Challenge Airlines IL

“It’s not easy being green.”

—Kermit the Frog

Risk Management for Sustainability

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The Aircraft took off from runway 12 instead of runway 30

Line training flight.

The Copilot was the pilot flying (PF).

It was her first flight to xxxx.

Single engine taxi with the second engine start during the taxi.

Intersection and rolling takeoff.

The responsibility for engine start and air traffic communications was the Commander’s, whereas the Copilot was responsible for taxiing the Aircraft.


B14 intersection
Take-off roll

TIMELINE

- During the pushback #1 engine was started.
- *1220:22 – Taxi Clearance*
- *1221:43 – #2 engine start completed.*
- *1224:35 – takeoff clearance*

Entire taxi time was 4 minutes

1 minute and 21 seconds of Engine-Out-Taxi

CONCLUSIONS

From the operator's OM-A:

"One engine taxi is authorised except in some operational conditions, such as uphill slope, slippery taxiways, or high gross weight.

The flight crew must exercise caution when taxiing on one engine to avoid generating excessive jet blast.

Some countries may also impose additional restrictions to single engine taxi."

- As per the Commander's statement, ***he was busy*** […] did not realize that the Aircraft had turned right onto runway 12 instead of runway 30.
- the Investigation believes that the Commander's decision to carry out a single-engine taxi followed by the second engine start during taxi could have potentially put the flight crewmembers under ***extra workload***.
- Therefore, the Investigation recommends that the Operator improve its single-engine policy that takes into consideration ***taxi time*** to the runway holding point and the ***cockpit crew gradient.***
- The Operator is recommended to carry out ***risk assessment*** for single engine taxi considering the estimated taxi time, and operation environmental conditions to determine mitigation measures accordingly.

WHAT DOES EOT DO?

- Increased workload
- Adds operational complexity
- Reduces monitoring capability

I WANT TO DISCUSS TODAY

- Examine common fuel-saving practices
- Risks, direct and indirect
- Mitigation options
- Culture

ENGINE-OUT TAXI

Benefits

- Saves fuel
- Reduces noise
- Saves engine run time
- Reduces brake wear
- Saves time from pushback to start of taxi
- Saves time from on-block to ground equipment connections (turboprop)

ENGINE-OUT TAXI: RISKS

What I found online…

- Excessive jet blast to achieve wheel un-stick
- Accidental single-engine take-off (unlikely)
- Creation of adverse thermal cycles in engine components
- Failure to develop standard operating procedures (SOP) and checklists to avoid cancelled take-offs and/or malfunctions
- Increased corrosion on aircraft components on the side of the non-running engine/propeller due to absence of propeller propwash as a result of single-engine taxi (inadequate performance of vent systems).
- Strong asymmetric force generated by greater jet blast from single engine could lead to unbalancing the aircraft.
- Shutdown of key plane functions when turning engines on and off.

What about…

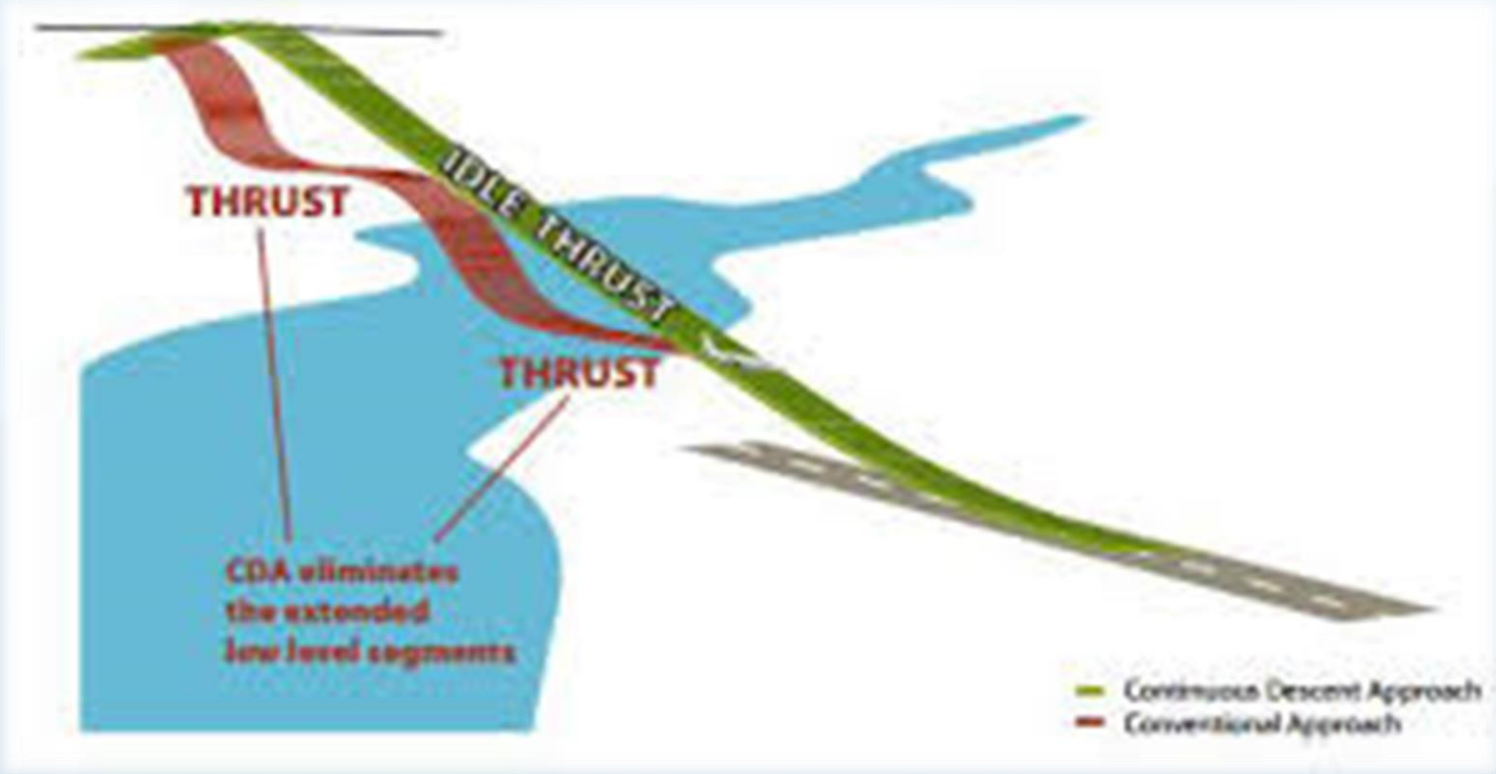
- Increased workload.
- Heads-down activity.
- Controllability issues on slippery taxiways.
- Distraction in case of start malfunction.
- Effect of failed systems (MEL or inflight).
- Fuel Imbalance.

