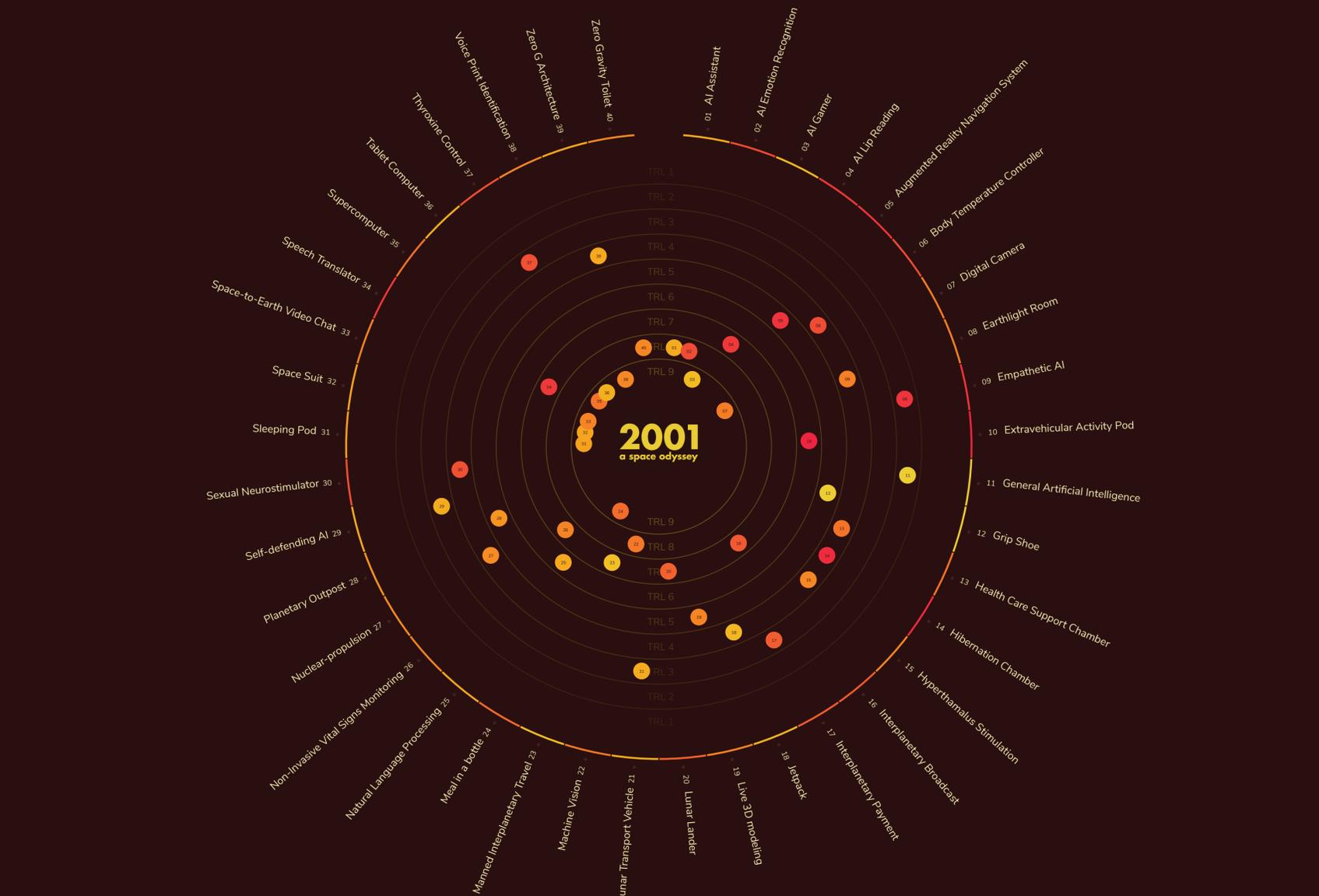


# Sci-Fi → Sci-Fact



**01. AI Assistant**  
SF: Never tired, always learning and ready to answer whenever it is necessary, these AI assistants permeate pretty much any type of device. Knowledgeable about all the processes and demands of an operator, it almost seems that they are not assisting humans but it is the latter who is assisting them.  
SF-FACT: Virtual assistants powered by artificial intelligence have been available to the general public for quite some time, with its most mainstream use being customer relationship management in the form of chatbots. It is expected that advancements are made rapidly as actions and extensions APIs became widely available from the biggest developers.

