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Iraqi Ballistic Missile Developments [redacted]

An Intelligence Assessment

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July 1990

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Iraqi Ballistic Missile Developments [redacted]

An Intelligence Assessment

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Iraqi Ballistic Missile Developments [redacted]

Key Judgments

Information available as of 29 May 1990 was used in this report.

Iraq has the most aggressive and advanced ballistic missile development program in the Arab world. It already possesses two missiles—Iraqi-modified Soviet Scud B's called the Al Husayn and the Al Abbas—capable of reaching Tel Aviv or Tehran, targets some 600 km away. Seeking an indigenous missile production capability, Iraq also has development well under way of five other missiles capable of greater ranges and payloads. [redacted]

Foreign assistance is critical to Iraq's effort. With it, production of one or more of Iraq's new missiles could possibly begin during the early 1990s. Otherwise, production could be delayed into the mid-to-late 1990s. Iraq realizes this dependence and is working to become self-sufficient and to wean itself from foreign support—including Moscow, its only supplier of Scud B missiles. [redacted]

Iraq has acquired most of its missile development and production infrastructure in less than three years. With West European design and technical assistance, it has built over 70 buildings needed to produce and test major missile components and to develop and produce subcomponents. At the heart of this effort are two extensive construction projects, Project 395 and Sa'ad 16, which include facilities for solid-propellant production, for rocket motor production and testing, for guidance and control systems development and production, and for missile integration. Iraq still depends on foreign suppliers for some raw materials but is pursuing production facilities for these materials in its drive for self-sufficiency. Several government organizations—especially the Technical Corps for Special Projects and the Nassr State Enterprise for Mechanical Industries—continue to seek additional equipment and materials to support Iraq's missile program. [redacted]

Iraq has based its missile program on a diversified acquisition strategy, with low-risk and high-risk development projects running in parallel. At the low-risk end, three of the five missiles under development—the domestic variants of the Al Husayn and the Al Abbas and the Tamuz I—are derived from basic, proven Scud B technology. The other two—the Condor II and the Al Hamza—use more advanced Western propulsion and guidance technology. All of these developments are based on foreign technology and design. We believe Iraq will not be able to design its own missiles for a least five to 10 years. [redacted]

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Conducting these five missile projects at once is costly and undoubtedly stretches Iraq's financial and manpower resources. The multiple developments, however, provide a safety net and give Iraq something to fall back on if one or more missile projects fail. Working with several generations of technology, some of which Iraq will grasp very easily, reinforces this safety net. [redacted]

We believe Iraq could begin indigenous production of its variants of the Al Husayn and the Al Abbas by 1991. Both should be able to reach 600-km targets, with 300- or 660-kg warheads, respectively. In addition, some Al Abbas missiles could be equipped with a 200-kg warhead to reach targets at 900 km. In the meantime, Iraq will push to complete development of the Condor II, with production possibly beginning by the early 1990s if foreign assistance continues. If the flow of assistance is interrupted, production could be delayed until the mid-to-late 1990s. Iraq could operate development and production facilities on its own, possibly within five years of the beginning of missile production. [redacted]

We judge that, in addition to high-explosives warheads, Iraq will develop and manufacture chemical and possibly biological warheads for all of its missile systems. Chemical and biological warheads are more cost effective, result in greater numbers of human casualties, provide a psychological edge, and make the missile a more effective deterrent. Iraq currently has the ability to weaponize its chemical and biological agents. It may already possess a chemical warhead for its modified Scuds. [redacted]

We also judge that, depending on the level of foreign assistance, Iraq may also be able to develop a nuclear warhead before the end of the decade. It is procuring equipment, materials, and technology that strongly suggest a nuclear weapons program exists. But it will not be a simple task to fit a nuclear weapon into a missile's warhead. Also, there are weaponization problems—how to ensure that a nuclear device will survive missile flight—that must be solved. If these problems are not readily solved, Iraq could face two or more years delay in fielding a nuclear payload. [redacted]

In our assessment, the high-priority status of Iraq's missile program will continue to command the necessary personnel and financial resources. Iraq probably has placed some of its most capable engineers, technicians, and managers on missile projects. Iraq will continue to fund development, probably using a combination of Iraqi and foreign—probably Saudi Arabian—monies. In the future, Iraq may sell missile-related technology to garner prestige as the emerging technology leader in the Arab world. [redacted]

In our judgment, current Iraqi missile projects will be difficult, if not impossible, to stop. Impeding the flow of foreign assistance, however, could slow development considerably. This would best be achieved by thwarting Iraqi attempts to secure technology in areas such as guidance and control, in which Iraq has limited, but growing, capabilities. Iraq has, however, proved itself capable of tapping into Western and other nations' aerospace industries for technology support, despite attempts by some governments to prevent it. It has effectively exploited a consortium of Western firms known as the Consen Group and has organized a covert procurement network of its own. There almost certainly is no way to block such assistance entirely. The Missile Technology Control Regime will have limited success as Iraq taps nonmember nations like China, India, or Brazil for assistance with its program. Iraq probably will also use its space program as a conduit to gain dual-use technology for its missile program. [redacted]

Contents

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Iraqi Ballistic Missile Developments (U)

Introduction: A Commitment to Self-Sufficiency

He who launches an aggression against Iraq or the Arab nation will now find someone to repel him. If we can strike him with a stone, we will. With a missile, we will . . and with all the missiles, bombs, and other means at our disposal.

Iraqi President Saddam Husayn
18 April 1990 (U)

Iraq has made indigenous missile production one of its highest priorities. This priority is driven by two major goals. First, Iraq wants to demonstrate to its allies and enemies that it has operational missiles with sufficient ranges to threaten Middle Eastern cities. These missiles could be used to deter Israeli attacks and establish Iraq's leadership in the Arab world as a military power and a technologically advanced nation. Second, it wants to end its dependence on foreign support—both for operational missiles and related technology. Only by building its own missile R&D infrastructure of people and facilities can Iraq wean itself of this dependence. [redacted]

Iraq has come a long way in pursuing these goals. In the past five years, Iraq has moved from third-hand participation in the Argentine Condor II program (inset) to implementation of a diverse, indigenous capability to develop missiles. It has also developed a large procurement network to amass the technology needed for its missiles. [redacted]

Iraq's current missile development program began to take shape in 1987. The most pressing need at that time was for a ballistic missile capable of reaching Tehran—a distance of about 600 km, or twice the range of Iraq's Soviet-supplied Scud B missiles. We believe that in early 1987 Iraqi engineers started on a project to produce a missile with this range capability. Iraq modified some of its Soviet-origin Scuds to fly to twice the nominal range—at least 600 km. These missiles, which it called Al Husayn, were used during

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Argentina-Egypt-Iraq: A Cooperative Venture

In 1984, Iraq, restricted by a limited missile development and production infrastructure and the financial burden incurred during the war with Iran, focused on funding Argentina's and Egypt's missile-development program for the Condor II missile. Iraq transferred funds to Egypt as partial financing for the missile, then under development in Argentina. We do not know the exact terms of the agreement, but we believe Egypt and Iraq provided funding for the Buenos Aires program in return for some of the first missiles to be produced. In addition, both Egypt and Iraq eventually were to gain a production capability. [redacted]

