

Iran's Nuclear and Missile Programs: A Status Report

A grayscale image of a nuclear explosion with a large, billowing white cloud rising from a dark base, set against a lighter sky.A faint, grayscale background image of a person, possibly a woman, looking down with their hand near their face, overlaid on the lower half of the slide.

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Iran's Nuclear Program:

Key Issues and Uncertainties



Known Weapons Related Research

- Beryllium (neutron reflector)
- Polonium (neutron initiator)
- Plutonium separation
- High Uranium enrichment
- Machining of Uranium
- Re-entry vehicle design
- Acquisition of North Korean (Chinese) weapons design? AQ Khan network transfers
- High explosive lenses

Concealment Activity - Part I

- **Uranium Imports:** Iran failed to report that it had purchased natural uranium (1,000 kg of UF₆, 400 kg of UF₄, and 400 kg of UO₂) from China in 1991, and its subsequent transfer for further processing. Iran acknowledged the imports in February 2003.
- **Uranium conversion:** Iran did not inform the IAEA of its use of the imported uranium in tests of its uranium conversion processes, including “uranium dissolution, purification using pulse columns, and the production of uranium metal, and the associated production and loss of nuclear material.” Iran acknowledged this failure in February 2003.

This analysis of violations is taken from Jacqueline Shire and David Albright, “Iran’s NPT Violations – Numerous and Possibly On-Going?”, The Institute for Science and International Security (ISIS), September 29, 2006. It is also based on the IAEA report for 2004, <http://www.iaea.org/Publications/Documents/Board/2004/gov2004-83.pdf>, and International Atomic Energy Agency, “Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran,” GOV/2003/75, 10 November 2003, Annex 1, p. 2.

Concealment Activity - Part II

- **Uranium enrichment:** Iran failed to report that it had used 1.9 kg of the imported UF₆ to test P-1 centrifuges at the Kalaye Electric Company centrifuge workshop in 1999 and 2002. In its October 2003 declaration to the IAEA, Iran first admitted to introducing UF₆ into a centrifuge in 1999, and into as many as 19 centrifuges in 2002. Iran also failed to declare the associated production of enriched and depleted uranium.
- **Hidden Sites:** Iran did not declare to the IAEA the existence of a pilot enrichment facility at the Kalaye Electric Company Workshop, and laser enrichment plants at the Tehran Nuclear Research center and at Lashkar Ab'ad. Because experiments at these sites involved the use of nuclear material in equipment, Iran was obligated to report them to the IAEA.

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Concealment Activity - Part III

- **Laser Isotope Enrichment Experiments:** Iran failed to report that in 1993 it imported 50 kg of natural uranium metal, and that it used 8 kg of this for atomic vapor laser isotope separation (AVLIS) experiments at Tehran Nuclear Research Center between 1999 to 2000, and 22 kg of the metal for AVLIS experiments at Lashkar Ab'ad between 2002 to 2003. These activities were ultimately acknowledged in an October 2003 declaration.
- **Plutonium Experiments:** Iran did not report to the IAEA that it had produced uranium dioxide (UO₂) targets, irradiated them in the Tehran Research Reactor, and then separated the plutonium from the irradiated targets. Iran also failed to report the production and transfer of waste associated with these activities and that it had stored unprocessed irradiated targets at the Tehran Nuclear Research Center. In later meetings with the IAEA, Iran said that it conducted the plutonium separation experiments between 1988 and 1993 using shielded glove boxes at the Tehran Nuclear Research Center.

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Green Salt Project

- US intelligence estimates reveal a new “military-nuclear dimension.”
- Assessment was reportedly based on information provided by the US to the IAEA, and it referred to a secret program called “the Green Salt Project” to produce UF₄, which, according to the IAEA Deputy Director General for Safeguards “could have a nuclear military dimension”.
- This project worked on uranium enrichment, high explosives, and on adapting nuclear warheads to Iran's missiles.
- The report suggested that there was evidence of “administrative interconnections” between weaponization and nuclear experts in Iran's nuclear program.
- Tehran argued that these claims were “baseless.”

Related Nuclear Issues

- US officials claimed that these estimates tracked with the comments made by then Secretary of State Collin Powell in November 2004 about Iran's delivery system to carry nukes.
- The uranium mine in Gchine believed to be under IRGC control.
- There is a high degree of organizational and personnel overlap between state-owned defense industries, the military and even more so the IRGC.
- The Annex to UNSCR 1737 identifies a number of companies and individuals involved in the ballistic missile and nuclear programs that are mainly the Atomic Energy Organization of Iran (AEOI) and Defense Industries Organization (DIO).

Preparing for an Eventual Test? February 2006

- Washington Post reports on February 8, 2006 that Tehran completed sophisticated drawings of *a deep subterranean shaft* with:
 - remote-controlled sensors to measure pressure and heat,
 - plans for the 400-meter tunnel appear designed for an underground atomic test).
 - a test control team parked a safe 10 kilometers from the shaft
 - US official was quoted as saying “The diagram is consistent with a nuclear test-site schematic.”
- According to US officials, the source was a set of documents received from a laptop obtained by US intelligence in 2004
 - US believes this is “nearest” to a “smoking gun.”
 - British believe information authentic
 - German & French believe the information are “troubling”
 - Russians believe information inconclusive

Arak Heavy Water Production Plant Announcement in August 2006

- Ahmadinejad inaugurates on August 26.
- Heavy water production plant with reactor to be completed in 2009.
- Reactor can use natural uranium mined by Iran without outside enrichment.
- Spent fuel can be reprocessed to extract Plutonium for bomb.
- Claim to diagnose and treat AIDS and cancer, medical and agricultural research.
- Iran admitted to procurement of hot cells for Arak, which would be suitable for the production of plutonium.

USNSCR 1747 (2007), March 24, 2007

- **Re-affirms that the Islamic Republic of Iran (Iran) shall without further delay take the steps..essential to build confidence in the exclusively peaceful purpose of its nuclear programme and to resolve outstanding questions,**
- **... in this context, affirmed its decision that Iran shall without further delay take the steps required in paragraph 2 of Security Council resolution 1737 (2006);**
- **...requested within 60 days a report from the Director General on whether Iran had established full and sustained suspension of all activities mentioned in resolution 1737 (2006), as well as on the process of Iranian compliance with all the steps required by the Board of Governors**
- **and with the other provisions of resolution 1737 (2006) and resolution 1747 (2007), to the Board and in parallel to the Security Council for its consideration.**

New Tunneling Near Natanz: June 2007

- **Digital Globe commercial satellite photos show two new roads leading to a construction site on the side of a mountain closest to the Natanz site southern boundary. There are no signs of construction in similar photos taken six months earlier.**
- **Institute for Science and International Security (ISIS) compares the new Natanz construction with a tunnel built by Iran inside a mountain near another key nuclear site. That site is located at Esfahan, about 80 miles to the south, and houses a nuclear research center and facility to convert uranium to a form that can be enriched at Natanz.**
- **ISIS speculates that, "such a tunnel inside a mountain would offer excellent protection from an aerial attack...This new facility would be ideal for safely storing" natural and enriched uranium and the specialized equipment needed to make it.**

Key Cautions in IAEA Board of Governors Report of November 15, 2007 -I

- **...the Agency's knowledge about Iran's current nuclear programme is diminishing.**
- **Contrary to the decisions of the Security Council, Iran has not suspended its enrichment related activities, having continued the operation of PFEP and FEP. Iran has also continued the construction of the IR-40 and operation of the Heavy Water Production Plant.**
- **the Agency is not in a position to provide credible assurances about the absence of undeclared nuclear material and activities in Iran without full implementation of the Additional Protocol.**
- **This is especially important in the light of Iran's undeclared activities for almost two decades and the need to restore confidence in the exclusively peaceful nature of its nuclear programme. Therefore, the Director General again urges Iran to implement the Additional Protocol at the earliest possible date.**
- **The Director General also urges Iran to implement all the confidence building measures required by the Security Council, including the suspension of all enrichment related activities.**
- **Bearing in mind the long history and complexity of the programme and the dual nature of enrichment technology, the Agency is not in a position, based on the information currently available to it, to draw conclusions about the original underlying nature of parts of the programme.**

Key Cautions in IAEA Board of Governors Report of November 15, 2007 -II

- **As previously reported to the Board ...statements made by Iran and key members of the supply network about the events leading up to the mid-1990s offer have been at variance with each other.**
- **The Agency has so far not been able to confirm Iran's statement that the supply network initiated the 1993 offer. Information provided by Iran on the deliveries and technical meetings after 1993 is consistent with that given to the Agency in interviews with some of the network members. Based on interviews with Libyan officials and supply network members and information from other sources, the Agency has concluded that most of the items related to the 1993 offer had originally been ordered by the Libyan Arab Jamahiriya but were in fact delivered to Iran in the period 1994-1996.**
- **Iran has provided names, locations and activities of the workshops involved in the domestic production of centrifuge components, most of which are owned by military industrial organizations...**
- **Iran has stated that, in order to compensate it for the poor quality of the P-1 centrifuge components provided by the supply network, the network provided Iran at a meeting in Dubai in 1996 with a full set of general P-2 centrifuge drawings...The Agency does not have credible procurement related information pointing to the actual acquisition by Iran of P-2 centrifuges or components during this period (an earlier indication which appeared to support this (GOV/2006/15, para. 18) could not be substantiated).**
- **There have been several press reports about statements by high level Iranian officials concerning R&D and testing of P-2 centrifuges by Iran...In a communication to the Agency received on 8 November 2007, Iran wrote: Iran voluntarily has informed the IAEA on the status of mechanical test (without UF6 feeding) of new generation of centrifuge design. In the communication, Iran added that it agreed that exchanging of the new centrifuge generation information would be discussed with the Agency in December 2007.**

Key Cautions in IAEA Board of Governors Report of November 15, 2007 -III

Possible Weapons Components

- **Uranium Metal:** On 8 November 2007, the Agency received a copy of the 15-page document describing the procedures for the reduction of UF₆ to uranium metal and casting it into hemispheres. the Agency has seen no indication of any UF₆ reconversion and casting activity in Iran. It should be noted, however, that a small UF₆to uranium metal conversion line in the Uranium Conversion Facility (UCF) was declared by Iran in the design information questionnaire for the UCF This line has not been built, as verified by the Agency's inspectors.
- **Polonium-210:** In accordance with the work plan, Iran should provide answers to the questions and the requested access in the next few weeks.
- **Reprocessing Activities:** The Agency has continued monitoring the use and construction of hot cells at the Tehran Research Reactor (TRR), the Molybdenum, Iodine and Xenon Radioisotope Production Facility (the MIX Facility) and the Iran Nuclear Research Reactor (IR-40) through inspections and design information verification. There have been no indications of ongoing reprocessing related activities at those facilities.
- **Heavy Water Reactor Related Projects:** Satellite imagery appears to indicate that the Heavy Water Production Plant is operating. The Agency must rely on satellite imagery of this plant as it does not have routine access to it while the Additional Protocol remains unimplemented.
- **Laptop - Green Salt:** The Agency has urged Iran to address at an early date the alleged studies concerning the conversion of uranium dioxide into UF₄(the green salt project), high explosive testing and the design of a missile re-entry vehicle.

