

Iraq's Military Industry: A Critical Strategic Target

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Whether the goal is to coerce, overthrow, or simply punish Saddam Hussein, the United States can succeed only if it concentrates on what really matters to him and threatens to destroy it. What is this? It is Saddam's ability to survive, and to exert control over his own country, as well as to threaten to invade his neighbors. To do this he certainly needs many of the things people have talked about targeting in air strikes--air defense centers, weapons capable of mass destruction, elite Republican guard units. What he needs at least as much, however, and what has received far too little attention from coalition security analysts, is a healthy indigenous military industry.

This industry is a critical strategic target. Because of the sanctions regime, Iraq's indigenous military industry currently provides all of Saddam's arms, ammunition, spare parts, and repair services on which he relies to repress his people and threaten invasion of his neighbors. It remains the source of many of his unconventional weapon delivery vehicles. In their zeal to suppress Saddam's development and possession of weapons of mass destruction (WMD), U.S. policy makers fail to realize the limitations inherent in an air campaign: air strikes alone may not eliminate WMD production facilities, and the knowledge acquired by Iraqi technicians and scientists allows rapid regeneration of certain types of WMD (particularly biological weapons) with only limited industrial requirements.

The United States and its partners may, in fact, be more successful in limiting Saddam's potential use of WMD by focusing on delivery vehicles, which are produced by Iraq's military industries in the form of shells, rockets, bombs, and missiles. Iraq's military industry has, however, consistently been underestimated and neglected by security analysts, and there is reason to believe that it was not a priority target during the Gulf War. Identifying Iraq's indigenous arms production facilities *should* be a priority in American planning, although there are many reasons to believe it has not been one to date. Saddam's military-industrial base represents a high-leverage target that if attacked effectively will significantly reduce his ability

to repress his people and threaten his neighbors with conventional or unconventional arms.

SADDAM'S REGIME CANNOT SURVIVE WITHOUT LARGE CONVENTIONAL FORCES

In the eighty years since Iraq was carved out of the former Ottoman Empire, it has experienced over a dozen coups and attempted coups, several invasions and foreign interventions, and a number of internal uprisings. Like many developing states, therefore, Iraq relies on the military for both internal and external security.¹ Under the Ba'athist regime, internal security is an obsession. The Iraqi secret police have a well- deserved reputation for brutality and savage effectiveness, but even they have not succeeded in eliminating insurgencies based on ethnicity and religion.² As a result, Iraq's military remains among the largest in the Middle East. Without these forces, Iraq might splinter in the face of Kurdish and Shi'ite insurgencies.

Controlling Kurds and Shi'ites

Historically, the primary role of the Iraqi military has been the extension of Baghdad's central authority over the peripheral regions.³ While Baghdad is the political center of Iraq, the former Ottoman regions of Mosul and Basra provide 60 percent and 30 percent of Iraq's oil production, respectively.⁴ These regions are home to significant insurgencies.

The Kurds in the north make up approximately 20 percent of Iraq's population, and have close ties with Kurdish populations in Turkey, Iran, and Syria. The duration of the insurgency, ongoing since the early 1920s, and its scope often surprise Western analysts. The southern threat is relatively more recent, although the marshes in the Basra region are a traditional haven for criminals.⁵ Since the Iranian Revolution, Baghdad has viewed the Shi'ite population as a potentially pro-Iranian force, and some analysts have argued that Iranian support for Shi'ite rebels constituted an important reason for Iraq's invasion of Iran in 1980.⁶ Since Kurds and Shi'ites combined make up 80 percent of the Iraqi population, ethnic and religious threats are taken very seriously, and repressed with great brutality and at great expense, including the draining of the swamps near Basra in the mid-1990s. In 1993, Iraq engaged eight Iraqi divisions to suppress Shi'ite opposition, and a further 16 garrisoned the north against the Kurds.⁷

Table 1: Kurdish Rebellions and Iraq's Growing Military Commitment in the North

Year	Opponents	Garrison Requirements	Percent of active army	Casualties
1920s	several hundred			
1930s-40s		1-2 brigades		
1960s	15-20,000	8 brigades	roughly 67%	
1974-75	60-100,000	6 divisions	≤67%	9-16,000 (7-13% of 135,000 active regulars)
1990s	35-70,000	≤15 divisions	50-67%	

