

AWOS Benefit-Cost Analysis (Phase II) Jefferson County International Airport

prepared for
**Port of Port Townsend and
Federal Aviation Administration**

Engineer's Report

February 2014

prepared by
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Table of Contents

PROJECT DESCRIPTION	1
LOCATION.....	1
BACKGROUND AND ANALYSIS	1
EQUIPMENT	2
AWOS BENEFIT-COST ANALYSIS (PHASE I).....	2
AWOS BENEFIT-COST ANALYSIS (PHASE II)	2
PRELIMINARY OPINION OF PROBABLE COST	3
<i>MOBILIZATION</i>	<i>3</i>
<i>ENGINEERING AND ADMINISTRATION</i>	<i>3</i>
<i>CONTINGENCY</i>	<i>3</i>

Appendices

- Appendix A – AWOS Benefit-Cost Analysis Form (Phase I)
- Appendix B – AWOS Benefit-Cost Analysis Form (Phase II)
- Appendix C – Current and Forecast Operations
- Appendix D – Preliminary Opinion of Probable Cost
- Appendix E – Current Cost Estimate Breakout of Various AWOS Sensors

Port of Port Townsend

AWOS Benefit-Cost Analysis (Phase II) Jefferson County International Airport

Engineer's Report

Project Description

There is currently a need for accurate weather information at Jefferson County International Airport. This project proposes to acquire, install, and operate an AWOS system to fulfill the apparent need at the facility. The project will consist of grading and clearing, electrical equipment, fencing, localized drainage improvements, acquiring AWOS equipment, installing a tower and various foundations, computer equipment, software, and other appurtenances to complete the AWOS system. The intention for this project is to provide engineering and design services this spring and construction activities this summer/fall (2014). It is understood that acquiring the frequencies for the system may push the commissioning of the AWOS facilities into the 2015 calendar year.

Location

Jefferson County International Airport is located approximately three miles south of the City of Port Townsend, Washington. The airport is nestled between State Route 20 and Airport Cutoff Road (State Route 19). The airport consists of approximately 292 acres, has one paved and lighted runway (3,000 feet by 75 feet), and an east-west orientation. Jefferson County International Airport is owned and operated by the Port of Port Townsend (Port).

Background and Analysis

Jefferson County International Airport is located near mountains (within the Olympic Mountain "rain shadow"), where weather conditions change rapidly. While weather information is available at nearby airport facilities, the variations in the weather patterns in this area is significant enough that weather stations located 30 nautical miles away are considered inaccurate for operations at the airport. Compounding this issue, the Super Unicom system at Jefferson County International Airport stopped functioning. The Port attempted to repair the unit; however, it was discovered that the existing system was obsolete and appeared to be unrepairable, due to the lack of replacement and/or reproduction parts. Since the Super Unicom system went down, accessing the airport facilities in inclement weather conditions has caused some challenges for the facility users.

Recently, the Jefferson County Pilots Association, Airlift NW, and various taxi service providers placed inquiries with the Port regarding the installation of an AWOS system. The airport facility users value the accurate weather reporting information that an AWOS system would provide. This prompted the Port to develop and submit an AWOS Benefit-Cost Analysis (Phase I) document.

Equipment

The proposed AWOS facility at the airport is a type III-P. An AWOS III-P includes observations for altimeter setting, density altitude, visibility, variable visibility, temperature, dew point, wind speed, wind gust, wind direction, variable wind direction, day/night, cloud height, sky condition, and precipitation identification sensors.

The Port has expressed interest in including weather observation data being reported to the FAA national network through the National Aerospace Data Interchange Network (NADIN). An AWOS III or better is required in order to send data to NADIN. NADIN provides real-time weather observations and allows public access through Flight Service Stations, the National Weather Service, commercial airports, and other internet based weather sources. Moreover, accurate weather information allows pilots to make informed decisions regarding fuel management, diversions, and alternate planning. It also provides pilots with the ability to make informed decisions regarding whether to attempt an approach, and if so, what type of approach to use. This information is a significant benefit to air ambulance pilots, private pilots, government agencies, businesses, and the surrounding communities.

AWOS Benefit-Cost Analysis (Phase I)

The AWOS Benefit-Cost Analysis (Phase I) was formally submitted to the FAA on January 9, 2014. The AWOS Benefit-Cost Analysis (Phase I) document is based on the criteria established in FAA Order 7031.2C, Chapter 4, Paragraph 46c(1b). According to AirNav, Jefferson County International Airport has a total of 159 operations per day (for a 12-month period ending June 30, 2012). This traffic consists of roughly 3-percent air taxi services, 60-percent general aviation itinerant, and 37-percent local general aviation traffic.

