CARGOJET AIRWAYS

OPT

NOTAM/Obstacle and MEL Entry Guide — Revision 1

Pilot Reference Guide

Applies to:	B757-200 / B767-200 / B767-300
Platform:	iPad (iOS OPT App)
Reference:	OPT Administrator's Guide v4.92; Boeing SME Guidance May 2026
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MANDATORY — READ BEFORE ANY DEPARTURE WITH TEMPORARY OBSTACLES OR MELs

- OPT has no knowledge of which SID or departure procedure you are flying.
- OPT normally ingests NOTAM-based obstacles which are older than 60 days. However, temporary obstacles published by NOTAM more recent than 60 days may be included as a separate runway with the suffix T1. These can be verified by checking obstacle height and distance under Airport Info – Obstacles.
- **Tier 2 and Tier 3 airports (Canada and all non-listed regions):** any obstacle on a NOTAM or charted on your SID must be assessed against both the 40:1 AEO OCS (200 ft/NM) and the 62.5:1 OEI Advisory Threshold (97 ft/NM). Any obstacle inside the departure corridor that exceeds 100 ft/NM must be resolved by a published ODP or SID gradient, or entered in OPT. See Section 3 for the crew decision framework.
- **Tier 1 airports (US, Europe, UK, Mexico):** if an ODP, SID gradient, or takeoff obstacle note is published for your departure runway, comply with the published requirement. See Section 3 for the crew decision framework.
- OPT cannot calculate combined MEL + NNC scenarios — see Part B of this guide.

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Glossary of Terms and Acronyms

Terms and acronyms used throughout this guide. Refer here when an abbreviation is unfamiliar.

Term / Acronym	Definition
AEO	All Engines Operating. The normal departure case with both engines producing thrust. The AEO obstacle clearance surface is 40:1 (200 ft/NM).
AGL	Above Ground Level. Obstacle height measured from the ground at its base. NOTAM obstacle heights are stated AGL and entered directly in OPT.
AIM	Aeronautical Information Manual (Transport Canada AIM in the Canadian context). Reference for how Nav Canada treats close-in obstacles.
AIP	Aeronautical Information Publication. The national source for procedure amendments. Checked for EU, UK, and Mexican (SENEAM) departures.
AMDT	Amendment. Identifies the revision of a published procedure such as an ODP (e.g. ODP AMDT 18).
AMSL	Above Mean Sea Level. Obstacle elevation referenced to sea level. SID chart obstacle heights are AMSL and must be converted to AGL before OPT entry (AMSL minus threshold elevation).
ASDA	Accelerate-Stop Distance Available. The runway distance available to accelerate and then stop. Returns to database values when a NOTAM is cleared.
CL / RCL	Centreline / Runway Centreline. Reference for lateral offset of an obstacle (distance left or right of the extended runway centreline).
DER	Departure End of Runway. The far threshold from the start of the takeoff roll. The origin point of the OCS. Same physical point as OPT Liftoff End.
EASA	European Union Aviation Safety Agency. Source of the EASA (PANS-OPS) Obstacle Accountability Area geometry used for EU and UK airports.
EFB	Electronic Flight Bag. The iPad-based system where NOTAMs, charts, and OPT are accessed.
FAA	Federal Aviation Administration. US civil aviation authority. Source of the OAA geometry (AC 120-91A) used as the basis for corridor width in this guide.
FCOM	Flight Crew Operations Manual. Source of the tabular performance data OPT draws on.
FCTM	Flight Crew Training Manual.
FDC	Flight Data Center. The FAA NOTAM category used for procedural NOTAMs such as ODPs. FDC NOTAMs may split across multiple parts due to character limits.
fpm	Feet Per Minute. Unit for Rate of Climb (ROC).
ft/NM	Feet Per Nautical Mile. Unit for climb gradient and for the OCS thresholds (200 ft/NM AEO, 97 ft/NM OEI advisory).
FMS	Flight Management System.
IAP	Instrument Approach Procedure.
ICA	Initial Climb Area. The lateral corridor within which obstacles must be assessed for vertical clearance.
IFR	Instrument Flight Rules.

Term / Acronym	Definition
IMC	Instrument Meteorological Conditions. Weather below the stated visual minima, where a published climb gradient must be met.
ISA	International Standard Atmosphere. The reference condition for the climb gradient table in Appendix B.
LDAW	Landing Distance Available (Wet) or landing distance available figure used to verify a calculated landing distance is sufficient.
LOFT	Line Oriented Flight Training. The recurrent training scenario source for the combined MEL plus NNC worked example.
MEL	Minimum Equipment List. Defines which inoperative items an aircraft may be dispatched with. OPT cannot combine some MEL items with an NNC.
MSL	Mean Sea Level. See AMSL.
NM	Nautical Mile. 1 NM = 6076 ft. Used to convert SID chart distances to feet for OPT entry.
NNC	Non-Normal Checklist. An in-flight abnormal or emergency procedure (e.g. a hydraulic system failure) that may affect landing performance.
NOTAM	Notice to Air Missions. Time-limited notice of conditions such as temporary obstacles. Inside-corridor NOTAM obstacles must be assessed and entered in OPT if penetrating.
OAA	Obstacle Accountability Area. The lateral corridor within which obstacles must be cleared vertically. Geometry differs between the FAA and EASA (PANS-OPS) frameworks.
OAT	Outside Air Temperature. A main takeoff screen input in OPT.
OCS	Obstacle Clearance Surface. The sloped surface that obstacles must not penetrate. Two surfaces apply: the 40:1 AEO surface (200 ft/NM) and the 62.5:1 OEI advisory surface (97 ft/NM).
ODP	Obstacle Departure Procedure. A published procedure (gradient, weather minimum, or obstacle note) addressing a departure obstacle. Published as an FDC NOTAM in the US.
OEI	One Engine Inoperative. The single-engine departure case. The OEI net second-segment climb surface is 62.5:1 (97 ft/NM).
OPT	Onboard Performance Tool. The Boeing iPad application used to calculate takeoff and landing performance. Subject of this guide.
PANS-OPS	Procedures for Air Navigation Services, Aircraft Operations (ICAO Doc 8168). The international standard for instrument procedure and obstacle assessment surface design. The EASA OAA geometry used for EU and UK airports is built on PANS-OPS criteria.
QNH	Altimeter setting referenced to mean sea level. A main takeoff screen input in OPT.
QRH	Quick Reference Handbook. Source, with the FCOM, of the performance adjustment tables used in the manual combined-failure method.
RCC	Runway Condition Code (TALPA). Reports runway surface condition for contamination assessment.
RNAV	Area Navigation. A navigation method; some RNAV SIDs require a steeper initial climb gradient.

Term / Acronym	Definition
ROC	Rate of Climb. Vertical speed in fpm. ROC = Gradient (ft/NM) x Groundspeed (kt) / 60.
RWY	Runway.
SENEAM	Servicios a la Navegacion en el Espacio Aereo Mexicano. The Mexican air navigation service; procedure amendments appear via the Mexican AIP, not the North American NOTAM feed.
SID	Standard Instrument Departure. A published departure routing. SID-specific obstacles apply only to that routing and are not applied automatically by OPT.
SM	Statute Mile. Unit for visibility in US weather minima (e.g. 1 1/4 SM).
SME	Subject Matter Expert. Source of the Boeing guidance on combined MEL and NNC limitations.
TALPA	Takeoff and Landing Performance Assessment. The framework behind runway condition codes and contamination reporting.
TC	Transport Canada. Canadian civil aviation authority.
TODA	Takeoff Distance Available. Returns to database values when a NOTAM is cleared.
TOGW	Takeoff Gross Weight. The OPT output compared between obstacle passes; the lower value identifies the limiting obstacle.
VMC	Visual Meteorological Conditions. Weather at or above the stated visual minima, allowing see-and-avoid of obstacles.
wx	Weather. Shorthand used for weather minima (e.g. wx min).

1. What is the Obstacle Clearance Surface (OCS)?

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Any obstacle inside the lateral corridor that exceeds the 40:1 AEO surface (above 200 ft/NM) must be entered in OPT. A second protected surface exists within the same corridor: the OEI Advisory Threshold at 62.5:1 (97 ft/NM), representing the net second-segment climb surface for a single-engine departure through the engine-out corridor. Any obstacle inside the corridor above this threshold must also be resolved by a published ODP or SID gradient, or entered in OPT. The diagram shows three cases: Obstacle A, below both surfaces, no action; Obstacle B, above the OEI threshold but below the AEO surface, OPT entry or published procedure required; Obstacle C, above both surfaces, OPT entry or published procedure required. An obstacle outside the lateral corridor requires no entry regardless of height.

