#TrackingWorldWater

The Science Behind the SWOT Satellite

SCIENCE BRIEFING

Tuesday, Dec. 13, 12pm PT / 3pm ET

1
00:00:52,569 --> 00:00:03,770
foreign

2
00:01:29,649 --> 00:00:52,579
[Music]

3
00:01:29,659 --> 00:01:49,010
thank you

4
00:01:49,020 --> 00:02:16,580
foreign

5
00:02:19,360 --> 00:02:19,070
[Music]

6
00:03:13,260 --> 00:02:19,370
foreign

7
00:03:13,270 --> 00:03:29,770
[Music]

8
00:03:29,780 --> 00:03:37,390
thank you

9
00:03:37,400 --> 00:03:45,130
[Music]

10
00:03:45,140 --> 00:04:02,089
thank you

11
00:04:02,099 --> 00:04:29,880
foreign

12
00:04:29,890 --> 00:04:38,270
[Music]

13
00:04:38,280 --> 00:04:42,030

foreign

14
00:06:02,290 --> 00:05:23,770
[Music]

15
00:06:02,300 --> 00:06:17,870
thank you

16
00:06:17,880 --> 00:06:36,310
foreign

17
00:06:36,320 --> 00:07:10,430
[Music]

18
00:07:14,749 --> 00:07:12,890
hello and welcome to Vandenberg space

19
00:07:17,150 --> 00:07:14,759
force base on the Central Coast of

20
00:07:19,309 --> 00:07:17,160
California for the science briefing of

21
00:07:21,830 --> 00:07:19,319
the international surface water and

22
00:07:24,350 --> 00:07:21,840
ocean topography Mission also known as

23
00:07:26,570 --> 00:07:24,360
SWAT I'm Jasmine Hopkins with NASA

24
00:07:28,730 --> 00:07:26,580
Communications SWAT will be the first

25
00:07:31,070 --> 00:07:28,740
satellite mission to observe nearly all

26
00:07:32,930 --> 00:07:31,080
the water on Earth's surface this will

27
00:07:35,390 --> 00:07:32,940
help scientists understand how water

28
00:07:38,150 --> 00:07:35,400
moves worldwide and give us new insight

29
00:07:40,129 --> 00:07:38,160
into climate change SWOT is an

30
00:07:42,830 --> 00:07:40,139
international collaboration between NASA

31
00:07:44,990 --> 00:07:42,840
and the French space agency kness with

32
00:07:47,870 --> 00:07:45,000
contributions from the UK and Canadian

33
00:07:50,390 --> 00:07:47,880
space agencies as well this Mission will

34
00:07:53,390 --> 00:07:50,400
lift off aboard a SpaceX Falcon 9 rocket

35
00:07:56,650 --> 00:07:53,400
this Thursday that's December 15th at 3

36
00:07:59,330 --> 00:07:56,660
46 a.m Pacific and this will Mark the

37
00:08:01,490 --> 00:07:59,340
101st Mission managed by NASA's launch

38
00:08:02,629 --> 00:08:01,500

Services Program based at Kennedy Space

39
00:08:04,490 --> 00:08:02,639
Center

40
00:08:06,770 --> 00:08:04,500
joining us today is a distinguished

41
00:08:09,110 --> 00:08:06,780
panel of guests ready to uncover the

42
00:08:12,110 --> 00:08:09,120
science behind SWAT starting on my left

43
00:08:15,350 --> 00:08:12,120
we have Kate Calvin Chief scientist and

44
00:08:17,870 --> 00:08:15,360
Senior climate advisor for NASA

45
00:08:21,050 --> 00:08:17,880
so much for Charlie Earth observation

46
00:08:23,689 --> 00:08:21,060
program manager from canes

47
00:08:26,749 --> 00:08:23,699
Nadia vinaigrette of a shiffer SWAT

48
00:08:29,930 --> 00:08:26,759
program scientist for NASA

49
00:08:31,550 --> 00:08:29,940
Tamlin pavelski SWAT hydrology signs

50
00:08:33,110 --> 00:08:31,560
lead from the University of North

51
00:08:36,110 --> 00:08:33,120
Carolina

52
00:08:37,850 --> 00:08:36,120
and finally Benjamin Hamilton research

53
00:08:39,649 --> 00:08:37,860
scientist for the sea level and Ice

54
00:08:41,449 --> 00:08:39,659
group at NASA's jet propulsion

55
00:08:43,130 --> 00:08:41,459
Laboratory

56
00:08:44,570 --> 00:08:43,140
we are so glad to have this panel

57
00:08:46,730 --> 00:08:44,580
experts with us today and they'll be

58
00:08:48,769 --> 00:08:46,740
answering questions from media here in

59
00:08:50,210 --> 00:08:48,779
the room and over the phone we also

60
00:08:54,410 --> 00:08:50,220
invite the public to join the

61
00:08:56,090 --> 00:08:54,420
conversation online using ask NASA but

62
00:08:57,829 --> 00:08:56,100
before we get into your questions we're

63
00:08:59,509 --> 00:08:57,839

going to give each of them a moment to

64
00:09:01,550 --> 00:08:59,519
introduce themselves and their role in

65
00:09:05,030 --> 00:09:01,560
the mission and Kate we'll start with

66
00:09:07,070 --> 00:09:05,040
you yeah thank you Jasmine NASA has a

67
00:09:09,949 --> 00:09:07,080
long history of studying our home planet

68
00:09:11,870 --> 00:09:09,959
so if you queue my first animation

69
00:09:14,030 --> 00:09:11,880
this is going to show you the current

70
00:09:15,889 --> 00:09:14,040
Earth observing Fleet we have more than

71
00:09:17,630 --> 00:09:15,899
two dozen Earth observing satellites and

72
00:09:20,090 --> 00:09:17,640
instruments in orbit including several

73
00:09:21,829 --> 00:09:20,100
on the International Space Station we

74
00:09:24,410 --> 00:09:21,839
have more than 60 years of satellite

75
00:09:26,090 --> 00:09:24,420
observations many of those observations

76
00:09:27,769 --> 00:09:26,100
and satellite missions are in

77
00:09:30,949 --> 00:09:27,779
partnership with other U.S government

78
00:09:33,050 --> 00:09:30,959
agencies or International Partners like

79
00:09:34,910 --> 00:09:33,060
SWAT which is in partnership with canez

80
00:09:36,949 --> 00:09:34,920
the French space agency with

81
00:09:39,769 --> 00:09:36,959
contributions from the UK and Canadian

82
00:09:42,290 --> 00:09:39,779
space agencies and SWAT is continuing

83
00:09:44,210 --> 00:09:42,300
our Legacy of partnership

84
00:09:45,590 --> 00:09:44,220
when we're looking at Earth from space

85
00:09:47,389 --> 00:09:45,600
we've been observing the Earth for

86
00:09:49,610 --> 00:09:47,399
decades we can see both the state of it

87
00:09:51,650 --> 00:09:49,620
now as well as how it's changed over

88
00:09:53,210 --> 00:09:51,660

time and we're thinking about where NASA

89
00:09:55,070 --> 00:09:53,220
is going forward in earth science it's

90
00:09:57,230 --> 00:09:55,080
continuing to innovate and do new

91
00:09:59,090 --> 00:09:57,240
observations as well as to work on

92
00:10:01,790 --> 00:09:59,100
providing that information to the public

93
00:10:03,470 --> 00:10:01,800
as stakeholders and users to ensure that

94
00:10:05,570 --> 00:10:03,480
they have actionable information as

95
00:10:08,509 --> 00:10:05,580
they're going forward and SWAT is a part

96
00:10:09,949 --> 00:10:08,519
of both of that SWAT is a is one of the

97
00:10:11,870 --> 00:10:09,959
missions that's going to help us lay the

98
00:10:13,970 --> 00:10:11,880
foundation for going forward a new

99
00:10:16,550 --> 00:10:13,980
generation of Earth observing and remote

100
00:10:18,769 --> 00:10:16,560
sensing missions both because of the

101
00:10:20,329 --> 00:10:18,779
type of information it provides but also

102
00:10:21,949 --> 00:10:20,339
the diversity of people that we're

103
00:10:24,050 --> 00:10:21,959
expecting to be able to use that

104
00:10:25,730 --> 00:10:24,060
information so it is part of a future

105
00:10:28,130 --> 00:10:25,740
set of Genera of Earth observing

106
00:10:30,350 --> 00:10:28,140
satellites another area we're working

107
00:10:32,389 --> 00:10:30,360
towards is the earth system Observatory

108
00:10:34,670 --> 00:10:32,399
which is the next set of missions that

109
00:10:37,430 --> 00:10:34,680
will provide a more holistic picture of

110
00:10:39,170 --> 00:10:37,440
the Earth in terms of accessibility of

111
00:10:41,329 --> 00:10:39,180
information we're going to be reaching a

112
00:10:43,190 --> 00:10:41,339
new set of users with SWOT and we're

113
00:10:44,630 --> 00:10:43,200

also working within NASA to provide that

114
00:10:45,829 --> 00:10:44,640
information and make it more accessible

115
00:10:47,449 --> 00:10:45,839
through things like the Earth

116
00:10:49,430 --> 00:10:47,459
information center

117
00:10:50,870 --> 00:10:49,440
so just a little bit about swap before I

118
00:10:53,210 --> 00:10:50,880
hand it over to my other colleagues on

119
00:10:55,190 --> 00:10:53,220
this panel so it is about surface water

120
00:10:57,590 --> 00:10:55,200
and ocean so it's on the surface waters

121
00:10:59,210 --> 00:10:57,600
it'll provide the first Global survey of

122
00:11:01,490 --> 00:10:59,220
water running through rivers and lakes

123
00:11:03,590 --> 00:11:01,500
it'll help us understand where water is

124
00:11:04,550 --> 00:11:03,600
where it's coming from and where it's

125
00:11:08,030 --> 00:11:04,560
going

126
00:11:10,430 --> 00:11:08,040
observe ocean features with higher

127
00:11:11,750 --> 00:11:10,440
resolution oceans absorb a lot of carbon

128
00:11:13,850 --> 00:11:11,760
and heat and this will give us a better

129
00:11:15,650 --> 00:11:13,860
understanding of that those processes

130
00:11:17,210 --> 00:11:15,660
and help us improve both our

131
00:11:19,550 --> 00:11:17,220
understanding of the oceans as well as

132
00:11:21,650 --> 00:11:19,560
our projections into the future and with

133
00:11:23,090 --> 00:11:21,660
that I'll turn it back to Jasmine thank

134
00:11:24,530 --> 00:11:23,100
you so much Kate for getting us kicked

135
00:11:26,389 --> 00:11:24,540
off on our opening remarks a lot of

136
00:11:28,790 --> 00:11:26,399
great background information there next

137
00:11:32,449 --> 00:11:28,800
let's turn it over to Selma churchali

138
00:11:34,850 --> 00:11:32,459

thank you Jasmine I'm really delighted

139
00:11:35,750 --> 00:11:34,860
and very pleased to be here with you

140
00:11:37,970 --> 00:11:35,760
today

141
00:11:40,610 --> 00:11:37,980
as the Earth observation program manager

142
00:11:43,069 --> 00:11:40,620
and the former SWAT program this is with

143
00:11:45,650 --> 00:11:43,079
a deep emotion that we are mainly now

144
00:11:49,069 --> 00:11:45,660
less than two days before the launch

145
00:11:52,069 --> 00:11:49,079
SWOT and the SWOT launch today is really

146
00:11:55,550 --> 00:11:52,079
me is really timely correlated

147
00:11:58,730 --> 00:11:55,560
to the anniversary of more than three

148
00:12:02,329 --> 00:11:58,740
decades of excellent cooperation between

149
00:12:05,210 --> 00:12:02,339
NASA and kness marking the anniversary

150
00:12:07,970 --> 00:12:05,220
of the launch of the first Pathfinder

151
00:12:10,430 --> 00:12:07,980
mission called topics Poseidon dedicated

152
00:12:12,550 --> 00:12:10,440
to Ocean ultimate remission

153
00:12:15,829 --> 00:12:12,560
since that time the international

154
00:12:19,190 --> 00:12:15,839
cooperation has been extended to many

155
00:12:22,269 --> 00:12:19,200
other space agencies operational ones

156
00:12:25,850 --> 00:12:22,279
you met sat Noah and the European Union

157
00:12:29,210 --> 00:12:25,860
Copernicus program has decided to

158
00:12:32,329 --> 00:12:29,220
implement a new generation of Copernicus

159
00:12:35,870 --> 00:12:32,339
Sentinel 6 Mike fraglich with B which

160
00:12:37,970 --> 00:12:35,880
has taken over Json tree as the new

161
00:12:40,250 --> 00:12:37,980
satellite ultimate tree reference

162
00:12:44,150 --> 00:12:40,260
missions

163
