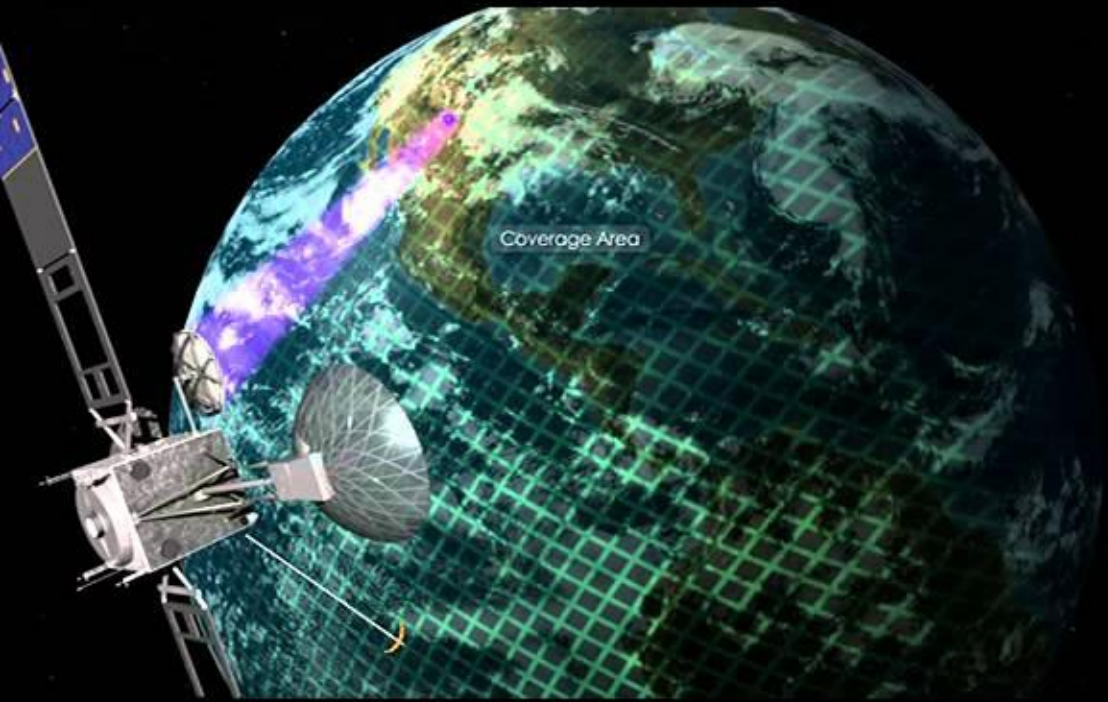
Coverage Area

1
00:00:10,500 --> 00:00:02,080
Music

2
00:00:10,520 --> 00:00:12,670
NASA's constellation of
Tracking

3
00:00:12,690 --> 00:00:14,860
and Data Relay Satellites

4
00:00:14,880 --> 00:00:17,050
TDRS – are the critical link
for

5
00:00:17,070 --> 00:00:19,220
continuous space
communications.

6
00:00:19,240 --> 00:00:21,410
But it wasn't always this way...

7
00:00:21,430 --> 00:00:23,600
Before TDRS, NASA relied

8
00:00:23,620 --> 00:00:25,620
on a web of ground-based
tracking and

9
00:00:25,640 --> 00:00:27,800
communication stations located
around the globe.

10
00:00:27,820 --> 00:00:29,990
These ground stations

11
00:00:30,010 --> 00:00:32,030
used large antennas to receive
early

12
00:00:32,050 --> 00:00:34,200
transmissions from space.

13
00:00:34,220 --> 00:00:36,390
The different orbits of these
spacecraft determined

14
00:00:36,410 --> 00:00:38,430
the locations of ground
stations,

15
00:00:38,450 --> 00:00:40,610
with the majority being
centered around the equator.

16
00:00:40,630 --> 00:00:42,640
Sometimes even ships and planes

17
00:00:42,660 --> 00:00:44,820
that housed antennas were used
to fill in holes of

18
00:00:44,840 --> 00:00:47,000
coverage between spacecraft and

19
00:00:47,020 --> 00:00:49,030
user control centers.

20
00:00:49,050 --> 00:00:51,210
During this period, these
early spacecraft only

21
00:00:51,230 --> 00:00:53,390
had a few moments to transmit
their data

22
00:00:53,410 --> 00:00:55,570
to each station as it traveled
on

23
00:00:55,590 --> 00:00:57,760
on its orbit passing from
horizon to horizon.

24
00:00:57,780 --> 00:00:59,790
In an attempt

25
00:00:59,810 --> 00:01:01,960
to increase visibility with the
ground,

26
00:01:01,980 --> 00:01:04,140
the number of these ground
stations

27
00:01:04,160 --> 00:01:06,320
around the world multiplied.

28
00:01:06,340 --> 00:01:08,360
As time passed these networks
evolved and

29
00:01:08,380 --> 00:01:10,390
merged but they often suffered
from a variety of

30
00:01:10,410 --> 00:01:12,570
challenges such as regional
weather

31
00:01:12,590 --> 00:01:14,600
and political instability.

32
00:01:14,620 --> 00:01:16,780
With the advent of the shuttle
program,

33
00:01:16,800 --> 00:01:18,950

NASA began to see the need for
an improved

34
00:01:18,970 --> 00:01:21,130
solution.

35
00:01:21,150 --> 00:01:23,310
The TDRS project was

36
00:01:23,330 --> 00:01:25,490
established to develop a
constellation of satellites

37
00:01:25,510 --> 00:01:27,680
satellites that would be
designed to route data between
the

38
00:01:27,700 --> 00:01:29,710
user spacecraft and the ground

39
00:01:29,730 --> 00:01:31,880
ground for critical NASA
missions in low-Earth orbit.

