Army Orders 1 Million Pieces of Grenade Developed by DRDO's Chandigarh Lab

July 21, 2010
The Tribune

About a decade after being designed, the Army has approved bulk production of lightweight modular hand grenades developed by the Defence Research and Development Organisation (DRDO) for induction. An order has been placed with the Ordnance Factory Board for supplying one million hand grenades to the Army.

Known as Shivalik, these would replace the existing M-36 HE grenades, the original version of which dates back to the Second World War. Developed by DRDO's Chandigarh-based Terminal Ballistics Research Laboratory, the new

grenade overcomes the safety hazards posed by the existing grenades. The M-36, according to the DRDO, has a severe reliability problem due to its flawed fusing system and uneven fragmenting pattern, making it unsafe even for the thrower. Shivalik uses a modular plastic body and pre-formed cylindrical mild steel fragments for uniform distribution of fragments to overcome these deficiencies. Additional features have been incorporated into the fuse's arming mechanism to ensure greater safety during storage, transportation and airdropping. Fragmentation distribution can also be controlled for use in offensive or defensive roles by attachment of a fragmentation sleeve. The use of plastic has also resulted in reduction of the grenade's overall weight. Unlike earlier grenades, it can be para-dropped if urgent re-supplies are needed and can function in temperatures ranging from minus 20 to 55°C.

Besides the Shivalik, the Army has also approved bulk production of the add-on 40 mm under-barrel grenade launcher (UBGL) that is attached to rifles for increasing their firepower. The UBGL, which can be mounted on the INSAS as well as AK-47 rifles, was developed keeping in view the global trend in technology for small arms from the concept of point-target capability to area-target capability. Capable of night-firing, it fills the gap between the maximum range achieved by a hand grenade and the minimum range of a mortar while giving better accuracy than both. Another unique weapon under development by the DRDO is the "chill grenade", which uses extract of Bhut Jolokia, certified as the world's hottest chilli and is native to the northeast. Part of a range of equipment being developed by the DRDO for counter-insurgency and internal security operations, the chilli-grenade is non-toxic and non-lethal and functions like tear-gas used by the security forces. Its pungent fumes can smoke out terrorists or hostile elements from hideouts.

Source: http://www.tribuneindia.com/2010/20100722/main6.htm

Prithvi-II Test-fired Successfully

Y. MALLIKARJUN ➤ July 19, 2010
The Hindu

HYDERABAD: Nuclear weapons-capable, medium range surface-to-surface Prithvi-II ballistic missile was successfully test-fired from the Integrated Test Range (ITR) at Chandipur, off the Orissa coast, on July 16, 2010. The missile was fired by the personnel of the Strategic Forces Command (SFC) from a mobile launcher at 6.50 a.m. as part of the user training exercise. Aided by a state-of-the-art navigation system, Prithvi-II achieved a high degree of accuracy as it splashed down within a few metres of the target in the sea after a six-minute flight. The trial met all the mission objectives

While the single-stage, liquid propelled missile is capable of striking targets at a maximum range of 350 km, it was tested for a lesser distance, an official of the Defence Research and Development Organisation (DRDO) told TheHindu from the ITR. A number of radars, electro-optical and telemetry systems, located along the Orissa coast, monitored the trajectory of the missile and evaluated all parameters in real time. Two naval ships anchored near the target point tracked and witnessed the terminal event.

The nine-metre-tall Prithvi-II has already been inducted into the Air Force. It can carry payloads ranging from 500 kg to 1,000 kg and has features to deceive anti-ballistic missiles.

Its guidance system enables it to carry multiple payloads for multiple ranges. It can also carry different conventional warheads, including sub-munitions, cluster

munitions and pre-fragmented explosives. S.K. Vasudeva, Chief Controller, R & D (Strategic Systems); V.L. N. Rao, Programme Director, Air Defence; Avinash Chander, Director, Advanced Systems Laboratory; S.P. Dash, Director, ITR; and other senior officials from the DRDO and the SFC witnessed the launch.

V.K. Saraswat, Scientific Adviser to the Defence Minister, congratulated the DRDO scientists and armed forces personnel for the success of the mission. The Prithvi is the first of the missiles developed under the country's Integrated Guided Missile Development Programme. It now has two variants — Air Force version (Prithvi-II) and Naval (Dhanush) — both having a range of 350 km.

