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Iraq's Air Force: Improving Capabilities, Ineffective Strategy [redacted]

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An Intelligence Assessment

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Iraq's Air Force: Improving Capabilities, Ineffective Strategy

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An Intelligence Assessment

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This paper was prepared by Office of Near Eastern and South Asian Analysis, with contributions by and Office of Leadership Analysis. It was coordinated with the Directorate of Operations.

Comments and queries are welcome and may be directed to the Chief, Persian Gulf Division, NESA,

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Iraq's Air Force: Improving Capabilities, Ineffective Strategy [redacted] 25X1

Key Judgments

Information available as of 1 September 1987 was used in this report.

The Iraqi Air Force could be a major factor in bringing Tehran to the bargaining table, but Baghdad has been unwilling to commit fully its air resources against Iran. By continuing to hold back its Air Force, Iraq risks missing an opportunity to cripple Iran's ability to launch large-scale offensives. Unless the Iraqi regime takes advantage of the Air Force's improvements and Iran's relatively weak air defenses, the impact of airpower on the war will be limited. [redacted] 25X1

A primary concern of the Iraqi regime is to minimize aircraft losses in an effort to preserve the Air Force's resources for a long war. Moreover, political restrictions will continue to prevent the Air Force from performing up to its potential. Iraqi President Saddam Husayn seeks to limit air attacks on Iran so as not to antagonize the Iranians and cause them to strike at Iraq's Gulf allies. [redacted] 25X1

Over the past seven years the Iraqi Air Force has become one of the largest and most experienced in the Middle East. The acquisition of new aircraft and weapons, greater emphasis on pilot training, and the upgrading of airfields, radar, and communication facilities have significantly expanded Iraq's capabilities. Many shortcomings persist, however, limiting the threat posed to Iran and the region by the Iraqi Air Force. [redacted] 25X1

Highly centralized control of air operations significantly impairs the Air Force's effectiveness by slowing its response to changing situations and the needs of ground commanders. Rigid flight plans and tight ground control prevent Iraqi pilots from using their judgment and often give them no choice but to perform ineffectively. The Air Force leadership is reluctant to challenge these constraints. [redacted] 25X1

Problems with training, tactics, and equipment maintenance also have contributed to Iraq's poor performance in the air war. A reliance on foreigners for instruction and technical support will limit improvements in initial flight training—the Air Force's most serious shortcoming—and in maintenance. Financial constraints will also keep Iraq from becoming more self-sufficient in sustaining its Air Force. Economic problems and Iraq's weak educational base will limit Iraq's ability to obtain and operate newer high-technology equipment and weapon systems without significantly more—and costly—foreign help. [redacted] 25X1

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Iraq's strategic bombing campaigns against critical Iranian economic facilities, most evident in 1986, have been the most successful of its operations. As a result of Iraq's more effective air campaign last year, Iran lost $1 billion in oil revenues and suffered fuel shortages, widespread electrical blackouts, and some economic dislocations. A similar campaign, sustained over a period of several months, could significantly reduce Tehran's ability to wage war and result in economic hardship and civilian unrest that might force the leadership to scale down hostilities.

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Iraq, however, is unlikely to change its generally conservative strategy for using airpower and for preserving its resources to fight a longer war. Baghdad's current strategy meets the needs of the regime. Iraq probably will increase its attacks against Iran's economy only as the Air Force improves and demonstrates it can do more within the political restraints set by the regime.

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In the aftermath of the attack on the USS Stark, the Iraqi Air Force will take greater care to ensure that its operations do not directly affect US shipping in the Persian Gulf. Iranian responses to Iraqi ship attacks and strikes on oil export facilities, however, could involve US interests—possibly including warships—in the Gulf.

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Scope Note

This paper addresses the development and current capabilities of the Iraqi Air Force and its likely impact on the Iran-Iraq war, given the political constraints under which the Air Force operates. It examines developing trends in Iraqi airpower and their implications for the United States and its allies. [redacted]

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Iraq's Air Force: Improving Capabilities, Ineffective Strategy

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After seven years of war, the Iraqi Air Force is Baghdad's only significant means of taking the fight to the Iranian people and of demonstrating to its own people that military measures are being taken to end the conflict. Until recently, poor performance characterized the Air Force's activity. The Air Force's initial air offensive against Iran in 1980 was a failure despite the ground attack experience it had acquired from campaigns against the Kurds in the 1970s. Moreover, Baghdad was chastened by its moderately high losses in the early part of the conflict—we estimate that nearly 90 aircraft were lost in the war's first six weeks—and decided not to pursue the air war vigorously.

Iraq ultimately achieved air superiority by default as Iran's Air Force—cut off from spare parts and replacement aircraft by a US embargo—withered. Iran now has only 50 to 60 operational fighters, while Iraq has over 500 operational combat aircraft. The Iraqis, however, have not been able to make their air superiority felt in the ground war. Instead, Iraq has used air operations to compensate for its Army's defeats. Baghdad often seems to select targets with high visibility but limited military value—Iranian cities in early 1987, for example—in order to punish Iran as well as to boost Iraqi morale.

The addition of more modern aircraft and new ordnance in the past seven years has strengthened the capabilities of Iraqi airpower. As it demonstrated in a successful, but short-lived, campaign against Iranian economic targets in 1986, the Air Force can now operate more aggressively. We believe that the improvement will count for little in the outcome of the war, however, unless there is a corresponding shift in the regime's willingness to take advantage of the Air Force's potential.

Improving Capabilities

We believe that the Iraqi Air Force has the men and equipment to perform its assigned ground attack and air defense missions. We estimate that it has between 33,000 and 35,000 personnel and has organized four air and air defense sectors to protect Iraqi airspace. Numerous airfields allow Iraqi aircraft to be deployed throughout the country, providing excellent coverage. each sector has at least three interceptor squadrons and two attack squadrons. Also, most Iraqi combat squadrons contain 12 aircraft, with some having as many as 18 aircraft assigned.

