
S.U.I.T.S.
SPACESUIT USER INTERFACE
TECHNOLOGIES FOR STUDENTS
VIDEO FEATURE

1
00:00:04,230 --> 00:00:02,470
[Music]

2
00:00:06,550 --> 00:00:04,240
nasa is building exciting new

3
00:00:07,670 --> 00:00:06,560
technologies to help astronauts explore

4
00:00:09,669 --> 00:00:07,680
the moon

5
00:00:12,709 --> 00:00:09,679
and it is tapping into the unique

6
00:00:14,870 --> 00:00:12,719
perspective of today's college students

7
00:00:18,700 --> 00:00:14,880
to contribute research to those new

8
00:00:18,710 --> 00:00:25,109
[Music]

9
00:00:29,349 --> 00:00:27,109
today is test day

10
00:00:32,150 --> 00:00:29,359
nasa engineers are helping evaluate

11
00:00:34,630 --> 00:00:32,160
software designed by students the task

12
00:00:36,310 --> 00:00:34,640
is to see how this technology can help

13
00:00:38,389 --> 00:00:36,320

during a space mission it's the

14
00:00:41,030 --> 00:00:38,399
culmination of the student's hard work

15
00:00:43,670 --> 00:00:41,040
on the program known as suits

16
00:00:46,549 --> 00:00:43,680
so suits is spacesuit user interface

17
00:00:49,910 --> 00:00:46,559
technologies for students what that

18
00:00:52,790 --> 00:00:49,920
means is we're having students design a

19
00:00:54,790 --> 00:00:52,800
graphic user interface for

20
00:00:56,229 --> 00:00:54,800
the suit helmet bubble you know a

21
00:00:57,110 --> 00:00:56,239
heads-up display would be something

22
00:00:59,830 --> 00:00:57,120
that's

23
00:01:03,270 --> 00:00:59,840
fairly far out from your face

24
00:01:05,670 --> 00:01:03,280
so maybe a couple of feet or further

25
00:01:08,630 --> 00:01:05,680
what the students are using is a head

26
00:01:12,070 --> 00:01:08,640
mounted display and we really kind of

27
00:01:14,469 --> 00:01:12,080
refer to that as a heads on like it's on

28
00:01:16,870 --> 00:01:14,479
the head and so it's only

29
00:01:17,830 --> 00:01:16,880
maybe a half inch or so away from the

30
00:01:20,870 --> 00:01:17,840
eyes

31
00:01:22,070 --> 00:01:20,880
and they wear it like goggles it allows

32
00:01:24,469 --> 00:01:22,080
them to

33
00:01:27,429 --> 00:01:24,479
not only see the real environment in

34
00:01:31,429 --> 00:01:27,439
front of them or around them but also it

35
00:01:33,990 --> 00:01:31,439
overlays text or imagery in front of

36
00:01:36,630 --> 00:01:34,000
their eye so that they see that on top

37
00:01:38,710 --> 00:01:36,640
of the real environment seeing both the

38
00:01:41,670 --> 00:01:38,720

graphic overlays and the real

39
00:01:43,670 --> 00:01:41,680
environment is called augmented reality

40
00:01:46,469 --> 00:01:43,680
the challenge for the students is to use

41
00:01:49,109 --> 00:01:46,479
this technology to be of help during one

42
00:01:53,520 --> 00:01:49,119
of the most difficult tasks encountered

43
00:01:53,530 --> 00:01:57,429
[Music]