ENGINE-OUT TAXI: MITIGATIONS

- Make it optional
- Guidelines
  - When (straight taxiway), not during runway crossing…
  - Who (PF/M or CA/FO?)
  - When not to (too heavy, slippery, system degradation, fatigue, workload, training)
- Training
  - Knowledge (Limitations, effect on systems especially steering & braking)
  - LOFT sessions
  - Line Training
- Make it optional

CONSTANT DESCENT APPROACH

- Benefits
  - Saves fuel
  - Saves time
  - Reduces noise emissions



CONSTANT DESCENT APPROACH: RISKS

- Late stabilization
- Rushed approaches
- Unforeseen tailwind or icing
- Over-reliance on VNAV
- And this…

CONSTANT DESCENT APPROACH: MITIGATIONS

- Make it optional
- Consider stabilization gates, GA Decision making
- G/A policy
- Uplink latest descent wind & icing forecasts
- Adjust idle thrust settings
- Training
  - Monitoring descent path and total energy state
  - Recovery from too-high situations
  - Stabilized approach and go-around policy
- Make it optional

REDUCED FLAPS LANDING & TAKEOFF

- Saves fuel and time
- Reduces flap wear
- Improves climb & G/A performance

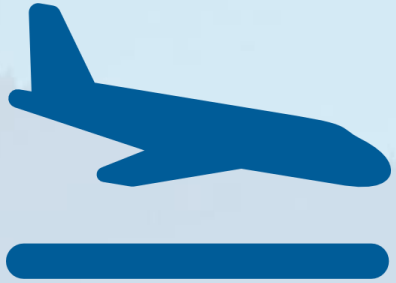
REDUCED FLAP: RISKS

Tailstrike

Higher takeoff speeds induce tire failure

Higher takeoff thrust increases engine wear

Longer time on the runway increases chance for FOD ingestion



Overrun, runway excursion

Increased brake and tire wear

Missing the planned turn-off… following traffic G/A

REDUCED FLAP: MITIGATION

- Make it optional
- Analyze economy of fuel saving vs. engine, break and tire wear.
- SOP for performance calculations
- Training
  - Understand takeoff performance benefits of every flap setting, runway limit vs. climb limit, available margins
  - Tailstrike prevention, rotation and landing technique
- Make it optional

