1
00:00:06,549 --> 00:00:03,790
nasa and the european space agency easa

2
00:00:08,970 --> 00:00:06,559
have embarked on a joint program to

3
00:00:11,650 --> 00:00:08,980
explore mars in the coming decades and

4
00:00:14,949 --> 00:00:11,660
selected the five science instruments

5
00:00:17,080 --> 00:00:14,959
for the first mission the exomars trace

6
00:00:19,180 --> 00:00:17,090
gas orbiter scheduled to launch in

7
00:00:21,490 --> 00:00:19,190
twenty sixteen is the first of three

8
00:00:24,520 --> 00:00:21,500
joint robotic missions to the red planet

9
00:00:27,160 --> 00:00:24,530
it will study the chemical makeup of the

10
00:00:29,770 --> 00:00:27,170
Martian atmosphere with the one thousand

11
00:00:32,470 --> 00:00:29,780
fold increase in sensitivity over

12
00:00:35,049 --> 00:00:32,480
previous Mars orbiters the mission will

13
00:00:37,630 --> 00:00:35,059

focus on trace gases including methane

14
00:00:40,270 --> 00:00:37,640
which could potentially be geochemical

15
00:00:42,579 --> 00:00:40,280
or biological in origin and be

16
00:00:45,669 --> 00:00:42,589
indicators for the existence of life on

17
00:00:48,160 --> 00:00:45,679
Mars the mission also will serve as an

18
00:00:58,569 --> 00:00:48,170
additional communications relay for Mars

19
00:00:58,579 --> 00:01:51,730
you

20
00:01:57,080 --> 00:01:54,110
we've been in the space business or 50

21
00:01:58,520 --> 00:01:57,090
years the simple stuff has been done you

22
00:02:00,260 --> 00:01:58,530
know missions don't cost 50 million

23
00:02:02,930 --> 00:02:00,270
dollars anymore because you can't do

24
00:02:05,359 --> 00:02:02,940
much for 50 million dollars missions

25
00:02:07,700 --> 00:02:05,369
tend to cost half a billion a billion or

26
00:02:10,430 --> 00:02:07,710
even billions of dollars to do the kind

27
00:02:12,890 --> 00:02:10,440
of world class science that NASA is

28
00:02:16,340 --> 00:02:12,900
known to do and that the American people

29
00:02:18,590 --> 00:02:16,350
expect us to do you know we've flown by

30
00:02:20,780 --> 00:02:18,600
planets long time ago Voyager did that

31
00:02:22,790 --> 00:02:20,790
we're in the process of orbiting planets

32
00:02:25,130 --> 00:02:22,800
and landing on planets and roving on

33
00:02:28,040 --> 00:02:25,140
planets that cost a little bit more than

34
00:02:30,320 --> 00:02:28,050
a few dollars the trouble is we also

35
00:02:32,449 --> 00:02:30,330
have an economic situation in the world

36
00:02:35,860 --> 00:02:32,459
that's not exactly conducive to a lot of

37
00:02:38,300 --> 00:02:35,870
extra money for science recognizing

38
00:02:41,000 --> 00:02:38,310

missions costs a lot more to do the best

39
00:02:43,880 --> 00:02:41,010
science and to the economic situation is

40
00:02:46,040 --> 00:02:43,890
it the best it could be it's time for us

41
00:02:47,990 --> 00:02:46,050
to stop competing with our major

42
00:02:49,940 --> 00:02:48,000
partners like the Europeans and start

43
00:02:51,979 --> 00:02:49,950
working together Mars has the raw

44
00:02:54,500 --> 00:02:51,989
materials to keep astronauts going for a

45
00:02:57,020 --> 00:02:54,510
long time it's got its got ice why is

46
00:03:00,650 --> 00:02:57,030
ice important well I stern's under water

47
00:03:03,050 --> 00:03:00,660
for drinking Isis me out of h2o hydrogen

48
00:03:05,120 --> 00:03:03,060
and oxygen hydrogen makes a great rocket

49
00:03:08,180 --> 00:03:05,130
fuel and oxygens the kind of stuff you

50
00:03:10,250 --> 00:03:08,190
like to breathe so the raw materials to

51
00:03:12,380 --> 00:03:10,260
support a human expedition to Mars are

52
00:03:14,990 --> 00:03:12,390
there but before we go there we need a

53
00:03:17,690 --> 00:03:15,000
map and we also need to make sure what

54
00:03:19,880 --> 00:03:17,700
Mars is me out of are there any toxins

55
00:03:21,680 --> 00:03:19,890
air is there any biology there we have

