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# Faraday Packaging Project

## Interim Crit

Design a revolutionary and ground breaking concept for either a new or existing everyday food or drink product of your choice. Ideas should be innovative and as unique as possible, and not currently available in the format, materials or design on shelf today. They should also focus on sustainability.

**pro<sup>2</sup>pac**

the complete food and drink  
processing & packaging event

17-20 March 2013 • ExCeL London



Gray HAM 77116897

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# THE FUTURE

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## Prof. Cathy Barnes, Faraday Centre For Retail Excellence

- What is packaging?
- Why do we need packaging?
- What materials are used to make packaging?

## Dr Benjamin Punchard, Global Director of Packaging Insight

- 1 Household sizes are shrinking, homes are getting smaller and household budgets are being squeezed
- 2 Mobile devices are an increasingly important part of our lives, how will this impact packaging?
- 3 The state will force corporations to become more responsible for consumers
- 4 Over 55's are becoming the most coveted and influential demographic for marketers
- 5 One-size-fits-all is dead, consumer want the ability to have some sort of input into what they buy

they lied to us

- What is packaging?

- Why do we need packaging?

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**this was**

1 Household sizes are shrinking, homes are getting smaller and household budgets are being squeezed

2 Mobile devices are an increasingly important part of our lives, how will this impact packaging?

3 The state will force corporations to become more responsible for consumers

4 What is's sure we're going to need to create and distribute digital content for mobile devices

5 Online content is all over the place, even when the ability to have some sort of control over what they buy

**supposed to be**

**the future**

where is my jetpack,

where is my robotic companion,

where is my dinner in pill form,

where is my hydrogen fueled automobile,

where is my nuclear powered levitating house,

where is my cure for this disease

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Who has no choice  
but to consume  
packaged food all  
the time?



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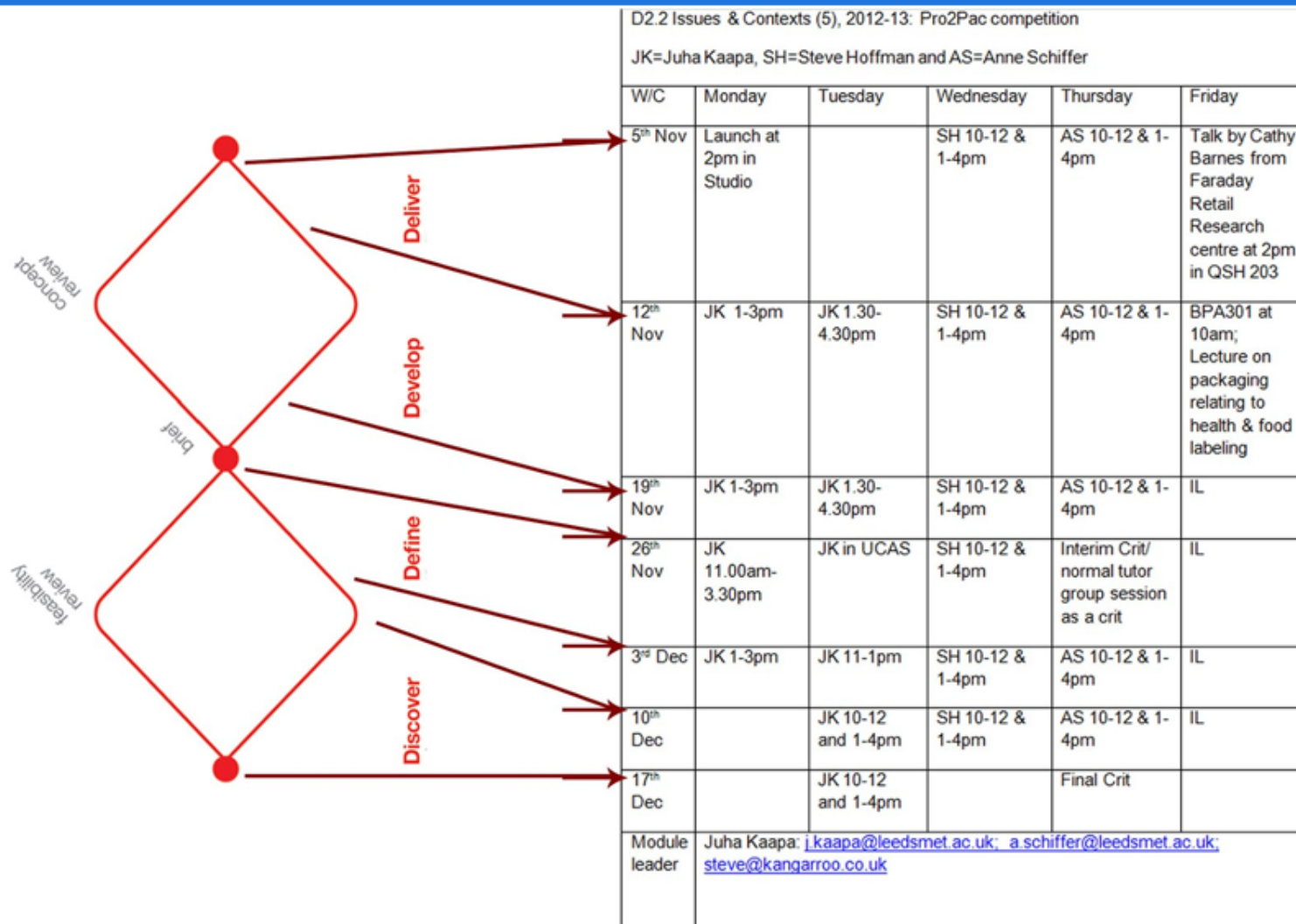
# Gray's Brief

The focus is on the future, kansei, and sustainability.

Space travel is as inevitable as air travel or seafaring. I've taken Virgin Galactic as a case study, as well as all the food being brought up to space by various astronauts from all over the world.

Rather than the bland packaging being used by government agencies, these private space agencies have an identity to establish.

A lot of the principles of packaging still apply, and soon all our descendants will be going to space just like we would take a plane to another continent. It's better we start thinking about it now.





### Kansei Engineering: Nestlé embraces the Kansei design method for a better emotional connection with consumers



Kansei engineering is a Japanese design philosophy that is based on blending design with consumers' instinctive emotional connection to products.

