1
00:00:00,280 --> 00:00:01,400
[Engine sound]

2
00:00:01,400 --> 00:00:02,040
>> Clear to go.

3
00:00:02,046 --> 00:00:02,796
>> You're clear.

4
00:00:03,220 --> 00:00:04,500
[Music]

5
00:00:05,060 --> 00:00:05,980
>> Nozzle swing.

6
00:00:05,980 --> 00:00:06,700
[Jet revving up]

7
00:00:06,700 --> 00:00:07,560
>> Here we go.

8
00:00:07,560 --> 00:00:08,060
>> Smoke

9
00:00:08,060 --> 00:00:08,800
>> CFO.

10
00:00:09,020 --> 00:00:10,480
>> Good ignition.

11
00:00:10,480 --> 00:00:13,920
[Music]

12
00:00:13,920 --> 00:00:15,920
[Jet taking off]

13
00:00:15,920 --> 00:00:16,660

[Sonic boom]

14
00:00:16,660 --> 00:00:21,516
[Radio chatter]

15
00:00:21,516 --> 00:00:23,776
[Music]

16
00:00:23,780 --> 00:00:25,360
[ER-2 taking off]

17
00:00:25,366 --> 00:00:27,826
>> Forty-seven point
nine altitude.

18
00:00:28,296 --> 00:00:29,336
>> Here we go.

19
00:00:29,336 --> 00:00:31,896
3, 2, 1 release.

20
00:00:32,516 --> 00:00:39,476
[Music]

21
00:00:39,480 --> 00:00:45,240
[747 taking off]

22
00:00:45,806 --> 00:00:47,846
>> 2, 1, 0.

23
00:00:47,846 --> 00:00:51,046
[Rocket blasting off]

24
00:00:51,046 --> 00:00:51,976
>> Still got it.

25
00:00:52,166 --> 00:00:52,946
Awesome.

26
00:00:52,946 --> 00:00:55,586
[Truck driving by]

27
00:00:55,840 --> 00:00:57,356
>> Gonna hold level for a minute here...

28
00:00:57,356 --> 00:00:58,816
>> NASA 836, we're gonna
hold here.

29
00:00:59,036 --> 00:00:59,866
>> Flight control, do G look good?.

30
00:00:59,866 --> 00:01:00,766
>> Two Gs.

31
00:01:00,766 --> 00:01:02,126
>> Two Gs, copy.

32
00:01:02,440 --> 00:01:06,240
[Music]

33
00:01:06,240 --> 00:01:09,000
[Camera shutter]

34
00:01:09,000 --> 00:01:14,200
[Music]

35
00:01:21,506 --> 00:01:23,846
>> Whenever a NASA
aircraft leaves the ground,

36
00:01:24,366 --> 00:01:26,346
an entire team of people ensure

37
00:01:26,346 --> 00:01:29,246
that it executes its mission

safely and successfully.

38
00:01:29,816 --> 00:01:32,556
The pilot and mission
controller sit at the ends

39
00:01:32,556 --> 00:01:36,136
of a complex stream of
data along which dozens

40
00:01:36,196 --> 00:01:40,046
of IT specialists, engineers,
and technicians work to ensure

41
00:01:40,046 --> 00:01:42,206
that each inflight
decision is informed

42
00:01:42,206 --> 00:01:43,966
by accurate information.

43
00:01:43,966 --> 00:01:47,406
And that all test or science
data is successfully gathered

44
00:01:47,406 --> 00:01:48,840
and processed.

45
00:01:48,840 --> 00:01:52,240
At the Armstrong Flight
Research Center, this team makes

46
00:01:52,256 --> 00:01:54,926
up the mission information
and test systems directorate

47
00:01:55,276 --> 00:01:59,496
known simply as Code M. A
critical behind the scenes force

48
00:01:59,656 --> 00:02:02,716
that helps Armstrong keep
its reputation as one

49
00:02:02,720 --> 00:02:05,516
of the world's finest
flight research centers.

50
00:02:05,516 --> 00:02:12,076
[Music]

51
00:02:12,076 --> 00:02:15,886
>> In most cases, new flight
projects first approach the

52
00:02:15,886 --> 00:02:18,986
Mission Integration
Office or MIO.

53
00:02:18,986 --> 00:02:22,486
The MIO is responsible for the
development of partnerships

54
00:02:22,486 --> 00:02:24,926
with key researchers,
mission directorates,

55
00:02:24,926 --> 00:02:27,206
and external stakeholders.

56
00:02:27,206 --> 00:02:29,726
They help create
value for our partners

57
00:02:29,736 --> 00:02:31,796
by providing an initial
interface

58
00:02:31,796 --> 00:02:34,496

and a cross functional
integration of processes,

59
00:02:34,736 --> 00:02:36,766
capabilities, and operations.

