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OF YURI GAGARIN'S
FLIGHT

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EDITOR'S LETTER

ICARUS' DREAM



60 years ago, on April 12, 1961, a human flew into space for the first time. This person turned out to be an ordinary Russian guy Yuri Gagarin, a 27-year-old aviator of the Soviet Air Force. His pleasant, smiling face instantly appeared on the covers of all magazines in the world and on the front pages of newspapers. All radio stations and TV channels opened their news programs pronouncing his name. Within only one day Yuri Gagarin became the most famous person in the world, even more famous than the most famous movie and pop stars.

Such extraordinary, incredible popularity arose primarily due to the fact that

his image began to embody a human dream. In ancient Greek mythology, Icarus, the son of Daedalus, dreamed of flying to the Sun – to conquer space. After thousands of years of waiting, Icarus' dream was realised by Yuri Gagarin, an ordinary man, who was born in an ordinary Russian village.

The paradox is that there was something unusual in Gagarin's simplicity. He did not pretend to be a VIP. He just committed an act. The act making everyone's hearts beat. There aren't that many people capable of equally significant actions. And those whose actions embody our dreams can be counted on the fingers of one hand.

Gagarin's flight did not last long, it took less than two hours, and it was rather symbolic. But this is precisely what gave it a poetic essence, without which there are no mythical heroes.

Victor Loupan



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HIGHLIGHTS

YURI GAGARIN: A HERO OF OUR TIME

There was something bewitchingly pleasant, unofficial, un pompous in the appearance of this amazing person

VICTOR LOUPAN,
Head of the Editorial Board

April 12, 1961. It was a normal working day. Parents were not at home, they were working. The weather was slushy in April. The football ground in the yard looked more like a swamp and the game did not go well...

Our neighbour Uncle Senya, a severely shell-shocked war veteran, did not work due to his disability, but sat near the open window in his kitchen on the ground floor, and constantly listened to the radio. Usually, he ignored us. But this time he shouted:

Hey, guys! Our man flew into space!

We immediately ran to his window and began to listen, of course, having no clue. After listening to the news, he turned off the radio and began explaining us something about space, rockets, about the fact that our citizen Yuri Gagarin looped the Earth. I do not know whether we understood anything or not, but I remember how everyone, as one, looked up at the cloudy rainy sky with their heads up. I think, we stared for a couple of hours, until our grandmothers called us to dinner.

It is difficult to imagine today what a global event the first manned flight into space was! And this man turned out to be an ordinary Rus-

sian guy Yuri Gagarin, a young officer of the Soviet Air Force with such a good face and a pleasant smile. The other day, no one in the world knew that he existed on the globe, but then his photograph appeared on the front pages of the world's largest mass media.

It also should be noted that the times were paradoxical then. On the one hand, the Khrushchev thaw, de-Stalinisation, liberalisation of intellectual and cultural *life* in the USSR. On the other hand, the aggravation of the all-encompassing



competition between the USA and the USSR, which will lead to the construction of the Berlin Wall and the Cuban Missile Crisis just a year after Yuri Gagarin's flight. The Cuban Crisis put the world on the very brink of nuclear war.

Two years before Gagarin's flight, in 1959, Khrushchev made his historic visit to the United States. Looking at the photographs in the American media covering his visit, one is simply amazed. Nikita Sergeevich was so relaxed and plain that the then largest magazine *Life* shot him as if he were a movie star, but not the leader of the enemy state. Yes, there was something extravagant, spontaneous in Khrushchev's behaviour, and it was unlike the way the superpower leader behaves in the minds of the average man. His unusual appearance, embroidered shirts, strange hats, straight and even rude statements made the "premier" Khrushchev (that is what he was called) a star of the then emerging pop culture.

After that notable trip, the task of "catching up and overtaking America" became a true fix idea of Soviet propaganda. Even in cartoons, the "Soviet boat" was catching up and overtaking the "American boat". "Corn – the queen of the fields" was also an "imported idea" brought by Khrushchev from the United States. But it was all for internal use. In the global arena, there was a struggle for spheres of influence, or rather, for the redivision of the world. Redivision is impossi-

ble without ideological confrontation and an arms race. The struggle for primacy in space exploration combined these two aspects: military technologies for building rockets, primacy in the field of science and the media and political exploitation of the fulfilment of the human dream of conquering the vast expanses of space.

The fact that the Soviet Union overtook the United States, became clear as early as in 1957, when on October 4, the first artificial satellite of the Earth was successfully launched from the 5th Field Research Facility of the Soviet Ministry of Defense (later called the Baikonur Cosmodrome) by the Sputnik carrier rocket. Its appearance and small size impressed the imagination of people so much, that the simple Russian word "satellite" became a brand, a trademark: *The Sputnik, Le Spoutnik*, etc. It weighed only 84 kilograms with the maximum diameter of 58 centimetres only. But the prestige of the USSR grew with each rotation of Sputnik around the Earth.

The Communist idea conquered the minds of thinking people, no longer as a utopia, but as a reality. World tours not only of the Bolshoi Theatre, but also of the Red Banner Song and Dance Ensemble of the Soviet Army took place with a full house in London, Paris and Brussels. A wonderful film "The Cranes Are Flying" by Mikhail Kalatozov (by the way,



A solemn meeting of the first man in space Yuri Gagarin. Moscow. April 14, 1961

also screened in 1957) was awarded in 1958 the Palme d'Or which is the highest award granted at the prestigious International Cannes Film Festival.

Just 10–15 years after the crushing victory over Nazi Germany, the Soviet Union, which had risen from the ruins, declared itself as a country where not vulgar-commercial, but

truly classical, elite and at the same time real folk art flourishes.

Space exploration should be viewed from a cultural perspective, especially in its early, romantic stage of development. Space is the dream of humanity. Our most ancient ancestors, in the most prehistoric times, looked at the sky with horror and admiration, as is poetically ev-



identified by the mysterious statues on Easter Island. Strange stone idols mystically gaze into the sky, as if expecting someone's arrival. Likewise, Tycho Brahe and Johannes Kepler, astronomers and progenitors of space exploration, were staring at the heavens. And Konstantin Eduardovich Tsiolkovsky too. I do not know, was it intentionally or not, but the launch of Sputnik coincided with the centenary of the birth of that great Russian and Soviet scientist. Tsiolkovsky, like Brahe and Kepler, was a scientist and thinker being ahead of his time. As a promoter of the idea of space exploration, Tsiolkovsky, back in the 1920s, came to the conclusion of deploying "rocket trains" – in fact, they were prototypes of today's multistage rockets. At the same time, he comprehended the problem of human survival in weightlessness during long space flights. It is also remarkable that the basis of Tsiolkovsky's works putting him ahead of everyone and everything and being fantastic at the time, included nothing more than mathematics with attempts to use the "mathematical apparatus".

Yuri Gagarin was born on March 9, 1934. In 1961 he was only 27 years old. On the day of departure, April 12, 1961, he, a senior lieutenant, was early promoted to a major in the Air Force.

He wrote a report asking for admission to the group of cosmonaut candidates at the age of 25. The selection was strictest. Initially the detachment was supposed to include 20 people. The candidates were selected by a special group of specialists from the Central Military Research Aviation Hospital. Psychologists noticed that "Gagarin loves performances in which heroism, the will to win, the spirit of competition prevail. In sports games, he takes the initiative, leadership, captains the team. His favourite word is "work". He is self-confident. He takes workouts in his stride. He is educated very harmoniously. Sincere. Persevering. Does not hesitate to defend the point of view, which he considers to be correct".

Sergei Pavlovich Korolev, the chief designer being responsible for the entire space program of the USSR, was in a hurry. Because, according to Soviet intelligence, the Americans intended to send a man into space on

April 20. Knowing this, he scheduled the launch no later than April 17, 1961 (in fact, the first American John Glenn flew into space almost a year after Yuri Gagarin.)

Due to the lack of time during creation of the Vostok-1 spacecraft, a number of extraordinary decisions were made. For example, they had to abandon the emergency rescue systems at the start and soft landing of the ship. In addition, a redundant brake system was removed from the design.

During takeoff, Gagarin uttered a simple word: "Let's go!" It immediately became legendary and historic.

During the flight, which lasted 1 hour and 48 minutes, Gagarin conducted the simplest experiments: he ate, drank, and made notes with a pencil. His feelings and everything that he saw through the window, he recorded using the onboard tape recorder.

The return to Earth turned out to be so unusual that it is impossible to miss talking about it. The first people who met the cosmonaut after the flight were the forester's wife Anna Takhtarova and her six-year-old

granddaughter Rita. The military officers and local collective farmers arrived at the scene soon. One group of military men took the descent vehicle under protection, and the other took Gagarin to the location of the unit. From there, Gagarin reported by phone: "Please, tell the Air Force Commander: I have completed the task, landed in the specified area, I feel good, there are no bruises or breakdowns. Gagarin".

A helicopter immediately took off from the Engels airfield and easily found the descent vehicle, but the cosmonaut was not nearby. The officers were informed that he left in a passing truck. The helicopter immediately set off in pursuit and easily caught up with the truck moving along the bumpy road. Hearing the rotor of the Mi-4, Gagarin jumped out of the cockpit and waved his hands. Just like in the movies!

Due to the maximum level of secrecy, the launch of Gagarin into space was not previously covered. All the wonderful shots that we saw and loved were not filmed on April 12, 1961, but post factum, especially for newsreels. He repeated before the cameras everything that he really did.

In Moscow, Gagarin was received with unheard-of fanfare. Khrushchev was waiting for him at Lenin's mausoleum. The cosmonaut drove up in an open ZIL car and marched to the steps leading to the podium of the mausoleum. Soviet television did not show these shots, because



the hero's lace was untied on his right boot. The footage clearly shows how it dangles, which, in my opinion, is very touching! This unique chronicle was shown many years later, during the times of glasnost and perestroika. That record is widely available today. The uniqueness of Yuri Gagarin's personality also lies in his simplicity. There was something bewitchingly pleasant, unofficial, unpompous in the appearance of this amazing person. Having become an unprecedented world star, he continued working. No one could have imagined that he

continued flying, put his life at risk again testing new aircrafts.

Yuri Gagarin died in a plane crash on March 27, 1968. To investigate its causes, a special State Commission was established. The colossal report in 29 volumes was classified. It is only known with certainty that the MiG-15UTI plane collided with the Earth and the crew was killed.

The fate of Yuri Gagarin is like the life of ancient Greek mythical heroes – people who performed heroic deeds simply doing their duty. And their fate inspires subsequent generations.

CELEBRATING HER MAJESTY THE QUEEN'S 95TH BIRTHDAY



Born on 21 April 1926, Her Majesty The Queen celebrates her 95th birthday in 2021. Currently the world's longest reigning head of state and the longest reigning monarch in British history, she has overseen a period of extraordinary change. Throughout, The Sovereign has remained a symbol of quality and stability.

