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1
00:00:04,420 --> 00:00:10,710
>>> GOOD AFTERNOON.
I'M DWAYNE BROWN FROM NASA'S

2
00:00:10,710 --> 00:00:21,180
OFFICE OF COMMUNICATIONS.
THE RESEARCH TEAM HAS BEGUN

3
00:00:21,180 --> 00:00:25,940
SHARING THE UNPRECEDENTED IMAGES
AND SCIENCE FINDINGS WITH THE

4
00:00:25,940 --> 00:00:28,810
WORLD.
AND TODAY THEY HAVE MORE.

5
00:00:28,810 --> 00:00:32,529
LADIES AND GENTLEMEN, THIS
MISSION HAS CLEARLY BEEN

6
00:00:32,529 --> 00:00:36,370
EMBRACED BY THE ENTIRE WORLD OF
ALL AGES.

7
00:00:36,370 --> 00:00:39,920
IN FACT THE NUMBERS THAT ARE
COMING IN WITH MULTIMEDIA,

8
00:00:39,920 --> 00:00:48,799
SOCIAL MEDIA, THE INTERNET,
RADIO, TV IS IN THE BILLIONS.

9
00:00:48,799 --> 00:00:51,440
WE ALSO WANT TO GAVE NASA
HEADQUARTERS SHOUT OUT TO THE

10
00:00:51,440 --> 00:00:56,119
JOHNS HOPKINS PLATFORM IN LOWER
MARYLAND FOR THE UNFORGETTABLE

11
00:00:56,119 --> 00:01:00,119
MOMENTS AT THEIR FACILITY THIS
WEEK.

12
00:01:00,119 --> 00:01:03,210
AND NOW WE'VE TRANSFERRED HERE
TO NASA WHERE THE FUTURE

13
00:01:03,210 --> 00:01:08,369
MEETINGS WILL BE HERE.
WE'LL HAVE A BRIEF PRESENTATION

14
00:01:08,369 --> 00:01:13,539
AND OPEN IT UP FOR QUESTIONS
STARTING HERE, ON NASA CENTERS,

15
00:01:13,539 --> 00:01:17,920
SOCIAL MEDIA, IN THE PHONE
LINES.

16
00:01:17,920 --> 00:01:24,289
SOCIAL MEDIA IS ABSOLUTELY
EXPLODING THE MISSION.

17
00:01:24,289 --> 00:01:29,299
#PLUTO FLY BY.
TWITTER, FACEBOOK, YOUTUBE AND

18
00:01:29,299 --> 00:01:33,109
OTHER NASA ACCOUNTS.
AND IF YOU HAVE QUESTIONS SEND

19
00:01:33,109 --> 00:01:38,289
THEM IN†#ASK NASA.
AND CERTAINLY ALL THE

20
00:01:38,289 --> 00:01:41,780
INFORMATION YOU HAVE BEEN
HEARING WILL HEAR TODAY AND IN

21
00:01:41,780 --> 00:01:46,729
THE WEEKS AND MONTHS WILL BE
ONLINE AT WWW.NASA.GOV/NEW

22
00:01:46,729 --> 00:01:51,340
HORIZONS.
LET ME INTRODUCE YOU.

23
00:01:51,340 --> 00:01:57,039
FIRST UP JIM GREEN DIRECTOR OF
PLANETARY SCIENCE DIVISION IN

24
00:01:57,039 --> 00:02:04,389
NASA HEADQUARTERS.
ALLEN STERN, NEW HORIZONS

25
00:02:04,389 --> 00:02:08,390
PRINCIPLE INVESTIGATOR TO
SOUTHWEST RESEARCH INSTITUTE IN

26
00:02:08,390 --> 00:02:16,540
BOULDER, COLORADO.
RANDY GLADSTONE, NEW HORIZONS

27
00:02:16,540 --> 00:02:21,569
CORE INVESTIGATOR AT SOUTHWEST
RESEARCH INSTITUTE IN SAN

28
00:02:21,569 --> 00:02:28,650
ANTONIO.
FRAN BAGINAUGH NEW HORIZONS

29
00:02:28,650 --> 00:02:41,379
CURRENT INVESTIGATOR AT
UNIVERSITY OF COLORADO, BOULDER.

30
00:02:41,379 --> 00:02:46,540
WITH THAT TURN IT OVER TO YOU
DR. GREEN TO KICK US OFF.

31
00:02:46,540 --> 00:02:48,659
>> TODAY WE'RE GOING TO TALK
ABOUT SOME OF THE FANTASTIC

32
00:02:48,659 --> 00:02:52,640
DISCOVERIES ABOUT THE HEART OF
PLUTO.

33
00:02:52,640 --> 00:02:55,670
BEFORE WE START THAT WHETHER I'D
LIKE TO DO IS REALLY TALK ABOUT

34
00:02:55,670 --> 00:03:01,730
A LITTLE BIT THE HEART OF THE
NEW HORIZON MISSION.

35
00:03:01,730 --> 00:03:06,720
FIRST I WANT TO THANK NPL AND
SWERI IN PARTICULAR FOR ALL THE

36
00:03:06,720 --> 00:03:09,470
WORK THEY HAVE DONE TO MAKE THIS
HAPPEN.

37
00:03:09,470 --> 00:03:15,400
THERE IS A WHOLE SERIES OF
CONTRACTORS THAT HAVE MADE THE

38
00:03:15,400 --> 00:03:19,260
MISSION A SPECTACULAR SUCCESS
THAT IT IS.

39
00:03:19,260 --> 00:03:24,829
APL HOSTING A FABULOUS EVENT
THIS WEEK THAT MANY ATTENDED

40
00:03:24,829 --> 00:03:30,140
PERSONALLY, BUT MILLIONS
ATTENDED VIRTUALLY.

41
00:03:30,140 --> 00:03:32,890
WHICH HAS BEEN REALLY
CAPTIVATING.

42
00:03:32,890 --> 00:03:38,569
WHAT A HISTORIC WEEK.
IN PARTICULAR THE HEART OF NEW

43
00:03:38,569 --> 00:03:42,790
HORIZONS IS BEATING AND BEATING
WELL AND BEATING STILL.

44
00:03:42,790 --> 00:03:46,120
WAS PUT ON AND PRODUCED BY THE
DEPARTMENT OF ENERGY, ONE OF OUR

45
00:03:46,120 --> 00:03:50,969
MAJOR GOVERNMENT PARTNERS AND
WITH HIS RADIOISOTOPE POWER

46
00:03:50,969 --> 00:03:54,450
ENABLES US TO MOVE FURTHER OUT
INTO THE SOLAR SYSTEM.

47
00:03:54,450 --> 00:03:58,260
AND IT IS ON A TRAJECTORY TO
LEAVE.

48
00:03:58,260 --> 00:04:02,890
CURRENTLY IT IS IF I CAN HAVE
OUR FIRST GRAPHIC.

49
00:04:02,890 --> 00:04:08,269
HERE WE SEE NEW HORIZONS PASS
PLUTO.

50
00:04:08,269 --> 00:04:11,510
THIS IS THROUGH THE EYES ON
SOLAR SYSTEM THAT YOU CAN GET

51
00:04:11,510 --> 00:04:15,140
ACCESS TO THROUGH THE WEB.
AND AS YOU CAN SEE IT IS MORE

52
00:04:15,140 --> 00:04:19,519
THAN 2 MILLION MILES AWAY FROM
PLUTO.

53
00:04:19,519 --> 00:04:23,070
FOR TEN YEARS OR NEARLY TEN
YEARS THE NEW HORIZON TEAM WERE

54
00:04:23,070 --> 00:04:26,010
ALWAYS TALKING ABOUT EACH DAY
WE'RE CLOSER TO PLUTO.

55
00:04:26,010 --> 00:04:29,920
NOW EACH DAY WE'RE FURTHER AWAY.
BUT HERE IS WHERE IT COMES IN

56
00:04:29,920 --> 00:04:34,050
THAT IS IMPORTANT TO REMEMBER.
AND THAT IS, IT'S DURING THIS

57
00:04:34,050 --> 00:04:38,100
TIME THAT WE'RE GOING TO BE ABLE
TO OBTAIN THE DATA FROM THE

58
00:04:38,100 --> 00:04:41,250
FLYBY.
RIGHT NOW WE'VE ONLY RECEIVED

59
00:04:41,250 --> 00:04:46,340
1-2% OF THAT DATA ON THE GROUND.
BY NEXT WEEK WE'LL HAVE PERHAPS

60
00:04:46,340 --> 00:04:50,730
AS MUCH AS 5 OR 6%.
SO SOME OF THE DISCOVERIES YOU

61
00:04:50,730 --> 00:04:53,920
ARE GOING TO BE HEARING ABOUT
TODAY HAS ONLY BEEN THE TIP OF

62
00:04:53,920 --> 00:04:57,640
THE ICEBERG AND THE FEW PERCENT
WE'VE GOTTEN DOWN SINCE THE

63
00:04:57,640 --> 00:05:01,130
ENENCOUNTER OCCURRED ON TUESDAY
NIGHT.

64
00:05:01,130 --> 00:05:06,390
WITHOUT FURTHER ADO HERE IS
DWAYNE TO INTRODUCE THE NEXT

65
00:05:06,390 --> 00:05:09,940
SPEAKER.
>> AND ALLEN, GO FOR IT.

66
00:05:09,940 --> 00:05:14,540
ALL YOURS.
SOMEONE WHO DOESN'T NEED AN

67
00:05:14,540 --> 00:05:15,970
INTRODUCTION.
>> FANTASTIC.

68
00:05:15,970 --> 00:05:17,620
WELL WE'RE REALLY HAPPY TO BE
HERE.

69
00:05:17,620 --> 00:05:24,160
AND ON BEHALF OUR OUR ENTIRE
TEAM WE'VE HAD THE MOST FUN

70
00:05:24,160 --> 00:05:27,980
COMMUNICATING ABOUT EXPLORATION
AND ABOUT JUST HOW EXCITING

71
00:05:27,980 --> 00:05:31,030
SOLAR SYSTEM EXPLORATION IS THIS
WEEK.

72
00:05:31,030 --> 00:05:33,470
BUT I THIS PLUTO IS BECOMING
SORT OF A BRAND.

73
00:05:33,470 --> 00:05:36,980
SORT OF SELLS ITSELF.
AND YOU DON'T REALLY HAVE TO

74
00:05:36,980 --> 00:05:40,920
WORK ALL THAT HARD.
I DO WANT TO RECOGNIZE THE TEAM

75
00:05:40,920 --> 00:05:43,050
MEMBERS WHO ARE HERE.
WE HAVE QUITE A NUMBER OF

76
00:05:43,050 --> 00:05:46,090
MEMBERS OF THE NEW HORIZONS
MISSION TEAM, IF THEY WOULD

77
00:05:46,090 --> 00:05:51,400
STAND UP TO BE RECOGNIZED.
[APPLAUSE]

78
00:05:51,400 --> 00:06:01,780
THANK YOU VERY MUCH.
WE ALSO HAVE AND I'D LIKE TO

79
00:06:01,780 --> 00:06:06,870
RECOGNIZE NEW SOME HORIZONS
MISSION EDUCATORS WHO ARE IN THE

80
00:06:06,870 --> 00:06:08,370
AUDIENCE.
IF YOU WOULD STAND UP TO BE

81
00:06:08,370 --> 00:06:17,220
RECOGNIZED.
[APPLAUSE]

82
00:06:17,220 --> 00:06:20,580
AND THEN FINALLY, FINALLY I'D
LIKE TO RECOGNIZE ONE OF OUR

83
00:06:20,580 --> 00:06:24,070
SCIENCE TEAM COLLABORATORS WHO'S
COME OVER FROM EUROPE TO HELP US

84
00:06:24,070 --> 00:06:28,220
WORK WITH THE DATA A LITTLE BIT.
SOME OF YOU MAY KNOW DR. BRIAN

85
00:06:28,220 --> 00:06:39,170
MAY.
[APPLAUSE]

86
00:06:39,170 --> 00:06:46,720
>> I'M THE GUY†-- I'M ONE OF
THOSE PEOPLE IN EUROPE WHO'S

87
00:06:46,720 --> 00:06:52,250
BEEN FOLLOWING YOUR EVERY MOVE
ON OUR LAPTOPS AND TVS AND IN

88
00:06:52,250 --> 00:06:55,110
OUR OFFICES AND IN OUR BEDROOMS.
IT IS A THRILL TO BE HERE WITH

89
00:06:55,110 --> 00:06:56,950
YOU AND WHETHER AN AMAZING
ACHIEVEMENT.

90
00:06:56,950 --> 00:07:01,330
YOU HAVE INSPIRED THE WORLD.
THANK YOU.

91
00:07:01,330 --> 00:07:04,890
>> THANK YOU.
[APPLAUSE]

92
00:07:04,890 --> 00:07:10,160
WELL, WHILE YOU ENJOY THIS
BEAUTIFUL EYE CANDY, THE PLUTO

93
00:07:10,160 --> 00:07:15,030
SHARING SYSTEM IS REVEALED BY
NEW HORIZONS IN COLOR.

94
00:07:15,030 --> 00:07:19,320
YOU REALLY SEE A BINARY PLANET.
ENJOY THAT VIEW WHILE I TELL YOU

95
00:07:19,320 --> 00:07:21,600
NEWS ABOUT NEW HORIZONS.
THE SPACECRAFT IS DOING VERY

96
00:07:21,600 --> 00:07:24,690
WELL.
WE'RE NOW A LITTLE OVER 2

97
00:07:24,690 --> 00:07:27,590
MILLION MILES ON THE FAR SIDE OF
PLUTO.