Iraq also began construction of its own Condor II production facilities in mid-1987. Over the next two and a half years, we believe Iraq continued to fund development of the missile in Argentina, while seeking and acquiring materials needed to produce the Condor II in Iraq. The Condor II program, however, ran into difficulty in mid-1989. International pressure, the Missile Technology Control Regime (MTCR), and technical setbacks subsequently brought the program to a virtual standstill in Argentina and Egypt. Repeated Argentine attempts to conduct the first flight test of the missile have failed, largely because of technical difficulties with guidance and control. The lack of progress in Argentina threatens now to scuttle the Egyptian effort as well. [redacted] *Condor II development in both countries seems to be on hold, at least for the time being.* [redacted]

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the "war of the cities" with Tehran in 1988. Iraq later claimed to have developed and tested a 900-km-range missile, the Al Abbas. This, however, still left Iraq dependent on Moscow—its only missile supplier—for missiles and parts. [redacted]

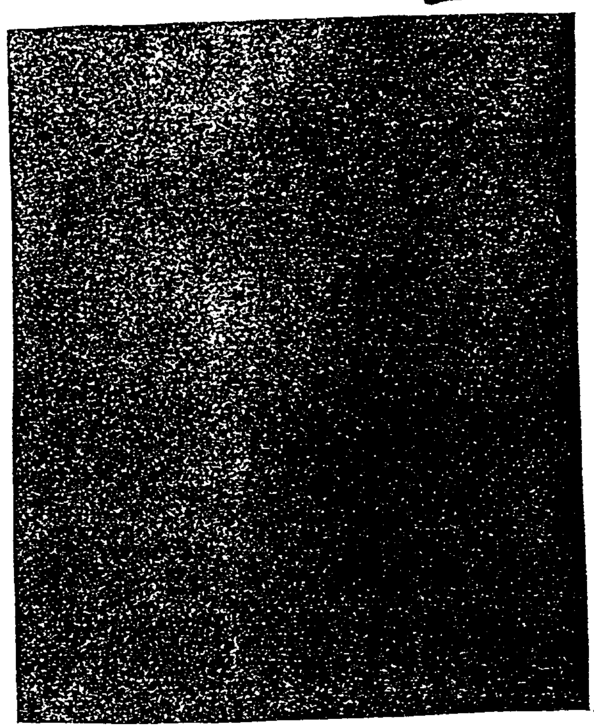
Seeking total indigenous production, Iraq also began other parallel missile development projects. It now has five missiles under development, all of which are based on foreign technology and design (figure 1). We believe that, concurrent with its 1987 decision to modify the Scud B's, Iraq began mapping out a second project for entirely Iraqi-manufactured copies of the Al Husayn and Al Abbas missiles. It is also pursuing parallel Iraqi development of the Tamuz, and the more advanced Condor II and Al Hamza missiles, capable of greater ranges (figure 2) and payloads. Although development of the latter two missiles will be slower, they will offer Iraq greater flexibility. The solid-propellant Condor II, for example, will be easier to handle, require less preparation time before launch, offer more payload options, and provide better accuracy and range than any version of the Al Husayn or the Al Abbas. [redacted]

We believe Iraq's success thus far is based on the following factors:

- It has made a very determined commitment of people and resources. We estimate well over a billion dollars were invested in ballistic missile development.
- It has learned how to tap into Western and other nations' aerospace industries for technology support, despite attempts by some governments to prevent it.
- It has a diversified missile acquisition strategy with low-risk and high-risk development projects running in parallel.
- It has relied on modest changes to mature, proven, and available Scud technology as the low-risk program.
- It proved in the "war of the cities" that the low-end technology of the Scud is adequate to threaten civilian populations. High technology is desirable, but not critical; basic range capability, however, is critical. [redacted]

Iraq's Missile Program: A Multiple Approach

Underlying Iraq's ballistic missile development program is a strategy that incorporates several generations of missile technology. Three of its missile projects are based on liquid propellants and are evolutions of Scud B technology—the domestic copies of the Al Husayn and Al Abbas missiles, and the 2,000-km-range Tamuz I, which is probably based on the Iraqi space launch vehicle, the Al Abid. Iraq's Scud derivatives show more imagination and creativity than that seen elsewhere in the Third World. Meanwhile, Iraq also is pursuing development of more advanced solid-propellant missiles, the 750- to 1,000-km-range Condor II and the 1,200- to 1,500-km-range Al Hamza. This multiple approach, although costly, may be a well-calculated effort to help Iraq achieve its goal of indigenous missile production. Multiple developments give Iraq something to fall back on should part of the program fail. [redacted]



The Condor II is a two-stage ballistic missile designed to have a range of 750 km and deliver a payload of approximately 500 kg. Original specifications called for

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a solid-propellant first-stage motor and a liquid-propellant second-stage engine. [redacted]

Iraq could begin production of the Condor II missile by the early 1990s with continued foreign assistance. It probably will face problems in areas such as guidance and control, second-stage configuration, and flight-testing as it completes development of the missile. [redacted] Its choice for the Condor II second stage is unclear, although we believe Iraq has engine designs for both solid- and liquid-propellant configurations. When Iraq begins flight-testing the Condor II, Iraqi engineers will need foreign help in collecting and analyzing launch data. [redacted]

Iraqi production of the Condor II could be delayed until the mid-to-late 1990s if the flow of foreign technology or components is interrupted. Hindering Iraqi procurement in these areas, however, may have only a short-term effect. Iraq is seeking an indigenous production capability for the bulk of the missile-related materials it now purchases. [redacted] If Iraq cannot procure missile-related raw materials and guidance technology and components from Western sources, it probably will turn to non-Western sources, such as China or India. [redacted]

We believe Iraq will strongly resist any pressure to delay or abandon development of the missile and will press ahead regardless of the status of Condor II development in Argentina or Egypt. Iraq, however, almost certainly will seek continued cooperation with Argentina and Egypt on Condor II development. It would be to Iraq's advantage to exploit its partners for the near future for the hands-on development and testing experience they can provide. [redacted] In the past, Iraq had closer ties to the Egyptian program, but we now expect stronger links between Buenos Aires and Baghdad as Iraq taps Argentina as a source of assistance. [redacted]