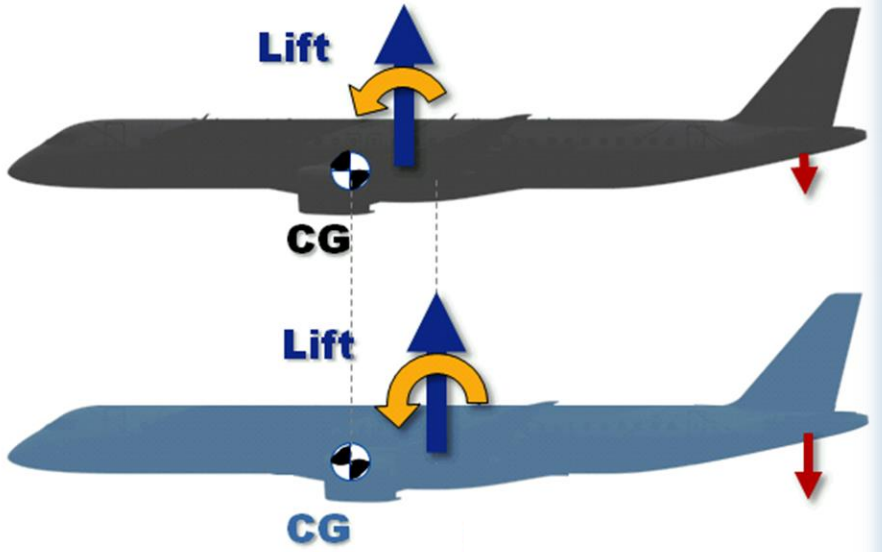
AFT CG LOADING

- Fuel saving by reducing total lift required

Fuel Burn and Weight Savings

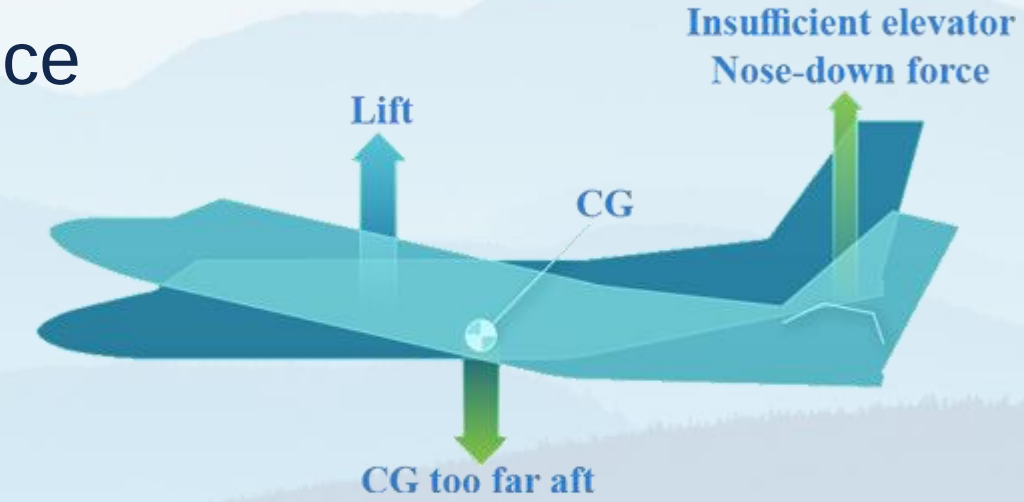
The repositioning of the wing to a more forward position results in a more aft CG position related to the wing

As a consequence the pitch moment that must be counter-balanced by the horizontal stabilizer is reduced



AFT CG LOADING: RISKS

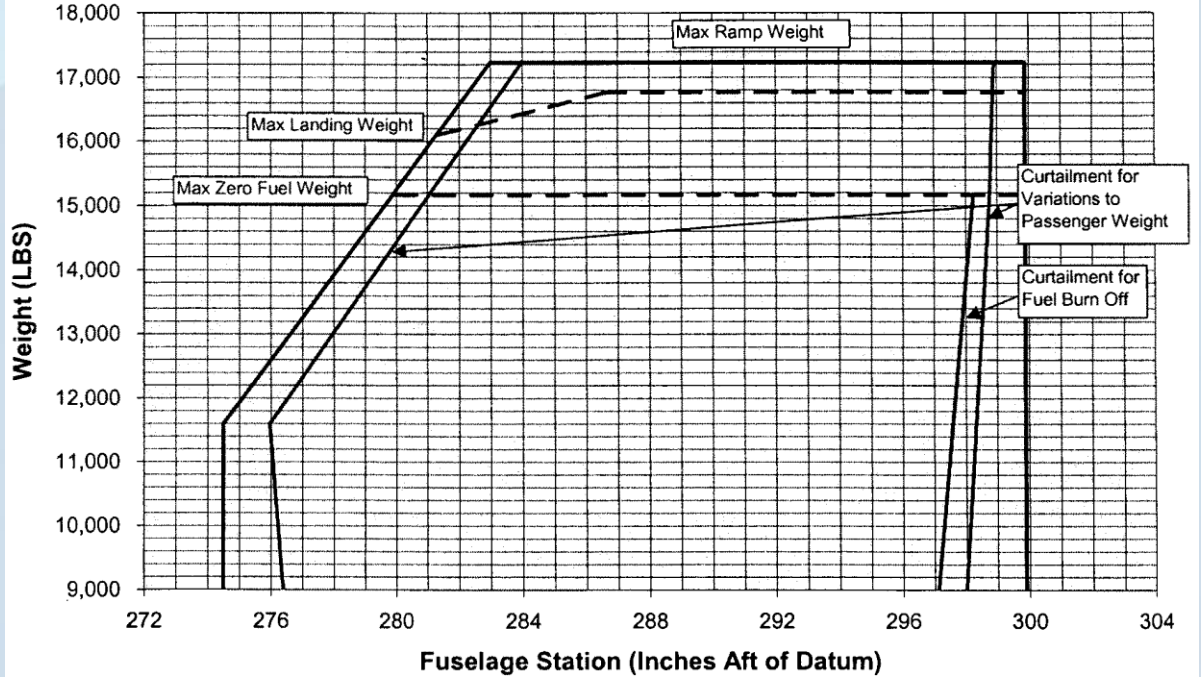
- Degraded stall recovery performance
- Tail tipping
- Tail strike



