

Dawn mission at Ceres  
*Today!*

Europa Multiple Flyby Mission  
*Nominal Launch, 2022*

1  
00:00:01,680 --> 00:00:09,750  
>>> GOOD AFTERNOON.

2  
00:00:09,750 --> 00:00:13,810  
WE'RE HERE AT THE 2015 SCIENCE  
CONFERENCE.

3  
00:00:13,810 --> 00:00:19,500  
WE CALL IT FOR THE WHOLE WEEK  
HERE IN CHICAGO, ILLINOIS.

4  
00:00:19,500 --> 00:00:21,430  
THANKS FOR JOINING US TODAY.

5  
00:00:21,430 --> 00:00:26,490  
WE HAVE 750 SCIENTISTS FROM ALL  
OVER THE WORLD REGISTERED TO

6  
00:00:26,490 --> 00:00:31,210  
PARTICIPATE IN THE CONFERENCE  
HERE AT THE HEALTH OF CHICAGO.

7  
00:00:31,210 --> 00:00:34,830  
I AM HERE WITH THE PANEL OF FOUR  
OUTSTANDING SCIENTISTS.

8  
00:00:34,830 --> 00:00:37,520  
WE'RE WAITING FOR THE FOURTH TO  
ARRIVE, AND HE IS THE FIRST

9  
00:00:37,520 --> 00:00:44,579  
SPEAK ER, SO WE WILL HOLD ON.

10  
00:00:44,579 --> 00:00:48,710  
IN THE MEANTIME I WILL INTRODUCE  
THE PANEL OF SPEAK ERS.

11  
00:00:48,710 --> 00:00:51,250  
WE'RE HERE TO DISCUSS AFTER

## BIOLOGY RESEARCH AND

12

00:00:51,250 --> 00:00:58,100

ACKNOWLEDGMENTS IN THE SOLAR  
SYSTEM AND BEYOND.

13

00:00:58,100 --> 00:01:05,100

WE'RE ON THE WEB AND ALSO ON  
NASA TV.

14

00:01:05,100 --> 00:01:09,460

OUR BRIEFING PARTICIPANTS THE  
FIRST SPEAKER IS JUST ARRIVING

15

00:01:09,460 --> 00:01:15,869

ON STAGE NOW, I WILL START.

16

00:01:15,869 --> 00:01:25,560

HE IS THE ADMINISTRATOR FOR THE  
ADMINISTRATORS IN WASHINGTON.

17

00:01:25,560 --> 00:01:29,520

HE HAS BEEN RUNNING FROM ROOM TO  
ROOM.

18

00:01:29,520 --> 00:01:33,220

WE'RE HAVING 12 HOURS DAYS HERE.

19

00:01:33,220 --> 00:01:38,509

HE HAS JUST COME FROM A SOCIAL  
MEDIA GATHERING TO JOIN US HERE

20

00:01:38,509 --> 00:01:40,659

AT THE PRESS CONFERENCE.

21

00:01:40,659 --> 00:01:45,759

HE SERVED DEPUTY DIRECTOR IN  
BALTIMORE AND MANAGING THE

22

00:01:45,759 --> 00:01:51,409  
SCIENCE PROGRAM AND THE FOURTH  
COMING JAMES WEB SPACE TELL

23  
00:01:51,409 --> 00:01:52,409  
COPE.

24  
00:01:52,409 --> 00:01:59,189  
HE GRADUATE FROM THE INSTITUTE  
OF TECHNOLOGY AND A NATIVE OF

25  
00:01:59,189 --> 00:02:02,580  
CHICAGO, SO HE IS HERE IN HIS  
HOMETOWN, AND I BET THAT HE IS

26  
00:02:02,580 --> 00:02:03,930  
GOING TO THE CUBS GAME TONIGHT.

27  
00:02:03,930 --> 00:02:05,930  
YOU HAVE TO GO BACK TO  
WASHINGTON.

28  
00:02:05,930 --> 00:02:07,640  
HOW SAD.

29  
00:02:07,640 --> 00:02:11,450  
HE EARNED THE MASTERS AND PH.D  
IN PHYSICS FROM THE UNIVERSITY

30  
00:02:11,450 --> 00:02:12,790  
OF CHICAGO.

31  
00:02:12,790 --> 00:02:17,980  
HE IS A VETERAN OF FIVE SPACE  
SHUTTLE FLIGHTS AND PERFORMING

32  
00:02:17,980 --> 00:02:19,719  
EIGHT SPACE WALKS.

33

00:02:19,719 --> 00:02:22,890  
HE WAS INDUCTED INTO THE ASTRO  
NAUGHT HALL OF FAME THIS PAST

34  
00:02:22,890 --> 00:02:25,439  
MAY.

35  
00:02:25,439 --> 00:02:29,489  
HE IS PASSIONATE ABOUT BIOLOGY,  
AND THAT'S WHY HE IS HERE.

36  
00:02:29,489 --> 00:02:34,290  
HE IS NOT HERE IN AN OFFICIAL  
CAPACITY BUT BECAUSE HE IS

37  
00:02:34,290 --> 00:02:37,170  
PASSIONATE ABOUT THE SCIENCE.

38  
00:02:37,170 --> 00:02:42,010  
YESTERDAY IN THE OPENING REMARKS  
FOR THE CONFERENCE, HE CALLED

39  
00:02:42,010 --> 00:02:47,370  
ASTRO BIOLOGY A UNIFYING THEME  
IN SPACE SCIENCE AND CERTAINLY

40  
00:02:47,370 --> 00:02:51,639  
ALL OF US HERE WERE HAPPY TO  
HEAR THAT.

41  
00:02:51,639 --> 00:02:56,419  
OUR NEXT SPEAKER AND EACH OF THE  
SPEAKERS WILL BE TALKING BRIEFLY

42  
00:02:56,419 --> 00:03:00,969  
FOR FIVE MINUTES BECAUSE WE'RE  
ON A TIGHT SCHEDULE HERE.

43  
00:03:00,969 --> 00:03:03,890  
WE WANT TO MAKE SURE THAT WE

HAVE TIME FOR QUESTIONS.

44

00:03:03,890 --> 00:03:09,699  
OUR NEXT SPEAKER IS ALEX SIS AND  
SHE IS AN ASSOCIATE PROFESSOR

45

00:03:09,699 --> 00:03:15,200  
WITH THE DEPARTMENT OF  
GEOLOGICAL OF SCIENCE AND SHE IS

46

00:03:15,200 --> 00:03:23,409  
THE PRINCIPAL INVESTIGATOR OF  
THE ROCK POWERED LIFE TEAM.

47

00:03:23,409 --> 00:03:26,859  
OUR NEXT SPEAKER WILL BE  
BRITTNEY SMIT.

48

00:03:26,859 --> 00:03:32,819  
SHE IS AN ASSISTANT DIRECTOR AT  
THE GEORGIA INSTITUTE OF

49

00:03:32,819 --> 00:03:34,129  
TECHNOLOGY.

50

00:03:34,129 --> 00:03:37,620  
SHE IS PRINCIPAL INVESTIGATOR  
FOR THE SUB ICE MARINE AND

51

00:03:37,620 --> 00:03:41,689  
PLANETARY KNOWN AS SIMPLE.

52

00:03:41,689 --> 00:03:46,889  
I GUARANTEE YOU THAT IT'S NOT  
SIMPLE AND THEN ONE OF THE

53

00:03:46,889 --> 00:03:54,090  
INSTRUMENTS THAT NASA JUST  
SELECTED FOR THE NEXT MISSION.

54  
00:03:54,090 --> 00:03:58,790  
OUR LAST SPEAKER WILL BE VICKIE  
MEADOWS AND HE IS A PROFESSOR AT

55  
00:03:58,790 --> 00:04:04,829  
THE UNIVERSITY OF WASHINGTON AND  
THE BIOLOGY INSTITUTE AND

56  
00:04:04,829 --> 00:04:07,939  
VIRTUAL PLANNING TERRITORY TEAM.

57  
00:04:07,939 --> 00:04:10,409  
OUR SPEAKERS TODAY ARE WORKING  
AT THE CUTTING EDGE OF THE

58  
00:04:10,409 --> 00:04:13,930  
SCIENCE AND TECHNOLOGY IN THE  
AREA OF EXPERTISE.

59  
00:04:13,930 --> 00:04:19,129  
SHE IS EXPLORING THE PROCESSES  
THAT CAN PLAY A ROLE IN THE

60  
00:04:19,129 --> 00:04:20,129  
LIFE.

61  
00:04:25,979 --> 00:04:21,129  
DR.

62  
00:04:25,979 --> 00:04:28,740  
MEADOWS  
IS MODDING XO ENVIRONMENT AND

63  
00:04:28,740 --> 00:04:35,600  
WORKING ON THOUSAND SEE AND WHEN  
WE GET THE QUESTIONS AND

64  
00:04:35,600 --> 00:04:38,669  
ANSWERS, WE WILL BE TAKING

## QUESTIONS HERE FROM THE AUDIENCE

65

00:04:38,669 --> 00:04:42,860

AND BY E-MAIL AND MY COLLEAGUE  
LESLEY WILL BE FIELDING THE

66

00:04:42,860 --> 00:04:44,900

E-MAIL QUESTIONS.

67

00:04:44,900 --> 00:04:46,220

WE'RE GOING TO START WITH DR.

68

00:04:46,220 --> 00:04:52,389

GRUNSFIELD AND HE IS IN CHARGE  
OF ALL OF SPACE SCIENCE.

69

00:04:52,389 --> 00:04:58,000

AS HE HAS TOLD US ALL THAT THE  
SCIENCES ARE BEING UNIFIED BY

70

00:04:58,000 --> 00:05:01,900

THE THEME AND SEARCH FOR  
EVIDENCE OF LIFE IN THE

71

00:05:01,900 --> 00:05:03,639

UNIVERSE.

72

00:05:03,639 --> 00:05:05,389

>> OKAY.

73

00:05:05,389 --> 00:05:14,819

I DON'T WANT TO TAKE TOO MUCH  
TIME BEFORE WE GO TO THE

74

00:05:14,819 --> 00:05:17,660

SPEAKERS, BUT I WANT TO TELL YOU  
ABOUT THE PERSPECTIVE OVERALL

75

00:05:17,660 --> 00:05:20,400

FOR THE NASA SCIENCE AND NASA IN  
GENERAL.

76

00:05:20,400 --> 00:05:26,159  
THE MISSION IS TO INNOVATE,  
EXPLORE, DISCOVER AND INSPIRE.

77

00:05:26,159 --> 00:05:30,479  
IN PARTICULAR WE'RE ALL HERE  
BECAUSE IT FITS THAT TO A T.

