



Brandi Dean

NASA PUBLIC AFFAIRS OFFICER



Gary Cox

EPIC PROJECT MANAGER

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00:00:01,326 --> 00:00:02,776
[Brandi Dean] Welcome to the Mission Control.

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00:00:02,876 --> 00:00:07,306
As I said Gary Cox talked with us
about the EPIC computer upgrade

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00:00:07,306 --> 00:00:12,536
that the crew has been working on, in particular
Dan Burbank has spent upgrading a couple

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00:00:12,536 --> 00:00:13,546
of the computers this week.

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00:00:13,546 --> 00:00:16,206
And Gary is the EPIC program manager.

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00:00:16,206 --> 00:00:17,816
So he's going to tell what that's all about,

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00:00:17,816 --> 00:00:20,036
and why it's necessary, why
it's good for the station.

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00:00:20,036 --> 00:00:20,796
Thanks for coming Gary.

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00:00:20,796 --> 00:00:21,496
[Gary Cox] You're welcome.

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00:00:22,246 --> 00:00:23,046
[Brandi] Okay, so EPIC.

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00:00:23,046 --> 00:00:24,316
What does that stand for first of all?

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00:00:24,526 --> 00:00:27,736
[Gary] EPIC stands for Enhanced

Processor Integrated Communications.

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00:00:28,226 --> 00:00:31,796

Basically, it's a circuit board upgrade to the existing space station computers

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00:00:31,796 --> 00:00:34,526

to help improve their performance and their memory margins

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00:00:34,526 --> 00:00:36,096

and their CPU performance margins.

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00:00:36,096 --> 00:00:41,116

As you know the station's been on orbit for 10 years or so and the original computers

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00:00:41,116 --> 00:00:47,486

that were put up there are starting to feel the effects of mission...ISS completion

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00:00:48,056 --> 00:00:49,936

where they're having more demands put on them.

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00:00:50,276 --> 00:00:53,666

And so what we had to do was come up with a upgrade for those computers

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00:00:53,666 --> 00:00:59,126

to give them more performance so they can handle this new configuration as well as get us ready

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00:00:59,126 --> 00:01:04,606

for future activation through 2020 and 2028.

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00:01:04,606 --> 00:01:04,856

[Brandi] Okay.

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00:01:04,926 --> 00:01:09,026

Well when you say computers are we talking about like the laptops that we see the crew using?

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00:01:09,026 --> 00:01:11,666

Or is this the computers that run all the equipment on the station?

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00:01:11,666 --> 00:01:14,776

Or... [Gary] These are specifically the computers that run all the equipment on board.

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00:01:15,186 --> 00:01:17,136

There's 47 of those computers on orbit.

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00:01:17,136 --> 00:01:19,006

They're called MDMs.

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00:01:19,586 --> 00:01:24,216

Basically, we looked at the top three or four types of computers that needed to be upgraded

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00:01:24,216 --> 00:01:27,356

because their performance needed to be improved.

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00:01:27,766 --> 00:01:32,286

And we identified our highest most computer called the CNC,

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00:01:32,286 --> 00:01:33,346

or the Command and Control computer.

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00:01:33,546 --> 00:01:35,946

It's the three computers that control the entire vehicle.

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00:01:35,946 --> 00:01:36,066

[Brandi] Okay.

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00:01:36,066 --> 00:01:39,536

[Gary] So what we had to do was
go upgrade that computer along

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00:01:39,536 --> 00:01:41,526
with a guidance and navigation computer.

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00:01:41,596 --> 00:01:42,446
And of course, payloads.

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00:01:42,816 --> 00:01:45,596
We have alot of science experiments
that we've been adding over the years.

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00:01:45,916 --> 00:01:49,176
And wanted to make sure we had
capacity to handle additional science.

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00:01:49,456 --> 00:01:49,906
[Brandi] Okay.

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00:01:49,906 --> 00:01:53,016
So it's all about the science which
is not unusual for space station.

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00:01:53,016 --> 00:01:54,136
Right? [Gary] Yes.

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00:01:54,136 --> 00:01:54,516
That's right.

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00:01:54,516 --> 00:01:59,976
We wanted to make sure we had no limitations
gettng to the next 10 to 15 years of operation.

