1
00:00:01,329 --> 00:00:06,300
Hi I'm Mike Massamino and welcome to another
episode of Inside the International Space

2
00:00:06,300 --> 00:00:07,300
Station.

3
00:00:07,300 --> 00:00:14,040
..Bacteria act different in space, I liked
it 'cause you can get your hands on it…

4
00:00:14,040 --> 00:00:16,860
lab technicians or lab rats…

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00:00:16,860 --> 00:00:23,769
Today we're going to be doing something
a little bit different.

6
00:00:23,769 --> 00:00:28,390
We're going to be talking to two of my buddies,
these two guys making fun of me behind my

7
00:00:28,390 --> 00:00:35,190
back over here, over my shoulder, my two friends
Ron Garan and Mike Fossum spent about 4 months

8
00:00:35,190 --> 00:00:39,300
in space together and they're here to talk
to us today about their adventures.

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00:00:39,300 --> 00:00:40,300
Guys.

10
00:00:40,300 --> 00:00:43,010
Hey Mass, good to see ya.

11
00:00:43,010 --> 00:00:48,650
Hey Mike, we were there to see the transition
between building the Space Station and using

12
00:00:48,650 --> 00:00:50,080
the Space Station.

13
00:00:50,080 --> 00:00:54,339
And we really ramped up the amount of science,
I mean, it is an orbiting laboratory.

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00:00:54,339 --> 00:01:00,410
A world class, state of the art laboratory,
you know cutting edge science and we did an

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00:01:00,410 --> 00:01:01,949
awful lot of science during that time frame.

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00:01:01,949 --> 00:01:07,400
And this is not just science that is gonna
help us go further in the exploration of the

17
00:01:07,400 --> 00:01:12,010
solar system most of the science is dedicated
to how we improve life on Earth.

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00:01:12,010 --> 00:01:16,770
You know, new materials, new medicines, environmental
stuff a lot of earth observations, you know

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00:01:16,770 --> 00:01:21,650
looking at the human impact to the environment,
to the atmosphere, there's just, the list

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00:01:21,650 --> 00:01:25,940
goes on and on and on of all the science that's
being conducted on board and it's a very

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00:01:25,940 --> 00:01:27,920
important part of what we do every day up
there.

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00:01:27,920 --> 00:01:33,990
Do you have one example you throw out there,
Cause I think that, this is what the public

23
00:01:33,990 --> 00:01:36,240
what the, what are we, how is it helping us?

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00:01:36,240 --> 00:01:37,240
You know what it is doing for us.

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00:01:37,240 --> 00:01:41,120
One of my favorite experiments was called
SHEAR and the reason I liked it was because

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00:01:41,120 --> 00:01:43,360
I had a lot of interaction with it.

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00:01:43,360 --> 00:01:47,531
It was kind of a hazardous material or could
be messy anyway so we had to do it inside

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00:01:47,531 --> 00:01:55,070
a glove box so it was a little bit of a juggling
act or hassle getting it all set up.

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00:01:55,070 --> 00:02:02,040
But, it’s an experiment to measure part
of the physics of a polymer fluid.

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00:02:02,040 --> 00:02:05,430
A fluid with these long chain polymer strands.

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00:02:05,430 --> 00:02:11,060
They’re microscopic but they end up being
significant inside this fluid.

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00:02:11,060 --> 00:02:12,440
The amount of fluid was small.

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00:02:12,440 --> 00:02:15,150
About the size of a hazelnut or large peanut.

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00:02:15,150 --> 00:02:20,850
You know so you just have this little dollop
of fluid and it's all temperature controlled

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00:02:20,850 --> 00:02:28,120
and then they actually put it in, it's in
kind of like a lathe that spins so you have

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00:02:28,120 --> 00:02:34,260
to get it all set up inside here get this
thing freed up, so you've got these two

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00:02:34,260 --> 00:02:41,610
moveable surfaces the material, the little
dollop of fluid just stuck using surface tension

38
00:02:41,610 --> 00:02:47,600
to these two surfaces and then it starts to
spin it up a certain number of times and what

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00:02:47,600 --> 00:02:51,960
it's doing, it's entangling, it's twisting
those polymer strands that you can't see

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00:02:51,960 --> 00:02:57,830
inside this fluid, and it stretched it and
they're measuring the tension and the physical

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00:02:57,830 --> 00:03:00,550
properties of that fluid as it gets pulled
out.

42
00:03:00,550 --> 00:03:02,030
So it's really cool stuff.

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00:03:02,030 --> 00:03:04,670
It was sponsored by industry and it's a

fundamental science.

