



THE ARAB-ISRAELI MILITARY BALANCE

Conventional Realities and Asymmetric Challenges

Anthony H. Cordesman
Arleigh A. Burke Chair in Strategy
And Aram Nerguizian

acordesman@gmail.com

Revised June 29, 2010

Please note that this document is a working draft and will be revised regularly. To comment, or to provide suggestions and corrections, please email the authors at acordesman@gmail.com and anerguizian@csis.org.

Introduction

The Arab-Israeli military balance has steadily evolved in recent years to put more and more emphasis on irregular or asymmetric warfare, and the use of military force for political and ideological leverage – both inside the countries involved and in dealing with their neighbors. Most of this focus is driven by the steady strengthening of Hezbollah, and Hamas in Gaza, but it also includes a nascent nuclear arms race between Israel and Iran in which Israel seems to be strengthening both its long-range nuclear and conventional attack capabilities and is clearly strengthening its missile defense capabilities.

At the same time, the conventional arms race has continued to narrow down to two countries. While Egyptian, Jordanian and Lebanese military development should not be ignored, the overall balance continues to center on evolving Israeli-Syrian confrontation and brinksmanship in the region.

These shifts do not mean the conventional balance has lost its importance. The fact that Israel is at peace with Egypt and Jordan, and has a significant conventional superiority over Syria, has both been a major factor in stabilizing the peace process and deterring conventional clashes and wars. Yet, it also means that the regional military balance must increasingly be assessed in new ways, and kept in careful perspective.

The conventional Arab-Israeli balance includes traditional mixes of ground, air and naval power predicated on national defense planning and acquisition strategies supported by national funds, foreign military assistance or both. Accordingly, the conventional military balance provides a snapshot of baseline national capabilities and the force disposition of military power in the region. As the analysis will show, only Israel has been able to effectively plan, budget, procure and recapitalize its forces in order to compete in the regional balance over the 2000-2010 period.

This same conventional superiority, however, has been a key reason why other states and non-state actors now increasingly develop their asymmetric and unconventional capabilities to challenge the conventional balance, and to seek to use force and military power in ways that will allow them to avoid or limit conventional combat. These developments range from low-level threats like kidnapping and locally made rockets to the development of tactical and ballistic missile capabilities, the pursuit of weapons of mass destruction (WMD), and creating highly trained and well-armed sub-national military organizations like Hezbollah.

These developments have allowed countries with limited national resources and foreign support - such as Syria - to minimize if not counteract some impacts of the conventional balance. They have allowed nations previously outside the Arab-Israeli balance, such as Iran, to use advisors and weapons shipments to pose an indirect threat to Israel, while also moving towards a far more significant nuclear and missile threat. This, in turn, makes Egyptian and Jordanian stability and commitments to their peace treaties steadily more important, while increasing the potential impact on the regional balance of “wild cards,” like Russian arms sales, and a shift in Turkish alignments away from Israel and towards the Arab world.

Table of Contents

INTRODUCTION	2
THE CONVENTIONAL MILITARY BALANCE	4
Figure 1: Israeli versus Syrian Operational Force Strength as of 2010	5
Figure 2: Syrian-Israeli Arms Agreements and Deliveries: 2001-2008	6
COMPARATIVE MANPOWER QUANTITY AND QUALITY	7
Figure 3: Total Arab-Israeli Active Military Manpower: 1973-2010	7
Figure 4: Arab Active versus Israeli Mobilized Army Manpower: 1973-2010	8
ARMOR AND ANTITANK WEAPONS	10
Figure 5: Arab-Israeli Armored Forces in 2010	11
Figure 6: Israel versus Egypt, Jordan, Lebanon and Syria: Tanks by Type 2010	12
Figure 7: Arab-Israeli Other Armored Fighting Vehicles (Light Tanks, OAFVs, APCs, Scouts, and Reconnaissance Vehicles): 1973-2010	14
Figure 8: Israel versus Egypt, Jordan, Lebanon and Syria: "True AFVs" 2010	15
Figure 9: Arab-Israeli Anti-Armor Systems in 2010	16
ARTILLERY WEAPONS	17
Figure 10: Arab-Israeli Artillery Forces by Category of Weapon in 2010	18
Figure 11: Israel versus Egypt, Jordan, Lebanon and Syria: High Performance Artillery in 2010	19
Figure 12: Arab-Israeli Self-Propelled Artillery by Caliber in 2010	20
Figure 13: Arab-Israeli Multiple Rocket Launchers by Caliber in 2010	21
AIR FORCE AIRCRAFT, WEAPONS, AND TECHNOLOGY	22
Figure 14: Trends in Total Arab-Israeli Combat Aircraft: 1973-2010	23
Figure 15: High-Quality Operational Arab-Israeli Combat Aircraft in 2010	24
Figure 16: Unarmed Fixed and Rotary-Wing RECCE, Electronic Warfare, and Intelligence Aircraft in 2010	25
Figure 17: Operational Arab-Israeli Attack and Armed Helicopters in 2010	26
COMPARATIVE LAND-BASED AIR DEFENSE FORCES	27
Figure 18: Arab-Israeli Land-Based Air Defense Systems in 2010	28
COMPARATIVE NAVAL STRENGTH	30
Figure 19: Arab-Israeli Major Combat Ships by Category in 2010	30
COMPARATIVE TRENDS IN MILITARY EXPENDITURES	31
Figure 20: Arab-Israeli Military Expenditures by Country: 1997-2009	32
Figure 21: Trend in Percent of GNP Spent on Military Forces: 1983-2009: Half the Burden of the Early 1980s	33
COMPARATIVE ARMS IMPORTS	34
Figure 22: Arab-Israeli New Arms Agreements and Deliveries by Country: 1997-2008	35
Figure 23: Arab-Israeli Arms Orders by Supplier Country: 1997-2008	36
Figure 24: Actual and Projected US Military Assistance to	39
Arab-Israeli States from 2000 to 2011	39
Figure 25: Select U.S. Foreign Military Sales Congressional Notifications for Egypt, Jordan and Israel 2005-2010	40
THE ASYMMETRIC BALANCE & REGIONAL WILD CARDS	43
LOW-LEVEL AND IRREGULAR WARFARE	44
Figure 26: UNIFIL Deployment: February 2010	44
ROCKETS AND MISSILES	45
Figure 27: The Israeli Security Barrier in July 2009	46
Figure 28: The Gaza Strip	47
Figure 29: Arab-Israeli Surface-to-Surface Missiles in 2010	49
PROXY WARFARE	50
WEAPONS OF MASS DESTRUCTION, LONGER-RANGE MISSILES, AND A NUCLEAR ARMS RACE	51

The Conventional Military Balance

Long term patterns of regional expenditures, weapons deliveries and recapitalization initiatives play a key role in forming the conventional balance. The conventional balance is time and resource intensive, and this means that nations can only make critical changes in the strengths and weaknesses of their forces over time and through careful planning, adequate resources, and well-managed force development. As the following analysis shows, this has given Israel a major advantage. It has had the combination of national expenditures, massive external funding, national industrial capacity and effective strategy and force planning that has enabled it to attain and sustain a clear “edge” in the regional conventional balance in spite of its size and limited manpower.

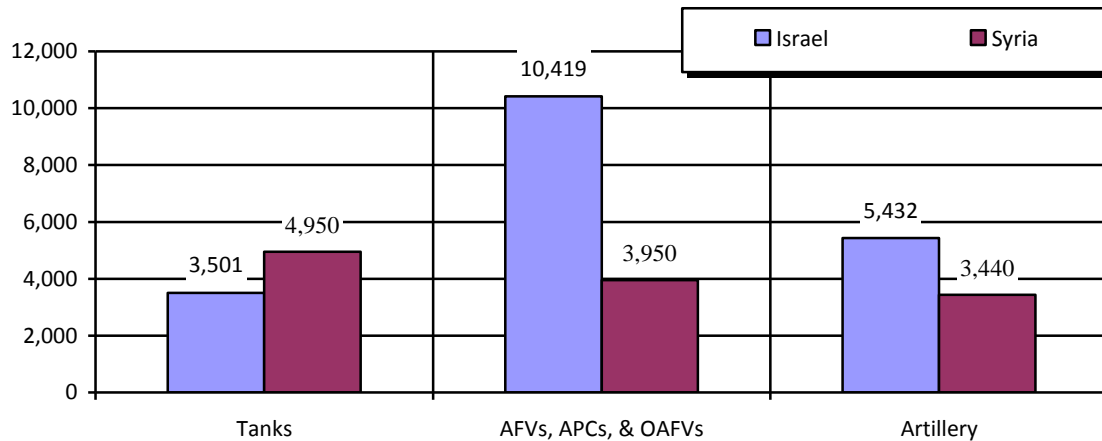
There are significant uncertainties in the force counts of Arab and Israeli forces available from unclassified sources. Any assessment of the Israel-Syrian military balance in particular must also address the fact that strength measured in force numbers can be very different from strength measured in terms of force quality. Force size has only limited meaning as a measure of military capability or merit, unless it can be related to force quality. Leadership, the ability to conduct joint and combined operations, morale, and the ability to sustain complex cycles of rapid maneuver warfare are just a few of the aspects of force quality that can overcome superiority in force quantity.

It is possible to quantify some key measures of this balance, but such analysis has to be carefully structured to be more revealing than misleading, and constantly kept in context. This is illustrated by some of the key numbers in the balance between Israeli and Syrian forces – the forces most likely to shape the key conventional war fighting options in the region.

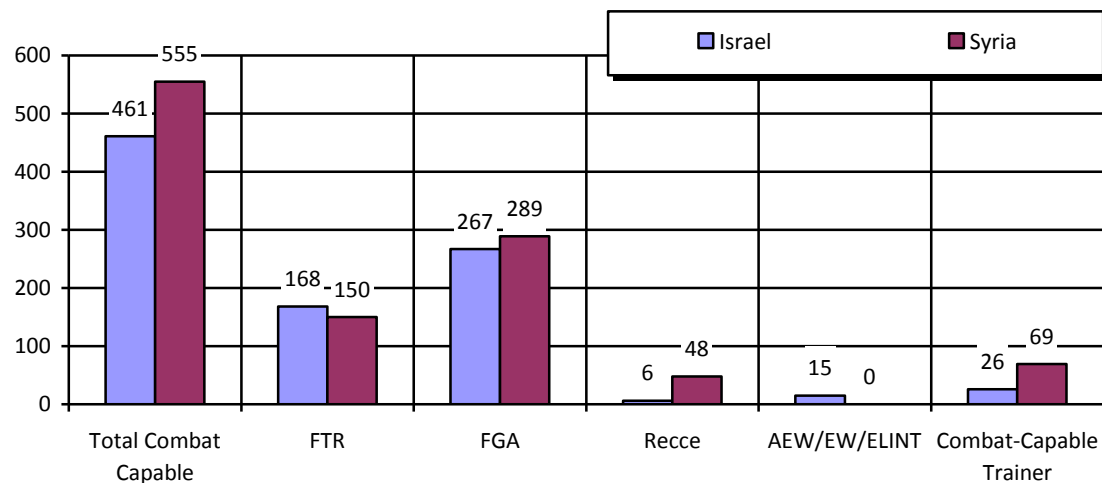
Figure 1 compares the size of *operational* Israeli and Syrian forces. Taken at face value, Syria has parity or even a marginal lead. The balance of force quality, however, decisively favors Israel and vastly offsets the balance in numbers. It also prevents Syria from undertaking military adventures in ways the quantitative balance cannot portray.

Figure 1: Israeli versus Syrian Operational Force Strength as of 2010

Land Weapons



Air Forces



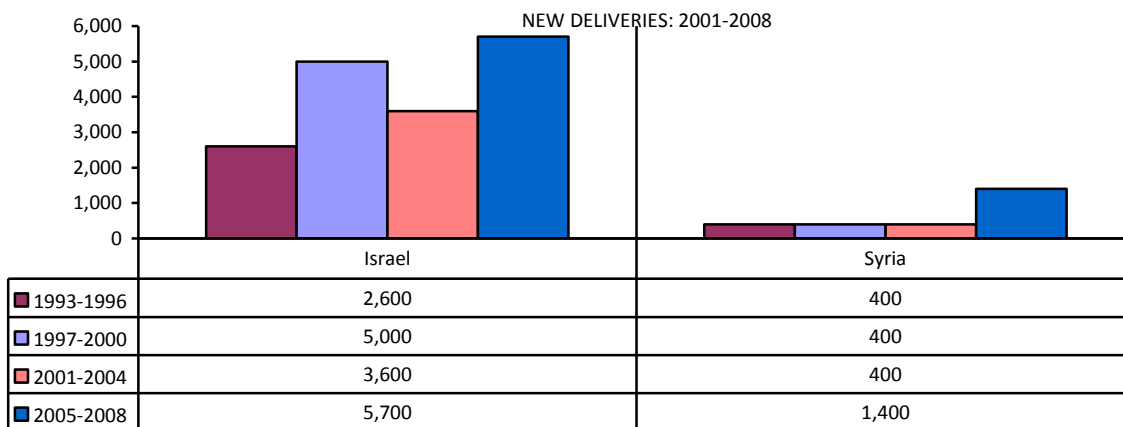
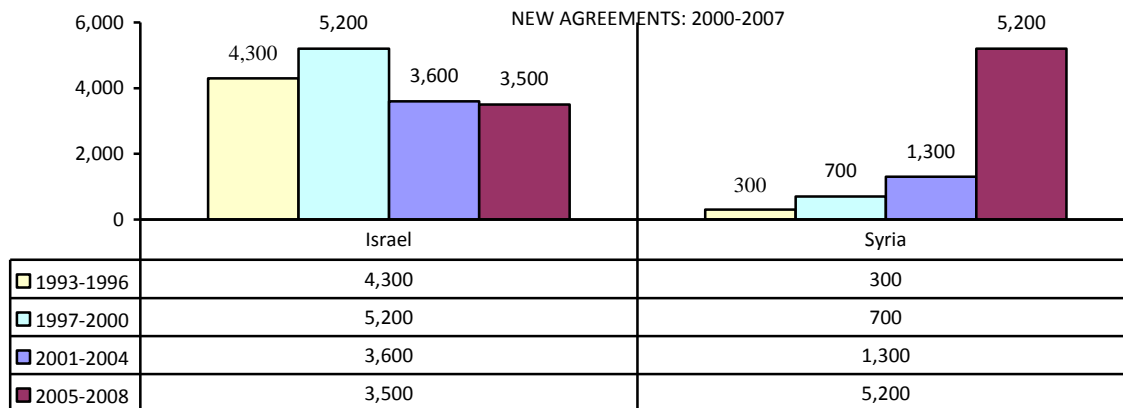
Note: Israeli AEW/EW/ELINT include 6 Phalcon B-707, 1 Gulfstream G550 Eitam with 2 more on order, 6 RC-12 D Recce, 3 B-707 ELINT/ECM, 3 Gulfstream G-500 Shavit and 2 EC-130H AEW. Syrian combat-capable trainers include 40 L-39 Albatros, 6 MFI-17, 20 MIG-21U, 6MIG-23UM and 2 MIG-25U. Total air forces include operational fixed-wing combat and combat-capable aircraft, including fighters, attack, fighter-attack, and combat-capable reconnaissance and training aircraft.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from data provided by U.S. experts, and the IISS, *The Military Balance*, various editions.

Figure 2 shows a declassified US intelligence estimate of the rate and size of arms transfers. It too is somewhat ambiguous. Israel has a major advantage in deliveries but seems to be slipping in new orders. In practice, however, Israel has a major advantage in the quality of its deliveries, and can couple this advantage to a vast lead in defense industry and in its domestic military technology. Moreover, Syria has a long history of making “orders” it cannot actually finance or turn into actual deliveries.

Figure 2: Syrian-Israeli Arms Agreements and Deliveries: 2001-2008

(\$U.S. Current Millions)



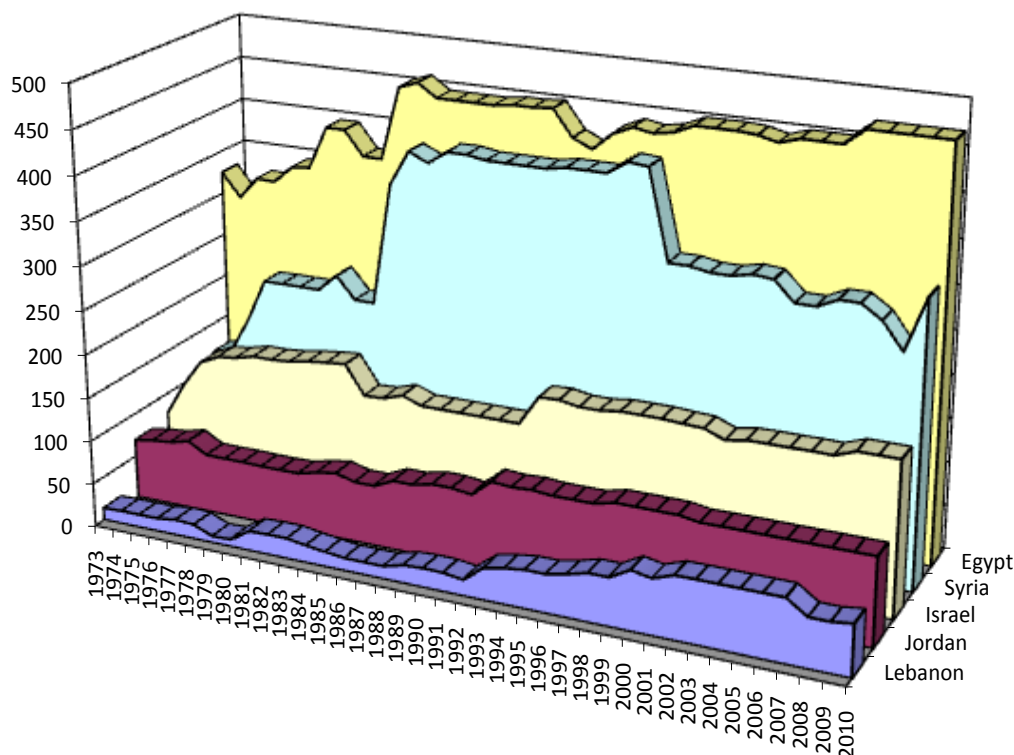
Source: Richard F. Grimmett, *Conventional Arms Transfers to the Developing Nations*, Congressional Research Service, various editions.

Israel not only leads in actual deliveries but in new orders -- which normally take between three years to a decade to deliver. This more than 10:1 lead in new agreements is particularly important because so many advances have taken place in precision guided munitions, munitions lethality, sensor systems, and the "net-centric" integration of battle management, intelligence, targeting, tracking, and communications systems during the years involved. Syria has fallen far behind in force quality.

Comparative Manpower Quantity and Quality

Total manpower is an uncertain measure of force strength, and it is a particularly poor measure when countries have such different force structures and set such different standards for manpower quality and training. Once again, however, some broad trends are clear. The data in **Figures 3** and **4** provide a rough measure of total force strength, and show the trends in the forces concerned.

