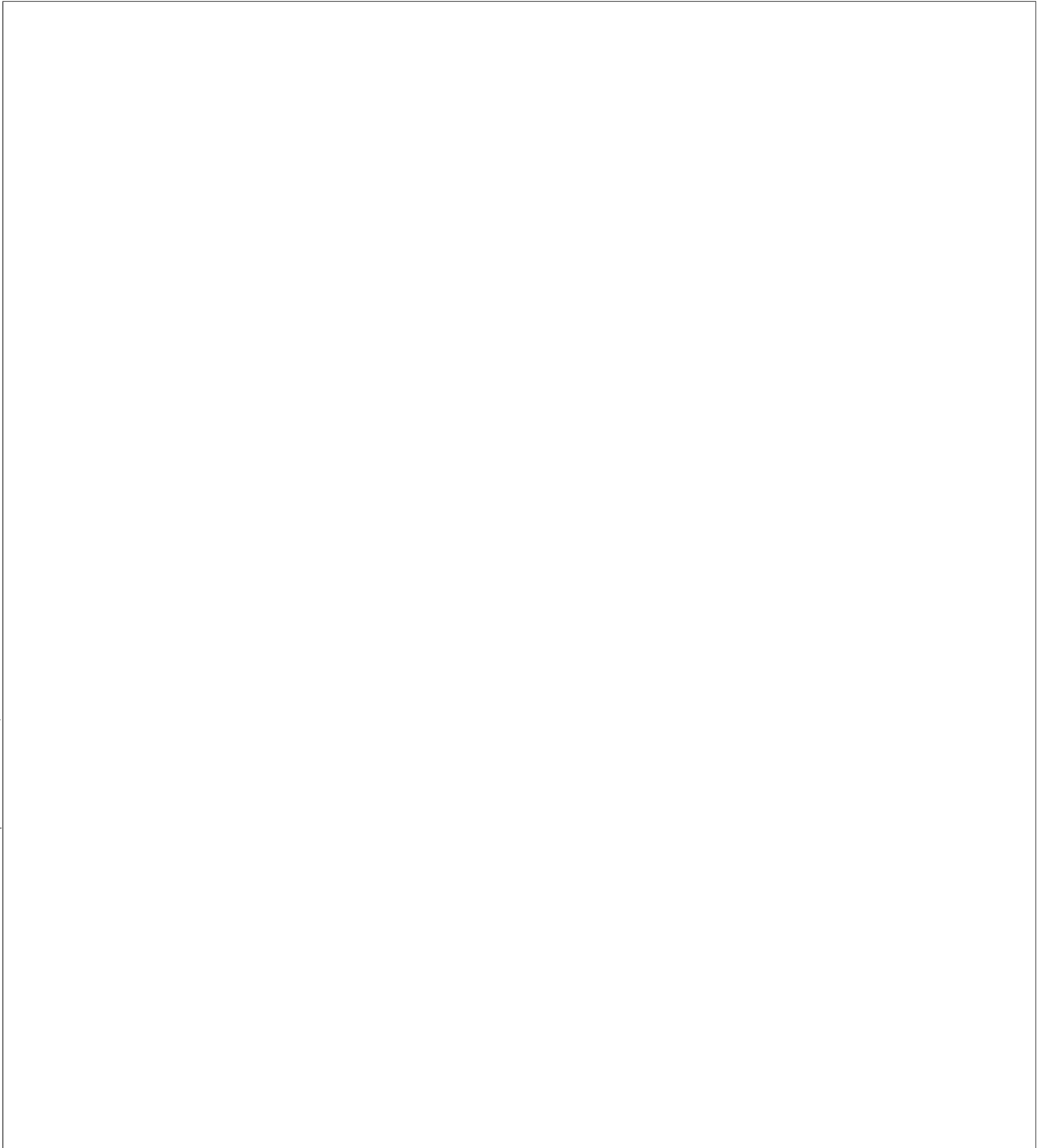


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CENTRAL INTELLIGENCE AGENCY



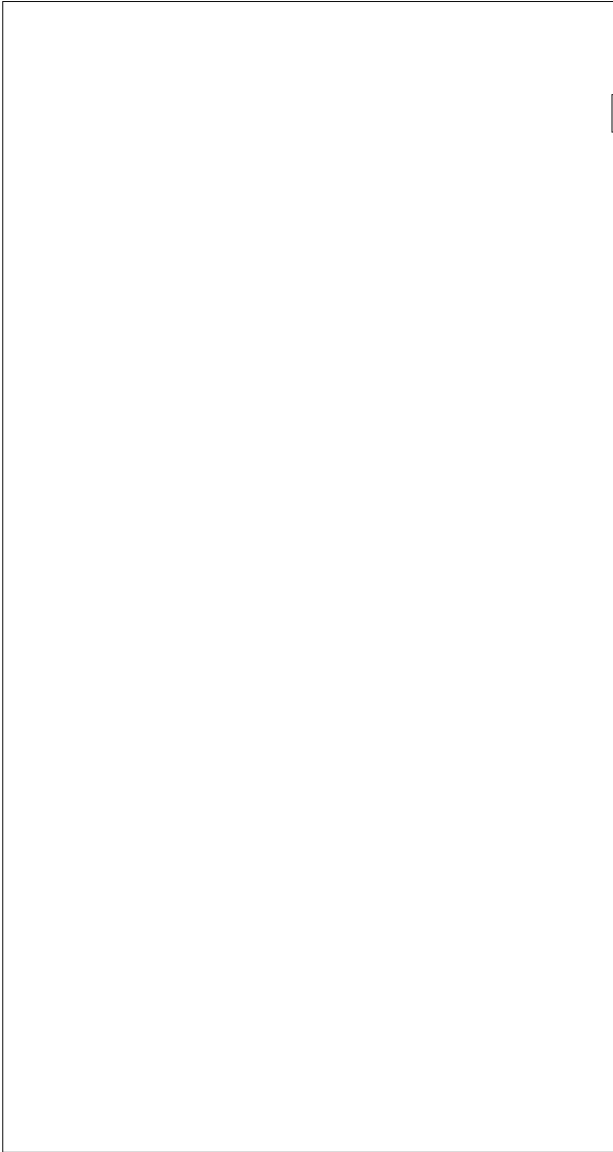
DIRECTORATE OF INTELLIGENCE

Roles and Capabilities of Iraqi Pre-OIF UAVs

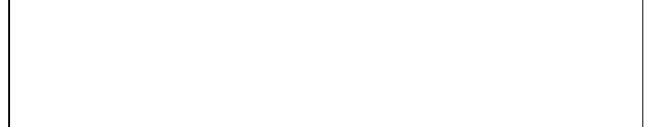
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Iraq began a new UAV development project in the mid-1990s—the al-Yamamah series—that produced both aerial targets and reconnaissance UAVs. Iraq declared these small UAVs in multiple declarations to the UN.



Current Assessment: Early Small UAV Missions
Early Iraqi UAVs were used primarily for air defense training, although some reconnaissance UAVs were used during the Iran-Iraq war to monitor Iranian troop movements.

Iraqi officials in the late 1980s expressed interest in using some of these early small UAVs for BW agent dissemination, although we have no information confirming that any were modified for that purpose.

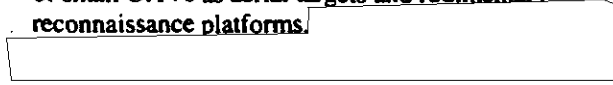


Small UAVs (2000 to OIF) (U)

Pre-OIF Assessment.
We judged that Iraq was developing small UAVs for multiple missions and payloads. We were concerned that the resurgence of small UAV development activity in Iraq, including flight-testing and parts procurement, following the apparent halt of the L-29 UAV project in late 2000 could mean that Baghdad intended these smaller UAVs to replace the L-29 UAV in its assessed mission, CBW agent delivery.

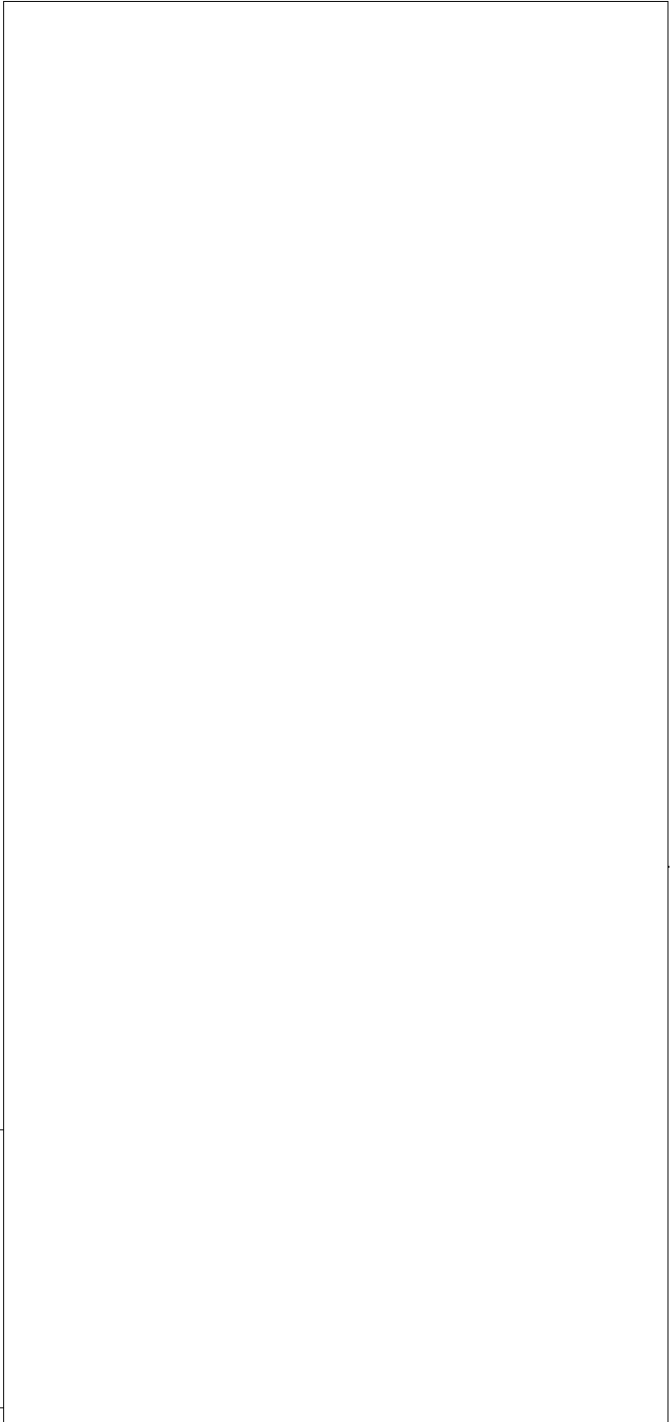
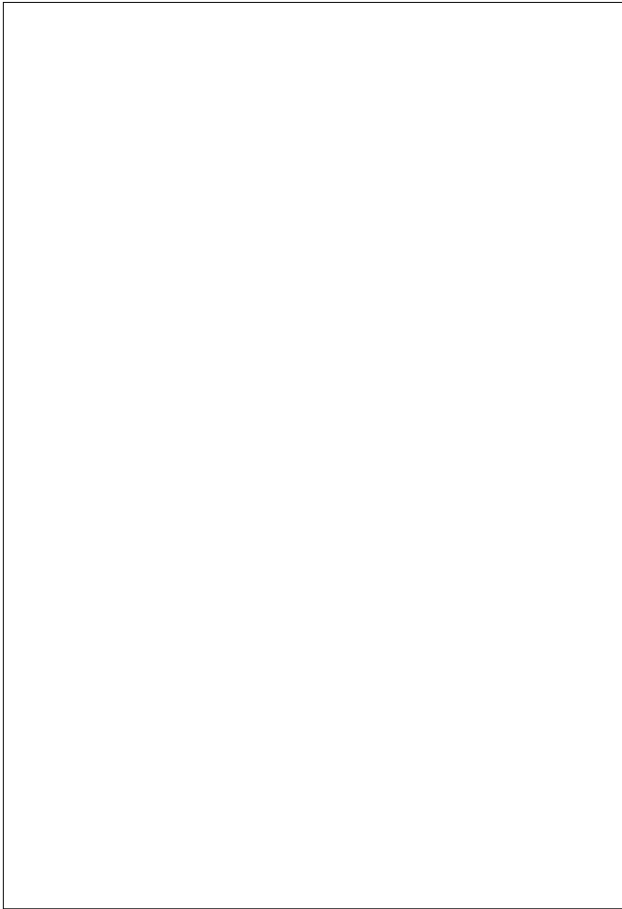
Small UAVs (1980s Through 2000) (U)

Current Assessment: Early Small UAV Status
Starting in the 1980s Iraq commenced development of small UAVs as aerial targets and rudimentary reconnaissance platforms.