The methodology was developed in the seventies by Professor Mitsuo Nagamachi, formerly Dean of Hiroshima University and was initially applied to car design. Kansei is based on translating into design attributes the meaning, and use, of words that consumers choose to describe how they feel about brands and products. This generates a range of data, which are statistically analysed to define the optimum combination of design criteria. The processed data

provide clear directions for designing new packaging solutions that will reflect the product and brand values.

#### Nestlé Packaging and Design

Nestlé has a strong capability in packaging and design, and has a large global network of more than 500 packaging experts. Packaging serves a number of purposes, such as:

- Product protection during distribution and storage
- A vehicle for communication about the product and related matters, such as its nutritional attributes
- Functionality for the user, such as easy-to-open, re-sealable, portion controlled
- Attractiveness, which consumers expect in good products

Design is therefore a key component of a packaging solution. In addition to its internal design teams, Nestlé works with several Universities and Design Colleges, world-wide, as well as with selected Design Agencies.

#### Nestlé and Kansei

Nestlé has been exploring the opportunities that the Kansei engineering approach brings to packaging design, with the support of Professor Nagamachi as well as Design Perspectives from Faraday, and has done pioneering work in applying this technique to package design. Today, Kansei is one of the specific tools in Nestlé's Packaging and Design toolbox for consumer centric development. However, it does not replace the need for experienced industrial designers, graphic designers or packaging engineers whose skills are still needed to turn Kansei-generated data into tangible product packaging.





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BQ Question: Who in the world has no choice but to use packed food everyday?

Astronauts!

- because all space flights are actually limited, all food produced is on special order by government.

Private Space Flight?

Yes!

- Virgin Galactic → SpaceShip Two & White Knight Two
- XCOR Aerospace → Lynx Rocket plane
- Bigelow Aerospace → Genesis
- Bezos Space Company → Dream chaser

What foodstuffs?

Who has astronauts?  
(with our foodstuffs)

- Russian → USSR → toothpaste, tubes, pureed meat & chocolate sauce.
- American → NASA → Apollo "Spoon-bowl" → hot water rehydrated food, could stick to spoons!
- (Modern) → Chinese → Skylab warming trays, magnetic sealed cartons, frozen & spicy foods.
- Japanese → ISS → hydrolyzed rice, soups & drinks, pouch/canned foods, powder tea
- Korean → Canned Space Kimchi
- Russian → breakfast, lunch, supper, second supper.
- Swedish → moose jerky
- International Space Station → Tortillas & caffeine.

- 鱼香肉丝 yuxiang pork
- 宫保鸡丁 kung pao chicken
- 八宝饭 eight treasure rice
- chinese herbal tea
- mooncake
- reconstituted dried fruit
- 五香卤汁牛肉 beef?

Space food against of Virgin Atlantic

"Laurie" & "Express" & "Box"

typical: 60-70, 80s, 90s, 2000s, 2010s, 2020s, 2030s, 2040s, 2050s, 2060s, 2070s, 2080s, 2090s, 2100s, 2110s, 2120s, 2130s, 2140s, 2150s, 2160s, 2170s, 2180s, 2190s, 2200s, 2210s, 2220s, 2230s, 2240s, 2250s, 2260s, 2270s, 2280s, 2290s, 2300s, 2310s, 2320s, 2330s, 2340s, 2350s, 2360s, 2370s, 2380s, 2390s, 2400s, 2410s, 2420s, 2430s, 2440s, 2450s, 2460s, 2470s, 2480s, 2490s, 2500s, 2510s, 2520s, 2530s, 2540s, 2550s, 2560s, 2570s, 2580s, 2590s, 2600s, 2610s, 2620s, 2630s, 2640s, 2650s, 2660s, 2670s, 2680s, 2690s, 2700s, 2710s, 2720s, 2730s, 2740s, 2750s, 2760s, 2770s, 2780s, 2790s, 2800s, 2810s, 2820s, 2830s, 2840s, 2850s, 2860s, 2870s, 2880s, 2890s, 2900s, 2910s, 2920s, 2930s, 2940s, 2950s, 2960s, 2970s, 2980s, 2990s, 3000s, 3010s, 3020s, 3030s, 3040s, 3050s, 3060s, 3070s, 3080s, 3090s, 3100s, 3110s, 3120s, 3130s, 3140s, 3150s, 3160s, 3170s, 3180s, 3190s, 3200s, 3210s, 3220s, 3230s, 3240s, 3250s, 3260s, 3270s, 3280s, 3290s, 3300s, 3310s, 3320s, 3330s, 3340s, 3350s, 3360s, 3370s, 3380s, 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## Experiments

[edit]

