1
00:00:52,610 --> 00:00:51,380
yepper to learn more about the Earth's

2
00:00:59,450 --> 00:00:52,620
atmosphere

3
00:01:01,279 --> 00:00:59,460
nASA has launched scientists are now

4
00:01:03,920 --> 00:01:01,289
looking at a new generation of

5
00:01:07,370 --> 00:01:03,930
inexpensive aircraft made specifically

6
00:01:10,100 --> 00:01:07,380
for high-altitude studies called Perseus

7
00:01:11,899 --> 00:01:10,110
it is shown here in a hangar at NASA's

8
00:01:26,840 --> 00:01:11,909
Dryden Flight Research Center in

9
00:01:30,889 --> 00:01:26,850
California this remote-controlled blind

10
00:01:33,410 --> 00:01:30,899
as I understand the song it's thin wispy

11
00:01:35,809 --> 00:01:33,420
hangs and large 15-foot bomber made of

12
00:01:39,109 --> 00:01:35,819
strong ultralight composite materials

13
00:01:41,270 --> 00:01:39,119

the plane carries bottled oxygen to help

14
00:01:44,510 --> 00:01:41,280
fuel its gas-powered engine

15
00:01:47,240 --> 00:01:44,520
the upper reaches of the atmosphere it

16
00:01:50,120 --> 00:01:47,250
has the ability to fly twice as high as

17
00:01:52,250 --> 00:01:50,130
a commercial jetliner conceived by

18
00:01:53,000 --> 00:01:52,260
Aurora flight sciences in Manassas

19
00:01:55,940 --> 00:01:53,010
Virginia

20
00:01:58,670 --> 00:01:55,950
Perseus can carry 110 pounds of science

21
00:02:01,280 --> 00:01:58,680
payload NASA hopes to eventually

22
00:02:03,200 --> 00:02:01,290
commission a fleet of inexpensive global

23
00:02:06,350 --> 00:02:03,210
Watchers that can be launched anywhere

24
00:02:08,480 --> 00:02:06,360
in the world I think the excitement is

25
00:02:10,310 --> 00:02:08,490
that you're actually building a vehicle

26
00:02:13,430 --> 00:02:10,320
that's never been done before

27
00:02:15,590 --> 00:02:13,440
Jenny Bayer Reed hardheads a program to

28
00:02:18,620 --> 00:02:15,600
expand NASA's development and use of

29
00:02:21,260 --> 00:02:18,630
remotely piloted balloons the science

30
00:02:24,110 --> 00:02:21,270
community per se is is a quote war

31
00:02:26,840 --> 00:02:24,120
community so with these vehicles you

32
00:02:28,490 --> 00:02:26,850
have a little more cost-effective way of

33
00:02:30,920 --> 00:02:28,500
getting that type of data and

34
00:02:32,840 --> 00:02:30,930
information and then if it looks like

35
00:02:35,750 --> 00:02:32,850
you need more information to where you

36
00:02:37,970 --> 00:02:35,760
need a a higher payload manned vehicle

37
00:02:41,840 --> 00:02:37,980
capability you can then spend that money

38
00:02:45,110 --> 00:02:41,850

to bring that extra source in Perseus

39
00:02:47,350 --> 00:02:45,120
NASA's newest global watcher the first

40
00:02:49,210 --> 00:02:47,360
and the family of low cost airplanes

41
00:03:17,259 --> 00:02:49,220
designed to further

42
00:03:32,500 --> 00:03:20,000
in its effort to learn more about the

43
00:03:36,360 --> 00:03:33,990
scientist

44
00:03:37,920 --> 00:03:36,370
the new generation of inexpensive a

45
00:03:42,120 --> 00:03:37,930
draft made specifically for

46
00:03:44,190 --> 00:03:42,130
high-altitude studies called Perseus it

47
00:03:45,990 --> 00:03:44,200
is shown here in a hangar at NASA's

48
00:03:48,410 --> 00:03:46,000
Dryden Flight Research Center in

49
00:03:53,540 --> 00:03:50,390
this remote-controlled slider has a

50
00:03:56,510 --> 00:03:53,550
deceptively simple design it's thin

51
00:03:58,970 --> 00:03:56,520
wispy wears a Raj 15 foot proper made of

52
00:04:02,030 --> 00:03:58,980
strong electrolyte composite materials

53
00:04:04,220 --> 00:04:02,040
the plane carries marveled oxygen to

54
00:04:05,870 --> 00:04:04,230
help fuel its gas-powered engine when

55
00:04:08,960 --> 00:04:05,880
climbing into the upper reaches of the

56
00:04:12,040 --> 00:04:08,970
atmosphere it has the ability to fly

57
00:04:15,050 --> 00:04:12,050
twice as high as a commercial jetliner

58
00:04:17,300 --> 00:04:15,060
conceived by Aurora flight sciences in

59
00:04:21,110 --> 00:04:17,310
Manassas Virginia first years can carry

60
00:04:23,090 --> 00:04:21,120
110 pounds of science payloads NASA

61
00:04:25,370 --> 00:04:23,100
hopes to eventually commissioned a fleet

62
00:04:27,379 --> 00:04:25,380
