



SAN DIEGO
COMIC CON

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1

00:00:01,459 --> 00:00:10,420

PLEASE STATE THE NATURE OF YOUR INSPIRATIONAL EMERGENCY.

2

00:00:10,420 --> 00:00:11,700

[CHEERING]

3

00:00:11,700 --> 00:00:18,949

BECAUSE WE HAVE YOUR TREATMENT PROTOCOL THE
STAR TREK NASA PANEL BUT FIRST A MESSAGE FROM

4

00:00:18,949 --> 00:00:24,939

THE CAPTAIN:

5

00:00:24,939 --> 00:00:30,730

[MUSIC]

6

00:00:30,730 --> 00:00:36,399

NASA WORKS BY SCIENCE.

7

00:00:36,399 --> 00:00:47,969

O-RINGS, BETTER WORK, AMOUNT OF ENERGY, THE
THRUST TO LIFT AND FREE OURSELVES FROM GRAVITY,

8

00:00:47,969 --> 00:00:54,329

THE MATHEMATICS INVOLVED IN STUDYING AN ARC
THERE BECAUSE WE WANT TO LAND OVER THERE,

9

00:00:54,329 --> 00:00:56,460

ALL THAT'S MATHEMATICAL.

10

00:00:56,460 --> 00:01:00,320

BUT, SCIENCE FICTION IS TOTALLY IMAGINATIVE.

11

00:01:00,320 --> 00:01:02,649

IT'S THE EXACT OPPOSITE.

12

00:01:02,649 --> 00:01:09,070

WHAT HAPPENS IF LIGHT THAT IS BENT AND YOU

COULD GO THROUGH THE CENTER AND MAKE IT QUICK?

13

00:01:09,070 --> 00:01:19,649

THERE--ALL THESE IMAGINATIVE EXERCISES IN
SCIENCE FICTION IS MERELY FOOD FOR THE IMAGINATION

14

00:01:19,649 --> 00:01:27,020

OF SCIENTISTS WHO ARE ACTUALLY WORKING WITH
TECHNOLOGY THAT IS.

15

00:01:27,020 --> 00:01:30,970

IMAGINE SENDING A VEHICLE TO TAKE A PHOTOGRAPH
OF PLUTO.

16

00:01:30,970 --> 00:01:33,420

IT'LL COME AROUND AND TAKE AROUND.

17

00:01:33,420 --> 00:01:36,310

IT'LL MOVE AROUND AND KEEP GOING.

18

00:01:36,310 --> 00:01:37,729

YOU CAN'T DO THAT ON A MOTORCYCLE.

19

00:01:37,729 --> 00:01:40,480

I MEAN, YOU KNOW, YOU SET YOUR COURSE ON A
MOTORCYCLE.

20

00:01:40,480 --> 00:01:44,509

IF YOU DON'T HIT YOUR LINE, YOU'RE GOING TO
FALL.

21

00:01:44,509 --> 00:01:47,380

WELL, TAKE IT AROUND THERE.

22

00:01:47,380 --> 00:01:56,600

IT'S PHENOMENAL WHAT NASA IS DOING WITH SCIENCE
THAT IS, WHEN YOU LOOK AT IT, IS THE EQUAL

23

00:01:56,600 --> 00:01:57,899

OF SCIENCE FICTION.

24

00:01:57,899 --> 00:02:03,060

HOW ARE YOU GOING TO MAKE A PARACHUTE THAT'S
GOING TO STOP A VEHICLE?

25

00:02:03,060 --> 00:02:05,159

IT POPS OUT AND IT'S GOING TO STOP IT.

26

00:02:05,159 --> 00:02:06,159

IT'S NOT A MIRACLE.

27

00:02:06,159 --> 00:02:07,159

HOW MUCH LINE DO YOU NEED?

28

00:02:07,159 --> 00:02:08,159

WHAT'S YOUR MATERIAL GOING TO BE?

29

00:02:08,159 --> 00:02:13,890

HOW DO YOU SLOW IT DOWN BEFORE THE--AND THEN
YOU GOT SEND A SIGNAL, AND IS IT SEVEN OR

30

00:02:13,890 --> 00:02:15,080

NINE MINUTES LATER?

31

00:02:15,080 --> 00:02:18,980

THE SIGNAL--I MEAN IT'S SCIENCE FICTION.

32

00:02:18,980 --> 00:02:26,660

SHADOWS THAT CROSS IN FRONT OF A STAR THAT
SUGGEST THERE'S A PLANET, AND IT'S A BIG ENOUGH

33

00:02:26,660 --> 00:02:29,870

PLANET TO BE THE SIZE OF THE M-1--OF THE EARTH.

34

00:02:29,870 --> 00:02:38,550

IS IT POSSIBLE THAT LIFE EXISTS ON THAT PLANET
THAT'S ONLY A SHADOW IN A TELESCOPE?

35

00:02:38,550 --> 00:02:44,500

THOSE ARE THE IMAGINATIVE THINGS THAT NASA
ARE LOOKING AT THAT'S EVERY BIT AS PASSIONATELY

36

00:02:44,500 --> 00:02:48,450

IMAGINATIVE AS SCIENCE FICTION.

37

00:02:48,450 --> 00:02:54,920

WHAT YOU GUYS ARE WORKING ON, IT'S INCREDIBLE.

38

00:02:54,920 --> 00:02:56,360

[MUSIC]

39

00:02:56,360 --> 00:03:00,300

TO SEEK OUT NEW LIFE, MY FIRST QUESTION IS
FOR YOU, AMBER.

40

00:03:00,300 --> 00:03:05,140

HOW WILL THE JAMES WEBB SPACE TELESCOPE AND
FUTURE TELESCOPES HELP US IN OUR SEARCH FOR

41

00:03:05,140 --> 00:03:06,940

LIFE IN THE UNIVERSE?

42

00:03:06,940 --> 00:03:13,780

OH, YEAH, SO, THE JAMES WEBB SPACE TELESCOPE,
FIRST OF ALL, HOW MANY OF YOU HAVE HEARD OF

43

00:03:13,780 --> 00:03:14,780

IT?

44

00:03:14,780 --> 00:03:15,780

BE HONEST.

45

00:03:15,780 --> 00:03:16,780

OH, YES.

46

00:03:16,780 --> 00:03:17,780

OKAY.

47

00:03:17,780 --> 00:03:18,780

SO, WE'RE STILL A FEW YEARS FROM LAUNCH.

48

00:03:18,780 --> 00:03:21,590

SO, A LOT OF TIMES IN A CROWD WHEN I ASK THAT,
IT'S ONLY MAYBE--MAYBE 10 PERCENT IF I'M LUCKY.

49

00:03:21,590 --> 00:03:24,310

BUT, Y'ALL ARE IN THE KNOW, WHICH I LOVE.

50

00:03:24,310 --> 00:03:26,430

SO, YEAH, IT'S THE JAMES WEBB SPACE TELESCOPE.

51

00:03:26,430 --> 00:03:29,690

WE'RE BUILDING IT AS THE SUCCESSOR TO THE
HUBBLE SPACE TELESCOPE.

52

00:03:29,690 --> 00:03:32,830

AND SO, ALL SAID AND DONE, IT'S GOING TO BE
ABOUT 100 TIMES MORE POWERFUL THAN HUBBLE.

53

00:03:32,830 --> 00:03:34,170

SO, IT'S GOING TO BE AMAZING.

54

00:03:34,170 --> 00:03:39,280

THERE'S THIS AWESOME PICTURE UP HERE AND VIDEOS
THAT ARE SHOWING, GIVE YOU A LITTLE GLIMPSE

55

00:03:39,280 --> 00:03:41,220

OF IT.
AND I HOPE WHAT YOU CAN SEE IN HERE IS HOW

56

00:03:41,220 --> 00:03:42,220

BIG THIS THING IS.

57

00:03:42,220 --> 00:03:46,600

IT IS BY FAR THE BIGGEST TELESCOPE THAT WE'VE

EVER SENT INTO SPACE.

58

00:03:46,600 --> 00:03:50,310

IT'S SO BIG THAT WE HAVE TO FOLD IT UP, PUT IT INSIDE THE ROCKET, AND THEN IT DEPLOYS

59

00:03:50,310 --> 00:03:51,410

ONCE IT GETS INTO ORBIT.

60

00:03:51,410 --> 00:03:54,160

IT'S ABOUT FOUR STORIES TALL, TOP TO BOTTOM.

61

00:03:54,160 --> 00:03:56,570

AND IT'S GOT A MASSIVE SUN SHIELD THAT ISN'T SHOWN HERE.

62

00:03:56,570 --> 00:03:58,120

IT'S ABOUT THE SIZE OF A TENNIS COURT.

63

00:03:58,120 --> 00:04:01,580

TO GIVE YOU A SENSE OF SCALE, LIKE, IT ABSOLUTELY WOULDN'T FIT IN THIS ROOM.

64

00:04:01,580 --> 00:04:02,580

SO, IT'S HUGE.

65

00:04:02,580 --> 00:04:07,050

AND WE NEED THIS HUGE TELESCOPE TO HELP US ANSWER THESE FUNDAMENTAL QUESTIONS ABOUT THE

66

00:04:07,050 --> 00:04:11,040

UNIVERSE, QUESTIONS ABOUT EARLY GALAXIES, WHICH I'M REALLY INTERESTED IN, BUT THEN ALSO

67

00:04:11,040 --> 00:04:14,140

THIS ULTIMATE QUESTION OF ARE WE ALONE IN THE UNIVERSE.

68

00:04:14,140 --> 00:04:18,829

SO, WITH THIS TELESCOPE, ONE OF THE AWESOME THINGS THAT WE HOPE TO BE ABLE TO DO IS REALLY

69

00:04:18,829 --> 00:04:23,879

EXPAND ON THE KNOWLEDGE THAT WE'VE GAINED FROM OTHER TELESCOPES, LIKE THE KEPLER TELESCOPE,

70

00:04:23,879 --> 00:04:25,969

AND LEARN IN DETAIL ABOUT EXOPLANETS.

71

00:04:25,969 --> 00:04:32,639

SO, FROM THE KEPLER TELESCOPE, WE'VE NOW LEARNED THAT THERE ARE THOUSANDS OF CONFIRMED EXOPLANETS

72

00:04:32,639 --> 00:04:34,449

ORBITING OTHER STARS.

73

00:04:34,449 --> 00:04:35,449

SO, THINK ABOUT THAT.

74

00:04:35,449 --> 00:04:40,069

I MEAN WHEN I WAS A KID GROWING UP IN RURAL ARKANSAS, THE ONLY PLANETS WE KNEW OF WERE

75

00:04:40,069 --> 00:04:41,090

IN OUR OWN SOLAR SYSTEM.

76

00:04:41,090 --> 00:04:46,780

YOU KNOW, SO, THIS HAS BEEN AN ABSOLUTE FUNDAMENTAL PARADIGM SHIFT OF OUR KNOWLEDGE ABOUT THE

77

00:04:46,780 --> 00:04:52,210

UNIVERSE, REALLY JUST, YOU KNOW, THE LAST 20 YEARS, BUT REALLY IN THE LAST FIVE TO 10

78

00:04:52,210 --> 00:04:53,210

YEARS.

