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General Aviation Workshop

September 21, 2016



Raleigh-Durham Airport Authority

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Agenda

- ▶ GA Industry Overview
- ▶ Business Aviation Market Overview and Outlook
- ▶ Local General Aviation Market Overview
- ▶ RDU General Aviation Forecast
- ▶ GA Development Alternatives
- ▶ Approach to Future GA Infrastructure Development
- ▶ Q&A (Boards)



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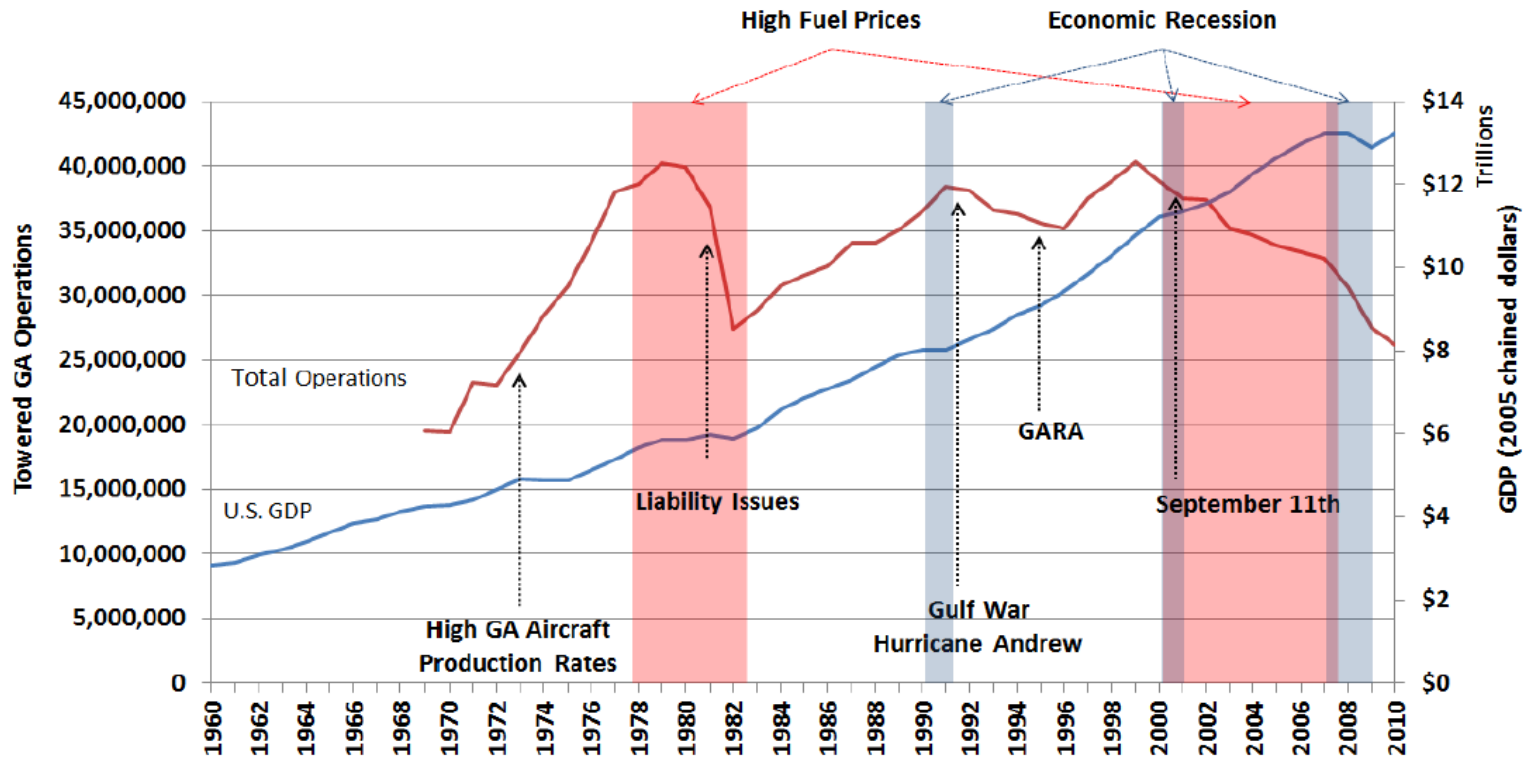
GA Industry Overview



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Influences on GA Activity



Source: Shetty, Kamala and Hansman, John, *Current and Historical Trends in General Aviation in the United States*, August 2012.

General Aviation (GA) activity tends to be more sensitive to various external influences.

