

Executive Summary

On May 10, 2021, the scheduled passenger flight B7-9091 of UNI Airways Corporation (UNI Air), an ATR72-212A aircraft, registration B-17010, departed from Taipei Songshan Airport on route to Matsu Nangan Airport at 0926 Taipei time. One captain, one first officer, two cabin crew members, and 70 passengers, a total of 74 people were on board. At 1006 Taipei time, the aircraft performed a go-around on its approach to runway 21 at Nangan Airport. During the go-around, the left and right main wheels and tail skid of the aircraft collided with the top outer edge of the pre-threshold area of runway 21. The flight crew decided to return to Songshan Airport and landed safely on runway 10 at 1107 hours. The aircraft and Songshan Airport runway surface were damaged, no injuries to the persons on board.

According to the Transportation Occurrence Investigation Act of the Republic of China (ROC) and the content of Annex 13 to the Convention on International Civil Aviation Organization, the Taiwan Transportation Safety Board (TTSB), an independent transportation occurrence investigation agency, was responsible for conducting the investigation. The investigation team also included members from BEA (Bureau d'Enquêtes et d'Analyses, France), ATR (Avions de Transport Régional), CAA (Civil Aeronautics Administration), and UNI Air.

The 'Final Draft Report' of the occurrence investigation was completed in February 2022. In accordance with the procedures, it was reviewed at TTSB's 36th Board Meeting on 4 March 2022 and then sent to relevant organizations and authorities for comments. After comments were collected and integrated, the investigation report was reviewed and approved by TTSB's Board Meeting on 1 July 2022.

There are a total of 9 findings from the Final Draft Report, and 5 safety recommendations issued to the related organizations.

Findings as the result of this investigation

The TTSB presents the findings derived from the factual information gathered during the investigation and the analysis of the occurrence. The findings are presented in three categories: **findings related to probable causes**, **findings related to risk**, and **other findings**.

Findings Related to Probable Cause

When the occurrence aircraft performed a non-precision approach to runway 21 of Nangan Airport, the pre-threshold area was obscured by low clouds or marine fog. During the final approach, the pilot flying used the autopilot lateral navigation and vertical speed mode for the approach. Focusing on flight operations in the cockpit, the pilot flying lost situational awareness of the aircraft position and did not realize that the aircraft altitude was very close to the runway threshold elevation. When the aircraft entered low clouds and was unable to maintain visual contact with the runway, the pilot flying did not follow the procedure of immediate execution of a go-around but continued using the autopilot for the approach, the pilot monitoring did not remind the pilot flying to execute or call for a go-around. When the pilot flying decided to perform a go-around, the aircraft had reached an altitude of 229 ft, 11 ft above the runway threshold elevation. Because the altitude was too low, before the aircraft could establish an effective positive rate of climb, the aircraft's main wheels and tail skid collided with the top outer edge of the pre-threshold area of runway 21, causing substantial damage to the aircraft.

Findings Related to Risk

1. The pilot flying, ignoring the operational limit for disengaging the autopilot and initiating manual control at 160 ft above the runway threshold, continued using autopilot's vertical speed mode to control the descent of the aircraft for the approach, which increased the risk of flight operation.
2. When the altitude of the aircraft was markedly below the designated glideslope, and the actions of the pilot flying deviated from standard operating procedures (SOPs), the pilot monitoring did not comment or call out on the deviations, did not apply teamwork or remind functions.
3. Before the occurrence, UNI Air's safety monitoring mechanism did not lead to targeted detection of those flight crew's deviations from standard operating procedures (SOPs) or the factors that caused the deviations during the occurrence final approach.
4. UNI Air's safety performance indicators, risk management of targets for controlled flight into terrain (CFIT), and mechanisms for monitoring and controlling flight crew actions that would increase CFIT risk still warrant further adjustment and reinforcement.

Other Findings

1. The flight crew of the occurrence flight hold valid aviation personnel

and medical certificates issued by the Civil Aeronautics Administration (CAA). The flight crew meet the qualification and proficiency requirements of the CAA and UNI Air. Records of training and checks have revealed no anomaly related to the occurrence. The leisure and work activities of the flight crew 72 hours prior to the occurrence were normal. No evidence indicated that the flight crew was impaired by any medical condition, medication, or alcohol that might have adversely affected the flight crew's performance during the occurrence flight.

2. The occurrence aircraft's weight and balance were within the operational limits and the airworthiness information was normal before the occurrence flight.
3. In the routine and special weather reports of Nangan Airport before and after the occurrence, 300 ft of scattered clouds and mist were reported, but these reports did not include marine fog or low clouds elevated to the outer side of the runway 21 threshold as a result of the terrain.
4. Nangan Airport's runway threshold markings and the various declared distances are inconsistent with the requirements of Civil Aerodrome Design and Operation Standards.

Safety Recommendations

To UNI Airways

1. Strengthen the safety monitoring mechanism, identify and prevent the flight crew from deviating from the standard operating procedures (SOPs), and require the pilot monitoring to achieve the functions of team cooperation, reminder and correction, to reduce the risk of flight operations.
2. Review and strengthen Controlled Flight Into Terrain (CFIT) risk control and preventive measures based on organizational characteristics, operational patterns, and safety data analysis results, including: identification and monitoring of relevant hazards, establishment of safety performance indicators and goals, and enhancement of risk awareness among the flight crew, etc. to prevent the recurrence of similar occurrence.

To Civil Aeronautics Administration

1. Supervise UNI Airways to strengthen the safety monitoring mechanism to:
 - Identify and prevent the flight crew from deviating from the standard operating procedures (SOPs), and require the pilot monitoring to achieve the functions of team cooperation, reminder and correction.
 - Review and strengthen Controlled Flight Into Terrain (CFIT) risk control and preventive measures, including: identification and monitoring of relevant hazards, establishment of safety performance indicators and goals, and enhancement of risk awareness among the flight crew, etc. to reduce the risk of flight operations
2. Evaluate the installation of relevant auxiliary equipment at Nangan Airport, or provide meteorological observation guidance to assist meteorologists in observing and reporting marine fog or low clouds on the outer side of the runway threshold.
3. Review Nangan Airport's runway end safety area and declared runway distances in accordance with the Civil Aerodrome Design and Operation Standards. In addition, examine whether any other affiliated airport has a similar configuration.