



# DEMAND FORECASTING FOR SOUTHWEST MICHIGAN AIRPORTS

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# DEFINITIONS

- Airport Master Plan
- Federal Aviation Administration (FAA)
- Department of Transportation (DOT)
- Commercial Service
- Demand Forecasting
- Airport Improvement Program (AIP)

# DEFINITIONS (CONT.)

- Critical Aircraft
  - Aircraft Approach Category
  - Airplane Design Group
- Catchment Area
- Enplanements
- Southwest Michigan
- Essential Air Service (EAS)



Source: Michigan Aeronautics Commission, 2017



# AIRPORT MASTER PLANS

- Backbone of an airport's future
- Periodically refreshed
- Required for commercial service airports
  - AC150/5070-6B
  - Required if airport received AIP funds
- One chapter dedicated to demand forecasts
  - Second or third chapter for each reviewed plan
  - Other sections too

Source: Kalamazoo/ Battle Creek International Airport, 2010

# ANALYZED AIRPORTS

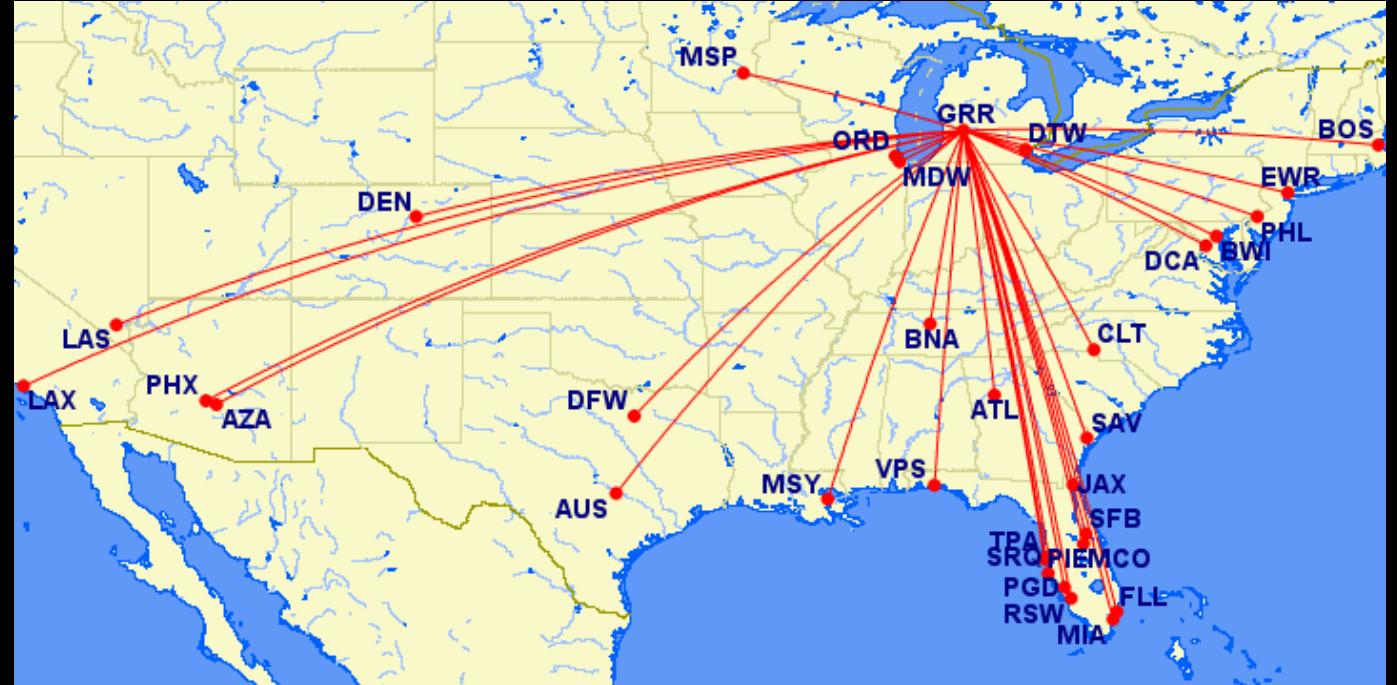
- Gerald R. Ford Grand Rapids International Airport (GRR)
- Kalamazoo/ Battle Creek International Airport (AZO)
- Muskegon County Airport (MKG)
- South Bend International Airport (SBN)





# GERALD R. FORD GRAND RAPIDS INTERNATIONAL AIRPORT

- IATA: GRR, ICAO: KGRR
- Commercial Service from 6 airlines
  - 32 destinations
- Cargo Service from 2 airlines
  - 5 destinations
- 2019 Figures
  - 1.8 million enplanements
  - Largest carrier was Delta (24%)
- 2020 Figures
  - 863,000 enplanements
  - Largest carrier was Allegiant (21%)
- Critical Aircraft was D-IV



Source: Great Circle Mapper, 2021

# KALAMAZOO/ BATTLE CREEK INTERNATIONAL AIRPORT

- IATA: AZO, ICAO: KAZO
- Commercial Service from 3\* airlines
  - 2 destinations
- No Cargo Service
- 2019 Figures
  - 150,000 enplanements
  - Largest carrier was SkyWest (34%)
- 2020 Figures
  - 53,000 enplanements
  - Largest carrier was SkyWest (41%)
- Critical Aircraft was C-III



Source: Great Circle Mapper, 2021

\* Note: Service from United Express ceased on January 3, 2022 after the analysis was completed

# MUSKEGON COUNTY AIRPORT

- IATA: MKG, ICAO: KMKG
- Commercial Service from 1 airline (SkyWest)
  - Service to Chicago- O'Hare
- No Cargo Service
- 2019 Figures
  - 19,000 enplanements
- 2020 Figures
  - 5,393 enplanements
- Critical Aircraft was C-II



Source: Great Circle Mapper, 2021



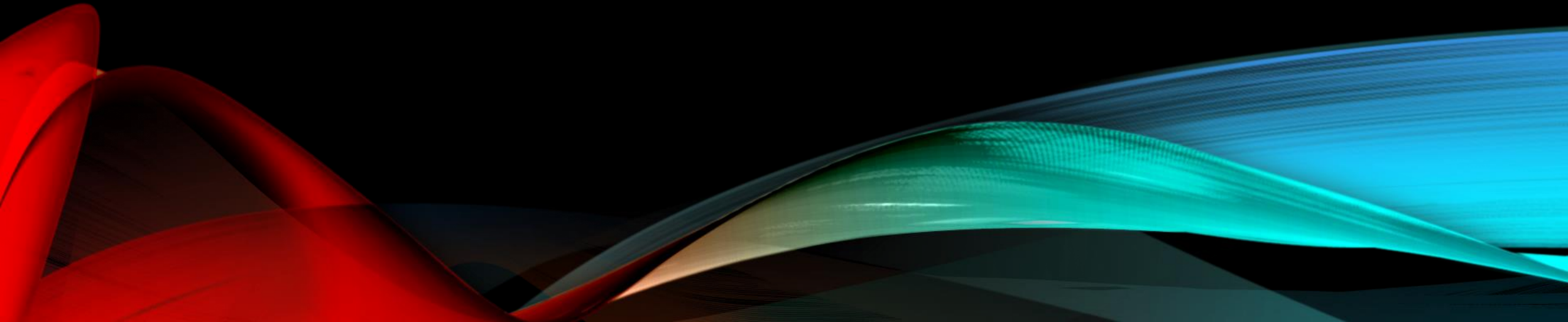
# SOUTH BEND INTERNATIONAL AIRPORT

- IATA: SBN, ICAO: KSBN
- Commercial Service from 4 airlines
  - 12 destinations
- Cargo Service from 3 airlines
  - 3 destinations
- 2019 Figures
  - 410,000 enplanements
  - Largest carrier was SkyWest dba American, Delta, & United(58%)
- 2020 Figures
  - 208,000 enplanements
  - Largest carrier was SkyWest (42%)
- Critical Aircraft was D-IV