56
00:03:23,720 --> 00:03:21,690
to worry about the only way to do that

57
00:03:26,420 --> 00:03:23,730
really well is to go there and do a

58
00:03:28,039 --> 00:03:26,430
robotic sample return mission Mars is

59
00:03:30,289 --> 00:03:28,049
probably the most likely place in the

60
00:03:33,650 --> 00:03:30,299
solar system other than the earth for

61
00:03:36,289 --> 00:03:33,660
life to evolve at some point in time it

62
00:03:38,360 --> 00:03:36,299
was wet it had standing water it has

63
00:03:40,400 --> 00:03:38,370

organic material it has energy it's got

64
00:03:42,199 --> 00:03:40,410
all the ingredients for life and there

65
00:03:43,780 --> 00:03:42,209
may have been life there some time now

66
00:03:47,870 --> 00:03:43,790
it might have only been you know

67
00:03:49,670 --> 00:03:47,880
bacteria type of life but it's important

68
00:03:53,210 --> 00:03:49,680
to find out because it's the very first

69
00:03:56,120 --> 00:03:53,220
place we look for life in depth we find

70
00:03:58,400 --> 00:03:56,130
it or find fossil evidence of it that

71
00:04:01,490 --> 00:03:58,410
has profound implications for a universe

72
00:04:03,589 --> 00:04:01,500
that has as we know now hundreds if not

73
00:04:04,500 --> 00:04:03,599
thousands if not billions of planets out

74
00:04:05,640 --> 00:04:04,510
there

75
00:04:07,160 --> 00:04:05,650
and it says something about the

76
00:04:10,740 --> 00:04:07,170
possibilities of life in the universe

77
00:04:13,470 --> 00:04:10,750
the driving reason behind an ISA NASA

78
00:04:17,280 --> 00:04:13,480
collaboration is to build our

79
00:04:20,340 --> 00:04:17,290
capabilities to return samples from Mars

80
00:04:22,350 --> 00:04:20,350
in the 2020s that's a complicated series

81
00:04:24,659 --> 00:04:22,360
of missions it's not a single mission we

82
00:04:26,340 --> 00:04:24,669
call it a campaign because it could

83
00:04:28,770 --> 00:04:26,350
cover two or maybe three launch

84
00:04:30,300 --> 00:04:28,780
opportunities to be able to set the

85
00:04:32,670 --> 00:04:30,310
infrastructure on the surface of the

86
00:04:34,350 --> 00:04:32,680
planet get the samples back off of the

87
00:04:37,350 --> 00:04:34,360
planet and return those to Earth safely

88
00:04:39,300 --> 00:04:37,360

that's the driving goal for this broad

89
00:04:41,939 --> 00:04:39,310
collaboration is the ability to do that

90
00:04:44,939 --> 00:04:41,949
in an international context frankly the

91
00:04:47,790 --> 00:04:44,949
science of that could be very paradigm

92
00:04:49,050 --> 00:04:47,800
changing science and the my personal

93
00:04:50,580 --> 00:04:49,060
opinion is this needs to be an

94
00:04:51,960 --> 00:04:50,590
international collaboration because we

95
00:04:53,310 --> 00:04:51,970
may change paradigms around the world

96
00:04:56,250 --> 00:04:53,320
with what we find out from that mission

97
00:04:58,710 --> 00:04:56,260
the prices and costs of things continue

98
00:05:00,390 --> 00:04:58,720
to increase just inflation a roads are

99
00:05:02,010 --> 00:05:00,400
buying power and that's true around the

100
00:05:03,510 --> 00:05:02,020
world for whether you're buying a

101
00:05:05,250 --> 00:05:03,520
refrigerator whether you're buying a new

102
00:05:07,890 --> 00:05:05,260
car whether you're buying you know a

103
00:05:09,120 --> 00:05:07,900
jetliner for an airplane company or

104
00:05:11,820 --> 00:05:09,130
whether you're buying spacecraft and

105
00:05:13,770 --> 00:05:11,830
launch vehicles so as time goes on our

106
00:05:16,529 --> 00:05:13,780
budgets tend not to keep up with the

107
00:05:18,629 --> 00:05:16,539
inflation rates so the missions we can

108
00:05:21,689 --> 00:05:18,639
fly either become smaller or they become

109
00:05:24,510 --> 00:05:21,699
less frequent that was the case for both

110
00:05:26,370 --> 00:05:24,520
