ANALYSIS OF EXISTING SYSTEM

THE PURPOSE OF THIS CHAPTER IS TO provide the necessary database for subsequent phases of the System Plan. Pertinent data, regarding each airport/heliport and the area it serves was collected from each airport and the appropriate State and local agencies. In addition to the data provided by these sources, information published by the Federal government and other sources required for comprehensive understanding of the existing aviation system was collected, tabulated, and reviewed. Maximum use was made of the existing system planning work, various existing airport master plans, and environmental studies that have been completed. From these data, the analysis of the existing system was developed. Inventory items included:

- Airport and Heliport Facilities
- Aeronautical Activity
- Fuel Sales by Airport
- Land Use Around System Airports
- Socioeconomic Base
- Statutes and Regulations
- Future Technology

Of these items, the examination of State Aviation Regulations was used to determine whether an update is needed to accommodate funding for private airport development.

1. AIRPORT AND HELIPORT FACILITIES

THE FACILITY INVENTORY RECORDS OF DELDOT (WHICH are used for the FAA Form 5010), were used as one source of inventory data for airport and heliport facilities. **Figure 2-1** presents a map of Delaware showing the locations of each of the existing public-use airports and heliports. Additional data and information were obtained through review of existing completed airport master plans, and those that are in progress. In addition to the data from published records, on-site inspections of some of the system airports were necessary to inspect runway and taxiway pavement conditions. The inventory effort collected information concerning obstruction data and existing navaids; aircraft operations by type; general condition and type of runways, taxiways, and aprons; size and condition of terminal buildings, and parking facilities. Special attention was given to the physical limitations of each airport for expansion. All this data provided information for each airport including but not limited to:

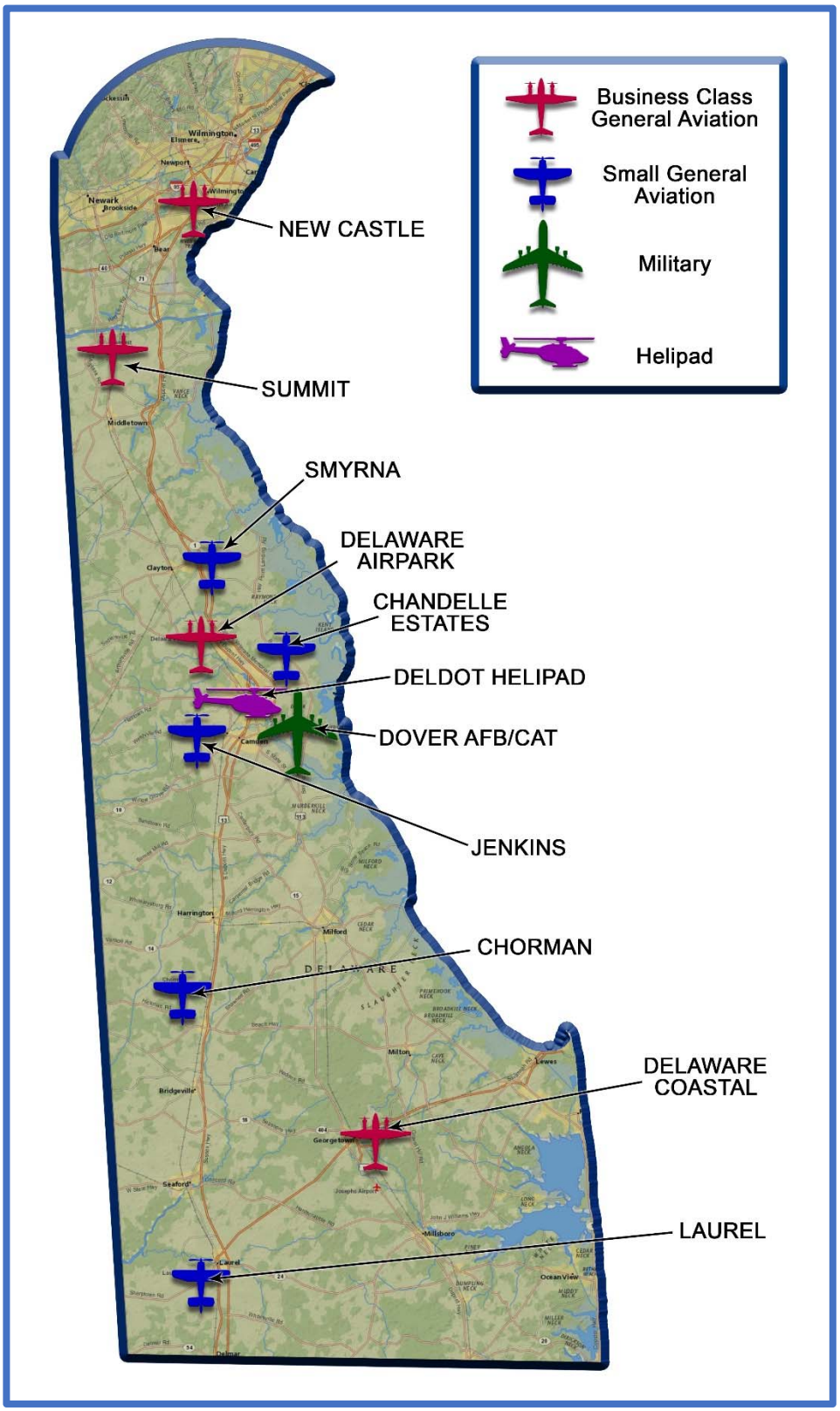


Figure 2-1 – Delaware Public-Use Airports and Heliports

- Present classification
- Land area owned or available at the airport
- An inventory of facilities at each airport, such as runways and taxiways, terminal buildings, hangar buildings, and airport lighting systems, aircraft apron, auto parking, cargo facilities, and fueling facilities
- Any limitations on future expansion
- Planned improvements
- Pavement conditions
- Ground access to the airport
- Navigational aids, airspace conditions
- Existing activity levels at system airports

In addition to the database, accurate counts of aircraft operations and based aircraft were included as a part of the inventory process. In this regard, the State's aircraft operations counting devices are being used by Office of Aeronautics staff to gather accurate operational data.

1.1 AIRPORT CLASSIFICATIONS

Airport classifications are based on an Airport Reference Code (ARC). The ARC is based on the characteristics of the most demanding aircraft, or group of aircraft (generally referred to as the "design aircraft") that regularly use the airport, with the term "regularly" defined as at least 250 takeoffs annually (500 annual operations). The ARC signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

Table 2-1 presents a summary of the Airport Reference Code aircraft categories and their operating and dimensional characteristics. The ARC is represented by a letter and Roman numeral. The letter defines the approach category and is based on the approach speed, or 1.3 times the stall speed of the design aircraft. The Roman numeral, which indicates the design group, is based on the wingspan or the tail height of the design aircraft, whichever is more demanding.

Table 2-1 - Airport Reference Code (ARC)

Aircraft Approach Category	**Approach Speed**	
A	Less than 91 knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
Airplane Design Group	**Wingspan**	**Tail Height**

Table 2-1 - Airport Reference Code (ARC)		
I	Up to but not including 49 feet	Up to but not including 20 feet
II	49 feet up to but not including 79 feet	20 feet up to but not including 30 feet
III	79 feet up to but not including 118 feet	30 feet up to but not including 45 feet
IV	118 feet up to but not including 171 feet	45 feet up to but not including 60 feet
V	171 feet up to but not including 214 feet	60 feet up to but not including 66 feet
VI	214 feet up to but not including 262 feet	66 feet up to but not including 80 feet

Source: FAA Advisory Circular 150/5300-13A

Under this system, short runway airports and turf airports are classified as A-I and Less than A-I, respectively. Other airports are classified, based upon their design characteristics and critical aircraft type usage. In this regard, each of the State's airports can be classified by ARC as follows:

Table 2-2 - Airports by ARC		
A-I or Less:	**B-I, B-II, or B-III**	**C-I or Higher**
Chandelle Estates Airport	Chorman Airport	New Castle Airport
Jenkins Airport	Delaware Airpark	Civil Air Terminal at Dover AFB
Laurel Airport	Delaware Coastal Airport	
Smyrna Airport	Summit Airport	

1.2 DESCRIPTION OF FACILITIES

Since the previous aviation system plan, there have been no changes in the number of public- use airports in Delaware. As such, there are currently nine public-use airports, one joint-use military air base, and one public-use heliport in Delaware. There have been some changes on the Airport level since the 2013 System Plan Update. Some notable changes include:

Chorman Airport:

- Paved and widened runway increasing from 3,588' x 37' to 3,588' x 50'
- Multiple hangars were constructed which increased based aircraft by 25.

Delaware Airpark:

- Constructed a new runway increasing from 3,582' x 60' to 4,200' x 75'
- Full parallel taxiway
- ARC BI to ARC BII
- Demolished hangars and relocated them during construction - net loss of 27 aircraft

Delaware Coastal Airport:

- Changed name from Sussex County
- Purchased 48 acres of land (an increase from 615 to 663)
- Lengthened runway from 5,000 feet to 5,500 feet
- Finished construction of a full parallel taxiway for the main runway

Jenkins Airport:

- Closed one of its two turf runways; Runway 18-36 (2,842' x 70')

New Castle:

- Airport role changed from Reliever to Commercial Service back to Reliever.

In the following pages, graphic and tabular data describes each of the existing public-use airports. These airports make up the database of existing facilities from which the recommended aviation system will be developed.