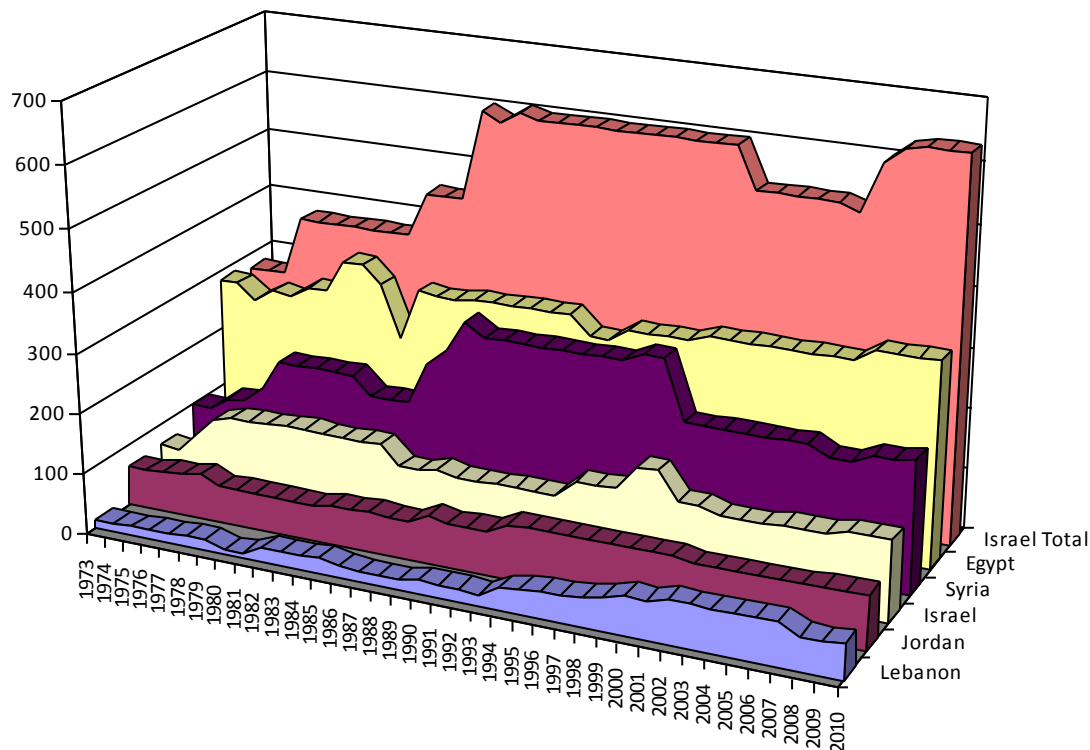
Figure 3: Total Arab-Israeli Active Military Manpower: 1973-2010
(Troops in thousands)



	1973	1976	1982	1985	1988	1991	1994	1997	2000	2004	2005	2006	2007	2008	2009	2010
Lebanon	14.25	15.3	23.75	17.4	15	21.8	41.3	48.9	67.9	72.1	72.1	72.1	72.1	56	56	59.1
Jordan	69.25	80.25	67.5	70.3	80.3	82.25	100.6	98.65	104	100.5	100.5	100.5	100.5	100.5	100.5	100.5
Israel	77	156	172	142	141	141	176	175	173.5	168	168	168.3	168	176.5	176.5	176.5
Syria	100	177.5	222.5	402.5	407.5	404	408	421	316	296.8	296.8	307.6	307.6	292.6	262.6	325
Egypt	325	322.5	367	445	445	450	430	440	450	450	450	468.5	468.5	468.5	468.5	468.5

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the author.

Figure 4: Arab Active versus Israeli Mobilized Army Manpower: 1973-2010
(Troops in thousands)



	1973	1976	1982	1985	1988	1991	1994	1997	2000	2004	2005	2006	2007	2008	2009	2010
Lebanon	13	14	17	22.25	25.5	15	21	35.7	43	65	70	70	70	53.9	53.9	57
Jordan	65	70	61	60	65	62.75	74	90	90	90	84.7	85	85	88	88	88
Israel	65	125	135	135	135	112	104	104	134	130	120	125	125	133	133	133
Syria	100	125	200	200	170	320	300	300	315	215	215	215	200	215	215	220
Egypt	285	280	295	320	315	320	320	290	310	320	320	320	340	340	340	340
Israel Total	275	375	375	375	450	606	598	598	598	530	530	518	625	633	633	633

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the author.

Israel's active manpower has not changed radically over time, but has fluctuated according to fiscal and security pressures. The data also show just how dependent Israel is on reserve versus active manpower. Israel has a small active force, but it has now halted a recent trend toward force cuts and is rebuilding the training and readiness of both its active manpower and reserves. If its high-quality reserves are added to its total actives, its force strength is far more competitive with its Arab neighbors.

Syria maintained extremely high manpower levels after its 1982 war with Israel, but cut back in the late 1990s, partly because of their cost and partly because it could not properly equip, train, and support such forces.

Egypt has maintained relatively consistent manning levels since the 1979 Egyptian-Israeli peace accord. While the Egyptian officer corps continues to benefit from U.S.-sponsored

international training and military professionalization, overall manpower suffers from a continued reliance on conscription and the militarization of social welfare.

Note unlike Egypt, Jordan has maintained relatively consistent manning levels since signing peace with Israel in 1994. Jordan has emphasized building up special operations forces (SOF) over conventional manpower development. The overall focus of the military remains rapidly containing emerging internal threats and protecting the territorial integrity of the Kingdom.

The repealing of national conscription –implemented in 2007 – coupled with a limited national defense budget promoted the contraction of the Lebanese Armed Forces (LAF) from a force of 72,000 to 59,000. Lebanese military personnel benefit from regular international training; however the officer corps suffers from severe over-manning at the senior officer level. The high operational tempo of the LAF's internal security operations has also made it challenging to develop overall force quality. While the quality of Lebanese SOF manning continues to improve, it is unclear how Lebanon will compensate for its manning shortfalls given stagnant defense expenditures, continued domestic political discord and a sectarian system averse to meaningful military development.

With regards to the Israeli-Syrian balance, it is clear that numbers tell only part of the story. Human factors are at least as important as manpower numbers. Training, experience, and personnel management and development are critical "intangibles" that are hard to compare, virtually impossible to quantify, and which again can differ radically between countries and units. Israel has set much higher training standards than Syria, although it did reduce many aspects of its training activity between 2003 and 2005. The Israeli-Hezbollah War of 2006 made the Israeli Defense Force (IDF) aware of the need to rebuild its manpower quality as soon as possible, to carry out large-scale exercises of its conscripts and reserves, and to expand and improve the training of its experienced, combat-ready cadres.

There is a serious gap in manpower quality between Israel and Syria that is compounded by similar differences in the quality of realistic training for war. Israel has resumed demanding unit and exercise training at the field (FTX) and command post (CPX) level. Syrian FTX and CPX exercises are limited and unrealistic. The Palestinians have little experience, although Lebanon has gained ground over the past two to three years in expanding and consolidating its FTX and CPS exercises to accommodate the current high tempo of internal security operations. Such efforts would not have been possible without the assistance of international partners, chiefly the U.S.

Similar disparities exist in the key elements of military organization, systems, and training that underpin what some experts have called the "revolution in military affairs." Israel is the only country in the region to have made major progress in developing a modern mix of "jointness" among its military services; integration or netting of its command, sensor, communications, information and intelligence systems; and integrated or "combined operations" within its individual services.

These differences in the quality of each country's full-time active manpower are compounded by even more serious quality gaps in the case of most reserve forces. Israel does have modern and relatively well-trained reserves, many of which have had extensive practical experience in asymmetric warfare since 2000. In general, Syria's reserve

military forces are little more than "paper" forces with no real refresher or modern training, poor equipment and readiness support, and little or no experience in mobility and sustainability. These forces are often given low-grade or failed officers and NCOs. They do little more than pointlessly consume military resources that would be better spent on active forces.

Jordan is the only Arab state that has created a modern corps of NCOs and that gives its junior officers significant initiative, promotes largely on the basis of merit, and limits the impact of nepotism and favoritism. Jordan faces serious financial constraints on both its force size and rates of modernization, however, which informs its national focus on elite SOF units, modernizing its air forces, and maintaining a deliberately defensive land posture for armored warfare.

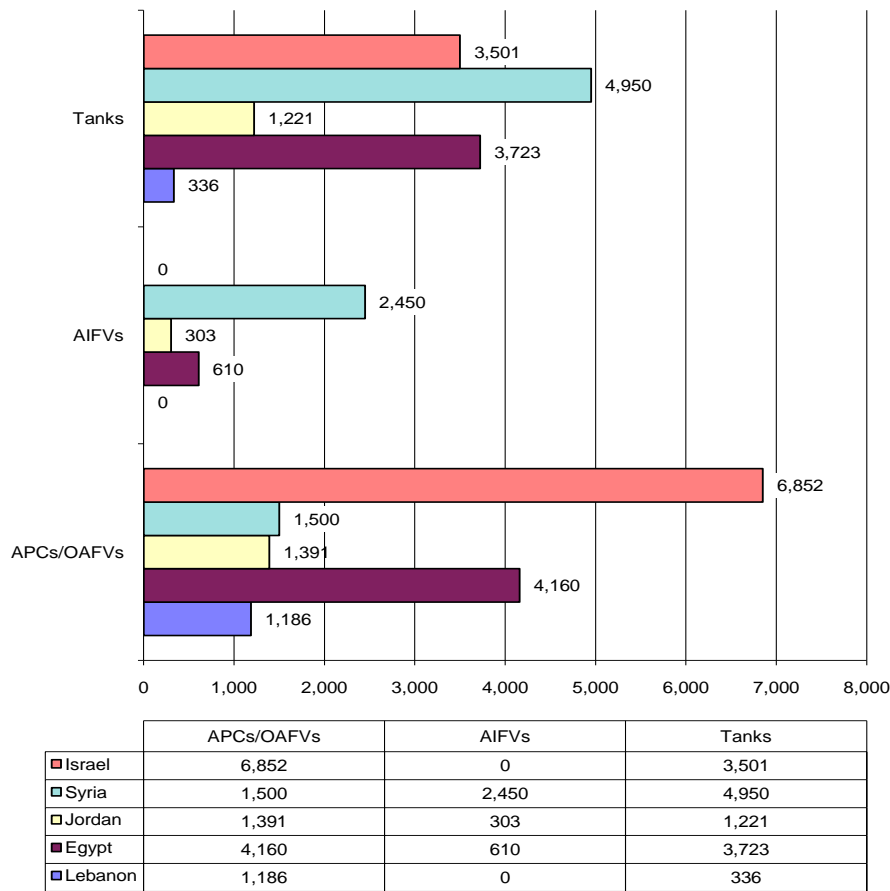
Egypt and a number of other Arab states are making progress in improving manpower quality, but most Arab forces lack recent combat experience and face political and cultural problems that are compounded by swollen and inflexible military bureaucracies and a garrison mentality. Syria compounded these problems with corruption, nepotism, and an occupation of Lebanon that further politicized and corrupted its forces. Syrian forces still have very real pockets of excellence, but they exist in spite of – not because of – Syria's overall approach to manpower quality. Unlike Egyptian and Jordanian forces, Syrian troops have showed determination in defensive operations, having rarely broken ranks and fled during past Arab-Israeli wars.

Armor and Antitank Weapons

The importance of qualitative differences is striking in every aspect of the Arab-Israeli balance, but it is particularly important in heavy armor, combat aircraft, surface-to-air missiles, and suppression of enemy air defense (SEAD) capabilities. **Figures 5 to 8** show the trend in Israeli and Arab armor. Both Israeli and Syrian ground forces are "tank heavy" and place a major emphasis on heavy armor – partly because the outcome of past wars has been so heavily shaped by armored maneuver warfare. These figures also show, however, that the mix of combined arms within each army is strikingly different.

Figure 5 compares the armored forces of each nation. It shows that Israel has emphasized main battle tanks (MBTs) and armored personnel carriers (APCs) – many of which it has armed with light weapons. Syria has supported its tanks with large numbers of other armored fighting vehicles (OAFVs) from the Soviet Bloc, but has much less overall armored mobility and far fewer armored personnel carriers. Syria's forces seem to be deliberately tank heavy in an effort to provide enough tank numbers to try to compensate for the IDF's superior tactics, training, leadership, and equipment. Egypt and Jordan also maintain large holding of tanks and APCs, and while Lebanon has large holdings relative to national manning and expenditure levels, the Lebanese military has struggled to keep the majority of its holdings operational.

Figure 5: Arab-Israeli Armored Forces in 2010
(Numbers of major combat weapons)

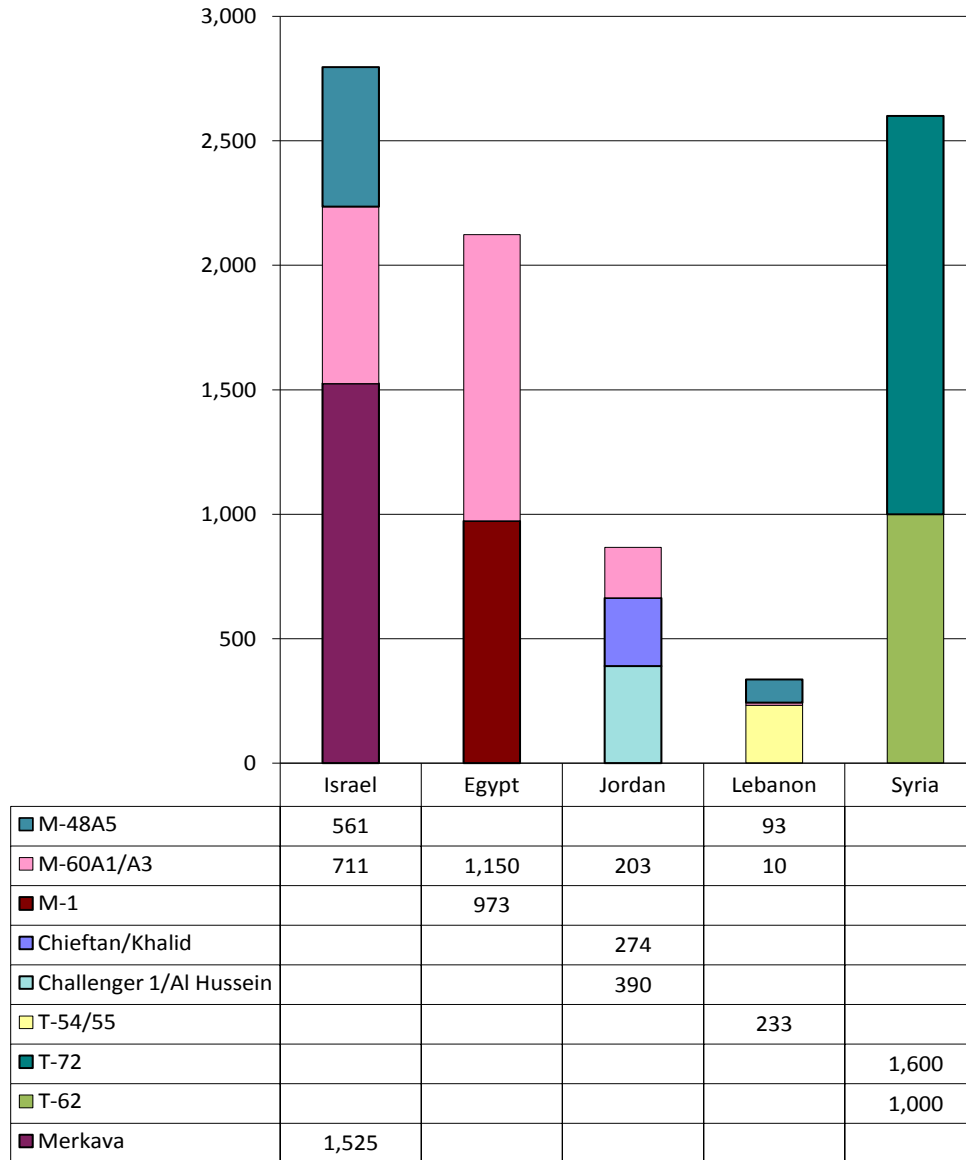


Note: Does not include old half-tracks and some combat engineering and support equipment.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Other data based upon discussions with US experts.

Figure 6 shows regional main battle tank (MBT) trends. This includes both modern high quality armor and aging systems.

Figure 6: Israel versus Egypt, Jordan, Lebanon and Syria: Tanks by Type 2010



Note: The totals exclude large numbers of older vehicles that are in storage or are fixed in place. In 2010, these include 500 T-62 and 840 T-54/55 for Egypt, 111 Magach-7, 261 Ti-67, 206 Centurion, 561 M-48A5 and 126 T-54 for Israel, 292 Tarik and 23 M-47/M-48A5 for Jordan and 2,250 T-54/55 for Syria. All of Lebanon's holdings are included, and there is no confirmation on their operational status.

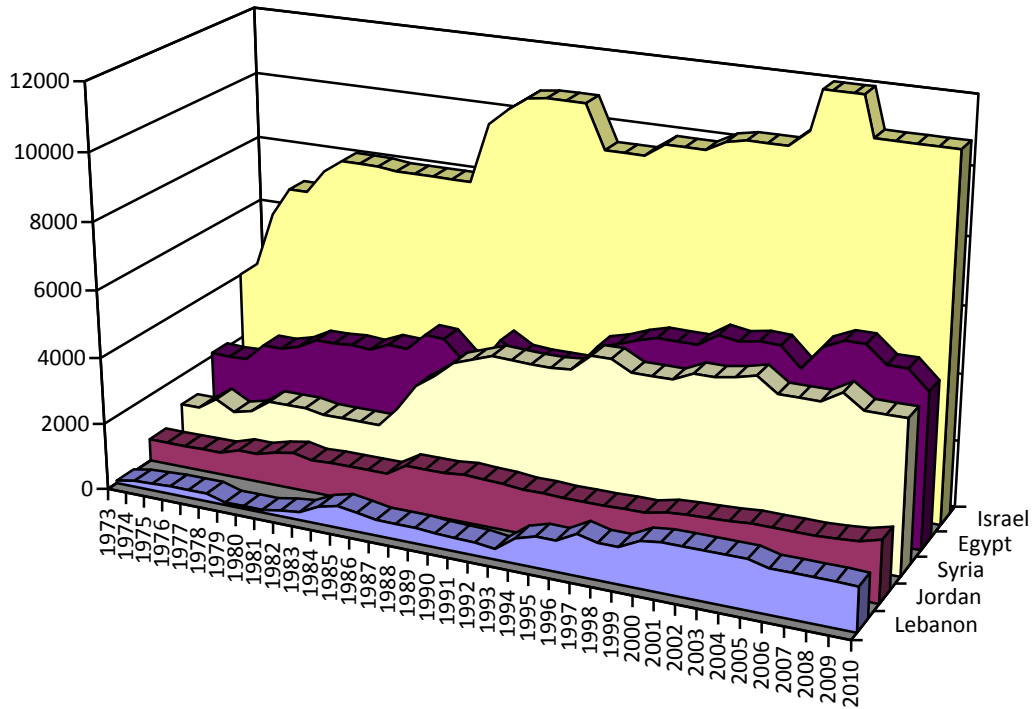
Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the author. Data differ significantly from estimated by US experts.

Israel has a distinct lead in tank quality. The export versions of the T-72s in Syria have competent armor and drive trains, but poor ergonomics and inferior fire control, targeting, and night-vision systems. The armor, night-fighting and long-range engagement capabilities of export versions of the T-72 proved to be significantly more limited than many unclassified estimates had predicted. Egypt maintains a modern mix of M-60 and M-1 tanks supported by national industry and facilities. Most of Egypt's soviet era armor is held in storage or in reserve. Jordan also maintains an increasingly modern mix of tanks. Lebanon maintains vintage tank holdings and the majority of its 10 relatively newer M-60s have suffered from drive train problems.

Figures 7 and 8 show the relative strength and quality of Israeli and Arab other armored vehicles, including armored infantry fighting vehicles (AIFVs) and APCs.

Figure 7 shows that Israel has a major lead in sheer numbers of all types of other armored vehicles, but the totals shown include 180 obsolete M-2 half-tracks and some 3,386 M-3 half-tracks. A large portion of these vehicles are inoperable and in storage. These are open, World War II vintage armored vehicles that are extremely vulnerable and make up more than a third of the more than 10,000 Israeli OAFVs shown for 2010.

