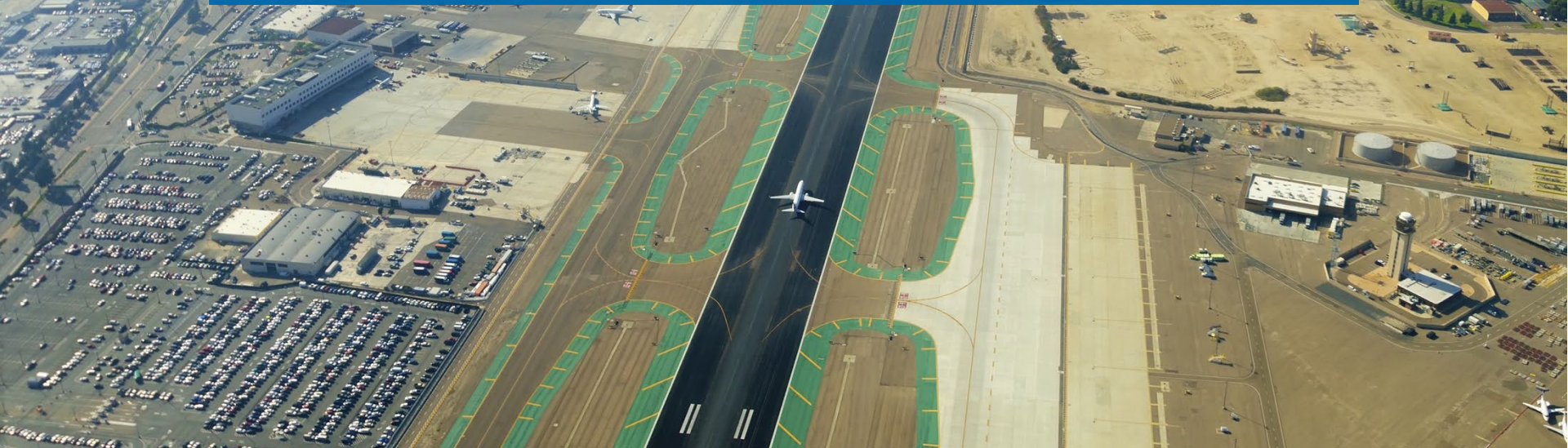


# Rethinking Parking to Enhance Airport Revenues

April 7, 2022



# Today's Learning Objectives

- **Estimate future parking demand for your airport**
- **Identify key considerations for evaluating new parking technologies and payment systems**

# American Association of Airport Executives (AAAE)

**1.0 Continuing Education Units (CEUs)  
are available to Accredited Airport Executives (A.A.E.)**

**Report your CEUs:**

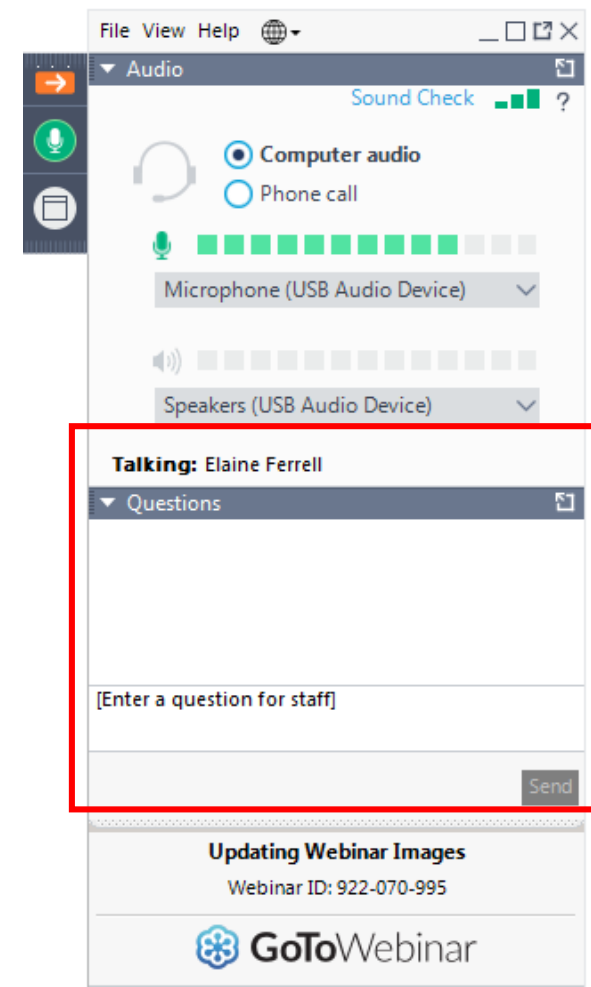
**[www.aaae.org/ceu](http://www.aaae.org/ceu)**

# Questions and Answers

Please type your questions into your webinar control panel

We will read your questions out loud, and answer as many as time allows

#TRBwebinar



# Adam Cohen

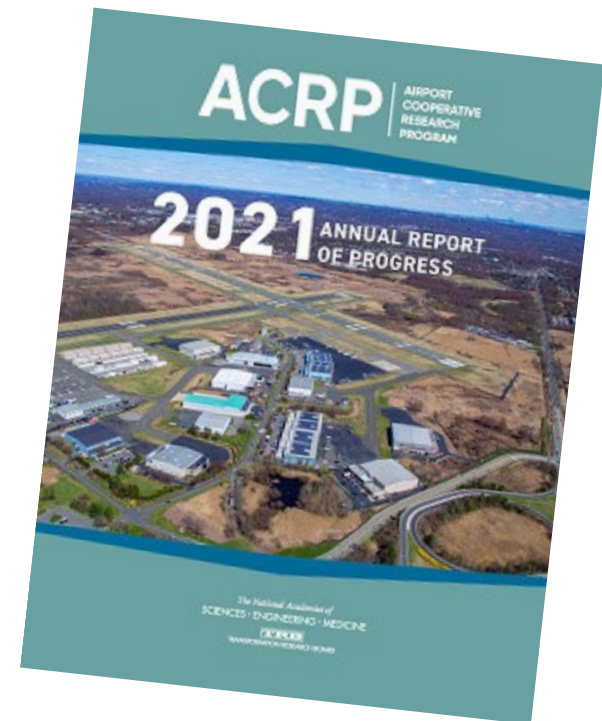
## University of California, Berkeley

- Mobility futures researcher, Transportation Sustainability Research Center, UC Berkeley
- Research focuses on innovative mobility strategies, including advanced air mobility, vehicle automation, transportation network companies, smart cities, smartphone apps, and other emerging technologies
- Multidisciplinary background with unique insight into automation, electrification, landside and airside aviation issues, and the potential impacts of innovative and disruptive technologies.



# ACRP is an Industry-Driven Program

- Managed by TRB and sponsored by the Federal Aviation Administration (FAA).
- Seeks out the latest issues facing the airport industry.
- Conducts research to find solutions.
- Publishes and disseminates research results through free publications and webinars.



# Today's Speakers



Gavin Duncan

[Gavin.Duncan@InterVISTAS.com](mailto:Gavin.Duncan@InterVISTAS.com)

InterVISTAS

Jenna Buckner

[jbuckner@ricondo.com](mailto:jbuckner@ricondo.com)

Ricondo and Associates



John Dorsett

[JDorsett@walkerconsultants.com](mailto:JDorsett@walkerconsultants.com)

Walker Consultants

## Rethinking Airport Parking to Preserve and Enhance Non-Aeronautical Revenues

Gavin Duncan

John Dorsett, AICP, CPP, MBA

Jenna Buckner, CM, MBA



# Research Team

- Gavin Duncan – Inter *VISTAS*, Senior Vice President
- John Dorsett – Walker Consultants, Managing Director and Senior Vice President
- Jenna Buckner – Ricondo and Associates, Director
- JLL
- DWU Consultants

# Research Problem

**Parking demand at airports is declining due to TNCs (e.g., Lyft and Uber) and (eventually) automated vehicles, therefore airports could use guidance on:**

- Forecasting parking needs in environment of uncertainty
- Evaluating potential for conversion of existing parking facilities that may not be needed
- Strategies to offset ongoing and future revenue reductions

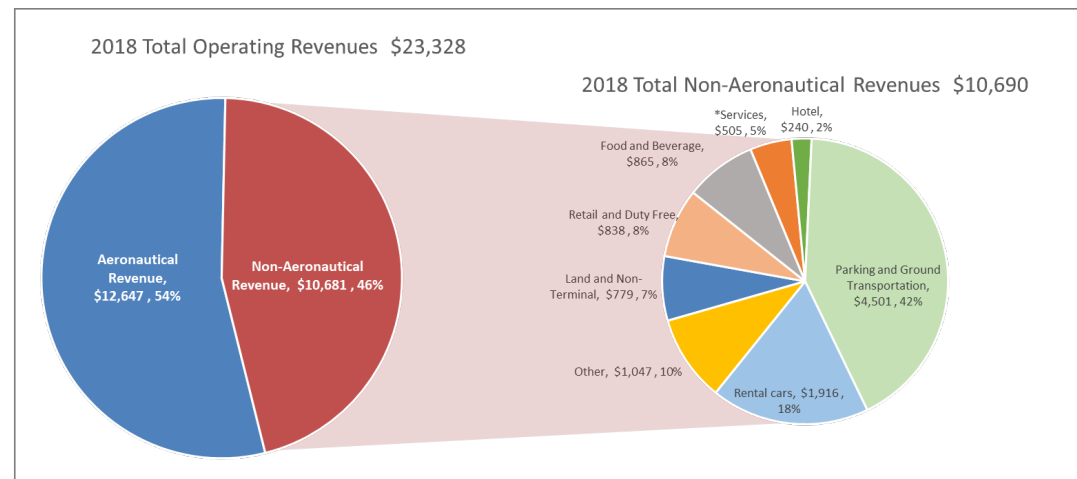
# Research Approach

- Airport interviews
- Case studies
- Forecasting techniques
- Parking management best practices
- Research into repurposing
- Prepare Guidebook

# Risks to Parking and Ground Transportation Revenues

In 2018, parking + rental car + ground transportation generated 60% of non-aeronautical revenues

- Since 2015, rental car revenue per passenger has declined
- Since 2014, parking revenue per passenger has not kept pace with inflation



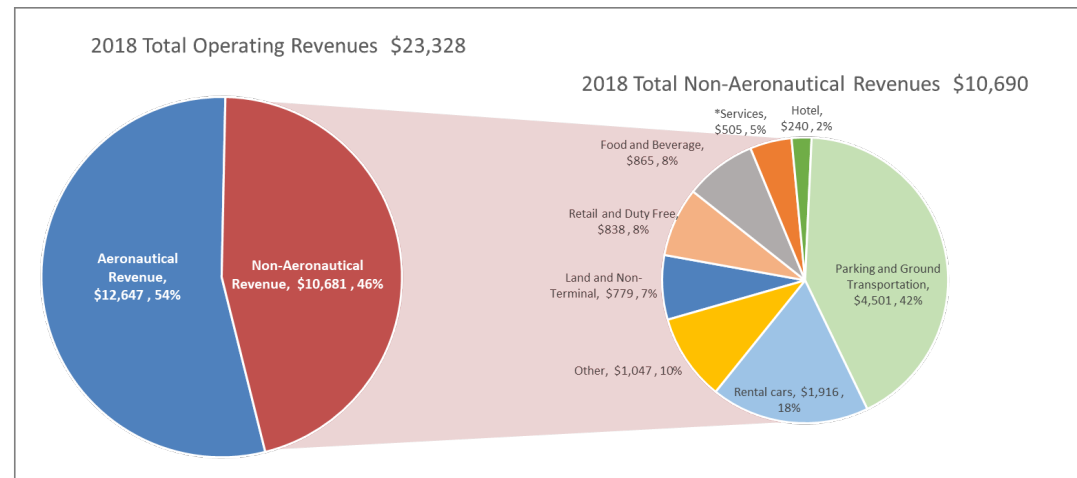
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## Current and future risks include

- TNCs
- Subscription-based car rentals (e.g., ZipCar)
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- Off-airport parking
- Automated vehicles