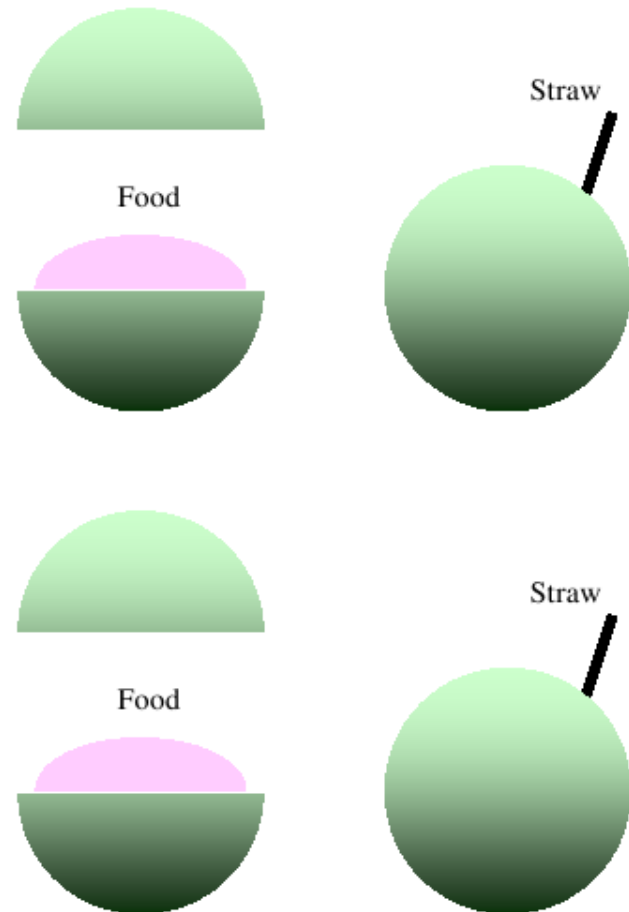
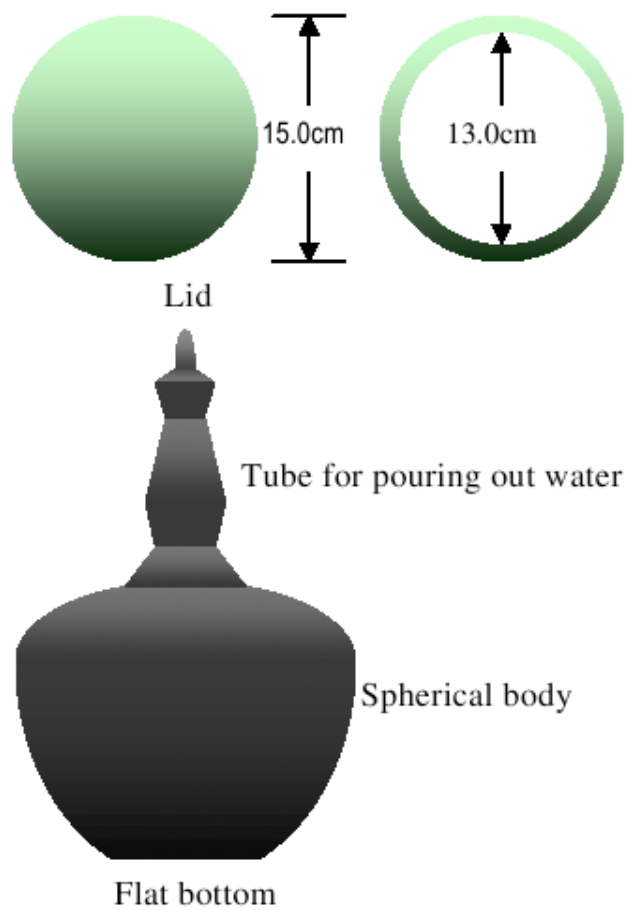
#	Experiment	Code	Description
1	Cells in Space	CIS	Study of the effects of microgravity and space radiation on eukaryotic cells focusing on changes in the structure and function at the cellular and molecular levels
2	Microbes in Space	MIS	Study of the effects of microgravity on motility of bacteria, drug resistances as well as changes in gene expression (using the <a href="#">microarray approach</a> ). Expect to show some effects of bacterial growth using a pre-determined <a href="#">minimum inhibitory concentration (MIC)</a> .
3	Protein Crystallisation in Space	PCS	The purpose of this experiment is to compare the crystal growth of <a href="#">lipases</a> on Earth with that grown in microgravity. Several test conditions will also be tested to improve the protein crystallisation process on Earth as well as in space.
4	Malaysian Food in Space	FIS	Increase the variety and quality of food available to space travelers by identifying new food items (specifically typical <a href="#">Malaysian dishes</a> ) that are appropriate for consumption during space flight.
5	Study of spinning motions in microgravity environment	TOP	A physics demonstration to show the effect of microgravity on the motions of spinning object using a <a href="#">top</a> .
6	PR and Symbolics	PAS	PR and Symbolics activities.

## Experiments

[edit]

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[http://www.spacefuture.com/archive/the\\_symbiotic\\_relationship\\_between\\_astronaut\\_program\\_and\\_space\\_tourism\\_development\\_a\\_third\\_world\\_perspective.shtml](http://www.spacefuture.com/archive/the_symbiotic_relationship_between_astronaut_program_and_space_tourism_development_a_third_world_perspective.shtml)



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## Typical menu onboard



### Courses:

A welcome drinks service followed by a full meal service served in two sections.

Welcome drinks

Starter and main meal served with drinks

Dessert and Tea & Coffee service

### Courses Express:

A full meal service served in two sections with combined drinks service

Starter and main meal served with drinks

Dessert and Hot Chocolate service

### Supper:

A full meal service served on late night flight

Starter, main and dessert served together with drinks

Dessert and Hot Chocolate Service

### Afternoon Tea/Breakfast Deli Box:

A self-contained deli style meal service consisting of time appropriate cold items





## Sample menu for flights to USA



### Courses:

A full meal service served in two sections

Starter and Main served together on a half tray

Separate Dessert and Hot Chocolate service

### Movie Snack:

Ice creams, popcorn or sweets will be served by the crew to all passengers

### Afternoon Tea:

A cold offering consisting of both sweet and savoury items served in a VAA Afternoon Tea Box



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### Sample menu for flights to the Far East



#### **Courses:**

A full meal service served in two sections  
Starter and Main served together on a half tray  
Separate Dessert and Hot Chocolate service

#### **Mid Flight Snacks:**

Cold items will be available for passengers throughout the flight

#### **Breakfast:**

A full hot breakfast served on a half tray with accompanying breakfast pastry and OJ



What is packaging?

Airline

Space food.

Physical protection

stop spilling, in time

keep from getting messy

Barrier protection

while being handled

for health & safety

Containment

from one item to another

disposal

Info dissemination

Marketing

-

-

Convenience

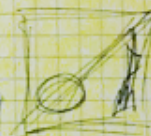
Reduce cost

Lunchboxes?

Bento boxes?

black + blum

- bento boxes are always partitioned
- mostly plastic, some others
- cubic, rectangular



1. smaller portions, cheaper packaging
2. mobile, information
3. health & sustainability
4. 55+ demographic
5. microsoft is dead

malaysia space group  
↓  
rubbish, unrecyclable stuff

What is packaging?

Define

Spice food.

Physical protection

stop spilling, in time

keep from getting messy

Barrier protection

while being handled

for health & safety

Containment

from moisture to air

the rest

Info dissemination

Marketing

Convenience

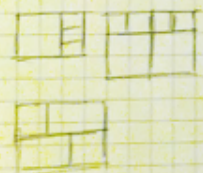
Reduce cost

Lunchboxes?

Bento boxes?

black + blue

- bento boxes are always partitioned
- mostly plastic, some others
- often reusable



1. Smaller portions, cheaper packaging
2. mobile, convenient
3. health & sustainability
4. 55+ demographic
5. workout is dead

malaysian spice guru

rubber, unrecyclable glass





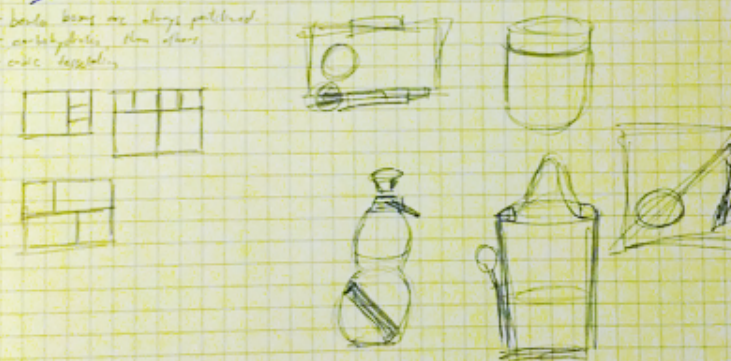
What is packaging?