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Growing Inventory of Modern Fighters

Despite estimated losses of between 300 to 325 aircraft over the past seven years, the Iraqi Air Force has grown from a prewar strength of nearly 500 to between 700 and 760 fighters and fighter-bombers. In our judgment, most of Iraq's aircraft are older models that are satisfactory for the majority of missions flown. We believe that Iraq continues to buy less expensive, older model fighters such as the SU-22 Fitter from the USSR and the F-7 from China in an effort to economize.

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Nearly one-fourth of the over 500 new aircraft delivered since 1980, however, have been modern aircraft, such as the multirole French Mirage F1 and the Soviet MIG-25 interceptor. In late 1986, Iraq was the first country outside the Soviet Union to receive the MIG-29 air superiority fighter, which should improve Iraq's ability to intercept intruding aircraft. In our judgment,

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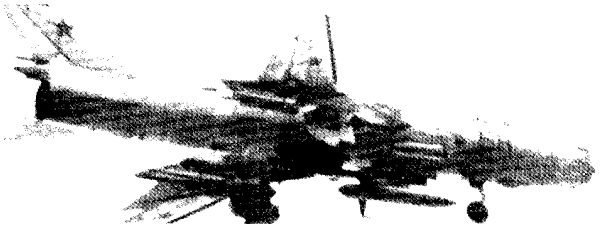
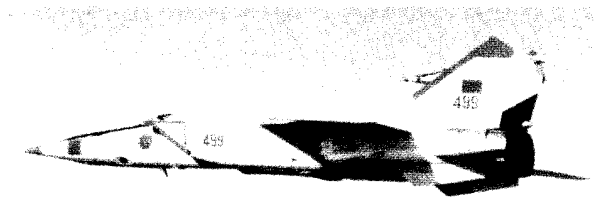
Figure 1
Selected Iraqi Fighters and Bombers

F1	Combat Radius (km)	Payload (Kg)	Comment
	425-890	6,300	Relied on for attacks against ships and point targets using precision-guided munitions.



SU-22	Combat Radius (km)	Payload (Kg)	Comment
	425-700	4,000	Called "bomb truck" by Iraqis . . . relied on for ground attacks.



MIG-25	Combat Radius (km)	Payload (Kg)	Comment
	590-925	2,700	Ineffectively used for high-altitude bombing . . . also reconnaissance.

MIG-29	Combat Radius (km)	Payload (Kg)	Comment
	250-429	3,000	Air superiority fighter. [redacted]

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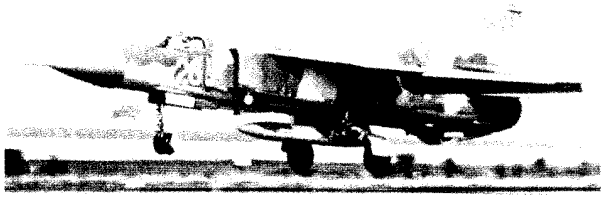
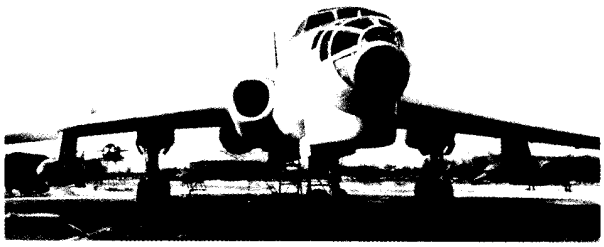


MIG-23	Combat Radius (km)	Payload (Kg)	Comment
	590-810	3,000	Used for ground attack and air patrol.



B-6D	Combat Radius (km)	Payload (Kg)	Comment
	3,050-4,160	3,000-9,000	Chinese copy of TU-16 Badger bomber . . . carries two C-601 air-to-surface missiles.

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Table 1
Iraqi Air Force Order of Battle

Aircraft Type	1980	1985	1987
Bombers	19	13	17
TU-16 Badger A	7	5	5
TU-22 Blinder A	12	8	8
B-6D Badger	0	0	4
Fighters and fighter-bombers	498	690	756
MIG-29 Fulcrum	0	0	26
MIG-25 Foxbat A	0	22	22
MIG-23 Flogger E	30	58	52
MIG-23 Flogger F	46	40	38
MIG-23 Flogger G	0	15	21
MIG-21 Fishbed	237	249	216
F-7 Fishbed	0	33	45
SU-17/20/22 Fitter	135	140	180
MIG-17 Fresco	35	35	35
Hawker Hunter	15	12	12
SU-25 Frogfoot	0	18	50
Mirage F1EQ5	0	20	19
Mirage F1E	0	48	40

The Important Role of Transport Aircraft

Transports have been essential to the Iraqi war effort because of their frequent employment to speed the delivery of arms and spare parts from Baghdad's suppliers to Iraq. We believe Baghdad has increased its inventory of transports from 41 to possibly 65 in the past seven years. This increase has given Iraq the ability to lift, if necessary, a maximum payload of approximately 1,000 metric tons up to 5,250 kilometers.

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Baghdad probably will buy more transport aircraft.

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Iraq's other recent acquisitions, the Soviet-built SU-25 ground attack aircraft and Chinese-made B-6D bombers, should help correct deficiencies in antitank and close air support operations and long-range strikes in the Persian Gulf if they are used properly.

The Air Force's nearly completed modernization program has fulfilled most of Iraq's requirements for more sophisticated aircraft and reduces the need for more than minor improvements for years to come.

