND
THERE WERE SOME ORIGINAL

287

00:17:24,329 --> 00:17:27,020
EXPERIMENTS THAT WERE DONE ON
THE SPACE STATION, AND THEN

288

00:17:27,020 --> 00:17:29,920
SAFFIRE ONE WAS DONE.

289

00:17:29,920 --> 00:17:31,940
>> SORRY.

290

00:17:31,940 --> 00:17:35,380
>> THAT WAS SAFFIRE ONE.

291

00:17:35,380 --> 00:17:38,010
YEAH.

292

00:17:38,010 --> 00:17:41,440

>> SO WE HAVE THIS PARTICULAR,
AND WE WILL HAVE THE FOLLOW ONE

293

00:17:41,440 --> 00:17:45,150

OF THAT AND THE COMMONALITY
TRAIT BETWEEN SAFFIRE ONE AND

294

00:17:45,150 --> 00:17:49,090

TWO, AND IS THAT THE WHOLE
MATERIAL THAT WAS, AND IT WAS A

295

00:17:49,090 --> 00:17:50,090

40-94 CENTIMETERS, OKAY?

296

00:17:50,090 --> 00:17:54,790

AND NOW WE ARE GOING TO HAVE
SOME MEDIUM AND SMALL SAMPLES

297

00:17:54,790 --> 00:18:00,990

AND SO WHEN YOU HAVE THE SMALL
SAMPLE, AND THE MEDIUM.

298

00:18:00,990 --> 00:18:04,820

WE CAN DO IT AND WHERE IS THE
FIRE, FROM THE SIZE OF MATERIAL

299

00:18:04,820 --> 00:18:07,750

AND SO THAT IS THE COMMON THREAD
AND THE OTHER THING IS THAT I

300

00:18:07,750 --> 00:18:11,340

TOLD YOU THAT THE MATERIALS OF
THE DIFFERENT THICKNESSES.

301

00:18:11,340 --> 00:18:14,880

WHICH ARE COMMONLY USED
PARTICULAR LIKE SILICON OR

302

00:18:14,880 --> 00:18:18,230
PARTICULARLY THIS, THAT I TALKED
ABOUT.

303
00:18:18,230 --> 00:18:24,250
AND SO THAT IS THE COMMONALITY
IS THE SIZE OF THE MATERIAL.

304
00:18:24,250 --> 00:18:28,440
>> ANY OTHER QUESTIONS HERE IN
THE ROOM?

305
00:18:28,440 --> 00:18:30,460
THANK YOU DR.

306
00:18:30,460 --> 00:18:32,070
JOSHI.

307
00:18:32,070 --> 00:18:34,820
UP NEXT I WOULD LIKE TO WELCOME
JESSE ROBBINS TO SPEAK TO US

308
00:18:34,820 --> 00:18:37,350
ABOUT THE COOL FLAMES
INVESTIGATION, THIS

309
00:18:37,350 --> 00:18:40,290
INVESTIGATION ALSO LOOKING AT
FIRE IN SPACE.

310
00:18:40,290 --> 00:18:43,850
CAME OUT OF AN UNEXPECTED
OBSERVATION IN A PREVIOUS

311
00:18:43,850 --> 00:18:44,850
EXPERIMENT.

312
00:18:44,850 --> 00:18:46,860
JESSE COULD YOU TELL US ABOUT
HOW THE COOL FLAMES

313

00:18:46,860 --> 00:18:50,750

INVESTIGATION CAME TO YOU AND
HOW IT WILL WORK?

314

00:18:50,750 --> 00:18:51,920

>> SURE.

315

00:18:51,920 --> 00:18:58,170

OUR PROJECT HAS BEEN RUNNING
COMBUSTION, SCIENCE ON THE

316

00:18:58,170 --> 00:19:06,840

STATION SINCE ABOUT 2009 AND
MAINLY LOOKING AT LIQUID FUELS,

317

00:19:06,840 --> 00:19:14,000

HYDROCARBONS, ALCOHOLS AND
MIXTURES THEREOF, AND OUR

318

00:19:14,000 --> 00:19:19,130

DIAGNOSTICS LOOK AT FLAME
RADIATION AND FLAME DIAMETER AND

319

00:19:19,130 --> 00:19:27,260

FLAME TEMPERATURE AND DROPLET
DIAMETER AND WHAT WE MAINLY SEE

320

00:19:27,260 --> 00:19:33,200

IS THE HOT FLAME ERUPT AND
EXTINGUISH AND ALL OF THAT

321

00:19:33,200 --> 00:19:40,810

EVOLVING OVER TIME, EXCEPT IN
CERTAIN CASES WITH CERTAIN FUELS

322

00:19:40,810 --> 00:19:44,970

SOMETHING INTERESTS HAS HAPPENED
THAT NO ONE EXPECTED AND HAS NOT

323

00:19:44,970 --> 00:19:50,460

BEEN RECREATED ON THE GROUND,
WHERE THIS FUSION FLAME WITH THE

324

00:19:50,460 --> 00:19:55,830

LARGER CHAIN STRAIGHT CHAIN OUT
CAME THE HIGH CARBON NUMBER LIKE

325

00:19:55,830 --> 00:20:00,720

THE ALCANES AND DECANE.

326

00:20:00,720 --> 00:20:04,170

WHAT YOU SEE IS THE HOT FLAME
M

327

00:20:04,170 --> 00:20:10,420

EXTINGUISHES AND THE DIAMETER
GREATER THAN THE EVAPORATION

328

00:20:10,420 --> 00:20:13,100

ALONE WOULD DRIVE.

329

00:20:13,100 --> 00:20:16,360

AND IT TOOK A WHILE FOR THE
SCIENTISTS TOO MAKE SENSE OF

330

00:20:16,360 --> 00:20:22,630

THIS AND THE LATEST EXPLANATION
IS THE LOW TEMPERATURE CHEMISTRY

331

00:20:22,630 --> 00:20:27,770

EVENT HAPPENING CALLED THE COOL
FLAME.

332

00:20:27,770 --> 00:20:35,340

AND THIS EXPERIMENT CFI IS
FOLLOWING ON THOSE EXPERIMENTS

333

00:20:35,340 --> 00:20:39,881

TO FOLLOW UP AND ATTEMPT TO
BETTER CHARACTERIZE WHAT IS

334

00:20:39,881 --> 00:20:44,510
HAPPENING WITH THIS LOW
TEMPERATURE COMBUSTION.

335

00:20:44,510 --> 00:20:50,620
SO, WE CAN GO TO THE NEXT SLIDE.

336

00:20:50,620 --> 00:20:53,690
AND I CAN TALK ABOUT SOME OF THE
HARDWARE THAT WE ARE SENDING UP

337

00:20:53,690 --> 00:20:56,290
ON SIGNAS TOMORROW.

338

00:20:56,290 --> 00:21:02,220
THE HARDWARE ON THE LEFT IS THE
COMBUSTION INTEGRATED RACK AS

339

00:21:02,220 --> 00:21:05,820
PART OF THE FLUID COMBUSTION
FACILITY, THAT IS WHERE WE RUN

340

00:21:05,820 --> 00:21:10,440
OUR COMBUSTION EXPERIMENTS
INSIDE OF THE LARGE COMBUSTION

341

00:21:10,440 --> 00:21:12,630
CHAMBER IN THE CENTER THERE.

342

00:21:12,630 --> 00:21:17,220
GAS BOLTSES ARE LOADED ON THE
TOP, AND WE CAN CONTROL THE

343

00:21:17,220 --> 00:21:23,260
MIXTURE OF OXYGEN AND THE
PRESSURE IN THE CHAMBER AND WE

344

00:21:23,260 --> 00:21:28,920

DISPENSE AND IGNITE THE LIQUID
FUEL LEAVING THE INSERT ON THE

345

00:21:28,920 --> 00:21:37,100

RIGHT, WHICH IS THE MULTI USER
DROPPER APPARATUS AND WE WILL

346

00:21:37,100 --> 00:21:41,560

SEE INSIDE OF THAT A LITTLE BIT
LATER.

347

00:21:41,560 --> 00:21:45,100

SOME OF THE HARDWARE ON THE
EXTERIOR THAT YOU CAN SEE THERE,

348

00:21:45,100 --> 00:21:48,501

OR THE FUEL RESERVOIRS THERE ARE
TWO IN THE FRONT, IF YOU CAN GO

349

00:21:48,501 --> 00:21:52,930

TO THE NEXT SLIDE, YOU WILL SEE
AN ASTRONAUT REPLACING ONE OF

350

00:21:52,930 --> 00:21:57,230

THOSE IN HIS LEFT-HAND, AND YOU
CAN SEE THE CIA INSERT IT INTO

351

00:21:57,230 --> 00:22:00,650

THE CHAMBER, AND FEEL ABOUT
HALFWAY SO THAT HE CAN ACCESS

352

00:22:00,650 --> 00:22:03,230

SOME OF THE HARDWARE THAT HE
NEEDS TO REPLACE.

353

00:22:03,230 --> 00:22:08,650

SO A LOT OF THE HARDWARE IS
REPLACE ABLE AND CUSTOMIZABLE

354

00:22:08,650 --> 00:22:14,930

FOR EXPERIMENTS AND LIKE I SAID,
WE HAVE TWEAKED THE DESIGN AND

355

00:22:14,930 --> 00:22:20,520

USED MULTIPLE DIFFERENT FUELS
OVER THE LAST SEVEN YEARS.

356

00:22:20,520 --> 00:22:24,930

AND WE HAVE SEEN THIS LOW
TEMPERATURE BEHAVE OR IN A

357

00:22:24,930 --> 00:22:31,080

COUPLE OF THE FUELS STRAIGHT
CHAIN HIGH CARBON NUMBER ALKANES

358

00:22:31,080 --> 00:22:38,980

AND SO CFI IS SENDING UP SOME
EXPERIMENTAL FUELS TO FURTHER

359

00:22:38,980 --> 00:22:40,670

LOOK INTO THAT.

360

00:22:40,670 --> 00:22:50,430

NORMAL GODECATE AS AN ISOMER
WITH A BRANCHED GEOMETRY AND THE

361

00:22:50,430 --> 00:23:03,450

MIXTURE OF THE NORMAL ALKANES
MIMICS THE CON S/* STANDARD

362

00:23:03,450 --> 00:23:06,680

FUEL AND THE DIESEL GASOLINE,
AND TRYING TO GET A BETTER

363

00:23:06,680 --> 00:23:13,830

UNDERSTANDING OF HOW THIS LOW
TEMPERATURE COMBUSTION COULD BE

364

00:23:13,830 --> 00:23:17,640
IMPLEMENTED IN THE DEVELOPMENT
OF TECHNOLOGIES OF THE NEXT

365
00:23:17,640 --> 00:23:21,930
GENERATION, PISTON ENGINES AND
THE ACCI ENGINES OR THE CCI

366
00:23:21,930 --> 00:23:22,930
ENGINES.

367
00:23:22,930 --> 00:23:27,420
AND ALMOST, SPELLED IT AS OUT IF
ANYONE ASKS ME LATER.

368
00:23:27,420 --> 00:23:30,320
AND SO WE CAN GO TO THE NEXT
SLIDE.

369
00:23:30,320 --> 00:23:33,880
AND SEE INSIDE THE NBKA.

370
00:23:33,880 --> 00:23:39,930
AND THIS SHOWS A DROPLET BEING
DISPENSED BETWEEN THE TWO

371
00:23:39,930 --> 00:23:44,830
DEPLOYMENT NEEDLES AND BETWEEN
TWO HOT WIRE IGNITERS AND THIS

372
00:23:44,830 --> 00:23:48,400
IS IN THE CENTER OF THE NBKA.

373
00:23:48,400 --> 00:23:53,200
AND THERE IS AN ARRAY OF CAMERAS
IN THE SIR, AND MOUNTED TO THE

374
00:23:53,200 --> 00:23:58,630
COMBUSTION CHAMBER AND LOOKING
IN AND GETTING IMAGES OF THE

375

00:23:58,630 --> 00:24:02,850

FLAMES, OF THE METRIC OUTPUT.

