1
00:01:05,350 --> 00:01:03,349
since its founding in the 1960s

2
00:01:07,670 --> 00:01:05,360
the space electronics division has

3
00:01:09,990 --> 00:01:07,680
established itself as a leader in space

4
00:01:12,550 --> 00:01:10,000
communications and other space

5
00:01:15,590 --> 00:01:12,560
electronics applications

6
00:01:17,590 --> 00:01:15,600
in the early 1970s its development of

7
00:01:20,149 --> 00:01:17,600
high efficiency transmitters for the

8
00:01:22,950 --> 00:01:20,159
communication technology satellite

9
00:01:26,070 --> 00:01:22,960
enabled global transmission of broadcast

10
00:01:28,550 --> 00:01:26,080
signals by creating access to the ku

11
00:01:30,950 --> 00:01:28,560
band a feat for which the division later

12
00:01:34,469 --> 00:01:30,960
received an emmy

13
00:01:37,670 --> 00:01:34,479

in the 1980s the division initiated work

14
00:01:40,310 --> 00:01:37,680
on acts the advanced communications

15
00:01:42,870 --> 00:01:40,320
technology satellite which will enable

16
00:01:45,830 --> 00:01:42,880
innovative communication services and

17
00:01:48,069 --> 00:01:45,840
improved spectral use by opening up the

18
00:01:50,550 --> 00:01:48,079
ka band

19
00:01:52,789 --> 00:01:50,560
today the division continues to perform

20
00:01:55,429 --> 00:01:52,799
award-winning research and development

21
00:01:58,950 --> 00:01:55,439
work in varied areas of space

22
00:02:02,709 --> 00:01:58,960
electronics from communication systems

23
00:02:05,749 --> 00:02:02,719
antenna and rf systems technology to

24
00:02:07,590 --> 00:02:05,759
electron beam solid state and digital

25
00:02:10,469 --> 00:02:07,600
technology

26
00:02:12,630 --> 00:02:10,479
staffed by nearly 100 professionals many

27
00:02:15,190 --> 00:02:12,640
of whom are recognized authorities in

28
00:02:17,510 --> 00:02:15,200
their fields the division performs its

29
00:02:23,030 --> 00:02:17,520
work in partnership with a distinguished

30
00:02:29,190 --> 00:02:25,190
space communications remains an

31
00:02:31,830 --> 00:02:29,200
important research area for the division

32
00:02:34,630 --> 00:02:31,840
the communications systems branch for

33
00:02:37,350 --> 00:02:34,640
instance performs advanced system and

34
00:02:39,750 --> 00:02:37,360
communication architecture studies which

35
00:02:42,390 --> 00:02:39,760
permit the formulation of network design

36
00:02:44,710 --> 00:02:42,400
requirements and traffic models

37
00:02:47,030 --> 00:02:44,720
and the identification of technologies

38
00:02:49,270 --> 00:02:47,040

critical to the deployment of advanced

39
00:02:51,589 --> 00:02:49,280
architectures

40
00:02:55,030 --> 00:02:51,599
division's electron beam technology

41
00:02:57,670 --> 00:02:55,040
branch a world leader in long life

42
00:02:59,670 --> 00:02:57,680
cathode and high efficiency traveling

43
00:03:03,190 --> 00:02:59,680
wave tube research

44
00:03:06,470 --> 00:03:03,200
is developing 32 gigahertz and 60

45
00:03:09,430 --> 00:03:06,480
gigahertz traveling wave tubes for use

46
00:03:11,190 --> 00:03:09,440
in deep space and enter satellite links

47
00:03:13,030 --> 00:03:11,200
respectively

48
00:03:14,710 --> 00:03:13,040
the comparative longevity of these

49
00:03:18,070 --> 00:03:14,720
devices coupled with their high

50
00:03:21,270 --> 00:03:18,080
efficiency extends satellite life while

51
00:03:23,750 --> 00:03:21,280
reducing redundancy requirements

52
00:03:25,830 --> 00:03:23,760
the division's solid state branch is

53
00:03:27,830 --> 00:03:25,840
well known for its testing and

54
00:03:29,350 --> 00:03:27,840
characterization of high temperature

55
00:03:31,990 --> 00:03:29,360
superconductors

56
00:03:34,710 --> 00:03:32,000
such as microwave and millimeter wave

57
00:03:38,149 --> 00:03:34,720
circuits for use in high frequency

58
00:03:42,710 --> 00:03:40,149
high speed circuit design and

59
00:03:44,830 --> 00:03:42,720
development from schematic capture to

60
00:03:47,990 --> 00:03:44,840
printed circuit board layout and

61
00:03:50,229 --> 00:03:48,000
fabrication is the forte of the digital

62
00:03:52,710 --> 00:03:50,239
