

This document is a translation of the original assessment in Swedish by SHK of the response to the recommendation. In case of discrepancies between this translation and the Swedish original text, the Swedish text shall prevail in the interpretation of the assessment.

Swedish Armed Forces  
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## **The Swedish Accident Investigation Authority's report RM 2019:02**

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On 20 August 2019, the Swedish Accident Investigation Authority (SHK) published the report RM 2019:02, which deals with an accident that occurred on 21 August 2018 in Möljeryd, Blekinge County, involving a military aeroplane of the type JAS 39 C Gripen, operated by the Swedish Armed Forces.

A total of nine safety recommendations were made in this report, three of which were to the Swedish Armed Forces.

### **Recommendation RM 2019:02 R1**

The Swedish Armed Forces was recommended initially to investigate the need for, and if such need exists and it is considered appropriate, develop and implement a function for information on hazardous bird occurrence in connection with the airports from which the Armed Forces operates (RM 2019:02 R1).

According to the Armed Forces, the winding-up of the former bird warning system, which was in use between 1978 and 1988, did not result in any break in the trend of a slowly falling incidence of bird strikes. In a somewhat contradictory fashion the number of bird strikes was at a higher level during the period the system was in use than the periods immediately before and after.

According to the Armed Forces, the method used to look out for birds when flying that is taught by the Armed Forces is probably more decisive in terms of avoiding bird strikes than the bird forecasts used previously. One further explanatory model is that the existence of a warning system in itself resulted in a false sense of security for pilots, who thus did not take preventive action in the same manner as they would otherwise have in those cases where the incidence of birds had been classified as low through the bird forecasts.

There are now modern systems for bird warnings that are based on radar monitoring of the areas around aerodromes. Since 1972, approximately 42 % of bird strikes in the Armed Forces have occurred close to aerodromes in conjunction with approach, take-off, landing, instrument approach and ground movement. However, the Armed Forces states that it is not at the low speeds used close to

aerodromes that the major damage occurs. Instead, this occurs during tactical flying in training areas.

Currently, monitoring of the presence of birds at aerodromes takes place visually and action is taken to scare birds away. When there are large numbers of birds, the flightpaths are also adapted.

The Armed Forces makes the assessment that the advantages of introducing a radar system for monitoring the presence of birds around aerodromes do not outweigh the costs involved in developing such a system. However, the Armed Forces, together with FMV, is studying a system for warning of the presence of both UAVs and birds around aerodromes. Nevertheless, no decision has yet been made about the acquisition of this system, nor has any schedule been set for the study.

The Armed Forces also does not believe that it is pertinent to modify the radar in the JAS 39 in order to enable the detection of birds using the radar. Approximately 32 % of bird strikes have involved the JAS 39, which in itself means that around one third of bird strikes could be prevented with such a modification. However, such a modification is not included in the current plan for developing the capabilities of the JAS 39 and such a development would, as it involves renegotiation of existing development contracts, probably delay other important improvements to the capability of the JAS 39 system that are of importance to defence capabilities.

SHK finds that the Armed Forces has provided a factually justified explanation of why it does not intend to introduce any bird warning system for older models or to modify the radar in the JAS 39 in order to allow it to detect birds. However, a radar warning system is being studied for aerodromes. Nevertheless, at present there is neither a decision concerning such a system nor any schedule for when such a decision may be made. In light of this the recommendation may be deemed as part of an overall assessment to have been only partially implemented.

### **Recommendation RM 2019:02 R2**

The Armed Forces was recommended to further investigate the need for and if appropriate determine a minimum height for ejection in the event of engine failure. (RM 2019:02 R2)

In its response to the recommendation, the Armed Forces has claimed that there is a risk of a fixed value for a minimum height for ejection could be interpreted as an instruction indicating the height up to which one should remain in the aircraft and, for example, attempt to relight the engine, instead of a minimum height for exiting the aircraft. What is an appropriate minimum height is also dependent on several factors, for example whether it involves instrument flying or flying using visual references, whether one is over water or land, the nature of the terrain, the wind direction etc. According to the Armed Forces, this makes it difficult to define a minimum height that applies in all cases.

On the other hand, the Armed Forces is of the opinion that fixed values are often a good aid to the pilot and has a minimum height for safe ejection during an instrument approach in the aircraft operating manual (AOM). Nevertheless, the Armed

Forces is not of the opinion that a minimum height for ejection in the event of engine failure should be introduced into the manual. Instead, the Armed Forces intends to clarify the height down to which safe ejection can take place in the event of engine failure during approach. The Armed Forces also intends to practice emergency bail-out in the event of engine failure at low altitude in the simulator in conjunction with OPCs<sup>1</sup> over the course of 2020.

The action that the Armed Forces intends to take may be regarded as implementing the aim of the recommendation; to give pilots better guidance for dealing with engine failure at low altitude and the response to the recommendation may therefore be deemed satisfactory in this respect.

### **Recommendation RM 2019:02 R3**

Finally, the Armed Forces was recommended to develop a routine for handling soil and environmental damage and decontamination after an air accident and ensure that the routine is known within the Armed Forces and its units.

According to the response to the recommendation, the Armed Forces will be recommended that a central head of function for soil damage be appointed at headquarters and that certified soil damage assessors be reintroduced at units in the Air Force. It is to be possible for certified soil damage assessors to be called on in the event of an air accident and a register of those who are certified is to be drawn up within the Armed Forces. In addition, a review of all documents that regulate procedures in the event of crashes is to be conducted in order to ensure there is clarity and consistency. Potentially, new internal regulations will be worked out.

At every operating location, there is also a salvage handbook (Handbok Bärkning Militära Luftfartyg 2019), which has, however, not yet been adopted. The Armed Forces intends to adopt the handbook immediately and make this available by publishing it on its intranet in order to familiarise the Armed Forces and units with the handbook. The handbook includes checklists and tables. According to the recommendation, these should be supplemented with clearer routines for handling environmental damage and decontamination in conjunction with crashes. Air Force units' checklists for a crash should also be updated. All the measures now reported are intended to be completed no later than the third quarter of 2020.

The action that the Armed Forces is planning to take may be regarded as being consistent with the recommendation. Consequently, the response to the recommendation may be deemed satisfactory in this respect.

Helene Arango Magnusson  
Chair, Accident Investigations

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<sup>11</sup> OPC – operator proficiency check.