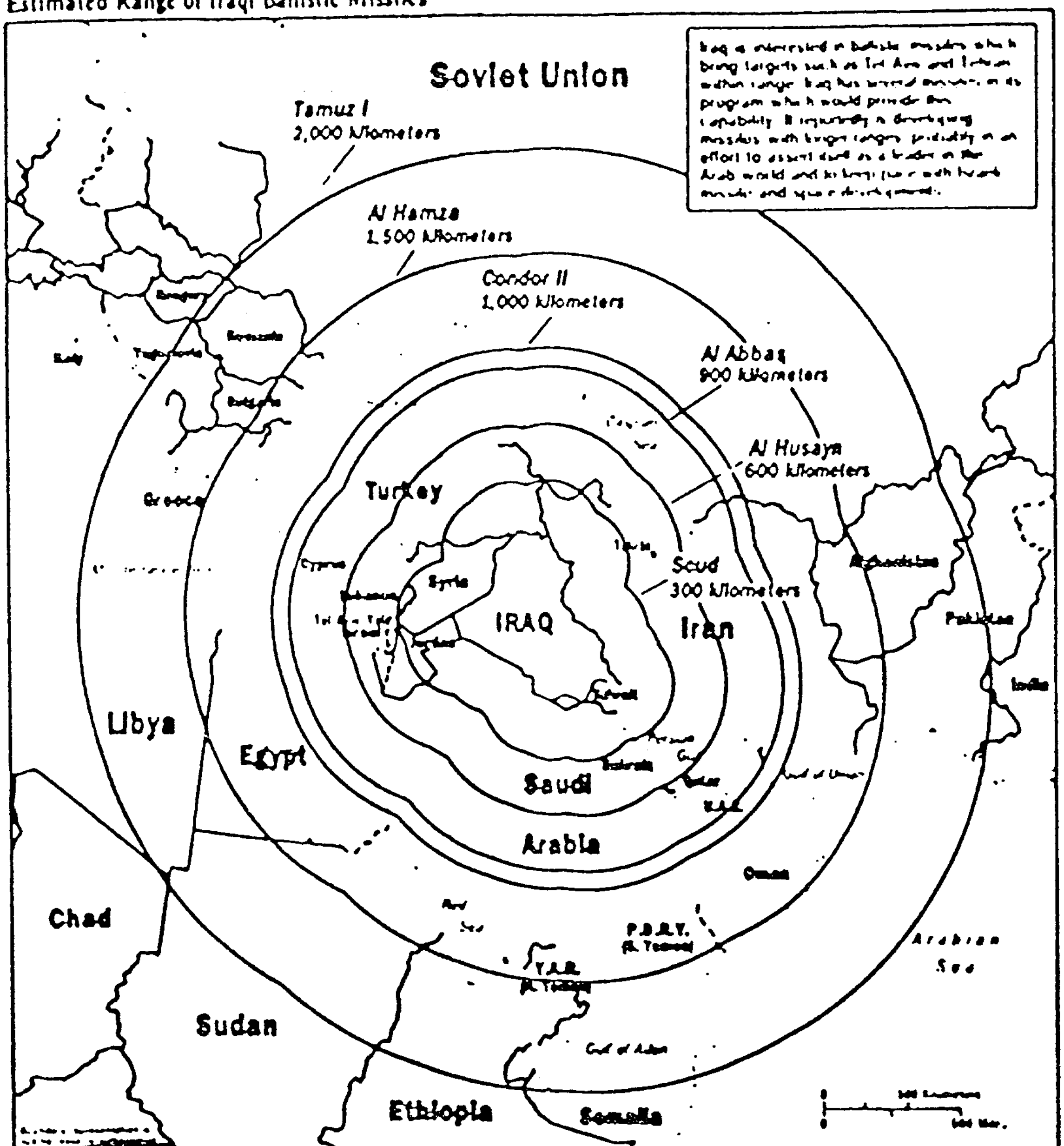
Our growing concern is that Argentina and Egypt—despite claims of withdrawing from the program—will continue development of the Condor II through Iraq. Argentine and Egyptian engineers may train at Iraqi production facilities, which are similar to those in Argentina and almost identical to ones in Egypt. Argentina and Egypt could begin indigenous production with little or no notice shortly after its engineers return from Iraq. We believe Iraq will be the first of the three to produce the Condor II. If production technology is not transferred to Argentina and Egypt by Iraq, Argentina and Egypt could purchase Condor II missiles from Iraq once Iraqi production begins. [redacted]

The Al Hamza: Probably Building on Condor II Technology

Iraq is working on a second solid-propellant missile, called the Al Hamza. According to a source of the US defense attache in Iraq, it has two stages and a range of 1,200 to 1,500 km. Al Hamza almost certainly is of foreign design—Iraq probably will not be capable of designing ballistic missiles on its own for at least five to 10 years. Iraq reportedly is receiving Romanian technical assistance on the project. Romania has only a modest solid-propellant production capability, and it is unclear if it could lend significant assistance in the missile's development. Additional reporting on the Al Hamza is sparse. [redacted]

With the Al Hamza, Iraq probably is building on its Condor II technology. Through development of the Condor II, Iraq will gain experience in producing solid propellants, rocket motors, guidance systems, and experience in technical areas such as stage separation. Iraq undoubtedly realizes that all of this can be applied to longer range missiles. It may prefer to build

Figure 2
Estimated Range of Iraqi Ballistic Missiles



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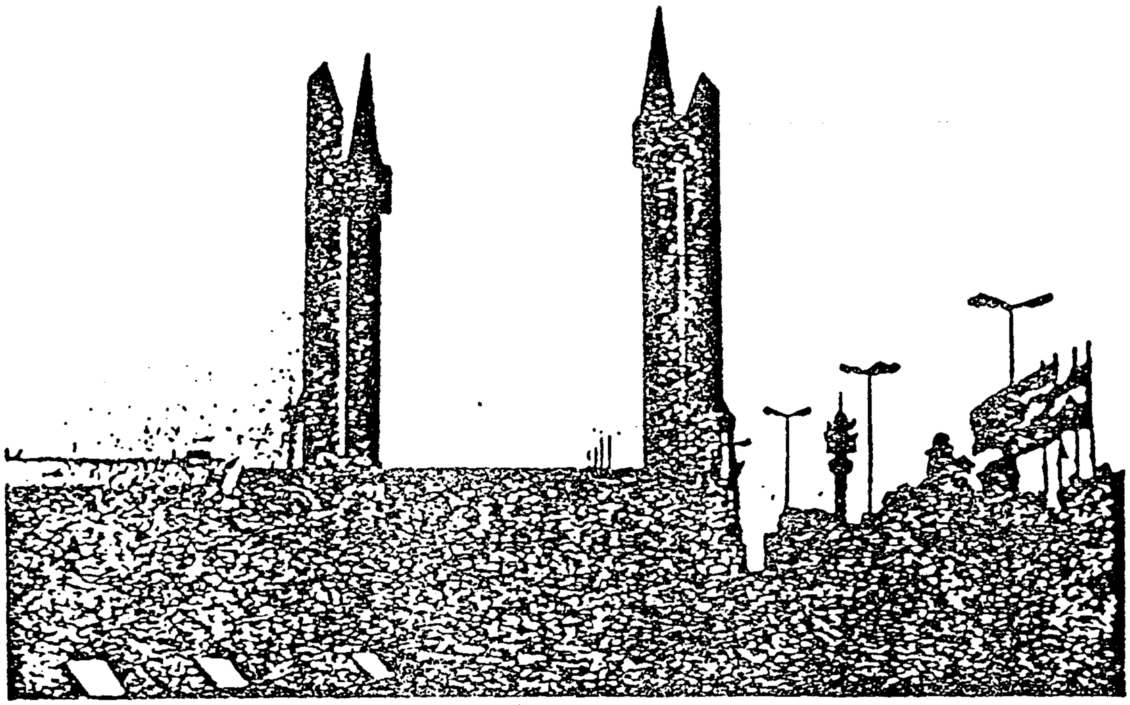