CHANDELLE ESTATES AIRPORT

Airport Information:

FAA Identifier:	0N4	**ARC:**	Less Than A-I
Location:	3 Miles Northeast of Dover		
City:	Dover	**Weather Info:**	Not on Airport
County:	Kent	**FSS:**	Millville
Lat/Long:	N 39-12-08	**Based Aircraft:**	24
	W 75-29-07	**Annual Operations:**	1,100 Annually
Ownership:	Private		100% General Aviation
Acreage:	27		
Airport role:	Small General Aviation/		
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	RJR Airdome
Services:	
Fuel:	100LL, MOGAS
Parking:	Hangars
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	None
Other Services:	Crop Dusting, Flight Instruction, Aircraft Rental, Aircraft Dealer
Website:	None

Runway Information:

Orientation:	**04-22**
Length:	2,533'
Width:	28'
Strength:	Single-Less than 12,500 lbs.
Surface:	Asphalt
Condition:	Poor
Taxiway:	Turn-Around
Lighting:	LIRL
Visual Landing Aids:	None, None
Navaids:	None

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
22	2	0	0	0	0	24

CHORMAN AIRPORT

Airport Information:

FAA Identifier:	D74	**ARC:**	B-I
Location:	2 Miles Southwest of Farmington		
City:	Farmington	**Weather Info:**	Not on Airport
County:	Kent	**FSS:**	Millville
Lat/Long:	N 38-50-58	**Based Aircraft:**	44
	W 75-36-46	**Annual Operations:**	13,500 Annually
Ownership:	Private		100% General Aviation
Acreage:	134		
Airport role:	Small General Aviation/		
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Allen Chorman & Son Russell Aircraft
Services:	
Fuel:	None
Parking:	Hangars
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	None
Other Services:	Crop Spraying
Website:	N/A

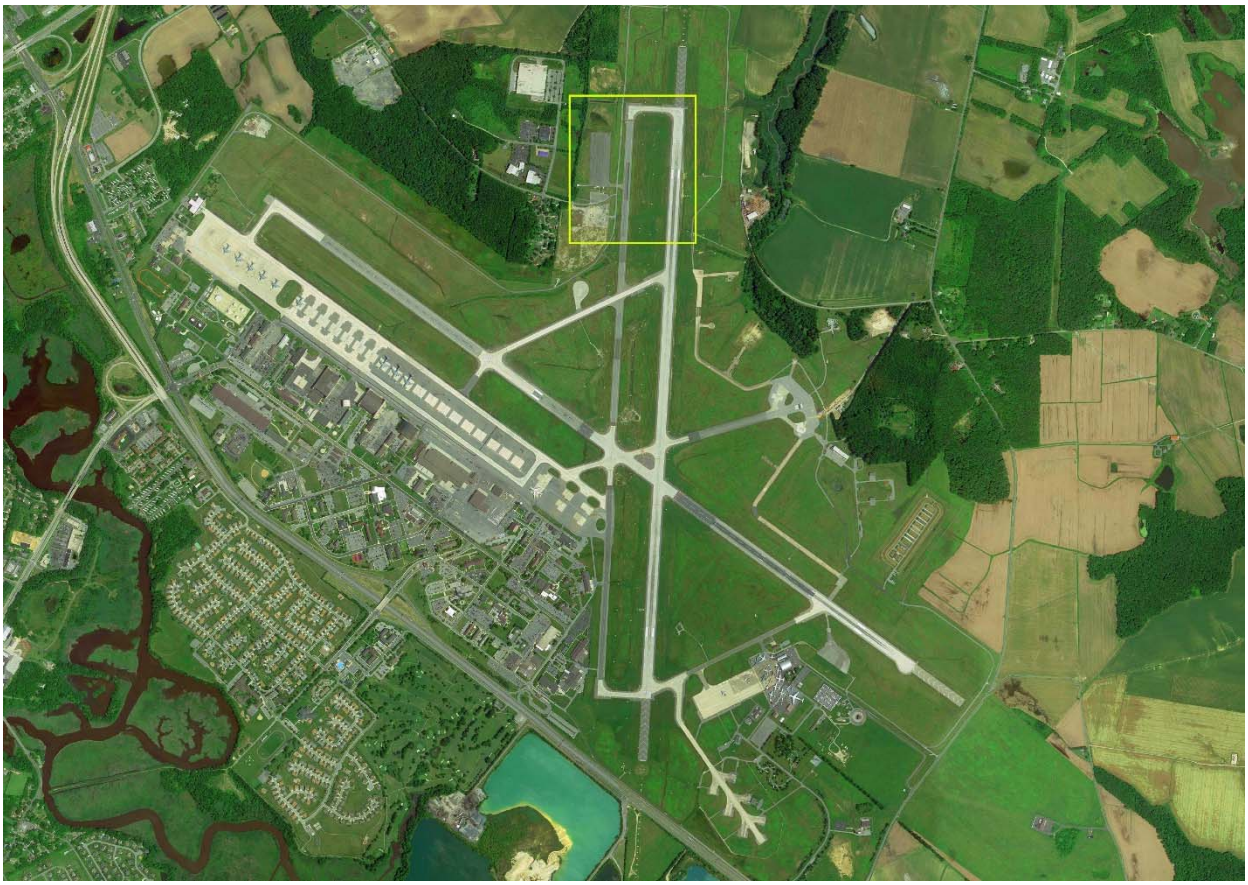
Runway Information:

Orientation:	**16-34**
Length:	3,588'
Width:	50’
Strength:	Single-Less than 12,500 lbs.
Surface:	Asphalt
Condition:	Excellent
Taxiway:	Parallel Turf Taxiway
Lighting:	LIRL
Visual Landing Aids:	None, None
Navaids:	None

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
40	2	0	2	0	0	44

CIVIL AIR TERMINAL



Airport Information:

FAA Identifier:	DOV	**ARC:**	E-VI
Location:	3 Miles East of Dover		
City:	Dover	**Weather Info:**	Not on Airport
County:	Kent	**FSS:**	Millville
Lat/Long:	N 39-07-46	**Based Aircraft:**	None
	W 75-27-57	**Annual Operations:**	200 Annually
Ownership:	State/Military		200 General Aviation
Acreage:	20		
Airport role:	Open to limited General Aviation		
	Prior permission only	**Airspace:**	Class D

Airport Services

FBO:	Delaware River and Bay Authority (DRBA)
Services:	
Fuel:	Jet A
Parking:	Hangars
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	Low
Bulk Oxygen:	Low
Other Services:	Cargo
Website:	www.catatdover.com

Runway Information:

Orientation:	14-32	01-19
Length:	12,903'	9,602'
Width:	150'	150'
Surface:	Asphalt	Asphalt
Taxiway:	Full Parallel	Full Parallel
Lighting:	HIRL	HIRL
Visual Landing Aids:	PAPI, PAPI	ALSF2, ALSF1
Navaids:	ILS, RNAV(GPS), TACAN	

DELAWARE AIRPARK

Airport Information:

FAA Identifier:	33N	**ARC:**	B-II
Location:	1 Mile West of Cheswold		
City:	Dover/Cheswold	**Weather Info:**	AWOS-3: (302)-735-9754
County:	Kent	**FSS:**	Millville
Lat/Long:	N 39-13-07	**Based Aircraft:**	29
	W 75-36-01	**Annual Operations:**	23,600 Annually
Ownership:	Public		100% General Aviation
Acreage:	190		
Airport role:	General Aviation/		
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Delaware River and Bay Authority (DRBA)
Services:	
Fuel:	100LL
Parking:	Hangars
Airframe Service:	None
Powerplant Service:	None
Bottled Oxygen:	None
Bulk Oxygen:	None
Other Services:	Crop Dusting, Flight Instruction, Aircraft Rental
Website:	www.delawareairpark.com

Runway Information:

Orientation:	**09-27**
Length:	4,201'
Width:	75'
Strength:	SW-38.5,000
	DW-56.5,000
Surface:	Asphalt
Condition:	Excellent
Taxiway:	Full Parallel
Lighting:	MIRL
Visual Landing Aids:	PAPI, PAPI
Navaids:	GPS, VOR

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
25	4	0	0	0	0	29

DELAWARE COASTAL AIRPORT

Airport Information:

FAA Identifier:	GED	**ARC:**	B-III
Location:	2 Miles Southeast of Georgetown		
City:	Georgetown	**Weather Info:**	ASOS (302) 856-2927
County:	Sussex	**FSS:**	Millville
Lat/Long:	N 38-41-15	**Based Aircraft:**	60
	W 075-21-3	**Annual Operations:**	34,500 Total Operations
Ownership:	Public		33,900 General Aviation
Acreage:	663		500 Air Taxi
Airport role:	General Aviation/		100 Military
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Georgetown Air Service
Services:	
Fuel:	100LL, Jet A
Parking:	Tie-downs
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	None

Other Services:	Air Ambulance, Charter, Flight Instruction, Aircraft Rental, Aircraft Dealer
Website:	www.delawarecoastalairport.com

Runway Information:

Orientation:	**04-22**	**10-28**
Length:	5,500'	3,109'
Width:	150'	75'
Strength:	SW-50,000	SW-50,000
	DW-175,000	DW-91,000
Surface:	Asphalt	Asphalt
Condition:	Good	Good
Taxiway:	Full Parallel	Full Parallel
Lighting:	MIRL	MIRL
Visual Landing Aids:	MALSR, PAPI	PAPI, PAPI
Navaids:	GPS, VOR	

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
40	11	3	6	1	0	61

JENKINS AIRPORT

Airport Information:

FAA Identifier:	15N	**ARC:**	Less Than A-1
Location:	1 Mile West of Wyoming		
City:	Wyoming	**Weather Info:**	Not on Airport
County:	Kent	**FSS:**	Millville
Lat/Long:	N 39-07-02	**Based Aircraft:**	20
	W 75-35-03	**Annual Operations:**	500 Annually
Ownership:	Private		100% General Aviation
Acreage:	60		
Airport role:	Open to the Public		
	Small General Aviation	**Airspace:**	Class E

Airport Services

FBO:	Joe C. Jenkins
Services:	
Fuel:	None
Parking:	Hangars
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	None

Other Services:	Flight Instruction, Aircraft Dealer
Website:	N/A

Runway Information:

Orientation:	**12-30**
Length:	2,035'
Width:	70'
Surface:	Turf
Condition:	Good
Taxiway:	None
Lighting:	None
Visual Landing Aids:	None, None
Navaids:	None

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
18	1	0	0	1	0	20

LAUREL AIRPORT

Airport Information:

FAA Identifier:	N06	**ARC:**	Less Than A-I
Location:	1 Mile Southwest of Laurel		
City:	Laurel	**Weather Info:**	Not on Airport
County:	Sussex	**FSS:**	Millville
Lat/Long:	N 38-32-31	**Based Aircraft:**	14
	W 75-35-39	**Annual Operations:**	7,500 Annually
Ownership:	Private		100% General Aviation
Acreage:	88		
Airport role:	Small General Aviation/		
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Sky Dive DelMarVa, Inc
Services:	
Fuel:	None
Parking:	Hangars, Tie-downs
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	None

