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Closely Spaced Parallel Operations and Precision Runway Monitor Approaches: A Pilot's Training Guide

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1.0 Introduction

Simultaneous close parallel approach operations apply to runways spaced at least 3000 feet apart but less than 4300 feet apart. In Canada, these procedures are called Closely Spaced Parallel Operations (CSPO). Toronto/Lester B. Pearson International airport (CYYZ) will be initiating CSPO using Precision Runway Monitor (PRM) approach procedures. During runway 15/33 operations at CYYZ, PRM approaches will be available to help improve traffic management.

This guide provides specific information that can be used to supplement pilot training prior to operating into CYYZ during times when PRM operations are in progress.

2.0 Learning objectives

This training will enable pilots to:

- Appreciate the Air Traffic Control (ATC) components of PRM operations
- Recognise when PRM operations are in progress
- Identify additional approach briefing requirements for PRM operations
- Understand usage of dual VHF communications and the PRM frequency
- Explain the breakout procedure and its difference to a go-around.

3.0 ATC components of PRM operations

In addition to normal ATC operations, PRM at CYYZ uses:

- Wide Area Multilateration (WAM) & secondary surveillance radar (SSR) inputs
- High resolution, high update rate displays with advanced deviation and alerting capability
- Additional PRM radio frequency (133.1)
- An additional controller (Approach Monitor Controller), monitoring PRM approaches
- Additional final approach monitor frequency (134.17)

4.0 Notice of PRM operations

PRM operations may be used when weather conditions demand, typically when wind conditions compel switching runways from the usual East/West orientation of operations at CYYZ during most times of the year.

PRM operations are advised via ATIS, shortly after the runway nomination. Notice that PRM operations are in effect may also be given directly by ATC. Examples:

- "EXPECT PRM OPERATIONS FROM 2100Z"
- "PRM OPERATIONS IN PROGRESS"

Notice of PRM operations in effect at CYYZ prior to arrival is the pilot's cue to brief and prepare appropriately. PRM approach charts include the following cues:

The Attention All Users Page – AAUP

The AAUP provides the flight crew with procedures that must be used when conducting these operations, in a form that may be reviewed prior to conducting the procedure. The flight crew is notified when an AAUP is published via a note on the PRM Approach chart:

"**See additional requirements on AAUP**."

The AAUP reflects the requirements of the procedure and airport for which they are developed. The AAUP first describes the pilot actions in the event the flight is unable to conduct a PRM approach. Next, a listing of approved IAPs for conducting PRM approaches is provided. The remainder of the AAUP is divided into two sections, General and Runway Specific.

ATTENTION ALL USERS OF ILS and RNAV (GNSS) PRECISION RUNWAY MONITOR (PRM) APPROACHES

NOT FOR NAVIGATION

Closely Spaced Parallel Operations

PILOT NON-PARTICIPANT PROCEDURE:

Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ATC facility as soon as practical, but at least 100 miles from destination / OR ON FIRST CONTACT.

LIST OF APPROVED PRM APPROACHES:

ILS PRM Rwys 15L, 15R, 33L, 33R

RNAV (GNSS) PRM Z Rwys 15L, 15R, 33L, 33R

Requirements: Approaches supporting PRM operations must have vertical guidance. For RNAV (GNSS) approaches, flight director or autopilot and GNSS are required.

General, applicable to all approaches

Review procedure for executing a climbing and descending PRM breakout.

Breakout phraseology:

"TRAFFIC ALERT - (*Call Sign*)
TURN (LEFT/RIGHT) IMMEDIATELY HEADING (degrees),
CLIMB/DESCEND TO (altitude)."

All breakouts: Hand flown, initiate immediately.

Figure 1: Example of an Attention All Users Page (AAUP)

Operator participation requirements are NOT listed because the AAUP is designed to remind the qualified pilot of the procedures to be used when conducting a PRM approach. Examples of reasons that pilots may not be able to participate include on-board equipment failure (no glideslope or no second communications receiver) or because they do not have the required training. Pilots determine whether they are qualified to conduct the approach.

5.0 Approach brief

To ensure vertical separation between aircraft being vectored to the adjacent approach, pilots assigned arrivals to runway 15L and 15R or 33L and 33R in CYYZ will be given instructions to intercept the Final Approach Course (FAC) of the intended landing runway at different altitudes.

If notified by ATC, hand-fly a breakout immediately.

Dual VHF is required to ensure ATC is heard during blocked transmissions.

