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00:00:00,556 --> 00:00:04,496
>> Dan Huot: Hey, everybody, Dan
Huot here and you're joining me

2
00:00:04,536 --> 00:00:06,396
at the spaceflight
meteorology group.

3
00:00:06,516 --> 00:00:08,596
We're right around the
corner from Mission Control

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00:00:09,036 --> 00:00:10,456
and joining me today is --

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00:00:10,456 --> 00:00:13,046
from the National Weather
Service is Frank Brody.

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00:00:13,136 --> 00:00:14,316
Frank, thanks so much

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00:00:14,316 --> 00:00:16,866
for letting us come
inside your facility today

8
00:00:16,866 --> 00:00:18,486
and telling us a little
bit about what you do.

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00:00:18,486 --> 00:00:20,116
>> Frank Brody: Good
morning, it's a pleasure

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00:00:20,116 --> 00:00:20,826
to have you here, Dan.

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00:00:21,156 --> 00:00:22,166
>> Dan Huot: So let's

get right into it.

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00:00:22,236 --> 00:00:24,696

What exactly does the
spaceflight meteorology

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00:00:24,696 --> 00:00:25,046

group do?

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00:00:25,046 --> 00:00:26,596

What are you guys
responsible for?

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00:00:26,596 --> 00:00:28,546

>> Frank Brody: Well, first the
spaceflight meteorology group is

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00:00:28,546 --> 00:00:29,886

part of the National
Weather Service

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00:00:30,546 --> 00:00:33,846

and we are a special
unit focused

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00:00:33,846 --> 00:00:36,746

on supporting NASA's
unique requirements

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00:00:36,746 --> 00:00:37,776

for human spaceflight.

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00:00:38,246 --> 00:00:40,216

>> Dan Huot: So you were
heavily involved, I assume then,

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00:00:40,216 --> 00:00:41,946

in the shuttle and
every single launch

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00:00:41,946 --> 00:00:43,146
and landing of that vehicle.

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00:00:43,196 --> 00:00:44,726
Tell us a little bit
about that experience.

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00:00:44,726 --> 00:00:44,816
>> Frank Brody: Yes.

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00:00:44,816 --> 00:00:47,146
Actually the spaceflight
meteorology group, or SMG,

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00:00:47,146 --> 00:00:49,406
has been here at
Johnson Space Center

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00:00:49,406 --> 00:00:51,636
since the Space Center
started in the early '60s.

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00:00:52,076 --> 00:00:57,256
So SMG supported Gemini,
Apollo, the shuttle --

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00:00:57,256 --> 00:00:59,906
the entire length of the
shuttle program from STS1,

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00:00:59,906 --> 00:01:03,726
all the way through the last
mission, last summer, STS135.

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00:01:04,646 --> 00:01:07,616
So we've been here through it
all, providing weather support

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00:01:08,206 --> 00:01:10,656

to make sure the launches
and landings were safe.

33

00:01:11,016 --> 00:01:11,426

>> Dan Huot: Okay.

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00:01:11,426 --> 00:01:14,406

And what are some of the factors
that you guys look out for?

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00:01:14,406 --> 00:01:16,866

I know the shuttle
would sometimes scrub

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00:01:16,866 --> 00:01:18,346

for different weather
related things.

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00:01:18,386 --> 00:01:20,486

What, what kind of weather
are you guys always tracking

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00:01:20,586 --> 00:01:22,536

that could affect these
launches and landings?

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00:01:22,616 --> 00:01:23,966

>> Frank Brody: Well,
for the space shuttle,

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00:01:23,966 --> 00:01:26,586

that was a very weather
sensitive vehicle.

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00:01:26,586 --> 00:01:29,556

As large as it was and
as imposing as it was,

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00:01:30,126 --> 00:01:33,716

it was very -- weather had a

big impact on both the launch,

43

00:01:33,716 --> 00:01:35,776
on the launch situation
and the landing.