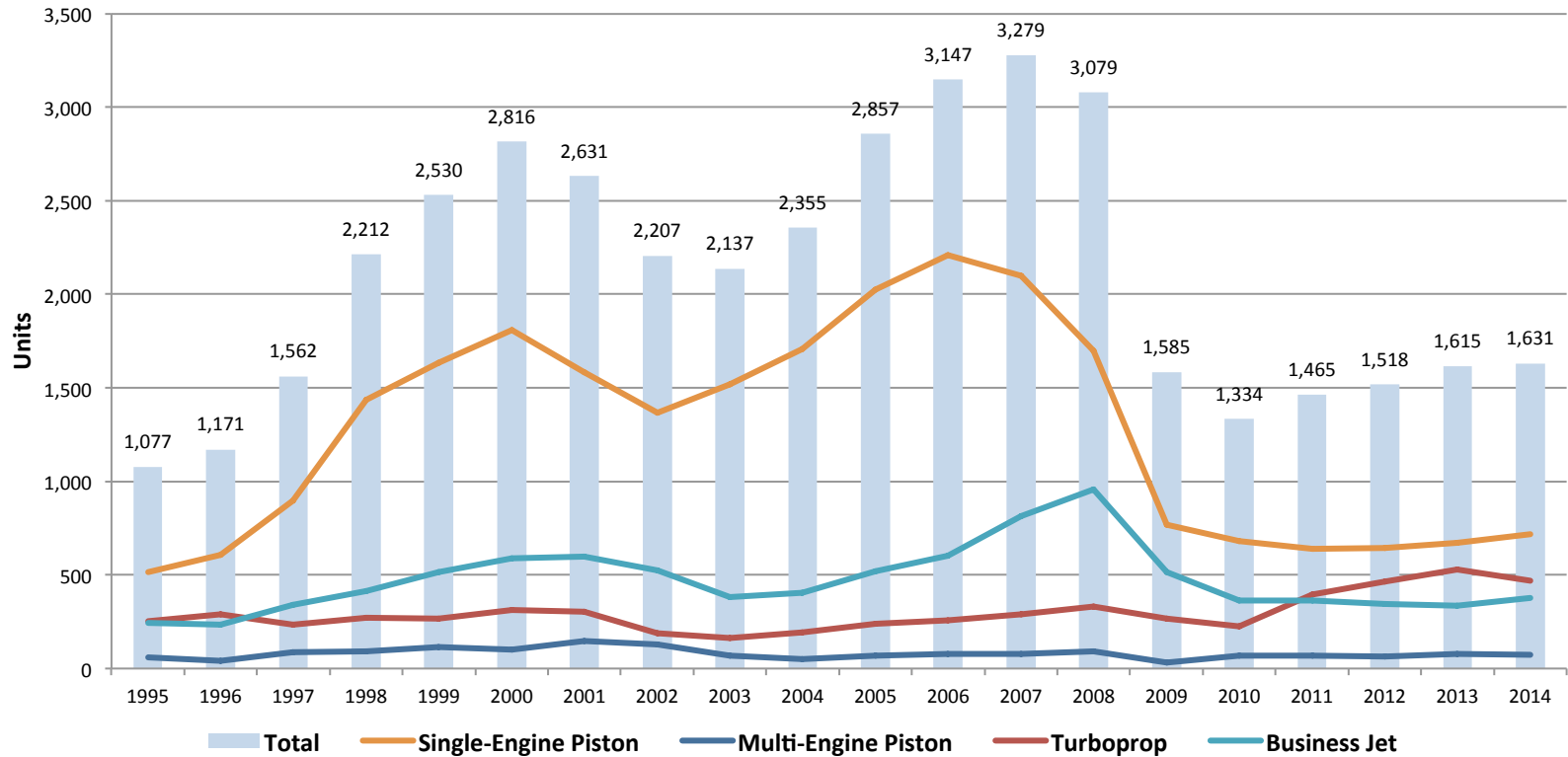
Aircraft Shipments

- ▶ Continued modest growth in 2014, especially with growth in business jet and single engine piston deliveries
- ▶ Strong growth of turboprop and multi-engine piston segments in 2013 slowed to nearer 2012 levels
- ▶ U.S. manufacturers of GA aircraft delivered 1,631 aircraft in 2014 (1% more than 2013); fourth straight year of increased shipments
- ▶ Business jet market: 2014 recorded the first increase in shipments by U.S. manufacturers since 2008

2014 GA aircraft deliveries:

- Piston: +4.5%
 - Single-engine: +6.2%
 - Multi-engine: -10.0%
- Turbojet (e.g., business jet): +12.3%
- Turboprop: -11.2%

U.S. Manufactured GA Aircraft Shipments



Source: General Aviation Manufacturers Association, 2014 General Aviation Statistical Databook & 2015 Industry Outlook, 2015.

National Active GA Aircraft Forecast (FAA Aerospace Forecast)

- ▶ Rapid growth over past decade slowed over last several years
- ▶ Most recent shipment activity indicates that modest growth continues in the overall GA market.
- ▶ Business segment – robust growth in the long term, driven by:
 - Higher corporate profits and the growth of worldwide GDP
 - Continued concerns about safety, security, and flight delays (relative to commercial air travel)
 - Business use predicted to expand at a faster pace than personal and recreational use
- ▶ Active GA fleet – increase at an average annual rate of 0.4% through 2035

2035 GA fleet forecast (average annual change):

- Jet: +2.8%
- Piston: -0.5%
 - Single Engine: -0.6%
 - Multi-engine: -0.4%

Active GA Pilots Forecast (FAA Aerospace Forecast)

- ▶ GA pilots (excluding air transport pilots): increase 0.1% per year through 2035
- ▶ Commercial pilots: increase at an average annual rate of 0.4% through 2035
- ▶ Student pilots: to decrease at a rate of 0.3% per year
- ▶ Private pilots: decrease at an average annual rate of 0.3%
- ▶ Helicopter pilot certificates: increase at a rate of 2.2% per year

Pilot Categories (general descriptions):

- **Student** (under supervision)
- **Recreational** (one pax, SE aircraft, within 50 miles of home airport)
- **Sport** (light-sport aircraft under limited flight conditions)
- **Private** (cannot carry passengers for compensation)
- **Commercial** (no air carrier service)
- **Airline Transport** (air carrier service)

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Business Aviation Market Overview and Outlook



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Honeywell 2015 Global Business Aviation Outlook

- ▶ New jet purchases predicted to grow at an average annual rate of 3% through 2025

Estimated 9,200 new business jets
by 2025, worth \$270 billion

- ▶ Of total new jet purchase plans:
 - 19% by the end of 2016 (675 to 725 new jets in 2015)
 - 17% and 20% by 2017 and 2018, respectively
- ▶ Purchase plans by aircraft class
 - Big cabin: 52% (81% of total valuation)
 - Midsize: 23% (12% of total valuation)
 - Small cabin: 25% (7% of total valuation)

2015 Business and Commercial Aviation Purchase Planning Handbook

- ▶ **Bombardier Aerospace analysts:** industry confidence, corporate profits, aircraft utilization and billings all were up in 2014

“Long-term market drivers of growth for the business jet industry, such as GDP growth, globalization of trade, fleet replacement, new aircraft programs and growth in non-traditional markets, remain solid.”

“The continued wealth creation in major non-traditional markets, along with aviation infrastructure development, is expected to accelerate the use of business aircraft dramatically from levels seen today.”

- ▶ **Gulfstream:** reinvesting profits in new product development (e.g., 5,000-nm range G500 and 6,200-nm range G600 with Mach 0.85 long-range cruise as new norm)
- ▶ **Bombardier:** working on development of 7,300-nm and 7,900-nm range aircraft within the next 2-3 years
- ▶ **Dassault** to begin deliveries of the 6,450-nm range Falcon 8X

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Local General Aviation Market Overview



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GA Market Drivers

“Overall, the range, level, and quality of airport infrastructure and aviation products, services, and facilities are some of the key factors that drive the decision of based and transient aircraft operators to select one airport over another.”

Personal

- Close proximity
- 3,000-foot runway (with longer preferred)
- Fuel (with self-serve available)
- Line services/ground handling (basic)
- Maintenance (basic: airframe and powerplant)
- Ground transportation (basic)
- Tiedown (with hangar available)