98
00:07:27,590 --> 00:07:30,210
SPACECRAFT IS PERFORMING
ACCORDING TO PLAN.

99
00:07:30,210 --> 00:07:34,480
WE EXITED THE 9 DAY POST
APPROACH AND COUNTER LOAD JUST

100
00:07:34,480 --> 00:07:37,580
YESTERDAY.
WE ARE NOW IN THE DEPARTURE

101
00:07:37,580 --> 00:07:42,250
SCIENCE LOAD.
LOOKING AT THE BACK OF THE

102
00:07:42,250 --> 00:07:45,030
PLANET AND LOOKING AT THE NIGHT
SIDE AND DOING VARIOUS

103
00:07:45,030 --> 00:07:50,180
EXPERIMENTS AND ALSO DOING OUR
DOWN DOWN LINKING DATA.

104
00:07:50,180 --> 00:07:53,310
AND WE'VE BEEN DOWNLOADING A LOT
OF DATA.

105
00:07:53,310 --> 00:07:56,820
SO WE HAVE SOME BIG NEWS AND I
EXPECT WE'LL HAVE MORE BIG NEWS

106
00:07:56,820 --> 00:08:00,150
NEXT FRIDAY WHEN WE'VE
DOWNLOADED EVEN MORE.

107
00:08:00,150 --> 00:08:02,860
I'LL HAVE TO TELL YOU I'M A LIM
LITTLE BIASED.

108
00:08:02,860 --> 00:08:05,770
BUT I THINK THE SOLAR SYSTEM
SAVED THE BEST FOR LAST.

109
00:08:05,770 --> 00:08:11,740
I'M GOING TO SHOW YOU THINGS AND
I'M GOING START WITH THE LITTLE

110
00:08:11,740 --> 00:08:14,310
NEWS AND PASS IT ALONG TO MY
COLLEAGUES.

111
00:08:14,310 --> 00:08:20,350
IF I COULD HAVE THE NEXT TIME
STEP, THE NEXT GRAPHIC.

112
00:08:20,350 --> 00:08:23,530
LET'S SEE IF WE CAN BRING THAT
UP.

113
00:08:23,530 --> 00:08:25,390
THERE IT IS.
OKAY THAT IS NOT VERY MANY

114
00:08:25,390 --> 00:08:27,590
PIXELS ACROSS.
BUT THAT IS PLUTO'S SATELLITE

115
00:08:27,590 --> 00:08:36,560
NIX IN HIS FIRST IMAGE.
AS LITTLE AS THREE MONTHS AGO WE

116
00:08:36,560 --> 00:08:40,269
DIDN'T HAVE PICTURES OF PLUTO
THIS GOOD.

117
00:08:40,269 --> 00:08:43,409
AND THIS IS ACTUALLY ABOUT TWICE
AS MANY PIXELS AS THE BETH

118
00:08:43,409 --> 00:08:48,290
EARTH-BASED VIEWS OF PLUTO.
WE WERE ABLE TO DETERMINE NIX'S

119
00:08:48,290 --> 00:08:50,800
SIZE.
ABOUT 25 MILES ACROSS.

120
00:08:50,800 --> 00:08:56,730
WE WERE ABLE TO MEASURE THE
BRIGHTNESS BETWEEN SHARON AND

121
00:08:56,730 --> 00:08:58,879
PLUTO.
IN THIS VIEW WE BELIEVE WE'RE

122
00:08:58,879 --> 00:09:04,019
LOOKING DOWN THE POLL OF AN
ELONGATED OBJECT.

123
00:09:04,019 --> 00:09:09,860
ABOUT TWICE AS NARROW IN ONE
DIRECTION AS IT IS LONG.

124
00:09:09,860 --> 00:09:13,699
AND WE'RE LOOKING DOWN THE
BARREL OF IT RIGHT THERE.

125
00:09:13,699 --> 00:09:16,639
WE'LL HAVE MORE TO SAY ABOUT NIX
WHEN WE GET MORE ON THE GROUND

126
00:09:16,639 --> 00:09:23,379
BUT A FASCINATING SATELLITE.
MOVE TO THE NEXT TIME STEP.

127
00:09:23,379 --> 00:09:30,439
THIS IS OVERLAY OF DATA FROM THE
RALPH INSTRUMENT.

128
00:09:30,439 --> 00:09:33,810
FOR THE FIRST TIME IDENTIFIES
THE LOCATION OF A CARBON

129
00:09:33,810 --> 00:09:37,509
MONOXIDE RICH REGION ON PLUTO
THAT HAD BEEN OBSERVED FROM

130
00:09:37,509 --> 00:09:41,180
EARTH FOR QUITE A LONG TIME.
NOW WE CAN ACTUALLY OVERLAY ON A

131
00:09:41,180 --> 00:09:44,790
MAP.
NEW HORIZONS MAP PRODUCT THERE,

132
00:09:44,790 --> 00:09:47,889
OVERLAYED WITH CONTOURS FOR
ABUNDANCE OF THIS CARBON

133
00:09:47,889 --> 00:09:50,819
MONOXIDE.
AND YOU CAN SEE THE PEAK IS ON

134
00:09:50,819 --> 00:10:04,329
THE WEST SIDE OF TOMBO REGIO, OR
THE HEART.

135
00:10:04,329 --> 00:10:06,800
IT COULD BE THERE IS A SOURCE
REGION THERE AND WE'LL BE

136
00:10:06,800 --> 00:10:10,079
LOOKING FOR IT HARD IN HIGH
RESOLUTION IMAGERY.

137
00:10:10,079 --> 00:10:11,550
OR THERE COULD BE ANOTHER
REVELATION.

138
00:10:11,550 --> 00:10:15,420
BUT EITHER WAY IT CATCH OURS EYE
BECAUSE ACROSS THE REST OF THIS

139
00:10:15,420 --> 00:10:20,490
DISC THERE IS NO OTHER CARBON
MONOXIDE CONCENTRATION, ANYTHING

140
00:10:20,490 --> 00:10:22,050
LIKE.
THIS WE ALREADY KNOW.

141
00:10:22,050 --> 00:10:25,699
THAT IT IS A VERY SPECIAL PLACE
ON THE PLAN.

142
00:10:25,699 --> 00:10:31,110
RANDY WILL SHOW YOU PROFOUND
RESULTS CONCERNING THE

143
00:10:31,110 --> 00:10:33,269
ATMOSPHERE.
IN FACT THE FIRST RESULTS WE'LL

144
00:10:33,269 --> 00:10:37,610
SHARE AND FRAN WILL SHARE WITH
YOU THE ESCAPING IONS FROM

145
00:10:37,610 --> 00:10:43,100
PLUTO.
AND JEFF IS GOING TO TALK ABOUT

146
00:10:43,100 --> 00:10:45,769
THE HIGH RESOLUTION.
I'M GOING TO GIVE YOU A PREVIEW.

147
00:10:45,769 --> 00:10:49,860
AT THE NEXT GRAPHIC.
HAVE A LOOK AT THE ICY FROZEN

148
00:10:49,860 --> 00:10:53,100
PLAINS OF PLUTO.
WHO WOULD HAVE EXPECTED THIS

149
00:10:53,100 --> 00:10:57,649
KIND OF COMPLEXITY.
AND BY THE WAY THIS SCENE IS

150
00:10:57,649 --> 00:11:02,399
ESSENTIALLY ADJACENT,
NEIGHBORING THE MOUNTAIN RANGES

151
00:11:02,399 --> 00:11:04,910
THAT YOU SAW A COUPLE OF DAYS
AGO.

152
00:11:04,910 --> 00:11:09,050
WE CAN SEE THAT THERE ARE STARK
CONTRASTS ON PLUTO IN TERMS OF

153
00:11:09,050 --> 00:11:11,399
THE GEOLOGY.
JEFF WILL SHOW YOU A LOT MORE.

154
00:11:11,399 --> 00:11:12,980
BUT I WANT TO SHOW YOU SOMETHING
ELSE.

155
00:11:12,980 --> 00:11:18,249
I'M GOING TO SHOW YOU A GRAPHIC.
IT IS A FLYOVER MADE AS IF YOUR

156
00:11:18,249 --> 00:11:21,060
EYE WAS 25 MILES OVER PLUTO.
AND WE CAN GO AHEAD AND START

157
00:11:21,060 --> 00:11:24,189
THAT.
A FLYOVER OF FAR AWAY MOUNTAINS

158
00:11:24,189 --> 00:11:26,860
AND PLAINS IN THE QUAKER BELT.
IF THEY CAN GO AHEAD AND CALL

159
00:11:26,860 --> 00:11:29,930
THAT UP.
I THINK YOU WILL ENJOY SEEING

160
00:11:29,930 --> 00:11:31,509
IT.
IF WE CAN LOWER†-- PROBABLY

161
00:11:31,509 --> 00:11:38,779
CAN'T LOWER HOUSE LIGHTS.
IS THAT AVAILABLE?

162
00:11:38,779 --> 00:11:41,600
WE CAN'T SEE IT BACK HERE.
THERE IT IS.

163
00:11:41,600 --> 00:11:46,459
WHAT YOU ARE LOOKING IS A SCENE
THAT IS ABOUT A TOTAL WIDTH

164
00:11:46,459 --> 00:11:50,189
ABOUT 250 MILES ACROSS, 400
KILOMETERS.

165
00:11:50,189 --> 00:11:55,889
AND THESE MOUNTAINS SOAR AS HIGH
ABOVE THEIR LOCAL TERRAIN AS

166
00:11:55,889 --> 00:11:59,680
MANY OF THE MOUNTAINS IN THE
ROCKY MOUNTAINS DO HERE IN THE

167
00:11:59,680 --> 00:12:01,430
UNITED STATES.
PRETTY IMPRESSIVE.

168
00:12:01,430 --> 00:12:05,139
THE SECOND FLYOVER IS OF THE
PLANE WHICH I JUST SHOWED YOU

169
00:12:05,139 --> 00:12:14,769
WHICH WE'RE CALLING SPUTNIK
PLANEM.

170
00:12:14,769 --> 00:12:18,379
GIVES YOU A FEEL OF THE SCALE OF
FEATURES YOU WERE LOOKING AT.

171
00:12:18,379 --> 00:12:24,309
BEAUTIFUL SURFACES.
THIS IS 400 METER PER PIXEL

172
00:12:24,309 --> 00:12:27,879
IMAGERY.
AND BY NEXT WEEK WE'LL HAVE MORE

173
00:12:27,879 --> 00:12:31,360
THAN TWICE AS MUCH AS THE THREE
FRAMES WE'VE ALREADY BEEN ABLE

174
00:12:31,360 --> 00:12:34,850
TO SHARE BY THE END OF TODAY.
AND WE'LL SHARE THAT WITH YOU AS

175
00:12:34,850 --> 00:12:39,129
WELL.
WITH THAT I'M GOING TURN IT OVER

176
00:12:39,129 --> 00:12:42,199
THE RANDY GLADSTONE.
>> THANKS ALLEN.

177
00:12:42,199 --> 00:12:48,399
IF WE COULD GO TO THE FIRST TIME
STEP.

178
00:12:48,399 --> 00:12:53,839
AND I'LL SHOW YOU WHAT THE
ATMOSPHERE IS LOOKING AT.

179
00:12:53,839 --> 00:12:58,370
WE'VE HAD TO WAIT TILL WE GOT
PAST PLUTO AND LOOKING BACK

180
00:12:58,370 --> 00:13:00,850
TOWARDS THE SUN TO GET OUR BEST
DATA SET.

181
00:13:00,850 --> 00:13:05,499
THIS SHOWS YOU WHAT IT LEASE
LIKE WHEN PLUTO GOES IN FRONT OF

182
00:13:05,499 --> 00:13:08,029
THE SUN AS SEEN FROM THE
SPACECRAFT.

183
00:13:08,029 --> 00:13:14,009
AND THE CURVES ON THE RIGHT SHOW
YOU TWO PLAUSIBLE ATMOSPHERIC

184
00:13:14,009 --> 00:13:18,959
MODELS FOR PLUTO.
AND HERE WE SHOW YOU THE DATA WE

185
00:13:18,959 --> 00:13:22,149
GOT COMING DOWN.
IT IS JUST COUNT RATE DATA.

186
00:13:22,149 --> 00:13:24,459
EACH OF THOSE POINTS IS TEN
SECONDS.

187
00:13:24,459 --> 00:13:28,019
BUT WE GET A†-- FOR EVERY POINT
ON THERE WE'LL GET A WHOLE

188
00:13:28,019 --> 00:13:30,329
SPECTRUM.
AND THEN ON THE WAY OUT IF WE

189
00:13:30,329 --> 00:13:34,189
FLIP IT YOU SEE THE GREEN LINE
GOES BACK EXACTLY THE SAME SPOT.

190
00:13:34,189 --> 00:13:37,339
SO THE ATMOSPHERE IS VERY
SYMMETRIC ON OPPOSITE SIDES OF

191
00:13:37,339 --> 00:13:40,069
THE PLANET.
AND IT SEEMS TO BE MORE

192
00:13:40,069 --> 00:13:43,149
CONSISTENT WITH THE RED LINE
WHICH IS MORE SLUGGISH

193
00:13:43,149 --> 00:13:46,800
ATMOSPHERE OR STAGNANT.
SO WE'VE ALREADY ELIMINATED JUST

194
00:13:46,800 --> 00:13:51,769
FROM THIS LITTLE BIT OF DATA A
GLIMPSE OF THE DATA ELIMINATES A

195
00:13:51,769 --> 00:13:55,550
COUPLE OF MODELS THAT WERE
CONTENDERS UP TILL NOW.

