
esa
NASA
esa

1
00:00:05,240 --> 00:00:11,010
GOOD AFTERNOON AND WELCOME
TO NASA GLENN RESEARCH CENTER.

2
00:00:11,010 --> 00:00:14,019
I WOULD LIKE TO THANK YOU ALL
FOR BEING HERE.

3
00:00:14,019 --> 00:00:16,990
WE HAVE SPECIAL GUESTS WITH US
TODAY THAT HAVE TRAVELLED FROM

4
00:00:16,990 --> 00:00:21,830
OUT OF STATE AND OVERSEAS.
SPECIAL WELCOME TO A BUNCH OF

5
00:00:21,830 --> 00:00:24,160
FOLKS THAT ARE ON THE PANEL HERE
TODAY.

6
00:00:24,160 --> 00:00:25,772
ALL OF THEM ARE DISTINGUISHED
GUESTS.

7
00:00:25,772 --> 00:00:26,772
I WOULD LIKE TO THANK GENERAL
STRINGER AND THE ENTIRE TEAM FOR

8
00:00:26,772 --> 00:00:44,520
THEIR WORK IN GETTING US HERE
FOR THIS INCREDIBLE EVENT HERE

9
00:00:44,520 --> 00:00:52,969
TODAY.
THANK YOU SO MUCH.

10
00:00:52,969 --> 00:01:13,330
I'M MOST HAPPY THAT IT IS SUNNY
OUTSIDE AND NOT SNOWING, THAT WE

11
00:01:13,330 --> 00:01:14,330
WERE ALL ABLE TO MAKE IT HERE
WITHOUT REALLY ANY

12
00:01:14,330 --> 00:01:15,330
WEATHER-RELATED ISSUES.
LET ME FIRST RECOGNIZE A SPECIAL

13
00:01:15,330 --> 00:01:16,330
PERSON WE HAVE WITH US HERE
TODAY CONGRESS WOMAN

14
00:01:16,330 --> 00:01:17,330
REPRESENTING OHIO'S 9th
CONGRESSIONAL DISTRICT.

15
00:01:17,330 --> 00:01:18,330
WE WILL HEAR FROM CONGRESS WOMAN
CASTER HERE SHORTLY.

16
00:01:18,330 --> 00:01:19,330
[ APPLAUSE ]
WE HAVE SEVERAL OTHER FOLKS

17
00:01:19,330 --> 00:01:20,330
JOINING US TODAY.
ELECTED REPRESENTATIVES THE

18
00:01:20,330 --> 00:01:21,330
OFFICE OF -- BOB GIBBS ALSO
FROM -- THOMAS QUEEN.

19
00:01:21,330 --> 00:01:22,330
THANK YOU ALL FOR BEING HERE, AS
WELL.

20
00:01:22,330 --> 00:01:23,330
ARRIVED IN OHIO TWO WEEKS AGO.
SINCE THEN THE INCREDIBLE TEAM.

21
00:01:23,330 --> 00:01:24,330
THAT IS WHAT THE TESTING
CAPABILITIES ARE REALLY ALL

22
00:01:24,330 --> 00:01:25,330
ABOUT INSURING THAT MISSION
SUCCESS.

23
00:01:25,330 --> 00:01:26,330
THAT IS OUR JOB.
THAT IS WHAT WE HEARD FROM MARK

24
00:01:26,330 --> 00:01:27,330
AND THE ORION TEAM.
FOR THOSE OF YOU THAT HAVE NOT

25
00:01:27,330 --> 00:01:28,330
BEEN HERE BEFORE HOME TO SEVERAL
UNIQUE TEST FACILITIES, ONE THE

26
00:01:28,330 --> 00:01:29,330
SPACE POWER FACILITY CONTAINING
THE LARGEST VACUUM CHAMBER AND

27
00:01:29,330 --> 00:01:30,330
CAPABLE OF TESTING ALL MANNERS
OF HARDWARE IN SIMULATED SPACE

28
00:01:30,330 --> 00:01:31,330
OR PLANETARY ENVIRONMENT.
OTHER FACILITIES INCLUDE SPACE

29
00:01:31,330 --> 00:01:32,330
PROPULSION RESEARCH FACILITY AND
HYPERSONIC TUNNEL FACILITY.

30
00:01:32,330 --> 00:01:33,330
EACH PROVIDING TESTING
CAPABILITY THAT GIVES NASA AND

31
00:01:33,330 --> 00:01:34,330
ITS CUSTOMERS ONE OF WHICH IS
ORION THE ABILITY TO BUY DOWN

32
00:01:34,330 --> 00:01:35,330
THAT RISK THAT EACH MISSION
NEEDS TO REDUCE COST AND DELIVER

33
00:01:35,330 --> 00:01:36,330
HUMANS SAFELY TO ORBIT.
BY DISCOVERING ISSUES IN THE

34
00:01:36,330 --> 00:01:37,330
CONTROLLED TESTING ENVIRONMENT
ON THE GROUND WE CAN CORRECT

35
00:01:37,330 --> 00:01:38,330
THOSE ISSUES BEFORE LAUNCH
RATHER THAN AFTER WHEN THERE IS

36
00:01:38,330 --> 00:03:28,940
LOTS WE CAN DO AND AT A FAR
GREATER COST.

37
00:03:28,940 --> 00:03:36,420
THROUGHOUT NASA GLENN'S HISTORY
WE HAVE BEEN ON THE CUTTING EDGE

38
00:03:36,420 --> 00:03:40,849
FIRST WITH TECHNOLOGIES DURING
THE WAR WHICH NOT ONLY LED OUR

39
00:03:40,849 --> 00:03:46,170
COUNTRY INTO THE JET AGE BUT
INTO AND THROUGH SPACE.

40
00:03:46,170 --> 00:03:50,140
THIS LEGACY OF HELPING DEVELOP
TECHNOLOGIES THAT ALLOW US TO

41
00:03:50,140 --> 00:03:54,360
EXPLORE THE DEEPEST REGIONS OF
SPACE LIVES ON THROUGH TESTING

42
00:03:54,360 --> 00:03:58,170
THAT WILL TAKE PLACE RIGHT HERE
IN A FEW SHORT MONTHS.

43
00:03:58,170 --> 00:04:03,580
NASA GLENN'S EXPERTISE HAS BEEN
INSTRUMENTAL AS PART OF THE

44
00:04:03,580 --> 00:04:08,590
AGENCY TEAM WORKING ON ORION IN
DEVELOPING MANY OF ORION'S

45
00:04:08,590 --> 00:04:12,980
SYSTEMS WITH PARTNERS AT CENTERS
INCLUDING STRUCTURES,

46
00:04:12,980 --> 00:04:16,739
MECHANISMS, PYROTECHNICS,
MATERIALS, POWER AND AVIONICS.

47
00:04:16,739 --> 00:04:22,380
THIS TESTING WILL BE NASA
GLENN'S MOST RECENT CONTRIBUTION

48
00:04:22,380 --> 00:04:29,889
TO THE PROGRAM OF THIS NATION.
ORION WILL BE USED TO REACH

49
00:04:29,889 --> 00:04:34,910
DESTINATIONS THROUGHOUT THE
SOLAR SYSTEM, A CAPABILITY NO

50
00:04:34,910 --> 00:04:38,669
OTHER SPACECRAFT IN THE WORLD
POSSESSES.

51
00:04:38,669 --> 00:04:47,440
THANK YOU AGAIN FOR BEING HERE.
AT THIS TIME IT IS MY HONOR TO

52
00:04:47,440 --> 00:04:51,889
INTRODUCE CONGRESS WOMAN.
LADIES AND GENTLEMEN, THANK YOU

53
00:04:51,889 --> 00:04:57,780
SO MUCH FOR BEING HERE TODAY TO
BE A PART OF WITNESSING HISTORY

54
00:04:57,780 --> 00:05:01,979
AND BUILDING THE FUTURE.
THE OTHER NIGHT WHEN THE MOON

55
00:05:01,979 --> 00:05:07,080
WAS FULL I JUST STOOD OUTSIDE AT
NIGHT AND I LOOKED AT IT AND I

56
00:05:07,080 --> 00:05:15,210
THOUGHT ABOUT WHEN I WAS BORN
VERSUS NOW AND HOW MUCH MORE WE

57
00:05:15,210 --> 00:05:23,539
AS HUMANS KNOW ABOUT THE MILKY
GALAXY AND POINTS BEYOND AND HOW

58
00:05:23,539 --> 00:05:27,990
MUCH MORE WE KNOW ABOUT HOW TO
EVEN LOOK AT OUR OWN PLANET

59
00:05:27,990 --> 00:05:34,500
SUSPENDED IN THAT SPACE.
AND THIS FACILITY TODAY BECAUSE

60
00:05:34,500 --> 00:05:42,259
OF THE WORK OF DIRECTOR, GENERAL
STRINGER, SCIENTISTS WHO TOO

61
00:05:42,259 --> 00:05:47,940
OFTEN REMAIN NAMELESS WHO GIVE
THEIR LIVES TO THIS, THE

62
00:05:47,940 --> 00:05:54,080
COUNTLESS HOURS SPENT IN LABS
AND TRYING TO FIGURE OUT HOW TO

63
00:05:54,080 --> 00:06:01,009
MAKE THE MATH WORK AND THE
SCIENCE WORK.

64
00:06:01,009 --> 00:06:06,900
CREATING A MORE LIGHTENED FUTURE
FOR ALL OF HUMANITY.

65
00:06:06,900 --> 00:06:15,699
I WANT TO THANK OUR EUROPEAN
GUESTS WHO HAVE TRAVELLED SO

66
00:06:15,699 --> 00:06:21,180
VERY FAR TO BE WITH US TODAY.
WE SHARE A FRATERNITY AND LOVE

67
00:06:21,180 --> 00:06:27,860
OF LIBERTY.
AND THE ENLIGHTENMENT THAT

68
00:06:27,860 --> 00:06:33,039
TRANSFERRED ITS GREAT POWER HERE
TO THE UNITED STATES AND TO BE

69
00:06:33,039 --> 00:06:34,860
UNITED WITH OUR EUROPEAN ALLIES
IN THIS GREAT QUEST IS TRULY A

70
00:06:34,860 --> 00:06:35,860
REMARKABLE AND IMPORTANT
UNDERTAKING.

71
00:06:35,860 --> 00:07:17,190
I WANT TO ALSO SAY FOR THOSE WHO
MAY NOT BE FROM THIS REGION OR

72
00:07:17,190 --> 00:07:53,180
MAY BE LISTENING FROM POINTS
NEAR AND FAR THERE IS NO OTHER

73
00:07:53,180 --> 00:08:23,169
PLACE LIKE THIS ON EARTH.
THIS TESTING FACILITY IS RARE.

74
00:08:23,169 --> 00:08:53,160
IT HAS TAKEN MILLIONS AND
BILLIONS LITERALLY OF DOLLARS TO

75
00:08:53,160 --> 00:09:03,970
CONSTRUCT TO ANTICIPATE THE
TESTING THAT WILL BE DONE HERE

76
00:09:03,970 --> 00:09:05,779
ON THIS MODULE.
I WAS ASKING COMPARED TO WHAT

77
00:09:05,779 --> 00:09:06,779
HAS BEEN DONE BEFORE IN THIS
MODULE, HOW MUCH MORE

78
00:09:06,779 --> 00:09:07,779
SOPHISTICATED WILL THIS
PARTICULAR TESTING BE?

79
00:09:07,779 --> 00:09:08,779
GIVE ME A NUMBER.
HE DIDN'T WANT TO COMMIT HIMSELF

80
00:09:08,779 --> 00:09:09,779
TO EXACTLY A NUMBER BUT
GEOMETRICALLY GREATER THAN

81
00:09:09,779 --> 00:09:10,779
ANYTHING THAT HAS BEEN TESTED
HERE BEFORE.

