

Space is the answer to the resource crisis

by A. Cavallo

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The crisis of XXI century

This XXI century began quite badly for the whole humankind. The most reminded event of 2001, which by the way was the first year of the century for chronologists, is the terroristic attack to New York and Washington. But the crisis has just begun, and that is not about the asymmetrical war between the western countries and the middle eastern terrorists. The true crisis, of which the peculiar conflict I was hinting to is only a partial element, concerns the availability of the resources that we need for life, a dignified life, for all humankind.

Every day the landing of desperate people at the southernmost shores of Italy reminds us that the largest part of the human species lives in sorrowful conditions and would only like to live better. Hundreds of millions of Chinese and Indian people are engaged every day in a frantic rush to obtain a better life through conventional economic development: more production, more industry, more trade, more consumer goods - and they are having a significant success, albeit paying a heavy price for what they get, if we look at the environmental degradation of their countries, social unrest, the living conditions they are submitting to, in name of a better future that for most of them is only in their hope.

What seems to be seriously lacking, nevertheless, is authentic innovation. Development of emerging countries is based on absolutely conservative social and technical schemes: it runs substantially, with faster pace, along the way followed by Europe and the United States in the previous centuries. They are using exactly the same raw materials and energy sources that the developed world adopted in the past and is still using today.

That means that a growing number of people is pressing on the same resources, with a growing individual and overall weight. Raw material prices are increasing very quickly, but there is no sign of the reaction that, according to the economists, should naturally occur: a greater use of alternative means and resources, corresponding to the higher price of traditional ones. The first resource we are thinking of is oil, and its derivatives. It is widely accepted that the exploitation of the oil we have on the Earth is nearing to, or has already reached, the critical point where a half of the total quantity has been used (peak oil). The solution that we are adopting is a return to coal or to old versions of nuclear energy. Here in Italy we are trying ways that are, just to be optimistic, of dubious effectiveness, from agriculture-derived fuel to small scale photovoltaic to hydrogen (which

is not an energy source, but most people are not aware of this subtle detail).

I was myself favourable to the so called biofuel, but I had to change my mind: there is no real convenience, because it would be necessary to employ a huge part of arable land for specific cultivations, with heavy use of machines, fertilizers and pesticides, all derived from oil!

Photovoltaic energy is not a solution because it is energetically expensive to produce the cells, and it cannot satisfy the practical requirements of energy consumers if there is not a traditional source as a backup. The "savers of the world" with a photovoltaic panel on their balcony can afford that because, for instance, in Italy the State is financing them by buying their energy at five times its commercial value and because there is always the "holy" ENEL (National Electricity Company) supporting them when it's needed (for instance during the night... if they don't fill up their house with batteries, which are on their part full of toxic chemicals).

Hydrogen is an energy vector, not a source, and not very practical. The overall efficiency of energy conversion from any source to hydrogen and then back to some usable form (usually electrical) is not very good, there is no reason not to produce electric power from the beginning and use it as a vector. The hydrogen propelled city bus is a trick, public transport system can easily run on electricity, those systems are already there, called underground railways, tramways and trolley-buses.

Besides playing with those deceitful innovations, we are doing nothing to avoid a dramatic future, when we shall use the huge quantity of weapons present in the world to contend for the last barrels of oil. Some say that like stone age did not end for lack of stones, the oil age will not end for lack of oil. First of all we can observe how many civilizations ended having exhausted the available resources, being incapable of finding others: to give an example, the Maya in Central America developed a great civilization which fell a long time in advance of the arrival of the Europeans, because they did not know how to improve their agricultural and transport methods and were stifled by the overexploitation of the land they could use with the techniques they knew. In the middle of a large continent rich of immense resources the cities of the Maya collapsed and became heaps of ruins in the tropical jungle, because their builders were not able to improve their agricultural techniques in order to preserve their land, nor they learned how to transport significant quantities of goods over long distances. We can make a comparison with ancient Rome, which imported wheat even from Egypt thanks to an efficient commercial fleet.

