PANS-Ops vs. TERPS
What's the Difference?
Tuesday, November 1, 2016 | 1:00 p.m. – 2:00 p.m.

PRESENTED BY:
Guy Gribble, General Manager International Flight Resources, LLC
TERPS vs. PANS-Ops

Departures
Enroute
Holding
Arrival Maneuvering
Approaches
Missed Approaches
Annexes à la Convention de l’Organisation internationale de l’aviation civile (OACI)

La Convention sur l’aviation civile internationale, également connue sous les noms de Convention de Chicago, comporte dix-huit annexes contenant des normes et pratiques recommandées (SARPs) dans le domaine de l’aviation civile.

Pour des raisons de droits d’auteur les annexes ne peuvent être imprimées. L’OACI offre sur son site Internet (ci-joint le lien) une possibilité de commande ou d’abonnement.

Les documents suivants n’ont qu’un caractère informatif, l’autorité ne répond ni de l’exactitude de leur contenu, ni de leur exhaustivité.

Annexe 1: Personnel Licensing

ICAO Annex 1, Personnel Licensing
Tenth edition
Valable dès le 15.11.2010 | Dimension: 666 kb | Typ: PDF

Annexe 2: Rules of the Air

ICAO Annex 2, Rules of the Air
Tenth edition
Valable dès le 19.11.2009 | Dimension: 1048 kb | Typ: PDF
Procedures for Air Navigation Services

Doc 8168 — OPS — Aircraft Operations.

Volume I — Flight Procedures.
This volume describes operational procedures recommended for the guidance of flight operations personnel. It also outlines the various parameters on which the criteria in Volume II are based so as to illustrate the need for operational personnel including flight crew to adhere strictly to the published procedures in order to achieve and maintain an acceptable level of safety in operations.


This volume is intended for the guidance of procedures specialists and describes the essential areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operations. It provides the basic guidelines to States, and those operators and organizations producing instrument flight charts that will result in uniform practices at all aerodromes where instrument flight procedures are carried out.


Corrigendum (12/6/07)
Amendment 2 (applicable 20/11/08)
Corrigendum No. 2 (9/6/09)
Amendment 3 (applicable 18/11/10)
Amendment 4 (applicable 17/11/11)

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</table>
13 JUN 06  AIR TRAFFIC CONTROL

IRAN - RULES AND PROCEDURES

GENERAL

In general, the air traffic rules and procedures in force and the organization of the air traffic services are in conformity with ICAO Standards, Recommended Practices and Procedures.

Units of measurement used in connection with all air traffic services in Iran:

<table>
<thead>
<tr>
<th>MEASUREMENT OF</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance used in navigation, position reporting, etc., generally in excess of 2 to 3 nautical miles</td>
<td>Nautical Miles and Tenths</td>
</tr>
<tr>
<td>Relatively short distances such as those relating to aerodromes (e.g., runway lengths)</td>
<td>Meters</td>
</tr>
<tr>
<td>Altitude, elevations, and heights</td>
<td>Feet</td>
</tr>
<tr>
<td>Horizontal speed including wind speed</td>
<td>Knots</td>
</tr>
<tr>
<td>Vertical speed</td>
<td>Feet Per Minute</td>
</tr>
<tr>
<td>Wind direction for landing and taking off</td>
<td>Degrees Magnetic</td>
</tr>
<tr>
<td>Wind direction except for landing and taking off</td>
<td>Degrees True</td>
</tr>
<tr>
<td>Visibility including rain at any altitude</td>
<td>Kilometers or Meters</td>
</tr>
<tr>
<td>Altimeter setting</td>
<td>Hectopascals</td>
</tr>
</tbody>
</table>

SPECIAL REQUIREMENTS AND REGULATIONS

AIR DEFENCE IDENTIFICATION ZONE (ADIZ) PROCEDURES

General

All aircraft entering Iranian airspace must be at FL150 or above. Aircraft unable to comply shall obtain prior permission. FIR entry estimates shall be made good within ±5 minutes. Entry into Tehran FIR shall be via published ATS Routes. Aircraft not complying with these procedures are subject to interception.

