



Zuljanah: Iran's New Solid-Fuel Rocket

OE Watch Commentary: Iran's satellite launch program is of increasing policy concern in the United States and Europe because of the applicability toward ballistic missiles of the technology used to launch satellites. At issue is a legal loophole: Prior to the 2015 Joint Comprehensive Plan of Action (JCPOA), the United Nations viewed satellite launches through the lens of the nuclear program, but the Iran nuclear deal changed legal interpretation. Rather than ban rockets with the capability to carry nuclear warheads, Annex B of UN Security Council Resolution 2231, which enshrined the JCPOA into the UN system, "call[ed] upon Iran not to undertake any activity related to ballistic missiles designed to be capable of delivering nuclear weapons, including launches using such ballistic missile technology." The Iranian government has argued that it designs its rockets to carry satellites and not warheads and that therefore they are legal.



1 February 2021 launch of the Zuljanah three-stage "satellite carrier" from the Imam Khomeini Space Base in Semnan, Iran.

Source: Fars News Agency, https://media.farsnews.ir/Uploaded/Files/Images/1399/11/14/13991114000857_Test_PhotoN.jpg

The latest Iranian rocket test described in the excerpted article from the *Fars News Agency*, a service with close ties to the Islamic Revolutionary Guard Corps, may further raise concerns about the dual-purpose potential of Iran's rocket program. While previous Iranian rockets such as the Simorgh and Qiam were liquid fueled, the Iranian military described the Zuljanah rocket as solid fueled, at least in its first two stages. A shift to solid-fuel rockets would be significant for Iran because it allows for both easier fuel storage and more compact rockets. While multi-stage rockets are useful for launching satellites or other payloads into orbit as they enable the rocket to shed deadweight once the fuel is expended, the technology is also necessary for an intercontinental ballistic missile should Iranian authorities end their own self-imposed moratorium on developing missiles with a range of more than 2,000 kilometers (1250 miles).

At 84 feet, the Zuljanah is about one-quarter the size of the Saturn V, which was 363 feet tall, and slightly less than one-third the size of the SpaceX Heavy Falcon, which is 230 feet tall. The Zuljanah's 200-kilogram payload would be sufficient in theory for a nuclear warhead; the W80 low-to-intermediate yield nuclear warhead produced by the United States in the late 1970s weighs only 110 kilograms. It is not clear, however, that Iranian engineers could build such a compact warhead even if they wanted to.

While much of the policy concern about Iran's satellite launch ambitions may be theoretical, the biggest immediate concern should the Zuljanah be successful is the Iranian military's claim that it operates from mobile launchers. This will in turn raise suspicion about Iranian intentions, given that the mobility of launchers is not generally a concern when launching civilian satellites. **End OE Watch Commentary (Rubin)**

“The Zuljanah can be launched from a mobile launch pad”

Source: “‘Zuljanah’ Dastavarad-e Jadid Faza-ye Keshavar ba Qadratmandtarin Motor Sokht Jamid (‘Zuljanah’ the Country’s Newest Space Achievement Equipped with the Most Powerful Solid Fuel Engine),” *Fars News Agency* (News agency with close ties to the Islamic Revolutionary Guard Corps), 2 February 2021. <https://www.farsnews.ir/news/13991114000994>

Zuljanah, a three-stage solid fuel satellite, is the latest space achievement of the country in the field of indigenous satellites. The Space Group of the Ministry of Defense and Armed Forces Logistics announced news of its launch from Imam Khomeini Space Base in Semnan yesterday. The Zuljanah was first mentioned in February 2020, and after the unsuccessful launch of the Zafar satellite by the Simorgh rocket, the minister of Defense announced the launch of this satellite carrier this year....

The Zuljanah is 25.5 meters long, weighs 52 tons, and has three stages. The first and second stages have 1.5 meter-diameter solid fuel engines with a capacity of 75 tons (expandable to 100 tons) and a third-stage liquid fuel engine. With a diameter of 1.25 meters, the engine of the third stage of this satellite is in fact the same as the engine of the second stage of the Safir rocket.

The Zuljanah uses solid fuel in its first and second stages, unlike the Safir, Simorgh and Ghased satellite launchers that use liquid fuel in their first stage.... The Zuljanah is able to carry 200 kilograms of cargo, which can place one or more satellites with a total weight of 200 kg into orbit up to 500 kilometers above earth. Another feature of Zuljanah is that it does not need a fixed base for launching and it can be launched from a mobile launch pad from anywhere in the country.