

# OUT OF THE CRADLE



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## ANTHROPOLOGICAL BACKGROUND AND PROCESS

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## ABSTRACT

The study done in this prospective is based on a cognitive system, Globe Expert, which is the only one capable of considering what could happen in a hundred years with objectivity and neutrality. To the question of the triggering cause of humankind's expansion into outer space, its answer is quite clear: a major crisis of the biosphere. Then, who takes the decision? Without hesitation, Globe Expert points out the transfer of responsibilities to international organizations and private players. The procedure of space exploration emerges as a necessity to understand, anticipate, manage and resolve the Earth's issues. It is as if the states, by refocusing on earthly problems, have delegated to private players the task of finding solutions and have delegated to international organizations the charge of coordinating and managing this formidable mission. As for the pioneers, they necessarily subscribe to a new vision of society and to the economy of civilization, supported by international organizations that are indispensable for rethinking complex human organizations both on Earth and in outer space. The conclusion of Globe Expert is remarkably simple: the place of human beings is central. At no time, is it challenged by advanced technologies. This positioning is structured by philosophical bearings. Globe Expert concurs with the thought of Teilhard de Chardin by showing that nothing can be done and nothing will be done outside of this "human phenomenon".



# OUT OF THE CRADLE: ANTHROPOLOGICAL BACKGROUND AND PROCESS AS SEEN BY AN ARTIFICIAL INTELLIGENCE AND A GROUP OF EXPERTS

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**T**he main interest of a cognitive system lies in its neutrality, in the fact that it is devoid of any emotion, prejudice and personal opinion. Its rationality is based on mathematical logic as intended by Gödel and information theory as defined by Claude Shannon. No belief or value structures it. In this way, no matter what question is asked, it will never answer: « this question is stupid! ». On the other hand, it will be able to point out the inconsistencies of its interlocutor or to inform that, with the available information, it is impossible to go reliably beyond a particular date forward. Faced with a subject as sensitive and controversial as the exploration of outer space, the discovery of new worlds and human settlements which would be created there, the use of artificial intelligence is therefore essential. It is the only way to objectify a matter that is fundamentally emotional because it is linked to the essence and meaning of our humanity.

The following article presents the vision of artificial intelligence when it is submitted to the question of background and the process of an expansion of the human race on planets located dozens of light years from our cradle: the Earth.

This vision was analyzed and discussed by members of GMAP, an acronym for Global Mutations Analyses and Prospective, a multidisciplinary research group dedicated to the analysis and prospective of the major changes of this century, including the biosphere because the alteration of the relationship between biosphere and human societies is one of the most radical and threatening innovations of our time.

## METHODOLOGY

When reviewing the subject, five questions were asked:

1. Will people embark on interstellar travel for political, environmental or exploratory reasons, responding to our impulse to continuously push our boundaries?

2. Will the decision be made by one country - and will it be Western or Asian -, more than one, or by international organizations?
3. Once the decision has been made, what will be the *modus operandi*, and to what sort of resistance and confrontation will it give rise?
4. Who will be the pioneers? What models and values will come to the fore in this passage from a globalized earth to a globalized universe? At what moment and how will humans definitively break free from their cradle?
5. Final question: will the travel be taken through space-time as known today, in other multiverses, or in a universe of time-loops, as described by Gödel?

To answer, three different analytical frameworks have been established to examine different aspects of the reality and complexity of the human issue faced with the assumption of leaving the original Land, by having to avoid the projection of current political, economic and social trends over a hundred years. The following areas have been taken into account.

1. The geo-cultural areas, that is to say, the Anglo-American, European, Slavic, Australian-European, Sino-Japanese, Southeast Asian, Indian, Eurasian, Latin American, Sub-Saharan, Muslim and Israeli.
2. Institutions such as various international organizations, including those involved in space, or representative religious institutions.
3. The fundamentals of the biosphere: demography, climate change impacts, vital resources (water and food), energy.
4. The economic space: space industry and private actors in space field, the economy in the classical sense, the knowledge economy, but also what could be an economy of civilization, inspired by the concept of politics of civilization such as envisioned by the French philosopher and sociologist Edgar Morin, hinged on notions such as development, sustainability, distribution, gross domestic happiness, wellness.
5. Sociological structures as resources - rich or poor - activities - manual, intellectual, military - gender - men, women, but also robots - integration, taking into account the different categories of fringe groups.
6. The dynamics of social stability or instability, withdrawal toward a past considered as golden age, or opening to an evolution of humankind, transhumanism and more!
7. Beliefs, whether religious, philosophical, political.
8. Science and technology, first and foremost those related to space research and exploration, but also the different fields of knowledge.

9. Finally the uncertainty factor covering the various possible major breaks, be they scientific, ecological, anthropological, social ...

In a third step, these checklists have been linked to the prior questions. The cognitive system Globe Expert then began working, using for its analysis its own database, which contains just over five million documents so far, widening, when necessary, to the appropriate documentation of public data available on the Internet.

In a projection to one hundred years, even for an artificial intelligence, there is a margin of error. It does not practice the augury nor reading coffee grounds and therefore does not yet consider black swans and other unexpected events such as the flapping wings of a butterfly which, inevitably, would degrade the probabilities it calculates. However, this margin of error is known precisely, point by point by the analysis grids. For example, if the question of advancements in cosmology has a margin of error of 50% to one hundred years, however in terms of energy and vital resources it is only 22%. Furthermore, this margin of error is reduced in proportion to the prospective horizon. In a prospective of thirty years, the margin of error on cosmology is 20%, on energy and vital resources it is reduced to 7%. Nevertheless, the fact remains that the system is an excellent indicator of weak signals, of the forces currently at work and of what might be their evolution on a constant basis, all things being equal.

Similarly, the introduction of a segment of uncertainty in the analytical grids shows the areas where the system perceives possible break points. Finally, to summarize, when strong trends are revealed by 2040 on segments with a minimal margin of error, they are likely to persist beyond.

## **THE BIOSPHERE IN QUESTION**

The result of the analysis by the artificial intelligence system Globe Expert is unequivocal. The state of the living system of our planet, its biosphere, is the root cause which would motivate human expansion into outer space, and it can be already said that the biosphere is at stake regardless of the questions asked.

This key role of the Earth indicates immediately the time in which the whole process takes place. This is a long cycle. Centuries would be required for the concentration of CO<sub>2</sub> in the atmosphere to return to its 1850 level, assuming that all emissions of greenhouse gases are stopped right now, and that no break occurs in the cycle of carbon and ocean for example, as a result of rising temperatures. This is also the long cycle of space exploration and expansion. Between the history of the original cradle and what could be a new world, there is temporal unity. And this is not the only thing in common.

Indeed, regarding the "Biosphere" area of analysis, Globe Expert indicates two critical issues: the vital resources - water, food - and energy, whose role is particularly crucial because, in 2011, it appears as a "factor of imbalance ", that is to say, as the element that breaks the overall balance of the system simulated in the analysis and triggers its dynamics. It just so

happens that the issue of energy is also central and decisive in the field of space exploration. It is the very obstacle that makes the endeavour impossible, both now and in the long run if considering only our current knowledge.

Thus, in the diptych of time and energy where the land cradle and the new possible worlds look at each other, the mirror effect resolves the initial contradiction noted by Prof. Urs Luterbacher of the Graduate Institute of International Studies and Development in Geneva, in response to those who say, "Why worry about the outer space when it is urgent to take care of the Earth?" There is a special urgency to carry out work in the energy field, to serve on earth... as in the heavens for the well-being of ocnophiles and the delight of philobates.

While awaiting such solutions, Globe Expert, beyond the abstract paintings of its maps in the game of information signals that it identifies and quantifies says - if no break occurs - quite a terrible story will occur.

