Israel's top planners see a future freighted with more and increasingly sophisticated threats, straitened budgets and a 360-deg. battlefield. The following articles are the first in a series attempting to explain how politicians, military officials and warriors plan to introduce new technologies, refine screening talented youngsters for national service and train the military at a higher level of simulation and authenticity. Part 2, slated for the Aug. 9 issue, will continue the examination of Israel's threats and proposed solutions.

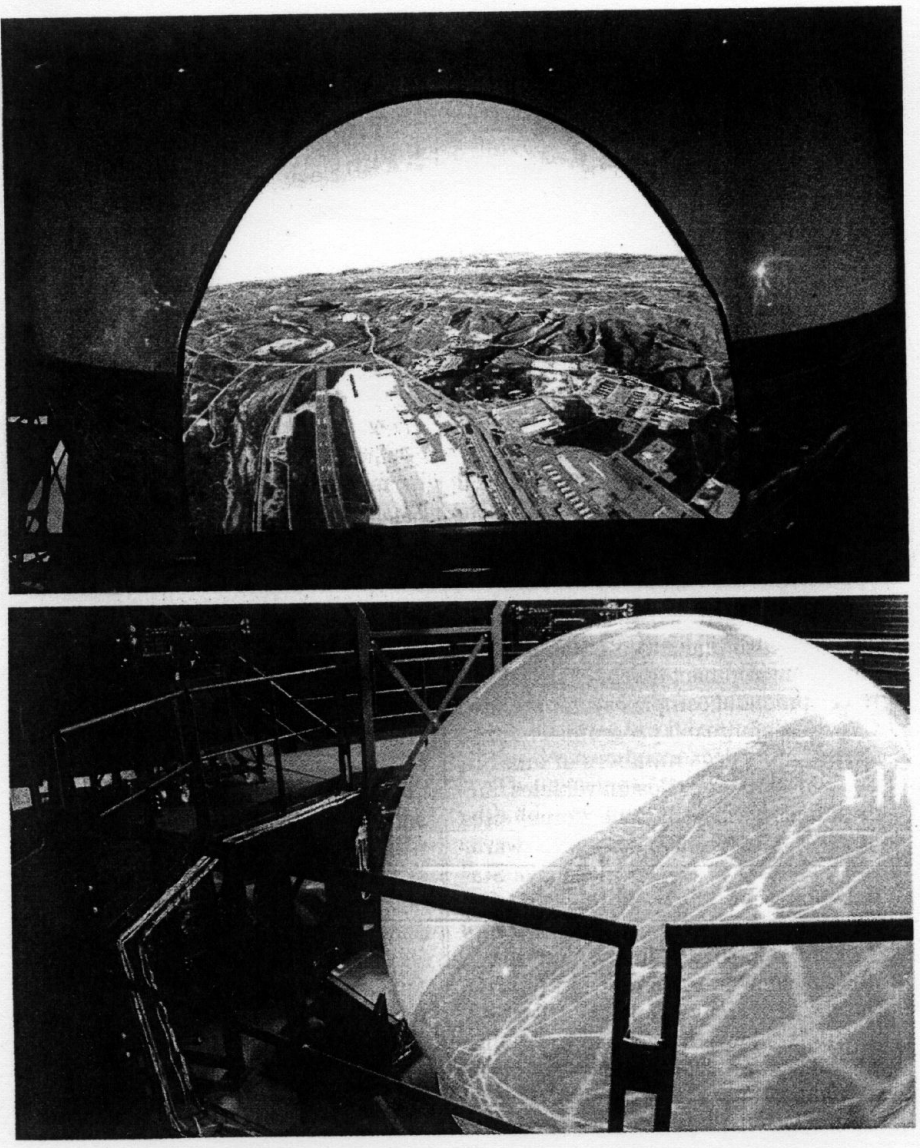
Tactical Training

IAF seeks more realism when it comes to practising air raids

ROBERT WALL/KUURNE, BELGIUM

With an eye both on cutting training costs and boosting the ability of pilots to act in concert, the Israeli air force is looking to field an enhanced mission-training system in the coming years.

BARCO PHOTOS



A new complex of simulator domes developed by an Elbit/Barco team will allow IAF F-15 and F-16 aircrews to practice in groups of four two-seat fighters. The entire simulator with the rear-projection system measures 10.1 X 10.1 X 6 meters (bottom), with the centerpiece a 1.7-meter-radius simulator dome (top).

The service already extensively employs simulator tools across its aircraft types, but the majority of those activities are focused on improving aircraft handling or on how to deal with emergency situations. As a result, the air force concluded that it needed a capability to actually carry out tactical operational flights in a so-called synthetic setting.

The new setup, which is due to become operational in about two years, will also allow pilots to practice with high-fidelity complex attack scenarios, including advanced threats and the use of the helmeted-mounted cuing system and night-vision equipment. Pilots also will have the ability to practice night-time air-to-air refueling via the system. With the IAF's increasing concern about monitoring—and possibly having to attack—Iran's nuclear facilities, the system would allow pilots to become experienced for the long-range operation.