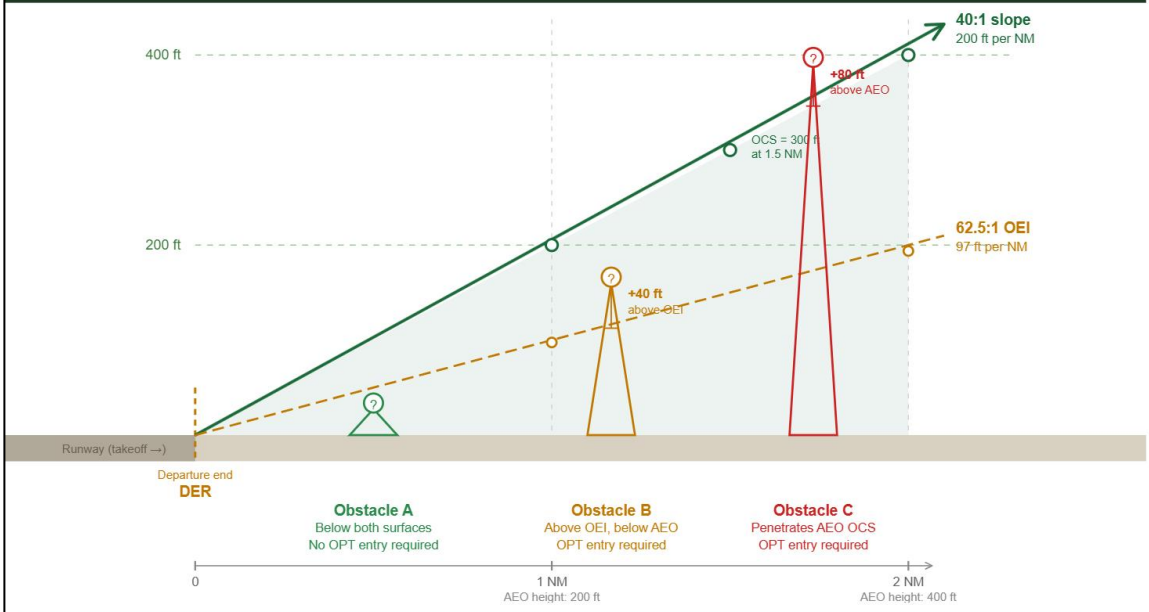
The Obstacle Accountability Area (OAA). The OAA is the lateral corridor within which obstacles must be cleared vertically. Its geometry differs between the FAA and EASA (PANS-OPS) regulatory frameworks. The plan views below show both.

FAA OAA (AC 120-91A, Para. 14a). Three zones from the DER. Zone 1: fixed minimum width of 300 ft each side to 4,800 ft (0.79 NM). Zone 2: 1:16 lateral splay (0.0625 x D ft per side) expanding to 5.27 NM. Zone 3: frozen at 2,000 ft half-width (4,000 ft total) from 5.27 NM to 10 NM.

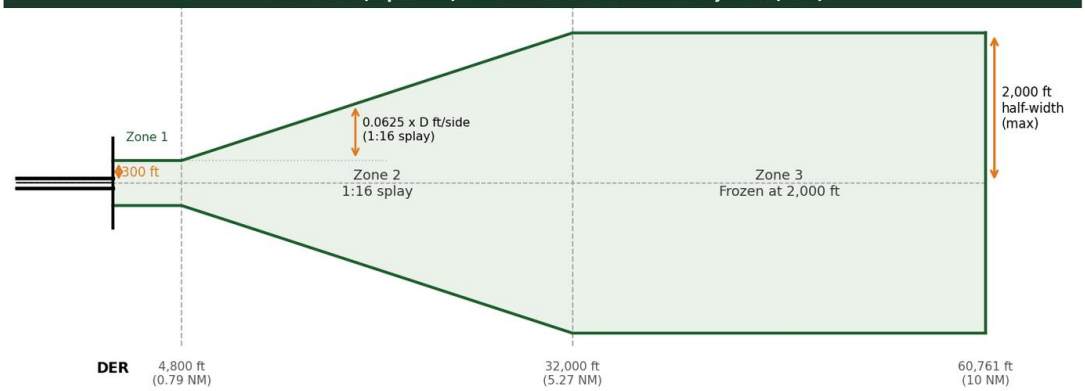
EASA (PANS-OPS) OAA. Continuous 12.5% (1:8) lateral splay from a starting half-width of 180 m, freezing at the maximum band width. For required navigational accuracy (FMS/RNAV): 300 m half-width, 600 m total. All other conditions: 600 m half-width, 1,200 m total.

Which framework applies. The FAA OAA applies to US airports and is the methodology used by Boeing OPT. The EASA (PANS-OPS) OAA applies to EU and UK airports. At Tier 2 and Tier 3 airports where independent OCS assessment is required, the FAA OAA geometry is used as the basis for corridor width determination.

Elevation view (side profile) — 40:1 AEO and 62.5:1 OEI Obstacle Clearance Surfaces

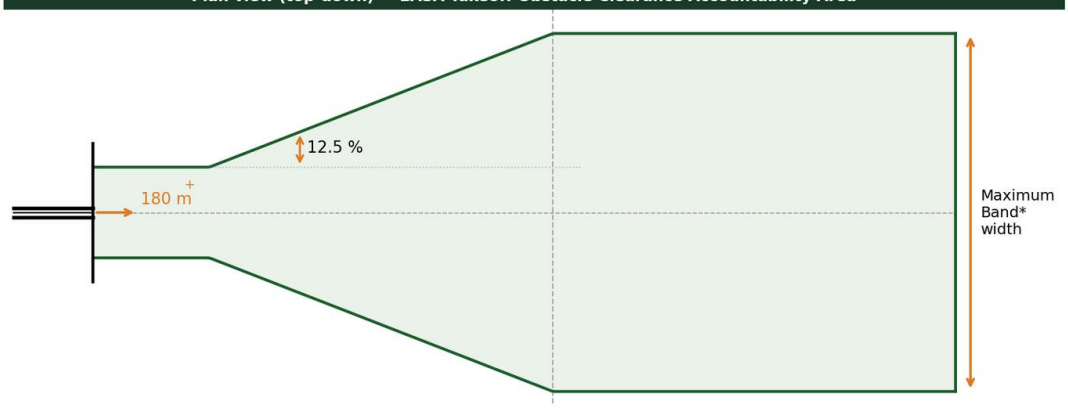


Plan view (top-down) — FAA Obstacle Accountability Area (OAA)



FAA AC 120-91A, Para. 14a -- Straight-out departures. Vertical scale exaggerated.

Plan view (top-down) — EASA Takeoff Obstacle Clearance Accountability Area



*** Less than 15 degree track change**

Required navigational accuracy - 300 m half width
600 m band width

All other conditions - 600 m half width
1,200 m band width

+ For airplanes with wingspan less than 60 m, starting band width is 120 m.

PART A
NOTAM / Obstacle Entry

2. Background — Obstacle Database Currency and When Manual Entry Is Required

Two categories of obstacle always require manual entry if not already in the OPT database:

- **NOTAM-based temporary obstacles —** Construction cranes, buildings under construction, and other transient obstructions published by NOTAM. Whether the obstacle is already in the OPT database depends on how long it has been present and whether it has been surveyed and incorporated into the Jeppesen data. The currency criteria for making this determination are addressed in Section 3 — Regulatory Framework. If the obstacle is NOT in the database, it must be manually entered using the NOTAM function before calculating.
- **SID and departure chart obstacles —** Obstacles published on a Jeppesen SID or departure chart are procedure-specific. They apply only to a particular routing and may not be relevant to every departure from that runway. Since OPT has no knowledge of which departure procedure the crew is flying, it cannot apply these obstacles automatically, even if they exist somewhere in the database.

THE CONSEQUENCE OF NOT ENTERING

If a temporary or procedure-specific obstacle is not manually entered using the NOTAM function in OPT before calculating, that obstacle plays no part in the calculation.

The resulting takeoff weight, speeds, and performance data will not reflect the actual obstacle environment on departure and cannot be considered valid.

MANUAL ENTRY IS NOT OPTIONAL — IT IS THE ONLY MEANS BY WHICH OPT CAN PRODUCE A RESULT THAT IS ACCURATE AND SAFE FOR THE INTENDED DEPARTURE.

ONE OBSTACLE LIMIT

- OPT accepts only ONE obstacle entry via the crew NOTAM screen.
- If two or more obstacles apply, use the two-pass comparison procedure in Section 6.

How Transport Canada Treats Close-In Obstacles

Under TC AIM, Nav Canada may satisfy its obligation for a close-in obstacle (within 1 NM of the DER) by publishing an obstacle note on the departure procedure rather than a climb gradient. That note is for awareness only. It does not confirm the standard OCS is protected.

The crew cannot infer clearance from the fact that an obstacle appears on the chart. Any obstacle identified in a departure procedure note must be assessed against both OCS thresholds using the method in this guide, and entered in OPT if required.

A departure has two distinct performance segments, and an obstacle in either one can independently limit the maximum takeoff weight. OPT accepts only one obstacle entry at a time. Understanding why both entries may be necessary — and why neither can substitute for the other — is essential to using OPT correctly.

Close-in obstacles (within approximately 7,000 ft of DER). In the initial climb segment, the aircraft is at its heaviest and climbing steeply away from the runway. An obstacle encountered early in the departure can impose a significant weight penalty because OPT must ensure the aircraft clears it with adequate margin at that phase of flight. This effect is amplified at high-elevation airports such as Calgary (3,557 ft), Edmonton (2,373 ft), Bogota (8,361 ft), and Mexico City (7,316 ft): reduced air density at altitude lowers available engine thrust, which flattens the climb gradient and reduces the margin above close-in obstacles. The same obstacle that presents a minor constraint at a sea-level airport can become significantly weight-limiting at elevation.

