

DRAFT

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Strategic Outlook for the Decade

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As you know "strategic" is a word which comes from the Greek for "of or pertaining to a general." To open our discussion this evening, this general will offer some personal observations on what may lie ahead of us as passengers on Spaceship Earth, formed as a nation thereon. These may or may not live up to the Greek billing. Of that, you shall be the judge.

Slide 3 - Polar Projection

This depiction of the earth accurately portrays the geo-strategic relationship between the U.S. and its chief antagonist, the USSR. The coloration goes beyond to portray the technologic and economic systems employed by the nations of the world. The bright purple represents those nations which have industrialized with the most advanced technologies under market economics, while the barred green depicts developed countries which have industrialized under centralized planning-- the communist system. The yellow highlights newly industrialized non-communist countries whose technology lags that of the purple nations by a decade or more, but whose potential in population and resources make them prime candidates for joining the purple. Of the latter you can readily see Mexico and Brazil, but I call attention to South Korea, Taiwan, Hong Kong, and Singapore in Asia, not

evident because of relative size.

Slide 4 - Strategic Zones

The red asterisks on this overlay signal countries where armed conflict is underway. These wars threaten U.S. national interests directly or indirectly--as the map suggest, we live in a dangerous world. Militarily, the three zones shown loom large in U.S. strategy: NATO Europe, the Middle East and Northeast Asia. In each of these the US has ~~positioned~~ ~~force~~ deployed forces, and maintains a larger pool of forces in the U.S., prepared to reinforce if necessary. Among the more strategically significant technologies are those which lend our forces enhanced intercontinental mobility.

The differentiations on these maps--I will not discuss the other colors or shadings, but take it from me they are also significant--portray some of the primary strategic issues facing us today. Technology profoundly influences modern military strategy as well military tactics. For example, America's industrial base is being converted from mass production to high-technology short-run manufacturing which depends on very skilled labor and large expenditures in research, from hard-good production to service industries. Fewer and fewer firms participate in Defense production. In the aerospace industry, there are 50 percent fewer firms involved in Defense contracts now compared with 10 years ago. The US is moving out of whole categories of security-relevant economic enterprise--merchant marine, ship building, and large-produce foundries being especially significant. For these purposes we need our allies in Europe and Northeast Asia more than ever. Of course, the US is at the same time acquiring marvelous capabilities in space, in bio-chemistry,

in cybrenetics, and in robotics. Yet we are going to have to find ways to engage our technological strengths and to compensate for our industrial shortfalls. At the same time, in a more direct military sense, we must confront squarely the implications of our inventory of high-cost, high-capability weapon systems. And above all, we must develop leaders who can cope technically and aesthetically with such problems.

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To establish the acuity of my vision of the technological future, allow me to cite a recently published book entitled Augustine's Laws, to which I modestly contributed. On the dust cover, I am quoted as advocating the book be required reading at the nation's defense colleges and business schools-- faculty present take note. Norman R. Augustine, a former Under Secretary of the Army and current President of the Defense Science Board therein provides this projection of trends in Gross National Product, the defense budget, and the unit cost of military aircraft.

Slide 6 - Coolidge's Revenge

Augustine's ninth law states that "In the year 2054 the entire defense budget will purchase just one tactical aircraft. This aircraft will have to be shared by the Air Force and the Navy $3\frac{1}{2}$ days each per week except for leap year, when it will be made available to the Marines on the extra day." Augustine labels this "Calvin Coolidge's Revenge" as a tribute to Presidential prescience, for in January 1928, Coolidge, wrestling with an item in his budget entailing payment of \$25,000 for an entire squadron of aircraft, asked his staff "Why can't we buy just one aircraft and let the aviators take turns flying it?" That President was ahead of his time.

Now behind these somewhat facetious projections there lies sobering reality: from the Wright brothers' first extrapolation of bicycle technology to the B-1 bomber aborning, the cost of aircraft has grown by a factor of four every ten years, and that trend is consistent for military and civil aircraft alike. Military vehicles for less demanding environments, like ships or tanks, seem responsive to similar inflationary pressures, although for them the march of technology has induced only a mere doubling in cost each decade. The consequence predictably responds to elementary economic law: the dearer, the fewer, as these data show:

Slide 7 - Cost-Quantity Tradeoffs

And there is even more alarming evidence that the fewer more costly implements are inherently less reliable.