Key Cautions in IAEA Board of Governors Report of November 15, 2007 - IV

- **...Iran's cooperation with the IAEA remains selective and incomplete. Iran has not met the world's expectation of full disclosure.**
- **Under international pressure, Iran has finally shed more light on the history of its program. However, Iran still refuses to fully disclose the past and present as the IAEA expects and to suspend fully its proliferation-sensitive activities as the Security Council requires.**
- **... despite their best efforts, the Director General reports that Iran's cooperation "remains reactive rather than proactive." Iran refused to implement the Additional Protocol and to provide early information on new nuclear facilities. The Board of Governors will be distressed to learn that "the Agency's knowledge of Iran's current nuclear program is diminishing."**

President Ahmadinejad Statement at Ardabil November 21, 2007

Ahmadinejad says no concessions beyond transparent cooperation with the UN's International Atomic Energy Agency (IAEA) should be expected.

"The Iranian nation has resisted over the nuclear issue until today and will resist later on too

We will under no circumstances allow anyone to get even a minor advantage over the Iranian nuclear issue by violating the law

"We do not refuse to negotiate in a just atmosphere while both sides enjoy equal and same rights. Nevertheless, we believe that nuclear energy is our right, we own that today and no one is able to deprive our nation of that,"

"Enemies of the Iranian nation have hope in what? Do they rely on their armed forces? We see that their troops are stuck in mud to the neck and are struggling for their life in quagmires."

"The world should know that our enemies' weapons are broken and rusty in front of the Iranian nation."

Nuclear Fuel Pellets for Arak

November 25, 2007

- **Head of Iranian AEO says Iran has produced first nuclear fuel pellets for nuclear reactor at Arak.**
- **Reactor began construction in 2004 and is still under construction.**
- **Heavy water reactor can be used to produce weapons grade Plutonium.**

Present IAEA Understanding of Known Weapons Related Research

- Beryllium (neutron reflector): No details
- Polonium (neutron initiator): Only “peaceful” programs reported.
- Plutonium separation: Limited data related to discovered activities.
- High Uranium enrichment: : Limited data related to discovered activities.
- Machining of Uranium: : Limited data related to discovered activities.
- Re-entry vehicle and warhead design:): No details
- Acquisition of North Korean (Chinese) weapons design? AQ Khan network transfers:): No details
- High explosive lenses:): No details

What the IAEA May Never Be Able to Determine (Even with Protocol)

- **Clandestine elements of nuclear weapons research.**
- **Passive (non-fissile) testing of nuclear weapons designs and warheads/bombs/reentry vehicles.**
- **Clandestine R&D activity in centrifuges, reactors, plutonium separation, LIS.**
- **Existence and nature of undisclosed facilities.**
- **“Breakout” plans for nuclear power reactors and fuel cycle.**
- **True intention of disclosed and inspected activities.**
- **Level of North Korean (Chinese) weapons and warhead designs.**
- **Existence and validity of national intelligence data.**
- **MEK truths vs. half-truths vs. lies.**

Iran's Nuclear Program:

Current Assessments



Possible Iranian Motives

- National pride
- Strategic posture in the region
- The legacy of Iraq
- Instability in the Gulf and the region
- Deterrence to the US and US discussion of military action and regime change
- Deterrence to Israel, strategic parity with Israel
- Nuclear sandwich
- Lessons from recent conflicts
- The threat of Sunni Islamic extremism
- The cause of Shiite Islamic extremism

Official US Policy Towards Negotiating with Iran

- The US policy since March 11, 2005, has been to actively support the diplomatic efforts of Britain, France and Germany (the EU-3).
- The US is prepared to provide incentives for Iranian compliance such as support for an Iranian nuclear power program, dropping its objection to Iran's application to the World Trade Organization. and the licensing of spare parts for Iranian commercial aircraft.
- While no options are off the table, Sec. Rice has publicly and repeatedly stated that an attack on Iran was "not on the agenda" since February 4, 2005.
- Secretary Gates and senior US commanders like Admiral Fallon (Centcom) have repeatedly said US is not currently preparing for an attack.
- US agreed to join with EU-3 in negotiating with Iran, Russian fuel and enrichment offer in March 2006 and 2007.
- US is calling for a UNSCR that combines stronger political and economic sanctions against Iran.

US Estimates

- **NIC**: “Iran has very active missile and WMD development programs, and is seeking foreign missile, nuclear, chemical, and biological technologies.”
- **DIA (2005)**: “Iran is likely continuing nuclear weapon-related endeavors in an effort to become the dominant regional power and deter what it perceives as the potential for US or Israeli attacks. We judge Iran is devoting significant resources to its weapons of mass destruction and ballistic missile programs. Unless constrained by a nuclear non-proliferation agreement, Tehran probably will have the ability to produce nuclear weapons early in the next decade.”
- **NIE (2005)**: revised the timeline to reflect possible technical obstacles in Iran’s nuclear program. If such complexities were taken into account, Iran would be “unlikely to produce a sufficient quantity of highly enriched uranium, the key ingredient for an atomic weapon, before ‘early to mid-next decade.’”
- **CIA (2006)**: According to news reports in November 2006, the CIA presented a classified draft report on Iranian that did not find conclusive evidence on an Iranian nuclear weapons program.

US Estimates - II

- **DNI (February 2007):** Iran and North Korea are the states of most concern to us because their regimes disregard international opprobrium, flout UN Security Council restrictions on their nuclear programs, pervert the legitimate purposes of governance, and ignore the needs and rights of their citizens.
- The United State's concerns about Iran are shared by many nations, including Iran's neighbors. We assess that Tehran is determined to develop nuclear weapons despite its international obligations and international pressure. It is continuing to pursue uranium enrichment and has shown more interest in protracting negotiations than reaching an acceptable diplomatic solution.
- This is a grave concern to the other countries in the region whose security would be threatened by Iranian nuclear weapons. Any such development could prompt dangerous and destabilizing countermoves in a volatile region that is, because of its energy reserves, critical to the global economy.

US Estimates - III

Key Differences Between May 2005 IC Assessment and December 2007 National Intelligence Estimate

2005 IC Estimate

Assess with high confidence that Iran currently is determined to develop nuclear weapons despite its international obligations and international pressure, but we do not assess that Iran is immovable.

We have moderate confidence in projecting when Iran is likely to make a nuclear weapon; we assess that it is unlikely before early-to-mid next decade.

Iran could produce enough fissile material for a weapon by the end of this decade if it were to make more rapid and successful progress than we have seen to date.

2007 NIE

Judge with high confidence that in fall 2003, Tehran halted its nuclear weapons program. Judge with high confidence that the halt lasted at least several years. (DOE and the NIC have moderate confidence that the halt to those activities represents a halt to Iran's entire nuclear weapons program.) Assess with moderate confidence Tehran had not restarted its nuclear weapons program as of mid-2007, but we do not know whether it currently intends to develop nuclear weapons. Judge with high confidence that the halt was directed primarily in response to increasing international scrutiny and pressure resulting from exposure of Iran's previously undeclared nuclear work. Assess with moderate-to-high confidence that Tehran at a minimum is keeping open the option to develop nuclear weapons.

We judge with moderate confidence that the earliest possible date Iran would be technically capable of producing enough highly enriched uranium (HEU) for a weapon is late 2009, but that this is very unlikely.

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US Estimates - IV

- **NIE (December 2007):** We judge with high confidence that in fall 2003, Tehran halted its nuclear weapons Program (For the purposes of this Estimate, by “nuclear weapons program” we mean Iran’s nuclear weapon design and weaponization work and covert uranium conversion-related and uranium enrichment-related work; **we do not mean Iran’s declared civil work related to uranium conversion and enrichment.**);
- **...we also assess with moderate-to-high confidence that Tehran at a minimum is keeping open the option to develop nuclear weapons.**
- We judge with high confidence that the halt, and Tehran’s announcement of its decision to suspend its declared uranium enrichment program and sign an Additional Protocol to its Nuclear Non-Proliferation Treaty Safeguards Agreement, **was directed primarily in response to increasing international scrutiny and pressure resulting from exposure of Iran’s previously undeclared nuclear work.**
- **We assess with high confidence that until fall 2003, Iranian military entities were working under government direction to develop nuclear weapons.**
- We judge with high confidence that the halt lasted at least several years. **(Because of intelligence gaps discussed elsewhere in this Estimate, however, DOE and the NIC assess with only moderate confidence that the halt to those activities represents a halt to Iran's entire nuclear weapons program.)**
- We assess with **moderate confidence** Tehran had not restarted its nuclear weapons program as of mid-2007, **but we do not know whether it currently intends to develop nuclear weapons.**
- We continue to assess with moderate-to-high confidence that Iran does not currently have a nuclear weapon.
- **Tehran’s decision to halt its nuclear weapons program suggests it is less determined to develop nuclear weapons than we have been judging since 2005. Our assessment that the program probably was halted primarily in response to international pressure suggests Iran may be more vulnerable to influence on the issue than we judged previously.**

US Estimates - V

- **NIE (December 2007Continued):** We continue to assess with **low confidence that Iran probably has imported at least some weapons-usable fissile material**, but still judge with moderate-to-high confidence it has not obtained enough for a nuclear weapon. We cannot rule out that Iran has acquired from abroad—or will acquire in the future—a nuclear weapon or enough fissile material for a weapon. **Barring such acquisitions, if Iran wants to have nuclear weapons it would need to produce sufficient amounts of fissile material indigenously—which we judge with high confidence it has not yet done.**
- We assess centrifuge enrichment is how Iran probably could first produce enough fissile material for a weapon, if it decides to do so. Iran resumed its declared centrifuge enrichment activities in January 2006, despite the continued halt in the nuclear weapons program. **Iran made significant progress in 2007 installing centrifuges at Natanz, but we judge with moderate confidence it still faces significant technical problems operating them.**
- We judge with moderate confidence that the earliest possible date Iran would be technically capable of producing enough HEU for a weapon is late 2009, but that this is very unlikely.
- **We judge with moderate confidence Iran probably would be technically capable of producing enough HEU for a weapon sometime during the 2010-2015 time frame. (INR judges Iran is unlikely to achieve this capability before 2013 because of foreseeable technical and programmatic problems.)** All agencies recognize the possibility that this capability may not be attained **until after 2015.**
- **Iranian entities are continuing to develop a range of technical capabilities that could be applied to producing nuclear weapons**, if a decision is made to do so. For example, Iran's civilian uranium enrichment program is continuing. We also assess with high confidence that since fall 2003, **Iran has been conducting research and development projects with commercial and conventional military applications—some of which would also be of limited use for nuclear weapons.**
- **We do not have sufficient intelligence to judge confidently whether Tehran is willing to maintain the halt of its nuclear weapons program indefinitely** while it weighs its options, or whether it will or already has set specific deadlines or criteria that will prompt it to restart the program.
- Our assessment that Iran halted the program in 2003 primarily in response to international pressure indicates **Tehran's decisions are guided by a cost-benefit approach rather than a rush to a weapon irrespective of the political, economic, and military costs.** This, in turn, suggests that some combination of threats of intensified international scrutiny and pressures, along with opportunities for Iran to achieve its security, prestige, and goals for regional influence in other ways, might—if perceived by Iran's leaders as credible—prompt Tehran to extend the current halt to its nuclear weapons program. It is difficult to specify what such a combination might be.