Nonetheless, Baghdad may be considering the purchase of more modern aircraft, such as the French Mirage 2000, the Soviet SU-24, or more MIG-29 aircraft. With its cash shortages, Iraq is likely to decide that its money would be better spent on equipment that could have an immediate impact on the war. Iraq's weak educational base will also limit Baghdad's ability to absorb much more modern, high-technology equipment and weapon systems without significantly more—and costly—foreign help. Despite economic problems, Iraq probably will continue its

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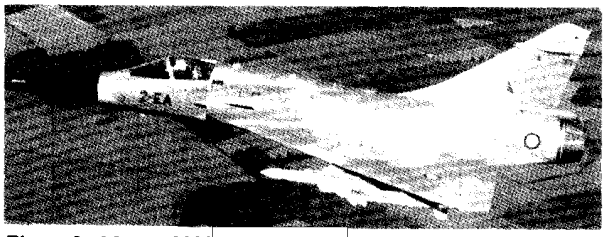

Figure 2. Mirage 2000

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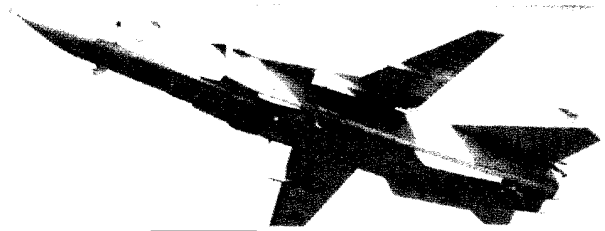

Figure 3. SU-24

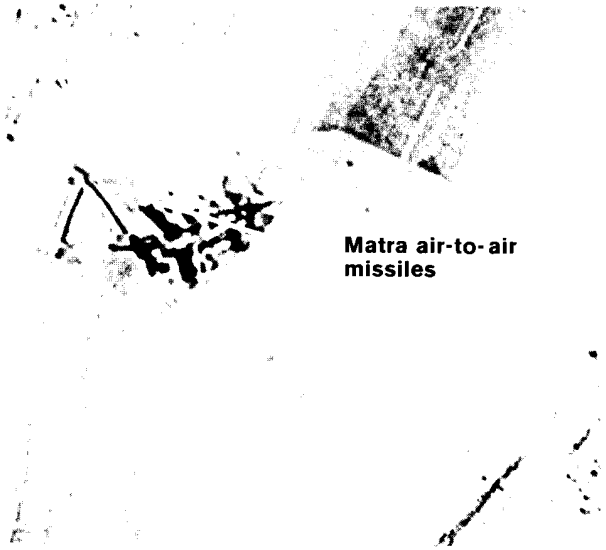

Figure 4. Mirage F1 at Qayyarah West Airfield with French Matra air-to-air missiles.

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already reduced efforts to attain self-sufficiency in the production of some Air Force equipment.

Better Munitions

We believe that the greater accuracy and lethality of new munitions acquired by Iraq have been almost as important as new aircraft to the increase in the Air Force's capabilities. Unlike the first two years of the war when the Iraqis had only World War II–type iron bombs to use, Iraq can now employ a variety of bombs, rockets, and precision-guided munitions against Iran.

Iraq still relies heavily on iron bombs, but cluster bombs, fuel-air explosive bombs, and others are being used in larger numbers, adding the capability to tailor ordnance to specific targets.

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Although the Iraqis normally have used cluster bombs against Iranian frontline formations, they also have been used against an Iranian pumping station, possibly to prevent workers from repairing airstrike damage. The accuracy provided by Iraq's French-built, precision-guided air-to-surface missiles such as the Exocet and the AS-30L has increased the effectiveness of Iraqi airstrikes against point targets. Iran and Iraq studiously avoid dogfights, but occasional downings of Iranian aircraft by air-to-air missiles indicate that Iraq's Soviet-made AA-6 and French-built AA-550 Magic air-to-air missiles are effective.

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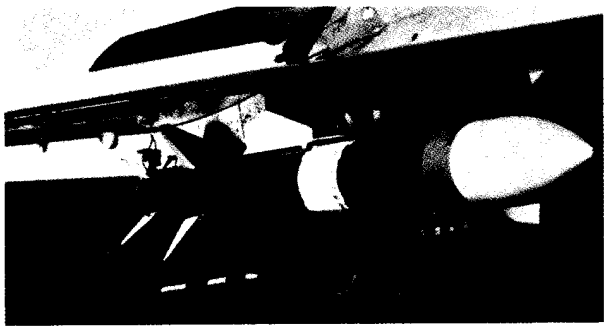
In our judgment, however, training deficiencies among support personnel have seriously degraded Iraq's employment of its munitions. We believe that early in the war between 30 and 60 percent of Iraqi bombs failed to explode, probably because ground

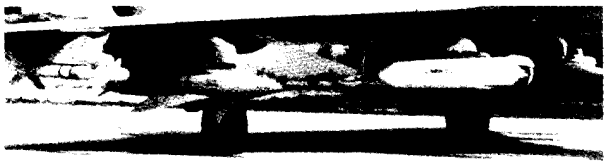
Figure 5
Iraq's Precision-Guided Munitions



AM-39

The AM-39 Exocet is the all-weather air-launched variant of a subsonic, sea-skimming antiship cruise missile sold by the French firm Aerospatiale. Iraq fires the Exocet from F1 aircraft and occasionally from Super Frelon helicopters.

Maximum Range	Warhead	Guidance
50-70 km	165 kg	Active radar



AS-30L

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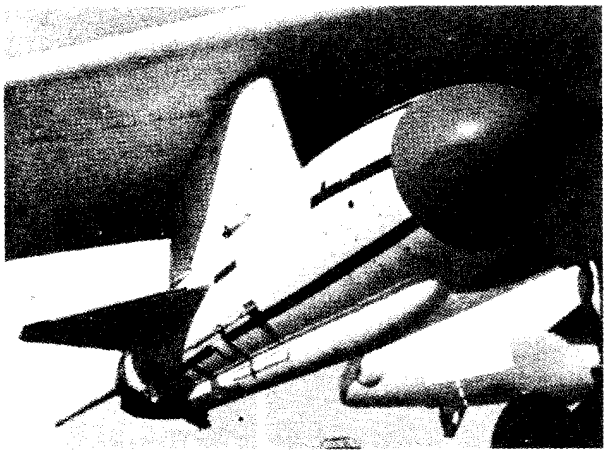
The AS-30L is a highly accurate air-to-surface missile that is also produced by Aerospatiale. The missile's laser guidance system allows the aircraft to maneuver evasively while the missile is in flight. This missile was probably used in several attacks on critical Iranian oil and power generation facilities in 1986.