The Jefferson County International Airport is located approximately 30 nautical miles from the nearest FAA Contract Weather Observation Station. In the AWOS Benefit-Cost Analysis (Phase I), an AR factor of 1.0 was used. The total benefit in dollars of an AWOS III-P at Jefferson County International Airport was calculated at \$224,568. The life cycle cost for an AWOS III-P is \$128,970. Therefore, the total benefit-cost value for this project is 1.74, which meets the eligibility criteria of a benefit-cost ratio of 1.0 or greater. Please refer to Appendix A for more details.

AWOS Benefit-Cost Analysis (Phase II)

The development of the AWOS Benefit-Cost Analysis (Phase II) was based on information collected from numerous sources. The following outlets were used: AirNav; AirportIQ 5010; the Jefferson County International Airport Master Plan (currently being updated); FAA Advisory Circular 150/5220-16D; recent construction bid tabulations; and conversations with the Port, FAA, and AWOS manufacturers.

A number of items on the AWOS Benefit-Cost Analysis (Phase II) requested data regarding specific operations by aircraft type and size; unfortunately, this information is not tracked or recorded by the Port. Jefferson County International Airport does not possess a contract tower

and the Port does not have the capabilities to monitor the air traffic to the extent requested. Therefore, these categories on the form were left blank. Please refer to Appendix B for more information.

Preliminary Opinion of Probable Cost

The preliminary opinion of probable cost is based upon our conceptual understanding of the site layout, basic assumptions, and anticipated equipment needs for a complete AWOS system. Please refer to Appendix C, D, and E for more information regarding the proposed system and its associated costs.

In addition to the proposed improvements presented previously, the estimates of probable program costs include the following:

Mobilization

Mobilization represents a number of items directly related to the Contractor's overall work at the site. It typically includes mobilization and demobilization, bonds, insurance, and other general administrative costs. For a project of this magnitude, mobilization typically ranges from 5% to 10% of the construction costs, and is dependent on how the Contractor structures the bid.

Engineering and Administration

Engineering costs were estimated for the project. The estimate for engineering services is based on the anticipation that the AWOS equipment will be a packaged system from a single manufacturer and will be engineered by the manufacturer. A packaged AWOS system significantly reduces the cost of designing the project; however, the project will still require engineering services to provide site development plans and specifications along with overall project management and various other project elements.

Contingency

A contingency of 20% was placed on the probable construction costs associated with the project to provide a buffer for the budgeting of the improvements. The contingency allows for volatile fluctuations in the construction market, minor changes in scope, and unforeseeable circumstances as the project proceeds from the planning stage to construction. The contingency should not be used to accommodate inflation.

Reducing the contingency may be appropriate as site investigations are completed, elements are further defined and the design nears completion. However, due to the volatility of the construction industry it is recommended that a contingency of at least 15% always be considered for budgeting purposes.

APPENDIX A

AWOS BENEFIT-COST ANALYSIS FORM

PHASE I

AWOS BENEFIT-COST ANALYSIS

Jefferson County International Airport OS9

Port of Port Townsend, WA
January 29, 2013

Per FAA ORDER 7031 2C: Airway Planning Standard Number One -
Terminal Air Navigation Facilities and Air Traffic Control Services, Chapter 4, Paragraph 46

GROWTH FACTORS:

Air Carrier	-
Air Taxi *	3.1%
GA Itinerant *	3.1%
GA Local *	3.1%
Military Itinerant	
Military Local	-

OPERATIONS FORECASTS:

	Current	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Air Carrier	-	-	-	-	-	-	-	-	-	-
Air Taxi **	1,500	1,547	1,594	1,644	1,695	1,747	1,802	1,857	1,915	1,974
GA Itinerant **	34,800	35,879	36,991	38,138	39,320	40,539	41,796	43,091	44,427	45,804
GA Local **	21,700	22,373	23,066	23,781	24,519	25,279	26,062	26,870	27,703	28,562
Military Itinerant	-	-	-	-	-	-	-	-	-	-
Military Local	-	-	-	-	-	-	-	-	-	-

* Growth factors based on projected operations per JCIA Master Plan

** Current year (2012) operations figures per JCIA 5010 Master Record and AirNav

BENEFIT CALCULATIONS:

