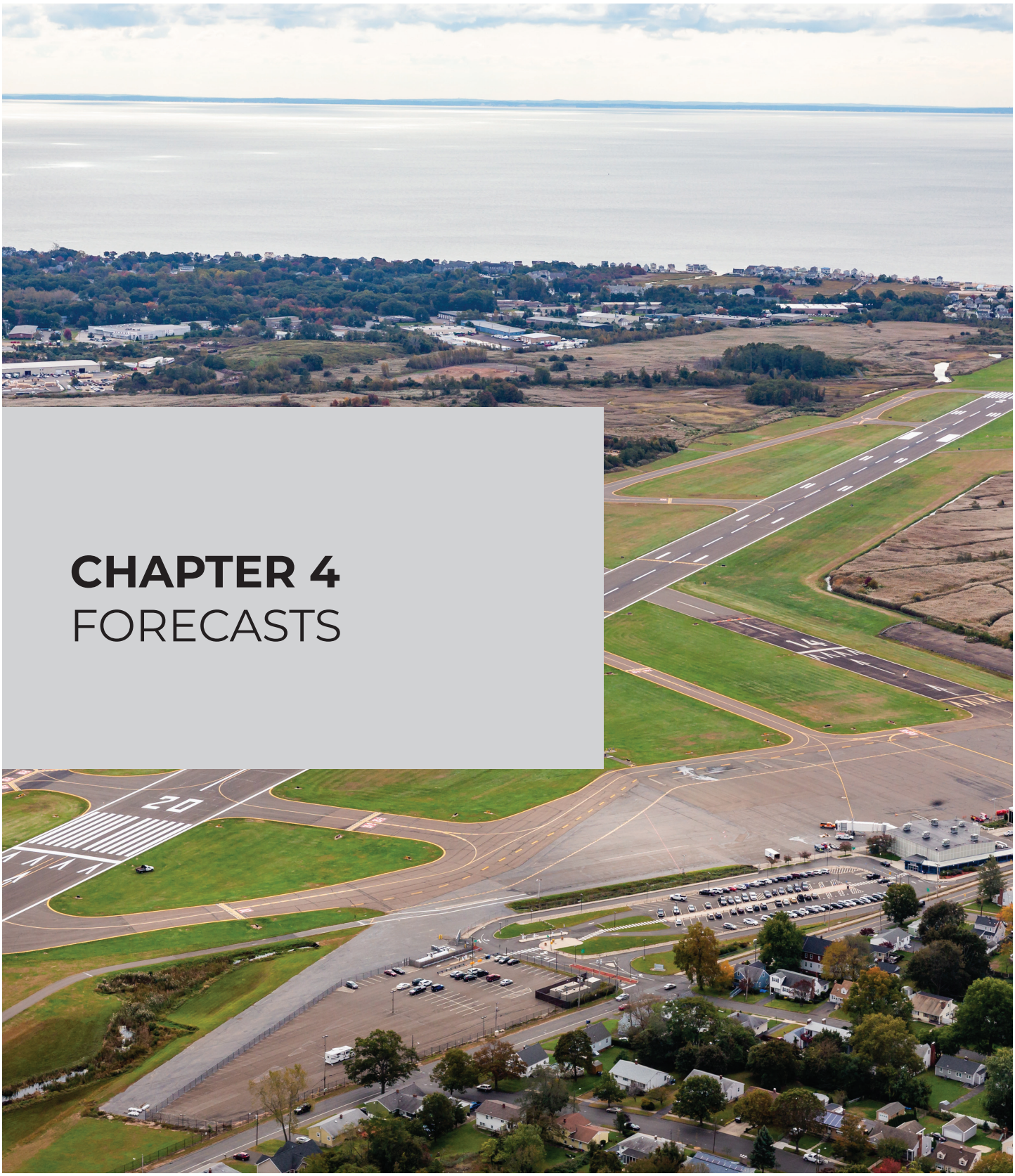


CHAPTER 4
FORECASTS

4. Forecasts

4.1. INTRODUCTION

The purpose of aviation forecasting is to outline future growth of aviation activity over a 20-year period at the Tweed-New Haven Airport (HVN or the Airport). The Federal Aviation Administration (FAA) requires that all airport planning efforts be based upon an approved forecast methodology as the resulting analysis assists in determining the facility requirements for meeting future demand. These Forecasts were created pre-COVID-19/Coronavirus impacts. An addendum to this chapter was added that addresses the Airport's impacts and anticipated recovery path.

The key elements of this chapter include:

- Forecast Influencing Factors
- Commercial Passenger Enplanements
- Aircraft Operations
- Based Aircraft
- General Aviation Passengers
- Annual Instrument Operations
- Forecast Summary
- Existing and Future Design Aircraft

Key metrics of the aviation forecasts and their focus at HVN include the following:

Annual Commercial Passenger Enplanements – The number of people boarding aircraft at HVN each year, which is used to identify the need for future passenger terminal area space, parking facilities, and airport access. In the dynamic commercial aviation industry forecasting passenger enplanements requires a broad view of trends and influencing factors as opposed to looking at past relationships through regression analysis. These growth-influencing factors range from socioeconomic patterns to air service analyses.

Aircraft Operations – The number of takeoffs and landings at HVN each year, which is used to determine the necessary capacity of the airfield and aircraft operating area. Each takeoff or landing is counted individually as one operation.

General Aviation Operations – The estimated number of general aviation (GA) takeoffs and landings at HVN, which is used to determine the necessary capacity of the airfield and GA support facilities.

Annual Military Operations – The estimated number of military takeoffs and landings at HVN.

Based Aircraft by Type – The number and type of GA aircraft maintained at the Airport a majority of the time, which is used to identify the space requirements of future facilities.

General Aviation Passengers – The estimated number of non-pilots utilizing GA facilities.

Annual Instrument Approaches – The estimated number of approaches using a flight plan.

The forecast efforts will carefully consider the uses and applications for which the forecast demand will be applied. An emphasis has been placed on activity indicators that drive facility planning such as peak hour enplanements and GA demand.

4.2. FORECAST INFLUENCING FACTORS

The forecast analysis for the HVN master plan reflects a snapshot in time based on historical trends and industry data from the year 2018. Influencing factors presented in this section identify considerations and areas of uncertainty that provide additional context for the HVN forecast. Changing variables and guaranteed uncertainty are underlying reasons for the dynamic master plan approach which includes the scenario-based forecasts to enhance the utility of the forecast as the industry evolves.

4.2.1. Aviation Industry Trends

Airline and Hub Consolidation – In the early to mid-2000's, there were close to a dozen major network airlines such as Air Tran, America West, Continental, Northwest, TWA, and U.S. Airways all of whom have since merged or have been acquired by other airlines. These actions have also limited hub choice as airlines closed hubs such as Pittsburgh (U.S. Airways), Cincinnati (Delta), Cleveland (Continental), and Memphis (Northwest). While consolidation among the major network carriers (American, Delta, Southwest, and United) is unlikely, some consolidation cannot be ruled out for the next size-tier of airlines such as Alaska, Frontier, JetBlue, or Spirit. Despite how the airlines sell the merger to regulatory agencies in the approval process, mergers and acquisitions typically result in reduced options and higher fares for the consumer in the long run. For airports this can result in a surplus of facilities such as ticket counters, baggage offices, and sometimes even gates.

Low-Cost Airline Growth – Low-cost and less than daily service has been introduced at dozens of small-hub and non-hub airports throughout the U.S. The number of airports with low fare service had increased steadily over time with nearly every airport small-hub and larger boasting some type of low-fare service, with an increasing number of non-hub airports joining that list. This service is often seasonal and less-than daily allowing airlines to better match service levels to the limited demand of these small markets.

Aircraft Up-Gauging – Industry wide, and especially at small and medium sized airports, regional jets and turboprops with 50 seats or less are being consolidated into larger regional aircraft. In most cases, these larger aircraft come at the expense of frequency. This is further emphasized by the fact that there are no aircraft being produced or in development for the 9 to 66 seat segment aside from the ATR-42 which only has one operator in the U.S. which is Silver Airways. The last 50-seat regional jet was delivered to a U.S. regional in 2005, meaning they will likely all be retired within the 20-year planning horizon.

This trend has included as a highlight in the FAA's Aerospace Forecast for 2019-2039, which notes "*US carrier system capacity as measured in available seat miles (ASM) is forecast to grow in line with the increases in demand. The number of seats per aircraft is getting bigger, especially in the regional jet market, where we expect the number of 50 seat regional jets to fall to just a handful by 2030, replaced by 70-90 seat aircraft*."

Pilot Supply – In recent years, the industry has begun to see impacts associated with a reduced number of pilots entering the aviation industry. Reduced pay, with the onset of regional jet flying in the 2000's, and regulatory changes requiring 1,500 hours for first officers have added to an already increasingly expensive training process. These are compounding factors that will likely increase the severity of this issue in the coming years. Some industry groups predict a similar shortage in qualified aircraft mechanics as well. Limited pilot supply is a contributing factor to the recent aircraft up-gauging trend.

NextGen – For the past 10 years, the FAA has been incrementally implementing new technology with the broader goal of modernizing the nation's air traffic control system. Some of the key objectives involve improving the safety and efficiency of airspace in and around high-volume airport regions such as Atlanta, New York, and Washington. These improvements may not have a noticeable impact on airport's operational efficiency; however, it may reduce delays to hub airports and provide the opportunity for additional schedule frequencies resulting in an improved passenger experience.

Fuel Prices – Over the past 10 years the aviation industry has demonstrated its sensitivity to fuel prices and their impact on operational cost and ultimately aviation demand. On average, fuel represents approximately one-third of the cost of commercial aviation activity. Thus, during spikes in fuel prices like in 2008, the impacts to both supply and demand are tremendous. Advancements in fuel technology will help reduce industry sensitivity to fuel although it will likely continue to be a key influencer for activity for some time.

