



1
00:00:02,200 --> 00:00:03,780
>>> GOOD AFTERNOON.

2
00:00:03,780 --> 00:00:07,050
WELCOME TO THE JOHNS HOPKINS
APPLIED PHYSICS LABORATORY IN

3
00:00:07,050 --> 00:00:08,050
LOWER MARYLAND.

4
00:00:08,050 --> 00:00:12,000
MY NAME IS DWAYNE BROWN WITH THE
OFFICE OF COMMUNICATIONS.

5
00:00:12,000 --> 00:00:16,710
TO SET THE STAGE FOR TODAY'S
PRESS CONFERENCE, PLEASE WELCOME

6
00:00:16,710 --> 00:00:20,360
TO THE PODIUM THE ASSOCIATE
ADMINISTRATOR FOR NASA'S SCIENCE

7
00:00:20,360 --> 00:00:23,640
MISSION AND DIRECTORATE IN
WASHINGTON, D.C., DR.

8
00:00:23,640 --> 00:00:26,730
JOHN
RUMSFELD.

9
00:00:26,730 --> 00:00:36,020
[APPLAUSE]
>> WELCOME, EVERYONE.

10
00:00:36,020 --> 00:00:41,911
IT'S A FULL AUDITORIUM HERE AT
THE JOHNS HOPKINS UNIVERSITY OF

11
00:00:41,911 --> 00:00:43,290

APPLIED PHYSICS LAB.

12

00:00:43,290 --> 00:00:46,420

I WOULD WORRIED NO ONE WOULD
SHOW UP.

13

00:00:46,420 --> 00:00:48,900

ACTUALLY, I WASN'T WORRIED AT
ALL.

14

00:00:48,900 --> 00:00:53,300

ANYBODY GET ANY SLEEP LAST
NIGHT?

15

00:00:53,300 --> 00:00:56,149

I'M NOT HEARING TOO MANY
AFFIRMATIONS OF A GOOD NIGHT

16

00:00:56,149 --> 00:00:57,149

SLEEP.

17

00:00:57,149 --> 00:00:59,470

I'M NOT GOING TO ASK THE TEAM,
BECAUSE I KNOW THEY WERE

18

00:00:59,470 --> 00:01:03,280

PROBABLY PRETTY EXCITED ABOUT
THIS MORNING'S DATA PASS, AS WAS

19

00:01:03,280 --> 00:01:06,380

I.
I'D LIKE TO TAKE YOU ON A SHORT

20

00:01:06,380 --> 00:01:10,389

TOUR TO FRAME THE DISCUSSION,
AND I'M NOT GOING TO SAY A WHOLE

21

00:01:10,389 --> 00:01:11,389

LOT.

22

00:01:11,389 --> 00:01:14,560

THE FIRST IMAGE THAT I'D LIKE TO
BRING UP WAS TAKEN JUST ABOUT

23

00:01:14,560 --> 00:01:17,080

TWO HOURS AGO BY THE SOLAR
DYNAMICS OBSERVATORY.

24

00:01:17,080 --> 00:01:21,380

I HOPE YOU RECOGNIZE THAT
OBJECT, AND I THINK YOU KNOW

25

00:01:21,380 --> 00:01:25,469

WHERE WE'RE GOING, MERCURY.

26

00:01:25,469 --> 00:01:31,200

FROM THE MESSENGER MISSION,
VENUS FROM MAGELLAN.

27

00:01:31,200 --> 00:01:33,740

IF ANYBODY DOESN'T RECOGNIZE THE
NEXT PLANET, I'D LIKE YOU TO

28

00:01:33,740 --> 00:01:35,329

LEAVE THE AUDITORIUM.

29

00:01:35,329 --> 00:01:43,920

SECURITY WILL ESCORT YOU TO AREA
51.

30

00:01:43,920 --> 00:01:47,869

[LAUGHTER]

[APPLAUSE]

31

00:01:47,869 --> 00:01:51,049

THE RED PLANET, MARS, I HAD TO
GET A HUBBLE IMAGE IN THERE

32

00:01:51,049 --> 00:01:54,409

SOMEWHERE.

33

00:01:54,409 --> 00:02:01,209
I REALIZE I MISSED SIRI, WHICH
WAS ON THE SPACECRAFT ORBITING

34

00:02:01,209 --> 00:02:06,659
RIGHT NOW, JUPITER, WITH SOME OF
THE MOONS IN SHADOW FROM THE

35

00:02:06,659 --> 00:02:09,410
GALILEO SPACECRAFT.

36

00:02:09,410 --> 00:02:12,069
WHAT A WONDERFUL MISSION.

37

00:02:12,069 --> 00:02:14,430
THIS IS JUST A STRIKING IMAGE.

38

00:02:14,430 --> 00:02:21,500
URANUS, SOMEONE MADE A WISECRACK
THAT I PUT IT IN SIDEWAYS.

39

00:02:21,500 --> 00:02:23,650
NEPTUNE.

40

00:02:23,650 --> 00:02:28,340
AND FOR A GRAND FINALE, I TURN
IT OVER TO ALLEN STERN, THE

41

00:02:28,340 --> 00:02:35,159
PRINCIPAL INVESTIGATOR OF THE
PLUTO NEW HORIZONS MISSION.

42

00:02:35,159 --> 00:02:50,840
[CHEERS AND APPLAUSE]
>> WELL, BEFORE WE TURN IT OVER

43

00:02:50,840 --> 00:02:56,560

TO ALLEN, I HAVE A FEW WORDS TO SAY.

44

00:02:56,560 --> 00:03:00,750
YESTERDAY, AMERICA'S SPACE PROGRAM TOOK ANOTHER HISTORIC

45

00:03:00,750 --> 00:03:03,540
LEAP FOR HUMANKIND.

46

00:03:03,540 --> 00:03:08,099
TODAY, THE NEW HORIZONS TEAM IS BRINGING WHAT WAS PREVIOUSLY A

47

00:03:08,099 --> 00:03:13,170
BLURRED POINT OF LIGHT INTO FOCUS.

48

00:03:13,170 --> 00:03:16,659
WE HAVE PRESENTATIONS FROM OUR PANEL, WE'LL OPEN UP FOR

49

00:03:16,659 --> 00:03:22,109
QUESTIONS WITH MEDIA HERE, ON SOCIAL MEDIA, AND WE'LL GO TO

50

00:03:22,109 --> 00:03:25,540
THE PHONE LINES.

51

00:03:25,540 --> 00:03:32,370
YOU CAN JOIN THE CONVERSATION ON SOCIAL MEDIA, TWITTER, FACEBOOK,

52

00:03:32,370 --> 00:03:36,930
AT HASH TAG #PLUTOFLYBY, AND IF YOU HAVE QUESTIONS ON SOCIAL

53

00:03:36,930 --> 00:03:41,540
MEDIA, SEND THEM IN TO #ASKNASA.

54
00:03:41,540 --> 00:03:47,319
THE IMAGES AND INFORMATION TODAY
FOR MORE DAYS AND WEEKS AND

55
00:03:47,319 --> 00:03:54,480
MONTHS WILL BE ONLINE AT
WWW.NASA.GOV/NEWHORIZONS.

56
00:03:54,480 --> 00:03:55,480
YOU'VE HEARD FROM DR.

57
00:03:55,480 --> 00:03:57,560
JOHN
RUMSFELD, OF COURSE, ALLEN STERN

58
00:03:57,560 --> 00:04:04,319
NEEDS NO INTRODUCTION, SO I WILL
GO TO THE PROJECT SCIENTIST FOR

59
00:04:04,319 --> 00:04:08,260
THE JOHNS HOPKINS APPLIED
PHYSICS LABORATORY, FOLLOWED BY

60
00:04:08,260 --> 00:04:11,920
WILL GRUNDY, NEW HORIZONS
CO-INVESTIGATOR, LOWELL OBSERVE

61
00:04:11,920 --> 00:04:15,459
IN FLAGSTAFF, ARIZONA.

62
00:04:15,459 --> 00:04:23,070
FOLLOWED BY DEPUTY SCIENTIST AT
THE SOUTHWEST INSTITUTE, AND

63
00:04:23,070 --> 00:04:26,630
JOHN SPENCER, ANOTHER NEW
HORIZONS CO-INVESTIGATOR FROM

64
00:04:26,630 --> 00:04:29,440

THE SOUTHWEST RESEARCH
INSTITUTE.

65

00:04:29,440 --> 00:04:31,420
AND WITH THAT, ALLEN, IT'S ALL
YOURS.

66

00:04:31,420 --> 00:04:32,620
>> THANK YOU.

67

00:04:32,620 --> 00:04:41,780
WELL, I HAD A PRETTY GOOD DAY
YESTERDAY, HOW ABOUT YOU?

68

00:04:41,780 --> 00:04:53,980
[APPLAUSE]
WELL, NEW HORIZONS IS NOW MORE

69

00:04:53,980 --> 00:04:56,410
THAN A MILLION MILES ON THE
OTHER SIDE OF PLUTO.

70

00:04:56,410 --> 00:04:59,660
THAT'S HOW FAST WE'RE MOVING,
HAVING MADE CLOSEST APPROACH

71

00:04:59,660 --> 00:05:01,550
YESTERDAY MORNING.

72

00:05:01,550 --> 00:05:04,610
THE SPACECRAFT'S IN GOOD HEALTH,
IT'S COMMUNICATED WITH THE EARTH

73

00:05:04,610 --> 00:05:09,640
AGAIN FOR A NUMBER OF HOURS THIS
MORNING, BEGINNING ABOUT 5:50.

74

00:05:09,640 --> 00:05:12,500
WE GOT DATA DOWN FROM FIVE OF
THE SCIENTIFIC INSTRUMENTS

75
00:05:12,500 --> 00:05:16,210
ALREADY, AND WE'RE GOING TO
REPORT ON SOME OF THOSE RESULTS,

76
00:05:16,210 --> 00:05:19,200
BUT FRANKLY, WE'RE JUST SKIMMING
THE TOP OF IT.

77
00:05:19,200 --> 00:05:23,630
THERE'S A LOT IN JUST THE THINGS
WE'VE TALKED TO YOU ABOUT.

78
00:05:23,630 --> 00:05:28,810
WE HAVE BIG NEWS, FROM THE FIRST
RESOLVED IMAGE OF HYDRA, THE

79
00:05:28,810 --> 00:05:36,910
OUTER MOST MOON, SHARON HAS BEEN
ACTIVE.

80
00:05:36,910 --> 00:05:45,370
[APPLAUSE]
AND THERE ARE MOUNTAINS.

81
00:05:45,370 --> 00:05:46,370
YOU'LL ENJOY THAT.

82
00:05:46,370 --> 00:05:48,090
THIS SYSTEM IS AMAZING.

83
00:05:48,090 --> 00:05:53,500
NOW ALL OF OUR MOONS TODAY
RELATES TO THE SURFACES OF PLUTO

84
00:05:53,500 --> 00:05:55,170
AND ITS SATELLITES.

85
00:05:55,170 --> 00:05:59,630

WE'LL BE TALKING MORE ABOUT THE SURFACES IN THE PRESS EVENT ON

86

00:05:59,630 --> 00:06:02,630
FRIDAY DOWN AT NASA HEADQUARTERS, BUT WE'LL ALSO BE

87

00:06:02,630 --> 00:06:06,280
BRINGING IN ATMOSPHERIC RESULTS AT THAT POINT.

88

00:06:06,280 --> 00:06:11,080
I DO WANT TO ANNOUNCE ONE PIECE OF MOOD, THE ALICE ULTRAVIOLET

89

00:06:11,080 --> 00:06:15,430
SPECTROMETER GOT A GREAT DATA SET TO THE GROUND FROM THE UV

90

00:06:15,430 --> 00:06:18,530
SOLAR OBSERVATION, WHICH WE'RE ALREADY LEARNING ABOUT PLUTO'S

91

00:06:18,530 --> 00:06:22,450
ATMOSPHERE, SO STAY TUNED FOR FRIDAY ON THAT.

92

00:06:22,450 --> 00:06:24,450
SO WITH THAT, I'M GOING TO TURN IT OVER TO THE PROJECT

93

00:06:24,450 --> 00:06:25,450
SCIENTISTS.

94

00:06:25,450 --> 00:06:28,970
HOWARD IS GOING TO GIVE YOU A BIT OF HYDRO THERAPY.

95

00:06:28,970 --> 00:06:32,660
>> THANK YOU VERY MUCH, ALLEN.

96
00:06:32,660 --> 00:06:36,940
WELL, PLUTO AND SHARON ARE GOING
TO STEAL THE DAY TODAY.

97
00:06:36,940 --> 00:06:41,790
I MEAN, THIS IS -- THESE IMJ AS
YOU'LL SEE IN A FEW MINUTES, BUT

98
00:06:41,790 --> 00:06:46,530
LET'S NOT FORGET THAT PLUTO HAS
FOUR SMALL MOONS, AS WELL, THAT

99
00:06:46,530 --> 00:06:48,990
WE WANT TO COLLECT DATA ON.

100
00:06:48,990 --> 00:06:56,130
STARTING CLOSE TO PLUTO AND
GOING OUT, STYX, NIX, KERBOROS,

101
00:06:56,130 --> 00:06:58,220
AND HYDRA.

102
00:06:58,220 --> 00:07:04,570
WE GOT RESOLVED IMAGES OF HYDRA,
WHICH IS SHOWN TO ME HERE FROM

103
00:07:04,570 --> 00:07:08,770
THE NATIVE SCALE TWO MILES PER
PIXEL.

104
00:07:08,770 --> 00:07:12,310
THIS IS ABOUT THE SAME NUMBER OF
PIXELS ACROSS HYDRA THAT WE HAD

105
00:07:12,310 --> 00:07:17,890
ACROSS PLUTO IN MID-JUNE, SO
WE'RE ECSTATIC ABOUT THIS.

106

00:07:17,890 --> 00:07:22,610
PRIOR TO THE NEW HORIZONS
REVEALING OF HYDRA HERE, WE WERE

107
00:07:22,610 --> 00:07:25,800
COMPLETELY UNCERTAIN ABOUT HOW
BIG HYDRA WAS.

108
00:07:25,800 --> 00:07:29,380
IT COULD HAVE BEEN ANYWHERE FROM
20 MILES ACROSS TO ALMOST 100

109
00:07:29,380 --> 00:07:32,380
MILES ACROSS.

110
00:07:32,380 --> 00:07:33,590
NEW HORIZONS HAS MADE IT EASY.

111
00:07:33,590 --> 00:07:37,150
JUST COUNT THE NUMBER OF MIX ELS
ACROSS.

112
00:07:37,150 --> 00:07:45,390
28 BY 19 MILES, ELONGATED
OBJECT, HYDRA IS NOT A PLANET.

113
00:07:45,390 --> 00:07:49,890
ABOUT 30% LARGER IN ONE
DIMENSION THAN IN THE OTHER.

114
00:07:49,890 --> 00:07:54,090
THERE'S SOME VERY INTERESTING
THINGS, WE SEE SOME VARIATIONS

115
00:07:54,090 --> 00:07:55,090
ACROSS THE SURFACE.

116
00:07:55,090 --> 00:08:00,030
IF YOU GO TO THE NEXT SLIDE,
THIS SHOWS -- WHAT WE DID HERE

117

00:08:00,030 --> 00:08:03,960

WAS ACTUALLY SUB SAMPLE THE
IMAGE BY A FACTOR OF FOUR, SO

118

00:08:03,960 --> 00:08:09,240

FOUR TIMES SUB SAMPLED TO TAKE
AWAY THAT PIXELATED LOOK AND AS

119

00:08:09,240 --> 00:08:14,960

WELL AS CONTOURS SHOWING THE
BRIGHTNESS CHANGES AND WE TOOK

120

00:08:14,960 --> 00:08:18,570

CUTS ACROSS TO MEASURE THE --
THAT'S THE APPROXIMATE, YOU

121

00:08:18,570 --> 00:08:21,560

KNOW, PLACES WHERE YOU HAVE THE
LONGEST DIMENSION IN THE GREEN

122

00:08:21,560 --> 00:08:24,860

AND THE SHORTER DIMENSION IN THE
YELLOW.

