

5 September 2003

Byron K. Callan
(1) 212 449-1394
Byron_Callan@ml.comRonald J. Epstein
(1) 212 449-4585
R_Epstein@ml.com

Defense & Aerospace

Deficit, Iraq Could Limit Defense Valuation Expansion

Reason for Report: [Review of defense stance](#)

Industry

Highlights:

- We have reduced price objectives on Alliant Techsystems, L-3 Communications, Northrop Grumman and Raytheon, but these stocks are still rated Buy.
- The earnings outlook for each remains solid and each company has issues that we believe can be resolved by performance in coming quarters. Additionally, each stock has lagged the S&P 500 so far in 2003.
- Looking out 12-18 months, however, we believe that valuation expansion may be lower than our prior objectives assumed. The costs of Iraq's reconstruction and military operations against insurgents, changing military threats – particularly conventional ones – and the magnitude of the U.S. federal budget deficit are key issues to watch that could constrain valuation expansion in the defense sector.
- Another issue to watch is whether U.S. defense planning again enters a debate over procurement of a “high-low” mix of weapons systems. This could emerge after the 2004 presidential election.
- It is too soon to determine how potential changes in threat assessments and emphasis on lower-cost systems impact specific companies. Most companies have portfolios that might allow reductions in one area to be offset by increases in others.

Refer to important disclosures on page 20.
Analyst Certification on page 19.

Merrill Lynch Global Securities Research & Economics Group
Global Fundamental Equity Research Department

Investors should assume that Merrill Lynch is seeking or will seek investment banking or other business relationships with the companies in this report.

1. Coasting to a Crossroads

Defense Stocks Have Lagged The Market

The past eight months have generally seen defense stocks we follow underperform broad market indices. This report focuses on companies whose fundamentals mainly rest on U.S. defense spending. Clearly, other companies in our U.S. universe of aerospace/defense coverage address defense markets, but to a lesser extent compared to commercial aerospace of other commercial businesses than those discussed in this report.

Stocks have rebounded from early March lows

Table 1 shows the price performance from the end of 2002 through August 29 and from each stock's low price in 2003. Without exception, the lows were all reached within the eight day period of March 5-12.

Table 1: From End of 2002, Most Defense Stocks Lagged S&P 500

	12/31/02 to 8/29/03	From 2003 Low to 8/29
Alliant Techsystems	-18%	18%
Anteon	36%	60%
General Dynamics	8%	64%
L-3 Communications	14%	42%
Lockheed Martin	-11%	23%
Northrop Grumman	-2%	21%
Raytheon	4%	28%
United Defense	21%	39%
S&P 500	15%	25%

Source: MLPF&S

In our view there are three main reasons that the stocks have lagged:

- Investors believe that an economic recovery is emerging and therefore have been buying stocks of companies whose earnings are more leveraged to this theme.
- U.S. budget deficits have cast a cloud over long-term growth prospects for defense.
- While defense company earnings have lately been in line, or better than expected, it is not clear what catalysts could propel earnings still higher for the overall sector.

Defense has taken a back seat to companies benefiting from economic recovery

Coasting to a Crossroads

Although we have not changed investment opinions, we have elected to reduce price objectives for some of the defense stocks we follow.

- The primary reason for this change is our increasing concern that valuations may not increase in the face of a budget deficit that exceeds 4% of U.S. GDP and because the costs of military operations in Iraq to thwart a growing insurgency could pressure long-range defense spending plans.
- Additionally, a year from now, investors will be considering the post-2004 defense landscape and we suspect that this will include a recognition that another debate over what gets funded, and in what quantity, could emerge.

A year from now, more risks could emerge

We believe that select defense stocks could appreciate in the months to come mainly as a result of our belief that concerns overhanging specific stocks can dissipate. Earnings for 2003 and 2004 could be in line with, or possibly moderately higher than consensus projections. Additionally, geopolitical events

(such as a North Korean nuclear weapons test) could also contribute to higher prices. However, the rate of increase is not as high as our prior objectives.

A year from now, we believe that investors will be looking at a crossroads for the sector. The direction the group takes at this crossroads will be largely determined by Iraq, other military threat assessments, the state of specific defense programs and the magnitude of the budget deficit. We have broken our perspectives down on these issues into three separate sections that follow in this report. These are:

- Iraq, the elections and economic projections
- Changes in military threat assessments
- The impact these issues could have on defense spending trends and on defense stock valuations.

Long Term Issue is Valuation

Currently, there is a wide spread in defense valuations

Defense stocks in our universe are selling at a wide range of free cash flow multiples, using our 2004 estimates. These range from a low of 12X for United Defense, to 23X for Anteon, with most large defense companies clustered at 14X-17X. We have been basing our price objectives on discounted cash flows using equity cost of capital of 8.9%-10.7% and a continuing value of 2008E free cash flow of 20X-18X for defense pure-plays. With equity costs of capital for defense companies we follow, these multiples imply growth rates in perpetuity of 3%-5%.

We are now assuming appropriate multiples could be at 16X-18X, depending on our assessment of each company's prospects. Changes we have made are summarized in Table 2.

Table 2: Changes to Objectives

	Opinion	Symbol	9/4/03 Price	Equity cost of capital	Former CV multiple	Current CV multiple	Price Objective
Alliant Techsystems	B-1-9	ATK	\$51.41	8.9%	20	18	\$68
Anteon	C-2-9	ANT	\$32.80	8.9%	20	18	n.a.
General Dynamics	B-2-7	GD	\$86.99	10.7%	17	no change	n.a.
L-3 Communications	B-1-9	LLL	\$49.29	10.7%	18	17	\$62
Lockheed Martin	B-2-7	LMT	\$51.60	9.5%	18	16	n.a.
Northrop Grumman	C-1-7	NOC	\$95.27	9.5%	18	16	\$122
Raytheon	C-1-7	RTN	\$32.50	10.1%	20	17	\$39
United Defense	C-1-9	UDI	\$29.47	10.7%	18	no change	\$32

Source: MLPF&S

In our view there is not much of a consensus on the dominant valuation metric for defense companies. Some analysts use EV/EBITDA and then adjust this further by adding back non-cash pension expense. Other analysts use P/Es, again adjusting for non-cash pension expense. These P/E's are then compared to a "market" multiple and valuation established in relation to the market multiple.

