1
00:00:01,046 --> 00:00:04,496
>> Hi now we're back here inside
the Space Food Laboratory here

2
00:00:04,496 --> 00:00:05,996
at the NASA Johnson Space Center

3
00:00:06,396 --> 00:00:08,576
and again earlier we've
been talking about some

4
00:00:08,576 --> 00:00:11,006
of the preparation and
talking about food and some

5
00:00:11,316 --> 00:00:14,266
of the menu items that crew
aboard the International Space

6
00:00:14,266 --> 00:00:16,156
Station will be having
this Thanksgiving

7
00:00:16,416 --> 00:00:18,226
and again we are here
with Vickie Kloeris,

8
00:00:18,226 --> 00:00:22,346
our NASA space scientist, tell
me this is just another area

9
00:00:22,346 --> 00:00:26,056
of that food lab so tell
me exactly what area are we

10
00:00:26,056 --> 00:00:26,546
in right now.

11
00:00:26,546 --> 00:00:29,336

Okay what you see behind
you is our packaging room

12
00:00:29,576 --> 00:00:33,006
and so it's really a portable,
commercial portable clean room

13
00:00:33,006 --> 00:00:35,316
that we've converted
into a packaging area

14
00:00:35,386 --> 00:00:37,566
so all our packaging
equipment is inside.

15
00:00:37,906 --> 00:00:40,516
It has Hepa filters
that filter the air

16
00:00:41,076 --> 00:00:44,196
to help keep the
contamination possibilities

17
00:00:44,316 --> 00:00:46,146
down when we're packaging food.

18
00:00:46,546 --> 00:00:49,606
So the type of food that you
would...we do all our beverages

19
00:00:50,076 --> 00:00:52,326
would be packaged here like
we have in this package

20
00:00:52,696 --> 00:00:55,736
and all our freeze
dried items as well

21
00:00:55,736 --> 00:00:59,646
as our bite sized products like

M and M's, cookies, crackers,

22
00:00:59,806 --> 00:01:03,106
candies all of those items would
be packaged in the equipment

23
00:01:03,256 --> 00:01:05,096
that you see here
in this facility.

24
00:01:05,166 --> 00:01:07,706
>> Okay great so tell me a
little about the packaging,

25
00:01:07,706 --> 00:01:10,036
what do we have, what
kind of packaging is this?

26
00:01:10,146 --> 00:01:12,646
>> The beverage package,
all of our beverages are

27
00:01:12,646 --> 00:01:17,106
in powdered form and so this
is a foil laminate pouch

28
00:01:17,106 --> 00:01:20,406
that we buy from a commercial
manufacturer, we buy it,

29
00:01:20,406 --> 00:01:22,986
it's sealed on three sides,
it's open on this end.

30
00:01:23,306 --> 00:01:25,816
We weigh in the appropriate
amount of powder

31
00:01:25,926 --> 00:01:28,756
for a single serving and

then the packaging equipment

32
00:01:28,756 --> 00:01:33,916
that you see here is designed
to seal the beverage adapter

33
00:01:33,916 --> 00:01:37,836
or the septum adapter assembly
into the end of the package

34
00:01:38,186 --> 00:01:41,136
and so this is what allows
the water to be injected

35
00:01:41,136 --> 00:01:44,016
on orbit using the
rehydration station.

36
00:01:44,386 --> 00:01:48,566
Inside this is a septum and the
septum is a little plastic valve

37
00:01:49,066 --> 00:01:53,526
so the needle inserts and the
water is injected and then

38
00:01:53,526 --> 00:01:55,976
when the needle is withdrawn
the septum closes off

39
00:01:55,976 --> 00:01:58,286
to prevent the fluid from
flowing out of the package.

40
00:01:58,456 --> 00:02:00,876
>> Okay, great and then they
just take this and shake it up

41
00:02:00,966 --> 00:02:02,846
and then insert a straw...

