1
00:00:03,629 --> 00:00:10,950
WE WILL HIGHLIGHT THE COOL
SCIENCE WE ARE SENDING TO THE

2
00:00:10,950 --> 00:00:16,369
INTERNATIONAL SPACE STATION.
OUR NEXT DELIVERY WILL BE CARGO

3
00:00:16,369 --> 00:00:18,510
RESUPPLY MISSION TO THE SPACE
STATION.

4
00:00:18,510 --> 00:00:24,769
A DRAGON THAT WILL LAUNCH A
ROCKET HAS BEEN LOADED WITH

5
00:00:24,769 --> 00:00:30,499
7,000 POUNDS SUPPLIES FOR THE
CREW ON BOARD THE ORBITING

6
00:00:30,499 --> 00:00:33,380
LABORATORY.
THE TARGET LAUNCH DATE FOR THE

7
00:00:33,380 --> 00:00:38,930
MISSION IS FRIDAY, APRIL 8th AT
4:43 P.M. EASTERN AT CAPE

8
00:00:38,930 --> 00:00:42,220
CANAVERAL IN FLORIDA.
NASA TELEVISION COVERAGE BEGINS

9
00:00:42,220 --> 00:00:45,790
AT 3:30 P.M.
WE HAVE A FANTASTIC LINEUP OF

10
00:00:45,790 --> 00:00:49,110
SPEAKERS FOR YOU ALL.
WE WILL DISCUSS A STUDENT DESIGN

11
00:00:49,110 --> 00:00:53,800
DNA INVESTIGATION, DEMONSTRATION
OF AN EXPANDIBLE HABITAT AND

12
00:00:53,800 --> 00:00:59,310
OTHER RESEARCH THAT WILL EXPLORE
NASA'S JOURNEY TO MARS.

13
00:00:59,310 --> 00:01:02,030
AFTER EACH SPEAKER WE WILL HAVE
AN OPPORTUNITY FOR QUESTION AND

14
00:01:02,030 --> 00:01:03,760
ANSWER.
WE WILL START WITH QUESTIONS IN

15
00:01:03,760 --> 00:01:05,150
THE ROOM.
IF YOU HAVE A QUESTION, RAISE

16
00:01:05,150 --> 00:01:07,560
YOUR HAND.
IF YOU ARE ON THE PHONE LINE

17
00:01:07,560 --> 00:01:12,700
PRESS STAR 1 TO ENTER THE QUEUE
AND IF YOU ARE WATCHING ON LINE,

18
00:01:12,700 --> 00:01:19,170
USE THE HASH TAG ASK NASA.
NOW, OUR FIRST GUEST IS JOY

19
00:01:19,170 --> 00:01:24,720
AMASA, A SCIENCE TEAM LEAD RIGHT
HERE AT KENNEDY SPACE CENTER IN

20
00:01:24,720 --> 00:01:27,299
FLORIDA.
EXPLAIN TO US HOW GROWING

21
00:01:27,299 --> 00:01:30,539
VEGETABLES ON BOARD THE SPACE
STATION WILL FURTHER OUR

22
00:01:30,539 --> 00:01:47,689
EXPLORATION GOALS.
>> WE ARE GOING TO BE TESTING A

23
00:01:47,689 --> 00:01:52,020
NEW CROP IN THE VEGGIE HARDWARE
THAT WILL BE A SMALL CHINESE

24
00:01:52,020 --> 00:01:57,810
CABBAGE.
THIS ALONG WITH THE OTHER VEGGIE

25
00:01:57,810 --> 00:02:01,670
TESTING GIVES US A LOT MORE
INFORMATION ON HOW WE CAN GROW

26
00:02:01,670 --> 00:02:05,899
CROPS TO PROVIDE SUPPLEMENTAL
NUTRITION TO THE ASTRONAUTS.

27
00:02:05,899 --> 00:02:13,510
AS WE START TO DO REGULAR SALAD
CROPS IN THE NEAR FUTURE AND

28
00:02:13,510 --> 00:02:17,750
POSSIBLY EVEN MORE TYPES OF FOOD
AS WE GO TOWARDS OUR JOURNEY TO

29
00:02:17,750 --> 00:02:21,360
MARS.
OUR CHINESE CABBAGE VARIETY WAS

30
00:02:21,360 --> 00:02:28,311
SELECTED BECAUSE WE DID TESTS OF
A NUMBER OF LEAFY LOOKING AT HOW

31
00:02:28,311 --> 00:02:36,020
THEY GROW, NUTRIENT CONTENT AND
TASTE COMPONENTS.

32
00:02:36,020 --> 00:02:40,350
WE GREW THEM AND SENT THEM TO
JOHNSON SPACE CENTER WHERE THEY

33
00:02:40,350 --> 00:02:44,430
DID TASTE TEST EVALUATIONS.
THIS WAS BOTH THE BEST GROWING

34
00:02:44,430 --> 00:02:51,060
AND THE MOST HIGHLY ACCEPTABLE
FLAVOR OF ALL THE CROPS TESTED.

35
00:02:51,060 --> 00:02:55,300
WE CHOSE TO SEND THIS VARIETY
WITH THIS MISSION AS WELL AS

36
00:02:55,300 --> 00:02:59,300
ADDITIONAL SEEDS OF THE RED
ROMAINE LETTUCE.

37
00:02:59,300 --> 00:03:04,300
THIS TIME WE WILL BE TESTING
AUTONOMOUS GARDENING, HAVING THE

38
00:03:04,300 --> 00:03:09,330
CREW GARDEN IN RESPONSE TO THE
PLANT'S GROWTH WITHOUT SPECIFIC

39
00:03:09,330 --> 00:03:13,350
DIRECTIONS FROM THE GROUND TEAM
EVERY STEP OF THE WAY.

40
00:03:13,350 --> 00:03:17,670
WE WILL SEE HOW THE VEGGIE
SYSTEM WORKS WITH THIS NEW

41
00:03:17,670 --> 00:03:20,210
APPROACH.
SO WE WILL SHOW YOU A FEW PHOTOS

42
00:03:20,210 --> 00:03:23,780
OF THE PROCESSING AND
PREPARATION OF WHAT WE CALL THE

43
00:03:23,780 --> 00:03:26,730
PLANT PILLOWS.
IF WE CAN HAVE THE FIRST PHOTO.

44
00:03:26,730 --> 00:03:31,240
THIS IS OUR VEGGIE TEAM.
WHAT WE ARE DOING IS WEIGHING OR

45
00:03:31,240 --> 00:03:36,650
MEASURING OUT THE SUBSTRAIGHT
THAT GOES IN A BAKED CERAMIC

46
00:03:36,650 --> 00:03:41,390
CLAY AND HAS CONTROLLED RELEASE
FERTILIZER MIXED IN.

47
00:03:41,390 --> 00:03:45,860
AS WE GO TO THE SECOND PHOTO,
YOU WILL SEE TESTING OF THE

48
00:03:45,860 --> 00:03:52,210
PLANT PILLOW MAKING SURE AIR
PENETRATES THE TUBING IN THERE

49
00:03:52,210 --> 00:03:55,540
AND WE WANT TO MAKE SURE IT'S
PERFORMING FLAWLESSLY AND WE GO

50
00:03:55,540 --> 00:03:59,650
TO THE THIRD PHOTO AND YOU CAN
SEE THE FILLING.

51
00:03:59,650 --> 00:04:04,980
WE INSERT THE PRECISELY MEASURED
VOLUMES OF MEDIA INTO THE PLANT

52
00:04:04,980 --> 00:04:09,590
PILLOWS.
WE HAVE THE SPACE GROW BAG.

53
00:04:09,590 --> 00:04:13,750
THEY INTERFACE WITH THE VEGGIE
HARDWARE ON SPACE STATION AND

54
00:04:13,750 --> 00:04:16,769
EVERYTHING IS SENT UP DRY AND
THE ASTRONAUTS ADD WATER WHEN

55
00:04:16,769 --> 00:04:20,049
THEY GET THERE.
IF WE GO TO THE NEXT PHOTO, THE

56
00:04:20,049 --> 00:04:23,870
PILLOWS GET SEWN SHUT AND THIS
IS DONE IN THE LABORATORIES AT

57
00:04:23,870 --> 00:04:28,750
KENNEDY SPACE CENTER.
IT WILL SHOW YOU A CLOSE UP OF

58
00:04:28,750 --> 00:04:32,730
THAT SEWING PROCESS.
THEN THE NEXT THING THAT HAPPENS

59
00:04:32,730 --> 00:04:36,880
IS SHOWN IN THE NEXT PHOTO.
THIS IS OUR SEED PLANTING.

60
00:04:36,880 --> 00:04:40,460
WE HAVE THESE PICKS THAT
PENETRATE THROUGH THE MEDIA AND

61
00:04:40,460 --> 00:04:45,580
THIS ESTABLISHES A WATER COLUMN
AND THE SEEDS ARE INSERTED IN

62
00:04:45,580 --> 00:04:48,030
THE WICKS.
THESE ARE STERILIZED, SURFACE

63
00:04:48,030 --> 00:04:50,590
STERILIZED SEEDS.
EVERYTHING WE SEND UP IS CLEAN.

64
00:04:50,590 --> 00:04:57,930
THESE ARE ALL DONE UNDER CLEAN
CONDITIONS.

65
00:04:57,930 --> 00:05:01,210
YOU CAN SEE HERE A SHOT OF SEEDS
BEING INSERTED AND THEY ARE

66
00:05:01,210 --> 00:05:06,419
GLUED IN WITH A WEAK GLUE TO
KEEP THEM IN PLACE FOR LAUNCH

67
00:05:06,419 --> 00:05:10,580
AND WHEN THEY ADD WATER, THE
SEEDS WILL HYDRATE.

68
00:05:10,580 --> 00:05:13,470
I THINK WE HAVE ONE MORE PHOTO
OF PILLOW PREPARATION.

69
00:05:13,470 --> 00:05:17,700
YOU CAN SEE THE PILLOWS ARE
SEALED UP IN GAS AND PERMEABLE

70
00:05:17,700 --> 00:05:20,870
BAGS.
WE ARE NOT ENTIRELY SURE WHEN

71
00:05:20,870 --> 00:05:25,639
THE PLANTS WILL BE GROWN.
SOME OF THEM MAY BE GROWN

72
00:05:25,639 --> 00:05:29,350
SEVERAL MONTHS FROM NOW.
WE WANT THEM TO BE JUST AS FRESH

73
00:05:29,350 --> 00:05:32,980
AS THE DAY WE PACKED THEM.
WE SEAL THEM UP.

74
00:05:32,980 --> 00:05:37,160
THIS PHOTO WAS GOING ON THIS
WEEK AND IN THE MIDST OF

75
00:05:37,160 --> 00:05:41,620
PREPARATION FOR PLANTING FOR
THIS FLIGHT, I HAD THE

76
00:05:41,620 --> 00:05:44,250
OPPORTUNITY TO REPRESENT THE
VEGGIE TEAM IN THE FIRST LADY'S

77
00:05:44,250 --> 00:05:50,720
GARDEN WHERE WE ARE SENDING UP
ON THIS MISSION.

78
00:05:50,720 --> 00:05:54,650
YOU CAN SEE IN THE FLOOR GROUND,
THE ROMAINE LETTUCE AND JUST

79
00:05:54,650 --> 00:05:58,490
BEHIND IT, THE CHINESE CABBAGE.
THOSE ARE GROWING IN THE WHITE

80
00:05:58,490 --> 00:06:02,840
HOUSE KITCHEN GARDEN WHERE THE
WHITE HOUSE WILL BE EATING THE

81
00:06:02,840 --> 00:06:07,770
SAME PLANTS AS THE SPACE STATION
WILL GET TO USE.

82
00:06:07,770 --> 00:06:18,470
THAT'S VEG 03 IN A NUT SHELL.
>> CAN YOU TELL ME, LOOKING AT

83
00:06:18,470 --> 00:06:24,591
THE FUTURE IN SPACE, CHINESE
CABBAGE AT THE PRESENT TIME, IF

84
00:06:24,591 --> 00:06:29,310
YOU LOOK AT ASTRONAUTS AND LET'S
SAY CARBOHYDRATES, TRYING TO GET

85
00:06:29,310 --> 00:06:33,620
THE MOST VALUE OUT OF THE
VEGETABLE IN TERMS OF THE MOST

86
00:06:33,620 --> 00:06:39,550
IT CAN PRODUCE AND THE AMOUNTS,
ARE YOU LOOKING AT POTATOES,

87
00:06:39,550 --> 00:06:43,121
OTHER TYPES OF CROPS THAT ARE
GOING TO PRODUCE MORE IN THE WAY

88
00:06:43,121 --> 00:06:47,669
OF CARBOHYDRATES AND ALSO WOULD
WE BE LOOKING AT THE FUTURE

89
00:06:47,669 --> 00:06:54,919
WHERE BEFORE MARS WOULD BE
LANDED ON THAT YOU COULD BE

90
00:06:54,919 --> 00:06:58,790
LOOKING AT A GREEN HOUSE
OPERATION TESTED ON THE SURFACE

91
00:06:58,790 --> 00:07:04,169
OF THE MOON AND IF SO, LOOKING
AT THE VALUES OF THE SUN IN

92
00:07:04,169 --> 00:07:08,430
TERMS OF WHAT IT WOULD DO WITH
SOLARLY GROWING THE VEGETABLES?

93
00:07:08,430 --> 00:07:12,241
>> THOSE ARE GREAT QUESTIONS.
FOR THE FIRST QUESTION, RIGHT

94
00:07:12,241 --> 00:07:15,800
NOW THERE IS NO WAY TO COOK
ANYTHING ON SPACE STATION.

95
00:07:15,800 --> 00:07:18,530
THEY DON'T HAVE A MICROWAVE.
THEY HAVE HOT WATER AND THAT'S

96
00:07:18,530 --> 00:07:20,520
IT.
FOR SPACE STATION, WE ARE

97
00:07:20,520 --> 00:07:24,330
LOOKING AT SUPPLEMENTAL SALADS
THAT GO ALONG WITH THE PACKAGED

98
00:07:24,330 --> 00:07:27,480
DIET.
WE HAVE DONE A LOT OF WORK OVER

99
00:07:27,480 --> 00:07:29,350
THE YEARS HERE AT KENNEDY SPACE
CENTER.

100
00:07:29,350 --> 00:07:33,720
MY COLLEAGUES HAVE BEEN DOING
THIS FOR AROUND THREE DECADES

101
00:07:33,720 --> 00:07:36,760
NOW.
MAYBE LONGER.

102
00:07:36,760 --> 00:07:41,970
INCLUDING STAPLE CROPS AND A LOT
OF POTATOES GROWN.

103
00:07:41,970 --> 00:07:45,050
THINGS LIKE PEANUTS AND SOY
BEANS AND WHEAT.

104
00:07:45,050 --> 00:07:48,949
A VARIETY OF CROPS HAVE BEEN
LOOKED AT FOR LONGER DURATION.

105
00:07:48,949 --> 00:07:57,169
YOU
NEED THINGS LIKE A MICROWAVE

106
00:07:57,169 --> 00:07:59,229
AND OVEN.
MAYBE A BREAD MORE THAN AND A

107
00:07:59,229 --> 00:08:02,520
FLOWER MILL.
TOFU PRESS.

108
00:08:02,520 --> 00:08:06,110
THAT WOULD BE PRETTY FAR DOWN
THE ROAD.

109
00:08:06,110 --> 00:08:09,770
WE ARE LOOKING AT THINGS THAT
CAN BE EATEN FRESH WITH MINIMAL

110
00:08:09,770 --> 00:08:23,169
PROCESSING AND CROUTONS.
IT'S DEFINITELY SOMETHING THAT

111
00:08:23,169 --> 00:08:25,670
IS IN OUR MINDS AND WE ARE
LOOKING AT THAT.

112
00:08:25,670 --> 00:08:29,660
WE ARE ALSO LOOKING AT SPECIFIC
NUTRIENTS TO HELP AUGMENT THE

113
00:08:29,660 --> 00:08:35,500
PACKAGED DIET.
THINGS TO GROW FRESH AND MAYBE

114
00:08:35,500 --> 00:08:45,790
VITAMIN LOW AND MAY LAST A
COUPLE OF YEARS AND YOU HAVE THE

115
00:08:45,790 --> 00:08:50,880
FRESH PRODUCE TO SEE THE DIET.
IN TERMS OF WHAT YOU CAN HAVE ON

116
00:08:50,880 --> 00:08:54,850
THE SURFACE OF MARS WHEN YOU GET
THERE, YOU CAN DO A

117
00:08:54,850 --> 00:09:06,310
PREDEPLOYABLE GREEN HOUSE.
THE INCOMING SOLAR RADIATION IS

118
00:09:06,310 --> 00:09:08,750
A LOT LOWER THAN WHAT IT IS ON
EARTH.

