Journal of Slavic Military Studies, 22:87–96, 2009

ISSN: 1351-8046 print/1556-3006 online
DOI: 10.1080/13518040802697304

Routledge
Taylor & Francis Group

The Iranian Space Program and Russian Assistance

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Russian-Iranian satellite and missile cooperation has grown substantially over the past ten to fifteen years, and there are sufficient grounds to suggest that the scale of the two countries' collaboration in this field is much higher and more focused than many in the West are aware. At a time when both Moscow and Tehran are taking bolder measures to counter US and Western interests, growing trends of Russian support to Iran's satellite and missile program development can not be ignored. The following article correlates Russian direct and indirect assistance to the progressive development of Iran's satellite and missile program, addressing Iranian assets including the Mesbah, Sina-1, and Zohreh platforms as well as the Shahab-3,-4 and -5 missiles.

IRAN'S INITIAL STEP

On October 27, 2005, Iran launched a few 100-pound micro-satellites and became the new, 43rd member of the world space club. The satellites

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weren't particularly sophisticated, but Western military experts reacted somewhat nervously: "Is this an attempt to add another building block to Iran's nuclear program? Such technologies are able to launch a nuclear missile accurately and guide a warhead to its target."[1]

The micro-satellite launch drew significant attention from Western analysts who were concerned that Tehran was working diligently to build missiles powerful enough to launch satellites into space or, better yet, warheads between continents. Particularly, they claimed Iran was planning to use space technologies as a means by which the capabilities of the Shahab-3 ballistic missile system could be enhanced and upgraded to the new Shahab-4 ballistic missile. The Shahab-3 has a range of nearly 1,000 miles and was already on combat duty; the Shahab-4 is believed to have a range of approximately 1,250 miles.

It is noteworthy that the same type of micro-satellite had previously been launched by a Russian missile carrier from one of Moscow's military space bases. And it became known soon after this launch that the U.S. administration was going to "press Moscow to end the space assistance" to Iran. Specifically, the West already knew that Russia's well-known satellite producer, the Polyot (Flight) Company in the Siberian city of Omsk, had produced these satellites—called Sina-1 or Pars—that became Iran's first-ever platform launched into orbit. Russia received $15 million for the project. The satellite was initially test-launched by the Russian missile carrier "Kosmos-3" from the Plesetsk military space base in northern Russia's Arkhangelsk region.

In November 2005, Ahmad Talebzadeh, director of the Iranian Space Agency, claimed that Sina-1 was capable of collecting and relaying data from the earth's surface to spy on Israel. Other sources indicated that Sina-1 was equipped with an earth surveillance system with a resolution precision of 45 meters. Iranian officials also claimed that by 2010 Iran may have roughly a half-dozen satellites in orbit, including a large $132 million platform known as Zohreh, or Venus, and that these satellites could be made and launched by Russia. Another Iranian official said that "Sina-1 would help Iranian scientists better understand natural disasters such as floods and earthquakes and to observe agricultural trends". However, almost nobody in the West took this statement seriously.[2]

This article reviews key developments in Russian-Iranian satellite and missile cooperation over the past ten to fifteen years, and provides sufficient reason to suggest that the scale of the two countries' collaboration in this

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1 William J. Broad and David E. Sanger, 'Iran Joins the Space Club, but Why,' *New York Times*, 4 April 2006, <http://www.nytimes.com/2006>.

2 Ibid. See also: Space Security Index, *Misslethreat.com*, 5 April 2006, <www.missilethreat.com/>. See also: 'Russia's NPO PM to Manufacture Iranian Zohreh Communications Satellite,' *Novosti Kosmonavtiki* (Moscow), 1 March 2005, republished in *Open Source Center*, <https://www.open-source.gov/>. See also: Ali Akbar Dareni, 'Iran Trying to Bolster Its Space Program,' *The Associated Press*, 29 November 2005.

field is much higher and more focused than many in the West are aware. At a time when both Moscow and Tehran are taking bolder measures counter to US and Western interests, ongoing trends of Russian support to Iran's satellite and missile program development can not be ignored.

BACKGROUND

Tehran initially planned to build its own satellite. Iran's Telecom Research Center (ITRC or Sa Iran, a company affiliated with Iran's Defense Ministry) and the Iranian Organization of Science and Technology (IROST) began developing the 130-pound Mesbah micro-satellite in 1997 with the help of an Italian company, Carlo Gavazzi Space. The Iranian Institute of Applied Research was the primary constructor of Mesbah. On August 4, 2005, the day after Iran's radical President Mahmoud Ahmadinejad began his term, Tehran showcased the Mesbah satellite in an official ceremony.