With a record-breaking reign characterised by unprecedented achievements and milestones, it's hard to believe that Her Majesty was once a princess that nobody ever expected to become queen.

Born third in line to the throne, it was due to her uncle's abdication and the unexpected loss of her father that she found herself being crowned at 25. However, Her Majesty very quickly earned a place in the hearts

of the people throughout the United Kingdom and the Commonwealth, thanks to her earnest commitment and devotion to her people.

The Royal Mint has struck every UK coin of The Queen's reign, from the first ones that marked her coronation to the coinage of an experienced and much-loved monarch. The year 2021 signifies a personal milestone for Her Majesty and Royal Mint be celebrating with the nation as the Queen turns 95, making her the first British monarch to reach such a grand age. The coin's reverse, designed by Timothy Noad, is a floral tribute, featuring The Queen's own words, 'My heart and my devotion,' as the inscription.

"Her Majesty The Queen is well-known as a lover of flowers and gardens. I like the idea that a posy or

bouquet is often presented to The Queen, perhaps on her birthday, and that this could be a tribute from the four nations of the United Kingdom. I wanted it to look suitably royal but with an element of informality for the personal nature of the occasion. I also enjoy gardening, which I find relaxing and creative as well as an inspiration for my work," said Timothy Noad.

"I wanted to create a tapestry-like effect, with the Royal Cypher standing out against a dense, circular mass of leaves and flowers. I originally experimented with using spring flowers but eventually settled on the national floral emblems, which are tried and tested in coin designs and clearly connect The Queen to the four UK nations. For this design, I made the flowers more naturalistic and less

formal than usual. I also felt that Her Majesty would prefer to be given a daffodil flower than the more heraldically correct Welsh leek!"

This year's coin has 95 mils, which is a change from the number normally used on sovereigns of Elizabeth II – each symbolising a year of The Queen's life. Another exception is 1957 and sovereigns of this year have significantly more mils than those struck after this date. The 2021 Sovereign will also feature a unique privy mark – a Royal Crown with 95 entwined.

The 2021 Sovereign retains Pistrucci's St George design, which is revered as one of the greatest works of numismatic art. The Royal Mint ensures that each Sovereign is struck to the proof standard that built the Sovereign's iconic reputation.

Clare Maclennan, Divisional Director of the Consumer Division at The Royal Mint said, "The launch of the annual Sovereign Collection is eagerly anticipated amongst coin collectors and this year we mark a very special royal occasion as we celebrate Her Majesty the Queen's 95th Birthday. To celebrate this remarkable milestone, the 2021 Sovereign will include two extra special elements – a unique privy mark and a change to the milled edge of the coin. The unique privy mark represents the royal cypher crown with the number '95' to mark the celebration of Her Majesty's 95th birthday. As a classic symbol of royalty, the crown makes a fitting choice for this extraordinary moment in British royal history."

During the 19th century the Sovereign was known as 'the chief coin of



the world', while its role has changed over the years that followed, it maintains a global reputation for accuracy, reliability and quality.

When Elizabeth II was officially proclaimed queen, thousands of people lined the streets to catch a glimpse of their young queen, while millions more watched the ceremony on television.

It was the perfect moment for The Royal Mint to welcome the return of The Sovereign coin, marking the historic occasion by striking a handful of Sovereign Proof

sets. From the limited striking of the Proof coin sets, one was gifted to the British Museum and another to the Royal Collection. One set was kept at The Royal Mint Museum, where it remains in the collection today, along with the pattern pieces and the original dies. This special striking heralded the return of The Sovereign coin. Just a few years later, in 1957, the highly regarded gold coin was also struck as bullion, becoming the flagship coin of The Royal Mint, famous across the world as a symbol of quality, accuracy and a masterpiece of design. For this reason, The Sovereign was also stockpiled as an emergency ransom fund by the military during the 1950s, in case of war in the Middle East.



HISTORY

YURI GAGARIN
IN MANCHESTER

JOHN CALLOW

Exactly three months to the day after his flight in Vostok I had ushered in a new age of space exploration [i.e. 12 July 1961], the trim figure of Yuri Gagarin strode down the gangway of a British Viscount airliner and walked briskly out across the runway of Manchester airport towards a sea of expectant faces, and flashing camera bulbs.

Heavy banks of cloud had obscured the aircraft's final descent, and a ferocious downpour had lashed the tarmac, soaking the top hats and tails of the waiting dignitaries. However, what the rain could not dampen was the warmth of Gagarin's smile and the raw enthusiasm of the crowds who thronged the concourse: pushing at the safety barriers and seizing every vantage point in an attempt to catch a glimpse of their hero.

The sheer scale of public enthusiasm for the visit, which came at the height of the Cold War, had elsewhere caught the authorities by surprise. The Macmillan government, which had initially been reluctant to invite the cosmonaut to Britain, hastily added an extra day to his schedule and offered a grudging official sanction to what had originally been conceived as a trades union-sponsored tour, aimed at promoting economic co-operation between the East and West.

Although Whitehall chose to remain aloof, the situation in Manchester was very different.

Gagarin's visit to the city had been organised in advance, under the aus-



picines of the local trades councils, and had received the blessing of the civic leaders who were only too happy to organise a lavish reception for him at the Town Hall. As the rain cleared, the Red Flag fluttered beside the Union Jack over Albert Square and a brass band struck up the national anthem of the U.S.S.R. to welcome the arrival of the first cosmonaut.

Against the background of the Berlin crisis, the escalating conflict in Vietnam and the abortive American invasion of Cuba, this spontaneous outpouring of popular sentiment in honour of a Soviet airman, acting as an unofficial ambassador, may at first sight appear incongruous. However, upon closer inspection the reasons behind the genuine warmth of

Gagarin's reception are not hard to discern. In marked contrast to the ageing Soviet leadership, Yuri was young, dynamic and glamorous. Possessing an unaffected charm and an outgoing personality, his fame rested securely on his own bravery, skill and athleticism.

As a result, he appealed equally to both men and women, the young and the old. Small children dressed up in home-made space suits, and stayed away from their lessons in order to wave at him from street corners. Teenage girls crowded the platform constructed for him at Trafford Park, and surged through the police lines which surrounded Ring-

way airport and the union offices at Brooks Bar, anxious to obtain an autograph, to present a bouquet of flowers, or to steal a kiss. Seasoned factory workers rushed to shake his hand or to slap him on the back, stumbling over their words of praise, while outside their training ground the United team broke off their practice to wave at the «Magellan of the Cosmos».

After the drab years of post-war austerity, there seemed something almost magical about the first human being to have broken the bounds of the earth and viewed 'through the portholes [of his spaceship] ... a diamond-field of shining, bright, cold stars.

Mary McClellan, who had travelled up to the rally at the Metro-Vickers

plant that morning, thought that in contrast to the grey suited businessmen and the dark overalls of the factory workers Gagarin cut an 'unbelievable' figure in his bright green uniform; and that he looked as though he had been filmed in 'technicolour, thrown into a stark contrast by the monotone which surrounded him. In an age before the Beatles, when rock music stood on the flimsiest of foundations and the role of the pop singer was still ill-defined, the first man in space was guaranteed a status normally reserved for visiting royalty and Hollywood film stars.

The young Martin Kettle plastered pictures of Gagarin on his bedroom walls, while in the pages of the Times one correspondent captured the feelings of many, for whom 'space-men have been the wildest fiction', the stuff of popular novels, comic books and radio programmes until suddenly 'one morning, this fantastic fiction' had become scientific fact. Who, he asked, 'would not ... walk a few hundred yards to see this incredible' man, who 'visits us and talks to us.

If Gagarin's popularity with the people of Manchester was undeniable, then the nature and long-term political significance of his visit was still in doubt, and was to be hotly debated over the course of the next few weeks, in the pages of the local and national press. Commentators, from both the left and the right, were agreed that the tour had done little to alter the domestic political landscape, to remove deeply held prejudices, or to prompt a thorough-going reassessment of Britain's Cold War alignment. However, the prestige of the labour movement as a whole, and the Foundry Workers' Union in particular, had been greatly enhanced by the presence of the youthful cosmonaut. Gagarin was a potent symbol of the power of organised labour and socialist thought. Born into a peasant family, he had served his time as a foundry apprentice before finding fame through his own efforts, and sustained hard work. As both the product and expression

of all that was best in the mature Soviet system, he seemed to represent the embodiment of the new 'Socialist Man' and delighted his audience at the union offices by declaring that he was 'still a foundryman at heart'. Presented with the honorary membership of the Foundry Workers' Union, and a medal bearing the hopeful inscription 'Together moulding a better world', Gagarin paid tribute to 'a union which ranks among the oldest in the world and has such fine traditions', before wishing its members 'every success in... championing working class rights and interests, and working for a world of peace.

These sentiments were expanded upon during his address, later in the day, to the workforce at the Metro-Vickers factory: then the largest industrial plant in Western Europe. Skilfully circumventing many of the most intransigent problems created by the Cold War, Yuri stressed the need for arms reduction and peaceful co-operation in pushing forward the boundaries of science and technology, and in pursuing a policy of understanding the detente. He explained that 'Although only one person was aboard the spaceship, it took tens of thousands of people to make it a success. Over 7,000 scientists, workers and engineers just like yourselves were decorated for contributing to the success of the flight', and concluded to the sound of thunderous applause that 'There is plenty of room for all in outer space ... I visualise the great day when a Soviet spaceship landing on the moon will disembark a party of scientists, who will join British and American scientists working in observatories in the spirit of peaceful co-operation and competition rather than thinking on military lines.

In reflecting these aspirations, Gagarin struck a chord with a workforce who lived under the constant threat of thermo-nuclear war and attempted to capture something of the spirit of Khrushchev's new, more open and vibrant U.S.S.R. That the dreams of rapprochement and socialist advance, cherished by the Soviet premier and his protege, were ultimately to evaporate amidst Kennedy's blockade of Cuba and a return to the arms race, was by no means clear in the summer of 1961. The subtle manner in which Gagarin's visit to Britain had been handled – as opposed to the heavy handed treatment afforded to his later and quite disastrous mission to Gomulka's Poland – ensured that the reputation of the U.S.S.R. probably stood higher with the British public at that moment than at any point since May 1945, while the order books of the Soviet firms who exhibited at Earls Court were filled in record time by their anxious commercial rivals.

Khrushchev had scored a valuable public relations success in the West, while for Gagarin himself, the visit had been nothing short of a triumph: confirming his diplomatic skills and conferring upon him a political role which had not yet become onerous.

