Guidelines for NATO SOF Helicopter Operations

September 2016
NSHQ MANUAL 80-005

GUIDELINES FOR NATO SPECIAL OPERATIONS FORCES HELICOPTER OPERATIONS

REFERENCES:

1. **Status.** This publication is a revision of the *Guidelines for NATO Special Operations Forces Helicopter Operations*, dated 15 Nov 2013.

2. **Purpose.** To serve as a guideline to assist Nations in the process of developing and implementing special operations forces (SOF) rotary-wing tactics, techniques, and procedures and improve interoperability between Alliance and partner assets. In the hierarchy of NSHQ publications, this manual is nested below the *Special operations Component Command (SOCC) Manual* and the *NATO SOF Air Operations Manual*.

3. **Applicability.** This publication is applicable as a baseline document for NATO SOF helicopter operations performed by special operations air task units and is also useful for conventional air units that support SOF. It is not directive in nature, but intended as a guide. Recommendations within this manual are based upon reference publications and best practices.

4. **Publication Updates.** This publication will be reviewed at least annually by the proponent and updates will be made as needed. Suggestions for updates should be directed to the proponent.

5. **Proponent.** The proponent for this publication is the NSHQ Education and Doctrine Division, Air Development Programme.

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PREFACE

1. Special operations are those military activities conducted by specially designated, organized, trained, and equipped forces using operational tactics, techniques, and modes of employment that are not standard to conventional forces. According to NATO special operations forces (SOF) policy and doctrine, special operations are, by nature, joint. This essential characteristic, the inherent jointness of the forces involved and the operations those forces conduct, is the key to understanding special air operations warfare.

2. Just as their land and maritime counterparts, special operations airmen conduct special operations across the spectrum of conflict using whatever equipment they have available in unconventional and innovative ways. Special air warfare is, simply, special operations performed by airmen. For the purpose of this manual, special operations air task units (SOATUs) and forces may be provided from the troop-contributing nations’ (TCNs’) army, navy, or air forces. The term airman, as it is used in this manual, refers to any individual, regardless of service affiliation, gender, or rank, who understands and practises the application of air power principles and doctrine. While pilots and other aviators are certainly airmen, the term airman includes the entire range of operations and support specialties required to effectively apply air power in order to achieve joint force commander objectives.

3. Certification and designation as a special operations unit remain a national responsibility. The Guidelines for NATO SOF Helicopter Operations is provided as a tool to assist those nations who are in the process of developing their aviation capability to the minimum standards of an SOATU. The Guidelines offers a compendium of best practices and recommended procedures to assist nations in achieving the interoperability and standardization necessary to be part of an effective NATO special air warfare force.

4. The Guidelines for NATO SOF Helicopter Operations is written at the tactical level and conforms to recent changes in special operations doctrine, AJP-3.5(A)(1), Allied Joint Doctrine for Special Operations, and the SOF Air Operations Manual. The Guidelines is not a doctrinal publication but supports all applicable Allied joint publications and is subordinate to the NATO Special Operations Headquarters (NSHQ), Special Operations Component Command (SOCC) Manual, as shown in the diagram below.
5. The Guidelines provides rotary-wing (RW) aircrews with a reference to the various facets of conducting RW operations in support of special operations. The Guidelines is not intended to replace any country’s doctrinal or reference manual, to serve as a standard operating procedure (SOP), or to be considered a mandate or regulation. It is not a replacement for intuition, experience, and judgement based on the situation. The checklists, briefing guides, and examples in this manual illustrate important concepts; however, they are provided only as a starting point for critical thinking, mission planning, and execution. For the purpose of this manual, the term may indicates an acceptable or suggested means of accomplishing an action or manoeuvre, whereas should indicates a recommended procedure based on best practices/lessons learned. In all cases, the ultimate authority for determining tactics, techniques, and procedures (TTP) resides with the TCN.

6. Important information is highlighted throughout this manual. The following icons focus the user’s attention on the crucial pieces of information and best practices.
<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
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<tr>
<td><img src="image" alt="Thumb Up" /></td>
<td><strong>Best Practice.</strong> This icon highlights ideas and processes that have proven successful during real-world operations and exercises. Best Practices offer tips and strategies that may help the user succeed.</td>
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<tr>
<td><img src="image" alt="Key" /></td>
<td><strong>Important Note.</strong> This icon highlights the most important (key) concepts that users will want to remember and offers reminders of information provided elsewhere in the manual.</td>
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<tr>
<td><img src="image" alt="Red Flag" /></td>
<td><strong>Red Flag.</strong> This icon serves as a warning to users, highlighting common pitfalls so that users can avoid making the mistakes others have made in the past.</td>
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CHAPTER 1 – GENERAL

1-1. Introduction

a. Special operations airmen share many of the same characteristics as land or maritime SOF. They are trained beyond basic military skills; they have a high level of competency in more than one discipline; they are often supplied with specialized equipment; and they maintain very high levels of readiness.

b. These Guidelines for NATO SOF Helicopter Operations provide TTP to those RW units that are working toward SOF qualification. They are also used by RW units already designated as an SOATU and are maintaining a habitual, peacetime relationship with land and/or maritime SOF, who themselves are trained to perform the three principal SOF tasks (military assistance (MA), special reconnaissance (SR), and direct action (DA)).

c. RW SOATUs may be deployed as stand-alone units, as part of a national special operations task group (SOTG), or if more than one SOATU is present, they may be grouped into a special operations air task group (SOATG). Occasionally, in an MA role for example, an SOATG will be the only SOF in theatre. It is more often the case that an SOATG will work alongside an SOTG within a larger SOCC. In larger deployments, when there are sufficiently large numbers of SOATGs in a given theatre, the SOCC commander (COM SOCC) may create a command, control, apportionment, and tasking headquarters (HQs) called a special operations air command (SOAC).¹

1-2. Special Operation Forces Air Capability Development

a. In most cases, the first step for a nation interested in developing a RW SOF air operations capability is to establish a habitual relationship between a conventional RW unit and the nation’s land or maritime SOTGs. Once a unit has been assigned to assume the special operations supporting role, resources dedicated to the assigned unit will need to be increased to a level that allows that RW unit to achieve and maintain at least a high-readiness posture.

b. The next step is to recognize that special air warfare units must be prepared to execute air support tasks that exceed the capability of conventional RW forces. This requirement introduces a need for additional specialized aircrew training in tactics and procedures that are beyond those assigned to the conventional RW forces of the nation.

1-3. Special Air Operations Capabilities and Limitations

a. In all aspects of special operations, humans are more important than hardware. This means that special operations RW aircrew will often use conventional helicopters to achieve unconventional results. Some nations have fielded very specialized, purpose-built aircraft, while other nations have been able to achieve very good results with some after-market modifications to aircraft already in use by their conventional fleets.

¹ Occasionally, and particularly on exercises, a group of SOATUs may be commanded directly by a SOAC.
b. NATO has detailed the outline RW SOATU capabilities in the *Bi-SC Capability Codes and Capability Statements*, which are duplicated in Chapter 5.
CHAPTER 2 – SPECIAL AIR TRANSPORT

2-1. Introduction

a. One of the main roles of RW SOATUs is the transport of SOF personnel and equipment in support of the SOF principal tasks: MA, SR, and DA. These transport missions frequently involve extended ranges and difficult flying conditions (e.g. low illumination levels, harsh environments, high threat levels). The movement, pre-positioning, and resupply of these personnel and their caches, which is often conducted in a discreet or covert manner and which is critical to the overall SOTG’s success, are carried out by SOATUs conducting special air transport (AT).

b. Nowhere are special AT missions more prevalent than when supporting MA missions. Personnel movement is particularly important as SOTGs teach friendly security forces how to employ rapid reaction forces to re-establish secure and stable environments. As in any unconventional conflict, it is often difficult to distinguish friend from foe, which makes force protection, rules of engagement (ROE), and contingency planning critically important.

c. SR missions with special AT support are almost always flown as covert operations requiring stealthy tactics and high regard for operations security (OPSEC). Although often flown by specially equipped helicopters, special operations airmen may employ conventional helicopters and use specialized tactics in order to accomplish these missions. Special operations aircrews frequently use low-profile airborne reconnaissance (RECCE) support to facilitate the delivery of personnel and equipment on particularly discreet AT missions. By using the advantages of night vision goggles (NVGs), careful route selection, forward arming and refuelling points (FARPs), and cunning deception plans, special air operations are regularly able to achieve success without the need for specialized helicopters.

d. Special AT missions include infiltration (Infil.) and exfiltration (Exfil.), which are beyond the air mobility capabilities of conventional units due to distances, threats, environments, or risks. RW SOATUs may support a DA mission through special AT directly to the objective, or to a landing zone (LZ) that may be displaced from the target, so as to maintain OPSEC while achieving COM SOCC’s mission objectives.

2-2. Key Considerations for Special Air Transport

a. **Access to Intelligence.** Many of the AT missions performed by SOATUs will be at the extreme edges of, or even beyond, the boundaries of conventional land forces, making access to timely intelligence a critical element to mission success. Reliable intelligence allows SOATUs to plan discreet routes, to assess the intent of the local population, and to exploit the advantages that may be present due to low visibility phenomenon (e.g. low illumination nights, localized weather).

b. **Operations Security.** While the aforementioned principles give an advantage to SOATU crews, they also give paramount importance to the principle of OPSEC. The *bird’s-eye view* of friendly forces, especially SOF, must be protected from both deliberate and
accidental disclosure. Minimal map markings, short-term codes, and compartmentalization of supported units’ mission parameters are just a few of the tools necessary to ensure OPSEC for SOATU missions. Avoidance of lines of communication (LOC) and population centres, as well as enemy forces, is usually necessary. Execution of multiple false insertions is also useful, as these complicate the enemy’s ability to discern SOF intentions and/or actions.

2-3. **Currency Requirements of Aircrew.** Currency requirements are detailed in the *NATO SOF Air Operations Manual*. However, currency is not the same as proficiency, and it is essential that SOF aircrew be proficient in the mission areas the SOATU is tasked to support.

2-4. **Mission Planning**

a. Two of the key differences between special AT missions and conventional AT missions are the relative isolation from conventional support and the increased OPSEC requirements of SOF. SOF depend heavily on surprise, speed, and audacity to accomplish missions where the enemy often has the advantage of numbers and is operating from his home terrain. The *NATO SOF Air Planning and Briefing Guidelines*, created by the NSHQ Air Development Program, provides a comprehensive guide to how to plan a SOF air mission; it includes a variety of useful planning templates.

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[Important Note. Whenever possible, the aircrew should develop the plan in collaboration with the supported forces or unit representatives. Collaborative planning will save time and give the ground teams and aircrews a better understanding of each other’s capabilities and limitations. Collaborative planning greatly increases the probability of mission success.]
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b. The challenges these differences between SOF and conventional AT present are overcome by careful planning and the exploitation of the strategic resources that can be accessed through the SOATG HOs, the SOAC, or the SOCC. Pre-mission planning must include a thorough RECCE of the route of flight and the objective area, selection of Infil./Exfil./LZ locations with backups and deception plans, and flight training and rehearsal for the aircrew and ground personnel. As in any military planning cycle, leaders should endeavour to abide by the *one third–two thirds* rule, thereby ensuring subordinate commanders and crews have ample time to complete their own planning cycles.

c. Special AT missions should be thought of in five phases.

   (1) Ground tactical phase.

   (2) Landing phase.

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2 The *one third–two thirds* rule is a time management technique wherein the commander uses one third of the planning time available to develop his planning products and leaves two thirds of the time available for subordinate commanders to conduct their own pre-mission planning and rehearsals.

3 The phases are explained in the *NATO SOF Air Operations Manual*. 
(3) Air movement phase.
(4) Loading phase.
(5) Staging phase.

d. **Rehearsals.** Rehearsals, and in some cases specific pre-mission training, are key elements to successfully executed special AT missions. Rehearsals can range in methodology from electronic simulation to rehearsal of operational capabilities (ROC) drills and should be performed whenever time allows. As a minimum, the SOATU mission commander, the SOTG commander, and the aircraft captains from each aircraft are required to attend. Examples of events to be rehearsed include airspace deconfliction, integration with joint fires, route deconfliction, overall mission execution, and downed aircraft procedures. A typical agenda for a rehearsal is:

(1) Time check—if not using global positioning system (GPS) time.
(2) Roll call.
(3) Opening remarks and quick review of overall mission.
(4) List of phases and methodology.
(5) Phase rehearsals.
   (a) What events preceded this phase?
   (b) Location of all relevant forces at beginning of phase.
   (c) Walk-through/fly-through/talk-through of key phase events.
   (d) Key decision points and contingency plans.
   (e) What events will follow this phase?
(6) Wrap-up.

e. **Mission-specific Training.** For the majority of missions, rehearsals of varying degrees will be sufficient to help ensure mission success; however, in some instances the SOF solution will be so unique that it will require mission-specific training. This training could involve new equipment, new TTP, or even new aircraft.

f. **Flight Package Composition.** Mission requirements will dictate the number and types of aircraft required. Team transport, on-scene command and control (C2), escort/fire support, and personnel recovery (PR) considerations must be accounted for. In addition, an airborne quick reaction force (QRF) should be considered.

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4 ROC drills are a means of rehearsing key mission phases in abbreviated timelines, using 3D models ranging in complexity from lines in the dirt to professionally engineered scale models.
g. **Landing Zone Selection Best Practices.** The SOTG will provide operational requirements (proximity to target, offset distances, OPSEC, ground threats, etc.) for the LZ. Helicopter landing zones (HLZs) may be any surface that provides rotor clearance, safety of flight, and that can support the weight of the helicopter. Weight considerations can be mitigated by maintaining power and remaining *light on the skids or wheels* during troop deployment and extraction. The SOATU aircrew will work with the SOTG and intelligence planners to choose the optimal LZ and the fastest insertion/extraction method (e.g. landing, fast rope), taking into consideration the objective area’s size, shape, slope, proximity to defensive positions for ground personnel, hazards in the terminal area to include enemy threats (e.g. obstacles, improvised explosive devices, rocks, blowing dust), and the overall security of the site.

**Important Note.** Mission success is dependent on the aircrew being able to land or hover the helicopter in the pre-planned location on the LZ (e.g. in the north-west corner of the LZ facing east). During mission preparation, aircrews should use all available means when selecting the LZ, to include area satellite imagery, local area maps, and computerized flight planning tools. In addition, the aircrew should conduct a detailed route study of the planned flight path from the release point (RP) to the LZ, focusing on prominent terrain features, obstacles, landmarks, and cultural lighting, to ensure the aircrew can correctly identify the LZ on final approach.

h. **Night Operations Considerations.** SOF generally prefer to conduct operations at night in order to manage risk and to achieve surprise on the target. SOATUs should be able to execute operations in minimal illumination conditions, as well as during *transition conditions* (dawn/dusk), which can be difficult for NVG operations. Other factors for planners, mission commanders, and aircrew to consider include terrain obstacles, open-water illumination, meteorological obscurants, and low light/dark physiological illusions.

2-5. **Execution**

a. **Infiltration/Exfiltration.** The primary goal of an Infil. or Exfil. mission is to insert or to extract a team successfully onto/from the objective (e.g. LZ, building, deck) undetected or in such a manner as to preclude an effective enemy response that could jeopardize the mission.

   (1) **Ingress**

   (a) Aircraft will ingress to the objective at either nap-of-the-earth (NOE) altitudes or above any land-based weapon’s threat band. In the latter case, aircrew will need to employ effective threat band transition tactics, as explained in Annex A.

   (b) If permissible, pre-landing RECCE of the insertion/extraction area ensures that the aircrew are aware of any differences in the pre-flight
briefing and the actual objective upon arrival. This RECCE could be provided by pathfinder helicopters as part of the Infil. package, tactical- or operational-level intelligence, surveillance, and reconnaissance (ISR) assets (e.g. SOTG SR teams, remotely piloted vehicles (RPVs), or other RECCE aircraft), or theatre ISR assets.

(c) When ingress requires integrated ISR and/or fire support, strict adherence to planned timings is critical to ensure synchronization and avoid fratricide.

(2) Approach

(a) During an approach, the aircrew confirms the location and timing are correct, that mission parameters are still valid, and that the enemy forces are suppressed or distracted.

(b) Environmental conditions (e.g. brown-out, white-out, excessive lighting) may require aircraft to sequence into the LZ. Power considerations, as well as dissimilar aircraft rotor wash characteristics, must be addressed during pre-mission planning to determine adequate aircraft spacing and timing. Environmental consideration and phenomena are discussed in Chapter 4.

(c) For an Exfil., it is critical to authenticate the identity and threat posture of the objective area prior to extraction in order to avoid being drawn into an ambush. Secure communications combined with authentication procedures (coloured smoke/flares at a specific time, use of isolated personnel reports (ISOPREPs), verbal challenge and response, etc.) reduce this risk. Positive authentication should occur at predetermined times during the approach, with a final visual authentication completed prior to touchdown. A typical communication sequence for rendezvous with a ground party is included in Annex A.

(d) Insertion and extraction by landing is the most expeditious method of moving a team and should be used whenever possible. However, objective area characteristics may necessitate an alternative technique; some of these alternative insertion and extraction (AIE) techniques are outlined in Annex A.

(e) Annex A includes some recommended best practices for tactical approaches.

(3) Departure

(a) Since the objective area is where aircraft are at their greatest risk, an expeditious departure is in order. A formation departure may enhance formation integrity, but may also put the entire formation at increased risk. Departing sequentially, or simultaneously in different directions, and rejoining the formation en route should be considered as a less risky option.
(b) Tactical departure best practices are included in Annex A.