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00:01:36,696 --> 00:01:40,276
So the conditions that we
would watch would be lightning,

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00:01:40,556 --> 00:01:45,526
that's a big issue, low
cloud ceilings were a, could,

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00:01:45,746 --> 00:01:49,756
could be a problem because that
way, when either on a return

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00:01:49,756 --> 00:01:51,766
to launch site abort
or on the final planned

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00:01:51,766 --> 00:01:54,586
into mission landing, that way
the commander would be able

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00:01:54,586 --> 00:01:57,136
to have time to visually
see the runway

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00:01:57,386 --> 00:01:58,606
because it's just a glider.

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00:01:59,896 --> 00:02:05,676
The other factors that we looked
out for were regular rain,

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00:02:06,526 --> 00:02:09,236
rain couldn't be
within a certain radius

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00:02:09,236 --> 00:02:10,886
of the shuttle's
launch or landing path.

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00:02:11,726 --> 00:02:16,236
Also turbulence, moderate or
greater turbulence was a factor.

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00:02:17,006 --> 00:02:19,786
So -- and, and possibly one

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00:02:19,786 --> 00:02:21,826
of the biggest issues
was crosswinds.

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00:02:22,666 --> 00:02:27,166
If the wind was blowing across
the runway, too, too hard,

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00:02:27,696 --> 00:02:30,696
that could be an issue with the
shuttle landing, since, again,

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00:02:30,696 --> 00:02:32,616
it was essentially a
heavy weight glider.

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00:02:32,776 --> 00:02:32,916
>> Dan Huot: Yeah.

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00:02:33,296 --> 00:02:35,596
And you weren't only
monitoring that weather

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00:02:35,596 --> 00:02:37,906
for the Kennedy Space Center,
you also had to monitor,

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00:02:38,066 --> 00:02:39,986

like you said, kind of
like the, the other,

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00:02:39,986 --> 00:02:42,716

the over the ocean landing sites
and things like that as well.

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00:02:43,246 --> 00:02:47,116

>> Frank Brody: Yes, because a
shuttle couldn't launch unless

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00:02:47,116 --> 00:02:49,016

it can land pretty
quickly somewhere.

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00:02:49,596 --> 00:02:54,276

So there were several
transoceanic abort landing sites

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00:02:54,536 --> 00:02:56,846

in Europe and Northern
African during the course

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00:02:56,846 --> 00:02:59,956

of the shuttle program and at
least one of those locations had

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00:02:59,956 --> 00:03:01,196

to have acceptable weather

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00:03:01,506 --> 00:03:03,196

for the shuttle to
be able to launch.

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00:03:04,006 --> 00:03:07,626

In addition, on launch day
and of course on landing day,

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00:03:07,626 --> 00:03:10,186

we were watching the other
landing sites in the U.S.,

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00:03:10,186 --> 00:03:13,496
not only Kennedy but Edwards
Air Force Base and White Sands,

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00:03:13,806 --> 00:03:16,466
in case on launch day,
there was an abort once

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00:03:16,466 --> 00:03:18,886
around contingency possibility.

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00:03:19,036 --> 00:03:21,876
And of course on landing day, we
were watching all the U.S. sites

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00:03:22,216 --> 00:03:23,726
for the landing weather.

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00:03:24,266 --> 00:03:24,686
>> Dan Huot: Okay.

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00:03:24,686 --> 00:03:26,866
So you guys were kind of all
over the map with shuttle.

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00:03:26,866 --> 00:03:28,736
Well, let's move a
little bit forward and get

82

00:03:28,736 --> 00:03:30,466
into what you guys
are working on today.

83

00:03:30,556 --> 00:03:32,426
Now our astronauts are
launching and landing

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00:03:32,426 --> 00:03:33,896
on Russian Soyuz vehicles

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00:03:34,016 --> 00:03:37,046
and I understand you don't
do the weather calculations

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00:03:37,046 --> 00:03:38,466
and predictions for
those vehicles,

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00:03:38,696 --> 00:03:41,256
but you are heavily involved
in a lot of the logistics,

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00:03:41,296 --> 00:03:42,756
getting people there
and things like that.