Electric Aircraft – To counter the high cost and uncertainty associated with fuel, several aircraft manufacturers have begun investing in the development of all-electric aircraft. The prospects that are furthest along in the development phase are predominantly those 9-seats and smaller. Cape Air is hoping to be a pioneer by having ordered aircraft for their fleet. There are significant regulatory hurdles to overcome before these aircraft can enter revenue service or even be utilized privately on a wide scale; however, this could potentially have notable implications on demand. Key considerations associated with the development of electric aircraft include the provision of the necessary facilities for charging and the loss of fuel sales, flowage fees, and tax revenue that funds airport infrastructure.

Aircraft Technology – Over the past 20 years there have been significant advances and innovations to aviation and aircraft technology. With global positioning system (GPS) technology, unmanned aerial systems (UAS) and single pilot operations for complex aircraft systems, the next 20 years will likely yield numerous additional advances in technology that could impact various airline business models. Monitoring and maintaining an awareness of technology enhancements and potential applications for will help ensure the Airport is always well-positioned to respond to a changing industry.

4.3. COMMERCIAL PASSENGER ENPLANEMENTS

HVN is located in close proximity to the country's largest population base and some of the country's most affluent zip codes as discussed in Chapter 3, *Market Analysis and Catchment Areas*. This analysis shows that HVN is, in fact, one of the most underserved airports in the country. There are over 2.2 million people residing within 30 miles of HVN.

4.3.1. Growth Factors

New Airlines and Routes – Industry consolidation has reduced the number of airlines in the domestic market, as a result most small- and medium-sized airports are served by each of the major network carriers, and often a low-cost carrier and/or an ultra-low-cost carrier (ULCC).

Long term it is anticipated that congested airports in New York (EWR/LGA/JFK) and Philadelphia will not see limited additional frequencies, with growth coming from the use of larger aircraft. Congestion at these large hubs creates opportunities at other, less congested hub airports aimed at connecting traffic such as Washington DC, Chicago, or daily service to Charlotte.

Low-Cost Airline Growth – Low-Cost and Ultra-Low-Cost Airlines have expanded their national network coverage with the introduction of less-than-daily service to better tailor the demand to smaller markets and adjust for seasonality. Growth comes from the introduction of additional weekly frequencies and/or additional destinations (likely seasonal to start). Potential new destinations could include Orlando (Sanford), Tampa/St. Petersburg, Punta Gorda/Fort Myers, or Fort Lauderdale.

Aircraft Up-gauging – As pilot supply has become increasingly constrained, airlines have increased the "productivity" of pilots by increasing the number of seats in the aircraft. The seat count increase is achieved by replacing smaller 50-seat regional aircraft with larger two-class regional jets with 66-76 seats on average. For most major airlines, the number of these larger regional jets allowed in the fleet is limited by the scope clause in their labor contract with their pilot unions. Some airlines have configured these larger regional jets as two-class 50-seat jets to meet the seat capacities identified in the scope clauses.

For mainline-sized aircraft, airlines have improved seat technology that has allowed them to increase the number of seats on the aircraft while maintaining a reasonable level. Aircraft like the Boeing 737-800 and Airbus A320 that have traditionally been 150-seat aircraft have been reconfigured to accommodate between 160 and 189 seats.

4.3.2. Historical Activity

Passenger enplanements represent a particularly challenging forecast element for an airport such as HVN, as utilizing traditional methodologies such as econometric trending from present-day volumes do not adequately capture legitimate future opportunities and growth potential. As a current example, ultra-low-cost carrier (ULCC) Allegiant Air has directly stated that they plan to start service from HVN should the Airport's primary runway length be extended to 6,000 feet or longer (see Appendix B). While this statement is based on the requirements of a high-density 177-seat Airbus A320, we believe less demanding aircraft types (125-150 seat A319/73G) in a similar business model could potentially be considered as part of a baseline condition of existing facilities. For an airport such as HVN with limited existing service, the entry of a new airline can result in a step-function growth event which can significantly alter traditionally calculated long-term growth trends.

The underlying market dynamics of HVN's catchment area suggest the potential to support a significantly larger service profile than current trends would suggest – particularly in an expanded

runway scenario. Baseline comparisons to similar nearby airport markets can provide estimates of longer-term enplanement potential and be used a tool to gauge more traditional methodologies.

Historical Enplanements and Load Factor Performance

Regardless of the methodology used in developing longer-term projections, it remains useful to examine historical service and enplanement levels. Table 4-1 shows historical enplanements.

Table 4-1: Scheduled Service Outbound Enplanements – HVN

Year	Scheduled Service Enplanements	Other Misc. Enplanements	Total Enplanements
2009	32,941	41	32,982
2010	35,761	24	35,785
2011	39,792	5	39,797
2012	36,902	8	36,910
2013	36,659	57	36,716
2014	33,524	27	33,551
2015	30,864	2	30,866
2016	27,771	89	27,860
2017	28,519	84	28,603
2018	38,619	64	38,732

Source: US DOT / T100 data via Airline Data, Inc, 2019.

It is important to note that throughout the period, enplanement trends were driven more by tactical changes in capacity and load factor performance than by macroeconomic trends. This lends further credence to the decision to build forecast(s) based on tactical airline strategic and capacity assumptions. In addition, load factor performance from HVN has generally trailed domestic service averages – although that situation appears to have been at least partially mitigated by the recent introduction of jet service into the local marketplace as shown in Table 4-2. With this 4Q17 launch of jet service, load factors nearly achieved the U.S. average by 2018.

Table 4-2: HVN Scheduled Service Load Factor vs. Total U.S. Domestic Average

Year	HVN Load Factor*	U.S. Load Factor*
2009	60%	81%
2010	63%	82%
2011	76%	83%
2012	76%	83%
2013	77%	83%
2014	74%	85%
2015	77%	85%
2016	74%	85%
2017	77%	85%
2018	83%	84%

Source: US DOT / T100 data via Airline Data, Inc, 2019.

Current HVN Service and Fare Profile

The current (as of January 2020) service profile at HVN consists of 2-3 daily departures by American Airlines (AA) primarily into their hub at Philadelphia/PHL (as well as once weekly service to Charlotte/CLT). This service provides HVN travelers with access into AA's vast domestic and international network as well as the international alliance network of oneworld. AA service is currently operated with Embraer 175 (E175) aircraft.

Domestic fares from HVN exceed the U.S. domestic average by 11 percent[1] when adjusted for differences in stage length, likely in part due to the lack of low-cost or ultra-low-cost carrier airline service. This fare premium highlights the market's potential to drive additional traffic growth at more standard fare levels and may play a role in the market's historical below-industry load factor.

4.3.3. Enplanement Forecast

This forecast utilized a strategic, airline-driven approach in deriving enplanement forecast(s). Each of the six scenarios discussed below are built using a "bottom-up" methodology, assuming tactical capacity increases across various airline/service types based on underlying conditions with varying levels of macroeconomic/industry growth and volatility built in.

Comparison to Proxy Markets

As discussed above, the forecast enplanement scenarios are developed in a tactical, "bottom-up" manner, with assumptions incorporated regarding airline market entries, macroeconomic scenarios, runway constraints, and other items. Detailed population, catchment area traffic, and capacity-based "proxy" analyses were conducted to provide comparative benchmarks to our standard forecast(s).

The first analysis looked at the relationship between population within a 30-mile radius at nearby airports at Newburgh-Stewart/SWF and Trenton/TTN. As evidenced in **Table 4-3**, service levels at each of these proxy airports suggest that the local population near HVN can support additional air service.

Table 4-3: HVN vs. SWF/TTN – Comparable Population/Capacity Metrics

Airport	Population – 30 mi.	2018 Outbound Seats	Ratio
New Haven / HVN	2.245mm	46,960	0.021
Stewart / SWF	1.417mm	448,916	0.317
Trenton / TTN	4.681mm	460,455	0.098
Potential HVN market seats (average of SWF/TTN)		***466,045***	*0.208*

Source: ASM Americas analysis, 2019.

[1] U.S. DOT data and Innovata schedule data via Airline Data, Inc.

While a rather simple comparison – understanding that a myriad of other factors determines a market's ability to support air service – HNV's regional demographics suggest significant growth potential.

In addition, ASM Americas recently analyzed catchment area data from neighboring airports at SWF and Islip/ISP to identify the percentage of airline traffic that each airport "captured" from within a 30-mile radius of the facility (vs. losing to neighboring airports). While again a simplified analysis, results similarly suggest that HVN can support additional growth as can be seen in **Table 4-4.**

Table 4-4: HVN vs. SWF/ISP – Catchment Area Catchment Rates

Airport	Catchment Area Passenger Traffic (30 miles)	Catchment Area Traffic Airport Capture	HVN Traffic Potential
Stewart / SWF	4.609mm	3.3%	
Islip / ISP	10.927mm	9.1%	
New Haven / HVN (average of SWF/ISP)	*8.033mm*	*6.2%*	***498,051***

Source: ASM Americas analysis, 2019.

Both of these benchmark comparisons strongly suggest that HVN can support a considerably larger air service profile.

Ultra-Low-Cost Carrier (ULCC)

ULCC are airlines whose business model supports cheaper fares and additional fees for extras such as luggage, seat selection, food/beverages, etc.

Allegiant Air, a ULCC, has stated that – should HVN extend its usable runway to at least 6,000 feet – they will begin scheduled service in the HVN market. This will serve to increase HVN enplanements and to potentially lower overall fares at HVN, which could further stimulate increased traffic.

Forecast Scenario Overviews

Six distinct forecast scenarios were developed. The three "unconstrained" cases: high/medium/low growth scenarios. The three "constrained" scenarios assume that no major changes will be made to the Airport. The forecast scenarios can be seen in **Table 4-5**.

Scenario 1. Unconstrained high case. Stronger macroeconomic and local market growth profile drives more aggressive seat capacity and traffic increases.

Scenario 2. Unconstrained medium case. Moderate macroeconomic and local market growth profiles.