AFT CG LOADING: MITIGATIONS

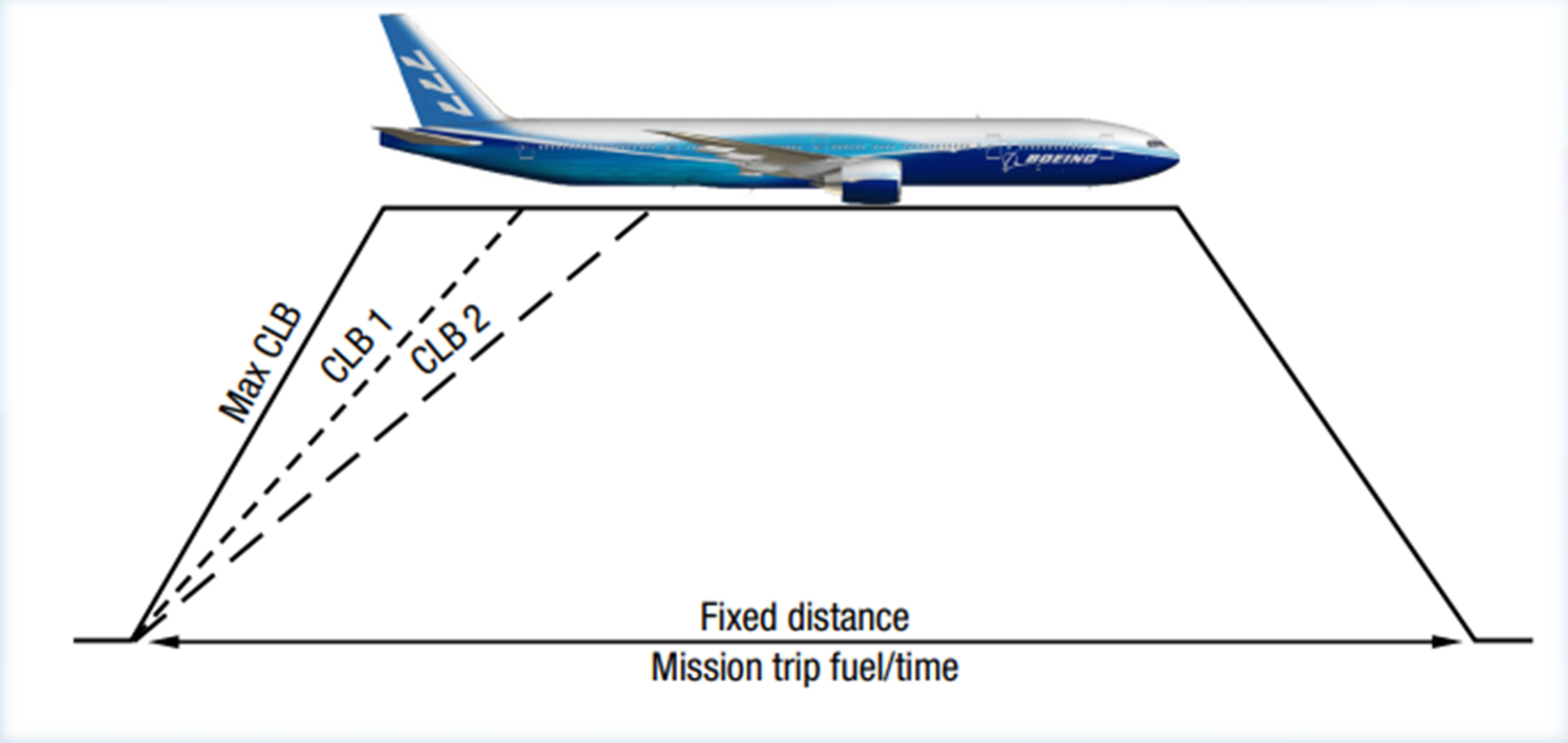
- Make it optional
- Envelope curtailment
- Loading / Boarding procedures
- FBW systems
- Make it optional

FIGURE 3-3. OPERATIONAL LOADING ENVELOPE USING ACTUAL SEATING LOCATION OF PASSENGERS



INCREASED TO & CLB THRUST

- Saves fuel and time
- Less time in weather (icing)