Sources: Devlin, "Iraq"; Marr, *The Modern History of Iraq*; IISS *The Military Balance 1975-1976 and 1994-1995*; Eisenstadt, "Like A Phoenix..."; Haim Shemesh, *Soviet Iraqi Relations, 1968-1988: In the Shadow of the Iran-Iraq Conflict* (London: Lynne Rienner, 1992); Marion Fouk-Sluglett and Peter Sluglett, *Iraq Since 1958: From Revolution to Dictatorship* (New York: L.B. Taurus & Co., Ltd., 1990).

Coping with Iran and the Gulf States

Saddam's career, since finally seizing power in 1979, has revolved around domination of the Persian Gulf and playing a primary role in the Arab-Israeli conflict. Political conflict with Iran, including both Iranian support for Kurdish insurgents and the Iran-Iraq War of 1980-88, continues today. Iranian aircraft periodically violate Iraqi airspace to attack insurgents seeking shelter in Iraq, and Iran maintains possession of over 100 Iraqi aircraft flown to sanctuary during the Gulf War. Iraq has threatened or invaded Kuwait on five occasions (1938-59, 1961, occupation of Kuwaiti territory in the 1970s, 1990, and 1994) as well as making frequent offers or thinly veiled demands to lease portions of the border including the Warbah and Bubiyan Islands.⁸ Iraq's indebtedness to other Gulf States, particularly Saudi Arabia and the United Arab Emirates, as a result of the Iran-Iraq War remains a potential spark for future conflict.

The expansion of the Kurdish insurgent force by at least 300 percent in the late 1960s, the rise in the price of oil, and the ambitious military expansion of neighboring Iran drove Iraq to a substantial increase in military capability in the mid-1970s. In 1980, Iraq invaded Iran with an army of about 250,000 organized into approximately 12 divisions, with a Popular Army of several hundred

thousand poorly trained and organized Ba'athist militia in support. By 1988, Iraq fielded approximately one million soldiers organized into at least 50 regular and elite divisions.⁹ Iraq invaded Kuwait with several Republican Guard divisions in 1990, but deployed over 40 divisions with at least 350,000 troops to defend it by early 1991.¹⁰

Arab-Israeli Conflicts

Finally, Iraq has sought to play an increasing role in every Arab-Israeli conflict since 1967. Iraq has historically considered Israel a major justification for increased military forces, conventional and unconventional. A recent *Washington Post* editorial implies that Saddam feels he needs unconventional weapons to defend against Israel.¹¹

This type of analysis does not assess accurately Saddam's perceptions. Saddam's intentions include hegemony in the region and symbolic and political dominance in the Arab world. Iraq, even under the monarchy, was one of the hard-line Arab states, opposing any accommodation with Israel. Iraqi military capability reaffirms Saddam's perception of Iraq as an Arab leader, and unconventional weapons both deter Israeli's nuclear forces and offer a means of redressing Arab grievances. The clearest example of this is Saddam's famous speech of 1 April 1990, where he threatened to "...make fire eat up half of Israel..."¹²

Iraq's participation in Arab-Israeli conflicts suggests another application for Iraqi military forces. Israelis believed that Iraq would contribute approximately one-third of its order of battle to Arab-Israeli conflicts: in 1973, with fewer than 10 divisions, Iraq sent 2-3 of its best equipped units (armored and mechanized divisions) to support the Syrians. In comparison, by 1989 Iraq had 55 divisions, suggesting that Iraq's contribution to an Arab-Israeli conflict might lie in the 10-20 division range. Israeli security analysts took this threat very seriously.¹³ A brief survey of Iraqi expeditions in previous Arab-Israeli conflicts suggests that substantial portions of Iraqi forces have been sent to fight Israel. The level of participation compared to garrison requirements, however, has consistently dropped. Approximately two-thirds of the Iraqi Army has been on garrison duty since the 1960s (a constantly expanding force, until the Gulf War): anti-Israeli expeditions have used the other third of the Army. These expeditionary forces included Iraq's best troops, in particular the armored and mechanized units.