Other Services:	Crop Dusting, Parachute Jumping
Website:	0

Runway Information:

Orientation:	**15-33**
Length:	3,175'
Width:	270'
Surface:	Turf
Condition:	Good
Taxiway:	N/A
Lighting:	LIRL
Visual Landing Aids:	None, None
Navaids:	GPS

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
13	1	0	0	0	0	14

NEW CASTLE AIRPORT

Airport Information:

FAA Identifier:	ILG	**ARC:**	D-III
Location:	4 Miles S of Wilmington		
City:	Wilmington	**Weather Info:**	ASOS (302) 328-1536
County:	New Castle	**FSS:**	Millville
Lat/Long:	N 39-40-43	**Based Aircraft:**	198
	W 75-36-23	**Annual Operations:**	41,576 Annually
Ownership:	Public		33,246 General Aviation
Acreage:	1,250		3,876 Air Taxi
Airport role:	GA Reliever		4,454 Military
	Open to the Public	**Airspace:**	Class D

Airport Services

FBO:	FlyAdvanced, Dassault Aircraft Services, Atlantic ILG and Dumont Aviation
Services:	
Fuel:	100LL, Jet A
Parking:	Hangars, Tie-downs
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	High/low
Bulk Oxygen:	High/low

Other Services:	Air Ambulance, Avionics, Cargo, Flight Instruction, Aircraft Rental, Aircraft Dealer
Website:	www.newcastleairportilg.com

Runway Information:

Orientation:	**09-27**	**01-19**	**14-32**
Length:	7,275'	7,012'	4,602'
Width:	150'	150'	150'
Strength:	SW-90,000	SW-90,000	SW-50,000
	DW-140,000	DW-140,000	DW-60,000
Surface:	Asphalt	Asphalt	Asphalt
Condition:	Excellent	Fair	Fair
Taxiway:	Full Parallel	Partial Parallel	Full Parallel
Lighting:	HIRL	HIRL	MIRL
Visual Landing Aids:	PAPI, PAPI	MALSR, PAPI	None, VASI
Navaids:	ILS, LOC, GPS, VOR		

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
85	21	68	4	0	20	198

SMYRNA AIRPORT

Airport Information:

FAA Identifier:	38N	**ARC:**	Less Than A-I
Location:	1 Mile East of Smyrna		
City:	Smyrna	**Weather Info:**	Not on Airport
County:	Kent	**FSS:**	Millville
Lat/Long:	N 39-18-13	**Based Aircraft:**	10
	W 75-35-01	**Annual Operations:**	1,700 Annually
Ownership:	Private		100% General Aviation
Acreage:	20		
Airport role:	Small General Aviation/		
	Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Robert Jones
Services:	
Fuel:	100LL, MOGAS
Parking:	Hangars
Airframe Service:	None
Powerplant Service:	None
Bottled Oxygen:	None
Bulk Oxygen:	None
Other Services:	None
Website:	None

Runway Information:

Orientation:	**10-28**
Length:	2,600'
Width:	125'
Surface:	Turf
Condition:	Good
Taxiway:	N/A
Lighting:	LIRL
Visual Landing Aids:	None, None
Navaids:	None

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
8	0	0	0	2	0	10

SUMMIT AIRPORT

Airport Information:

FAA Identifier:	EVY	**ARC:**	B-II
Location:	5 Miles North of Middletown		
City:	Middletown	**Weather Info:**	AWOS-3: (302) 378-2063
County:	New Castle	**FSS:**	Millville
Lat/Long:	N 39-31-15 W 75-43-25	**Based Aircraft:**	32
		Annual Operations:	31,976 Annually 31,876 General Aviation 100 Military
Ownership:	Private		
Acreage:	209		
Airport role:	General Aviation/ Open to the Public	**Airspace:**	Class E

Airport Services

FBO:	Summit Aviation, Inc
Services:	
Fuel:	100LL, Jet A
Parking:	Hangars, Tie-downs
Airframe Service:	Major
Powerplant Service:	Major
Bottled Oxygen:	None
Bulk Oxygen:	Low
Other Services:	Avionics, Flight Instruction
Website:	www.summit-aviation.com

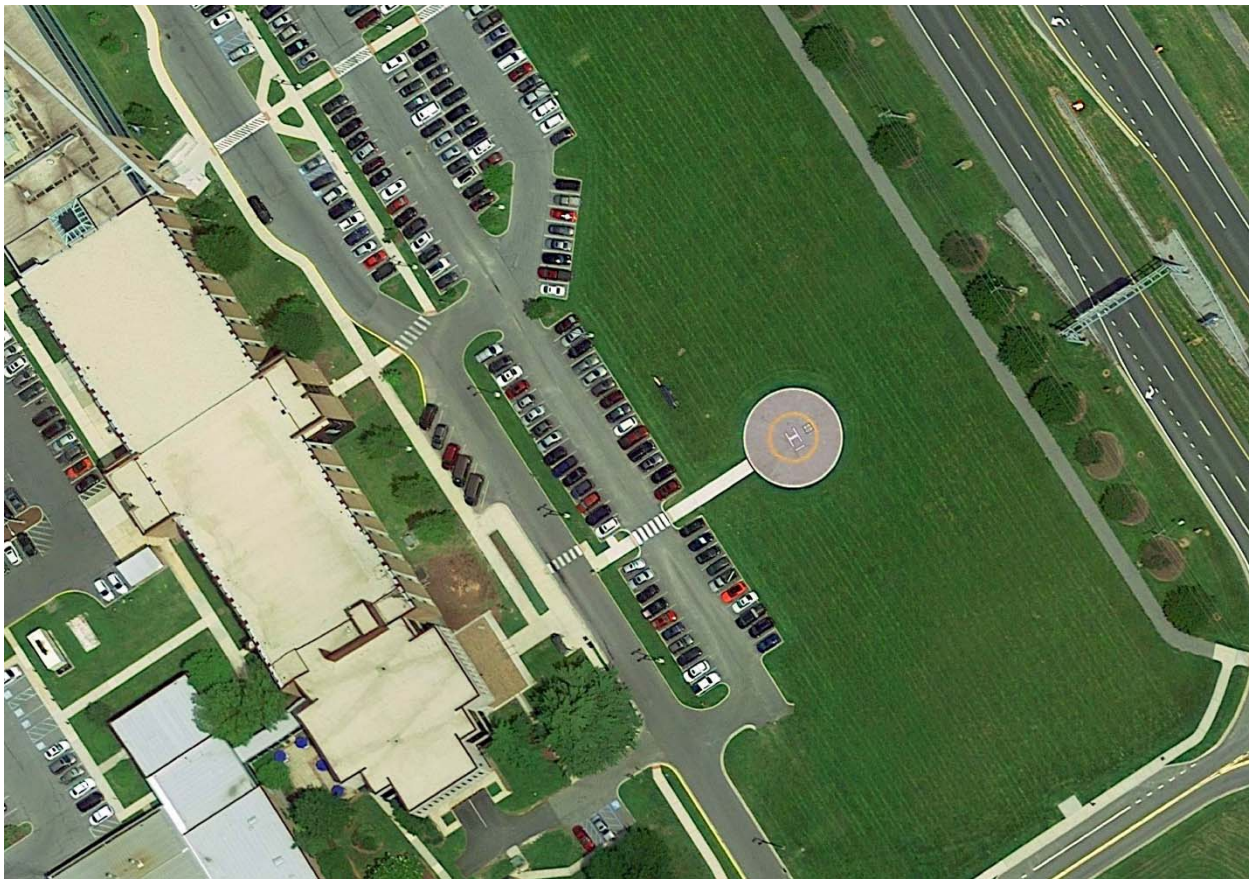
Runway Information:

Orientation:	**17-35**	**11-29**
Length:	4,488'	3,601'
Width:	65'	200'
Surface:	Asphalt	Turf
Condition:	Fair	Good
Taxiway:	Full Parallel	
Lighting:	MIRL	LIRL
Visual Landing Aids:	PAPI, PAPI	None, None
Navaids:	GPS, NDB-A	

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
29	0	0	3	0	0	32

DELDOT HELISTOP



Airport Information:

FAA Identifier:	0N5	**ARC:**	None
Location:	On the Delaware Department of Transportation campus in Dover	**Weather Info:**	Not on Airport
City:	Dover	**FSS:**	Millville
County:	Kent	**Based Aircraft:**	None
Lat/Long:	N 39-08-58 W 75-30-17	**Annual Operations:**	20 Annually
Ownership:	Public	**Airspace:**	Class E
Acreage:	1		
Airport role:	General Aviation/ Open to the Public		

Airport Services

FBO:	DelDOT
Services:	
Fuel:	None
Parking:	None
Airframe Service:	None
Powerplant Service:	None
Bottled Oxygen:	None
Bulk Oxygen:	None
Other Services:	None
Website:	None

Runway Information:

Orientation:	**H1**
Length:	60'
Width:	60'
Surface:	Concrete
Condition:	Excellent
Taxiway:	N/A
Lighting:	PERI
Visual Landing Aids:	None
Navaids:	None

Based Aircraft:

Single Engine	Multi Engine	Jet	Helicopter	Other	Military	Total
0	0	0	0	0	0	0

Table 2-3 – Summary of Delaware Public-Use Airport and Heliport Facilities

AIRPORT	Ownership	ARC Class**	# of Runways	Runway Dimensions	Runway Surface	Based Aircraft	Civil Aircraft Operations	Service Area	Business Aviation Activity
Chandelle Estates Airport	Private	Less Than A-I	1	2,533' x 28'	Asphalt	24	1,100	Local	Crop Spraying, Powerline Surveillance, Pilot Training
Chorman Airport	Private	B-I	1	3,588' x 50'	Asphalt	44	13,500	Local	Crop Spraying, Aircraft Maintenance
Civil Air Terminal at Dover AFB*	Civil-Mil. Joint Use	E-VI	2	9,602' x 200' 12,903' x 150'	Concrete Asphalt	0	200	Regional	Corporate Aviation, NASCAR Race Air Travel Support, Military Aviation
Delaware Airpark	Public	B-II	1	4,200' x 75'	Asphalt	29	23,600	Regional	Pilot Training, Business Aviation, Sight Seeing, Tourism
Delaware Coastal	Public	B-III	2	5,500' x 150' 3,109' x 75'	Asphalt Asphalt	61	34,400	Regional	Pilot Training, Aircraft Manufacturing, Corporate Aviation, Tourism, Banner Towing, Military Aviation, Air Cargo, Medevac
Jenkins Airport	Private	Less Than A-1	1	2,035' x 70'	Turf	20	500	Local	Aircraft Salvage
Laurel Airport	Private	Less Than A-I	1	3,175' x 270'	Turf	14	7,500	Local	Parachute Training, Crop Spraying, Pilot Training, Sight Seeing
New Castle Airport	Public	D-III	3	7,275' x 150' 7,012' x 150' 4,602' x 150'	Asphalt Asphalt Asphalt	198	36,600	Regional	Air Cargo, Pilot Training, Corporate Aviation, Military Aviation, Medevac, Tourism
Smyrna Airport	Private	Less Than A-I	1	2,600' x 125'	Turf	10	1,700	Local	Pilot Training, Crop Spraying
Summit Airport	Private	B-II	2	4,488' x 65' 3,601' x 200'	Asphalt Turf	32	31,900	Regional	Corporate Aviation, Military Aviation, Aircraft Maintenance, Medevac
DELDOT Helistop	Public	N/A	1	60' x 60'	Concrete	0	50	Local	Helicopter Operations

* Joint-use facility with State-owned civil facilities.
** ARC = Airport Reference Code

2. AIRPORT ACTIVITY LEVELS

THE PAST AND PRESENT AIR TRAFFIC VOLUMES at the existing public-use airports in the State were reviewed to establish a basis for forecasting future aeronautical activity. The categories of air traffic activity collected and studied included:

- General Aviation
  - Based aircraft
  - Fleet mix
  - Aircraft operations and peaking characteristics
- Military
  - Total aircraft operations at system airports

The primary source for aircraft activity information at the outset of the planning effort was airport management records, Air Traffic Control Tower (ATCT) records, FAA Form 5010 data, and aircraft activity counts from the State's airport operations counting program.

Data regarding military aviation operations was collected from Dover AFB, New Castle Airport, and Delaware Coastal Airport. Although the Civil Air Terminal is located at Dover Air Force Base, military operations at Dover AFB are not considered to be a part of the CAT's operations. Delaware Coastal Airport and Summit Airport show only a small number of military operations each year. Military activity in the State consists mostly of Dover traffic, with additional weekend training and transport operations conducted by the Air National Guard. The level of military operations is determined by the Department of Defense policy and Congressional funding.

Table 2-4 presents a summary of aircraft activity for all categories. As shown, all general aviation activity for 2018 totaled 151,000 operations. Military operations totaled 129,182, with Dover AFB showing the major share of activity (124,000). The top three airports in the State with regard to based aircraft are: New Castle County (198), Delaware Coastal (61), and Chorman Airport (44).

Table 2-4 – Airport Activity Summary			
AIRPORT	**ANNUAL OPERATIONS**		**BASED AIRCRAFT**
	General Aviation	**Military**	
Chandelle Estates Airport	1,100	0	24
Chorman Airport	13,500	0	44
Civil Air Terminal at Dover AFB	200	124,000[1]	0
Delaware Airpark	23,600	0	29
Delaware Coastal Airport	34,400	100	61
Jenkins Airport	500	0	20
Laurel Airport	7,500	0	14
New Castle Airport	36,600	4,982	198
Smyrna Airport	1,700	0	10
Summit Airport	31,900	100	32
DELDOT Helistop	0	0	0
GRAND TOTALS	**151,000**	**129,182**	**432**

[1] Dover Air Force Base Operations

Table 2-5 shows differences in operations from the previous system plan. Appendix 2A shows these differences by individual airport.

Table 2-5 – Statewide Differences from Previous System Plan			
Categories	**2010**	**2018**	**Change**
Based Aircraft	437	432	(5)
Operations- Total	206,640	156,182	(50,458)
General Aviation	197,570	151,000	(46,570)
Military	9,070	5,182	(3,888)
Peak Hour Operations- Total	214	187	(28)
Enplanements - GA	115,600	92,200	(23,400)

3. POTENTIAL JET FUEL TAX

In 2019, the Delaware Legislature enacted House Bill No. 86; a $0.05 per gallon excise tax on jet fuel, effective July 1, 2019. Revenues generated by this Act will be directed toward the improvement and capital maintenance of Delaware's public-use system of airports. A retroactive estimate of the new jet fuel tax was made, based upon the most recent records available for jet fuel sales at public-use airports in Delaware. These numbers show what the new

tax would have accumulated, had it been in place over the last three years. It also shows a possible trend toward future revenues in this category.

Table 2-6 – Potential Jet Fuel Tax Estimates

Airport	2016	2017	2018
Civil Air Terminal	17,800	22,051	25,771
New Castle Airport	3,897,900	4,043,300	3,902,000
Summit Airport	103,160	85,884	126,680
Delaware Coastal	232,200	254,000	281,600
Chorman/Laurel Spray Ops*	190,000	190,000	190,000
Total Gallons	**4,423,260**	**4,595,235**	**4,526,051**
Total Revenue (Total Gallons * $0.05)	**$212,553**	**$220,262**	**$216,803**

* Excludes spray operations at Chorman/Laurel

As shown, potential tax revenues for 2018 are $216,800. This excludes fuel that is used for spray operations. Future revenue streams were not estimated, however, 2018 could be considered a low-end number relative to future years.

4. LAND USE AROUND SYSTEM AIRPORTS

THE PURPOSE OF THIS SECTION IS TO highlight the land use development around system airports in Delaware. From an aviation planning standpoint, compatible land use is a key factor in the healthy development of system airports. In cases where incompatibilities exist, there are difficulties in providing new facilities to accommodate aviation demand, simply because of the environmental objections of area residents.

Impacts of airport noise on land uses have relative scale of compatibility. The general scale would include the following five types of land uses from lowest to highest impact:

- **Agricultural:** Mostly rural farmland with very few residential structures.
- **Industrial:** Includes factories, plants, warehouses, outdoor storage areas and facilities, machine shops, and similar workplaces.
- **Commercial:** Includes retail shops, big box stores, office complexes, professional practice offices, and other places of business (including hotels).
- **Recreational:** Includes parks, recreational facilities, and school athletic facilities.
- **Residential:** Includes residential housing, apartment buildings, mobile homes, schools, churches, day care centers, nursing homes, and hospitals.

The rank order for these land uses indicates that residential land uses are the least compatible with airports because people are sleeping in those houses during night hours. Thus, they are particularly sensitive to night aircraft noise. In the other land uses, most recreational parks and commercial businesses do not have people sleeping there. Agricultural uses are considered buffer areas because there are generally very few structures and people on the land.

4.1 DEVELOPMENT AROUND AIRPORTS

While Industrial and Commercial development around airports can be considered mostly compatible, residential development is not. Therefore, this portion of the analysis shows the recent history of development beginning, in most cases, in 1992. Using Google Earth's historical pictures of land use at system airports (mostly in black and white photos), a comparison with present day development can be made. In cases where new residential housing has occurred in visible density, those changes are shown on the recent (2018) aerial photos.

Figures 2-2 to 2-10 show the before and after photos for each system airport. Not included are the DelDOT heliport and the Civil Air Terminal. The significant changes are marked with a color