123

00:08:24,860 --> 00:08:28,520

THE SURFACE OF HYDRA IS
SURPRISINGLY LARGE, YOU KNOW,

124

00:08:28,520 --> 00:08:33,729

IT'S ABOUT 45% REFLECTIVITY, SO
ABOUT 45% OF THE SUNLIGHT ONLY

125

00:08:33,729 --> 00:08:37,570

GETS REFLECTED AWAY, AND THAT
CAN ONLY MEAN THAT HYDRA'S

126

00:08:37,570 --> 00:08:41,530

SURFACE IS PROBABLY COMPOSED
PRIMARILY OF WATER ICE.

127

00:08:41,530 --> 00:08:49,350

IT'S THE ONLY WAY TO GET IT THAT
BRIGHT.

128

00:08:49,350 --> 00:08:51,090

AND THAT'S COOL.

129

00:08:51,090 --> 00:08:57,160

BETWEEN CHARON AND PLUTO, NICE
THING ABOUT WHAT WE HAVE, WE

130

00:08:57,160 --> 00:08:59,930

HAVE COMING UP ACTUALLY MORE
OBSERVATIONS OF HYDRA, WHICH

131

00:08:59,930 --> 00:09:02,450

WILL BE AT EVEN HIGHER
RESOLUTIONS BY A FACTOR OF TWO

132

00:09:02,450 --> 00:09:07,300

OR THREE BETTER, SO WE'RE
LOOKING FORWARD TO THOSE, BUT

133

00:09:07,300 --> 00:09:08,300

IT'S GREAT.

134

00:09:08,300 --> 00:09:12,500

WE'VE ALREADY SEEN HYDRA
REVEALED, AND IT LOOKS VERY

135

00:09:12,500 --> 00:09:13,500

INTERESTING.

136

00:09:13,500 --> 00:09:16,850

THANK YOU.

137

00:09:16,850 --> 00:09:23,410

>> VERY NICE.

138

00:09:23,410 --> 00:09:27,330

>> WILL GRUNDY LEADS OUR
COMPOSITION TEAM AND IS GOING TO

139

00:09:27,330 --> 00:09:30,480

REPORT SOME RESULTS THEY'VE
OBTAINED.

140

00:09:30,480 --> 00:09:37,000

>> SO, THE INSTRUMENT THAT WE'RE
RELYING ON MOSTLY FOR SURFACE

141

00:09:37,000 --> 00:09:40,930

COMPOSITIONS AND IT'S COMPOSED
OF TWO PARTS, THE COLOR CAMERA

142

00:09:40,930 --> 00:09:44,950

AND INFRARED IMAGING
SPECTROMETER CALLED LISA.

143

00:09:44,950 --> 00:09:48,180

WE DON'T GET ANY DATA DOWN TODAY
FROM EITHER OF THOSE

144

00:09:48,180 --> 00:09:51,880

INSTRUMENTS, AND SO WHAT I'M
SHOWING YOU IS DATA THAT CAME

145

00:09:51,880 --> 00:09:56,590

DOWN IN THE FAIL SAFE DATA SET
THAT CAME DOWN OVERNIGHT BETWEEN

146

00:09:56,590 --> 00:09:58,080

THE 12TH AND THE 13TH.

147

00:09:58,080 --> 00:09:59,760

SO THIS IS A LITTLE EARLIER.

148

00:09:59,760 --> 00:10:02,620
THIS IS A BASE MAP THAT'S JUST
SHOWING YOU THE GEOMETRY.

149
00:10:02,620 --> 00:10:06,380
YOU CAN SEE THAT THE HEART
REGION IS JUST ROTATING ON, SO

150
00:10:06,380 --> 00:10:07,840
THIS IS A LITTLE WHILE AGO.

151
00:10:07,840 --> 00:10:09,940
COULD I HAVE THE NEXT TIME
STAMPED?

152
00:10:09,940 --> 00:10:18,270
THIS IS AN OVERLAY OF LISA DATA,
SO WHAT I DID IS EACH OF THOSE

153
00:10:18,270 --> 00:10:23,190
LARGE BLOCKY PIXELS ABOUT 150
KILOMETERS ACROSS IS AN INFRARED

154
00:10:23,190 --> 00:10:26,360
SP
SPECTRUM, TELLING YOU WHAT THAT

155
00:10:26,360 --> 00:10:27,960
PIXEL IS MADE OUT OF.

156
00:10:27,960 --> 00:10:30,280
WE'RE GOING TO GET MUCH HIGHER
RESOLUTION DATA OF THIS, BUT

157
00:10:30,280 --> 00:10:33,210
THIS IS WHAT'S IN THE FAIL SAFE
DATA SET.

158
00:10:33,210 --> 00:10:38,360
THESE COLORS ARE THREE INFRARED

WAVELENGTHS, 256 INFRARED

159

00:10:38,360 --> 00:10:42,360

WAVELENGTHS, SO WE COULD MAKE AN ENORMOUS VARIETY OF COLOR MAPS

160

00:10:42,360 --> 00:10:45,020

TO PULL OUT COMPOSITIONAL INFORMATION.

161

00:10:45,020 --> 00:10:47,220

THIS PARTICULAR ONE IS FOCUSING ON METHANE.

162

00:10:47,220 --> 00:10:54,450

I PUT AN ABSORPTION BAND ABOUT 1.65 MICRONS INTO THE BLUE COLOR

163

00:10:54,450 --> 00:10:58,250

CHANNEL, A CONTINUAL REGION BETWEEN TWO METHANE BANDS INTO

164

00:10:58,250 --> 00:11:03,170

THE GREEN CHANNEL, AND A MUCH STRONGER METHANE BAND INTO THE

165

00:11:03,170 --> 00:11:04,170

RED CHANNEL.

166

00:11:04,170 --> 00:11:08,400

AND ALL I'M DOING HERE IS SHOWING, AGAIN, LOWER RESOLUTION

167

00:11:08,400 --> 00:11:11,590

THAN THE COLOR IMAGES YESTERDAY, THE DIVERSITY OF TERRAIN.

168

00:11:11,590 --> 00:11:15,170

WHAT I'M GOING TO DO NOW IS PICK OUT A SPECIFIC -- A COUPLE OF

169

00:11:15,170 --> 00:11:17,750

SPECIFIC REGIONS, ALTHOUGH YOU
CAN SEE THERE'S MANY DIFFERENT

170

00:11:17,750 --> 00:11:19,170

REGIONS HERE.

171

00:11:19,170 --> 00:11:21,190

SO IF I COULD GET THE NEXT TIME
STAMP, PLEASE.

172

00:11:21,190 --> 00:11:26,540

THESE TWO REGIONS OF INTEREST,
ONE IS A 3X3 PIXEL BLOCK, THE

173

00:11:26,540 --> 00:11:30,250

OTHER IS A SQUIGGLY THING IN ONE
OF THE DARK REGIONS, SO I'M

174

00:11:30,250 --> 00:11:34,300

CONCENTRATING ON THE POLAR CAP
AND ON ONE OF THE DARK REGIONS,

175

00:11:34,300 --> 00:11:37,410

AND IF WE GO TO THE LAST TIME
STAMP I HAVE, THESE ARE THE TWO

176

00:11:37,410 --> 00:11:39,630

SPECTRA YOU PULL OUT AND YOU CAN
SEE THEY ARE QUITE DIFFERENT

177

00:11:39,630 --> 00:11:40,630

FROM EACH OTHER.

178

00:11:40,630 --> 00:11:45,220

THEY BOTH HAVE METHANE, BUT THE
OVERALL SHAPE OF THE SPECTRUM IS

179

00:11:45,220 --> 00:11:50,880
VERY DIFFERENT, AND WE CAN
REALLY BE SPENDING YEARS

180
00:11:50,880 --> 00:11:53,310
MODELING THESE AND THINKING
ABOUT WHAT THEY TELL US.

181
00:11:53,310 --> 00:11:54,820
THERE'S A LOT OF INFORMATION.

182
00:11:54,820 --> 00:11:57,380
WE ONLY HAVE A SMALL SUBSET OF
THE WAVELENGTHS AT THIS POINT,

183
00:11:57,380 --> 00:12:02,480
BECAUSE WE JUST DON'T HAVE THE
BANDWIDTH TO GET MORE DOWN.

184
00:12:02,480 --> 00:12:07,000
BUT THIS IS PROVIDING A LOT OF
INFORMATION ABOUT THE DIFFERENT

185
00:12:07,000 --> 00:12:10,310
REGIONS AND HOW THEY WORK.

186
00:12:10,310 --> 00:12:16,250
>> THANK YOU, WILL.

187
00:12:16,250 --> 00:12:19,290
[APPLAUSE]
YESTERDAY WE SHOWED YOU A

188
00:12:19,290 --> 00:12:24,180
BEAUTIFUL IMAGE OF PLUTO THAT
HAS MADE NOT JUST BEFORE THE

189
00:12:24,180 --> 00:12:27,000
CLOSEST APPROACH, AND SENT TO
THE GROUND AS PART OF THE FAIL

190

00:12:27,000 --> 00:12:28,720

SAFE DATA SETS.

191

00:12:28,720 --> 00:12:32,500

TODAY WE'RE GOING TO SHOW AN
IMAGE OF A SIMILAR RESOLUTION ON

192

00:12:32,500 --> 00:12:35,690

THE BIG SATELLITE CHARON AND
DEPUTY PROJECT SCIENTIST IS

193

00:12:35,690 --> 00:12:38,930

GOING TO DISCUSS THOSE RESULTS.

194

00:12:38,930 --> 00:12:42,900

>> SO ORIGINALLY I THOUGHT
CHARON MIGHT BE AN ANCIENT

195

00:12:42,900 --> 00:12:45,029

TERRAIN COVERED IN CRATERS.

196

00:12:45,029 --> 00:12:48,350

MANY PEOPLE ON THE TEAM THOUGHT
THAT MIGHT HAVE BEEN THE CASE,

197

00:12:48,350 --> 00:12:52,751

AND SO CHARON JUST BLEW OUR
SOCKS OFF WHEN WE HAD THE NEW

198

00:12:52,751 --> 00:12:53,830

IMAGE TODAY.

199

00:12:53,830 --> 00:12:59,360

SO IF WE CAN PULL IT UP SO YOU
CAN TAKE A LOOK AT IT.

200

00:12:59,360 --> 00:13:02,800

YEAH.

201

00:13:02,800 --> 00:13:11,780

[APPLAUSE]

SO WE HAVE BEEN THRILLED ALL

202

00:13:11,780 --> 00:13:13,620

MORNING.

203

00:13:13,620 --> 00:13:15,870

THE TEAM HAS JUST BEEN A BUZZ.

204

00:13:15,870 --> 00:13:17,050

LOOK AT THIS, LOOK AT THAT.

205

00:13:17,050 --> 00:13:18,839

OH, MY GOD, THAT'S AMAZING.

206

00:13:18,839 --> 00:13:22,910

SO I'LL WALK YOU GUYS THROUGH
SOME OF THE THINGS WE'VE SEEN IN

207

00:13:22,910 --> 00:13:25,900

THE IMAGE AND TELL YOU WHAT
WE'RE THINKING ABOUT.

208

00:13:25,900 --> 00:13:28,920

AND I'M GOING TO START IN THE
NORTH AND KIND OF WORK MY WAY

209

00:13:28,920 --> 00:13:30,040

DOWN.

210

00:13:30,040 --> 00:13:37,220

SO YOU'VE SEEN THE DARKISH AREA
THAT IS AT THE NORTH POLE, AND

211

00:13:37,220 --> 00:13:40,070

INFORMALLY WE'VE BEEN REFERRING
TO THAT AS MORDOR.

212

00:13:40,070 --> 00:13:44,860

SO THAT'S AWESOME.

213

00:13:44,860 --> 00:13:50,270

SO MORDOR IS THE DARKISH AREA
NEAR THE POLE, AND YOU CAN SEE

214

00:13:50,270 --> 00:13:55,930

THIS IS A NATURAL COLOR IMAGE,
AND SO THE RED AROUND IT, THE

215

00:13:55,930 --> 00:14:00,930

RED COLORING THAT WE'VE SEEN,
EXTENDS BEYOND JUST THE DEEPEST

216

00:14:00,930 --> 00:14:05,839

DARKEST PART OF THAT POLAR
REGION MORDOR, AND WE THINK THAT

217

00:14:05,839 --> 00:14:09,680

THE DARK COLORING COULD PERHAPS
BE A THIN VENEER.

218

00:14:09,680 --> 00:14:15,640

YOU CAN SEE LOCATIONS AT THE
NORTH POLE WHERE A CRATER HAS

219

00:14:15,640 --> 00:14:20,850

PERHAPS DUG INTO THAT REGION AND
EXCAVATED UNDERNEATH IT.

220

00:14:20,850 --> 00:14:24,500

SO YOU CAN SEE THOSE BRIGHTER
REGIONS THAT MAY BE CRATERS, AND

221

00:14:24,500 --> 00:14:27,770

SO THAT'S PART OF THE REASON WHY
I SAY WE THINK IT COULD BE A

222

00:14:27,770 --> 00:14:29,730

THIN VENEER.

223

00:14:29,730 --> 00:14:34,740

SO LET'S SEE, AND ALSO YOU CAN
SEE THAT THAT AREA IS KIND OF A

224

00:14:34,740 --> 00:14:41,500

POLYGON SHAPE AND THE RED COLOR
IS MORE DIFFUSED AROUND IT.

225

00:14:41,500 --> 00:14:46,310

MOVING DOWN ACROSS A LITTLE BIT
LOWER GOING FROM THE NORTHEAST

226

00:14:46,310 --> 00:14:52,170

TO THE SOUTHWEST IS A SERIES OF
TROUGH AND CLIFFS, AND THAT'S

227

00:14:52,170 --> 00:14:54,160

JUST STRIKING TO ME.

228

00:14:54,160 --> 00:14:56,490

IT'S AMAZING TO SEE THIS IMAGE.

229

00:14:56,490 --> 00:15:01,470

THEY EXTEND ABOUT 600 MILES
ACROSS THE PLANET, SO THIS IS A

230

00:15:01,470 --> 00:15:06,980

HUGE AREA, AND IT COULD BE THAT
IT'S DUE TO INTERNAL PROCESSING,

231

00:15:06,980 --> 00:15:11,680

AND WE'LL BE LOOKING AT THAT IN
MORE DETAIL.

232

00:15:11,680 --> 00:15:16,050

JUST BELOW THAT REGION, THE LINE

THAT YOU SEE CUTTING ACROSS FROM

233

00:15:16,050 --> 00:15:20,690

THE NORTHEAST TO THE SOUTHWEST,
MORE EAST/WEST THAN NORTH/SOUTH,

234

00:15:20,690 --> 00:15:24,430

IS A REGION WHERE IT'S
RELATIVELY SMOOTH, THERE'S LESS

235

00:15:24,430 --> 00:15:30,120

CRATERS, SO PERHAPS IT'S BEEN
GEOLOGICALLY ACTIVE OR RECENTLY

236

00:15:30,120 --> 00:15:32,250

RESURFACING THAT AREA.

237

00:15:32,250 --> 00:15:36,080

SO THAT'S VERY EXCITING TO SEE,
AS WELL.

238

00:15:36,080 --> 00:15:39,180

TWO FEATURES THAT I WANT TO GO
BACK UP A LITTLE BIT HIGHER ON

239

00:15:39,180 --> 00:15:44,400

THE NEAR THE TOP AT ABOUT THE
2:00 POSITION YOU SEE A CANYON.

