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Bird Deflection System

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Abstract: Winged animals cause a considerable measure of inconvenience in airplane terminals particularly amid take off and arriving of aircrafts. Rate of the fledging hitting the airship is called winged creature strike. A little feathered creature, if gets struck inside the engine can cause genuine outcomes like losing the whole aircraft, travelers and its team. It can once in a while harm the flying machine to significant degree. Thus, it is critical to distinguish any nearness of flying creature inside the range indicated. On the off chance that winged creatures are identified, they must be diverted so they would not come into the way of the flying machine. One can utilize water stream as a redirector framework since it is an innocuous approach to divert the wing creatures.

Keywords: Birds, Deflection.

I. Introduction

Bird-strike accidents are generally common. These happen most of time at the runway and climbing phase. It also observed that, many time it was noticed the bird strikes happened at higher altitudes (6km to 9km). The most difficult situation when a bird hits into the aircraft engine turbine. This accident cause damage to turbine also problem occurs inside engine ingestion. When bird strike occurs to the canopy or windshield then the cracks take place on the surface of the canopy or windshield.

The project mainly consists of three systems:

- Detection system
- Location estimation system
- Water Jet system

This technique, 1st the detection system will scan the range specified. If it found any birds on the way of flight then send a signal. If signal found by detection system, then the detector system will raise an alarm in the form of signal. After getting the signal from the detector system, the location estimation system will estimate the position of the bird or object relative to the aircraft. After this signal is end to the water injection system from where the water jet can be turned on to reach the target of the object to remove the bird.

As per safety concerned while climbing and descending the bird Strike is common threat in aviation field. Due to this bird strike more damages can occur to the engine aircraft structure. Specific to jet-engine thrust is affected due to damage of compressor blade. This has resulted in a number of fatal accidents.

When a bird strikes to engine the compressor and engine ingestion systems can be damaged. This caused the reduction in rotation speed of fan and thrust. The engine blade can be displaced even brake down when the bird strikes to the fan. That damaged blade can be displaced into nearby blade and so forth. This causes a cascade failure. Jet engines are particularly in high alert while the take off phase and climbing phase. But at the time of take off the engine will be turning at a very high speed at a low altitude. This is a critical phase for birds' accident because of the birds is more commonly found in this altitude.

Many time also found that the bird strike are happen to the wind screen of smaller fixed wing aircraft and helicopters. In this situation windscreen was penetrated and causes injury to pilots or other persons on board. And few times it was observed that the control was lost due this type of bird strike. Very rare case it was found that there is problem in pressurization system due to bird strike at higher altitude. This can lead to rapid depressurization.

Also many cases it was found damage to extended landing gear assemblies in flight, which can lead to damage of brakes or malfunctioning of nose gear to cause directional control problems during a subsequent landing roll due to bird strike at higher altitude as well as lower altitude. A relatively common but avoidable significant consequence of a bird strike on the take off roll is a rejected take off decision which is either made after V1 or which is followed by a delayed or incomplete response and which leads to a runway excursion off the end of the departure runway.

Fig. 1: UH-60 Black Sikorsky Hawk collision with a Bird Cause Damage to Windshield

Fig. 2: Above Collision from Inside

Fig. 3: Serious Incident While Taking Of

II. Methodology

There are approaches to reduce the effect of bird strikes. The vehicles can be designed to be more bird resistant, the birds can be moved out of the way of the vehicle, or the vehicle can be moved out of the way of the birds.

Flight Path

Pilot should not take off or land in the presence of wildlife and should avoid migratory routes, wildlife reserves, estuaries and other sites where birds may congregate. At time of collision the total impact can be consider as equal to energy dissipated due to bird strike. This impact may be calculated considering the relative kinetic energy ($1/2mv^2$). Where,

m = mass of bird

v = relative velocity of aircraft.