Mesbah was scheduled to enter orbit in early 2006 onboard a Russian rocket. Once the Mesbah satellite was fully operational, personnel from ITRC/IROST planned to control it from a ground station in Tehran throughout its three-year lifespan. Mesbah would greatly expand Iran's understanding of space technology and create a solid base for further achievements in this area. However, it appeared—probably as soon as 2004—that the Mesbah project was troubled with multiple technical difficulties. As a result, the Iranian Institute of Applied Research requested Russian assistance, i.e., it ordered the micro-satellite Sina-1 with all of Iran's desired characteristics and functions. Moscow eagerly fulfilled the Iranian order and planned to launch the satellite in September 2005. However, according to Russian Space Troops chief spokesman Colonel Aleksei Kuznetsov, manufacturing delays in Sina-1 postponed the launch until October 2005.[3]

Following Iran's November 2005 satellite launch, Iranian and Russian officials gave several public statements that suggest further cooperation in the space arena and reveal possible Iranian objectives in this field. Ebrahim Mahmoudzadeh, Director of ITRC and Director General of Iran Electronic Industries, stated in April 2006 that plans were set to launch a second Iranian satellite in 2008. Specifically, Mahmoudzadeh claimed ITRC had reached agreement with the Iranian Space Agency to produce a satellite called Pars (Sina-2). Subsequently, Rajab Safarov, director of the Russian Center for Modern Iranian Studies, claimed that Iran intends to send a man

[3] Lee Kass, 'Iran's Space Program: The Next Genie in a Bottle?' *The Middle East Review of International Affairs*, 10 (6 September 2006) <http://meria.idc.ac.il/>.

into space and "will ask Russia for assistance in the very near future; and Russia is not opposed to the idea."[4]

At the end of June 2006, then-Russian Defense Minister Sergei Ivanov denied U.S. media reports that Iranian missile specialists were trained at Russia's Samara State Aerospace University on the Volga River. The reports had suggested that Iran's Revolutionary Guards Air Force officers had been sent to Samara State Aerospace University under the cover of a cultural delegation, but Ivanov—who was also a deputy prime minister—stated, "We checked this and confirmed this was a hoax. Peaceful cooperation with Iran in space research should not be politicized." Samara City is a major center for military and civilian space industry research, development, and manufacturing of satellite launch vehicles (SLV), satellites, manned spacecrafts, and their components.[5]

While the final conclusions of all these developments are yet to be determined, Sergei Ivanov's statements on this matter could be considered—mildly speaking—as a primitive disguise only.

NEW DEVELOPMENTS (FROM MID-2006)

By mid-2006, Iranian space tech specialists accumulated significant knowledge and experience from the above-mentioned Mesbah and Sina-1 projects. They were planning primarily to construct—undoubtedly with significant Russian assistance—an upgraded, more powerful variation of the Mesbah satellite. Iran wanted this upgraded spacecraft system to obtain pictures for a variety of civilian purposes, including data collection and distribution that would assist its efforts to find natural resources and accurately predict weather. In parallel, Iran intended for the new satellite to obtain remote sensing functions for military purposes. Moreover, Iran considered building an "indigenously developed" SLV for the Mesbah or other spacecraft, albeit with substantial contributions of Russian technology.

Iranian specialists considered Mesbah as a springboard to manufacture more sophisticated reconnaissance satellites. In particular, Tehran was extremely interested in obtaining a reliable early warning system against a potential Israeli attack on Iranian nuclear and other essential military targets. In Iran's view, two or three modern early-warning satellites could undermine Israel's efforts to achieve total surprise, as Iran would have more time to prepare its defenses and to transfer personnel and nuclear material to more secure locations.

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[4] 'Iran Plans Second Satellite,' *Iranian Official Information Agency-IRNA*, 10 April 2006, <http://regimechangeiniran.com/>. See also: 'Iran Asks Russia to Help Send . . .,' *Russian Information Agency-RIA Novosti* and *Iranian Official Information Agency-IRNA*, 11 April 2006, <regimechangeiniran.com/>.