US Estimates - VI

- **NIE (December 2007 Continued):** We continue to assess with **low confidence that Iran probably has imported at least some weapons-usable fissile material**, but still judge with moderate-to-high confidence it has not obtained enough for a nuclear weapon. We cannot rule out that Iran has acquired from abroad—or will acquire in the future—a nuclear weapon or enough fissile material for a weapon. **Barring such acquisitions, if Iran wants to have nuclear weapons it would need to produce sufficient amounts of fissile material indigenously—which we judge with high confidence it has not yet done.**
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US Estimates - VII

- **NIE (December 2007 Continued):** We assess with moderate confidence that convincing the Iranian leadership to forgo the eventual development of nuclear weapons will be difficult given the linkage many within the leadership probably see between nuclear weapons development and Iran's key national security and foreign policy objectives, and given Iran's considerable effort from at least the late 1980s to 2003 to develop such weapons. **In our judgment, only an Iranian political decision to abandon a nuclear weapons objective would plausibly keep Iran from eventually producing nuclear weapons—and such a decision is inherently reversible.**
- We assess with moderate confidence that Iran probably would use covert facilities— rather than its declared nuclear sites—for the production of highly enriched uranium for a weapon. A growing amount of intelligence indicates Iran was engaged in covert uranium conversion and uranium enrichment activity, but we judge that these efforts probably were halted in response to the fall 2003 halt, and that these efforts probably had not been restarted through at least mid-2007.
- We judge with high confidence that Iran will not be technically capable of producing and reprocessing enough plutonium for a weapon before about 2015.
- We assess with high confidence that Iran has the scientific, technical and industrial capacity eventually to produce nuclear weapons if it decides to do so.

El Baradei Statement on US 2007 NIE

IAEA - December 4, 2007

IAEA Director General Mohamed ElBaradei received with great interest the new U.S. National Intelligence Estimate about Iran's nuclear program which concludes that there has been no ongoing nuclear weapons program in Iran since the fall of 2003. He notes in particular that the Estimate tallies with the Agency's consistent statements over the last few years that, although Iran still needs to clarify some important aspects of its past and present nuclear activities, the Agency has no concrete evidence of an ongoing nuclear weapons program or undeclared nuclear facilities in Iran.

The Director General believes that this new assessment by the U.S. should help to defuse the current crisis. At the same time, it should prompt Iran to work actively with the IAEA to clarify specific aspects of its past and present nuclear program as outlined in the work plan and through the implementation of the additional protocol. This would allow the Agency to provide the required assurances regarding the nature of the program.

While calling on Iran to accelerate its cooperation with the Agency, in view of the new U.S. Estimate, the Director General urges all parties concerned to enter without delay into negotiations. Such negotiations are needed to build confidence about the future direction of Iran's nuclear program - concern about which has been repeatedly expressed by the Security Council. They are also needed to bring about a comprehensive and durable solution that would normalise the relationship between Iran and the international community.

Iranian Views on US 2007 NIE

- Foreign Minister Manouchehr Mottaki says: "It's natural that we welcome it when those countries who in the past have questions and ambiguities about this case ... now amend their views realistically. The condition of Iran's peaceful nuclear activities is becoming clear to the world."
- Alaeddin Boroujerdi, head of the Iranian parliament's foreign policy and national security committee a senior Iranian deputy, says. "This report will be another factor in line with strengthening the positions of these countries (Russia and China) and weakening the positions of the group who were pursuing... the issue of the third resolution... I believe that from the beginning American intelligence organizations knew Iran did not have deviations (from peaceful atomic aims)."

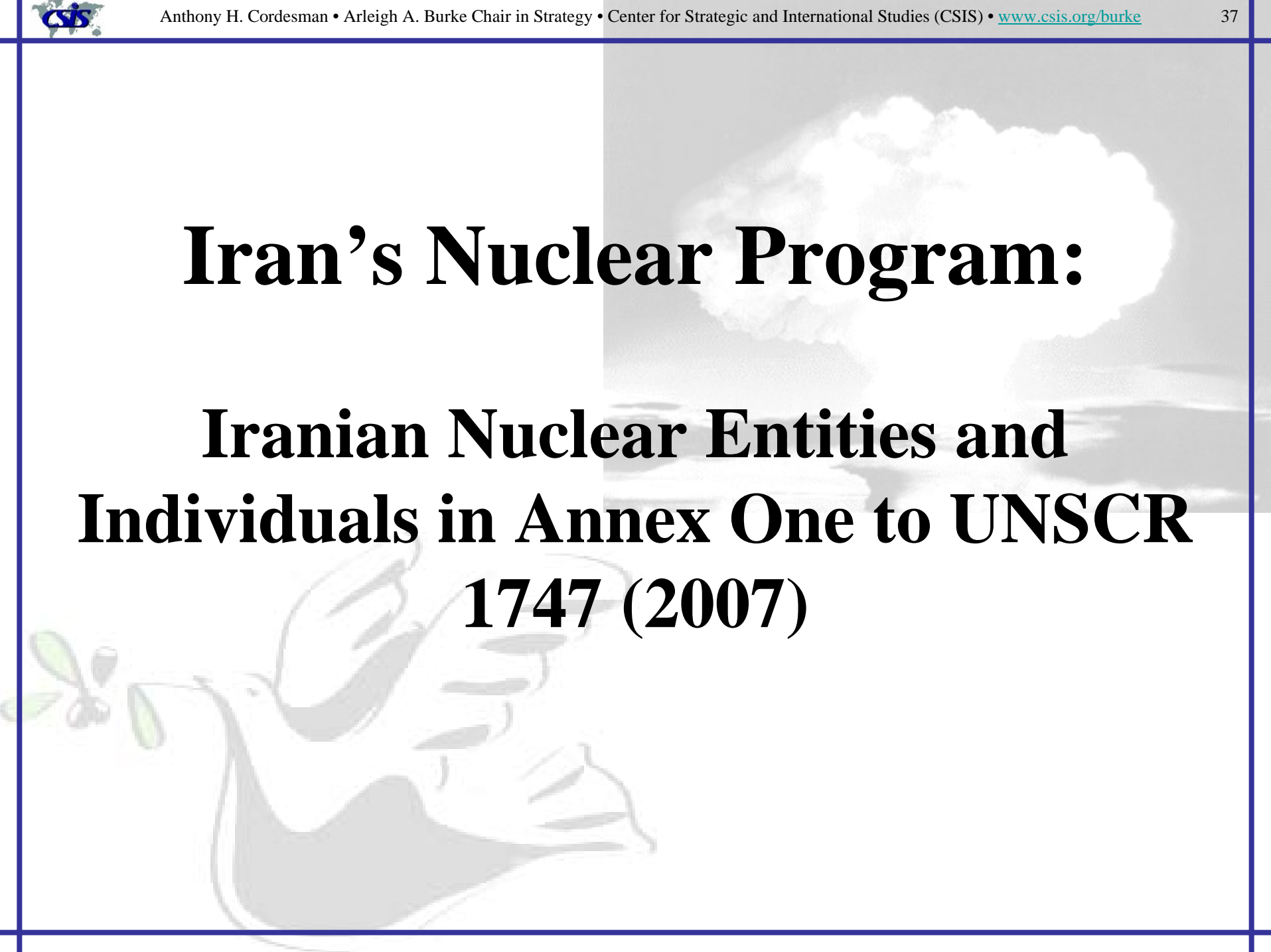
Reuters 4-12-2007

Israeli Views on US 2007 NIE

IAEA - December 4, 2007

- Israel says Iran had probably restarted its nuclear weapons programme and that a U.S. intelligence report saying the work was frozen in 2003 and remained on hold was incomplete.
- Israeli Defence Minister Ehud Barak says "It seems Iran in 2003 halted for a certain period of time its military nuclear programme but as far as we know it has probably since renewed it...We are talking about a specific track connected with their weapons building programme, to which the American (intelligence) connection, and maybe that of others, was severed.
- Barak says such intelligence reports are "made in an environment of uncertainty" and the assessment would not change Israel's position.

Reuters 4-12-2007



Iran's Nuclear Program:

Iranian Nuclear Entities and Individuals in Annex One to UNSCR 1747 (2007)

Designated Entities

Entities Involved in Nuclear or Ballistic Missile Activities

1. Ammunition and Metallurgy Industries Group (AMIG) (aka Ammunition Industries Group) (AMIG controls 7th of Tir, which is designated under resolution 1737 (2006) for its role in Iran's centrifuge programme. AMIG is in turn owned and controlled by the Defence Industries Organisation (DIO), which is designated under resolution 1737 (2006))
2. Esfahan Nuclear Fuel Research and Production Centre (NFRPC) and Esfahan Nuclear Technology Centre (ENTC) (Parts of the Atomic Energy Organisation of Iran's (AEOI) Nuclear Fuel Production and Procurement Company, which is involved in enrichment-related activities. AEOI is designated under resolution 1737 (2006))
3. Kavoshyar Company (Subsidiary company of AEOI, which has sought glass fibres, vacuum chamber furnaces and laboratory equipment for Iran's nuclear programme)
4. Parchin Chemical Industries (Branch of DIO, which produces ammunition, explosives, as well as solid propellants for rockets and missiles)
5. Karaj Nuclear Research Centre (Part of AEOI's research division)
6. Novin Energy Company (aka Pars Novin) (Operates within AEOI and has transferred funds on behalf of AEOI to entities associated with Iran's nuclear programme)
7. Cruise Missile Industry Group (aka Naval Defence Missile Industry Group) (Production and development of cruise missiles. Responsible for naval missiles including cruise missiles)
8. Bank Sepah and Bank Sepah International (Bank Sepah provides support for the Aerospace Industries Organisation (AIO) and subordinates, including Shahid Hemmat Industrial Group (SHIG) and Shahid Bagheri Industrial Group (SBIG), both of which were designated under resolution 1737 (2006))
9. Sanam Industrial Group (subordinate to AIO, which has purchased equipment on AIO's behalf for the missile programme)
10. Ya Mahdi Industries Group (subordinate to AIO, which is involved in international purchases of missile equipment)

Iranian Revolutionary Guard Corps entities

1. Qods Aeronautics Industries (Produces unmanned aerial vehicles (UAVs), parachutes, para-gliders, para-motors, etc. Iranian Revolutionary Guard Corps (IRGC) has boasted of using these products as part of its asymmetric warfare doctrine)
2. Pars Aviation Services Company (Maintains various aircraft including MI-171, used by IRGC Air Force)
3. Sho'a' Aviation (Produces micro-lights which IRGC has claimed it is using as part of its asymmetric warfare doctrine)