Figure 7: Arab-Israeli Other Armored Fighting Vehicles (Light Tanks, OAFVs, APCs, Scouts, and Reconnaissance Vehicles): 1973-2010
(Numbers of major combat weapons)



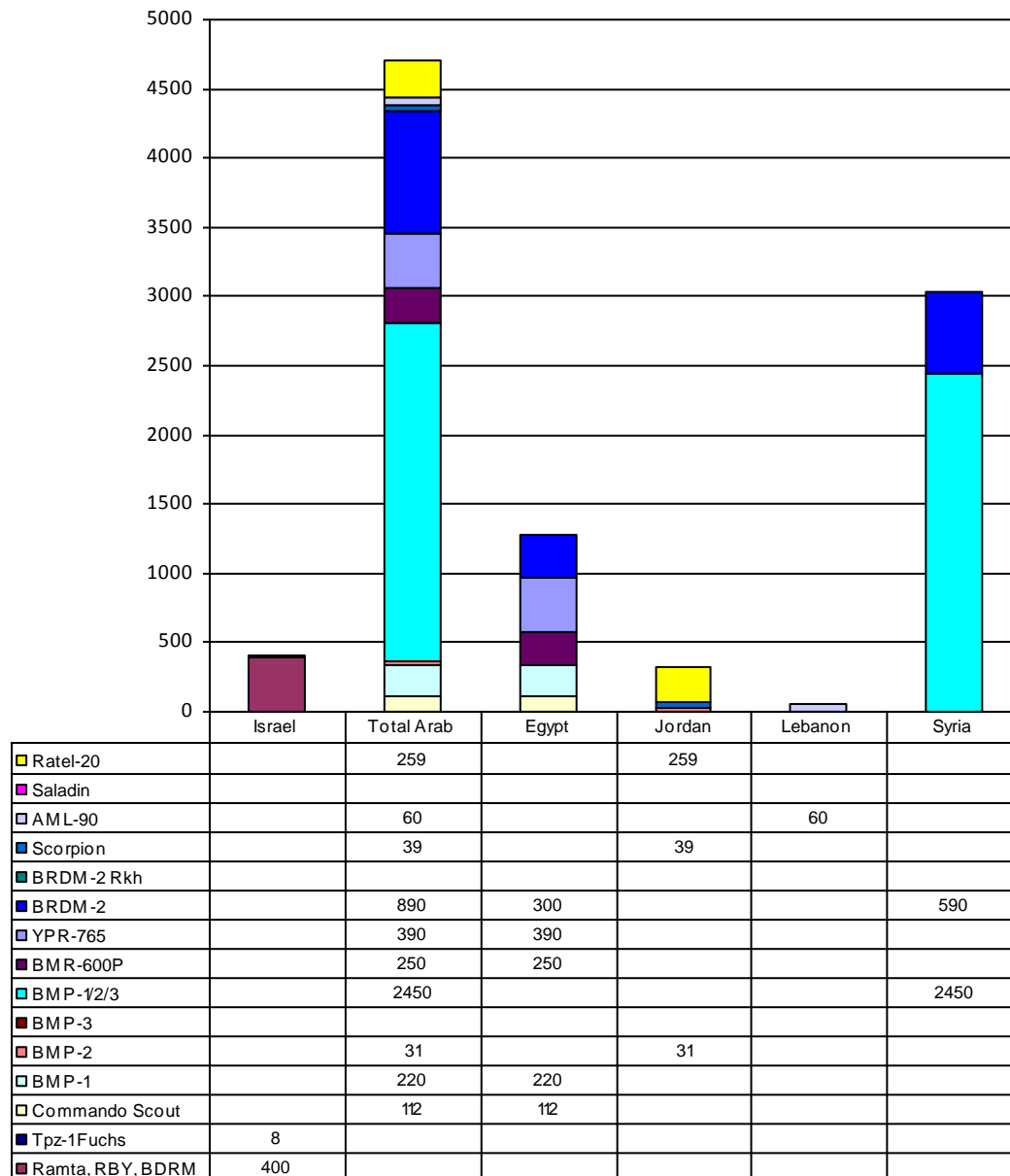
	'73	'75	'77	'79	'81	'83	'85	'91	'93	'95	'99	'01	'04	'07	'08	'09	'10
Lebanon	80	204	239	80	80	245	658	402	312	915	1,085	1,463	1,463	1,317	1,317	1,317	1,294
Jordan	670	670	680	860	1,102	1,022	1,022	1,403	1,324	1,304	1,324	1,501	1,595	1,595	1,625	1,674	1,836
Syria	1,100	1,470	1,300	1,700	1,600	1,600	2,200	4,275	4,250	4,800	4,510	4,785	4,600	4,950	4,540	4,540	4,540
Egypt	2,100	2,100	2,630	3,080	3,130	3,330	3,830	3,660	3,660	4,501	4,886	5,172	4,682	5,682	5,182	5,182	4,632
Israel	4,015	6,100	6,965	8,080	8,065	8,000	8,000	10,780	8,488	9,488	10,188	10,308	13,078	7,261	10,827	10,827	10,827

Note: Figures for Israel include 180 obsolete M-2 half-tracks and some 3,386 M-3 half-tracks. These are open, World War II vintage armored vehicles that are extremely vulnerable, and many of which are in storage. They make up more than a third of the more than 10,000 Israeli OAVs shown for Israel in 2010.

Source: Adapted by Anthony H. Cordesman from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the author.

Figure 8 shows the relative strength of each country in combat-capable armored fighting vehicles.

Figure 8: Israel versus Egypt, Jordan, Lebanon and Syria: “True AFVs” 2010
(AFVs include Light Tanks, MICVs, AIFVs, and Reconnaissance)



Note: MICV are mounted infantry combat vehicles.

Source: Adapted by Anthony H. Cordesman from the IISS, *The Military Balance*. Some data adjusted or estimated by the author on the basis of comments by U.S. experts.

It is clear that Syria has a major quantitative lead. However, many of these Syrian systems are worn and obsolete or obsolescent. While Syria's BMPs and YPR-765s are exceptions, they are lightly armored by modern standards. They are also less able to

engage in armored maneuver warfare except in the support role or in defensive positions where those equipped with modern anti-tank-guided weapons can be far more effective. Almost all, however, can play an important role in bringing infantry and weapons squads into the forward area and provide fire support. This “battlefield taxi” role can be critical in ensuring that tanks have suitable combined arms support in combat.

One key point about these figures is that they show total numbers before combat. Armor, artillery, and aircraft numbers in combat depend heavily on support, maintenance, and repair capabilities. Israel retains a major lead in battlefield recovery and repair, overall maintenance, readiness, and armored support vehicle capability. It takes only days of maneuver, or minutes of intensive combat for the ability to recover major weapons and make rapid repairs to be at least as critical as the initial force ratios of weapons committed to combat.

Both Israel and Syria have built up major stocks of anti-armor weapons, although anything like an accurate inventory of current holdings or a historical trend line analysis is impossible without access to classified information. **Figure 9** shows an estimate of regional anti-tank holdings in 2010 based on figures from IISS.

Figure 9: Arab-Israeli Anti-Armor Systems in 2010

Country	SP	MANPAT	RCL/RL
Egypt	53 M-901 210 YPR 765 PRAT	1,200 AT-3 Sagger (incl. BRDM-2) 200 Milan 700 TOW-II	520 B-11 107 mm
Israel	300 TOW-IIA/IIB (incl. Ramta M-113 SP)	900 M47 Dragon AT-3 9K11 Sagger 25 IMI MAPATS Some Gil/Spike	250 M-40A1 106 mm B-300 82 mm
Jordan	70 M-901 45 YPR-765 with Milan	30 Javelin (110 msl) 310 M47 Dragon 310 TOW/TOW-IIA	Some RPG-26 73 mm 2,500 LAW-80 94 mm 2,300 APILAS 112 mm
Lebanon	None	26 Milan 12 TOW/II	113 M-40A1 106 mm 13 M-60 3,250 RPG-7 Knout 73 mm 8 M-69 90 mm
Syria	410 9p133 BRDM-2 Sagger	150 AT-4 9k111 Spigot 40 AT-5 9k113 Spandrel 800 AT-10 9k116 Stabber 1,000 AT-14 9M133 Kornet 200 Milan Some AT-7 9k115 Saxhorn	Some RPG-7 Knout 73 mm Some RPG-29 105 mm

Note: “SP” are self-propelled, “MANPAT” are man-portable anti-tank and “RCL/RL” are recoilless rifles and rocket launchers.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the authors

Israel has significant numbers of antitank guided missiles (ATGMs) and other antitank weapons, and it is steadily improving its ATGM and anti-armor sub-munition technology. Syria has exceptionally large numbers of ATGMs and has focused on importing the latest weapons from Russia in recent years. Syria has done so because Israel has forced it to react defensively against Israeli tank attacks. Many of the ATGMs held by all of the countries that make up the frontline states in the Arab-Israeli balance are now mounted on APCs and AIFVs, but each country has a different force mix.

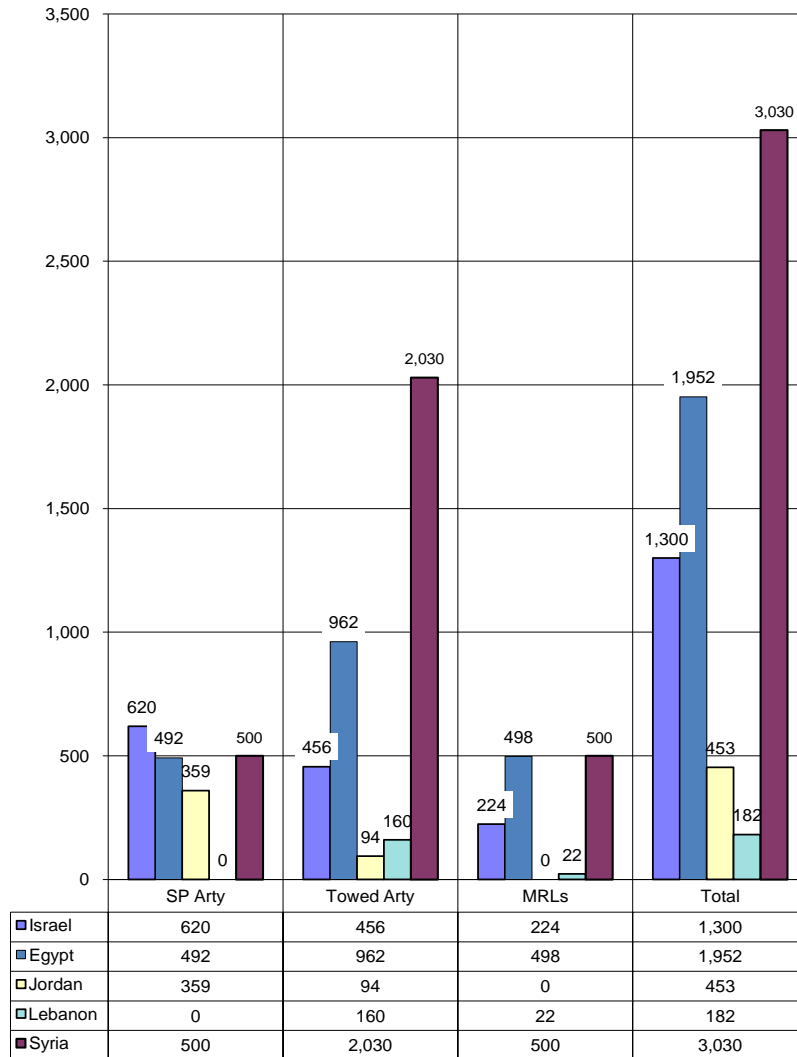
Israel has, however, developed significant up-armor programs for their OAFVs. It is important to note that Israel, like the United States in Iraq, has learned the hard way that irregular forces such as Hezbollah and the Palestinians have learned how to carry out sophisticated ambushes with such light anti-armored weapons as rocket-propelled grenades (RPGs) and improvised explosive devices (IEDs) and that such attacks can be effective in urban warfare against exposed patrols.

Artillery Weapons

As might be expected from armies that have fought several major wars of maneuver, Israel and Syria have large numbers of self-propelled artillery weapons – although the ratios differ and there are major differences in equipment quality. All of the Arab-Israeli armies also retain large numbers of towed weapons, although Syria has a very large pool of such weapons compared to its neighbors. This reflects a long-standing Syrian emphasis on artillery, growing out of its past dependence on French doctrine from the 1950s and 1960s, and Soviet doctrine thereafter. However, it also reflects Syria's heavy dependence on mass fires and the use of towed artillery in defensive positions.

Figure 10 shows the overall mix of artillery weapons in each country. **Figure 11** highlights relative strength in self-propelled weapons and reflects the Israeli emphasis on self-propelled weapons over towed weapons.

Figure 10: Arab-Israeli Artillery Forces by Category of Weapon in 2010
(Numbers of major combat weapons)

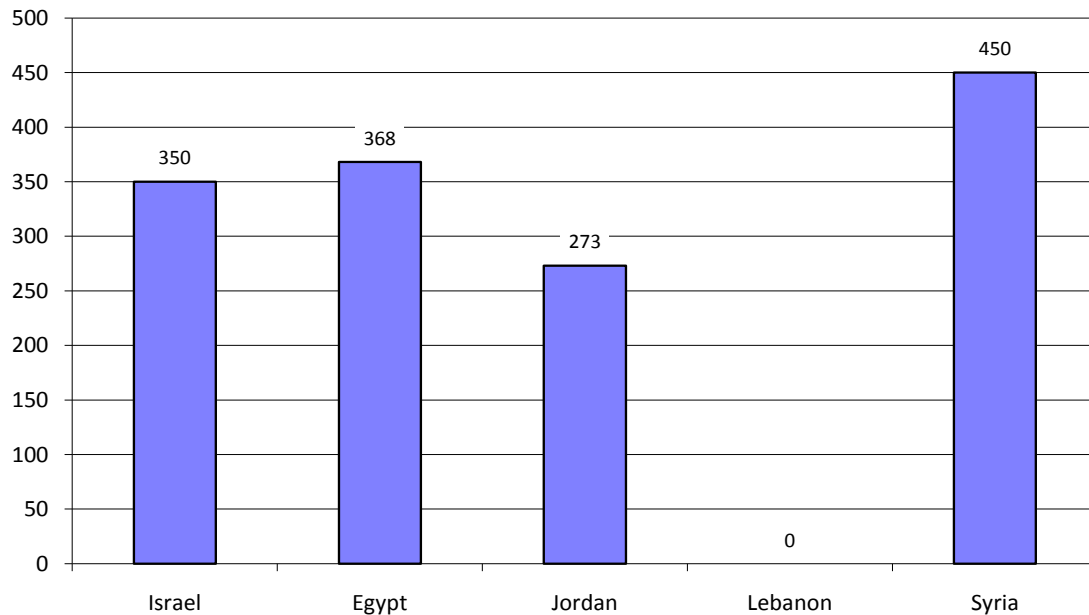


Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, and discussions with U.S. experts.

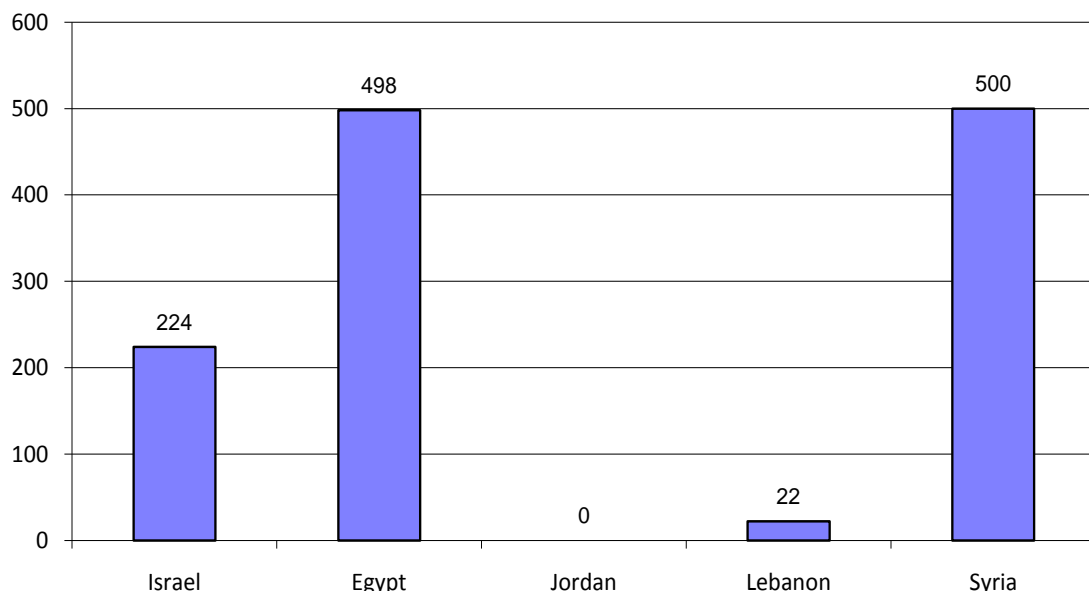
Figure 11: Israel versus Egypt, Jordan, Lebanon and Syria: High Performance Artillery in 2010

(Numbers of major combat weapons)

Modern Self-Propelled Artillery



Multiple Rocket Launchers

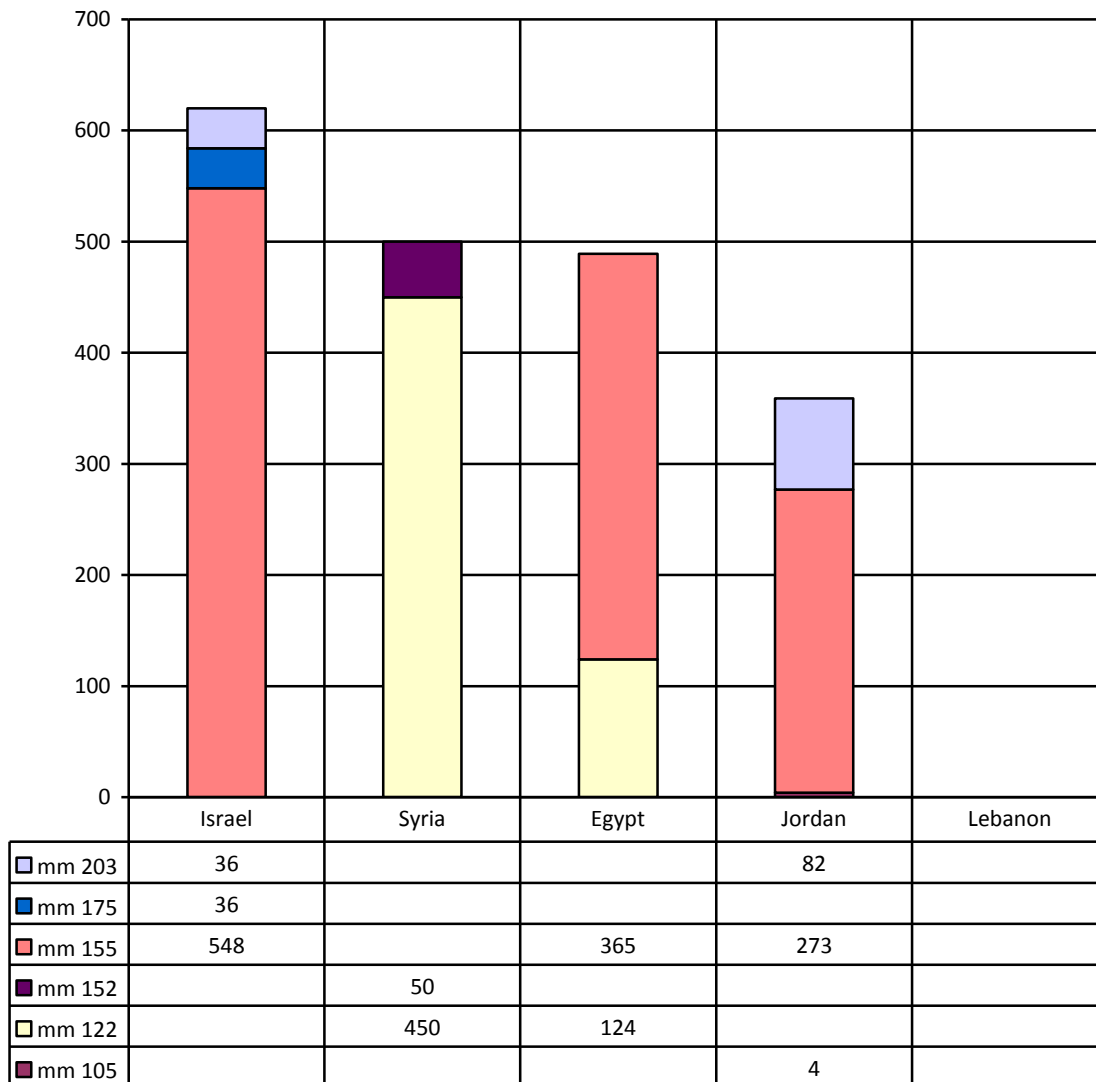


Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, and discussions with U.S. experts.