We have used discounted cash flows, but also believe that free cash flow (cash from operations less capital expenditures) multiples are a good way to compare companies. They capture all non-cash expense (not just FAS 87) and include capital expenditures and taxes, which cannot be ignored as a cost of doing business.

There are two issues before defense investors today.

- How much of a deficit concern do current multiples capture?
- And if deficits do grow larger and pinch off defense budget growth, how much more pressure could there be on defense valuations?

These issues should be reflected in valuation multiples. Any multiple can be interpreted as a shorthand answer for how future cash flows are, or should be discounted. We calculate the relationship between growth and discount rates embedded in free cash flow multiples by simply setting the multiple equal to a growing perpetuity and solving for the growth and discount rates. The calculation is outlined below where M is the free cash flow (FCF) multiple, g is the growth rate and r is the discount rate.

A multiple is a function of growth and discount rates

The free cash flow multiple is given by

$$\text{Price}/\text{FCF} = M \quad (1)$$

Now set the equity value equal to a growing free cash flow perpetuity

$$\text{Price} = M \times \text{FCF} = \frac{\text{FCF} \times (1 + g)}{(r - g)} \quad (2)$$

Solve for the multiple as a function of the growth and discount rates

$$M = \frac{(1 + g)}{(r - g)} \quad (3)$$

Table 3 takes this theory and provides some answers to the questions posed above. It shows:

We are using higher equity costs of capital than finance theory suggests

- The ratio of the current stock price to our 2004 estimated free cash flow estimate (we define free cash flow as GAAP cash from operations less capital expenditures).
- The implied growth rate for each company using three different equity costs of capital – 8%, 10% and 12%. Using the 10-year U.S. treasury note as a bench mark results in a risk free rate of 5.3%. We assume an equity risk premium of 6%. Stocks we follow tend to sell at betas well below 1.00. Bloomberg shows betas of 0.24-0.60 for the companies in Table 3. We believe that some adjustment should be made as future volatility could be less relative to the market than has been the case since 2000 when defense spending surged and technology valuations declined.
- The implied growth rate is a growth rate in perpetuity. This is lower than the low-double digit earnings growth rates that are projected by ourselves and others.

Table 3: Implied Growth Rates on Current FCF Multiples Using Different Discount Rates

	2004E Price/Free Cash Flow	Discount Rates		
		8%	10%	12%
Alliant Techsystems	15.9	2%	3%	5%
Anteon	23.2	4%	5%	7%
General Dynamics	16.1	2%	4%	5%
L-3 Communications	16.7	2%	4%	6%
Lockheed Martin	15.6	1%	3%	5%
Northrop Grumman	12.8	0%	2%	4%
Raytheon	14.0	1%	3%	5%
United Defense	11.9	0%	1%	3%

Source: MLPF&S

But it is probably more reasonable to assume that if defense spending is constrained by GDP and there is not much margin expansion then over a longer term period – say 20 years – long-term growth could revert to a level of GDP.

One obvious conclusion is that there is not a uniform multiple being applied to these stocks. Valuations appear to vary based on perceptions of future growth prospects, quality of earnings and conviction in the ability of management to deliver on earnings or cash flow expectations. Companies have different mixes of businesses and arguably, General Dynamics and Raytheon could see outyear growth enhanced by a pick-up in commercial aerospace.

If investors concluded defense was a no-growth business cash flow multiples could decline to 10X

Now, let's turn the analysis shown in Table 3 around to focus on long term growth rates. In this case, for each different equity cost of capital and growth rate, we have shown the resulting free cash flow multiple. For example, if we assume that investors conclude that long-term growth in the industry could flatten out to zero and an appropriate discount rate was 10%, then we would expect a free cash flow multiple of 10X to be the norm for the sector.

To, us, the data in Table 4 suggests that multiples in the mid-upper teens for defense stocks are appropriate, but that 20X, or more is probably too high given the issues we discuss below.

Table 4: Implied Multiples for Different Growth Rate Assumptions

	0% long-term growth rate			2.5% long-term growth rate			5% long-term growth rate		
	8%	10%	12%	8%	10%	12%	8%	10%	12%
Price cash flow multiple	12.5	10.0	8.3	18.6	13.7	10.8	35.0	21.0	15.0

Source: MLPF&S

2. Iraq, Elections and Deficits

Iraq Is A Critical Variable in the Defense Outlook

We see Iraq as the most important issue for the defense sector. In the coming months, if the insurgency that now appears confined to Sunni-populated portions of Iraq expands and includes Iraqi Shiites, two major risks for most of the defense stocks we cover could loom:

Main Iraq risk is an expanding insurgency against U.S./U.N forces

- The costs of a larger U.S. military presence in Iraq could limit funds that are available for outyear defense modernization plans (post-FY04).
- The immediate demands of counter-insurgency operations could shift funds out of modernization programs addressing longer-term conventional military threats and into programs meeting the current needs of forces in Iraq.

In our view, the stakes in Iraq are too high to contemplate a U.S. withdrawal, similar to the departures from Lebanon or Somalia. A U.S. withdrawal, leaving Iraq in chaos, could destabilize a region that remains critical to the global economy. Iraqi insurgents and other groups opposed to the U.S. also likely recognize that a U.S. victory in Iraq could be a crushing setback to their aspirations.

We thus don't see an easy solution to Iraq and suspect that the situation could get worse, before it gets better. Thus the monthly costs of \$4 billion for operations in Iraq and Afghanistan coupled with additional costs to rebuild Iraq's economic infrastructure could prove to be a larger headwind to defense than we had previously been expecting.

2004 Election Probably a Benign Event for Defense

The coming twelve months will see more news flow on the 2004 elections in the U.S. Traditionally, election years have been good for defense stocks because candidates discuss national security. As the economy is showing signs of improvement, we are assuming that President Bush is re-elected and that the Republicans retain control of the House and Senate.

We don't expect Republicans or Democrats to call for increases in defense, as was case in 2000

Recent opinion polls have generally shown the President to be slightly ahead of Democrats, but most of the polls (CBS News, CNN/USA Today/Gallup, Newsweek) have asked respondents to choose between George Bush or "the Democratic candidate." We probably won't have a good idea of who the leading Democratic Party candidate will be until the spring of 2004.