119
00:09:08,750 --> 00:09:13,020
WITH THINGS LIKE DUST STORMS,
POTENTIALS FOR METEORITE IMPACT,

120
00:09:13,020 --> 00:09:16,420
I'M NOT SURE YOU WANT TO BE ON
THE SURFACE WITH THE TRANSPARENT

121
00:09:16,420 --> 00:09:20,100
GREEN HOUSE.
THERE IS DAMAGING UV RADIATION

122
00:09:20,100 --> 00:09:23,250
THAT DAMAGE A LOT OF TRANSPARENT
MATERIALS.

123
00:09:23,250 --> 00:09:27,120
I THINK IT'S MORE LIKELY IN THE
NEAR FUTURE YOU WOULD HAVE AN

124
00:09:27,120 --> 00:09:33,370
UNDERGROUND PROTECTED STRUCTURE
AND POSSIBLY USING LIGHT PIPING

125
00:09:33,370 --> 00:09:37,230
AND USE ELECTRIC LIGHTS LIKE WE
ARE USING ON SPACE STATION TO

126
00:09:37,230 --> 00:09:40,180
GROW THE PLANTS.
ALL OF THOSE ARE DEFINITE

127
00:09:40,180 --> 00:09:42,970
POSSIBILITIES.
>> THAT'S ALL INCREDIBLE WORK.

128
00:09:42,970 --> 00:09:48,600
DO WE HAVE MORE QUESTIONS IN THE
ROOM?

129
00:09:48,600 --> 00:09:55,950
WE HAVE TIME FOR ONE MORE.
>> IS THERE A DIFFERENCE BETWEEN

130
00:09:55,950 --> 00:10:07,090
THE WAY PLANTS GROW ON EARTH AND
HOW THEY GROW IN MICROGRAVITY.

131
00:10:07,090 --> 00:10:09,790
>> THAT'S AN EXCELLENT QUESTION
AS WELL.

132
00:10:09,790 --> 00:10:15,480
>> THERE A LOT OF INCREDIBLE
RESEARCH TO UNTANGLE AND FIND

133
00:10:15,480 --> 00:10:19,779
OUT WHAT THE DIFFERENCES ARE.
FROM A LARGE PLANT PERSPECTIVE

134
00:10:19,779 --> 00:10:23,520
FOR CROP PLANTS, THE MAIN
DIFFERENCE WE HAVE SEEN IS

135
00:10:23,520 --> 00:10:28,430
DEPENDENT ON THE ENVIRONMENT AND
THE BEHAVIOR OF WATER AND AIR.

136
00:10:28,430 --> 00:10:32,230
FLUIDS AND WATER AND AIR DON'T
MIX WELL.

137
00:10:32,230 --> 00:10:37,200
WATERING YOUR PLANTS IS TRICKY.
IF YOU CAN GET THE ENVIRONMENTAL

138
00:10:37,200 --> 00:10:42,660
CONTINUES SATISFACTORY, PLANTS
WILL GROW WELL.

139
00:10:42,660 --> 00:10:45,870
THEY DON'T HAVE GRAVITY AS A
SIGNAL, BUT THEY KEY IN ON OTHER

140
00:10:45,870 --> 00:10:48,230
THINGS.
THEY WILL GROW TOWARDS THE LAKE

141
00:10:48,230 --> 00:10:56,390
AND MAY GROW TOWARDS WATER AND
POCKETS OF NUTRIENTS AND AIR.

142
00:10:56,390 --> 00:11:06,050
THEY WILL DO OKAY, BUT A LOT OF
DIFFERENCE ARE GOING ON ON A

143
00:11:06,050 --> 00:11:09,470
SMALLER SCALE.
>> THANK YOU SO MUCH.

144
00:11:09,470 --> 00:11:13,730
>> THANK YOU.
>> NEXT WE WILL HEAR FROM THE

145
00:11:13,730 --> 00:11:17,770
PINS PAL INVEST GATOR FROM
MICROBIAL OBSERVATORY ONE AS

146
00:11:17,770 --> 00:11:21,910
WELL AS THE COPRINCIPAL FROM
MICRO10 FROM NASA'S JET

147
00:11:21,910 --> 00:11:24,240
PROPULSION LAB.
YOUR EXPERIENCE WILL HELP US

148
00:11:24,240 --> 00:11:27,700
UNDERSTAND LONG DURATION BASE
FLIGHTS.

149
00:11:27,700 --> 00:11:31,160
CAN YOU PLEASE TELL US MORE
ABOUT THEM?

150
00:11:31,160 --> 00:11:39,050
>> THAT'S A GREAT WAY HOW THE
PLANTS ARE GROWING.

151
00:11:39,050 --> 00:11:43,290
WE HAVE TO COME UP WITH THE
APPROPRIATE CONTINUES FOR THE

152
00:11:43,290 --> 00:11:46,890
PEOPLE THAT LIVE IN THERE.
THEY ARE GOING TO BREATHE IN AND

153
00:11:46,890 --> 00:11:52,060
BREATHE OUT.
THE FIRST RADIO, PLEASE?

154
00:11:52,060 --> 00:12:01,180
THIS IS TO MONITOR THE MICROBES
FOR THE CLOSED SYSTEM.

155
00:12:01,180 --> 00:12:06,120
THAT DOESN'T MEAN THAT NASA HAS
NOT MAINTAINED THIS SO FAR.

156
00:12:06,120 --> 00:12:14,959
IN THE PAST 20 YEARS, WE DO
MONITOR THE CONTAMINATION, BUT

157
00:12:14,959 --> 00:12:19,520
WHAT WE HAVE DONE SO FAR IS THE
TRADITIONAL ANALYSIS THAT CAN

158
00:12:19,520 --> 00:12:25,959
COVER 1% TO 10%.
THEY ARE SAYING WE ARE IN DNA

159
00:12:25,959 --> 00:12:32,459
AND WE HAVE TO HAVE THE
TECHNOLOGY SO THAT YOU WILL BE

160
00:12:32,459 --> 00:12:39,560
ABLE TO COMPREHENSIVELY COME TO
KNOW WHAT IS THERE.

161
00:12:39,560 --> 00:12:52,160
IF YOU THINK ABOUT THE JOURNEY
TO MARS, IT'S NOT POSSIBLE.

162
00:12:52,160 --> 00:12:56,019
THIS IS THE FIRST TIME THAT
WE'RE COLLECTING SAMPLES

163
00:12:56,019 --> 00:13:02,921
UTILIZING THE TECHNOLOGY AND
THOSE THINGS ARE NOT YET TO BE

164
00:13:02,921 --> 00:13:07,680
PROCESSED IN THE STATION.
SOME OF THE OTHER TECHNOLOGY IS

165
00:13:07,680 --> 00:13:13,550
GOING TO BE SHOWN TO US AND IT
MAY BE HELPING US TO GO INTO

166
00:13:13,550 --> 00:13:21,660
SPACE, BUT RIGHT NOW WE ARE
BRINGING BACK WITH THE WHOLE

167
00:13:21,660 --> 00:13:24,990
TECHNOLOGIES.
TO GET A BASE LINE STORY, IT'S

168
00:13:24,990 --> 00:13:29,780
NOT ONLY ONE.
IT'S NOT LIKE THAT.

169
00:13:29,780 --> 00:13:35,180
WE HAVE TO MAINTAIN MULTIPLE
TIMES CLEAN AND CLEAN AND CLEAN.

170
00:13:35,180 --> 00:13:40,940
HOW THIS SURVIVES.
WE NEED TO HAVE THAT.

171
00:13:40,940 --> 00:13:47,370
WE HAVE A SERIES IN OUR PROJECT
AND THREE DIFFERENT TIME

172
00:13:47,370 --> 00:13:56,330
PERIODS.
TO SIX MONTHS.

173
00:13:56,330 --> 00:14:05,910
WE ARE COLLECTING.
THIS IS A THIRD SET OF SAMPLES.

174
00:14:05,910 --> 00:14:12,500
THE EXACT SAME PLACE.
WE TELL THEM TO CLAIM FOUR OR

175
00:14:12,500 --> 00:14:19,730
FIVE DAYS.
WE CAN GET AN IDEA OF WHAT YOU

176
00:14:19,730 --> 00:14:26,779
NEED TO KNOW.
YOU CAN SEE AND THAT MAY BE

177
00:14:26,779 --> 00:14:31,839
PROBLEMATIC FOR THE HEALTH.
YOU WILL BE ABLE TO GET INTO THE

178
00:14:31,839 --> 00:14:35,690
COUNTER MEASURE ELEMENT.
THAT WILL ENABLE FOR A LONG TIME

179
00:14:35,690 --> 00:14:40,750
JOURNEY TO MARS.
CAN YOU SHOW THE PHOTO, PLEASE?

180
00:14:40,750 --> 00:14:44,240
THIS IS AN EXAMPLE.
SO FAR I TOLD YOU SOME OF THOSE

181
00:14:44,240 --> 00:14:50,000
THINGS ARE NOT ONLY WHAT THE
ASTRONAUTS ARE BREATHING IN, YOU

182
00:14:50,000 --> 00:14:52,250
ARE ALL BREATHING IN GOOD AND
BAD.

183
00:14:52,250 --> 00:15:03,530
WE ARE GETTING THE SECOND ONE.
FOR THE FUTURE IN A COUNTER

184
00:15:03,530 --> 00:15:11,019
MEASURES, THEY ARE FLYING IN THE
SAME SPACE.

185
00:15:11,019 --> 00:15:20,110
WE ARE SENDING THEM AND THAT
EXHIBITS PRODUCTION OF THE

186
00:15:20,110 --> 00:15:29,470
MEDICINE FOR THE FUTURE.
WE DID NOT GET ANY WONDER DRUGS

187
00:15:29,470 --> 00:15:33,550
AFTER PENICILLIN YET.
WE MAY BE ABLE TO SEE WHETHER

188
00:15:33,550 --> 00:15:38,230
ANYTHING LIKE THAT IS UP THERE
AND WHETHER ANYTHING IS BEING

189
00:15:38,230 --> 00:15:44,980
PRODUCED.
SO FIRST WHICH IS MICROBIAL

190
00:15:44,980 --> 00:15:50,750
TRACKING NUMBER ONE.
WE ARE GETTING A BASE LINE AND

191
00:15:50,750 --> 00:15:58,139
IF WE HAVE ANYTHING THAT WE ARE
TAKING IT TO THE BENEFICIAL

192
00:15:58,139 --> 00:16:00,720
LEVEL.
THANK YOU VERY MUCH.

193
00:16:00,720 --> 00:16:04,910
>> WE WILL NOW GO TO QUESTIONS.
IF YOU ARE IN THE ROOM, I WILL

194
00:16:04,910 --> 00:16:08,290
BRING YOU A MICROPHONE.
IF YOU ARE ON THE PHONE, PRESS

195
00:16:08,290 --> 00:16:12,290
STAR 1 TO ENTER THE AND IF YOU
ARE FOLLOWING ONLINE, ENTER THE

196
00:16:12,290 --> 00:16:18,579
HASH TAG.
>> YES, SIR.

197
00:16:18,579 --> 00:16:22,860
VERY INTERESTING.
CAN YOU ME, MICROBIAL BACTERIA.

198
00:16:22,860 --> 00:16:28,649
WHEN ASTRONAUTS ARE LEAVING AND
GOING UP TO THE SPACE STATION,

199
00:16:28,649 --> 00:16:33,120
THE BACTERIAS THEY BRING, FLU
LIKE AND COLD LIKE, ET CETERA,

200
00:16:33,120 --> 00:16:38,430
DO THEY THRIVE IN ZERO GRAVITY
SPACE ATMOSPHERE OR DO THEY

201
00:16:38,430 --> 00:16:46,130
PERFORM NEGATIVELY IN COULD WE
BE LOOKING AT SUCH A THING AS A

202
00:16:46,130 --> 00:16:51,410
MARS ROVER SENT WITH THE
CAPABILITY OF CAPTURING

203
00:16:51,410 --> 00:17:01,270
MICROBIAL BACTERIA ON MARS?
>> I WILL ANSWER THE SECOND ONE

204
00:17:01,270 --> 00:17:03,110
FIRST.
THAT'S HOW I STARTED MY LIFE IN

205
00:17:03,110 --> 00:17:08,000
NASA.
WE ARE IN A GROUP THAT IS

206
00:17:08,000 --> 00:17:12,030
RESPONSIBLE TO TAKE A CLEAN
RECOVERIER TO THE SPACE TRAP AND

207
00:17:12,030 --> 00:17:17,540
NOT TO COMPROMISE THE SCIENCE.
WHILE YOU ARE LOOKING AT LIFE ON

208
00:17:17,540 --> 00:17:24,540
OTHER PLANETS, THEY HAVE SOME OF
THE BACTERIA YOU ARE WORKING

209
00:17:24,540 --> 00:17:27,209
WITH YOU.
THAT IS ONE OF THE BIGGEST

210
00:17:27,209 --> 00:17:32,910
CHALLENGES THAT WE HAVE IN MARS
TO MAKE SURE THAT THEY CLEAN THE

211
00:17:32,910 --> 00:17:40,830
SPACECRAFT TO THE LEVEL THAT
WILL NOT PROLIFERATE.

212
00:17:40,830 --> 00:17:45,650
WE ARE CLEANING IT.
THAT IS THE CONDITIONS WE ARE

213
00:17:45,650 --> 00:17:48,780
WORKING ON RIGHT NOW.
THAT IS A GOOD QUESTION.

214
00:17:48,780 --> 00:17:56,911
THE TECHNOLOGY IF YOU HAVE THAT,
WE ARE CAREFUL OF DETECTING IT

215
00:17:56,911 --> 00:18:03,610
NOW, BUT WE DO NOT KNOW WHETHER
THE IN MARS AND BEYOND IS DNA

216
00:18:03,610 --> 00:18:08,040
BASED.
THAT IS WHAT MARS 2020 WILL TAKE

217
00:18:08,040 --> 00:18:12,660
BACK TO US AFTER THE MARS 2020
MISSION.

218
00:18:12,660 --> 00:18:20,270
WE WILL COME TO KNOW WHETHER WE
HAVE CARBON BASED OR SOMETHING

219
00:18:20,270 --> 00:18:23,500
ELSE.
UNTIL THEN, WE DO NOT KNOW HOW

220
00:18:23,500 --> 00:18:28,860
WE WILL LOOK AT LIFE ON MARS.
THE FIRST QUESTION IS LIKE US,

221
00:18:28,860 --> 00:18:33,890
WE ARE ALL LIVING.
WE GATHER A LOT OF FACTORY AND

222
00:18:33,890 --> 00:18:37,970
WE ARE WALKING AND SHREDDING.
SWEATING AND ALL.

223
00:18:37,970 --> 00:18:41,020
WE ARE ACTUALLY SHARES THOSE
THINGS.

224
00:18:41,020 --> 00:18:54,110
THAT IS A PART OF LIFE.
WHAT I HAVE IN MYSELF IS NOT THE

225
00:18:54,110 --> 00:19:03,830
COWORKER.
THE PATIENTS MAY ACQUIRE

226
00:19:03,830 --> 00:19:08,110
SOMETHING.
UNLESS YOUR IMMUNITY IS BETTER.

227
00:19:08,110 --> 00:19:13,910
YOU TAKE YOUR BACTERIA WITH YOU.
YOU KNOW THE SYMPTOMS BEFORE YOU

228
00:19:13,910 --> 00:19:16,950
GO.
IF NOT, YOU DEFINITELY DO.

229
00:19:16,950 --> 00:19:27,790
THE OTHER WORK GOING ON IS HOW
TO REACTIVATE UNDER STRESS.

230
00:19:27,790 --> 00:19:32,450
BECAUSE OF THE STRESS, WHEN YOU
ARE IN THE MICROGRAVITY, THEY

231
00:19:32,450 --> 00:19:36,799
SHED MORE THAT ARE OTHERWISE
LATENT.

232
00:19:36,799 --> 00:19:41,120
I THINK I ANSWERED YOUR
QUESTION.

233
00:19:41,120 --> 00:19:43,550
>> THANK YOU.
WE HAVE A HANDFUL OF GUEST

234
00:19:43,550 --> 00:19:46,950
SPEAKERS FOR THE NEXT
PRESENTATION.

235
00:19:46,950 --> 00:19:48,910
LET'S TAKE A LOOK AT THE
RESEARCH FROM THE CENTER FOR

236
00:19:48,910 --> 00:19:56,140
ADVANCEMENT OF SCIENCE AND
SPACE.

237
00:19:56,140 --> 00:20:00,590
>> THIS WAS CREATED TO PROVIDE
ACCESS TO A WHOLE GROUP OF

238
00:20:00,590 --> 00:20:04,280
NON-TRADITIONAL SPACE USERS THAT
CAN USE A ONE-OF-A-KIND PLATFORM

239
00:20:04,280 --> 00:20:06,990
FOR RESEARCH AND TECHNOLOGY
DEVELOPMENT.