Yet perhaps the most durable effect of his visit to these shores, and the one which Gagarin would probably have been best pleased with, was the sense of idealism and hope which he had inspired in the hearts and minds of British working people. This, at least, was enough to transcend the harsh realities of the Cold War era and to signal a better way ahead.



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HISTORY

THE FIRST AND TODAY'S WOMEN IN SPACE

European Space Agency looks back at the incredible achievements of females in space – starting with Valentina Tereshkova who has made history as the first woman in space, and celebrating today's female astronauts.

Valentina Tereshkova

Valentina Tereshkova was born in Maslennikovo, near Yaroslavl, in Russia on 6 March 1937. Her father was a tractor driver and her mother worked in a textile factory. Interested in parachuting from a young age, Tereshkova began skydiving at a local flying club, making her first jump at the age of 22 in May 1959. At the time of her selection as a cosmonaut, she was working as a textile worker in a local factory.

After the first human spaceflight by Yuri Gagarin, the selection of female cosmonaut trainees was authorised by the Soviet government, with the aim of ensuring the first woman in space was a Soviet citizen.

On 16 February 1962, out of more than 400 applicants, five women were selected to join the cosmonaut corps: Tatyana Kuznetsova, Irina Solovyova, Zhanna Yorkina, Valentina Ponomaryova and Valentina Tereshkova. The group spent several months in training, which included weightless flights, isolation tests, centrifuge tests, 120 parachute jumps and pilot training in jet aircraft.

Four candidates passed the final examinations in November 1962, after which they were commissioned as lieutenants in the Soviet air force (meaning Tereshkova also became the first civilian to fly in



Valentina Tereshkova. Photo: ESA

space, since technically these were only honorary ranks).

Originally a joint mission was planned that would see two women

launched on solo Vostok flights on consecutive days in March or April 1963. Tereshkova, Solovyova and Ponomaryova were the leading can-

didates. It was intended that Tereshkova would be launched first in Vostok 5, with Ponomaryova following her in Vostok 6.

However, this plan was changed in March 1963: Vostok 5 would carry a male cosmonaut, Valeri Bykovsky, flying the mission with a woman in Vostok 6 in June. The Russian space authorities nominated Tereshkova to make the joint flight.

Flight of the 'Seagull'

After watching the launch of Vostok 5 at Baikonur Cosmodrome on 14 June, Tereshkova completed preparations for her own flight. On the morning of 16 June, Tereshkova and her backup Solovyova both dressed in spacesuits and were taken to the launch pad by bus. After completing checks of communication and life support systems, she was sealed inside her spacecraft.

After a two-hour countdown, Vostok 6 lifted off without fault and, within hours, she was in communi-



Peggy Whitson. Photo: ESA/NASA

cation with Bykovsky in Vostok 5, marking the second time that two manned spacecraft were in space at the same time. With the radio call sign 'Chaika' ('seagull'), Tereshkova had become the first woman in space. She was 26.

Tereshkova's televised image was broadcast throughout the Soviet Union and she spoke to Khrushchev by radio. She maintained a flight log and performed various tests to collect data on her body's reaction to spaceflight. Her photographs of Earth and the horizon were later used to identify aerosol layers within the atmosphere.

Her mission lasted just under three days (two days, 23 hours, and 12 minutes). With a single flight, she

had logged more flight time than the all the US Mercury astronauts who had flown to that date combined. Both Tereshkova and Bykovsky were record-holders. Bykovsky had spent nearly five days in orbit and even today he retains the record for having spent the longest period of time in space alone.

Today's women in space

The assignment of women to space missions is no longer regarded in the same 'historic' way that it was in years gone by. In 2012, NASA's Sunita Williams was only the second woman in history to command an International Space Station Expedition and this was barely mentioned in the media.

Men and women work alongside each other in space as members of expert teams on the International Space Station. There is no difference between the training given to male or female astronauts, or in the responsibilities given in space missions. It is commonplace for female astronauts to fly several times in space.

Susan Helms jointly holds the record for the longest spacewalk, while Peggy Whitson (first female Space Station commander) has spent more than a year of her life off the planet. Whitson and South Korean astronaut Soyeon Yi flew the first spacecraft reentry in which women outnumbered men on a crew.

NASA astronaut Karen Nyberg, flying with ESA's Luca Parmitano on Expedition 36/37 is working on the Space Station on the anniversary of Valentina Tereshkova's pioneering flight.

Nyberg said, "I grew up in an age where it was OK to do what you wanted to do as a girl, but I know that before this, it was not necessarily so. A lot of the scientists, engineers and astronaut females who came before me, set the stage for me. It's incredible what some of those women probably had to go through to make it no question for me."



ESA astronaut Luca Parmitano and NASA astronaut Karen Nyberg. Photo: ESA/NASA

HISTORY

SPACE EXPLORATION – A BRIEF HISTORY

Humans have always looked up into the night sky and dreamed about space. In the latter half of the 20th century, rockets were developed that were powerful enough to overcome the force of gravity to reach orbital velocities, paving the way for space exploration to become a reality. Here are the key highlights and milestones in the history of space exploration, according to the Aerospace Corporation.

1957–1962

On Oct. 4, 1957, the Soviet Union launched the first artificial satellite, Sputnik 1, into space. Four years later on April 12, 1961, Russian Lt. Yuri Gagarin became the first human to orbit Earth in Vostok 1. His flight lasted 108 minutes, and Gagarin reached an altitude of 327 kilometers (about 202 miles).

The first U.S. satellite, Explorer 1, went into orbit on Jan. 31, 1958. In 1961, Alan Shepard became the first American to fly into space. On Feb. 20, 1962, John Glenn's historic flight made him the first American to orbit Earth.

Landing on the Moon

“Landing a man on the moon and returning him safely to Earth within a decade” was a national goal set by President John F. Kennedy in 1961. On July 20, 1969, astronaut Neil



The International Space Station

Armstrong took “one giant leap for mankind” as he stepped onto the moon. Six Apollo missions were made to explore the moon between 1969 and 1972.

During the 1960s, unmanned spacecraft photographed and probed the moon before astronauts ever landed. By the early 1970s, orbiting communications and navigation satellites were in everyday use, and the Mariner spacecraft was orbiting and mapping the surface of Mars. By the end of the decade, the Voyager space-

craft had sent back detailed images of Jupiter and Saturn, their rings, and their moons.

Skylab, America's first space station, was a human-spaceflight highlight of the 1970s, as was the Apollo Soyuz Test Project, the world's first internationally crewed (American and Russian) space mission.

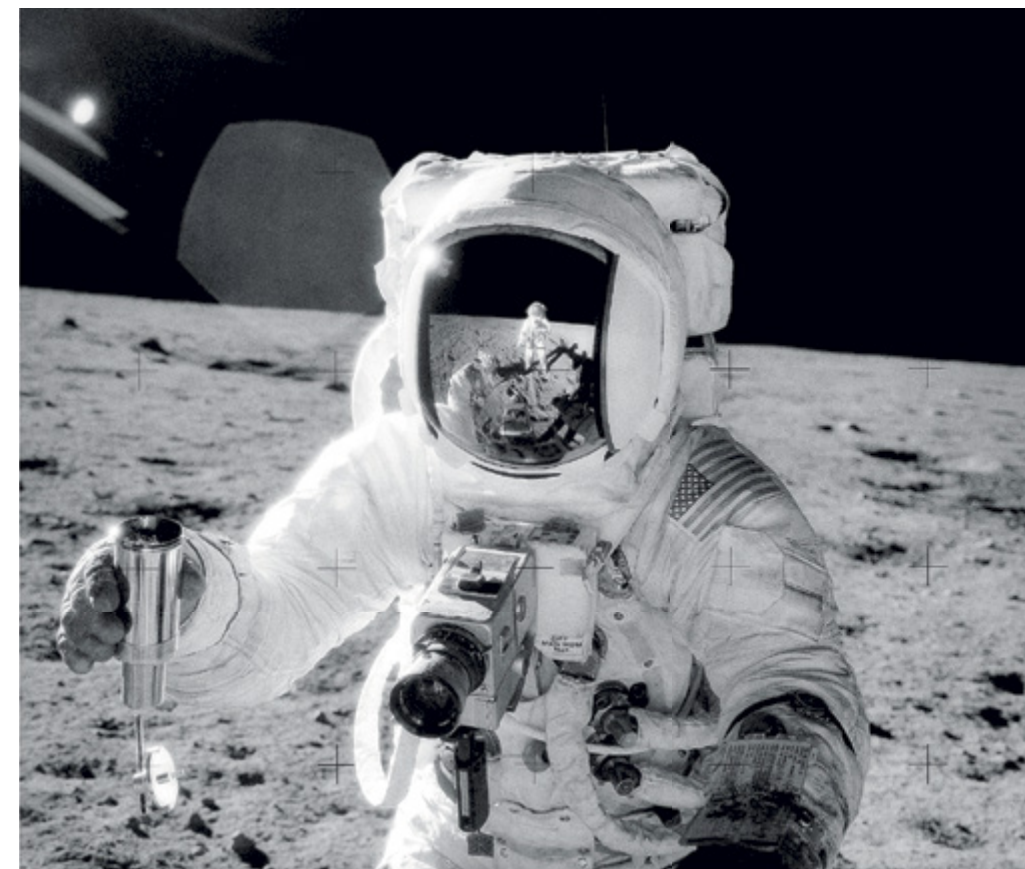
In the 1980s, satellite communications expanded to carry television programs, and people were able to pick up the satellite signals on their home dish antennas. Satellites discovered an ozone hole over Antarctica, pinpointed forest fires, and gave us photographs of the nuclear power plant disaster at Chernobyl in 1986. Astronomical satellites found new stars and gave us a new view of the center of our galaxy.

Space shuttle

In April 1981, the launch of the space shuttle Columbia ushered in a period of reliance on the reusable



During Exploration Mission-1, Orion will venture thousands of miles beyond the moon during an approximately three-week mission. (Image: NASA)



Landing on the moon: Apollo 12 launches for second moon landing Nov. 14, 1969

shuttle for most civilian and military space missions. Twenty-four successful shuttle launches fulfilled many scientific and military requirements until Jan. 28, 1986, when just 73 seconds after liftoff, the space shuttle Challenger exploded. The crew of seven was killed, including Christa McAuliffe, a teacher from New Hampshire who would have been the first civilian in space.

The Columbia disaster was the second shuttle tragedy. On Feb. 1, 2003, the shuttle broke apart while re-entering the Earth's atmosphere, killing all seven crew members. The disaster occurred over Texas, and only minutes before it was scheduled to land at the Kennedy Space Center. An investigation determined the catastrophe was caused by a piece of foam insulation that broke off the shuttle's propellant tank and damaged the edge of the shuttle's left wing. It was the second loss of a shuttle in 113 shuttle flights. After each of the disasters, space shut-

tle flight operations were suspended for more than two years.