40
00:01:31,900 --> 00:01:34,060
The 9 TDRS

41
00:01:34,080 --> 00:01:36,090
spacecraft that have been
deployed since

42
00:01:36,110 --> 00:01:38,280
1983 have transformed the way

43
00:01:38,300 --> 00:01:40,460
NASA communicates.

44
00:01:40,480 --> 00:01:42,490

Each TDRS spacecraft is placed

45
00:01:42,510 --> 00:01:44,680
into geosynchronous orbit,

46
00:01:44,700 --> 00:01:46,850
giving them a fixed line of
sight with

47
00:01:46,870 --> 00:01:49,030
one of the TDRS ground
stations.

48
00:01:49,050 --> 00:01:51,090
Today, TDRS spacecraft

49
00:01:51,110 --> 00:01:53,270
relay data between
Earth-orbiting

50
00:01:53,290 --> 00:01:55,300
satellites and the dedicated
TDRS ground

51
00:01:55,320 --> 00:01:57,480
terminals 24 hours a day

52
00:01:57,500 --> 00:01:59,660
7 days a week.

53
00:01:59,680 --> 00:02:01,820
Three TDRS ground terminals
provide

54
00:02:01,840 --> 00:02:03,850
a constant connection between
the TDRS

55
00:02:03,870 --> 00:02:05,870

constellation and the User

56
00:02:05,890 --> 00:02:07,980
spacecraft's data processing
facilities.

57
00:02:08,000 --> 00:02:10,160
Two of these

58
00:02:10,180 --> 00:02:12,190
stations are located at the
White Sands

59
00:02:12,210 --> 00:02:14,370
Complex in New Mexico and the
third

60
00:02:14,390 --> 00:02:16,560
is located in Guam.

61
00:02:16,580 --> 00:02:18,690
Together, the ground stations
and

62
00:02:18,710 --> 00:02:20,830
the fleet of TDRS spacecraft,
provide

63
00:02:20,850 --> 00:02:22,860
100 percent global

64
00:02:22,880 --> 00:02:24,890
communication coverage,
ensuring

65
00:02:24,910 --> 00:02:27,030
that data from dozens of
Earth-orbiting

66

00:02:27,050 --> 00:02:29,170
missions is delivered on-time,

67
00:02:29,190 --> 00:02:31,340
every-time.

68
00:02:31,360 --> 00:02:33,520
TDRS provides a vital service
to Earth Science

69
00:02:33,540 --> 00:02:35,700
missions studying the evolution
of Earth's

70
00:02:35,720 --> 00:02:37,880
climate and researchers
postulating

71
00:02:37,900 --> 00:02:40,080
about the future of the Earth
system.

72
00:02:40,100 --> 00:02:42,260
These missions are delivering
data

73
00:02:42,280 --> 00:02:44,430
in real time about Earth events

74
00:02:44,450 --> 00:02:46,600
and processes vital to human
civilization.

75
00:02:46,620 --> 00:02:48,800
TDRS communicates

76
00:02:48,820 --> 00:02:50,830
with launch vehicles as they
send missions on

77
00:02:50,850 --> 00:02:53,000
their journeys of discovery.

78
00:02:53,020 --> 00:02:55,170
TDRS tracks their location as
they

79
00:02:55,190 --> 00:02:57,340
leave the pad ensuring that
engineers

80
00:02:57,360 --> 00:02:59,380
on the ground know that the
vehicle is on the right

81
00:02:59,400 --> 00:03:01,400
course and is functioning
properly.

82
00:03:01,420 --> 00:03:03,550
TDRS

83
00:03:03,570 --> 00:03:05,730
provides critical voice and
video

84
00:03:05,750 --> 00:03:07,910
support to NASA's human space
flight endeavors,

85
00:03:07,930 --> 00:03:10,090
including ongoing support

86
00:03:10,110 --> 00:03:12,260
of the International Space
Station and it's

87
00:03:12,280 --> 00:03:14,430
critical resupply vehicles.

88
00:03:14,450 --> 00:03:16,460
TDRS supports space science
missions

89
00:03:16,480 --> 00:03:18,620
that investigate the farthest
reaches of

90
00:03:18,640 --> 00:03:20,790
space, cataloging gamma-ray

91
00:03:20,810 --> 00:03:22,950
bursts, the birth of

92
00:03:22,970 --> 00:03:25,110
galaxies and the early history
of our

93
00:03:25,130 --> 00:03:27,140
universe. Through them

94
00:03:27,160 --> 00:03:29,300
we can learn new information
about the scope

95
00:03:29,320 --> 00:03:31,460
and scale of the cosmos.

96
00:03:31,480 --> 00:03:33,630
Music

97
00:03:33,650 --> 00:03:35,660
NASA is getting ready to
replenish the fleet by

98
00:03:35,680 --> 00:03:37,690
adding the first of three new
spacecraft

99
00:03:37,710 --> 00:03:39,870
to the constellation

100
00:03:39,890 --> 00:03:41,890
TDRS K. TDRS L

101
00:03:41,910 --> 00:03:44,070
and TDRS M will be

102
00:03:44,090 --> 00:03:46,100
launched in the coming years
and join the

103
00:03:46,120 --> 00:03:48,280
constellation ensuring that the

104
00:03:48,300 --> 00:03:50,290
critical lifeline of
space-to-ground

105
00:03:50,310 --> 00:03:52,460
communication support will be
available

106
00:03:52,480 --> 00:03:54,650
for many years to come.

107
00:03:58,840 --> 00:03:56,760
music

108
00:03:58,860 --> 00:04:00,860
beep, beep, beep, beep

109
00:04:00,880 --> 00:04:03,030
music

110
00:04:03,050 --> 00:04:05,220

beep