44
00:02:03,590 --> 00:02:00,709
so an eva or an extravehicular activity

45
00:02:05,510 --> 00:02:03,600
a fancy word for a spacewalk at nasa is

46
00:02:07,030 --> 00:02:05,520
typically a crew member

47
00:02:10,550 --> 00:02:07,040
leaving their vehicle their their

48
00:02:11,510 --> 00:02:10,560
spacecraft in a pressurized suit evas

49
00:02:13,190 --> 00:02:11,520
are

50
00:02:15,190 --> 00:02:13,200
oftentimes if you ask an astronaut

51
00:02:17,030 --> 00:02:15,200
they'll say that they're much like doing

52
00:02:18,470 --> 00:02:17,040
brain surgery and running a marathon at

53
00:02:21,110 --> 00:02:18,480
the same time

54
00:02:23,990 --> 00:02:21,120
what we do with suits is simulate this

55
00:02:26,949 --> 00:02:24,000
intense eva environment but we then

56
00:02:29,990 --> 00:02:26,959
introduce an augmented reality display

57
00:02:32,390 --> 00:02:30,000
in harmony with the audio feed that that

58
00:02:34,869 --> 00:02:32,400
comes over the loop from mission control

59
00:02:37,509 --> 00:02:34,879
astronauts today don't have augmented

60
00:02:39,270 --> 00:02:37,519
reality visible inside the space helmet

61
00:02:41,270 --> 00:02:39,280
during an eva

62
00:02:43,750 --> 00:02:41,280
they rely on their training mission

63
00:02:46,949 --> 00:02:43,760

control and in some cases a small

64
00:02:49,990 --> 00:02:46,959
booklet known as a cuff checklist should

65
00:02:52,390 --> 00:02:50,000
they need more information

66
00:02:54,550 --> 00:02:52,400
suits project challenges the students to

67
00:02:57,350 --> 00:02:54,560
look forward and wonder

68
00:02:59,190 --> 00:02:57,360
what if astronauts could access data

69
00:03:01,030 --> 00:02:59,200
using this technology

70
00:03:03,589 --> 00:03:01,040
what would it look like

71
00:03:06,710 --> 00:03:03,599
yeah i think suits is an awesome program

72
00:03:09,350 --> 00:03:06,720
and asks teams to create some kind of

73
00:03:11,830 --> 00:03:09,360
user interface it can be virtual reality

74
00:03:12,550 --> 00:03:11,840
or it can be augmented reality

75
00:03:14,470 --> 00:03:12,560
but

76
00:03:17,030 --> 00:03:14,480
the goal is to

77
00:03:18,790 --> 00:03:17,040
basically build a tool that astronauts

78
00:03:19,990 --> 00:03:18,800
can use when they're doing space

79
00:03:22,309 --> 00:03:20,000
operations

80
00:03:24,789 --> 00:03:22,319
students come up with ideas that run the

81
00:03:27,350 --> 00:03:24,799
gamut of eva activity

82
00:03:29,830 --> 00:03:27,360
such as operating complex equipment

83
00:03:32,710 --> 00:03:29,840
cataloging a lunar sample

84
00:03:34,949 --> 00:03:32,720
or navigating to a remote location

85
00:03:37,350 --> 00:03:34,959
our main goal was to build a

86
00:03:40,149 --> 00:03:37,360
minimalistic and uh unobtrusive

87
00:03:42,630 --> 00:03:40,159
interface that's easy to use so we made

88
00:03:44,789 --> 00:03:42,640

sure to develop exclusively natural

89
00:03:47,990 --> 00:03:44,799
inputs like hand gestures and voice

90
00:03:51,509 --> 00:03:48,000
command to control the eva system

91
00:03:53,910 --> 00:03:51,519
nasa mentors and academia sponsors help

92
00:03:56,070 --> 00:03:53,920
the students achieve their goals it was

93
00:03:57,830 --> 00:03:56,080
extremely constructive altogether i

94
00:03:59,509 --> 00:03:57,840
would like to say that we riled each

95
00:04:01,750 --> 00:03:59,519
other up

96
00:04:04,070 --> 00:04:01,760
positively in the sense that we were

97
00:04:05,910 --> 00:04:04,080
able to achieve greater things because

98
00:04:08,229 --> 00:04:05,920
at every meeting we would say hey what

99
00:04:10,309 --> 00:04:08,239
if we do this hey what if we do that hey

100
00:04:12,550 --> 00:04:10,319
wouldn't it be awesome math so overall

101
00:04:14,390 --> 00:04:12,560
we were positively reinforcing each

102
00:04:16,550 --> 00:04:14,400
other's interests

103
00:04:19,030 --> 00:04:16,560
nasa engineers evaluate the students

104
00:04:21,030 --> 00:04:19,040
work by trying out their ideas in a

105
00:04:23,909 --> 00:04:21,040
simulated space walk

106
00:04:26,710 --> 00:04:23,919
so that they and the students see what

107
00:04:29,670 --> 00:04:26,720
works and what needs tweaking it's a

108
00:04:31,749 --> 00:04:29,680
unique educational experience

109
00:04:34,469 --> 00:04:31,759
even though we had some technical issues

110
00:04:36,629 --> 00:04:34,479
while testing it was very surreal to see

111
00:04:37,909 --> 00:04:36,639
our tool being tested at johnson space

112
00:04:39,590 --> 00:04:37,919
center

113
00:04:42,150 --> 00:04:39,600

my favorite part about working with the

114
00:04:44,469 --> 00:04:42,160
team is that everyone was very excited

115
00:04:46,150 --> 00:04:44,479
to learn and also share what they know

116
00:04:48,230 --> 00:04:46,160