78

00:05:30,479 --> 00:05:35,370  
WE INNOVATE BECAUSE LIFE OUTSIDE  
OF EARTH IS PROBABLY GOING TO BE

79

00:05:35,370 --> 00:05:36,819  
REALLY HARD TO FIND.

80

00:05:36,819 --> 00:05:40,590  
WE CAN NOT AGREE ON WHAT A  
DEFINITION OF LIFE DETECTION IS,

81

00:05:40,590 --> 00:05:44,340  
AND THERE ARE MANY SESSIONS ON  
TRYING TO FIGURE THAT OUT.

82

00:05:44,340 --> 00:05:47,349  
WHEN WE INNOVATE, WE DEVELOP NEW  
TECHNOLOGY AND APPLY THAT NEW

83

00:05:47,349 --> 00:05:49,950  
TECHNOLOGY TO EXPLORATION.

84

00:05:49,950 --> 00:05:53,469  
THAT'S WHAT THEY DO BEST TO  
EXPLORE THE COSMOS.

85

00:05:53,469 --> 00:05:55,449  
WHEN WE EXPLORE, WE DISCOVER  
THINGS.

86  
00:05:55,449 --> 00:06:02,210  
I BELIEVE THAT THEY HAVE A  
PARTICULAR EXPRESSION OF A GENE

87  
00:06:02,210 --> 00:06:05,749  
THAT DRIVES THEM TO EXPLORE,  
BECAUSE WHEN WE EXPLORE, WE

88  
00:06:05,749 --> 00:06:11,229  
DISCOVER THINGS AND THAT  
WONDERFUL ACT OF DISCOVERING NEW

89  
00:06:11,229 --> 00:06:17,479  
THINGS OR DISCOVERING THINGS  
THAT WE CONFORM AND IS ONE OF

90  
00:06:17,479 --> 00:06:20,800  
THE SOURCES THAT HAVE ALLOWED  
HUMANS TO E VOLUME AND HAVE THE

91  
00:06:20,800 --> 00:06:26,230  
COMPLEXITY THAT WE HAVE AND THE  
SEARCH FOR LIFE IN THE UNIVERSE

92  
00:06:26,230 --> 00:06:29,800  
AND SEARCH FOR INTELLIGENT LIFE  
ON EARTH.

93  
00:06:29,800 --> 00:06:32,139  
THAT'S A JOKE.

94  
00:06:32,139 --> 00:06:38,419  
THAT'S SOMETHING THAT INSPIRES  
NOT JUST STUDENTS BUT EVERYONE.

95  
00:06:38,419 --> 00:06:40,969  
WE'RE TRYING WITH THE SCIENCE TO  
ANSWER THE FUNDAMENTAL

96

00:06:40,969 --> 00:06:41,969

QUESTIONS.

97

00:06:41,969 --> 00:06:43,379

WHERE DID WE COME FROM?

98

00:06:43,379 --> 00:06:48,939

WHAT'S THE ORIGIN THAT WE'RE  
MADE OF AND THE OXYGEN THAT WE

99

00:06:48,939 --> 00:06:52,340

BREATHE AND THE IRON IN THE  
BLOOD.

100

00:06:52,340 --> 00:06:56,010

IT'S ALL COMING FROM WITHIN  
SIDE.

101

00:06:56,010 --> 00:06:59,580

WHAT'S THE EVOLUTION AND THE  
PATH THAT THE EARTH WAS FORMED

102

00:06:59,580 --> 00:07:05,810

AND THE CHEMICAL WITH THE SEED  
OF THE EARLY EERT AND ALLOWING

103

00:07:05,810 --> 00:07:06,849

IT TO FORM.

104

00:07:06,849 --> 00:07:09,900

WHERE IS IT GOING AND THE FUTURE  
HISTORY.

105

00:07:09,900 --> 00:07:14,129

WE'RE YOUNG FOR A HALF BILLION  
YEARS OLD.

106

00:07:14,129 --> 00:07:17,789

THERE ARE MUCH OLDER SOLAR

SYSTEMS OUT THERE.

107

00:07:17,789 --> 00:07:19,289

WHERE ARE WE GOING.

108

00:07:19,289 --> 00:07:24,759

WHAT'S THE FUTURE OF THE EARTH  
AND THE ROLE OF THE FUTURE?

109

00:07:24,759 --> 00:07:28,690

LIFE IS ALWAYS CHANGE THE EARTH  
FROM WHEN IT STARTED.

110

00:07:28,690 --> 00:07:31,430

CHANGE THE GEOLOGY AND THE  
COURSE.

111

00:07:31,430 --> 00:07:34,510

IT'S CHANGE WHAT WE LOOK LIKE  
FROM A GREAT DISTANCE.

112

00:07:34,510 --> 00:07:39,770

IF THERE'S LIFE OUT THERE AND  
LOOKING AT EARTH, THEY WILL KNOW

113

00:07:39,770 --> 00:07:41,419

THAT WE'RE HERE.

114

00:07:41,419 --> 00:07:45,789

WE PUT THE SIGNATURES IN AND  
GUARANTEE THAT SOMEONE WITH A

115

00:07:45,789 --> 00:07:52,879

LARGE TELESCOPE COULD DETECT  
THEM, AND ARE WE ALONE.

116

00:07:52,879 --> 00:07:56,500

IS THERE ANY OTHER LIFE OUT  
THERE.

117

00:07:56,500 --> 00:07:59,919

NOW, THE FACT THAT WE'RE SKMEER  
THE LIFE IS SO COMPLEX AND WE

118

00:07:59,919 --> 00:08:07,680

SEE THE LIFE AND DEEP INSIDE OF  
THE ROCKS THAT CAN SURVIVE OR

119

00:08:07,680 --> 00:08:11,820

OTHER EXTREME AND IT'S  
CONVINCING THAT VERY HIGH

120

00:08:11,820 --> 00:08:14,729

PROBABILITY THAT THERE'S A HIGH,  
AND NASA IS LOOKING FOR THAT.

121

00:08:14,729 --> 00:08:20,380

WE ARE LOOKING FOR IT ON MARS  
AND THEN EVIDENCE FOR LIFE IN

122

00:08:20,380 --> 00:08:22,360

THE SUB SURFACE OCEAN.

123

00:08:22,360 --> 00:08:25,440

THAT'S PART OF THE PORTFOLIO.

124

00:08:25,440 --> 00:08:28,300

ALL OF THOSE THINGS AND THE  
EARTH SCIENCE AND THE IMPACT OF

125

00:08:28,300 --> 00:08:33,390

THE SUN AND OTHER SUNS ON THEIR  
PLANETS.

126

00:08:33,390 --> 00:08:36,690

PLANETARY SCIENCE AND THEN ASTRO  
PHYSICS AND THAT'S THE

127

00:08:36,690 --> 00:08:40,169

INVESTIGATION AND ALL OF THOSE  
ARE REALLY ANSWERING THE BIG

128

00:08:40,169 --> 00:08:41,169

QUESTIONS.

129

00:08:41,169 --> 00:08:44,839

FOR ME IT'S ONE OF THE ARE WE  
ALONE IS THE DRIVING QUESTION.

130

00:08:44,839 --> 00:08:48,760

WITH THAT, I WILL HAND IT OVER  
TO THE NEXT SPEAKER.

131

00:08:48,760 --> 00:08:51,459

>> THANK YOU DR.

132

00:08:51,459 --> 00:08:53,940

RUMSFELD.

133

00:08:53,940 --> 00:08:56,440

IT'S A GREAT INTRODUCTION TO THE  
PANEL DISCUSSION.

134

00:08:56,440 --> 00:08:58,610

WE WILL TURNOVER THE MIC TO DR.

135

00:08:58,610 --> 00:09:00,079

TEMPLETON AT THIS POINT.

136

00:09:00,079 --> 00:09:01,560

>> THANK YOU.

137

00:09:01,560 --> 00:09:05,240

I AM THRILLED TO BE HERE AND  
THRILLED TO BE HERE IN THE

138

00:09:05,240 --> 00:09:09,850

SESSION TODAY AS WELL BECAUSE

THIS IS A WONDERFUL OPPORTUNITY

139

00:09:09,850 --> 00:09:12,820

FOR DISCUSSING THE CHANGES AND  
UNDERSTANDING OF THE HABIT

140

00:09:12,820 --> 00:09:17,750

ENVIRONMENTS THAT EXISTS AND HOW  
THAT INFORMS FOR THE SEARCH AND

141

00:09:17,750 --> 00:09:20,540

THE ENVIRONMENTS ELSEWHERE AND  
THE SOLAR SYSTEM AND BEYOND.

142

00:09:20,540 --> 00:09:25,120

THAT'S SOME OF THE THEMES AND  
THE DISCUSSIONS FOR TODAY.

143

00:09:25,120 --> 00:09:30,000

I AM PART OF A NEW TEAM OF NASA  
AND A TEAM THAT'S CALLED ROCK

144

00:09:30,000 --> 00:09:31,640

POWERED LIFE.

145

00:09:31,640 --> 00:09:35,779

IT'S A FIVE YEAR PROJECT AND  
WE'RE PART OF A LARGE COMMUNITY

146

00:09:35,779 --> 00:09:41,510

AND IT'S INTERESTED IN THE  
CAPABILITY OF THE ROCKS WITHIN

147

00:09:41,510 --> 00:09:46,030

THEM TO POWER THE BIOLOGICAL  
SYSTEMS.

148

00:09:46,030 --> 00:09:49,290

ESSENTIALLY THERE'S A  
FUNDAMENTAL UNDERSTANDING THAT

149

00:09:49,290 --> 00:09:56,279

ROCKS HAVE THE ABILITY TO  
RELEASE THE ELECTRONS OR THE

150

00:09:56,279 --> 00:10:02,340

COMPONENTS THAT CAN FUEL AND  
EMPOWER LIKE THE FULL CELLS DO

151

00:10:02,340 --> 00:10:05,810

AND ONE OF THE BIG QUESTIONS AT  
THE MOMENT IS HOW WE CAN COUPLE

152

00:10:05,810 --> 00:10:10,649

WITH ENERGY THAT'S STORED WITHIN  
THE ROCKS TO BIOLOGICAL SYSTEMS.

153

00:10:10,649 --> 00:10:13,560

ONE OF THE THINGS THAT WE KNOW  
IS THAT OFTEN TO RELEASE THAT

154

00:10:13,560 --> 00:10:16,730

ENERGY THAT'S STORED WITHIN THE  
ROCKS, IT REQUIRES A REACTION OR

155

00:10:16,730 --> 00:10:18,300

A CONTACT WITH WATER.

156

00:10:18,300 --> 00:10:21,820

ANOTHER INGREDIENT THAT WE  
CONSIDER TO BE ESSENTIAL FOR

157

00:10:21,820 --> 00:10:22,820

LIFE.