Source: Great Circle Mapper, 2021

# THE CURRENT AVIATION CLIMATE



# DEPRESSED TRAVEL DEMAND

- Global demand fell by 67% (IATA, 2020)
- Aircraft parked, pilots furloughed, airlines bankrupted
- Shift in how and why people travelled
  - Increased demand for direct flights
  - Increased leisure demand
  - Decreased business demand
- Dramatic reduction in international flights
- Increases in general aviation



# FLEET SIZE

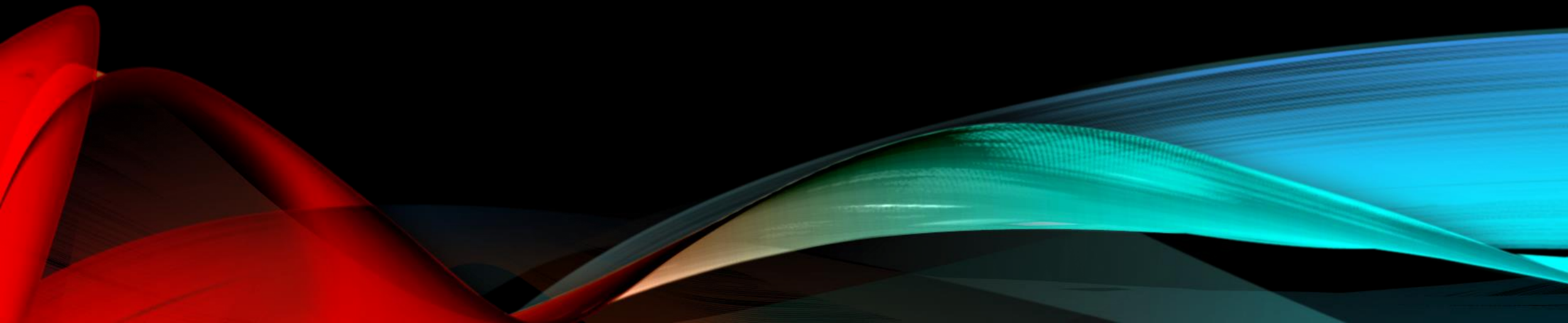
## Aircraft Size

- Largest aircraft parked indefinitely or removed from fleets
  - B747, A380
- Smallest aircraft utilized more short term- Downguaging

## Number of Aircraft

- Delta parked 570 aircraft (Bloomberg, 2020)
- Older aircraft phased out

# FORECASTING





# TYPES OF METHODOLOGY

## Time-Series

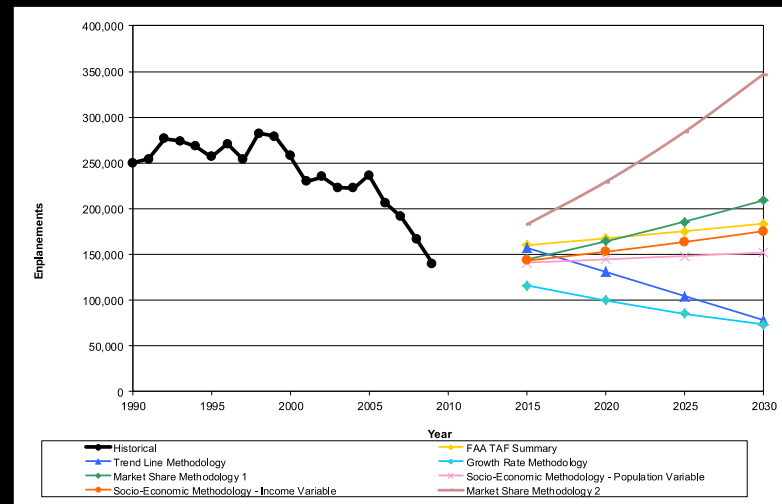
- Linear
- Exponential
- Logarithmic
- Polynomic

## Market-Share

- TAF Derived Data
- Part of the National Market

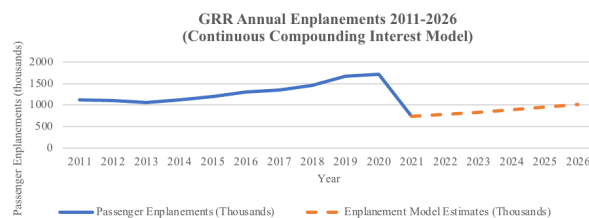
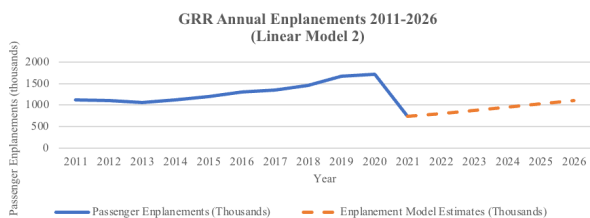
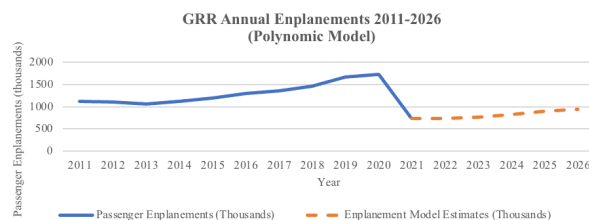
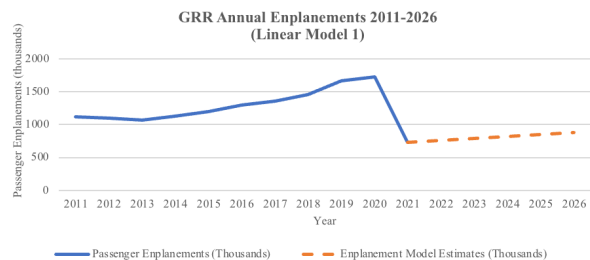
## Socio-Economic