Figure 3. The Al Husayn and Al Abbas—Iraqi-Modified Scuds. Iraq's Al Husayn and Al Abbas modified Scuds were displayed on fixed launchers at Baghdad's Weapons Exhibition in 1989. These photos show that the Al Abbas is roughly 1 meter longer than the Al Husayn. Fixed launchers that would accommodate the longer Al Abbas are being constructed in at least nine sites in western Iraq [redacted]

on solid-propellant technology. Producing a larger solid-propellant rocket motor, such as one for the Al Hamza, probably would be simpler and quicker than producing a liquid fuel engine of an equivalent capability. [redacted]

Modified Scud B's: A Quick Fix

In 1987, Iraq had a pressing need for a surface-to-surface missile delivery capability against Iran. Iraq's 300-km-range Soviet-origin Scud B missiles fell far short of the target. There were no systems with greater ranges available for purchase, and indigenous missile production was a prospect several years off. We believe Iraqi engineers chose the quickest and easiest way to fill this gap—greatly reducing the payload of the Scud B missile to gain greater range. It renamed the missile the Al Husayn and gave it at least a 600-km range. Iraq also claims to have developed a variant, called the Al Abbas, with a range of 900 km (figure 3). In our judgment, Iraq may have received foreign technical assistance for this project—possibly to determine the scope and nature of the modifications. [redacted]

The Al Husayn. The Al Husayn carries a very small payload and is highly inaccurate. It, however, quickly filled the Iraqi need for a missile capable of striking Tehran in 1988. In less than seven weeks, Iraq was able to fire close to 200 Al Husayn missiles against Iran during the "war of the cities," contributing to bringing about an end to the Iran-Iraq war. [redacted]

The Al Husayn is inaccurate because Iraq probably did not modify the Scud's strapdown inertial guidance system. Our analysis indicates the Al Husayn should have a circular error probable (CEP) of about 2,300 meters, compared with a CEP of about 1,000 meters for the nominal Scud B. [redacted]

In our judgment, it is unlikely that Iraq has done more than stretch the propellant tanks on the Al Abbas. Further changes would be more difficult and more time consuming. Iraq may have exaggerated the missile's capabilities for propaganda purposes. The Iraqi announcement of the Al Abbas was well timed - a few days after it called a cease-fire to the "war of the cities" with Iran. Iraq probably wanted to impress Iran with the idea that Iraq could strike back with longer range missiles should Iran choose to resume its own missile attacks. [redacted]

The Al Abbas, however, could offer Iraq other options. Our analysis indicates that it could carry a 400-kg payload to roughly 600 km. We believe Iraq will move some of its Al Abbas missiles to western Iraq. [redacted]

Scud B Technology: More Innovations

Iraq is getting the most mileage it can out of Scud B technology. The Al Husayn and Al Abbas started as modified Scud B missiles, but Iraq is taking this a step further. It is reverse-engineering the modified system and now will produce Al Husayn and Al Abbas missiles domestically. Iraq is also working to take Scud B technology even further—out to 2,000 km and possibly into space. The Tamuz I, announced in December 1989, probably is based on Iraq's space-launch vehicle, the first stage of which consists of five clustered Scud B airframes. [redacted]

Domestically Produced Al Husayn and Al Abbas Missiles. Iraq is proceeding quickly with its plans to reverse-engineer Scud components and produce Al Husayn and Al Abbas missiles entirely within Iraq. Iraq has obtained blueprints of the Scud. Since at least June 1988, several West and East European firms have produced parts from these drawings for the Iraqis (figure 4). [redacted] Iraq has ordered the components under Project 1728, a project through which Iraq seems to be coordinating this effort. [redacted]

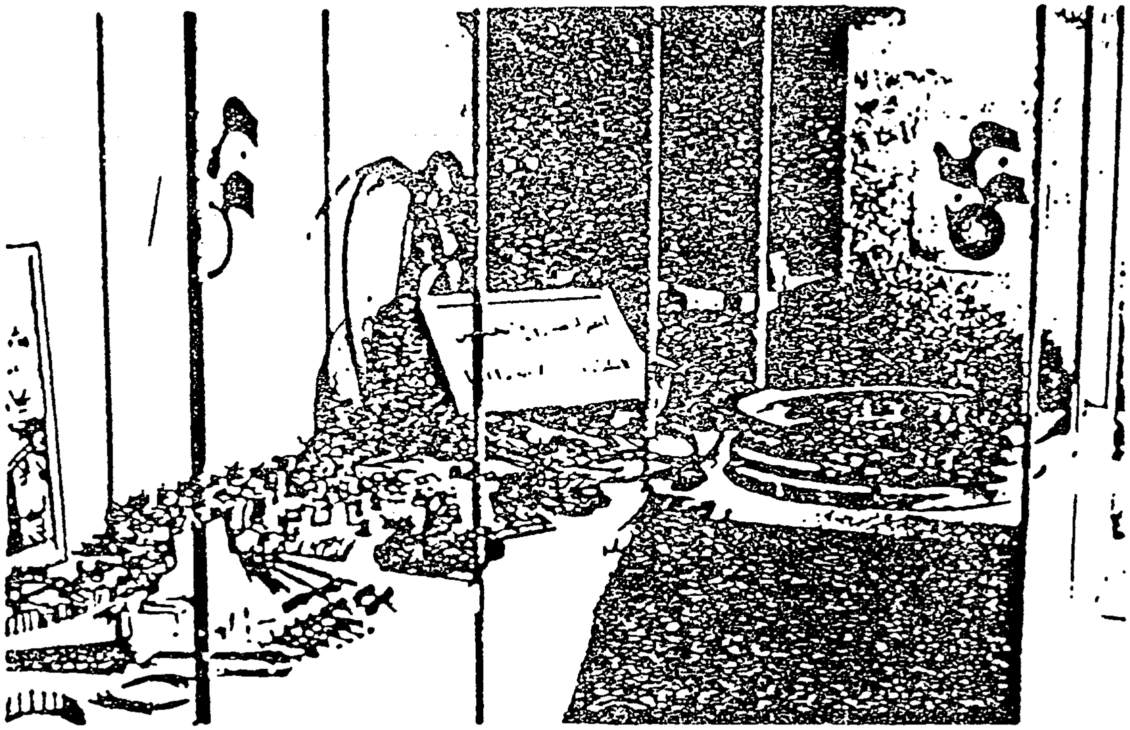


Figure 6. Iraqi Al Husayn Missile Parts. Iraq has been acquiring missile parts, both foreign and domestically produced, in its program to produce the Al Husayn and Al Abbas missiles indigenously. Some of these parts were displayed at Iraq's Weapons Exhibition in 1989. They have been manufactured since mid-1988 by East and West European firms using Iraqi-supplied blueprints. Because Iraq is producing the missiles itself, rather than modifying existing systems, it can incorporate design changes that carry the Al Husayn and Al Abbas to the same ranges as the modified versions but with larger payloads. [redacted]

Iraq also is manufacturing some of the missile parts indigenously. Iraq now purchases the bulk of the parts but almost certainly wants to ultimately produce all of them domestically. [redacted]

