



Slot Property Rights and Aviation Operations



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Aviation Operations Challenges

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- Demand growth and capacity saturation: LaGuardia, O'Hare, ..
 - Emergence of business aviation
 - Uncertainty:
 - Capacity, especially impact of weather.
 - Demand: which flights, when, where??
 - Actions and reactions:
 - FAA perspective: how will airlines react
 - Airline perspective: what control actions will FAA take and what will other airlines do
 - Timing and synchronization of events and actions

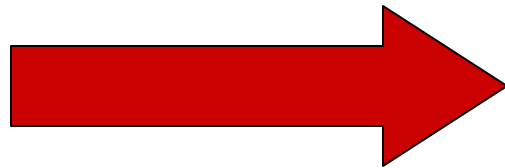


Demand Management Options

- Peak period pricing
- Administrative procedures
- Slot auctions

Demand Management Options

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What are property rights associated with a slot lease or slot ownership?



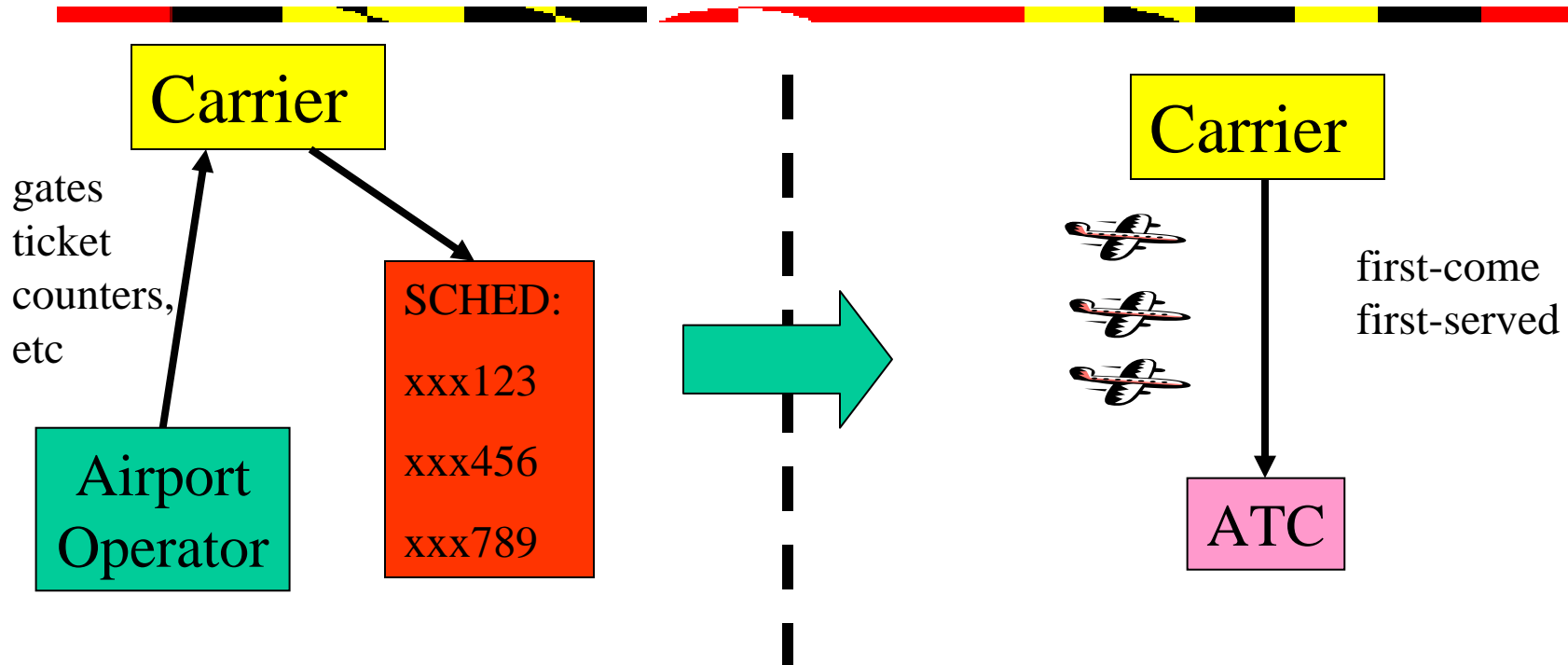
Question:

If an airline or other service provider leases or buys an arrival or departure slot what rights can be expected on a day of operations?

