



INSS Insight No. 314, February 15, 2012

More Trouble for the F-35?

Yiftah Shapir

In early December 2011, a US Department of Defense report about the F-35 Joint Strike Fighter (JSF) was leaked to the media.¹ The report, dubbed the "Quick Look Review" (QLR), was written by a committee that included some senior US defense establishment figures who were charged specifically with looking into the question of "concurrency," i.e., selling the airplane while the flight testing is still underway. The committee was set up in light of a less than glowing report about the flight tests submitted at the end of October.

Concurrent acquisitions have been part of virtually every large weapons acquisition project in the West in recent decades. The extended development and production timetables have always required the start of low rate initial production (LRIP) before the conclusion of all testing and sometimes even before the end of the final development. The assumption is that flaws that surface during testing can be fixed later in units manufactured in the early batches.

In the case of the F-35, this method has been stretched to unprecedented lengths. The plane's developers relied on the fact that the development methods, particularly regarding the computer simulations – based on the experience with development of the F-22 at Lockheed Martin – would allow them to reach a design mature enough to begin procurement even before flight tests began. Thus, the first batch was ordered in FY 2007, even though flight tests only started in 2008. By FY2011, 88 planes had already been ordered and the acquisitions for the next few years are planned at the rate of 30-40 additional planes every year.

Toward the middle of 2011 it became clear that the flight tests were not progressing at the anticipated rate and indicated that the design of the three F-35 models was not as mature as had been expected. The bottom line of the QLR report was that while there is no reason to stop concurrent acquisition altogether, there are, in the language of the report, several problems with "major consequences" regarding continued production.

So far, more than 700 change requests (CRs) have been submitted. The committee noted that it takes 24 months on average from the time a CR is submitted until the change is actually introduced in the planes on the production line. As for the planes made up until then – they will have to be modified at a later date, with an additional cost to the plane.

Among the problems of major consequence are problems with the pilot's helmet mounted display system (HMDS).² There are severe safety problems with the fuel dump subsystem, and problems with the reliability of the integrated power package (IPP).³ The report's authors also indicated problems whose full extent would only become apparent during later testing.

The flight test program is only in its initial stages. So far only 19 percent of the planned testing is complete, and all tests were within the more "conservative areas" of the flight envelope. Likewise, no testing has yet been undertaken to certify weapon systems.

The QLR report does not deal with the cost of the plane, but recently published data indicates that the cost of planes from LRIP 5 (whose production has recently begun) will reach some \$160 million. This price does not include the cost of the modifications and repairs that have already become evident or those that will appear during later testing.⁴

According to the current schedule (which may yet change), only the planes going into production after 2018 will have full operational capabilities. These planes will only be supplied some time after 2019-20.

In August 2010, the Israeli Ministry of Defense announced its intention to acquire 20 F-35 planes (the security cabinet's approval was granted in October 2010). During the negotiations over the issue, there was talk of delivering the planes starting in 2014 at the earliest. As of now, the order is for 19 planes to be delivered starting in 2016 at the earliest. The latest report published has direct implications for the Israeli Air Force's ability to take delivery and integrate the planes. Some estimate that the delivery date will be postponed, perhaps even until 2018.

The F-35 is without a doubt the most advanced combat aircraft in terms of its stealth, ability to pinpoint and identify targets, and help the pilot's situational awareness. Indeed, one could accept the proponents' claim that the transition to the fifth generation fighter is a huge technological leap. However, the most recent report shows that even if the first planes are supplied in 2018, these will come from one of the LRIPs before the end of the flight tests. In exchange for a \$140-160 million price tag per plane, the Israel Air Force will take delivery of planes that are not yet certified to carry any sort of weapon systems, are not certified for the entire flight envelope, and will almost certainly have to be upgraded to repair flaws that will only emerge during later flight tests.

The defense establishment is thoroughly convinced that the planes will be supplied by the end of 2016. Air force pilots will start training on them in the United States even earlier than that. Furthermore, sources in the defense establishment say that changes and improvements in fighter jets, even new ones, are a routine matter. In the past too, Israel acquired planes that underwent such changes as soon as they landed here. As for the flaws noted in the QLR, the defense establishment is aware of them and is also aware of the technological solutions to fix them – solutions that will be incorporated into the planes intended to be delivered here.

Were Israel to buy the fighter jets with Israeli taxpayer money, it is certainly a question whether the acquisition of the F-35 is a worthwhile deal at this stage. However, even under current circumstances, when the planes are bought with the special American defense aid funds, it is worth giving serious reconsideration to the questions: On which weapon systems does it make sense to use the defense aid money in the next few years? Is it not a good idea to postpone the purchase of the F-35 until the coming decade and in the meantime invest the money in different weapon systems?

At the same time, it should be asked: in what ways have the threats against Israel changed, and to what extent can the existing aircraft array confront them? Fifth generation planes would certainly improve capabilities, but does a possible postponement in acquisition seriously affect Israel's response to the new threats?

In addition, it is necessary to examine the F-35's special capabilities, some of which – though assuredly not all – are technologies one can install on combat aircraft already in the IAF ORBAT. While such upgrades will not turn the enhanced planes into fifth generation fighters, they will certainly improve their capabilities to confront the new threats.

¹ For the full report, see <http://s3.documentcloud.org/documents/274217/dod-quick-look-ahern-report.pdf>.

² In the F-35 there are several displays, including images from the infrared cameras, screened on the visor of the pilot's helmet. Damage of this sort can impede the airplane's ability to operate at night

³ The integrated power package includes the engine starter, power generator, and the environmental control system. Loss of the IPP means the loss of some of the avionics systems and the loss of the systems supplying oxygen and regulating air pressure in the cockpit.

⁴ Calculating the cost of the planes per unit is a complex matter and different methods will generate different results. So, for example, it was recently stated that Lockheed Martin received a contract for the production of LRIP 5 for a total of \$4.01 billion. The contract is for 30 planes of the three models (LRIP5: the batch includes 21 F-35A 's for the USAF, 6 F-35C for the Navy, and 3 F-35Bs for the Marine corps). Seemingly, the cost would then be \$133.7 million per plane, but this does not include the following costs: \$12.4 million per plane paid in July 2010 for "long lead items" and the cost of the engine ordered separately and estimated at \$13.6 million per engine. The total cost: \$159.9. The Israeli deal is for \$2.75 billion, i.e., \$144 million per plane.