00:12:47,870 --> 00:12:44,160

could you please put the slides

164
00:12:49,790 --> 00:12:47,880
if NASA and Kines have decided to make

165
00:12:53,389 --> 00:12:49,800
this Mission happen

166
00:12:55,430 --> 00:12:53,399
extended to UK space agency and Canadian

167
00:12:59,389 --> 00:12:55,440
space agency

168
00:13:00,769 --> 00:12:59,399
it really thanks to their trust to

169
00:13:03,350 --> 00:13:00,779
collectively

170
00:13:06,530 --> 00:13:03,360
have the capability to handle such

171
00:13:08,210 --> 00:13:06,540
Innovations and the challenges

172
00:13:10,790 --> 00:13:08,220
few days ago

173
00:13:13,550 --> 00:13:10,800
we were on the committee on Earth

174
00:13:16,370 --> 00:13:13,560
observation satellite plenary meeting in

175
00:13:18,949 --> 00:13:16,380
France in Brits where we had the

176
00:13:22,069 --> 00:13:18,959
opportunity to meet with the UK space

177
00:13:24,590 --> 00:13:22,079
agency leader CSA leader and NASA and

178
00:13:27,370 --> 00:13:24,600
Kines with the picture you had just in

179
00:13:30,829 --> 00:13:27,380
front of you this is a great celebration

180
00:13:33,350 --> 00:13:30,839
marking this excellent cooperation and

181
00:13:36,290 --> 00:13:33,360
what a better present than the SWOT

182
00:13:38,030 --> 00:13:36,300
within this anniversary of 30 years of

183
00:13:39,290 --> 00:13:38,040
cooperation

184
00:13:41,449 --> 00:13:39,300
of course

185
00:13:44,509 --> 00:13:41,459
within the global warming

186
00:13:46,090 --> 00:13:44,519
there is a huge impact today we know on

187
00:13:52,129 --> 00:13:46,100
water cycle

188
00:13:55,970 --> 00:13:52,139

by putting some draft in some parts of

189
00:14:00,110 --> 00:13:55,980
the words and floats in other parts

190
00:14:03,230 --> 00:14:00,120
and we are reaching our knowledge within

191
00:14:05,230 --> 00:14:03,240
the Earth cycle with some limits and we

192
00:14:07,970 --> 00:14:05,240
know that many of the compartment

193
00:14:09,110 --> 00:14:07,980
compartments of this water cycle to be

194
00:14:12,230 --> 00:14:09,120
understood

195
00:14:15,069 --> 00:14:12,240
and that's why SWOT will be really a

196
00:14:18,949 --> 00:14:15,079
pint finder Mission providing new

197
00:14:21,769 --> 00:14:18,959
measurements a new era by having a

198
00:14:25,210 --> 00:14:21,779
global first Global invent inventory of

199
00:14:29,810 --> 00:14:25,220
the surface water bodies by providing

200
00:14:32,269 --> 00:14:29,820
heads of the surface water slopes and

201
00:14:35,569 --> 00:14:32,279
delivering what we called the growl of

202
00:14:38,090 --> 00:14:35,579
hydrologists which is discharge and in

203
00:14:41,870 --> 00:14:38,100
the meantime we will have also an

204
00:14:45,949 --> 00:14:41,880
important fine picture of the stock

205
00:14:47,449 --> 00:14:45,959
water within the lakes or reservoirs and

206
00:14:50,210 --> 00:14:47,459
wetlands

207
00:14:51,590 --> 00:14:50,220
we are speaking about revolution in

208
00:14:54,350 --> 00:14:51,600
hydrology

209
00:14:55,930 --> 00:14:54,360
but in the meantime we will for the

210
00:15:00,230 --> 00:14:55,940
first time address

211
00:15:04,009 --> 00:15:00,240
a key processes within the ocean those

212
00:15:06,590 --> 00:15:04,019
key processes are totally unknown today

213
00:15:09,829 --> 00:15:06,600

the scientists made an important

214
00:15:11,110 --> 00:15:09,839
hypothesis that with those fine scale

215
00:15:14,389 --> 00:15:11,120
processes

216
00:15:17,629 --> 00:15:14,399
currents edges filaments

217
00:15:19,750 --> 00:15:17,639
swats will provide those measurements in

218
00:15:24,110 --> 00:15:19,760
order to understand those processes

219
00:15:27,170 --> 00:15:24,120
which play a critical role in the global

220
00:15:28,189 --> 00:15:27,180
circulation ocean and related to climate

221
00:15:31,490 --> 00:15:28,199
change

222
00:15:34,490 --> 00:15:31,500
and this is really important provision

223
00:15:37,310 --> 00:15:34,500
from of course the SWOT mission

224
00:15:40,430 --> 00:15:37,320
next slide please

225
00:15:43,069 --> 00:15:40,440
since the beginning of the program and

226
00:15:45,710 --> 00:15:43,079
the memorandum of understanding which

227
00:15:49,250 --> 00:15:45,720
was signed between NASA and Guinness

228
00:15:51,710 --> 00:15:49,260
the science Community was initially

229
00:15:53,210 --> 00:15:51,720
involved from the beginning

230
00:15:56,269 --> 00:15:53,220
first of all

231
00:15:59,230 --> 00:15:56,279
for establishing the science requirement

232
00:16:02,389 --> 00:15:59,240
then after with the science definition

233
00:16:05,449 --> 00:16:02,399
team and the science team

234
00:16:07,430 --> 00:16:05,459
they play a key role in order to refine

235
00:16:11,030 --> 00:16:07,440
those requirements and the

236
00:16:13,310 --> 00:16:11,040
specifications taking into account the

237
00:16:15,530 --> 00:16:13,320
constraints from the technical point of

238
00:16:18,949 --> 00:16:15,540

view and budgetary ones

239
00:16:21,170 --> 00:16:18,959
and the way that we used to work closely

240
00:16:23,990 --> 00:16:21,180
between the projects and the science

241
00:16:26,329 --> 00:16:24,000
Community was built through and over

242
00:16:28,910 --> 00:16:26,339
these three decades and this is really

243
00:16:31,430 --> 00:16:28,920
an important aspect of the success of

244
00:16:33,470 --> 00:16:31,440
the past and current missions and of

245
00:16:34,490 --> 00:16:33,480
course of the upcoming one the SWAT

246
00:16:37,129 --> 00:16:34,500
missions

247
00:16:39,050 --> 00:16:37,139
and the next place next to a slide

248
00:16:42,230 --> 00:16:39,060
please

249
00:16:43,430 --> 00:16:42,240
we had many many meetings with the

250
00:16:48,129 --> 00:16:43,440
science team

251
00:16:51,110 --> 00:16:48,139
and we now have more than 17 countries

252
00:16:53,749 --> 00:16:51,120
involved within the preparation of swats

253
00:16:56,090 --> 00:16:53,759
why 17 countries

254
00:16:59,569 --> 00:16:56,100
because because with this an

255
00:17:02,090 --> 00:16:59,579
unprecedented measurements new ones we

256
00:17:04,250 --> 00:17:02,100
need to make calibration and validation

257
00:17:07,069 --> 00:17:04,260
of those measurements

258
00:17:10,250 --> 00:17:07,079
and across the world there are many

259
00:17:12,949 --> 00:17:10,260
teams already in starting Block in order

260
00:17:14,390 --> 00:17:12,959
to check those measurements and to

261
00:17:16,510 --> 00:17:14,400
validate them

262
00:17:21,409 --> 00:17:16,520
next slide please

263
00:17:24,370 --> 00:17:21,419

NASA and kness worked jointly to prepare

264
00:17:28,789 --> 00:17:24,380
the core towards the science community

265
00:17:31,549 --> 00:17:28,799
in order to decide to assess and to of

266
00:17:34,250 --> 00:17:31,559
course identify the free proposal that

267
00:17:36,650 --> 00:17:34,260
would make really advances in science

268
00:17:39,529 --> 00:17:36,660
and in the projects

269
00:17:44,029 --> 00:17:39,539
and here you have some of the meetings

270
00:17:47,830 --> 00:17:44,039
we had in France in 2015 next please

271
00:17:53,330 --> 00:17:47,840
and the last one before the covet crisis

272
00:17:55,970 --> 00:17:53,340
was held in Bordeaux in 2019 with one of

273
00:17:58,850 --> 00:17:55,980
the key NASA Science Program Eric

274
00:18:01,970 --> 00:17:58,860
Lindstrom who has now retired and we

275
00:18:06,409 --> 00:18:01,980
have now Nadia next to me who has become

276
00:18:09,950 --> 00:18:06,419
the news ocean science program

277
00:18:12,830 --> 00:18:09,960
of course made the science

278
00:18:15,350 --> 00:18:12,840
and the awaited advances that is

279
00:18:17,029 --> 00:18:15,360
expected from SWAT mission

280
00:18:20,810 --> 00:18:17,039
since the beginning

281
00:18:22,130 --> 00:18:20,820
we initiated the SWOT early adopter

282
00:18:24,770 --> 00:18:22,140
programs

283
00:18:29,270 --> 00:18:24,780
on French side we could we called that

284
00:18:32,450 --> 00:18:29,280
the SWOT Downstream Preparatory program

285
00:18:34,970 --> 00:18:32,460
the aim of the program is to enlarge

286
00:18:38,810 --> 00:18:34,980
beyond the science community

287
00:18:42,470 --> 00:18:38,820
to all users around the world and of

288
00:18:46,549 --> 00:18:42,480

course within the water agencies within

289
00:18:50,169 --> 00:18:46,559
the of course navigations agencies many

290
00:18:53,690 --> 00:18:50,179
users in order to allow them to prepare

291
00:18:56,210 --> 00:18:53,700
the handling those SWOT data within

292
00:18:59,590 --> 00:18:56,220
their premises and within the O system

293
00:19:02,510 --> 00:18:59,600
in order to deliver operational Services

294
00:19:05,450 --> 00:19:02,520
we are speaking about prediction of

295
00:19:08,810 --> 00:19:05,460
floods and we are waiting of course an

296
00:19:11,630 --> 00:19:08,820
important improvements of those key

297
00:19:14,630 --> 00:19:11,640
models for prediction floats but also

298
00:19:18,590 --> 00:19:14,640
for ocean circulation at the key scales

299
00:19:21,770 --> 00:19:18,600
so we are really waiting all in a very

300
00:19:24,529 --> 00:19:21,780
exciting manner this marvelous and a

301
00:19:26,690 --> 00:19:24,539
Pathfinder SWOT Mission and looking

302
00:19:29,930 --> 00:19:26,700
forward to the success of the SWOT lunch

303
00:19:32,330 --> 00:19:29,940
thank you Jasmine back to you thank you

304
00:19:33,289 --> 00:19:32,340
so much great opening remarks and also a

305
00:19:35,390 --> 00:19:33,299
good highlight to our International

306
00:19:37,250 --> 00:19:35,400
collaboration next we're are going to

307
00:19:39,950 --> 00:19:37,260
turn it over to Nadia vinogradova

308
00:19:43,370 --> 00:19:39,960
Schiffer thank you Jasmine and thank you

309
00:19:45,590 --> 00:19:43,380
Selma reminding of nashik nest's a

310
00:19:47,630 --> 00:19:45,600
strong altimetry marriage that going on

311
00:19:49,250 --> 00:19:47,640
a fourth decade it's an open marriage

312
00:19:52,970 --> 00:19:49,260
we're making new friends along the way

313
00:19:54,710 --> 00:19:52,980

with Canada and UK with a SWAT and as

314
00:19:57,890 --> 00:19:54,720
some already mentions what is a

315
00:20:01,430 --> 00:19:57,900
Pathfinder Mission and what it means is

316
00:20:04,669 --> 00:20:01,440
that there are many firsts with a SWAT

317
00:20:07,850 --> 00:20:04,679
satellite Mission we're testing a new

318
00:20:11,570 --> 00:20:07,860
technology new approaches to measure

319
00:20:14,990 --> 00:20:11,580
earth water height volume its Dynamics

320
00:20:18,110 --> 00:20:15,000
we are forging a new community of

321
00:20:21,250 --> 00:20:18,120
scientists and users we are changing the

322
00:20:25,190 --> 00:20:21,260
culture the business of doing science

323
00:20:27,890 --> 00:20:25,200
Making a critical and complex Earth

324
00:20:31,490 --> 00:20:27,900
information more accessible more

325