- Economic factors
  - Businesses
  - Employment
- Population

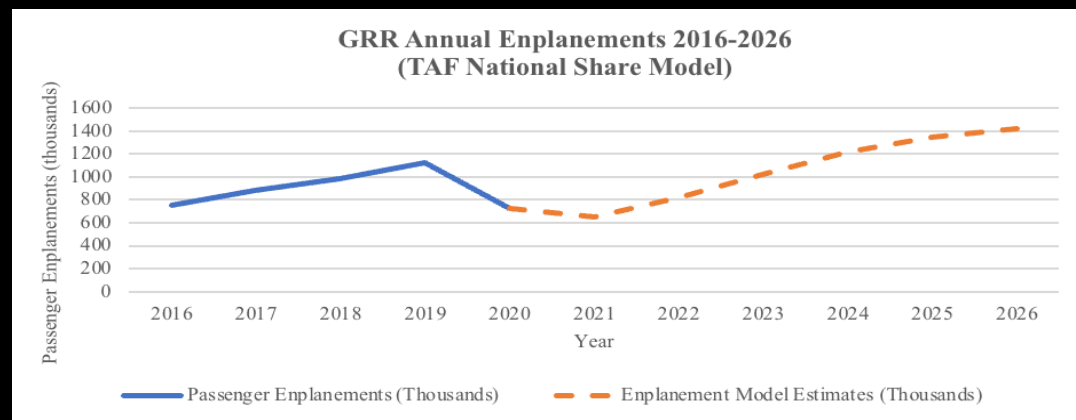
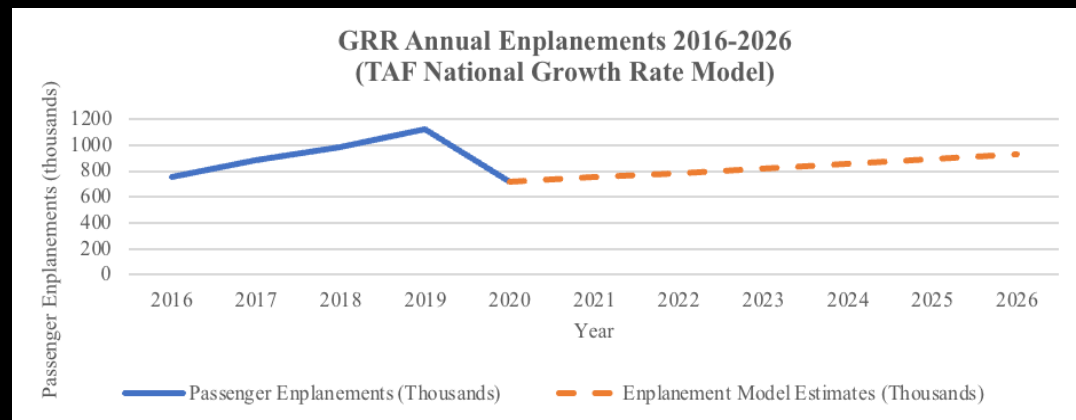
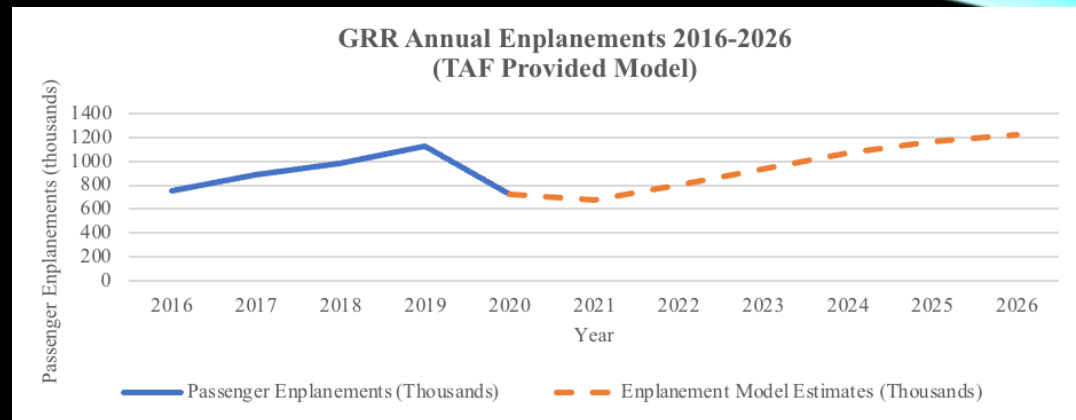


Source: Mead & Hunt, 2010

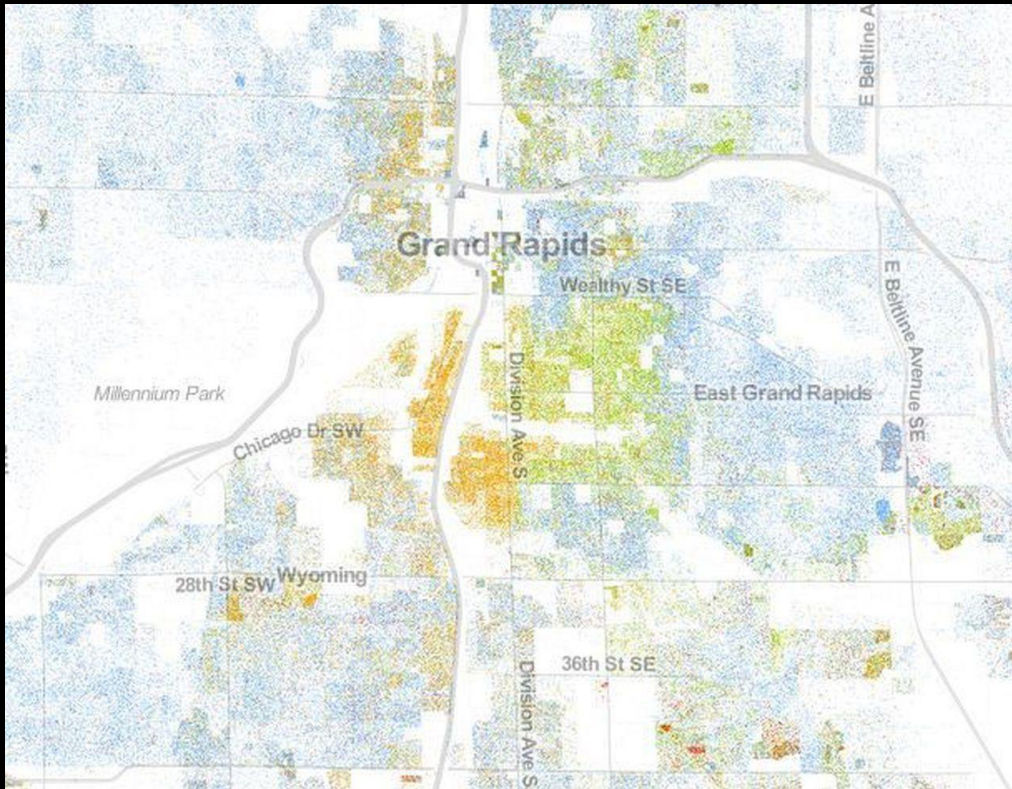
# GRAND RAPIDS TIME- SERIES



# GRAND RAPIDS MARKET-SHARE



# GRAND RAPIDS SOCIO-ECONOMIC



- Population increased approx. 6.9% (Data Commons, 2021)
- Steady employment rates
- Resumption of business travel for several companies
  - Amway
  - Gordon Food Service
  - Spectrum Health