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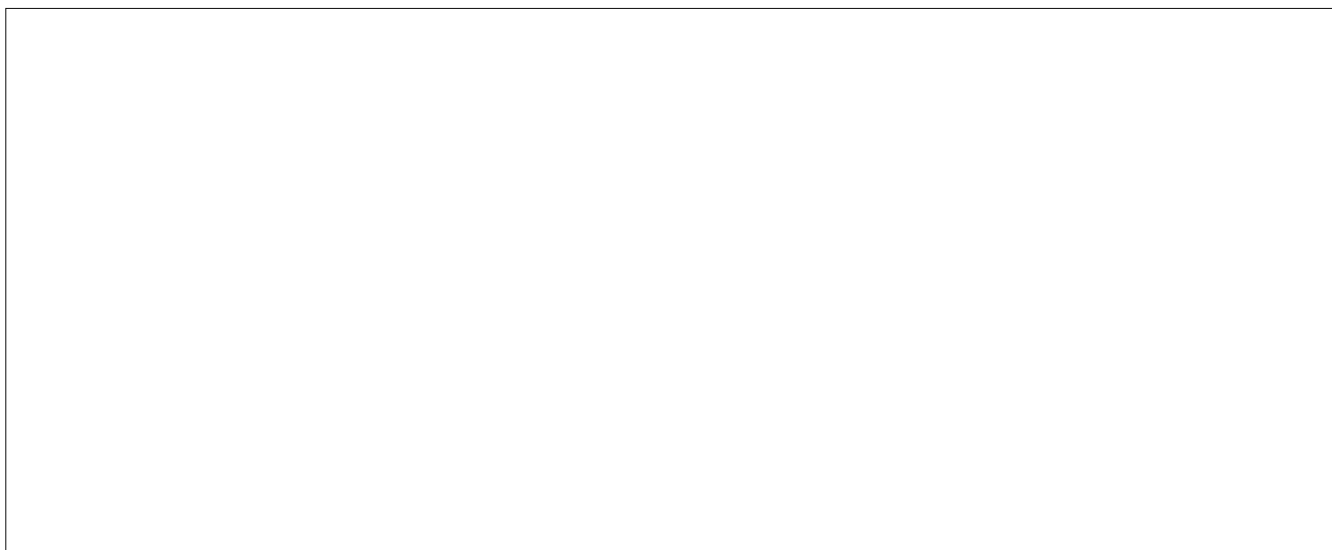
Flight-Testing: Marginal Success

Flight-testing of the RPV-20A series—conducted at [redacted] was likely only marginally successful, with most of the flights ending in failure. [redacted] flight tests were conducted via remote control within line-of-sight of the launch airfield.



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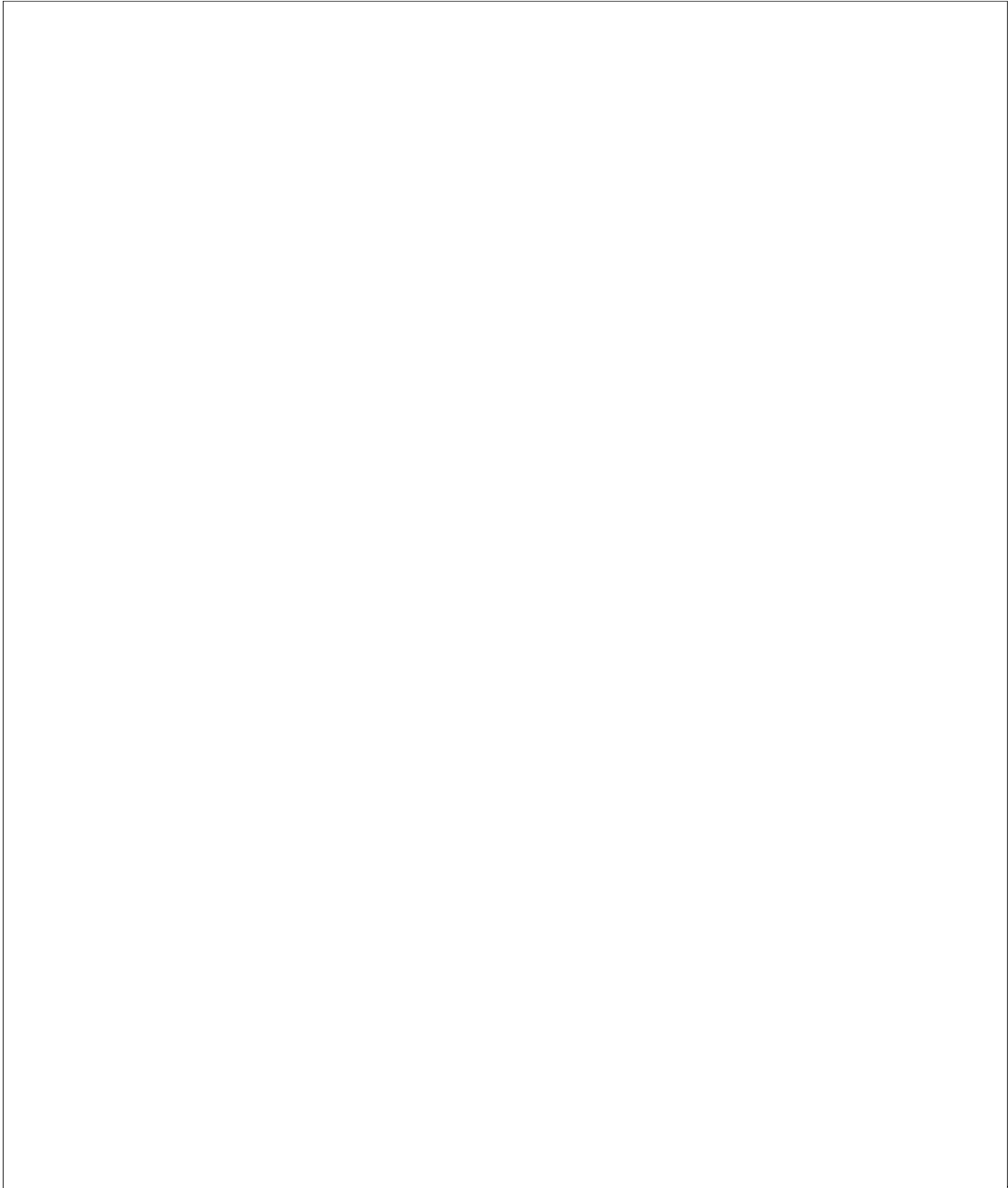
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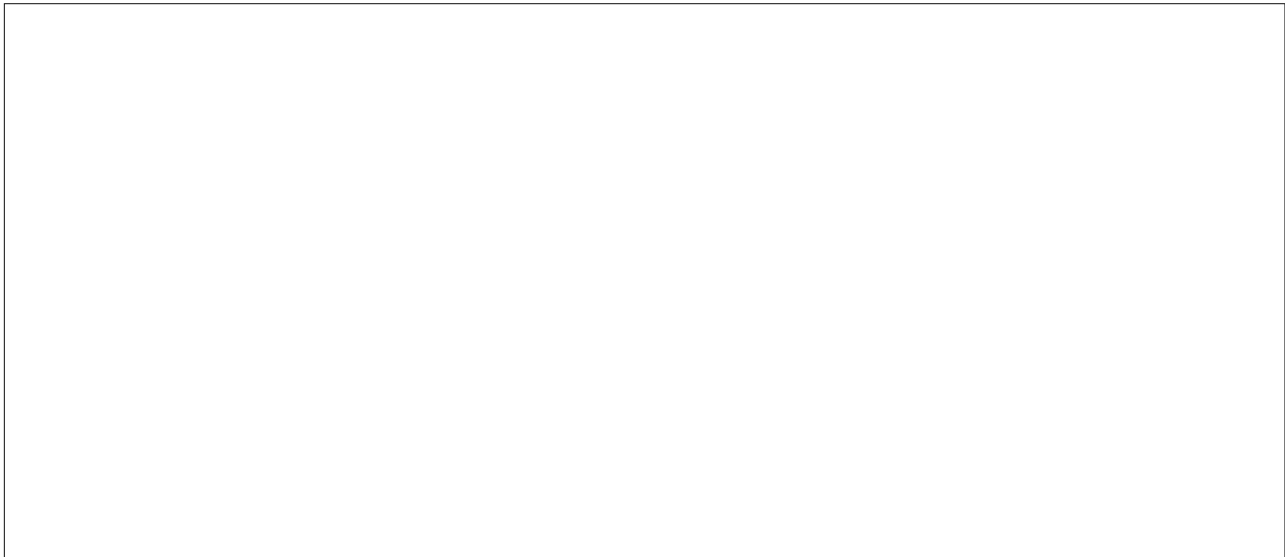
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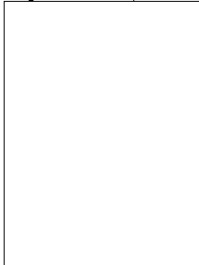
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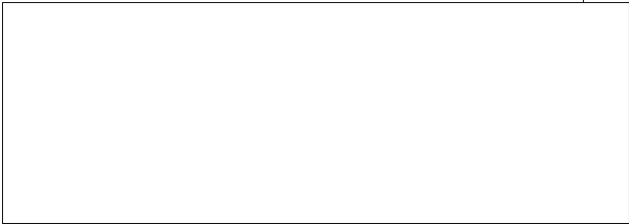
and probably was intended for dissemination of BW or, less likely, CW agent. The project may have been placed on hold or canceled because of technical problems [redacted]



[redacted] that Ibn Firmas had prepared a report in 2001 recommending cancellation of the L-29 UAV project following the UAV's failed final flight. The report stated that repeated control problems made conversion of the manned aircraft impractical.²³



Current Assessment: L-29 UAV Status
Iraqi officials most likely ended the L-29 UAV project in 2001 because of technical problems and difficulty acquiring spare parts for the aging L-29s. [redacted]