Demand uncertainty effect: *What if an airline fails to deliver an aircraft to an assigned arrival slot – does that flight lose the right to land? What if a flight is unable to access an assigned arrival slot but it is not clear who is at fault?*

Capacity uncertainty effect: *What if the FAA is unable to provide access to a slot owned by airline?*

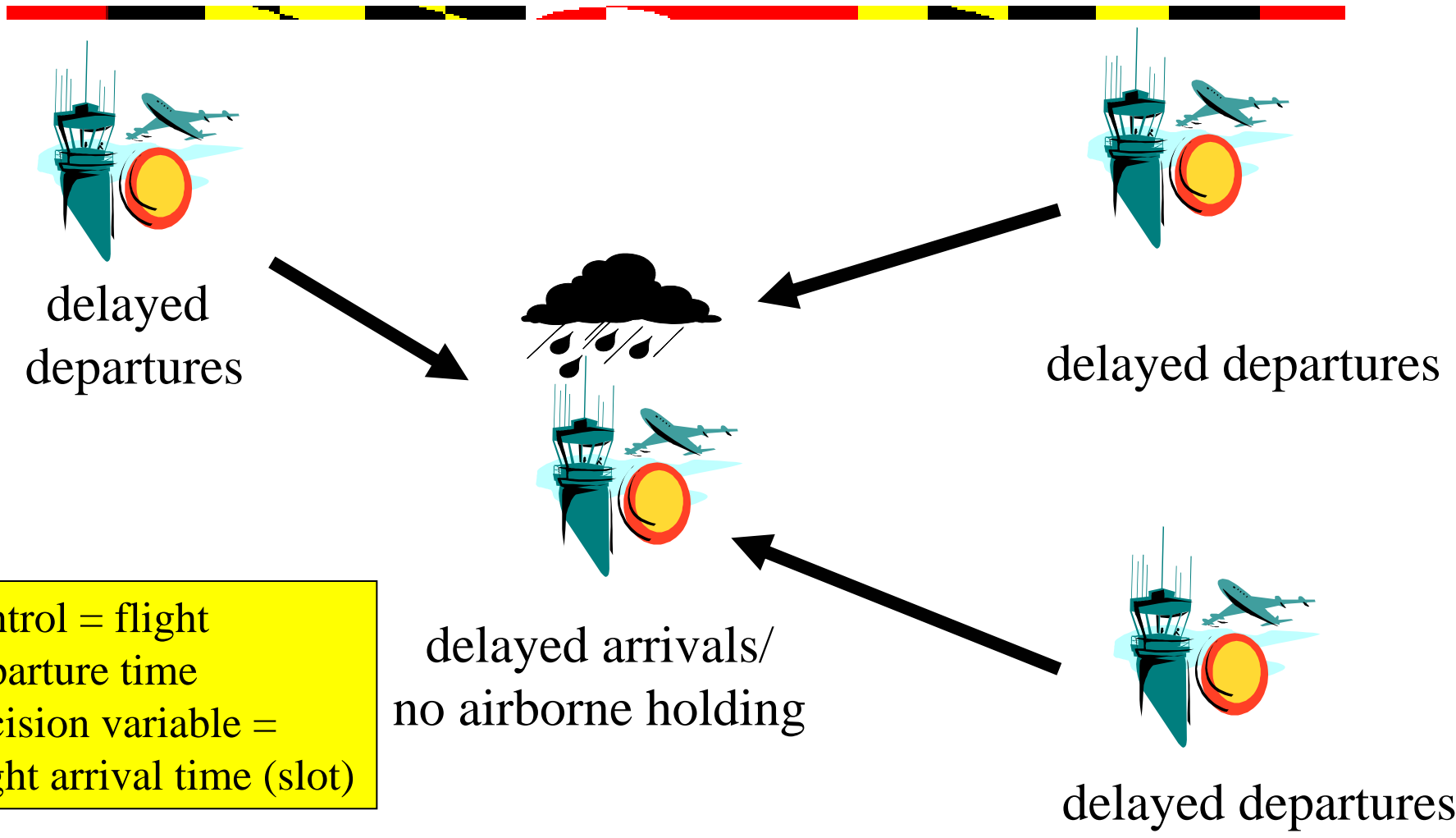
Current Model



(IATA 2000): *“The Conferences deal with adjustments to planned schedules to fit in with the slots available at airports. This activity has nothing to do with adjustments to schedules on the day of operation for air traffic flow management. The two types of slot allocation are quite different and unrelated.”*

