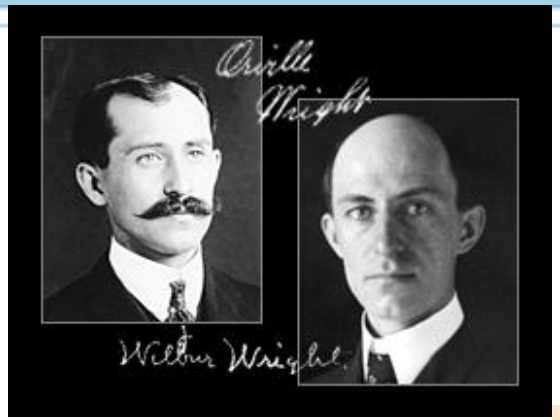
ATFM - Airlines' View

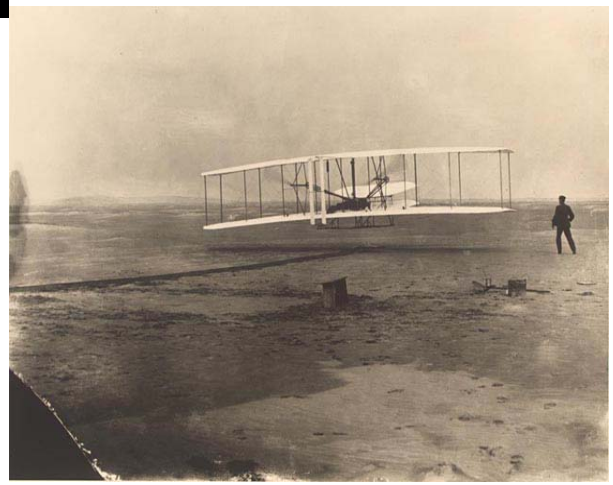
ICAO RSO ATFM Workshop Asia Pacific 2014

Beijing
29th Oct. 2014

These Men



Invented This Machine



Which Brought Us Together…

What Are We in Common

- Safety / Efficiency
- Regulatory / Rules / Procedures
- Airspace/Airport
- Capacity/ Punctuality
- Infrastructure – Avionics
- Weather
- …

What Are We in Difference

- Competitive
- Revenue/Profits
- Cost for Delays
- Information Acquisition Passivity
- Disruption
- …

The Industry Contribute…

- Carried 3.3 Billion Passengers
- Transported 52 million tonnes of cargo
- Provided 589 million jobs
- $2.4 trillion in annual economic activity

…While We Live on Revenue

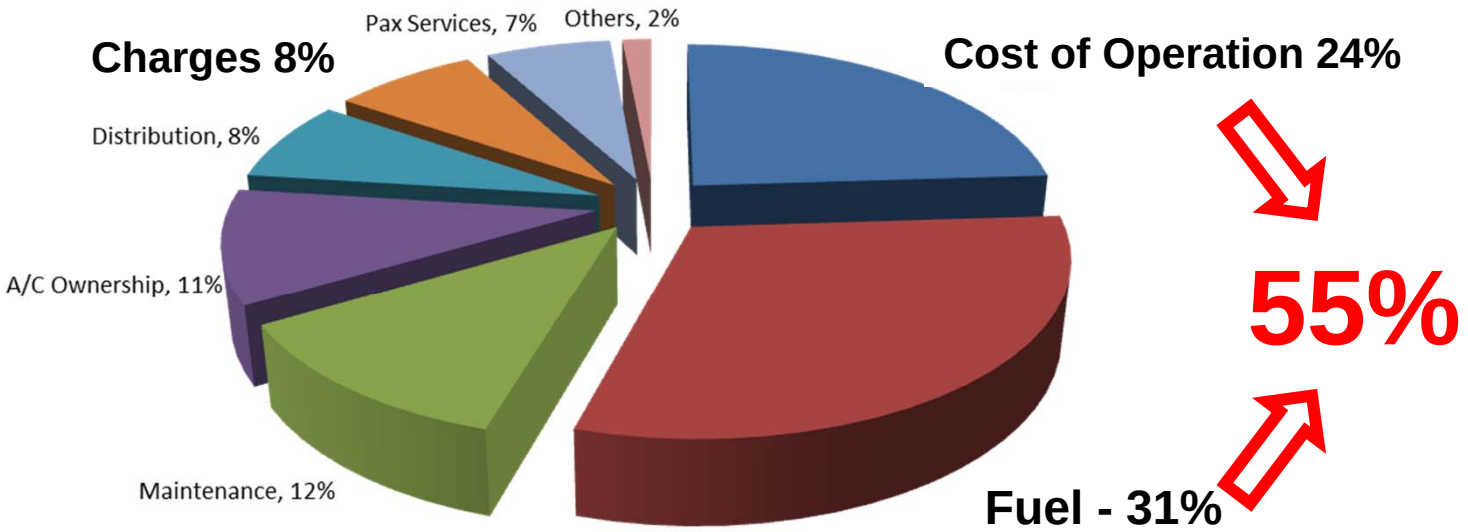
- 2014 Revenue Globally $746 Billion
- Collective Global Profit $18 Billion
  - Average net margin 2.4%
  - Less than $6 per passenger