82
00:09:10,779 --> 00:09:11,779
MAYBE 20 TIMES, MAYBE MORE.
MAYBE MORE THAN THAT.

83
00:09:11,779 --> 00:09:12,779
SO WE THINK ABOUT WHAT TOOK ALL
OF YOU WORKING TOGETHER, MANY

84
00:09:12,779 --> 00:09:13,779
WHO AREN'T HERE TODAY TO HELP US
PROBE WITH THIS LIFE SUPPORT

85
00:09:13,779 --> 00:09:14,779
SYSTEM WHICH IS WHAT IT IS, WE
THANK THOSE IN EUROPE FOR

86
00:09:14,779 --> 00:09:15,779
PARTNERING ACROSS SEVERAL
NATIONS WITH OUR OWN AND I KNOW

87
00:09:15,779 --> 00:09:16,779
THAT WHEN ORION IS TESTED AND
ULTIMATELY LIFTED WITH A FULL

88
00:09:16,779 --> 00:09:17,779
PAY LOAD THAT THE WORLD WILL
CHEER AND WE KNOW THAT THE

89
00:09:17,779 --> 00:09:18,779
PEOPLE HERE WILL HAVE DONE IT.
SO MARVELOUS TO BE HERE WITH

90
00:09:18,779 --> 00:09:19,779
REPRESENTATIVES OF MY COLLEAGUES
FROM THE CONGRESS.

91
00:09:19,779 --> 00:09:20,779
CONGRESSMAN GIBBS, SENATORS
BROWN AND PORTMAN WHO HAVE ALSO

92
00:09:20,779 --> 00:09:21,779
TRAVELLED FAR TO BE WITH US
TODAY.

93
00:09:21,779 --> 00:09:22,779
DID I MISS ANYONE?
I HOPE NOT.

94
00:09:22,779 --> 00:09:23,779
TO KNOW THAT YOU HAVE OUR
SUPPORT AND WE ARE VERY PROUD AS

95
00:09:23,779 --> 00:09:24,779
BUCKEYES THAT THIS TESTING WILL
BE DONE HERE IN THE GREAT STATE

96
00:09:24,779 --> 00:09:25,779
OF OHIO.
CONGRATULATIONS TO ALL.

97
00:09:25,779 --> 00:09:26,779
WE ARE VERY PROUD OF YOU AND WE
ALL STAND AT LIBERTY SIDE AS

98
00:09:26,779 --> 00:09:27,779
THIS MOVES FORWARD.
THANK YOU SO MUCH.

99
00:09:27,779 --> 00:09:28,779
[ APPLAUSE ]
>> THANK YOU.

100
00:09:28,779 --> 00:09:29,779
GOOD AFTERNOON.
MT I FRANK JENNINGS OF THE NASA.

101
00:09:29,779 --> 00:09:30,779
JOINING US ON STAGE IS OUR PANEL
OF REPRESENTATIVES FROM EACH OF

102
00:09:30,779 --> 00:09:31,779
THE ORION PROGRAM PARTNERS
INVOLVED IN THE TESTING BEING

103
00:09:31,779 --> 00:09:32,779
CONDUCTED IN THE SPACE POWER
FACILITY.

104
00:09:32,779 --> 00:09:33,779
THEY ARE MR. JIM FREE, MR. GREG
WILLIAMS, DEPUTY ASSOCIATE

105
00:09:33,779 --> 00:09:34,779
ADMINISTRATOR FOR HUMAN
EXPLORATION AND OPERATIONS.

106
00:09:34,779 --> 00:09:36,209
MR. MARK KIRASICH, DR. MIKE
HAWES, LOCKHEED MARTIN RORN

107
00:09:36,209 --> 00:09:40,600
PROGRAM MANAGER.
MR. NICO DETTMANN, EUROPEAN

108
00:09:40,600 --> 00:09:44,720
SPACE AGENCY HEAD OF DEVELOPMENT
DEPARTMENT.

109
00:09:44,720 --> 00:09:54,839
AND DR. OLIVER JUCKENHOFEL.
AT THE CONCLUSION OF REMARKS I

110
00:09:54,839 --> 00:10:00,690
OPEN THE DOOR FOR QUESTIONS AS
WELL AS THOSE JOINING US ONLINE

111
00:10:00,690 --> 00:10:04,410
THROUGH SOCIAL MEDIA AND ON THE
PHONE.

112
00:10:04,410 --> 00:10:06,570
IF ANYONE IS FOLLOWING US ON
SOCIAL MEDIA AND WOULD LIKE TO

113
00:10:06,570 --> 00:10:10,640
ASK A QUESTION YOU CAN SEND A
QUESTION TO #ASKNASA.

114
00:10:10,640 --> 00:10:16,769
I WILL PROVIDE ADDITIONAL
DETAILS ONCE WE ARRIVE AT THAT

115
00:10:16,769 --> 00:10:18,940
POINT.
BEFORE WE HEAR FROM OUR

116
00:10:18,940 --> 00:11:58,910
PANELISTS WE HAVE A SHORT VIDEO
WE WOULD LIKE TO SHOW.

117
00:11:58,910 --> 00:13:37,450
[ APPLAUSE ]
>>> AT THIS TIME WE BEGIN WITH

118
00:13:37,450 --> 00:13:39,209
OUR FIRST PANEL MEMBER MR. JIM
>> GOOD AFTERNOON AGAIN

119
00:13:39,209 --> 00:13:40,209
EVERYONE.
THAT IS A GREAT VIDEO TO WATCH.

120
00:13:40,209 --> 00:13:41,209
SIMPLE.
COUPLE MINUTES WE FLEW OUT AND

121
00:13:41,209 --> 00:13:42,209
BACK AND LANDED NO PROBLEM.
THAT REALLY IS LOOKING FORWARD A

122
00:13:42,209 --> 00:13:43,209
COUPLE OF YEARS OF WHERE WE ARE
GOING TO BE.

123
00:13:43,209 --> 00:13:44,209
THAT IS WHY WE ARE HERE TODAY.
THIS IS ANOTHER STOP ALONG THAT

124
00:13:44,209 --> 00:13:45,209
JOURNEY, THE JOURNEY OF THE
INTERNATIONAL TEAM DESIGNING A

125
00:13:45,209 --> 00:13:46,209
VEHICLE THAT IS GOING TO CARRY
HUMANS FARTHER THAN WE HAVE GONE

126
00:13:46,209 --> 00:13:47,209
EVER.
THAT IS AN AGENCY TEAM.

127
00:13:47,209 --> 00:13:48,209
MANY PARTNERS ACROSS, SOME OF
WHICH YOU SEE FROM THE NASA

128
00:13:48,209 --> 00:13:49,209
SIDE.
WE HAVE INCREDIBLE PARTNER

129
00:13:49,209 --> 00:13:50,209
LEADING FROM A CENTER
PERSPECTIVE AND A GREAT PARTNER

130
00:13:50,209 --> 00:13:51,209
TO ME PERSONALLY HERE AT THE
CENTER.

131
00:13:51,209 --> 00:13:52,209
THANK YOU FOR BEING HERE.
THE TESTING THAT IS GOING TO

132
00:13:52,209 --> 00:13:53,209
TAKE PLACE IN THE SPACE POWER
FACILITY OVER THE NEXT YEAR IS

133
00:13:53,209 --> 00:13:54,209
REALLY ABOUT INSURING THAT
SUCCESS OF EM 1.

134
00:13:54,209 --> 00:15:46,783
THE BUILDING HOUSES THE LARGEST
AND MOST POWERFUL AND CAPABLE

135
00:15:46,783 --> 00:15:47,783
TESTING FACILITIES.
IT'S THE ONLY PLACE TO TEST A

136
00:15:47,783 --> 00:15:48,783
VEHICLE OF THIS SIZE FULLY
DEPLOYED IN ITS LAUNCH AND IN

137
00:15:48,783 --> 00:15:49,783
ITS SPACE CONFIGURATION WHICH IS
SO IMPORTANT IN INSURING THAT

138
00:15:49,783 --> 00:15:50,783
MISSION'S SUCCESS.
IT IS GREAT TO LOOK THROUGH THIS

139
00:15:50,783 --> 00:15:51,783
ENTIRE FACILITY END TO END.
AT THE OTHER END AND MECHANICAL

140
00:15:51,783 --> 00:15:52,783
VIBRATION FACILITY WHICH TAKES
THE HARD MOUNTED VEHICLE AND

141
00:15:52,783 --> 00:15:53,783
SHAPES IT TO INDUCE ENVIRONMENTS
STRONGER THAN ANY OTHER IN THE

142
00:15:53,783 --> 00:15:54,783
WORLD WITH.
AT THE FAR END THE ACOUSTIC TEST

143
00:15:54,783 --> 00:15:55,783
FACILITY CAPABLE OF UP TO 163
DECIBELS WHICH IS EQUIVALENT OF

144
00:15:55,783 --> 00:15:56,783
20 JET ENGINES FIRING
SIMULTANEOUSLY.

145
00:15:56,783 --> 00:15:57,783
OUR ENGINEERS, THE EUROPEAN
SPACE AGENCY AND AIR BUS

146
00:15:57,783 --> 00:15:58,783
ENGINEERS WILL SIMULATE THAT
LAUNCH ENVIRONMENT TO GET THOSE

147
00:15:58,783 --> 00:15:59,783
VIBRATIONS IN THE VEHICLE.
IT IS TO UNDERSTAND HOW GOOD IS

148
00:15:59,783 --> 00:16:00,783
OUR DESIGN.
AND THEN THE SPACE SIMULATION

149
00:16:00,783 --> 00:16:01,783
VACUUM CHAMBER NEAREST TO US,
100 FEET IN DIAMETER MORE

150
00:16:01,783 --> 00:16:02,783
CAPABLE THAN ANYWHERE IN THE
WORLD.

151
00:16:02,783 --> 00:16:03,783
THAT IS WHERE WE SIMULATE WHAT
SPACE IS LIKE FOR THE VEHICLE.

152
00:16:03,783 --> 00:16:04,783
IT'S REALLY THAT ONE STOP SHOP
TO COME TO FOR ENVIRONMENTAL

153
00:16:04,783 --> 00:16:05,783
TESTS ON THIS SCALE.
THE VEHICLE WILL GO THROUGH

154
00:16:05,783 --> 00:16:08,649
MULTIPLE LOCATIONS DURING ITS
TESTING AND GETTING QUALIFIED

155
00:16:08,649 --> 00:16:11,190
FOR FLIGHT.
FOR US THAT JUST MEANS WE DID

156
00:16:11,190 --> 00:16:14,320
OUR JOB RIGHT AND TRIED TO
FIGURE OUT THE PROBLEMS WE COULD

157
00:16:14,320 --> 00:16:16,730
ON THE GROUND WHICH MEANS WE
NEED TO TEST THE WAY WE ARE

158
00:16:16,730 --> 00:16:21,180
GOING TO FLY.
IN ADDITION TO VIBRATION AND

159
00:16:21,180 --> 00:16:25,149
SPACE ENVIRONMENT CAPABILITY
THAT ARE HERE THE SOLAR

160
00:16:25,149 --> 00:16:28,839
DEPLOYMENT IS DONE HERE.
WE WILL FIRE PYROTECHNICS TO

161
00:16:28,839 --> 00:16:34,009
SIMULATE DEPLOYMENT AND ALSO
SIMULATE SEPARATION FROM THE

162
00:16:34,009 --> 00:16:40,649
LAUNCH VEHICLE AND THE SHOCKS
THAT THAT INDUCES INTO RRN ORION

163
00:16:40,649 --> 00:16:46,860
ABOUT INSURING MISSION SUCCESS,
MAKING SURE OUR ULTIMATE GOAL

164
00:16:46,860 --> 00:16:50,420
WHICH IS CREW SAFETY AND MEETING
FLIGHT REQUIREMENTS AND MISSION

165
00:16:50,420 --> 00:16:52,730
REQUIREMENTS.
THAT TESTING IS GOING TO

166
00:16:52,730 --> 00:16:56,490
IDENTIFY ANY RISKS THAT WE
HAVEN'T GONE THROUGH, ANY DESIGN

167
00:16:56,490 --> 00:17:00,279
PROBLEMS, ANY POTENTIAL FAILURES
HERE IN THE CONTROL ENVIRONMENT

168
00:17:00,279 --> 00:17:02,899
ON THE GROUND.
THAT'S THE BEST PLACE TO FIND

169
00:17:02,899 --> 00:17:06,970
THE ISSUES IS BEFORE FLIGHT.
IT IS ALL ABOUT THE SUCCESS OF

170
00:17:06,970 --> 00:17:11,459
EM-1.
THE ORION SERVICE MODULE

171
00:17:11,459 --> 00:17:15,439
PROVIDED BY PARTNERS AT THE
EUROPEAN SPACE AGENCY AND AIR

172
00:17:15,439 --> 00:17:20,789
BUS, WE ARE EXCITED ABOUT THE
INTERNATIONAL PARTNERSHIP.