of inexpensive global Watchers that can

63
00:04:29,330 --> 00:04:27,389

be launched anywhere in the world I

64
00:04:31,490 --> 00:04:29,340
think the excitement is that you're

65
00:04:32,690 --> 00:04:31,500
actually building a vehicle that's never

66
00:04:35,629 --> 00:04:32,700
been done before

67
00:04:38,060 --> 00:04:35,639
Jeni Bayer Reid hardheads a program to

68
00:04:40,610 --> 00:04:38,070
expand NASA's development and use of

69
00:04:43,250 --> 00:04:40,620
remotely piloted vehicles the science

70
00:04:46,040 --> 00:04:43,260
community per se is is a quote war

71
00:04:48,770 --> 00:04:46,050
community so with these vehicles you

72
00:04:50,420 --> 00:04:48,780
have a little more cost-effective way of

73
00:04:52,850 --> 00:04:50,430
getting that type of data and

74
00:04:54,770 --> 00:04:52,860
information and then if it looks like

75
00:04:57,680 --> 00:04:54,780
you need more information to where you

76
00:04:59,900 --> 00:04:57,690
need a a higher payload manned vehicle

77
00:05:03,440 --> 00:04:59,910
capability you can then spend that money

78
00:05:05,990 --> 00:05:03,450
to bring that extra source in according

79
00:05:08,360 --> 00:05:06,000
to a roar a project manager Tom Clancy

80
00:05:10,370 --> 00:05:08,370
there are advantages to keeping the

81
00:05:12,740 --> 00:05:10,380
pilot on the ground while an on-board

82
00:05:15,170 --> 00:05:12,750
computer interprets commands and adjusts

83
00:05:17,930 --> 00:05:15,180
flight controls when you leave the pilot

84
00:05:20,240 --> 00:05:17,940
on the ground a lot of hardware as well

85
00:05:22,940 --> 00:05:20,250
as the mass of the pilot doesn't have to

86
00:05:25,460 --> 00:05:22,950
be carried up to the particular position

87
00:05:28,040 --> 00:05:25,470
word that you're targeting perseus like

88
00:05:30,230 --> 00:05:28,050

a craft may enhance important studies of

89
00:05:32,000 --> 00:05:30,240
Earth's protective ozone shield over the

90
00:05:35,240 --> 00:05:32,010
North and South Poles

91
00:05:37,310 --> 00:05:35,250
both very hostile environments it turns

92
00:05:39,440 --> 00:05:37,320
out to be an extremely dangerous mission

93
00:05:41,360 --> 00:05:39,450
for a man vehicle because of the cold

94
00:05:43,880 --> 00:05:41,370
temperatures that you have below you and

95
00:05:46,280 --> 00:05:43,890
the inability to glide home from

96
00:05:49,130 --> 00:05:46,290
Antarctica in an engine out type of

97
00:05:51,200 --> 00:05:49,140
situation remotely controlled vehicles

98
00:05:53,900 --> 00:05:51,210
are under far less constraints than when

99
00:05:56,210 --> 00:05:53,910
a pilot is in the cockpit this allows

100
00:05:58,280 --> 00:05:56,220
the team to take some calculated risks

101
00:06:01,280 --> 00:05:58,290
and reduce development time

102
00:06:03,770 --> 00:06:01,290
Aurora's computer designer Martin Gomez

103
00:06:05,240 --> 00:06:03,780
I made a change to the software this

104
00:06:07,430 --> 00:06:05,250
morning which we're going to try to fly

105
00:06:09,380 --> 00:06:07,440
tomorrow morning if this were a manned

106
00:06:11,000 --> 00:06:09,390
airplane that would have paused our

107
00:06:13,610 --> 00:06:11,010
flight operations for weeks if not

108
00:06:16,070 --> 00:06:13,620
months adjustments are also being made

109
00:06:18,380 --> 00:06:16,080
on a toll release mechanism that will

110
00:06:19,640 --> 00:06:18,390
resolve handling during takeoff minor

111
00:06:21,530 --> 00:06:19,650
changes such as the one that's being

112
00:06:23,030 --> 00:06:21,540
done right now on the airplane can be

113
00:06:25,910 --> 00:06:23,040

done in a matter of hours because

114
00:06:27,860 --> 00:06:25,920
there's nobody's life at risk much of

115
00:06:29,750 --> 00:06:27,870
the design work that made Percy as

116
00:06:32,060 --> 00:06:29,760
possible grew out of a human powered

117
00:06:36,740 --> 00:06:32,070
flight project at MIT called

118
00:06:40,160 --> 00:06:36,750
Netherlands in 1988 this 69 pound craft

119
00:06:43,130 --> 00:06:40,170
flew a distance of 72 miles between the

120
00:06:45,710 --> 00:06:43,140
Greek islands of Crete and santorini the

121
00:06:47,770 --> 00:06:45,720
ultralight long flexible wings were able

122
00:06:50,920 --> 00:06:47,780