Distant obstacles (beyond approximately 7,000 ft of DER). Further along the departure path, the aircraft has accelerated and the climb gradient has shallowed as thrust reduces toward the climb setting. A taller obstacle at greater distance can still drive a meaningful weight penalty through the required departure gradient. Again, high airport elevation compounds this: a flatter climb gradient means the aircraft arrives at any given distance point at a lower altitude than it would at sea level, reducing vertical clearance over distant obstacles as well.

Because these two segments respond differently to obstacle geometry, the most critical obstacle could either be close-in or distant obstacle. Both entries may be required to determine which produces the more limiting takeoff weight. The procedure for this is the two-pass comparison in Section 7.

Cargojet Flight Operations is developing a tool to assist crews in filtering active NOTAM obstacles against the departure corridor and identifying the most critical close-in and distant obstacles for OPT entry. Until that tool is available for use, crews must apply the assessment method in this guide to determine which obstacles require entry and use the two-pass comparison in Section 7 to identify the limiting obstacle.

3. Regulatory Framework: Published Procedure Reliability by Region

The required crew action for any departure depends on the regulatory environment of the departure state. The three-tier framework below defines that requirement. Apply the crew decision table at the end of this section to determine the correct procedure for each departure.

Three-Tier Regional Framework

Tier 1 — Published procedures can be relied upon

Regions: United States, European Union member states, United Kingdom, Mexico.

In these regions, confirmed OCS penetrations produce a published procedure amendment. The absence of a published ODP, SID gradient, or obstacle note, combined with no active obstruction NOTAMs for the departure runway, reflects a geometrically clean corridor. Check the correct channel for your region: FDC NOTAMs for the US; national AIP supplements for EU/UK; SENEAM via the Mexican AIP for Mexico (procedure amendments do not appear in the North American NOTAM feed).

Tier 2 — Independent assessment always required

Region: Canada.

Nav Canada does not systematically publish ODPs, SID gradient amendments, or takeoff obstacle notes in response to confirmed OCS penetrations. The absence of a published procedure cannot be interpreted

as confirmation that the departure corridor is clear. Crews must independently assess every active obstruction NOTAM for the departure runway against the 40:1 OCS using the method in this guide, regardless of what is or is not published. This applies to every Canadian departure on every flight.

Tier 3 — Treat as Tier 2 by default

Regions: All states not explicitly listed under Tier 1, including South America, Central America (excluding Mexico), Africa, Middle East, Asia Pacific, and any other state not formally reclassified to Tier 1 by Cargojet Flight Operations.

Crew Decision Framework

The following table sets out the required crew action for each departure scenario. The tier of the departure state is determined from the regional framework above.

Departure scenario	Required crew action
Tier 2 or Tier 3 — any runway	Review all active obstruction NOTAMs for the departure runway. For each obstacle inside the engine-out departure corridor: compute the ratio (height AGL divided by distance from DER in NM). If the result exceeds 100, enter the obstacle in OPT or verify it is covered by a published ODP or SID gradient. Do not assume the absence of a published gradient means the corridor is clear. See Section 3A for the penetration check method.
Tier 1 — ODP, SID gradient, or takeoff obstacle note published for the departure runway	Comply with the published requirement. Confirm all three channels: (1) ODP Takeoff Minimums document, (2) FDC or national equivalent NOTAM amending the applicable SID, (3) takeoff obstacle notes on procedure plates. Verify the aircraft achieves the required climb gradient at planned weight using OPT. No individual obstacle entry in OPT is required for obstacles already addressed by the published procedure.
Tier 1 — No published procedure and no active obstruction NOTAMs for the departure runway	Departure corridor verified clean. Depart normally. No OPT entry required.
Tier 1 — No published procedure, but obstruction NOTAMs issued within the past 7 days for the departure runway	Where active obstruction NOTAMs exist for the departure runway and no ODP or SID gradient has been published, apply the same independent OCS assessment used for Tier 2 departures: assess each obstacle geometrically against the OCS thresholds using the method in this guide, and enter in OPT if required. The absence of a published procedure does not confirm the corridor is clear. It may mean the obstacle is outside the corridor, or that the FAA assessment is still pending. Do not assume clearance without verifying the geometry.

3A. Tier 1 — How to Apply a Published ODP or Departure Gradient

The ODP gives one of three instructions per runway:

- **Non-standard climb gradient required —** Standard 200 ft/NM does not clear the obstacle. A higher gradient (e.g. 371 ft/NM to 1,400 ft MSL) must be maintained until reaching the specified altitude. The crew must verify the aircraft can achieve this gradient at actual weight and conditions before accepting the runway.
- **Weather minimum or climb gradient (crew choice) —** If weather is at or above the stated ceiling and visibility, the crew may depart visually and avoid the obstacle. If below those minima, the stated gradient must be met. The crew chooses which condition applies at the time of departure.
- **Obstacle note — informational only —** Standard 200 ft/NM clears the obstacle. The obstacle is published for crew awareness but no revised gradient or weather minimum is required. No OPT entry is needed for these obstacles.

The ODP is published as an FDC NOTAM and appears in the crew's EFB alongside all other NOTAMs for the airport. It may be split across two or more parts due to FDC character limits — both parts must be read together as a single continuous document. The annotated example below shows how to identify and apply each runway's section when reading the ODP NOTAM.

HOW TO USE THE ODP

1. Locate your departure runway in the ODP NOTAM. Sections are labelled by runway (e.g. "RWY 9", "RWY 12", "RWY 8R").
2. Note whether your runway appears in the TAKEOFF MINIMUMS section (top), the TAKEOFF OBSTACLE NOTES section (middle), or both. Each section serves a different purpose. TAKEOFF MINIMUMS states the restriction. TAKEOFF OBSTACLE NOTES lists the specific obstacles that drove it.
3. Apply the restriction. If a non-standard gradient is required, verify OPT performance against it. If informational only, no OPT entry or action is needed. If a weather minimum applies, compare current conditions and depart under the appropriate option.
4. Read all parts of the NOTAM. FDC NOTAMs may be split into Part 1 and Part 2 due to character limits. Both parts form a single continuous document and must be read together.

CANADIAN AIRPORTS — ODP MAY NOT EXIST

At US airports, the FAA consolidates multiple crane and obstacle NOTAMs into a single ODP NOTAM when the volume of obstacles makes individual evaluation impractical. Nav Canada does not follow the same model. At Canadian airports — including busy construction environments such as CYYC and CYYZ — Nav Canada publishes each obstacle as a separate individual NOTAM. A consolidated ODP-style NOTAM may not exist even when six or more obstacles are active simultaneously near the departure end of the same runway.

At Canadian airports, each obstacle NOTAM must be individually assessed against the OCS for the departure runway using the method in this guide. Where multiple obstacles penetrate the OCS, the two-pass comparison procedure in Section 6 applies.

Quick OCS penetration check: Divide the obstacle height AGL by its distance from the DER in nautical miles. If the result exceeds 100, the obstacle must be entered in OPT or covered by a published ODP or SID gradient. This single threshold conservatively captures both the 40:1 AEO surface (200 ft/NM) and the 62.5:1 OEI departure corridor surface (97 ft/NM). Example: a crane 128 ft AGL at 0.035 NM gives

3,657 ft/NM, well above 100, enter in OPT. A crane 53 ft AGL at 0.34 NM gives 156 ft/NM, above 100, enter in OPT. A crane 40 ft AGL at 0.5 NM gives 80 ft/NM, below 100, no action required.

Note also that at Canadian airports, any NOTAM that amends a published departure procedure will appear as a standard NOTAM with no special prefix or category flag. There is no equivalent of the FAA's FDC NOTAM classification. Crews must scan the full NOTAM list and read any entry referencing takeoff minimums, departure procedures, or climb gradients, rather than relying on category filtering in the EFB.

A fully annotated real-world example — KMIA ODP NOTAM 6/2336 colour-coded by runway, with per-runway restriction cards and key reading notes — is provided in **Appendix A** at the back of this guide.

WHEN NO ODP IS PUBLISHED — HOW TO CONFIRM THE DEPARTURE IS CLEAR

The absence of an ODP does not always mean the obstacle environment has been evaluated and found clear. Before concluding that no crew action is required, verify through one of the following:

OCS geometry confirms clearance. Apply the quick check: divide obstacle height AGL by distance from DER in NM. If the result is below 100 ft/NM for all active NOTAMs on the departure runway, no OPT entry is required. Note that the absence of an ODP does not by itself confirm the corridor is clear. Some airports have active obstruction NOTAMs with inside-corridor obstacles and no published procedure.

SID or departure procedure references the obstacle. Even when no ODP exists, a significant obstacle that affects the departure environment will typically be referenced in the applicable SID or departure procedure — either as an awareness note, a revised climb gradient on that specific routing, or a charted track designed to maintain obstacle separation. If active NOTAMs show obstacles in the departure corridor and no ODP has been issued, check the SID notes carefully. A gradient requirement or obstacle note on the SID is the FAA's alternative mechanism for communicating the restriction without publishing a standalone ODP.

If neither condition is satisfied — the OCS geometry check is inconclusive and the SID contains no obstacle reference — treat the obstacle as potentially penetrating and enter it in OPT.

4. Reference Data and Required Conversions (Tier 2 / Tier 3)

HEIGHT CONVERSION — SID CHART OBSTACLES

SID chart obstacle heights are AMSL elevations — NOT AGL heights.
Entering the AMSL value directly into OPT will overstate the obstacle.
At low-elevation airports the error is small. At YYC (elev 3555 ft) the error would be 3555 ft — catastrophic.