Communications

All flights are required to establish contact at least 10 minutes prior to entering Iran ADIZ (Tehran FIR) with the following appropriate defense defense radar station on 127.8MHz and 135.1MHz for the purpose of military identification and avoidance of interception especially for those aircraft entering via Persian Gulf and Oman Sea. After establishing contact, inform Tehran ACC accordingly.

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PROCEDURE LIMITATIONS AND OPTIONS

Instrument approach procedures, except holding speeds, comply with an earlier version of PANS-OPS, Document 8168, Volume 1.

ATS AIRSPACE CLASSIFICATIONS

Iran has adopted the ICAO airspace classification as listed in ATC-Chapter "ICAO ATS Airspace Classifications - Annex 11". Airspace classes "B", "E", and "F" are not used within Tehran FIR/UIR.

The use transponder Mode A and C is compulsory in the following airspaces:
- class "A" airspace in the Tehran FIR/UIR;
- class "C" airspace in the Tehran and Shiraz TMAs;
- class "D" airspace in the Tehran and Shiraz CTRs;

For flights from and to the Persian Gulf, aircraft must be equipped with a voice communication radio. Aircraft must maintain an aircraft identification and avoidance of interception especially for those aircraft entering via Persian Gulf and Oman Sea. After establishing contact, inform Tehran ACC accordingly.

- Tabriz Radar when entering from ALRAM, BONAM, DASIS, DULAV, MAGRI, PARSU and AGINA.
- Babolsar Radar when entering from LALDA, PUTMA and ULDUS.
- Mashhad Radar when entering from GIRUN, RIKOP, ORPAB, OTRUZ and CHARN.
- Birjand Radar when entering from SOKAM and KAMAR.
- Zaboli Radar when entering from DERBO and DANIB.
- ChahBahar Radar when entering from KEBUD, EGSAL, EGRON, METBI, DENDA and IMLOT.
- Bandar Abbas Radar when entering from DARAX, KUMUN and ORSAR.
- Bushehr Radar when entering from MIDSI, ALSER, VUXAL, NAPNI, PATIR, TULAX and KUVER.
- Hamadan Radar when entering from MIGMI, RAGET and PAXAT.

FLIGHT PLANNING

Except for RPLs, flight plans shall be submitted no sooner than 24 hours and no later than 60 minutes before EOBT, unless more restrictive time provisions have been promulgated by other states. Scramble, ambulance, VIP, and search and rescue (SAR) aircraft in the event of an aircraft accident are exempt from these time provisions.

Flight movement messages relating to traffic into or out of the Tehran FIR shall be addressed as stated below in order to warrant correct relay and delivery.
AIP
Aeronautical Information Publication, AIP

TERPS
PANS-Ops
Aeronautical Information Publication, AIP

AIP Supplements
Aeronautical Information Circulars

NOTAMS
Airdrome
Enroute
General
**TERPS**  **PANS-Ops**

Aeronautical Information Publication, AIP

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**GEN 1.7 DIFFERENCES FROM ICAO STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES**

1. In CAA publications, where a term is used, which is defined by ICAO in a relevant Annex or PANS document, that definition will apply unless:
   1. the contrary is indicated; or
   2. there is a different definition in the Air Navigation Order or European Union Regulations.

2. Differences to ICAO definitions and SARPS are identified in the tables below.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Chapter 2</td>
<td>S-Standard</td>
<td>Licences and Ratings for Pilots</td>
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<tr>
<td>2.1.7</td>
<td>R-Recommended Practice</td>
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<td>2.2.3</td>
<td>Chapter 1</td>
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<tr>
<td>1.4</td>
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<td>Departure Procedures</td>
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<td>2.3.1.4</td>
<td></td>
<td>Use of FMS/RNAV equipment to follow conventional departure procedures</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Additional requirements:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1. the conventional procedure must have been inserted into the FMS from a recognised database and cannot be manually loaded or modified by the crew other than to follow ATC instructions;</td>
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<td></td>
<td></td>
<td>2. after the procedure has been loaded into the FMS as above, it must be cross-checked against the published conventional procedure before any attempt is made to follow the procedure using the FMS.</td>
<td></td>
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</tr>
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</table>
TERPS vs. PANS-Ops