79

00:04:53,210 --> 00:04:55,580

KEPLER HAS CHANGED THE WAY THAT WE UNDERSTAND
HOW PLANETS FORM.

80

00:04:55,580 --> 00:05:00,639

SO, IF YOU GO OUTSIDE AT NIGHT AND POINT UP
AT A STAR, ALMOST CERTAINLY IT HAS A PLANET

81

00:05:00,639 --> 00:05:03,960

AROUND IT. AND, YOU KNOW, THAT'S SOMETHING
THAT WE DIDN'T KNOW EVEN 10 YEARS AGO.

82

00:05:03,960 --> 00:05:06,759

BUT, KEPLER HAS SHOWN US THAT PLANETS ARE
COMMON.

83

00:05:06,759 --> 00:05:10,680

BUT, WE HAVEN'T YET BEEN ABLE TO STUDY THEM
IN DETAIL.

84

00:05:10,680 --> 00:05:17,270

AND SO, WHAT THIS TELESCOPE IS GOING TO ALLOW
US TO DO IS LOOK FOR PLANETS, STARS AND PLANETS,

85

00:05:17,270 --> 00:05:19,249

THAT ARE RELATIVELY NEARBY.

86

00:05:19,249 --> 00:05:22,349

WE WATCH THE PLANET TRANSIT IN FRONT OF ITS
STAR.

87

00:05:22,349 --> 00:05:28,219

AND THEN WE LOOK AT THE STARLIGHT THAT PASSES
THROUGH THE ATMOSPHERES OF THESE EXOPLANETS

88

00:05:28,219 --> 00:05:29,770

WITH THIS AMAZING, HUGE TELESCOPE.

89

00:05:29,770 --> 00:05:35,090

AND SO, WE NEED THIS BIG MIRROR AND THE REALLY,
REALLY ADVANCED DETECTORS THAT WE HAVE ON

90

00:05:35,090 --> 00:05:40,200

THE TELESCOPE TO STUDY IN DETAIL THOSE ATMOSPHERES
OF THOSE EXOPLANETS.

91

00:05:40,200 --> 00:05:42,840

SO, WHAT ARE WE LOOKING FOR?

92

00:05:42,840 --> 00:05:45,719

OF COURSE, WE'RE LOOKING FOR SIGNS OF LIFE.

93

00:05:45,719 --> 00:05:48,289

YOU KNOW, WE'RE LOOKING FOR HABITABLE PLANETS.

94

00:05:48,289 --> 00:05:55,190

NOW, FINDING THOSE, REALLY HARD TO DO, ABSOLUTELY
BELIEVE THAT THERE'S LIFE OUT THERE.

95

00:05:55,190 --> 00:05:56,880

ABSOLUTELY, I BELIEVE THAT.

96

00:05:56,880 --> 00:06:02,810

WE'D HAVE TO SORT OF HIT THE JACKPOT TO GET
A CONFIRMATION WITH JAMES WEBB, YOU KNOW,

97

00:06:02,810 --> 00:06:04,240

IN ITS OPERATING LIFETIME.

98

00:06:04,240 --> 00:06:09,639

BUT, ABSOLUTELY, THIS TELESCOPE IS THE NEXT
STEP, NEXT BIG STEP IN OUR SEARCH FOR LIFE

99

00:06:09,639 --> 00:06:10,909

IN THE UNIVERSE.

100

00:06:10,909 --> 00:06:18,669

THANK YOU, AND BOBAK [SP] OF FIRST CASSINI
CURIOSITY, NOW EUROPA, HOW ARE YOU AT JPL

101

00:06:18,669 --> 00:06:19,880

EXPANDING OUR SEARCH?

102

00:06:19,880 --> 00:06:22,979

I'M--SO, I'M NOT LOOKING FOR THE CIVILIZATIONS
PART BECAUSE THAT'D BE TERRIFYING IF THEY

103

00:06:22,979 --> 00:06:26,979

WERE ELSEWHERE IN OUR SOLAR SYSTEM AND WE
HADN'T FOUND THEM YET.

104

00:06:26,979 --> 00:06:31,150

BUT, NO, I REALLY--I FUNDAMENTALLY BELIEVE--SO,
I MEAN, THE CRAZY THING IS, YOU KNOW, WE LOOK

105

00:06:31,150 --> 00:06:34,449

AT EARTH, AND IT'S THIS ONE DATA POINT TO
UNDERSTAND.

106

00:06:34,449 --> 00:06:37,800

OUR ENTIRE UNDERSTANDING OF LIFE COMES FROM
ONE DATA POINT, EFFECTIVELY.

107

00:06:37,800 --> 00:06:42,370

BUT, THE IDEA NOW, AS WE KIND OF LOOK OUT
IN, YOU KNOW, IN THE UNIVERSE, AND AS WELL

108

00:06:42,370 --> 00:06:48,009

JUST KIND OF NEARBY, IS THAT ALL THE INGREDIENTS
WE BELIEVE ARE NECESSARY FOR LIFE EXIST IN

109

00:06:48,009 --> 00:06:54,559

A VARIETY OF PLACES, YOU KNOW, PLACES LIKE
MARS, BUT ALSO THESE ICY WORLDS, THESE MOONS

110

00:06:54,559 --> 00:06:55,630

OF JUPITER AND SATURN.

111

00:06:55,630 --> 00:07:01,439

AND WITH EUROPA, YOU KNOW, WE'RE SENDING A MISSION THERE, POSSIBLY UP TO TWO MISSIONS

112
00:07:01,439 --> 00:07:05,219
THERE, TO LOOK FOR REAL EVIDENCE OF HABITABILITY AND POSSIBLY LIFE.

113
00:07:05,219 --> 00:07:08,849
AND THAT'S BECAUSE, YOU KNOW, EUROPA IS THIS MOON ABOUT THE SIZE OF OUR MOON, WITH ABOUT

114
00:07:08,849 --> 00:07:14,250
TWO THREE TIMES THE WATER OF EARTH, WE BELIEVE, THAT EXISTS KIND OF IN A WARM, RELATIVELY

115
00:07:14,250 --> 00:07:16,199
WARM OCEAN BELOW THIS ICY SHELL.

116
00:07:16,199 --> 00:07:18,059
THAT'S WHAT WE THINK IS THERE.

117
00:07:18,059 --> 00:07:21,259
THAT'S WHAT WE'RE GOING TO GO TRY TO CONFIRM, AND THEN TO LOOK FOR THE INGREDIENTS.

118
00:07:21,259 --> 00:07:23,969
BUT, IT'S, YOU KNOW, IT'S THE CHEMISTRY.

119
00:07:23,969 --> 00:07:24,969
IT'S THE ENERGY.

120
00:07:24,969 --> 00:07:26,509
AND IT'S HAD THAT KIND OF PRESENCE FOR A LONG TIME.

121
00:07:26,509 --> 00:07:30,319
SO, I ABSOLUTELY BELIEVE THAT, YOU KNOW, WE HAVE THE CHANCE TO FIND LIFE IN OUR OWN SOLAR

122

00:07:30,319 --> 00:07:31,470
SYSTEM OUTSIDE OF EARTH.

123
00:07:31,470 --> 00:07:36,930
I THINK THAT IT MAY NOT, YOU KNOW, LOOK LIKE
THE VULCANS OR ANYTHING LIKE THAT.

124
00:07:36,930 --> 00:07:39,639
BUT, WE MAY MAKE FIRST CONTACT HOPEFULLY BEFORE
2061.

125
00:07:39,639 --> 00:07:41,360
SO, I'M KIND OF OPTIMISTIC.

126
00:07:41,360 --> 00:07:43,039
WITH A MICROBE?

127
00:07:43,039 --> 00:07:44,039
WITH A MICROBE.

128
00:07:44,039 --> 00:07:47,150
YEAH, I MEAN IT'S GOING TO BE A LITTLE DIFFERENT
THAN YOU IMAGINED.

129
00:07:47,150 --> 00:07:51,449
YOU KNOW, JAMES CROMWELL TO JUST LIKE KIND
OF DO THIS.

130
00:07:51,449 --> 00:07:55,710
CAN I COMPARE AND CONTRAST TO THEIR COMMENTS?

131
00:07:55,710 --> 00:07:56,710
ABSOLUTELY.

132
00:07:56,710 --> 00:08:01,550
SO, ONE OF THE THING--IT'S SO EXCITING TO
BE ABLE TO SIT HERE AND LISTEN TO WHAT WE

133
00:08:01,550 --> 00:08:04,290

WERE DOING, LOOKING WAY OUT IN THE DISTANCE.

134
00:08:04,290 --> 00:08:10,199
AND LET ME JUST COMPARE AND CONTRAST A LITTLE
BIT OF EXPERIENCE OF WHAT WE'RE DOING ON THE

135
00:08:10,199 --> 00:08:11,309
SPACE STATION.

136
00:08:11,309 --> 00:08:20,351
THESE GUYS ARE LOOKING OUT FOR LIFE OUTSIDE
THE SOLAR SYSTEM, AND THE SPACE STATION, OUR

137
00:08:20,351 --> 00:08:23,000
VIEWS OF THE EARTH.

138
00:08:23,000 --> 00:08:25,370
AND IT IS ABSOLUTELY BEAUTIFUL.

139
00:08:25,370 --> 00:08:30,780
AND WHEN YOU ARE ON--WHEN YOU ARE IN LOW-EARTH
ORBIT, AND YOU LOOK OUT, YOU CAN SEE OVER

140
00:08:30,780 --> 00:08:35,400
THE CURVATURE OF THE EARTH, OBVIOUSLY, AND
SEE OUT INTO DEEP SPACE.

141
00:08:35,400 --> 00:08:39,180
THERE'S CONSTELLATIONS, AND THE VIEW OF THE
NIGHT SKY IS ABSOLUTELY INCREDIBLE FROM UP

142
00:08:39,180 --> 00:08:40,180
THERE.

143
00:08:40,180 --> 00:08:44,150
BUT, THE ONE THING, YOU KNOW, WHEN PEOPLE
ASK ME DO YOU THINK THERE'S LIFE OUT THERE,

144
00:08:44,150 --> 00:08:45,620

MY ANSWER IS I DON'T KNOW.

145

00:08:45,620 --> 00:08:51,510

BUT, WHAT I DO KNOW IS THAT THE EARTH IS ABSOLUTELY
UNIQUE AND ABSOLUTELY BEAUTIFUL.

146

00:08:51,510 --> 00:08:55,650

AND IT IS OUR--TO USE A CLICHÉ--SPACESHIP.

147

00:08:55,650 --> 00:08:58,250

WE ARE ALL CREW MEMBERS ON THIS SPACESHIP.

148

00:08:58,250 --> 00:09:03,750

AND LIVING ON THE SPACE STATION, IT BECOMES
IMMEDIATELY CLEAR THAT IF YOU DO NOT TAKE

149

00:09:03,750 --> 00:09:08,020

OF THE SPACE STATION, IF WE AREN'T DOING THE
MAINTENANCE THAT WE NEED TO DO, IF WE TREAT

150

00:09:08,020 --> 00:09:14,440

THE SPACE STATION CARELESSLY, THAT THERE IS
A VERY, VERY REAL PROBABILITY OF THE SPACE

151

00:09:14,440 --> 00:09:17,950

STATION BREAKING AND NOT BEING ABLE TO SUSTAIN
OUR LIFE.