(4) **Egress.** Egress techniques are very similar to ingress, except for the increased risk due to the loss of surprise. An effective deception plan incorporating false LZs, distracting fires, and varied routings will ensure the security of both ground teams and SOATU crews.

b. **Fire Support**

(1) Effects from fire support can aid in the deception, distraction, and dislocation of the enemy, and are useful in maintaining the SOATU’s element of surprise. These effects may be brought to bear by:

(a) Organic fire support (e.g. fixed-wing (FW) gunships, attack or armed helicopters, snipers) from within the SOATU.

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<tr>
<th>Important Note.</th>
<th>In some cases the RW aircraft used for insertion or extraction may also be the only available fire support platform. Aircrews must plan accordingly in order to provide effective suppressive fires for the ground team.</th>
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<td>(b) Direct support from theatre air/aviation assets (e.g. attack helicopters (AHs), FW close air support (CAS), or armed RPVs).</td>
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<tr>
<td></td>
<td>(c) Direct support from conventional land or naval indirect fire assets (e.g. artillery, rockets, naval gunfire, or missiles).</td>
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<td></td>
<td>(d) General support from theatre-level assets.</td>
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(2) In many scenarios, it is useful to employ joint fires to distract the enemy away from the potential objective, to suppress the enemy near the real objective, or to confuse and dislocate the enemy.

c. **Actions on Contact**

(1) Actions on contact will always be briefed for special air operations missions and will need to address ROE and the national caveats for all mission participants. For many SOATU missions, mission primacy will influence both the actions on contact and the timeliness of downed aircraft recovery. In some cases, downed aircrew will be expected to destroy the aircraft, secure any classified material, and then integrate into the land force until mission completion and extraction.

(2) Some recommended best practices for actions on contact are included in Annex A.
CHAPTER 3 – TACTICAL FORMATION FLYING

3-1. **Introduction.** The purpose of this chapter is to expand upon the SOF-specific formation flying requirements and procedures. Formation flying techniques allow for effective employment and control of two or more aircraft to accomplish a mission; practically every RW SOATU operational mission will require a formation of aircraft. The tactical helicopter formation offers good mutual support between individual aircraft, sections, and/or elements; should be manoeuvrable and manageable; and should minimize vulnerability to enemy attack. Tactical formations supporting SOF cannot be rigid; they must remain flexible and agile to adjust to terrain, the enemy, and environmental conditions. RW SOATU airmen need to be completely comfortable with and proficient in ATP-49(G) formation operations.

<table>
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<tr>
<th><strong>Best Practice.</strong></th>
<th>While there are no fully agreed terms and definitions among NATO countries about formation definitions, the following can be used as guidelines for naming the units and leaders in a formation:</th>
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<tr>
<td><strong>Chalk number or aircraft call sign</strong></td>
<td>Individual aircraft.</td>
</tr>
<tr>
<td><strong>Section, flight, or element</strong></td>
<td>Sub-component of multiple aircraft.</td>
</tr>
<tr>
<td><strong>Formation</strong></td>
<td>Complete package; may consist of multiple sections/flights/elements.</td>
</tr>
<tr>
<td><strong>Air Mission Commander</strong></td>
<td>Commander of the complete air mission.</td>
</tr>
<tr>
<td><strong>Section lead, flight lead, element lead, or formation lead</strong></td>
<td>Commander of the particular section/flight/element/formation, who can be the air mission commander (AMC).</td>
</tr>
<tr>
<td><strong>Formation lead aircraft</strong></td>
<td>The first aircraft in the formation and responsible for the navigation, timing, and obstacle avoidance but does not necessarily have to be the commander.</td>
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Before commencing a multinational/dissimilar formation flight, the terms and definitions, as well as the (brevity/codeword) communication used, have to be clear to everyone.

3-2. **Key Principles.** Formation benefits include mutual support, threat detection, control, mass, flexibility, and unity of effort.
3-3. Operational Requirements Summary

a. Members of a RW SOATU must be able to conduct formation flight in all terrains and in weather conditions with ceilings as low as 500 feet (ft)/160 metres (m) (day or night) and visibilities of 1 nautical mile (NM)/2 kilometres (km) (day), and 2 NM/4 km (night). Capitalizing on the principle of surprise, most SOATU formations will be conducted at night; therefore, aircrew must be completely proficient in conducting NVG formation operations.

b. Larger SOF missions may require participation from more than one contributing nation, raising the likelihood of dissimilar aircraft formations. Special operations missions often require aircraft to fly within very tight parameters (e.g. proximity to obstructions or other aircraft, operations at the edge of the flight envelope). Aircrew must be able to conduct formation flights with as little as one rotor disc spacing (equal to the largest aircraft rotor disc in the formation).

Important Note. When conducting dissimilar formation flight, it is essential that each member of the formation become familiar with the flight characteristics, power limitations, and SOPs of the other aircraft in the formation.

Best Practice. Before conducting dissimilar formation flight, each aircraft commander should give a capabilities briefing on their aircraft to the rest of the formation. This briefing should cover flight characteristics, power limitations, and SOPs with emphasis on the approach and take-off considerations.

Best Practice. Whenever possible, a familiarization formation training flight should be conducted prior to conducting operational missions.

3-4. General Technical Requirements. Formations must have both intra- and inter-formation secure communications. All formation aircraft must have internal and external NVG-compatible lighting. Non-NVG, overt lighting can become NVG compatible by making approved taping/painting/filtering modifications.

3-5. Currency Requirements of Aircrew. Pilots must have flown an NVG formation flight within the period mandated by their nation or NATO.
Important Note. As aircrew transition to becoming SOF qualified, it is critical the preponderance of their flying hours be conducted at night and under NVGs in order to simulate the most probable flying conditions that will be required of them during combat and contingency operations.

3-6. Formation Responsibilities. The clear delineation of responsibilities is crucial to a successful formation mission.

a. Command and Control

(1) Similar to conventional AT missions, the overall mission command lies with the ground force commander (GFC), who in the SOATU’s case is almost always a land or maritime SOF commander. The command of the aviation mission to support the GFC is given to the SOATU’s AMC. In the case of large formations or missions that require complex formation duties, it is common for the AMC to delegate control of the formation to a formation lead; however, the AMC occasionally retains these duties.

(2) While airborne, the AMC is responsible for all decisions affecting the outcome of the special AT mission and will confer with the GFC for any decision that could impact the GFC’s overall mission. It should be noted that there are occasions when the AMC may elect to command from outside the formation proper, either in a C2 aircraft or from a ground station.

b. Formation Lead Responsibilities. Discipline is perhaps the most important element for successful formations, and a proactive and directive formation lead is the key to formation discipline. Formation lead qualifications should be confined to only the most qualified, experienced, and proven aviators.

(1) The formation lead is responsible for planning, organizing, and briefing the mission; leading the formation; delegating tasks within the formation; and ensuring formation integrity, discipline, and mission accomplishment.

(2) During mission planning and execution, formation leads must be aware of aircraft and aircrew capabilities/limitations.

(3) Formation leads must be assertive in identifying unacceptable risks and then seeking alternatives with the AMC.

(4) The formation lead must direct or pre-brief all formation changes, manoeuvring, radio changes, lead changes, and other operational requirements in a positive and professional manner.

c. Wingman Responsibilities. SOATU wingman responsibilities are the same as those addressed in ATP-49(G); however, SOF missions will sometimes be flown in very confined airspace and in constantly changing environments that can challenge wingmen
to maintain formation integrity while still allowing lead maximum leeway to manoeuvre. Wingmen must have a thorough understanding of the commander's intent so they too have the flexibility to safely deviate from the plan and still meet the mission objectives.

3-7. **Mission Planning.** Mission planning must address the communication plan, the instrument meteorological conditions (IMC) avoidance and break-up plan, the bump plan, and procedures for departure, en route, terminal operations, and arrival. If dissimilar aircraft are involved in the mission, they should be separated into sections or elements of similar aircraft. Aircraft performance (e.g. cruise airspeeds, climb capabilities) and inclement weather capabilities are logical element/section discriminators. If an aircraft has a significant inclement weather navigation capability (e.g. weather radar, terrain following/terrain avoidance radar), then it can serve as a pathfinder for other aircraft. If mission requirements/aircraft availability dictate(s) dissimilar aircraft within the same section/element, pre-mission flight training is required to address the often dramatic differences in aircraft flight characteristics, capabilities, visual references, and operating procedures. Mission planners should seek to exploit national strengths or equipment fits and allocate different national units to specific tasks or mission phases. Detailed advice on mission planning can be found in the *NATO SOF Air Planning and Briefing Guidelines*.

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**Important Note.** For further information on multinational considerations or briefing guidance concerning dissimilar formations, refer to ATP-49(G) and the *NATO SOF Air Planning and Briefing Guidelines*.

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a. **Formation Pattern.** The formation pattern(s) and flight profile(s) that best meet the requirements for a mission will be influenced by the tasks to be accomplished, terrain, weather, threat, available aircraft, and aircraft performance capabilities. Helicopter tactical formations may be flown at close, loose, or extended spacing, depending on operational considerations. If more than three aircraft are required for the mission, consideration should be given to breaking the flight into smaller elements; this will aid in terrain masking, OPSEC, and threat manoeuvring.

b. **Formation Communications.** The formation lead is normally responsible for external formation radio calls, but may assign additional radio responsibilities to wingmen (e.g. Chalk Two makes all *ops normal* calls). Since SOF missions will likely include complex communications, the formation communications plan should be as simple as possible. Formations will use chalk position numbers when communicating on a discreet intra-formation frequency (e.g. “Two”). If on a non-discreet frequency, all calls will be answered with full call sign (e.g. “Hawk Two” for number two of the Hawk flight).

c. **Radio-Silence or Communications-Out (Comm-out) Formation.** During pre-mission planning, the feasibility of conducting a formation flight without in-flight communications can be addressed. This increases overall OPSEC and can greatly reduce the flight lead’s workload.
d. **Bump Plan.** Bump plans are the procedures for adjusting aircraft loads in order to maintain minimum force requirements. Numerous factors could result in losing an aircraft: pre-launch unserviceability and mechanical aborts on take-off or en route are typical reasons. The SOF GFC will determine the minimum ground force required to conduct the mission. The AMC and/or formation lead will then match the aircraft capabilities to accommodate the ground force lift requirements. The bump plan addresses the procedures for adjusting the aircraft loads among the remaining aircraft. Again, the larger the formation, the more complicated the bump plan will be. Developing a thorough bump plan during pre-mission planning can eliminate, or at least minimize, confusion during mission execution.

e. **Departure.** The formation lead will plan to take off simultaneously (formation take-off) if sufficient space is available (e.g. runway); otherwise, pre-planned spacing (staggered take-off) will be used. Staggered take-offs have the added benefit of disguising the overall size and intent of the formation. Some best practices for formation departures are included in Annex A.

f. **En Route.** Flight routes, threat avoidance, threat response, rejoins, loss of aircraft, and inadvertent IMC procedures must all be pre-planned. The formation lead will determine the type of formation to be flown, taking into account terrain, threat, formation size, weather, and helicopter performance characteristics. ATP-49(G) describes the battle and trail formations most commonly used by SOATUs.

g. **Arrival.** After a mission is complete, aircrew must remain vigilant against complacency at arrival. Until the aircraft are shut down in parking, mishap potential remains.

3-8. **Execution Best Practices**

![Figure 3-1. Formation Operations](image-url)
a. **Communication.** Communications are typically one of the most frustrating and confusing aspects of formation operations. The larger the formation, the more problems communications present. Aircrew should minimize transmission length and frequency, allowing air time for other important inputs and time to process information without *friendly communications jamming*. The communications plan should be developed for minimum frequency changes. The most effective means of formation communications is accomplished by using proper radio discipline. Transmissions should be accurate, clear, and concise. *Get well* frequencies are pre-briefed radio frequencies that allow formations to recover to the same frequency when they have lost (mischannelled) communications. Additionally, chattermarks can be used for OPSEC reasons if the flight becomes *lost* on the radios. A chattermark is a code word that can be transmitted on Guard frequency to direct the flight to a specific, pre-planned common frequency. One technique to avoid unnecessary communications is to designate navigation waypoints as frequency changeover points; this way, the entire formation knows which frequencies to monitor and when.

b. **Departure.** A formation that is not organized before departure is prone to a very difficult or possibly failed mission.

1. **Communications Preparations.** Maintenance personnel, or additional crew members, should conduct communications checks on all required radios well before scheduled take-off to give every opportunity to fix discrepancies. Secure radios should be checked to ensure the correct cryptography fills are loaded. The formation lead will typically conduct a formation communications check sometime prior to engine start. Communications check procedures should be thoroughly understood by all formation members.

2. **Departure Radio Calls.** The formation lead will normally make the radio calls for the formation to include start, taxi, and take-off. Radio frequency changes can be either directed by the flight lead or can occur sequentially as briefed (e.g. frequency change from clearance, to ground, to tower after calls are made). If the formation lead directs a frequency change, it should be acknowledged through the formation by each chalk sequentially. If any aircraft does not check in on the new frequency, the formation lead will attempt contact on the previous frequency or on another radio.

c. **En Route.** Two of the biggest threats to helicopter survival are impact with fixed objects (e.g. terrain or man-made obstructions) and impact with another formation aircraft. The wingman position is critical to minimizing aircraft-aircraft mishaps.

1. **Formation Positioning.** Wingmen determine the correct positioning relative to the preceding aircraft by visual cues (e.g. horizontal stabilizer relationship with fuselage, tail rotor gearbox relationship with main rotor head). Sight limitations at night may require night cues different than day cues (e.g. position of fuselage lights). Aircrew must be proficient using both day and night cues to determine and maintain appropriate aircraft formation positioning.
Red Flag. The inability to detect closure rates on NVGs necessitates minimizing the time spent in the 6 o'clock position of the preceding aircraft, especially during formation decelerations.

(2) **Small (Two to Three Aircraft) Formations.** For small daytime SOF missions, the *battle formation* is a good option with the advantages of individual aircraft maneuverability and terrain masking, threat recognition, mutual fire support, and enemy targeting difficulties. However, for night or limited visibility operations, the preferable formation will be *trail formation* because of its advantages of formation control, precision navigation, visual connectivity between aircraft, and force concentration during landing.

(3) **Medium (Four to Seven Aircraft) Formations.** Formations larger than three aircraft should be broken into smaller elements if possible. However, if the tactical environment/mission precludes breaking down the formation, the trail formation would be preferable, for the same reasons as mentioned above. The trail formation is especially beneficial when weather/restricted visibility is a factor, such as at night, since depth perception and peripheral vision are severely restricted during NVG operations. For very low altitude NVG flights (i.e. less than 50 ft), wingmen must position themselves to simultaneously see both the approaching terrain and the preceding aircraft. If the flying pilot's head needs to move (NVG peripheral vision restriction) to see either the approaching terrain or the preceding aircraft, then the flying pilot may have a delayed reaction time to obstructions (e.g. trees, wires, poles) or to the manouevring of the preceding aircraft. The optimum position is with wingmen in the 60-degree cone (i.e. 30 degrees either side) off the preceding aircraft’s tail.

(4) **Large (More than Seven Aircraft) Formations.** If mission requirements dictate more than seven aircraft, OPSEC can be severely jeopardized if the formation is maintained in a single body. The formation lead should break the formation into separate elements if at all possible. Route planning must address the deconfliction of these elements. For mission OPSEC, elements should avoid overflying the same terrain; elements should plan to rendezvous in a coordinated manner either on, or just short of, the objective. Precision navigation, in terms of location and timing, is absolutely critical to an SOATU large formation’s mission success.

(5) **Weather Avoidance.** Pre-mission planning must address potential weather hazards and the actions to be taken if adverse weather is encountered. Formations should first attempt weather avoidance by adjusting the route. Another technique would be to send the most weather capable aircraft (i.e. one with weather radar) ahead to scout potential routes while the other formation aircraft remain in visual meteorological conditions (VMC). However, splitting the formation in a tactical environment must be weighed against mission and threat considerations.
d. **Inadvertent Instrument Meteorological Conditions.** Crews should formulate IMC avoidance options as well as reactions to inadvertently encountering IMC. These options/reactions should be made clear during the mission briefing; simply briefing, “We will avoid IMC to the maximum extent possible,” is of little value. The larger the formation, the more difficult and confusing the IMC break-up plan will be. Any formation aircraft encountering IMC conditions should immediately notify the formation by a pre-briefed radio call. The formation lead then announces execution of the inadvertent IMC break-up plan that includes aircraft headings, altitudes, airspeeds, and lighting configurations. Typically, IMC break-up plans differ for mountainous and non-mountainous terrain, but always allow safe terrain and formation aircraft separation. If any aircraft are still in VMC, those aircraft should attempt to remain so (i.e. if ground visual references are still maintained, do not execute the IMC break-up). Numerous factors influence the formation’s ability to continue the mission after an IMC break-up. Weather conditions (e.g. icing, ceiling, visibility, weather area coverage), enemy radar threat, minimum force requirements, timing, fuel, and airspace control all impact the flight lead and mission commander’s decision to continue or to abort the mission. See Annex A for more inadvertent IMC best practices.

e. **Formation Arrival at the Objective.** Conducting a formation flight is but a means to an end—to infiltrate/exfiltrate a SOF team at an objective. Likely the most difficult formation phase is the actions on the objective. Time permitting, SOF will conduct extensive rehearsal drills using computer simulations, drawings, sand tables, models, or whatever is available. The purpose of these drills is to rehearse the mission so all players understand the mission objectives, phases, sequencing, timing, backup plans, actions on the objective, touchdown/AIE locations, obstructions, ingress/egress routing, ROE, downed aircraft procedures, known enemy positions/capabilities, and egress plans. Aircraft may be operating in a congested environment with multiple aircraft, obstructions, obscurants (e.g. smoke, dirt, dust, lights), and potential enemy fire. It is critical for all crews to thoroughly understand the commander’s intent to be able to react appropriately in a rapidly changing environment.