Another instance may be China in the XV century: it was by far the most technically and economically advanced part of the world. The fleets commanded by admiral Zheng He, composed of hundreds of high sea vessels, with crews of thousands of men, reached in several expeditions all the shores of the Indian Ocean, down to Africa. But a change in political strategy brought China to disband the fleets and give up with exploration, which was considered useless and too expensive (does it sound new?). At the end of the same century the Portuguese arrived in the East with a few small caravels, so small that Zheng He could have used them as tender boats for his vessels, but they began an expansion that brought in the end to the subjection of China to the European powers.

Coming back to our topic, let's not forget that oil can be replaced, it is indeed being

replaced, for electric power production, but there are presently no alternatives in vital sectors like transportation and petrochemical industry. Moreover, there are other even more essential resources which are going to be more and more scarce in the near future: especially, nothing less than water. But there is something worse: the entire terrestrial ecosystem is overloaded, because humankind is absorbing a major portion of all the resources produced by the biosphere.

Certainly we are still on time: it depends on us whether to give an end to the "oil age" because we have found suitable alternatives or to face the collapse of our civilization. Human history gives us examples of both kinds.



"Space... a resource it is!"

Space is a resource

The message we must pronounce loud and clear is that space is not a cost but a resource. It is enough to compare military expenditures in order to show how even the very inefficient and bureaucratized space agencies like NASA spend very little indeed, with respect to how much the same governments which finance them are ready to spend to wage war.

And still it is really a struggle for survival: the resources of the Earth are limited and, not to have to kill each other of us down here we must climb out of the pit, like some civilizations of the past were able to do, even if others failed and perished. The difference is that nowadays everything is connected: globalization is a fact, the world civilization is one, there cannot be thriving and decaying civilizations at the same time - if a collapse is about to happen, it will involve all the world together.

Those who say that we must solve our problems down here before going to the outer space are deeply wrong, because THE PROBLEM of down here is that the Earth we have is only one and it has a finite size. There is no possibility of guaranteeing to all the world population a standard of life equal to the one of affluent countries, with the means and resources we know and with those we can foresee for the near future. The downshifting which some theorists speak about is not practical in a world where 5/6 of the population are already poor and the others will never accept to become poor like them - because sharing the present welfare among all the people would mean to become all poor, indeed to starve all in the long run. Today the survival of most of humankind is already linked to modern technology, without which we would have an unprecedented global famine.

There is no doubt that the current model of exploitation of natural resources is wrong and should be corrected, that we should be more careful and less wasteful, and we must surely strive for a transition towards more balanced economic models, as far as the use of natural resources is concerned. But we must be well aware that nobody accepts to live worse or to renounce to the hope of living better in the future. It does not require a deep understanding of human nature to realize that nobody will waive better living standards spontaneously. Renunciations are accepted in expectation of some future good which is

perceived as possible, or else they are suffered as an imposition. Therefore it is necessary that new models are acceptable to everyone as improvements, not as a set of renunciations, a step back, which could only be imposed by dictatorial regimes.

There are several ways to follow. the transportation system, for instance, should be transformed. The alternative to traffic on tyres may be a comeback to the train, but not the old one: there must be new systems which make an improvement for the users, like for instance high speed trains for passengers. On the day, I hope not very far, when Turin and Milan are connected by efficient high speed convoys, many people will agree to give up the car to move between the two cities. Fast trains may even be an alternative to planes for intermediate distances, for instance Turin-Paris or Milan-Rome. It should be clear what amount of damage the "no-TAV" movement is making, by imposing their localistic and shortsighted view with respect to projects of the greatest importance for the future of a larger community. (note: in Piedmont, Italy there is a political movement against the construction of high speed rail lines).

But any innovation of this kind, be it transport, energy or anything else, cannot be enough to take us out of the trouble where we are now. Only the beginning of a space civilization can give us the opportunity to escape from the fundamental limitation we undergo to: the finite extension of the environment where we live. However careful we may be in exploiting them, the resources of the Earth are limited and subject to risk. Let's not forget that, for instance, climate itself is constantly changing, today perhaps for our fault, but in general even more for natural causes. In a densely populated world where resources are managed in the smallest portions a climate change, due to any cause, may create a serious threat for a very large number of people, with scarce possibilities to remediate. Let's think, then, of an asteroidal impact: an event much lesser than the one which brought dinosaurs to extinction would be devastating for humankind.