Scenario 3. Unconstrained low case. Lower levels of macroeconomic growth and more modest local market growth profile. ULCC service launches similar to other cases but grows at only (adjusted) macro industry levels.

Scenario 4. Constrained high case. Limited ULCC/LCC growth profile with smaller aircraft. Moderate level of legacy carrier growth.

Scenario 5. Constrained medium/LCC case. Very limited legacy carrier growth but more aggressive ULCC growth with smaller mainline aircraft.

Scenario 6. Constrained low case. Very limited legacy carrier growth with limited LCC/ULCC growth profile. Lowest of the six scenarios.

Forecast Results

Table 4-5: HVN Enplanements Forecast: 2020-2040 (Six Scenarios)

Year	Uncon-strained High	Constrained High	Uncon-strained Medium	Constrained Medium/ LCC	Uncon-strained Low	Constrained Low
2020	87,175	84,639	82,656	80,120	67,969	65,659
2021	105,442	101,633	98,945	95,143	77,829	74,377
2022	114,301	104,879	102,012	98,093	79,894	76,379
2023	163,527	108,230	105,175	101,134	82,017	78,436
2024	203,864	138,798	142,079	104,562	84,433	80,776
2025	214,884	159,999	167,368	107,501	88,016	82,723
2026	221,964	167,250	181,411	118,212	91,358	84,596
2027	229,278	173,909	192,568	126,488	93,779	87,252
2028	272,989	180,075	228,490	148,639	96,535	89,863
2029	303,920	185,429	253,669	164,225	98,821	92,038
2030	314,004	181,472	261,563	169,316	101,447	94,531
2031	324,423	197,713	269,672	174,565	104,145	97,094
2032	336,107	204,724	278,796	180,477	107,217	100,009
2033	346,312	210,813	286,650	185,555	109,766	102,438
2034	386,149	217,685	295,537	191,307	112,693	105,223
2035	398,991	224,782	304,698	197,238	115,701	108,085
2036	413,397	232,756	315,008	203,918	119,125	111,340
2037	425,973	239,680	323,882	209,656	121,969	114,054
2038	440,141	247,496	333,923	216,156	125,233	117,165
2039	454,782	255,568	344,274	222,857	128,588	120,363
2040	471,206	264,635	355,923	230,404	132,406	123,999

Source: ASM Americas analysis, 2019.

Detailed Forecast Scenario Service Assumptions – Unconstrained Scenarios

Macro assumptions:

- Variance across scenarios in macroeconomic/industry growth profiles.
- Aircraft types: large regional jets and very small mainline (A319) and could transition to broader mix of regional jets and narrow-body aircraft.

- Frequency is grown by an assumed rate of 3.1 percent in between manual service additions with adjustments made to reflect the various economic scenarios. This rate reflects the Boeing long-term U.S. passenger traffic growth forecast.
- Load factors assumed as a blend of HVN and aggregate U.S. domestic averages.

Scenario 1. Unconstrained High. Legacy carrier expansion of +3 daily flights (June 2023) followed by macro growth profile. ULCC service at 0.75 daily flights (May 2020) / one daily flight (June 2022) / two daily flights (June 2028) / three daily flights (June 2034) / then macro growth profile.

Scenario 2. Unconstrained Medium. Legacy carrier growth at +2 daily flights (June 2024) followed by macro growth profile. ULCC service 0.75 daily flights (May 2020) / 1.2 daily flights (June 2026) / two daily flights (June 2028) / then macro growth profile.

Scenario 3. Unconstrained Low. Legacy carrier growth at macro rate only. ULCC service at 0.75 times daily (May 2020) / then macro growth profile.

Detailed Forecast Scenario Service Assumptions – Constrained Scenarios

Macro assumptions:

- Variance across scenarios in macroeconomic growth trajectories.
- Aircraft types: large regional jets and smaller mainline (A220/A319).
- Frequency is grown by an assumed rate of 3.1 percent in between manual service additions (adjusted across scenarios).
- Load factors assumed as a blend of HVN and aggregate U.S. domestic averages.

Scenario 4. Constrained High. Legacy carrier growth at +2 daily flights (June 2024) with large regional jets. ULCC service at 0.75 daily flights (May 2020) / one daily flight (June 2026) / then macro growth profile. ULCC service with A220 aircraft.

Scenario 5. Constrained Medium/LCC. Legacy carrier growth at standard macro growth rate only. ULCC service at 0.75 times daily (May 2020) / 1.2 times daily (June 2026) / two times daily (June 2028) / then macro growth profile. ULCC service with A220 aircraft. This case assumes that the airport transitions into a ULCC-focused facility somewhat distinct from other scenarios.

Scenario 6. Constrained Low. Legacy carrier growth at macro growth only with large regional jets. ULCC service at 0.75 times daily then macro growth only. Lowest output scenario with most traditional economic growth trajectory.

Discussion of Selected Forecasts

Unconstrained forecasts represent a range of potential growth scenarios. These forecast LCC/ULCC airlines to introduce mainline aircraft service, potentially including Allegiant with their A319/A320 equipment. Three unconstrained scenarios introduce and then develop this service at various levels – each starting at sub-daily service in 2020 and then progressing to as much as three times daily (2034) in the high case. In the low case, ULCC service is introduced but grows only at general macro industry rates.

As legacy carrier service growth is not impacted by runway considerations, reasonable and varying levels of capacity development across scenarios were assumed. The two more aggressive cases introduce additional legacy carrier frequencies at different volumes and time (high case = three times daily by June 2023, medium case = two times daily by June 2024) while the low case grows service at the assumed 3.1 percent standard industry growth rate. In the first two cases, frequency is subsequently increased at that standard rate in between formal service introductions.

The constrained forecasts represent a range of potential growth scenarios should runway capacity be constrained to the current facilities at the Airport. While this does not necessarily preclude the entrance of low-cost or ultra-low-cost carrier service, it does limit access for most mainline aircraft. These scenarios introduce LCC/ULCC service into the market – with smaller aircraft – as seen below. The constrained options also introduce a specific scenario which assumes that HVN transitions into an LCC/ULCC focused airport (e.g. ULCC growth without accompanying legacy carrier expansion).

- Constrained/high case = 0.75 times daily in May 2020, one time daily in June 2026
- Constrained/medium (LCC) case = 0.75 times daily in May 2020, 1.2 times daily in June 2026, two times daily in June 2028
- Constrained/low case = 0.75 times daily in May 2020

Legacy carrier growth scenarios (constrained) are straight forward. The high case adds two daily frequencies in June 2024, while neither the medium (LCC) case nor the low case incorporate specific step function adds. In each case, the frequency is forecast to grow at an assumed macro growth rate (adjusted up or down across scenarios) in between and following assumed service adds.

Note that all scenarios (constrained and unconstrained) assume annual macroeconomic growth - adjusted up or down across scenarios - in between and following these incremental increases.

Selected Forecast and Market Discussion

The "Constrained – Low" forecast scenario, or Scenario 6, was selected as the baseline forecast. While this represents the lower end of likely outcomes, it also offers a moderate and justifiable growth profile when compared to current enplanements. In addition, assumptions in this scenario are easier to justify within the context of long-term industry growth.

Macro assumptions:

- Average annual capacity growth rate of 3.1 percent adjusted for slower than projected macroeconomic/industry growth (plus tactical manual capacity increases).
- Load factors based on a blend of recent HVN and domestic industry performance.
- Equipment types: large regional jets (legacy) and A319 (ULCC) reflecting the current runway profile.
- Legacy carrier capacity growth: macro growth only.
- ULCC capacity growth: May 2020 launch at 0.75 daily frequency increasing by the projected adjusted macro industry growth rate.

Forecast Risks and Opportunities

Risks:

Current constraints. Current terminal and airside constraints could impact the ability for specific airlines and aircraft types to serve HVN, putting growth projections at risk. Existing constraints will be reviewed as part of the Facility Requirements chapter.

- Near-term ULCC growth. The forecast scenario incorporates ULCC service at HVN by May 2020. In a delayed service launch scenario, enplanement growth would be slightly delayed although end-period projections are still being anticipated to occur.

- Geopolitical and economic risk. While the selected forecast scenario has a more modest economic growth profile, the airline industry remains vulnerable to economic and geopolitical shocks which can impact capacity growth over multi-year time horizons.

- Above-market growth assumptions. Manual/tactical capacity increases were added in excess of macro industry growth projections. While those assumptions are based on a variety of realistic factors, they do present execution risk.

- Industry performance and trends. Items such as industry mergers and/or acquisitions, changes in aircraft technology, changes in product, and related others can impact airline capacity and schedule profiles in unforeseen ways over a 20-year time horizon.

Opportunities:

- Additional growth. Even with tactical capacity assumptions, individual frequency additions remain quite modest over the forecast time horizon.

- ULCC performance and expansion. As mentioned, ULCC service growth is shown at a slower than projected industry growth rate throughout the period. The airport profile and demographics of HVN and its catchment area suggest the feasibility to support a more robust ULCC service profile.

- Aircraft technology and capabilities. Changes in aircraft technology bring the potential to expand the types of aircraft and service offerings which can operate from HVN (in either runway expansion assumption).

- Service parity with other regional airports. As discussed above, demographic comparisons to other local facilities suggest that the local New Haven market can support a more robust air service profile than is presented.

4.3.4. Summary and Peaking Characteristics

An additional element necessary for determining future passenger terminal requirements is the identification of peak period of activity. A peak period is an interval of time, normally defined as a

month, day, or hour (60-minute period), that represents an event of the busy flow of passengers that must be accommodated by a given airport facility.

Peak Month – The peak month at an airport represents the busiest month during a calendar year. The busiest month can vary from year to year and over the last five years the peak month for enplanements at HVN is normally August through October. The peak represents approximately 10 percent of annual operations. 2019 information was excluded as the up-gauging of aircraft in the middle of the year skews the later months to show a higher enplanement percentage due to the larger aircraft capacity.