173
00:17:20,789 --> 00:17:23,179
WE ARE BUILDING ON INTERNATIONAL
PARTNERSHIP.

174
00:17:23,179 --> 00:17:30,610
THAT IS WHERE WE COME FROM AND
THE STRENGTH WE RELY ON TO

175
00:17:30,610 --> 00:17:34,039
FULFILL OUR GOAL IN DEVELOPING
THE TESTING FOR THIS VEHICLE.

176
00:17:34,039 --> 00:17:38,750
WE ARE VERY PROUD OF OUR ROLE IN
THAT MISSION HERE AT NASA GLENN.

177
00:17:38,750 --> 00:17:42,240
I HAVE BEEN FORTUNATE TO BE
ASSOCIATED ARE ORION FOR A LONG

178
00:17:42,240 --> 00:17:48,080
TIME.
WE ARE PROUD TO BE PART OF THAT

179
00:17:48,080 --> 00:17:50,799
HERE IN OHIO AND ESPECIALLY AT
NASA GLENN.

180
00:17:50,799 --> 00:18:02,679
THANK YOU FOR BEING HERE.
>>> GOOD AFTERNOON.

181
00:18:02,679 --> 00:18:07,799
I'M GREG WILLIAMS.
YOU HAVE TO HAVE A HEADQUARTERS

182
00:18:07,799 --> 00:18:11,390
GUY.
I'M REALLY PLEASED TO BE HERE TO

183
00:18:11,390 --> 00:18:14,559
BE ABLE TO CONGRATULATE THE TEAM
ON WHAT IS REALLY A SIGNIFICANT

184
00:18:14,559 --> 00:18:18,500
ACCOMPLISHMENT IN THE PROGRAM,
DELIVERY OF STRUCTURAL TEST

185
00:18:18,500 --> 00:18:25,620
ARTICLE.
THE DELIVERY HERE TODAY IS A

186
00:18:25,620 --> 00:18:28,590
SUBSTANTIAL MILESTONE IN THE
PROGRAM AND REALLY REPRESENTS

187
00:18:28,590 --> 00:18:32,789
TWO THINGS IN MY MIND.
ONE JIM MENTIONED A SECOND AGO

188
00:18:32,789 --> 00:18:36,450
IS WHAT IT REPRESENTS IN TERMS
OF INTERNATIONAL COLLABORATION

189
00:18:36,450 --> 00:18:41,250
THAT IS INVOLVED IN THIS WHOLE
HUMAN EXPLORATION ENDEAVOR.

190
00:18:41,250 --> 00:18:44,990
YOU HEAR A LOT OF FOLKS SAY WE
NEED INTERNATIONAL COLLABORATION

191
00:18:44,990 --> 00:18:48,809
BECAUSE NO ONE NATION CAN AFFORD
TO DO SPACE EXPLORATION ON ITS

192
00:18:48,809 --> 00:18:53,059
OWN.
WHAT IS MORE IMPORTANT IS THAT

193
00:18:53,059 --> 00:18:57,100
WE DON'T WANT TO GO ALONE.
WE WANT TO GO AS INTERNATIONAL

194
00:18:57,100 --> 00:19:01,320
PARTNERSHIP WE WOULD LOVE TO BE
GLOBAL ENDEAVOR.

195
00:19:01,320 --> 00:19:06,309
IT SAYS A LOT ABOUT WHAT WE WANT
TO ACCOMPLISH AS HUMANITY.

196
00:19:06,309 --> 00:19:09,650
SO WE ARE EXCITED ABOUT THIS
INTERNATIONAL COLLABORATION.

197
00:19:09,650 --> 00:19:12,480
JIM MENTIONED INTERNATIONAL
SPACE STATION PARTNERSHIP WHICH

198
00:19:12,480 --> 00:19:18,860
HAS BEEN FOR SOME TIME.
PLEASED TO BE A PART FOR THE

199
00:19:18,860 --> 00:19:20,940
FIRST ROUND FOR INTERNATIONAL
SPACE STATION.

200
00:19:20,940 --> 00:19:23,960
I HAVE A SENSE FOR HOW
CHALLENGING THE PARTNERSHIPS CAN

201
00:19:23,960 --> 00:19:27,690
BE TO FORM AND CARRY OUT AND HOW
REWARDING THEY ARE.

202
00:19:27,690 --> 00:19:59,410
WHAT IT IS WE CAN ACCOMPLISH
TOGETHER AND LOOK AT WONDER.

203
00:19:59,410 --> 00:20:14,820
THEY ARE GOING TO SEE THE SAME
WITH ORION.

204
00:20:14,820 --> 00:20:15,820
THE INTERNATIONAL COLLABORATION
THAT REPRESENTS FOR US IS HUGE.

205
00:20:15,820 --> 00:20:16,820
THAT'S ONE REASON WHY I AM
PRIVILEGED TO BE HERE.

206
00:20:16,820 --> 00:20:17,820
THE OTHER THING IT REPRESENTS
TREMENDOUS PROGRESS THIS PROGRAM

207
00:20:17,820 --> 00:20:18,820
IS MAKING.
THE WHOLE EXPLORATION SYSTEM'S

208
00:20:18,820 --> 00:20:19,820
ENDEAVOR, WE ARE WRAPPING UP THE
DESIGN PHASE.

209
00:20:19,820 --> 00:20:20,820
WE ARE BUILDING HARDWARE,
DELIVERING HARDWARE,

210
00:20:20,820 --> 00:20:21,820
FABRICATING, WRITING SOFTWARE.
WE ARE PUTTING THE PIECES

211
00:20:21,820 --> 00:20:22,820
TOGETHER.
IT'S REALLY EXCITING TO SEE.

212
00:20:22,820 --> 00:20:23,820
YOU ARE GOING TO HEAR ABOUT
ORION AND THE PROGRESS IN THAT

213
00:20:23,820 --> 00:20:24,820
CONTEXT.
I WANT TO POINT OUT WHILE I'M

214
00:20:24,820 --> 00:20:25,820
HERE THAT OTHER PIECES ARE ALSO
COMING TOGETHER UNDER LEADERSHIP

215
00:20:25,820 --> 00:20:26,820
OF THOSE WHO ARE HERE AND
LEADING SO EFFECTIVELY THE

216
00:20:26,820 --> 00:20:28,809
ENTERPRISE.
THE SPACE LAUNCH SYSTEM PROGRAM

217
00:20:28,809 --> 00:20:36,630
IS MAKING TREMENDOUS PROGRESS.
THERE ARE ELEMENTS BEING

218
00:20:36,630 --> 00:20:40,919
FABRICATED.
THERE ARE ENGINES BEING TESTED.

219
00:20:40,919 --> 00:20:43,880
THERE IS A NEW CONTRACT IN PLACE
TO START THAT PRODUCTION LINE

220
00:20:43,880 --> 00:20:46,970
AGAIN.
TREMENDOUS PROGRESS.

221
00:20:46,970 --> 00:20:50,320
SIMILARLY IN THE GROUND SYSTEMS
PROGRAM THE VERTICAL ASSEMBLY

222
00:20:50,320 --> 00:20:53,250
BUILDING, THE ICONIC HUGE
STRUCTURE IS BEING RE-JOUT

223
00:20:53,250 --> 00:20:58,330
FITTED WITH A WHOLE NEW
STRUCTURE TO ACCOMMODATE

224
00:20:58,330 --> 00:21:02,260
PROCESSING.
THE PADS ARE BEING REFURBISHED.

225
00:21:02,260 --> 00:21:03,559
THERE IS A NEW FIRE CONTROL
ROOM.

226
00:21:03,559 --> 00:21:07,679
ALL OF THESE ARE EVIDENCE OF
REAL PROGRESS THAT THE WHOLE

227
00:21:07,679 --> 00:21:11,450
EXPLORATION SYSTEM ENTERPRISE IS
MAKING AND IT IS EXCITING TO

228
00:21:11,450 --> 00:21:15,350
SEE.
BILL HILL HAS HIRED A MISSION

229
00:21:15,350 --> 00:21:19,210
MANAGER TO CHOREOGRAPH THESE
PIECES COMING TOGETHER.

230
00:21:19,210 --> 00:21:25,470
YOU WILL SEE VARIOUS TIMES A
VIEW OF PROGRESS FROM THE TOP OF

231
00:21:25,470 --> 00:21:30,690
THE STACK DOWN TO THE BOTTOM.
ALL THAT TO SAY IS WE ARE ON

232
00:21:30,690 --> 00:21:34,770
THIS MARCH TO EM-1.
IT IS A FEW SHORT YEARS AWAY AND

233
00:21:34,770 --> 00:21:39,169
REALLY EXCITING TO SEE.
AND THE SERVICE MODULE IS THE

234
00:21:39,169 --> 00:21:44,429
FIRST EVIDENT OF THAT.
YOU GET TO SEE HERE.

235
00:21:44,429 --> 00:21:48,159
I JUST LIKE TO CLOSE BY
CONGRATULATING THE WHOLE TEAM,

236
00:21:48,159 --> 00:21:54,520
THE ORION PROGRAM IN NASA,
LOCKHEED MARTIN, SIGNIFICANT

237
00:21:54,520 --> 00:21:56,900
ACCOMPLISHMENT AND WE ARE
LOOKING FORWARD TO SEEING MORE

238
00:21:56,900 --> 00:22:09,140
TO COME.
LET ME TALK ABOUT ORION.

239
00:22:09,140 --> 00:22:10,620
>> THANK YOU.
WELCOME.

240
00:22:10,620 --> 00:22:13,150
THANKS FOR JOINING US HERE
TODAY.

241
00:22:13,150 --> 00:22:17,260
WE IN THE ORION PROGRAM HAVE THE
GREAT OPPORTUNITY AND CHALLENGE

242
00:22:17,260 --> 00:22:20,549
OF BUILDING THE SPACECRAFT THAT
IS GOING TO TAKE HUMANS FARTHER

243
00:22:20,549 --> 00:22:22,480
THAN WE HAVE GONE INTO SPACE
BEFORE.

244
00:22:22,480 --> 00:22:27,159
AT TIMES IT CAN GET HARD TO
BORROW FROM THE CONGRESS WOMAN

245
00:22:27,159 --> 00:22:30,370
AT TIMES IT IS HARD TO GET TO
WORK AND CLOSE TOGETHER.