Maximum Range	Warhead	Guidance
10-12 km	240-250 kg	Laser guided



C-601

The C-601 is an air-launched variant of the Chinese Silkworm antiship cruise missile. The C-601 can be fired from Iraq's four Chinese B-6D long-range bombers.

Maximum Range	Warhead	Guidance
100 km	510 kg	Active radar (possible infrared variant)

[redacted]

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crews were not proficient at setting fuzes. The difficulties caused by the limited technical skills of ground crews were repeated when Iraq initially used the Exocet missile and cluster bombs. In our judgment, wartime experience and greater familiarity with the new equipment have helped to overcome some of the problems, but deficiencies persist and the Air Force still drops a large number of duds.

Iraq's biggest problem with munitions may be maintaining a sufficient stockpile. According to Iraqi press reports, more than 1,400 ground attack sorties were flown against Iranian positions by Iraq in the first 10 days of the Al Basrah offensive this year. In our analysis, in both the Al Faw and Al Basrah offensives, Iraq's Air Force averaged between 100 to 200 sorties per day against the Iranian attackers, delivering tens of thousands of tons of bombs during the battles. Iraq made many urgent requests to Egypt, Saudi Arabia, and some Communist countries to acquire more bombs, according to The Air Force's minimal participation in the Iraqi defeat at Mehran in July 1986 may have been the result of a shortage of munitions, according to sources of the US defense attache in Baghdad.

We believe that Iraq is trying to reduce the wasteful expenditure of munitions. in 1985 Iraqi President Saddam Husayn gave a medal to an Iraqi pilot who had not dropped his bomb load when unable to find the designated target, indicating that the Iraqis are trying to end their pilots' wasteful practices. We expect that continuing economic difficulties will exert further pressure on Baghdad to stop wasting munitions. The French press reported earlier this year that Paris was demanding payment on delivery for its arms, a move that threatened to suspend deliveries of critical precision-guided munitions. Other suppliers could make similar demands, resulting in significant shortfalls for Iraq.

More Airfields

Since 1981 the Air Force has constructed three major and 21 dispersal airfields, mostly in southern and western Iraq. Many of these are complete and operational. The others are in the mid-to-late stages of construction. the Iraqis also have made improvements at many of their 16 existing major airfields since 1981. They have built new runways to speed operations and constructed additional hardened aircraft shelters and maintenance/assembly hangars to protect aircraft from air attacks and exposure to weather.

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Maintaining High Levels of Operation

We believe that Iraq's ability to maintain its aircraft is very good by Third World standards and provides some evidence of the Air Force's ability to absorb—with significant foreign help—modern equipment while maintaining respectable readiness levels. routine maintenance occurs regularly at Iraqi airfields, although limited coverage precludes a determination of its frequency. a squadron of 12 MIG-21 or MIG-23 fighters will normally have one of every three aircraft undergoing routine maintenance at a given time.

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we estimate Iraq's operational readiness rate for all types of aircraft is between 70 and 75 percent. We believe that the increased number of sorties flown during the past two Iranian offensives indicates that the ground crews quickly prepared returning aircraft for new operations.

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Extended high-intensity operations take a toll on readiness rates, however, because Iraq's technical base for supporting its Air Force beyond routine maintenance is still weak. This was demonstrated by the lull in nearly all Air Force activity following the Iranian Al Faw offensive last year. A similar pause occurred toward the end of the 1987 offensive near Al Basrah when Baghdad initiated a moratorium on air operations against civilian targets.

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The Air Force does not have sufficient skilled Iraqi technicians and relies on approximately 30 French and several hundred Soviet personnel to keep its

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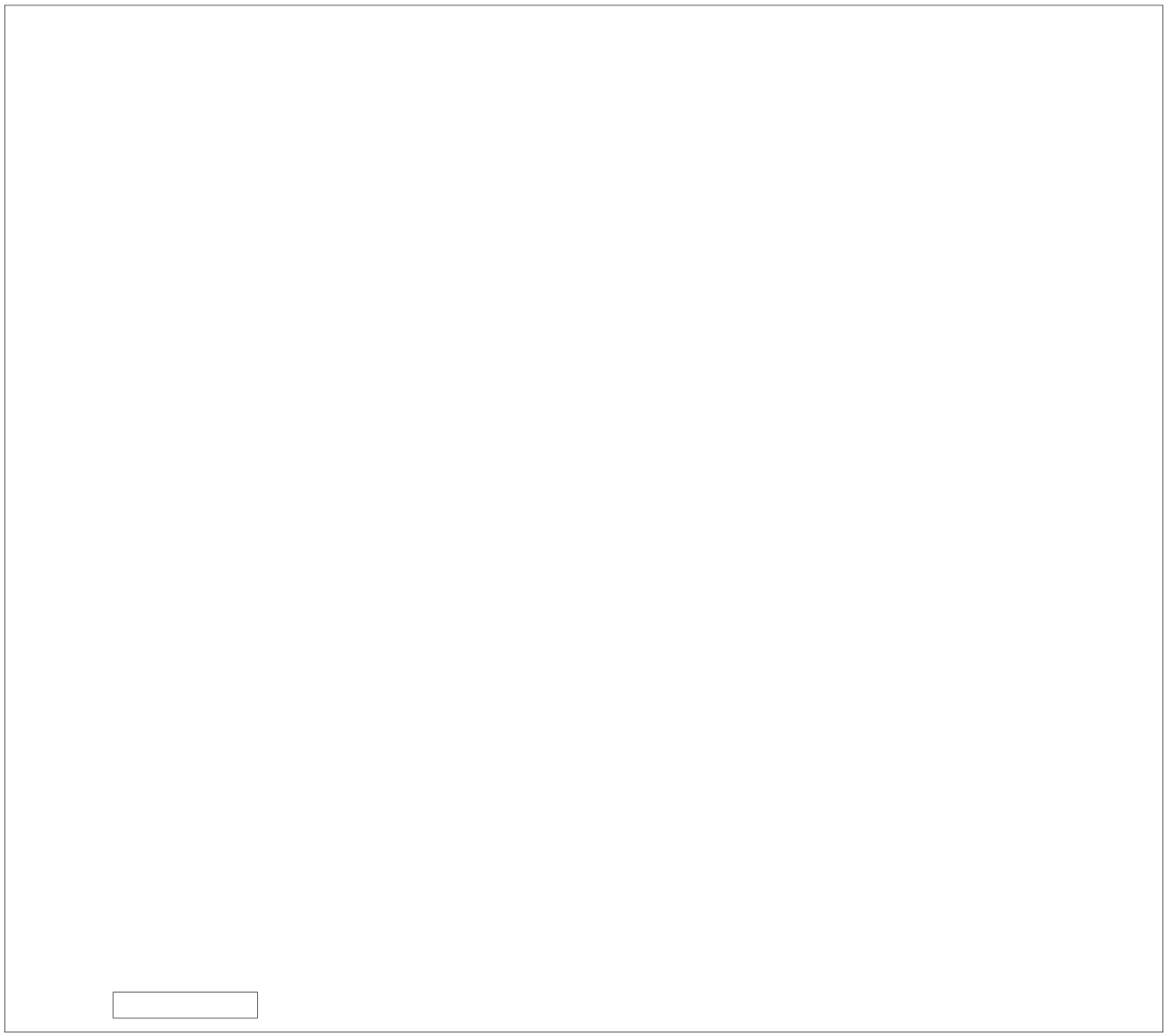