196
00:13:55,550 --> 00:14:00,660
SO THE NEXT SLIDE SHOWS YOU†--
THAT WAS ZOOMED IN AT JUST THE

197
00:14:00,660 --> 00:14:02,930
SURFACE OF PLUTO.
BUT WE SEE THE ATMOSPHERE WAY

198
00:14:02,930 --> 00:14:05,589
FAR OUT.
SO THIS IS HOW OUR COUNT RATE

199
00:14:05,589 --> 00:14:09,290
WENT FROM THE BEGINNING ON THE
LEFT TO THE END IN THE RIGHT IN

200
00:14:09,290 --> 00:14:12,290
THE RED AND WHITE CURVES AND
PLUTO IN THE MIDDLE.

201
00:14:12,290 --> 00:14:15,170
SO WE SEE THE ATMOSPHERE ALL THE
WAY TO THE GROUND.

202
00:14:15,170 --> 00:14:19,550
FROM EARTH THAT INNER CIRCLE
AROUND CLOSE TO PLUTO IS THE

203
00:14:19,550 --> 00:14:22,869
HIGHEST STELLAR OPTICALS FROM
EARTH CAN SEE.

204
00:14:22,869 --> 00:14:29,589
AND THEY CAN'T SEE TO THE
GROUND.

205
00:14:29,589 --> 00:14:33,129
WE SEE FROM THE GROUND OUT TO
1,000 MILES ABOVE THE SURFACE.

206
00:14:33,129 --> 00:14:36,529
SO YOU CAN SEE THIS ISN'T A
STRAIGHT SIMPLE CURVE.

207
00:14:36,529 --> 00:14:39,649
IT DROPS SLOWLY AND THEN PICKS
UP AND THEN HAS ANOTHER BEND

208
00:14:39,649 --> 00:14:43,920
WHERE IT PICKS UP AGAIN.
AT THE HIGHEST ALTITUDES THAT IS

209
00:14:43,920 --> 00:14:46,040
MOLECULAR NITROGEN.
THE MAIN COMPONENT OF PLUTO'S

210
00:14:46,040 --> 00:14:48,930
ATMOSPHERE AS IT STARTS TO
ABSORB SUNLIGHT.

211
00:14:48,930 --> 00:14:54,100
AND LOWER DOWN METHANE KICKS IN.
AND EVEN LOWER IS HEAVIER

212
00:14:54,100 --> 00:14:57,779
HYDROCARBONS NEAR THE SURFACE
ABSORBING THE SUNLIGHT.

213
00:14:57,779 --> 00:15:02,699
SO EACH POINT ON THE GRAPH WILL
BE A WHOLE SPECTRUM OF COLORS IN

214
00:15:02,699 --> 00:15:06,509
THE ULTRAVIOLET LIGHT WE'RE
GETTING THE SIGNAL FROM AND

215
00:15:06,509 --> 00:15:10,540
WE'RE LOOKING FORWARD TO GETTING
THAT DATA IN A MONTH OR TWO.

216
00:15:10,540 --> 00:15:14,449
BUT IT IS VERY TANTALIZING RIGHT
NOW AND IT ALREADY IS WE'RE ABLE

217
00:15:14,449 --> 00:15:19,069
TO DO SCIENCE WITH IT.
BUT THAT NITROGEN ATMOSPHERE

218
00:15:19,069 --> 00:15:21,550
BECAUSE PLUTO IS SO SMALL, IT
ESCAPES DIRECTLY INTO THE SPACE.

219
00:15:21,550 --> 00:15:26,130
AND FRAN IS GOING TELL YOU WHAT
IT DOES.

220
00:15:26,130 --> 00:15:30,589
>> WE'VE HAD NINE AND A HALF
YEARS OF THIS FLIGHT OUT TO

221
00:15:30,589 --> 00:15:33,459
PLUTO TO THINK ABOUT WHAT ARE WE
GOING TO SEE WITH THE PLASMA

222
00:15:33,459 --> 00:15:39,439
INSTRUMENTS.
WE HAVEN'T GOT ALL THE DATA DOWN

223
00:15:39,439 --> 00:15:43,829
OZ F A YET AND WE'RE LOOKING
FORWARD TO GETTING IT DOWN.

224
00:15:43,829 --> 00:15:50,480
IN THE MEANTIME RANDY HAS
DISCUSSED ALREADY WE KNOW THE

225
00:15:50,480 --> 00:15:53,800
ATMOSPHERE IS NITROGEN AND WE
SUSPECT IT IS ESCAPING BECAUSE

226
00:15:53,800 --> 00:16:00,869
OF THE WEAKER GRAVITY ON PLUTO.
THE GRAVITY IS A LOT WEAKER THAN

227
00:16:00,869 --> 00:16:07,420
EARTH AND SO WE KNOW THAT IT'S
GOING AWAY.

228
00:16:07,420 --> 00:16:11,360
WHAT WE THINK IS HAPPENING IS
THAT THE SOLAR WIND THAT COMES

229
00:16:11,360 --> 00:16:17,709
FROM THE SUN, THE PROTONS AND
ELECTRONS RACING AT AT SPEEDS

230
00:16:17,709 --> 00:16:24,329
WILL CRASH INTO AND INTERACT
WITH THIS ESCAPING ATMOSPHERE

231
00:16:24,329 --> 00:16:32,619
AND THIS WILL PRODUCE WE THINK A
SHOCK UPSTREAM.

232
00:16:32,619 --> 00:16:36,899
WE KNOW THERE IS AN UPSTREAM
AMOUNT OF NITROGEN IONS.

233
00:16:36,899 --> 00:16:39,749
WE'VE ALREADY OBSERVED THAT WITH
NEW HORIZONS WITH THE PEPSI

234
00:16:39,749 --> 00:16:42,550
INSTRUMENT.
WELL UPSTREAM.

235
00:16:42,550 --> 00:16:47,110
AND THAT WAS ENERGIZED BY THE
SOLAR WIND AND CARRIED AWAY BY

236
00:16:47,110 --> 00:16:49,939
THE WIND.
THE REAL QUESTION IS WHAT

237
00:16:49,939 --> 00:16:53,949
HAPPENS WHEN IT INTERACTS WITH
THE DENSER SOLAR WIND THAT RANDY

238
00:16:53,949 --> 00:16:59,910
WAS TALKING ABOUT.
AND THIS GRAPHIC YOU ARE LOOKING

239
00:16:59,910 --> 00:17:02,179
AT GIVES YOU A SENSE OF WHAT WE
THINK HAPPENS.

240
00:17:02,179 --> 00:17:07,559
AND IS THAT AS IT ESCAPES IT IS
IONIZED AND PICKED UP BY THE

241
00:17:07,559 --> 00:17:11,860
SOLAR WIND.
AND THE SCIENCE ACTUALLY FILLS

242
00:17:11,860 --> 00:17:15,530
OUT BEYOND THE SCALE OF THE
SATELLITE.

243
00:17:15,530 --> 00:17:21,050
SO IT IS A LARGE VOLUME.
WE HAVE ACTUALLY FLOWN THROUGH

244
00:17:21,050 --> 00:17:27,320
THIS WITH THE INSTRUMENTS.
AND THE NEXT SLIDE WILL SHOW YOU

245
00:17:27,320 --> 00:17:33,590
WE THINK IS HAPPENING IS THAT
SWAP NOW HAS ACTUALLY DETECTED

246
00:17:33,590 --> 00:17:37,320
THE IONIZED ATMOSPHERE.
THESE ARE NITROGEN MOLECULES

247
00:17:37,320 --> 00:17:42,060
THAT ARE BEING IONIZED BY
PHOTONS FROM THE SUN.

248
00:17:42,060 --> 00:17:45,530
AND ONCE THEY ARE IONIZE THEY
GET ENTRAINED IN THE SOLAR WIND

249
00:17:45,530 --> 00:17:52,120
AND CARRIED AWAY.
SO WE SEE A TAIL BEHIND PLUTO OF

250
00:17:52,120 --> 00:17:58,810
PARTICLES THAT ARE BEING CARRIED
AWAY BY THE SOLAR WIND.

251
00:17:58,810 --> 00:18:04,200
WHEN WE GET THE RECORDS BACK IN
AUGUST OR SO WE'LL BE ABLE TO

252
00:18:04,200 --> 00:18:15,390
QUANTIFY THE
AMOUNT OF THAT
ESCAPING ATMOSPHERE.

253
00:18:15,390 --> 00:18:19,700
WHAT WE THINK IT IS BASED ON
MODELS AND A PRETTY GOOD GUESS

254
00:18:19,700 --> 00:18:25,240
IS ABOUT 500 TONS PER HOUR OF
MATERIAL THAT IS BEING†-- THAT

255
00:18:25,240 --> 00:18:31,440
IS ESCAPING.
AND FOR COMPARISON WE KNOW THAT

256
00:18:31,440 --> 00:18:34,850
THE ESCAPING ATMOSPHERE FOR MARS
WHICH IS BEING STUDIED BY NASA'S

257
00:18:34,850 --> 00:18:44,560
MAVEN IS ABOUT 1 TON.
>> WHAT IS THE CONSEQUENCE OF

258
00:18:44,560 --> 00:18:48,500
THAT?
IF YOU ADD THAT UP ROUGHLY OVER

259
00:18:48,500 --> 00:18:55,370
THE AGE OF THE SOLAR SYSTEM,
THIS IS ON THE EQUIVALENT OF 1

260
00:18:55,370 --> 00:18:59,390
TO 9,000 FEET.
SO THAT IS A SUBSTANTIAL

261
00:18:59,390 --> 00:19:03,520
MOUNTAIN OF ICE.
NITROGEN ICE THAT IS BEING

262
00:19:03,520 --> 00:19:07,830
REMOVED FROM THIS EVAPORATION
AND ESCAPE INTO THE ATMOSPHERE.

263
00:19:07,830 --> 00:19:14,630
AND ALLEN STERN HAS WORKED
PREDICTING WHAT THIS WILL DO TO

264
00:19:14,630 --> 00:19:18,250
THE GEOLOGY.
AND THEY HAVE A PREDICTION

265
00:19:18,250 --> 00:19:22,350
PAPER.
BUT JEFF ARE GOING TO LOOK AT

266
00:19:22,350 --> 00:19:24,430
THE GEOLOGY AND TELL US WHAT
ACTUALLY HAPPENED.

267
00:19:24,430 --> 00:19:27,660
>> INDEED WE WILL.
WELL I'M STILL HAVING TO REMIND

268
00:19:27,660 --> 00:19:33,010
MYSELF TO TAKE DEEP BREATHS.
THE LANDSCAPE IS JUST

269
00:19:33,010 --> 00:19:36,570
ASTOUNDINGLY AMAZING.
IN FACT LET'S GO BACK TO THIS

270
00:19:36,570 --> 00:19:40,340
PICTURE THAT WE TALKED ABOUT A
FEW DAYS AGO WHEN IT WAS STILL A

271
00:19:40,340 --> 00:19:43,790
GLOBAL VIEW AND REMIND OURSELVES
THAT THE GLOBAL VIEW SHOWS SOME

272
00:19:43,790 --> 00:19:47,790
SURFACES ARE THE PEPPERED WITH
THE IMPACT CRATERS AND ARE

273
00:19:47,790 --> 00:19:52,490
MILLIONS OF YEARS OLD.
SOME OTHER REGIONS SUCH AS THE

274
00:19:52,490 --> 00:20:00,190
INTERIOR OR THE HEART SHOW NO
CRATERS AT ALL.

275
00:20:00,190 --> 00:20:04,230
AND OBVIOUSLY YOUNGER.
AND ALL OF THIS SHOWS THAT PLUTO

276
00:20:04,230 --> 00:20:16,420
HAS A LONG AND COMPLEX
GEOLOGICAL HISTORY.

277
00:20:16,420 --> 00:20:22,000
SOME OF THE CRATERS APPEAR
PARTIALLY DESTROYED, PERHAPS BY

278
00:20:22,000 --> 00:20:23,900
EROSION.
AND THERE ARE ALSO PARTS OF

279
00:20:23,900 --> 00:20:26,940
PLUTO'S CROSS THAT HAVE BEEN
FRACTURED AND THUS THERE'S

280
00:20:26,940 --> 00:20:36,580
PROBABLY BEEN SOME FORCES OF THE
TECTONICS.

281
00:20:36,580 --> 00:20:40,930
AND ALSO HIGHER RESOLUTION
IMAGES SHOW THERE ARE CRATERS

282
00:20:40,930 --> 00:20:42,870
THAT MAY HAVE BEEN PARTIALLY
ERODED I WAY.

283
00:20:42,870 --> 00:20:46,990
SO EROSION PROCESSES ALSO SEEM
TO BE OPERATING ON PLUTO.

284
00:20:46,990 --> 00:20:54,770
AND THE NEXT TIME STEP, PLEASE.
NEXT SLIDE PLEASE.

285
00:20:54,770 --> 00:20:58,890
SO LET'S ZOOM IN TO OUR THREE
IMAGE MOSAIC OF THE 400 METER

286
00:20:58,890 --> 00:21:00,840
PER PIXEL IMAGING THAT WE'VE
TAKEN.