Figure 2-2: Delaware Coastal Airport- Current/March 1992

Figure 2-3: Delaware Airpark- Current/March 1992

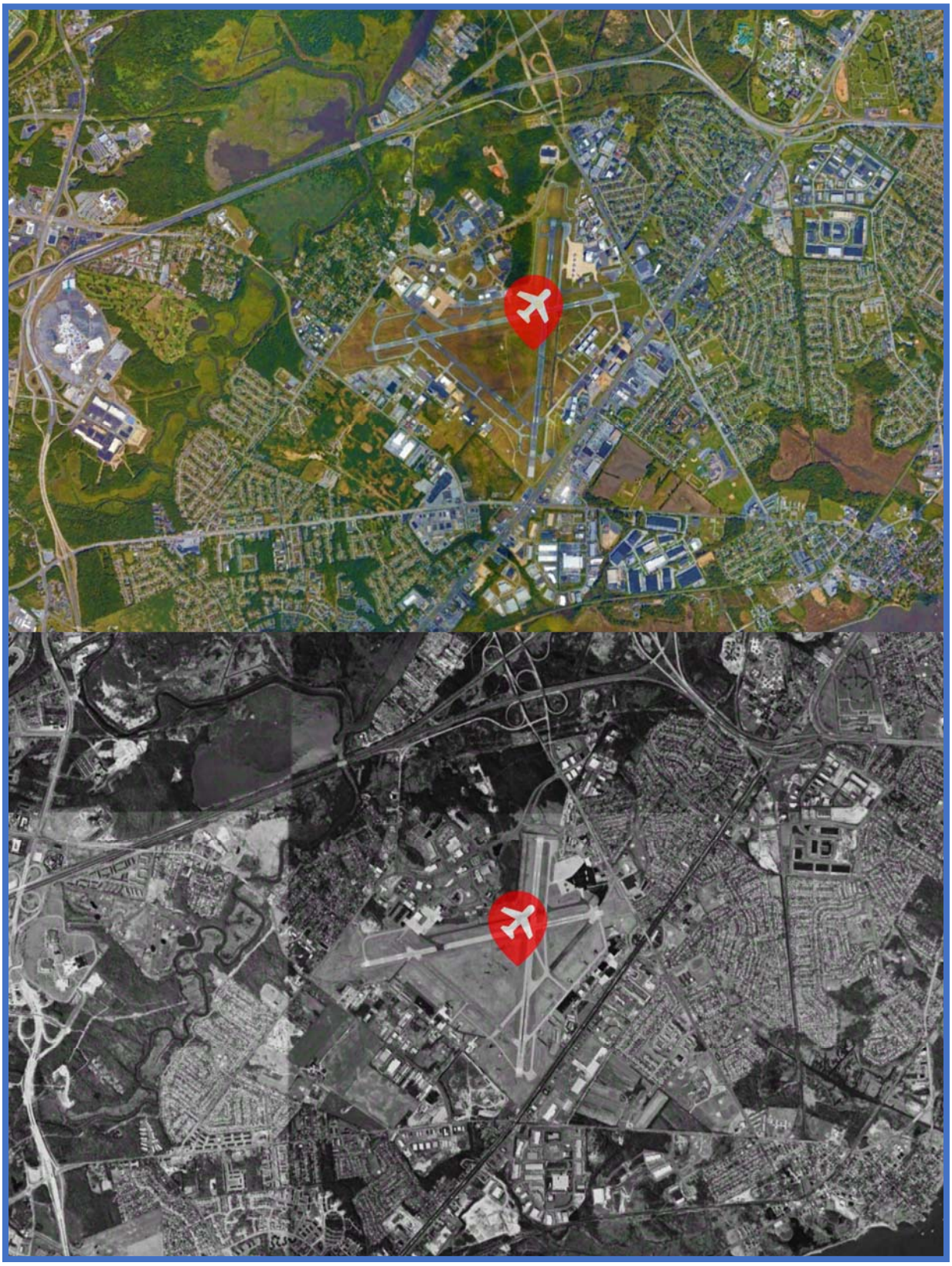


Figure 2-4: New Castle Airport- Current/March 1992

Figure 2-5: Summit Airport- Current/March 1992

Figure 2-6: Chorman Airport- Current/March 1992

Figure 2-7: Laurel Airport- Current/March 1992

Figure 2-8: Jenkins Airport- Current/September 2005

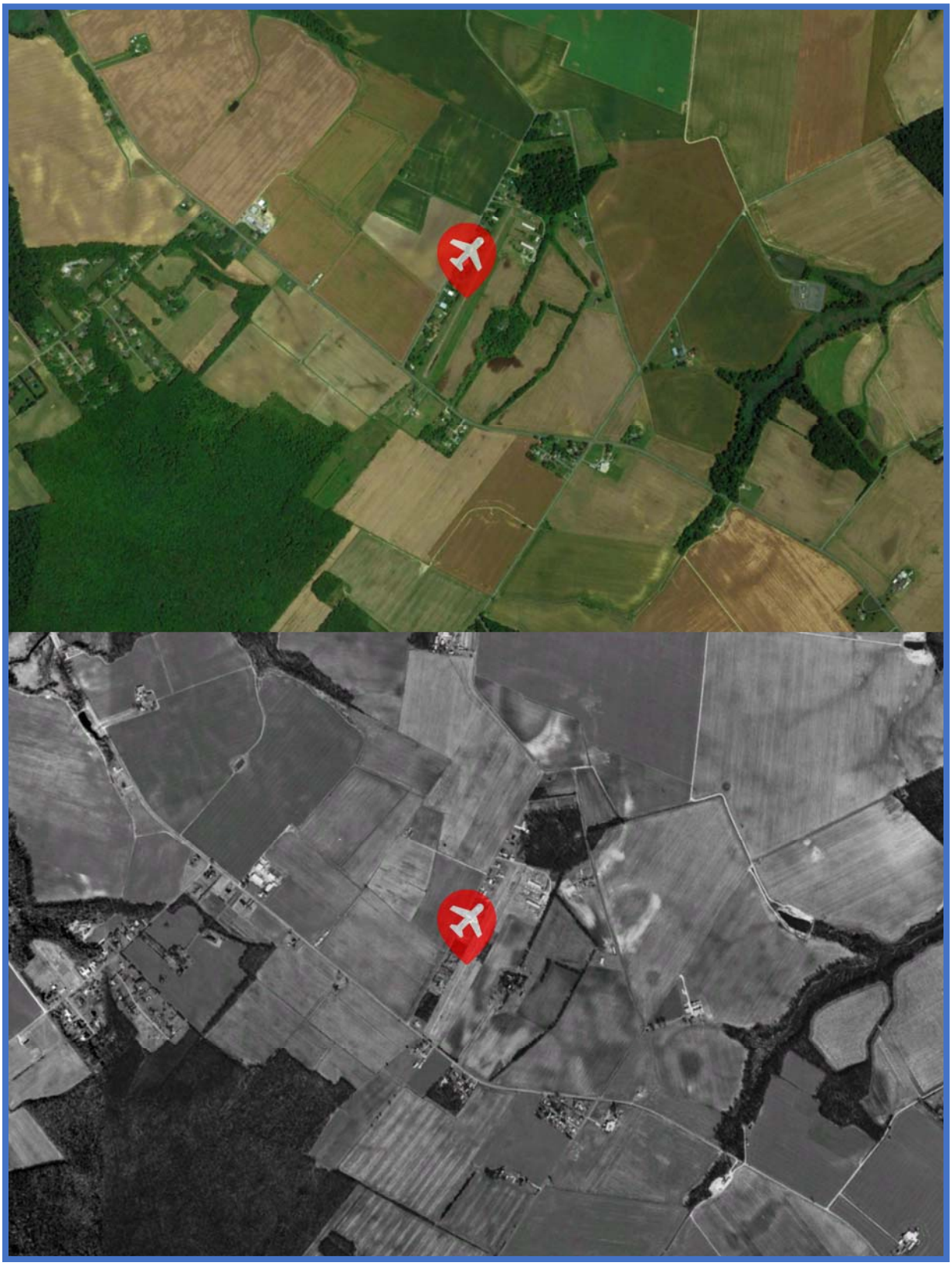


Figure 2-9: Chandelle Estates Airport- Current/March 1992

Figure 2-10: Smyrna Airport- Current/March 1992

shading on the recent photos. Again, the purpose of pointing out new residential development near airports is to underscore the potential conflicts that will arise in the future. In some cases, these could be detrimental to the aviation system.

4.2 SUMMARY OF CHANGES

Examination of the changes in residential and other development around Delaware public-use airports reveals a number of changes throughout the State. The degree of those changes at each airport is subjectively different. However, the primary purpose of this analysis is to raise awareness of the issue. Described below is a summary of changes by airport:

- ***Delaware Coastal Airport:*** As shown in **Figure 2-2**, the primary change in development around Delaware Coastal has been the ball parks located to the north of the airport. In this regard, there are significant numbers of playing fields which are used for tournaments during sports seasons. There has been discussion of adding hotel or similar types of facilities to accommodate visiting ball teams. Given the location of this development off the end of the primary runway, the land use compatibility has decreased to some degree over the last 26 years or so.
- ***Delaware Airpark:*** As shown in **Figure 2-4**, the primary change in development around Delaware Airpark has been the development of high-density residential housing to the east off Main Street feeding Parkers Drive. There are more than 200 homes in the roughly 60-acre development. These homes are in line with the new runway at the airport. However, the new runway was shifted almost 700 feet to the west, thereby causing aircraft to be at higher elevations over the residential development when on approach or departure. It should be noted that there are new residential developments planned just to the north and east of the airport across Moorton Road. These planned streets will be accessible via Lynnbury Woods Road (Highway 152). In addition, the development of a mobile home park to the south of the airport has occurred since 1992. Because these homes are not off the runway ends, they are impacted somewhat less than those located under the approach or departure paths of aircraft.
- ***New Castle Airport:*** It is interesting that the residential development (and other development for that matter) around New Castle Airport has remained mostly unchanged since 1992. This is primarily because most of the developable land was already taken.
- ***Summit Airport:*** Residential development around Summit Airport has grown significantly since 1992. In this regard, developments to the southwest, northwest, and southeast have been constructed or enlarged. These areas are shown on **Figure 2-5**. There is currently new development directly north of the airport which may not be compatible with potential expansion plans of the airport.
- ***Chorman Airport:*** Very little has changed for the land use around Chorman Airport since 1992. The land use remains mostly agricultural and few new homes have been developed.
- ***Laurel Airport:*** Similar to Chorman Airport, there has been very little change in the land use around Laurel Airport. It remains mostly agricultural in nature.

- ***Jenkins Airport:*** There has been very little change in the land use around Jenkins Airport since 2005 (the best historical aerial picture available). It remains mostly agricultural in nature.
- ***Chandelle Estates:*** This airport was originally developed as a residential airport, with owners of the adjacent residences having access to the runway. Some residents do have aircraft and do use the airport from their back yards. However, there has been no other significant residential development around the airport since the aerial photo from 1998.
- ***Smyrna Airport:*** There has been residential development to the west of Smyrna Airport over the past 20 years (**Figure 2-10**). This development has occurred on the west side of Highway 1, off East Commercial Street. It is likely that the high produces a significantly higher noise level than the airport and thus, actually shields the airport from receiving any noise complaints.

As shown, there have been some significant changes in residential land use near Delaware's system of airports. These changes have mostly occurred near Delaware Coastal, Delaware Airpark, and Summit Airport. New Castle Airport has not had new residential construction, as there is little or no land available near the airport for such development.

As residential development continues, there it will be important to plan for compatible land uses. This is to keep the airports open and functioning, while at the same time providing property to residential developers. More will be explored as the System Plan progresses. The purpose of this section was simply to show the recent trends near system airports.

5. CURRENT AND FORECAST SOCIOECONOMIC INDICATORS

SOCIOECONOMIC STATISTICS ARE GENERALLY USED TO DESCRIBE the economic and demographic trends expected to occur in a particular area. Socioeconomic factors have been shown in numerous studies sponsored by the FAA to be related to an area's demand for aviation facilities and services. Among the most significant are population, income, and employment. This section identifies each of these factors and presents historical statistics and trends for the years 2008-2018 for all three Delaware counties.

5.1 POPULATION

Analysis and projection of population are the basis for almost all major planning decisions. In many instances, they determine the level of demand for future facilities and serve as indices of most county and urban characteristics. Further, they have typically served as one of the best indicators of local aviation demand. Historical population, when compared to aviation demand statistics, has shown a high correlation in many areas of the country. Until population growth or declined in the study area is compared to aviation demand statistics in Delaware, it is uncertain whether or not population can be used as a prediction variable in the forecasting process.