Iraq probably could begin producing the missiles as early as 1991 by assembling a mix of foreign and domestically produced parts. Since mid-1989, Iraq has launched several Scud-type missiles—possibly prototypes from Iraq's own assembly line for the Al Husayn or Al Abbas. Iraq's rapid progress in this project can be attributed to several factors. Scud B technology is very basic and Iraqi engineers probably have grasped it quickly. Iraq is shrewd in procuring components. It has spread component blueprints out among a large number of companies, reducing the chance that any one company has enough drawings to identify the true nature of the project. Our assessment is that it will be difficult to impede Iraqi progress on this project. [redacted]

In our judgment, Iraq's goal is to domestically produce its Al Husayn and Al Abbas missiles with the same ranges as the original modified versions, but with larger payloads. Because Iraq will produce the missile itself, rather than modify an existing system, it can make design changes to reduce the overall weight of the missile without incurring such a large reduction in payload. We believe Iraq will accomplish this goal by using a high-strength aluminum alloy for as much of the missile's structure as possible—including the airframe [redacted]

[redacted]

The Chinese Precision Machinery Import Export Corporation (CPMIEC) is assisting Iraq on Project 1728. Since at least August 1988, Iraq has been working with CPMIEC on the construction of a liquid-propellant engine test stand facility in Iraq. Iraq had previously sought the equipment from several other countries—including the United States—as early as September 1987 and found a willing supplier in CPMIEC. [redacted]

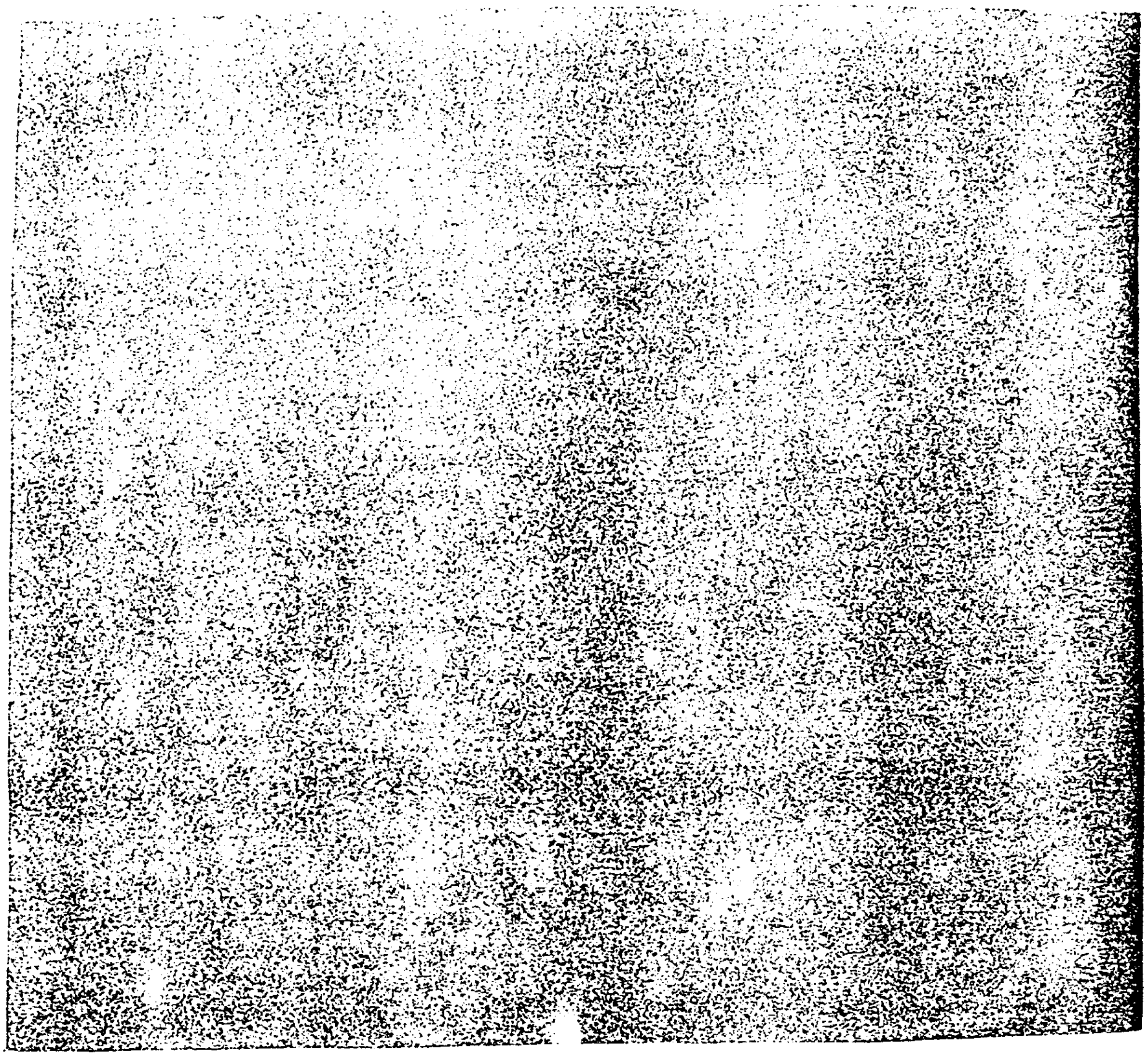
The Tamuz I/Al Abid. Iraq apparently is trying to parlay Scud B technology into a medium-range ballistic missile and a space launch vehicle. In December 1989, Iraq announced that it was developing a 2,000-km-range missile, called the Tamuz I. The announcement came shortly after Iraq's test of the first stage of its space launch vehicle, the Al Abid, on 5 December 1989. We believe that these developments are related and that Iraq probably intends to use some of the Al Abid's technology in a ballistic missile. [redacted]

[redacted]

The Iraqi space launch vehicle, however, would make for a very ungainly ballistic missile. It requires a large, fixed launchsite (figure 5), which could be susceptible to air attack. Fueling the vehicle would be time consuming. Even if Iraq decides to configure the space launch vehicle as a ballistic missile, production of the Tamuz I is unlikely before the mid-to-late 1990s. Iraq will have several hurdles to overcome, including developing an adequate guidance and control system and successfully igniting and separating the stages during fligh[redacted]

Warhead Options: Chemical, Biological, and Nuclear

To date, Iraq has used its ballistic missiles only with high-explosives warheads. It achieved great success with its conventionally armed modified Scuds during the "war of the cities" and probably will continue to use conventional warheads on some of its missiles. We believe Iraq is also interested in developing warheads



filled with chemical or biological agents [redacted] Because these warheads can disperse lethal concentrations over a larger area, they are more cost effective, result in greater numbers of human casualties, provide a psychological edge, and make the missile a more effective deterrent. Chemical and biological warheads are a more near-term option, but ultimately Iraq may hope to produce nuclear warheads as well. [redacted]

The Chemical and Biological Threat
Iraq almost certainly will produce a chemical and probably a biological warhead for each kind of missile it has or is developing (inset). Iraq currently has the ability to weaponize its chemical and biological

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Iraq's Chemical and Biological Warfare Programs

Chemical

Iraq now has the largest chemical warfare (CW) program in the Middle East. [redacted] *Iraq also appears to be nearing production of the persistent nerve agent VX and to be researching production of the nerve agent soman (GD) and the psychochemical BZ. According to special intelligence, the organization responsible for Iraqi CW-agent production is the State Organization for Chemical Industries (referred to as SOCI or SEPP), formerly the State Establishment for Pesticide Production.* [redacted]