Source: http://www.hindu.com/2010/06/19/stories/2010061964131500.ht m

After Two Failures, Nuclear-capable Agni-II Successfully Test-fired

May 18, 2010
Times of India

After two failures in a row last year, India tested its nuclear-capable Agni-II ballistic missile successfully from Wheelers Island off the Orissa coast on Monday morning. The tri-service Strategic Forces Command (SFC) test-fired the 2,000-km-plus Agni-II, which carries a one-tonne warhead, in a "user training trial" towards making the two-stage, solid-fuelled missile fully operational in the country's nuclear arsenal.

"Agni-II, which is around 20 metres tall and weighs 17 tonnes, was tested for the full range and met all mission objectives. With this launch, the SFC has carried out launches of Agni-I (700-km), Agni-II and Agni-III (3,500-km) within a time span of five months," said a defence ministry official. DRDO officials, incidentally, have blamed the two Agni-II failures last year, on May 19 and November 23, on manufacturing problems rather than any design and development defect.

At present, the only ballistic missiles which can be said to be "100% operational" are the short-range Prithvi missile (150-350 km) and the 700-km-range Agni-I. Both Agni-II and Agni-III are still in the process of being inducted by the SFC. India's most ambitious strategic missile Agni-V, in turn, will be ready for its first test only by early-2011. With a proposed range of 5,000-km, Agni-V will have near ICBM capabilities (strike range in excess of 5,500-km) and give India's "dissuasive deterrence posture" against China some credible much-needed muscle.

Interestingly, Agni-V will be a canister-launch missile system to ensure it can be swiftly moved closer to the border with China to bring the entire country within its strike envelope. As reported earlier, DRDO is also working on MIRV (multiple independently targetable re-entry vehicles) technology for the Agni

series of ballistic missiles. An `MIRVed' missile can carry a bunch of nuclear warheads in a single payload, each of which can hit different targets along separate trajectories.

Source: http://timesofindia.indiatimes.com/india/After-two-failures-nuclear-capable-Agni-II-successfully-test-fired /articleshow/5941459.cms

Pakistan Navy Tests its Strike Capability in Arabian Sea

March 12, 2010
Associated Press of Pakistan (APP)

Pakistan Navy Fleet tested its fire power in the North Arabian Sea to assess the lethality, precision and efficacy of its weapon systems. This was announced in an ISPR (Navy) press release issued here on Friday. It said that Admiral Noman Bashir, Chief of the Naval Staff, witnessed the event. This included successful firing of a variety of missiles and torpedoes from PN ships, submarines and aircraft.

Commander Pakistan Fleet, Vice Admiral Tanveer Faiz, was overall incharge of the firing serial. Chief of the Naval Staff on this occasion expressed his complete satisfaction on the operational readiness of PN fleet and commended the officers and men for their commitment and professionalism. The weapons tested included newly inducted weapon systems, such as anti surface missiles from F-22 P Frigate and air-to-surface missiles from P3C aircraft.

An important feature of the event was firing of subsurface-to-surface missiles from Agosta 90B submarines. The target set was successfully engaged. Earlier, the weapons firing zone spread over hundreds of miles at sea was cleared of all merchant ships and fishing craft through extensive range clearance operations to ensure safe conduct of the activity.

Source: http://www.app.com.pk/en_/index.php?option=com_content&task=view&id=98296&Itemid= 2

China Sets Up First Cyber Base

July 23, 2010
The Asian Age

PTI- The Chinese military has opened its first cyber base headquarters but has assured that the facility was not aimed at launching cyber war. People's liberation Army (PLA) on Monday launched the centre dedicated to handling all types of cyber threats and related issues.

The centre marks the debut of a new force in China to tackle potential cyber threats and to safeguard national security; PLA Daily reported but did not mention the location of headquarters. It marks the emergence of China's military power in information support and security, the daily said. "The setup of the base just means that our army is strengthening its capacity and is developing potential military officers to tackle information-based warfare," a top army official said, denying the perception that it was aimed at penetrating other country's networks for disrupting them.

The base will be used to gather online information and "build up walls" to safeguard confidential military information, he added. "It is a 'defensive' base for information security, not an offensive headquarters for cyber war," he was quoted assaying by Global Times.

He also said that the question about whether to build a cyber war headquarters similar to that of the US or not had triggered a heated debate among some senior military officials in China. The current level of information technology in the Chinese army lags behind that of the US. Meanwhile there are 13 DNS servers around the globe, of which the root server and nine others are all located in US, he said.

Li Fei, a network security expert at the National Defence University, told the Global Times that the major purpose for establishing the base was to enhance the army's strength in network defence, but he refused to give details about the

base. Cyber security attracted worldwide concern recently. Some foreign media blamed Chinese hackers for a string of attacks on some websites that belong to government agencies and military institutions in other countries, including some sensitive ministries in India.