42
00:02:03,076 --> 00:02:05,656
>> Yeah into the package
and drink through the straw.

43
00:02:05,806 --> 00:02:06,046
>> Okay.

44
00:02:06,046 --> 00:02:07,746
>> And the straw has
a clamp on it so that

45
00:02:07,746 --> 00:02:09,816
in between sips they
can clamp it closed

46
00:02:10,196 --> 00:02:12,756
to prevent the fluid
from flowing out.

47
00:02:12,886 --> 00:02:16,096
>> The re-hydratable products
all require the addition

48
00:02:16,096 --> 00:02:18,566
of some amount of water
prior to consumption,

49
00:02:18,926 --> 00:02:21,676
has the same septum
adaptor assembly,

50
00:02:21,946 --> 00:02:24,826
in this case they inject the
water, they wait for the product

51
00:02:24,826 --> 00:02:27,856
to absorb the water then they're
able to cut the package open

52
00:02:27,926 --> 00:02:30,666
with scissors and eat out of the
package with a fork or a spoon.

53
00:02:31,206 --> 00:02:33,866
Typically what they'll do
is cut an X across the top,

54
00:02:34,296 --> 00:02:37,236
they'll eat out of the
center of the X and the flaps

55
00:02:37,236 --> 00:02:39,676
from the remaining material
will help hold the rest

56
00:02:39,766 --> 00:02:43,076
of the product inside the
package while they extract the

57
00:02:43,076 --> 00:02:44,886
bite that they're going to eat.

58
00:02:44,886 --> 00:02:45,076
>> Okay.

59
00:02:45,226 --> 00:02:46,816
>> You're depending
on the surface tension

60
00:02:46,816 --> 00:02:49,626
of the wet product to cause
it to stick to the package

61
00:02:49,896 --> 00:02:51,486
or stick to your utensil.

62
00:02:51,666 --> 00:02:56,146
>> So there's no turkey carving

up there, it's just the scissors

63
00:02:56,146 --> 00:02:58,326
and they cut it open and
eat that just as that is.

64
00:02:58,676 --> 00:03:00,856
So talk to me a little bit
about...so this is what he is

65
00:03:00,856 --> 00:03:03,956
doing actually right behind
us, there's some packaging now,

66
00:03:04,026 --> 00:03:08,636
can you tell me about how long
in advance do we typically start

67
00:03:08,636 --> 00:03:11,686
to prepare food that is
going to flown into space?

68
00:03:11,686 --> 00:03:14,506
>> Well, we have to maintain
an inventory of our products

69
00:03:14,666 --> 00:03:20,216
at all times and so typically
we'll be producing...we produce

70
00:03:20,456 --> 00:03:23,856
like our thermo stabilized
products we'll produce those

71
00:03:23,856 --> 00:03:24,376
year round.

72
00:03:24,576 --> 00:03:24,696
>> Okay.

73
00:03:24,906 --> 00:03:26,876
>> Because it will
take us an entire year

74
00:03:26,876 --> 00:03:28,976
to produce all the
different kinds

75
00:03:28,976 --> 00:03:30,766
of thermo stabilized
products that we have.

76
00:03:31,466 --> 00:03:35,506
Beverages we're going to
package those usually as needed

77
00:03:35,786 --> 00:03:37,876
and so typically for a ship set

78
00:03:38,296 --> 00:03:41,476
for beverages we'll start
packaging those about four

79
00:03:41,506 --> 00:03:43,986
of five months in
advance of the time

80
00:03:44,116 --> 00:03:47,636
that shipment is actually
going to go out the door.

81
00:03:48,016 --> 00:03:48,106
>> Okay.

82
00:03:48,106 --> 00:03:51,766
>> And re-hydratables usually
we try to package those

83
00:03:52,006 --> 00:03:55,596

in about...within about a six
or eight month period prior

84
00:03:55,596 --> 00:03:57,136
to the shipment going
out the door.

