



## **Israel in Space**

Twenty Years of Exploration (1988-2008)

By Dr. Fred Ortenberg

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In 1983 the Israel Space Agency (ISA) was founded. It was headed by the late Prof. Yuval Ne'eman.

Despite the early successes of the Russian Sputnik and the American Explorer, the author proudly points out that Israel earned its seat in the space-club without any outside help, meaning Israel developed its launch capability, the Shavit rocket without any regress to existing rocket systems like the Americans and Russians did after WWII.

Driven by military demands the three stage, solid fuel Shavit-2 rocket was developed from 1982 onwards on Israel's own management from an existing sounding rocket for placing small payloads into low earth orbit. The rocket is manufactured by Israel Aircraft Industries (IAI)

The official date of Israel's accession to the Space Age was September 19, 1988 – the day on which its first satellite, OFEQ-1, was launched by means of the three-stage Shavit-2 rocket.

The book's scope covers the first 20 years of operations up to 2008.

The three basic legs on which Israel's scientific technological program stands, education, research and development, are now in place and working. Academic Institutions, Research Centers and Industry are all well established and functioning. The industrial basis with its major components Israel Aircraft Industry at its helm, Rafael and Elbit/ElOp lead the work. The Technion, Israel Institute of Technology, through the educational activities of its unique Faculty of Aerospace Engineering and its research activities under the leadership of the Asher Space Research Institute, provide the long-term capabilities of an ambitious space program.

Indeed, as Fred Ortenberg points out his book is the first comprehensive and concise overview of Israel's space program from the very beginning.

Israel's launch site at Palmachim, characterized by the constraint to launch to the west into a 143 retrograde orbit and its penalties for the payloads is described. Israel's control center at Yehud is mentioned although in some co-operations other external facilities are used, as well as direct transmissions to the users are facilitated.

We learn about Israel's Earth observing missions, the OFEQ satellite series and other reconnaissance and imaging satellites for military and public use, OFEQ improvements over the years and the follow-on satellites EROS-A/B/C, TECSAR and VENUS. The various co-operations with India, Russia and France are described in detail.

We learn about Israel's Communications and Technology satellites. in particular the AMOS communications satellites and various technological satellites: TECH-SAT, SLOSH, TAUVEX and INSA.

Each satellite is presented with a color image and is described with its characteristics and payload capabilities, operational status and failed launches.

A very concise summary is shown as a color-coded table presenting all the relevant information about launched, failed and planned satellites at a glance. The table stops with the year 2011. So, an update – or continuation of the table is announced by the author.

The second part of the book is dedicated to Israel's future goals, collaborations and market strategic aspects under the umbrella of Israel's distinctive national features.

A remarkable chapter, "Space Security Strategy" explains Israel's peculiar role and motivation for joining the space-club: In the 1981 formulation of tactical-technological requirements for the first Earth-observation mission the basic credo was that Israel's military goals in space are dictated by its immediate defense needs. In Israel's opinion, penetration of space and presence in it is a question of life and death for the State.

Referring to China's anti-satellite (A-Sat) rocket test with one of its own decommissioned Fengyun1C meteorological satellites and other occurrences of laser-blinding tests with satellites, Israel position and future goals, described in the book becomes clear.

In addition Israel's concern about kinetic-generated debris and the worldwide neglect of coming to terms to alleviate the overall debris situation is clearly pointed out.

Besides the above, long-term needs include facilities, in-orbit refueling, repairs, and replacement of specific systems for an extended service life. Accessible and effective methods and means should be considered against likely developments and threats 10, 20 and even 30 years ahead. Of course everything is depending on appropriate funding – which the author is noting, is always too low.

To conclude with a quotation of the author: "Accordingly, this book is not only an achievement review of Israel's astronautics, but also an attempt to foresee its future against the background of projects under way at present. Will the future "obey" the forecasts? No exact answer is now possible; everything will depend on the coming generation of specialists, and on the new ideas and concepts it will contribute."

As the book covers only the time period 1988 -2008 an update can be expected soon and Fred Ortenberg will answer part of his questions posed above.

I personally liked the book very much, because it opens new aspects of modern spaceflight, which as an European "astronautics insider" (ESA) I have never been concerned with before. Therefore I would strongly recommend this book to the space operations community – the author Fred Ortenberg, an insider himself really widens your horizon in the truest sense.

I also liked the picture concluding the last chapter of his book, because it is not only symbolic for Israel but for the whole astronautics community.



Space flower

*References:*

**Postscript/References:**

As the book was published over 10 years ago, I learned from the publisher that the book is no longer available in hardcopy, however as e-book or pdf-file.

Please try the following links, some allow free downloads.

In order to fill the gap between 2009 and 2021 the Editor of SpaceOps had the opportunity to conduct an e-mail interview with Dr. Fred Ortenberg – which is published as “Technical Articles” under “New Inside Articles” of this issue.

Links to the e-book:

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