![Figure 3-2. Night-time Formation Operations](image_url)
Important Note. If a formation aircraft needs to conduct an overshoot/go-around, it should announce its intentions over the intra-flight radio (e.g. “Chalk Three is go-around, left 360 back to original touchdown location”). Due to the inherent transmitting delay in secure radios, using the secure radio network may not be the best choice for urgent calls, such as go-around or threat identification calls.

f. **Arrival.** As previously mentioned, arrival back to home base following a mission is not the time to allow aircrew vigilance to lapse. More SOF aircraft have been lost to mishaps than to enemy actions.

g. **Debrief.** A thorough post-mission debrief is mandatory for all SOF operations. The debrief should occur as soon as possible after landing, although it is sometimes delayed because of crew rest and other mission requirements. It is important to have both aircrew and SOTGs participate in the debrief. After an overall mission debrief, aircrew can separate to continue an air-only debrief as necessary. These debriefs should be an open forum to discuss the good, the bad, and the ugly of the mission, with the overall objectives to learn from the experience and to improve future missions.
CHAPTER 4 – ENVIRONMENTAL CONSIDERATIONS

4-1. Introduction. Generally speaking, the environmental considerations for special air operations crews are no different than for conventional operations crews. The exception is that SOATUs may find themselves deployed more independently, away from the large administrative areas afforded a conventional deployment. Therefore, SOATU aircrew should continually improve their personal survival skills with periodic survival, escape/evasion, resistance, and extraction (SERE) refresher training and maintain their physical conditioning. Because of the wide variance in contributing nations’ home topography, this chapter will highlight a few of the more important environmental considerations. There is an abundance of environmental expertise available within the NSHQ that SOATU commanders are encouraged to utilize during the pre-deployment phase.

a. Critical to the success of special air operations missions in extreme environments is the accurate forecasting of the environmental impact. A weather observation taken at or near a target is often the deciding Go/No Go factor prior to mission execution. SOATUs can achieve this by employing special operations weather teams (SOWTs). These are combat weathermen who deploy, individually or with SOF land and maritime personnel, to conduct environmental RECCE missions to collect and report critical hydrographic, geological, and meteorological information. These operations support both SOATU and SOTG missions.

b. Combat weathermen employ sophisticated remote sensors and unmanned aerial systems to provide real-time updates to SOATU operators, who can then make mission adjustments as necessary. Additionally, SOWTs will interface with the regional weather reporting system, thereby expanding the environmental awareness and accuracy of their forecasts. In addition to real-time ceiling and visibility observations, SOWTs can make short-term, local weather forecasts, as well as remote landing site evaluations for brown-out, flooding, and avalanche potential. C2 of the SOWTs normally resides within a special operations air-land integration task unit under the SOAC, or SOWTs may be attached to an SOATU or SOTG.

4-2. Key Principles. Strategy to task and balance are the two key principles that allow SOATUs to excel in austere environments.

a. Strategy to task ensures that SOATUs are only employed for those precision operations where relative superiority can be quickly gained and where the challenges of the environment can be overcome through the use of unconventional tactics, techniques, and equipment.

b. Balance is used by the SOATU mission commander to ensure that all elements of the available combat power are best utilized to support the mission, thereby reducing the risks presented by the environment.
4-3. **Urban Operations.** SOF operations are very often carried out in urban environments, especially when conducted against terrorist threats. These operations are complex for both the SOTU and the SOATU.\(^5\)

a. **Operational Requirements Summary.** SOATU crews should be able to perform a tactical approach to and departure from rooftops of equivalent size to the helicopter’s confined area limits. Crews should also be able to conduct fast rope insertions and extractions, or to rappel assaulters in an urban environment.

b. **Technical Requirements.** Aircraft should have the power available to conduct out-of-ground effect (OGE) hovers with a tactical load of assaulters.

c. **Currency Requirement.** Aircrew are deemed to be current if they have conducted a multi-storey building landing and a confined area landing in the preceding period mandated by their nation or NATO.

d. **Planning Considerations**

(1) **Threat Awareness.** Man-made obstacles are obviously the most apparent threat factor, with built-up areas creating blind spots and canalizing ground, affording readily adaptable defensive positions, and providing complex terrain for landing. Man-made obstacles also include less visible objects, such as antennas, wires, and light standards that are especially hazardous at night. Making the urban environment even more challenging are the presence of non-combatants, the risks of collateral damage, and the consequential complications those bring to ROE development and implementation.

(2) **Landing Zone Selection.** Potential urban LZs are often found at sports fields, parking lots, street intersections (all with a risk of traffic lights and wires), and parks. However, most adversaries are also aware of the practicality of these sites and monitor, if not defend, them. Less predictable, and often more available, are rooftop insertions using AIE techniques as explained in the NATO SOF Air Operations Manual. AIE techniques allow troops to be less constrained by the obstacles, to be less predictable, and to have the opportunity for multiple insertion points in areas around the target rather than massing at a single LZ and then dispersing on the ground.

e. **Execution Best Practices**

(1) **General.** Most deliberate urban operations use an established geo-referencing system that utilizes either a grid overlay reference system, a building numbering system, or a combination of the two. These sorts of common referencing systems are critical to a common operational picture between the SOTU and the SOATU. Special air operations missions should incorporate a top cover

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\(^5\) For a complete read on the complexities of aviation operations in an urban environment, aviators are encouraged to read the publicly available U.S. joint publication *Aviation Urban Operations: Multiservice Procedures for Aviation Urban Operations.*
asset to maintain good situational awareness (SA) as the special AT force concentrates on the insertion and extraction. Time permitting, pre-positioned SR teams or reliable local human intelligence can enhance a threat assessment.

(2) **Arrival Best Practices.** Aircraft transitioning over urban areas can reduce risk by flying above the threat level and by using threat band transitions. If conducting an insertion/extraction, aircraft should remain at NOE altitudes and at maximum safe airspeeds to minimize exposure time to small arms/rocket-propelled grenades. A large aviation force should consider approaching in smaller packets with different approach/departure paths. In most cases, each helicopter should have its own LZ or insertion point so as to allow the entire aviation force to minimize the loiter time during the disembarkation/embarkation phase.

(3) **Departure Best Practices.** Aircraft are most vulnerable either on the ground or in a hover and should therefore minimize time spent conducting the actual insertion/extraction. A rapid insertion/extraction and departure reduces an enemy’s ability to reposition to engage the helicopters. It is important that departing forces use surprise and deception whenever possible to increase their survivability. Varied departure routes, false LZs, and smoke or ROE-compliant fires can all enhance a safe departure of the aviation force.

(4) **Night Operations Considerations.** While a night insertion using NVGs will dramatically increase the survivability of a special air operations mission against a less technologically equipped enemy, SOATUs need to plan for the unique risks of operating in an urban environment at night.

   (a) **Unseen Obstacles.** Wires and thin antennas are particularly difficult to see during NVG use and pose a significant threat in urban operations. A thorough RECCE during the day or a comprehensive examination of imagery and intelligence can assist in mitigating this risk.

   (b) **Night Vision Goggle Degradation.** Artificial light sources, flares, and explosions all have a degrading effect on NVGs; in fact, in some earlier generations of NVGs, the effect can be debilitating to the user. Good crew resource management (CRM) and being prepared for such a phenomenon are the only ways to protect against this.

   (c) **Peripheral Threat.** NVG field-of-view limitations can allow an adversary to move undetected on the periphery. For this reason, having a dedicated top cover asset is critical to maintaining good SA. Multi-crew coordination is also crucial, as the aircrew that are not directly involved in either flying or AIE should be scanning the environment for threats.

4-4. **Maritime Operations.** Maritime special operations range from inserting/extracting teams into an area of operations (AOOs) to the conduct of opposed ship boardings. Many maritime operations are complex and may require nationally regulated training and currency requirements. Regarding operations to/from ships, SOATUs should refer to NATO MPP-2(G),
Volume II, *Helicopter Operations from Ships other than Aircraft Carriers*, as a foundation reference manual; the following information is meant to highlight some aspects of the maritime environment particular to special air operations.

a. **Operational Requirements Summary.** SOATU crews should be able to hover over water without reference to land. They should have an understanding of basic helicopter-to-ship communications and terminal approach procedures (approaching, departing, and unopposed/friendly landing on ships). All aircrew should be trained in underwater escape and sea survival skills.

b. **Technical Requirements.** SOATUs must have the means/equipment to support operations in a saltwater environment. Aircraft and aircrew should have survival equipment as designated by their national regulations. In addition, all aircraft operating at a distance from shore that precludes a single engine recovery to land should have a personal flotation device for every crew member and passenger. Furthermore, except in the case where a designated recovery platform is available, aircraft operating at a distance from shore that precludes a single engine recovery to land should have an emergency life raft available.

c. **Currency Requirements.** Aircrew should be considered current for general over-water operations if they have conducted an over-water hover in the period specified by their nation or NATO.

d. **Planning Considerations**

(1) **Detectability.** The barrenness of water features and the enhanced sound propagation over water make approaching a target undetected very difficult.

(2) **Fuel Management.** The AMC needs to pay particular attention to fuel management in maritime operations, as there is often a lack of available holding areas (HAs) where the aviation force can conserve fuel during mission execution. Carrying enough fuel to deploy, insert, loiter, provide ISR or fire support, extract, and redeploy is necessary but needs to be balanced with the number of SOTU members that can be carried.

e. **Execution Best Practices**

(1) **General.** Since special air operations missions in a maritime environment often involve hovering flight, it is important that aircrew are watchful for the power loss that water spray can induce in turbine helicopters. This power loss is most common below 20 ft above water level in winds of 8 to 12 knots (kts), and can be detected by observing an increase in turbine gas temperature for a given torque setting.

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6 MPP-2(G), Volume II, *Helicopter Operations from Ships Other than Aircraft Carriers* (Change 9), dated 4 Jan 16.
(2) **Arrival Best Practices**

(a) **Hovering Considerations.** Over-water hovering is challenging due to the lack of stable references and the illusions and undulating surface level caused by waves. Some basic over-water hovering tips include:

1/ Be cognizant of, and compensate for, the tendency to drift backward in an over-water hover.

2/ Good CRM techniques include having the non-flying pilot identify the windshield wiper on short-final and also being prepared to increase collective throughout over-water hovers in the event of an inadvertent descent or a rogue wave.

3/ Use of windshield anti-ice equipment in calm winds may induce a glaze from the salt spray. However, windshield anti-ice equipment can be effective when hovering over water in sub-zero conditions and ice begins to form on the windshield.

4/ If recovering a downed aircrew member who is still attached to a parachute, caution with the helicopter’s rotor wash should be exercised.

5/ Smooth water makes depth perception extremely difficult. Use of instruments will help cue the pilot to inadvertent descents.

6/ Waves, poor illumination levels, and lack of references make it easy to lose sight of the objective. Aircrew should fly profiles that keep the objective in sight at all times and should make extensive use of available on-board mission flight data/navigation equipment.

(b) **Amphibious Operations.** Helicopters with amphibious capabilities, i.e. the ability to land and operate on the water, offer some unique opportunities for special operations employment. Many of the same considerations as hovering over water apply to amphibious operations. Special operations aircrews and their associated SOTGs should be current in amphibious operations and should include mission-oriented rehearsals with the SOTU, on the water if possible, prior to executing a mission where amphibious operations are expected.

(3) **Departure Best Practices.** The only significant departure consideration that differs from over-land operations is that the RW force will be visible for a prolonged period of time, which could allow enemy forces to more accurately deduce the friendly recovery location. If the recovery location needs to be concealed, a deception plan must be executed that includes false routes, false LZs, and potentially obscuring/distracting smoke and fires.
Important Note. Aircrew are advised to minimize power changes after take-off from a saltwater environment due to the risk of compressor stalls that can be caused by engine ingestion of salt spray.

(4) Night Operations Considerations

(a) NVG operations over water require a great deal of CRM in order to maintain safe and effective flight. Often the calmer winds at night can make for a calm, smooth water surface that makes depth perception difficult and fails to provide any hover references. The use of artificial lighting (aircraft searchlights, for example) and the deployment of chemlights/glowsticks can assist aircrew in maintaining their flight profile.

(b) While night can prevent a technologically inferior enemy from visually detecting the SOATU, the quiet of night makes audible detection easier. Downwind approaches to the objective, along with planned distractions, such as overhead aircraft, fires, fast boats, or other sea traffic, can serve to mask the SOATU operation.

4-5. Desert Operations. Arid locations with blowing sand, dirt, and dust pose a number of challenges to an SOATU mission commander. The blowing sand often reduces visibility, creates moving sand dunes that make accurate topographical maps very time-sensitive, and increases wear and tear on aircraft components.

a. Operational Requirements Summary. SOATU crews should have the means to accurately conduct precision navigation in a barren topography. All aircrew members should be trained in desert survival skills.

b. Technical Requirements. SOATUs should have the means/equipment to support operations in an extreme-heat and high-dust/dirt/sand environment. Aircraft should be certified for operation in extremely high temperatures (e.g. environments such as Afghanistan and Iraq often reach temperatures exceeding 50 degrees Celsius). For prolonged desert deployments, aircraft will be equipped with systems to prevent premature engine/rotor wear (e.g. particle separators, blade abrasion tape). If aircrew will be expected to regularly conduct lengthy missions in the heat of day, consideration should be given to mechanisms such as aircrew cooling vests.

c. Currency Requirements. To be deemed acceptable for operations in a desert environment, aircrew should have, in the preceding 4 months, received a desert weather briefing that covers physiological effects of extreme heat, obscuring phenomena, and basic desert survival practices.
d. **Planning Considerations**

(1) **Detectability**

(a) The barrenness of the desert increases the risk of visual and audible detection from far distances. The visual detection is particularly noticeable when aircraft perform in ground effect (IGE) hovering manoeuvres, as these will create large dustballs.\(^7\)

(b) Furthermore, western nation SOF personnel tend to be visibly distinct as the indigenous people in most of the globe’s deserts have a strong family and tribal bond that makes outsiders stand out. In and around desert regions, the tribal communication networks extend from ports through to the few scattered resupply hubs, making initial deployment OPSEC difficult.

(2) **Importance of Contingency Plans.** Unpredictable changes in visibility from blowing sand and the higher equipment failure rate from daytime heat increase the chances that the aviation component of a special operation may not be available at the last minute. Non-aviation contingency plans for every phase of the operation are prudent.

e. **Execution Best Practices**

(1) **General.** The past 2 decades have given western aviators a solid foundation in operations in a desert environment; Somalia, Iraq, and Afghanistan have all provided good aviation lessons learned that an SOATU commander would be well advised to review.

(2) **Arrival Best Practices**

(a) **Enemy.** Detecting signs of enemy activity in such a sand-/windswept environment is challenging; some indicators to watch for include:

1/ New trails between areas that provide shelter and have water.

2/ Trails leading to caves.

3/ Groups of camels and other load-bearing animals.

4/ Vehicles away from towns and LOC.

(b) **Dustballs/Brown-out.** Most low-level decelerations, IGE hovers, and landings will produce a loss of visual references caused by the recirculation of the dust, sand, or dirt, commonly referred to as dustballs or

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\(^7\) Dustballs are a phenomenon caused when the rotor downwash mixes with and begins recirculating the underlying loose ground cover (sand, dirt, and/or dust). These dustballs can cause a pilot to lose visual references (commonly referred to as *brown-out*) and can also increase the risk of visual detection as the dustballs can be seen for a long distance and in some cases over the horizon.
brown-outs. More advanced aircraft may be equipped with brown-out landing devices that employ technologies such as light detection and ranging and digital terrain elevation data to provide landing cues. In the absence of this sort of technology, aircrew are encouraged to conduct into-wind shallow approaches that keep a forward speed sufficient to keep the flying pilot ahead of the dustball and to continue this approach to a no-hover landing, thereby ensuring continuous visual references.

(c) Should hovering be necessary, an OGE hover will produce less recirculation, and it may be possible to blow out the underlying area, thereby permitting a transition to an IGE hover/landing.

**Important Note.** It is only possible to blow out a suitable area when the dust/dirt/sand is lightly covering a solid surface such as a road or a prepared landing pad.

(d) Dropping off an object that can be used as a stable reference point (e.g. rucksack) could assist the flying pilot on the approach and hover.

(e) When operating in a formation, the lead aircraft can overfly the intended LZ and deploy this hover reference without disturbing the dirt/sand, allowing the next aircraft to make a direct approach.

(f) All approaches where the possibility of brown-out exists should be conducted with a shallower-than-normal approach (e.g. approximately 300 ft per minute descent) to a no-hover landing. Prior to commencing the approach, the flying pilot conducts a go-around briefing consisting of:

1/ Guidance for all crew members to notify the flying pilot if they lose visual references to the ground.

2/ A go-around departure heading.

3/ The controlling obstacle on the approach, i.e. the highest and/or most risky obstacle that may affect a go-around.

(3) **Departure Best Practices**

(a) Departures in a desert environment differ from normal departures only in that the departure is likely to create a dustball, which impacts the pilot's visual references and the mission's detectability. To maintain OPSEC, SOATU mission commanders should incorporate deception plans that may include conditioning flights so the enemy sees many dustballs and cannot tell which is pertinent to his situation. Other deception plans include false take-offs of extra aircraft and/or staggered take-offs to disguise the actual aviation package size.
Important Note. OGE hover power may be required to fly out of
the dustball/brown-out conditions. Aircrews should confirm
power requirements prior to departure. Also, the pilot flying
should brief his loss of power emergency procedures and
intentions should the helicopter suddenly lose power during take-
on and is unable to fly out of the dustball/brown-out condition.

