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Chapter 16

TM-3: A Joint Soviet-Syrian Space Mission*

M. A. Fares[†] and G. Edelby[‡]

In the year 1947, the Syrian Institute of Aeronautics came into existence as a part of the Syrian Air Force. This Institute has graduated thousands of highly qualified jet pilots; one of them was General Muhammad Ahmmad Fares the Syrian cosmonaut, Mission TM-3 the joint Soviet/Syrian Space mission to orbit in July 1987.

On July 22nd 1987, almost everybody in Syria stayed awake all night long engrossed in their TVs, watching the live transmission of one of the greatest events in the history of Syria, which was supposed to take place at the Baykonur Space Station. The Syrian people were very eager to see with their own eyes the lift off of a Soyuz rocket at the break of dawn as it roars with a blazing flame carrying on board three cosmonauts; one of them was a Syrian pilot, and his name was Mohammed Ahmad Fares.

This paper summarizes this joint Soviet/Syrian space mission from the Syrian space program perspective.

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The Selection

In 1985, there had been a selection of young air force pilots to undergo some delicate medical checkups. The reasons were unknown, but soon the pilots concluded as to what the purpose behind this was.

The medical committee had selected 10 pilots out of 40. A committee of Soviet specialists then came to Damascus, and they subjected the pilots to delicate and arduous check-ups. They then selected four out of the ten.

These four were sent to the Soviet Union for further checkups. Among them were two close friends, Mohammed Fares and Munir Habib.

Arriving in Moscow for the first time, the pilots were stung by the sturdy cold winds and wondered how they would be able to live there.

They were very happy to learn that the medical results were excellent for both of them, and they were then informed that only one of them was going to fly to space.

Two Syrian Cosmonauts

Born in Aleppo in May 1951 in an old city district near the citadel inhabited by simple people (most artisans), Mohammed Fares has two sisters and three brothers. He finished his secondary education and joined the Institute of Aeronautics, graduating with honors in 1971. Eventually becoming a lieutenant colonel, he became a close associate and a colleague with Munir Habib, who was living next door to him. After 1700 flight hours, M. Fares and M. Habib became professional pilots. M. Fares taught Aerodynamics while M. Habib taught aviation dynamics to the younger generation.

Munir Habib was born in September 1953 in Salamieh (a small mountainous village in Syria) and he is the eldest child in the family. He joined the Institute of Aeronautics and graduated in 1973 as a lieutenant colonel.

The two cosmonauts were given two apartments and their elder children were sent to the Arabic School in Moscow while the cosmonauts started learning Russian; then the theoretical lessons in a aerospace engineering commenced, in addition to training on some dedicated simulation apparatus in the Gagarin Center for Cosmonauts. Afterwards, he declared to the journalists: "I am a pilot and I used to believe that the pilot's profession is difficult. But now it seems to me that the astronaut's profession is even much more difficult; every day you have new arduous commissions. We started training making our bodies used to balance in weightlessness by means of rapid rotation vehicles. It was hard. Then by the centrifuge vehicle to train our bodies to re-orient themselves to conditions exceeding human limitations. Then we started to fly and achieve temporary microgravity in the airplane, then we have to pass the visual landing simulation."

At the end of November 1986, a press conference was held at the Russian Ministry of Exterior at which the two crews were announced:

The primary crew was composed of:

Alexander Viktorinko—Alexander Alexandrov—Mohammed Fares,

The secondary crew was composed of:

Anatoly Solivyov—Viktor Safinikh—Munir Habib

Now, it was time for the crewmembers to get used to each other and be as if they were a one-body crew.

The Road to Baykonur

The two crews arrived in Linsk and stayed at the cosmonaut hotel. And the next day each member planted a tree on the side of Cosmonaut Street, as was the tradition. A press conference was held before the flight; later Alexander Viktorinko, A. Alexandrov, and M. Fares sat in the nose cone after they had made some experimental tests and checked the comfortability of their sculptured seats.

