

Synthèse de documents type CENTRALE proposée par Christophe Repplinger, Lycée Marcelin-Berthelot, Saint-Maur-des-Fossés

Rédiger en anglais en 500 mots environ une synthèse des documents proposés. Vous indiquerez avec précision à la fin de votre synthèse le nombre de mots qu'elle comporte. Un écart de 10% en plus ou en moins sera accepté. Votre synthèse comportera un titre comptabilisé dans le nombre de mots.

Document 1

The end of the Space Age

Inner space is useful. Outer space is history

The Economist Jun 30th 2011 | from the print edition

HOW big is the Earth? Any encyclopedia will give you an answer: its equatorial diameter is 12,756km, or, for those who prefer to think that way, 7,926 miles. Ah, but then there is the atmosphere. Should that count? Perhaps the planet's true diameter is actually nearer 13,000km, including all its air. But even that may no longer be an adequate measure. For the Earth now reaches farther still. The vacuum surrounding it buzzes with artificial satellites, forming a sort of technosphere beyond the atmosphere. Most of these satellites circle only a few hundred kilometres above the planet's solid surface. Many, though, form a ring like Saturn's at a distance of 36,000km, the place at which an object takes 24 hours to orbit the Earth and thus hovers continuously over the same point of the planet.

Viewed this way, the Earth is quite a lot larger than the traditional textbook answer. And viewed this way, the Space Age has been a roaring success. Telecommunications, weather forecasting, agriculture, forestry and even the search for minerals have all been revolutionised. So has warfare. No power can any longer mobilise its armed forces in secret. The exact location of every building on the planet can be known. And satellite-based global-positioning systems will guide a smart bomb to that location on demand.

Yet none of this was the Space Age as envisaged by the enthusiastic "space cadets" who got the whole thing going. Though engineers like Wernher von Braun, who built the rockets for both Germany's second-world-war V2 project and America's cold-war Apollo project, sold their souls to the military establishment in order to pursue their dreams of space travel by the only means then available, most of them had their eyes on a higher prize. "First Men to a Geostationary Orbit" does not have quite the same ring as "First Men to the Moon", a book von Braun wrote in 1958. The vision being sold in the 1950s and 1960s, when the early space rockets were flying, was of adventure and exploration. The facts of the American space project and its Soviet counterpart elided seamlessly into the fantasy of "Star Trek" and "2001: A Space Odyssey". Other planets may or may not have been inhabited by aliens, but they, and even other stars, were there for the taking. That the taking would begin in the lifetimes of people then alive was widely assumed to be true.

No longer. It is quite conceivable that 36,000km will prove the limit of human ambition. It is equally conceivable that the fantasy-made-reality of human space flight will return to fantasy. It is likely that the Space Age is over.

Bye-bye, sci-fi

Today's space cadets will, no doubt, oppose that claim vigorously. They will, in particular, point to the private ventures of people like Elon Musk in America and Sir Richard Branson in Britain, who hope to make human space flight commercially viable. Indeed, the enterprise of such people might do just that. But the market seems small and vulnerable. One part, space tourism, is a luxury service that is, in any case, unlikely to go beyond low-Earth orbit at best (the cost of getting even as far as the moon would reduce the number of potential clients to a handful). The other source of revenue is ferrying astronauts

to the benighted International Space Station (ISS), surely the biggest waste of money, at \$100 billion and counting, that has ever been built in the name of science.

The reason for that second objective is also the reason for thinking 2011 might, in the history books of the future, be seen as the year when the space cadets' dream finally died. It marks the end of America's space-shuttle programme, whose last mission is planned to launch on July 8th (see article, article). The shuttle was supposed to be a reusable truck that would make the business of putting people into orbit quotidian. Instead, it has been nothing but trouble. Twice, it has killed its crew. If it had been seen as the experimental vehicle it actually is, that would not have been a particular cause for concern; test pilots are killed all the time. But the pretence was maintained that the shuttle was a workaday craft. The technical term used by NASA, "Space Transportation System", says it all.

But the shuttle is now over. The ISS is due to be de-orbited, in the inelegant jargon of the field, in 2020. Once that happens, the game will be up. There is no appetite to return to the moon, let alone push on to Mars, El Dorado of space exploration. The technology could be there, but the passion has gone—at least in the traditional spacefaring powers, America and Russia.