	Antine	Spice food.
Physical protection	stop spilling, in time	keep from drying out
Barrier protection	with long shelf	for health & safety
Containment	from moisture to water	trapped
Info dissemination		
Marketing	-	-
Convenience		
Reduce cost		

Lunchboxes?

Bento boxes? → black + blue

- bento boxes are always partitioned
- mostly proteins, then others
- often vegetables



1. Smaller portions, cheaper packaging.
2. mobile information
3. health & sustainability
4. 55+ demographic
5. workout is done

malaysian spice guru.  
↓  
rubik's unscented glass





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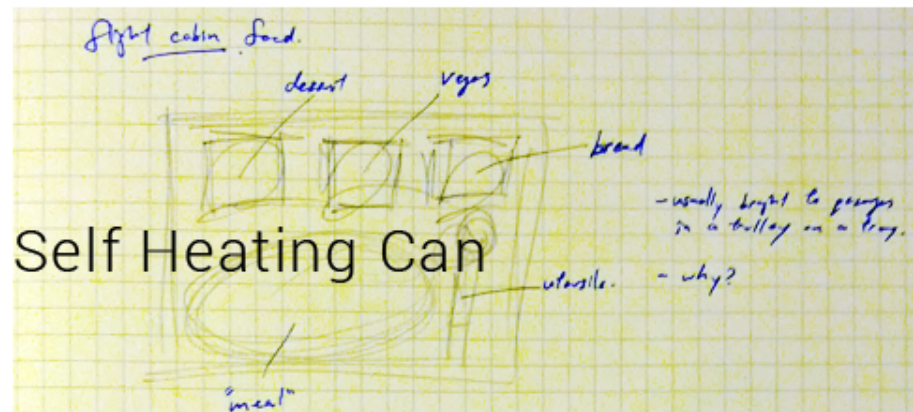


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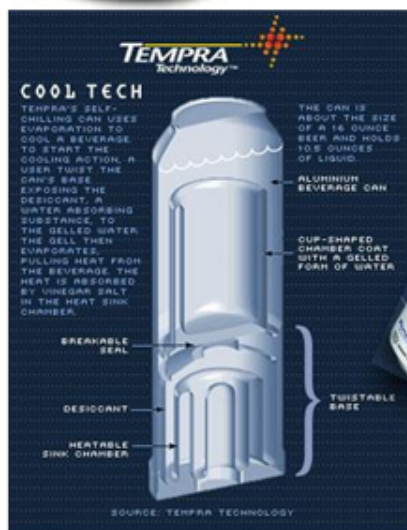


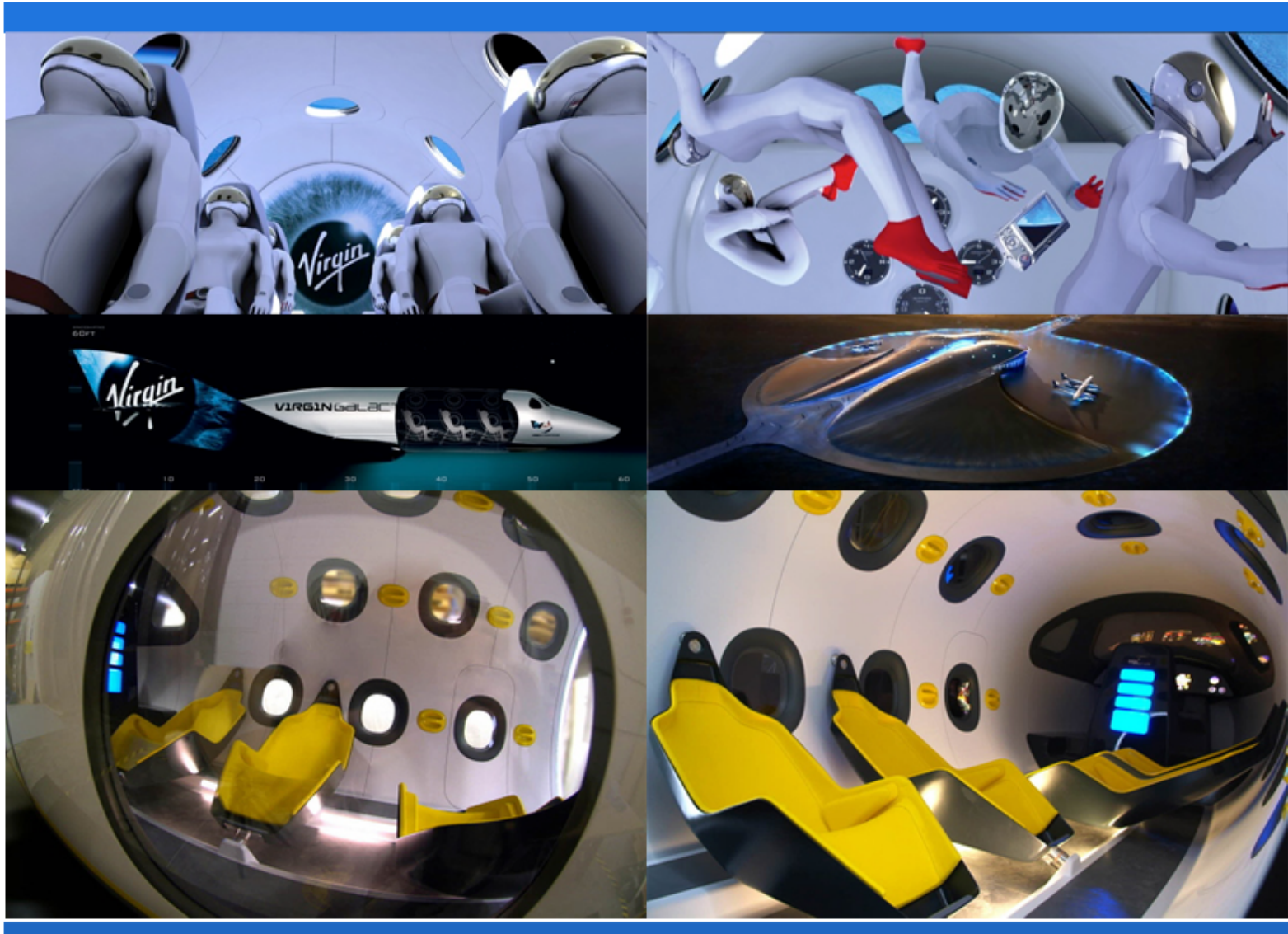


*Friends study: all med "corgals" made, assembled on trays & trolleys.*

*Shockable like dim sun?*

## Self Cooling Can





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Note: Japanese self-heating cans.