60
00:02:37,516 --> 00:02:43,646
[Music]

61
00:02:44,146 --> 00:02:45,786
>> And there's 10,000 feet.

62
00:02:46,106 --> 00:02:48,976
>> I'm going to go about 100
feet above you if I can here.

63
00:02:48,976 --> 00:02:49,840
>> Okay.

64
00:02:49,840 --> 00:02:52,320
>> Flights of new aircraft or
systems are first simulated

65
00:02:52,466 --> 00:02:54,986
to ensure that any novel
concepts are working

66
00:02:54,986 --> 00:02:55,596
as designed,

67
00:02:56,286 --> 00:02:57,896
or to conduct trade studies

68
00:02:57,966 --> 00:03:00,906
or to iterate a design
towards optimum performance.

69
00:03:01,646 --> 00:03:05,156
Later when an actual flight is

scheduled, before the aircraft

70
00:03:05,156 --> 00:03:08,866
even revs its engine, simulation
familiarizes the pilot

71
00:03:08,866 --> 00:03:11,806
and mission control team with
the procedures and test points

72
00:03:12,056 --> 00:03:14,706
and prepares them for
unexpected situations.

73
00:03:16,086 --> 00:03:18,546
Engineers and technicians
in code ME,

74
00:03:18,776 --> 00:03:21,486
the simulation engineering
branch of Code M,

75
00:03:21,536 --> 00:03:24,086
create one-of-a-kind
simulation programs

76
00:03:24,086 --> 00:03:26,236
and hardware subsystem
interfaces

77
00:03:26,466 --> 00:03:29,216
that enable NASA's pilot
and their industry partners

78
00:03:29,316 --> 00:03:32,156
to understand how a new
aircraft or a system will handle

79
00:03:32,686 --> 00:03:35,756
or discover the most efficient

ways to hit their data points.

80
00:03:36,136 --> 00:03:39,866
>> Paul, I'm going to light the
burners just for a second here,

81
00:03:39,866 --> 00:03:41,816
just to see the difference
in the thrust.

82
00:03:42,276 --> 00:03:42,706
>> All right.

83
00:03:43,296 --> 00:03:43,976
>> And uh--

84
00:03:44,166 --> 00:03:47,186
>> Saw the cable tension go up a little there, it's into the red.

85
00:03:48,126 --> 00:03:48,416
>> All right

86
00:03:48,416 --> 00:03:51,916
coming out of the after burners
back to full power..

87
00:03:53,396 --> 00:03:54,946
>> Getting some slack on the rope now...

88
00:03:57,156 --> 00:03:58,476
>> Oh yeah it's amazing.

89
00:03:58,480 --> 00:04:00,156
Now that I'm getting
kind of used to the sim,

90
00:04:00,156 --> 00:04:02,566
I can really feel you back
there and the effects.

91
00:04:03,516 --> 00:04:08,546
[Music]

92
00:04:09,046 --> 00:04:10,806
>> Ready to send check.

93
00:04:10,946 --> 00:04:12,376
>> Sending check command now.

94
00:04:12,686 --> 00:04:13,406
>> Send arm.

95
00:04:14,166 --> 00:04:14,856
>> Arming now.

96
00:04:15,640 --> 00:04:16,570
>> Send terminate.

97
00:04:16,720 --> 00:04:18,640
>> And terminating now.

98
00:04:19,626 --> 00:04:21,626
And we have a good
arm-term cycle.

99
00:04:21,836 --> 00:04:23,856
>> Well before the
research flight phase,

100
00:04:24,046 --> 00:04:27,246
the Range Engineering
Branch, Code MC, engineers

101
00:04:27,246 --> 00:04:29,746
and software developers
build, integrate,

102

00:04:29,746 --> 00:04:31,406
and verify range assets.

103
00:04:31,546 --> 00:04:34,256
This is how they ensure the
aircraft telemetry can be

104
00:04:34,256 --> 00:04:37,466
received and processed for
control-room display monitoring.

105
00:04:37,836 --> 00:04:39,666
That aircraft position
can be tracked

106
00:04:39,666 --> 00:04:41,216
for situational awareness.

107
00:04:41,216 --> 00:04:41,646
>> All right,

108
00:04:41,646 --> 00:04:43,286
this is TD on Data 2.

109
00:04:43,446 --> 00:04:45,976
I'll go ahead and check everybody
for their control-room display

110
00:04:45,976 --> 00:04:47,746
status now that we
have both engines up.

111
00:04:48,056 --> 00:04:49,936
>> Heard you loud and clear.

112
00:04:50,276 --> 00:04:53,976
>> And that control-room voice
communications are working.