The space cadets' other hope, China, might pick up the baton. Certainly it claims it wishes, like President John Kennedy 50 years ago, to send people to the surface of the moon and return them safely to Earth. But the date for doing so seems elastic. There is none of Kennedy's "by the end of the decade" bravura about the announcements from Beijing. Moreover, even if China succeeds in matching America's distant triumph, it still faces the question, "what next?" The chances are that the Chinese government, like Richard Nixon's in 1972, will say "job done" and pull the plug on the whole shebang.

No bucks, no Buck Rogers

With luck, robotic exploration of the solar system will continue. But even there, the risk is of diminishing returns. Every planet has now been visited, and every planet with a solid surface bar Mercury has been landed on. Asteroids, moons and comets have all been added to the stamp album. Unless life turns up on Mars, or somewhere even more unexpected, public interest in the whole thing is likely to wane. And it is the public that pays for it all.

The future, then, looks bounded by that new outer limit of planet Earth, the geostationary orbit. Within it, the buzz of activity will continue to grow and fill the vacuum. This part of space will be tamed by humanity, as the species has tamed so many wildernesses in the past. Outside it, though, the vacuum will remain empty. There may be occasional forays, just as men sometimes leave their huddled research bases in Antarctica to scuttle briefly across the ice cap before returning, for warmth, food and company, to base. But humanity's dreams of a future beyond that final frontier have, largely, faded.

Document 2

Nasa must collaborate if it is to continue its mission in space

Shared resources could lead to a more focused and ambitious space programme than individual nations can achieve

Ian Sample, www.guardian.co.uk, Thursday 21 July 2011

And so begins a testing time for the US space agency, Nasa, who with the final touchdown of the shuttle Atlantis lost any means to launch its own astronauts for the first time in 30 years.

The world's leading space-farer has put a brave face on a predicament it has wandered into with eyes wide open. The hiatus in US supremacy in human

space-flight will be brief, officials say. While US astronauts join the queue for rides into space on the Russian Soyuz – an irony lost on no one in the industry – private companies are working flat-out to build and test new rockets to take over the bread-and-butter task of ferrying astronauts to and from the International Space Station.

The US could be stranded on Earth a while yet. Outside Nasa, some space experts predict a decade could pass before the agency can resume its own manned missions. In that time, the organisation faces an uphill struggle to maintain morale and momentum among its staff who work on human exploration of space.

The retirement of the shuttle is not the only problem that Nasa must contend with. This month, the agency learned its budget is threatened with a whopping 9% cut. Part of that includes the loss of funds for the jewel in Nasa's crown, the James Webb Space Telescope, a spectacular – albeit delayed and over budget – replacement for Hubble. It is fair to say the agency has seen brighter days.

The uncertainty that swirls around Nasa is troubling enough for its employees and contractors, but it brings to the fore a much broader issue. There is a major flaw in the single-nation leadership of space exploration we have become so used to. Even an agency of the size and pedigree of Nasa – last year it received more than \$18bn (£11bn) from US taxpayers – is not insulated from bad planning or financial crises. The problem is that when hardship strikes Nasa, there are knock-on effects across the board.

There might be another way. The wavering leadership of Nasa points to the folly of over-reliance on the US and to the need to spread that leadership more widely. Taken to its extreme, we might envisage an international space agency that pools national funding, draws up shared goals and distributes contracts and responsibilities.

There are good reasons a global space agency does not exist. Those nations that have space programmes have their own agendas and want the political prestige for themselves. More practically, by learning how to send robots and humans into

space, nations gain the kind of first-hand knowledge that drives competitive, high-technology industries.

But all this comes at a cost. Space exploration is piecemeal, fragile and sluggish when nations go their own way. In the half century since Yuri Gagarin's flight in 1961, we have not gone far: only the two dozen Apollo astronauts have ventured beyond low Earth orbit, a few hundred kilometres high.

There is a vast and expensive duplication of effort when space exploration is fragmented. Believe the rhetoric and the US, Russia, China, India, Japan, Iran and the European Space Agency all have tentative plans to land humans on the moon. It doesn't end there. Many of these space agencies have talked of going onwards to Mars. The phenomenal expense puts the task beyond what even a small group of nations could afford.