158

00:10:22,820 --> 00:10:25,980

THERE'S A BROAD INTEREST OF  
UNDERSTANDING WITHIN THE

159

00:10:25,980 --> 00:10:30,070  
LOCATION WHEN WATER AND ROCKS  
COME INTO REACTION OR CONTACT

160  
00:10:30,070 --> 00:10:33,320  
WITH EACH OTHER AND THE FACT  
THAT THE CONTROL OF THE TRANSFER

161  
00:10:33,320 --> 00:10:36,730  
OF THAT ENERGY AND DIFFERENT CAR  
YOURS THAT CAN POWER THE

162  
00:10:36,730 --> 00:10:38,190  
BIOLOGICAL SYSTEM.

163  
00:10:38,190 --> 00:10:43,540  
THE GREAT EXAMPLE THAT'S TO MANY  
IS THE MOLL CULL.

164  
00:10:43,540 --> 00:10:46,149  
IT'S SOMETHING THAT CAN BE  
PRODUCED WITH THE REACTION OF

165  
00:10:46,149 --> 00:10:48,920  
ROCKS AND WATER AND CONTACT WITH  
EACH OTHER.

166  
00:10:48,920 --> 00:10:54,070  
WE USE THEM IN BUILDING  
BATTERIES AND IN PARTICULAR

167  
00:10:54,070 --> 00:10:58,910  
REKNOW MANY TYPES THAT CAN USE A  
MOLECULE LIKE ANY KIND OF

168  
00:10:58,910 --> 00:11:04,850  
CARRIER AND CAN DRIVE THE  
ACTIVITIES.

169  
00:11:04,850 --> 00:11:06,660

ONE OF THE INTERESTING THING  
SOCIAL SECURITY THAT IN THE

170

00:11:06,660 --> 00:11:09,940

GEOLOGICAL STUDIES THAT HAVE  
OCCURRED TODAY MOST OF THEM HAVE

171

00:11:09,940 --> 00:11:17,760

LOOKED FOR LIFE FORMS IN AREAS  
THAT ARE ACTIVE.

172

00:11:17,760 --> 00:11:20,720

WE'RE VERY GOOD AT TRYING TO  
LOOK AT ENVIRONMENTS THAT ARE

173

00:11:20,720 --> 00:11:24,550

QUIETER AND COLDER THROUGHOUT  
THE SOLAR SYSTEM AND UNDERSTAND

174

00:11:24,550 --> 00:11:27,970

WHETHER THOSE ARE OCCURRING AT  
MEASURABLE RATES THERE AND

175

00:11:27,970 --> 00:11:31,589

WHETHER OR NOT THEY MAY SUSTAIN  
OR SUPPORT THE BIOLOGICAL

176

00:11:31,589 --> 00:11:32,589

ACTIVITY.

177

00:11:32,589 --> 00:11:34,970

I WANT TO GIVE EXAMPLES TODAY OF  
THE RESEARCHING THAT'S BEING

178

00:11:34,970 --> 00:11:38,779

HIGHLIGHTED AND MANY PAPERS THAT  
ARE COMING OUT IN THE LITERATURE

179

00:11:38,779 --> 00:11:40,230

AT THE MOMENT.

180  
00:11:40,230 --> 00:11:42,260  
I WILL PUT UP A FIRST SLIDE.

181  
00:11:42,260 --> 00:11:44,020  
THAT'S NOT A FIRST SLIDE.

182  
00:11:44,020 --> 00:11:45,020  
SORRY.

183  
00:11:45,020 --> 00:11:46,620  
LET ME GO BACK.

184  
00:11:46,620 --> 00:11:52,300  
SO THE PICTURE THAT I HAVE  
BEHIND ME AT THE MOMENT IS WHEN

185  
00:11:52,300 --> 00:11:55,550  
THAT I TOOK MYSELF IN JANUARY OF  
THIS YEAR.

186  
00:11:55,550 --> 00:11:58,649  
I AND OTHER MEMBERS OF THE TEAM  
THAT I AM WORKING WITH HAVE BEEN

187  
00:11:58,649 --> 00:12:01,980  
TRAVELING SO THESE ARE FROM THE  
DESSERT.

188  
00:12:01,980 --> 00:12:04,940  
WHAT YOU'RE LOOKING AT HERE ARE  
ROCKS THAT COME FROM THE MANTLE

189  
00:12:04,940 --> 00:12:09,110  
OF THE EARTH, SO THEY'RE STORED  
UNDER THE SURFACE OF THE PLANET,

190  
00:12:09,110 --> 00:12:13,860  
BUT THERE ARE PLACES THAT

THEY'RE STORED ON THE SURFACE.

191

00:12:13,860 --> 00:12:16,850

MANY AREAS ON THE MODERN EARTH  
THAT HAVE SMALL EXPOSURES OF THE

192

00:12:16,850 --> 00:12:17,920

ROCK.

193

00:12:17,920 --> 00:12:20,829

I WANT TO HIGHLIGHT THIS ONE  
BECAUSE IF YOU LOOK IN THE

194

00:12:20,829 --> 00:12:29,529

PICTURE, THIS IS A DRY BARING  
LANDSCAPE AND WE'RE IN THE

195

00:12:29,529 --> 00:12:30,779

DESERT.

196

00:12:30,779 --> 00:12:34,819

HOWEVER, THERE ARE SMALL AMOUNTS  
OF WATER THAT DO COME INTO THE

197

00:12:34,819 --> 00:12:39,089

CONTACT OF THE ROCKS AND  
INFILTRATE THEM AND IS STORED

198

00:12:39,089 --> 00:12:41,160

OVER A LONG PERIOD OF TIME.

199

00:12:41,160 --> 00:12:44,470

IT'S THE CONTINUED REACTION OF  
THAT WATER WITH THOSE ROCKS THAT

200

00:12:44,470 --> 00:12:47,569

CHANGES THE WATER CHEMISTRY  
PROGRESSIVELY.

201

00:12:47,569 --> 00:12:50,760  
WE WOULD HAVE NO INDICATION OF  
THAT IF IT DID NOT GET RELEASED

202  
00:12:50,760 --> 00:12:55,540  
UP TO THE SURFACE, SO IN THE  
LOWER PICTURE THAT'S PRESENT

203  
00:12:55,540 --> 00:12:59,290  
HERE IS AN IMAGE OF A SMALL  
SPRING WHERE WATER IS RELEASED

204  
00:12:59,290 --> 00:13:02,790  
BACK TO THE SURFACE AFTER A LONG  
PERIOD OF BEING STORED.

205  
00:13:02,790 --> 00:13:08,389  
IT'S CHANGED IN THE CHEMICAL  
CARE AND YOU CAN COME AND FIND

206  
00:13:08,389 --> 00:13:14,740  
THE HYDROGEN AND THE ENERGY  
CARRIERS THAT WE'RE INTERESTED

207  
00:13:14,740 --> 00:13:15,740  
IN.

208  
00:13:15,740 --> 00:13:19,019  
ONE OF THE THINGS THAT'S NOTE IN  
THE SYSTEMS STUDIES LIKE THIS

209  
00:13:19,019 --> 00:13:23,740  
ACROSS THE WORLD AND THEN IN  
CALIFORNIA, CANADA AND ALL OF

210  
00:13:23,740 --> 00:13:26,810  
THE EXAMPLES ARE ON THE SEA  
FLOOR, AND THAT THERE ARE WATERS

211  
00:13:26,810 --> 00:13:33,269

THAT ARE ON THE PL SCALE OF ZERO  
TO 14, THEY'RE UP NEAR THE FAR

212

00:13:33,269 --> 00:13:34,690  
END OF 12.

213

00:13:34,690 --> 00:13:37,259  
IT'S A RARE TYPE OF WATER TO  
FIND.

214

00:13:37,259 --> 00:13:42,319  
IT'S A CHEMICAL REACTION THAT  
OCCURRED WITHIN IT.

215

00:13:42,319 --> 00:13:46,170  
THERE HAVE BEEN MANY QUESTIONS  
ABOUT WHETHER OR NOT LIFE WOULD

216

00:13:46,170 --> 00:13:48,750  
PERSIST IN WATER IN THE EXTREME  
CONDITIONS.

217

00:13:48,750 --> 00:13:52,529  
VERY CHALLENGING FOR THE LIFE TO  
EXIST.

218

00:13:52,529 --> 00:13:56,209  
WORK THAT'S BEING HIGHLIGHTED IN  
SEVERAL SESSIONS THAT ARE HERE

219

00:13:56,209 --> 00:14:00,870  
AND THAT HAVE STARTED THIS WEEK  
REFER TO THE ABILITY TO DETECT

220

00:14:00,870 --> 00:14:08,290  
THE ACTIVITY IN THE WATER AND  
SUSTAINED BY THEM AND THE DNA

221

00:14:08,290 --> 00:14:11,500  
HAS BEEN EXTRACTED AND WE'RE

STARTING TO UNDERSTAND MORE

222

00:14:11,500 --> 00:14:15,759

ABOUT WHO THE ORGANIZATIONS ARE,  
BUT IN PARTICULAR WE'RE ABLE TO

223

00:14:15,759 --> 00:14:23,060

I WOULD SAY WORK THAT'S  
PUBLISHED ARE GROWING AND

224

00:14:23,060 --> 00:14:29,060

STUDYING THE BIOLOGY THAT ARE  
ADAPTED FOR THE HIGH PH.

225

00:14:29,060 --> 00:14:32,120

IT'S NOT ONLY THAT THEY CAN  
TOLERATE THEM AND THEY'RE

226

00:14:32,120 --> 00:14:36,440

ACTUALLY OPTIMIZING THEM WITH 11  
OR 12.

227

00:14:36,440 --> 00:14:40,120

THIS IS EXCITING AND STARTING  
IMAGINE THAT THERE'S A LIFE FORM

228

00:14:40,120 --> 00:14:44,329

THAT MAYBE ADAPTED IN THE  
SURFACE ENVIRONMENT TO BEING

229

00:14:44,329 --> 00:14:48,170

SUSTAINED BY THE REACTION  
BETWEEN THE ROCKS AND WATER.

230

00:14:48,170 --> 00:14:52,620

SO I WILL JUST JUMP AGAIN INTO  
ANOTHER IMAGE HERE AND THAT'S

231

00:14:52,620 --> 00:14:55,509

FROM THE PROPORTION LABORATORY.

232

00:14:55,509 --> 00:15:01,600

WHAT YOU HAVE IN THE PICTURE  
HERE IS A CARTOON AND ONE OF THE

233

00:15:01,600 --> 00:15:15,209

THINGS AND LOOKING AT THE CON  
SEPTEMBER OF THE ROCKY TOUR.