Designated Persons

Persons involved in nuclear or ballistic missile activities

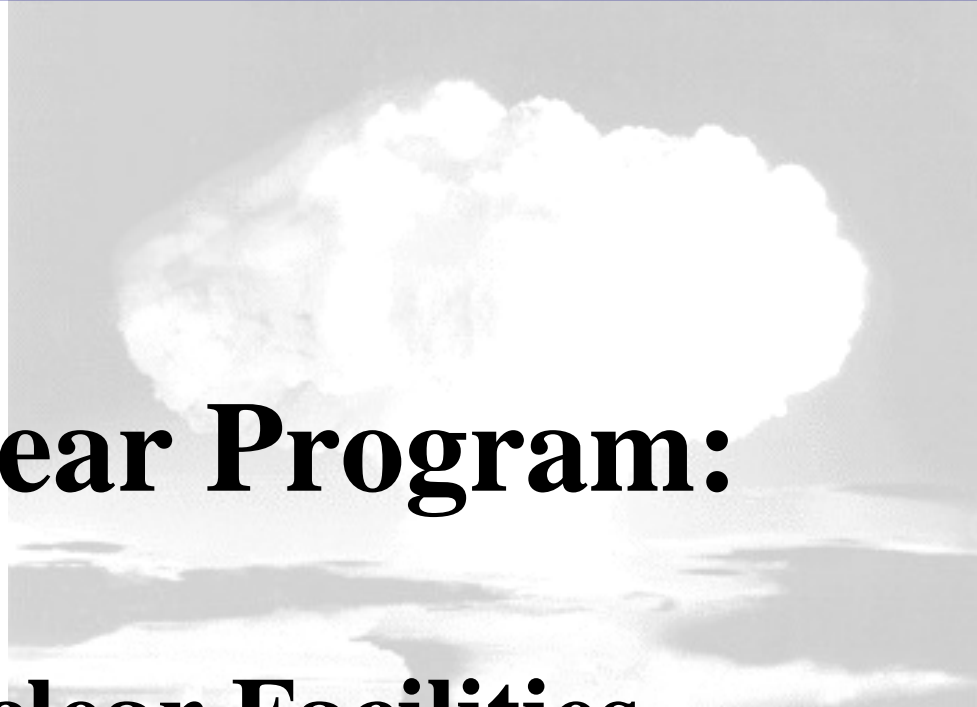
1. Fereidoun Abbasi-Davani (Senior Ministry of Defence and Armed Forces Logistics (MODAFL) scientist with links to the Institute of Applied Physics, working closely with Mohsen Fakhrizadeh-Mahabadi, designated below)
2. Mohsen Fakhrizadeh-Mahabadi (Senior MODAFL scientist and former head of the Physics Research Centre (PHRC). The IAEA have asked to interview him about the activities of the PHRC over the period he was head but Iran has refused)
3. Seyed Jaber Safdari (Manager of the Natanz Enrichment Facilities)
4. Amir Rahimi (Head of Esfahan Nuclear Fuel Research and Production Center, which is part of the AEOI's Nuclear Fuel Production and Procurement Company, which is involved in enrichment-related activities)
5. Mohsen Hojati (Head of Fajr Industrial Group, which is designated under resolution 1737 (2006) for its role in the ballistic missile programme)
6. Mehrdada Akhlaghi Ketabachi (Head of SBIG, which is designated under resolution 1737 (2006) for its role in the ballistic missile programme)
7. Naser Maleki (Head of SHIG, which is designated under resolution 1737 (2006) for its role in Iran's ballistic missile programme. Naser Maleki is also a MODAFL official overseeing work on the Shahab-3 ballistic missile programme. The Shahab-3 is Iran's long range ballistic missile currently in service)
8. Ahmad Derakhshandeh (Chairman and Managing Director of Bank Sepah, which provides support for the AIO and subordinates, including SHIG and SBIG, both of which were designated under resolution 1737 (2006))

Iranian Revolutionary Guard Corps key persons

1. Brigadier General Morteza Rezaie (Deputy Commander of IRGC)
2. Vice Admiral Ali Akbar Ahmadian (Chief of IRGC Joint Staff.)
3. Brigadier General Mohammad Reza Zahedi (Commander of IRGC Ground Forces)
4. Rear Admiral Morteza Safari (Commander of IRGC Navy)
5. Brigadier General Mohammad Hejazi (Commander of Bassij resistance force)
6. Brigadier General Qasem Soleimani (Commander of Qods force)
7. General Zolqadr (IRGC officer, Deputy Interior Minister for Security Affairs)

Iran's Nuclear Program:

Iranian Nuclear Facilities



Key Areas of Uncertainty

- When centrifuge plants will be able to produce fissile material and at what rate.
- State of “passive” testing of key components and weapons assemblies using non-fissile material.
- Efforts in boosted and fusion weapons design.
- Criteria for reliability and safety.
- Intentions with heavy water reactor project.
- Remote and unknown site activity, including P-2 centrifuge design. State of weapons and warhead design.
- Plans for testing; progression from device to weapons.
- Force deployment plans once weapons are available.
- Dates for ability to test first device; first weapon, and deployable bombs and warheads: 2010-2015?

Nuclear Weapons Production Capacity

- **Estimates of Iranian Nuclear Capacity differ:**
 - The IAEA warned that Iran intended to “turn 37 tons of nearly raw uranium called yellowcake, into uranium hexafluoride.” Experts contend that this could be enough to create 5-6 atomic weapons.
 - Many assessments cite 25 kilograms of weapon-grade uranium (HEU containing more than 90 percent uranium 235) as the minimum amount necessary for a an implosion-type fission weapon of the type Iran is expected to build.
- As of November 2007, Iran was believed to have 3,000 centrifuges in place and enough components for up to 5,000 more centrifuges. The IAEA reported on November 15, 2007 that Iran had installed and fed uranium gas into nearly 3,000 centrifuges, and that Iran had finished installing eighteen 164-machine cascades at Natanz and that UF-6, or uranium gas, had been fed into all 18 cascades. It had announced plans for up to 54,000 centrifuges at Natanz,.
- No consensus on future capabilities of centrifuge “chains” or “cascades.” At present, are still in test phase with low enrichment and in blocks of 164 devices. ISIS estimates would require 3,000 fully operating centrifuges to obtain enough fissile material in 1- 1/2 years.
- Weapons design factors critical to such estimates

Key Nuclear Sites

- 18 known sites
- Two sites of particular concern: **Arak** and **Natanz**, that could be used to produce materials for nuclear weapons: Iran claims it needs a test facility of 3,000 centrifuges at Natanz; UF6 activity claimed to be permitted.
- The US is also concerned about the **Bushehr** reactor, which could provide Iran with enough plutonium each year for 30 weapons.
- **Isfahan** is where it is believed that Iran was successful in converting 37 tons (85 tons?) of uranium (yellowcake UF4) into gas in May 2005. It is believed that much yellowcake is enough to produce 5-6 atomic weapons.
- In September 2005, Iran solicited two tenders for new nuclear facilities.

300 miles
500 km

TURKEY

TURKMENISTAN

CASPIAN
SEA

Lashkar A'bad



Tehran

**Sites circled in red
unknown pre-mid 2002**

IRAQ



Arak



Isfahan



Natanz

IRAN





Saghand





Ardekan


MW Megawatts


 Uranium
processing facility

 Uranium mines

 Heavy-water facility

 Research reactors /
research facilities

 Uranium
enrichment facility

 Light-water reactor
(under construction)

KUWAIT



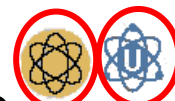
Bushehr

SAUDI
ARABIA

BAHRAIN

QATAR

Gachin



AFGHANISTAN

MIDDLE EAST

PAKISTAN

The Gulf

Gulf of Oman

Location	As of November 2007	Status
Tehran Nuclear Research Center (TNRC)	Tehran Research Reactor (TRR)	Operating
	Molybdenum, Iodine and Xenon Radioisotope Production Facility (MIX Facility)	Constructed, but not operating
	*Jabr Ibn Hayan Multipurpose Laboratories (JHL)	Operating
	*Waste Handling Facility (WHF)	Operating
Esfahan Nuclear Technology Center	Miniaturized Neutron Source Reactor (MNSR)	Operating
	Light Water Sub-Critical Reactor (LWSCR)	Operating
	Heavy Water Zero Power Reactor (HWZPR)	Operating
	FFL	Operating
	UCL	Closed down
	UCF	Hot testing/commissioning stage
	GSCR	Decommissioned
	*Fuel Manufacturing Plant (FMP)	In detailed design stage, construction to begin in 2004
	*Zirconium Production Plant (ZPP)	Under construction

Location	As of November 2007	Status
Natanz	*Pilot Fuel Enrichment Plant (PFEP)	Operational; currently suspended
	*Fuel Enrichment Plant (FEP)	Under construction; currently suspended
Karaj	*Radioactive Waste Storage	Partially operating
Lashkar Ab'ad	*Pilot Uranium Laser Enrichment Plant	Dismantled
Arak	*Iran Nuclear Research Reactor (IR-40)	In detailed design phase
	*Hot cell facility for production of radioisotopes	Declared as no longer being under consideration
	*Heavy Water Production Plant (HWPP)	Under construction
Anarak	*Waste storage site	Waste to be transferred to JHL
Tehran	*Kalaye Electric Company	Dismantled pilot enrichment facility; being converted to centrifuge enrichment R&D
Bushehr	Bushehr Nuclear Power Plant (BNPP)	Under construction, believed to be operational in early 2007

Isfahan Conversion Facility

- Can convert Uranium yellowcake into Uranium Hexafluoride (UF₆), Uranium Dioxide (UO₂), and Uranium metal. Operational in February 2006.
- Has converted Uranium Tetrafluoride (UF₄) into metal.
- Conducted P-2 centrifuge research and had advanced drawings. Found rotor cylinders. Supposed to transfer to Pars Trash Company in Tehran.

Arak Heavy-Water Reactor in Development in 2005

A Pictorial Illustration

(Note: Some estimates put capacity as designed to support production of 2-3 Pu-239)

Arak Heavy Water Facility

- Initially said producing for export.
- Announced 40 MW thermal heavy water reactor construction in 2004; complete in 2009.
- Deny has hot cells for Plutonium production. Found to have tested in Tehran.
- Could produce 8-10 kilograms of Pu-239 a year; enough for 1-2 weapons.

Arak 40 MWth Heavy Water Reactor

Foundation for reactor and containment structure

Foundation for reactor ventilation stack

Auxiliary building foundation (for Laboratory/Hot cells?)

DigitalGlobe Quickbird commercial satellite image

14 FEB 05

Arak 40 MWth Heavy Water Reactor

Foundation for reactor and containment structure

New excavation

Foundation for reactor ventilation stack

Auxiliary building foundation (for Laboratory/Hot cells?)

