
PAO

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00:00:01,656 --> 00:00:06,176
[Dan Huot] I'm joined on console now
by Mike Ewert who is the co-inventor

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00:00:06,176 --> 00:00:08,846
of a pretty fascinating device
that's come out of a lot

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00:00:08,846 --> 00:00:11,676
of space research, a solar powered refrigerator.

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00:00:12,246 --> 00:00:15,936
Now Mike why don't you tell us a little
bit about the work, kind of what it is.

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00:00:15,936 --> 00:00:20,236
I mean obviously it's a refrigerator, keeps
things cool for extended periods of time.

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00:00:20,236 --> 00:00:21,616
What's so special about this one?

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00:00:22,196 --> 00:00:22,686
[Mike Ewert] Okay Dan.

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00:00:23,456 --> 00:00:27,696
Uh, yeah it's actually technology development
work that began quite a few years ago.

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00:00:28,116 --> 00:00:32,436
Obviously we need refrigeration in
space as well as down here on Earth.

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00:00:32,506 --> 00:00:37,636
And we were actually looking at
cooling lunar bases originally.

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00:00:38,206 --> 00:00:46,186
And looking at the power that was available

on the moon and solar power is abundant

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00:00:46,186 --> 00:00:51,896
and during the day when we need the most
cooling is when the sun was most available.

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00:00:52,406 --> 00:00:56,876
So I started looking at the synergy
between the solar photovoltaic power source

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00:00:57,346 --> 00:00:59,476
and the power needed for the compressor.

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00:01:00,486 --> 00:01:07,536
That eventually led to looking at applications
on Earth because obviously we need new,

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00:01:07,536 --> 00:01:12,446
renewable energy sources on Earth and
we started working on refrigerators

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00:01:12,836 --> 00:01:15,826
that were directly powered by the sun.

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00:01:16,646 --> 00:01:22,026
So it's a traditional compressor type
refrigerator but the unique thing is

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00:01:22,026 --> 00:01:30,486
that the photovoltaic solar panel is
tied directly to the compressor and runs

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00:01:30,536 --> 00:01:33,046
in proportion to the amount
of sunshine available.

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00:01:33,316 --> 00:01:35,736
So we call it a battery free solar refrigerator.

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00:01:35,736 --> 00:01:38,286
[Dan] So battery for, it doesn't have a battery.

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00:01:38,286 --> 00:01:41,086
It's not, you know, plugged into a
power grid or anything like that.

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00:01:41,086 --> 00:01:43,726
This is directly just one-hundred
percent solar powered.

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00:01:43,986 --> 00:01:44,376
[Mike] Correct.

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00:01:45,166 --> 00:01:50,886
And so one thing that was required to make that
work is to have some kind of energy storage.

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00:01:51,326 --> 00:01:54,806
Traditionally out in areas
where you don't have electricity

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00:01:54,806 --> 00:01:58,826
where you might have a solar powered
refrigerator you'd have a large bank

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00:01:58,826 --> 00:02:01,496
of batteries that would store electrical energy

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00:02:01,496 --> 00:02:05,466
to run the refrigerator overnight
or when there's clouds.

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00:02:06,306 --> 00:02:11,816
So in this case we actually built a bank
of ice inside the refrigerator walls

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00:02:12,136 --> 00:02:19,366
by letting the compressor run extra during the
day and freeze this water in the walls into ice

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00:02:19,366 --> 00:02:23,826
and then it would keep the cold overnight
or during extended cloudy periods.

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00:02:24,386 --> 00:02:26,026
[Dan] Okay and lets' talk about, you know,

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00:02:26,026 --> 00:02:28,846
some of the applications of
having something like this.

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00:02:28,846 --> 00:02:32,516
I mean, obviously you're not going to
have big batteries or anything like that.

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00:02:32,516 --> 00:02:33,526
So you're saving weight.

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00:02:34,306 --> 00:02:37,006
What are some of like the
real, you mentioned the moon,

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00:02:37,336 --> 00:02:40,016
what are some of the space
applications something like this?