Business

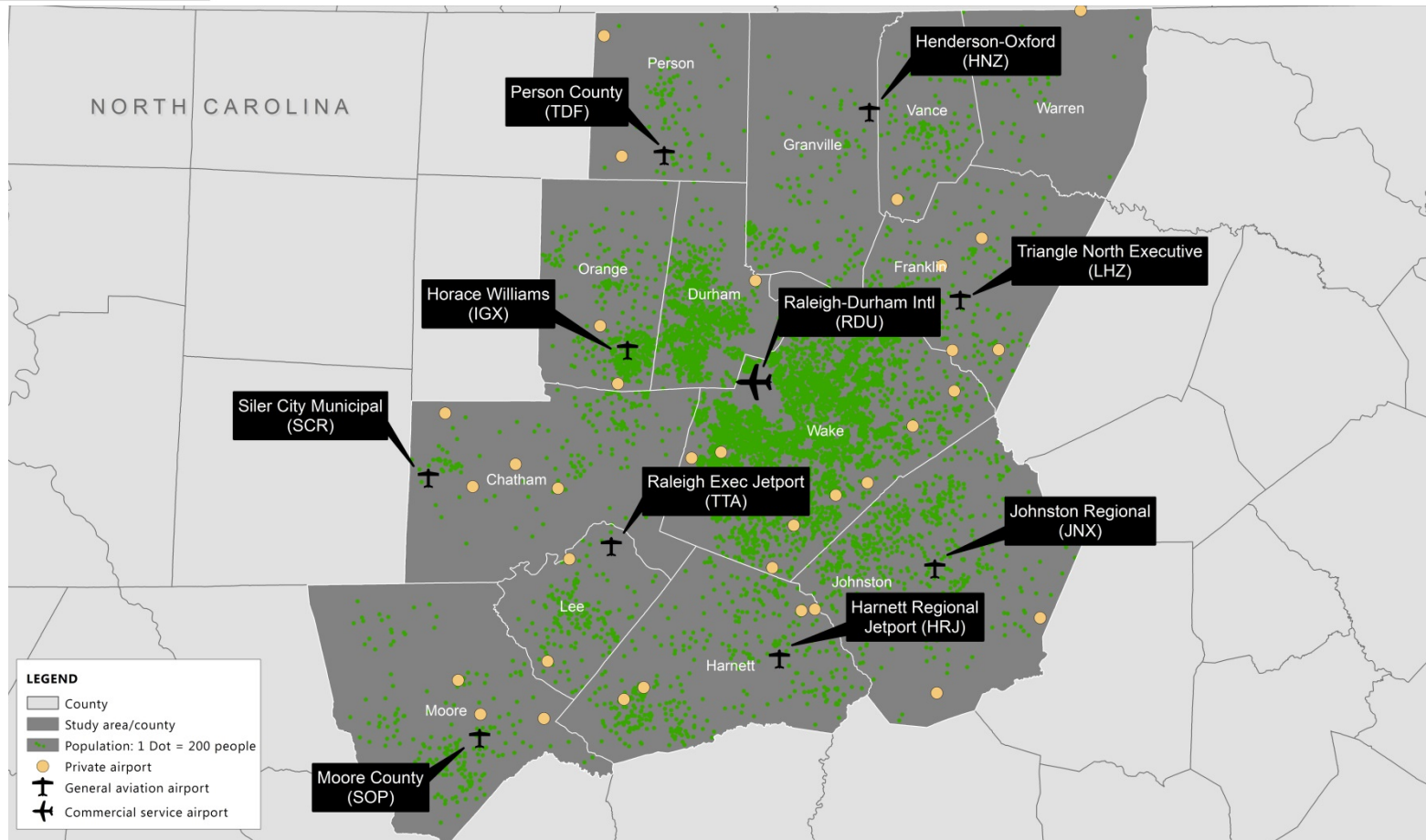
- Close proximity
- 5,000-foot runway (with longer preferred)
- Precision approach(es)
- ATCT (with radar coverage preferred)
- Fuel
- Line services/ground handling (full)
- Maintenance (full - with avionics and instruments preferred)
- Ground transportation (full)
- Hangar (preferred)
- Aircraft catering (full)

Source: Transportation Research Board, Airport Cooperative Research Program (ACRP) Report 77, *Guidebook for Developing General Aviation Airport Business Plans*, 2012.

Strong Economic Base for GA Demand

- ▶ Research Triangle Region
 - 2015 population: 2.4 million - projected to grow at a compound annual growth rate (CAGR) of **1.8% from 2014-2040**, compared with 0.9% for the U.S.
 - Employment – Projected to grow at a **CAGR of 1.8%** from 2014-2040, compared with 1.2% for the U.S.
 - Personal income per capita – Projected to grow at a **CAGR of 4.3%** from 2014-2040
- ▶ Major academic institutions – Duke University, UNC Chapel Hill, and NC State University
- ▶ Research Triangle Park
- ▶ 11 technology-based clusters
 - Future of region: Advanced Industries (manufacturing, energy, services)

Surrounding Airports



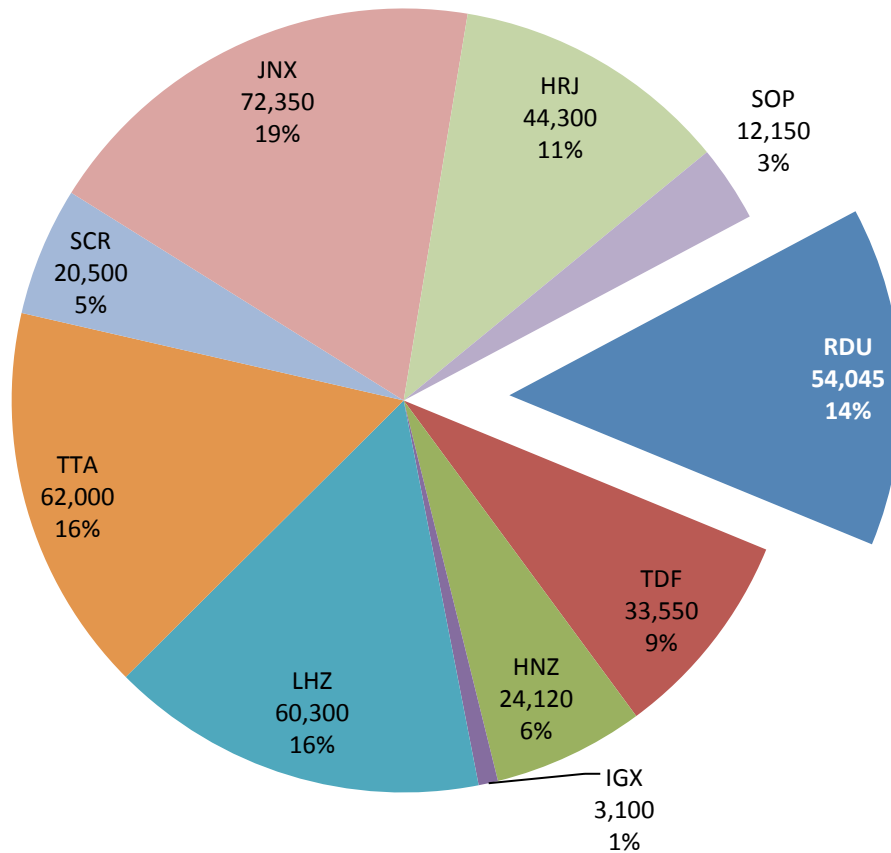
Source: U.S. Census Bureau, Topologically Integrated Geographic Encoding and Referencing data; population from 2010 Census block groups.

Study Area Airport Characteristics

Airport	Max Runway Length (ft.)	Precision Approach	Non-Precision Approach	ATCT	Major Maintenance	Passenger Terminal & Lounge	Hangar	Ramp / Tiedown
Raleigh-Durham Int'l	10,000	■	■	■	■	■	■	■
Person County	6,005	■	■			■	■	■
Henderson-Oxford	5,500		■		■			■
Horace Williams	4,005		■					■
Triangle North Executive	5,498	■	■		■	■	■	■
Raleigh Executive Jetport	6,500	■	■		■	■	■	■
Siler City Municipal	5,000		■		■			■
Johnston Regional	5,500	■	■		■	■	■	■
Harnett Regional Jetport	5,000		■		■	■	■	■
Moore County	6,502	■	■		■		■	■

Sources: Federal Aviation Administration, Airport Master Record, effective October 15, 2015; North Carolina Department of Transportation Division of Aviation, *North Carolina 2015-16 Airport Guide*; www.airnav.com.