we all come from different majors and

117
00:04:50,070 --> 00:04:48,240
different backgrounds so by the end of

118
00:04:52,710 --> 00:04:50,080
the cycle everyone knew a little bit

119
00:04:54,070 --> 00:04:52,720
about rocks about programming or got out

120
00:04:57,030 --> 00:04:54,080
of their comfort zone five percent of

121
00:04:59,030 --> 00:04:57,040
the art project it also helps with

122
00:05:00,469 --> 00:04:59,040
interpersonal skills learning how to

123
00:05:02,469 --> 00:05:00,479
work within a team

124
00:05:03,990 --> 00:05:02,479
improving my technical communication you

125
00:05:06,710 --> 00:05:04,000
know i can talk about systems and

126
00:05:08,629 --> 00:05:06,720
software or you know helping me be more

127
00:05:10,790 --> 00:05:08,639
confident in liabilities

128
00:05:13,029 --> 00:05:10,800
it's great to see them grow it's great

129
00:05:14,870 --> 00:05:13,039
to see them collaborating with each

130
00:05:16,950 --> 00:05:14,880
other collaborating with subject matter

131
00:05:19,270 --> 00:05:16,960
experts to make their designs more

132
00:05:21,909 --> 00:05:19,280
effective or more efficient

133
00:05:23,029 --> 00:05:21,919
the research gathered in suits benefits

134
00:05:25,110 --> 00:05:23,039
nasa too

135
00:05:27,350 --> 00:05:25,120
as it develops its own designs for

136
00:05:30,310 --> 00:05:27,360
possible graphic displays

137
00:05:31,110 --> 00:05:30,320
it's future forward work that is needed

138
00:05:33,110 --> 00:05:31,120

now

139
00:05:36,629 --> 00:05:33,120
when i entered the field of augmented

140
00:05:39,590 --> 00:05:36,639
reality for eva displays

141
00:05:40,790 --> 00:05:39,600
there was about one paper that i could

142
00:05:42,070 --> 00:05:40,800
reference

143
00:05:44,550 --> 00:05:42,080
what suits

144
00:05:46,310 --> 00:05:44,560
provides to the engineers at nasa is

145
00:05:48,950 --> 00:05:46,320
really the ability

146
00:05:51,270 --> 00:05:48,960
to explore many different designs to

147
00:05:54,710 --> 00:05:51,280
explore many different concepts and

148
00:05:56,550 --> 00:05:54,720
really have a think tank if you will for

149
00:05:57,830 --> 00:05:56,560
what the future of these displays really

150
00:06:01,430 --> 00:05:57,840
look like

151
00:06:03,990 --> 00:06:01,440
all the hard work testing and learning

152
00:06:07,270 --> 00:06:04,000
points to a brighter future using this

153
00:06:09,430 --> 00:06:07,280
technology it's an amalgamation of

154
00:06:10,550 --> 00:06:09,440
doing something that i love

155
00:06:13,670 --> 00:06:10,560
and also

156
00:06:15,510 --> 00:06:13,680
seeing the value that would come off of

157
00:06:16,950 --> 00:06:15,520
it in the long run and i think that's

158
00:06:19,110 --> 00:06:16,960
the same for

159
00:06:21,830 --> 00:06:19,120
most of my peers as well who worked in

160
00:06:25,270 --> 00:06:21,840
this present you could see some real

161
00:06:27,189 --> 00:06:25,280
genuine passion and working on this and

162
00:06:29,749 --> 00:06:27,199
everything shows that we really want

163
00:06:32,309 --> 00:06:29,759

this to work we really want tech and

164
00:06:34,790 --> 00:06:32,319
space exploration to be the next big

165
00:06:36,710 --> 00:06:34,800
thing and and that was super satisfying

166
00:06:37,510 --> 00:06:36,720
and fulfilling to me and to the team as

167
00:06:39,110 --> 00:06:37,520
well

168
00:06:41,189 --> 00:06:39,120
building this software for these

169
00:06:42,469 --> 00:06:41,199
displays is like giving the crew members

170
00:06:44,070 --> 00:06:42,479
superpowers

171
00:06:46,469 --> 00:06:44,080
and that's something that i love about

172
00:06:48,469 --> 00:06:46,479
it but also getting to engage with

173
00:06:50,950 --> 00:06:48,479
academia and

174
00:06:54,550 --> 00:06:50,960
the talent that we have

175
00:06:56,550 --> 00:06:54,560
in academia and in universities that's

176
00:06:59,110 --> 00:06:56,560
what we need to see

177
00:07:01,430 --> 00:06:59,120
and the creativity that comes from it to

178
00:07:01,850 --> 00:07:01,440
make these tools the best that they can

179
00:07:03,589 --> 00:07:01,860
be

180
00:07:05,749 --> 00:07:03,599
[Music]

181
00:07:07,189 --> 00:07:05,759
with nasa suits we want to see your

182
00:07:11,510 --> 00:07:07,199
vision

183
00:07:12,790 --> 00:07:11,520
with massachusetts we want to see your

184
00:07:17,749 --> 00:07:12,800
vision

185
00:07:19,930 --> 00:07:17,759
this is nasa suits and we want to see

186
00:07:23,909 --> 00:07:19,940
your vision

187
00:07:25,230 --> 00:07:23,919
[Music]

188
00:07:26,870 --> 00:07:25,240

visit

189
00:07:29,029 --> 00:07:26,880
stem.nasa.gov

190
00:07:30,790 --> 00:07:29,039
artemis and see how you can join one of

191
00:07:34,940 --> 00:07:30,800
nasa's mission related student