234

00:15:15,209 --> 00:15:18,040

AND ONE OF THE NOTICEABLE THINGS  
FROM THE MISSIONS AND THE

235

00:15:18,040 --> 00:15:22,270

DETECTION OF THE PARTICLES THAT  
ARE EJECT FROM THE SOUTH POLE,

236

00:15:22,270 --> 00:15:27,529

AND THERE'S BEEN A LOT OF  
EXCITEMENT AND THEY REPRESENT

237

00:15:27,529 --> 00:15:32,350

LIQUID WATER THAT'S STORED AND  
TO RELATE IT TO WHAT I HAVE BEEN

238

00:15:32,350 --> 00:15:36,970

TALKING ABOUT, YOU CAN SEE THAT  
THE CONTACT OF THE WATER WITH

239

00:15:36,970 --> 00:15:41,370

THE RUSTIC CORE.

240

00:15:41,370 --> 00:15:43,410

THE EXISTING PAPERS ARE  
SUGGESTING THAT IT'S A SALTY

241

00:15:43,410 --> 00:15:48,310

WATER THAT WE JUST PICKED THEM  
UP WITH THE REACTIONS AND THE

242

00:15:48,310 --> 00:15:49,310

ROCKS.

243

00:15:49,310 --> 00:15:55,399

THE RESENT PAPER THAT'S COME OUT  
OF THE INSTITUTION IS THE

244

00:15:55,399 --> 00:16:00,810

CHEMICAL MODDING AND HE HAS GONE  
AND SHOWN THAT THE PH OF THE

245

00:16:00,810 --> 00:16:04,639

WATER IS AGAIN IN THE HIP ER  
TYPES OF CONDITIONS AND WOULD

246

00:16:04,639 --> 00:16:09,300

INDICATE THAT THERE'S  
COMMUNICATION AND REACTION WITH

247

00:16:09,300 --> 00:16:12,931

THE WATERS AND THE ROCKS AND THE  
INTERIOR.

248

00:16:12,931 --> 00:16:15,579

NOW WE'RE GIVING RISE TO A  
CONDITION THAT WE'RE STUDYING IN

249

00:16:15,579 --> 00:16:19,629

THE SUB SURFACE OF THE EARTH AND  
THAT COULD BE HAPPEN BITABLE.

250

00:16:19,629 --> 00:16:24,350

THIS IS A DISCUSSION OF THE  
SIGNS.

251

00:16:24,350 --> 00:16:30,680

WHEN YOU CAN FIND THE FLUIDS  
THAT ARE BEING STORED.

252

00:16:30,680 --> 00:16:33,410  
SO WITH THAT, I WOULD LIKE TO  
TRANSITION TO BRITTNEY, AND SHE

253  
00:16:33,410 --> 00:16:36,760  
WILL TALK ABOUT THE MISSIONS  
PLANNED.

254  
00:16:36,760 --> 00:16:37,879  
>> THANK YOU.

255  
00:16:37,879 --> 00:16:39,959  
NOW TO DR.

256  
00:16:39,959 --> 00:16:40,959  
SMIT.

257  
00:16:40,959 --> 00:16:41,959  
DR.

258  
00:16:41,959 --> 00:16:44,489  
SMIT HAS BEEN STUDYING  
HABIT.

259  
00:16:44,489 --> 00:16:51,389  
>> THANKS VERY MUCH.

260  
00:16:51,389 --> 00:16:52,389  
IT'S A PLEASURE TO BE HERE.

261  
00:16:52,389 --> 00:16:55,850  
I WANT TO TALK ABOUT RESEARCH  
AND THE ISIS WORLD.

262  
00:16:55,850 --> 00:17:00,970  
ALEX SIS WAS TALKING ABOUT THE  
EARTH AND WE THINK OF MARS IN

263  
00:17:00,970 --> 00:17:02,329

THE SOLAR SYSTEM.

264

00:17:02,329 --> 00:17:07,650

THERE'S A WHOLE HOST THAT  
POTENTIALLY HARBOR AND THESE ARE

265

00:17:07,650 --> 00:17:10,540

GREAT PLACES TO THINK ABOUT.

266

00:17:10,540 --> 00:17:16,350

I AM SHOWING TWO EXAMPLES OF  
EXCITING SCIENCE THAT NASA IS

267

00:17:16,350 --> 00:17:19,910

DOING RIGHT NOW AND THAT THEY  
PLAN TO DO IN THE FUTURE THAT'S

268

00:17:19,910 --> 00:17:20,910

RELEVANT.

269

00:17:20,910 --> 00:17:26,840

SO IF WE LOOK AT THE TWO IMAGES  
BEHIND ME, WE'RE LOOKING AND

270

00:17:26,840 --> 00:17:33,580

IT'S OR BITTING OR THE INNER  
MOST PLANET AND A PLACE CALLED

271

00:17:33,580 --> 00:17:36,900

SERIES THAT YOU MAY NOT HAVE  
HEARD ABOUT.

272

00:17:36,900 --> 00:17:42,970

IT'S ROUGHLY THE SIZE OF TEXAS  
AND SPER CAL UNLIKE THE OTHERS

273

00:17:42,970 --> 00:17:44,160

THAT YOU MAY THINK ABOUT.

274

00:17:44,160 --> 00:17:49,030  
IT'S INTERESTING AND IT'S SHAPE  
AND THE LOW DENSITY IS INDICATED

275  
00:17:49,030 --> 00:17:52,640  
AND THERE'S ICE AND WATER BELOW  
THE SURFACE.

276  
00:17:52,640 --> 00:17:57,560  
THESE ARE NEW IMAGES FROM DAWN  
AND SUGGEST THAT PERHAPS IT

277  
00:17:57,560 --> 00:18:02,690  
MAYBE ICE AND ICE RICH AND MAYBE  
SALT IS BEING ERUPTED OR MAKING

278  
00:18:02,690 --> 00:18:05,060  
IT UP AND SHOWING THE PRESENCE  
ON THE SURFACE.

279  
00:18:05,060 --> 00:18:10,250  
THIS IS THE KIND OF SYNERGY FROM  
THE OLDER MISSIONS LIKE THE

280  
00:18:10,250 --> 00:18:13,201  
TELESCOPE THAT TOLD US THE  
PLACES WERE INTERESTING AND WE

281  
00:18:13,201 --> 00:18:16,410  
COULD USE THE SCIENTIFIC  
UNDERSTANDING OF THE PLACES TO

282  
00:18:16,410 --> 00:18:19,310  
PREPARE A MISSION LIKE DAWN TO  
GO OUT THERE AND DO THAT

283  
00:18:19,310 --> 00:18:26,870  
EXPLORATION SO IT'S AN INDUSTRY  
OF WORK TO TRY TO EXPLORE A NEW

284

00:18:26,870 --> 00:18:29,640  
PLACE THAT WE HAVE NEVER REALLY  
THOUGHT ABOUT BEFORE.

285  
00:18:29,640 --> 00:18:33,060  
SO IT'S VERY EXCITING AND THAT'S  
WHAT WE'RE DOING RIGHT NOW TO

286  
00:18:33,060 --> 00:18:35,370  
HIGHLIGHT THE BODY.

287  
00:18:35,370 --> 00:18:48,430  
SERIES IS JUST BETWEEN MARS AND  
JUPITOR, SO IT'S CLOSER TO US.

288  
00:18:48,430 --> 00:19:00,870  
THE IMAGE THAT I AM SHOWING HAS  
BEEN STUDIED AND WILL BE

289  
00:19:00,870 --> 00:19:05,730  
SELECTED BY NASA TO LAUNCH IN  
2022.

290  
00:19:05,730 --> 00:19:11,210  
CALLED THE FLY BY MISSION AND  
THAT'S GOING GO BACK.

291  
00:19:11,210 --> 00:19:15,720  
LIKE I SAID ONE OF THE MOONS AND  
SEARCH FOR ACTIVITY IN THE ICE

292  
00:19:15,720 --> 00:19:18,120  
SHELL AND SEARCH FOR THE  
INDICATION OF A SUB SURFACE

293  
00:19:18,120 --> 00:19:22,850  
OCEAN THAT WE KNOW OR THINK  
ATHAT WE KNOW IS THERE AND THEN

294  
00:19:22,850 --> 00:19:26,610

TRY TO UNDERSTAND HOW THIS  
GEOLOGICAL ACTIVE YOUNG SURFACE

295

00:19:26,610 --> 00:19:32,891

IS FORMED FROM THE ICE SHELL AND  
THE OCEAN AND PERHAPS AN ACTIVE

296

00:19:32,891 --> 00:19:34,290

INTERIOR BELOW.

297

00:19:34,290 --> 00:19:39,850

AS WE WERE HIGHLIGHTING SUB  
SURFACE PROCESSES IN

298

00:19:39,850 --> 00:19:46,690

HYDROTHERMAL REACTION WITH THE  
INTERIORS AND LIKE ROCKS MAYBE

299

00:19:46,690 --> 00:19:50,550

ENOUGH ENERGY TO POWER BIOLOGY.

300

00:19:50,550 --> 00:19:59,000

I AM SHOWING ANOTHER GRAPHIC OF  
OTHER PLACES.

301

00:19:59,000 --> 00:20:04,120

THE OCEAN THAT MAYBE CIRCULATING  
ENERGY BETWEEN THE REDUCING AND

302

00:20:04,120 --> 00:20:07,330

THE OXIDIZING SURFACE, SO REALLY  
EXCITING PLACE.

303

00:20:07,330 --> 00:20:10,960

SO WE'RE EXCITING TO BE GOING  
BACK TO THERE.

304

00:20:10,960 --> 00:20:14,720

PERSONALLY I AM THRILLED TO BE  
APART OF THE TEAM AND HELPED ON

305

00:20:14,720 --> 00:20:15,720

THE STUDIES FOR A WHILE.

306

00:20:15,720 --> 00:20:19,650

TUS JUST BEEN A LARGE GROUP OF  
PEOPLE FOR THE LAST 20 YEARS TO

307

00:20:19,650 --> 00:20:21,610

GET IT GOING.

308

00:20:21,610 --> 00:20:26,860

I AM ON THE RADAR TEAM AND THE  
INSTRUMENTS CALLED REGION.

309

00:20:26,860 --> 00:20:32,830

THAT'S LEAD BY DAWN BLACKEN SHIP  
AT THE UNIVERSITY OF TEXAS.

310

00:20:32,830 --> 00:20:40,280

WE MAYBE ABLE TO BY USING ICE BE  
ABLE TO IMAGE THE PROCESSES FOR

311

00:20:40,280 --> 00:20:43,740

THE FIRST TIME IN THE SUB  
SURFACE WITHIN THE ICE SHELL,

312

00:20:43,740 --> 00:20:46,251

AND FINALLY ANSWERING THE  
QUESTION IS WHERE IS THE WATER,

313

00:20:46,251 --> 00:20:48,310

AND WHERE DO WE LAND?

