CONCOURS CENTRALE•SUPÉLEC

Anglais

TSI 2021

4 heures — Calculatrice interdite

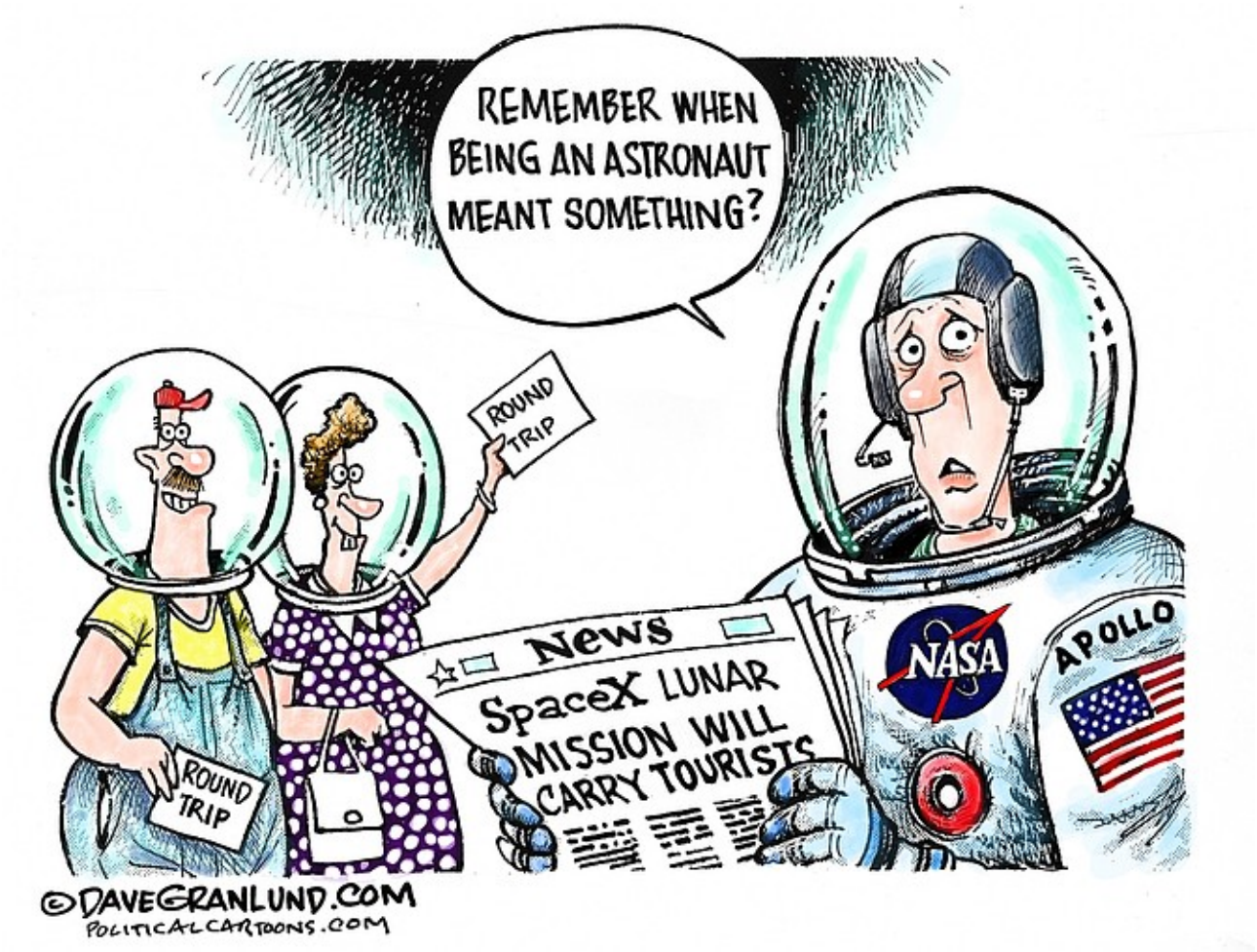
L'usage de tout système électronique ou informatique est interdit dans cette épreuve.

Rédiger en anglais et en 400 mots (plus ou moins 10 %) une synthèse des documents proposés, qui devra obligatoirement comporter un titre. Indiquer avec précision, à la fin du travail, le nombre de mots utilisés (titre inclus).

Ce sujet comporte les 4 documents suivants :

— un dessin paru dans *The Daily Courier* le 3 mars 2017 ;
— deux éditoriaux publiés à 50 ans d'écart dans *The Economist*, les 26 juin 1969 et 18 juin 2019 ;
— les paroles d'une chanson de David Bowie sortie en 1969.

L'ordre dans lequel se présentent les documents est arbitraire et ne revêt aucune signification.



The Daily Courier, March 3rd, 2017

The Economist

The Eagle Has Landed

July 26th, 1969

They're down; they're safe; they've shown it can be done. The Eagle has landed. There is life on the moon, at last. And space itself seems friendlier. The men who have been out there before—after nine years there are still only 37 of them, plus one woman—have been near-robots, bulky servo-mechanisms slotted into their capsule's machinery. Yet man frisking on the powdery moon is different. Preposterously space-suited, sweating heavily and near middle-aged he may be, but he is no robot.