152

00:09:17,950 --> 00:09:22,220

SO, WE SPENT--I SPENT ABOUT 30 PERCENT OF
MY TIME TAKING CARE OF THE SPACE STATION WHILE

153

00:09:22,220 --> 00:09:23,580

I WAS UP THERE.

154

00:09:23,580 --> 00:09:29,900

IT IS WHAT PROVIDES US OXYGEN AND WATER, FOOD
AND PROTECTION FROM RADIATION, A BREATHABLE

155

00:09:29,900 --> 00:09:30,900
ATMOSPHERE.

156
00:09:30,900 --> 00:09:35,280
AND THEN, WHEN YOU LOOK BACK AT THE EARTH,
IT IS GORGEOUS, BUT IT IS FRAGILE.

157
00:09:35,280 --> 00:09:42,950
YOU CAN SEE A VERY, VERY THIN BLUE LINE THAT
SEPARATES HUMANITY FROM THE COLD VOID OF SPACE.

158
00:09:42,950 --> 00:09:48,120
AND WE DO NOT SPEND ANYWHERE NEAR 30 PERCENT
OF OUR TIME TAKING CARE OF THIS PLANET.

159
00:09:48,120 --> 00:09:49,120
IT IS FRAGILE.

160
00:09:49,120 --> 00:09:51,540
IT IS FINITE.

161
00:09:51,540 --> 00:09:52,880
IT IS OUR HOME.

162
00:09:52,880 --> 00:09:58,630
AND AS WE LOOK INTO SPACE, I THINK THE OTHER
THING THAT NASA HELPS US DO IS LOOK BACK AT

163
00:09:58,630 --> 00:10:04,200
OUR PLANET, AT OUR HOME, TO STUDY OUR HOME
PLANET AND FIGURE OUT WAYS THAT WE CAN--WHAT

164
00:10:04,200 --> 00:10:09,150
WE CAN DO TO TAKE BETTER CARE OF IT.
AND SO, I THINK IT'S AWESOME THAT WE ARE LOOKING

165
00:10:09,150 --> 00:10:15,320
OUTWARD, BUT WE NEED TO CONTINUE TO LOOK INWARD
AS WELL AND MAINTAIN OUR HOME AS WE CONTINUE

166
00:10:15,320 --> 00:10:17,300
TO EXPLORE.

167
00:10:17,300 --> 00:10:21,120
[APPLAUSE]
KJELL.

168
00:10:21,120 --> 00:10:24,940
HEAR, HEAR.

169
00:10:24,940 --> 00:10:29,710
THANK YOU FOR REMINDING US THAT MAINTAINING
OUR PLANET IS A SURVIVAL ISSUE AND NOT A POLITICAL

170
00:10:29,710 --> 00:10:31,330
ISSUE.

171
00:10:31,330 --> 00:10:39,070
[APPLAUSE]
JAY [SP], DO YOU WANT TO WEIGH IN, JAY, ON

172
00:10:39,070 --> 00:10:42,560
THE SEARCH FOR LIFE AS IT RELATES TO YOUR
WORK?

173
00:10:42,560 --> 00:10:46,930
OH, NO, I HAVE TO FOLLOW THE ASTRONAUT WITH
THAT?

174
00:10:46,930 --> 00:10:47,930
NO, NO.

175
00:10:47,930 --> 00:10:51,260
WE ALL HAVE TO FOLLOW THE ASTRONAUT.

176
00:10:51,260 --> 00:10:54,870
THIS IS ACTUALLY WHERE I WOULD WEIGH IN LESS
THAN THE OTHER PANELISTS BECAUSE THE MAIN

177

00:10:54,870 --> 00:10:59,270

THING I GET TO DO IS PERIODICALLY FUND REVOLUTIONARY
NEW CONCEPTS.

178

00:10:59,270 --> 00:11:03,180

EVERY ONCE IN A WHILE, PEOPLE WILL HAVE AN
IDEA FOR A NEW WAY TO MAKE A TELESCOPE OR

179

00:11:03,180 --> 00:11:10,520

AN IMAGER OR TO ENABLE EXPLORATION INTO A
PLACE THAT WE CAN'T GO NOW, LIKE INTO A CRYOVOLCANO

180

00:11:10,520 --> 00:11:15,310

OR DOWN TO EXPLORE THE OCEANS UNDER THE ICE.
AND SO, THAT'S THE KIND OF THING THAT SOME

181

00:11:15,310 --> 00:11:17,630

OF THE TECHNOLOGIES THAT I'M HONORED TO STUDY.

182

00:11:17,630 --> 00:11:20,580

I WANT TO FOLLOW UP WITH A QUESTION TO KJELL.

183

00:11:20,580 --> 00:11:27,910

STAR TREK FAMOUSLY ENVISIONS A FUTURE IN WHICH
EXPLORATION IS VERY COOPERATIVE, AND IT'S

184

00:11:27,910 --> 00:11:31,600

INDEPENDENT OF RACE, GENDER.

185

00:11:31,600 --> 00:11:37,880

EVERYONE COOPERATES AND GETS ALONG IN THEIR
DESIRE TO EXPLORE.

186

00:11:37,880 --> 00:11:42,770

AND I WANTED TO KNOW HOW HAS YOUR EXPERIENCE
AND TRAINING ON THE INTERNATIONAL SPACE STATION,

187

00:11:42,770 --> 00:11:49,030

HOW DOES IT MEASURE UP WITH THIS WONDERFUL

VISION THAT WE HAVE ON STAR TREK?

188

00:11:49,030 --> 00:11:51,380

THAT'S A GREAT QUESTION.

189

00:11:51,380 --> 00:11:55,550

WE'VE DONE SOME AMAZING THINGS ON THE SPACE STATION, AND I THINK AMONG THOSE THINGS, YOU

190

00:11:55,550 --> 00:12:02,730

KNOW, I ALONE GOT TO WORK ON OVER 240 EXPERIMENTS WHILE I WAS UP ON THE SPACE STATION.

191

00:12:02,730 --> 00:12:05,150

AND IT'S THE REASON THAT WE HAVE THE SPACE STATION.

192

00:12:05,150 --> 00:12:09,760

IT IS AN ORBITING LABORATORY WHERE WE CONDUCT SCIENCE AND RESEARCH TO EXTEND OUR PRESENCE

193

00:12:09,760 --> 00:12:15,310

IN THE SOLAR SYSTEM, BUT ALSO TO MAKE LIFE BETTER BACK HERE ON EARTH.

194

00:12:15,310 --> 00:12:17,370

AND SO, WE ARE STUDYING THE HUMAN BODY.

195

00:12:17,370 --> 00:12:21,040

WE'RE STUDYING COMBUSTION TO BENEFIT HUMANITY.

196

00:12:21,040 --> 00:12:26,500

BUT, IN SPITE OF ALL THAT WORK, I THINK THAT ONE OF THE GREATEST BENEFITS THAT WE HAVE

197

00:12:26,500 --> 00:12:30,630

DERIVED FROM THE SPACE STATION IS THAT INTERNATIONAL COOPERATION PIECE.

198

00:12:30,630 --> 00:12:37,490
FOR OVER 20 YEARS, FORMER ADVERSARIES, SO
JAPAN, GERMANY, THE US, RUSSIA, HAVE WORKED

199
00:12:37,490 --> 00:12:42,030
TOGETHER TO CREATE THIS MODERN MIRACLE OF
ENGINEERING.

200
00:12:42,030 --> 00:12:44,870
I MEAN IT IS A TRULY PHENOMENAL PLACE TO LIVE
AND WORK.

201
00:12:44,870 --> 00:12:48,990
AND IF YOU CAN--I KNOW MANY OF YOU TRAVELED
TO GET HERE.

202
00:12:48,990 --> 00:12:54,390
IMAGINE WHILE YOU'RE FLYING ON THAT 737 THAT
THEY'RE PUTTING IT TOGETHER WHILE YOU'RE--WHILE

203
00:12:54,390 --> 00:12:55,530
YOU'RE FLYING HERE.

204
00:12:55,530 --> 00:12:58,880
I MEAN THAT'S WHAT WE DID WITH THE SPACE STATION.

205
00:12:58,880 --> 00:13:04,790
OVER THE COURSE OF OVER A DECADE, WE WERE
PUTTING THIS AMAZING PIECE OF MACHINERY TOGETHER,

206
00:13:04,790 --> 00:13:08,770
BUT ALSO LIVING AND WORKING AND DOING WORK.

207
00:13:08,770 --> 00:13:12,410
SOME OF THE PIECES OF THE SPACE STATION HAD
NOT EVEN BEEN BUILT WHEN THE FIRST PIECES

208
00:13:12,410 --> 00:13:19,510
WENT UP. AND SO, IT'S A TESTAMENT TO THE ENGINEERING
LANGUAGE, TO OUR LEVEL OF COMMUNICATION THAT

209
00:13:19,510 --> 00:13:22,820
WE WERE ABLE TO DO THIS SAFELY AND SUCCESSFULLY.

210
00:13:22,820 --> 00:13:29,620
IT--THAT PARTNERSHIP WITH THESE COUNTRIES
I THINK HAS PROVIDED AN AVENUE FOR COMMUNICATION,

211
00:13:29,620 --> 00:13:31,200
COOPERATION.

212
00:13:31,200 --> 00:13:37,070
IT HAS SERVED AS A KEEL FOR OUR COUNTRIES
OVER THE PAST COUPLE OF DECADES, IN SPITE

213
00:13:37,070 --> 00:13:40,250
OF THE DIRECTION THE POLITICAL WINDS ARE BLOWING.

214
00:13:40,250 --> 00:13:48,840
SO, I THINK THAT THAT--ULTIMATELY, THE SPACE
STATION HAS SERVED AS A--REALLY A TESTAMENT

215
00:13:48,840 --> 00:13:54,050
THAT WHAT WE WERE ABLE TO DO WHEN WE WORK
TOGETHER FOR PEACEFUL MEANS, INSTEAD OF WORKING

216
00:13:54,050 --> 00:13:55,910
AGAINST EACH OTHER.

217
00:13:55,910 --> 00:14:00,931
AND IT WAS PHENOMENAL TO BE A PART OF THAT,
TO BE--TO GO TO RUSSIA, TO GO TO JAPAN, TO

218
00:14:00,931 --> 00:14:07,320
GO TO GERMANY, TO CANADA, TO TRAIN, AND THEN
ULTIMATELY TO FLY AND HAVE REPRESENTATIVES

219
00:14:07,320 --> 00:14:12,810
FROM ALL THESE COUNTRIES ON THE SPACE STATION,

ALL OF US WORKING TOGETHER TO--FOR MISSION

220

00:14:12,810 --> 00:14:15,780

SUCCESS AND TOWARDS A COMMON GOAL.

221

00:14:15,780 --> 00:14:18,110

SO, INCREDIBLE TO BE A PART OF THAT.