246
00:22:30,370 --> 00:22:36,200
IN ORION WE ARE FORTUNATE THAT
WE ARE ABLE TO EMPLOY BEST,

247
00:22:36,200 --> 00:22:38,880
BRIGHTEST ENGINEERS AND
SCIENTISTS FROM ACROSS THE

248
00:22:38,880 --> 00:22:43,900
AGENCY FROM INDUSTRY AND IN THIS
PROGRAM FROM AROUND THE WORLD.

249
00:22:43,900 --> 00:22:47,260
THAT'S REALLY WHAT WE ARE HERE
TODAY TO DO IS TO CELEBRATE THE

250
00:22:47,260 --> 00:22:50,909
ACCOMPLISHMENTS OF TWO OF
ORION'S MOST IMPORTANT PARTNERS.

251
00:22:50,909 --> 00:22:59,340
I'LL START WITH A STORY.
WHEN I JOINED THE PROGRAM MANY

252
00:22:59,340 --> 00:23:02,929
YEARS AGO I WON'T QUOTE THE
NUMBER.

253
00:23:02,929 --> 00:23:06,520
THE VERY FIRST PERSON THAT
CALLED ME WHEN I JOINED THE

254
00:23:06,520 --> 00:23:10,409
PROGRAM AND WELCOMED ME INTO THE
PROGRAM WAS JIM FREE WHO IS NOW

255
00:23:10,409 --> 00:23:13,330
THE CENTER DIRECTOR.
AT THE TIME HE WAS THE SERVICE

256
00:23:13,330 --> 00:23:19,679
MODULE MANAGER FOR ORION.
JIM HAS HELD A NUMBER OF JOBS

257
00:23:19,679 --> 00:23:23,500
SINCE THEN BUT WHAT I CAN TELL
YOU ABOUT JIM AND ABOUT

258
00:23:23,500 --> 00:23:30,390
EVERYBODY THAT WE WORK WITH HERE
IS THEY WORK TIRELESSLY TO HELP

259
00:23:30,390 --> 00:23:34,309
MAKE ORION SUCCESSFUL.
WE REALLY APPRECIATE THAT.

260
00:23:34,309 --> 00:23:43,549
AND REALLY NOWHERE IS IT MORE
VISIBLY --

261
00:23:43,549 --> 00:23:45,559
YOU WILL HAVE AN
OPPORTUNITY TO WALK THROUGH THE

262
00:23:45,559 --> 00:23:48,110
BUILDING.
YOU WILL SEE THIS LARGE THERMAL

263
00:23:48,110 --> 00:23:54,539
VACUUM CHAMBER, THE ACOUSTIC
CHAMBER.

264
00:23:54,539 --> 00:23:57,150
THESE REALLY ARE WORLD CLASS
FACILITIES.

265
00:23:57,150 --> 00:23:59,779
THERE IS NOWHERE ELSE IN THE
WORLD THAT YOU SEE FACILITIES

266
00:23:59,779 --> 00:24:02,650
LIKE THIS.
JIM TALKED ABOUT THEY ARE REALLY

267
00:24:02,650 --> 00:24:05,909
IMPORTANT BECAUSE WHEN WE LAUNCH
ON THE WORLD'S MOST POWERFUL

268
00:24:05,909 --> 00:24:08,580
ROCKET WE ARE GOING TO BE SHAKEN
AND VIBRATED.

269
00:24:08,580 --> 00:24:10,690
WE HAVE TO MAKE SURE WE CAN
SURVIVE THAT.

270
00:24:10,690 --> 00:24:16,590
WHEN WE ARE TRAVELING WE WILL
SEE THERMAL EXTREMES.

271
00:24:16,590 --> 00:24:20,500
WE HAVE TO PUT OUR SPACECRAFT
THROUGH TESTING TO MAKE SURE IT

272
00:24:20,500 --> 00:29:06,429
IS WORTHY OF CARRYING HUMAN
BEINGS ON THIS MISSION.

273
00:29:06,429 --> 00:29:07,429
THANK YOU AND I REALLY
APPRECIATE EVERYTHING THAT THE

274
00:29:07,429 --> 00:29:09,880
PEOPLE HERE HAVE DONE TO GET US
READY FOR THIS TESTING.

275
00:29:09,880 --> 00:29:12,890
I ALSO LIKE TO RECOGNIZE OUR
EUROPEAN COLLEAGUES.

276
00:29:12,890 --> 00:29:18,140
IT WAS JUST THREE YEARS AGO IN
DECEMBER OF 2012 THAT WE SIGNED

277
00:29:18,140 --> 00:29:30,029
AN AGREEMENT AND WELCOMED THEM
INTO THE ORION PROGRAM.

278
00:29:30,029 --> 00:30:26,240
I WANTED TO TALK A LITTLE BIT
ABOUT THE FUNCTION OF THE

279
00:30:26,240 --> 00:30:59,640
EUROPEAN SERVICE MODULE.
IT'S A REALLY IMPORTANT PIECE OF

280
00:30:59,640 --> 00:31:02,919
HARDWARE IN OUR SPACECRAFT.
PROPULSION SYSTEM.

281
00:31:02,919 --> 00:31:06,779
IT PROVIDES THE CAPABILITIES,
DURING THE HIGHEST PART OF

282
00:31:06,779 --> 00:31:09,480
ASCENT IT GIVES AN ABORT
CAPABILITY SHOULD WE HAVE A

283
00:31:09,480 --> 00:31:12,480
CONTINGENCY GOING UPHILL.
IT HAS VERY LARGE SOLAR RAYS.

284
00:31:12,480 --> 00:31:13,480
IT GENERATES ELECTRICITY THAT
POWERS EQUIPMENT ON BOARD.

285
00:31:13,480 --> 00:31:14,480
IT HAS RADIATORS THAT OVERTHROW
HEAT AND KEEP OUR EQUIPMENT AND

286
00:31:14,480 --> 00:31:18,669
HUMANS INSIDE THE SPACECRAFT
NICE AND COMFORTABLE AND HAS GAS

287
00:31:18,669 --> 00:31:26,909
TANKS AND WATER TANKS TO PROVIDE
THE AIR THE CREW BREATHES AND

288
00:31:26,909 --> 00:31:32,480
WATER THAT THEY DRINK.
AS YOU CAN EASILY UNDERSTAND THE

289
00:31:32,480 --> 00:31:36,029
SERVICE MODULE IS CRITICAL AND
WE REALLY NEED IT.

290
00:31:36,029 --> 00:31:37,630
WE AREN'T GOING ANYWHERE WITHOUT
IT.

291
00:31:37,630 --> 00:31:40,899
THAT'S WHY TODAY IS SUCH A GREAT
DAY BECAUSE THE PIECE OF

292
00:31:40,899 --> 00:31:43,429
HARDWARE RIGHT BEHIND ME, THE
BEAUTIFUL PIECE OF HARDWARE IS A

293
00:31:43,429 --> 00:31:45,840
SIGN OF THE PROGRESS AND OVER
THE THREE YEARS IT SHOWS THE

294
00:31:45,840 --> 00:31:48,080
COMMITMENT THAT THE EUROPEAN
SPACE AGENCY AND THEIR

295
00:31:48,080 --> 00:31:51,149
CONTRACTOR TEAM HAD TO DELIVER
THE ARTICLE WHEN THEY DID.

296
00:31:51,149 --> 00:31:55,850
SO NICO, TO YOU AND OLIVER AND
OUR COLLEAGUES TODAY I WANT TO

297
00:31:55,850 --> 00:32:12,380
EXPRESS OUR APPRECIATION FOR
WHAT YOU ARE BRINGING TO THE

298
00:32:12,380 --> 00:32:21,200
PROGRAM.
THANK YOU.

299
00:32:21,200 --> 00:32:38,830
[ APPLAUSE ]
BEFORE I INTRODUCE MY INDUSTRY

300
00:32:38,830 --> 00:33:05,940
PARTNER I DID WANT TO TALK ABOUT
THE PROGRESS ORION IS MAKING

301
00:33:05,940 --> 00:33:08,240
AROUND THE COUNTRY.
MOST NOTABLY DOWN IN LOUISIANA

302
00:33:08,240 --> 00:33:11,100
RIGHT NOW AS WE SPEAK THE
EXPLORATION MISSION I CREW

303
00:33:11,100 --> 00:33:15,429
MODULE THAT WILL BE ON ITS WAY
TOWARDS THE MOON IN THE VIDEO

304
00:33:15,429 --> 00:33:20,710
YOU JUST SAW IN THREE YEARS FROM
NOW IS ALMOST COMPLETE.

305
00:33:20,710 --> 00:33:24,870
WE WILL COMPLETE IT EARLY
JANUARY.

306
00:33:24,870 --> 00:33:32,490
FROM THERE WE SHIP IT TO KENNEDY
SPACE CENTER WHERE LOCKHEED

307
00:33:32,490 --> 00:33:39,100
FACTORY IS LOCATED ON SITE.
AND WHAT WE HAVE NOW IS A SHORT

308
00:33:39,100 --> 00:33:42,370
VIDEO THAT SHOWS YOU SOME OF
THIS PROGRESS AROUND THE

309
00:33:42,370 --> 00:33:43,370
COUNTRY.

310
00:33:43,370 --> 00:33:49,169
[ APPLAUSE ]
THANK YOU AND I WILL HAND OFF TO

311

00:33:49,169 --> 00:33:53,179
MIKE HAWES.
MIKE IS MY INDUSTRY COUNTER PART

312
00:33:53,179 --> 00:33:55,840
WITH LOCKHEED MARTIN.
>> THANKS VERY MUCH.

313
00:33:55,840 --> 00:34:01,159
THANK YOU ALL FOR COMING OUT.
LOCKHEED MARTIN IS PROUD TO BE

314
00:34:01,159 --> 00:34:05,600
NASA'S INDUSTRY PARTNER.
THAT GIVES US A SPECIAL ROLE IN

315
00:34:05,600 --> 00:34:11,250
RELATION TO THE EUROPEAN SERVICE
MODULE, AS WELL, THAT I WOULD

316
00:34:11,250 --> 00:34:17,379
LIKE TO TALK ABOUT.
BUT FIRST I WOULD LIKE TO THINK

317
00:34:17,379 --> 00:34:24,250
IT IS A LITTLE SURPRISING TO ME
WHEN WE THINK BACK THAT THIS

318
00:34:24,250 --> 00:34:29,149
SATURDAY IS ONE YEAR FROM OUR
FIRST TEST FLIGHT FOR ORION.

319
00:34:29,149 --> 00:34:33,760
IT IS HARD TO BELIEVE IT HAS
GONE THAT FAST.

320
00:34:33,760 --> 00:34:37,679
BUT USUALLY I TELL MY TEAM TO
KEEP THEIR HEADS DOWN AND COLOR

321

00:34:37,679 --> 00:34:42,409
AND KEEPING OUR HEADS DOWN AND
COLORING HAS GIVEN YOU THE ORION

322
00:34:42,409 --> 00:34:47,149
SCENES IN THAT MOVIE.
WE HAVE THE NEXT CREW MODULE IN

323
00:34:47,149 --> 00:34:50,339
NEW ORLEANS.
THERE ARE SEVEN WELDS OF THE

324
00:34:50,339 --> 00:34:53,300
ALUMINUM STRUCTURE.
FIVE OF THE SEVEN HAVE BEEN

325
00:34:53,300 --> 00:34:56,329
COMPLETE.
WE ARE LOOKING AT THE NEXT ONE

326
00:34:56,329 --> 00:35:01,430
AT THE END OF THIS WEEK, EARLY
NEXT WEEK.