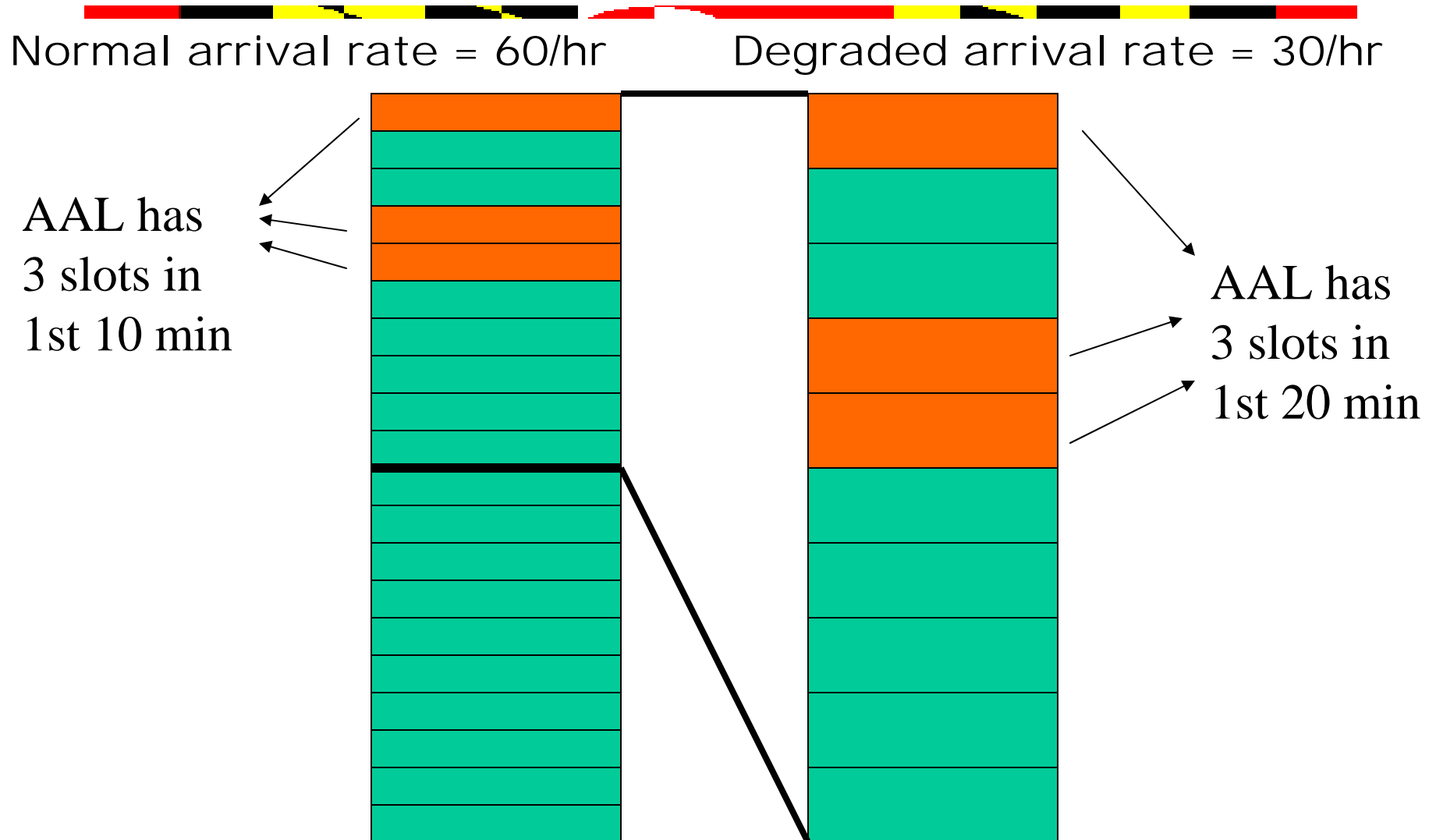


Ground Delay Programs and Collaborative Decision Making (CDM) Resource Allocation