Discovery was the first of the three active space shuttles to be retired, completing its final mission on March 9, 2011; Endeavour did so on June 1. The final shuttle mission was completed with the landing of Atlantis on July 21, 2011, closing the 30-year space shuttle program.

Space systems continue to become more and more integral to homeland defense, weather surveillance, communication, navigation, imaging, and remote sensing for chemicals, fires, and other disasters.

The International Space Station is a research laboratory in low Earth orbit. With many different partners contributing to its design and construction, this high-flying laboratory has become a symbol of cooperation in space exploration, with former competitors now working together.

The station has been continuously occupied since the arrival of Expe-

dition 1 in November of 2000. The station is serviced by a variety of visiting spacecraft: the Russian Soyuz and Progress; the American Dragon and Cygnus; the Japanese H-II Transfer Vehicle; and formerly the Space Shuttle and the European Automated Transfer Vehicle. It has been visited by astronauts, cosmonauts, and space tourists from 17 different nations.

Space launch systems have been designed to reduce costs and improve dependability, safety, and reliability. Most U.S. military and scientific satellites are launched into orbit by a family of expendable launch vehicles designed for a variety of missions. Other nations have their own

launch systems, and there is strong competition in the commercial launch market to develop the next generation of launch systems.

The future of space exploration

Modern space exploration is reaching areas once only dreamed about. Mars is focal point of modern space exploration, and manned Mars exploration is a long-term goal of the

United States. NASA is on a journey to Mars, with a goal of sending humans to the Red Planet in the 2030s.

NASA and its partners have sent orbiters, landers, and rovers, increasing our knowledge about the planet. The Curiosity Rover has gathered radiation data to protect astronauts, and the MARS 2020 Rover will study the availability of oxygen and other Martian resources.

ITALIAN ASTRONAUT SAMANTHA CRISTOFORETTI RETURNS TO SPACE

The European Space Agency (ESA) astronaut Samantha Cristoforetti has been assigned a second space mission and will fly to the International Space Station in spring 2022. Samantha first flew to the International Space Station in 2014 for Italy's space agency ASI 'Futura' mis-

sion, returning to Earth in a Russian Soyuz vehicle after 200 days in space. "It gives me great pleasure to announce Samantha's second space mission," said ESA Director General Josef Aschbacher. "Samantha is an excellent role model for anyone applying to ESA's recently announced

2021/22 astronaut selection. I look forward to her continuing the essential work of European scientists in orbit as she inspires all Europeans to explore farther and reach higher for the benefit of Earth."

"I am grateful that in the years since I returned from my first mis-

sion I have had many opportunities to grow as a professional. Leading Spaceship EAC, our team of students and young researchers working on technologies for lunar exploration, and being part of the iHAB programme, providing an astronaut's perspective in the early development of the habitation module that ESA will provide to the Lunar Gateway, were both enriching professional experiences. I also had the chance to live for 10 days underwater as the Commander of NASA's NEEMO23 crew, experiencing a close analogue to a space mission," said Samantha.

"But going back to the International Space Station, my home away from home, has always remained my aspiration. I am honoured to be entrusted with a second space mission and look forward to representing again Europe in orbit, as we continue to pursue scientific discovery and technological excellence," added Samantha.

Preparation in progress

Training for Samantha's second mission is already under way and has included International Space Station refresher sessions at ESA's European Astronaut Centre in Cologne, Germany, and NASA's Johnson Space Center in Houston, Texas.

In the coming months, her schedule will intensify as she brushes up on Space Station systems and procedures and trains for the specific experiments and tasks she will perform in space.



Soyuz training for ESA astronaut Samantha Cristoforetti at Star City, Moscow in Russia.
Photo: ESA/GCTC

Reflecting on Futura

During Futura, Samantha supported an extensive scientific programme of experiments in physical science, biology and human physiology as well as radiation research and technology demonstrations.

Samantha also oversaw the undocking of ESA's fifth and final Automated Transfer Vehicle (ATV) marking the end of a successful programme that paved the way for the European Service Modules currently being produced for NASA's Orion spacecraft that will travel around and to the Moon.

Italian involvement in the mission

The call for applications of the new ASI experiments is still ongoing. While waiting to train on the new experiments, Samantha Cristoforetti will follow among others LIDAL, NUTRISS, Acoustic Di-

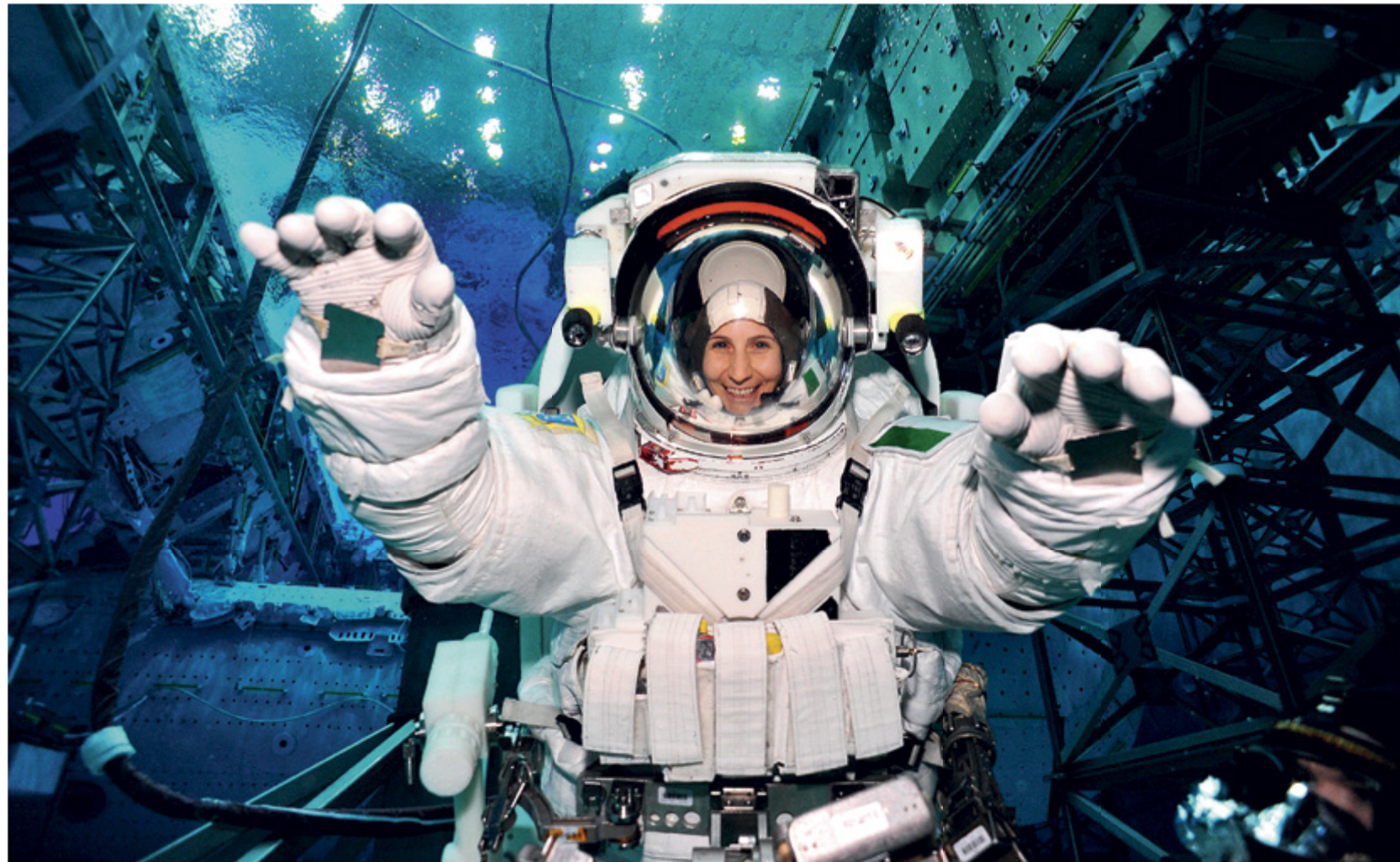
agnostics, Mini-EUSO experiments, already on board on the ISS, and on which Luca Parmitano has already worked during the ESA Beyond mission in 2019.

Europe in low- Earth orbit

During ESA's Space19+ ministerial council, Member States supported the Agency's continued commitment to the International

Space Station until at least 2030 and the provision of second flights for all astronauts from ESA's class of 2009.

Samantha's flight follows the second flights of her classmates Alexander Gerst in 2018, Luca Parmitano in 2019 and Thomas Pesquet in 2021, and could see a direct on-Station handover with Matthias Maurer who is scheduled to fly his first mission to the Space Station later this year.



Samantha Cristoforetti training for spacewalks in NASA's Neutral Buoyancy Laboratory in Houston, USA. Diving underwater is as close as it gets to experiencing weightlessness on Earth for long periods of time. Photo: NASA/ESA



Samantha Cristoforetti poses in the Cupola module of the International Space Station with two 100-day patches to mark her 200th day in space.
Photo: ESA/NASA

PERSEVERANCE: DRIVING ON MARS FOR THE FIRST TIME

NASA's Mars 2020 Perseverance rover performed its first drive on Mars March 4, covering 21.3 feet (6.5 meters) across the Martian landscape. The drive served as a mobility test that marks just one of many milestones as team members check out and calibrate every system, subsystem, and instrument on Perseverance. Once the rover begins pursuing its science goals, regular commutes extending 656 feet (200 meters) or more are expected.

"When it comes to wheeled vehicles on other planets, there are few first-time events that measure up in significance to that of the first drive," said Anais Zarifian, Mars 2020 Perseverance rover mobility test bed engineer at NASA's Jet Propulsion Laboratory in Southern California. "This was our first chance to 'kick the tires' and take Perseverance out for a spin. The rover's six-wheel drive responded superbly. We are now confident our drive system is good to go, capable of taking us wherever the science leads us over the next two years."

The drive, which lasted about 33 minutes, propelled the rover forward 13 feet (4 meters), where it then turned in place 150 degrees to the left and backed up 8 feet (2.5 meters) into its new temporary parking



Credits: NASA/JPL-Caltech

space. To help better understand the dynamics of a retrorocket landing on the Red Planet, engineers used Perseverance's Navigation and Hazard Avoidance Cameras to image the spot where Perseverance touched down, dispersing Martian dust with plumes from its engines.

More Than Roving

The rover's mobility system is not the only thing getting a test drive during this period of initial checkouts. On Feb. 26 – Perseverance's eighth Martian day, or sol, since landing – mission controllers completed a software update, replacing the computer

program that helped land Perseverance with one they will rely on to investigate the planet.