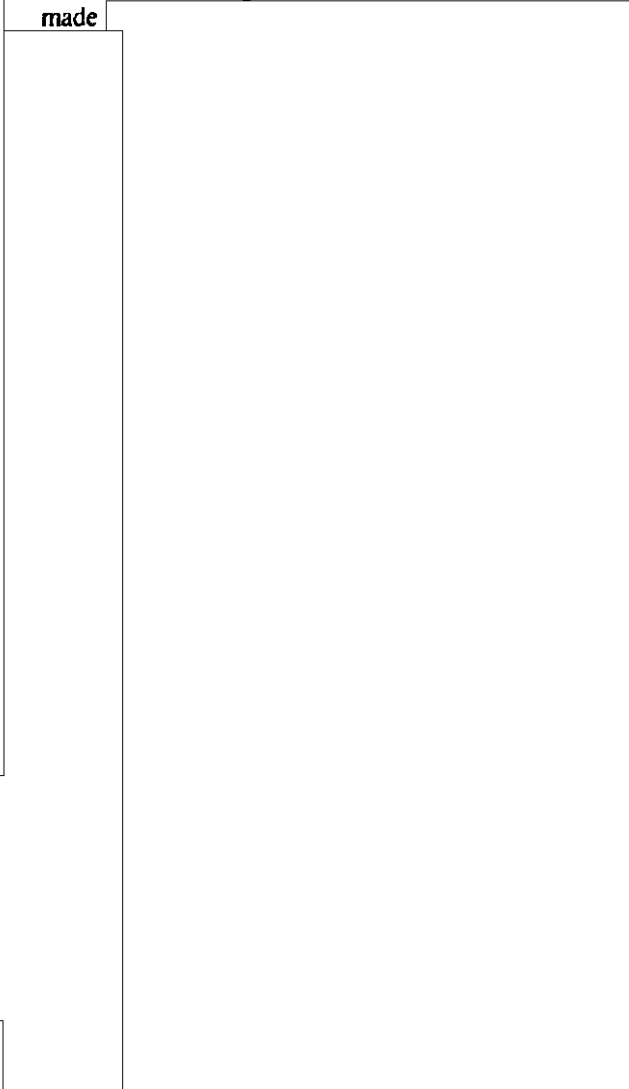


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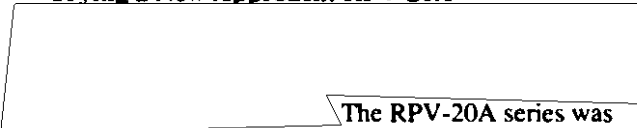
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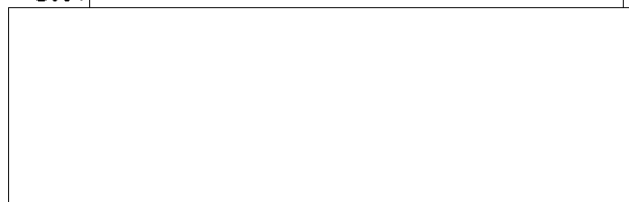
- Al Quds produced and tested eight RPV-20A UAVs, which were built and numbered in sequence from Quds-1 through Quds-8 as modifications were made



Trying a New Approach: RPV-20A



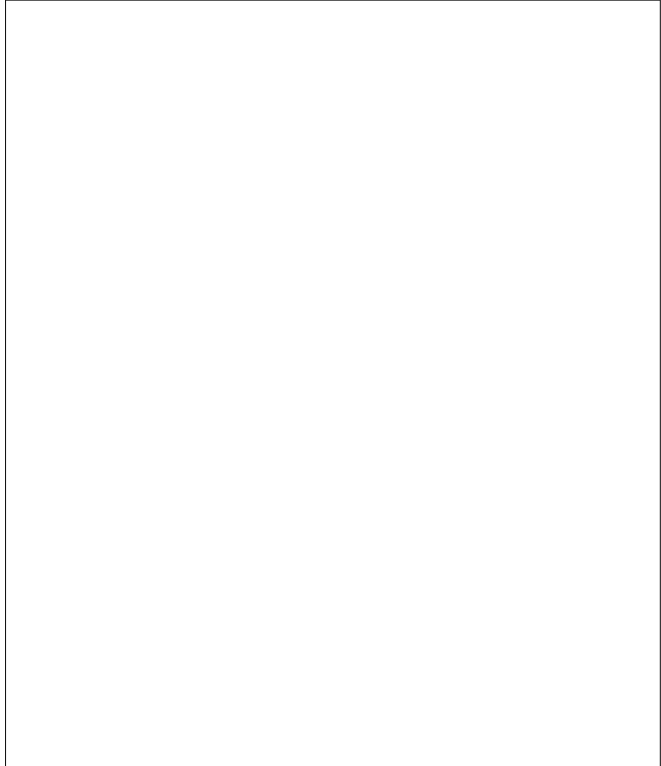
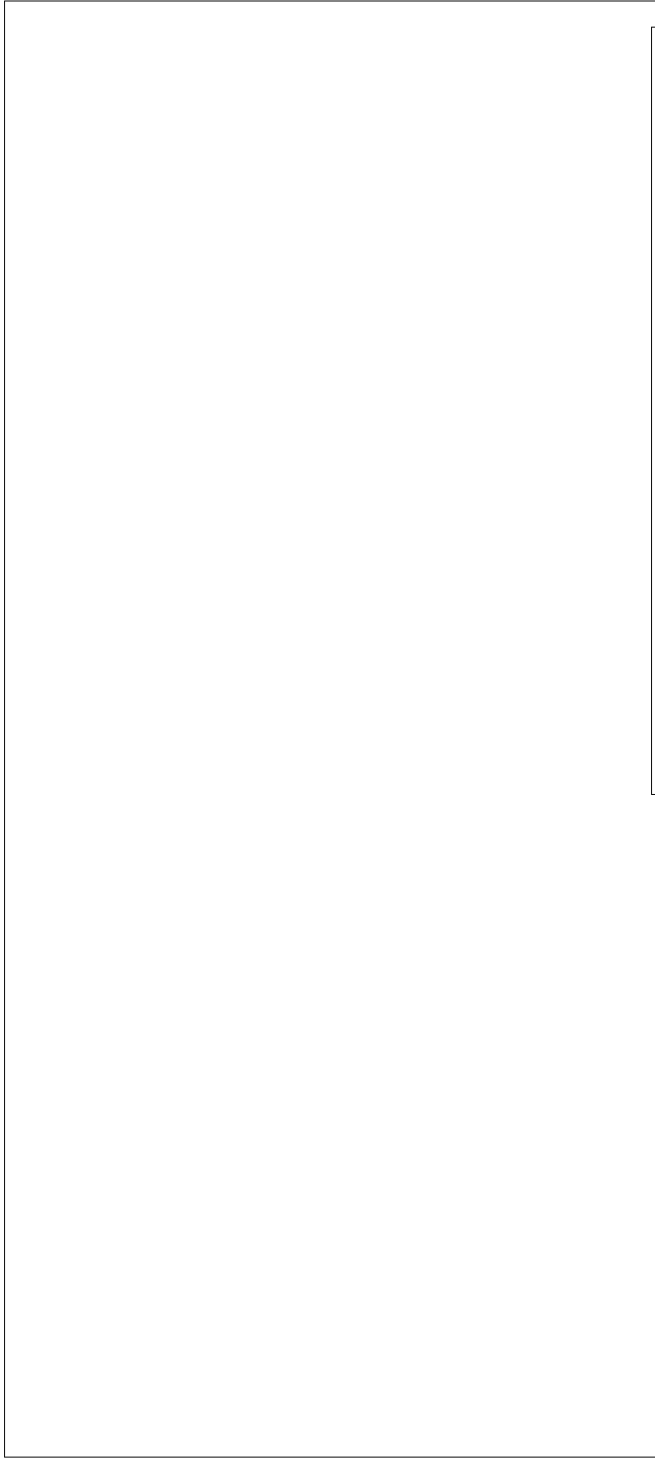
The RPV-20A series was intended to test the original design concepts of the [redacted] before returning to work on the larger UAV



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Iraq probably considered the Al Quds project a sensitive military development program and therefore hid the program's true intent from the UN. Although both the RPV-20A series and the RPV-30A were declared by Iraq [redacted] [redacted] neither the original Quds-100 UAV nor the Al Quds project's true intent were declared to the UN.

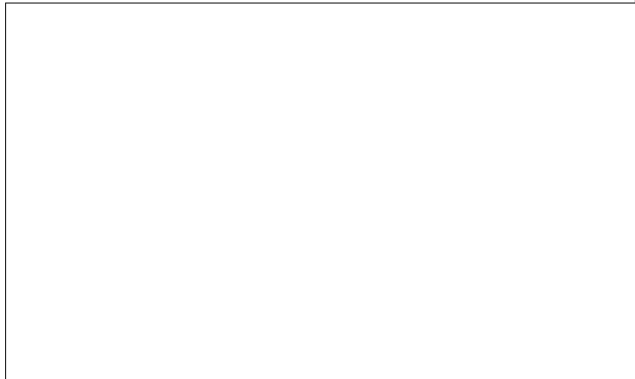


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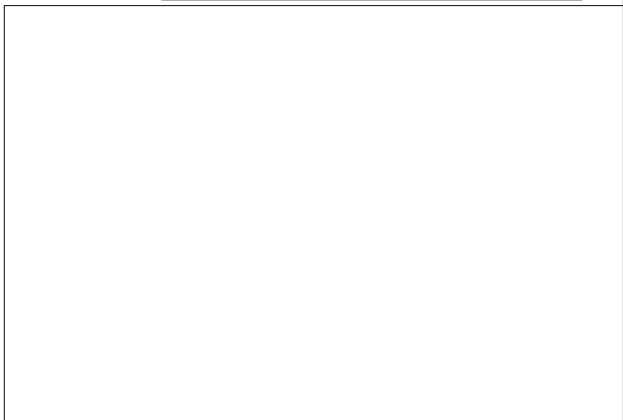
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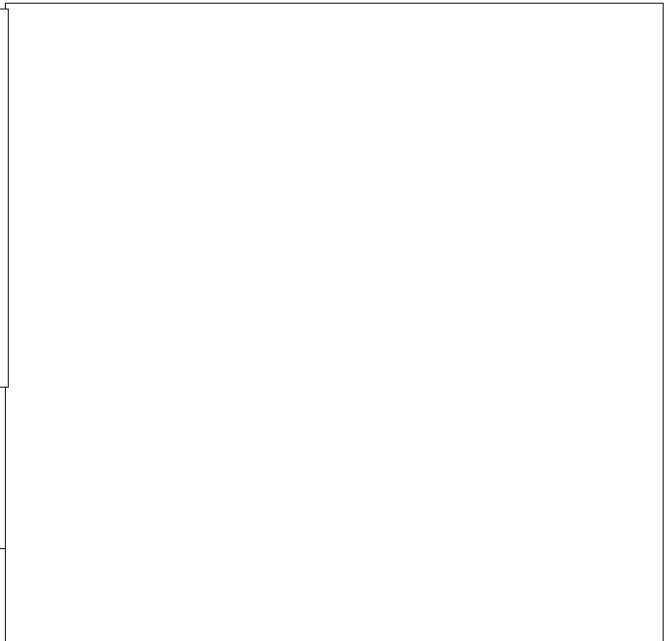
Al Quds Small UAVs (U)



develop small UAVs in parallel with Ibn Firas. *The project was intended to fulfill an IZAF requirement for an unmanned radar and communications-jamming platform* but never proceeded beyond initial flight-testing



The IZAF required a UAV capable of carrying a 100-kg EW payload autonomously for more than four hours.



judged that such performance specifications could only be achieved by using a turbojet engine

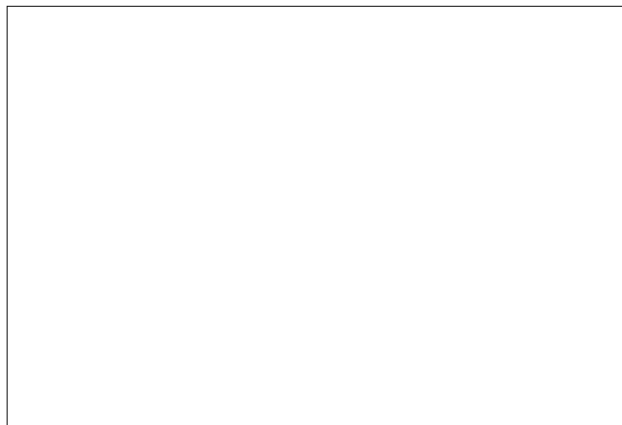
- With a likely flight speed in excess of 100-km/hr, a four-hour flight would far exceed the 150-km-range limit mandated by UN resolutions

Iraq's inability to indigenously produce small gas turbine engines likely led Al Quds engineers to consider using engines already available in Iraq.