Who are the space tourists? →

American  
British  
Canadian

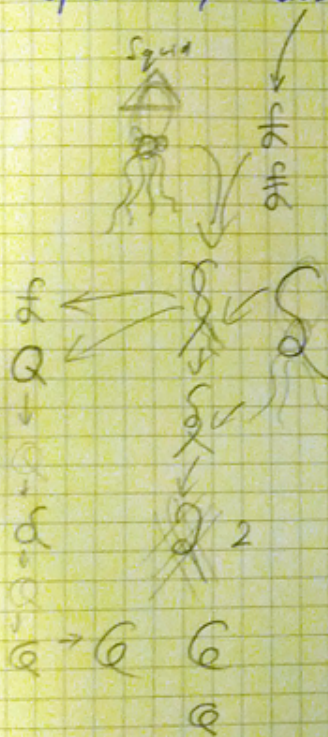
BRIC? Brazil, Russia, India, China

Space emergency? → QUID:

Quasi  
Universal  
Intergalactic  
Dinner

→ Traveler Co., London based PR

"Quintessential" Cuisine Study.



American burgers, hot dogs,

British Sunday roast, fish & chips, toad in the hole.

Canadian poutine (cheesy chips), butter tarts, maple cheese.

Brasillian Feijada, Corvaca

Indian ~ 33

Chinese ~ 8

Halal/Kashmir?

Russian

Note: Japanese Self-heating cans.

Who are the space tourists? → American  
British  
Canadian  
BRIC? Brazil, Russia, India, China

Space currency? → QUID: Quasi Universal  
→ Tawaka Co. London based PR

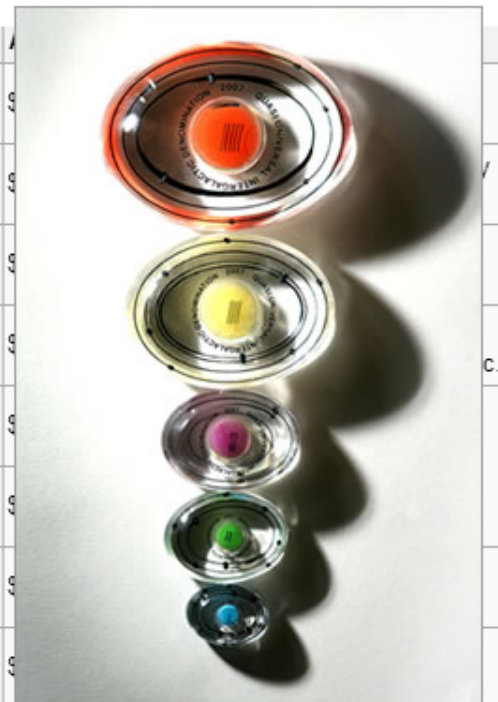
Space tourist	Nationality	Year	Duration of flight	Flight	Amount paid (USD)	Source of Wealth
1. Dennis Tito	American	2001	8 days (Apr 28 – May 6)	Launch: Soyuz TM-32 Return: Soyuz TM-31	\$20 million <sup>[22]</sup>	Investment management (Wilshire Associates)
2. Mark Shuttleworth	South African / British	2002	11 days (Apr 25 – May 5)	Launch: Soyuz TM-34 Return: Soyuz TM-33	\$20 million <sup>[23]</sup>	Software - internet security (Thawte)
3. Gregory Olsen	American	2005	11 days (Oct 1 – 11)	Launch: Soyuz TMA-7 Return: Soyuz TMA-6	\$20 million <sup>[24]</sup>	Optoelectronic sensors (Sensors Unlimited Inc.)
4. Anousheh Ansari	Iranian / American	2006	12 days (Sept 18 – 29)	Launch: Soyuz TMA-9 Return: Soyuz TMA-8	\$20 million <sup>[25]</sup>	Telecom (Telecom Technologies, Inc.)
5. Charles Simonyi <sup>[26]</sup>	Hungarian / American	2007	15 days (Apr 7 – 21)	Launch: Soyuz TMA-10 Return: Soyuz TMA-9	\$25 million <sup>[27]</sup>	Software (Microsoft Office)
		2009	14 days (Mar 26 – Apr 8)	Launch: Soyuz TMA-14 Return: Soyuz TMA-13	\$35 million <sup>[27]</sup>	
6. Richard Garriott <sup>[28]</sup>	American / British	2008	12 days (Oct 12 – 23)	Launch: Soyuz TMA-13 Return: Soyuz TMA-12	\$30 million <sup>[29]</sup>	Software gaming (Origin Systems)
7. Guy Laliberté	Canadian	2009	11 days (Sept 30 – Oct 11)	Launch: Soyuz TMA-16 Return: Soyuz TMA-14	\$40 million <sup>[30]</sup>	Performance art (Cirque du Soleil)



Foreign exchange specialist Travelex today unveiled a unit of currency that has been created for use in space. It is the first currency of its kind in the universe and has been developed in partnership with a team of scientists from the National Space Centre and the University of Leicester. With Virgin Galactic making its maiden voyage in 2009 and with the signing in April this year of the Global Exploration Initiative, an agreement between the US and the UK to work together on future planetary explorations to the Moon and beyond, Space Tourism is soon to become commonplace. Recognising that tourists could soon be heading further than Spain and Greece Travelex has teamed up with the National Space Centre to create the Quasi Universal Intergalactic Denomination or QUID. The QUID has been designed to withstand the stresses of space travel and the extreme environment found in orbit around the Earth. It has also been created so that it can be purchased on earth in any one of the 176 currencies used around the globe.