Operations (Max 3,000)		Benefit @	Total
AIR TAXI	1,500.00	\$25.38	\$38,070
Total Benefit Air Taxi			\$38,070

GA ITINERANT	Operations	Benefit @	Total
Altimeter			
Wind	34,800	\$3.80	\$132,240
Temp / DP	34,800	\$0.04	\$1,392
Visibility			\$0
Ceiling			\$0
Liquid Precip	34,800	\$0.06	\$2,088
Thunder			\$0
Freezing Precip			\$0
Total Benefit GA Itinerant			\$135,720

GA LOCAL	Operations	Benefit @	Total
Altimeter			
Wind	21,700	\$2.28	\$49,476
Temp / DP	21,700	\$0.02	\$434
Visibility			\$0
Ceiling			\$0
Liquid Precip	21,700	\$0.04	\$868
Thunder			\$0
Freezing Precip			\$0
Total Benefit GA Local			\$50,778

TOTAL CALCULATED BENEFIT \$224,568

@ Unit benefit figures from FAA Order 7031 2C

AR FACTOR:

AR is an adjusting proximity penalty or remoteness premium reciprocal.

AR = 0.5 for airports less than 10NM from the nearest full-time non-automated FAA/NWS contract surface weather observation station.

AR = 1.25 for airports more than 90 NM from the nearest full-time non-automated FAA/NWS contract surface weather observation station.

AR = 1.0 for others

AR Factor for JCIA = 1.0

LIFE-CYCLE COSTS:

AWOS Sensors	LCC
Base	\$49,617
Altimeter	\$3,974
Wind	\$1,999
Temp / DP	\$1,615
Visibility	\$28,517
Ceiling	\$41,881
Liquid Precip	\$1,367
Thunder	\$23,175
Freezing Precip	\$3,687

AWOS Systems	LCC	
AWOS-A	\$53,591	Automated Altimeter
AWOS-A/V	\$82,108	AWOS-A plus Visibility
AWOS-I	\$57,205	AWOS-A plus Temperature, Dew point & Winds
AWOS-II	\$85,722	AWOS-I plus Visibility
AWOS-III	\$127,603	AWOS-II plus Ceiling
AWOS-III-P	\$128,970	AWOS-III plus Liquid Precipitation
AWOS-III-T	\$150,778	AWOS-III plus Thunderstorm
AWOS-III-PT	\$152,145	AWOS-III plus Liquid Precipitation & Thunderstorm
AWOS-IV	\$155,832	AWOS-III plus Freezing Rain & Runway Condition

BENEFIT-COST ANALYSIS CALCULATION:

Total Calculated Benefit \$224,568
 AR Factor 1.0

Total AWOS System LCC \$128,970 for AWOS-III-P

TOTAL BENEFIT-COST VALUE = $\frac{\text{Total Calculated Benefit} \times (\text{AR Factor})}{\text{Total AWOS System LCC}} = 1.74$

Total AWOS System LCC

AirportIQ 5010 Airport Master Records and Reports

Airport Name: JEFFERSON COUNTY INTL Associated City: PORT TOWNSEND
 FAA Site: 26363.A Location Identifier: OS9
 NPIAS Number: 53-0134 Hub Type: ?
 Service Level: General Aviation


General Information Services & Facilities Based Aircraft & Operations Runway Information Remarks

CBD To Airport (NM) & Direction: 04 SW
 County: JEFFERSON
 FAA Region / ADO Code: ANM SEA
 Sectional Aeronautical Chart: SEATTLE
 Ownership: PUBLIC
 Owner: PORT OF PORT TOWNSEND
 P O BOX 1180
 PORT TOWNSEND, WA 98368
 360-385-0666
 Manager: LARRY CROCKETT
 PO BOX 1180
 PORT TOWNSEND, WA 98368
 360-385-0666

Attendance Schedule:

MONTHS	DAYS	HOURS
ALL	ALL	0900-1900

Airport Use: PUBLIC
 Airport Latitude: 48-03-13.7000N ESTIMATED
 Airport Longitude: 122-46-39.3000W
 Airport Elevation: 110.1 SURVEYED
 Acreage: 797
 Right Traffic: 09
 Non-Commercial Landing Fee: NO
 IFRAS Federal Agreement: NR
 FAR 139 Index:
 Last Inspection Date: 07/05/2012
 Last Information Request:



Click on the weather icons for an additional forecast
[Open forecast map](#)

Airport Name	JEFFERSON COUNTY INTL	Associated City	PORT TOWNSEND
FAA Site	26363.*A	Location Identifier	OS9
NPIAS Number	53-0134	Hub Type	
Service Level	General Aviation		

Data Effective Date: 01/10/2013

Provided By GCR Inc.