314

00:20:48,310 --> 00:20:52,020

MOVING FORWARD I WANT TO MOVE TO  
THE NEXT SLIDE AND SHOW YOU WHAT

315

00:20:52,020 --> 00:20:54,980

WE'RE DO NOTHING THE MEANTIME AS  
WE WAIT FOR THIS MISSION TO GET

316

00:20:54,980 --> 00:20:55,980

OFF THE GROUND.

317

00:20:55,980 --> 00:21:01,020

IT TURNS OUT THAT THEY MAY SEEM  
ALIEN TO YOU AND I AND IF WE GO,

318

00:21:01,020 --> 00:21:02,460

IT DOES NOT SEEM SO FARFETCHED.

319

00:21:02,460 --> 00:21:08,090

I AM SHOWING YOU A FUNDED  
PROGRAM BY THE SCIENCE AND

320

00:21:08,090 --> 00:21:10,540

TECHNOLOGY PROGRAM.

321

00:21:10,540 --> 00:21:11,790

IT'S CALLED SIMPLE.

322

00:21:11,790 --> 00:21:13,000

IT'S AN ARON I CAN NAME.

323

00:21:13,000 --> 00:21:15,390

IT'S FAR FROM SIMPLE.

324

00:21:15,390 --> 00:21:21,330

I AM VERY VERY PLEASED TO BE THE  
LEAD AND WORKING WITH A GREAT

325

00:21:21,330 --> 00:21:24,210

TEAM OF THE INDIVIDUALS FROM THE  
INSTITUTIONS THAT ARE

326

00:21:24,210 --> 00:21:26,230

HIGHLIGHTED ON THE SLIDE.

327

00:21:26,230 --> 00:21:29,430

ONE OF THE COOL THINGS ABOUT  
THIS IS THAT AS DR.

328

00:21:29,430 --> 00:21:35,820

RUMSFELD  
MENTIONED IS TO LOOK AT THE

329

00:21:35,820 --> 00:21:38,520

SCIENCE AND THIS PROGRAM DOES  
THAT.

330

00:21:38,520 --> 00:21:45,150

WE LOOK AT A NUMBER OF DIFFERENT  
VEHICLES AND REMOTE THINGS

331

00:21:45,150 --> 00:21:49,050

SENSING THE PLATFORM IN ORDER TO  
STUDY OUR OCEAN THE SAME WAY

332

00:21:49,050 --> 00:21:53,050

THAT WE WANT TO STUDY IT.

333

00:21:53,050 --> 00:21:58,340

IN THE UPPER IMAGES I AM SHOWING  
FROM THIS PAST FIELD SEASON AND

334

00:21:58,340 --> 00:22:04,620

WE WORK AT THE ICE SHELLS AND  
NSF IS GLADLY HOSTING US IN

335

00:22:04,620 --> 00:22:09,300

THEIR MAIN STATION, AND IN THE  
ICE SHELLS THESE ARE IMAGES OF

336

00:22:09,300 --> 00:22:13,530

THE VEHICLE THAT WE BUILT AT  
GEORGIA TECH AND BEING DEPLOYED

337

00:22:13,530 --> 00:22:17,070

ON THE RIGHT SIDE OF THE SCREEN  
AND THAT'S THE VEHICLE ABOUT TO

338

00:22:17,070 --> 00:22:21,810

BE DEPLOYED THROUGH THE ICE  
SHELLS, SO TENS OF LITERS OF ICE

339

00:22:21,810 --> 00:22:23,380

TO EXPLORE THE LOW.

340

00:22:23,380 --> 00:22:29,150

ON THE LEFT HAND SIDE YOU'RE  
SEEING IT FROM THE PERSPECTIVE

341

00:22:29,150 --> 00:22:30,640

OF IT DOING THE WORK.

342

00:22:30,640 --> 00:22:35,160

JUST BELOW THAT THERE'S A SMALL  
DIAGRAM AND THAT'S AN INSTRUMENT

343

00:22:35,160 --> 00:22:38,620

THAT WAS FUNDED UNDER THE SIMPLE  
PROJECT AND JUST THIS YEAR I

344

00:22:38,620 --> 00:22:44,870

WENT OUT WITH NASA OR A WIZARD  
PROGRAM AND WAS THE FIRST TO SEE

345

00:22:44,870 --> 00:22:53,240

SMALL FISH SWIMMING OUT AT 200  
OR 300 KM OF THE OCEAN.

346

00:22:53,240 --> 00:22:56,880

SOME OF THOSE WORKED†-- SOME OF  
THAT IS THE TYPE OF SCIENCE THAT

347

00:22:56,880 --> 00:22:59,550

WE WOULD LIKE TO BE ABLE TO DO  
ONE DAY.

348

00:22:59,550 --> 00:23:03,710

AT THE VERY BOTTOM OF THE SLIDE,  
I AM SHOWING AN IMAGE AND THAT'S

349

00:23:03,710 --> 00:23:07,910

A LARGE ONE THAT WE'RE GOING TO  
BE DEPLOYING THIS FIELD SEASON,

350

00:23:07,910 --> 00:23:11,410

SO BEGINNING IN AUGUST AND ALSO  
AT THE STATION AND WE'RE GOING

351

00:23:11,410 --> 00:23:15,050

TO DO A LONG RANGE.

352

00:23:15,050 --> 00:23:18,510

THIS IS A REALLY LONG TERM  
PROJECT AND A NUMBER OF

353

00:23:18,510 --> 00:23:19,880

INSTITUTIONS.

354

00:23:19,880 --> 00:23:25,160

I WANTED TO HIGHLIGHT THE REASON  
THAT WE'RE DOING THIS IS TO HELP

355

00:23:25,160 --> 00:23:27,580

REASON OUT THE INSTRUMENT THAT I  
HELPED.

356

00:23:27,580 --> 00:23:33,410

THERE'S A PICTURE OF A PLAN IN  
HERE AND THERE'S A CONVERTED

357

00:23:33,410 --> 00:23:38,520

AIRCRAFT AND FLOWN BY THE WRUN  
UNIVERSITY OF TEXAS.

358

00:23:38,520 --> 00:23:49,710

THIS IS THE ICE SHELLS OF THE AN  
ANTARCTIC.

359

00:23:49,710 --> 00:23:53,050

SO TAKING YOU TO AN EXOTIC  
PLACE, AND I THINK THAT WE'RE

360

00:23:53,050 --> 00:23:54,580

GOING TO GO FURTHER OUT.

361

00:23:54,580 --> 00:23:56,620

I WANT TO TURN IT OVER TO DR.

362

00:23:56,620 --> 00:23:57,620

MEADOW.

363

00:23:57,620 --> 00:23:58,620

>> THANK YOU DR.

364

00:23:58,620 --> 00:23:59,620

SMIT.

365

00:23:59,620 --> 00:24:00,620

VERY INTERESTING.

366

00:24:00,620 --> 00:24:04,860

NOW WE GO BEYOND THE SOLAR  
SYSTEM WITH DR.

367

00:24:04,860 --> 00:24:06,380

MEADOW.

368

00:24:06,380 --> 00:24:07,900

>> OKAY.

369

00:24:07,900 --> 00:24:10,180

I AM GOING TALK ABOUT STUDYING  
ANOTHER PLANET IN THE SOLAR

370

00:24:10,180 --> 00:24:13,710

SYSTEM AND ONE THAT'S FAMILIAR  
TO US AND THE EARTH AND HOW

371

00:24:13,710 --> 00:24:16,510

WE'RE USING THE STUDIES TO TRY  
TO UNDERSTAND WHAT WE SHOULD

372

00:24:16,510 --> 00:24:21,650

LOOK FOR WHEN WE LOOK AT THE  
PLAN NETS AND SEE IF WE CAN HAVE

373

00:24:21,650 --> 00:24:25,510

LIFE ON THEM.

374

00:24:25,510 --> 00:24:34,270

IT'S A  
TEST THAT WE HOPE TO USE

375

00:24:34,270 --> 00:24:39,450

IN THE SEARCH FOR SCIENCE AND  
LIQUID WATER.

376

00:24:39,450 --> 00:24:45,700

IT'S SOMETHING THAT IS FAMILIAR  
TO YOU IF YOU SAT ON THE BEACH

377

00:24:45,700 --> 00:24:46,920

FOR A SUN RISE OR SUN SET.

378

00:24:46,920 --> 00:24:49,472

YOU KNOW THE LIGHT THAT CONNECTS  
YOU AND THE STAR.

379

00:24:49,472 --> 00:24:51,890

THAT'S IT.

380

00:24:51,890 --> 00:24:55,860

ON A LARGER SCALE, IF YOU LOOK  
AT THE EARTH AS A GLOBE, YOU

381

00:24:55,860 --> 00:24:58,640

ALSO SEEN IT ON THE EARTH AND IN  
THAT CASE IT LOOKS A LITTLE BIT

382

00:24:58,640 --> 00:25:02,770

MORE LIKE YOU PUSHED IT NEAR THE  
WINDOW AND SEEING THE REFLECTION

383

00:25:02,770 --> 00:25:04,930

ON THE WINDOW.

384

00:25:04,930 --> 00:25:18,110

THAT CAME FROM THE OCEAN ON THAT  
BALL THAT'S ON EARTH-- WHEN

385

00:25:18,110 --> 00:25:25,330

IT'S NEAR THE PRESENT PHASE.

386

00:25:25,330 --> 00:25:29,740

COMPARING THE BRIGHTNESS IT  
AFFECTS IF IT'S WORKING.

387

00:25:29,740 --> 00:25:34,050

WE PREDICTED THIS AND HAD SOME  
DATA THAT SHOWED THE FULL EERLTH

388

00:25:34,050 --> 00:25:38,650

AND WE DID NOT HAVE IT TO BE  
ABLE TO VOLUME DATE THE

389

00:25:38,650 --> 00:25:54,620

TECHNIQUE YOU MAY REMEMBER AND  
IT'S A SPECTACULAR AND THE

390

00:25:54,620 --> 00:25:57,550

EARTH  
AND THE MOON AND THIS IS ONE OF

391  
00:25:57,550 --> 00:25:58,970  
THEM UP HERE.

392  
00:25:58,970 --> 00:26:02,540  
I THINK THAT IT'S INTERESTING  
BECAUSE BRITTNEY IS SO EXCITING

393  
00:26:02,540 --> 00:26:05,760  
OF THE IMAGES AND I AM SO  
EXCITED ABOUT THE BLURRY IMAGE

394  
00:26:05,760 --> 00:26:07,330  
OF THE EARTH.

