Exceptional Pilot Performance Programme

Airline Pilot Performance
Authored by: Ben Watts

Welcome!

There's two types of pilots; those that are happy to stay average and those that continually strive for excellence.

The fact that you've enrolled on this course, tells me that you belong in the second category, and that's awesome!

It doesn't matter if you're still in flight school, currently doing a Type Rating or are already an experienced airline pilot, this course will arm you with the techniques and strategies that will enable you to optimize and maximise your performance.

Although this course is based around the Boeing 737, zero technical knowledge of the 737 is required to make the most of the course.

Any technical knowledge necessary for each exercise is provided in this workbook. Information such as checklists, system diagrams, notams and weather will be included when the exercise requires knowledge of those areas. However, specific 737 knowledge is kept to a minimum and this course is applicable no matter what aircraft you fly.

To make the most of the course, I recommend that you spend a few minutes reviewing the information for each exercise before the live lesson, this will arm you with the knowledge necessary to inform decisions and formulate plans as we get to them.

I've also created blank spaces within this workbook to enable you to take notes – this will provide you with a valuable revision tool once the course has been completed.

This course is based around the 9 internationally agreed pilot core competencies:

- Application of Procedures
- Knowledge,
- Flight Path Manual
- Flight Path Automation
- Communication
- Leadership and Teamwork
- Decision Making
- Situation Awareness
- Workload Management

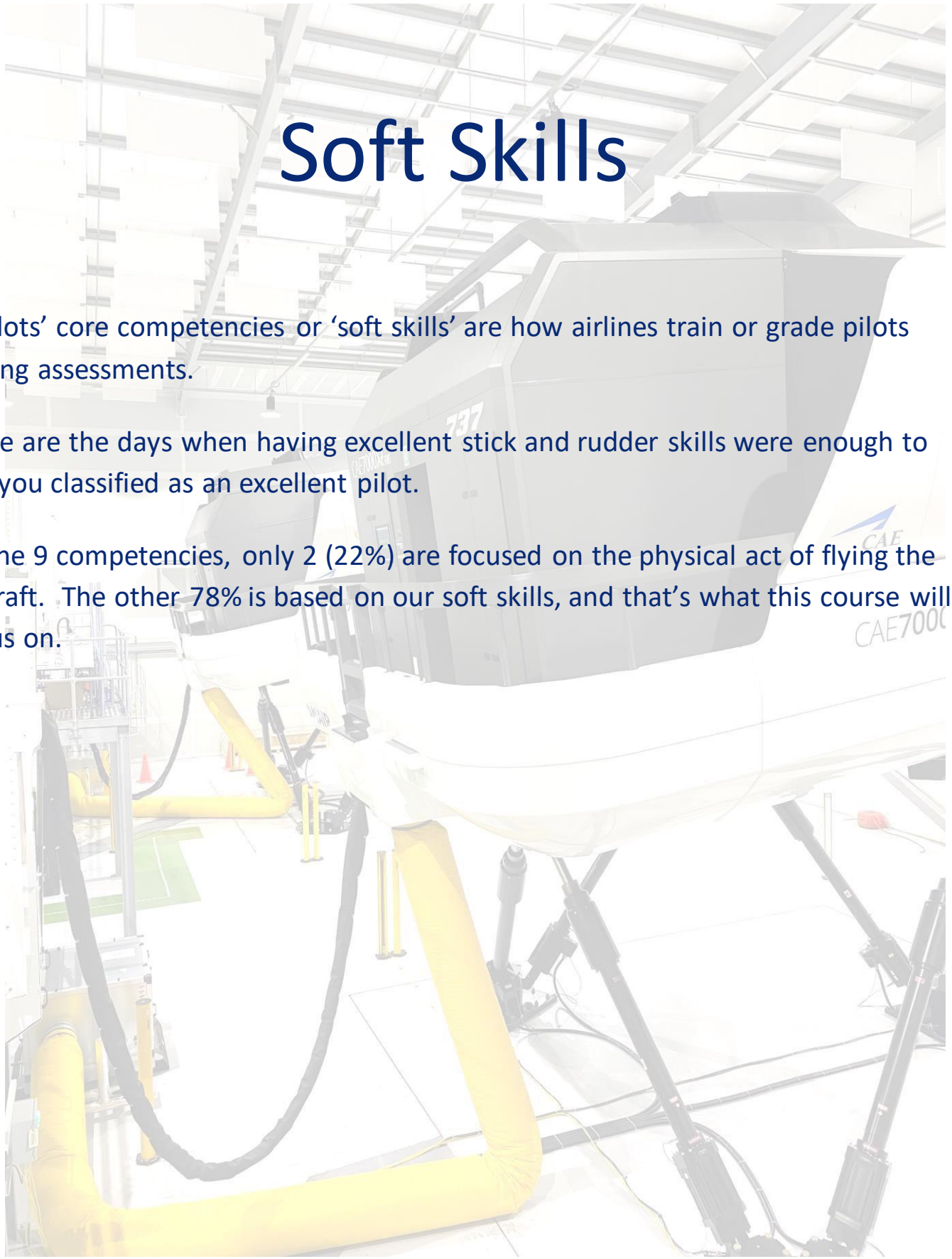
"This is not just a theory course! This course provides you with the PRACTICAL skills and techniques that will enable you to significantly improve your performance"

Soft Skills

A pilots' core competencies or 'soft skills' are how airlines train or grade pilots during assessments.