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00:03:43,536 --> 00:03:44,166
>> Frank Brody: That's correct.

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00:03:44,316 --> 00:03:49,656
The Spaceflight Meteorology
Group is forecasting for the

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00:03:49,746 --> 00:03:55,136
in route forecast when the
NASA planes leave Houston to go

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00:03:55,136 --> 00:03:59,226
to Kazakhstan to retrieve the
U.S. astronauts that just landed

93

00:03:59,226 --> 00:04:02,506
on the Soyuz and then
bring them back home.

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00:04:03,306 --> 00:04:07,446

And for that reason,
it's a long flight to go

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00:04:07,446 --> 00:04:10,546

from Ellington Field, near
Houston to Kazakhstan.

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00:04:10,976 --> 00:04:15,246

First, they go to Goose Bay,
Canada, they stop and refuel.

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00:04:15,636 --> 00:04:18,366

Then they go across the
ocean to Prestwick, Scotland.

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00:04:19,546 --> 00:04:22,556

And then from there,
to Kazakhstan,

99

00:04:22,986 --> 00:04:27,046

and then await the landing,
load up the astronauts,

100

00:04:27,776 --> 00:04:31,486

bring them back, reverse their
route and come all the way back.

101

00:04:31,486 --> 00:04:35,506

So what the Spaceflight
Meteorology Group does is

102

00:04:35,506 --> 00:04:39,636

forecast the weather that that
NASA plane will experience

103

00:04:39,686 --> 00:04:43,386

in route, all the way from
Texas to Eastern Canada

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00:04:43,826 --> 00:04:46,086

to the Northern U.K.
to Kazakhstan and back,

105
00:04:46,506 --> 00:04:49,366
to make sure that the weather
will not -- will be acceptable,

106
00:04:49,646 --> 00:04:51,866
that the big storms
won't be there.

107
00:04:51,866 --> 00:04:54,246
Or if they are, what are
the alternate locations

108
00:04:54,246 --> 00:04:56,246
or the alternate routes
that the plane could take.

109
00:04:56,246 --> 00:04:57,986
And it has done that
a couple of times.

110
00:04:58,226 --> 00:05:00,686
>> Dan Huot: So, again, you guys
are kind of all over the map

111
00:05:00,686 --> 00:05:03,716
and I know we had some
-- a little bit --

112
00:05:03,716 --> 00:05:05,336
a couple of maps up, what, what,

113
00:05:05,516 --> 00:05:07,106
what exactly are we
looking at over here?

114
00:05:07,106 --> 00:05:09,486
I can see we've got the

whole world up right now.

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00:05:09,486 --> 00:05:09,846
>> Frank Brody: Well, right here

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00:05:09,846 --> 00:05:15,636
on the center screen is a
weather map that shows the path

117

00:05:15,966 --> 00:05:17,846
in the blue line,
that's the path

118

00:05:18,006 --> 00:05:20,896
that the NASA flight
will take or did take

119

00:05:21,626 --> 00:05:25,706
and will take any time that
they go overseas to Kazakhstan

120

00:05:26,146 --> 00:05:29,496
and it's going from Texas to
Eastern Canada, to the U.K.,

121

00:05:29,496 --> 00:05:31,706
to Kazakhstan, and then they
reverse that, going back.

122

00:05:32,126 --> 00:05:36,636
And the, the lines on
the map are isobars,

123

00:05:36,636 --> 00:05:39,686
which are pressure lines, which
tell us, the meteorologists,

124

00:05:39,956 --> 00:05:41,946
where the high pressure
systems are,

125

00:05:41,946 --> 00:05:45,536

the low pressure systems
are, the fronts and things --

126

00:05:45,716 --> 00:05:47,086

and the, and the
moisture patterns

127

00:05:47,086 --> 00:05:49,126

where there might be rain
or thunderstorms or snow.