96 Articles, UN Chicago Convention 1947

- Article 1-18, Air Regulations
- Article 18-96, Meeting Regulations

19 Annexes Standards and Recommend Practices, SARPS

- Annex 2- Rules of the Air (14CFR 91.703)

Countries “STATES”
Are Required to Publish Differences to ICAO SARPS
TERPS  PANS-Ops

ICAO Documents
Regional Supplements, Document #7030
RNP-AR Manual, Document #9905
Holding Templates, Document #9371
Procedures for Air Navigation Services “PANS…”
  - “ATM” Air Traffic Management, Document #4444
  - “ABC” Abbreviations, Document #8400
  - “Training” Training Manual, #9869

Countries “STATES”
Are Not Required to Publish Differences to ICAO Documents
TERPS vs. PANS-Ops

"AIM"

#8168, Volume #1
Amendment #6 2014
Corrigendum#1 2009

#8168, Volume #2
Corrigendum#1 2015
TERPS vs. PANS-Ops

Document #9368

Document #9365
Aeronautical Information Manual

Official Guide to Basic Flight Information and ATC Procedures

December 10, 2015

Order 8260.3C
New Issue 14MAR16
## TERPS vs. PANS-Ops

### National Airspace System

**RNP Resource Guide**

**Updates Quarterly**

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### Performance Based Navigation

<table>
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<tr>
<th>Operation</th>
<th>Flight Phase</th>
<th>Presentations</th>
<th>Approval Mechanism</th>
<th>Advisory Circuit</th>
<th>Other Documents</th>
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<td>RNP 1</td>
<td>Terminal: Departures and Arrivals</td>
<td>OpSpec/MSpec/DA C982</td>
<td>AC 90-510A</td>
<td>“Get It Vis” Video Compliance Table</td>
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<tr>
<td>RNP 2</td>
<td>En Route, (2 and 1 Mode)</td>
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<td>AC 90-510A</td>
<td>Compliance Table</td>
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<tr>
<td>RNP 2-3 (Rotary)</td>
<td>En Route, Terminal Approach</td>
<td>TRD</td>
<td></td>
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<tr>
<td>RNP 1</td>
<td>Terminal: departures and arrivals</td>
<td>OpSpec/MSpec/DA C982</td>
<td>AC 90-510A</td>
<td>“Get It Vis” Video Compliance Table</td>
<td></td>
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<tr>
<td>RNP 2 (Domestic)</td>
<td>En Route</td>
<td>TRD</td>
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<tr>
<td>RNP 2 (Domestic)</td>
<td>En Route: Oceanic/Remote</td>
<td>OpSpec/MSpec/DA C982</td>
<td>AC 90-150A</td>
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<td>OpSpec/MSpec/DA C982</td>
<td>AC 90-150A</td>
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<td>AC 90-150A</td>
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<td>En route, Terminal Approach</td>
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**Federal Aviation Administration**
TERPS  vs. PANS-Ops
They Are the Same

Physics, Aerodynamics, Mathematics
Physics, Aerodynamics, Mathematics
Units of Measure

**TERPS** vs. **PANS-Ops**
*They Are the Same... Only Different*

US Customary Units vs. Intl System of Units, SI

- Inches
- Pounds
- Gallons

- Centimeters
- Kilograms
- Liters

(Unit Conversions)

- Temperature
  - Celsius, Fahrenheit, Kelvin...
- Distance
  - Statute, Nautical, Kilometers...
- GPS Coordinates
  - between all common formats
- Speed
  - Knots, MPH, m/sec, Mach...
**TERPS vs. PANS-Ops**
They Are the Same... Only Different