Big Mac - Meal $5.69

What If When Airlines Stop

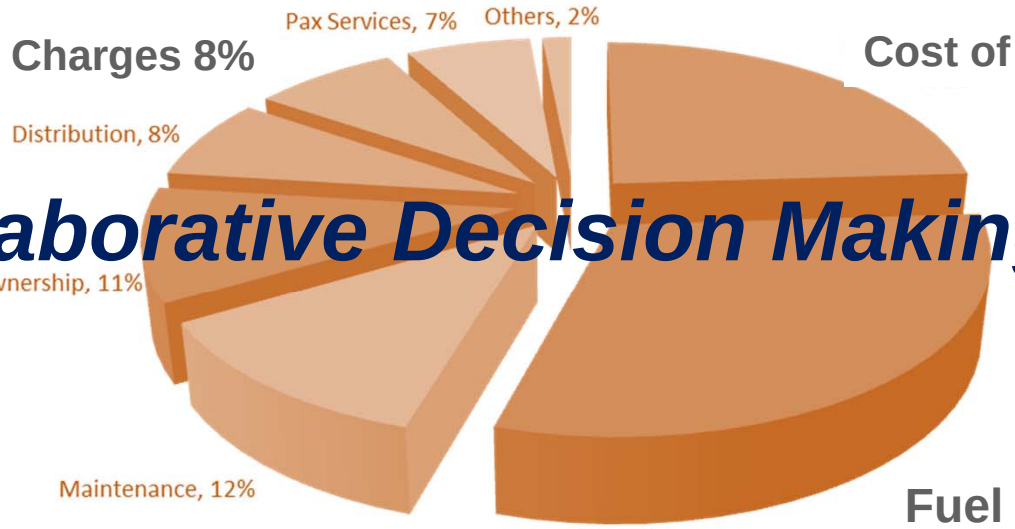
- Iceland's Eyjafjallajokull volcano erupted on 14th April 2010
- A week-long disruption of air traffic resulted in
  - 100,000 flights canceled
  - 10 million passengers affected
  - Global aviation sector losses $2.6 billion
  - Total impact on GDP - $4.7 billion

Fuel + Ops Cost Are Critical…



Fuel + Ops Cost Are Critical…

Reduce Delays



Collaborative Decision Making

55%

Improve Predictability

Delay Reduction

Predictability Improvement

Collaborative Decision Making

Delay Reduction…

- ATC Service Quality Metrics Has Long Been Centered on DELAY

- ATFM/CDM balance the demand/capacity, optimize the utilization of the airspace/airport, reduce the delay and operational cost…

Delay Costs – China 2013

	Low Scenario	High Scenario
Cancellation	3hr/flt.	6hr/flt.
Delay	30min/flt.	60min/flt.
Ave. Delay Time	23.81min/pax.	47.61min/pax.
Pax. Time Cost	$2.42 Bil.	$4.83 Bil.
Ops. Cost	$4.67 Bil.	$9.34 Bil.
Indirect Cost	N/A	N/A
Total Cost	$7.09 Bil.	$14.17 Bil.

Based on statistics in China 3rd Aug. – 3rd Sept. 2013, $1 = ¥ 6.2
http://finance.sina.com.cn/zl/china/20131101/122417194257.shtml

European ATFM Delay Cost

Factor	Cost (Euro)
Network Total Cost of ATFM Delays (All Causes)	1,125 Million
Average Cost of Delay of an ATFM Delayed Aircraft	1,660
Network Average Cost of ATFM Delay, Per Minutes	81

Cost in 2010 Euro.

US Delay Cost

Cost Component	Cost (in billion)
Costs to Airlines	$8.3
Costs to Passengers	$16.7
Costs from Lost Demand	$3.9
Total Direct Cost	**$28.9**
Impact on GDP	**$4.0**
Total Cost	**$32.9**

All data for the year of 2007

…And Comfort the Passengers

- **Passenger's View…**
  - **ALL delay are equally evil no matter how short the duration**
  - **EVERY operational situation is predictable by airlines with 100% accuracy**
  - **ANYTIME anything goes wrong it's the automatic fault of the airlines**