Arab and Israeli SP artillery systems are broken down by caliber in **Figure 12**. In theory, the weapons in Syrian hands should have a range advantage over those in Israeli forces. In practice, Syria has badly lagged behind Israel in long range targeting capability, the ability to shift and rapidly retarget fires, other artillery battlement systems, the use of counter-battery and other radars, the use of unmanned aerial vehicles (UAVs) as targeting and reconnaissance systems, and mobile ammunition support.

Figure 12: Arab-Israeli Self-Propelled Artillery by Caliber in 2010

(Numbers of major combat weapons)

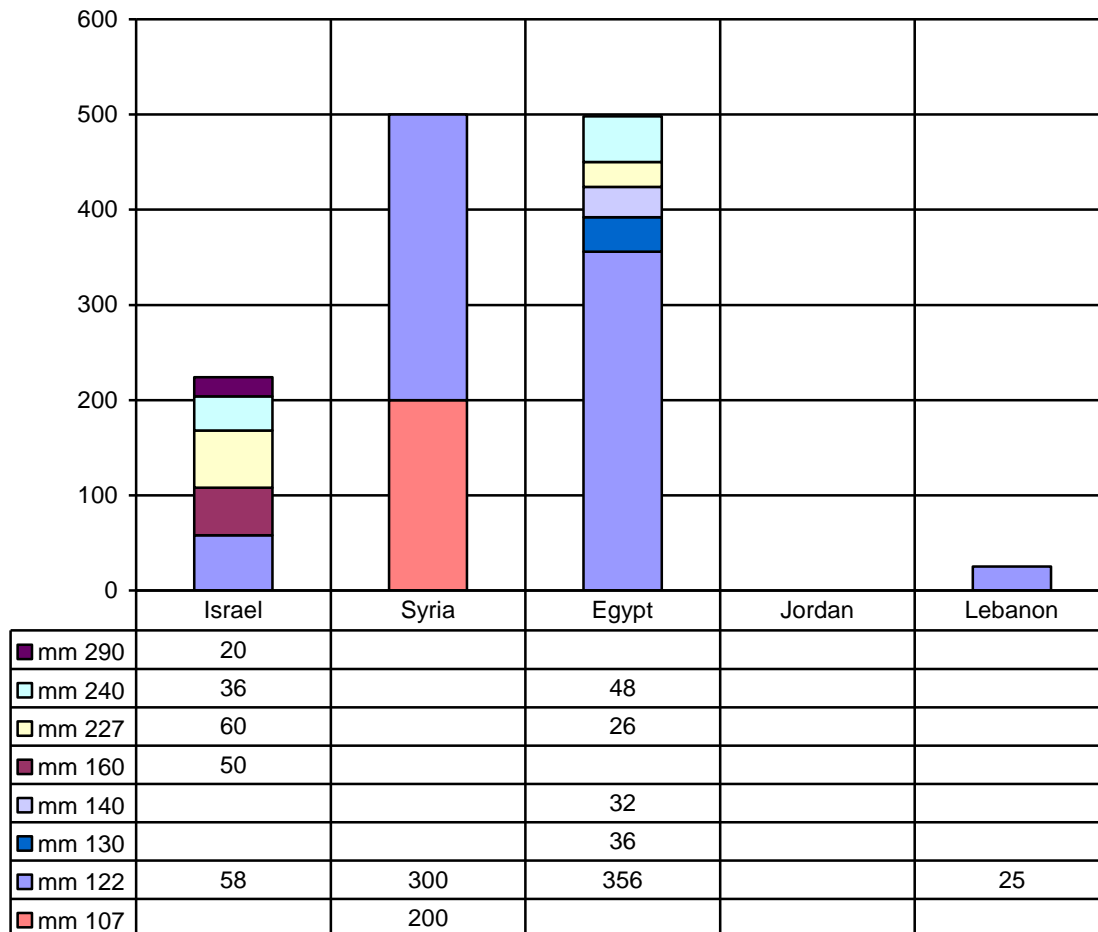


Note: Israel is phasing out its 175-mm weapons.

Source: Prepared by Anthony H. Cordesman, based upon the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

Figure 13 shows that Egypt, Israel and Syria also have significant numbers of multiple rocket launchers (MRLs) and surface-to-surface missiles (SSMs).

Figure 13: Arab-Israeli Multiple Rocket Launchers by Caliber in 2010
(Numbers of major combat weapons)



Source: Prepared by Anthony H. Cordesman, based upon the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

The numbers of MRLs is misleading, however, since Israel has developed a family of highly sophisticated rockets for its MRLs, while Syria and Egypt are more dependent on conventional Soviet-Bloc rounds with limited accuracy and lethality. Syria is acquiring steadily larger numbers of long-range artillery rockets with improved accuracy and some with what seem to be guided warheads. Both Israel and Syria have rockets with advanced sub-munitions, including anti-armor systems. These systems could significantly change and increase the role of artillery in a future war, but no empirical combat data yet exist on each side's maneuver, targeting, and supply/sustainability capability to use such weapons effectively or what their future tactical impact would be.

These figures do not, however, include the growing holdings of non-state actors. Irregular forces such as Hezbollah have large numbers of rockets that can be fired from single

round launchers or improvised vehicle launchers, and various Palestinian groups have started manufacturing crude single round rockets. All of the countries involved have significant numbers of mortars, many mounted in armored vehicles, for close combat.

The figures for surface-to-surface missile launchers almost certainly sharply understate Israeli and Syrian holdings. These weapons generally have operational conventional warheads, but lack the accuracy and lethality to be useful as much more than terror weapons. Israel has had conventional cluster warheads, but it is unclear that these are still in service. It is also widely assumed to have tactical nuclear warheads with variable yields. Syria is believed to have mustard and nerve gas warheads, probably including persistent nerve agents, and chemical cluster munitions. It may have experimental biological devices.

Two additional points need to be made about interpreting the data in **Figures 9 to 13**. Israel is the only country to have developed, deployed, and realistically exercised “precision artillery” capabilities in terms of training and doctrine for rapid maneuver, the ability to target and register the effect of individual fires in near real or real time, and the ability to shift fires to strike at a mix of individual targets.

Syria lacks the equipment needed to support its massive artillery holdings effectively, and does a poor job of conducting meaningful training for an artillery doctrine that is weak on precision fire, rapid maneuver, and rapid changes in well-targeted fire. Syria also lags in computerized fire management, communications practices, and artillery radars.

Israel’s advantages in precision artillery include the ability to acquire targets and observe fire in real time using unmanned aerial vehicles and long-range ground based and other aerial sensors. Israel also has a major advantage in processing such data, joint air-land targeting and operations, and battle damage analysis. Syria has a number of long-range weapons, but poor long-range targeting and battle damage assessment capability – unless it can take advantage of covert observers using cell phones or similar communications devices.

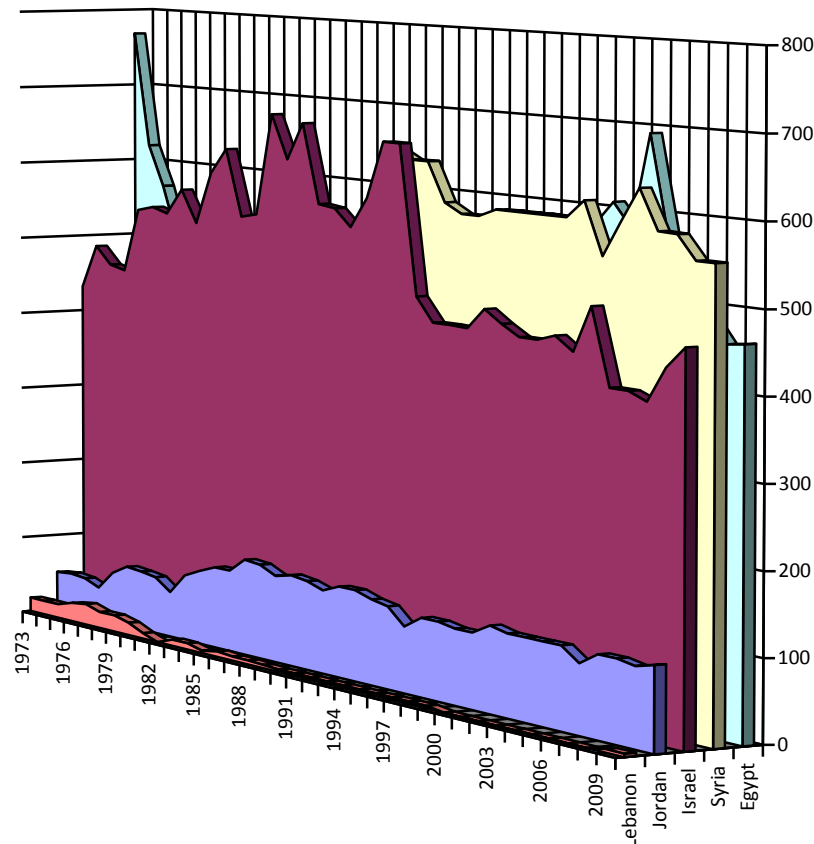
As is the case with tanks, Israel retains a critical lead in battlefield recovery and repair capability, and overall maintenance, readiness, and armored support vehicle capability. This is a critical capability in combat.

Air Force Aircraft, Weapons, and Technology

Syria maintains much larger numbers of combat aircraft than it can properly support – in effect, disarming by over-arming. This problem also affects Egypt. As is the case with the Egyptian Army, Egypt maintains a substantial pool of low-grade and obsolete weapons platforms that do not serve any apparent military purpose. Furthermore, while Egypt continues to acquire growing numbers of F-16s, the air force has suffered from a steady number of crashed aircraft and poor systems integration. If one looks only at the total aircraft numbers, Syrian forces would have a lead in aircraft. This is driven in part by the large number of obsolete and obsolescent aircraft in the Syrian forces. Syria is also trying to train for, maintain, arm, and sustain far too many different types of aircraft. This puts a major – and costly – burden on the air force and dilutes manpower quality, and does so with little, if any, actual benefit.

Figure 14 shows the trend in total numbers of combat aircraft or combat air strength. Oddly enough, it is the overall downward trend in Israeli numbers that is the best indication of effectiveness. This trend is driven by the fact that Israel has done the best job of emphasizing overall force quality over numbers and of funding full mission capability with all of the necessary munitions, force enablers, and sustainability.

Figure 14: Trends in Total Arab-Israeli Combat Aircraft: 1973-2010



	'73	'75	'77	'79	'81	'83	'85	'87	'89	'91	'93	'95	'97	'99	'01	'04	'08	'10
Lebanon	18	18	27	21	7	8	3	5	4	3	3	3	3	3	0	0	0	4
Jordan	50	50	66	76	58	94	103	119	114	104	113	102	97	93	106	101	100	102
Israel	432	466	543	543	535	634	555	629	577	553	662	478	449	474	446	438	393	461
Syria	210	300	440	392	395	450	503	483	448	558	639	591	579	589	589	548	583	555
Egypt	768	568	488	612	363	429	504	443	441	517	492	551	567	585	580	579	489	461

Note: Latest figures for Lebanon include 1 Cessna Armed Caravan, 3 Hawker *Hunter* MK9, MK6, exclude t66 (all grounded) and 8 CM-170 *Magister*).

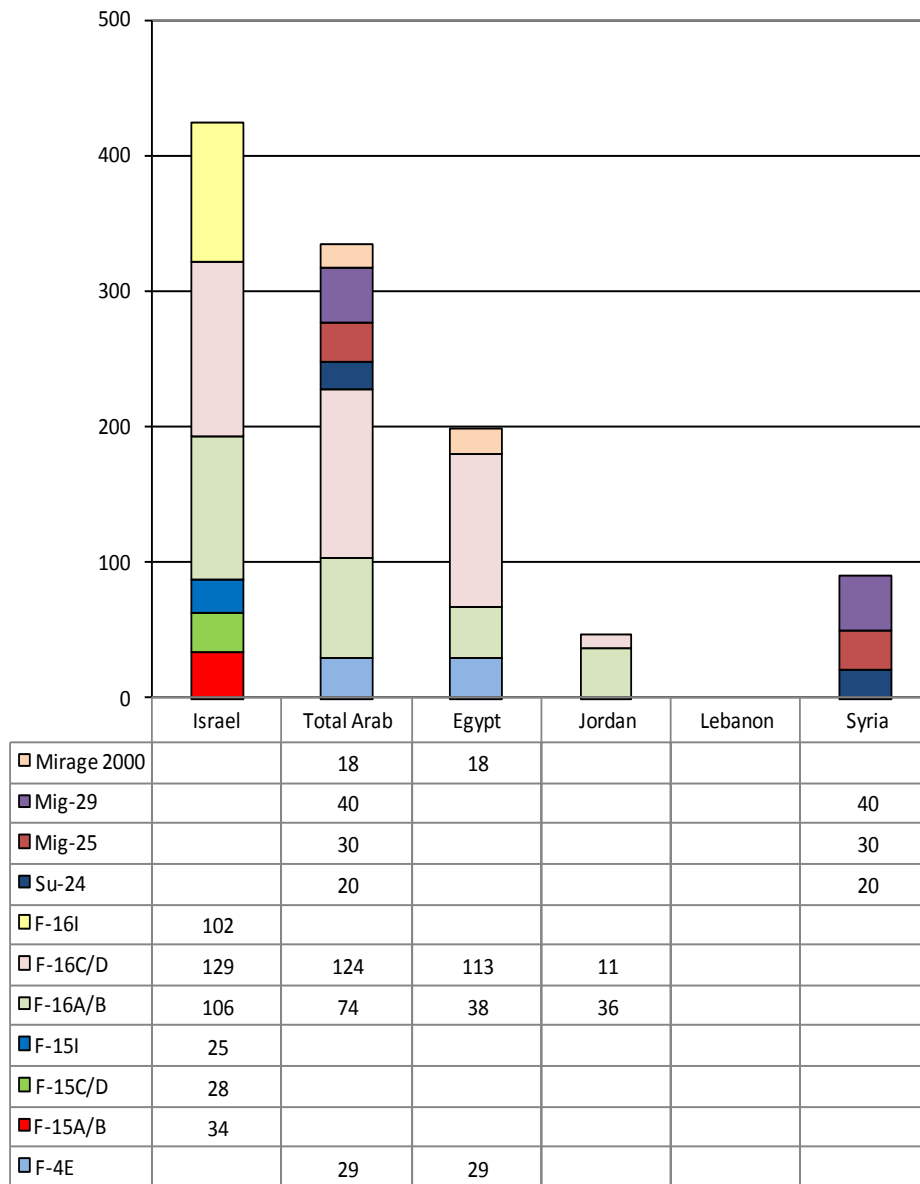
Source: Prepared by Anthony H. Cordesman and Aram Nerguizian based upon the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

Figure 15 shows the number of high-quality aircraft in the region. While the number of total combat aircraft is not irrelevant, in war-fighting terms, high quality air assets are the ones that really count. **Figure 15** shows that Israel maintains major air superiority over Syria, whose MiG-29s and Su-24s now have obsolescent avionics and cannot compete

with Israeli types on a one-on-one basis. Given past rates of delivery and modernization, this Israeli lead will also grow in the near term. Israel has much better real-world access to aircraft improvement programs, and next-generation aircraft such as the F-35 than Syria has to either aircraft upgrades or any next-generation system with “stealth,” supercruise, or advanced avionics.

Figure 15: High-Quality Operational Arab-Israeli Combat Aircraft in 2010

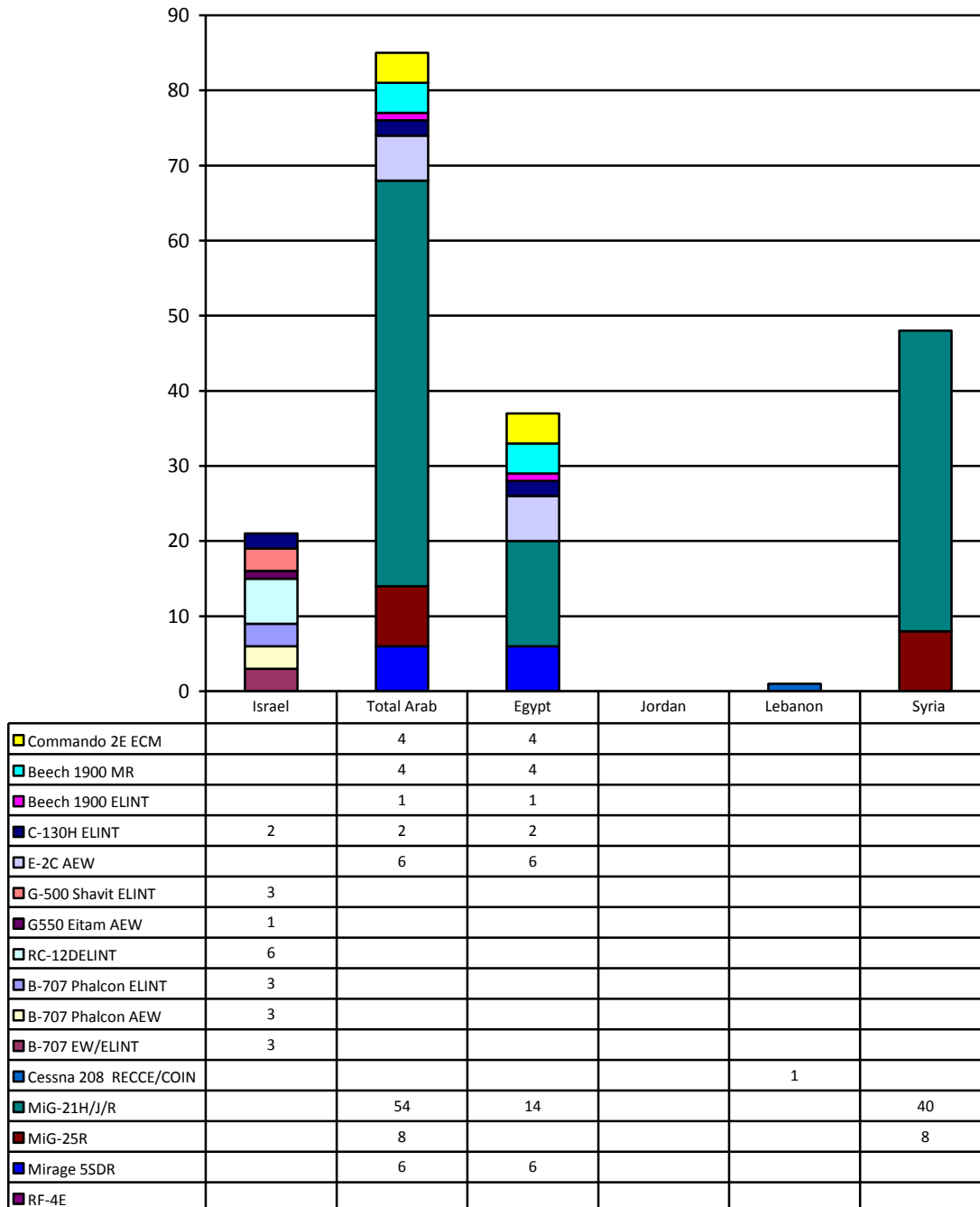
(Does not include stored, unarmed electronic warfare or combat-capable RECCE and trainer aircraft)



Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

Figure 16 provides a rough picture of the airborne command and control (C2), reconnaissance, electronic warfare, and intelligence “enabling” aircraft in each force.

Figure 16: Unarmed Fixed and Rotary-Wing RECCE, Electronic Warfare, and Intelligence Aircraft in 2010



Note: Jordan had 15 Mirage F-1EJ and 54 F-5E/F Tiger II with FGA and Recce capabilities.