Average Day Peak Month – The average peak day is determined by dividing the peak month by 30.

Peak Hour – The peak hour represents the busiest one-hour period that occurs during the average day of the busiest month. For many airports the size of HVN, this peak hour occurs during the mid-day when airlines schedule flights to arrive and depart within the same hour of day. Other busy periods often occur during the early morning hours when flights originate at the airport and during evening hours when flights arrive and terminate for the day. In special cases charter airlines can, on occasion, introduce large aircraft into daily flight operations and temporarily change the peak hour dynamics used for planning. To maintain a consistent baseline forecast peak period passenger activity will be based on aircraft sizes in the current and projected airline flight schedule.

Table 4-6 shows peak month and peak day enplanements at the Airport.

Table 4-6: Enplanement Peaking Characteristics

	Actual	Forecast			
	2019	2020	2025	2030	2040
Peak Month Enplanements	5,272	6,566	8,272	9,453	12,400
Average Peak Day Enplanements	176	219	276	315	413

Source: FAA TFMSC, 2019; FAA, 2010; and McFarland Johnson analysis, 2020.

Table 4-7 below details available aircraft seats by aircraft type, projected passenger load factors, and estimated peak period activity. The A319 is assumed to be in a high-density ULCC configuration with 156 seats with a higher load factor of 90 percent consistent with ULCC leisure operations.

Table 4-7: Aircraft Seats and Scheduling Peaking Characteristics

	Aircraft	Seats Available	Load Factor	60-Min. Pax Peak
Existing	E175	76	83%	63
Future	A319	156	90%	140
	E175	76	83%	63
Total Future		202		203

Source: Airport Management, ASM Americas, and McFarland Johnson analysis, 2020.

4.4. AIRCRAFT OPERATIONS

The FAA defines an aircraft operation as a takeoff or a landing and categorizes the operations by aircraft type and purpose. These categories include commercial (all airline operations at the passenger terminal), GA (both recreational and corporate), and military. The forecasting of these operations by category is used in the planning of terminal buildings, runways, taxiways, and other airport infrastructure.

4.4.1. Growth Factors

Air Carrier/Taxi – As airlines, especially major/network carriers, up-gauge, it is anticipated they will deploy larger aircraft in place of greater frequency. This will maintain or even boost enplanements however it will slow overall operational growth.

Trends for LCCs and ULCCs are expected to continue into the future, with growth coming from the introduction of additional weekly frequencies and/or additional destinations (likely seasonal to start). Potential new destinations could include destinations in Florida.

Growth is expected to be extremely limited in the aircraft segment of fewer than 60 seats until there is an industry change that significantly improves the availability of pilot resources (i.e. single pilot operations) and/or provides significant fuel saving advantages (i.e. electric powered aircraft).

General Aviation – Security procedures after 9/11 followed by the combination of the Great Recession and increased fuel and ownership costs have resulted in sharp declines in discretionary GA activity over the last 10-20 years. After being stripped to near-core demand only, itinerant GA has begun to grow again. Much of this growth is due to enhancement in turbine aircraft efficiencies and the introduction of smaller turbine powered aircraft which has made entry-level business aviation more affordable than ever. Single engine turbine powered aircraft like the 9-seat Pilatus PC-12 and the 4-9 seat very-light-jet Embraer Phenom 100/300 can rival the affordability of commercial aviation in some cases.

Civil (local) aviation bared the brunt of the recession and fuel spike; however, now with the pilot shortage and increased demand for flight training, civil aviation has begun to grow again.

Military – The growth of military operations is largely dependent on the security interests of the nation. Military aircraft are constantly relocated throughout the aviation system. Threats to the United States and disaster relief efforts may impact the number of military operations at and around the Airport. Most military operations conducted at civilian airports are associated with training activity.

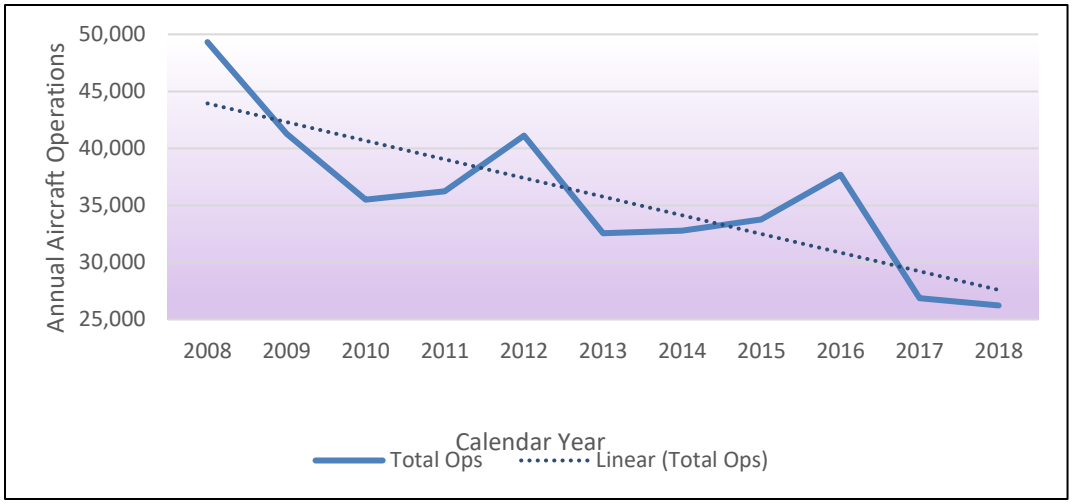
Unmanned Aerial Systems (UAS) – Presently, the FAA does not have a counting metric for UAS activity at airports as their integration into the national airspace has been limited. Operations forecasts should be reviewed and updated as UAS integrate as part of the national airspace and airport operations and FAA identifies a metric/category in which to account for this activity.

4.4.2. Historical Activity

Following the Great Recession in 2008, airports across the country saw a notable decline in general aviation activity, in particular, local operations which are more associated with

recreational flying. While local operations account for most of the decline in operations, itinerant air taxi and commuter operations, which are more associated with business activity, have started to increase since a low of 3,099 operations in 2010. Total historical aircraft operations are shown in **Figure 4-1**.

Figure 4-1: Historical Aircraft Operations



Source: FAA Terminal Area Forecast (TAF), 2019.

4.4.3. Air Carrier Operations

The air carrier operations forecasts are split into the same scenarios as detailed in the enplanement forecasts section. Nearly all of these air carrier operations are currently reported as air taxi operations since service has been operated by 50-seat jets until recently (the threshold between air taxi and air carrier is 60 seats). The results of which are shown in **Table 4-8**. The constrained – low forecast is the recommended baseline forecast.

Table 4-8: Air Carrier Operations Forecasts

Year	Uncon-strained High	Constrained High	Uncon-strained Medium	Constrained Medium	Uncon-strained Low	Constrained Low
2020	2,512	2,512	2,361	2,361	1,872	1,880
2021	2,915	2,915	2,699	2,699	2,000	2,011
2022	3,095	3,007	2,783	2,783	2,056	2,068
2023	4,587	3,102	2,869	2,869	2,115	2,126
2024	5,602	4,101	3,859	2,967	2,180	2,192
2025	5,769	4,791	4,538	3,050	2,236	2,248
2026	5,958	4,983	4,812	3,278	2,299	2,312
2027	6,152	5,167	5,045	3,463	2,364	2,377
2028	6,718	5,349	5,539	3,904	2,438	2,452
2029	7,140	5,507	5,901	4,220	2,500	2,514
2030	7,374	5,686	6,084	4,351	2,571	2,586
2031	7,616	5,870	6,273	4,486	2,644	2,659

Year	Uncon-strained High	Constrained High	Uncon-strained Medium	Constrained Medium	Uncon-strained Low	Constrained Low
2032	7,888	6,077	6,485	4,638	2,726	2,743
2033	8,124	6,257	6,668	4,768	2,796	2,813
2034	8,818	6,459	6,874	4,916	2,876	2,893
2035	9,108	6,669	7,087	5,069	2,957	2,975
2036	9,433	6,904	7,327	5,240	3,050	3,069
2037	9,716	7,108	7,534	5,388	3,128	3,148
2038	10,036	7,339	7,767	5,555	3,217	3,237
2039	10,366	7,577	8,008	5,727	3,309	3,330
2040	10,736	7,844	8,279	5,921	3,413	3,435

Source: ASM Americas Analysis, 2020.

4.4.4. Air Taxi Operations

In 2019, there was a shift of commercial operations from the air taxi operations, which are defined as aircraft with seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less, to air carrier operations (greater than 60-seat aircraft). Within the planning period, a higher percentage of operations are forecast to be air carrier rather than air taxi. Table 4-9 shows forecast air taxi operations for HVN.

