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Efficient Flight Operations

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Agenda

- Building a Strong Foundation
- Efficient Flight Planning
- Efficient Flight Operation
- Making it work

Foundation for Success

- Four "corner posts" required to support improving efficiency:
  - Accountability
    - All departments & employees must be financially accountable for fuel consumption
  - Measurement
    - Efficiency must be continually measured & reported
  - Policy and SOP's
    - Consistent policy & SOP's that promote efficiency
  - Employee engagement
    - Employees must be actively engaged through education, training and checking activities to be efficient

Efficient Flight Planning

- Vertical & lateral optimization yield valuable efficiencies, but the biggest returns come from two key areas:
  - » Alternate Selection
  - » Additional Fuel
- Fuel choices must be "risk based", informed decisions
- Clearly defined policy, in addition to safety & regulatory requirements, is needed to define corporate expectations to pilots and dispatchers

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Alternate Selection

- Select and manage the destination alternate based on the likelihood of actually going to the alternate
  - » Alternate choice is based on analysis of destination & alternate weather and approach facilities
  - » Use collaborative decision making for "hub" airports
  - » If the likelihood of going to the alternate is:
    - › Low, choose the closest legal alternate
    - › High, choose an alternate that is commercially beneficial as well as safe & legal

Additional Fuel

- Additional fuel is a risk management tool, the challenge is to make informed decisions
- Additional fuel is boarded for four primary reasons:
  - » ATC Delays
  - » Flight below planned altitude for a period of time
  - » Weather deviation (Convective Storms)
  - » Go-around & second approach
- The problem – no/limited guidance provided to pilots & dispatchers for these scenarios
  - » Result – inconsistent, inaccurate and excessive amounts of fuel being boarded

ATC Delays

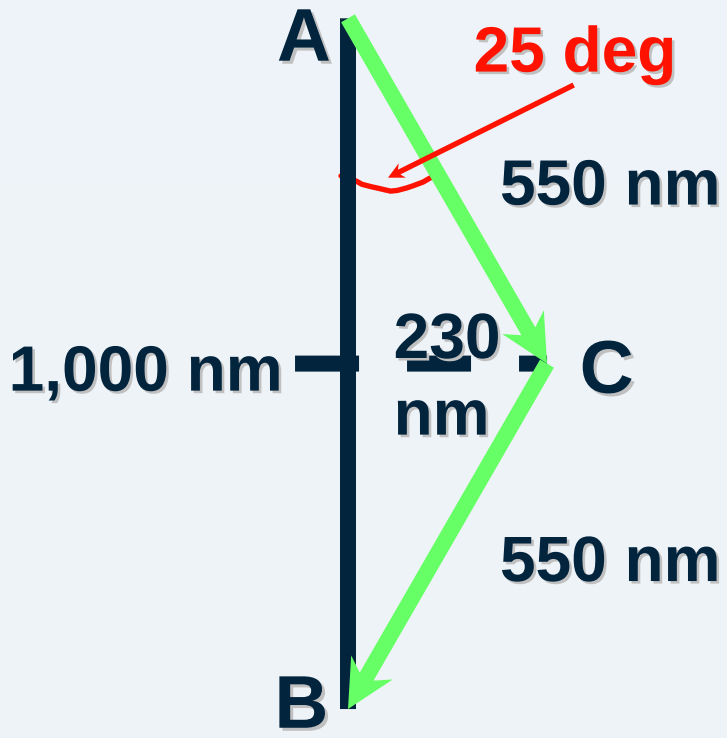
- Two key strategies to make better decisions:
  - » City pair, time based analysis of actual flight data to derive a statistical value of additional fuel for each flight
    - › Provide the flight crews with time/fuel details on the Operational Flight Plan (OFP)
  - » Use of Air Traffic Service Provider airport capacity/demand tools
    - › Append information to OFP and/or make tools available to pilots & dispatchers

Flight Below Planned Altitude

- Provide pilots & dispatchers with guidance on the best way to calculate the fuel required for flight at lower than planned altitudes for a portion of the flight:
  - » Encourage the use of flight planning systems to analyze alternate altitude scenarios and board incremental fuel difference
  - » In table form, based on manufacturer's data for pilots to carry on board the aircraft

Weather Deviation

- Typical values added – 15 minutes
- What does 15 minutes buy?