128

00:05:49,286 --> 00:05:50,936

>> Dan Huot: Pretty much
anything that could hold them

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00:05:50,936 --> 00:05:52,186

up or impede their trip.

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00:05:52,446 --> 00:05:52,686

>> Frank Brody: Right.

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00:05:52,806 --> 00:05:55,716

So with our, our
[inaudible] system,

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00:05:55,716 --> 00:05:57,346

which is our National
Weather Service System,

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00:05:57,606 --> 00:06:01,156

we are able superimpose the
flight path on the weather map

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00:06:01,986 --> 00:06:04,416

so that we can better
predict the weather

135

00:06:04,416 --> 00:06:07,326
and then we create a graphic,
based on the simplified version

136
00:06:07,326 --> 00:06:09,446
of that, that we send
to the flight crews

137
00:06:09,666 --> 00:06:13,106
and the mission managers so they
can also see, at a quick glance,

138
00:06:13,356 --> 00:06:16,126
what kind of weather patterns
this plane will be experiencing

139
00:06:16,126 --> 00:06:17,766
as they go over and come back.

140
00:06:18,396 --> 00:06:18,746
>> Dan Huot: Okay.

141
00:06:18,746 --> 00:06:20,606
Well, now I want to
jump into the future

142
00:06:20,686 --> 00:06:22,356
of this spaceflight
meteorology group.

143
00:06:22,356 --> 00:06:25,266
You guys protected all
of America's space fleet

144
00:06:25,266 --> 00:06:27,116
in the past and you're
also going to be looking

145
00:06:27,116 --> 00:06:28,926
out for its future

Spaceship Orion.

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00:06:28,976 --> 00:06:30,576

Tell us about some of the work you're doing for them.

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00:06:31,776 --> 00:06:35,396

>> Frank Brody: Orion is the next human spaceflight program

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00:06:35,396 --> 00:06:39,206

that NASA is pursuing and SMG is --

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00:06:39,586 --> 00:06:42,766

has a couple of areas that we're doing for support.

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00:06:42,876 --> 00:06:47,656

First, we're consulting with NASA on the, the,

151

00:06:47,836 --> 00:06:50,756

the weather flight rules and the instrumentation

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00:06:51,056 --> 00:06:53,356

that will be necessary for a successful flight.

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00:06:54,166 --> 00:06:57,136

Since Orion has planned to land in the Eastern Pacific,

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00:06:57,546 --> 00:07:00,156

that will be a much different situation than a shuttle,

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00:07:00,156 --> 00:07:01,236

which landed on a runway.

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00:07:01,896 --> 00:07:06,396

So we've been investigating things like wave heights and how

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00:07:06,396 --> 00:07:10,066

to get weather data in an area where there is no weather data.

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00:07:10,556 --> 00:07:14,576

And upper air data, where there is no upper air balloons

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00:07:14,656 --> 00:07:16,986

and so we've in, in a consulting role for that.

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00:07:17,756 --> 00:07:23,126

For Orion Flight Test 1, which is scheduled for two years

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00:07:23,706 --> 00:07:25,646

from now, which would be mid 2014,

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00:07:26,386 --> 00:07:29,396

we will providing operational support here at MSG

163

00:07:29,716 --> 00:07:31,946

for the actual landing in the Eastern Pacific

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00:07:31,996 --> 00:07:35,436

so that the right decisions can be made, both for launch

165

00:07:35,506 --> 00:07:37,746

and landing for that test flight.

166

00:07:38,396 --> 00:07:38,906

>> Dan Huot: Okay.

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00:07:38,906 --> 00:07:41,806

So watching the skies, you
know, for our past astronauts

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00:07:41,806 --> 00:07:43,866

and also looking out for
our future spacecraft.

169

00:07:44,266 --> 00:07:46,286

We'll be sure to
follow along and we'll,