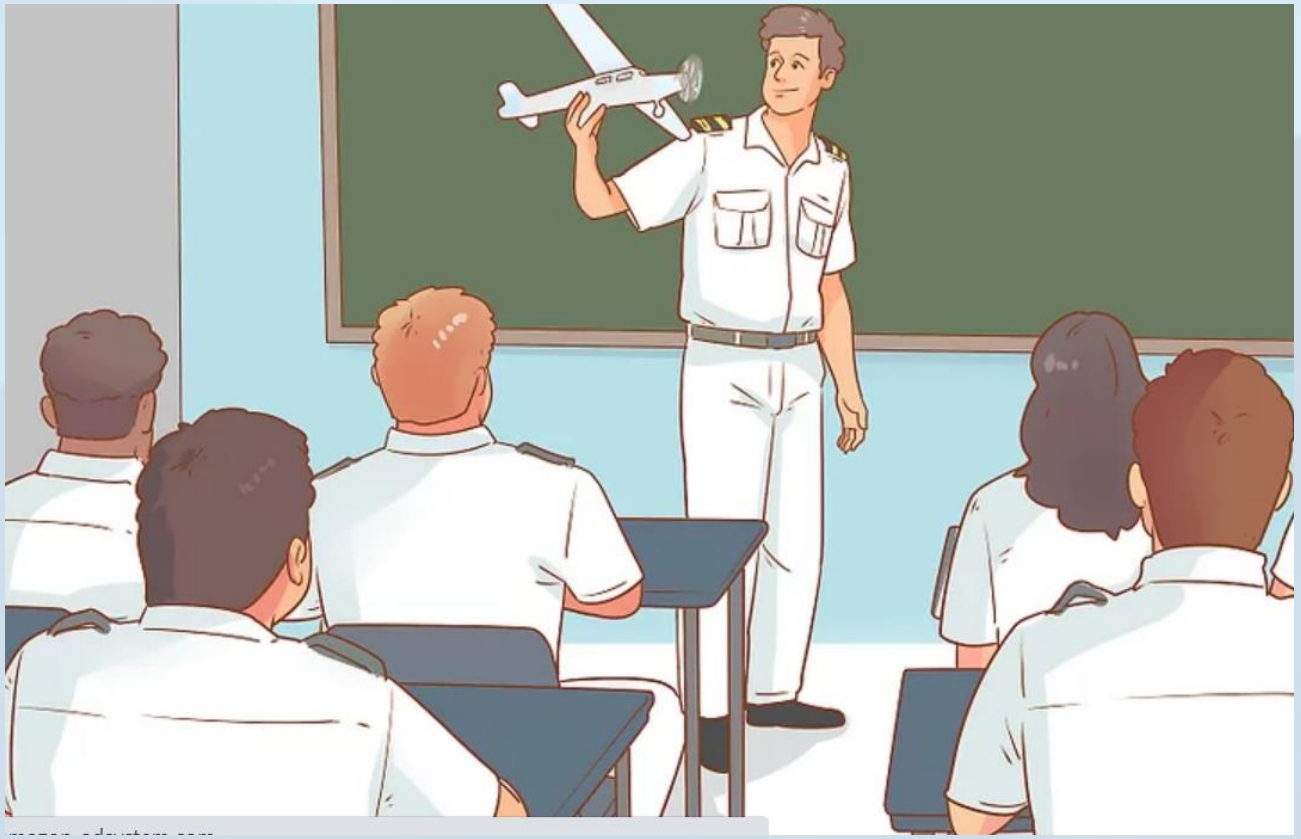


INCREASED TO & CLB THRUST: RISKS

- Engine wear
- Greater asymmetry in case of engine failure
- Contaminated runway Vmcg affected
- Increased FOD damage on the runway