It is the story of a planet that has found no solution to any of its current environmental challenges and ends up confronted with outright inhabitability of areas like sub-Saharan Africa, Central Asia, the insular regions, while all other geo-cultural areas, with the exception of Latin America, face a convergence of energy, economic, vital resources and social stability issues. Faced with this situation, two groups of countries are formed. Some have no direct access to space research and industry, the others yes, but they lack what is essential to consider human settlements on exoplanets: energy. There is no way out.

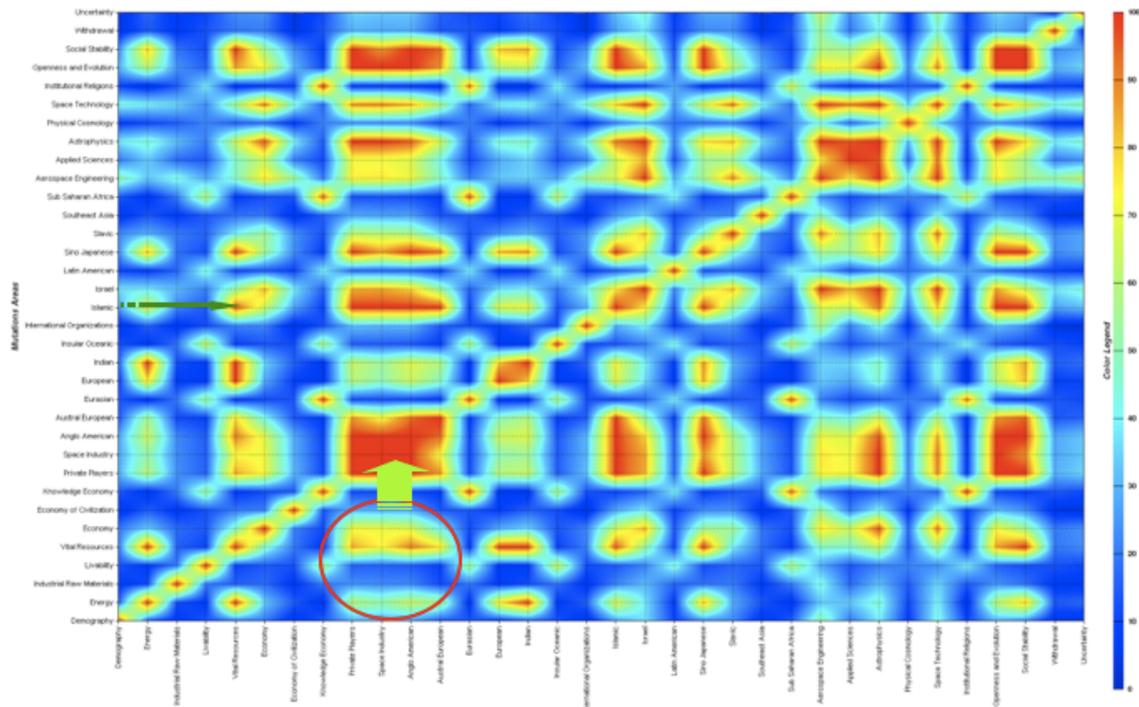
In this dark landscape, however humankind does not withdrawal into itself. It does not give into apocalyptic fundamentalism. It is through knowledge and development that it faces this. Thus, by 2111, knowledge economy is involved in the field of habitability, notably through the bio-nano-info sciences applications. So, by targeting regions such as Subsaharan Africa, their concerns converge with ones of the religious authorities. The latter are consistent with what is already known from them, whether the Vatican concerns about environmental issues, the presence of Christian - Catholic or Protestant - and Muslim NGOs in SSA or Southeast Asian countries.

If religions are concerned about the Earth and are alongside the most vulnerable of its people, they do not necessarily reject the perspective of outer space. There is no conflict between religious authorities and those for whom the evolution of humanity is not limited to Homo Sapiens, whether considering biological, mental or environmental issues. The religious authorities can be seen as thereby supporting the space effort. Better yet, Globe Expert, by applying the equation of Lotka - Volterra to the relations of influences of the different players, shows that religious protagonists do not just speak in favor of the major victims of climate change, they also foster space research and exploration.

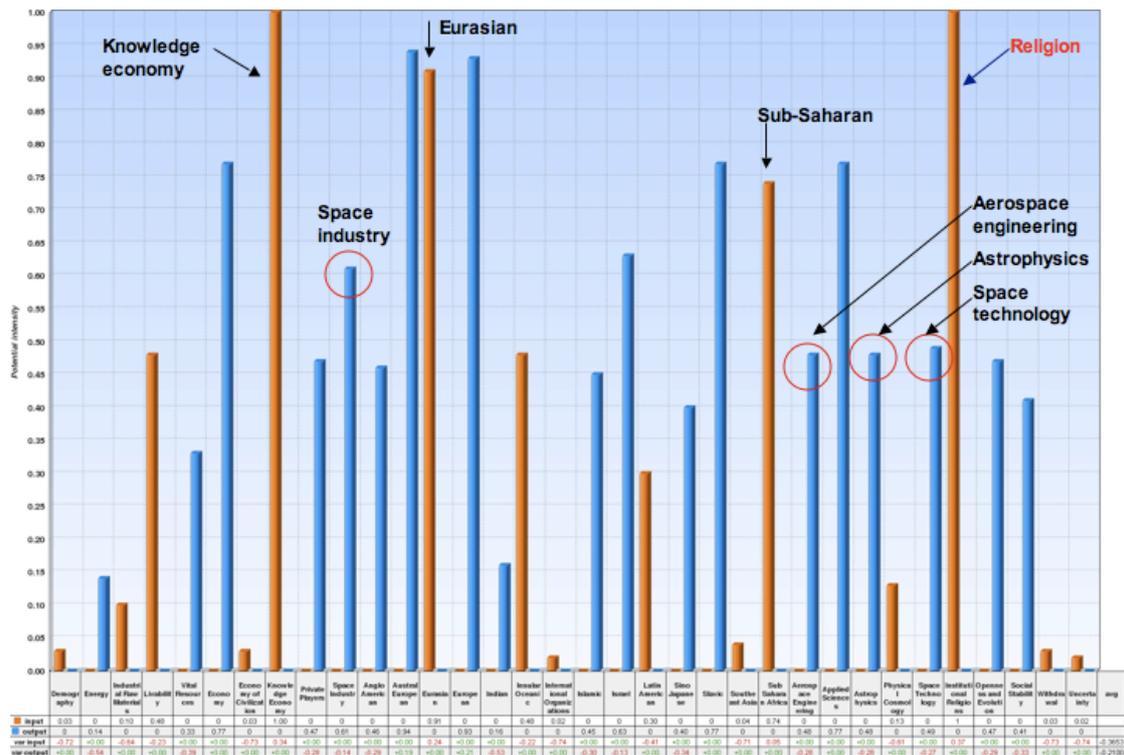
The religious subject, as seen by artificial intelligence, cannot be concluded without noticing that the Muslim geo-cultural area is one which fully participates in the process of openness and evolution. Would one see here the possibility of a return of the Arab-Muslim world in the field of knowledge after eight centuries of absence? Moreover it is essential to emphasize that artificial intelligence, in its answer to the question of what could be the cause of space

exploration in a hundred years, raises two observations, one negative and one positive. The bad news regards biosphere and energy.

The good news concerns the knowledge society as envisioned by the French epistemologist Alain-Marc Rieu, *"Not simply a society as a carrier of scientific innovations, but a society capable of societal innovations, that is to say, to invent itself."* Notwithstanding the margin of error inherent in the system with respect to such a long forward look, it is certain that, despite all the appearances, the dynamics along this line are already at work as they are so clearly revealed by Globe Expert .