Study Area GA Operations (2013)

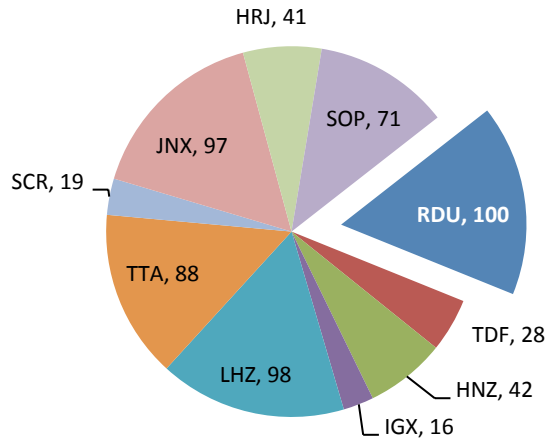


ID	Airport
RDU	Raleigh-Durham Int'l
TDF	Person County
HNZ	Henderson-Oxford
IGX	Horace Williams
LHZ	Triangle North Executive
TTA	Raleigh Exec. Jetport
SCR	Siler City Municipal
JNX	Johnston Regional
HRJ	Harnett Regional Jetport
SOP	Moore County

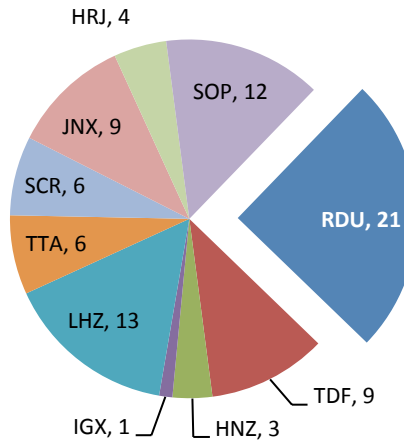
Source: Raleigh-Durham Airport Authority, September 2015 (RDU operations); Federal Aviation Administration, 2014 Terminal Area Forecast (other airports).

Study Area Based Aircraft (2015)

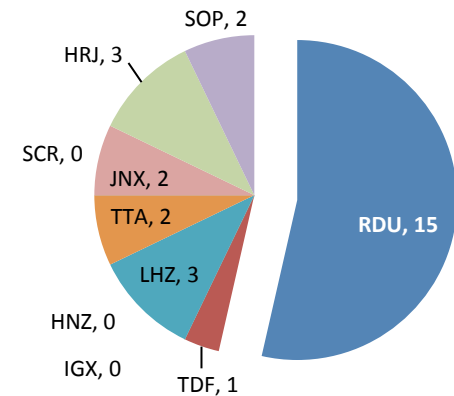
Single-Engine (600)



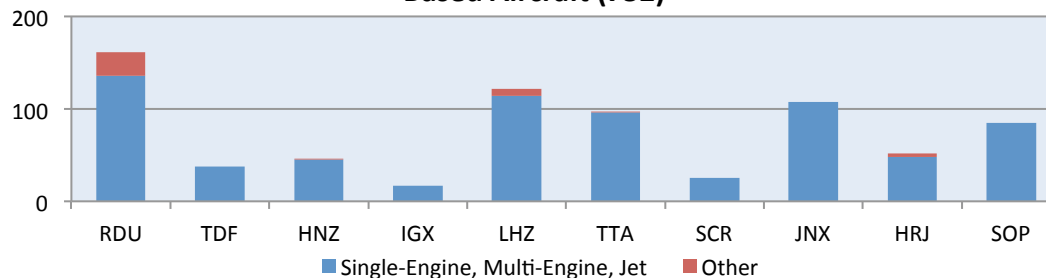
Multi-Engine (84)



Jet (28)



Based Aircraft (752)



ID	Airport
RDU	Raleigh-Durham Int'l
TDF	Person County
HNZ	Henderson-Oxford
IGX	Horace Williams
LHZ	Triangle North Executive
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Source: Federal Aviation Administration, Airport Master Record, effective October 15, 2015.

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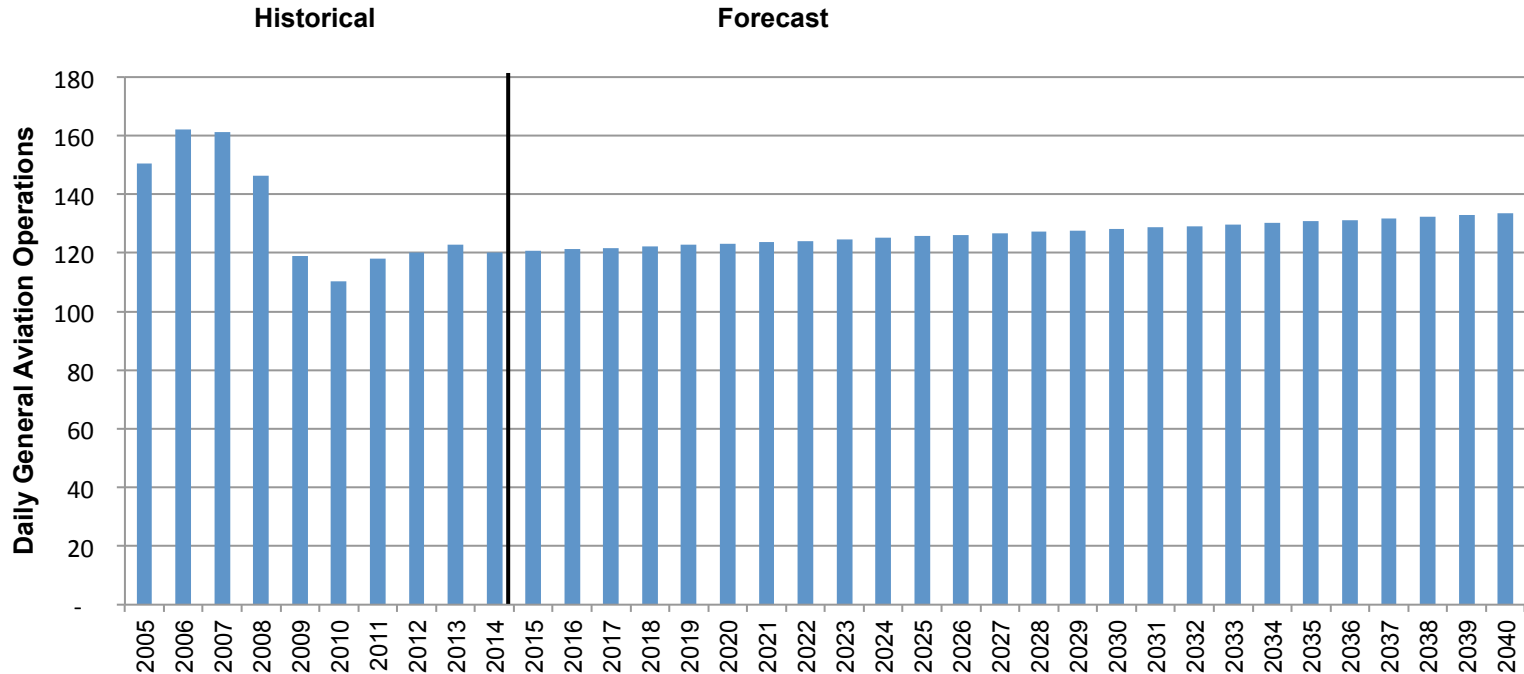
RDU General Aviation Forecast