Delay Reduction

Predictability Improvement

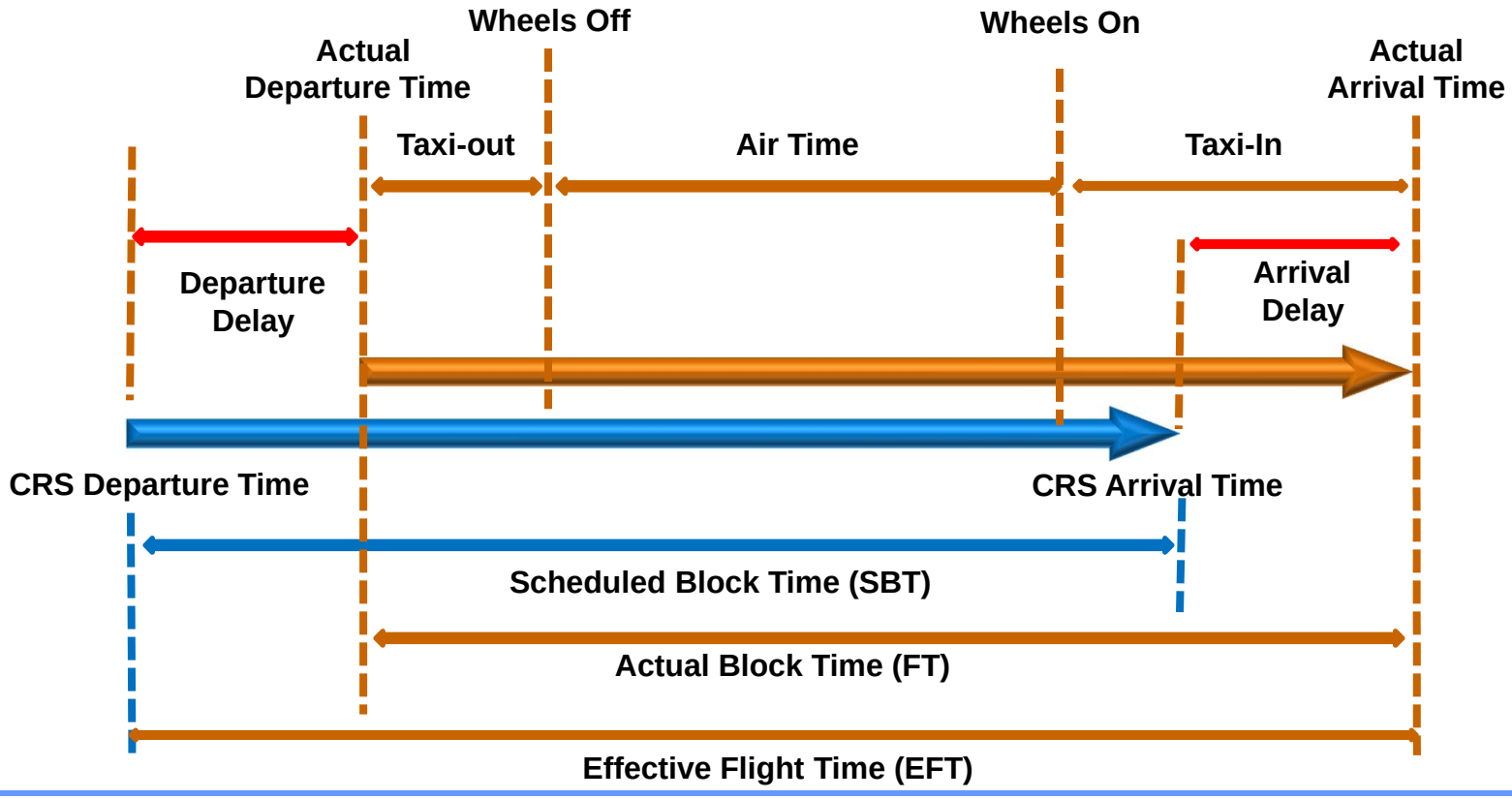
Collaborative Decision Making

Predictability Improvement…

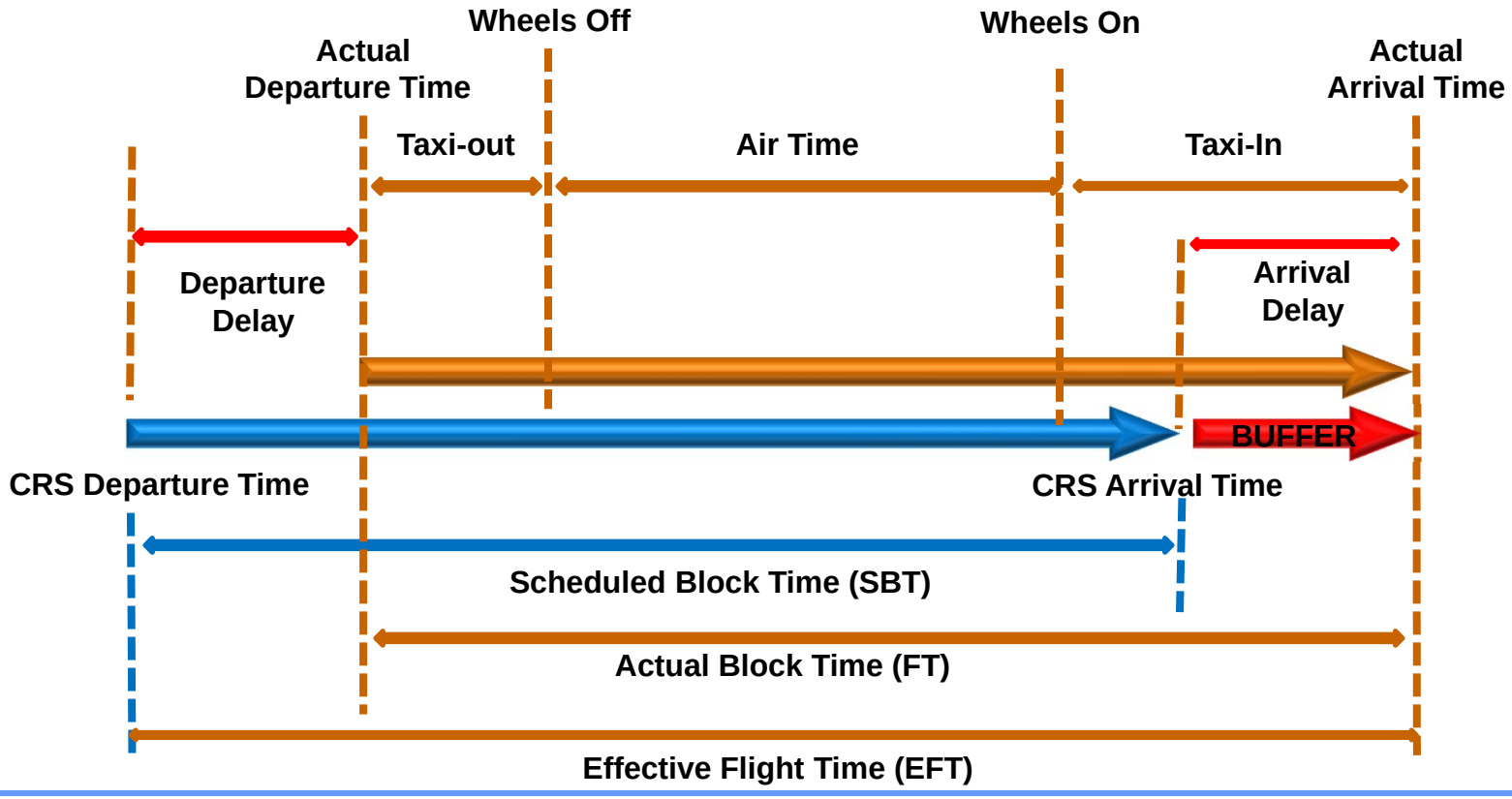
- **PREDICTABILITY, a Metrics for Service Quality**
  - ***Improve flight predictability by reducing variances in flying time between core airports based on a 2012 baseline***

