

POSSIBILITIES OF MODERNIZATION L-159 AIRCRAFT IN THE AIR FORCE OF THE ARMY CZECH REPUBLIC

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Abstract: *Author analyses problems L-159 ALCA aircraft of the Czech Air Force, on the area of flight training in modern airplanes, and the problematics of two-seaters. The conclusion points out the need of a modern flight simulator, that is prepared for manufacturing and is connected with the possibility of selling of this aircraft abroad.*

Keywords: *L-159 ALCA aircraft, L-159 ALCA armament.*

1. INTRODUCTION

In the spring of 2003, the first phase of reconstruction of this airbase into a standard NATO airbase was initiated. This phase is expected to be terminated in 2008. Eight pilots and forty mechanics have been undergoing conversion training for the Swedish-made JAS-39 Gripen aircraft since August and October of 2004. This airplane replaced the MiG-21 in the integrated air defense system NATO – NATINADS on July 1st, 2005.



Fig. 1 L-159 Aircraft with armament

2. L-159 AIRCRAFT AND ARMAMENT

The aircraft does not carry any internal fixed cannon armament. The two-barrel 20mm ZPL-20 Plamen cannon (or the French GIAT)

is mounted under the fuselage. It was not possible to install this air cannon into the fuselage due to lack of space in the airframe. It is a certain disadvantage while firing at aerial targets or at point ground targets, when the fire effectivity is decreased due to increased cone of fire. On the other hand, the fire effectivity is greater while firing at surface ground targets thanks to bigger scatter pattern (and therefore better coverage of the entire surface of the target). For destruction of ground targets, guided and unguided missiles, as well as laser-guided bombs, can be used. Further equipment includes reconnaissance, navigational and gunnery containers for electronic warfare. The AIM-9M (L) Sidewinder short-range missile is used for air-to-air combat. The L-159 ALCA can carry up to 2 340 kg of ordnance or up to four external fuel tanks on six wing pylons and one underfuselage pylon.

The GEC-Marconi Sky Guardian radar warning receiver is used for aircraft's self defence. It is able to detect and evaluate any threat from ground or air. This system is connected to chaff&flare dispensers, which can be deployed in automatic, semi-automatic or manual mode. The records of the warning system are continuously recorded during flight for further analysis and for the purpose of radio-electronic reconnaissance and warfare. Perspectively, the usage of externally carried jammers able to analyze and jam wide spectre

of radars and tracking devices is being thought over.



Fig. 2 L-159 Aircraft and possible equipment variants

To briefly summarize the contribution of L-159 ALCA to our Air Force, it is necessary to mention three essential fields. By fielding of a rightly equipped and fully compatible combat system, the ongoing transformation of Air Force and its conversion to entirely new flight and operational standards was vitally sped. By other words, the Czech Air Force was able to transfer to the NATO standards in quite a short time. In the area of flight training, it was possible the induce an entirely new level of quality, which fully meets the requirements of the modern time, thanks to the L-159.



Fig. 3 Indicator HIS in L-159 aircraft

The flight and ground personnel began to dispose with a proper know-how and to operate contemporary airborne and weapon systems, which were established on modern airplanes with regard to NATO standards. It was possible to begin the training in full conformity with NATO regulations and procedures. One of the major factors was the

increase of combat capabilities of the Czech Air Force. The L-159 aircraft are able to participate in a wide range of aerial operations regardless of daytime or weather conditions. The flight crews can use modern tactical ways of combat activity conduction and perform strikes with a much higher precision. By introduction of L-159, the Czech Air Force gained a great compatibility and ability of a full-value cooperation with other NATO air forces.

The basic armament of L-159 comprises:

- AGM-65B Maverick air-to-ground/anti-tank guided missile with TV guidance;
- PAVEWAY II air-to-ground precisely guided bomb (PAVEWAY III is not used in the Czech Air Force);
- Brimstone anti-tank guided missile;
- AIM-9M (L) Sidewinder air-to-air guided missiles;
- 20mm two-barrel Plamen (GIAT) cannon pod of high rate of fire.