240
00:20:06,990 --> 00:20:10,929
THE TYPES OF PROJECTS THAT
LITERALLY YOU CAN'T DO ANYWHERE

241
00:20:10,929 --> 00:20:14,570
ELSE ON EARTH.
>> THAT IS WHAT IS SO EXCITING.

242
00:20:14,570 --> 00:20:18,080
>> THEY REACHED OUT TO ALL PARTS
OF THE ORGANIZATIONS.

243
00:20:18,080 --> 00:20:21,010
THROUGH THAT PROCESS, WE HAVE
MORE PROJECTS.

244
00:20:21,010 --> 00:20:27,910
>> KIND OF THE GUIDELINES FOR
THE INTERACTION FOR NASA WAS

245
00:20:27,910 --> 00:20:32,309
THAT WE WOULD NOT DO IT IF IT
WASN'T A VALUE TO THEM.

246
00:20:32,309 --> 00:20:34,780
WE COULD NOT SEE THE VALUE FOR
OURSELVES AND HAVE TO BE

247
00:20:34,780 --> 00:20:37,020
SOMETHING THAT IS A VALUE TO
MANKIND.

248
00:20:37,020 --> 00:20:40,580
>> IT'S ALL ABOUT CARING AND
PLUS DISCOVERY.

249
00:20:40,580 --> 00:20:43,049
WE WANTED TO MAKE SURE THAT
WHATEVER EXPERIMENTS WE CAME UP

250
00:20:43,049 --> 00:20:46,780
WITH COULD DO THAT.
THIS GAVE THE OPPORTUNITY TO DO

251
00:20:46,780 --> 00:20:51,530
IT IN SPACE.
>> THE PURPOSE OF THIS IS TO

252
00:20:51,530 --> 00:20:55,600
GROW MORE ORDERED CRYSTALS THAT
WE CAN STUDY BY BEING ABLE TO

253
00:20:55,600 --> 00:21:10,490
CRYSTALLIZE THAT.
>> LOOKING TO SEE HOW THE

254
00:21:10,490 --> 00:21:14,440
MUSCLES AND OTHER ORGANS AT
FEED.

255
00:21:14,440 --> 00:21:20,480
THAT WILL BE ALSO LOOKING AT
WAYS IN WHICH WE CAN POTENTIALLY

256
00:21:20,480 --> 00:21:28,789
PREVENT THAT FROM OCCURRING.
>>> PER IT'S A PROCESS THAT IS

257
00:21:28,789 --> 00:21:37,270
USED AND I PARTICULARLY USE IT
AS A TOOL AND HE COMES OUT MORE

258
00:21:37,270 --> 00:21:41,150
AS A DRUG PRODUCT.
>> IT'S TWO MAIN PARTS.

259
00:21:41,150 --> 00:21:45,370
THERE IS FREEZING FOLLOWED BY
DRYING AT LOW PRESSURE.

260
00:21:45,370 --> 00:21:50,419
WHICH PROCESS DOES HE PLAY A
LARGER ROLE IN?

261
00:21:50,419 --> 00:21:54,530
>> THAT'S THE CORE BUSINESS.
>> IF YOU THINK ABOUT TABLETS OR

262
00:21:54,530 --> 00:21:58,340
FUELS, THEY NEED TO DISSOLVE
THAT AS WELL.

263
00:21:58,340 --> 00:22:02,210
YOU DON'T WANT THEM TO TAKE
MULTIPLE HOURS TO DISSOLVE IF

264
00:22:02,210 --> 00:22:07,400
THERE IS SUPPOSED TO BE A QUICK
RELEASE.

265
00:22:07,400 --> 00:22:12,780
>> THIS IS A GREAT MATCH FOR THE
INTERNATIONAL SPACE STATION.

266
00:22:12,780 --> 00:22:17,690
>> THIS HAS BEEN A ROLLING BALL
OF ENTHUSIASM AND EXCITEMENT.

267
00:22:17,690 --> 00:22:24,210
>> A NUMBER OF INDIVIDUALS ARE
INVOLVED IN THAT AND ALL COMING

268
00:22:24,210 --> 00:22:31,400
TOGETHER TO MAKE THIS MISSION
REALLY WORK.

269
00:22:31,400 --> 00:22:38,760
IT IS PHENOMENAL.
>> DIRECTOR OF OPERATIONS WILL

270
00:22:38,760 --> 00:22:42,820
INTRODUCE THE ELI LILY AND
COMPANY TEAM AND EXPLAIN HOW IT

271
00:22:42,820 --> 00:22:45,539
WILL BENEFIT THOSE OF US ON
EARTH AS WELL AS OUR JOURNEY TO

272
00:22:45,539 --> 00:22:48,059
MARS.
>> THANK YOU, CHERYL.

273
00:22:48,059 --> 00:22:49,870
IT IS A PLEASURE TO BE HERE
TODAY.

274
00:22:49,870 --> 00:22:55,860
THIS MISSION, THIS SPACE MISSION
MARKS A SIGNIFICANT MILESTONE,

275
00:22:55,860 --> 00:23:00,299
THE RETURN OF THE DRAGON CAPSULE
GOING BACK TO THE SPACE STATION.

276
00:23:00,299 --> 00:23:05,380
IT'S A REAL WORK HORSE.
FOR US, THE CENTER FOR THE

277
00:23:05,380 --> 00:23:09,640
ADVANCEMENT OF SCIENCE AND SPACE
THAT OPERATES THE INTERNATIONAL

278
00:23:09,640 --> 00:23:13,620
SPACE STATIONS LABORATORY IS
REALLY A SIGNIFICANT EVENT.

279
00:23:13,620 --> 00:23:17,419
IT'S A PLEASURE TO BE HERE
SHARING WHAT ELI LILLY IS DOING

280
00:23:17,419 --> 00:23:21,640
AND THE DIVERSITY OF WHAT THE
PORTFOLIO AND THIS MANIFEST

281
00:23:21,640 --> 00:23:26,520
REPRESENTS.
WE HAVE PHYSICAL SCIENCES AND

282
00:23:26,520 --> 00:23:30,820
LIFE SCIENCES AND TECHNOLOGY
DEMONSTRATION AND FLUID DYNAMICS

283
00:23:30,820 --> 00:23:35,080
AND EVEN EDUCATIONAL OUTREACH.
IN ADDITION TO THE DIVERSITY OF

284
00:23:35,080 --> 00:23:38,620
THE SCIENCES AND THE SCIENCE
TYPES THAT WE ARE FLYING, THE

285
00:23:38,620 --> 00:23:41,330
ORGANIZATIONS THAT ARE FLYING
ARE EXTREMELY DIVERSE.

286
00:23:41,330 --> 00:23:44,990
YOU SAW A FANTASTIC VIDEO ABOUT
ELI LILY AND COMPANY.

287
00:23:44,990 --> 00:23:49,460
YOU WILL HEAR MORE ABOUT THAT IN
A SECOND.

288
00:23:49,460 --> 00:23:52,340
WE HAVE ACADEMIC ORGANIZATIONS
AND NONPROFITS.

289
00:23:52,340 --> 00:23:56,990
IT'S A WONDERFUL WAY FOR THE
NATIONAL LAP TO DEMONSTRATE THE

290
00:23:56,990 --> 00:24:00,910
UTILITY AND EFFECTIVENESS AND
POTENTIAL AS A PLATFORM OF

291
00:24:00,910 --> 00:24:05,890
INNOVATION FOR A WIDE ARRAY OF
INTEREST AND ORGANIZATIONS.

292
00:24:05,890 --> 00:24:09,020
PLEASE PAY CLOSE ATTENTION TO
WHAT WE ARE DOING AT THE LAB.

293
00:24:09,020 --> 00:24:12,679
YOU WILL SEE A LOT OF GOOD THAT
COMES OUT OF SCIENCE AND SPACE.

294
00:24:12,679 --> 00:24:17,120
IT'S MY PLEASURE TO INTRODUCE
THE TEAM HERE FROM ELI LILY.

295
00:24:17,120 --> 00:24:21,100
STARTING AT THE FAR END, WE HAVE
MIKE HICKY AND ALSO CHRISTOPHER

296
00:24:21,100 --> 00:24:25,600
GONZALES AND LAST BUT NOT LEAST
WILL BE SMITH.

297
00:24:25,600 --> 00:24:29,100
MIKE?
>> THANK YOU, KEN.

298
00:24:29,100 --> 00:24:33,371
ON BEHALF OF LILY, WE JUST WANT
TO THANK YOU FOR THE ABILITY TO

299
00:24:33,371 --> 00:24:38,950
BE ABLE TO COLLABORATE WITH YOU
ON THIS MISSION.

300
00:24:38,950 --> 00:24:41,570
IT'S KIND OF A DREAM COME TRUE
FOR A LOT OF SCIENTISTS TO BE

301
00:24:41,570 --> 00:24:47,760
ABLE TO BE A PART OF WHAT YOU
ARE ENABLING FOR US TO GET THE

302
00:24:47,760 --> 00:24:49,860
EXPERIMENTS UP LIKE THAT.
IT'S GREAT.

303
00:24:49,860 --> 00:24:54,679
IT GOES HAND IN HAND WITH THE
DISCOVERY AND THE SPIRIT THAT

304
00:24:54,679 --> 00:24:58,880
LILY HAD AND MADE IT THE
PHARMACEUTICAL COMPANY THAT IT

305
00:24:58,880 --> 00:25:01,920
IS TODAY.
I HAPPENED TO BE A SCIENTIST IN

306
00:25:01,920 --> 00:25:07,330
STRUCTURAL BIOLOGY.
I TYPICALLY FIND MYSELF WORKING

307
00:25:07,330 --> 00:25:10,020
ON PROJECTS THAT HAD TO DO WITH
ONCOLOGY.

308
00:25:10,020 --> 00:25:13,210
MY FIELD OF EXPERTISE IS IN
CRYSTALLIZATION.

309
00:25:13,210 --> 00:25:18,710
I DECIDED THAT WHAT I WOULD LIKE
TO DO AS FAR AS SEEING CHANGE GO

310
00:25:18,710 --> 00:25:23,830
ON IN THE WORK I'M DOING HERE ON
EARTH IS IN ROADBLOCKS WITH

311
00:25:23,830 --> 00:25:26,060
CRYSTALLIZATION OF EXPERIMENTS
IN SPACE.

312
00:25:26,060 --> 00:25:29,250
WHAT IS THE CRYSTALLIZATION
EXPERIMENT?

313
00:25:29,250 --> 00:25:34,330
WE ARE EMPLOYING WHAT THE
PHARMACEUTICAL TERM WOULD BE.

314
00:25:34,330 --> 00:25:40,400
A STRUCTURAL-BASED DRUG DESIGN
WHERE YOU IDENTIFY A DISEASE OR

315
00:25:40,400 --> 00:25:46,169
CANCER TYPE AND YOU IDENTIFY A
UNIQUE PATHWAY AND THERE MIGHT

316
00:25:46,169 --> 00:25:51,050
BE A MOLECULE AND YOU ARE
TARGETING THAT MOLECULE AND

317
00:25:51,050 --> 00:25:55,450
DESIGNING A COMPOUND THROUGH
MANY ITERATIONS TO SPECIFICALLY

318
00:25:55,450 --> 00:25:59,590
BIND THAT TO RENDER IT
INEFFECTIVE AND STOP IT.

319
00:25:59,590 --> 00:26:03,330
YOU MAY BE ABLE TO SLOW THE
CANCER THAT YOU ARE LOOKING AT

320
00:26:03,330 --> 00:26:09,590
OR STOP IT COMPLETELY.
THAT'S OUR PURPOSE AND THAT WAS

321
00:26:09,590 --> 00:26:11,789
WHAT I DECIDED THAT I WANTED TO
BE A PART OF AS FAR AS THIS

322
00:26:11,789 --> 00:26:16,270
MISSION WAS CONCERNED.
I'M INVOLVED IN A PROJECT THAT

323
00:26:16,270 --> 00:26:20,480
IS THE IMPACT OF WHAT YOU ARE
DOING.

324
00:26:20,480 --> 00:26:32,179
ONE OUT OF 20 PEOPLE WILL GET
COLORECTAL CANCER.

325
00:26:32,179 --> 00:26:35,770
IT WAS THE THIRD MOST COMMON
CANCER IN THE UNITED STATES.

326
00:26:35,770 --> 00:26:41,600
THAT HAPPENS TO BE THE TARGET
THAT I'M WORKING WITH AND WE

327
00:26:41,600 --> 00:26:46,770
WANT TO SEE IF SPACE GROW THESE
CRYSTALS WITH COMPOUNDS TOGETHER

328
00:26:46,770 --> 00:26:50,039
WHERE THEY BIND EACH OTHER WILL
ENABLE US TO GET PAST THE

329
00:26:50,039 --> 00:26:53,960
ROADBLOCKS WE HAVE ON EARTH.
THEY ARE FIGHTING ISSUES WITH

330
00:26:53,960 --> 00:27:02,900
THE LATTICE FORMING AND THESE
ARE THINGS THAT CAN BE MITIGATED

331
00:27:02,900 --> 00:27:06,450
AND THAT MADE THE PROJECT
VALUABLE TO US.

332
00:27:06,450 --> 00:27:16,960
AND YOU
SEE OTHER

333
00:27:16,960 --> 00:27:22,670
CRYSTALLIZATION EXPERIMENTS.
THIS IS ONLY THE SECOND PROTEIN

334
00:27:22,670 --> 00:27:35,700
TO MY KNOWLEDGE, HUMAN MEMBRANE.
THIS PROTEIN IS REALLY A TOOL

335
00:27:35,700 --> 00:27:41,450
THAT IS LOOKING FOR ITERATIONS
AND DRUG DESIGN.

336
00:27:41,450 --> 00:27:46,260
IT NOT ONLY IMPLICATED IN A
VARIETY OF OTHER CANCERS AS

337
00:27:46,260 --> 00:27:51,429
WELL.
IT HAS A HUGE PLATFORM AND IT'S

338
00:27:51,429 --> 00:27:56,070
A GREAT TARGET.
WE ARE EXCITED ABOUT IT.

339
00:27:56,070 --> 00:27:58,970
WE HAVE SOME EXAMPLES FOR YOU UP
HERE.

340
00:27:58,970 --> 00:28:01,450
WE CAN TALK ABOUT THESE IN
DETAIL OFF LINE.

341
00:28:01,450 --> 00:28:04,590
I WANTED TO SHOW YOU ONE IN
PARTICULAR THAT WE ARE USING ON

342
00:28:04,590 --> 00:28:09,460
THE MISSION.
THIS IS CALLED THE HGPCG TWICE

343
00:28:09,460 --> 00:28:13,669
AND THANK FOR ENABLING US TO USE
THIS.

344
00:28:13,669 --> 00:28:18,200
IT AFFORDS US THE ABILITY TO
SEND UP 30 EXPERIMENTS INTO

345
00:28:18,200 --> 00:28:23,640
SPACE AND THE BEAUTY OF THIS IF
I CAN SHOW YOU, IT ALLOWS†-- CAN

346
00:28:23,640 --> 00:28:26,970
YOU HOLD THAT, CHRIS?
IT INVOLVES THE ASTRONAUTS.

347
00:28:26,970 --> 00:28:32,030
THEY HAVE TO COME IN ON A TIMELY
BASIS AND REMOVE THE TOOL AND

348
00:28:32,030 --> 00:28:36,330
ROTATE THIS AT A CERTAIN TIME
POINT AT THE BEGINNING OF THE

349
00:28:36,330 --> 00:28:39,470
MISSION AND AT THE END OF THE
MISSION, THEY ROTATE IT BACK

350
00:28:39,470 --> 00:28:40,770
AGAIN AND SHUT OFF THE
EXPERIMENT AND RETRIEVE THIS AND

351
00:28:40,770 --> 00:28:49,200
OPEN IT UP AND WHAT WE SEE ON
THE INSIDE, WE HAVE SIX ROWS OF

352
00:28:49,200 --> 00:28:55,120
EXPERIMENTS THAT WE CAN LOOK AT
AND SEE HOW THIS FARED BASED ON

353
00:28:55,120 --> 00:29:00,090
SIMILAR EXPERIMENTS THAT WE SAW
AND SEE IF THERE WAS A MARKED

354
00:29:00,090 --> 00:29:15,510
IMPROVEMENT.
I CAN'T BELIEVE

355
00:29:15,510 --> 00:29:18,399
I HAD THIS
OPPORTUNITY AND LOOKING FORWARD

356
00:29:18,399 --> 00:29:20,890
TO A FUTURE OPPORTUNITY WITH
YOU.

357
00:29:20,890 --> 00:29:21,950
I THINK I SAID ENOUGH HERE.
WE WILL LET CHRIS TALK.

