"Middle East Space Race Gathers Pace"

International Defense Review, October 1995, Vol. 28

Gerald M. Steinberg

From the early 1960s and through the end of the Cold War, reconnaissance satellites played a central role in the strategic balance between the superpowers. Space was the "ultimate high ground," and the United States and Soviet Union used orbital platforms to count missiles, observe military movements, and monitor activities around weapons production plants. Tens of billions of dollars were spent on a wide range of space-based imaging systems and data interpretation.

As China became a major power, Beijing deployed its own reconnaissance satellites, and, more recently, France (in cooperation with Spain and Italy) has developed the SPOT and Helios space observation systems. (IDR, January 1995, p.28) The first Helios was launched in July of this year.

Until now, space-based reconnaissance systems have been confined to these four major powers. However, the Middle East is now on edge of a major space race, based on the Israeli indigenous space program, and Arab access to new high-resolution commercial satellites and services. As a result of these developments, reconnaissance satellites can be expected to play a major in the Middle East strategic balanced in the next decade.

The Israeli Space Effort

Israel has invested heavily in its space program, reflecting the general emphasis on advanced technology in the economy, as well as the importance of maintaining a qualitative edge to offset the Arab advantage in numbers of weapons and troops.

Israel's small size and vulnerability to surprise attack have resulted in a high priority for intelligence and early warning. From time to time, the IDF has reportedly received satellite images from the United States, but the resolution has been degraded, the coverage limited, and the images were not provided in real time. Since the two-front surprise attacks that began the 1973 Yom Kippur War, Israeli intelligence analysts have given high priority to developing an independent source of space-based intelligence. Former Chief of Staff Mordechai Gur (and current Deputy Minister of Defense) charged that immediately prior to the 1973 Yom Kippur War, the US withheld critical intelligence information, obtained by reconnaissance satellites, on Arab offensive military formations.

For Jerusalem, the events prior to and during the 1991 Gulf War demonstrated the failures of US intelligence with respect to the Iraqi missile and nuclear weapons program. Despite US assurances, Israel was subjected to six weeks of Scud attacks, while the American military failed to locate and destroy the Iraqi launchers. Israeli military and political leaders were particularly upset by Washington's refusal to provide real-time satellite images to the IDF, even "when the missiles were falling in Tel Aviv." After the war, Defense Minister Arens explicitly and publicly declared Israel's intention of launching an indigenous reconnaissance satellite.

The growing threat posed by the fundamentalist regime in Iran has provided an additional motivation behind the Israeli military space program. The IDF has placed a high priority on detailed monitoring of Iranian efforts to obtain chemical, biological, and nuclear weapons, as well as long-range delivery systems (aircraft and ballistic missiles).

At the same time, the peace process and the prospect of withdrawal from strategic lands, including the Golan Heights and the West Bank regions of Judea and Samaria has increased the premium on early warning and timely intelligence. The IDF relies on reserve forces to augment a relatively small standing army, and a large scale conventional attack mounted before the reserves could be mobilized would threaten Israeli survival. This situation places a premium on early warning and real-time intelligence.

Like other strategic technologies and weapons, the Israeli government provides little official information regarding space launchers and satellites. However, using available data and logical inferences, the outlines of the Israeli program can be discerned. The Shavit (Comet) launchers are apparently based on the Jericho ballistic missile. The Jericho I reportedly carries a payload of 500kg to a 500km range, and the more advanced Jericho-2 (in some sources, Jericho-2B or Jericho 3) is estimated to have a range of 1450 to 2800 km and a payload of 1000 kg. The first two solid rocket engines of the Shavit are manufactured by TAAS (formerly Israel Military Industries), and the third stage motor was designed and produced by Rafael (the national Arms Development Research Authority). Israeli Aircraft Industries is the prime contractor.