**Map 1 - The dynamics of convergence triggered by the vital resources and energy (red circle) in 2111. The green arrow, at the top-left, indicates the convergences of the Muslim geo-cultural area. © Globe Expert**



Map 2 - "Prey and Predator" model (Lotka - Volterra equation) applied to the causes of outer space exploration in 2111. Red bars: predators. Blue bars: preys. The predators, influential agents, are clearly the religious authorities, the knowledge economy and all the regions impacted by the global warming. The red circles indicate the different sectors related to the outer space exploration which are under the predators' influence. © Globe Expert

## ON EARTH AS IN HEAVENS

For his part, François Mabile, professor of international relations at the Catholic University of Lille and specialist in the prospect of the religion, makes the following reading of the prior aspects highlighted by the system.

It could be that the current years complete a historical phase initiated by the Age of Enlightenment, which opposed reason and the thirst for knowledge to religious obscurantism, specifically Catholic. The fight continued in the following centuries. It had its precursor symbol: the condemnation of Galileo in the 17<sup>th</sup> century, which obtained at the end of the 20<sup>th</sup> century, a late rehabilitation due to Cardinal Poupard, at the time president of the Pontifical Council for Culture.

During the 20<sup>th</sup> century, religions experienced a double conflict regarding scientific developments. Both the bioethical field and the question of the origins, with the various religious fundamentalist sects promoting a literal reading of their texts. In the beginning of 21<sup>st</sup> century, the situation seems better. Secularization has weakened the influence of religion. In some countries, the religious practice is no longer in line with society. Religious temporal power is declining. The Dalai Lama has, on his own initiative, renounced his political positions. The revolutions in the Arab world may mean the end of political Islam.

According to the analysis of the French political scientist Emmanuel Todd, they could mark the entry of the Arab countries into modernity since improved literacy rates, declining fertility, religious changes and regime crises are constants in History. Corroborating these theories, French historian Benjamin Stora thinks that the emergence of the individual in the Arab world is currently witnessed.

The end of religious temporal power causes a restructuring of religious beliefs. The churches, the "religious apparatus" such as the Catholic Church are undergoing a crisis but the spiritual quests of individuals are not in crisis. Better educated, better trained, in Western countries and in Asia, people claim liberty in their search for meaning. In a way, this is the revenge of the "religions of call" on the "religions of authority".

What many sociologists often contemptuously call the "New Age" refers to this spiritual quest, that articulates the search for meaning ensuing from the great traditions and from scientific achievements. Currently, four major movements upset the religious field.

- **A re-reading of the Buddhist experience and religious approach in the light of contributions of quantum physics.**  
Deepak Chopra's works along with those of Trinh Xuan Thuan and Matthieu Ricard's symbolize this current approach. In the coming years, it will be interesting to observe whether the Catholic Church will rehabilitate the works of Teilhard de Chardin, a precursor whose views were prescient regarding many of these subjects and fields.
- **The connection between scientific and religious approaches also emerges in psychoanalytic and psychological fields.**  
The re-reading of spiritual works in light of psychological research necessitates reclassification of disciplinary configurations. John Welwood's works in the United States and Anselm Grün's in Germany symbolize this better than those of Eugen Drewermann.
- **Consideration of the science of "extra-ordinary" phenomena results in re-legitimizing approaches often clumsy but so exciting in the metapsychic current.**  
The discovery of the human brain's capabilities (eg brain plasticity), not new but mostly unknown until now, gives some credibility to spiritual experiences previously discredited, for instance, cases of near-death experiences (NDE).
- **Finally, the ongoing eclipse of religious temporal influence should allow a reaffirmation of Gnostic currents, "swept under the carpet" during the 20<sup>th</sup> century.**  
Regarding this issue, Islam is an interesting case. The evolution of the Arab countries might lead in the next fifty years to a rediscovery of the mystical dimensions of this religion, whose Gnostic currents have historically contributed to the promotion of Arab culture. This approach may also include the way Judaism is worked from within by progressive approaches. In contrast, within Christianity, it is certain that minoritarian sectarianisation as well as anti-intellectual processes may appear. Creationism is a contemporary example of this trend.

Overall, if one combines the gradual disappearance of normative religious institutions in favor of the affirmation of customized beliefs along with the emergence of neo-Gnostic trends, in a context of cultural globalization based on a level of literacy and thus of increasing education, not only do the religious systems appear hospitable to the ultimate aims of space exploration, but one can imagine that religious images and concepts, which are related to the heavens and stars in virtually all belief systems, will provide an extra sense, by analogy or poetic metaphor, to the ambitions of astrophysicists.

## **THE TRANSFER OF DECISION FROM STATES TO INTERNATIONAL ORGANIZATIONS**

The cause and its context established, the question now concerns the decision-making of human expansion into new worlds. Globe Expert makes clear that if the decision was taken today, it would result from states' authorities. The Anglo-American and European geo-cultural areas would then be in the "front line" against a backdrop of antagonism between withdrawal forces and opening dynamics, one and the other making use of arguments of a spiritual nature.

In 2111, the landscape changes drastically. The decision for space exploration and perennial human settlements is no longer the responsibility of the States, but international organizations. They act under the pressure of climate change demographic consequences, especially in the Island regions, whose vulnerability to the rising sea levels, the ensuing migrations and the risks of conflict in fallback countries are well known.

In the corridors and the bodies of these organizations, the Anglo-Americans and Europeans have apparently stepped aside for the benefit of nationals of the Sino-Japanese geo-cultural area which now appears to be the neuralgic heart of the space industry and especially aerospace engineering. But other stakeholders also act with international organizations. These are private players. To this group belong scientific societies, foundations that since the 1930s have worked to promote space exploration, and also companies that focus on the space economic market. This group includes mainly the Anglo-Americans and the Europeans.

It is as if - through the prospective of the future and the outer space endeavour - artificial intelligence has shown us a change in political and economic structures, similar to what were the translations and transformations of the Greek *Polis* (πόλις), the Roman *Res Publica* and the Holy Roman Empire. Regardless of scenarios of developments of the international system towards a global governance which are still considered utopian today, one can read a Western tendency consistent with a juxtaposition of large regional federations on a planetary scale, at least regarding political decisions of global proportions. There would be then a "transfer" of power from states, not to international organizations, but to supra-state ones.

In the same way, there would be a substitution of private players to the states in the fields requiring funds that they would not be able to meet, a movement already well underway, including states prerogatives such as security and defense. How and under what rules and

according to what model would this substitution take place? At this stage of the analysis, Globe Expert does not answer a question that it is not asked. It only indicates a trend that, for its part, makes private entities some of the major players in the decision process of 2111.

As a base of their future action, international organizations already have a legal framework, the Outer Space Treaty of 1967. Signed or ratified by more than 120 states, it can be seen as universally applicable (*jus cogens*). It is worth mentioning that its two main articles provide that space and celestial bodies are the heritage of humanity (*Article 1: The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.*) and that they cannot be appropriated (*Article 2: Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.*).

Other articles include in particular the non-use of force, the peaceful nature of exploration, non-deployment of weapons of mass destruction or military bases, mutual assistance and cooperation, the responsibility of states and international organizations.

This legal basis, if it is still maintained in 2111, at least in its spirit, implies that outer space exploration, even if the possibility of permanent settlements is included, cannot be achieved through a process of colonization *stricto sensu*. There is no way to claim the celestial bodies in the name of the king of France, England, Spain or ... of the Emperor of China!

In addition, Marc Finaud, a career diplomat, Special Advisor to the Director of the Geneva Centre for Security Policy, points out that even if the Geneva Conference on Disarmament (CD) has been blocked for several years, it remains the place for discussion of draft treaties to prevent an arms race in outer space: anti-satellite weapons, laser weapons, etc. One may hope that the major space powers, including emerging powers, will understand sooner or later the need to legislate in this area, if only for preserving strategic stability inherent in nuclear deterrence (sanctuarization of second-strike capability, dependent on satellites) and in the longer-term, for a world free of nuclear weapons.