222

00:14:18,110 --> 00:14:23,320

I WAS--FELT SO BLESSED TO BE ASSIGNED TO A MISSION WITH THE CREW MEMBERS THAT I WAS UP

223

00:14:23,320 --> 00:14:24,370

THERE WITH.

224

00:14:24,370 --> 00:14:26,940

WE ALL GOT ALONG.

225

00:14:26,940 --> 00:14:30,660

EVERYBODY WAS VERY PROFESSIONAL, CONCERNED ABOUT EACH OTHER.

226

00:14:30,660 --> 00:14:35,520

YOU KNOW, WORKING IN THAT KIND OF AN ENVIRONMENT, OF COURSE, IS GOING TO FORGE A BOND THAT WILL

227

00:14:35,520 --> 00:14:37,610

LAST OUR LIFETIME.

228

00:14:37,610 --> 00:14:41,450

SO, ABSOLUTELY AN AMAZING--TO BE A PART OF AN INTERNATIONAL PROGRAM, AND I THINK THAT

229

00:14:41,450 --> 00:14:48,030

ONE THAT IS REALLY REFLECTED IN A FUTURE LOOKING STAR TREK.

230

00:14:48,030 --> 00:14:54,150

[APPLAUSE]

ALL RIGHT.

231

00:14:54,150 --> 00:14:55,150

BACK TO DR.

232

00:14:55,150 --> 00:15:00,000

FALKER AT THE END OF THE TABLE, A FASCINATING
PART OF YOUR JOB IS TRYING TO MAKE IDEAS FROM

233

00:15:00,000 --> 00:15:01,860

SCIENCE FICTION REAL.

234

00:15:01,860 --> 00:15:03,640

NOW HOW DO YOU APPROACH THAT?

235

00:15:03,640 --> 00:15:08,740

AND WHAT ARE YOU WORKING ON, WHAT TECHNOLOGIES
THAT ARE SIMILAR TO STAR TREK?

236

00:15:08,740 --> 00:15:09,740

THANK YOU.

237

00:15:09,740 --> 00:15:10,740

OKAY.

238

00:15:10,740 --> 00:15:15,050

SO, MY FAVORITE PROGRAM AT NASA, WELL, ALL
RESPECT TO THE ASTRONAUTS, AND I DON'T GET

239

00:15:15,050 --> 00:15:20,530

TO GO INTO SPACE, IS A LITTLE RESEARCH PROGRAM
CALLED, NASA INNOVATIVE ADVANCED CONCEPTS.

240

00:15:20,530 --> 00:15:24,070

AND OUR JOB, IN A PHRASE, IS TO CHANGE THE
POSSIBLE.

241

00:15:24,070 --> 00:15:30,220

AND WE VERY MUCH STUDY REVOLUTIONARY CONTROVERSIAL

THINGS TO TRY TO FIGURE OUT HOW TO GET CAPABILITIES

242

00:15:30,220 --> 00:15:35,200

WE DON'T HAVE AND ENABLE MISSIONS THAT ARE EITHER IMPOSSIBLE OR PROHIBITIVE TODAY.

243

00:15:35,200 --> 00:15:40,650

SO, SOME OF THE THINGS THAT WE FUNDED ARE RIGHT OUT OF SCIENCE FICTION, A SPACE ELEVATOR.

244

00:15:40,650 --> 00:15:45,400

EVEN WHEN WE DON'T HAVE THE MATERIALS WITH THE STRENGTH-TO-WEIGHT RATIO REQUIRED TO BUILD

245

00:15:45,400 --> 00:15:50,080

ONE, WE TOOK A LOOK AT A PROPOSAL THAT SAID HERE'S WHAT MATERIAL ADVANCEMENT IS DOING

246

00:15:50,080 --> 00:15:53,060

AND WHERE IT'S PROJECTED TO BE IN 10 AND 20 YEARS.

247

00:15:53,060 --> 00:15:55,550

AND THERE'S A REASON TO BELIEVE WE WILL BE ABLE TO BUILD ONE.

248

00:15:55,550 --> 00:16:00,040

SO, IF WE COULD, AND THE MATERIAL OPERATED LIKE THIS, COULD WE BUILD ONE?

249

00:16:00,040 --> 00:16:03,860

PEOPLE KNOW HOW WE WOULD USE ONE IF IT EXISTED, BUT COULD YOU ACTUALLY BUILD SOMETHING THAT

250

00:16:03,860 --> 00:16:06,740

BIG AND HAVE IT BECOME OPERATIONAL?

251

00:16:06,740 --> 00:16:09,880

AND IF WE DID THAT, HOW--WHAT WOULD IT DO?

252

00:16:09,880 --> 00:16:10,880

WHAT WOULD IT COST?

253

00:16:10,880 --> 00:16:12,320

WOULD WE ACTUALLY WANT THAT?

254

00:16:12,320 --> 00:16:17,010

THAT'S THE KIND OF QUESTION, THE KIND OF EXPLORATION
THAT WE DO IN A WHOLE RANGE OF AREAS.

255

00:16:17,010 --> 00:16:18,510

WE DON'T HAVE WARP DRIVE YET.

256

00:16:18,510 --> 00:16:23,020

WE DO STUDY ADVANCED PROPULSION IN A NUMBER
OF DIFFERENT WAYS.

257

00:16:23,020 --> 00:16:27,230

REPLICATORS ARE BECOMING A REALITY WITH THE
ADDITIVE MANUFACTURING MACHINES.

258

00:16:27,230 --> 00:16:31,090

I THINK WE'LL SEE THAT WITHIN OUR LIFETIME.

259

00:16:31,090 --> 00:16:38,660

AND I HAVE ACTUALLY STUDIED TRACTOR BEAMS
IN TWO DIFFERENT FORMS.

260

00:16:38,660 --> 00:16:42,270

COOL.

261

00:16:42,270 --> 00:16:48,260

A QUESTION FOR AMBER, AND THEN BOBAK.

262

00:16:48,260 --> 00:16:54,910

WHY DO YOU THINK SPACE EXPLORATION HAS BECOME
SUCH AN IMPORTANT PART OF POP CULTURE?

263

00:16:54,910 --> 00:16:56,560

YEAH.

264

00:16:56,560 --> 00:16:58,990

THAT'S A GREAT QUESTION.

265

00:16:58,990 --> 00:17:06,079

I THINK IT REALLY DOES COME BACK TO THIS IDEA
THAT SPACE EXPLORATION AND NASA AND SCIENCE

266

00:17:06,079 --> 00:17:11,809

AND WHAT WE--EVERY--ALL THE THINGS WE DO AT
NASA COMES BACK TO THIS IDEA OF HOPE.

267

00:17:11,809 --> 00:17:12,809

YOU KNOW?

268

00:17:12,809 --> 00:17:17,089

IT'S ABOUT HOPE FOR A BETTER FUTURE, HOPE
FOR REACHING BEYOND WHAT WE'RE CURRENTLY CAPABLE

269

00:17:17,089 --> 00:17:19,059

OF.
AND, YOU KNOW, THAT SOUNDS--THAT SOUNDS A

270

00:17:19,059 --> 00:17:22,669

LITTLE FROOFY FOR A SCIENTIST TO SAY, RIGHT?

271

00:17:22,669 --> 00:17:23,669

THAT'S NOT HARD DATA.

272

00:17:23,669 --> 00:17:28,439

BUT, YOU KNOW, IT'S SOMETHING DEEP ABOUT US
AS HUMAN BEINGS THAT WE WANT TO EXPLORE AND

273

00:17:28,439 --> 00:17:31,429

THAT WE WANT TO REACH BEYOND WHAT WE'RE CAPABLE
OF.

274

00:17:31,429 --> 00:17:34,510
SO, I THINK IT REALLY DOES COME DOWN TO THAT.

275
00:17:34,510 --> 00:17:36,600
AND SO, THAT'S WHY WE SEE IT IN CULTURE.

276
00:17:36,600 --> 00:17:40,610
YOU KNOW, JUST LAST YEAR, WE CELEBRATED THE
25TH ANNIVERSARY OF THE HUBBLE SPACE TELESCOPE.

277
00:17:40,610 --> 00:17:41,610
YAY!

278
00:17:41,610 --> 00:17:46,970
SO, I WORK WITH HUBBLE DATA, AND I LOVE HUBBLE,
AND I LOVE HOW HUBBLE HAS JUST ABSOLUTELY

279
00:17:46,970 --> 00:17:48,289
INFILTRATED POP CULTURE.

280
00:17:48,289 --> 00:17:50,289
YOU CAN FIND HUBBLE IMAGES EVERYWHERE.

281
00:17:50,289 --> 00:17:57,210
THEY'RE ALL OVER THE PLACE, ON YOUTUBE OR
ON U-HAUL TRUCKS, IN MUSIC VIDEOS, ALBUM ART

282
00:17:57,210 --> 00:18:00,740
FOR SOME, YOU KNOW, POPULAR BANDS.

283
00:18:00,740 --> 00:18:07,789
IT'S ALL OVER THE PLACE, AND I THINK, YOU
KNOW, PUBLIC REALIZES THAT HUBBLE IS THIS

284
00:18:07,789 --> 00:18:13,400
AMAZING MACHINE THAT WE BUILT THAT EXPLORES
THE UNIVERSE IN THESE REALLY FUNDAMENTAL WAYS.

285
00:18:13,400 --> 00:18:20,070

AND I THINK EVEN JUST MAYBE EVEN A LITTLE
BIT BEYOND THAT, IT'S SORT OF--I GUESS IT'S

286

00:18:20,070 --> 00:18:24,960
NOT SURPRISING THAT TECHNOLOGY, LIKE THE SPACE
STATION, THIS AWESOME THING THAT WE'VE BUILT,

287

00:18:24,960 --> 00:18:26,760
YOU KNOW, WE BUILD THINGS AS HUMANS.

288

00:18:26,760 --> 00:18:31,519
SO, THAT'S SORT OF--YOU CAN UNDERSTAND WHY,
YOU KNOW, WHY THE SPACE STATION, HUBBLE, AND

289

00:18:31,519 --> 00:18:34,049
THESE MACHINES THAT WE BUILD ARE SORT OF INSPIRATIONAL.

290

00:18:34,049 --> 00:18:39,440
WHY--AND IF, YOU KNOW, YOU GO OUT ON NATURE
WALKS, AND WE ALL ENJOY GETTING OUT IN NATURE

291

00:18:39,440 --> 00:18:41,309
BECAUSE IT'S PART OF OUR EXPERIENCE.

292

00:18:41,309 --> 00:18:45,890
WHY HUMAN BEINGS THINK THAT IMAGES OF NEBULA
ARE BEAUTIFUL IS A LITTLE WEIRDER, RIGHT?

293

00:18:45,890 --> 00:18:48,120
BECAUSE THAT'S NOT REALLY PART OF OUR EXPERIENCE.

294

00:18:48,120 --> 00:18:52,269
BUT, EVERYONE RECOGNIZES THE BEAUTY IN THESE
HUBBLE IMAGES, RIGHT?

295

00:18:52,269 --> 00:18:53,769
IT'S A LITTLE STRANGE.