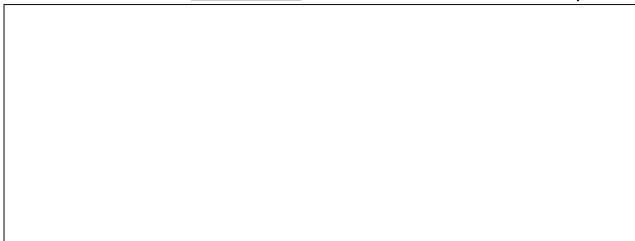
efforts to identify and adapt a suitable turbojet engine failed

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- The L-29 UAV's operational range would have been limited without the addition of an autopilot, restricting it to reconnaissance of areas within LOS of Iraqi airfields. [redacted]
- On reconnaissance missions the L-29 UAV would be easily detected and engaged by opposing forces. Manned aircraft could more effectively carry out such missions. [redacted]

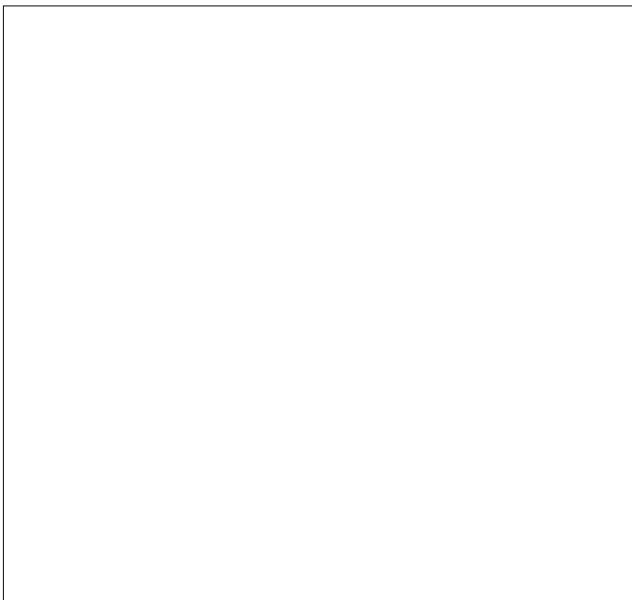


The L-29 UAV could simulate the threat from low-performance aircraft, although the 1960s era aircraft would not realistically represent the threat posed by modern Coalition aircraft patrolling the No-Fly zones. Alternately, Iraq's more modern manned aircraft—MiG-29s or MiG-25s—or more reliable, cheaper small UAVs fitted with radar reflectors to simulate larger aircraft, could more effectively perform this mission if live ammunition was not to be used. [redacted]

fiberglass UAVs were far better suited to the reconnaissance mission. [redacted]

Reconnaissance Mission

We judge that Iraq originally did not develop the L-29 UAV for the reconnaissance mission but later may have considered it for that role. Iraq, however, never pursued the development or integration of a reconnaissance payload for the UAV.



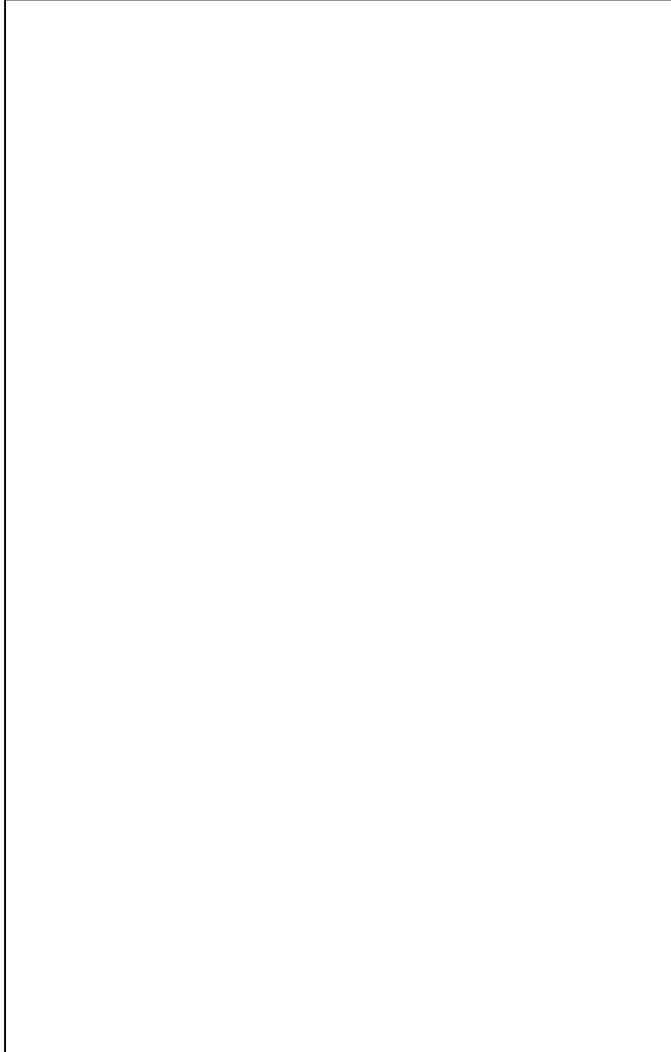
- We have no information from sources or documentation to suggest that a reconnaissance payload was identified or developed for the UAV. Although cameras were installed in the UAV, they were used only to remotely pilot the aircraft. Iraq possessed much more capable manned Mirage F-1 and MiG-25 RB aircraft that were routinely used for reconnaissance missions. [redacted]

Lure Mission and the Tallil Deployment

Iraqi officials in post-OIF interviews claimed that a single L-29 UAV was deployed to Tallil Airbase in the Southern No-Fly Zone in late 1997 to be used to lure Allied aircraft into a SAM trap. [redacted]

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Current Assessment: L-29 UAV Mission
We judge that *Iraq initially intended the L-29 UAV for one-way, cruise missile-like lethal missions—* possibly to succeed the failed MiG-21 UAV in a CBW agent delivery role—but as development of the UAV progressed Iraqi officials considered additional, nonlethal uses for the platform. Difficulties extending the UAV's operational range possibly contributed to Iraq's consideration of additional roles for the L-29 UAV [REDACTED]

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**Roles and Capabilities of Iraqi
Pre-OIF UAVs**
Iraq WMD Retrospective Series [redacted]

Overview (U)

Information acquired before and after Operation Iraqi Freedom (OIF) indicates that Iraq began developing small unmanned aerial vehicles (UAVs) in the late 1980s, and by the early 1990s it was attempting to convert manned aircraft—the MiG-21 and L-29—into UAVs. These systems were being developed for a variety of nonlethal and lethal missions, including reconnaissance, electronic warfare (EW), and delivery of high explosives (HE), and in the case of the MiG-21 UAV for the delivery of chemical and biological warfare (CBW) agents. Many of the small UAV projects continued up to the start of OIF; no manned aircraft conversion projects were still active at that time. [redacted]

We continue to judge, based on numerous credible sources, that Iraq's 1990 to 1991 effort to convert the MiG-21 fighter aircraft into a UAV was intended to develop a CBW agent delivery capability. The conversion effort failed and was abandoned in 1991. Senior Iraqi officials most likely initially intended the subsequent L-29 UAV for a lethal role—possibly CBW agent delivery as a successor to the MiG-21 UAV—before exploring additional nonlethal roles for the UAV. Regardless, the L-29 conversion effort proved unsuccessful in the long term because of continuing technical problems. [redacted]

Iraqi small UAVs developed since 2000 most likely were designed for reconnaissance or EW and not biological warfare (BW) agent delivery, but some were later considered for conventional lethal missions. Iraq investigated at least two methods of arming some small UAVs with HE for conventional

attacks and in 2003 assembled a handful of UAVs for this purpose, although none appear to have been used. [redacted]

Iraqi UAV development from the 1980s until OIF evolved through a series of fits and starts. Failed projects were followed by new approaches to accomplishing Iraq's goal of indigenously developing an advanced UAV force. [redacted]

MiG-21 UAV Project (U)

Pre-OIF Assessment

Iraq's early 1990s effort to convert a MiG-21 fighter aircraft to a UAV was intended to develop a CBW agent delivery platform. The project failed early in the flight-test stage and was canceled in 1991, [redacted]

Current Assessment: MiG-21 UAV Status

[redacted] the MiG-21 conversion project failed and was canceled in 1991 because of difficulties in converting the manned aircraft to a UAV. Operation Desert Storm interrupted work on the UAV after its first and only

This assessment was prepared by the Weapons Intelligence, Nonproliferation, and Arms Control Center. Comments and queries are welcome and may be directed to [redacted]

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[Redacted] the L-29 UAV was intended for cruise missile-like strike missions and that the requirement for such a capability came from the highest levels of the Iraqi regime.

Although using an L-29 UAV as a one-way weapons delivery platform is technically feasible, Iraq's inability to successfully integrate an autopilot into the UAV's guidance system—limiting the operational range to line-of-sight (LOS) of the GCS—would have greatly reduced the UAV's effectiveness in a weapons delivery role [Redacted]

CBW Agent Delivery Mission
Post-OIF reporting does not confirm or disprove a CBW role for the L-29 UAV

[Redacted]

[Redacted] prevent us from eliminating CBW agent delivery as a mission [Redacted]

[Redacted]

Iraqi senior officials possibly intended the L-29 UAV to deliver a CBW agent payload in a one-way, cruise missile-like mission. As a CBW agent delivery platform, the L-29 UAV would have provided Iraq a follow-on capability to the failed MiG-21 UAV effort.