Table 2: Iraqi Participation in Arab-Israeli Wars: Shrinking Relative to Internal Requirements

Year	Iraqi Expeditionary Force	Garrison in north (see Table 1)	Percent of total army fighting Israel	Percent of garrison
1948	8-10,000 (2 brigades)	1-2 brigades		100-200%
1967	4 brigades (one armored)	8 brigades		50%
1973	2 + divisions (armored/mechanized)	none (truce); 6 divisions the next year (1974)	~33%	33% of 1974 requirement

Source: Helen Chapin Metz, *Iraq: A Country Study* (Washington, DC: U.S. GPO, 1990); Chaim Herzog, *The Arab-Israeli Wars* (New York: Random House, 1982).

Ammunition: the key to Iraqi conventional military strength

Iraqi conventional military operations rely on high-firepower and attrition as a key to their success. A high priority is placed on minimizing casualties. Artillery and mortar fire and, when available, air strikes are useful ways of suppressing large numbers of insurgents, and also proved effective against masses of poorly organized and lightly armed Iranian infantry. Since the numbers of Kurds under arms have occasionally approached the size of the standing Iraqi army, Iraqi operations against the Kurds have always been ponderous, and stressed firepower instead of risking casualties.¹⁴

After the Gulf War, Iraq's lack of firepower affected both Kurdish success and Iraqi morale. In 1991, all but three Iraqi provinces rose in rebellion. Iraq's army had less than two days of ammunition left, and Saddam reportedly had to resort to desperate subterfuge to stay in power.¹⁶ [sic] In July 1991, over 1200 Iraqi soldiers surrendered to Kurdish guerrillas near Sulamaniya.¹⁷ In September 1991, another 800 surrendered near Kirkuk.¹⁸ As recently as March 1995, an abortive Kurdish uprising captured 500 Iraqi soldiers in an initial assault, but then failed when promises of U.S. air support and a simultaneous Iraqi army uprising proved false.¹⁹

Arab armies prefer high-firepower, attrition strategies for conventional conflicts also. Artillery and mortars account for over 50 percent of all combat casualties worldwide since 1945.²⁰ Emphasizing attrition and numbers allows Arab armies to maximize potential damage to opponents while minimizing their own casualties, which is always an Iraqi priority.²¹ These tactics also allow Arab armies to avoid maneuver warfare: a relative weakness demonstrated in every Cold War and post-Cold War conflict.²²

Iraq relied heavily on artillery and firepower throughout the Iran-Iraq War, and ammunition consumption increased constantly. Iraqi artillery tactics are poor at best, and exhibit relatively inflexible fire support plans.²³ Iraqi gunners reportedly fired tank shells recklessly during the war with Iran, a rate of expenditure which led to high demand for replacement barrels.²⁴ This practice wastes ammunition, and is not effective against trained conventional forces. It is more effective, however, against light infantry and insurgents. Iraqi artillery reportedly killed over 200,000 Iranians in the Iran-Iraq War.²⁵

After the disastrous Iranian attack on Faw in 1986, Iraq spent hundreds of millions of dollars purchasing ammunition on an emergency basis. Egyptian defense officials said Iraq was firing one million shells per day.²⁶ Iraq's ammunition expenditure surpassed 400 rounds per gun per day in the battles around Faw. Analysts report that Iraqi guns routinely fired as much ammunition in a single day as U.S. Army planners estimated would be fired in an entire week of high intensity conflict by U.S. Army artillery.²⁷ Cordesman and Wagner identify logistic oversupply as a "key operational principle," and note that lack of accuracy is a key reason for massive ammunition expenditure.²⁸ For comparison, German gunners fired up to 400-500 shells per gun per day in the First World War, and the overworked and outnumbered gunners of the British Army expended 450 shells per gun in one evening during the fighting near Goose Green during the Falkland Islands War.²⁹

High-firepower strategies, obviously, require large amounts of ammunition. This requirement was a major incentive for the development of Iraq's arms industry. In the absence of either a change in Iraqi military tactics or an end to the arms embargo, Iraq's military industry is therefore critical to Saddam's ability to suppress rebellion or threaten his neighbors with conventional arms.