240

00:15:44,400 --> 00:15:47,920

YOU CAN SEE A LONG LINEAR
FEATURE, AND YOU CAN ACTUALLY AT

241

00:15:47,920 --> 00:15:51,940

THE VERY TOP SEE KIND OF A NOTCH
WHERE YOU'RE LOOKING THROUGH TO

242

00:15:51,940 --> 00:15:54,279

THE SPACE ON THE OTHER SIDE.

243

00:15:54,279 --> 00:15:57,279

AND THAT CANYON IS REALLY QUITE DEEP.

244

00:15:57,279 --> 00:16:00,540

IT'S ABOUT FOUR TO SIX MILES DEEP.

245

00:16:00,540 --> 00:16:04,160

I FIND THAT FASCINATING.

246

00:16:04,160 --> 00:16:10,240

SO IT'S A SMALL WORLD WITH DEEP CANYONS, TROUGHS, CLIFFS, DARK

247

00:16:10,240 --> 00:16:14,310

REGIONS THAT ARE STILL SLIGHTLY MYSTERIOUS TO US.

248

00:16:14,310 --> 00:16:18,310

THERE'S ANOTHER CANYON ON THE OTHER SIDE, IT MAY BE THE 10:00

249

00:16:18,310 --> 00:16:22,840

OR 11:00 POSITION, AND THAT ONE IS ABOUT THREE MILES DEEP.

250

00:16:22,840 --> 00:16:28,040

THERE IS SO MUCH INTERESTING SCIENCE IN THIS ONE IMAGE ALONE,

251

00:16:28,040 --> 00:16:32,720

AND WE HAVE HIGHER RESOLUTION IMAGE THAT WE'LL GET THAT WON'T

252

00:16:32,720 --> 00:16:36,260

COVER THE WHOLE -- ALL OF CHARON, BUT IT WILL CUT ACROSS

253

00:16:36,260 --> 00:16:41,170
THE NORTHERN PART AND IT WILL
GET SOME OF THE DARK AREA AND

254
00:16:41,170 --> 00:16:43,390
THEN SOME OF THE MIDDLE AREA.

255
00:16:43,390 --> 00:16:48,180
AND IT'S GOING TO BE ABOUT
FACTOR OF FIVE BETTER IN

256
00:16:48,180 --> 00:16:49,390
RESOLUTION.

257
00:16:49,390 --> 00:16:53,520
SO AS WE'VE BEEN SAYING, PLUTO
DID NOT DISAPPOINT.

258
00:16:53,520 --> 00:16:58,220
I CAN ADD THAT CHARON DID NOT
DISAPPOINT EITHER.

259
00:16:58,220 --> 00:17:03,339
THANK YOU.

260
00:17:03,339 --> 00:17:09,179
[APPLAUSE]
>> WELL, YESTERDAY WHEN WE

261
00:17:09,179 --> 00:17:14,399
SHOWED THAT BEAUTIFUL IMAGE OF
PLUTO, WE NOTED WE WOULD HAVE

262
00:17:14,399 --> 00:17:17,299
IMAGERY WITH TEN TIMES
RESOLUTION ON THE GROUND BY

263
00:17:17,299 --> 00:17:18,299
TODAY.

264

00:17:18,299 --> 00:17:21,699

IN FACT, JOHN SPENCER'S GOING TO
TELL US ABOUT THE FIRST, JUST

265

00:17:21,699 --> 00:17:26,709

THE FIRST FRAME OF THAT MSAIC
THAT'S ON THE GROUND THAT'S

266

00:17:26,709 --> 00:17:28,779

ALREADY GIVING US A BIG
SURPRISE.

267

00:17:28,779 --> 00:17:29,779

JOHN?

268

00:17:29,779 --> 00:17:30,779

>> THANK YOU, ALLEN.

269

00:17:30,779 --> 00:17:33,850

SO, YEAH, WE GOT A WHOLE BUNCH
OF HIGH RESOLUTION OBSERVATIONS

270

00:17:33,850 --> 00:17:37,500

NOW SAFELY ONBOARD THE
SPACECRAFT, AND THIS IS JUST A

271

00:17:37,500 --> 00:17:41,990

TASTE, ONE SMALL PART OF ONE OF
THOSE OBSERVATIONS.

272

00:17:41,990 --> 00:17:45,840

AND IF I CAN HAVE THE FIRST
SLIDE, DON'T GET EXCITED YET,

273

00:17:45,840 --> 00:17:51,809

THIS IS WHAT YOU -- THIS IS WHAT
WE SAW YESTERDAY, AND THIS IS

274

00:17:51,809 --> 00:17:58,070

SPECTACULAR IMAGE, BUT WE NOW
ARE FOCUSING IN ON SMALL DETAILS

275

00:17:58,070 --> 00:18:00,450

ON THIS AMAZING WORLD.

276

00:18:00,450 --> 00:18:03,820

BEFORE I GO TO THAT, I SHOULD
SAY THAT WE NOW HAVE AN INFORMAL

277

00:18:03,820 --> 00:18:09,570

NAME FOR THE HEART, THE HEART IS
A GOOD NAME, BUT WE WANT TO

278

00:18:09,570 --> 00:18:12,729

HONOR THE DISCOVERER OF PLUTO
AND WE ARE CALLING THIS --

279

00:18:12,729 --> 00:18:47,059

[APPLAUSE]

AND SO IF I CAN HAVE THE SLIDE

280

00:18:47,059 --> 00:18:52,720

BACK, WE ARE NOW GOING TO FOCUS
ON A SMALL REGION JUST NEAR THE

281

00:18:52,720 --> 00:18:55,560

BOTTOM OF THIS IMAGE, WHICH IS
NEAR THE DAY/NIGHT LINE WHERE WE

282

00:18:55,560 --> 00:19:02,239

HAVE SHADING THAT THROWS THE
RELIEF INTO SHARP FOCUS, AND SO

283

00:19:02,239 --> 00:19:05,259

WE'RE GOING TO BE FOCUSING ON AN
AREA JUST A LITTLE BIT TO THE

284

00:19:05,259 --> 00:19:11,090

LEFT OF THE BOTTOM OF THE FRAME,

AND IF WE CAN NOW RUN THE MOVIE.

285

00:19:11,090 --> 00:19:19,100

OKAY, ZOOMING IN ON THIS AREA.

286

00:19:19,100 --> 00:19:33,999

HERE'S THE IMAGE, HERE IT COMES.

287

00:19:33,999 --> 00:19:43,379

[APPLAUSE]

YEAH, THAT WAS OUR REACTION,

288

00:19:43,379 --> 00:19:45,009

TOO.

289

00:19:45,009 --> 00:19:52,170

SO THIS IS A SMALL PART THAT
COVERS THE WHOLE AND REGIONS

290

00:19:52,170 --> 00:19:55,590

AROUND IT, COVERING QUITE A
VARIETY OF TERRAIN, BUT THIS IS

291

00:19:55,590 --> 00:19:58,370

ONE OF THE FIRST THINGS THAT
REALLY CAUGHT OUR ATTENTION.

292

00:19:58,370 --> 00:20:01,779

THIS AREA, AS YOU CAN SEE FROM
THE SCALE, IS ABOUT 150 MILES

293

00:20:01,779 --> 00:20:02,779

ACROSS.

294

00:20:02,779 --> 00:20:04,629

WE'VE SEEN FEATURES AS SMALL AS
HALF A MILE HERE.

295

00:20:04,629 --> 00:20:10,230

YOU COULD SEE THE APL CAMPUS ON
THIS KIND OF IMAGE.

296

00:20:10,230 --> 00:20:15,080

THERE ARE MANY STUNNING THINGS,
BUT THE MOST STRIKING

297

00:20:15,080 --> 00:20:18,460

GEOLOGICALLY IS WE HAVE NOT YET
FOUND A SINGLE IMPACT CRATER ON

298

00:20:18,460 --> 00:20:19,710

THIS IMAGE.

299

00:20:19,710 --> 00:20:25,130

THIS MEANS THIS IS A VERY YOUNG
SURFACE, BECAUSE PLUTO HAS BEEN

300

00:20:25,130 --> 00:20:29,070

BOMBARDED BY OTHER OBJECTS IN
THE KUIPER BELT AND CRATERS

301

00:20:29,070 --> 00:20:30,130

HAPPEN.

302

00:20:30,130 --> 00:20:34,739

SO WE JUST EYEBALLING IT, WE
THINK IT HAS TO BE PROBABLY LESS

303

00:20:34,739 --> 00:20:37,980

THAN 100 MILLION YEARS OLD,
WHICH IS A SMALL FRACTION OF THE

304

00:20:37,980 --> 00:20:41,490

4.5 BILLION AGE OF THE SOLAR
SYSTEM.

305

00:20:41,490 --> 00:20:48,309

RIGHT NOW, WITH NO CRATERS, HOW
ACTIVE IT MIGHT BE.

306

00:20:48,309 --> 00:20:51,059

THESE MOUNTAINS HERE THAT WE'RE
SEEING ARE QUITE SPECTACULAR.

307

00:20:51,059 --> 00:20:55,799

THESE ARE UP TO 11,000 FEET
HIGH, MAYBE HIGHER ONES

308

00:20:55,799 --> 00:20:57,340

ELSEWHERE.

309

00:20:57,340 --> 00:21:01,950

NOW WE KNOW THE SURFACE OF PLUTO
IS COVERED IN LOTS OF NITROGEN,

310

00:21:01,950 --> 00:21:05,279

ICE, METHANE ICE, CARBON
MONOXIDE ICE.

311

00:21:05,279 --> 00:21:07,279

YOU CAN'T MAKE MOUNTAINS OUT OF
THAT STUFF.

312

00:21:07,279 --> 00:21:10,409

IT'S TOO SOFT, DOESN'T HAVE THE
STRENGTH TO MAKE MOUNTAINS, SO

313

00:21:10,409 --> 00:21:14,100

WE'RE SEEING THE DEAD ROCK OR
BED OF ICE OF PLUTO.

314

00:21:14,100 --> 00:21:19,739

WE'RE SEEING THE ICY CRUST OF
PLUTO TEMPERATURES TO HOLD UP

315

00:21:19,739 --> 00:21:23,950

BIG MOUNTAINS AND THAT'S WHAT WE
THINK WE ARE SEEING HERE.

316

00:21:23,950 --> 00:21:26,690

SO THEN THE NITROGEN AND THE
METHANE ARE JUST A COATING ON

317

00:21:26,690 --> 00:21:30,519

TOP OF THE ICY BEDROCK, AND
WE'RE SEEING THAT HERE.

318

00:21:30,519 --> 00:21:34,700

NOW, WHAT'S PARTICULARLY
EXCITING TO ME ABOUT THIS IS,

319

00:21:34,700 --> 00:21:37,299

THIS IS THE FIRST TIME WE'VE
SEEN AN ICY WORLD THAT'S NOT

320

00:21:37,299 --> 00:21:38,649

ORBITING A GIANT PLANET.

321

00:21:38,649 --> 00:21:42,039

ALL THE OTHERS HAVE BEEN MOONS
OF GIANT PLANETS.

322

00:21:42,039 --> 00:21:47,059

AND WE SEE STRANGE GEOLOGICAL
FEATURES ON MANY OF THESE MOONS

323

00:21:47,059 --> 00:21:53,039

AND WE USUALLY ATTRIBUTE THIS TO
TIDAL HEAPING, DEFAMATION OF

324

00:21:53,039 --> 00:21:55,490

THESE WORLDS BY THE GRAVITY OF
THAT GIANT PLANET AND

325

00:21:55,490 --> 00:21:57,360

INTERACTIONS WITH OTHER MOONS.

326

00:21:57,360 --> 00:21:59,399

THAT CAN'T HAPPEN ON PLUTO.

327

00:21:59,399 --> 00:22:04,869

THERE'S NO GIANT BODY ON AN
ONGOING REGULAR BASIS TO KEEP

328

00:22:04,869 --> 00:22:05,869

THE INTERIOR.

329

00:22:05,869 --> 00:22:08,139

CHARON IS JUST TOO SMALL TO DO
THAT.

330

00:22:08,139 --> 00:22:12,659

THIS IS TELLING US YOU DO NOT
NEED TIDAL HEATING TO POWER

331

00:22:12,659 --> 00:22:15,610

ONGOING GEOLOGICAL ACTIVITY ON
ICY WORLDS.

332

00:22:15,610 --> 00:22:31,659

THAT'S A VERY IMPORTANT
DISCOVERY WE JUST MADE THIS

333

00:22:31,659 --> 00:22:38,759

MORNING.

334

00:22:38,759 --> 00:22:48,260

[APPLAUSE]

SO I KNOW THIS IS JUST A FIRST

335

00:22:48,260 --> 00:22:51,190

OF THE MANY AMAZING LESSONS
WE'RE GOING TO GET FROM PLUTO

336

00:22:51,190 --> 00:22:52,570

AND THERE WILL BE MORE ON
FRIDAY.

337

00:22:52,570 --> 00:22:58,100

WE'LL HAVE MORE OF THIS TO SHOW
YOU ON FRIDAY, WHICH IS GOING TO

338

00:22:58,100 --> 00:23:01,039

SHOW EQUALLY AMAZING THINGS, I'M
SURE, SO STAY TUNED.

339

00:23:01,039 --> 00:23:03,809

>> I'M GOING TO FOLLOW UP ON
THIS SAME IMAGE, SO WE CAN LEAVE

340

00:23:03,809 --> 00:23:06,749

IT ON THE SCREEN FOR YOU TO
ENJOY.

341

00:23:06,749 --> 00:23:10,559

I'LL TELL YOU ANOTHER COUPLE OF
IMPLICATIONS THAT WE'VE REACHED

342

00:23:10,559 --> 00:23:13,960

AS A RESULT OF THIS DISCOVERY.

343

00:23:13,960 --> 00:23:17,100

JUST TO EXPAND ON WHAT JOHN LAST
SAID, WHICH WAS VERY, VERY

344

00:23:17,100 --> 00:23:21,559

IMPORTANT, WE NOW HAVE AN
ISOLATED SMALL PLANET THAT'S

345

00:23:21,559 --> 00:23:26,009

SHOWING ACTIVITY AFTER FOUR AND
A HALF BILLION YEARS.

346

00:23:26,009 --> 00:23:29,629

WE THOUGHT THIS MIGHT BE THE
CASE AFTER VOYAGER 2 DISCOVERED

347

00:23:29,629 --> 00:23:36,190
THE TRITEN ORBITING NEPTUNE
VIRTUALLY HAD NO IMPACT CRATERS,

348

00:23:36,190 --> 00:23:40,369
BUT WE COULDN'T BE SURE BECAUSE
OF THE REASON JOHN SAID, THERE'S

349

00:23:40,369 --> 00:23:46,370
ALWAYS AN OUT THAT TIDAL ENERGY
COULD HAVE POWERED ACTIVITY,

350

00:23:46,370 --> 00:23:51,039
TIDAL ENERGY DUE TO BREAKING
ORBIT AROUND NEPTUNE COULD HAVE

351

00:23:51,039 --> 00:23:59,139
BEEN POWERING THE ACTIVITY ON
TRITEN.

352

00:23:59,139 --> 00:24:02,710
NOW WE'VE SETTLED THE FACT THESE
VERY SMALL PLANETS CAN BE VERY

353

00:24:02,710 --> 00:24:06,129
ACTIVE AFTER A LONG TIME AND
IT'S GOING TO SEND A LOT OF

354

00:24:06,129 --> 00:24:08,639
GEOPHYSICISTS BACK TO THE
DRAWING BOARD TO TRY TO

355

00:24:08,639 --> 00:24:12,779
UNDERSTAND HOW EXACTLY YOU DO
THAT.

356

00:24:12,779 --> 00:24:16,109
THERE'S ANOTHER IMPLICATION, AND
SOMETIMES THINGS WORK OUT IN

357

00:24:16,109 --> 00:24:17,109
SCIENCE.