We doubt that defense spending will be a critical issue in the 2004 election (unless it is folded into a broader debate over Iraq). President Bush and the Democratic candidate will likely both call for strong national security, but we doubt that a repeat of 2000 will occur when both parties called for increases to spending above levels that had been proposed under the final Clinton Administration plan.

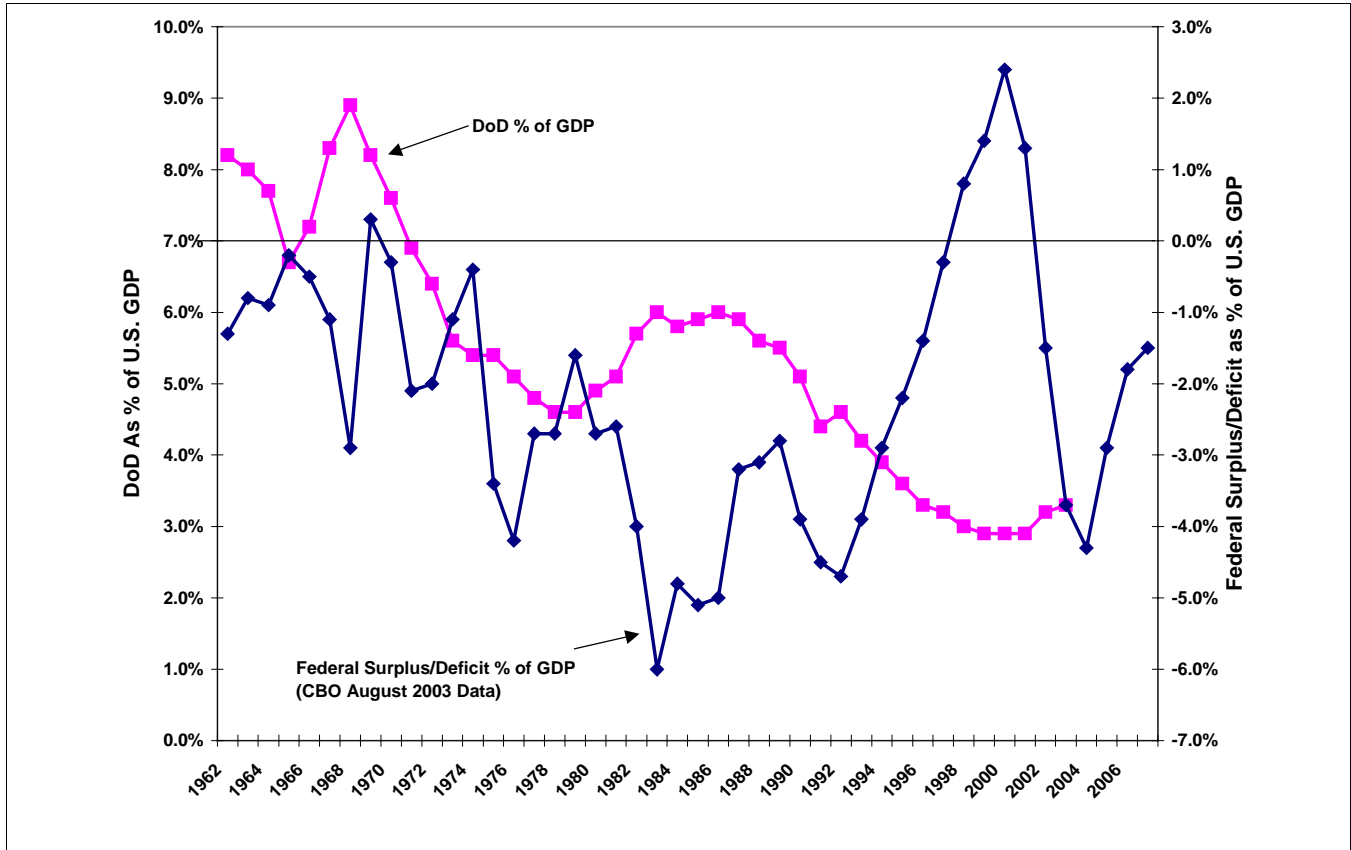
Federal Budget Deficits Raise Questions About Outyear Availability of Incremental Defense Funds

We have believed for several months now that defense stocks are not as counter-cyclical as investors may believe. While these companies may not have much earnings leverage to an improving economy, valuations could be sustained, and possibly enhanced if the federal budget deficit is reduced, relieving pressure on spending and possibly allowing for continued long-term growth.

On July 15, the OMB (Office of Management & Budget) released new projections showing an increase in the magnitude of federal budget deficits to over 4% for FY03 and FY04 (fiscal years 2003 and 2004). And in August the CBO (Congressional Budget Office) released its updated projections.

We have been thinking that federal budget deficits in the range of 2%-4% of GDP are tolerable and would still enable existing defense spending plans to be realized. Both the OMB (Office of Management and Budget) and the CBO (Congressional Budget Office) have released updated budget deficit projections. Exhibit 1 shows U.S. defense spending and federal budget deficits as a percent of GDP from 1962 through estimates to 2007. We have used the CBO projections and the DoD data is taken from the “National Defense Budget Estimates for FY 2004.”

Exhibit 1: Federal Deficits, Surpluses and Defense Spending as A Percentage of GDP



Source: MLPF&S

Budget deficit could limit additional defense modernization funds above current plans

- The exhibit shows three spikes in periods where deficits approached or exceeded levels now being projected by the OMB. The first was in 1967-68 during the Vietnam War, the next was in 1974-75 and the last was in 1984. In 1984 the federal deficit was a record 6.5% of GDP.
- When federal budget deficits exceeded 4%, subsequent periods saw a decline in defense spending as a percentage of GDP. They were also marked by peaks in defense spending.
- CBO’s projections show total Defense outlays increasing 11% in FY04, 4% for FY05 and 2% for FY06 and FY07. For FY08, CBO projects annual defense outlay growth of 3%. These figures are for total defense spending, not just modernization, and also include Department of Energy defense related activities.

We Are Not Expecting A Cut in Defense, But Growth Above Current Plans Could Be More Difficult to Achieve

Current projections show the U.S. spending 3%-4% of GDP on defense over the balance of this decade. Exhibit 1 shows that this is historically low, compared to the post-World War II period, but then the international security environment has changed dramatically since the collapse of the Soviet Union. The U.S. was able to reduce the burden of defense spending during the Cold War as European and Asian economies recovered and allies provided more military force and because the U.S. could negotiate with adversaries to reduce tensions.