MILITARY INDUSTRY IS THE KEY TO KEEPING SADDAM'S CONVENTIONAL FORCES CREDIBLE

Before Desert Storm: Iraq's arms industries were robust and growing

Iraq experienced its first arms embargo during the struggle with the Kurds in 1974-1975. The Soviet Union cut off supplies to Iraq, leaving it extraordinarily vulnerable against a Kurdish force supported by external powers and supplied with heavy artillery by

the Iranian government. Supplies of arms reached critical levels. Saddam Hussein noted,

...[T]he situation became extremely dangerous when our material and essential munitions cruelly began to run out. We had almost no heavy artillery shells. Our air force had only three bombs left.¹⁵ [sic]

During the Iran-Iraq War, Iraq took steps to stockpile munitions and diversify its arms purchases to reduce vulnerability to blockade. Nevertheless, Iraq experience difficulties acquiring necessary weapons and munitions. As a result, a conscious effort was made to build-up indigenous production capabilities in key technologies.

By 1990, Iraq's military industry was enormous: it employed more workers than the well-known Israeli defense industries, and the military-industrial labor force constituted at least 40 percent or more of Iraq's total industrial employees.³⁰ Iraq spent \$14.2 billion between 1985 and 1989 on industrial technology, almost all of which had military applications.³¹ Senator John McCain provided even higher numbers, arguing that Iraq spent \$27 billion on weapons technology and industrial supplies from 1980-1990.³² Total imports of all goods amounted to \$48.324 billion in this period, and imports of military equipment amounted to \$24.5 billion.³³ Military-industrial technology amounted to 29.4 percent of total imports, and its value was over *half* the value of arms imports in the same period. This suggests an extraordinarily high priority, and significant "hidden" capability.

Iraq's expenditure on military *equipment* in this time frame is not surprising. What is surprising is that between 1985 and 1989, when the Iran-Iraq War had reached its most critical point, military-industry was such a high priority that it amounted to almost 30 percent of total imports and over half the value of finished weapons and munitions (military equipment). The "hidden" capability here is that most of the industrial equipment and technology represented long-term projects--the impact of which would not show nearly as immediately on the battlefield as finished products and equipment. Some of these products increased military-industrial capabilities were exhibited in the Iran-Iraq War: modified Scud missiles, for example, or the products of chemical warfare programs. However, it is unlikely that Iraq utilized much of the technology purchased in the 1985-1989 period in the conflict with Iran. Estimates of the Iraqi military industry based on its contribution to that conflict, therefore, do not reflect accurately the scope and long-term impact of military industrial growth.

Military industrial capability was most manifest in the production of munitions, artillery, and mortars: the high-firepower tools required by Iraqi doctrine. As early as 1986, it was evident that Iraq was using more home-produced ammunition and bombs.³⁴ By 1987, Iraq had become self-sufficient in small calibre ammunition, artillery shells, aircraft bombs, mortar rounds, rocket-propelled grenades, rockets, tube-launched rockets, mortars, propellant, fuses, and replacement barrels.³⁵ Fuse technology was a priority between 1988 and 1990 because of its usefulness in the development of more sophisticated and lethal artillery munitions.³⁶ At least 19 state-run plants produced ordinance and artillery in 1989.³⁷ Clearly, Iraq's military industry was closely linked with the Iraqi military's reliance on firepower and artillery.

Iraq also took increasing responsibility for upgrading and maintaining existing tanks and other armored vehicles:³⁸ sites included Al/Ameen/Yusufiyah, Base West World, possibly Huteen, Taji, Samawa and the Al-Ameer portion of the Aqba bin Nafi State Establishment.³⁹ The Taji factory complex doubled in size in 1985: it included a forge capable of producing 1000 artillery barrels per year and armor maintenance and refit plants for T-54, T-55, and T-62 tanks in the Iraqi inventory. The complex also included facilities for assembly of the T-72, and would eventually build armor and tank bodies.⁴⁰

Finally, Iraqi production also figures prominently in the number and type of long-range missiles and mobile missile launchers available to Iraq. At the 1989 Baghdad Arms Exhibition, Iraq unveiled locally-produced launchers. It is uncertain how many mobile launchers were available in 1990-1991, but this uncertainty reflects a lack of knowledge of *indigenous* production.