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American

British

Canadian

Russian

Chinese

Brazilian

Indian

Halal/Kosher

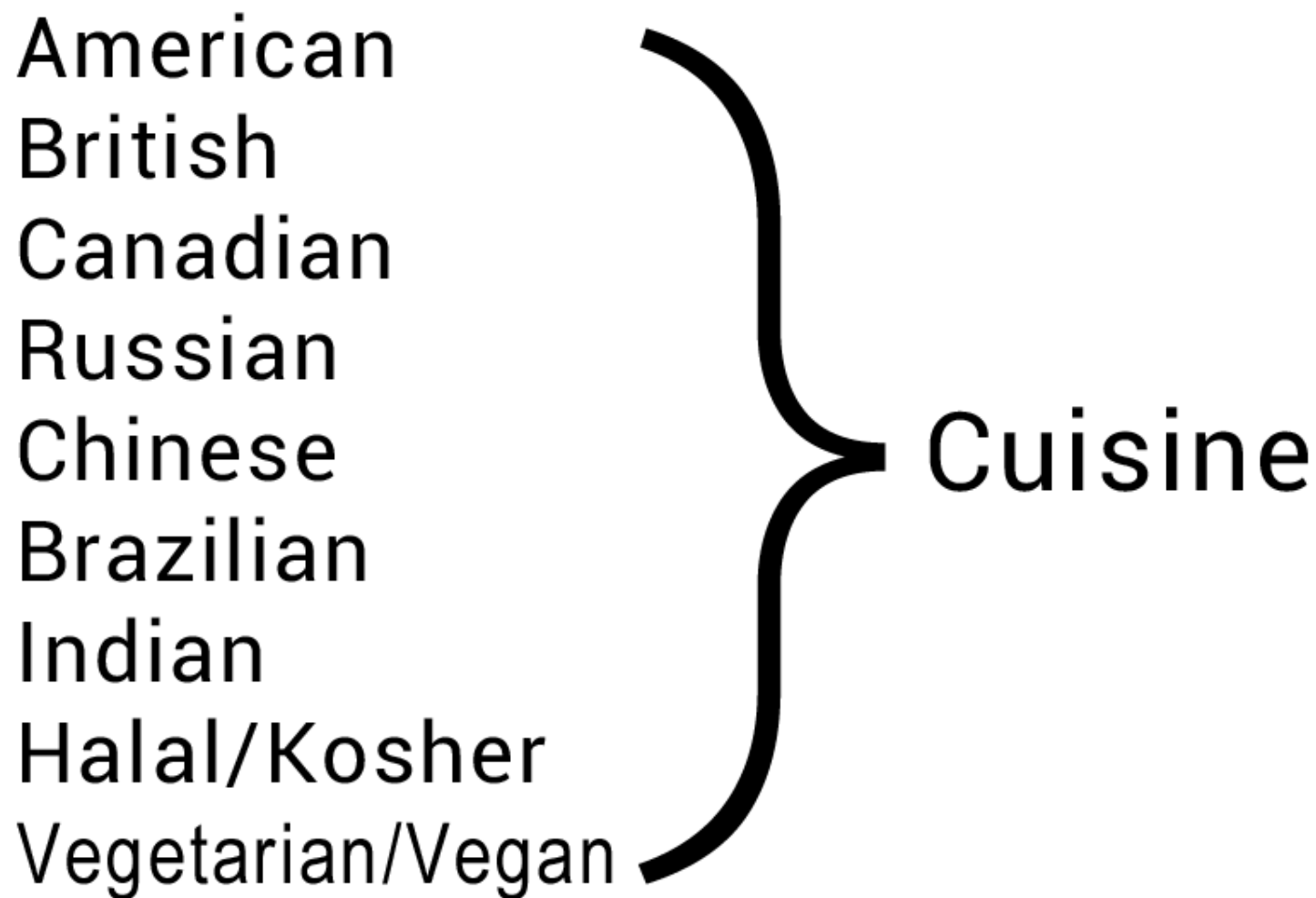
Vegetarian/Vegan



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American  
British  
Canadian  
Russian  
Chinese  
Brazilian  
Indian  
Halal/Kosher  
Vegetarian/Vegan

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# Food of the Apollo 11 Lunar Landing

July 16, 2009, 12:00 pm 12 Comments



Figure 1. Apollo rehydratable food packages

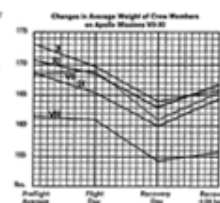
Apollo rehydratable food packaging. Via [hds.jsc.nasa.gov](http://hds.jsc.nasa.gov)

The Apollo 11 flight is remembered as a giant leap for mankind, a moment when the world came together to watch Buzz Aldrin and Neil Armstrong hop, skip, and jump across the lunar surface. But the glamour and excitement of the moon landing overshadowed the more menial aspects of the eight-day flight mission surrounded it, days filled with NASA-mandated rest periods, science experiments, and, of course, eating. The food aboard Apollo 11 represented the height of late 1960s technology, as much as the Lunar Landing Module or the spacesuits worn on moonwalks. Tubes of apple sauce and stew were ditched for meals that could be heated by the astronauts as eaten with real silverware.

The Apollo crew even [dined](#) on thermo-stabilized cheddar cheese spread and hot dog during the moon mission, bringing at least a bit of America in July to the sterile flight craft. And yes, there was bacon – foreshadowing the current bacon craze, the first meat eaten by man on the moon was none other than bacon cubes, coated with gelatin to combat crumbs.

Apollo 11 food had to satisfy some major requirements we never have to worry about here on Earth. Pre-flight body weight had to be maintained, something that had proved mysteriously difficult on previous missions. The graph, right from the *Autumn 1969 edition* (paid article) of the journal *Nutrition Today*, illustrates the dramatic weight loss suffered by Apollo astronauts.

After crunching the numbers back home, NASA revealed that Buzz Aldrin had expended 300 calories an hour on the moon, an amount akin to an hour of light yard work or running after the kids. Not



enough to worry about a severe weight loss, but add that amount to the stress and tension of being in space, and it's a small wonder that a main concern of dietary scientists was ensuring calorie-laden dinners.

## Apollo 11 meal pack and menu



Figure 5. Apollo meal pack.

