Flight Operations Group Report of C-124 S/N 50-100 Aircraft
Accident at Larson Air Force Base, Washington, on 20 December,1952

I DISCUSSION

1. The pilot of C-124 S/N 50-100, Lt O'Connell, appeared at Base Operations on 20 December 1952 and carried on his routine duties relative to flight planning, weather checking and filing his DD Form 175. Other personnel of the 62nd Troop Carrier Group, such as the 7th Troop Carrier Squadron Engineer Officer and squadron maintenance personnel, were on hand to assist in the dispatch of the flight. Also, the Base Operations personnel were on hand and rendered assistance by calling the passenger roll call and distributing mimeographed instruction briefing sheets to all passengers. Subsequent to these routine duties, all passengers were boarded on the aircraft. After passengers were aboard, the nose ramps were retracted, the clam shell doors were closed and the engines were started.

2. Subsequent to the boarding of passengers and the starting of engines, Lt O'Connell was observed in the Base Operations office where he was reported to be getting some five gallon water cans. He was then seen going to the aircraft and went aboard while the engines were running.

3. The aircraft was seen to make a normal taxi-out, commencing at about 0610 or 0615 and routine radio checks were made with the tower. The aircraft taxied to runway 03 and the wind, as given by the tower was 13 knots from the north. Runway 03 was the active runway because runway lights were inoperative on "32". A normal time was estimated by the tower for engine runup and an ARTC clearance was given at 0624, stipulating at 0626 takeoff. This takeoff time was in consideration of a ten minute spacing behind C-124 AF 51-193 that had departed Larson AFB from the same runway at 0616.

4. The takeoff roll, according to the tower operator, seemed normal and the aircraft appeared to become airborne at about the midway point of the runway, which is approximately 10,000 feet in length. The aircraft disappeared from the tower view at an estimated elevation of 300 feet shortly after becoming airborne. The GCA team monitering the take off made an observation of the aircraft within a matter of seconds as it was observed as a target moving in a left turn pattern relative to the projected center line of runway 03 at about one and one-half to two miles. Shortly after this with an approximate airborne time of one minute plus or minus a fraction, the aircraft was heard to have plunged to the ground with a resounding crash. Both the GCA personnel, as well as tower and base operations personnel, observed the aircraft burning after it crashed.

CREW EXPERIENCE

5. The aircrew assigned to AF 50-100A for the transport training mission scheduled for takeoff at 0600, 20 December 1952, was, with the exception of student status crew members scheduled for supervised training, well qualified.

a. Aircraft Commander: 1st Lt William N. O'Connel, Jr, AO 1909366, checked out as A/C, 2 September 1952, by successfully completing the prescribed transition training and meeting all time and experience qualifications. He successfully completed a flight check for renewal of his instrument rating AF From 8 (white) on 17 December 1952. Total time to 20 December 1952, 2775 hours; C-124 time, 468 hours, of which 331 hours was pilot time.

b. Co-Pilot: 1st Lt Robert V Maple, AO 2086872, checked out as a qualified C-124 co-pilot, 9 September 1952, by successfully completing the prescribed transition training. Total time, 2007 hours; C-124 time, 269 hours.

c. Flight engineer: M/Sgt Wendell L Burton, AF 18083825, checked out as a qualified C-124 flight engineer on 17 June 1951 and was at time of the flight, a designated Instructor Engineer. His total panel time was over 1000 flying hours.

d. Scanner: S/Sgt Joseph Skrzyniarz, AF 12326777, was an experienced and qualified flight mechanic-scanner.

e. Other members of the crew listed below were qualified:
Radio Operator- A/1C R. M. Jacobs
Loadmaster - A/1C I. A. Schwan

f. Two flight engineers aboard as students (S/Sgt Flowers and A/1C Micelli); one student radio operator (A/2C Adams); and one additional pilot (Capt Wells) were unqualified and were included on the crew for training indoctrination only. Evidence indicates that none of these unqualified personnel were performing crew duties during this flight.

g. The operational aircrew assigned this mission was well qualified according to all accepted procedures and was considered completely capable individually and as a flying crew team member.