Iraq's CW munitions include artillery shells, aircraft-delivered bombs, and artillery rockets. A chemical warhead on a surface-to-surface missile would be highly attractive to Iraq, particularly in light of the effect Iraq's conventional surface-to-surface missiles had on Iranian morale during the "war of the cities" in 1988. [redacted]

Biological

Iraq has a biological warfare (BW) program that we believe is in full production. Iraq may already have filled some fairly simple weapons, such as bombs, with biological agents. [redacted]

[redacted] *Iraq may be developing biological warheads for some of its surface-to-surface missiles. The Technical Corps for Special Projects (TECO) reportedly will be involved in constructing a plant that will be used for production of BW agents. This plant will be built at a facility already associated with Iraq's missile program. Given TECO's coordinating role in Iraq's missile program, this information suggests that Iraq is planning a biological warhead for its missiles.* [redacted]

A biological warhead would have an even greater effect than a chemical one. [redacted] *The area of contamination would increase proportionally if these agents were used in missiles with larger payloads, such as the domestic Al Husayn and Al Abbas. Operational constraints would most likely reduce the effective area of lethal contamination. Biological weapons of modern design have not been used in battle during the 20th century, except on a small scale or in clandestine experiments.* [redacted]

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agents. It may already possess a chemical warhead for its modified Scud Al Husayn or Al Abbas missiles and probably could produce a biological warhead as well. Iraq undoubtedly will exploit the Condor II's submunition warhead design—one of the most effective ways to disseminate chemical or biological agents—once it begins production of the missile. [redacted]

Work is under way to manufacture chemical warheads for the domestically produced Al Husayn and Al Abbas missiles. [redacted]

Iraq's Nuclear Program

Notwithstanding Iraq's Nuclear Non-Proliferation Treaty (NPT) commitment, we believe the current leadership judges a nuclear weapons capability to be essential to meet Iraq's security needs and to further Iraq's regional ambitions. Although we have not identified a formal, coordinated nuclear weapons program, we believe Iraq's activities, especially its covert nuclear procurement, strongly suggest a weapons program exists. Iraq probably has the technical competence, when combined with clandestinely obtained foreign technology or assistance, to develop a nuclear weapon by the late 1990s. This foreign assistance would be of the type Iraq has obtained most recently, namely, individual experts assisting Iraq's program rather than a country-to-country exchange. [redacted]

Iraq continues to have an interest in reprocessing spent nuclear fuel but is now apparently concentrating on establishing a uranium enrichment capability and purchasing equipment suitable for weapons development. [redacted] *Still, we believe Iraq is at least five years from enriched uranium production on a small scale. Nuclear weapons activities, so far unconfirmed, are probably centered at Tuwaitha, near Iraq, which houses Iraq's peaceful nuclear efforts.* [redacted]

Iraq, as a party to the NPT, is obligated to inform the International Atomic Energy Agency (IAEA) before nuclear materials are moved into new or existing facilities. Iraq's flagrant disregard for the Geneva Protocol prohibiting the use of chemical and biological weapons in war, however, suggests that Saddam Husayn would not refrain from conducting activities in violation of Iraq's NPT assurances. [redacted]

[redacted]

Iraq probably would need to test a chemical or biological warhead on each of its missile types before being confident that the warhead would function properly on it. The missile's flight could produce instability in the liquid fill, and physical extremes, such as heat, could cause deterioration of the agent. Iraq also will have to develop or purchase a different fuzing mechanism because these agents are optimally dispensed at altitude, preferably as an aerosol or in bomblets. [redacted]

A Nuclear Payload

We believe Iraq may hope to eventually deploy a missile with a nuclear payload. We estimate that Iraq has the technical competence to develop a nuclear weapon by the late 1990s, with the aid of clandestinely obtained foreign technology and assistance. Fitting that nuclear weapon in a missile's warhead, however, will not be a simple task. Unless Iraq solves weaponization problems—that is, engineering the nuclear device so it can survive the missile flight—it could face two or more years of delay in fielding a nuclear payload. [redacted]

Iraq is procuring equipment, materials, and technology that strongly suggest that a nuclear weapons program exists (inset). However, we have not identified a formal effort that would integrate and coordinate the various nuclear activities now under way. [redacted]

[redacted]

Iraq's Missile Production Infrastructure: Procuring Equipment and Constructing Sites

Acquiring the Infrastructure

Iraq is not content with its dependence on foreign suppliers or with modifying existing systems for a long-range delivery capability. Acquisition efforts over the past several years strongly indicate a drive for greater self-sufficiency in the military and industrial sectors of Iraq's economy. To that end, several Iraqi Government organizations—including the Technical Corps for Special Projects (TECO) and the Nassr State Enterprise for Mechanical Industries (NEMI)—are procuring much of the needed materials, equipment, and technology for Iraq's ballistic missile industry. [redacted]

Technical Corps for Special Projects. TECO appears to be responsible for coordinating Iraq's ballistic missile development program. The Corps is subordinate to Iraq's Ministry of Industry and Military Industries (MIMI) and was established in 1987, probably to expedite high-priority Iraqi military and civilian projects. Once a project is identified, TECO apparently marshals the efforts of individual Iraqi military establishments to complete the task. [redacted]

TECO and Dr. Al Saadi also help to procure equipment and technology needed to build Iraq's missile production infrastructure [redacted]

[redacted] Much of this technology clearly is directed at its current development efforts. Some of the technology—such as filament-wound rocket motor cases—would not be used in production of either the Condor II or the homegrown Al Husayn or Al Abbas. The equipment may be intended for development and production of longer range missiles, such as the Al Hamza. [redacted]

[redacted]

Through the efforts of TECO and NEMI, Iraq is rapidly acquiring the necessary infrastructure for indigenous production of surface-to-surface missiles (figure 7). This capability requires production and test