FORMULA: OPT Height (ft) = Chart Elevation (AMSL) - Runway Threshold Elevation (AMSL)

YVR RWY 08R (departure-end threshold RWY 26L = 7 ft): Trees 108 AMSL -> 108 - 7 = 101 ft
YYC RWY 35L (threshold elev 3555 ft): Obstacle 3700 AMSL -> 3700 - 3555 = 145 ft

DISTANCE CONVERSION — SID CHART OBSTACLES

SID chart distances are in NM past DER. OPT requires feet. DER = Liftoff End (same point).

FORMULA: OPT Distance (ft) = Chart Distance (NM) x 6076

0.4 NM = 2430 ft | 0.6 NM = 3646 ft

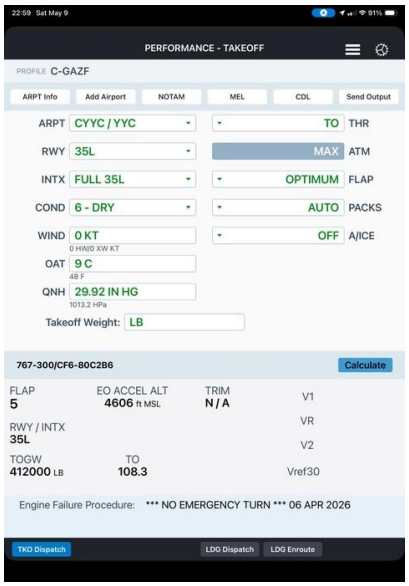
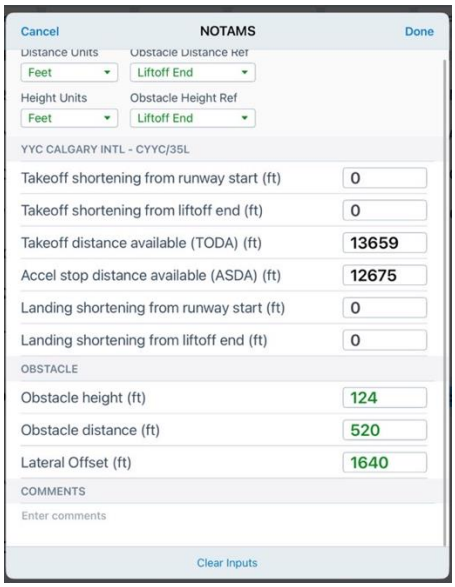
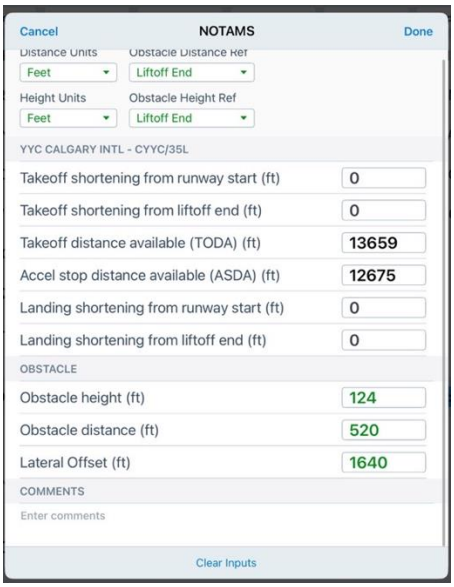
NOTAM obstacles state distance in feet from threshold — enter directly, no conversion needed.

Source	Height	Distance	Lateral Offset
NOTAM	AGL — enter directly	Feet from threshold — enter directly	Feet from RCL — enter directly
SID chart	AMSL - threshold elev	NM x 6076 (convert to feet)	Feet from RCL — enter directly

5. Single Obstacle Entry — Step by Step (Tier 2 / Tier 3)

Complete the main takeoff screen first — ARPT, RWY, INTX, COND, WIND, OAT, QNH — before opening the NOTAM screen.

Step 1-3 — Open OPT, tap NOTAM, verify runway header:

STEP 1 — Main Screen	STEP 2 — Tap NOTAM	STEP 3 — Set Units & Refs
		
No active NOTAM (plain button text). Set all fields before proceeding.	*NOTAM screen opens. Verify airport/runway header is correct.*	*Units: Feet. Both Ref dropdowns: Liftoff End.*

Step 1: Open the Takeoff screen. Confirm ARPT and RWY are set correctly.

Title bar reads PERFORMANCE - TAKEOFF.

Step 2: Tap the NOTAM button in the top toolbar.

Located between Add Airport and MEL.

Step 3: Verify the airport/runway header in the grey band.

Must match your departure runway. If wrong, tap Cancel, correct the runway, re-open.

Step 4: Set Distance Units: Feet | Height Units: Feet | Both Ref dropdowns: Liftoff End.

Liftoff End = departure-end threshold = DER. This is the Cargojet standard for all operations.

Step 5: Leave runway shortening fields at zero unless a separate runway length NOTAM applies.

Shortening and obstacle fields are independent.

Step 6: Enter Obstacle Height, Obstacle Distance, and Lateral Offset with conversions applied.

Apply all conversions from Section 3 before entering. All three fields must be populated.

Step 7: Enter a comment: NOTAM ID or SID chart procedure name.

Examples: 'NOTAM C1292/26 crane THR 17R' | 'Fraser 9 trees 0.4NM DER'

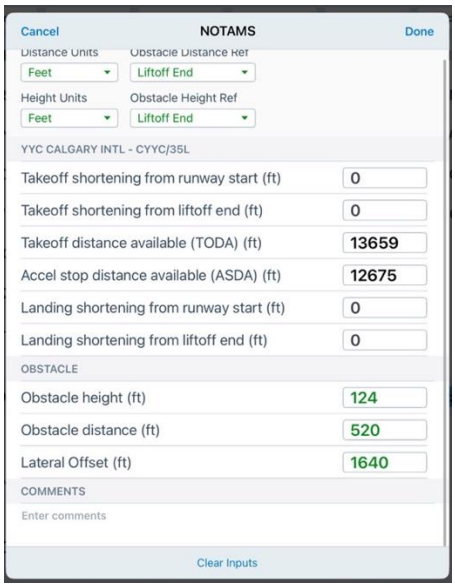
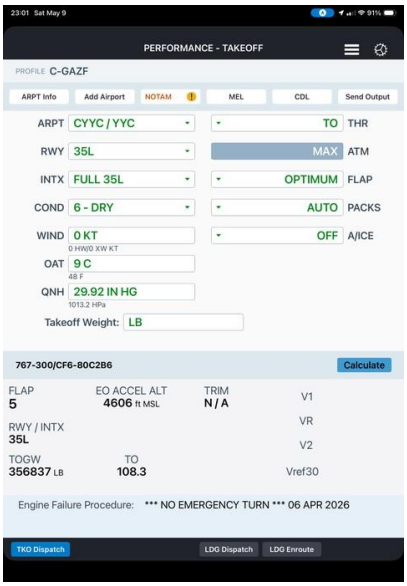
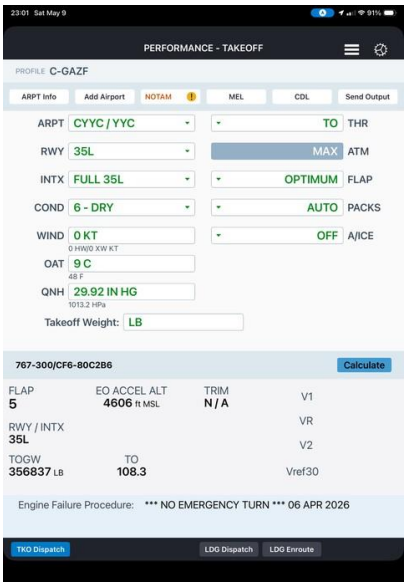
Step 8: Tap Done.

The overlay closes. You return to the main takeoff screen.

Step 9: Verify the amber indicator (!) is showing on the NOTAM button.

No amber = entry not saved. Tap NOTAM again and re-enter.

Step 6-9 — Enter data, tap Done, verify amber:

STEP 6 — Data Entered	STEP 9 — Amber Confirmed	STEP 10 — Calculate
		
Obstacle values entered. All three fields populated.	*Amber (!) indicator confirms NOTAM is active and applied.*	*Proceed with normal calculation. Expect TOGW reduction.*

Step 10: Calculate normally.

The active NOTAM obstacle is now reflected in the Max TOGW output.

6. Reference Point Selection (Tier 2 / Tier 3)

Reference Point	What It Means
Runway Start	Distance/height from brake-release point (start of takeoff roll).
Liftoff End	Distance/height from the departure-end threshold. Use for all NOTAM obstacles ('BFR THR') and all SID chart obstacles ('past DER'). DER and Liftoff End are the same physical point.

7. Multiple Obstacles — Two-Pass Comparison Procedure (Tier 2 / Tier 3)

OPT ACCEPTS ONLY ONE OBSTACLE AT A TIME

When a SID chart lists multiple obstacles, you must run a SEPARATE calculation for EACH obstacle.
Compare results to identify the most limiting obstacle (lowest Max TOGW).
The limiting obstacle MUST be the active NOTAM for the final departure calculation.
Do not use a weight from a pass where a non-limiting obstacle was active.