287
00:21:00,840 --> 00:21:06,180
HERE ARE THE PROVINCES OF THE
TWO MILE HIGH MOUNTAINS WHICH

288
00:21:06,180 --> 00:21:19,140
WE'RE NOW CALLING ENORGEMONTEZ.
AND THE EXTREMELY YOUNG PLAINS

289
00:21:19,140 --> 00:21:24,090
MAKING UP THE NORTHERN HALF OF
THE IMAGE.

290
00:21:24,090 --> 00:21:39,160
THIS IMAGE IS ORGANIZED NORTH
AND SOUTH.

291
00:21:39,160 --> 00:21:43,260
YOU SEE HERE ARE THE NAMES WE'VE
ASSIGNED TO THEM.

292
00:21:43,260 --> 00:21:47,500
WE DECIDED TO NAME SPUTNIK
PLANUM AFTER THE FIRST

293
00:21:47,500 --> 00:21:56,140
ARTIFICIAL SATELLITE LAUNCHED
INTO THE SPACE AND STARTING THE

294
00:21:56,140 --> 00:22:00,900
SPACE AGE.
AND FIRST NEPALESE TO HAVE A

295
00:22:00,900 --> 00:22:06,670
NAME ON ANY PLANET IN THE SOLAR
SYSTEM.

296
00:22:06,670 --> 00:22:09,000
LET'S HAVE THE NEXT TIME STEP,
PLEASE.

297
00:22:09,000 --> 00:22:12,240
LET'S LOOK AT THIS LITTLE REGION
HERE IN THE MIDDLE OF SPUTNIK

298
00:22:12,240 --> 00:22:18,170
PLANEM.
I SAW THIS IMAGE THE FIRST TIME

299
00:22:18,170 --> 00:22:24,590
I DECIDED I WAS GOING TO CALL IT
NOT EASY TO EXPLAIN TERRAIN.

300
00:22:24,590 --> 00:22:28,800
THIS IS THE FROZEN PLAINS OF
PLUTO.

301
00:22:28,800 --> 00:22:37,950
WHEN YOU LOOK AT THIS PLAINS,
YOU CAN CLEARLY SEE VAST COLLATE

302
00:22:37,950 --> 00:22:49,590
†-- CRATERLESS PLAINS.
JUDGING FROM THE ABSENCE OF

303
00:22:49,590 --> 00:22:53,450
CRATERS IT IS CLEAR THAT SPUTNIK
PLANUM COULDN'T BOEBL POSSIBLY

304
00:22:53,450 --> 00:23:00,830
MORE THAN A HUNDRED YEARS OLD.
AND STILL BE SHAPED BY TECTONIC

305
00:23:00,830 --> 00:23:08,970
PROCESSES.
THIS
IS ABOUT A HALF A MILE

306
00:23:08,970 --> 00:23:17,070
ACROSS.
NEXT SLIDE PLEASE.

307
00:23:17,070 --> 00:23:24,140
THE SURFACE IS BROKEN INTO THE
POLYGONALLY SHAPED SEGMENTS.

308
00:23:24,140 --> 00:23:27,760
THAT ARE ROUGHLY 12-20 MILES
ACROSS.

309
00:23:27,760 --> 00:23:32,800
THEY ARE BORDERED AS YOU CAN SEE
BY APPEAR TO BE SHALLOW TROUGHS.

310
00:23:32,800 --> 00:23:37,820
SOME OF THESE TROUGHS HAVE

DARKER MATERIAL THAT SEEMS TO BE

311
00:23:37,820 --> 00:23:41,140
IN MATERIAL THAT'S COLLECTED
THERE OR ERUPTED THERE.

312
00:23:41,140 --> 00:23:44,690
I DON'T KNOW.
BUT SOME OF THE TROUGHS DO HAVE

313
00:23:44,690 --> 00:23:49,240
WHAT APPEARS TO BE JUST DARK
STUFF.

314
00:23:49,240 --> 00:23:52,890
MUCH MORE ENIGMATIC ARE THESE
CLUSTERS OF HILLS WHICH I THINK

315
00:23:52,890 --> 00:23:55,840
YOU CAN SEE IN THE UPPER RIGHT
OF THE FRAME.

316
00:23:55,840 --> 00:24:00,990
THEY APPEAR TO BE ELONGATED
LUMPS OF MOUNDS AND TRACE OUT

317
00:24:00,990 --> 00:24:05,740
THE SHAPES OF THE TROUGHS THAT
ENCIRCLE THE POLYGONS.

318
00:24:05,740 --> 00:24:08,020
ABOUT THE ONLY THING YOU CAN SAY
FOR THE HILLS EXCEPT FOR THEIR

319
00:24:08,020 --> 00:24:14,700
SMOOTHNESS IS THAT THE HILLS ARE
HIGHER THAN THE SURROUNDING

320
00:24:14,700 --> 00:24:15,850
TERRAIN.

WE DON'T HAVE A VALUE FOR THAT

321
00:24:15,850 --> 00:24:20,210
YET BUT THIS IS PART OF A BIGGER
SEQUENCE WE TOOK.

322
00:24:20,210 --> 00:24:22,500
SO WHEN WE GET THE DATA DOWN WE
CAN TELL YOU EXACTLY HOW HIGH

323
00:24:22,500 --> 00:24:25,520
AND EXACTLY HOW THEY ARE SHAPED
WHICH WILL GO A LONG WAY TO IN

324
00:24:25,520 --> 00:24:31,520
FACT HELP US INTERPRET WHAT
CREATED THESE HILLS.

325
00:24:31,520 --> 00:24:36,740
WE HAVE†-- WE SUSPECT THE HILLS
MAY HAVE EITHER BEEN PUSHED UP

326
00:24:36,740 --> 00:24:38,680
FROM UNDERNEATH ALONG THE
CRACKS.

327
00:24:38,680 --> 00:24:44,120
BUT ALTERNATIVELY ANOTHER
EXPLANATION IS THEY ARE EROSION

328
00:24:44,120 --> 00:24:52,350
RESISTANT NOBS STANDING OUT AS
THE SURFACE IS BEING LOWERED.

329
00:24:52,350 --> 00:24:54,970
WE DON'T KNOW WHICH IS CORRECT
BUT THEY CAN GO EITHER WAY.

330
00:24:54,970 --> 00:25:00,620
THEY CAN EITHER BE POPPING UP OR

EMERGING FROM EROSION LOWERING

331
00:25:00,620 --> 00:25:03,970
PROCESS THAT IS LOWERING THE
ENTIRE PLAINS.

332
00:25:03,970 --> 00:25:07,310
IN THE TERRAIN IN THE LOWER
RIGHT I THINK YOU CAN SEE THERE

333
00:25:07,310 --> 00:25:21,580
ARE POLYGONS APPEAR TO BE ETCHED
BY FIELDS OF SMALL PITS.

334
00:25:21,580 --> 00:25:24,440
WE'LL VERY SOON RECEIVE THE SAME
IMAGES WITHOUT ANY COMPRESSION.

335
00:25:24,440 --> 00:25:31,790
AND I THINK THE ISSUE OF WHETHER
THAT IS INDEED VAST SCENES OF

336
00:25:31,790 --> 00:25:38,640
PITS WILL BE VERIFIED PROBABLY
PRETTY STRAIGHTFORWARD WAY.

337
00:25:38,640 --> 00:25:41,850
SIMILAR FEATURES TO THESE VAST
PITTED SURFACES CAN BE SEEN, FOR

338
00:25:41,850 --> 00:25:46,360
INSTANCE, ON THE SURFACES OF
GLACIERS HERE ON THE EARTH.

339
00:25:46,360 --> 00:26:07,990
AND ON RESTIAL†-- TERRESTRIAL.
>> WHAT DO THESE FEATURES TELL

340
00:26:07,990 --> 00:26:14,500
US?

ONE IS THAT THE POLYGONS ARE

341
00:26:14,500 --> 00:26:17,370
SIGNS OF CONVECTION OCCURRING
WITHIN A SURFACE LAYER OF THE

342
00:26:17,370 --> 00:26:21,560
CARBON MONOXIDE METHANE AND
NITROGEN IONS DRIVEN FROM THE

343
00:26:21,560 --> 00:26:25,020
INTERIOR OF PLUTO ITSELF
CREATING KIND OF THE SAME SORT

344
00:26:25,020 --> 00:26:28,770
OF PATTERNS YOU SEE WHEN YOU
LOOK AT THE SURFACE OF A BOILING

345
00:26:28,770 --> 00:26:32,860
POT OF OATMEAL OR LIKE THE BLOBS
IN A LAVA LAMP.

346
00:26:32,860 --> 00:26:37,380
ALTERNATIVELY THEY COULD BE
ANALOGOUS TO MUD CRACKS AND

347
00:26:37,380 --> 00:26:40,770
CREATED BY CONTRACTION OF THE
SURFACE MATERIALS.

348
00:26:40,770 --> 00:26:44,830
WE HAVE WAYS TO TEST THOSE IDEAS
AND WILL BE REPORTING IN

349
00:26:44,830 --> 00:26:49,530
UPCOMING CONFERENCES AND
SCIENTIFIC PAPERS.

350
00:26:49,530 --> 00:26:53,860
AND WE'LL LEARN MORE ABOUT THESE

FEATURES AND TERRAIN IN MUCH

351
00:26:53,860 --> 00:26:56,800
HIGHER RESOLUTION AND
STEREOCOVERAGE WHICH IS STILL UP

352
00:26:56,800 --> 00:27:01,330
ON THE SPACECRAFT IS GOING TO
COME DOWN IN THE NEXT FEW MONTHS

353
00:27:01,330 --> 00:27:04,340
AND IN FACT I THINK 20 YEARS AGO
PEOPLE ARE GOING TO LOOK AT THE

354
00:27:04,340 --> 00:27:11,050
FOOTAGE OF THE THIS AREA IN
PARTICULAR.

355
00:27:11,050 --> 00:27:18,080
IT JUST WORKED OUT THAT WAY
THAT, YOU KNOW, THE FACETS FAVOR

356
00:27:18,080 --> 00:27:21,550
US TO PUT THE MOST INTERESTING
PLACES DIRECTORY IN THE SIGHTS

357
00:27:21,550 --> 00:27:25,180
OF YOU ARE A HIGHEST QUALITY
DATA.

358
00:27:25,180 --> 00:27:34,860
TO BE MORE SPECULATIVE WE ALSO
SAW ONE OTHER THING.

359
00:27:34,860 --> 00:27:37,400
LET'S ZOOM INTO THIS AREA THAT
IS JUST NORTHWEST OF THE ONE YOU

360
00:27:37,400 --> 00:27:42,150
JUST LOOKED AT.

THERE YOU GO.

361
00:27:42,150 --> 00:27:46,010
SO THESE DARK SMUDGES APPEAR TO
BE ALIGNED AND RUNNING FROM

362
00:27:46,010 --> 00:27:48,840
UPPER LEFT TO LOWER RIGHT.
AND MAY HAVE BEEN PRODUCED BY

363
00:27:48,840 --> 00:27:52,470
WINDS BLOWING ACROSS PLUTO'S ICY
SURFACE.

364
00:27:52,470 --> 00:27:55,450
MAY I HAVE THE NEXT SLIDE
PLEASE.

365
00:27:55,450 --> 00:28:00,310
AND SO ON BOTH MARS AND EARTH
SIMILAR FEATURES ARE WHAT

366
00:28:00,310 --> 00:28:05,100
SCIENTISTS CALL WIND STREAKS AND
ARE PREVAILING CAUSE EROSION OR

367
00:28:05,100 --> 00:28:11,210
DEPOSITION MATERIAL BEHIND THE
TOPOGRAPHIC OBSTACLES.

368
00:28:11,210 --> 00:28:13,580
AND DON'T ASK WHAT THE
TOPOGRAPHIC OBSTACLES ARE

369
00:28:13,580 --> 00:28:19,550
BECAUSE WE CAN'T TELL YOU YET.
AND ALTERNATIVELY THIS IS EVEN

370
00:28:19,550 --> 00:28:27,390
MORE SPECULATIVE THEY MAY BE

PLUME DEPOSITS.

371
00:28:27,390 --> 00:28:30,910
THE PLUMES THEMSELVES F THEY
EXIST ON PLUTO HAVE NOT BEEN

372
00:28:30,910 --> 00:28:32,660
SPOTTED YET.
SO THIS IS NOT AN ANNOUNCEMENT

373
00:28:32,660 --> 00:28:36,090
THAT WE'VE SPOTTED PLUMES OR
GEYSERS OR ANYTHING LIKE ON

374
00:28:36,090 --> 00:28:43,630
PLUTO BUT OF COURSE WE'LL BE
LOOKING FOR THEM.

375
00:28:43,630 --> 00:28:46,570
LET ME CONCLUDE BY SAYING THESE
ARE EARLY DAYS OF THE POST

376
00:28:46,570 --> 00:28:49,330
ENCOUNTER ANALYSIS AND AS
EXTRAORDINARY AND PROVOCATIVE AS

377
00:28:49,330 --> 00:28:53,480
THESE IMAGES ARE, WE ARE IN THE
MOST PRELIMINARY STAGES OF

378
00:28:53,480 --> 00:28:58,190
INVESTIGATIONS AND WE'RE STILL
ENTERTAINING THE WIDEST RANGE OF

379
00:28:58,190 --> 00:29:00,890
HYPOTHESES.
WE ARE ACUTELY AWARE THAT

380
00:29:00,890 --> 00:29:03,730
JUMPING TO CONCLUSIONS COMES AT

GREAT PERIL.