Arrival / Approach Controller transfers aircraft to Approach Monitor Controller (134.17) when established on final.

134.17(5) MHz is the existing Approach Monitor frequency, and the crews will be transferred to this frequency as is done today during RWY 05/23 operations. For PRM operations on RWYs 15/33, aircrews will also be instructed to monitor the PRM frequency (133.1) on COM 2.

Set COM 2 to the PRM frequency (133.1) and monitor that frequency during the approach while also selecting/maintaining assigned frequency on COM 1. Transmit only on COM 1.

The Approach Monitor Controller transfers aircraft to the Tower Controller before the final approach fix. Aircrews will continue to monitor PRM frequency (133.1) on COM 2 until landing.

In the Flight Management System, select the CYYZ ILS RWY 15L to fly the ILS PRM RWY 15L. Similarly, select the RNAV (GNSS) Z RWY 15L if planning the RNAV (GNSS) PRM Z RWY 15L.

Briefing a PRM approach also briefs the same runway ILS or RNAV (GNSS) approach, provided the same vertically guided minimums are utilized. If later assigned the same runway, non-PRM approach, consider it briefed provided the same minimums are utilized. PRM related chart notes and PRM frequency will not be required in this scenario.

The AAUP brief includes:

- Reviewing the procedure for executing a breakout.
- Reviewing the breakout phraseology: "Traffic alert (call sign) turn (L/R) immediately climb/descend and maintain (altitude)."
- Noting that all breakouts are hand flown and initiated immediately.
- Noting that descending on the glideslope/glidepath meets any charted crossing restrictions.
- Noting that if there is a later assignment of the non-PRM approach to the same runway, consider it briefed if the same vertically guided minima are utilized. PRM related notes may be disregarded.
- Follow a TCAS RA climb/descend during a breakout, even if it differs from ATC, while executing the breakout turn.
- Using dual communications to tune a secondary radio to the PRM monitor frequency.

Some items are only charted on the PRM procedure.

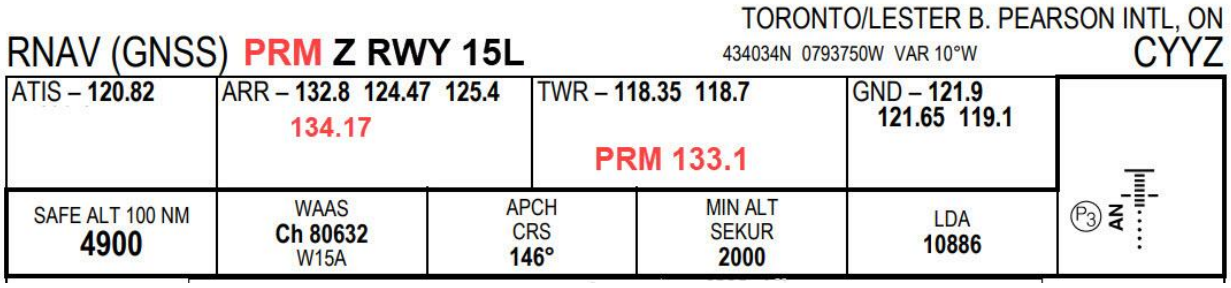

Figure 2: Example of a PRM Approach Communications Block

- PRM Naming convention
- Additional ARR Frequency (134.17(5)) MHz
- PRM Frequency 133.1 MHz

PRM Frequency monitoring protects against 'stuck microphone' or blocked "breakout" instruction.

Standard PRM Communication Transfers

- Arrival frequency
  - Check in
  - ATC vectors to final and approach clearance
- When directed by ATC, switch to:
  - Approach Monitor Controller frequency
  - Check in (Maintain a listening watch on the PRM frequency on the secondary VHF radio receiver)
- When directed by ATC, switch to:
  - Tower Controller frequency
  - Landing Clearance (Continue monitoring PRM frequency on the secondary VHF radio receiver)

Pilots will see new Plan View Operational Notes specific to PRM procedures.