Gone are the days when having excellent stick and rudder skills were enough to get you classified as an excellent pilot.

Of the 9 competencies, only 2 (22%) are focused on the physical act of flying the aircraft. The other 78% is based on our soft skills, and that's what this course will focus on.



Checklist

- Read through this workbook, so you know exactly what's going on and when.
- Join the private Facebook Group HERE
  The Facebook group is integral to the week and we really encourage you to join us there – it's where we will be hosting the Live Lessons, explaining all the daily content in more detail, posting bonus content and it's also the perfect platform to ask questions and share experiences.
- Check out the week's schedule on the next page so you know when the Facebook Live Lessons are happening.

Tuesday 17th May

Facebook Live at 1900 UK time	**Welcome and first live exercise – How to maximise your performance when dealing with an Engine failure after takeoff scenario, with a focus on Decision Making and Situation Awareness competencies.**

Wednesday 18th May

Facebook Live at 190 UK time	Day 2 – How to manage more unusual scenarios developing our Situation Awareness and Decision Making skills from yesterday with a focus on Leadership, Teamwork and Communication competencies.

Thursday 18th May

Facebook Live at 1900 UK time	Day 3 – How to deal with multiple failure scenarios with a focus on Workload Management while building on our knowledge of the previous competencies

Friday 19th May

Facebook Live at 183(UK time	Bonus Live session! This one's a surprise!

DAY 1

Flight details:

STN-EDI

WX: STN 180/13 3500BR OVC005 +5/+3 1015
EDI 220/10 8000 SCT010 +4/+2 1011
PIK 230/12 7000 OVC 012 +5/+3 1012
MAN 220/10 5000 OVC007 +4/+3 1014

NOTAMS: STN – no applicable notams
EDI – NONE
DUB – NONE
MAN - NONE

Checklists:

Engine Failure or Shutdown ( )

Condition: One of these occurs:
- An engine failure
- An ENG FAIL alert shows
- An engine flameout
- Another checklist directs an engine shutdown.

1 Choose one:

◆**Airframe vibrations with abnormal engine indications** exist:

►►**Go to the ENGINE FIRE ( ) checklist on page 8.2**

■ ■ ■ ■

◆An engine has **separated**:

►►**Go to the ENGINE FIRE ( ) checklist on page 8.2**

■ ■ ■ ■

◆Airframe vibrations with abnormal engine indications do **not** exist **and** an engine has **not** separated:

►►**Go to step 2**

2 Do an engine shutdown only when flight conditions allow.

3 Autothrottle (if engaged) . . . . . .Disengage

4 Thrust lever
(affected engine) . . . . . Confirm . . . . . Close

▼ Continued on next page ▼

▼Engine Failure or Shutdown ( ) continued▼

5 **When** the affected engine is at idle thrust:

Engine start lever
(affected engine) . . . . Confirm . . . . . CUTOFF

6 PACK switch (affected side) . . . . . OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

7 Choose one:

◆APU is **available** for start:

APU . . . . . START

When APU is running:

APU GEN switch
(affected side) . . . . . ON

►►**Go to step 8**

◆APU is **not** available:

►►**Go to step 8**

8 With no fuel in the center tank, fuel quantity on the operative engine side should be less than the quantity on the failed side. If not, suspect a fuel leak. Do **not** balance fuel.

Fuel . . . . . Balance

▼ Continued on next page ▼

▼Engine Failure or Shutdown ( ) continued▼

YF501 - YW164

9 Transponder mode selector . . . . . TA

This prevents climb commands which can exceed single engine performance capability.

YA573

10 Transponder mode selector . . . . . TA ONLY

This step prevents climb commands which can exceed reduced thrust performance capability.

11 ISOLATION VALVE switch. . . . . Verify AUTO

This ensures bleed air is available to both wings if wing anti-ice is needed.

12 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

13 Choose one:

◆A restart will be **attempted**:

►►Go to the Engine In-Flight Start checklist on page 7.24

■ ■ ■ ■

◆A restart will **not** be attempted:

►►Go to step 14

14 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►►Go to the One Engine Inoperative Landing ( ) checklist on page 7.32

■ ■ ■ ■

Engine In-Flight Start

Condition: An engine start is needed and all of the following are true:
- There was **no** engine fire
- There is N1 rotation
- There is **no** abnormal airframe vibration.