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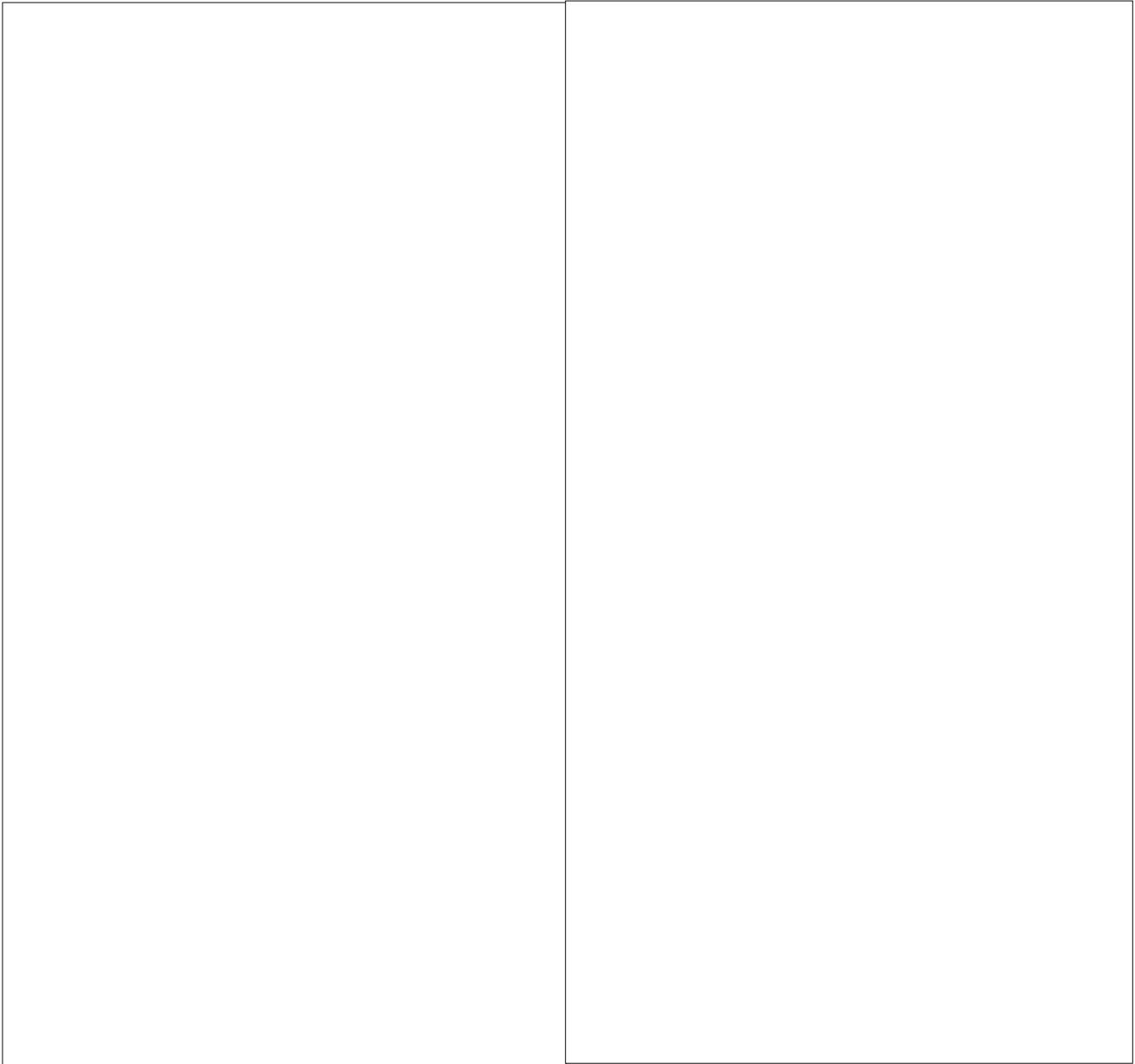
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- Multiple sources indicate that the RPV-20 in 2002 successfully flew autonomously to a range of 500 km, contradicting Iraqi declarations. [REDACTED]

Iraq attempted to conceal the scope of some small UAV programs by falsifying declarations, withholding programmatic details, and hiding UAV materials from UN inspectors [REDACTED]

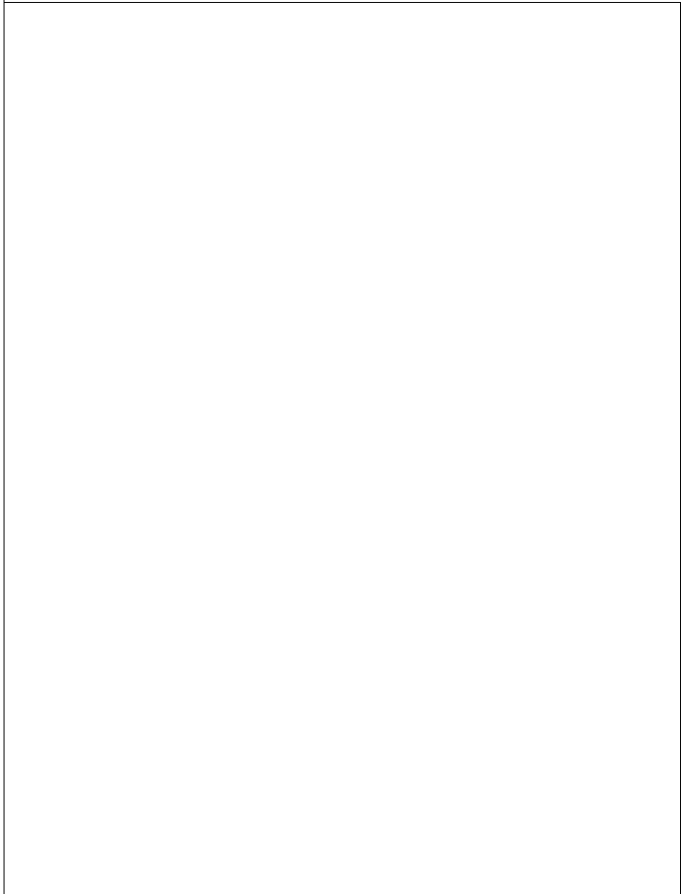
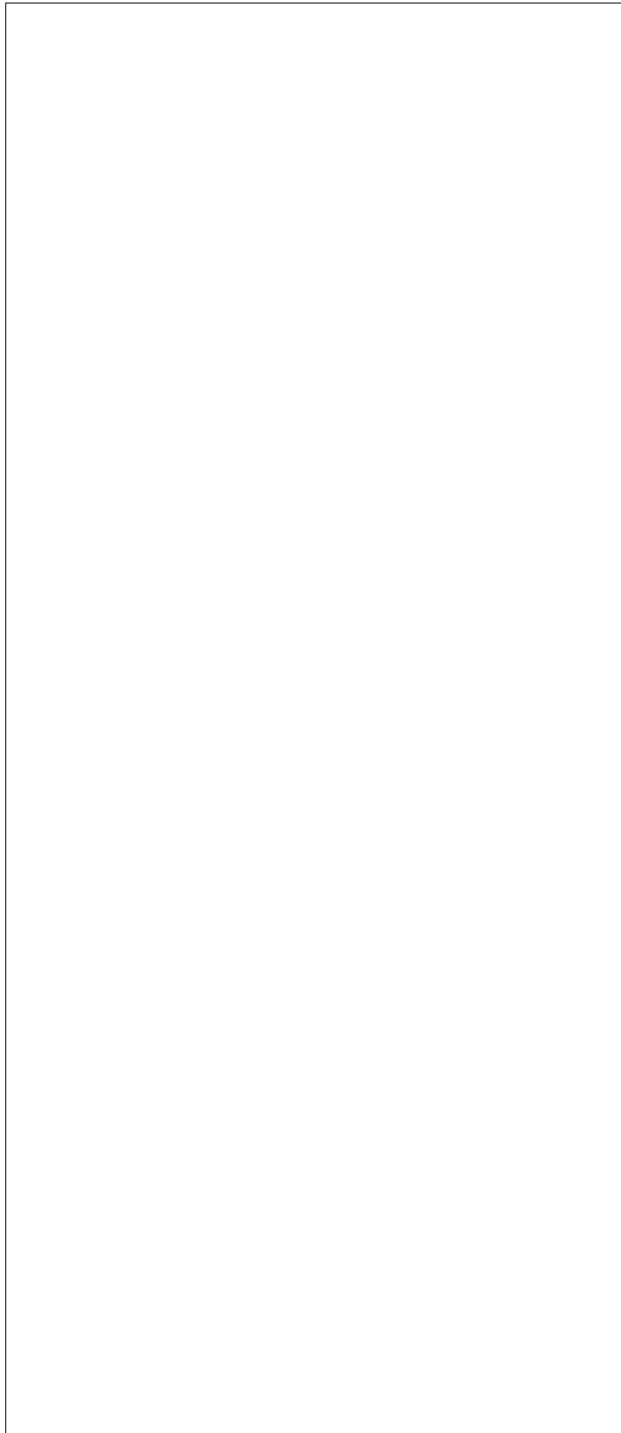
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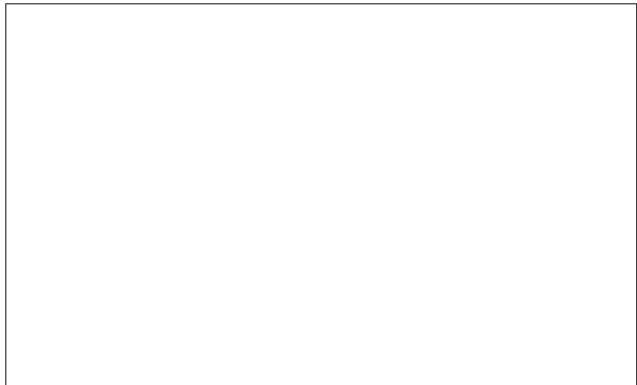
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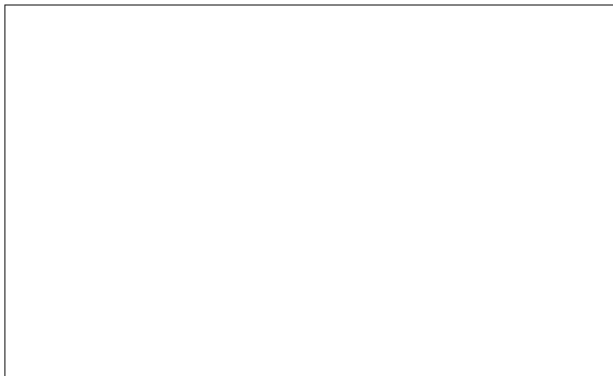
Air Defense Target Mission

Iraq probably never intended the L-29 UAV as an aerial target for air defense training, according to statements [redacted] Iraq's declaration of such a mission may have served as cover for a cruise missile-like lethal mission.



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Current Assessment: Small UAV Missions

Iraq's small UAVs—those developed by Ibn Firmas and Al Quds—were most likely designed as aerial targets, reconnaissance vehicles, EW platforms, and in one case to deliver HE. *We found no indications that any Iraqi small UAVs were designed or modified to carry CBW payloads*, although such modifications were technically feasible with several of the designs. [redacted]

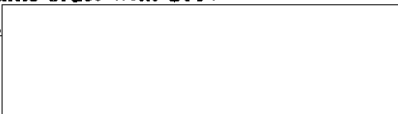
[redacted] Iraq's intent to weaponize some of these small UAVs with HE payloads for strike missions [redacted]



US Topographic Software (U)



[redacted] procurement agent in 2001 attempted to covertly purchase US topographical mapping software in the same order with UAV autopilots and gyroscopes. [redacted]



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[redacted]
[redacted] Iraq intended to use the L-29 UAV in a cruise missile-like weapons delivery role.

nonlethal missions for the L-29 UAV. These included air defense training, EW, reconnaissance, and bait-to-lure Coalition aircraft into a surface-to-air missile (SAM) trap—in addition to the lethal CBW agent delivery and conventional “poor man’s” cruise missile role [redacted]

[redacted]

Although the nonlethal missions claimed by some sources are technically feasible, *missions such as air defense training and reconnaissance seem to have been unlikely* as they would not have garnered the level of regime interest and resources expended on the project.

