
LEONARDO
asi
agenzia spaziale italiana
DANGER
Restricted Work Area

1
00:00:00,000 --> 00:00:04,630
Music.

2
00:00:04,630 --> 00:00:09,460
I'm Scott Higginbotham, NASA's payload manager for the Permanent Multipurpose Module.

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00:00:09,460 --> 00:00:14,830
For many years, NASA and the Italian Space Agency have been looking at the potential of

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00:00:14,830 --> 00:00:19,390
turning one of the multipurpose logistics modules into a permanent module to fly

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00:00:19,390 --> 00:00:21,520
and attach to the station and leave behind.

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00:00:21,520 --> 00:00:27,720
Efforts to actually conduct the conversion got serious in the summer of 2009 when we started studies to

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00:00:27,720 --> 00:00:31,370
understand specifically what modifications would be necessary to make the

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00:00:31,370 --> 00:00:35,140
conversion from a temporary visiting vehicle to a permanent vehicle.

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00:00:35,140 --> 00:00:41,900
There are three basic types of modifications that were performed to make the conversion from the MPLM to the

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00:00:41,900 --> 00:00:43,600
The first has to do with weight.

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00:00:43,600 --> 00:00:48,370
We tried to reduce the weight of the module as much as possible by eliminating hardware that we didn't

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00:00:48,370 --> 00:00:55,770
need for the long-duration stay on orbit to allow us to carry more useful cargo up to space on STS-133.

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00:00:55,770 --> 00:00:59,940

The second type of modification was associated with trying to make the interior of the module a

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00:00:59,940 --> 00:01:03,910
little bit more useful for the astronauts during this long duration stay.

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00:01:03,910 --> 00:01:08,020
For example, we have modified some of the panels inside the vehicle so that they are much

16
00:01:08,020 --> 00:01:11,410
easier for the astronauts to open and close during a flight.

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00:01:11,410 --> 00:01:15,420
And then last and probably most importantly, we had to look at a series of changes to make the

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00:01:15,420 --> 00:01:19,500
vehicle compatible for its new long-duration stay on orbit.

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00:01:19,500 --> 00:01:23,390
The MPLMs were really only designed to be in space for about a week and a half,

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00:01:23,390 --> 00:01:26,390
and now we have a vehicle that we're trying to leave in space for ten years.

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00:01:26,390 --> 00:01:29,680
So we had to go back and recertify all the equipment, all the hardware,

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00:01:29,680 --> 00:01:33,180
to make sure that it would be compatible in a space environment for that long,

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00:01:33,180 --> 00:01:37,350
and that involved both analysis and actually physically swapping out some parts with

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00:01:37,350 --> 00:01:41,320
newer parts that would be able to last that duration of the mission.

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00:01:41,320 --> 00:01:46,350
And then probably most significant, we had to armor the exterior of the module so that it can withstand the

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00:01:46,350 --> 00:01:51,990
micrometeoroid and hypervelocity debris impacts over the 10 years that it'll be on the station.

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00:01:51,990 --> 00:01:57,520
Rather than modify the external shields, which are made of metal, which was going to be heavy and expensive

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00:01:57,520 --> 00:02:02,880
the clever idea that both we and the Italians came up with was to install a micrometeoroid mattress,

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00:02:02,880 --> 00:02:07,900
which is basically a bullet-proof vest for the station that lies underneath the metallic

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00:02:07,900 --> 00:02:09,840
shield and on top of the pressure vessel.

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00:02:09,840 --> 00:02:15,290
This mattress is made up of Kevlar and Nextel fabric woven together and attached to our multi-layer

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00:02:15,290 --> 00:02:19,400
insulation that lies between the pressure vessel and the external shields.