

West Michigan Airport Authority

Regular Meeting Agenda

December 10, 2018

****11:00am – 1:00pm****

Airport Business Center, 60 Geurink Boulevard, Main Conference Room (Holland)

11:00 a.m.

1. Public Comment
2. Consideration of November 12, 2018 meeting minutes. (Action Requested)
3. Presentation of Fiscal Year 2018 Audit. (Accept as Information)
4. Bid for Gate Card Readers. (Action Requested)
5. EV Charging Station Purchase Agreement with HBPW. (Action Requested)
6. FBO report.
7. Communications Update.
8. Financial Reports. (Accept as information)
9. 2019 Board Meeting Schedule. (Action Requested)
10. Other Business.

11:45 a.m.

11. Strategic Plan Discussion:
 - A. Restaurant Analysis.
 - B. Crosswind Runway report.
 - C. New hangar report.
 - D. Board member priorities.
 - E. Items that need to be discussed further.
12. Next meeting: January 14, 2019, 11:30am, at the Airport Business Center.
13. Adjourn.

If you are not able to attend the meeting, please contact Greg Robinson (g.robinson@wmairportauthority.com) or Aaron Thelenwood (a.thelenwood@cityofholland.com). We must have at least one of the three representatives of each unit of government present at the meeting to attain a quorum. Thank you.

West Michigan Airport Authority

MEETING MINUTES

November 11th, 2018

11:30am – 1:00pm

Airport Business Center, 60 Geurink Blvd. Holland, MI.

PRESENT: Hoekstra, Matthyse, Sylte, Klynstra, Blanton, Bos, Hoogland, Storey, Haverdink.

ABSENT: Keter, Corbin, Sylte

Others Present: Authority Manager Robinson, Communications Coordinator Scholten, Boer (FBO),

Board Member Sylte called the meeting to order at 11:30 a.m.

18.11.01 Public Comments.

No Public Comments

18.11.02 Consideration of October 8th, 2018 Meeting Minutes.

Klynstra made a motion, supported by Hoogland to approve the October 8th Meeting Minutes as presented and was approved unanimously.

18.11.03 Renewal of Hangar 3 Partners Ground Lease.

Hangar 3 Partners (H3P) has had a ground lease at the airport since 1988. This is a 30-year lease with the Option to Renew for another 30 years, subject to certain conditions. The H3P hangar is the first hangar as one enters the main airport entrance road (Geurink Blvd.).

Although the Board could simply extend the lease for another 30 years, much has changed at the airport over the past 30 years and the current lease includes provisions that are no longer relevant. So, a new lease has been prepared that blends the provisions of the current lease with revised language contained in the newest lease at the airport (Gentex). In addition, we have had the leased area surveyed to determine exactly where the current boundaries are.

The revised lease has the following key provisions:

1. The lease is for a 30-year term with the option to renew for an additional 30 years. (Sections 2 and 3)
2. The leased square footage is 41,000 and includes a portion of the current entranceway parking lot. (Section 1 and Exhibit A)
3. The lease rate is 20 cents per square foot in year one with annual adjustments according to the Consumer Price Index. 20 cents/sq.ft. is close to the current year lease rate with a slight adjustment. (Section 4)
4. All references to Tulip City Airport have been changed to West Michigan Regional Airport.
5. Language has been added regarding maintenance of the building. (Sections 8 G & H)
6. Language has been included noting non-exclusive use of the driveway. (Section 10)
7. Insurance levels have been revised to \$1,000,000. (Section 12)

It was recommended that the Airport Authority Board approve the land lease with Hangar 3 Partners as presented. Additionally, in absence of Chair Sylte & Vice Chair Corbin it was recommended to authorize Secretary Matthyse to sign the lease agreement. It was moved by Hoogland, supported by Hoekstra and approved unanimously to authorize Secretary Matthyse to sign the lease, and renew the lease agreement with Hangar 3 Partners.

18.11.04 Proposed Improvements to Airport Business Center.

The Building & Development Committee has been discussing the need to improve the restroom facilities in the Airport Business Center. There currently are two units within each restroom and there are times when additional units would better meet the needs of those departing from aircraft.

If we were constructing this portion of the building over and money was not an objective, we would have ideally provided four units in each restroom. However, the Committee and Board were working with limited funds for construction of the building and providing the additional units was not made a priority at that time.

The architect for the Business Center, Progressive AE, has designed five concepts for the Committee's consideration to accommodate three or four units. To provide an additional two units in each restroom, the restrooms would either have to be expanded into the lobby or an expansion constructed to the north wall of the building. The cost estimates for these expansions range from \$68,200 (interior expansion) to \$117,000

(exterior expansion). An additional unit could be installed in each restroom (three units total in each restroom) for an estimated cost of \$29,000.

The Building & Development Committee does not recommend that the restrooms be expanded further into the lobby area. The preferred concept for expanding the restrooms to the north is estimated to cost \$117,000. This would provide four units in each restroom as opposed to the two units currently provided. An additional unit could be provided in each restroom (for a total of three in each) for an estimated \$29,000. As a result, the Committee was not able to rationalize spending, in essence, an additional \$88,000 for two extra units (\$117,000-\$29,000).