    (FAA: Destination 2025)

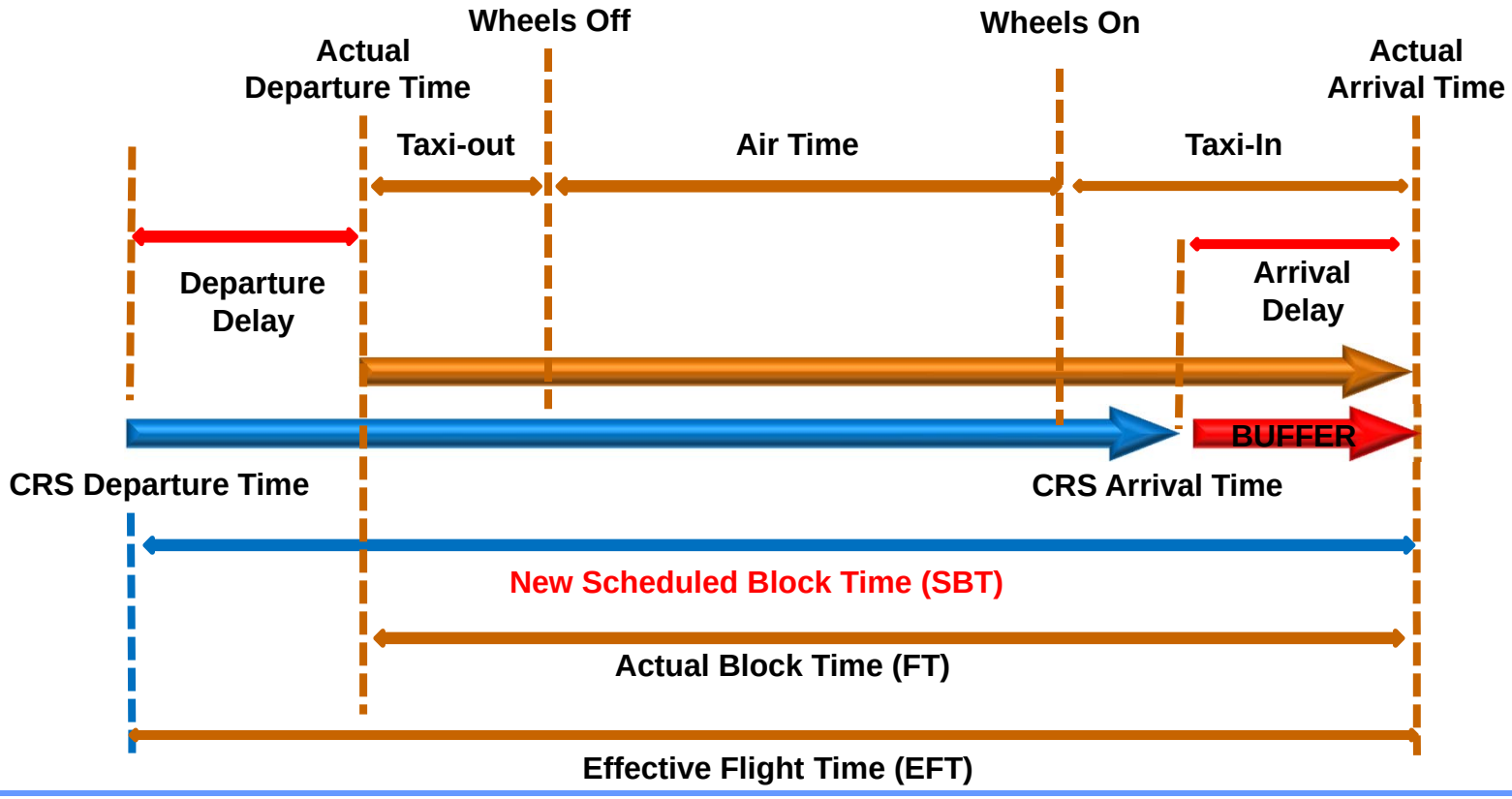
Flight Time Decomposition



Scheduled Buffer (SB)



Scheduled Buffer



Scheduled Block Time (SBT)

- SBT is an important airlines cost driver
- Airlines profit motive encourage a shorter SBT
  - Improve fleet utilization
  - Reduce operation cost
  - Improve overall operational efficiency