1 **Convert ALL obstacle data before starting.**
Apply height (AMSL - threshold) and distance (NM x 6076) conversions for every obstacle. Have all values ready.

2 **Enter Obstacle 1. Tap Done. Verify amber active.**
Set all fields. Confirm amber indicator is showing.

3 **Tap Calculate. Record Max TOGW(1).**
Note this weight. It is the limit imposed by Obstacle 1 alone.

4 **Tap NOTAM -> Clear Inputs. Confirm amber is gone.**
Verify the NOTAM button returns to plain text before proceeding.

5 **Enter Obstacle 2. Tap Done. Verify amber active.**
Enter the second obstacle's converted values. Confirm amber.

6 **Tap Calculate. Record Max TOGW(2).**
Compare with TOGW(1). The LOWER value identifies the limiting obstacle.

7 **Identify the limiting obstacle.**
Lower TOGW = limiting obstacle.
If TOGW(1) = TOGW(2) — neither is currently weight-limiting. Either may remain active.

8 **CRITICAL — Ensure the limiting obstacle is the active NOTAM.**
If Obstacle 2 is limiting: already active — confirm amber and proceed.
If Obstacle 1 is limiting: tap NOTAM -> Clear Inputs, re-enter Obstacle 1, tap Done, verify amber.

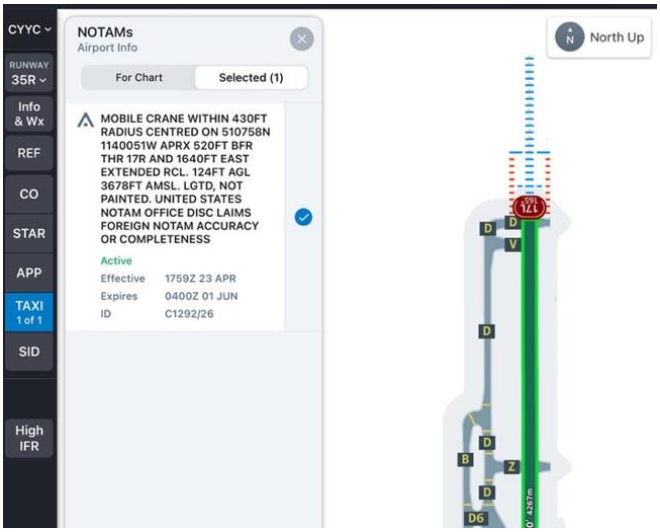
9 **Perform final departure calculation with limiting obstacle active.**
All further calculations must use this active NOTAM. Do not clear until departure is complete.

8. Worked Example A — NOTAM Obstacle: YYC Crane (Tier 2 / Tier 3)

C1292/26 NOTAMN A) CYYC B) 2604231759 C) 2606010400 E) MOBILE CRANE WITHIN 430FT RADIUS CENTRED ON 510758N 1140051W APRX 520FT BFR THR 17R AND 1640FT EAST EXTENDED RCL. 124FT AGL 3678FT AMSL. LGTD, NOT PAINTED.

OPT Field	Value	Source / Reasoning
Obstacle height (ft)	124	124 FT AGL — stated as AGL in NOTAM. Enter directly. No conversion.
Obstacle distance (ft)	520	520 FT BFR THR 17R — feet from threshold. Enter directly.
Lateral Offset (ft)	1640	1640 FT EAST EXTENDED RCL. Enter directly.
Distance Ref	Liftoff End	'BFR THR' = from departure-end threshold.
Height Ref	Liftoff End	Consistent with distance reference.

NOTAM C1292/26 — Jeppesen Moving Map



OPT NOTAM Entry — Crane Obstacle

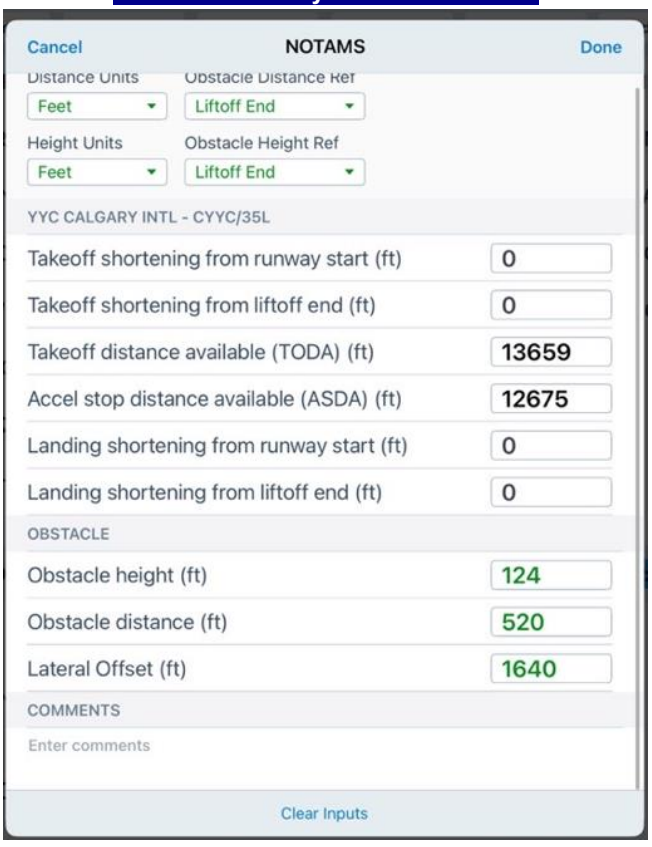


Fig. 1 — CYYC Airport Moving Map showing crane NOTAM active near THR 17R and YYC crane entered: height 124 ft AGL, distance 520 ft, offset 1640 ft

9. Worked Example B — SID Obstacles: YVR Fraser 9 (Tier 2 / Tier 3)

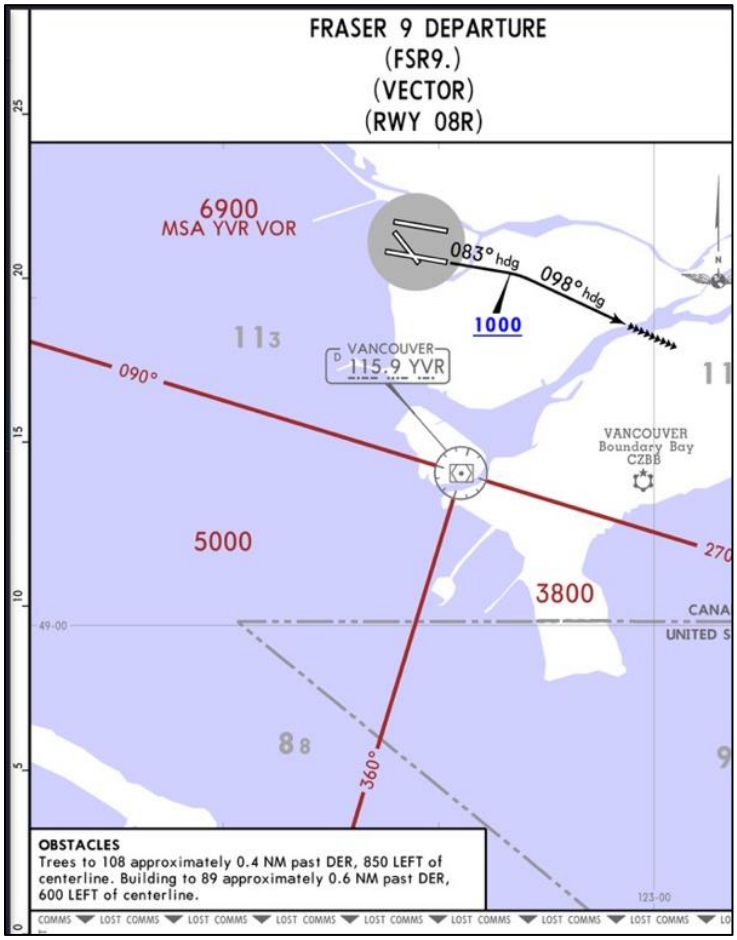


Fig. 2 — Fraser 9 SID. Obstacle notes (bottom): (i) trees to 108, 0.4 NM past DER, 850 ft left; and (ii) building to 89, 0.6 NM past DER, 600 ft left.

Step 1 — Convert all data:

SID chart obstacle heights are published as AMSL elevations. The OCS originates at the departure end of the runway (DER) — the opposite threshold from where the takeoff roll begins. To convert an obstacle height to AGL for OPT entry, subtract the **departure-end threshold elevation** from the charted AMSL value. For RWY 08R, the departure end is the RWY 26L threshold (7 ft MSL).