# GRAND RAPIDS CRITICAL AIRCRAFT

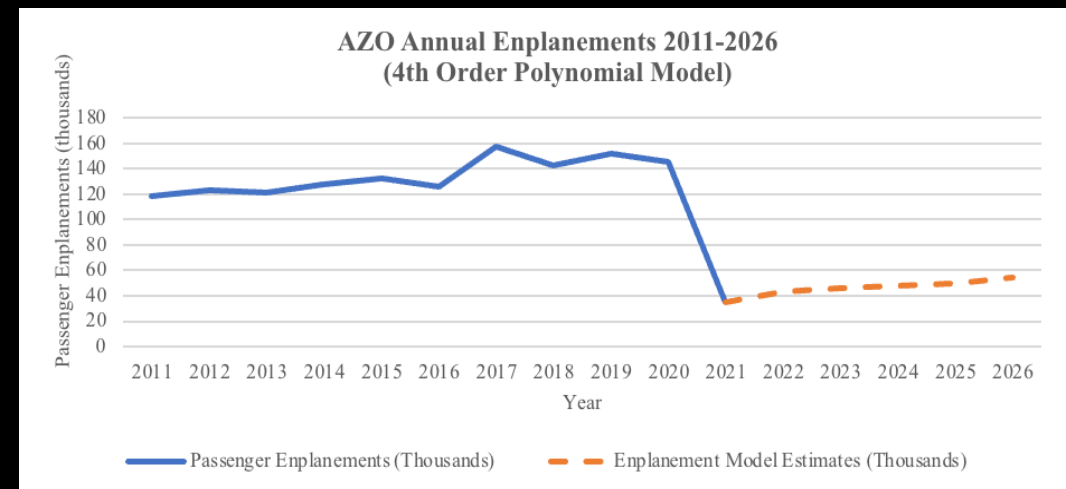
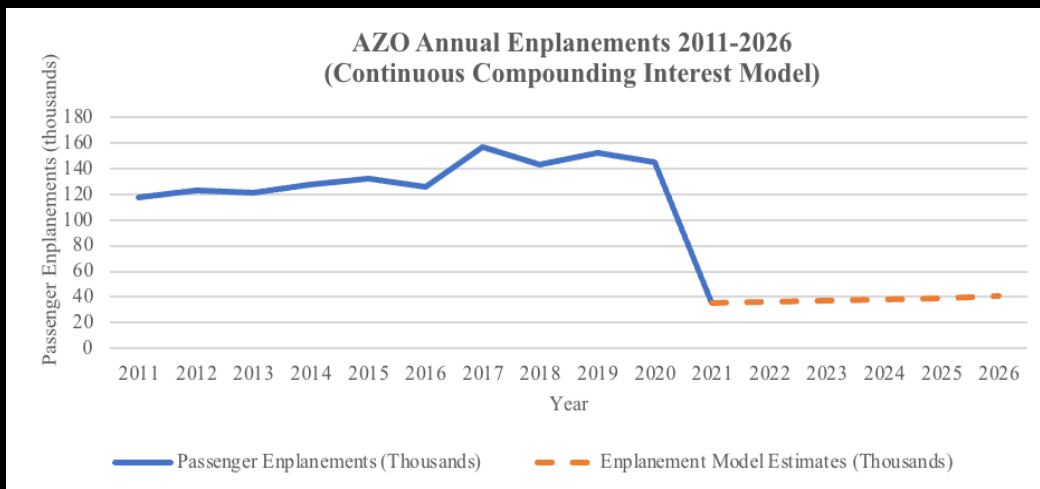
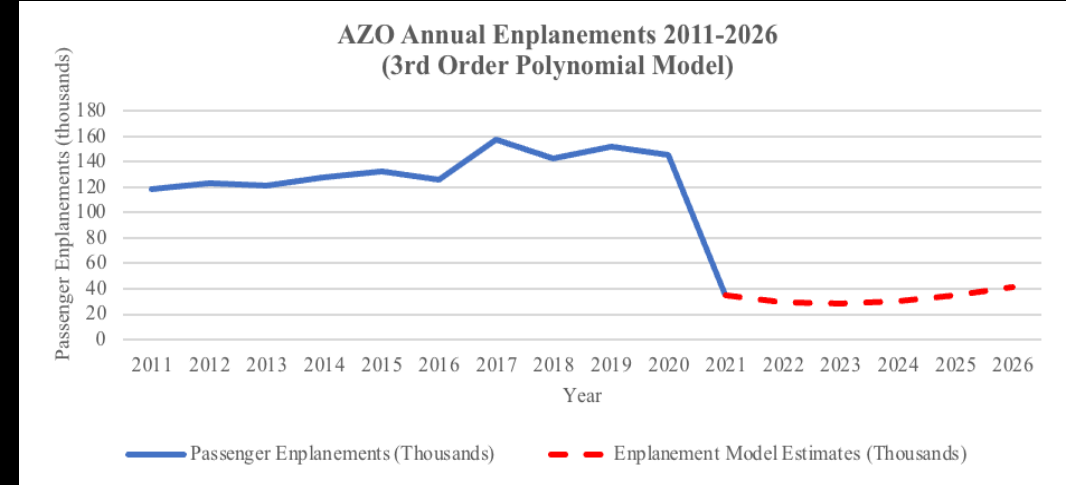
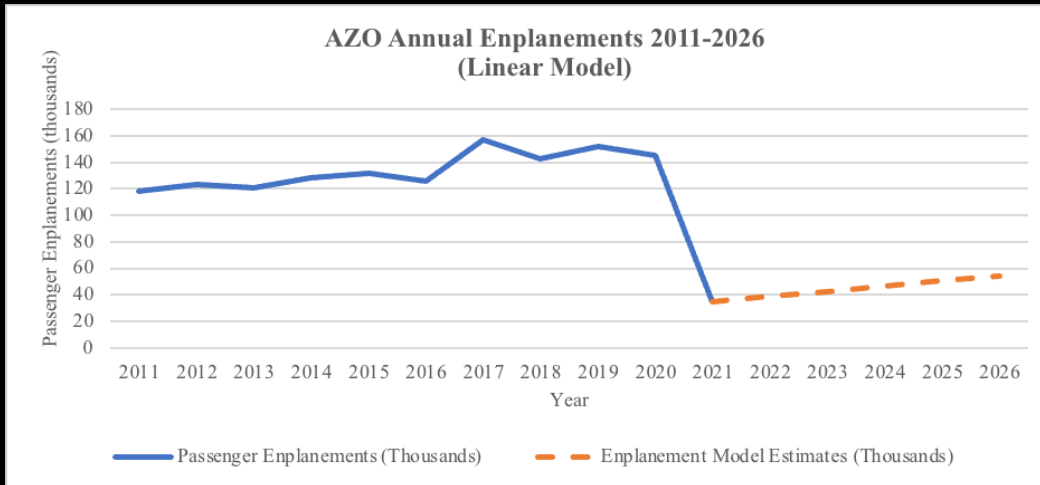
- Remains a D-IV
- Cargo Service
- Without cargo service, the critical aircraft would be a C-IV (A321)



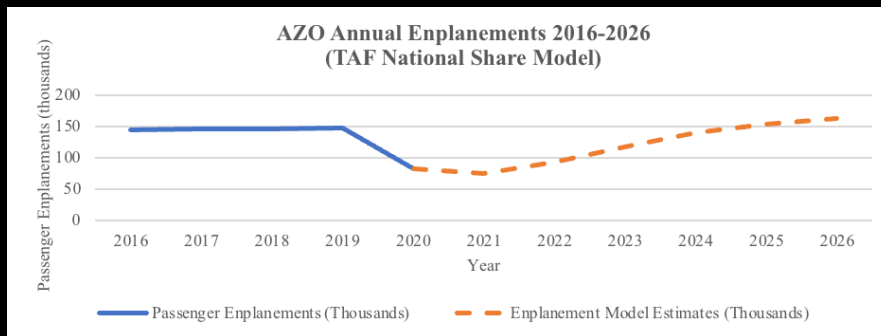
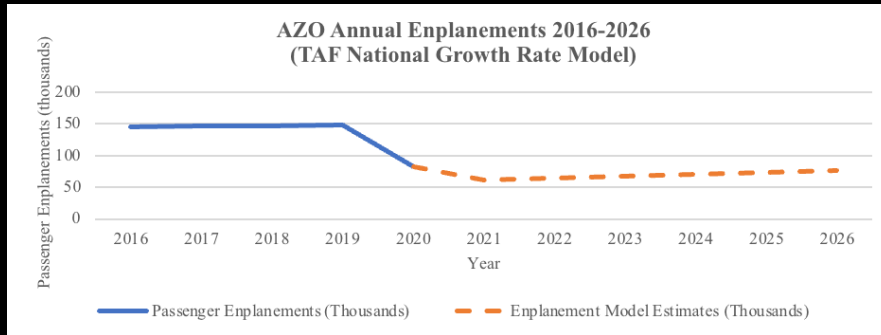
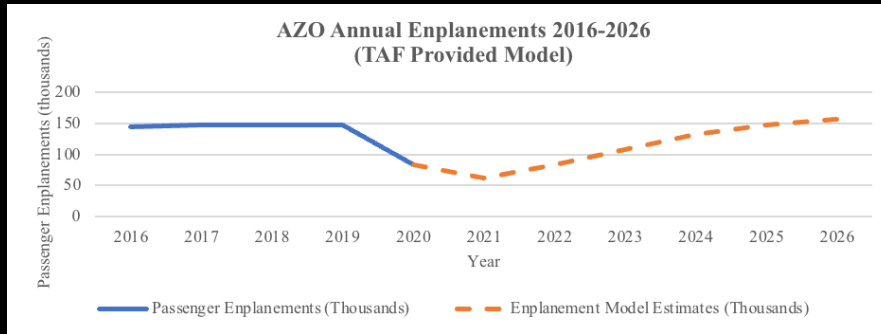
Source: WWMT, 2021



