

Technology
Demonstration
Mission

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1
00:00:11,792 --> 00:00:02,279

Music

2
00:00:12,294 --> 00:00:14,225

The objective of the solar electric propulsion

3
00:00:14,260 --> 00:00:17,216

project is to enable or be a step change in

4
00:00:17,287 --> 00:00:20,136

solar electric propulsion. Right now it is used

5
00:00:20,262 --> 00:00:23,353

for station keeping for a lot of geo comm sats.

6
00:00:23,388 --> 00:00:25,647

What we are trying to do is take it a step

7
00:00:26,030 --> 00:00:28,168

further, and have this electric propulsion used

8
00:00:28,302 --> 00:00:31,304

as the primary propulsion for satellites. We

9
00:00:31,358 --> 00:00:33,944

need to make higher powered solar arrays that

10
00:00:33,950 --> 00:00:36,520

can power these higher powered thrusters. The

11
00:00:36,555 --> 00:00:38,647

issue with that is that you need them to be

12
00:00:38,682 --> 00:00:41,384

stowed for your launch vehicle and they need

13
00:00:41,419 --> 00:00:43,641

to be autonomously deployed. We also have

14

00:00:43,676 --> 00:00:46,375

support from folks at Glenn and Langley,

15

00:00:46,410 --> 00:00:48,832

supporting that work. Historically there

16

00:00:48,867 --> 00:00:51,111

was the NSTAR mission and DAWN and those

17

00:00:51,557 --> 00:00:53,336

were on the order of 2.5 kilowatts of

18

00:00:53,958 --> 00:00:56,711

electric propulsion. The advanced EHF was on

19

00:00:57,045 --> 00:00:59,192

the order of 10 kilowatts and that was where

20

00:00:59,227 --> 00:01:01,264

they utilized, and that was where they used

21

00:01:01,299 --> 00:01:02,448

electric propulsion in a manner it was not

22

00:01:02,622 --> 00:01:04,752

designed for. And it succeeded, it saved a

23

00:01:04,787 --> 00:01:07,032

billion dollar asset. What we are looking at

24

00:01:08,150 --> 00:01:10,576

is a 30 kilowatt SEP TDM. So this would be

25

00:01:11,614 --> 00:01:13,176

a step change from the current state of the

26

00:01:13,493 --> 00:01:16,144

art, with about a factor of 3 to then

27

00:01:16,678 --> 00:01:19,416

something that could support human exploration.

28

00:01:19,605 --> 00:01:21,239

And that is on the order of 100 kilowatts

29

00:01:21,597 --> 00:01:23,640

to 300 kilowatts. What exactly that is we don't

30

00:01:23,675 --> 00:01:25,912

know for sure because of the particular

31

00:01:25,947 --> 00:01:27,488

architectures are trading, but it is on the

32

00:01:27,589 --> 00:01:30,352

order of 100-200 kilowatts for human exploration.

33

00:01:30,774 --> 00:01:33,168

So as far as compared to chemical propulsion,

34

00:01:33,509 --> 00:01:36,288

you don't need as much propellant and electric

35

00:01:36,323 --> 00:01:39,280

propulsion is much more efficient as well. We're

36

00:01:39,315 --> 00:01:42,168

utilizing power from the sun to power our

37

00:01:42,203 --> 00:01:45,120

thrusters and also other on-board electronics.

38

00:01:45,155 --> 00:01:47,976

So we are utilizing, caching the sun's power,

39

00:01:48,011 --> 00:01:49,832

with our arrays, using that to power our

40

00:01:49,867 --> 00:01:52,688

thrusters. So our tanks that we need to

41

00:01:52,723 --> 00:01:55,360

power our thrusters are xenon are much smaller

42

00:01:55,395 --> 00:01:57,944

than what you would utilize with chemical

43

00:01:57,979 --> 00:02:01,105

propulsion. So what that does it allows you to

44

00:02:01,140 --> 00:02:03,911

either send more payload or to use smaller

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00:02:03,946 --> 00:02:06,392

launch vehicles. Both of which save you a lot

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00:02:06,427 --> 00:02:10,071

of money because it costs so much to send things

47

00:02:10,106 --> 00:02:12,311

into space. There are 4 main objectives for

48

00:02:12,346 --> 00:02:15,616

the mission; there's technology, technology

49

00:02:15,651 --> 00:02:18,121

development, infusing new technology. There's

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00:02:18,156 --> 00:02:20,672

capability, so having a new capability, a new

51
00:02:20,707 --> 00:02:24,992
system, an integrated system again which is the

52
00:02:25,027 --> 00:02:26,992
same. And extensibility, something that can be

53
00:02:27,027 --> 00:02:30,103
used for this TDM but infused for human missions

54
00:02:30,138 --> 00:02:33,017
but also for industry. So those would be our

55
00:02:33,052 --> 00:02:35,015
four objectives that we are gearing towards that

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00:02:35,050 --> 00:02:37,984
this mission will be targeting. SEP can be

57
00:02:38,019 --> 00:02:41,000
applied to broad range of missions, it would

58
00:02:41,035 --> 00:02:43,871
range from science missions to human exploration

59
00:02:43,906 --> 00:02:45,600
missions, to DOD to satellite servicing to a

60
00:02:45,635 --> 00:02:49,489
plethora of industry opportunities. So there