0207 Sky Arrow 55 Drone Occurrence Investigation

Executive Summary

On February 7, 2020, a Sky Arrow 55 drone, serial number P040, owned by GEOSAT Aerospace & Technology Inc., encountered engine failure during aerial photography test on the north side of the Lanyang River mouth, Yilan County. The drone got out of control and crashed on the eaves of the gymnasium of Kai-Syuan Junior High School at 1013. It was burned down, a small part of the eaves of the gymnasium was damaged, and there were no casualties.

Conclusion

1. The fail-safe procedures of the flight control computer of the drone were not designed in accordance with the company's Drone Operations Manual to execute the gliding return mode automatically after engine failure. The operator failed to follow the engine stall/power loss procedure to perform emergency process of engine failure, and the optimal glide speed was not defined in the manual, causing the drone to hit a building.
2. The emergency landing areas was drawn in the reminder sheets before the flight mission only, not integrated in the ground control station display for the operator's immediate reference. The densely populated areas was not drawn and integrated for the operator in emergency avoidance. These would affect the emergency handling when the drone was abnormal.
3. The ground control station display did not contain the necessary information and filter unnecessary information in an emergency situation, which was not conducive to emergency handling.
4. Emergency procedure training for drone operators and the simulation training equipment of GEOSAT Aerospace & Technology Inc. were imperfect, which affected flight safety.
5. GEOSAT Aerospace & Technology Inc. carried out the flight in advance of the approval time, beyond the approved

airspace, and did not send coordinator to the Taipei Approach. There was a risk of conflicts with other agencies' operations, or with small aircraft flying in VFR corridors.

Safety Recommendations

To: **GEOSAT Aerospace & Technology Inc.**

1. Improve the fail-safe procedures for emergency situations in the flight control computer, and add the optimal glide speed data in the Drone Operations Manual to facilitate the operator to perform emergency handling. (TTSB-ASR-20-08-006)
2. Integrate emergency landing and densely populated areas in the display of the ground control station. When an emergency occurs, display necessary emergency response information on the screen and filter other non-essential information to shorten the operator's response time. The above can reduce the operator's work load and the risk of ground personnel injury. (TTSB-ASR-20-08-007)
3. Increase the flight training courses and set up ground control station simulator for emergency situations to enhance the operator's emergency handling ability. (TTSB-ASR-20-08-008)
4. Apply for airspace in accordance with the regulations of the Civil Aviation Administration, and operate the drone in the approved airspace and time slot to ensure flight safety. (TTSB-ASR-20-08-009)

The final report is in Chinese only and available for download at http://www.TTSB.gov.tw