(b) When a dustball/brown-out is likely to occur, aircrew are encouraged
to perform one of two techniques depending on the amount of wind, the
obstacles around the departure zone, and the specific characteristics of the
helicopter(s):

1/ In the presence of a headwind greater than 5-7 kts, a no-hover
take-off may be possible to permit the flying pilot to stay ahead of the
forming dustball. The flying pilot should increase power to the point
of being light on skids/wheels and assess the dustball. If it appears
that references will be available, then the smooth transition to a no-
hover take-off and accelerating climb-out is possible.

2/ In the absence of sufficient headwind or in the presence of
obstacles that could prevent a no-hover take-off, an altitude over
airspeed or towering take-off is recommended. This technique
involves the flying pilot using all available instruments and on-board
hover cues to maintain heading and position over the ground, while
smoothly and continuously increasing power to the maximum torque
available. The aircraft quickly breaks ground enveloped in a dustball,
and just as quickly pops out the top, at which point the flying pilot
maintains the power setting and adjusts the attitude to transition to
forward flight. Upon reaching a safe airspeed, the flying pilot adjusts
to normal flying attitudes and power.

3/ Similar to situations where an OGE hover may be able to blow
out the sand/dirt/dust from a prepared surface, maintaining a light-on-
skids/wheels power setting may blow out obscurants prior to a take-
on and make the subsequent take-off much safer. Consideration to
the effect of a prolonged dustball on the mission must be considered.

f. Night Operations Considerations. Night operations in a desert environment are
unique in that the illumination levels can be dramatically darker without the ambient
lighting caused by population (street lights, building lighting, etc.). On an overcast night,
special attention should be given to the forecast illumination levels, and contingency
plans for recovery should be put in place in the event that conditions are encountered
that make NVGs unsuitable for mission continuation. Unlike other environments where a
nearby instrument recovery may be possible, launching into the desert has few available
alternatives. The SOATUs must also consider that NVGs and the forward-looking
infrared (system) (FLIRS) do not penetrate blowing sand in the same way they penetrate
reduced visibility in fog and rain.
4-6. **Snow/Freezing Weather Operations.** Because SOF helicopters must be able to react globally, environments where extremely low temperatures and moisture can be encountered must be considered and operating in them should be practised. Conducting RW operations under freezing conditions presents additional concerns and considerations for aircrews and can test the operational parameters of their aircraft.

   a. **Operational Requirements Summary.** SOATU crews should have the means to accurately conduct precision navigation in a barren topography, without the assistance of global navigation satellite systems (e.g. GPS), which are often unreliable in a snowing/freezing environment. All aircrew should be trained in dead reckoning/directional gyrocompass navigation, due to arctic anomalies in magnetic compasses.

   b. **Technical Requirements.** SOATUs must have the means/equipment to support operations in an extreme-cold and high-snow/ice environment. Aircraft should be certified for operation in minus 40 degrees Celsius. All SOATU deployments and detachments should have access to ground power units and portable heaters suitable for maintaining aircraft systems’ operating parameters. For prolonged deployments to a snowing/freezing environment, aircraft should be equipped with anti-ice and de-ice equipment.

   c. **Currency Requirements.** To be deemed acceptable for operations in a snowing/freezing environment, aircrew should have, in the preceding 4 months, received a snow/freezing weather briefing that covers physiological effects of extreme cold, obscuring phenomena, and basic snowing/freezing environment survival practices.

   d. **Planning Considerations**

      (1) **Detectability**

         (a) Like deserts, the barrenness of a snowing/freezing environment presents similar risks of visual and audible detection from far distances. The visual detection is particularly noticeable when aircraft perform IGE hovering manoeuvres, as these will create large snowballs.\(^8\)

         (b) Unlike deserts that often have commercial ports on their periphery, most of the arctic is uninhabited. Any deployment to the region is particularly noteworthy in the regular pattern of life and makes initial deployment OPSEC difficult.

      (2) **Importance of Contingency Plans.** Unpredictable changes in cold weather increase the chances that the aviation component of a special operation may not be available at the last minute. Non-aviation contingency plans for every phase of the operation are prudent.

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\(^8\) Snowballs are a phenomenon caused when the rotor downwash mixes with and begins recirculating the underlying loose ground cover (snow/ice pellets). These snowballs can cause a pilot to lose visual references (commonly referred to as a *white-out*) and can also increase the risk of visual detection as the snowballs can be seen for a long distance and in some cases over the horizon.
(3) **Open-door Work.** Extreme low temperatures and the wind chill brought on by the rotor(s) make prolonged open-door work (e.g. AIE, door gunnery) extremely dangerous for aircrew, especially cabin crew members. For prolonged snowing/freezing environment operations, aircrews should consider equipment and technique modifications to allow minimal open-door sequences. For example, some fast rope insertion equipment can be installed with the doors closed and then extended in flight at the last possible moment, thereby allowing the cabin doors to remain closed for the majority of the flight.

e. **Execution Best Practices**

(1) **General.** Snow/freezing weather operations are very similar to desert operations, except at the opposite end of the temperature spectrum. Blowing obscurants, temperature extremes that impact both man and machine, and potential communication degradation are all factors that the SOATU mission commander needs to consider.

(2) **Arrival Best Practices.** Similar to brown-out approaches, a shallower than normal approach to a no-hover landing, using a natural or pre-positioned hover reference, is safest. When landing on snow, power should be maintained until a proper *seating check* can be performed to verify there is no risk of dynamic or static rollover. If landing on a frozen body of water, power should be maintained until the aircrew is sure the ice can support the weight of the aircraft, then power can be slowly reduced. Unless fuel is critical, the aircrew should maintain engines running in case the ice begins to fracture and an emergency take-off is required.

(3) **Enemy.** Detecting signs of enemy activity in such a snow- or windswept environment is challenging. Some indicators to watch for include:

   (a) Thermal signatures away from camps.

   (b) Unnatural breaks in the ice, which may indicate recent submarine/icebreaker traffic.

   (c) Tracks in the snow (e.g. foot/vehicle trails).

   (d) Vehicles isolated from towns/LOC.

(4) **Snowballs/White-out.** Most low-level decelerations, IGE hovers, and landings will produce a loss of visual references caused by the recirculation of the snow, unless the snow is damp or hard packed. Arrival techniques in snowballs/white-out are the same as those described for dustballs/brown-out in para 4-5e(2).

f. **Departure Best Practices.** Snowing/freezing environment departures differ from normal departures only in that the departure is likely to create a snowball, which impacts the pilot's visual references and mission OPSEC. Departure techniques in snowballs/white-out are the same as described for dustballs/brown-out in para 4-5e(3).
g. Night Operations Considerations. Night snowing/freezing environment operations present unique illumination levels that can often be too dark for effective unaided flight and too bright for optimal NVG flying. This is particularly true during the winter’s traditional daylight hours, when the sun is still below the horizon but causes enough illumination to cast heavy shadows.

4-7. Mountain Operations. Mountain operations are a challenge to all types of military forces. Canalized ground, abrupt shifts in weather and winds, and a plethora of potential enemy defensive positions all combine to make mountainous terrain a high-risk environment. SOF are often called into mountainous terrain to ferret out the enemy, and special air operations play a critical role in land SOF’s mobility and SA.

a. Operational Requirements Summary. SOATU aircrew should be trained and proficient in pre-landing RECCE and landing techniques for pinnacles, saddles, and shoulders, in up to moderate turbulence.

b. Technical Requirements. Aircraft should have sufficient power to take off and land with a combat load at a minimum density altitude of 8,000 ft. Aircraft should have communications methods that do not rely on line of sight (e.g. high frequency, satellite), as the rough terrain makes line-of-sight communications unreliable.

c. Currency Requirements. To be deemed current for mountain operations, aircrew should have conducted mountain operations, including high altitude landings, within the previous 4 months.

d. Planning Considerations

(1) Transiting through Mountains. Conventional mountain flying techniques should be used, such as flying in the boundary layer two thirds up the height of the valley, on the windward side, or on the sunny side (whichever has the best upflow and least turbulence). Canalizing ground and sound propagation in the mountains will hamper SOATU OPSEC. The mission commander will need to develop a deception plan that can disguise the final objective area from being determined until the last possible moment.

(2) Landing Zone Selection. The wind direction and speed can change rapidly and dramatically in the mountains, making a pre-landing RECCE an absolute necessity. To skip this step, in anything except the most powerful helicopter, risks transitioning into a profile where the aircraft has neither the power to maintain flight, nor a way ahead to overshoot. Unfortunately, executing the pre-landing RECCE also discloses the ultimate landing spot to any enemy in the area, so it should be conducted in as quick and stealthy a manner as possible. Assessing LZ slopes in mountainous terrain is especially difficult.

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9 This is a stand-alone requirement and does not need to be combined with stated range and load requirements. Combat loads/range may need to be reduced in order to operate at 8,000 ft.
Importance of Contingency Plans. Rapidly changing weather, the difficulty in maintaining OPSEC, and the often poor sources of pre-mission intelligence for the area make it risky that a specific LZ will be attainable. SOF are encouraged to build a branch plan that includes a more attainable secondary LZ that can still achieve mission success.

e. Execution Best Practices

(1) General. Special air operations normally fly below the level of the surrounding ridges, therefore without reference to a natural visual horizon, making altitude and attitude assessment more difficult. This demands an increased cross-check to aircraft instruments and can cause disorientation and possibly vertigo in the aircrew, especially if they do not have recent mountain experience. Another challenge is assessing the upflow and downflow air, and then striving to fly in the upflow air. Flight in upflow air is characterized by:

(a) Having a lower power requirement for a given airspeed and altitude.
(b) Smoother flight conditions.
(c) Good aircraft responsiveness.

(2) Arrival Best Practices. Formal mountain flying training is highly recommended prior to any SOATU mission involving mountain operations, especially in moderate to high winds. If operational conditions permit, aircrew should conduct pre-landing RECCE patterns at eye level and as close to the actual LZ as possible. Airspeeds should be constant throughout the RECCE pattern in order to assess power requirements and other indications of wind flow (upflow/downflow, into wind/downwind, and demarcation). In all cases, a good drop-off\(^{10}\) should be maintained. There are essentially three mountain pre-landing RECCE patterns:

(a) Figure Eight Pattern. This is the most common pattern flown because the aircraft remains in good upflow air most of the time, and turns are made toward the drop-off, which is the safest.

\[\text{Figure 4-1. Figure Eight Pattern}\]

\(^{10}\) Drop-off refers to open sky below the aircraft that permits the aircraft to trade altitude for airspeed in the event that the pilot misjudges the power available relative to the power required in a given situation. In plain language, drop-off allows the pilot to dive into, or fall into, a safe area of flight without increasing power.
(b) **Circular Pattern.** In light winds, a circular pattern may be best, especially if the LZ is on a pinnacle or crown.

![Figure 4-2. Circular Pattern](image)

(c) **Racetrack Pattern.** Least common, but sometimes necessary because of the topography, is an eye-level approach to the landing area before turning away 180 degrees in a racetrack pattern. This type of pattern is essentially a flat approach to overshoot in order to assess the winds and turbulence.

![Figure 4-3. Racetrack Pattern](image)

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**Important Note.** Speeds shown in the figures above are unique to the aircraft being flown. Aircrew should reference their flight manual for the best RECCE pattern airspeed that allows minimum power required and level flight.

**Best Practice.** Regardless of the pre-landing RECCE pattern chosen, the approach to landing should be flown shallower than normal, with aircrew striving to maintain a flat rotor disc and minimizing power setting changes. This technique will minimize the rate of descent, maintain translational lift longer, enter ground effect sooner, make it easier to control ground speed, and allow the aircrew the best assessment of the power requirements for landing. Approaches should always terminate in a very low hover. No-hover landings are dangerous in mountain LZs because of the tendency to visually misjudge slopes.
Important Note. Caution is necessary when landing on snow in the mountains. Snow can form cornices overhanging cliff faces that can easily shear off from the weight of helicopter or downwash. Likewise, aircraft should always be alert for avalanches.

(3) **Departure Best Practices.** Departures in mountainous terrain are less risky than approaches because, in most cases, the aircrew have an opportunity to accurately assess the wind before take-off. To depart, aircraft should stabilize in a very low hover to verify the power available and then translate forward toward the drop-off by following the terrain and exploiting the benefits of ground effect.

(4) **Night Operations Considerations.** NVGs have made night mountain flying much safer than unaided night mountain flying. The biggest challenge is the increased disorientation and vertigo brought on by the reduced field of view of NVGs. Good CRM, flying technique, and cross-referencing of aircraft instruments will allow a night-aided capability that is comparable to day. Night operations are often less turbulent with lighter winds.

4-8. **Jungle Operations**

a. **General.** Prolonged jungle operations can diminish the combat readiness of equipment and personnel alike. High temperatures and high humidity can cause premature wear, corrosion, and rot of equipment, and can cause health issues with personnel that range from fungus growth to malaria and dysentery. Thick and sometimes multiple layers of tree canopy make LZ selection and enemy detection difficult. Some enemy activity indications include:

   (1) Smoke and cooking fires in unexpected areas.

   (2) Indications of cultivation or other signs of community living away from an established community.

   (3) Drying clothes, especially if military in nature, in unusual locales.

b. **Operational Requirements Summary.** Aircrew must be able to conduct precision navigation over a uniform tree canopy that has little topographic relief.

c. **Technical Requirement.** Aircraft must be able to operate in 50 degree Celsius temperatures for prolonged periods of time. Aircraft should also be able to hover OGE in the expected density altitudes in order to allow towering take-offs and landings into confined areas with higher than normal vegetation.

d. **Currency Requirements.** To be considered current for jungle operations, aircrew should have received a jungle weather briefing in the preceding 4 months that includes physiological effects of extreme humidity, preventative medicine, and basic jungle survival practices.
e. **Planning Considerations – LZ Selection.** Jungle environments offer few options for LZ selection, making it easy for the enemy to predict conventional friendly courses of action (COAs). The use of AIEs, cunning deception plans, and speed are tactics that can minimize this risk. LZs will often be in confined areas surrounded by extra-tall vegetation, making a towering take-off and landing necessary.

f. **Execution Best Practices**

   (1) **General.** Flight profiles for jungle operations are not dissimilar from other environments with restricted terrain and canalizing ground, such as urban areas.

   **Best Practice.** Jungle approaches should be conducted in a shallower than normal approach to ensure the power available meets or exceeds the power required in high density environments. The dense jungle forms ideal camouflage for enemy defensive positions and makes the detection of obstacles such as vines or branches more difficult.

   **Best Practice.** The surface of the LZ may be boggy or swampy under a thin layer of ground cover, so attention should be given to avoid rollover situations upon landing.

   **Best Practice.** Departures are typically the reverse of the approach: taking off nearly vertically until clearing the trees, then transitioning to forward flight.

   (2) **Night Operations Considerations.** Differences in foliage colour, even on NVGs, can indicate the differences in tree types. These differences can indicate water sources that will assist in jungle navigation. Dead trees with little foliage (commonly called *widow-makers* or *deadheads*) can be very difficult to see on NVGs, especially when they have live foliage in their background. Aircrews need to be vigilant when flying over water areas that can be bird habitats. Birds that can be easily avoided in daytime operations will not be seen at night until they pass or strike the aircraft.
CHAPTER 5 – TRAINING

5-1. Introduction. The ultimate training objective of any special air operations unit is to be able to operate effectively and with confidence on the joint battlespace. To that end, effective individual, crew, and collective training programmes form the foundation of an aviation unit training programme. Once the SOATU commander establishes individual and crew training programmes, subordinate leaders and instructor pilots must integrate them into an effective collective training programme that is directly linked to its mission-essential task list (METL). A guide to METLs is in Annex E. RW SOATU METLs will normally expand upon the capabilities detailed in the NATO Bi-SC Capability Codes and Capability Statements.

a. Capable of planning and conducting the full spectrum of special operations (including the three principal tasks MA, SR, and DA) in the land and maritime environments through the provision of special operations air support, across the full spectrum of military operations unilaterally and independently as part of the overall plan as directed by a SOCC/SOAC/SOATG or in support of a regular commander.

b. Capable of providing fire support for the platform or supported troops with the effect to penetrate lightly armoured vehicles at a range of at least 500 m.

c. Capable of AT to prepared/unprepared LZs and marked/unmarked drop zones (including personnel and equipment airdrops).

d. Capable of using one or more assets in a single lift to transport a minimum of 16 fully equipped combat soldiers or 2,000 kg, with a duration of 2 hours and combat radius of 100 NM in a non-permissive tactical environment.

e. Capable of performing alternate (non-landing) insertion and extraction methods (i.e. fast rope, rappelling, helo-cast, and hoist/winch operations).

f. Capable of landing or hovering safely and effectively over land and water, day and night, in degraded visual environments (snow, desert, or other areas with minimum references).

g. Capable of flying with maximum internal and/or external loads.

h. Capable of navigating accurately (within +/- 500 m of pre-planned path) and landing/hovering within +/- 1 minute of the time on/over target and with <100 m accuracy.

i. Capable of sustaining aircrews and support personnel to operate two to eight RW or tilt-rotor aircrafts, with a minimum of two assets (RW) at any time.

j. Capable of hovering within 5 m on all axes over sea, snow, or desert area that are devoid of specific reference for hovering.

k. Capable of flying in mountainous or desert terrain in reduced visibility (e.g. dusk, dawn, moonlight, streetlight, and overcast night).
5-2. **Levels of Training.** To design and manage an effective training plan, the commander must analyse individual, crew, and collective training requirements. The SOATU METL identifies the unit’s mission-essential and supporting tasks. These collective tasks represent the objective capabilities the overall training plan must achieve. Individual proficiency in aircraft and aircraft systems operations is essential to the unit training effort.

a. **Individual Training.** Individual training is the foundation for overall qualification. Developing individual proficiency prior to commencing crew and collective training enhances training effectiveness and reduces risks. The helicopter operator’s manual, SOATU-specific training plans, and the *Guidelines* help unit leadership train individuals to mission-ready standards.

b. **Crew Training.** Crew training is the next phase of training and merges the individuals’ skills and qualifications into mission-ready crews. The basis for crew training is TTP outlined in the applicable manoeuvre guides, SOPs, and other national and NATO publications.

c. **Collective Training.** Collective training comprises multi-helicopter special operations. This level of training ensures that individual crews are knowledgeable and proficient in working as a unit. It is at this level that more complex tactics and procedures are learned; communication procedures, common terminology, and execution checklists are developed; and the supporting functions of logistics planning, human resource management, and operational leadership are determined.

d. **Combined Arms Training.** Combined arms training, which is normally conducted at the SOATG level, helps the SOATU achieve fully combat ready status by working with and supporting the land and maritime SOTGs. Because a SOATU may, at times, operate independently, SOATUs should be proficient at combined arms operations. Collective training at any level is considered combined arms training when it is conducted with the other elements of an SOTG. Examples of combined arms training opportunities include special operations exercises, pre-deployment exercises, combined arms live fire exercises, and command post exercises.