At every bounding step, by Armstrong and Aldrin, the moon seemed almost to accommodate itself to man. It is not a particularly comfortable place, but it neither impeded the astronauts' landing, nor their departure on the journey back to earth. Dust on its surface did not stick excessively to their feet, their cameras or their windows. The physical toll on them was less than half what had been expected; the visitors did not come anywhere near using up their oxygen and water reserves. The scientific equipment they had brought could be erected and worked; there were interesting, purple rocks to take back to scientific earthmen. Courage of a cold and disciplined kind that few men have ever been called upon to show was rewarded by proof positive of what we could only suspect a week ago: that man, from this day on, can go wheresoever in the universe his mind wills and his ingenuity contrives.

Where will he go next? This is where men come down to earth. In particular the American people may come down with a bump when they discover how little the Apollo pioneers can really do now. The Americans have not spent beyond their means. To get to the moon has cost no more than the equal of nearly 3 per cent of one year's gross national product, spent over a decade, but earth taxpayers will expect more for that than one bag of rocks. They will want their crock of gold[1]. One day they will surely get it, but will their patience hold out while the space engineers spend the next decade consolidating what Armstrong and Aldrin achieved in 27 hours? When new land is struck, behind the explorers come the anonymous toilers to cut the roads and harbours. Space will be no different from earth in this. So it will be a long, expensive and necessarily less exciting slog than the flight of the Eagle. And as the excitement dies and familiarity sets in, the voices that say the money could be better spent on ending wars and poverty on earth must gain converts.

But this argument overlooks the factor in human make-up that sets us apart from the apes. When man became a tool-maker, he ceased to be a monkey. The human race's way of sublimating its highest aspirations has been to build the greatest and grandest artifact that the technology of the time can achieve. Through the pyramids, the parthenons and the temples, built as they were on blood and bones, to the be-spired cathedrals conceived and constructed in ages of great poverty, the line runs unbroken to the launch pad of Apollo. Oddly—or perhaps not so oddly—the churchmen with their unstinting praise of the astronauts have recognised this where the liberally-educated rationalists with their bored carping, and their ill-bred little jokes, have not. Spiralling to the planets expresses something in human nature that relieving poverty, however noble a cause that is, does not. And to the planets, sooner rather than later, man is now certain to go.

If he went tomorrow, it would be American man, with Soviet man at his heels and the rest of the industrialised world nowhere. When Europe drew pride and status from its expensive colonies, the Americans had none; the tables are turned now. While the United States rings July 21st red on its calendar, Europe faces the probability that when the planets are opened up we Europeans will have no part in doing it. The idea, at this late stage, of a European manned space programme is nonsense. The policy that would make more sense would be to approach the United States to see if the Administration will accept some foreign collaboration in the hugely expensive next years of its space programme. If the next American objective is Mars, a sensible Administration may welcome help and participation—especially if this excludes pressure to co-operate with the Russians.

The first space industry, communication satellites, is already on an international basis, with Britain the largest non-American shareholder. The arrangement has worked well, at least for Britain; two of the four newest satellites are being built entirely by British companies. When the Apollo programme involves 20,000 contractors, it ceases to matter how far from the actual launch site their factories are; they could as easily be in Britain as in the United States. If there were a British government with the self-confidence to think of real priorities this would be the time for Mr Wilson to say these things when he meets Mr Nixon on Sunday week. There is an economic fare to be paid for the ride to the Copernicus crater—and to participation in what will dominate men's minds and energies in the next century. There will not be a better chance. There will be no opportunity in this generation that it would cost us more to miss.

[1] crock of gold: large prize or reward that someone hopes for but is unlikely to get.

The Economist

The next 50 years in space

July 18th, 2019

A new age of space exploration is beginning

The moment when, 50 years ago, Neil Armstrong planted his foot on the surface of the Moon inspired awe, pride and wonder around the world. This newspaper argued that "man, from this day on, can go wheresoever in the universe his mind wills and his ingenuity contrives... to the planets, sooner rather than later, man is now certain to go." But no. The Moon landing was an aberration, a goal achieved not as an end in itself but as a means of signalling America's extraordinary capabilities. That point, once made, required no remaking. Only 571 people have been into orbit; and since 1972 no one has ventured much farther into space than Des Moines is from Chicago.

The next 50 years will look very different. Falling costs, new technologies, Chinese and Indian ambitions, and a new generation of entrepreneurs promise a bold era of space development. It will almost certainly involve tourism for the rich and better communications networks for all; in the long run it might involve mineral exploitation and even mass transportation. Space will become ever more like an extension of Earth—an arena for firms and private individuals, not just governments. But for this promise to be fulfilled the world needs to create a system of laws to govern the heavens—both in peacetime and, should it come to that, in war.