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aircraft flying.

we believe that Iraq sends many of its aircraft and engines to the Soviet Union, East Germany, Bulgaria, and France for major repairs and overhauls.

The Iraqis appear to be making strides in this area. Iraq modified at least one of its F1 aircraft—later involved in the attack on the USS Stark—to carry two Exocet missiles. In our judgment, this moderately difficult task showed that Iraqi technicians can conduct some technical operations without foreign help, although, according to sources of the US defense attaches in Baghdad and Paris, the Iraqis continually experiment with their new systems with little success. Iraq had previously modified some of its Soviet aircraft to carry Western ordnance.

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Iraq is almost totally dependent on foreign suppliers for spare parts. The diversity in the types of aircraft in the inventory adds to the problem. The Iraqis, however, have been able to acquire sufficient supplies to support their operations during most of the war.

Emphasis on Pilot Training

Iraq's pilot-to-aircraft ratio is slightly over 1:1. Baghdad is trying to increase the number of available pilots to allow the Air Force to sustain extended high-intensity operations during Iranian offensives. According to a source of the Iraq has put greater emphasis recently on training aeronautical engineers—most of whom go on to become pilots—at the Military College of Technology. sources of the US defense attache in Baghdad report that about 200 pilots—approximately half scheduled for fighter aircraft—begin training annually. Many, however, wash out. In early 1986 the Air Force Academy speeded up training, according to another source of the US defense attache in Baghdad, by compressing the three-year course to less than two years.

Iraq depends on instructors from many countries—primarily the Soviet Union, France, India, Pakistan, and Bangladesh—for both domestic and foreign training. In our judgment, the training is of low quality. The foreign instructors' assessments of Iraqi pilots are generally negative, and, the Iraqis do not rate most of their foreign instructors highly either. French flight training is tougher and more thorough than that of the Soviets, and Iraqi pilots who wash out of training in France often get their wings to fly Soviet-made aircraft. many of the foreign instructors do not speak Arabic, and the language barrier hampers instruction.

The content of Iraqi training does not prepare pilots thoroughly for the types of missions actually flown by the Air Force. Iraqi pilots complain that, once assigned to a squadron, their skills deteriorate because they follow tactics that vary from the basic pilot training in Soviet tactics they receive.

Limitations on Improved Capabilities

We believe that tightly centralized control of all air operations and political interference significantly impair the performance of the Iraqi Air Force. Regime concerns about pilot and aircraft limitations, security considerations, and limited cooperation between the air and ground forces before and during the war strengthen Baghdad's tendency toward tight control. We believe that the Air Force seldom raises questions about the operational and political restrictions placed on it. Many senior officers and Iraqi pilots have grown rich from cash and land awards presented to them for their service, and they are unlikely to jeopardize their position by questioning the regime.

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Figure 9. Iraqi pilots have suffered from poor training, particularly that provided by the Soviets. Earlier in the war,

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These methods often lead to poor results.

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says that, on some missions involving more than one aircraft, only the leader knows the destination and the others just follow, dropping their bombs on command. These observers lament that Iraqi pilots will follow flight profiles that prevent them from accomplishing their mission rather than deviate from them and face punishment on their return. Security regulations also cause problems. These sources suggest that, in many instances, pilots are forbidden to share information about their missions.

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Iraq's Air Force relies heavily on its ground control intercept stations to direct not only air-to-air combat, but also ground attack missions—a practice in part necessitated by the relatively primitive avionics of Iraq's older Soviet-model and Chinese aircraft. Iraqi pilots apparently cannot substitute their own judgment, even when they are in a better position to direct their aircraft.

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says that many Iraqi pilots use these controls as an excuse for not doing their job properly. The Iraqi pilots will often "pile on" the easiest or least defended targets because of inadequate briefings and the failure to assign specific targets to individual aircraft. Many pilots use the instruction not to lose aircraft as an excuse to avoid reasonable risks. The Air Force leadership has tacitly supported this behavior by rewarding the pilots with medals and automobiles, regardless of performance.

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Overly centralized control prevents the Air Force from being responsive to battlefield commanders or to changing situations. Coordination problems, which earlier led the Army to take control of most of Iraq's

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helicopter fleet for close air support, continue.

Weak Leadership

In our judgment, the Air Force leadership has done little to increase its role in airpower policy making during the war. The current commander of the Air Force, Lt. Gen. Hamid Sha'ban, was chosen in part because Saddam believed he would not challenge the regime's handling of air operations,

Sha'ban's statements in the press, however, strongly indicate that Air Force operations still are governed as much by political decisions as by current capabilities and opportunities.

The leadership of the Air Force may also be hampered because of its subordination to Army officers. The Air Force commander is under the chief of the Armed Forces General Staff and the General Headquarters in Baghdad, which is staffed predominantly by Army officers. We believe that most senior Army officers involved in planning have had little instruction or experience in air operations and capabilities.