signal technology branch

63
00:03:54,869 --> 00:03:52,720

an area of major concentration for the

64
00:03:57,990 --> 00:03:54,879
branch is space and ground-based

65
00:03:59,670 --> 00:03:58,000
communications switching technology

66
00:04:02,470 --> 00:03:59,680
specifically the development of

67
00:04:07,190 --> 00:04:02,480
modulation and coding on-board

68
00:04:09,990 --> 00:04:07,200
processing and digital ground terminals

69
00:04:11,750 --> 00:04:10,000
the branch's artificial intelligence lab

70
00:04:14,390 --> 00:04:11,760
is doing pioneering work in the

71
00:04:16,870 --> 00:04:14,400
development of expert systems that

72
00:04:19,349 --> 00:04:16,880
identify and provide solutions to

73
00:04:21,909 --> 00:04:19,359
problems in satellite power and

74
00:04:24,469 --> 00:04:21,919
communications systems

75
00:04:26,950 --> 00:04:24,479
expert systems are also being applied to

76
00:04:29,030 --> 00:04:26,960
operator training and documentation

77
00:04:31,430 --> 00:04:29,040
needs

78
00:04:35,350 --> 00:04:31,440
a principal area of expertise for the

79
00:04:37,830 --> 00:04:35,360
antenna and rf systems technology branch

80
00:04:39,590 --> 00:04:37,840
is the development of phased array

81
00:04:42,230 --> 00:04:39,600
antenna systems

82
00:04:44,710 --> 00:04:42,240
these systems provide significant beam

83
00:04:45,909 --> 00:04:44,720
control advantages over other antenna

84
00:04:48,790 --> 00:04:45,919
systems

85
00:04:51,270 --> 00:04:48,800
the branch's photonics research has led

86
00:04:54,310 --> 00:04:51,280
to the development of optically fed

87
00:04:56,390 --> 00:04:54,320
controlled and processed arrays which

88
00:04:58,550 --> 00:04:56,400

are much smaller and lighter than

89
00:05:00,870 --> 00:04:58,560
conventional arrays

90
00:05:04,070 --> 00:05:00,880
testing of such arrays is conducted in

91
00:05:07,029 --> 00:05:04,080
state-of-the-art near and far field

92
00:05:09,270 --> 00:05:07,039
antenna facilities

93
00:05:11,430 --> 00:05:09,280
the divisions rf activity includes

94
00:05:13,830 --> 00:05:11,440
designing monolithic microwave

95
00:05:17,189 --> 00:05:13,840
integrated circuits such as phase

96
00:05:18,870 --> 00:05:17,199
shifters amplifiers and oscillators the

97
00:05:21,350 --> 00:05:18,880
division is also developing more

98
00:05:23,830 --> 00:05:21,360
appropriate circuit packaging for such

99
00:05:27,909 --> 00:05:23,840
devices and has received a number of

100
00:05:30,310 --> 00:05:27,919
patents for its circuit test fixtures

101
00:05:31,270 --> 00:05:30,320
the divisions communications projects

102
00:05:33,510 --> 00:05:31,280
branch

103
00:05:35,350 --> 00:05:33,520
builds on and augments the

104
00:05:37,749 --> 00:05:35,360
communications related work of the

105
00:05:40,230 --> 00:05:37,759
division's other branches

106
00:05:42,950 --> 00:05:40,240
its noteworthy projects include a

107
00:05:45,670 --> 00:05:42,960
satellite communication test bed and a

108
00:05:48,790 --> 00:05:45,680
link evaluation terminal both of which

109
00:05:50,950 --> 00:05:48,800
have been applied to the axe satellite

110
00:05:53,909 --> 00:05:50,960
among the terminals capabilities are the

111
00:05:56,309 --> 00:05:53,919
demonstration of a high burst rate earth

112
00:05:58,150 --> 00:05:56,319
acts satellite link

113
00:06:01,189 --> 00:05:58,160

the test bed's uses include the

114
00:06:03,590 --> 00:06:01,199
evaluation of link transmission quality

115
00:06:05,749 --> 00:06:03,600
and the modeling of the axe satellites

116
00:06:09,590 --> 00:06:05,759
planned multi-channel

117
00:06:13,029 --> 00:06:09,600
to 20 gigahertz transponder

118
00:06:15,430 --> 00:06:13,039
as the 21st century approaches the space

119
00:06:18,790 --> 00:06:15,440
electronics division's unique research

120
00:06:21,430 --> 00:06:18,800
capabilities and highly qualified staff

121
00:06:24,870 --> 00:06:21,440
ensure that it will continue to be an

122
00:06:27,590 --> 00:06:24,880
innovative force in space electronics

123
00:06:30,150 --> 00:06:27,600
providing leadership and support for the