Demands vs. Capacity

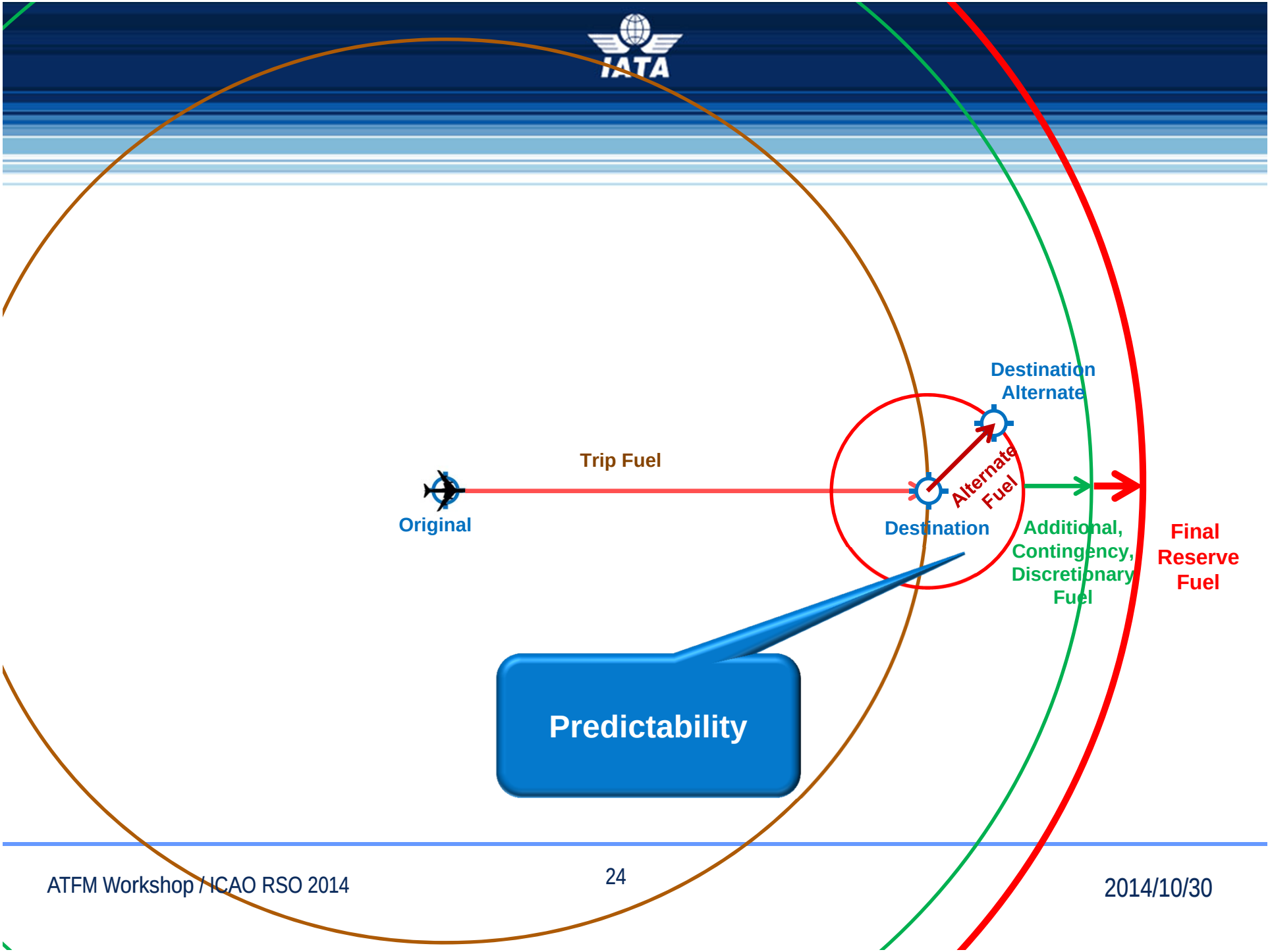
Origin	Destination	Difference of Ave. Flt. Time(Min.) (2011 vs 2004)	Block Time Standard Deviation Var. % (2011 vs 2004)
HKG	BKK	5.3	10%
BKK	HKG	-1.6	0%
HKG	SIN	2.9	-10%
SIN	HKG	3.9	22%
HKG	MNL	6.1	60%
MNL	HKG	3.3	43%
HKG	TPE	1.8	14%
TPE	HKG	2.4	29%
HKG	SYD	7.4	8%
SYD	HKG	4.1	7%
HKG	DXB	13.6	0%
DXB	HKG	1.0	0%

US Cost Estimate for 2007

$ billions

	Delay Beyond SB	Scheduled Buffer(SB)	Total
7 major airlines	**3.3**	**2.6**	**5.9**
Industry Wide*	**4.6**	**3.7**	**8.3**

* Includes airlines with $20 million annual operating revenue only


Destination
Alternate
Trip Fuel
Alternate
Fuel
Original
Destination
Additional,
Contingency,
Discretionary
Fuel
Final
Reserve
Fuel
Predictability

Predictability – Fuel

- Burning fuel to carry fuel
  - 0.25 – 0.5 Pound of fuel to carry 1 pound of fuel
- 1 min. standard deviation of airborne time lead to additional 1.85 min. of contingency fuel + alternate fuel