# KALAMAZOO TIME-SERIES



# KALAMAZOO MARKET-SHARE



# KALAMAZOO SOCIO-ECONOMIC

- Better than average unemployment throughout the pandemic
  - Medical Industry
- Consistent population in Kalamazoo
  - Battle Creek decreasing
  - Portage and Oshtemo increasing



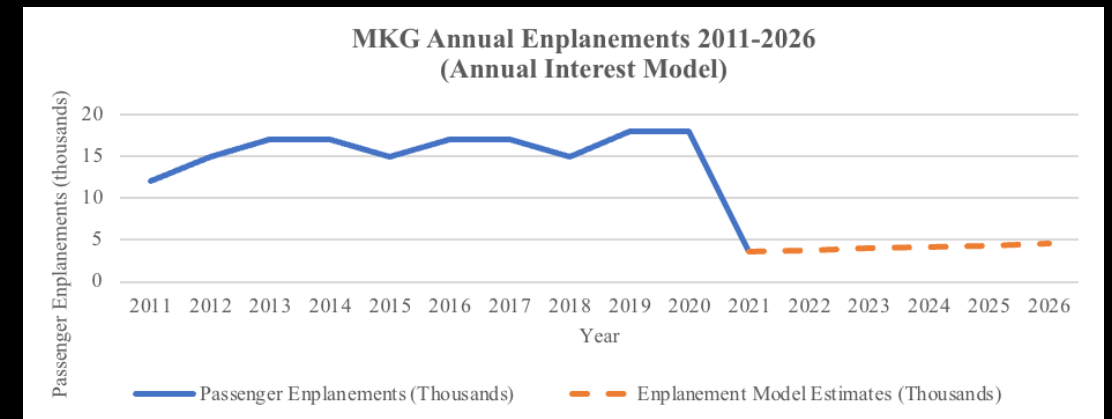
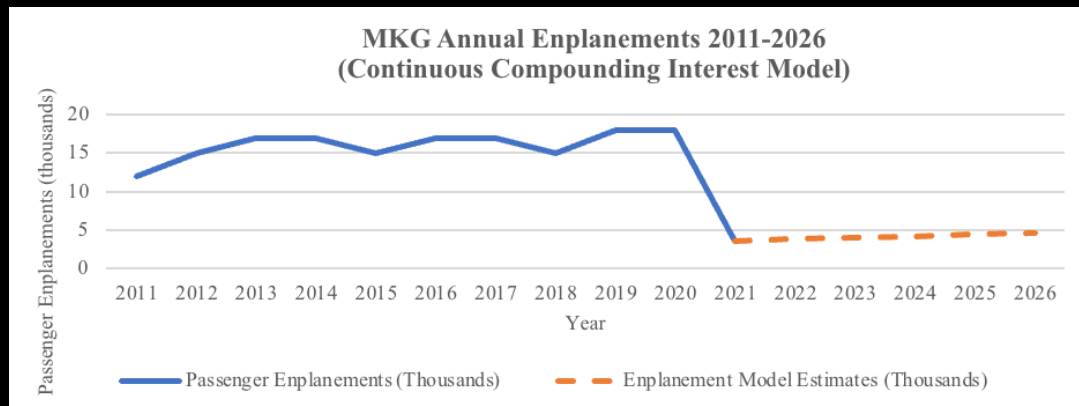
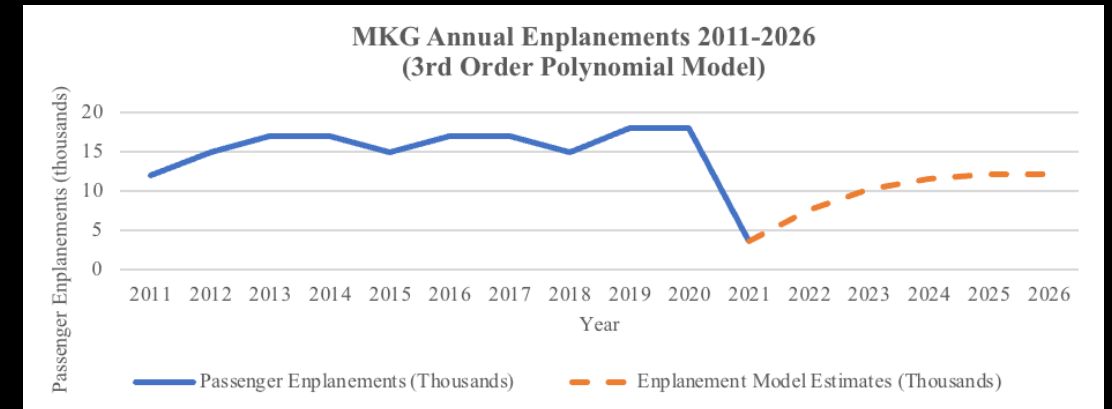
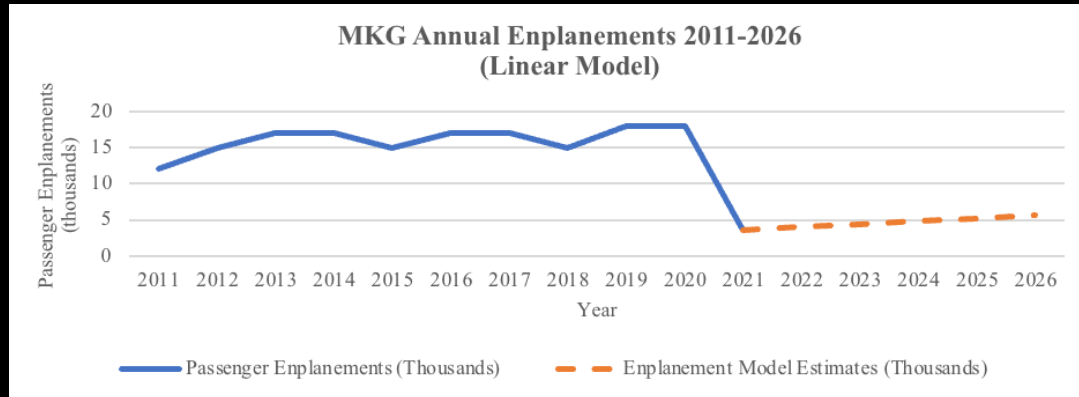
Source: Kalamazoo Gazette, 2020

