
NASA'S NEXT STEP IN OPTICAL COMMUNICATIONS
LCRD
LASER COMMUNICATIONS RELAY DEMONSTRATION
NASA GSFC - MIT LINCOLN LABORATORY - NASA JPL - USSF STPSAT-6

1
00:00:00,190 --> 00:00:02,280
[Music]

2
00:00:02,280 --> 00:00:04,460
Since 1958,

3
00:00:04,460 --> 00:00:06,520
NASA has relied on radio wave

4
00:00:06,520 --> 00:00:09,580
technology to “talk” with missions in space.

5
00:00:09,580 --> 00:00:11,620
Today, we’re developing a

6
00:00:11,620 --> 00:00:13,650
better way to get spacecraft data

7
00:00:13,650 --> 00:00:15,750
back to Earth.

8
00:00:15,750 --> 00:00:17,790
That’s where the Laser Communications Relay

9
00:00:17,790 --> 00:00:20,940
Demonstration, or LCRD, comes in.

10
00:00:20,940 --> 00:00:23,110
Built and managed by NASA’s

11
00:00:23,110 --> 00:00:25,140
Goddard Space Flight Center,

12
00:00:25,140 --> 00:00:27,320
LCRD will send and receive

13
00:00:27,320 --> 00:00:29,500

near-infrared laser beams to and

14
00:00:29,500 --> 00:00:30,540
from Earth.

15
00:00:30,540 --> 00:00:32,720
As NASA’s first long-duration

16
00:00:32,720 --> 00:00:35,790
test of optical communications technology,

17
00:00:35,790 --> 00:00:39,810
the mission aims to perfect space and ground-based technologies.

18
00:00:39,810 --> 00:00:42,860
So, why lasers?

19
00:00:42,860 --> 00:00:45,030
Laser communications can

20
00:00:45,030 --> 00:00:47,200
transmit up to 100 times more data

21
00:00:47,200 --> 00:00:49,370
per second than previous systems

22
00:00:49,370 --> 00:00:51,410
by using a shorter wavelength of energy.

23
00:00:51,410 --> 00:00:53,450
With this increased bandwidth,

24
00:00:53,450 --> 00:00:55,490
missions can send larger files

25
00:00:55,490 --> 00:00:57,550
and even live high-definition

26
00:00:57,550 --> 00:00:59,650
video from space.

27
00:00:59,650 --> 00:01:01,690
Laser communications systems are

28
00:01:01,690 --> 00:01:04,830
smaller and more efficient than radio wave technology.

29
00:01:04,830 --> 00:01:07,940
They leave more room for science instruments,

30
00:01:07,940 --> 00:01:10,070
are cheaper to launch and require less

31
00:01:10,070 --> 00:01:12,120
energy onboard the spacecraft.

32
00:01:12,120 --> 00:01:14,210
These benefits extend to

33
00:01:14,210 --> 00:01:16,350
to receivers on the ground.

34
00:01:16,350 --> 00:01:18,510
Earth-based laser communications receivers

35
00:01:18,510 --> 00:01:20,670
can be up to 44 times smaller

36
00:01:20,670 --> 00:01:22,860
than current radio antennas.

37
00:01:22,860 --> 00:01:25,030
LCRD is the next step

38
00:01:25,030 --> 00:01:27,210

in making these technologies a reality,

39
00:01:27,210 --> 00:01:29,250
helping NASA to push the boundaries

40
00:01:29,250 --> 00:01:32,440
of scientific discovery and exploration.

41
00:01:32,440 --> 00:01:35,500
Eventually, NASA will integrate this technology