Obstacle	Chart value (AMSL)	Conversion	Enter in OPT
Trees — height	108 ft AMSL	108 - 7 (departure-end threshold RWY 26L) = 101	101 ft
Trees — distance	0.4 NM past DER	0.4 x 6076 = 2430	2430 ft
Trees — offset	850 ft left of CL	None	850 ft
Building — height	89 ft AMSL	89 - 7 (departure-end threshold RWY 26L) = 82	82 ft
Building — distance	0.6 NM past DER	0.6 x 6076 = 3646	3646 ft
Building — offset	600 ft left of CL	None	600 ft

WRONG vs. CORRECT — HEIGHT ENTRY AT YVR

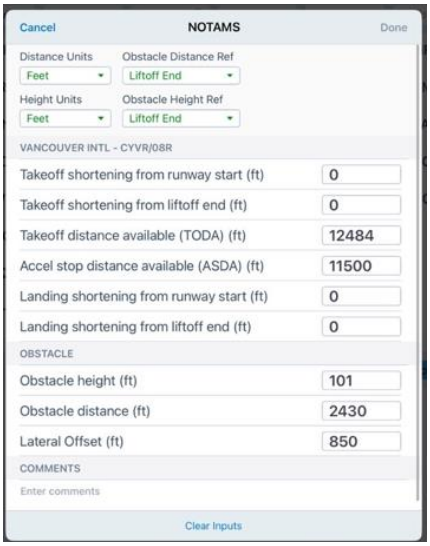
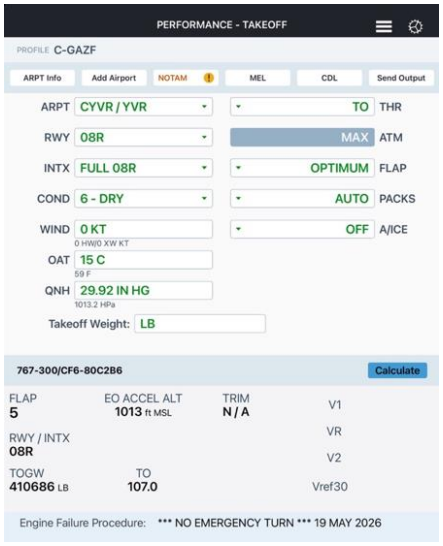
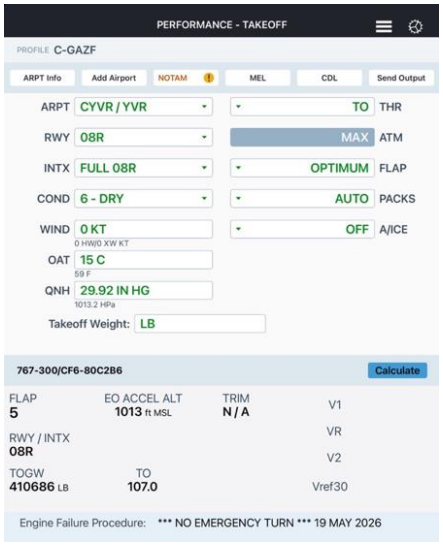
× **WRONG**: Entering 108 ft (trees) and 89 ft (building) — these are raw AMSL values.

✓ **CORRECT**: Entering 101 ft (trees) and 82 ft (building) — AMSL minus departure-end threshold elevation (RWY 26L = 7 ft).

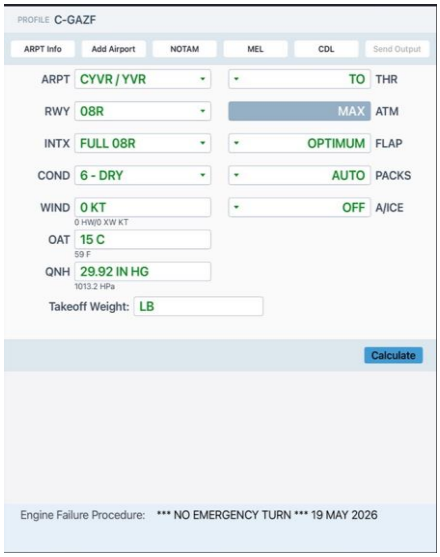
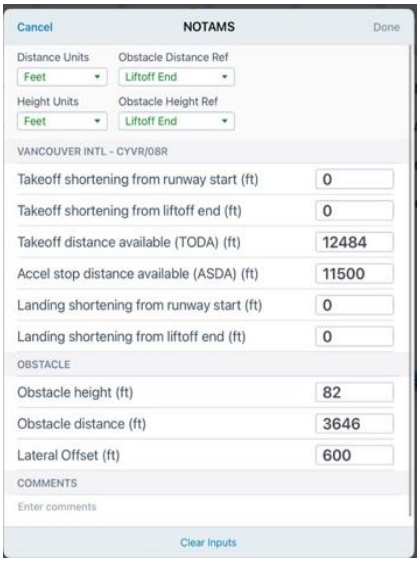
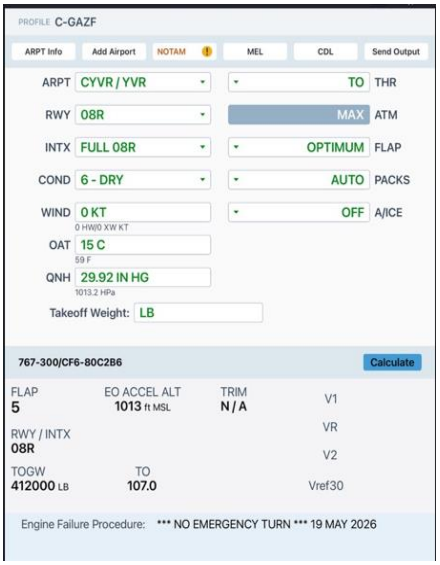
At YVR the error is only 7 ft. At YYC the same mistake would be a 3555 ft error.

ALWAYS apply the conversion regardless of airport elevation.

Pass 1 — Trees obstacle:

PASS 1 — TREES ENTERED	PASS 1 — AMBER CONFIRMED	PASS 1 — RESULT
		
Height 101 ft, distance 2430 ft, offset 850 ft. Liftoff End.	*Active NOTAM confirmed. Tap Calculate.*	*Record TOGW(1). Trees obstacle active.*

Clear Inputs. Then Pass 2 — Building obstacle:

CLEAR INPUTS	PASS 2 — BUILDING ENTERED	PASS 2 — RESULT
		
All fields reset. Amber gone. Verify before entering Obstacle 2.	*Height 82 ft, distance 3646 ft, offset 600 ft.*	*Record TOGW(2). Compare with TOGW(1).*

RESULT ANALYSIS — PASSES DIVERGE: TREES IS LIMITING (410,686 LB vs 412,000 LB)

- Pass 1 (trees: 101 ft / 2430 ft) produced TOGW 410,686 lb. Pass 2 (building: 82 ft / 3646 ft) produced TOGW 412,000 lb. The two passes diverge — trees is the limiting obstacle.
-
-

Trees is the limiting obstacle. *Clear inputs, re-enter the trees obstacle (101 ft / 2430 ft / 850 ft), confirm amber, and use **410,686 lb** as the departure weight limit.*

10. Clearing an Active NOTAM (Tier 2 / Tier 3)

A crew-entered NOTAM persists until manually cleared. It is NOT deleted on app restart.

Action	How to Perform
Clear Inputs	Tap NOTAM -> Clear Inputs. All obstacle and shortening fields reset to zero. TODA/ASDA return to database values.
Verify cleared	Confirm the amber indicator is absent before calculating without a NOTAM active.

WHEN TO CLEAR

NOTAM has expired — verify effective dates before every departure.
Departing a different runway where the obstacle does not apply.
Between Pass 1 and Pass 2 in the multi-obstacle comparison process.
Re-entering the limiting obstacle after the comparison if Obstacle 1 was limiting.
Any time the amber indicator is showing and the source is uncertain.

11. Part A Quick Reference Card (All Tiers)

Pre-entry

- Airport and runway set on main takeoff screen
- Source document in hand (NOTAM text or SID chart)
- Heights converted: SID obstacle AMSL - threshold elevation
- Distances converted: SID obstacle NM x 6076 = feet
- If multiple obstacles: two-pass comparison planned (Section 5)

Each entry

- NOTAM tapped | Airport/runway header confirmed
- Units: Feet | Distance Ref: Liftoff End | Height Ref: Liftoff End
- Height, Distance, Lateral Offset entered with conversions applied
- Comment entered | Done tapped | Amber indicator confirmed

Multi-obstacle comparison

- Pass 1: Obstacle 1 entered -> Calculate -> TOGW(1) recorded
- Clear Inputs -> amber absent confirmed
- Pass 2: Obstacle 2 entered -> Calculate -> TOGW(2) recorded
- Lower TOGW = limiting obstacle identified
- Limiting obstacle confirmed as active NOTAM before final calculation

Conversion quick-reference

Conversion	Formula	Example
SID height (AMSL to OPT)	Chart elev - threshold elev	108-7=101 ft | 3700-3555=145 ft
SID distance (NM to feet)	NM x 6076	0.4NM=2430 ft | 0.6NM=3646 ft
NOTAM height (AGL)	Enter directly	124 AGL -> 124
NOTAM distance (ft)	Enter directly	520 ft BFR THR -> 520

PART B
MEL / NNC Combined Performance

12. Background — Why OPT Cannot Combine MEL and NNC

Source: Boeing SME, via Boeing EXI — May 14, 2026.

OPT uses fixed tabular data from the FCOM/QRH. Each table covers a single system failure in isolation. Combined scenarios are not in those tables.

BOEING SME STATEMENT

"OPT does not have the capability to calculate either simultaneous NNCs, or NNCs in combination with some MEL items (i.e. Brake Deactivated). This is primarily because such combined effects have not been considered in the creation of the performance data tables or databases."