Source: Adapted by Anthony H. Cordesman from the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

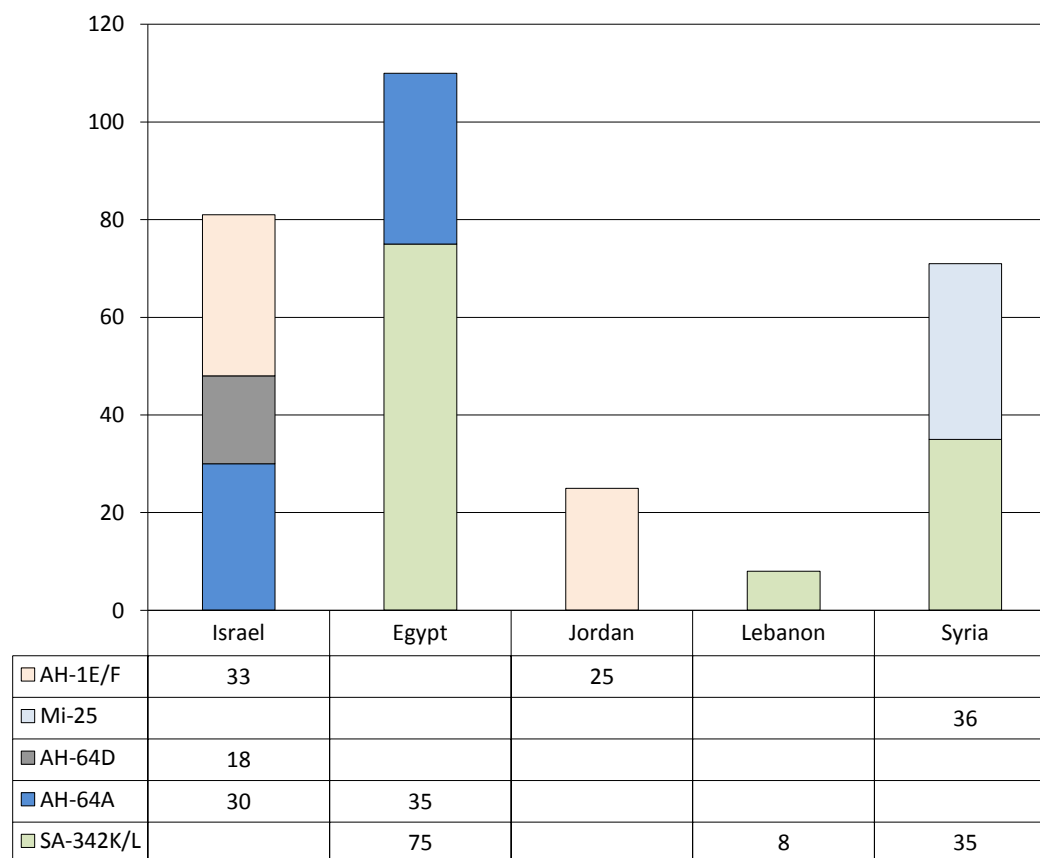
The figure shows that Israel has a major lead in the quality of air battle management, intelligence, warning, and targeting systems critical to making use of modern airpower and precision weapons. Syrian totals, though higher, are aging systems that cannot match Israel in terms of C2, intelligence, surveillance and reconnaissance (ISR) capabilities or electronic warfare (EW).

Israel's advantage is further enhanced by superior tactics, overall training, and the use of other technologies such as unmanned aerial vehicles (UAVs). Israel has its own intelligence satellites for surveillance and targeting purposes, and much more advanced "netting" of its communications, battle management, and intelligence systems, plus world-class electronic intelligence and electronic warfare capabilities. Despite operating four reconnaissance squadrons with 40 MiG-21 H/J *Fishbed*, Syria has little overall meaningful capability in this area.

Figure 17 shows the total strength each air force and army has in rotary-wing combat aircraft, less naval assets.

Figure 17: Operational Arab-Israeli Attack and Armed Helicopters in 2010

(Does not include antisubmarine warfare or antiship helicopters)



Source: Prepared by Anthony H. Cordesman and Aram Nerguizian based upon the IISS, *The Military Balance*, and discussions with U.S. and regional experts.

Israel has truly advanced attack helicopters such as the AH-64 Apache, and it is also now in the process of taking delivery of 18 AH-64D Apache *Longbow* helicopters with extremely advanced avionics and “fire and forget” capabilities that do not require the aircraft to wait and track the missile to its target. Syrian attack helicopter units are elite units, but Syria has not been able to modernize its rotary-wing combat forces, and its training and tactics have not been fully updated over the last decade.

It is more difficult to make comparisons of air-to-air and air-to-ground munitions, particularly since Israel can modify imports and has a wide range of its own systems, some of which are classified. It is clear, however, that Israel has extensive stocks of state of the art systems and ready access to U.S. weapons and technology.

Syria’s stocks are often badly dated, and Syria faces particularly serious limits in terms of comparative precision strike, and long-range air-to-air missiles that have high terminal energy of maneuver and effective counter-countermeasures. The IAF also has a significant advantage in the ability to add specialized external fuel tanks, add on pods with special electronic warfare and precision strike capability, modify and develop external jammers, and adapt wing loading to new munitions needs.

Comparative Land-Based Air Defense Forces

Egypt, Israel and Syria all have large numbers of surface-to-air missiles (SAMs), but only the Israeli Air Force has truly modern medium and long-range systems, radars, and command and control facilities.

Figure 18 shows the strength of each country’s land-based air defenses. Some countries integrate their major air defenses into their air forces, and some have a dedicated air defense force. Most countries also deploy a separate mix of short-range air defenses (SHORADs) in their land forces. Lebanon is the only country in the balance and the broader Middle East and North Africa region to not have even token air defense capabilities.

Figure 18: Arab-Israeli Land-Based Air Defense Systems in 2010

Country	Major SAMs	Light SAMs	AA Guns
Egypt	702+ <i>launchers</i> 282 SA-2 212 SA-3A 56+ SA-6 78+ <i>MIM-23B I Hawk</i>	2,242+ 50 MIM-92A Avenger SP 26 M-54 Chaparral SP Some FIM-92A Stinger 20 SA-9 2,000 Ayn al-Saqr/SA-7 36+ <i>Amoun w/RIM-7F</i> <i>Sea Sparrow quad SAM</i> 36+ <i>Skyguard/twin 35 mm</i> 24+ <i>Crotale</i> 50+ <i>M-48 Chaparral</i>	2270+ guns 300 ZPU-4 14.5 mm 200 ZU-23-2 23 mm 45 Sina-23 SP 23 mm 120 ZSU-23-4 SP 23 mm 40 ZSU-57-2 57 mm Some S-60 57 mm 36+ <i>Sinai-23 Ayn al-Saqr/ Dassault 6SD-20S land/</i> <i>SP 23 mm</i> 230 ZSU-23-4 23 mm 600 S-60 57 mm 400 M-1939 KS-12 85 mm 300 KS-19 100 mm
Israel	2 Bty w/9 Arrow II 3 Bty w/16 PAC-2 17 Bty w/MIM-23 Hawk 5 Bty w/MIM-104 Patriot	1,250 20 Machbet 250 FIM-92A Stinger 1,000 FIM-43 Redeye	920 guns 105 M-163 Machbet Vulcan 20 mm 60 ZSU-23-4 23 mm 150 ZU-23 23 mm 455 M-167 Vulcan 20 mm/ M-1939 37 mm/ TCM-20 20 mm 150 L/70 40 mm
Jordan	5-6 Bty w/PAC-2 Patriot 5 Bty w/I-Hawk MIM-2BB Phase III 6 Bty w/Skyguard	992+ 50 SA-7B2 60 SA-8 92 SA-13 300 SA-14 240 SA-16 Some SA-18 Igla 250 FIM-43 Redeye	395 guns 139 M-163 SP 20 mm 40 ZSU-23-4 SP 23 mm 216 M-43 SP 40 mm
Lebanon	None	84 SA-7A/B	81 guns 23 mm 58 ZU-23 23 mm
Syria	25 AD Bde 150 SAM Bty 320 SA-2 148 SA-3 195 SA-6 44 SA-5	8,184+ 4,000+ SA-7/SA-18 Igla 14 SA-8 20 SA-9 20 SA-11 30 SA-13 100 SA-14 4,000 SA-7A/B	1,225 guns 600 ZU-23 23 mm ZSU-23-4 SP 23 mm M-1939 37 mm 600 S-60 57 mm 25 KS-19 100 mm Some 4,000 air defense artillery

Note: Figures in italics are systems operated by the Air Force or Air Defense commands. “Bty” are batteries. “Bde” are brigades.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the author.

Israel has access to the latest U.S. weapons and technologies and can develop advanced weapons systems of its own. Moreover, Israel is able to combine surface-to-air missile defenses with anti-missile defenses in a layered defense system, and is examining options to add defenses against short-range rockets and UCAVs.

Syria's system has many obsolescent and obsolete weapons and sensors and is vulnerable to Israeli real-time targeting, precision air and missile attacks, and electronic countermeasures. It has a weak command and control system, as well as serious training and readiness problems.

The effectiveness of many of the Syrian surface-to-air missile systems listed in **Figure 18** is increasingly uncertain. Advances in air targeting and long-range, air-to-ground precision combat capability – coupled with steady advances in the long-range strike capabilities of rockets and missiles – have reduced the effectiveness of many short-range air defense systems. Some have limited or no effectiveness against low-flying helicopters unless the pilots cannot avoid overflying the defenses. Many others lack the range, lethality, and ease of maneuver to attack fighters that can use long-range air-to-surface missiles.

Many of the longer-range systems – particularly the SA-2, the SA-3, the SA-5, and the SA-6 – are now so old that electronic and other countermeasures, including anti-radiation missiles, can deprive them of much of their effectiveness. If they use their radars persistently they can be located, characterized, and jammed or killed. If they make sudden use of their radars, or remote radars further to the rear, reaction times are slow and lethality is low. If they attempt to use optical means, they generally fail to hit a target.

Egypt and Israel's Improved Hawk or IHawk missiles are considerably better and more modern systems than Syria's aging SA-2, SA-3, SA-5, and SA-6s and have been heavily updated, but do have some of the same vulnerabilities. The Patriots in Israeli forces are the only fully modern long-range air defense missiles in Arab or Israeli hands, although Syria has long sought Soviet-designed S-300 and S-400 surface-to-air missiles – which have many of the advantages of the Patriot.

Israel's Arrow missiles are the only antiballistic missile defenses in the region with significant area coverage, although the Patriot has meaningful point defense capability and the IHawk has limited value as a point defense system. In the face of increasing risk of attack by ballistic missile capable threats such as Iran, the U.S. could also deploy Terminal High-Altitude Area Defense (THAAD), the Aegis and PAC-3 systems in the event of a large-scale conflict.

In 2009 it was reported that Syria began taking delivery of the Russian 96K6 Pantsir-S1 self-propelled short-range gun/surface-to-air missile air-defense system. This comes some four years after an order for 36 systems was signed. It is unclear if these systems are operational, let alone integrated into Syria's increasingly obsolete air defense holdings.

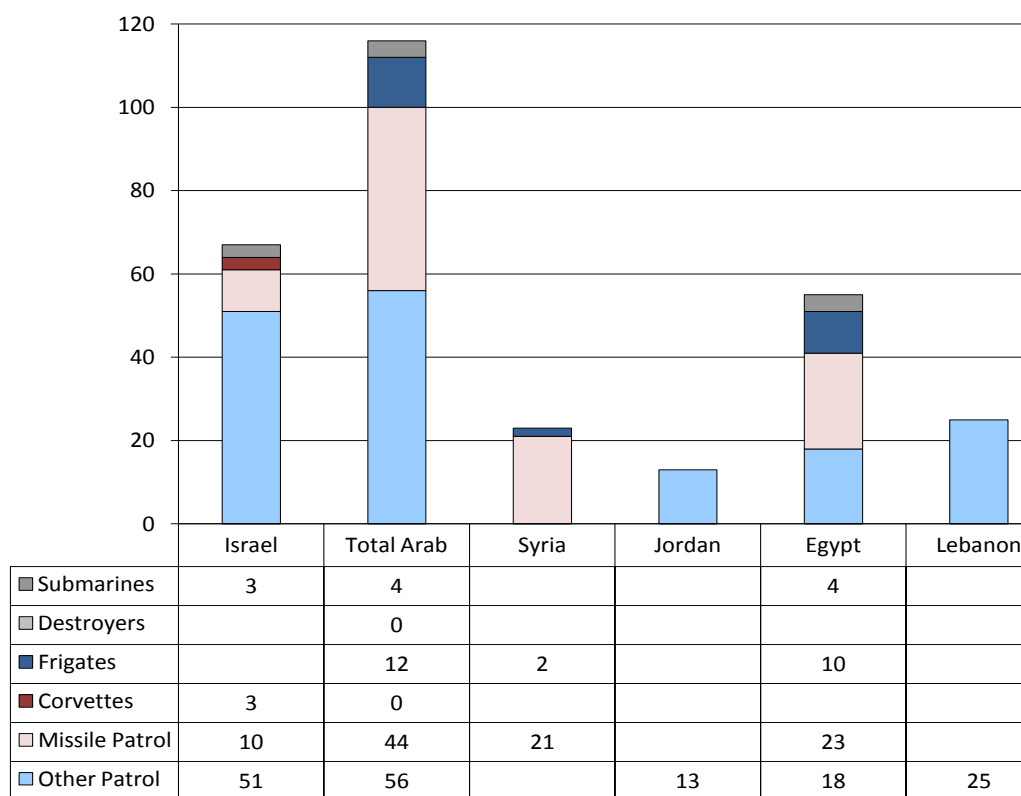
At present, neither Israel nor Syria has a fully modern, integrated mix of sensors and battle-management systems to tie together its surface-to-air defenses, but Israel does have a significant capability to perform such operations. The Syrian system was never of more than limited capability and has lost capability relative to Israel's ability to suppress Syrian air defenses over time in spite of some modernization. Though it is increasingly vulnerable, it still has some capability, and Syria is improving its shorter-range air defense systems. The survivability of both Syrian radars and hardened and dispersed Syrian command facilities is increasingly questionable.

Comparative Naval Strength

Syria and Israel still maintain significant naval forces, but only Israel retains significant operational capability in the regional balance. The naval forces of both Israel and Syria are now more likely to be used for asymmetric warfare missions or amphibious raids than in conventional combat. The Israel-Hezbollah War in 2006, for example, showed that a non-state actor such as Hezbollah could use anti-ship missiles to attack one of the Israeli Navy's most modern ships. At the same time, the Israeli Navy maintained extraordinarily high activity levels seeking to prevent infiltration or asymmetric attacks on Israel's coast, secure the waters off of the Gaza, and prevent seaborne resupply of Hezbollah.

Figure 19 compares the major combat ship strength in Arab-Israeli forces.

Figure 19: Arab-Israeli Major Combat Ships by Category in 2010



Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, and Jane's *Fighting Ships*, various editions.

Israel has relatively modern and effective submarines and surface forces, backed by effective airpower. Israel has effective anti-ship missiles, as well as superior systems and targeting/electronic warfare capabilities. Its three *Sa'ar 5*-class corvettes are very modern ships with considerable long-range capability by local mission capability standards. Construction of the first of the eight *Sa'ar 4.5*-class missile patrol boats began in 1981, but most were commissioned during 1994-2002, and they have been regularly modernized. All of these *Sa'ar*-class vessels are armed with updated versions of the Harpoon anti-ship missile and have modern radars and electronic warfare suites. Israel's

three *Dolphin*-class (Type 800) submarines are also modern vessels commissioned during 1999-2000. Israel updated some of its support vessels in the late 1980s.

In 2009 the Israeli Navy abandoned its plan to procure the US Navy's Littoral Combat Ship (LCS) as the baseline for a future surface combatant, opting instead to explore acquiring German ThyssenKrupp Marine Systems (TKMS) MEKO A-100 corvettes. However, while the building of an Israeli LCS could be funded by US Foreign Military Financing, building a new combatant for the IN outside the US will require scarce funds from the IDF's local currency budget.

Syria's navy is largely obsolete, ineffective, and dependent on aging anti-ship missiles. It has two *Petya*-class frigates armed with guns and torpedoes, but they spend little meaningful time at sea. Its three *Romeo*-class submarines never performed meaningful combat roles and have been withdrawn from service.

In 2009 as part of its lessons learned from the 2006 war between Israel and Hezbollah, Syria was looking to procure the Russian SSC-5 "Bastion" radar-guided anti-ship missile. Procuring the shore-based version of the Mach 2-capable "Yakhont" SSM would be an important step towards modernizing Syrian naval and coastal defense capabilities. With an effective range of 300 km, the system would mark a dramatic improvement over the country's existing SS-N-2 "Styx" and SS-C-1B "Sepal" SSMs. There was no confirmation on deliveries of systems integration and fielding in 2010.

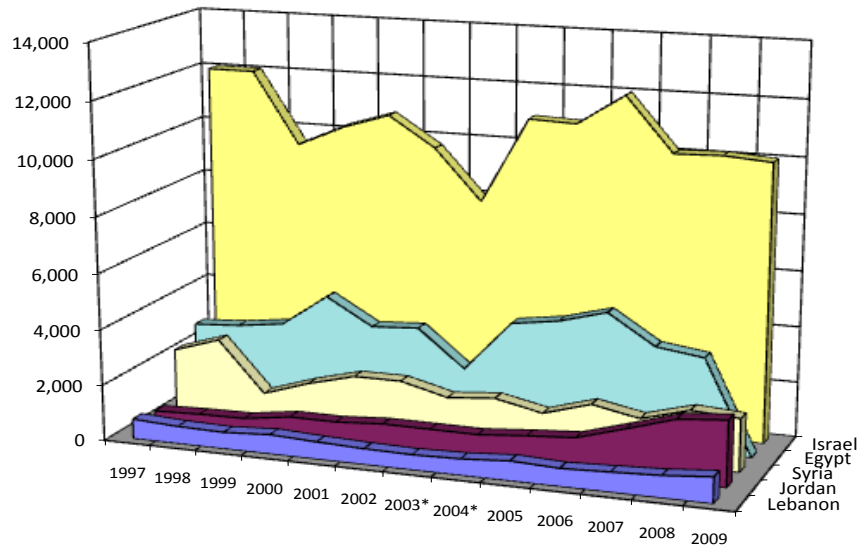
Syria is also expanding its maritime patrol, surveillance and interdiction capabilities with the modernization of two Kamov Ka-28 maritime patrol/anti-submarine helicopters, resuming maritime patrols by Syrian Air Force Su-24MK "Fencer-D" fighters and equipping its *Tir* (IPS 18)-class fast inshore attack craft with "Noor" medium-range radar-guided anti-ship cruise missiles (ASCMs).

Comparative Trends in Military Expenditures

The resources countries in the regional balance spent to develop force quality and depth vary greatly. Syria's military expenditures continued to decline over most of the last decade and have been less than one-third of the level needed to pay for the mix of manpower quality, readiness, and modernization it would need to compete with Israel in overall conventional force quality.

Figure 20 shows more recent trends in military expenditures in current U.S. dollars based on IISS figures. These data are considerably more uncertain than the previous data because they include estimates for some countries for 2004 and 2005 rather than actual data and do not seem to fully account for the impact of U.S. aid to Egypt, Israel, and Jordan. Israel's edge in military resources remains clear, although its spending efforts dropped significantly after 2001 in spite of the Israeli-Palestinian War, while other Israeli security-related spending increased to pay for such civilian programs as roads and settlements.