INCREASED TO & CLB THRUST: MITIGATION

- Make it optional
- Training on risks and benefits



USING IDLE REVERSE THRUST

- Saves fuel
- Reduces engine wear
- Prevents FOD damage

USING IDLE REVERSE THRUST: RISKS

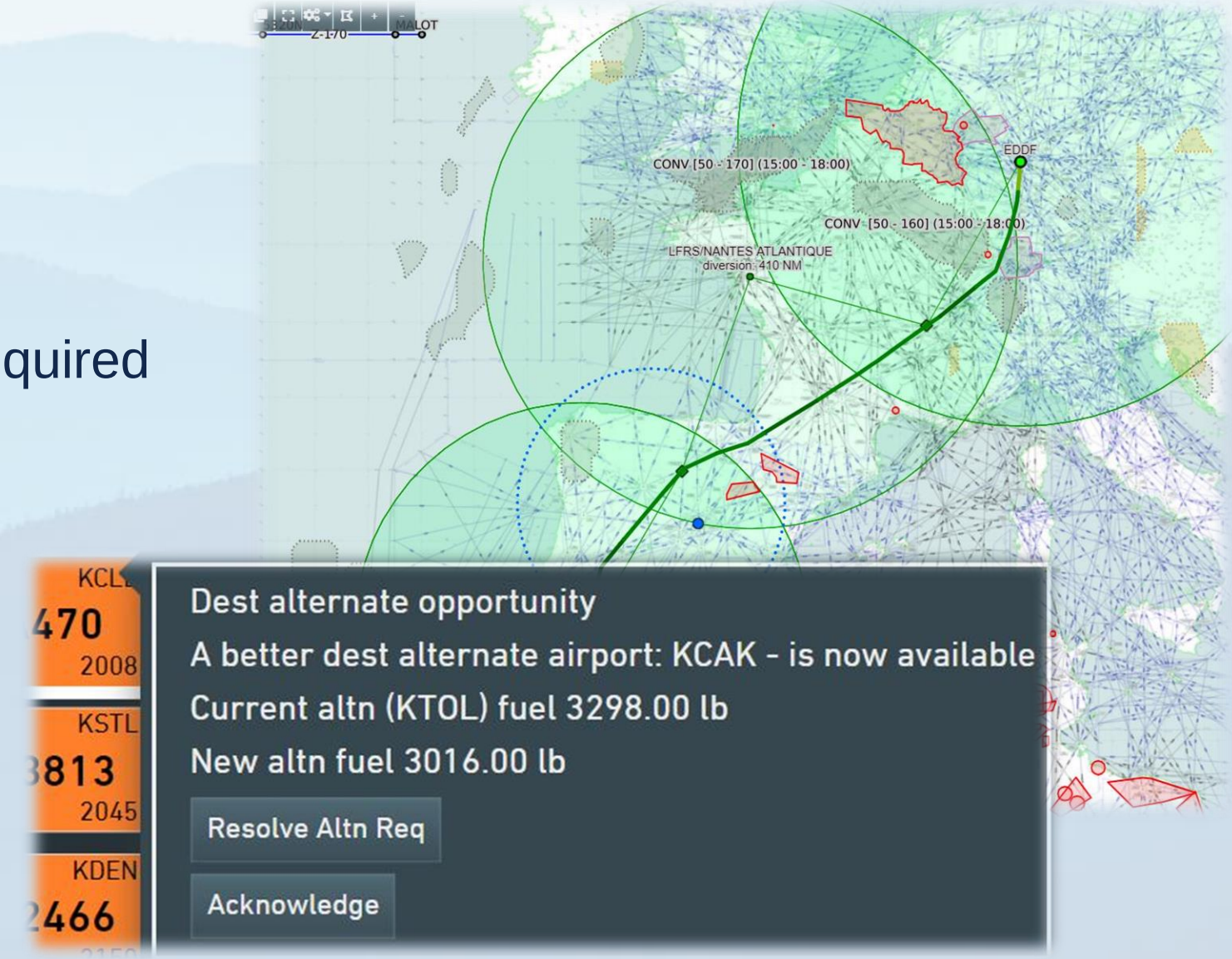
- Overrun / excursion
- Increased brake wear
- Missing the planned turn-off… following traffic G/A

USING IDLE REVERSE THRUST: MITIGATIONS

- Make it optional
- Provide guidance when to use (runway condition, weight, safety margin)
- Training
  - Landing performance calculation and factors
- Make it optional

REDUCED FUEL RESERVES

- Reducing Contingency Fuel
  - 3% ERA
  - RCF
- Reducing Alternate fuel:
  - Dispatch with No Alternate Required
- Reducing trip fuel
  - Statistical fuel
- Reducing commander discretionary fuel

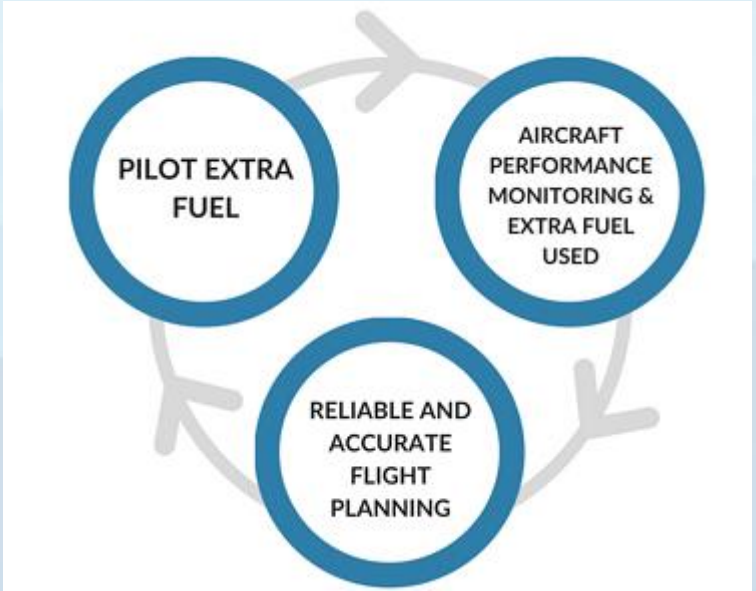


REDUCED FUEL RESERVES: RISKS

- Diversion
- Landing below FRSV
- Workload and stress affecting crew decision making

REDUCED FUEL RESERVES: MITIGATION

- Trust in the OFP
- Trust in the FOO
- Comfort in diversion execution and aftermath
- Data sharing
- Training (LOFT scenarios)