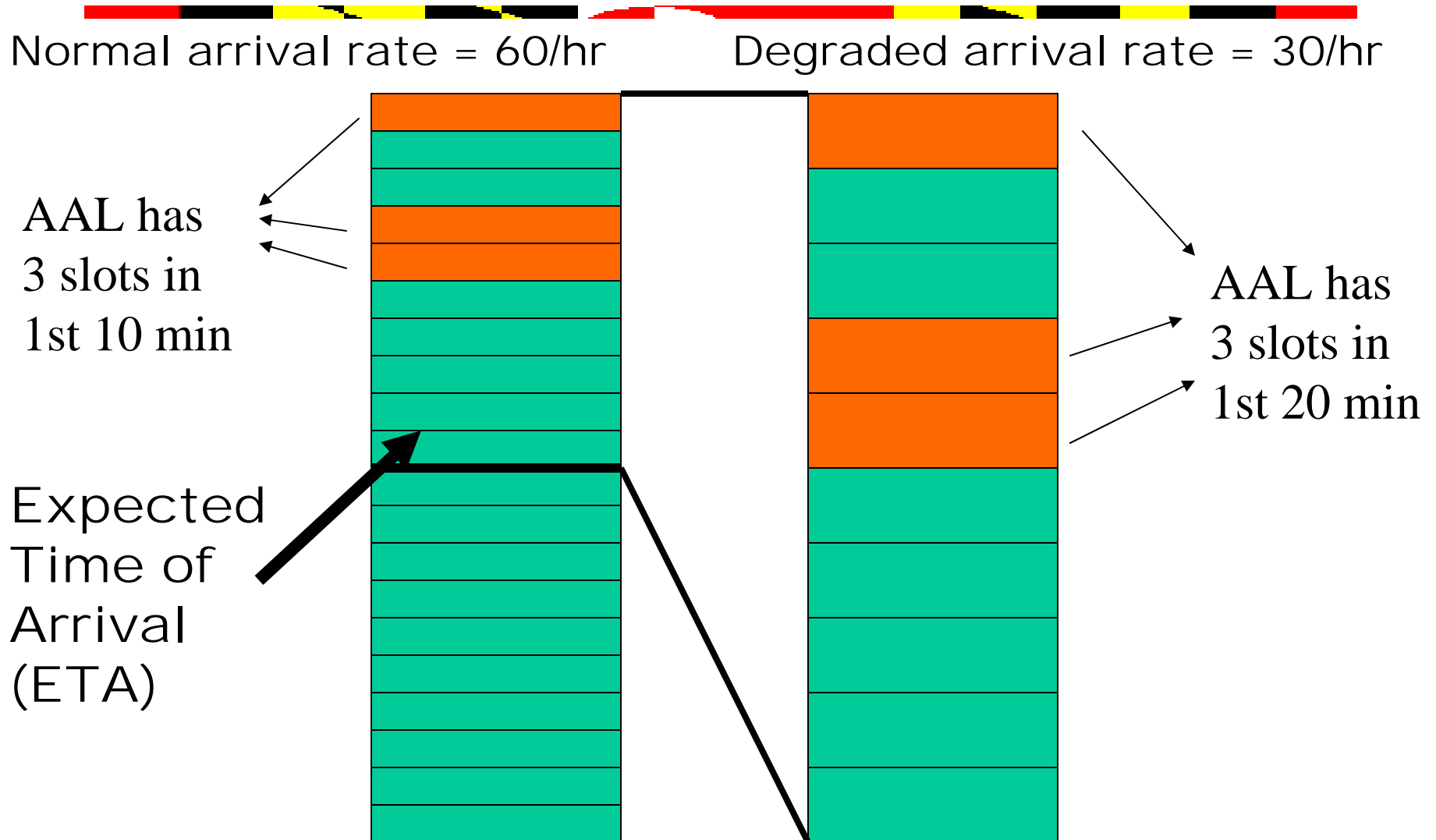




Rationing Arrival Slots

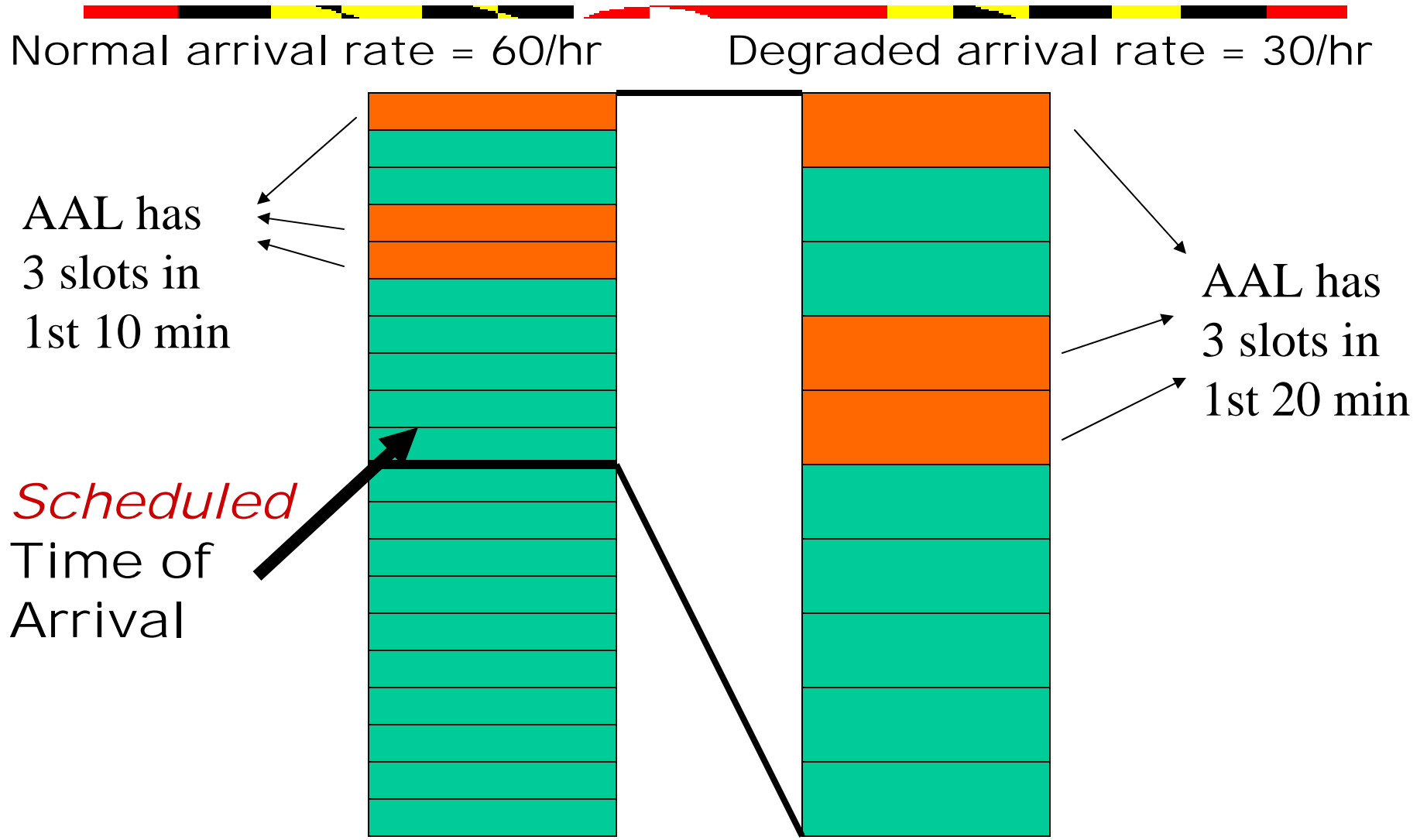


Old Way (before CDM)





CDM Approach: Ration-by-Schedule (RBS)