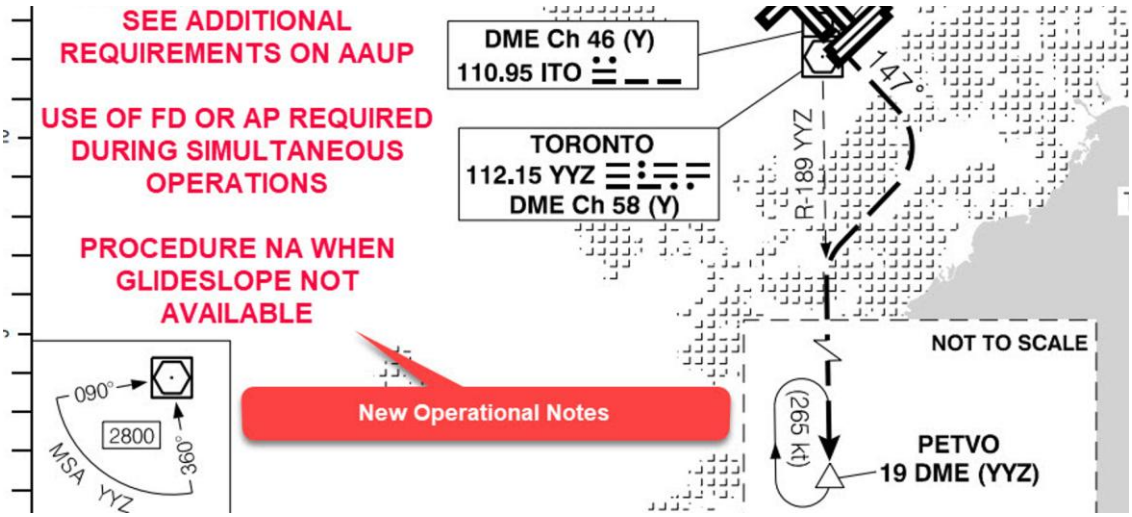

Figure 3: Example of PRM Approach Operational Notes

Pilots will notice that PRM procedures do not include charted elements normally present to support non-vertically guided approach procedures.

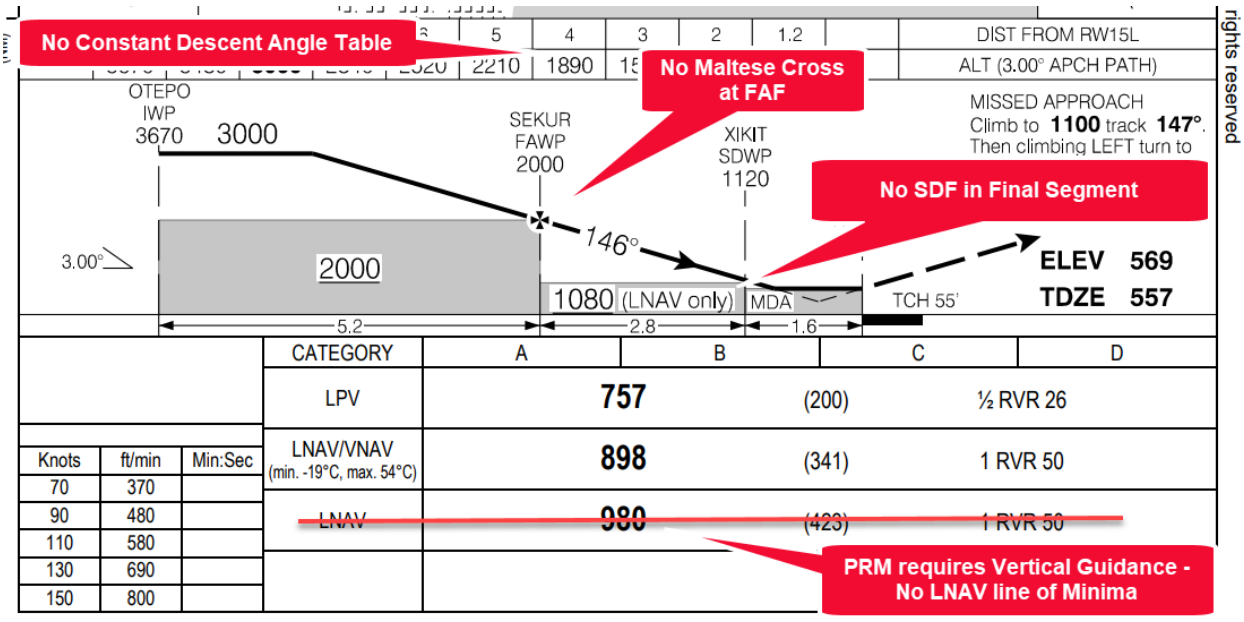

Figure 4: Example of PRM Approach Changes in Procedure Profile View and Landing Minima - RNAV (GNSS).