After the Storm: Iraqi military industry recovered rapidly

Initial assessments of the damage done to Iraq's military industry after the Gulf War stated that 25-30 percent of Iraqi military industrial capability had been destroyed or damaged.⁴¹ British wartime assessments indicated that all of Iraq's artillery and ammunition capability had been eliminated, and that restoration would take several years.⁴² This estimate was optimistic: in fact, as the experience of Germany in the Second World War demonstrated, states often recover much more quickly from bombing campaigns than expected.

In fact, Iraq rapidly regained many of its former industrial capabilities. In March 1992, Director of Central Intelligence Robert Gates admitted that U.S. intelligence had found "significant

reconstruction" at Iraq's estimated two dozen military-industrial sites and that limited production of artillery and ammunition had been resumed.⁴³ Gates also said that limited production of artillery, munitions, and possibly armored vehicles was restored by early 1992, and that Iraq claimed to have repaired nearly 200 military industrial buildings.⁴⁴ According to Iraqi Prime Minister Muhammad al-Zubaydi, by August 1992, 87 percent of the factories, institutions, and military projects in the country were back in operation.⁴⁵ By 1993, reports indicated that Iraq had reestablished a significant military- industrial capability.⁴⁶ Twenty-three sites producing conventional military equipment were identified, roughly matching Gates' estimates of the previous year. T-72 production resumed in 1993, assembling tanks from kits provided before the Gulf War.⁴⁷

These reports emphasized that lack of spares, technicians, and access to imports kept these facilities producing at well below their designed capacity. They also indicate that the facilities were functional, and that equipment hidden before the Gulf War had been brought back into service. Pre-war intelligence estimates had identified 25 military-industrial sites, and an additional 40 civilian agencies which were controlled by the Ministry of Industry and Military Industrialization.⁴⁸ Post-war reports indicated that ten sites producing weapons in the late 1980s could not be located, suggesting that intelligence on Iraq's pre-war military industry was inadequate.⁴⁹ The inability after the war to locate facilities known to be producing small arms, artillery, rocket launchers, and munitions since the Iran-Iraq conflict suggests that important targets in the military-industrial complex were missed during the Gulf War.

MISJUDGING EVIDENCE

Estimates of Iraq's military industries before the Gulf War

The lack of attention Iraqi military industry received in the pre- Gulf War period is remarkable, particularly because Iraq staged an international arms exhibition in 1989 which clearly indicated both its interest in arms manufacturing and its growing capabilities. Dilip Hiro, a contemporary historian and chronicler of the Iran- Iraq War, devotes six pages to Iranian military industries, and only comments cryptically on the more significant Iraqi efforts.⁵⁰ *SIPRI Yearbook 1990* devotes only two pages to Persian Gulf military industries, shared between Iran and Iraq.⁵¹

Academic and civilian analysts focused on production of major weapons systems--such as tanks, ships, and aircraft--as a tool for measuring the capabilities of military industries. This provided a means of comparing production of "top-of-the-line" systems with the

major military producers, but did not consider how an industrializing state might tailor existing resources for particular needs. Iraq did not produce many major weapons systems, but the things it *did* produce were very important to its military strategy and requirements.⁵² The Soviets, who supplied the bulk of Iraq's major weapons systems, were aware of the extent of Iraq's arms industry. According to one Soviet expert, local defense industry was believed to supply 60 percent of the hardware for Iraq's military, and 80 percent of the hardware for its ground forces.⁵³ U.S. intelligence sources also had a more accurate understanding of Iraq's efforts than most civilian analysts.⁵⁴ Still, it is revealing that shortly after the invasion of Kuwait, "knowledgeable" sources in the Senate could state that Iraq's military industry could be taken out by a one-hour cruise missile strike.⁵⁵ Clearly, much of the policy and security community did not suspect that Iraq's military industrial capabilities were wither advanced or important.

The strategic bombing campaign did not emphasize attacks on industry

In 1991, the U.S. led coalition launched the most sophisticated air campaign in history, devastating Iraq's military and economic infrastructure and paving the way for a rapid and decisive victory on the ground. Yet, as we have seen, Iraqi military industry recovered quickly. Deception, storage of industrial equipment, and inadequate intelligence all played a role in Iraq's rapid reconstitution of critical industrial capacity. But perhaps the most important reason Iraq's industry did not receive high priority was the debate over the objectives of the air campaign.