296

00:18:53,769 --> 00:19:01,049

SO, I DON'T REALLY KNOW WHY THAT IS, BUT I
THINK THAT MAYBE IT GOES BACK TO ON SOME FUNDAMENTAL

297

00:19:01,049 --> 00:19:06,220

LEVEL, YOU KNOW, WE REALIZE THAT WE'RE SORT
OF LOOKING BACK AT OURSELVES WHEN WE'RE LOOKING

298

00:19:06,220 --> 00:19:08,450

OUT AT THE COSMOS, THAT WE ARE FROM THE COSMOS.

299

00:19:08,450 --> 00:19:09,450

WE'RE PART OF IT.

300

00:19:09,450 --> 00:19:15,280

WE'RE PART OF THIS BIGGER PICTURE, THIS BIGGER
STORY.

301

00:19:15,280 --> 00:19:17,879

[APPLAUSE]

BOBAK?

302

00:19:17,879 --> 00:19:20,460

I DON'T HAVE A BUNCH TO ADD TO THAT.

303

00:19:20,460 --> 00:19:25,470

I THINK THE OTHER THING THAT'S CENTRAL, AND
EVERYTHING, REALLY COMPLETELY HONESTLY, EVERYTHING

304

00:19:25,470 --> 00:19:31,480

OUT OF THIS PROGRAM, EVEN IT'S--EVEN THOUGH
I KNOW HOW THE--YOU KNOW, THE SAUSAGE IS MADE,

305

00:19:31,480 --> 00:19:36,340

IT DOES NOT MAKE IT ANY LESS AWE-INSPIRING
TO SEE THE ACCOMPLISHMENTS OF PEOPLE.

306

00:19:36,340 --> 00:19:42,311

AND I THINK ONE OF THE THINGS THAT NASA AND
REALLY ALL THE SPACE AGENCIES, ONE OF THE

307
00:19:42,311 --> 00:19:47,020
THINGS THAT'S SO POWERFUL ABOUT IT IS IT SHOWS
YOU WHAT IS POSSIBLE WHEN PEOPLE PUT THEIR

308
00:19:47,020 --> 00:19:51,240
MINDS TOGETHER, WHEN WE REALLY WORK TOGETHER
TO ACHIEVE THINGS.

309
00:19:51,240 --> 00:19:57,179
AND I DON'T KNOW THAT THERE'S THAT MANY OTHER
FIELDS THAT SEEM SO COHESIVELY, YOU KNOW,

310
00:19:57,179 --> 00:19:58,920
MOTIVATED TO DO ONE INCREDIBLE THING.

311
00:19:58,920 --> 00:20:03,120
AND, YOU KNOW, I LOOK AT THE SPACE STATION,
JAMES WEBB, CURIOSITY, EVERYTHING I'VE WORKING

312
00:20:03,120 --> 00:20:04,120
ON.

313
00:20:04,120 --> 00:20:09,640
I MEAN THOUSANDS OF PEOPLE WORKING TOGETHER
TO MAKE, YOU KNOW, ONE MOMENT, YOU KNOW, AND

314
00:20:09,640 --> 00:20:13,320
SUBSEQUENTLY YEARS OF SCIENCE, HAPPEN.

315
00:20:13,320 --> 00:20:18,250
I THINK THAT'S A VERY POWERFUL EMOTION, AND
I THINK THAT'S WHAT--YOU KNOW, WHAT I SEE

316
00:20:18,250 --> 00:20:19,250
OUT OF THIS PROGRAM.

317
00:20:19,250 --> 00:20:22,500
THAT'S PROBABLY WHAT I'M MOST PROUD OF I GUESS.

318
00:20:22,500 --> 00:20:28,049
I WAS RECENTLY AT JPL FOR THE JUNO INSERTION
INTO ORBIT, AND THERE'S NOTHING MORE EXCITING

319
00:20:28,049 --> 00:20:33,600
THAN BEING IN THE FRIENDS AND FAMILY ROOM
WHEN YOU GUYS GO NUTS IN THE CONTROL ROOM.

320
00:20:33,600 --> 00:20:37,360
IT IS THE MOST WONDERFUL FEELING TO WATCH
THEM JUMPING UP AND DOWN AND HUGGING EACH

321
00:20:37,360 --> 00:20:38,499
OTHER AND HIGH-FIVING.

322
00:20:38,499 --> 00:20:40,289
I CANNOT TELL YOU.

323
00:20:40,289 --> 00:20:46,830
KJELL, DID YOU USE ANY STAR TREK-INSPIRED
TECHNOLOGY ON THE ISS?

324
00:20:46,830 --> 00:20:54,779
WELL, WE DON'T HAVE A HOLODECK YET, BUT WE
ACTUALLY DID HAVE A HOLOLENS.

325
00:20:54,779 --> 00:21:01,440
IT'S A MICROSOFT PROGRAM, A HOLOLENS DELIVERED
TO THE SPACE STATION A LITTLE BIT I ARRIVED.

326
00:21:01,440 --> 00:21:05,679
ACTUALLY, THEY ARRIVED TWO DAYS BEFORE I LEFT
THE SPACE STATION.

327
00:21:05,679 --> 00:21:06,679
WE DIDN'T GET TO UNPACK THEM.

328
00:21:06,679 --> 00:21:07,759
I DIDN'T GET TO PLAY WITH THEM.

329
00:21:07,759 --> 00:21:15,559
BUT, I TRAINED ON THEM, AND I THINK THAT THIS
IS--HAS SOME REAL POTENTIAL, SO USING AUGMENTED

330
00:21:15,559 --> 00:21:23,799
OR MIXED REALITY TO PRESENT NOT ONLY OPERATIONALLY
ASSISTANCE TO AN ASTRONAUT.

331
00:21:23,799 --> 00:21:28,960
SO, AS AN ASTRONAUT OR A CREW MEMBER IS LOOKING
AT A PIECE OF EQUIPMENT, SOMEBODY THAT'S FOLLOWING

332
00:21:28,960 --> 00:21:35,779
ALONG CAN ACTUALLY DRAW ON REALITY AND SAY
THIS IS THE BOLT THAT WE NEED YOU TO TURN,

333
00:21:35,779 --> 00:21:39,769
OR TO BE ABLE TO BRING UP PROCEDURES AND LOOK
AT PROCEDURES WHILE YOU'RE WORKING ON SOMETHING.

334
00:21:39,769 --> 00:21:42,669
AND THEN THERE'S THE POTENTIAL FOR A HOLODECK
AS WELL.

335
00:21:42,669 --> 00:21:44,320
YOU KNOW, IT WAS VERY STRANGE.

336
00:21:44,320 --> 00:21:50,419
WHEN I FIRST ARRIVED ON THE SPACE STATION,
CAME OUT OF THE SOYUZ, AND IMMEDIATELY GO

337
00:21:50,419 --> 00:21:54,700
INTO THE RUSSIAN SEGMENT OF THE SPACE STATION
TO DO A DOWNLINK WITH OUR FAMILY AND FRIENDS

338
00:21:54,700 --> 00:21:58,869
THAT ARE STILL DOWN IN BAIKONUR HAVING JUST
LAUNCHED--WATCHED US LAUNCH AND DOCK.

339

00:21:58,869 --> 00:22:04,610

AND AS I FLOATED INTO THE SERVICE MODULE,
I HEARD CHIRPING BIRDS.

340

00:22:04,610 --> 00:22:08,190

AND I THOUGHT THAT WAS INTERESTING.

341

00:22:08,190 --> 00:22:14,970

AND SO, OUR PSYCHOLOGIST AND OUR BEHAVIOR
SUPPORT FOLKS WILL OFTEN SEND UP SOUNDS OF

342

00:22:14,970 --> 00:22:16,299

EARTH.

343

00:22:16,299 --> 00:22:21,961

AND SO, I THINK AUGMENTED OR MIXED REALITY
PRESENTS A POSSIBILITY IN THE FUTURE OF, YOU

344

00:22:21,961 --> 00:22:26,440

KNOW, BEING ABLE TO SIT IN YOUR BACKYARD AND
LISTEN TO THE BIRDS CHIRP FOR A COUPLE OF

345

00:22:26,440 --> 00:22:30,330

HOURS WHILE YOU'RE HANGING OUT IN YOUR CREW
QUARTERS.

346

00:22:30,330 --> 00:22:38,509

AND SO, THAT'S I THINK ONE VERY COOL VISION
THAT STAR TREK HAD THAT WE MAY BE ABLE TO

347

00:22:38,509 --> 00:22:40,669

IMPLEMENT SOMETIME IN THE NEAR FUTURE.

348

00:22:40,669 --> 00:22:42,960

I HAVE A--SORRY, I HAD TO GO BACK A MOMENT.

349

00:22:42,960 --> 00:22:46,860

SO, BASICALLY, IF I UNDERSTAND AT THE MOMENT,
A BUNCH OF STUFF CAME TO THE SPACE STATION.

350

00:22:46,860 --> 00:22:49,190

LIKE, IT WAS LIKE CHRISTMAS EVE.

351

00:22:49,190 --> 00:22:50,970

ALL THE PRESENTS WERE THERE, EVERYBODY TO UNWRAP.

352

00:22:50,970 --> 00:22:54,600

AND THEN, THEY WERE LIKE, NO, YOU GOT TO GO HOME.

353

00:22:54,600 --> 00:22:56,909

IS THAT--IS THAT--DID I GET THAT RIGHT?

354

00:22:56,909 --> 00:22:58,710

SO, ALMOST.

355

00:22:58,710 --> 00:23:03,539

WE--I GOT TO USE THE ROBOTIC ARM TO CAPTURE CYGNUS, ORBITAL ATK CYGNUS MODULE.

356

00:23:03,539 --> 00:23:05,230

OKAY, THAT'S PRETTY COOL.

357

00:23:05,230 --> 00:23:12,389

AND SO, MY VIDEO GAME SKILLS CAME INTO USE THERE, VERY COOL.

358

00:23:12,389 --> 00:23:15,039

[APPLAUSE]

WE DOCKED AT THE SPACE STATION.

359

00:23:15,039 --> 00:23:19,110

WE BEGGED AND PLEADED FOR MISSION CONTROL TO ALLOW US TO DO ALL THE VESTIBULE OPS SO

360

00:23:19,110 --> 00:23:20,510

THAT WE COULD OPEN THE HATCHES.

361
00:23:20,510 --> 00:23:25,600
AND I DID IMMEDIATELY DIVE IN TO FIND MY CREW
CARE PACKAGE, WENT THROUGH IT ALL, AND, YOU

362
00:23:25,600 --> 00:23:30,100
KNOW, AND THIS IS ALL PROBABLY 10 HOURS BEFORE
WE'RE SUPPOSED TO CLIMB INTO THE SOYUZ AND

363
00:23:30,100 --> 00:23:31,500
COME BACK TO EARTH.

364
00:23:31,500 --> 00:23:35,990
SO, ALL THE PERSONAL STUFF THAT GOT SENT UP
THERE, I PUT ON A SWEATSHIRT THAT I HAD SENT

365
00:23:35,990 --> 00:23:36,990
UP TO ME.