Note: Oil quantity indication as low as zero is normal if windmilling N2 RPM is below approximately 8%.

1 Do this checklist **only** after completion of the Engine Failure or Shutdown checklist or as directed by the Engine Limit or Surge or Stall checklist or by the Loss of Thrust on Both Engines checklist.

2 Check the In-Flight Start Envelope. X-BLD or XB indication may not match the envelope. Starts are not assured outside of the In-flight Start Envelope.

Note: If the N2 is less than 8%, ENGINE START switch must be in CONT to display the EGT.

Note: For engines shut down one hour or more, or if EGT is less than 30°C, attempt a restart:
- At an altitude at or below 20,000 feet
- With airspeed at or above 220 knots
- Using a crossbleed start.

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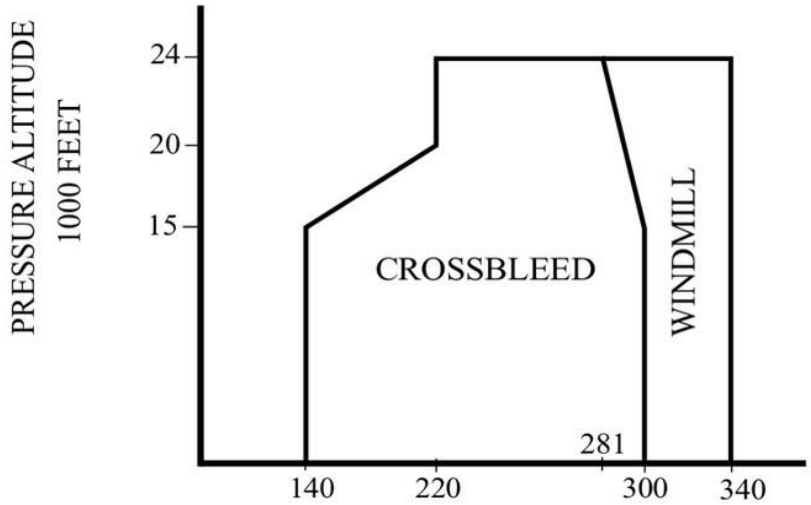
▼Engine In-Flight Start continued▼

IN-FLIGHT START ENVELOPE



3 Thrust lever
(affected engine) . . . . . Confirm . . . . . Close

4 Engine start lever
(affected engine) . . . . . Confirm . . . . . CUTOFF

5 Engines can accelerate to idle very slowly, especially at high altitudes or in heavy precipitation. If N2 is steadily increasing and EGT stays within limits, do not interrupt the start.

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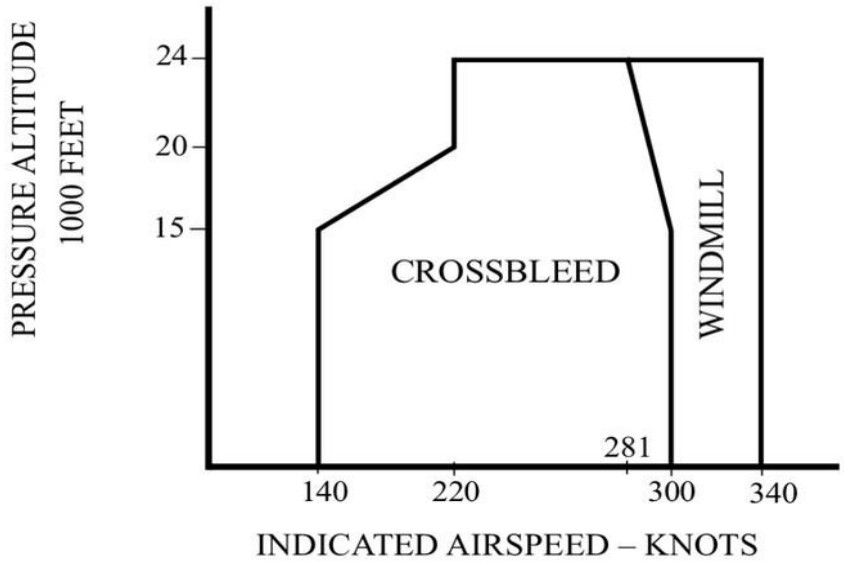
▼Engine In-Flight Start continued▼

IN-FLIGHT START ENVELOPE



3 Thrust lever
(affected engine) . . . . . Confirm . . . . . Close

4 Engine start lever
(affected engine) . . . . . Confirm . . . . . CUTOFF

5 Engines can accelerate to idle very slowly, especially at high altitudes or in heavy precipitation. If N2 is steadily increasing and EGT stays within limits, do not interrupt the start.