# KALAMAZOO CRITICAL AIRCRAFT



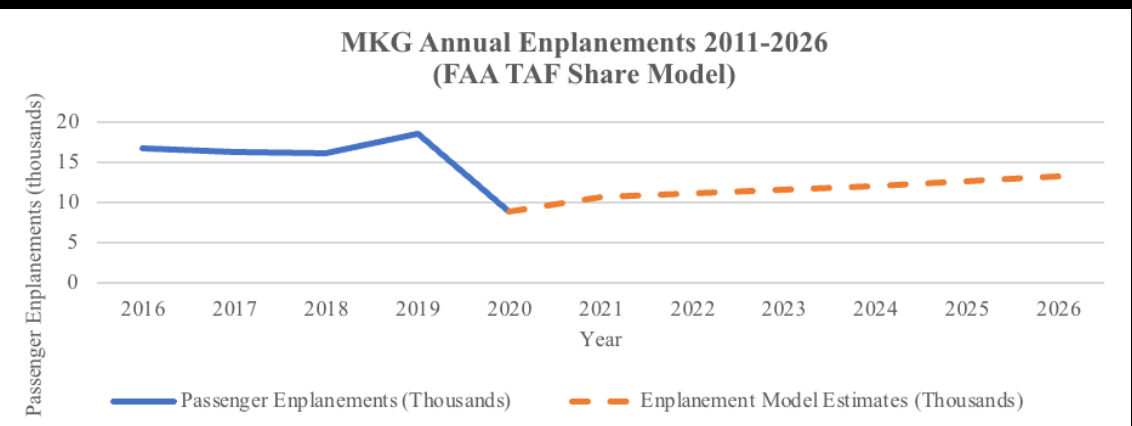
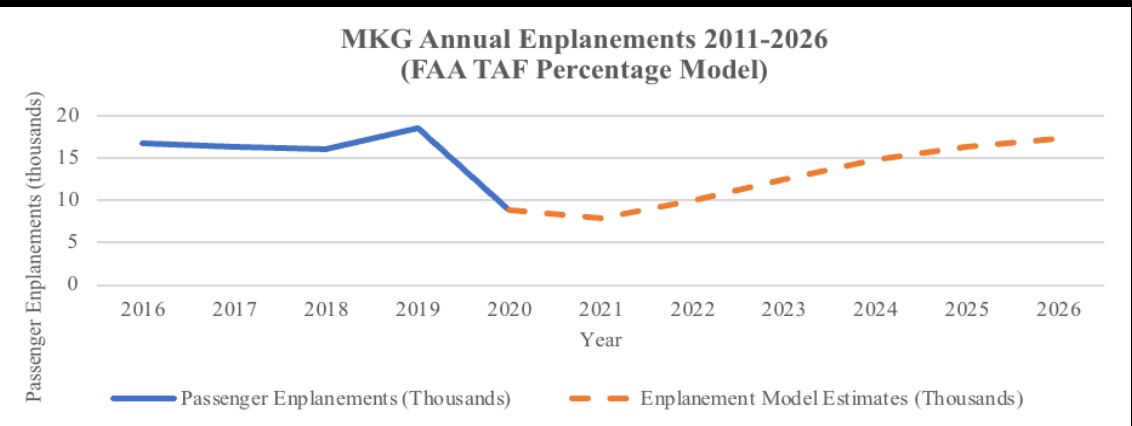
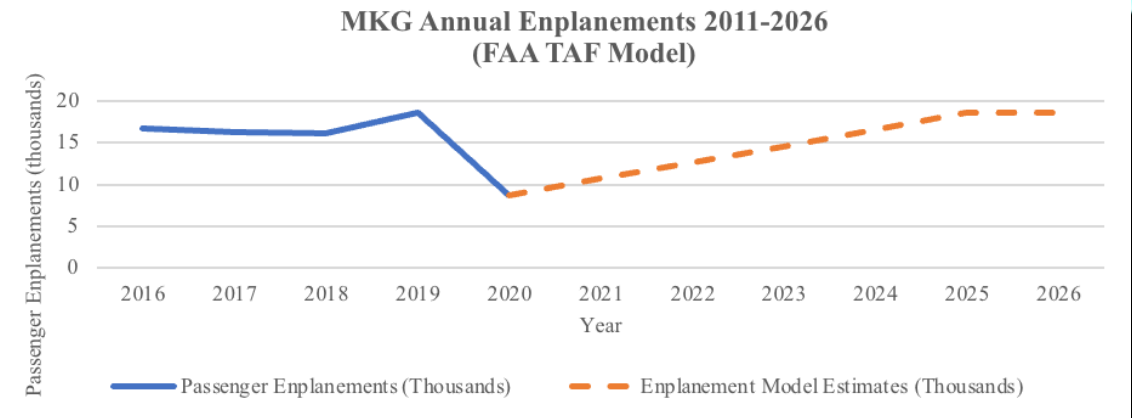
- C-II
- CRJ-200
- May grow to C-III if CRJ-900 service resumes

# MUSKEGON TIME-SERIES





# MUSKEGON MARKET-SHARE



# MUSKEGON SOCIO-ECONOMIC



- Steady population
- Tourism destination
- Aerospace manufacturing

*Source: Muskegon Development Council, n.d.*

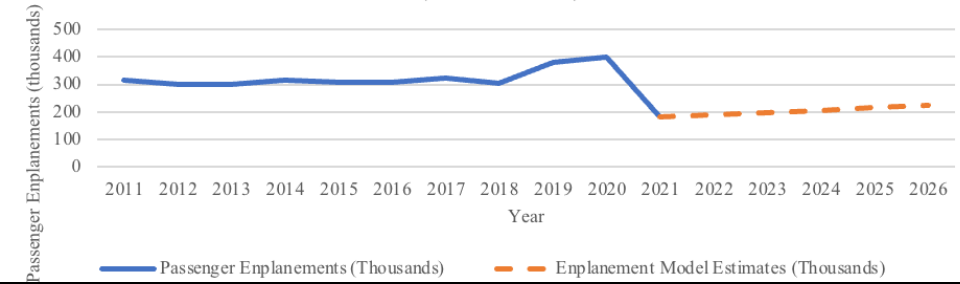
# MUSKEGON CRITICAL AIRCRAFT

- C-II
- CRJ-200
- May change depending on EAS conditions from the DOT and SkyWest

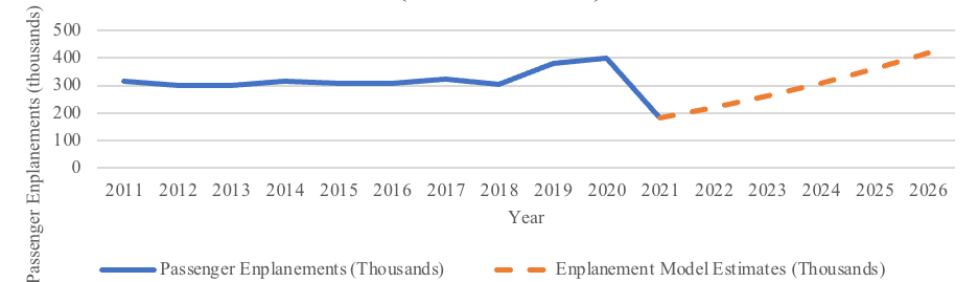


Source: MiBiz, 2019

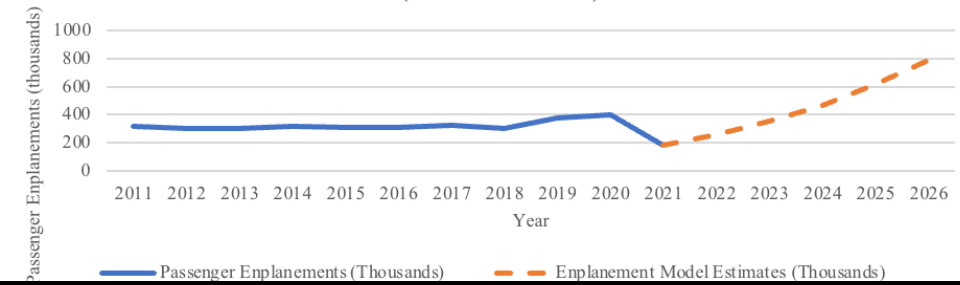
**SBN Annual Enplanements 2011-2026  
(Linear Model)**