Table 4-9: Forecast Air Taxi Operations

Year	Air Taxi Operations
2020	3,434
2025	3,310
2030	3,224
2040	2,916

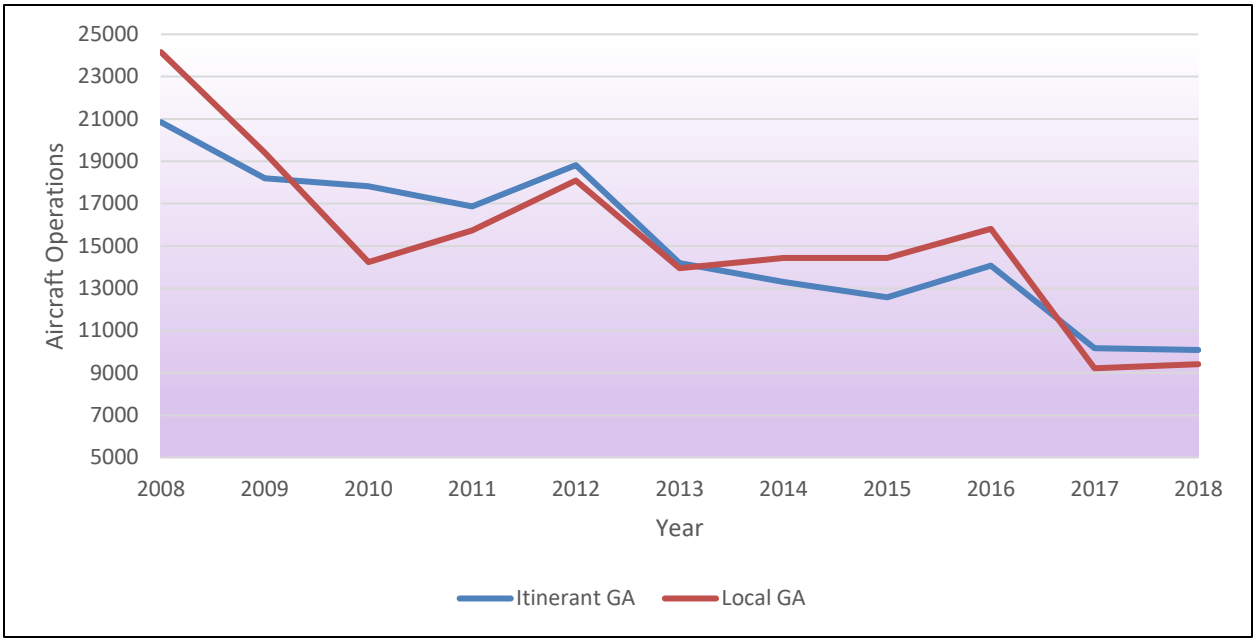
Source: McFarland Johnson analysis, 2020.

4.4.5. General Aviation Operations

GA operations can be broken down into local and itinerant operations. Local operations are those that originate or terminate within 20 nautical miles (NM) of HVN, while itinerant operations are those that originate or terminate at an airport more than 20 NM away.

GA operations have declined nationally and at HVN. According to operations information from the FAA TAF, which provides historical and forecast operations data nationally, and at HVN, itinerant GA operations at HVN have decreased at a compound annual growth rate (CAGR) of approximately -7 percent from 2008 to 2018. Local operations at HVN over the same period have declined at a CAGR of approximately -9 percent. Historical GA operations can be seen graphically in Figure 4-2.

Figure 4-2: Itinerant and Local GA Operations



Source: FAA TAF, 2019.

Forecast HVN GA operations are expected to continue to slightly increase by a CAGR of 0.3 percent per information taken from the FAA *Aerospace Forecast*. For the forecast GA operations at HVN, a baseline number of Airport operations for 2018 was taken from the TAF. From this baseline number, and using information on actual enroute flight plans from the FAA Traffic Flow Management System Counts (TFMSC), the number of forecast GA operations throughout the planning period can be seen in **Table 4-10**.

Table 4-10: Forecast GA Operations

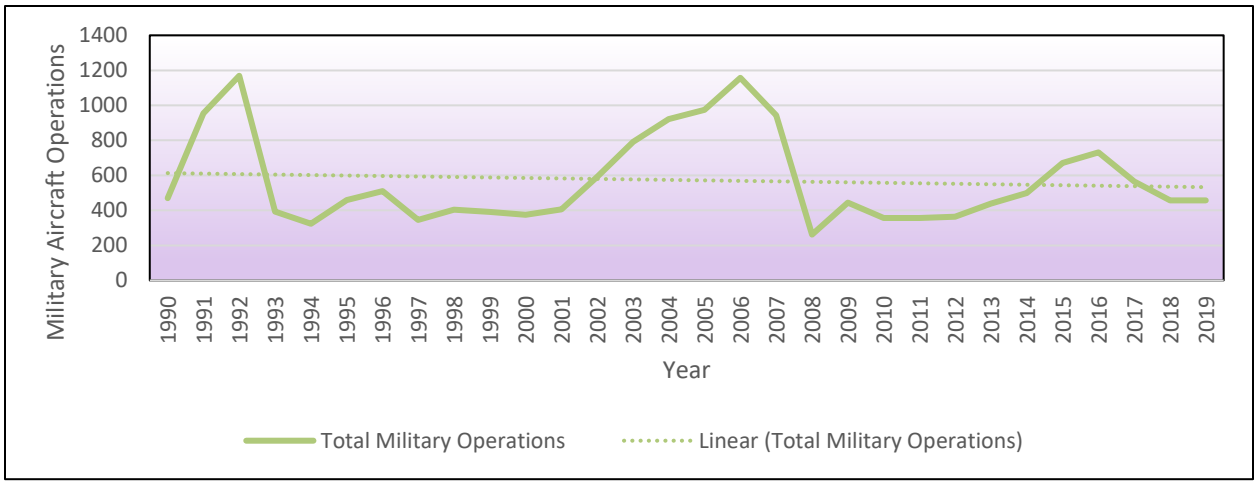
	Itinerant GA	Local GA	Total GA Operations
2020	10,145	9,468	19,612
2025	10,298	9,610	19,908
2030	10,453	9,755	20,209
2035	10,611	9,903	20,513
2040	10,771	10,052	20,823

Source: FAA TAF, 2019; FAA TFMSC (2018-2019); McFarland Johnson analysis, 2020.

4.4.6. Military Operations

The number of military operations has fluctuated over the years, but the trendline of the number of operations has remained relatively flat (shown in **Figure 4-3**). The FAA anticipates the number of military aircraft operations to be flat at 457 per year throughout the planning period. Over the 20-year planning horizon forecast military operations are expected remain constant.

Figure 4-3: Historical Military Operations



Source: FAA TAF, 2019.

4.4.7. Aircraft Fleet Mix

The breakdown of operations by type of aircraft is shown in **Table 4-11**. Note: piston and turbine categories include both single and multi-engine aircraft.

Table 4-11: Aircraft Fleet Mix

	Piston	Turboprop	Jet	Military	Total
Baseline	11,298	2,355	11,108	457	25,219
2020	11,366	2,370	11,190	457	25,383
2025	11,538	2,405	11,523	457	25,923
2030	11,712	2,442	11,865	457	26,476
2040	12,068	2,516	12,590	457	27,631

Source: McFarland Johnson, 2020.

4.4.8. Summary and Peaking Characteristics

An additional element necessary for determining future requirements for aircraft operating areas and support facilities is the identification of peak period of aircraft activity. A peak period is an interval of time, normally defined as a month, day, or hour (60-minute period), that represents an event of the busy flow of aircraft movements that must be accommodated by a given airport facility.

Peak Month – The peak operating month at an airport represents the busiest month during a calendar year. The busiest month of the year may not necessarily be the same for each year studied. The busiest month can vary from year to year and over the last five years the peak month for operations at HVN is normally May, August, or October. The peak represents approximately 10 percent of annual operations.

Average Day Peak Month – The average peak day is determined by dividing total number of aircraft operations by 30.

Peak Hour – The peak hour represents the busiest one-hour period (60 minutes) that occurs during the average day of the busiest month. For airports like HVN, the busiest period of aircraft activity generally occurs during the morning or evening hours. A peaking factor of 12 percent will be applied to the peak hour planning for HVN.

Peaking characteristics for aircraft operations at HVN are show in **Table 4-12**.

Table 4-12: Peak Hour Operations

	Actual	Forecast			
	Baseline	2020	2025	2030	2040
Peak Month Operations	2,522	2,538	2,592	2,648	2,763
Average Day Operations	84	85	86	88	92
Peak Hour Operations	10	10	10	11	11

Sources: FAA TFMSC, 2019; FAA, 2010; and McFarland Johnson analysis, 2020.

4.5. BASED AIRCRAFT

Forecasting the number and type of based aircraft is critical to planning future GA facilities, especially for the type and size of hangars, aircraft movement, and parking areas. The growth elements below discuss the factors that influence the number of based aircraft at HVN.

4.5.1. Growth Elements

Single/Multi Piston – Piston (single and multi-engine) aircraft are forecasted to follow a negative growth rate over the next 20 years, while turbine aircraft will grow positively throughout the planning period. As the economic advantage of aircraft leasing, renting, fractional ownership, and flying clubs become more popular, the number of individually owned piston engine aircraft is decreasing in most regions. While the aircraft counts are negative, the negative aspects are offset from enhanced utilization from a broader user base not burdened by high-entry costs.

Turbine/Jet – Advancements in fuel efficiency and aircraft technology have resulted in a wide variety of new products entering the turbine and jet aircraft market. More aircraft options at lower costs have increased the number of aircraft in the business aviation market not only as a lease/purchase capacity but also more fractional ownership and charter options. With this, and the national forecast for based turbine aircraft following a positive trend, it is forecasted that turbo propeller and turbo jet aircraft will increase throughout the planning period.