358
00:29:21,950 --> 00:29:27,090
THE DISTINGUISHING FEATURE IS
THAT WE ARE PIONEERING A NEW

359
00:29:27,090 --> 00:29:32,549
TYPE CALLED THE INSTITUTE 1
CRYSTALLIZATION PLATE AND WE ARE

360
00:29:32,549 --> 00:29:37,800
EXCITED TO FUTURE THIS BECAUSE
THE HOPE IS IT HOLDS

361
00:29:37,800 --> 00:29:42,169
CRYSTALLIZATION DROPS IN THIS
PLATE IN A SMALLER FOOTPRINT

362
00:29:42,169 --> 00:29:46,029
THAN THE HAND HELD CRYSTAL
GROWTH APPARATUS.

363
00:29:46,029 --> 00:29:50,360
IT IS COMMERCIALLY AVAILABLE AND
CAN BE PERFORMED BY ANY

364
00:29:50,360 --> 00:29:56,500
LABORATORY.
THIS WILL BE THE FIRST MISSION

365
00:29:56,500 --> 00:30:00,300
THE PLATE WILL FLY ON AND IT
WILL BE ABLE TO MAKE THE

366
00:30:00,300 --> 00:30:04,340
EXPERIMENTS MORE ACCESSIBLE TO A
BROADER AUDIENCE OF RESEARCHERS.

367
00:30:04,340 --> 00:30:09,799
>> OKAY.
I'M THE PRINCIPAL INVESTIGATOR

368
00:30:09,799 --> 00:30:16,370
FOR THE MUSCLE WASTING
EXPERIMENT TO SEE IF THE

369
00:30:16,370 --> 00:30:22,390
INVESTIGATIONAL COMPOUND WILL
PREVENT MUSCLE WASTING IN SPACE.

370
00:30:22,390 --> 00:30:26,600
WE ARE GOING TO USE MICE AS THE
EXPERIMENTAL MODEL FOR THIS

371
00:30:26,600 --> 00:30:31,110
EXPERIMENT.
I THINK YOU ARE AWARE IN SPACE

372
00:30:31,110 --> 00:30:35,090
MUSCLES AT FEE AND WASTE AND THE
ASTRONAUTS EXPERIENCE THAT.

373
00:30:35,090 --> 00:30:40,940
THIS HAS IMPLICATIONS FOR SPICE
FLIGHT AND LONGER TERM MISSIONS.

374
00:30:40,940 --> 00:30:46,400
FOR US THE INTEREST IS BECAUSE
OF PATIENTS ON EARTH WHO HAVE

375
00:30:46,400 --> 00:30:51,049
MUSCLE WASTING DISEASES.
THIS CAN BE THINGS RANGING FROM

376
00:30:51,049 --> 00:30:57,960
ALS AND MUSCULAR DYSTROPHY AND
CERTAIN TYPES OF CANCER.

377
00:30:57,960 --> 00:31:02,300
THERE MANY SIMILARITIES BETWEEN
THE MUSCLE WASTING ON EARTH AND

378
00:31:02,300 --> 00:31:07,880
THOSE THAT OCCUR IN SPACE.
WE ARE EXCITED TO RUN THE

379
00:31:07,880 --> 00:31:11,670
EXPERIMENT IN SPACE.
UNDER THE CONDITIONS OF SPACE

380
00:31:11,670 --> 00:31:16,909
WHERE THAT IS NO LOADING OF THE
MUSCLES, YOU GET A GLOBAL EFFECT

381
00:31:16,909 --> 00:31:19,680
OF MUSCLE WASTING OVER THE
MUSCLES.

382
00:31:19,680 --> 00:31:24,570
THIS IS A UNIQUE FEATURE THAT IS
DIFFICULT TO MAKE HAPPEN ON

383
00:31:24,570 --> 00:31:26,840
EARTH.
WE ARE EXCITED TO DO THIS

384
00:31:26,840 --> 00:31:30,590
EXPERIMENT AND IT'S A UNIQUE
FEATURE.

385
00:31:30,590 --> 00:31:35,779
THERE SEVERAL UNIQUE THINGS
ABOUT OUR EXPERIMENT, NOT ONLY

386
00:31:35,779 --> 00:31:40,860
WILL THEY MEASURE THE FUNCTION
OF THE MUSCLES OF THE MICE, BUT

387
00:31:40,860 --> 00:31:46,049
NORMALLY WE JUST IN PREVIOUS
EXPERIMENTS WE LOOKED AT THE

388
00:31:46,049 --> 00:31:49,830
SIZE OF THE MUSCLES AND THIS
TIME WE WILL BE SENDING OUT A

389
00:31:49,830 --> 00:31:52,760
PIECE OF EQUIPMENT WHERE WE CAN
MEASURE THE FUNCTION OF THE

390
00:31:52,760 --> 00:31:56,320
ASTRONAUTS THAT WILL BE HELPING
TO COLLECT THE DATA TO MEASURE

391
00:31:56,320 --> 00:31:58,880
THE FUNCTIONS OF THE MUSCLES ON
THE MICE.

392
00:31:58,880 --> 00:32:02,270
WE ARE EXCITED AND HOPE TO GET
THE RESULTS FROM THIS EXPERIMENT

393
00:32:02,270 --> 00:32:07,100
AND INTEGRATE THEM INTO OUR
EFFORTS TO TRY TO FIND NEW WAYS

394
00:32:07,100 --> 00:32:10,649
TO HELP PATIENTS ON EARTH WHO
HAVE THESE MUSCLE WASTING

395
00:32:10,649 --> 00:32:17,020
DISEASES.
>> APPRECIATE THE SHOW YOU HAVE

396
00:32:17,020 --> 00:32:19,880
FOR US TODAY.
IF YOU WOULD LIKE TO ASK A

397
00:32:19,880 --> 00:32:20,880
QUESTION, PLEASE RAISE YOUR
HAND.

398
00:32:20,880 --> 00:32:26,870
WE WILL START OVER HERE.
>> THIS IS KIND OF A MULTIPLE

399
00:32:26,870 --> 00:32:29,490
QUESTION.
IS THIS THE FIRST TIME LILY HAS

400
00:32:29,490 --> 00:32:32,340
DONE THIS IN SPACE AND HOW LONG
WILL THE EXPERIMENTS LAST AND

401
00:32:32,340 --> 00:32:34,890
HOW MUCH IS IT COSTING THE
COMPANY?

402
00:32:34,890 --> 00:32:38,520
>>>.
>> FIRST OF ALL, IT'S THE FIRST

403
00:32:38,520 --> 00:32:41,240
TIME I'M AWARE OF THAT LILLY IS
DOING THIS IN SPACE.

404
00:32:41,240 --> 00:32:48,620
FROM THE MUSCLE WASTING
EXPERIMENT, I WILL LET MIKE AND

405
00:32:48,620 --> 00:33:00,460
CHRIS ANSWER ON THAT.
>> HOW LONG YOUR EXPERIMENT WILL

406
00:33:00,460 --> 00:33:07,831
LAST.
>> OUR EXPERIENCE WILL BE UP FOR

407
00:33:07,831 --> 00:33:19,100
ABOUT 30 TO 35 DAYS.
IT WILL BE UNLOADED AND WE WILL

408
00:33:19,100 --> 00:33:23,390
RETRIEVE IT.
>> THAT'S A GREAT QUESTION ABOUT

409
00:33:23,390 --> 00:33:28,980
THE COST AND THE FUNDING AND ALL
OF THESE ARE AN EXAMPLE OF HOW

410
00:33:28,980 --> 00:33:35,440
THE LAB IS REALLY I THINK A
PERFECT COLLABORATIVE PLATFORM

411
00:33:35,440 --> 00:33:39,630
FOR A PUBLIC-PRIVATE PARTNERSHIP
FOR SCIENCE AND DISCOVERY AND

412
00:33:39,630 --> 00:33:43,340
DOING R&D IN SPACE.
ELI LILLY IS COVERING ALL OF THE

413
00:33:43,340 --> 00:33:56,549
INTERNAL COSTS AND ALL OF THE
COSTS THAT HAVE BEEN COVERED IN

414
00:33:56,549 --> 00:33:59,049
THE VERY COMMERCIAL WAY BY ELI
LILY.

415
00:33:59,049 --> 00:34:04,800
WHAT IS BEING PROVIDED FROM A
SUBSIDIZED WAY AND THE LAUNCH OF

416
00:34:04,800 --> 00:34:08,579
THE ISS AND THE USE OF THE ISS
LIKE ALL OF THE OTHER

417
00:34:08,579 --> 00:34:11,899
INVESTIGATIONS THAT GO TO SPACE.
THAT'S MY ATTEMPT TO TRY TO

418
00:34:11,899 --> 00:34:18,529
EXPLAIN THE COST, IF YOU WILL.
>> ANYBODY KNOW WHAT IT COSTS

419
00:34:18,529 --> 00:34:21,529
THE COMPANY?
>> I'M SURE THE COMPANY KNOWS.

420
00:34:21,529 --> 00:34:31,790
I DON'T KNOW WHAT THAT FIGURE IS
AND THEY WOULD BE ABLE TO SHARE

421
00:34:31,790 --> 00:34:32,790
THAT RIGHT NOW.
>> THAT WOULD BE CORRECT.

422
00:34:32,790 --> 00:34:34,899
>> I DIDN'T WANT TO SPEAK FOR
LILY.

423
00:34:34,899 --> 00:34:42,729
>> THANK YOU ALL.
I BELIEVE YOU HAVE ONE MORE

424
00:34:42,729 --> 00:34:45,049
QUESTION IN THE FRONT.
>> THANK YOU.

425
00:34:45,049 --> 00:34:48,469
HISTORICAL SPACE IMAGERY.
THE WORLD NEATS TO BE THANKFUL

426
00:34:48,469 --> 00:34:53,940
OF THE ORIGINAL CREATION AND
ONCE AGAIN WE LOOK AT THE

427
00:34:53,940 --> 00:34:58,099
OPPORTUNITY THAT THEY ARE GIVING
A PRIVATE BUSINESS AND PRIVATE

428
00:34:58,099 --> 00:35:00,920
INDIVIDUALS THAT YOU HAVE
BROUGHT FORWARD TO DO

429
00:35:00,920 --> 00:35:05,130
EXPERIMENTS IN SPACE.
TO ASK YOUR QUESTION INVOLVING

430
00:35:05,130 --> 00:35:10,930
YOUR MUSCLE RESEARCH, HOW WOULD
YOU EXPECT THAT DIFFERENCES FROM

431
00:35:10,930 --> 00:35:17,190
WHAT YOU LEARNED ON EARTH AND
MUSCLES AND YOUR EXPERIMENTS

432
00:35:17,190 --> 00:35:21,900
BEING AFFECTED AND HOW WOULD IT
AFFECT AND CHANGE THAT

433
00:35:21,900 --> 00:35:26,969
MEDICATION BY WHAT YOU MAY LEARN
IN SPACE?

434
00:35:26,969 --> 00:35:37,400
>> THE EXPERIMENT IS A UNIQUE
WAY TO GIVE MICE A GLOBAL MUSCLE

435
00:35:37,400 --> 00:35:42,499
WASTING.
THAT'S DIFFICULT TO ACHIEVE.

436
00:35:42,499 --> 00:35:51,579
WE HAVEN'T BEEN ABLE TO DO THAT.
WHAT IS UNIQUE AND USEFUL TO US,

437
00:35:51,579 --> 00:35:55,619
MANY OF THE DISEASES ON EARTH
ARE OFTEN AFFECTING ALL MUSCLES

438
00:35:55,619 --> 00:35:58,920
OF THE BODY.
THAT'S THE UNIQUE PART.

439
00:35:58,920 --> 00:36:08,359
THAT'S WHEN ONE HAS THAT TYPE OF
MUSCLE WASTING.

440
00:36:08,359 --> 00:36:10,529
>> THANK YOU ALL.
NEXT WE WILL HEAR MORE ABOUT A

441
00:36:10,529 --> 00:36:16,760
STUDENT-LED DNA INVESTIGATION.
>> NOW I'M TAKING THE SAMPLES

442
00:36:16,760 --> 00:36:21,190
THAT WE PREPARED AND I'M GETTING
READY TO ACTUALLY RUN THEM IN

443
00:36:21,190 --> 00:36:24,630
THE MACHINE.
>> I'M AN ASSOCIATE AND I'M 17

444
00:36:24,630 --> 00:36:27,069
YEARS OLD.
>> MY EXPERIMENT LOOKS AT THE

445
00:36:27,069 --> 00:36:32,759
GENETIC SEQUENCE IN SPACE TO SEE
IF CHANGES IN OUR GENETICALLY

446
00:36:32,759 --> 00:36:36,069
MIGHT BE RELATED TO IMMUNE
SYSTEM DIFFICULTIES THAT

447
00:36:36,069 --> 00:36:39,900
ASTRONAUTS FACE.
WE USE THIS TO MAKE MULTIPLE

448
00:36:39,900 --> 00:36:46,289
COPIES THAT WE WANTED.
>> FOR ASTRONAUTS WHO ARE

449
00:36:46,289 --> 00:36:49,910
LOOKING TO LONG SPACE FLIGHTS IN
THE FUTURE, THE INTERNATIONAL

450
00:36:49,910 --> 00:36:53,380
SPACE STATION WHILE IT IS
DEFINITELY FAR AWAY, IT IS MUCH

451
00:36:53,380 --> 00:36:59,739
CLOSER AND CONNECTED TO EARTH
THAN A MARS MISSION.

452
00:36:59,739 --> 00:37:03,650
BY UNDERSTANDING THE MARKERS, WE
CAN THEN UNDERSTAND ABOUT THE

453
00:37:03,650 --> 00:37:07,789
IMMUNE SYSTEM IN SPACE AND KEEP
ASTRONAUTS HEALTHIER.

454
00:37:07,789 --> 00:37:12,109
JUST KNOWING THAT MAYBE I'M NOT
IN SPACE YET, BUT A LITTLE PIECE

455
00:37:12,109 --> 00:37:15,430
OF ME IS AND NOT ONLY IS A
LITTLE PIECE OF ME GOING TO

456
00:37:15,430 --> 00:37:19,210
SPACE, IT'S POTENTIALLY HELPING
THE FUTURE OF SPACE TRAVEL.

457
00:37:19,210 --> 00:37:23,380
THE FUTURE OF MANKIND.
THAT'S A REALLY POWERFUL THING

458
00:37:23,380 --> 00:37:26,069
TO ME.
I CAN'T WAIT TO WATCH THAT

459
00:37:26,069 --> 00:37:32,089
ROCKET LAUNCH AND KNOW, THERE WE
GO.

460
00:37:32,089 --> 00:37:37,459
>> THE STUDENT RESEARCHER FROM
THE VIDEO.

461
00:37:37,459 --> 00:37:41,509
SHE JOINED ME ON STAGE AND THE
PROGRAM MANAGER FOR THE BOEING

462
00:37:41,509 --> 00:37:43,930
COMPANY TO DISCUSS THIS.
OVER TO YOU.

463
00:37:43,930 --> 00:37:47,950
>> THANK YOU VERY MUCH.
IT'S AN HONOR TO BE HERE.

464
00:37:47,950 --> 00:37:51,180
BOWING IS PROUD TO BE NASA'S
PRIME CONTRACTOR FOR THE SPACE

465
00:37:51,180 --> 00:37:53,670
STATION.
TODAY OF COURSE IS SUSTAINING

466
00:37:53,670 --> 00:37:58,539
OPERATIONS AND INTEGRATION OF
PAY LOADS AND SCIENCE AND OTHER

467
00:37:58,539 --> 00:38:02,569
ELEMENTS.
IT'S ALSO MAKING SURE THE

468
00:38:02,569 --> 00:38:05,650
SYSTEMS ARE OPERATING.
IT'S A LOT OF ACTIVITY GOING ON

469
00:38:05,650 --> 00:38:08,520
CURRENTLY.
AS WE LOOK TO THE CUSP OF THE

470
00:38:08,520 --> 00:38:14,019
ONE-YEAR MISSION, UNDERSTANDING
IN THE LONG-TERM EFFECTS OF ZERO

471
00:38:14,019 --> 00:38:17,869
GRAVITY AND SPACE TRAVEL TO OUR
CREW, IT IS VERY IMPORTANT FOR

472
00:38:17,869 --> 00:38:22,920
US TO UNDERSTAND AND WE WERE
LOOKING AT THE OTHER COMPANIES

473
00:38:22,920 --> 00:38:28,430
FOR ONE OF OUR EMERGENCYING AND
MATH.