366
00:23:36,990 --> 00:23:40,880
I GOT--I WORE IT FOR LIKE AN HOUR AND THEN
HAD TO PACK IT AWAY.

367
00:23:40,880 --> 00:23:43,919
AND THERE WAS SOME CANDY AND SOME OTHER--AND
NOTES FROM MY FAMILY.

368
00:23:43,919 --> 00:23:47,759
BUT, SOME OF THE COOL STUFF, LIKE THE HOLOLENS,
WERE PACKED DEEP IN THERE, AND WE DIDN'T GET

369
00:23:47,759 --> 00:23:49,009
TO PLAY WITH IT.

370
00:23:49,009 --> 00:23:53,690
SO, WE HAD A--WE OPENED OUR PRESENTS ON CHRISTMAS
EVE.

371
00:23:53,690 --> 00:24:01,149

JAY, I'VE HEARD OF AN ANNUAL EVENT CALLED
FROM SCIENCE FICTION TO SCIENCE FACT.

372

00:24:01,149 --> 00:24:03,559

YES.

IS THAT--IS THAT A REAL THING?

373

00:24:03,559 --> 00:24:05,480

YEAH, THANK YOU FOR MENTIONING IT.

374

00:24:05,480 --> 00:24:09,860

THE CHICAGO MUSEUM OF SCIENCE AND INDUSTRY
STARTED THIS, SO CREDIT TO THEM, NOT TO ME

375

00:24:09,860 --> 00:24:10,860

OR TO NASA.

376

00:24:10,860 --> 00:24:14,610

BUT, THEY SPECIFICALLY ASKED FOR SOME OF THE
NIAC FELLOWS WHO DO RESEARCH IN ONE OF MY

377

00:24:14,610 --> 00:24:16,809

PROGRAMS TO COME HELP WITH THIS.

378

00:24:16,809 --> 00:24:19,909

WOULD YOU DEFINE--WOULD YOU TELL US WHAT NIAC,
THE ACRONYM, IS?

379

00:24:19,909 --> 00:24:21,740

NASA INNOVATIVE ADVANCED CONCEPTS.

380

00:24:21,740 --> 00:24:22,740

RIGHT.

381

00:24:22,740 --> 00:24:24,799

YOU GUYS ARE REALLY FAST AND FURIOUS WITH
THE ACRONYMS.

382

00:24:24,799 --> 00:24:26,509

YOU KNOW THAT.

383

00:24:26,509 --> 00:24:27,509

WE DON'T HAVE TIME FOR ALL THOSE WORDS.

384

00:24:27,509 --> 00:24:29,159

WE'RE RIGHT TO THE ACRONYMS.

385

00:24:29,159 --> 00:24:31,140

THERE ARE ACRONYMS MADE OF ACRONYMS.

386

00:24:31,140 --> 00:24:37,169

YES, THERE ARE.

AND IT WAS--SO, I WENT THERE TO THE INAUGURAL

387

00:24:37,169 --> 00:24:38,169

EVENT.

388

00:24:38,169 --> 00:24:41,529

THE MUSEUM'S DONE IT FOUR TIMES, BUT IT WAS REALLY AWESOME BECAUSE NOT ONLY WAS IT AN

389

00:24:41,529 --> 00:24:45,629

AUDITORIUM FULL OF PEOPLE LIKE THIS ON THEIR DAY OFF WHO CAME TO SEE.

390

00:24:45,629 --> 00:24:50,009

KIDS, LITTLE KIDS, LINED UP TO ASK QUESTIONS OF THE SCIENTISTS AFTERWARDS.

391

00:24:50,009 --> 00:24:53,570

AND IT WAS JUST THE KIND OF THING THAT I WOULD HAVE LOVED IF I HAD SEEN IT WHEN I WAS A KID.

392

00:24:53,570 --> 00:24:55,090

IT WAS AN HONOR TO BE PART OF IT.

393

00:24:55,090 --> 00:24:59,489

SO, NOT ONLY HAS THAT MUSEUM DONE IT FOR FOUR

YEARS AND INVITED OTHER FELLOWS TO COME PRESENT

394

00:24:59,489 --> 00:25:01,889

ABOUT THEIR WORK.

395

00:25:01,889 --> 00:25:06,909

TWO OTHER MUSEUMS HAVE DONE IT, AND A UNIVERSITY
AND TWO OTHERS ARE IN CONTACT WITH US.

396

00:25:06,909 --> 00:25:08,419

ALL RIGHT.

397

00:25:08,419 --> 00:25:12,820

NOW I HAVE A QUESTION TO ANYONE ON THE PANEL.

398

00:25:12,820 --> 00:25:15,120

CAN YOU DEFINE THE PRIME DIRECTIVE?

399

00:25:15,120 --> 00:25:22,429

BOBAK, I

THINK YOU'RE GOING TO DO THIS.

400

00:25:22,429 --> 00:25:25,570

NO, I CAN ONLY TELL YOU ABOUT PLANETARY PROTECTION,
WHICH IS BASICALLY THE EQUIVALENT OF OUR PRIME

401

00:25:25,570 --> 00:25:26,640

DIRECTIVE FOR NASA.

402

00:25:26,640 --> 00:25:28,350

THAT'S EXACTLY WHERE I WAS HEADING.

403

00:25:28,350 --> 00:25:29,519

SO, GO AHEAD.

404

00:25:29,519 --> 00:25:30,519

ALL RIGHT.

405

00:25:30,519 --> 00:25:35,429

SO, ONE OF THE THINGS THAT IS CRAZY ABOUT THIS IS WE ARE ACTIVELY LOOKING FOR LIFE,

406

00:25:35,429 --> 00:25:39,210

YOU KNOW, OUTSIDE OF OUR OWN PLANET.

407

00:25:39,210 --> 00:25:43,980

AND ONE OF THE THINGS WE WANT TO DO IS WHEN WE FIND IT, WE WANT TO BE SURE THAT IT'S ACTUALLY

408

00:25:43,980 --> 00:25:45,889

FOREIGN IN ORIGIN.

409

00:25:45,889 --> 00:25:51,700

WE DON'T WANT TO CARRY A BUNCH OF EARTH LIFE WITH US TO MARS AND THEN REDISCOVER THE EARTH

410

00:25:51,700 --> 00:25:53,529

LIFE THAT WE BROUGHT WITH US TO MARS.

411

00:25:53,529 --> 00:25:59,279

SO, THERE IS AN INCREDIBLE AMOUNT OF PROTOCOLS ASSOCIATED WITH EVERY MISSION THAT WE SEND

412

00:25:59,279 --> 00:26:01,869

TO A PLACE THAT WE THINK COULD BE HABITABLE.

413

00:26:01,869 --> 00:26:06,019

AND AS I KIND OF ALLUDED TO EARLIER, THERE'S A LOT OF PLACES THAT ARE VERY HABITABLE.

414

00:26:06,019 --> 00:26:07,559

AND THOSE ARE THE PLACES WE WANT TO GO.

415

00:26:07,559 --> 00:26:10,799

SO, WITH MARS, FOR EXAMPLE, WE HAVE TO STERILIZE THE SPACECRAFT.

416

00:26:10,799 --> 00:26:11,870

WE HAVE TO BAKE IT.

417

00:26:11,870 --> 00:26:15,149

YOU KNOW, WE RUB IT DOWN WITH ALCOHOL IN CERTAIN PLACES.

418

00:26:15,149 --> 00:26:19,009

AND THERE IS, LIKE, BASICALLY AN ACCEPTABLE LIMIT OF, YOU KNOW, NUMBER OF SPORES THAT

419

00:26:19,009 --> 00:26:22,380

ARE SURVIVING THAT WE THINK WOULDN'T MAKE THE TRIP ALL THE WAY TO MARS.

420

00:26:22,380 --> 00:26:23,590

AND THEREFORE, IT'S GOOD.

421

00:26:23,590 --> 00:26:28,549

BUT, CONVERSELY, THAT PROBLEM APPLIES NOW TO--IN RETURN.

422

00:26:28,549 --> 00:26:31,059

WE'RE STARTING TO TALK ABOUT BRINGING A SAMPLE BACK FROM OTHER PLANETS.

423

00:26:31,059 --> 00:26:35,619

AND, YOU KNOW, WE WANT TO MAKE SURE THAT, ONE, THAT THAT--ANYTHING THAT MAY BE SURVIVING

424

00:26:35,619 --> 00:26:40,009

IN THERE DOESN'T GET CONTAMINATED BY EARTH WHEN WE OPEN IT UP, BUT ALSO THAT WE DON'T

425

00:26:40,009 --> 00:26:43,539

CONTAMINATE OUR OWN PLANET AND START LIKE THE ANDROMEDA STRAIN.

426

00:26:43,539 --> 00:26:45,529

SO, WE DO ACTUALLY HAVE TO BE CAREFUL.

427
00:26:45,529 --> 00:26:49,470
SO, THIS IS AN INCREDIBLE ENGINEERING CHALLENGE
FOR ALL OF US, IS HOW DO WE, YOU KNOW, KEEP

428
00:26:49,470 --> 00:26:50,470
THINGS CLEANS.

429
00:26:50,470 --> 00:26:52,059
AND, YOU KNOW, WE HAVE TO--WE ARE HUMANS BUILDING
SPACECRAFT.

430
00:26:52,059 --> 00:26:58,080
SO, WE ARE INHERENTLY COVERED IN MICROBES
AND OTHER THINGS THAT YOU DON'T WANT TO THINK

431
00:26:58,080 --> 00:26:59,820
ABOUT TOO MUCH.

432
00:26:59,820 --> 00:27:02,600
BUT, IT'S ACTUALLY A REALLY DIFFICULT CHALLENGE.

433
00:27:02,600 --> 00:27:06,679
AND, YOU KNOW, THEY'RE GETTING TO THE POINT
WHERE, YOU KNOW, THEY'RE LIKE, WELL, WE DON'T

434
00:27:06,679 --> 00:27:11,159
WANT YOU TO WEAR DEODORANT WHILE YOU'RE, YOU
KNOW, ASSEMBLING A SPACECRAFT BECAUSE THAT

435
00:27:11,159 --> 00:27:14,239
COULD CONTAMINATE OUR PROCESSING CHAIN.

436
00:27:14,239 --> 00:27:20,749
SO, IT IS GOING TO BE AN INTERESTING CHALLENGE,
AND I THINK THAT'S KIND OF SURPRISING, I THINK,

437
00:27:20,749 --> 00:27:22,369
COMING FROM A, YOU KNOW, AN EDUCATION IN ENGINEERING.

438
00:27:22,369 --> 00:27:25,159
THAT WAS ONE THING THAT THEY'D NEVER TAUGHT
ME ABOUT IN SCHOOL, WAS THAT YOU WERE GOING

439
00:27:25,159 --> 00:27:28,809
TO HAVE TO, LIKE, WATCH OUT FOR HOW TO KEEP
LIFE OFF OF YOUR SPACECRAFT.

440
00:27:28,809 --> 00:27:31,090
AND YOU GUYS, I MEAN YOU CONTAMINATED ALL
OVER THE SITE.