00:20:34,250 --> 00:20:31,500
inclusive more actionable while still

326
00:20:36,890 --> 00:20:34,260
maintaining the highest standards of

327
00:20:39,789 --> 00:20:36,900
scientific Integrity of our information

328
00:20:44,210 --> 00:20:39,799
that both NASA

329
00:20:47,990 --> 00:20:44,220
known for so with that many firsts and

330
00:20:52,789 --> 00:20:48,000
all eyes on SWAT it's truly a pivotal

331
00:20:57,770 --> 00:20:52,799
moment for our space science Industry a

332
00:21:00,370 --> 00:20:57,780
moment that will Define future standards

333
00:21:03,890 --> 00:21:00,380
in Earth observing particularly

334
00:21:06,169 --> 00:21:03,900
satellite altimetry in order to Define I

335
00:21:08,029 --> 00:21:06,179
would truly maximizing with this new

336
00:21:12,289 --> 00:21:08,039
technologies and new approaches are we

337
00:21:15,049 --> 00:21:12,299
maximizing our return on investments our

338
00:21:17,330 --> 00:21:15,059

scientific and societal return on

339
00:21:22,070 --> 00:21:17,340
investments and observing and predicting

340
00:21:25,850 --> 00:21:22,080
earth water is a worthy investment as we

341
00:21:28,570 --> 00:21:25,860
as Humanity depend on earth water to

342
00:21:31,190 --> 00:21:28,580
survive and prosper

343
00:21:33,110 --> 00:21:31,200
let's just take a quick look at how

344
00:21:35,930 --> 00:21:33,120
water moves a little bit or signs

345
00:21:38,930 --> 00:21:35,940
one-on-one if you don't mind just the

346
00:21:40,789 --> 00:21:38,940
first image what we're looking here is

347
00:21:44,390 --> 00:21:40,799
the precipital water and how the water

348
00:21:47,390 --> 00:21:44,400
moves from Ocean to land we know that

349
00:21:50,450 --> 00:21:47,400
oceans is the ultimate source of all

350
00:21:54,789 --> 00:21:50,460
moisture and water on Earth think of

351
00:21:58,970 --> 00:21:54,799
oceans those huge warehouses that Supply

352
00:22:01,149 --> 00:21:58,980
moisture and water for to land that we

353
00:22:04,970 --> 00:22:01,159
rely in as our drinking water

354
00:22:08,810 --> 00:22:04,980
Agriculture and Industry and this SWOT a

355
00:22:11,810 --> 00:22:08,820
global look on both ocean and land water

356
00:22:14,630 --> 00:22:11,820
it gives you a truly look at the supply

357
00:22:16,909 --> 00:22:14,640
and demand chain in order for us to

358
00:22:20,270 --> 00:22:16,919
truly look at the earth water as a

359
00:22:22,190 --> 00:22:20,280
holistic process and that enables a

360
00:22:24,110 --> 00:22:22,200
better predictive capability if you

361
00:22:26,630 --> 00:22:24,120
truly observe the supply Dimension

362
00:22:29,390 --> 00:22:26,640
demand chain just think of it as if you

363
00:22:31,669 --> 00:22:29,400

come to your local grocery store and you

364
00:22:34,789 --> 00:22:31,679
want to buy some fruits or vegetables

365
00:22:36,470 --> 00:22:34,799
and the shells are empty right I mean at

366
00:22:39,890 --> 00:22:36,480
that point it's kind of too late to

367
00:22:42,649 --> 00:22:39,900
prepare but if you have information that

368
00:22:44,990 --> 00:22:42,659
your farmer your supplier of your

369
00:22:47,510 --> 00:22:45,000
produce experience some disruption

370
00:22:50,450 --> 00:22:47,520
either shortage or excessive Supply then

371
00:22:52,970 --> 00:22:50,460
you have more time to prepare those

372
00:22:54,950 --> 00:22:52,980
disruption in it when you come to the

373
00:22:57,590 --> 00:22:54,960
local grocery store so the same with

374
00:23:00,890 --> 00:22:57,600
earth water if you want to prepare for

375
00:23:02,169 --> 00:23:00,900
the upcoming flood or or a deficit of

376
00:23:05,450 --> 00:23:02,179
land water

377
00:23:08,510 --> 00:23:05,460
you do look at your supply your farmer

378
00:23:11,630 --> 00:23:08,520
the ocean where the uh where the

379
00:23:14,990 --> 00:23:11,640
moisture originates so that's of course

380
00:23:16,549 --> 00:23:15,000
a unique aspect of the mission and a

381
00:23:19,970 --> 00:23:16,559
welcome one

382
00:23:22,250 --> 00:23:19,980
another uh breakthrough with the SWAT

383
00:23:24,950 --> 00:23:22,260
technology of course is that we're going

384
00:23:27,770 --> 00:23:24,960
to look at earth water

385
00:23:30,409 --> 00:23:27,780
um at a very high resolution and Clarity

386
00:23:33,710 --> 00:23:30,419
like never before I call it a sword

387
00:23:37,330 --> 00:23:33,720
goggles so it's a 10x Improvement in

388
00:23:40,010 --> 00:23:37,340

Clarity and resolution of of earth water

389
00:23:42,710 --> 00:23:40,020
let's see what it means for the ocean if

390
00:23:45,909 --> 00:23:42,720
you don't mind on the next on the next

391
00:23:49,370 --> 00:23:45,919
animation what we're looking here is uh

392
00:23:51,710 --> 00:23:49,380
ocean movement ocean movement the red

393
00:23:53,990 --> 00:23:51,720
colors represent warmer oceans and the

394
00:23:58,310 --> 00:23:54,000
blue colors uh cooly oceans and what we

395
00:24:02,570 --> 00:23:58,320
see here is essentially that ocean is a

396
00:24:05,750 --> 00:24:02,580
turbulent flow and ocean turbulence and

397
00:24:07,810 --> 00:24:05,760
80s are constantly on the move and they

398
00:24:11,870 --> 00:24:07,820
are busy and effective engines

399
00:24:16,490 --> 00:24:11,880
transporting a large amount of kinetic

400
00:24:20,029 --> 00:24:16,500
energy heat Mass salt nutrients carbs

401
00:24:23,029 --> 00:24:20,039
even plastic pollution you name it so

402
00:24:26,870 --> 00:24:23,039
this constant movement of that is

403
00:24:29,270 --> 00:24:26,880
initiated by by those active players in

404
00:24:32,270 --> 00:24:29,280
a climate system are what keeps our

405
00:24:34,850 --> 00:24:32,280
Earth system functioning or a

406
00:24:37,909 --> 00:24:34,860
dysfunctioning as as we already see in

407
00:24:40,010 --> 00:24:37,919
our measurements so when we in the

408
00:24:42,070 --> 00:24:40,020
business of making better prediction of

409
00:24:46,010 --> 00:24:42,080
the earth system of the global warming

410
00:24:46,909 --> 00:24:46,020
we we rely on the ocean to take it for

411
00:24:50,390 --> 00:24:46,919
the team

412
00:24:52,669 --> 00:24:50,400
team Earth and absorb most of the global

413
00:24:54,950 --> 00:24:52,679

Ocean or global warming within the ocean

414
00:24:57,890 --> 00:24:54,960
and that think about it that

415
00:24:59,930 --> 00:24:57,900
um half of the vertical transfer of this

416
00:25:02,690 --> 00:24:59,940
heat absorption from the surface to the

417
00:25:06,350 --> 00:25:02,700
deep ocean is done by turbulence half

418
00:25:09,169 --> 00:25:06,360
the turbulence matters perhaps a

419
00:25:12,470 --> 00:25:09,179
turbulence is that missing climate

420
00:25:14,750 --> 00:25:12,480
puzzle piece that we've never observed

421
00:25:18,950 --> 00:25:14,760
and that what helps us solve this

422
00:25:21,830 --> 00:25:18,960
climate prediction better enter SWOT a

423
00:25:24,230 --> 00:25:21,840
very timely entrance and entrance as we

424
00:25:27,649 --> 00:25:24,240
look at our changing water on planet

425
00:25:30,350 --> 00:25:27,659
Earth just in front of our eyes

426
00:25:32,690 --> 00:25:30,360
so we're ready for your SWAT and goes

427
00:25:34,430 --> 00:25:32,700
what yeah very excited back to you

428
00:25:36,590 --> 00:25:34,440
Jasmine thank you Maddie I love your

429
00:25:38,210 --> 00:25:36,600
energy yes we are very excited for SWAT

430
00:25:40,310 --> 00:25:38,220
uh next we're going to hear from Tamlin

431
00:25:42,590 --> 00:25:40,320
pavelski all right thanks so much

432
00:25:44,690 --> 00:25:42,600
Jasmine so as you've heard from some of

433
00:25:46,970 --> 00:25:44,700
our other speakers

434
00:25:49,430 --> 00:25:46,980
um we're really going to see this uh

435
00:25:51,230 --> 00:25:49,440
this this big new capability with SWAT

436
00:25:52,310 --> 00:25:51,240
to see our rivers and lakes in high

437
00:25:54,950 --> 00:25:52,320
definition

438
00:25:57,890 --> 00:25:54,960

and that's that's immensely exciting so

439
00:25:58,490 --> 00:25:57,900
right now with satellite imagery

440
00:26:01,190 --> 00:25:58,500
um

441
00:26:02,690 --> 00:26:01,200
we can see pretty well where rivers and

442
00:26:05,510 --> 00:26:02,700
lakes are located right we can see their

443
00:26:06,649 --> 00:26:05,520
area pretty well but we don't do nearly

444
00:26:08,450 --> 00:26:06,659
so well

445
00:26:10,370 --> 00:26:08,460
in terms of our ability to see the

446
00:26:15,049 --> 00:26:10,380
height of the water in them

447
00:26:17,510 --> 00:26:15,059
and uh really the the key advance for

448
00:26:19,190 --> 00:26:17,520
SWAT in terms of in terms of surface

449
00:26:21,950 --> 00:26:19,200
water hydrology is that we're going to

450
00:26:25,130 --> 00:26:21,960
be able to simultaneously measure the

451
00:26:27,769 --> 00:26:25,140
extent of water and the height of water

452
00:26:30,590 --> 00:26:27,779
and adding that new dimension is

453
00:26:32,269 --> 00:26:30,600
critical because it allows us to to

454
00:26:34,669 --> 00:26:32,279
think about things in terms of volumes

455
00:26:37,010 --> 00:26:34,679
and changes in volumes over time right

456
00:26:39,230 --> 00:26:37,020
so all of us learned about the water

457
00:26:41,930 --> 00:26:39,240
cycle at some point in elementary school

458
00:26:43,430 --> 00:26:41,940
or middle school and uh you know we

459
00:26:45,529 --> 00:26:43,440
heard a little bit about it from Nadia

460
00:26:48,409 --> 00:26:45,539
already thinking about the transport of

461
00:26:51,529 --> 00:26:48,419
moisture from oceans via the atmosphere

462
00:26:53,210 --> 00:26:51,539
onto the land surface and for the entire

463
00:26:54,710 --> 00:26:53,220

water cycle if we really want to

464
00:26:56,690 --> 00:26:54,720
understand it in in ways that are

465
00:26:59,029 --> 00:26:56,700
important for us we need to be able to

466
00:27:01,610 --> 00:26:59,039
think about it not just conceptually but

467
00:27:03,409 --> 00:27:01,620
in terms of volumes how much water is

468
00:27:05,269 --> 00:27:03,419
there and how is it flowing

469
00:27:07,789 --> 00:27:05,279
from place to place

470
00:27:09,830 --> 00:27:07,799
and SWAT is going to allow us to do that

471
00:27:11,570 --> 00:27:09,840
for for Lakes we'll be able to see how

472
00:27:14,330 --> 00:27:11,580
the volume of lakes and reservoirs

473
00:27:15,649 --> 00:27:14,340
increases and decreases over time and

474
00:27:17,990 --> 00:27:15,659
for Rivers we're going to be able to see

475
00:27:19,490 --> 00:27:18,000
how essentially we'll be able to track

476
00:27:22,190 --> 00:27:19,500
the volume of water flowing through

477
00:27:24,409 --> 00:27:22,200
rivers from space which is which is just

478
00:27:26,990 --> 00:27:24,419
really exciting and and uh frankly

479
00:27:28,190 --> 00:27:27,000
pretty unprecedented so what are we

480
00:27:31,130 --> 00:27:28,200
actually going to see with spot let's

481
