

Technology Themes on Human Space Activities

Mitsuru Ohnishi[1]

[1] JAXA, IAT, AST

To learn how to proceed research and development of technologies expanding human space activities, we would like to make a survey on the history of mankind from the technological point of view.

About three hundreds thousands years ago, our ancestors were born in Africa. About one hundred fifty thousands years ago, they left Africa and spread over the other continents in no time. In Europe, they met Neanderthal men whose ancestors departed from Africa about one million years ago. At that time, ancestors of our ancestors chose to stay Africa. That is, Neanderthal men correspond our evolutionary uncles, if our ancestors correspond our evolutionary parents. The uncles and the parents coexisted for while. However the parents witnessed the uncles becoming extinct about thirty thousand years ago and then have prospered so far. One of the reasons of this difference was superior clothes developed by the parents. These fitted human bodies and kept body temperature well. On the other hand, the uncles' clothes were very simple. So the uncles could not live neither warmer condition nor colder one. It is said that a technological innovation, the invention of needles, made this large difference. Thus, the invention of needles was one of the key technologies to expand human activities.

Then, we notice that it is much important for expanding our activities to keep comfortable conditions for our bodies even in any outer conditions. This is also a key technology for the human space activities. When we go back in time furthermore, we also notice that the evolution to expand life's region is the invention of a new isolation system to keep comfortable conditions in life's body under new environment. For example, the blood circulation system enables cells to live in ancient sea conditions and skin between the cells and their outside prevents outer environment disturbing the cells. The evolution of the skin has the similarity to the development of the fitted clothes.

Consequently, we are following the evolutionary history but with very high speed. We can conclude that the development of a excellent isolation system from any environmental conditions is essential not only for the evolution but also for the expansion of human activities. Thus, the development of ECLSS (Environmental Control and Life Support System) for the human space activities will have an extreme importance to the history of mankind in future.