Lift Off at Dawn

The prime crew stood up in their white space suits in front of General Shatalov, who inquired about their health and morale. And the secondary crew stood behind them. Minutes later, they hugged and bade good-bye. Separation was rather difficult, and time became scarce as the Syrian Governmental delegate arrived, presided by General Moustafa Tlass as a representative of President Hafez Assad, the President of the Syrian Arab Republic. General Tlass was Vice General Commander of the Army, the Vice Prime Minister, and the Minister of Defense, all at the same time. There was also a delegate from the "Inter-cosmos Assembly" presided by Kotolnikov, President of the Academic Assembly. Finally, there was a party of the Soviet Space Organization, and the crew and visitors exchanged greetings, promises and thanks. Then the crew took a bus and headed to the rocket. And at that time the crew commenced to count the third hundred of the names on the list of astronauts - cosmonauts. Afterwards, the visitors and journalists headed to the observation room to watch the count down and lift off.

An Orbit Of Peace

Every spaceflight is considered to be an experiment on its own, since man has not completely conquered outer space yet. And the Soviet-Syrian Space-

flight was no exception as Viktorinko, Alexandrov, and Fares were assigned to test a brand new model of space transport vehicle: the "Soyuz TM-3" designed as a three seat model with its special properties. The cosmonauts were trained to work on this space vehicle in the Stars City; during this period M. Fares was subjected to tests and exams that exceeded in number the ones he had been through in all his life. Now in space, he had one special responsibility: he was held responsible for the TV and the wireless communication. He also monitored the life sustaining systems on both the isolated space vehicles. On board Mir, on the other hand, Romaninco and Laviken had not seen the lift off but were sure that everything was on schedule. The Soyuz rocket had to carry the space ship to L.E.O. within two parameters of distance from earth, which are 236 down to 199 kms. This compared with the Mir space station's parameters, which are 365 down to 325 kms. And the crew had to elevate their space vehicle in two days to Mir's orbit by means of the orbital engine so that they could dock with the space station. The TM-3 is distinguished from previous space vehicles by being provided with a new apparatus for maneuvering and docking called "Corse." This was necessary because with previous dockings extra efforts were needed to achieve the required special position in between Mir and the space vehicle, and this had consumed some extra fuel. Since the space station now is composed of a forty-ton "Mir," "Quant" and "Soyuz TM-2," changing its position is not that easy. Therefore, "Corse" will allow docking to take place with the Soyuz TM-3 playing the active role and the space station staying comparatively motionless. Everything would be automatic and the cosmonauts would be much like travelers. Even though they had to be fully prepared to take control in emergencies, the crew was thus provided with extra time to enjoy the beauty of space. After docking, the space station's mass had increased to 50 tons, it became 30 meters long, and the two crews became an international one.

The Syrian-Soviet Scientific Space Experiments

Palmyra

Named after the ancient Roman city built in the Syrian steppe, this experiment was carried out by M. Fares; it tackled the field of space technology, with the study of the geometric structure formation of substances in weightlessness as its purpose. It focused on a number of monocrystalline substances in cylindrical boxes supplied by compressors. He studied the closeness of these crystals and their growth. The materials studied were apatite water oxides and clay. Scientists through the ages have been searching for an alternative for bone and dental tissue. It should have the same properties of strength, being light and being as close as possible to the natural bone texture in order not to be rejected by the human body. Bearing in mind that apatite water oxide crystals do form the es-

sential substance in bone and teeth texture, the Palmyra experiment may be the first step towards the production of such a material in space.

The Euphrates Experiment

Named after the Euphrates River, the Euphrates experiment was carried out on Saturday, July 25th, 1987, and on this day there was a direct TV telecommunication with the President of Syria. He conveyed to the international crew Syrian regards and wishes, and wished them success in executing their programs.

The Euphrates experiment is a remote sensing experiment. It dealt with the issues of pollution above big cities and the western coastline. In addition, it studied plate tectonics in the Arabian plate by probing means from outer space. Moreover, It has taken some remote sensing pictures of Syria in search of natural resources and reservoirs. This will allow an improvement of irrigation systems according to planning, thus preventing desertification.

When asked about it in a press conference, M. Fares said the Euphrates experiment is his most interesting one "because it tackles some vital issues of concern to my homeland."

The Bosra Experiment

This experiment aimed to study the red line of atomic oxygen, which illuminates excessively during geomagnetic storms. The experiment used small cooling units which allowed space measuring apparatus to carry out the delicate measures while the space station was passing through the dark places of the orbit. Thanks to the electronic photosensitive apparatus used in the Bosra experiment, it lasted throughout the duration of the mission. It had specified the heat transfer of inert atoms in the upper atmospheric layers. Moreover, the experiment is considered a practical criterion to approve the theoretical and mathematical models for the influence of ultra-violet radiation on the protective Ionosphere.