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00:03:04,670 --> 00:03:08,080
There were others where you were changing
samples in a furnace and while we’re sleeping

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00:03:08,080 --> 00:03:13,180
they’re cranking the furnace up to a thousand
degrees or a couple of thousand degrees and

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00:03:13,180 --> 00:03:15,590
going through profiles but we don’t get
to see anything …

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00:03:15,590 --> 00:03:17,660
Gets the smoke detector going just in case
though…

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00:03:17,660 --> 00:03:19,470
We had the smoke detector going.

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00:03:19,470 --> 00:03:26,250
We’re doing a lot of combustion research
on board and if we’re able to increase the

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00:03:26,250 --> 00:03:31,129
efficiency of a combustion reaction by one
percent then imagine fuel efficiency in vehicles

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00:03:31,129 --> 00:03:33,210
heating oil cost, you know, the whole nine
yards.

52
00:03:33,210 --> 00:03:34,670
It will have a huge impact.

53
00:03:34,670 --> 00:03:39,410
But you know three’s a, this one experiment
ISSAC, the ISS Agricultural camera, and this

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00:03:39,410 --> 00:03:46,430
camera is pointing at the Earth and it takes
frequent visual and infrared pictures of vegetated

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00:03:46,430 --> 00:03:52,610
areas around the planet, Specifically those
areas that have short growing season’s so

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00:03:52,610 --> 00:03:57,710
they are trying to find ways in these short
growing seasons to get better crop yield,

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00:03:57,710 --> 00:04:03,350
we’ve got some fluids experiments that are
looking at the critical point of some of materials

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00:04:03,350 --> 00:04:08,750
and ya know this could really lead to better
ways to get rid of hazardous waste, better

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00:04:08,750 --> 00:04:14,580
ways to produce clean energy, so I mean really,
the list goes on and on of all the different

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00:04:14,580 --> 00:04:16,940
types of research that’s going on.

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00:04:16,940 --> 00:04:20,709
We have the European laboratory, the Japanese
Laboratory, the US laboratory, all the research

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00:04:20,709 --> 00:04:24,659
facilities on the Russian side, all that going
on all the time.

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00:04:24,659 --> 00:04:30,189
So it’s not, it seems like it’s not your,
alright we’re gonna make this certain gadget

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00:04:30,189 --> 00:04:32,479
in space that we're going to use on the
ground.

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00:04:32,479 --> 00:04:36,740
It's more of, right, it's more of basic….

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00:04:36,740 --> 00:04:43,569
That's right, however, we did have, we did
develop a vaccine for salmonella on board.

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00:04:43,569 --> 00:04:51,419
I mean not us, but us being the 15 nations
of the International Space Station Partnership.

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00:04:51,419 --> 00:04:54,099
The research directly led to that.

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00:04:54,099 --> 00:04:58,169
There's been a number of other breakthroughs
that have come from the research,

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00:04:58,169 --> 00:05:02,270
And was it studying the disease more clearly
in space, that did it?

71
00:05:02,270 --> 00:05:05,240
Well in space, bacteria act differently in
space.

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00:05:05,240 --> 00:05:07,589
There tougher in space, more virulent.

73
00:05:07,589 --> 00:05:08,589
Is that right?

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00:05:08,589 --> 00:05:12,499
It's got like a whole aliens thing going
on here.

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00:05:12,499 --> 00:05:13,879
Possibly, Possibly.

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00:05:13,879 --> 00:05:22,159
But you know, because of that there's ways
to design countermeasures against bacteria

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00:05:22,159 --> 00:05:25,919
that you can't do on the earth for that
reason as well.

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00:05:25,919 --> 00:05:27,539
And I'm not sure we fully understand why.

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00:05:27,539 --> 00:05:33,960
So, they actually had the Salmonella bugs
up there and that helped studying them in

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00:05:33,960 --> 00:05:36,430
that weightless environment helped you figure
out how to kill them?

81
00:05:36,430 --> 00:05:38,529
That led directly to a vaccine.

82
00:05:38,529 --> 00:05:43,789
You know basically as crew members we have
two roles, we're either lab technicians/helpers

83
00:05:43,789 --> 00:05:46,939
or whatever or lab rats.

84
00:05:46,939 --> 00:05:52,599
So, but seriously we are the subject of a
lot of experiments that are looking at the

85
00:05:52,599 --> 00:05:53,599
human body.

86
00:05:53,599 --> 00:05:55,809
We’re looking at our osteoporosis.

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00:05:55,809 --> 00:05:59,360
Ways to counter act osteoporosis because of
the bone loss that we have in space.

88
00:05:59,360 --> 00:06:05,069
There’s a lot of cardiac studies on how
to reduce the effects of cardiac disease.

89
00:06:05,069 --> 00:06:08,409
How to boost the human body’s immune system.

90
00:06:08,409 --> 00:06:09,720
Again the list goes on and on.

91
00:06:09,720 --> 00:06:15,369
There’s a lot of medical breakthroughs that
have and will continue to be brought on by