Apollo 11 meal pack. Photo via [history.nasa.gov](http://history.nasa.gov)

Table 1 Flight Menu, Apollo 11			
Meal	Food	Portion	Weight (lb)
Breakfast	Instant oatmeal	1 cup	0.10
	Instant cereal	1 cup	0.10
	Instant pudding	1 cup	0.10
	Instant fruit	1 cup	0.10
Lunch	Instant noodle soup	1 cup	0.10
	Instant cereal	1 cup	0.10
	Instant pudding	1 cup	0.10
	Instant fruit	1 cup	0.10
Dinner	Instant noodle soup	1 cup	0.10
	Instant cereal	1 cup	0.10
	Instant pudding	1 cup	0.10
	Instant fruit	1 cup	0.10
Snack	Instant cereal	1 cup	0.10
	Instant pudding	1 cup	0.10
	Instant fruit	1 cup	0.10
	Instant cereal	1 cup	0.10

Apollo 11 Menu. View larger. Via [hds.jsc.nasa.gov](http://hds.jsc.nasa.gov)

## Requirements

Of course, these miracle meals had to be lightweight, compact, and edible in zero gravity. This last point was essential: hamburger buns are still banned on space flights because of the crumbs that might result (which is why [toaster](#) is so popular aboard the International Space Station). Until very recently, all drinks had to be sucked out of straws. Even the smallest drop of tomato juice had to be caught, in case it interfered with the craft in some way.

Another less obvious problem with space food was what to do with it once served its purpose and left the astronauts' bodies. The pleasant euphemism NASA created for this is "low residue." The other unpleasant fact is that in-flight nausea and other "undesirable physiological responses" during earlier Apollo missions had been attributed to food. There's nothing worse in a cramped, stuffy space cabin than a fellow astronaut with "enhanced gastric awareness."

To combat some of these difficulties, NASA scientists employed the "wet pack" food technology developed on Apollo 8. A wet pack allowed thermo-stabilized food to retain

its moisture content, thereby saving astronauts valuable food prep time. It also allowed them to see and smell what they were eating, rendering Beef and Potatoes a bit more appetizing.

## The spoon-bowl packet



Figure 19. Beef with vegetables in the spoon-bowl package, before and after rehydration. View larger. Photo via [hds.jsc.nasa.gov](http://hds.jsc.nasa.gov)

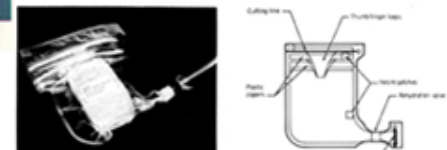


Figure 19. Rehydratable-food spoon-bowl package with water dispenser inserted in the rehydration valve.

Spoon-bowl packaging schematic. Via [history.nasa.gov](http://history.nasa.gov) (pdf)

A major improvement in food technology from the Apollo 11 mission was the spoon-bowl packet, allowing for food to be rehydrated and warmed in a pouch, which was then opened with a plastic clipper and eaten with a spoon. The moisture in the food made it cling to the spoon, even in a reduced-gravity environment. Sausage Patties, Pork With Scalloped Potatoes, and Chicken Stew were some of the delicacies packed in spoon-bowls and enjoyed by our guys in space during the Apollo 11 mission.

## Beverages

Some of the most telling details about space appetites on Apollo 11 come from the beverage side of things. For the first time, coffee was brought up for the astronauts: fifteen cups for each man, with Aldrin requesting black, Michael Collins with sugar, and Neil Armstrong's light and sweet. Oddly enough, Tang, the orange-flavored drink powder associated so closely with the early space program, was not aboard Apollo 11.

In *First Man: The Life of Neil A. Armstrong*, by James R. Hansen, Aldrin said, "I can't remember for the other flights, but before ours, the throw of us dutifully sampled the orange drink and instead chose an orange grapefruit mixture as our citrus drink." Also MIA was that staple of science museum gift shops, astronaut ice cream. The astronauts settled instead on desserts like bite-sized brownies and pineapple cake.

But how did the food taste?



Apollo 11 Peaches (left), Chocolate pudding (right). View larger. Photo via [hds.jsc.nasa.gov](http://hds.jsc.nasa.gov)

All of this spoon-bowl and wet pack talk leads us to ask the question, "How did it taste?" There's surprisingly little data about that. Dr. Malcolm Smith, the Chief of Food and Nutrition at NASA for the Apollo 11 flight, reported in the *Autumn 1969 edition of Nutrition Today* (paid article) that astronauts Armstrong, Aldrin, and Collins "enjoyed the food we had put aboard. The variety was satisfactory, and there was enough to satisfy their hunger and maintain their performance."

Buzz Aldrin enjoyed the shrimp cocktail, explaining later that, "The shrimp were chosen one by one to be sure they would be tiny enough to squeeze out of the food packet, and they were delicious." From *First Man: The Life of Neil A. Armstrong* we learn that Neil Armstrong's favorite meal was spaghetti with meat sauce, scalloped potatoes, fruitcake cubes, and grape punch, a spread that certainly sounds *Retro Recipe* ready.



## Conclusion

The 1974 [case document](#) (pdf) about Apollo food systems reveals the hard work and care that went into feeding astronauts. Thermo-stabilized hot dogs, packs of dehydrated chicken salad and the like were all the "result of the efforts of a large group of people of diverse backgrounds, interests, and skills." Each person in this group was "taught up in a desire to contribute to a glamorous, adventuresome, and authentic program of space exploration" during the Apollo missions.

Food technology might seem like small space potatoes when compared to the intricacies of rocketry and climate control systems, but the physical and mental well-being of the astronauts, and by extension the success of the mission, depended on details as small as cheddar cheese spread and brownie bites.