474
00:38:28,430 --> 00:38:33,499
THE SPACE TRAVEL IS HERE AND
COMING AND GOING TO BE IN THE

475
00:38:33,499 --> 00:38:39,440
NEXT SET OF FIVE YEARS WHERE WE
WILL BE GOING TO MARS AND OTHER

476
00:38:39,440 --> 00:38:40,859
PLACES.
IF WE UNDERSTAND THE EFFECTS OF

477
00:38:40,859 --> 00:38:46,489
SPACE TRAVEL ON OUR DNA ON THE
HUMANS, WE CAN BETTER PREPARE

478
00:38:46,489 --> 00:38:51,079
THE CREW AND WHEN THEY COME BACK
TO EARTH, THEY HAVE A BETTER

479
00:38:51,079 --> 00:38:53,760
LIFE.
THEY WILL BE TO THREE-YEAR

480
00:38:53,760 --> 00:38:58,619
MISSIONS.
IT'S NOT A SHUFT DURATION OF SIX

481
00:38:58,619 --> 00:39:03,170
MONTHS OR EVEN SCOTT KELLY'S
ONE-YEAR MISSION, BUT THE BETTER

482
00:39:03,170 --> 00:39:06,029
WE UNDERSTAND IT, THE BETTER OFF
WE ARE.

483
00:39:06,029 --> 00:39:10,579
WE HAD 330 PROPOSALS FROM
STUDENTS FROM SEVENTH GRADE TO

484
00:39:10,579 --> 00:39:13,540
HIGH SCHOOL.
VERY IMPRESSIVE.

485
00:39:13,540 --> 00:39:19,390
IT WAS THE PROPOSALS ON HOW DNA
CAN AFFECT THE EXPLORATION OF

486
00:39:19,390 --> 00:39:24,269
THE HUMAN DNA AND THESE STUDENTS
PUT TOGETHER DIFFERENT PROPOSALS

487
00:39:24,269 --> 00:39:28,619
AND PUT A TEAM OF EXPERTS
TOGETHER TO SELECT FROM THEM AND

488
00:39:28,619 --> 00:39:32,069
INDUSTRY PROPOSALS.
NOT JUST FROM BOEING, BUT WE

489
00:39:32,069 --> 00:39:37,299
PICKED THE BEST OF THE BEST THAT
IS APPLICABLE AND TO OUR CREDIT,

490
00:39:37,299 --> 00:39:43,190
WE HAVE A DYNAMIC PERSON WHO IS
ALSO SELECT AND WE ARE PROUD OF

491
00:39:43,190 --> 00:39:48,650
ANNA SOFIA.
>> HELLO, I'M ANNA SOFIA AND I'M

492
00:39:48,650 --> 00:39:51,719
A GIRL WITH A BOX.
THIS IS MY BOX.

493
00:39:51,719 --> 00:39:59,259
IT'S A PCR MACHINE.
THIS IS A PRETTY STANDARD LAB

494
00:39:59,259 --> 00:40:07,589
PROCEDURE WHERE YOU TAKE LITTLE
PIECES OF DNA AND MIX THEM UP

495
00:40:07,589 --> 00:40:14,299
AND THE CHEMICAL REACTION THAT
OCCURS PHOTOCOPIES THE DNA.

496
00:40:14,299 --> 00:40:26,910
YOU AMPLIFY IT AND THIS ALLOWS
YOU TO INTO THE GENETICS IN THE

497
00:40:26,910 --> 00:40:30,349
BODY.
IT'S NEVER BEEN CARRIED OUT IN

498
00:40:30,349 --> 00:40:32,480
SPACE.
THE TYPICAL MACHINES ARE LARGE

499
00:40:32,480 --> 00:40:39,920
AND BULKY THINGS.
THAT'S WHAT LED TO THE CONTEST.

500
00:40:39,920 --> 00:40:47,900
WHEN I LOOKED AT IT AND THOUGHT
WHAT WOULD I DO, I WOULDN'T GO

501
00:40:47,900 --> 00:40:52,109
TO THE GENOME.
I WENT TO ANOTHER LAYER CALLED

502
00:40:52,109 --> 00:40:56,279
THE EPIY GENOME.
A LAYER OF EXTRA MARKINGS YOU

503
00:40:56,279 --> 00:41:00,480
CAN HAVE ON THE DNA SEQUENCE
THAT AFFECTS HOW GENES ARE

504
00:41:00,480 --> 00:41:04,630
EXPRESSED.
I WAS LOOKING AT THE MARKERS IN

505
00:41:04,630 --> 00:41:06,829
RELATION TO ASTRONAUTS IMMUNE
SYSTEMS.

506
00:41:06,829 --> 00:41:11,029
WHEN THEY GO TO SPACE, THEY TEND
TO EXPERIENCE PROBLEMS WITH

507
00:41:11,029 --> 00:41:17,069
THEIR IMMUNE SYSTEM.
READING UP ON THIS, THERE WAS A

508
00:41:17,069 --> 00:41:19,289
LOT OF SIMILARITY AND THE
ASTRONAUTS WERE EXPRESSING.

509
00:41:19,289 --> 00:41:25,029
THINGS THAT OCCURRED ON EARTH
AND THEY WERE CAUSED BY CHANGES

510
00:41:25,029 --> 00:41:29,529
IN THIS EPIY GENETIC PATTERN AND
CHANGES IN THE MARKERS ON THE

511
00:41:29,529 --> 00:41:32,130
DNA.
I THOUGHT WOW, WHAT IF WE CAN

512
00:41:32,130 --> 00:41:36,769
USE THE MACHINE TO ESSENTIALLY
MONITOR ASTRONAUTS'S IMMUNE

513
00:41:36,769 --> 00:41:38,410
SYSTEMS BY LOOKING AT THE
MARKERS.

514
00:41:38,410 --> 00:41:42,290
THEY HAVE NEVER GONE UP BEFORE.
WE HAVE TO MAKE SURE THE PROCESS

515
00:41:42,290 --> 00:41:45,190
WORKS.
WHAT IS FLYING HOPEFULLY

516
00:41:45,190 --> 00:41:57,180
TOMORROW IS GOING TO BE A TEST
TO SEE IF WE LOOK AT DNA AND THE

517
00:41:57,180 --> 00:42:00,910
MARKERS AND THE EPIGENETIC
MARKERS WORK IN SPACE.

518
00:42:00,910 --> 00:42:06,420
WE HAVE THIS WHOLE WINDOW OF
INSIGHT INTO HUMAN GENETICS THAT

519
00:42:06,420 --> 00:42:12,989
WE NEVER HAD BEFORE THAT WILL
LEAD TO A HUGE AMOUNT OF

520
00:42:12,989 --> 00:42:18,469
INNOVATION AND INCREASE IN
AUTONOMY FROM THE EARTH.

521
00:42:18,469 --> 00:42:23,989
WE WON'T HAVE TO BE CONNECTED TO
THE EARTH AND THEY CAN BE AWARE

522
00:42:23,989 --> 00:42:31,029
OF DEFECTS GOING ON.
EPIY GENETICS IS RELATED TO MANY

523
00:42:31,029 --> 00:42:35,749
BODY SYSTEMS.
WOE ARE CUTTING THE TETHERS WE

524
00:42:35,749 --> 00:42:41,000
HAVE TO EARTH.
THAT'S THE EXTREME FUTURE

525
00:42:41,000 --> 00:42:46,660
GENERATION.
>> LADIES AND GENTLEMEN, SHE IS

526
00:42:46,660 --> 00:42:49,499
17.
SO REMARKABLE.

527
00:42:49,499 --> 00:43:01,299
WE WILL OPEN UP THE FLOOR FOR
QUESTIONS.

528
00:43:01,299 --> 00:43:05,709
>> HISTORICAL SPACE IMAGERY.
VERY GOOD PRESENTATION.

529
00:43:05,709 --> 00:43:12,890
DID YOU DEVELOP THAT MICROBIAL
MACHINE AND AS YOU MENTIONED,

530
00:43:12,890 --> 00:43:17,979
THERE WAS A LARGER MACHINE
TYPICALLY USED AND IN LOOKING AT

531
00:43:17,979 --> 00:43:24,890
THE MICROBIAL TEST THAT YOU WILL
DO, DO YOU EXPECT THAT THE

532
00:43:24,890 --> 00:43:33,430
RESULTS WILL YIELD TO BEING ABLE
TO ADDRESS THE ASTRONAUTS

533
00:43:33,430 --> 00:43:37,719
FALLING PREY TO WHAT IS
HAPPENING WITH LONGER PERIODS IN

534
00:43:37,719 --> 00:43:40,549
SPACE?
>> SO FOR THE FIRST QUESTION,

535
00:43:40,549 --> 00:43:42,250
NO, I DIDN'T DESIGN THIS
MACHINE.

536
00:43:42,250 --> 00:43:45,989
IT WAS DESIGNED BY A COMPANY
WITH THE SAME NAME AS THE

537
00:43:45,989 --> 00:43:48,549
MACHINE.
SAY ARE THE ONES THAT DOWNSIZED

538
00:43:48,549 --> 00:43:51,359
IT AND A LOT WAS FOR EDUCATIONAL
PURPOSES.

539
00:43:51,359 --> 00:43:59,229
THEY'RE BIG EDUCATIONAL OUTREACH
PEOPLE WHICH IS WHY I'M HERE.

540
00:43:59,229 --> 00:44:02,839
THE SECOND QUESTION, WERE YOU
ASKING IF I EXPECT TO SEE IF IT

541
00:44:02,839 --> 00:44:08,430
WORKS OR USE IT IN THE FUTURE?
>> HOW DO YOU EXPECT IT TO

542
00:44:08,430 --> 00:44:14,339
DIFFER†-- [INAUDIBLE].
THEIR CONDITION AS TIME AND

543
00:44:14,339 --> 00:44:19,259
DURATION GOES ON.
>> PROCEDURALLY I EXPECT THE

544
00:44:19,259 --> 00:44:23,640
TECHNIQUE TO WORK THE SAME, BUT
WHAT I'M LOOKING AT EVENTUALLY

545
00:44:23,640 --> 00:44:30,160
IN THE EPIGENETICS, THE WAY IT
WORKS IS YOU HAVE CELLS

546
00:44:30,160 --> 00:44:33,839
DIFFERENTIATING AND WHAT
CONTROLS HOW THEY TURN INTO ONE

547
00:44:33,839 --> 00:44:36,519
CELL TYPE OR ANOTHER, THAT'S THE
MARKERS.

548
00:44:36,519 --> 00:44:40,799
IF THEY ARE THERE, IT WILL TURN
INTO CELL AND IF THEY ARE NOT,

549
00:44:40,799 --> 00:44:46,709
IT TURNS INTO CELL TWO.
WE HAVE T CELLS WHICH ARE PART

550
00:44:46,709 --> 00:44:53,329
OF THE SYSTEM AND T HELPER
CELLS.

551
00:44:53,329 --> 00:44:57,060
ON EARTH WE HAVE A RELATIVELY
BALANCED PHENOTYPE.

552
00:44:57,060 --> 00:45:02,730
IN SPACE WE SEE A SIGNIFICANT
SHIFT TOWARDS A T HELPER TWO

553
00:45:02,730 --> 00:45:06,420
CELL.
I LOOK AT THE REGIONS WHERE THE

554
00:45:06,420 --> 00:45:11,979
MARKERS OCCUR.
IN THE T HELPER CELLS AND SEE IF

555
00:45:11,979 --> 00:45:16,210
THE MARKER PATTERN WAS THE SAME
AS WE SEE ON EARTH.

556
00:45:16,210 --> 00:45:19,709
I WOULDN'T EXPECT IT TO.
I WOULD EXPECT US TO SEE MORE

557
00:45:19,709 --> 00:45:22,880
MARKERS THAT ENCOURAGE
DIFFERENTIATION TOWARDS T HELPER

558
00:45:22,880 --> 00:45:30,549
2 CELLS AND THEY CAN BE CHANGED
BY MICROGRAVITY AND POTENTIAL

559
00:45:30,549 --> 00:45:35,430
RADIATION AND THAT CHANGE COULD
INDICATE THE SOURCE OF THE

560
00:45:35,430 --> 00:45:41,359
AVERAGE IMMUNE SYSTEM WE SEE IN
SPACE.

561
00:45:41,359 --> 00:45:46,420
>> THANK YOU BOTH.
>> OUR FINAL GUESTS ARE THE

562
00:45:46,420 --> 00:45:49,670
DIRECTOR OF NASA'S ADVANCED
EXPIRATION SYSTEMS DIVISION AND

563
00:45:49,670 --> 00:45:55,650
ROBERT BIGELOW.
LET'S TAKE A CLOSER LOOK AT THE

564
00:45:55,650 --> 00:46:01,269
BEAM, THE ACTIVITY MODULE.
>> NASA IS DEVELOPING THE

565
00:46:01,269 --> 00:46:05,420
CAPABILITIES TO SEND PEOPLE INTO
DEEP SPACE.

566
00:46:05,420 --> 00:46:08,579
WE NEED TO EXTEND THE KNOWLEDGE
OF HOW TO OPERATE IN SPACE.

567
00:46:08,579 --> 00:46:14,249
NASA IS DEVELOPING HABITATION
SYSTEMS WITH SUSTAINABLE WORK

568
00:46:14,249 --> 00:46:18,450
SPACES AND LABORATORIES.
EXPANDIBLE HABITATS ARE ONE

569
00:46:18,450 --> 00:46:21,700
OPTION.
THESE WEIGH LESS AND LESS VOLUME

570
00:46:21,700 --> 00:46:25,690
WHEN ALLOWING FOR ADDITIONAL
SPACE FOR LIVING AND WORKING,

571
00:46:25,690 --> 00:46:29,199
BUT TESTING NEEDS TO BE DONE ON
A DESIGN PERFORMANCE OF

572
00:46:29,199 --> 00:46:34,459
HABITATS.
THE BIGELOW EXPANDIBLE MODULE

573
00:46:34,459 --> 00:46:38,039
DEVELOPED UNDER CONTRACT WITH
BIGELOW AEROSPACE PROVIDES A

574
00:46:38,039 --> 00:46:41,239
PLATFORM FOR DEMONSTRATING THE
THERMAL, STRUCTURAL, RADIATION

575
00:46:41,239 --> 00:46:48,519
AND DURABILITY AND LONG-TERM
LEAK PERFORMANCE OF HABITATS.

576
00:46:48,519 --> 00:46:51,550
THE BEAM WILL BE TRANSPORTED TO
THE INTERNATIONAL SPACE STATION

577
00:46:51,550 --> 00:46:58,369
IN THE SUPPLY VEHICLE'S TRUNK.
FLIGHT CONTROLLERS AT MISSION

578
00:46:58,369 --> 00:47:03,349
CONTROL IN HOUSTON WILL MANEUVER
THE ROBOTIC ARM TO EXTRACT IT

579
00:47:03,349 --> 00:47:06,700
AND ATTACH IT TO THE
TRANQUILLITY NODE.

580
00:47:06,700 --> 00:47:10,219
AFTER ALL PREPARATIONS ARE
COMPLETE, CREW MEMBERS WILL

581
00:47:10,219 --> 00:47:13,910
INFLATE THE STRUCTURE.
THIS WILL BE THE FIRST TIME A

582
00:47:13,910 --> 00:47:17,109
HABITAT HAS BEEN DEPLOYED AND
THE PROCEDURE WILL TAKE PLACE

583
00:47:17,109 --> 00:47:21,249
SLOWLY TO OBSERVE THE EXPANSION
PROCESS AND MAINTAIN THE SAFETY

584
00:47:21,249 --> 00:47:24,779
OF THE CREW AND THE STATION.
DURING THIS TIME, BEAM WILL

585
00:47:24,779 --> 00:47:30,459
EXPAND FROM THE DIMENSIONS OF
5.7 FEET LONG AND JUST UNDER 7.7

586
00:47:30,459 --> 00:47:35,039
FEET IN DIAMETER TO THE
DIMENSIONS OF 12 FEET AND 10.5

587
00:47:35,039 --> 00:47:38,740
FEET IN DIAMETER.
WHEN THE BEAM IS EXPANDED, THEY

588
00:47:38,740 --> 00:47:43,509
WILL BE TESTED FOR LEAKS.
AFTER THIS THE PRESSURE WILL BE

589
00:47:43,509 --> 00:47:47,470
EQUALIZED AND THE CREW WILL
ENTER THE BEAM AND INSTALL

590
00:47:47,470 --> 00:47:51,709
SENSORED.
THE SENSORS WILL COLLECT

591
00:47:51,709 --> 00:47:55,489
THERMAL, IMPACT AND RADIATION
THROUGHOUT THE TWO YEARS ON

592
00:47:55,489 --> 00:48:03,930
ORBIT LIFE OF BEAM.
THESE WILL HELP DETERMINE THE

593
00:48:03,930 --> 00:48:16,579
LIGHTWEIGHT OPTION FOR FUTURE
SPACE HABITAT.

594
00:48:16,579 --> 00:48:20,190
>> INFLATABLE VERSUS EXPANDIBLE.
IS THERE A DIFFERENCE?

595
00:48:20,190 --> 00:48:26,109
>> WE GET THIS QUESTION AND IT
IS GOOD TO DIFFERENTIATE BETWEEN

596
00:48:26,109 --> 00:48:28,430
THE TWO.
IT IS SIMPLE ANSWER IS

597
00:48:28,430 --> 00:48:33,959
INFLATABLES MAKE YOU THINK OF
THINGS LIKE BALLOONS THAT DON'T

598
00:48:33,959 --> 00:48:36,199
HAVE A STRUCTURE IN AND OF
THEMSELVES.