In 1988, Israel launched the Ofeq (Horizon) 1 test satellite, using the Shavit (Comet) launcher. The launch site is on the Mediterranean Coast near Palmachim. To avoid flying over Syria or other Arab countries, a highly unusual flight path was used which headed northwest over the Mediterranean, placing the satellite into a retrograde orbit at an inclination of 143(. The 156 kg satellite was reported to be a test vehicle designed to lead to the development of an orbital reconnaissance capability, and it reentered Earth's atmosphere in January 1989. Ofeq's orbit limited the satellite's view to areas 37(north and south of the equator. Ofeq 2 was similar in weight and technical

characteristics to Ofeq 1. It was launched in April 1990 and had an orbital lifetime of 3 months. Both were spin stabilized.

The Ofeq 3, launched on April 5 1995, weighed 225 Kg at launch, including a 36 kg payload. Its higher perigee (369km) and orbital maneuvering capability allows for a longer lifetime, estimated to be from 1 to 3 years. According to reports in the Israeli press, this version of the Shavit launcher included a small new IAI rocket engine with 674lb. of thrust. Its orbit will take it over sites in the Middle East, including Iraq, on most passes during the first months of operation. This version of Ofeq has small thrusters for three-axis stabilization and attitude control with an accuracy of 0.1 degree.

Ofeq 3 is primarily an imaging satellite, with ultraviolet and visible imaging sensors. As in the case of other strategic programs, the Israeli government and IAI (which is a government- owned firm under the Ministry of Defense) maintain a blackout of all technical details. While reports that this system could "read license plates in Baghdad" are clearly exaggerated, if, as has been suggested, Ofeq's technical capabilities are similar to those that had been planned for the South African Greensat (now canceled), this would provide a resolution of 1.8 meters.

A number of Israeli firms have been developing technology for orbital surveillance, including El-Op cameras, Elisra and Tadiran (communications systems), Rafael (thrusters), Elta (antennas), the Dimona nuclear center (vacuum chambers), IAI/Melam (solar cells), IAI/Tamam (gyros and magnetometer). It is not clear which of this technology is incorporated in Ofeq 3. For an operational system, Israel will need a number of reconnaissance satellites capable of monitoring various targets. In addition, a data analysis unit to interpret images will require a very large budget. The cost of such an operation is very high, and it is not clear that the Israeli government or military is willing to make this commitment. Much will depend on future threat perceptions and changes in the regional military balance. However, with the successful launching of Ofeq 3, the Israelis have demonstrated that they have the technical capability to develop a sophisticated military reconnaissance system.

High Resolution Dual-Use Satellites For the UAE and Saudi Arabia

In the Middle East, the interest in military space applications is not confined to Israel. Iraq tested a space launcher in 1989, and before the Gulf War, was negotiating with Brazil and other countries for joint development of reconnaissance satellites.

Other Arab countries are seeking to obtain space-based images from commercial systems. Egypt, Saudi Arabia, and a number of other states operate ground stations for the American LANDSAT and French SPOT imaging satellites. LANDSAT's

resolution is limited to 30 meters, and is generally considered to have no military applications. However, it should be noted that these resolutions are useful for detection and targeting of large areas, such as railroad yards, and coastal features.

Although officially civilian, SPOT (Satellite Pour l'Observation de la Terre) is a clearly a dual-use system. With a resolution of 10 meters, SPOT has been used for many national security-related purposes, such as monitoring the construction of a chemical warfare plant in Rabta, Libya, and the deployment of Chinese CSS2 missiles in Saudi Arabia. There are indications that Iraq and Iran used SPOT images during their eight-year war. SPOT has also been used to obtain information regarding the Dimona nuclear reactor complex in Israel, sites in Iran and Iraq, and for NATO air operations in the areas of Serbia and Bosnia. (IDR, January 1995, p.22) In a study involving the use of SPOT for observing military deployments in the Golan Heights, Jasani was able to identify anti-aircraft positions, barracks, perimeter fence locations, aircraft shelters, and other objects. (Jane's Intelligence Review, May 1993) SPOT images were embargoed during the 1990-1991 Gulf War, indicating that these images contained militarily useful information. These images were apparently supplied to Allied military commanders to supplement the images provide by the American military reconnaissance satellites.

