



***TRACK: A (PLANNING)***

***WORKSHOP: 2***

***Title: Get me to my plane on time***

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***Date: February 18, 2015***



ACC



AIRPORT

PLANNING DESIGN & CONSTRUCTION

SYMPOSIUM

FEBRUARY 18-20, 2015 ✈ SHERATON DENVER DOWNTOWN HOTEL ✈ DENVER, CO

Driverless Parking Shuttles

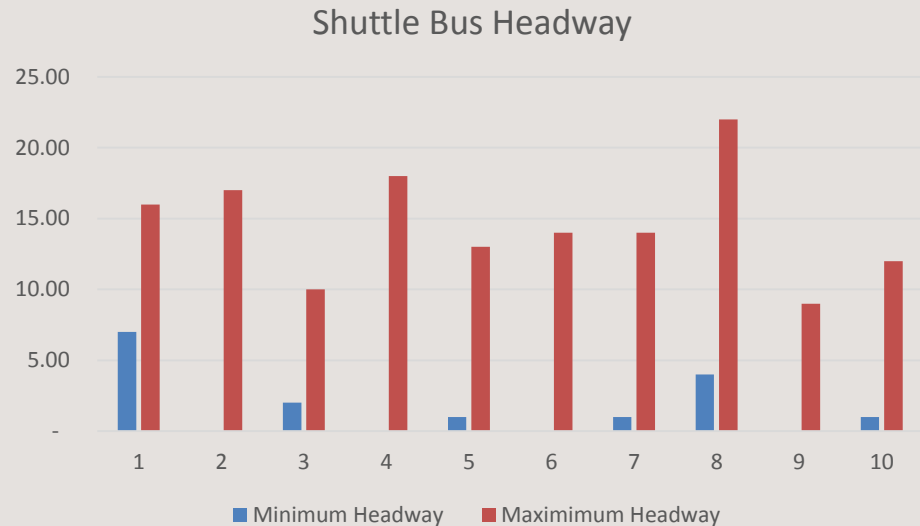
...better than buses?



- What is the problem with shuttle buses?
- Driverless shuttles
- Heathrow International Airport
- Greenville-Spartanburg International Airport
- Conclusions



- Passenger service
  - Connect times
  - Reliability
  - Limited seats
  - Lifting/storing luggage
- Congestion
- Emissions
- Bus maintenance and operations







# Driverless Shuttles





# Heathrow International Airport

- T-5 to Business Carpark
- 21 vehicles, 3 stations, 2.4 track-miles
- 1.2 M passengers since May 2011







# Increased Occupancy & Revenue

- 2012 lot occupancy doubled over 2011
- Rate increased 20% June 2011
- Lot being expanded and rebranded
  - “Pod Parking”





- Increased dwell time in departures
- Passengers love it - predictable
- Revenue from sponsorships
- Adjacent hotel use
  - 2,000 per month @ £5
- Replaced 70,000 annual bus trips
  - Reduced congestion
  - Reduced emissions







6 to 10 minute connect times

An aerial photograph of a campus. A red line starts at a building in the upper center, goes south, then east, then south again, ending at a large parking lot in the lower right. The campus includes several buildings, parking lots, green spaces, and a road. A text box with the text '6 to 10 minute connect times' is overlaid on the image, with a red line connecting a building to a parking lot.



# Growing Parking Demand







500'

TERMINAL

GARAGE A  
(1046)

GARAGE C  
(1500)

ECONOMY LOT 2  
(1300)

GARAGE B  
(1483)

ECONOMY LOT

12 to 17 minute connect times

#### LEGEND

EXISTING PARKING

PROPOSED PARKING

PROPOSED ROAD

PROPOSED ROUTE 1

PROPOSED ROUTE 2

PROPOSED ROUTE 3

PROPOSED COMMON ROUTE

PROPOSED PICKUP POINT

PROPOSED DROPOFF POINT



ECONOMY LOT 3  
(1100)

Bus Solution





500'

TERMINAL

GARAGE A  
(1045)

GARAGE B  
(1483)

DAILY  
(367)

GSP DRIVE

ECONOMY LOT 2  
(1300)

5 to 7 minute connect times

ECONOMY LOT  
(1440)

AVIATION PARKWAY

#### LEGEND

EXISTING PARKING

PROPOSED PARKING

PROPOSED ROAD

PROPOSED GUIDEWAY (ELEVATED)

PROPOSED GUIDEWAY (AT GRADE)