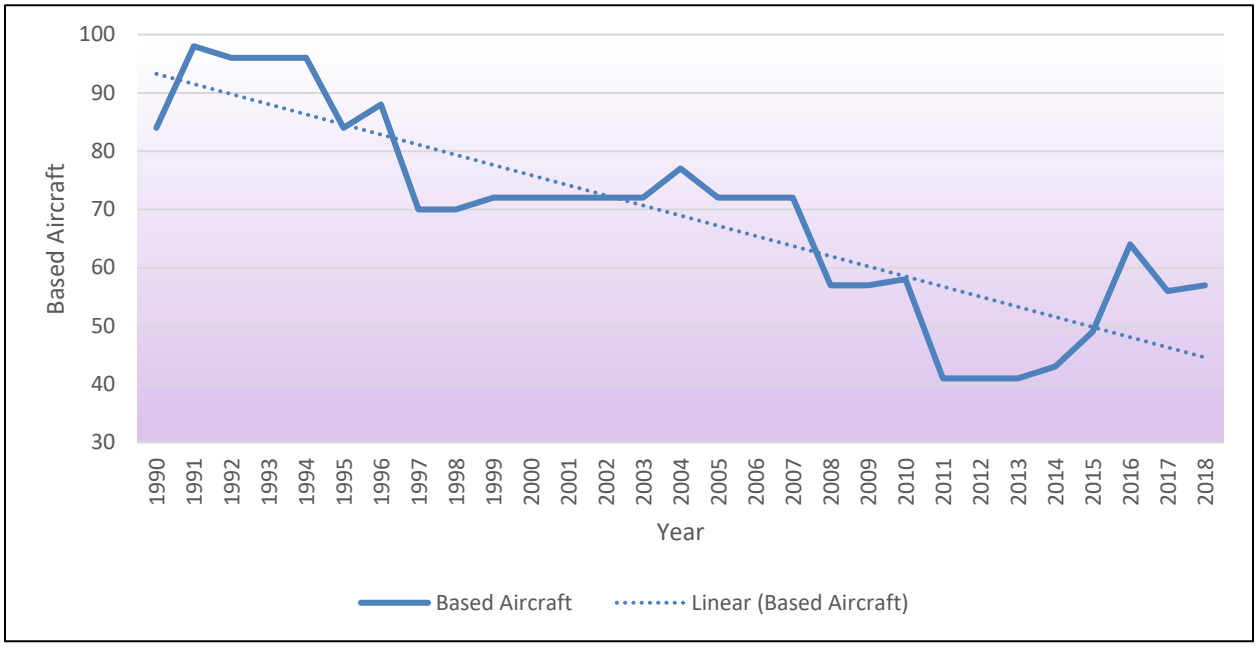
Unmanned Aerial Systems (UAS) – Presently, the FAA does not have a counting metric for UAS aircraft based at airports as their integration into the national airspace has been limited. Based aircraft forecasts should be reviewed and updated as UAS integrate as part of the national airspace and airport operations and FAA identifies a metric/category in which to account for this activity.

4.5.2. Historical Based Aircraft

The number of based aircraft at HVN has generally trended downward; however, the Airport has seen somewhat of a rebound in based aircraft in recent years from a low of 41 just after 2010. This decline is consistent with national trends as many baby boomer generation pilots age out and

the cost of aircraft ownership has steadily increased. The numbers of based aircraft at HVN can be seen in **Figure 4-4**.

Figure 4-4: Historical Based Aircraft at HVN



Source: FAA TAF, 2019.

For a more detailed look at historical based aircraft, information from the FAA TAF was collected and is shown in **Table 4-13**.

Table 4-13: Historical Based Aircraft at HVN

Year	Single	Jet	Multi	Helicopter	Other	Total
1990	73	3	8	0	0	84
1991	85	1	12	0	0	98
1992	86	1	9	0	0	96
1993	86	1	9	0	0	96
1994	84	1	11	0	0	96
1995	75	1	8	0	0	84
1996	73	4	11	0	0	88
1997	62	0	8	0	0	70
1998	62	0	8	0	0	70
1999	62	1	9	0	0	72
2000	62	1	9	0	0	72
2001	62	1	9	0	0	72
2002	62	1	9	0	0	72
2003	62	1	9	0	0	72
2004	63	3	11	0	0	77
2005	62	5	5	0	0	72

Year	Single	Jet	Multi	Helicopter	Other	Total
2006	62	5	5	0	0	72
2007	62	5	5	0	0	72
2008	52	1	4	0	0	57
2009	52	1	4	0	0	57
2010	52	1	5	0	0	58
2011	34	2	5	0	0	41
2012	34	2	5	0	0	41
2013	34	2	5	0	0	41
2014	31	4	8	0	0	43
2015	39	5	5	0	0	49
2016	53	6	5	0	0	64
2017	47	5	4	0	0	56
2018*	38	3	3	0	6	50

Source: Airport management and FAA TAF, 2019.
**Note: 2018 based aircraft information has been provided by airport management.*

4.5.3. Based Aircraft Forecast

The following based aircraft forecasts were considered for HVN:

- **FAA Aerospace Forecast:** The 20-year forecast growth percentage for each category and class of aircraft was applied to the existing based aircraft fleet as reported by the Airport throughout the planning period.

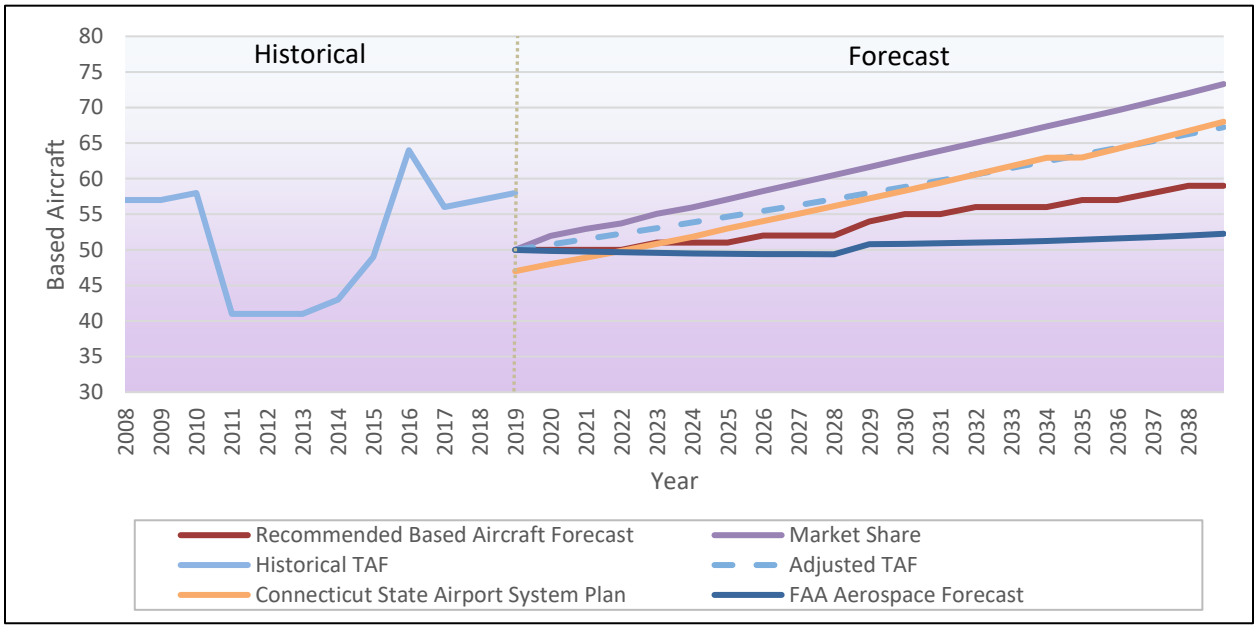
- **Market Share:** The market share forecast totals historical based aircraft at airports within HVN's service area per the FAA TAF between 2008 and 2019. This results in a market share of 7.6 percent for 2019. This percentage is applied to the remaining years in the forecast to calculate future based aircraft throughout the planning period.

- **Connecticut State Airport System Plan:** The 2016 *Connecticut Statewide Airport System Plan* (CSASP) forecast a CAGR for based aircraft at HVN of 1.9 percent.

- **FAA TAF:** The number of based aircraft forecast by the FAA TAF will be included for comparison against the other forecasts. The TAF shows 58 existing based aircraft which is different from the Airport's based aircraft count of 50. As such, an adjusted TAF forecast shows the TAF CAGR of 1.0 percent starting at 50 based aircraft for comparison.

Figure 4-5 depicts the based aircraft forecasts as described above. The recommended based aircraft forecast keeps single engine piston aircraft stable while applying the FAA Aerospace Forecast growth rates to experimental/light sport aircraft (LSA), multi-engine, and based jet aircraft. The recommended based aircraft forecast also includes rotorcraft growth throughout the planning period as piston engine aircraft. The result is a CAGR of 0.8 percent. The based aircraft forecast is shown in **Table 4-14**.

Figure 4-5: HVN Based Aircraft



Source: FAA TAF, 2019; Connecticut Statewide Airport System Plan, 2016; FAA Aerospace Forecasts 2019-2039; McFarland Johnson analysis, 2019.

Table 4-14: HVN Based Aircraft Forecast

Year	Single	Multi	Turboprop	Jet	Helicopter	Total
Baseline	42	3	2	3	0	50
2025	43	3	2	3	0	51
2030	43	3	2	4	1	53
2040	43	3	3	5	2	56

Source: Airport management and McFarland Johnson analysis, 2019.

4.6. GENERAL AVIATION PASSENGERS

GA passengers are defined as those traveling to/from the Airport (itinerant) using GA facilities (excluding pilots). Unlike commercial airline passengers and charters, this number is not accounted for nor quantified by either the FAA or the Airport. GA operations not likely to utilize GA facilities include based aircraft operations, repositioning flights, and some charter operations, among others. A planning factor of 2.5 passengers per itinerant GA operation was used for airports like HVN. The number of forecast GA passengers can be seen in **Table 4-15**.

Table 4-15: Forecast GA Passengers

	Total Itinerant GA Ops.	Forecast GA Passengers
Baseline	10,084	25,210
2025	10,298	25,745
2030	10,453	26,133
2040	10,771	26,928

Source: McFarland Johnson analysis, 2019.

4.7. ANNUAL INSTRUMENT APPROACHES

Instrument approaches are approaches to an airport with an instrument flight regulations (IFR) flight plan. The FAA's TFMSC records IFR flights that are captured by the FAA's enroute computers. Therefore, most visual flight regulation (VFR) and some non-enroute IFR traffic is excluded. **Table 4-16** shows historical and percentage of change TFMSCs at the Airport.

Table 4-16: FAA TFMSC Approaches at HVN

Year	Annual Instrument Arrivals	Estimated Annual Instrument Approaches
2010	4,474	922
2011	4,466	920
2012	4,262	878
2013	4,208	867
2014	4,180	861
2015	4,216	868
2016	4,109	846
2017	4,089	842
2018	3,827	788
2019	3,899	803

Source: FAA TFMSC, 2010-2019.

