Will the U.S. be Overtaken by China In Space?

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China is clearly seeking to acquire by all possible means the modern space know-how required to gain a command of critical civilian applications for its own use and to give work to Chinese industries in fields like earth observation, meteorology, satellite television, telecommunications, and navigation. In addition, it is developing a 'man in space' programme and projects for the use of space in the field of defense at the same pace. In January 2007 it successfully conducted an anti-satellite (ASAT) weapon test directed at one of its own aged satellites. Since 2008 China has conducted human flights on board the *Shenzhou* vehicle, allowing the first space walk by a Chinese 'taikonaut'. In August of the same year, the Chinese launched the *Shenzhou VIII* and in 2011 the same vehicle flew for the first time two docking/rendezvous missions with the *Tiangong* orbital module. Above all, the PRC possesses the high-performance *Long March* space launch vehicle. In 2010, 15 launchs were realized including the launching of the *Chang'e* lunar probe (orbiter built in preparation for the 2013 lunar rover mission to the Moon surface). In 2011, 19 launchs were performed which represents 22 % of the world's total launch activity!

These are some facts and figures showing, with no discussion, that the Chinese are now more than an emerging country in the space business, able to compete with the Russians, Indians, Europeans, and even the United States. Knowing that the space policy of the world leader is still alive (*Curiosity* in 2012! And *InSight-Discovery* in 2016!) and full of initiatives in the field of launchers, but also some very vague ideas concerning the future of human exploration, one could ask whether China be the new leading force in space by the end of the decade.

Historically, China inherited the Soviet space program to a great extent and makes intensive use of Russian space technology in 'heritage', in particular the *Shenzou* manned spacecraft. Yet, China does not possess the resources provided by the scientific and technical complex that existed in the former Soviet Union. Its space program is central government-steered to an extent that cannot be compared with Moscow's steering of its own Soviet military-industrial sector. It is, of course, even more true if you compare the U.S. space complex and budgets!

On the other hand, China is benefiting from the dynamism of its market industrial sector and of reliable though not huge public budgets. Recently it has overhauled aerospace project management structures and procedures. As an emergent great power, it looks forward to acquiring altogether more military and security space capabilities. And, finally, the main incentive, the PRC produces a vision or an ambition and a clear political motivation for investing in space technology – which is not necessarily the case of its competitors, be they Americans, Russians or Europeans.

Strictly speaking, China's military space program is little known. It does make use of civilian systems in meteorology, earth observation and telecommunications. Even the Pentagon's Annual Report on Defense in China mentions only a few defense related programs dedicated to a real direct use by the armed forces. There is, however, the exception of counterspace programs, such as ASAT interceptors, ASAT laser directed energy weapons (DEW) and communication or navigation satellite jammers, but all of these are ground deployed systems. According to experts, observation is not conducted on a permanent basis in the surveillance and military imagery areas. In telecommunications, China is reported to have only one true military satellite (*Fenghuo-1*) as backup for civilian capabilities. The specialist journal *Jane's* suggests that Chinese leaders are beginning to view the space sector as a channel for the modernization of the capabilities of the armed forces with the objective of mastering the art of modern warfare or information warfare by the 2050s. China would be called upon to develop a new generation of some 15 satellites, including imagery, electronic eavesdropping and communications equipment, in addition to counterspace

capabilities. In 2008, a LM-4B launcher launched a new couple of signal or electronic intelligence mini-satellites (derived from the FY-1). China's BX-1 microsatellite or "CompanionSat", launched to provide inspection images of the Shenzou capsule-7, would in fact test some capabilities required for a co-orbital anti-satellite attack. According to the U.S. Department of Defense (DOD) analysis, China's budgetary global effort for defense ranges between 85 B$ and 125 B$. A study of reference published in 2005 by theRAND Corporation, *Modernizing China's Military: Opportunities and Constraints,* estimates China's budgetary effort for defense at 30 B$ to 40 B$. Several analysts contend that, with the help of a civilian-military space budget, probably in the range of 2 B€ a year, China is about to become a world space leader (the first space power back to the Moon in 2020?), possessing at least credible eavesdropping and ASAT weapon capabilities and making the decision to build a series of 100 orbiting satellites by 2010.

Other analysts observe, however, that China is still twenty to thirty years behind in terms of major arms programs, that its defense modernization only ranks fourth worldwide, and that China is not in any case a global threat in terms of operational space capabilities. In fact, China's capacity to translate foreign technology into autonomous modern and operational technology is thought to be limited. Furthermore, since the 1998 administrative reforms, space developments have officially been conducted in a civilian framework, under the authority of COSTIND, which is attached to the Industry Ministry. A recent survey conducted by the Strategic Studies Institute of the U.S. War College pointed out in its conclusions that, while China has made progress in space technology, it still lags behind compared with the major world space powers. But, according to Pr F. Godement, head of one of the best think tanks on Asia, the Asia Centre of Paris, "one only has the vaguest idea about the real strength of the Chinese army." We cannot rule out that technical and scientific investments made in the civilian sector with government support drawn from economic growth margins or the support of foreign knowledge may be used ultimately in the service of the defense forces or spectacular space adventures. Vigilance about export controls on sensitive technologies is still required, as we should not underestimate the power of seduction for a state, which is better than others at playing on its weakness to restore its power. Once again on the geopolitical ground, one cannot exclude the possibility that the Chinese government may be determined to acquire advanced technology for military telecommunications, eavesdropping, satellite radio navigation, reconnaissance and ASAT weapons, in addition to the ASAT demonstrations it already made, with a view to modernizing its equipment and creating an instrument for implementing at least an asymmetric strategy. The development of Chinese naval capabilities, including the change from a "brown-water navy" to a "blue-sea navy", and the acquisition of sophisticated satellite radio navigation systems and electronic eavesdropping or very high resolution observation systems, would likely accelerate Chinese sea power projection and manoeuvring naval capability.