▼ Continued on next page ▼

▼Engine In-Flight Start continued▼

8 Choose one:

- EGT **increases** within 30 seconds **and** a normal start occurs:

  ►►Go to step 10

- EGT does **not** increase within 30 seconds **or** another abort start condition as listed in the Normal Procedures occurs:

  Engine start lever
  (affected engine) . . . Confirm . . . CUTOFF

  ENGINE START switch
  (affected engine) . . . . . OFF

  Note: If the engine has been shutdown for more than one hour, multiple start attempts can be needed.

  ►►Go to step 9

9 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►►Go to the One Engine Inoperative Landing ( ) checklist on page 7.32

■ ■ ■ ■

10 Engine GEN switch (affected side) . . . . . ON

11 PACK switch (affected side) . . . . . AUTO

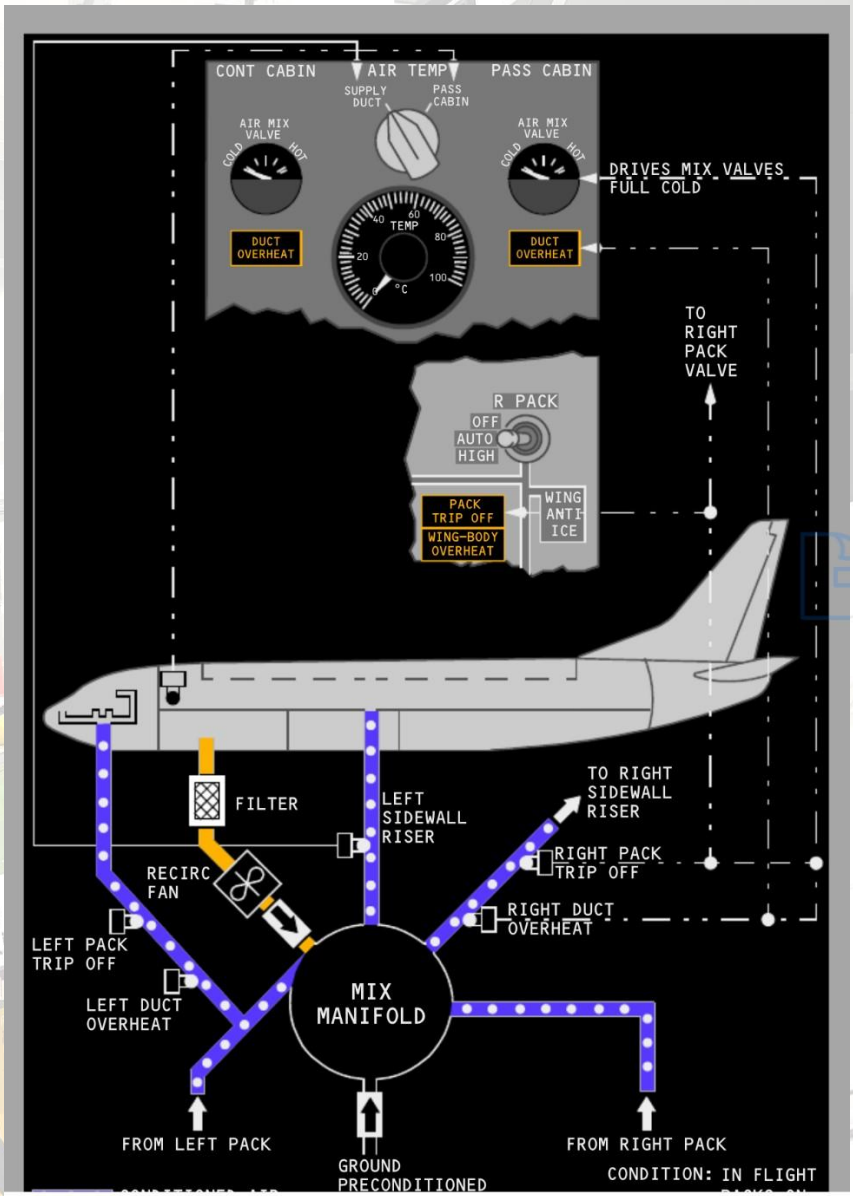
12 ENGINE START switch . . . . . As needed

13 APU . . . . . As needed

14 Transponder mode selector . . . . . TA/RA

■ ■ ■ ■

Air Conditioning Schematic



Day 2

Flight Details:

STN-BFS

WX - STN 180/13 0150FG VVIII +5/+3 1015
BFS 220/10 8000 SCT010 +4/+2 1011
DUB 230/12 7000 OVC009 +5/+3 1012
MAN 210/10 4000BR OVC007 +4/+3 1014

NOTAMS – STN: NONE
BFS: RWY17/35 CLOSED DUE WIP
DUB: NONE
MAN: NONE

FUEL – FPL FUEL = 5217 KGS
DEP FUEL ON BOARD = 5500 KGS

ENGINE LOW OIL PRESSURE

LOW OIL PRESSURE

May or may not be shown

Condition: The engine oil pressure is low.