The aircraft can further use:

- CBU-87 cluster bombs;
- Mk-82, Mk-83 conventional aerial bombs;
- CRV-7 unguided missiles launched from LAU-5002 and LAU-5003 rocket blocks.



Fig. 4 The cockpit of L-159 with multifunction displays

In this phase, we can ask a question what the further cooperation between the aircraft manufacturer and Czech Air Force will be. A view to the future of the Air Force is always a complicated prediction based upon various factors. In the case of L-159 program, amount of support from the side of military budget

resources and level of technical support by the manufacturers are the most important factors. These were the causes of signing an agreement between Czech Army and Aero Vodochody regarding after-guaranty servicing and operation support with a certain guarantee for future years. If the L-159 should fully turn profit of its potential, it is necessary to conceptually continue in three essential areas. It is necessary to solve the issue of double-seaters and introduce them into operation.

An essential factor, which is related to the future of the L-159 project will be our corporate ability to export the airplane abroad. In this area, a bigger amount of responsibility lays on the trade policy of the state and on the Aero Vodochody management. The sale support from the side of Czech Army (as a user) remains a critically important act. The sale of unoperated and redundant L-159A aircraft from the Air Force's inventory seems to be a real option in the near horizon. This is subsidized by the close cooperation with E-Com Slavkov company, which has developed an L-159B flight simulator, that was exposed at IDET 2005 international exhibition and that is now ready for manufacturing.



Fig. 5 L-159 Aircraft with armament

As the most perspective seems the conversion of single-seaters into two-seater trainers. Though, this conversion would solve just the contemporary chilling situation at the operational combat unit. Further, the present defined number of four trainer aircraft will not

most likely cover the needs of advanced flight training of tactical air force. It will be necessary to think about a conceptual provision of the advanced flight training of combat pilots after the year 2010. Along with qualitatively growing demands for the level of training of tactical air force pilots as well as for their ability to operate systems and dynamics of fourth generation aircraft, a question of whether our air force possesses a sufficient number of advanced and relevantly powerful trainer aircraft arises. Number of aircraft to cover the needs of a modern advanced flight training in the horizon of at least 15 to 20 years. It is also necessary to mention, that the actual manner of pilot training at the training center in Pardubice is temporary and is perspective just in the horizon of five, maximally ten years, because of the obsolescence of L-39 Albatros aircraft. In this situation, it seems to be very desirable to maintain the ability to conduct development and provision of final deliveries by domestic aviation industry in conformity with the past tradition.

The near future solution could be the acquisition of sufficient number of L-159B trainers for provision of a full-value flight training at the training unit. These aircraft are able to answer the demands of the nearest 25 years thanks to their parameters and features. The second area is the necessary modernization of L-159A combat aircraft. Present technological progress is so dynamic, that the technical and moral lifespan of each system declines dramatically. Already today, it is important to think about the manner and extent of the mid-life upgrade. It is crucial to be concerned with integration of new identification and information devices and data transfer systems.

A further pertinent integration of modern armament (for which the L-159 seems to be an appropriate platform) will increase combat capabilities of the whole complex.

3. CONCLUSIONS

In the conclusion, it is necessary to state, that an entirely new quality of modern combat force, which is respected both domestically and

abroad, has been created thanks to the L-159 combat and training complex. This system has brought a brand new quality and contributed to its transformation into present modern and combat ready forces, respected home and abroad. The complicated and uneasy process of development and fielding of L-159 aircraft greatly contributed to the increase of know-how and technological level of domestic aviation industry. A field, which has not only a magnificent history, but possess sufficient potential to react on the demands of modern air forces on the world level even today. An area, which is thanks to its expert and financial heftiness accessible just to the desirable ones, and which is thanks to L-159 aircraft closely connected to Czech military aviation for many years on.

This mutual dependancy connects the personnel of industry and military. Therefore it is possible to await a close and mutual cooperation on the projects of conversion, modernization, integration, development and integration of both parts and whole units of L-159 combat and training system even now. Such is the Czech Air Force, which has been greatly enriched by the JAS-39 Gripen

supersonic aircraft, that receives (and will receive) a lot of attention on the domestic and international scene.

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