

APPENDIX 9

STOL FIELDS CLEARANCE REQUIREMENTS

“.....This manual provides guidance for the planning and establishment of STOLPORTS, unique airports designed to serve aeroplanes that have exceptional short-field performance capabilities. While "stolport" and "STOL aircraft" have not been precisely defined by ICAO, it is recognized that the capability of certain aeroplanes to operate safely in areas constrained by limited space, restricted terrain or both, offers economic and social advantages provided there are dedicated airports available.

A **STOLPORT** is “an airport whose physical characteristics, visual and non-visual aids and total infrastructure are created to support safe and effective public air transport in and out of densely populated urban areas as well as to and from rural areas with difficult terrain.”

As no Standards or Recommended Practices for stolports exist in any of the ICAO Annexes, this manual covers all the aircraft operating aspects of stolports except non-visual navigation aids. The airport terminal building and groundside operations are not addressed. The material in this manual is based on adaptations of conventional airport practices and on the experience of States that have operated stolports or complete STOL systems. It should, however, be noted that Stolport specifications included herein are *not* applicable to **ALTIPOINTS** which are constructed in mountainous regions, though some of the STOL aircraft in use today are designed to operate from altiports.

An **ALTIPOINT** may be defined as “a small airport in a mountainous area with a steep gradient runway, used for landing up the slope and for take-off down the slope, thereby making use of only one approach/departure area.”

On the other hand, the longitudinal slope of a STOL runway is flatter than even that prescribed for a runway designed for the operation of conventional aircraft and generally has approach/departure areas at both ends of the runway. Contemporary "short-field" aeroplanes fall into a rather narrow range with respect to size and performance. The guidance in this manual caters to that fact. The future of civil STOL aircraft development is uncertain, but should progress in this area lead to larger aeroplanes, a revision of some of the material in this manual will be required.....” **Foreword, STOLPORT Manual, Doc 9150-AN/899, Second Edition – 1991 (ICAO)**

1. INTRODUCTION

1.1 What has generally been accepted commonly in Nepal as “STOL fields”, do not necessarily fall under the definition of ICAO DOC 9150 as STOLports. Airfields like Lukla, Syangboche, Dolpa, Rara, Simikot clearly reflect the definition of ALTIPOINTS as defined by Doc 9150, as all these fields are located in mountainous regions, have a steep gradient runway and only one approach/departure path is used. Surprisingly however, Manang does not fit this definition of ALTIPOINT, despite being located at approximately 11000 ft above mean sea level as it does not have a steep gradient runway and departure/approaches are possible (with caution) from both ends of the runway.

Some STOL airfields located on a lower altitude, seem to partially fit the definition of an ALTIPOINT where the runway has a somewhat steep gradient and normally only one end of the runway is used for both arrival and departure eg. Salley and Bhojpur.



However, they cannot be classified as Altiports because of their low elevation. Kangelanda and Lamidanda both have fairly flat runways and both runway ends can be used for departure or arrival. Phaplu and Rumjatar, on the other hand, have steep runway gradients and although normally only one runway end is used for departure and arrival, it is possible to use both. Taplejung on the other hand is located on a mountain slope but has a fairly flat runway gradient, except for the arrival end but only one arrival and departure path. Most of Nepal’s STOL airfields are much more demanding and present a much higher risk factor than the STOLPORT concept described by DOC 9150.

1.2 The different and unique challenges presented by the STOL fields of Nepal make it difficult to determine a universal STOL field clearance procedure for every class and type of aeroplane or for every operator. What have been provided in this Appendix after three decades of study and experience, are the minimum requirements to be met by an operator and it is strongly recommended by CAAN for operators to opt for a more stringent clearance procedure to ensure that the flight crew will have sufficient experience and skill prior to being released for normal STOL operations.

1.3 SMS and SOP

While operators now are required to have a Safety Management System in place, particular attention must be paid by operators using STOL fields in their systems focusing particularly on this issue. The SOP too must have a section devoted entirely to the standard procedures to be followed by a flight crew for every STOL field to which it operates.

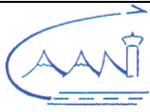
1.4 Flight Crew utilization

Operators should ensure that the flight crew maintain their proficiency and familiarization for the airfields and routes to which they operate. Consideration should be particularly given to crew who were previously operating to STOL fields but have not been engaged in STOL field operations for a number of years or even months.