**Physics, Aerodynamics, Mathematics**

**Units of Measure**

**US Customary Units vs. Intl System of Units, SI**

**Rounding of Numbers**

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<th>PANS-Ops</th>
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<tr>
<td>MDA's</td>
<td>UP 20’ 800.2’ = 820’</td>
<td>MDA’s UP 20’ 800.2’ = 820’</td>
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<td>DA/H’s</td>
<td>UP 1’ 800.2’ = 801’</td>
<td>OCA/H’s UP 5m/10’ 800.2’ = 810’</td>
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<td>Nrst 1’ 800.2’ = 800’</td>
<td>HAA’s Nrst 1’ 800.2’ = 800’</td>
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<tr>
<td>MEA’s</td>
<td>Nrst 100’ 801’ = 800’</td>
<td>MEA’s Nrst 100’ 801 = 800’</td>
</tr>
<tr>
<td>MSA’s</td>
<td>UP 100’ 801’ = 900’</td>
<td>MSA’s UP 50m/100’ 801 = 900’</td>
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<tr>
<td>Obst’s</td>
<td>Nrst 1’ 800.2’ = 800’</td>
<td>Obst’s Nrst 1’ 800.2’ = 800’</td>
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TERPS PANS-Ops
They Are the Same... Only Different

Physics, Aerodynamics, Mathematics
Units of Measure
US Customary Units vs. Intl System of Units, SI
Conversions?
Rounding of Numbers
Fix Tolerances and Accuracy

<table>
<thead>
<tr>
<th>Phase of flight</th>
<th>Specific to required navigation specification</th>
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<tbody>
<tr>
<td>En-route (greater than or equal to 56 km (30 NM) from departure or destination ARP)</td>
<td>RNAV 5 - 4 630 m (2.5 NM) RNP 4 - 3 704 m (2 NM) RNAV 2 - 1 852 m (1 NM) RNAV 1 - 926 m (0.5 NM) Basic RNP-1 - 926 m (0.5 NM)</td>
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<tr>
<td>Terminal (SEDs, STARs, initial and intermediate approaches less than 56 km (30 NM) of the ARP)</td>
<td>RNAV 2 - 1 852 m (1 NM) RNAV 1 - 926 m (0.5 NM) Basic RNP-1 - 926 m (0.5 NM) RNP APCH - 926 m (0.5 NM)</td>
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<tr>
<td>Final approach</td>
<td>RNP APCH - 463 m (0.25 NM)</td>
</tr>
<tr>
<td>Missed approach</td>
<td>RNP APCH - 926 m (0.5 NM)</td>
</tr>
</tbody>
</table>

Figure 2-9-2. Fix Displacement
TERPS vs. PANS-Ops
Who is in Charge Here?

State (Country)
Aeronautical Information Publication
AIP
Flight Check, Maintain
Publish, Revise
Design Criteria

Countries “STATES”
Are Required to Publish Differences to ICAO SARPS

Countries “STATES”
Are Not Required to Publish Differences to ICAO Documents
TERPS vs. PANS-Ops

Where Does This Data Come From?

State (Country)
Commercial Provider
WGS-84 Compliant?
Airport
Country
TERPS

ICAO Identifiers

PANS-Ops
TERPS
Standard Instrument Departure
“Standard Obstacle Climb”

≈ 2 NM
Initial Climb
Area

≈ 3.7 KM
Area 1

400AGL

SID

PANS-Ops

≈ 3.7 KM
Area 1

400AGL

SID

≈ 2 NM
Initial Climb
Area

“Low and In-Close<200’
If straight out will not work...