General Information Services & Facilities Based Aircraft & Operations Runway Information

Based Aircraft

Single Engine (SE):	84
Multi Engine (ME):	4
Jet (J):	0
TOTAL FIXED WING: (SE + ME + J)	88
Helicopters:	0
Gliders:	0
Military:	0
Ultra-Light:	1

Operations

Air Carrier:	0
Air Taxi:	1,500
General Aviation Local:	21,700
General Aviation Itinerant:	34,800
Military:	0
TOTAL OPERATIONS:	58,000
Operations for 12 Months Ending:	06/30/2012



**National
Based Aircraft
Inventory**

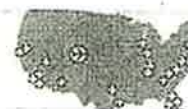
Update counts for non-published NPIAS airports

Visit www.basedaircraft.com to verify your counts

AirportIQ™ Looking for Activity?

Data Center Get Activity Reports

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NEW LOCATION
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NavAids

Airspace Fixes

Aviation Fuel

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iPhone App

1855 users online 

0S9 Jefferson County International Airport

Port Townsend, Washington, USA



GOING TO PORT TOWNSEND?

Reserve a
Hotel RoomRent a
Car


Reserve Online

FAA INFORMATION EFFECTIVE 10 JANUARY 2013

Location

FAA Identifier: 0S9

Lat/Long: 48-03-13.7000N / 122-48-38.3000W

48-03.228333N / 122-48.638333W

48.0538056 / -122.8106389

(estimated)

Elevation: 110.1 ft. / 33.6 m (surveyed)

Variation: 21E (1985)

From city: 4 miles SW of PORT TOWNSEND, WA

Time zone: UTC -8 (UTC -7 during Daylight Saving Time)

Zip code: 98368

Road maps at: [MapQuest](#) [MapPoint](#) [Yahoo!](#)[Maps Google](#) [Rand McNally](#)Satellite photo at: [TerraServer](#) [Virtual Earth](#)

Airport Operations

Airport use: Open to the public

Activation date: 01/1939

Sectional chart: [SEATTLE](#)

- Control tower: no

ARTCC: SEATTLE CENTER

FSS: SEATTLE FLIGHT SERVICE STATION

NOTAMs facility: SEA (NOTAM-D service available)

Attendance: 0900-1800

Pattern altitude: 1000.1 ft. MSL

Wind indicator: lighted

Segmented circle: yes

Beacon: white-green (lighted land airport)

DUSK-DAWN. ACTVT MRL RY 09/27 - CTAF.

International operations: international airport of entry

Airport Communications

CTAF/UNICOM: 123.0

WX AWOS-3 at OKH (13 nm NE): 132.775 (360-675-8431)

- AUTOMATED UNICOM.

Airport Operational Statistics

Aircraft based on the field: 89	Aircraft operations: avg 159/day *
Single engine airplanes: 84	60% transient general aviation
Multi engine airplanes: 4	37% local general aviation
Ultralights: 1	3% air taxi

* for 12-month period ending 30 June 2012

Aerial photo

WARNING: Photo may not be current or correct

Photo courtesy of longbachnguyen.com
Photo taken 24-Feb-2010Do you have a better or more recent aerial photo of Jefferson County International Airport that you would like to share? If so, please [send us your photo](#)

Sectional chart

OVC020 PROB30 2909/2915 -SHRA

NOTAMs

Click for the latest **NOTAMs**
 NOTAMs are issued by the DoD/FAA and will open in a separate window not controlled by AirNav.

APPENDIX B

AWOS BENEFIT–COST ANALYSIS FORM PHASE II

Data Requirements for ARP AWOS Phase II BCA

5-16-13

Airport Name & LocID: Jefferson County International Airport / OS9

Preparer's Name and Contact info: Benjamin Sommer – Reid Middleton, Inc. / (425) 741-3800
--

(A) Type of AWOS with all features (e.g., AWOS III w T/P)	AWOS III-P
--	------------

(B) 1st Month and Year of Operation	Month: 01	Year: 1939
---	------------------	-------------------

(C) Share of GA operations operating in IFR conditions at airport	%
Source:	

