Israel’s Response to Regional Missile and Rocket Threats

Uzi Rubin

- Threat rationale: Hybrid Warfare.
- The missile threat on Israel’s homeland: Scope and implications.
- Overview of Israel’s missile defense programs.

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Israel Response to Regional Missile and Rocket Threats

Iran’s Radical Alignment

Hamas/Islamic Jihad in Gaza
The New Military Paradigm of Hybrid Warfare

Credit: Brigadier General Itai Brun, IDF General Staff

“We have devised a new type of warfare that is unlike anything the world has ever seen, a kind of warfare that is somewhere between regular war and guerilla”

Hassan Nasrallah, 2008

• The underlying assumption is that Western societies are inherently weak, morally corrupt and fearful of casualties therefore frail (the “Cobweb” doctrine).

• In contrast, the practitioners of Hybrid Warfare are strong, morally upright, heroic and fearless – they “embrace death”.

• Hybrid Warfare is designed to exploit the perceived societal asymmetry for destroying the antagonist’s society rather than his armed forces.
Main Features of Hybrid Warfare

• Intimidation by highly visible demonstrations and verbal threats of destructive missile attacks on the adversary’s homeland.

• Attrition of the adversary’s society by protracted missile and rocket attacks against the defender’s population centers.

• Survivable deployment of ballistic weapons by concealment, dispersion and embedding within the aggressor’s own population centers.

• Leveraging Western values to delegitimize the defender once his counter operations cause collateral casualties within the aggressors’ human shield populations.

• Provoking the defender to hurl massive ground and air assaults on the aggressor’s pre prepared defense in depth to maximize his casualties.

• Dominating the cognitive battlefield by proclaiming each engagement as a “Victory” and never conceding defeat.
Implementation of Hybrid Warfare doctrine

- The military forces of the Radical Alignment are being organized and equipped for static Wars of Attrition rather than mobile Wars of Maneuver.

- Accordingly, classic weapons of mobile warfare - tanks, combat aircraft, large surface naval vessels - are de-emphasized.

- Instead, the emphasis is put on standoff weapons and precision guided munitions - Ballistic and cruise missiles, anti-tank, anti-aircraft and anti-ship missiles.

"I believe we are entering a new era, the era of the Firepower Wars... The new dimension of ballistic firepower is creating a new reality"

Brigadier General Yossi Baidatz, Designated Commander of the IDF War College, in a speech to the INSS, November 17 2011
Syrian Air Force Combat Aircraft
Obsolete or Approaching Obsolescence

MIG-29

SU-24

MIG-23

SU-22
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Iran Air Force Combat Aircraft

F - 14 Tomcat

MIG - 29

F4 Phantom

SU - 24
Iran Missile Programs

Shahab 3 Variants

Shahab 3
Range: 1300 Km
Warhead: Explosive

Shahab 3 ER
Range: 2000 Km
Warhead: Cluster, Thermobaric?

“Ghader 1”
Range: 2000 Km
Warhead?
Iran Missile Programs

The “Ashura”/“Sejil” Two Stage Solid Propellant Ballistic Missile

- First tested November 2007. several more tests followed in 2008 and 2011.

- Declared range: “More than 2000 Km” (Calculated range: 2450 – 2600 Km.)

- Solid propellant rocket motors and staging capability are two key technologies for ballistic missiles of global ranges.
Iran Missile Programs

Iran missiles going into hardened silos
Iran Missile Programs

Iran missiles going into hardened silos

Silo diameter can accommodate larger missiles
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Iran Missile Programs

Is the 3500 Km. BM 25 in Iran?
Iran Missile Programs

BM 25 Components in Iran

Junked SSN6/R27 SLBM
In Russia

Gimbaled steering rocket motor
Displayed in Teheran, Feb 3 2010

SSN6/R27 SLBM Drawing (Russian Arms Encyclopedia)
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Shahab 3
Kadir 1
Ashura/Sejjil
BM25/Musudanil
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Iran Missile Programs