- Climb over obstacle
- Climb faster over obstacle
- Turn away from obstacle
- Climb in a safe sector away from obstacle
- Keep in sight, “See and avoid”
- Speed limiting
- Combinations of any of the above

“Low and In-Close<200’

TERPS vs. PANS-Ops

SID Standard Instrument Departure  SID

SID
**TERPS**

Standard Instrument Departure

“Climb Over the Obstacle”

**PANS-Ops**

SID

15NM Max

DER

SID

MSA

No Turns Prior to Departure end of Runway
SID
Standard Instrument Departure
"Climb Faster Over Obstacle"

TERPS
152 Feet per NM OCS
Requires 350'/NM Until Reaching MSA
200 FEET PER NM

PANS-Ops
48 Feet per NM ROC
Maintain 4.3% Until Reaching 1700MSL

MSA
3.3%

OCS
.8% MOC
25% OIS

35 Ft ?
5 M or DER if >

5 M or DER if >
TERPS vs. PANS-Ops

SID Standard Instrument Departure

“Climb Faster Over Obstacle”

SID SID

These SIDs require minimum climb gradients of

ALBIX 1C, 1D: 6.5% up to 2500’
ALBIX 1R: 6.4% up to 2200’.

Initial climb clearance 5000’

<table>
<thead>
<tr>
<th>SID</th>
<th>RWY</th>
<th>ROUTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALBIX 1C</td>
<td>10</td>
<td>Climb straight ahead to KLO 2.1 DME or 2500’, whichever is later, intercept KLO R-087 to ZH502/D8 KLO, turn RIGHT, 230° track, intercept TRA R-169 to ALBIX.</td>
</tr>
<tr>
<td>ALBIX 1D</td>
<td></td>
<td>Climb straight ahead to KLO 2.1 DME or 2500’, whichever is later, turn LEFT, intercept KLO R-255 to ZH553/D8 KLO, turn LEFT, 150° track, intercept HOC R-109 to ALBIX.</td>
</tr>
<tr>
<td>ALBIX 1R</td>
<td>16</td>
<td>Climb straight ahead, if in VMC turn LEFT as soon as possible, but not before KLO 1 DME, maintain visual ground contact up to 2200’, or climb VFR. MVFR MIN ALT: 1000’ or KLO 0.4 DME, whichever is earlier.</td>
</tr>
</tbody>
</table>

Gnd speed-KT 75 100 150 200 250 300
6.5% V/V (fpm) 494 658 987 1317 1846 1975
6.4% V/V (fpm) 486 648 972 1296 1620 1944

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TERPS vs. PANS-Ops

SID
Standard Instrument Departure
“Turn Away from Obstacle”

Initial Climb Area

≈ 2 NM

Area 1

394’ 394’

394’ 394’

Start of Runway

Departure Turn 600m/2000’

SID
TERPS vs. PANS-Ops

SID Standard Instrument Departure
“Climb in a Safe Sector”

SID Area 3
Evaluation to MEA
No Turns Eastbound

“Low and In-Close<200’”
Diverse Departure Evaluation to MEA

SID
Standard Instrument Departure

TERPS vs. PANS-Ops
“Climb in a Safe Sector”

No Turns Eastbound

SID Area 3 Evaluation to MEA

“Low and In-Close<200’”
TERPS
Standard Instrument Departure
“Pilot Keep in Sight, See and Avoid”

PANS-Ops
SID
Obstacle Departure Procedures

“Low and In-Close<200’

Take Off Minimums
800/2
Hazard Beacons on top of hill to the east clearly visible or Take Off Minimums 600/1

SID
Obstacle Departure Procedures

“Pilot Keep in Sight, See and Avoid”
TERPS
Standard Instrument Departure
“Pilot Keep in Sight, See and Avoid”

PANS-Ops

SID

Visual Climb Over Airport
250’ ROC

@2,000MSL
250KIAS, 2.8nm

“Low and In-Close<200’

SID

Visual Climb Over Airport
TERPS vs. PANS-Ops

SID
Standard Instrument Departure
“Pilot Keep in Sight, See and Avoid”

SID

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This SID requires take-off minimums [for standard minimums, refer to airport chart]:
- Runway 15:
  - CONEY CLIMB: 400-2 1/4 or standard (or lower than standard, if authorized), with a minimum climb of 280° per NM to 500°. ATC climb of 900° per NM to 1500°, if unadvertised, advise ATC.
  - FLUSHING CLIMB: 450-2 1/4 or standard (lower than standard). If authorized, with a minimum climb of 280° per NM to 500°. ATC climb of 900° per NM to 1500°, if unadvertised, advise ATC.
- Runway 23:
  - CONEY CLIMB: 450-2 1/4 or standard (lower than standard). If authorized, with a minimum climb of 280° per NM to 500°. ATC climb of 900° per NM to 1500°, if unadvertised, advise ATC.