358
00:24:17,109 --> 00:24:20,820
A COUPLE OF MONTHS AGO IN MAY,
KELCE SINGER, POST-DOC ON THIS

359
00:24:20,820 --> 00:24:28,749
PROJECT AND MYSELF MADE SOME
PREDICTIONS.

360
00:24:28,749 --> 00:24:35,159
TO FOLLOW UP ON THAT, AS JOHN
SAID, STEEP TOPOGRAPHY MEANS THE

361
00:24:35,159 --> 00:24:38,830
BEDROCK THAT MAKES THOSE
MOUNTAINS MUST BE MADE OF H₂O,

362
00:24:38,830 --> 00:24:39,830
OF WATER ICE.

363
00:24:39,830 --> 00:24:44,909
EVEN BEFORE THE COMPOSITION TEAM
TELLS US THAT THEY FOUND PLACES

364
00:24:44,909 --> 00:24:49,440
WHERE THE NITROGEN VENEER HAS
BEEN ERODED OR SCRAPED OFF AND

365
00:24:49,440 --> 00:24:53,009
WE SEE WATER ICE ON PLUTO FOR
THE FIRST TIME, WE CAN BE VERY

366
00:24:53,009 --> 00:24:57,039
SURE THAT THE WATER IS THERE IN
GREAT ABUNDANCE.

367
00:24:57,039 --> 00:24:59,440
AND ACTUALLY MODELS PREDICTED

THAT, BUT IT'S NICE TO SEE IT

368

00:24:59,440 --> 00:25:00,619

DRIVEN HOME.

369

00:25:00,619 --> 00:25:04,609

WELL, THE OTHER THING THAT
MEANS, AS JOHN SAID, IS THE

370

00:25:04,609 --> 00:25:08,730

VOLATILES ARE JUST A FROSTING,
JUST A VENEER ON THE SURFACE.

371

00:25:08,730 --> 00:25:13,129

NOW, THE STICKY POINT IN THIS IS
THAT PLUTO'S ATMOSPHERE IS BEING

372

00:25:13,129 --> 00:25:17,909

LOST IN SPACE AT A RATE OF A FEW
TIMES TEN TO THE 27TH MOLECULES

373

00:25:17,909 --> 00:25:23,720

PER SECOND, TONS PER SECOND, AND
OVER THE AGE OF THE SOLAR

374

00:25:23,720 --> 00:25:31,229

SYSTEM, THAT EQUIVALENT LAYER OF
300 METERS OF NITROGEN AND THREE

375

00:25:31,229 --> 00:25:34,389

KILOMETERS OF NITROGEN.

376

00:25:34,389 --> 00:25:39,769

SO IF WE ONLY SEE A VENEER,
WHICH WE NOW KNOW WHAT'S GOING

377

00:25:39,769 --> 00:25:45,190

ON, WHAT KELSEY AND I PREDICTED
IN THAT PAPER IS THAT IF WE SAW

378

00:25:45,190 --> 00:25:48,590

STEEP TOPOGRAPHY ON PLUTO AND,
THEREFORE, SEEING ONLY A

379

00:25:48,590 --> 00:25:52,610

VOLATILE VENEER, THERE MUST BE
INTERNAL ACTIVITY THAT'S

380

00:25:52,610 --> 00:25:57,799

DREDGING NITROGEN UP THROUGH
GEYSERS OR SOME OTHER PROCESS

381

00:25:57,799 --> 00:26:01,720

THAT'S ACTIVE INTO THE PRESENT
ON THIS PLANET.

382

00:26:01,720 --> 00:26:07,570

NOW WE HAVEN'T FOUND GEYSERS,
AND WE HAVEN'T FOUND VOLCANOS,

383

00:26:07,570 --> 00:26:10,960

BUT THIS IS VERY STRONG EVIDENCE
THAT WILL SEND US LOOKING AS WE

384

00:26:10,960 --> 00:26:15,460

GET MORE AND MORE DATA ACROSS
THE SURFACE OF THE HEMISPHERE TO

385

00:26:15,460 --> 00:26:18,510

LOOK FOR EVIDENCE OF EXACTLY
THESE PHENOMENA.

386

00:26:18,510 --> 00:26:22,629

INTERESTINGLY ENOUGH, THAT PAPER
SUBMITTED IN MAY WAS ACCEPTED

387

00:26:22,629 --> 00:26:25,259

TODAY.

388

00:26:25,259 --> 00:26:30,529

HOW'S THAT?

389

00:26:30,529 --> 00:26:34,220

[APPLAUSE]

AND I SHOULD POINT OUT THAT THE

390

00:26:34,220 --> 00:26:38,320

EDITOR OF THE JOURNAL IS ONLY
LEARNING THE RESULTS COMING TO

391

00:26:38,320 --> 00:26:41,240

YOU NOW BECAUSE SHE'S WATCHING
IT.

392

00:26:41,240 --> 00:26:43,299

ALL RIGHT.

393

00:26:43,299 --> 00:26:47,330

THAT SUMMARIZES THE PRIMARY
THINGS THAT WE WANT TO TELL YOU

394

00:26:47,330 --> 00:26:49,399

ABOUT TODAY THAT LANDED JUST
THIS MORNING.

395

00:26:49,399 --> 00:26:53,450

EACH OF THESE IMAGES AND DATA
SETS HAVE A LOT MORE TO TELL US

396

00:26:53,450 --> 00:26:56,999

ABOUT PLUTO'S HISTORY AND ABOUT
SMALL PLANETS AND HOW THEY ARE

397

00:26:56,999 --> 00:26:58,100

FORMED AND EVOLVE.

398

00:26:58,100 --> 00:27:02,179

I JUST WANT TO MAKE ONE MORE
COMMENT ABOUT REGIO.

399

00:27:02,179 --> 00:27:06,570

YOU KNOW, WE COULD SEE THE HEART
VERY FAR FROM PLUTO.

400

00:27:06,570 --> 00:27:10,650

WHEN WE WERE STILL 70 MILLION
MILES OUT AND ONLY BARELY

401

00:27:10,650 --> 00:27:14,229

RESOLVING THE PLANET, LITTLE
BETTER THAN HUBBLE COULD DO FROM

402

00:27:14,229 --> 00:27:18,879

3 BILLION MILES AWAY, YOU CAN
SEE THAT SHINING LIKE A BEACON.

403

00:27:18,879 --> 00:27:22,019

AND BECAUSE IT'S THE BRIGHTEST
AND MOST PROMINENT FEATURE ON

404

00:27:22,019 --> 00:27:29,229

THE PLANET, THAT'S WHY WE WANT
TO INFORMALLY CALL IT REGIO FOR

405

00:27:29,229 --> 00:27:33,699

THE DISCOVERER OF PLUTO.

406

00:27:33,699 --> 00:27:48,769

>> LADIES AND GENTLEMEN, BEFORE
WE TAKE QUESTIONS FOR THE MEDIA

407

00:27:48,769 --> 00:27:51,510

HERE AND ON THE PHONE LINES AND
SOCIAL MEDIA, I WANT TO TAKE A

408

00:27:51,510 --> 00:27:58,669

MOMENT TO SAY IT HAS BEEN A
REMARKABLE WEEK.

409

00:27:58,669 --> 00:28:02,059

IT HAS BEEN MAGICAL, AND AS WE
TRANSITION FROM THE JOHNS

410

00:28:02,059 --> 00:28:05,549

HOPKINS APPLIED PHYSICS
LABORATORY HERE TO NASA

411

00:28:05,549 --> 00:28:09,809

HEADQUARTERS PRESS CONFERENCES,
THE WORLD HAS BEEN WATCHING,

412

00:28:09,809 --> 00:28:10,929

DR.

413

00:28:10,929 --> 00:28:15,159

JOHN RUMSFELD, FIVE-TIME
SPACE SHUTTLE FLOWN ASTRONAUT,

414

00:28:15,159 --> 00:28:19,320

HUBBLE REPAIRMAN, AND HEAD OF
SCIENCE FICTION DIRECTORATE OF

415

00:28:19,320 --> 00:28:23,019

MORE THAN 100, ALMOST 100
MISSIONS WITH NEW HORIZONS BEING

416

00:28:23,019 --> 00:28:27,179

ONE OF THEM, HE IS A HOUSEHOLD
WORD, HOUSEHOLD NAME IN

417

00:28:27,179 --> 00:28:31,609

HOUSEHOLDS NATIONALLY AND
INTERNATIONALLY.

418

00:28:31,609 --> 00:28:35,760

ALLEN STERN, YES, YOU ARE,
EXCLAMATION POINT, AND THE NEW

419

00:28:35,760 --> 00:28:39,940
HORIZONS TEAM, AND THE JOHNS
HOPKINS APPLIED PHYSICS

420
00:28:39,940 --> 00:28:43,860
LABORATORY HOUSEHOLD NAME, SHOW
THE WORLD HOW MUCH YOU

421
00:28:43,860 --> 00:28:47,700
APPRECIATE THAT AND WHAT THEY
HAVE DONE THIS WEEK WITH A NICE

422
00:28:47,700 --> 00:28:55,720
AND LOUD AS YOU CAN ROUND OF
APPLAUSE FOR THEIR

423
00:28:55,720 --> 00:29:01,140
ACCOMPLISHMENTS.

424
00:29:01,140 --> 00:29:33,690
[CHEERS AND APPLAUSE]
[CHEERS AND APPLAUSE]

425
00:29:33,690 --> 00:29:45,539
OKAY, NOW, LET'S GET TO THE
QUESTIONS.

426
00:29:45,539 --> 00:29:48,679
IF YOU CAN RAISE YOUR HAND HIGH,
WE HAVE A FULL HOUSE.

427
00:29:48,679 --> 00:29:52,100
I WANT TO MAKE SURE I CAN GET AS
MANY AS I CAN TO SEE YOU

428
00:29:52,100 --> 00:29:53,739
CLEARLY.

429
00:29:53,739 --> 00:29:57,549
LET'S START WITH HERE AND WAIT

FOR THE MIC AND GIVE YOUR NAME

430

00:29:57,549 --> 00:29:59,379

AND AFFILIATION, PLEASE.

431

00:29:59,379 --> 00:30:01,429

>> THANKS, IRENE WITH REUTERS.

432

00:30:01,429 --> 00:30:05,399

THERE'S A LOT TO DIGEST, BUT --
SO, I GUESS ONE OF THE FIRST

433

00:30:05,399 --> 00:30:06,999

QUESTIONS I HAVE IS FOR CATHY.

434

00:30:06,999 --> 00:30:13,879

DOES THE REALIZATION CHARON IS
ACTIVE HAVE ANY IMPLICATION FOR

435

00:30:13,879 --> 00:30:20,899

THE ORIGIN THEORY THAT IT WAS A
SPLAT OFF PLUTO AND ANOTHER

436

00:30:20,899 --> 00:30:22,720

BODY?

437

00:30:22,720 --> 00:30:24,530

THANKS.

438

00:30:24,530 --> 00:30:32,669

>> I DON'T THINK THERE -- I
DON'T KNOW QUITE YET.

439

00:30:32,669 --> 00:30:36,869

AT THE TOP OF MY HEAD, IT'S THAT
I WAS THINKING WE WOULD SEE LOTS

440

00:30:36,869 --> 00:30:40,529

OF CRATERS AND THAT WOULD TELL

US SOMETHING ABOUT HOW LONG AGO

441

00:30:40,529 --> 00:30:43,710

CHARON CREATED AND THAT WOULD
TELL US SOMETHING ABOUT THAT

442

00:30:43,710 --> 00:30:47,580

GIANT IMPACT, BUT THAT WE DON'T
SEE THOSE CRATERS MAKES THAT

443

00:30:47,580 --> 00:30:49,769

DIFFICULT TO DO.

444

00:30:49,769 --> 00:30:54,779

BUT I DON'T KNOW THAT WE ARE
GOING TO HAVE TO PUT OUR

445

00:30:54,779 --> 00:30:59,129

THINKING CAPS ON AND UNDERSTAND
HOW THIS ALL FITS TOGETHER AND

446

00:30:59,129 --> 00:31:00,129

WHAT IT MEANS.

447

00:31:00,129 --> 00:31:05,599

SO THIS IMAGE JUST CAME DOWN
TODAY, AND WE'RE MAKING A LOT OF

448

00:31:05,599 --> 00:31:11,259

IT RIGHT NOW, BUT THAT'S MY --
YES.

449

00:31:11,259 --> 00:31:15,820

>> BRIEFLY, WE DON'T KNOW HOW
MANY CRATERS, THIS IMAGE HAS

450

00:31:15,820 --> 00:31:22,279

BEEN COMPRESSED, WE GET BETTER
IMAGES TOMORROW, SO SPECULATING

451

00:31:22,279 --> 00:31:24,900

NOW WOULD BE ESPECIALLY
EMBARRASSING, BECAUSE WE'D BE

452

00:31:24,900 --> 00:31:27,989

PROVED WRONG VERY QUICKLY.

453

00:31:27,989 --> 00:31:33,399

BUT IT WOULD HAVE SHOWN
TREMENDOUSLY -- THE MATERIALS WE

454

00:31:33,399 --> 00:31:37,489

CREATED TO FORM CHARON PROBABLY
WOULD BE PRETTY WARM, BUT THIS

455

00:31:37,489 --> 00:31:41,190

LOOKS LIKE IT'S SOMETHING MUCH
MORE RECENT, SO AGAIN WE HAVE A

456

00:31:41,190 --> 00:31:45,539

STORY THAT WE HAVE SOME WAY OF
KEEPING HEAT FROM GOING INTO

457

00:31:45,539 --> 00:31:48,100

THESE OBJECTS FOR QUITE A LONG
TIME.

458

00:31:48,100 --> 00:31:53,830

>> FREELANCE, THOSE MOUNTAINS
LOOK REALLY BIG.

459

00:31:53,830 --> 00:31:57,789

DO YOU HAVE ANY THEORIES OF HOW
THEY ORIGINATED?

460

00:31:57,789 --> 00:32:01,279

ARE THEY VOLCANOS OR TECTONIC?

461

00:32:01,279 --> 00:32:04,339

THEY DON'T LOOK TECTONIC.

462

00:32:04,339 --> 00:32:10,360

>> WE HAVE NO IDEA AT THIS
POINT.

463

00:32:10,360 --> 00:32:15,590

WE MENTIONED THAT THERE ARE
ABOUT 11,000 FEET HIGH, SO THEY

464

00:32:15,590 --> 00:32:20,960

LOOK TO BE TENS OF MILES WIDE,
SO THEY STAND UP RESPECTIVELY

465

00:32:20,960 --> 00:32:24,659

AGAINST ROCKY MOUNTAINS,
SIGNIFICANT MOUNTAIN RANGES HERE

466

00:32:24,659 --> 00:32:30,840

ON THE EARTH, BUT WE WANT TO SEE
A LOT MORE ABOUT THE

467

00:32:30,840 --> 00:32:34,960

DISTRIBUTION AND WE ARE GETTING
SO MUCH DATA THAT WE'RE RIGHT

468

00:32:34,960 --> 00:32:38,039

NOW STILL SCRATCHING OUR HEADS.

469

00:32:38,039 --> 00:32:41,859

>> YEAH, KELLY FROM SKY AND
TELESCOPE.

470

00:32:41,859 --> 00:32:46,519

JOHN, JUST TO FOLLOW IRENE'S
QUESTION, THE LARGE GASH ACROSS

471

00:32:46,519 --> 00:32:52,559

CHARON, IS THAT IN ANY WAY
RELATED TO A TIDAL D SPINNING,

472

00:32:52,559 --> 00:32:56,289

OR IS THIS, PLUS THE SMOOTH
AREAS, TELLING YOU THAT THERE'S

473

00:32:56,289 --> 00:33:00,179

SOMETHING CHURNING INSIDE IN A
RELATIVELY RECENT TIME AND CAN

474

00:33:00,179 --> 00:33:02,570

YOU PUT A DATE ON THAT YET?