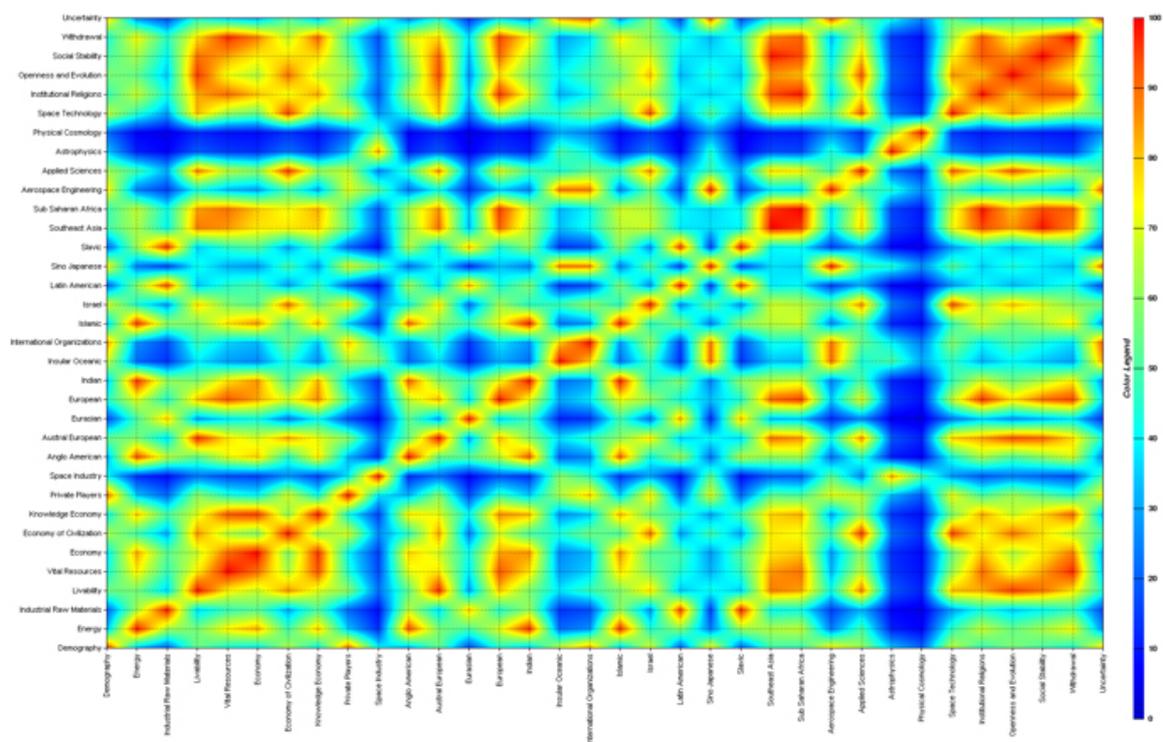
Furthermore, all the areas of vital importance for the planet - climate change, fighting against epidemics, the need for food or energy security, suppression of transnational organized crime, migration, communication and transport control, navigation, and others - require the use of space facilities, a sharing of means and funds and thus a multilateral management which is already the responsibility of the UN or regional organizations such as ITU, EUTELSAT, ITSO, Intersputnik, Arabsat...

Thus, for Marc Finaud, the decision of human expansion can only result from the pooling of resources at least at the regional level, the management of such a process having necessarily to be assigned to a multilateral organization where the responsibilities of contributing entities (suppliers of scientific, financial, technology means...) and the prerogatives of regions and countries affected or threatened by the impacts of climate change can be balanced.

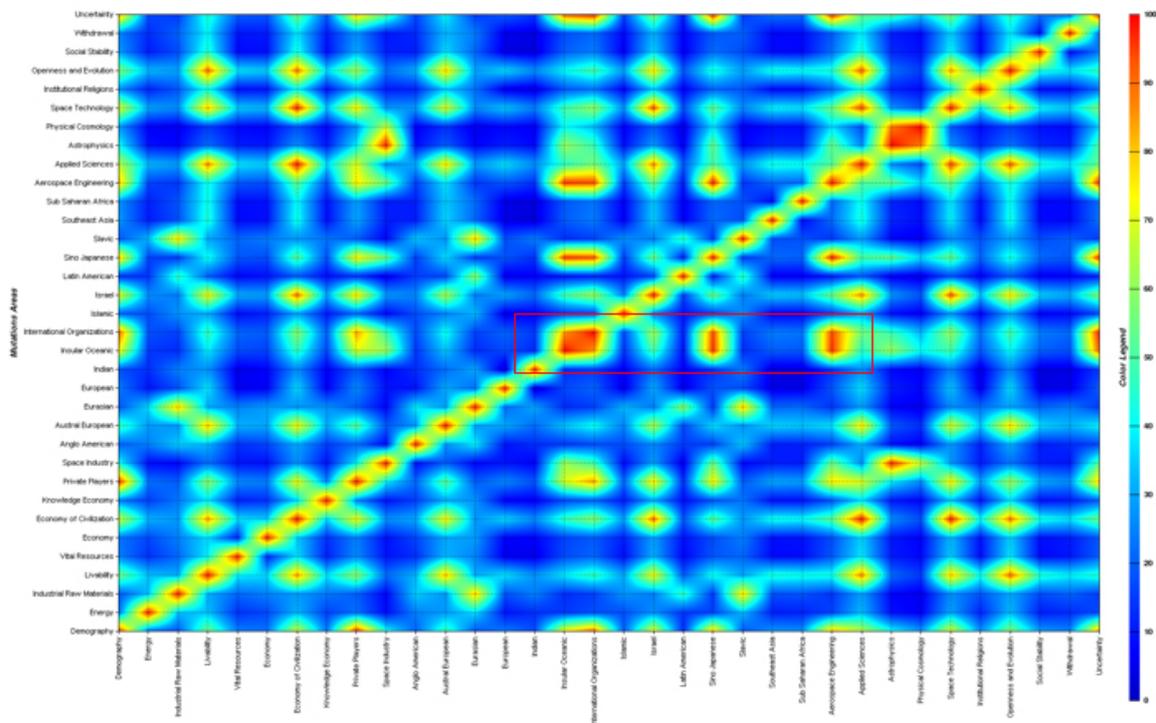
A new form of democracy is therefore likely to be invented on the basis of a "win-win" approach - supply of resources by rich countries in exchange for a stabilization of some poor regions - not the zero-sum game. In this matter, and so entirely consistent considering the central place held by the biosphere in this analysis, the carbon market, as set up in the Kyoto Protocol, and its Clean Development Mechanism already constitutes a relevant laboratory for such a process, including the pitfalls and problems they currently face.

A final key completes this overview of international relations, the weak signals concerning two geo-cultural areas, the Eurasian region and the Southeast Asian region. According to cartographies produced by Globe Expert, their presence appears as "intermittent". Benoit Forin, chief economist at the International Institute of Banking and Finance of Banque de France, in charge of Central Europe, the Balkans, Central Asia and Eastern Europe, CIS and Turkey, analyzes this weak signal as an effect of centrifugal forces that drive the countries of these areas in the sphere of influence and action of other regional leaders much more powerful, like China for example.

More specifically, in the case of the Eurasian area, he explains how the region could be subject to a dispersion between the different adjacent sets - Slavic world, Muslim world, Sino-Japanese or Indian area - more than to one grouping together. He discerns the hesitations between the competing spheres of influence of Russia and China of Kazakhstan and Kyrgyzstan, the unclear geopolitical position of Azerbaijan and Afghanistan, the temptation of isolation of Turkmenistan and Uzbekistan. In general, the vast territory and low population density make it more attractive to follow the dominant powers rather than to allow the emergence of a regional identity driven by an autonomous dynamic.