Historical instrument approaches as shown in **Table 4-16** have declined in the past decade except for an increase in 2019. Forecast operations are showing a relative stability through the planning period with an increase in air carrier, air taxi, and general aviation itinerant operations. Therefore, it is anticipated that instrument approaches will increase at a reasonable 0.7 percent per year to approximately 930 instrument approaches in 2040.

4.8. FORECAST SUMMARY

Table 4-17 presents a summary of the aviation demand forecasts developed for HVN and detailed throughout this chapter. These forecasts are considered reasonable and achievable and will be used throughout the Master Plan Update in the development of facility requirements and the identification of alternatives.

Table 4-17: Aviation Demand Forecast Summary

	FORECAST			
	Baseline	2025	2030	2040
Enplanements				
Air Carrier/ Airline	50,355	82,723	94,531	123,999
Peak Hour	63	168	168	168
Aircraft Operations	**25,219**	**25,923**	**26,476**	**27,631**
Air Carrier/ Air Taxi	5,267	5,558	5,810	6,351
General Aviation				
GA Itinerant	10,084	10,298	10,453	10,771
GA Local	9,411	9,610	9,755	10,052
Military	457	457	457	457
Peak Hour	10	10	11	11
Based Aircraft	**50**	**51**	**53**	**56**
Single	42	43	43	43
Multi	3	3	3	3
Helicopter	0	0	1	2
Turboprop	2	2	2	3
Jet	3	3	4	5

Source: McFarland Johnson analysis, 2019.

4.8.1. Comparison with FAA Terminal Area Forecast

To confirm validity, master plan aviation forecasts are often compared with other aviation forecasts prepared for the airport and the region. Ideally, this report's forecasts should be reasonably consistent with other forecasts of future airport activity, and compatible with forecasts for the larger region. With master plan forecasts being much more specific to an airport, it is not unusual to see some variation from national forecasts. The most useful forecasts for comparison are those prepared by the FAA with the standard being the TAF, which is prepared annually and includes airport forecasts for all active National Plan of Integrated Airport Systems (NPIAS) airports. Table 4-18 shows the compared results between the selected forecast and that of the FAA's TAF.

The comparison shows that the results of the Master Plan operations forecast, and the based aircraft forecast anticipate the growth in operations and based aircraft to be less than that displayed in the TAF. 2019 actual enplanements are similar to the TAF 2026 enplanements. The TAF does not account for the 2019 up-gauging of aircraft to the E175 76-seat aircraft from the 50-seat CRJ-200. 2018 to 2019 HVN saw a 30-percent increase in enplanements. Continued use the larger E175 means enplanements will continue to increase at a higher rate in 2020 before increasing at rate of approximately 3.4 percent annually, which is on par with optimistic National Aerospace Forecasts.

Table 4-18: Aviation Demand Forecast vs. FAA TAF

	Baseline	Forecasts			
	2019	2025	2030	2040	CAGR
FAA TAF (2019)					
Enplanements	46,953	49,836	52,380	57,861	1.05%
Total Operations	26,255	26,162	26,394	26,895	0.12%
Based Aircraft	59	65	70	80	1.53%
Master Plan Forecast					
Enplanements	50,355	82,723	94,531	123,999	3.40%
Total Operations	25,219	25,923	26,476	27,631	0.46%
Based Aircraft	50	51	53	56	0.57%
Percent Difference From TAF					
Enplanements	7.2%	66.0%	80.5%	114.3%	
Total Operations	-3.95%	-0.91%	0.31%	2.74%	
Based Aircraft	-15.25%	-21.54%	-24.29%	-30.00%	

Source: FAA TAF, 2019; McFarland Johnson analysis, 2020.

4.9. EXISTING AND FUTURE DESIGN AIRCRAFT

The runway design code (RDC) used in airport planning is derived from the features of the most demanding aircraft using an airport on a regular basis coupled with the best available instrument approach minimums. The first component, depicted by a letter, is the aircraft approach category (AAC) and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the airplane design group (ADG) and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by runway visual range (RVR) values. **Table 4-19** displays the RDC criteria used in airport planning.

Table 4-19: Runway Design Code Characteristics

Aircraft Approach Category (AAC)	
Category	**Approach Speed**
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

Airplane Design Group (ADG)	
Group	**Tail Height (and/or) Wingspan**
I	< 20′ // < 49′
II	20′ - < 30′ // 49′ - < 79′
III	30′ - < 45′ // 79′ - < 118′
IV	45′ - < 60′ // 118′ - < 171′

Airplane Design Group (ADG)	
V	60′ - < 66′ // 171′ - < 214′
VI	66′ - < 80′ // 214′ - < 262′

Visibility Minimums	
RVR (FT)	Flight Visibility Category (statute mile)
VIS	Visual Approaches
4000	Lower than 1 mile but not lower than ¾ mile (APV ≥ 3/4 but < 1 mile)
2400	Lower than 3/4 mile but not lower than 1/2 mile (CAT-I PA)
1600	Lower than 1/2 mile but not lower than 1/4 mile (CAT-II PA)
1200	Lower than 1/4 mile (CAT-III PA)

Source: FAA AC 150/5300-13A, 2014.

The critical aircraft is the most demanding aircraft or family or aircraft with similar characteristics to operate at a particular airport more than 500 times within a year.

4.9.1. Existing Critical Aircraft

Based on information from the TFMSC for HVN as shown in **Table 4-20**, the most demanding group of aircraft to utilize the Airport at least 500 times in the past year is AAC-ADG C/D-III. Aircraft in the ARC C/D-III categories shown in **Table 4-21** have had 500 or close to 500 operations in 2019 and ADG D aircraft (from GA operations) are anticipated to increase to 500.

Table 4-20: January through November 2019 HVN Operations by ADG-AAC

AAC/ADG	I	II	III	Total
B	499	2,270	22	
C	255	1,486	1,036	**2,777**
D	136	127	166	**429**
Total			**1,224**	

Source: FAA TFMSC, January – November 2019.

Table 4-21: Existing Design Aircraft

	Existing Design Aircraft		
Aircraft Model	CRJ-200	Embraer 175	Gulfstream V/550
Length Overall	87.83	103.92	96.42
Wingspan	68.67	85.33	93.50
Tail Height	20.75	32.33	25.83
Maximum Takeoff Weight	47,450	82,873	91,000
Typical Approach Speed	140	124	150
Approach Speed Category	C	C	D
Aircraft Design Group	II	III	III

Source: FAA AC 150/5300-13A, 2014.

4.9.2. Future Design Aircraft

The future design aircraft is the Airbus A319 based on letters of interest sent to both the City of New Haven and the Administrator of the Federal Aviation Administration (see Appendix B). Should a runway extension occur within the 20-year planning period, the future design aircraft would likely become the Airbus A320.

Both the A319 and A320 are C-III aircraft. Therefore, the design aircraft will continue to be a C/D-III for the Airport throughout the planning period taking into consideration both commercial and GA operations.

McFarland Johnson

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

MEMORANDUM

To: Jeremy Nielson, Airport Manager

Lisa Lesperance – Lead Community Planner FAA

From: Rick Lucas - Senior Project Manager, MJ

Date: September 15, 2020

Subject: HVN Master Plan Forecast Review and Validation

At the time of this forecast effort (Summer 2020), there is a great deal of short-term uncertainty and volatility in demand due to the impacts of the global Covid-19/Coronavirus crisis. The initial sharp reduction in demand and following economic ramifications may result in much lower demand in all aviation segments, especially those related to commercial aviation in the immediate short-term. Though the full impacts remain to be seen, the situation is currently being viewed as more of a temporary shock/interruption to the market as opposed to a shift in demand. The cardinal years of 5, 10, and 20 are still considered prudent for long-range planning purposes as the broader market is expected to ultimately emerge the same as it was prior to these events. Operations and based aircraft projections were well below demand trigger point thresholds to the focus of this review is on passenger enplanements.

Market Comparison and Review

The first half of 2020 and impacts to aviation demand are unprecedented by a notable margin making development of an accurate forecast a difficult task. This task will compare HVN's market demand response to past occurrences of softened demand (9/11 and the Great Recession) to four (4) peer airports as well as Bradley International (BDL). HVN's market performance relative to these five (5) airports will also be compared to the decreases seen over the first five months of 2020. This benchmarking review will provide clues on the strength of the overall market as conditions improve.

Peer/Benchmark Airports:

- Islip NY/Long Island MacArthur (ISP) - Located in east-central Long Island, serving a densely populated region offering a less-crowded alternative to the major NYC area airports.

McFarland Johnson

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

- Newburgh, NY/Stewart Airport (SWF) – Lower-Hudson Valley area airport operated by the Port Authority of New York and New Jersey (PANYNJ) being promoted as a north metro area alternative to the major NYC area airports also owned by the PANYNJ.
- Trenton Mercer Airport (TTN) – Just outside of the suburbs of Philadelphia, TTN has the highest 30-minute catchment area. TTN has an intermittent history with air service and had no airline service at the time Frontier Airlines launched service in 2013 which has been sustained ever since. Operations at TTN are limited by the 6,000-foot runway.
- Worcester, MA (ORH) – Located an hour west of Boston, in the 80's and 90's Worcester was served by multiple network carriers, but eventually wound up unserved as low-fare competition increased at both Manchester, NH and Providence, RI. Following a renewed effort by new owner/operator Massport, Worcester was able to regain service on JetBlue to Florida followed a few years later by Delta with regional jet service to Detroit.

Airport	2019 Enplanements	Airlines	Destinations	Population within 30 min	Distance to Large Hub (mi)
Islip	774,374	3	12*	1,262,734	44 (JFK) 46 (LGA)
Newburgh	268,083	4	10	313,278	66 (LGA) 77 EWR)
New Haven	48,860	1	1	776,420	74 (LGA)
Trenton	462,173	1	17*	1,341,195	42 (PHL) 50 (EWR)
Worcester	97,090	2	3	435,648	48 (BOS)

* Most destinations are served less than daily

The next smallest peer airport has more than twice as many enplanements while having almost 50% less people living within 30 minutes of the airport. The ratio of enplanements to 30 min. population is 6.2% for HVN while ranging between 22% and 86% for the peer benchmark airports. When applied to HVN this results in an equivalent range of 170,812 to 663,839 theoretical enplanements based on the 30 min population of HVN.