599
00:48:36,199 --> 00:48:40,769
THEY INFLATE THEM AND IT
COLLAPSES DOWN.

600
00:48:40,769 --> 00:48:43,689
STRUCTURE IS MORE LIKE A TENT.
YOU THINK ABOUT IN A PACKED

601
00:48:43,689 --> 00:48:50,240
CONFIGURATION, WHEN YOU GO TO A
SITE, YOU CAN SET IT UP AND GET

602
00:48:50,240 --> 00:48:53,619
IN AND OUT.
IT KEEPS ITS STRUCTURE AT THAT

603
00:48:53,619 --> 00:48:55,489
POINT IN TIME.
WE TEND TO CALL THINGS

604
00:48:55,489 --> 00:49:01,039
EXPANDIBLE.
BECAUSE OF THAT RIGIDITY OF THE

605
00:49:01,039 --> 00:49:04,380
DEVICE, IF SOMETHING WERE TO
HAPPEN, IT MAINTAINS THE

606
00:49:04,380 --> 00:49:08,630
PHYSICAL STRUCTURE EVEN AFTER
REDID DEUCED AIR PRESSURE AS

607
00:49:08,630 --> 00:49:12,059
WELL.
WITH THAT INITIAL QUESTION, I'M

608
00:49:12,059 --> 00:49:18,150
GOING TO TOUCH ON THREE THINGS.
WHY DO WE NEED HABITATION AND

609
00:49:18,150 --> 00:49:23,930
THAT'S THE POTENTIAL USE OF
EXPANDIBLES AND WHAT WE ARE

610
00:49:23,930 --> 00:49:29,019
DOING ON BOARD.
FIRST OFF, HABITATION.

611
00:49:29,019 --> 00:49:33,589
AS WE SEND CREWS TO MARS, YOU
HEARD MENTION OF OTHER FOLKS ON

612
00:49:33,589 --> 00:49:38,549
THE PANEL TALKING ABOUT MISSION
CLASSES OF UP TO 1,000 OR 1100

613
00:49:38,549 --> 00:49:41,490
DAYS.
WE NEED A PLACE TO LIVE.

614
00:49:41,490 --> 00:49:47,039
A ROUND TRIP TO MARS MAY TAKE US
UP TO 300 CUBIC METERS IN

615
00:49:47,039 --> 00:49:50,779
STORAGE VOLUME FOR THE LIVE IN
AND THE GOODS WE HAVE.

616
00:49:50,779 --> 00:49:53,939
WE NEED A LARGE HABITAT TO LIVE
IN.

617
00:49:53,939 --> 00:49:56,880
WHY EXPANDIBLES?
EVERYTHING WE HAVE FLOWN IS

618
00:49:56,880 --> 00:50:02,079
METALLIC STRUCTURES WOMEN HAVE A
WIDE UNDERSTANDING AND THERE

619
00:50:02,079 --> 00:50:05,170
LIMITATIONS TO METALLIC
STRUCTURES.

620
00:50:05,170 --> 00:50:08,509
THE LARGEST THING YOU CAN FLY IS
WHAT SITS IN THE ROCKETS.

621
00:50:08,509 --> 00:50:15,030
IT'S NEVER GOING TO GET BIGGER.
GETTING BACK TO THAT VOLUME THAT

622
00:50:15,030 --> 00:50:17,880
YOU WANT.
WE HAVE ALWAYS CONSIDERED

623
00:50:17,880 --> 00:50:24,509
EXPANDIBLES.
WE HAD NEVER GONE ALL THE WAY TO

624
00:50:24,509 --> 00:50:27,599
FLIGHT.
WE ARE ACTUALLY FLYING A HIGHER

625
00:50:27,599 --> 00:50:31,930
FACTOR OF SAFETY BECAUSE OF THE
UNKNOWN KNOWLEDGE ABOUT

626
00:50:31,930 --> 00:50:34,640
STRUCTURES, BUT YOU WANT TO
UNDERSTAND THE STRUCTURAL

627
00:50:34,640 --> 00:50:38,069
INTEGRITY AND THE RADIATION
PERFORMANCE AND THE TEMPERATURE

628
00:50:38,069 --> 00:50:42,829
CONTROLS OF THE BEAM IN ORDER TO
HELP INFORM OUR CHOICES FOR DEEP

629
00:50:42,829 --> 00:50:54,119
SPACE HABITATS.
HOW DID THEY BUILD THIS MODEL?

630
00:50:54,119 --> 00:51:02,599
>> OUR HERITAGE IS FROM THE
PROGRAM.

631
00:51:02,599 --> 00:51:08,140
WE SAW THE POTENTIAL AND IF I
CAN ASK FOR THE FIRST SLIDE,

632
00:51:08,140 --> 00:51:10,699
PLEASE.
THAT'S THE HOME BASE IN NORTH

633
00:51:10,699 --> 00:51:16,479
LAS VEGAS, NEVADA.
IT'S ON 50 ACRES AND 365 SQUARE

634
00:51:16,479 --> 00:51:21,319
FEET OF MANUFACTURING AND
FABRICATION AND DESIGN SPACE AT

635
00:51:21,319 --> 00:51:24,690
THAT FACILITY.
THAT'S WHERE EVERYTHING IS MADE.

636
00:51:24,690 --> 00:51:28,640
WE FUNCTION AS A GENERAL
CONTRACTOR AND ABOUT 50% OF THE

637
00:51:28,640 --> 00:51:33,380
HARDWARE OF THE SPACECRAFT IS
CREATED THERE.

638
00:51:33,380 --> 00:51:39,189
WE SUBCONTRACT OUT FOR OTHER
HARDWARE SYSTEMS FROM OTHER

639
00:51:39,189 --> 00:51:41,920
COMPANIES.
WE DON'T MAKE EVERYTHING.

640
00:51:41,920 --> 00:51:47,259
IT'S ABOUT A 50-50 BALANCE.
NEXT SLIDE, PLEASE?

641
00:51:47,259 --> 00:51:52,869
THAT REPRESENTS THE BEAM BEFORE
IT WAS SEQUESTERS IN THE TRUNK

642
00:51:52,869 --> 00:51:59,510
OF THE DRAGON.
IT'S NOT TERRIBLY LARGE.

643
00:51:59,510 --> 00:52:03,930
IT IS A DIFFERENT SHAPE THAN WE
WERE USED TO. GENESIS ONE AND

644
00:52:03,930 --> 00:52:06,640
GENESIS TWO.
THANKS TO THE RUSSIANS.

645
00:52:06,640 --> 00:52:10,630
IN 06 AND 07.
THOSE HAD TO BE CONFIGURED TO

646
00:52:10,630 --> 00:52:13,849
THE SHAPE OF A FORRING.
THIS HAD TO BE CONFIGURED TO THE

647
00:52:13,849 --> 00:52:19,769
SHAPE OF SOMETHING DIFFERENT.
HALF THE SHAPE OF A SOUP CAN.

648
00:52:19,769 --> 00:52:21,990
WE HAD TO COME UP WITH A WAY
THAT WAS PRACTICAL TO

649
00:52:21,990 --> 00:52:27,059
ORCHESTRATE THAT TO FIT IN THAT
ENCLOSURE.

650
00:52:27,059 --> 00:52:32,109
YOU MAY HAVE OTHER ENCLOSURES
POTENTIALLY THAT YOU COULD STILL

651
00:52:32,109 --> 00:52:36,789
ADAPT.
NEXT SLIDE, PLEASE.

652
00:52:36,789 --> 00:52:45,420
THIS GOES INTO
THE TRUNK.

653
00:52:45,420 --> 00:52:49,809
NEXT SLIDE, PLEASE.
NEXT SLIDE, PLEASE.

654
00:52:49,809 --> 00:52:57,309
THERE IS THE BEAM SHOWING THE
ADAPTOR SYSTEM AND LITTLE AN 10

655
00:52:57,309 --> 00:53:03,799
IT-LOOKING THING WHICH IS WHAT
IT WILL GRAB ON TO TO SECURE

656
00:53:03,799 --> 00:53:08,910
ITSELF TO THE BEAM AND REMOVE IT
FROM THE TRUNK AND PUT IT ON TO

657
00:53:08,910 --> 00:53:12,969
NODE THREE FOR BIRTHING.
NEXT SLIDE.

658
00:53:12,969 --> 00:53:18,400
THAT'S THE PERSPECTIVE OF SIZE.
A 6 FOOT TALL PERSON ADJACENT TO

659
00:53:18,400 --> 00:53:21,920
THE BEAM.
NEXT SLIDE.

660
00:53:21,920 --> 00:53:26,969
THAT'S A TRANSPARENT SYSTEM OR
TRAIL OF WHAT THE INTERIOR LOOKS

661
00:53:26,969 --> 00:53:31,079
LIKE.
IT'S QUITE EMPTY AS YOU CAN SEE.

662
00:53:31,079 --> 00:53:34,999
THE THING I WANT TO IMPRESS HERE
IS THAT THE BEAM IS AN

663
00:53:34,999 --> 00:53:39,059
EXPERIMENTAL SPACECRAFT.
THIS HAS NEVER BEEN FLOWN

664
00:53:39,059 --> 00:53:43,059
BEFORE.
IT HAS BEEN BOUND UP FOR OVER A

665
00:53:43,059 --> 00:53:48,240
YEAR WAITING FOR LAUNCH.
WE ARE NOT 100% SURE OF THE

666
00:53:48,240 --> 00:53:51,309
BEHAVIOR.
IT IS A TESTING STATION.

667
00:53:51,309 --> 00:53:55,930
THAT IS THE POINT HERE IN ALL
RESPECTS NOT ONLY IN MONITORING

668
00:53:55,930 --> 00:53:59,559
THE ENVIRONMENT INSIDE AND
RADIATION EXPOSURE AND DEFENSE

669
00:53:59,559 --> 00:54:07,690
AGAINST THINGS AND PERHAPS
DEBRIS OR RADIATION, BUT

670
00:54:07,690 --> 00:54:12,539
POTENTIALLY MAY EVEN SOME DAY
GIVE PERMISSION FOR A COMMERCIAL

671
00:54:12,539 --> 00:54:16,369
APPLICATION.
WE DON'T KNOW YET.

672
00:54:16,369 --> 00:54:19,299
IT IS A TESTING FACILITY.
IT'S HUMAN RATED.

673
00:54:19,299 --> 00:54:28,769
IT HAS A UNIQUE SPACECRAFT.
THE NEXT SLIDE, PLEASE.

674
00:54:28,769 --> 00:54:33,299
THIS IS BEING ATTACHED TO NODE
THREE.

675
00:54:33,299 --> 00:54:38,059
THE SIZE IS SMALLER THAN THE
NODE THREE ITSELF.

676
00:54:38,059 --> 00:54:42,670
THE BEAM IS 16 CUBIC METERS AS
OPPOSED TO THIS BEAM WHICH IS 20

677
00:54:42,670 --> 00:54:47,430
TIMES LARGER.
NEXT SLIDE.

678
00:54:47,430 --> 00:54:53,190
THAT SHOWS WHERE WE HOPE TO HAVE
BY 2020, TWO OF THEM READY FOR

679
00:54:53,190 --> 00:54:56,079
LAUNCH.
THIS SHOWS THEM WITH A CS 2 100

680
00:54:56,079 --> 00:54:58,219
ON ONE END AND A DRAGON ON THE
OTHER.

681
00:54:58,219 --> 00:55:02,829
WE ARE POLITICALLY CORRECT
THERE.

682
00:55:02,829 --> 00:55:09,549
THAT REPRESENTS VOLUME JUST WITH
THOSE TWO TOGETHER.

683
00:55:09,549 --> 00:55:14,059
THAT'S WHAT WE HOPE TO DEPLOY
SOMETIME AROUND 2020.

684
00:55:14,059 --> 00:55:15,809
>> THANK YOU, GENTLEMEN.
WE WILL GO TO QUESTIONS IN A

685
00:55:15,809 --> 00:55:17,640
MOMENT.
IF YOU ARE IN THE ROOM, RAISE

686
00:55:17,640 --> 00:55:19,970
YOUR HAND.
IF YOU ARE ON THE PHONE LINE,

687
00:55:19,970 --> 00:55:23,640
PRESS STAR ONE.
IF YOU ARE GOING WITH US ONLINE,

688
00:55:23,640 --> 00:55:33,380
USE THE HASH TAG†#ASKNASA.
CAN YOU EXPLAIN WHAT WE ARE

689
00:55:33,380 --> 00:55:37,140
LOOKING AT?
>> THIS IS THE BEAM STRUCTURE.

690
00:55:37,140 --> 00:55:42,720
THIS IS THE 330.
A OPPOSED TO THE BEAM, IT'S

691
00:55:42,720 --> 00:55:46,770
INTENDED TO NOT RELY ON ANY
OTHER SPACECRAFT FOR CONTINUING

692
00:55:46,770 --> 00:55:52,869
LIFE.
IT IS A STAND ALONE SPACE

693
00:55:52,869 --> 00:55:57,459
STATION IN AND OF ITSELF.
CONTRARY TO THE BEAM IT REQUIRES

694
00:55:57,459 --> 00:56:02,309
COMPLETE ASSISTANCE AND IT IS AN
ENCLOSURE THAT IS LACKING OF A

695
00:56:02,309 --> 00:56:07,079
YONNIC AND PROPULSION AND
ECOSYSTEMS.

696
00:56:07,079 --> 00:56:13,140
IT IS MUCH DIFFERENT THAN THE
LARGER SYSTEM IS.

697
00:56:13,140 --> 00:56:18,779
>> ANY QUESTIONS FROM THE ROOM?
WE WILL START HERE.

698
00:56:18,779 --> 00:56:21,140
SECOND ROW.
>> THANKS.

699
00:56:21,140 --> 00:56:25,960
HOW IMPORTANT IS THE BEAM TO
ACHIEVING YOUR 2020 HOPE FOR

700
00:56:25,960 --> 00:56:28,989
LAUNCHING A PRIVATE STATION?
IS THIS MISSION ESSENTIAL TO

701
00:56:28,989 --> 00:56:33,530
CREATING THE CONFIDENCE FOR
CUSTOMERS TO SIGN UP FOR A

702
00:56:33,530 --> 00:56:36,469
STATION LIKE THAT?
TO SIGNING LAUNCH CONTRACTS OR

703
00:56:36,469 --> 00:56:41,400
IS IT MORE ABOUT SHOWING NASA
THAT THIS IS A DEEP SPACE

704
00:56:41,400 --> 00:56:44,469
TECHNOLOGY?
>> YES, ALL OF THAT.

705
00:56:44,469 --> 00:56:47,619
>> SERIOUSLY, IT IS AN IMPORTANT
STEP TO US.

706
00:56:47,619 --> 00:56:51,989
IT REALLY IS.
NASA HAS THE CONFIDENCE IN OUR

707
00:56:51,989 --> 00:56:57,349
COMPANY TO BE ABLE TO DO THIS.
WE ARE VERY PROUD TO BE ABLE TO

708
00:56:57,349 --> 00:57:01,980
ACTUALLY GET TO A POINT OF
DEPLOYMENT ON A TYPE OF

709
00:57:01,980 --> 00:57:04,779
ARCHITECTURE THAT BEGAN IN THE
90s.

710
00:57:04,779 --> 00:57:10,549
IT GOES WAY BACK DECADES BEFORE.
IT GOT SERIOUS BECAUSE NASA WAS

711
00:57:10,549 --> 00:57:15,309
LOOKING FOR ENCLOSURES THAT WERE
AND GOOD TO TAKE PEOPLE TO MARS.

712
00:57:15,309 --> 00:57:20,429
IT CAME FULL CIRCLE NOW.
WE ARE EXCITED ABOUT THIS

713
00:57:20,429 --> 00:57:23,890
OPPORTUNITY.
WE DO HOPE THAT IT DOES LEAD TO

714
00:57:23,890 --> 00:57:28,769
OTHER EXTENSION OF RELATIONSHIP
THAT WE HAVE WITH NASA.

715
00:57:28,769 --> 00:57:34,579
>> 2020, ARE YOU TALKING ABOUT A
PRIVATE STATION FOR SOME

716
00:57:34,579 --> 00:57:37,400
CUSTOMER OTHER THAN NASA OR IS
THAT SOMETHING NASA WILL BE

717
00:57:37,400 --> 00:57:40,509
PARTICIPATING IN AS WELL?
>>.

718
00:57:40,509 --> 00:57:47,069
>> WE ARE WORKING ON A
COMBINATION OF THINGS.

719
00:57:47,069 --> 00:57:57,760
>> DAN BILLOW FROM CHANNEL TWO.
YOU TALKED ABOUT GENERICALLY

720
00:57:57,760 --> 00:57:59,779
COMMERCIAL APPLICATIONS.
WHAT DO YOU MEAN?

