

**Conference for Food Protection
2023 Issue Form**

Issue: 2023 III-018

Council Recommendation: Accepted as Submitted _____ Accepted as Amended _____ No Action _____

Delegate Action: Accepted _____ Rejected _____

All information above the line is for conference use only.

Issue History:

This is a brand new Issue.

Title:

Commercial Space Travel and Food Safety

Issue you would like the Conference to consider:

Creation of a Commercial Space Food Safety Committee

Public Health Significance:

Space missions as defined by space station, lunar mission(s), asteroid mission(s), Mars mission(s) and or other off-Earth missions require food safety for astronauts. Private space missions (commercial flying) are increasing but there are no defined criteria for food safety for these private missions.

This topic is an Issue because we have no evidence that the food is being held to standard. We know that food for Government program astronauts must meet high standards, we don't know if commercial space food must meet those same standards.

Not all food is created equal and not all food can go into space. The commercialization of flights cross that barrier affecting both food that travels into space and is consumed during or after the event.

Various newspaper articles depict commercial space travel food consumption, cold pizza and lamb. See attached PDF documents for reference: Daily Breeze Article, Axiom Article, 2 Million Dollar Bacon Sando article, and Kimchi Article New York Times. It should also be noted that foods like kimchi and a bacon sandwich, were specially developed to fly in space. This took years of research and millions of dollars to achieve. NASA currently has 250 food items that have been approved for space travel; the question still lies within, for commercial space travel, there are no known standards that would protect consumed food - Was it cooled correctly, held at a safe temperature, transported safely, stored correctly, served correctly, disposed of properly/off gassing/crumbs?

In addition, the after travel/space port celebrations: there may be the desire to celebrate with an after-flight toast. Such situations also create circumstances where short duration weightlessness is experienced. If a person experiences nausea, vomiting, and/or diarrhea,

it may not be known if these symptoms are due to weightlessness or a foodborne illness event. There should be standards in place to provide protection for the individuals experiencing the post-flight celebration where alcoholic beverages and food are involved.

Because commercial space companies are already seeking food provisions for their missions, it is important to address commercial space food safety. And to investigate whether or not regulations and policy should be found needed in the protection of people participating in commercial space program missions.

NASA currently has standards which include four areas of food safety: packaging/containerization, facility design, cleaning, and food engineering/testing; however these standards do not apply to commercial space travel. Since NASA guidelines do not address commercial space travel food safety, this gap needs to be addressed.

Recommended Solution: The Conference recommends...:

That a special committee be formed to explore commercial space food safety. This should be done in order to have a more robust conversation about this Issue. The Committee should be charged with:

1. Research and investigate current standards for food safety for commercial space travel;
2. Recommending to the FDA that it considers adding commercial space food providers as part of the definition for FOOD ESTABLISHMENT;
3. Drafting standards for food safety and commercial space travel that meet or exceed NASA standards for food safety;
4. Standards should address food handling practices, holding temperatures, cooling parameters, sanitary storage of food, and other associated requirements;
5. Review and update standards as research informs additional needs; and
6. Report back to the Conference in 2025 with recommendations.

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Supporting Attachments:

- "Daily Breeze Article"
- "Axiom Article"
- "2 Million Dollar Bacon Sando Article"
- "Kimchi Article New York Times"

It is the policy of the Conference for Food Protection to not accept Issues that would endorse a brand name or a commercial proprietary process.

Daily Breeze Article

SpaceX's Inspiration4 update: Cold pizza, zero-gravity flips and a ukulele solo

Hawthorne-based SpaceX's crew of amateur astronauts will return to Earth on Saturday evening

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This photo provided by SpaceX shows the passengers of Inspiration4 in the Dragon capsule on Friday, Sept. 17. They are, from left, Chris Sembroski, Jared Isaacman, Sian Proctor and Hayley Arceneaux. SpaceX got them into a 363-mile (585-kilometer) orbit following Wednesday night's launch from NASA's Kennedy Space Center. That's 100 miles (160 kilometers) higher than the International Space Station. (SpaceX)

By [TYLER SHAUN EVAINS](#) | tevains@scng.com |

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This photo provided by SpaceX shows Hayley Arceneaux, one of the passengers of Inspiration4 in the Dragon capsule on Friday, Sept. 17. (SpaceX)

Two days into Hawthorne-based SpaceX's Inspiration4 mission, the Earth-orbiting crew of amateur astronauts provided a lively livecast update on its journey on Friday, Sept. 17, 24 hours before they're due to splash down off the Florida coast.