While not a scientific or statistically valid analysis, as there are many other market factors and there are other better served airports in which HVN competes for service, it does highlight that the forecast market potential for HVN is likely significantly higher than existing levels and what has been previously projected.

In addition, the market performance in past aviation downturns has been consistent with peer airports with HVN at or above the average respective to peers during the previous two recessions.

	HVN	TTN	SWF	ISP	ORH	BDL
2001-2002	-23.90%	-55.90%	-11%	-4.80%	-53.20%	-5.70%
2008-2009	-2.91%	N/A	-49.64%	-11.33%	441.80%	-12.62%

McFarland Johnson

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

Critical Aircraft Validation and Review

Even at only 6 months into the global pandemic, airlines have made permeant retirements of hundreds of aircraft, removing some types from their fleets entirely. Changing fleets have shaped the service levels of HVN for the past 20 years and will continue to shape service levels into the future.

Short-Term

The sharp reduction in flying in the post-Covid environment has resulted in the need for airlines to shuffle around and consolidate the regional flying they do in conjunction with their regional airline partners. Changes in operators, aircraft, and crew bases will likely impact how airports like HVN are served. Based on the Existing American Airlines regional fleet the following aircraft should be considered for operations at HVN:

- Bombardier CRJ-200 (400 nm segment)
- Bombardier CRJ-700 (700 nm segment)
- Bombardier CRJ-900 (700 nm segment)
- Embraer E-175 (700 nm segment)

The Embraer 145 also plays a significant role in the American Airlines regional fleet; however, preliminary analysis shows the aircraft cannot be reasonably accommodated at HVN in the short-term due to runway length constraints with most operations requiring in excess of 6,000 feet, especially in contaminated conditions.

Long-Term

In the long-term, HVN is expected to experience incremental upgauging consistent with other similar airports. In the previous list of peer/benchmark airports, each of them is currently served by the Airbus 320 except for Worcester, MA which is served by the E190 as the current largest aircraft. In addition, some of the aircraft discussed in the short-term, will likely still be serving HVN post-2025 in addition to the larger aircraft likely to enter the fleet mix.

- 2025 - Embraer 175 and Airbus 319
- 2030 – Airbus 220 and Airbus 320NEO (or Boeing 737-8)
- 2040 – A320NEO (or Boeing 737-8) and New Narrowbody Aircraft

Year	Low Case	High Case
2025	*Embraer 175*	*Airbus 319*
Passengers	76	124-150
Weight (MTOW)	89,000 lbs	166,000 lbs
Wingspan	85 ft 4 in	117 ft 5 in

McFarland Johnson

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

Year	Low Case	High Case
2030	*Airbus 220-300*	*Airbus 320 NEO*
Passengers	110-135	150-189
Weight (MTOW)	154,000 lbs	172,000 lbs
Wingspan	115 ft 1 in	117 ft 5 in
2040	*Airbus 320 NEO*	*New Narrowbody Aircraft*
Passengers	150-189	150-180 est
Weight (MTOW)	174,000 lbs	165,000-175,000 est
Wingspan	117 ft 5 in	

Forecast Validity Review

While there are many unknows in the near-term regarding the impacts of Covid-19, the market characteristics of New Haven and the immediate surrounding area remain strong. Commercial service airports in the northeast averaged capacity declines of around 80% in June which has recovered to around 60-65% decline for September/October. While most airports have begun to recover, it is occurring at a slower pace than initially anticipated. Based on the market geography and size, we believe the long-term forecasts previously presented are valid for use in airport planning with the short-term period of 0-5 years containing the most volatility. Revised master plan forecasts reflect a 5-year recovery period from what had previously been presented.

Year	Constrained Low (Selected MP)	Covid-19 Impact	Revised Master Plan Forecast
2020	65,659	-80%	13,132
2021	74,377	-50%	37,188
2022	76,379	-25%	57,269
2023	78,436	-10%	70,592
2024	80,776	-5%	76,737

Emerging Trends in the post-Covid-19 aviation market

Increased Reliance on Hub and Spoke Model by Network Airlines: When demand is high, airlines add point-to-point routes in important markets to both strengthen their market presence and also free up additional capacity for hub routes which take the bulk of traffic to a variety of destinations. When demand is lower, these point-to-point routes are often eliminated as the network carriers still have the ability to fly passengers between the two cities, just with a connection in one of their hubs. While it is less desirable

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

to the passenger, absent any other non-stop service, flying with a connection is still the most convenient option.

> *What it means for HVN:* HVN has always relied on the hub and spoke model for air service. Increased non-stop destination and frequencies at other nearby airports make it increasingly difficult for New Haven to compete with those options. Several point-to-point routes have been cut from airports like Hartford Bradley and frequencies have been reduced from the busy New York area airports. The reduced appeal from other airports having less options, while the frequencies are mostly unchanged at HVN having already been at minimum core levels, helps to boost the appeal of HVN relative to other airport choices. An example of this is someone from New Haven may be inclined to drive to Bradley or a NYC area airport for a non-stop flight to Raleigh Durham, without those options, flying locally out of New Haven may be more favorable even with limited options as a connection is required either way.

Focus on Less Competitive Markets: During periods of high demand airlines often compete for market share to better appeal to the frequent fliers in the market. Since competition drives down prices, during periods of softer demand, airlines look for less competitive markets that will not have the downward pressure on fares. In recent months, airlines have actually added capacity in some markets and launched new cities in an effort to diversify their network away from previously ultra-competitive routes and to expand their reach to more potential passengers.

> *What it means for HVN*: With a sizeable population in the area immediately adjacent to the airport there is a sizeable local market that currently uses other airports and other airlines are competing for those passengers. Expanding or adding service at HVN could capture a currently fragmented market in terms of airport and airline use. For example, United trails competitors in terms of market share at nearby airports, if service was added to HVN they could capture passengers in the New Haven market that were likely bound to fly on a competitor. In the short-term, this also focuses on leisure flying to places like Florida which is consistently a strong market from the Northeast regardless of economic conditions. New Haven is one of only two Primary Commercial Service airports (Non-Essential Air Service) in New England and one of six in the entire northeast that does ***not*** have service to Florida. Meanwhile, airports like Bradley and Providence will have service on three or more carriers to most major Florida markets this winter.

Fleet Simplification: In the months ahead, it is expected that airlines that serve HVN and/or prospective airlines will strategically deploy their assets in ways that result in operational efficiencies and economies of scale. Part of this strategy will involve a reduction in the types of aircraft operated by the airlines. So far this year we have seen American permanently retire their Boeing 757 and 767 fleets and Delta permanently retire their MD88, MD90, and Boeing 777 fleets, none of which were anticipated to occur in 2020.

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

What it means for HVN: Airlines will base fleet decisions across their various hubs meaning that the aircraft and opportunities for HVN will be a function of the aircraft based at certain hubs along the east coast. With a very limited portion of the fleet able to currently use the existing infrastructure, as fleets are consolidated, options to effectively serve HVN will be further reduced.

Consolidation and Reduction in Regional Airline Fleets: Similar to the fleet strategies of the network airline fleets, similar practices are being done for the various regional operators themselves. Trans States and Compass Airlines, which flew for United and American, respectively, have ceased operations as a result of the Covid-19 demand crisis. Another regional airline, Expressjet has lost flying contracts with United for this year leaving it with an uncertain future.

What it means for HVN: Similar to the major airline fleets, airlines will consolidate their regional airline partners across their various hubs meaning that the aircraft and opportunities for HVN will be a function of the aircraft based at certain hubs along the east coast. Each regional operator typically only operates certain types of aircraft. With a very limited portion of the fleet able to currently use the existing infrastructure, as regional operators and respective fleets are consolidated, options to effectively serve HVN will be further reduced.

Additional Planning Scenario

The master plan forecast chapter includes scenarios for less than daily service by an LCC such as Allegiant Air, however looking at trends and developments at other smaller airports with large catchment areas, an additional planning scenario was developed to capture a more robust LCC presence at HVN similar to what has been experienced in those other markets.

This planning scenario identifies the forecast implications of a new airline starting service with 4 daily departures on 150-seat aircraft growing to 9 daily departures over the planning period. Enplanements assume a load factor between 85 and 90%, consistent with LCC service patterns. Since the start year is unknown (if at all), the additive values to the baseline forecast would begin with “year 1” and grow from there.

Year	Enplanements	Operations
1	186,150	2,920
5	264,598	3,688
10	382,270	4,649
20	558,778	6,570

49 Court Street, Metrocenter
Binghamton, NY 13902
Phone: (607)723-9421
www.mjinc.com

The increased operations would be considered “Air Carrier” under the operational totals. While the additional enplanements would represent more than a five-fold increase, the additional operations would add about 10% to the operations total at the onset less than 25% to the total operations in the long run.

Summary

The baseline forecast for HVN already includes and assumes that new service options will be limited to existing airside infrastructure. While there is some uncertainty around the short-term (5-year) demand levels, passenger demand has typically recovered within two years for most airports for 9/11 and the Great Recession. To-date the impacts of the Covid-19 crisis have been more severe and could lead to a longer recovery period with most industry groups projecting between 3-5 years for demand to fully recover, with domestic demand recovering faster than international. While there is uncertainty for the validity of the short-term demand, the near-term changes for the regional and network airlines could result in operational constraints should airside infrastructure not adequately match the operational needs of the airline serving or looking to serve HVN.

The forecast for the near-term and long-term periods is still valid as, even with some demand being permanently lost to video and web-based meetings, the natural and incremental growth will eventually replace the lost demand. Based on the market geography and size respective to similar and comparable markets/airports, we believe the long-term forecasts previously presented are valid for use in airport planning.