721
00:57:59,779 --> 00:58:03,249
WHAT ARE YOUR DREAMS AND WHAT
COULD RESULT HERE.

722
00:58:03,249 --> 00:58:05,380
WHAT KIND OF COMMERCIAL
APPLICATIONS?

723
00:58:05,380 --> 00:58:10,059
>> OUR BUSINESS MODEL IS MY
BACKGROUND IS IN DEVELOPMENT AND

724
00:58:10,059 --> 00:58:13,039
CONSTRUCTION AND GENERAL
CONTRACTING AND BANKING AND

725
00:58:13,039 --> 00:58:14,219
EVERYTHING TO DO WITH REAL
ESTATE.

726
00:58:14,219 --> 00:58:17,869
I TRANSFER A LOT OF BUSINESS
CASE FROM THAT AND THAT

727
00:58:17,869 --> 00:58:19,869
INDUSTRY.
ESSENTIALLY THE FOUNDATION OF

728
00:58:19,869 --> 00:58:23,670
OUR BUSINESS CASE IS TIME
SHARING.

729
00:58:23,670 --> 00:58:27,799
TIME SHARING WITH TIME AND
VOLUME.

730
00:58:27,799 --> 00:58:32,029
BRANDING THAT INCLUDES ANYTHING
FROM NAMING RIGHTS TO

731
00:58:32,029 --> 00:58:35,069
ADVERTISING OR WHATEVER.
THE KIND OF THING THAT YOU WOULD

732
00:58:35,069 --> 00:58:40,210
SEE PERHAPS IN THE CASE OF
INCOME STREAMS AND UNIVERSITIES.

733
00:58:40,210 --> 00:58:43,990
YOU HAVE NAMING RIGHTS FOR
LECTURE HALLS AND NAMES OF

734
00:58:43,990 --> 00:58:49,039
BUILDINGS AND THE BUILDING
ITSELF AND THE COLLEGE.

735
00:58:49,039 --> 00:58:52,069
ALL THAT IS APPLICABLE TO
STRUCTURES IN PLACE THAT ARE

736
00:58:52,069 --> 00:58:54,869
COMMERCIALLY OPERATED.
WE WOULD OPERATE THEM ON BEHALF

737
00:58:54,869 --> 00:58:59,719
OF NATIONS THAT HAVE ASTRONAUT
CORES AND OTHERS THAT ASPIRE TO

738
00:58:59,719 --> 00:59:06,390
HAVE THEM.
THE FREQUENCY OF THE OPPORTUNITY

739
00:59:06,390 --> 00:59:10,709
TO FLY IS NOT OFTEN.
FOR OTHER THAN THE UNITED STATES

740
00:59:10,709 --> 00:59:18,359
AND RUSSIA, IT'S ONCE EVERY
THREE YEARS, CLOSE TO THAT.

741
00:59:18,359 --> 00:59:23,440
THERE IS A SUBSTANTIAL APPETITE
THAT WE DISCOVERED.

742
00:59:23,440 --> 00:59:33,469
THE CORPORATE WORLD LIKE LILY
FOR EXAMPLE IS MAINSTREAM IN OUR

743
00:59:33,469 --> 00:59:35,940
THINKING.
IT'S A COMBINATION OF EVERYTHING

744
00:59:35,940 --> 00:59:39,910
FROM WHAT YOU CAN MANUFACTURE
PRODUCT-WISE AND SEND DOWN AND

745
00:59:39,910 --> 00:59:41,449
COULD BE INFORMATION YOU ARE
SENDING DOWN.

746
00:59:41,449 --> 00:59:44,420
IT'S NOT A HARD PIECE OF
MATERIAL.

747
00:59:44,420 --> 00:59:52,989
IT CAN BE AN IMAGE OF A COUNTRY
OVERNIGHT OR TO INDUCE LILY TO

748
00:59:52,989 --> 00:59:57,189
LOCATE THE PLANT IN OUR COUNTRY
AND OFFER THAT RESOURCE IN ORBIT

749
00:59:57,189 --> 01:00:04,500
AS A VERY UNIQUE LABORATORY.
IT COULD BE IN THE INDUSTRY AND

750
01:00:04,500 --> 01:00:11,359
SAVING MONEY.
TO BE ABLE TO SPEND MONEY FOR

751
01:00:11,359 --> 01:00:22,439
JUST DISCREET PERIODS OF TIME
AND A CERTAIN VOLUME

752
01:00:22,439 --> 01:00:24,369
IS WHAT IT
NEEDS.

753
01:00:24,369 --> 01:00:30,009
THEY HAVE THE OPPORTUNITIES OF
FOLKS WE POSSIBLY CAN FOR THE

754
01:00:30,009 --> 01:00:39,699
LOWEST COST WE POSSIBLY CAN.
>> CAN YOU EXPLAIN HOW THE BEAM

755
01:00:39,699 --> 01:00:43,410
WILL BE EXPANDED WHETHER IT'S
THE PRESSURE OR MECHANICAL OR

756
01:00:43,410 --> 01:00:48,869
COMBINATION OF THE TWO?
>> YEAH, SO AFTER THE BEAM IS ON

757
01:00:48,869 --> 01:00:54,000
THE STATION, THE PRESSURIZATION
WILL BE THROUGH THE INNER MODULE

758
01:00:54,000 --> 01:00:56,890
FANS.
THESE ARE PRECISION FANS THAT

759
01:00:56,890 --> 01:01:05,240
MOVE AIR AND THEY WILL FLOW AIR
INTO THE BEAM MODULE.

760
01:01:05,240 --> 01:01:11,609
THAT WILL BE A CONTROLLED
EXPANSION OF IT.

761
01:01:11,609 --> 01:01:14,229
MODELS SAY ONE THING, BUT MODELS
ARE MODELS.

762
01:01:14,229 --> 01:01:23,579
WE WANT TO START AND GET UP TO A
NOMINAL PRESSURE AND BRING IT UP

763
01:01:23,579 --> 01:01:28,799
TO THE FULL PRESSURE.
REPLACEMENT GAS TO INFLATE

764
01:01:28,799 --> 01:01:32,480
ITSELF.
WE WILL BRING IT UP AFTER WE

765
01:01:32,480 --> 01:01:38,200
FINISH THE INFLATION SEQUENCE.
IT'S GAS-NEUTRAL FOR THE ENTIRE

766
01:01:38,200 --> 01:01:40,709
EXPANSION.
>> THANK YOU.

767
01:01:40,709 --> 01:01:52,410
ALL THE WAY TO THE BACK.
>> I'M WITH REUTERS AND HAVE A

768
01:01:52,410 --> 01:01:57,069
FEW QUESTIONS.
FIRST FOR MR.†BIGELOW.

769
01:01:57,069 --> 01:02:03,049
AFTER THE LAUNCH, WHAT WILL BE
THE MOST CRITICAL PARTS OF THE

770
01:02:03,049 --> 01:02:07,130
MISSION AND ARE THERE ANY
CONTINGENCIES AND ARE THERE

771
01:02:07,130 --> 01:02:14,499
ISSUES WITH IT UNFOLDING.
WHAT KIND OF PLAN DO YOU HAVE

772
01:02:14,499 --> 01:02:19,979
FOR THAT?
WE WILL START WITH THAT.

773
01:02:19,979 --> 01:02:21,949
>> MY OPINION AND FOCUS IS ON
SEALS.

774
01:02:21,949 --> 01:02:28,569
IT'S AN EXTREME ENVIRONMENT TO
PROTECT THAT ENCLOSURE.

775
01:02:28,569 --> 01:02:39,880
WHETHER IT'S IN THE B 330, MY
FIRST FOCUSES IS ON THE

776
01:02:39,880 --> 01:02:43,180
SUCCESSFUL FUNCTIONING OF ALL
THE SEAL MECHANISMS.

777
01:02:43,180 --> 01:02:46,689
I'M NOT WORRIED ABOUT ANYTHING
TO DO WITH THAT.

778
01:02:46,689 --> 01:02:50,689
I'M WORRIED ABOUT THE INTERFACE
BETWEEN THE SYSTEMS AND SOFT

779
01:02:50,689 --> 01:02:53,179
GOOD SYSTEMS.
IT'S A COMPLEX INTERFACE.

780
01:02:53,179 --> 01:02:59,180
THAT WILL BE THE FIRST CONCERN.
IF I WERE A DRINKING FELLOW, MY

781
01:02:59,180 --> 01:03:02,890
FIRST CONCERN WOULD BE GOING TO
THE FIRST TAVERN.

782
01:03:02,890 --> 01:03:10,619
IT PASSED THAT.
BUT I'M NOT.

783
01:03:10,619 --> 01:03:15,519
>> SO THERE CONTINGENCIES ON THE
OUTSIDE AND MOST EXTREME CASE

784
01:03:15,519 --> 01:03:18,279
CASE.
THEY HAVE THE CONDUCTING OF THE

785
01:03:18,279 --> 01:03:24,069
EBA ON THE OUTSIDE.
WE HAVE MULTIPLE WAYS TO

786
01:03:24,069 --> 01:03:28,589
INFLATE.
WE CAN ALSO USE THE COMPRESSED

787
01:03:28,589 --> 01:03:35,809
GAS AND IN THE MOST EXTREME CASE
IF NONE OF THE OPTIONS WORKED,

788
01:03:35,809 --> 01:03:42,099
WE CAN USE THE ROBOTIC ARM.
WE DON'T ENVISION THAT.

789
01:03:42,099 --> 01:03:50,809
THAT'S PLAN F SEVERAL DOWN THE
SCALE.

790
01:03:50,809 --> 01:03:57,660
>> REGULAR AIR AND AS FAR AS THE
FUTURE OF BEAMS OR†-- WOULD THE

791
01:03:57,660 --> 01:04:01,989
17.8 MILLION THAT I THINK NASA
IS PAYING FOR THIS, IS THAT

792
01:04:01,989 --> 01:04:05,499
ACTUALLY WHAT YOU THINK THESE
THINGS WILL COST OR IS THAT A

793
01:04:05,499 --> 01:04:08,269
SPECIAL DEMONSTRATION DISCOUNT
THAT NASA GOT?

794
01:04:08,269 --> 01:04:11,669
>> I AGREE FOR A LONG TIME OVER
THAT LOW FIGURE.

795
01:04:11,669 --> 01:04:16,469
BELIEVE ME.
THAT WAS A UNIQUE SITUATION.

796
01:04:16,469 --> 01:04:20,279
AS I MENTIONED BEFORE, THE
BUSINESS CASE IS TO SELL

797
01:04:20,279 --> 01:04:24,410
DISCREET PERIODS OF TIME AND
VOLUME.

798
01:04:24,410 --> 01:04:27,470
THIS WAS A UNIQUE SITUATION FOR
US AND FOR NASA.

799
01:04:27,470 --> 01:04:30,999
WE DID TRY TO ACCOMMODATE NASA
THE BEST WE COULD.

800
01:04:30,999 --> 01:04:36,140
>> ON THE AIR QUESTION, IT IS
OBVIOUSLY THE STATION AIR AND

801
01:04:36,140 --> 01:04:40,949
THE AIR MIXES IN THE TANKS IS UP
TO THE SAME QUALITY THAT WE FLY

802
01:04:40,949 --> 01:04:50,039
ON NORMAL MISSION AS WELL.
IT HAPPENED TO BE SOURCED FROM

803
01:04:50,039 --> 01:04:56,589
NEVADA.
>> THE REDUCED VOLUME LIKE THIS.

804
01:04:56,589 --> 01:05:01,349
CAN YOU TALK ABOUT THE RELATIVE
BALANCE BETWEEN NOT ONLY THE

805
01:05:01,349 --> 01:05:10,529
SIZE, BUT THE WEIGHT COMPARED TO
THE TYPICAL MODULE.

806
01:05:10,529 --> 01:05:13,880
>> THE ADVANTAGES ARE
TREMENDOUS.

807
01:05:13,880 --> 01:05:20,549
THAT'S HOW YOU EQUATE IT, RIGHT?
MOST OF THE MODULES DO NOT

808
01:05:20,549 --> 01:05:25,529
EXCEED 110 CUBIC METERS.
THAT'S THE LARGEST.

809
01:05:25,529 --> 01:05:29,989
SO YOU ARE GETTING THREE TIMES
THAT PER LAUNCH.

810
01:05:29,989 --> 01:05:36,609
AND IT HAPPENS TO BE AROUND
43,500 POUNDS.

811
01:05:36,609 --> 01:05:44,309
THAT'S A HUGE BENEFIT.
SOMETHING LIKE THIS WAS NOT

812
01:05:44,309 --> 01:05:49,089
OPTIMIZED.
WE HAVE A FACTOR OF SAFETY WHERE

813
01:05:49,089 --> 01:05:52,269
THEY ARE 1.5 TO TWO TIMES FACTOR
OF SAFETY.

814
01:05:52,269 --> 01:05:57,430
WE HAVE GONE OVERBOARD ON
PROTECTION BECAUSE OF THE

815
01:05:57,430 --> 01:06:03,049
UNKNOWN PERFORMANCE.
IF YOU HAVE SOMETHING LIKE THIS

816
01:06:03,049 --> 01:06:07,239
SICKNESS THAT IS CLOSE IN SIZE,
A MASS TO VOLUME PERFORMANCE

817
01:06:07,239 --> 01:06:10,589
WHICH IS THE SAME.
THAT'S THE EXTRA FACTORS OF

818
01:06:10,589 --> 01:06:14,049
SAFETY AND YOU CAN'T PREPARE
THOSE TWO APPLES TO APPLES.

819
01:06:14,049 --> 01:06:18,319
AS YOU SCALE TO LARGER SIZES,
THAT'S WHERE THE ADVANTAGE OF

820
01:06:18,319 --> 01:06:20,680
SOFT GOODS COME IN FROM A MASS
PERFORMANCE.

821
01:06:20,680 --> 01:06:23,119
THE STRENGTH OF MATERIAL
PERFORMANCE AND IF YOU LOOK AT

822
01:06:23,119 --> 01:06:37,439
METALLICS.
AND IT'S A STRENGTH IN MATERIALS

823
01:06:37,439 --> 01:06:44,809
AND STOPPING POWER.
FOR THAT.

824
01:06:44,809 --> 01:06:46,380
>> THANK YOU ALL.
I BELIEVE WE HAVE QUESTIONS FROM

825
01:06:46,380 --> 01:06:52,409
ONLINE.
WE WILL TAKE ONE.

826
01:06:52,409 --> 01:06:55,969
>> WE HAVE A QUESTION FROM
NON-SHIP HE IS ASKING THE

827
01:06:55,969 --> 01:07:00,739
COMPOSITION THAT IMPOSES
DETRIMENT TO THE SOLIDITY AS A

828
01:07:00,739 --> 01:07:03,539
PRESSURIZED HABITAT.
>> NO.

829
01:07:03,539 --> 01:07:09,009
A SIMPLE ANSWER.
THE EXTERNAL CLOTH ON THE BEAM

830
01:07:09,009 --> 01:07:13,549
IS SOMETHING WE USED ON THE
OUTSIDE.

831
01:07:13,549 --> 01:07:17,400
ALL THE COLORS WENT THROUGH
EXTENSIVE TESTING AND WENT

832
01:07:17,400 --> 01:07:25,519
THROUGH THE STANDARD PROCESSES.
>> AND FROM SOFIA, WE HAVE A

833
01:07:25,519 --> 01:07:29,959
QUESTION.
HAVE THEY USED ANY 3D PRINTING

834
01:07:29,959 --> 01:07:34,689
FOR BEAMS OR DO YOU PLAN TO?
>> WE HAVE NOT, BUT WE DO EXPECT

835
01:07:34,689 --> 01:07:42,039
THEY WILL BE A VALUABLE
COMPONENT TO FUTURE SPACECRAFT.

836
01:07:42,039 --> 01:07:51,699
>> IT IS MADE OF CLOTH AND I
IMAGINE THAT WILL BE MORE

837
01:07:51,699 --> 01:07:55,630
ABSORBENT OF SOUND CREATED BY
THE STATION.

838
01:07:55,630 --> 01:08:01,669
THE CREWS ARE SCHEDULED TO GO IN
THREE TO FOUR TIMES A YEAR.

839
01:08:01,669 --> 01:08:04,689
ARE THEY ALLOWED TO GO IN IF
THEY WANT PEACE AND THAT'S FOR

840
01:08:04,689 --> 01:08:11,049
THE TIMES.
>> THAT'S ABOUT THREE TO FOUR

841
01:08:11,049 --> 01:08:14,839
TIMES A YEAR.
WE HAVE DATA STORAGE DEVICES

842
01:08:14,839 --> 01:08:18,960
THAT ARE NOT PLUMED IN.
WE NEED TO GET THE DRIVES OUT

843
01:08:18,960 --> 01:08:24,049
AND DOWNLOAD THAT DATA.
AFTER A PERIOD OF TIME, WE WANT

844
01:08:24,049 --> 01:08:27,960
A PERIOD OF TIME TOWARDS THE
BEGINNING TO GET THE NOMINAL

845
01:08:27,960 --> 01:08:33,680
DATA.
THERE IS NOTHING THAT RESTRICTS

846
01:08:33,680 --> 01:08:45,239
THE CREW FROM GOING IN.
IT'S NOT AS QUIET AS YOU ARE

847
01:08:45,239 --> 01:08:50,080
THINKING.
THE REST OF THE STATION IS MUCH

848
01:08:50,080 --> 01:08:55,249
MORE QUIET.
NO RESTRICTIONS.