Overall Resource/Slot Allocation Process

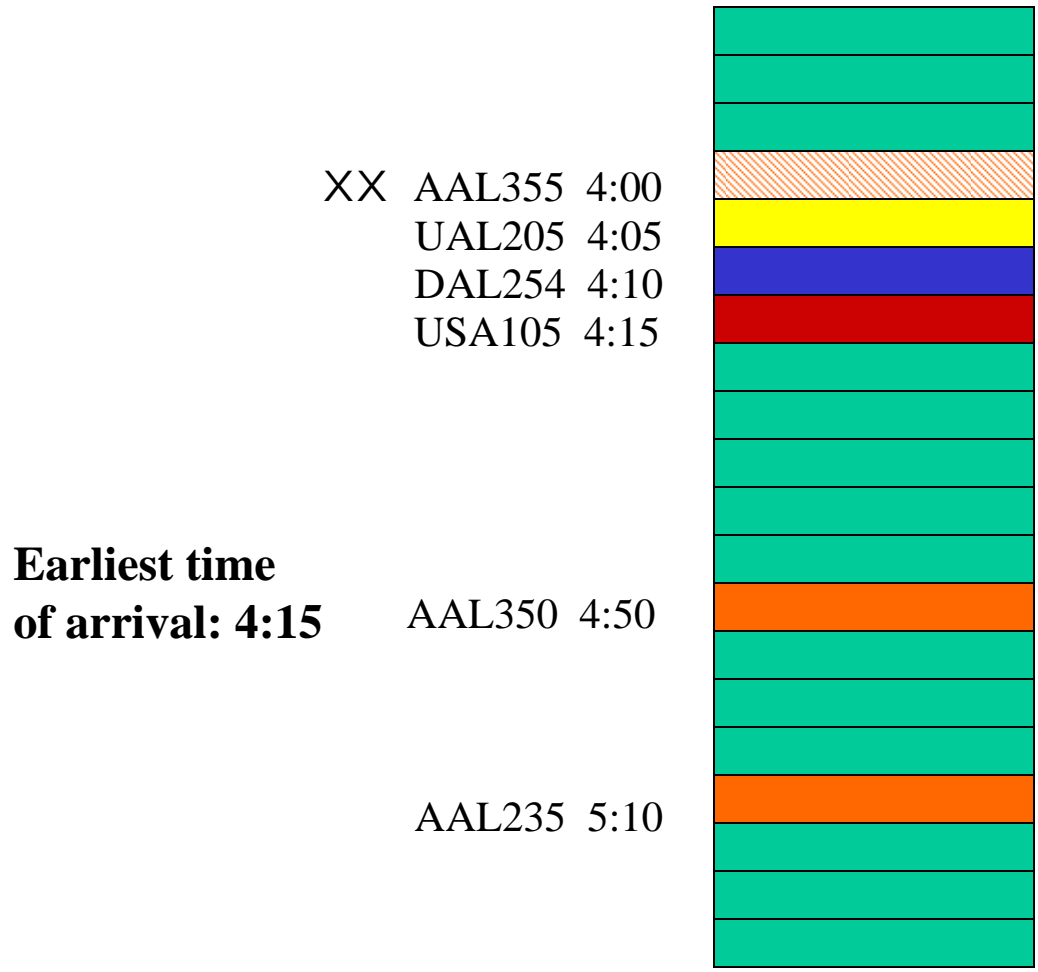
FAA: initial “fair” slot allocation
[Ration-by-schedule]