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TERPS vs. PANS-Ops

SID
Standard Instrument Departure

“Speed Limiting”

SID

This SID requires take-off minimums (for standard minimums, refer to airport chart).

1. Runway 12:
   CONEY CLIMB: 400°-2°/4° or standard (or lower than standard, if authorized) with a minimum climb of 200° per NM to 500°. ATC climb of 300° per NM to 1500°. If unable, advise ATC.
   FLUSHING CLIMB: 400°-2°/4° or standard (or lower than standard, if authorized) with a minimum climb of 200° per NM to 500°. ATC climb of 300° per NM to 1500°. If unable, advise ATC.

2. Runway 22:
   MAPLE CLIMB: 400°-2°/4° or standard (or lower than standard, if authorized) with a minimum climb of 200° per NM to 500°. ATC climb of 300° per NM to 1500°. If unable, advise ATC.
   WHITESTONE CLIMB: 400°-2°/4° or standard (or lower than standard, if authorized) with a minimum climb of 200° per NM to 500°. ATC climb of 300° per NM to 1500°. If unable, advise ATC.

Expect turn on course leaving 6000'.

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SID Standard Instrument Departure

"Speed Limiting"

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"Normal" Operations
Maintain the Ground Track
Maintain the Required Climb Gradient

e. Extraordinary circumstances, such as a mechanical or electrical malfunction, may prevent an aircraft from achieving the 200 ft/NM minimum climb gradient assumed by TERPS. In these cases, adequate obstacle clearance may not be provided by published IFPs. Operational procedures contained outside TERPS guidelines are required to cope with these abnormal scenarios.

1.7 ABNORMAL AND EMERGENCY OPERATIONS

1.7.1 The design of procedures in accordance with this section assumes normal operations and that all engines are operating.

1.7.2 It is the responsibility of the operator to conduct an examination of all relevant obstacles and to ensure that the performance requirements of Annex 6 are met by the provision of contingency procedures for abnormal and emergency operations. Where terrain and/or obstacle considerations permit, the contingency procedure routing should follow that of the departure procedure.
TERPS vs. Pans-Ops vs. FAR 25
Standard Instrument Departure, Vertically Speaking

35 Ft? 15? 5 M
Takeoff Thrust (V2 + 10 to 20 knots)

240 m (800 ft)
Maintain flaps/slats in the take-off configuration
Initiate power reduction

900 m (3,000 ft)
Maintain positive rate of climb. Accelerate smoothly to en-route speed. Retract flap/slats on schedule

Not Required IF:
- Contaminated Rwy
- Visibility < 1NM
- XWind > 15KTS
- TWind > 5KTS
- WindShear
- AT = ON?

TERPS vs. PANS-Ops
Noise Abatement Departure Procedure 1
TERPS Noise Abatement Departure Procedure 2

Takeoff Thrust (V2 + 10 to 20 knots)

900 m (3,000 ft)

Accelerate smoothly to en-route speed

While maintaining a positive rate of climb accelerate towards $V_{ZF}$, with the initiation of first flap/slat retraction, Reduce Power

.....OR.....

When flaps are retracted reduce power and while maintaining a positive rate of climb at V2 + 10 to 20 knots

240 m (800 ft)

Not Required IF:
Contaminated Rwy
Visibility < 1 NM
XWind > 15 KTS
TWind > 5 KTS
WindShear
AT = ON?