— Boeing Performance SME, May 14, 2026

13. What OPT Can and Cannot Calculate

Scenario	OPT Capability	Action Required
MEL only (no NNC)	Calculates normally	Enter MEL, calculate as normal
NNC only (no MEL)	Calculates normally	Enter NNC, calculate as normal
MEL that does not affect landing + NNC	Remove the MEL from OPT, run NNC alone	Enter NNC only. MEL not required if it has no landing performance effect
MEL affecting landing performance + NNC	ERROR — cannot combine	Use manual method (Section 13)
Two simultaneous NNCs	ERROR — cannot combine	Use manual method (Section 13)
MEL + MEL (multiple MELs)	May calculate depending on type	Verify each MEL individually; use manual method if combined effects are unknown

KEY PRINCIPLE — MEL 32-41-03 GEAR RETRACTION BRAKING SYSTEM

- MEL 32-41-03 (Gear Retraction Braking System inoperative) does NOT affect landing performance.

- If a second event occurs (e.g., hydraulic leak) requiring NNC landing distance calculation:
  - ➔ Remove MEL 32-41-03 from OPT
  - ➔ Run the NNC landing distance calculation alone (e.g., Right Hydraulic system inop)
- The MEL has no landing performance impact and its presence would trigger the combination error message.

14. Worked Example — MEL 32-41-03 + Right Hydraulic Leak

Scenario (from Cargojet recurrent LOFT):

Aircraft dispatched with MEL 32-41-03 (Gear Retraction Braking System inoperative). After departure, Right Hydraulic system leak develops. Crew attempts to calculate landing distance in OPT with both MEL and NNC entered.

Event	OPT Entry	Result	Correct Action
Dispatch condition	MEL 32-41-03 entered	Calculates normally for takeoff	Normal
R HYD leak develops	MEL still active + R HYD NNC entered	OPT ERROR MESSAGE	Remove MEL, run R HYD NNC alone
Correct approach	R HYD NNC only (MEL removed)	Calculates landing distance normally	Use this result

WHY THIS WORKS IN THIS CASE

- MEL 32-41-03 (Gear Retraction Braking System) affects the gear retraction sequence — not landing roll, braking, or stopping distance.
- It has no effect on the landing distance calculation.
- Removing it from OPT to run the NNC calculation is operationally correct and does not understate landing distance.

If the MEL DID affect landing performance (e.g., a brake deactivated MEL), the crew cannot simply remove it.

In that case the manual method in Section 13 must be used.

15. Manual Method for Combined Failures

When OPT cannot calculate a combined scenario and the MEL DOES affect the performance parameter being calculated, use the following Boeing-recommended method.

BOEING-RECOMMENDED APPROACH FOR COMBINED FAILURES

Source: Boeing SME, May 14, 2026

Step 1: Using OPT, calculate the landing distance for EACH system problem individually.
Step 2: Identify the result with the LONGEST (worst) landing distance — this is the baseline.
Step 3: Manually ADD the distance adjustment from the other system failure(s) to the baseline.
Step 4: Consider adding a conservative safety factor on top if landing distance is close to limiting.
Step 5: If possible, SELECT A RUNWAY where landing distance is not limiting.

Note: Boeing explicitly places this under the Captain's authority and judgment.
These scenarios fall under situations where the Captain assesses the specific situation and uses best judgment.

Example application:

Step	Action	Value (example)
1a	Run OPT: MEL (brake deactivated) only — note landing distance	4800 ft
1b	Run OPT: NNC (R HYD inop) only — note landing distance	5200 ft
2	Identify longest distance as baseline	5200 ft (NNC is worse)
3	Add adjustment from MEL table (FCOM/QRH) to baseline	5200 + 400 = 5600 ft
4	Apply safety factor if desired	5600 + margin = crew judgment
5	Verify runway available distance is sufficient	LDAW vs. 5600 ft

IMPORTANT LIMITATIONS

- This method is an APPROXIMATION — Boeing explicitly states combined effects have not been calculated.
- The individual adjustments are independent — real-world combined effects may differ.
- Runway selection: always prefer a runway where landing distance is not limiting.
- When landing distance IS limiting and this manual method is required, document the calculation and brief the crew.

16. Part B Quick Reference Card

OPT error message — first response

- Identify whether the MEL affects the performance parameter being calculated
- If MEL has NO landing performance effect: remove MEL from OPT, run NNC alone
- If MEL DOES affect landing performance: use manual method (Section 13)

Manual method checklist

- Calculate each system failure individually in OPT
- Identify the longest (worst) landing distance as baseline
- Add distance adjustment from other failure(s) using FCOM/QRH tables
- Apply safety factor if desired
- Select a runway where landing distance is not limiting if at all possible
- Captain makes final judgment call — document and brief crew

Key reminders

- OPT error on combined MEL+NNC is by design — not a software fault
- Each NNC adjustment in OPT/FCOM/QRH was calculated independently — combined effects not validated
- MEL 32-41-03 (Gear Retraction Braking System) has no landing performance effect — remove it and run NNC alone

Reference document — does not supersede OPT Administrator's Guide v4.92, Cargojet FOM, FCTM, or applicable MEL procedures. In case of conflict, the approved regulatory document takes precedence.

Appendix A — How to Read an Obstacle Departure Procedure (ODP)

This appendix uses a real-world example — KMIA (Miami International Airport), ODP AMDT 18, FDC NOTAM 6/2336 — to show how to identify and apply each runway's departure restriction when reading an ODP NOTAM. At KMIA, over 60 simultaneous obstacle NOTAMs were active during a construction period. The FAA consolidated the analysis into a single ODP NOTAM so that crews could look up their runway and apply only the restriction shown, rather than evaluating every individual obstacle. The sections below decode that NOTAM line by line and provide a per-runway summary card for each affected runway.

COLOUR KEY

Each runway's section of the ODP is colour-coded throughout this appendix. **Amber = RWY 09** (non-standard gradient required). **Cyan = RWY 12** (weather minimum or gradient). **Red = RWY 08R** (obstacle note, info only). **Purple = RWY 27** (obstacle note, info only). **Green = RWY 30** (obstacle note, info only — split across Part 1 and Part 2).

Annotated NOTAM — KMIA ODP 6/2336

The NOTAM below is typeset exactly as it appears in the EFB (Domestic view). Each coloured highlight marks one runway's section of the ODP. The callout column on the right identifies the runway and summarises the restriction. Scroll to the per-runway cards below the image for the full crew action breakdown.

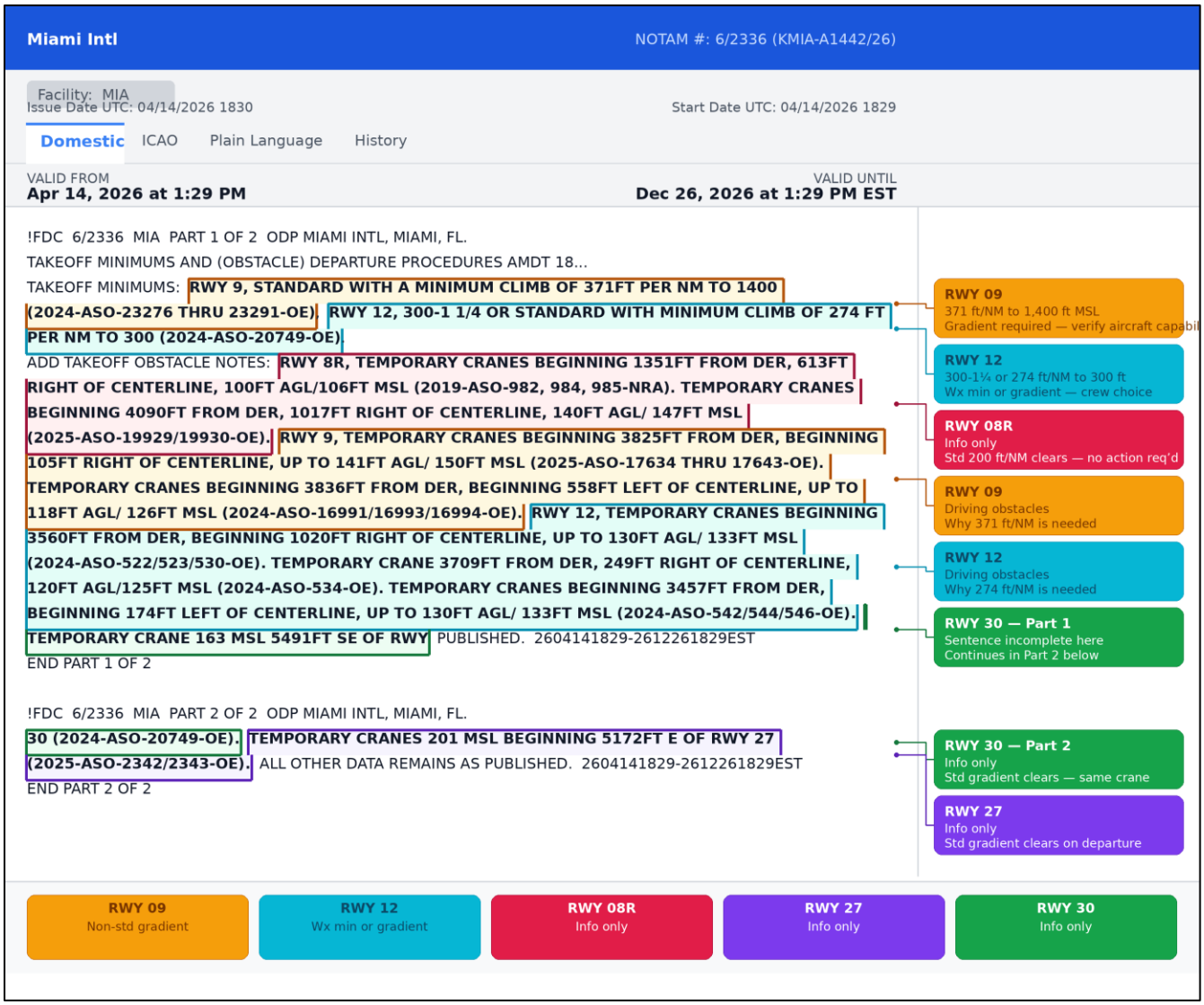


Fig. A1 — KMIA ODP NOTAM 6/2336 (FDC AMDT 18, valid Apr–Dec 2026) annotated by runway. NOT FOR NAVIGATION.