Natanz Gas Centrifuge in 2002 and 2004:

A Pictorial Illustration

(Note: Some estimates put capacity of full plant at one or more U-235 weapons per year)

Natanz Centrifuge Plant

- Pilot plant with six 164-centrifuge cascade lines and expansion to 1,000. 164-328 in operation or being placed.
- Commercial plant with three underground structures. Can house up to 50,000 P-1 centrifuges, enough for 380-520 kilograms of U-235 a year - 10-25 weapons.
- Module of 3,000 in construction underground. Earliest date is 2009. Could produce 1-3 weapons worth of HEU a year.
- P-2 centrifuge technology would give 5-7 times more output than P-1. State of the art is far higher than P-2.
- Iran told the IAEA that it intends to start the installation of the first 3,000 P1 centrifuges (first module) in the underground cascade halls at the PFEP in the fourth quarter of 2006.

Vehicle Entrance Ramp
(before burial)

Bunkered underground
production halls

Admin/engineering
office area

DigitalGlobe Quickbird commercial satellite image

20 SEP 02



Vehicle Entrance Ramp
(after burial)

Bunkered underground
Centrifuge cascade halls

Helicopter
pads

New security
wall

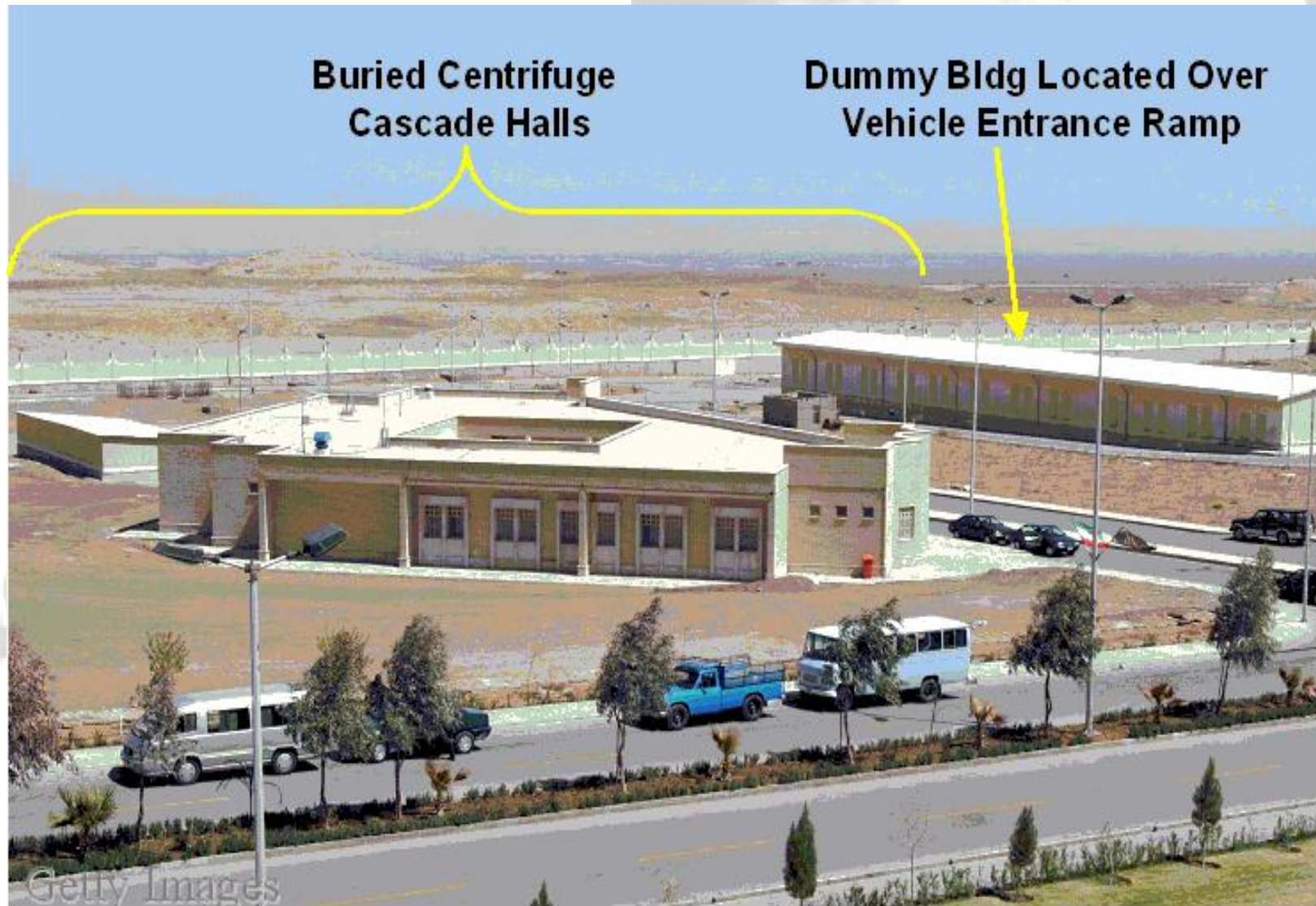
Dummy building
concealing tunnel
entrance ramp

Admin/engineering
office area

DigitalGlobe Quickbird commercial satellite image

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Effective Concealment



Iran's Nuclear Program:

Iranian Delivery Options

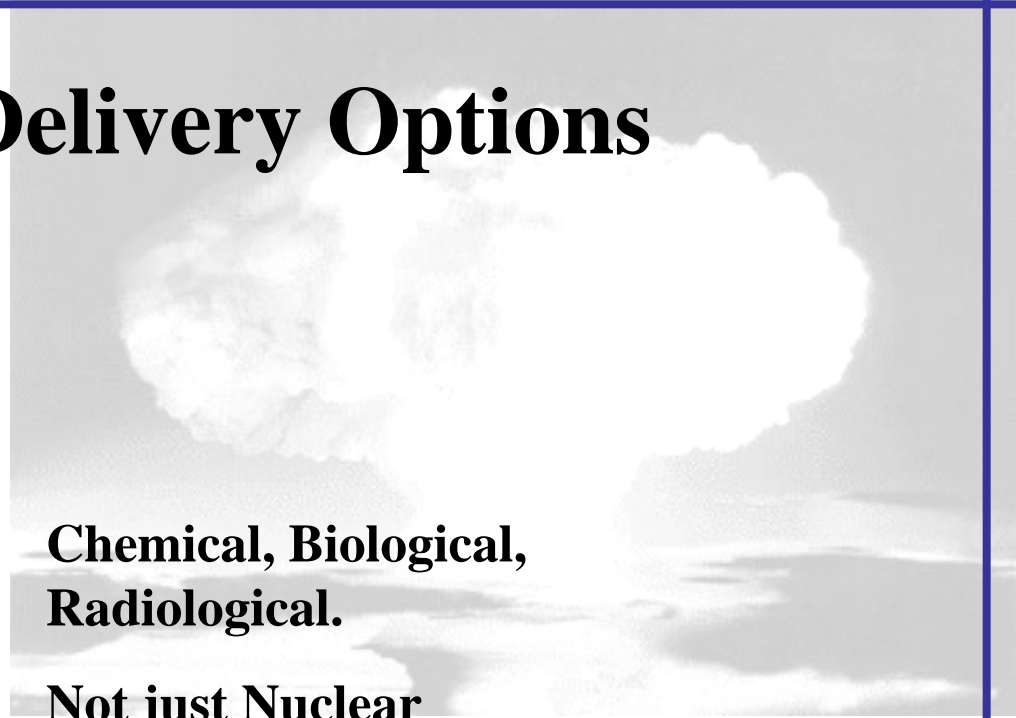
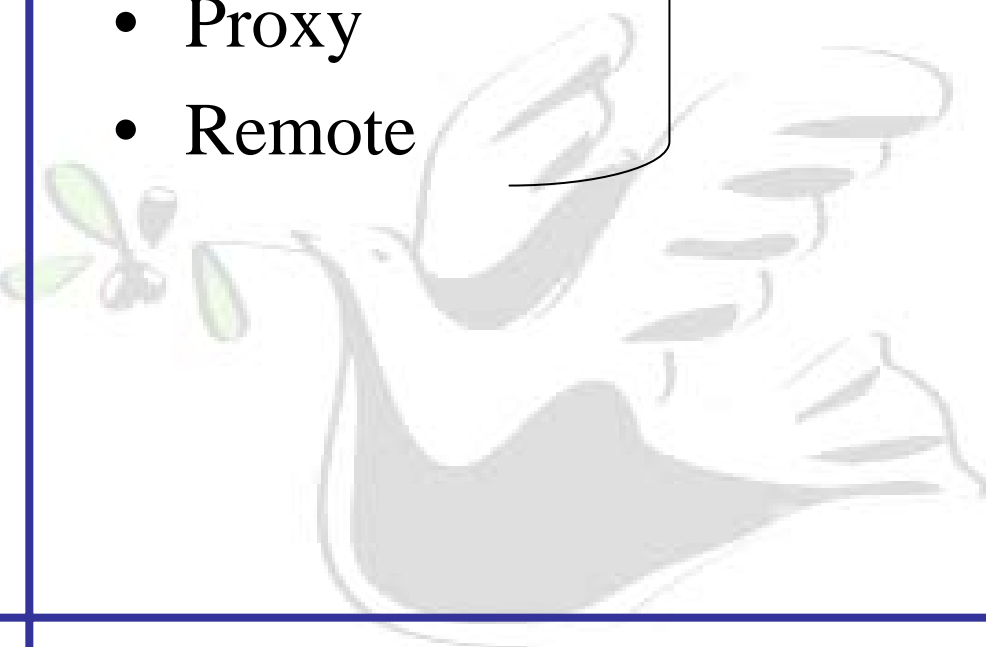


“No Rules” Delivery Options

- Missiles
- Air
- Covert
- Proxy
- Remote

**Chemical, Biological,
Radiological.**

Not just Nuclear



Iran's Current Delivery Assets

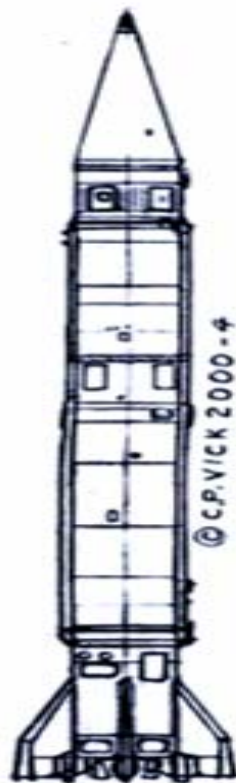
- **Scud B/C**: up to 18+ launchers, 300 missiles (IISS); 200 Scud B and 150 Scud C (CNS); distributed among three to four battalions, which form one Shahab brigade.
- **Shaheen-1/Shaheen-2**: (operational status unclear) **Su-24 MK**: 30 export versions in inventory
- **MiG-29 A/UB**: 25 export versions in inventory (for training)
- **F-4D**: 65 Phantoms in inventory
- **F-14**: 25 in inventory
- **R-27/SS-N-6**: A German intelligence report stated that Iran obtained BM-25 missiles from North Korea with an operational range of over 2,500 km. Given that BM-25 is the name for the Soviet Katyusha, an MRLS system, it has been assumed that the report referred to the SS-N-6 (Sawfly) missile.
- **Jury Rigged ASM or cruise**
 - Alleged procurement of AS-15 Kent with 3,000 km range and 410 kg payload