(3,000 ft)

PANS-Ops
Noise Abatement Departure Procedures

TERPS

✓ Operators of “public use airports,” including heliports
✓ Noise exposure map, 5yr expected ops
✓ Day/Night Averages
✓ Airport Operator Develops/Publishes
✓ Standard Instrument Departures
✓ Obstacle Departure Procedures
✓ “Climb Heading XXX”
✓ “Maintain Runway Heading”

PANS-Ops
TERPS PANS-Ops
Noise Abatement Departure Procedure

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TERPS vs. PANS-Ops

SID
Standard Instrument Departure
“Departure Restrictions”

LSZH/ZRH
ZURICH, SWITZERLAND

JEPPESSEN
16 SEP 11 10-3N

ZURICH
125.95

Apt Elev
1417’

Trans level: By ATC  Trans alt: 7000’
1. When instructed contact ZURICH Departure.
2. RWY 18 - VISUAL CONDITIONS FOR TAKE-OFF:
   Ceiling 1500’ - VIS 5000m.
3. SIDs are also noise abatement procedures. Strict
   adherence within the limits of aircraft performance
   is mandatory.
4. EXPECT close-in obstacles.

DEGES ONE DELTA (DEGES 1D) [DEGE1D]
DEGES ONE ROMEO (DEGES 1R) [DEGE1R]
RWYS 10, 16 RNAV DEPARTURES
RNAV (DME/DME OR GNSS)
BRNAV ABOVE MSA
BRNAV APPLICABLE WHEN PASSING 8600’

FOR ROUTE CONTINUATION AFTER DEGES REFER TO COURSE 10-3W & 10-3X.  
SPEED MAX 250 KT BELOW FL 100

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TERPS  PANS-Ops
“Minimum Sector Altitude” MSA

LSZH/ZRH
ZURICH
ZURICH

<table>
<thead>
<tr>
<th>ZURICH</th>
<th>Apt Elev</th>
<th>125.95</th>
<th>1417</th>
</tr>
</thead>
</table>

1. Trans level: By ATC  Trans alt: 7000’
2. When instructed contact ZURICH Departure.
3. RWY 18 - VISUAL CONDITIONS FOR TAKE-OFF:
   Ceiling 1500’ - VIS 5000m.
4. SIDs are also noise abatement procedures. Strict adherence within the limits of aircraft performance
   is mandatory.
5. EXPECT close-in obstacles.

DEGES ONE DELTA (DEGES 1D) [DEGE1D]
DEGES ONE ROMEO (DEGES 1R) [DEGE1R]
RWYS 10, 16 RNAV DEPARTURES
RNAV (DME/DME or GNSS)
BRNAV ABOVE MSA
BRNAV APPLICABLE WHEN PASSING 8600’
FOR ROUTE CONTINUATION AFTER DEGES REFER TO CHARTS 10-3W & 16-2W

5NM Buffer 1000’OCA
DME Sector
+/- 300’
TERPS vs. PANS-Ops

“Minimum Safe Altitude” MSA

MRLB/LIB
DANIEL ODUBER QUIROS INTL
7 OCT 05 (13-2)

*LIBERIA Approach
VOR
LIB
119.8

Final
Apch Crs
Lib
112.8

065°

Minimum Alt
D10.0
3000’ (2742’)

MDA (H)
1580’ (1322’)

Apt Elev 269’

TDZE 258’

MISSED APCH: Climb outbound on LIB VOR R-065 to D4.0, then turn RIGHT and return to LIB VOR at or above 3000’. Join holding pattern or continue outbound on LIB VOR R-265 to initiate another approach.

Alt Set: hPa
TDZ Elev: 9 hPa
Trans level: FL 200
Trans alt: 19000’

4NM Buffer?
1000’ OCA
30NM MAX

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TERPS vs. PANS-Ops
“Minimum Safe Altitude” MSA

Military or State?
1000’OCA
TERPS vs. Pans

Standard Instrument Departures

Minimum Safe Altitude

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PANS-Ops vs. TERPS
What's the Difference?
Tuesday, November 1, 2016 | 1:00 p.m. – 2:00 p.m.

PRESENTED BY:
Guy Gribble, General Manager International Flight Resources, LLC