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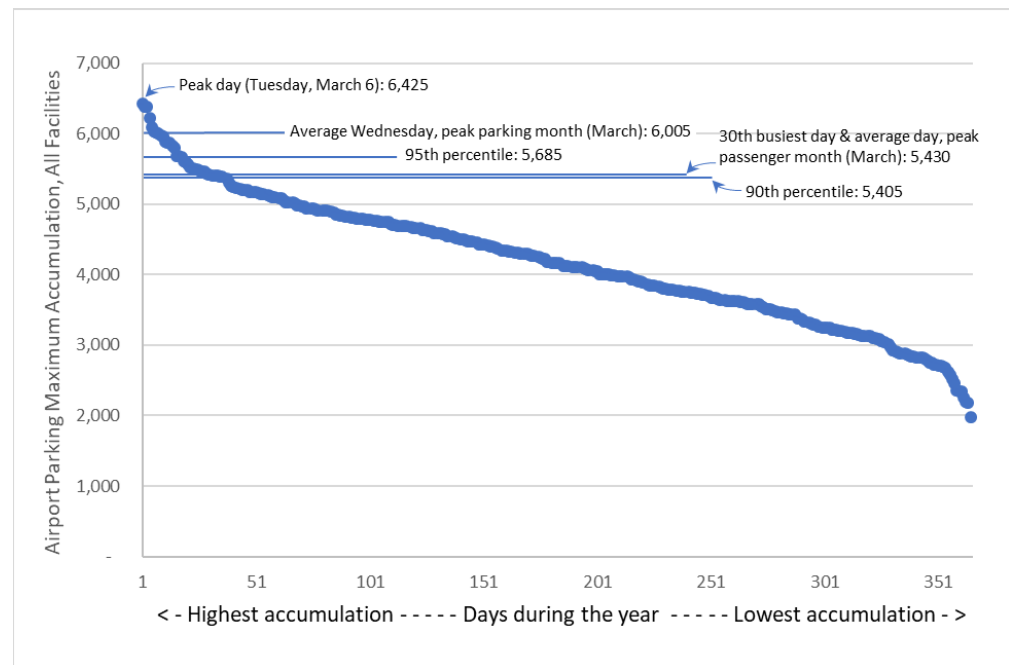
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# Forecasting Future Parking Needs

# Estimating Future Parking Needs in Environment of Uncertainty

*Historical relationships (e.g., required spaces per annual passenger) are no longer reliable for forecasting parking needs*

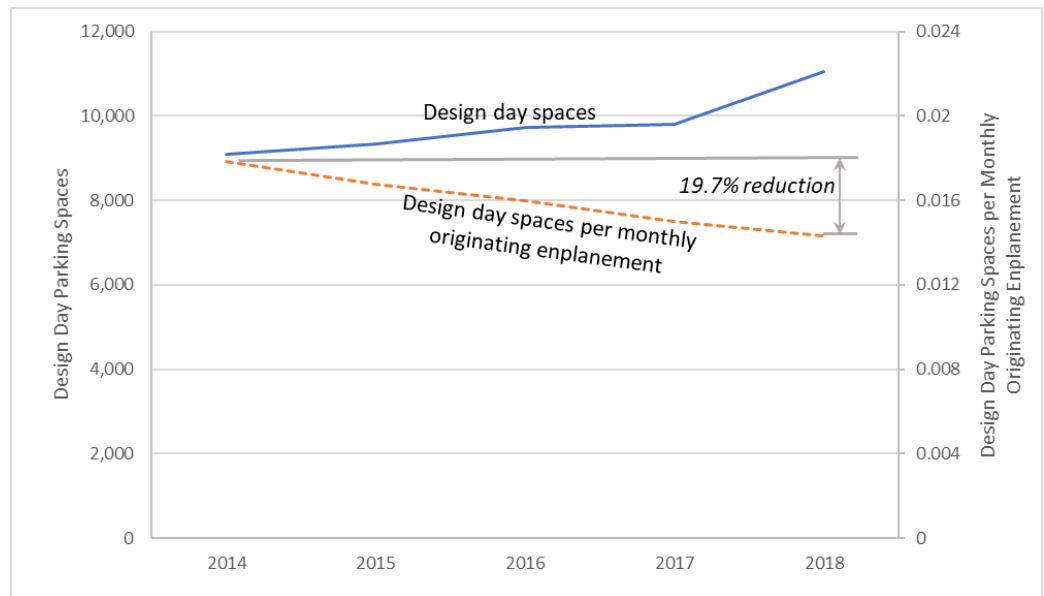
→ Strategies for selecting design day



# Estimating Future Parking Needs in Environment of Uncertainty

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- Strategies for selecting design day
- Assess recent trends

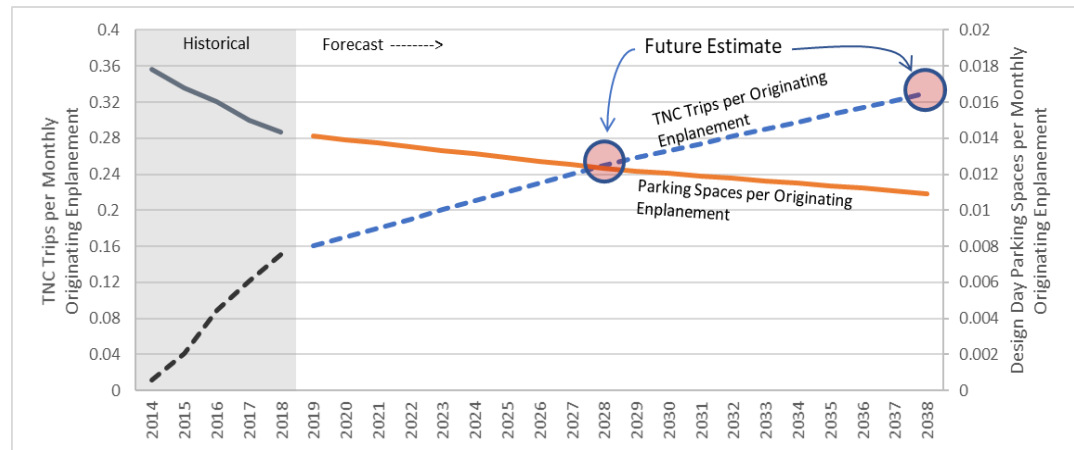




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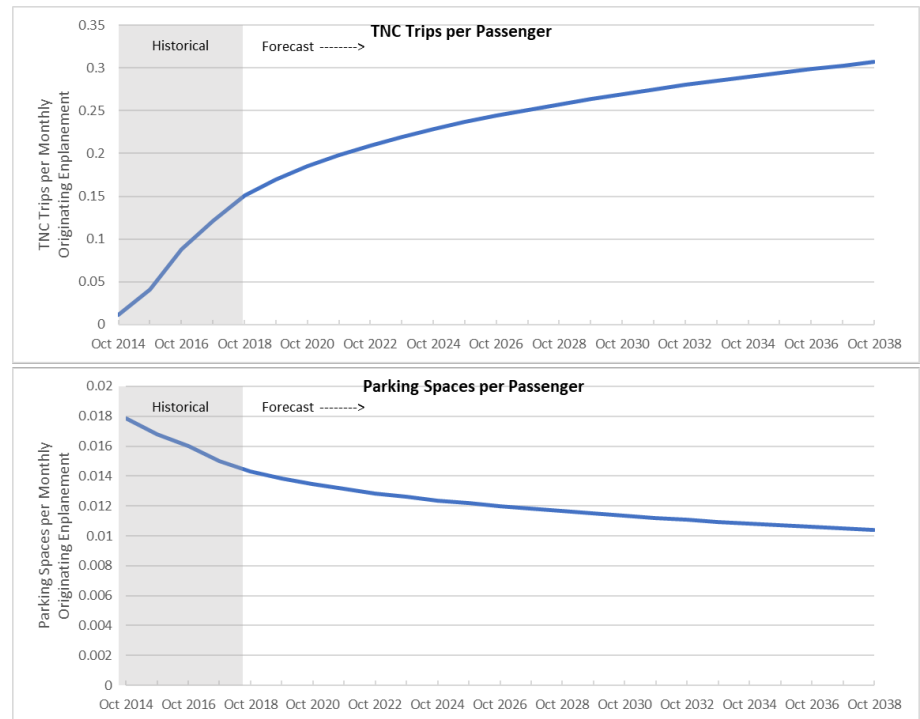
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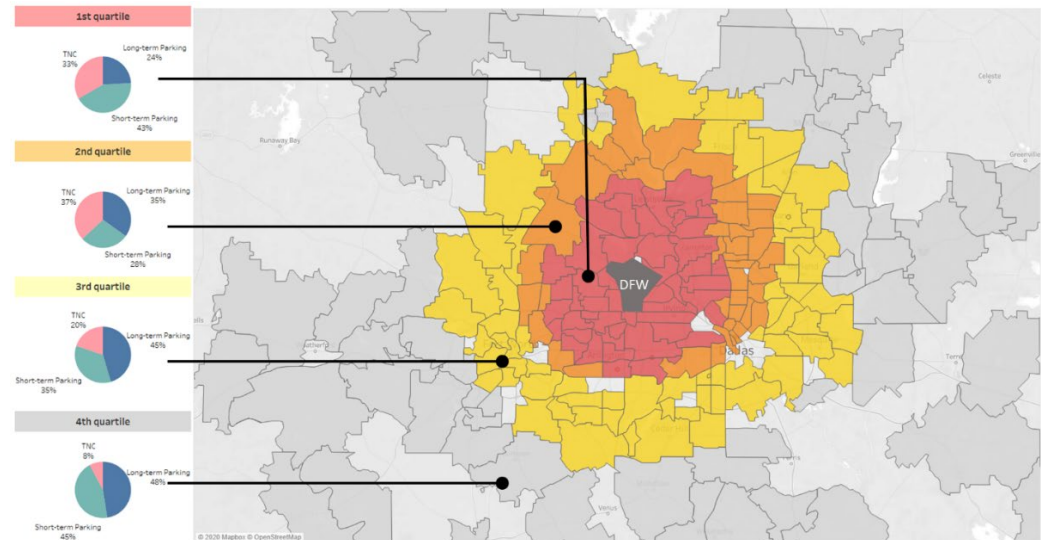
- ➔ Strategies for selecting design day
- ➔ Assess recent trends
- ➔ Estimate future propensity to park
  - Professional judgement
  - Extrapolate from recent trends



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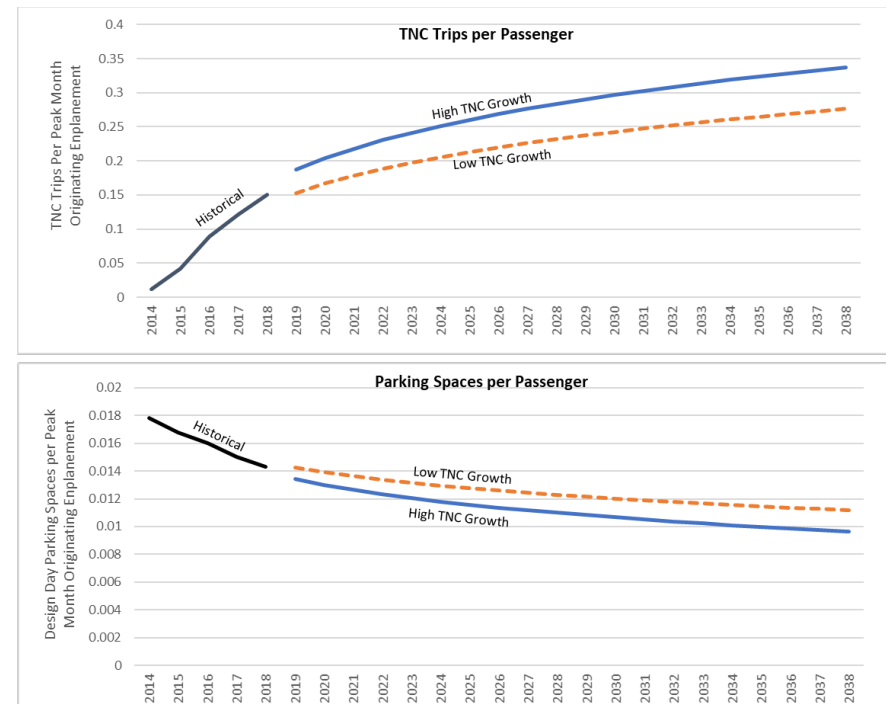
- Strategies for selecting design day
- Assess recent trends
- Estimate future propensity to park
  - Professional judgement
  - Extrapolate from recent trends
  - Passenger surveys + professional judgement



# Estimating Future Parking Needs in Environment of Uncertainty

*Historical relationships (e.g., required spaces per annual passenger) are no longer reliable for forecasting parking needs*

- Strategies for selecting design day
- Assess recent trends
- Estimate future propensity to park
- Recognize the uncertainty



# Repurposing Parking Facilities

# Repurposing Parking Facilities

*Early findings caused Research Team to redirect its efforts*

*ORIGINAL GOAL: “Evaluating potential for conversion of existing parking surface and multi-story parking, rental car, and commercial ground transportation facilities to non-vehicle uses”*