Refuting the reports, the National Computer Network Emergency Response Team (CNCERT) of China said "most foreign countries that developed advanced informational system and cyber technology are equipped with professional hacker teams."

"They never mention their cyber force but keep rumour mongering and overstating the cyber threat from Chinese hackers, which conversely reflect they're covering up their political purpose of building up a cyber army," Zhou Yonglin, an official with CNCERT, Xinhua News Agency reported.

Source: http://www.asianage.com/international/china-sets-cyber-base-hq-631

SCHOLAR WARRIOR

SECTION VII

MILITARY HISTORY

CENTRE FOR LAND WARFARE STUDIES

Gulf War I

The 100 Hour War

ROHIT SINGH
CLAWS

The Persian Gulf Region

Introduction

The Prussain Army of Frederick the Great with a few more than 20000 men, met and defeated a French army of more than double the number at the battle of Rossbach in the 18th Century. On September 19, 1415, the English army of Henry V comprising about 6000 men inflicted a stunning defeat on a French army of 25000 at the Battle of Agincourt.

In June 1967, the Iraeli Defence Forces launched preemptive strikes against a coalition of Arab nations and decimated their ground forces. But all of these

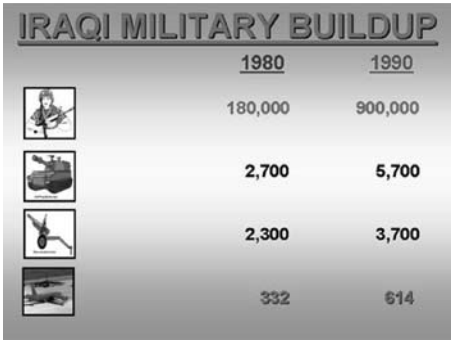
battles pale by comparison to the scope and margin of victory gained by the combined forces of the Coalition in Operation Desert Storm. An army of 500,000 men was crushed at a cost of fewer than 100 lives. A force of over 40 divisions, with 4000 tanks, was completely destroyed for a loss of fewer than 10 tanks. Coalition front-line fatalities in the ground portion of the campaign worked out to less than one man killed per enemy division destroyed.

Origins

Most of the Persian Gulf remained under British occupation till the Second World War. After gaining Independence from Britain in 1932, Iraq had started laying claims to Kuwait. It said that Kuwait was historically a part of the Ottoman Empire's province of Basra. Britain's aim was to limit Iraq's access to the sea and maintain its domination over the Persian Gulf. After Kuwait was granted Independence in 1961, Iraq claimed it as its 19th province. Iraq did not recognise Kuwait till 1963 and also the boundary between Iraq and Kuwait.

Throughout the Cold War, Iraq had been a Soviet Union ally. But, after the Iranian Revolution the United States began to cultivate its ties with Iraq in order to undermine Iran. It provided diplomatic and military support to Iraq during the Iran-Iraq War. However, Iraq's support to the Abu Nidal group (a Palestinian terrorist organisation operating with official support from Baghdad) continued to remain a sticking point in Iraq-US relations. When Iraqi President Saddam Hussein expelled the group to Syria at the United States' request in November 1983, the Reagan administration sent Donald Rumsfeld to meet President Hussein as a special envoy and to cultivate ties.

By the time the ceasefire with Iran was signed in August 1988, Iraq was virtually bankrupt, with most of its debt owed to Saudi Arabia and Kuwait. Iraq pressured both nations to forgive the debts, but they refused. Iraq also accused Kuwait of exceeding its OPEC quotas and driving down the price of oil, thus further hurting the Iraqi economy. The collapse in oil prices had a catastrophic impact on the Iraqi economy. The Iraqi Government described it as a form of economic warfare, which it claimed was aggravated by Kuwait slant-drilling across the border into Iraq's Rumaila oil field.