Airlines: flight-slot assignments/reassignments
[Cancellations and substitutions]

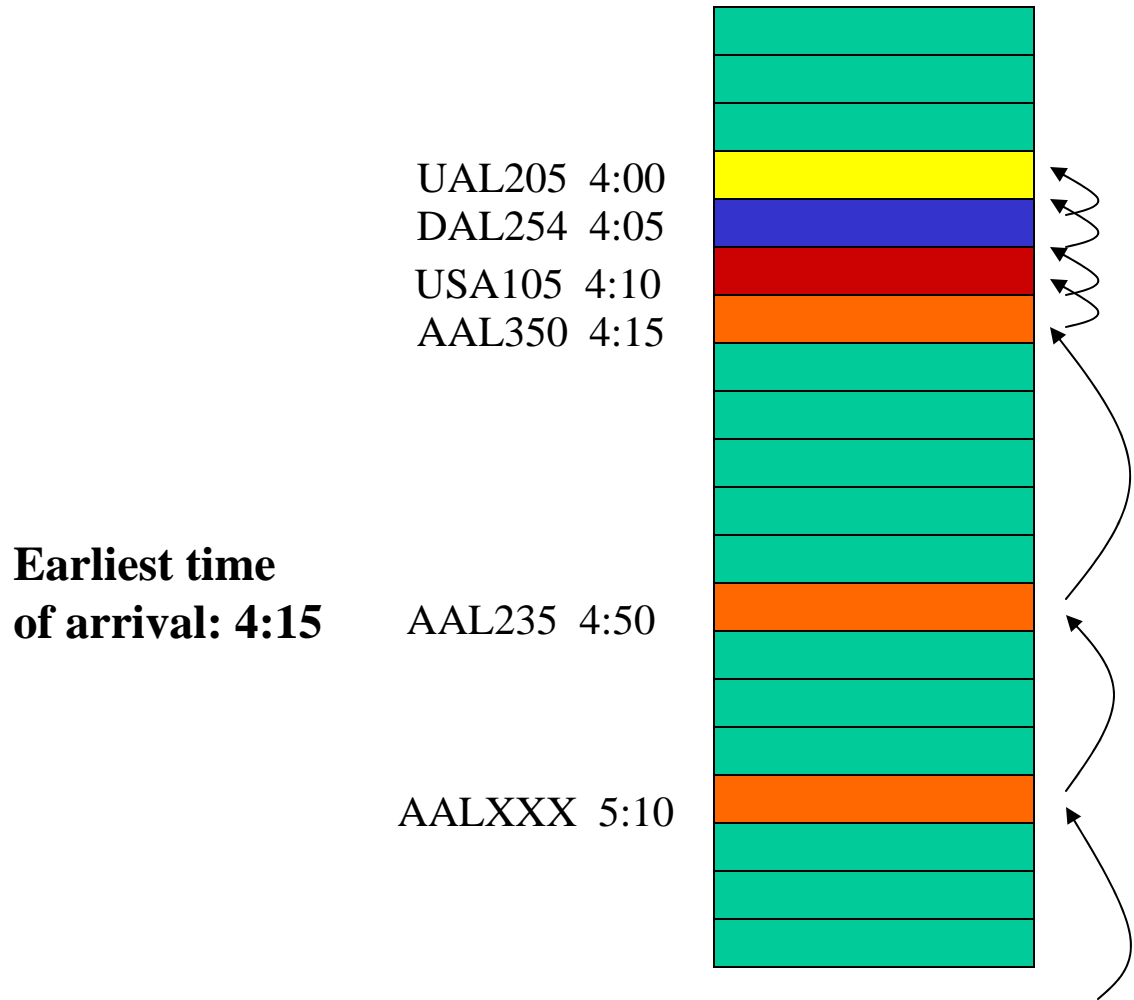
FAA: final allocation to maximize slot utilization
[Compression]