(D) Standard Instrument Approach Procedure(S) (SIAP) (or if in queue to be published, provide estimated publication date)				
	SIAP 1	SIAP 2	SIAP 3	SIAP 4
Type of Published SIAP	RNAV GPS-A			
Runway End	9			
Runway Length	3,000			
Share of operations using each SIAP	(Please provide best estimate)			
1. General Aviation	97 %	%	%	%
2. Air Taxi	3 %	%	%	%
3. Air Carrier	-- %	%	%	%
4. Military	-- %	%	%	%
SIAP Ceiling Minima	Source: Docket No. FAA-2012-0926			
1. Without AWOS (ft)	1,000			
2. With AWOS (ft)				
SIAP Visibility Minima	Source:			
1. Without AWOS (SM)	1-1/4			
2. With AWOS (SM)				

(E) Equipment and Construction Costs of Proposed AWOS	
Source: (ADO/Region/Engineer)	
1. Design and consulting fees	\$ 115,000
2. Land acquisition (if applicable)	\$ NA
3. Site improvements including utilities	\$ 180,000
4. AWOS Equipment	\$ 165,000
5. Installation/construction	\$ Included above
Total	\$ 460,000

(F) Recurring Annual Costs	
1. Annual O&M costs, including replacement parts (provide justification if below \$5,500 annually)	\$ 10,000
2. Annual third party cost upload AWOS data to FAA NADIN (required for all AWOS IIIs)	\$ 5,000
3. Annual cost for the FAA to conduct inspection of the AWOS III depends on the following factors. Which best applies?	(Check One)
a. Airport has other non-Federal facilities that require annual inspection	X
b. Airport does not have other non-Federal facilities requiring annual inspection	
c. The AWOS will be installed in a remote location without direct access	

(G) Distance, location, LocID, and equipment type of three nearest FAA/NWS contract surface observation stations				
	Location (city/state)	LocID	AWOS Type	Dist. (NM)
1.	Arlington, Washington	AWO	AWOS III	27
2.	Burlington, Washington	BVS	AWOS III	30
3.	Bremerton National	PWT	AWOS III	34
4.				

(H) Current and forecast operations (source)				
	Current	+5 yrs	+10 yrs	+15 yrs
1. Air Carrier	--	--	--	--
2. Air Taxi	1,500	1,695	1,974	2,300
3. Military	--	--	--	--
4. General Aviation (Itinerant)	34,800	39,320	45,804	53,358
5. General Aviation (local)	21,700	24,519	28,562	33,272

(I) Percent of operations for business travel (non-military)	%
(J) Percent of operations for personal/recreational travel (non-military)	%

(K) Percent General Aviation operations by aircraft category	
1. Piston engine airplanes 1 to 3 seats (<=200hp)	%
2. Piston engine airplanes 1 to 3 seats (>200hp)	%
3. Piston engine airplanes 4 to 9 seats one-engine (<=200hp)	%
4. Piston engine airplanes 4 to 9 seats one-engine (>200hp)	%
5. Piston engine airplanes 4 to 9 seats multiengine	%
6. Piston engine airplanes 10 or more seats	%
7. Turboprop airplanes 1 to 9 seats one-engine	%
8. Turboprop airplanes 1 to 9 seats multiengine	%
9. Turboprop airplanes 10 to 19 seats	%
10. Turboprop airplanes 20 or more seats	%
11. Turbojet/Turbofan airplanes <=12,500 lbs	%
12. Turbojet/Turbofan airplanes >12,500 lbs and <= 65,000 lbs	%

13. Turbojet/Turbofan airplanes >65,000 lbs	%
14. Rotorcraft piston <=6,000 lbs	%
15. Rotorcraft turbine <=6,000 lbs	%
16. Rotorcraft piston >6,000 lbs	%
17. Rotorcraft turbine >6,000 lbs	%
18. Other	%

(L) Percent Air Taxi operations by aircraft category	
1. Piston engine airplanes 1 to 3 seats (<=200hp)	%
2. Piston engine airplanes 1 to 3 seats (>200hp)	%
3. Piston engine airplanes 4 to 9 seats one-engine (<=200hp)	%
4. Piston engine airplanes 4 to 9 seats one-engine (>200hp)	%
5. Piston engine airplanes 4 to 9 seats multiengine	%
6. Piston engine airplanes 10 or more seats	%
7. Turboprop airplanes 1 to 9 seats one-engine	%
8. Turboprop airplanes 1 to 9 seats multiengine	%
9. Turboprop airplanes 10 to 19 seats	%
10. Turboprop airplanes 20 or more seats	%
11. Turbojet/Turbofan airplanes <=12,500 lbs	%
12. Turbojet/Turbofan airplanes >12,500 lbs and <= 65,000 lbs	%
13. Turbojet/Turbofan airplanes >65,000 lbs	%
14. Rotorcraft piston <=6,000 lbs	%
15. Rotorcraft turbine <=6,000 lbs	%
16. Rotorcraft piston >6,000 lbs	%
17. Rotorcraft turbine >6,000 lbs	%
18. Other	%