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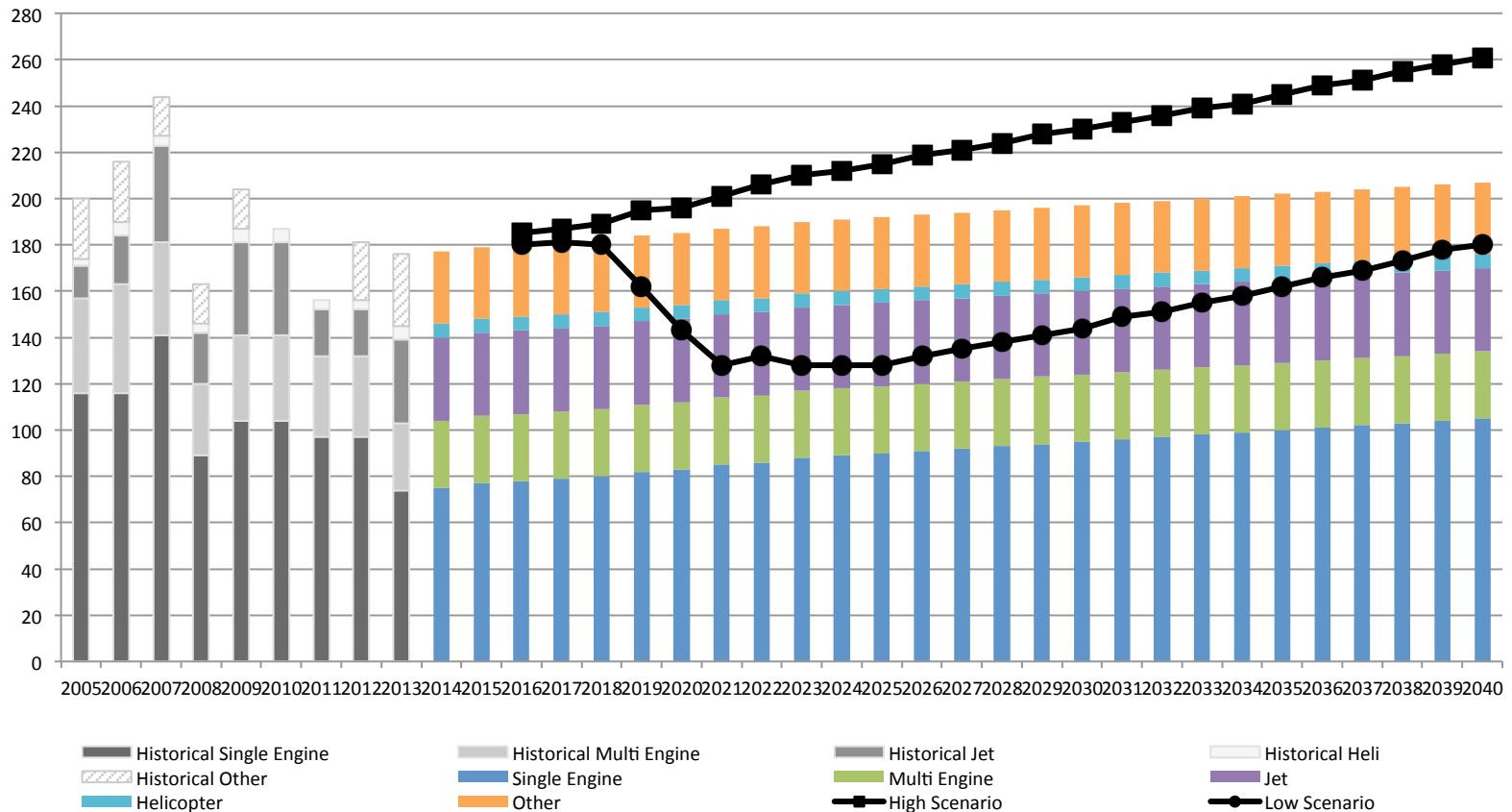
RDU GA Forecast



Sources: Raleigh-Durham Airport Authority, 2005-2015 (July); Ricondo & Associates, Inc. (analysis), August 2015.

Annual Growth in General Aviation Aircraft
Daily Operations: 0.4%

RDU Historical and Forecast Based Aircraft



Sources: Federal Aviation Administration, 2014 Terminal Area Forecast; Ricondo & Associates, Inc., November 2015 (high and low scenarios)

GA Industry Overview Conclusions

- ▶ GA industry is slowly recovering from recession
- ▶ Potential long-term decline in personal GA segment (student/private pilot certificates are decreasing)
- ▶ Business aviation segment expected to grow faster than personal GA segment
- ▶ Current/future expected trend toward larger-cabin business aircraft, with increased facility requirements
- ▶ RDU well-suited for GA business market
 - Adequate/ideal facilities
 - Quantity, type, and size of surrounding educational institutions and businesses drive demand for GA business segment

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GA Development Alternatives

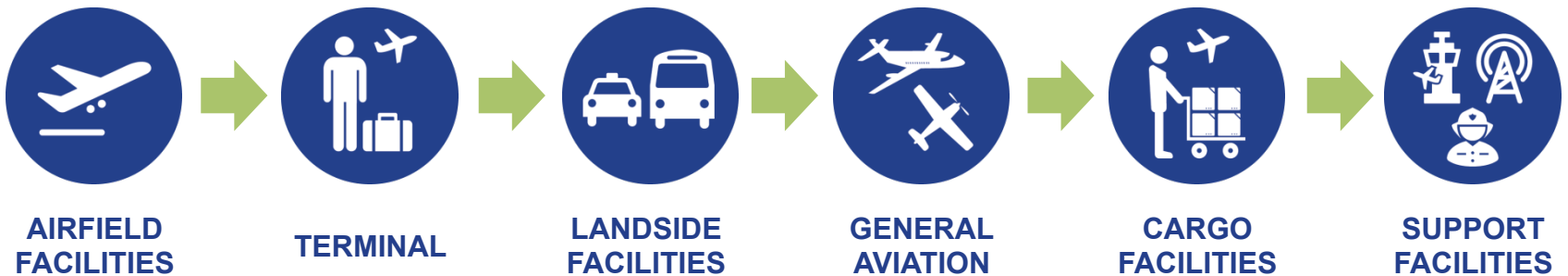


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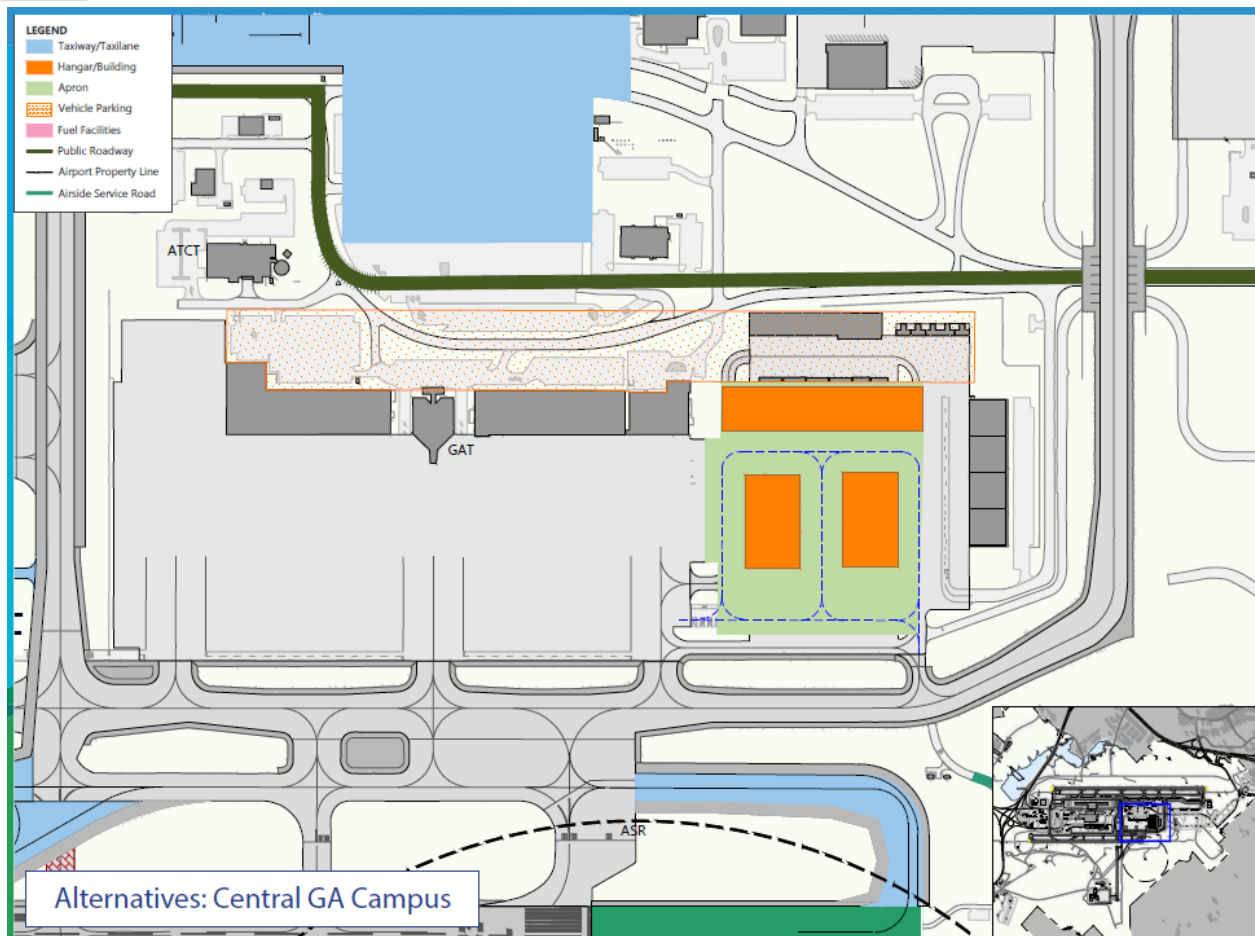
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Facility Planning