Table 2-7 presents the historical population growth for Delaware counties. As shown, Sussex County has shown the highest percentage growth (19.3%), and highest population growth (a net gain of 37,093 over the period). For the State, there has been a 9.8 percent growth over the 2008-2018 period, growing from 883,874 to 970,727.

Table 2-7 – Delaware Historical Population Trends

Year	Kent	New Castle	Sussex	State Total
2008	157,925	533,958	191,991	883,874
2009	160,081	536,898	194,751	891,730
2010	162,973	538,831	197,908	899,712
2011	165,149	542,282	200,453	907,884
2012	167,442	546,120	203,306	916,868
2013	169,150	549,486	206,478	925,114
2014	171,664	552,465	210,676	934,805
2015	173,332	555,587	215,188	944,107
2016	174,754	557,851	220,093	952,698
2017	176,824	559,793	225,322	961,939
2018	178,412	563,231	229,084	970,727
Net Change	**20,487**	**29,273**	**37,093**	**86,853**
% Change	**12.97%**	**5.48%**	**19.32%**	**9.83%**
CAGR: 2008-2018	**1.23%**	**0.54%**	**1.78%**	**0.94%**

Source: Bureau of Economic Analysis (BEA), U.S. Department of Commerce, July 2019. www.bea.gov
Source: Growth rates from 2018 population consortium estimates were used to estimate 2018 population statistics

By 2040, The 2018 Delaware Population Consortium estimates the following population totals for each Delaware County:

- Kent County- 201,639 (a growth of 13.0%, or 0.56% per year)
- New Castle County- 606,346 (a growth of 7.7%, or 0.34% per year)
- Sussex County- 268,180 (a growth of 17.1%, or 0.72% per year)
- State Total- 1,076,165 (a growth of 10.9%, or 0.47% per year)

Delaware's population is expected to grow through 2040. However, the Delaware Population Consortium predicts that the overall rate of population growth will steadily decline during that time.

5.2 INCOME

Similar to population, an area's income and economic activity have been shown to be positively related to the demand for aviation services and facilities in many parts of the country. Further, there is an assumed causal relationship between concentrated economic activity and demand for air transportation.

Income statistics commonly include Total Personal Income (TPI) and Per Capita Personal Income (PCPI). For tracking growth trends, PCPI is the preferred statistic since it removes the population growth factor from the income growth factor. Thus, PCPI statistics for Delaware counties were collected for the inventory. **Table 2-8** presents the historical growth in PCPI for the three counties and Delaware State totals.

Table 2-8 – Delaware Historical PCPI (Constant 2012 $)

Year	Kent	New Castle	Sussex	State Total
2008	$35,194	$46,879	$39,956	$43,287
2009	$36,239	$46,890	$38,987	$43,252
2010	$35,351	$46,466	$38,180	$42,630
2011	$36,007	$49,311	$39,248	$44,669
2012	$35,641	$47,832	$40,430	$43,964
2013	$35,737	$46,707	$41,868	$43,621
2014	$36,071	$47,649	$42,922	$44,458
2015	$36,623	$49,280	$46,102	$46,232
2016	$37,359	$49,400	$45,275	$46,239
2017	$37,996	$50,510	$44,614	$46,829
2018	$39,284	$50,355	$45,203	$47,099
Net Change	**$4,090**	**$3,476**	**$5,247**	**$3,812**
% Change	**11.62%**	**7.41%**	**13.13%**	**8.81%**
CAGR: 2008-18	**1.11%**	**0.72%**	**1.24%**	**0.85%**

Source: Bureau of Economic Analysis (BEA), U.S. Department of Commerce, July 2019. www.bea.gov
Source: Source: Woods & Poole Economics, (2019 CEDDS)

By 2040, Woods & Poole Economics[1] estimates the following Per Capital Personal Income averages for each Delaware County:

- Kent County- $49,790 (a growth of 26.7%, or 1.08% per year)
- New Castle County- $64,619 (a growth of 28.3%, or 1.14% per year)
- Sussex County- $57,476 (a growth of 27.2%, or 1.10% per year)
- State Total- $59,782 (a growth of 26.9%, or 1.09% per year)

Because of the strong growth in New Castle County, the State's overall PCPI is anticipated to grow at 1.09 percent per year. The PCPI numbers have been indexed to exclude the effects of inflation. Therefore, these projections represent estimates of real economic growth expected in each County.

[1] Source: Woods & Poole Economics, 2019.

5.3 EMPLOYMENT

Employment statistics are another measure of economic activity and thus are related to the demand for air transportation facilities and services. Growing employment trends point toward greater economic activity. This activity, in turn, leads to more use of aviation and air transportation services. Historical employment statistics for Delaware counties are presented in **Table 2-9**.

As shown, overall employment for Delaware grew by 8.9 percent over the period. Sussex County showed the fastest growth with 16.2 percent, while New Castle County had the slowest growth with 6.5 percent. Between 2008 and 2018 overall employment grew by 48,661 jobs with 37,000 jobs being created in the last five years of the period (2009 and 2010 had negative growth).

Table 2-9 – Delaware Historical Employment

Year	Kent	New Castle	Sussex	State Total
2008	84,602	359,443	100,866	544,911
2009	81,629	345,682	98,324	525,635
2010	81,671	341,825	98,907	522,403
2011	83,856	348,576	97,969	530,401
2012	84,763	350,311	99,186	534,260
2013	86,586	356,946	101,265	544,797
2014	87,648	363,922	104,988	556,558
2015	88,491	372,113	108,289	568,893
2016	90,457	376,087	112,225	578,769
2017	91,545	377,938	114,583	584,066
2018	93,298	383,082	117,192	593,572
Net Change	**8,696**	**23,639**	**16,326**	**48,661**
% Change	**10.3%**	**6.6%**	**16.2%**	**8.9%**
CAGR: 2008-18	**1.0%**	**0.6%**	**1.5%**	**0.9%**

Source: Bureau of Economic Analysis (BEA), U.S. Department of Commerce, July 2019. www.bea.gov
Source: Woods and Poole estimates for 2018

By 2040, Woods & Poole Economics[2] estimates the following Employment totals for each Delaware County:

[2] Source: Woods & Poole Economics, 2019.

- Kent County- 125,701 (a growth of 34.7%, or 1.36% per year)
- New Castle County- 449,143 (a growth of 17.2%, or 0.73% per year)
- Sussex County- 166,968 (a growth of 42.5%, or 1.62% per year)
- State Total- 741,812 (a growth of 25.0%, or 1.02% per year)

Employment in Delaware is anticipated to grow faster than its population. This implies greater utilization of the potential work force over the next 20 years.

6. STATUTES AND REGULATIONS

GOVERNMENT AT ALL LEVELS HAVE LONG BEEN involved in the regulation, funding, and development of aviation. This section presents a summary of more recent relevant federal and State legislation and regulations which may affect the development of the Delaware Aviation System Plan. Of significance to this study are the regulations impacting the State's ability to fund privately owned, public-use airports. Given the recent passage of aviation fuel taxes on jet fuel, the State Aeronautics program will have dedicated funds to invest in needed airport infrastructure and capital maintenance.

6.1 FEDERAL AVIATION LEGISLATION

The federal government has assisted and encouraged the aviation industry from its inception. In this regard, aviation safety has been relegated to the control of the FAA. The FAA establishes, operates, and maintains the nation's air traffic control and navigation facilities and provides both technical standards and funding for airport facility construction. While much of the early federal legislation covered the formation of the Federal Aviation Administration and environmental protection of airports, it has been covered in previous state aviation system plans. This plan is focused on the more recent laws impacting funding since the year 2000.

- Aviation Investment and Reform Act for the 21st Century, 2000: (funding)
- Aviation and Transportation Security Act of 2001: (aviation security)
- Vision 100, the Century of Aviation Act of 2003: (funding)
- FAA Reauthorization Act of 2007
- FAA Modernization and Reform Act of 2012 (funding and FAA structure)
- FAA Reauthorization Act of 2018 (funding)

These and other environmental legislation make up the bulk of federal involvement in the nation's aviation system. Essentially, the federal government provides funding for airport development, airport security, rules for the operation of aircraft and airports, and environmental protection for the operation and development of the system.

For Delaware Airports, only four are eligible for FAA funding: Delaware Airpark, Delaware Coastal Airport, New Castle Airport, and Summit Airport. These airports are included in the FAA's National Plan of Integrated Airport Systems (NPIAS). Summit Airport is privately owned and had been designated a reliever airport to the Wilmington area. Summit has not accepted any FAA grants in more than 20 years and is free of any grant assurances. The remaining airports are privately owned and not eligible for federal funding. These other airports will be the focus of analysis to determine which, if any, would justify State funding of capital maintenance or improvement.

6.2 STATE AVIATION LEGISLATION

State legislation pertaining to aviation in Delaware is contained primarily in Title 2, Parts 1 and 2 of the State Code (Transportation, Aeronautics). These statutes define the State's authority and legal role in the aviation system in Delaware. Powers granted to the State provide that DelDOT be involved in the following:

- Encourage the development of aeronautics, the establishment of airports and other air navigation facilities.
- Coordinate aeronautical matters between the federal government and political subdivisions of the state and others.
- Participate in the investigation of aircraft accidents.
- Enforce aviation safety standards, flight regulations and aeronautical laws.
- Design and map airways systems for the State that are in conformance with federal standards.
- Offer engineering and design services for airports free of charge to any political subdivision requesting such services.
- Provide financial assistance to political subdivisions in support of airport development, operation, and maintenance.
- License and inspect airports, airmen, aircraft, air schools, or aeronautics instructors for safety, qualifications, airworthiness, etc. DelDOT cannot grant exclusive rights to any airport or aviation facility.
- Receive and disburse federal money for airports. Acquire and operate State airports.
- Invoke penalties against violators of aeronautics laws.
- Establish the Delaware Aviation Advisory Council (DAAC) to promote the interests of aviation in Delaware.
- Remove existing obstructions to air navigation either on or off existing public-use airport property. The power of eminent domain is conveyed by State law to DelDOT for this purpose. Also, the authority to review building permits and deny potential obstructions to air navigation is granted to DelDOT.