Figure 20: Arab-Israeli Military Expenditures by Country: 1997-2009
(in 2010 \$U.S. Millions)



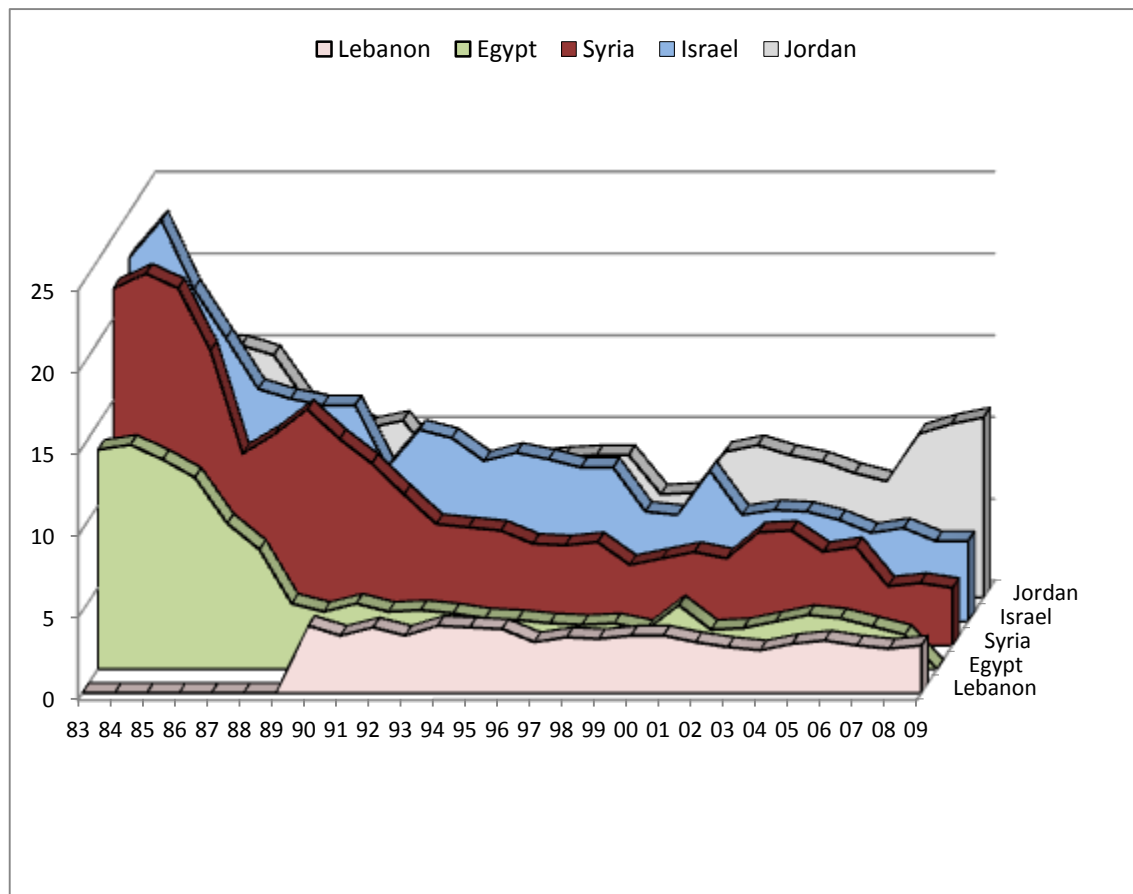
	1997	1998	1999	2000	2001	2002	2003*	2004*	2005	2006	2007	2008	2009
Lebanon	718	631	599	701	625	569	543	587	706	638	705	782	929
Jordan	527	583	605	841	838	948	941	932	1,075	1,193	1,690	2,207	2,356
Syria	2,338	2,870	1,051	1,594	2,020	2,020	1,594	1,743	1,382	1,877	1,551	2,020	1,907
Egypt	2,870	2,976	3,189	4,358	3,401	3,508	2,179	3,995	4,237	4,697	3,634	3,404	0
Israel	12,010	12,010	9,460	10,203	10,735	9,672	7,865	10,925	10,864	11,967	10,044	10,098	9,976

* Number reflects amounts budgeted as opposed to expenditures as the IISS no longer reports expenditures.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions.

Figure 21 shows the long-term trend in military effort as a percent of GNP.

Figure 21: Trend in Percent of GNP Spent on Military Forces: 1983-2009: Half the Burden of the Early 1980s



Source: Adapted by Anthony H. Cordesman and Aram Nerguizian Military Balance, various editions.

The burden placed on the Israeli, Jordanian, and Syrian economies has been cut sharply since the mid-1980s. It is striking, however, that Syria's military burden is so close to that of Israel. This indicates that Syria's slow economic development has been a major factor limiting what it can spend. Egypt cut its spending as a percentage of GNP and that spending has been low ever since. Despite expanding U.S. security assistance and financing, Lebanon has never attempted to spend the money to become a serious military power by regional standards, and domestic instability has precluded addressing significant budget shortfalls.

Israeli defense expenditures have remained relatively consistent over the 1997-2009 in terms of net spending. However, not unlike the other countries in the Arab-Israeli balance, defense spending as a percent of GDP has declined over the 1983-2009 period. In light of the 2006 Israeli-Hezbollah war, differences of opinion remain between successive governments and the IDF over defense spending.

Syrian defense spending of 3.5% of GDP in 2009 is a fraction of peak spending levels in 1985 of 21.8% of GDP and it is unlikely that Syria will be able to effectively budget for meaningful conventional military development. As the next section shows, Syria will continue to try to leverage regional and international alliances to fund national military spending.

From a peak of 13.7% of GDP in 1984, Egyptian defense spending has been cut significantly over time, reaching 2.4% of GDP by 2000 and then fluctuating between 2.1% and 3.9% over the 2000 to 2009 period. As the next section shows, Egypt has become reliant on US military assistance to fund its military development.

Jordanian defense expenditures have been declining consistently as a percentage of GDP since Israel and Jordan signed a peace treaty in 1994. While Jordan's defense budget has increased as a percentage of GDP over the 2007-2009 period, it is still 30% lower than peak spending in 1983. It is also unclear whether the overall trend of a downturn in spending will be reversed.

In the case of Lebanon, defense spending adjusted for inflations remained relatively flat and constant between 2.6% and 4.1% of GDP over the 1990 to 2009 period. As was discussed earlier, overlapping domestic and regional political instability and sectarian competition have precluded the emergence of realistic long term planning and budgeting in a country with a political system inherently averse to true military development. Furthermore, Lebanon's national debt to GDP ratio of over 160% at the end 2009 only serves to compound the challenge further.

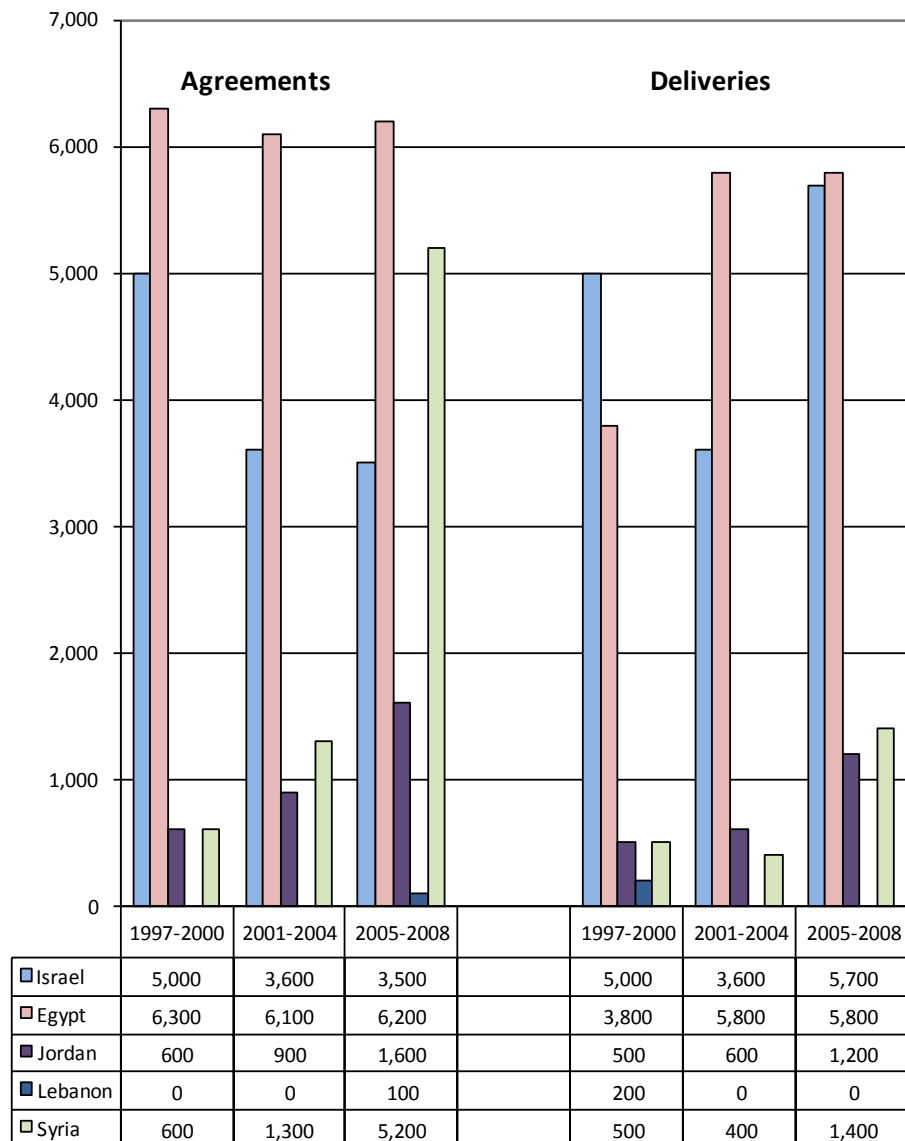
Comparative Arms Imports

The trends in arms imports and recapitalization initiatives provide another important measure of military effort and one that shows how well given countries are modernizing and recapitalizing their forces. Assessing regional trends suffer from the limitations of open source reporting on national defense expenditures, procurement and foreign assistance. Data on force recapitalization are particularly uncertain when compared to those for military spending, and almost all come from declassified U.S. intelligence estimates provided by the Department of State and the IISS. However, there is sufficient data to provide a snapshot of regional trends over the past decade.

Figure 22 provides more current data on new arms orders and arms deliveries, using a different source. It shows that Israel has continued to receive far more arms imports than Syria, and with the exception of the 2005-2008 period, Israel has placed far more new orders. Syria made a substantial increase in its new orders during 2005-2008 versus 1997-2004, but the total remained less than half that of Israel, and again, Israel has the additional advantage of more major deliveries from 1997 to 2008 in addition to a major military-industrial base and external financial support, which Syria does not have.

Figure 22: Arab-Israeli New Arms Agreements and Deliveries by Country: 1997-2008

(in \$U.S. Current Millions)

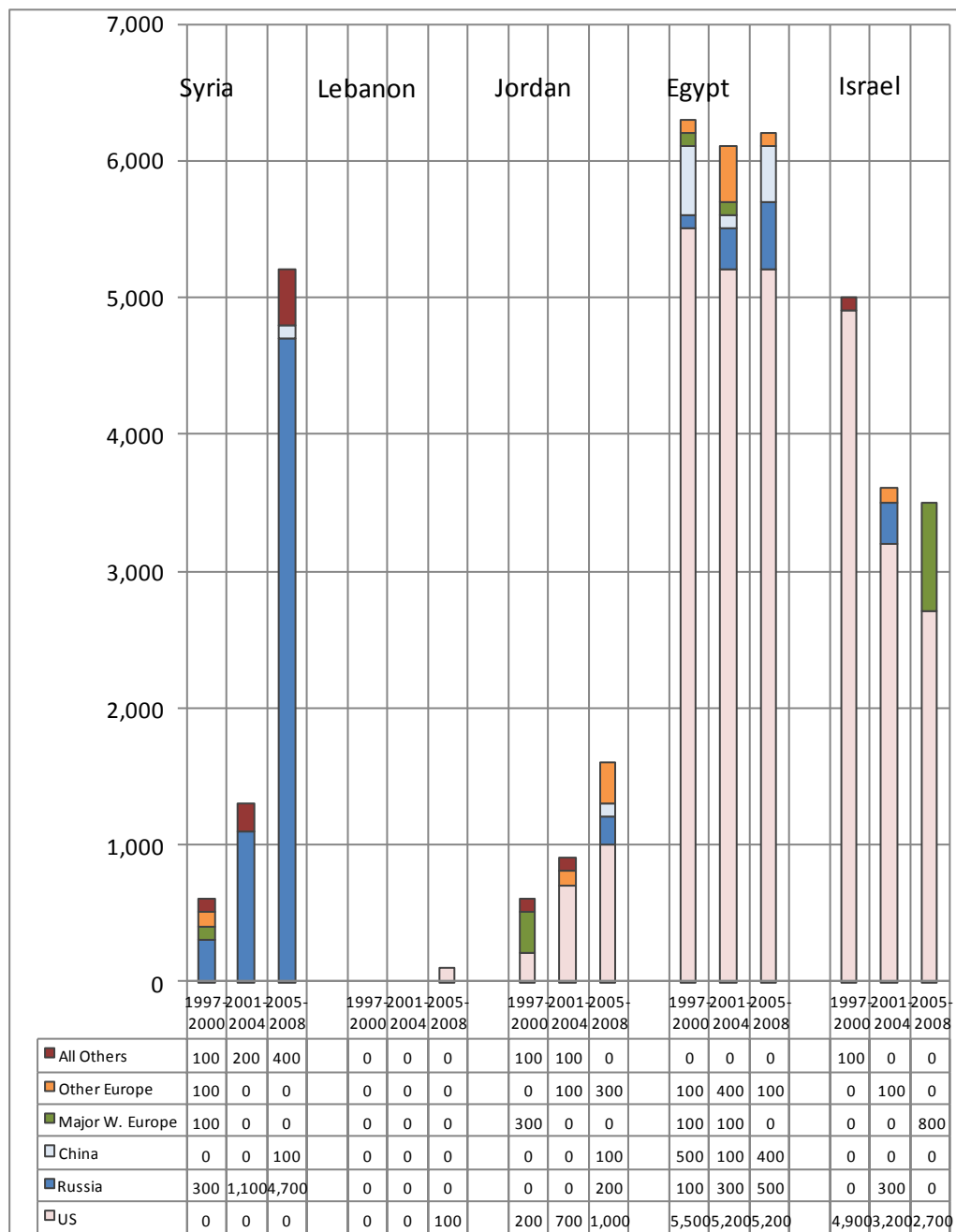


Note: 0 = Data less than \$50 million or nil. All data rounded to the nearest \$100 million.

Source: Adapted by Anthony H. Cordesman Aram Nerguizian Richard F. Grimm, *Conventional Arms Transfers to the Developing Nations*, Congressional Research Service, various editions.

Figure 23 shows the source of Arab-Israeli arms imports by supplier country.

Figure 23: Arab-Israeli Arms Orders by Supplier Country: 1997-2008
(Arms Agreements in \$U.S. Current Millions)



Note: 0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from Richard F. Grimmert, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

This figure shows that Israel has had large-scale access to U.S. arms imports, including the most modern equipment – and the data in **Figure 23** do not include significant

imports of technology, components, and subassemblies for Israeli military production that are not counted as arms imports. In contrast, Syria lost Russia as a major supplier during the 1990s and the early 2000s without finding any replacement – particularly one capable of selling advanced arms and technology in addition to providing the means to finance sustained recapitalization of Syrian forces. This negative trend may be reversing, however, in light of major – mainly Russian – arms orders for the 2005-2008 period. Syria made a total of \$6.1 billion in arms agreements with Russia during 1997-2008, while Israel made a total of \$10.8 billion in agreements with the United States. It is worthy of note, however that for the 2005-2008 period, Syria ranks fourth in the Middle East in terms of overall new arms agreements, behind Saudi Arabia, the U.A.E. and Egypt.

Comparative Recapitalization

While national recapitalization efforts are inherently distinct and path dependent, some patterns have emerged over the 2000-2010 period. In all cases, Syria has lagged behind in conventional recapitalization efforts.

- With the exception of Lebanon and Syria, countries in the regional balance have consolidated their holdings of modern or relatively modern MBTs. Israel has expanded its holdings of Merkavas by 50% and has reduced the total number or put on reserve many of its M-60s and older US and Soviet armor. While maintaining a large fleet of older M-60s, Egypt has doubled its holdings of M-1s that now form the backbone of the Egyptian armor corps. Jordan has also reduced its holdings of M-60s in favor of the British made FV4030/2 Khaled and CR1 Challenger 1 (Al Hussein) MBTs. Syria maintains an increasingly obsolescent fleet of T-72s and T-62.
- Developing or consolidating holdings of modern fixed wing combat aircraft has been a cornerstone of the evolving regional balance. Egypt continues to maintain a large fleet of F-16s while Jordan has tripled its holdings of F-16s over the 2000-2010 period. Israel acquired some 102 F-16Is, expanded its holdings of F-16A/Bs and is slated to acquire the Joint Strike Fighter (JSF) in limited numbers in the near future. Once again Syria continued to maintain an ageing mix of aircraft and it is unclear if it will be able to expand and consolidate its holdings of modern combat aircraft. Lebanon continues to have no real-world fixed wing capability.
- While Egypt and Syria have maintained largely unchanged AD holdings, Israel and Jordan have expanded their holdings of modern major SAM systems. Israel has increased its Patriot batteries from three to five in addition to acquiring the PAC-2 and the indigenous Arrow II AD systems. It has also retired its older Chaparral light SAMs. Jordan, which had two IHawk batteries in 2000, expanded its holdings of IHawk major SAMs to five batteries by 2010. In addition, Jordan has acquired five to six PAC-2 batteries and six Skyguard batteries – significantly expanding its holdings of major and long range SAMs. While Syria acquired some SA-18 Igla light SAMs in addition to future and potential deliveries of Pantsyr-S1E and TOR M1 modern light SAM systems, it is unclear as to when and if these systems will become operational and integrated into the broader Syrian AD net.

Egyptian and Jordanian commitments to peace with Israel have not stopped either country from maintaining significant fighting capability towards the end of the 1990s. However, neither country trained, deployed or provided support structures tailored to meet the needs of confrontation or war with Israel. Egypt continued to develop domestic military industrial capacity while remaining on a recapitalization path with no clear end state. As was previously stated, Jordan has focused primarily on developing its SOF and internal security capabilities. Ironically, these realities have made an economically hamstrung Syria the key state in the Arab-Israeli balance.

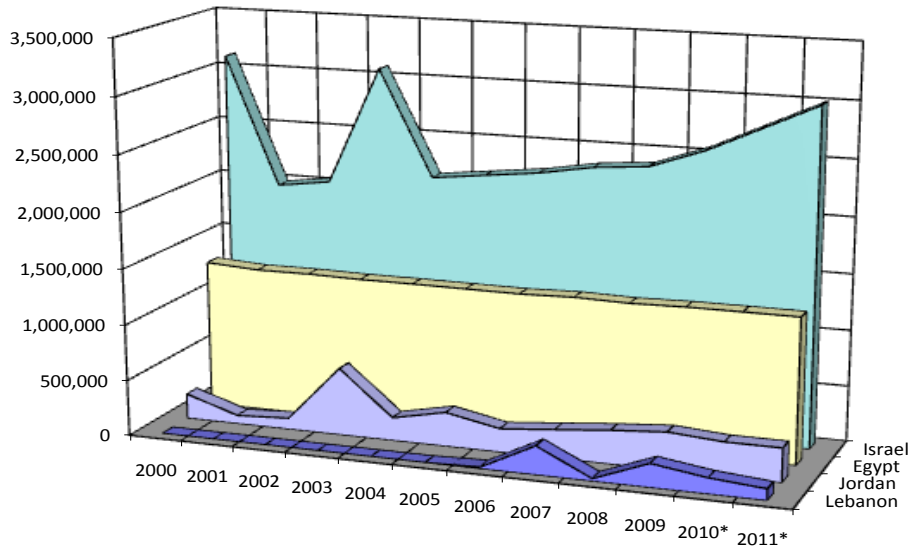
Israel is the only country with a clear recapitalization strategy. It is also the only country in the regional balance that can look to mature domestic industry and capacity to bolster national military development and force recapitalization. In keeping with the lessons learned from the 2006 war, the “Teffen 2012 plan,” put in motion in 2008, Israel looks to prepare the IDF for future combat scenarios including war with Syria, missile strikes from Iran and asymmetric threats from increasingly unstable neighbors. Teffen 2012 will develop Israel’s MBT holdings, precision strike capability, UAV combat systems, aerial refueling, C⁴I, battlefield management systems, naval capacity, missile defense and munitions inventory systems. With national defense spending increasing annually by some 2%, as the next section shows, US assistance will play a pivotal role in Israel’s ongoing recapitalization efforts.

The Impact of Foreign Military Assistance

While the data presented below does not provide accurate figures on Russian assistance to countries like Syria, the impact of foreign assistance in regional recapitalization efforts cannot be understated, given the overall trend of declining military spending as a percentage of GDP over the 1983-2010 period.