It is crazy that we persist in closing our eyes in front of the immensity that exists beyond our planet. The asteroids themselves, which we see as a menace, and they may be one, are indeed an immense resource, just because they are not far away, in fact they may be reached with a minimal expense of energy, once we have taken ourselves out of the gravitational pit of the Earth!

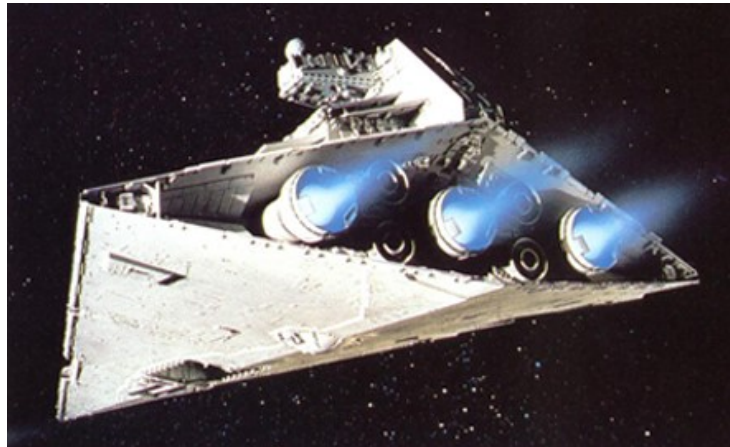
Outer space is vital because not only it contains vast resources, but particularly because it may help us to develop the main resource that is inside us: the aim to innovation, to adventure, to the search for new goals. Exploration is the true alternative to war, adventurous and ambitious people cannot find an open field if not up there - otherwise they will turn their aims to fighting. The move to a more rational use of earth resources and expansion to outer space are not alternative but complementary: the inhabitants of a space colony, for instance, will certainly have an extraordinary environmental sensitivity, because their survival will be based on knowing how to manage a complex system in the best way, from use of energy to recycling of waste.

By finding resources out of the Earth we will be able to avoid depleting its own - like our ancestors, we'll let the stones alone because we have found something better - and the Earth will be able to recover its balance and its best look. Let's think for instance of the opportunity to move to space the industrial activities that are most dangerous or use toxic or radioactive materials. I already expect that some "green" come out and say: you want to pollute the outer space itself! But, everybody knows, the greens are dogmatic and with

dogmatic people you must not discuss, because in their opinion they are right by principle. Those who know what space really is can only laugh at such arguments (what if we told the greens that the Sun, which according to them smiles, is indeed a huge nuclear reactor without any shielding?). A true environmentalist should think of the opportunity to save the environment by moving into space the material part of development and changing the Earth into a magnificent home of humankind, restored in its beauty, nowadays so endangered.

Less weapons, more spaceships

I am speaking of the United States, because no other country has military nor space programs comparable with its ones, on the other side it is obvious that we have to speak of the greatest superpower.



The budget of the American Department of Defence for fiscal year 2006 is 419,3 billions of dollars, to which 80 more billions are to be added for supplementary expenditures, of which 75 are for the Iraq war. To make a comparison, the Apollo program from the beginning to the end, in today's dollars, cost 150 billions - equal to two years of war in Iraq or three months and 8 days of the annual budget of the Defence, current wars excluded.

The annual budget of NASA for 2006 is 16.5 billions of dollars, equal to two months and 20 days of war in Iraq or 14 days of the annual defence budget without wars.

It is evident how the current US administration is going to face the crisis we are approaching: by fighting the war for the resources here on Earth and possibly in the near space. We recently heard how president Bush has included space in the areas of military interest for the US. The suspect could arise that the civil space program is seen as an obstacle by the military, who would not like to have civil astronauts in the middle, on the day when they should clash with China in orbit.

Are we doing like the Mayas, who exhausted themselves in wars among the cities while their civilization was going to succumb?

The conflict for resources for some aspects has already begun. Russia made an agreement with Algeria about natural gas and is using its resources as a weapon, the only one it still has. Iran is building nuclear power stations in order to save oil for export, besides acquiring technologies to endow itself with nuclear weapons. China is making agreements around the world to ensure raw materials and energy, while the United States, also with the help of its major ally in the Middle East, Israel, is using military force without restriction in order to seize control of the largest oil reserves remaining on the planet, in the Persian Gulf, by occupying Iraq and preparing the conflict with Iran, besides

keeping control of the dubiously trustworthy Saudis. The recent war in Lebanon was part of the clash with Iran, to which Hizbollah is linked. But the choice made by America looks like a losing one to the eyes of common sense: Afghanistan and Iraq are still in chaos, Lebanon and Palestine are open wounds.