Slide 8 - Impact of Increasing Cost

These data illustrate that the more an item of electronics equipment costs, the more often it fails in operation. From this sort of information Augustine derives his tenth law, as follows:

"It is very expensive to achieve high degrees of unreliability.
It is not uncommon to increase the cost of an item by a
factor of ten for each factor of ten degradation accomplished."

Or to put it another way, anyone willing to spend enough money to develop and produce an item of avionics can virtually guarantee that it won't work at all.

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Well, ladies and gentlemen, what does all of this portend for strategy? The apportioning of funds for various aircraft, ships, tanks, avionic items, or any other piece of new materiel is a strategic function, performed by the Defense Resources Board. The DRB is the management mechanism presently in use by Secretary of Defense Weinberger for laying out the current fiscal year budget and the program for the four succeeding years. The Defense Resources Board consists of the Secretary, his Deputy, and their principal civilian assistants, plus the Secretaries of the Army, Navy, and Air Force, and the Chairman of the Joint Chiefs of Staff. The Board sits around a long table covered with notebooks documenting issues of resource allocation. Back-benching the Board members are the Chiefs of the Armed Services and yours truly, the Assistant to the Chairman, JCS. Framed on the wall at the foot of the table are these words, attributed to William Thomson, Baron Kelvin, dated 1854:

"Large increases in cost with questionable increases in performance can be tolerated only for race horses and facny women."

What Lord Kelvin knew about either race horses or fancy women I don't know. It was Lord Kelvin who stated categorically that "aircraft flight is impossible," and "x-rays are a hoax." But he seems right enough on public intolerance for inefficient cannon or warships.

Today there assuredly is a media outcry over defense spending for advanced weapon systems. The term-of-art "high technology" is commonly accepted as synonymous with "gold-plating," "over-complicated," or "cost-ineffective," and it is increasingly difficult to obtain Congressional approval for high-technology weapon systems. In fact, we may be witnessing the birth of a neo-Luddite movement. The Luddites, as some of you may know, were organized bands who around 1812 undertook to destroy the textile machinery which was introducing into English society the first manifestations of what we now call the Industrial

Revolution. Luddite motivation, incidentally, included deep discontent with the quality and durability of high-technology ready-to-wear clothing, especially stockings, and so they prized wrecking stocking frames in particular. The neo-Luddites of today are well organized and funded groups who have set out with all the zeal of the mythical Ned Ludd and his followers to wreck new tanks, aircraft and ships--not physically but programatically in the Congress. You may find it as distressing as do I to see or hear so often not only their deframing of the materiel, but also their vilifications of the armed services and the defense establishment.

I do not wish tonight to respond to any neo-Luddite attack on any particular weapon system. Instead, I urge that we try to step back from that sort of argumentation to appraise in general the changes technology has wrought in warfare over recent generations so as to be able better to assess what influence it is likely to exert in the years ahead, on your generation.

Slide 10 - Airpower

Let me start with airpower. During August 1944, as Allied Forces broke out of Normandy, 3000 heavy bombers of the 8th Air Force flew more than 18,000 sorties. Something like 30,000 aircrew members were required for this effort. Today, 800 F-16 fighters, manned by just 800 pilots, could deliver the same tonnage of bombs over comparable distances, but much more accurately. To illustrate the last point, take the Thanh Hoa Bridge in North Vietnam, which up to the spring of 1972 had survived 872 bombing attacks during which 11 aircraft were lost. On 27 April 1972 eight sorties were flown using laser-guided bombs. The bridge was destroyed, and no aircraft were lost. High technology can be very productive in war--as the Syrians and Argentineans found out this year.

Slide 11 - Landpower

Technology has also exerted strong influence on landpower. Your Army is manpower lean: because of more powerful weapons and better mobility, today there are fewer soldiers in the Army for each combat division than at any time since before World War II. And the division of today has ten times the firepower of a World War II division, and is proportionately much more flexible and mobile. To generalize, land forces exist to gain or maintain control over territory; hence, one important measure of force productivity is extent of area controlled. If one goes back to the time of the War Between the States, one would find that an infantry organization proximate in size to the present day battalion--say 600 to 800 men--would be expected to control with its organic and supporting direct fire weapons an area perhaps 20 acres in extent. In World War I a battalion was expected to control some 160 acres, a very substantial increase over its Civil War predecessor, reflecting the prowess of the Springfield Rifle, the Browning Machine Gun, and the very much more formidable indirect fire support available in 1918. In 1945, a battalion on defense, because of yet more firepower, would be expected to control something like 400 acres, perhaps two and a half times the area held by the World War I battalion. But in 1980, in Germany today we expect a battalion to control as much as 18,000 acres--that's 40 or 50 times as much as 1945. Part of this productivity expectation arises from gross increases in firepower--over ten times as much, measured in projectile throw-weight alone--and part from the greatly improved mobility, sensors, and communications available to the modern battalion.