A different security environment reduces probability of cuts

The environment we foresee makes additional cuts unlikely.

- There is no central state with which the U.S. can negotiate, regarding terrorist threats or even the insurgency in Iraq.
- Negotiations with North Korea and Iran don't seem to be going anywhere fast.
- There is not a great deal of data on what percentage of GDP superpowers of the past have had to spend on defense. However, in "The Cost of Seapower" Philip Pugh shows data that England spent 2%-5.5% of her GDP on defense in times of peace from 1698-1963.

Additionally, depending on how deficits are reigned in, defense might look relatively more attractive than other parts of the economy. There could be four ways to reign in deficits:

- Cut government spending.
- Inflate prices.
- Raise taxes
- Hope that economic growth results in higher government revenues.

Of these options, the third and fourth could be the most attractive for defense stocks. Eliminating some of the recently enacted tax cuts would not harm defense operations and might make defense earnings relatively more attractive than other sectors of the economy. However, the other options may not be all that appealing.

Although we don't expect an absolute decline in defense spending, we think that incremental growth in modernization program funding will be harder to come by and thus current plans expressed in the FY05-09 plan might be seen as best case.

3. The Threat Dumbbell

Mirror Imaging Not Apparent

Recent developments in Iraq, North Korea and Iran all suggest to us that a dumbbell of military threats should continue emerging. On one end of the dumbbell are the guerrilla-terrorist tactics used by Iraqi opposition groups and Palestinian groups operating against Israel. On the other end are nuclear weapons and missile programs that offer countries such as Iran and North Korea a relatively low-cost way to keep the threat of U.S. intervention at bay.

Nuclear weapons and rocket-propelled grenades define threat spectrum

One of the foundations of a belief in long-term defense spending growth in the U.S. is that it will have to “recapitalize” military equipment, particularly combat aircraft, which were purchased in the 1970s and 1980s. This is a global issue, in our view and currently countries that are perceived as being hostile to U.S. interests face even more daunting challenges in modernizing their conventional military forces.

These countries lack the industrial/technical resources and finances to build conventional capabilities to match those now mastered by the U.S. They don’t have a super-power patron willing to provide this equipment, or the training to operate and support advanced aircraft, air defense systems, armor forces or naval vessels.

This is not a “new” issue, but in our thinking, it has assumed greater importance since the complete defeat of Iraq’s armed forces in the March/April war. Iraq had been weakened by years of embargo and its air defenses had been degraded by U.S. operations conducted months prior to the start of the invasion. Still, its use of conventional military equipment was ineffective.

Israeli defense debate could have parallels in U.S.

We also have been watching the debate in Israel over its defense spending plans with interest, as we see some parallels with a debate that could emerge in the U.S. Israel’s primary threats are suicide bombers and long-range missile strikes and unconventional weapons. Israel is confronting the need to “recapitalize” its conventional arms that were modernized in the aftermath of the October 1973 war. But it is debating change in light of fiscal constraint and recognition that its principal adversary, Syria, has conventional forces that are rusting away.

Two Very Different Sets of Threats

In the 20th century, military conflict was largely defined by war or threat of war between states with advanced industrial and technological capabilities.

The century began with competition between European states that coincided with rearmament using technologies from the industrial revolution (metallurgy, chemistry). Japan demonstrated that its navy could decisively defeat a “Western” power (Russia). Additionally, there was not all that wide a gap between the equipment fielded by conventional armies and unconventional ones – at least at the beginning of the century. A Boer irregular force defeated regular British Army units in the opening battles of the Boer War in 1899, using Mauser rifles, which were better than the Lee-Netfords that equipped British infantry.

One hundred years later, a very different picture exists:

- Advanced industrial/technology states are at peace with one another. No one in France is worried about a German military threat and the U.S. is not planning how it will defeat the Japanese Navy in order to protect the Philippines. The U.S. and Russia may still have ballistic missiles targeted at one another, but there is a degree of cordiality and cooperation today between the two and no worries about defending the Fulda Gap anymore.
- A number of countries still have the ornaments of advanced conventional military capability, in the form of mechanized ground forces and combat

U.S. has emerged as master of conventional warfare

aircraft. But for many poorer countries, these inventories resulted from the largesse of the Soviet Union or the United States during the Cold War. Today, these capabilities are obsolescent, relative to those deployed by the U.S.

- The last thirteen years have demonstrated the futility of attempting to challenge U.S./Western forces on their terms. Iraq’s military was crushed in 1991 and its conventional forces were ineffective in 2003. All that Yugoslavia’s forces could do in Kosovo was take pot-shots at NATO aircraft and make it difficult for air power to take out its ground forces by hiding them or by locating equipment in areas where civilian casualties would be inflicted.

Today, and for the foreseeable future, the U.S. is the dominant military power and it is difficult to imagine how another country could develop, equip and train the forces it has at its disposal. It is also difficult for us to imagine the U.S. military encountering the same surprises that greeted the British Army it encountered the Boers. Hostile forces would need to acquire a range of sensor, communications and air support, not just infantry rifles, in order to defeat U.S. regular forces in conventional battles.

This doesn’t mean that conventional military competition between states has gone away and it doesn’t mean that countries won’t miscalculate their chances for success in conventional battles. India is modernizing its conventional forces, mainly to deal with Pakistan. North Korea possesses a conventional military capability that could still wreck havoc on Seoul. And China is modernizing its conventional military forces, mainly with imported Russian equipment.

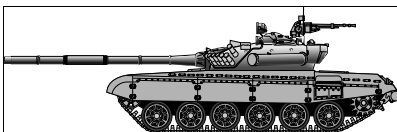
But, with the exception of China, we believe that since adversaries can’t afford to compete in the same game the U.S. and other powers are playing, they have adopted different tactics and capabilities at different ends of the technological spectrum:

- At one level is the sniper, the suicide bomber and terrorist, or the massed militia/mob with Ak-47s and RPGs (rocket propelled grenades), or guerrilla force with light weapons.
- At another level is the pursuit of nuclear weapons and the missiles to deliver these weapons.