The "strategic" bombing campaign was marked by the philosophical differences between short-range military and long-range political objectives.⁵⁶ Many of Iraq's industrial capabilities were more related to Iraqi long-term strength than to immediate military goals. The confusion over long-term objectives that left the U.S. a bewildered victor facilitated Iraq's military-industrial recovery and gave Saddam an opportunity to maintain power in Iraq.

On the one hand, the air campaign intended to "...eliminate Iraq's offensive military capacity by destroying major portions of key military production, infrastructure, and power projection capabilities."⁵⁷ According to other official reports, industrial targets received a relatively low overall priority.

In Desert Storm, the overarching objective of the strategic portion of the air campaign was somewhat different [from World War Two]... . Instead of attacking

the vital elements of war production...the principal thrust of the "strategic" effort against Iraq seems to have been to inhibit and paralyze the very functioning of the Iraqi government and its military forces.⁵⁸

The objective of the strategic air campaign was not to destroy a particular target set, but rather to achieve a synergistic degradation of Iraqi military control and capability. Coalition air superiority allowed the air campaign to focus on degrading, rather than destroying, and to spread air assets across a large target spectrum.⁵⁹ The strategic air campaign, therefore, was much more *operational* in nature than previous efforts.

Estimates of damage to Iraq's military industry appear exaggerated

There are reasons to believe that damage to Iraq's military industries was much less than initially reported, but more work is needed for accurate analysis. First, the rapid recovery of Iraq's military capability suggests that the two-day stockpile of ammunition in 1991 was rapidly replenished by local industry. Second, estimates of Iraq's unconventional weapons capability before the war were seriously flawed: it seems unreasonable to assume that estimates of conventional industry were dramatically more accurate. This implies survival of considerable residual capability even before the 1991-1993 rebuilding effort. Third, evidence from the bombing campaign itself suggests that known industrial targets were not identified or attacked.

As result of the operational focus of the bombing campaign, with the exception of the WMD targets, military industry did not receive a high priority. These facilities, in fact, were not identified as a separate target set, but were instead included with depots, logistics complexes, and other supply and storage facilities in the category "Military Storage and Production."

The long-term combat effectiveness of Iraq's large military forces depended on military production facilities and continued support from its logistical base. Destruction of repair facilities, spare parts supplies, and storage depots would degrade Iraq's combat capability and long-term threat to the region. Planners knew there were too many targets to be eliminated entirely. For instance, there were seven primary and 19 secondary ammunition storage facilities alone identified on target lists: each was composed of scores of individual storage bunkers.

Consequently, they planned first to destroy the most threatening production facilities and stored material, then methodically to proceed with attacks on other storage and production facilities as time and assets allowed.⁶⁰

We now know that Coalition analysts vastly underestimated the number of unconventional weapons production facilities and Scud-related sites, even though the number of targets increased throughout the campaign. By 26 February 1991, a total of 772 strategic targets had been identified, compared to the 84 initially listed in the August 1990 "Instant Thunder" strategic bombing plan, and the number of "Military Storage and Production" (MSP) targets had increased from 15 to 102, remaining roughly 15 percent of the target set. Nuclear, biological, and chemical weapons targets had increased from eight to 34, and Scud storage and production sites increased from zero to 59.⁶¹

Of these 102 MSP sites, however, 26 (approximately 25 percent) have already been identified as storage bunkers in the passage above. Given the emphasis on operational issues in the bombing campaign, it does not seem unreasonable to conclude that existing capabilities (depots and stockpiles) would have received higher priority than Iraq's long-term conventional-production potential. Post-war analyses of Iraq's military industry identified at least 33 military-industrial facilities producing conventional weapons alone, ten of which were not locatable. Central Intelligence Agency estimates from 1990 stated that 25 military and at least 40 civilian facilities were involved in Iraq's military industrial efforts. If all 65 of these were targeted, then over 60 percent of the MSP sites would have been industrial in nature: a surprising ratio in an air campaign heavily weighted towards operational impact. That would leave only eleven other targets (beyond the 26 main ammunition storage bunkers noted above) on the MSP list. In fact, it seems likely that the ratio would be heavily weighted towards the operational targets: that fuel depots, for instance, would be targeted for their more immediate military impact, rather than arms manufacturing facilities.