The event included zero-gravity tumbles, lots of high spirits, displays of artwork created in space and an interstellar ukulele solo.

During the livestream, the crew announced that the quartet was scheduled to return to Earth at 4:06 p.m. PDT Saturday, splashing down into the Atlantic Ocean off the coast of Florida.

SpaceX's Dragon capsule was scheduled to perform two burns Friday night to reduce the spacecraft's altitude to 365 kilometers, SpaceX tweeted Friday, to align the craft with its landing site.

Dragon reached as high as 590 kilometers, or 367 miles, above earth's surface before the astronauts took off their space suits, said Andy Tran, quality engineer at SpaceX, during the update.

[Dragon lifted off Wednesday](#) at NASA's Kennedy Space Center in Florida.

Aboard the history-making, fund-raising flight are the [four amateur astronauts](#): mission commander Jared Isaacman, billionaire CEO of payment processing company Shift4 Payments, who funded the trip; mission pilot Sian Proctor, a geoscientist and community college professor in Arizona; mission medical officer Hayley Arceneaux, a physician's assistant at St. Jude Children's Research Center in Memphis, TN; and mission specialist Chris Sembroski, an aerospace data engineer.

Their first meal in space was cold pizza, which the crew said, Tran relayed. And it was extraordinary, he added.

On Friday, Proctor turned the camera to the Dragon's cupola window, trying to share a view the stars and an aurora around Earth amid the dark atmosphere.

"We've been spending so much time in this cupola, the largest window flown into space," Arceneaux said. "We could see the entire perimeter of the Earth, which gives such incredible perspective; the views, I have to say, are out of this world."

Well, they literally are just that.

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- [SpaceX launches 49 satellites in a Falcon 9 rocket above Southern California](#)

The crew floated above Europe during the update, Proctor said, as Proctor showed her marker illustration of the Dragon being carried by an actual dragon off of Earth, Sembroski played his ukulele and Arceneaux turned flips in the zero-gravity environment.

The crew only had 10 minutes of connectivity to Earth on Friday, Tran said, as SpaceX can only communicate with a spacecraft travelling 17,500 mph when it is flying over a designated ground station.

They've been taking swabs of different body parts to evaluate the microbiome and how that changes in those three days in space, Arceneaux said. The crew has also been taking blood samples for research teams back on Earth to study, as well as cognitive tests.

Aside from scientific research, the mission's biggest goal is to raise \$200 million for [St. Jude Children's Research Hospital](#). Isaacman looks to the greater community to match the \$100 million he's pledging to the hospital.

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Axiom Article

4 days in, Axiom Space's crew makes history for private space flight at ISS
Axiom-1 is the first all-private mission to the International Space Station.

BY [DORIS ELÍN URRUTIA](#)

APRIL 12, 2022



SpaceX/Axiom

Over the weekend, the Axiom-1 mission carried [four rich guys](#) and philanthropists, a celebrity-chef menu, and biomedical experiments to the International Space Station (ISS).

On Friday (April 8) at 11:17 a.m. Eastern, [Axiom-1](#) launched atop a reused SpaceX [Falcon 9](#) rocket from NASA's Kennedy Space Center in Cape Canaveral, Florida. This flight began the 10-day mission for the first all-private mission for Axiom Space, a company based in Houston near NASA's [Johnson Space Center](#) that seeks to place the first commercial space station into low-Earth orbit sometime this decade.

Everything leading up to the flight went smoothly for the most part. Personnel noticed a slight loss of pressure after the hatch was first sealed, so a ground crew reopened and resealed it about two hours prior to takeoff.

Two minutes and 45 seconds after launch, the pre-flown first stage — the bottom two-thirds of the rocket — separated from the upper stage and successfully navigated back to Earth's surface, landing on a SpaceX [drone ship](#) floating in the Atlantic Ocean.



