Final Approach Operations Symposium

ICAO Framework and Approach Classifications

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NMD/TRG/TDD
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Agenda

- Conventional Approach Operations
- Evolution of Approaches
- 2014 ICAO Approach Classifications
- PBN supporting Approach Operations
Conventional Approach Operations

En Route

Terminal

Approach

Departure

Fix

Initial Fix

Intermediate Fix

FAF

Arrival

Non-Precision Approach

Approach with Vertical Guidance

Missed Approach Point

MDH

DH

RWY

NPA – Lateral Guidance Only

Radar Vectoring

PA – ILS
Evolution of Approach Operations

**Lateral**
- Conventional

**Vertical**
- Conventional

**Sensors**
- VOR/DME/NDB Localizer
- ILS/MLS

**NPA**
Non Precision Approaches

**PA**
Precision Approaches
New ICAO Approach Classification

- Why?
  - A proliferation of acronyms associated with new approach types confused everybody.
  - Operational Community especially unhappy with the term – APV
  - It used to be easy:
    - Non-Precision Approach
    - Precision Approach
Evolution of Approaches

**NPA**
Non Precision Approaches

- **Lateral**
  - Conventional
  - RNP APCH

- **Vertical**
  - CDFA

**APV**
Approaches with Vertical Guidance

- **Lateral**
  - APV Baro

- **Vertical**
  - APV SBAS

**PA**
Precision Approaches

- **Lateral**
  - Conventional
  - GBAS Approach

**Sensors**

- Conventional VOR/DME/NDB Localizer
- GPS
- GPS + Baro
- GPS + SBAS
- ILS/MLS
- GPS + GBAS
So Today?

- **RNP APCH:**
  - Flown to **LNAV minima**

- **RNP APCH with Baro-VNAV:**
  - Flown to **LNAV/VNAV minima**
  - Also called **APV Baro**

- **RNP APCH using SBAS augmentation**
  - Flown to **LPV minima**
  - Called an **APV SBAS**
  - Now **SBAS CAT I**

- **RNP AR (Authorisation Required) APCH:**
  - Flown to **LNAV/VNAV minima but reduced terrain clearance**

- **Chart name either RNAV or RNP**

Lots of possible confusion!
ICAO Standards Impacted by Approach Classification Change

Annex 14
- Instrument Approach Runways

PANS-OPS Vol. II
- Instrument Approach Procedures

Annex 10
- Instrument Approach System Performance

Annex 6
- Instrument Approach Operations

Final Approach Operations Symposium
**ICAO Approach Classifications**

<table>
<thead>
<tr>
<th>MDA/H, DA/H</th>
<th>&gt;=250ft</th>
<th>200ft</th>
<th>100ft</th>
<th>&lt;100ft</th>
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<tbody>
<tr>
<td><strong>RVR</strong></td>
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<tr>
<td>&gt;=600m</td>
<td>&gt;=550m</td>
<td>&gt;=300m</td>
<td>&lt;300m</td>
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**Air Operations**

<table>
<thead>
<tr>
<th>Type A</th>
<th>Type B</th>
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<tbody>
<tr>
<td>CAT I</td>
<td>CAT II</td>
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<tr>
<td>CAT III</td>
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</tbody>
</table>

| 2D         | 3D      |

| MDA/H      | DA/H    |

**Instrument Approach Procedure Design**

<table>
<thead>
<tr>
<th>NPA</th>
<th>APV</th>
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<tbody>
<tr>
<td>PA</td>
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**Aerodromes**

<table>
<thead>
<tr>
<th>Non Instrument RWY</th>
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</thead>
<tbody>
<tr>
<td>NPA RWY</td>
</tr>
<tr>
<td>PA RWY CAT I (DA/H)</td>
</tr>
<tr>
<td>PA RWY CAT II (DA/H)</td>
</tr>
<tr>
<td>PA RWY CAT III</td>
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</table>

**Navigation Systems**

<table>
<thead>
<tr>
<th>VDF, NDB, VOR/DME, SRA, LOC, GPS</th>
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<tbody>
<tr>
<td>GNSS/Baro/SBAS</td>
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<tr>
<td>ILS, MLS, SBAS Cat I, GBAS</td>
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</tbody>
</table>
Approach Classifications - 2014

ICAO Approach Classifications

Type A
- Minima $\geq 250$ ft
- Lateral & Lateral and Vertical Guidance

Type B
- Minima $< 250$ ft
- Lateral and Vertical Guidance only
Approach Classifications - 2014

ICAO Approach Classifications

- **Type A**
  - Minima $\geq 250$ ft
  - Lateral (2D)
  - Lateral and Vertical (3D)

- **Type B**
  - Minima < 250 ft
  - Lateral and Vertical (3D)
Annex 6 Instrument Approach Operations

ICAO Approach Classifications

Type A
- Minima ≥ 250 ft
  - Lateral (2D)
    - NPA (Non Precision Approaches)
  - Lateral and Vertical (3D)
    - APV or PA* (Approaches with Vertical Guidance)

Type B
- Minima < 250 ft
  - Lateral and Vertical (3D)
    - PA (Precision Approaches)

* Precision Approach (PA) can support Type A operations and there may be circumstances, such as obstacle clearance or aircraft category which does not allow a minima below 250 ft.