Over the course of the Gulf War, the 102 military storage and production targets were struck by about 2,750 sorties.⁶² In these sorties, however, only 982 pieces of ordinance were dropped on *military support targets*, defined as equipment production, research and development and testing facilities, production facilities, covered storage facilities, and logistics agencies: approximately 2 percent of the total munitions expended in the Gulf War air campaign.⁶³ This reinforces the tentative conclusion that longer-term strategic

targets, like military industry, were not the priority. As the Second World War Strategic Bombing Survey indicated, industries must be bombed repeatedly to ensure that they are not restored to operation.

From these observations, it is reasonable to suggest that:

1. The coalition did not locate all of Iraq's conventional-arms industries. Not only were there existing industries which planners could not target, but the successful concealment of unconventional industries suggests that conventional industries may also have escaped detection;
2. Based on the Gulf War Air Power Survey, it is not clear that coalition forces attacked all the known Iraqi military-industrial sites. Destruction of these facilities was not an operational necessity, given Iraq's difficulties in moving supplies into the Kuwait theater;
3. Damage assessments, therefore, were high. Not nearly as much of Iraq's industry was destroyed as analysts thought, due to inadequate intelligence, air campaign priorities, and Iraqi deception efforts and mobility;
4. It appears that Iraq's military industry played a critical role in Iraq's rapid recovery in 1991. A demoralized force with only two days of ammunition, with a history of firepower-intensive operations and doctrine, defeated major insurrections in both north and south and was able to consolidate its gains over the ensuing years, despite a total embargo on arms and munitions.

Analysts still need to know more about Iraq's military industrial base

As shown in Table Three, estimates of Iraq's *quantitative* strength before the Gulf War were fairly close. The discrepancy is greatest, perhaps, in numbers of combat aircraft, with estimates ranging from 650-845 (roughly 25 percent). Numbers of divisions are closer,

particularly if brigades are lumped into notional division-sized equivalents (three to four per division). But the overall estimates do not differ by more than 100 percent in any case, representing a tolerable degree of uncertainty.

Table 3: Estimates of Iraq's Pre-War Conventional Military Strength: tolerable uncertainty (<70% variation)

Measure	Low Estimate	Middle Estimate	High Estimate
Army Manpower	750K	955K	1.2 million
Total Divisions	53+	67	69-71
Armored/Mech Divisions		9+	11+
Infantry Divisions		40+	?
Other formations		20 Brigades	1 SF division
Republican Guard Divisions		6	8
Tanks	5500	5700	5800
Artillery	3700	3800	3850
Other armored vehicles	5100 APC alone		10,000
Combat Aircraft	650-689	800	845

Sources: *Conduct of the Persian Gulf War*, Eisenstadt, "Like A Phoenix..."; IISS *The Military Balance 1990-1991*; Bruce Riedel, "The Future of Iraq" in *The Future of Iraq* ed. John Calabrese (Washington, D.C.: The Middle East Institute, 1997); *The Iraqi Army*; Newsome (CRS).

The measures employed here are part of the reason for the relative consistency: tanks, artillery, and aircraft are fairly easy to identify, and transfers of these types of arms is frequently reported in trade press or leaked by supplier governments. Similarly, large military formations are relatively easy for observers and intelligence analysts to identify and track.

Most of the remaining uncertainties regarding both Saddam's conventional military strength and his unconventional weapons programs center around local production. In the conventional arena uncertainty centers around the quantities of operational aircraft, a function of Iraq's local maintenance capability, and around numbers of artillery pieces and mortars, which are produced locally. Iraq's *fighting* power is maintained by local production of munitions and spare parts.