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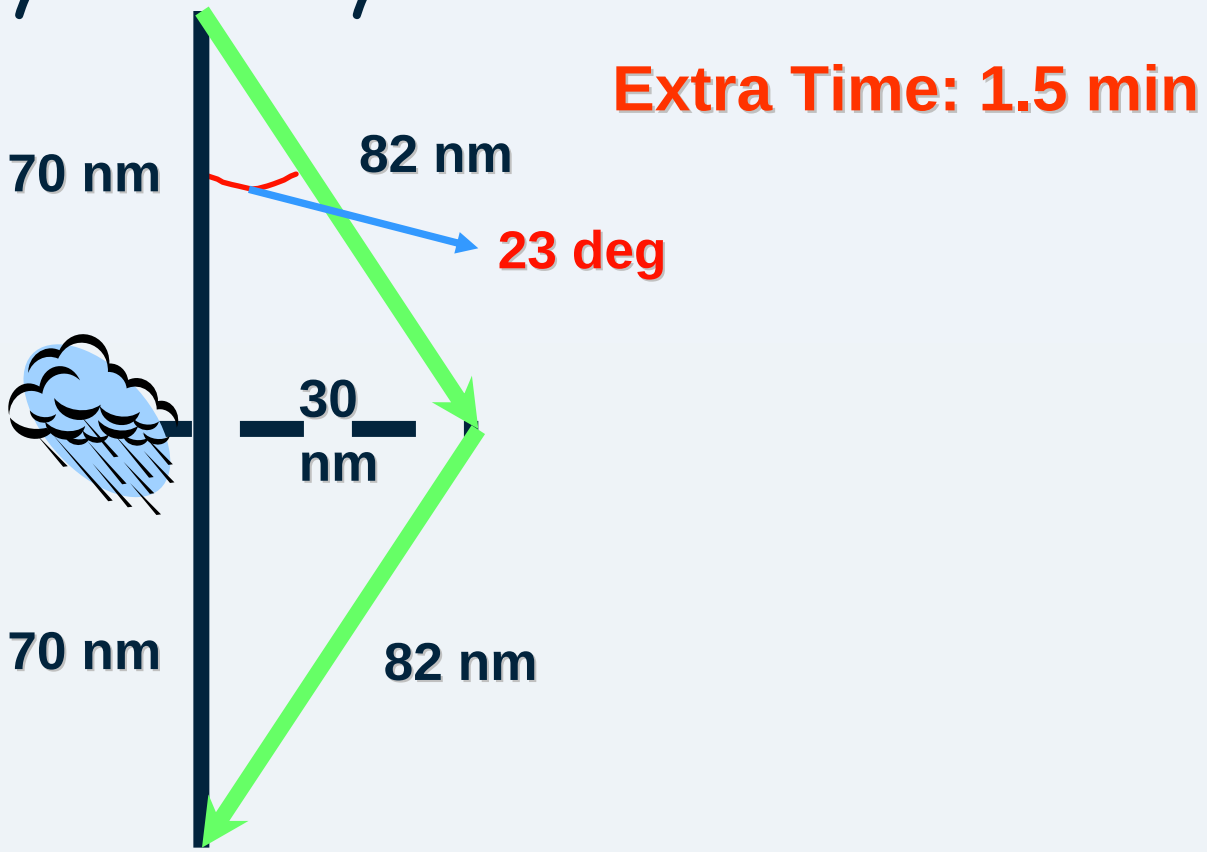
Weather Deviation

- What do you really need?



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Second Approach

- Use aircraft manufacturer's data to calculate:
  - » Go-around fuel
  - » Approach fuel
  - » Fuel for positioning vectors
- Provide pilots & dispatchers with information on the fuel required for a go-around & second approach, including reasonable expected values for ATC vectoring

Efficient Flight Operation

- Operating flights efficiently must consider all phases of flight, key focus areas are:
  - » APU use
  - » Engine-out taxi
  - » Departure profiles
  - » Decelerated approaches
  - » Reduced flap landings
  - » Idle Reverse Thrust on Landing

APU USE

- SOP's to minimize APU use:
  - » Key requirement is full ground support (electrical & conditioned air) at all times
  - » Start APU 10 minutes prior to departure
  - » Start APU Prior to gate arrival for immediate engine shutdown
  - » APU shutdown 5 minutes after gate arrival
- Ground handling contracts to specify:
  - » Full ground support requirement
  - » Financial penalties for non-compliance

Engine-out Taxi

- Define as normal & expected SOP
- Debunk the urban myths:
  - » One engine at higher power setting actually burns less than two engines for same thrust output
  - » APU & Engine start cycle costs
  - » Engine thermal stabilization requirements
  - » Flight deck workload
  - » Checklist management
- Train crews from day one
- Reinforce requirement during recurrent training & checking events

Departure Profiles

- Vertical departure profile selection by flight crew needs to be dependant on requirements to make on-course turn
- If on-course turn is:
  - » Distance dependant, then accelerate and retract flaps as soon as possible
  - » Altitude dependant, climb at V_2 + 10 to achieve required altitude, commence turn, and when within 90° of on-course track accelerate and retract flaps

Decelerated Approaches

- Aircraft configuration for landing (flaps & landing gear) to be based on aircraft altitude rather than distance from final approach fix (FAF), resulting in:
  - » Superior aircraft energy management
  - » Consistent approach technique
  - » Continuous idle descent profile to 1,000 ft. AGL stabilization point
  - » Lower noise levels

Reduced Flap Landings

- Full flap not required in many cases
- Reduced flap landings offer:
  - » Fuel savings
  - » Time savings
  - » Quieter approaches
  - » Superior go-around performance
  - » Superior engine-out performance

Idle Reverse Thrust

- Aircraft landing performance data is in most cases based on not using reverse thrust
- Carbon brakes have different properties than steel brakes and the wear rate is:
  - » Reduced at higher temperatures
  - » A function of the number of applications
- Using idle reverse thrust on landing results in:
  - » Improved fuel efficiency
  - » Reduced engine FOD maintenance costs
  - » Noise reduction
  - » No negative effects on brake wear

Making it work

- Success is driven by:
  - » Education:
    - › Each employee and department has a role to play in being fuel efficient
    - › Every business decision must consider fuel right after safety
  - » Measurement:
    - › Attribution of fuel consumption costs must be measured as rigorously as fuel purchasing costs
  - » Accountability:
    - › Upper management must hold all departments financially accountable for activities that impact fuel burn by cross-charging department or third party for fuel consumption costs