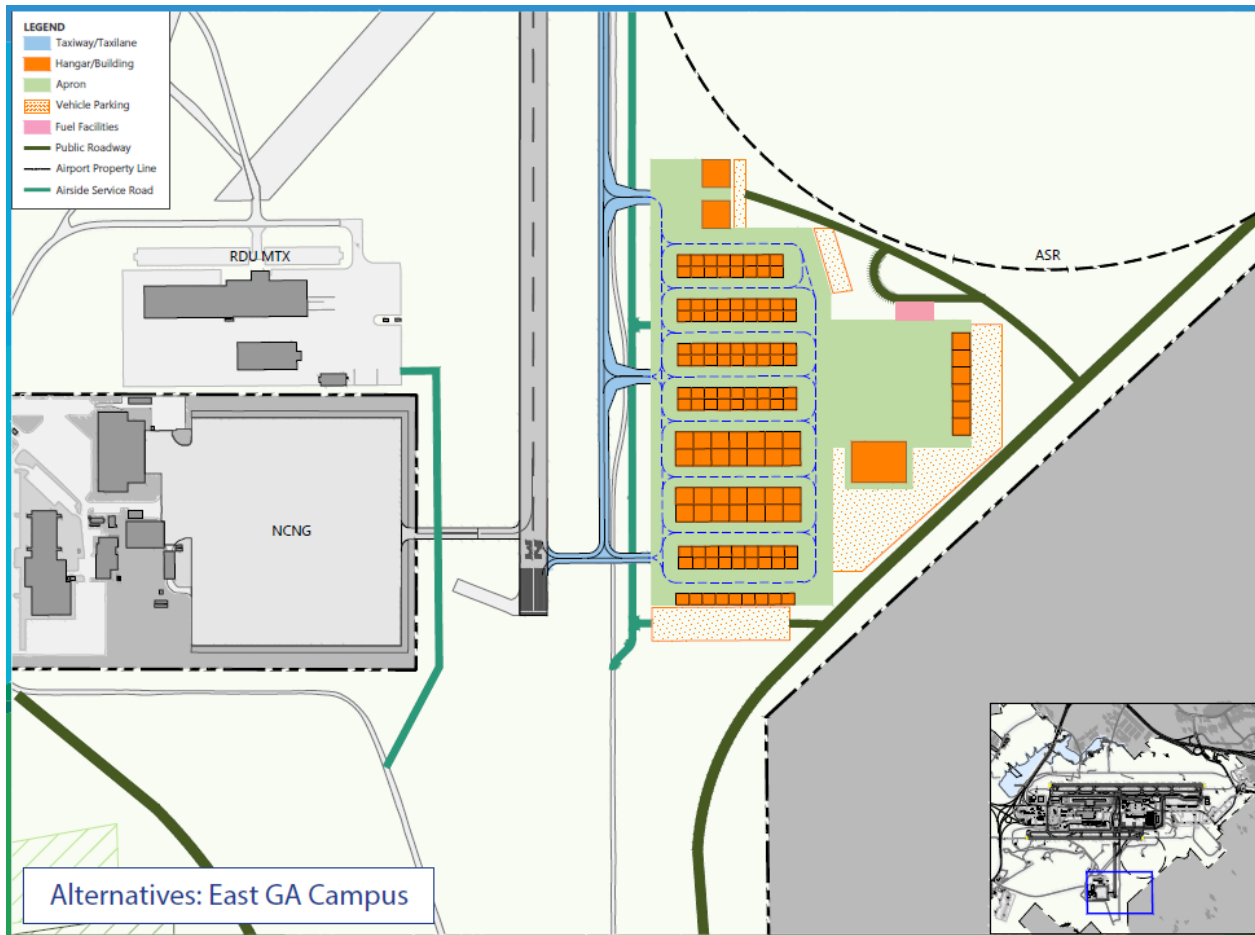
- ▶ Meet defined aeronautical needs
- ▶ Comply with FAA criteria
- ▶ Consider operational safety and efficiency
- ▶ Recognize hierarchy among facilities
- ▶ Goal: Define a framework to support incremental and organized GA facility development