These uncertainties are heightened by the inaccuracy of estimates of Iraqi unconventional strength. As we now know from United Nations Special Commission investigations, Western intelligence seriously underestimated the extent and sophistication of Iraq's unconventional weapons programs. Much of the uncertainty regarding these programs is receding, however, thanks to seven years of United Nations' monitoring. The key remaining areas of uncertainty, however, are linked in most cases to Iraqi military industrial products: the small number of remaining Scud-derivative missiles, a somewhat larger number of missile engines produced indigenously, the number of chemical and biological shells and warheads (manufactured locally), and the number of mobile missile launchers still unaccounted for are among the most important unanswered questions.⁶⁴

Table 4: Pre-War Estimates of Missile Capability: high uncertainty (>500%)

Type	Low	Medium	High
Scud-type missiles	200	500	1000-2000
Launchers (fixed)	8	28-30	50
Launchers (mobile)	22	33-36	400+

Sources: Gertz, "Missile Strike against Iraq mullied on Hill," *Washington Times*, 10 September 1990; Anthony H. Cordesman, "Iraq and Weapons of Mass Destruction," *Congressional Record* 8 April 1992; Peter Allen-Frost, "Saddam on the road to nuclear warhead," *Jane's Defense Weekly* 1 December 1990; Jack Anderson and Martin Binstein, "Full Iraqi Capabilities Remain Unknown," *Washington Post* 27 July 1992; GWAPS Vol. I: "Planning"; "UN Experts Say Inspection Useful," *Reuters* 19 October 1992; "Iraq Demonstrates SSM Capability," *Jane's Defense Weekly* 15 December 1990; Mark Crispin Miller, "Desert Sham," *New York Times*, 24 June 1992; *Conduct of the Persian Gulf War*.

Knowledge about the extent of Iraqi military industrialization is crucial if the United States is to estimate accurately the capability of Iraqi forces to actually *deliver* weapons capable of mass destruction. If we knew more about Saddam's munitions production sites, for example, we might also learn more about his potential arsenal of chemical and biological-filled artillery shells and bombs, which are locally manufactured. Similarly, a more careful study of his industry might minimize surprises: the local manufacture of

missile engines, for instance, apparently came as a shock in 1995, despite the indications as early as 1988 that Iraq was developing such a capability.⁶⁵

In fact, Saddam's ability to *deliver* any weapons of mass destruction derives largely from indigenous production and maintenance efforts. Aircraft must be able to fly to deliver chemical or biological weapons. The key to Iraq's limited remaining stockpile of ballistic missiles lies in local industry. The warheads and shells which represent the most likely method of tactical WMD delivery are manufactured locally. The cruise missiles, tactical rockets, and drones which might distribute them are being developed at known facilities.⁶⁶

Table 5: Pre- and Post-War Estimates of Iraq's Military Industrial Capacity: extreme uncertainty

Type	Low	Medium	High
Conventional Production Facilities	negligible	≤20	25-65+
Workers Employed	negligible	100,000	500,000

Sources: Metz, *Iraq: A Country Study*; Sayigh, *Arab Military Industry*; G. Willis, "Open Sesame: Baghdad show reveals Iraqi military-industrial capabilities," *International Defense Review* (June 1989); Riedel, "The Future of Iraq"; *Congressional Record* 21 July 1992; *MEDNews* 2 September 1991.

CONCLUSION

Iraq's military industries represent the best lever for attacking Saddam

Whether the United States and its allies intend to punish Saddam for misbehavior, coerce him into compliance with international inspections, or overthrow his regime, Iraq's military industry represent a very high leverage target. Despite seven years of sanctions, the military has successfully suppressed the Shi'ite rebellion in the south, and continues to keep a lid on the Kurds in the north. The tools it uses are elderly, but they are kept in working order and supplied with sufficient munitions and spares by Iraq's local industry. For this reason alone, the industry represents an incalculable asset to Saddam: without indigenous industry, his forces could not utilize their firepower superiority against insurgents. His forces would take heavier losses, run greater risks, have lower morale, and be more amenable to surrender.

As noted above, however, local industry also constitutes the research and resource base for Iraqi WMD delivery. However elusive the WMD complex may be, uncertainty is narrowing. If the international community cannot deprive Saddam of his WMD, it may be able to limit the threat by depriving him of the ability to deliver it. For both of these reasons, then, Iraq's military industry represents a *critical* intelligence issue and military target.

ENDNOTES

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Effective support to Strategic Communications is enhanced by military commanders choosing to delegate communication authority widely, empowering more personnel to communicate the NATO narrative through actions, words and imagery. b. This requires military leaders to maintain awareness of information released and the ability to refine this information as necessary to ensure its accuracy.