Wartime Performance of the Air Force

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Iraqi Strategy: Saving the Last Bullet

Throughout the Iran-Iraq war, Iraqi Air Force performance has been severely limited by Saddam's political agenda. In our judgment, Saddam has kept Iraqi air strategy focused on two main objectives: preventing an Iraqi defeat by using the Air Force to avert or stop Iranian ground offensives; and forcing Tehran to the negotiating table by attacking economic targets. Despite its overwhelming advantages in the air, Iraq has not succeeded in either mission. In our view, the failure is partly the result of technical and training deficiencies, which are slowly being overcome by wartime experience.

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We believe that the Air Force has been hampered by Saddam's decision to hold much of its assets in reserve and use them only in sporadic air campaigns. In our judgment, Saddam's primary concern is to prevent significant aircraft losses and maintain air superiority until the war ends, using the threat of an all-out air campaign to deter the Iranians from a war-winning ground offensive. If deterrence fails, Saddam apparently believes that the Air Force can serve as a "last bullet" to stop a major offensive. Saddam also does not want to provoke drastic Iranian reprisals against Iraq or an expansion of the war to Baghdad's Gulf Arab allies.

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Campaigns Against Strategic/Economic Targets

In the early years of the war most of Iraq's aircraft did not have the range to attack Iran's important targets. When attacking closer targets, Baghdad would usually send too few aircraft, which would bomb from high altitudes at high speeds. Baghdad did not use its Soviet-built, long- and medium-range bombers for these attacks, probably because it lacked confidence that these slow-moving aircraft could be protected.[2]

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[2] Baghdad refrains from using its bombers for strategic attacks but employs them for missions against troop concentrations and, occasionally, cities near the border.

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Key Air Force Decisionmakers

Saddam Husayn
President, Field Marshal

Iraqi President Saddam Husayn, on the advice of his closest confidants and allies, has allowed the Iraqi Air Force to take stronger action against Iran in the past year. We believe that, following major battlefield defeats in the first half of 1986, the President's principal subordinates and Arab allies convinced him to authorize the Air Force's bombing campaign against Iran's economy. [redacted]

Although Saddam probably has delegated greater operational authority to the Air Force, he still sets guidelines and monitors operations. He is briefed frequently on Air Force activities and must approve long-range strategic raids, [redacted] *Saddam, however, seeks the advice of Air Force Commander Sha'ban and also listens to his political advisers.* [redacted]

Except for his wartime experience, Saddam has no military background. He rose to power through the Ba'th Party ranks and views the armed forces as a potential opposition, [redacted]

Hamid Sha'ban
Commander, Air and Air Defense Forces

Hamid Sha'ban, a trusted military adviser to the President, used his recently increased authority to orchestrate Iraq's successful bombing campaign against Iran in the second half of 1986. The air raids planned by Sha'ban and his staff caused economic problems for Tehran and demonstrated to the international community Iraq's ability to stave off defeat. Since taking command of the Air Force, Sha'ban has presided over a steady increase in its size and performance. [redacted] 25X1 25X1

Sha'ban, about 55, is a native of Iraqi President Saddam Husayn's hometown of Tikrit. A member of the ruling Ba'th Party, he commanded a key Air Force squadron that helped bring the party to power briefly in 1963. [redacted] 25X1 25X1 25X1 25X1

[redacted] *During the 1970s, Sha'ban was an airbase commander, chief of Air Force training, and deputy commander and then commander of the Air Force until his brief retirement in 1979. He was recalled to service in 1980 as an adviser to Defense Minister Adnan Khayrallah and reinstated as Air Force commander in late 1983.* [redacted] 25X1 25X1 25X1

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In our judgment, Iraq's more recent campaign against Iran's economy has been the most successful use of its air assets. We estimate that Iran lost about $1 billion in oil revenues as a result of the substantial number of attacks by the Iraqi Air Force against Iranian economic and military facilities in 1986. The Iraqis caused greater damage to critical targets largely because they employed better aircraft and munitions.

During its longer range missions, Baghdad has relied on two of its modern aircraft, Soviet MIG-25s and French Mirage F1s. Both were used as soon as they became available. Until the end of 1985, Iraq primarily used the MIG-25 against strategic targets because it could operate in relative safety over long ranges at high altitudes and speeds. Since 1985 the Iraqis have relied on the F1 armed with French-made AS-30L air-to-surface missiles because this combination has allowed pilots to strike targets more accurately with minimal risk. Unlike the MIG-25, the F1 can attack targets from low altitudes at a safe distance using precision-guided munitions. MIG-25s are still used when accuracy is not so important, such as in Iraq's campaign against Iranian cities in early 1987.

The Iraqis have benefited from the F1's capability to be refueled by other F1s equipped with additional fuel tanks. Using this technique to extend the F1's range, the Air Force conducted several long-range attacks in late 1986 on Iranian oil shuttle terminals near the Strait of Hormuz and the Neka power station, northeast of Tehran. Baghdad also targeted munitions plants, steel mills, and other defense industries but avoided areas that were strongly defended. Iraq seldom attacks Iranian airfields and usually has its aircraft avoid other military facilities as well. We believe that Iraq's moratorium on attacks on civilian targets in February 1987 resulted in part because Baghdad wanted to reassess its tactics following the loss of a high-flying MIG-25 over Esfahan.

The incremental and sporadic nature of the Iraqi air campaigns has allowed Iran time to recover from the damage and improve its air defenses. In early 1987, Iran deployed at least four Libyan-supplied SA-2 and Chinese-built CSA-1 medium-to-high altitude surface-to-air missile batteries, and, for the first time in the war, it succeeded in downing an Iraqi MIG-25 flying at 20,000 meters. Tehran probably will make future attacks increasingly difficult by improving its air defenses with more surface-to-air missile systems.

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Ship Attacks

Iraq's systematic attempts to stop seaborne oil exports from Iran have been an important part of its overall campaign against Iran's economy. We expect that, as long as the war continues, Baghdad will conduct ship attacks, being careful not to push so hard that the Iranians retaliate forcefully against Iraq's Gulf allies.