1 Choose one:

- Engine oil pressure is in the **amber band** with **takeoff thrust** set:

  Do **not** takeoff.

  ■ ■ ■ ■

- Engine oil pressure is **at or below** the **redline**:

  ►►Go to the Engine Failure or Shutdown ( ) checklist on page 7.16

  ■ ■ ■ ■

737
CAE

ENGINE FIRE ( )
or
Engine Severe Damage
or Separation ( )

Condition: One or more of these occur:
- Engine fire warning
- Airframe vibrations with abnormal engine indications
- Engine separation.

1 Autothrottle (if engaged) . . . . . .Disengage

2 Thrust lever
(affected engine) . . . . . Confirm . . . . . Close

3 Engine start lever
(affected engine) . . . . . Confirm . . . . . CUTOFF

4 Engine fire switch
(affected engine) . . . . . Confirm . . . . . Pull

To manually unlock the engine fire switch, press the override and pull.

5 **If** the engine fire switch or ENG OVERHEAT light is illuminated:

Engine fire switch . . . . . Rotate to the stop and hold for 1 second

If after 30 seconds the engine fire switch or ENG OVERHEAT light stays illuminated:

Engine fire switch. . . . . .Rotate to the other stop and hold for 1 second

Day 3

SEN-EDI

WX - SEN: 290/4 2500BR OVC005 +10/+10 993

EDI: 310/7 6000 B012 +8/+5 1001 (Also nominated as T/O ALTN)

PIK: 320/8 7000 B015 +7/+6 1002

STN: 280/5 3000BR OVC0800 +10/+9 993

NOTAMS – NO APPLICABLE NOTAMS

FUEL – FPL FUEL= 4805
DEP FUEL = 5100

Checklists and data

8.2

BOEING

737 Flight Crew Operations Manual

ENGINE FIRE ( )
or
Engine Severe Damage
or Separation ( )

Condition: One or more of these occur:
- Engine fire warning
- Airframe vibrations with abnormal engine indications
- Engine separation.

1 Autothrottle (if engaged) . . . . . .Disengage

2 Thrust lever
(affected engine) . . . . . Confirm . . . . . Close

3 Engine start lever
(affected engine) . . . . . Confirm . . . . . CUTOFF

4 Engine fire switch
(affected engine) . . . . . Confirm . . . . . Pull

To manually unlock the engine fire switch, press the override and pull.

5 **If** the engine fire switch or ENG OVERHEAT light is illuminated:

Engine fire switch . . . . . Rotate to the stop and hold for 1 second

If after 30 seconds the engine fire switch or ENG OVERHEAT light stays illuminated:

Engine fire switch. . . . . .Rotate to the other stop and hold for 1 second

LOSS OF SYSTEM B ( )

FLT CONTROL	B HYD PUMPS	
B	ELEC 1	ENG 2
LOW PRESSURE	LOW PRESSURE	LOW PRESSURE

Condition: Hydraulic system B pressure is low.

1 System B
FLT CONTROL switch . . . . Confirm . . . .STBY RUD

2 System B
HYD PUMP switches (both). . . . . OFF

3 Plan a flaps 15 landing.

4 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti–ice will be used during landing
- Wing anti–ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

5 Plan to extend flaps to 15 using alternate flap extension.

Note: The drag penalty with the leading edge devices extended may make it impossible to reach an alternate field.