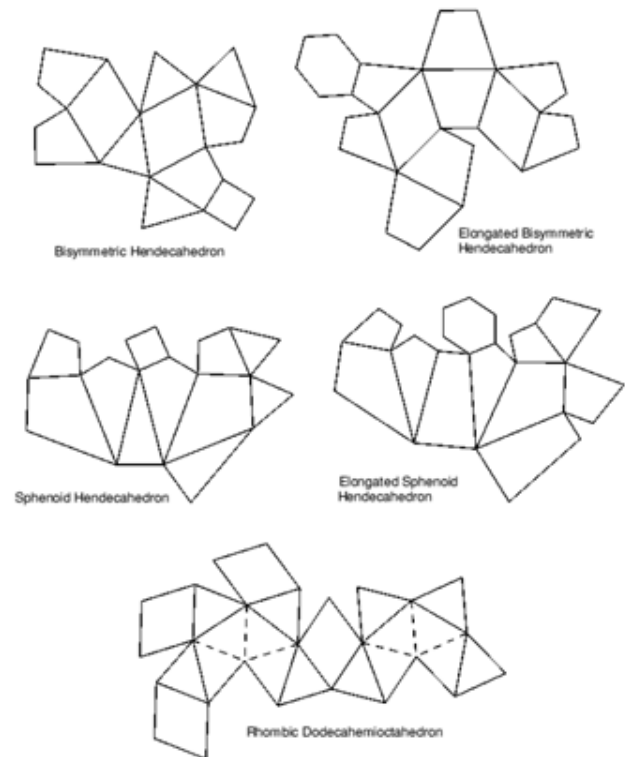
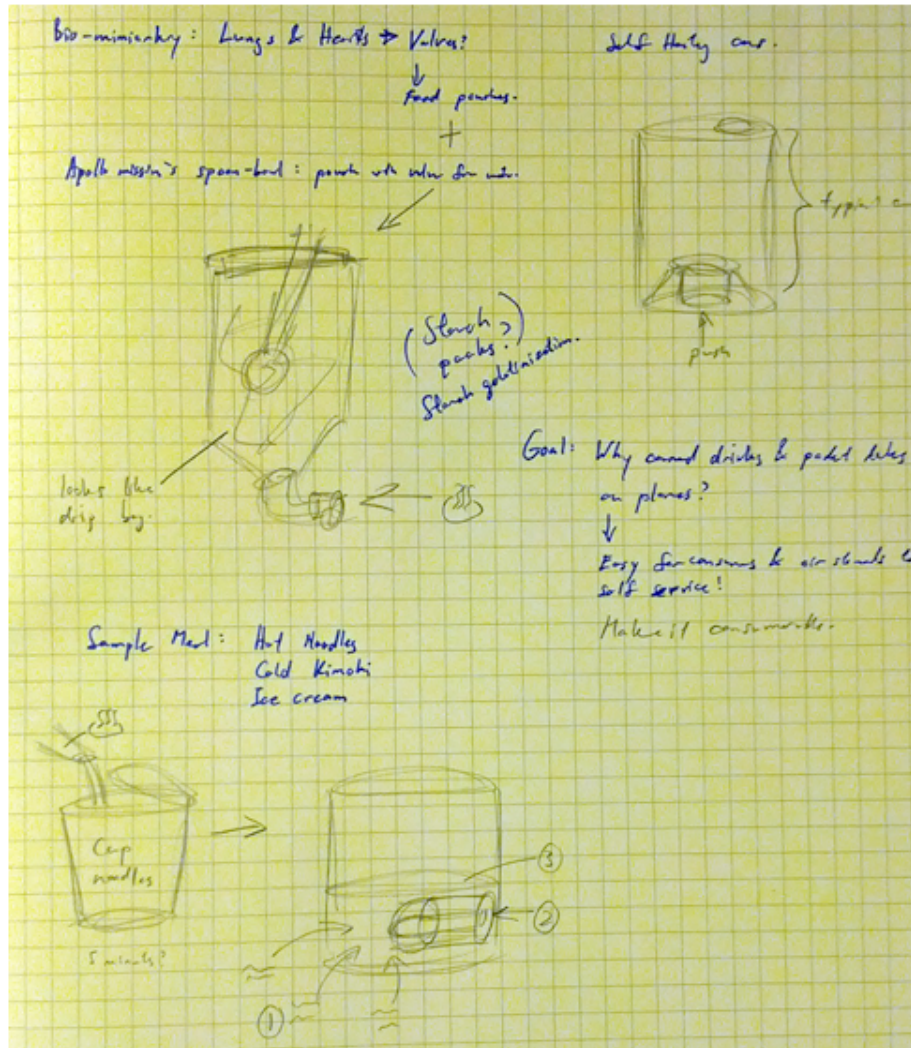
—Stephanie Butler

Video: NASA Apollo 11: Chicken Stew: "Delicious"





<http://www.notquitenigella.com/2010/02/03/all-about-airline-food-behind-the-scenes-at-emirates-airlines/>





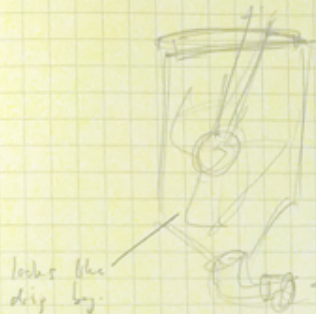
Bio-mimicry: Lungs & Hearts → Valves?

Self-filling one

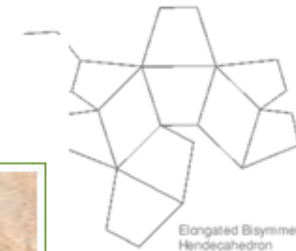
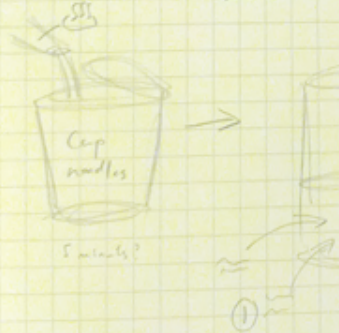
## A Self-Filling Water Bottle

Written by **Philip Proefrock** on 28/11/12

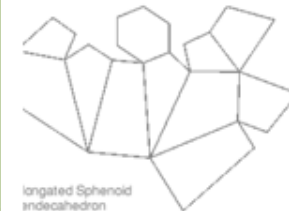
Asphalt mixer's spoon-bowl: pour



Sample Meal: Hot Noodles  
Cold Kimchi  
Ice cream



Elongated Bisymmetric  
Hendecahedron



elongated Sphenoid  
icosahedron



hemioctahedron

The need for water is important in many parts of the world without the infrastructure to provide safe drinking water. There are many personal technologies that can be used water purification or water gathering. While the idea of a self-filling water bottle may at first sound like magic, it's based on nanotechnology and biomimicry.

**NBD Nano** is named for the Namib Desert Beetle, whose shell functions to collect water for the insect, and which served as the inspiration for the technology. The technique behind this uses hydrophilic (water retaining) and hydrophobic (water repelling) coatings to concentrate moisture in the air onto the hydrophilic surfaces, and then, as the droplets become big enough, the water runs into a central collector. A small fan is used to move air over the surface to improve collection.

The company is pursuing a variety of possible applications for the technique. While it is not yet a commercial product, this offers a possibility of making water scarcity less of a problem in an increasingly water-dependent world.

**What next?**