5-3. **Responsibilities**

a. **Special Operations Air Task Unit Commander.** The commander is responsible for the overall SOATU aircrew training programme. The commander bases training requirements on the unit’s tactical mission, sets and enforces standards, and evaluates proficiency. He also provides the required resources and develops and executes training plans that result in proficient individuals, leaders, and units. The commander relies on subordinate leaders, staff officers, non-commissioned officers, and instructors to help him plan, prepare, execute, and evaluate appropriate, realistic training.

b. **Operations Officer.** The operations officer is the commander’s principal staff officer on matters of special air operations and training. The operations officer identifies training requirements, prepares and carries out training programmes, determines and allocates training resources, plans and conducts training inspections, and compiles training records.
c. **Standardization Instructor Pilot.** The standardization instructor pilot is the commander's chief aviation advisor; some special air operations forces may refer to this position as the chief pilot, the unit standards officer, or the chief instructor. He helps the commander and the operations officer develop, implement, and manage the air training programme. The standardization instructor pilot is also responsible for the training and management of all instructor pilots and other crew member instructor positions. These carefully selected, designated, and trained special air operations professionals are critical to the effectiveness of the air training programme and to unit readiness.

d. **Crew Member Instructors.** Crew member instructors have a variety of names depending on the nationality and function of the crew member; for example, they may be referred to as a non-rated crew member trainer or an instructor flight engineer. They are the commander's primary aviation advisors in the area of non-pilot aircrew training and readiness. They assist the commander, operations officer, standardization instructor pilot, and instructor pilot in the development, implementation, and management of the air training programme. The crew member instructors train individual- and collective-level training tasks and also environmental operations and weapons qualifications.

e. **Aviation Safety Officer.** The aviation safety officer, also known as a flight safety officer, assists the commander in the safe administration of the air training programme and advises the commander on all safety issues, including risk management, CRM, and the development and coordination of plans and orders to conserve warfighting resources.

f. **Aircraft Commander.** The aircraft commander is the first-level trainer in the unit and is responsible for being proficient in all aspects of the unit mission and aircraft operation and procedures. The aircraft commander, also sometimes referred to as the aircraft captain, is ultimately responsible for the safe operation of the aircraft and the safety of all occupants.

5-4. **Additional Training**

a. **Crew Resource Management.** CRM provides crewmembers with performance-enhancing knowledge and skills directly applicable to flying operations. CRM training is a key component of a combined effort to identify and manage threats to execute safe and effective mission operations. CRM should begin with a crewmembers' initial flying training and is continuously built upon throughout their operational careers.

   (1) The goals of CRM are to maximize operational effectiveness and combat capability. Preserve personnel and material resources and ensuring the safety of non-combatants. Additionally, CRM facilitates mishap reduction by providing skills, processes, tools, and techniques to aircrew members to effectively identify threats and mitigate errors in air operations.

   (2) CRM training is designed to develop aircrew skills in recognizing and responding to the conditions and/or threats that lead to aircrew error. CRM develops aircrew proficiency in skills to anticipate conditions and/or threats and minimize their negative impact in order to safely and effectively meet mission requirements.
b. **Night Vision Goggles.** As the primary tool of SOF air operations, SOF aircrew need to have sufficient knowledge about NVG design considerations, operational applications, and appreciation of their limitations as well as their capabilities. The goal for all NVG training, both initial and recurring, is to prepare SOF aircrew to fly NVG missions safely and effectively.

c. **Ground-related Training**

   (1) **Weapons Handling.** It is essential that all special operations aircrew are proficient with their primary and secondary personal weapons. There are occasions when SOF aircrews are required to hold or to wait in areas without a well-established perimeter. There may also be times when SOF aircrew will be required to operate on the ground, should an emergency occur that renders the aircraft inoperable.

   (2) **Advanced Survival, Escape/Evasion, Resistance, and Extraction Training.** Due to the increased access to information of strategic importance, coupled with the higher risks associated with special air operations missions, all SOATU aircrew should be trained in advanced SERE or equivalent national escape and evasion training. Aircrew training should address conduct after capture and resistance-to-interrogation techniques.

   (3) **Medical.** NATO SOF often operate in denied areas and outside Role 1/Role 2 supported areas without dedicated air medical evacuation (MEDEVAC) platforms. Tactical combat casualty care training is a valuable course for SOF aircrew operating in the grey zone that characterizes today’s conflicts.

5-5. **Aircrew Readiness.** Aircrew readiness is managed by the SOATG commander through an effective air training programme that provides for individual- and collective-level training for all members. An air training programme outlines the training required to gain qualifications, refresh qualifications, prepare for missions, and maintain readiness. The goal of the SOATG’s air training programme is to develop and sustain mission-ready SOATUs.

   a. **Readiness Levels.** Readiness levels identify the training phase in which special air operations aircrew members are participating and measure aircrew member readiness. They also provide a logical progression of individual and aircrew training based on individual and collective task and mission proficiency. In most nations, an SOATU member progresses from a fully qualified conventional member to a basic special air operations member, and finally to a fully mission-qualified special air operations member. Individual nations will assign readiness levels that accommodate their needs.

   b. **Battle Rostering.** One way that SOATG commanders may elect to manage different readiness levels is to battle roster them in crews of different experience levels (e.g. an experienced aircraft captain with a low readiness first officer). Battle rostering refers to the designation of two or more individuals to routinely perform as a crew. Studies show that certain specific performance areas, such as target engagements, may benefit from battle rostering.
Important Note. Commanders must be aware that prolonged battle rostering may produce crew complacency, overconfidence, implicit coordination behaviours, and non-standard procedures, which result in a degradation of crew proficiency.

5-6. National Limitations. Not all NATO nations will seek to obtain the full range of qualifications for crews and capabilities suggested; some may restrict their efforts to specific environments or skill sets because of resource restraints or strategic priorities. Nations often choose a phased approach to develop these unique capabilities. However, nations must be reminded of the SOF Truth that SOF cannot be made after the crisis has occurred, and by choosing not to train in specific environments or to specific missions, they may limit their options for certain scenarios.

5-7. Summary. When developing the air training programme, commanders must first evaluate the unit’s METL to determine the collective training requirements. They also should analyse the unit’s geographical area, probable employment roles, supported units’ missions, and past requirements. From this analysis, commanders develop supporting individual task lists.
RECOMMENDED STANDARD OPERATING PROCEDURES

The following information is provided as recommended SOPs with the understanding that the tactical situation and national directives will take precedence. Many of these SOPs have been derived from the best practices of various multinational special air operations experts. These SOPs remain at the unclassified level and do not reflect specific classified parameters.

1. **Zulu Time.** All timings should be Zulu from the GPS.

2. **Loading**
   
   a. The standard chalk load timing for a staging pickup zone (PZ) (not Exfil.) of 5 minutes during the summer and 10 minutes during the winter will be used for planning considerations.

   b. Chalks should be formed up in a single line at either the 12 o’clock or 3 o’clock position, depending on the landing formation used, and divided into two groups for each side of the helicopter.

   c. The ground element should pop smoke, display a panel marker, or use covert infrared (IR) signals (night operations), in accordance with the mission brief, when the formation is on final approach. This will serve to orient the aircrew and to confirm that the PZ is secure.

   d. Delays that will compromise assigned air corridor/fire support coordination timings must be communicated to the element lead(s) and the AMC for decision.

   e. Any delays in timings are to be expressed in \(H/L/Y^{11} + xx\) minutes format.

   f. Helicopters will depart the PZ when a thumbs up or other visual signal has been passed from the last aircraft to the preceding aircraft and so on up to the lead. For night operations, selection of NVG lights from flashing to steady in sequence from the last helicopter to the lead indicates ready for take-off. Once readiness is confirmed, take-off will be predicated on briefed GPS timings.

3. **Formations**

   a. Formations should be in accordance with the tactical situation. For example, the formation may be grouped into four helicopter elements, each consisting of two two-helicopter sections.

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\(^{11}\) H/L/Y times are defined in Tac Aide Memoire 51 of ATP-49(G), as: H-hour designates the start time of an operation; L-hour designates the time the first aircraft of an assault touches down in the LZ; and Y-hour designates the time the first aircraft departs the PZ.
b. Each element should make best use of terrain while staying within the corridor.

c. Element spacing will be in accordance with the tactical situation but should be pre-planned. For example, 2 minutes apart if the elements land separately at the LZ; otherwise, spacing will be 30 seconds or approximately 1,500 m spacing between the last helicopter in the preceding element and the first helicopter in the following element.

d. Sections operating alone will maintain close trail formation over heavily wooded areas and open battle/combat cruise formation in open, flat terrain.

4. **Join-ups/Rejoins.** Formation join-ups or rejoins need to be covered in detail and clearly understood by all aircrew within the formation. Formation lead will brief the type of join-up, location, procedures (e.g. lighting and communication), and the flight parameters for rejoining the formation. Formations flown at night with aircrew flying unaided or aided (using NVGs) require even more attention to detail when executing the join-up and rejoin procedures due to the limited visual acuity and depth perception associated with low-light operations. There are basically two types of join-ups/rejoins: airborne or ground.

a. **Airborne Join-ups/Rejoins**

(1) Airborne join-ups/rejoins are the most difficult and require the formation lead and the joining aircraft to communicate their actions and intentions during the join-up/rejoin process to reduce the possibility of an air-to-air collision. There are two types of airborne join-up/rejoins: **straight ahead** or **turning**. Prior to beginning the join-up/rejoin, the joining aircraft will request permission to join the formation. Once formation lead acknowledges and approves the request, formation lead will establish the previously briefed flight regime (e.g. airspeed, altitude, lighting configuration, aircraft heading for a straight ahead join-up/rejoin or angle of bank for a turning join-up/rejoin). If necessary, the formation lead can change the pre-briefed flight parameters. However, formation lead must communicate any changes to the joining aircraft, and the joining aircraft must acknowledge the new flight parameters.

<table>
<thead>
<tr>
<th><strong>Important Note.</strong></th>
<th>It is imperative that the formation lead maintain a stable aircraft platform to allow the joining aircraft to manoeuvre into the wingman position.</th>
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<tbody>
<tr>
<td><strong>Best Practice.</strong></td>
<td>During low-light join-ups the pilot flying will maintain sight of lead while manoeuvring in for the join-up/rejoin. The non-flying pilot acts as a safety pilot monitoring aircraft instruments and clearing the aircraft from any obstacles or terrain. All other aircrew members will assist with maintaining visual contact with formation lead and obstacle/terrain clearance.</td>
</tr>
</tbody>
</table>

A-2
Pilots flying the join-up/rejoin must be aware of the aircraft closure rate and the lack of visual acuity and depth perception during low-light conditions.

b. **Ground Join-up/Rejoins.** Just like airborne join-up/rejoins, the joining aircraft will make contact with formation lead prior to entering the LZ. Formation lead will acknowledge and approve the join-up/rejoin and brief the joining aircraft on any changes from the original formation briefing. These procedures can be conducted using limited communications or light signals.

5. **Ground Holding Areas**

a. Elements will proceed to the HA when directed or when loitering is required.

b. Aircrew will orient helicopters on the LZ appropriate for the tactical situation. For example, hold by element, facing inward for mutual support when no door guns are mounted or when dual door guns are mounted. When equipped with a single door gun only, elements could adopt a box formation.

c. Distance between helicopters is area specific with respect to size, shape, and terrain. Aircrews should position helicopters within 1/3 of the effective range of the weapon system to the next adjacent helicopter (e.g. 600 m range would have helicopters no more than 200 m apart).

6. **Ammunition Usage Rates for Door Guns (Example)**

a. En route to PZ: 10%

b. En route to LZ: 40%

c. In LZ: 30%

d. En route to HA/FARP: remaining

7. **Actions on Contact**

a. **Enemy Ground Fire (Small Arms)**

   (1) Take immediate evasive action; return fire if able.

   (2) If mission parameters permit, turn away from fire and mask; inform AMC.

   (3) Send a contact report as appropriate.

   (4) Attempt to rejoin the element or proceed to the next rendezvous/air control point for rejoin.
b. **Enemy Air Attack**

   (1) The first person making contact will report the location of the threat relative to the element.
   
   (2) The threatened section will turn toward the threat, spread out, and attempt to mask.
   
   (3) The other section will attempt to mask.
   
   (4) Once the threat has passed overhead, helicopters will attempt to mask/land until the threat exits area, if the mission parameters permit.
   
   (5) Helicopters will attempt to rejoin the element or proceed to the next rendezvous for rejoin.

8. **En Route Emergencies**

   a. Inform the element lead and maintain section integrity.
   
   b. If en route to the LZ, the shadow helicopter will ensure that the helicopter with the emergency is on the ground and will then proceed to the LZ.
   
   c. The AMC and the GFC will decide if the chalk is recovered, or if a QRF helicopter will be dispatched.
   
   d. Any downed helicopter crew will carry out theatre- and unit-level combat search and rescue (CSAR)/downed aircrew/downed helicopter SOPs.

9. **Lost Lead**

   a. **Visual Meteorological Conditions.** Inform the lead in accordance with emission control policy, attempt to rejoin, and then proceed to the next rendezvous for rejoin.
   
   b. **Inadvertent Instrument Meteorological Conditions.** Inadvertent IMC procedures by element will be briefed, dependent on the formation to be used. The non-mountainous default standard is:
      
      (1) The lead aircraft operator will call out heading and altitude he will climb to. This level depends on minimum safe height/minimum safe altitude and freezing level (mostly preplanned) plus the number of aircraft in formation times 500-foot spacing.
      
      (2) The second aircraft will climb to the lead altitude minus 500 ft and turn to the lead’s heading plus 20 degrees.

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12 This procedure is from ATP-49(G).
(3) The third aircraft will climb to the lead’s altitude minus 1,000 ft and turn to the lead’s heading minus 20 degrees.

(4) The fourth aircraft will climb to the lead’s altitude minus 1,500 ft and turn to the lead’s heading plus 40 degrees.

10. **Downed Helicopter**

   a. If possible, report the situation to the AMC.

   b. If capture of the helicopter is likely, prepare it and all sensitive equipment for destruction in order of priority as follows:

      (1) **Priority 1.** Codes, identification, friend-or-foe equipment, classified electronic equipment with related publications and documents, and other material as defined by the national government concerned.

      (2) **Priority 2.** Installed armament.

      (3) **Priority 3.** Engine assembly.

      (4) **Priority 4.** Airframe, control surfaces, and undercarriage.

      (5) **Priority 5.** Instruments, radios, and electronic equipment.

      (6) **Priority 6.** Electrical, fuel, and hydraulic systems.

   c. If situation allows, employ survival radio/locator and visual signalling devices to aid in locating the downed aircraft.

   d. Establish defensive positions around the recovery site.

   e. If not immediately evacuated, proceed to a pre-planned pickup point or follow the briefed escape and evasion plan.

   f. Assist as necessary in aircraft battle damage repair actions and in the evacuation of the helicopter and/or personnel from the site.

11. **Abort Criteria.** Abort criteria will be set jointly by the SOATU mission commander and the SOTG commander.

   a. Throughout the mission, factors such as LZ suitability, aircraft availability, weather, enemy situation, target confirmation, and the political situation will be monitored to ensure mission parameters have a reasonable probability of success. Should abort criteria be met, the SOATU mission commander will need to decide to:

      (1) Delay until the unfavourable condition can be corrected.

      (2) Divert to a location that will allow the overarching mission to proceed.
12. Communications

a. Radio minimized unless radio silence is specified.

b. If a radio check is required, then check in after engine start, on element frequency only, e.g. “Blues this is lead, check in”, “Blue 2”, “Blue 3”.

c. References to radios should be made using the type of radio, not the number of radio; i.e. one should transmit, “This is Lead on Victor” for VHF, not “This is Lead on Radio 1”.

13. Threat Band Transitions. Threat band transitions allow aircraft to climb and to descend through higher risk enemy engagement altitudes using techniques that minimize exposure (see Figure A-1). Whenever possible, transitions should be conducted over areas that are either secure or are free of enemy activity.

a. High to Low Transitions. These techniques are used when approaching the objective or en route if a change in flight profile is desired. There are two common techniques.

1) Spiral Descent. This transition employs a descending spiral dive that allows for a high rate of descent within a selected area, which can be controlled by adjusting airspeed and angle of bank. High airspeeds and shallow bank angles have a larger footprint.

(a) When transitioning in the vicinity of an LZ, the spiral descent allows the helicopter pilot to identify and keep the LZ in view during transition and
to remain over a small area of the terrain. It is well suited for use over isolated LZs that could receive direct fire from 360 degrees.

(b) While this transition is generally quicker to reach tactical altitudes, it is not the preferred method for descent for the following reasons.

1/ The spiral descent involves a higher pilot workload, focusing more attention inside the cockpit—airspeed, bank angle, trim, and rotor revolutions per minute (RPM)—and reducing crew SA.