475

00:33:02,570 --> 00:33:04,690

>> WE GOT A COUPLE OF CRATERS
AND HAVE TO HAVE BETTER IMAGES

476

00:33:04,690 --> 00:33:06,009

TO DO THAT.

477

00:33:06,009 --> 00:33:09,050

WE CERTAINLY KNOW THERE AREN'T
MANY CRATERS, BUT IN TERMS OF

478

00:33:09,050 --> 00:33:11,830

THE TIMING OF ALL THIS, WE NEED
THE BETTER IMAGES THAT WE'LL GET

479

00:33:11,830 --> 00:33:12,869

VERY SOON.

480

00:33:12,869 --> 00:33:15,480

>> CHIP REID WITH CBS NEWS.

481

00:33:15,480 --> 00:33:16,480

DR.

482

00:33:16,480 --> 00:33:18,899

STERN, I'D LIKE TO ASK YOU A
QUESTION WITH NO SCIENTIFIC

483

00:33:18,899 --> 00:33:20,029

WORDS IN IT.

484

00:33:20,029 --> 00:33:23,450

I INTERVIEWED YOU BEFORE THE FLY
BY AND THE ONLY PREDICTION YOU

485

00:33:23,450 --> 00:33:25,789

WOULD MAKE IS YOU WOULD SEE
SOMETHING WONDERFUL.

486

00:33:25,789 --> 00:33:27,659

HAS YOUR EXPECTATIONS BEEN MET?

487

00:33:27,659 --> 00:33:30,579

AND WHAT'S THE MOST WONDERFUL
THING YOU'VE SEEN SO FAR?

488

00:33:30,579 --> 00:33:37,850

>> I'LL GIVE YOU A TECHNICAL
ANSWER, YOU THINK?

489

00:33:37,850 --> 00:33:40,169

I THINK THE WHOLE SYSTEM IS
AMAZING, AND MY PREDICTION

490

00:33:40,169 --> 00:33:44,490

WRITTEN 20 YEARS AGO ON A LITTLE
SLIP OF PAPER, HELD IN A MANILA

491

00:33:44,490 --> 00:33:49,440

ENVELOPE SINCE 1993 WAS PROVEN
RIGHT BY NEW HORIZONS, THE PLUTO

492

00:33:49,440 --> 00:33:52,740

SYSTEM IS SOMETHING WONDERFUL.

493

00:33:52,740 --> 00:33:56,239

>> YEAH, QUESTION FOR CATHY.

494

00:33:56,239 --> 00:33:58,090

BILL HARVICK, CBS.

495

00:33:58,090 --> 00:34:01,429

THE STRUCTURE OF THAT DARK
NORTHERN REGION ON THIS PHOTO IS

496

00:34:01,429 --> 00:34:05,789

SO MUCH MORE DIFFERENT AREAS
SEEM TO BE WITHIN THAT AREA.

497

00:34:05,789 --> 00:34:09,080

DOES THIS INFORM ANYTHING ABOUT
THE ATMOSPHERE, THE PLUTO

498

00:34:09,080 --> 00:34:12,129

ATMOSPHERE TRANSPORT WE'VE BEEN
TALKING ABOUT?

499

00:34:12,129 --> 00:34:14,899

HOW THIS WAS DEPOSITED ON THE
SURFACE?

500

00:34:14,899 --> 00:34:15,899

THANKS.

501

00:34:15,899 --> 00:34:19,440

>> YEAH, SO THERE'S DEFINITELY
DIFFERENT SUB REGIONS INSIDE

502

00:34:19,440 --> 00:34:23,639

THAT REGION, AND YOU CAN SEE IT
IN THE PICTURE, IF YOU ZOOM IN

503

00:34:23,639 --> 00:34:29,520

YOU CAN SEE IT IN MORE DETAIL,
AS WELL.

504

00:34:29,520 --> 00:34:33,850

THERE ARE A NUMBER OF DIFFERENT
THEORIES ABOUT WHAT THAT DARK

505

00:34:33,850 --> 00:34:36,899

REGION MIGHT BE.

506

00:34:36,899 --> 00:34:42,609

I DON'T KNOW THAT THE
DISTRIBUTION OF THE DARKER PARTS

507

00:34:42,609 --> 00:34:47,549

WITHIN IT ACTUALLY IN DETAIL
INFORM THAT.

508

00:34:47,549 --> 00:34:50,629

TO REALLY INFORM THAT I'M
LOOKING FORWARD TO GETTING THE

509

00:34:50,629 --> 00:34:54,350

INFORMATION BACK FROM THE ROUTE
INSTRUMENT.

510

00:34:54,350 --> 00:34:59,790

>> ANOTHER ASPECT A LOT OF US
ARE LOOKING FOR IS THE

511

00:34:59,790 --> 00:35:01,430

TOPOGRAPHIC RECONSTRUCTION.

512

00:35:01,430 --> 00:35:04,580

IF THAT'S A BASIN, IT WILL BE
PRETTY OBVIOUS, FOR EXAMPLE, AND

513

00:35:04,580 --> 00:35:09,390

IF IT'S A GREAT PLATEAU, THAT
WOULD MEAN SOMETHING ELSE.

514

00:35:09,390 --> 00:35:14,400

>> YEAH, NICK, WHY MAGAZINE.

515

00:35:14,400 --> 00:35:18,230

WITH REGARDS TO BOTH THE
FEATURES ON PLUTO AND CHARON,

516

00:35:18,230 --> 00:35:25,189

WHAT TIDAL ENERGY COULD BE
POWERING THE GEOLOGY?

517

00:35:25,189 --> 00:35:37,660

>> WE THINK -- WELL, WE HAVE A
COUPLE OF OPTIONS.

518

00:35:37,660 --> 00:35:43,910

ONE WOULD BE THAT WE KNOW THIS
RADIOACTIVE MATERIAL INSIDE

519

00:35:43,910 --> 00:35:48,809

CHARON, AS THERE IS INSIDE ANY
BODY MADE UP OUT OF AVERAGE

520

00:35:48,809 --> 00:35:54,049

SOLAR SYSTEM STUFF AND
RADIOACTIVE PIECES, BUT THE

521

00:35:54,049 --> 00:35:59,730

EARTH IS A LOT BIGGER, SO THIS
MAY BE TELLING US THAT EVEN VERY

522

00:35:59,730 --> 00:36:05,280

SMALL BODIES SEE RADIOACTIVE
HEAT ENOUGH TO PRODUCE THE

523

00:36:05,280 --> 00:36:08,660

ACTIVITY, BUT MAY BE WAYS TO
STORE HEAT FROM ITS FORMATION

524

00:36:08,660 --> 00:36:10,760

FOR A VERY LONG PERIOD OF TIME.

525

00:36:10,760 --> 00:36:14,950

MAYBE YOU CAN HAVE AN OCEAN,
WHICH IS VERY FREEZING AND AS IT

526

00:36:14,950 --> 00:36:20,040

DOES GRADUALLY FREEZE, THAT
RELEASES HEAT AND MAYBE THAT CAN

527

00:36:20,040 --> 00:36:21,240

POWER ACTIVITY.

528

00:36:21,240 --> 00:36:36,980

AND SO WHETHER THIS IS -- SO
TIDAL ENERGY IS NOT AT WORK HERE

529

00:36:36,980 --> 00:36:40,660

AND WE KNOW THAT BECAUSE PLUTO
AND CHARON ARE IN TIDAL

530

00:36:40,660 --> 00:36:43,780

EQUILIBRIUM.

531

00:36:43,780 --> 00:36:48,539

GEOSYNCHRONOUS ORBIT AND IT'S
ALSO SPINNING AT THE SAME RATE

532

00:36:48,539 --> 00:36:51,690

THAT PLUTO SPINS, SO THERE'S NO
SIGNIFICANT EXCHANGE OF TIDAL

533

00:36:51,690 --> 00:36:53,600

ENERGY ANYMORE.

534

00:36:53,600 --> 00:36:57,540

THAT PROCESS, ACCORDING TO
MODELS, NUMERICAL MODELS, TOOK

535

00:36:57,540 --> 00:37:01,920

PLACE PRETTY QUICKLY AFTER THE
GIANT IMPACT, VERY SMALL

536

00:37:01,920 --> 00:37:04,580
FRACTION OF THE AGE OF THE SOLAR
SYSTEM, SO THAT MUST HAVE ALL

537

00:37:04,580 --> 00:37:06,900
BEEN A LONG TIME AGO AND IT'S
NOT CONTRIBUTING TO THE ENERGY

538

00:37:06,900 --> 00:37:08,140
BUDGET CURRENTLY.

539

00:37:08,140 --> 00:37:09,900
WE HAVE TO GET A LITTLE MORE
CLEVER.

540

00:37:09,900 --> 00:37:15,470
>> OKAY, WE'RE GOING TO TAKE
THREE QUESTIONS, PLEASE, THEN

541

00:37:15,470 --> 00:37:18,260
WE'RE GOING TO GO TO THE PHONE
LINES, TAKE A COUPLE QUESTIONS

542

00:37:18,260 --> 00:37:22,119
FROM SOCIAL MEDIA, THEN COME
BACK HERE.

543

00:37:22,119 --> 00:37:23,119
ONE.

544

00:37:23,119 --> 00:37:24,119
>> ASTRO MAGAZINE.

545

00:37:24,119 --> 00:37:26,360
I'M ONE OF THE PEOPLE IN THE
ROOM THAT CAN REMEMBER WHEN THE

546

00:37:26,360 --> 00:37:30,690

FIRST PICTURES CAME BACK FROM
MARINER 4, AND AT THAT TIME YOU

547

00:37:30,690 --> 00:37:34,140

COULD HEAR THE BALLOONS POPPING,
HOLY MACKEREL, IT'S NOT

548

00:37:34,140 --> 00:37:37,299

EARTH-LIKE AT ALL, THERE'S
CRATERS, ATMOSPHERE IS TEN TIMES

549

00:37:37,299 --> 00:37:39,680

THINNER THAN WE THOUGHT IT WAS.

550

00:37:39,680 --> 00:37:43,410

TODAY I HEAR A LOT OF
EXCITEMENT, BUT NO BALLOONS

551

00:37:43,410 --> 00:37:44,710

POPPING.

552

00:37:44,710 --> 00:37:48,510

IT SEEMS PLUTO IS PRETTY MUCH
THE KIND OF WORLD YOU THOUGHT IT

553

00:37:48,510 --> 00:37:49,510

WAS GOING TO BE.

554

00:37:49,510 --> 00:37:52,369

WOULD YOU LIKE TO COMMENT ON
THAT AND IS THAT BECAUSE WE'RE

555

00:37:52,369 --> 00:37:55,650

FURTHER IN OUR KNOWLEDGE TODAY?

556

00:37:55,650 --> 00:38:00,779

>> I'M COMPLETELY SURPRISED AND
WOULD DISAGREE WITH THE

557

00:38:00,779 --> 00:38:01,779

ASSERTION.

558

00:38:01,779 --> 00:38:05,610

IN MY CASE, I CERTAINLY DIDN'T
EXPECT CHARON TO SHOW NEARLY THE

559

00:38:05,610 --> 00:38:08,309

DEGREE OF DIFFERENT TERRAINS,
THE VARIETY, OR THE YOUTHFUL

560

00:38:08,309 --> 00:38:10,309

SURFACE IT DOES SHOW US.

561

00:38:10,309 --> 00:38:13,770

THAT'S A COMPLETE SURPRISE,
THAT'S A BALLOON POPPING.

562

00:38:13,770 --> 00:38:19,910

IN ADDITION, I THINK JUST IN ONE
IMAGE OF ABOUT 1% OF THE SURFACE

563

00:38:19,910 --> 00:38:24,200

OF PLUTO THE PLANET AND FINDING
MOUNTAIN RANGES LIKE THE ROCKIES

564

00:38:24,200 --> 00:38:25,690

IS A BALLOON POPPING.

565

00:38:25,690 --> 00:38:27,750

NOW, MY COLLEAGUES MIGHT
DISAGREE WITH ME.

566

00:38:27,750 --> 00:38:29,400

WHY DON'T WE ASK THEM.

567

00:38:29,400 --> 00:38:33,280

>> WHO WOULD HAVE SUPPOSED THERE

WERE ICE MOUNTAINS, YOU KNOW?

568

00:38:33,280 --> 00:38:38,559

YOU KNOW, THAT WE CAN, YOU KNOW,
IT'S BLOWING MY MIND.

569

00:38:38,559 --> 00:38:41,589

WE HAVE HAD SUCH A HARD TIME
FINDING ANY EVIDENCE FOR WATER

570

00:38:41,589 --> 00:38:43,900

ICE ON THE SURFACE OF PLUTO.

571

00:38:43,900 --> 00:38:48,670

WE'RE GOING TO HAVE SOME DATA
THAT'S GOING TO, YOU KNOW,

572

00:38:48,670 --> 00:38:53,589

REALLY REVEAL THAT FOR SURE, BUT
THAT'S THE ONLY WAY TO GET THESE

573

00:38:53,589 --> 00:38:54,599

HUGE MOUNTAINS.

574

00:38:54,599 --> 00:38:59,480

AND THAT'S A BIG SURPRISE, I
THINK.

575

00:38:59,480 --> 00:39:01,890

>> I CAN SPEAK TO THAT, AS WELL.

576

00:39:01,890 --> 00:39:05,900

THAT FALSE COLOR IMAGE YESTERDAY
THAT SHOWED AN AMAZING DIVERSITY

577

00:39:05,900 --> 00:39:10,920

OF COMPOSITIONAL UNITS ON
SURFACE AND THE PHOTOGRAPHS SHOW

578

00:39:10,920 --> 00:39:18,970
AN AMAZING DIVERSITY OF
GEOMORPHOLOGY SHOW PROCESSES

579
00:39:18,970 --> 00:39:22,440
SHAPING THE SURFACE, AND I THINK
ALL OF US THOUGHT IT WAS

580
00:39:22,440 --> 00:39:26,359
PROBABLY A FEW PROCESSES AT
WORK, AND NOW IT LOOKS LIKE THIS

581
00:39:26,359 --> 00:39:29,830
IS A MUCH MORE COMPLICATED
SYSTEM, WHERE THE INTERPLAY OF

582
00:39:29,830 --> 00:39:33,940
PHYSICS AND CHEMISTRY AND
THERMAL DYNAMICS IS LEADING TO

583
00:39:33,940 --> 00:39:38,410
JUST A HUGE PALLET OF PROCESSES
WORKING IN DIFFERENT WAYS ON

584
00:39:38,410 --> 00:39:41,400
DIFFERENT PARTS OF THE SURFACE,
AND THAT, TO ME, IS AMAZING.

585
00:39:41,400 --> 00:39:48,240
THIS IS GOING TO KEEP US BUSY
FOR A LONG TIME TO COME.

586
00:39:48,240 --> 00:39:51,240
>> I WOULD NEVER HAVE BELIEVED
THE FIRST CLOSE-UP PICTURE OF

587
00:39:51,240 --> 00:39:55,329
PLUTO WOULDN'T HAVE A SINGLE
IMPACT CRATER ON IT.

588

00:39:55,329 --> 00:39:57,069

ASTONISHING.

589

00:39:57,069 --> 00:40:02,980

[APPLAUSE]

>> EMILY FROM THE PLANETARY

590

00:40:02,980 --> 00:40:03,980

SOCIETY.

591

00:40:03,980 --> 00:40:08,530

I'M WONDERING IF WILL GRUNDY
COULD READ THE SPECTRA FOR US,

592

00:40:08,530 --> 00:40:12,510

AND IF IT'S TIME FOR US TO
CONSIDER MAYBE THE

593

00:40:12,510 --> 00:40:15,079

CHARON-FORMING IMPACT COULD HAVE
HAPPENED MORE RECENTLY AND THAT

594

00:40:15,079 --> 00:40:18,710

MIGHT HAVE EXPLAINED THE RECENT
LOOKING GEOLOGY.