Iranian Missile Program

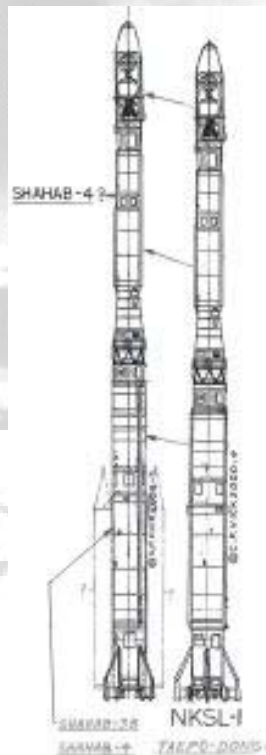
Shahab-3



No Dong



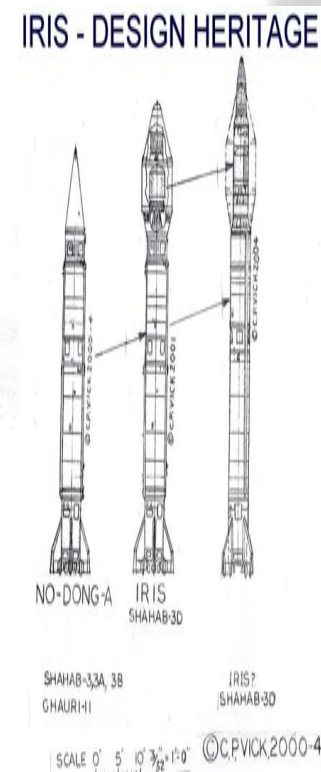
Shahab-4



Variant

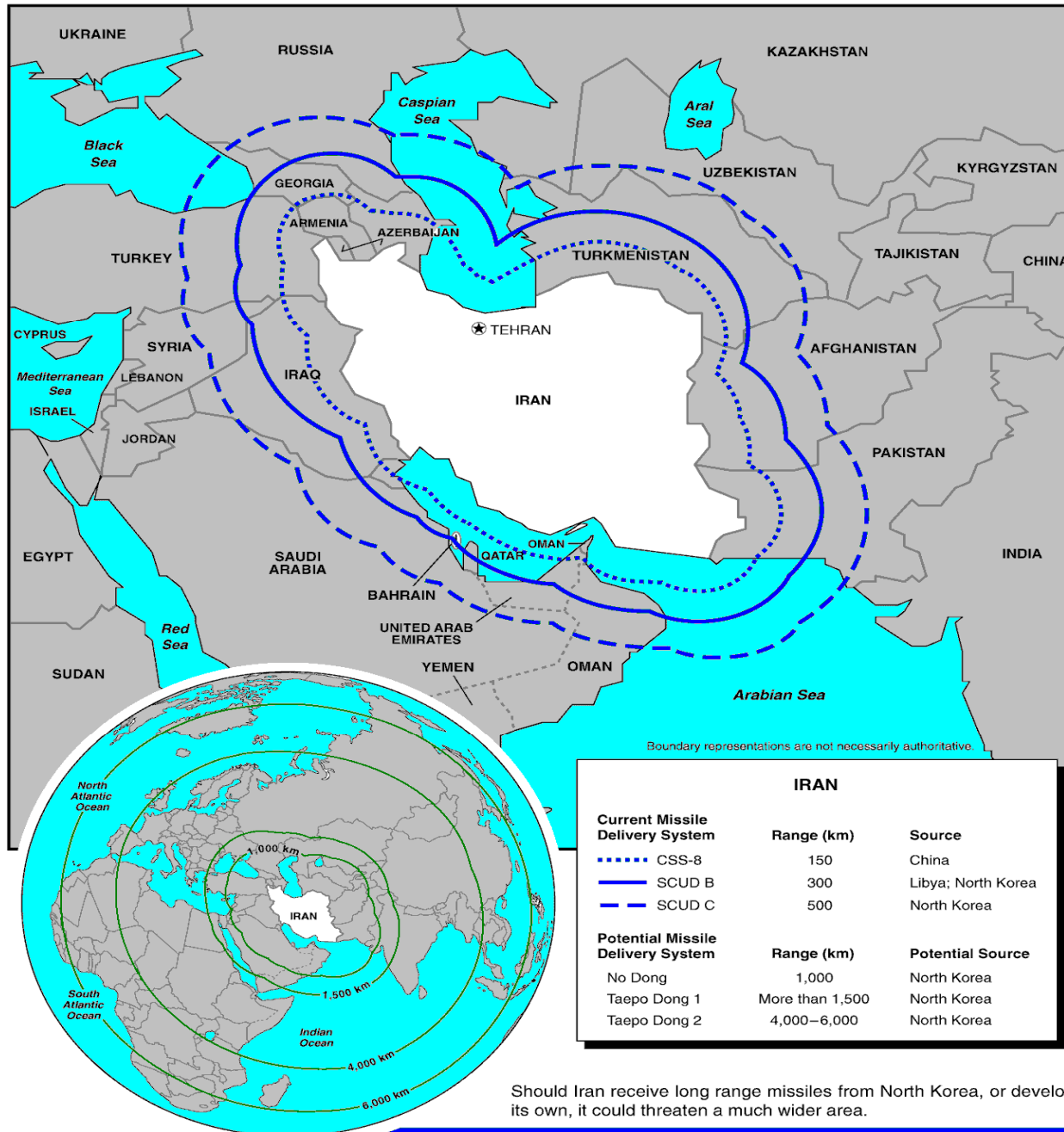


IRIS



<u>Range</u>	1,300	1,300	2,000	2,000	3,000
<u>Payload</u>	~1,000	700-1000	?	700	~1,000
<u>IOC</u>	2002	?	?	?	2005

Estimated Ranges of Current and Potential Iranian Ballistic Missiles



Should Iran receive long range missiles from North Korea, or develop its own, it could threaten a much wider area.

Stages of Development of Iran's Missiles

Designation	Stages	Progenitor Missiles	Propellant	Range (Km)	Payload (Kg)	IOC (Year)	Inventory
Mushak-120	1	CSS-8, SA-2	Solid	130	500	2001	?
Mushak-160	1	CSS-8, SA-2	Liquid	160	500	2002	?
Mushak-200	1	SA-2	Liquid	200	500	NA	0
Shahab-1	1	Soviet SSN-4, N Korean SCUD B	Liquid	300	987-1,000	1995	250-300
Shahab-2	1	Soviet SSN-4, N Korean SCUD C	Liquid	500	750-989	?	200-450 (these are very high estimates)
Shahab-3	1	N Korea Nodong-1	Liquid	1,300	760-1,158	2002	25-100
Shahab-4	2	N Korea Taep'o-dong-1	Liquid	3,000	1,040-1,500	NA	0
Ghadr 101	multi	Pakistan Shaheen-1	Solid	2,500	NA	NA	0
Ghadr 110	multi	Pakistan Shaheen-2	Solid	3,000	NA	NA	0
IRIS	1	China M-18	Solid	3,000	760-1,158	2005	NA
Kh-55	1	Soviet AS-15 Kent, Ukraine	jet engine	2,900-3,000	200kgt nuclear	2001	12
Shahab-5	3	N Korea Taep'o-dong-2	Liquid	5,500	390-1,000	NA	0
Shahab-6	3	N Korea Taep'o-dong-2	Liquid	10,000	270-1,220	NA	0

Source: Adapted from [Iran Special Weapons Guide](http://www.GlobalSecurity.org/wmd/world/iran/missile.htm), Global Security.org, available at: [http://www.Global Security.org/wmd/world/iran/missile.htm](http://www.GlobalSecurity.org/wmd/world/iran/missile.htm)

Shahab-1 and Shahab-2 SRBM

- Shahab 1 (Scud B) has a range of 285-330km/(700?) 950-1,110 kg warhead. Iran used extensively in Iran-Iraq War. May now have up to 15 North Korean TELs and 250-300 missiles.
- Shahab 2 (Scud C) has a range of 300-500-700km/750-800-989 kg warhead. Estimates range from 50-200 missiles.
- Their short range limits on their usefulness in a nuclear exchange.
- IISS estimates Iran has 12-18 launchers with 300-400 Shahab 1 and 2 missiles in 2007

Shahab-3 MRBM: Chronology I

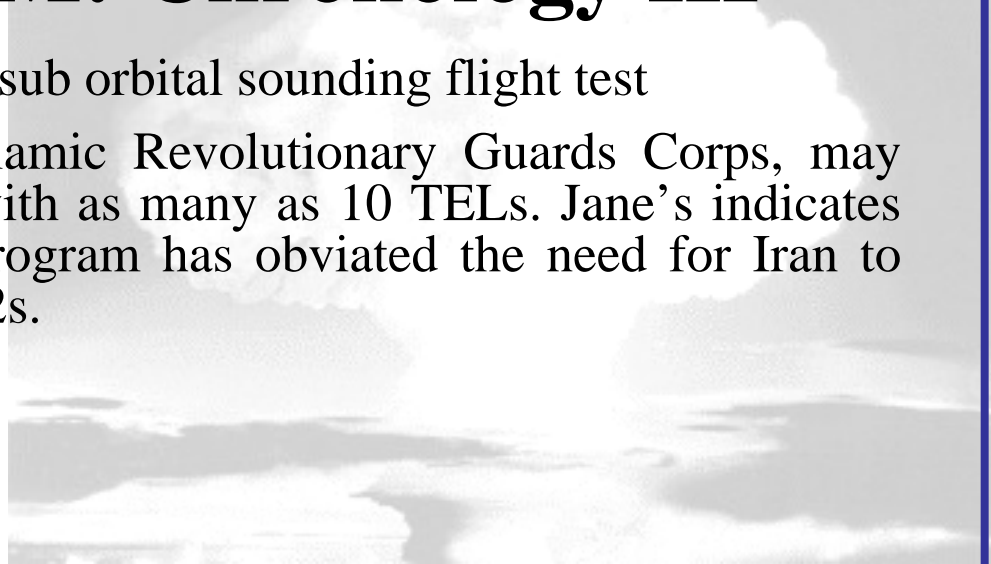
- **October 1997:** Russia began training Iranian engineers on missile production for the Shahab-3.
- **1998:** Iran began testing its own Shahab-3s. Problems with finding or making an advanced guidance system hindered many of their tests, however. Meanwhile, Iran begins experimenting with the Shahab-4.
- **July 23, 1998:** Iran launched its first test flight of the Shahab-3. The missile flew for approximately 100 seconds, after which time it was detonated. It is not known if it malfunctioned, or because the Iranians did not want to risk discovery.
- **July 15, 2000:** Iran had its first successful test of a Shahab-3.
- **Summer, 2001:** Iran began production of the Shahab-3.
- **July 7, 2003:** Iran completes final test of Shahab-3. The missile is seen in Iranian military parades and displayed openly.
- **October, 2003:** Iran claimed it was abandoning its Shahab-4 program, citing that the expected increase in range (2,200 to 3,000km) would cause too much global tension.
- **Late 2003:** Some sources indicated that Iran had begun only limited production of the Shahab-3.
- **August 11, 2004:** Reports Iran decreased the size of the Shahab-3 warhead to 700 kg with a possible range increase to 2,000 km. At this point, the modified Shahab-3 is often referred to as the Shahab-3M or Shahab 3ER.
- **October 2004:** Uncertain reports Shahab-3 tested to range of 2,000 kilometers

