

A man with a goatee and short brown hair, wearing a dark grey polo shirt, is speaking in a manufacturing environment. In the background, there is a large piece of machinery with two circular openings on the left, and a computer monitor on a stand to the right displaying a software interface. The lighting is somewhat dim, typical of an industrial setting.

Ken Cooper

Advanced Manufacturing Team Lead, MSFC

1
00:00:01,728 --> 00:00:03,493
Ken Cooper: What we've got

2
00:00:03,528 --> 00:00:04,445
here is the latest in direct

3
00:00:04,480 --> 00:00:05,613
metal 3-D printing, if you

4
00:00:05,812 --> 00:00:06,917
will. We call it additive

5
00:00:07,859 --> 00:00:08,069
manufacturing now. It's the

6
00:00:09,068 --> 00:00:09,166
official term. What it is,

7
00:00:10,060 --> 00:00:11,870
it takes fine layers of metal

8
00:00:11,905 --> 00:00:13,804
powder and welds those

9
00:00:13,839 --> 00:00:15,197
together with a laser beam

10
00:00:15,232 --> 00:00:16,269
to fuse a three-dimensional

11
00:00:16,304 --> 00:00:17,365
object right from a computer

12
00:00:17,400 --> 00:00:19,029
file. It's like artistic

13
00:00:19,064 --> 00:00:20,853

welding, if you will. Selective

14

00:00:20,888 --> 00:00:22,422

Laser Melting is the official

15

00:00:22,457 --> 00:00:24,110

term on the patent. That kind

16

00:00:24,145 --> 00:00:26,358

of describes what's going on.

17

00:00:26,393 --> 00:00:27,886

You are selectively melting

18

00:00:27,921 --> 00:00:29,798

the powder and wherever the

19

00:00:29,833 --> 00:00:31,942

laser touches it turns to

20

00:00:31,977 --> 00:00:33,133

solid and the rest of it stays

21

00:00:33,168 --> 00:00:34,165

powder that you dump out

22

00:00:34,200 --> 00:00:35,285

afterwards. Right now, we're

23

00:00:35,320 --> 00:00:36,685

trying to qualify this to

24

00:00:36,720 --> 00:00:38,485

build rocket motor parts.

25

00:00:38,520 --> 00:00:40,693

Basically, what additive

26

00:00:40,728 --> 00:00:41,941
manufacturing gives you is the

27

00:00:41,976 --> 00:00:43,293
ability to build very complex

28

00:00:43,328 --> 00:00:44,620
shapes that couldn't be built

29

00:00:44,655 --> 00:00:46,654
other ways or just to simplify

30

00:00:46,689 --> 00:00:48,021
building complex shapes. It

31

00:00:48,056 --> 00:00:49,845
really doesn't care about the

32

00:00:49,880 --> 00:00:52,101
geometry. Really the deciding

33

00:00:52,136 --> 00:00:54,309
factor in whether the machine

34

00:00:54,344 --> 00:00:55,894
can do it or not is the size

35

00:00:55,929 --> 00:00:57,342
of the part. We wanted to have

36

00:00:57,377 --> 00:00:58,734
the best technology out there

37

00:00:58,769 --> 00:01:00,734
because we are shooting to put

38

00:01:00,769 --> 00:01:02,493

these into human-rated rocket

39

00:01:02,528 --> 00:01:03,677
systems.

40

00:01:03,712 --> 00:01:04,861
Andy Hardin: When we build parts,

41

00:01:04,896 --> 00:01:06,693
we go through a lot of tests, a

42

00:01:06,728 --> 00:01:08,981
lot of inspection. We do a lot

43

00:01:09,016 --> 00:01:10,917
of engineering builds first to

44

00:01:10,952 --> 00:01:12,517
make sure we have the process

45

00:01:12,552 --> 00:01:14,101
wrung out. There's always weld

46

00:01:14,136 --> 00:01:15,653
problems that you have to deal

47

00:01:15,688 --> 00:01:17,365
with and there's going to be

48

00:01:17,400 --> 00:01:18,501
problems with this that we'll

49

00:01:18,536 --> 00:01:20,053
have to work out, too, but this

50

00:01:20,088 --> 00:01:21,669
has the potential to eliminate

51

00:01:21,704 --> 00:01:23,765

a lot of those problems and it

52

00:01:23,800 --> 00:01:25,597

has the potential to reduce the

53

00:01:25,632 --> 00:01:26,917

cost by as much as half in some

54

00:01:26,952 --> 00:01:30,509

cases on a lot of parts. Everybody

55

00:01:30,544 --> 00:01:32,109

was really excited and now it's

56

00:01:32,144 --> 00:01:34,485

time to start the real work,

57

00:01:34,520 --> 00:01:36,261

which is making parts and building

58

00:01:36,296 --> 00:01:38,733

the material properties, getting