Each has been shown to be effective in accomplishing limited ends. Massed militias, guerrilla forces and bombers resulted in withdrawal of U.S. and later Israeli forces from Lebanon and of U.S. forces from Somalia. Nuclear weapons may be one of the main reasons that the U.S. has not pursued regime change in North Korea as vigorously as it did in Iraq.

Arguably, both are cheaper than attempting to replicate Western style military capability. We have seen estimates that South Africa’s nuclear weapons development program cost a total of \$200-\$400 million. This is a fraction of the cost of procuring a squadron of advanced multi-role fighters and training the personnel to operate and support them.

T-72 Still Most Modern Tank Many Nations Possess



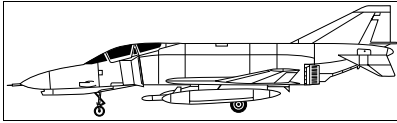
Recapitalization of Military Forces is a Global Issue

One of the tenets of bull cases regarding increased U.S. defense spending prospects is that the U.S. has to “recapitalize” its military power because most of the aircraft, armored vehicles and naval vessels it now deploys were procured in the 1970s and 1980s. These aging systems will need to be replaced (though not on a one-for-one basis) as operating costs increase and effectiveness decreases.

This issue is not confined to the U.S. Many countries face more daunting modernization challenges because there is no military supplier willing to provide advanced systems at below market prices (and a number of countries couldn’t afford these even if they did), and because of the cost and complexity of many

current products. For example, according to the IISS's "The Military Balance, 2002-03," Iran has an air force of 306 combat aircraft. It notes that "serviceability probably about 60% for US ac types and about 80% for PRC/Russian ac". Iran's air force has 65 F-4Ds (a type retired by the U.S. in the 1980s) and 60 F-5E/Fs, which is based on a 1960s design. Iran also has 25 F-14s, whose effectiveness has to be questioned given that the Iran was the only international customer for this type (they were purchased in the 1970s by the Shah). Iran retained some of the Iraqi aircraft that were flown over in 1991 and it has some Chinese F-7s (based on the MiG-21) and 25 modern MiG-29s.

F-4s Still Used By Iran



Source:

Military effectiveness of conventional forces these days can no longer be thought of in terms of how many modern tanks, or fighter aircraft or naval vessels are available, but increasingly how a military gathers and shares information. So, it is not enough for a country to simply buy modern multi-role fighters. They should also have airborne surveillance aircraft, an integrated air defense system with surface-to-air missiles capable of detecting and destroying low observable aircraft and missiles and a robust, secure communications network if they expect their aircraft to be effective against the U.S. or other similarly-equipped powers. The same is true for armored vehicles, which are so much junk if there is not some sort of air defense system to protect them from aircraft and helicopters equipped with precision guided weapons.

A Range of Issues Affect Ability to Replace Aging Conventional Military Equipment

Countries with developing economies and no or limited indigenous defense industrial capability face a daunting set of challenges in effectively replacing aging conventional military equipment. These include:

Absence of lower cost advanced weapons for export

The costs of advanced weapons systems built in Europe and the U.S. have risen significantly and there are not many products now offered that are tailored to the needs of the developing world. In the 1960s, for example, Northrop sold a low cost jet (the F-5 "Freedom Fighter") to a number of countries with developing economies that could not afford more advanced fighters.

While this is true of Western-built equipment, 1990s-vintage MiG-29 and Su-27 aircraft have been sold by countries of the former Soviet Union to states such as Yemen, Ethiopia, Vietnam and Peru. Venezuela is reported to be considering MiG-29s too. However, these aircraft may be in questionable condition and Soviet/Russian design philosophy did not place a lot of emphasis on after-market support of weapons.

More limited availability of decent used Western equipment

During the Cold War both the Soviet Union and the U.S. made relative modern military equipment available to their allies that might still have years of useful life, but which was being replaced by newer designs. Table 1 shows Pakistan as an example. Pakistan emerged as a key U.S. ally in the Cold War. Its air force benefited from the phase out of the F-86 and F-104 from active U.S. Air Force units. These aircraft types had only been introduced several years earlier. The U.S. embargoed military sales to Pakistan following a 1965 war with India, but the Soviet invasion of Afghanistan rekindled U.S. interest in Pakistan as an ally. The result was a sale of F-16s.

Developing nations may not be able to afford new Western weapons

Table 5: Pakistan's Air Force Benefited From U.S. Willingness to Transfer or Sell Advanced Jets

Aircraft Type	First Year of Service		Comment
	U.S. Air Force	Pakistan	
F-86	1950	1956	+5,500 were built, production completed 1956 in U.S., 1961 in Japan
F-104	1957	1961	Approx. 400 were built, production completed in 1959 in U.S., 1963 in Canada
F-16	1978	1983	4,092 were built, still in production

Source: MLPF&S

There are changes now underway which make availability of effective recently used front-line conventional weapons less likely:

- The pace of technological change in major weapons systems, particularly combat aircraft, has slowed.
- The U.S. Europe and Russia are going to be holding onto older aircraft types for a far longer period of time because of the costs of developing and introducing new jets.
- These platforms were designed in pre-network centric warfare eras. Older equipment cascaded down to countries may be far less compatible with newer systems and networks, barring extensive upgrades.

When equipment is available, it is in far smaller quantities than seen in the Cold War. Currently, this is mainly limited to F-16As that the U.S. is offering to some countries.

Internal security concerns

A number of countries have greater security concerns within their borders than on their borders. Saudi Arabia, for example, has shifted emphasis of its security on social spending at the expense of continued purchases of advanced military systems.

Emaciated state of Russian defense industry, limited capabilities of China's industry

Russia's defense industry is heavily dependent on exports of equipment to China and India. We see lots of artists' conceptions of new Russian equipment, but financial resources for new projects remain scarce. Russia is now attempting to consolidate its aerospace and defense industries, but this is meeting internal opposition.

China is now viewed as the one country most likely to emerge as a long-term peer conventional military competitor to the U.S. The annual DoD report on China's defense (which was released on July 28) highlighted this contention. Clearly, as China's economic, technical and industrial capabilities develop, so too could its expertise in conventional weapons. However, it still relies mainly on Russia for advanced weapons systems (Su-27 aircraft and naval vessels). Its defense industry has not developed any conventional weapons systems that could be considered world class in quality or capability.