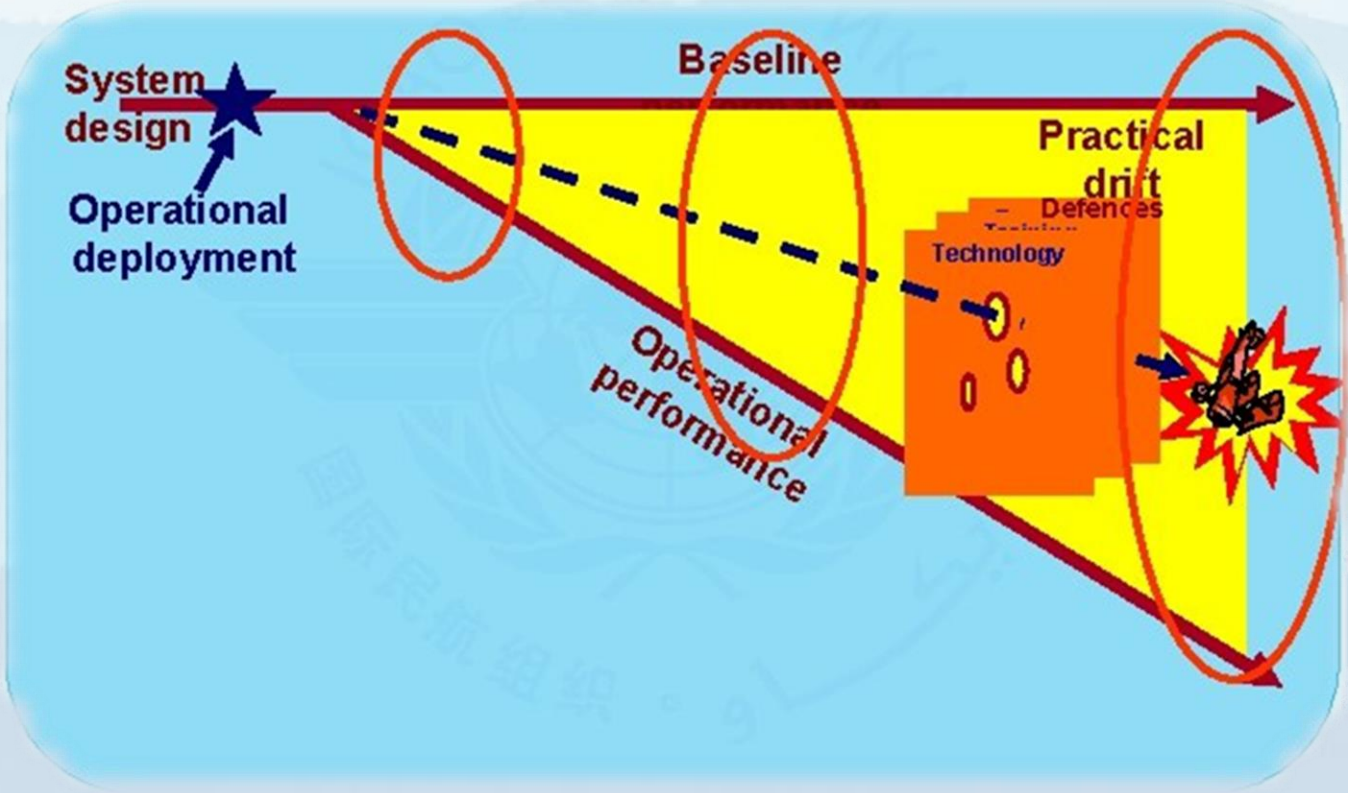


SUMMARY OF RISKS

- Increase of operational complexity
- Reduced safety margins
- Need for more accurate flight path control
- Increased stress, workload

CONDITIONS ARE NEVER OPTIMAL

- Baseline system is designed for practical drift
- Reducing safety margin can be done based on assessment of actual drift
  - By the operator, in procedures and guidelines
  - By the crew, based on knowledge, training and real-time risk management



DESPERATE TIMES CALL FOR WORKING TOGETHER

- Sustainability, in all its meanings, demands constant improvement in efficiency.
- Both operators and pilots must do their part

Operators	Crew
On-Going risk management	Maintain proficiency
Simple procedures, with freedom for crew to make risk-based decisions	Understand risks
Guidelines	Conduct real-time risk management
Training	Adjust fuel-saving measures and increase safety margins when needed
Foster safety-efficient culture	

WHAT IS “SAFETY-EFFICIENT CULTURE”?

What is the job description for a pilot?

WANTED

1 PILOT

Must be a trained navigator, engineer, computer technician, HR manager, communications officer, customer services operator, weather expert… Oh, and must be able to fly a plane!

1 LAWN MOWER

WHAT IS THE JOB DESCRIPTION FOR A PILOT?

“A pilot’s job is to operate the aircraft in the most efficient way, while maintaining an acceptable level of safety”

HOW NOT TO DO IT

“As the airline is going through unprecedented times due to the current crisis, I expect all of you as professionals to make all necessary measures to avoid unnecessary operational costs.

The background of this notice is to highlight that there has been gross deviations by some flight crew from the company’s mandated procedure to carry out SE (taxi in) from the start of the pandemic.

When we started this project a few years ago we had set a target of 95% compliance but it is quite disappointing to see that in the last 3 months we have only achieved an average of 55%.

SOPs are meant to be adhered to and I will not hesitate to take serious action against those who do not follow or deviate from this requirement intentionally without any valid reason.