327
00:35:01,430 --> 00:35:03,800
WE ARE ALSO DELIVERING COMPUTER
BOARDS, SECONDARY STRUCTURE,

328
00:35:03,800 --> 00:35:05,920
INTERFACE CARDS THAT WE ARE
WORKING TO DELIVER TO OUR

329
00:35:05,920 --> 00:35:07,170
COLLEAGUES.
WORK GOING ON ACROSS THE

330
00:35:07,170 --> 00:35:11,050
COUNTRY.
SO IT'S REALLY EXCITING TO SEE

331

00:35:11,050 --> 00:35:15,220
THAT MUCH WORK COMING TOGETHER
AND NEW EQUIPMENT BEING

332
00:35:15,220 --> 00:35:18,500
PRODUCED -- THE EXPLORATION HAS
TO BE AN INTERNATIONAL VENTURE.

333
00:35:18,500 --> 00:35:21,839
WE ARE PROUD THAT ORION IS THE
FIRST PIECE OF THAT

334
00:35:21,839 --> 00:35:22,839
INTERNATIONAL COOPERATION.
SO WE WORK REGULARLY ON THE

335
00:35:22,839 --> 00:35:25,579
GENERAL SIDE WE SUPPORT THE
NASA/ESA PARTNERSHIP.

336
00:35:25,579 --> 00:35:31,230
WE WORK DAY IN AND DAY OUT WITH
OLIVER'S AIR BUS TEAM.

337
00:35:31,230 --> 00:35:33,256
WHILE IT IS CHALLENGING YOU
CAN'T GO DOWN THE HALLWAY TO

338
00:35:33,256 --> 00:35:34,256
TALK, AIR BUS HAS FOLKS IN THE
UNITED STATES WORKING WITH US.

339
00:35:34,256 --> 00:35:35,256
WE HAVE FOLKS WORKING REGULARLY
WITH OLIVER'S TEAM.

340
00:35:35,256 --> 00:35:36,256
SO THERE IS A LOT THAT WE ARE
ABLE TO ACCOMPLISH, THE TWO

341

00:35:36,256 --> 00:35:37,256
TEAMS WORKING TOGETHER.
ONE OF THE THINGS THAT I WANTED

342
00:35:37,256 --> 00:35:38,256
TO REALLY GIVE YOU A SENSE FOR
AND MARK TOUCHED ON IT IN A

343
00:35:38,256 --> 00:35:39,256
COUPLE OF EXAMPLES BUT I WANT TO
TAKE THOSE EXAMPLES A LITTLE BIT

344
00:35:39,256 --> 00:35:40,256
FURTHER.
THERE IS SO MUCH CAPABILITY IN

345
00:35:40,256 --> 00:35:41,256
THE SERVICE MODULE BUT THAT ALL
HAS TO BE TOTALLY INTERACTIVE

346
00:35:41,256 --> 00:35:42,256
WITH WHAT IS IN THE CREW MODULE.
THESE ARE NOT MODULES YOU CAN

347
00:35:42,256 --> 00:35:43,256
JUST BOLT TOGETHER AND SAY YOU
ARE GOOD TO GO FLY.

348
00:35:43,256 --> 00:35:44,256
YOU HAVE TO DEMONSTRATE ALL OF
THE INTERFACES AND CAPABILITIES.

349
00:35:44,256 --> 00:35:45,256
THE SOLAR RAYS THAT MARK TALKED
ABOUT POWER THE ENTIRE VEHICLE.

350
00:35:45,256 --> 00:35:46,256
THEY FEED THE BATTERIES IN THE
CREW MODULE AND COMMANDS THROUGH

351

00:35:46,256 --> 00:35:47,256
THE COMPUTERS TELL THE SOLAR
RAYS WHICH DIRECTIONS TO TURN TO

352
00:35:47,256 --> 00:35:48,256
OPTIMIZE THE SUN LIGHT.
JUST AS IN DATA CONNECTIONS WHEN

353
00:35:48,256 --> 00:35:49,256
WE ARE FIRING THE ENGINES THAT
MARK TALKED ABOUT, GUIDANCE

354
00:35:49,256 --> 00:35:50,256
NAVIGATION SYSTEM IN THE CREW
MODULE IS DETERMINING WHICH

355
00:35:50,256 --> 00:35:51,256
ENGINES TO FIRE, HOW LONG TO
FIRE AND FEEDING THOSE COMMANDS

356
00:35:51,256 --> 00:35:52,256
ACROSS THE INTERFACE TO THE
SERVICE MODULE.

357
00:35:52,256 --> 00:35:53,256
VERY COMPLICATED AND COMPLEX
INTERACTIONS, BUT THINGS THAT

358
00:35:53,256 --> 00:35:54,256
HAVE TO ABSOLUTELY BE TESTED AND
DEMONSTRATED BEFORE WE FLY.

359
00:35:54,256 --> 00:35:55,256
AND THIS WORK IS REALLY THE
FIRST STEP OF DOING THAT

360
00:35:55,256 --> 00:35:56,256
INTEGRATION AND THAT TEST.
SO IT IS A PLEASURE FOR LOCKHEED

361

00:35:56,256 --> 00:35:57,256
MARTIN TO BE A PART OF THIS
TEAM.

362
00:35:57,256 --> 00:35:58,256
AND IT'S A PLEASURE TO BE
WORKING IN A VERY COLLABORATIVE

363
00:35:58,256 --> 00:35:59,256
MANNER WITH OUR AIRBUS INDUSTRY
PARTNERS.

364
00:35:59,256 --> 00:36:00,256
WITH THAT I WILL TURN IT OVER TO
NICO FOR THE ESA PERSPECTIVE.

365
00:36:00,256 --> 00:36:01,256
>> THANK YOU FOR THE WARM
WELCOME.

366
00:36:01,256 --> 00:36:02,256
EVERYBODY WAS TALKING AND I CAN
TELL YOU ESA IS PROUD HAVING

367
00:36:02,256 --> 00:36:03,256
BEEN SELECTED AS PARTNER FOR THE
LARGEST U.S. EXPLORATION

368
00:36:03,256 --> 00:36:04,256
PROGRAM.
WE ARE DEVELOPING A VERY

369
00:36:04,256 --> 00:36:05,256
SIGNIFICANT ONE.
THE LAST THREE YEARS OF

370
00:36:05,256 --> 00:36:06,256
COOPERATION HAVE BEEN TOUGH, BIG
EXCITEMENT.

371

00:36:06,256 --> 00:36:07,256
I WANT TO MAKE A BIG COMPLIMENT
TO ALL TEAMS INVOLVED FOR THE

372
00:36:07,256 --> 00:36:08,256
EUROPEAN INDUSTRY AND FOR
LOCKHEED WHO HELPED TO BRING

373
00:36:08,256 --> 00:36:09,256
THIS PIECE OF HARDWARE AFTER
THREE YEARS TO HERE.

374
00:36:09,256 --> 00:36:10,256
IMPLEMENTING ARRANGEMENTS HAVE
BEEN SIGNED AND WHO KNOWS WHAT

375
00:36:10,256 --> 00:36:11,256
IT MEANS -- IT IS A REAL TEAM
ACHIEVEMENT.

376
00:36:11,256 --> 00:36:12,256
THE ATLANTIC BETWEEN US HAS NOT
ALWAYS HELPED.

377
00:36:12,256 --> 00:36:13,256
I HAVE SEEN A TREMENDOUS
DEVELOPMENT IN COOPERATION OF

378
00:36:13,256 --> 00:36:14,256
THE TEAMS.
THIS IS CONCERNING THE

379
00:36:14,256 --> 00:36:15,256
SUCCESSFUL CONTINUATION OF WHAT
THE TEAMS HAVE DONE.

380
00:36:15,256 --> 00:36:16,256
I BELIEVE WE HAVE A GOOD TRACK
RECORD IN THE COOPERATION.

381

00:36:16,256 --> 00:36:17,256
BUT I WOULD ALSO LIKE TO SAY
WHAT THIS MEANS THIS

382
00:36:17,256 --> 00:36:18,256
COOPERATION?
THIS IS THE FIRST TIME EMBARKING

383
00:36:18,256 --> 00:36:19,256
ON THE HUMAN MISSION BEYOND
LOWER EARTH ORBIT.

384
00:36:19,256 --> 00:36:20,256
AND IT FITS INTO OUR STRATEGY
AND THEY ARE VERY HAPPY.

385
00:36:20,256 --> 00:36:21,256
WE ARE VERY COMMITTED TO DELIVER
ON TIME.

386
00:36:21,256 --> 00:36:22,256
WITH THAT I CAN HAND OVER TO
OLIVER.

387
00:36:22,256 --> 00:36:23,256
THANK YOU.
[ APPLAUSE ]

388
00:36:23,256 --> 00:36:24,256
>>> SO SOLID LIKE I'M THE ONE
WHO IS SUPPOSED TO DELIVER ON

389
00:36:24,256 --> 00:36:25,256
TIME.
I GOT THAT MESSAGE.

390
00:36:25,256 --> 00:36:26,256
STARTED DELIBERATING ON MY
PERSPECTIVE.

391

00:36:26,256 --> 00:36:27,256
LET ME THANK YOU JIM FREE FOR
THE HOSPITALITY NOT JUST FOR

392
00:36:27,256 --> 00:36:28,256
TODAY BUT FOR THE LAST WEEKS AND
MONTHS TO COME BECAUSE WHAT WE

393
00:36:28,256 --> 00:36:29,256
DON'T SEE IN THIS ROOM WE ARE
HAVING PEOPLE HERE WHO ARE GOING

394
00:36:29,256 --> 00:36:30,256
TO LIVE IN OHIO, IN THE VICINITY
OF THE FACILITY TO WORK HERE FOR

395
00:36:30,256 --> 00:36:31,256
THE NEXT MONTHS.
THIS SHOWS HOW MUCH INTEGRATED

396
00:36:31,256 --> 00:36:32,256
THIS WORK IS TODAY AND HOW IT
MUST BE.

397
00:36:32,256 --> 00:36:33,256
WITHOUT THE INTEGRATION STARTING
IN EUROPE AND THEN GOING OVER

398
00:36:33,256 --> 00:36:34,256
HERE INTO THE U.S. IT WOULD
SIMPLY NOT WORK.

399
00:36:34,256 --> 00:36:35,256
WE HAVE A LOT OF EXPERIENCE IN
BUILDING FOR SPACE AND MANY,

400
00:36:35,256 --> 00:36:36,256
MANY TIMES WE HAVE BEEN IN
CHARGE WHICH MEANS WE ARE USED

401

00:36:36,256 --> 00:36:37,256
TO BEING THE SYSTEM PRIME.
IN THIS PROGRAM WE ARE THE

402
00:36:37,256 --> 00:36:38,256
PARTNER OF LOCKHEED MARTIN
BUILDING FOR THE AGENCIES.

403
00:36:38,256 --> 00:36:39,256
YOU CAN HAVE THE PERSPECTIVE
EUROPE IS BUILDING FOR THE U.S.

404
00:36:39,256 --> 00:36:40,256
OR THE PERSPECTIVE THAT A TEAM
IS BUILDING FOR AGENCIES.

405
00:36:40,256 --> 00:36:41,256
ABOUT ONE AND A HALF YEARS AGO
MENTIONED WHAT HE IS EXPECTING

406
00:36:41,256 --> 00:36:42,256
US TO DO IS THAT WE GET OUR
STAKES TOGETHER AND WE FIX

407
00:36:42,256 --> 00:36:43,256
ISSUES ON A TECHNICAL LEVEL
INDEPENDENT OF BOUNDARIES AND OF

408
00:36:43,256 --> 00:36:44,256
COMPANY BOUNDARIES AND AGENCY OR
NATIONAL BOUNDARIES AND THEN WE

409
00:36:44,256 --> 00:36:45,256
REPORT INTO A JOINT MANAGEMENT
TEAM.