▼ Continued on next page ▼

▼LOSS OF SYSTEM B ( ) continued▼

6 Check the Non–Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

7 Do **not** arm the autobrake for landing. Use manual braking.

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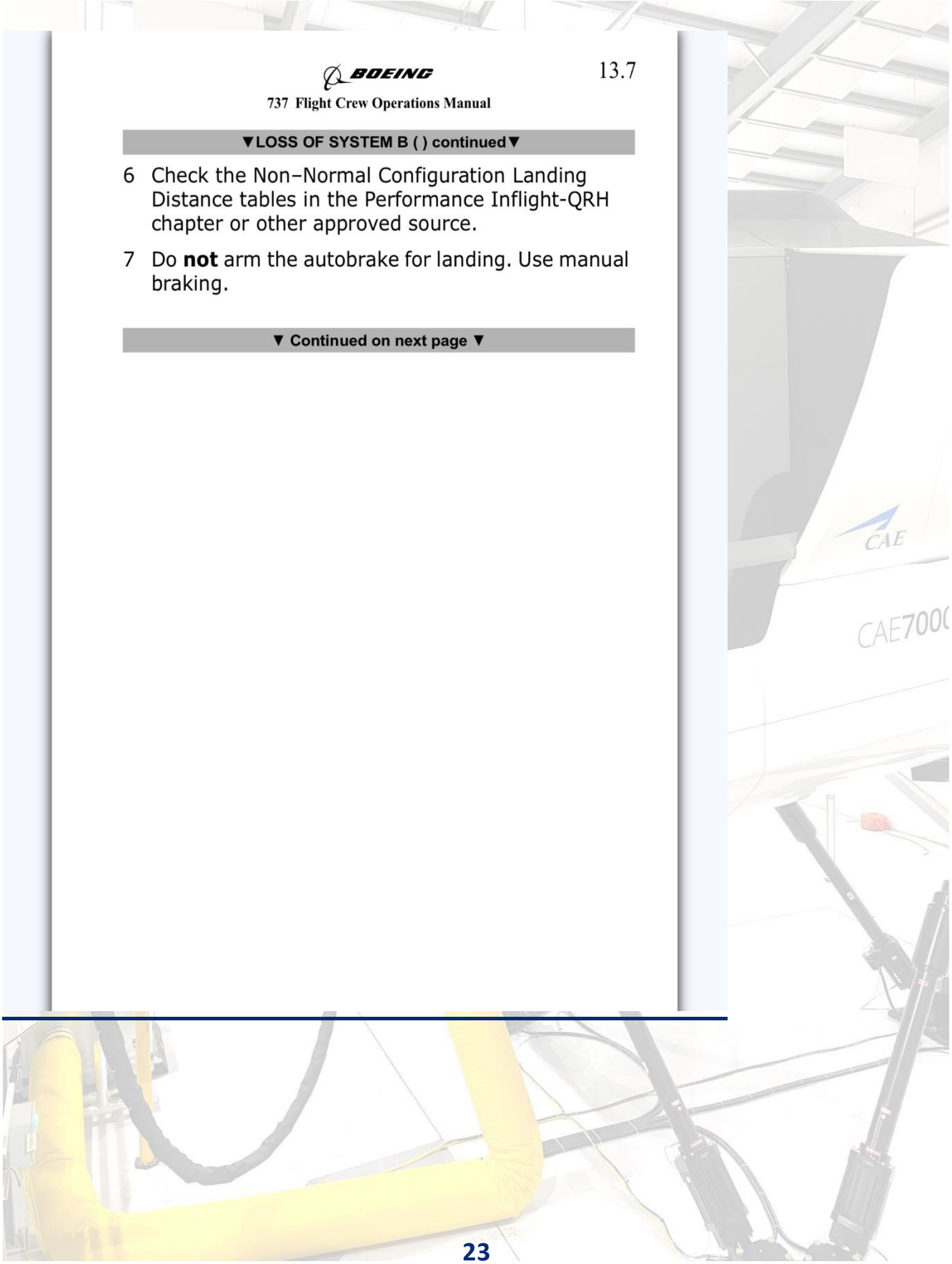

▼LOSS OF SYSTEM B ( ) continued▼

Note: Inoperative Items

Autopilot B inop
Autopilot A is available.

Flight spoilers (two on each wing) inop
Roll rate and speedbrake effectiveness may be reduced in flight.

Yaw damper inop

Trailing edge flaps normal hydraulic system inop
The trailing edge flaps can be operated with the alternate electrical system. Alternate flap extension time to flaps 15 is approximately 2 minutes.

Leading edge flaps and slats normal hydraulic system inop
The leading edge flaps and slats can be extended with standby pressure. Once extended, they can not be retracted.

Autobrake inop
Use manual braking.

Normal brakes inop
Alternate brakes are available.

Engine 2 thrust reverser normal hydraulic pressure inop
Thrust reverser will deploy and retract at a slower rate and some thrust asymmetry can be anticipated during thrust reverser deployment.

Alternate nose wheel steering inop
Normal nose wheel steering is available.

8 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼LOSS OF SYSTEM B ( ) continued▼

Deferred Items

Descent Checklist

Pressurization. . . . . LAND ALT ___

Anti-ice . . . . . ___

Approach brief & fuel. . . . . Discussed

IAS & ALT bugs **. . . . . VREF 15 or VREF ICE ___, Minimums ___**

Approach Checklist

Altimeter & instruments. . . . . Set & X-checked

Approach aids. . . . . Checked & set

▼ Continued on next page ▼

▼LOSS OF SYSTEM B ( ) continued▼

Alternate Flap Extension

During flap extension, set the flap lever to the desired flap position.

230K maximum during alternate flap extension.

ALTERNATE FLAPS master switch . . . . . ARM

Note: The landing gear configuration warning may sound if the flaps are between 10 and 15 and the landing gear are retracted.

YW098 - YW164

Note: The amber LE FLAPS TRANSIT light stays illuminated until the flaps approach the flaps 15 position.

YA573 - YW097

Note: The amber LE FLAPS TRANSIT light stays illuminated until the flaps approach the flaps 10 position.