595

00:40:18,710 --> 00:40:22,769

>> I THINK ONE MORE TIME STAMP
PAST THIS ONE.

596

00:40:22,769 --> 00:40:31,040

RIGHT, SO THESE SPECTRA ARE BOTH
METHANE ICE SPECTRA, REALLY.

597

00:40:31,040 --> 00:40:36,000

ALL OF THOSE DIPS THAT YOU SEE
ARE METHANE ICE.

598

00:40:36,000 --> 00:40:38,640

THE OTHER FEATURES ARE MUCH MORE

SUBTLE AND THEY ARE GOING TO

599

00:40:38,640 --> 00:40:42,900

REQUIRE SOME MODELING TO PULL
THEM OUT, BUT JUST TO DRAW YOUR

600

00:40:42,900 --> 00:40:47,440

EYES TO THE RIGHT-HAND SIDE OF
IT, YOU SEE HOW THE CYAN OR BLUE

601

00:40:47,440 --> 00:40:51,650

COLORING ONE GOES DOWN TO ALMOST
ZERO AND THE RED ALMOST GOES

602

00:40:51,650 --> 00:40:55,760

DOWN TO ZERO, THAT TELLS ME
THERE'S SOMETHING ELSE PRESENT

603

00:40:55,760 --> 00:41:00,039

IN THE RED TERRAIN THAT SCATTERS
LIGHT, WHERE METHANE ABSORBS

604

00:41:00,039 --> 00:41:01,569

QUITE STRONGLY.

605

00:41:01,569 --> 00:41:03,880

THERE'S AN EXAMPLE OF THE THINGS
YOU CAN DO.

606

00:41:03,880 --> 00:41:06,539

GET AHOLD OF ME LATER AND WE CAN
CHAT AS LONG AS YOU LIKE ABOUT

607

00:41:06,539 --> 00:41:07,549

THIS STUFF.

608

00:41:07,549 --> 00:41:11,619

DON'T WANT TO PUT PEOPLE TO
SLEEP, BUT THERE'S A HUGE AMOUNT

609
00:41:11,619 --> 00:41:14,920
OF INFORMATION IN THESE DATA.

610
00:41:14,920 --> 00:41:16,519
>> LET'S GO TO THE PHONE LINES.

611
00:41:16,519 --> 00:41:22,710
I BELIEVE WE HAVE A QUESTION ON
THE PHONE LINES.

612
00:41:22,710 --> 00:41:29,340
DO WE HAVE THE QUESTION?

613
00:41:29,340 --> 00:41:31,660
>> CAN YOU HEAR ME?

614
00:41:31,660 --> 00:41:34,570
>> I CAN HEAR YOU NOW.

615
00:41:34,570 --> 00:41:35,570
>> NASAWATCH.COM.

616
00:41:35,570 --> 00:41:37,359
THE QUESTION I HAVE, I HOPED TO
ASK LAST NIGHT, THE ANSWER LINE

617
00:41:37,359 --> 00:41:38,750
DIDN'T WORK, BUT I'M GLAD IT
DIDN'T, I WAS LOOKING AT THE

618
00:41:38,750 --> 00:41:39,769
SPECTRA IMAGE JUST REFERENCED.

619
00:41:39,769 --> 00:41:43,539
A QUESTION FOR ALLEN STERN, WHAT
SPECIFICITY ARE YOU GOING TO GET

620
00:41:43,539 --> 00:41:51,470

FROM THIS ANALYSIS AS YOU GO ON
AND HOW WILL YOU BE ABLE TO MAP

621

00:41:51,470 --> 00:41:52,470
IT UP AGAINST THE TERRAIN?

622

00:41:52,470 --> 00:41:55,940
YOU TALKED ABOUT A THIN VENEER
OF THIS STUFF, SOME OF THIS WAS

623

00:41:55,940 --> 00:41:58,410
TALKING ABOUT WASTE WHEN I WAS
TEACHING CHEMISTRY.

624

00:41:58,410 --> 00:42:03,980
ARE YOU GOING TO GET DOWN TO THE
POINT OF MORE THAN JUST METHANE,

625

00:42:03,980 --> 00:42:06,390
BUT SPECIFIC ORGANIC CHEMICALS?

626

00:42:06,390 --> 00:42:12,569
>> I HAD A HARD TIME --
>> CAN YOU SPEAK A LITTLE LOUDER

627

00:42:12,569 --> 00:42:13,569
AND REPEAT?

628

00:42:13,569 --> 00:42:15,759
WE APOLOGIZE, REPEAT THE
QUESTION ONE LAST TIME.

629

00:42:15,759 --> 00:42:22,819
>> HOW MUCH SPECIFICITY WILL YOU
HAVE WITH THE SPECTROMETER THAT

630

00:42:22,819 --> 00:42:28,509
YOU CAN SEE AGAINST THESE
FEATURES?

631
00:42:28,509 --> 00:42:34,400
>> I THINK THE QUESTION IS ABOUT
HOW WILL WE BE ABLE TO DETERMINE

632
00:42:34,400 --> 00:42:38,359
THE COMPOSITION OF THE SURFACE
AND SPOT OTHER ORGANICS ON THE

633
00:42:38,359 --> 00:42:39,359
SURFACE.

634
00:42:39,359 --> 00:42:42,420
WE'RE GOING TO HAVE VERY HIGH
RESOLUTION COMPARED TO WHAT

635
00:42:42,420 --> 00:42:46,460
WE'RE SHOWING YOU HERE, ABOUT
100 TIMES, NOT QUITE 100 TIMES,

636
00:42:46,460 --> 00:42:50,940
BUT SPATIALLY WE'RE GOING TO
HAVE ROUGHLY THE 5 TO 10

637
00:42:50,940 --> 00:42:54,750
KILOMETER RANGE, SO EVERY PIXEL
THAT WE'LL SHOW YOU, WE CAN LOOK

638
00:42:54,750 --> 00:42:58,680
AT THINGS TEN TIMES SMALLER, 1%
SMALLER BY AREA, WHICH MEANS WE

639
00:42:58,680 --> 00:43:02,990
DON'T AVERAGE OVER LARGE BLOCKS
OF TERRAIN, BUT INSTEAD CAN

640
00:43:02,990 --> 00:43:05,630
REALLY SEE THE DETAILS, THE
INTERFACES BETWEEN UNITS,

641

00:43:05,630 --> 00:43:09,240
LOOKING LIKE ANY CRATERS WE FIND
THAT ARE WINDOWS INTO THE

642
00:43:09,240 --> 00:43:10,240
INTERIOR.

643
00:43:10,240 --> 00:43:13,769
I'LL LET WILL SPEAK TO THE RANGE
OF ORGANICS THAT WE CAN FIND ON

644
00:43:13,769 --> 00:43:15,710
THE SURFACE, BECAUSE THAT'S HIS
AREA.

645
00:43:15,710 --> 00:43:16,710
>> RIGHT.

646
00:43:16,710 --> 00:43:21,890
SO THERE ARE A LOT OF DIFFERENT
CHEMICALS THAT HAVE DIAGNOSTIC

647
00:43:21,890 --> 00:43:24,190
FEATURES IN THIS WAVELENGTH
RANGE AND THAT'S WHY WE PICK

648
00:43:24,190 --> 00:43:30,410
THIS WAVELENGTH RANGE, BUT THERE
ARE ALSO SUBSTANCES THAT HAVE NO

649
00:43:30,410 --> 00:43:31,750
VISIBLE ABSORPTIONS.

650
00:43:31,750 --> 00:43:36,980
A GOOD EXAMPLE OF THAT IS ARARGAN,
WHICH IS OF THAT SURFACE

651
00:43:36,980 --> 00:43:39,930
ENVIRONMENT AND WE CAN'T DETECT
IT BECAUSE IT DOESN'T HAVE ANY

652

00:43:39,930 --> 00:43:42,329

VIBRATIONS IN OUR WAVELENGTH
REGION.

653

00:43:42,329 --> 00:43:46,980

YOU'LL SEE IT IF IT'S IN THE
ATMOSPHERE, BUT ON THE SURFACE

654

00:43:46,980 --> 00:43:48,140

WE'RE BLIND TO IT.

655

00:43:48,140 --> 00:43:51,440

YOU KNOW, IT'S A MIXED BAG.

656

00:43:51,440 --> 00:43:54,930

WE'LL BE ABLE TO LEARN A LOT
MORE THAN WHAT WE KNOW ABOUT IT

657

00:43:54,930 --> 00:43:55,930

TODAY.

658

00:43:55,930 --> 00:43:57,010

>> CAN I ADD TO THAT?

659

00:43:57,010 --> 00:44:03,740

>> MAYBE WILL COULD GIVE A
COUPLE OF EXAMPLES OF

660

00:44:03,740 --> 00:44:04,740

HYDROCARBON.

661

00:44:04,740 --> 00:44:07,640

>> SURE, SURE, FOR INSTANCE,
THINGS LIKE CARBON CHAIN WITH

662

00:44:07,640 --> 00:44:11,380

HYDROGEN STUCK TO IT, WE COULD
DISTINGUISH BETWEEN METHANE,

663

00:44:11,380 --> 00:44:19,269

ETHANE, PROPANE, AND SO ON,
HYDROCARBONS, SOME OF THEM HAVE

664

00:44:19,269 --> 00:44:22,099

VERY DISTINCTIVE FEATURES.

665

00:44:22,099 --> 00:44:25,039

THERE'S A WIDE RANGE OF ORGANIC
COMPOUNDS THAT WE CAN HOPE TO

666

00:44:25,039 --> 00:44:29,250

DETECT THAT COULD QUITE LIKELY
BE PRODUCED IN THAT SURFACE

667

00:44:29,250 --> 00:44:30,250

CHEMISTRY.

668

00:44:30,250 --> 00:44:35,000

>> I WAS JUST GOING TO ADD THAT
THERE'S OTHER ICES ALSO THAT

669

00:44:35,000 --> 00:44:37,450

HAVE SPECTRAL FEATURES IN THIS
REGION.

670

00:44:37,450 --> 00:44:42,769

THERE'S WATER ICE, CARBON
MONOXIDE ICE, THIS IS A

671

00:44:42,769 --> 00:44:48,559

DIAGNOSTIC REGION, AND YOU CAN
SEE SLOPES ACROSS THE SPECTRUM,

672

00:44:48,559 --> 00:44:51,761

SO EVEN SOME THINGS THAT DON'T
HAVE SHARP FEATURES YOU CAN

673

00:44:51,761 --> 00:44:59,859
IDENTIFY THE POSSIBILITY THAT
THEY ARE THERE BY THE SLOPES IN

674
00:44:59,859 --> 00:45:00,869
THE INFRARED SPECTRA.

675
00:45:00,869 --> 00:45:01,869
>> OKAY.

676
00:45:01,869 --> 00:45:03,319
LET'S SEE WHAT'S GOING ON IN THE
SOCIAL MEDIA WORLD.

677
00:45:03,319 --> 00:45:08,390
I KNOW IT IS ABUZZ, SO WE'RE
GOING TO TURN IT OVER TO EMILY.

678
00:45:08,390 --> 00:45:10,490
>> I'M EMILY FROM NASA
HEADQUARTERS.

679
00:45:10,490 --> 00:45:12,420
WE DO HAVE A LOT OF QUESTIONS ON
SOCIAL.

680
00:45:12,420 --> 00:45:15,539
THE FIRST ONE'S FROM DAVID AND
HE ASKS, WHAT, IF ANYTHING, CAN

681
00:45:15,539 --> 00:45:17,900
WE LEARN ABOUT OUR OWN PLANET
FROM THIS INFORMATION NEW

682
00:45:17,900 --> 00:45:23,119
HORIZONS HAS PROVIDED?

683
00:45:23,119 --> 00:45:28,349
>> WELL, WE EXPECT THAT THE DATA
SET THAT WE'LL RETURN TEACHES US

684

00:45:28,349 --> 00:45:30,619

ABOUT THE EARTH, MOON, AND
SYSTEM.

685

00:45:30,619 --> 00:45:32,500

WE'RE REALLY LOOKING FORWARD TO
DOING THAT.

686

00:45:32,500 --> 00:45:36,869

WE'RE ALSO GOING TO GET
ATMOSPHERIC DATA SETS AND STUDY

687

00:45:36,869 --> 00:45:37,869

PLUTO'S ATMOSPHERE.

688

00:45:37,869 --> 00:45:41,289

IN FACT, THE INSTRUMENT COMBINED
WITH THE ALICE INSTRUMENT SHOULD

689

00:45:41,289 --> 00:45:45,200

GIVE US POWERFUL CONSTRAINTS ON
THAT ESCAPE RATE.

690

00:45:45,200 --> 00:45:47,760

INTERESTINGLY ENOUGH, PLUTO'S
ATMOSPHERE IS ESCAPING THROUGH A

691

00:45:47,760 --> 00:45:54,450

PROCESS WITH A BIG FANCY NAME
THAT YOU JUST DON'T FIND ON ANY

692

00:45:54,450 --> 00:45:57,180

OF THE PLANETS IN THE SOLAR
SYSTEM, EXCEPT PLUTO.

693

00:45:57,180 --> 00:46:00,730

THE MOST INTERESTING THING ABOUT
THAT, THE SAME PROCESS DID

694

00:46:00,730 --> 00:46:05,140

OPERATE IN THE EARLY ATMOSPHERES
OF A NUMBER OF PLANETS,

695

00:46:05,140 --> 00:46:06,190

INCLUDING THE EARTH.

696

00:46:06,190 --> 00:46:09,109

IN FACT, THE EARTH IS BELIEVED
TO HAVE LOST ITS ORIGINAL

697

00:46:09,109 --> 00:46:14,690

POISONOUS HYDROGEN/HELIUM
ENVELOPE DUE TO ESCAPE, SO WE'VE

698

00:46:14,690 --> 00:46:17,340

NEVER BEEN ABLE TO DISCOVER THIS
ON A PLANETARY SCALE YET.

699

00:46:17,340 --> 00:46:21,510

BY GOING TO PLUTO AND OBSERVING
THAT PROCESS AND DETERMINING

700

00:46:21,510 --> 00:46:24,319

EXACTLY HOW FAST THE ATMOSPHERE
IS ESCAPING AND KNOWING THE

701

00:46:24,319 --> 00:46:28,020

INPUT CONDITIONS, THE SOLAR FLUX
AT THE TIME WE MADE THE FLY BY,

702

00:46:28,020 --> 00:46:31,470

FOR EXAMPLE, AND THE HEMISPHERE
RADIATION ENVIRONMENT IN THE

703

00:46:31,470 --> 00:46:35,820

CLOUDS, WILL GIVE US A GOOD
HANDLE FOR THE FIRST TIME ON THE

704

00:46:35,820 --> 00:46:39,849
NUMERICAL MODELS THAT ARE USED
TO UNDERSTAND THE EARLY EARTH

705
00:46:39,849 --> 00:46:41,769
AND THE LOSS OF OUR ATMOSPHERE.

706
00:46:41,769 --> 00:46:46,069
THIS ALSO HAS SOME APPLICATIONS
TO THE LOSS OF WATER FROM EARLY

707
00:46:46,069 --> 00:46:47,069
MARS.

708
00:46:47,069 --> 00:46:50,119
SO WE'RE REALLY LOOKING FORWARD
TO LEARNING THINGS FROM THE

709
00:46:50,119 --> 00:46:53,170
PLUTO SYSTEM THAT WILL
ULTIMATELY TRANSLATE INTO A

710
00:46:53,170 --> 00:46:57,040
BETTER UNDERSTANDING OF OTHER
PLANETS IN THE SOLAR SYSTEM.

711
00:46:57,040 --> 00:46:58,040
>> OKAY, EMILY, WE'RE GOING TO
TAKE TWO MORE QUESTIONS.