What Would Change Our View

We recognize that emerging conventional military competitors typically don't attempt to match all the capability of the dominant military power. Rather they may attempt to build a force that can defeat that portion of the superpower's force that operates in their neighborhood.

For example, in 1890s, the U.S. Navy began to produce war plans. One of the first contemplated a war with Britain in which a small number of U.S. naval vessels would engage in commerce raiding. Protected battle fleets in Narragansett Bay, Puget Sound and Lake Ontario would aggressively attack Royal Navy ships

History suggests growing economic powers can also pursue conventional force expansion

operating off the U.S. coast, weakening England's strategic position in Europe ("American War Plans; 1890-1939," by Steven T. Ross).

Also in the 1890s, Japan commenced a naval expansion program on the assumptions that it needed a 50% more battleships than a combination of a force sent either by Britain or Russia, combined with Germany or France.

In neither case did the emerging power pursue an entirely different approach to warfare than that of the superpower of the day. Both sought to gain regional advantage, using leading weapons systems of the day so that they could defeat the superpower's forces and thereby threaten the larger strategic calculus of the superpower.

Regional military powers could still more aggressively pursue conventional force modernization plans that aim to defeat a portion of U.S. conventional forces. Arguably, this is what Iran and China have been attempting to do. But neither has yet been able to design, develop and build their own advanced weapons. China could well be in a position to do so, however, and if signs emerged that China was more aggressively pursuing a conventional military modernization program, our notion of a threat dumbbell would become less relevant.

4. Implications For the Defense Sector

The Broad Themes in U.S. Defense Spending

The Bush Administration came into office with a broad notion that it was going to transform the nation’s military. Prior to September 11, 2001, we believe that the long-term focus on transformation was on creating a military that could more effectively deal with military threats in Asia, particularly China. With this threat in mind, emphasis was placed on ballistic missile defense, naval modernization and air power. Ground forces were seen as having a limited role in these contingencies and speculation would rise from time to time that the Army would be cut by two divisions.

September 11 changed this focus because the focus of defense planners shifted from the long-range potential threat posed by China to the more immediate problems of terrorism. The military campaigns in Afghanistan and Iraq were conducted swiftly, with the decisive defeat and collapse of enemy forces. However, the U.S. has had to subsequently commit ground forces to attempt to maintain order and to foster the building of new governments and societies in these countries.

- Maintenance of global military dominance. We have heard senior U.S. defense leadership speak of winning wars by scores of 72-0, not 21-19.
- Technology is seen as a key strength. Technology can be used to hasten military operations in the face of adversaries, to reduce manpower needs and to reduce damage to civilians in wartime. The U.S. enjoys global leadership in aerospace technologies, which have been decisive in the conventional wars of the 1990s and 2000s.
- Speed of global deployment is increasingly desirable. This speed could keep adversaries off balance by not allowing them to consolidate or protect gains, should they launch an attack first.
- Defense needs should be defined on the basis on capabilities, not on specific threat assessments. So, instead of defining defense needs on the ability to defeat North Korea in a four week war, needs are to be defined in terms of the capability to defeat a medium sized regional power with a theoretical set of strengths and weaknesses in a limited time period.
- The network is more important than individual platforms. Sharing information enables faster response.
- U.S. forces must be capable of responding to a complete spectrum of threats.
- The U.S. needs to be able to pre-empt military threats.

Changes Could Emerge

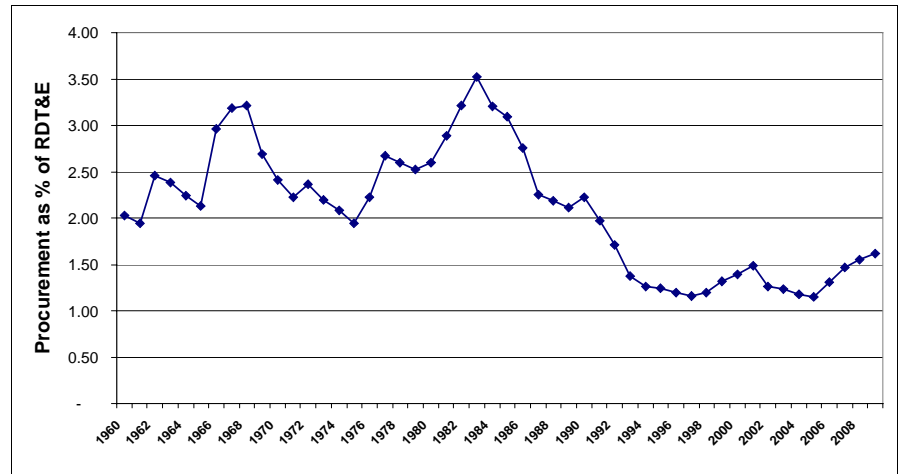
Some elements of U.S. defense modernization over the balance of this decade could prove enduring, including missile defense, intelligence, introduction of common defense communication/information architecture, precision-guided weapons and strategic mobility.

However, we increasingly believe that deficits, changing military threat assessments, and the fact that major modernization programs don’t enter production until late this decade could result in a much more radical review of U.S. modernization plans after the 2004 elections. Exhibit 2 shows that, in historic terms, the balance of this decade will still see Procurement budget authority remain at a historically low ratio, compared with RDT&E (research development test and evaluation). In the defense modernization cycles of the 1960s and early 1980s, Procurement was more than 3X the level of RDT&E. This implies that there is still a Procurement “bow wave” of spending beyond the

Focus of change could be in platforms, not on technology infrastructure

horizon of current DoD plans. Procurement spending should increase, in order to buy F-35s, deploy a missile defense system, buy DD(X)s and other naval vessels and deploy the Future Combat System, V-22 and Comanche helicopter.

Exhibit 2: Procurement Bow Wave Just Beyond Current Planning Horizon



Source: DFI, U.S. Department of Defense

This may not happen and it could be more apparent with the FY06 or FY07 DoD budget submission.

A range of options could be pursued

■ **Force size could be reduced or altered in order to preserve core modernization programs**

An analogy here is the behavior of U.S. airlines since 2001. They have aggressively shed their oldest aircraft types, in order to reduce operating costs. Were this path taken, it would not be good for companies reliant on upgrades and spare parts sales of older aircraft, naval vessel and armored vehicle types. This path is more likely if the U.S. can crush the emerging insurgency in Iraq and reduce its commitment.