The Invasion of Kuwait

Iraq had been carrying out a troop buildup on the Iraq-Kuwait border in the garb of exercises. On 31 July 1990, the negotiations between Iraq and Kuwait at Jeddah broke down. Kuwait was invaded at 0200 h on 02 August 1990 in a two-pronged assault led by the Iraqi Republican Guards. The main thrust of the attack was moving southwards from the Iraq-Kuwait border along the highway into Kuwait city. After two days of intense fighting most of Kuwait's Armed Forces disintegrated. Kuwait city was taken by the Republican Guards. The Iraqi's assaulted the Dasman Palace, the Royal Residence of the Emir of Kuwait, Jaber Al-Ahmad Al-Jaber Al-Sabah, which was defended by the Emiri Guard supported with M84 tanks. In the process, the Iraqis killed Sheikh Fahad Al-Ahmed Al-Jaber Al-Sabah, the Emir of Kuwait's youngest brother. Most of the Royal family fled to Saudi Arabia. After the decisive Iraqi victory, Saddam Hussein installed his cousin, Ali Hassan al-Majid (later known as Chemical Ali and now executed) as the governor of Kuwait. The Republican Guards positioned themselves on the Saudi border. The Kuwaiti oil fields were impounded and atrocities carried out on Kuwaiti citizens.

After the invasion, the United Nations Security Council (UNSC) imposed economic sanctions (resolution 661) and economic blockade (resolution 665) on Iraq. Iraq offered to withdraw from Kuwait but linked it up with Israel withdrawing from Gaza and West Bank, and Syria from Lebanon. A series of diplomatic moves and negotiations by major western countries failed to break the impasse.

MNF AGAINST IRAQ

COUNTRY			
US	5,32,000	2000	1800
UK	42,000	200	60
UAE	40,000	200	20
FRANCE	20,000	350	38
SYRIA	19,000	300	-
SAUDI ARABIA	94,000	550	300
PAKISTAN	10,000	-	-
BANGLADESH	2,000	-	-
OTHERS	85,150	499	396
TOTAL	8,44,150	4,099	2,614

Operation Desert Shield

Saudi Arabia had loaned some 26 billion dollars to Iraq during the Iran-Iraq war. As the post war Iraqi economy crumbled, Sadam Hussein hoped that it would not have to pre-pay the debt as Iraq had defended Saudi Arabia's interest from Iran. (Iran being a Shia country is a threat to Saudi Arabia as it feared the influence of the Iranian Revolution from reaching Saudi Arabia; most of the Saudi oil fields lie in Shia dominated areas).

As Saudi Arabia was unwilling to forgive the debts Saddam Hussein launched a tirade against the Saudi Kingdom and accused it of being a US puppet. The presence of Iraqi forces in Kuwait directly threatened Saudi Arabia's oil fields. On the request of King Fahd and due to the fear of an Iraqi invasion of Saudi Arabia, the US President George H.W. Bush invoked the Carter doctrine and launched "Operation Desert Shield" for the defence of Saudi Arabia. This "wholly defensive" doctrine was quickly abandoned when, on 8 August, Iraq declared Kuwait to be the 19th province of Iraq and Saddam Hussein named his cousin, Ali Hassan Al-Majid as its military-governor.

Two Naval battle groups with the aircraft carriers, USS Dwight D. Eisenhower and USS Independence were positioned in the Persian Gulf by 8 August 2008. They were later joined by the battleships USS Missouri and Wisconsin. 48 F-15 aircrafts commenced patrols of the Iraq-Kuwait-Saudi Arabia border areas. The United States military buildup in the area reached 5,43,000 troops. (twice the number mobilised during the Iraq invasion of 2003).

The objectives of Op Desert Shield were to defend Saudi Arabia, effect Iraq's withdrawal from Kuwait and bring stability to the Persian Gulf region. The other objectives were to protect US citizens in the area and destroy WMDs alleged to be possessed by Iraq.

Iraqi Military in 1990

Iraq had the fourth largest army in the world. It was the largest army at the time in the Persian Gulf with heavy artillery and mechanised forces. It also possessed the Scud missiles with a 750 Km range. It had an air force with modern aircrafts. In comparison its navy was relatively small.

Operation Desert Storm

The multi-national offensive campaign, "Op Desert Storm" was referred as the "Mother of all Battles" by Saddam Hussein. The four phases of the campaign were:

- Strategic Air campaign
- Air Supremacy
- Destruction of strategic assets
- Offensive ground campaign

Resolution 678, passed on 29 November 1990 by the UNSC gave Iraq a withdrawal deadline until 15 January 1991, and authorised "all necessary means to uphold and implement Resolution 660," and a diplomatic formulation authorizing the use of force if Iraq failed to comply.

Strategic Air Campaign: The air campaign was launched on 17 January 1991. Over 1,00,000 sorties were flown over six weeks. The initial strikes were primarily against Iraqi air defence sites. In the second phase of the air battle, Iraq's command and control facilities were targeted. In the third phase, Iraqi Scud missile launchers, naval facilities and research centres were targeted. The Iraqi air force was flown to Iran. The coalition forces lost 44 aircrafts due to Iraqi action. Iraq launched Scud missile attacks. 39 such missiles landed on Israel causing some property damages but little casualties. In one Scud attack in Dhahran in Saudi Arabia's Eastern Province, 28 US soldiers were killed. The Iraqis also burnt oil fields and spilled a large quantity of oil into the Persian Gulf.

