

# CRS Report for Congress

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## Iraq: Weapons of Mass Destruction (WMD) Capable Missiles and Unmanned Aerial Vehicles (UAVs)

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### Summary

This report addresses Iraq's post-Gulf-War missile and UAV programs, system capabilities, and operational employment considerations. The UN has recently ordered Iraq to destroy its Al Samoud 2 missiles and associated engines which the UN claims are in violation of UN Security Council Resolutions (UNSCR) 687 and 715. Iraq is also estimated to have illegally retained up to 20 Al Hussein SCUD variant missiles and may have also attempted to extend the range of their Ababil-100 (also referred to as Al Fatah) missiles to proscribed limits. Iraq has also been accused of modifying L-29 Czech jet trainers to be used as UAVs to disseminate chemical or biological agents. This report will be updated as events warrant. Additional information is provided in CRS Issue Brief 1B92117, *Iraq: Weapons, Threat, Compliance, Sanctions, and U.S. Policy* and CRS Report RL31671, *Iraq: UN Inspections for Weapons of Mass Destruction*.

### Iraq's Missile and UAV Program, 1991-1998

Since the conclusion of the Gulf War in 1991 and the imposition of UNSCR 687, United Nations Special Commission on Iraq (UNSCOM) inspectors have either supervised the destruction of, or accounted for:<sup>1</sup>

- 817 of 819 Russian-supplied SCUD missiles;
- 19 transporter, erector, launchers (TELs); and
- 30 chemical/biological warheads.

Prior to the Gulf War, Iraq experimented with a variety of ballistic missiles, most based on the proven SCUD design, with ranges from 900 to 2,500 kms. Missiles such as the Al Abid, Tammouz I, and Badr-2000 have been developed with varying degrees of

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<sup>1</sup> *Iraq Weapons of Mass Destruction Programs*, U.S. Government White Paper, February 13, 1998, p. 11.

foreign assistance but either have failed during operational testing or the programs were discontinued because of the Gulf War, UN disarmament activities, or lack of foreign assistance. These programs may have been resurrected after the departure of UNSCOM inspectors in 1998.

Baghdad is allegedly attempting to convert a number of L-29 Czech jet trainers into UAVs that can be fitted with aerial spray tanks for the dissemination of chemical or biological agents over a wide area. This is not a new endeavor as Iraq conducted experiments in converting Mig-21 aircraft into UAVs capable of carrying 2,000 liter spray tanks prior to the Gulf War.<sup>2</sup>

It is important to note that this report covers only Iraqi systems that are known through inspections to be WMD capable and not those systems that could be modified to carry WMDs. This report also does not cover Iraqi WMD capable artillery, rockets, aerial bombs, and mines.

## **Current Estimated Status of Iraq's WMD Capable Missiles and UAVs**

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**Al Samoud** (Photo at[<http://www.cbsnews.com/stories/2003/02/25/iraq/main541855.shtml>])

In Chief UN Weapons Inspector Hans Blix's report to the UN on January 27, 2003, he suggested that Iraq's Al Samoud II and Al Fatah (Ababil-100) missiles were in violation of the 150 kilometer range limit set by the Security Council. Iraqi test reports given to the UN inspectors revealed that of 40 documented tests of the Al Samoud II that the missile exceeded the 150 km (93 miles) limit on 13 occasions - once out to 114 miles.<sup>3</sup> Test documents also indicated that out of 33 Al Fatah flight tests, 8 tests violated the 150 km limit - once out to 100 miles.<sup>4</sup> Blix also indicated that Iraq had expanded the diameter of the Al Samoud II missiles to 760 mm despite UN directives limiting the missile's diameter to 600 mm or less.<sup>5</sup> In addition, 380 SA-2 ( a Soviet-origin anti- aircraft missile permitted under UNSCR 687) missile engines were also deemed as proscribed as they had been modified for use in the Al Samoud II. While the Iraqi claim that neither missile would have exceeded the 150 km range if payloads (both have an estimated 300 kg payload) and guidance systems were installed for the flight tests has possible merit, such a claim could only be proven if flight tests were conducted with payloads and guidance systems.