[5] 'Ivanov Denies Reports on Iran,' *RIA Novosti*, 30 June 2006, <regimechangeiniran.com/>.

To meet this objective, Iranian technicians were developing, by mid-2006, two similar reconnaissance systems purely for military purposes. First, the Iranian Defense Ministry initiated a project aimed at manufacturing the Sepehr satellite. Second, Iran contracted with a Russian company, M.F. Reshetnev Scientific-Production Association of Applied Mechanics (NPO PM, in the Eastern Siberia town of Zheleznogorsk), to build the above-mentioned $132 million Zohreh (Venus) satellite. Zohreh was designed to provide Iranians with numerous services including television and radio broadcasts, internet, and e-mail access. NPO PM technicians planned to assist their Iranian counterparts in controlling the system during its utilization, thus increasing its functionality.

Once fully operational, the Sepehr and Zohreh spacecrafts would give the Iranian military the capability to rapidly distribute orders, tremendously upgrading its command and control of Iranian troops. Additionally, Sepehr and Zohreh would allow Tehran to closely monitor developments in Israel and neighboring Iraq, enhancing the country's ability to respond to perceived threats more efficiently.

It is possible to conclude that by mid-2006 the Iranian space sector was engaged in development of lightweight and inexpensive micro-satellites with comparatively highly technical capabilities. Some experts go as far as claiming that Tehran was even considering the development of an anti-satellite weapon within its micro-satellites program.[6]

By the end of 2006, Iran converted one of its most powerful ballistic missiles into a satellite launch vehicle (SLV). This 30-ton rocket could also be a wolf in sheep's skin for testing longer-range missile strike technologies. At the beginning of January 2007, Alaoddin Boroujerdi, the chairman of the Iranian parliament's National Security and Foreign Policy Commission, claimed that the new Iranian SLV "has recently been assembled and will lift off soon with an Iranian satellite."[7]

Tehran's next major development in the space technology industry came roughly one year later. On February 4, 2008, Tehran officially opened its first space research center. This center was inaugurated in the presence of President Ahmadinejad at the headquarters of Iran's Space Agency in Tehran, though the center itself is physically located in the northern Semnan province. This research center will be used to launch Iran's first home-produced satellite "Omid" (Hope), possibly as early as March 2009.

Coinciding with the opening of its space research center—literally the same day—Iran fired an SLV, Explorer-1 (Kavoshgar-1), designed to send the Omid satellite into orbit. Iran's state TV channel claimed, "Iran has joined the world's top 11 countries that possess space technology to build

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6 Kass, op. cit.

7 Craig Covault, 'Iran Set to Try Space Launch,' *Aviation Week & Space Technology*, 29 January 2007.

satellites and launch rockets into space." The rocket blasted off from a launch pad in the Semnan province's desert terrain.[8]

MOSCOW ASSISTS TEHRAN IN DEVELOPMENT OF IRBMS AND SLVS

While there are no doubts that Iran assembled the 30-ton Explorer-1 SLV at the end of 2006, the more significant question is whether Moscow had—or has—any involvement in it. More specifically, does Moscow help Tehran in the development of both SLVs as well as long-range Shahab series ballistic missiles? Insightful international observers are saying "yes."

As early as October 2000, John Lauder, Director of the DCI Non-Proliferation Center, shared the following [summarized and paraphrased] facts with the U.S. Senate Committee on Foreign Relations (*bold words emphasize future aerospace developments*):

> Iran, in 1998, three times tested the Shahab-3 ballistic missile with a 1,300 km range and may soon deploy it. Recently, Iran's Defense Minister announced the development of **Shahab-4, originally calling it a more capable ballistic missile, but later categorizing it as a space launch vehicle with no military applications**. . . . Tehran has also mentioned plans for Shahab-5, strongly suggesting that it intends to develop even a longer range ballistic missile in the near future . . . **Iran has displayed a mock-up satellite and space launch vehicle, suggesting it plans to develop an SLV to deliver Iranian satellites to orbit. However, Iran could convert an SLV into a ballistic missile by developing a re-entry vehicle**.
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> Tehran and Moscow aerospace entities have been cooperating since the mid-1980s. Iran is acquiring Russian technology which could significantly accelerate the pace of its ballistic missile development program. Assistance from Russia already helped Iran save years in Shahab-3 developments, and is also playing a crucial role in Iran's ability to develop more sophisticated and longer-range missiles (*i.e.; Shahab-4 and Shahab-5*) . . . Russian entities have helped the Iranian missile effort in areas such as training, testing and component development. These entities include Russia's **state-owned space-technology marketing agency Glavkosmos, the aerospace materials research institute NIIGrafit, guidance technology developer Polyus**, Moscow's Aviation Institute, and Baltic State Technical University.[9]

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[8] 'Iran Shows Off Space Drive, Irks US,' *Xinhua News Agency* via *IRNA*, 5 February 2008, <http://www.china.org.cn/>.