The Coalition air campaign managed to achieve total air supremacy, later facilitating deep ground operations and evolving the concept of AirLand battle. The Iraqi supply was reduced from 20 K tons to 2 K tons per week. The targeting of Iraqi Command and Control facilities rendered its ground forces ineffective as Iraq had a highly centralised command and control with no initiative being encouraged at the lower levels.

On 29 January 1991, the Iraqi forces attacked the strategically important but lightly defended Saudi city of Khafji. In the battle that lasted for two days nearly 60-300 Iraqi soldiers were killed. 11 US troops were killed when an AC-130 helicopter gunship was shot down.

Operation Desert Sabre

The four phases of the war were:-

- Phase 1- Advance into Kuwait and Iraq.
- Phase 2- Invest Kuwait City and advance upto the Euphrates river.
- Phase 3- Capture Kuwait City and destruction of the Republican Guards.
- Phase 4- Advance to Baghdad.

Liberation of Kuwait: On 23 February 1991, the 1st Marine Division, 2nd Marine Division, and the 1st Light Armored Infantry crossed into Kuwait and headed toward Kuwait City. They overran the well designed, but poorly defended, Iraqi trenches in the first few hours. Kuwaiti forces soon liberated Kuwait City. Most Iraqi soldiers in Kuwait opted to surrender rather than fight.

By 26 February 1991, Iraqi forces had begun retreating from Iraq. They adopted a scorched earth policy in which 737 Kuwaiti oil fields were set on fire.

The U.S. VII Corps in full strength and, spearheaded by the 3rd Squadron of the 2nd Armored Cavalry Regiment (3/2 ACR), launched an armored attack into Iraq early on 24 February, just to the west of Kuwait, taking Iraqi forces by surprise. Simultaneously, the U.S. XVIII Airborne Corps launched a sweeping "left-hook" attack across the largely undefended desert of southern Iraq, led by the 3rd Armoured Cavalry Regiment (3rd ACR) and the 24th Infantry Division (Mechanized). The left flank of this movement was protected by the French 6th Light Armoured Division Daguet.

A long convoy of retreating Iraqi troops formed along the main Iraq-Kuwait highway. Although they were retreating, this convoy was bombed so extensively by Coalition air forces that it came to be known as the Highway of Death. Hundreds of Iraqi troops were killed. Forces from the United States, the United Kingdom, and France continued to pursue retreating Iraqi forces over the border and back into Iraq, eventually moving to within 150 miles (240 km) of Baghdad before withdrawing from the Iraqi border.

One hundred hours after the ground campaign started, on 28 February, President Bush declared a cease-fire, and he also declared that Kuwait had been liberated.

Casualties

IRAQ

Civilian: An investigation by Beth Osborne Daponte estimated civilian fatalities at about 3,500 from bombing, and some 100,000 from other effects of the war.

Military: A report commissioned by the US Air Force based on POW accounts estimated Iraqi Military casualties to be around 20,000 (including 10-12,000 in the air campaign).

MNF

US	148 battle-related deaths (35 to friendly fire), A further 145 Americans died in non-combat accidents.

UK	47 deaths (9 to friendly fire)
France	02
Kuwait	suffered 37 deaths
Saudi Arabia	18
Egypt	10
UAE	06
Syria	03

State of Iraq Army after the War

42 out of 68 Divisions rendered ineffective for combat.
3700 MBTs destroyed.
2400 AFVs destroyed.
2600 Artillery pieces destroyed.

Air Force

36 aircrafts and 6 helicopters destroyed.

Multi National Force

US

28 aircrafts and 5 helicopters destroyed in combat.
10 Ac and 17 HEPTRs due to non combat losses.

UK, ITALY, KUWAIT & SAUDI ARABIA

Lost 9 aircrafts and 2 in training.

The Gulf War brought to fore the theory of war which had the following salient features:

National Will to carry out war: A systematic PR campaign was carried out in the US which led the Senate to vote in favour of war.

Political Goals achieved by war: The Coalition forces re-affirmed their supremacy in the Persian Gulf region and came to the defence of Saudi Arabia. Politics and economy came to be closely interlinked in the end-state of warfare, US aimed to corner sizeable influence in the Gulf oil reserves due to the war. The aim of warfare transformed from mere territorial aims to geo-political interests.