85
00:03:57,136 --> 00:03:57,736
>> Okay, great.

86
00:03:58,026 --> 00:04:01,086
So this is the packaging
but talk to me a little bit

87
00:04:01,146 --> 00:04:04,156
about the packing, how
is this food packed to go

88
00:04:04,156 --> 00:04:05,346
up into the International
Space Station.

89
00:04:05,346 --> 00:04:07,776
>> Okay well we have a
couple of different options

90
00:04:07,996 --> 00:04:11,046
for actually the containers
that we use to send the food

91
00:04:11,076 --> 00:04:15,026
to orbit, one is a collapsible
metal food container,

92
00:04:15,376 --> 00:04:18,176
typically we use that when we're
sending food on the Progress

93
00:04:18,556 --> 00:04:20,946
because the Progress

has slots built into it

94
00:04:20,946 --> 00:04:22,516
that hold those containers.

95
00:04:22,986 --> 00:04:26,636
Another option that we often
use is what we call our bulk

96
00:04:26,746 --> 00:04:30,396
overwrap bag, it's really
just a large plastic bag

97
00:04:30,586 --> 00:04:32,866
that we overwrap
the contents of one

98
00:04:32,866 --> 00:04:34,346
of those metal containers in.

99
00:04:34,616 --> 00:04:36,346
And we're typically using

100
00:04:36,426 --> 00:04:38,806
that when we're sending
food on the ATV or HTV.

101
00:04:38,806 --> 00:04:43,016
>> Okay and these are cargo
ships of the different agencies

102
00:04:43,016 --> 00:04:44,196
that we have [inaudible].

103
00:04:44,636 --> 00:04:45,796
>> Unmanned cargo vehicles.

104
00:04:46,036 --> 00:04:46,716
>> Right, Okay.

105
00:04:46,816 --> 00:04:49,866
>> Okay and now with Space X the
new commercial cargo [inaudible]

106
00:04:49,916 --> 00:04:53,156
we're also using the
bulk overwrap bags,

107
00:04:53,266 --> 00:04:56,616
the plastic overwrap bags
which I can show you later.

108
00:04:56,786 --> 00:04:57,006
>> Sure.

109
00:04:57,486 --> 00:05:00,836
>> And they take those and
actually put them inside

110
00:05:00,896 --> 00:05:04,226
of the crew transfer
bag, or the MO2 bags,

111
00:05:04,336 --> 00:05:07,006
the different...we
have an example of one

112
00:05:07,006 --> 00:05:08,786
in there in the lab as well.

113
00:05:09,076 --> 00:05:09,236
>> Okay.

114
00:05:09,586 --> 00:05:11,626
>> But they typically take
those bulk overwrap bags

115
00:05:11,686 --> 00:05:16,776

and stow them inside another
container to get them to orbit.

116
00:05:17,046 --> 00:05:20,196
>> Great, okay now as you
know we've been answering some

117
00:05:20,196 --> 00:05:21,876
questions from people that
we've polled and thanks

118
00:05:22,046 --> 00:05:24,706
to our total followers just
sending these questions.

119
00:05:24,706 --> 00:05:26,676
Now one of the questions
and this kind of talks

120
00:05:26,676 --> 00:05:28,826
about the future space feed
system and so I'd like you

121
00:05:28,826 --> 00:05:30,856
to kind of go on and
talk to me a little

122
00:05:30,856 --> 00:05:34,256
about what technologies we're
exploring for space feed system

123
00:05:34,256 --> 00:05:36,916
because obviously International
Space Station is one place

124
00:05:36,946 --> 00:05:38,536
and then there are further
destinations that's we'd

125
00:05:38,536 --> 00:05:39,136

like to go.

126
00:05:39,336 --> 00:05:39,526
>> Right.

127
00:05:39,526 --> 00:05:42,696
>> And we need food to sustain
us for longer periods of time.