410
00:36:45,256 --> 00:36:46,256
AND I THINK THIS IS THE KEY.
YOU CAN SEE THESE ARE EUROPE

411

00:36:46,256 --> 00:36:47,256
WITH OR AGAINST THE U.S. OR YOU
CAN SEE IT IS TO SELECT THE

412
00:36:47,256 --> 00:36:48,256
RIGHT PEOPLE AND THE RIGHT
PARTNERS TO WORK ON THE TOPIC

413
00:36:48,256 --> 00:36:49,256
AND THEN DELIVER AGAINST
EXPECTATIONS.

414
00:36:49,256 --> 00:36:50,256
THIS IS WHAT WE ARE DOING EVERY
DAY.

415
00:36:50,256 --> 00:36:51,256
WE MUST DO IT LIKE THAT BECAUSE
SUCH A VEHICLE YOU COULDN'T

416
00:36:51,256 --> 00:36:52,256
BUILD IN A DIFFERENT MANNER.
WE HEARD IT ALREADY IN A NUT

417
00:36:52,256 --> 00:36:53,256
SHELL.
OUR EUROPEAN SERVICE MODULE

418
00:36:53,256 --> 00:36:54,256
COULDN'T FLY ALONE.
IT IS MISSING A LITTLE BIT OF

419
00:36:54,256 --> 00:36:55,256
INTELLIGENCE.
WE HAVE A LOT OF THINGS WE CAN

420
00:36:55,256 --> 00:36:56,256
EXECUTE.
THE WHOLE MISSION CONTROL IS

421

00:36:56,256 --> 00:36:57,256
DONE IN THE CREW MODULE
DELIVERED BY LOCKHEED AND THEN

422
00:36:57,256 --> 00:36:58,256
BY NASA FOR OVERALL MISSION
RESPONSIBILITY.

423
00:36:58,256 --> 00:36:59,256
NASA CANNOT FLY WITHOUT US, WE
CANNOT FLY WITHOUT THEM WHICH

424
00:36:59,256 --> 00:37:00,256
MEANS YOU HAVE TO FIND
SOLUTIONS.

425
00:37:00,256 --> 00:37:01,256
THIS IS THE BASIC PREREQUISITE
FOR DESIGNING AN OPTIMUM

426
00:37:01,256 --> 00:37:02,256
VEHICLE.
WITHOUT DESIGNING FOR OPTIMUM

427
00:37:02,256 --> 00:37:03,256
VEHICLE YOU WILL NOT FLY TO THE
MOON OR BEYOND.

428
00:37:03,256 --> 00:37:04,256
WHAT I SEE IN THE TEAMS WORLD
WIDE THAT IS JUST AMAZING.

429
00:37:04,256 --> 00:37:05,256
WE KNOW WHAT IT MEANS TO
COLLABORATE.

430
00:37:05,256 --> 00:37:06,256
IT IS WORLD WIDE EVEN IN THE
U.S.

431

00:37:06,256 --> 00:37:07,256
BUT COLLABORATION ON SUCH A
DAILY BASIS REQUIRES A LOT OF

432
00:37:07,256 --> 00:37:08,256
EFFORT FROM EVERYBODY.
SO YOU MENTIONED THAT ALREADY

433
00:37:08,256 --> 00:37:09,256
I'M NOT SURE WHAT IS MOST COSTLY
ON THIS PROGRAM, THE TELEPHONE

434
00:37:09,256 --> 00:37:10,256
BILL FOR OUR TEAMS OR ANY YOU
ARE SEEING THERE.

435
00:37:10,256 --> 00:37:11,256
IT IS A GREAT EFFORT.
THANK YOU FOR EVERYBODY INVOLVED

436
00:37:11,256 --> 00:37:12,256
IN THAT.
FOR US AND ALSO FOR YOU IF YOU

437
00:37:12,256 --> 00:37:13,256
TAKE A LOOK AT THE EUROPEAN
SERVICE MODULE IT IS THE FIRST

438
00:37:13,256 --> 00:37:14,256
OF ITS KIND.
IT IS CALLED STRUCTURAL TEST

439
00:37:14,256 --> 00:37:15,256
ARTICLE.
IT IS THE FIRST EUROPEAN SERVICE

440
00:37:15,256 --> 00:37:16,256
MODULE.
IT HAS TO BE LIKE THAT BECAUSE

441

00:37:16,256 --> 00:37:17,256
THE WAY WE ARE TESTING HERE IS
TESTING FOR FLIGHT.

442
00:37:17,256 --> 00:37:18,256
IF THIS IS NOT FLIGHT
REPRESENTATIVE IN MATERIALS AND

443
00:37:18,256 --> 00:37:19,256
THE WAY WE ARE PRODUCING THAT
THEN YOU DONOT GET THE MESSAGE

444
00:37:19,256 --> 00:37:20,256
OUT OF THE TEST.
IT IS MISSING THE ELECTRONICS

445
00:37:20,256 --> 00:37:21,256
COMPONENT WHICH WE ARE
DEVELOPING AND MANUFACTURING IN

446
00:37:21,256 --> 00:37:22,256
PERIL TO THIS BUT THE MAJORITY
OF THE MECHANICAL

447
00:37:22,256 --> 00:37:23,256
REPRESENTATIONS YOU SEE BEHIND
OURSELVESM.

448
00:37:23,256 --> 00:37:24,256
THIS IS OUR FIRST MILESTONE TO
EMBARK IN THE LONG TERM ORION

449
00:37:24,256 --> 00:37:25,256
PROGRAM.
I CAN JUST SAY ALL EUROPEAN

450
00:37:25,256 --> 00:37:26,256
COUNTRIES WHO ARE PARTICIPATING
FOR THIS SPACE IS IN OUR DNA.

451

00:37:26,256 --> 00:37:27,256
IF YOU WANT TO FIND ONE PROGRAM
WHERE YOU CAN REALLY HAVE THE

452
00:37:27,256 --> 00:37:28,256
PLEASURE OF FACING THAT, THAT IS
THE ORION PROGRAM.

453
00:37:28,256 --> 00:37:29,256
WE WANT TO BE THERE FOR A LONG
TIME.

454
00:37:29,256 --> 00:37:30,256
THANK YOU FOR ALL WHO ARE
PARTICIPATING HERE.

455
00:37:30,256 --> 00:37:31,256
>>> THIS CONCLUDES THE REMARKS
PORTION FOR THE PANEL.

456
00:37:31,256 --> 00:37:32,256
I WILL NOW OPEN THE FLOOR FOR
QUESTIONS FROM THE MEDIA

457
00:37:32,256 --> 00:37:33,256
REPRESENTATIVES THAT ARE JOINING
US.

458
00:37:33,256 --> 00:37:34,256
BECAUSE OF TIME CONSTRAINTS I
CAN ONLY ACCEPT QUESTIONS FROM

459
00:37:34,256 --> 00:37:35,256
I WILL ROTATE THE QUESTIONS
BETWEEN THOSE COMING FROM

460
00:37:35,256 --> 00:37:36,256
AUDIENCE AND THOSE SUBMITTED
ONLINE AT #ASKNASA AND THEN WE

461

00:37:36,256 --> 00:37:37,256
DPOE TO THE PHONES IF WE HAVE
QUESTIONS.

462
00:37:37,256 --> 00:37:38,256
IF THOSE MEDIA REPS IN THE
AUDIENCE PLEASE RAISE HANDS AND

463
00:37:38,256 --> 00:37:39,256
SOMEONE WITH A MICROPHONE WILL
COME TO YOU.

464
00:37:39,256 --> 00:37:40,256
PLEASE STATE YOUR NAME AND
ORGANIZATION YOU ARE WITH AND

465
00:37:40,256 --> 00:37:41,256
THEN WE WILL PROCEED.
FIRST QUESTION.

466
00:37:41,256 --> 00:37:42,256
>> I'M WITH NBC 24 FROM TOLEDO.
WELCOME.

467
00:37:42,256 --> 00:37:43,256
AND THIS IS FOR MR. FREE IF I
COULD.

468
00:37:43,256 --> 00:37:44,256
A LOT OF FOLKS IN OUR AREA DON'T
KNOW THIS FACILITY EXISTS.

469
00:37:44,256 --> 00:37:45,256
THEY KNOW SANDUSKY IS THE HOME
TO CEDAR POINT.

470
00:37:45,256 --> 00:37:46,256
COULD YOU REFLECT A LITTLE BIT
ON WHAT THIS FACILITY MEANS TO

471

00:37:46,256 --> 00:37:47,256
THIS COMMUNITY?
>> I ACTUALLY THINK CEDAR POINT

472
00:37:47,256 --> 00:37:48,256
IS SECOND TO US.
NOT EVERYBODY THINKS THAT WAY.

473
00:37:48,256 --> 00:37:49,256
I THINK IT IS A GREAT -- FOR ALL
NINE NASA CENTERS EVERY

474
00:37:49,256 --> 00:37:50,256
COMMUNITY THAT HAS A NASA
CENTER, A NASA FIELD SITE LIKE

475
00:37:50,256 --> 00:37:51,256
THIS IS FOR US SHOULD BE PROUD
TO HAVE IT.

476
00:37:51,256 --> 00:37:52,256
THIS PLACE IS PART OF THE LEGACY
OF WHAT IS IN SPACE.

477
00:37:52,256 --> 00:37:53,256
THE TESTING THAT HAS OCCURRED
HERE TO DATE FOR THE RADIATORS

478
00:37:53,256 --> 00:37:54,256
ON THE SPACE STATION, THE WAY WE
DUMP FEED ON THE STATION TODAY

479
00:37:54,256 --> 00:37:55,256
IS BECAUSE OF RADIATOR TESTING
DONE HERE.

480
00:37:55,256 --> 00:37:56,256
LAUNCH VEHICLE TESTING DONE HERE
HAS SERVED TO LAUNCH SCIENTIFIC

481

00:37:56,256 --> 00:37:57,256
SPACECRAFT AND NATIONAL SECURITY
PAY LOADS AND THAT WILL SHROUD

482
00:37:57,256 --> 00:37:58,256
THE JAMES WEB SPACE TELESCOPE
WHICH WAS TESTED HERE.

483
00:37:58,256 --> 00:37:59,256
IT SHOULD BE AN ELEMENT OF PRIDE
AS THIS PLACE IS PART OF THE

484
00:37:59,256 --> 00:38:00,256
SPACE PROGRAM IN YEARS PAST AND
WITH WHAT YOU SEE HERE TODAY

485
00:38:00,256 --> 00:38:01,256
WILL BE PART OF THE SPACE
PROGRAM IN YEARS TO COME.

486
00:38:01,256 --> 00:38:02,256
>> NEXT QUESTION.
IN THE SECOND ROW.

487
00:38:02,256 --> 00:38:03,256
>> GOOD AFTERNOON.
I'M FROM DUTCH RADIO AND

488
00:38:03,256 --> 00:38:04,256
TELEVISION.
I HAVE A QUESTION ABOUT THE LONG

489
00:38:04,256 --> 00:38:05,256
TERM VISION.
YOU SHOWED WHAT IS AHEAD OF US.

490
00:38:05,256 --> 00:38:06,256
IN 2018 WE WANT TO GO TO THE
MOON.

491

00:38:06,256 --> 00:38:07,256
OF COURSE, THE LONG TERM
ENVISION IS MARS.

492
00:38:07,256 --> 00:38:08,256
ARE YOU ALREADY THINKING AHEAD
BECAUSE A SERVICE MODULE LIKE

493
00:38:08,256 --> 00:38:09,256
YOU HAVE NOW IS NOT ENOUGH TO
BRING PEOPLE TO MARS.

494
00:38:09,256 --> 00:38:10,256
YOU NEED SOMETHING WHERE PEOPLE
CAN LIVE IN.

495
00:38:10,256 --> 00:38:11,256
IS SOMETHING BEING DESIGNED
ALREADY?