Shahab-3 MRBM: Chronology II

- **May 31, 2005:** Iran claimed that Iran successfully tested a new missile motor using solid-fuel technology with a range of 2000 km.
- **September 2005:** Two Shahab-3 missiles with triconic warheads were displayed at a parade. These missiles were believed to be new variants of the Shahab-3.
- **February 16, 2006:** Iran believed to have successfully completed four successful missile test launches this year, including one of a Shahab-3 and a Shahab-4 missile with ranges of 1,300 kilometers and 2,200 kilometers respectively.
- **April 7, 2006:** The *London Telegraph* reports that Iran has succeeded in adapting the nosecone of the Shahab-3 missile to deliver a nuclear weapon. Allegedly, a modified Shahab-3 could carry the Pakistani version of a nuclear warhead and it is rumored that Iran possesses this design.
- **November 23, 2006:** Iran reports fired Shahab-3 missiles for first time on November 3 in Great Prophet 2 air, land and sea exercise that extends across 14 provinces and covers Gulf and the Sea of Oman. Iranian state television says the Shahab missiles, carrying cluster warheads, with a range of 2,000 kilometers (1,200 miles), were fired from the desert near Qom." Senior IRGC commander stated that the missile had a CEP of a few meters. Shahab-2 missiles were also tested, along with Zolfaghar-73, Scud B, Fath-110 and Zelza missiles. (FAS)

Shahab-3 MRBM: Chronology III

- **February 25, 2007:** Shahab-3A, sub orbital sounding flight test
- **October 2007:** reports that Islamic Revolutionary Guards Corps, may have more than 30 Shahab 3s, with as many as 10 TELs. Jane's indicates development of the Shahab 3 program has obviated the need for Iran to acquire additional Shahab 1 and 2s.



Shahab-3 MRBM: Deployment claims

- **Jane's claimed on March 6, 2006 that Western intelligence services said the Islamic Revolutionary Guards Corps (IRGC), which controls Iran's ballistic missile forces, was ordered in January to change the location of its mobile Shahab 3 batteries every 24 hours as a precautionary measure.**
- **This was apparently done, for at least two weeks, with the batteries remaining within a 35 km radius, presumably to stay within range of their command-and-control centers.**
- **Units were said to be in Kermanshah and Hamadan provinces in the west of the country, with reserve batteries deployed in Fars and Isfahan provinces further east.**
- **Iran believed to have six operational Shahab 3 brigades, the first of which was established in July 2003.**
- **Mainly equipped with standard variants, but with others described as 'enhanced Shahab', with ranges of 1,300 km-1,500 km and 2,000 km respectively.**

Shahab (Meteor/Shooting Star)-3 Profile

- Shahab-3's range-payload, accuracy, and reliability are uncertain:
 - If the system used older guidance technology and warhead separation methods, its CEP could be anywhere from 1,000 to 4,000 meters.
 - If it uses newer technology, such as some of the most advanced Chinese technology (GPS/INS), it could have a CEP as low as 190-800 meters.
- Shahab-3/3M/3ER:
 - approximate range: 1,300, 1,350, 1,400, 1,500, 1,540, 1,600, 2,000km?
 - It carries a 700-750-989-1,158kg-1,200 kilogram warhead/payload?
 - Height of 13.4-15.9-16.5 meters, 1.32-1.58 meter diameter?
 - Launch weight: 19,022 kilograms?
 - Mass of 15,090 kilograms?
 - DW mass of 1,780-2,180-2,208 kilograms?
 - Propellant mass of 12,912 kilograms?

Shahab-3 Issues

- The **Shahab-3** requires launch support vehicles for propellant transport and loading and power besides its Transport Erector Launcher (TEL)
- **Shahab-3** reaction time uncertain. Some say slow to set up: several hours to prepare for launch. Allegedly, the missile requires a one hour-long exposure for refueling before launch.
- **Shahab-3** is in production, but:
 - The new “bottle neck” warhead made the **Shahab-3M** more accurate and capable of air-burst detonations. The smaller warhead also increased the range.
 - The Shahab-3 with the solid fuel source created yet another variant of the Shahab-3 series, the **Shahab-3D**, or **IRIS** missile.

Shahab-Follow On Developments

- Reportedly, Chinese technical assistance is required to advance Iran's solid-fueled missile production capabilities.
- New Shahab-3 with triconcic warheads will likely be the future means of delivery of choice.
- Allegedly, Iran has begun a program to fit a nuclear warhead on a Shahab-3 (project 111).
- Iran is believed to have developed a new TEL that can erect a fueled missile, thereby reducing the exposure time of the missile (see above).

Ghadr-1 (Power-1) or Shahab 3 ER?

- In September 2007 Iran presented what it claimed was a new medium-range ballistic missile (MRBM), dubbed Ghadr-1 (Power-1), with a declared range of 1,800 km.
- However, experts examining the footage of the 22 September parade in Tehran where the missile was being displayed said that it appeared identical to a previously shown Shahab 3 MRBM variant.
- The annual parade, which commemorates the anniversary of the beginning of Iran's 1980-88 war with Iraq, has been used to present weapons developed by Iran.
- The official announcer said that the new missile's range - 1,800 km - was "sufficient to put US bases in the Middle East and Israel within its reach" (Jane's).

Ashoura Missile November 27, 2007

- Iranian Minister of Defense, Defence Minister Mostafa Mohammad Najjar, tells the Fars News Agency says Iran has built a new missile able to hit targets 2,000 kilometres (1,200 miles) away.
- "The construction of the Ashoura missile, with the range of 2,000 km, is among the accomplishments of the Defence Ministry"
- The new missile is said to be called the Ashoura and matches the nominal range of the Shahab-3. Ashoura means "the tenth day" in Farsi, and is reference among Shiite Muslims to the martyrdom of the third Imam.
- The Minister does not say how the new missile differed from the Shahab-3. It may be solid-fueled.

Long-Range New Delivery Systems?

- **Shahab-4:**
 - Shahab-4 with a range of about 2,200 km (with 1,000 kg warhead) and could carry 3 atomic warheads?
 - Reportedly based on Soviet SS-4.
 - Perhaps successfully tested on January 28, 2006. Intelligence reports that examined the flight trajectory states that the missile may fly as far as 4,000km (see Jane's).
 - Announced on Iranian TV by a commander of the IRGC?
- **Shahab-5:**
 - Revealed at the Munich conference???
 - Intelligence services consider it possible that as early as *next year* Iran will test a Shahab-5.
 - Shahab-5 may have a range of from 3,000 to 5,000 km.
 - Believed to draw on Taep'o Dong -2 technology, but it remains unclear to what extent.
- **Shahab-6:**
 - 2/3-stage solid fuel missile with up to 6,000km range. Reportedly, this missile is virtually an improved Shahab-5.

Currently, there is no evidence or definition of a missile “above” the Shahab-3. The addition of numbers may be little more than backing up political rhetoric.

Other Missile Developments

- Some sources claim that Iran has begun a new missile development project (project *Koussar/Kowsar*) to develop an IRBM
- Teheran is suspected to have acquired a North Korean SLBM, which in return was reverse-engineered from a Russian SS-N-6.
- Some believe Iran seeks to transform this missile into a land-based IRBM. According to unconfirmed reports, Iran tested this missile in January 2006.

US Estimates of Iran's Missile Program

- **CIA (2004):** “Iran's ballistic missile inventory is among the largest in the Middle East and includes some 1,300-km-range Shahab-3 medium-range ballistic missiles (MRBMs) and a few hundred short-range ballistic missiles (SRBMs)-including the Shahab-1 (Scud-B), Shahab-2 (Scud C), and Tondar-69 (CSS-8) - as well as a variety of large unguided rockets. Already producing Scud SRBMs, Iran announced that it had begun production of the Shahab-3 MRBM and a new solid-propellant SRBM, the Fateh-110. In addition, Iran publicly acknowledged the development of follow-on versions of the Shahab-3. It originally said that another version, the Shahab-4, was a more capable ballistic missile than its predecessor but later characterized it as solely a space launch vehicle with no military applications. Iran is also pursuing longer-range ballistic missiles.”
- **DIA (2005):** “We judge Iran will have the technical capability to develop an ICBM by 2015. It is not clear whether Iran has decided to field such a missile. Iran continues to field 1300-km range Shahab III MRBMs capable of reaching Tel Aviv. Iranian officials have publicly claimed they are developing a new 2000-km-range variant of the Shahab III. Iranian engineers are also likely working to improve the accuracy of the country's SRBMs.”

Assessment of Iran's Delivery Systems

- **Missile Technology more advanced than its nuclear capabilities,**
 - May be too inaccurate to be used for conventional attacks,
 - Solid fuel options, reaction times, accuracy, reliability, warhead design are key uncertainties,
 - But, technology is getting more advanced by the day.
- **Seem to have cruise missile programs**
- **Substantial air delivery capability and UCAVs in development**

Iran's Nuclear Program:

Iranian Force Structure and Employment Options



Iran's Evolving Force Posture

- “Bomb in basement:” Threatened or real
- Conceal weapons: air, missile, or covert delivery armed only when necessary
- Test or testing, proven and evolving capability
- Deployed, armed missile and air capability
- Launched or working, launched under attack quick reaction alert, ride out.
- Countervalue (cities), counterforce (military), or both
- Proxy or cover delivery

The “Intangibles” of Iranian Force Development

- Weapon of deterrence and intimidation, how far can you go?
- Testing safety, reliability, size, height, fissile materials, type, yield
- Bomb and warhead capability
- Targeting doctrine, escalation: counter force, counter value, existential
- Accuracy and reliability vs. yield and target choice
- Effect prompt vs. delayed height of burst, thermal vs. blast vs. radiation
- Survivability
- C4I/BM: Plans vs. reality, damage assessment, situational awareness, perception of enemy

Iran's Nuclear Program:

Knowns, Unknowns, and Unknowables (?)



Ongoing Climate of Uncertainty

- No simple or reliable way to characterize Iran's ability to acquire nuclear weapons and the means to deliver them.
- El Baradei said: "We at the IAEA lack conclusive evidence. We have yet to see a *smoking gun* that would convict Tehran. I can make assumptions about intentions, but I cannot verify intentions, just facts,"
- Hard to discuss the case against Iran without raising questions about the mistakes the US and UK made in characterizing Iraq's efforts to acquire weapons of mass destruction. The US in particular, has problems in convincing the international community that Iran is a grave threat to global security.

What We Don't Know

- Iran's intentions regarding force size and character, strategy, political use, targeting, escalation, and war fighting.
- When Iran could get a nuclear weapon and rate of production.
- C4I/BM, safety, release and reliability issues.
- Test plans, if any.
- Capability of missile programs.
- Capability to go from basic fission to boosted and thermonuclear weapons.
- Status of biological warfare programs, if any.
- Current status of chemical weapons programs.