World Opinion: The importance of creating just causes or a favourable international opinion before military intervention was highlighted.

Diplomacy: Diplomacy and negotiations were an important ingredient in the intervening periods between the various stages of war and different crisis. Diplomacy was quickly resorted to to buy time for military action and build on gains of military victory. Several peace embassies by the US and other European nations helped create the justification for military action and provided an alternate path to war.

Study Strategy and Operational Art: The US forces had carefully studied the Iraqi campaigns of the Iran-Iraq war and evolved their own Operational Art accordingly. The top-heavy Iraqi command and control structure of the former war led to the coalition forces to target the enemy C2 assets in the initial stages of the campaign itself. This led to the breakdown of leadership and control over the Iraqi ground forces.

Air Land Battle: The concept of Air Land battle evolved prominently with the Gulf War. The advantages of achieving total air supremacy over the modern-day battlefield, thus enabling swift maneuver by ground forces was demonstrated.

CNN War: The war in the Persian Gulf was touted as the first modern day televised war. Reporters embedded with frontline coalition units beamed reports back home, thus bringing the common man and the soldier close. It also helped in generating favourable opinions for the countries waging the war. On the other hand, there were allegations of censoring and restricted access to reporters.

Lessons Learnt

Technology: Precision-guided munitions, such as the United States Air Force guided missile AGM-130, were heralded as key in allowing military strikes to be made with a minimum of civilian casualties compared to previous wars, although they were not used as often as more traditional, less accurate bombs. Specific buildings in downtown Baghdad could be bombed whilst journalists in their hotels watched cruise missiles fly by. Precision-guided munitions amounted to approximately 7.4% of all bombs dropped by the coalition. Other bombs included cluster bombs, which disperse numerous submunitions,[116] and daisy cutters, 15,000-pound bombs which can disintegrate everything within hundreds of yards.

Technology was the key in defeating a numerically superior enemy.

Air Dominance: The importance of the air component in war gained prominence. A devastating air campaign which destroyed the enemy's C2 and Air Defence assets enabled successful ground campaigns to be launched. The enemy's SCUD missile launchers and aircrafts were also targeted on the ground. This helped them in carrying out swift and un-hindered maneuvers.

Surprise and Deception: The Coalition Forces carried out an effective mobilisation by carrying out a ground exercise in January 1991. At the same time, an amphibious show of force in the Persian Gulf led Saddam Hussein to divert four of his divisions to the Eastern flank. This weakened the Iraqi force levels along the Kuwaiti border from where the ground invasion was finally launched. The forces also gave signal signatures of their HQ at old location.

Logistics: The targeting of Iraqi logistics prior to the main battle led to the rout of their ground forces as they were unable to systematically mobilise their units and sustain them for battle.

Communication, EW , IW & Psychological Warfare: The importance of electronic means for secure communication, rendering the enemy's C2 assets ineffective before the actual campaign was highlighted. Electronic Warfare and Information Warfare emerged as battle concepts and tools to gain moral and psychological ascendancy over the enemy.

Salient features of the War

Surprise and Deception

- Simulate build up in the traditional areas to reinforce en's perceptions and threat analysis.
- Conceal build up as part of mov to traditional areas in garb of trg and launch on the line of march.
- Retain the capability to launch from concentration areas.
- In areas of own intrest keep build up a well guarded secret.
- Retain amph capability to pose threat in a vulnerable sect.

Command and Control

- US employed world wide command and control system.
- Iraqis centralised command and control due to break down in comn crippled Iraqi forces from fighting coordinated battles.
- Recommend integrated operation at theatre level.
- Synergised employment of force multipliers.
- FMCP at corps level.

High Tech War and Technological Asymmetry

- MNF resorted to employment of high tech weapon systems, Iraqi forces lacked the following :

- Access to satellite imagery and high tech surveillance means.
- Redundancy in Iraqi command and control setup.
- Technological gap in weapon systems fielded by MNF and Iraq.
- The future warfare will rely on improved technology.
- Achieve ideal mix of man and machine.
- Achieve essential technological edge and develop Electronic Warfare capabilities and programmes.

Communication

- Need for inter service C31 systems.
- Survivability of sys, indigenous backup.
- Accretion in EW capability.
- Information warfare technology.

Intelligence

- Battle field transparency.
- Integration of surveillance resources and intelligence sharing in real time
- Imporatnce of denial of information.