(M) Percent Air Carrier operations per aircraft category	
1. Two-Engine Narrow-Body	%
2. Two-Engine Wide-Body	%
3. Three-Engine Narrow-Body	%
4. Three-Engine Wide-Body	%
5. Four-Engine Narrow-Body	%
6. Four-Engine Wide-Body	%
7. Regional Jet under 70 seats	%
8. Regional Jet 70 to 100 seats	%
9. Turboprops under 20 seats (Part 23)	%
10. Turboprops under 20 seats (Part 25)	%
11. Turboprops with 20 or more seats	%
12. Piston Engine (Part 23)	%
13. Piston Engine (Part 25)	%

(N) Please provide a separate narrative for project justification and acknowledgement

- 1. What weather conditions does the airport currently experience on a normal basis (fog, low ceilings, etc.)?**

Jefferson County International Airport experiences morning fog starting in late summer that continues through the fall. Daily wind speeds typically average around 10 miles per hour (MPH) with gusts over 30 MPH.

- 2. Have there been complaints of a lack of weather data? Has the lack of weather data caused aircraft to divert?**

- a. Yes, there have been complaints about the lack of weather data at Jefferson County International Airport. The existing Super Unicom system is not functioning; therefore, the facility users (pilots) are flying without an audible alert reporting system.
- b. Yes, the lack of weather data has caused aircraft to divert. Weather is a significant factor in incidences involving aircraft. Current weather observations are critical for flight plan preparation. Accurate weather information allows pilots to make informed decisions regarding fuel management, diversions, and alternate planning. It also provides pilots with the ability to make informed decisions regarding whether to attempt an approach, and if so, what type of approach to use.

- 3. Why do they need this system over an AWOS A or A-V?**

An AWOS III-P is the preferred system by the Port of Port Townsend, the local Pilots Association, Airlift Northwest, and other facility users. An AWOS III-P includes observations for altimeter setting, density altitude, visibility, variable visibility, temperature, dew point, wind speed, wind gust, wind direction, variable wind direction, day/night, cloud height, sky condition, and precipitation identification sensors. The wealth of information included in an AWOS III-P system far exceeds the capabilities an AWOS A (altimeter) or A-V (altimeter plus visibility). Additionally, an AWOS III, or greater, is required in order to send data to the National Airspace Data Interchange network (NADIN). By connecting to NADIN, AWOS observations are available for preflight briefing from anywhere in the country, making flying safer.

- 4. Any other information that justifies an AWOS (e.g., Does the airport have unique operations with a specialized contribution to the national system? If so, what are the economic impacts for flights not accommodated due to not having the proposed AWOS at the airport)?**

- a. Jefferson County International Airport is located within the Olympic Peninsula. It is situated in the Olympic Mountain "rain shadow," which keeps the area relatively dry.

The weather patterns in this area differ from the surrounding AWOS facilities within the region.

- b. Flights that are diverted from landing at the airport possess a potential economic impact. There is a potential loss of goods, services, and other capital expenditures.

5. Has the Sponsor or ADO coordinated the installation of the proposed AWOS with the Service Center non-Federal Program Implementation Manager (PIM)?

It is our understanding the FAA ADO Representative for Jefferson County International Airport is coordinating with the Service Center non-Federal PIM.

6. Has the Sponsor coordinated the installation of the proposed AWOS with the Spectrum Engineering Services Group (AJW) per FAA Order 6050.32B *Spectrum Management regulations and Procedures Manual*?

It is our understanding that the FAA ADO Representative and the Sponsor will coordinate with the Spectrum Engineering Services Group as the project progresses.

7. Explain the Sponsor's proposed arrangements to upload the AWOS III data to FAA National Airspace Data Interchange Network (NADIN) per the requirements of FAA 7110.104 *Non-Federal Automated Weather Observation System (AWOS) Connection to the Weather Message Switching Center (WMSC)*?

The proposed AWOS system will be equipped with the necessary hardware (i.e., modems, interface boards, modules, etc.) to interface with the equipment of an approved third-party vendor to download data through the FAA's NADIN system and into the WMSC. The Sponsor will contract with this third-party vendor to provide these services.