The Federal Aviation Regulations (Part A of Subtitle VII of Title 49 of the United States Code, as amended) govern the operation of aircraft and are therefore adopted by the State of Delaware into their laws.

In addition to aviation laws, a recent law that changed the Delaware's motor fuel tax will have a significant impact on Delaware's public-use airport system. House Bill 86 was recently passed in July of 2019. This Act imposes a 5 cent per gallon tax on certain aviation jet fuel, exempting aerial spray operations. The revenue generated by this tax will be dedicated to the aviation system and its improvement.

An important task in this aviation system plan will be to recommend updates to aeronautical legislation or new regulations that are needed. One purpose of these recommendations will be to empower DelDOT to invest in privately owned, public-use airports for capital maintenance and improvement. The associated regulations will ensure the protection of the State's interest in these improvements through the airports' obligation period. It will be important for the DAAC to input the development of these recommendations as they are identified.

6.3 STATE AVIATION REGULATIONS

Title 2 Transportation Delaware Administrative Code provides the authority for the Office of Aeronautics to develop aviation regulations. There are two sets of aviation regulations – one for airport licensing and the other for airport obstructions.

Aviation Regulation 2151 – Delaware Airport Licensing

Delaware State law says, "The Department, through the Office of Aeronautics may approve and license airports and helicopter landing sites, or other air navigation facilities, in accordance with regulations it adopts pertaining to such approval and licensure. Licenses granted under this section shall be renewed annually in conjunction with the Federal Aviation Administration sponsored airport survey program."

To implement this law, Regulation 2151 provides guidance for the Office of Aeronautics. First, only public-use airports need licenses. In this regard, a representative from the Office of Aeronautics will conduct an annual inspection of the licensed airports. Licensing criteria have been developed for two specific areas of airport or heliport facility operation. The first involves the requirement of each public use airport to obtain and carry minimum levels of liability and property insurance. The second involves the requirement for displaced thresholds at runways obstructed by existing roadways, railways, or navigable waterways.

Minimum insurance requirements include one million dollars ($1,000,000) in liability insurance covering bodily injury and property damage liability in any one accident, along with fifty-thousand dollars ($50,000) coverage for property damage for each accident. Certificates of insurance, issued by an insurance company licensed to write such insurance in the State of Delaware, need to be filed annually with the Department of Transportation, Office of Aeronautics, as a part of the licensing procedure.

Runways that are obstructed, as defined in FAR Part 77, either by highways, railways, or navigable waterways shall have the thresholds of the impacted runways displaced by the appropriate distance. Appropriate displacement markings are required on paved surfaces in accordance with FAA guidelines and need to be installed as in-ground flush markers or other suitable FAA approved markings on turf strips.

Provisions for temporary waivers and license revocation are included in the regulation.

Aviation Regulation 2152 – Delaware Airport Obstructions

The Delaware Airport Obstruction Regulation (2152) focuses on preventing the construction or establishment of regulations through new building permit reviews by the Office of Aeronautics (Sections 4-6). These reviews ensure that imaginary surfaces around public-use airports are not penetrated by obstructions. If penetrations are unavoidable, they must be marked or lighted in order to preserve operational safety.

Section 7 addresses the removal of existing obstructions. The section requires the Office of Aeronautics to conduct an inventory of airspace obstructions not less than every 24 months. The obstruction inventory is to prioritize the severity of the obstruction, develop a cost for removal, and consider the activity level at the airport. Prior to the State investment of funds greater than $10,000 in obstruction removal, privately owned, public use airports must agree to a deed restriction keeping the airport as an airport for a minimum of 10 years. A violation of this restriction will trigger a reimbursement schedule for State expenditures. An Advisory Committee shall rank the list of obstruction removal priorities for DelDOT consideration and funding. Civil penalties not exceeding $1,000 per day can be imposed.

7. TECHNOLOGY IMPACTS

PREVIOUS SYSTEM PLANNING EFFORTS HAVE NOT EXAMINED the impacts of future technology on the demand for aviation transportation. However, because technological changes have been occurring at an increasing pace, it is likely that the Delaware system will look very different in 20 years, relative to the existing system. Not only will there be new means of communication which will limit the need to travel in person to meetings, there will be new methods of transportation itself. Across multiple industries, disruptive innovations are occurring at a rapid pace. Some of the new technology that is either already here, or coming soon includes the following:

- Electric Aircraft
- Autonomous Cars
- Flying Taxis
- Virtual Reality
- Unmanned Aerial Systems (UAS) Integration

- Airport Sustainability Practices

By including these technology considerations at the outset of the system plan, future airport facility needs that may be impacted can be adjusted.

7.1 ELECTRIC AIRCRAFT

Electric powered aircraft are already being manufactured in the U.S. These aircraft use electric engines instead of gas or jet fuel engines. Currently, the smaller general aviation aircraft are the most likely to be feasible because the size and weight of batteries is suited to a smaller weight payload and engine type. Large jet-powered airliners remain a difficult problem for manufacturers of electric engines.

Electric batteries pack much less energy per unit of weight than jet fuel - about 40 times less, even if the best batteries available are considered. Electric motors partly compensate this disadvantage by being more efficient in converting energy into power, but a huge gap remains.[3]

Rolls-Royce, a British developer of electric aircraft engines, is looking to set a world speed record with a propeller plane. In 2017, Siemen set an electric flight record of 210 mph. The Rolls-Royce electric aircraft (called ACCEL) is being readied to fly at more than 300 mph. Despite their plans for electrification, batteries remain the biggest hurdle to fully electrified commercial flight. Industry observers believe it will be decades before airlines will have fully electric aircraft that can perform like the large jet aircraft used today.[4]

An Israeli firm, Eviation, has developed an aircraft - called Alice – that will carry nine passengers for up to 650 miles at 10,000 ft at 276 mph. It is expected to enter service in 2022. Alice is an unconventional-looking craft, powered by three rear-facing pusher-propellers - one in the tail and two counter-rotating props at the wingtips to counter the effects of drag. It also has a flat lower fuselage to aid lift.[5] Cape Air has multiple orders for this aircraft. It is also likely that this type of aircraft will enter the business aviation market as an alternative to the King Air or Pilatus 12.

For Delaware, airports will need to prepare for general aviation electric aircraft with new charging stations. In addition, a new way to collect "fuel flowage fees" will have to be developed for these electric charging stations. Smaller, 4-seat electric aircraft models are entering the market and are said to be able to fly more than 300 miles on a single charge. In addition, they are very quiet compared to internal combustion powered aircraft.

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[3] Source: CNN Travel: ***7 Electric Aircraft You Could Be Flying in Soon,*** Miquel Ros, November 2017.
[4] Source: Green Car Reports: ***Rolls Royce Guns for Electric Airplane Speed Record,*** Eric Evarts, June 2019. https://www.greencarreports.com/news/1123371_rolls-royce-guns-for-electric-airplane-speed-record, accessed 8/13/19.
[5] Source: ***Why the Age of Electric Flight is Finally Upon Us***, Tim Bowler, BBC News. July 2019. https://www.bbc.com/news/business-48630656 accessed 8/14/19.

7.2 AUTONOMOUS CARS

Recent developments in Cloud computing and emerging technologies like Artificial Intelligence, (AI), the Internet of Things (IoT) and Light Detection and Ranging (LiDAR) have turned autonomous cars from a vision to a present reality. As such, a number of companies have announced their plans of launching autonomous cars, and trial runs of these cars are already going on in different cities of the world.

The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for internet connectivity. The communication that occurs between these objects and other Internet-enabled devices and systems does not require human-to-human or human-to-computer interaction. Thus, an autonomous car is linked with IoT to Cloud-based resources, which serves as its intelligence. The car "sees" with LiDAR and is able to navigate with AI.

Companies like Waymo and Tesla are the forefront of the autonomous revolution. Recently, Drive.ai, a Silicon Valley-based startup building self-driving car software, announced that it will offer free rides to passengers in Frisco, Texas. It is anticipated that autonomous cars will transform the existing automobile industry more than any other technology since its inception in the beginning of the 20th century.[6]

Impacts of this technology on aviation will occur primarily at airline airports, where the main source of income is auto parking. In this case, many air travelers will be able to ride to the airport and simply tell their cars to drive home. Millions of dollars of revenue to these airports will be lost with the widespread use of this technology. In Delaware, the main impact would be felt at New Castle Airport, where new airline service is expected to generate significant auto parking needs. Autonomous cars will not replace the need for the proposed parking expansion at New Castle Airport, but they should limit the long-term future additional parking needs if the potential airline service is successful.

For general aviation airports, the picture is not nearly as bad. Very few general aviation airports charge for parking, and thus, will not be hurt by self-driving cars. At Delaware general aviation airports, the future need for automobile parking could level off because of this technology.

7.3 FLYING CARS AND TAXIS

Companies such as Uber, Boeing, and Airbus have started developing flying cars and taxis technology. Silicon Valley startups are showing enthusiasm about flying taxis. Uber desires to fly

[6] Source: ***5 Futuristic Transportation Technologies That Will Transform the World***, by Aditya Chaturvedi, 5/28/18, Geospatial World Website: https://www.geospatialworld.net/blogs/5-futuristic-transportation-technologies/

these taxis by 2023 and has partnered with NASA to make it a reality. Uber's plans for an urban aviation rideshare network will be combined with NASA's latest in airspace management computer modeling and simulation to assess the impacts of small aircraft. This will include delivery drones as well as passenger aircraft with vertical take-off and landing capability in crowded environments.[7]

Uber hopes its flying taxi will have a cruising speed of 150 to 200 miles an hour and a range of about 60 miles. This means a flying taxi could serve an area with a radius of 30 miles, assuming it must return to its base. While this market would directly compete with helicopter transportation, it would not compete with fixed wing aircraft.

One possibility in the future is the transportation of executives from their downtown offices by flying taxi to a general aviation airport in the suburbs. With increasing automobile gridlock on the freeways, a flying taxi ride would greatly compress the time in transport. Otherwise, the trip to the general aviation airport may take as long as the airborne leg of the journey to their distant destinations.