395  
00:26:07,330 --> 00:26:10,651  
YOU CAN IMAGINE THAT THIS IS A  
DISTANT EARTH AND SOMETHING THAT

396  
00:26:10,651 --> 00:26:13,860  
WE'RE TRYING TO DISCOVER AND  
UNDERSTAND.

397  
00:26:13,860 --> 00:26:21,231  
YOU CAN SEE THERE'S A BALL IN  
THERE THAT'S FROM THE OCEAN, SO

398  
00:26:21,231 --> 00:26:25,780  
YOU'RE ACTUALLY DETECTING THE  
OCEAN BY LOOKING AT THAT IMAGE.

399  
00:26:25,780 --> 00:26:28,460  
SO BY COMPARING THE MODELS AND  
THAT DATA, WE WERE ABLE TO

400  
00:26:28,460 --> 00:26:30,820  
CONFIRM THAT THE MODELS ARE  
ACCURATE.

401

00:26:30,820 --> 00:26:40,540

WE HAVE MORE CONFIDENCE ON THE SIGNALS THAT WE CAN PREDICT.

402

00:26:40,540 --> 00:26:43,340

THE OTHER AREA OF RESEARCH THAT I WOULD LIKE TO HIGHLIGHT FROM

403

00:26:43,340 --> 00:26:46,740

MY TEAM IS THE LABORATORY AND THAT'S IN THE AREA OF LOOKING AT

404

00:26:46,740 --> 00:26:48,630

THE OXYGEN AND THE BIO SIGNATURE.

405

00:26:48,630 --> 00:26:53,850

YOU HAVE HEARD THAT WE HAVE IT IN THE ATMOSPHERE BECAUSE OF THE

406

00:26:53,850 --> 00:26:55,100

PHOTO SYNTHETIC.

407

00:26:55,100 --> 00:27:01,130

LOTS OF MICROS OVER THE YEARS AND MORE RESENT VEGETATION HAVE

408

00:27:01,130 --> 00:27:05,680

WORKED TO BUILD UP A LARGE FRACTURE JUST OVER 20†PERCENT.

409

00:27:05,680 --> 00:27:09,350

WE LIKE THAT BECAUSE IT'S A LARGE CHANGE TO THE ENVIRONMENT

410

00:27:09,350 --> 00:27:12,750

AND SOMETHING THAT WE'RE LOOKING FOR IN A VERY DISTANT WORLD.

411

00:27:12,750 --> 00:27:15,510

WE NEED A LARGE CHANGE WHEN WE  
ARE KE TEKTED.

412

00:27:15,510 --> 00:27:21,390

WE ARE CONFIDENT AND WE COULD  
NOT THINK OF A WAY IN THE

413

00:27:21,390 --> 00:27:24,170

ATMOSPHERE MY NAME THE LAST YEAR  
OR SO HAS COME UP WITH FOUR

414

00:27:24,170 --> 00:27:29,290

SEPARATE WAYS IN THAT A PLANET  
IS REACTING WITH THE STAR OR

415

00:27:29,290 --> 00:27:34,940

BASED ON THE COMPOSITION MAYBE  
ABLE TO BUILD UP.

416

00:27:34,940 --> 00:27:38,250

THESE TECHNIQUES INVOLVE A WAY  
THAT THE RADIATION FROM THE

417

00:27:38,250 --> 00:27:45,190

START AND THE ATMOSPHERE OR EVEN  
THE LOSS OF AN OCEAN AND WATER

418

00:27:45,190 --> 00:27:49,350

EARLY ON IN THE PLANETS LIFE  
THAT BUILDS UP.

419

00:27:49,350 --> 00:27:58,360

THIS IS RESEARCH BEING LEAD BY  
PETER AND BY GOLDMAN.

420

00:27:58,360 --> 00:28:00,650

SO WHAT IS INTERESTING ABOUT  
THIS IS THAT YOU MAY THINK THAT

421

00:28:00,650 --> 00:28:09,610

I AM DEPRESSED ABOUT THIS NEWS,  
BUT I AM EXCITED.

422

00:28:09,610 --> 00:28:14,400

THIS KNOWLEDGE THAT I WOULD LIKE  
TO SAY FORWARDED AND NOW WE KNOW

423

00:28:14,400 --> 00:28:18,520

IN PARTICULAR WHICH TARGETS WE  
CAN PICK THAT WILL HELP US AVOID

424

00:28:18,520 --> 00:28:23,130

THE POTENTIAL THINGS IN LIFE AND  
WHAT OTHER THING IN THE SPECTRUM

425

00:28:23,130 --> 00:28:26,660

WE SHOULD LOOK FOR THAT MIGHT IN  
FACT HELP US FIGURE OUT WHAT IS

426

00:28:26,660 --> 00:28:27,660

GOING ON.

427

00:28:27,660 --> 00:28:31,290

FOR THIS DIAGRAM HERE IT IS  
SHOWING THAT IT'S NOT ENOUGH TO

428

00:28:31,290 --> 00:28:33,620

DETECT THE OXYGEN.

429

00:28:33,620 --> 00:28:36,850

NOW WE KNOW THAT WE HAVE TO GO  
AFTER OTHER GASES AND IF WE

430

00:28:36,850 --> 00:28:44,260

CEASER BONN THAT DECREASING THAT  
IT COMES TO LIFE.

431

00:28:44,260 --> 00:28:47,740

NOW WE'RE GOING TO A POINT WHERE  
WE CAN START TO FIGURE OUT

432

00:28:47,740 --> 00:28:50,580  
EXACTLY WHAT MEASUREMENTS WE  
WANT TO MAKE WHEN WE HAVE THE

433

00:28:50,580 --> 00:28:52,280  
LARGE TELESCOPES.

434

00:28:52,280 --> 00:28:57,000  
AND SO JUST SUMMING UP I THINK  
THAT WHAT YOU HAVE SEEN HER

435

00:28:57,000 --> 00:29:01,470  
TODAY AND THE WORK OF ALEX SIS  
AND BRITTNEY AND MY TEAM AS WELL

436

00:29:01,470 --> 00:29:04,720  
IS THAT WE'RE COMBINING  
KNOWLEDGE AND EXPERTISE FROM

437

00:29:04,720 --> 00:29:14,920  
MANY LOCATIONS AND BRINGING IT  
TOGETHER AND THAT'S THE CORE TO

438

00:29:14,920 --> 00:29:16,940  
BRING ALL OF THE SYSTEMS  
TOGETHER AND WORK TOGETHER TO

439

00:29:16,940 --> 00:29:20,419  
ADDRESS THE SYSTEM OF THE SEARCH  
FOR LIFE BEYOND EARTH.

440

00:29:20,419 --> 00:29:24,660  
>> THANK YOU FOR THAT TERRIFIC  
SUMMATION OF WHAT WE'RE DOING

441

00:29:24,660 --> 00:29:25,790  
HERE.

442

00:29:25,790 --> 00:29:27,410

THANK YOU FOR THE REMARKS.

443

00:29:27,410 --> 00:29:32,160

I AM GOING TO START WITH THE  
QUESTIONS FROM THE MEDIA IN THE

444

00:29:32,160 --> 00:29:37,230

AUDIENCE, AND THEN WE WILL GO TO  
QUESTION IN THE E-MAIL FOR THOSE

445

00:29:37,230 --> 00:29:38,950

PARTICIPATING VIA E-MAIL.

446

00:29:38,950 --> 00:29:42,200

WE RECEIVED A FIRST ONE  
YESTERDAY, AND THAT'S GOING COME

447

00:29:42,200 --> 00:29:49,250

UP IN THE Q.  
WE WILL USE THE MIC IN THE BACK

448

00:29:49,250 --> 00:29:53,620

TO READ THE QUESTIONS SUBMITTED  
BY E-MAIL, BUT WE WILL START

449

00:29:53,620 --> 00:29:54,620

HERE.

450

00:29:54,620 --> 00:29:58,370

I WOULD ASK MY COLLEAGUE IN THE  
ASTRO BIOLOGY COMMUNITY TO SAVE

451

00:29:58,370 --> 00:30:02,190

THE QUESTIONS FROM THE  
COLLEAGUES FOR AFTER THE PRESS

452

00:30:02,190 --> 00:30:04,090

CONFERENCE.

453

00:30:04,090 --> 00:30:10,770

ARE THEIR QUESTIONS FROM THE  
AUDIENCE?

454

00:30:10,770 --> 00:30:13,060

>> YES, FIELD WITH SPACE.COM.

455

00:30:13,060 --> 00:30:17,470

I THINK IN THE PAST COUPLE OF  
MONTHS AS THE MISSION IS GETTING

456

00:30:17,470 --> 00:30:22,070

GOING, THERE ARE SOME INFORMED  
PEOPLE MAKING BIG PREDICTIONS ON

457

00:30:22,070 --> 00:30:23,670

WHEN WE MIGHT FIND SCIENCE OF  
LIFE.

458

00:30:23,670 --> 00:30:29,690

I THINK THAT'S MULTIDECADES  
AWAY, SO CAN YOU TALK ABOUT MORE

459

00:30:29,690 --> 00:30:33,210

REALISTIC GOALS THAT YOU'RE HOPE  
TO GO ACHIEVE EVEN IN THE NEXT

460

00:30:33,210 --> 00:30:40,450

DECADE OR THINGS THAT WE CAN  
LOOK FORWARD TO ON A SMALLER

461

00:30:40,450 --> 00:30:42,169

TIME SCALE?

462

00:30:42,169 --> 00:30:48,950

>> I WILL TAKE A START AT THAT  
AND THAT'S AGAIN STAYING ON THE

463

00:30:48,950 --> 00:30:53,060

EARTH SYSTEM FOR A MOMENT BEFORE  
GOING BEYOND IS THAT THERE'S A

464

00:30:53,060 --> 00:30:59,060

HUGE AMOUNT OF ACTIVE FOR  
DRILLING TO LOOK FOR SIGNS OF

465

00:30:59,060 --> 00:31:03,090

LIFE AND TO DEMONSTRATE ACTIVITY  
IN THE SYSTEMS THAT WE THINK DO

466

00:31:03,090 --> 00:31:06,400

HAVE GREAT RELEVANCE WITHIN THE  
SOLAR SYSTEM.

467

00:31:06,400 --> 00:31:11,400

I THINK THAT THEY'RE†-- THIS  
WILL BE AN EXCELLENT CONNECTION

468

00:31:11,400 --> 00:31:14,740

TO WHAT ARE SOME OF THE TARGETS  
WITHIN THE MISSIONS FOR THE

469

00:31:14,740 --> 00:31:15,850

SEARCH FOR LIFE.

470

00:31:15,850 --> 00:31:20,510

AS WE VALIDATE AT THE MOMENT,  
THAT WILL CONNECT WELL.