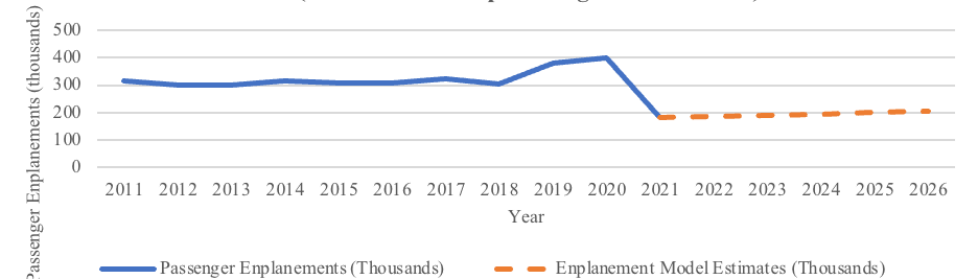
**SBN Annual Enplanements 2011-2026  
(2nd Order Model)**



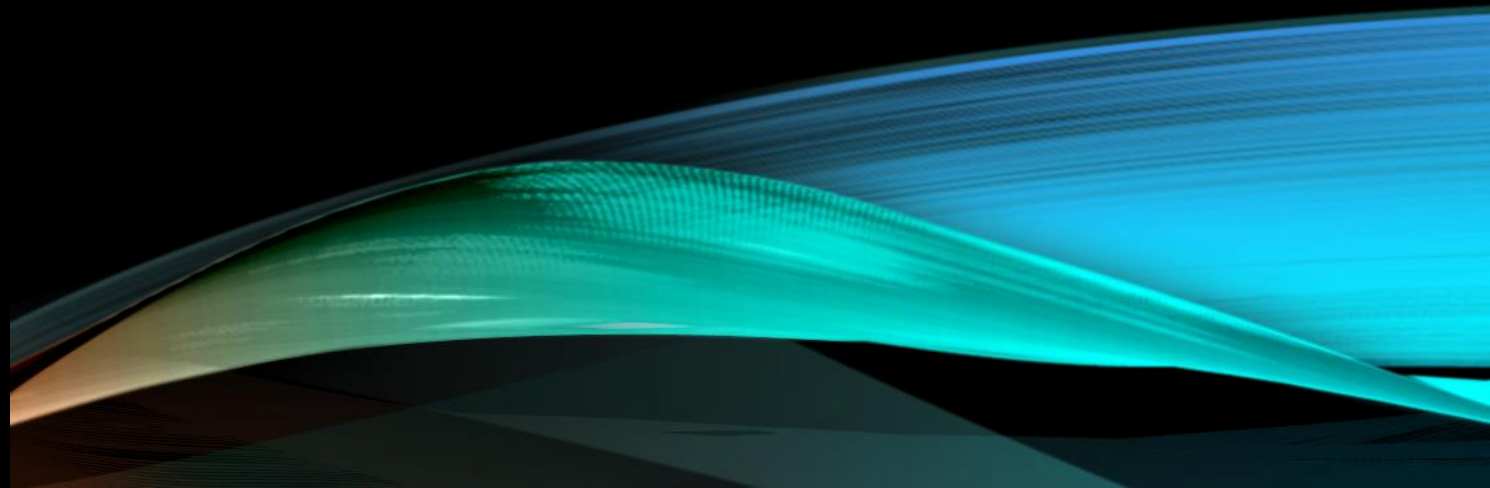
**SBN Annual Enplanements 2011-2026  
(3rd Order Model)**



**SBN Annual Enplanements 2011-2026  
(Continuous Compounding Interest Model)**

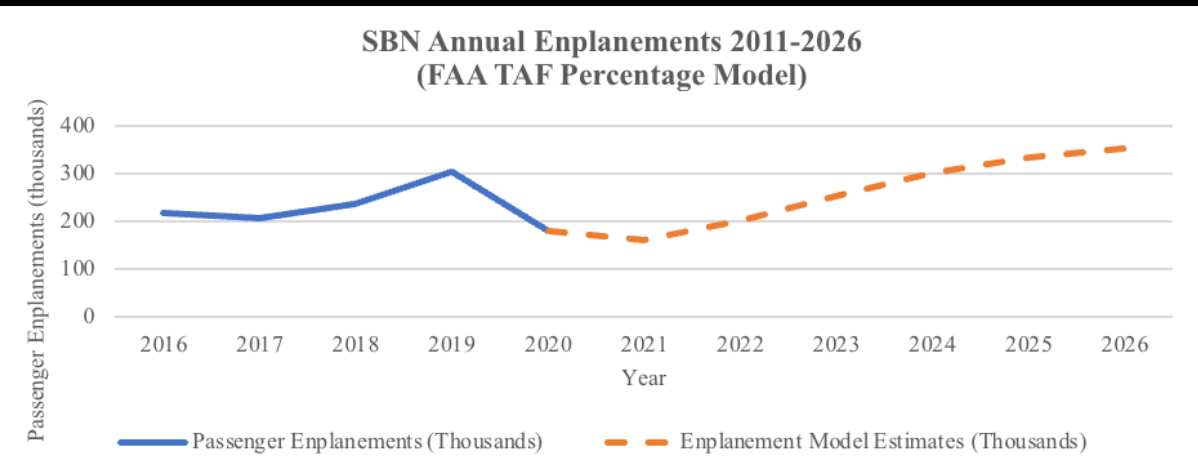
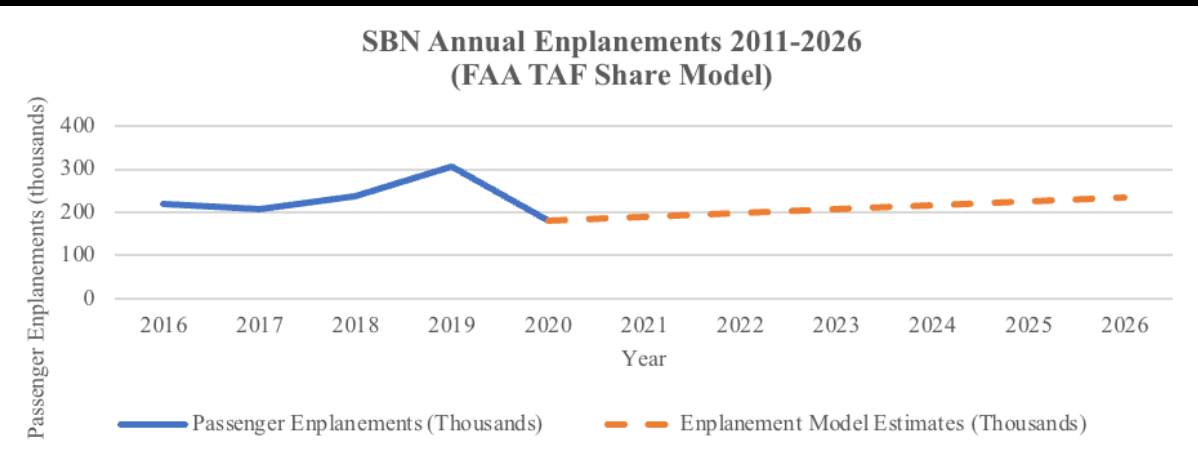
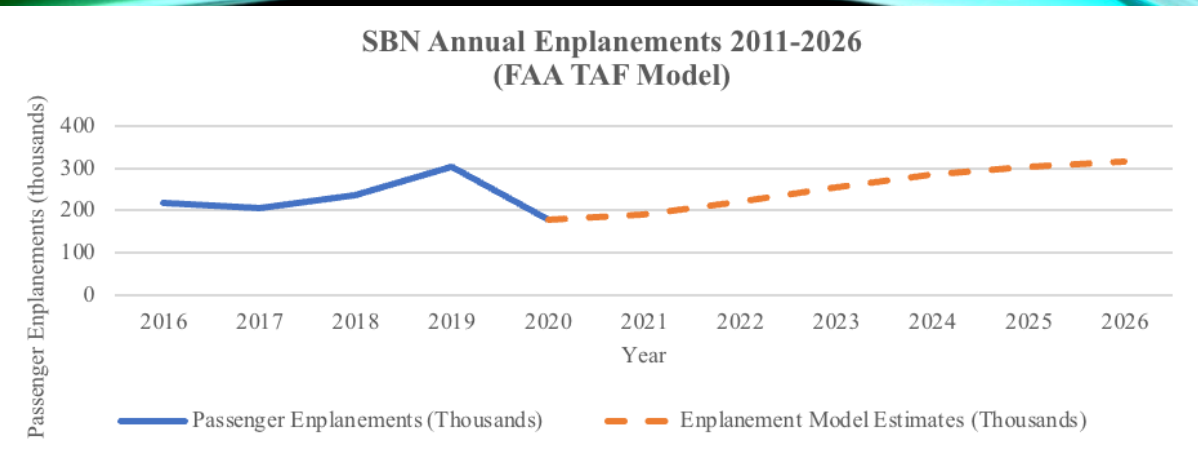