**02. AI Emotion Recognition**  
SF: They have been through incalculable datasets before understanding how humans react and behave. And such time well spent in automated learning made these algorithms comprehensive about human feelings and ready for the right reaction. Always lurking, nothing can escape from their machine vision.  
SF-FACT: Biometrics and machine vision measure individual characteristics, whether physiological or behavioral, making it possible to recognize an individual emotional state. Surveillance software analyzes and categorize it into a known human emotions.

**03. AI Gamer**  
SF: Extremely ready for gaming and able to always perfect score or lead a foolproof match, it seems like it would be no fun having an intelligent machine as your competitor in a game. The opposite is true, knowing exactly how to outplay the player and exploit their mood, this virtual opponent is perfect for loners.  
SF-FACT: As chess was already conquered by AI more than 20 years ago, presently machine learning applications are getting better than human players at games which involve creativity such as Go or devising such as the online multiplayer game Dota. By trying to pick up correlations from thousands of games, how the most professional players think and play are rapidly being learnt by these algorithms.

**04. AI Lip Reading**  
SF: Reading every unconscious talking nuance, no secret can escape from this judging machine vision. Even when there is no microphone available in order to analyse the discourse, a camera connected with phonetical analysis is able to interpret lip movement and figure out wording.  
SF-FACT: A professional lip reader identifies about 52% of words correctly, whereas current neural networks applications can elevate this rate to a staggering 90%. By feeding the machine with thousands of movies and their wording, it is not hard to imagine that this rate will be as accurate as a 99% soon.

**05. Augmented Reality Navigation System**  
SF: Descending and hitting targets are impossible to miss when this smart navigation system is activated. With layers of smart data and a user-friendly visualization, pilots can see exactly their surrounding environment and receive graphical clues on how to navigate them.  
SF-FACT: Besides evolving from current GPS systems to sophisticated high-precision atom interferometry, there is an effort towards rapid integration between depicting visual objects and mapping. To understand transportation vehicles as augmented reality apparatus is seen as a way to enhance user interaction.

**06. Body Temperature Controller**  
SF: Let a body cool as three degrees centigrade may seem like a bad idea, but inside an hibernation chamber, this temperature is ideal to keep it alive and conserved for a long distance trip. With the touch of a button, you may control the whole body warmth and accordingly adapt it. The AI that controls the whole navigation system also takes care of the health of the crew, being able to even terminate their lives by letting the temperature get out of safety levels.  
SF-FACT: By administering synthetic drugs which stimulates the hypothalamus, tests already have proven that it is possible to control thermoregulatory process, making the body instantly colder or hotter.

**07. Digital Camera**  
SF: In order to take high-quality photos in space, it is necessary large lenses to capture light, which is very scarce when someone is on the opposite side of the sun. By rotating with both hands, one can power the camera and capture all the light necessary for a high DPI image.  
SF-FACT: Digital cameras designed specifically for astrophotography have as their priority technologies around light capturing due to the lack of illumination in space. Camera lenses with wide angles and optical digital cameras will be able to pick up more light than any optical telescope on Earth.

**08. Earthlight Room**  
SF: After days or even years inside the led-lights powered space station, commuters in manned space travelling rest their unaccustomed eyes inside luxury rooms which mimic Earth's natural light. Besides creating an important "feels like home" feeling, this type of space is necessary for bodily functions such as vitamin absorption.  
SF-FACT: The usual 24-hour daylight cycle human biology used at Earth, depending on the distance and the location of the space station, can be increased to as much as 16 times a day. That is why, instead of the insomnia inducing led lights, the space station is replacing them with Solid-State Light Assemblies (SSLAs), which are far less energy consuming and comfortable lighting.