Parenthetically, it is sometimes mistakenly believed that increases in area controlled and firepower such as I have just described occasion greater costs in terms of casualties. In the US Army experience, that has not yet been the case. Our casualties as a percent of combat troops per year were approximately the same in 1864 as they were in 1918, and the numbers for 1918

are very similar to the numbers of 1945, and, indeed, for Vietnam in 1968. Our experience in Korea, incidentally, was somewhat lower than either World War II or Vietnam in 1968.

The reason casualties have not risen proportionate to the increase in firepower is dispersion. As the figures on expansion of the area of control suggest, we have over the years endowed our units with the technological means to operate while spread out, and the very process of spreading out has reduced their vulnerability. In fact, reckoning from the slice of men behind a given frontage, one can demonstrate that we have reduced the density of manpower at risk on the battlefield nearly one-hundredfold since 1918. But we have also thereby multiplied the demand for productive effort from each soldier, and magnified the importance of soldier initiative and energy, and leader skill and adaptability. We expect that man-density on the battlefield will continue to go down. Hence, no matter how elegant the technologies we bring to bear, each soldier and leader in future battle is likely to count for more than ever before toward accomplishing the unit's basic mission; and selection, training, and motivation of soldiers and leaders will weigh the heavier on the scales of battle.

Slide 13 - (case for high tech)

Here are some propositions concerning high technology systems. Implicit in these is the conviction that high technology need lead neither to high complexity nor low reliability. It is important to note that in recent wars nations have been impelled to reach for high technology even if it entails heavy fiscal burdens, because the advantages of a technological edge in battle are enormous.

Slide 14 - Loss ratios

In both of these wars, technology counted. To be sure, in both the quality of fighters among the victors was dominant. But it is instructive to me that neither the British nor the Israelis have allowed their possessing well motivated and practiced servicemen to interfere one iota with their strivings to obtain the finest high technology weapon systems available to equip those men--and that the weapons they prize especially are often American made.

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But if there is in London and in Tel Aviv new understanding that the march of martial technology waits for no nation, such understanding is often lacking in Washington. Technology is moving ahead, and quite dramatic new munitions, surveillance, and battle management means are in the offing. We Americans, all of us, but certainly at least our elected leaders and those who practice in the military profession, must appreciate that even so-called conventional arms can now approach nuclear weapons in lethality. let me show you one weapon system now in development.

Slide 16 (Assault Breaker)

Here you see a long-range, all-weather radar which can seek out groups of vehicles far behind the forward edge of the battle area, providing target

location to a missile, which flies into enemy territory to burst above the target, releasing a horde of small anti-armor missiles, which speed unerringly to strike each vehicle. Our engineers are now talking about sub-munitions fitted with multiple sensors and microprocessors which can find their quarry in total darkness, and do so with an average miss distance approaching zero.

Slide 17 (Counter-air)

Here is a comparable munition, an airfield denial missile, which can fly to long ranges to release a cloud of bomblets which could crater and mine the runways and taxiways of an aerodrome from which air attacks could be launched upon our forces.

Slide 18 (Air Land Battle)

You have heard, I am sure, about "air-land battle." Technology will make new tactics and even new strategies attractive. The operational scheme depicted postulates attack of an aggressor in depth, both from the air and overland.

Taken together, the technological choices facing our defense leaders today are broader than at any time since 1945. The prospect is that they will be even wider in years to come, when you are they. Against that day you must

learn all you can about such technological options, and above all, you must maintain an open mind. You must not succumb to the hubris of Admiral William Leahy who told President Truman that making the atomic bomb was "the biggest fool thing we have ever done...(it) will never go off, and I speak as an expert in explosives." Or exhibit the myopia of Napoleon, who said to Robert Fulton:

"What, Sir, would you make a ship sail against the wind and currents by lighting a bonfire under her deck? I pray you excuse me. I have no time to listen to such nonsense."

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