AIRCREW STANDING OPERATING PROCEDURES:

6. The present Standing Operating Procedures as prescribed by the 62nd Troop Carrier Wing is inadequate because it contains ambiguous statements, false statements, and contents are not in proper order. The SOP has never been properly proofread and no revisions have been passed down to the operating squadrons since the SOP was published in July, 1952. The following examples need revision:

a. Before taxiing, the flight controls are to be unlocked but the SOP does state what procedure will be used and does not state by whom the the controls will be unlocked. The copilot is responsible to see that the controls are unlocked but he cannot unlock the controls without leaving his position in the copilot's seat.

b. Before taxiing, the flight controls and tabs are to be checked but the SOP does not state what procedure will be used nor who will do the checking. The SOP gives authority and delegates responsibility to the aircraft commander to operate the C-124 but further delegation of duties

to the individual crew members is not clearly defined.
c. Since the conditions under which landing lights will be used on take off are not clearly defined the use of lights as stated in the 62nd SOP pertaining to retracting of lights above 300 feet should be revised. It is very definite that there should be changes in the 62nd Troop Carrier Group Standard Operating Procedures such as delegation of authority, a more thorough check of controls, closer supervision of crew members and fixing of responsibility for each particular function, since the results from the conference at Long Beach to revise TO 01-4CNVA-1 will not be released as the conference is to reconvene at a later date the SOP of the 62nd Troop Carrier Group should be revised as soon as possible.

7. Reviewing the weight and balance form DD 365F filed for the flight revealed several discrepences although the form was prepared by the loadmaster and signed for the pilot by the co-pilot. The total personnel listed on the form F was one more than contained on the manifest. The form on file, after correcting an error in addition indicated a gross weight of 168,390 pounds and a MAC of 27.1%. This weight calculated on the basis of 200 pounds for each passenger including parachute did not provide for the baggage allowance of 65 pounds authorized by operation "Sleighride". A recalculated weight and balance indicated the gross weight of the aircraft was actually 173,868 pounds and the MAC 30.6%. This condition is within; but approaching the aft center of gravity limit of 32% MAC. The recalculated weight was determined after accounting for 3180 pounds of baggage (estimated at 30 pounds per passenger), 1792 pounds of parachutes, and 1006 pounds miscellaneous, including water, flyaway kit and crew baggage.

8. From the information as to the weather, weight of aircraft and latest engine performance data, the take-off prediction was computed. There were no ADI tanks installed, all power is computed for the dry conditions. The wind was assumed to be approximately effective 10 to 11 knots. With the the gross weight of 173,868, the ground run was 3,300 feet; lift-off speed, 108.5 knots, critical engine failure speed, 99 knots; critical runway length, 4,200 feet; and a take-off to clear a 50 foot obstacle was 4,750 feet. Four-engine climb-out speed was 151.5 knots; and the three engine climb-out would have been 148 knots. Statements and testimonys submitted indicate the preflight inspection was adequate. Although there was a light snow at the time, it was not enough to be considered as unsafe for takeoff. The normal procedure on carburetor heat is to maintain at least plus 10° C at all times when possible. In the sequence of unlocking the controls such as elevator first or the throttle last, it would be a particular advantage to unlock the throttle last as it can be assured that all controls are then unlocked.

CREW CONDITION PRIOR TO FLIGHT

9. The Flight Surgeon's files of the crew were reviewed. Physical examination records were found to be current and all personnel met qualifications for flying. No recent significant illnesses, injuries or abnormalities were on record.

Statements were obtained from associates of the crew members as to the activities and appearance of the crew members for a 24--48 hour period prior to the flight. These statements indicated the following:

1. None of the crew were under the influence of alcohol or drugs.
2. Adequate rest had been obtained.
3. No unusual or abnormal behavior was noted.

MISSION

10. The mission of the aircraft was a transport training mission. The aircraft was to participate in air lifting AOCP parts from Forbes AFB and to air lift a helicopter in accordance with 18th mission no. 4683. In addition, the aircraft were to be loaded on a spare available basis with service personnel desiring to take advantage of the airlift. Potential passengers were manifested by base operations and loaded on base or transient aircraft. This plan was identified locally as "Operations Sleigh Ride". A briefing was given as to the mission of flight to the crew three days prior to the flight. On the morning of the accident the pilot presented himself at the weather office for a weather briefing. The weather briefing was given the pilot verbally by the forecaster and placed on clearance. The DD 175 clearance was presented in person by the pilot to the Base Operaions officer for checking and signing. After determing that flight was planned properly and could be accomplished as planned the clearance was signed. No discrepancies in the briefing, flight plan or route is indicated.

FLIGHT PATH AND ALTITDE

11. The presumed flight path and altitude of aircraft AF 50-100 is based partially upon testimony of the control tower operator, the GCA operator and partially upon conjecture using the relative positions of the takeoff point from the runway and the point of impact. These points, together with a known time element , provide a substantial basis for the conclusion. Further based upon calculated data of field elevation, outside temperature and known gross weight of the aircraft, it is believed that the aircraft became airborne at a point 3500 feet from the takeoff end of runway 03.