While some analysts have characterized these as "minor" violations to Security Council Resolutions, other analysts disagree. The increased diameter of the Al Samoud II permits additional fuel and payload capacity which could permit a 70% increase in its

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<sup>2</sup> Ibid.

<sup>3</sup> *International Experts Study Iraqi Missiles*, Associated Press, February 10, 2003.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

chemical or biological payload capacity at a 150 km range.<sup>6</sup> Inspectors have verified that 76 Al Samoud II missiles were produced and there could actually be up to 100 of these missiles with approximately 50 of them deployed to units in the field.<sup>7</sup> Even at a UN-permissible 150 km range, the Al Samoud II and Al Fatah could deliver chemical or biological payloads to targets in Kuwait, Jordan, and Turkey but Iraq would need to deploy these missiles into the Northern No Fly Zone to hit Turkey and into the Southern No Fly Zone to reach Kuwait.<sup>8</sup> An additional benefit would be enhanced missile survivability. If the Al Samoud II's true range was near the 114 mile mark as indicated by its maximum flight test, it could permit the missile to be hidden in an almost 50% greater area (which would make it all the more difficult for U.S. and coalition forces to find and destroy these missiles) and still hit selected targets outside of Iraq.<sup>9</sup> Because the Al Samoud is a liquid propellant missile, its range could be increased fairly easily by "stretching" the missile's length to accommodate more propellant and some experts believe that achieving a 200 to 300 km range would be a distinct possibility.<sup>10</sup> Some experts also fear that Al Samoud II and Al Fatah missiles could be combined in various forms to create multi-stage missiles that could deliver chemical or biological payloads to even far greater distances. Press reports on March 3, 2003 stated that Iraq had destroyed 16 Al Samoud II missiles under UN supervision at the Taji missile production and storage facility north of Baghdad but would stop destruction if it appeared that the U.S. was ready to commence offensive operations against Iraq.<sup>11</sup>

**Al Hussein** (Photo at [[www.fas.org/nuke/guide/iraq/missile/01\\_alhusein.jpg](http://www.fas.org/nuke/guide/iraq/missile/01_alhusein.jpg)])

Western intelligence believes that Iraq has up to 20 Al Hussein missiles and about a dozen TELs although, to date, UN weapons inspectors have been unable to verify these claims. In 1999 UNSCOM reported that they could account for all but 9 Al Husseins (2 of the modified Russian SCUDs and 7 domestically produced Al Husseins).<sup>12</sup> The Al Hussein missile is essentially an Iraqi-modified version of the former Soviet Union's mobile SCUD-B missile that was developed in the 1950s based on German World War II V-2 missile technology. During the Iran-Iraq War in the 1980s, Iraq fired more than 500 SCUD-type missiles at Iranian military and civilian targets; 93 SCUD-type missiles were fired at Israeli and Coalition forces during the Gulf War.<sup>13</sup>

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<sup>6</sup> *The Great Iraqi Missile Mystery*, by Anthony H. Cordesman, GulfWire Perspectives, February 26, 2003, p. 7.

<sup>7</sup> Ibid.

<sup>8</sup> *Iraq's Al Samoud: A Missile With Great Possibilities*, by Richard Speier, Policy Watch 713, The Washington Institute, February 21, 2003, p. 3.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> *UN: Iraq Destroys More Missiles*, CNN.com. March 3, 2003.

<sup>12</sup> S/1999/94, UNSCOM Report on the Status of Disarmament and Monitoring, January 29, 1999.

<sup>13</sup> Ibid.