Ground Operations

Fixed defences:

- DCB defence with viable fwd zone as zone of decision essential.
- Depth in defence.
- Concept of filling ditches with oil to set aflame.
- Obstruction without being covered by fire is redundant.
- Employment of mobile reserves to restore situation.
- Employment of MOGs.

Obstacle Breaching

- Recommend FAE capability.
- Introduction of CLMC towed by A vehs.
- Intro of CET.
- HB capability to establish brigade size bridge heads.

Additionally, the capability to establish helicopter bases in enemy depth was also highlighted.

The role played by the US Training and doctrine command (TRADOC) also needs to be studied.

Conclusion

It is likely that staff colleges and Schools of Instruction around the world will study Desert Storm for generations to come. Attempts to explain the success of Desert Strom will have to examine various sources. However the salient features upon which hinged the success of the Coalition Campaign were the vitality of air power, leadership, motivation, equipment and state of the art technology. The war also highlighted the fact that realistic training is essential and that troops are more important than equipment.

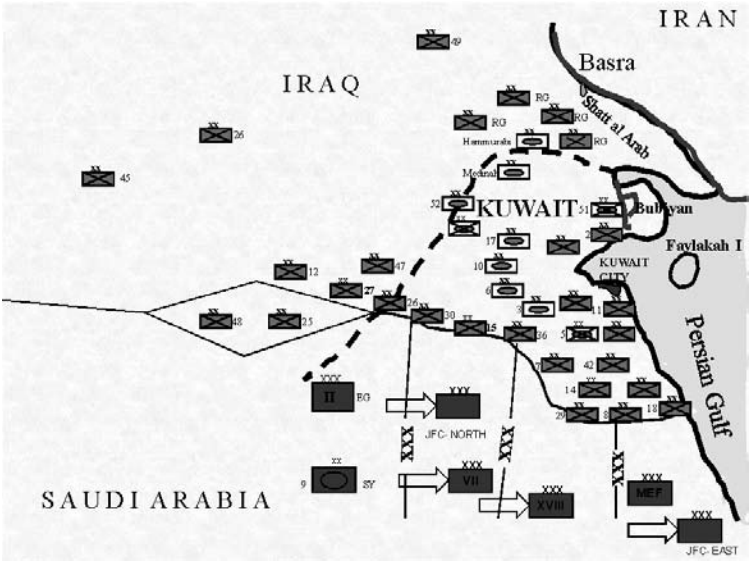
The combination of the best troops with the best equipment was unstoppable. The Iraqis fought hard for eight years against Iran, but they threw in the towel in 100 hours. They had been subjected to an intense bombing campaign for five weeks. This broke their motivation and will to fight. Many units were on the verge of physical collapse as the Coalition forces had crippled their logistics. The line troops of the Coalition armies lacked experience in warfare although they had combat experienced officers at battalion and above levels. On the other hand, the Iraqi army which had eight years of experience in positional warfare failed to face a mobile warfare scenario. Realistic training gained by the Navy's Top Gun and Air Force's Red Flag program and the Army's National Training Centre readied soldiers for realistic maneuvers. The proof was there to see in Desert Storm.

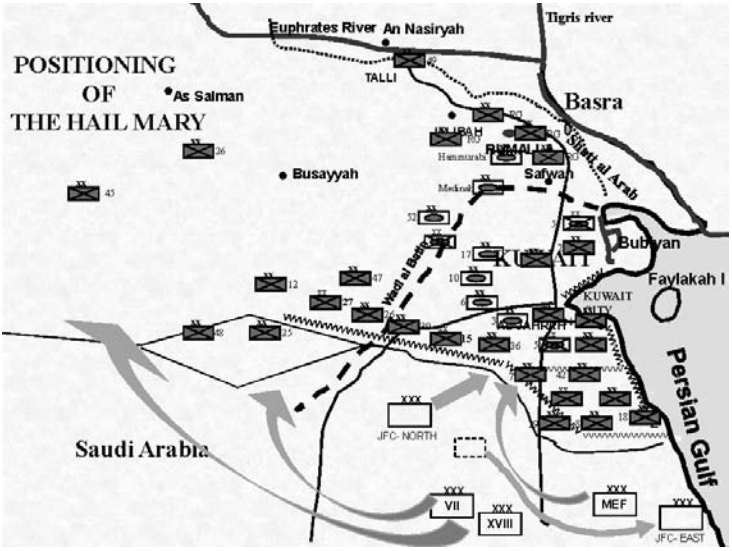
In the end it was the experienced and professionally competent leadership of the Coalition forces which gave their men and women the motivation and direction to wage a successful campaign. It is said that lopsided victories occur when one side is very smart and the other side is very stupid. Iraq suffered at the alter ego of one man, Saddam Hussein and his top-heavy leadership structure. Their most experienced and professional leaders were purged, leaving only yes-men in the fray. The poor quality of leadership and lack of initiative at the junior levels led to the rout of the largest army in the Persian Gulf which had resolutely battled Iran for eight long years.