Map 3 - The map above shows the convergences in 2011. © Globe Expert



Map4 - The map above shows the convergences in 2111. The landscape changes drastically. The convergences focus on the international organizations, insular regions, Sino-Japanese geocultural area and aerospace engineering (red rectangle). © Globe Expert

## SPACE EXPLORATION: A FACTOR OF CONFLICT?

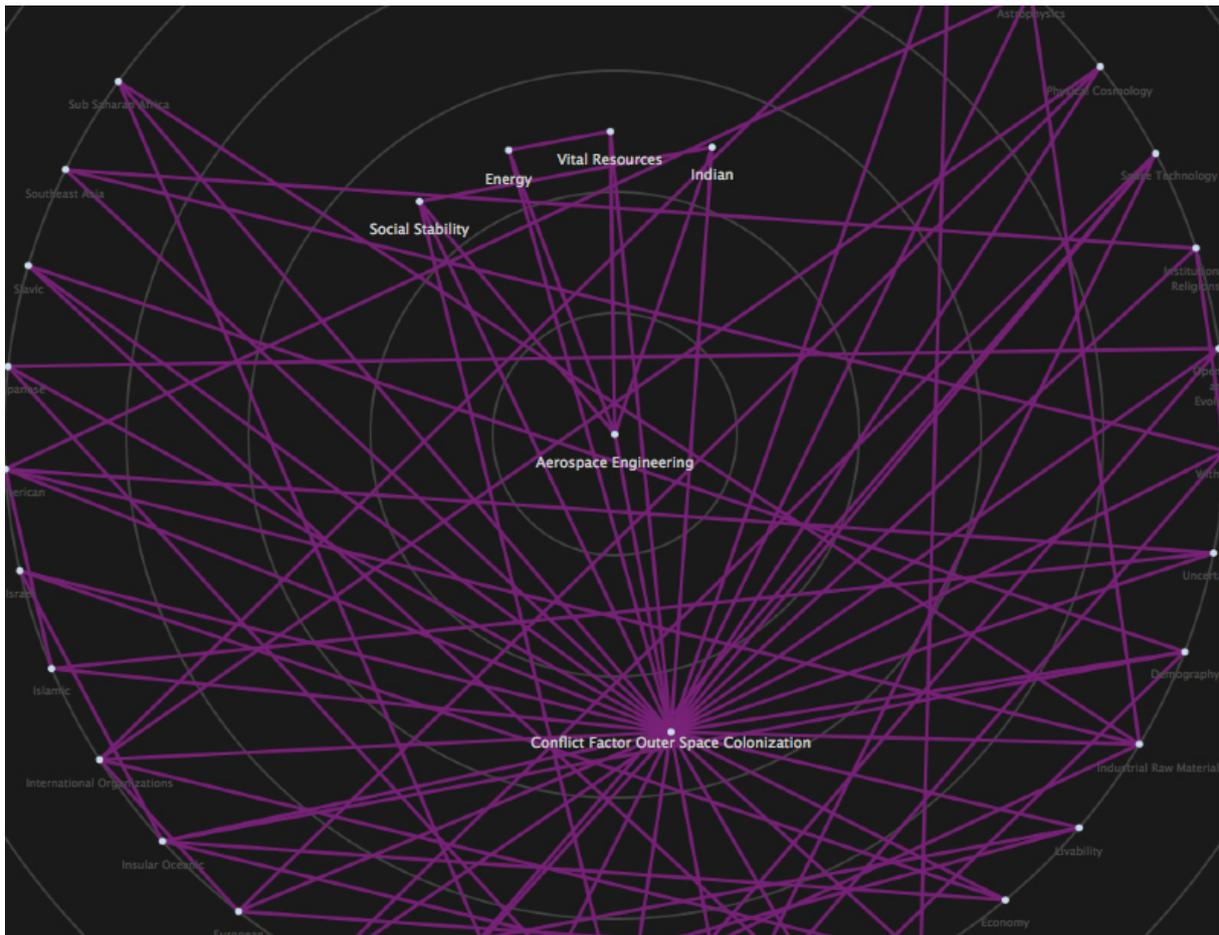
In 2111, the biospheric crisis, affecting every part of the world and that arises in terms of outright livability in some regions, ties and traps others into the quintuple knot of economy, vital resources, raw materials, energy - more particularly with respect to the Anglo-American, Sino-Japanese, Indian, Austral-European and Israeli regions - and social stability could appear as a factor of conflict. It is impossible not to imagine riots, confusion and violence on board this global Titanic where the majority will stay on board while a few will board rowboats which, risky, nevertheless offer hope. However artificial intelligence provides quite a different scenario.

Of course, factors of conflict exist, but they relate to the biospheric crisis. If there are potential risks of conflict, they are linked with what occurs on Earth and not in view of leaving the cradle. On the contrary, in the analysis of the relations of influences (Lotka - Volterra equation), pressure on the space sector can be observed. This is obviously the kind

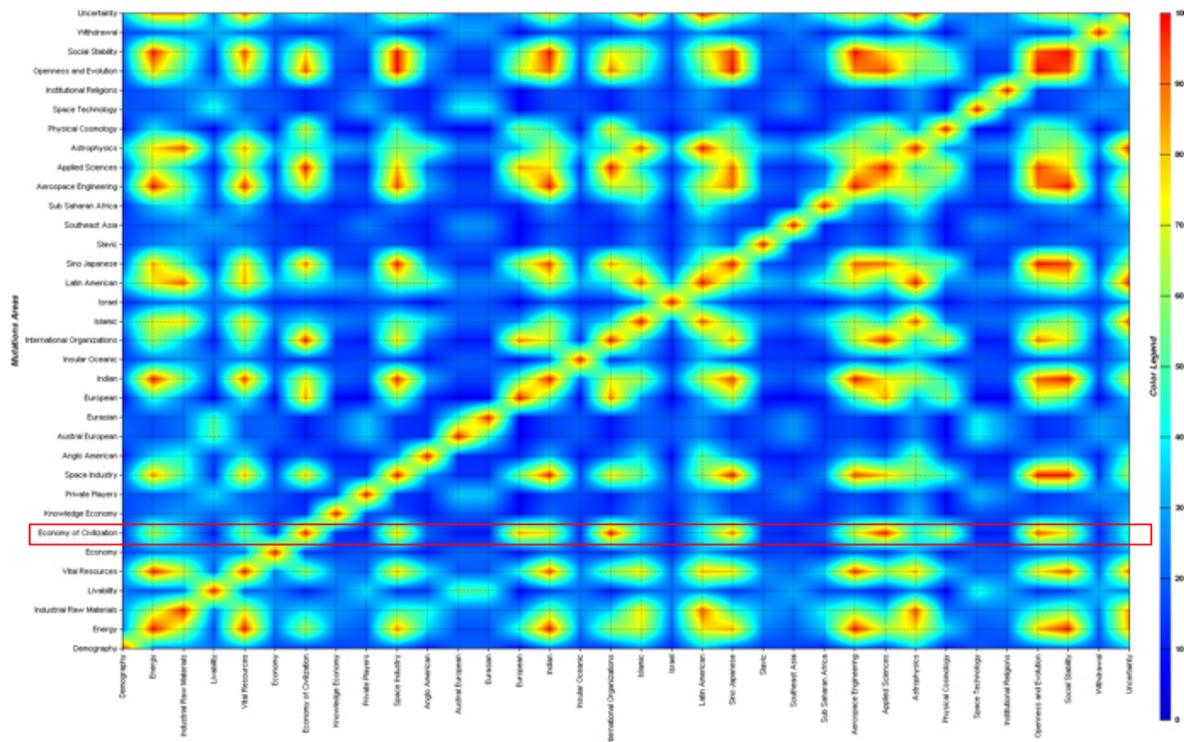
of pressure put on a field from which recourse is expected in the face of the factors of potential conflicts due to global warming and its impacts.