376

00:24:02,850 --> 00:24:06,230

AND A BACK LIT VIEW THAT SHOWS
THE SILLOUETTE OF THE DROPLET

377

00:24:06,230 --> 00:24:12,610

AND YOU CAN MEASURE THE
EVOLUTION OF THE DIAMETER OF THE

378

00:24:12,610 --> 00:24:18,130

DROPLET DURING THE BURN AND SO
WE WILL HIT PLAY HERE ON THE

379

00:24:18,130 --> 00:24:19,600

VIDEO.

380

00:24:19,600 --> 00:24:23,320

AND THIS IS VERY AND THE
DROPLET.

381

00:24:23,320 --> 00:24:26,760

AND YOU WILL SEE IT IS BEING
HEATED BY THE IGNITERS AND THEY

382

00:24:26,760 --> 00:24:30,060

WILL PULL AWAY AFTER THE
IGNITION, AND YOU CAN SEE THE

383

00:24:30,060 --> 00:24:33,580

HOT FLAME.

384

00:24:33,580 --> 00:24:40,840

AND THE EXTINCTION OCCURS RIGHT
THERE AND THE FLAME GOES OUT.

385

00:24:40,840 --> 00:24:45,811

AND THE DROPLET LOOKS PRETTY
QUIET, BUT WAIT FOR IT.

386

00:24:45,811 --> 00:24:50,870
THERE IT GOES.

387

00:24:50,870 --> 00:24:55,621
AND SO, WHAT IS FEEDING THAT
REIGNITION IS THAT COOL FLAME

388

00:24:55,621 --> 00:25:01,070
LOW TEMPERATURE COMBUSTION WHICH
IS DRIVING EVAPORATION OF THE

389

00:25:01,070 --> 00:25:05,480
FUEL BUT NOT BURNING IT AS FAST
AS IT EVAPORATES SO IT CREATES A

390

00:25:05,480 --> 00:25:11,470
CLOUD OF FLAMMABLE GAS, WHICH
THEN CAN REIGNITE AND THAT HAS

391

00:25:11,470 --> 00:25:17,070
IMPLICATIONS FOR FIRE SAFETY FOR
LONG RANGE, LONG DURATION HUMAN

392

00:25:17,070 --> 00:25:19,570
SPACE FLIGHT AS YOU MIGHT
EMERGENCY, YOU THINK THAT THE

393

00:25:19,570 --> 00:25:23,710
FIRE IS OUT AND LIKE ONE OF
THOSE TRICK BIRTHDAY CANDLES AND

394

00:25:23,710 --> 00:25:28,809
YOU WALK AWAY AND THE BURST INTO
FLAME WHEN YOU ARE NOT LOOKING.

395

00:25:28,809 --> 00:25:34,630
SO, TO THAT END, THIS NEGATIVE

TEMPERATURE CO-EFFICIENT REGION

396

00:25:34,630 --> 00:25:42,420

WHERE THIS COMBUSTION IS
OPERATING IS THE OR A BIG

397

00:25:42,420 --> 00:25:45,910

COMPONENT IN THE DESIGN OF THESE
NEXT GENERATION INTERNAL

398

00:25:45,910 --> 00:25:48,890

COMBUSTION ENGINES AS WELL.

399

00:25:48,890 --> 00:25:56,940

AND SO FOR CFI ON THIS LAUNCH,
WE HAVE THE HARDWARE NECESSARY

400

00:25:56,940 --> 00:26:06,430

TO UPGRADE THE FACILITY FOR THE
CFI SCIENCE, INCLUDING DIE /*

401

00:26:06,430 --> 00:26:10,110

DIAGNOSTICS.

402

00:26:10,110 --> 00:26:12,890

BECAUSE YOU CAN SEE AS THE HOT
FLAME GOES OUT THERE IS

403

00:26:12,890 --> 00:26:18,690

NOVICIBLE FLAME, BUT THE
SCIENTISTS BELIEVE THAT IT IS

404

00:26:18,690 --> 00:26:25,380

THERE, JUST NONE OF OUR OURS
CAN DETECT IT, SO A NEW IS BEING

405

00:26:25,380 --> 00:26:32,700

SET UP TO TRACK THE HOT AND THE
COOL FLAME OSCILLATIONS AND

406

00:26:32,700 --> 00:26:37,809

ADAPT ITS SETTINGS SO THAT IT
CAN FOLLOW THE HISTORY OF THE

407

00:26:37,809 --> 00:26:39,429

BURN.

408

00:26:39,429 --> 00:26:44,790

AND SO I THINK I WILL LEAVE IT
THERE.

409

00:26:44,790 --> 00:26:45,790

>> ALL RIGHT.

410

00:26:45,790 --> 00:26:49,360

AND WE WILL NOW TAKE QUESTIONS
FROM THE FOLKS IN THE ROOM AND

411

00:26:49,360 --> 00:26:54,010

VIA ON-LINE USING THE HASH TAG
ASK NASA, THE FOLKS ON THE LINE

412

00:26:54,010 --> 00:27:01,630

CAN ENTER STAR ONE TO BE ENTERED
DOO THE CUE, COULD YOU PLAY THE

413

00:27:01,630 --> 00:27:10,500

VIDEO JUST BECAUSE IT IS COOL.

414

00:27:10,500 --> 00:27:13,410

>> YOU WERE TALKING ABOUT
IMAGING THE FLAME AS IT BUSHES,

415

00:27:13,410 --> 00:27:17,260

ARE YOU JUST IN THE FIRST
GENERATION WERE YOU JUST IMAGING

416

00:27:17,260 --> 00:27:18,929

USING VISUAL WAVE LENGTHS?

417

00:27:18,929 --> 00:27:26,090

>> NO, UV WAVE LENGTHS THERE IS
A CH FILTER FOR THE HOT FLAME

418

00:27:26,090 --> 00:27:30,100

THAT WE USED THAT DOES A REALLY
GOOD JOB AT IMAGING THE

419

00:27:30,100 --> 00:27:35,280

EMISSIONS OF THE CH WAVE LENGTH.

420

00:27:35,280 --> 00:27:40,500

AND YOU CAN GET THE FLAME
DIAMETER VERY CLEARLY USING THE

421

00:27:40,500 --> 00:27:44,420

UV CAMERA THAT WE CURRENTLY
HAVE, THE NEXT CAMERA THAT WE

422

00:27:44,420 --> 00:27:48,180

ARE SENDING UP ON THIS FLIGHT,
USES THAT SAME FILTER, BUT WITH

423

00:27:48,180 --> 00:27:56,430

THE INTENSIFIED CAMERA THAT IT,
IT HAS A DEEPER UV CAPABILITY

424

00:27:56,430 --> 00:28:02,160

SXH IN THE COOL FLAME REGION,
THE EMISSIONS EXPECTED THERE ARE

425

00:28:02,160 --> 00:28:06,179

DEEP WITHIN THAT AND SO THERE IS
A FILTER WHEEL THAT CHANGES

426

00:28:06,179 --> 00:28:13,781

DEPENDING ON WHICH MODE THE BURN
IS IN TO CAPTURE THE COOL FLAME

427

00:28:13,781 --> 00:28:17,340

THROUGH A SEPARATE FILTER, WITH
THE DIFFERENT INTENTIONFIATION

428

00:28:17,340 --> 00:28:19,730

SETTINGS ON THE CAMERA.

429

00:28:19,730 --> 00:28:22,720

>> ALL RIGHT.

430

00:28:22,720 --> 00:28:27,740

DID YOU RAISE YOUR HAND?

431

00:28:27,740 --> 00:28:32,341

>> JARED, COULD YOU TELL US A
LITTLE BIT WHY THE EXPERIMENT IN

432

00:28:32,341 --> 00:28:35,160

PARTICULAR IS WELL SUITED TO
MICROGRAVITY, VERSES ATTEMPTING

433

00:28:35,160 --> 00:28:37,100

TO CREATE THE SAME HERE ON
EARTH.

434

00:28:37,100 --> 00:28:42,510

>> IT IS A VERY LONG AS YOU CAN
SEE ABOUT A MINUTE LONG

435

00:28:42,510 --> 00:28:44,100

COMBUSTION EVENT.

436

00:28:44,100 --> 00:28:50,760

AND THIS IN MICROGRAVITY, YOU
GET THE FLAME AROUND THE

437

00:28:50,760 --> 00:28:51,760

DROPLET.

438

00:28:51,760 --> 00:28:56,910

AND THAT IS ONLY BECAUSE THERE
IS A LACK OF CONVECTION.

439

00:28:56,910 --> 00:28:59,120

HEAVIER THINGS DON'T SINK AND
LIGHTER THINGS DON'T RISE,

440

00:28:59,120 --> 00:29:03,710

BECAUSE THERE IS NO GRAVITY,
THERE IS MICROGRAVITY.

441

00:29:03,710 --> 00:29:08,960

AND SO, RECREATING THAT ON THE
GROUND IS VERY DIFFICULT.

442

00:29:08,960 --> 00:29:14,000

WE HAVE DROPPED TOWERS, WE HAVE
PARABOLIC FLAMES THAT CAN GIVE

443

00:29:14,000 --> 00:29:21,930

YOU UP TO 20 SECONDS, OR SO, OF
MICROGRAVITY, CONDITIONS BUT, AS

444

00:29:21,930 --> 00:29:28,790

YOU SEE FOR THE LARGER DROPLETS,
THESE TESTS RUN TWO MINUTES.

445

00:29:28,790 --> 00:29:35,470

AND THERE IS REALLY NO WAY TO
EFFECTIVELY CHARACTERIZE THE

446

00:29:35,470 --> 00:29:40,360

ENTIRE BURNING HISTORY FOR THESE
LARGER DROP LET'S, EXCEPT IN THE

447

00:29:40,360 --> 00:29:44,710

STATION.

448

00:29:44,710 --> 00:29:49,049

>> OKAY.

449

00:29:49,049 --> 00:29:52,010

>> TALKING SPACE, WILL YOU BE TRACKING THE MOVEMENT OF THE

450

00:29:52,010 --> 00:29:54,800

FUELS DURING THE EXPERIMENT AND IF SO, WITH WHAT KIND OF

451

00:29:54,800 --> 00:29:56,740

EXPERIMENTATION?

452

00:29:56,740 --> 00:29:58,690

THANKS.

453

00:29:58,690 --> 00:30:00,530

TRACKING THE MOVEMENT OF THE FUELS?

454

00:30:00,530 --> 00:30:06,510

I MIGHT NEED A FOLLOW UP QUESTION WITH THAT.

455

00:30:06,510 --> 00:30:13,990

HOW EXACTLY DO YOU MEAN TRACKING THE MOVEMENT OF THE FUELS?

456

00:30:13,990 --> 00:30:26,970

>> WELL, OUR EQUIPMENT DEPLOYS THE DROPLET IN FREE SPACE, IN A

457

00:30:26,970 --> 00:30:30,040

MANNER SO THAT THERE IS VERY LITTLE MOTION OF THE DROPLET AND

458

00:30:30,040 --> 00:30:34,120

SO IT STAYS AT THE CENTER MUCH LIKE IN THE VIDEO, IT

459

00:30:34,120 --> 00:30:38,210

OCCASIONALLY YOU WILL GET THE
BURNING OR IGNITION THAT MIGHT

460

00:30:38,210 --> 00:30:42,870

FORCE IT AND ACCELERATION ONE
WAY OR THE OTHER.

461

00:30:42,870 --> 00:30:46,060

BUT THOSE ARE JUST FAILED
ATTEMPTS THAT WE ARE, YOU KNOW,

462

00:30:46,060 --> 00:30:50,160

THAT WE RECREATE IN A SEPARATE
TEST.

463

00:30:50,160 --> 00:31:00,590

>> AND WE HAVE GOT ONE MORE
QUESTION OVER HERE.

464

00:31:00,590 --> 00:31:03,200

>> MY NAME IS KATHLEEN AND I AM
THE ENVIRONMENTAL BROADCAST

465

00:31:03,200 --> 00:31:06,220

JOURNALIST AND I AM GOING TO ASK
YOU THE MOST DIFFICULT QUESTION

466

00:31:06,220 --> 00:31:07,520

IN THE ROOM.

467

00:31:07,520 --> 00:31:10,660

WHAT I WOULD LIKE YOU TO DO IS
BREAK DOWN EXACTLY WHAT YOU TOLD

468

00:31:10,660 --> 00:31:16,690

US IF YOU WERE TALKING TO MIDDLE
SCHOOL SCIENCE STUDENTS.