12. The point of impact is located at approximately 2400 feet on a 90° angle to the left of the center line of runway 03, measured from a point located 300 feet beyond the end of runway 03 center line. This point of impact required a left turning movement of the aircraft immediately after takeoff. This factor of a left turn is substantiated in the testimony of the GCA operator as aircraft 50-100 appeared on the radar scope as a target with a left turning indication. The time element involved for the time of flight is considered to be one minute plus or minus fifteen seconds.

13. Based on this data, it is assumed that immediately after takeoff, the aircraft commenced a slightly left deviation from the takeoff direction of runway 03. This turn continued during which time the degree of bank was gradually increased and the aircraft possibly became engaged in a partially stalled condition. As a result of this condition, the aircraft began to fall

off to the left until the aircraft struck the ground at the point of impact indicated.

WEATHER SUMMARY

14. At the time of the accident, the Larson AFB official weather conditions were as follows: Precipitation ceiling of 500 feet; sky obscured; visibility, two miles; light snow; temperature 33°F; dewpoint, 31°F; surface wind, N 13 k; altimeter setting, 29.33 inches.

15. It had been snowing lightly since 0400 hours and by the time of the accident, only a trace of wet snow had accumulated on the ground, turf and concrete ramps. It is, therfore, likely that only a trace of wet snow had accumulated on the top surface of all airfoils. The weather conditions were identical during the departure of C-124 51-193 about ten minutes prior to the accident. The possibility of ice or frost forming on the aircraft is considered remote and particurally so in view of the prior aircraft departure with identical conditions.

16. The official time of sunrise was 0740, therefore, the takeoff was made in total darkness and it is not believed "white-out" conditions existed, or that pilot had visual reference beyond the runway end.

ADEQUACY OF PASSENGER BRIEFING AND SECURITY IN AIRCRAFT

17. All indications point to the fact that crew personnel complied with their standard procedures in passenger briefing relating to the wearing of parachutes, safety belts, etc. This is based upon statement from several of the accident survivors, both passengers and crew members, that the briefing over the aircraft public address system was adequate and that each passenger was provided a written instruction sheet.

18. Tower personnel observed loading of crew and passengers onto AF 50-100 which was parked in front of Base Operations. All procedures and radio contacts appeared normal during loading, taxiing to runway 03 and engine run-up. The ARTC clearance and the takeoff clearance were acknowledged by the aircraft. AF 50-100 became airborne at 0626 and visual contact with the aircraft was lost almost immediately due to restricted visibility. AT this time the aircraft relayed the position of the other C-124 since the ARTC clearance required a 1000 foot separation in altitude during climb. It is not known if this report was made by one of the pilots or possibly the radio operator. GCA personnel monitored the takeoff, picking the aircraft up on the scope approximately 5000 feet from the GCA unit, 9000 feet from beginning of takeoff run. The aircraft was tracked by GCA personnel for approximately one mile with indications of aircraft was moving to the left of reference line representing runway 03. Radar contact with the aircraft was lost and an explosion was heard immediately thereafter. No radio contacts were heard indicating malfunctions during taxiing, takeoff or after aircraft became airborn. Navigational aids employed appear adequate.

AIRFIELD OBSTRUCTIONS AND FACILITIES

19. The airfield conditions and facilities were adequate for this operation. There are no permanent faulty conditions on the airfield. Runway lighting on the active runway 03-21 was normal, lights on runway 14-32 were inoperative. There are no outstanding NOTAMS on the airfield. Airfield obstructions or field conditions did not contribute in any way to the probable cause of the accident.

20. Crash personnel at the fire station and the Base Operations dispatcher were alerted by the tower immediately after tower personnel had observed a fire north of runway 03. Fire equipment and medical personnel were dispatched with minimum delay - less than one minute from first observation by tower personnel. Base Operations dispatcher alerted the base hospital and other personnel by base crash system and/or telephone if crash alarm system was not answered. It was noted that the base crash alarm system in the control tower has not been connected. Although the response to the crash were quickly reported and acted upon it is considered important that the base crash system in the control tower console be connected. This will eliminate the need to relay information and avoid possibility of confusion.