8. Acknowledge that the Sponsor is aware that they are required to have the AWOS properly commissioned and must operate and maintain AWOS equipment during its life cycle per FAA Order 5100.38C *Airport Improvement Program (AIP) Handbook (Appendix 7)*. FAA Order 6700.20 *Non-Federal Navigational Aids and Air Traffic Control Facilities* and FAA AC 170-11, *Amendment of FAR Part 171 – Cost of Flight & Ground Inspections*.

The sponsor is aware of the requirements to properly commission, operate, and maintain the AWOS equipment during its life cycle.

9. Acknowledge that the Sponsor submitted a FAA Form 7460 for the proposed installation/construction of the AWOS?

As part of the Consultant's scope of work for design, an FAA 7460-1 form will be developed and submitted to the FAA for the AWOS system.

Additional information and requirements regarding the installation, frequency, commissioning and NADIN requirements can be found in

1. FAA AC 150/5220-16D *Automated Weather Observation Systems (AWOS) for Non-Federal Applications*.
2. FAA Resource Bulletin No. 2010-01 *General Requirements when Commissioning Airport Weather Observation Systems (AWOS)*; Airports Division, Great Lakes Region

APPENDIX C

CURRENT AND FORECAST OPERATIONS

GROWTH FACTORS:

Air Carrier	-
Air Taxi	3.1%
GA Inherent	3.1%
GA Local	3.1%
Military Inherent	-
Military Local	-

OPERATIONS FORECASTS:

	Current	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Air Carrier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Taxi	1,500	1,547	1,594	1,644	1,695	1,747	1,802	1,857	1,915	1,974	2,036	2,099	2,164	2,231	2,300
GA Inherent	34,800	35,879	36,991	38,138	39,320	40,539	41,796	43,091	44,427	45,804	47,224	48,688	50,198	51,754	53,358
GA Local	21,700	22,375	23,066	23,781	24,519	25,279	26,062	26,870	27,705	28,562	29,447	30,360	31,301	32,272	33,272
Military Inherent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Military Local	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Growth factors based on projected operations per JCIA Master Plan
 ** Current year (2012) operations figures per JCIA 5010 Master Record and AirNav

APPENDIX D

PRELIMINARY OPINION OF PROBABLE COST

Jefferson County International Airport
Port of Port Townsend
 Engineer's Opinion of Probable Cost
 Summary

Summary				
Design and consulting fees	1	LS	\$ 115,000.00	\$ 115,000.00
Site Development including utilities	1	LS	\$ 177,103.20	\$ 177,103.20
AWOS Equipment & Installation	1	LS	\$ 163,500.00	\$ 163,500.00
AWOS Maintenance	1	LS	\$ 22,890.00	\$ 22,890.00
GRAND TOTAL				\$ 478,493.20

Jefferson County International Airport
Port of Port Townsend
 Engineer's Opinion of Probable Cost
 Site Development

Items of Work and Materials	Quantity	Unit	Unit Price	Total Amount
Mobilization, Controls, and Survey				
Mobilization	1	LS	10%	\$ 10,900.00
FOD Prevention Controls	1	LS	\$ 2,000.00	\$ 2,000.00
Traffic Control	1	LS	\$ 2,500.00	\$ 2,500.00
Quality Control	1	LS	\$ 5,000.00	\$ 5,000.00
Utility Locate	1	LS	\$ 1,000.00	\$ 1,000.00
Trench Excavation Safety Provisions	1	LS	\$ 500.00	\$ 500.00
Construction Survey	1	LS	\$ 5,000.00	\$ 5,000.00
Subtotal				\$ 26,900.00
Site Work				
Gravel Construction Entrance	1	LS	\$ 5,000.00	\$ 5,000.00
Erosion Control	1	LS	\$ 5,000.00	\$ 5,000.00
Drainage Improvements	1	LS	\$ 5,000.00	\$ 5,000.00
Stripping	0.5	AC	\$ 8,000.00	\$ 4,000.00
Unclassified Excavation and Haul	500	CY	\$ 32.00	\$ 16,000.00
Subbase Course	600	TN	\$ 22.00	\$ 13,200.00
Crushed Aggregate Top Course	500	TN	\$ 25.00	\$ 12,500.00
Stabilization Fabric	1400	SY	\$ 2.00	\$ 2,800.00
Hydroseeding	0.5	AC	\$ 5,000.00	\$ 2,500.00
Chain-link Fence	300	LF	\$ 35.00	\$ 10,500.00
Double Swing Gate	1	EA	\$ 4,000.00	\$ 4,000.00
Single Swing Gate	1	EA	\$ 2,000.00	\$ 2,000.00
Pedestrian Gate	1	EA	\$ 1,000.00	\$ 1,000.00
Subtotal				\$ 83,500.00
Electrical				
New AWOS Electrical Service and Power Rack	1	LS	\$ 5,000.00	\$ 5,000.00
New Panelboard	1	EA	\$ 1,500.00	\$ 1,500.00
New N36 Pullbox	2	EA	\$ 750.00	\$ 1,500.00
600V Cable, various sizes	1	LS	\$ 10,000.00	\$ 10,000.00
Electrical Conduit, various sizes	1	LS	\$ 7,000.00	\$ 7,000.00
Subtotal				\$ 25,000.00
SUBTOTAL				\$ 135,400.00
CONTINGENCY (20%)				\$ 27,080.00
SUBTOTAL				\$ 162,480.00
SALES TAX (9.0%)				\$ 14,623.20
TOTAL				\$ 177,103.20