469

00:31:16,690 --> 00:31:21,130

TELL THEM WHY THIS IS IMPORTANT
AND WHAT THIS MEANS FOR FUTURE

470

00:31:21,130 --> 00:31:24,970

LAUNCHES.

471

00:31:24,970 --> 00:31:36,740

>> OKAY, SO, THE EFFICIENCY OF
M

472

00:31:36,740 --> 00:31:43,290

CARS, THE CARS THAT WE ALL DRIVE
EVERY DAY PUT OUT A LOT OF

473

00:31:43,290 --> 00:31:49,510

POLLUTION, SOME OF WHICH ARE
GREENHOUSE GASES, AND THEY ARE

474

00:31:49,510 --> 00:31:52,050

NOT VERY EFFICIENT.

475

00:31:52,050 --> 00:31:53,990

LARGELY MORE EFFICIENT THAN IN
THE PAST.

476

00:31:53,990 --> 00:31:58,880

BUT WE BELIEVE THERE IS A LOT OF
WORK TO BE DONE TO CREATE MORE

477

00:31:58,880 --> 00:32:05,250

EFFICIENT ENGINES AND THE HCCI,
ENGINE, AND THE CHARGE,

478

00:32:05,250 --> 00:32:11,790

COMPRESSION IGNITION ENGINE, AND
THE REACTION CONTROLLED

479

00:32:11,790 --> 00:32:19,160

COMPRESSION ENGINES ARE TWO OF
THE POSSIBLE BENEFICIARIES OF

480

00:32:19,160 --> 00:32:25,059

THIS TECHNOLOGY THAT WE ARE
INVEST GATING.

481

00:32:25,059 --> 00:32:34,710

IF WE CAN CHARACTERIZE AND
LEVERAGE THE FINDINGS FROM THIS

482

00:32:34,710 --> 00:32:37,780

EXPERIMENT, THEY CAN BE
INCORPORATED INTO THE FUTURE

483

00:32:37,780 --> 00:32:43,660

TECHNOLOGY THAT CAN POSSIBLY
TRADE CARS THAT TREAT THE WORLD

484

00:32:43,660 --> 00:32:47,500

MUCH BETTER.

485

00:32:47,500 --> 00:32:48,500

>> THAT WAS A TOUGH QUESTION.

486

00:32:48,500 --> 00:32:52,549

THAT IS ALL OF THE QUESTION THAT
WE HAVE RIGHT NOW FOR JESSE.

487

00:32:52,549 --> 00:32:54,480

THANKS.

488

00:32:54,480 --> 00:32:56,419

JESSE.

489

00:32:56,419 --> 00:32:57,830

>> NOW I WOULD LIKE TO WELCOME
DR.

490

00:32:57,830 --> 00:33:00,600
LIZ WARREN, ASSOCIATE
PROGRAM SCIENTIST WITH THE

491
00:33:00,600 --> 00:33:04,560
NATIONAL LAB WHICH IS MANAGED BY
THE CENTER OF ADVANCEMENT FOR

492
00:33:04,560 --> 00:33:09,710
THE SCIENCE IN SPACE, AND HENRY
MARTIN WHO IS THE PAYLOAD

493
00:33:09,710 --> 00:33:14,990
COORDINATOR AND THEY WILL BE
TELLING US ABOUT THE TECHNOLOGY

494
00:33:14,990 --> 00:33:18,820
THAT COULD BE OPENING UP NEW
OPPORTUNITIES FOR THE LAB AND

495
00:33:18,820 --> 00:33:22,720
FUTURE RESEARCHERS LOOKING TO
CONDUCT SCIENCE EXPERIMENTS

496
00:33:22,720 --> 00:33:24,750
ABOARD THE STATION.

497
00:33:24,750 --> 00:33:26,940
CAN YOU TELL US A LITTLE BIT
ABOUT WHAT IS ON BOARD FOR THE

498
00:33:26,940 --> 00:33:27,940
NATIONAL LAB?

499
00:33:27,940 --> 00:33:30,700
>> ABSOLUTELY, AND THANK YOU.

500
00:33:30,700 --> 00:33:31,700
AND HELLO.

501

00:33:31,700 --> 00:33:34,260

WE ARE EXCITED TO BE HERE TODAY,
TO TELL YOU A LITTLE BIT ABOUT

502

00:33:34,260 --> 00:33:36,540

SOME OF THE NEW ENABLES
TECHNOLOGIES THAT WE ARE

503

00:33:36,540 --> 00:33:41,460

LAUNCHING TO THE INTERNATIONAL
SPACE STATION, AS KATHRYN SAID,

504

00:33:41,460 --> 00:33:45,030

WE ARE PRIVILEGED TO MANAGE THE
NATIONAL LAB PORTION OF THE

505

00:33:45,030 --> 00:33:47,380

INTERNATIONAL SPACE STATION.

506

00:33:47,380 --> 00:33:50,920

WE PROVIDE ACCESS TO THE SPACE
STATION TO THE RESEARCH

507

00:33:50,920 --> 00:33:55,340

COMMUNITY AND ACADEMICS AND
OTHER INDUSTRIES.

508

00:33:55,340 --> 00:33:59,470

WE ALSO KEEP AN EYE AND LOOK TO
ENHANCE RESEARCH CAPABILITIES

509

00:33:59,470 --> 00:34:04,150

FOR FUTURE INVESTIGATIONS TO THE
INTERNATIONAL SPACE STATION.

510

00:34:04,150 --> 00:34:08,020

IN THE PAST YEAR, THE ISS
NATIONAL LAB HAS WORKED WITH

511

00:34:08,020 --> 00:34:13,240
IMPLEMENTATION PARTNERS TO BRING
A NEW ENABLING TECHNOLOGIES TO

512
00:34:13,240 --> 00:34:16,869
THE SPACE STATION FOR THE
RESEARCH COMMUNITY, INCLUDING

513
00:34:16,869 --> 00:34:23,159
THE EXTERNAL PLATFORM, AND THE
SPACE TANGO SPACE, AND THE TANGO

514
00:34:23,159 --> 00:34:24,799
LAB ONE.

515
00:34:24,799 --> 00:34:27,490
AND THE ADDITIVE MANUFACTURING
FACILITY.

516
00:34:27,490 --> 00:34:31,669
AND ON THIS LAUNCH, I WILL TELL
YOU ABOUT TWO ADDITIONAL

517
00:34:31,669 --> 00:34:36,470
RESEARCH CAPABILITIES AND HENRY
WILL TELL YOU ABOUT SOME MORE.

518
00:34:36,470 --> 00:34:37,470
AS MR.

519
00:34:37,470 --> 00:34:40,319
PETE HASBROOK AINCLUDED
TO EARLIER, THE INTERNATIONAL

520
00:34:40,319 --> 00:34:44,210
SPACE STATION IS AN INCREDIBLE
RESEARCH FACILITY, YOU HAVE

521
00:34:44,210 --> 00:34:47,389
HEARD ABOUT THE COMBUSTION

EVENTS THAT ARE REALLY ONLY

522

00:34:47,389 --> 00:34:51,530
POSSIBLE IN MICROGRAVITY.

523

00:34:51,530 --> 00:34:53,889
THAT IS ONE OF THE UNIQUE
ASPECTS OF THE INTERNATIONAL

524

00:34:53,889 --> 00:34:57,380
SPACE STATION IS SUSTAINED
MICROGRAVITY, AND FOR A

525

00:34:57,380 --> 00:35:01,960
RESEARCHER THAT MEANS THAT YOU
MAY BE PROVIDED WITH THE UNIQUE

526

00:35:01,960 --> 00:35:06,150
INSIGHTS THAT YOU MAY NOT BE
ABLE TO DO OR BE ABLE TO FIND IN

527

00:35:06,150 --> 00:35:08,369
YOUR RESEARCH, ON EARTH.

528

00:35:08,369 --> 00:35:14,440
HOWEVER, IN SOME CASES, THE
RESEARCH COMMUNITY WANTS EVEN

529

00:35:14,440 --> 00:35:19,539
MORE PURE MICROGRAVITY RESEARCH,
THAN IS POSSIBLE ON A FOOTBALL

530

00:35:19,539 --> 00:35:22,799
SIZED OR A FOOTBALL FIELD SIZED
LABORATORY LIKE THE

531

00:35:22,799 --> 00:35:26,049
INTERNATIONAL SPACE STATION,
THERE IS LITTLE GOSSEL AND WHAT

532

00:35:26,049 --> 00:35:29,280

WE CALLED, THE GITTER ON THE
SPACE STATION BECAUSE THERE ARE

533

00:35:29,280 --> 00:35:32,390

SIX PEOPLE LIVING THERE AND A
BUNCH OF EQUIPMENT ON BOARD AND

534

00:35:32,390 --> 00:35:37,759

THAT PRODUCES THE LITTLE
VIOLATIONS, AND SO, THE FIRST

535

00:35:37,759 --> 00:35:39,260

EXPERIMENT THAT I WILL TELL YOU
ABOUT OR THE FIRST FACILITY, IF

536

00:35:39,260 --> 00:35:42,619

YOU WANT TO ROLL THE VIDEO IS
CALLED THE CONTROLLED DYNAMIC

537

00:35:42,619 --> 00:35:43,619

LOCKER.

538

00:35:43,619 --> 00:35:48,739

AND CDL IS AN ACTIVE VIBRATION
ISOLATION SYSTEM, SO WHAT THAT

539

00:35:48,739 --> 00:35:53,170

MEANS IS THAT IS PROVIDES A VERY
PURE, MICROGRAVITY ENVIRONMENT

540

00:35:53,170 --> 00:35:57,900

BY CANCELLING OUT ALL OF THE G,
JITTERS THAT MIGHT BE I AM

541

00:35:57,900 --> 00:36:04,910

IMPARTED ON THE RACK IT COULD BE
UP SCALED TO A LARGER FACILITY,

542

00:36:04,910 --> 00:36:08,890
BUT RIGHT NOW THIS IS WHAT IT
LOOKS LIKE.

543
00:36:08,890 --> 00:36:12,829
THE TYPES OF RESEARCH THAT MIGHT
TAKE ADVANTAGE OF THE CDL

544
00:36:12,829 --> 00:36:18,980
INCLUDE MACRO CRYSTAL GROWTH,
PLANT BIOLOGY AND CELL CULTURE

545
00:36:18,980 --> 00:36:21,979
AND STEM CELLS.

546
00:36:21,979 --> 00:36:26,210
AND ALSO, FLUID PHYSICS SUCH AS
THE RECENTLY ANNOUNCED NSF

547
00:36:26,210 --> 00:36:29,369
FUNDED FLUID DYNAMICS
INVESTIGATIONS.

548
00:36:29,369 --> 00:36:34,510
CVL IS ALSO PROGRAMMABLE SUCH
THAT IF A RESEARCHER WANTS TO

549
00:36:34,510 --> 00:36:37,450
HAVE A KNOWN VIOLATION IMPARTED
INTO THEIR EXPERIMENT THEY CAN

550
00:36:37,450 --> 00:36:40,630
ALSO DO THAT.

551
00:36:40,630 --> 00:36:43,589
THE OTHER FACILITY IS ACTUALLY
JUST GETTING AN UPGRADE AND

552
00:36:43,589 --> 00:36:44,589
MR.

553

00:36:44,589 --> 00:36:47,930

PETE HAS RECOMMENDED THAT
EARLIER SUBSA, THE SOLIDIFY OF

554

00:36:47,930 --> 00:36:52,670

USING THE BATHEL WHICH IS A
FURNACE EXISTING AROUND ON THE

555

00:36:52,670 --> 00:36:56,039

SPACE STATION, AND WE ARE
LAUNCHING UP THE IMPROVEMENT

556

00:36:56,039 --> 00:36:59,819

HARDWARE TO THE SPACE STATION SO
THAT THE FUTURE USERS WILL BE

557

00:36:59,819 --> 00:37:04,930

ABLE TO CONDUCT AS PETE SAID
SOME SEMICONDUCTOR RESEARCH TO

558

00:37:04,930 --> 00:37:09,809

IMPROVE THEM HERE ON EARTH.

559

00:37:09,809 --> 00:37:13,749

AND WITH THAT, HENRY I WILL HAND
IT OVER TO YOU.

560

00:37:13,749 --> 00:37:14,799

>> THANK YOU, LIZ.