381
00:29:03,730 --> 00:29:08,740
WITH THAT CAVEAT BACK TO DWAYNE.
>> THANK YOU ALL.

382
00:29:08,740 --> 00:29:16,340
LET'S GIVE THIS TEAM A ROUND OF
APPLAUSE.

383
00:29:16,340 --> 00:29:24,270
[APPLAUSE]
>> MUCH MUCH MORE TO COME.

384
00:29:24,270 --> 00:29:27,320
NOW WE TRANSITION INTO THE Q AND
A.

385
00:29:27,320 --> 00:29:30,490
WE'RE GOING TO START HERE WITH
NASA HEADQUARTERS AND THE

386
00:29:30,490 --> 00:29:36,890
MEETING AND AUDIENCE AND THEN
ANY QUESTIONS FROM PHONE BRIDGE

387
00:29:36,890 --> 00:29:40,560
AND OF COURSE SOCIAL MEDIA.
WAIT FOR THE MIC.

388
00:29:40,560 --> 00:29:46,340
RAISE YOUR HAND.
AND GIVE YOUR NAME AND

389
00:29:46,340 --> 00:29:50,700
AFFILIATION, PLEASE.
>> STEVEN YOUNG WITH ASTRONOMY

390
00:29:50,700 --> 00:29:54,140
NOW MAGAZINES.

WE HEARD HOW THIS IS JUST THE

391
00:29:54,140 --> 00:29:58,310
TIP OF THE ICEBERG AND ALSO IN
THE IMAGES, YOU CAN SEE THEY ARE

392
00:29:58,310 --> 00:30:01,440
COMPRESSED.
CAN YOU QUALIFY HOW MUCH YOU

393
00:30:01,440 --> 00:30:04,910
HAVE ON THE GROUND RIGHT NOW
VERSUS HOW MUCH SON THE

394
00:30:04,910 --> 00:30:07,910
SPACECRAFT WAITING TO COME DOWN
AND WHAT IS THE DIFFERENCE GOING

395
00:30:07,910 --> 00:30:15,630
TO BE WHEN WE SEE THE
UNCOMPRESSED VERSION.

396
00:30:15,630 --> 00:30:20,530
>> IN VERY ROUND NUMBERS WE HAVE
ABOUT 50 GIG BITS OF DATA THAT

397
00:30:20,530 --> 00:30:23,220
WAS MADE IN THE BEGINNING ABOUT
TEN DAYS BEFORE CLOSEST

398
00:30:23,220 --> 00:30:27,630
APPROACH.
AND THAT 50 GIGA BITS IS THE

399
00:30:27,630 --> 00:30:33,080
FULL AMOUNT WE'LL STORE THROUGH
THE END OF THIS MONTH.

400
00:30:33,080 --> 00:30:37,220
INCLUDING THAT WHICH WE HAVEN'T

YET TAKEN.

401
00:30:37,220 --> 00:30:41,890
ALL THAT WILL COME TO THE GROUND
WITH LESS COMPRESSION.

402
00:30:41,890 --> 00:30:45,230
ABOUT 2 TO 1 COMPRESSION, IT
DOESN'T INTRODUCE ANY SORT OF

403
00:30:45,230 --> 00:30:49,320
NOISE.
BUT THE OTHER COMPRESSION CAN

404
00:30:49,320 --> 00:30:56,190
GET IMAGES TO THE GROUND WITH
EXPENSE OF SOME NOISE.

405
00:30:56,190 --> 00:31:01,780
VERY EFFICIENT AT THE BEGINNING
TO SEND HOME THE BROWSE DATA

406
00:31:01,780 --> 00:31:04,500
SET, AS WE CALL IT.
CONCERTED EFFORT TO GET

407
00:31:04,500 --> 00:31:08,570
EVERYTHING TO THE GROUND THAT
CAN BE COMPRESSED WILL BEGIN IN

408
00:31:08,570 --> 00:31:10,880
SEPTEMBER.
AND THAT WILL TAKE ABOUT 10

409
00:31:10,880 --> 00:31:14,250
WEEKS, MAYBE 12.
DEPENDING UPON DSN SCHEDULES AND

410
00:31:14,250 --> 00:31:18,750
OTHER FACTORS.

WE CURRENTLY HAVE ON THE GROUND

411
00:31:18,750 --> 00:31:23,490
LESS THAN 1 OF THOSE 50 GIGA
BITS.

412
00:31:23,490 --> 00:31:27,770
PROBABLY AROUND 1 GIGA BIT.
WE CAN GET YOU A MORE ACCURATE

413
00:31:27,770 --> 00:31:32,400
NUMBER IF IT'S HELPFUL.
>> ERIC HAND WITH SCIENCE

414
00:31:32,400 --> 00:31:36,440
MAGAZINE.
MY QUESTION IS FOR RANDY.

415
00:31:36,440 --> 00:31:38,980
YOU MENTIONED THAT YOU THINK YOU
HAVE RULED OUT THIS TURBULENT

416
00:31:38,980 --> 00:31:41,990
MODEL FOR THE ATMOSPHERE AND YOU
THINK IT'S MAYBE MORE SLUGGISH

417
00:31:41,990 --> 00:31:44,720
OR STAGNANT.
WHAT ARE THE IMPLICATIONS OF

418
00:31:44,720 --> 00:31:50,130
THAT FOR TRANSPORT OF MATERIALS
AROUND THE PLANET VIA FROST?

419
00:31:50,130 --> 00:31:54,100
AND DOES IT, YOU KNOW, HAVE ANY
EFFECTS ON MAYBE WHAT YOU ARE

420
00:31:54,100 --> 00:31:56,840
STARTING TO SEE ON THE SURFACE

WITH THESE WIND STREAKS?

421
00:31:56,840 --> 00:32:00,840
IS THIS AN ATMOSPHERE THAT BLOWS
AROUND ALL THE TIME OR MAYBE NOT

422
00:32:00,840 --> 00:32:02,690
SO MUCH.
>> YEAH.

423
00:32:02,690 --> 00:32:06,000
GOOD QUESTION.
WE STILL DON'T HAVE A GOOD

424
00:32:06,000 --> 00:32:10,690
MEASURE OF THE LOWEST ATMOSPHERE
WHERE IT'S VERY COMPLICATED.

425
00:32:10,690 --> 00:32:13,160
WE THINK OF ALL THE ATMOSPHERE
ON PLUTO AS SORT OF COMPRESSED

426
00:32:13,160 --> 00:32:16,600
INTO A VERY THIN LAYER ON THE
SURFACE WHERE THE WINDS CAN BE

427
00:32:16,600 --> 00:32:20,050
UP TO A FEW METERS PER SECOND,
EASILY.

428
00:32:20,050 --> 00:32:24,380
AND THOSE NUMBERS ARE GOOD
ENOUGH TO LAUNCH OR LOFT

429
00:32:24,380 --> 00:32:27,750
PARTICLES OFF THE SURFACE, YOU
KNOW, MICRON SIZES.

430
00:32:27,750 --> 00:32:31,390
SO IT IS NOT INCONSISTENT AT ALL

EVEN WITH A SLUGGISH ATMOSPHERE

431
00:32:31,390 --> 00:32:34,890
TO BE ABLE TO MOVE STUFF AROUND
STILL.

432
00:32:34,890 --> 00:32:41,160
WE THINK IT IS FINE, OR
CONSISTENT, SO FAR.

433
00:32:41,160 --> 00:32:41,630
>>.
AVIATION WEEK.

434
00:32:41,630 --> 00:32:45,850
AT THIS POINT HAVE YOU LEARNED
ANYTHING THAT WILL HELP YOU

435
00:32:45,850 --> 00:32:49,580
UNDERSTAND WHAT HAPPENS ON THE
SURFACE OF PLUTO HAS IT GOES

436
00:32:49,580 --> 00:33:02,390
THROUGH ITS LONG ORBIT?
>> WE'VE UNDERSTOOD THE PHYSICS

437
00:33:02,390 --> 00:33:06,980
OF MULTIPLE TRANSPORT COUPLED
WITH THE ATMOSPHERIC ESCAPE VERY

438
00:33:06,980 --> 00:33:09,980
WELL FOR A LONG TIME.
BUT HAVEN'T HAD THE BOUNDARY

439
00:33:09,980 --> 00:33:14,690
CONDITIONS TO BE ABLE TO RUN
THOSE MODELS IN A WAY WE'D LIKE

440
00:33:14,690 --> 00:33:17,830
TO.

WE DON'T KNOW, WE HAVEN'T KNOWN

441
00:33:17,830 --> 00:33:22,520
UNTIL NOW THE DETAILS OF WHERE
THE BRIGHT AREAS ARE AND THE

442
00:33:22,520 --> 00:33:26,070
DARKER ONES ARE.
AND THAT CAN RELATE TO WHERE

443
00:33:26,070 --> 00:33:30,130
AREAS HEAT UP.
PARTICULARLY PLACES DEVOID OF

444
00:33:30,130 --> 00:33:32,950
MOLECULES MIGHT HAVE HIGHER
SWINGS.

445
00:33:32,950 --> 00:33:40,590
IN THE COMING MONTHS WE'RE GOING
TO SEE MANY MORE MAPS COME TO

446
00:33:40,590 --> 00:33:44,730
THE GROUND ALL OF WHICH WILL
MAKE TREMENDOUS INPUT TO BE ABLE

447
00:33:44,730 --> 00:33:48,380
TO INFORM US TO RUN THE MODELS
TO THE REAL PLUTO.

448
00:33:48,380 --> 00:33:56,360
AND NEW HORIZONS PAY LODE WAS
SELECTED TO MAKE THOSE KIND OF

449
00:33:56,360 --> 00:33:58,950
ANSWERS AND QUESTIONS.
BECAUSE THE SURFACE IS

450
00:33:58,950 --> 00:34:04,630
ELLIPTICAL AND THE PLANET'S POLE

VECTOR IS TILTED OVER.

451
00:34:04,630 --> 00:34:10,079
IT'S OBLIQUITY IS VERY HIGH.
IT IS A PRETTY COMPLEX

452
00:34:10,079 --> 00:34:12,980
SITUATION.
WE KNOW HOW TO MODEL IT AND ONCE

453
00:34:12,980 --> 00:34:15,409
WE GET THIS DATA ON THE GROUND I
THINK WE'RE GOING TO GET SOME

454
00:34:15,409 --> 00:34:18,230
SPECTACULAR RESULTS.
IT WILL SHOW US NOT WHAT HAPPENS

455
00:34:18,230 --> 00:34:23,509
AROUND A 248 YEAR ORBIT WHICH
ITSELF IS INTERESTING BUT OVER

456
00:34:23,509 --> 00:34:28,099
MUCH LONGER TIME SCALES.
I'M INTERESTED IN HOW THE

457
00:34:28,099 --> 00:34:31,730
VOLATILES TRANSPORT OVER LONG
TIMES AROUND THE PLANET AND

458
00:34:31,730 --> 00:34:34,980
WHETHER SUFFICIENT MATERIAL
MOVES AROUND THE PLANET TO

459
00:34:34,980 --> 00:34:41,690
ACTUALLY OR TO POTENTIALLY BURY
STRUCTURES OR BE REMOVED FROM

460
00:34:41,690 --> 00:34:47,740
STRUCTURES SO THAT WE SEE THEM

AT DIFFERENT TIMES IN PLUTO'S

461
00:34:47,740 --> 00:34:52,019
SEASONAL CYCLES.
THE CLIMATE CYCLES HAVE VERY

462
00:34:52,019 --> 00:34:55,109
LONG PERIODS IN SOME CASES.
EVERYBODY IS AWARE OF THE 248

463
00:34:55,109 --> 00:34:58,400
YEAR ORBITAL CYCLE.
BUT THE POLE VECTOR ACTUALLY

464
00:34:58,400 --> 00:35:02,230
CIRCULATES OVER A 4 MILLION YEAR
CYCLE WHICH AVERAGES OVER MANY

465
00:35:02,230 --> 00:35:04,740
MANY ORBITS.
RUNNING THE MODELS IS GOING TO

466
00:35:04,740 --> 00:35:07,279
BE FASCINATING AND WE'RE GOING
TO HAVE THE DATA ON THE GROUND

467
00:35:07,279 --> 00:35:12,730
TO DO IT.
REALLY HAM TER NAIL ON THE HEAD.

468
00:35:12,730 --> 00:35:16,900
>> I'M GOING TO GO TO THE PHONE
LINES AND FOR THE MEDIA LIKE

469
00:35:16,900 --> 00:35:19,670
WE'VE HAD AT ALL OF OUR BRIEFS.
LOTS OF MEDIA FROM AROUND THE

470
00:35:19,670 --> 00:35:21,690
WORLD ARE GOING TO ASK

QUESTIONS.

471
00:35:21,690 --> 00:35:25,109
I WANT TO GET TO AS MANY AS
POOBL POSSIBLE.

472
00:35:25,109 --> 00:35:32,319
SO PLEASE LIMIT YOUR QUESTIONS
TO ONE.

473
00:35:32,319 --> 00:35:35,729
ON THE PHONE LINE FIRST NBC
NEWS, ALLEN BOYLE.

474
00:35:35,729 --> 00:35:40,410
>> THANK YOU.
THIS MIGHT BE FOR JEFF OR ALLEN.