It was Moved by Klynstra, supported by Hoekstra and approved unanimously to approve the staff recommendation for Improvements at the Airport Business Center as presented.

18.11.05 Report on October 22nd Michigan Airport Planning Meeting

Authority Manager Robinson updated the board regarding the Airport Planning Meeting between MDOT & Authority staff in Lansing. Robinson also provided updated schedules regarding projects at the airport. No Board Action was requested.

18.11.06 Discussion on Strategic Plan

At the October 2018 Authority Board meeting, a member suggested that the Board prepare a Strategic Plan. We did not discuss what exactly was meant by "Strategic Plan" but decided to discuss this at the November 2018 Board meeting.

Enclosed with this report are the following documents that have served as the guides for the Board and staff as we consider present and future development of the airport.

- 2013 Master Plan for West Michigan Regional Airport.
- Airport Layout Plan (drawings located at the end of Chapter 6 of the Master Plan).
- 2017 Site Development Evaluation for West Michigan Regional Airport.

The **2013 Master Plan** was an extensive effort, funded in part by the FAA, that was developed by a Work Team of 10 members comprised of Authority representatives and representatives of Gentex, Metal Flow, JCI, Haworth, Tiara Yachts and the City of Holland Planning Commission. It is a comprehensive document that covers a wide-range of airport related interests.

The **Airport Layout Plan (ALP)** guides the use of airport property and any projects to be funded with FAA participation must be shown on this plan. As a result, this ALP is updated periodically to reflect changes at the airport.

The **2017 Site Development Evaluation** identifies all airport properties that are vacant or underutilized. This evaluation provides a summary of how each parcel is intended to be used.

The Authority's **Building & Development Committee** has been discussing concepts for future public and private hangars. The Committee has also discussed the merits of a crosswind runway. The Committee is nearing completion of this work and a presentation could be ready for the December 2018 Board meeting.

The Board Reviewed the documents outlined above with the intent to discuss Strategic Plan Preparation at the December 10th Board Meeting. December 10th's meeting will be an extended meeting to accommodate the additional discussion. No Board Action was requested.

18.11.07 FBO Report

18.11.08 Communication Update

18.11.09 Financial Reports

Authority Manager Robinson summarized the monthly financial statements of the Airport Authority outlining the current good standing of Authority funds. The authority is currently on-track for projected spending for FY19. It was moved by Hoekstra, supported by Klynstra & approved unanimously to accept the financial reports as information.

18.11.10 Other Business

- A. Runway painting & crack sealing – Contract for Crack Sealing on the Airport Taxiway has been scheduled for Spring of 2019. Authority staff are working with consultant Mead & Hunt to prepare bid documents for runway & taxiway pavement markings. Additionally, Authority Manager Robinson Authorized emergency spending for runway hold-lines due to their heavily deteriorated state and critical safety function for runway traffic. Total cost for this project was \$3,750 paid out of the airport's Working Capital. The rest of the pavement markings will be completed in 2019.

- B. Restaurant analysis & development activities – Authority Manager Robinson provided an update to the board regarding current status of the following:
- Restaurant analysis
 - Potential corporate hangar construction
 - Working with Lakeshore Advantage to identify available properties for development around the airport
 - Identifying opportunities to attract aeronautical businesses to the airport
 - Status of the FAA land release for Parcel K
- C. Emergency Training – Authority Assistant Manager is working with local and regional Public Safety officials to plan & schedule an emergency training exercise at the airport. Additionally, the Holland Police has been given tours outlining new facilities and developments on airport property to ensure their continued familiarity with airport property and relevant access points, in case of emergency as well as overall operations.
- D. Webcam – regarding installation of a public webcam on airport property, due to significant privacy concerns, and potential negative impact on traffic, staff recommended not installing a webcam with public access.
- E. Gate Card Readers – Authority staff are currently soliciting bids to repair & update card readers located around the airport’s airfield. In addition to repairing non-functioning card readers, the intent would be to put all card readers on a unified system, integrated with security at the Airport Business Center. Bid’s will be presented to the airport board at the December Board meeting.

Meeting Adjourn – 1:00PM

Minutes Approved: _____ (Secretary)

Date: _____

West Michigan Airport Authority

60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332

Comprising City of Zeeland, Park Township and City of Holland



December 10, 2018

Report 4

To: West Michigan Airport Authority Board.
From: Aaron Thelenwood, Authority Assistant Manager.
Subject: **Bid for Gate Card Readers.**

On October 23rd, 2018 the Airport Authority Solicited Bids to (a) replace one non-functional security card reader located at a gate on the west-side of the airfield, (b) to bring all airfield security card readers (3 total) onto a unified security system, serviced by a single vendor, and (c) install up-to-to date card reader models.