The development of space thus far has been focused on facilitating activity down below—mainly satellite communications for broadcasting and navigation. Now two things are changing. First, geopolitics is stoking a new push to send humans beyond the shallows of low-Earth orbit. China plans to land people on the Moon by 2035. President Donald Trump's administration wants Americans to be back there by 2024. Falling costs make this showing off more affordable than before. Apollo cost hundreds of billions of dollars (in today's money). Now tens of billions are the ticket price.

Second, the private sector has come of age. Between 1958 and 2009 almost all of the spending in space was by state agencies, mainly NASA and the Pentagon. In the past decade private investment has risen to an annual average of $2bn a year, or 15% of the total, and it is set to increase further. SpaceX, Elon Musk's rocket firm, made 21 successful satellite launches last year and is valued at $33bn. Jeff Bezos, the founder of Amazon, sells off $1bn-worth of his shares in the company each year to pay for Blue Origin, a space venture. Virgin Galactic plans to go public this year at a valuation of $1.5bn. As well as capital and ideas, the private sector provides much greater efficiency. According to NASA, developing SpaceX's Falcon rockets would have cost the agency $4bn; it cost SpaceX a tenth of that.

Two new commercial models exist or are within reach: the big business of launching and maintaining swarms of communications satellites in low orbits and the niche one of tourism for the rich. The coming year will almost certainly see Virgin and Blue Origin flying passengers on sub-orbital excursions that offer the thrill of weightlessness and a view of the curved edge of Earth against the black sky of space. Virgin claims it might carry almost 1,000 wealthy adventurers a year by 2022. SpaceX is developing a reusable "Starship" larger and much more capable than its Falcons. Yusaku Maezawa, a Japanese fashion mogul, has made a down-payment for a Starship trip around the Moon; he intends to go with a crew of artists as early as 2023.

Such possibilities could see the annual revenues of the space industry double to $800bn by 2030, according to UBS, a bank. Still further in the future, space development could remake how humanity lives. Mr Musk hopes to send settlers to Mars. Mr Bezos, the richest man in the world, wants to see millions of people making a living on space stations, perhaps before Armstrong's footprint marks its centenary.

At a time when Earth faces grim news on climate change, slow growth and fraught politics, space might seem to offer a surprising reason for optimism. But it is neither a panacea nor a bolthole. And to realise its promise, a big problem has to be resolved and a dangerous risk avoided. The big problem is developing the rule of law. The Outer Space Treaty of 1967 declares space to be "the province of all mankind" and forbids claims of sovereignty. That leaves lots of room for interpretation. America says private firms can develop space-based resources; international law is ambiguous.

Who would have the best claim to use the ice at the poles of the Moon for life support? Should Martian settlers be allowed to do what they like to the environment? Who is liable for satellite collisions? Space is already crowded—over 2,000 satellites are in orbit and NASA tracks over 500,000 individual pieces of debris hurtling at velocities of over 27,000km an hour.

Such uncertainties magnify the dangerous risk: the use of force in space. America's unparalleled ability to project force on Earth depends on its extensive array of

satellites. Other nations, knowing this, have built anti-satellite weapons, as America has itself. And military activity in space has no well-tested protocols or rules of engagement.

America, China and India are rapidly increasing their destructive capabilities: blinding military satellites with lasers, jamming their signals to Earth or even blowing them up, causing debris to scatter across the cosmos. They are also turning their armed forces spaceward. Mr Trump plans to set up a Space Force, the first new branch of the armed forces since the Air Force was created in 1947. On the eve of the annual Bastille Day military parade on July 14th Emmanuel Macron, France's president, also announced the formation of a new space command.

In Heaven as it is on Earth

It is a mistake to promote space as a romanticised Wild West, an anarchic frontier where humanity can throw off its fetters and rediscover its destiny. For space to fulfil its promise governance is required. At a time when the world cannot agree on rules for the terrestrial trade of steel bars and soyabeans that may seem like a big ask. But without it the potential of all that lies beyond Earth will at best wait another 50 years to be fulfilled. At worst space could add to Earth's problems.

Space Oddity

David Bowie, 1969

Ground Control to Major Tom
Ground Control to Major Tom
Take your protein pills and put your helmet on
Ground Control to Major Tom
Commencing countdown, engines on
Check ignition and may God's love be with you

This is Ground Control to Major Tom
You've really made the grade
And the papers want to know whose shirts you wear
Now it's time to leave the capsule if you dare
This is Major Tom to Ground Control
I'm stepping through the door
And I'm floating in a most peculiar way
And the stars look very different today
For here
Am I sitting in a tin can
Far above the world
Planet Earth is blue
And there's nothing I can do

Though I'm past one hundred thousand miles
I'm feeling very still
And I think my spaceship knows which way to go
Tell my wife I love her very much she knows
Ground Control to Major Tom
Your circuit's dead, there's something wrong
Can you hear me, Major Tom?
Can you hear me, Major Tom?
Can you hear me, Major Tom?
Can you... Here am I floating 'round my tin can
Far above the Moon
Planet Earth is blue
And there's nothing I can do