Recently, the 'Daily Yomiuri Shinbun' (March 2012), a Japanese journal, stated that, though the PRC has a slightly declining performance in terms of economic growth (7%), it increased its budget for defense in 2012 by more than 11% anyway, and the budget for Ballistic Missiles and submarines was not quoted. There is also the information that, at the present time, the PRC's Army wants to use ELINT/SIGINT electronic eavesdropping systems ("Technical experimental satellites", initiated as early as the 1970s albeit unsuccessfully and discontinued after the death of Mao Zedong) in addition to using satellite (*Beidou-Compass*) radio navigation signals for its needs. Ground-based eavesdropping, the solution envisaged up to now, and satellite-based eavesdropping are indeed particularly useful for the precision use of long-range antiship missiles that have been purchased in Russia. U.S. experts contend that, to meet these needs, China already uses Shenzou civilian platforms, on which it places adequate antennas, and possibly commercial communication satellites sold by Western firms. The document of the *U.S. Office of Naval Intelligence,* "A modern navy with Chinese characteristics – PLA Army Navy", states that 'non-contact warfare' implies that the PLA Navy acquire or develop long range weapons to be launched from ships or submarines as well as the associated detection and targeting capabilities (space assets). China is even said to have built an anti-ship ballistic missile. It is developing a near-continuous at-sea strategic deterrent with the *Jin* SSBN, follow-on to first generation *Xia* (presently 3 nuclear ballistic missile submarines existing), carrying a 4000 nm SLBM JL-2. These new means are not fully operational but they will be.

As for the civilian effort, the Chinese White Paper on "China's Space Activities in 2006" tends to emphasize, over and above military objectives, a thrust of Chinese space activities in line with the government's economic priorities since the 1980s. Space science research, lunar exploration and manned spaceflights are discussed, yet these

themes, as well as ultimate defense purposes, are not explicitly listed as top priority objectives at the highest government level where industrial objectives are paramount. Above all, China wants to control the entire space industry chain, including manufacturing,, launch services, ground-based equipment, and dual-use derivative services in communications, television broadcasting, radio navigation and remote sensing satellites with respect to various current and future civilian and military needs. The Third White Paper on Space, published in December 2011, demonstrates again how the Chinese government is committed to an ambitious space policy as a whole, while maintaining the policy line of progressive and nonaggressive progression towards the ideology of developing in harmony.

To conclude, it seems necessary to confess that a precise assessment of the Chinese space technology performances remains – as it is actually in the defense sector – rather difficult. The state and industrial organization, complex and opaque as it is, does not permit a full, comprehensive and transparent view of the decision making process. If it is not advisable to overestimate the effort done by the PRC in the space domain – as most space policy analysts are tempted to do – it would be risky to underestimate – as too many European businessmen are inclined – the raw, handy way the Chinese build and use high technology for space. In all, the real question is probably not as much about the motivation of such visible programmes (in-orbit demonstrations, taikonaut flights), as the significance that the political rulers, the Communist Central Party and the PLA, place on the space segment (signal and electronic intelligence, imagery and surveillance, satellite navigation) as critical equipment at the service of the development of the Navy and strategic missiles forces.

Simplification, when you consider the progression of a country like China – emerging as a power amid a world which is less than ever "in harmony"- is not the right method. To have a Chinese policy, to appear more open to a modern China, to accept Chinese capital investments suppose at the same time fighting for more transparency and international regulation, it is even true in the field of Space policy. One must be aware that we work in a triangle, Europe, the US and China; and it seems that Washington is better armed in many respects than Brussels, in a first phase at least, to lobby our Chinese Partner in view of gaining more information on the pace of their space ambitions both civilian and military and to provide the international community with the hurdles or necessary handrails which eventually would appear to be necessary to the US and Europe.

Would you have to bet about the chances of seeing a Chinese taikonaut walking on the Moon surface before ten years, leaving the world, especially the American public, stunned? I would personally bet yes! Thus, the relevant question here should be: what will the reactions from the competitors, the US, Europe, and Russia be?

First place in space for China – even for a while – would be such a shock that it could at last stimulate the creativity of the space policies of the other nations in the world after 2020. It might even encourage a more international approach to space conquest in the 21st century.

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