475
00:35:40,410 --> 00:35:46,029
JUST LOOKING AT THAT HILLY
TERRAIN AND POTENTIAL FOR

476
00:35:46,029 --> 00:35:51,329
PLUMES, CAN YOU SAY ANYTHING
FURTHER ABOUT WHETHER THERE IS

477
00:35:51,329 --> 00:35:53,999
TRITON-LIKE TERRAIN?
WHAT SORTS OF SIMILARITIES DO

478
00:35:53,999 --> 00:35:59,069
YOU SEE TO WHAT FOLKS HAVE SEEN
ON TRITON AND HOW DO YOU HOPE TO

479
00:35:59,069 --> 00:36:02,950
RESOLVE THE ISSUE ABOUT THOSE
PLUMES OR WIND STREAKS?

480
00:36:02,950 --> 00:36:05,910
>> FIRST OF ALL, AS I SAID

BEFORE WE ARE NOT MAKING AN

481
00:36:05,910 --> 00:36:09,380
ANNOUNCEMENT THAT WE'VE SEEN
PLUMES IN ANY WAY.

482
00:36:09,380 --> 00:36:15,079
AS FAR AS COMPARING TO TRITON,
WELL THE SAD STORY FOR TRITON IS

483
00:36:15,079 --> 00:36:18,289
IT DIDN'T HAVE A NEW HORIZONS
ENCOUNTER.

484
00:36:18,289 --> 00:36:25,079
THE DATA SET WE HAVE FOR TRITON
IS ABOUT TWICE AS†-- WELL LET ME

485
00:36:25,079 --> 00:36:27,089
PUT IT THIS WAY.
THE VERY BEST IMAGES WE EVER

486
00:36:27,089 --> 00:36:31,319
TOOK OF TRITON UNDER THE BEST OF
CIRCUMSTANCES ARE ONLY JUST AS

487
00:36:31,319 --> 00:36:33,980
GOOD AS THE PICTURES WE'VE SHOWN
YOU SO FAR.

488
00:36:33,980 --> 00:36:37,690
AND ALMOST ALL OF TRITON'S IMAGE
ARE MUCH WORSE RESOLUTION OF THE

489
00:36:37,690 --> 00:36:42,049
IMAGES THAT WE'VE SHOWN YOU.
AND OUR IMAGES IN CONTRAST.

490
00:36:42,049 --> 00:36:44,160
THESE ARE JUST KIND OF THE

MIDDLE RESOLUTIONS FOR US

491
00:36:44,160 --> 00:36:47,440
COMPARED TO THE REALLY GOOD
STUFF WE HAVEN'T EVEN SEEN YET.

492
00:36:47,440 --> 00:36:51,960
IT IS HARD TO COMPARE PLUTO AND
TRITON IN SUBSTANCE BECAUSE WE

493
00:36:51,960 --> 00:36:55,569
NEED TO SEE TRITON BETTER.
HAVING SAID THAT.

494
00:36:55,569 --> 00:37:00,519
NOT ONLY DID THE SCIENTISTS IN
1989 SEE ACTIVE PLUMES ON

495
00:37:00,519 --> 00:37:05,279
TRITON, TRITON APPEARED TO BE
COVERED WITH A NUMBER OF DARK

496
00:37:05,279 --> 00:37:09,549
ALIGNED MARKS WHICH ARE
INTERPRETED AS WIND STREAKS.

497
00:37:09,549 --> 00:37:13,279
SO TO THE EXTENT THAT WE CAN
COMPARE OUR GOOD DATA WITH

498
00:37:13,279 --> 00:37:16,650
TRITON DATA AND THE BEST TRITON
DATA WAS ACTUALLY OVER THEIR

499
00:37:16,650 --> 00:37:23,449
WIND TERRAIN.
WEATHER COMPARABLE.

500
00:37:23,449 --> 00:37:26,680
>> JEFF IT'S PROBABLY WORTHWHILE

TO SPEAK TO THE COMPARATIVE

501
00:37:26,680 --> 00:37:30,150
DIFFERENCES TO DO WITH OUR
DETECTION OF MOUNTAIN RANGES

502
00:37:30,150 --> 00:37:32,940
RIGHT OFF THE BAD AND THE
POLYGONAL TERRAIN.

503
00:37:32,940 --> 00:37:40,609
>> FOR ONE THING, PEOPLE HAVE
FOR MANY YEARS, WONDERED WHETHER

504
00:37:40,609 --> 00:37:45,569
THESE VERY EVOLVED YOUNG
TERRAINS YOU SEE ON THE GIANT

505
00:37:45,569 --> 00:37:52,079
ICY MOONS OF THE GAS AN GIANTS
WERE MADE THAT WAY BECAUSE OF A

506
00:37:52,079 --> 00:37:55,950
PROCESS CALLED TIDAL HEATING
WHERE THE MOONS INTERACT WITH

507
00:37:55,950 --> 00:37:59,420
THEMSELVES AND THE BODY THEY ARE
ORBITING AROUND TO BASICALLY

508
00:37:59,420 --> 00:38:01,140
HEAT UP THE INTERIORS THROUGH
FRICTION.

509
00:38:01,140 --> 00:38:08,569
AND PEOPLE SEE VOLCANOS ERUPTING
THEY ATTRIBUTE IT TO THIS

510
00:38:08,569 --> 00:38:13,039
PROCESS TIDAL TORQUE HEATING.

BUT THE QUESTION, COULD ICY

511
00:38:13,039 --> 00:38:19,999
WORLDS ALSO BE GEOLOGICALLLY
ACTIVE?

512
00:38:19,999 --> 00:38:24,490
AND THE ANSWER IS OBVIOUSLY YES.
PLUTO IS EVERY BIT AS

513
00:38:24,490 --> 00:38:27,460
GEOLOGICALLLY ACTIVE AS ANY
PLACE WE'VE SEEN IN THE SOLAR

514
00:38:27,460 --> 00:38:30,410
SYSTEM.
AND THIS ANSWERS A FUNDAMENTAL

515
00:38:30,410 --> 00:38:34,950
QUESTION ABOUT ARE ICE WORLDS
ABLE TO DO THEIR THING ON THEIR

516
00:38:34,950 --> 00:38:41,729
OWN RIGHT OR THE HELP OF THE BIG
PLANETS THEY ORBIT AROUND.

517
00:38:41,729 --> 00:38:45,589
>> NEXT UP PETE STOTTS,
CHRISTIAN SCIENTIST MONITOR.

518
00:38:45,589 --> 00:38:51,920
>> THANKS VERY MUCH.
DR. MOOR I THINK, ONE OF THE

519
00:38:51,920 --> 00:38:56,640
DETAILED QUESTIONS WHEN YOU WERE
TALKING ABOUT THE HEIGHTS OF

520
00:38:56,640 --> 00:39:00,089
THESE HILLS AS BEING ABOVE THE

SURROUNDING TERRAIN.

521
00:39:00,089 --> 00:39:05,150
IS THAT THE TERRAIN TRENCHES OR
THE ACTUAL INTERIORS OF THE

522
00:39:05,150 --> 00:39:07,180
POLYGONS.
AND DO YOU HAVE ANY DEPTH

523
00:39:07,180 --> 00:39:12,119
ESTIMATES FOR THE TROUGHS AND
ANY BALLPARK ESTIMATES FOR THE

524
00:39:12,119 --> 00:39:14,880
HEIGHT OF THE HILLS.
>> THE HEIGHT OF THE HILLS

525
00:39:14,880 --> 00:39:22,099
APPEAR†-- AND WE DON'T HAVE ANY
QUANTITATIVE DATA TO SAY MUCH

526
00:39:22,099 --> 00:39:24,240
MORE THAN THIS.
APPEAR TO BE A LITTLE HIGHER

527
00:39:24,240 --> 00:39:30,619
THAN THE SURFACE REPRESENTED BY
THE POLYGONS.

528
00:39:30,619 --> 00:39:33,369
WE DON'T HAVE ANY DIRECT
MEASUREMENT OS SHADOWS AND SO

529
00:39:33,369 --> 00:39:34,700
ON.
AS I SAID BEFORE WE'LL BE

530
00:39:34,700 --> 00:39:39,329
RECEIVING DATA SIX ORE SEVEN

TIMES HIGHER RESOLUTION AND IN

531
00:39:39,329 --> 00:39:45,259
STEREO.
SO WE CAN GIVE YOU THE ANSWER

532
00:39:45,259 --> 00:39:48,359
EXPLICITLY VERY SOON IN THE NEXT
FEW MONTHS.

533
00:39:48,359 --> 00:39:55,740
>>KEN KRAMER, UNIVERSITY TODAY.
>> GREAT RESULTS.

534
00:39:55,740 --> 00:39:59,970
MY QUESTION ALSO ON THE
POLYGONS.

535
00:39:59,970 --> 00:40:06,079
PHOENIX LANDED ON POLYGONS A FEW
YEARS BACK.

536
00:40:06,079 --> 00:40:09,069
IS THAT A REASONABLE COMPARISON
AT ALL?

537
00:40:09,069 --> 00:40:11,579
IS THERE ANY RELATIONSHIP TO
THEM AT ALL?

538
00:40:11,579 --> 00:40:16,119
OR ARE THEY TOTALLY DIFFERENT?
>> YOU ARE RIGHT THAT WHEN YOU

539
00:40:16,119 --> 00:40:20,650
LOOK AT LARGE POLYGONS ELSEWHERE
IN THE SOLAR SYSTEM, THE SURFACE

540
00:40:20,650 --> 00:40:25,299
THAT IS MOST REMINISCENT OF THE

SURFACE WE ARE LOOKING AT IS THE

541
00:40:25,299 --> 00:40:31,130
HIGH ALTITUDES†-- SORRY, THE
HIGH LATITUDES OF THE NORTHERN

542
00:40:31,130 --> 00:40:34,849
HEMISPHERE OF MARS.
AND INDEED THE PHOENIX LANDER

543
00:40:34,849 --> 00:40:42,200
DID LAND ON SUCH POLYGONAL
TERRAIN NEAR THE ARCTIC OF MARS.

544
00:40:42,200 --> 00:40:47,009
HAVING SAID THAT WE'RE
ENTERTAINING TWO ALTERNATE

545
00:40:47,009 --> 00:40:54,930
EXPLANATIONS AND I THINK RIGHT
THIS SECOND THE GEOLOGY TEAM MAY

546
00:40:54,930 --> 00:40:59,920
WEAKLY FAVOR THE IDEA THAT SOME
FORM OF INTERNAL CONVECTION MAY

547
00:40:59,920 --> 00:41:02,539
BE RESPONSIBLE.
BUT AS I SAID WE ARE STILL VERY

548
00:41:02,539 --> 00:41:06,539
VERY OPEN TO THE IDEA THAT THESE
COULD BE DUE TO CONTRACTION AND

549
00:41:06,539 --> 00:41:12,460
THERMAL CONTRACTION FORMING THE
POLYGONS, ESSENTIALLY

550
00:41:12,460 --> 00:41:15,329
RESPONSIBLE FOR THE POLYGONS ON

MARS.

551
00:41:15,329 --> 00:41:20,059
THAT IN COMBINATION WITH.
SO COULD BE MORE ANALOGOUS.

552
00:41:20,059 --> 00:41:26,279
IT IT IS JUST REALLY TOO EARLY
TO SAY.

553
00:41:26,279 --> 00:41:28,809
>> WE'RE STILL ON THE PHONE
LINE.

554
00:41:28,809 --> 00:41:31,630
WE'RE GOING TO DO THREE MORE
CALLS FROM THE PHONE.

555
00:41:31,630 --> 00:41:33,930
SOCIAL MEDIA AND THEN WE'RE
GOING TO COME BACK HERE FOR THE

556
00:41:33,930 --> 00:41:39,150
MEDIA IN THE AUDIENCE.
DAVE MOSIER.

557
00:41:39,150 --> 00:41:42,430
FROM BUSINESS INSIDER.
>> THANK YOU.

558
00:41:42,430 --> 00:41:45,710
CONGRATULATIONS ON THE MISSION.
THIS IS FOR JIM.

559
00:41:45,710 --> 00:41:47,359
MAYBE FOR ALLEN.
YOU MENTIONED THE BEATING HEART

560
00:41:47,359 --> 00:41:51,680
OF NEW HORIZONS.

THERE IS ONLY SO MUCH PLUTONIUM

561
00:41:51,680 --> 00:41:58,119
238 LEFT.
HOW IS THE CURRENT SUPPLY CRUNCH

562
00:41:58,119 --> 00:42:02,189
LIMITING FUTURE MISSIONS NASA IS
DREAMING UP?

563
00:42:02,189 --> 00:42:06,700
>> CURRENTLY WE HAVE OUR
PLUTONIUM IS BEING OF COURSE

564
00:42:06,700 --> 00:42:09,579
MANAGED BY THE DEPARTMENT OF
ENERGY.

565
00:42:09,579 --> 00:42:14,569
WE DO HAVE A FAIR AMOUNT OF IT.
IT IS APPROXIMATELY 17 OR SO

566
00:42:14,569 --> 00:42:19,880
KILOGRAMS OF PLUTONIUM THAT IS
AVAILABLE TO US THAT COULD BE

567
00:42:19,880 --> 00:42:22,690
USED RIGHT AWAY.
WE HAVE ADDITIONAL PLUTONIUM.

