

MIDEAST'S FIRST ROCKET REMEMBERED

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By Prof. Manoug Manougian, University of South Florida in Tampa, 25 May 2011 *This year is the 50th anniversary of **the first rocket launch in the Middle East**. Manoug Manougian, then instructor of mathematics and physics at the Haigazian College in Beirut, was the helmsman of the college's Science Club, which began to build the rockets in the early '60s. To commemorate the pioneering scientific event, Prof. Manougian, who now teaches at the University of South Florida in Tampa, wrote a brief history of the project. The anniversary has created excitement in various Middle Eastern countries. French/Lebanese film makers have produced a documentary celebrating the 50th anniversary of the Haigazian College Rocket Society (HCRS). This spring the HCRS participated, with the emphasis on the peaceful use of rockets, in the Sharjah Biennial Art Festival in Dubai. Articles about the Haigazian rockets have been published in the "New Scientist" magazine and "The Guardian" in the United Kingdom, as well as in the "Huffington Post." A Cedar 4 replica now stands at the entrance to Haigazian University. Below are Prof. Manougian's memoirs of the remarkable launch of the Cedar rockets.*

My passion for rocketry began at an early age--when I was at St. George's School in Jerusalem. My wooden desk was covered with carvings of rockets flying to the moon.

In the summer of 1959, in my third year at the University of Texas at Austin, I worked for a trucking company for Republic Steel in Cleveland. Soon after, the workers went on strike and I was left idle at the workshop. That's where I designed and built my first rocket ... without a propellant.

After graduating, the following year, from the university, I joined the faculty at Haigazian College as an instructor of mathematics and physics. I was also assigned as faculty advisor for the Science Club. This provided me with the opportunity to realize my dreams of rocketry. I renamed the Science Club and formed the Haigazian College Rocket Society (HCRS). Initially, the student members were Simon Aprahamian, Garabed Basmadjian, Hampartsum Karaguezian, Hrair Kelechian, and Michael Ladah. Others who joined were John Tilkian, Hrair Aintablian, Hriar Sahagian, Jirair Zenian and Jean Jack Guvlekjian.

The purpose of HCRS was two-fold: to teach my students the methods of science through the mathematics and physics of rocketry, and to encourage them to pursue careers in mathematics, engineering and science. I made it clear, at the outset, that the project was not for military purposes. Rather, it was to be a voyage in the science of rocketry. Members of the society met regularly where I discussed rocket design and the mathematics of flight.

The next step was to come up with a propellant. Because of the inherent dangers of propellants, our initial attempts were conducted away from the college, on a farm belonging to Hrair Kelechian's family. After a few mishaps, we perfected a propellant and launched a small 45-cm. rocket.

Excitement at Haigazian was contagious. In April 1961 we prepared a rocket that was 1.75-meters long. We invited the entire student body to witness the launch. We selected Kchag in the Ain Saade area for the launch. Although the rocket performed successfully, reaching an altitude of about 1,000 meters, the primitive launcher directed the rocket in the opposite direction from what we had

planned. This prompted the Lebanese government to control the launching sites. In May 1961, a second similar rocket was launched on Sannine. It soared about 2,300 meters.

It was not until July 1961 that Israel launched its first rocket. Thus, Haigazian College and Lebanon can rightfully claim to be the first to have launched a rocket in the Middle East.

I was very impressed by the hard work and devotion exhibited by members of the HCRS. Many other Haigazian College students also assisted us by mixing the ingredients of the propellant and attended the launchings.

Following the early launches, I decided to experiment with multi-stage rockets. We devised a system that would separate the first and second stages while in flight. In September 1961, under the supervision of Capt. Wehbe of the Lebanese army we successfully launched a two-stage, 2.85-meter rocket. Capt. Wehbe was present for security reasons. The rocket was named Cedar 2. The first stage had a 10-cm diameter, while the second had a 7.5-cm diameter. The rocket rose to a height of about 2,500 meters.



Left to right: Simon Aprahamian, Hrair Kelechian, President of Lebanon Fuad Chehab, Manoug Manougian, Hampartsum Karaguezian, Garabed Basmadjian