**All interviewed airports indicated that conversion of garages to non-vehicle use would never happen**

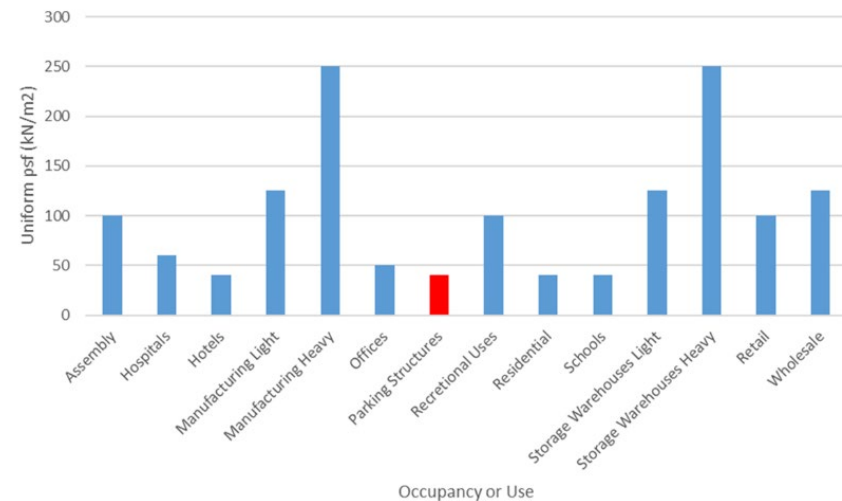
- ➔ If they had excess capacity, they would close remote surface lots first
- ➔ If a garage was not needed, it would be removed

# Repurposing Parking Facilities

## *Early findings caused Research Team to redirect its efforts*

### Garages are difficult to turn into something else

- People weigh more than cars
- More acceptable settling and lateral drift
- Sloped floors
- Elevator & stair locations
- Limited ceiling clearances
- Facades



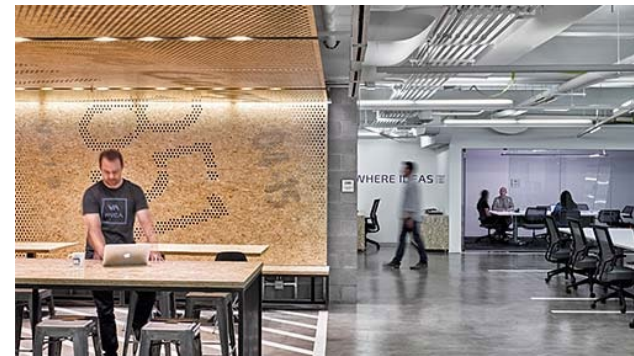
# Redirection

*Early findings caused Research Team to redirect its efforts*

Research identified very few examples

Converting a surface lot is no different than any other land development

*Focus shifted to evaluating strategies for using garages for pickup/drop-off operations, such as for TNCs (Uber / Lyft)*





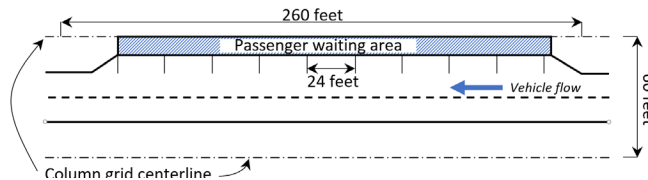
# Adapting Parking Facilities for Other Vehicular Uses

*As demand shifts away from parking toward pickup/drop-off services, existing parking facilities can be used for such services. Key considerations:*

- Pedestrian and motorist safety
- Customer experience
- Flexibility
- Driver familiarity
- Costs
- Efficiency

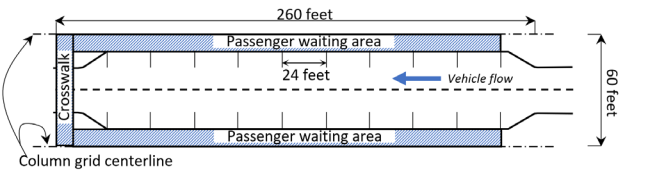
# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5 potential configurations

1



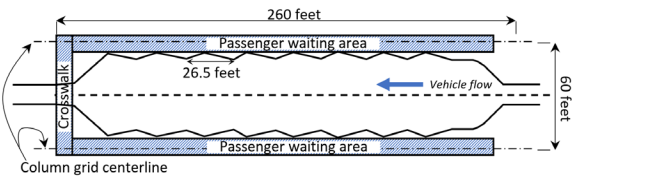
Linear, single-sided

2



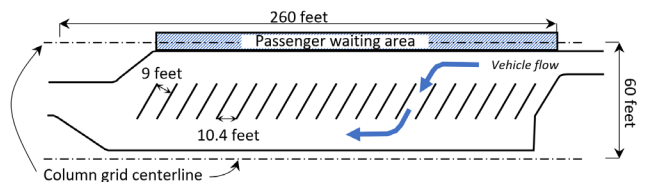
Linear, dual-sided

3



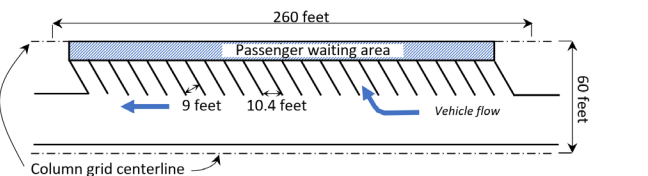
Sawtooth, dual-sided

4



Angled, pull through

5

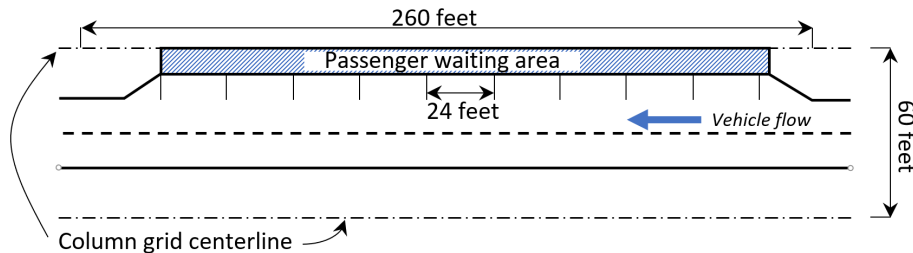


Pull in, back out

# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5

potential configurations

## *Linear, single-sided*



- **243 vehicles per hour**
- **Minimal pedestrian-vehicle interactions**
- **During busy periods, vehicles can double-park**
- **Conventional configuration at an airport**
- **Inexpensive**

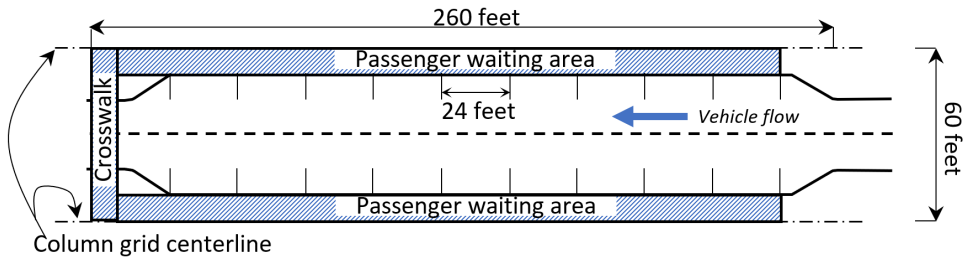


*Remote TNC loading area,  
Los Angeles International Airport*

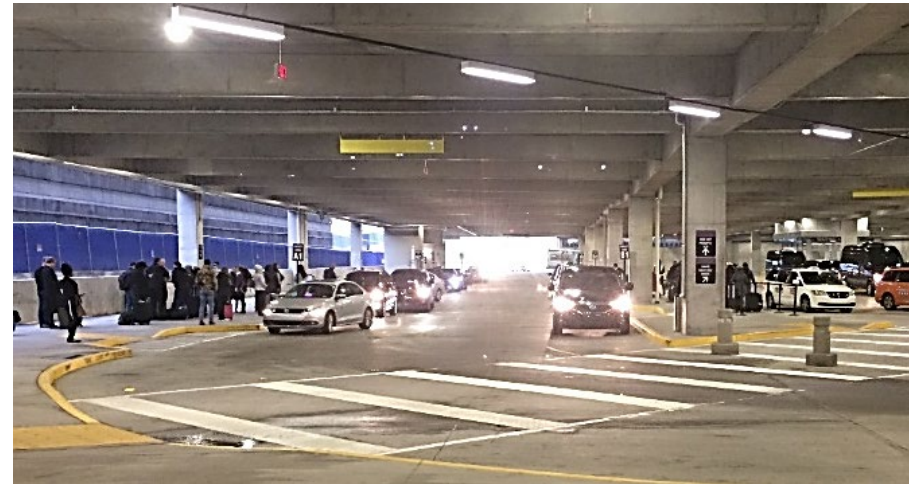
# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5

## potential configurations

### *Linear, dual-sided*



- 450 vehicles per hour
- Increased pedestrian-vehicle interactions
- When busy, double-parked vehicles risk blocking roadway
- Left-side loading less common
- Inexpensive to build, may need staff for crosswalk control

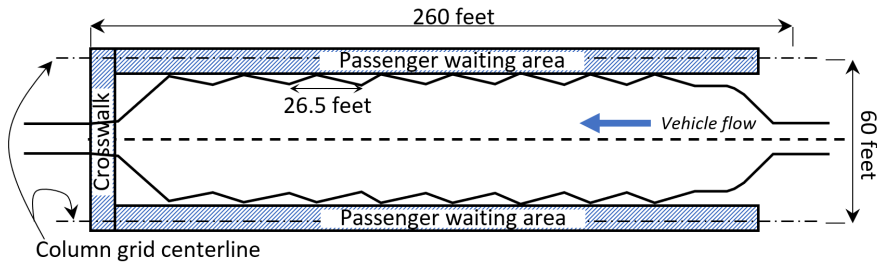


*TNC loading area,  
Nashville International Airport*

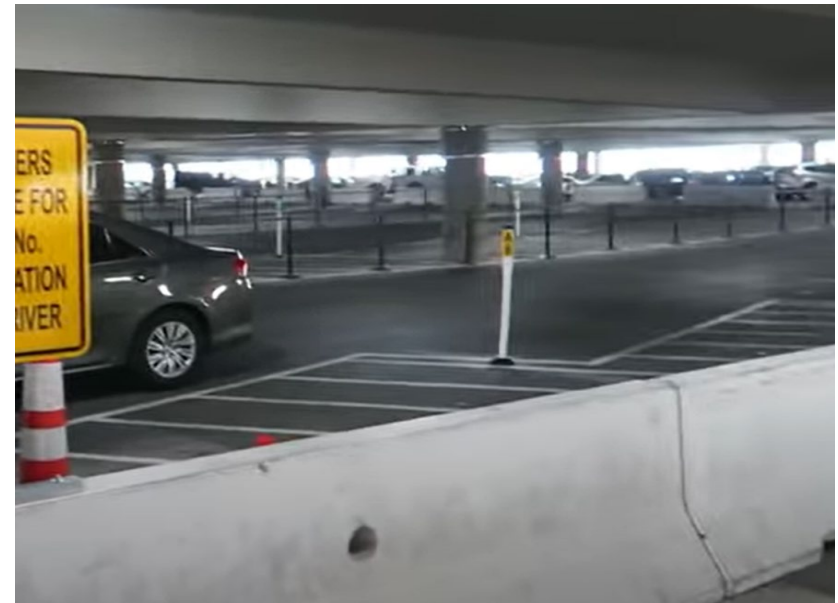
# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5

## potential configurations

### *Sawtooth, dual-sided*



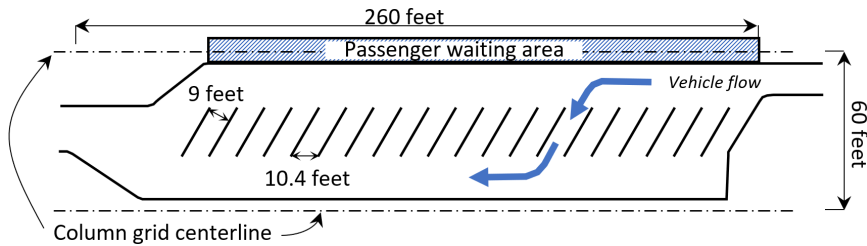
- **464 vehicles per hour**
- **Increased pedestrian-vehicle interactions**
- **All vehicle travel is forward**
- **When busy, double-parked vehicles risk blocking roadway**
- **Left-side loading is less common**
- **Inexpensive to build, may need staff for crosswalk control**



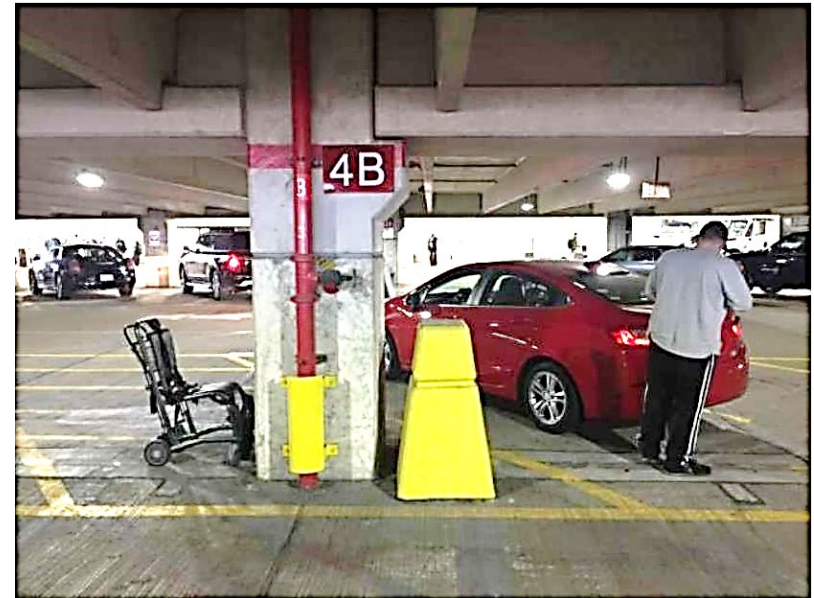
*Sawtooth TNC spaces, Las Vegas McCarran International Airport*

# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5 potential configurations

## Angled pull-through



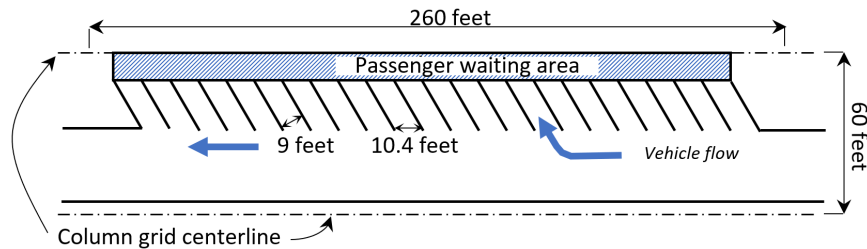
- 500 vehicles per hour
- Increased pedestrian-vehicle interactions
- All vehicle travel is forward
- Minimal ability to accommodate demand surges
- Drivers may not see downstream open spaces
- May require space guidance and/or staff to direct drivers



*Pull-through TNC spaces,  
Detroit Metropolitan Airport*

# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5 potential configurations

## *Pull in, back out*



- **330 vehicles per hour**
- **Minimal pedestrian-vehicle interactions**
- **Requires reversing into traffic**
- **Minimal ability to accommodate demand surges**
- **Drivers may not see downstream open spaces**
- **May require space guidance and/or staff to direct drivers**



*Pull in, back out TNC spaces,  
Seattle-Tacoma Int'l. Airport*

# Adapting Parking Facilities for Other Vehicular Uses Evaluated 5

## potential configurations

	Capacity	
	<p>9 stalls 243 vph</p>	<p>Conventional, inexpensive, requires no pedestrian control, least capacity</p>
	<p>18 stalls 450 vph</p>	<p>Less conventional, requires pedestrian control, high capacity</p>
	<p>16 stalls 464 vph</p>	<p>Less conventional, requires pedestrian control, high capacity</p>
	<p>20 stalls 500 vph</p>	<p>Uncommon, frequent pedestrian-vehicle interactions, highest capacity</p>
	<p>22 stalls 330 vph</p>	<p>Less conventional, requires no pedestrian control, low capacity</p>



# Repurposing Parking Facilities to Non-Vehicle Uses

- **Opportunities are severely limited to convert parking structures**
- **Examples generally limited conversions at grade level (loads are not an issue) or roof level (clearances are not an issue)**
- **No examples identified where an airport has taken a parking structure and converted to a non-vehicle use**
- **Limited examples of where non-aviation uses have repurposed parking**

# Future-Proofing New Parking Structures

- **Guidebook summarizes numerous strategies for potential future-proofing**
  - **Lower-cost (~ 10% premium):** shorter planning horizon; provide for limited vertical expansion; higher clearances; plan for additional mechanical/electrical infrastructure; strategic locations for ramps, elevators, and stairs
  - **Medium-cost (10% - 25% premium):** plan for firewalls/setbacks; provide for more vertical expansion; build one level underground (future conversion to mechanical/electrical space)
  - **Higher-cost (over 25% premium):** design for higher live load; short-span construction; helical or speed ramps (many airports may use these anyway)
- **Since additional cost is incurred on opening day and future needs and payback are uncertain, future-proofing can complicate project financing**

# Strategies and Technologies to Preserve / Enhance Revenues

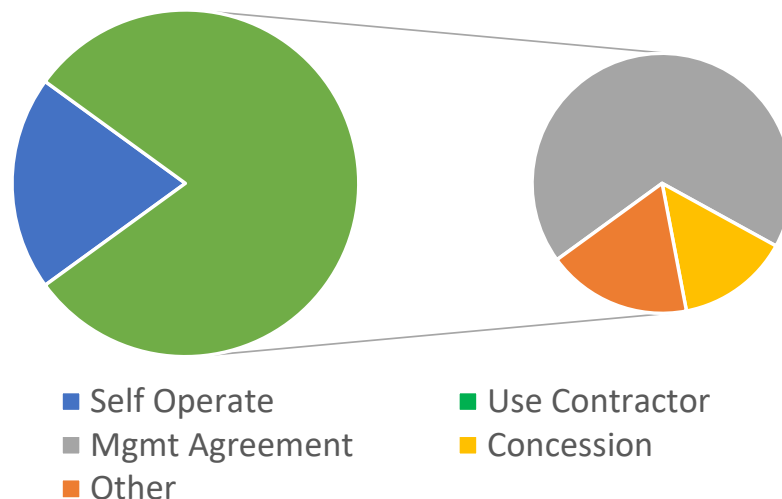
# Airport Parking Management Models

## ▪ Presents four models

- Management – pay operator expenses plus a fixed fee
- Lease / concession – pay operator a share of revenues
- Fixed price
- Private development investment

## ▪ Compares key aspects of each

- Revenue collection
- Reimbursable expenses
- Incentives
- Flexibility
- Risk management
- Strengths and weaknesses

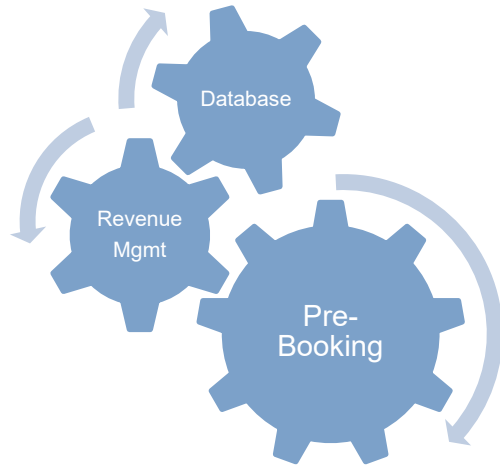


# Innovative Payment Systems and Technologies

- **Revenue Management and Pre-booking**
- **New Payment Methods (Mobile Pay and Mobile Wallet)**
- **Nested Parking Areas**
- **Automated Valet**
- **Airport Access Fees**

# Revenue Management & Pre-Booking

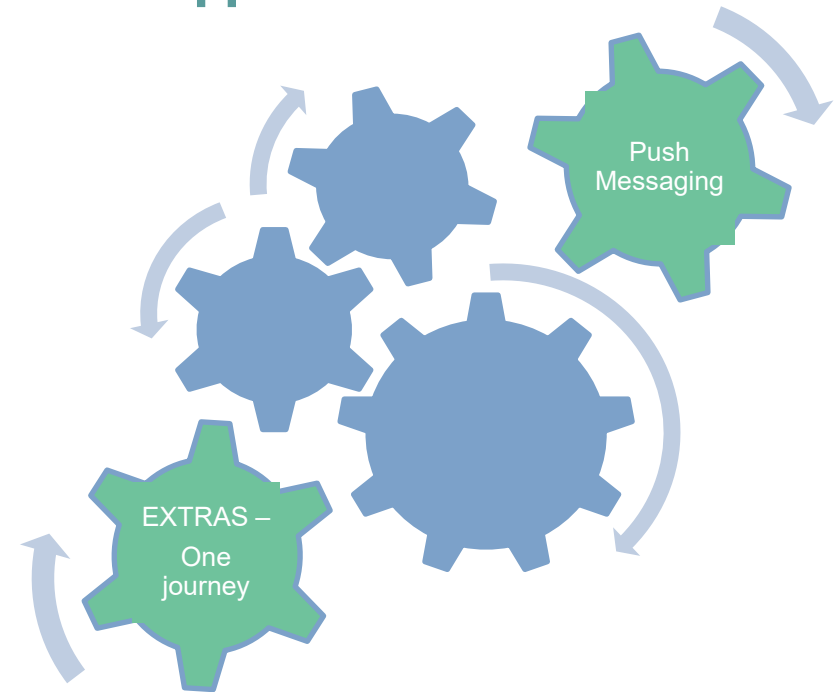
## Where we are



## Reservations systems for

- Contactless payment
- Virtual products / discounts
- Promotional fulfilment
- Occupancy management
- Database build

## Opportunities



Integrated airport-wide shopping cart with loyalty component & customized messaging

# Revenue Management & Pre-Booking

## Parking at SEA Airport



Making your journey **effortless**



### Cell phone waiting area

Wait in a Pearson Airport Cell Phone Waiting Area at no charge for up to 45 minutes



### Car care

Leave your car in our care. Professional car cleaning and detailing right in Terminal 1



### Premium lounge service

Book your visit to one of our premium travel lounges at a preferred rate when you reserve your parking in advance



### Airport meet and greet

Premium personalized airport assistance to support you or your loved one at every step of your journey

# Modern Payment Methods

## What Are They?

- Digital wallet: e.g. PayPal, Cash App
- Mobile wallets: e.g. ApplePay, GooglePay
- Pay Later feature: e.g. at NCP UK

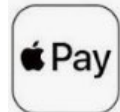
## Limited Deployment

### Airports:

- |     |   |
|-----|---|
| SEA | GooglePay in process, Paypal rejected (funds hold time)                       |
| LAX | GooglePay scheduled for year end deployment                                   |
| UK  | ABZ, GLA, SOU – Paypal, ApplePay and GooglePay on pre-booking site as options |



*Currently, mobile payments are available most commonly through existing parking apps, e.g. ParkMobile, Passport*





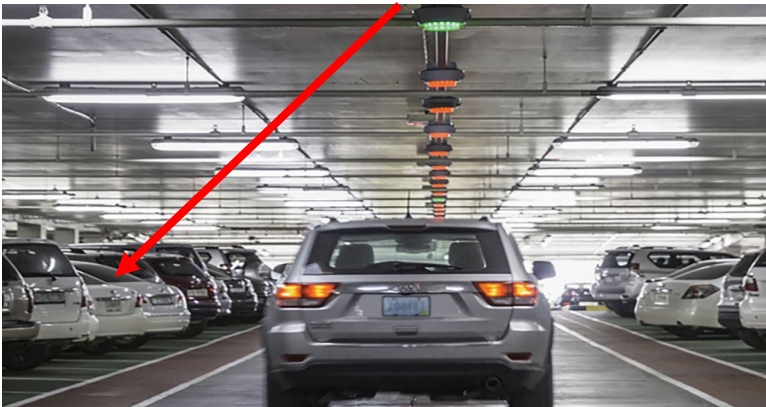
# Nested Parking Areas

## Virtual

Moving beyond red and green

**Objective:** Enable variable pricing without fixed capacity limits

- Based on license plate recognition

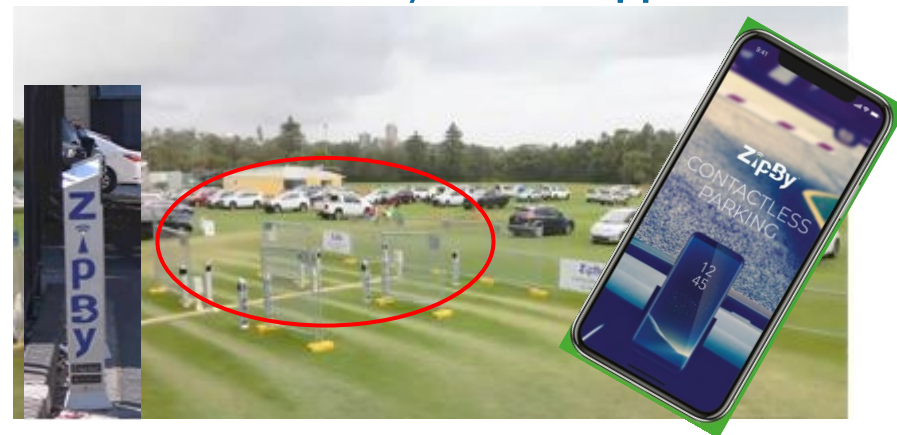


## Bluetooth

Automation via app-based account

**Objective:** Provide fast, flexible set up and ease of use at lower cost

- Based on BLE / mobile app



# Automated Valet and Beyond

## Automated Valet

- “Ray” (Serva Transport Systems) – Dusseldorf Airport (2014)
- “Stan” (Stanley Robotics) – Lyon and London Gatwick (2019)

## Automated Parking

- Park Assist 2.0
- Tesla “Enhanced Summon”

## Automated Shuttles

- First mile/last mile
- Heathrow “pods”
- Tests worldwide, including AUS, DFW, GSP, BRU, BMH, ADP, CHC, SDJ, others