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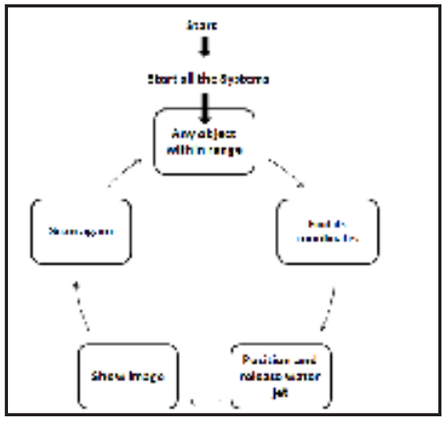

Fig. 4

III. Result and Discussion

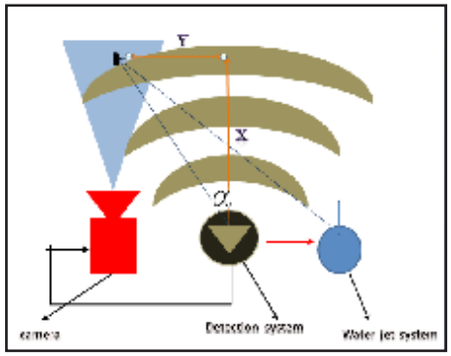

Fig. 5

A. Detection System

Detection system is used the technique to scan the range which was specified in system. This will send a signal if any bird or object is found within the signal range. After finding the object the system will create an alarm. Then the distance of the bird / object can be estimated by estimated system from the aircraft. This can provide clear position of bird / object with relative to the aircraft. After this water jet system is turned on and water jet hit the bird. This water jet makes the bird to get away from the way of flight.

B. Use of Radar for Survey

If the radar can detect 100% accuracy then water jet can be used perfectly to make the bird away from the flight path. Once the bird location and flying speed of bird is captured then water jet can be through towards the birds to get away from flight path. In this procedure the risk of bird strike can be avoided. The radar is used for tracking of migrating birds for so many years. In this paper a technique was provided to reduce the accident of bird strike by using the radar system. By doing so the hazard activities can be reduced. For this type of uses X-band and S-band radar can be used to prevent the track birds.

C. Use of Radar for Real-Time Detection

By using the radar at early phase can avoid the high risk hazards. This has been tested in many military bases and it was effectively work for detection of large birds.

Full 360 degree rotation ariel is available, multiple sensors is used to scan full runways and the aircraft approach and departure path. This also covered a range over 10 miles. Most systems are available as either fixed or mobile installations.

D. Detection and Recognition of Birds

This detection system can be performed by thermal and daylight stereo cameras. Using this system the scanning can be done for any fling object inside flight area constantly.

Once an object is detected, proprietary software analyzes the data. Panoramic Infra-red Detection Module are faction till 360° coverage. It work full day and night and all weather conditions. This is also helpful for multiple birds.

E. Daylight Stereo Monitoring Module

- Monitoring and reporting.
- True bird recognition.
- Habitat management.
- Flexible control.
- Specialized monitoring and reporting software.

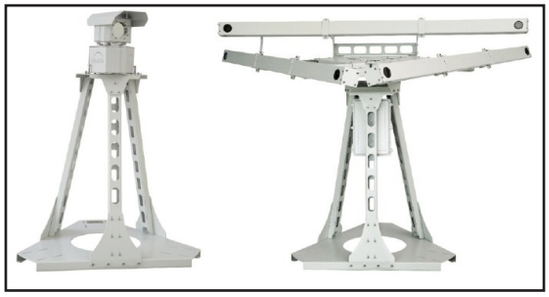

Fig. 6

F. Specialized Bird Control Software

360 degree rotation Ariel is available with multiple sensors is used to scan full runways and the aircraft approach and departure path. This also covered a range over 10 miles. Systems of this type typically have user-selectable visual, audible and messaging risk alert options and it is possible to integrate the radar display with ATC radar and weather radar if required. Most systems are available as either fixed or mobile installations.

IV. Conclusion

Bird strikes are always a measure accident in aviation industry. These cause measure damage to the aircraft where human life can be lost due to these accidents. This a measure threat to air safety. By using above methods these accidents can be avoided. But it is not possible to avoid all 100 percentage of bird strike. It was observed that over 800 ft altitude, strikes and damage are dominated by heavier birds, whereas at lower altitude the damages are from lighter bird but percentages of accidents are more at lower altitude, that is at time of take of landing, climbing and gliding.

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