In this picture, just as it was seen regarding decision-making, international organizations are again in the front-line, both for managing outer-space matter and seeing to the Earth. Concerning this last point, their positioning reveals a convergence with a player still unknown in our current background. This one is called “economy of civilization”. This notion, worth future and full study, was designed for responding to the needs of the present research. It represents an extension of the concept of “Politics of Civilization”, envisioned by Edgar Morin, into the economic field. Outside of any theory that does not yet exist in the state of the works, this concept of “economy of civilization” emphasizes principles such as wellness, sharing, sustainable development and common good, but also takes into account the best that different economic systems have. All things that may seem utopian today, but identified as valid by artificial intelligence, and consistent enough - that is to say, already at work - to make it a central point of reflection or action for international organizations in 2111.

Thus, owing to this study on the anthropologic background and process of outer space exploration by 2111, a new possible major change can appear in the scope of our current political and economic models: transformation of the ways of governance, through the role of supra-states organizations and change in economic structures.



*Map 5 - This map shows the main interactions related to aerospace engineering. Vital resources and energy are connected, just as the Indian geo-cultural region and the social stability issue. These interactions indicate that the conflict factors concern the terrestrial problems. The outer space exploration appears as a recourse. © Globe Expert*



*Map 6 - In 2111, the economy of civilization converge with all the “hot spots”: energy, vital resources, space industry, aerospace engineering, applied sciences, physical cosmology, the European, Indian, Sino-Japanese geo-cultural regions, the international organizations, the social stability issue and the openness forces. This convergence indicates that the economy of civilization is a strong emerging notion. © Globe Expert*

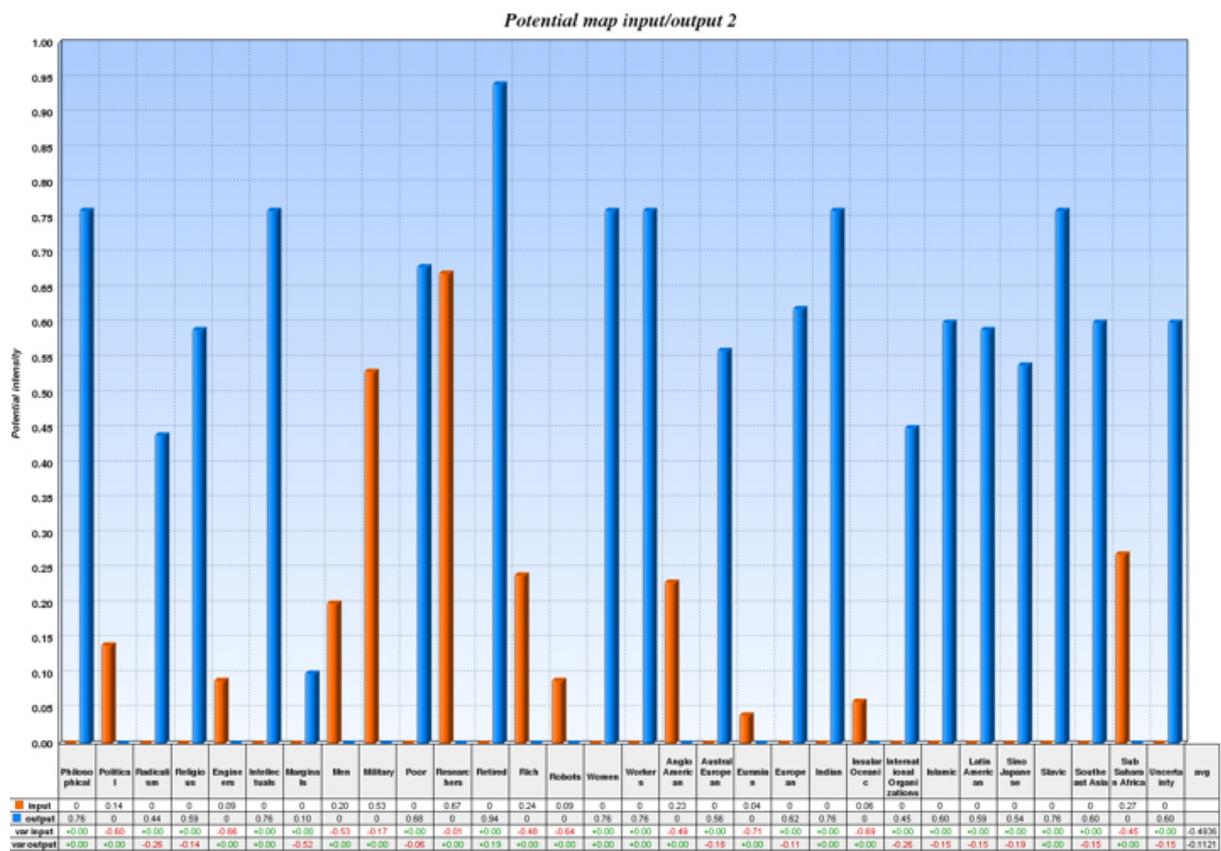
## PIONEERS: IDENTIKIT-PICTURE

To the question “who will be the pioneers of human expansion toward a far outer space”, Globe Expert answers that information available today does not allow it to provide an analysis beyond 2083. In other words, the system - all things being equal - reaches a state of stability beyond which it cannot develop further calculations. In this way, the figure, which is drawn finally, is not really amazing. The photography shows somebody who mainly comes from the Anglo-American region, belonging to the well-off, who has made a career in the army or as an engineer or a researcher and is accompanied by a few robots. This a mere projection of the current actuality.

However, Globe Expert is not limited to this profile. Regarding the geo-cultural regions, it also points out pioneers coming from Africa, insular regions and Central Asia. In other words three areas where livability is impacted by climate change. Now, as for questions of decision-making or factors of conflict, international organizations again stand at the forefront. An effect of this “new form of democracy” mentioned by Finaud, the result of this “win-win” system, which inevitably involves the main victims of the biospheric crisis in this new step of the humankind, can be seen in this result of the Globe Expert’s analyses.

In any voluntary departure to a “new world”, there is a constant: the will to extricate oneself from a constraining and alienating background - whether the reasons are economic, political, religious or even judicial - in order to build something different. So, what beliefs would bring the future pioneers? According to Globe Expert, they would be mainly political beliefs that are in a certain way similar to what was utopia at the dawn of the discovery of America, that is to say a world described by Thomas More and envisioned by the humanists. *Quod novum sub sole?*