More recently, the controllers checked out Perseverance's Radar Imager for Mars' Subsurface Experiment (RIMFAX) and Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) instruments and deployed the Mars Environmental Dynamics Analyzer (MEDA) instrument's two wind sensors, which extend out from the rover's mast. Another significant milestone occurred on March 2, or sol 12, when engineers unstowed the rover's 7-foot-long (2-meter-long) robotic arm for the first time, flexing each of its five joints over the course of two hours.

According to Robert Hogg, Mars 2020 Perseverance rover deputy mission manager, the first test of the robotic arm was "a big moment." "That's the main tool the science team will use to do close-up examination of the geologic features of Jezero Crater, and then we'll drill and sample the ones they find the most interesting. When we got confirmation of the robotic arm flexing its muscles, including images of it working beautifully after its long trip to Mars – well, it made my day," said Hogg.

Upcoming events and evaluations include more detailed testing and calibration of science instruments, sending the rover on longer drives, and jettisoning covers that shield both the adaptive caching assembly (part of the rover's Sample Caching System) and the Ingenuity Mars Helicopter during landing. The experimental flight test program for the Ingenuity Mars Helicopter will also take place during the rover's commissioning.

Through it all, the rover is sending down images from the most advanced suite of cameras ever to travel to Mars. The mission's cameras have already sent about 7,000 images. On Earth, Perseverance's imagery flows through the powerful Deep Space Network (DSN), managed by NASA's Space Communications and Navigation (SCaN) program. In space, several Mars orbiters play an equally important role.

"Orbiter support for downlink of data has been a real gamechanger," said Justin Maki, chief engineer for imaging and the imaging scientist for the Mars 2020 Perseverance rover mission at JPL. "When you see a beautiful image from Jezero, consider that it took a whole team of Martians to get it to you. Every picture from Perseverance is relayed by either the European Space Agency's Trace Gas Orbiter, or NASA's MAVEN, Mars Odyssey, or Mars Reconnaissance Orbiter. They are important partners in our explorations and our discoveries."

The sheer volume of imagery and data already coming down on this mission has been a welcome bounty for Matt Wallace, who recalls waiting anxiously for the first images to trickle in during NASA's first Mars rover mission, Sojourner, which explored Mars in 1997. On March 3, Wallace became the mission's new project manager. He replaced John McNamee, who is stepping down as he intended, after helming the project for nearly a decade.

"John has provided unwavering support to me and every member of the project for over a decade," said Wallace. "He has left his mark on this mission and team, and it has been my privilege to not only call him boss but also my friend."

Touchdown site named

With Perseverance departing from its touchdown site, mission team scientists have memorialized the spot, informally naming it for the late science fiction author Octavia E. Butler. The groundbreaking author and Pasadena, California, native was the first African American woman to win both the Hugo Award and Nebula Award, and she was the first science fiction writer honored with a MacArthur Fellowship. The location where Perseverance began its mission on Mars now bears the name "Octavia E. Butler Landing."

Official scientific names for places and objects throughout the solar system – including asteroids, comets, and locations on planets – are designated by the International Astronomical Union. Scientists working with NASA's Mars rovers have traditionally given unofficial nicknames to various geological features, which they can use as references in scientific papers.

"Butler's protagonists embody determination and inventiveness, making her a perfect fit for the Perseverance rover mission and its theme of overcoming challenges," said Kathryn Stack Morgan, deputy project

scientist for Perseverance. "Butler inspired and influenced the planetary science community and many beyond, including those typically under-represented in STEM fields."

"I can think of no better person to mark this historic landing site than Octavia E. Butler, who not only grew up next door to JPL in Pasadena, but she also inspired millions with her visions of a science-based future," said Thomas Zurbuchen, NASA associate administrator for science. "Her guiding principle, 'When using science, do so accurately,' is what the science team at NASA is all about. Her work continues to inspire today's scientists and engineers across the globe – all in the name of a bolder, more equitable future for all."

Butler, who died in 2006, authored such notable works as "Kindred," "Bloodchild," "Speech Sounds," "Parable of the Sower," "Parable of the Talents," and the "Patternist" series. Her writing explores themes of race, gender, equality, and humanity, and her works are as relevant today as they were when originally written and published.

The mission

A key objective of Perseverance's mission on Mars is astrobiology, including the search for signs of ancient microbial life. The rover will characterize the planet's geology and past climate, pave the way for human exploration of the Red Planet, and be the first mission to collect and cache Martian rock and regolith.

Subsequent NASA missions, in cooperation with ESA (European Space Agency), would send spacecraft to Mars to collect these sealed samples from the surface and return them to Earth for in-depth analysis.

The Mars 2020 Perseverance mission is part of NASA's Moon to Mars exploration approach, which includes Artemis missions to the Moon that will help prepare for human exploration of the Red Planet.

TODAY IS THE BEGINNING OF OUR SALVATION

AUGUSTIN SOKOLOVSKI,
Doctor of Theology, priest

Today is the beginning of our salvation, / the revelation of the eternal mystery! / The Son of God becomes the Son of the Virgin / as Gabriel announces the coming of Grace. / Together with him let us cry to the Theotokos: / Hail, O Full of Grace, / the Lord is with You! (Troparion – Tone 4).

These words from the Troparion of the Annunciation are very meaningful. “Hence in our Lord Jesus, the personal existence overcomes all own limits and in God, it becomes truly unlimited.” The Annunciation is celebrated in the Russian Orthodox Church on April. It is one of the most important Christian feasts of the month.

If somebody looks at the liturgical calendar, one can feel that it is a special calendar of its kind in which, as in any secular calendar, the time from the beginning of the year to its end is administered, in celebrations, rhythms and data and that it is diachronic.

This means we are dealing with different time sequences, between the liturgical cycles and the festive events, to change those in detail to resolve paradoxical relationships. The first and most im-

portant holiday concerning the following of its occurrence is Easter. Easter is celebrated on the first Sunday after the first full moon after the vernal equinox.

This means that all the celebrations and memories associated with Easter, Lent, the day of Pentecost and the sequence of liturgical readings on Sunday belong to different dates each year. This year 2021, Lent

began on March 15 and Easter closes on May 2. The Christmas cycle is parallel to the Easter cycle in the liturgical calendar. It begins with the Annunciation, that is the day of the conception of the Lord Jesus Christ by the Virgin Mary of the Holy Spirit and the Christmas season, circumcision and presentation. And the early church celebrated Christmas and the baptism of Jesus Christ was called Epiphany, on January 6 (19) with the countdown from Epiphany.

Festivals for saints, icons and historical events are celebrated throughout the year. There are ideological celebrations in the liturgical calendar as well. Initially in connection with this or that event, they have turned into celebrations in honour and memory of this or that dogma or doctrinal belief. Concerns related to Easter change by date, the rest do not. One of these holidays – the adornment of April – is the feast of the Annunciation. It will be celebrated by the church on April 7. The event of Annunciation is directly related to salvation and is conducted in the profession of faith. The main song of the festival, the Troparion, is called the



Annunciation. 1408

“beginning” of our redemption.

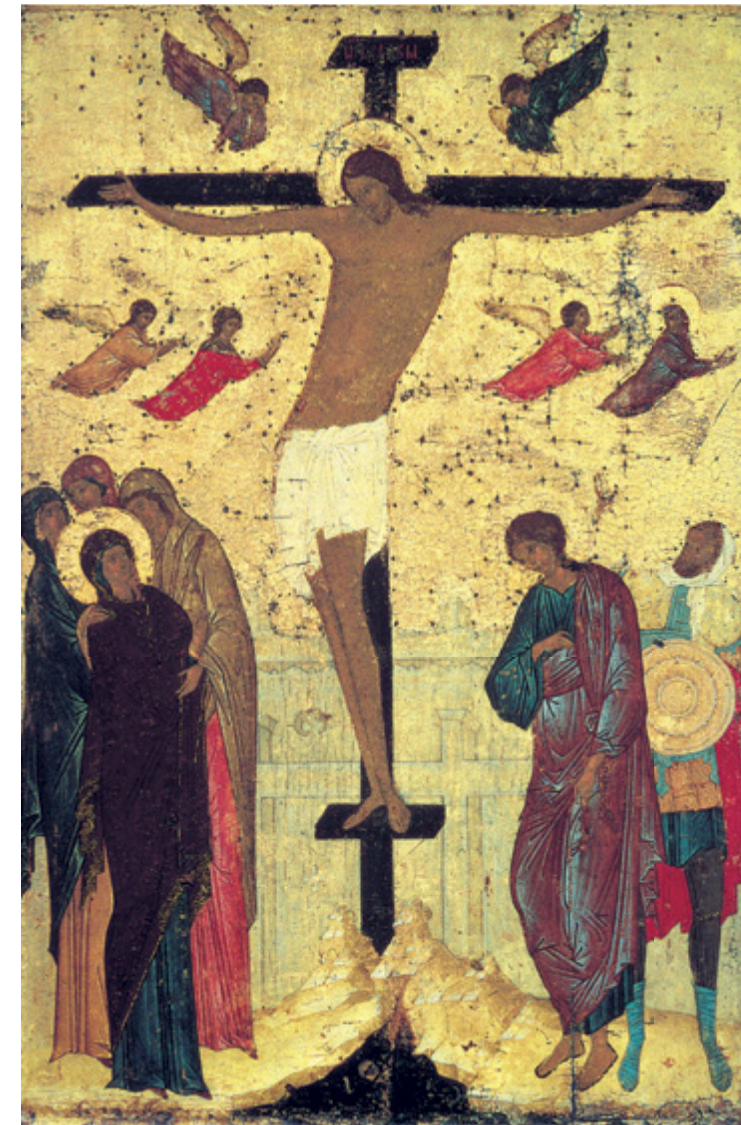
The belief that the Lord Jesus was crucified and died on the cross is an important dogma of the Church. In the creed, we confess our faith in “the Lord Jesus, Christ, the Son of God, who was crucified for us under Pontius Pilate”. This means that the death of the Lord on the cross is not an idea, not a representation, not an accomplishment realised by some great hero, but a real, terrible, shameful, painful, grievous death. Once upon a time in history.

The death of the one who as God once entered into history to save us, something exceptional made up for human salvation. Our being, we know this and see, we recognise and understand it more and more, is connected with suffering, hardship and pain. The Lord’s cross is inseparable from the sufferer.

Turning to the cross we refer to it as you. We invoke the cross of the Lord, we glorify the cross, we have bitten the protection and the help of the cross. All sacraments and ordinances of the church are developed from the cross of the Lord.

The sacrament of the sacraments – the Eucharist – becomes the moment when the priest blesses the bread and wine that has to become the Sacrament in a cruciform manner by the power of the Holy Spirit. And they become the body and blood of the Lord Jesus.