441
00:27:31,090 --> 00:27:34,129
AND THAT'S--SO, THAT'S THE REASON--THAT'S
THE REASON WHY WE'RE DOING ALL OF OUR SEARCH

442
00:27:34,129 --> 00:27:40,480
FOR LIFE RIGHT NOW WITH ROVERS AND--BECAUSE
AS SOON AS YOU PUT A PERSON ON THE SURFACE,

443
00:27:40,480 --> 00:27:41,480
WE'RE BRING--.

444
00:27:41,480 --> 00:27:42,480
--KJELL, DON'T MESS IT UP FOR US--.

445
00:27:42,480 --> 00:27:44,980
--BRINGING ALL OF OUR [UNINTELLIGIBLE] WITH
US.

446
00:27:44,980 --> 00:27:46,400
SO--.

447
00:27:46,400 --> 00:27:49,529
--WELL, ONE FINAL QUESTION FOR THE GROUP.

448
00:27:49,529 --> 00:27:54,270
I WANT ANYONE WHO HAS A QUESTION, MAYBE YOU

SHOULD LINE UP.

449

00:27:54,270 --> 00:27:59,390

BUT, THIS CHALLENGE OF, YOU KNOW, HUMANS TO MARS, DOES ANYBODY WANT TO TALK ABOUT THIS

450

00:27:59,390 --> 00:28:06,139

SORT OF NEW REINVIGORATED EXCITEMENT AMONG THE PUBLIC FOR EXPLORATION IN THE WAKE OF

451

00:28:06,139 --> 00:28:10,619

THE SUCCESS OF THE MOVIE THE MARTIAN AND THE FACT THAT WE NOW SEEM TO HAVE A GROUND PLAN

452

00:28:10,619 --> 00:28:18,290

TO PUT US IN ORBIT AROUND MARS IN 2033 AND POSSIBLY EVEN LANDING IN THE--IN LATER THAT

453

00:28:18,290 --> 00:28:19,290

SAME DECADE?

454

00:28:19,290 --> 00:28:20,290

ANYONE?

455

00:28:20,290 --> 00:28:26,700

SO, I'LL JUST SAY THAT MOVIES LIKE THE MARTIAN AND THE RECENT ONE-YEAR MISSION WITH SCOTT

456

00:28:26,700 --> 00:28:33,919

KELLY, THE USE OF SOCIAL MEDIA TO SHARE, IMAGES FROM DEEP SPACE, AND ALSO THE EXPERIENCE THAT

457

00:28:33,919 --> 00:28:38,210

THE ASTRONAUTS ARE HAVING ON THE SPACE STATION, ALL OF THESE THINGS I THINK ARE REALLY CREATING

458

00:28:38,210 --> 00:28:46,220

A GROUNDSWELL OF INTEREST FOR SPACE EXPLORATION IN GENERAL, AND SPECIFICALLY OUR CURRENT JOURNEY

459

00:28:46,220 --> 00:28:47,359

TO MARS.

460

00:28:47,359 --> 00:28:53,279

AND WE HAVE, OF COURSE, ROVERS AND PROBES
EXAMINING MARS RIGHT NOW WITH CURIOSITY AND

461

00:28:53,279 --> 00:28:58,830

MARS 2020 COMING UP, REALLY PATH FINDING FOR
THE ASTRONAUTS THAT WE HOPE TO SEND THERE

462

00:28:58,830 --> 00:29:01,899

IN THE NEXT TWO DECADES.

463

00:29:01,899 --> 00:29:02,899

AND WE SEE THAT.

464

00:29:02,899 --> 00:29:10,019

WE SEE THAT INTEREST ACTUALLY JUST RECENTLY
AS WE HAD A NEW ASTRONAUT APPLICATION.

465

00:29:10,019 --> 00:29:12,710

HOW MANY--ANYBODY HERE?

466

00:29:14,710 --> 00:29:13,710

AWESOME.

467

00:29:14,710 --> 00:29:20,409

SO, YOU AND 18,000 OTHERS APPLIED.

468

00:29:20,409 --> 00:29:23,239

WHEN I--WHEN I APPLIED, THERE WAS JUST 3500
OF US.

469

00:29:23,239 --> 00:29:26,570

SO, I'M GLAD I'M NOT IN YOUR CLASS.

470

00:29:26,570 --> 00:29:30,529

BUT, IT'S VERY EXCITING TO BE A PART OF THE SPACE PROGRAM.

471

00:29:30,529 --> 00:29:36,299

WE WERE HAVING A DISCUSSION EARLIER HOW SOMEBODY WAS KIND OF LAMENTING NOT BEING A PART OF--BEING

472

00:29:36,299 --> 00:29:42,350

ALIVE--AND SOME OF YOU WERE AROUND FOR--AND GOT TO WATCH THE FIRST STEPS ON THE MOON AND

473

00:29:42,350 --> 00:29:43,590

THE FIRST SHUTTLE LAUNCH.

474

00:29:43,590 --> 00:29:47,269

AND SO, I SAW THE FIRST SHUTTLE LAUNCH WHEN I WAS IN SECOND GRADE.

475

00:29:47,269 --> 00:29:53,440

I REMEMBER WATCHING THAT ON TELEVISION, BUT MISSED OUT ON THE WHOLE ON THE LUNAR LANDINGS

476

00:29:53,440 --> 00:29:54,440

AND EVERYTHING.

477

00:29:54,440 --> 00:29:58,179

BUT, THIS IS THIS IS AN AMAZING TO BE A PART OF THE SPACE PROGRAM.

478

00:29:58,179 --> 00:30:03,909

WE HAVE WITH THE JAMES WEBB TELESCOPE, WITH THE EXPLORATION WE HAVE OF MARS WITH THE PROBES

479

00:30:03,909 --> 00:30:07,890

THAT WE'RE SENDING ALL OVER THE SOLAR SYSTEM, AND THEN COMMERCIAL SPACE FLIGHT, THE OPPORTUNITIES

480

00:30:07,890 --> 00:30:12,880

THAT ARE GOING TO EXIST HERE IN THE NOT TOO DISTANT FUTURE, SO THAT MORE PEOPLE HAVE THAT

481
00:30:12,880 --> 00:30:16,029
OPPORTUNITY TO SEE THE PERSPECTIVE OF THE
EARTH FROM LOW-EARTH ORBIT.

482
00:30:16,029 --> 00:30:20,570
I THINK THAT'S GOING TO BE CRITICALLY IMPORTANT
TO REALLY UNDERSTAND WHAT WE NEED TO DO TO

483
00:30:20,570 --> 00:30:24,850
TAKE CARE OF OUR PLANET.

484
00:30:24,850 --> 00:30:27,940
[APPLAUSE]
ALL RIGHT.

485
00:30:27,940 --> 00:30:32,600
SO, PLEASE DIRECT YOUR QUESTION TO ANY MEMBER
OF THE PANEL.

486
00:30:32,600 --> 00:30:33,600
YES?

487
00:30:33,600 --> 00:30:34,720
SO, I HAVE TWO QUESTIONS.

488
00:30:34,720 --> 00:30:40,000
THE FIRST ONE IS FOR EVERYBODY, AND IT'S DO
YOU THINK ANY INTELLIGENT LIFE EXISTS ELSEWHERE

489
00:30:40,000 --> 00:30:44,980
IN THE UNIVERSE, BESIDES LIKE--BECAUSE MICROBES
ARE POSSIBLE?

490
00:30:44,980 --> 00:30:49,149
DO YOU THINK THAT INTELLIGENT LIFE EXISTS?

491
00:30:49,149 --> 00:30:51,389
YES.

492

00:30:51,389 --> 00:30:53,629

YEAH.

493

00:30:53,629 --> 00:30:55,320

I DON'T--I DON'T KNOW.

494

00:30:55,320 --> 00:31:00,570

I DON'T KNOW IF WE'LL FIND IT IN OUR LIFETIMES,
BUT ABSOLUTELY I THINK IT'S OUT THERE.

495

00:31:00,570 --> 00:31:05,860

I MEAN THE FACT IS, IS THAT OUR MILKY WAY
GALAXY, NORMAL GALAXY, HAS HUNDREDS OF BILLIONS

496

00:31:05,860 --> 00:31:06,940

OF STARS.

497

00:31:06,940 --> 00:31:11,039

AND NOW, LIKE I SAID, WE KNOW THAT PLANETS
ARE COMMON AROUND ALMOST EVERY STAR.

498

00:31:11,039 --> 00:31:15,109

BASICALLY EVERY STAR IN OUR GALAXY HAS PLANETS
AROUND IT.

499

00:31:15,109 --> 00:31:18,960

BUT, THERE ARE HUNDREDS OF BILLIONS OF OTHER
GALAXIES.

500

00:31:18,960 --> 00:31:21,350

THE UNIVERSE IS SO FAST.

501

00:31:21,350 --> 00:31:26,779

IT IS SO HUGE THAT I THINK--I THINK WITHOUT
A DOUBT THAT THERE'S LIFE OUT THERE.

502

00:31:26,779 --> 00:31:29,799

THAT'S MY OPINION, NOT A FACT, JUST MY OPINION.

503

00:31:29,799 --> 00:31:31,619

DID YOU HAVE A FOLLOW-UP AS WELL?

504

00:31:31,619 --> 00:31:32,619

YEAH.

505

00:31:32,619 --> 00:31:34,890

I HAVE A QUESTION FOR KJELL OR SHELL?

506

00:31:34,890 --> 00:31:36,289

HOW DO I PRONOUNCE IT?

507

00:31:36,289 --> 00:31:37,299

YEAH, THAT'S FINE.

508

00:31:37,299 --> 00:31:38,299

OH.

509

00:31:38,299 --> 00:31:39,299

I RESPOND TO JUST ABOUT ANYTHING.

510

00:31:39,299 --> 00:31:47,399

WHAT WAS IT LIKE--WHAT WAS IT LIKE TRANSITIONING
BETWEEN LIKE MICROGRAVITY AND EARTH'S GRAVITY

511

00:31:47,399 --> 00:31:49,639

WHEN YOU CAME BACK FROM THE ISS?

512

00:31:49,639 --> 00:31:52,609

GRAVITY IS A BUMMER.

513

00:31:52,609 --> 00:31:55,070

GREAT ANSWER.

514

00:31:55,070 --> 00:32:01,210

SO, MY FIRST INTERACTION WITH GRAVITY WAS
BASICALLY CLIMBING OUT OF THE SPACECRAFT.

515
00:32:01,210 --> 00:32:06,950
WE WERE--BECAUSE OUR SPACECRAFT TIPPED OVER,
WHICH IS A NORMAL--A NORMAL CONFIGURATION,

516
00:32:06,950 --> 00:32:10,229
BUT WE WERE HANGING FROM OUR STRAPS KIND OF
FACE-DOWN.

517
00:32:10,229 --> 00:32:14,340
AND THE HATCH OPENS THIS WAY AND MAKES A REALLY
NICE PLATFORM ACTUALLY FOR GETTING OUT.

518
00:32:14,340 --> 00:32:18,479
SO, OLEG, MY COMMANDER, GOT OUT FIRST, THEN
KIMIYA, MY JAPANESE CREWMATE, AND THEN IT

519
00:32:18,479 --> 00:32:19,479
WAS MY TURN.

