Israeli Programmes in Space

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Information Revolution

First Wave
Second Wave
Third Wave
Agriculture
Industry
Information
Sword
Tank
Computer
First there was the Security Need

Then came the Gulf War (1991)
Revolution in Military Affairs

- Precision Strike
- Space Control
- Information Warfare
- Dominant Maneuver

System Of Systems

Precision Guided Munitions

GPS

Com- Sat

C4I
Targeting Intelligence

Sensors
All weather, real time

Intel & Warning
SATs

And than came Amos (Com)
An Exclusive Club

OFEQ-5 Satellite Launching
By SHAVIT Launcher
Small Is Beautiful

- Miniaturization as a necessity
- Small is cheap (~20K$/KG)
- Affordability and availability
- 200-300 Kg

Israeli – French Venus Mission
Multi Channel Sensor

- Electronics' enclosure: 260 x 290 x 420
- Sun shield: 220 mm past telescope opening
- Optical Module (OM): Ø345 mm x 460 mm
- Camera to Bus IF flexures
- Detectors' thermal IF
- Interface connectors

Coastal Zone Applications

- Chlorophyll indicates pollution
- Sediments originated from the Nile Delta
- Nile Delta, EGYPT, ISRAEL
Hall Thruster

- Israeli HALL Effect Plasma Thruster
  - Trajectory corrections
  - Orbit change
  - Drag compensation in low altitudes

A view of the TAUVEX mounted on GSAT-4
## Space SAR Payload

- An affordable space borne SAR satellite that operates day and night in all weather conditions.
- The payload is capable of multi-mode operation:
  - High Resolution.
  - Wide Coverage.
  - Electronic beam steering.

## Hyperspectral Sensor

Each pixel contains a continuous spectrum that is used to identify the materials present in the pixel.
Environmental Applications

- Fire Front Detection
- Urban Heat Island of Tel-Aviv
- Geology Mapping

Application: Global and local scales

- The Middle East during night time
- The Middle East during day time

- High Spatial Resolution Digital Image
- High Spectra Resolution Digital Image: Chlorophyll content in waste pond
Achievements

10 satellites were launched
8 in orbit currently

Coming Launches

Ground Stations
Future Trends

- 100Kg → 10 → 1Kg
- A host docking satellite with multiple cubesats no larger than 10 cm on any side able to place for instance a black swath of adhesive material over a satellite lens or solar array – then removed once the objective has been met.

ESCORT INSPECTION MICROSCATELLITE

Monitor space around a large satellite to detect attacks

Stealthily inspect and monitor a large satellite to determine its capabilities

Stealthily attack to permanently or temporarily disable a large satellite

Actively defend a large satellite against attack by microsatellites
Conclusion

• Israel is a living proof that a small country can be a full member in the Space Club
• High return for relatively small investments in space
• Space is the new frontier.
There are three possible roads to ruin - women, gambling and technology. The most pleasant is with women, the quickest is with gambling, but the surest is with technology.

Georges Pompidou