561

00:37:14,799 --> 00:37:18,450

GOOD EVENING, EVERYBODY, AGAIN
MY MAME IS HENRY MARTIN AND I AM

562

00:37:18,450 --> 00:37:21,900

HAPPY TO BE HERE AND THIS IS AN
EXCITING TIME BECAUSE JUST THIS

563

00:37:21,900 --> 00:37:25,359
WEEK THE PRESIDENT OF THE UNITED
STATES TALKED ABOUT THE NEXT

564
00:37:25,359 --> 00:37:29,489
STEPS PROGRAM WHERE THEY HAVE
SELECTED SIX COMPANIES TO

565
00:37:29,489 --> 00:37:33,670
RESEARCH THE COMMERCIAL HABITATS
FOR BELOW EARTH'S ORBIT AND

566
00:37:33,670 --> 00:37:39,900
BEYOND, AND WE ARE ONE OF THE
SIX AT ORBITAL ATK WHO WE WILL

567
00:37:39,900 --> 00:37:42,119
BE LAUNCHING TOMORROW.

568
00:37:42,119 --> 00:37:45,349
ON THIS MISSION YOU CAN SEE
HERE, WE HAVE TWO PAY LOADS, ONE

569
00:37:45,349 --> 00:37:51,329
IS THE EXTERNAL DEPLOYER, AND
NANARAX, IS KNOWN FOR SHOOTING

570
00:37:51,329 --> 00:37:55,710
THE CUBES OUT OF THE STATION, SO
FOR THOSE ON TV.

571
00:37:55,710 --> 00:37:57,869
WE HAVE DONE THAT NOW 139 TIMES.

572
00:37:57,869 --> 00:37:59,599
OH, YEAH, YOU CAN HOLD IT.

573
00:37:59,599 --> 00:38:01,509
THIS IS THE SPACE BY THE WAY AND
SO THAT IS COOL.

574

00:38:01,509 --> 00:38:02,509
ONLY 6.1 KG.

575

00:38:02,509 --> 00:38:11,479
>> AND WE HAVE DONE IT 139 AND
WE ARE NOW DOING IT ON THE

576

00:38:11,479 --> 00:38:21,619
OUTSIDE OF THE SIGNAS IT STAYS
ON THE OUTSIDE, AND THEN IT WILL

577

00:38:21,619 --> 00:38:27,479
TRAVEL TO A HIGHER ORBIT THAN
THE ISS, 450 KM AND IT WILL

578

00:38:27,479 --> 00:38:32,619
SHOOT OUT FOUR LEMERS AND SO
THAT IS THE FIRST PRIORITY AND

579

00:38:32,619 --> 00:38:36,440
WE ARE EXCITED ABOUT IT PENDING
ALL OPERATIONS SO IF YOU IMAGINE

580

00:38:36,440 --> 00:38:38,989
THE PIECE OF HARDWARE, IT IS
ABOUT SIX OF THESE THINGS

581

00:38:38,989 --> 00:38:41,369
STACKED UP ON EACH OTHER AND IT
IS ABOUT THE SIZE OF YOUR OVEN

582

00:38:41,369 --> 00:38:42,369
IN YOUR KITCHEN.

583

00:38:42,369 --> 00:38:46,359
AND THE NEXT PAYLOAD IS THE
BLACK BOX AND SO THE NEXT SLIDE

584

00:38:46,359 --> 00:38:47,359

PLEASE?

585

00:38:47,359 --> 00:38:50,529

HERE IS THE SIGNAS AND YOU WILL
SEE IT RIGHT THERE, THE LITTLE

586

00:38:50,529 --> 00:38:56,049

RED CIRCLE AND YOU CAN GO ON TO
THE NEXT SLIDE TOO.

587

00:38:56,049 --> 00:38:57,049

SO THERE IT IS AGAIN.

588

00:38:57,049 --> 00:38:59,569

AND RED ARROW AND VERY SCHOOL
SHOTS, THE CREW TOOK THOSE AND

589

00:38:59,569 --> 00:39:04,789

IT IS NEAT TO LOOK AT, THE NICE
TOUCH AND NEXT SLIDE PLEASE, BUT

590

00:39:04,789 --> 00:39:08,260

WE ARE EXCITED ABOUT THIS IS THE
BLACK BOX AND IT IS CALLED THE

591

00:39:08,260 --> 00:39:11,140

BLACK BOX AND I WILL ADDRESS IT
NOW, BECAUSE REALLY THE OUTSIDE

592

00:39:11,140 --> 00:39:14,190

STAYS THE SAME, AND IT IS POWER
AND DATA, BUT THE INSIDE YOU CAN

593

00:39:14,190 --> 00:39:17,099

SWAP OUT TONS OF DIFFERENT PAY
LOADS AND SO REALLY YOU JUST

594

00:39:17,099 --> 00:39:20,310

OPEN IT UP AND REPLACE SOMETHING

AND THEN SEND IT UP, WHAT IS

595

00:39:20,310 --> 00:39:23,170

ALSO COOL ABOUT THIS, IS THAT IT
IS DESIGNED FOR THE NEAR LAUNCH

596

00:39:23,170 --> 00:39:26,920

PAYLOAD TURNOVER, AND SO A LOT
OF STUFF, THE GOOD SCIENCE, AND

597

00:39:26,920 --> 00:39:31,349

SOME SCIENCE CANNOT WAIT IN A
BOX FOR I DON'T KNOW, 30 DAYS,

598

00:39:31,349 --> 00:39:33,499

OR THREE MONTHS, BEFORE IT
LAUNCHES.

599

00:39:33,499 --> 00:39:35,789

AND IT IS LIFETIME, AND SO THIS
ALLOWS FOR THE NEAR LAUNCH

600

00:39:35,789 --> 00:39:38,660

TURNOVER SO THAT WE CAN GET IT
UP THERE, QUICKER.

601

00:39:38,660 --> 00:39:42,609

IT IS ALSO A PURELY ATONOMOUS
OPERATED MACHINE AND SO WE DON'T

602

00:39:42,609 --> 00:39:45,140

NEED THE CREW INTERACTION, IT
HAS A LOT OF STUFF TO DO, AND

603

00:39:45,140 --> 00:39:48,170

THE OTHER THINGS TO DO, LIKE THE
COMBUSTION AND HOPEFULLY WE WILL

604

00:39:48,170 --> 00:39:49,920

NOT BE DOING THE COMBUSTION.

605

00:39:49,920 --> 00:39:53,030

AND SO, AND SO IT REALLY TAKES
THAT ELEMENT OUT AND IT ALLOWS

606

00:39:53,030 --> 00:39:57,500

FOR THE MORE ATONOMOUS OPERATION
AS IT FURTHER ANALYZES IT.

607

00:39:57,500 --> 00:40:02,900

AND WE CAN HANDLE 18 U, AND IT
IS TEN BY TEN, BY TEN, AND WE

608

00:40:02,900 --> 00:40:05,150

ARE EXCITED ON THIS ONE AND WE
WILL BE FLYING IT AGAIN ON THE

609

00:40:05,150 --> 00:40:08,690

SPACE X, ELEVEN IN JANUARY OR
MARCH WHATEVER THAT IS.

610

00:40:08,690 --> 00:40:09,809

SO YEAH.

611

00:40:09,809 --> 00:40:13,330

>> ALL RIGHT, THANKS, WE WILL
NOW TAKE THE QUESTIONS FROM THE

612

00:40:13,330 --> 00:40:15,789

FOLKS HERE IN THE ROOM AND AGAIN
ON THE PHONE IF YOU PRESS STAR

613

00:40:15,789 --> 00:40:19,930

ONE, AND ON-LINE USING THE HASH
TAG ASK NASA AND I BELIEVE THAT

614

00:40:19,930 --> 00:40:21,559

WE DO HAVE A QUESTION ON THE
PHONE.

615

00:40:21,559 --> 00:40:22,559

>> IRENE YOUR LINE IS OPEN.

616

00:40:22,559 --> 00:40:23,559

>> THANK YOU, CAN YOU HEAR ME.

617

00:40:23,559 --> 00:40:24,649

>> YES, MA'AM, PRECEDE WITH YOUR QUESTION.

618

00:40:24,649 --> 00:40:49,750

>> I ACTUALLY HAVE A QUESTION A WHILE BACK.

619

00:40:49,750 --> 00:40:55,290

>> YOU CAN GO AHEAD WITH ONE OF THE QUESTIONS IN THE ROOM.

620

00:40:55,290 --> 00:41:00,749

>> YOU HERE IN THE MIDDLE THAT WILL BE HARD TO GET TO.

621

00:41:00,749 --> 00:41:04,759

>> HI, THERE.

622

00:41:04,759 --> 00:41:08,700

FROM THE GMINUS, AND QUICK QUESTION.

623

00:41:08,700 --> 00:41:12,970

HOW DOES THAT STABILIZATION SYSTEM OF THAT PLATFORM WORK?

624

00:41:12,970 --> 00:41:17,689

>> SO, THIS IS ACTUALLY PLUGGED IN TO THE RACK.

625

00:41:17,689 --> 00:41:21,270

>> NO, NO, THE PLATFORM

STABILIZER FOR THE PLANT.

626

00:41:21,270 --> 00:41:27,329

>> OH, AS I UNDERSTAND IT IT IS
DONE MAGNETICALLY AND THE VIDEO

627

00:41:27,329 --> 00:41:30,200

THAT YOU SAW SHOWED THAT THE
SAFETY CAPTURE, AND THEN THE

628

00:41:30,200 --> 00:41:32,789

LETTING GO AND IN FACT IT WAS
FILMED IN ONE GRAVITY

629

00:41:32,789 --> 00:41:35,349

ENVIRONMENT AND SO THAT IS WHAT
THE LITTLE SPRING ON TOP WAS

630

00:41:35,349 --> 00:41:39,359

FOR, BUT IT USES MAGNETS AND
LASERS FOR ALIGNMENT I BELIEVE.

631

00:41:39,359 --> 00:41:43,089

BUT WE HAVE A FACT SHEET THAT I
CAN SEND YOU FOR THE FURTHER

632

00:41:43,089 --> 00:41:47,799

DETAIL, AND I THINK THAT THE
DATA ARE THAT IT IS 500 TIMES

633

00:41:47,799 --> 00:41:52,240

QUIETER, THAN THE INTERNATIONAL
SPACE STATION, MICROGRAVITY

634

00:41:52,240 --> 00:41:55,989

ENVIRONMENT, WHICH OF COURSE IS
FINE FOR MOST RESEARCH, BUT SOME

635

00:41:55,989 --> 00:41:59,760

PEOPLE REALLY WANT THAT QUIET,

AND THERE YOU GO, YOU CAN

636

00:41:59,760 --> 00:42:03,369

ACTUALLY SEE SOME OF THE LASER
ALIGNMENT AND THIS, MAGNETICALLY

637

00:42:03,369 --> 00:42:06,549

CONTROLLED.

638

00:42:06,549 --> 00:42:09,679

>> NEXT QUESTION?

639

00:42:09,679 --> 00:42:19,180

>> JEFF, SPACE, FOR HENRY, ARE
YOU CARRYING ANY CUBES FOR THE

640

00:42:19,180 --> 00:42:21,460

DEPLOYMENT TO CARRY INSIDE OF
THE SPACE STATION FOR THE

641

00:42:21,460 --> 00:42:22,460

DEPLOYMENT?

642

00:42:22,460 --> 00:42:25,900

>> NOT ON OA FIVE, WE HAVE NO
INTERNAL NSRDS AS WE CALL IT.

643

00:42:25,900 --> 00:42:28,720

>> AND FOR THE EXTERNAL ONES,
ARE WE DOING THAT TO JUST GET TO

644

00:42:28,720 --> 00:42:33,570

GET THEM IN THE ORBIT OR ALSO TO
GET AROUND THE CONGESTION OF

645

00:42:33,570 --> 00:42:36,000

USING THE AIR LOCK WHICH IS IN
M

646

00:42:36,000 --> 00:42:37,150
HIGH, DEMAND.

647
00:42:37,150 --> 00:42:44,480
YES, IT IS HARD TO COME BACK, WE
DECON GUEST, THIS ORBIT ALLOWS

648
00:42:44,480 --> 00:42:48,683
IT TO STAY UP LONGER, IF YOU
HAVE A BIRD UP THERE, YOU WHAT

649
00:42:48,683 --> 00:42:50,430
NT TO FLY IT AS LONG AS YOU CAN.