For all its shortcomings, an international space agency might lead to a more focused, resilient and ambitious programme of space exploration.

Some groundwork has already been done. In 2007, 14 nations signed up to a Global Exploration Strategy, a voluntary programme to share expertise and plans for the future of space exploration. There is no single programme that nations are compelled to follow, but the spirit of greater collaboration is central. Together, the combined budgets more than double what the US spends on its own space agency.

If nothing else, the \$100bn International Space Station demonstrated that multiple space agencies – five in this case – can share the burden of a single goal. The next step is to relieve the US of its role as sole leader and forge broader collaborations to achieve ambitious goals more swiftly.

Document 3

Mars was empty before we came. That's not to say that nothing had ever happened. The planet had accreted, melted, roiled and cooled, leaving a surface scarred by enormous geological features: craters, canyons, volcanoes. But all of that happened in mineral unconsciousness, and unobserved. There were no witnesses—except for us, looking from the planet next door, and that only in the last moment of its long history. We are all the consciousness that Mars has ever had.

Now everybody knows the history of Mars in the human mind: how for all the generations of prehistory it was one of the chief lights in the sky, because of its redness and fluctuating intensity, and the way it stalled in its wandering course through the stars, and sometimes even reversed direction. It seemed to be saying something with all that. So perhaps it is not surprising that all the oldest names for Mars have a peculiar weight on the tongue—Nirgal, Mangala, Auqakuh, Harmakhis—they sound as if they were even older than the ancient languages we find them in, as if they were fossil words from the Ice Age or before. Yes, for thousands of years Mars was a sacred power in human affairs; and its color made it a dangerous power, representing blood, anger, war and the heart.

Then the first telescopes gave us a closer look, and we saw the little orange disk, with its white poles and dark patches spreading and shrinking as the long seasons passed. No improvement in the technology of the telescope ever gave us much more than that; but the best Earthbound images gave Lowell enough blurs to inspire a story, the story we all know, of a dying world and a heroic people, desperately building canals to hold off the final deadly encroachment of the desert.

It was a great story. But then Mariner and Viking sent back their photos, and everything changed. Our knowledge of Mars expanded by magnitudes, we literally knew millions of times more about this planet than we had before. And there before us flew a new world, a world unsuspected.

It seemed, however, to be a world without life. People searched for signs of past or present Martian life, anything from microbes to the doomed canal-builders, or even alien visitors. As you know, no evidence for any of these has ever been found. And so stories have naturally blossomed to fill the gap, just as in Lowell's time, or in Homer's, or in the caves or on the savannah—stories of microfossils wrecked by our bioorganisms, of ruins found in dust storms and then lost forever, of Big Man and all his adventures, of the elusive little red people, always glimpsed out of the corner of the eye. And all of these tales are told in an attempt to give Mars life, or to bring it to life. Because we are still those animals who survived the Ice Age, and looked up at the night sky in wonder, and told stories. And Mars has never ceased to be what it was to us from our very beginning—a great sign, a great symbol, a great power.

And so we came here. It had been a power; now it became a place.

Kim Stanley Robinson, *Red Mars* (1992)

Document 4



Chris Madden (www.chrismaddencartoons.wordpress.com)

In an Earthbound Era, Heaven Has to Wait

By FRANK BRUNI, *The New York Times*, July 6, 2011

(...) The current political debate and the nascent 2012 election season are utterly earthbound, with a tone so gloomy it's often shocking. Instead of the defiant trumpet blast that it's morning in America — Ronald Reagan's retort to the so-called malaise of the Jimmy Carter years — we have anxious promises to hold back the night.

"Let's stop this American downward spiral," Rick Perry, the Texas governor, told a conservative convention last month, as he rehearsed lugubrious lines he might use in a presidential bid.

Jon Huntsman, declaring his candidacy for the presidency a few days later, observed, "For the first time in history, we are passing down to the next generation a country that is less powerful, less compassionate, less competitive and less confident than the one we got." Hard decisions had to be made, he added, in order "to avert disaster."

To some degree, such dire language reflects predictable political gamesmanship. By lamenting the status quo, candidates disparage its designated steward — in this case, President Obama.

And the country has certainly survived more devastating and sustained periods of economic distress than the present one, finding renewed prosperity on the far side.