- OMI Director Huwaysh stated that Saddam Husayn’s significant interest in the L-29 UAV project prevented him from canceling the project until after the crash [redacted]

[redacted]

Cruise Missile Mission

We judge that *the L-29 UAV project began in response to a 1995 requirement from Saddam Husayn for a cruise missile-like strike capability.* Iraq’s inability to produce a true cruise missile led Saddam to authorize the conversion of aging L-29s to UAVs for cruise missile-like missions. We have no reporting directly indicating which payloads—conventional or nonconventional—were intended for the platform at the time the project was conceived.

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Scope Note (U)

This is the fourth intelligence assessment (IA) in the CIA's Iraq WMD Retrospective Series that addresses our post-Operation Iraqi Freedom (OIF) understanding of Iraq's weapons of mass destruction (WMD) and delivery system programs. These IAs reevaluate past assessments and reporting in light of the investigations carried out by the Iraq Survey Group (ISG). [REDACTED]

Information in this paper was obtained from interviews with former Iraqi senior officials, personnel working in Iraq's UAV programs. [REDACTED]

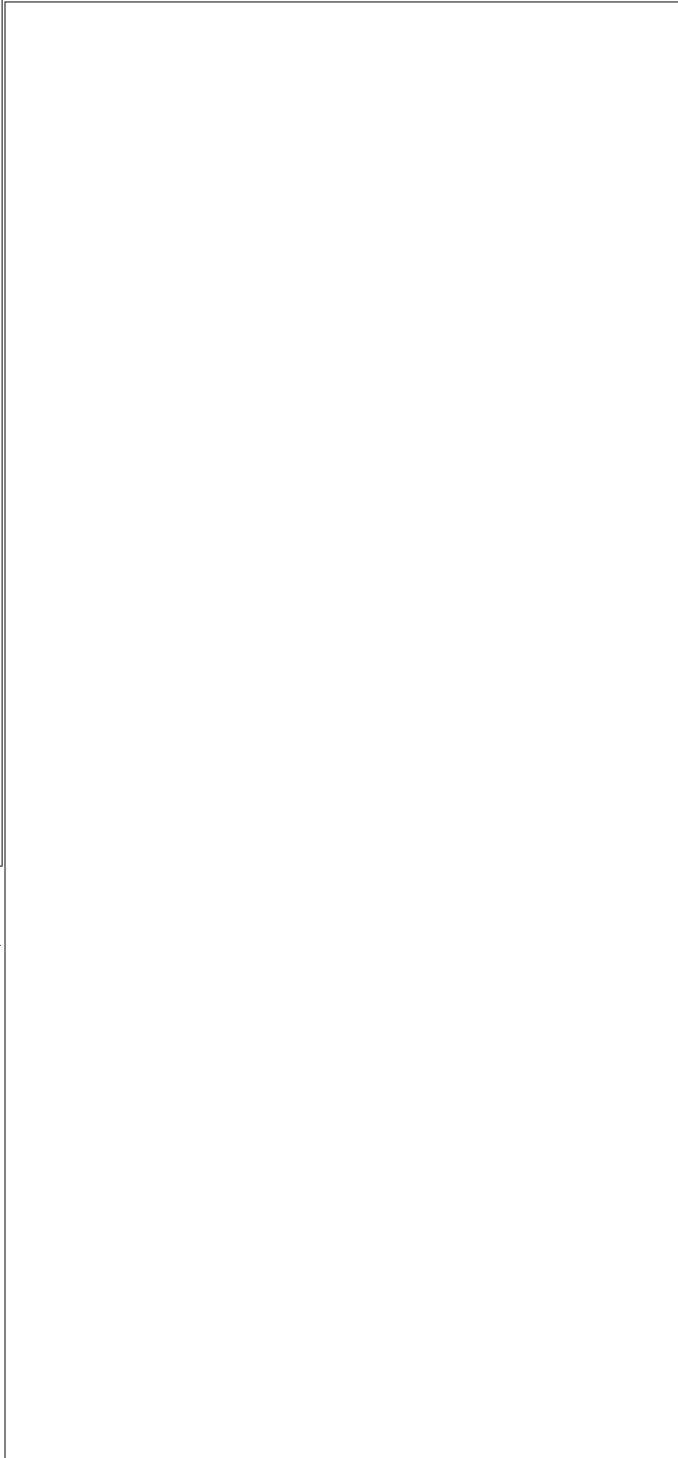
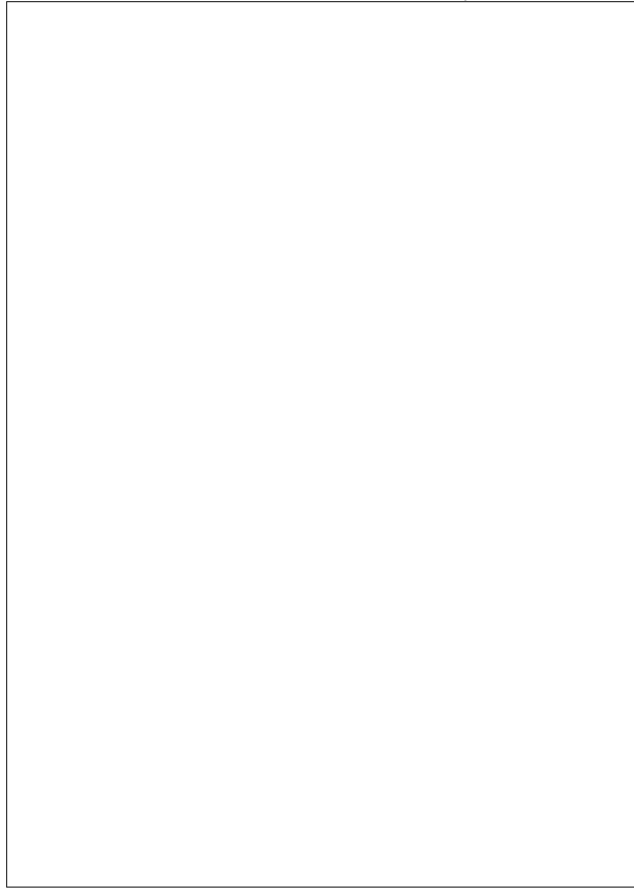
Although we reference our pre-OIF judgments, we are providing them only as background for the reader and are not rejustifying or resourcing pre-OIF assessments. [REDACTED]

This product reflects past and current CIA assessments [REDACTED]

Throughout this paper the term UAV is used to refer to both UAVs and remotely piloted vehicles (RPVs), which are piloted via data link by a ground controller. UAV is an all-encompassing term that includes RPVs as a subset. In addition, the term "small" UAV in this paper refers to those UAVs that are not derived from manned aircraft [REDACTED]

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Struggling To Succeed Up to OIF

We judge that the Al Quds UAVs were still in the testing and prototype development stage at the start of OIF and were not ready for serial production. Barring the onset of OIF in March 2003, Iraqi officials possibly would have canceled the Al Quds project had success not been achieved in the near-term. However, had OIF not occurred and Iraqi officials allowed the Al Quds project to continue, the UAV project likely would have produced a fully autonomous small UAV capable of delivering 20- to 30-kg lethal and nonlethal payloads to extended ranges.

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test flight just days before the start of the war.

the project was officially canceled in April 1991.

- The MiG-21 conversion project failed because of a lack of time and expertise necessary to develop a working control system for the UAV.

Current Assessment: MiG-21 UAV Mission

We continue to judge—based on post-OIF reports from multiple sources—that *Iraq intended the MiG-21 UAV for CBW agent delivery*.

- According to the former Organization for Military Industrialization (OMI) Director 'Abd Al-Tawab Mullah Al-Huwaysh, Iraq developed the MiG-21 UAV and a sprayer for the aircraft to deliver CBW agent against Iran.

L-29 UAV (U)

Pre-OIF Assessment

The L-29 UAV project, also known as the Al-Bai'aa project, was a follow-on to the MiG-21 UAV project

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Roles and Capabilities of Iraqi Pre-OIF UAVs
Iraq WMD Retrospective Series [REDACTED]

Key Findings (U)

Information acquired since Operation Iraqi Freedom (OIF) indicates that most Iraqi unmanned aerial vehicles (UAVs) were developed for nonlethal roles such as reconnaissance, electronic warfare, and as air defense targets. We have found no post-OIF information confirming that any Iraqi small UAVs—those not derived from manned aircraft—were designed or modified for chemical and biological warfare (CBW) agent delivery, although Iraq intended the 1991 MiG-21 aircraft-to-UAV conversion for CBW dissemination and possibly intended the L-29 UAV to succeed it in this role. [REDACTED]

Iraq in 1995 initially intended the L-29 UAV for one-way, cruise missile-like lethal missions—possibly to succeed the failed MiG-21 UAV in a CBW agent delivery role—but as development of the UAV progressed, Iraqi officials considered additional, nonlethal uses for the platform.

- Post-OIF reporting does not confirm or disprove a CBW role for the L-29 UAV. Statements by a senior Iraqi regime official suggesting a CBW mission for the UAV and a lack of consensus among project personnel as to the UAV's mission prevent us from eliminating CBW agent delivery as a mission.
- Post-OIF reporting suggesting a CBW role for the UAV does not clarify, however, whether CBW agent delivery was the original mission of the L-29 UAV or in addition to an initial conventional weapons delivery role. [REDACTED]

After the cancellation of the L-29 UAV project in 2001, Iraq continued to advance the capabilities of its small UAVs—including autonomous flight beyond the 150-km UN missile-range limit for one UAV—and intended at least two small UAVs to deliver a high-explosive (HE) payload during offensive operations.

- By the start of OIF most Iraqi small UAVs probably had not reached operational status and were still in the design, testing, or airframe production stage. A limited number of the Ibn Firas-designed RPV-20s, however, were flight-ready.

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[redacted] Because the software in question only works in the United States, the purchase attempt raised concern that Iraq was considering operating UAVs in a lethal role against the US homeland. By the fall of 2002, we uncovered additional information suggesting the purchase attempt may have been inadvertent—the result of carelessness or greed [redacted] By the time of OIF we could not determine whether the purchase attempt was directed by Baghdad—suggesting intent to operate UAVs in the United States—or inadvertent [redacted]

Current Assessment: US Topographic Software
Since OIF we have uncovered no information suggesting [redacted] was directed to acquire a mapping capability of the United States, nor any other evidence suggesting Iraqi intent to operate UAVs in the United States. Iraqi officials, when interviewed, denied such intent.

[redacted]

At the time of this writing we believe that the US topographical software purchase attempt was more likely the result of carelessness or greed [redacted] than an indication of intent to target the United States.