849
01:08:55,249 --> 01:08:58,589
>> THINKING AHEAD, DO YOU HAVE
ANY CUSTOMERS SIGNING

850
01:08:58,589 --> 01:09:02,750
MEMORANDUMS OF UNDERSTANDING FOR
THE LEAST TIME ON THE B-330 AND

851
01:09:02,750 --> 01:09:06,259
IS THERE FEDERAL LAW THAT WOULD
PROHIBIT YOU FROM REACHING

852
01:09:06,259 --> 01:09:08,259
AGREEMENTS WITH CERTAIN
GOVERNMENTS THAT ARE INTERESTED

853
01:09:08,259 --> 01:09:15,279
IN, FOR EXAMPLE, CHINA.
>> WE ARE AWARE OF FAVOR NATIONS

854
01:09:15,279 --> 01:09:19,929
STATUS.
WE WOULD NOT RUB ANYBODY'S NOSE

855
01:09:19,929 --> 01:09:22,980
IN THAT PROBLEM.
SORRY.

856
01:09:22,980 --> 01:09:26,580
WE ARE CONSCIOUS OF
RELATIONSHIPS THAT WE NEED TO

857
01:09:26,580 --> 01:09:36,429
AND HAVING SAID THAT, WE HAVE
ACTUALLY FOUR DIFFERENT GROUPS

858
01:09:36,429 --> 01:09:42,779
TODAY THAT WANT TO FLY
EXPERIMENTS AND PAY LOADS.

859
01:09:42,779 --> 01:09:47,139
TO DEPLOY THOSE.
THE TWO ARE COUNTRIES.

860
01:09:47,139 --> 01:09:52,799
TWO ARE COUNTRIES AND TWO ARE
CORPORATIONS.

861
01:09:52,799 --> 01:09:56,690
WE ARE HOPING IN A HALF A YEAR
OR SOMETHING WE CAN GET

862
01:09:56,690 --> 01:10:02,619
PERMISSION TO ACCOMMODATE THESE
PEOPLE IN SOME WAY.

863
01:10:02,619 --> 01:10:09,630
WE HAVE THE ELEMENT OF
SUBSTANTIAL CLIENTELE AND

864
01:10:09,630 --> 01:10:13,520
STARTING TO COLLECT THE DEPOSITS
AND THAT TYPE OF THING.

865
01:10:13,520 --> 01:10:17,989
IT HAS BEEN HOSTAGE TO THE
AVAILABILITY OF TRANSPORTATION.

866
01:10:17,989 --> 01:10:21,530
WE HAD TO THROTTLE OUR OWN
PROGRESS FROM DIFFERENT HEADS OF

867
01:10:21,530 --> 01:10:28,270
TIME ACCORDING TO THE ABILITY TO
BE THERE.

868
01:10:28,270 --> 01:10:32,350
OUR PERCEPTION TODAY IS THAT WE
WILL PROBABLY HAVE MAYBE TWO

869
01:10:32,350 --> 01:10:40,969
SYSTEMS IN 2018.
WE CAN MAYBE MAKE THE SYSTEM.

870
01:10:40,969 --> 01:10:56,969
>> WE HAVE A COUPLE QUESTIONS UP
FRONT AND WORK OUR WAY TO MARK.

871
01:10:56,969 --> 01:11:03,679
>> I WAS HOPING TO GET AN IDEA
HOW AND IF THIS TECHNOLOGY CAN

872
01:11:03,679 --> 01:11:06,800
CHANGE THE EVOLUTION AND DESIGN
OF THE INTERNATIONAL SPACE

873
01:11:06,800 --> 01:11:08,650
STATION.
SHOULD WE SEE MORE BEING

874
01:11:08,650 --> 01:11:13,010
ATTACHED?
>> SO AT THIS POINT IN TIME, WE

875
01:11:13,010 --> 01:11:18,250
DON'T ENVISION ANY MAJOR CHANGES
ON THE NASA SIDE OR EVEN THE

876
01:11:18,250 --> 01:11:23,699
INTERNATIONAL STRUCTURE OF THE
ISS ITSELF.

877
01:11:23,699 --> 01:11:29,739
HOW DO WE TRANSITION?
WE ARE TRYING TO FIGURE IT OUT

878
01:11:29,739 --> 01:11:33,880
BETWEEN US AND THE COMMERCIAL
ORGANIZATIONS LIKE BIGELOW AND

879
01:11:33,880 --> 01:11:41,090
HOW WE TRANSITION FROM AN ISS
MODEL TO LOWER THE ORBIT WHERE

880
01:11:41,090 --> 01:11:46,679
NASA IS JUST ONE OF HOPEFULLY
MANY THAT INVOLVE GOING FROM

881
01:11:46,679 --> 01:11:50,199
SPACE STATION TO A MODULE
STATION TO A FREE FLYER.

882
01:11:50,199 --> 01:11:52,630
WE DON'T KNOW AT THIS POINT IF
THERE DESIRES.

883
01:11:52,630 --> 01:11:57,500
WE WILL HAVE TO FIGURE THAT OUT
OVERCOMING YEARS.

884
01:11:57,500 --> 01:12:01,790
>> THIS IS A FOLLOW-UP.
I HEAR ABOUT THE DESIGN

885
01:12:01,790 --> 01:12:13,130
CHALLENGES AND THE ISSUES OF
BRINGING THIS TO FRUITION.

886
01:12:13,130 --> 01:12:15,730
>> UP TO THIS POINT TO AN
INCREDIBLE STAFF.

887
01:12:15,730 --> 01:12:24,320
WE RECEIVED GOOD ADVICE FROM
NASA IN THIS PROCESS.

888
01:12:24,320 --> 01:12:30,070
THEY WERE PROVIDING INSIGHT AS
OPPOSED TO OVERSIGHT WHICH IS

889
01:12:30,070 --> 01:12:37,599
THE IMPORTANT DISTINCTION THERE.
WE WERE ALLOWED TO PROCEED THE

890
01:12:37,599 --> 01:12:44,460
ARCHITECTURE AND THE FULL
COMPLIMENT ON OUR OWN WITH NASA

891
01:12:44,460 --> 01:12:49,790
INPUT HERE AND THERE.
I THINK WE HAD A GOOD SYMBIOTIC

892
01:12:49,790 --> 01:12:54,210
RELATIONSHIP WITH OUR TEAM OF
FOLKS AND NASA PEOPLE AND WE ARE

893
01:12:54,210 --> 01:12:58,110
HOPING IF THERE IS A FOLLOW
ALONG PROJECT, WE CAN MAINTAIN

894
01:12:58,110 --> 01:13:05,790
THAT SAME GROUP OF PEOPLE
AND

895
01:13:05,790 --> 01:13:10,821
THAT SAME SPIRIT.
>> FROM THE NASA SIDE, AND WE

896
01:13:10,821 --> 01:13:14,989
SHARED OUR EXPERTISE AND
OBVIOUSLY THE WHOLE LESSONS

897
01:13:14,989 --> 01:13:18,820
LEARNED FROM THE ISS ITSELF.
THE BIGGEST CHALLENGES WERE NOT

898
01:13:18,820 --> 01:13:22,230
SO MUCH THE DEVELOPMENT OF THE
STRUCTURE AND HOW DO YOU DO FOR

899
01:13:22,230 --> 01:13:25,349
THE FIRST TIME THE EXPANSION IN
SPACE.

900
01:13:25,349 --> 01:13:27,949
HOW IS THAT DYNAMICALLY GOING TO
WORK AND HOW ARE LOADS AND

901
01:13:27,949 --> 01:13:32,510
MODELS AND WE DON'T HAVE THIS
FOR THE STRUCTURES PERFORMING.

902
01:13:32,510 --> 01:13:36,070
THAT UNKNOWN MADE US DO A LOT OF
HOMEWORK.

903
01:13:36,070 --> 01:13:40,599
EVEN IF THE UNLIKELY
CIRCUMSTANCES, THE THINGS THAT

904
01:13:40,599 --> 01:13:43,610
YOU HOPE NEVER HAPPEN.
THESE ARE THE HARDEST THINGS TO

905
01:13:43,610 --> 01:13:49,869
HAPPEN.
WE CAN DO A JETSON AT THAT

906
01:13:49,869 --> 01:13:58,139
POINT.
s THOSE ARE MOST OF THE

907
01:13:58,139 --> 01:14:04,139
MANUFACTURING AND DESIGN AND IT
WAS ALL BIGELOW.

908
01:14:04,139 --> 01:14:06,110
>> I THINK EVERYONE SAVED THEIR
QUESTIONS FOR YOU.

909
01:14:06,110 --> 01:14:11,380
WE WILL GO TO ONE MORE WITH MARK
AND HAVE A FINAL QUESTION AFTER

910
01:14:11,380 --> 01:14:14,630
THAT.
>> VERY INTERESTING

911
01:14:14,630 --> 01:14:18,520
PRESENTATION.
A COUPLE PARTS TO MY QUESTION.

912
01:14:18,520 --> 01:14:20,909
THEY WILL GO UP TO THE SPACE
STATION.

913
01:14:20,909 --> 01:14:26,831
I SEE IT BEING ATTACHED TO IT AS
A SPACE AND LET'S SAY THERE WERE

914
01:14:26,831 --> 01:14:33,930
REPAIRS OR TECHNOLOGY TO BE DONE
IN A SMALLER FORM.

915
01:14:33,930 --> 01:14:36,150
IT WOULD BE WELL USABLE THAT
ADDITIONAL SPACE.

916
01:14:36,150 --> 01:14:40,440
IF I LOOK AT THE LAST SLIDE
SHOWING THE SPACE STATION IMAGE

917
01:14:40,440 --> 01:14:44,199
OF TWO BIGELOWS PUT TOGETHER, I
WANT TO ASK YOU THIS.

918
01:14:44,199 --> 01:14:49,989
CURRENTLY THE SPACE STATION IS
STRUCTURED INTERIOR IN TERMS OF

919
01:14:49,989 --> 01:14:53,159
ONE OF THE WAYS.
I KNOW WE WERE WORKING IN A

920
01:14:53,159 --> 01:14:58,119
WEIGHTLESS ATMOSPHERE.
HOW MUCH COULD THE BIGELOWS, TWO

921
01:14:58,119 --> 01:15:04,969
OF THEM INCORPORATED IN TERMS OF
STRUCTURE, INTERIOR OF WHAT IS

922
01:15:04,969 --> 01:15:07,929
IN THE CURRENT SPACE STATION AND
HOW WOULD THEY STRUCTURALLY

923
01:15:07,929 --> 01:15:13,480
ATTACH TO THIS AND HOW MUCH
WEIGHT COULD THE BIGELOW

924
01:15:13,480 --> 01:15:18,699
STRUCTURE SUPPORT?
>> INITIALLY YOU ARE CONSTRAINED

925
01:15:18,699 --> 01:15:22,590
BY THE ABILITY OF THE LAUNCH
VEHICLE, RIGHT?

926
01:15:22,590 --> 01:15:25,800
IN OUR CASE WE HAVE TO FIT
WITHIN TWO THINGS.

927
01:15:25,800 --> 01:15:30,520
THE VEHICLE THAT CAN LIFT 43,500
POUNDS AND A VEHICLE THAT HAS A

928
01:15:30,520 --> 01:15:34,750
LINK OF WHICH THERE IS ONLY ONE
AT THE MOMENT.

929
01:15:34,750 --> 01:15:39,500
FOR THE NEXT FORESEEABLE FEW
YEARS AND THAT HAPPENS TO BE THE

930
01:15:39,500 --> 01:15:46,270
552 STRETCH FORRING.
THOSE ARE WHAT WE HAVE IN THIS

931
01:15:46,270 --> 01:15:51,380
ARCHITECTURE.
ONCE YOU ARE ON ORBIT,

932
01:15:51,380 --> 01:15:55,079
ESSENTIALLY YOU HAVE A
TREMENDOUS VOLUME TO CONTINUE TO

933
01:15:55,079 --> 01:15:58,210
BRING UP AN ENORMOUS AMOUNT OF
SUPPLIES.

934
01:15:58,210 --> 01:16:00,770
THESE AS TESTING STATIONS WOULD
BE IDEAL.

935
01:16:00,770 --> 01:16:08,199
YOU COULD RUN TWO DIFFERENT
SYSTEMS AT THE SAME TIME AND BE

936
01:16:08,199 --> 01:16:12,079
ABLE TO VALIDATE ONE OR THE
OTHER AND ONE MAY BE A SYSTEM

937
01:16:12,079 --> 01:16:14,610
THAT IS OLDER, MORE RELIABLE
BECAUSE YOU HAD HISTORY ON THAT.

938
01:16:14,610 --> 01:16:18,530
ONE YOU INTEND TO USE FOR D
SPACE AND YOU DON'T WANT TO TEST

939
01:16:18,530 --> 01:16:22,140
IT.
YOU WANT TO TEST IT CLOSER TO

940
01:16:22,140 --> 01:16:24,460
HOME.
YOU COULD OUTFIT THESE AND WE

941
01:16:24,460 --> 01:16:28,070
HAVE ABOUT 28 OR 30 DIFFERENT
DESIGN REFERENCE MISSIONS.

942
01:16:28,070 --> 01:16:32,590
EVERYTHING FROM A FARM THAT WE
HEARD ABOUT EARLIER TODAY OR A

943
01:16:32,590 --> 01:16:36,270
HOSPITAL OR A MEDICAL FACILITY.
THE SURGERY AREA.

944
01:16:36,270 --> 01:16:40,869
THERE 28 OR 30 DIFFERENT KINDS
OF DISUSES CAN CAN PUT THE

945
01:16:40,869 --> 01:16:51,010
SYSTEM TO.
>> [INAUDIBLE].

946
01:16:51,010 --> 01:16:58,621
IT IS EXACTLY THAT.
AN EXPERIMENTAL STAGE THAT WE

947
01:16:58,621 --> 01:17:08,270
CAN SEE WHAT IT INCORPORATED.
>> WE ARE IN THE EARLY STAGE OF

948
01:17:08,270 --> 01:17:16,540
A NEW SPACECRAFT THAT OFFERS A
LOT OF PROMISE.

949
01:17:16,540 --> 01:17:22,789
>> WE HAVE A FINAL QUESTION.
>> THAT'S A LONG TIME COMING FOR

950
01:17:22,789 --> 01:17:27,120
YOU.
GETTING IT UP TO THE STATION IS

951
01:17:27,120 --> 01:17:29,659
A BIG DEAL.
WHAT IS YOUR EMOTIONAL STATE?

952
01:17:29,659 --> 01:17:32,670
WHAT ARE YOU FEELING ABOUT THE
LAUNCH?

953
01:17:32,670 --> 01:17:39,110
>> I'M PROUD OF OUR STAFF.
I'M A VERY THANKFUL TO NASA

954
01:17:39,110 --> 01:17:42,830
GIVING US THIS OPPORTUNITY.
I HOPE THINGS GO WELL TOMORROW

955
01:17:42,830 --> 01:17:49,600
AND WHENEVER THE LAUNCH OCCURS.
WE ARE THINKING AHEAD AS WE

956
01:17:49,600 --> 01:17:53,559
ALWAYS DO AND THE NEXT PROJECT
WE ARE ANXIOUS FOR THE PROJECT

957
01:17:53,559 --> 01:17:58,880
TO BE LAUNCHED AND SUCCESSFUL.
WE CAN START WORKING ON THE NEXT

958
01:17:58,880 --> 01:18:02,909
ITERATION OF THE NEXT
SPACECRAFT.

959
01:18:02,909 --> 01:18:05,900
>> THANK YOU ALL.
THANK YOU, GENTLEMEN.

960
01:18:05,900 --> 01:18:07,789
THAT IS ALL THE TIME WE HAVE FOR
TODAY.

961
01:18:07,789 --> 01:18:10,370
THANK YOU FOR JOINING US FOR
WHAT'S ON BOARD TO DISCUSS THIS

962
01:18:10,370 --> 01:18:12,599
EXCITING SCIENCE OF HEADING TO
STATION.

963
01:18:12,599 --> 01:18:16,090
AS A REMINDER, OUR NEXT LAUNCH
IS TARGETED FOR FRIDAY, APRIL

964
01:18:16,090 --> 01:18:19,820
8th AT 4:43 P.M. AND WE HOPE YOU
WILL TUNE IN.