113

00:04:54,056 --> 00:04:58,706
For unmanned aircraft, Code MC
verifies uplinks for command

114
00:04:58,706 --> 00:05:00,976
and control and flight
termination systems.

115
00:05:01,046 --> 00:05:03,216
>> We're going to
arm and terminate.

116
00:05:04,516 --> 00:05:07,076
[Music]

117
00:05:07,080 --> 00:05:09,000
[Jet engine revving]

118
00:05:10,586 --> 00:05:12,826
>> Slaving is routed for Guy.

119
00:05:13,236 --> 00:05:13,746
>> We're high.

120
00:05:14,516 --> 00:05:18,356
[Music]

121
00:05:25,286 --> 00:05:27,286
>> Got him

122
00:05:27,846 --> 00:05:28,966
>> And...brake release.

123
00:05:29,516 --> 00:05:33,596
[Music]

124
00:05:41,360 --> 00:05:34,876
[Jet taking off]

125
00:05:43,626 --> 00:05:44,946
[Radio chatter]

126
00:05:45,686 --> 00:05:48,446
>> And the squawk is a little off,

127
00:05:48,446 --> 00:05:50,366
if you have to use it,
by about 5 degrees.

128
00:05:51,806 --> 00:05:52,306
>> ...don't know...

129
00:05:53,516 --> 00:05:56,956
[Music]

130
00:05:59,246 --> 00:06:00,826
>> Tracking the aircraft
while it's

131
00:06:00,826 --> 00:06:03,426
in flight is the
responsibility of MR,

132
00:06:03,506 --> 00:06:05,146
the Range Operations Branch.

133
00:06:05,716 --> 00:06:07,486
From working with
the U.S. Air Force,

134
00:06:07,526 --> 00:06:10,806
which controls Edwards Air
Space, to scheduling flights,

135
00:06:11,126 --> 00:06:14,106
to keeping radar dishes locked
on a supersonic airplane,

136
00:06:14,536 --> 00:06:17,166
to tracking that airplane
with long-range optics,

137
00:06:17,376 --> 00:06:20,066
Code MR is responsible
for getting the data

138
00:06:20,126 --> 00:06:21,436
from the airplane to the ground.

139
00:06:22,276 --> 00:06:25,176
This branch operates the
telemetry tracking systems,

140
00:06:25,546 --> 00:06:28,946
space positioning systems,
audio communication systems,

141
00:06:29,546 --> 00:06:33,116
video systems, mission control
center, and mobile systems.

142
00:06:34,516 --> 00:06:41,896
[Music]

143
00:06:42,396 --> 00:06:44,436
After a flight, the data arrives

144
00:06:44,436 --> 00:06:47,176
at the Information
Services Branch, or Code MI,

145
00:06:47,766 --> 00:06:50,276
which provides information
technology solutions

146
00:06:50,276 --> 00:06:51,556
for NASA's workforce,

147
00:06:51,596 --> 00:06:54,606
everything from desktops
to internet connections.

148
00:06:55,306 --> 00:06:58,336
Code MI also manages
Armstrong's data center

149
00:06:58,336 --> 00:07:01,696
and network infrastructure,
ensuring the right data is

150
00:07:01,696 --> 00:07:03,606
available to the
appropriate users,

151
00:07:03,716 --> 00:07:05,266
from routine e-mail

152
00:07:05,266 --> 00:07:08,406
to specialized mission-specific
flight data.

153
00:07:08,406 --> 00:07:13,196
Finally, MI provides multimedia
services. From graphic artists,

154
00:07:13,316 --> 00:07:16,876
photographers, and
videographers, to web and repro.

155
00:07:16,876 --> 00:07:20,096
These skilled individuals
ensure effective communication

156
00:07:20,096 --> 00:07:23,646
of the many activities and
accomplishments of the Center.

157
00:07:23,646 --> 00:07:27,446
These services include airborne
photography and videography,

158
00:07:27,446 --> 00:07:30,646
specialty services driven by
the demands of flight research.

159
00:07:30,646 --> 00:07:34,436
The multimedia products help
make this information accessible

160
00:07:34,436 --> 00:07:37,746
to engineers, researchers,
partners, and stakeholders

161
00:07:37,836 --> 00:07:41,796
around the Center, around the
agency, and out in the public.

162
00:07:41,800 --> 00:07:46,560
[Kids clapping to music]

163
00:07:46,560 --> 00:07:52,120
[Music]

164
00:07:52,120 --> 00:07:54,120
[DC-8 taking off]

165
00:07:58,236 --> 00:08:00,936
>> A strong team with
an important role--

166
00:08:01,056 --> 00:08:03,856
The Mission Information
And Test Systems Directorate helps

167
00:08:03,856 --> 00:08:07,516
separate the real from the

imagined through flight.