The utilization of expatriate and foreign flight crew members who have never flown to STOL fields abroad or who have never flown in Nepal requires particular attention. Despite having a great many hours in type, their inexperience in flying in Nepal’s extreme flying environment presents a serious challenge to all concerned. Instructor-on-type does **not** automatically qualify a pilot for release for solo or with a copilot to any of Nepal’s STOL fields. This is of particular concern in the case of single-engined aeroplanes. The utilization of CRM and Human Factors principles in the rostering of crew as well as their implementation in flight must be emphasized.

1.5 Aircraft

Previous clearance requirements focused primarily on twin engined aeroplanes. The recent change of policy of permitting the continuation of operation of single-engined aeroplanes to and from STOL fields has yet presented even greater challenges. Every operator who operates such class of aeroplanes to Nepal's STOL fields must identify and include in their SOP, an emergency landing field or strip along the route in case



of engine failure, to which the aeroplane can safely glide and land. STOL field clearance for crew involved in such operations will naturally be more stringent than for crew flying multi-engined STOL aeroplanes. Operators that operate "tail-dragger" or tail-wheel type aeroplanes should as far as practicable refrain their flight crew from operating another type of aeroplane.

Certain airfields situated at a low elevation and categorized as STOL fields (eg. Ramechhap, Chaurjhari etc.) for multi-engined aeroplanes may not necessarily be STOL fields for certain aeroplanes like the PC-6 Pilatus Porter which has an exceptional short-field performance capability and for which a so-called "STOL" field is really a normal field.

1.6 Airfields

Each and every STOL field in Nepal is unique and has its own peculiar characteristics. A STOL pilot should be well acquainted with these characteristics before being released for solo or flights with copilots. STOL fields in Nepal range from the shortest field length of 1400 feet (Doti) to the longest at 2200 feet (Jumla, Jomsom and Phaplu). They range from the lowest elevation at 1,555 feet MSL (Ramechhap) to the highest at 12,297 feet MSL (Syangboche). They range from flat airfields to the steepest at 12% (Lukla). Rapidly changing weather and wind conditions in mountainous regions are both highly critical influential factors in the safe operations in these airfields. Narrow and busy routes through a particular mountain pass during peak travel season to some of these airfields provide further hazards to pilots operating to and from these airfields particularly if their aircraft are not equipped with ACAS equipment or flying solo.

1.6.1 Categories of STOL airfields.

In the case of single-engine aeroplanes, since it is assumed that pilots will initially fly as First Officers with Instructors and Line Captains for a number of years acquiring the required flight hours prior to being promoted to Captain, they will normally be first cleared to the STOL fields for two-pilot operations. Only after having gained considerable flight experience over a number of years in all seasons, should an operator consider releasing a pilot for solo operations to STOL fields. It is therefore assumed that by the time a pilot is released for solo, he will have already cleared the required STOL fields during his multi-pilot operational period.

Pilots shall be cleared to the following airfields with copilots categorically through Categories A, B and C; however, where an operator does not operate to any airfields in Category A, his pilots may commence clearing Category B airfields after having completed the preliminary requirements of Category B. Similarly where an operator does not operate to any Category B airfields, his pilots may, after having cleared Category A airfields, commence clearance of Category C airfields.



DEFINITIONS

Aerodrome Traffic Density

- a) *Light*. Where the number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements.
- b) *Medium*. Where the number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements.
- c) *Heavy*. Where the number of movements in the mean busy hour is of the order or 26 or more per runway or typically more than 35 total aerodrome movements.

Note 1. The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.

Note 2. Either a take-off or a landing constitutes a movement.

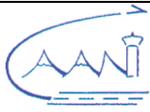
Aeroplane reference field length. The minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certificating authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for aeroplanes, if applicable, or take-off distance in other cases.

Slush. Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter, specific gravity: 0.5 upto 0.8.

Note.-Combinations of ice, snow and/or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water/ice content, will have a transparent rather than a cloudy appearance and, at the higher specific gravities, will be readily distinguishable from slush.

Snow (on the ground).

- a) *Dry snow*. Snow which can be blown if loose or, if compacted by hand, will fall apart again upon release; specific gravity: up to but not including 0.35.
- b) *Wet snow*. Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5.
- c) *Compacted snow*. Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.