00:27:33,890 --> 00:27:31,140
get get down to Brass tax here

482
00:27:36,470 --> 00:27:33,900
um for Lakes we expect to see uh Lakes

483
00:27:39,230 --> 00:27:36,480
larger than about 15 Acres so that's 250

484
00:27:40,610 --> 00:27:39,240
meters by 250 meters and we expect to

485
00:27:43,190 --> 00:27:40,620
see almost all of the world's Rivers

486
00:27:44,570 --> 00:27:43,200
wider than about 330 feet or about 100

487
00:27:46,070 --> 00:27:44,580
meters

488
00:27:47,630 --> 00:27:46,080

so let's take each one of these

489
00:27:51,470 --> 00:27:47,640
individually and let's start with Lakes

490
00:27:54,710 --> 00:27:51,480
could I have my first slide please

491
00:27:57,529 --> 00:27:54,720
so right now if I went out and wanted to

492
00:28:00,350 --> 00:27:57,539
get data on changes in water level or

493
00:28:01,909 --> 00:28:00,360
volume in some of uh some of the Earth's

494
00:28:03,649 --> 00:28:01,919
Lakes I could probably get pretty good

495
00:28:05,690 --> 00:28:03,659
on the ground data for maybe a few

496
00:28:08,330 --> 00:28:05,700
thousand of them

497
00:28:10,850 --> 00:28:08,340
um scattered over the world

498
00:28:13,610 --> 00:28:10,860
SWAT is going to observe millions of

499
00:28:15,950 --> 00:28:13,620
lakes so we're going up by orders of

500
00:28:18,529 --> 00:28:15,960
magnitude in terms of our capability to

501
00:28:20,750 --> 00:28:18,539
track water through lakes and reservoirs

502
00:28:23,149 --> 00:28:20,760
and this matters a lot whether you're

503
00:28:25,250 --> 00:28:23,159
thinking about a really ecologically

504
00:28:27,230 --> 00:28:25,260
vulnerable like like the mountain lake

505
00:28:30,710 --> 00:28:27,240
that I that we have up here in this

506
00:28:32,930 --> 00:28:30,720
image or if you're uh thinking about a

507
00:28:34,549 --> 00:28:32,940
Reservoir in a rural part of India where

508
00:28:37,010 --> 00:28:34,559
people depend on that water for

509
00:28:39,049 --> 00:28:37,020
irrigating their crops SWAT is going to

510
00:28:41,510 --> 00:28:39,059
provide the free and open data that

511
00:28:44,149 --> 00:28:41,520
everyone needs in order to be able to

512
00:28:47,390 --> 00:28:44,159
track these really important resources

513
00:28:50,810 --> 00:28:47,400

okay so what about rivers

514
00:28:52,909 --> 00:28:50,820
uh could I have the next image please

515
00:28:55,669 --> 00:28:52,919
so what you're looking at here is a map

516
00:28:57,890 --> 00:28:55,679
of all of the rivers that we plan to

517
00:29:01,010 --> 00:28:57,900
observe with SWAT there's about 2.1

518
00:29:02,450 --> 00:29:01,020
million kilometers of rivers worldwide

519
00:29:04,010 --> 00:29:02,460
and

520
00:29:07,130 --> 00:29:04,020
um

521
00:29:10,610 --> 00:29:07,140
for for all of these Rivers you know we

522
00:29:13,610 --> 00:29:10,620
we uh we plan to uh be able to observe

523
00:29:15,470 --> 00:29:13,620
that volume of water uh moving down them

524
00:29:18,110 --> 00:29:15,480
which is which is uh really impressive

525
00:29:20,870 --> 00:29:18,120
so right now when we when we try to

526
00:29:22,850 --> 00:29:20,880
observe rivers around the world we use a

527
00:29:26,750 --> 00:29:22,860
network of of sort of on the ground

528
00:29:28,430 --> 00:29:26,760
gauges and those gauges are expensive to

529
00:29:31,730 --> 00:29:28,440
maintain and install and they're very

530
00:29:32,630 --> 00:29:31,740
unevenly distributed around the world

531
00:29:34,610 --> 00:29:32,640
um

532
00:29:36,169 --> 00:29:34,620
now they can do things that SWAT can't

533
00:29:38,389 --> 00:29:36,179
right like they can provide data every

534
00:29:40,430 --> 00:29:38,399
15 minutes which is great but SWAT can

535
00:29:42,830 --> 00:29:40,440
also do some things that they can't so

536
00:29:44,450 --> 00:29:42,840
for example SWAT will observe the entire

537
00:29:46,130 --> 00:29:44,460
length of a river rather than just

538
00:29:49,970 --> 00:29:46,140

what's going on at a single point which

539
00:29:51,470 --> 00:29:49,980
is really cool and uh and and and really

540
00:29:53,870 --> 00:29:51,480
different

541
00:29:56,029 --> 00:29:53,880
um so let's look at one specific example

542
00:29:57,409 --> 00:29:56,039
here of of where SWAT might make a

543
00:29:58,909 --> 00:29:57,419
difference for Rivers could we have the

544
00:30:00,769 --> 00:29:58,919
next image please

545
00:30:02,930 --> 00:30:00,779
so what we're looking at here are the

546
00:30:04,970 --> 00:30:02,940
rivers that we expect SWAT to observe in

547
00:30:06,769 --> 00:30:04,980
the Congo River Basin so the Congo it's

548
00:30:09,289 --> 00:30:06,779
the second largest river in the world

549
00:30:11,090 --> 00:30:09,299
about 75 million people live in the

550
00:30:12,710 --> 00:30:11,100
Congo River Basin and yet

551
00:30:15,409 --> 00:30:12,720
we actually have good on the ground

552
00:30:17,930 --> 00:30:15,419
observations of uh of flow through the

553
00:30:19,190 --> 00:30:17,940
Congo River at a handful of places in

554
00:30:21,409 --> 00:30:19,200
this entire area

555
00:30:23,990 --> 00:30:21,419
and with SWAT we're going to be able to

556
00:30:25,970 --> 00:30:24,000
observe all of the rivers that you see

557
00:30:28,669 --> 00:30:25,980
and up on the screen here and it's going

558
00:30:30,230 --> 00:30:28,679
to really help us do a better job of

559
00:30:31,730 --> 00:30:30,240
serving people who live in the space and

560
00:30:34,010 --> 00:30:31,740
that's particularly important because

561
00:30:36,230 --> 00:30:34,020
the UN has identified the Congo Basin as

562
00:30:39,289 --> 00:30:36,240
as a basin that's particularly

563
00:30:40,730 --> 00:30:39,299

vulnerable to uh the impacts of climate

564
00:30:43,730 --> 00:30:40,740
change

565
00:30:46,730 --> 00:30:43,740
so if we put all of this together

566
00:30:50,930 --> 00:30:46,740
spot is really gonna I

567
00:30:54,250 --> 00:30:50,940
allow us to understand sort of how water

568
00:30:57,470 --> 00:30:54,260
volume changes in our rivers and lakes

569
00:30:59,750 --> 00:30:57,480
worldwide and that's a a new and

570
00:31:02,870 --> 00:30:59,760
exciting thing so I've been working for

571
00:31:04,130 --> 00:31:02,880
for the last 20 years or more on trying

572
00:31:06,110 --> 00:31:04,140
to use satellite data to understand

573
00:31:07,970 --> 00:31:06,120
Earth's surface water

574
00:31:10,070 --> 00:31:07,980
and we're constantly having to come up

575
00:31:11,930 --> 00:31:10,080
with ways of using data from satellites

576
00:31:13,850 --> 00:31:11,940
that weren't designed for what we want

577
00:31:16,010 --> 00:31:13,860
to do right we're repurposing other

578
00:31:17,870 --> 00:31:16,020
people's data and we've been able to do

579
00:31:19,549 --> 00:31:17,880
cool things with that but SWAT is the

580
00:31:22,310 --> 00:31:19,559
first satellite that's specifically

581
00:31:24,110 --> 00:31:22,320
designed to study rivers and lakes and

582
00:31:26,330 --> 00:31:24,120
it's going to be a real game changer I'm

583
00:31:28,070 --> 00:31:26,340
so excited about it back to you Jasmine

584
00:31:29,510 --> 00:31:28,080
thank you Tamlin we really appreciate

585
00:31:31,669 --> 00:31:29,520
you shedding light on so many different

586
00:31:32,930 --> 00:31:31,679
bodies of water we have one more

587
00:31:34,909 --> 00:31:32,940
panelist to hear from you've been

588
00:31:37,430 --> 00:31:34,919

waiting very patiently so let's throw it

589
00:31:38,930 --> 00:31:37,440
over to uh Benjamin Hamilton thanks

590
00:31:40,970 --> 00:31:38,940
Jasmine and thanks to the other speakers

591
00:31:42,889 --> 00:31:40,980
so I want to focus in a little bit more

592
00:31:45,230 --> 00:31:42,899
on some of the societal benefits and

593
00:31:46,430 --> 00:31:45,240
applications of the swad data we've

594
00:31:47,930 --> 00:31:46,440
heard that SWAT is going to provide

595
00:31:50,029 --> 00:31:47,940
measurements of nearly all surface water

596
00:31:52,250 --> 00:31:50,039
here on Earth we're gonna have

597
00:31:53,810 --> 00:31:52,260
measurements over the land over the

598
00:31:55,190 --> 00:31:53,820
ocean but also where land and ocean meet

599
00:31:56,269 --> 00:31:55,200
and this Coastal interface which is

600
00:31:58,730 --> 00:31:56,279
really critical so many people around

601
00:32:00,169 --> 00:31:58,740
the world live along our coastlines so

602
00:32:02,090 --> 00:32:00,179
swat's going to provide really relevant

603
00:32:03,289 --> 00:32:02,100
information for all these communities

604
00:32:05,330 --> 00:32:03,299
all these people living in these

605
00:32:06,470 --> 00:32:05,340
different places and allow us to make

606
00:32:08,870 --> 00:32:06,480
measurements that will ultimately

607
00:32:10,010 --> 00:32:08,880
improve our our lives and livelihoods so

608
00:32:13,549 --> 00:32:10,020
I want to walk through some of these

609
00:32:15,710 --> 00:32:13,559
examples starting with the land first so

610
00:32:17,630 --> 00:32:15,720
as Tamil and others have said SWAT is

611
00:32:19,610 --> 00:32:17,640
going to give us this really new look at

612
00:32:20,990 --> 00:32:19,620
the lakes rivers and reservoirs across

613
00:32:22,310 --> 00:32:21,000

the globe so on these Global scales

614
00:32:24,110 --> 00:32:22,320
we're going to be able to see things we

615
00:32:25,549 --> 00:32:24,120
just could not see before we're going to

616
00:32:27,649 --> 00:32:25,559
be able to track the movement of water

617
00:32:29,090 --> 00:32:27,659
around the the Earth between ocean and

618
00:32:30,590 --> 00:32:29,100
land be able to make some of these

619
00:32:32,389 --> 00:32:30,600
connections and really understand where

620
00:32:34,730 --> 00:32:32,399
water is at any given time

621
00:32:36,470 --> 00:32:34,740
so this is really critical because we

622
00:32:38,389 --> 00:32:36,480
know with climate change that the

623
00:32:40,610 --> 00:32:38,399
Earth's water cycle is accelerating what

624
00:32:42,710 --> 00:32:40,620
this means is that some locations have

625
00:32:44,870 --> 00:32:42,720
too much water others don't have enough

626
00:32:47,750 --> 00:32:44,880
we're seeing more extreme droughts more

627
00:32:49,370 --> 00:32:47,760
extreme floods precipitation patterns or

628
00:32:51,409 --> 00:32:49,380
changes are changing becoming more

629
00:32:53,029 --> 00:32:51,419
volatile so it's really important that

630
00:32:55,549 --> 00:32:53,039
we try to understand exactly what is

631
00:32:57,889 --> 00:32:55,559
happening using the SWOT data so if we

632
00:32:59,990 --> 00:32:57,899
can pull up the first visual

633
00:33:01,430 --> 00:33:00,000
um so in this visual we're showing the

634
00:33:03,289 --> 00:33:01,440
Connecticut River which flows through

635
00:33:06,350 --> 00:33:03,299
several states in the Northeast United

636
00:33:08,389 --> 00:33:06,360
States SWAT is flying over with its

637
00:33:10,610 --> 00:33:08,399