In August 1961, President Fuad Chehab of Lebanon invited members of the HCRS to meet him. The president congratulated us at an official reception. Later Lebanon issued a stamp to commemorate the Cedar launches. Deputy Emile Bustany was very supportive of our project while the government offered us financial assistance, as well as the army workshop to construct the rockets. We initially received 500 LL, followed by 25,000 LL for 1962 and 25,000 LL for 1963. This encouraged a group of prominent Lebanese to form the "Comite d'encouragement du Groupe Haigazian" to promote the activities of HCRS. The committee included Dr. Ibrahim Dagher, Dr. Bedros Aznavourian, Mme Issam Hussami, Mlle Huguette Kraichaty and Mme Marie-Paulette Karayan. Our experiments and the activities at the HCRS drew the attention of the Lebanese news media and beyond, including articles in the "News Review" of the U.S. Information Service and in a publication of the American Friends of the Middle East. I was interviewed on Lebanese television, as well as on Voice of America. Various embassies showed an interest in our activities, with visits from cultural attaches of the U.S. and the Soviet Union. I also met U.S. Ambassador Porter. Although I have no proof that foreign agents were monitoring us, on several occasions I noticed that my notes on my office desk were shuffled. By the middle of 1962 we were seeking new and more powerful propellants. One possibility was potassium perchlorate paste. However, because of its dangerous characteristics, I ruled it out and we did not pursue any experiments with it.

In the summer of 1962 I decided to return to the University of Texas to continue my graduate education. By then the HCRS had accomplished some major firsts. They included:

1. The Cedar 2 series (2-A, 2-B, and 2-C) proved that we had a viable and safe propellant
2. Our rocket design functioned well and the device for separation of stages in flight was perfected
3. Support by the college, the Lebanese government and the army (under the direction of Capt. Wehbe) proved to be very helpful. An area overlooking the Mediterranean in Dbayeh was assigned as our permanent launch site
4. As a result of national interest in the study of rocketry, the Lebanese Rocket Society (LRS) was formed. The supervising committee of the LRS consisted of M. Manougian, Dr. P. Mourad (AUB), L. Karamanougian, Capt. J. Sfeir, E. Kai and Capt. J. Wehbe.



Cedar 3 moments before launch

Before I departed for the U.S., Capt. Wehbe and HCRS planned the launch of three-stage rockets.

These produced Cedar 3 and Cedar 4. It was a cooperative effort between HCRS, LRS and the Lebanese Army. During my absence (1962 to 1964), Prof. Edward Hart of Haigazian was the faculty advisor of HCRS.

Cedar 3 was launched to celebrate Lebanese Independence Day in 1962. Cedar 4 was launched on Nov. 21 1963. Cedar 3 was launched to celebrate Lebanese Independence Day in 1962. Cedar 4 was launched on Nov. 21 1963.



Cedar 4 before launch

In 1964, after receiving my M.A. from the University of Texas, I returned to Haigazian. To my horror, I found out that a few weeks earlier a member of the HCRS (Hrair Keleshian) had tried to prepare a rocket with potassium perchlorate as propellant. The propellant ignited inflicting serious burns on Hrair. Another student (Hampar Karageuzian), who happened to be passing by, rescued Hrair, but in the process he too received severe burns. The two were taken to the AUB hospital. Fortunately, both recovered and continued as active members of the society. Upon my return in 1964 we organized a science exhibition which displayed our earlier launches, as well as our plans for the next two years. The exhibit was held at Haigazian College and was attended by the students and the general public. The program for 1964 to 1966 involved the construction of more powerful and reliable rockets to perform telecommunication experiments with Keles rockets in flight. We received propellants from France. The first step was to conduct static tests that were performed in Dbayeh. Static tests involve

holding a rocket in place without flight, ignite the propellant, and measure the characteristics of the propellant, the nozzle, and the metal used for the body of the rocket.

On Sept. 23, 1964, we launched Cedar 6. This was a 3-meter rocket equipped with solid propellant and electronic instruments in the nose cone. The electronic instruments were prepared by Capt. Joseph Sfeir to study telecommunication and the performance of the rocket. Cedar 6 flew to an altitude of 14 kilometers and had a range of about 40 kilometers.

On May 12, 1966, Cedar 7 was ready to be launched. This was a one-stage rocket with a payload of 20 kilograms designed to fly to an altitude of 70 kilometers, with a range of about 100 kilometers. It carried instruments to study rocket design, telemetry and recording. At ignition, Cedar 7 exploded on the ramp. We determined that there was a weakness in the seams of the body of the rocket. This had happened a few days before for the launch of American astronaut Eugene Cernan's planned walk in space.

A few days after the launch of Cedar 8, I returned to the University of Texas to complete my education for a doctorate in mathematics. I left firmly believing that Haigazian College had become a leader in higher education in the Middle East. Five decades later, I look back with excitement at a rare voyage of discovery and the realisation of a dream that Haigazian College, my students and Lebanon offered me.

A question that I am often asked is why did I form the Haigazian College Rocket Society? For a meaningful educational experience, a college has to offer cutting-edge research in various disciplines. One has to remember that in the latter part of the '50s and the '60s rocketry and space exploration had taken center stage in world affairs. The United States and the Soviet Union had locked horns for control of space. What better way to teach current issues and the interaction of mathematics and physics than rocketry and space exploration?