Jefferson County International Airport
Port of Port Townsend
 Engineer's Opinion of Probable Cost
 AWOS Equipment Installation

Items of Work and Materials	Quantity	Unit	Unit Price	Total Amount
AWOS Installation and Commissioning				
AWOS III-P Equipment and Foundation, Complete	1	LS	\$ 90,000.00	\$ 90,000.00
AWOS III-P Equipment Installation and Commissioning	1	LS	\$ 35,000.00	\$ 35,000.00
Subtotal				\$ 125,000.00
SUBTOTAL				\$ 125,000.00
CONTINGENCY (20%)				\$ 25,000.00
SUBTOTAL				\$ 150,000.00
SALES TAX (9.0%)				\$ 13,500.00
TOTAL				\$ 163,500.00

Jefferson County International Airport
Port of Port Townsend
 Engineer's Opinion of Probable Cost
 AWOS Maintenance

Items of Work and Materials	Quantity	Unit	Unit Price	Total Amount
AWOS Maintenance and Training				
AWOS Equipment Base Year Maintenance	1	LS	\$ 15,000.00	\$ 15,000.00
AWOS Equipment Maintenance On-site Training	1	LS	\$ 2,500.00	\$ 2,500.00
Subtotal				\$ 17,500.00
SUBTOTAL				\$ 17,500.00
CONTINGENCY (20%)				\$ 3,500.00
SUBTOTAL				\$ 21,000.00
SALES TAX (9.0%)				\$ 1,890.00
TOTAL				\$ 22,890.00

APPENDIX E

**CURRENT COST ESTIMATE BREAKOUT
OF VARIOUS AWOS SENSORS**



allweatherinc

AWOS Level Descriptions

AWOS System Configurations. The AWOS is a modular system utilizing a central processor which may receive input from several sensors. Eight standard groups of sensors are defined in subparagraphs a-h; however, an AWOS may be certified with any combination of sensors, depending upon system design additional sensors may be certified to any AWOS configuration. All AWI AWOS configurations are FAA certified.

- a. AWOS A. The AWOS A system contains only dual-pressure sensors that measure pressure and report altimeter setting to the pilot. \$18,556
- b. AWOS I. The AWOS I system contains the AWOS A sensors, plus sensors to measure wind data (speed, direction, and gusts), temperature, dewpoint, and report density altitude. \$21,256.00
- c. AWOS AV. The AWOS AV system contains the AWOS I system sensors, plus a visibility sensor. \$38,969.00
- d. AWOS II. The AWOS II system contains the AWOS I system sensors, plus a visibility sensor. \$38,969.00
- e. AWOS III. The AWOS III system contains all the AWOS II system sensors, plus a cloud-height sensor. \$53,770.00
- f. AWOS III P. The AWOS III P system contains all the AWOS III system sensors, plus a precipitation identification sensor. \$65,512.00
- g. AWOS III T. The AWOS III T system contains all the AWOS III system sensors and includes a thunderstorm/lightning reporting capability. \$64,001.00
- h. AWOS III P/T. The AWOS III P/T system contains all the AWOS III system sensors, plus a precipitation identification sensor and a thunderstorm/lightning reporting capability. \$76,791.00
- i. AWOS III P/T/FZ. The AWOS III P/T/FZ system contains all the AWOS III P/T system sensors, plus a freezing rain sensor reporting capability. \$105,122.00