■ **Force mix could change and ground force could possibly expand**

If Iraq consumes a larger U.S. force, then there will be real pressure to increase the size of the Army. Currently, the Secretary of Defense and senior military leaders are arguing that no additional ground forces are needed. This could change, particularly if Shiite-populated parts of Iraq see attacks against U.S. forces.

There are no simple solutions for the U.S. to pursue. Expanding the Army by two divisions (about 30,000 people) may sound easy, but a typical Army recruiter needs to contact 120 individuals for each one recruited. Additionally, if it is expanded, the focus is not going to be on creating heavy divisions with armor, but rather on light mobile units best suited for counter-insurgency.

The industry may argue that it can provide technology to offset demand for personnel and/or that the DoD should outsource more to the private sector. We are skeptical that defense technologies could replace dismounted infantry in combating insurgents. Outsourcing of support functions to industry (such as maintenance of equipment) might be one way to free up personnel, but would also entail extensive change in maintenance practices and could place civilians in combat zones.

■ **There could be another major debate on “high-low” mix of weapons systems**

In the 1970s and early 1980s, there was a debate regarding U.S. defense modernization regarding the appropriate mix of weapons systems. At that time, defense planners were grappling with how to counter Soviet quantitative advantages that were being leavened with better quality weapons, while at the same time working within budget constraints.

The notion of “high-low” is that the DoD could be small quantities of “high” cost weapons systems, but then complement these with greater quantities of lower cost, less capable ones. For the Air Force, this debate focused on the number of F-15s to be purchased and resulted in the development of the F-16. One article in our files from 1985 recommends buying Northrop F-20s to complement Advanced Tactical Fighters (now called the F-22). In the Navy, it resulted in procurement of the FFG-7 *Oliver Perry* class of frigates.

An issue surrounding “high low” mix debates in the 1970s and 1980s, however, was that against a peer military competitors, the “low” portion of the mix might not do that well. Additionally, cost savings could be limited as platforms would be manned.

We could see another “high-low” debate emerge after the Presidential election in 2004. This time, however, technology and changes in military threats might put more teeth in the debate. Advances in materials and information/computing technology have enabled reductions in ship crew sizes and demonstrations are progressing of unmanned combat air vehicles. As conventional military capability of some adversaries could wane, it might entail that these low-cost approaches are more survivable and capable in military conflicts.

5. Investment Implications

Defense primes focusing on defense

What the U.S. Industry Seems to Believe

Major U.S. defense companies appear to believe that growth in defense spending is sustainable and the commercial businesses are not as attractive:

- Lockheed Martin recently swapped its commercial IT business for ACS' federal government technical services operations.
- General Dynamics purchased Veridian at a premium valuation. This further dilutes the impact of Gulfstream on its earnings.
- Northrop Grumman has curtailed efforts at TRW operations to develop commercial technology businesses.

A widely-held view is that defense companies can't compete in commercial markets because they work on much slower development cycles, don't have markets for distribution and are used to building high performance products, when commercial customers may demand something less complex. This view has been reinforced by the persistent problems U.S. naval shipyards have on far simpler commercial ship designs, Lockheed Martin's efforts to expand into commercial telecommunications and Raytheon's wind-down of discontinued operations.

But, there are examples of companies successfully operating in both markets. Rockwell Collins has thrived in avionics and Boeing has not abandoned commercial aerospace for defense. We suspect that well-managed commercial businesses could be viewed as an asset, not a liability in the coming years.

Degree to Which Companies Can Adopt to Defense Change Varies

Large defense companies appear to have some hedges in hand to deal with the possibility that lower cost systems are pursued at the expense of higher cost ones. However, depending on which course emerges after the 2004 election, we could see changes in expectations for growth rates at firms. In the context of the three changes we noted above, we see the following investment implications:

■ Reduction in force size – focus on preserving new weapons programs

From a conceptual standpoint, this change would negatively impact companies relying in upgrades of older weapons systems that could be mustered out of service. So, for example, Northrop Grumman and Raytheon upgrades of radars on F-16s and F-15s might decline. A smaller sized Navy could impact repair and overhaul work at United Defense and Northrop Grumman and engineering work done by General Dynamics on older vehicles and ships could also decline.

These negatives could be offset by production of the F-35, Future Combat System and naval vessels, including the DD(X) and *Virginia*-class submarines. Missile defense suppliers would also far well.

■ Changes in force size and mix

Based on this path, we would expect to see reductions in tactical combat aircraft programs. The total buy on the F-22 might fall below 200 and the F-35 buy could be slashed. Tactical aircraft programs might be seen as less relevant to dealing with adversaries who pursue defense policies at either end of the threat dumbbell we discussed. We also believe that Navy ship construction might falter – at least to the degree that a 300-ship goal is altered. These trends could negatively impact Lockheed Martin and Northrop Grumman and, to a lesser extent General Dynamics.

Expansion of the Army (possibly the Marine Corps?) could conceivably benefit Alliant Techsystems through provision of ammunition, munitions and light infantry weapons. As for the vehicles that these units operate, this could depend on the status of the Future Combat System. General Dynamics might see increased sales of its Stryker family of vehicles and it also provides munitions. If force expansion is pursued more aggressively, then United Defense might see more upgrade money for Bradley IFVs.

■ High-Low mix

There are two major contenders for “Low” mix status.

- In naval vessels, the Littoral Combat Ship program is an obvious candidate. General Dynamics, Lockheed Martin and Raytheon-led teams are competing in 2005. If DD(X) only remains a demonstration program, then Northrop Grumman could lag whoever wins LCS. Raytheon is also teamed with Northrop Grumman on DD(X).
- UCAV programs are still in early stages of development. Boeing and Northrop Grumman appear to have done the most work in this area.

Supplemental Disclosure

■ Alliant Techsystems

We believe that continued execution, resumption of Shuttle flights and program wins in precision weapons markets could result in a higher valuation. Our price objective of \$68 is based on a discounted cash flow, using a continuing value multiple of 18X free cash flow and a discount rate of 8.9%. Risks to our forecast include execution on defense programs, the possibility of another Shuttle loss and risk that outyear defense plans are curtailed as a result of government budget deficits.