Long Range Ground Launched Cruise Missile

"Iran is extending the range of the KH 55 beyond 2500 Km”

Yair Shamir, than Chairman of IAI, May 5 2010,
http://www.worldtribune.com/worldtribune/WTARC/2010/me_iran0382_05_06.asp
Iran Missile Programs

The 600 mm Family of Heavy Rockets

Zilzal 2
Range C. 250 Km.
Unguided

Fatah 110 3d Generation
Range 300 Km
Boost and midcourse guidance

Fatah 110 anti ship version “Khalij Fars”
Range: C. 200 Km.
Terminal Guidance
Kalij Farse ASBM Keep Away Zone
Brief History of Syria’s Missile Forces

• The Soviet equipped Syrian Air Force and Ground Based Air Defense Forces were heavily defeated by the US equipped Israel Air Force in the 1982 Lebanon War.

• Concurrently, Saddam Hussein Soviet equipped air force was barely holding out against the US equipped and trained Iranian Air Force in the Iran – Iraq war.

• Hafez Assad (Bashar’s Father) rightly concluded that his air power would remain inferior as long as Soviet air combat technology lagged behind the West.

• Two fundamental policy decision were made:
  ➢ To switch from Air Power to Missile Power.
  ➢ To established WMD based deterrence against Israel.
Brief History of Syria’s Missile Forces

- Large quantities of ballistic missiles were acquired from the Soviet Union, subsequently from North Korea and lately from Iran.

- A missile industry was established, including R&D facilities with trained manpower.

- A chemical warfare industry was established, operational chemical warheads were deployed on ballistic missiles.

- A military nuclear program was initiated, but suffered a setback when the North Korean supplied nuclear reactor was destroyed in 2007.

- A policy of opacity was strictly practiced. Syria never conceded having ballistic missiles or WMD – until recently.
The Syrian Civil War
Syria’s Missiles Unveiled

- To discourage outside intervention, the Syrian regime conducted televised exercises of its anti ship, air defense and ground to ground missiles in December 2011 and again in July 2012.

- 7 types of ground to ground weapons were displayed: Four unguided rocket systems and 3 guided missile systems.

- All were anticipated, but never seen before in Syrian service.
Syria’s Ground to Ground Missiles

Unguided Rocket Systems
Syria’s Ground to Ground Missiles

Unguided Rocket Systems

Frog 7
Syria’s Ground to Ground Missiles

Unguided Rocket Systems

Syria: “Maysalun”

Iran: “Zilzal 2”
Syria’s Ground to Ground Missiles

Unguided Rocket Systems

220 mm

302 mm
Syria’s Ground to Ground Missiles

Unguided Rocket Systems

220 mm

302 mm
Syria’s Ground to Ground Missiles
Ballistic Missiles

Syrian “Tishrin”

Iran “Fatah 110”
Syria’s Ground to Ground Missiles
Ballistic Missiles

SS21/KN02
Syria’s Ground to Ground Missiles
Ballistic Missiles

SCUD C/”Joulan 2”
Syria Missile Programs

SCUD Variants

SCUD B
Range: 300 Km
Warheads: Explosive, Chemical

SCUD C
Range: C. 600 Km.
Warheads: Explosive, Chemical

SCUD D
Range: C. 700 Km.
Warheads: Explosive, Chemical Cluster – Runway demolition
Antipersonnel, Fuel/Air,
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Threat to Israel

Map showing Scud B, Scud C, and Scud D threats to Israel from Syria and Lebanon.
Synchronized Launchings

Syria: Synchronized launch of 2 Joulan -2’s

Iran: Synchronized launch of 2 Shahab 2’s
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Synchronized Launchings

Syria: Synchronized launching of 302 mm rockets

Iran: Synchronized launch of 5 Zilzal 2
Mimicking Civilian Transports

Syrian 220 and 302 mm MLRS

Iranian Fajer 5 MLRS

Iranian Fajer 3 MLRS
Syrian Missiles Through Insurgent Eyes – June 10 2012
Syrian Missiles Through Insurgent Eyes – June 6 2012
Syria Rattles its Missiles – December 3 2011
First Ever Officially Released Footage of Syrian Anti Ship Missiles