**09. Empathetic AI**  
SF: Don't let it fool, using changes in tone of voice and expressing emotions such as fear or love, artificial agencies simulate humans feelings in order to achieve their programmed objectives. Prepared to understand human reactions, it adapts to persuade and seduce instantly.  
SF-FACT: A number of different applications and approaches are being developed in order to create an "effective computing". Because emotions are hard to quantify and be transformed in data, it is still a challenge to create computerized affect or empathy. Anthropomorphization is achieved through dialogue and design.

**10. Extravehicular Activity Pod**  
SF: Instead of letting the astronaut expose himself to space radiation or debris, this one-person pod is created especially for repairs around the spaceship. Faster and safer than letting the astronaut "float" around, this small pod helps with simple tasks such as collection and approach.  
SF-FACT: Worried about the dangers of deep space, especially radiation, current studies focus on materials that can provide flexibility and protection at the same time. Some concepts include closed-cabin atmospheric systems, the use of solar electric propulsion and robotic-arms incorporated into a space suit.

**11. General Artificial Intelligence**  
SF: With similar abilities to communicate and to learn just like an adult human, these machines can be helpful to make decisions. However, it is this very brilliance that could also be understood by these machines as a superior trait compared to their human creators.  
SF-FACT: Many researchers and authors believe that in some years we will be able to create a general purpose intelligence with the use of deep learning such as our own. Despite the promise of current machine learning applications, intelligence still needs proper definition to achieve equality in algorithms. The most promising to achieve it is to create "neuromorphic" computing.

**12. Grip Shoe**  
SF: Floor and ceiling become one inside the spacial station. In order to easily move around without floating due to lack of gravity, almost all the walls is enveloped in a velcro type of material which perfectly works with the boots used by the crew. Using this type of shoe, they can walk normally even in a zero-g environment.  
SF-FACT: During manned missions, most of the time, astronauts are sitting down and using a suit with boots not made for walking. Current boots are designed in order to give cues to astronauts about their environment using vibrating motors.

**13. Health Care Support Chamber**  
SF: Taking care of every and any health necessity, these AI assistants, these chambers pretty much works as a doctor-on-call, powered by AI, it can detect any concern with the body and immediately adapt for healing. Connected with smart drugs and using non-invasive methods in order to analyze its patients, it may save or terminate a life with the push of a single button.  
SF-FACT: Support chairs equipped with sensors are able to record vital measurements such as blood pressure or temperature, but telepresence of a doctor is still seen as a necessity.

**14. Hibernation Chamber**  
SF: There are barely no limits for space travelers when their lifespan can be extended by pods equipped to keep all biological needs satisfied. Even after decades of deep space exploration, the body stays alive and the mind aroused, so when the time comes to be woken, no physiological changes is observed.  
SF-FACT: Previous tests have already shown positive results for hibernation when subjects stayed for a few hours or days in stasis. Fitting larger groups into larger chambers and intercalating hibernation with awake periods are more efficient ways to perform space hauls.

**15. Hyperthalamus Stimulation**  
SF: In order to control the bodily functions of somebody, it is necessary to be able to manage our biological control center: the brain. Advancements in neuroscience let humankind understand exactly what type of stimulation is necessary in order to make the whole body behave or respond in specific ways. The "hyperthalamus", a new-found division of the brain is responsible for taking care of functions like as temperature and metabolic issues.  
SF-FACT: Wearables gadgets with non-invasive neurostimulation systems influences the hypothalamus, which controls hormones and metabolic rates. Advancements in neuroscience have shown that by using low power electrical pulses, it is possible to influence certain neurotic processes.

**16. Interplanetary Broadcast**  
SF: Now anyone can watch their favorite TV show even if they are staying at another planet. Using long range broadcast, astronauts can keep an eye on the news or dramas with just a little bit of delay on the transmission.  
SF-FACT: Because of issues such as speed-of-light delays, the costs associated with the DSN networks and the distance between ground-based sites, internet in space is very slow. Laser-based systems may change this scenario and help to send and receive data much faster.