2/ Conducting a spiral descent in formation is time consuming; one aircraft must provide top cover to ensure mutual support while the other aircraft descends.

(c) Spiral descents should be carried out in accordance with national aircraft manoeuvre manuals; however, the general procedure involves:

1/ Reduce collective to minimum, and decelerate to transition speed in level flight.

2/ At the desired airspeed, adjust attitude to commence and maintain descent.

3/ Initiate a coordinated turn (left turns are easier in terms of managing rotor RPM in most western helicopters) around the selected descent point.

4/ Once below threat band—approximately 150-100 ft above ground level (AGL)—continue en route or land.

(2) **Straight Descent.** This transition employs a low power setting to produce a high rate of descent along a planned route, with airspeed controlling the amount of ground covered during the descent. Straight descents should be carried out in accordance with national aircraft manoeuvre manuals; however, the general procedure involves:

(a) Reduce collective to minimum, and decelerate to 60 knots-indicated airspeed (KIAS) in level flight.

(b) At 60 KIAS, adjust the attitude to commence descent.

(c) Maintain 60 KIAS (low speed) or accelerate to $V_{NE}$ (high speed).

(d) During the descent, randomly adjust heading along the planned route.

(e) Once below the threat band (approximately 150-100 ft AGL), continue en route or land.
b. **Low to High Transitions.** These techniques can be used after departure from or en route to get above the threat band.

(1) **Spiral Climb.** This transition employs maximum power, best climb performance airspeed, and a coordinated turn to achieve a high rate of ascent within the confines of a selected area. Spiral climbs should be carried out in accordance with national aircraft manoeuvre manuals; however, the general procedure involves:

(a) Adjust collective to obtain maximum torque.

(b) Adjust airspeed to achieve the aircraft’s best climb speed.

(c) Initiate coordinated turn over the selected ascent point.

(d) Once above threat band, adjust the aircraft attitude to accelerate to normal en route speed.

(2) **Zoom Climb.** This transition employs high airspeed (kinetic energy) at climb entry and maximum power to achieve the highest rate of climb along a planned route. The zoom climb should be carried out in accordance with national aircraft manoeuvre manuals; however, the general procedure involves:

(a) Adjust collective to obtain maximum torque, and accelerate to \( V_{NE} \) (as tactical situation permits).

(b) At the designated climb point, initiate smooth cyclic climb to a 30-degree nose-up attitude.

(c) As the aircraft decelerates to the best climb speed, adjust the attitude to maintain that airspeed.

(d) Once above threat band, adjust the aircraft attitude and accelerate to normal en route speed.

14. **Tactical Approaches and Departures.** Tactical approaches and departures (TACADs) are conducted to minimize the enemy’s opportunity to locate the position of LZs during an operation; both the arrival and departure are equally important. TACADs will normally be flown in a manner that exploits terrain masking to avoid detection. Planning considerations for TACADs include:

a. Enemy situation: size, strength, weapons systems, intent.

b. Topography, weather, and wind, in order to mask the helicopter from visual, radar, and acoustic observation.

c. If multiple aircraft have the same objective area, consider using different approach and departure routes to avoid predictability of the latter lifts.
d. Approaching landing sites with the sun behind the helicopter will minimize visual and IR acquisition, while approaching into wind with departure downwind from the enemy will help to minimize the noise signature. Using false LZs before and/or after the real LZ will contribute to OPSEC.

15. **Landing Zone.** Communicating the known information of an LZ prior to arrival is an excellent manner of increasing the SA of both aircrew and the SOF to be inserted. A standardized format for communicating that information is detailed in ATP-49(G), para 5-5-14. Figure A-2 provides an example of a shorter format, called a LZ update form, with detailed instructions on how to fill out the form.

<table>
<thead>
<tr>
<th><strong>v1.2 LZ-Update</strong></th>
<th><strong>Freq:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location</strong></td>
<td><strong>C/S ground:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>C/S air:</strong></td>
</tr>
<tr>
<td>MGRS or LP</td>
<td>F / M</td>
</tr>
<tr>
<td><strong>2. Altitude</strong></td>
<td></td>
</tr>
<tr>
<td>(F)eet / (M)eters</td>
<td></td>
</tr>
<tr>
<td><strong>3. Type</strong></td>
<td>P / R / C / D</td>
</tr>
<tr>
<td>(P)innacle</td>
<td></td>
</tr>
<tr>
<td>(R)idge line</td>
<td></td>
</tr>
<tr>
<td>(C)onfined Area</td>
<td></td>
</tr>
<tr>
<td>(D+Size) NATO Size</td>
<td></td>
</tr>
<tr>
<td><strong>4. Surface</strong></td>
<td></td>
</tr>
<tr>
<td>Hard</td>
<td>Slope</td>
</tr>
<tr>
<td>Soft</td>
<td>Rocks</td>
</tr>
<tr>
<td>Sand</td>
<td>Obstacles</td>
</tr>
<tr>
<td>Snow</td>
<td>FOD</td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td><strong>5. Wind</strong></td>
<td>Dominant direction on LZ</td>
</tr>
<tr>
<td><strong>6. Enemy</strong></td>
<td>Size, type and location from LZ</td>
</tr>
<tr>
<td><strong>7. Friendly</strong></td>
<td>Size, type (+ Nation) and location from LZ</td>
</tr>
<tr>
<td><strong>8. Troops</strong></td>
<td>(P)AX total incl. D, W, L</td>
</tr>
<tr>
<td></td>
<td>(D)etained</td>
</tr>
<tr>
<td></td>
<td>(W)ounded</td>
</tr>
<tr>
<td></td>
<td>(L)itter</td>
</tr>
<tr>
<td><strong>9. Cargo</strong></td>
<td>(I)nternal, type and kg</td>
</tr>
<tr>
<td>(per a/c)</td>
<td>(E)xternal, type and kg</td>
</tr>
<tr>
<td><strong>10. Other</strong></td>
<td></td>
</tr>
<tr>
<td><strong>11. Marking</strong></td>
<td>P / S / O</td>
</tr>
<tr>
<td>(P)rimary</td>
<td></td>
</tr>
<tr>
<td>(S)econdary</td>
<td></td>
</tr>
<tr>
<td>(O)ther</td>
<td></td>
</tr>
</tbody>
</table>

**Figure A-2. LZ Update**
16. **Landing Zone Update**

a. **General**
   
   (1) Line 1, 6, 7, and 11 are mandatory.
   
   (2) Do not mention lines if no information is present.

b. **Line 1 – Location**
   
   (1) Military grid with an 8-digit minimum (WGS 84).
   
   (2) Or predefined landing point (e.g. Orange-1).

c. **Line 2 – Altitude.** Altitude of the LZ in feet or metres. Altitude in feet is preferable.

d. **Line 3 – Type**
   
   (1) Pinnacle landing means that the hard surface is suitable to ensure complete landing gear (hard surface size 3). Usually used in mountainous operation and preferred above a ridge-line landing.
   
   (2) Ridge-line landing means that the hard surface and/or clearance is only suitable for a part of the landing gear. Other sections of the helicopter will stay in the hover.
   
   (3) Confined area is partially or completely surrounded by obstacles. The minimum for this area is 50 x 50 m in size.
   
   (4) D+Size. Name Delta plus size number, e.g. D1 for size 1, D3 for size 3.\(^{13}\)
   
   (5) If LZ size is smaller than 50 x 50 m and/or deviates from ATP-49(G), it can still be used as an LZ; however, this should be mentioned in *Surface Additional* and/or *Other*. Aircrew will decide if the LZ is suitable for landing. Smaller LZs will dramatically increase the landing time.

e. **Line 4 – Surface**
   
   (1) Most dominant surface on the LZ, e.g. grass, concrete, or frozen mud are considered hard surfaces. Mud and marsh are considered soft surfaces.
   
   (2) Mention additional only if applicable.

\(^{13}\) Sizes as dictated by the NATO ATP-49(G).
f. **Line 5 – Wind**
   
   (1) Dominant wind direction in degrees (360 degrees) on the LZ or the vicinity of the LZ (e.g. winds from the east are from 90 degrees).
   
   (2) Alternative (not preferable): wind direction in cardinal heading (north/north-east/east, etc.).
   
   (3) Wind determines a generic land heading; however, this land heading is not mandatory due to other (non-)tactical reasons. Land heading information should be included in line 10.

g. **Line 6 – Enemy**
   
   (1) Use of *unknown* or *none* in this line is possible.
   
   (2) Size includes troops and vehicles.
   
   (3) Type can be troops, vehicles, heavy-machine gun, rocket-propelled grenade, etc.
   
   (4) Location shall be addressed from the LZ (e.g. 100 m north of the LZ).

h. **Line 7 – Other Friendly**
   
   (1) Provide line 7 only if applicable and/or friendly troops are in close vicinity.
   
   (2) Size includes troops and vehicles.
   
   (3) Do not mention nation if unknown.
   
   (4) Location shall be addressed from the LZ (e.g. 10 troops and police vehicle 100 m south of LZ).
   
   (5) Optional call sign and frequency.

i. **Line 8 – Troops**
   
   (1) **P.** State total passengers (pax) including detainee, wounded, and/or litters.
   
   (2) **D.** Specify total detainees.
   
   (3) **W.** Specify total wounded.
   
   (4) **L.** Specify total amount of litters.
   
   (5) Deceased personnel are considered internal cargo; specify at line 9.
j. **Line 9 – Cargo.** Information in this line can be divided per landing aircraft.
   
   (1) **I.** Internal cargo, excluding troops, specified with type of load (e.g. boxes, pallets).
   
   (2) **E.** External cargo that is prepared for under-slung operation and has a clearance in accordance with NATO regulations, specified with type of cargo (e.g. netted load).

k. **Line 10 – Other.** Only important information; keep the transmission to a minimum. This information is optional:
   
   (1) Additional surface information: slope, rocks, obstacles.
   
   (2) Additional LZ information: orientation, landing heading.
   
   (3) Advise ingress/egress and reason. This is important as the aircrew will decide if ingress/egress is manageable.
   
   (4) Under-slung operation: Specify type of under-slung pickup—hook-up team or shepherd’s crook.

l. **Line 11 – Marking**
   
   (1) Make sure the marking is ready after the LZ update.
   
   (2) Other is not followed by the actual signal.

m. **After Landing Zone Update**
   
   (1) Helicopter will request the marking.
   
   (2) Ground unit response to this call should be, “Signal is out IDENTIFY”.
   
   (3) Confirmation of the given signal will be stated by the helicopter, e.g. “Green Smoke”.

17. **Alternative Insertion and Extraction**

   a. **Introduction.** While the most expeditious and safest way to insert or extract personnel is usually by landing the aircraft, the environment may not always allow a safe landing. Over-water operations, urban environments, forested areas, highly sloped terrain, and obstructions such as wires, poles, or antennas can make a landing unsafe, if not physically impossible; AIE methods must be used to accomplish these missions.

   (1) Performing AIEs is a skill set that requires extreme precision on the part of the pilot because the aircraft must be manoeuvred in close proximity to terrain and obstacles. The ability to conduct precision hovering manoeuvres in any number of locations/situations adds mission flexibility to SOF because it allows the ground
force to be inserted close to their objective. The skills and confidence to perform these manoeuvres require additional training, equipment, and a close working relationship with the supported land and maritime SOF.

(2) AIE operations can become challenging and risky when field of view is restricted by NVG use, open water where the horizon is obscured, brown-out or white-out, or enemy contact. Additionally, the SOATU aircrew must be experienced and skilled in aircraft power management in order to conduct these manoeuvres at high altitude and during OGE hovers. Dynamic changes in the aircraft’s weight and balance that occur as personnel and equipment are offloaded or taken on board also must be managed by the aircrew. Qualified and competent cabin crewmen are also critical to successful AIE operations. These crewmen (e.g. flight engineers, gunners, crew chiefs, PR specialists, rescue swimmers) are the pilot’s extra eyes during an AIE operation, and they require significant additional training to be designated as mission ready. Emergency procedures for aircraft and AIE device malfunctions must be thoroughly briefed and understood by aircrew and SOTG personnel.

Red Flag. **AIE emergency procedures will be discussed during the aircrew and team briefings.**

If an in-flight emergency occurs while the helicopter is in a hover and personnel are on the fast rope, rappel, hoist, or another device that is attached to the helicopter, the pilot must immediately determine if he can maintain altitude and control of the aircraft to permit personnel to reach the ground and clear the area below the aircraft. Once exiting personnel are no longer attached to the aircraft, the pilot should continue to fly or land the aircraft away from ground personnel. If the emergency does not allow for sustained flight, the rope master/hoist operator or designated aircrew should stop additional personnel from exiting the aircraft and, if possible, allow personnel already on the device to reach the ground. The pilot should attempt to fly the aircraft forward and away from personnel already on the ground.

(3) There are numerous proven, alternative methods of inserting/extracting personnel; the key to all of these is standardized, safe equipment and the proficiency and currency of both SOATU and land SOF in the AIE procedures. There are innumerable forms of AIE; examples include:

(a) **Fast Rope.** The practice of the helicopter deploying a braided rope (10-30 m long) with one end attached to an anchor point within the aircraft allowing the assault force to quickly slide down the rope for insertion to the objective area.
(b) **Rappel.** The practice of deploying rappelling lines from the aircraft and having the assault force rappel down to the objective area.

(c) **Hoist.** The practice of using the helicopter’s integral hoist to lower and retrieve either a penetrator or Stokes litter; typically used for rescue operations.

(d) **Special Patrol Insertion Extraction System.** The practice of using a rope, 10-30 m in length, with one end attached to the helicopter’s anchor point and the other end attached to personnel on the ground wearing specialized harnesses. Personnel are picked up from a confined area and transported to a more suitable landing area where they can board the helicopter.

(4) This section addresses some of the most common, time-proven methods: fast rope, hoist, rappel, rope ladder, and helo-cast. These methods did not exist before visionaries, working with technical experts, came up with out-of-the-box ways of using the special capabilities of helicopters in innovative and unexpected ways; SOATUs should continually be on the lookout for new AIE methods. In addition, the practice of using helicopters to insert parachutists will also be briefly discussed.

b. **Key Principles.** The ability to conduct AIEs gives SOF the advantages of speed, surprise, flexibility, and mobility.

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**Important Note.** AIEs require precise and thorough coordination and rehearsal between aircrew and the ground forces participating in the AIE. A key aspect to this coordination is to have the ground force team leader on headset and monitoring aircrew transmissions prior to the Infil. so that he has SA of the environment. Hand signals and pyrotechnic signals, as well as other signals, must be fully briefed prior to commencing with AIE manoeuvres.

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c. **Hand Signals Common to All Alternative Insertions and Extractions.** The hand signals listed below are commonly used to relay information between the aircrew and operators conducting the AIE. Not all hand signals in this list are applicable to all AIEs. This list is not all inclusive and use of the signals is solely up to the discretion of the pilot in command and the troop leader conducting the operation.

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**Important Note.** This list of hand signals is a combination of best practices from several nations, but these signals are not common to all NATO nations.

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(1) **OK/affirmative/ready:** thumbs up.
d. **Fast Rope Insertion and Extraction System.** The fast rope insertion and extraction system (FRIES) consists of a rope made of approximately 2.5-inch/6.5-centimetre diameter woven rope that is attached to an anchor point within the aircraft or from a hoist system. The rope is deployed from a hovering aircraft. Fast ropes come in a variety of lengths, e.g. 48 ft/15 m, 60 ft/20 m, 90 ft/30 m, and 120 ft/40 m, to meet mission requirements.

![Figure A-3. Helicopter Fast Rope Insertation](image)

**Important Note.** Prior to all live fast ropes, a complete safety inspection of the fast rope, FRIES bar, anchor points, and hoist must be accomplished.

(1) **Operational Requirements.** Fast rope insertions are second only to landing in their ability to rapidly insert multiple personnel; they are useful for
insertions where there are obstructions or where the objective area cannot support the aircraft weight (e.g. building roofs). Multiple fast ropes can often be employed simultaneously, depending on the helicopter, although aircrews should be cautious of exceeding lateral centre of gravity limits. Extraction using a modified fast rope outfitted with attachment points is a useful method when the terrain doesn’t permit the aircraft to land or hover close enough to the ground to permit embarkation of assault forces. With a properly outfitted rope, ground forces attach themselves to the rope while the aircraft maintains a hover at a feasible altitude. Once the ground forces have attached themselves to the rope, the aircraft begins a slow, steady ascent and commences forward flight.

(2) **General Technical Requirements.** Aircraft must be equipped with a hoist for Stokes litter and penetrator operations or an approved FRIES bar with a quick release attachment. The aircraft must also have a reinforced contact point to secure the fast rope loop and/or rappel ropes during those operations.

(3) **Aircrew Currency.** Currency requirements shall be determined by NATO or the TCN.

(4) **Mission Planning.** Insertion altitudes should be planned for the lowest altitude at which aircraft can safely perform the manoeuvre, to allow for a quicker and safer ground team insertion. Optimally, insertions should use the shortest rope required for the mission, as the ropes are heavy and take up room in the aircraft.

**Important Note.** In some cases it may be possible to use a low hover over the LZ, which will allow the team to step out of or onto the aircraft. This technique is very useful during urban operations (e.g. building rooftops) or in mountainous terrain where landing is not an option. Pilots may be able to manoeuvre the ramp over the LZ for a rear exit or lower the aircraft to where the wheels or skids are barely touching the surface until the team has exited or boarded the aircraft. This manoeuvre requires a precision hover and will be more difficult without good visual references for holding the hover. OGE hover power may be required to complete this manoeuvre.

