



HIGH ABOVE  
DOWN UNDER  
EPISODE 1

# A STAR FIT FOR LIFE



1  
00:00:05,930 --> 00:00:04,430  
over the last two decades scientists

2  
00:00:07,670 --> 00:00:05,940  
have found thousands of planets

3  
00:00:09,710 --> 00:00:07,680  
elsewhere in the universe these are

4  
00:00:11,509 --> 00:00:09,720  
called exoplanets as we get better and

5  
00:00:13,249 --> 00:00:11,519  
better at finding them we need ways to

6  
00:00:14,509 --> 00:00:13,259  
narrow down the ones most likely to

7  
00:00:16,730 --> 00:00:14,519  
support life

8  
00:00:18,650 --> 00:00:16,740  
two NASA rocket teams are working to do

9  
00:00:21,170 --> 00:00:18,660  
just that from Australia

10  
00:00:22,490 --> 00:00:21,180  
their mission study a special pair of

11  
00:00:24,890 --> 00:00:22,500  
stars best seen in the Southern

12  
00:00:27,589 --> 00:00:24,900  
Hemisphere and Propel Humanity's search

13  
00:00:29,570 --> 00:00:27,599

for habitable worlds into the future I'm

14

00:00:31,310 --> 00:00:29,580

miles Hadfield and I'm following these

15

00:00:33,410 --> 00:00:31,320

rocket teams to Australia to show you

16

00:00:34,610 --> 00:00:33,420

what it takes to launch a rocket and

17

00:00:37,250 --> 00:00:34,620

make groundbreaking scientific

18

00:00:39,420 --> 00:00:37,260

measurements hang on tight we're going

19

00:00:45,069 --> 00:00:39,430

on an adventure High Above Down Under

20

00:00:45,079 --> 00:00:50,209

Earth is packed with life

21

00:00:54,350 --> 00:00:52,010

some environments are more habitable

22

00:00:56,869 --> 00:00:54,360

than others so what makes an environment

23

00:01:00,770 --> 00:00:56,879

or a planet a good place for life to

24

00:01:03,650 --> 00:01:00,780

thrive well one thing is

25

00:01:05,210 --> 00:01:03,660

water and in fact that's what the search

26

00:01:07,550 --> 00:01:05,220

for life elsewhere in the universe is

27

00:01:09,950 --> 00:01:07,560

focused on so far finding planets where

28

00:01:11,990 --> 00:01:09,960

water can exist in liquid form there's a

29

00:01:14,390 --> 00:01:12,000

region around every Star that scientists

30

00:01:16,190 --> 00:01:14,400

call the Goldilocks zone a planet in

31

00:01:19,130 --> 00:01:16,200

this Zone has the right temperature for

32

00:01:21,590 --> 00:01:19,140

water to remain liquid too close and the

33

00:01:24,350 --> 00:01:21,600

water will evaporate away too far and

34

00:01:27,410 --> 00:01:24,360

it'll freeze the distance has to be just

35

00:01:29,510 --> 00:01:27,420

right this Zone has been the basis for

36

00:01:31,490 --> 00:01:29,520

the search for habitable worlds but just

37

00:01:33,469 --> 00:01:31,500

because a planet is inside the Goldilocks

38

00:01:35,870 --> 00:01:33,479

zone doesn't mean it can sustain life

39

00:01:38,450 --> 00:01:35,880

take for example the closest known

40

00:01:40,490 --> 00:01:38,460

exoplanet to Earth At just 4.2 light

41

00:01:42,649 --> 00:01:40,500

years away it's located in the

42

00:01:44,569 --> 00:01:42,659

Goldilocks zone but scientists think the

43

00:01:46,310 --> 00:01:44,579

star's frequent eruptions might have

44

00:01:48,469 --> 00:01:46,320

blown away any atmosphere the planet

45

00:01:50,810 --> 00:01:48,479

might have had in other words the

46

00:01:52,789 --> 00:01:50,820

Goldilocks zone is just a first guess to

47

00:01:54,649 --> 00:01:52,799

truly tell whether an exoplanet is

48

00:01:57,410 --> 00:01:54,659

habitable we need to look at the star

49

00:01:59,810 --> 00:01:57,420

it's orbiting unfortunately we can't

50

00:02:01,789 --> 00:01:59,820

just observe a planet and understand it

51  
00:02:03,649 --> 00:02:01,799  
at face value we have to understand it

52  
00:02:07,010 --> 00:02:03,659  
in the context of what its parent star

53  
00:02:08,809 --> 00:02:07,020  
is giving it so scientists have been

54  
00:02:10,790 --> 00:02:08,819  
collecting data from different types of

55  
00:02:12,470 --> 00:02:10,800  
stars to learn how they affect their

56  
00:02:15,190 --> 00:02:12,480  
planets we would like to be able to

57  
00:02:18,110 --> 00:02:15,200  
create a menu of star planet

58  
00:02:22,130 --> 00:02:18,120  
possibilities that our future missions

59  
00:02:25,250 --> 00:02:22,140  
can draw from and prioritize the most

60  
00:02:27,350 --> 00:02:25,260  
promising places to find habitable

61  
00:02:29,750 --> 00:02:27,360  
environments the next item to be added

62  
00:02:32,089 --> 00:02:29,760  