C802
Silkworm
Yakhont
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Syrian Yakhont ASM Keep Away Zone
Countries Entitled to Offshore Resource Exploitation:

- Turkey
- Syria
- Cyprus
- Lebanon
- Israel
- Palestinian Authority
- Egypt
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Eastern Mediterranean Resource Zone

Leviatan

Hamas: C-704

Hizbullah: C-802

Syria: Yakhont

Mari-B Field

Tamar

Dalit
BARAK 8 Sea based air/missile defense system

*By IAI and Rafael*
Lebanon/Hizbullah Heavy Missiles and Rockets

SCUD B
Range: 300 Km

Fatah 110 guided rocket
Range: C. 250 - 300 Km.
Lebanon/Hizbullah Medium Rockets

Fajer 3
Range C. 45 Km.

“220 mm”
Range C. 70 Km.

Fajer 5
Range C. 75 Km

“302 mm”
Range: C. 110 Km
Lebanon/Hizbullah Light Rockets

Military issue mobile launcher 122mm

Improvised mobile launcher, 107mm (?)

Military issue mobile launcher, Fajer 3 (?)

Static Launcher, 122mm
Gaza: Hamas/Islamic Jihad Rockets

“Kassam” home made rockets
Ranges: 4 – 12 Km

Fajer 5 rocket (?)
Range: 75 Km

Grad 122 mm artillery rocket
Range: 20 Km

Grad ER 122 mm artillery rocket
Range: 43 Km

Ranges:
- 4 – 12 Km
- 43 Km
- 75 Km
- 20 Km
- 43 Km
Potential Range of Jihad Rocket Fired at Israel October 26th 2011
Islamic Jihad Rocket Team Preparing to Fire a Long Range Rocket October 29th 2011

Credit: IDF Spokesperson
A New Reality

• The members of the Radical Alignment are developing, acquiring, deploying and stockpiling rapidly growing arsenals of ballistic weapons, both guided and unguided.

• The current trends in the growing missile threats are:
  - Exponential growth in quantity.
  - Increased range, lethality and precision.

• This hostile capability can now reach anywhere within Israel, cripple key national assets, interfere with military operations and cause a severe casualties in all population centers.

"In 2006 the threat on Israel’s center comprised of a few hundred missiles. Nowadays we are talking about many thousands. Quantity has turned into quality”.

Brigadier General Yossi Baidatz, Designate Commander of the IDF War College, in a speech to the INSS, November 17 2011
Rethinking Israel’s Military Doctrine

- Israel’s legacy military doctrine did not factor in the revolutionary, game changing implications of the rocket and missiles threats on the country’s heartland.

- Missile defense programs started in Israel in the late 1980’s, but it was the shock of the 2006 Lebanon War that instigated a formal modification. To the three enshrined pillars of deterrence, preemption and offensive, a fourth pillar of defense was added – much to the discontent of IDF traditionalists.

- Four major active defense programs are being pursued, as well as integration of the missile defense array to the US deployable missile defense assets.

- The priorities of the missile defense shield should be:
  1. Preservation of the IDF capacity to mobilize and carry out offensive actions.
  2. Preservation of key national installation and infrastructures (Airports, seaports, power grid etc).
  3. Mitigation of casualties and damage among civilian populations.
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Israeli Multi-Layer BMD Concept

Upper-Tier

Intermediate-Tier – ARROW WEAPON SYSTEM

Lower-Tier – DAVID’S SLING / PATRIOT

IRON DOME
Arrow 2 Intermediate Tier Capability
Optimized against medium and long range TBM

Status: Operational, spiral development of Block 4 completed

Arrow 2 Interceptor
US industrial partner: Boeing

Green Pine EW/FC L Band radar
Arrow 3 Upper Tier Capability
Optimized against evolved, long range TBM

