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Rear Admiral Ophir Shoham, head of R&D at the Israeli Ministry of Defence

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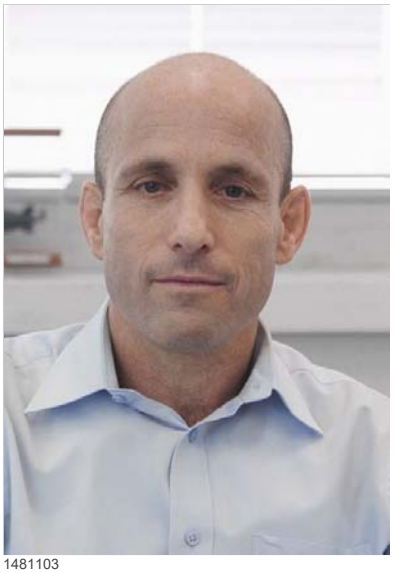
Technology innovations are vital to maintain the Israel Defence Forces' edge in future wars. *Joe Charlaff* talks to the ministry's head of research

As with its contemporaries, the Israel Defence Forces (IDF) will rely heavily on the integration of technology - particularly unmanned weapons systems - in future wars according to Rear Admiral Ophir Shoham. He heads up the Directorate of Defence Research and Development (DDR&D) within Israel's Ministry of Defence (MAFAT), playing a crucial role in the development of these systems for the battlefield.

Most of the projects conducted under MAFAT's supervision are financed from an annual budget of roughly USD210 million, although some systems - such as Rafael's Iron Dome - were developed by an external budget. According to Adm Shoham, "the R&D budget dedicated for these kinds of activities will never be enough in our creative defence community, but the decision makers are doing their best to keep the critical mass."



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Rear Admiral Ophir Shoham, head of R&D at the Israeli Ministry of Defence (Israeli Ministry of Defence)

He asserted that it is essential to support and maintain the infrastructure to ensure fertile ground for technology development. "We must ascertain that the technological infrastructure needed is available in order to run full-scale development projects, including test ranges, simulators, EW [electronic warfare] simulators, wind tunnels, etc. We will continue to develop these technological building blocks so that they will be available for a host of projects. This is a necessity to incubate and demonstrate new concepts and capabilities."

Israel has played a key role in popularising the use of unmanned aerial vehicles (UAVs) of course, and Adm Shoham said that unmanned aviation has seen a spike in sorties compared with piloted hours, with the recent induction of the latest Heron UAV type, and that IDF acceptance of unmanned systems has reached a level where UAVs are considered embedded within operations. "Just in the last few months," he said, "the Heron TP UAVs have become operational - within the IAF [Israel Air Force] - significantly increasing the IDF's capabilities and effectiveness during operational activity."

However, he acknowledged that ground-based systems present a greater challenge than aerial vehicles - not least for non-line-of-sight communications reasons and the general unpredictability of terrain conditions - but flagged development as a key area of focus.

Although Israel currently has no plans to arm unmanned ground vehicles (UGVs) it is developing systems to operate in more dangerous situations in the near future. He predicts that by 2020 the IDF will deploy remotely operated logistics vehicles to deal with specific missions collecting intelligence, breaching threatened areas, providing logistical support, and patrolling.

Israel already uses unmanned vehicles to patrol the border area along the Gaza Strip, but is looking to expand its use of UGVs. The revolution is already under way with platforms such as the recently introduced Sahar all-terrain UGV, which was developed in co-operation with Israel Aerospace Industries (IAI), primarily to autonomously tackle improvised explosive devices (IEDs) and breach obstacles.

Another R&D focus area within Israel is exoatmospheric craft. Back in 1988 Israel was the eighth country to launch a satellite into space - seven years after the space programme began - and work is presently looking to further improve the resolution of satellites' imagery (for use at night and in all-weather conditions), and their range of coverage.

In addition, Israel has built up conspicuous experience in ballistic missile defence, as well as counter-rocket artillery and mortar systems. February saw a successful test of the IAI/Boeing exoatmospheric Arrow 3 interceptor, while Iron Dome reportedly knocked down 85% of the rockets fired from Gaza in last year's Operation 'Pillar of Defence'.

Adm Shoham rebuffed several analysts' recent attempts to debunk the accuracy of Iron Dome, saying that "the IMDO [Israel Missile Defence Organisation] under the auspices of the DDR&D and the IDF are standing solidly by the success rate of Iron Dome during Operation 'Pillar of Defence'. All the rumours and assumptions questioning this are simply baseless."

However, he added that "software and algorithmic" enhancements are being implemented to Iron Dome "to deal with a wider spectrum of threats. This system will continue to be developed and updated in what is an evolutionary process vis-à-vis the dynamic threats in the region.

"[Likewise] the Arrow Weapon System is also always under evolutionary development."

Much of Israel's defence industrial capability is now in private hands, but it can still be argued that the IDF has more of a symbiotic relationship with industry than many western forces enjoy, and this extends to R&D.

Adm Shoham explained that within the field of missile defence for example, "the IMDO, under the auspices of DDR&D, and in complete co-operation with the US [Missile Defence Agency], is responsible for defining the programmes' goals, milestones, contracts, and monitoring the entire development process.

"Of course any new technological solution or idea of the Rafael or IAI engineers is more than welcome and analysed by the DDR&D/IMDO. Additionally, the IMDO's programme officers are actually integrated into the day-to-day activities, design reviews, programme management reviews, and engineering consultations, with the [government] project teams and industry."