Perhaps the most striking difference between the aerospace industrial base in the United States and that in Korea is that in the United States aerospace companies have a strong commercial business base and do not rely solely on the military for business. In fact, the U.S. Department of Defense is not always the customer of first choice; however, there is mutual reinforcement between the commercial and military/defense sectors that is very positive in these companies. Another difference, which Korea is experiencing to some extent, is an extraordinary consolidation of aerospace companies. One should be concerned that, if unchecked, consolidation can lead to monopolistic situations that will affect cost. Furthermore, at least as worrisome is the prospect that competition of ideas will be lost or slowed, hence limiting progress.

Korea needs an aerospace industry that has both strong commercial and military components. The synergy that arises from such a combination has the potential to produce quality products more efficiently and at lower cost. It can also provide stability for the workforce in that it does not depend on the vagaries of either the commercial or military/defense sectors, but can strive to balance the business, and hence the workforce.

There is much rhetoric these days about the “revolution in military affairs.” In fact, the phrase has been used so much that it is essentially a cliché. The label is not what matters. What matters is what problems need to be solved and what technologies can enable solu-
tions to the problems. Whether it is technology evolution or revolution or technology aggregation or technology maturation or whether it is technology development or engineering does not matter. What matters is how to identify and solve the problem best and at a reasonable cost.

The word “revolution” evokes an image of rapid change. In fact, the changes that we point to as revolutionary have really occurred over a fairly long period of time. True breakthroughs occur infrequently. Information technology is an exception—we see major changes in processing speed, memory size, and the like occurring in months, not years. But not all technology is like information technology. For example,

— the transistor was invented over 50 years ago, yet it is the foundation of modern computer technology
— the first object-oriented computer languages were invented three decades ago, and are the foundations for today’s languages
— laser technology investment began 20–30 years ago, and has been applied in laser-guided bombs and the Airborne Laser program
— laser-guided bomb concepts were demonstrated 30 years ago
— the first U.S. satellite was put into orbit over 30 years ago, on the 13th try
— the Global Positioning System (GPS) was born over 25 years ago
— rocket propulsion, inertial guidance, and small-warhead designs that evolved decades ago enabled the ICBM.

The point is that it takes time to develop most technologies and to demonstrate their value as enablers to solve problems. It’s not a clichéd name; it is being able to achieve or enable a military capability not before possible—affordably—and to significantly alter the measure-countermeasure equation in your favor.

There are several key U.S. and U.S. Air Force technology investments that are shaping the U.S. Air Force of the 21st century and that can affect Korea’s military capability. Some of them are:
1. GPS—for targeting precisely using differential methods; for air traffic control—locally and worldwide—making aircraft operations more efficient and safe; for enhancing all-weather, precision-target attack; and for precision timing.

2. Commercial satellite communications (SATCOM)—to fill needs beyond specialized military communications, including bandwidth on demand. It will be driven by commercial industry and provide great opportunities for partnering, but the military users need to make their requirements known early so that a good partnership can develop.

3. Commercial remote sensing/imagery products—to enable lower-cost product development for many applications and reduce infrastructure costs. The products are widely available to both allies and adversaries but must be used with care because images can be altered.

4. Smart munitions—small smart bombs enable performance of large weapons in small sizes, enhancing range/payload characteristics; area weapons (submunitions) can discriminate among vehicle targets and detonate accordingly (Low-Cost Anti-Armor Submunitions [LOCAAS]); standoff weapons can extend range and/or enhance survivability (e.g., Joint Acoustic Surveillance System Model [JASSM]).

5. Airborne laser—a critical element of layered theater missile defense, providing both boost-phase intercept and battle-management information for other layers.

6. Unmanned air vehicles (UAVs)—for intelligence/recce/surveillance (e.g., Predator, Global Hawk). Command and control (C2) and formation control are still developing. UAVs are an important complement/supplement for manned and space-based Intelligence, Surveillance, and Reconnaissance (ISR); communications relay.

7. Space-based systems—primarily communications and sensors today; synthetic aperture radar/ground moving-target indication (SAR/GMTI). Don’t go to space just because it’s there; we must continue to strive to understand protection issues as well as policy and legal issues surrounding denying use to others; continuing R&D is critical to meet performance needs affordably.
8. Manufacturing technology—methods that significantly reduce labor reduce cost; reliable, repeatable manufacturing and interleaving commercial and military parts on the same production lines reduce infrastructure and overhead costs.

9. Distributed training—using simulation and simulators as well as flying can make some training more effective and reduce some costs, but there is a limit; we’re still learning. Training cannot be overemphasized; great equipment without adequate training is a fool’s investment.

It has been said that U.S. military, and particularly U.S. Air Force, technology development and application are proceeding at a pace so rapid that soon our allies will have little or no interoperability with the U.S. military. Clearly there are exceptions to this—most recently in operations in Bosnia and Kosovo, for example. However, if unchecked that could become the case. It is important that we all understand what capabilities and effects are needed to meet the national security demands of our alliances and our own nations. Everyone cannot afford to do everything. The challenge to all of us is to determine where to make our individual and collective investments to enable our individual and collective security. It is particularly important to strive for interoperability in command, control, and communications (C3) for planning and execution.

In any event, we must think of what operational capabilities can be enabled by military (and possibly commercial) systems. The taxonomy of this analysis, often called strategy-to-task, requires a breakdown of the problem into objectives, tasks, and the implied operational capabilities/systems. However, one should take care to not think of things first; rather they should be the product of a strategy-to-task thought process.

What strikes me is the degree to which the ROK is willing to consider the possibility of the U.S. presence in Korea being reduced in the future. No one knows what the future holds, but one must realize that when Korean unification occurs, or as it occurs, all military alliances and presence will be rethought and debated because of regional dynamics—in all dimensions. While it is prudent planning on the
part of the ROK, it is very costly to go it alone. In fact, going it alone could result in unintended instabilities and perceptions of an arms race. A partnership with the United States must continue in whatever form. This partnership should include an understanding of who will do what, when, and how. And, to be prudent, what hedges should exist.

The conditions at the end of the Korean War shaped today’s ROK force structure. This strategy has prevailed for 40 years but is now obsolete. Incrementalism probably won’t buy the necessary preparedness. A comprehensive regional strategy must be developed from which a military force structure emerges—for example, with and without North Korea; with varying numbers and types of U.S. forces; and considering the thousands-of-years-old regional dynamics that have precluded a more-cooperative multilateral alliance and force development opportunities.

The sheer size (population), purchasing power, and economic growth make Asia a region of strategic importance that must be reckoned with by the world. Witness the effect of the recent economic crises in Asia felt around the world. Korea is in a strategic position to be a strong economic partner as well as a political stabilizer.

The United States must undertake true long-range strategic thinking about its role in a region still dominated by dynamics that are thousands of years old and that are not well understood in the West. These old cultures have developed the ingenuity, intellect, and work ethic that have not only resulted in survival over many centuries but also armed the populations with the capabilities needed to propel those regional countries into the 21st century. To be a good partner, the United States must strive always to understand the tensions and find ways to act in the best interest of all.

Finally, we must all be prudent in our decisions; the result will be a strong military capability both offensively and defensively. Both the United States and the Republic of Korea must be mindful of how their actions and words may be perceived by others and what intentions those perceptions may imply.
Remember

— Mistakes are made
— Wars kill
— The price is high.