(5) **Best Practices**

(a) **Positioning.** As with any tactical manoeuvre, fast rope insertions should be expeditious, typically occurring at the end of a low-level ingress and tactical approach. Transitioning from the en route environment to a terminal fast rope is a demanding piloting skill. An over-aggressive tactical deceleration (quick stop) can result in an overshoot of the Infil. position and altitude and can also result in excessive power requirements. This aggressive manoeuvring can pose an increased risk to the Infil. team who may be unsecured in preparation for the fast rope operations. The cabin
crew member verbally positions the pilot over the objective using agreed upon standard calls (e.g. "forward 20, 10, 5, hold; up 2, left 5") to give the pilot an indication of relative distances and closure rates.

**Important Note.** In the event of intercom failure, hand signals may be used from the cabin crew member to the non-flying pilot or to another crew member with communications capability. Visual signals include an open palm moving in the desired aircraft movement direction and a closed fist for hold.

(b) **Deploying.** Aircrew should try to hover as low as possible in order to minimize power requirements, to expedite the insertion, and to lessen the likelihood of ground team injury. When in position over the site, the pilot will authorize rope deployment (perhaps with a call such as, “Ropes, ropes, ropes.”), which signals that the aircraft is stable, is at the appropriate height for deployment, and that clearance is given for the cabin crew member to deploy the fast ropes. The cabin crew member will confirm the ropes are on the ground and are not tangled (typically, there should be at least 6 ft/2 m of rope on the ground for safety purposes) and will then signal for the team to exit by a straight arm motion pointing from the aircraft to the ground. Deploying assault force personnel should sequence their exits to avoid congestion at the bottom of the rope; terrain permitting, a slow forward aircraft speed can assist in precluding such congestion.

(c) **Extraction using Fast Rope Insertion and Extraction System.** If an extraction is to be executed, a modified FRIES fast rope that has been outfitted with attachment points at intervals along the rope is used and must be lowered from the aircraft. Once lowered, ground forces will attach themselves to the rope, and the helicopter will gradually increase power and climb to an appropriate altitude while the assault force personnel remain attached to the rope.

(d) **Night Considerations.** Placing a chemlight/glowstick at the top of the rope can assist deploying personnel in grabbing the rope prior to departure. Placing chemlights/glowsticks at the bottom and at approximately 6 ft/2 m from the bottom of the rope will assist in determining if the rope is safely on the ground during night or low visibility operations.

(e) **Tactical Considerations.** For tactical purposes, the fast ropes should be jettisoned from the aircraft after Infil. in order to expedite the aircraft’s departure.

e. **Hoist.** Many NATO aircraft can be equipped with a hoist. A hoist is either an electric or hydraulic winch attached to an aircraft that is capable of vertical operation and is designed with safety margins for live personnel operations.
Important Note. Prior to all live hoists, a complete safety inspection of the hoist, any hoisting devices, and the entire hoist cable must be accomplished.

(1) **Operational Requirements.** Locations with restricted access, such as urban, shipboard, jungle, and mountains, often require a precision OGE hoist manoeuvre to insert/extract SOF personnel.

(2) **General Technical Requirements.** Hoists should be capable of lifting 600 pounds/275 kilograms, which allows for the insertion/extraction of two combat-equipped personnel. The length of the hoist cable should allow for the insertion/extraction of personnel from altitudes in excess of 150 ft/50 m. Hoists should have an emergency cable cutting capability in the event cables becomes tangled, uncontrollable, or inoperative, and place aircrew or ground personnel in danger.

(3) **Aircrew Currency.** Pilots are considered current if they have conducted a live, or simulated live, personnel hoist within the period mandated by their nation or NATO. As the hoisting responsibilities of the cabin crewmen are more complex, it is recommended that cabin crew conduct live hoists with personnel versus simulating live hoists for currency training.

(4) **Mission Planning.** Hoists can be equipped with various devices such as a forest penetrator for jungle operations, a Stokes litter for patient extraction, and a horse collar for water extractions. The biggest limitation of the hoist is the time required for execution. For large teams, using the hoist may be time prohibitive and may subject the aircraft/team to a prolonged threat environment. Additionally, hoist operation requires the full attention of a crew member, thus removing a potential defensive fire position.

(5) **Best Practices**

(a) **Positioning.** Similar to fast rope operations, the cabin crew member will talk the pilot over the objective area using standard calls. If there is an intercom failure, the same hand signals as used for fast rope operations apply (e.g. thumbs up/down signals hoist cable up/down).

(b) **Hoisting.** On final approach, and prior to the pilot losing visual contact of ground personnel, the hoist operator should go *hot mike* (hands free microphone/voice activated) to free both hands for the hoist operation. The operator should ground the hoist (to release static electricity) prior to personnel touching the hoist cable or device. Once secured on the device,

---

14 Note: The hoist operator can be any aircrew member (e.g. flight engineer, gunner, rescue diver, crew chief) who is trained and certified in hoist operations.
ground personnel signal ready for hoisting by holding a straight arm to the side, thumb up, and moving the arm in an upward motion.

(c) **Restricted Vision.** If the hoist operator cannot see the personnel to be lifted because of obstacles (e.g. forested area), then multiple pulls on the cable by ground personnel will signal the hoist operator that ground personnel are ready for lift.

(d) **Limited Power.** Aircraft power management is critical as the power required to hoist is often very close to the maximum power available. A good technique to ensure adequate power margins exist is to raise the personnel off the ground by raising the aircraft versus lifting with the hoist.

(e) **Controlling Device Oscillation/Rotation.** Device oscillations can be controlled by the hoist operator moving the hoist cable opposite the direction of the device oscillation. Device rotation can be minimized by rotating the hoist cable in a one- to two-foot diameter circle in the opposite direction of the device rotation.

(6) **Standard Equipment**

(a) **Stokes Litter.** The Stokes litter is a relatively common hoist device. It is constructed of wire mesh and lightweight steel tubing, holds a casualty securely in a supine position, and can be configured with floatation devices for over-water operations. The sides of the litter protect the casualty from hitting obstacles or the side of the aircraft. To lower, the litter is placed outside the aircraft foot end first, and rotated until it is parallel to the aircraft. Conditions and time permitting, the ground team can disconnect the Stokes litter from the hoist hook once it is on the ground/water, and the aircraft can reposition while the ground team loads the casualty. This can make the litter loading easier for ground personnel, save fuel, remove the aircraft from a vulnerable hovering position, minimize drawing enemy attention to the hoisting site, and give the aircrew an opportunity to reconnoitre the local area. When lifting the litter with a casualty, oscillations and rotations must be controlled early lest they get out of control. The litter is retrieved into the aircraft head first and, because a loaded litter is both awkward and heavy, may require additional assistance for the hoist operator.

Important Note. The Stokes litter’s size and shape make it extremely susceptible to rotor wash and it may spin or flip uncontrollably. A *tag line* held by personnel on the ground during litter ascent will help control the litter’s movement.

(b) **Tag Line.** A tag line can assist significantly in deployment and recovery of the Stokes litter; this line is a 250 ft/80 m nylon rope with a snap-link on one end and small weighted bag on the other end. When
raising a Stokes litter from the ground, a tag line can be attached to the litter with a snap-link and held by ground personnel at the other end to stabilize the litter and keep it from spinning in the rotor wash.

(c) **Deck Operations.** When hoisting to/from a small boat’s deck, a tag line should always be used. After selecting the hoisting location on the ship that provides the best clearance from poles, antennas, or boat superstructure, the tag line should be lowered to the boat first. Once ground personnel have control of the tag line, it can be attached to the Stokes litter for a more controlled and safe descent of the litter to the boat. The pilot can hover slightly offset the ship to use it as a hover reference during this manoeuvre while the Stokes is lowered/raised at an angle to the aircraft.

(7) **Over-water Operations.** From large swells and salt spray in stormy conditions to crystal clear nights with glassy smooth surfaces and no visible horizon, over-water hoist operations can be one of the most demanding and dangerous AIE operations. A major challenge of over-water hoist operations is establishing a hover reference with which to maintain a stable platform. In a daytime environment, deploying a sea dye marker 45 degrees off the wind line on the flying pilot’s side of the aircraft can provide a suitable reference. Whitecaps, if present, can also be used as a relatively stable hover reference. If there is significant water current, the whitecaps should move with the current and aid in maintaining position over the objective. In a no-wind condition, the aircraft’s rotor wash can produce ripples and foam on the water that can be used as a hover reference. The most difficult condition for hover references is a light wind that moves the rotor wash aft of the aircraft. If the objective is moving at a different speed than the current (e.g. raft in the wind, vessel underway, etc.) the pilot should consider hovering away from the objective until it is time for pickup. If limited fuel is an issue, the pilot can set up a circular orbit at maximum endurance speed until time for pickup. If the aircraft needs to depart the hoist location temporarily, attention should be paid to marking the location well (in the water and with onboard navigation systems) to ensure the aircraft is able to return to the hoist location.

(8) **Night Considerations.** Night over-water hoists combine difficult hover reference concerns with the restricted visibility problems of NVGs. Deploying a group of chemlights/glowsticks tied together in a position 45 degrees off the wind line on the flying pilot’s side of the aircraft can provide a suitable hover reference and for returning to the objective if subsequent patterns are required. All aircrew members must be vigilant in monitoring aircraft altitude and attitude in this environment because of limited visual cues and restricted NVG fields of view for the flying pilot; a constant cross-check of aircraft instrumentation is required to supplement visual cues. A chemlight/glowstick attached to the hoist hook will assist the operator and ground personnel in determining the device location during NVG operations.
f. **Rappel.** Secured properly to the aircraft, rappelling can occur much like traditional mountain/building rappelling.

![Image of helicopter rappelling](image)

**Figure A-4. Helicopter Rappelling Operations**

(1) **Operational Requirements.** SOATU crews should be able to perform a TACAD to and from rooftops of equivalent size to the helicopter’s confined area limits. Crews should also be able to hover OGE and rappel assaulters onto the rooftop.

(2) **General Technical Requirements.** Aircraft must have suitable tie-down points for the rappel ropes and have the power available to hover OGE.

(3) **Aircrew Currency.** Aircrew must have conducted a live or simulated rappel within the period mandated by their nation or NATO.

(4) **Mission Planning.** Rappelling allows for the rapid insertion of personnel (one per line at a time) from heights limited only by rope length. Aircrew will confirm deployment heights with the disembarking SOF during pre-mission planning.

| Red Flag. | Smaller aircraft may require rappellers to alternate out each side of the aircraft to avoid contact with each other during descent and/or to preclude exceeding lateral centre of gravity limits. |

(5) **Best Practices**

(a) **Positioning.** Just like fast rope, the cabin crewman will talk the pilot over the objective area with standard calls.
(b) **Deploying.** When in position over the site, the pilot will call, “Ropes, ropes, ropes,” which signals that the aircraft is stable, is at the appropriate height for deployment, and that clearance is given for the team to deploy rappel ropes and to exit the aircraft. The team lead will confirm rappel ropes have reached the ground and are not tangled before clearing his team to deploy.

(c) **Night Considerations.** Placing chemlights/glowsticks at the bottom and at approximately 6 ft/2 m from the bottom of the rope will assist in determining if ropes are on the ground during NVG operations.

(d) **Tactical Considerations.** In a tactical environment, the rappel ropes will be jettisoned/cut from the aircraft for immediate departure.

g. **Rope Ladder.** Rope ladders are made from heavy duty nylon with rigid steps, or from stranded steel cable with metal steps (caving ladder). Rope ladders are useful in inserting/extracting multiple personnel when the aircraft is required to hover at a height that is too high for SOF to jump, but low enough that the rope ladder will reach the surface (approximately 20 ft/7 m). When inserting/extracting more than two personnel, the rope ladder is usually faster than hoisting. Rope ladders are normally used to extract but can be used to insert multiple personnel in land or water environments.

1. **Operational Requirements.** Aircrew should be proficient in over-water precision hovering.

2. **General Technical Requirements.** Aircraft must have tie-down points to attach the rope ladders to and that allow for the ropes to be pulled back into the aircraft or jettisoned/cut depending on the tactical situation.

3. **Aircrew Currency.** Pilots conducting live, or simulated live, personnel rope ladder recoveries/deployments within the period mandated by their nation or NATO are considered current. As the rope ladder responsibilities of the cabin crewmen are more complex, they do not have the option of simulating live rope ladder operations for currency training.

4. **Mission Planning.** Deployment/recovery heights should be planned at approximately 20 ft/7 m or less. Climbing a rope ladder is physically demanding and requires both strength and skill (especially from water), so its use is typically restricted to SOF ground personnel. The rope ladders can be maintained by either aircrew or ground personnel but must be thoroughly inspected prior to live ladder operations.

5. **Best Practices**

   (a) **Positioning.** Just like fast rope operations, cabin crewman will talk the pilot over the objective area with standard calls. When required to immediately exit a threatened area during extraction, a slow forward flight
(within aircraft limitations) with personnel snap-linked onto the ladder is possible for short distances.

(b) **Deploying.** Once in position over the site, the pilot will call, “Ladders, ladders, ladders,” which signals that the aircraft is stable, is at the appropriate height for deployment, and that clearance is given for the team/crewmen to deploy ladders and enter/exit the aircraft. There should be no more than three personnel on a ladder at any given time.

(c) **Water Considerations.** For water extractions, the personnel to be recovered should disperse in a line into the wind with approximately 50 ft/15 m spacing. This allows the aircraft to recover one person from a hover, then transition to the next pickup versus conducting an extended hover in such a difficult hovering environment, especially with NVGs.

(d) **Night Considerations.** Chemlights/glowsticks attached to the bottom of the ladder will assist in determining if the ladder is safely on the ground/water.

h. **Helo-cast.** Helo-cast provides for a rapid insertion of personnel into the water without any special aircraft equipment.

(1) **Operational Requirements.** Aircrew should be proficient at accurately determining their height and ground speed over water.

(2) **General Technical Requirements.** There are no specific technical requirements for helo-casting; however, an aircraft that is equipped with a radar altimeter and/or an ability to safely secure rafts will present more options to the SOATU.

(3) **Aircrew Currency.** Aircrew are considered current if they have conducted live, or simulated live, helo-cast deployments within the period mandated by their nation or NATO.

(4) **Mission Planning.** It is important for the AMC and the lifted unit commander to jointly decide on the best insertion location, taking into account mission planning factors as well as water depth. Often the lifted unit commander will desire the insertion of inflatable boats/rafts to continue his mission post-disembarkation. If the aircraft is capable of safely deploying the raft out of an aft ramp, this manoeuvre should be carried out in a manner that allows the back of the boat to be touching the water as the front fully departs the aircraft; this will help negate the tendency for the rotor wash to flip the boat. A medium-sized helicopter (e.g. H-60) may be capable of internally carrying a deflated combat rubber raiding craft or attaching it to the belly of the aircraft (a manoeuvre known as K-Duck). The K-Duck option severely limits airspeed and cabin carrying capacity. Except when using large, ramp-equipped helicopters, it will not be possible to recover the boat.
(5) **Best Practices**

(a) **Positioning.** Similar to fast-rope operations, the cabin crew member will talk the pilot over the objective area using standard calls. In rough seas, the pilot should attempt to maintain the aircraft at 10-15 ft above the wave tops and not descend/climb with wave movement. Deployment speeds should be 10 knots (kts) or less.

(b) **Deployment.** Once the aircraft is stable over the objective area at 10-15 ft/10 kts, the pilot will call, “Clear to deploy”. Deploying personnel should time their exit to land on wave tops. If personnel are deploying off the ramp and doors, the ramp personnel should deploy first, followed by door personnel. Once personnel are safely in the water, they should signal to the cabin crew member that everything is OK by giving a thumbs up.

(c) **Night Considerations.** For NVG operations, deploying/recovering personnel should have a chemlight/glowstick or an IR strobe taped to their helmets and should carry a chemlight/glowstick for signalling.

i. **Parachuting.** Parachuting from a helicopter is typically practised to rehearse parachuting for the jumper when FW aircraft are not available. Parachuting from a helicopter is not widely recognized as a tactical insertion method.

(1) **Operational Requirements.** The aircraft must be at an appropriate elevation above ground and proper airspeed to allow the parachute to fully inflate and for the jumper to have enough time to obtain SA of his environment before landing.

(2) **Technical Requirements.** The helicopter must have suitable attachment points to permit attachment of the static line from the parachute to the aircraft. For high-altitude, low-opening operations, there are no aircraft requirements other than a feasible and safe method for the jumpers to exit the aircraft without obstruction.

(3) **Aircrew Currency.** As mandated by NATO or home nation.

(4) **Mission Planning.** The same pre-mission brief and planning considerations used during FW parachuting operations should be considered for helicopter operations. The parachuting jump master should be familiar with the helicopter and its flying characteristics to ensure a safe operation for his jumpers. The jump master will be responsible for ensuring jumpers’ equipment is checked, that the jumpers are rigged safely to the aircraft, and for their safe deployment.
RISK ASSESSMENT (ALSO NAMED MISSION ACCEPTANCE/LAUNCH AUTHORITY)

1. The assessment of risk, to ensure that the cost (physical, moral, and conceptual) of the mission does not outweigh the benefit, has become an established element of mission planning. The NATO SOF Air Operations Manual introduces risk and considers a deployment risk assessment; the following tables provide examples of quantitative risk assessments that are related to mission acceptance and launch acceptance.

2. The mission acceptance process focuses on the nature of the mission itself and is designed to balance the operational imperative and the residual risk. The mission acceptance process affects the tasking process and is designed to ensure appropriate oversight of SOATU missions, including those that present elevated risk. The mission acceptance process is largely focused on the planning phase of the mission.