650
00:42:50,430 --> 00:42:54,739
WE ARE ESTIMATING THAT THEY WILL
BE UP THERE FOR THREE YEARS, ANY

651
00:42:54,739 --> 00:43:00,710
AND SO IT IS EXCITING FOR THE
PEOPLE WHO WANT TO STAY IN THE

652
00:43:00,710 --> 00:43:02,269
AIR LONGER.

653
00:43:02,269 --> 00:43:06,219
>> ALL RIGHT, ANY OTHER
QUESTIONS HERE IN THE ROOM?

654
00:43:06,219 --> 00:43:10,969
AGAIN, PRESS STAR ONE IF YOU ARE
ON THE PHONE AND USE THE HASH

655
00:43:10,969 --> 00:43:15,399
TAG ASK NASA IF YOU ARE HAVING
ANY QUESTIONS ON-LINE.

656
00:43:15,399 --> 00:43:17,719
>> ALL RIGHT.

657
00:43:17,719 --> 00:43:18,720
THANK YOU.

658
00:43:18,720 --> 00:43:19,720
>> THANKS.

659
00:43:19,720 --> 00:43:24,190
>> AND ED HARRIS IS UP NEXT, HE
IS PARTNER AT EDGE OF SPACE.

660
00:43:24,190 --> 00:43:27,109
AND HE IS GOING TO TELL US ABOUT
THEIR RELATIONSHIP WITH MANORACK

661
00:43:27,109 --> 00:43:30,190
AND ANOTHER COMPANY CALLED
SPHERO AS ONE OF THE PAY LOADS

662
00:43:30,190 --> 00:43:34,999
THAT IS GOING IN THE BLACK BOX
THAT YOU JUST HEARD ABOUT.

663
00:43:34,999 --> 00:43:38,339
>> CAN YOU TELL US MORE ABOUT
THE PARTNERSHIP AND WHAT IT IS

664
00:43:38,339 --> 00:43:39,470
THAT YOU HAVE UP HERE.

665
00:43:39,470 --> 00:43:40,470
>> ABSOLUTELY.

666
00:43:40,470 --> 00:43:44,519
AND SO WE ARE FLYING AN
EXPERIMENT AND WHAT WE ARE DOING

667
00:43:44,519 --> 00:43:50,450
IS WE ARE FLYING THIS SFERO
SPARK EDUCATIONAL ROBOT.

668

00:43:50,450 --> 00:43:54,040

AND I THINK THAT THE BEST THING
TO DO BEFORE I TALK ABOUT IT,

669

00:43:54,040 --> 00:43:57,519

WOULD BE TO ROLL THIS REALLY
COOL VIDEO THAT THEY MADE AND IT

670

00:43:57,519 --> 00:44:15,059

WILL SHOW YOU A LOT ABOUT THAT.

671

00:44:15,059 --> 00:44:55,729

>> IN IS THE EDUCATIONAL UNIT,
AND IT ACTUALLY ROLLED OUT TO

672

00:44:55,729 --> 00:45:01,619

A
PARTNERSHIP.

673

00:45:01,619 --> 00:45:13,779

AND THE COMPANY HAS THE SPACE.

674

00:45:13,779 --> 00:45:17,930

>> THEY LIKE TO TALK ABOUT
SHARING THEIR CODING, AND WHAT

675

00:45:17,930 --> 00:45:22,529

WE DID IS WE CREATED A SERIES OF
EXPERIMENTS AND WE HAVE A SERIES

676

00:45:22,529 --> 00:45:26,979

OF SCHOOLS THAT THEY PARTNER
WITH AND COME IN AND DEVELOP

677

00:45:26,979 --> 00:45:29,799

CODES, USING THE OPEN SOURCE APP
FOR THIS ROBOT.

678

00:45:29,799 --> 00:45:34,099
AND THOSE CODES WHO HAVE BEEN
LOADED IN THE ROBOT AND IN THE

679
00:45:34,099 --> 00:45:39,589
BLACK BOX AND IT WILL OPERATE
AND IT WILL BE FILMED, THAT DATA

680
00:45:39,589 --> 00:45:42,150
WILL BE BROUGHT BACK AND WILL BE
USED TO DEVELOP A SERIES OF

681
00:45:42,150 --> 00:45:45,490
ADDITIONAL PROGRAMS, AND THE
LESSON PLANS, AND THE OTHER

682
00:45:45,490 --> 00:45:48,460
CODES AND THINGS LIKE THAT, DP
AND IT WILL BE SHARED OPEN

683
00:45:48,460 --> 00:45:50,599
SOURCE ON THE WEBSITE.

684
00:45:50,599 --> 00:45:55,960
AND THE PARTNERS SUCH AS
CODE.ORG, ABOUT A YEAR AGO,

685
00:45:55,960 --> 00:45:58,890
SPHERO, DEVELOPED A PROGRAM THAT
THEY CALLED, LIGHTNING LAB, CL

686
00:45:58,890 --> 00:46:03,400
IS AN INTERACTIVE COMMUNITY OF
STUDENTS AND TEACHERS AND

687
00:46:03,400 --> 00:46:08,660
MAKERS, AND CODERS, WHO ALL COME
TOGETHER USING THIS ROBOT TO

688
00:46:08,660 --> 00:46:10,849

ESSENTIALLY DEVELOP THE
PROGRAMMING THAT TEACHES

689

00:46:10,849 --> 00:46:13,740

ROBOTICS, AND THAT REINFORCES
THE EXISTING CURRICULUM IN THE

690

00:46:13,740 --> 00:46:17,160

SCHOOLS AND TEACHING THE LOWER
AND MIDDLE SCHOOL MATH AND

691

00:46:17,160 --> 00:46:22,420

PHYSICS AND GEOMETRY, AND YOU
KNOW, GEOGRAPHY AND ART, AND

692

00:46:22,420 --> 00:46:27,799

OBVIOUSLY CODING AND COMPUTER
SCIENCE, TO DATE THERE HAVE BEEN

693

00:46:27,799 --> 00:46:30,660

ABOUT, 75,000 PROGRAMS WRITTEN
FOR THIS.

694

00:46:30,660 --> 00:46:35,049

VERY BY SFPERO AND MOSTLY BY THE
OUTSIDE, STUDENTS AND CODERS,

695

00:46:35,049 --> 00:46:39,059

AND WHAT WE ARE TRYING TO
ACHIEVE WITH THIS IS TO BRING

696

00:46:39,059 --> 00:46:43,380

BACK THAT CONSTITUENCY AND THAT
GREAT AUDIENCE THAT THEY HAVE

697

00:46:43,380 --> 00:46:45,910

AND THAT THE PEOPLE THAT ARE
INTERESTED IN ROBOT TIKZ AND

698

00:46:45,910 --> 00:46:50,410

BRING THAT TOGETHER WITH THE
IDEA OF SPACE FLIGHT.

699

00:46:50,410 --> 00:46:51,410
AND THE ISS.

700

00:46:51,410 --> 00:46:54,190
AND THE EXPERIMENTS AND THE
EDUCATIONAL EXPERIMENTS AND THE

701

00:46:54,190 --> 00:46:57,190
SCIENCE EXPERIMENTS THAT GO ON
ON THE ISS RIGHT NOW.

702

00:46:57,190 --> 00:47:04,599
AND INVIGORATE THE STUDENTS AND
BY USING THE EXCITEMENT AND THE

703

00:47:04,599 --> 00:47:07,849
ENGAGEMENT OF SPACE FLIGHT, AND
IN THE INTERNATIONAL SPACE

704

00:47:07,849 --> 00:47:09,029
STATION.

705

00:47:09,029 --> 00:47:15,349
>> SO, ONCE THIS IS COMPLETED
AND THE APP, IS PUT OUT AND THE

706

00:47:15,349 --> 00:47:18,280
LESSON PLANS ARE PUT OUT AND
THINGS OF THAT NATURE, THEY WILL

707

00:47:18,280 --> 00:47:22,869
IMMEDIATELY BE AVAILABLE TO A
GROUP OF 5,000-PLUS, SCHOOLS

708

00:47:22,869 --> 00:47:26,770
THAT THEY ARE ALREADY PARTNERS
WITH, 15,000 PLUS TEACHERS AND

709

00:47:26,770 --> 00:47:30,119

OVER, 500,000 STUDENTS AND THAT
NUMBER WILL GROW, AS A

710

00:47:30,119 --> 00:47:34,650

PARTNERSHIPS GROW AND THESE
ABSENT, LESSON PLANS GET PUSHED

711

00:47:34,650 --> 00:47:38,849

OUT AND SO WE ARE WHAT WE ARE
HOPING TO DO IS TO REACH,

712

00:47:38,849 --> 00:47:43,150

MILLIONS OF STUDENTS, ALL
ENGAGING IN USING THIS ROBOT AND

713

00:47:43,150 --> 00:47:45,779

THE EXPERIMENT AND THE
EXCITEMENT AND THE ENGAGEMENT OF

714

00:47:45,779 --> 00:47:49,380

WHAT IS DONE ON THE ISS, TO
LEARN CODING AND TO DEVELOP

715

00:47:49,380 --> 00:47:53,549

PROGRAMS, AND TO REINFORCE THOSE
LESSONS THAT THEY ARE GOING

716

00:47:53,549 --> 00:47:54,549

THROUGH RIGHT NOW.

717

00:47:54,549 --> 00:47:56,460

AND LOWER AND MIDDLE SCHOOLS.

718

00:47:56,460 --> 00:47:59,759

>> AND SO IT IS VERY EXCITING
FOR US, AND WE ARE, WE ARE

719

00:47:59,759 --> 00:48:01,269
LOOKING FORWARD TO THE RESULTS
OF THIS.

720
00:48:01,269 --> 00:48:04,000
AND ALL OF THE GREAT THINGS THAT
THE STUDENTS COME UP WITH, AND

721
00:48:04,000 --> 00:48:06,099
BECAUSE I WILL TELL YOU RIGHT
NOW, THERE IS NOTHING MORE

722
00:48:06,099 --> 00:48:10,300
POWERFUL THAN AN INTELLIGENT,
MOTIVATED 12-YEAR-OLD WITH A

723
00:48:10,300 --> 00:48:11,300
ROBOT.

724
00:48:11,300 --> 00:48:12,300
>> YEAH?

725
00:48:12,300 --> 00:48:15,190
>> ALL RIGHT, WE WILL NOW TAKE
QUESTIONS FROM THE FOLKS IN THE

726
00:48:15,190 --> 00:48:18,200
ROOM AS WELL AS ON-LINE, AGAIN,
PRESS STAR ONE TO BE ENTERED

727
00:48:18,200 --> 00:48:22,779
INTO THE QUE OR ON-LINE ON THE
WEB, USING THE HASH TAG ASK

728
00:48:22,779 --> 00:48:26,549
NASA.

729
00:48:26,549 --> 00:48:29,339
>> SPACE FLIGHT INSIDER, HOW
WOULD IT BE USED IN TERMS OF THE

730

00:48:29,339 --> 00:48:32,690

JOURNEY TO MARS, COULD YOU SEE
IT TRAVELING TO THE RED PLANET?

731

00:48:32,690 --> 00:48:38,559

>> ABSOLUTELY, I CAN SEE THAT, I
AM NOT DOING THAT AS A PLUG, THE

732

00:48:38,559 --> 00:48:41,260

ROBOT AND AND THERE ARE
INTERESTING THINGS THAT THE

733

00:48:41,260 --> 00:48:45,579

ROBOT HAS BEEN ABLE TO DO, I
HAVE SEEN THE STUDENTS BUILD A

734

00:48:45,579 --> 00:48:53,190

MARS ROVER USING THIS AS THE
DRIVE TRAIN, AND THE COMPUTER

735

00:48:53,190 --> 00:48:56,309

THAT RUNS THEM AROUND, THAT WAS
INNOVATIVE.

736

00:48:56,309 --> 00:48:59,630

COULD SOMETHING LIKE THIS
ESSENTIALLY COMMERCIAL OFF OF

737

00:48:59,630 --> 00:49:04,709

THE SHELF HARDWARE BE UTILIZED
IN THE NASA JOURNEY TO MARS?