ISA and for NASA with Mars that as time

111
00:05:28,589 --> 00:05:26,380
went on and these missions when you go

112
00:05:30,839 --> 00:05:28,599
to the surface of another planet become

113
00:05:33,659 --> 00:05:30,849

especially challenging cost wise as well

114
00:05:35,760 --> 00:05:33,669
as technically so by merging we are

115
00:05:39,240 --> 00:05:35,770
keeping a very vibrant program in place

116
00:05:42,150 --> 00:05:39,250
that will allow us to go to Mars on

117
00:05:44,159 --> 00:05:42,160
every opportunity which essentially is a

118
00:05:47,159 --> 00:05:44,169
planetary alignment between Mars and

119
00:05:49,170 --> 00:05:47,169
Earth is optimum every 26 months makes

120
00:05:51,750 --> 00:05:49,180
the trip much shorter makes it easier to

121
00:05:52,950 --> 00:05:51,760
get to and so we like to go on those

122
00:05:54,839 --> 00:05:52,960
opportunities this kind of a

123
00:05:57,089 --> 00:05:54,849
collaboration allows us to do that on

124
00:06:00,080 --> 00:05:57,099
essentially every opportunity as long as

125
00:06:02,760 --> 00:06:00,090
we want to do that I'm not certain that

126
00:06:05,610 --> 00:06:02,770
anybody as a single space agency

127
00:06:09,180 --> 00:06:05,620
actually could do the Mars sample return

128
00:06:12,510 --> 00:06:09,190
campaign by itself it's complicated it's

129
00:06:13,709 --> 00:06:12,520
expensive and I think you really need

130
00:06:15,000 --> 00:06:13,719
this to be an international

131
00:06:17,190 --> 00:06:15,010
collaboration to make it a viable

132
00:06:18,070 --> 00:06:17,200
mission so to be able to do more sample

133
00:06:19,719 --> 00:06:18,080
return in a high

134
00:06:21,610 --> 00:06:19,729
collaborative fashion it's very

135
00:06:24,760 --> 00:06:21,620
important to get used to working with

136
00:06:27,189 --> 00:06:24,770
each other so that's what the 2016 and

137
00:06:29,679 --> 00:06:27,199
the 2018 missions are really about is a

138
00:06:32,140 --> 00:06:29,689

large-scale collaboration where we're

139
00:06:34,089 --> 00:06:32,150
essentially in each other's knickers as

140
00:06:35,740 --> 00:06:34,099
far as we're dependent on them and

141
00:06:38,290 --> 00:06:35,750
they're dependent on us which creates a

142
00:06:40,360 --> 00:06:38,300
very different dynamic than we typically

143
00:06:41,860 --> 00:06:40,370
deal with if we're only getting a single

144
00:06:44,589 --> 00:06:41,870
instrument here or providing them a

145
00:06:46,300 --> 00:06:44,599
single instrument there in fact if

146
00:06:48,580 --> 00:06:46,310
things go the way we want them to go and

147
00:06:51,309 --> 00:06:48,590
the way the US science community I

148
00:06:53,469 --> 00:06:51,319
believe wants to go the 2018 mission

149
00:06:54,640 --> 00:06:53,479
actually may cash the samples in other

150
00:06:58,059 --> 00:06:54,650
words collect them and put them in

151
00:06:59,379 --> 00:06:58,069
canisters for the sample return mission

152
00:07:02,260 --> 00:06:59,389
that would go retrieve those in the

153
00:07:04,899 --> 00:07:02,270
2020s so the 18 mission could be a very

154
00:07:07,390 --> 00:07:04,909
very large scale very exciting mission

155
00:07:09,879 --> 00:07:07,400
and set the science pace for Mars for a

156
00:07:12,309 --> 00:07:09,889
decade or more also leads directly into

157
00:07:13,930 --> 00:07:12,319
human exploration of the planet I don't

158
00:07:15,670 --> 00:07:13,940
think we can send humans to Mars without

159
00:07:18,760 --> 00:07:15,680
actually understanding the details of

160
00:07:20,860 --> 00:07:18,770
dust characteristics toxicity of the

161
00:07:22,540 --> 00:07:20,870
soils is there something alive in that

162
00:07:25,209 --> 00:07:22,550
soil it's a threat to our astronauts

163
00:07:27,040 --> 00:07:25,219

Mars sample return is almost mandatory

164
00:07:28,540 --> 00:07:27,050
before you send humans to the planet