Figure 24 shows the overall pattern of US foreign military assistance to Egypt, Israel Jordan and Lebanon. **Figure 25** shows major U.S. FMF-funded Congressional arms sales notifications for Egypt, Israel and Jordan over the 2005-2010 period. As **Figure 25** shows the Defense Security Cooperation Agency (DSCA) notified the U.S. Congress of potential arms sales worth \$23.1 billion to Israel, \$3.8 billion to Egypt and \$1.97 billion to Jordan over the 2005-2010 period. It is important to remember that such notifications only offer an approximate and potential picture of future arms sales 3-10 years on the horizon.

Figure 24: Actual and Projected US Military Assistance to Arab-Israeli States from 2000 to 2011
(In thousands of current US dollars)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011*
Lebanon	582	546	560	700	700	0	15,097	256,305	23,540	210,830	141,500	102,500
Jordan	226,394	76,535	102,012	606,400	208,010	307,411	210,920	255,822	301,299	338,100	303,800	303,700
Egypt	1,326,006	1,298,259	1,301,217	1,292,782	1,293,699	1,290,864	1,288,208	1,301,203	1,290,707	1,301,300	1,301,900	1,301,400
Israel	3,120,000	1,975,644	2,040,000	3,086,350	2,147,256	2,202,240	2,257,200	2,340,000	2,380,000	2,550,000	2,775,000	3,000,000

* Data for 2010 reflect estimates; data for 2011 reflect requested amounts.

Note: Includes supplemental funding and FMF/IMET funds tied to the Wye River Agreement. Data shown include FMF, IMET and Department of Defense Section 1206 funding for Lebanon. "FMF" is Foreign Military Financing, "IMET" is International Military Education and Training and Section 1206 is "Title 10" funding.

Source: Adapted by Aram Nerguizian from *Congressional Budget Justification for Foreign Operations*, various fiscal years.

Figure 25: Select U.S. Foreign Military Sales Congressional Notifications for Egypt, Jordan and Israel 2005-2010
(In current US dollars)

Country Recipient	Date	Weapon System/ Equipment	Cost
Egypt	July 29, 2005	200 M109A5 155 mm SP howitzers with equipment and services	\$181 million
Egypt	June 27, 2005	25 AVENGER Fire Units with equipment and services	\$126 million
Egypt	June 27, 2005	50 CH-47D, T55-GA-714A turbine engines for CHINOOK Helicopters with equipment and services	\$73 million
Israel	April 29, 2005	100 GBU-28 with equipment and services	\$30 million
Israel	July 14, 2006	JP-8 aviation fuel	\$210 million
Jordan	July 28, 2006	M113A1 to M113A2 APC upgrade and sustainment with equipment and services	\$156 million
Jordan	September 26, 2006	C4ISR System with equipment and services	\$450 million
Jordan	September 28, 2006	UH-60L Black Hawk helicopters with equipment and services	\$60 million
Israel	August 3, 2007	JDAM, PAVEWAY II tail kits, MK-83 bombs, MK-84 bombs, GBU-28, BLU-109, components, equipment and services	\$465 million
Israel	August 24, 2007	200 AIM-120C-7 AMRAAM air-to-air missiles with equipment and services	\$171 million
Israel	August 24, 2007	30 RGM-84 BkII HARPOON SSMs, 500 AIM-9M SIDEWINDER air-to-air missiles with equipment and services	\$163 million
Egypt	September 18, 2007	125 M1A1 Abrams tank kits with equipment and services	\$899 million
Egypt	October 4, 2007	164 STINGER Bk1 missiles with equipment and services	\$83 million
Egypt	September 28, 2007	139 RIM-116B Bk1A Rolling Air Frame with equipment and services	\$125 million
Egypt	October 19, 2007	2 E-2C AEW C2 aircraft with equipment and services	\$75 million
Israel	October 29, 2007	TOW-IIA, AGM-114 MSLs, PATRIOT GEM+ , HEDP, HE rounds, various munitions with equipment and services	\$1.329 billion
Egypt	October 29, 2007	2,000 TOW-IIA ATGMs	\$99 million
Israel	June 9, 2008	25 T-6A Texan aircraft, equipment and	\$190 million

		services	
Israel	July 15, 2008	4 Littoral Combat Ships (LCS-I), weapons, systems equipment and services	\$1.9 billion
Israel	July 15, 2008	JP-8 aviation fuel	\$1.3 billion
Israel	July 30, 2008	9 C-130J-30, engines, systems, equipment and services	\$1.9 billion
Israel	September 9, 2008	1,000 GBU-39, mounting carriages, simulators, trainers, systems, equipment and services	\$77 million
Israel	September 9, 2008	28,000 M72A& LAAW, 68,000 training rockets, equipment and services	\$89 million
Israel	September 9, 2008	3 PATRIOT System Configuration 3 fire unit upgrades, equipment and services	\$164 million
Jordan	September 9, 2008	Increment 2 Requirements for Border Security Program, equipment and services	\$390 million
Egypt	September 9, 2008	6,900 TOW-IIA ATGMs	\$319 million
Egypt	September 9, 2008	15,500 120 mm HE-T rounds, other systems, equipment and services	\$69 million
Egypt	September 9, 2008	4 UH-60M BLACK HAWK helicopters, engines, parts, systems, equipment and services	\$176 million
Israel	September 29, 2008	25 F-35 CTOL JSF, 50 F-35 CTOL, engines, C4/CNI, other systems, equipment with services	\$15.2 billion
Egypt	May 26, 2009	12 AH-64D Bk II APACHE Longbow helicopters, engines, systems, equipment with services	\$820 million
Jordan	August 3, 2009	85 AIM-120C-7 AMRAAM air-to-air missiles, equipment and services	\$131 million
Egypt	August 6, 2009	6 CH-47D CHINOOK helicopters, engines, systems, equipment and services	\$308 million
Jordan	September 9, 2009	12 M142 High Mobility Artillery Rocket Systems, systems, equipment and services	\$220 million
Jordan	November 30, 2009	1,808 JAVELIN ATGMs, systems, equipment and services	\$388 million
Jordan	December 8, 2009	61 F100-PW-220E engines with equipment and services	\$75 million
Egypt	December 14, 2009	450 AGM-114K3A HELLFIRE II	\$51 million

		missiles with equipment and services	
Egypt	December 18, 2009	156 F-110-GE-100 engine modification and upgrade kits with equipment and services	\$750 million
Egypt	December 18, 2009	4 Fast Missile Craft (FMC) with systems, equipment and services	\$240 million
Egypt	December 18, 2009	20 RGM-84L/3 HARPOON Bk II SSMs with equipment and services	\$145 million

Note: Costs are letter of offer and acceptance (LOA) estimates that are subject to change and re-costing.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from DSCA data on 36(b) Congressional arms sales notifications.

With the exception of Israel which can convert 26% of the U.S. Foreign Military Financing (FMF) it receives to be used as part of national expenditure, US assistance can only be allocated towards either procurement or training from US sources – not towards funding other aspects of national military expenditure.

While all countries in the regional balance continue to make efforts to secure outside military assistance, Israel has been far more successful than Syria until recently. As was described earlier, Israel relies mainly on its alliance with the United States for external military assistance, and defense cooperation between the IDF and the Pentagon appears to be on sure footing for the foreseeable future.

With \$2.5 billion in military assistance for 2009 and estimated and projected amounts of \$2.7 billion and \$3 billion for 2010 and 2011 respectively, U.S. security assistance accounts for 19% to 23% of Israeli actual defense expenditures. This continued growth in assistance is due to a memorandum of understanding (MoU) between Israel and the US signed on August 17, 2007 that would provide Israel with \$30 billion in FMF over the 2009-2018. This would see annual levels of aid expand to \$3.1 billion a year over the 2011 to 2018 period.

As **Figure 25** shows, Israel has focused on expanding its holdings of munitions and sub-munitions, upgrading its Patriot missile defense systems and expanding its air mobility and logistical support capacity. Israel's most financially significant commitments included the potential acquisition of 25-50 F-35 Joint Strike Fighters and the Littoral Combat Ship (LCS). As was previously mentioned, congressional notifications only give a tentative picture of future acquisition paths. Israel has since cancelled its order of four LCS for the Israeli Navy, with an eye on co-producing the 2,200 ton MEKO A-100 built by Hamburg Germany-based ThyssenKrupp Marine Systems (TKMS).¹

Syria, which used to rely on substantial levels of Soviet assistance during the Cold War, saw arms deliveries decrease from \$2.6 billion in 1987 to \$52 million in 1994 as a result of the collapse of the Soviet Union. By 2005 Syria also owed some \$13.4 billion in debt to the Russian Federation, compounding efforts to continue force recapitalization. Syria has attempted to cement its relationship with Iran while continuing efforts to obtain Russian assistance at or near Cold War levels.

In 2005, Russia agreed to write off 73% of Syria's debt, opening the prospect of renewed arms sales. Russia has been keen to reassert its influence in the region, committing to provide Syria with some \$300 million in aid over a three year period starting in 2008. Iran has also been reported to have financed part of a \$730 million deal for Syria to purchase 50 Russian Pantsyr-S1E mobile air defense systems.

A coherent long term Russian Middle East strategy beyond antagonizing US interests in the region has remained elusive. Accordingly it is unclear whether or not Moscow will emerge as a reliable source of funds, equipment and training for a cash-strapped Damascus. Russia has yet to disrupt the regional balance by providing either Syria or its ally Iran with sophisticated long range SAM systems, such as the S-300PMU-2/ SA-10 "Grumble" or the S-400/SA-21 "Growler." Given that the bulk of agreements with Russia were made in 2007, it remains to be seen whether Syria has found a reliable arms supplier in the longer term. Even with renewed Russian support, it is doubtful that external support for Syrian expenditures will reach pre-1992-levels.

Levels of US assistance to Egypt and Jordan have also been largely stable since the two countries signed peace with Israel. This "peace dividend" has been essential to both countries' national recapitalization efforts. US assistance added 15.3% to Jordan's defense budget for 2009. Of all the countries in the regional balance, Egypt has become the most dependent on US assistance. US military assistance totaled some \$1.29 billion in 2008 – adding an additional 37.1% to Egypt's \$3.4 billion defense budget. It is unlikely that this trend will change, making US assistance all that more essential to Egypt's long term plans for military procurement.

Egypt hopes to expand its holding of modern SP artillery in addition to both surface and air-launched ATGMs. It has also sought to develop and update its holdings of SHORADs by purchasing additional Avenger and Stringer missiles. Egypt has also moved to ramp up co-production of M1A1 tanks.

Jordan's path based on U.S. FMF includes expanding its C4ISR capability, upgrading its APCs, continuing to develop air power lethality and sustaining ground-based AD and artillery holdings.

Lebanon has received in excess of \$525 million in US military assistance since 2006, a significant increase given Lebanon's tenuous regional position, the presence of Hezbollah and a continued technical state of war between Lebanon and Israel. While US military aid added 8.5% to national defense spending in 2008, numbers for 2007 and 2009 were 37% and 23% respectively. Unlike Egypt, Israel and Jordan, Lebanon has yet to enter into a stable pattern of assistance from the US.

The Asymmetric Balance & Regional Wild Cards

In contrast to the conventional balance, the evolving asymmetric balance is far more fluid and contingent upon the pursuit of short and medium term objectives by regional players with limited resources and comparative disadvantages in the overall conventional balance. This aspect of the balance is a growing feature of the Israeli-Syrian balance and any discussion of Syrian military capabilities would be incomplete without recognizing that Syria's struggle with Israel hinges on asymmetric and proxy warfare.

Low-Level and Irregular Warfare

It is clear that Israel dominates the balance in terms of modern conventional systems, recapitalization and foreign military support. However, asymmetric and unconventional strategies have provided Syria with the means to harass, if not outright undermine, Israeli security and strategic interests in the region. The 2006 Israeli-Hezbollah war was the best proof that Syria could use these efforts to put significant pressure on Israel. **Figure 26** shows the deployment of the expanded UN Interim Force in Lebanon (UNIFIL) in the wake of the 2006 war.

Figure 26: UNIFIL Deployment: February 2010



Source: The United Nations Interim Force in Lebanon.

A pillar of the asymmetric balance is Syria's relationship with armed sub-national organizations with an anti-Israel agenda, especially Hezbollah in Lebanon and Hamas in the Gaza Strip. While proxy warfare is not new to the region, the development of increasingly sophisticated non-state conventional military capacity represents an evolutionary step in Syria's long-term policy of "passive" confrontation with Israel. "Active" non-state allies confront Israel in South Lebanon and the occupied Palestinian territories, rather than on the Golan Heights.²

It is clear that Hezbollah would never have emerged as a major force in Lebanon and the region without Syrian and Iranian arms transfers, training and financial support. While the Shi'a group's unrivaled autonomy in Lebanon has relied on its links to its patron

states, there is little indication that Hezbollah has acted, or will, as a Syrian or Iranian proxy unless its leaders feel this is to the group's direct advantage. In practice, all three seem to have used each other for their own goals and interests.

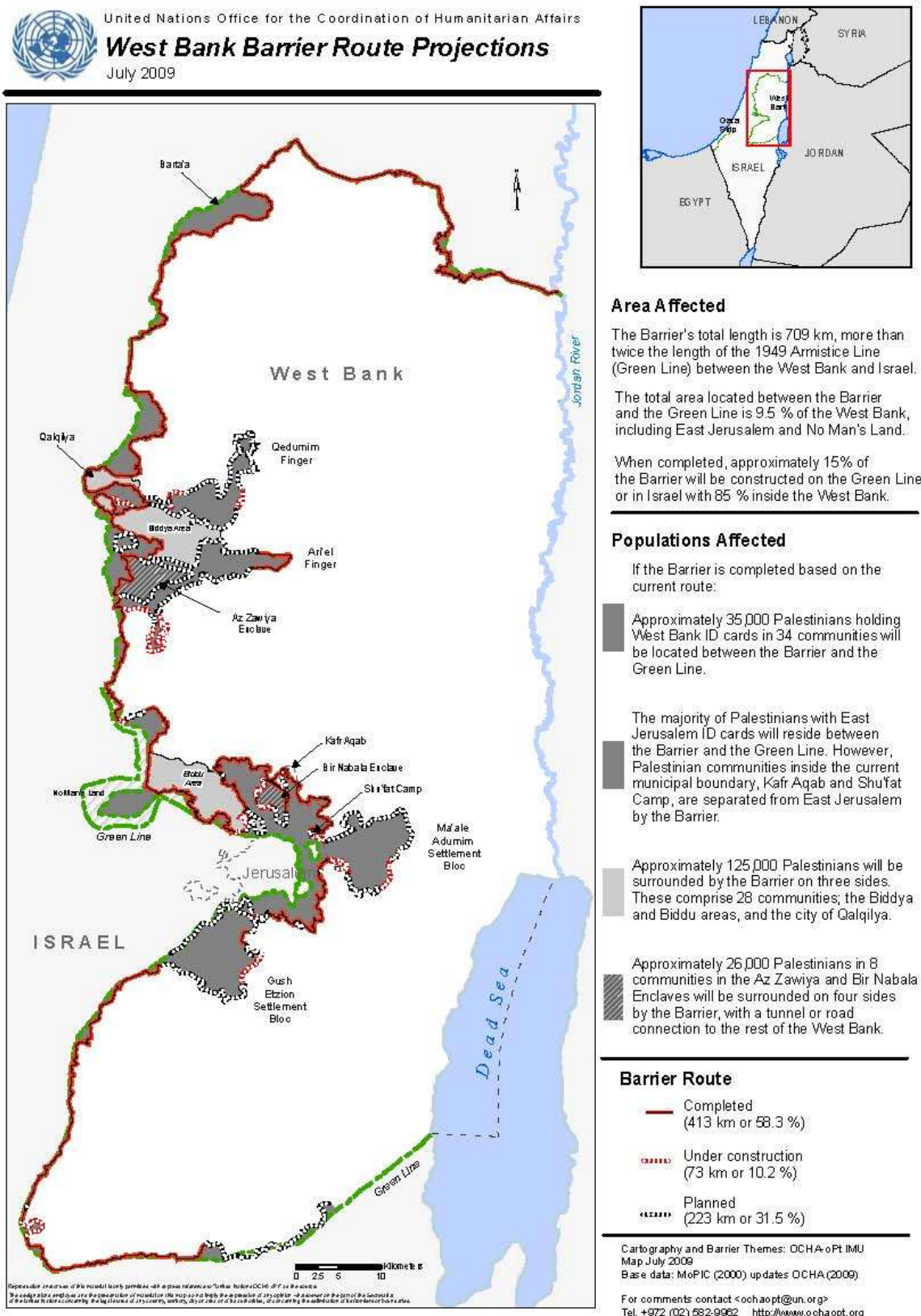
While the Lebanese and Palestinian "fronts" allow Syria to harass Israel, Damascus' proxies lack the kind of effective conventional war-fighting capability necessary to defeat the IDF. Hezbollah demonstrated the limits of its war-fighting capabilities in 2006, as well as some of its strengths. It can play a limited, largely defensive role in conventional warfare and wage spoiler attacks and wars of defensive attrition, but is not a serious direct threat to Israel's ability to maneuver, defend its territory, or exercise air and missile supremacy. Nonetheless, Hezbollah allows Syria and Iran to project power in ways that Israel could not directly counter and without conditions that would prompt Israel to use decisive force against Hezbollah's sponsors. This form of power projection has allowed Syria to push Israel into a low-level war of attrition without involving Syria, while transforming Hezbollah into a serious threat over time.

Rockets and Missiles

Hamas also has tried to develop its holdings of short range rockets; however these efforts have yet to bear fruit. Israeli security measures, including the separation barrier between Israel and the West Bank have served to complicate Hamas' or other Palestinian groups' efforts to confront or antagonize Israel. **Figure 27** and **Figure 28** show the West Bank barrier wall and the Gaza Strip respectively.

Hezbollah has significantly developed its holdings of guided and unguided anti-tank systems in the wake of the IDF's withdrawal from South Lebanon in 2000. Like reports of rocket and ballistic missile transfers, it is hard to determine what systems have actually been transferred, but a number of reports raise important questions about the level of increased sophistication in Hezbollah holdings:

- Tehran is reported to have provided Hezbollah with the "Nader" and the "Toophan," Iranian versions of the Russian RPG-7 and possibly the American TOW missile. The Shi'a group is also reported to be in possession of the "Towsan" and the "Raad," which are based on the AT-5 "Spandrel" and the AT-3 "Sagger" ATGM systems. The improved "Raad-T" is reported to be armed with tandem warheads designed to defeat reactive armor systems.³
- According to some reports, the bulk of Hezbollah's ATGM capabilities expansion in the post-2000 period were provided by Damascus. This is noteworthy given that prior to the presidency of Bashar al-Assad, Syria had allowed arms transfers but was not a direct supplier. Systems reported to have been provided include the AT-13 "Metis-M" equipped with a tandem warhead and able to hit targets at 1.5 km and the AT-14 "Kornet-E." The "Kornet-E," which has a range of 5.5 km and utilizes a semi-automatic command-to-line of sight laser beam-riding targeting system, is one of the most sophisticated anti-armor systems currently available. It could significantly raise the level of threat to Israeli forces in any future conflict. Unguided RPG systems provided by Syria are reported to include the RPG-29 (a tandem warhead variant of the RPG-7) and the disposable single-shot RPG-18.⁴

Figure 27: The Israeli Security Barrier in July 2009

Source: The United National Office for the Coordination of Humanitarian Affairs.

Figure 28: The Gaza Strip



Source: The United National Office for the Coordination of Humanitarian Affairs.

By default, Hezbollah's growing holdings of guided and unguided short range and tactical missiles are the core aspect of the asymmetric balance.