to the menu yellow stars we're looking

63  
00:02:35,449 --> 00:02:32,099

for something around 5 billion years old

64

00:02:37,670 --> 00:02:35,459

an average sized wait a second don't we

65

00:02:40,790 --> 00:02:37,680

have one right here so why not use the

66

00:02:43,809 --> 00:02:40,800

sun we've thought that our sun is the

67

00:02:46,729 --> 00:02:43,819

prototype for kind of 5 billion year old

68

00:02:49,009 --> 00:02:46,739

average yellow stars what we've learned

69

00:02:51,949 --> 00:02:49,019

recently is that our sun is actually

70

00:02:54,890 --> 00:02:51,959

quite inactive for a 5 billion year old

71

00:02:56,750 --> 00:02:54,900

yellow star typical Earthling Behavior

72

00:02:58,970 --> 00:02:56,760

really thinking we're the example for

73

00:03:01,130 --> 00:02:58,980

the entire universe but it turns out

74

00:03:03,110 --> 00:03:01,140

yellow stars are found throughout our

75

00:03:05,150 --> 00:03:03,120

galaxy and they tend to erupt with

76

00:03:07,550 --> 00:03:05,160

life-altering activity more often than

77

00:03:09,650 --> 00:03:07,560

our sun does so if we want to understand

78

00:03:11,570 --> 00:03:09,660

if they can still support life we'll

79

00:03:13,790 --> 00:03:11,580

need more data than our son can give us

80

00:03:16,670 --> 00:03:13,800

that's why two rocket teams are looking

81

00:03:18,949 --> 00:03:16,680

to Alpha Centauri A and B the reason why

82

00:03:22,009 --> 00:03:18,959

we're targeting Alpha Centauri is that

83

00:03:24,229 --> 00:03:22,019

it's our nearest solar twin so in many

84

00:03:26,509 --> 00:03:24,239

many ways it's just like the sun it has

85

00:03:28,369 --> 00:03:26,519

almost the same mass it's a very similar

86

00:03:30,589 --> 00:03:28,379

age and it's nearby which is always

87

00:03:32,270 --> 00:03:30,599

great and with the help of NASA sounding

88

00:03:33,710 --> 00:03:32,280

Rockets they'll capture light from those

89

00:03:35,869 --> 00:03:33,720

stars that doesn't make it to the ground

90

00:03:37,490 --> 00:03:35,879

this range of Highly energetic

91

00:03:40,009 --> 00:03:37,500

ultraviolet light has never been

92

00:03:42,110 --> 00:03:40,019

measured before for these Stars even

93

00:03:44,089 --> 00:03:42,120

small differences in this UV light from

94

00:03:47,210 --> 00:03:44,099

a star can determine whether a nearby

95

00:03:49,250 --> 00:03:47,220

planet can support life or not but the

96

00:03:51,890 --> 00:03:49,260

Alpha Centauri system isn't visible from

97

00:03:53,930 --> 00:03:51,900

most places in the U.S it's best studied

98

00:03:55,670 --> 00:03:53,940

from the southern hemisphere

99

00:03:57,470 --> 00:03:55,680

that's why we're here in Northern

100

00:03:59,030 --> 00:03:57,480

Australia in the traditional homelands

101  
00:04:00,710 --> 00:03:59,040  
of the yongyu people they've been

102  
00:04:02,990 --> 00:04:00,720  
observing the Stars here for tens of

103  
00:04:05,449 --> 00:04:03,000  
thousands of years I'm here with two

104  
00:04:07,910 --> 00:04:05,459  
rocket science teams Sistine and deuce

105  
00:04:11,149 --> 00:04:07,920  
and a crew of about 50 NASA Engineers

106  
00:04:12,649 --> 00:04:11,159  
rocket Specialists and support staff in

107  
00:04:14,449 --> 00:04:12,659  
partnership with equatorial launch

108  
00:04:16,909 --> 00:04:14,459  
Australia and the gumach corporation

109  
00:04:18,710 --> 00:04:16,919  
they have created an entire rocket range

110  
00:04:20,870 --> 00:04:18,720  
from scratch to help the scientists

111  
00:04:22,730 --> 00:04:20,880  
achieve their goals in this series

112  
00:04:24,530 --> 00:04:22,740  
you're going to meet these teams and

113  
00:04:26,570 --> 00:04:24,540

follow their Quest high above the

114

00:04:28,310 --> 00:04:26,580

Australian Outback to see what it takes

115

00:04:30,530 --> 00:04:28,320

to make these first ever measurements

116

00:04:32,090 --> 00:04:30,540

from our closest Stellar neighbors we

117

00:04:33,770 --> 00:04:32,100

are going behind the scenes to learn

118

00:04:35,810 --> 00:04:33,780

more about the science of habitability

119

00:04:37,909 --> 00:04:35,820

and what goes into launching a rocket

120

00:04:40,310 --> 00:04:37,919

dodging venomous snakes and crocodiles

121

00:04:42,170 --> 00:04:40,320

along the way but first we'll take a

122

00:04:43,969 --> 00:04:42,180

look at how this brand new rocket range

123

00:04:45,890 --> 00:04:43,979

came to life with the help of the