### MISSION ACCEPTANCE CONDITIONS EXAMPLE

<table>
<thead>
<tr>
<th></th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td># of aircraft</td>
<td>&gt; 3 or single aircraft ops</td>
<td>2 or 3</td>
<td></td>
</tr>
<tr>
<td>Formation</td>
<td>Mixed/not national</td>
<td>National</td>
<td></td>
</tr>
<tr>
<td>Pax</td>
<td>VIP (MG and equiv or above)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Mission</td>
<td>Deliberate operation (op)</td>
<td>Deliberate non-national op –</td>
<td>Deliberate task force op –</td>
</tr>
<tr>
<td></td>
<td>No-notice casualty</td>
<td>aerial mobility</td>
<td>aerial mobility mission?</td>
</tr>
<tr>
<td></td>
<td>evacuation/MEDEVAC PR</td>
<td>Other</td>
<td>Conditions check and GO/NO</td>
</tr>
<tr>
<td>Mission Profile</td>
<td>Mountain ops</td>
<td></td>
<td>GO parameters</td>
</tr>
<tr>
<td>Landing Zone</td>
<td>Unfamiliar forward</td>
<td>Familiar FOB (Green)</td>
<td>Log airlift (pax, cargo)</td>
</tr>
<tr>
<td></td>
<td>operating base (FOB)</td>
<td>Main operating base</td>
<td>Local training</td>
</tr>
<tr>
<td>Threat</td>
<td>High or greater</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>RW Escort</td>
<td>Not available</td>
<td>Available/on call</td>
<td>Available/dedicated</td>
</tr>
<tr>
<td>Environment</td>
<td>Night (Red Illume)</td>
<td>Night (Amber/Green Illume)</td>
<td>Day</td>
</tr>
</tbody>
</table>

### AUTHORIZATION LEVEL – MISSION ACCEPTANCE

<table>
<thead>
<tr>
<th></th>
<th>COM JTF</th>
<th>CO SOATG</th>
<th>OC SOATU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady-state</td>
<td>≥ 2 Red</td>
<td>1 Red</td>
<td>Green &lt; 3 Amber</td>
</tr>
<tr>
<td>Within 30 Days of Relief in Place (RIP)</td>
<td>≥ 2 Red</td>
<td>1 Red (discussion with COM JTF as necessary) ≥ 2 Amber</td>
<td>Green &lt; 2 Amber</td>
</tr>
</tbody>
</table>

### AUTHORIZATION

COM JTF / CO SOATG / OC SOATU ___________________________ Date
3. **Launch Authority.** Once a mission is accepted, a different set of factors is examined to manage risks and ensure oversight of the conduct of the mission. Many conditions contribute to increased risk during mission execution, and increased levels of authority will be involved in the decision to carry on with a mission, in the event of increased risk.

### LAUNCH AUTHORIZATION CONDITIONS EXAMPLE

<table>
<thead>
<tr>
<th>Crew Rest</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8-10 hours</td>
<td>&gt; 10 hours</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crew qualifications</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aircraft captain has not previously completed sequence in theatre</td>
<td>First officer has not previously completed sequence in theatre</td>
<td>Aircraft captain and first officer have both previously completed sequence in theatre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aircraft captain flying time in the AOO</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1000 total RW</td>
<td>&lt; 25 hrs AOO</td>
<td>25-50 hrs AOO</td>
<td>&gt; 50 hrs AOO</td>
</tr>
<tr>
<td>&gt; 1000 total RW</td>
<td>&lt; 25 hrs AOO</td>
<td>&gt; 25 hrs AOO</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NVG – Number days since last NVG flight (aircraft CO and/or flight officer)</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100 hrs total NVG time</td>
<td>&gt; 45 days</td>
<td>&gt; 30 days</td>
<td>&lt; 30 days</td>
</tr>
<tr>
<td>&gt; 100 hrs total NVG time</td>
<td>&gt; 45 days</td>
<td>&lt; 45 days</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night</td>
<td>&lt; 500’ or &lt; 1 statute mile (SM) visibility</td>
<td>500’ - 1000’ or &gt; 1 &lt; 3 SM visibility</td>
<td>≥ 1000’ and ≥ 3 SM visibility</td>
</tr>
<tr>
<td>Day</td>
<td>&lt; 1000’ or &lt; 3 SM visibility</td>
<td>≥ 1000’ and ≥ 3 SM visibility</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crew day</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last 1/3 of crew day</td>
<td>Red Illume</td>
<td>Green Illume &amp; Amber Illume</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Red Illume</td>
<td>Green Illume &amp; Amber Illume</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preparation Time</th>
<th>Red</th>
<th>Amber</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6 hours</td>
<td>Red</td>
<td>Green Illume &amp; Amber Illume</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Authorization Level – Mission Acceptance</th>
<th>Red</th>
<th>Green</th>
<th>Amber</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>AUTHORIZATION LEVEL – LAUNCH</th>
<th>CO SOATG</th>
<th>OC SOATU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady-state</td>
<td>≥ 2 Red (or)</td>
<td>1 Red and ≥ 3 Amber (or)</td>
</tr>
<tr>
<td></td>
<td>≥ 4 Amber</td>
<td>&lt; 4 Amber</td>
</tr>
<tr>
<td>Within 30 Days of RIP</td>
<td>≥ 1 Red (or)</td>
<td>&lt; 3 Amber</td>
</tr>
<tr>
<td></td>
<td>≥ 3 Amber</td>
<td></td>
</tr>
</tbody>
</table>

### AUTHORIZATION

<table>
<thead>
<tr>
<th>CO SOATG / OC SOATU</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GO/NO-GO AND ABORT CRITERIA

1. The formulation of go/no-go and abort criteria is an important aspect of mission planning. The AMC should ensure that appropriate criteria are developed for the mission to be flown.

2. The tables below provide examples of potential go/no-go and abort criteria.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Requirement</th>
<th>Conditions Checks and GO/NO GO Criteria</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>Day: XX NM vis, clear of cloud. Night: XX NM vis, XXX’ AGL ceiling. Illume: If red illume, then black illume available.</td>
<td>Weather close to or below minimums but workable with significantly increased risk (operational imperative). Impact of weather/cloud base/light levels on ground force/AHs/escort/mission helicopters/ISR capability. If red illume, then black illume available for critical phases of flight. NO GO (OC SOATU): Forecast or actual cloud at night &lt;XXXX’ AGL en route and/or at target area, and/or vis below X NM. Black illume unavailable.</td>
<td>GO NO GO</td>
</tr>
<tr>
<td>Int. and Info, Protection/Security</td>
<td>ISR soak XX hours before insert.</td>
<td>Sufficient airborne ISR coverage of the HLZ, immediate surrounding areas, and ingress/egress routes to provide a suitable indication of pattern of life during a period that extends from XX hours before the planned insertion time until XX hours after the planned insertion, daily, starting at D-XX. NO GO (OC SOATU/SOTG): No airborne ISR feed for pattern of life during mission timing period for at least XX days prior to insertion.</td>
<td>GO NO GO</td>
</tr>
<tr>
<td>ISR feed for XX hours before and XX hours after the insert and extract windows. Suitable route, primary LZ, and alternate LZ.</td>
<td>Live airborne ISR coverage required during helicopter insertion from XX hour prior to, until XX hour after the planned insertion/extraction time. Sufficient coverage of the HLZ, surrounding areas, and ingress/egress routes to provide confirmation of normal pattern of life, no abnormal or threatening enemy forces activity or positions. Enemy forces pattern of life is as expected and planned for on route and within XXX m of LZ. Any personnel on LZ are assessed to be non-threatening. NO GO (OC SOATU/SOTG): No ISR for a min XX hour prior to and during insert window. Threatening enemy force activity within XXX m of LZ.</td>
<td>GO NO GO</td>
<td></td>
</tr>
<tr>
<td>Secure HLZ: (HLZ selection on J2 assessment of location and/or system by ground call signs)</td>
<td>Size and effectiveness of secured zone. Residual threat within security zone. Threat outside the secured zone (ingress/egress routes). Vicinity of compounds to LZ (&lt;XXX m, ISR essential. &lt;XXX m, OC SOATU approval). NO GO (OC SOATU/SOTG): Positive confirmation of weapons, familiar activity, abnormal pattern of life in vicinity of ingress/egress routes or HLZ.</td>
<td>GO NO GO</td>
<td></td>
</tr>
<tr>
<td>Firepower</td>
<td>CAS/utility helicopter escort/over HLZ</td>
<td>One RW escort section minimum acceptable ingress/egress and FW fires avail for tactical security at LZ/PZs. NO GO (OC SOATU): Less than one escort section available. No FW fires available at LZ/PZ.</td>
<td>GO NO GO</td>
</tr>
</tbody>
</table>
Each phase of the op must allow for sufficient crew rest period, or a plan must be in place to mitigate through crew changes. Crew duty period not to exceed national limits (XX hours during daytime, XX hours at night).

**NO GO (OC SOATU):** Op is extended necessitating an extension to a crew duty period.

Op needs to rolex in order to meet other conditions.

**NO GO (OC SOATU/SOTG):** J2 picture/pattern of life indicates threat to package would increase due to rolex period. Max rolex based on crew day.

Min number of helicopters to achieve mission

**NO GO (OC SOATU/SOTG):** Min 2 x helo with escort required for insertion and extraction.

MEDEVAC should be available through SOATG, SOAC, or through conventional forces.

**NO GO (OC SOATU/SOTG):** Abort option if no MEDEVAC assets available during critical phases.

### Table C-2. Abort Criteria

<table>
<thead>
<tr>
<th>Condition</th>
<th>Requirement</th>
<th>Abort Criteria</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Met</td>
<td>Day: XX NM vis, clear of cloud. Night: XX NM vis, XXX’ AGL ceiling.</td>
<td>En route or on obj met falls below minimum or is considered untenable – AMC.</td>
<td>GO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO GO</td>
</tr>
<tr>
<td>C2</td>
<td>Joint operations centre, AMC, air packet, and ground call signs have communications. Forward basing of liaison officer if required to establish C2 chain.</td>
<td>AMC doesn’t have sufficient communications to speak to all mission aircraft, to the ground call signs, or to SOATU Ops – AMC.</td>
<td>GO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO GO</td>
</tr>
<tr>
<td>Protection/Security</td>
<td>Aircraft systems serviceable.</td>
<td>Any mission-essential aircraft with a failure of its protection systems and/or defensive systems, or any helo calls bingo fuel prior to landing – AMC.</td>
<td>GO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO GO</td>
</tr>
<tr>
<td>Int. and Info, Protection/Security</td>
<td>ISR, Icom feed, visual cues to identify route and HLZ.</td>
<td>Enemy forces showing hostile intent or action that presents an imminent threat in the vicinity of H LZ or to ingress/egress routes, H LZ not secure and/or ongoing troops-in-contact at or in the vicinity of H LZ (and time/fuel precludes hold) and/or pax on H LZ presenting threat to mission or endangering themselves. <em>(OC SOATU/AMC (unless launch authority has placed a caveat on landing))</em></td>
<td>GO</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>NO GO</td>
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FORWARD ARMING AND REFUELLING POINT BRIEFING TEMPLATE

1. Location

2. Time on Target

3. Communication
   a. Call signs
   b. Frequencies
      (1) Air-to-air
      (2) Air-to-ground

4. **Marshalling Procedures.** In accordance with ground control party direction/pre-briefed procedures. (See diagrams below for FARP layout examples.)

5. Onload
   a. Fuel (quantity required)
   b. Ammunition (total weight/type anticipated)

6. Equipment
   a. Grounding wire (if applicable)
   b. Water (all personnel directly involved with the refuelling portion will have a canteen/water container on their person to be able to quickly flush an individual sprayed/doused by fuel)

7. Emergency Procedures
   a. Fuel leak or spill
   b. Fuel spill on personnel
      (1) Flush contaminated area immediately
      (2) Clean area with soap, if available
   c. Taxi the aircraft if situation warrants
d. Egress (if aircraft cannot be taxied away from spill site, fire, or emergency condition)

8. **Departure.** In accordance with ground control party direction/pre-briefed procedures.

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**Figure D-1. Typical Single-point Layout**
Figure D-2. Two-point FARP Layout

A) Hot Refuelling Supervisor
B) Panel Operators
C) Hose Deployment Personnel

100 m Minimum

Fuel Distribution Centre/Aux Pump
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HOW TO GENERATE A MISSION-ESSENTIAL TASK LIST

1. Procedure
   a. Step 1. The unit commander reads and analyses:
      (1) His higher HQ’s METL.
      (2) His unit’s standard mission statement.
      (3) War plans and contingency plans.
   b. Step 2. The unit commander lists the tasks that will be assigned to his unit in combat.
   c. Step 3. The unit commander selects only those tasks essential to his wartime mission.
   d. Step 4. The unit commander communicates the METL:
      (1) To his higher HQ for approval.
      (2) To his subordinate units as training guidance.

2. Format
   a. A METL is usually a short numbered list of generic task statements. Some tasks may be broken down into separate types of tasks.
      (1) Conduct attack.
         (a) Conduct deliberate attack.
         (b) Conduct counterattack.
         (c) Conduct movement to contact/hasty attack.
         (d) Conduct night attack.
      (2) Defend.
         (a) Block.
         (b) Defend a fixed location.
(c) Conduct linear defence.

(3) Conduct relief operations.

(4) Conduct security operations.

(5) Move.

b. Each task may include additional information. A sample mission statement puts the task in a combat context. A short outline of conditions and standards—a mission profile—is the first step in developing training plans to train to the task.


3. Mission Essential Task List

a. Definition. A METL is a list of tasks that a unit must accomplish in combat. The METL is a written requirement of wartime missions.

b. Purpose. Training prepares a unit for combat. The METL, as a list of combat tasks, describes the end state of training. All training must be battle focused on the METL.

c. Training Management. The METL is a unit’s primary and most important training management document.

d. Units. All infantry units from regiment to company require a METL. Unit below company level do not have a METL.

4. Common Errors

a. Priorities. All METL tasks are equally important. The METL does not set training priorities, the training plan does.

b. Resources. The METL is an end state. It is unconstrained by resources. The METL does not acknowledge limited training resources; the training plan does.

c. Higher HQ’s METL disconnect. A unit’s METL must support its higher HQ’s METL. A unit’s METL does not include those higher HQ tasks that the higher HQ accomplishes by itself.

d. Length. The METL should be as short as possible. Essential tasks receive focus.

e. Copying. Identical units do not have identical METLs. War plans, geography, and higher HQ all generate varying tasks for identically organized units.
f. Regurgitation of training standards. A list of training standards or doctrinal tasks is not a METL. A unit’s METL defines specific combat tasks, not generic capabilities.

g. Environments or conditions listed instead of tasks. Each listed task could be assigned to the unit in combat. Including an example mission statement for each listed task solidifies this linkage. Generic environments, platforms, equipment, or conditions may apply to an essential task, but are not stand-alone tasks. “Operate in an nuclear biological and chemical environment” is not a METL task. “Operate in military operation in urban terrain” is not a METL task. “Conduct mechanized operations” is not a METL task.

h. Subordinate tasks. The METL includes only the highest-level collective tasks that apply to the entire unit, tasks that would be assigned by higher HQ to the unit as a whole. Including an example mission statement for each listed task solidifies this linkage. Staffs and subordinate units have their own tasks that support the METL but are not stand-alone tasks in the METL. “Coordinate fire support” is a subordinate task. “Command control unit” is a subordinate task. “Provide internal combat service support” is a subordinate task.

i. Secondary activities. Firefighting, community support, base operations, ceremonies, formal training requirements, and other similar activities are not mission-essential tasks and are not part of the METL.

5. Training Plans

a. The METL provides the foundation for the training plan. A training plan selects one or more METL tasks, identifies the collective and individual training needed to accomplish the METL task, and allocates time and resources to train to that task.

b. METL training is first priority above formal training requirements and ancillary training requirements. A commander whose training plan is not focused on a specific METL task, but addresses only formal training requirements, is not preparing his unit for combat.
LEXICON

1. Abbreviations and Acronyms

AGL above ground level
AH attack helicopter
AIE alternative insertion/extraction
AMC air mission commander
AOO area of operation
AT air transport

C2 command and control
CAS close air support
CO commanding officer
COA course of action
COM commander
CRM crew resource management
CSAR combat search and rescue

DA direct action

Exfil. exfiltration

FARP forward arming and refuelling point
FLIR forward-looking infrared
FOB forward operating base
FRIES fast rope insertion extraction system
ft feet
FW fixed wing

GFC ground force commander
GPS global positioning system

HA holding area
HLZ helicopter landing zone
HQ headquarters

IGE in ground effect
IMC instrument meteorological conditions
Infil. infiltration
IR infrared
ISOPREP isolated personnel report
ISR intelligence, surveillance, and reconnaissance
JTAC joint tactical air controller
JTF joint task force

KIAS knots-indicated airspeed
km Kilometre
kts Knots

LOC lines of communication
LZ landing zone

m metres
MA military assistance
MEDEVAC medical evacuation
METL mission-essential task list

NATO North Atlantic Treaty Organization
NM nautical miles
NOE nap of the earth
NSHQ NATO Special Operations Headquarters
NVG night vision goggles

OC officer commanding
OGE out-of-ground effect
op operation
OPSEC operations security

pax passengers
PR personnel recovery
PZ pickup zone

QRF quick reaction force

RECCCE reconnaissance
RIP relief in place
ROC rehearsal of operational capabilities
ROE rules of engagement
RP release point
RPM revolutions per minute
RPV remotely piloted vehicle
RW rotary wing

SA situational awareness
SERE survival, escape/evasion, resistance, and extraction
SM statute mile
SOAC special operations air command
SOATG special operations air task group
2. Terms Explained

*may* indicates an acceptable or suggested means of accomplishment

*should* indicates a recommended procedure
REFERENCE PUBLICATIONS

The following bibliography lists the Allied publications and other documents related to this publication. It is provided to supplement the reader’s knowledge of special air warfare and special operations. Unless otherwise noted, only ratified and promulgated publications are listed.

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