The cross of Christ is the foundation of the world. This is the force of gravity that scholars believe to be



The Crucifixion of Jesus. Russian icon by Dionisius. XVI

found and that has since been revealed in the Bible and the life of the Church. The cross of Christ is the life of the world. The cross of Christ is the new heart of the universe. When we worship the cross, we bid him to protect us. We bid him to save us from all misfortune.

We live worried on fearful days. They frighten us because we are unaware of the greatness of the divine gift. Power and protection that was once given by the Lord in his cross. We forget that the Lord belongs to us. He lives and feels, he cries and mourns, sees himself and waits with a childlike love for everyone who turns to him over and over again.

That is how grace, healing and protection from the Lord’s cross are poured out on the world. The cross is not only past and present but also the future. The Church is waiting... on the return of the cross. We are waiting for the Lord’s return according to the Bible.

Not only are we all partakers of this world, but we are flesh of the flesh of our planet. But the world lives its own life, the world goes its own way. Like any real historical event in salvation history, the message must be revealed in the history of the world. If this is not heard, the world has started to collapse. The world starts suffering from ailments and diseases.

“Like there is a soul in the body, there are Christians in the world,” says one of the first Christian texts, “Epistle to Diognetus”. We are Christians in the Church. Like

the angels of the Lord Jesus, messengers of the eternal praise.

“Rejoice, gracious, the Lord is with you” is said to Mother Mary. The divine and the Human meet, never to separate again. The communion of man and God becomes an example, a paradigm, an image and a criterion for every other common coexistence. For the experience of Redemption today.

O Victorious Leader of Triumphant Hosts! / We, your servants, delivered from evil, sing our grateful thanks to you, O Theotokos! / As you possess invincible might, set us free from every calamity / so that we may sing: Hail, O unwedded Bride! (Kontakion – Tone 8).

BOOKS THAT WILL TAKE YOU TO SPACE

These books will take you on a journey through space – be it a galaxy far, far away or our own Solar system.

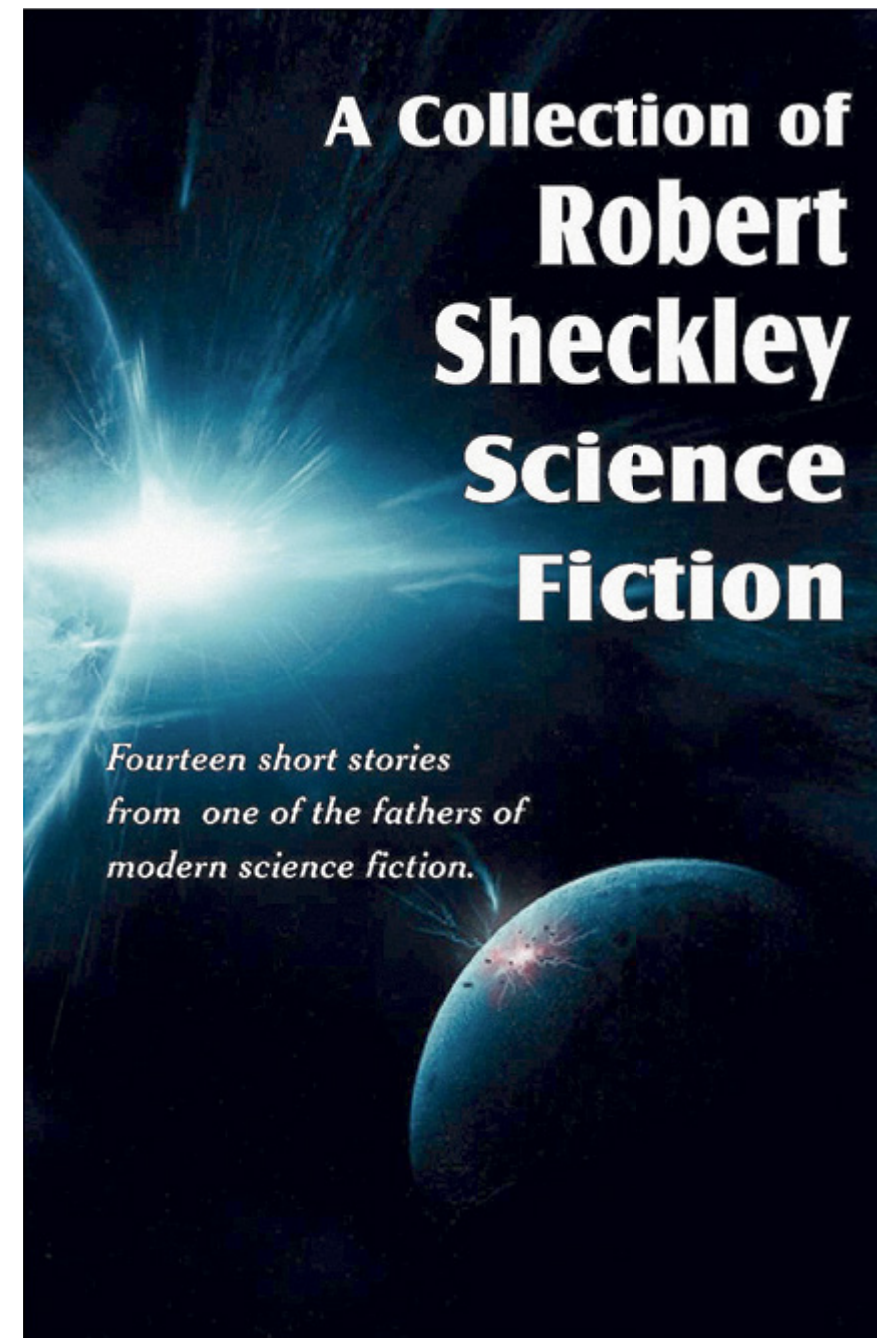
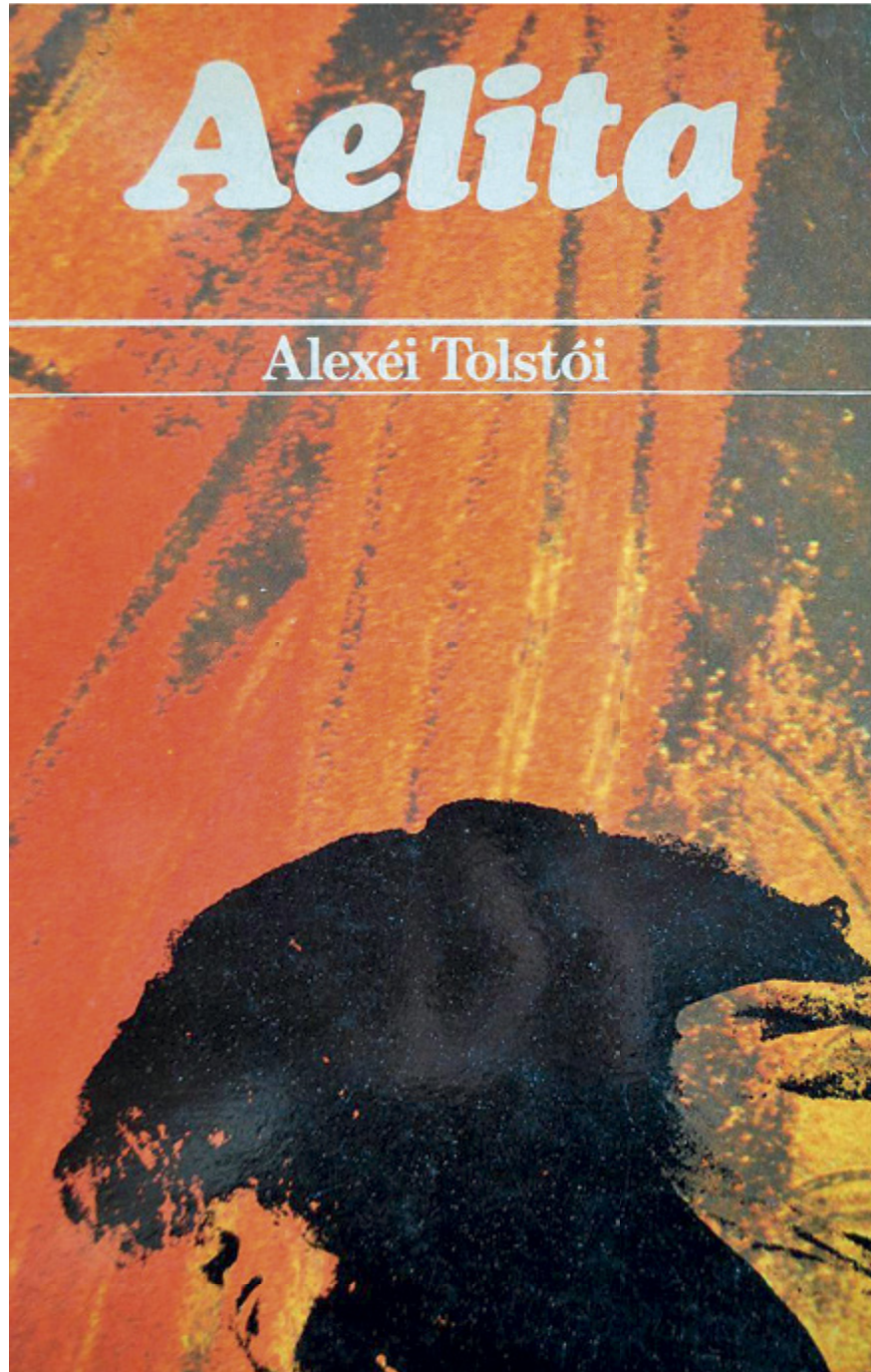
Aelita by Alexei Tolstoi

Aelita (1923) is a science-fiction fantasy in the manner of H. G. Wells, telling the story of a Soviet expedition to Mars with the aim of establishing communism. A Red Army officer foments a rebellion of the native Martians, who are in fact long-ago emigrants from Atlantis. The story was adapted into a screenplay in 1924. Its futuristic, expressionistic sets were designed by Isaac Rabino-vitch of the Kamerny Theatre.

The film influenced the design in *Flash Gordon*, a space opera, which was created by the artist Alex Raymond in 1934 and led to a popular radio serial and several films. *Giperboloid inzhenera Garina* (1926, *The Death Box*) described an attempt of an unscrupulous inventor to use his death ray to conquer the world. He manages to rule a decadently capitalist USA for a short period.

A Collection of Robert Sheckley Science Fiction by Robert Sheckley

A Collection of Robert Sheckley Science Fiction includes 14 short stories that appeared in magazines of the 1950's. Included are: *Beside Still Waters*, *Cost of Living*, *Diplomatic Immunity*, *Ask A Foolish*, *Question*, *The Leech*, *Warrior Race*, *The Hour*



of Battle, One Man's Poison, Warm, Keep Your Shape, Death Wish, Watchbird, Bad Medicine, Forever.