I have given the instructions to all Fleet Managers that any unjustified non adherence to SE taxi procedures will result in pilots being placed on LOG and called to the fleet office for explanation if not mentioned in post flight report and if the explanation is found to be without valid reasons, a serious action will be taken against offenders including dismissal from the company.”

HOW TO CREATE A SAFETY-EFFICIENCY CULTURE

- Establish clear and simple procedures & guidance
  - Simple and clear
  - Basic guidelines based on risk management done by the operator
  - Leave room for crew to make their own decisions
  - Provide information on risks
- Data collection and sharing
  - Collect data – FDM, reporting
  - Share efficiency data
  - Share global data rather than individual

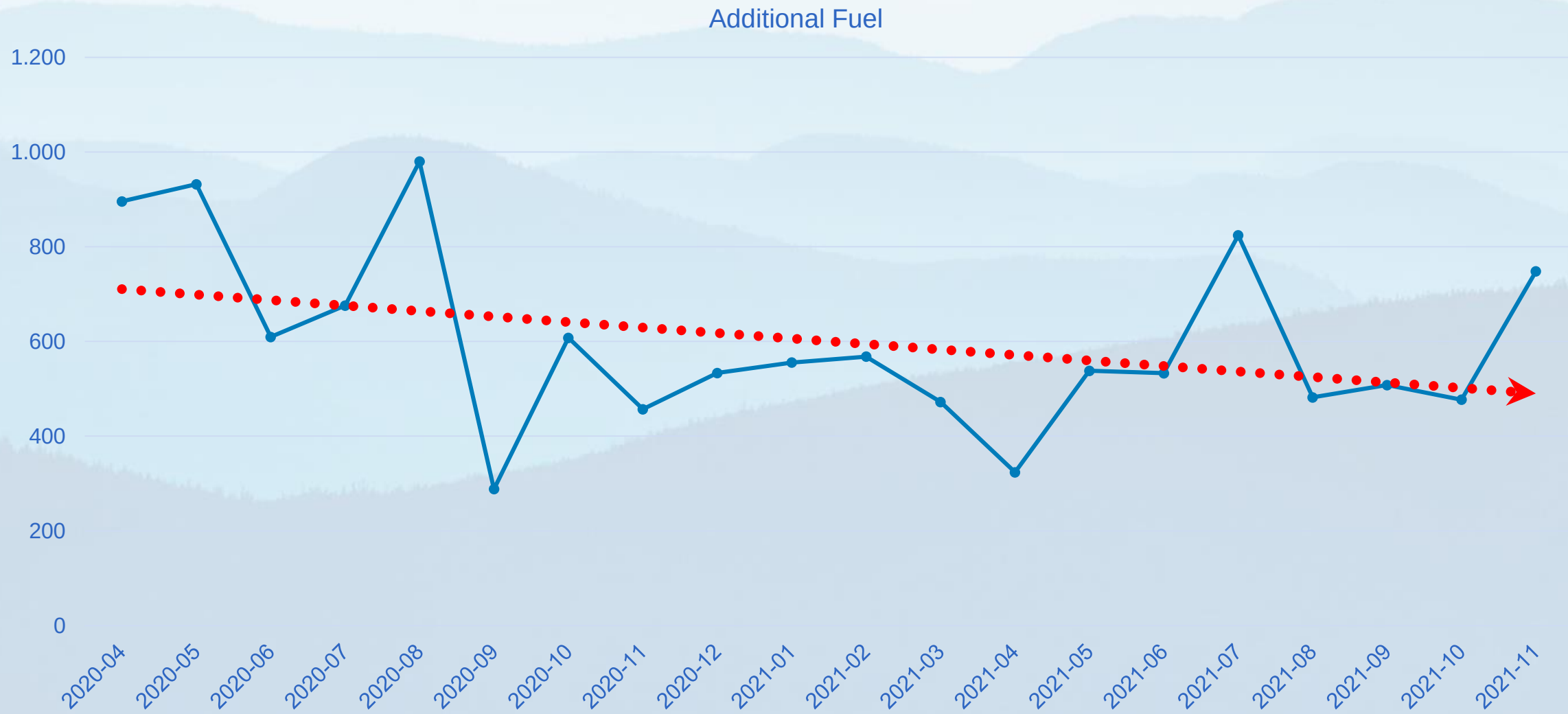
ANALYZE NON-COMPLIANCE

- By now, you understand that fuel saving SOP can never be complied with 100%
- Set realistic compliance targets
- Smart measuring methods
- Most important – Root cause. Why?
  - Interviews / Surveys
  - Anonymous reports
  - LOSA

CASE STUDY – REDUCING COMMANDER DISC. FUEL

- Education
  - The philosophy of extra fuel – risks involved
  - Economics of extra fuel vs. diversions
- Trust in the OFP
  - Share actual vs. planned consumption data
- Share global data
  - Smart measuring, excluding the exceptions (data outside of 2xSTDDEV is excluded)
- Open invitation to view personal data
- Careful addressing of severe cases of non-compliance

COMMANDER DISC. FUEL OVER TIME



Challenge Group

Thank you!

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