The Al Hussein can carry high explosive, chemical, or biological warheads. After the Gulf War, the Iraqis admitted filling at least 75 of their SCUD warheads with either chemical or biological agents.<sup>14</sup> Fifty chemical warheads were intended to carry a mixture of Sarin and Cyclosarin nerve agents but technical analysis of warhead remnants indicated that some of these warheads were likely filled with VX nerve agents.<sup>15</sup> Iraq also claimed to have unilaterally destroyed all 25 biological warheads (16 botulinum, 5 anthrax, and 4 aflatoxin) in mid-1991.<sup>16</sup> UNSCOM later claimed that the alleged Iraqi destruction of these biological warheads “could not be reconciled with the physical evidence.”<sup>17</sup> These warheads were bulk filled but it is possible that Iraq has developed submunition chemical and biological warheads for their missiles since the cessation of UN inspections in 1998.<sup>18</sup> Upon the conclusion of inspections, UNSCOM reported that between 40 to 70 chemical/biological capable warheads were unaccounted for.<sup>19</sup>

**Ababil-100** (Photo at [[www.globalsecurity.org/wmd/world/iraq/images/ababil-100.jpg](http://www.globalsecurity.org/wmd/world/iraq/images/ababil-100.jpg)])

The Ababil-100 missile is also referred to as the Al Fatah missile by the UN and the press. The Ababil-100 missile is a solid propellant missile and is also believed to have undergone engineering modifications to extend its range. The Ababil-100 is estimated to have a 300 kg payload capacity<sup>20</sup> and it is believed that it is currently being developed as an unguided missile with the intent of eventually including a guidance package to enhance its accuracy.<sup>21</sup> There are no known unclassified estimates of the number of Ababil-100's that Iraq might be able to operationally deploy and the Ababil-100 is also assessed to be chemical/biological capable with submunition potential. Current UN inspection reports do not include production figures on Ababil-100 missiles or what if any modifications were made to the missile in order for it to achieve ranges greater than 150 kms.

**L-29 UAV** (Photo at [[www.globalsecurity.org/wmd/world/iraq/images/l-29.jpg](http://www.globalsecurity.org/wmd/world/iraq/images/l-29.jpg)])

A variety of intelligence sources report that Iraq is converting an unspecified number of L-29 Czech jet trainers into UAVs designed to conduct long range chemical or

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<sup>14</sup> *Iraq's Weapons of Mass Destruction Programs*, Unclassified CIA Report, October 2002, p. 18.

<sup>15</sup> *Iraq's Weapons of Mass Destruction: The Assessment of the British Government*, September 24, 2002, p. 23

<sup>16</sup> *Iraq Weapons of Mass Destruction Program*, p. 11.

<sup>17</sup> *Ibid.*

<sup>18</sup> The efficacy of all missile systems would be significantly enhanced if Iraq employed chemical or biological submunitions. Submunitions allow for a wider and more effective dispersion and concentration of chemical or biological agents and also permit a larger portion of agent to survive a missile intercept.

<sup>19</sup> *Ibid.*

<sup>20</sup> *Iraq's Missiles: A Brief History*, Iraq Watch, November 7, 2002, p. 11.

<sup>21</sup> *Iraq's Weapons of Mass Destruction: The Assessment of the British Government*, September 24, 2002, p. 27.

biological spray attacks.<sup>22</sup> The L-29 UAV's estimated range is approximately 600 kms and its payload is approximately 160 kgs. This UAV configuration would be best suited for conducting biological spray attacks due to the L-29's relatively small payload capacity. It is not known how the L-29 UAV would be controlled, either from fixed or mobile ground sites or from an airborne platform.

## Operational Considerations

Given the stated U.S. aims of "regime change and disarmament," it is possible that Iraq will employ their WMD missiles and UAVs, as well as any other delivery means (rockets, artillery, aerial bombs, and mines) available to insure the survival of the regime. If Iraq chooses not to use WMDs, Coalition forces would still need to take appropriate protective measures and this, in and of itself, causes a degree of operational and logistical degradation.