[9] 'Lauder Statement to Senate Committee on Foreign Relations,' *Central Intelligence Agency*, 5 October 2000, <http://www.cia.gov/>.

It is easy to see from Lauder's testimony that Moscow was assisting Tehran both in long-range ballistic missile technology and in space technology from 1998–2000. Moreover, further estimations by authoritative experts on this account emerged in 2001. Two of them [summarized and paraphrased] follow:

> Iranian president Khatami's visit to Russia on March 12–15 2001 resulted in expanded strategic cooperation in areas of weapon and nuclear and ballistic missiles technology. As a result, Tehran eventually may gain a nuclear-tipped ICBM. . . . Already before this trip, Moscow facilitated the sale to Tehran of technology that is used to manufacture Soviet-era SS-4 IRBM and helped Iran to develop its Shahab-3 ballistic missile with 1,200 km range. . . . Cooperation between Moscow and Tehran, including ballistic missile technology, increased after Putin became president of Russia in January 2000 and Moscow's renunciation of the 1995 Gore-Chernomyrdin agreement. Cooperation in long-range ballistic missiles area additionally intensified after Russian Defense Minister Igor Sergeev's visit to Iran in December 2000.[10]

> The Shahab-4 ballistic missile has a range of 2,200 km and 2,890 km. Russia definitely helps Iran in Shahab-4 development. Clearly, Shahab-4 utilizes missile airframes or engines of the Soviet SS-4 IRBM (Intermediate Range Ballistic Missile).[11]

Moscow used to deny such accusations. For example, after Iran test-fired the Shahab-3 missile on May 20, 2002, the U.S. raised concerns over Moscow's assistance to Tehran's nuclear missile program. However, Russian Foreign Minister Igor Ivanov rejected U.S. claims of Moscow's nuclear and missile assistance to Tehran as "groundless". Despite Russia's numerous official statements denying this assistance, Moscow media continued to include indications of Russian-Iranian cooperation in this field. For example, in October 2004, *Moscow News Daily* dared to claim that the "Iranian Shahab-3 missile and North Korean Nodong missile, from which Shahab-3 is partly derived, both employ Russian missile technology."[12]

For a long time, so-called "pacifiers," both in Moscow and in Washington, D.C., tried to prove that North Korea was the main foreign source of long-range ballistic missile technology for Iran, so that there would be no need to concentrate attention on Moscow's activity in this area. However,

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[10] Ariel Cohen and James A. Phillips, 'Countering Russian-Iranian Military Cooperation,' *The Heritage Foundation*, 5 April 2001, <http://www.heritage.org/>.

[11] 'Shahab-4,' *FAS*, 30 May 2008, <http://www.fas.org/>.

[12] Charles R. Smith, 'New Missiles in Iran and Pakistan Raise Fear of Nuclear War,' *Newsmax.com*, 29 May 2002, <http://archive.newsmax.com/>. See also: 'Shahab-3,' *Misslethreat.com*, 14 October 2008, <http://www.missilethreat.com/>.

mid-2005 analysis issued through the Axis Information and Analysis Center refutes such "constructions" [summarized and paraphrased]:

> In 1993, Tehran stopped manufacturing "Scud" missiles with a comparatively small radius, based on technology received from North Korea, and started the creation of its own "Shahab" ballistic missile with a much greater radius, the main components of which are based on Russian technology. The flow of missile technology from Moscow to Tehran intensified after the visit of Russian Defense Minister Igor Sergeev to Iran in December 2000. (In 2001–2005) Russia was the main partner in Iranian armed forces' modernization program. . . . The Shahab-3 missile, with a range of up to 1,500 km, reportedly entered batch production in May 2002. Shahab-4, with a range of 2,000–2,200 km, entered final testing in 2000. And in 2001 Iranian missile developers received the order for the Shahab-5 missile, with a much greater range.
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> There are multiple, official Western reports on full-scale Russian assistance in all stages of the Iranian missile program. Under U.S. pressure, Russia has promised more than once to minimize its involvement. Nevertheless, **Western and Israeli sources claim that such statements are just empty promises**. Participation of Moscow in the Iranian missile program poses the greatest threat not only to Israel, but to Russia's traditional geopolitical opponent - United States of America.[13]