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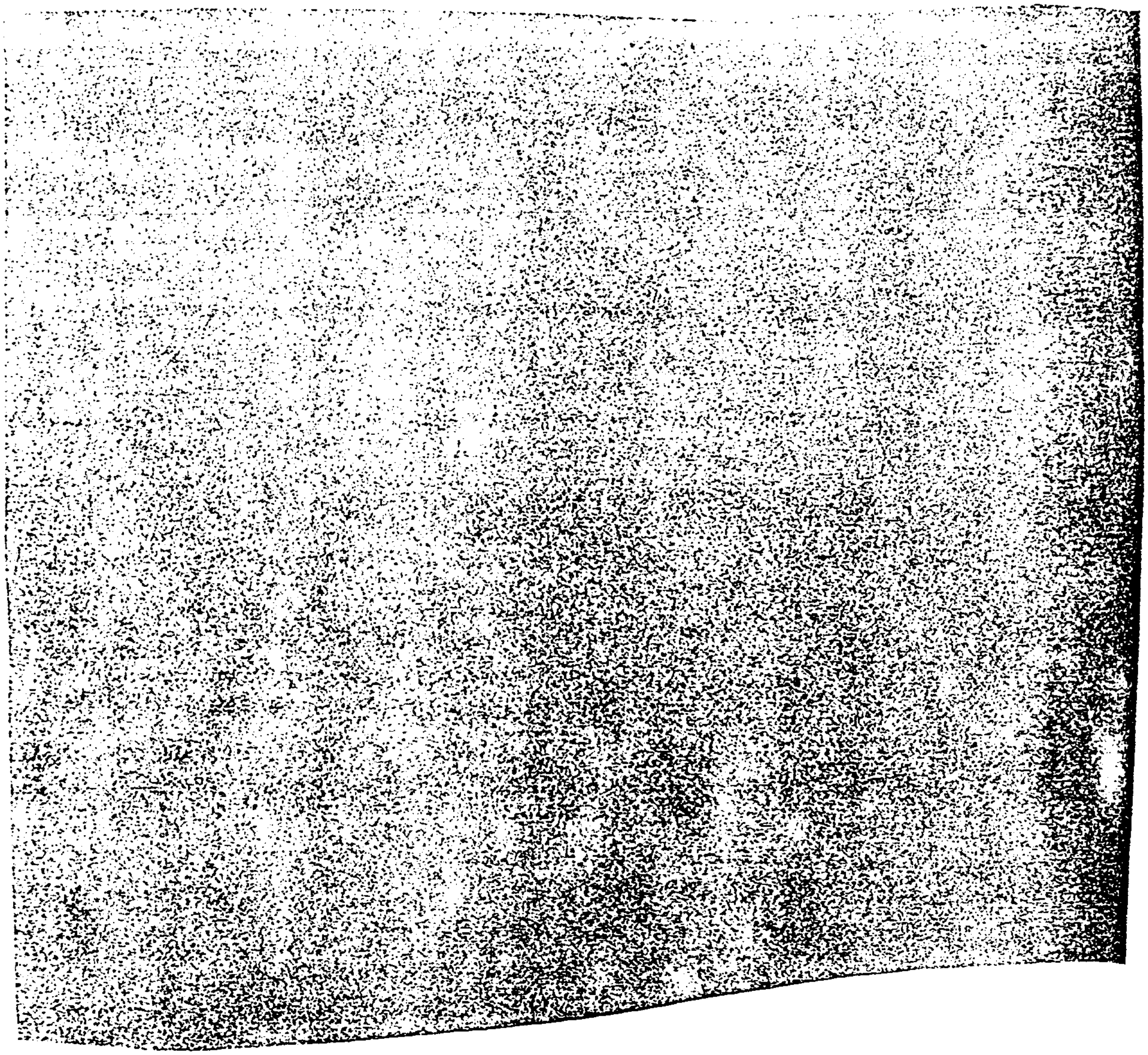
facilities for major missile components, such as rocket motors and engines; guidance and control systems; nosecones and airframes; and materials and subcomponents, such as propellants, ablative materials, accelerometers, and motor cases. Iraq has gained facilities to do most of the research, development, and production through two extensive construction projects—Project 395 and Sa'ad 16.[3] Progress, particularly on Project 395, has proceeded at a surprisingly rapid pace. [redacted] Iraq continues to seek additional equipment and production facilities and probably will upgrade and use existing plants to support its missile program. [redacted]

Production and Test Facilities

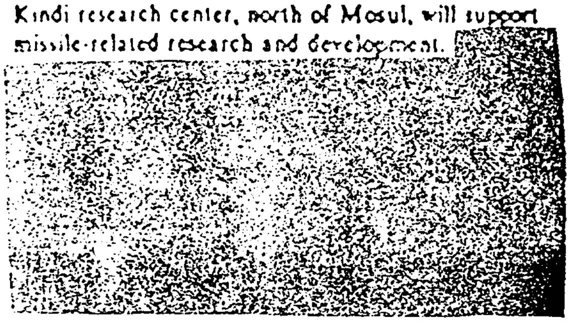
Project 395: The Road to Self-Sufficiency. The construction of the majority of Iraq's missile production facilities has been coordinated under Project 395—also known as Project DOT. In mid-July 1987, TECO signed a contract with Condor Projekt Ag (CPAG) to provide designs, drawings, and specifications for the buildings; equipment; and raw materials needed for the project. Condor Projekt Ag—later renamed Conchem Projekte Ag—is part of the Swiss-based Consen Group responsible for coordinating the Condor II missile program in Argentina and Egypt. Iraq's Al Fao General Establishment probably organized the construction forces for Project 395. The bulk of the construction is for Condor II production facilities, but we believe some of the facilities will support Iraq's extended-range Scud project as well. [redacted]

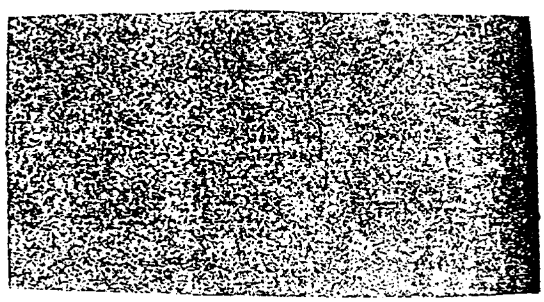
[redacted]

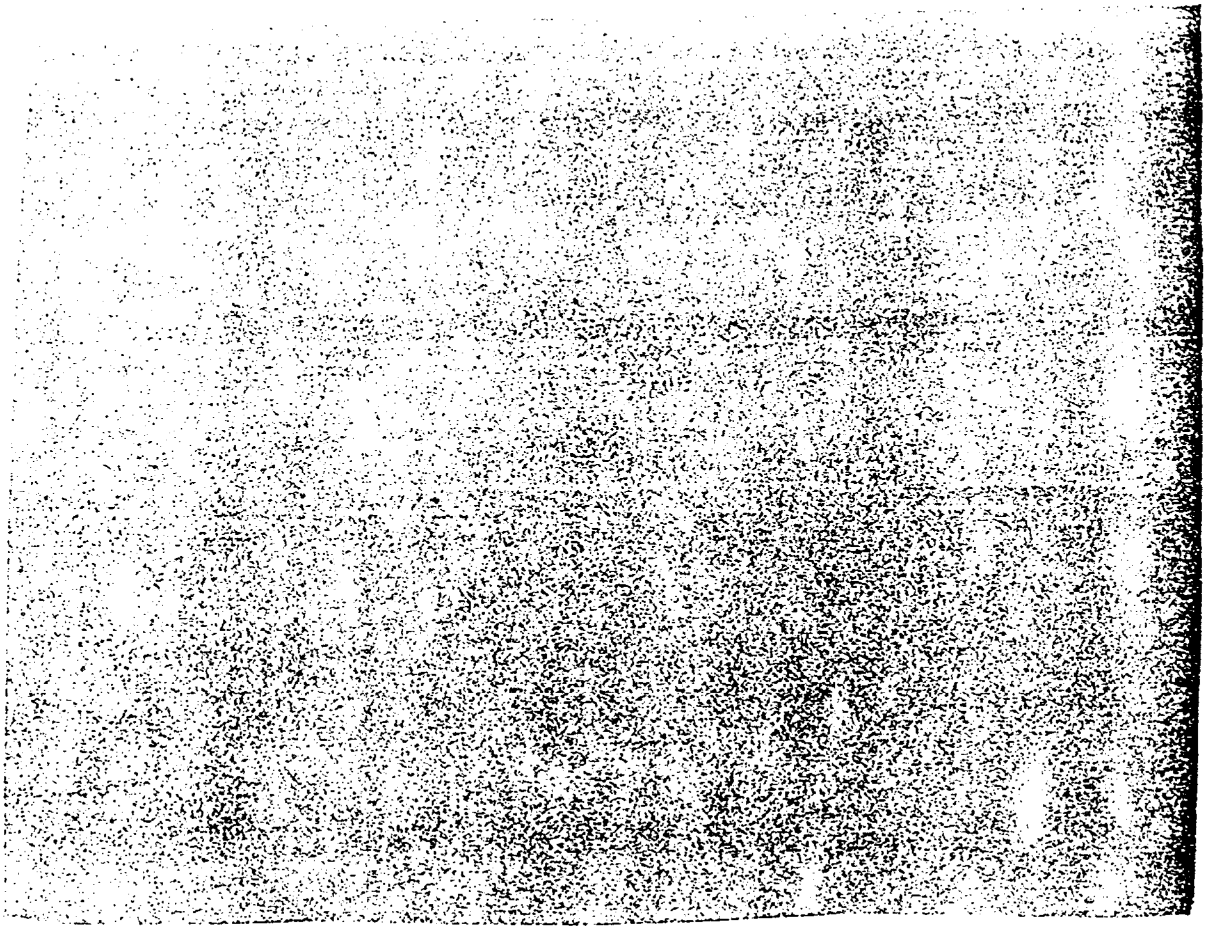
[redacted]