Predictability - Benefits

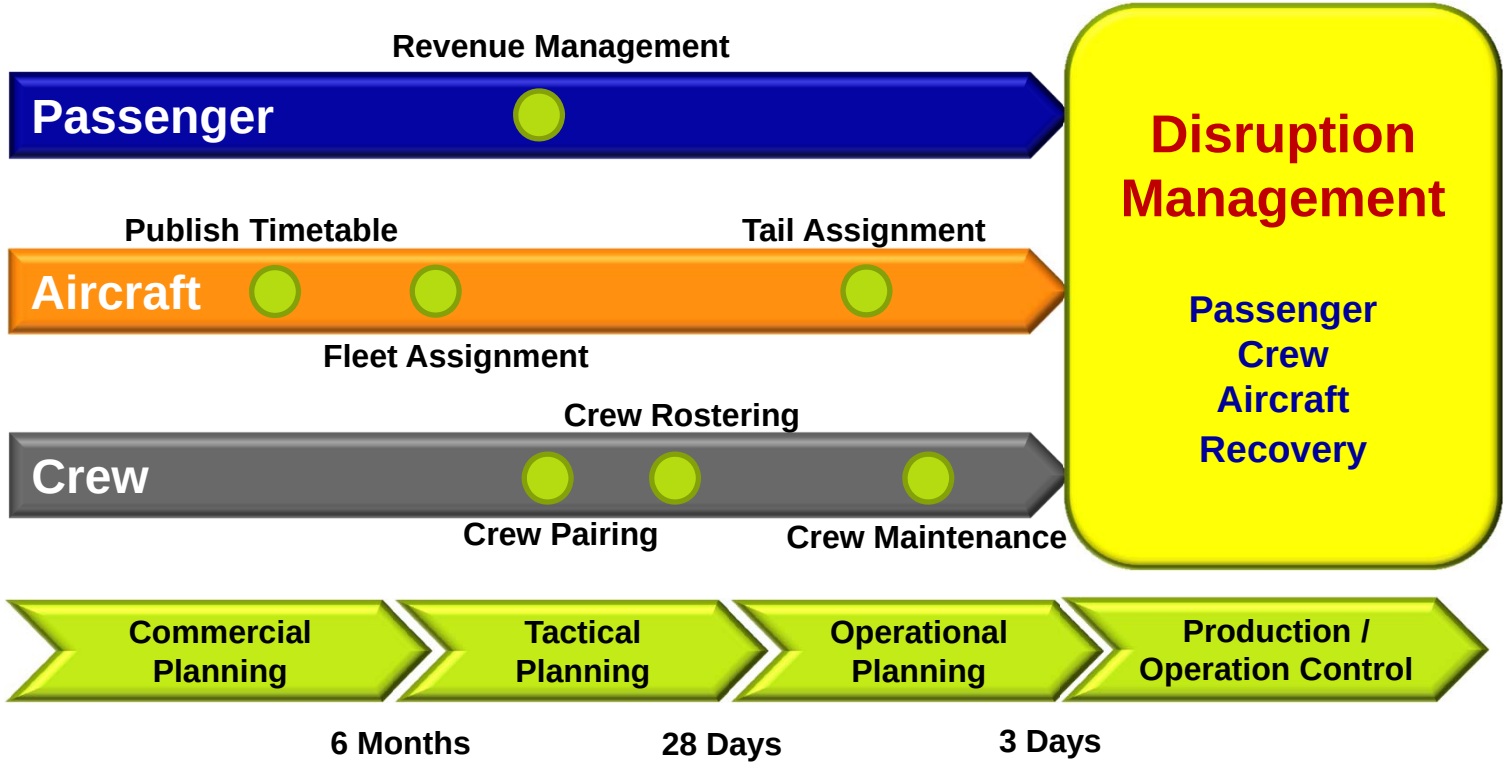
- A reduction in the variability of actual flight times will lead to a reduction in Scheduled Block Time (SBT) and fuel buffers
- The reduction in SBT will lead to shorter actual block times
- With improvements in scheduled and actual block times, carriers could achieve the same level of scheduled operations with fewer aircraft and less total crew duty time
- The reduction in fuel buffer will lead to a reduction in contingency fuel loaded, which will also lead to a reduction in actual fuel usage

