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Iran tested advanced nuclear warhead design – secret report

**Exclusive: Watchdog fears Tehran has key component to put bombs in
missiles**

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An Iranian long-range Shahab-3 missile being fired at an unspecified location. Photograph: Press TV/AFP/Getty Images

The UN's nuclear watchdog has asked Iran to explain evidence suggesting that Iranian scientists have experimented with an advanced nuclear warhead design, the Guardian has learned.

The very existence of the technology, known as a "two-point implosion" device, is officially secret in both the US and Britain, but according to previously unpublished documentation in a dossier compiled by the International Atomic Energy Agency (IAEA), Iranian scientists may have tested high-explosive components of the design. The development was today

described by nuclear experts as "breathtaking" and has added urgency to the effort to find a diplomatic solution to the Iranian nuclear crisis.

The sophisticated technology, once mastered, allows for the production of smaller and simpler warheads than older models. It reduces the diameter of a warhead and makes it easier to put a nuclear warhead on a missile.

Documentation referring to experiments testing a two-point detonation design are part of the evidence of nuclear weaponisation gathered by the IAEA and presented to Iran for its response.

The dossier, titled "Possible Military Dimensions of Iran's Nuclear Program", is drawn in part from reports submitted to it by western intelligence agencies.

The agency has in the past treated such reports with scepticism, particularly after the Iraq war. But its director general, Mohamed ElBaradei, has said the evidence of Iranian weaponisation "appears to have been derived from multiple sources over different periods of time, appears to be generally consistent, and is sufficiently comprehensive and detailed that it needs to be addressed by Iran".

Extracts from the dossier have been published previously, but it was not previously known that it included documentation on such an advanced warhead. "It is breathtaking that Iran could be working on this sort of material," said a European government adviser on nuclear issues.

James Acton, a British nuclear weapons expert at the Carnegie Endowment for International Peace, said: "It's remarkable that, before perfecting step one, they are going straight to step four or five ... To start with more sophisticated designs speaks of level of technical ambition that is surprising."

Another western specialist with extensive knowledge of the Iranian programme said: "It raises the question of who supplied this to them. Did AQ Khan [a Pakistani scientist who confessed in 2004 to running a nuclear smuggling ring] have access to this, or is it another player?"

The revelation of the documents comes at a time of growing tension. Tehran has so far rejected a deal that would remove most of its enriched uranium stockpile for a year and replace it with nuclear fuel rods which would be much harder to turn into weapons. The Iranian government has also balked at negotiations, which were due to begin last week, over its continued enrichment of uranium, in defiance of UN security council resolutions.

There are fears in Washington and London that if no deal is reached to at least temporarily defuse tensions by the end of December, Israel could set in motion plans to take military action aimed at setting back the Iranian programme by force, with incalculable consequences for the Middle East.

Iran has rejected most of the IAEA material on weaponisation as forgeries, but has admitted carrying out tests on multiple high-explosive detonations synchronised to within a microsecond. Tehran has told the agency that there is a civilian application for such tests, but has so far not provided any evidence for them.

Western weapons experts say there are no such civilian applications, but the use of coordinated detonations in nuclear warheads is well known. They compress the fissile core, or pit, of the warhead until it reaches critical mass.

A US national intelligence estimate two years ago said that Iran had explored nuclear warhead design for several years but had probably stopped in 2003. British, French and German officials have said they believe weaponisation continued after that date and may still be continuing.

In September, a German court found a German-Iranian businessman, Mohsen Vanaki, guilty of brokering the sale of dual-use equipment with possible applications in developing nuclear weapons. The equipment included specialised high-speed cameras, of the sort used to develop implosion devices, as well as radiation detectors. According to a report by the Institute for Science and International Security, the German foreign intelligence service, the Bundesnachrichtendienst, testified at the trial that there was evidence that Iran's weapons development was continuing.

The IAEA is seeking to find out what the scientists and the institutions involved in the experiments are doing now, but has so far not been given a response. The agency's repeated requests to interview Mohsen Fakhrizadeh, whose name features heavily in the IAEA's documentation and who is widely seen as the father of the Iranian nuclear programme, have been turned down.

The agency has also asked Iran to explain evidence that a Russian weapons expert helped Iranian technicians to master synchronised high-explosive detonations.

The first implosion devices, like the "Fat Man" bomb dropped on Nagasaki on 9 August 1945, used 32 high-explosive hexagons and pentagons arrayed around a plutonium core like the panels of a football. The IAEA has a five-page document describing experimentation on such a hemispherical array of explosives.

According to a diplomat familiar with the IAEA documentation, the evidence also points to experiments with a two-point detonation system that represents "a more elegant solution" to the challenges of making a nuclear warhead, but it is much harder to achieve. It is used in conjunction with a non-spherical pit, in the shape of a rugby ball, or explosives in that shape wrapped around a spherical pit, and it works by compressing the pit from both ends. The IAEA has expressed "serious concern" about Iran's failure to give an account of the research its scientists have carried out.

Descriptions of "two-point implosion" warheads designs have occasionally appeared in the public domain (there are extensive descriptions on Wikipedia) and they were first developed by US scientists in the 1950s, but it remains an offence for American officials or even non-governmental nuclear experts with security clearance to discuss them.