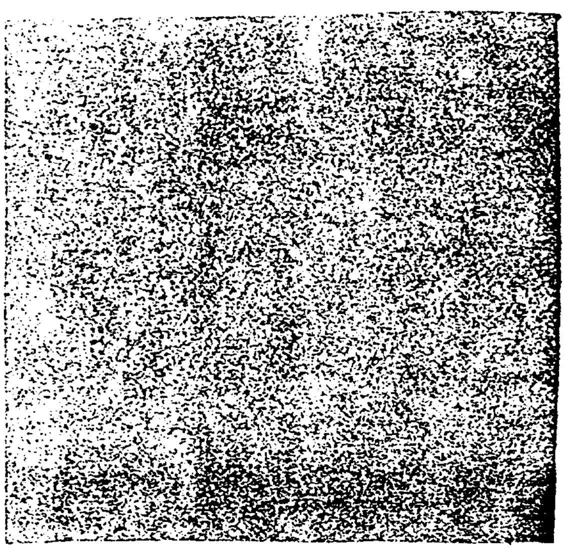


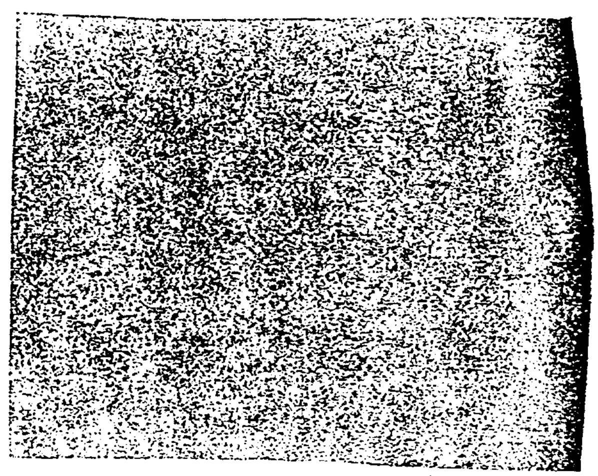
Sa'ad 16: The Al Kindi Research Center. The Al Kindi research center, north of Mosul, will support missile-related research and development.











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Exemptions: (b)(1) (b)(3)

The network services a wide spectrum of Iraqi needs. Some of its acquisitions support the civilian industry, but others, including that for anthrax samples, uranium enrichment technology and materials, and sophisticated machine tool equipment, clearly have military applications. The United States has received applications made through the network for equipment intended for Iraq's missile program, specifically for the Central Tool Room Plant. These applications were denied, but Iraq undoubtedly will turn to another machine tool supplier to meet its need. [redacted]

The Iraqi network has suffered setbacks in the past year, but shutting it down completely will be difficult. In early 1990 part of the network was exposed in a thwarted attempt to acquire components well suited for nuclear weapons applications from the United States. Key members of the network were arrested—including Iraqi, British, and French citizens. Other portions of the network remain, apparently untouched. [redacted]

[redacted]

Public exposure of the network—including names of several of the cover firms—will make it more difficult for the organization to operate in the near term. We believe, however, that the network has the resources available to effect a reorganization, possibly in another country, in a very short period of time. Iraq used a British registration agent to establish most of the companies, a commonplace practice in the United Kingdom. Through this agent, the network's companies have already changed names and addresses several times within the past two years and undoubtedly could do so again quickly. [redacted]

Outlook

In the 1990s, Iraq will continue to aggressively pursue missile development and production capabilities. Although its overlapping developments undoubtedly stretch its resources, they provide a safety net, should a project fail. Because of the basic nature of technology used in its Scud B effort, we believe Iraq will undoubtedly see success with these missiles first—particularly the homegrown Al Husayn and Al Abbas. Working with this basic technology will give Iraq some of the experience it needs for more advanced missile development. [redacted]

Iraq will push for a more robust missile capability over the next decade. This will involve technology with which Iraq has little or no experience, such as solid rocket propellants, improved guidance systems, multiple stages, and reentry vehicles. Iraq's success in these areas probably will be slower and more dependent on foreign technical assistance. This pace, however, will not discourage or deter Iraq from seeking improved missile capabilities. The solid-propellant Condor II, for example, will be easier to handle, require less preparation time before launch, offer more payload options, and provide better accuracy and range than any version of the Al Husayn or Al Abbas. Iraq will be motivated as well by a desire to assert itself as a leader of the Arab world and a perceived need to keep pace with Israeli developments. [redacted]

We believe Iraq's program may be too far along to be stopped. Iraq's missile production facilities are virtually completed and much of the equipment has been received and installed. It also is seeking production facilities for raw materials, such as ammonium perchlorate and carbon fiber, for which it now depends on foreign suppliers. We believe Iraq will need foreign assistance to operate and maintain its facilities initially but probably will be able to operate them independently within five years of the beginning of missile production. [redacted]

[redacted]

Iraq's economy may have difficulty keeping pace with its military desires. Although missile development is a high priority, Iraq's resources eventually may be stretched to the limit. Rather than abandon a portion of its program, Iraq may opt to sell missile-related technology or operational missiles to other developing nations. If Iraq chooses this route, in addition to funding its own program, it will increase our difficulty in hindering Third World ballistic missile proliferation. [redacted]

In the coming years, improving our collection ability inside Iraq will be necessary in order to keep abreast of Iraqi missile developments. Our analysis is largely based on Iraq's procurement list outside of its borders. Although this information is invaluable, it frequently imparts only a shadow of Iraqi activities and intentions. Over the next 10 years, competition for collection and analytical resources will further frustrate our ability to monitor Iraq's program. [redacted]