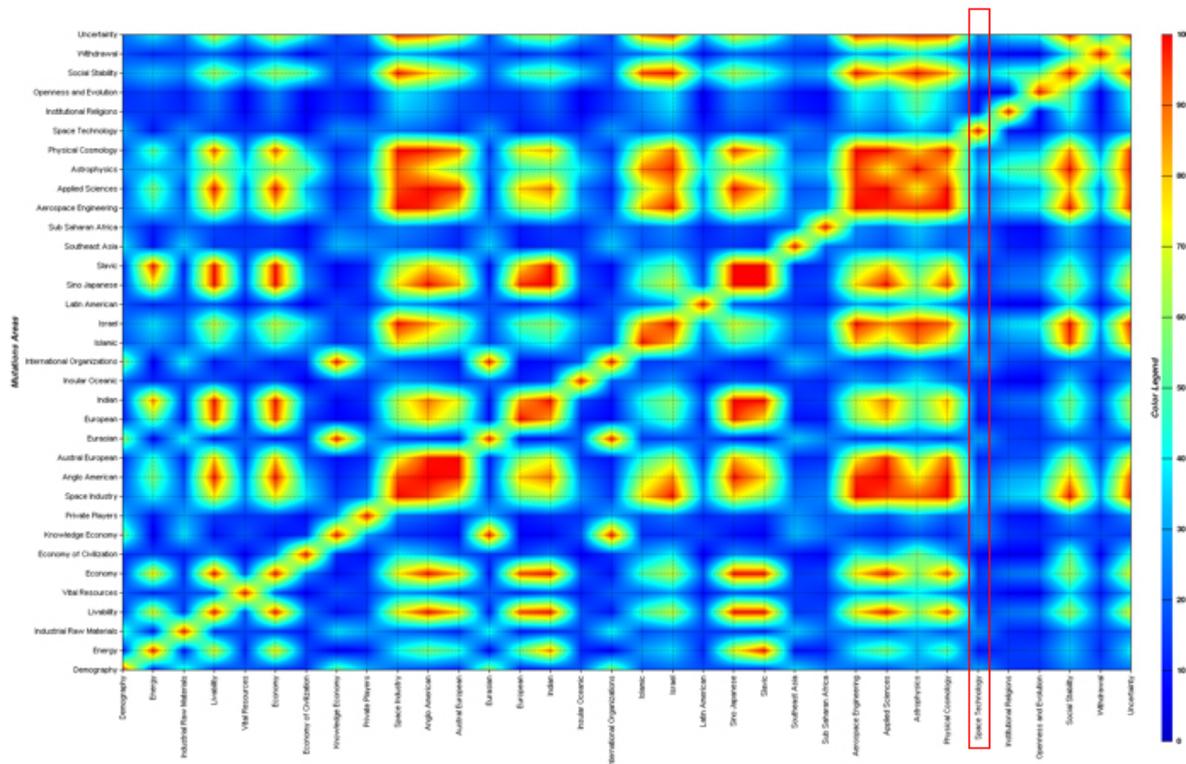
Regarding beliefs, Globe Expert highlights another point. Women, as a gender, show a convergence with notions that are in line with the evolution of humankind, whether biological or mental. If we consider that women are associated with the archetype of life and its perpetuation, so we have here an indication of a factor, which might be important to the future history of humanity and the catalyst of singularity.



*Map 7 - “Prey and Predator” model (Lotka - Volterra equation) applied to the pioneers of outer space exploration in 2111. Red bars: predators. Blue bars: preys. The predators, influent agents, represent the pioneers. © Globe Expert*

## PROCESS? WHICH PROCESS?

Until now, on the backdrop of the biospheric crisis where everything is played and woven, the different aspects of outer space exploration have been put in place. Fundamentally, nothing seems to stand in their way. So, what about the decisive step of the process? With a relentless consistency, artificial intelligence points out the major stumbling block, shown in the analysis of causes: space technology, that is to say the question of energy, is lacking. Once more, in the absence of a scientific disruption, Globe Expert announces: “dead end”.



*Map 8 - Space technology in 2111: a desperately empty place! © Globe Expert*

## THE HORIZONS OF KNOWLEDGE

Facing this deadlock, it was proposed that the artificial intelligence system tackles the question differently, by focusing its prospective on the potentialities and the weak signals of the knowledge field. In essence, the questions asked to Globe Expert were as follows. What will be the state of sciences in a hundred years? What new technologies will have been designed? What new frontiers will basic research and comprehension of the universe cross? How will these different steps be reached? The system is not an oracle. However, in the mass of information regarding our current knowledge, it points out the crucibles containing some elements of possible solutions and moreover the essential tracks of thinking.

When asked about the state of the sciences by 2111, Globe Expert shows interesting answers. Indeed, it focuses on system science, sociology, geography, anthropology, earth sciences, agronomy, astronomy, chemistry and computer science. Gone are the engineering, economic and political sciences!

At a first glance - a crack in the wall blocking the impasse, glows somewhere in the darkness of the tunnel - it is tempting to construe this landscape by thinking that the outer space exploration and establishment of settlements on exoplanets would no longer meet a space technology lack. In this way, in 2111, the reflection would focus on the ability to understand the Other - hence sociology and anthropology - this one with whom the voyage will be made and the new world built. New understanding would also focus on the capacity to explore new horizons and make new lands livable, hence geography, earth sciences, agronomy, chemistry and astronomy. Finally, this process would be based on system and computer sciences, in other words on the comprehension and management of complexity.

Another interpretation is also possible. According to this one, the different disciplines would not address the outer space question, because the necessary technology would still lack, but Earth. This interpretation would be justified by the presence of sciences such as geography, agronomy, chemistry, but also sociology and anthropology.

Consistent with what was pointed out regarding energy, a third interpretation may be taken into account. The work of the mentioned fields would contribute to resolving the biospheric crisis and to preparing interstellar missions. From a logical point of view, this process would not be paradoxical at all. In both cases, it would ultimately ensure the livability, not just narrowed to the physical and biological environments, but addressed as a whole, that is to say, including social and societal livability, the reflection of the complexity of human organizations and the types of relations to the Other they lead. In one case as in the other, the purpose would be space - close or distant - as defined by Leibniz, that is to say, "*the order of the possible coexistences.*"

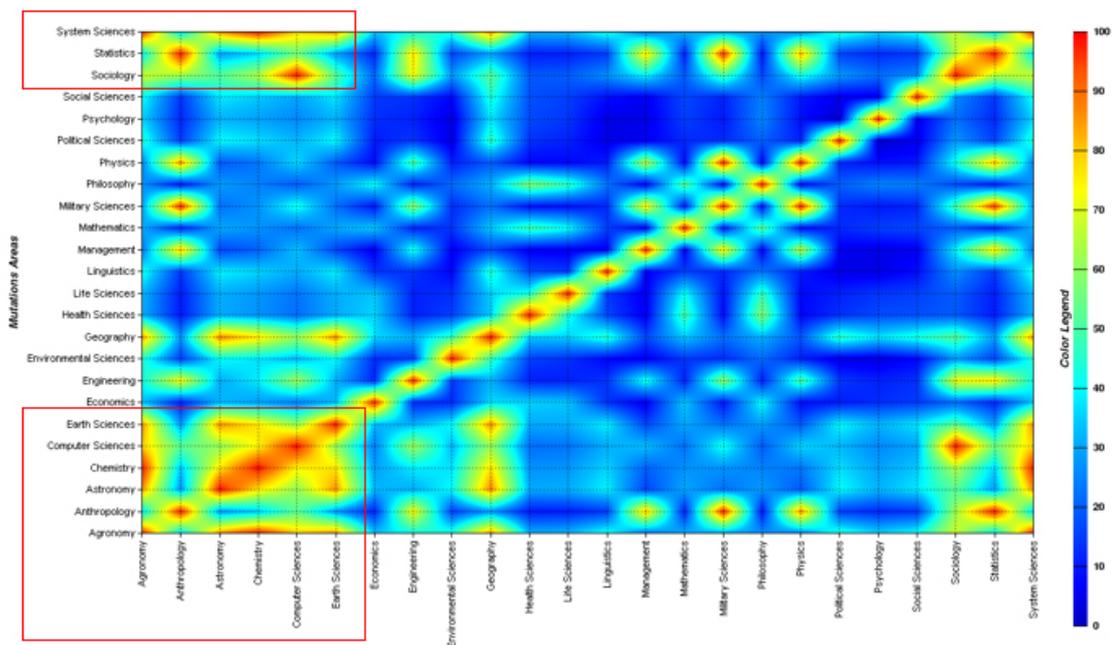
Behind the configuration of these various converging disciplines, there is an underlying dynamic composed of four fields: management science, military science, theoretical physics and philosophy.