FLIGHTSURGEON ACTIVITIES:

21. Fire control and casualty evacuation procedures were instituted immediately and proceeded efficiently, the first casualties arriving at the base hospital approximately 30 minutes after the crash occurred and a total of 33 survivors were evacuated to the hospital. Two field type ambulances and two Metropolitan type cadillac ambulances were utilized for the removal of the 24 litter patients. Traverse of the terrain from the end of the runway to the crash scene was accomplished slowly and with difficulty by the metropolitan type ambulances. Even slightly more uneven terrain would have rendered them useless. Had it been possible to utilize only the two available field type ambulances, evacuation would have been unnecessarily prolonged, delaying vital medical treatment.

22. Numbered tags were attached to the bodies of the 82 deceased personnel and to four isolated portions. The numbers were then plotted on rough map of the crash scene. A careful survey of the entire crash area for items of possible identification value was then conducted. Upon completion of this, the bodies and associated items of identification were individually placed on stretchers and removed via inclosed vehicle to temporary morgue. Identification of bodies was performed by a team consisting of dental and medical personnel of the 62nd Medical Group and three identification specialists from Wright-Patterson AFB. Positive identification of 97% of the bodies was completed 80 hours after the crash. Identification was rendered more difficult by inaccuracies of the passenger manifest. Apparently several of the personnel aboard the aircraft had not worn identification tags. As a survivability factor it should be noted, with one exception, that all immediate

survivors had fastened safety belts and were seated in the tail section.

23. The flyaway kit and elevator platform became torn loose on impact and acted as projectiles, traveling from the aft section through the center seating section of the main deck.

RAMP SECURITY

24. Security provided for the aircraft parking on ramp on Larson Air Force Base is provided by a roving patrol assigned to the ramp twenty-four hours a day. The patrol vehicle is equipped with a two-way radio and makes a complete coverage of the ramp approximately every ten minutes. The north perimeter of the ramp is lighted by two-way floodlights. The entire ramp is under tower scrutiny twenty-four hours per day. Security for parking ramp space utilized by the 82nd Fighter-Interceptor Squadron is furnished by the organization. Althought the accident investigation did not reveal any evidence of sabotage, the 20th District OSI was requested to make a background investigation of each person knownto have performed maintenance on or had contact with C-124 aircraft SN 50-100 since the last flight of long duration.

II FINDINGS

1. The crew experience and qualification was adequate according to Air Force standards.

2. The pilot had recently completed an instrument check and the condition for flights were not considered beyond his capability.

3. The 62nd TCW standing operating procedures requires revision to fit responsibility and proceedure for:
   a. Release of surface controls locks
   b. Visual check of the surface controls
   c. Requirements for use of landing lights.

4. The 62nd SOP does not fully explain the functions, limits and emergency operations of the snubber system.

5. The 62nd SOP does not fully cover operation of the aileron boost emergency system.

6. The crew members were in excellent physical condition for at least 24-48 hours prior to flight.

7. The aircraft was on an authorized transport training mission upon which military passengers were carried on a first came first served bases. Transportation of passengers on the flight was incidental to the training mission on a local plan known as "Operation Sleighride".

8. Crew was adequately briefed on weather and flight was cleared in accordance with AFR 60-16.

9. Weather was apparently no factor as a cause in this accident.

10. The form F, weight and balance for the aircraft, although within normal operating limits was inaccurately prepared.

11. Adequacy of control and manifesting of passengers was weak. The large number of passengers and the lack of experienced passenger handling personnel is considered a cause of the weakness.

12. Navigational aids were adequate.

13. There were no apparent condition of airdrome facilities nor obstructions that would have contributed to the accident.

14. Crash, fire, evacuation and identification activities were promptly initiated, efficient and orderly.

15. Metropolitan type ambulances are unsatisfactory for crash and rescue work. Two field ambulances are insufficient in number for crash rescue and evacuation work at Larson AFB.

16. Identification of deceased was hampered by the inaccurate manifest and the failure of several personnel aboard the aircraft to wear identification tags.

17. Survivability was definitely favored by use of safety belts and by being fortunate enough as to be seated in the tail section.

18. Passenger survivability was adversely affected when the elevator platform and the fly-away kit tie down tore loose in the aft passenger section.

19. Certain aircraft within the 62nd Troop Carrier Wing are equiped with the early type instrument panel lighting system. Aircraft 50-100 was one of these aircraft equiped with this type lighting. One UR was submitted.

20. Security of aircraft while on the parking ramp is considered adequate .

III RECOMMENDATION

It is recommended that:

1. The 62nd Troop Carrier Wing Standing Operating Procedures (SOP), 1 July, 1952 be revised with the intent of clarifying the existing crew procedures and responsibilities.

2. The 62nd Troop Carrier Wing SOP provide detailed instructions for unlocking and visual observation of flight control surfaces for freedom of movement before taxiing.