PROPOSED STATION

PROPOSED MAINTENANCE FACILITY



ECONOMY LOT 4  
(1100)

ECONOMY LOT 3  
(1100)

PRT Solution



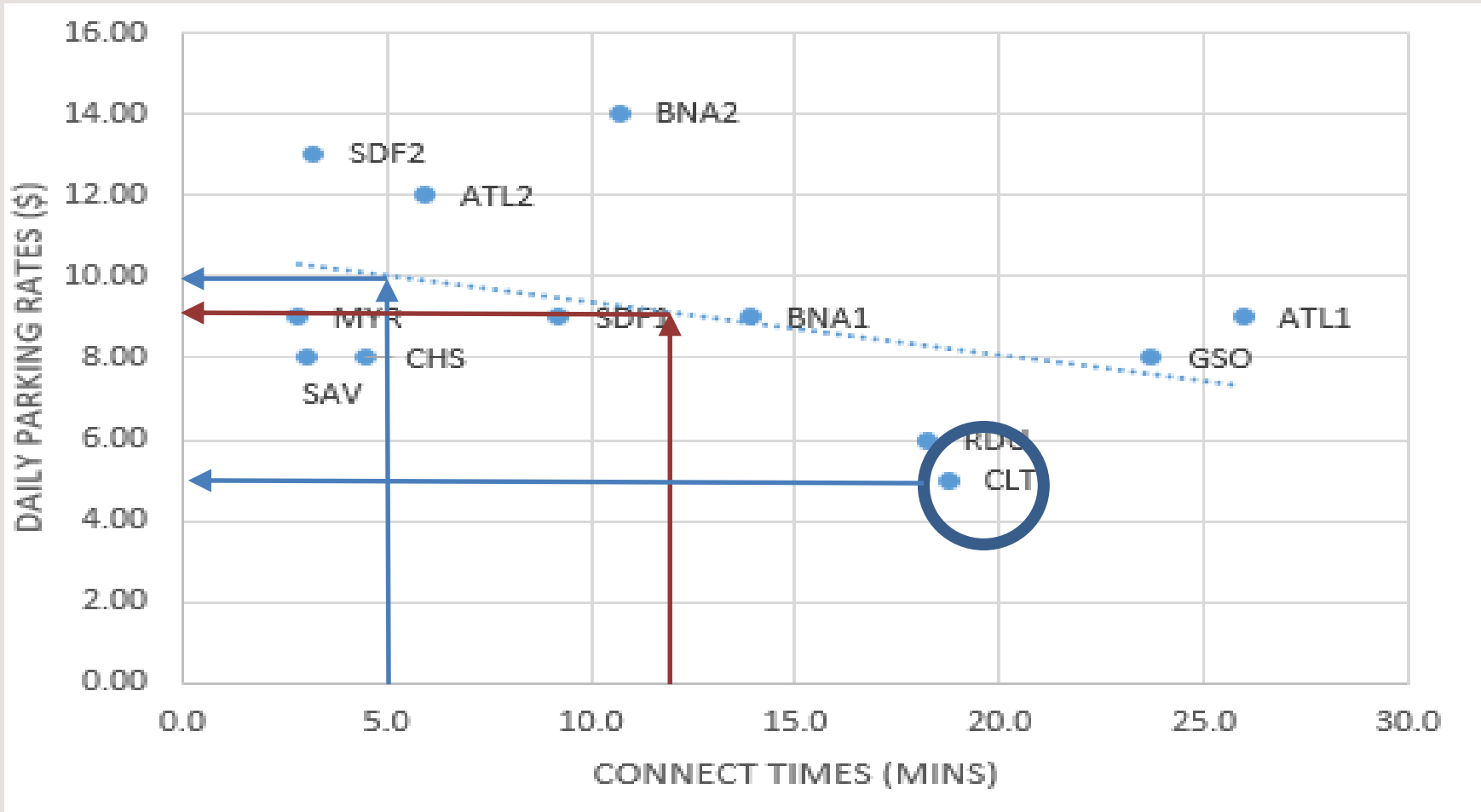
# 30-Year Life-Cycle Costs

- PRT: \$181 M
- Bus: \$198 M

**PRT has lower costs**



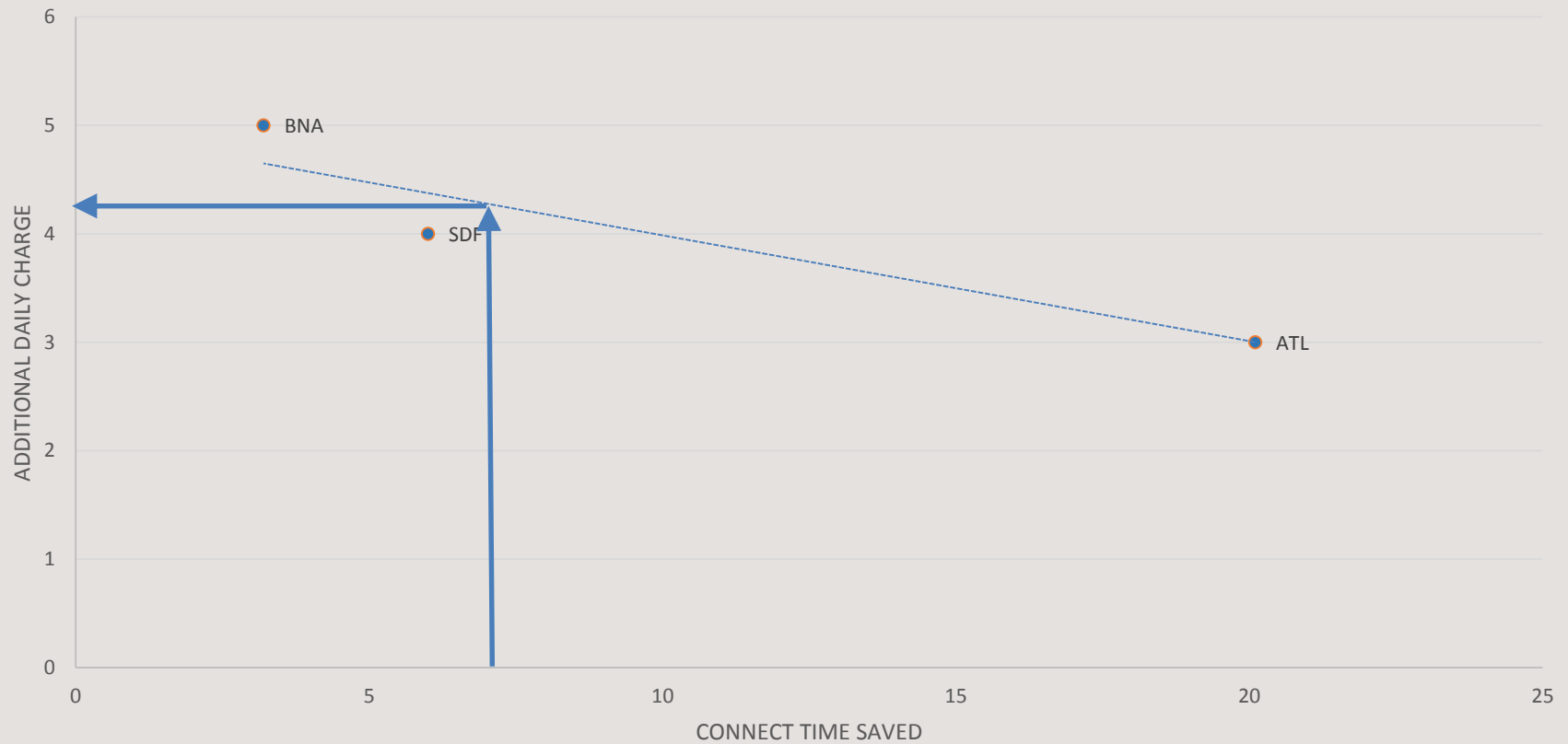
# Parking Rates vs. Connect Times







# Additional Charge vs. Time Saved





# Rates Used for Comparison

- PRT: \$6.00 per day
- Bus: \$5.00 per day



# 30-Year Parking Revenue

- PRT: \$204 M
- Bus: \$201 M

**PRT has higher revenues**

PRT based on \$6.00/day

Bus based on \$5.00/day





- Shuttle needed to maintain high level of service
- PRT is preferred to bus
  - Higher level of service
  - Lower capital costs
  - Higher revenues
  - Obviates need for parking structure
  - No disruption of surface traffic
  - No on-site emissions
  - Breaks even at \$6.00 daily rate



- PRT can provide a much higher level of shuttle service
- It is cost effective at small and large airports
- Key airport parameters
  - Shuttle lot with more than 1,000 spaces
  - Employee lot shuttle buses
  - And/or rental car shuttle buses
  - Air quality non-attainment a bonus
  - Hotel connection a possibility





Thank you