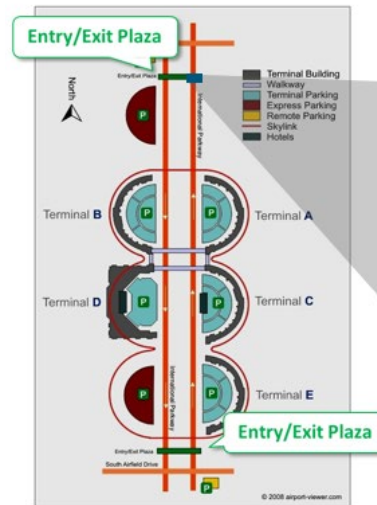


# Airport Access Fees

## Three Approaches:

- Access to entire airport
- Access to curbside
- Alternative drop off / pick up zones

Dallas Fort Worth International Airport



**DFW controls access to the entire airport through two control plazas**

# Airport Access Fees

## Monetizing the Curb

- Increasingly, airports are charging the public to access the terminal curb for pick up and drop off
  - Mainly in UK / Europe
  - Under consideration in U.S.
- Existing systems need improvement

Information tarifaire		
Durée	Parking	Dépose minute
0 à 10 mn	gratuit	gratuit
30 mn	4 €	11 €
1 heure	6 €	26 €



Charles De Gaulle International Airport

# Airport Access Fees

## Proximity Fees

- Alternative Pick Up / Drop Off Zones
- Some charged differentially based on proximity to terminal
  - In Europe and Australia



### Domestic pick up options

Priority Pick-up zone Rates from \$4.35 

Just a four minute walk from Domestic terminals, our most convenient pick up option

Express Pick-up zone Free for 15 minutes 

Eight minute walk from the Domestic terminals

# FOR ADDITIONAL INFORMATION



Gavin Duncan

[gavin.duncan@intervistas.com](mailto:gavin.duncan@intervistas.com)

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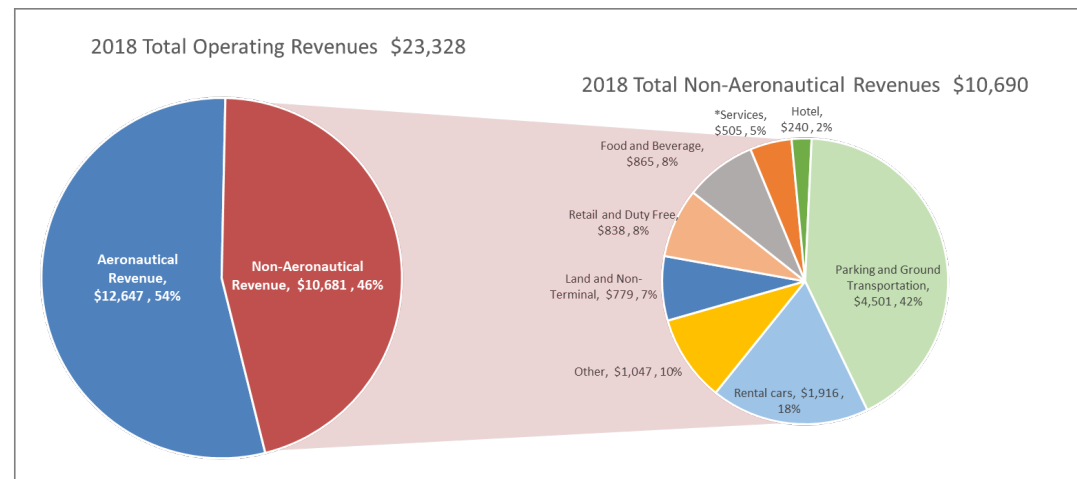
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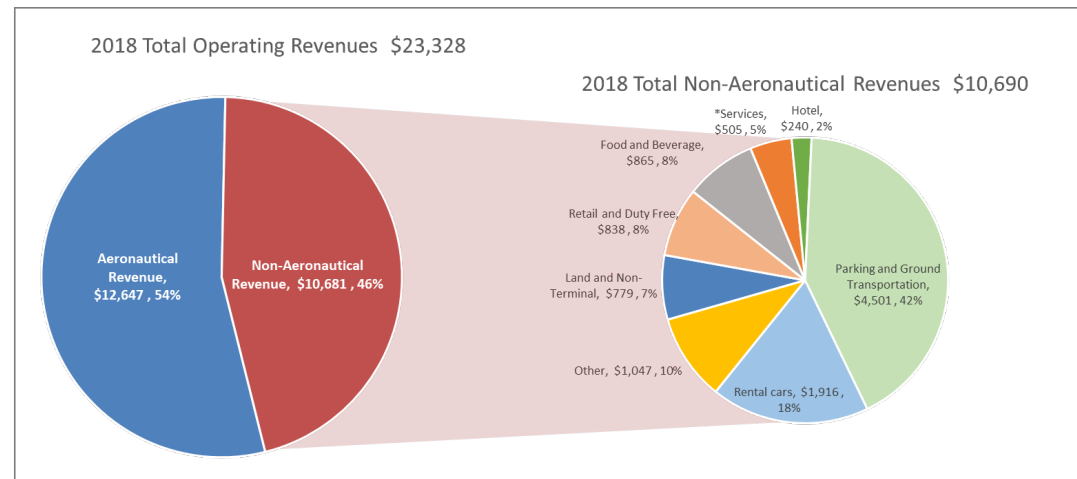
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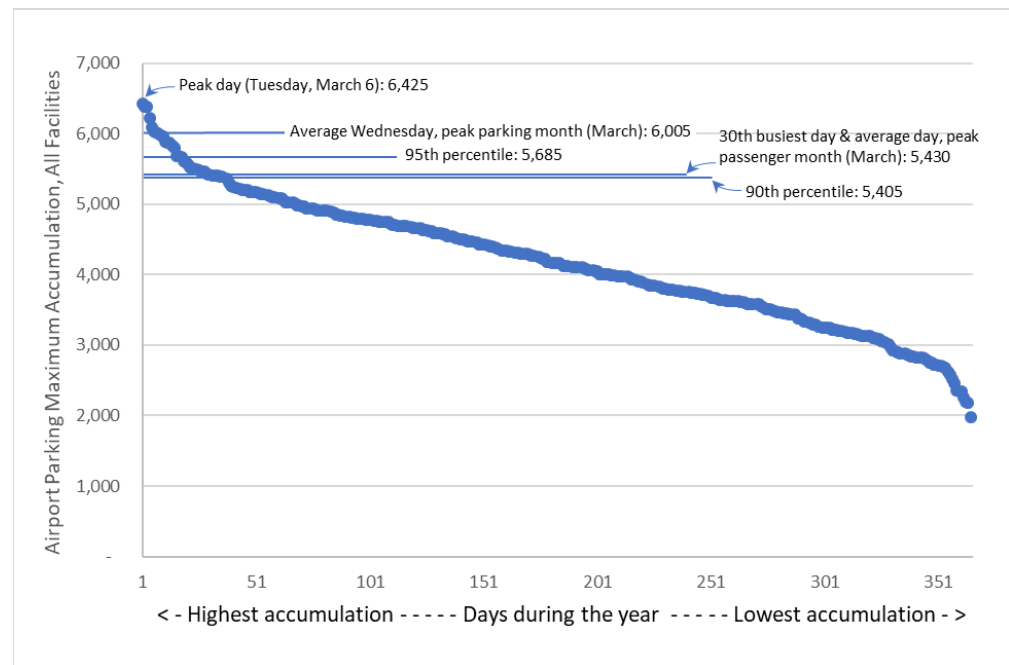
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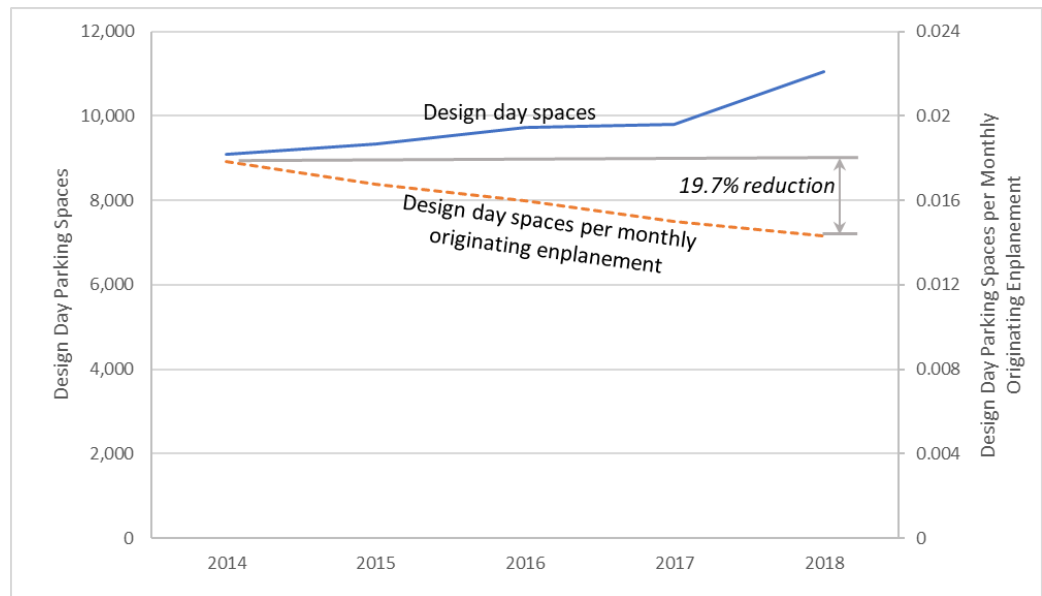
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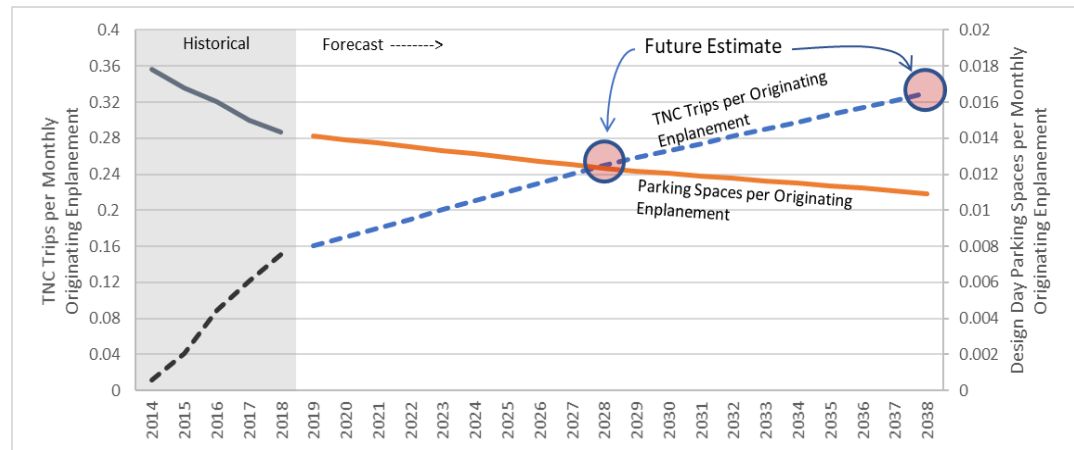
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- Assess recent trends



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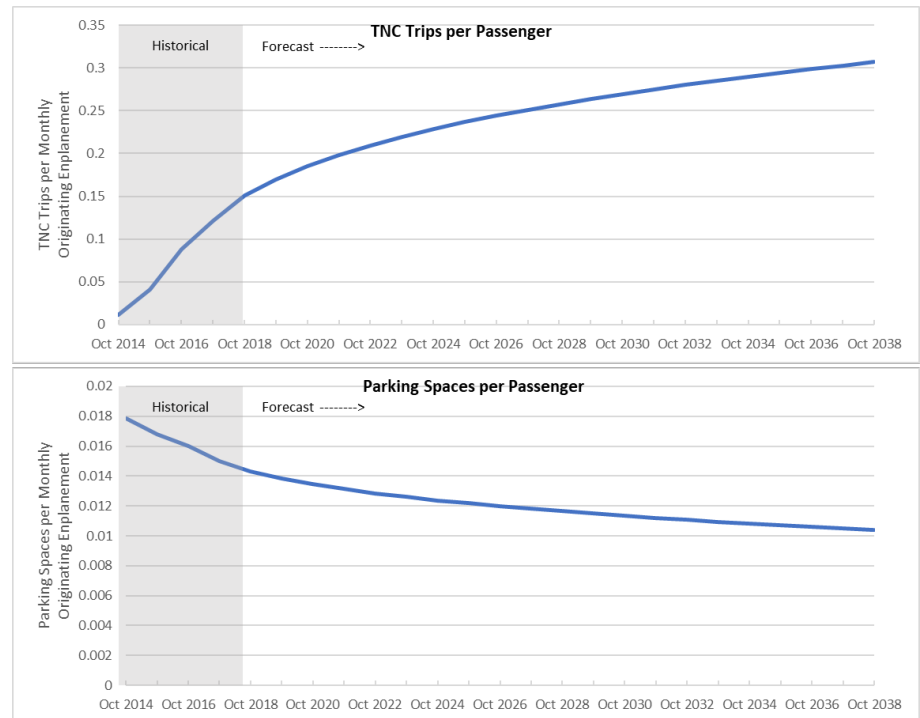