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Earlier in the war, Iraq employed Super Frelon helicopters, whose range limited ship attacks to the upper part of the Gulf. Attacks on tanker traffic around Khark Island began only after France loaned Iraq five Exocet-armed, Super Etendard aircraft in 1984. Once its F1s became operational, Iraq increased ship attacks, although the effect was reduced by poor tactics and technical problems

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In the first half of 1987 Iraq maintained the high level of ship attacks seen in 1986. The Iraqi Air Force has averaged between four and five successful attacks per month and has hit more than 160 tankers and merchant ships since it began these operations in 1984. Although only a few tankers and about 20 merchant ships have been sunk, we believe Iraq's purpose is to raise the cost to Iran of exporting oil and, in turn, reduce Tehran's export revenues. The danger posed by Iraqi attacks has forced Iran to open an oil shuttle between Khark and Larak Islands and to offer special prices to entice buyers to send their tankers to Khark Island.

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Support for Ground Forces and Interdiction

The Iraqi Air Force has been ineffective in countering Iranian ground operations through close air support for Iraqi troops at the front and interdiction operations against Iranian reserves and supply units. We believe, however, that Baghdad's understanding and appreciation of the importance of these missions have grown during the war.[5]

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Close Air Support. Iraqi efforts to increase the lethality of its close air support missions have met with mixed results. Early efforts reflected a lack of Air Force and Army experience in joint air and ground operations. After the Air Force mistakenly attacked Iraqi ground units on several occasions, the General Headquarters began limiting it to interdiction missions against Iranian rear areas. Army helicopters took the place of Air Force ground attack aircraft along the front. the Army remains unskilled in controlling air and ground operations and in using forward air controllers.

Since 1985, however, the Air Force has been flying more missions near the frontlines in support of ground operations, but their effectiveness is still questionable.

New munitions, including incendiary and chemical bombs, increased the destructiveness of these attacks, but Iraqi tactics continue to impair performance.

Figure 11. *Iraqi aircraft shot down while on an interdiction mission against Iranian rear areas.*

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Interdiction. We believe that the Air Force is becoming more proficient at disrupting and damaging Iranian support of its ground operations, although it still cannot stop Iranian offensives. In 1982, Iraq could not destroy the few bridges over the Karun River that were instrumental in Iran's recapture of Khorramshahr. During the most recent Al Faw offensive, however, the Iraqi Air Force knocked out the most important permanent bridges over the Bahmanshihr River, interrupting critical Iranian lines of communication. The improvement in performance was clear, even though its consequences were mitigated by Iranian use of pontoon bridges and causeways.

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We believe that poor targeting, training weaknesses, and political considerations prevent Iraq's interdiction missions from being more effective. little evidence

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[5] A close air support mission attacks targets such as tanks, field fortifications, and artillery in close proximity to friendly ground forces. Interdiction missions aim to delay, disrupt, or destroy an enemy's military potential before it can be brought to bear against friendly ground forces

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that Iraq attacks many suitable Iranian military targets such as artillery batteries, boat storage areas, or air defense sites. Moreover, analysis of Iraqi air operations indicates that possibly because of training shortcomings Iraqi pilots seldom fly during periods of low visibility—a deficiency exploited by the Iranians who move troops and supplies during these periods. Political decisions interfere as well. Baghdad has announced its reluctance to bomb Ahvaz—a major logistic hub and supply depot for the southern war front—for fear of injuring its predominantly Arab population.

Air Defense

The Iraqi Air Force's foremost achievement has been its successful defense of Iraqi territory against the diminished Iranian air threat. The addition of new fighters, air defense weapons, and Soviet and French air-to-air missiles have significantly improved Iraqi air defenses since 1980. The integration of the Soviet MIG-29 fighter into Iraq's Air Force will also increase Baghdad's ability to challenge intruding aircraft. We estimate that over half of the Air Force's personnel belong to the Air Defense Command, which controls more than 5,000 antiaircraft guns and 400 surface-to-air missile launchers. In the face of Iraqi defenses, Iran musters only infrequent and ineffective airstrikes.

The Israeli raid on Iraq's Osirak nuclear reactor in 1981 awakened Baghdad to the weakness of its air defenses in western Iraq. Progress has been made in reducing the gaps in air defense coverage in the west, but many of Baghdad's projects will not be completed for several years. Iraq has set up additional early warning radar sites and increased its surface-to-air missile network in the area. New airfields under construction and improvements in existing airfields should increase Iraq's intercept capabilities in the west once the war is over and Baghdad can disperse its aircraft more widely. Moreover, communication links for passing air defense information have been established with Amman and Riyadh, although these improvements probably would not enable Iraq to stop a determined Israeli air attack.[6] We believe, however, that they will complicate Israeli planning and increase the likelihood of losses to the Israeli strike force.

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Implications

Impact on the War With Iran

We believe that the Iraqi Air Force could be instrumental in ending the war if Baghdad used it more aggressively. Although it could not win the war, we believe that a sustained campaign that succeeded in destroying critical targets of Iran's vulnerable economic infrastructure would significantly reduce Tehran's ability to prosecute the war. Furthermore, these attacks could create economic hardship and lead to civil unrest sufficient to compel the Iranian leadership to scale down the conflict. The current strategy of modulating pressure in response to movements in the ground war, however, gives Iran the opportunity to repair facilities, improve air defenses, and otherwise adjust to Iraqi air attacks. By failing to fully exploit its Air Force to reduce Iranian ground operations, we believe that Baghdad allows Tehran to increase the strain on Iraq's limited manpower by persistently launching offensives.

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Baghdad is unlikely to change its overall strategy of conserving its airpower to fight a longer war. Saddam probably believes that this strategy matches both the regime's war policies and the capabilities of the Air Force. Moreover, he may fear losing the Air Force's political support by demanding dramatic improvements in combat performance. In the past year Baghdad has been willing to widen the scope of its air campaigns as the Air Force showed itself able to do

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more without incurring heavy losses. Nonetheless, such a conservative strategy could permit Iran to achieve a major breakthrough on the ground that the Air Force could not stop.