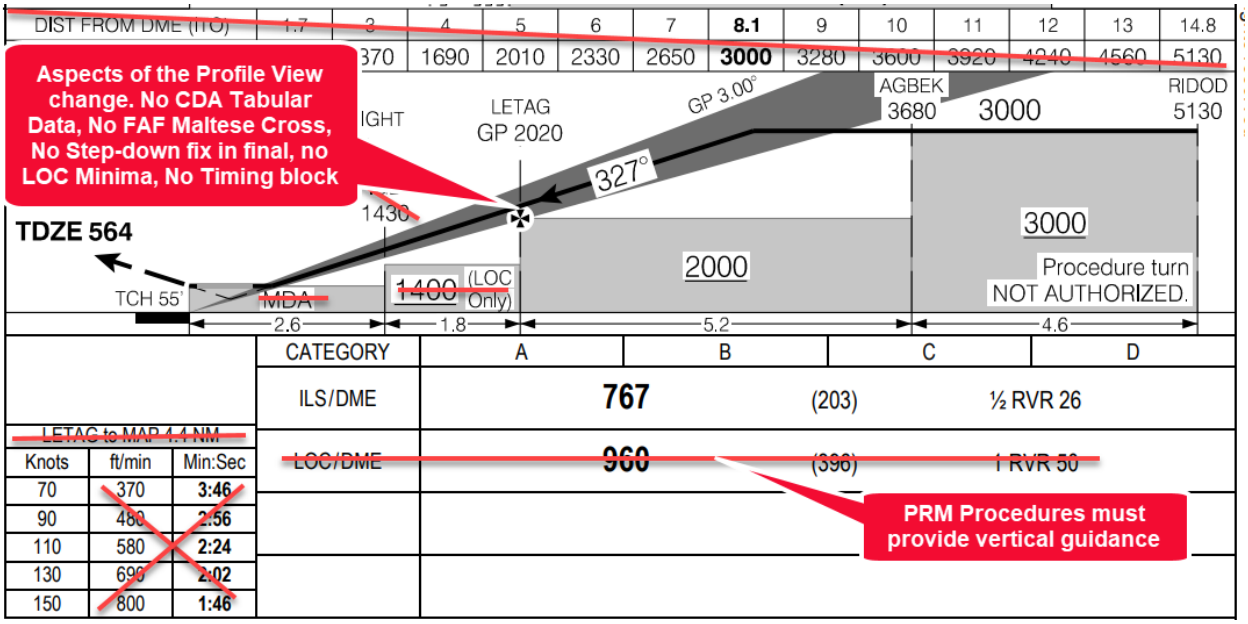

Figure 5: Example of PRM Approach Changes in Procedure Profile View and Landing Minima - ILS.

6.0 Breakout procedure

To avoid another deviating aircraft in unsafe proximity, ATC may issue avoiding action in the form of a "TRAFFIC ALERT".

Hand-fly the breakout manoeuvre immediately.

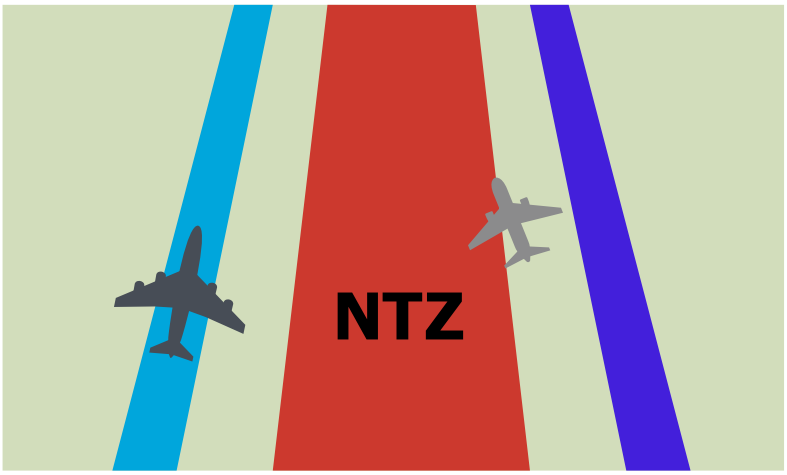

Figure 6: The deviating aircraft may force the non-deviating aircraft to conduct a breakout manoeuvre