471

00:31:20,510 --> 00:31:23,900

>> I WAS GOING TO COMMENT THAT  
ONE OF THE THEMES OF THE

472

00:31:23,900 --> 00:31:27,140

CONFERENCE THIS HERE IS HABIT.

473

00:31:27,140 --> 00:31:31,570

THIS IS WHAT YOU DO.

474

00:31:31,570 --> 00:31:33,910  
YOU GO AND EXPLORE AND GET THE  
ANSWERS AND GET THE BASIC

475

00:31:33,910 --> 00:31:36,441  
INFORMATION THAT YOU NEED TO  
MAKE THE HYPOTHESIS.

476

00:31:36,441 --> 00:31:37,490  
WE HAVE THEM NOW.

477

00:31:37,490 --> 00:31:42,470  
WHAT WE'RE TRYING TO DO NOW IS  
ADVANCE IT OF THE SYSTEM.

478

00:31:42,470 --> 00:31:46,070  
THE WHOLE PLANET AND NOT JUST AN  
INDIVIDUAL TERRAIN OR ONE PART

479

00:31:46,070 --> 00:31:47,770  
OF THE SYSTEM, BUT EVERYTHING.

480

00:31:47,770 --> 00:31:51,980  
HOW IT CYCLES AND COUPLES AND  
HOW THEY'RE ACTIVE.

481

00:31:51,980 --> 00:31:59,260  
SO THERE'S A ENERGY AND THERE'S  
KIND OF A GRAPHIC THAT YOU CAN

482

00:31:59,260 --> 00:32:04,080  
LOOK FOR THAT SHOWS THE THREE  
PILLERS THAT ARE THE FOCUS OF

483

00:32:04,080 --> 00:32:05,310  
THE MISSION.

484

00:32:05,310 --> 00:32:07,910  
ONE IS WATER AND ONE IS  
CHEMISTRY AND ONE IS ENERGY.

485  
00:32:07,910 --> 00:32:13,130  
THOSE ARE THE THINGS THAT WE  
THINK ABOUT THAT WE CAN QUANTIFY

486  
00:32:13,130 --> 00:32:16,650  
HOW MUCH CHEMICALS OF WHAT KIND  
ARE ON THE SURFACE.

487  
00:32:16,650 --> 00:32:18,470  
HOW DOES THE ICE SHELLS  
RECIRCULATE.

488  
00:32:18,470 --> 00:32:22,039  
IS IT BRIDGING IT UP OR DOWN.

489  
00:32:22,039 --> 00:32:26,510  
WE HAVE TO FIND CHEMICALS AND  
FIND A RADAR TO FIND ACTIVITY IN

490  
00:32:26,510 --> 00:32:27,510  
THE ICE SHELLS.

491  
00:32:27,510 --> 00:32:38,060  
WE  
HAVE A MAGNETIC FIELD TO TRY

492  
00:32:38,060 --> 00:32:41,700  
TO DETECT MORE DETAILED  
INFORMATION ABOUT THE OCEAN.

493  
00:32:41,700 --> 00:32:46,510  
SO TO ME THE NEXT MILESTONE IS  
TO CONNECT THOSE THINGS AND SEE

494  
00:32:46,510 --> 00:32:50,200  
NOW THAT WE KNOW THE THINGS OF

## THE SYSTEM AND THE PLANET

495

00:32:50,200 --> 00:32:53,780

ITSELF, WHERE DO WE GO THAT'S  
THE PERFECT PLACE TO ASK THE

496

00:32:53,780 --> 00:32:55,120

NEXT QUESTIONS.

497

00:32:55,120 --> 00:33:04,090

IS IT THERE?

498

00:33:04,090 --> 00:33:08,260

>> IN THE SOLAR SYSTEM WE HAVE A  
LOT GOING ON AND IT'S BEYOND THE

499

00:33:08,260 --> 00:33:12,330

SOLAR SYSTEM AND 2017 WE'RE  
GOING TO LAUNCH THE SURVEY

500

00:33:12,330 --> 00:33:18,530

SATELLITE AND IT'S GOING TO  
IDENTIFY THE PLANETS WHERE THE

501

00:33:18,530 --> 00:33:25,740

PLANETS BLOCKS THE SUNLIGHT.

502

00:33:25,740 --> 00:33:27,300

IT'S GOING TO LOOK AT ALL OF THE  
NEAREST NEIGHBORS.

503

00:33:27,300 --> 00:33:31,150

WE'RE GOING TO FIND OUT WHERE  
THE NEAREST PLANETS ARE AROUND

504

00:33:31,150 --> 00:33:35,890

OUR OWN SOLAR SYSTEM AND TO LOOK  
FOR ROCKY PLANETS.

505

00:33:35,890 --> 00:33:39,770  
WE'RE GOING TO HAVE A CATALOG  
BECAUSE THEY'RE AROUND THE

506  
00:33:39,770 --> 00:33:45,809  
NEAREST STARS AND CLOSE AND  
ALLOW US TO DO A BETTER JOB OF

507  
00:33:45,809 --> 00:33:52,530  
LOOKING AT THE ATMOSPHERES OR  
WITH THE JAMES TELL COPE AND

508  
00:33:52,530 --> 00:33:59,130  
DIRECT IMAGES THAT MAY ALLOW US  
TO GET A SPECTRUM AND THEN 2018

509  
00:33:59,130 --> 00:34:04,160  
OCTOBER WE'RE GOING TO LAUNCH  
THE JAMES WEB SPACE TELESCOPE.

510  
00:34:04,160 --> 00:34:07,790  
THAT'S A WONDERFUL TELESCOPE AND  
IF WE WANTED TO DESIGN AN

511  
00:34:07,790 --> 00:34:14,839  
EXPLORER IN THE INFER RED, WE  
WOULD DESIGN THAT EVEN WHEN IT

512  
00:34:14,839 --> 00:34:17,419  
WAS CONCEIVED.

513  
00:34:17,419 --> 00:34:22,869  
IT WAS THEN DEVOTED TO EIGHT SO  
THE JAMES WEB SPACE TELESCOPE IS

514  
00:34:22,869 --> 00:34:30,839  
GOING TO BE ABLE TO STUDY AND  
THAT'S MANY AND HOPEFULLY LOOK

515  
00:34:30,839 --> 00:34:35,700

AND SEE FOR WATER VAPORS AND  
CARBON DIOXIDE AND ALLOW US TO

516

00:34:35,700 --> 00:34:39,899

START DECOMPOSING IT.

517

00:34:39,899 --> 00:34:43,269

OF COURSE MARS 2020 FOLLOWS THAT  
BY JUST A COUPLE OF YEARS AND

518

00:34:43,269 --> 00:34:45,230

THAT'S AN ASTRO BIOLOGY  
EXPLORER.

519

00:34:45,230 --> 00:34:54,899

IT'S WONDERFUL AND GOING TO TAKE  
CORE SAMPLES IN RELEVANT CONTENT

520

00:34:54,899 --> 00:35:00,009

TO TRY AND FIND SPOTS THAT LIKE  
THE CURIOSITY ARE PLACES THAT WE

521

00:35:00,009 --> 00:35:02,220

KNOW ARE HABITABLE.

522

00:35:02,220 --> 00:35:10,540

THEN TO SEE WHETHER MARS WAS  
ONCE THERE AND HAD ANCIENT LIFE.

523

00:35:10,540 --> 00:35:13,960

CERTAINLY THE MISSION AND WE  
WANT TO GET STARTED.

524

00:35:13,960 --> 00:35:16,349

WE'RE GETTING STARTED WITH THE  
MISSION AND WE LAUNCH AS SOON AS

525

00:35:16,349 --> 00:35:19,910

WE CAN AND WE'RE NOT DONE YET.

526

00:35:19,910 --> 00:35:25,279

WE WANT TO ADD CAPABILITIES TO  
THE OVERALL MISSION TO TRY TO

527

00:35:25,279 --> 00:35:29,880

ANSWER THE QUESTIONS IS THERE  
LIFE EVEN BEFORE THAT 2016 WE

528

00:35:29,880 --> 00:35:35,190

LAUNCH THE REX MISSION AND  
THAT'S GOING GO OUT TO A 500

529

00:35:35,190 --> 00:35:41,780

METER ASTRO AND THAT'S GOING TO  
GO DOWN TO A FINE SCALE AND

530

00:35:41,780 --> 00:35:49,569

MINERALS AND IMAGES AND THEN DO  
A QUICK TOUCH AND GO AND GRAB

531

00:35:49,569 --> 00:35:53,369

SAMPLES AND MOTOR THAT BACK TO  
EARTH.

532

00:35:53,369 --> 00:35:56,690

WE KNOW THERE'S A LOT MORE  
COMPOUNDS THAT WE WANT TO STUDY

533

00:35:56,690 --> 00:35:59,170

IN DETAIL ON EARTH.

534

00:35:59,170 --> 00:36:08,760

TO ANSWER ONE OF THE QUESTIONS  
OR GIVE US LEVERAGE GAVE US THE

535

00:36:08,760 --> 00:36:10,970

ORGANIC.

536

00:36:10,970 --> 00:36:15,200

THAT'S JUST SOME OF THE MISSIONS  
THAT ARE MORE MERE TERM, BUT I

537

00:36:15,200 --> 00:36:25,430  
CONSIDER IT BEING LAUNCHED IN  
2020 NEAR TERM AS WELL.

538

00:36:25,430 --> 00:36:31,490  
>> IN THE SEARCH FOR LIFE  
WE'RE

539

00:36:31,490 --> 00:36:37,650  
GOING GET THE TARGET.

540

00:36:37,650 --> 00:36:42,910  
FOR HABIT PLANETS IT'S GOING TO  
BE CHALLENGING, BUT WE'RE GOING

541

00:36:42,910 --> 00:36:44,190  
TRY ANY WAY.

542

00:36:44,190 --> 00:36:50,690  
ONE OF MY TEAMS IS LOOKING FOR  
OXYGEN, AND WE HAVE DONE

543

00:36:50,690 --> 00:36:54,920  
RESEARCH ON THE OXYGEN AND  
THAT'S WHEN TWO MOLECULES THAT

544

00:36:54,920 --> 00:36:59,460  
HAVE PASS IN THE NIGHT AND FORM  
AN O<sub>4</sub> MOLECULE.

545

00:36:59,460 --> 00:37:04,509  
THAT KIND TYPE OF STUFF FROM  
THAT MOLECULE MIGHT BE SOMETHING

546

00:37:04,509 --> 00:37:07,759  
THAT WE CAN GO AFTER, BUT IT'S A  
REALLY LONG T SHOT.