Europe, which has no significant energy resources (the North Sea ones are already declining, so that Britain too now depends on Russian gas) and does not want to enter the spiral of rearmament and open war, should be the motor of initiatives of a completely different kind. China itself avoided till now a serious involvement with the rearmament spiral, probably because it analyzed the causes of the fall of the Soviet Union and found that the excess in military spending compared with an inadequate economic development was the main factor that brought the second superpower of the world to its disintegration. The fact that China has a significant space program is noteworthy as well.

Then Russia, which is endowed with a very good, if aged, space technology and above all with still alive competence in the field, able to develop new solutions if adequately supported, would not be able to sustain a new arms race, but it can and is in fact giving a remarkable impulse to the development of space.

In the matter of fact there is no threat justifying the military expenditures of the United States. If the enemy is Islamic extremism, it should come out clear that aircraft carriers and battle tanks are good for nothing, after the disastrous experiences in Afghanistan and Iraq and the similar failure of Israel in Lebanon. The right way to fight terrorism is by intelligence services, police and above all by coping with the basic questions about its roots: from the conflict in Palestine to the economic and social condition of Arab countries.

My proposal is this: let's transfer money from weapons to space! The financial resources currently employed in the military are so huge that a small fraction of them would be enough to restart the human presence in space in a truly decisive way, as one can easily guess from the numbers I gave above. Large resources would remain for terrestrial initiatives, from the solution of conflicts to the rebuilding of energy and transportation systems. Furthermore, the most advanced military industry is contiguous to the space industry, it could be converted without serious difficulties. Instead of using war as a stimulus for technical advancement, let's use the noble race to outer space, like we did in the Sixties of the last century. Certainly care must be taken to avoid that the bad habits of the military sector, like inflated costs and bureaucracy, transfer to space industry, like it happened in the past.

Space could give us a sound opportunity to revive the economic development of the most advanced countries, taking with it the intermediate ones and the whole world in general. Let us not forget that war used to be the alternative to shake the economy and do big business...

The program must involve a direct human presence and not only robotic exploration. We are not talking about making science, but development! The higher costs imposed by it are very well sustainable, if we pick from the deep pockets of the military. But the world in general is not lacking financial resources, it is lacking above all good ideas, there are large private funds that could be mobilized if the right impulse is given. Anyway, the contribution of governments is necessary at least for two reasons.

The first reason is that today there are those who prefer moving to the opposite direction, militarizing space, in parallel with the effort they are making to produce a general state of creeping conflict in the whole world. Only decisions at government level can modify this situation: if the other most important nations of the world showed a clear commitment, even the main superpower shall sooner or later adequate its behaviour, and all of us hope that it does it promptly, taking back that role of ideal leader that it once had and now seems to have lost.

The second reason is that there is little time and there are big enterprises to accomplish. In not many years we could be compelled to dedicate the remaining resources to the mere purpose of survival. Only the governments of big nations can finance enterprises like building the first permanent moon base, and they can do it until we are not in a serious energy or environmental crisis yet. Private investors are trying to start from scratch, but by principle they have to get revenues also during the early phase, therefore following an efficient but slow pace. It is better that the two lanes run in parallel but it is not possible to renounce to the contribution of the governments, like always happened when new paths of development were opened, from geographical exploration to the construction of road and railway networks, including the current development of the high speed railways to which we hinted above. Not taking revenues into account, governments can throw in a critical mass of financial resources to sever the knots restraining the start of the great human enterprises.

It is necessary to break into a sclerotized political world, where the right is seized by the neo-con ideology, ultraliberist in economy but not liberal in politics, being militarist, authoritarian and philosophically backward (it is nothing else than religious integralism), while the left is not able to produce an idea of its own, is characterized by not being exactly like the right, gets entangled with the so called environmentalism and (in Italy mostly) runs after the latest NIMBY cause to catch some votes.

It is not an easy task but it's essential, all suggestions are welcome!