For the purposes of this study, a phone interview with the head of business development at Uber Elevate revealed that the company sees a distinct opportunity utilizing general aviation airports in the future. Specifically, the company expects to have a significant need for maintenance work on their fleet of air-taxis that would likely need to be provided by operators at general aviation airports. Because Uber's air taxis cannot operate in Class B airspace, the company will be unable to use high density commercial service airports for any of their needs.

In Delaware, New Castle Airport is under Class D and Class B airspace. The Class D airspace extends from the ground up to 2,600 feet, while the Class B airspace begins at 4,000 feet and extends up to 7,000 feet. It is possible that an Uber air taxi operating below 4,000 feet could use New Castle Airport, it is likely that systems will have to be developed which will ensure segregation of traffic prior to any implementation. Thus, the near-term changes will be limited. However, within 20 years, it is likely that full airspace integration of autonomous air taxis and flying cars could be possible.

7.4 VIRTUAL REALITY

Virtual reality is the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors. Many of the new rides at theme parks such as Disney World or Universal Studios attempt to fill the riders' visual, hearing, and feeling world with synthetic experiences, designed to seem real. This is a type of virtual reality experience, but very expensive to produce.

[7] Ibid.

Computer-generated VR will have significantly greater applications that will impact transportation. New VR programs are being created for businesses. Using these, employees could one day hold meetings in virtual environments, allowing them to be anywhere they want, with anyone, regardless of geographical boundaries. This may reduce the amount of air travel needed to meet in person.

For tourism, VR could potentially reduce the number of vacation trips taken by people who can enjoy simulated travel instead. For businesses, VR could reduce the number of trips taken to meet people in person. Similarly, VR technology could produce a "try-before-you-buy" experience that would also reduce the need to test products at their site of origin or manufacture. In any event, it is likely that VR will reduce the growth in demand for both airline and general aviation travel in the future. This reduction is likely to be greater for airlines than for general aviation, primarily because of the higher numbers of overall person-trips taken using commercial airlines versus general aviation.

7.5 UAS INTEGRATION

The FAA has made significant progress in integrating UAS into the National Airspace System (NAS). However, the FAA believes much more must still be accomplished to achieve their vision for full integration. Tremendous growth has occurred in the UAS sector over the past several years, and the growing interest in using UAS for business applications will continue in concert with the small UAS rule (FAR Part 107).

FAA considers safety as the first priority. As such, UAS integration must consider risk and mitigations, and above all, must ensure the safety of the current airspace system and its users is maintained as progress is made. While finalizing the small UAS rule was an important first step, the FAA continues to gain valuable experience from issuing waivers to the rule, as well as from continued work performed through other UAS initiatives.

The newly launched Integration Pilot Program for UAS sets the stage to move even closer to expanded operations through enhanced partnerships among industry and State, local and tribal authorities. This experience will inform the next round of rulemaking, which will expand UAS operations beyond visual line of sight (BVLOS) for new purposes and services.[8]

Currently, interaction of small drones in controlled airspace is limited and requires special permission. Because drones can be programed to fly autonomously, it is likely that future technology will incorporate these programs into FAA air traffic control programming to ensure separation from manned flights. Other on-board equipment such as transponders with ADS-B

[8] Source: ***Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap***, FAA, July 2018.

capabilities will help air traffic control monitor locations of the aircraft which cannot be visually seen when they are 1,000 feet or more distant.

In Delaware, UAS operations will continue to rise as new applications are developed or improved. This will involve both small UAS (55 pounds or less) and larger UAS. In particular, UAS aircraft may become the backbone of aerial spray operations in the future. These would require larger UAS that provide a significant payload. Other UAS operations that are or will become commonplace will include highway and bridge inspection, environmental benchmarking, mapping, 3-D quantity measurements, and video capture for commercial uses. It is likely that most of the new UAS operations will be in addition to traditional means of performing tasks. Full integration of UAS operations into the Delaware aviation system will be observed as a part of this study.

7.6 AIRPORT SUSTAINABILITY

Airport sustainability is defined by the FAA as actions that:

- Reduce environmental impacts.
- Help maintain high, stable levels of economic growth.
- Help achieve "social progress" - a broad set of actions that ensure organizational goals are achieved in a way that's consistent with the needs and values of the local community.

In terms of technology, airport sustainability impacting operations at Delaware airports are those advances which will create energy savings, economic development, and community compatibility. In this regard, continued progress in green technology has helped reduce costs, such as the use of LED lighting and solar panels where possible. Environmental sustainability also requires Airport drainage technology solutions that will benefit both the Airport and downstream communities. Sustainable economic development is that which provides revenues for the Airport and can coexist with aircraft operations.

The push toward airport sustainability will benefit airport users and nearby residents, as solutions to noise impacts, runway length requirements, area drainage requirements, and reduced energy usage all work toward common goals. While there may be little impact on the number of aircraft operations in the State, the sustainability movement will help the system airports better coexist with their respective communities. In this way, aircraft operations in the future should have a lesser negative impact on Delaware residents.

Appendices: 2A & 2B

Appendix 2-A – Aviation Activity Differences From 2010 to 2018			
Airport Name	**2010**	**2018**	**Change**
Chandelle Estates			
Based Aircraft	**24**	**24**	**0**
Operations	3,200	1,100	(2,100)
Peak Hour Operations	3	3	0
Enplanements - GA	700	400	(300)
Chorman			0
Based Aircraft	**19**	**44**	**25**
Operations	13,200	13,500	300
Peak Hour Operations	8	8	0
Enplanements - GA	15,000	15,300	300
Civil Air Terminal			0
Based Aircraft	**0**	**0**	**0**
Operations	600	200	(400)
Peak Hour Operations	24	24	0
Enplanements - GA	5,000	5,000	0
Delaware Airpark			0
Based Aircraft	**56**	**29**	**(27)**
Operations	22,650	23,600	950
Peak Hour Operations	14	18	4
Enplanements - GA	7,400	7,700	300
Delaware Coastal Airport			0
Based Aircraft	**62**	**61**	**(1)**
Operations- Total	34,000	34,500	500
General Aviation	33,900	34,400	500
Military	100	100	0
Peak Hour Operations-Total	25	25	0
General Aviation	21	21	0
Military	4	4	0
Enplanements - GA	12,900	12,100	(800)
Jenkins			0
Based Aircraft	**20**	**20**	**0**
Operations	1,400	500	(900)
Peak Hour Operations	2	2	0
Enplanements - GA	800	200	(600)
Laurel			0
Based Aircraft	14	14	0
Operations	8,950	7,500	(1,450)
Peak Hour Operations	7	7	0
Enplanements - GA	2,100	2,500	400
New Castle Airport			0

Appendix 2-A – Aviation Activity Differences From 2010 to 2018			
Airport Name	**2010**	**2018**	**Change**
Based Aircraft	**189**	**198**	**9**
Operations- Total	78,840	41,582	(37,258)
General Aviation	69,970	36,600	(33,370)
Military	8,870	4,982	(3,888)
Peak Hour Operations-Total	100	72	(29)
General Aviation	70	56	(15)
Military	30	16	(14)
Enplanements - GA	47,500	30,000	(17,500)
Smyrna			0
Based Aircraft	10	10	0
Operations	2,300	1,700	(600)
Peak Hour Operations	2	4	2
Enplanements - GA	600	400	(200)
Summit			0
Based Aircraft	**43**	**32**	**(11)**
Operations- Total	41,500	32,000	(9,500)
General Aviation	41,400	31,900	(9,500)
Military	100	100	0
Peak Hour Operations-Total	29	23	(6)
General Aviation	25	19	(6)
Military	4	4	0
Enplanements - GA	23,600	18,600	(5,000)
STATEWIDE TOTALS			
Based Aircraft	**437**	**432**	**(5)**
Operations- Total	**206,640**	**156,182**	**(50,458)**
General Aviation	**197,570**	**151,000**	**(46,570)**
Military	**9,070**	**5,182**	**(3,888)**
Peak Hour Operations	**214**	**187**	**(28)**
Enplanements - GA	**115,600**	**92,200**	**(23,400)**

Appendix 2-B - FAA AIP Grants by Airport				
Year	**Airport**	**Service Level**	**Grant Seq Number**	**AIP Federal Funds**
2010	Delaware Airpark	GA	14	$1,583,555
2012	Delaware Airpark	GA	15	$149,314
2013	Delaware Airpark	GA	16	$2,802,840
2014	Delaware Airpark	GA	17	$4,383,671
2015	Delaware Airpark	GA	18	$5,813,539
2016	Delaware Airpark	GA	19	$3,478,891
2017	Delaware Airpark	GA	20	$132,247
2018	Delaware Airpark	GA	21	$14,310
2018	Delaware Airpark	GA	21	$346,500
2010	Sussex County	GA	24	$50,804
2010	Sussex County	GA	25	$227,712
2011	Sussex County	GA	26	$514,234
2011	Sussex County	GA	27	$723,900
2012	Sussex County	GA	28	$3,101,080
2013	Sussex County	GA	29	$4,297,047
2014	Sussex County	GA	30	$255,600
2015	Sussex County	GA	31	$479,182
2016	Delaware Coastal	GA	32	$225,549
2017	Delaware Coastal	GA	33	$430,196
2018	Delaware Coastal	GA	34	$5,532,528
2010	New Castle	R	30	$45,524
2010	New Castle	R	31	$3,679,042
2011	New Castle	R	32	$445,630
2012	New Castle	R	33	$1,421,275
2012	New Castle	R	34	$856,767
2013	New Castle	R	35	$893,910
2013	New Castle	R	36	$154,388
2014	New Castle	R	37	$4,479,108
2015	New Castle	P	38	$2,846,864
2015	New Castle	P	39	$810,000
2016	New Castle	P	40	$776,850
2016	New Castle	P	41	$4,240,191
2017	New Castle	P	42	$5,432,041
2018	New Castle	R	43	$4,133,293
2018	New Castle	R	44	$241,509
2018	New Castle	R	45	$1,015,900
2018	New Castle	R	46	$115,020
Total				**$66,130,011**