[redacted]

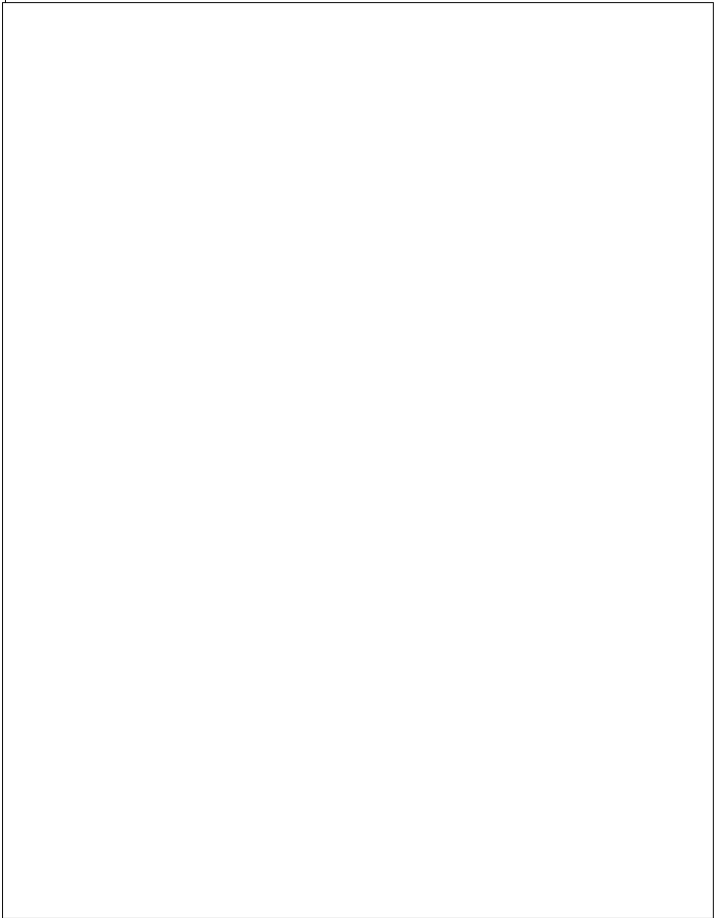
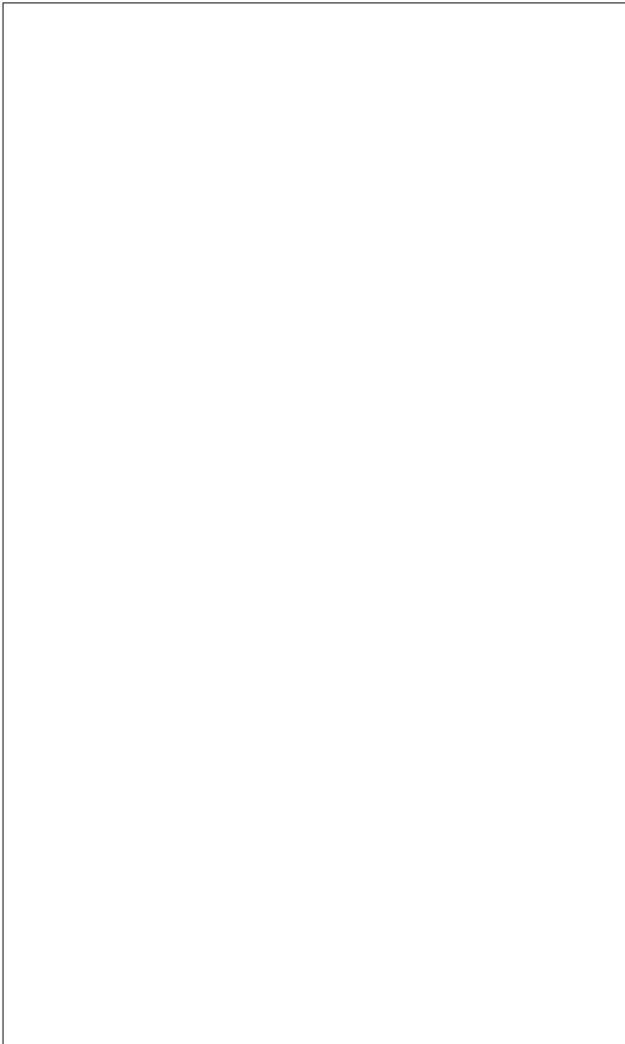
[redacted]

- Documents recovered in Iraq indicate [redacted] marked up the prices of some items sold [redacted] by as much as 110 percent. Such profit margins could have motivated [redacted] increase his profits by “padding” Iraqi equipment orders with additional items not requested by Iraqi officials. [redacted]

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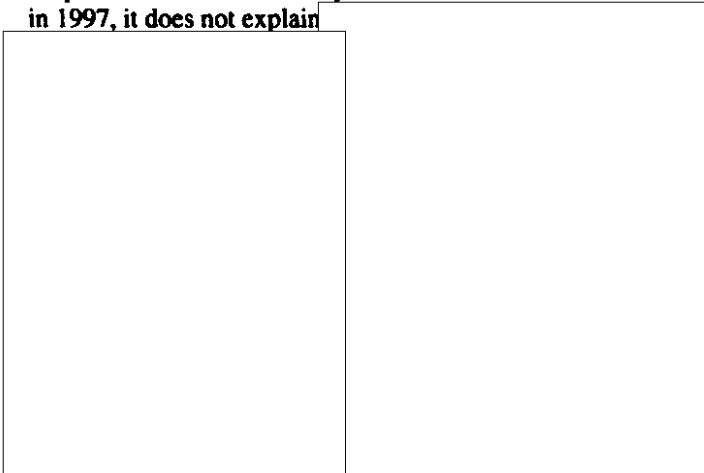
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Although the SAM trap explanation is plausible given Iraq's continued vulnerability to Coalition airstrikes in 1997, it does not explain

Following initial successes in the L-29 UAV flight-test program in 1997, and after six years of Coalition enforcement of the No-Fly zones, Iraq possibly considered using the L-29 UAV to lure US and UK aircraft into Iraqi SAM operating areas. Available reporting, however, indicates only the one deployment of the L-29 UAV, possibly in this role.



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Since OIF, sources [redacted]

[redacted] *have been inconsistent or vague* regarding the date of the final flight test and the exact date and circumstances of the project's cancellation. Most agree, however, that repeated control problems and maintenance issues led OMI and Ibn Fimas to end the project. [redacted]

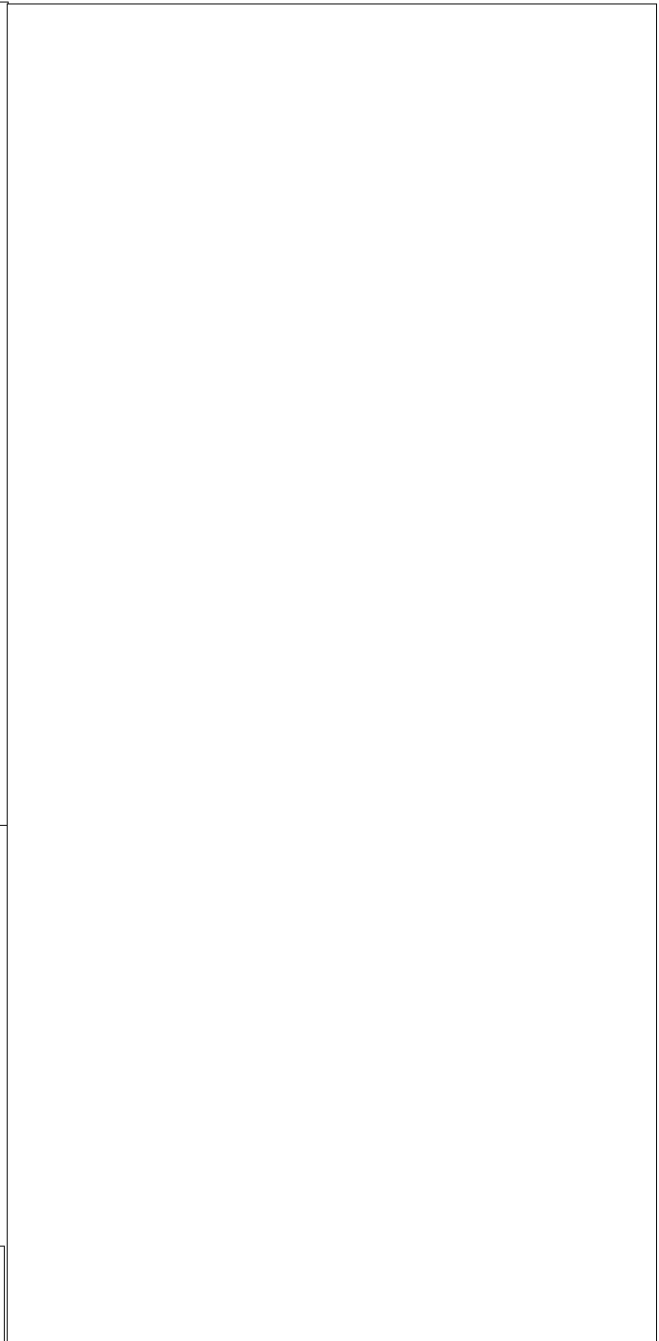
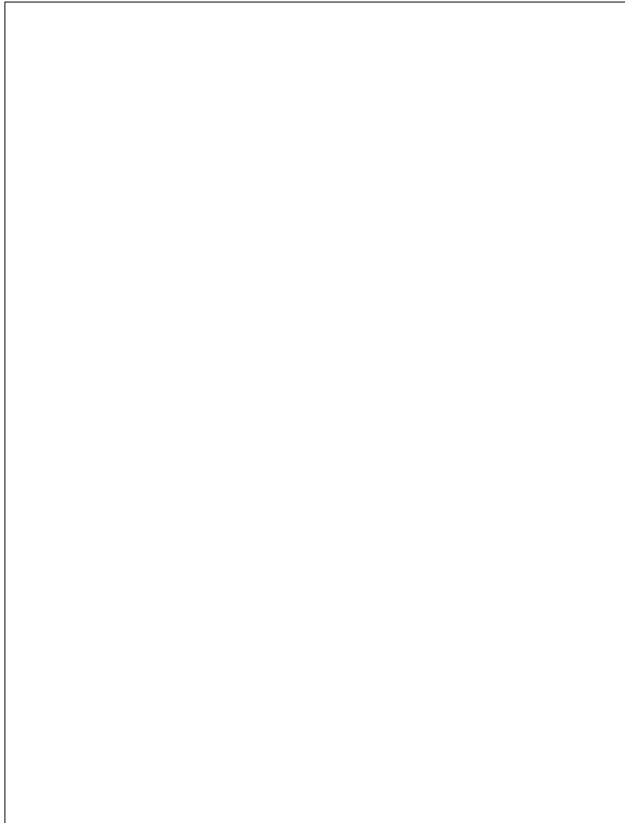
[redacted]

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[redacted] indicate that at least two L-29 UAV taxi tests and the final two of the four declared L-29 UAV test flights resulted in crashes. [redacted]

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Ibn Firmas: Iraq's Primary UAV Developer

Ibn Firmas was developing two fully autonomous UAVs, the RPV-20 and -30, for reconnaissance and EW roles. Ibn Firmas also was continuing to produce the much smaller Yamamah [redacted] which had been in production since the early 1990s, and was working on several other experimental designs [redacted]

- By OIF, production and limited delivery of the RPV-20 had begun but the lack of suitable engines and IZAF interest had stalled the development of the RPV-30, [redacted]



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[Redacted]

[Redacted]

[Redacted]

and flight-tested the smaller RPV-20A series of UAVs to develop the technologies [Redacted] Neither [Redacted] series proceeded beyond prototype construction and initial flight-testing, respectively.