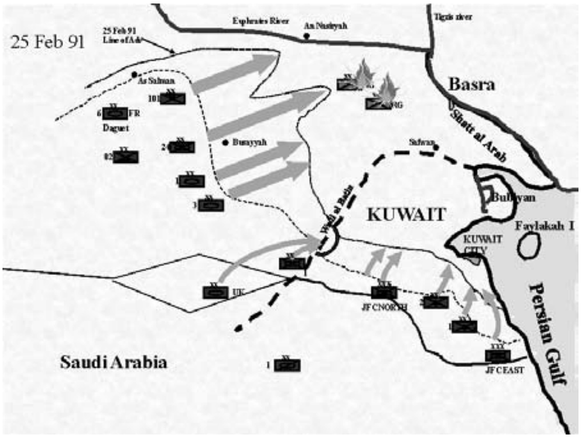
(Referred from various sources)

MANEUVERE WARFARE

Op Desert Sabre: 24-27 FEB 1991



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Euphrates River
An Nasiryah
Tigris river
Basra
As Salman
Busayyah
Safwan
Shatt al Arab
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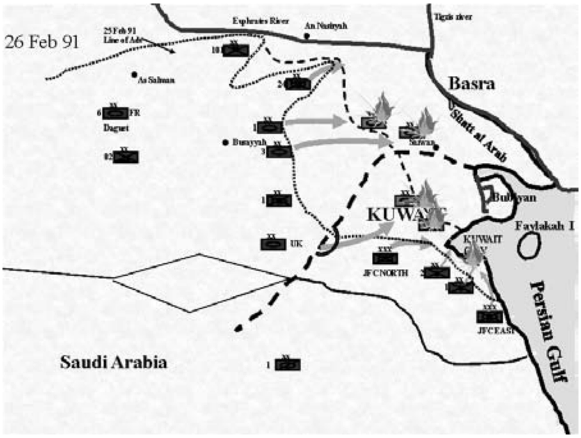
KUWAIT
Faylakah I
KUWAIT CITY
UK
JFC NORTH
JFC EAST
Persian Gulf
Saudi Arabia


26 Feb 91
Euphrates River
An Nasiryah
Tigris river
Basra
As Salman
Busayyah
Safwan
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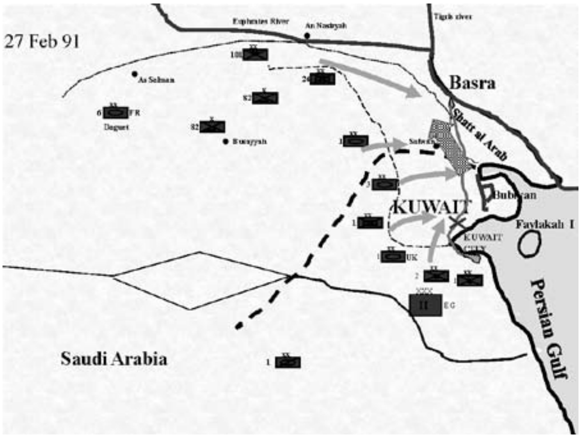
JFC EAST
Persian Gulf
Saudi Arabia


27 Feb 91
Euphrates River
An Nasiryah
Tigris river
Basra
As Salman
Busayyah
Safwan
Shatt al Arab
KUWAIT
Faylakah I
UK
EG
Persian Gulf
Saudi Arabia

Suggested Readings

1. The Gulf War 1991 by Alastair Finlan. 95 pgs.
2. Desert Storm: A Forgotten War by Alberto Bin, Richard Hill, Archer Jones. 286 pgs.
3. Operation Desert Shield/Desert Storm: Chronology and Fact Book by Kevin Don Hutchison. 274 pgs.
4. At War in the Gulf: A Chronology by Arthur H. Blair. 144 pgs.
5. The Eagle in the Desert: Looking Back on U.S. Involvement in the Persian Gulf War by William Head, Earl H. Tilford Jr. 356 pgs.
6. Arms over Diplomacy: Reflections on the Persian Gulf War by Dennis Menos. 180 pgs.
7. The Persian Gulf War: Lessons for Strategy, Law, and Diplomacy by Christopher C. Joyner. 262 pgs.