It is possible to list at least a dozen similar reports issued between 2005 and 2007 (e.g., the one issued in August 2006, directly after the 2nd South Lebanon War, claiming "**Hundreds of Russian technicians also started helping the government of Iran to develop the Shahab-4 missile**, with a range of over 1,250 miles").[14] However, even without mentioning them in this assessment, it is sufficient simply to refer to the reaction of Western media and missile experts to Iran's aforementioned February 2008 Explorer-1 missile launch. The *British Daily Telegraph* reported just two days after this launch [summarized and paraphrased]:

> Explorer-1 is, evidently, the SLV version of new Iranian ballistic missile Shahab-4 with a range of at least 2,000 km, tested in November 2007. Most of the missile technology was received from Russia, while some parts are from North Korea. The Russian side facilitated a multi-million [dollar] technology transfer agreement between Iran and North Korea in 2003.

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[13] 'Russia and the Development of Iranian Missile Program,' *Axis Information and Analysis (AIA)*, 7 June 2005, <http://www.axisglobe.com/>.

[14] Ion Mihai Pacepa, 'Russian Footprints: What Does Moscow Have to Do with the Recent War in Lebanon?' *National Review Online*, 24 August 2006, <http://article.nationalreview.com/>.

> Russia has exported to Iran production facilities and operation instructions so the Shahab-4 missile and its SLV modification could be manufactured in Iran, as well as liquid propellant to fuel the rockets. Russian specialists have also been sent to Iran to help develop the Shahab-5 missile with a range of 3,500 km and payload of 1.2 ton.[15]

Other reliable sources confirmed these facts, emphasizing that "Moscow is the main source of missile and SLV technology for Iran" and gave some additional technical details.[16]

CONCLUSIONS

The chronology and references addressed in this paper suggest several possible, significant trends regarding Russian-Iranian cooperation. First, collaboration between these two countries in space technology and ballistic missiles began in 1992–93 and grew considerably more substantial in 2000–2001, after Putin became president of Russia and concentrated his efforts on creating technology partnerships that would challenge Western interests in the Middle East and elsewhere. Russian Defense Minister Sergeev's December 2000 visit to Iran marks a key juncture in the level of cooperation between the two countries. Moscow's assistance to Tehran in space technology and ballistic missile development appears to have multiplied between 2001 and 2005, and expanded yet again in 2006–2007.

Second, multiple reports suggest that the share of Russian contributions to Iran's space technology achievements between 2001 and 2008 could be quite high—perhaps 90% or more. Russia's share of contributions to Iran's achievements in long-range ballistic missiles may be nearly the same.

Third, Iran's primary effort to develop its space technology sector is likely intended for military purposes. This obviously includes its development of reconnaissance and military telecom satellites, the technology to upgrade long-range missiles such as the Shahab-3 class, and the development of the more powerful Shahab-4 and Shahab-5 missiles. Russian-Iranian cooperation in this field, indeed, could lead to effective development of an Iranian ICBM.

Fourth, one must infer from the level of Moscow's assistance to Tehran in space technology and missile program development that a considerable number or Russian specialists in this field have worked directly within Iran. According to well-informed sources in the Iranian opposition, by mid-2006, the quantity of Russian specialists in Iran surpassed 30,000. These specialists

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[15] Ariel Cohen, 'The Real World: Iran's Space Rocket Launch,' *The Heritage Foundation*, 9 February 2008, <http://www.heritage.org>.

[16] Found in archives under "mission launches," *Space.com*, February 2004, <http://www.space.com/>.

were engaged mostly in the development of military and double-use technology. Whether or not this number is accurate, there are solid grounds to consider that the quantity of Russian specialists in Iran increased further by mid-2008. It would seem plausible that, at a minimum, several hundreds of Russian specialists—including those in numerous research and development organizations within Russia itself—have been engaged throughout Iran's military space and ballistic missile development programs between 2006 and 2008. In parallel, the Russian side has upgraded dozens of Iranian military space technology and missile specialists during this process.