Al Quds: Step Behind Ibn Firas

The other UAV development entity in Iraq, called the Al Quds

[Redacted]

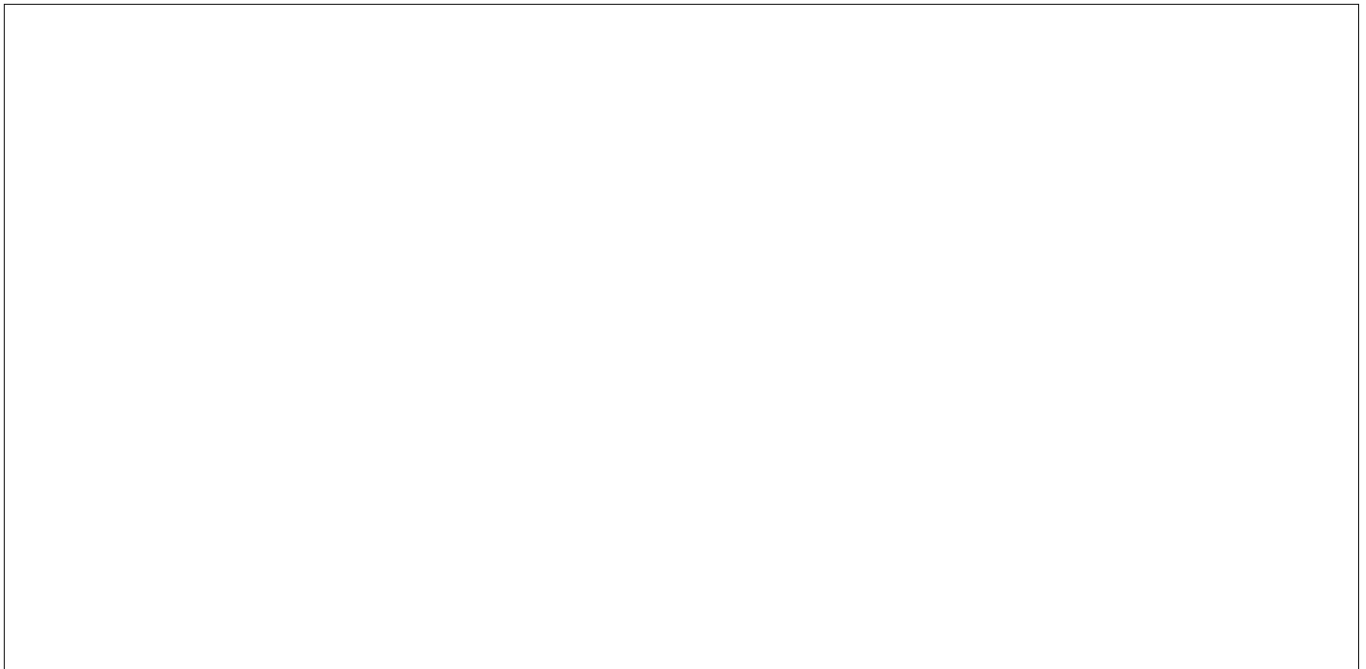
[Redacted]

the Al Quds project intended to develop a turbojet-powered, 100-kg payload UAV [Redacted] for fully autonomous EW missions. After initial problems with [Redacted] however, engineers built

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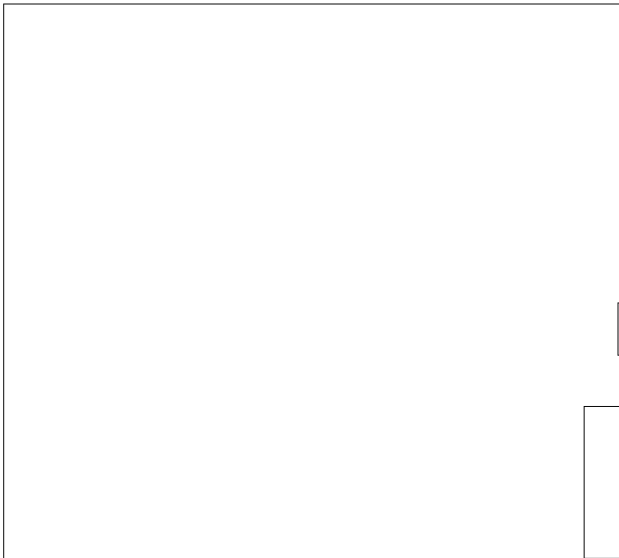
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Work Continued Beyond Final Test Flight

Various sources indicate that Iraq continued work on the L-29 UAV project after the declared final flight test in October 2000 by conducting additional manned flight tests, building a new ground control station (GCS) for the UAV, and training pilots [redacted]



Iraq intended to extend the operational range of the L-29 UAV beyond the 150-km UN imposed missile-range limit.



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We also had nonspecific intelligence stating that Iraq had modified unidentified small UAVs for BW agent delivery

Considering Iraq's declared past interest in developing small and large UAVs for BW agent delivery, we were concerned that small UAVs, if modified for BW agent delivery, could pose a danger to US forces and our allies in the region. Furthermore, a 2001 attempt to procure US topographic mapping software along with UAV autopilots raised concerns that Iraq was considering using UAVs in the continental United States.

In December 2002 and early 2003, Iraq declared to the UN its development of several new small UAV designs including the RPV-20, -30, -20A, -30A, and various small aerial targets. These design projects all seemingly at the time fell under the UAV development organization at Ibn Firas and were declared with ranges below 100-km

Current Assessment: Small UAV Status

By the start of OIF most Iraqi small UAVs probably had not reached operational status and were still in the design, testing, or airframe production stage. A limited number of the Ibn Firas-designed RPV-20s

were flight-ready for potential reconnaissance and conventional lethal missions.



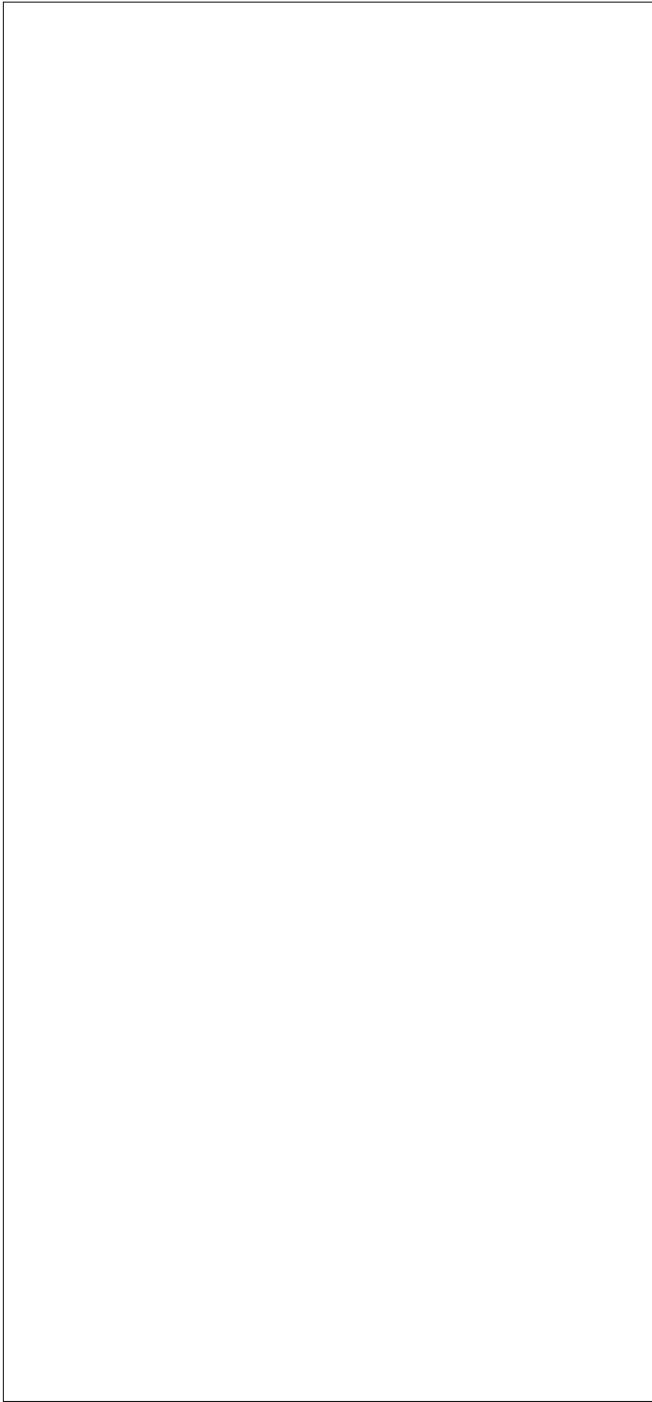
two RPV-20 UAVs—along with multiple other parts for six different airframes—at the site. suggesting the UAVs were intended for one-way lethal missions



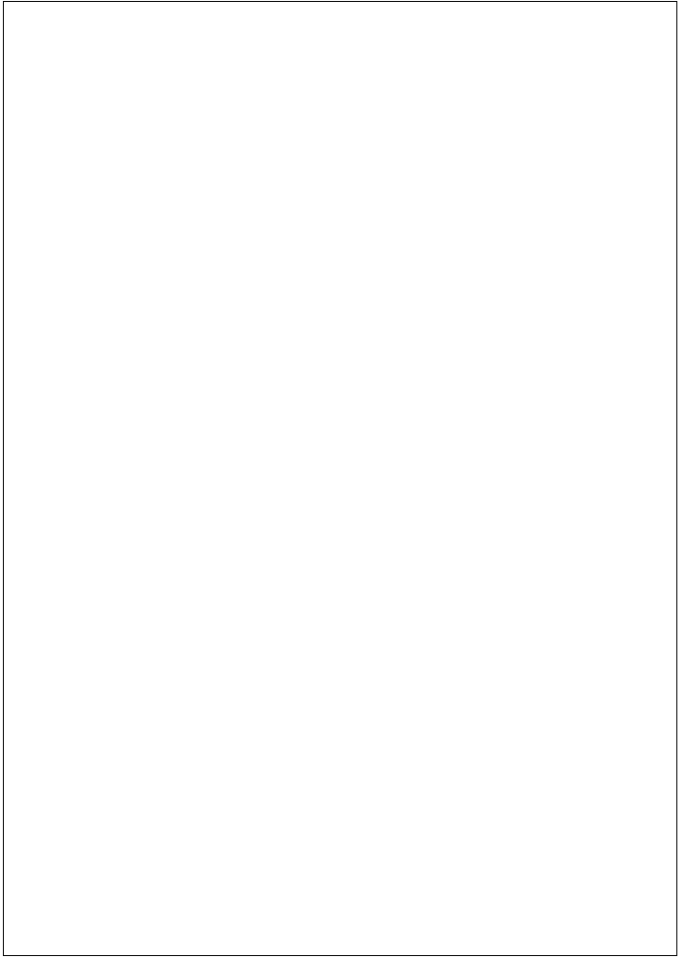
Various post-OIF sources revealed that Iraq had two distinct small UAV development entities at the start of the war. Ibn Firas—Iraq's primary UAV developer since the mid-1990s—was responsible for developing smaller 20- to 30-kg payload UAVs, while the Al Quds project was created to develop a larger 100-kg payload UAV

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Autonomous Flight Planned But Not Achieved
We judge that none of the Al Quds UAVs ever achieved a fully autonomous flight capability, though such a capability was intended for the UAVs.



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