
ROMAN
NASA
SIMULATED
ULTRA-DEEP FIELD

1
00:00:08,710 --> 00:00:06,789
in 2004 nasa's hubble space telescope

2
00:00:10,709 --> 00:00:08,720
changed astronomy forever when

3
00:00:13,110 --> 00:00:10,719
astronomers revealed the first

4
00:00:15,910 --> 00:00:13,120
ultra-deep field image

5
00:00:18,390 --> 00:00:15,920
created with more than 270 hours of

6
00:00:21,029 --> 00:00:18,400
observation over the course of a year it

7
00:00:22,870 --> 00:00:21,039
is our farthest ever visible light image

8
00:00:25,109 --> 00:00:22,880
of the universe

9
00:00:27,429 --> 00:00:25,119
this tiny window revealed thousands of

10
00:00:29,509 --> 00:00:27,439
galaxies in a seemingly empty patch of

11
00:00:31,589 --> 00:00:29,519
sky

12
00:00:33,750 --> 00:00:31,599
we can't see any farther in visible

13
00:00:35,830 --> 00:00:33,760

light because the unrelenting expansion

14
00:00:38,869 --> 00:00:35,840
of space has stretched galaxy's

15
00:00:40,709 --> 00:00:38,879
ultraviolet glow into red light

16
00:00:43,990 --> 00:00:40,719
more distant galaxies are mostly

17
00:00:46,950 --> 00:00:44,000
detectable in infrared

18
00:00:49,430 --> 00:00:46,960
that's why in 2009 hubble captured an

19
00:00:52,950 --> 00:00:49,440
infrared ultra deep field image that

20
00:00:55,029 --> 00:00:52,960
probed even deeper into the same spot

21
00:00:57,990 --> 00:00:55,039
it remains one of the most distant

22
00:01:00,150 --> 00:00:58,000
images ever made and a key source of

23
00:01:02,050 --> 00:01:00,160
information about some of the universe's

24
00:01:03,830 --> 00:01:02,060
early history

25
00:01:06,070 --> 00:01:03,840
[Music]

26
00:01:07,990 --> 00:01:06,080
the nancy grace roman space telescope

27
00:01:10,789 --> 00:01:08,000
will have infrared resolution and

28
00:01:13,670 --> 00:01:10,799
capabilities similar to hubble but each

29
00:01:14,950 --> 00:01:13,680
image will cover 200 times the area of

30
00:01:17,270 --> 00:01:14,960
sky

31
00:01:19,830 --> 00:01:17,280
a potential roman ultra deep field could

32
00:01:21,910 --> 00:01:19,840
be far faster to capture yet cover

33
00:01:24,230 --> 00:01:21,920
hundreds of times as much of the early

34
00:01:26,789 --> 00:01:24,240
universe

35
00:01:29,350 --> 00:01:26,799
to further explore this potential a team

36
00:01:32,230 --> 00:01:29,360
of researchers has created a simulated

37
00:01:34,310 --> 00:01:32,240
ultra-deep field image

38
00:01:36,870 --> 00:01:34,320

the entire image contains about one

39
00:01:37,750 --> 00:01:36,880
square degree of sky or about five full

40
00:01:39,190 --> 00:01:37,760
moons

41
00:01:41,030 --> 00:01:39,200
[Music]

42
00:01:43,109 --> 00:01:41,040
even a single roman field of view

43
00:01:46,230 --> 00:01:43,119
contains a staggering number of distant

44
00:01:50,389 --> 00:01:46,240
galaxies each one filled with billions

45
00:01:54,630 --> 00:01:52,789
this computer-generated image represents

46
00:01:56,789 --> 00:01:54,640
the distribution of galaxies that

47
00:01:59,350 --> 00:01:56,799
researchers expect to find based on the

48
00:02:01,429 --> 00:01:59,360
existing hubble observations

49
00:02:03,749 --> 00:02:01,439
it will help astronomers determine how

50
00:02:05,670 --> 00:02:03,759
best to conduct an actual roman ultra

51
00:02:07,670 --> 00:02:05,680
deep field and anticipate the

52
00:02:10,469 --> 00:02:07,680
measurements and conclusions they might

53
00:02:13,030 --> 00:02:10,479
be able to make

54
00:02:15,510 --> 00:02:13,040
because light travels at a finite speed

55
00:02:17,510 --> 00:02:15,520
distant images are also snapshots

56
00:02:19,910 --> 00:02:17,520
earlier in time

57
00:02:22,550 --> 00:02:19,920
ultra deep field images reveal a time

58
00:02:25,750 --> 00:02:22,560
from about 200 million to 1 billion

59
00:02:27,670 --> 00:02:25,760
years after the big bang

60
00:02:29,910 --> 00:02:27,680
roman's image would be the largest

61
00:02:30,949 --> 00:02:29,920
observation of its kind for this time

62
00:02:32,949 --> 00:02:30,959
period

63
00:02:34,949 --> 00:02:32,959

and could reveal key features in the

64
00:02:37,509 --> 00:02:34,959
adolescent universe

65
00:02:40,150 --> 00:02:37,519
including rare infant galaxies that

66
00:02:41,640 --> 00:02:40,160
eventually evolve into mature galaxies

67
00:02:43,589 --> 00:02:41,650
like our own milky way

68
00:02:46,790 --> 00:02:43,599
[Music]

69
00:02:50,070 --> 00:02:46,800
with roman set to launch by 2027

70
00:02:52,470 --> 00:02:50,080
this simulated ultra deep field image is

71
00:02:54,790 --> 00:02:52,480
just one example of the fantastic