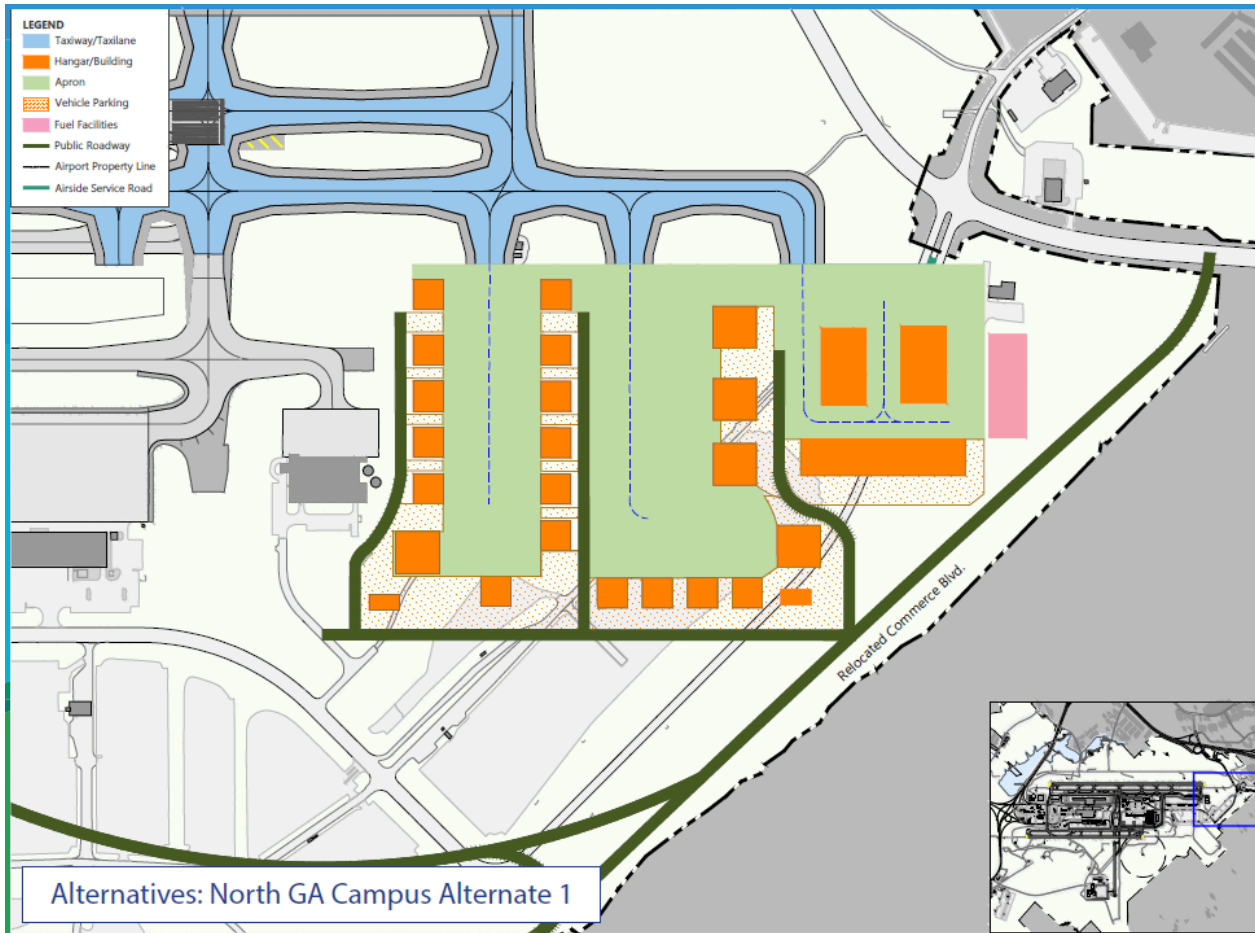
Alternatives – Central GA Campus



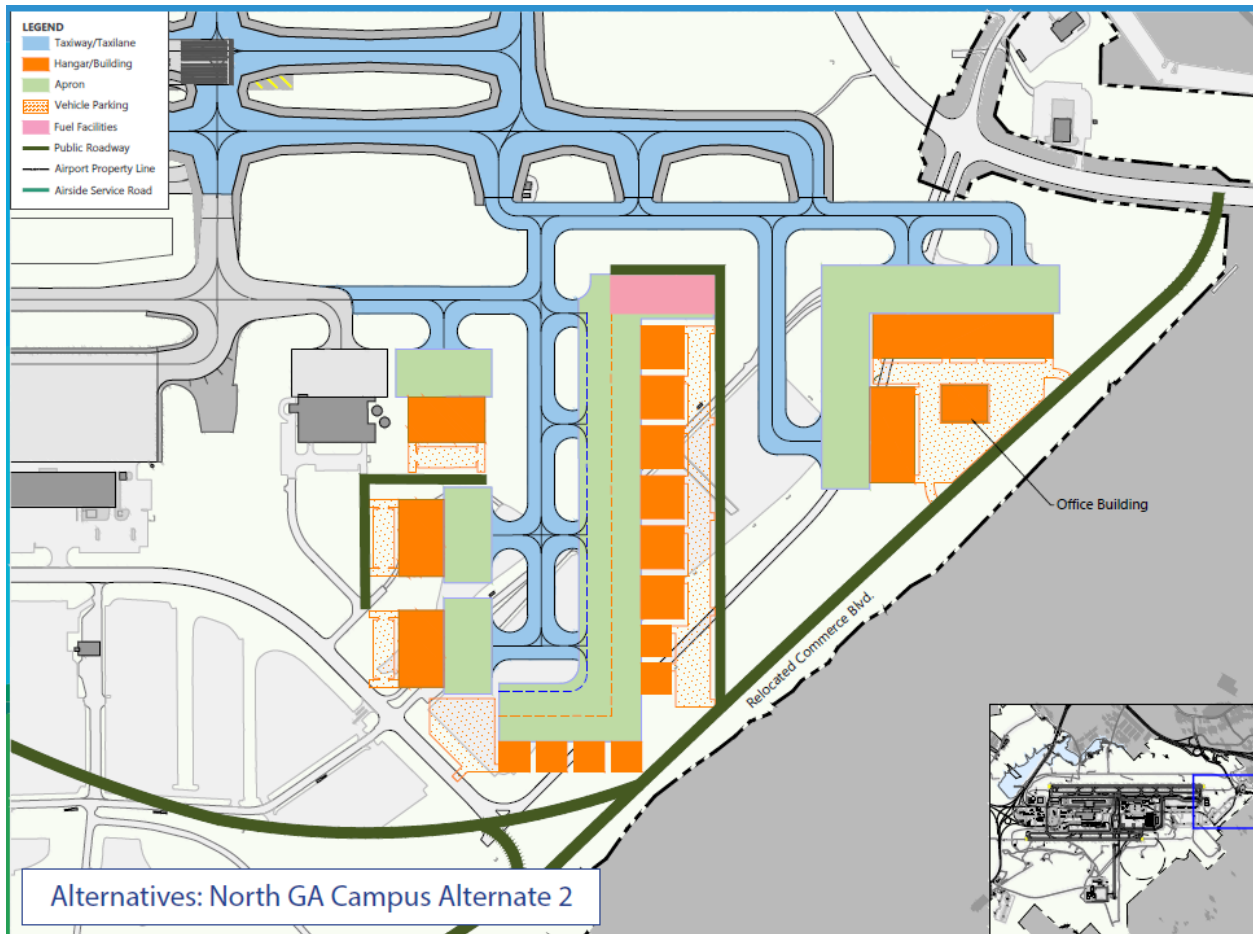
Alternatives – East GA Campus



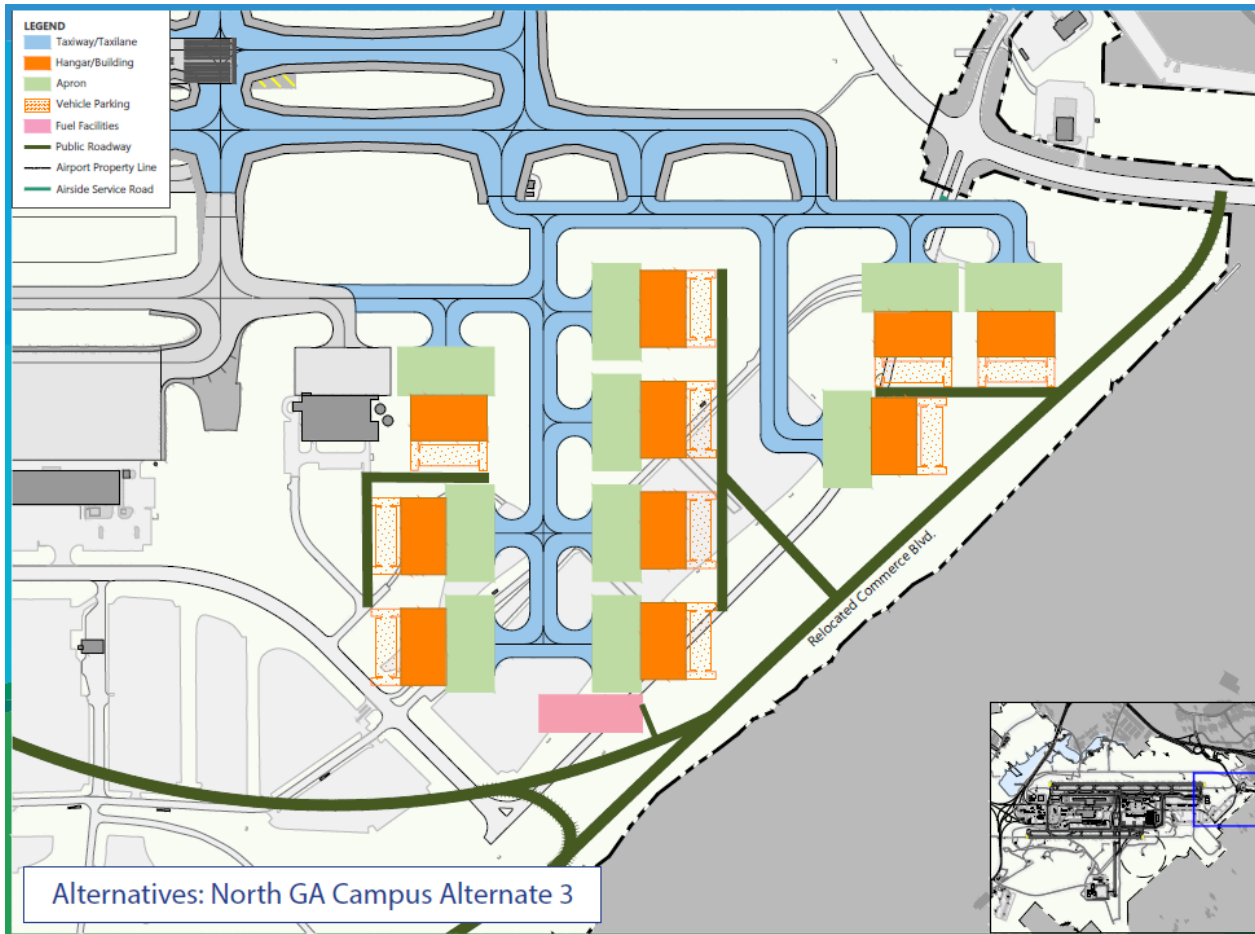
Alternatives – North GA Campus



Alternatives – North GA Campus



Alternatives – North GA Campus Alt. 3



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Approach to Future GA Infrastructure Development



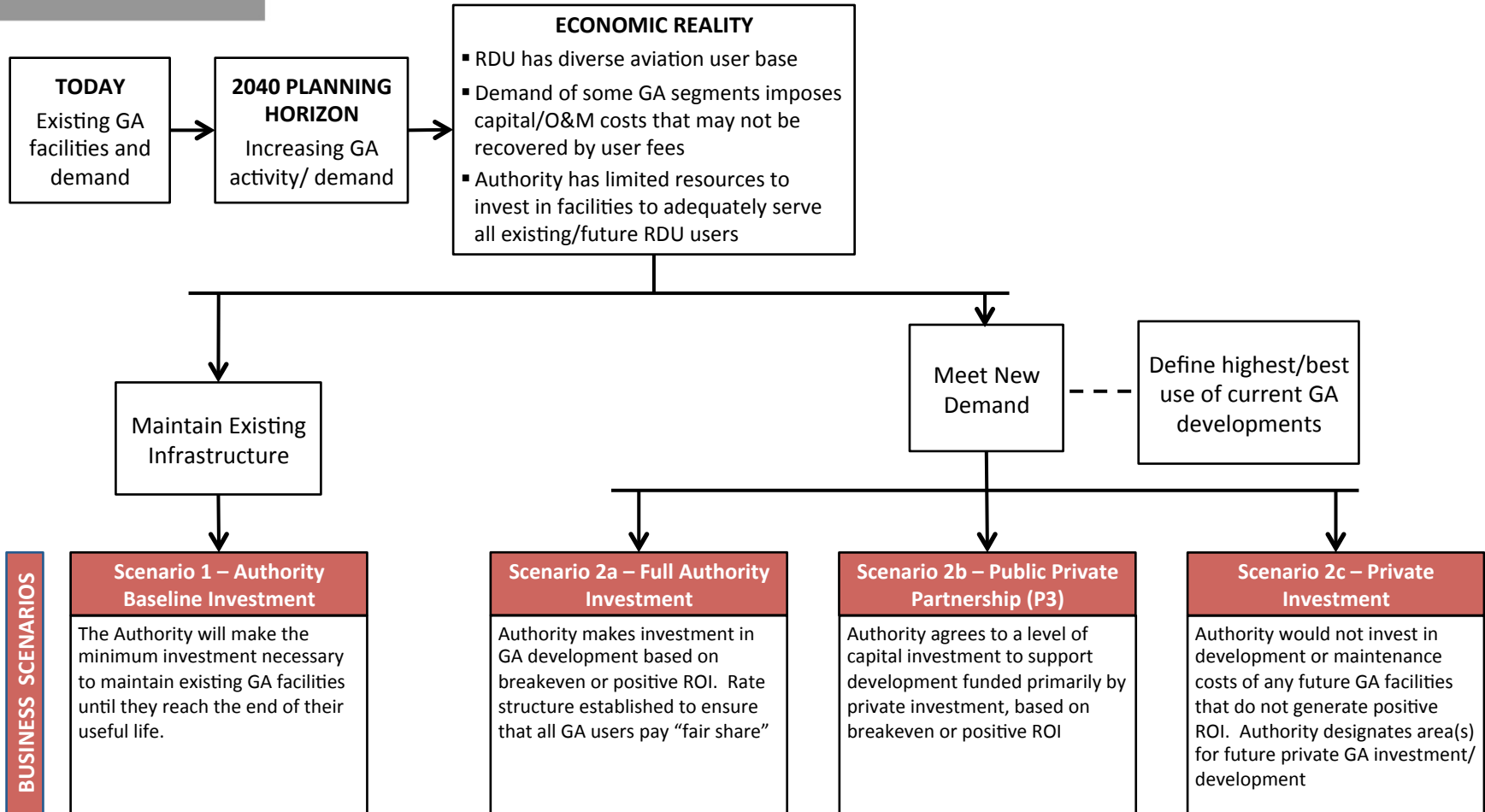
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GA Development Flexibility

- ▶ Protect sufficient space for organized development to accommodate a range of GA facilities
 - Forecast demand / requirements
 - Latent demand
- ▶ Anticipate evolution in GA development (change in magnitude and characteristics)
- ▶ Consider the context of future facility development
 - Compatibility with surrounding/existing development
 - Compatibility with planned development
 - Construction of new facilities in different location(s) versus new facilities in same location (facility replacement)
- ▶ Business priorities, ROI climate, and resources will drive facility decisions

RDU GA Business Scenarios



Approach to GA Infrastructure

- ▶ Recognize corporate/business market
 - Ready market (latent demand)
 - Compatible with RDU traffic characteristics
 - Financial resources needed for business deal
- ▶ Preserve flexibility
- ▶ Organize development (rather than “one off” improvements)
- ▶ Focus on campus configuration to facilitate incremental development
- ▶ Implement development standards

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Q&A (Boards)



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