swath measurement measuring the the full

638
00:33:13,009 --> 00:33:10,620

extent of this River as as SWAT as a

639
00:33:13,810 --> 00:33:13,019
excuse me as timeline referred to these

640
00:33:16,130 --> 00:33:13,820
red

641
00:33:18,649 --> 00:33:16,140
colors here are higher higher water

642
00:33:21,470 --> 00:33:18,659
levels so SWAT is measuring water levels

643
00:33:23,149 --> 00:33:21,480
not just the extent of the river as it

644
00:33:24,289 --> 00:33:23,159
changes over time but swat's going to

645
00:33:25,850 --> 00:33:24,299
continue to make these measurements

646
00:33:27,470 --> 00:33:25,860
track the changes that are occurring in

647
00:33:29,090 --> 00:33:27,480
rivers like the Connecticut River and

648
00:33:30,830 --> 00:33:29,100
provide very important information for

649
00:33:33,110 --> 00:33:30,840
those that rely upon it

650
00:33:34,789 --> 00:33:33,120
so what does this mean so with the SWAT

651
00:33:36,409 --> 00:33:34,799
data we can give really important

652
00:33:37,669 --> 00:33:36,419
information to a wide variety of

653
00:33:38,930 --> 00:33:37,679
stakeholders really anyone that cares

654
00:33:40,130 --> 00:33:38,940
about water should be it should be

655
00:33:41,810 --> 00:33:40,140
concerned about what it's going to

656
00:33:45,409 --> 00:33:41,820
provide we have water resource

657
00:33:47,810 --> 00:33:45,419
management managers we have emergency

658
00:33:50,029 --> 00:33:47,820
preparedness agencies civil engineers

659
00:33:52,250 --> 00:33:50,039
for those of you at home who are maybe

660
00:33:53,870 --> 00:33:52,260
concerned about access to water or

661
00:33:55,730 --> 00:33:53,880
flooding and drought will be able to

662
00:33:57,649 --> 00:33:55,740
better predict those the occurrences of

663
00:33:58,789 --> 00:33:57,659

those things with the SWAT data so it's

664
00:34:01,789 --> 00:33:58,799
really going to provide Rich information

665
00:34:03,230 --> 00:34:01,799
that impacts all of us and really

666
00:34:05,870 --> 00:34:03,240
importantly it's going to measure these

667
00:34:07,310 --> 00:34:05,880
on global scales right so in the U.S

668
00:34:09,589 --> 00:34:07,320
maybe there's some areas that we monitor

669
00:34:12,230 --> 00:34:09,599
really well within situ observations but

670
00:34:13,669 --> 00:34:12,240
on global scales some of these rivers

671
00:34:16,070 --> 00:34:13,679
lakes are very difficult to measure

672
00:34:17,450 --> 00:34:16,080
swat's going to provide a solution to

673
00:34:19,490 --> 00:34:17,460
that we'll be able to see those changes

674
00:34:21,409 --> 00:34:19,500
that are occurring on global scales not

675
00:34:23,329 --> 00:34:21,419
just in specific locations

676
00:34:25,909 --> 00:34:23,339
so shifting gears a little bit focusing

677
00:34:28,010 --> 00:34:25,919
on the coastlines so we know sea level

678
00:34:29,810 --> 00:34:28,020
is rising climate change is causing sea

679
00:34:32,210 --> 00:34:29,820
levels along the world's coastlines to

680
00:34:33,589 --> 00:34:32,220
go up we know from other NASA satellites

681
00:34:35,510 --> 00:34:33,599
that the rate at which sea level is

682
00:34:37,730 --> 00:34:35,520
increasing is increasing itself we can

683
00:34:38,930 --> 00:34:37,740
have our foot on the gas pedal in terms

684
00:34:41,149 --> 00:34:38,940
of the sea level rise that we're seeing

685
00:34:43,190 --> 00:34:41,159
the impacts that are associated with the

686
00:34:45,349 --> 00:34:43,200
sea level rise are also expanding

687
00:34:46,970 --> 00:34:45,359
they're worsening severity the impacts

688
00:34:48,770 --> 00:34:46,980

are getting worse here in California

689
00:34:50,089 --> 00:34:48,780
where we are today we see Coastal

690
00:34:52,310 --> 00:34:50,099
erosion that's happening because of

691
00:34:54,770 --> 00:34:52,320
higher sea levels in other parts of the

692
00:34:56,869 --> 00:34:54,780
country of the us we see greater storm

693
00:34:58,010 --> 00:34:56,879
surge associated with hurricanes and all

694
00:34:59,990 --> 00:34:58,020
along the world's coastlines we're

695
00:35:02,150 --> 00:35:00,000
seeing these impacts increase flooding

696
00:35:04,190 --> 00:35:02,160
start to increase and populations become

697
00:35:05,870 --> 00:35:04,200
threatened by sea level now it may be

698
00:35:07,010 --> 00:35:05,880
surprising but in some of these

699
00:35:08,030 --> 00:35:07,020
locations around the world we really

700
00:35:10,250 --> 00:35:08,040
don't have a good understanding of

701
00:35:11,630 --> 00:35:10,260
what's happening at the coast so the

702
00:35:12,890 --> 00:35:11,640
satellites we have now don't get us

703
00:35:15,050 --> 00:35:12,900
right up to the coast a little bit

704
00:35:16,370 --> 00:35:15,060
offshore we have tie gauge measurements

705
00:35:17,870 --> 00:35:16,380
which are directly at the coast but

706
00:35:19,550 --> 00:35:17,880
they're very sparse across the world's

707
00:35:21,109 --> 00:35:19,560
coastlines there's big gaps between them

708
00:35:22,790 --> 00:35:21,119
so again it may be surprising but we

709
00:35:24,290 --> 00:35:22,800
just don't know what's happening with

710
00:35:25,970 --> 00:35:24,300
Coastal sea levels in a lot of these

711
00:35:28,310 --> 00:35:25,980
locations around the world if you can

712
00:35:29,870 --> 00:35:28,320
pull up my our next animation

713
00:35:31,790 --> 00:35:29,880

the reason it's so important to

714
00:35:33,890 --> 00:35:31,800
understand these changes because they're

715
00:35:35,210 --> 00:35:33,900
pretty fine scale sea level changes that

716
00:35:37,010 --> 00:35:35,220
are occurring in these coastal areas

717
00:35:39,650 --> 00:35:37,020
this here is an image of the Mississippi

718
00:35:41,390 --> 00:35:39,660
Delta Region you can see SWAT flying

719
00:35:43,310 --> 00:35:41,400
over the ocean through that Coastal

720
00:35:44,930 --> 00:35:43,320
interface and onto land and it's going

721
00:35:46,550 --> 00:35:44,940
to provide Rich information across all

722
00:35:47,930 --> 00:35:46,560
these different components of that

723
00:35:49,790 --> 00:35:47,940
coastal zone

724
00:35:51,290 --> 00:35:49,800
so we're going to be able to provide

725
00:35:52,670 --> 00:35:51,300
this information to those that need it

726
00:35:54,470 --> 00:35:52,680
most these Coastal communities that are

727
00:35:56,150 --> 00:35:54,480
already planning for and adapting to the

728
00:35:58,010 --> 00:35:56,160
sea level rise and Coastal impacts that

729
00:36:01,250 --> 00:35:58,020
are occurring there's a wide range of

730
00:36:03,829 --> 00:36:01,260
stakeholders that are impacted by sea

731
00:36:05,630 --> 00:36:03,839
level rise National Security is an issue

732
00:36:07,490 --> 00:36:05,640
certainly that that comes up our

733
00:36:09,349 --> 00:36:07,500
military has a lot of infrastructure in

734
00:36:11,150 --> 00:36:09,359
these coastal regions being able to

735
00:36:12,829 --> 00:36:11,160
provide this information to the military

736
00:36:14,270 --> 00:36:12,839
and other Coastal communities will allow

737
00:36:15,890 --> 00:36:14,280
them to better plan for what's happening

738
00:36:17,750 --> 00:36:15,900

and account for those changes going

739
00:36:19,730 --> 00:36:17,760
forward into the future

740
00:36:21,530 --> 00:36:19,740
so what is being done to ensure this

741
00:36:23,210 --> 00:36:21,540
data is actually useful how are we what

742
00:36:24,410 --> 00:36:23,220
are we doing to make sure that this data

743
00:36:26,150 --> 00:36:24,420
can be used in all these different

744
00:36:28,010 --> 00:36:26,160
applications so there's a couple things

745
00:36:30,170 --> 00:36:28,020
so SWAT has this concept of open science

746
00:36:32,390 --> 00:36:30,180
so we're making the data associated with

747
00:36:33,890 --> 00:36:32,400
SWOT available publicly available that's

748
00:36:35,510 --> 00:36:33,900
that's certainly important but beyond

749
00:36:36,890 --> 00:36:35,520
that we're also building tools to help

750
00:36:38,750 --> 00:36:36,900
people work with the data once it

751
00:36:40,849 --> 00:36:38,760
becomes available right so we're not

752
00:36:42,530 --> 00:36:40,859
just providing the data but encouraging

753
00:36:43,630 --> 00:36:42,540
people to use it interact with it and

754
00:36:46,370 --> 00:36:43,640
start to

755
00:36:47,690 --> 00:36:46,380
implement it within their applications

756
00:36:49,069 --> 00:36:47,700
additionally we have something called

757
00:36:50,390 --> 00:36:49,079
the early adopters program which you've

758
00:36:52,550 --> 00:36:50,400
already heard about it's an

759
00:36:54,470 --> 00:36:52,560
international program with early

760
00:36:57,069 --> 00:36:54,480
adopters these different people who are

761
00:36:59,270 --> 00:36:57,079
working in say Water Resource Management

762
00:37:00,829 --> 00:36:59,280
working on the oceans different

763
00:37:02,990 --> 00:37:00,839

applications they come in and work with

764
00:37:04,370 --> 00:37:03,000
the SWAT team to really understand how

765
00:37:05,950 --> 00:37:04,380
to implement the SWAT data once it

766
00:37:08,329 --> 00:37:05,960
becomes available it's an international

767
00:37:09,890 --> 00:37:08,339
team of these early adopters we actually

768
00:37:10,730 --> 00:37:09,900
have a couple early adopters here that

769
00:37:13,069 --> 00:37:10,740
are going to be at launch with us

770
00:37:14,810 --> 00:37:13,079
tomorrow one from India one from from

771
00:37:17,089 --> 00:37:14,820
Germany so it's a really global scale

772
00:37:19,550 --> 00:37:17,099
effort to ensure that the SWAT data is

773
00:37:21,349 --> 00:37:19,560
ultimately useful so just to wrap up the

774
00:37:23,089 --> 00:37:21,359
SWOT data it's going to measure surface

775
00:37:25,069 --> 00:37:23,099
water everywhere right we're going to

776
00:37:26,510 --> 00:37:25,079
have measurements both over land over

777
00:37:28,370 --> 00:37:26,520
the ocean but also that Coastal

778
00:37:29,569 --> 00:37:28,380
interface and it's going to provide such

779
00:37:31,550 --> 00:37:29,579
important information it's going to be

780
00:37:33,349 --> 00:37:31,560
transformative in our ability to provide

781
00:37:34,970 --> 00:37:33,359
information that will ultimately improve

782
00:37:37,130 --> 00:37:34,980
the daily lives and livelihoods of

783
00:37:38,990 --> 00:37:37,140
almost everyone here on Earth with that

784
00:37:40,310 --> 00:37:39,000
I'll hand it back to you Jasmine

785
00:37:42,170 --> 00:37:40,320
amen and thank you to all of our

786
00:37:43,910 --> 00:37:42,180
panelists for those open remarks a great

787
00:37:45,650 --> 00:37:43,920
job from all of you now we're going to

788
00:37:47,990 --> 00:37:45,660

transition into the question and answer

789
00:37:49,250 --> 00:37:48,000
portion of today's briefing for media

790
00:37:50,750 --> 00:37:49,260
here in the phone we do have a

791