520
00:32:19,479 --> 00:32:21,750
AND THE SEARCH AND RESCUE GUYS CAME IN AND
UNBUCKLED MY STRAPS.

521
00:32:21,750 --> 00:32:25,139
YOU KNOW, MY BRAIN, YOU KNOW, IT MADE A LOT
OF SENSE.

522
00:32:25,139 --> 00:32:29,809
I'LL JUST GET DOWN ON ALL FOURS AND KIND OF
SHIMMY OUT. AND SO, I GOT DOWN ON ALL FOURS

523
00:32:29,809 --> 00:32:30,809
AND FACE-PLANTED.

524
00:32:30,809 --> 00:32:31,809
THUNK!

525
00:32:31,809 --> 00:32:36,499

I JUST KIND OF LAID THERE, YOU KNOW.

526

00:32:36,499 --> 00:32:40,519

HELP!

AND THEN--AND IT WAS NOT A STRENGTH ISSUE

527

00:32:40,519 --> 00:32:45,429

BECAUSE WE WORK OUT TWO AND A HALF HOURS EVERY DAY ON THE SPACE STATION.

528

00:32:45,429 --> 00:32:50,830

IT WAS JUST BASICALLY MY BRAIN DID NOT UNDERSTAND HOW HARD MY BODY NEEDED TO WORK TO COUNTER

529

00:32:50,830 --> 00:32:51,830

THE FORCE OF GRAVITY.

530

00:32:51,830 --> 00:32:58,799

AND THAT TOOK ME ABOUT 30 DAYS TO GET OVER THE EFFECTS OF JUST THE MUSCULOSKELETAL KIND

531

00:32:58,799 --> 00:33:02,860

OF ACHES AND SORENESS FROM BEING BACK IN GRAVITY.

532

00:33:02,860 --> 00:33:04,419

BUT, AFTER ABOUT 30 DAYS, I FELT GREAT.

533

00:33:04,419 --> 00:33:07,669

THANKS FOR THE GREAT QUESTION.

534

00:33:07,669 --> 00:33:10,169

THANK YOU.

535

00:33:10,169 --> 00:33:12,740

[APPLAUSE]

THEY WERE TWO GREAT QUESTIONS.

536

00:33:12,740 --> 00:33:14,650

WOULD YOU LIKE TO MODERATE THE NEXT PANEL?

537

00:33:14,650 --> 00:33:15,650

YES?

538

00:33:15,650 --> 00:33:16,650

THANK YOU, GUYS.

539

00:33:16,650 --> 00:33:23,489

ALL OF YOU ARE CHAMPIONS OF OUR CULTURE RIGHT NOW.

540

00:33:23,489 --> 00:33:29,669

[APPLAUSE]

STAR TREK I THINK HAS BEEN ON A LITTLE HIATUS

541

00:33:29,669 --> 00:33:36,049

FOR QUITE A WHILE, AND TALKING ABOUT THE SYNERGY BETWEEN THAT POP CULTURE AND THE REALITY OF

542

00:33:36,049 --> 00:33:38,110

NASA SCIENCE.

543

00:33:38,110 --> 00:33:43,340

YOU GUYS ARE TAKING THAT SYNERGY AND GIVING SO MUCH BACK TO US.

544

00:33:43,340 --> 00:33:48,299

I'M WONDERING, LIKE, HOW YOU FEEL, LIKE, IN AN AREA LIKE COMIC-CON, LIKE HOW THE POP CULTURE

545

00:33:48,299 --> 00:33:54,700

CAN REITERATE THAT SYNERGISTIC ENERGY, LIKE, BACK TOWARDS NASA AND THE REALITY.

546

00:33:54,700 --> 00:34:00,460

AND, LIKE, YOU TALKED ABOUT THINKING OF THE AWARENESS OF OUR PLANET AND SPACESHIP EARTH

547

00:34:00,460 --> 00:34:06,659

AND HOW WE CAN INCREASE THE POSITIVE TO KIND
OF FEEDBACK FLOW WITH THE MESSAGE OF STAR

548
00:34:06,659 --> 00:34:09,100
TREK THROUGHOUT HISTORY AS WELL AS NASA.

549
00:34:09,100 --> 00:34:12,669
YOU WANT TO TAKE THIS ONE?

550
00:34:12,669 --> 00:34:18,139
SO, THAT'S A GREAT QUESTION, AND WE WERE ACTUALLY
JUST TALKING A LITTLE BIT EARLIER REALLY ABOUT

551
00:34:18,139 --> 00:34:24,060
THE SYNERGY THAT EXISTS BETWEEN SCIENCE FICTION
AND POP CULTURE AND WHAT WE'RE DOING AT NASA.

552
00:34:24,060 --> 00:34:30,990
AND IT'S A CYCLE BECAUSE WE'VE GOT THE BIGGEST
COLLECTION OF SPACE NERDS AT NASA ANYWHERE,

553
00:34:30,990 --> 00:34:32,629
AND SCIENCE FICTION NERDS.

554
00:34:32,629 --> 00:34:40,480
SO, WE'RE INSPIRED BY WHAT--WE'RE INSPIRED
BY POP CULTURE, AND THEN IN TURN, POP CULTURE

555
00:34:40,480 --> 00:34:44,169
I THINK IS INSPIRED BY THE WORK THAT WE DO.

556
00:34:44,169 --> 00:34:51,730
BUT, FUNDAMENTALLY, TO HELP NASA DO ITS JOB,
TO HELP US DO THE THINGS THAT WE WOULD LIKE

557
00:34:51,730 --> 00:34:59,160
TO DO, AND TO HELP THE KIDS HERE COME AND
TAKE OUR JOBS AND BECOME THE NEXT GENERATION

558

00:34:59,160 --> 00:35:04,990

OF EXPLORERS AND SCIENTISTS AND ENGINEERS,
I MEAN, IT REALLY REQUIRES THE USE OF THE

559

00:35:04,990 --> 00:35:13,520

POLITICAL SYSTEM JUST TO TALK TO YOUR LEADERS,
TO YOUR CONGRESS PEOPLE, AND EXPRESS THAT

560

00:35:13,520 --> 00:35:18,430

SUPPORT, BECAUSE IT IS PUBLIC SUPPORT THAT
OUR POLITICAL LEADERS LOOK AT.

561

00:35:18,430 --> 00:35:23,890

AND THEN--AND THAT'S HOW PROGRAM--GOVERNMENT
PROGRAMS GET FUNDED.

562

00:35:23,890 --> 00:35:31,910

SO, ULTIMATELY, YOU KNOW, TURN YOUR PASSION
FOR POP CULTURE AND FOR WHAT WE'RE DOING AT

563

00:35:31,910 --> 00:35:35,480

NASA AND GIVE IT FEET.

564

00:35:35,480 --> 00:35:41,640

[APPLAUSE]

I'LL ADD TO THAT REAL QUICK.

565

00:35:41,640 --> 00:35:43,240

JUST KEEP DOING WHAT YOU'RE DOING.

566

00:35:43,240 --> 00:35:44,240

EVERYBODY'S HERE.

567

00:35:44,240 --> 00:35:48,049

YOU GUYS ARE READING THE BOOKS, WATCHING THE
MOVIES, ROOTING FOR US TO EXPLORE AND GO BEYOND,

568

00:35:48,049 --> 00:35:49,049

AND THAT'S WHY WE'RE DOING.

569

00:35:49,049 --> 00:35:53,150

AND I'M GOING TO DROP A PLUG HERE FOR YOU,
BOB, BECAUSE BOB WORKS AT THE PLANETARY SOCIETY,

570

00:35:53,150 --> 00:35:57,410

AND THEY HAVE A TON OF GREAT RESOURCES ON
HOW TO ACTUALLY CONTACT YOUR CONGRESS PEOPLE

571

00:35:57,410 --> 00:35:58,530

AND SHOW THAT SUPPORT.

572

00:35:58,530 --> 00:36:01,450

SO, THERE'S A LOT OF GOOD STUFF.

573

00:36:01,450 --> 00:36:03,400

THANK YOU.

574

00:36:03,400 --> 00:36:07,450

[APPLAUSE]

AND PLEASE SUBSCRIBE TO MY FREE WEB VIDEO,

575

00:36:07,450 --> 00:36:12,210

THE PLANETARY POST, WHERE YOU WILL HEAR WHAT
IS COOL, WHAT IS HAPPENING IN SPACE EVERY

576

00:36:12,210 --> 00:36:13,920

MONTH, THE PLANETARY POST.

577

00:36:13,920 --> 00:36:15,099

THAT WAS A CHEAP PLUG.

578

00:36:15,099 --> 00:36:16,099

ALL RIGHT.

579

00:36:16,099 --> 00:36:18,349

WE ONLY HAVE ONE MORE QUESTION.

580

00:36:18,349 --> 00:36:19,349

OKAY.

581

00:36:19,349 --> 00:36:20,980

THANKS, GUYS, ALL FOR BEING HERE.

582

00:36:20,980 --> 00:36:25,480

ALL BEING FANS OF STAR TREK, OBVIOUSLY, THE DOCTOR IS OUR FAVORITE CHARACTER.

583

00:36:25,480 --> 00:36:27,619

YAY DOCTORS.

584

00:36:27,619 --> 00:36:30,360

WE'RE NOT GOING TO ARGUE.

585

00:36:30,360 --> 00:36:33,780

I WOULD LIKE TO KNOW WHAT IS YOUR FAVORITE STAR TREK SERIES AND WHY?

586

00:36:33,780 --> 00:36:39,630

I'M GOING TO LEAVE THE STAGE.

587

00:36:39,630 --> 00:36:42,200

COME ON.

588

00:36:42,200 --> 00:36:43,200

TELL THE TRUTH.

589

00:36:43,200 --> 00:36:44,579

RUN DOWN AND TELL THE TRUTH, STARTING WITH JAY.

590

00:36:44,579 --> 00:36:45,579

DON'T LIE.

591

00:36:45,579 --> 00:36:48,859

I HAVE TO SAY THE ORIGINAL SERIES, BECAUSE I SAW IT FIRST, AND IT MOST INSPIRED ME.

592
00:36:48,859 --> 00:36:52,960
I'LL HAVE TO SAY VOYAGER BECAUSE WOMAN CAPTAIN!

593
00:36:52,960 --> 00:36:57,539
[APPLAUSE]
TNG, JUST BECAUSE I LOVE GEORDI.

594
00:36:57,539 --> 00:37:04,372
I MEAN LIKE WHO DOESN'T WANT TO BE [UNINTELLIGIBLE]?

595
00:37:04,372 --> 00:37:05,840
[APPLAUSE]
I WOULD HAVE TO SAY THE ORIGINAL SERIES.

596
00:37:05,840 --> 00:37:11,010
I ASPIRE TO BE SPOCK, BUT I'M MORE LIKE BONES.

597
00:37:11,010 --> 00:37:17,020
[APPLAUSE]
AND I'M NOT ALLOWED TO ANSWER.

598
00:37:17,020 --> 00:37:18,020
THANK YOU ALL VERY MUCH.