# Estimating Future Parking Needs in Environment of Uncertainty

*Historical relationships (e.g., required spaces per annual passenger) are no longer reliable for forecasting parking needs*

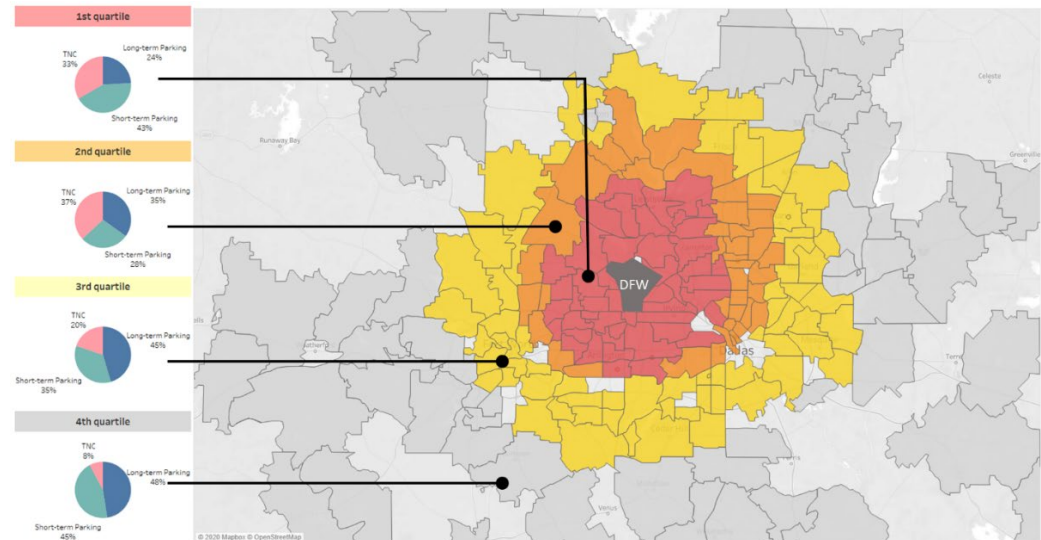
- ➔ Strategies for selecting design day
- ➔ Assess recent trends
- ➔ Estimate future propensity to park
  - Professional judgement
  - Extrapolate from recent trends



# Estimating Future Parking Needs in Environment of Uncertainty

*Historical relationships (e.g., required spaces per annual passenger) are no longer reliable for forecasting parking needs*

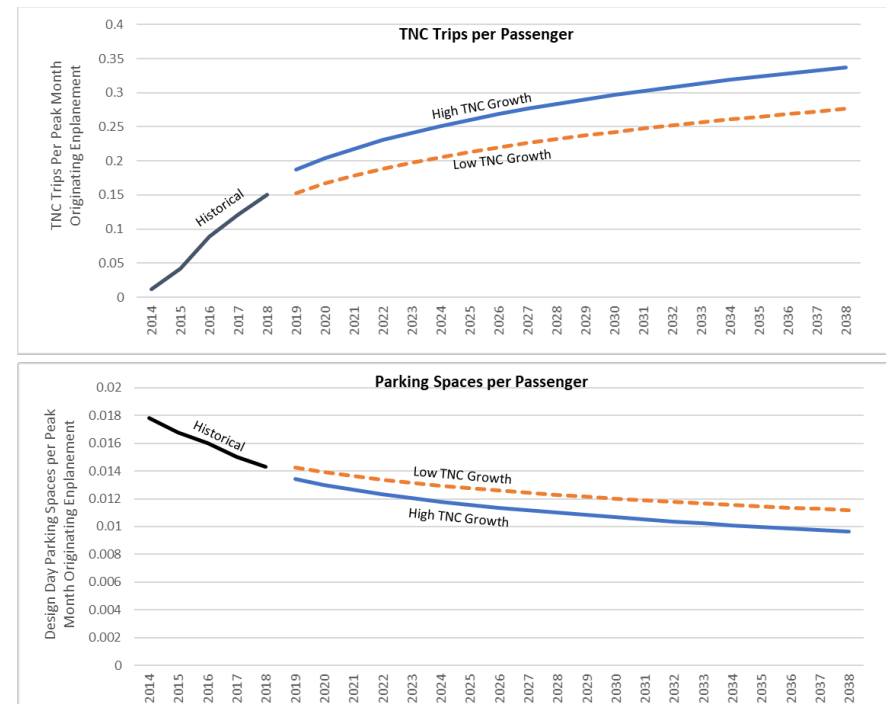
- Strategies for selecting design day
- Assess recent trends
- Estimate future propensity to park
  - Professional judgement
  - Extrapolate from recent trends
  - Passenger surveys + professional judgement



# Estimating Future Parking Needs in Environment of Uncertainty

*Historical relationships (e.g., required spaces per annual passenger) are no longer reliable for forecasting parking needs*

- Strategies for selecting design day
- Assess recent trends
- Estimate future propensity to park
- Recognize the uncertainty



# Repurposing Parking Facilities

# Repurposing Parking Facilities

*Early findings caused Research Team to redirect its efforts*

*ORIGINAL GOAL: “Evaluating potential for conversion of existing parking surface and multi-story parking, rental car, and commercial ground transportation facilities to non-vehicle uses”*

**All interviewed airports indicated that conversion of garages to non-vehicle use would never happen**

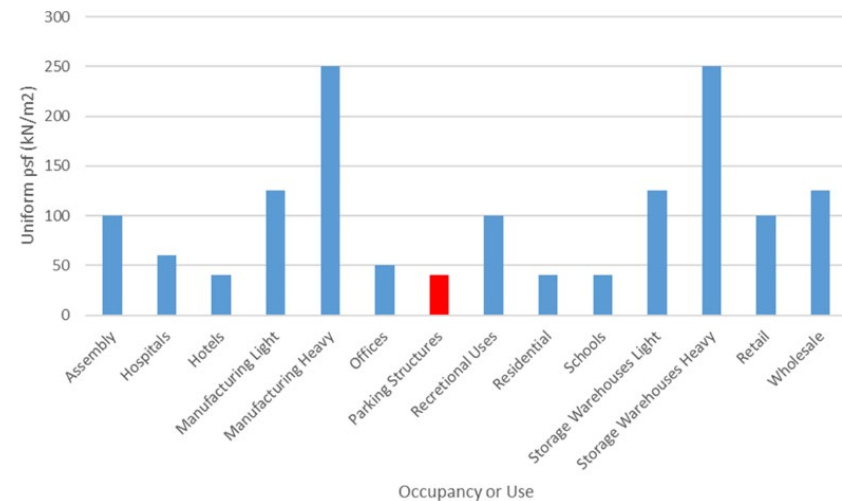
- ➔ If they had excess capacity, they would close remote surface lots first
- ➔ If a garage was not needed, it would be removed

# Repurposing Parking Facilities

## *Early findings caused Research Team to redirect its efforts*

### Garages are difficult to turn into something else

- People weigh more than cars
- More acceptable settling and lateral drift
- Sloped floors
- Elevator & stair locations
- Limited ceiling clearances
- Facades



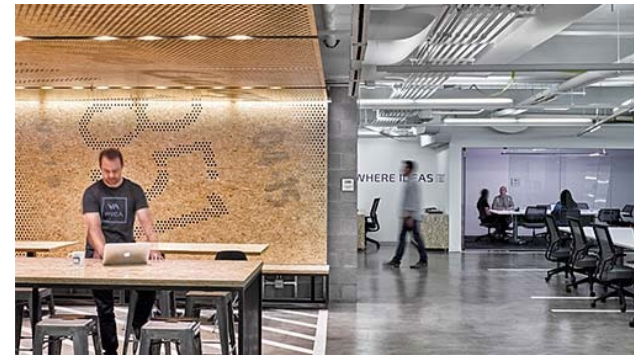
# Redirection

*Early findings caused Research Team to redirect its efforts*

Research identified very few examples

Converting a surface lot is no different than any other land development

*Focus shifted to evaluating strategies for using garages for pickup/drop-off operations, such as for TNCs (Uber / Lyft)*



# Adapting Parking Facilities for Other Vehicular Uses

*As demand shifts away from parking toward pickup/drop-off services, existing parking facilities can be used for such services. Key considerations:*

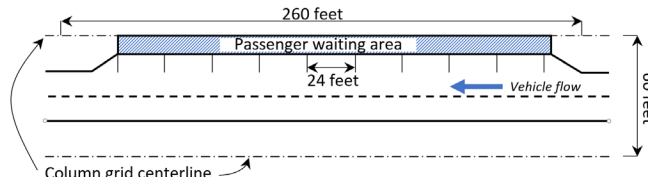
- Pedestrian and motorist safety
- Customer experience
- Flexibility
- Driver familiarity
- Costs
- Efficiency



# Adapting Parking Facilities for Other Vehicular Uses

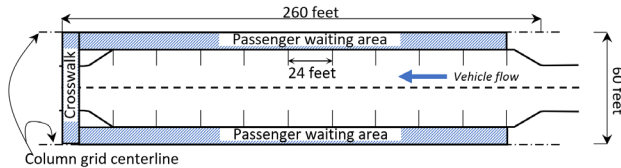
Evaluated 5 potential configurations

1



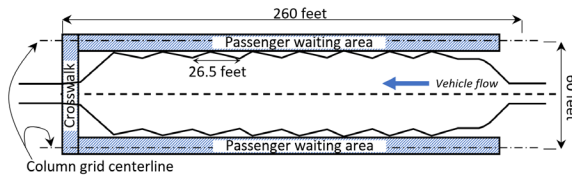
Linear, single-sided

2



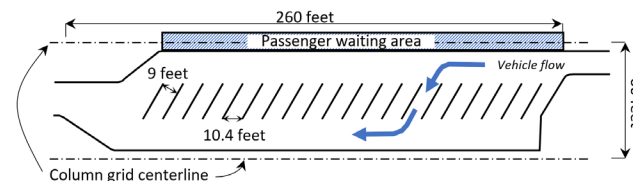
Linear, dual-sided

3



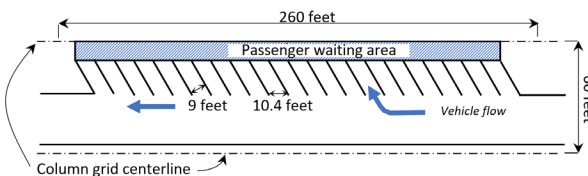
Sawtooth, dual-sided

4



Angled, pull through

5

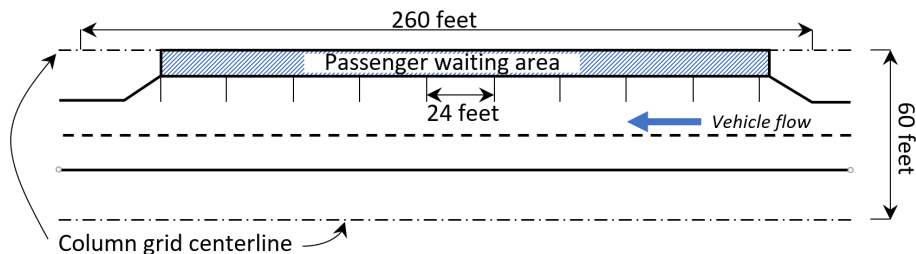


Pull in, back out

# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

## *Linear, single-sided*



- **243 vehicles per hour**
- **Minimal pedestrian-vehicle interactions**
- **During busy periods, vehicles can double-park**
- **Conventional configuration at an airport**
- **Inexpensive**