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00:01:59,976 --> 00:02:04,506
So we wanted to upgrade those computers to
ensure we had proper capability for that.

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00:02:04,506 --> 00:02:07,956

[Brandi] And I guess 10 years is a long time for us on the ground to go

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00:02:07,956 --> 00:02:11,026
without getting a new computer,
or at the very least upgrades.

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00:02:11,026 --> 00:02:11,126
[Gary] Right.

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00:02:11,126 --> 00:02:12,596
[Brandi] So it has to have been about time.

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00:02:12,826 --> 00:02:13,056
[Gary] Yes.

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00:02:13,056 --> 00:02:15,836
These computers, again, have been
operating for nearly 10 years.

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00:02:15,836 --> 00:02:18,826
Some of them a little bit more than
10 years and have flawless operations.

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00:02:18,826 --> 00:02:19,346
No problems.

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00:02:19,346 --> 00:02:25,886
But one of the challenges we had to have...what
we had to overcome was coming up with an upgrade

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00:02:25,886 --> 00:02:27,496
that didn't change the infrastructure.

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00:02:27,766 --> 00:02:31,646
Cause we have a tremendous infrastructure
built already with the software development,

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00:02:31,646 --> 00:02:34,786

and the testing that we have on the ground and the infrastructure within the station itself.

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00:02:34,786 --> 00:02:37,276

So we had to be very careful when we upgraded these computers

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00:02:37,276 --> 00:02:38,816

that we didn't upset that infrastructure.

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00:02:39,296 --> 00:02:39,746

[Brandi] Okay.

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00:02:39,746 --> 00:02:41,006

That sounds complicated.

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00:02:41,706 --> 00:02:41,906

[Gary] Yeah.

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00:02:41,906 --> 00:02:42,876

It was quite a challenge.

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00:02:42,916 --> 00:02:46,046

But as you saw just after Christmas

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00:02:46,046 --> 00:02:48,676

when we started the initial upgrades everything went very smoothly.

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00:02:48,846 --> 00:02:50,766

We're now operating off the new computers [Brandi] Okay.

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00:02:50,766 --> 00:02:54,466

Great. Well, I guess you've probably been working on this program

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00:02:54,466 --> 00:02:56,246

for a long time even before it launched.

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00:02:56,246 --> 00:02:57,036

Right? [Gary] Yes.

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00:02:57,036 --> 00:03:00,436

We've been wroking on it for about four years to make sure we had everything in place.

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00:03:00,436 --> 00:03:01,536

We had alot of testing on the ground.

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00:03:01,536 --> 00:03:05,406

Alot of great support from the Mission Control folks here as well as the crew.

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00:03:05,406 --> 00:03:08,726

The crew were involved heavily in installing these computer upgrades.

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00:03:08,986 --> 00:03:11,946

[Brandi] Did you know...how long ahead of time did you know that it was going

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00:03:11,946 --> 00:03:14,616

to be this particular crew that was doing the work?

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00:03:14,926 --> 00:03:19,006

[Gary] We knew about eight months ago or so that it was going Don Pettit and Dan Burbank.

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00:03:19,206 --> 00:03:22,126

[Brandi] So they had some time to practice on the ground before they went up.

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00:03:22,126 --> 00:03:22,276

[Gary] Yes.

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00:03:22,606 --> 00:03:23,156

Definitely.

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00:03:23,156 --> 00:03:26,536

[Brandi] And how difficult is it actually to perform those changeouts in space?

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00:03:27,096 --> 00:03:29,786

[Gary] What we do is we actually have to pull the computer out of the racks.

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00:03:29,786 --> 00:03:32,146

All these computers are located in racks on space station.

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00:03:32,146 --> 00:03:34,786

We have to pull them out of the racks and put them on a workstation.

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00:03:34,786 --> 00:03:36,266

That's kind of like a workbench if you will.

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00:03:36,866 --> 00:03:39,436

And then we have to pull front covers off and then we actually have

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00:03:39,436 --> 00:03:41,956

to pull single cards out and reinstall.

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00:03:41,956 --> 00:03:45,456

Much like you would do on a home computer when you install and changeout computer cards.