712
00:46:58,040 --> 00:47:00,260
I'M GOING TO ASK THE MIC HANDLER
TO HELP ME HERE.

713
00:47:00,260 --> 00:47:03,609
I KNOW SOME FOLKS HAVE BEEN
RAISING HANDS A LONG TIME, I

714
00:47:03,609 --> 00:47:05,029
WANT TO GET TO YOU.

715

00:47:05,029 --> 00:47:09,059

IF YOU KNOW SOMEONE HAS BEEN
RAISING, GIVE THEM THE MIC, CUE

716

00:47:09,059 --> 00:47:11,859

THEM UP, BUT LET'S GO BACK TO
SOCIAL MEDIA.

717

00:47:11,859 --> 00:47:14,220

TWO MORE QUESTIONS, THEN WE'RE
GOING TO COME BACK HERE.

718

00:47:14,220 --> 00:47:15,220

>> SURE.

719

00:47:15,220 --> 00:47:16,220

THIS ONE'S FROM HAROLD.

720

00:47:16,220 --> 00:47:18,859

HE'S ASKING HOW LARGE A
PERCENTAGE OF PLUTO WILL BE

721

00:47:18,859 --> 00:47:22,029

VIEWED BY NEW HORIZONS AND WILL
THERE BE ANY BLIND SPOTS.

722

00:47:22,029 --> 00:47:26,289

>> SURE, I'M HAPPY TO TAKE THAT.

723

00:47:26,289 --> 00:47:31,019

SO WE'RE GOING TO COVER THE
ENTIRE ILLUMINATED PART OF

724

00:47:31,019 --> 00:47:33,950

PLUTO.

725

00:47:33,950 --> 00:47:35,510

ALL THE PARTS THAT ROTATE INTO

VIEW.

726

00:47:35,510 --> 00:47:39,819

IT TAKES 6.4 DAYS FOR PLUTO TO
ROTATE, SO WE'LL HAVE SOME AT

727

00:47:39,819 --> 00:47:44,050

HIGHER RESOLUTION THAN OTHERS.

728

00:47:44,050 --> 00:47:49,359

BUT THERE'S JUST LIKE ON EARTH
WHEN YOU HAVE THE WINTER POLE

729

00:47:49,359 --> 00:47:51,769

AND IT'S DARK THERE, THE SUN
DOESN'T RISE, THERE'S SOMETHING

730

00:47:51,769 --> 00:47:57,009

SIMILAR ON PLUTO SO THAT WINTER
PULL OF PLUTO, WE'RE GOING TO

731

00:47:57,009 --> 00:48:00,580

MAKE A SPECIAL OBSERVATION TO
TRY AND OBSERVE THAT.

732

00:48:00,580 --> 00:48:03,970

AND WE'RE GOING TO USE THE LIGHT
THAT GOES FROM THE SUN, THAT

733

00:48:03,970 --> 00:48:07,970

REFLECTS OFF OF PLUTO'S LARGE
MOON CHARON, AND THEN REFLECTS

734

00:48:07,970 --> 00:48:11,809

TO PLUTO AND WE'RE GOING TO USE
CHARON SHINE TO LOOK AT THE

735

00:48:11,809 --> 00:48:15,619

WINTER POLE OF PLUTO, SO WE'LL
BE SEEING ALL OF IT, BUT AT

736

00:48:15,619 --> 00:48:18,490
DIFFERENT RESOLUTIONS.

737

00:48:18,490 --> 00:48:22,180
>> JUST NOT TO GET YOUR HOPES UP
TOO MUCH ON THE CHARON SHINE,

738

00:48:22,180 --> 00:48:24,779
THIS IS A VERY DIFFICULT
OBSERVATION, CHARON SHINE IS

739

00:48:24,779 --> 00:48:28,529
INCREDIBLY FEEBLE AND WE'LL DO
THE BEST TO PULL DETAIL OUT OF

740

00:48:28,529 --> 00:48:29,529
THOSE IMAGES.

741

00:48:29,529 --> 00:48:31,420
WE'RE ALSO LOOKING BACK TOWARDS
THE SUN WITH THE SUN IN OUR

742

00:48:31,420 --> 00:48:33,910
EYES, JUST TO MAKE IT MORE
DIFFICULT, SO WE'RE GOING TO

743

00:48:33,910 --> 00:48:37,700
HAVE FUN, BUT CERTAINLY DO OUR
BEST.

744

00:48:37,700 --> 00:48:39,339
>> YES, THANK YOU.

745

00:48:39,339 --> 00:48:40,440
>> ONE MORE?

746

00:48:40,440 --> 00:48:41,440
>> SURE.

747

00:48:41,440 --> 00:48:42,440

THIS QUESTION'S FROM WILL.

748

00:48:42,440 --> 00:48:44,690

HOW DO YOU THINK PLUTO HAS BEEN
ABLE TO MAINTAIN ITS OWN

749

00:48:44,690 --> 00:48:46,689

GEOACTIVITY FOR SO LONG?

750

00:48:46,689 --> 00:48:50,390

>> THERE'S A GREAT QUESTION.

751

00:48:50,390 --> 00:48:52,269

>> RIGHT.

752

00:48:52,269 --> 00:49:00,630

THE -- CERTAINLY, IF YOU HAVE
ROCKS IN ITS INTERIOR TO MAKE

753

00:49:00,630 --> 00:49:04,860

ITS DENSITY COME OUTRIGHT, WATER
ICE ISN'T DENSE ENOUGH.

754

00:49:04,860 --> 00:49:12,490

SILICAT ROCKS COME WITH BOREUM,
URANIUM THAT GIVE OFF HEAT, IT'S

755

00:49:12,490 --> 00:49:13,490

ADK.

756

00:49:13,490 --> 00:49:19,180

THE NAIVE EXPECTATION OR NAIVE
NOW IN HINDSIGHT WAS THAT A

757

00:49:19,180 --> 00:49:22,789

WORLD THIS SIZE JUST WOULDN'T
GET ENOUGH HEAT TO REALLY DRIVE

758

00:49:22,789 --> 00:49:26,680

THIS KIND OF ACTIVITY, AND NOW
WE SEE THAT IT CAN.

759

00:49:26,680 --> 00:49:32,079

OR, LIKE JOHN SAID, THERE'S A
LOT OF HEAT IN A INTERNAL OCEAN,

760

00:49:32,079 --> 00:49:36,440

AND AS THE INTERNAL OCEAN
FREEZES, THAT LIBERATES THE

761

00:49:36,440 --> 00:49:40,190

LATENT HEAT, AND ALSO WILL TEND
TO MAKE THE WORLD EXPAND IN

762

00:49:40,190 --> 00:49:45,039

SIZE, BECAUSE ICE IS LARGER THAN
LIQUID, DEPENDING ON WHICH PHASE

763

00:49:45,039 --> 00:49:46,790

OF ICE YOU MAKE.

764

00:49:46,790 --> 00:49:49,920

WHICH COULD ALSO PRODUCE
TECTONIC FEATURES.

765

00:49:49,920 --> 00:49:53,630

>> I WANT TO THANK THE WORLD ON
SOCIAL MEDIA SENDING IN YOUR

766

00:49:53,630 --> 00:49:56,569

QUESTIONS AT #ASKNASA, AND, OF
COURSE, FOLLOWING THE

767

00:49:56,569 --> 00:49:59,880

CONVERSATION THROUGHOUT THE
WORLD ON #PLUTOFLYBY.

768

00:49:59,880 --> 00:50:03,819

OKAY, MY PANELISTS, HELP ME OUT.

769

00:50:03,819 --> 00:50:05,680

NAME AND AFFILIATION, GO.

770

00:50:05,680 --> 00:50:08,710

>> CORY POWELL WITH DISCOVER
MAGAZINE.

771

00:50:08,710 --> 00:50:12,880

THE QUESTION ABOUT THE DIVERSITY
OF PROCESSES THAT YOU'RE SEEING

772

00:50:12,880 --> 00:50:15,710

IN THIS NEW CLOSE-UP PLUTO
IMAGE, I'M WONDERING IF YOU

773

00:50:15,710 --> 00:50:18,630

COULD WALK US THROUGH THE IMAGE
A LITTLE BIT.

774

00:50:18,630 --> 00:50:20,539

I REALIZE YOU'RE NOT AT THE
STAGE WHERE YOU CAN PROVIDE

775

00:50:20,539 --> 00:50:23,279

ANSWERS, BUT I'M CURIOUS ABOUT
THE KINDS OF QUESTIONS YOU SEE

776

00:50:23,279 --> 00:50:27,680

POSED BY THE STRANGE SORT OF
HILLY TERRAIN, SOMETHING THAT

777

00:50:27,680 --> 00:50:28,680

LOOKS LIKE A FAULT.

778

00:50:28,680 --> 00:50:31,099

I'D BE CURIOUS WHAT ARE THE

THINGS YOU'RE GOING TO BE

779

00:50:31,099 --> 00:50:33,849

INVESTIGATING THERE, WHAT ARE
THE QUESTIONS THAT IT RAISES?

780

00:50:33,849 --> 00:50:35,779

>> THOSE ARE GOOD ONES.

781

00:50:35,779 --> 00:50:38,660

>> YOU DID A VERY NICE JOB.

782

00:50:38,660 --> 00:50:43,190

>> WE HAVE THE SURFACE THAT
LOOKS LIKE FAULT, AND, YEAH,

783

00:50:43,190 --> 00:50:44,990

THAT'S KIND OF THE STAGE WE'RE
AT.

784

00:50:44,990 --> 00:50:48,049

THAT TERRAIN DOWN TOWARDS THE
LOWER RIGHT LOOKS REALLY

785

00:50:48,049 --> 00:50:49,980

STRANGE.

786

00:50:49,980 --> 00:50:57,430

AND IT'S LIKE PILES OF STUFF
WITH GROOVES ON IT.

787

00:50:57,430 --> 00:51:00,359

TO BE TECHNICAL.

788

00:51:00,359 --> 00:51:05,230

AND THEN WE HAVE SMOOTH PLAINS
FILLING IN SOME OF THE LOW

789

00:51:05,230 --> 00:51:06,260

SPOTS.

790

00:51:06,260 --> 00:51:11,339

THAT WE CAN SAY MORE ABOUT ON
FRIDAY, I THINK.

791

00:51:11,339 --> 00:51:15,509

THIS BEING EROSION THAT'S BEEN
BUILDING, WHATEVER PRODUCES,

792

00:51:15,509 --> 00:51:20,430

LUMPY TERRAIN WITH GROOVES ON
IT, AND IT'S BAFFLING.

793

00:51:20,430 --> 00:51:23,180

IT'S BAFFLING IN A VERY
INTERESTING AND WONDERFUL WAY.

794

00:51:23,180 --> 00:51:26,900

AND I HOPE THAT WHEN WE GET MORE
CONTEXT, WE CAN FILL IN HOW THIS

795

00:51:26,900 --> 00:51:30,269

FITS IN WITH THE REST OF THE
GEOLOGY AND START TO MAKE SOME

796

00:51:30,269 --> 00:51:31,269

SENSE.

797

00:51:31,269 --> 00:51:32,269

WE CAN ONLY HOPE.

798

00:51:32,269 --> 00:51:36,690

>> I'M ALLEN BOYLE WITH NBC
NEWS, AND I WANTED TO RETURN TO

799

00:51:36,690 --> 00:51:38,220

THE ICE MOUNTAINS, AS WELL.

800

00:51:38,220 --> 00:51:42,940
IS THAT ACTUALLY IN THE REGIONAL
AND DO YOU SEE ANY PATTERN

801
00:51:42,940 --> 00:51:46,120
FOLLOWING UP ON WHAT CORY WAS
ASKING ABOUT DO YOU SEE A

802
00:51:46,120 --> 00:51:49,660
PATTERN THAT MIGHT SUGGEST THE
FORMATION OF THOSE MOUNTAINS?

803
00:51:49,660 --> 00:51:52,309
ARE THEY BEING PUSHED UP LIKE
RIDGES?

804
00:51:52,309 --> 00:51:54,049
ALLEN MENTIONED THE ROCKIES.

805
00:51:54,049 --> 00:51:56,770
IS THERE A SIMILAR PROCESS GOING
ON HERE?

806
00:51:56,770 --> 00:51:57,980
>> THANK YOU.

807
00:51:57,980 --> 00:52:03,440
>> YEAH, WE -- THIS IS RIGHT AT
THE BASE OF THE HEART, IF YOU

808
00:52:03,440 --> 00:52:07,279
LIKE, SORT OF WHERE IT WRAPS
AROUND THE EDGE OF THE WHALE,

809
00:52:07,279 --> 00:52:13,619
INFORMALLY, BUT IT'S THE BASE OF
THE HEART, SO THAT'S WHERE THIS

810
00:52:13,619 --> 00:52:14,619
IS.

811

00:52:14,619 --> 00:52:19,190

AND AGAIN IN TERMS OF
DISTRIBUTION OF THE MOUNTAINS,

812

00:52:19,190 --> 00:52:22,320

WE'LL JUST HAVE TO WAIT AND SEE
WHEN WE GET THE BIGGER PICTURE

813

00:52:22,320 --> 00:52:33,920

VIEW OF MORE OF THE SURFACES AND
MAKES MORE SENSE.

814

00:52:33,920 --> 00:52:42,589

>> SOME OF THE FEATURES ON THAT
VERY GOOD RESOLUTION SCALE

815

00:52:42,589 --> 00:52:51,240

ARE -- MAYBE YOU'RE WAITING FOR
THE OTHER DIRECTION IMAGE, BUT

816

00:52:51,240 --> 00:52:57,859

COULD THEY POSSIBLY BE SIMILAR
TO LAVA TUBES?

817

00:52:57,859 --> 00:53:00,931

>> WE -- I DON'T SEE ANYTHING
THAT LEAPS OUT TO LOOKING LIKE A

818

00:53:00,931 --> 00:53:01,931

LAVA TUBE.

819

00:53:01,931 --> 00:53:05,509

SOME OF THAT SURFACE LOOKS LIKE
A LAVA FLOW, BUT ON A VASTLY

820

00:53:05,509 --> 00:53:09,270

LARGER SCALE, SO I DON'T THINK
IT WOULD BE THE SURFACE OF A

821

00:53:09,270 --> 00:53:14,300

LAVA FLOW, BUT MAYBE THE PROCESS
HAPPENING ON A BIGGER SCALE.

822

00:53:14,300 --> 00:53:21,980

AND, YEAH, THAT'S --
MAYBE I

823

00:53:21,980 --> 00:53:25,299

SHOULD COMMENT, YEAH, THERE ARE
A LOT OF LINEAR PARALLEL

824

00:53:25,299 --> 00:53:31,369

FEATURES, AS YOU SAY, AND MAYBE
IT'S FORMING ON THE SURFACE OF

825

00:53:31,369 --> 00:53:35,150

SOME STRANGE KIND OF EROSION,
BUT YEAH, WE'LL HAVE FUN

826

00:53:35,150 --> 00:53:36,160

FIGURING IT OUT.

827

00:53:36,160 --> 00:53:39,730

I SHOULD SAY, I'M NOT SURE THIS
EXACT AREA IS COVERED IN HIGH

828

00:53:39,730 --> 00:53:42,890

RESOLUTION, BUT IT PROBABLY IS,
BUT I THINK WE'LL HAVE EVEN MORE

829

00:53:42,890 --> 00:53:47,200

DETAILED IMAGES OF THIS AREA AND
CERTAINLY OTHER AREAS NEARBY

830

00:53:47,200 --> 00:53:49,849

WHEN ALL THE DATA COMES DOWN.

831

00:53:49,849 --> 00:53:52,250

>> LEO WITH IRISH TELEVISION.

832

00:53:52,250 --> 00:53:57,089

YOUR FINDINGS ON INTERNAL
HEATING TODAY, ARE THEY A GAME

833

00:53:57,089 --> 00:53:59,299

CHANGER FOR THE WAY THAT WE
SHOULD BE THINKING ABOUT OTHER

834

00:53:59,299 --> 00:54:02,490

OBJECTS IN THE KUIPER BELT?