Status: In development

Arrow 3 Interceptor
US industrial partner: Boeing

Super Green Pine L Band EW/FC Radar
Status: Operational
Augmented Early Warning Capability

Optimized against evolved, long range TBM

TPY- 2 X Band EW Radar
Status: Deployed
US Asset

Airborne EO sensor
Status: In development
David Sling Lower Tier Capability

Optimized against heavy and medium rockets and cruise missiles

Status: In development

Stunner Interceptor Missile

ELM 2084 Multi Mission Radar

Mobile Launcher

Stunner interceptor

US industrial partner: Raytheon
Iron Dome Localized Defense Capability
Optimized against medium and light rockets

Status: Operational, combat proven

interceptor
Launcher
FC Radar
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Interoperability and Cost Targets

Arrow 2
Cost: 1

Arrow 3
Cost target ~0.75

David Sling
Cost target ~0.1

Iron Dome
Cost target ~0.01

Interoperable with Patriot, THAAD and AEGIS
The Rocket Campaign Against Southern Israel: The Arena
The Rocket Campaign Against Southern Israel 2001 – 2012 And On

Evolution

- From 2001 to 2006 – mainly short range harassment of border communities
- 2006 – first major city attacked (Ashkelon)
- 2009 – range increased to 43 Km, two major more major cities come within range.
- Unpredictable, sporadic fire, “Bursts”.
- No centralized command, attacks come from different armed groups in Gaza, sometimes from individuals seeking revenge or profit.
The Rocket Campaign Against Southern Israel 2001 - 2011
Iron Dome Short Range Missile Defense In Action 2011-2012

• The system was rushed into operation in late March 2011.

• It subsequently saw action in April, August and October 2011 as well as March and June 2012.

• The system successfully discriminated between non-threatening and threatening targets, scoring 75% - 85% kill rates against the latter.

• Losses and damages were dramatically reduced. About 500 rockets that hit Israeli territory caused 1 fatality within a defended area.
Impact within Israel

• The “wow” factor: Missile defense really works!

• Significant morale boost to the involved civilian population, expressions of gratitude to the Israel Air Defense Command troops.

• An elevated – and exaggerated - sense of security in the defended communities.

• Reversal of attitude by treasury and economists: “Whatever the cost of a single interceptor, it is certainly less than the value of the apartments it saves from destruction in Ashdod” (Alon Ben David, military correspondent of Chan. 10)

• Reversal of attitude by ranking Generals: “Active defense is a game changer, because it brings to an end the situation where our cities have been held hostages to any terrorist with a rocket” (Maj. General res. Dan Harel, former deputy chief of staff).

• Fierce competition between city mayors for protection by Iron Dome.
Impact on the Adversaries

• In the declarative dimension: Initially, no official reference to Iron Dome. From March 2012 and on: Accusation that Israel is using Gaza as a battle lab for testing Iron Dome.

• In the cognitive dimension: Sense of dejection in Gaza, criticism of local leadership by public opinion.

• In the policy dimension: No discernable tendency to cease or reduce the rocket fire.

• In the operational dimension: Prompt attempts to break through the defensive shield by saturation.

• In the wider adversarial zone: Strong impression of Israeli technical prowess (Iran: “Our missile will defeat Iron Dome”).
Future Plans

- As of June 2012, four batteries were available to defend the 650,000 residents of Southern Israel’s major cities.

- Two additional batteries are scheduled for commissioning by early 2013.

- Thanks to the generosity of the US, the production of more Iron Dome batteries and interceptors is now proceeding ahead.

- An improved version of the interceptor has been cleared for operations.
In Conclusion

- The successful defense of Israel’s southern cities against rocket attacks proved:
  - That “you can hit a bullet with a bullet”.
  - That it can be done with current technologies, allowing future technologies to mature in a timely fashion.
  - That cities need not be hostage to every rocket wielding terrorist.
Israel Missile Shield

Defending the Nation