■ L-3 Communications

Our price objective is based on discounted free cash flow, using a 10.3% discount rate and a continuing value multiple of 17X. The company should be able to maintain 8% internal sales growth from defense and commercial programs and add earnings from acquisitions. Risks to achieving our price objective include defense budget growth rates, program execution and the ability to integrate acquisitions

■ Northrop Grumman

Our price objective is based on a discounted cash flow analysis using a continuing value 17X and an equity cost of capital of 9.4%. Integration concerns have been overblown and cash flow should improve from growth in defense programs and wind-down of acquisition-related outflows. On price-to-free cash flow, using 2004E, company sells at discount to most others in sector. Risks include defense program performance and that government budget deficits could crimp outyear growth prospects

■ Raytheon

Our price objective is based on a discounted cash flow analysis using a continuing value of 17X and an equity cost of capital of 10.1%. Execution concerns could abate now that e&c projects have been completed and we believe Network Centric problems were limited in scope. We are not expecting an improvement in Aircraft in 2003, but certification of Horizon in 2004 could help build visibility of this product. Risks include defense program performance, ability of Raytheon to sustain defense margins. Aircraft demand could be lower than we estimate.

■ United Defense

Our price objective is based on a discounted cash flow analysis using a continuing value of 18X and a discount rate of 10.7%. Upside rests mainly on Army modernization programs and naval ship repair demand. Risks include inability of the company to eventually replace Bradley upgrade work, defense program execution and overall funding for defense projects.

Analyst Certification

I, Byron Callan, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

Important Disclosures

Investment Rating Distribution: Aerospace/Defense Electronics Group (as of 30 June 2003)					
Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	16	64.00%	Buy	6	37.50%
Neutral	8	32.00%	Neutral	5	62.50%
Sell	1	4.00%	Sell	0	0.00%
Investment Rating Distribution: Global Group (as of 30 June 2003)					
Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	884	38.20%	Buy	314	35.52%
Neutral	1229	53.11%	Neutral	335	27.26%
Sell	201	8.69%	Sell	42	20.90%

* Companies in respect of which MLPF&S or an affiliate has received compensation for investment banking services within the past 12 months.

OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium, and C - High. **INVESTMENT RATINGS**, indicators of expected total return (price appreciation plus yield) within the 12-month period from the date of the initial rating, are: 1 - Buy (10% or more for Low and Medium Volatility Risk Securities - 20% or more for High Volatility Risk securities); 2 - Neutral (0-10% for Low and Medium Volatility Risk securities - 0-20% for High Volatility Risk securities); 3 - Sell (negative return); and 6 - No Rating. **INCOME RATINGS**, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure); 8 - same/lower (dividend not considered to be secure); and 9 - pays no cash dividend.

Price charts for the equity securities referenced in this research report are available at <http://www.ml.com/research/pricecharts.asp>, or call 1-888-ML-CHART to have them mailed.

[Alliant Tech, Anteon, General Dynamics, L-3 Comm, Lockheed Martin, Northrop Grumman, Raytheon Co., United Defense] MLPF&S or one or more of its affiliates acts as a market maker for the recommended securities to the extent that MLPF&S or such affiliate is willing to buy and sell such securities for its own account on a regular and continuous basis.

[General Dynamics, United Defense] MLPF&S or an affiliate was a manager of a public offering of securities of this company within the last 12 months.

[General Dynamics, L-3 Comm, Northrop Grumman, United Defense] Additional information pursuant to Section 34b of the German Securities Trading Act: Merrill Lynch and/or its affiliates was an underwriter in an offering of securities of the issuer in the last five years.

[Northrop Grumman] An officer, director or employee of MLPF&S or one of its affiliates is an officer or director of this company.

[Anteon, General Dynamics, L-3 Comm, United Defense] MLPF&S or an affiliate has received compensation for investment banking services from this company within the past 12 months.

[Alliant Tech, Anteon, General Dynamics, L-3 Comm, Lockheed Martin, Northrop Grumman, Raytheon Co., United Defense] MLPF&S or an affiliate expects to receive or intends to seek compensation for investment banking services from this company within the next three months.

[General Dynamics, L-3 Comm, Raytheon Co.] MLPF&S together with its affiliates beneficially owns one percent or more of the common stock of this company calculated in accordance with Section 13(d) of the Securities Exchange Act of 1934.

The analyst(s) responsible for covering the securities in this report receive compensation based upon, among other factors, the overall profitability of Merrill Lynch, including profits derived from investment banking revenues.

Copyright 2003 Merrill Lynch, Pierce, Fenner & Smith Incorporated (MLPF&S). All rights reserved. Any unauthorized use or disclosure is prohibited. This report has been prepared and issued by MLPF&S and/or one of its affiliates and has been approved for publication in the United Kingdom by Merrill Lynch, Pierce, Fenner & Smith Limited, which is regulated by the FSA; has been considered and distributed in Australia by Merrill Lynch Equities (Australia) Limited (ACN 006 276 795), a licensed securities dealer under the Australian Corporations Law; is distributed in Hong Kong by Merrill Lynch (Asia Pacific) Ltd, which is regulated by the Hong Kong SFC; and is distributed in Singapore by Merrill Lynch International Bank Ltd (Merchant Bank) and Merrill Lynch (Singapore) Pte Ltd, which are regulated by the Monetary Authority of Singapore. The information herein was obtained from various sources; we do not guarantee its accuracy or completeness. Additional information available.

Neither the information nor any opinion expressed constitutes an offer, or an invitation to make an offer, to buy or sell any securities or any options, futures or other derivatives related to such securities ("related investments"). MLPF&S, its affiliates, directors, officers, employees and employee benefit programs may have a long or short position in any securities of this issuer(s) or in related investments. MLPF&S or its affiliates may from time to time perform investment banking or other services for, or solicit investment banking or other business from, any entity mentioned in this report.

This research report is prepared for general circulation and is circulated for general information only. It does not have regard to the specific investment objectives, financial situation and the particular needs of any specific person who may receive this report. Investors should seek financial advice regarding the appropriateness of investing in any securities or investment strategies discussed or recommended in this report and should understand that statements regarding future prospects may not be realized. Investors should note that income from such securities, if any, may fluctuate and that each security's price or value may rise or fall. Accordingly, investors may receive back less than originally invested. Past performance is not necessarily a guide to future performance.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or related investment mentioned in this report. In addition, investors in securities such as ADRs, whose values are influenced by the currency of the underlying security, effectively assume currency risk.