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Energy Management Operations

A Cargolux Fuel Efficiency Initiative

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Constant Descent Operations (CDO):

- ATC ensures traffic deconfliction, separation and flow.
- CLX crews are trained to fly low drag and CDO arrivals.
- Flight Management Computers (FMC) installed to calculate and support Flight Crew in descent planning.

Managing Challenge:

- With limited manpower resources, it is extremely difficult to monitor, measure and quantify over 23,000 flights meeting ICAO's industry standardized CDO criteria, from a set TOD point.

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Solution:

Narrow our measuring and quantifying to all arrivals between:

- 10,000’ to 2,000’

These criteria have been defined internally, utilizing the term **Energy Management Operations (EMO)** while remaining closely aligned with ICAO’s CDO definition.

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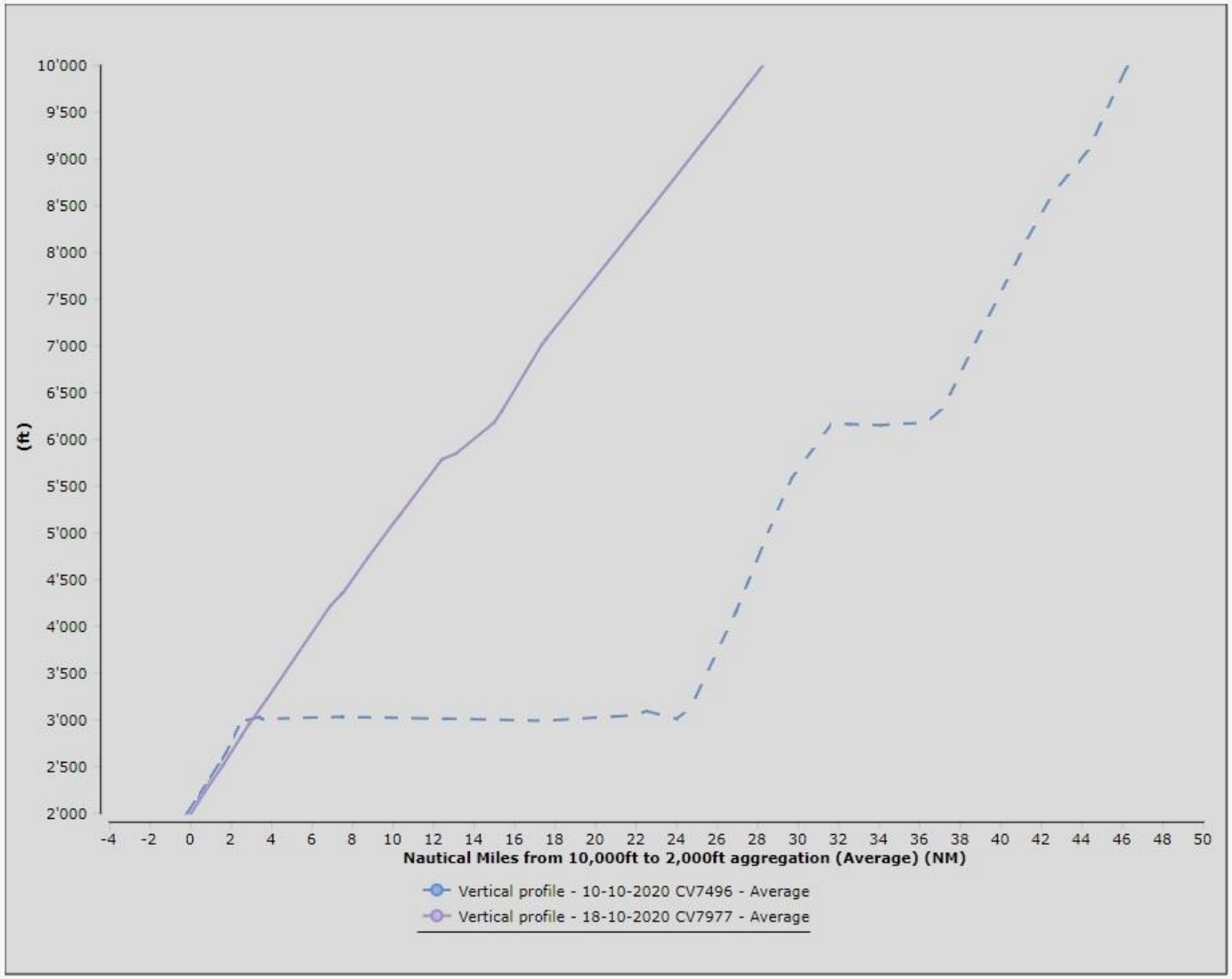
Advantage to a Modified EMO Analysis:

- Quantifies fuel efficiency on all arrivals across a worldwide network regardless of approach type e.g., published CDO, precision/non-precision, vectored or self-positioning visual.

- Highlights pilot energy management techniques, where it matters most.

Efficient vs Less Efficient
LUX Arrival



Fuel Consumption

1,985 Kg

466 Kg

Delta: 1,519 Kg

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Results:

As a result of CLX's **EMO Initiative**, we have experienced a;

- **62%** increase in fuel efficient approaches, within the EMO defined segment.
- **44%** reduction in fuel burn within the EMO defined segment.

Reduction In Environmental CO2 Impact:

2020 YTD:

- **26** B747 flights between LUX-GYD.
- **1000** average private automobiles annually.

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Conclusion:

- Proper energy managed arrivals significantly improve efficiency and reduce overall environmental impact.
- Pilots would benefit having more insight into ATC procedures.
- ATC would benefit having more insight into cockpit procedures.
- Only with close coordination, working hand in hand, can ATC and Flight Crews ensure maximum CDO/EMO advantage is achieved – **regardless of approach flown**.