There are several schools of thought on the timing of possible Iraqi WMD use. The first is that Baghdad would pre-empt U.S. force deployments. U.S. forces in the region have taken well-publicized precautions to mitigate the effects of just such a pre-emptive attack. Iraqi missiles and UAVs would also have to penetrate U.S. Patriot missile defenses deployed to protect seaports, airports, equipment sites, and assembly areas. Given Iraq's limited inventory of systems, it would be difficult for them to overwhelm U.S. defenses. However, a successful attack might slow U.S. deployment and ultimately operational time lines but would probably have little effect on the ultimate outcome of the campaign. Another theory is that these weapons would be used early on in the campaign. Targeting airfields, naval formations, or troop concentrations with missiles is a possibility and there is potential to cause a significant operational impact should one of these targets be hit. Another effective tactic might be to conduct a biological or chemical spray attack against one of the aforementioned targets using a UAV. Presumably, the UAVs could fly low enough to avoid radar detection but terminal control and agent release from the UAVs would be difficult unless there was an Iraqi ground controller present near the target. The final school suggests that Saddam would only employ his WMD missiles and UAVs if Baghdad or Tikrit were directly threatened late in the campaign. At this point of the campaign when Saddam would likely have little breathing room left, it might be difficult to launch a WMD-laden missile or UAV with U.S. forces in such close proximity. Chemical and biological artillery, rockets, and bombs would be a better means of halting US ground forces in this instance.

The primary operational limitation is that of scale: Iraq simply does not have enough missiles and UAVs to cause widespread operational impact on Coalition forces. After more than ten years of storage and possibly re-assembly, it is likely many missiles that were hidden will not be functional. This may also be the case for Iraq's remaining TELs. During the Gulf War, Al Hussein's had a significant accuracy problem and also tended to break up upon reentry and it is unclear if these performance deficiencies have since been rectified. Another limitation is the payload capacity of Iraqi Al Hussein's. In 1991 the US Army Chemical Research Development and Engineering Center estimated that a bulk-filled SCUD could cover an area of about 7 sq km with 1.0 mg-min/m<sup>3</sup> (the dosage level at which Sarin nerve agent has a noticeable effect on unprotected humans) under optimal

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<sup>22</sup> Ibid., p. 23.

weather conditions. Al Hussein missiles fired at Tel Aviv and Riyadh had payload capacities of 100 to 400 lbs.<sup>23</sup> This being the case, chemical coverage could have ranged from .56 sq kms to 2.3 sq kms. In order to effectively cover a large target area target such as an airfield, seaport, or troop concentration with these reduced payloads, the Al Hussein missiles would have to be extremely accurate and it would likely require more than one missile per target to insure adequate coverage. In terms of Iraq's shorter-range missiles, any deployed Al Samoud II and Ababil-100 missiles might have a measurable effect on Coalition ground forces, particularly if they are complemented with Iraqi chemical or biological artillery or rockets. If properly amassed and coordinated, these systems could cause casualties among improperly protected forces.

The means to interdict missile attacks has improved and would be a factor in any conflict. Since 1991, U.S. forces have devoted significant resources to improve both the Special Forces' and the Air Force's "SCUD-hunting" abilities. The U.S. Patriot system has also seen significant upgrades, to include the limited deployment of PAC 3 "hit to kill" missiles. When the limitations mentioned above are considered, along with an unknown degree of attrition due to ground and air interdiction operations and Coalition and Israeli missile defenses, Iraq's limited inventory of longer-range missiles may be militarily insignificant.

While Iraq has begun destruction of their Al Samoud II missiles, there is still cause for concern. The presence of longer-range Al Hussein missiles and L-29 UAVs, which U.S. and British intelligence believe are hidden somewhere in Iraq, has yet to be confirmed or denied by UN inspectors. It is also not known if any Al Samoud II or Ababil-100 missiles have been deployed to frontline units. These deployed missiles could be easily hidden by Iraqi forces in the field for use against invading U.S. or Coalition forces as well as for attacks on regional targets within their range. Well-documented inconsistencies in Iraq's chemical and biological weapons program declarations to the UN makes the missile issue that much more worrisome. Despite these circumstances, Iraq's missile and UAV threat is limited by its scale, operational capabilities, and a corresponding increase in U.S. capability to locate, intercept, and destroy these weapons.

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<sup>23</sup> US Army Chemical Research Development and Engineering Center Paper, *Effects of Patriot Interception on SCUD Warhead Dissemination*, January 23, 1991.