Compression: execution



Compression: execution



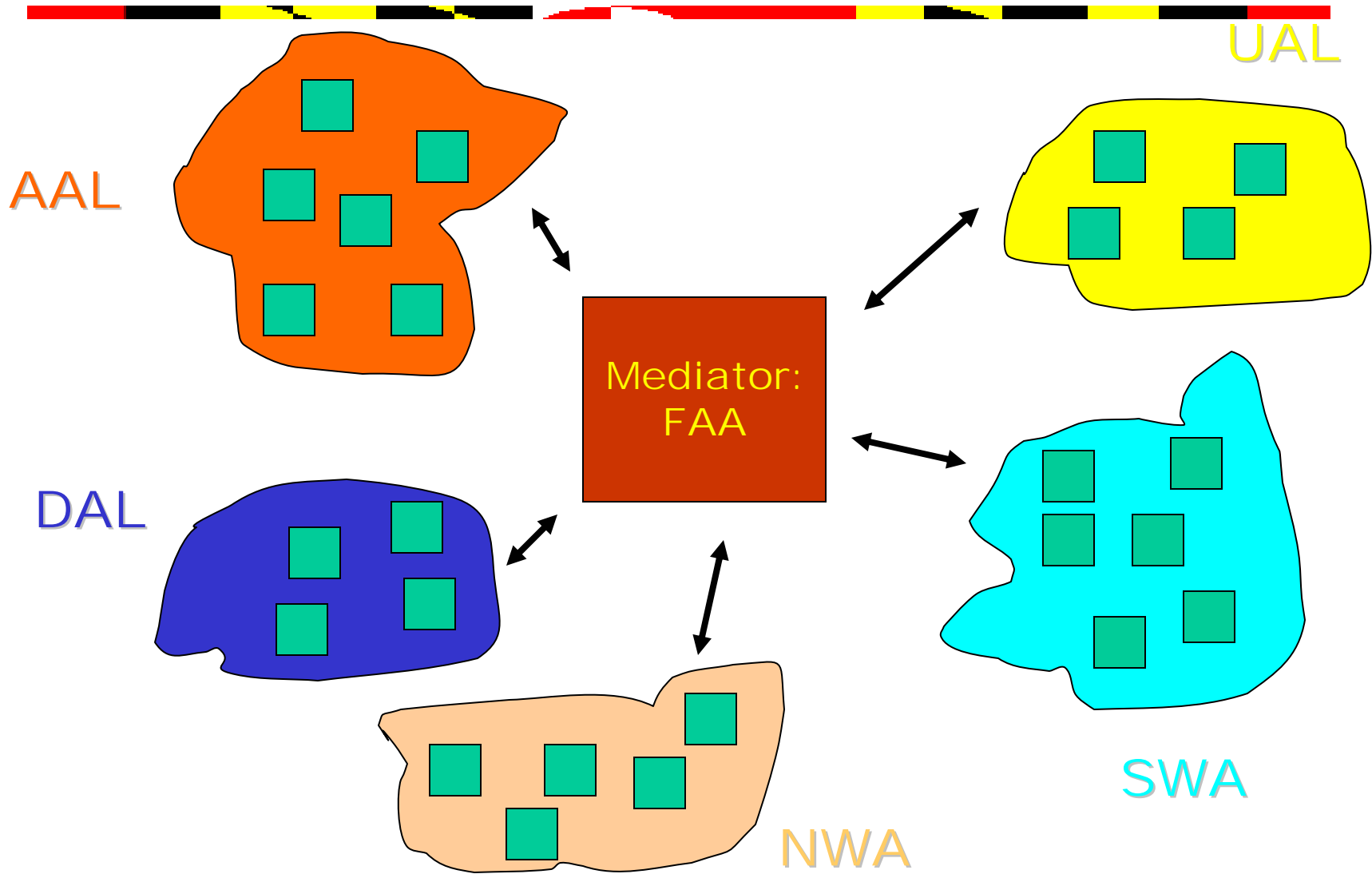
Recently, slot credit substitution (SCS), a transaction oriented version of compression, has been introduced



Revised View of GDP Processes

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- Step 1: Fair allocation of landing time slots to airlines
 - Step 2: Mediated, inter-airline bartering

Inter-Airline Bartering



A decorative horizontal bar with a repeating pattern of red, black, and yellow segments.

Question:

If an airline or other service provider leases or buys an arrival or departure slot what rights can be expected on a day of operations?

Most likely individual one-operation slots would not be sold/leased; rather permission to perform an operation within a designated time interval would be given; possible interval lengths might be 15 min, 20 min, ½ hr.

Solution 1

A slot lease or slot ownership provides an airline with the right to publish a flight arrival or departure at a given time at a given airport:

- airlines suffer no penalty for arriving/departing early or late;
- FAA suffers no penalty for being unable to support designated operation.



Solution 2

FAA guarantees access to each slot sold or leased;
slot owner only has right to land/takeoff during its
designated slot time

- if the FAA is unable to provide that access then it must appropriately compensate the owner of the slot;
- if the slot owner is unable to access its slot then it must trade its slot for one it is able to access – otherwise, access will be provided on a first-come, first-served basis during unreserved time periods.