In subsequent tree diagrams PA will not be shown in this box to avoid confusion.
PBN Applications supporting approach operations

ICAO Approach Classifications

Type A
Minima ≥ 250 ft

- Lateral (2D)
  - NPA (Non Precision Approaches)

- Lateral and Vertical (3D)
  - APV (Approaches with Vertical Guidance)

Type B
Minima < 250 ft

- Lateral and Vertical (3D)
  - PA (Precision Approaches)

Conventional Procedure

RNP APCH

RNP APCH

RNP AR APCH

SBAS CAT I

Conventional Procedure

GLS

PBN
Approach Guidance

ICAO Approach Classifications

Type A

Minima ≥ 250 ft

Lateral (2D)

NPA (Non Precision Approaches)

Conventional Procedure

VOR/DME
NDB
LOC

RNP APCH

GPS (either ABAS or SBAS)

Lateral and Vertical (3D)

APV (Approaches with Vertical Guidance)

RNP APCH

GPS (ABAS) & Barometric Altimetry

GPS & SBAS

RNP AR APCH

GPS (ABAS) & Barometric Altimetry

SBAS CAT I

Conventional Procedure

GLS

ILS
MLS

Type B

Minima < 250 ft

Lateral and Vertical (3D)

PA (Precision Approaches)

Conventional Procedure

GPS & SBAS

GLS

SCAT 1

xLS
Points of Decision

ICAO Approach Classifications

Type A

Minima ≥ 250 ft

Lateral (2D)

NPA (Non Precision Approaches)

Conventional Procedure

VOR/DME
NDB
LOC

MDA/MDH

LNAV Minimum
LP Minimum

RNP APCH
GPS (either ABAS or SBAS)

GPS (ABAS) & Barometric Altimetry
LNAV/VNAV Minimum
LPV Minimum

RNP AR APCH
GPS & SBAS

GPS (ABAS) & Barometric Altimetry
LPV Minimum
RNP Minimum

SBAS CAT I

Conventional Procedure
GLS

ILS
MLS
GLS SCAT 1

Type B

Minima < 250 ft

Lateral and Vertical (3D)

APV (Approaches with Vertical Guidance)

Conventional Procedure

GPS (ABAS)
& Barometric Altimetry

GPS (ABAS)
& Barometric Altimetry

GPS & SBAS

GPS & SBAS

LPV

LPV

CAT I
CAT II/III
GLS

CAT II/III

MAPt (Pilot derived DA/H)
# ICAO Approach Classifications

## ICAO Approach Classification

<table>
<thead>
<tr>
<th>Domain</th>
<th>Document</th>
<th>Relationship</th>
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<tbody>
<tr>
<td><strong>Approach Operations</strong></td>
<td>Annex 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Classification (based minima)</td>
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</tr>
<tr>
<td></td>
<td>Type A</td>
<td>Type B</td>
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<tr>
<td></td>
<td>(250' or higher)</td>
<td>CAT I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(less than 250' &amp; 200' or higher)</td>
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<tr>
<td></td>
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<td>CAT II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(less than 200' &amp; 100' or higher)</td>
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<tr>
<td></td>
<td></td>
<td>CAT III</td>
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<td>(less than 100')</td>
</tr>
<tr>
<td>Method</td>
<td>2D</td>
<td>3D</td>
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<tr>
<td>Minima</td>
<td>MDA/H</td>
<td>DA/H*</td>
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<tr>
<td><strong>Approach Runways</strong></td>
<td>Annex 14</td>
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<td></td>
<td>M(DA/H) &gt;= VMC</td>
<td>Non Instrument RWY</td>
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<tr>
<td></td>
<td>M(DA/H) &gt;= 250' Visibility &gt;= 1000m</td>
<td>Non Precision Approach RWY</td>
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<td>DA/H &gt;= 200' RVR &gt;= 550m</td>
<td>Precision Approach RWY, Category I</td>
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<td>DA/H &gt;= 100' RVR &gt;= 300m</td>
<td>Precision Approach RWY, Category II</td>
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<tr>
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<td>DA/H &gt;= 0' RVR &gt;= 0m</td>
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<td><strong>System Performance Procedures</strong></td>
<td>Annex 10</td>
<td>PANS-OPS Vol. II</td>
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<td>NDB, Lctr, LOC, VOR, Azimuth, GNSS</td>
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<td>APV</td>
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* NPA procedures require a derived DA/H