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**The Russian microelectronics industry and national security**

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*By Bernard Casey*



It is often forgotten, in today's mobile, networked, and information-driven business climate, that many of the world's most prominent "Silicon Valleys" - Hsin-chu, Taiwan; Ang Mo Kio, Singapore; "Silicon Saxony", Germany; and even the original American Silicon Valley in the San Francisco Bay Area of California - were built largely or entirely on the semiconductor, or microelectronics, industry. Since then, America's Silicon Valley has undergone several evolutionary transformations, wherein one technology spawned a boom, only to be replaced by another technology driver in the next cycle.

Currently, Silicon Valley entrepreneurs and investors are focusing on Information and Communications Technology (ICT) with a particular emphasis on web applications like social networking and cloud applications for enterprises, and on Clean Technology, that is, non-fossil fuel based technology used to generate electricity. Some semiconductor fabs, fabless semiconductor companies, and semiconductor capital equipment manufacturers remain in the Valley, but they are clearly not the focus of either entrepreneurs or investors, and have thus migrated largely to Asia. This current focus in Silicon Valley may be in the best short term interest of entrepreneurs and investors, but it may not be in the best interest of a nation which is in economic and moral decline and whose military is the sole justification of its claim to superpower status.

A 2005 report by the Defense Science Board, a US Department of Defense advisory committee ("DSB"),revealed the following concerns of the US military with respect to the growing trend of outsourcing its microelectronics manufacturing to Asia:

"1) the manufacturing plants of top quality semiconductor materials, microprocessors, and integrated circuits are located now largely overseas; and

2) the US military's most cutting-edge microelectronic components incorporate technologies for which there is often no commercial demand."

To date, neither the US Government nor the private sector have taken significant steps to address these concerns, nor stem the continued outflow of America's microelectronics industry to Asia.

Conversely, in 2006, President of Russia Vladimir V Putin endeavored to establish a "Russian Silicon Valley" in Zelenograd, Russia, based largely on Russia's microelectronics technology. The status of Zelenograd Innovation and Technology Centre (ZITC), now one of Russia's main electronics and nanotechnology centers, is that there are about 30 companies there, and the Russian Government hopes that there will eventually be 200 companies there. A special economic zone has been established for Zelenograd to reduce bureaucracy and foster entrepreneurship. Semiconductor fabs in Zelenograd include one operated by a joint venture between Franco-Italian firm STMicroelectronics and Russian firm Mikron, one operated by a joint venture between American firm AMD and Russian firm Angstrem, and a300mm fab Russian firm Sitronics built in 2008 with technology licensed from American firms IBM and Intel and STMicrolectronics.

There are also a lot of fabless semiconductor companies in Zelenograd - UniqueICs, IDM, and others. Even American firms Motorola, Freescale, Intel, and others run Research & Development facilities there. It is still expected that the Russian Government will have invested $24 billion in Zelenograd by the time that the project is completed, roughly three times the Russian Government's actual committed investment for the new "Russian Silicon Valley" established in 2010 in Skolkovo, Russia (albeit, still a fraction of the estimated $500 billion of Government and foreign direct investment anticipated in Russia's innovation development budget between 2011 and 2020, to be targeted primarily at Skolkovo's 5 technology clusters- information technology, biomedical, energy efficiency, nuclear, and space technology).

In February of 2012, Deputy Prime Minister of Russia, Dmitry Rogozin, stated, "We urgently need to replace the microelectronic elements that we import with similar ones produced at home. The problem has to be solved within a couple of years. Last week, Defence Minister Serdyukov and I inspected the Mikron microelectronics company in Zelenograd just northwest of Moscow. We were pressing the message that possessing an internationally competitive domestic microelectronics industry is not only a matter of national pride but also of national security. Indeed, no one knows what is contained inside the imported microchips that we integrate into some of our latest weapon systems. To ward off potential dangers from this, Russia must start producing the necessary microchips itself as soon as possible. According to (then) Prime Minister Putin, importing microelectronic elements is admissible only in as much as it enables Russia to acquire the latest technologies. The domestic microelectronics industry should help Russia strengthen its military capability and save military lives.

"Reporting on the progress made toward this goal in April of 2012, Rogozin said that Russia planned to create an analog of the American Government's DARPA (Defense Advanced Research Projects Agency) to develop innovative defense technologies for the Russian military. Ironically, the US had initially established DARPA in 1958 in an effort to catch up with the USSR after its successful satellite launch. In the US, DARPA continues to receive $3 billion in annual funding. Rogozin did not indicate the anticipated level of funding for the Russian DARPA in his announcement.

Finally, just this week, Rogozin stated, "the public communications network and the special purpose communications network at the present time contain a large number of foreign-made electronic components that create the risk of network attacks", and that the solution is "a unified technology spending policy, encouraging the development and production in Russia of modern telecommunications equipment and software, and developing technical regulations and standards for the sustainability of the operation and safe use of telecommunications resources networks. Creating a domestic microelectronics component base is a priority and an issue of presidential attention."

One company that is playing an essential role in the continued development of Russia's microelectronics industry, and one of the two largest Russian companies in this sector, Angstrem, manufactures integrated circuits, and advanced communications systems, including digital radios, used by the Russian military. Earlier this month, the Chairman of Angstrem, Leonid Reiman, reported that investment in Russia's microelectronics industry was growing 30% per year, and was anticipated to reach $6.3 billion by 2015. He emphasized that this investment was not just support from the Russian Government to a strategic industry, but also equity investment from private investors. Reiman also noted that this investment would help to improve working conditions in the Russian microelectronics industry, thereby slowing the outflow of Russian scientists to foreign countries and enhancing Russia's national security in the process.

With all the splashy media coverage about social networking sites or Internet search engines holding IPO's in the US, it would be tempting for Russia's innovation and modernization architects to seek to emulate such high profile successes (as they actually did once with the IPO on NASDAQ of Russian Internet search engine, Yandex). However, it is vital to remember that, although a war can be started with Twitter or Facebook, it can be won only with state-of-the-art military weapons systems incorporating advanced microelectronics of predictable supply, quality, and security. For the sake of its national security, Russia would be wise not to overspend on the new Russian Silicon Valley in Skolkovo, to the detriment of the original Russian Silicon Valley in Zelenograd.

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