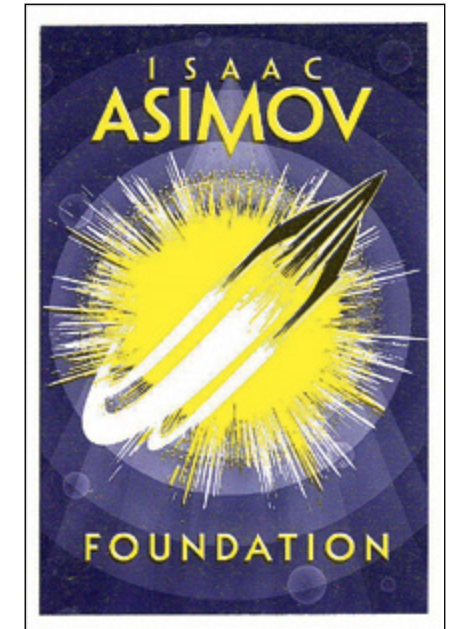
Robert Sheckley was a Hugo and Nebula-nominated American author. He was first published in science fiction magazines of the 1950's. His numerous quick-witted stories and novels were famously unpredictable, absurdist and comical. Sheckley was named Author Emeritus by the Science Fiction and Fantasy Writers of America in 2001.

The Foundation Trilogy by Isaac Asimov

The Foundation series is Isaac Asimov's iconic masterpiece. Unfolding against the backdrop of a crumbling Galactic Empire, the story of Hari Seldon's two Foundations is a lasting testament to an extraordinary imagination, one that shaped science fiction as we know it today.

The Galactic Empire has prospered for twelve thousand years. Nobody suspects that the heart of the thriving Empire is rotten, until psychohistorian Hari Seldon uses his new science to foresee its terrible fate.

Exiled to the desolate planet Terminus, Seldon establishes a colony



of the greatest minds in the Empire, a Foundation which holds the key to changing the fate of the galaxy.

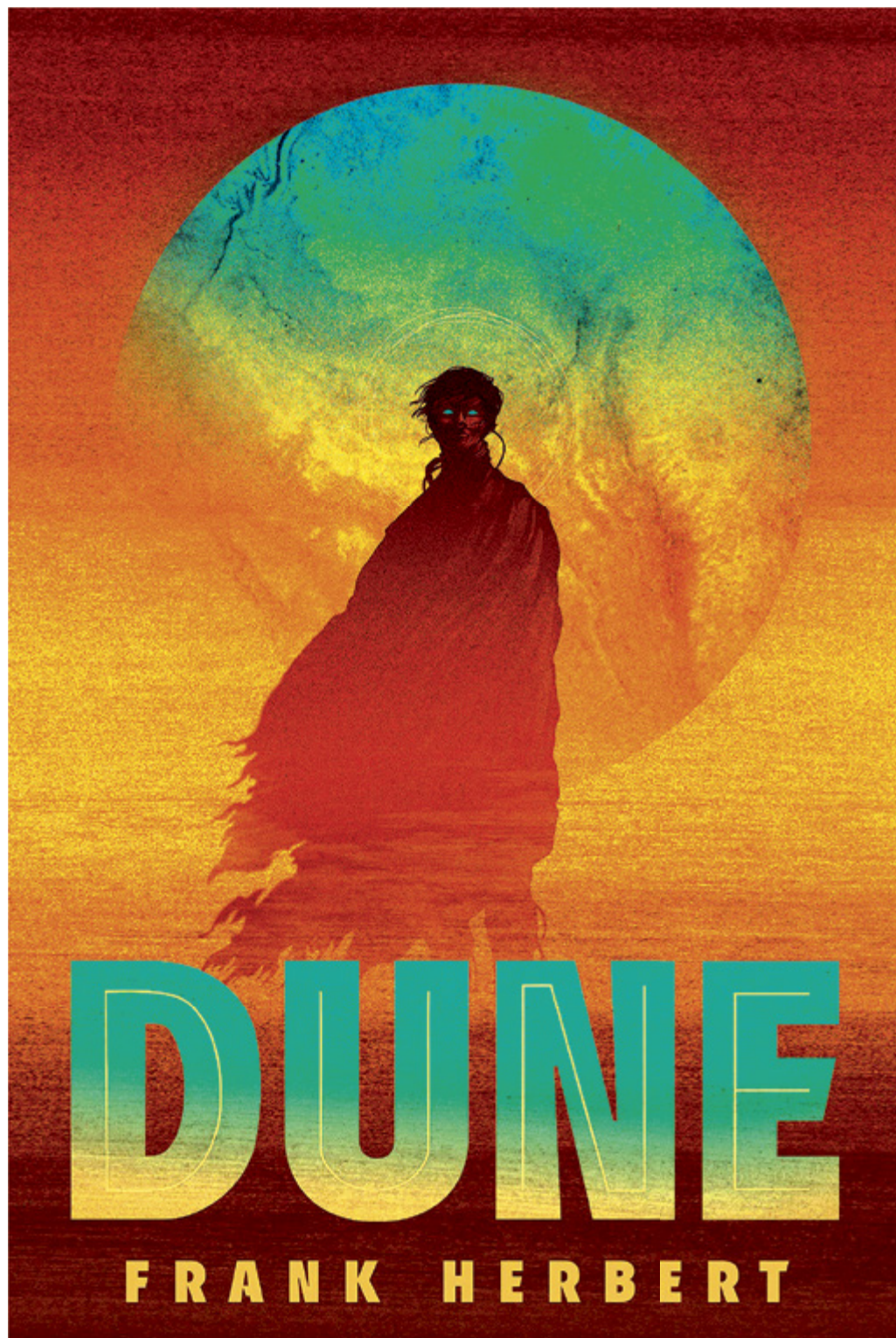
However, the death throes of the Empire breed hostile new enemies, and the young Foundation's fate will be threatened first.

Dune by Frank Herbert

Melange, or 'spice', is the most valuable – and rarest – element in the universe; a drug that does everything from increasing a person's life-span to making interstellar travel possible. And it can only be found on a single planet: the inhospitable desert world Arrakis.

Whoever controls Arrakis controls the spice. And whoever controls the spice controls the universe.

When the Emperor transfers stewardship of Arrakis from the noble House Harkonnen to House Atreides, the Harkonnens fight back, murdering Duke Leto Atreides. Paul, his



son, and Lady Jessica, his concubine, flee into the desert. On the point of death, they are rescued by a band of Fremen, the native people of Arrakis, who control Arrakis' second great resource: the giant worms that burrow beneath the burning desert sands.

In order to avenge his father and retake Arrakis from the Harkonnens, Paul must earn the trust of the Fremen and lead a tiny army against the innumerable forces aligned against them.

And his journey will change the universe.

Forty years after the groundbreaking movie *Star Wars: A New Hope* first hit the silver screen, *Star Wars* remains one of the most beloved sagas ever told. Together, the three original *Star Wars* movies *A New Hope*, *The Empire Strikes Back*, and *Return of the Jedi* told one epic: a heroic tale of innocence lost and wisdom gained, of

2001: A Space Odyssey by Arthur C. Clarke

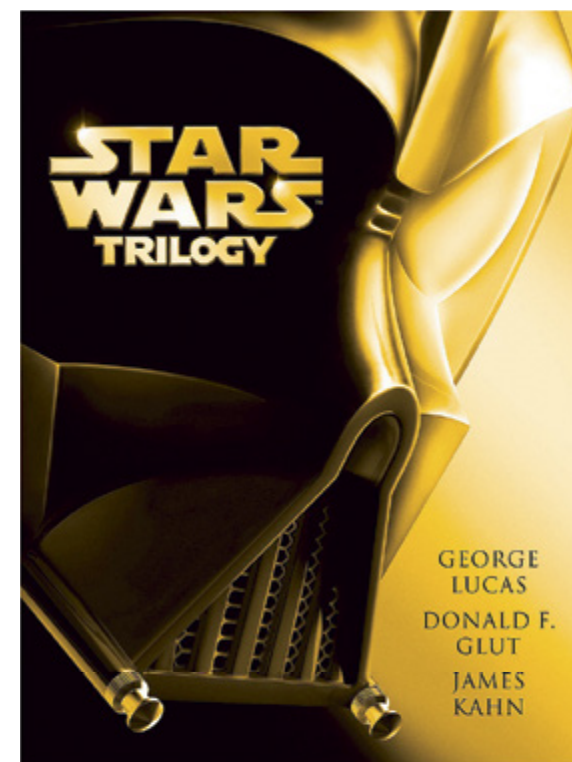
This classic novel, later turned film, defined an era of science fiction. After discovering a monolith transmitting radio signals buried under the moon's surface, a group of astronauts embark on a mission to investigate one of Saturn's moons where the radio signals are being received.

The mission goes awry, and the astronauts have a lot to contend with, from HAL 9000 – the artificially intelligent computer – to the truth behind the society situated in the depths of our solar system.

Star Wars Trilogy by George Lucas, Donald Glut and James Kahn

Luke Skywalker dreamed of adventures out among the stars and alien worlds. But when he intercepted a message from a beautiful captive princess, he got more than he had bargained for – and that was how the adventure of his life began.

Forty years after the groundbreaking movie *Star Wars: A New Hope*



downfall and redemption, of the never-ending fight between the forces of good and evil. Read the story of the movies in one paperback volume and

anyone can contemplate. Brian May, Patrick Moore and Chris Lintott explain how all this came about, from the moment when time and space



rediscover the wonder of the legend that begins: A long time ago, in a galaxy far, far away...

Bang! The Complete History of the Universe by Brian May and Patrick Moore

Bang! Space, time, matter... the Universe was born 13.7 billion years ago. Infinitely small at first, it expanded more rapidly than

came into existence, to the formation of the first stars, galaxies and planets, and to the evolution of human beings able to contemplate our own origins and ultimate destiny.

Then on towards that destiny in the infinite future, long after the Earth has been consumed by the Red Giant Sun. The story is told in clear, straight forward terms, in the strict order in which the events happened, and uses no mathematics.

Bang! is an amazing story and this newly revised text brings it up to date. Is it fiction? The authors hope not, since it is based upon lifetimes work by great scientists such as Albert Einstein, Stephen Hawking and hundreds of other brilliant minds. Enjoy, and let your imagination run riot.

TRAVEL

SPACE X: USHERING IN NEW ERA OF SPACE MISSIONS

Plans for the world's first all-civilian mission to space were announced earlier this year from SpaceX's headquarters in Hawthorne, CA. The mission is being targeted for the fourth quarter of this year and will be commanded by Jared Isaacman, the 37-year-old founder and Chief Executive Officer of Shift4 Payments and an accomplished pilot and adventurer.