Note: Operation within the lower amber airspeed band may be needed until the LE FLAPS TRANSIT light extinguishes.

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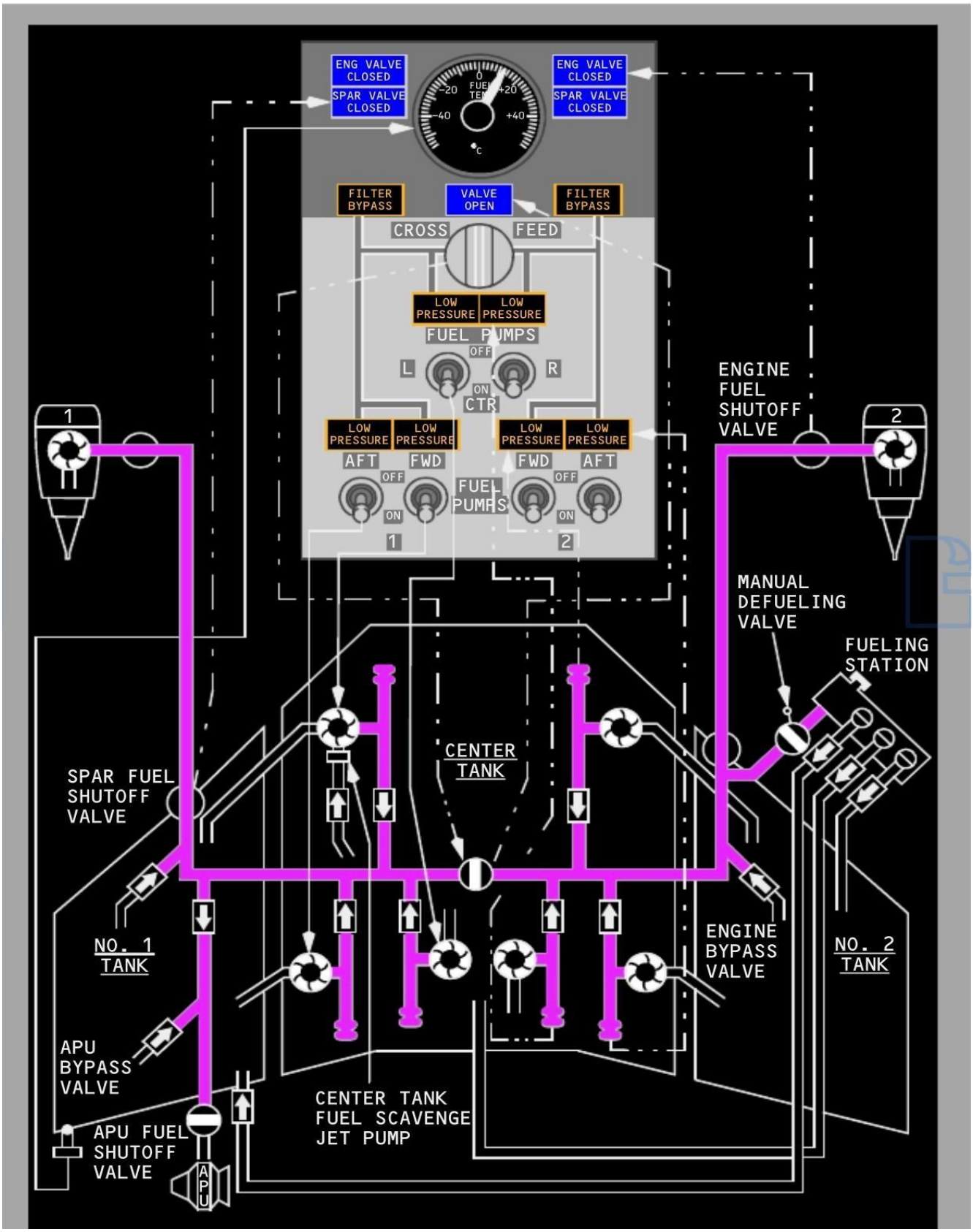
Fuel Schematic



Hydraulic fluid used for cooling and lubrication of the pumps passes through a heat exchanger before returning to the reservoir. The heat exchanger for system A is located in main fuel tank No. 1 and for system B is in main fuel tank No. 2.

CAUTION: Minimum fuel for ground operation of electric motor-driven pumps is 760 Kgs in the related main tank.

Pressure switches, located in the engine–driven and electric motor–driven pump output lines, send signals to illuminate the related LOW PRESSURE light if pump output pressure is low. A check valve, located in each output line, isolates the related pump from the system. The related system pressure transmitter sends the combined pressure of the engine–driven and electric motor–driven pump to the related hydraulic system pressure indication.