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00:03:45,846 --> 00:03:48,936

[Brandi] And its probably complicated a little bit by the lack of gravity?

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00:03:48,936 --> 00:03:50,546

[Gary] The fact is you don't have gravity

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00:03:50,646 --> 00:03:54,886
and you gotta make sure you're
secure and doing a changeout.

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00:03:54,886 --> 00:03:57,376
And yes, it definitely makes
it a little more complicated.

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00:03:57,616 --> 00:03:58,816
[Brandi] But so far they've been doing well.

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00:03:59,006 --> 00:04:00,306
Huh? [Gary] Everything went smoothly.

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00:04:00,306 --> 00:04:02,926
We've got seven computers that
have been transitioned now.

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00:04:02,926 --> 00:04:04,016
Everything's working just fine.

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00:04:04,136 --> 00:04:05,286
[Brandi] And you said there
were how many in all?

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00:04:05,546 --> 00:04:07,786
[Gary] There's 47 total computers.

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00:04:07,886 --> 00:04:09,106
We only had to changeout seven.

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00:04:09,106 --> 00:04:11,606
We're looking to do a couple
more in a couple of years...

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00:04:11,606 --> 00:04:12,156
[Brandi] Okay.

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00:04:12,206 --> 00:04:13,416

[Gary] ...that need to be addressed.

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00:04:13,416 --> 00:04:13,686

[Brandi] Okay.

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00:04:13,686 --> 00:04:15,906

So is there any work left for Dan to do?

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00:04:15,906 --> 00:04:17,106

Or is he completely done then?

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00:04:17,456 --> 00:04:18,726

[Gary] For this transition he's done.

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00:04:18,806 --> 00:04:18,916

[Brandi] Okay.

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00:04:18,916 --> 00:04:19,516

[Gary] He did a great job.

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00:04:19,516 --> 00:04:20,116

[Brandi] Congratulations!

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00:04:20,206 --> 00:04:20,536

[Gary] Yes.

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00:04:20,536 --> 00:04:20,836

Thank you.

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00:04:21,446 --> 00:04:23,036

[Brandi] That must feel really good to get that behind you?

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00:04:23,296 --> 00:04:23,726

[Gary] Oh yes.

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00:04:23,726 --> 00:04:25,976

It was a major project and alot of folks.

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00:04:25,976 --> 00:04:26,986

A good team effort.

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00:04:26,986 --> 00:04:32,316

Alot people were involved and the crew,
the astronauts, folks here in MOD,

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00:04:32,316 --> 00:04:34,236

as well as engineering and the
development side of the world.

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00:04:34,296 --> 00:04:35,686

So, yes it was a big project.

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00:04:35,986 --> 00:04:37,786

[Brandi] So is there work left
for you to do on the ground?

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00:04:37,786 --> 00:04:40,336

Or do you move on to something different now?

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00:04:40,336 --> 00:04:42,696

[Gary] We're actually looking...I mentioned
there are two more computers we have to upgrade.

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00:04:42,696 --> 00:04:45,066

That's going to be a challenge
becuase those are outside computers.

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00:04:45,066 --> 00:04:45,496

So... [Brandi] Okay.

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00:04:45,566 --> 00:04:48,766

[Gary] Yes they're going to get the
same EPIC upgrade but they're outside.

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00:04:48,766 --> 00:04:51,446

So we're going to have to do some EVAs

where the astronauts again will be involved.

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00:04:51,446 --> 00:04:55,776

They're going to have go outside and pull these computers back inside and do a changeout.

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00:04:56,326 --> 00:04:57,866

A little more complicated than this go around.

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00:04:57,996 --> 00:04:58,936

[Brandi] That sounds like it.

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00:04:58,936 --> 00:05:00,486

Yeah, we'll be looking forward to that.

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00:05:00,486 --> 00:05:02,496

I guess it's probably a little ways in the future still.

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00:05:02,776 --> 00:05:04,816

[Gary] It's about two years or so away.

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00:05:05,156 --> 00:05:05,526

[Brandi] Okay.

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00:05:05,526 --> 00:05:05,916

Well alright.

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00:05:05,916 --> 00:05:07,496

Thank you so much for coming and talking with us.