128
00:05:43,016 --> 00:05:45,546
One of these questions are
given a true space galley,

129
00:05:45,546 --> 00:05:46,986
this comes from Todd Templeman,

130
00:05:47,536 --> 00:05:49,566
what's the most useful
edible we could grow

131
00:05:49,566 --> 00:05:51,796
in an attached green
house, thanks.

132
00:05:51,796 --> 00:05:55,936
>> Okay so there's two ways
to look at that question,

133
00:05:56,356 --> 00:05:59,286
in transit if you were
say on your way to Mars

134
00:05:59,676 --> 00:06:02,456
on a six month mission, which
now we know it will take

135
00:06:02,886 --> 00:06:05,066
with current propulsion it
will take about six months

136
00:06:05,116 --> 00:06:10,336
to get there you could grow
some crops during the transit

137
00:06:10,576 --> 00:06:12,026
but typically those would have

138
00:06:12,106 --> 00:06:14,416
to be what we call
pick and eat crops.

139
00:06:14,846 --> 00:06:17,796
Meaning something like a cherry
tomato that you could grow,

140
00:06:18,116 --> 00:06:20,316
you could harvest and
basically all you'd have

141
00:06:20,316 --> 00:06:21,616
to do is clean it and eat it.

142
00:06:22,076 --> 00:06:25,186
Because in micro gravity you're
not really going to be able

143
00:06:25,186 --> 00:06:29,486
to do a lot of the
elaborate processing of crops

144
00:06:29,646 --> 00:06:33,346
or elaborate cooking because
without gravity that gets very,

145
00:06:33,346 --> 00:06:36,916
very difficult so it's not
really practical to think

146
00:06:36,916 --> 00:06:39,916

about growing wheat in micro
gravity and then having

147
00:06:39,916 --> 00:06:42,096
to mill it into flour,
that's not going

148
00:06:42,096 --> 00:06:43,136
to work in micro gravity.

149
00:06:43,466 --> 00:06:48,256
But when you get to the surface
of the moon or Mars and you have

150
00:06:48,606 --> 00:06:49,976
and you're on the
surface where you have

151
00:06:49,976 --> 00:06:53,416
at least partial gravity you can
certainly then begin to think

152
00:06:53,416 --> 00:06:56,716
about the possibility
of either growing crops

153
00:06:56,866 --> 00:07:01,226
to help you recycle your air and
water and then also using them

154
00:07:01,626 --> 00:07:05,956
as part of your food system or
also the possibility of taking

155
00:07:06,486 --> 00:07:09,966
like bulk ingredients
with you say like flour

156
00:07:10,286 --> 00:07:12,656
and then doing more

elaborate cooking...

157
00:07:12,656 --> 00:07:15,896
>> So not having our
food already prepared

158
00:07:15,896 --> 00:07:18,266
but actually kind of
putting ingredients together

159
00:07:18,516 --> 00:07:19,046
to prepare a dish.

160
00:07:19,046 --> 00:07:22,176
>> Actually doing real cooking,
probably you're not going to do

161
00:07:22,176 --> 00:07:26,696
that 100 percent because it does
take a lot more free time and so

162
00:07:26,776 --> 00:07:29,516
in that situation it's probably
going to end up being a mix

163
00:07:29,966 --> 00:07:33,136
of prepackaged foods and
perhaps stuff that you prepare.

164
00:07:33,406 --> 00:07:35,436
>> Kind of like the
cooking I do at home.

165
00:07:35,556 --> 00:07:36,306
>> Right, exactly.

166
00:07:36,446 --> 00:07:39,016
>> All right...well
thank you that's a wrap

167
00:07:39,016 --> 00:07:42,076
on the food wrap here and how
it's wrapped here at NASA,

168
00:07:42,076 --> 00:07:44,216
the NASA Space Food Lab,
again with Vickie Kloeris,

169
00:07:44,526 --> 00:07:46,476
from our kitchen to
yours, happy Thanksgiving.