(I) Category A airfields:

For Category A airfields,

- the first airfield of this category should be cleared after completing five missions* with an Instructor Pilot and checked by another Instructor Pilot in the sixth mission.
- The remaining airfields of this category may be cleared by an Instructor Pilot as per the approved Company Manuals.

1	Ramecchap	4	Baitadi	7	Darchula
2	Chaurjhari	5	Sanfebagar	8	Salley
3	Doti	6	Baglung	9	Bajhang

(II) Category B airfields:

For Category B airfields,

- a Pilot must have accomplished additional 50 STOL missions* to any Cat B airfield and every STOL field of this category should be cleared after completing at least five missions with an Instructor Pilot in each airfield and checked by another Instructor Pilot in the sixth mission.

1	Bhojpur	6	Bajura	11	Rumjatar
2	Taplejung	7	Rolpa	12	Khanidanda
3	Phaplu	8	Kangeldanda	13	Dhorpatan**
4	Jomsom (for multi-engine operations)	9	Thamkharka		
5	Jumla	10	Lamidanda		

(III) Category C airfields (ALTIPOINTS):

For Category C airfields,

- a Pilot must have accomplished additional 100 missions* in Cat C airfields.
- For multi-engine aeroplanes, after receiving the ATPL license, two years must be completed prior to beginning the clearance of CAT C airfields; and for single-engine aeroplanes, a minimum of three years for multi-pilot operations and four years for single-pilot operations after receiving the CPL license,
- Each airfield of this category should be cleared after accomplishing ten missions in each airfield and checked by an Instructor Pilot in the eleventh mission.

1	Lukla	4	Simikot	7	Langtang**
2	Manang	5	Rara	8	Jomsom (for single-engine operations)
3	Dolpa	6	Syangboche**		



Note- In certain instances where an operator does not operate to a particular aerodrome in Category C on a regular basis and it is not possible to clear his pilots with the required number of missions due to various constraints, clearances to such airfields is permitted as per the following procedure, provided that the pilots have already been cleared for at least two Cat C airfields:

- i) Company must notify CAAN for every pilot adopting this procedure stating the reason for the diversion from the normal procedure.*
- ii) The pilot shall perform a minimum of twelve Takeoffs and landings at that particular airfield within no less than three missions. He shall then be cleared by another IP in the next mission.*

*mission = For use of this document, a mission is defined as one complete sector commencing from the aerodrome of origin to the intended destination aerodrome culminating in a full stop landing. Such a completed sector shall fulfill one mission.

** single engine STOL operations

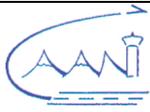
2. P-I-C CLEARANCE TO STOL FIELDS (AEROPLANE)

2.1 PIC clearances to STOL fields have been segregated in three parts viz; two-pilot operations in single-engined aeroplanes; single-pilot operations in single-engined aeroplanes and two-pilot operations in multi-engined aeroplanes.

2.2 A pilot will not be designated as Pilot-In-Command, for the destination to STOL airfields unless he has completed the experience in flight as specified below;

A) Aeroplane with multi-pilot operations (single-engined aeroplanes)

- 1) Upon obtaining P1 license from CAAN, a new pilot (designated as a copilot) shall fly a minimum of 100 flying hours logged as P1 with Instructor Pilot.
- 2) A pilot should have a minimum of total 2500 hours of experience in aeroplane category in which the minimum of experience mentioned below should be included and a clearance from the Instructor Pilot:
 - i) should have minimum of 300 hours logged as P1 airfields in Nepal to fly with colleagues; and minimum of 700 hours as P1 in STOL to fly with new copilots. The minimum number of landings required in STOL airfields to be mentioned in the Company Operations Manual. In the case of STOL airfields with Line Captains, accumulations of P1 hours only on return leg to base is allowed, while both ways may be logged as P1 when flying with an Instructor.
 - ii) should have minimum of 100 hours of flying experience in STOL airfield as P1 with Instructor Pilot.
- 3) Clearance to STOL airfields may be commenced categorically as mentioned in 1.6.1.