496
00:38:11,256 --> 00:38:12,256
ARE YOU THINKING AHEAD?
>> SHORT ANSWER IS YES WE ARE

497
00:38:12,256 --> 00:38:13,256
THINKING AHEAD.
WE CALL THE 2018 FLIGHT EM-1

498
00:38:13,256 --> 00:38:14,256
BECAUSE THERE ARE SEVERAL AFTER
THAT.

499
00:38:14,256 --> 00:38:15,256
THE WHOLE REASON WE ARE GOING TO
THE VICINITY OF THE MOON IS

500
00:38:15,256 --> 00:38:16,256
BECAUSE LUNAR SPACE AROUND THE
MOON SERVES AS GREAT AREA TO

501

00:38:16,256 --> 00:38:17,256
PRACTICE DEEP SPACE OPERATIONS
AND STAGING AREA FOR WHICH WE

502
00:38:17,256 --> 00:38:18,256
CAN SEND FUTURE MISSIONS TO
MARS.

503
00:38:18,256 --> 00:38:19,256
THE FIRST PIECES OF THIS ARE
ORION INCLUDING SERVICE MODULE.

504
00:38:19,256 --> 00:38:20,256
SUBSEQUENT PIECES ARE GOING TO
INCLUDE HABITATION CAPABILITY

505
00:38:20,256 --> 00:38:21,256
WHICH WE WILL NEED IN DEEP
SPACE, WHERE WE NEED IN SPACE

506
00:38:21,256 --> 00:38:22,256
PROPULSION CAPABILITIES.
WE ARE DEMONSTRATING THAT WITH

507
00:38:22,256 --> 00:38:23,256
THE REDIRECT MISSION.
THAT WILL PROVIDE US ABILITY TO

508
00:38:23,256 --> 00:38:24,256
MOVE LARGE CARGO MASSES LONG
DISTANCES IN DEEP SPACE.

509
00:38:24,256 --> 00:38:25,256
THAT IS UNDERWAY.
WE WILL ALSO NEED LANDING

510
00:38:25,256 --> 00:38:26,256
CAPABILITIES FOR THE ATMOSPHERE.
THERE IS A NUMBER OF

511

00:38:26,256 --> 00:38:27,256
TECHNOLOGIES THAT ARE BEING
DEVELOPED, FUNDED BY MISSION

512
00:38:27,256 --> 00:38:28,256
DIRECTORATE.
SIMILAR TECHNOLOGIES BEING DONE

513
00:38:28,256 --> 00:38:29,256
HERE.
SO WE ARE THINKING AHEAD.

514
00:38:29,256 --> 00:38:30,256
THERE ARE A LOT OF PIECES IN
PLACE.

515
00:38:30,256 --> 00:38:31,256
THERE ARE TECHNOLOGIES UNDERWAY
FOR ALL OF THOSE.

516
00:38:31,256 --> 00:38:32,256
A NUMBER OF THOSE ARE ALSO
TECHNOLOGIES WHICH WE ARE IN

517
00:38:32,256 --> 00:38:33,256
DISCUSSION WITH INTERNATIONAL
PARTNERS BECAUSE A LOT OF THE

518
00:38:33,256 --> 00:38:34,256
TECHNOLOGIES REVOLVE AROUND
KEEPING CREWS SAFE.

519
00:38:34,256 --> 00:38:35,256
A LOT OF THE TECHNOLOGIES ARE
BEING TESTED ON INTERNATIONAL

520
00:38:35,256 --> 00:38:36,256
SPACE STATION JUST RIGHT NOW WE
ARE IN THE MIDDLE OF THE

521

00:38:36,256 --> 00:38:37,256
ONE-YEAR CREW MISSION.
WE JUST PASSED THE HALF WAY

522
00:38:37,256 --> 00:38:38,256
MILESTONE ON THAT.
A LOT OF PIECES NEEDED.

523
00:38:38,256 --> 00:38:39,256
MANY ARE EITHER BEING DESIGNED
OR TECHNOLOGY BEING DEMONSTRATED

524
00:38:39,256 --> 00:38:40,256
FOR AND OTHERS ARE ON THE WAY.
THIS IS GOING TO BE A LONG

525
00:38:40,256 --> 00:38:41,256
DURATION.
WE HAVE TO PACE OURSELVES GIVEN

526
00:38:41,256 --> 00:38:42,256
WHERE WE ARE BUDGETARILY.
I ENCOURAGE YOU TO READ THE

527
00:38:42,256 --> 00:38:43,256
JOURNEY TO MARS DOCUMENT.
IT EXPRESSES OUR LATEST THINKING

528
00:38:43,256 --> 00:38:44,256
ON WHAT THE MAJOR PIECES ARE AND
IN PARTICULAR WHAT WE WANT TO

529
00:38:44,256 --> 00:38:45,256
ACCOMPLISH THROUGH THE 2020s
WITH MULTIPLE FLIGHTS SO THAT WE

530
00:38:45,256 --> 00:38:46,256
CAN CONVINCE OURSELVES WE ARE
READY.

531

00:38:46,256 --> 00:38:47,256
>> THANK YOU.
ANOTHER QUESTION.

532
00:38:47,256 --> 00:38:48,256
>>> WE HAVE SEVERAL THAT HAVE
COME IN ON SOCIAL MEDIA.

533
00:38:48,256 --> 00:38:49,256
THE FIRST IS FROM LAUNCH COMPLEX
WHO ASKED DOES THE ORION SERVICE

534
00:38:49,256 --> 00:38:50,256
MODULE INCLUDE NEW TECHNOLOGIES
NOT SEEN IN PREVIOUS SPACECRAFT?

535
00:38:50,256 --> 00:38:51,256
>> ALWAYS A GOOD QUESTION, WHAT
IS THE NEW TECHNOLOGY.

536
00:38:51,256 --> 00:38:52,256
THE ESSENCE IS THAT WE HAVE A
GOOD MIXTURE OF WHAT WE HAVE

537
00:38:52,256 --> 00:38:53,256
FLOWN ALREADY IN TERMS OF
TECHNOLOGY.

538
00:38:53,256 --> 00:38:54,256
WE PUT TOGETHER TO A NEW MIX.
I WANT TO FOCUS ON ONE

539
00:38:54,256 --> 00:38:55,256
PARTICULAR THING WHICH IS THE
PRESSURE REGULATION FOR THE

540
00:38:55,256 --> 00:38:56,256
PROPULSION SUBSYSTEM.
IT IS NOT NEW IN THE SENSE.

541

00:38:56,256 --> 00:38:57,256
YOU WILL SEE THE APPLICATION WE
ARE USING WITH THE PRESSURE

542
00:38:57,256 --> 00:38:58,256
RANGE OF MORE THAN 400 BARS DOWN
TO A VERY SMALL REGIME TO

543
00:38:58,256 --> 00:38:59,256
OPERATE WITH ONE SYSTEM.
BUT ALSO THE OLD SHUTTLE ENGINE,

544
00:38:59,256 --> 00:39:00,256
THIS IS REALLY A NEW KEY FEATURE
WHICH HAS BEEN DONE IN SUCH A

545
00:39:00,256 --> 00:39:01,256
RANGE BEFORE HAND.
YOU ALWAYS HAVE TO SELECT WHERE

546
00:39:01,256 --> 00:39:02,256
YOU WANT TO FLY NEW
TECHNOLOGIES.

547
00:39:02,256 --> 00:39:03,256
WE BELIEVE WE WANT TO GO AS FAST
AS POSSIBLE RATHER THAN BUILDING

548
00:39:03,256 --> 00:39:04,256
NEW TECHNOLOGIES AND THEN
POTENTIALLY HAVE DELAYS.

549
00:39:04,256 --> 00:39:05,256
WE ARE EXPLORING WHAT WE CAN DO
TODAY.

550
00:39:05,256 --> 00:39:06,256
>> I WOULD SAY FROM THE ORION
STANDPOINT WHAT HERITAGE IS THE

551

00:39:06,256 --> 00:39:07,256
SHAPE.
COMING BACK FROM A LUNAR

552
00:39:07,256 --> 00:39:08,256
VELOCITY THAT IS THE SHAPE THAT
WORKS.

553
00:39:08,256 --> 00:39:09,256
INSIDE THE SPACECRAFT AND
OUTSIDE ALL TECHNOLOGIES ARE

554
00:39:09,256 --> 00:39:10,256
NEW.
MANUFACTURES THE THRUSTERS FOR

555
00:39:10,256 --> 00:39:11,256
THE CREW MODULE HAS JUST
RELEASED A PRESS RELEASE THAT

556
00:39:11,256 --> 00:39:12,256
THEY ARE 3 D PRINTING ALL OF THE
NOZZLES FOR THE REACTION CONTROL

557
00:39:12,256 --> 00:39:13,256
SYSTEM ON THE ORION CREW MODULE.
>> ANOTHER ONE ON SOCIAL MEDIA

558
00:39:13,256 --> 00:39:14,256
FROM MARSHA SMITH.
HOW MANY SERVICE MODULES HAVE

559
00:39:14,256 --> 00:39:15,256
ESA AGREED TO PROVIDE?
ARE THEY REUSABLE AND HOW MUCH

560
00:39:15,256 --> 00:39:16,256
DOES EACH COST?
>> SO AT THE CURRENT AGREEMENT

561

00:39:16,256 --> 00:39:17,256
WE DEVELOP THE DESIGNS.
WE DELIVER THE FIRST FLIGHT

562
00:39:17,256 --> 00:39:18,256
MODULE.
WE HAVE ALREADY AGREED TO START

563
00:39:18,256 --> 00:39:19,256
THE PROCUREMENT OF THE SECOND
ITEM WHICH HAS TO BE CONFIRMED

564
00:39:19,256 --> 00:39:20,256
IN 2016 BUT THE PLAN AND THE
CONFIDENCE ARE HIGH THAT ESA

565
00:39:20,256 --> 00:39:21,256
WILL DELIVER THE SECOND MODULE.
AND BEYOND THAT WE WILL CONTINUE

566
00:39:21,256 --> 00:39:22,256
TO DISCUSS.
THANK YOU.

567
00:39:22,256 --> 00:39:23,256
>> ANY OTHER QUESTIONS?
WE DO HAVE A QUESTION ON THE

568
00:39:23,256 --> 00:39:24,256
PHONE.
>> FOLLOWING ON THE SECOND

569
00:39:24,256 --> 00:39:25,256
QUESTION, CAN YOU TELL US WHAT
IS GOING TO HAPPEN TO THE TEST

570
00:39:25,256 --> 00:39:26,256
ARTICLE IF ALL GOES WELL?
WILL THIS ONE LEAVE THE GROUND?

571

00:39:26,256 --> 00:39:27,256
WHICH TEST ARTICLE WILL BE
FLYING IN 2018?

572
00:39:27,256 --> 00:39:28,256
WHICH SERVICE MODULE?
>> FIRST OFF, AFTER THE TESTS

573
00:39:28,256 --> 00:39:29,256
ARE COMPLETE HERE PARTS OF THE
EUROPEAN SERVICE MODULE WILL GO

574
00:39:29,256 --> 00:39:30,256
BACK TO EUROPE TO BE USED FOR
OTHER TEST PURPOSES.

575
00:39:30,256 --> 00:39:31,256
THE MAIN PARTS HERE WE KEEP AND
SEND TO KENNEDY SPACE CENTER FOR

576
00:39:31,256 --> 00:39:32,256
REFURBISHMENT AND WE WILL USE
THE REFURBISHED ESA SERVICE

577
00:39:32,256 --> 00:39:33,256
MODULE IN A SECOND SERIES WHEN
THE LOCKHEED PRODUCED HALF

578
00:39:33,256 --> 00:39:34,256
ARRIVES.
IT WILL SEE A LOT OF USE.