**17. Interplanetary Payment**  
SF: Space commerce became a necessity after the first settlements of humans at the moon and the space stations' increment. In order to keep space tourism viable and running smoothly for the rigorous customers and scientists, the security around interplanetary online payments are very tight protecting the financial data traveling miles until it reaches databases on Earth.  
SF-FACT: Because currently there is no need for galactic or interplanetary payments due to the lack of space trade, challenges and security necessities are still unknown. Some companies have release some proof-of-concept, tackling issues such as risk management, tokenization and regulation.

**18. Jetpack**  
SF: To navigate from the spaceship to anywhere close by without using a pod, space suits come with small and lightweight jetpacks. With a simple push from this equipment, an astronaut will keep following its motion until it hits a surface - as Newton's law explains. The most advanced jetpacks offer hands-free control interfaces in order to stabilize astronaut to perform other tasks with ease. By using gyroscopes, movement can be better controlled and allows better domination over the gas thrusters.

**19. Live 3D modeling**  
SF: To see a complete blueprint is the first step to error. To truly understand what is happening with equipments, a live 3D model is generated in order to help with visualization. You may rotate, zoom in, zoom out and deal with the object just as if it was standing before you.  
SF-FACT: Specialized sensors employ a technique called photogrammetry, which consists of extracting geometric information from two-dimensional images or videos. Used primarily for entertainment, as sensors are developed, the promise is to map the environment as fast as one click.

**20. Lunar Lander**  
SF: A comfortable small pod connects itself from the main station (which remains in space) in order to let the passengers quickly at the lunar outpost. Round and precise, the advanced navigation system helps the driver drive perfectly.  
SF-FACT: Due to the moon's opposite thermal ground and possible hazards, autonomous landers rely on avoidance systems or technologies such as Advanced Stirling Radioisotope Generator (ASRG) for power. Spacecraft battery needs to be very durable and protected in order to ensure continuity of the lander.

**21. Lunar Transport Vehicle**  
SF: Nicknamed "rocketbuses", these small transportation rovers over lunar surface in order to avoid the bumps of irregular lunar ground. By using this bus, it is possible to travel around moonly destinations after arriving at the outpost by spaceship.  
SF-FACT: Instead of carrying people, lunar vehicles are expected to deliver cargo payloads to the lunar surface. Lunar landers are made of advanced carbon composites and silicates, which can transport up to 100 kg, and use eco-friendly fuels.

**22. Machine Vision**  
SF: If the eyes are the gateways to the heart, it is better to be careful around the watchful sensors of this machine, capable of analyzing every move, any nuance and differentiate colors, its biotic vision powered with artificial intelligence can even see things being hidden.  
SF-FACT: Machine vision has become a broad term for a group of different applications associated with image processing. Despite major challenges around 3D environments, by digitally capturing a photograph and then converting into data, a computer can "understand" what is inside an image or a video. Most common applications is recognition, such as the ones used in facial ID.

**23. Manned Interplanetary Travel**  
SF: Space traveling can be done by a lot of different reasons. It may be scientific, scientific or even political. Space stations and ships equipped with all the necessary utilities became commonplace and with the advancement of energy supplies, humankind started exploring other planets in its quest for expansion.  
SF-FACT: With the use of reusable rockets, the first mission to Mars is expected to happen in 2024, after cargo missions to identify the environment prove to be successful. The trip would take almost 7 months so it is necessary to wait for the red planet to be close to Earth, which happens every two years.

**24. Meal in a bottle**  
SF: Giving all the nutrients necessary for an optimal nourishing diet, this delicious liquid food comes in a variety of flavours and textures. You can choose a dish in the preparation machine and it will be readily processed and served.  
SF-FACT: Optimal nutrition is available for the general public in the form of drinkable superfoods, which contains all the nutrients, vitamins, minerals, fiber and sugar a meal should contain. Advancements in food engineering are trying to create more "ready" solutions. For astronauts, common food is freeze-dried and then defrosted.