00:37:52,550 --> 00:37:50,760
microphone to pass you so if you would

792
00:37:53,750 --> 00:37:52,560
like to ask a question uh please just

793
00:37:55,849 --> 00:37:53,760
raise your hand and then you can state

794
00:37:57,589 --> 00:37:55,859
your name your affiliation and who you

795
00:37:59,630 --> 00:37:57,599
would like to answer your question for

796
00:38:01,609 --> 00:37:59,640
media on the phone please please press

797
00:38:03,589 --> 00:38:01,619
star one if you would like to enter the

798
00:38:07,370 --> 00:38:03,599
question queue and if you're joining us

799
00:38:08,750 --> 00:38:07,380
online feel free to use ask NASA to ask

800
00:38:11,030 --> 00:38:08,760
a question here

801
00:38:13,250 --> 00:38:11,040
and with that being said I will start in

802
00:38:15,230 --> 00:38:13,260
the room here with media

803
00:38:17,450 --> 00:38:15,240
and if none I would like to ask a

804
00:38:20,750 --> 00:38:17,460
question yet we will go to our social

805
00:38:24,950 --> 00:38:23,210
the first question is from Instagram is

806
00:38:33,349 --> 00:38:24,960
there any kind of new tech that is being

807
00:38:39,710 --> 00:38:35,390
I'll I'll start and then pass it to

808
00:38:43,550 --> 00:38:39,720
Salma yes as one of the NASA's and kness

809
00:38:46,550 --> 00:38:43,560
firsts we're testing a new uh technology

810
00:38:49,069 --> 00:38:46,560
which is a raider interferometer that

811
00:38:51,290 --> 00:38:49,079
operates at a Ka band portion of

812
00:38:55,270 --> 00:38:51,300
electromagnetic spectrum we call it

813
00:38:57,589 --> 00:38:55,280

Karen and this is in first in-flight

814
00:39:01,310 --> 00:38:57,599
demonstration for this new technologist

815
00:39:04,310 --> 00:39:01,320
to measure elevation of ocean and Inland

816
00:39:07,010 --> 00:39:05,810
would you like to add something no no

817
00:39:09,410 --> 00:39:07,020
it's okay

818
00:39:12,410 --> 00:39:09,420
you answered it perfectly Nadia I'm very

819
00:39:13,849 --> 00:39:12,420
good all right uh we'll go to social

820
00:39:16,010 --> 00:39:13,859
media again

821
00:39:18,050 --> 00:39:16,020
uh how much more detail will we be able

822
00:39:20,089 --> 00:39:18,060
to see with SWAT than with current

823
00:39:26,870 --> 00:39:20,099
satellites where observation techniques

824
00:39:33,109 --> 00:39:29,750
so I I'm happy to talk especially about

825
00:39:34,790 --> 00:39:33,119
what's what's happening on on land right

826
00:39:36,109 --> 00:39:34,800
so

827
00:39:37,910 --> 00:39:36,119
um

828
00:39:40,790 --> 00:39:37,920
let's start by thinking about Lakes

829
00:39:43,130 --> 00:39:40,800
right we have uh Lakes uh dotting the

830
00:39:44,690 --> 00:39:43,140
world all over the place right and

831
00:39:46,430 --> 00:39:44,700
mostly we don't have an idea of what's

832
00:39:48,589 --> 00:39:46,440
going on in terms of how their water

833
00:39:50,690 --> 00:39:48,599
levels or the amount of water that is

834
00:39:52,370 --> 00:39:50,700
stored in them varies and you can kind

835
00:39:54,710 --> 00:39:52,380
of think about each one of those Lakes

836
00:39:56,569 --> 00:39:54,720
as like a little gauge that measures the

837
00:39:59,510 --> 00:39:56,579
water cycle right how much precipitation

838
00:40:01,190 --> 00:39:59,520

how much evaporation you know what's

839
00:40:04,069 --> 00:40:01,200
going on with the water cycle in that

840
00:40:05,810 --> 00:40:04,079
area and so right now we have this this

841
00:40:07,730 --> 00:40:05,820
sort of big blank canvas where mostly

842
00:40:10,010 --> 00:40:07,740
we're not using

843
00:40:13,010 --> 00:40:10,020
um that information to understand our

844
00:40:15,109 --> 00:40:13,020
world and once we have SWAT I'm up there

845
00:40:16,430 --> 00:40:15,119
we're going to be able to to see that

846
00:40:18,950 --> 00:40:16,440
everywhere and it's going to give us

847
00:40:22,010 --> 00:40:18,960
this much better picture of what's going

848
00:40:24,770 --> 00:40:22,020
on with the water cycle as a whole and

849
00:40:26,810 --> 00:40:24,780
with our Water Resources right how much

850
00:40:29,089 --> 00:40:26,820
water do we have available to irrigate

851
00:40:30,170 --> 00:40:29,099
our crops to drink when we turn on the

852
00:40:33,410 --> 00:40:30,180
tap

853
00:40:35,630 --> 00:40:33,420
um for our ecosystems so from a land

854
00:40:37,430 --> 00:40:35,640
perspective that sort of extra

855
00:40:39,109 --> 00:40:37,440
resolution is going to be really

856
00:40:40,730 --> 00:40:39,119
critical

857
00:40:41,950 --> 00:40:40,740
um maybe I'll pass it to Ben to talk a

858
00:40:44,390 --> 00:40:41,960
little bit about the ocean

859
00:40:46,930 --> 00:40:44,400
do you want to handle ocean

860
00:40:49,790 --> 00:40:46,940
for the just to perhaps to complement

861
00:40:52,430 --> 00:40:49,800
tamilin answer on the detail the

862
00:40:55,250 --> 00:40:52,440
question related to the detail I think

863
00:40:56,270 --> 00:40:55,260

we have to notice that it's the first

864
00:40:59,270 --> 00:40:56,280
time

865
00:41:01,970 --> 00:40:59,280
that so so finest measurement will be

866
00:41:05,510 --> 00:41:01,980
provided as a tunneling expenditure with

867
00:41:07,970 --> 00:41:05,520
his intervention we will have lakes with

868
00:41:12,829 --> 00:41:07,980
the um what we called a special

869
00:41:15,170 --> 00:41:12,839
resolution 250 meter per 250 meter we

870
00:41:18,170 --> 00:41:15,180
have never provided such measurement

871
00:41:20,810 --> 00:41:18,180
before the SWOT mission

872
00:41:23,810 --> 00:41:20,820
for the rivers it's the same the

873
00:41:27,290 --> 00:41:23,820
requirement is to reach all the river

874
00:41:31,730 --> 00:41:27,300
wider than 100 meter of the resolution

875
00:41:34,250 --> 00:41:31,740
with the goal of 50 meters and there was

876
00:41:37,670 --> 00:41:34,260
there was really a huge Preparatory work

877
00:41:40,250 --> 00:41:37,680
in order to prepare those database and

878
00:41:43,069 --> 00:41:40,260
to check if release what measurement

879
00:41:46,550 --> 00:41:43,079
will cover all those rivers and lakes

880
00:41:48,710 --> 00:41:46,560
and this is really a revolution as

881
00:41:51,550 --> 00:41:48,720
Tamlin mentioned it is really the first

882
00:41:53,470 --> 00:41:51,560
mission dedicated to hydrology purpose

883
00:41:56,990 --> 00:41:53,480
for ocean

884
00:41:59,690 --> 00:41:57,000
regarding the long history and the

885
00:42:03,109 --> 00:41:59,700
current nadir altimeter mission

886
00:42:06,170 --> 00:42:03,119
we are with SWOT really making a

887
00:42:09,170 --> 00:42:06,180
breakthrough also for ocean because we

888
00:42:13,310 --> 00:42:09,180

are aiming to provide fine scale

889
00:42:16,430 --> 00:42:13,320
observation 10 times better than the

890
00:42:19,849 --> 00:42:16,440
current technology which is really again

891
00:42:23,990 --> 00:42:19,859
A first what we called in French a word

892
00:42:26,270 --> 00:42:24,000
from here so hopefully I I respond to

893
00:42:27,890 --> 00:42:26,280
your question thank you

894
00:42:30,050 --> 00:42:27,900
you can add just maybe a little more

895
00:42:32,450 --> 00:42:30,060
detail on the coastal region as well so

896
00:42:33,650 --> 00:42:32,460
I work a lot with communities Coastal

897
00:42:34,609 --> 00:42:33,660
Community is trying to prepare for sea

898
00:42:36,470 --> 00:42:34,619
level we'll provide them sea level

899
00:42:37,910 --> 00:42:36,480
projections to plan for the future and

900
00:42:40,370 --> 00:42:37,920
the question always comes up but what's

901
00:42:42,230 --> 00:42:40,380
happening where I am like what right

902
00:42:43,849 --> 00:42:42,240
where I am here in this Bay and this

903
00:42:46,190 --> 00:42:43,859
very local area what's happening here

904
00:42:47,810 --> 00:42:46,200
and with the satellites we have now and

905
00:42:49,490 --> 00:42:47,820
the tie gauges like I said we really

906
00:42:50,990 --> 00:42:49,500
don't have great information there but

907
00:42:53,329 --> 00:42:51,000
with SWAT we're going to be able to get

908
00:42:55,310 --> 00:42:53,339
that fill in those gaps fill in those

909
00:42:56,930 --> 00:42:55,320
blind spots that we have now and really

910
00:42:58,069 --> 00:42:56,940
start to refine our understanding of the

911
00:42:59,750 --> 00:42:58,079
sea level change that's happening in

912
00:43:01,490 --> 00:42:59,760
this Coastal area so

913
00:43:03,349 --> 00:43:01,500

um that finer resolution information

914
00:43:04,609 --> 00:43:03,359
that Tamlin Osama talked about it

915
00:43:06,050 --> 00:43:04,619
certainly extends into these coastal

916
00:43:07,490 --> 00:43:06,060
regions as well which is going to be

917
00:43:09,170 --> 00:43:07,500
really important

918
00:43:10,670 --> 00:43:09,180
thank you guys for teaming up to answer

919
00:43:17,150 --> 00:43:10,680
that question we do have somebody on the

920
00:43:20,270 --> 00:43:18,890
thanks for having me on question for the

921
00:43:22,490 --> 00:43:20,280
panel how is the international

922
00:43:24,170 --> 00:43:22,500
collaboration help um the swap Mission

923
00:43:26,089 --> 00:43:24,180
receive a greater hydrology and

924
00:43:27,349 --> 00:43:26,099
oceanography research and which of the

925
00:43:28,730 --> 00:43:27,359
scientific instruments are critical

926
00:43:32,270 --> 00:43:28,740
Hardware has been provided by each of

927
00:43:35,210 --> 00:43:34,069
thank you uh would you guys like to

928
00:43:36,230 --> 00:43:35,220
start in the middle or do you do you

929
00:43:38,329 --> 00:43:36,240
need it repeated

930
00:43:39,829 --> 00:43:38,339
yes please if you're going to repeat it

931
00:43:42,890 --> 00:43:39,839
Ash would you be able to repeat your

932
00:43:46,190 --> 00:43:44,569
how has International collaboration

933
00:43:47,510 --> 00:43:46,200
helped the swap Mission receive a

934
00:43:49,250 --> 00:43:47,520
greater reach into hydrology and

935
00:43:50,690 --> 00:43:49,260
oceanography research and which

936
00:43:52,130 --> 00:43:50,700
scientific instruments are critical

937
00:43:54,670 --> 00:43:52,140
Hardware has been provided by each of

938
00:43:56,809 --> 00:43:54,680

the international partners

939
00:44:00,109 --> 00:43:56,819
thank you

940
00:44:04,609 --> 00:44:00,119
yes it is already outlined it's a truly

941
00:44:07,690 --> 00:44:04,619
collaborative Endeavor we have worked on

942
00:44:11,930 --> 00:44:07,700
it for about 20 years or so and

943
00:44:15,349 --> 00:44:11,940
truly leaned on each other and this

944
00:44:18,050 --> 00:44:15,359
collaborative this team spirit took us

945
00:44:21,170 --> 00:44:18,060
through multiple Global crises over the

946
00:44:25,130 --> 00:44:21,180
past few years from a Health crisis to

947
00:44:29,290 --> 00:44:25,140
political turmoils to to uh to you name

948
00:44:32,750 --> 00:44:29,300
it to environmental crises and so this

949
