Taking Off

A look at air surveillance in a world of modern technology

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06-10-15

The first time airplanes were used in warfare was during the First World War nearly 100 years ago. In parallel, a race began to detect ABT's and warn the home front of incoming planes, to increase the level of readiness of anti-aircraft guns and the readiness of planes to confront the enemy. The most important milestone was the invention of radar during the Battle of Britain during World War Two, an event which has set the significance of the air situation picture.

Aviation developed quickly - military, civilian and sport, new records were set for speed and the sound barrier was broken, creating a continually growing need to build a wider and more reliable picture of airplanes in the air. This air picture is critical for identifying and dealing with threats, managing friendly air forces and neutral, third party or civilian aircraft within the area of conflict.

Over the past few years, new capabilities were developed for the detection and tracking of ABT's with radar. With the introduction of ballistic capabilities, the radar capabilities were improved in order to enable detection and tracking of missiles. Next, aircraft began using IFF, while military communications networks improved in controlling the force in the air.

With time, the need for combined inter-operational systems as part of the air picture grew, made up not only of aircraft, but also zeppelin balloons, satellites, birds, civilian aircraft, other weapons within the enemies arsenal and the firing of missiles in the area of interest. This was how the term air situation picture was born, the meaning of which is the entire picture of what is happening in the sky which impacts the battle.

The process of building an air situation picture (ASP) is based on two components. The first component are the sensors, radars, tracking systems and identification systems. The second component of creating the ASP is the ability to analyze and interpret the data in order actualize the mission of the air force, and maintain control of the air space for military and civilian traffic.

Starting from the Second World War until the Yom Kippur War in 1973, military display systems were receiving information via communications system, such that the sensors collected the data which had to be manually analyzed. People received the information and created the air situation picture with elements of identity and trends, and distinguishing between friend and foe. In just under 40 years, computers have completely changed the way militaries and air forces operate.

The air picture has now become the central tool for battlefield management, in terms of defense, managing attacks and managing the air space. The previously display systems have become more accurate systems, also in terms of supplying data that can support and direct land and air based weapons systems. It can be said that at one time, ASP display systems were a source from which decision makers would use for mission control, but today, the air situation picture combined with communication systems are turning these systems into full combat management systems, whether relating to battlefield safety between different aircraft, between aircraft and weapons systems, target tracking and firing and electro-optic systems guidance.

This capability enables more effective operations and targeting, as well as managing the optimum level of operational safety.

The ability to allow more aircraft and weapons within the battlefield, as opposed to marking an area solely for defense or attack, allows for simultaneous operations within the same area which is critical today. Over the past few years, a trend of performing more missions with greater capabilities within the same air space has developed, requiring the use of smart systems. In addition, this requires the sensors to be more accurate, and to integrate with many other systems in creating the air picture.

When looking at the challenges which these systems must stand up to, it is possible to see the parameters and requirements have expanded, such as dealing with different speeds from low speed drones to missiles being fired at Mach 4. The size of the target and range of the radar which the systems and sensors need to manage requires the use of advanced and suitable technology.

Stealth technology is also improving. What was once the sole advantage to a few super powers, is now available to all, and the race for stealth detection technologies is becoming more wide-spread. The stealth of today are non-manned aircraft, presenting a challenge to both sides. On one hand is the designer of the air craft, and on the other hand, the developers of detection technologies which need to detect and track this threat.

Over time, the aerial picture has shaken off the old concept as a defensive tool, to one which supports attack, manages aircraft, positioning and detecting missile launch etc.. The battlefield of today is saturated with targets and threats in every place, including even weapons smuggling. If in the past, the abilities of the air force were within the domain of states, today guerilla and terror groups have entered into this club and present an operational and intelligence challenge to decipher.

The development of new technologies has influenced the battlefield, improved accuracy of hits, both in terms of attack and defense. Defense systems have become multi-purpose systems including fighter jets, defense and sensors. A multi-purpose radar knows how to detect aircraft, Katyushas, detect missile launches and to direct artillery. Detection systems which also do tracking, or fighter jets capable of both attack and use of sensors. The ability to perform multiple tasks is a direct result of technology within the battlefield, enabling the need to be flexible in the missions, and to maximize effectiveness of the defense systems allocated for the mission.

Omnisys enters exactly in this junction of analyzing the battlefield and better use of sensors to bring a better operational outcome. Omnisys systems assist in aligning the sensors to the missions, in better planning and in reaching real time operational decisions which meet the mission success requirements for Israel or any other operational arena. The ability to know what the sensors are doing, via algorithms, allows better control of the sensors Vis a Vis the different

missions, the changing deployment locations, under operational rational and the required operational goals.

The positioning of our enemies and the positioning of our own troops in the field is constantly changing. Omnisys systems know to respond to events in real time, by connecting operational understanding with advanced technology.

Advanced simulations of multiple events are able to show the expected results and the future challenges when planning missions and army build-up plans.

Colonel (Ret.) Ran Turgeman served for 30 years in the Israeli air-force, in charge of air control and managing the air situation space. He retired at the end of Operation "Protective Edge", after commanding the AF air control systems; a task which included responsibility for the ASP, on the multiple Air Force control units located throughout the country, and for planning the air space at the Air Force command HQ.