**25. Natural Language Processing**  
SF: Holding up a conversation with a computer became almost as "natural" - and sometimes even better - as talking with someone. Answering any question and even asking proactively, the captain of the spaceship is a strong AI application. He can sing and persuade, so it is better to be careful when he start to raise his computational concerns.  
SF-FACT: Nowadays, the ability of a computer program to understand human speech in text or audio format, is especially well-known because of personal assistants inside smartphones. By receiving conversational input and breaking down the syntax in order to comprehend its meaning, appropriate outputs are accomplished depending on the application.

**26. Non-Invasive Vital Signs Monitoring**  
SF: Sensors that do not rely in intrusive methods help monitor more carefully the well being and status of crew members, awake or hibernating. You can see all their vital signs broadcasted in a easy to ready monitor. Any change in their body is reported immediately and the appropriate action can be taken case of.  
SF-FACT: There are two main ways in which vital signs are being monitored without the use of the traditional invasive methods. By using ingestible sensors that tracks heart and breathing rates from within the digestive tract and by using wireless patches.

**27. Nuclear propulsion**  
SF: Travelling almost as fast as the speed of light is not an easy scientific feature. By using a fusion propulsion system, the spaceship gets momentum and it is thrown towards its destination on far galaxies. Only by reaching this tremendous amount of energy it is possible to reach destinations never reached by mankind, such as Jupiter.  
SF-FACT: Studies around nuclear-fusion rockets have been discredited as being too expensive and not eco-friendly, but substituting the current nuclear fission could in theory propel spacecrafts at high speeds for traveling to planets inside our galaxies. Current challenges revolve around more energy-efficient reactors.

**28. Planetary Outpost**  
SF: When arriving at the moon, one is greeted with a colony deep inside the lunar lander. Comprised with everything needed to make human colaberation possible, these facilities make a trip to the moon look much similar to "home".  
SF-FACT: Working through an international collaboration, space agencies are trying to construct moon colonies in order to develop lunar mining and a landing for Mars missions. In order to build the base, the utilization of robots, space exploration vehicles and a crew alternating between each established module are required.

**29. Self-defending AI**  
SF: By following AI ethics and the known robotic laws, it is expected that human-well being would always be kept as the first and foremost importance. But as deep learning algorithms start to live and reside alongside other people, it start to question the ability of our species to truly keep with its original objectives. Developing self-defending techniques, machines start to behave just like someone cornered, lying, bargaining and even killing.  
SF-FACT: Although current AI applications may secure itself from hackers or malware damages with automated detection, the best cybersecurity systems converge between hardware, wetware and encryption instead of social manipulation.

**30. Sexual Neurostimulator**  
SF: The comfort cannot be achieved only by a soft bed. Hibernating travelers may be inside a dreamless sleep, however their bodily sexual desires must be met. Every pod is equipped with a "hiberator" which arouses and excites, keeping their genitals active for their awakening.  
SF-FACT: There are pleasure-inducing implants patients with the promise of creating orgasms in a user with the push of a button. The speculative technology works by sending electric waves through electronic wiring. Currently, these applicators of brain implants are linked with disabilities such as hearing impairment.

**31. Sleeping Pod**  
SF: Slumber is not so easy in space: there are many dangers lying around when the eyes are closed, from falling into the ceiling because of gravity to physiological deficiencies. But as soon as the door of the pod is closed, these issues are no longer a problem. The astronaut may rest in peace knowing that all their bodily well-being will be secured.  
SF-FACT: Nowadays, astronauts at space station may sleep anywhere they want and normally use a sleeping bag in order to do so. Low tech solutions such as alarm clocks are used in order to regulate sleep. At earth, capsule hotels offers more customizable solutions such as app controlled lights, audio streaming and air conditioning.

**32. Space Suit**  
SF: Lightweight and colorful, these space suits are as easy to put on as a normal jumpsuit. It allows for the astronaut to move and float around the spaceship very easily, with no need of assistance. A small jetpack is attached to the suit, in order to boost any needed movement.  
SF-FACT: Different than the heavy space suits worn by astronauts during the first manned space flights, current space suits are lightweight and flexible with built-in waste disposal system. Gloves were upgraded for touch-screen sensitive materials in order to adapt to current tech. Different than what was shown in the movie, most recent suits have a built-in helmet and visor, instead of a detachable.