What We Do Know

- There are strong indications of an active Iranian interest in acquiring nuclear weapons since the time of the Shah, and that Khomeini revived such efforts after Iraq invaded Iran and began to use chemical weapons.
- The EU-3 and the US stated that Iran is actively pursuing nuclear weapons
- Iran's missile development problems only make sense if they are equipped with CBRN warheads.
- Analyses and estimates are cloaked with uncertainty
- There are no risk-free options: military, sanctions, do nothing

Iran's Nuclear Program: U.S. Strategic Options



World of Bad Choices

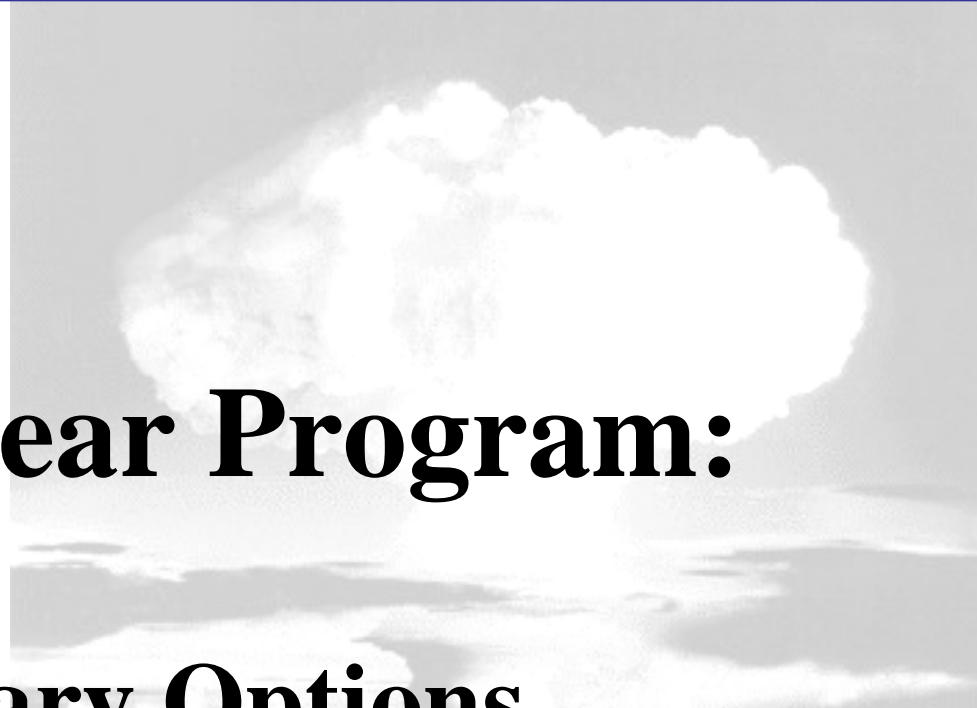
- No consensus for decisive allied or UN action regardless of Iranian actions.
- Iranian strategy of “diplomatic” attrition has limited risk to them, allows for political gains over time, and improves their bargaining position if they succeed
- Strikes on their facilities cannot be surgical; will not remove technology base. The resulting delay, however, may be significant.
- Technology in delivery systems, all areas of CBRN weapons advancing and becoming easier to conceal.
- But, open, successful deployment changes map of risk and military balance in the Gulf

US Strategic Options

- Play out negotiating options without accepting proliferation:
 - “Good cop, bad cop” and “arm wavers” help.
- Seek to lead allies to firmer action if Iran does not cave.
 - Overcome the legacy of Iraq
 - Prepare for bringing issue to the UN.
 - Consider backup-plan if UN action/sanctions do not work
- Improve intelligence, seek hard facts and “smoking guns.”
 - Same data needed for negotiating, arms control and targeting.
 - Look at missiles, chemical and biological weapons, not just nuclear.
- Restrict overt and covert acquisitions of Iranian weapons?.
- Preserve and improve military options.
- Develop missile defenses – extended deterrence.
- Support regime change/Iranian factions who are against a nuclear program
- Act through proxies

Iran's Nuclear Program:

US Military Options



Limited US Attacks

- 16-20 Cruise missiles and sorties
- 2-3 major facilities damaged or destroyed—but limited value assets
- Technology base survives; much of equipment
- Drive deep underground, better disperse, conceal, and compartment
- Deter and delay vs. mobilize and provoke
- International reaction

Major US Attacks

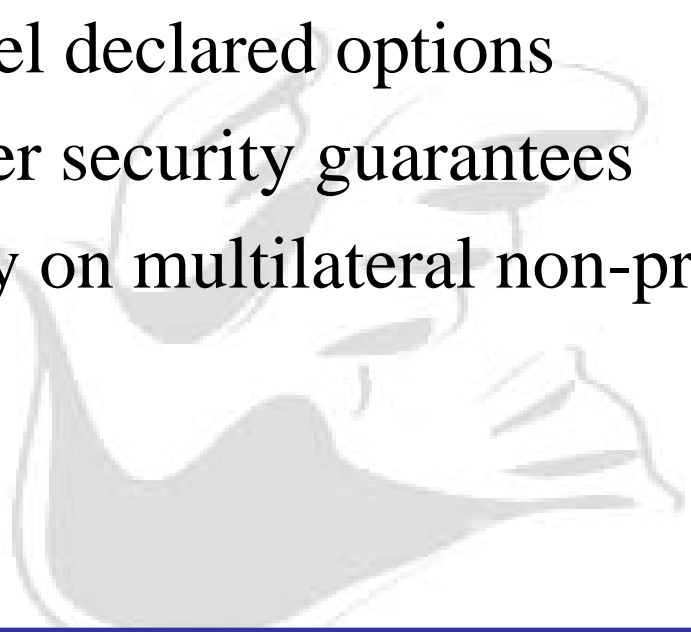
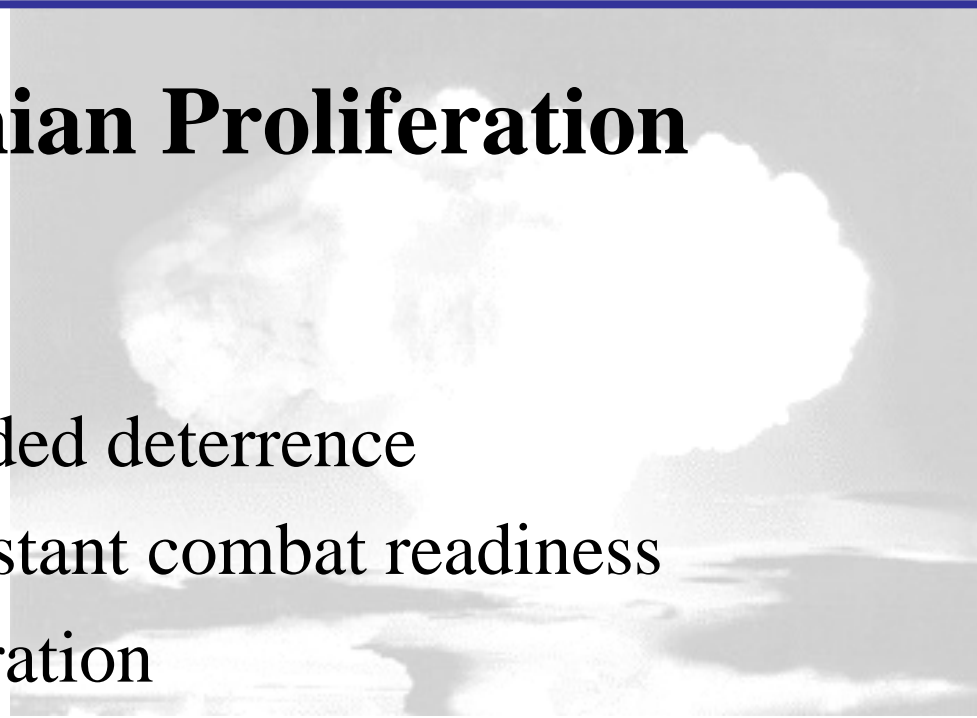
- 200-400 cruise missiles and sorties
 - Hit all suspect facilities for nuclear, missile, BW, and C4I/BM
 - Knock out SAMS, sensors, C4I/BM for future freedom of action
 - Restrike as necessary
- Technology base survives; some equipment
- Drive Deep underground, disperse and conceal
- May drive to biological weapons covert delivery
- Deter and delay vs. mobilize and provoke
- International reaction

Delay and Then (Re) Strike

- More chance of “smoking gun” and international consensus
- Iran must commit major resources, create high value targets
- More flexibility to broadening to hit hostage? targets: power, refineries, military industries, etc.
- Risk of unanticipated Iranian break out
- Dispersal and sheltering may be much better
- Allied and regional reactions?

Ride Out Iranian Proliferation

- Missile defenses
- US guarantees of extended deterrence
- Preemptive open at constant combat readiness
- Allied/Regional proliferation
- Israel declared options
- Offer security guarantees
- Rely on multilateral non-proliferation regime



Iran's Nuclear Program: Asymmetric Counterthreats



Iranian Possible Relation/Reaction?

- Retaliate against US forces in Iraq and Afghanistan covertly and/or overtly (Worst case: Shahab-3 missiles armed with CBR warheads)
- Use asymmetric capabilities to attacks US interests and forces in the region
- Attack US naval forces stationed in the Gulf with anti-ship missiles
- Attack Israel with missile attacks possibly with CBR warheads
- Escalate attacks by Hezbollah or Hamas against Israel
- Retaliate against energy targets in the Gulf and attack the flow of oil through Gulf and out of Strait of Hormuz
- Cut off Iranian oil to hurt the global and US economy
- Covert attacks against US or Israeli interests by its intelligence, Qods, and IRGC assets.

Iranian Asymmetric Capabilities

- **IRGC:**

- 125,000 strong (100,000 ground, 20,000 naval, 5,000 marines)
- Large intelligence and unconventional war capabilities
- 5000 men are assigned to unconventional warfare
- One Special Forces division
- Controls Iran's strategic missile force

- **Qods Forces:**

- Directly controlled by Khameni
- Assigned to deal with foreign proxies.
- Has directorates for Iraq; Lebanon, Palestine, and Jordan; Afghanistan, Pakistan, and India; Turkey, the Arabian Peninsula; the Asiatic republics of the FSU, Western Nations and North Africa
- “sections” in many Iranian embassies

The Iranian Counterthreat

- Hardened extremist nationalism
- Support of terrorists, use as proxies
- Destabilization of Iraq, Arab-Israeli Conflict, and Afghanistan
- Shift to biological, high risk concealed nuclear
 - LOW, LOA, proxy, false flag.
 - Concealed P-2 centrifuge and UF6 development, exploitation of Chinese Weapons Designs
- Threaten Gulf oil traffic with mines, subs, SSNs, IRGC Naval Branch.
- Conventional Resistance: 540,000 in forces, 1,600 tanks, 1,400 OAFUs, 3,000 arty, 3 subs, 59 surface ships, 311 combat aircraft, 245 major SAMs.
- Possible impact on global oil markets
- Promise to fight “never-ending” guerilla war if attacked