- Some reports indicate that Hezbollah's largest rocket system is the 610 mm Zelzal 2. Weighing some 3,400 kg and capable of delivering a 600 kg warhead in excess of 200 km, the system's lethality and utility are limited by its lack of electronic guidance systems. While the Shi'a militant group did not use its Zelzal rockets during the 2006 war, it is widely believed to have vastly expanded its holdings of both short and medium range unguided rockets to deter future conflict or to inflict psychological costs on the Israeli population in any future war.
- Hezbollah also hopes to expand its holdings of guided rocket systems. The Fatah A-110, a guided version of the Zelzal 2, or the Syrian made M600, a Fatah A-110 clone, would present more of a threat to Israel's interior. Equipped with inertial guidance systems and able to deliver a 500 kg payload to a range of 250 km within a circular error probability (CEP) of 100 m, these systems would allow Hezbollah to threaten as far south as Tel Aviv from the Northern Bekaa. While, there are competing and unconfirmed reports surrounding whether or not Hezbollah has them in inventory, the group is generally believed to have limited holdings of both systems.
- Reports surfaced in early 2010 that Syria may have transferred Russian R-17 "Scud-B" ballistic missiles to Hezbollah. 11.25 m long and weighting some 5,900 kg, the guided liquid fuel rocket is able to deliver a 985 kg warhead over a range of 300 km.

While the "Scud B" has superior range to Hezbollah's existing holdings of unguided medium range rockets, its much larger CEP of 450 m is significantly inferior to the Fatah A-110's CEP of 100 m. "Scud B" are unwieldy systems for an organization that emphasizes stealth, mobility and rapid deployments for multiple fires. The missile cannot be taken apart for easy or inconspicuous transportation. Furthermore, the complexity and volatility of the missile's propulsion system would require dedicated facilities in addition to highly trained personnel.

There is growing skepticism surrounding the transfer of "Scud-Bs" to Hezbollah and to date, there has been no release of aerial observation of any "Scud" transfers across the Lebanese-Syrian border. Unlike solid-propellant rockets like the Zelzal 2, even a modified/stealthy "Scud" transporter/erector/launcher (TEL) would present a clear target for overhead reconnaissance.⁵ US defense sources also have indicated that while a transfer has not been ruled out, there are increasing indications that Hezbollah personnel trained on "Scud" type systems in Syria rather than in the wake of a transfer to Lebanon.

Ultimately, Scud-type liquid fueled rockets might be more of a liability than an asset to Hezbollah's overall missile capability. Furthermore, given Hezbollah's existing inventory of guided and unguided systems, the potential acquisition of "Scud-Bs" has a popular psychological impact in Israel, rather than actually impacting the overall regional balance.

- While Hezbollah has continued to consolidate its arsenal of short range 107 mm and 122 mm rockets meant to harass IDF ground forces in any future war, it may also have developed a use for systems otherwise considered irrelevant in the asymmetric balance. These include fielding multiple teams using large numbers of 106 mm recoilless rifle rounds to swarm and overwhelm the IDF's Trophy active protection system currently equipped on Israeli Merkava MBTs. *Jane's* went on to report that if assisted by sighting guns, this low-tech AT solution could successfully hit Israeli armor out to a range of 1,000 m.⁶ Such tactics would be part of Hezbollah's own lessons learned as it tries to build an edge in the asymmetric balance with Israel.

The emergence of growing missile capabilities does not threaten Israeli security in real terms given the challenges of targeting largely unguided missile systems. However, they have increased Israel's desire to field newer defensive counter-fire systems, such as the Trophy active protection system (APS) for Israeli armor, the low altitude Iron Dome defensive systems and high altitude Arrow II counter-ballistic missile system, to defeat short and medium range rocket and missile threats. It has also prompted the IDF to

further decentralize its supply and logistics infrastructure to protect ammunition and equipment in event of a future war.

There are also reports that Hezbollah has expanded its holdings of advanced longer range anti-ship systems, while personnel may have also trained on the SA-2 and SA-3 major SAM systems. In the post-2006 era, Israel operates under the assumption that any system in Iran or Syria's arsenal could be made available to Hezbollah, with logistics posing the main challenge to inventory development and consolidation.⁷

Figure 29 shows major and short range missile and rocket holdings in the region.

Figure 29: Arab-Israeli Surface-to-Surface Missiles in 2010

Country	Med/Long Range SSM	Short Range SSMs	MRLs
Egypt	9 Scud-B	9 FROG-7 24 Sakr-80	96 BM-11 122 mm 60 BM-21 122 mm 50 Sakr-10 122 mm 50 Sakr-18 122 mm 100 Sakr-36 122 mm 36 Kooryong 133 mm 32 BM-14 140 mm 26 MLRS 277 mm 48 BM-24 240 mm (in store)
Israel	+/-100 Jericho 1 SRBM/ Jericho 2 IRBM 7 MGM-52 Lance (in store)	None	58 BM-21 122 mm 50 LAR-160 160 mm 60 LRS 227 mm 36 BM-24 240 mm 20 LAR-290 mm
Jordan	None	None	None
Lebanon	None	None	22 BM-21 122 mm
Syria	94+ SSM 18 Scud B/Scud C/Scud D 30 look-a-like	18 FROG-7 18+ SS-21 Tochka (Scarab) SS-C-3 Styx	+/- 200 Type 63 107 mm +/- 300 BM-21 12 mm

Note: Medium range SSMs have a range in excess of 70km and includes SRBMs and IRBMs.

Source: Adapted by Anthony H. Cordesman and Aram Nerguizian from the IISS, *The Military Balance*, various editions. Some data adjusted or estimated by the authors

While Hezbollah's weapons arsenal is of concern to Israel, is important to note that it is not the only player in the regional balance with short and medium range rocket and missile capability. Egypt has a large inventory of short range unguided missiles. It also maintains older SSMs and some 'Scud-Bs'. Syria has relatively large holdings of medium and short range ballistic missiles with large holdings of MRLs.

As is discussed later, Syria's larger systems such as its "Scud" holdings, while lacking accuracy and ease of deployment, could potentially play a role in the asymmetric balance were they to be used as chemical or biological delivery systems. Israel has modern short and intermediate range ballistic missiles. Its Jericho I and Jericho II SSMs are capable of delivering conventional, chemical, biological or nuclear payloads up to a range of 500 km

and 1,500 km respectively. Israel also has large holdings of short range MRLs. Lebanon's MRL holdings are negligible while Jordan has no SSM holdings.

In addition to Hezbollah's expansion of its surface-to-surface missile and rocket holdings, future SAM capabilities could become another dimension of the asymmetric balance. In addition to holdings of older SA-7 "Grail" MANPADs, the Shi'a group has been widely reported to be in possession of the more sophisticated SA-14 "Gremlin" and SA-18 "Igla" MANPADs. *Jane's* reported that Hezbollah was receiving training in Syria on the SA-8 "Gecko" mobile radar guided light SAM system in 2009.⁸ There is no indication that Hezbollah received SA-8s that could potentially pose a threat to Israeli helicopters. Neither the SA-8 nor the Igla present a meaningful threat to Israeli F-15Is and F-16Is.

As was stated earlier, the IDF's Teffen 2012 plan was conceived largely as a result of these realities and the perceived shortfalls of the 2006 war. One of the corps lessons was Israel's need to address manpower quality and training to confront the shifting realities of asymmetric urban warfighting. The IDF has since taken steps to drastically expand the number of urban warfare training centers in Israel. The IDF's Combat Engineering Corps, which plays an increasingly relevant counter-IED and armored demolition role, has also been adapting to the realities of future asymmetric warfighting. Teffen 2012 further emphasized the development of a comprehensive multitier Israeli anti-rocket and anti-ballistic missile defense umbrella.

Proxy Warfare

While proxy warfare is an important component in Syria's regional asymmetric strategy, its current posture would not have been possible without regional alliances. Russia, which has yet to completely support the rejuvenation of Syria's armed forces, has only limited impact on Syria's asymmetric regional capabilities. It is Iran, not Russia, the Palestinians or Hezbollah, which may be the most important source of support in the asymmetric balance with Israel.

The Israeli-Hezbollah War of 2006 showed that Syria and Iran could work together in proxy warfare. It also showed that Syrian and Iranian transfers of advanced weapons like modern antitank guided weapons, light surface-to-air missiles, and a range of short- to long-range rockets and missiles could inflict casualties on the IDF and limit its military freedom of action.

Iran's increasingly sophisticated ballistic missile capability plays an important role in buttressing Syria's asymmetric strategy. However, according to IISS's assessment of Iranian ballistic missile capabilities, the military effectiveness of Iran's current ballistic missiles is limited by poor overall accuracy.⁹

It is still far from clear that military ties exist between the two countries that would lead Iran to take the risk of threatening or actually using its missile capabilities against Israel on Syria's behalf. Syria's ties to Iran do, however, provide Damascus with at least one potential ally and significantly complicate Israel's threat analysis and contingency planning – both in dealing with Syria and in dealing with Iran.

One key question is whether Syria can benefit from Iran's growing long-range missile efforts and the possible Iranian acquisition of nuclear weapons. Many of the details of Iranian WMD and missile capabilities had limited importance as long as Israel did not

face a direct threat from Iran. Israel now faces the possibility, however, that it may lose its present nuclear monopoly at some point in the near future. Most estimates put such an Iranian development at least five years in the future.

While Russia and Iran are long-standing regional “wild cards” in the Arab-Israeli balance, Turkey’s evolving foreign policy orientation could serve to further complicate the regional asymmetric and political balance. After some 80 years of developing its ties to Europe, Turkey has taken a strategic decision to refocus its attention back towards the Middle East.¹⁰ Having significantly upgraded its relations with the GCC, Tehran and especially Damascus, Ankara went on to sign a free-trade agreement in June 2010 between Lebanon, Syria and Turkey.¹¹

Israeli-Turkish relations, in contrast, have been increasingly challenged by competing strategic imperatives and regional priorities. Israel and Turkey stand at odds on how best to address the Palestinian question. Perhaps more importantly, Israel and Turkey have competing visions for the Kurdish question in northern Iraq. While Israel supports the emergence of an independent Kurdistan, Turkey would consider such a development as the rise of a hostile fifth column on its southern flank. The May 31 2010 confrontation between the IDF and Turkey-flagged aid ships in international waters off the Gaza Strip highlighted the divisions between the two regional powers. The incident was a chance for Ankara to greatly expand its regional profile, facilitating its recalibration as a major power broker in the region.

Strained relations with Ankara do not benefit Israel’s strategic posture in the regional asymmetric balance, robbing it of a long time ally. However, recent events have made Turkey the most important regional actor supporting the Palestinians, largely at the expense of Iran. Turkey’s upgrading of its economic and security ties to Syria are equally troubling to an Iran that has grown comfortable having relatively free access to the Levant as a means of being a player in the larger Arab-Israeli confrontation. While Turkey’s definitive policy in the region is far from clear, it has become the most recent, and perhaps one of the most important additions to the regional balance in general, and the Israeli-Syrian asymmetric balance in particular.

Weapons of Mass Destruction, Longer-Range Missiles, and a Nuclear Arms Race

Israel is the only country widely reported to have nuclear weapons and advanced ballistic missiles. All of the Arab-Israeli countries, except Lebanon, have the technology base for manufacturing chemical weapons. Iran is a self-declared chemical weapons power, but has never declared its inventory. Both Egypt and Israel have been caught smuggling key components for chemical weapons in the past, including components for the manufacture of nerve gas. Egypt used chemical weapons in Yemen in the 1960s, and there are strong indications that Israel and Egypt believed the other side had chemical weapons during the 1973 conflict. However, no data exist on either Egyptian or Israeli inventories of such weapons, if any.

All of the Arab-Israeli countries have the technology base to manufacture first and second-generation biological weapons, but no reliable data exist to prove they are doing so. There are some indicators that Syria and Iran have at least explored the production of

both chemical and biological weapons. Iran, Israel, and Egypt have almost certainly at least explored the technology for both offensive biological weapons and biological defenses. (The two technologies cannot be separated from each other). All of the Arab-Israeli states are acquiring the technology and production base to develop and manufacture advanced genetically engineered biological weapons. There are no meaningful controls on such technology and equipment, and no existing credible inspection options.

Egypt and Syria may have chemical warheads for their Scud missiles, and it is possible they could have covert biological designs. It is unclear, however, that either country has advanced beyond unitary or relatively simple cluster warhead designs. Both countries have aircraft, and a potential capability to create drones or UCAVs for delivering chemical or biological weapons.

- Syria has extensive holdings of “Scud-B” missiles with a nominal range of 300 kilometers, a 985-kilogram payload, and operational accuracies of 1,500-2,000 meters. Reports of CEPs as low as 450 meters seem more theoretical than real.
- Syria also has up to 150 “Scud-C” missiles with 18-26 launchers. These are North Korean modifications of Russian designs – probably variants of the Hwasong 5 although some elements of Rodon 1 technology are possible – and have accuracies that range from 1,500-2,200 meters – although theoretical CEPs as low as 500 meters are reported in some sources. Reports that Syria has a more accurate “Scud-D,” with a CEP of only 50 meters, do not seem accurate. The “Scud C” has a nominal range of 500 kilometers, but a small warhead could extend the range.
- Egypt has an unknown number of “Scud-Bs,” and at least 9-12 mobile TEL launchers. There are a number of reports that it has operational “Scud-Cs” that it produced using technology it obtained from North Korea. Reports indicate that the CIA detected Egyptian imports of “Scud-C” production technology in 1996.

It is not known if any Arab-Israeli country has developed advanced designs for the covert use of such weapons, line source dissemination, the use of unconventional systems like UCAVs, or advanced cluster munition and non-destructive sub-munition delivery. There have been several reports of developments like a Syrian missile warhead with cluster munitions carrying nerve gas. Egypt, Iran, Israel, and possibly Syria all have the technology and manufacturing base to create such weapons, have developed or produced some form of cluster munition, and could manufacture systems munitions and warheads covertly.

Israel almost certainly has a significant, if undeclared, inventory of nuclear weapons. There are reports they have been manufactured at the Negev Nuclear Research Center, outside the town of Dimona. Based on estimates of the plutonium production capacity of the Dimona reactor, Israel has approximately 100-200 advanced nuclear explosive devices—but such estimates are based on nominal production figures and very uncertain estimates of the material required for a given number of nuclear weapons. They do not address yield, design, or the mix of fission, boosted, and thermonuclear weapons, and Global Security estimates that the total could be as high as 375 to 500 weapons.

There are no reliable unclassified data on Israel's mix of nuclear weapons, or the delivery systems it has given nuclear capability, but Israel did obtain substantial amounts of nuclear weapons design and test data from France before 1968, and probably has a stock of both tactical and thermonuclear weapons. Its inventory is sometimes stated to be 200 weapons, but there is no meaningful source for such data. It is clear that Israel has developed missile booster technology and systems that could deliver nuclear weapons that could strike at any target in Iran. Israel has at least two types of long-range ballistic missiles – sometimes called the Jericho, and has almost certainly deployed either an improved version of the second or a third type of system. Virtually any Israeli fighter could be equipped with nuclear bombs or stand off weapons, but its F-15s and F-16s seem the most likely delivery platforms.

There are no reliable unclassified reports on Israel's ballistic missile holdings, but unclassified sources speculate that Israel has the following capabilities:

- **Jericho I:** 13.4 meters (44 ft) long, 0.8 m (2 ft 7 in) in diameter, weighing 6.5 tons (14,000 lb). It had a range of 500 km (310 mi) and a nominal CEP of 1,000 m (3,300 ft), with a payload of 400 kilograms (880 lb). It was intended to carry a nuclear warhead. It seems to be close or identical to the Dassault MD-620, which was test fired in 1965. According to a report in Wikipedia, IAI produced such missiles at its Beit Zachariah facility. It also reports that that around 100 missiles of this type were produced, although there were some problems with its guidance systems. It also reports that The Jericho I is now considered obsolete and was taken out of service during the 1990s.
- **Jericho II:** a solid fuel, two-stage medium-range ballistic missile system tested in launches into the Mediterranean from 1987 to 1992. Wikipedia reports that the longest was around 1,300 km, and fired from the facility at Palmachim, south of Tel Aviv. Jane's reports that a test launch of 1,400 km is believed to have taken place from South Africa's Overberg Test Range in June 1989, but other sources indicate that this was part of a series of launches of a system using a larger booster. It is reported to be 14.0 m long and 1.56 m wide, with a reported launch weight of 26,000 kg (although an alternative launch weight of 21,935 kg has been suggested). Wikipedia reports that it has a 1,000 kg payload, capable of carrying a considerable amount of high explosives or a 1 MT yield nuclear warhead. It uses a two-stage solid propellant engine with a separating warhead. It also reports that the missile can be launched from a silo, a railroad flat truck, or a mobile vehicle. This gives it the ability to be hidden, moved quickly, or kept in a hardened silo, ensuring survival against any attack. It may have maximum range of about 7,800 km with a 500 kg payload.
- **Jericho III:** Estimates of the Jericho III differ sharply. It may have entered service in the late 1990s, but some put it in the late 2006-2008 period. It is reported to be a three-stage solid propellant and a payload of 1,000 to 1,300 kg. Wikipedia reports it may have a single 750 kg nuclear warhead or two or three low yield MIRV warheads; an estimated launch weight of 30,000 kg and a length of 15.5 m with a width of 1.56 m. Some reports indicate that Jericho III has a radar guided, terminal homing warhead in addition to inertial guidance, and silo-based with road and rail mobility. No reliable estimate of its range exists. It may be able to hit any target in the Middle East and targets as far away as Pakistan and Russia,

Israel has practiced air weapons deliveries that fit nuclear bomb delivery profiles, it may well have nuclear-armed air-to-surface missiles that can strike from outside the range of most surface-to-air missile defenses, and it may be developing nuclear armed cruise missiles for surface ship and submarine launch. Israel may have missile warheads with terminal guidance, but this is unclear. If it does not, it would have to use its ballistic

missiles to strike at large area targets like cities, although it could use its strike fighters to launch nuclear strikes on point targets. Commercial satellite photos have been published of earlier Israeli missile sites, including missile silos. Current siting is not known.

Israel's 17 batteries of improved Patriot MIM-23B surface-to-air missiles have a point defense capability against ballistic missiles. It has deployed three Arrow 2 theater ballistic missile systems and 20-24 active launchers, supported by a Green Pine radar system, and Citrus Tree command and control system. There are known sites at Hadera and Palmachin.

Although Iran does not yet have nuclear weapons, and has only a nominal capability to attack Israel with ballistic missiles – that currently seem limited to inaccurate guidance systems and unitary conventional warheads – Israel is already making significant improvements in its missile defenses. It also seems likely that Israel is improving its capabilities to strike at Iran with fission and fusion nuclear weapons. Iran almost certainly has developed both nuclear bomb and missile warhead designs, but its progress and their nature remain unclear.

¹ Barbara Opall-Rome, "Israel Eyes Locally Built Ship," *Defense News*, June 29, 2009, available at <http://www.defensenews.com/story.php?i=4160683>.

² See Eyal Zisser, The Mouse and the Lion: Syria – Between Passive and Active Resistance to Israel, *Strategic Assessment*, Vol. 12 No. 1 (June 2009).

³ Authors' interview with Nicholas Blanford, June 28, 2010.

⁴ Ibid.

⁵ Doug Richardson, "Reports of Hizbullah 'Scuds' still unconfirmed," *Jane's Missile & Rockets*, April 28, 2010, available at <http://www.janes.com>.

⁶ Nicholas Blanford, Return to arms – Hizbullah and Israel's preparations for war, *Jane's Intelligence Review*, January 14, 2010, available at <http://jir.janes.com>.

⁷ Authors' interview with Nicholas Blanford, June 28, 2010.

⁸ Ibid.

⁹ See "Iran's Ballistic Missile Capabilities: A Net Assessment," *IJSS Strategic Dossier*, 2010, and Doug Richardson, "Iranian ballistic missile developments slower than predicted," *Jane's Missiles & Rockets*, May 24, 2010, available at <http://www.janes.com>.

¹⁰ See Haim Malka, "Turkey and the Middle East: Rebalancing Interests," in "Turkey's Evolving Dynamics: Strategic Choices for U.S.-Turkey Relations," CSIS U.S.-Turkey Strategic Initiative, March 2009, available at http://csis.org/files/media/csis/pubs/090408_flanagan_turkeyreport_web.pdf

¹¹ Osama Habib, "Turkey looks to create free trade zone with Arabs," *The Daily Star*, June 11, 2010.