568
00:42:22,690 --> 00:42:26,369
IT DOESN'T HAVE QUITE THE ENERGY
DENSITY WE NEED TO ACTUALLY USE

569
00:42:26,369 --> 00:42:29,509
IN THESE MISSIONS.
BUT WE'VE ALSO BEEN GIVEN

570
00:42:29,509 --> 00:42:32,940
APPROVAL BY CONGRESS AND SUPPORT

BY THE ADMINISTRATION TO BE ABLE

571
00:42:32,940 --> 00:42:35,599
TO START GENERATING PLUTONIUM
238.

572
00:42:35,599 --> 00:42:40,420
THAT IS REALLY GOOD NEWS.
THE DEPARTMENT OF ENERGY HAS

573
00:42:40,420 --> 00:42:46,499
CREATED A PROCESS, AND THEY HAVE
VERIFIED IT, TO TAKE NEPTUNEIUM

574
00:42:46,499 --> 00:42:51,980
IRRADIATE IT IN SOME OF THE
REACTORS AND THE REACTION ENDS

575
00:42:51,980 --> 00:42:56,619
UP PROVIDING ONE OF THE BOILING
POINTS OF THE PLUTONIUM 238 AND

576
00:42:56,619 --> 00:43:00,349
THEN THAT CAN BE EXTRACTED AND
STORED.

577
00:43:00,349 --> 00:43:04,670
SO RIGHT NOW WE FEEL REALLY GOOD
THAT WE'RE IN THE POSITION TO BE

578
00:43:04,670 --> 00:43:08,499
GOOD STEWARDS OF THE PLANETARY
PROGRAM FOR MANY DECADES TO

579
00:43:08,499 --> 00:43:11,970
COME.
WE HAVE ADEQUATE RESERVES OF

580
00:43:11,970 --> 00:43:14,650
PLUTONIUM ON THE GROUND AND

INDEED WILL BE MAKING IT

581
00:43:14,650 --> 00:43:18,999
STARTING LATE THIS DECADE, EARLY
NEXT ON A REGULAR BASIS.

582
00:43:18,999 --> 00:43:22,119
>> KELLY, BEATTIE, SKON
TELESCOPE.

583
00:43:22,119 --> 00:43:26,789
>> THANK YOU VERY MUCH.
I'M GOING TO JUMP AHEAD A LITTLE

584
00:43:26,789 --> 00:43:30,589
IN THE PLAYBOOK FOR ALLEN OR
RANDY.

585
00:43:30,589 --> 00:43:38,140
DO YOU SEE ANYTHING IN THE DATA
TO SUGGEST SHARON HAS AN

586
00:43:38,140 --> 00:43:40,499
ATMOSPHERE?
>> WE DON'T HAVE ANY DATA YET.

587
00:43:40,499 --> 00:43:45,809
THEY WILL BE COMING IN THE NEXT
THREE TO FIVE DAYS†-- YEAH.

588
00:43:45,809 --> 00:43:48,849
SUNDAY.
SO WEED WE'LL GET BACK THE YOU

589
00:43:48,849 --> 00:43:50,819
ON THAT.
>> LAST QUESTION BEFORE WE GET

590
00:43:50,819 --> 00:43:52,819
TO SOCIAL MEDIA.

MIKE WALSH, SPACE.COM.

591
00:43:52,819 --> 00:44:03,799
>> THIS IS HOW HOLD THE TERRAINS
ARE.

592
00:44:03,799 --> 00:44:08,059
DO WE KNOW ABOUT IMPACT RATES,
CRATERING RATES TO MAKE GUESSES

593
00:44:08,059 --> 00:44:10,140
EVEN ON THE TERRAIN WHERE THERE
ARE CRATERS?

594
00:44:10,140 --> 00:44:15,970
OR ARE CRATERING RATES LOWER
THAN THEY ARE CLOSER TO THE SUN?

595
00:44:15,970 --> 00:44:20,059
AND THAT'S A TOTALLY DIFFERENT
BALL GAME OUT THERE?

596
00:44:20,059 --> 00:44:24,339
>> THE WAY WE ESTIMATE THAT IS
SEVERAL WAYS.

597
00:44:24,339 --> 00:44:28,119
FIRST OF ALL WE HAVE SEEN CRATER
SURFACES ON THE MOONS OF THE

598
00:44:28,119 --> 00:44:34,089
URANUS AND NEPTUNE.
WE STUDY THE LARGER COMPONENTS

599
00:44:34,089 --> 00:44:38,410
OF THE KIPER BELT DOWN TO A FEW
MILLIMETERS ACROSS WITH HUBBLE

600
00:44:38,410 --> 00:44:42,069
TELESCOPES.

BY LOOKING A AT THE CRATERING ON

601
00:44:42,069 --> 00:44:47,920
URANUS, NEPTUNE AND SATURN AND
THE NUMBERS AND DISTRIBUTION OF

602
00:44:47,920 --> 00:44:52,799
OBJECTS IN THE KIPER BELT, THERE
HAVE BEEN SEVERAL STUDIES WHICH

603
00:44:52,799 --> 00:44:56,710
HAVE DERIVED A APPROXIMATION OF
THE CRATER FLUX RATE.

604
00:44:56,710 --> 00:44:58,880
SO IT IS FAR FROM PRECISE
NUMBER.

605
00:44:58,880 --> 00:45:01,660
AND WE CAN OFTEN TELL YOU IF THE
SURFACE IS EXTREMELY OLD OR

606
00:45:01,660 --> 00:45:04,289
EXTREMELY YOUNG.
IT'S OFTEN HARDER TO TELL IF

607
00:45:04,289 --> 00:45:07,779
IT'S INTERMEDIATE AGES.
YOU HAVE FACTOR OF FOUR

608
00:45:07,779 --> 00:45:12,220
UNCERTAINTIES IN THESE.
WE CERTAINLY UNDERSTAND THE

609
00:45:12,220 --> 00:45:15,239
CRATERING RATES WELL ENOUGH TO
SEE A SURFACE THAT HAS NO

610
00:45:15,239 --> 00:45:19,789
CRATERS IT IS DIFFICULT TO SEE

HOW IT COULD BE MUCH OLDER THAN

611
00:45:19,789 --> 00:45:24,559
100 MILLION YEARS.
>> AS I SAID EARLIER, THE WORLD

612
00:45:24,559 --> 00:45:28,630
HAS EMBRACED THIS WITH BILLIONS
AND SOCIAL MEDIA IS CERTAINLY A

613
00:45:28,630 --> 00:45:32,839
BIG PART OF THAT AND NASA ALWAYS
LOOKING TO REACH OUT TO NEW

614
00:45:32,839 --> 00:45:39,700
AUDIENCES.
SO WHAT IS OUT THERE IN THE

615
00:45:39,700 --> 00:45:41,200
WORLD.
>> FIRST QUESTION FROM TWITTER

616
00:45:41,200 --> 00:45:45,529
USING WHO ASKS HOW DO WE KNOW
PLUTO'S ATMOSPHERE IS ESCAPING?

617
00:45:45,529 --> 00:45:49,480
HOW IS THAT MEASUREMENT MADE.
>> WE HAVE NOT YET ACTUALLY

618
00:45:49,480 --> 00:45:53,809
MEASURED THE ESCAPE.
WE HOPE TO.

619
00:45:53,809 --> 00:45:57,130
CURRENTLY IT IS BASED ON
EXPECTATIONS, UNDERSTANDING THE

620
00:45:57,130 --> 00:46:02,759
GRAVITY OF PLUTO, THAT IT IS

RELATIVELY WEAK AND THAT WE

621
00:46:02,759 --> 00:46:06,549
EXPECT IT TO BE ESCAPING.
FURTHER MORE WE KNOW THAT THERE

622
00:46:06,549 --> 00:46:11,589
IS A LITTLE BIT OF METHANE AND
MAYBE RANDY CAN TELL YOU MORE

623
00:46:11,589 --> 00:46:14,819
ABOUT THAT.
BUT WE KNOW THIS METHANE IN THE

624
00:46:14,819 --> 00:46:17,279
ATMOSPHERE AND WE KNOW FROM
EARTH THAT METHANE IS A

625
00:46:17,279 --> 00:46:23,319
GREENHOUSE GAS THAT ABSORBS THE
SUNLIGHT.

626
00:46:23,319 --> 00:46:28,739
AND THE ENERGY OF SUNLIGHT IN
THE ATMOSPHERE GIVES IT THAT

627
00:46:28,739 --> 00:46:33,609
ENERGY TO ESCAPE THE GRAVITY.
WE'RE PRETTY SURE THAT IS

628
00:46:33,609 --> 00:46:37,619
HAPPENING AND HAVEN'T GOT A
DIRECT MEASUREMENT BUT WE WILL

629
00:46:37,619 --> 00:46:44,960
HAVE MEASUREMENTS TO COMPARE
WITH THE ATMOSPHERIC

630
00:46:44,960 --> 00:46:51,199
OBSERVATIONS COMING FROM THE

ALEX AND REX TEAMS.

631
00:46:51,199 --> 00:46:54,660
>> NEXT QUESTION FROM JASON, WHO
SORT OF MATERIAL COULD BE

632
00:46:54,660 --> 00:46:57,170
RESPONSIBLE FOR PLUTO'S DARK
SCENES?

633
00:46:57,170 --> 00:47:00,249
ORGANICS?
>> JEFF, DO YOU WANT TO

634
00:47:00,249 --> 00:47:01,069
SPECULATE?
>> SURE.

635
00:47:01,069 --> 00:47:03,469
WHY NOT?
>> I DON'T.

636
00:47:03,469 --> 00:47:12,029
>> THE LEAST CRAZY IDEA, WHICH I
THINK WE'RE STILL WORKING ON.

637
00:47:12,029 --> 00:47:15,059
I KNOW THIS WILL HOPEFULLY BEEN
DETERMINED WITH THE

638
00:47:15,059 --> 00:47:19,859
SPECTROMETER.
THE DARK STAINS, WELL THE

639
00:47:19,859 --> 00:47:25,819
COMPOSITION ARE PROBABLY JUST
HIGHER HYDROCARBONS MADE BY THE

640
00:47:25,819 --> 00:47:30,749
IRRADIATION OF METHANE.

IT CAN BE EITHER E RADIATED ON A

641
00:47:30,749 --> 00:47:35,630
SURFACE ICE OR IRRADIATED MORE
LIKELY AND COMMONLY AS PARTICLES

642
00:47:35,630 --> 00:47:39,579
HIGHER UP IN THE ATMOSPHERE THAT
VERY SLOWLY RAIN DOWN TO THE

643
00:47:39,579 --> 00:47:41,920
SURFACE.
AND, FOR INSTANCE, THE STREAKS

644
00:47:41,920 --> 00:47:44,359
IF THEY IN FACT TURN OUT TO BE
WIND STREAKS ARE PROBABLY JUST

645
00:47:44,359 --> 00:47:48,609
VERY FINE PARTICLES THAT SLOWLY
FALL OUT OF THE ATMOSPHERE AND

646
00:47:48,609 --> 00:47:55,149
WIND SWEEPS THEM AND THEY GET
WIND TRAPPED BEHIND OBSTACLES.

647
00:47:55,149 --> 00:48:01,549
>> LET'S TAKE ONE MORE AND THEN
WE'LL COME BACK HERE JASON.

648
00:48:01,549 --> 00:48:02,739
>> LOTS OF QUESTIONS ABOUT
ELEVATION.

649
00:48:02,739 --> 00:48:06,589
THIS IS FROM GEORGE.
WILL THE DATA COLLECTED FROM NEW

650
00:48:06,589 --> 00:48:13,710
HORIZONS BE SUFFICIENT TO CREATE

PLUTO AND SHARON ELEVATION MAPS?

651
00:48:13,710 --> 00:48:18,160
>> ABSOLUTELY.
THE SURFACE YOU CAN SEE PRETTY

652
00:48:18,160 --> 00:48:20,720
MUCH IN THE PICTURE ON THE
SCREEN IF IT'S STILL UP ON THE

653
00:48:20,720 --> 00:48:23,759
SCREEN NOW, WE WILL HAVE
ALTHOUGH THEY WON'T ALWAYS BE AT

654
00:48:23,759 --> 00:48:27,680
THE SAME RESOLUTION TOPOGRAPHIC
MAPS FOR NEAR ENCOUNTER

655
00:48:27,680 --> 00:48:30,880
HEMISPHERES OF BOTH WORLDS.
>> OKAY.

656
00:48:30,880 --> 00:48:35,229
I WANT TO THANK OUR SOCIAL MEDIA
AUDIENCE.

657
00:48:35,229 --> 00:48:37,359
AND WE'RE GOING TOO ANSWER THOSE
QUESTIONS.

658
00:48:37,359 --> 00:48:40,259
GET THEM IN†#ASK NASA.
WE HAVE SCIENTISTS AND WE'LL GET

659
00:48:40,259 --> 00:48:42,410
TO THOSE ANSWERS AS QUICKLY AS
POSSIBLE.

660
00:48:42,410 --> 00:48:44,539
BUT YOU CAN FOLLOW THE

CONVERSATION AND THOSE ANSWERS

661
00:48:44,539 --> 00:48:47,680
WILL PROBABLY BE ON THAT
CONVERSATION.

662
00:48:47,680 --> 00:48:51,210
THERE IS A LOT OF CONVERSATION
AT†#PLUTO FLYBY.

663
00:48:51,210 --> 00:48:57,410
LET'S SEE THE HANDS.
WE'LL GO HERE AND THEN WORK OUR

664
00:48:57,410 --> 00:49:00,460
WAY THIS WAY.
NAME AND AFFILIATION SIR.