579
00:39:34,256 --> 00:39:35,256
THIS ARTICLE WILL NOT FLY.
WE ACTUALLY HAVE THE EXPLORATION

580
00:39:35,256 --> 00:39:36,256
MISSION ONE FLIGHT ARTICLES
UNDER CONSTRUCTION HERE IN THE

581

00:39:36,256 --> 00:39:37,256
UNITED STATES AND THE EQUIVALENT
EUROPEAN PARTS UNDER

582
00:39:37,256 --> 00:39:38,256
CONSTRUCTION IN EUROPE RIGHT
NOW.

583
00:39:38,256 --> 00:39:39,256
>> THANK YOU.
>> THANK YOU.

584
00:39:39,256 --> 00:39:40,256
ANY OTHER QUESTIONS?
>> CODY WITH

585
00:39:40,256 --> 00:39:41,256
NASASPACEFLIGHT.COM.
DOES ESA'S INVOLVEMENT WITH

586
00:39:41,256 --> 00:39:42,256
SERVICE MODULE PUT THEM IN GOOD
POSITION FOR ESA ASTRONAUT TO

587
00:39:42,256 --> 00:39:43,256
RIDE ON A FUTURE ORION MISSION?
>> THE ULTIMATE OBJECTIVE TO

588
00:39:43,256 --> 00:39:44,256
HAVE AN ESA ASTRONAUT FLYING
BEYOND LOWER EARTH ORBIT.

589
00:39:44,256 --> 00:39:45,256
WE HOPE THIS COOPERATION WILL
ACTUALLY LEAD TO HAVING A

590
00:39:45,256 --> 00:39:46,256
EUROPEAN NATIONAL ON SUCH A
MISSION.

591

00:39:46,256 --> 00:39:47,256
>> THIS IS GOING TO BE
INTERNATIONAL ENDEAVOR ON THE

592
00:39:47,256 --> 00:39:48,256
LONG JOURNEY TO MARS.
WE WOULD LOVE TO SEE ASTRONAUTS

593
00:39:48,256 --> 00:39:49,256
FROM SEVERAL NATIONS BE INVOLVED
WHEN WE FIRST STEP FOOT ON THE

594
00:39:49,256 --> 00:39:50,256
RED PLANET.
>> ANYONE ELSE?

595
00:39:50,256 --> 00:39:51,256
>>> I HAVE TWO QUESTIONS.
FIRST QUESTION, WHAT IS THE MOST

596
00:39:51,256 --> 00:39:52,256
POWERFUL ACHIEVEMENTS HELPING
WITH BUILDING ORION?

597
00:39:52,256 --> 00:39:53,256
AND THE SECOND QUESTION, WHAT
KIND OF MATERIAL CHALLENGES HAVE

598
00:39:53,256 --> 00:39:54,256
YOU FACED?
>> I WOULD SAY FIRST AND

599
00:39:54,256 --> 00:39:55,256
FOREMOST THE ADVANTAGE OF ISS IS
THAT IT IS AN EXISTENCE PROOF

600
00:39:55,256 --> 00:39:56,256
THAT THESE PARTNERSHIPS CAN WORK
IN A VERY LARGE SCALE.

601

00:39:56,256 --> 00:39:57,256
IN MY PAST LIFE IN NASA HAD
MANY, MANY YEARS OF WORKING ON

602
00:39:57,256 --> 00:39:58,256
THE INTERNATIONAL SPACE STATION
AND REALLY DEMONSTRATES HOW MUCH

603
00:39:58,256 --> 00:39:59,256
WE CAN DO.
IN THIS CASE THIS IS A STEP

604
00:39:59,256 --> 00:40:00,256
FORWARD FOR NASA AND ESA.
ESA IS ABSOLUTELY IN THE

605
00:40:00,256 --> 00:40:01,256
CRITICAL PATH.
IT IS A COMPLEX INTEGRATION OF

606
00:40:01,256 --> 00:40:02,256
THE TWO PORTIONS OF THE
SPACECRAFT.

607
00:40:02,256 --> 00:40:03,256
IT REALLY IS BUILDING ON THAT
FOUNDATION THAT WE SET IN ISS.

608
00:40:03,256 --> 00:40:04,256
THERE ARE SOME TECHNOLOGY
DEMENTRATIONS THAT WE ARE ALSO

609
00:40:04,256 --> 00:40:05,256
USING TO DEMONSTRATE ISS OR ON
COMPONENTS THAT WILL BE HELPFUL

610
00:40:05,256 --> 00:40:06,256
FOR THE LONGER TERM DEVELOPMENT
OF THE SPACECRAFT.

611

00:40:06,256 --> 00:40:07,256
WHAT WAS QUESTION TWO?
>> THE SECOND QUESTION WAS ABOUT

612
00:40:07,256 --> 00:40:08,256
MATERIAL CHALLENGES.
>> MATERIALS CHALLENGES,

613
00:40:08,256 --> 00:40:09,256
EVERYTHING.
I USUALLY DESCRIBE MY DAY ON THE

614
00:40:09,256 --> 00:40:10,256
INDUSTRY SIDE AS WHACK A MOLE.
THERE IS ALWAYS SOMETHING

615
00:40:10,256 --> 00:40:11,256
POPPING UP.
IT'S WHEN YOU ARE TRYING TO --

616
00:40:11,256 --> 00:40:12,256
YOU ARE TRYING TO USE THE BEST
MATERIALS THAT YOU CAN, THE BEST

617
00:40:12,256 --> 00:40:13,256
TECHNOLOGIES THAT YOU CAN, BUT
YOU ARE ALSO HOLDING SCHEDULE

618
00:40:13,256 --> 00:40:14,256
AND COST AND TRYING TO SEE HOW
ALL OF THESE PIECES COME

619
00:40:14,256 --> 00:40:15,256
TOGETHER.
ADDITIVE MANUFACTURING IS A

620
00:40:15,256 --> 00:40:16,256
GREAT EXAMPLE.
IN A BROAD FORM IT'S NOT WELL

621

00:40:16,256 --> 00:40:17,256
UNDERSTOOD BECAUSE YOU DON'T
HAVE MATERIAL PROPERTIES TESTS

622
00:40:17,256 --> 00:40:18,256
OF SOME OF THOSE END ITEM
MATERIALS.

623
00:40:18,256 --> 00:40:19,256
IF YOU HAVE ACTUALLY PRINTED
ALUMINUM PART OR TITANIUM PART

624
00:40:19,256 --> 00:40:20,256
YOU DON'T HAVE THE YEARS AND
YEARS OF USE OF THAT MATERIAL

625
00:40:20,256 --> 00:40:21,256
THAT TELLS YOU ITS STRENGTH,
ELASTICITY AND ALL OF THE THINGS

626
00:40:21,256 --> 00:40:22,256
THAT OUR DESIGNERS REALLY RELY
ON TO BUILD A SAFE DESIGN.

627
00:40:22,256 --> 00:40:23,256
THAT HAS TO BE DEVELOPED ALONG
THE WAY AS YOU GO ON THE

628
00:40:23,256 --> 00:40:24,256
>> ANY OTHER QUESTIONS?
ON THE PHONE?

629
00:40:24,256 --> 00:40:25,256
NO.
ONE UP FRONT.

630
00:40:25,256 --> 00:40:26,256
GENTLEMAN.
>> I'M A VOLUNTEER NASA SOLAR

631

00:40:26,256 --> 00:40:27,256
SYSTEM AMBASSADOR.
I BLOG AND A MEMBER OF THE

632
00:40:27,256 --> 00:40:28,256
ASTRONOMICAL SOCIETY.
HOW ARE YOU HANDLING THE

633
00:40:28,256 --> 00:40:29,256
RADIATION ENVIRONMENT LIKE
COSMIC RAYS WHEN IT COMES TO

634
00:40:29,256 --> 00:40:30,256
LONG TERM JOURNEYS TO MARS?
>> SEVERAL DIFFERENT FACTORS.

635
00:40:30,256 --> 00:40:31,256
FIRST OF ALL, AND YOU ARE RIGHT,
RADIATION WHEN WE LEAVE THE

636
00:40:31,256 --> 00:40:32,256
PROTECTIVE REGION AROUND THE
EARTH BECOMES MORE CHALLENGING.

637
00:40:32,256 --> 00:40:33,256
SO ALL OF OUR COMPONENTS HAVE TO
BE RADIATION HARDENED.

638
00:40:33,256 --> 00:40:34,256
WE HAVE TO TAKE CARE OF THE
CREW.

639
00:40:34,256 --> 00:40:35,256
ONE OF THE SPECIAL FEATURES TO
TAKE CARE OF THE HUMAN BEINGS,

640
00:40:35,256 --> 00:40:36,256
ONE OF THE SPECIAL FEATURES WE
ARE BUILDING INTO ORION IS

641

00:40:36,256 --> 00:40:37,256
BUILDING PLACES THAT CAN PROTECT
THE ASTRONAUTS, CREW FROM

642
00:40:37,256 --> 00:40:38,256
RADIATION SHOULD WE HAVE A SOLAR
FLARE OR SOMETHING LIKE THAT.

643
00:40:38,256 --> 00:40:39,256
WE DO IT SINCE MASS AND WEIGHT
IS SO IMPORTANT WE CAN'T BUILD

644
00:40:39,256 --> 00:40:40,256
UNIQUE STRUCTURES.
WE DESIGN THE LAYOUT TO PROVIDE

645
00:40:40,256 --> 00:40:41,256
CERTAIN AREAS WHERE THE CREW CAN
HIDE FROM THE RADIATION AND

646
00:40:41,256 --> 00:40:42,256
PROTECT THEMSELVES FROM THE
RADIATION.

647
00:40:42,256 --> 00:40:43,256
SO THE HUMAN BEINGS.
>> AND I'M CURIOUS HOW MANY

648
00:40:43,256 --> 00:40:44,256
ENGINEERS PLAY CURBAL SPACE
PROGRAMS?

649
00:40:44,256 --> 00:40:45,256
>> I HAVE HEARD IT DESCRIBED SO
I CAN SAY MORE THAN ZERO.

650
00:40:45,256 --> 00:40:46,256
DO I UNDERSTAND IT?
NOT A CLUE.

651

00:40:46,256 --> 00:40:47,256
ANY OTHER QUESTIONS?
THEN THIS CONCLUDES THE QUESTION

652
00:40:47,256 --> 00:40:48,256
AND ANSWER PORTION OF OUR
PROGRAM.

653
00:40:48,256 --> 00:40:49,256
I WOULD LIKE TO THANK OUR PANEL
MEMBERS FOR JOINING US TODAY AND

654
00:40:49,256 --> 00:40:50,256
TO TRAVEL MEMBER MILES AND I
THINK A ROUPD OF APPLAUSE IS IN

655
00:40:50,256 --> 00:40:51,256
ORDER FOR THEM.
[ APPLAUSE ]

656
00:40:51,256 --> 00:40:52,256
OUR PANEL MEMBERS WILL DEPART
THE STAGE AND WILL BE AVAILABLE

657
00:40:52,256 --> 00:40:53,256
FOR A BRIEF PERIOD OF TIME FOR
ADDITIONAL QUESTIONS AND ANSWERS

658
00:40:53,256 --> 00:40:54,256
OVER BY THE NASA MEAT BALL ON
THE WALL.

659
00:40:54,256 --> 00:40:55,256
AND FOR THOSE MEMBERS OF THE
AUDIENCE WHO ARE INTERESTED IN

660
00:40:55,256 --> 00:40:56,256
TOURING THE SPACE POWER FACILITY
IF YOU CAN PROCEED DOWN THE

661

00:40:56,256 --> 00:40:57,256
CENTER AISLE YOU WILL BE MET BY
SPACE POWER FACILITY PERSONNEL

662
00:40:57,256 --> 00:40:58,256
WHO BEGIN YOUR TOURS.
AND THAT CONCLUDES OUR PROGRAM.