Whatever the final application of the field of knowledge, the Earth or heaven, Earth and heaven, this dynamic means that:

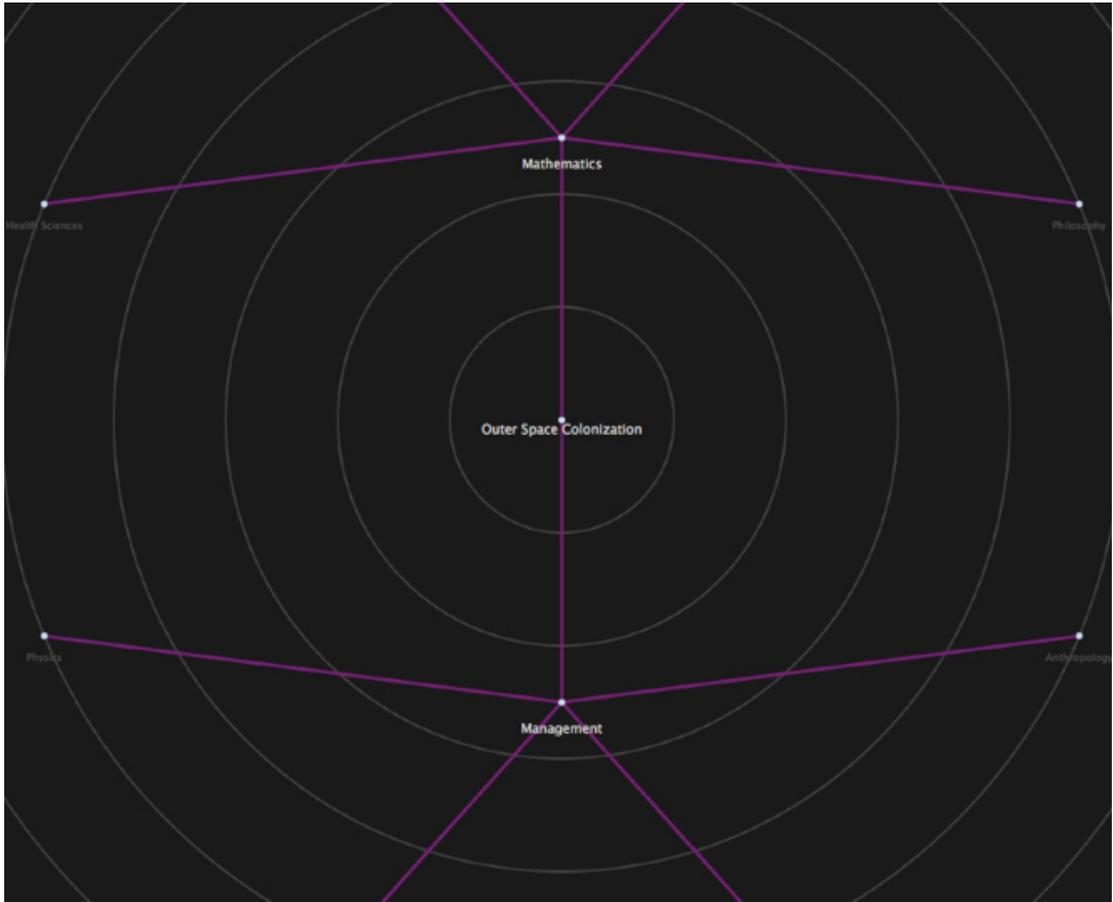
1. To achieve these objectives, it is necessary to structure the research by addressing it as a whole. This structure requires the ability to manage, and here the management science and military science (command, planning, organization) are not mutually exclusive.
2. The objective can only be achieved by maintaining efforts in basic research: comprehension of the intimate structure of the universe, quantum theory (quantum gravity, multiverses, branes, etc.). If a disruption might occur, and Globe Expert does not exclude this possibility with respect to the current state of the knowledge, it would come from basic science and not from applied sciences.

3. A deep reflection on the “why” of such an approach is essential. Here, philosophy and epistemology are at the very heart of the process.

So, this knowledge field has its players and key-dynamics. It also has its unifiers, those around which the whole revolves: management science and mathematics. Thus, Globe Expert points out the complexity of the project, whatever it is. It also confirms that mathematics are the keystone of an edifice where the parole is philosophical. Indeed, in the interplay of influences highlighted through the Lotka - Volterra equation, philosophy reigns absolutely, as if in majesty. It means that, either faced with the biospheric crisis or the expansion of humankind, nothing can be imagined and achieved without questioning the meaning of being, what Teilhard de Chardin called the human phenomenon and its “formidable problems posed by the reflective exercise of the human effort”.

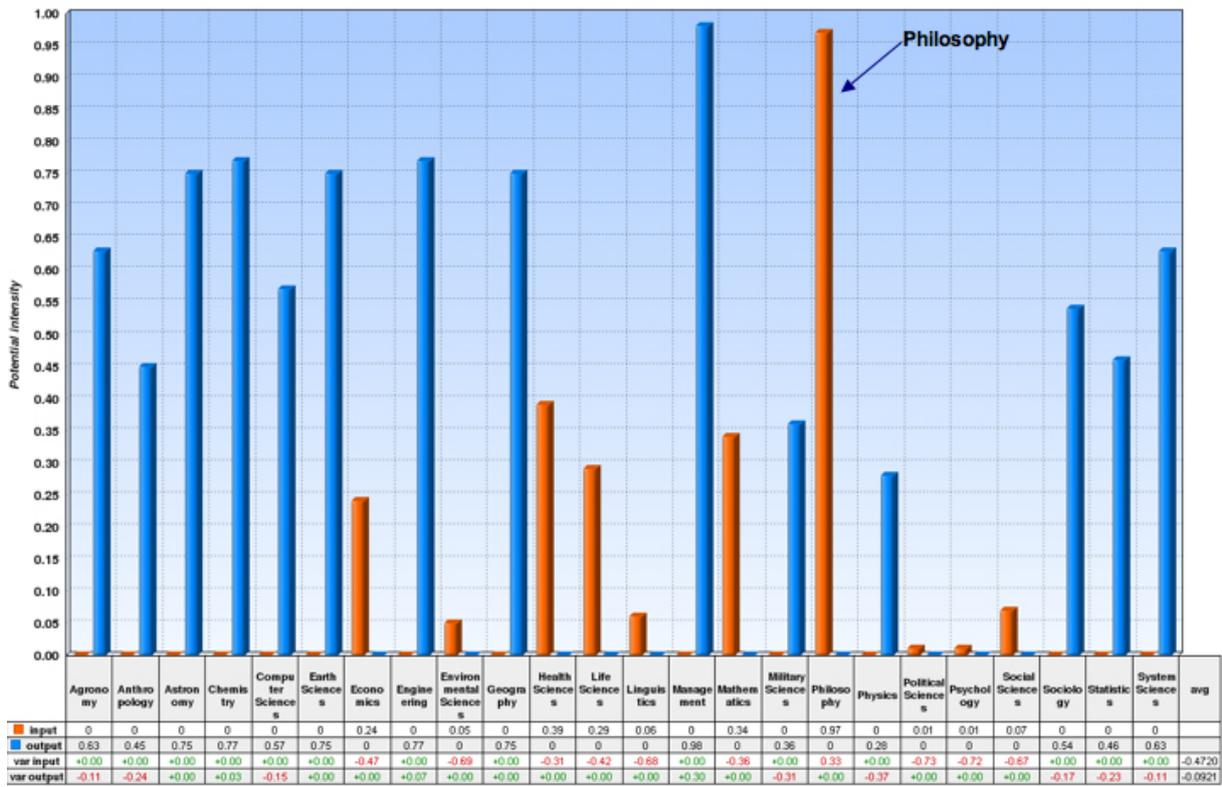


*Map 9 - The convergence of the sciences related to the outer space exploration in 2111.  
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*Map 10 - At the heart of all the interactions of the knowledge field, mathematics and management. © Globe Expert*

Potential map input/output 2



Map 11 - The most influent agent: philosophy. © Globe Expert