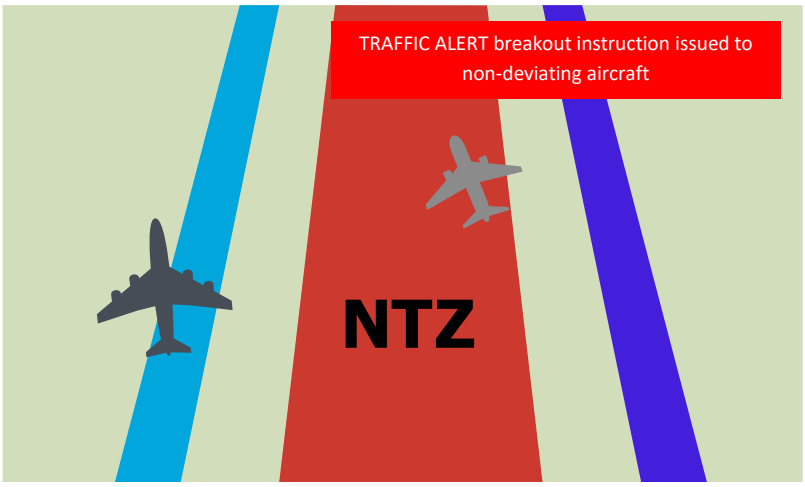

Figure 7: Non-deviating aircraft is issued TRAFFIC ALERT breakout instruction

A breakout is an entirely different procedure to a missed approach procedure. Pilots issued with "breakout" instructions are in a situation of minimal lateral separation with another aircraft with little or no advance warning of impending breakout. Time is critical. To obtain the quickest response, all "breakout" procedures must be hand flown. Pilots will be given instructions to breakout that will not conform to the published go around. Pilots will be instructed to turn immediately, climb or descend to headings and altitudes that maintain traffic separation and terrain clearance. In unusual circumstances, descending break out instructions may be given but this clearance will not be to an altitude below the minimum vectoring altitude (MVA).

7.0 Deviation alerts & TCAS

PRM may provide advice of deviations off centreline towards the other approach and an instruction to return to the cleared approach. This must be acknowledged as soon as practicable.

TCAS should be maintained in RA mode. In the case of a simultaneous break out and RA, and the ATC climb/descend instruction differs from the RA, pilots must follow the RA while continuing to follow the controller's immediate heading instruction. Report this deviation to ATC as soon as practical.

Figure 8: If, during a "breakout," TCAS issues a climb or descend Resolution Advisory (RA) opposite to the controller's instruction, follow the TCAS RA while executing the turn portion of controller's instruction.

8.0 Review questions

(1) How are pilots made aware of PRM operations?

- ATIS or ATC will advise operators to expect a PRM approach.

(2) What instrument approach chart cues indicate the approach is approved for PRM operations?

- The presence of a 'PRM' suffix in the approach name, a 'PRM' COMM frequency is provided, and PRM specific operational notes are charted on the procedure.

(3) What is COM 2 used for during PRM operations and when?

- COM 2 is designated as the radio tuned to the PRM monitor frequency.

(4) When conducting closely spaced PRM approaches, is the secondary COM 2 monitor frequency ever used by the pilot to transmit to ATC?

- No – the PRM Frequency is never used by the pilot to transmit to ATC.

(5) What document contains additional approach briefing information for PRM?

- The Attention All Users Page (AAUP).

(6) How may pilots fly a PRM procedure?

- Using the Autopilot or Flight Director, but a "breakout" must be hand flown.

(7) Can the autopilot remain engaged in response to a breakout instruction?

- No, all breakout procedures must be hand-flown.

(8) Can a breakout be given to an aircraft that is not deviating from final?

- Yes, it may be the non-blundering aircraft that is required to manoeuvre.

(9) What TCAS mode should be used when cleared for the approach?

- TCAS should be selected/maintained in RA Mode.

(10) At an airport where the PRM runway ILS glideslope is reported out of service, can you still conduct a PRM approach?

- Yes, if approved to conduct an RNAV (GNSS) PRM approach to LNAV/VNAV or LPV minimums to that runway.

(11) Why is briefing a climbing and descending "breakout" procedure for your aircraft required before conducting a PRM approach?

- Proximity of the runways and other aircraft make it essential that a "breakout" be promptly and properly executed.
- A "breakout" is a rare event and pilots are not often required to execute one.
- A "breakout" is an unexpected ATC clearance requiring immediate action. Pilots should know ahead of time how to react if directed.

(12) When should pilots unable to participate in PRM operations advise ATC?

- Advise ATC facility as soon as practical, but at least 100 miles from destination.