- 4) In the case of foreign Instructor Pilots on type, he must first fly a minimum of 400 hours and one year of flying experience in Nepal with Nepalese Instructor Pilots, Senior Line Captains or Senior Copilots (with more than 1000 flight hours in Nepal) before he is released with a new copilot. He must then receive a Clearance from the local Instructor Pilot or an authorized Senior Line Captain of the company before being released with new co-pilots. Such a clearance shall be required for every airfield to which the operator operates.
- 5) In the case where the operator does not have a local Instructor Pilot but only Line Captains and the foreign Instructor is required to fly with a copilot to clear his (copilot's) IP hours, the foreign Instructor shall fly to the destination STOL field with the Line Captain and on the return leg to base, he shall fly with the copilot to clear the copilot's IP hours. However, foreign Instructor Pilots who have accumulated a minimum of 400 hours of STOL flying experience in Nepal shall be exempted from this requirement.
- 6) Captains and copilots of multi-engine aeroplanes who already have previous STOL flying experience in Nepal need to fly a minimum of 50 hours with Instructor Pilots of single-engine STOL aeroplanes for type conversion. However, those with non-STOL experience or who have not flown STOL operations during the last five years must fly a minimum of 100 hours with Instructors prior to being released for normal flights.
- 7) Pilots who already have an Instructor Pilot rating in multi-engine aeroplanes and acceptable to the Director General, CAAN, shall be eligible to be endorsed with an IP rating in a single-engine aeroplane after acquiring a rating on type; accumulating a minimum of 100 hours of flight experience on type and successfully completing a checkride to the Check Pilot's satisfaction. However, in the case of tail-wheel type aeroplanes, he shall fly a minimum of 200 hours prior to applying for an IP rating.

B) Aeroplane with single-pilot operations (single-engined aeroplanes)

- 1) should have a minimum of total 5000 hours of experience in aeroplane category in which the minimum of experience mentioned below should be included:
 - i) should have a minimum of 2000 hours logged as P1 in Nepal in STOL airfields. In the case of STOL airfields with Line Captains, accumulations of P1 hours only on return leg to base is allowed, while both ways may be logged as P1 when flying with an Instructor.
 - ii) should have minimum of 100 hours of flying experience in STOL airfield as P1 with Instructor Pilot.
- 2) must have previously cleared as PIC, the particular STOL field in multi-pilot operations to which he intends to fly solo.
- 3) foreign pilots are prohibited to fly solo to and from Nepal's STOL fields until fulfilling the requirements of B 1).



C) Aeroplane with multi-pilot operations (multi-engined aeroplanes)

- 1) Upon obtaining P1 license from CAAN, the person shall fly a minimum of 50 flying hours logged as P1 with Instructor Pilot.
 - 2) Should have a minimum of total 2500 hours of experience in aeroplane category in which the minimum of experience mentioned below should be included:
 - i) should have minimum of 500 hours logged as P1 in Nepal in STOL airfields. In the case of STOL airfields with Line Captains, accumulations of P1 hours only on return leg to base is allowed, while both ways may be logged as P1 when flying with an Instructor.
 - ii) should have minimum of 100 hours of flying experience in STOL airfield as P1 with Instructor Pilot.
 - iii) one year of STOL experience in Nepal and has accomplished 100 missions on STOL airfields (for pilots who convert from non-STOL flying and have no previous STOL flying experience).
 - 3) Clearance to STOL airfields may be commenced categorically as mentioned in 1.6.1.
- 2.3
- a) In the case of foreign Instructor Pilots, he must first fly a minimum of 400 hours with Nepalese Instructor Pilots and/or Line Captains. He must then receive a Clearance from the local Instructor Pilot or a company authorized Senior Line Captain of the company before being released with co-pilots. Such a clearance shall be required for every airfield to which the operator operates.
 - b) In the case of foreign Line Captains with or without type rating, he must fulfill the requirements of C 1), 2) and 3).
 - c) In the case where the operator does not have a local Instructor Pilot but only a Line Captain and the foreign Instructor is required to fly with a copilot to clear his (copilot's) IP hours, the foreign Instructor shall fly to the destination STOL field with the Line Captain and on the return leg to base, he shall fly with the copilot to clear the copilot's IP hours.

3. REFERENCES

- STOLPORT Manual, Doc 9150-AN/899, Second Edition – 1991 (ICAO)
- UNDP/ICAO PROJECT : NEP/82/009 - HIGH ALTITUDE STOL PERFORMANCE CRITERIA STUDY (DHC-6/300 Series Twin Otter Aircraft) - His Majesty's Government of Nepal – February 1998
- ANNEX 14 VOLUME I - AERODROMES