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00:02:40,856 --> 00:02:45,206
[Mike] Alright, so in space we need
refrigeration for medical samples,

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00:02:45,816 --> 00:02:51,936
for food potentially and for just cooling
the astronauts, cooling the habitat.

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00:02:52,586 --> 00:02:56,926
And that's, like I mentioned the original
place we were looking at the concept was

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00:02:57,286 --> 00:02:58,996
for cooling an entire lunar base.

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00:02:59,516 --> 00:03:05,306
But on a smaller scale there might be
experiments out in any hot environment in space.

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00:03:05,816 --> 00:03:10,146
Talk about the moon in particular because
it gets up to about 250 degrees Fahrenheit

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00:03:10,146 --> 00:03:12,626
on the surface of the moon during at midday.

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00:03:13,046 --> 00:03:14,776
So that's a very hot environment.

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00:03:15,136 --> 00:03:17,056
And if we would have an experiment

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00:03:17,056 --> 00:03:21,106
out on the surface there's a very good
chance it need to be cooled in some way.

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00:03:21,526 --> 00:03:24,646
So if we could run directly from the sunshine

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00:03:24,646 --> 00:03:28,816
that is available then we
could keep the experiment cool.

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00:03:29,666 --> 00:03:33,256
[Dan] And, I mean, you just
said to cool the entire base.

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00:03:33,256 --> 00:03:36,516
So I mean this is kind of like a
technology that could eventually, you know,

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00:03:36,826 --> 00:03:41,356
right now it's a refrigerator so it's, you know,
kind of like maybe a cooler size or something.

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00:03:41,356 --> 00:03:44,726
You're envisioning this to be something
that could cool an entire, you know,

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00:03:44,726 --> 00:03:46,736
outpost on something like the moon.

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00:03:47,326 --> 00:03:48,896
[Mike] Right it is very scalable.

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00:03:49,076 --> 00:03:52,106
We can use a larger solar
array, larger compressor.

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00:03:52,946 --> 00:03:56,456
So basically, we think of an
air-conditioning system for the larger scale.

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00:03:56,976 --> 00:04:02,156
And we did an experiment here at Johnson
Space Center in building 29 a few years back.

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00:04:02,596 --> 00:04:09,806
We had a 10 kilowatt solar array
outside the building and we had a 15,

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00:04:10,206 --> 00:04:16,186
I mean a 5-ton heat pump unit, similar
to what you would have at your house,

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00:04:16,496 --> 00:04:18,796
that was running directly from the solar panel.

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00:04:19,486 --> 00:04:21,976
So yeah, it can be scaled
to a solar refrigerator.

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00:04:21,976 --> 00:04:23,766
It can be scaled up to building cooling.

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00:04:23,766 --> 00:04:28,686
The reason that the commercialization
has favored the refrigerator is just

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00:04:28,686 --> 00:04:31,896
because of the cost of the
solar panels right now.

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00:04:31,976 --> 00:04:34,606
For air-conditioning it would
take quite a few solar panels.

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00:04:35,696 --> 00:04:38,476
So there's not quite the market for that yet.

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00:04:39,016 --> 00:04:42,416
But we've seen the solar
refrigerator application

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00:04:42,916 --> 00:04:47,766
in off-grid type scenarios is
starting to take off commercially.

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00:04:48,086 --> 00:04:48,446
[Dan] Okay.

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00:04:48,446 --> 00:04:51,686
So right now you really, you got your design.

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00:04:51,686 --> 00:04:52,996
You have a solar refrigerator.

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00:04:52,996 --> 00:04:57,106
So what are some of the applications you can
find here on Earth for something like that?

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00:04:57,106 --> 00:05:00,976
Obviously, you know, places that don't
have ready access to power I'd imagine.

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00:05:02,006 --> 00:05:02,546
[Mike] Exactly.