If Tehran again appears to be gaining the upper hand in the war, Baghdad may significantly step up attacks on economic targets to speed Iran's economic decline. Iraq's Arab allies also could press Saddam to do more to seize the initiative as they did following the Iraqi defeat at Al Faw. Barring increased Iranian pressure on Iraq, however, Baghdad is more likely to remain cautious and may even temper its current modest campaign because of the slight improvement in Iranian air defenses this year.

By continuing to hold back its Air Force, however, Baghdad risks missing an opportunity to cripple Iran's ability to launch large-scale offensives. In our judgment, a sustained air campaign directed against Iranian oil exports, domestic refineries, and defense production facilities could significantly weaken Tehran's warmaking capability. We estimate, however, that it would take at least several months before the impact of a full-scale campaign against Iran's economy would be felt. In addition, the Air Force used as a "last bullet" would be unlikely to stop an Iranian breakthrough on the ground.

Impact on the Arab-Israeli Balance

The increase in the size and capabilities of the Iraqi Air Force only marginally reduces Israel's superiority over the Arabs. Iraqi attention will remain focused on its eastern border for the foreseeable future even if the war with Iran ends. We believe Baghdad would allow no more than a small contingent of aircraft operating out of Iraq to become involved in a future Arab-Israeli conflict. Moreover, these aircraft probably would not play a decisive role. Nonetheless, Iraq's newer aircraft might increase Israeli losses in the air, and Iraqi fighter-bombers would have an increased possibility of successfully bombing strategic targets inside Israel. Improvement in Iraq's air defense network probably would make Israeli air attacks against Iraqi territory more costly. Baghdad is better prepared to defend against a repetition of Israel's 1981 attack on the Osirak reactor or a similar attack on other strategic facilities such as the Samarra chemical weapons production plant, although Israeli aircraft probably could still reach their targets.

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Impact on US Interests

As demonstrated by the F1 attack on the USS Stark in May, Iraq's continuing air campaign against Iran's Persian Gulf shipping increases the likelihood that the United States may become involved in an escalation of the Iran-Iraq war. Any US commercial ships operating in the northern Gulf will remain at risk from inadvertent Iraqi attack despite Baghdad's attempts to improve Air Force command and control. Moreover, Iraq can use air attacks on critical Iranian oil facilities in the Gulf and in Iran's interior to refocus international attention on the war, thus keeping pressure on the United States and the other permanent UN Security Council members to maintain progress on resolving the war.

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If an escalation in Iraqi ship attacks leads to a broader antishipping campaign by Iran, the Gulf Arab states may request additional US security assistance, such as the Kuwaiti reflagging and escort program. Similarly, Iraqi strikes against economic facilities in Iran's interior could cause Tehran to take military action or launch terrorism against Iraq's allies, responses that Iran already has threatened. This would further heighten tensions in the Gulf and would lead to pressure by the Gulf Arabs for greater US involvement.

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Appendix

The Attack on the USS Stark

On 17 May 1987 an Iraqi F1 accidentally attacked the USS Stark, an incident that demonstrated the Iraqi Air Force's strengths and weaknesses. The guided-missile frigate, patrolling the Persian Gulf as part of the US Middle East force, was struck by two Exocet missiles. In the blast and ensuing fires, 37 US sailors lost their lives, becoming victims, in part, to improving Iraqi technical abilities and, conversely, to weaknesses in Iraq's tactics and control of air operations. [redacted]

Surprising Ability

The attack revealed important Iraqi capabilities. Iraq's modification of an F1 to carry two Exocet missiles demonstrated that Iraqi Air Force technicians were improving. Baghdad probably wanted to provide its aircraft with greater striking power against tankers, which absorb hits by the Exocet with minimal damage. We believe that most of the modifications were made by Iraqi technicians, [redacted]

The attack also indicated that Iraq's F1 pilots probably are skilled. We believe that the attacker, despite making some careless mistakes, must have been well trained and experienced to get his aircraft in position to attack. AWACS data indicate that the modifications probably made the F1 more difficult to fly. The aircraft moved erratically and at dangerously low speeds. The pilot, however, managed to keep the F1 airborne for the relatively lengthy flight. Moreover, he apparently used his fire-control radars in such a manner as to minimize the warning given to the Stark. [redacted]

What Went Wrong

Despite its capable performance, the Iraqi Air Force blundered—due mainly to its flawed ship attack procedures. Most Iraqi ship attacks occur in an apparently predetermined area along the Iranian coast used by tankers servicing Khark Island. Baghdad has said that any ships inside its or Iran's declared exclusion zones are potential targets. Iraq's aircraft are often launched with limited target information and seldom work with maritime patrol aircraft to help locate or identify targets. The pilots appear to be sent to specific points to look for their prey. They sometimes fly with no specific target in mind, relying on the aircraft's radar to locate one within the exclusion zones. [redacted]

Figure 13. USS Stark after attack by an Iraqi F1 [redacted]

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Consequently, pilots are never sure of finding a ship to attack. Many return to base without attacking a ship, probably because they could not find a target. The distance between the attacker and the target, as well as darkness, precludes visual identification. Moreover, the image on the radar screen cannot help the pilot identify his target beyond a determination of the ship's size.

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In addition to failing to properly identify his target, we believe the pilot made other mistakes. The Stark was outside the Iranian exclusion zone and should not have been targeted. The patrolling AWACS determined that the aircraft traveled much farther west along the Saudi coast than normal, suggesting that a possible navigation error had been made. The pilot might have entered incorrect data into the inertial navigation system that would later make him believe that his position was farther east and that the Stark was in the exclusion zone. The aircraft's modifications and the pilot's subsequent difficulties in controlling it also may have played a part in the possible navigation errors.

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The pilot did not respond to the warnings issued by the Stark. He may have had his radio off or the volume low—a habit possibly developed from flying missions requiring little or no communications. In addition, his command of English may have been insufficient to understand the warnings.

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