to keep the plane aloft at low speeds

123
00:06:53,630 --> 00:06:50,930
breaking new ground in aerodynamics

124
00:06:56,540 --> 00:06:53,640
building on their success several

125
00:07:00,050 --> 00:06:56,550
members of the MIT team branched out to

126
00:07:01,820 --> 00:07:00,060
form Aurora in creating Perseus they

127
00:07:03,370 --> 00:07:01,830
borrowed from the shape and design of

128
00:07:06,650 --> 00:07:03,380
the Daedalus wings

129
00:07:08,060 --> 00:07:06,660
Greg Zack was one of five cyclists

130
00:07:11,030 --> 00:07:08,070
pilots on the death

131
00:07:13,040 --> 00:07:11,040
project capitalizing on his skill in

132
00:07:15,860 --> 00:07:13,050
flying gliders and remotely controlled

133
00:07:20,060 --> 00:07:15,870
model airplanes zach has gone on to

134
00:07:24,170 --> 00:07:20,070
pilot Perseus okay ground equipment and

135
00:07:26,210 --> 00:07:24,180
payout the towline Aurora uses an open

136
00:07:29,410 --> 00:07:26,220
stretch of dry desert lake bed for

137
00:07:43,340 --> 00:07:33,010
I'm in position top okay go ahead and

138
00:07:48,290 --> 00:07:45,440

when all systems are sent the truck

139
00:08:02,129 --> 00:07:48,300
accelerates gently lived overseas into

140
00:08:08,489 --> 00:08:06,189
at 700 feet the towline is released and

141
00:08:16,959 --> 00:08:08,499
the ground team engages the propeller

142
00:08:20,049 --> 00:08:16,969
Perseus is free during operations Zack

143
00:08:21,939 --> 00:08:20,059
communicates with a blank Stanley who

144
00:08:24,969 --> 00:08:21,949
sits at a duplicate flight professional

145
00:08:27,369 --> 00:08:24,979
announces a ground station Zack must

146
00:08:30,069 --> 00:08:27,379
keep the plane in sight until coughing

147
00:08:32,529 --> 00:08:30,079
laughs okay trypsin airborne Frank

148
00:08:35,819 --> 00:08:32,539
Stanley's can take the Perseus control

149
00:08:38,319 --> 00:08:35,829
if not Martin Gomez and Tom plant

150
00:08:41,019 --> 00:08:38,329
sterols engineering of the plane and

151
00:08:53,970 --> 00:08:41,029
keep communication ties with the NASA

152
00:08:59,170 --> 00:08:58,059
the elements that these scientists are

153
00:09:01,360 --> 00:08:59,180
looking for particularly in

154
00:09:03,189 --> 00:09:01,370
stratospheric chemistry work are really

155
00:09:05,079 --> 00:09:03,199
very volatile and if they come in

156
00:09:09,069 --> 00:09:05,089
contact with the airplane they no longer

157
00:09:10,780 --> 00:09:09,079
exist and so both the slow speed and the

158
00:09:15,549 --> 00:09:10,790
ability for the payload to me in the

159
00:09:17,740 --> 00:09:15,559
nose is very important scientists argue

160
00:09:20,350 --> 00:09:17,750
that to positively determine the effects

161
00:09:23,499 --> 00:09:20,360
of ozone depletion by man-made chemicals

162
00:09:26,319 --> 00:09:23,509
or aircraft exhaust instruments need to

163
00:09:28,780 --> 00:09:26,329

fly slowly through specific areas of the

164
00:09:31,179 --> 00:09:28,790
upper atmosphere what we're trying to do

165
00:09:33,610 --> 00:09:31,189
is give the atmospheric scientists the

166
00:09:36,759 --> 00:09:33,620
ability to deliver his instrument to a

167
00:09:39,249 --> 00:09:36,769
place in space as often as possible as

168
00:09:41,439 --> 00:09:39,259
cheaply as possible this year Perseus

169
00:09:43,389 --> 00:09:41,449
will attempt to fly higher than any

170
00:09:44,639 --> 00:09:43,399
propeller driven remotely controlled

171
00:09:47,639 --> 00:09:44,649
aircraft

172
00:09:48,900 --> 00:09:47,649
a tremendous technical leap for the fact

173
00:09:50,369 --> 00:09:48,910
that we're making an airplane which is

174
00:09:52,470 --> 00:09:50,379
not designed to blow up people halfway

175
00:09:54,150 --> 00:09:52,480
around the world is rather comforting

176
00:09:56,309 --> 00:09:54,160
the end result of this air pool will be

177
00:09:59,609 --> 00:09:56,319
a better understanding of the Earth's

178
00:10:01,249 --> 00:09:59,619
atmosphere and I get a certain pleasure

179
00:10:05,189 --> 00:10:01,259
out of that I'm sure most of us do

180
00:10:07,730 --> 00:10:05,199
perseus NASA's newest global watcher the

181
00:10:10,919 --> 00:10:07,740
first and a family of low-cost airplanes