A SpaceX Falcon 9 rocket launched on Friday (April 8) shortly before noon local time with the four crewmembers of the Axiom-1 mission.

ANADOLU AGENCY/ANADOLU AGENCY/GETTY IMAGES

Axiom-1's crew were meanwhile "hooting and hollering" during the ride, Axiom-1 pilot and American real-estate investor Larry Connor said during a [video message](#) to SpaceX headquarters the following day. Commander and former NASA Space Shuttle astronaut Michael López-Alegría remained "diplomatic" during the cheers, Connor added.

They rode within a SpaceX Dragon Endeavour crew capsule, which is now on its third mission to the ISS. Once this robotic cocoon reached its targeted orbit about 12 minutes after launch, the crew got comfortable and had their first meals for the mission. The Axiom-1 mission menu includes Iberian ham and chicken paella, according to a video segment that SpaceX aired during its pre-launch broadcast. The food was prepared by the non-profit organization World Central Kitchen, helmed by celebrity chef José Andrés.

A "Caramel the Dog" stuffed animal traveled to space with Axiom-1. This is the mascot for the Montreal Children's Hospital in Canada.

AXIOM SPACE

[Caramel the Dog](#), the mascot for the Montreal Children's Hospital Foundation, made an appearance after launch. Astronauts typically use stuffed animals as zero-G indicators, which lets them see whether or not weightlessness has kicked in while remaining safely strapped into their seats. A camera inside Endeavour aired the first microgravity flight of Axiom-1's zero-G indicator. The toy was selected because Mission Specialist and Canadian entrepreneur Mark Pathy collaborates with Canadian health centers as part of his philanthropic work.

The 21-hour trip to the space station suffered a snag at the end. When Endeavor reached the ISS and attempted to dock, the astronauts on the space station [couldn't see the feed](#) from an Endeavour camera that was necessary for the docking procedure. Docking was delayed about 45 minutes as teams figured out a solution, which was eventually reached through support from SpaceX Headquarters and NASA.



The SpaceX Dragon Endeavour carrying the Axiom-1 astronauts approaches the International Space Station on April 9, 2022.

[NASA/FLICKR](#)

At 10:13 a.m. on Saturday (April 9), the Axiom-1 crew successfully docked to the ISS, bringing the orbiting laboratory's population up to 11. The space station was already housing Expedition 67, a mission made up of three NASA astronauts, one European astronaut, and three Roscosmos cosmonauts.

A NASA [blog post](#) published on Monday (April 11) details the science work they will be assisting during their eight days on the space station. The experiments will tackle questions about [genetic markers in cellular aging](#), [changes to brain activity in microgravity](#), and a [DNA editing system](#).

Monday marked Flight Day 4 of Axiom-1.

2-million-dollar bacon sando Article

Heston Blumenthal's Canned Bacon Sandwich Cost \$2.8 Million

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Is it the priciest sandwich in the galaxy?

by [Dana Hatic@DanaHatic](#) Mar 15, 2016, 4:30pm EDT

Via [TV chef Heston Blumenthal creates bacon sandwich costing 'a couple of million pounds' \[The Mirror\]](#), [Heston, we have a problem... the top chef cooks for Tim Peake \[The Guardian\]](#), and [All Heston Blumenthal Coverage \[E\]](#)

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Stuart C.

Wilson/Getty Images

British chef, TV personality, and proprietor of the many-starred Fat Duck in Bray, England, Heston Blumenthal is known for innovative and elaborate cooking styles, but his latest production takes the cake. Blumenthal designed a canned bacon

sandwich for Major Tim Peake, a British astronaut stationed at the International Space Station, and transport of the expensive sandwich cost "a couple million pounds," [according to *The Mirror*](#). That's over \$2.8 million.

The chef, who often makes use of molecular gastronomy techniques in his kitchens, curated a handful of meals for Peake, all of which were designed to hold up under zero-gravity situations. The meal also had to abide by the strict regulations of the world's space agencies which [had to approve the meal](#). Heston spent two years working on the sandwich, eventually landing on canning as the best method of preservation. Though canning cut the risks, it still left Blumenthal in of fear of giving Peake food poisoning, [The Guardian reported](#).

