
dH
CT
26 ft
0.4 kilos
0.528
1.0 G

1
00:00:00,334 --> 00:00:03,537
[Music]

2
00:00:03,537 --> 00:00:07,808
>> Code ME provides
high fidelity simulation

3
00:00:07,808 --> 00:00:10,510
of aerospace vehicles
and we do this

4
00:00:10,510 --> 00:00:14,147
from conceptual ideas all the
way through flight testing.

5
00:00:14,147 --> 00:00:16,216
That consists of
batch simulations

6
00:00:16,216 --> 00:00:18,352
that just usually
require a computer monitor

7
00:00:18,352 --> 00:00:22,356
to access, all the way
through piloted simulations.

8
00:00:22,356 --> 00:00:24,558
>> Flaps and gear
and we're at 200 knots.

9
00:00:24,558 --> 00:00:25,959
>> We also have the
ability to connect

10
00:00:25,959 --> 00:00:28,295
into the hardware components,
whether it be flight control

11

00:00:28,295 --> 00:00:31,131
computers, or actuators,
all the way

12
00:00:31,131 --> 00:00:32,699
through plugging full vehicles

13
00:00:32,699 --> 00:00:34,334
in the test bays
out in the hangars.

14
00:00:34,334 --> 00:00:38,872
In addition to simulating
individual aircraft,

15
00:00:38,872 --> 00:00:41,308
we have the ability to fly
remotely augmented vehicles.

16
00:00:41,308 --> 00:00:43,510
So a pilot sitting in one

17
00:00:43,510 --> 00:00:46,046
of our labs can fly an
uninhabited vehicle.

18
00:00:46,046 --> 00:00:48,515
Or conversely a pilot on
an airplane can be looking

19
00:00:48,515 --> 00:00:50,284
at a display that's driven

20
00:00:50,284 --> 00:00:53,787
with algorithms
running here in our labs.

21
00:00:53,787 --> 00:00:57,791
We also have the ability to
take our sim lab and connect it

22
00:00:57,791 --> 00:00:59,793
as a component of a live,

23
00:00:59,793 --> 00:01:01,128
virtual constructive
environment.

24
00:01:01,128 --> 00:01:03,597
Our simulated aircraft are
now part of a simulation

25
00:01:03,597 --> 00:01:07,968
that combines real and simulated
aircraft in a larger airspace

26
00:01:07,968 --> 00:01:09,269
like we do with UAS
in the NAS.

27
00:01:09,269 --> 00:01:18,412
[Music]

28
00:01:19,246 --> 00:01:21,148
If you want to build
a simulation,

29
00:01:21,148 --> 00:01:24,451
you have your basic
aircraft dynamics model,

30
00:01:24,451 --> 00:01:26,219
big mass properties type stuff.

31
00:01:26,219 --> 00:01:28,221
So that's one model
that you have to start

32
00:01:28,221 --> 00:01:29,423

assembling with other things.

33
00:01:29,423 --> 00:01:31,858
You have to assemble it with
an aerodynamics model.

34
00:01:31,858 --> 00:01:34,227
You have to assemble it with
a propulsion, an engine model,

35
00:01:34,227 --> 00:01:37,130
a set of guidance laws, and
a couple of other models.

36
00:01:37,130 --> 00:01:40,934
And you just have to assemble
all these things together.

37
00:01:40,934 --> 00:01:43,737
Once you build a simulation,
it's used quite a bit

38
00:01:43,737 --> 00:01:46,306
for training the pilots,
practicing maneuvers --

39
00:01:46,306 --> 00:01:48,608
>> I'm getting a little dynamic
here.

40
00:01:48,608 --> 00:01:50,877
>> Okay. I'll try
to be stable up here

41
00:01:50,877 --> 00:01:53,513
to give you a stable
platform to work off of.

42
00:01:53,513 --> 00:01:55,782
>> Because you have a

nice high fidelity sim,

43
00:01:55,782 --> 00:01:57,184
you know how long
each maneuver takes.

44
00:01:57,184 --> 00:01:59,586
You know how long it takes
in between maneuvers.

45
00:01:59,586 --> 00:02:02,422
So it allows you to optimize
the available flight time

46
00:02:02,422 --> 00:02:04,524
which is very expensive.

47
00:02:04,524 --> 00:02:06,693
Be it a center stick or
a side stick controller

48
00:02:06,693 --> 00:02:10,831
or a yolk type controller, that
would be modeled and simulated

49
00:02:10,831 --> 00:02:13,367
to behave just like the
stick in the actual airplane.

50
00:02:13,367 --> 00:02:15,569
You could actually
have force feedback

51
00:02:15,569 --> 00:02:17,237
so that it mimics
the actual forces

52
00:02:17,237 --> 00:02:20,841
that a pilot would
feel in the airplane.

53
00:02:20,841 --> 00:02:22,609
Data that we typically
collect looks like flight data

54
00:02:22,609 --> 00:02:25,312
and that data is used
to verify whether

55
00:02:25,312 --> 00:02:27,948
or not the control algorithms
were implemented correctly.

56
00:02:27,948 --> 00:02:31,651
The flip side of that is if
there's an anomaly in flight

57
00:02:31,651 --> 00:02:35,622
after the plane goes
into operational status,

58
00:02:35,622 --> 00:02:38,725
we would use the simulation
to research and investigate

59
00:02:38,725 --> 00:02:43,764
and understand what might have
caused that anomalous behavior.

60
00:02:43,764 --> 00:02:46,700
And that's something you only
get with a high fidelity sim.

61
00:02:46,700 --> 00:02:49,903
It's not like the simulations
that you get, you know,

62
00:02:49,903 --> 00:02:51,705
from X-Plane or something
like that.

63
00:02:51,705 --> 00:02:54,508
One of the projects
we're starting to work

64
00:02:54,508 --> 00:02:57,611
on is getting a Mars airspace up
and running and setting things

65
00:02:57,611 --> 00:03:00,080
up so we can fly
multiple Mars flyers.