00:44:35,270 --> 00:44:32,760
International Spirit as I call it like

950
00:44:38,569 --> 00:44:35,280
like a World Cup for kind of uh Endeavor

951
00:44:41,930 --> 00:44:38,579
that's really helped us to to move

952
00:44:42,730 --> 00:44:41,940
through a major Milestone and in terms

953
00:44:45,950 --> 00:44:42,740
of

954
00:44:48,829 --> 00:44:45,960
engineering a collaboration it was a

955
00:44:52,130 --> 00:44:48,839
um a collaborative effort as well with

956
00:44:54,770 --> 00:44:52,140
both NASA and Kanas providing a key

957
00:44:57,530 --> 00:44:54,780
component and testing both in France and

958
00:44:59,450 --> 00:44:57,540
the US and the observatory being being a

959
00:45:01,970 --> 00:44:59,460
ping pong back and forth between two

960
00:45:03,589 --> 00:45:01,980
continents so it was a we took

961
00:45:06,170 --> 00:45:03,599
collaboration on a new level don't you

962
00:45:08,390 --> 00:45:06,180
think Selma yeah I completely agree of

963
00:45:11,690 --> 00:45:08,400

course and regarding the question

964
00:45:15,530 --> 00:45:11,700
related to how we supported also the

965
00:45:19,490 --> 00:45:15,540
research community on both sides from

966
00:45:22,190 --> 00:45:19,500
the beginning we had always a joint call

967
00:45:23,650 --> 00:45:22,200
a course towards the the science

968
00:45:27,950 --> 00:45:23,660
Community

969
00:45:30,950 --> 00:45:27,960
we jointly assessed the French proposal

970
00:45:33,589 --> 00:45:30,960
the U.S proposals uh kness was in charge

971
00:45:36,710 --> 00:45:33,599
also to assess and to select the

972
00:45:39,490 --> 00:45:36,720
international ones and today this

973
00:45:42,589 --> 00:45:39,500
Collective and joint effort allow us to

974
00:45:45,230 --> 00:45:42,599
involve not only the four space agencies

975
00:45:48,170 --> 00:45:45,240
who are collaborating to develop the

976
00:45:51,829 --> 00:45:48,180
space segments but more more important

977
00:45:54,470 --> 00:45:51,839
17 countries are already involved in the

978
00:45:57,050 --> 00:45:54,480
preparation to handle those measurements

979
00:46:01,849 --> 00:45:57,060
and to calibrate them and validate them

980
00:46:04,670 --> 00:46:01,859
a few days ago I was chairing the CEOs

981
00:46:06,770 --> 00:46:04,680
plenary meeting and when we had from

982
00:46:09,290 --> 00:46:06,780
Nadia and rosemary Morrow who is the

983
00:46:12,349 --> 00:46:09,300
French ocean uh Pi principal

984
00:46:15,589 --> 00:46:12,359
investigator of the mission I I was

985
00:46:18,410 --> 00:46:15,599
really uh very pleased to see that more

986
00:46:21,290 --> 00:46:18,420
than countries already involved are also

987
00:46:24,230 --> 00:46:21,300
have the willingness to to join this

988
00:46:26,750 --> 00:46:24,240

International Club in order to provide

989
00:46:30,650 --> 00:46:26,760
also their expertise but also to benefit

990
00:46:32,829 --> 00:46:30,660
from those open data from the SWAT

991
00:46:37,309 --> 00:46:32,839
Mission so this is really a truly

992
00:46:39,650 --> 00:46:37,319
Cooperative mission of course Beyond CSA

993
00:46:41,630 --> 00:46:39,660
and uksa thank you

994
00:46:43,609 --> 00:46:41,640
Thelma Nadia thank you so much for

995
00:46:45,230 --> 00:46:43,619
answering that question together I

996
00:46:48,410 --> 00:46:45,240
believe we'll toss it back to social

997
00:46:52,010 --> 00:46:50,150
and this question is for Kate Kate

998
00:46:53,630 --> 00:46:52,020
climate change is complex how does

999
00:46:55,550 --> 00:46:53,640
knowing more about ocean circulation

1000
00:46:57,349 --> 00:46:55,560
help us better understand climate change

1001
00:46:59,089 --> 00:46:57,359
and then how does that understanding

1002
00:47:00,109 --> 00:46:59,099
impact our options on how to move

1003
00:47:01,910 --> 00:47:00,119
forward

1004
00:47:03,890 --> 00:47:01,920
thank you for the question so oceans

1005
00:47:05,990 --> 00:47:03,900
play a really important role in climate

1006
00:47:07,550 --> 00:47:06,000
change they absorb a lot of the heat as

1007
00:47:09,650 --> 00:47:07,560
well as a lot of the carbon so when we

1008
00:47:11,569 --> 00:47:09,660
put carbon dioxide emissions into the

1009
00:47:13,130 --> 00:47:11,579
when we burn them through fossil fuels

1010
00:47:15,170 --> 00:47:13,140
or other changes on the Earth's surface

1011
00:47:17,809 --> 00:47:15,180
some of that carbon goes into the ocean

1012
00:47:20,630 --> 00:47:17,819
some goes on to land absorbed by trees

1013
00:47:22,510 --> 00:47:20,640

others stays in the atmosphere and how

1014
00:47:24,710 --> 00:47:22,520
much and how the ocean circulates

1015
00:47:26,150 --> 00:47:24,720
influences how much more carbon we can

1016
00:47:28,309 --> 00:47:26,160
uptake and there are similar processes

1017
00:47:30,109 --> 00:47:28,319
related to heat so as it gets warmer the

1018
00:47:32,270 --> 00:47:30,119
oceans are absorbing a lot of that heat

1019
00:47:34,309 --> 00:47:32,280
so better understanding the mixing

1020
00:47:37,010 --> 00:47:34,319
process of the ocean will help us

1021
00:47:38,510 --> 00:47:37,020
understand how much more heat and carbon

1022
00:47:39,710 --> 00:47:38,520
we can uptake and that's really

1023
00:47:42,230 --> 00:47:39,720
important for understanding future

1024
00:47:45,349 --> 00:47:42,240
climate change and how activities by

1025
00:47:47,650 --> 00:47:45,359
humans influence future climate change

1026
00:47:50,329 --> 00:47:47,660
Kate thank you so much I appreciate that

1027
00:47:53,089 --> 00:47:50,339
uh seeing none in the room yet again we

1028
00:47:55,609 --> 00:47:53,099
will go back to social media

1029
00:47:57,589 --> 00:47:55,619
thank you and this one's from Russell on

1030
00:48:00,050 --> 00:47:57,599
YouTube asks will SWAT be able to see

1031
00:48:03,710 --> 00:48:00,060
through Forest canopy and vegetation for

1032
00:48:10,309 --> 00:48:07,390
this is a really good question and it is

1033
00:48:13,550 --> 00:48:10,319
there are a handful of questions that I

1034
00:48:16,730 --> 00:48:13,560
am really excited to see what happens

1035
00:48:20,210 --> 00:48:16,740
when spot launches because I don't think

1036
00:48:22,790 --> 00:48:20,220
we fully know the answer and a lot of

1037
00:48:26,630 --> 00:48:22,800
that is because wetlands are so complex

1038
00:48:28,309 --> 00:48:26,640

right that term contains a vast array of

1039
00:48:30,710 --> 00:48:28,319
different environments from places like

1040
00:48:32,329 --> 00:48:30,720
the Everglades where you might have you

1041
00:48:33,890 --> 00:48:32,339
know grass you know grasses with water

1042
00:48:36,589 --> 00:48:33,900
underneath to places like the Amazon

1043
00:48:39,890 --> 00:48:36,599
floodplain where you have really dense

1044
00:48:42,050 --> 00:48:39,900
forest canopies if I had to guess

1045
00:48:43,849 --> 00:48:42,060
I would guess that SWAT might be able to

1046
00:48:45,770 --> 00:48:43,859
tell us some really interesting things

1047
00:48:48,349 --> 00:48:45,780
about what's going on in those sort of

1048
00:48:49,730 --> 00:48:48,359
more grassland type areas or places

1049
00:48:50,809 --> 00:48:49,740
where you have a little bit sparser

1050
00:48:53,030 --> 00:48:50,819
vegetation

1051
00:48:55,010 --> 00:48:53,040
I think just because the wavelength that

1052
00:48:57,530 --> 00:48:55,020
we're using is so short

1053
00:48:59,210 --> 00:48:57,540
it may be a little bit difficult for us

1054
00:49:01,970 --> 00:48:59,220
to get really good data in places where

1055
00:49:04,730 --> 00:49:01,980
we have really dense vegetation but this

1056
00:49:06,410 --> 00:49:04,740
really goes back to a lot of what Nadia

1057
00:49:07,730 --> 00:49:06,420
was talking about right SWAT is a

1058
00:49:10,130 --> 00:49:07,740
Pathfinder mission

1059
00:49:12,530 --> 00:49:10,140
and what that means is that when we put

1060
00:49:15,050 --> 00:49:12,540
it up in space we don't know all of its

1061
00:49:16,730 --> 00:49:15,060
capabilities right and part of the joy

1062
00:49:18,650 --> 00:49:16,740
of working on SWAT is getting to find

1063
00:49:20,630 --> 00:49:18,660

out

1064
00:49:23,750 --> 00:49:20,640
thank you so much oh did would you like

1065
00:49:26,150 --> 00:49:23,760
to add Selma yeah yeah thank you uh just

1066
00:49:27,710 --> 00:49:26,160
um another um perhaps Insight on this

1067
00:49:30,950 --> 00:49:27,720
important question

1068
00:49:34,730 --> 00:49:30,960
uh within the uh early adopter programs

1069
00:49:36,829 --> 00:49:34,740
and within the SWOT Preparatory program

1070
00:49:39,530 --> 00:49:36,839
from the beginning we are not

1071
00:49:42,170 --> 00:49:39,540
considering SWOT at the Standalone

1072
00:49:45,109 --> 00:49:42,180
mission to address this key complex

1073
00:49:47,569 --> 00:49:45,119
climate change questions and issues

1074
00:49:50,390 --> 00:49:47,579
and from the beginning of course within

1075
00:49:52,790 --> 00:49:50,400
the kness Earth observation program also

1076
00:49:55,730 --> 00:49:52,800
for NASA at observation program

1077
00:49:58,550 --> 00:49:55,740
we are considering the the use of the

1078
00:50:00,589 --> 00:49:58,560
SWOT measurement in conjunction with a

1079
00:50:03,650 --> 00:50:00,599
complementary with other key

1080
00:50:05,809 --> 00:50:03,660
observations in order to tackle those

1081
00:50:08,390 --> 00:50:05,819
key questions in terms of what we call

1082
00:50:11,870 --> 00:50:08,400
the physical measurements and we have

1083
00:50:14,569 --> 00:50:11,880
already today in orbit some European

1084
00:50:18,050 --> 00:50:14,579
missions such as a small or snap on NASA

1085
00:50:20,870 --> 00:50:18,060
JPL Mission from the beginning they are

1086
00:50:24,230 --> 00:50:20,880
not they were not expected to provide

1087
00:50:26,690 --> 00:50:24,240
for example the the the height of

1088
00:50:28,670 --> 00:50:26,700

vegetation over tropical region they

1089
00:50:32,870 --> 00:50:28,680
were dedicated to other science

1090
00:50:37,069 --> 00:50:32,880
objective but when we explore those new

1091
00:50:40,010 --> 00:50:37,079
measurements we could develop other key

1092
00:50:42,230 --> 00:50:40,020
areas that were not completely expected

1093
00:50:45,230 --> 00:50:42,240
from the initial missions so my main

1094
00:50:48,710 --> 00:50:45,240
message here is to say that SWOT

1095
00:50:51,049 --> 00:50:48,720
measurement yes is a new is an

1096
00:50:53,870 --> 00:50:51,059
unprecedented measurement but in the

1097
00:50:56,569 --> 00:50:53,880
meantime all the signs coming unity and

1098
00:50:59,150 --> 00:50:56,579
all the users that we we spoke about in

1099
00:51:01,010 --> 00:50:59,160
the early adopter programs are preparing

1100
00:51:03,109 --> 00:51:01,020
that in conjunction in complementary

1101
00:51:05,690 --> 00:51:03,119
with other measurements but more

1102
00:51:08,510 --> 00:51:05,700
important more important tackling the

1103