835

00:54:02,490 --> 00:54:06,920

I'M THINKING IN PARTICULAR, IF I
COULD TAKE IT TO THE EXTREME,

836

00:54:06,920 --> 00:54:12,960

DOES IT RAISE THE PROSPECTS OF
WATER WORLDS OUT THERE AND DOES

837

00:54:12,960 --> 00:54:19,469

IT INCREASE THE EXCITEMENT ABOUT
WHAT WE MIGHT SEE OUT THERE?

838

00:54:19,469 --> 00:54:22,500

>> I'LL TAKE A CRACK AT IT,
SURE.

839

00:54:22,500 --> 00:54:26,009

YEAH, I THINK IT COULD BE A GAME
CHANGER.

840

00:54:26,009 --> 00:54:29,079

WE DON'T KNOW -- CHARON IS THE
SIZE OF SOME OF THE SMALLER

841

00:54:29,079 --> 00:54:33,279

WORLDS IN THE KUIPER BELT, AND
WE DON'T KNOW HOW RECENTLY

842

00:54:33,279 --> 00:54:36,390

ACTIVE ON CHARON, AND AGAIN,
UNTIL WE CAN START COUNTING THE

843

00:54:36,390 --> 00:54:40,430

CRATERS, BUT IT'S CLEARLY
HAPPENING GEOLOGICALLY FAIRLY

844

00:54:40,430 --> 00:54:44,880

RECENTLY AND I THINK WE TENDED
TO THINK OF THESE MID SIZE WORLD

845

00:54:44,880 --> 00:54:51,619

KIND OF OBJECTS AS PROBABLY
CANDY COATED LUMPS OF ICE AND

846

00:54:51,619 --> 00:54:55,970

THIS MEANS THEY COULD BE EQUALLY
DIVERSE AND EQUALLY AMAZING IF

847

00:54:55,970 --> 00:54:59,319

WE EVER GET A SPACECRAFT OUT
THERE TO SEE THEM CLOSE UP.

848

00:54:59,319 --> 00:55:02,750

>> OKAY, WE'RE COMING UP AT THE
TOP OF THE HOUR, WE GOT A

849

00:55:02,750 --> 00:55:06,599

CLUSTER HERE, GOING TO HAVE TO
SHUT THIS DOWN IN A MOMENT.

850

00:55:06,599 --> 00:55:07,599

GO AHEAD.

851

00:55:07,599 --> 00:55:09,079

>> JOSH LOCAL, NEW SCIENTIST.

852

00:55:09,079 --> 00:55:11,910
I NOTICED TODAY WE HAVEN'T
TALKED ABOUT THE FAMILIAR TOUCH

853
00:55:11,910 --> 00:55:19,700
STONES, ANALOGOUS TO PLUTO AND
CHARON, IS THAT BECAUSE THEY

854
00:55:19,700 --> 00:55:22,310
DON'T LOOK SIMILAR ENOUGH?

855
00:55:22,310 --> 00:55:25,380
HOW MUCH CAN WE USE WHAT WE
ALREADY KNOW FROM EXPLORATION TO

856
00:55:25,380 --> 00:55:30,210
UNDERSTAND WHAT'S GOING ON?

857
00:55:30,210 --> 00:55:33,849
>> WELL, WE'RE STARTING TO MAKE
THOSE ANALYSIS, SO THE FIRST

858
00:55:33,849 --> 00:55:41,509
THING, DOESN'T LOOK LIKE TRY
TRIDENT, THE MOST SIMILAR OBJECT

859
00:55:41,509 --> 00:55:44,839
IN THE SOLAR SYSTEM TO PLUTO.

860
00:55:44,839 --> 00:55:47,519
TRIDENT DOESN'T HAVE THIS KIND
OF RUGGED TERRAIN.

861
00:55:47,519 --> 00:55:52,049
IT HAS A LOT OF STRANGE
MATERIALS, BUT DOESN'T LOOK AT

862
00:55:52,049 --> 00:55:54,800
ALL LIKE THIS.

863

00:55:54,800 --> 00:55:59,900

SOMETHING VERY DIFFERENT ABOUT
PLUTO IN GEOLOGY, AND CHARON

864

00:55:59,900 --> 00:56:02,250

LOOKS A LITTLE BIT LIKE SOME OF
THE MOONS OF URANUS, I WOULD

865

00:56:02,250 --> 00:56:10,559

SAY, WHERE WE HAVE INVOKED MAYBE
TIDAL HEATING AS AN EXPLANATION

866

00:56:10,559 --> 00:56:12,410

FROM TIDAL HEATING FROM URANUS
ITSELF.

867

00:56:12,410 --> 00:56:21,200

AS I SAID, NOW WE'RE SEEING THAT
WE CAN GET -- ACTIVITY ON WALLS

868

00:56:21,200 --> 00:56:25,079

THAT DO NOT HAVE TIDAL HEATING,
THEN WE'LL HAVE TO GO BACK AND

869

00:56:25,079 --> 00:56:26,599

LOOK AT IT.

870

00:56:26,599 --> 00:56:29,740

>> I CAN ADD TO THAT, YOU KNOW,
PART OF THE REASON YOU'RE NOT

871

00:56:29,740 --> 00:56:33,710

HEARING US SAY PLUTO LOOKS LIKE
THIS WORLD OR THAT WORLD IS

872

00:56:33,710 --> 00:56:36,960

BECAUSE PLUTO HAS SO MUCH
DIVERSITY.

873

00:56:36,960 --> 00:56:38,720
WE'RE SEEING SO MANY DIFFERENT
FEATURES.

874
00:56:38,720 --> 00:56:42,059
LIKE WILL SAID, THERE'S LOTS OF
DIFFERENT PROCESSES GOING ON

875
00:56:42,059 --> 00:56:46,970
HERE, SO WE'LL PROBABLY END UP
PULLING IT APART AND SAY THIS

876
00:56:46,970 --> 00:56:50,240
PART RESEMBLES THAT ON THIS
WORLD.

877
00:56:50,240 --> 00:56:52,509
BUT THERE'S NOTHING LIKE IT.

878
00:56:52,509 --> 00:56:53,509
>> OKAY.

879
00:56:53,509 --> 00:56:56,499
SO WE'RE GOING TO TAKE TWO QUICK
QUESTIONS, THEN UNFORTUNATELY

880
00:56:56,499 --> 00:56:58,910
I'M GOING TO HAVE TO END.

881
00:56:58,910 --> 00:57:02,570
IF YOU HAVE QUESTIONS, WE'LL SEE
IF WE CAN FOLLOW THOSE UP AT A

882
00:57:02,570 --> 00:57:03,570
LATER TIME.

883
00:57:03,570 --> 00:57:04,570
GO AHEAD.

884

00:57:04,570 --> 00:57:07,710
>> THANK YOU, SPACE.COM, AND I
THINK THIS QUESTION MAY BE FOR

885
00:57:07,710 --> 00:57:12,079
ALLEN OR WHOEVER YOU WANT TO
DELEGATE TO, BUT YOU'VE SHOWN US

886
00:57:12,079 --> 00:57:17,410
A FIRST LOOK AT HYDRA, ACTIVITY
ON CHARON, ICE AT 11,000 FEET

887
00:57:17,410 --> 00:57:22,490
TALL ON PLUTO, AND I'M JUST
WONDERING TODAY IN THE MISSION

888
00:57:22,490 --> 00:57:27,779
OPERATIONS ROOM, HOW THAT FEELS
TO SEE IT COME DOWN, TO OPEN IT

889
00:57:27,779 --> 00:57:32,250
AND KNOW THAT YESTERDAY YOU HAD
ONE PHOTO, NOW YOU HAVE TEN

890
00:57:32,250 --> 00:57:36,449
TIMES BETTER AND TOMORROW IT'S
GOING TO GET EVEN BETTER.

891
00:57:36,449 --> 00:57:40,009
>> IT FEELS TERRIBLE.

892
00:57:40,009 --> 00:57:43,960
[LAUGHTER]
YEAH, YEAH, THERE'S A LOT OF

893
00:57:43,960 --> 00:57:46,470
DEPRESSION IN THE SCIENCE FIELD.

894
00:57:46,470 --> 00:57:52,630
WE DON'T UNDERSTAND ANYTHING.

895

00:57:52,630 --> 00:57:58,339

NO, HONESTLY, YOU KNOW, I SAID A
FEW DAYS BEFORE, THERE WERE A

896

00:57:58,339 --> 00:58:01,240

LOT OF SMILES, WE CAN FEEL THE
MOMENTUM, WE'RE FINALLY GETTING

897

00:58:01,240 --> 00:58:03,859

AT THE STAGE WHERE WE CAN SEE
GEOLOGY AND TOPOGRAPHY ON THE

898

00:58:03,859 --> 00:58:09,150

SURFACE, BUT NOW, YOU KNOW, I
THINK I COULD CHARACTERIZE THE

899

00:58:09,150 --> 00:58:12,960

FOUR INDIVIDUAL ROOMS WHERE
PEOPLE ARE AT WORK AS SOMETHING

900

00:58:12,960 --> 00:58:16,420

CLOSE TO BEDLAM.

901

00:58:16,420 --> 00:58:18,819

PARTICULARLY TODAY, TODAY IS
PROBABLY OUR BIGGEST CHALLENGE.

902

00:58:18,819 --> 00:58:23,710

FIRST, WE'RE DEFINITELY LIVING
ON LESS SLEEP THAN NORMAL, BUT

903

00:58:23,710 --> 00:58:29,130

THE IMAGERY CAME DOWN, BUT JUST
BEFORE 6:00 A.M., AND THIS

904

00:58:29,130 --> 00:58:33,269

BEGAN, YOU KNOW, NINE HOURS
LATER.

905

00:58:33,269 --> 00:58:35,920

WE HAD MORE DATA COMING DOWN
TODAY, BUT THE NEXT TIME WE TALK

906

00:58:35,920 --> 00:58:40,670

TO YOU IS IN 48 HOURS, SO MANY
TIMES AS LONG TO WORK WITH THE

907

00:58:40,670 --> 00:58:43,059

DATA AND DISCUSS WHAT WE THINK
THE RESULTS ARE.

908

00:58:43,059 --> 00:58:47,490

THEN THE NEXT TIME WE COME BACK
AND TALK TO YOU WILL BE YET A

909

00:58:47,490 --> 00:58:49,170

WEEK LATER STILL.

910

00:58:49,170 --> 00:58:53,119

SO THIS IS REALLY, YOU KNOW, HOT
OFF THE PRESS.

911

00:58:53,119 --> 00:58:57,690

BUT I DON'T THINK -- ASKED MY
COLLEAGUES TO PITCH IN, I DON'T

912

00:58:57,690 --> 00:59:02,759

THINK ANY ONE OF US COULD HAVE
IMAGINED THAT IT WAS THIS GOOD

913

00:59:02,759 --> 00:59:06,449

OF A TOY STORE.

914

00:59:06,449 --> 00:59:07,989

>> THIS IS WHAT WE CAME FOR.

915

00:59:07,989 --> 00:59:13,359

>> THIS EXCEEDS WHAT WE CAME

FOR.

916

00:59:13,359 --> 00:59:23,410

[APPLAUSE]

>> OKAY, FRANK, TAKE US HOME.

917

00:59:23,410 --> 00:59:28,440

>> FRANK, AVIATION WEEK.

918

00:59:28,440 --> 00:59:31,430

LAST WEEK I BELIEVE YOU WERE
SURPRISED BY THE DIFFERENCE IN

919

00:59:31,430 --> 00:59:33,890

COLOR BETWEEN CHARON AND PLUTO.

920

00:59:33,890 --> 00:59:36,619

HAVE YOU SEEN ANYTHING SINCE
YESTERDAY THAT IS BEGINNING TO

921

00:59:36,619 --> 00:59:38,540

INFORM THAT QUESTION?

922

00:59:38,540 --> 00:59:43,859

>> I CAN SPEAK FOR MYSELF, I
DON'T THINK SO YET, BUT ONE OF

923

00:59:43,859 --> 00:59:48,890

THE INTERESTING THINGS THAT I
THINK I'LL JUST REMARK ON IS THE

924

00:59:48,890 --> 00:59:52,339

IMAGE THAT WE SHOWED YESTERDAY
SHOWING VERY STRONG COLOR

925

00:59:52,339 --> 00:59:54,410

CONTRAST ON PLUTO'S SURFACE.

926

00:59:54,410 --> 00:59:57,410

I WOULD BE SURPRISED IF THERE
ARE SOME UNITS THAT MIGHT BE

927

00:59:57,410 --> 00:59:59,099

SHARING LIGHT.

928

00:59:59,099 --> 01:00:02,140

WE'LL HAVE TO SEE WHEN WE GET
THE HIGHER RESOLUTION AND MORE

929

01:00:02,140 --> 01:00:06,040

GLOBAL COLOR DATA SETS.

930

01:00:06,040 --> 01:00:10,400

BUT SOMETHING IS MAKING THESE
TWO WORLDS VERY, VERY DIFFERENT.

931

01:00:10,400 --> 01:00:13,769

ONE HAS AN ATMOSPHERE, REAT A
TIMES ON SURFACE, THE OTHER DOES

932

01:00:13,769 --> 01:00:14,769

NOT.

933

01:00:14,769 --> 01:00:19,559

ONE IS COVERED IN WATER ICE, THE
OTHER IS COVERED IN VOLATILES.

934

01:00:19,559 --> 01:00:20,559

IT'S A PUZZLE.

935

01:00:20,559 --> 01:00:22,590

IT'S A REAL PUZZLE.

936

01:00:22,590 --> 01:00:23,590

>> OKAY.

937

01:00:23,590 --> 01:00:26,170

WE'RE GOING TO END HERE.

938

01:00:26,170 --> 01:00:29,450

AS YOU'VE HEARD, THIS IS JUST
THE BEGINNING.

939

01:00:29,450 --> 01:00:32,010

THE STORY IS FAR, FAR FROM BEING
OVER.

940

01:00:32,010 --> 01:00:36,069

WE WILL TRANSITION TO THE NEXT
NEWS CONFERENCE AT NASA

941

01:00:36,069 --> 01:00:37,880

HEADQUARTERS AT 1:00 P.M.

942

01:00:37,880 --> 01:00:39,720

EASTERN ON FRIDAY.

943

01:00:39,720 --> 01:00:43,440

THERE WILL BE MORE INFORMATION
GOING OUT TOMORROW.

944

01:00:43,440 --> 01:00:47,690

FOLLOW THE MISSION AND THE
INCREDIBLE IMAGES AND

945

01:00:47,690 --> 01:00:49,819

INFORMATION ON SOCIAL MEDIA.

946

01:00:49,819 --> 01:00:53,529

JOIN THE CONVERSATION, FOLLOW
THE CONVERSATION, #PLUTOFLYBY

947

01:00:53,529 --> 01:00:58,599

AND SEND THOSE QUESTIONS IN
AT #ASKNASA, AND, OF COURSE, ALL

948

01:00:58,599 --> 01:01:04,299

OF THIS INFORMATION IS ONLINE AT
NASA.GOV/NEWHORIZONS.

949

01:01:04,299 --> 01:01:06,759

IT'S BEEN A REMARKABLE WEEK.

950

01:01:06,759 --> 01:01:12,359

THE NASA NEW HORIZONS AND
APPLIED PHYSICS LAB AND ALL THE

951

01:01:12,359 --> 01:01:15,920

PARTNERS ON THIS MISSION ARE
TRULY HOUSEHOLD NAMES THROUGHOUT

952

01:01:15,920 --> 01:01:16,920

THE WORLD.

953

01:01:16,920 --> 01:01:20,529

THANK YOU FOR JOINING US HERE AT
THE APPLIED PHYSICS LAB.