665
00:49:00,460 --> 00:49:01,930
>> STEVEN CLARK WITH SPACE
FLIGHT EXPLORATION.

666
00:49:01,930 --> 00:49:06,499
I KNOW YOU ARE NOT PREPARED TO
MAKE A REMARK ABOUT GEYSERS OR

667
00:49:06,499 --> 00:49:08,700
PLUMES.
DO YOU NEED DIRECT EVIDENCE OF

668
00:49:08,700 --> 00:49:18,109
THAT OR.
>> THERE MIGHT BE SOME INDIRECT

669
00:49:18,109 --> 00:49:21,099
MEANS BUT I'M AN OLD FASHIONED
GEOLOGIST.

670
00:49:21,099 --> 00:49:26,150
I WASN'T QUITE BORN IN MISSOURI,

I WAS BORN IN A STATE NEAR IT.

671
00:49:26,150 --> 00:49:28,779
I WANT TO SEE UNAMBIGUOUS
EVIDENCE THAT SOMETHING IS

672
00:49:28,779 --> 00:49:32,289
ERUPTING UP INTO THE ATMOSPHERE.
AND IF WE SEE IT, DON'T WORRY,

673
00:49:32,289 --> 00:49:37,029
WE'LL COME AND TELL YOU ABOUT
IT.

674
00:49:37,029 --> 00:49:40,460
>> PLANETARY SOCIETY.
ELLEN, FOR A LONG TIME YOU HAVE

675
00:49:40,460 --> 00:49:43,789
BEEN A PROPONENT OF AND BEEN
SUPPORTED BY THE AMATEUR IMAGE

676
00:49:43,789 --> 00:49:47,079
PROCESSING COMMUNITY AND STARTED
RELEASING THE RAW IMAGES.

677
00:49:47,079 --> 00:49:50,670
THAT WAS HALTED THIS MORNING.
I'M WONDERING IF THAT IS A PLAN

678
00:49:50,670 --> 00:49:54,349
TO CONTINUE OR IF YOU ARE GOING
TO KEEP THE DATA IN ORDER FOR

679
00:49:54,349 --> 00:49:57,119
THE SCIENTISTS TO INTERPRET IT
BEFORE YOU SHOW IT TO THE

680
00:49:57,119 --> 00:49:59,160
PUBLIC.

>> WE INTEND TO CONTINUE TO

681
00:49:59,160 --> 00:50:04,359
RELEASE ALL THE LAURIE IMAGES.
HOWEVER AS WE'RE WINDING DOWN

682
00:50:04,359 --> 00:50:10,229
FROM THE PEAK OF ACTIVITY AFTER
THE INTENSITY FLYBY ACTIVITIES,

683
00:50:10,229 --> 00:50:13,880
WE'RE GOING TO MOVE TO WEEKLY
RELEASES ALL IN ONE SET.

684
00:50:13,880 --> 00:50:18,569
THAT IS A MANPOWER THING AND
ALSO HELPING US VET THE IMAGES

685
00:50:18,569 --> 00:50:22,099
WHEN WE DON'T HAVE THE ENTIRE
SCIENCE TEAM ASSEMBLED.

686
00:50:22,099 --> 00:50:24,609
THE DATA IS REALLY GOING TO
START TO FLOW IN THE FALL.

687
00:50:24,609 --> 00:50:29,420
BEFORE THAT†-- YOU KNOW, AFTER
THE NEXT WEEK OR SO, ONE OF THE

688
00:50:29,420 --> 00:50:33,269
THINGS WE WANT TO MAKE SURE THE
AMATEUR COMMUNITY KNOWS IS THAT

689
00:50:33,269 --> 00:50:36,900
WE'RE GOING TO TURN TO GETTING
THE PLASMA DATA AND OTHER LOW

690
00:50:36,900 --> 00:50:40,200
SPEED DATA SETS TO THE GROUND.

THERE WILL BE A LONG GAP.

691
00:50:40,200 --> 00:50:43,349
IT IS NOT BECAUSE WE'RE STOPPING
THE SHARING IT WILL BE BECAUSE

692
00:50:43,349 --> 00:50:47,339
YEAR NOT SENDING IMAGES TO THE
GROUND IN AUGUST AND EARLY

693
00:50:47,339 --> 00:50:50,579
SEPTEMBER.
THEN WE'LL START AGAIN AND WILL

694
00:50:50,579 --> 00:50:55,229
BE ON A WEEKLY BASIS AND YOU
WILL BE ABLE TO COUNT ON IT LIKE

695
00:50:55,229 --> 00:50:58,999
A CLOCK.
>> A FEW MORE QUESTIONS.

696
00:50:58,999 --> 00:51:03,200
>> LEO ENRIGHT OF IRISH
TELEVISION.

697
00:51:03,200 --> 00:51:07,749
WE JOURNALISTS ABSOLUTELY LOVE
FLYBYS.

698
00:51:07,749 --> 00:51:11,160
MAINLY BECAUSE IT IS SCIENCE AT
THE SPEED OF JOURNALISM.

699
00:51:11,160 --> 00:51:15,729
AND WHO COULD POSSIBLY NOT LIKE
THAT.

700
00:51:15,729 --> 00:51:19,989
BUT IF YOU WILL FORGIVE ME, I I

DIDN'T WANT THIS WEEK TO FLY BY

701
00:51:19,989 --> 00:51:24,789
WITHOUT REMARKING THAT THAT IS
THE FIRST PLANETARY FLYBY IN

702
00:51:24,789 --> 00:51:32,809
AMERICAN MISSION YURIY WOODY HAS
NOT BEEN INVOLVED IN THE

703
00:51:32,809 --> 00:51:38,739
IMAGING.
YURIY WAS THE FIFTH PERSON AT

704
00:51:38,739 --> 00:51:44,170
THE FRONT TABLE AT EVERY FLYBY.
WE COMPLETELY RELIED UPON HIM TO

705
00:51:44,170 --> 00:51:51,670
SUPPLY US WITH IMAGERY DURING
THOSE DAYS.

706
00:51:51,670 --> 00:51:57,369
NASA CHOSE AN AIR FORCE FIGHTER
PILOT FROM THE DUTCH AIR FORCE

707
00:51:57,369 --> 00:52:01,269
TO DEAL WITH US.
BUT HE WAS OUR LINK WITH THE

708
00:52:01,269 --> 00:52:04,700
IMAGING TEAMS FOR MY ENTIRE
PROFESSIONAL CAREER.

709
00:52:04,700 --> 00:52:08,589
AND I DIDN'T WANT THIS WEEK TO
PASS WITHOUT MENTIONING YURIY.

710
00:52:08,589 --> 00:52:10,989
.

HE WAS A GREAT PUBLIC SERVANT, A

711
00:52:10,989 --> 00:52:13,809
TERRIFIC GUY.
AND I SUPPOSE AS WE IN IRELAND

712
00:52:13,809 --> 00:52:18,430
MIGHT SAY HE'S A MENSCH.
>> A TERRIFIC GUY.

713
00:52:18,430 --> 00:52:23,549
EVEN AS A YOUNG STUDENT YOU
COULD CALL HIM PICK UP THE PHONE

714
00:52:23,549 --> 00:52:28,529
AND YOU COULD SAY I'M SO AND SO
FROM HE WOULD MAIL YOU PICTURES

715
00:52:28,529 --> 00:52:31,880
OF THE LATEST ENCOUNTERS.
IT WAS FANTASTIC.

716
00:52:31,880 --> 00:52:36,440
>> FOR OUR TELEVISION ADDS,†--
AUDIENCE.

717
00:52:36,440 --> 00:52:45,970
YURIY, I KNEW HIM.
THE NASA FAMILY, WE WORK VERY

718
00:52:45,970 --> 00:52:48,170
HARD.
BUT WE CARE FOR EACH VERY HARD.

719
00:52:48,170 --> 00:52:52,009
AND WE'VE LOST SOME PEOPLE,
YURIY AND OTHERS TO THE JET

720
00:52:52,009 --> 00:52:54,640
PROPULSION LABS.

SO OUR THOUGHTS AND PRAYERS GO

721
00:52:54,640 --> 00:52:57,700
OUT.
BUT THE NASA FAMILY CARES VERY

722
00:52:57,700 --> 00:53:05,960
HARD WHEN WE LOSE FOLKS.
ERIC AND THEN ONE MORE AND CLOSE

723
00:53:05,960 --> 00:53:11,720
OUT.
>> ERIC HAND WITH SCIENCE AGAIN.

724
00:53:11,720 --> 00:53:14,749
I'M WONDERING IF YOU CAN TELL US
HOW THICK IT IS?

725
00:53:14,749 --> 00:53:18,259
THIS MORE THAN JUST THE VENEER
YOU SUSPECT EVERYWHERE ELSE?

726
00:53:18,259 --> 00:53:22,519
IS IT PURE?
THERE OTHER ICE MIXED IN?

727
00:53:22,519 --> 00:53:27,029
AND HOW DID IT GET THERE?
IS THIS DEPOSITS FROM ABOVE OR

728
00:53:27,029 --> 00:53:29,190
SOMETHING WELLING UP FROM
WITHIN?

729
00:53:29,190 --> 00:53:32,319
AND IF YOU CAN'T SAY RIGHT NOW
HOW WOULD YOU DISTINGUISH

730
00:53:32,319 --> 00:53:37,460
BETWEEN THOSE TWO?

>> I'M GOING TO SAY A COUPLE OF

731
00:53:37,460 --> 00:53:39,009
WORDS ABOUT THAT.
AND WE SPECIFICALLY BROUGHT

732
00:53:39,009 --> 00:53:46,479
ALONG OUR COMPOSITION TEAM LEAD
WILL GRUNDY WHO IS DOWN IN THE

733
00:53:46,479 --> 00:53:49,069
AUDIENCE.
WE KNOW IT'S AT LEAST THICK

734
00:53:49,069 --> 00:53:52,479
ENOUGH TO MAKE THAT ABSORPTION
BUT IT COULD BE QUITE A DEEP

735
00:53:52,479 --> 00:53:57,069
LAYER.
>> YOU SAID IT EXACTLY RIGHT.

736
00:53:57,069 --> 00:54:01,829
YOU ONLY NEED A CENTIMETER OR
SOMETHING TO PRODUCE AN

737
00:54:01,829 --> 00:54:06,109
ABSORPTION OF THAT DEPTH.
SO WE KNOW THAT THERE IS A LID

738
00:54:06,109 --> 00:54:08,359
THAT INCLUDES A LOT OF CARBON
MONOXIDE.

739
00:54:08,359 --> 00:54:11,739
BUT HOW THAT INTERACTS IS
POTENTIALLY QUITE SUBTLE.

740
00:54:11,739 --> 00:54:15,630
IT IS SOLUBLE IN NITROGEN ICE,

WHICH IS ALSO WIDE SPREAD AROUND

741
00:54:15,630 --> 00:54:18,309
THE SURFACE AND METHANE IS ALSO
PARTIALLY SOLUBLE IN THE

742
00:54:18,309 --> 00:54:21,239
MIXTURE.
SO HOW THEY COMBINE, REALLY

743
00:54:21,239 --> 00:54:23,569
DON'T KNOW YET AND WE'RE GOING
TO HAVE TO DO DETAILED

744
00:54:23,569 --> 00:54:25,930
MODELLING.
I LIKE THE SCENARIO OF UP

745
00:54:25,930 --> 00:54:30,380
LETTING FROM BELOW BUT WE'RE NOT
CLOSE TO PROVING THAT'S WHAT'S

746
00:54:30,380 --> 00:54:36,690
HAPPENING.
>> I'M WONDERING IF TELL US IF

747
00:54:36,690 --> 00:54:41,109
YOU SEE ANY SIGNS OF THE
ATMOSPHERIC STRUCTURE IN OKAYAL

748
00:54:41,109 --> 00:54:45,380
TAKES.
>> THE THEY TELL US WHERE ONE

749
00:54:45,380 --> 00:54:49,989
ATMOSPHERIC SPECIES TAKES OUT
AND THE OTHER ABSORBS UP.

750
00:54:49,989 --> 00:54:54,089
SO THAT IS NOT REALLY STRUCTURE.

BUT FROM THE SHAPE WE KNOW

751
00:54:54,089 --> 00:54:59,489
ACTUALLY HOW†-- ACTUALLY MIGHT
BE A LITTLE COOLER THAN WE

752
00:54:59,489 --> 00:55:02,720
THOUGHT.
BUT WE'LL GET THAT LATER.

753
00:55:02,720 --> 00:55:06,900
>> OKAY.
WELL, LADIES AND GENTLEMEN,

754
00:55:06,900 --> 00:55:09,549
FOLKS WATCHING FROM ALL OVER THE
WORLD, THE PLUTO STORY IS JUST

755
00:55:09,549 --> 00:55:11,559
BEGINNING.
YOU CAN FOLLOW THE CONVERSATION

756
00:55:11,559 --> 00:55:14,130
ON ALL THE NASA SOCIAL MEDIA
ACCOUNTS.

757
00:55:14,130 --> 00:55:20,210
AND OF COURSE GO TO
WWW.NASA.GOV/NEWHORIZONS.

758
00:55:20,210 --> 00:55:22,799
I WANT TO THANK FOCUS FOR
JOINING US AND WITNESSING

759
00:55:22,799 --> 00:55:31,160
HISTORY.
WE ANOTHER COMING UP FRIDAY.