Solution 2'

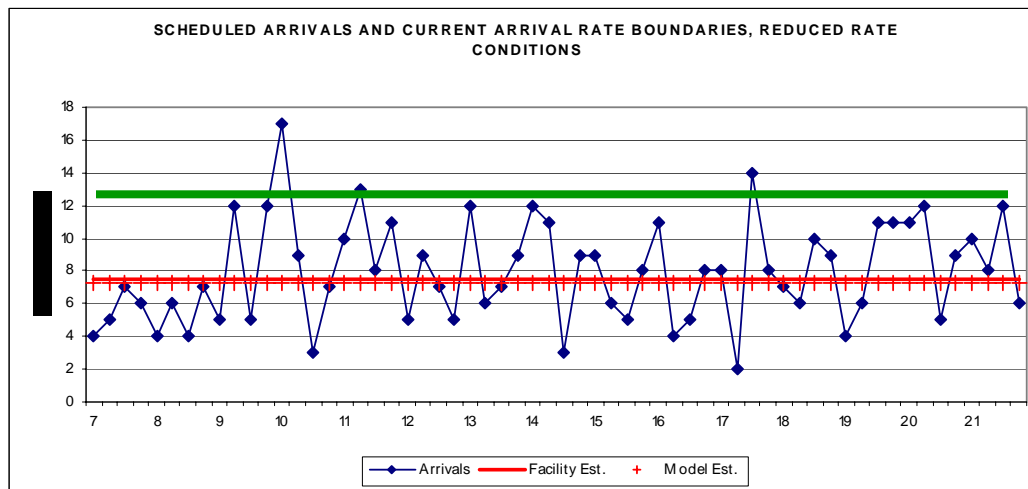
FAA guarantees a certain long-term average level of performance, e.g. access will be provided at least 90% of the time:

- at the end of each year the FAA performance level is computed, if performance level is below guarantee then a certain percentage of the fee paid by the owner is returned;
- slot owner has the right to request access to the airport outside of its designated slot time a limited number of times per year.

Solution 3

Multiple slot classes are defined:

- high priority slots are guaranteed in nearly all weather conditions;
- low priority slots are subject to delays in adverse weather conditions.



“as-available capacity”

“guaranteed capacity”

Solution 4

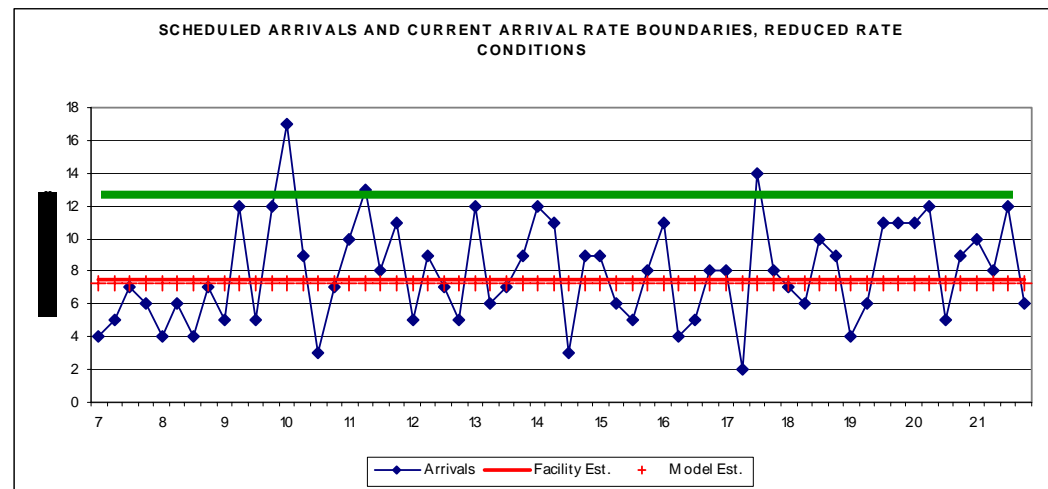
Slot ownership → priority in an RBS allocation scheme:

- on a good-weather day, access to owned or leased slot is provided;
- on bad-weather day, a delay consistent with RBS allocation scheme is applied;
- if an airline is unable to access its slot then compression/SCS (or a more advanced slot exchange method) is applied.

Clearly many particulars of the CDM procedures would have to be reevaluated and refined for this context.

Problems, Concerns, Questions

- Safety concern: penalties or incentives should not put undue pressure on ATC or pilots to “make” a particular slot time.
- Access to arrival slots and departure slots must be coordinated as a flight is dynamically controlled.
- How many slots should be allocated??



- Many others!!!