But Americans right now are profoundly doubtful. Shaken. For many, the fear isn't just that there's no imminent end to high unemployment and tepid economic growth, but that we've turned a fundamental corner and our best days really are behind us.

A Gallup/USA Today poll conducted in late April found that 55 percent of Americans considered it unlikely that children today would have better lives than their parents, while only 44 percent considered it likely. Those responses were the most negative, by far, over the last quarter-century, and they undercut a central tenet of American optimism.

Just last week the Democratic pollster Mark J. Penn, writing in *Time* magazine, concluded that "the country is going through one of its longest sustained periods of unhappiness and pessimism ever." He cited a recent survey suggesting that "more than two-thirds of the country sees the past decade as a period of decline."

And 39 percent of the respondents in a recent New York Times/CBS News poll characterized that decline as permanent, at least in economic terms. That was a marked increase from 28 percent who said so last fall.

It's in this context that many Democrats and Republicans alike nurse a new isolationism, convinced that we can no longer afford broad engagement in the world. It's in this context that immigrants, wanting pieces of a pie deemed more finite, are vilified. (...)

In Washington and in state capitals, the squabbling is epic, and it's focused not on what we might dare to build but on what we might manage to preserve, not on degrees of progress but on gradations of regress: how many parks, schools, libraries need be closed.

Despite the president's exhortation that we chart the frontiers of innovation, there's no grand mission that represents the kind of storehouse for our confidence and emblem of our can-do spirit that space exploration once did.

What has happened to our sense of discovery? I'm not sure, but I know what will happen to the spaceship *Discovery*, one of four remaining shuttles in the fleet. It's bound for the Smithsonian, where we stockpile the glories of yesteryear.

Proposition de corrigé

Is space exploration over?

Space has always been a matter of fascination for mankind, but today the cost of exploring the universe is increasingly seen as an unbearable burden. One may thus wonder whether the end of the space shuttle program in the US means the end of the space conquest or only announces a difficult period. The five documents – articles from *The Economist*, the *Guardian* website and *The New York Times*, an excerpt from Kim Stanley Robinson's *Red Mars* and a cartoon by Chris Madden – try to account for this situation and suggest solutions.

The situation at first seems worrying in as much as the leading country for space exploration has decided to end its 30 year old shuttle program, thus obliging American astronauts to hitch a ride on the Russian Soyuz. In addition, the *Guardian* article underlines, the budget of the US space agency, NASA, may be cut by 9%, with consequences on its new space telescope. The best mankind seems to be able to achieve today is nothing more than sending satellites into the 36,000 km geostationary orbit, as *The Economist* points out. All the planets of the solar system have been visited, the ISS is meant to be de-orbited, and the moon is no longer a goal, so that space exploration seems to be in a dead end.

But if the Space Age may be credited with undeniable returns in various technological fields such as telecommunications, they are far from what the so-called “space cadets” were expecting. Influenced by sci-fi, astronautics was pregnant with adventure and the prospect of walking on the moon and exploring the vast universe, so that, for *The Economist*, the discrepancy between the high expectations of space exploration (unveiling the mysteries of the universe thanks to the key the space shuttle represents, as the Chris Madden cartoon suggests) and its poor achievements is one of the main reasons for today's waning public interest. The other reason is political – in what *The New York Times* calls an “Earthbound Era”, the pessimistic vision of US politicians about the decline of the country as well as the doubt that pervades public opinion lead to a new form of isolationism and the absence of a grand mission or structuring dream as in the sixties.

But solutions do exist. Space tourism could be one – entrepreneurs like Richard Branson have created companies and think they will be able to make a profit with commercial space flights in the future, though *The Economist* thinks the trip will be limited to low-Earth orbit and the profitability of the operation highly unlikely. For *The Guardian*, the most realistic solution, though, is the creation of an international space agency, which would enable governments to share resources and finance more ambitious programs than the one any single country would be able to afford. Collaboration is of the essence if one wants to go to Mars one day. In this respect, Kim Stanley Robinson explains how Mars has been fascinating mankind for centuries, leading to countless efforts to know it better. It still remains a driving force, even if its exploration concluded it was a lifeless world.

Gathering together around an international project to keep the dream of space exploration alive may thus be the solution to today's apparently desperate situation.

546 words