738

00:49:04,709 --> 00:49:06,079

HOW, EXACT SLI?

739

00:49:06,079 --> 00:49:08,430

I DON'T KNOW, I THINK THAT WE
TURN IN THE 12 YEAR OLD AND SEE

740

00:49:08,430 --> 00:49:10,430

WHAT THEY COME UP WITH.

741

00:49:10,430 --> 00:49:16,710

>> ALL RIGHT, COME OVER HERE.

742

00:49:16,710 --> 00:49:18,920

>> KEN, TALKING SPACE.

743

00:49:18,920 --> 00:49:22,490

YOU WERE SAYING THAT THERE ARE A
LOT OF 12-YEAR-OLD MOTIVATED TO

744

00:49:22,490 --> 00:49:23,509

DOING THAT.

745

00:49:23,509 --> 00:49:27,690

DOES, OR DO EITHER YOURSELF OR
SPHERO HAVE THE PLANS TO PUT IT

746

00:49:27,690 --> 00:49:31,279

OUT COME MER SHALLY, MEANING
THAT THE OTHER KIDS OUTSIDE OF

747

00:49:31,279 --> 00:49:36,589

THE SCHOOL IS PLAY WITH THIS OR
POSTING THEIR PROGRAMS SOMEWHERE

748

00:49:36,589 --> 00:49:40,789

AND SHARING THEIR PROGRAMS
ON-LINE WITH FOLKS.

749

00:49:40,789 --> 00:49:41,789

>> ABSOLUTELY.

750

00:49:41,789 --> 00:49:44,219

THIS IS ANYONE CAN USE THIS.

751

00:49:44,219 --> 00:49:47,079
YOU CAN BUY ONE, IF YOU LIKE,
RIGHT AFTER THIS MEETING.

752
00:49:47,079 --> 00:49:50,999
>> I WILL LET YOU PLAY WITH THIS
ONE.

753
00:49:50,999 --> 00:49:52,589
AND ANYBODY CAN CODE FOR IT.

754
00:49:52,589 --> 00:49:56,279
IT DOES NOT HAVE TO BE JUST A
CLASS OR SCHOOL CHILDREN, ANYONE

755
00:49:56,279 --> 00:49:58,049
CAN DO IT.

756
00:49:58,049 --> 00:50:01,559
I ACTUALLY AM USING IT RIGHT NOW
AND I AM GOING TO WRITE A COUPLE

757
00:50:01,559 --> 00:50:04,589
OF PROGRAMS, YOU MAY HAVE SEEN
IN THE VIDEO THAT IT CAN BE USED

758
00:50:04,589 --> 00:50:09,799
FOR ART CLASSES AND SO I WANT TO
USE IT TO CREATE THE ART AND IT

759
00:50:09,799 --> 00:50:12,440
CAN DO THE INTERESTING THINGS ON
CANVAS.

760
00:50:12,440 --> 00:50:16,499
BUT, YEAH, ANYONE CAN USE IT.

761
00:50:16,499 --> 00:50:18,839
COME BACK HERE.

762

00:50:18,839 --> 00:50:19,839

>> AND POWERFUL.

763

00:50:19,839 --> 00:50:27,099

>> HI, I AM JAMES ROBERT SON,
AND I WAS WONDERING WHAT WAS IN

764

00:50:27,099 --> 00:50:34,770

THE SPARK, AND IF THERE ARE ANY
PLANS THAT MAYBE, YOU KNOW,

765

00:50:34,770 --> 00:50:38,839

EXPENSEBILITY OR ADD MORE SENSE
SENSORS TO IT.

766

00:50:38,839 --> 00:50:44,170

>> WE HAVE TALKED ABOUT DOING
ANOTHER RUN OF THIS EVENTUALLY,

767

00:50:44,170 --> 00:50:47,859

THAT WOULD ADD MORE CAPABILITY
TO IT AND WE HAVE NOT GONE VERY

768

00:50:47,859 --> 00:50:48,859

FAR WITH THAT.

769

00:50:48,859 --> 00:50:50,640

IN THE TERMS OF WHAT IS IN IT
RIGHT NOW?

770

00:50:50,640 --> 00:50:53,799

THAT IS A GOOD QUESTION, FOR
SPHERO AND I AM NOT FAMILIAR

771

00:50:53,799 --> 00:50:57,499

WITH THE ENGINEERING WITH IT, I
AM HAPPY TO PUT YOU IN CONTACT

772

00:50:57,499 --> 00:51:08,549

WITH THEM AND THEY WILL BE HAPPY
TO ANSWER THE QUESTIONS.

773

00:51:08,549 --> 00:51:11,809

>> IS THERE ANY POSSIBILITY THAT
IT WILL BE PROGRAMMED WITH THE

774

00:51:11,809 --> 00:51:14,890

KEY LIVE LANGUAGES INSTEAD OF A
GRAPHICAL PROGRAMMING ENTER

775

00:51:14,890 --> 00:51:15,890

FACE.

776

00:51:15,890 --> 00:51:22,069

>> THAT IS A QUESTION FOR THE
SPHERO PEOPLE, I WOULD TEMPTED

777

00:51:22,069 --> 00:51:23,459

TO SAY YES.

778

00:51:23,459 --> 00:51:27,109

BUT, DON'T HOLD ME TO THAT, I
THINK THAT WE WILL GET YOU THE

779

00:51:27,109 --> 00:51:29,139

PEOPLE AND THEY CAN ANSWER THAT
QUESTION.

780

00:51:29,139 --> 00:51:30,139

>> SECONDARILY.

781

00:51:30,139 --> 00:51:34,309

HOW WELL DOES IT BEHAVE IN ZERO
GRAVITY SINCE OF THE OFFSET

782

00:51:34,309 --> 00:51:35,309

REACTION?

783

00:51:35,309 --> 00:51:37,609
>> YOU KNOW I WAS WAITING FOR
THAT QUESTION.

784
00:51:37,609 --> 00:51:41,170
SO, I ACTUALLY GOT THAT
QUESTION, BEFORE I CAME HERE,

785
00:51:41,170 --> 00:51:44,329
BEFORE I FLEW UP HERE FROM
HOUSTON AND I GOT IT FROM MY SON

786
00:51:44,329 --> 00:51:47,460
WHO IS A 12-YEAR-OLD WHO PLAYS
WITH THE ROBOT AND THE MIND

787
00:51:47,460 --> 00:51:49,410
CRAFT AND ALL OF THIS.

788
00:51:49,410 --> 00:51:51,920
AND SO HE IS MY EXPERT ON THESE
THINGS.

789
00:51:51,920 --> 00:51:54,519
AND I ASKED HIM, I SAID WHAT DO
YOU THINK THAT THIS IS GOING TO

790
00:51:54,519 --> 00:51:55,890
DO WHEN WE FLY IT?

791
00:51:55,890 --> 00:51:59,540
AND KIND OF LOOKED AT HIM AND HE
SAID, I DON'T KNOW.

792
00:51:59,540 --> 00:52:01,849
BUT IT WILL DO SOMETHING COOL.

793
00:52:01,849 --> 00:52:05,920
AND SO, I AM NOT BEING FLIPANT
WE DON'T KNOW, THAT IS WHY WE

794

00:52:05,920 --> 00:52:07,930

ARE GOING TO FLY IT AND
EXPERIMENT WITH IT.

795

00:52:07,930 --> 00:52:10,259

WITH HE WILL MANIPULATE IT WITH
THE ROBOT ARM INSIDE OF THE

796

00:52:10,259 --> 00:52:14,451

BLACK BOX AND THERE IS A METAL
PLATE THAT IS MAGNA TIED THAT WE

797

00:52:14,451 --> 00:52:18,940

WILL BE ABLE TO AT SOME POINT
HAVE THE SPHERO ATTACH TO THAT

798

00:52:18,940 --> 00:52:27,089

IMULATES THE GRAVITY ON MARS AND
WE GAVE THE CAPABILITIES AND THE

799

00:52:27,089 --> 00:52:29,440

FACTORS TO THE VARIOUS SCHOOLS
AND SAID WRITE A PROGRAM AND SEE

800

00:52:29,440 --> 00:52:32,779

WHAT YOU WANT TO DO, SO ABOUT
SIX SCHOOLS ACROSS THE COUNTRY,

801

00:52:32,779 --> 00:52:36,259

THEY WROTE PROGRAMS THAT WERE
INTEGRATED INTO IT FLYING

802

00:52:36,259 --> 00:52:39,849

TOMORROW AND WE WILL SEE WHAT
HAPPENS AND WE WILL BE VERY

803

00:52:39,849 --> 00:52:42,890

HAPPY TO SHARE ALL OF THE VIDEO
AND DATA THAT COMES BACK AS

804

00:52:42,890 --> 00:52:43,890

WELL.

805

00:52:43,890 --> 00:52:45,859

>> THANK YOU.

806

00:52:45,859 --> 00:52:49,890

>> ALL RIGHT, AND I BELIEVE THAT
WE HAVE GOT A QUESTION FROM

807

00:52:49,890 --> 00:52:52,119

SOCIAL MEDIA.

808

00:52:52,119 --> 00:52:58,450

YES, WE HAVE A QUESTION FROM
ROBERT ON TWITTER AND HE ASKS IS

809

00:52:58,450 --> 00:53:01,000

THE SPHERO FLYING COMMERCIAL OFF
OF THE SHELF OR DOES IT NEED TO

810

00:53:01,000 --> 00:53:05,229

BE MODIFIED FOR THE USE ON THE
SPACE STATION.

811

00:53:05,229 --> 00:53:08,930

>> THE ONLY THING THAT WE
MODIFIED, I BELIEVE, NONE OF IT

812

00:53:08,930 --> 00:53:10,579

WAS MODIFIED EXCEPT FOR THE
SHELL.

813

00:53:10,579 --> 00:53:14,599

I THINK THAT WE HAD TO, I THINK
THAT WE HAD TO REINFORCE THE

814

00:53:14,599 --> 00:53:16,529

SEAL ON THE SHELL IF I REMEMBER.

815

00:53:16,529 --> 00:53:20,420

AND OTHERWISE IT IS COMPLETELY
OFF THE SHELF.

816

00:53:20,420 --> 00:53:24,190

>> AND THAT WAS REALLY CENTRAL
PART OF THE EXPERIMENT.

817

00:53:24,190 --> 00:53:27,680

WE DID NOT WANT TO BUILD A NEW
ROBOT, WE WANTED TO TAKE ONE

818

00:53:27,680 --> 00:53:30,910

THAT IS ALREADY IN THE CLASSROOM
AND ALREADY BEING USED AND FLY

819

00:53:30,910 --> 00:53:32,279

IT AND SEE WHAT HAPPENS.

820

00:53:32,279 --> 00:53:37,900

AND AGAIN, WITH THAT EXPERIMENT
WITH THE COOLNESS, AND THE

821

00:53:37,900 --> 00:53:39,400

EXCITEMENT OF SPACE FLIGHT.

822

00:53:39,400 --> 00:53:43,079

>> THANKS, THAT IS ALL OF THE
TIME THAT WE HAVE FOR QUESTIONS

823

00:53:43,079 --> 00:53:45,980

ON SPACE RIGHT NOW.

824

00:53:45,980 --> 00:53:48,539

NEXT I WOULD LIKE TO BRING PETE
HASBROOK AND DR.

825

00:53:48,539 --> 00:53:50,380

LIZ WARREN BACK
UP.

826

00:53:50,380 --> 00:53:54,989

IF ANYONE HAS ANY QUESTIONS
GENERALLY ABOUT THE RESEARCH

827

00:53:54,989 --> 00:54:02,420

CONDUCTED ABOARD THE SPACE
STATION OR THE NATIONAL LAB.

828

00:54:02,420 --> 00:54:07,229

>> KEN KRAMER AND I HAVE THE
QUESTION ABOUT THE FIRST

829

00:54:07,229 --> 00:54:10,589

SPEAKER, ABOUT THE VISUAL
IMPAIRMENT AND THE ASTRONAUTS

830

00:54:10,589 --> 00:54:15,119

AND I WONDER IF YOU CAN TELL US
ABOUT THAT, HOW MANY OF THE

831

00:54:15,119 --> 00:54:17,270

ASTRONAUTS ARE SUFFERING VISUAL
IMPAIRMENT?