In addition to the bacon sandwich, Blumenthal created a red Thai curry, beef stew with truffles, Alaskan salmon, and apple crumble, among other items. These dishes were sent to the International Space Station on a rocket from Cape Canaveral and were waiting for Peake [when he arrived in December](#). Back then we didn't know Blumenthal was the chef, though we did know Peake was excited about having a bacon sandwich in space.

Most expensive bacon sandwich ever? Probably. Worth it? Peake will be the judge, and the world will find out in a TV special called, "Dinner in Space," featuring a video-chat dinner with Peake and Blumenthal, which airs on March 20.

Kimchi goes to space, along with first Korean astronaut

- Give this article

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By [Choe Sang-Hun](#)

- Feb. 22, 2008

SEOUL — Koreans say they must eat kimchi wherever they are. When South Korea dispatched troops to the Vietnam War in the 1960s, tearful mothers sent off their sons with clay pots containing homemade kimchi. Soon troopships were filled with the pungent smell of the fermenting cabbage slathered with pepper and garlic.

So it was only natural for Koreans to think that their first astronaut must have the beloved national dish when he goes on his historic space mission in April. Three top government research institutes went to work. Their mission: to create "space kimchi."

"If a Korean goes to space, kimchi must go there, too," said Kim Sung Soo, a Korea Food Research Institute scientist. "Without kimchi, Koreans feel flabby. Kimchi first came to our mind when we began discussing what Korean food should go into space."

Ko San, a 30-year-old computer science engineer who beat 36,000 contestants to become the first South Korean space traveler, will blast off April 8 on board a Russian-made Soyuz rocket, together with two Russian cosmonauts. He will stay in the International Space Station for 10 days conducting scientific experiments.

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Ko's trip will be an occasion for national celebration. Since 1961, 34 countries, including Vietnam, Mongolia and Afghanistan, have sent more than 470 astronauts into space, but none of them was Korean - something South Koreans have found humiliating, given their country's economic stature. So when their government finally decided to finance Ko's trip, they wanted him well prepared for his momentous journey. Which means he must take kimchi with him.

After millions of dollars and years of research, South Korean scientists successfully engineered kimchi and nine other Korean recipes fit for space travel. When the Russian space authorities this month approved them for Ko's trip, the South Korean food companies that participated in the research took out full-page newspaper ads.

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The other space food Koreans created include the national instant noodle called ramyeon, hot pepper paste, fermented soybean soup and sticky rice.

But kimchi - a must-have side dish at every Korean meal - was the toughest to turn into space food.

"The key was how to make a bacteria-free kimchi while retaining its unique taste, color and texture," said Lee Ju Woon at the Korean Atomic Energy Research Institute, who began working on the newfangled kimchi in 2003 with samples provided by his mother.

Ordinary kimchi is teeming with microbes, like lactic acid bacteria, which help fermentation. On Earth they are harmless, but scientists fear they could turn dangerous in space if cosmic rays cause them to mutate. Another problem is that kimchi has a short shelf life, especially when temperatures fluctuate rapidly, as they do in space.

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"Imagine if a bag of kimchi starts fermenting and bubbling out of control and bursts all over the sensitive equipment of the spaceship," Lee said.

Lee's team found a way to kill the bacteria with radiation while retaining 90 percent of the original taste. Lee's space kimchi comes in cans, whereas the Korea Food Research Institute's version, developed by Kim's team using a different technology to control the fermentation process, comes in a plastic package.

"This will greatly help my mission. When you're working in space-like conditions and aren't feeling too well, you miss Korean food," Ko, who is training in Russia, said in a statement transmitted through the Korea Aerospace Research Institute, which is overseeing his mission. "Since I am taking kimchi with me, this will help cultural exchanges in space."

Ko plans to be host of a Korean dinner in the space station on April 12 to celebrate the 47th anniversary of the day the Soviet cosmonaut Yuri Gagarin became the first human in space. The dinner will conclude with Korean ginseng and green tea.

What about kimchi's strong aroma, which often keeps non-Koreans from trying it?

"We managed to reduce the smell by one-third or by half," Kim said. "So the other astronauts will feel comfortable trying our space kimchi."

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