# SOUTH BEND TIME-SERIES





# SOUTH BEND MARKET-SHARE





# SOUTH BEND SOCIO-ECONOMIC



- Population decreasing in Michigan, Stable in Indiana
- Whirlpool, LECO
- Notre Dame, Conn-Selmer, RV manufacturers

# SOUTH BEND CRITICAL AIRCRAFT

- D-IV
- Cargo Aircraft
- C-III for passenger operations



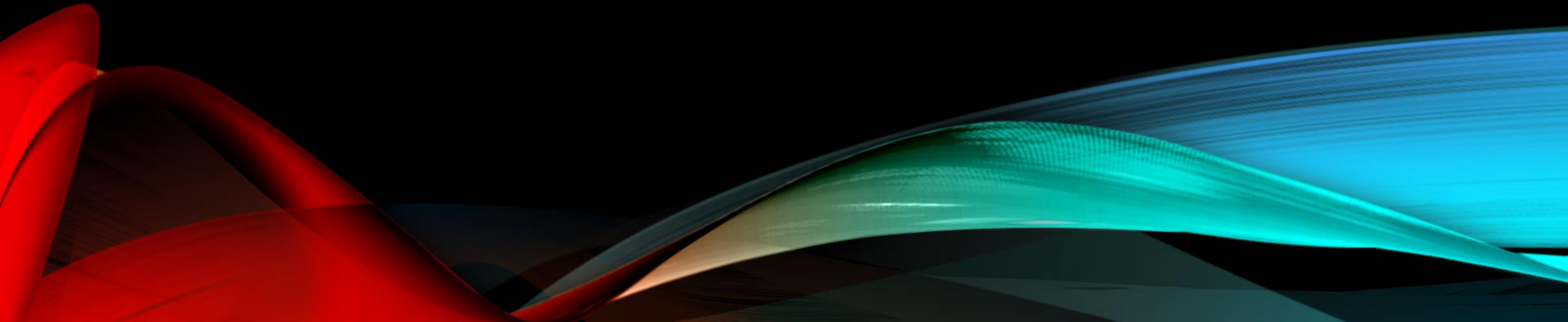
© Brian Stewart | N238NV | Airbus A320-214 | August 1, 2020 | South Bend Regional Airport (KSBN)

OneSpotter.com

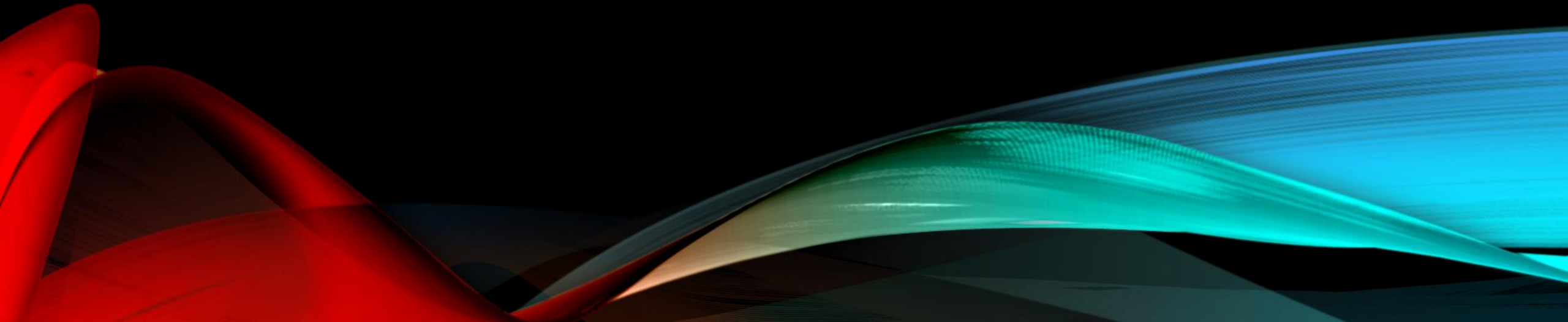


Sources: Wikimapia, 2006; One Spotter, 2020

# CONCLUSIONS

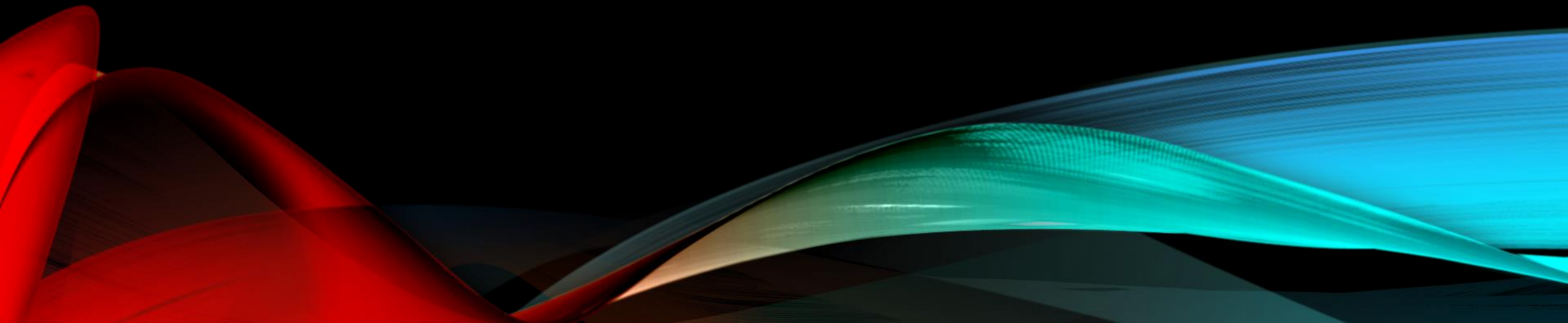


WHAT IS THE ONE BEST MODEL?





*THERE IS NONE, ALL AIRPORTS ARE DIFFERENT*





# WHERE THE INDUSTRY IS HEADED

- More point-to-point service
- Increase in domestic demand
  - Florida
- Emergence of more low-cost carriers
  - Market still dominated by legacy carriers
- “Right Sizing” aircraft
  - Not too big, not too small



Source: Airways Magazine, 2021

# RESULTS OF THIS ANALYSIS



TAF Market Share for  
three of four airports



Time-Series for  
Muskegon



Aviation is changing,  
forecasting must too



Airports rely on  
demand forecasting



# QUESTIONS

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