System A Hydraulic Leak

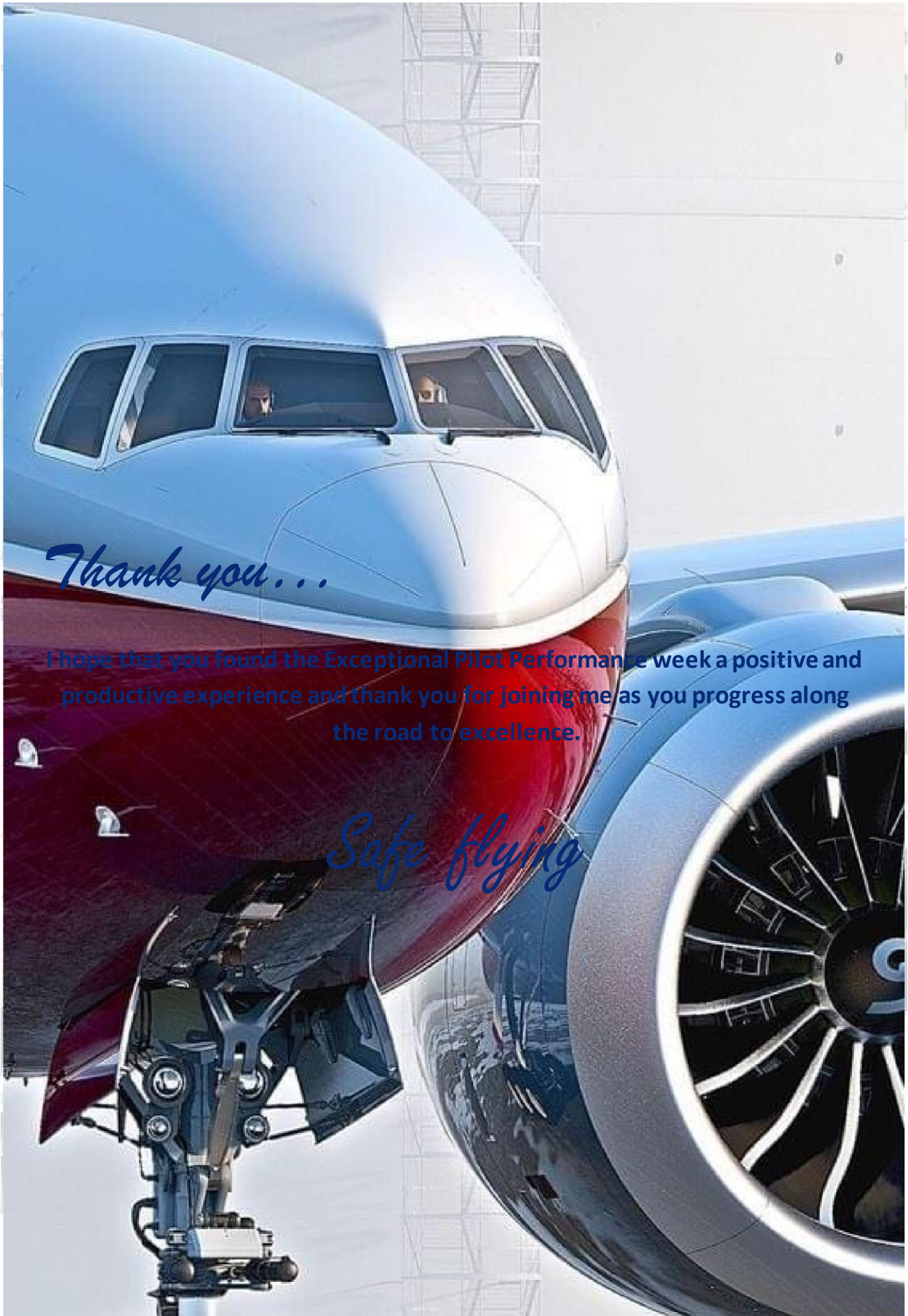
If a leak develops in the engine–driven pump or its related lines, a standpipe in the reservoir prevents a total system fluid loss. With fluid level at the top of the standpipe, the reservoir quantity displayed indicates approximately 20% full. System A hydraulic pressure is maintained by the electric motor–driven pump.

If a leak develops in the electric motor–driven pump or its related lines, or components common to both the engine and electric motor–driven pumps, the quantity in the reservoir steadily decreases to zero and all system pressure is lost.

System B Hydraulic Leak

If a leak develops in either pump, line or component of system B, the quantity decreases until it indicates approximately zero and system B pressure is lost. The system B reservoir has one standpipe which supplies fluid to both the engine–driven pump and the electric motor–driven pump. However, with fluid level at the top of the standpipe, fluid remaining in the system B reservoir is sufficient for power transfer unit operation.

A leak in system B does not affect the operation of the standby hydraulic system.



Thank you . . .

I hope that you found the Exceptional Pilot Performance week a positive and productive experience and thank you for joining me as you progress along the road to excellence.

Safe flying

Notes Notes