Delay Reduction

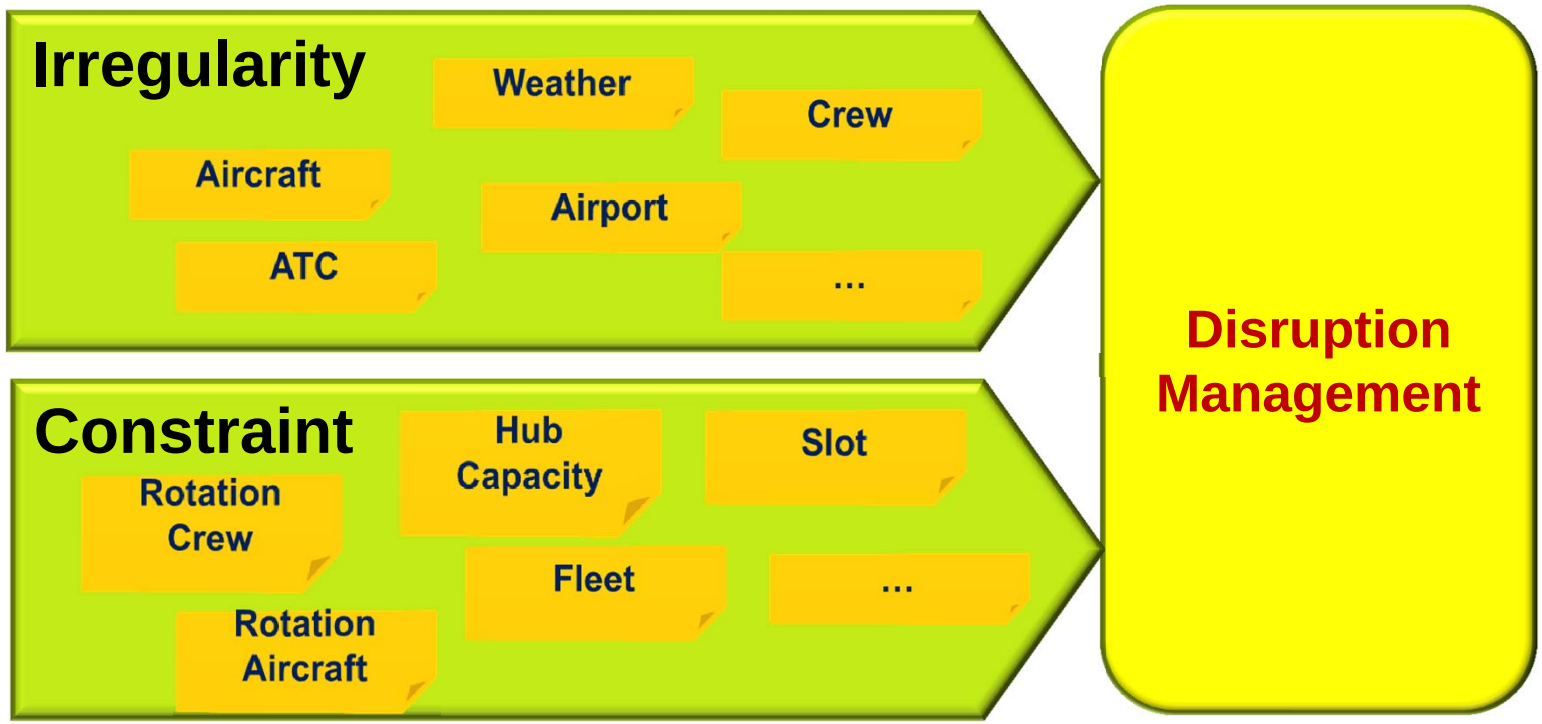
Predictability Improvement

Collaborative Decision Making

The Airline Scheduling Process

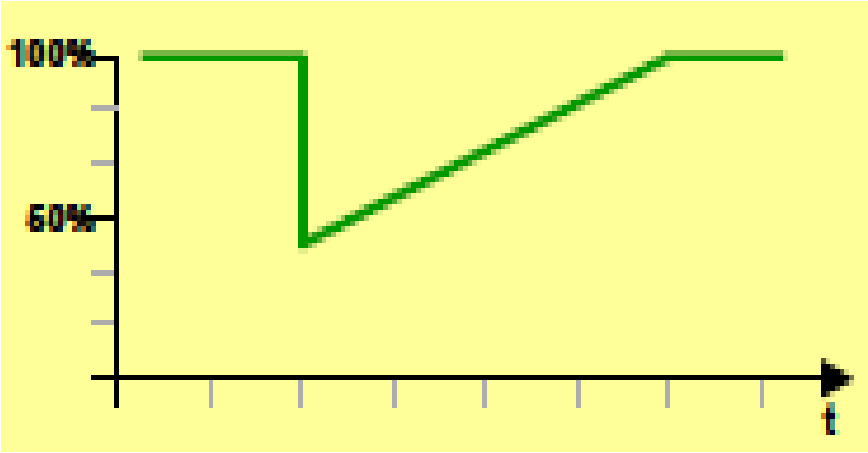


Disruption Sources



Disruption & Recovery

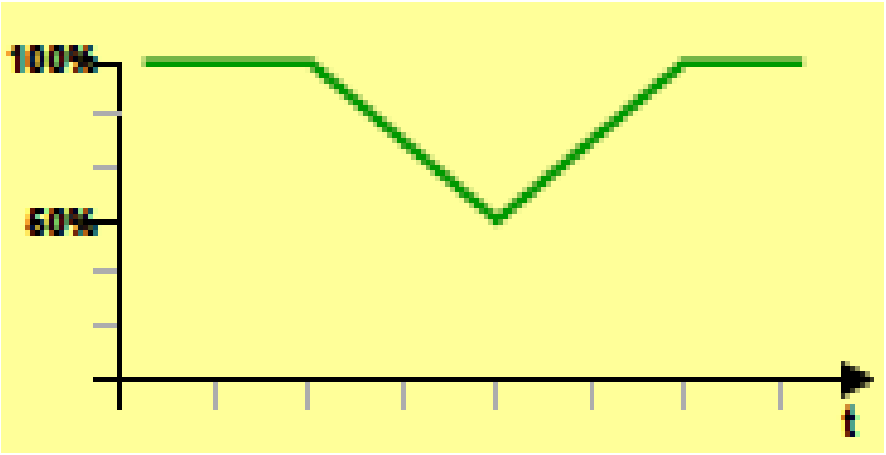
- **Ad-Hoc Effect**
  Gradual Recovery



- **Without any notification and with immediate effect**
- **E.g. Airport closure due to radar failure**

Disruption & Recovery

- **Creeping Effect Gradual Recovery**

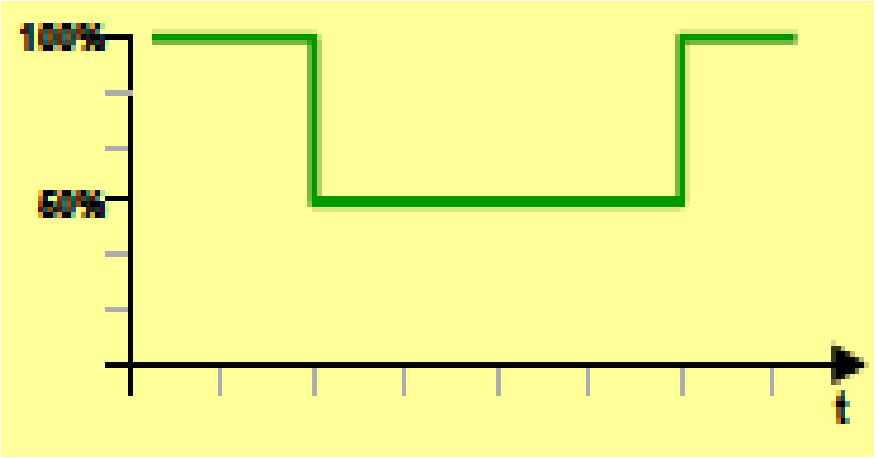


- **Unexpected deteriorating reasons or unexpected additional problems**
- **E.g. Deteriorating weather conditions**