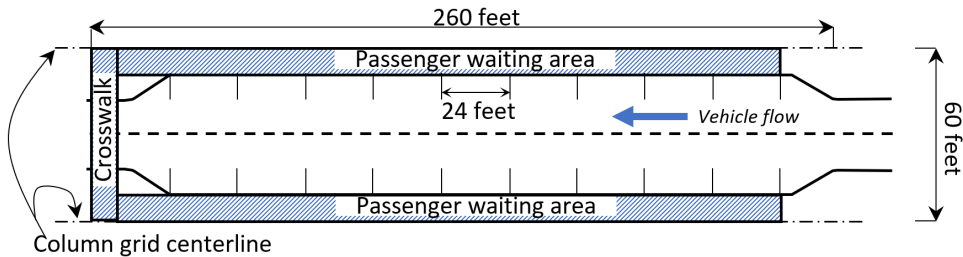


*Remote TNC loading area,  
Los Angeles International Airport*

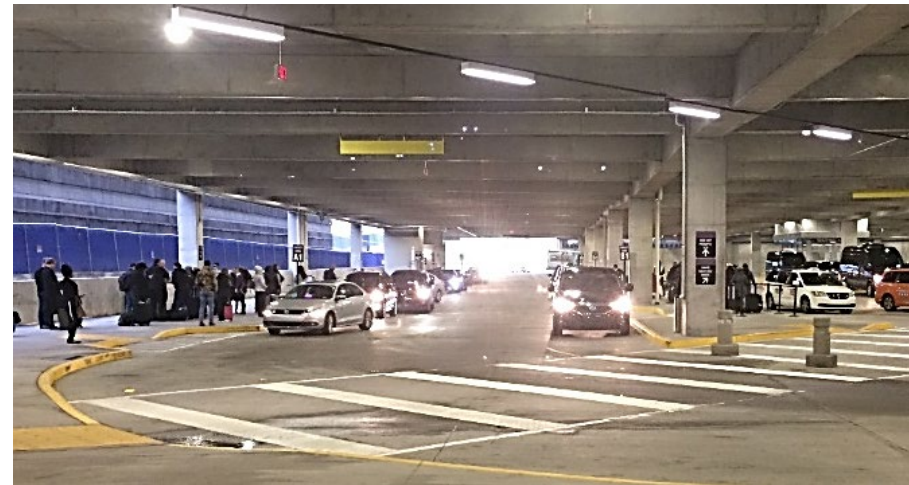
# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

## Linear, dual-sided



- 450 vehicles per hour
- Increased pedestrian-vehicle interactions
- When busy, double-parked vehicles risk blocking roadway
- Left-side loading less common
- Inexpensive to build, may need staff for crosswalk control

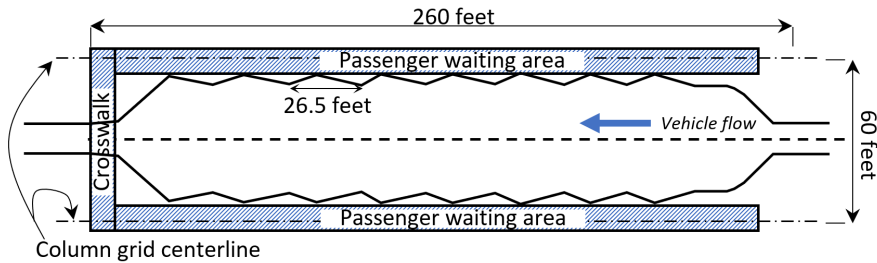


*TNC loading area,  
Nashville International Airport*

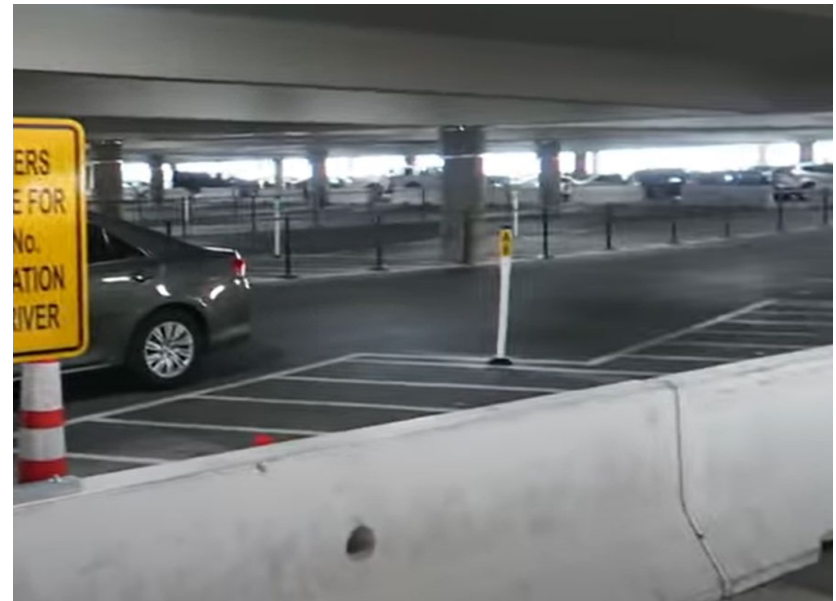
# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

## *Sawtooth, dual-sided*



- **464 vehicles per hour**
- **Increased pedestrian-vehicle interactions**
- **All vehicle travel is forward**
- **When busy, double-parked vehicles risk blocking roadway**
- **Left-side loading is less common**
- **Inexpensive to build, may need staff for crosswalk control**

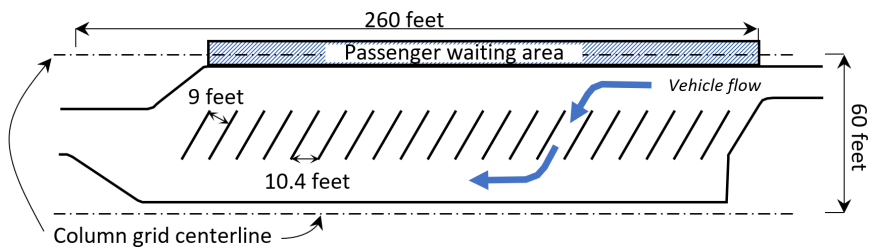


*Sawtooth TNC spaces, Las Vegas McCarran International Airport*

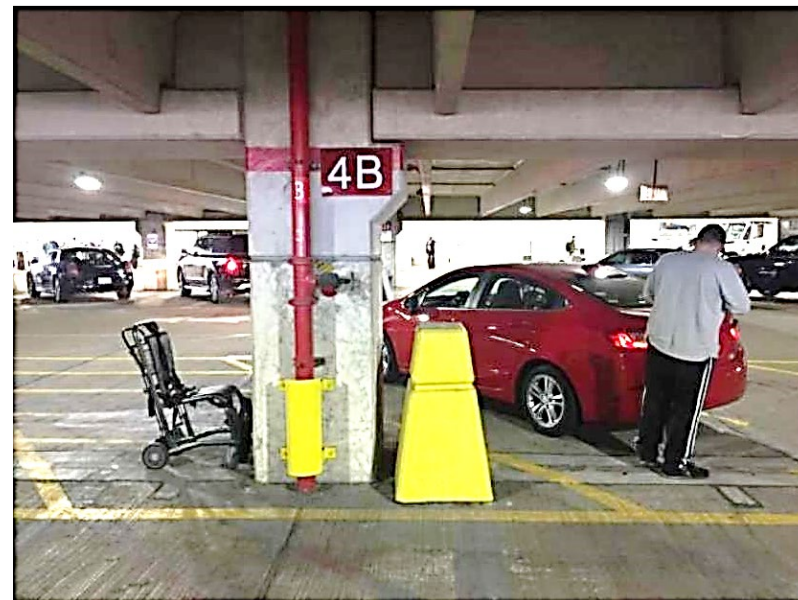
# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

## Angled pull-through



- 500 vehicles per hour
- Increased pedestrian-vehicle interactions
- All vehicle travel is forward
- Minimal ability to accommodate demand surges
- Drivers may not see downstream open spaces
- May require space guidance and/or staff to direct drivers

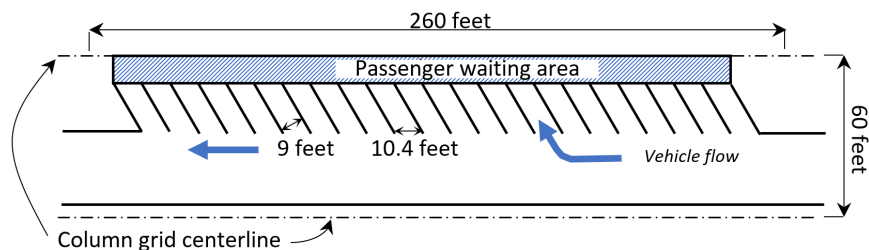


*Pull-through TNC spaces,  
Detroit Metropolitan Airport*

# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

## *Pull in, back out*



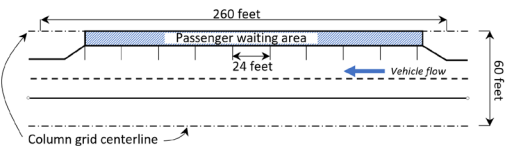
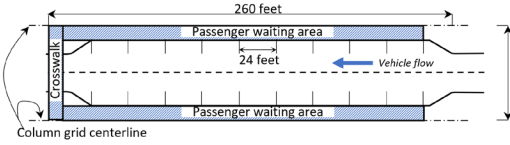
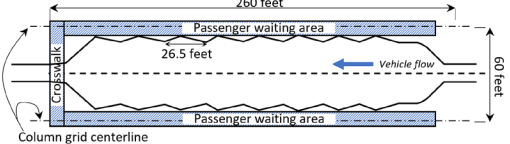
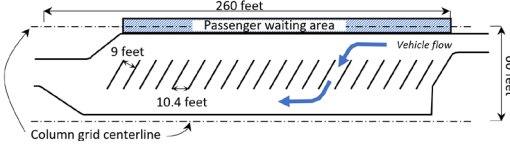
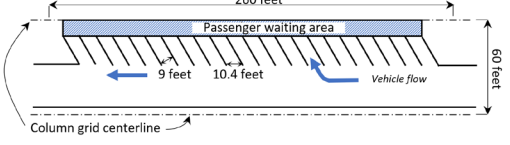
- 330 vehicles per hour
- Minimal pedestrian-vehicle interactions
- Requires reversing into traffic
- Minimal ability to accommodate demand surges
- Drivers may not see downstream open spaces
- May require space guidance and/or staff to direct drivers



*Pull in, back out TNC spaces,  
Seattle-Tacoma Int'l. Airport*

# Adapting Parking Facilities for Other Vehicular Uses

Evaluated 5 potential configurations

	Capacity	
	9 stalls 243 vph	Conventional, inexpensive, requires no pedestrian control, least capacity
	18 stalls 450 vph	Less conventional, requires pedestrian control, high capacity
	16 stalls 464 vph	Less conventional, requires pedestrian control, high capacity
	20 stalls 500 vph	Uncommon, frequent pedestrian-vehicle interactions, highest capacity
	22 stalls 330 vph	Less conventional, requires no pedestrian control, low capacity

# Repurposing Parking Facilities to Non-Vehicle Uses

- **Opportunities are severely limited to convert parking structures**
- **Examples generally limited conversions at grade level (loads are not an issue) or roof level (clearances are not an issue)**
- **No examples identified where an airport has taken a parking structure and converted to a non-vehicle use**
- **Limited examples of where non-aviation uses have repurposed parking**



# Future-Proofing New Parking Structures

- **Guidebook summarizes numerous strategies for potential future-proofing**
  - **Lower-cost (~ 10% premium):** shorter planning horizon; provide for limited vertical expansion; higher clearances; plan for additional mechanical/electrical infrastructure; strategic locations for ramps, elevators, and stairs
  - **Medium-cost (10% - 25% premium):** plan for firewalls/setbacks; provide for more vertical expansion; build one level underground (future conversion to mechanical/electrical space)
  - **Higher-cost (over 25% premium):** design for higher live load; short-span construction; helical or speed ramps (many airports may use these anyway)
- **Since additional cost is incurred on opening day and future needs and payback are uncertain, future-proofing can complicate project financing**

# Strategies and Technologies to Preserve / Enhance Revenues

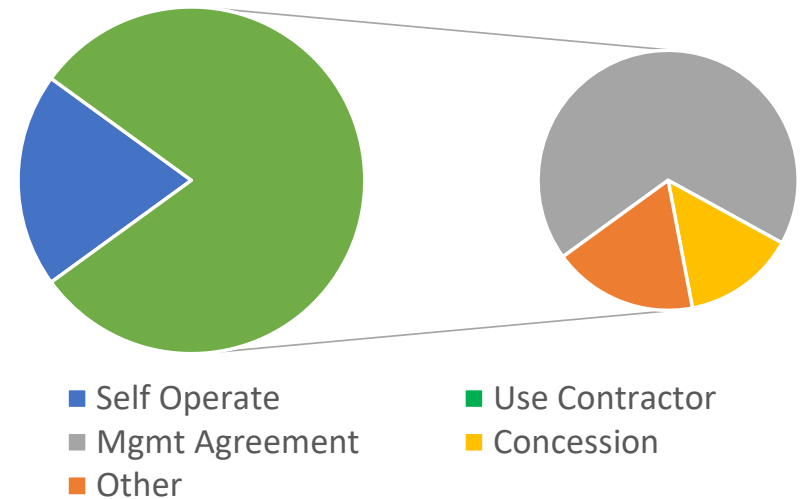
# Airport Parking Management Models

## ■ Presents four models

- Management – pay operator expenses plus a fixed fee
- Lease / concession – pay operator a share of revenues
- Fixed price
- Private development investment

## ■ Compares key aspects of each

- Revenue collection
- Reimbursable expenses
- Incentives
- Flexibility
- Risk management
- Strengths and weaknesses