As the technology for higher resolution imaging has become available, firms from a number of states have begun to develop new commercial satellites, and these are of increasing interest to the Middle East. The United States government has eased licensing limitations for high resolution commercial satellites, and a number of firms have begun to develop advanced systems with resolutions of 3 meters and below. In addition, France, Japan, and other states have announced plans to enter this market.

A number of states in the region are interested in obtaining access to these new satellite systems. In 1992, the United Arab Emirates (UAE) submitted an application to purchase an imaging satellite from Litton/Itek. Although the application was blocked by the US State Department (in part, in response to Israeli objections), the proposal was endorsed by of the space industry and its supporters in the US government.

More recently, Saudi Arabia has sought to become a major partner in the development of a high resolution commercial imaging satellite. A consortium of three American firms has designed the OrbView (originally called EYEGLASS) satellite for launch in 1997. According to Vipin Gupta, a researcher at the Livermore National Laboratory, this system will have a resolution of 1 meter, with potential coverage extending to an area of 14,400 kilometers. As a result, the Saudis and their customers would gain access to images similar to those provided by the most sophisticated and detailed American reconnaissance satellites.

In late 1994, a Saudi company known as EIRAD acquired a major interest in this venture, in return for exclusive rights to coverage in the Middle East. Although the objectives were unclear, this move was apparently designed to provide the Saudis with an independent source of intelligence, particularly with respect to activities in Iraq and Iran.

However, this development also alarmed the Israelis, who feared that access to high-resolution satellite images would give the Arab states access to intelligence information that would threaten Israeli security and vital interests. American defense officials were also concerned about the potential security implications resulting from Saudi control over this technology, and in March 1995, the US government decided to freeze the project during that period pending further study.

A number of additional commercial ventures are planning to offer high-resolution satellite imaging. According to Gupta, Earthwatch Inc. has announced plans to orbit a 3 meter system in 1996. In 1993, the WorldView Imaging Corporation received a license from the US Department of Commerce for the development of 3 meter resolution commercial imaging satellites, and two are currently under construction. Lockheed /Martin is developing the Space Imaging Satellite, with a planned resolution of 1 meter.

In addition, firms from other countries are also planning on launching high resolution commercial satellite systems. The French are developing an improved SPOT, and Japan is producing Alos, which will have a 2.5 meter resolution. The Middle East is clearly an important market in their business plans.

Implications of a Middle East Space Race

Reconnaissance satellites, like other intelligence technologies and systems, can be used for defensive purposes, to provide early warning and information regarding attacks, as well as offensively through target location and related information. The intelligence provided by such satellites can be stabilizing or destabilizing, depending on the circumstances. If intelligence strengthens early warning and crisis prevention or resolution, as well as anti-terrorist operations, it has a stabilizing effect. During the Cold Ear, orbital reconnaissance contributed to stable deterrence and the verification of arms control. However, if used by an aggressor for target location, damage assessment in the context of attacks, or determination of order of battle, this technology can also prove to be very destabilizing.

The acquisition of reconnaissance satellites by Israel or Saudi Arabia does not constitute a direct source of instability in the Middle East. Both countries are threatened by aggressive neighbors, and for both, additional intelligence and early

warning could contribute to regional stability. The Israeli system reinforces deterrence and helps to increase the credibility of that deterrence to distant potential threats, such as Iran and Libya.

The problems begin when the technology or the information is obtained by or transferred to other countries in the region. The Israeli government voiced strong objections to the application by the UAE, and, as noted above, to a major Saudi role and effective control in the Eyeglass project. They fear that the Saudis would make detailed imagery of Israel available to other Arab states, including Iraq and Syria, which would use this information for targeting and planning a first strike. (Saudi Arabia has provided financial and even token military support in previous Arab-Israeli wars.) There is also concern that the current Saudi regime could fall, and be replaced by a radical anti-Israeli government.

It will take many years until the impact of the increasing role of reconnaissance satellites, both dedicated, as in the case of Israel, and commercial dual-use systems, as in the case of OrbView, become clear. In the meantime, it is clear that a Middle East space race has begun, with high costs as well as stakes.