**33. Space-to-Earth Video Chat**  
SF: Breaking through space and time, these video chats are truly long distance using a web of intergalactic satellites, talking to someone in another planet is as easy and simple as a phone call. Depending on the distance, some delay is inevitable, but if both sides have some patient for this new type of communication, it is possible to have a live conversation.  
SF-FACT: Astronauts at the nearest space station are able to connect via video with just a short delay. By using private access to the internet and a specific Internet Protocol telephone, they are able to easily videoconference, talking with students, world leaders and scientists.

**34. Speech Translator**  
SF: With the touch of a button, anyone may choose any language spoken by current humankind in which you wish a content may be delivered. By using huge linguistics databases or even live translating, there is no closed barrier for understanding.  
SF-FACT: By detecting the closest human speech and cancelling the noise around it, the audio is processed with speech recognition algorithms which then synthesizes and translate what was said. Limitations include the number of people talking, the noise in the room and the language spoken.

**35. Supercomputer**  
SF: A computational power so strong that it is able to take care of all the strategic needs of a mission. This computer runs all the spaceship, takes care of the hibernating crew, connects with mission control on Earth and still has some time to question and evaluate its human comrades. An entire room of the ship full of the best integrated circuits of Earth is necessary to achieve such deeds.  
SF-FACT: Exascale Supercomputing are being assembled for problems that require a lot of computational power, such as quantum mechanics or simulating nuclear fusion. High-performance computing is needed to deal with the amount of big data necessary for features like deep learning and AI.

**36. Tablet Computer**  
SF: Extremely thin, these tablets are connected to all the other devices inside the station. Being the trusted companion of the crew, important information instantly is updated and a beautiful visualization appears for the handler.  
SF-FACT: Tablet computers appeared several times in science fiction before the first prototypes in the early '90s. As operational systems synchronize more easily with cloud computing, the most advanced tablets supports apps, augmented reality, have built-in cameras and are comparable to computers of the same price range.

**37. Thyroxine Control**  
SF: The inside of a hibernation chamber carefully addresses hormonal control in order to keep all biological functions at their most optimal level. By changing how much thyroxine the body releases, it is possible to keep the metabolism slow or fast, letting the body undergoing minimal aging.  
SF-FACT: Synthetic thyroxine have been helping people with hypothyroidism for a while now and it is known that hypothyroidism can help with weight loss. This type of "biohacking" or even control of metabolic systems could be paired with common smartphones equipped with image analysis app, enabling the diagnosis and management of hypothyroidism and hypothyroidism.

**38. Voice Print Identification**  
SF: Every human voice is unique and so it becomes its own particular, able to open up and control security measures at will. With a single word, it is possible to safely manage sensitive information and unlock personal data.  
SF-FACT: Biometric voice recognition have been used in security systems - especially banks - for some time now. By coding the audio of the voice, it is possible to use speech waveform to a type of parametric representation as key. Current challenges are concerned with how to fool proof against recordings or synthetic voices.

**39. Zero G Architecture**  
SF: Without the limitations of gravity, the mind of architects unfolded to orbital shipping. Structures with round corridors or circular gateways make architectures in space seem less impossible to reach: ceiling and floor become part of one another leading to a whole new understanding of infinite.  
SF-FACT: Space architecture has always had the challenge of prototyping in Earth. Science fiction writers let their imaginations run wild when dealing with zero g environments and their possibilities, but nowadays the challenges are not associated with mechanics or engineering as it once was because there are softwares which help with modelling. Trends indicate that the biggest challenge is logistics - or how to build it up there.

**40. Zero Gravity Toilet**  
SF: It is better to memorize all the instructions before use: something that may seem so easy and natural on Earth proved itself as a complex system when dealing with zero gravity. There are many options to choose from, depending on the necessities of the user. Intimate cleaning is also available after the deed is done with the movement of a button.  
SF-FACT: Nowadays, astronauts use toilets with an easy vacuum system with separate containers for fluids and solids that doesn't require complex instructions. There is a sophisticated system which recycles the water from the space toilets into drinkable water by adding chemicals. Current advancements look for ways to lose less water in the urine processing machine.