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00:05:02,616 --> 00:05:10,446
So we see this as, here in the U.S. it's
probably more like recreational cabins,

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00:05:10,446 --> 00:05:16,896
you know, hunting cabins, something like that
where there's no power around for refrigeration.

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00:05:17,496 --> 00:05:24,286
But there's almost 2 billion people in the
world that don't have access to electricity.

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00:05:24,786 --> 00:05:27,496
And so that's where the real
strong application is.

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00:05:27,496 --> 00:05:32,136
A lot of countries don't have an
electric grid, but they do have sunshine,

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00:05:32,546 --> 00:05:38,546
can have a solar refrigerator
to cool food for commerce

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00:05:38,546 --> 00:05:44,126
and sell products that need cooling, produce.

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00:05:44,566 --> 00:05:48,616
We see a lot of different
applications potential for this.

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00:05:48,706 --> 00:05:57,086
A little bit of work has been done with a
milk tank cooler, refrigerated transport

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00:05:57,086 --> 00:06:01,306
like refrigerated trucks or trains
has been looked into a little bit.

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00:06:01,856 --> 00:06:07,406
But the application that is taking
off first is to provide cooling

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00:06:07,406 --> 00:06:11,566
for vaccines in these developing countries.

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00:06:12,716 --> 00:06:18,796
Just last year the World Health
Organization certified our solar refrigerator

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00:06:20,026 --> 00:06:22,706
for use as a vaccine solar refrigerator.

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00:06:23,416 --> 00:06:28,176
And so that has allowed the company that
has licensed this technology from NASA

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00:06:28,726 --> 00:06:32,846
to begin marketing those
vaccine solar refrigerators.

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00:06:33,236 --> 00:06:37,216
[Dan] So, I mean, we're already seeing
some real, you know, real useful,

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00:06:37,216 --> 00:06:40,006
real important applications just
right here down on the ground.

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00:06:40,566 --> 00:06:44,156
And you, you said you're

the co-inventor of this.

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00:06:44,156 --> 00:06:52,296
So you just recently, you had just
recently gotten an innovation award

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00:06:52,296 --> 00:06:53,776
or an inventor award from NASA right?

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00:06:53,776 --> 00:06:56,646
Tell us a little a little
bit about that real quick.

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00:06:56,646 --> 00:06:57,196
[Mike] Okay.

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00:06:57,196 --> 00:07:03,866
My co-inventor David Bergeron and I
received the NASA Commercial Invention

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00:07:03,866 --> 00:07:05,766
of the Year Award for 2011.

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00:07:05,766 --> 00:07:15,316
It's kind of a lengthy process because the
patents were actually issued back in 2001.

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00:07:15,316 --> 00:07:22,216
But the company that David actually
started, Sundance Refrigeration,

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00:07:22,216 --> 00:07:30,056
just licensed the technology in 2010.

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00:07:30,056 --> 00:07:36,026
And so after that licensing occurred then
they were free to market products and,

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00:07:36,026 --> 00:07:42,026

as I mentioned, the World Health Organization certification made for a more salable product.

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00:07:42,026 --> 00:07:42,746
[Dan] Okay.

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00:07:42,746 --> 00:07:49,836
Well, Mike I really want to thank you coming on here with me today.

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00:07:49,836 --> 00:07:54,476
It's a really exciting technology and it's great to see, you know, something designed initially

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00:07:54,476 --> 00:07:57,566
for space is already getting so much great use down here on the ground.

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00:07:57,566 --> 00:08:00,126
It's already going to be impacting a lot of lives.

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00:08:00,316 --> 00:08:02,666
So Mike, again thank you so much for being on.

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00:08:02,666 --> 00:08:05,276
We're really excited to hear about the invention.

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00:08:05,276 --> 00:08:08,206
Looking forward to seeing some more applications for it.

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00:08:08,206 --> 00:08:09,036
[Mike] Thank you very much.

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00:08:09,036 --> 00:08:10,736
Glad to be here.

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00:08:10,736 --> 00:08:13,816
And I do hope that the technology that we work