Inspiration4 will leave Earth from Kennedy Space Center's historic Launch Complex 39A, the embarkation point for Apollo and Space Shuttle missions, and travel across a low earth orbit on a multi-day journey that will continually eclipse more than 90% of the earth's population. Named in recognition of the four-person crew that will raise awareness and funds for St. Jude Children's Research Hospital, this milestone represents a new era for human spaceflight and exploration.

"Inspiration4 is the realization of a lifelong dream and a step towards a future in which anyone can venture out and explore the stars. I appreciate the tremendous responsibility that comes with commanding this mission and I want to use this historic moment to inspire humanity while helping to tackle childhood cancer here on Earth," said Jared Isaacman.

Isaacman and the Inspiration4 crew will undergo commercial astronaut training by SpaceX on the Falcon 9 launch vehicle and Dragon spacecraft, including a specific focus on orbital mechanics, operating in microgravity, zero gravity, and other forms of stress testing. They will re-

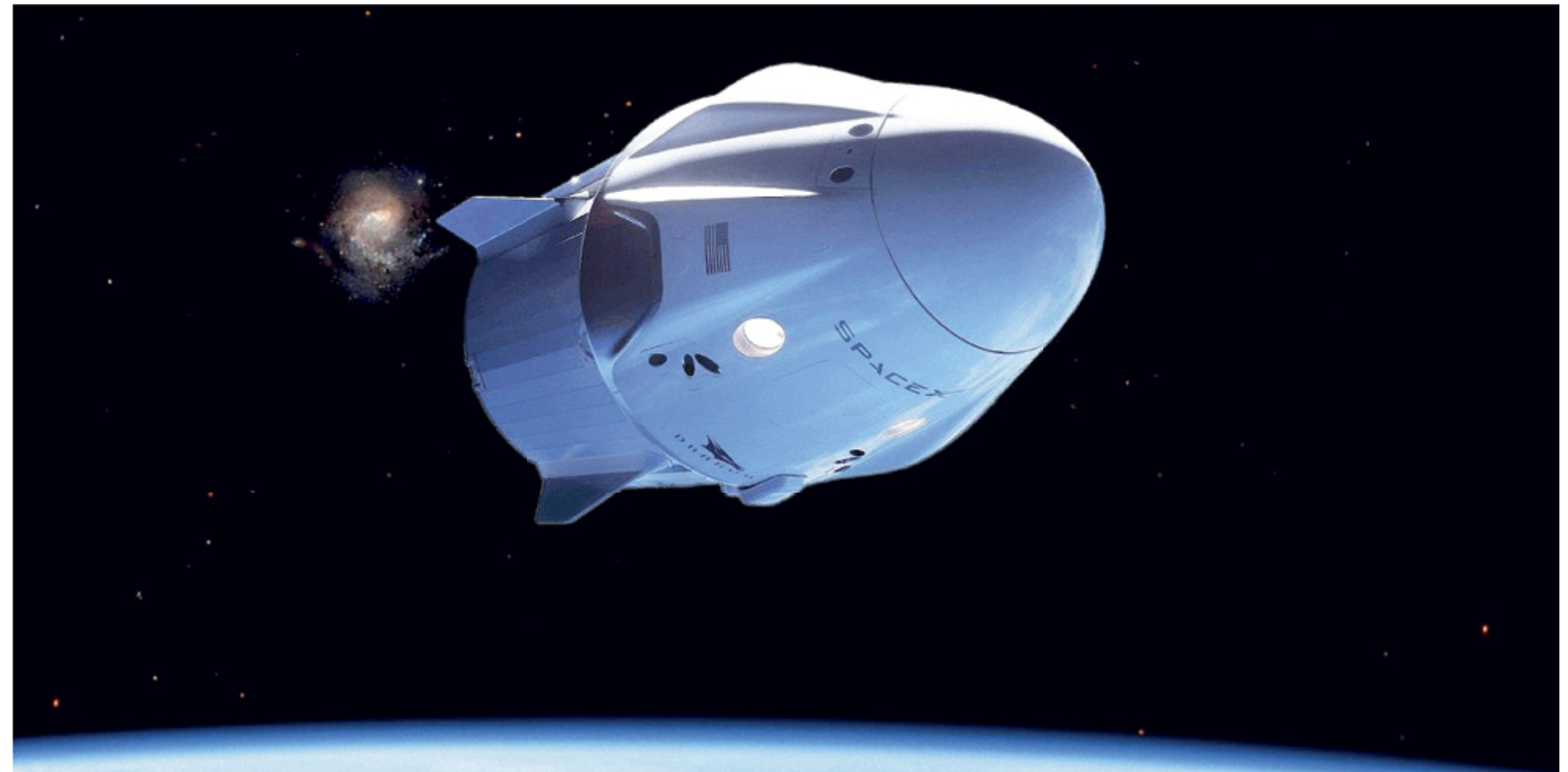
ceive emergency preparedness training, spacesuit and spacecraft ingress and egress exercises, as well as partial- and full-mission simulations.

The mission will launch from historic Launch Complex 39A at NASA's Kennedy Space Center in Florida and will be carefully monitored at every step by SpaceX mission control as the spacecraft orbits the planet every 90 minutes along a customized flight path. Upon conclusion of the multi-day journey, Dragon will reenter Earth's atmosphere for a soft water landing off the coast of Florida.

The Dragon spacecraft is capable of carrying up to 7 passengers to and from Earth orbit, and beyond. It is the only spacecraft currently flying that is capable of returning significant amounts of cargo to Earth, and is the first private spacecraft to take humans to the space station.

Falcon 9 is a reusable, two-stage rocket designed and manufactured by SpaceX for the reliable and safe transport of people and payloads into Earth orbit and beyond. Falcon 9 is the world's first orbital class reusable rocket. Reusability allows SpaceX to reflly the most expensive parts of the rocket, which in turn drives down the cost of space access.

Isaacman has given St. Jude two seats on the Inspiration4 mission. The first seat is reserved for a St. Jude ambassador with direct ties to the mission who exemplifies the pillar of Hope as well as the courageous vision upon which St. Jude was founded – compassion, unity, equality and inclusion. The second seat will represent the mission pillar of Generosity. Dur-



ing the month of February, members of the public can enter for a chance to join the flight to space and support the lifesaving mission of St. Jude.

An accomplished pilot rated to fly commercial and military aircraft, Isaacman holds several world records including a Speed-Around-The-World flight to raise money and awareness for the Make-a-Wish Foundation. He has flown in over 100 airshows as part of the Black Di-

among Jet Team, dedicating every performance to charitable causes. In 2011, Isaacman co-founded what would become the world's largest private air force, Draken International, to train pilots for the United States Armed Forces.

Traveling weightless at over 17,000 miles per hour, the crew will conduct experiments designed to expand our knowledge of the universe. Crew

SpaceX designed, manufactured, tested, and has flown multiple missions with one of the safest, most-advanced human spaceflight systems ever built.

In 2020, SpaceX returned America's ability to fly NASA astronauts to and from the International Space Station for the first time since Shuttle's last flight in 2011. In addition to flying astronauts to space for NASA,

egress exercises, as well as partial and full mission simulations.

Prior to flying NASA astronauts as part of the Commercial Crew Program, SpaceX put every component of every system through its paces, including two flight tests to and from the International Space Station, demonstrations of Dragon's escape system both on the launch pad and in-flight, over 700 tests of the spacecraft's Super-

Dragon's 365lbs cargo capacity will be allocated for both crew essentials as well as scientific equipment dedicated to micro-gravity research and experimentation.

Inspiration4 is committed to assigning the maximum possible mass towards this valuable research, providing access to space for inspiring projects that are otherwise unable to overcome the high barriers of traditional space-based research.

SpaceX's Dragon spacecraft was designed to also carry commercial astronauts to Earth orbit, the space station or beyond.

The crew will receive training by SpaceX on the launch vehicle and spacecraft, orbital mechanics, operating in microgravity, high gravity, zero gravity, and other forms of stress testing. They will go through emergency preparedness training, spacesuit and spacecraft ingress and

Draco engines, more than 500 joint soft-capture docking tests to validate the performance of Dragon's docking system design, about 8,000,000 hours of hardware in the loop software testing, and nearly 100 tests and flights of Dragon's parachutes to ensure a safe landing back on Earth – in addition to all of the knowledge gained from twenty one previous successful cargo resupply missions to the space station and over 100 Falcon 9 launches.



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CULTURE

COSMOS: REVERSE PERSPECTIVE

Exhibition at Pushkin House, the home of Russian culture in London

Pushkin House is proud to announce our first online exhibition, COSMOS: Reverse Perspective, by Liz Davis, Fred Scott, Gleb Sobolev and Marina Sokolova, curated by Pierre d'Avoine and Gleb Sobolev. The exhibition is supported by the Nikolai Fedorov Library (Moscow), the Konstantin Tsiolkovsky House-Museum (Kaluga), and the Museum of the First Flight (Gagarin).

Opening on 12th April – the 60th anniversary of Yuri Gagarin's first flight into outer space (and International Day of Human Spaceflight) – the exhibition of collages and graphics focuses on looking back at Earth from space, rediscovering our own earthly lives, experiences and challenges. Taking the “reverse perspective”, the artists offer the cosmos as an alternative lens for life, one opposed to a single perspective or absolute reference frame – a distributed vision, geometrically expressed as a Russian icon.

“Our vastness serves as a transition to the vastness of the heavenly space, this new field for a great feat,” wrote



Nikolai Fedorov (1829–1903), the father of Russian cosmism, a philosophical exploration of space that took place before the technology to reach it had even been developed. The predictions about space and life in zero gravity of his contemporary Konstantin Tsiolkovsky (1857–1935) grew out

of the history of the development of the Russian steppes, with its snows and frosts, endless spaces that have shaped the culture of the peoples living on it.

Join us for the opening event on 12th April to learn about the works in the exhibition, as well as an introduction to Russian cosmism, filmed at the site of Gagarin's monument in Moscow. Further events will include a discussion with anthropologist Tim Ingold and films by Stella Scott and Dan Canyon, as well as a discussion between cosmonaut Sergey Avdeev and Dr Iya Whiteley of the Centre for Space Medicine at University College London.

Finally, 18th May marks the 60th anniversary of the first flyby of Venus by a man-made object, the Soviet Venera-1 probe, and we'll be celebrating that with a closing discussion with the artists.

Throughout the five weeks of the exhibition, you'll be able to view the works online, read essays about the themes of the exhibition, and watch video previews of the events.

pushkinhouse.org