832

00:54:17,270 --> 00:54:23,359

HAVE YOU LEARNED ANYTHING YET TO
MITIGATE THOSE EFFECTS?

833

00:54:23,359 --> 00:54:28,589

AND CAN YOU TALK ABOUT THE
PROGRESSION OVER TIME?

834

00:54:28,589 --> 00:54:29,589

DOES IT STOP?

835

00:54:29,589 --> 00:54:30,589

DOES IT GET WORSE?

836

00:54:30,589 --> 00:54:31,589

WHAT HAPPENS?

837

00:54:31,589 --> 00:54:32,589

THANK YOU.

838

00:54:32,589 --> 00:54:33,809

>> I CAN TALK A LITTLE BIT ABOUT
IT.

839

00:54:33,809 --> 00:54:38,369

I AM NOT A PHYSIOLOGY AND ABLE
TO TALK ABOUT IT.

840

00:54:38,369 --> 00:54:42,789

AS FAR AS WHAT WE HAVE SEEN, IT
WAS KIND OF A RECENT DISCOVERY

841

00:54:42,789 --> 00:54:47,619

TO REALIZE THAT THE ASTRONAUTS
WERE HAVING VISION IMPAIRMENT AS

842

00:54:47,619 --> 00:54:48,619

THEY WHO IS FLYING?

843

00:54:48,619 --> 00:55:00,880

IT IS
MIDDLE AGED PEOPLE, BUT

844

00:55:00,880 --> 00:55:04,989

THAT IS WHAT HAPPENS, AND THE
PEOPLE WENT BACK AND DID A

845

00:55:04,989 --> 00:55:09,459

STUDY, AND REALIZED THAT THE
LONGER CREW MEMBERS, THERE WAS A

846

00:55:09,459 --> 00:55:15,009
HIGHER RATE OF VISUAL IMPAIRMENT
AND SOME OF IT WAS BLURRED AND

847
00:55:15,009 --> 00:55:17,140
SOME OF IT WAS SPOTS.

848
00:55:17,140 --> 00:55:20,309
I DON'T HAVE THE PERCENTAGES OF
THE SHORT DURATION, LIKE THE

849
00:55:20,309 --> 00:55:24,529
SHUTTLE, VERSES THE LONG.

850
00:55:24,529 --> 00:55:26,469
ARE WE ABLE TO TREAT IT YET?

851
00:55:26,469 --> 00:55:30,780
WHEN YOU SAW THE PICTURES, ONE
OF THE THINGS THAT THEY ARE

852
00:55:30,780 --> 00:55:34,680
DOING IS USING A RUSSIAN
FACILITY, AND IT IS BASICALLY A

853
00:55:34,680 --> 00:55:37,130
HARD, AND LOWER TORSO KIND OF
LIKE THE SPACE SUIT THAT WE HAVE

854
00:55:37,130 --> 00:55:39,619
OVER HERE WITH THE WASTE SEAL ON
IT.

855
00:55:39,619 --> 00:55:46,529
AND YOU CAN PULL A LOWER
PRESSURE ON THE LEGS AND THAT

856
00:55:46,529 --> 00:55:49,700
WILL PULL THE FLUID OUT OF THE
HEAD.

857

00:55:49,700 --> 00:55:55,199

THEY ARE MEASURING THE EYE, AND
THE EAR AND THE PRESSURE, AND SO

858

00:55:55,199 --> 00:56:00,029

THAT IS A POSSIBLE MITIGATION,
OR A POSSIBLE COUNTER MEASURE

859

00:56:00,029 --> 00:56:01,109

FOR IT.

860

00:56:01,109 --> 00:56:03,779

DO WE KNOW TO TREAT IT?

861

00:56:03,779 --> 00:56:18,630

I DON'T THINK THAT WE HAVE BEEN
THERE LONG ENOUGH.

862

00:56:18,630 --> 00:56:22,999

SOME THAT HAVE REMAINED IMPAIRED
AND BEFORE YOU ASK ME WHO THAT

863

00:56:22,999 --> 00:56:26,009

WAS, THAT WOULD BE A MEDICAL
CONDITION THAT WE WOULD NOT

864

00:56:26,009 --> 00:56:28,059

DEVLUGE IF I KNEW.

865

00:56:28,059 --> 00:56:32,660

>> ALL RIGHT, WE HAVE ANOTHER
QUESTION COMING IN FROM ON-LINE?

866

00:56:32,660 --> 00:56:38,220

>> YES THIS IS FROM JOHN LEWIS,
IN RELATION TO THE LIGHTING

867

00:56:38,220 --> 00:56:42,170

EFFECTS EXPERIMENT, HAVE WE
TAKEN ADVANTAGE OF INFORMATION,

868

00:56:42,170 --> 00:56:46,099
POTENTIALLY GAINED FROM THE
SUBMARINES IF YES, HOW, IF NO,

869

00:56:46,099 --> 00:56:47,359
WHY NOT?

870

00:56:47,359 --> 00:56:52,259
>> GEE, SO THE LIGHTING
EXPERIMENT IS THE HUMAN, WE ARE

871

00:56:52,259 --> 00:56:57,940
REPLACING THE FLUORESCENT
LIGHTS, AND THEY ARE

872

00:56:57,940 --> 00:57:02,180
CONTROLLABLE AND SO THEY ARE
CONTROLLABLE FROM THE FREQUENCY

873

00:57:02,180 --> 00:57:03,749
AND THE WAVE LENGTH OF THE
LIGHT.

874

00:57:03,749 --> 00:57:08,089
AS WELL AS THE INTENSITY, AND SO
THEY CAN BE DIALED UP AND DOWN

875

00:57:08,089 --> 00:57:13,319
AND IT HELPS WITH THE SHIFTING
AS YOU ARE GETTING TOWARD THE

876

00:57:13,319 --> 00:57:19,099
BED AND IT GETS A LITTLE MORE
RED, AND THE BLUE LIGHT KEEPS US

877

00:57:19,099 --> 00:57:22,700
UP, AS FAR AS SUBMARINE

APPLICATIONS I DON'T KNOW

878

00:57:22,700 --> 00:57:26,020

WHETHER WE HAVE STUDIED IT THERE
AND I CAN TELL YOU THAT WE HAVE

879

00:57:26,020 --> 00:57:29,440

RUN A LOT OF FLIGHT CONTROLLERS
AND MISSION CONTROL, AND

880

00:57:29,440 --> 00:57:32,079

IMAGINE, WORKING OVER NIGHT AND
YOU ARE TROO I GO TO SHIFT FROM

881

00:57:32,079 --> 00:57:36,140

YOUR DAYTIME AND YOU HAVE TO BE
ALERT AND AWAKE AND READY TO GO

882

00:57:36,140 --> 00:57:39,650

AT AN EMERGENCY'S NOTICE AND SO
THEY ARE USING THE LIGHTS URGED

883

00:57:39,650 --> 00:57:41,770

THE CONSUL AND SO THERE IS
COMPARISON OF THE FLIGHT

884

00:57:41,770 --> 00:57:42,770

CONTROLLERS.

885

00:57:42,770 --> 00:57:44,449

>> ALL RIGHT.

886

00:57:44,449 --> 00:57:46,750

WE HAVE A COUPLE OVER HERE.

887

00:57:46,750 --> 00:57:51,049

OVER HERE FIRST.

888

00:57:51,049 --> 00:57:52,049

>> TALKING SPACE.

889

00:57:52,049 --> 00:57:54,749

AND ARE THERE ANY OTHER STUDENT
EXPERIMENTS THAT ARE FLYING UP

890

00:57:54,749 --> 00:57:57,420

ON THIS PARTICULAR SIGNAS THAT
YOU WOULD WANT TO HIGHLIGHT AND

891

00:57:57,420 --> 00:58:01,379

IS THERE IS A LIST OF THOSE
ON-LINE.

892

00:58:01,379 --> 00:58:03,180

>> I DON'T KNOW OFF OF THE TOP
OF MY HEAD OF THE STUDENT

893

00:58:03,180 --> 00:58:08,979

EXPERIMENTS BUT WE CAN GET THAT
LIST FOR YOU.

894

00:58:08,979 --> 00:58:14,289

>> JASON, SPACE FLIGHT, INSIDER,
AND THIS IS FROM DR.

895

00:58:14,289 --> 00:58:15,289

WARREN.

896

00:58:15,289 --> 00:58:17,921

THE PRESIDENT HAS COME OUT AND
REITERATE HIS PLANS TO SEND THE

897

00:58:17,921 --> 00:58:19,859

CREWS TO MARS IN THE 2030S.

898

00:58:19,859 --> 00:58:24,640

CAN YOU TALK ABOUT HOW THEY ARE
WORKING TO GEAR THE EXPERIMENTS

899

00:58:24,640 --> 00:58:27,799

THAT ARE CONDUCTED ON THE ISS
TOWARD, SENDING CREWS TO THE RED

900

00:58:27,799 --> 00:58:28,799

PLANET?

901

00:58:28,799 --> 00:58:29,799

THANK YOU.

902

00:58:29,799 --> 00:58:34,490

>> MUCH OF THE MANDATE OF THE
ISS NATIONAL LAB, IS TO BENEFIT

903

00:58:34,490 --> 00:58:38,299

LIFE BACK HERE ON EARTH, AND
MUCH OF NASA RESEARCH IS REALLY

904

00:58:38,299 --> 00:58:42,750

TARGETED TOWARD LONGER DURATION
EXPLORATION MISSIONS AND SO AS

905

00:58:42,750 --> 00:58:46,950

FAR AS I AM AWARE, MOST OF OUR
RESEARCH COMPLIMENT IS BASED ON

906

00:58:46,950 --> 00:58:52,990

REALLY EARTH WARD FACING BENEFIT
AND SO OFF THE TOP OF MY HEAD I

907

00:58:52,990 --> 00:59:04,119

AM NOT ABLE TO THINK OF THE
RESEARCH THAT IS HAPPENING.

908

00:59:04,119 --> 00:59:08,940

>> THE NATIONAL LAB FOCUSES ON
EARTH, AND IT BENEFITS TD PEOPLE

909

00:59:08,940 --> 00:59:12,690

ON EARTH AND GIVING THEM ACCESS,
WHEREAS THE NASA KEEPS THE

910

00:59:12,690 --> 00:59:16,719

EXPLORATION LOOKING AND THE
EXPLORATION RESEARCH AND FOR

911

00:59:16,719 --> 00:59:20,499

EXAMPLE, ALL OF THE TECHNOLOGY
AND DEMONSTRATION THAT JITENDRA

912

00:59:20,499 --> 00:59:21,499

JOSHI WAS TALKING ABOUT.

913

00:59:21,499 --> 00:59:30,819

AND ALSO, THE NASA KEEPS THE
LEAD FOR USING THE STATION FOR

914

00:59:30,819 --> 00:59:35,889

OUR JOURNEY TO MARS FOR THE
EXPLORATION.

915

00:59:35,889 --> 00:59:43,289

>> WELL, FOR EXAMPLE, SENDING
HUMANS BEYOND THE LOWER EARTH

916

00:59:43,289 --> 00:59:45,779

ORBIT, WE KNOW THAT THERE ARE A
LOT OF RISKS TO THE HUMAN BODY

917

00:59:45,779 --> 00:59:50,430

AND WE HAVE A LIST OF 20 OF THEM
OR SO.

918

00:59:50,430 --> 00:59:53,499

FROM VISUAL IMPAIRMENT AND
IMMUNE SYSTEM AND BONE LOSS, AND

919

00:59:53,499 --> 00:59:59,569

CARDIAC AND PULMONARY WHAT IS

THE RISK?

920

00:59:59,569 --> 01:00:01,079

AND WHAT DO WE KNOW ABOUT IT?

921

01:00:01,079 --> 01:00:04,200

AND CAN WE CONTROL IT OR
MITIGATE IT AND AND THERE IS A

922

01:00:04,200 --> 01:00:07,570

STOPLIGHT CHART OF IT IS RED
UNTIL WE GET A NUMBER OF

923

01:00:07,570 --> 01:00:10,180

SUBJECTS THROUGH THE EXPERIMENT
AND THEN IT IS YELLOW BECAUSE WE

924

01:00:10,180 --> 01:00:13,479

UNDERSTAND WHAT THE RISK IS.