The IAF chose Elbit to develop, build and operate the system under a 15-year public finance initiative. Recently, service officials completed a milestone review of a development prototype in Belgium, where Elbit is working with its simulator visualization system partner, Barco, says Alon Afik, Elbit vice president for training and simulation.

Initially, the system is being developed for F-16s, but the ability exists to add F-15s into the mix.

The mission training facility will house eight simulators, two threat stations where operators can manually fly "red" threat aircraft (that can also be created virtually), and other related facilities for ground control-

lers, Afik says. The simulator domes allow the IAF to fly an eight-ship formation of single-seat F-16s or two four-ship formations using dual-seat F-16s, with each weapon systems officer getting his or her own dome; the cockpit is merely slightly modified to fully represent the more limited field of view for the backseater. Each simulator system measures 10.1 X 10.1 X 6 meters (33.1 X 33.1 X 19.6 ft.).

The IAF expects to migrate a few thousand hours per year from live flying into the virtual setting. Eventually, the system will be integrated to connect to other simulation facilities for helicopters and other assets.

Development has been underway for a little more than a year, with operations in Israel (at an undisclosed air base) to start in about two years. Afik hopes a derivative of the system will also find international interest.

The centerpiece of the training facility is the simulator dome, which is 1.7 meters in radius. Afik says the key for the IAF is a high degree of visual accuracy and resolution fine enough to allow pilots to identify an F-16 or a threat that is flying at 6-8-mi. distance. Moreover, there can be almost no latency between pilot inputs and reaction in both one's own simulator and that of others. "The chain has to be very fast," Afik says, which puts a premium on image processing.

Elbit provides the 54 image generators that each dome system requires; Barco is responsible for the 13 projectors that transmit the image to the rear-projected dome. Other rear-projected dome systems use more projectors, but Barco is trying to make do with a smaller number to reduce maintenance costs, says its vice president of engineering, Robert Clodfelter.

To meet the IAF's demand for realism, Clodfelter says Barco determined it needed to set a brightness standard of 10 foot-lamberts (Ft.L), versus a standard of 6 Ft.L, and a level of contrast of 20:1 to avoid washout by having light parts of the dome affecting darker ones. The result is an image quality that is four times better than a high-definition television standard.

The dome provides the pilot a 360-deg. horizontal field of view and 90- to 40-deg. vertical field of view. The vertical field of view limit matches what a pilot can see out of the cockpit.

Clodfleter says Barco was already looking at the technology, but only moved to implement it when Elbit put forward the program.

Top Israeli 18-year-olds are being trained as creative problem-solvers, to seek innovations with new equipment such as the IAI Eitan unmanned aircraft.

Brain Gain

Israeli program grabs top 18-year-olds for key problem-solving work

DAVID A. FULGHUM/JERUSALEM

Israeli's top young minds are being identified and put to work early with the goal of introducing radically new ideas and concepts of operations that can be applied to rapidly changing threats and technological innovation.

The program, called Talpiot, finds these youngsters with the same screening process that the nation uses to identify its elite fighter pilots. In this case, it is designed by the government to institutionalize creativity across the spectrum of military, political, industrial and intelligence organizations.

"I think we have to give more time, money and respect of the state to the young people around the age of 18-20," says Dan Meridor, deputy prime minister and minister of intelligence and atomic energy who is involved in the program and serves as an occasional lecturer to its participants. "I tell them when they get into the army and are under the command of 30-35-year-old colonels and generals—don't listen to them. They know how to win wars in the old way. They need somebody new who has never seen the old challenges and the old answers."

The basis of the concept is to avoid the danger of inertia in successful organizations, even though Israel is already renowned for producing young, able leaders.

"So we invest in thinking," Meridor says. "Experience can be an enemy. I speak for change. Some of it is going on, but never enough. We need to think more, deeper, further and different. We don't have only conventional enemies. It is a time for people with courage who love risks and who are not conservative. You need to stay a few steps ahead of your enemy."

Every year, from 30 to 100 of the nation's top 18-19-year-old students with top academic scores and networking skills are offered training as frontline analysts of Israel's most pressing military problems. Instead of three years of conventional military service they are given a free hand to research and investigate issues that are critical to Israel.

"Talpiot" roughly translates as a group of small mountains. It is designed to find and challenge the creativity of brilliant kids during their time of national service. The program originated with the Air Force and is now several years old.

Then the air force, navy, industrial community, Mossad and other intelligence agencies want to recruit them. They compete for them, even though the agencies know they don't come with a quick fix in their pocket. But they know that the people selected for Talpiot are of "Ivy League" quality. They are a resource that can be used to solve new problems, and that way the solutions aren't confined to experience.

The youngsters are instructed to operate on the edges of anarchy, or at least insubordination.

"Don't ask [for advice]," Meridor tells them. "Seek the answers on your own. Go to Google, Facebook or wherever you want and see what you can to find new ways to get out of that trouble, to win this war. [Your superiors] are very good, smart people, but they may be framed in the old world and old system. The down side is relying only on experience. You need to think on your own.

"I try to advise people that when you form a committee, add one of these smart, young people that is not of our making, that doesn't have our experiences, that can think anew."