547

00:37:07,759 --> 00:37:13,509

WE HAVE TO HAVE THE RIGHT TARGET  
AND OBSERVE EVERYTHING TO DO

548

00:37:13,509 --> 00:37:14,509

THAT TART.

549

00:37:14,509 --> 00:37:18,450

I THINK JWC HAS THE FIRST CHANCE  
TO START.

550

00:37:18,450 --> 00:37:21,630

I WOULD NOT HOLD THE BREATH THAT  
IT'S SUCCESSFUL.

551

00:37:21,630 --> 00:37:23,319

>> THANK YOU.

552

00:37:23,319 --> 00:37:28,989

>> ANY OTHER QUESTIONS FROM THE  
MEDIA IN TAUD YENS.

553

00:37:28,989 --> 00:37:35,510

>> ANYTHING THAT WE CANNOT  
ADDRESS BY 45, WE CAN WILL

554

00:37:35,510 --> 00:37:42,609

ADDRESS THEM  
SOMETIME AFTER

555

00:37:42,609 --> 00:37:43,940

THAT.

556

00:37:43,940 --> 00:37:46,920

I AM GOING TO READ THE FIRST  
QUESTION WE RECEIVED BY E-MAIL

557

00:37:46,920 --> 00:37:53,339

YESTERDAY FROM KEITH COWING AND  
THE DIRECTED TO DR.

558

00:37:53,339 --> 00:37:54,680

RUMSFELD.

559

00:37:54,680 --> 00:38:01,400

GIVEN THE SIMILARITIES TO  
ENVIRONMENTAL CONDITIONS ON

560

00:38:01,400 --> 00:38:06,509

PRESENT DAY EARTH AND LIFE CAN  
BE FOUND, WHY HAS NASA NOT SENT

561

00:38:06,509 --> 00:38:15,789

TO SURFACE OF MARS TO LOOK FOR  
THE EVIDENCE OF LIFE.

562

00:38:15,789 --> 00:38:36,450

>> AND THE AVIATION AND THE  
FIELD THAT'S GONE AND SO THE

563

00:38:36,450 --> 00:38:43,710

THERE ARE PLACES TO GO AND PUT  
ON THAT ARE INTERESTING FOR THE

564

00:38:43,710 --> 00:38:48,049

LIFE WHERE THERE'S CURRENT  
SURFACE WATER FOR INSTANCE IN

565

00:38:48,049 --> 00:38:53,970

PLACES WHERE THERE'S CURRENTLY  
AND THE MARGINS AND THERE'S SUB

566

00:38:53,970 --> 00:39:05,849

SURFACE WATER AND GLACIERS AND  
WORKPLACES AND THOSE ARE THE

567

00:39:05,849 --> 00:39:10,980

LIKELY PLACES THAT WE WILL SEE

THE EVIDENCE OF THE LIFE THERE.

568

00:39:10,980 --> 00:39:15,680

THOSE ARE ONE CHALLENGING PLACES  
TO GET TO.

569

00:39:15,680 --> 00:39:18,539

WE DO NOT QUIT HAVE THE  
TECHNOLOGY TO DO THAT YET.

570

00:39:18,539 --> 00:39:22,200

ALSO THE BELIEF THAT IF THERE'S  
LIFE, IT'S PROBABLY HAS TO BE

571

00:39:22,200 --> 00:39:23,529

SUB SURFACE.

572

00:39:23,529 --> 00:39:30,359

EVEN THE PRESERVATION AND IF  
IT'S OBSERVED, WE BELIEVE THAT

573

00:39:30,359 --> 00:39:36,180

THE RADIATION AND THE  
COMBINATION IS PROBABLY BROKEN

574

00:39:36,180 --> 00:39:40,009

UP THE ORGANICS, BUT EVEN THEN  
THAT'S NOT DETECTABLE.

575

00:39:40,009 --> 00:39:43,089

IF THERE'S ANCIENT LIFE AND THEY  
WERE PRESERVED.

576

00:39:43,089 --> 00:39:44,809

IT'S A CHALLENGE ENVIRONMENT.

577

00:39:44,809 --> 00:40:05,270

AS WE GET MORE CAPABLE IT WILL  
HAVE A DEEP ER DRILL THAN WE

578  
00:40:05,270 --> 00:40:06,339  
HAVE EVER SEEN.

579  
00:40:06,339 --> 00:40:12,970  
NOW, THEY DID SEE A SIGNAL WHEN  
DRIVING ALONG AND MANY TIMES

580  
00:40:12,970 --> 00:40:17,500  
OVER THE BACKGROUND COULD BE  
ABOTIC OR BIOTIC.

581  
00:40:17,500 --> 00:40:24,619  
I THINK THAT WE'RE GOING TO LOOK  
AT WHAT KIND OF MISSIONS COULD

582  
00:40:24,619 --> 00:40:26,289  
DETECT LIFE.

583  
00:40:26,289 --> 00:40:30,049  
THAT'S ONE OF THE GREAT THEMES  
OF THIS CONFERENCE.

584  
00:40:30,049 --> 00:40:34,710  
WHAT WOULD THAT LOOK LIKE  
BECAUSE WE CANNOT ASSUME IT WILL

585  
00:40:34,710 --> 00:40:35,710  
BE LIFE.

586  
00:40:35,710 --> 00:40:41,369  
A FRIEND OR SEQUENCE MAY FAIL  
FREQUENTLY EVEN IF EXTENDED.

587  
00:40:41,369 --> 00:40:45,170  
>> LESLEY, DO WE HAVE A QUESTION  
FROM E-MAIL?

588  
00:40:45,170 --> 00:40:46,170  
NO QUESTIONS.

589

00:40:46,170 --> 00:40:47,829

WE HAVE ANOTHER QUESTION IN  
AUDIENCE.

590

00:40:47,829 --> 00:40:52,130

>> JOHN, I AM HERE WITH NASA  
SOCIAL AND SOMEONE WANTS TO KNOW

591

00:40:52,130 --> 00:40:59,309

AND THEY'RE TALKING ABOUT THE  
BRIGHT SPOTS BUT WANT TO KNOW IF

592

00:40:59,309 --> 00:41:03,549

THERE'S ANY POS KT OF ICE OR  
COMPOUNDS OR MINERALS AND THE

593

00:41:03,549 --> 00:41:05,859

SERIES ON THAT.

594

00:41:05,859 --> 00:41:09,010

>> WELL, IT'S ONGOING.

595

00:41:09,010 --> 00:41:13,869

WE HAVE JUST FINALLY REACHED  
WHAT WE HAVE THE OR BIT.

596

00:41:13,869 --> 00:41:18,180

WE HAVE SEVERAL PHASES OF  
MAPPING OR BITS WITH DAWN.

597

00:41:18,180 --> 00:41:20,579

ONE OF THE THINGS THAT'S  
INTERESTING IS THE CAMERAS THAT

598

00:41:20,579 --> 00:41:26,680

WE HAVE AND WE TOLD THE NURSE TO  
ZOOM IN.

599

00:41:26,680 --> 00:41:30,220  
ON THE SPACE GRAPH, WE DO NOT  
HAVE IT SO THE RESOLUTION IS

600  
00:41:30,220 --> 00:41:34,740  
ABOVE THE SURFACE THAT WE'RE  
CURRENTLY FLYING AT.

601  
00:41:34,740 --> 00:41:36,980  
WE'RE IN THE FIRST OR BIT CALLED  
SURVEY.

602  
00:41:36,980 --> 00:41:39,940  
WE WILL GO DOWN AND THEN HIGH  
AND LOW.

603  
00:41:39,940 --> 00:41:44,599  
THE ANSWER TO THE QUESTION IS WE  
DO NOT KNOW YET.

604  
00:41:44,599 --> 00:41:47,020  
IT'S A REALLY GOOD INDICATION  
THAT SOMETHING IS THERE.

605  
00:41:47,020 --> 00:41:54,089  
THERE WAS A TELESCOPE THAT THEY  
HAD THEM NEAR THEM.

606  
00:41:54,089 --> 00:41:57,589  
WE DO NOT HAVE A DIRECT  
OBSERVATION.

607  
00:41:57,589 --> 00:41:59,001  
THE SCIENCE TEAM IS WORKING  
HARD.

608  
00:41:59,001 --> 00:42:00,001  
THIS IS NEW DATA.

609  
00:42:00,001 --> 00:42:02,160

THIS IS OTHER THING.

610

00:42:02,160 --> 00:42:05,369

IT TAKES A WHILE TO GET THE DATA  
DOWN TO WORK ON IT.

611

00:42:05,369 --> 00:42:08,930

IT'S EXCITING BECAUSE IT'S  
SOMETHING THAT WE IMAGINED COULD

612

00:42:08,930 --> 00:42:14,920

BE THERE BUT NOT THE WAY THAT IT  
PRESENTS ITSELF.

613

00:42:14,920 --> 00:42:17,650

YOU PUT THESE FOR IT AND GET  
CLOSE.

614

00:42:17,650 --> 00:42:19,809

THERE'S ALWAYS SOMETHING  
DIFFERENT THAT THROWS A WRENCH

615

00:42:19,809 --> 00:42:21,380

INTO THE PLAN.

616

00:42:21,380 --> 00:42:27,990

IT'S CURRENTLY UNDER WORK AND  
THAT'S A COLLABORATION SEVERAL

617

00:42:27,990 --> 00:42:32,509

OF THEM ARE WORKING ON IT, AND  
IT'S ONE OF THE LEADING

618

00:42:32,509 --> 00:42:36,640

CANDIDATES FOR WHAT IS THERE AND  
PEOPLE HAVE TALKED A LOT ABOUT

619

00:42:36,640 --> 00:42:40,260

IT IN THE PAST AND PEOPLE TALK  
ABOUT HYDRATING MINERALS AND ICE

620

00:42:40,260 --> 00:42:42,869

AND THAT TYPE OF THING.

621

00:42:42,869 --> 00:42:45,470

I THINK THE ANSWER IS STAY  
TUNED.

622

00:42:45,470 --> 00:42:49,390

WE LIKE TO HAVE THOSE KIND OF  
RESULTS READY.

623

00:42:49,390 --> 00:42:51,071

>> THAT'S GOING TO BE THE LAST  
QUESTION.

624

00:42:51,071 --> 00:42:55,450

WE HAVE TO WRAP UP BECAUSE THEY  
HAVE TO COME BACK INTO THE ROOM

625

00:42:55,450 --> 00:42:58,970

TO CONTINUE THEIR WORK, AND I AM  
GOING ECHO DR.

626

00:42:58,970 --> 00:42:59,980

SMIT'S MESSAGE.

627

00:42:59,980 --> 00:43:00,990

STAY TUNED.

628

00:43:00,990 --> 00:43:03,140

THERE'S ALWAYS SOMETHING NEW  
GOING ON.