925

01:00:13,479 --> 01:00:16,059

AND THEN ONCE WE KNOW HOW WE ARE
GOING TO TREAT IT IS THE

926

01:00:16,059 --> 01:00:18,350

ADVANCED MEDICAL TECHNOLOGY, AND
THE MEASUREMENT TECHNOLOGY AND

927

01:00:18,350 --> 01:00:20,999

IS IT SCREENING THE CREW
MEMBERS?

928

01:00:20,999 --> 01:00:22,630

IS IT EXTRA, EXERCISE?

929

01:00:22,630 --> 01:00:26,380

AND AT THIS POINT, AFTER A
CERTAIN AMOUNT OF SUBJECT IN

930

01:00:26,380 --> 01:00:28,930
TIME, WE CAN TURN IT TOWARD
GREEN AND MAYBE BLUE WHETHER IT

931
01:00:28,930 --> 01:00:32,190
IS TOTALLY MITIGATED AND THAT
RELIES ON HOW MANY CREW MEMBERS

932
01:00:32,190 --> 01:00:36,849
DO WE HAVE IN THE STATION, RIGHT
NOW, EVERYBODY IS PRETTY MUCH

933
01:00:36,849 --> 01:00:40,490
AGREED THROUGH 2024, AND THE
EUROPEANS ARE DOING THEIR LAST

934
01:00:40,490 --> 01:00:44,069
MEETING THIS, AT THE END OF THIS
YEAR, AND WE ADVOCATE THE

935
01:00:44,069 --> 01:00:48,959
ABILITY TO EXTEND THE ISS 2028
AND BEYOND, WHICH WILL HELP US

936
01:00:48,959 --> 01:00:51,630
YOU KNOW, ANYTHING THAT WE ARE
FORGETTING RIGHT NOW, WILL STILL

937
01:00:51,630 --> 01:00:55,579
HAVE A FEW MORE YEARS OF ISS TO
LOOK FORWARD TO THE EXPLORATION.

938
01:00:55,579 --> 01:00:59,339
>> AND WE HAVE GOT ANOTHER
QUESTION THAT CAME IN ON-LINE.

939
01:00:59,339 --> 01:01:06,099
SO, THE QUESTION FROM IRENE,
ASKING, IN LIGHT OF THIS SPACE X

940

01:01:06,099 --> 01:01:09,709
ACCIDENT, IS THERE ANY CARGO
THAT YOU SWAPPED OUT OR PAYLOADS

941
01:01:09,709 --> 01:01:13,499
THAT YOU SWAPPED OUT OR ADDED TO
THE MISSION AS A RESULT OF THAT?

942
01:01:13,499 --> 01:01:19,759
>> I KNOW THAT WE DID A THOROUGH
REVIEW OF WHAT WAS PLANNED FOR

943
01:01:19,759 --> 01:01:21,240
THE NEXT SPACE X MISSION.

944
01:01:21,240 --> 01:01:24,539
WE HAVE NOT, WE ARE WAITING FOR
THE SPACE X TO FIGURE OUT WHAT

945
01:01:24,539 --> 01:01:27,640
IT WAS AND TO CONFIRM WHEN THEY
CAN LAUNCH AND SO I KNOW THAT

946
01:01:27,640 --> 01:01:32,700
THERE WAS CARGO THAT WAS SHIFTED
TO OA FIVE AND I DON'T HAVE THAT

947
01:01:32,700 --> 01:01:34,959
LIST OFF OF THE TOP OF MY HEAD
BUT THAT IS SOMETHING THAT WE

948
01:01:34,959 --> 01:01:35,959
CAN DIG UP.

949
01:01:35,959 --> 01:01:39,400
>> AND SO IREEN THAT IS ALSO
SOMETHING THAT WE CAN TALK ABOUT

950
01:01:39,400 --> 01:01:44,929
IN THE 6:00 P.M., NEWS

CONFERENCE, AS WELL.

951

01:01:44,929 --> 01:01:47,040

>> ARE THERE ANY OTHER QUESTIONS
HERE IN THE ROOM?

952

01:01:47,040 --> 01:01:49,430

ALL RIGHT,
>> NOBODY IS GOING TO ASK THE

953

01:01:49,430 --> 01:01:52,269

FIFTH GRADER QUESTION?

954

01:01:52,269 --> 01:01:54,359

>> ACTUALLY COULD I TAKE A SHOT
AT THAT ONE.

955

01:01:54,359 --> 01:01:56,730

>> THE QUESTION ABOUT,
EXPLAINING TO A MIDDLE SCHOOL

956

01:01:56,730 --> 01:02:00,890

STUDENT ABOUT WHY WOULD WE WANT
TO RESEARCH THIS COOL FLAMES?

957

01:02:00,890 --> 01:02:04,410

THE THING THAT WE LIKE TO SAY IS
THAT RESEARCH IS DONE FOR

958

01:02:04,410 --> 01:02:06,940

DIFFERENT REASONS, SOMETIMES IT
IS TO LEARN THE BENEFITS TO

959

01:02:06,940 --> 01:02:10,579

BENEFIT US ON EARTH AND
SOMETIMES IT IS TO LEARN THE

960

01:02:10,579 --> 01:02:13,759

PHYSICAL PROCESSES TO IMPROVE
WHAT YOU ARE DOING, AND LET'S

961

01:02:13,759 --> 01:02:18,530

SAY THAT IT IS YOU ARE GROWING
CRYSTALS OR YOU ARE GROWING, OR

962

01:02:18,530 --> 01:02:21,470

SOLIDIFYING METALS AND SO YOU
WANT A BETTER PRODUCT AND YOU

963

01:02:21,470 --> 01:02:23,489

WHAT NT TO UNDERSTAND HOW THAT
WORKS.

964

01:02:23,489 --> 01:02:26,170

AND SOMETIMES WHEN YOU SH DOING
RESEARCH YOU JUST HAVE AN AH, HA

965

01:02:26,170 --> 01:02:37,149

MOMENT, AND YOU SEE SOMETHING
THAT YOU HAVE NEVER SEEN BEFORE.

966

01:02:37,149 --> 01:02:58,059

>> DO YOU THINK

967

01:02:58,059 --> 01:03:09,869

THAT
IT IS

968

01:03:09,869 --> 01:03:26,469

POSSIBLE TO MAIN
TAKE

969

01:03:26,469 --> 01:03:57,439

GRAVITY
THAT

970

01:03:57,439 --> 01:04:00,329

WILL ALLOW FOR HUMAN
BEINGS, NOT TO SUFFER ANY

971

01:04:00,329 --> 01:04:05,139

AILMENTS AND HOW SOON DO YOU
THINK THAT THAT IS DOABLE?

972

01:04:05,139 --> 01:04:06,139

>> WOW.

973

01:04:06,139 --> 01:04:10,359

SO, IT IS PHYSICALLY POSSIBLE TO
MAINTAIN GRAVITY.

974

01:04:10,359 --> 01:04:12,349

IF YOU REMEMBER THE MOVIE, 2001.

975

01:04:12,349 --> 01:04:15,690

YOU HAVE A BIG ROTATING SPACE
STATION, AND SO THAT IS STILL

976

01:04:15,690 --> 01:04:19,829

ONE OF THE THINGS THAT PEOPLE
ARE ASSESSING OF WHEN WE GO TO

977

01:04:19,829 --> 01:04:25,210

MARS OR GO TO ANOTHER PLANET,
COULD WE LAUNCH ALL OF THAT BIG

978

01:04:25,210 --> 01:04:28,309

MECHANISM, IT IS GOING TO BE
HEAVY IF WE CHOOSE TO DO THAT.

979

01:04:28,309 --> 01:04:31,612

YES, YOU CAN ROTATE SOMETHING
AND I THINK THAT THEY ARE

980

01:04:31,612 --> 01:04:34,900

LOOKING AT SMALLER VERSIONS OF
WHAT THEY CALL THE CENTRIFUGE TO

981

01:04:34,900 --> 01:04:39,160

PUT IN THE LEVEL OF GRAVITY, AND
MAYBE IT IS NOT A FULL 1 G LIKE

982

01:04:39,160 --> 01:04:42,369
HERE ON EARTH AND MAYBE IT IS A
PARTIAL GRAVITY, AND I AM GLAD

983

01:04:42,369 --> 01:04:45,430
THAT YOU MENTIONED THE TWIN
STUDY AS WELL.

984

01:04:45,430 --> 01:04:49,740
I DID WANT TO SAY THAT MARK AND
SCOTT, AND ALSO, MCHAIL AND

985

01:04:49,740 --> 01:04:53,060
SCOTT, THE TWO ONE YEAR CREW
MEMBERS, ALL OF THE DATA IS IN,

986

01:04:53,060 --> 01:04:56,240
AND WE HAVE ALL OF THE DATA BACK
AND THE SCIENTISTS ARE ANALYZING

987

01:04:56,240 --> 01:05:00,199
THE DATA AND THEY WILL BE
PUBLISHING AND ANNOUNCING WHAT

988

01:05:00,199 --> 01:05:04,719
THEY ARE ABLE TO ANNOUNCE AT THE
HUMAN RESEARCH PROGRAMS

989

01:05:04,719 --> 01:05:09,440
INVESTIGATOR WORKSHOP, AND IT IS
IN TEXAS IN THE END OF JANUARY.

990

01:05:09,440 --> 01:05:12,009
AND WHEN YOU ARE STUDYING, TWO
PEOPLE LIKE THAT AND WHAT WE

991

01:05:12,009 --> 01:05:15,499

CALL AN INN, OR A NUMBER OF
SUBLTS OR YOU CANNOT REALLY

992

01:05:15,499 --> 01:05:18,460

REVEAL A LOT ABOUT WHAT HAPPENED
TO THEM.

993

01:05:18,460 --> 01:05:21,700

BUT PART OF THE REASON OF DOING
A ONE-YEAR, MISSION LIKE THAT IS

994

01:05:21,700 --> 01:05:25,329

THAT MOST OF THE BASE LINE IS
WITH THE 6 MONTH CREW MEMBERS,

995

01:05:25,329 --> 01:05:29,019

AND DID ANYTHING STICK OUT THAT
HAPPENED TO SCOTT OR MCHAIL

996

01:05:29,019 --> 01:05:31,170

AFTER THAT SIX MONTH POINT?

997

01:05:31,170 --> 01:05:33,709

AND WHILE WE MAY NOT BE ABLE TO
SAY MUCH ABOUT THAT, OR SAY THAT

998

01:05:33,709 --> 01:05:36,529

THAT IS GOING TO HAPPEN TO
EVERYBODY, THAT IS A GOOD

999

01:05:36,529 --> 01:05:39,350

INDICATOR, HEY, WITH HE NEED TO
PUT MORE FOCUS ON THAT SO THAT

1000

01:05:39,350 --> 01:05:41,969

WE KNOW ABOUT IT WHEN WE CHOOSE
TO GO TO MARS.

1001

01:05:41,969 --> 01:05:43,890

>> THANK YOU, PETE.

1002

01:05:43,890 --> 01:05:44,890

AND THANK YOU, DR.

1003

01:05:44,890 --> 01:05:46,789

WARREN, THAT

IS ALL OF THE TIME THAT WE HAVE

1004

01:05:46,789 --> 01:05:48,499

NOW FOR QUESTIONS.

1005

01:05:48,499 --> 01:05:52,039

WE WILL BROADCAST THE FREE

LAUNCH NEWS CONFERENCE, AND

1006

01:05:52,039 --> 01:05:53,140

TARGETING FOR 6:00 P.M.

1007

01:05:53,140 --> 01:05:54,910

THIS

EVENING AND YOU WILL HEAR MORE

1008

01:05:54,910 --> 01:05:58,689

ABOUT THE MISSION LAUNCH

OPERATIONS AND BE SURE TO TUNE

1009

01:05:58,689 --> 01:06:01,749

IN TOMORROW NIGHT FOR A LIVE

LAUNCH COVERAGE BEGINNING AT

1010

01:06:01,749 --> 01:06:06,019

7:00 P.M., AND YOU CAN VISIT

NASA.GOV, FOR MORE INFORMATION

1011

01:06:06,019 --> 01:06:09,349

ABOUT THIS LAUNCH AND YOU CAN

FOLLOW ALONG WITH THE

1012

01:06:09,349 --> 01:06:11,930

RESEARCHERS AND THE STUDIES IN
ORBIT, BY VISITING