Disruption & Recovery

- Ad-Hoc Effect

  Ad-Hoc Recovery

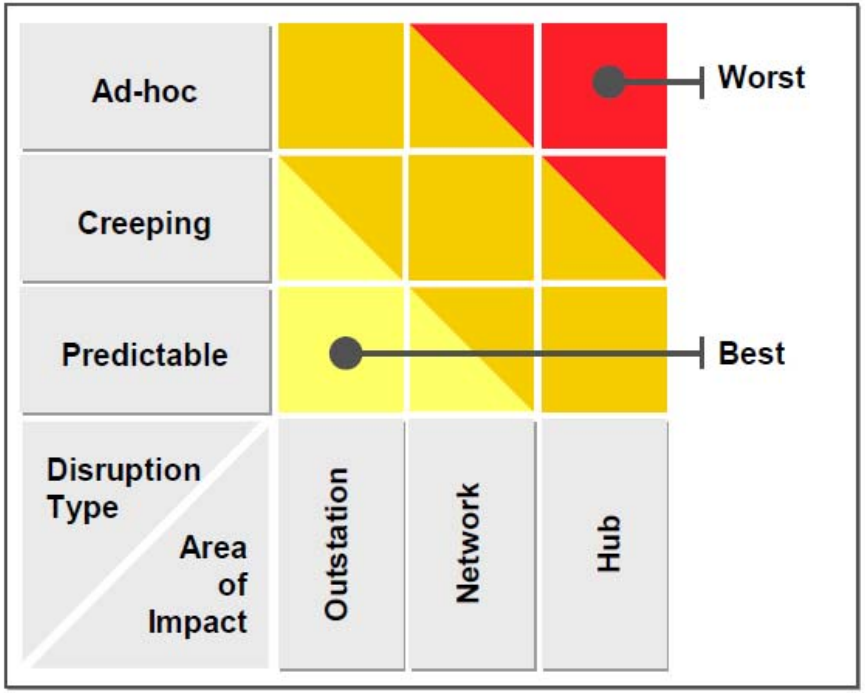


- Plan able/ Pre-Announced Reasons
- Defined Time Period
- E.g. Planned airport / airspace closure

Disruption Impact

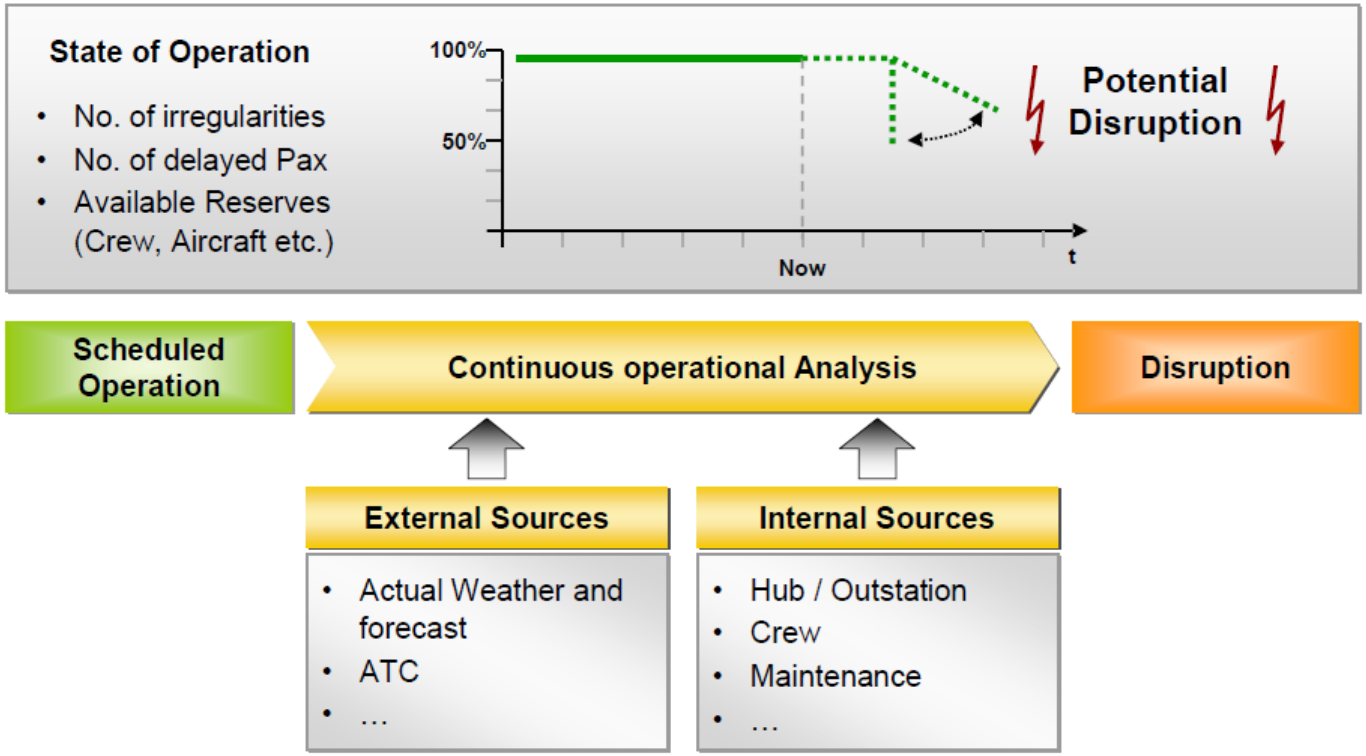
Area of Impact	Description
Outstation	• Hub Operation not effected • Outbound flights partly affected because of missing onto Passengers • E.g. Regional Airspace Closure
Network	• All stations inclusive the Hub are affected • Hard decision are required to minimize effect • E.g. Aircraft fleet grounded
Hub	• Hub Operation is affected • Inbound flights must be decentralized or cancelled to protect the Hub • E.g. Weather restrictions at Hub

Disruption Severity



- Ad-hoc disruptions without notification and with immediate effect are having the worst impact.
- Creeping disruptions with unexpected detorating or unexpected additional reasons are having an average impact.
- Predictable disruptions with a pre-announced reason and period are the easiest to handle.
- A disruption that affects only the outstations is easier to handle than a disruption with an impact on the hub or the complete network.

Information is Fundamental



Collaborative Decision Making

- Common Situational Awareness
- Right Information to Right People to Make Right Decisions

CDM
Collaborative
Decision Making

Benefits for Airlines

- Improved flexibility to optimize schedules through CDM
- Absorb delay on the ground or en route rather than airborne holding
- Reliable and timely information sharing
  - Airlines operation intent to ATC
  - ATC/Airport resource constraints to airlines
- Fuel savings / emission reduction

Benefits for Airlines

- Better aircraft utilization
- Better passenger's experience
- Optimization of staffing and allocation of resources
- Improved safety
- Predictability
  - Build achievable schedule
  - Load appropriate fuel weight

to represent, lead and serve the airline industry

THANKS