KEY READING NOTES

RWY 09 appears twice. First in TAKEOFF MINIMUMS (sets the 371 ft/NM gradient requirement). Then again in TAKEOFF OBSTACLE NOTES (lists the specific cranes that drive the gradient). First block = what to do. Second block = why.

RWY 12 also appears twice. In TAKEOFF MINIMUMS (300-1¼ wx min or 274 ft/NM gradient). Then in TAKEOFF OBSTACLE NOTES (three crane clusters that drove the restriction). Same structure — restriction first, driving obstacles second.

RWY 30 is split across Part 1 and Part 2. The FDC NOTAM hit its character limit mid-sentence. Part 1 ends: "TEMPORARY CRANE 163 MSL 5491FT SE OF RWY". Part 2 opens: "30 (2024-ASO-20749-OE)." Always read both parts as one continuous document. The entry is informational only — no gradient change.

"ALL OTHER DATA REMAINS AS PUBLISHED." Any runway not listed in this NOTAM (08L, 26L, 26R, 09R) has no new restriction added by NOTAM 6/2336. This does not mean the corridor is geometrically clear. Active obstruction NOTAMs for those runways must still be assessed independently using the OCS geometry check.

Per-Runway Restriction Cards

Find your departure runway below. Apply only the restriction shown for that runway — ignore all other cards.

RWY 09 NON-STANDARD CLIMB GRADIENT REQUIRED

Minimum climb: 371 ft/NM to 1,400 ft MSL — then standard.

Standard 200 ft/NM does NOT clear these obstacles. You must achieve and sustain 371 ft/NM from the departure end until reaching 1,400 ft MSL before reducing to a normal climb rate.

Driving obstacles:

- Cranes from 3,825 ft DER, 105 ft right of CL — up to 141 ft AGL / 150 ft MSL (2025-ASO-17634 thru 17643)
- Cranes from 3,836 ft DER, 558 ft left of CL — up to 118 ft AGL / 126 ft MSL (2024-ASO-16991/16993/16994)

Crew action:

Before accepting RWY 09 for IFR departure, verify the aircraft can achieve 371 ft/NM at actual weight, temperature, and wind. If it cannot, this runway is not available under standard IFR conditions. Also check SID NOTAMs 6/0029 and 6/0027 — some RNAV SIDs off RWY 09 require a steeper initial segment of 500 ft/NM to 520 ft MSL before reducing to 371 ft/NM.

RWY 12 WEATHER MINIMUM OR CLIMB GRADIENT

Option A (VMC): 300 ft ceiling / 1¼ SM vis — depart visually, see and avoid the obstacles.

Option B (IMC below 300-1¼): Climb at 274 ft/NM until reaching 300 ft MSL, then standard climb.

Driving obstacles:

- Cranes from 3,560 ft DER, 1,020 ft right of CL — up to 130 ft AGL / 133 ft MSL (2024-ASO-522/523/530)
- Crane at 3,709 ft DER, 249 ft right of CL — 120 ft AGL / 125 ft MSL (2024-ASO-534)
- Cranes from 3,457 ft DER, 174 ft left of CL — up to 130 ft AGL / 133 ft MSL (2024-ASO-542/544/546)
- Crane 163 ft MSL — 5,491 ft SE of RWY 30 (reciprocal geometry, cited in both RWY 12 and RWY 30 entries)

Crew action:

In IMC: confirm 274 ft/NM is achievable before departure. In VMC at or above 300-1¼: no gradient required, but remain aware of crane positions — see and avoid is your mitigation.

RWY 08R OBSTACLE NOTE

Standard 200 ft/NM clears these obstacles. No revised gradient required.

These obstacles are referenced in the ODP for crew awareness. The ODP itself does not publish a revised climb gradient for RWY 08R. Independent OCS geometry assessment may identify obstacles within the departure corridor that exceed the OEI net climb surface, requiring OPT entry.

Obstacles noted:

- Cranes from 1,351 ft DER, 613 ft right of CL — 100 ft AGL / 106 ft MSL (2019-ASO-982, 984, 985)
- Cranes from 4,090 ft DER, 1,017 ft right of CL — 140 ft AGL / 147 ft MSL (2025-ASO-19929/19930)

Crew action:

No departure restriction from this ODP entry. If assigned a SID off RWY 08R, cross-check the applicable SID NOTAM for any SID-specific gradient notes. Review active obstruction NOTAMs for RWY 08R and apply the geometry check before departure.

RWY 27 OBSTACLE NOTE

Standard 200 ft/NM clears these obstacles on departure.

These cranes are the primary driver of raised approach minimums on the RWY 26L/27 IAPs — but on a RWY 27 departure (heading 270°) the obstacles are behind the aircraft at 5,172 ft from the DER and are not a departure concern. They are noted for crew awareness only.

Obstacles noted:

- Cranes 201 ft MSL beginning 5,172 ft east of RWY 27 (2025-ASO-2342/2343)

Crew action:

No departure restriction from this ODP entry. If assigned a SID off RWY 27, cross-check the applicable SID NOTAM for any SID-specific gradient notes. Review active obstruction NOTAMs for RWY 08R and apply the geometry check before departure.

Key distinction: the same obstacle can be a departure non-issue and an approach constraint simultaneously, depending on which direction the aircraft is flying relative to the obstacle.

RWY 30 OBSTACLE NOTE — INFORMATIONAL ONLY

Standard 200 ft/NM clears this obstacle. No revised gradient required.

This entry was split across Part 1 and Part 2 of NOTAM 6/2336 due to FDC character limits. Part 1 ends mid-sentence with “TEMPORARY CRANE 163 MSL 5491FT SE OF RWY” and Part 2 opens with “30 (2024-ASO-20749-OE).” This is a formatting artifact — not a separate restriction. Always read both parts as a single continuous document.

Obstacle noted:

- Crane 163 ft MSL — 5,491 ft SE of RWY 30 (2024-ASO-20749)

Crew action:

No departure restriction from this ODP entry. If assigned a SID off RWY 30, cross-check the applicable SID NOTAM for any SID-specific gradient notes. Review active obstruction NOTAMs for RWY 08R and apply the geometry check before departure.

Part break lesson: if a NOTAM appears to end mid-sentence, always check for a Part 2 with the same NOTAM number. The content is continuous.

IMPORTANT — THIS APPENDIX COVERS ODP NOTAM 6/2336 ONLY

Before any IFR departure from KMIA, also review the following which are not captured in this ODP:

- SID NOTAMs 6/0029 and 6/0027 — RWY 09 SID gradients are steeper than the ODP gradient (500 ft/NM initial segment for most RNAV SIDs).
- SID NOTAMs 6/2235 and 6/6480 — MIAMI TWO SID restrictions (BEECH MOCA raised to 1,700; FREEPORT transition NA without RNAV/GPS).
- All active obstacle NOTAMs for situational awareness — 63 obstacle NOTAMs were active at KMIA as of May 2026, most driven by the eastern construction corridor.

NOT FOR NAVIGATION. Verify all NOTAMs via FAA NOTAM Search, 1800wxbrief, or company dispatch before departure. This appendix is a training and reference aid only.

Appendix B — Climb Gradient to Rate of Climb Reckoner

When a SID, ODP, or NOTAM specifies a required climb gradient in ft/NM, use this table to determine the required Rate of Climb (fpm) at your initial climb speed.

Formula: ***ROC (fpm) = Gradient (ft/NM) x Groundspeed (kt) ÷ 60***

Gradient (ft/NM)	ROC at 140 kt (fpm)	ROC at 160 kt (fpm)	ROC at 180 kt (fpm)
97 (OEI)	227	259	291
200	467	533	600
250	583	667	750
300	700	800	900
350	817	933	1050
400	933	1067	1200
500	1167	1333	1500
600	1400	1600	1800
700	1633	1867	2100
800	1867	2133	2400
1000	2333	2667	3000

Note: Table values are calculated at ISA, still air. Groundspeed and IAS are equal at sea level ISA. At altitude or with wind, use actual groundspeed in the formula for precise calculation.

QUICK RULE OF THUMB

At 180 kt: Gradient (ft/NM) x 3 = ROC (fpm). Exact. No rounding needed.

At 160 kt: Gradient (ft/NM) x 2.7 = ROC (fpm). Close enough for mental math. Example: 371 ft/NM x 2.7 = ~1,001 fpm (actual: 989 fpm).

At 140 kt: Gradient (ft/NM) x 2.3 = ROC (fpm). Example: 371 ft/NM x 2.3 = ~853 fpm (actual: 867 fpm).