00:51:11,030 --> 00:51:08,520
complex climate change is also preparing

1104
00:51:14,210 --> 00:51:11,040
the new generation of climate change

1105
00:51:17,030 --> 00:51:14,220
modeling we are speaking in France

1106
00:51:21,890 --> 00:51:17,040
within the Copernicus Marine Service and

1107
00:51:25,069 --> 00:51:21,900
marketer since 2013 we are preparing the

1108
00:51:27,770 --> 00:51:25,079
next high resolution model which could

1109
00:51:31,430 --> 00:51:27,780
assimilate and will assimilate those

1110
00:51:33,890 --> 00:51:31,440
SWOT measurements in order to provide a

1111
00:51:36,589 --> 00:51:33,900
better prediction more than better seven

1112
00:51:39,410 --> 00:51:36,599
days and this is the critical aspect

1113
00:51:42,170 --> 00:51:39,420

also of the Swatch program is to handle

1114
00:51:45,109 --> 00:51:42,180
and together all the means all the

1115
00:51:47,569 --> 00:51:45,119
assets in order to make the better added

1116
00:51:49,010 --> 00:51:47,579
value of those SWOT measurements

1117
00:51:50,809 --> 00:51:49,020
Selma thank you so much for that

1118
00:51:53,930 --> 00:51:50,819
addition there uh we do have another

1119
00:51:56,329 --> 00:51:53,940
phone in question this is Lucy odor with

1120
00:51:59,630 --> 00:51:56,339
asp

1121
00:52:00,950 --> 00:51:59,640
hi can you hear me yes

1122
00:52:03,349 --> 00:52:00,960
yes

1123
00:52:04,730 --> 00:52:03,359
um thank you for doing this um can you

1124
00:52:07,910 --> 00:52:04,740
talk a little bit more about the

1125
00:52:11,450 --> 00:52:07,920
scientific instruments on board uh what

1126
00:52:14,750 --> 00:52:11,460
are they exactly are they cameras Radars

1127
00:52:17,870 --> 00:52:14,760
um why these big two arms uh for the

1128
00:52:20,210 --> 00:52:17,880
satellite and and yeah how do these

1129
00:52:21,530 --> 00:52:20,220
instruments compare with previous ones

1130
00:52:25,190 --> 00:52:21,540
thank you

1131
00:52:27,710 --> 00:52:25,200
do you want me to start yeah

1132
00:52:30,530 --> 00:52:27,720
yeah so the the heart of the SWAT system

1133
00:52:33,349 --> 00:52:30,540
is the new radar interferometer which we

1134
00:52:35,870 --> 00:52:33,359
call Karen as I explained already there

1135
00:52:38,569 --> 00:52:35,880
are two antennas and one of them is

1136
00:52:41,290 --> 00:52:38,579
transmits an electromagnetic pulse which

1137
00:52:44,510 --> 00:52:41,300
bounce off the Earth's surface being

1138
00:52:46,190 --> 00:52:44,520

captured by both antennas and the

1139
00:52:49,069 --> 00:52:46,200
signals are a little bit out of sync out

1140
00:52:52,250 --> 00:52:49,079
of face what we call it uh and that this

1141
00:52:55,670 --> 00:52:52,260
phase difference combined with the radio

1142
00:52:58,190 --> 00:52:55,680
wavelength allows us to triangulate and

1143
00:53:00,410 --> 00:52:58,200
compute the distance between the Earth's

1144
00:53:03,890 --> 00:53:00,420
surface and the satellite which we then

1145
00:53:06,470 --> 00:53:03,900
translate to the height of the water so

1146
00:53:08,390 --> 00:53:06,480
um and we're doing it over this wide

1147
00:53:10,670 --> 00:53:08,400
swath like what two antennas doing it

1148
00:53:12,770 --> 00:53:10,680
over the white twist I think uh Ben had

1149
00:53:15,770 --> 00:53:12,780
a nice animation with a swath following

1150
00:53:17,569 --> 00:53:15,780
so over like 50 kilometers wide so this

1151
00:53:19,910 --> 00:53:17,579
is our first two-dimensional

1152
00:53:22,069 --> 00:53:19,920
measurements of CIS of his height or

1153
00:53:23,710 --> 00:53:22,079
ocean height right or water height

1154
00:53:27,410 --> 00:53:23,720
rather

1155
00:53:30,349 --> 00:53:27,420
still you know ocean physicist yes so

1156
00:53:32,990 --> 00:53:30,359
what a height and that's and that sets

1157
00:53:35,329 --> 00:53:33,000
it apart from the traditional uh just

1158
00:53:38,390 --> 00:53:35,339
downward looking Nader altimeter is what

1159
00:53:40,130 --> 00:53:38,400
Sandra I'm Selma referring earlier that

1160
00:53:42,829 --> 00:53:40,140
just looked down and collect

1161
00:53:44,390 --> 00:53:42,839
measurements of the water surface in a

1162
00:53:47,630 --> 00:53:44,400
traditional conventional way we will

1163
00:53:49,910 --> 00:53:47,640

have this Nader technology on a SWOT as

1164
00:53:52,730 --> 00:53:49,920
well to complement uh Karen White's

1165
00:53:55,790 --> 00:53:52,740
wealth it's what swath technology also

1166
00:53:57,890 --> 00:53:55,800
but so so complementarity is another

1167
00:54:01,250 --> 00:53:57,900
aspect of the SWAT

1168
00:54:03,049 --> 00:54:01,260
um observing system did I answer was it

1169
00:54:04,790 --> 00:54:03,059
a two-part question of of that's enough

1170
00:54:06,290 --> 00:54:04,800
I know that that was good that was all

1171
00:54:07,970 --> 00:54:06,300
the instruments I believe so I think you

1172
00:54:10,490 --> 00:54:07,980
covered it there's just a few mistakes

1173
00:54:13,730 --> 00:54:10,500
kind of edit it but all right we'll roll

1174
00:54:15,890 --> 00:54:13,740
with that thank you so much Nadia uh I

1175
00:54:17,990 --> 00:54:15,900
think we have time for about uh two or

1176
00:54:22,130 --> 00:54:18,000
three more questions so I will check

1177
00:54:26,450 --> 00:54:24,530
another question from YouTube well

1178
00:54:33,370 --> 00:54:26,460
moisture in the air affect the

1179
00:54:38,690 --> 00:54:36,349
the answer is yes not yes okay yes the

1180
00:54:41,450 --> 00:54:38,700
answer is yes of course yes and and we

1181
00:54:44,210 --> 00:54:41,460
have already uh some um what we called

1182
00:54:46,069 --> 00:54:44,220
uh within the the classical nadil

1183
00:54:48,470 --> 00:54:46,079
ultimate remission and it is the case

1184
00:54:50,750 --> 00:54:48,480
for the SWOT uh we will have what we

1185
00:54:52,490 --> 00:54:50,760
could have geophysical product that

1186
00:54:55,069 --> 00:54:52,500
could benefit from those correction

1187
00:54:58,069 --> 00:54:55,079
needed correction from the atmosphere

1188
00:55:00,130 --> 00:54:58,079

atmosphere impact on the measurement of

1189
00:55:06,410 --> 00:55:00,140
course

1190
00:55:08,930 --> 00:55:06,420
very good thank you Nadia and Thelma

1191
00:55:10,730 --> 00:55:08,940
again for answering that together again

1192
00:55:12,710 --> 00:55:10,740
I'm looking around the room but if none

1193
00:55:14,750 --> 00:55:12,720
uh no other are in the room we'll go

1194
00:55:17,510 --> 00:55:14,760
back to social media once more

1195
00:55:19,010 --> 00:55:17,520
the last one from social uh when are you

1196
00:55:24,829 --> 00:55:19,020
expecting the data to be available to

1197
00:55:30,829 --> 00:55:27,349
I can take it yes so so as we were

1198
00:55:33,170 --> 00:55:30,839
saying uh with what we are building an

1199
00:55:35,390 --> 00:55:33,180
open science Community what we call it

1200
00:55:38,030 --> 00:55:35,400
so we're trying this experiment where we

1201
00:55:41,770 --> 00:55:38,040
are releasing so-called pre-validated

1202
00:55:46,329 --> 00:55:41,780
data sets and kind of inviting Community

1203
00:55:49,309 --> 00:55:46,339
to help NASA and kness validate this new

1204
00:55:52,309 --> 00:55:49,319
measurements uh together so all hands on

1205
00:55:54,770 --> 00:55:52,319
deck and we're releasing this product in

1206
00:55:56,750 --> 00:55:54,780
approximately nominal time frame full

1207
00:55:59,770 --> 00:55:56,760
2023.

1208
00:56:02,390 --> 00:55:59,780
yeah this is an important uh Rendezvous

1209
00:56:06,470 --> 00:56:02,400
I would like to to say with the

1210
00:56:09,770 --> 00:56:06,480
community uh today all the data are

1211
00:56:14,030 --> 00:56:09,780
aiming to be available by September 2023

1212
00:56:17,510 --> 00:56:14,040
but prior to this important Milestone uh

1213
00:56:19,730 --> 00:56:17,520

there are many teams around the world to

1214
00:56:21,290 --> 00:56:19,740
handle and to investigate those those

1215
00:56:24,349 --> 00:56:21,300
new measurements and this is really

1216
00:56:27,650 --> 00:56:24,359
critical and as I have the the

1217
00:56:29,990 --> 00:56:27,660
opportunity to speak about that and at

1218
00:56:32,270 --> 00:56:30,000
European level we have also an important

1219
00:56:35,329 --> 00:56:32,280
rendezvous with those calval measurement

1220
00:56:36,890 --> 00:56:35,339
SWOT measurements uh because we are

1221
00:56:39,730 --> 00:56:36,900
preparing the next generation of

1222
00:56:42,890 --> 00:56:39,740
Copernicus Sentinel topography Mission

1223
00:56:47,210 --> 00:56:42,900
and of course this new technology as

1224
00:56:50,390 --> 00:56:47,220
Nadia mentioned is opening a new era but

1225
00:56:53,270 --> 00:56:50,400
in the meantime a continuity continuity

1226
00:56:58,069 --> 00:56:53,280
as nadir is on both this mission

1227
00:57:02,390 --> 00:56:58,079
but also opportunities on new areas in

1228
00:57:04,849 --> 00:57:02,400
climate in climate change studies and we

1229
00:57:07,430 --> 00:57:04,859
have within the European space agency

1230
00:57:10,490 --> 00:57:07,440
and the European Union an important

1231
00:57:14,270 --> 00:57:10,500
Rendezvous in

1232
00:57:16,130 --> 00:57:14,280
beginning of 2024 after the the

1233
00:57:18,530 --> 00:57:16,140
reception of the calibrated and

1234
00:57:22,010 --> 00:57:18,540
validated SWOT measurement this is a

1235
00:57:24,349 --> 00:57:22,020
really important Rendezvous thank you

1236
00:57:26,390 --> 00:57:24,359
thank you I think that was all the time

1237
00:57:28,370 --> 00:57:26,400
we had for for questions today but you

1238
00:57:30,410 --> 00:57:28,380

all did a fantastic job I want to thank

1239
00:57:32,290 --> 00:57:30,420
our panelists for joining us also thank

1240
00:57:34,910 --> 00:57:32,300
you to those of you who asked questions

1241
00:57:37,670 --> 00:57:34,920
we invite you to join us again right

1242
00:57:40,010 --> 00:57:37,680
here on NASA TV for the pre-launch

1243
00:57:40,970 --> 00:57:40,020
briefing that will be at 10 A.M Pacific

1244
00:57:43,010 --> 00:57:40,980
time

1245
00:57:45,049 --> 00:57:43,020
and you can tune in as well to watch the

1246
00:57:48,049 --> 00:57:45,059
launch broadcast that is this Thursday

1247
00:57:50,750 --> 00:57:48,059
December 15th with live coverage on NASA

1248
00:57:54,349 --> 00:57:50,760
TV or nasa.gov forward slash live and

1249
00:57:56,569 --> 00:57:54,359
that will begin at 3 A.M Pacific for

1250
00:57:58,750 --> 00:57:56,579
more information on SWAT science you can

1251
00:58:01,069 --> 00:57:58,760
go to

1252
00:58:03,549 --> 00:58:01,079
swot.jpl.nasa.gov and you can also

1253
00:58:06,530 --> 00:58:03,559
follow along with the mission at

1254
00:58:08,030 --> 00:58:06,540
blogs.nasa.gov forward slash SWAT we

1255
00:58:09,410 --> 00:58:08,040
thank you all again here in the room and

1256
00:58:12,290 --> 00:58:09,420
to our panelists for joining us today