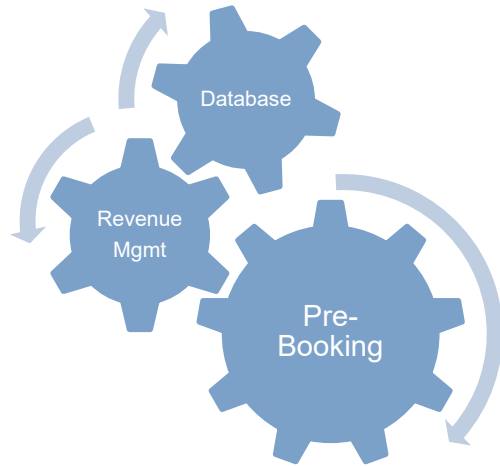


# Innovative Payment Systems and Technologies

- **Revenue Management and Pre-booking**
- **New Payment Methods (Mobile Pay and Mobile Wallet)**
- **Nested Parking Areas**
- **Automated Valet**
- **Airport Access Fees**

# Revenue Management & Pre-Booking

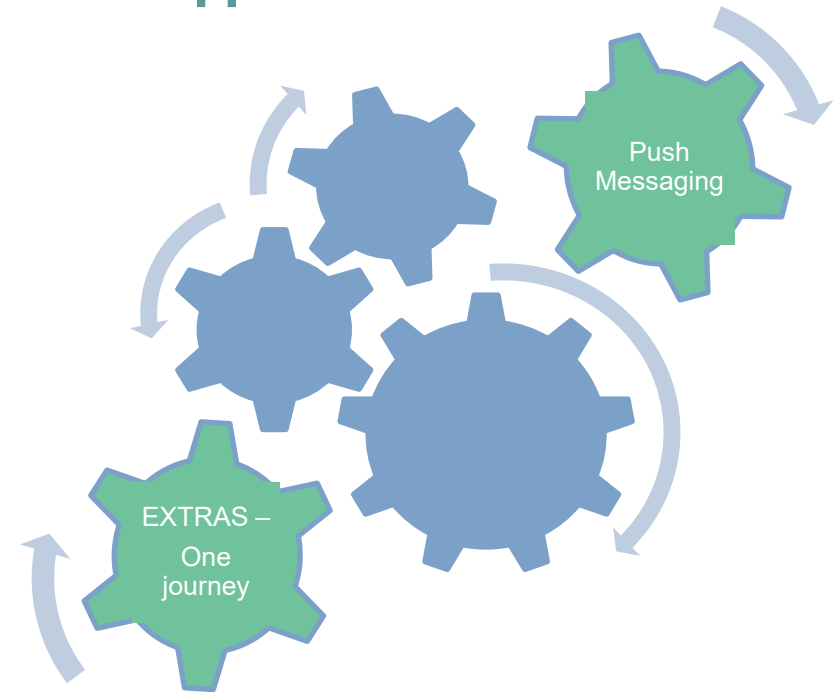
## Where we are



## Reservations systems for

- Contactless payment
- Virtual products / discounts
- Promotional fulfilment
- Occupancy management
- Database build

## Opportunities



Integrated airport-wide shopping cart with loyalty component & customized messaging

# Revenue Management & Pre-Booking

## Parking at SEA Airport

The screenshot shows the SEA Airport parking booking interface. At the top, there is a green navigation bar with a 'Book Parking' button and a 'Book Now' button. Below this, there are input fields for 'Entry Date' (03/30/2022), 'Entry Time' (2:00 PM), 'Exit Date' (04/06/2022), and 'Exit Time' (6:00 PM). A 'Promo Code' field is also present. The main content area features a '4 Easy Steps' progress indicator: 1. Select Travel Dates, 2. Choose Your Parking, 3. Your Details, 4. Confirmation. A central message states: 'The official site for Pre-Booked Parking at Seattle-Tacoma International Airport. Now you can book online and save!'. Below this, there are fields for 'Entry Date' (06/01/2020), 'Select Time' (11:00 AM), 'Exit Date' (06/07/2020), and 'Select Time' (11:00 AM). A sidebar on the right contains four green buttons: 'Parking Promotions and Coupons', 'Parking Information and Rates', 'Directions to Parking Garage', and 'Airport Traveler Updates'. At the bottom left, there is a yellow banner for 'COVID-19 and travel at SEA Airport' and a red banner for a 'Parking Alert' regarding the Spring Break.



Making your journey **effortless**



**Cell phone waiting area**  
Wait in a Pearson Airport Cell Phone Waiting Area at no charge for up to 45 minutes



**Car care**  
Leave your car in our care. Professional car cleaning and detailing right in Terminal 1



**Premium lounge service**  
Book your visit to one of our premium travel lounges at a preferred rate when you reserve your parking in advance



**Airport meet and greet**  
Premium personalized airport assistance to support you or your loved one at every step of your journey

# Modern Payment Methods

## What Are They?

- Digital wallet: e.g. PayPal, Cash App
- Mobile wallets: e.g. ApplePay, GooglePay
- Pay Later feature: e.g. at NCP UK

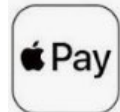
## Limited Deployment

### Airports:

- |     |   |
|-----|---|
| SEA | GooglePay in process, Paypal rejected (funds hold time)                       |
| LAX | GooglePay scheduled for year end deployment                                   |
| UK  | ABZ, GLA, SOU – Paypal, ApplePay and GooglePay on pre-booking site as options |



*Currently, mobile payments are available most commonly through existing parking apps, e.g. ParkMobile, Passport*



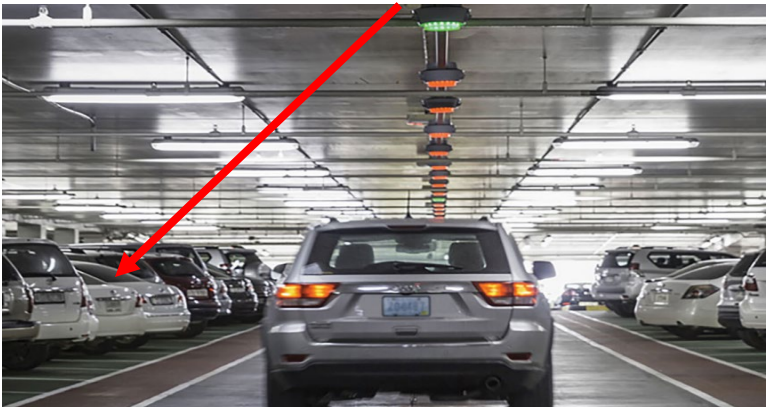
# Nested Parking Areas

## Virtual

Moving beyond red and green

**Objective:** Enable variable pricing without fixed capacity limits

- Based on license plate recognition



## Bluetooth

Automation via app-based account

**Objective:** Provide fast, flexible set up and ease of use at lower cost

- Based on BLE / mobile app





# Automated Valet and Beyond

## Automated Valet

- “Ray” (Serva Transport Systems) – Dusseldorf Airport (2014)
- “Stan” (Stanley Robotics) – Lyon and London Gatwick (2019)

## Automated Parking

- Park Assist 2.0
- Tesla “Enhanced Summon”

## Automated Shuttles

- First mile/last mile
- Heathrow “pods”
- Tests worldwide, including AUS, DFW, GSP, BRU, BMH, ADP, CHC, SDJ, others

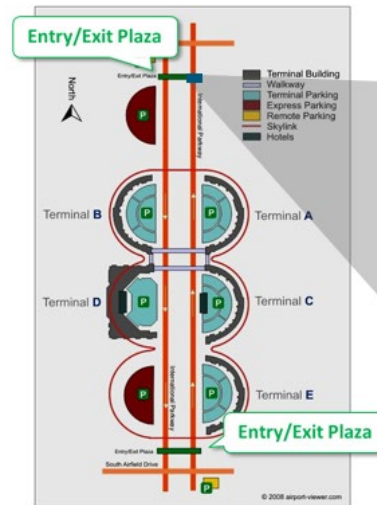


# Airport Access Fees

## Three Approaches:

- Access to entire airport
- Access to curbside
- Alternative drop off / pick up zones

Dallas Fort Worth International Airport



**DFW controls access to the entire airport through two control plazas**

# Airport Access Fees

## Monetizing the Curb

- Increasingly, airports are charging the public to access the terminal curb for pick up and drop off
  - Mainly in UK / Europe
  - Under consideration in U.S.
- Existing systems need improvement

Information tarifaire		
Durée	Parking	Dépose minute
0 à 10 mn	gratuit	gratuit
30 mn	4 €	11 €
1 heure	6 €	26 €



Charles De Gaulle International Airport

# Airport Access Fees

## Proximity Fees

- Alternative Pick Up / Drop Off Zones
- Some charged differentially based on proximity to terminal
  - In Europe and Australia



### Domestic pick up options

Priority Pick-up zone Rates from \$4.35 

Just a four minute walk from Domestic terminals, our most convenient pick up option

Express Pick-up zone Free for 15 minutes 

Eight minute walk from the Domestic terminals

# FOR ADDITIONAL INFORMATION



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# Other Events for You:

**Stay Tuned for New ACRP Webinars  
to be Announced for 2022**

**September 19-21, 2022  
Conference on Scenario Planning in Transportation**

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- Networking opportunities
- May provide a path to Standing Committee membership

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Work with CRP <https://bit.ly/TRB-crp>

Update your information [www.mytrb.org](https://www.mytrb.org)

*Getting involved is free!*

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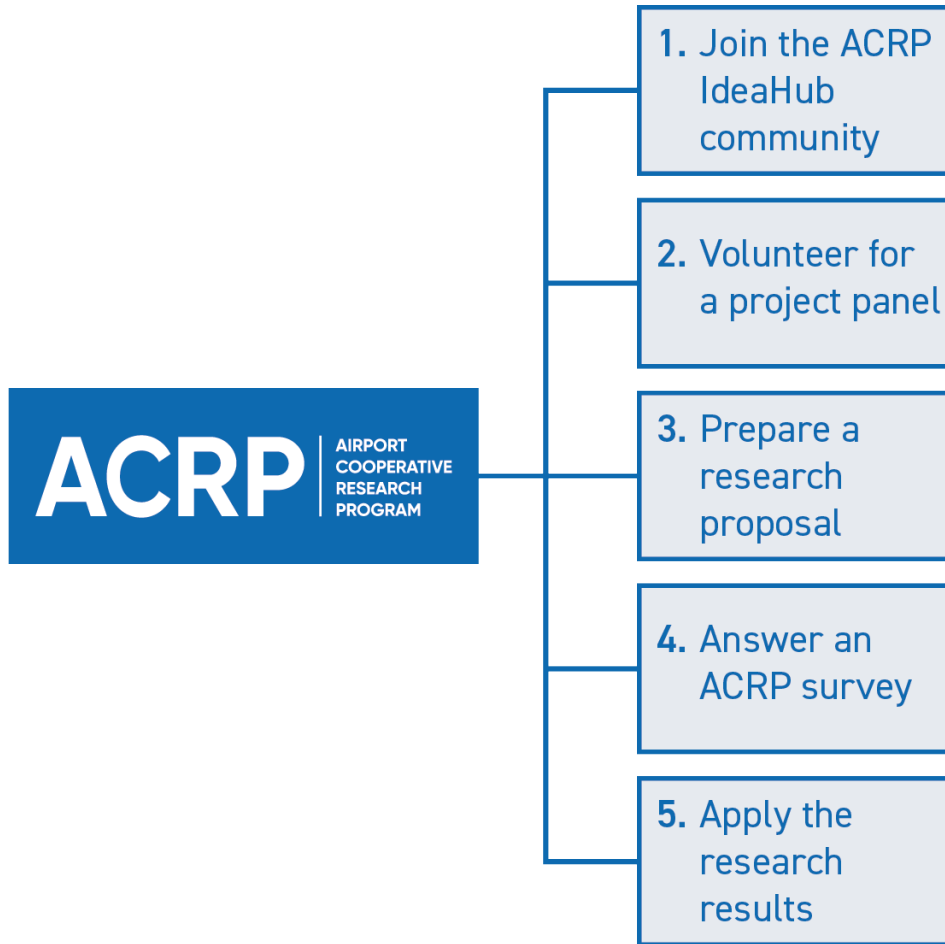
Have you heard TRB's Transportation Explorers?

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#TRBExplorers



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# Other ACRP Research on Today's Topic

Research Report 24: *Guidebook for Evaluating Airport Parking Strategies and Supporting Technologies*

Research Report 40: *Airport Curbside and Terminal Area Roadway Operations*

Research Report 47: *Guidebook for Developing and Leasing Airport Property*

Research Report 121: *Innovative Revenue Strategies—An Airport Guide*

Research Report 146: *Commercial Ground Transportation at Airports: Best Practices*

Research Report 176: *Generating Revenue from Commercial Development on or Adjacent to Airports*

Research Report 215: *Transportation Network Companies (TNCs): Impact to Airport Revenue and Operations—Reference Guide*

Synthesis 19: *Airport Revenue Diversification*

Synthesis 84: *Transportation Network Companies: Challenges and Opportunities for Airport Operators*

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