Of the three card readers on the airfield, one is currently serviced by Midstate Security LLC while the other two are serviced by Simplex Grinnell (JCI). Of those serviced by Simplex Grinnell, one is an obsolete model and no longer functioning. In the past, this unit had been serviced with scavenged parts from third party vendors and this solution is no longer a viable option.

The Bid specs released were presented in two parts. Option A reflected all requisite materials and equipment to meet the goals as described above. Option B was for strictly optional components which would allow for increased security functions at each gate as well as the ability to monitor gate access from anywhere on the airfield.

In total, Airport Authority staff identified and contacted four contractors with the ability to provide the services as described, inquiring about their interest in submitting an RFP. Staff only received one bid from Midstate Security LLC.

Midstate's bid is summarized below:

OPTION A (Required)

Midstate Security LLC:

OPTION B (Optional)

Midstate Security LLC:

The West Michigan Airport Authority will provide the public with state-of-the-art global air access to strengthen the local economy and improve the area's quality of life.

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- Three Security card readers located at vehicle gates
 - Requisite hardware to support/connect card readers & open gates
 - Installation of any required software systems
- Installation of Software allowing Tulip City Staff to activate/reprogram security cards

Option A Total: \$17,167.86

- Integrated video system for driver ID
- Intercom at gate to request access from TC staff
- Mobile App, allowing TC Staff to monitor gates from anywhere on the airfield

Option B Total: \$19,227.55

Project Total: \$36,395.41

Midstate currently provides security monitoring systems for the Airport Business Center and the services outlined in this bid would be integrated into that system, creating one unified security system for the entire airfield. This project would be paid for out of the Airport's working capital. Option A would need to be installed & functioning before Option B could be installed.

Recommendation

It is recommended that the Airport Authority Board authorize the installation of both Option A and Option B as presented in Midstate LLC's bid and that this cost be funded through the Authority's working capital.

The West Michigan Airport Authority will provide the public with state-of-the-art global air access to strengthen the local economy and improve the area's quality of life.

5 Year Capital and Maintenance Program										
Local share cash flow		Option A								
26-Nov-18										
					<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>
Revenues										
	working capital as of 11-12-18				851,200					
	Transfer from annual WMAA revenues				\$0	145,000	145,000	145,000	145,000	145,000
	Estimated working capital balance					\$355,266	\$428,741	\$324,266	\$411,766	467,191
	Total revenues				851,200	500,266	573,741	469,266	556,766	612,191
Expenses										
	Reserves for emergencies/unknown needs				200,000					
	Reserves for ABC maintenance/repairs				50,000	25,000	25,000			25,000
	Taxiway crack sealing				54,539					
	Miscellaneous crack sealing						15,000		20,000	
	Runway/taxiway painting				35,000			15,000		15,000
	Gate card readers				36,395					
	Entranceway improvements				60,000					
	Runway rehab design					11,250				
	Runway/taxiway lighting rehab design					2,775				
	Runway rehab construction						139,750			
	Runway/taxiway lighting rehab construction						34,725			
	West apron rehab design								24,575	
	West apron rehab construction									304,681
	T hangar maintenance					2,500		2,500		2,500
	Business Center restroom improvements				35,000					
	Miscellaneous pavement repair/replacement									
	Additional public hangars									
	Miscellaneous significant expenditures				25,000	30,000	35,000	40,000	45,000	50,000
	Total expenses				495,934	71,525	249,475	57,500	89,575	397,181
Balance forwarded to following year					355,266	428,741	324,266	411,766	467,191	215,010

REQUEST FOR PROPOSALS – CARD READERS FOR SECURITY GATES

West Michigan Airport Authority

October 23, 2018

The West Michigan Airport Authority is seeking Bids for installation/replacement of security card readers at vehicle gates surrounding the runway located at the West Michigan Regional Airport, 60 Geurink Boulevard, Holland, Michigan 49423. The intent is for all card readers currently maintained by the airport authority to be supported by the same system/vendor.

I. SCOPE OF WORK

A. Required Equipment & Software:

1. Three (3) security card readers located at vehicle gates surrounding the airport runway*
2. All requisite hardware to support & connect the card readers
3. Installation of relevant hardware to open vehicle gates when security card is scanned
4. Installation of required software to support & monitor the card reader systems, installed on a designated computer system operated by Tulip City Air Service (FBO)
5. Software & hardware allowing FBO to directly activate, deactivate, or edit security cards and parameters

*see attached map

B. Optional Equipment & Software:

1. Integrated video system for driver identification
2. Integrated system to notify FBO/request runway access at the gate (buzzer, intercom, etc.)
3. Mobile/app friendly interface, allowing FBO staff to monitor gates from a mobile device

Each Bidder is expected to provide pricing for each of the items as outlined above (both A & B), in an itemized list (broken out by items/products offered by the Bidder), attached to this bid, clearly marked as "Product List A" & "Product List B." The Airport Authority, at its sole discretion will determine, which combination of the equipment and features outlined above will be installed.

For A & B, the Bidder will provide a summary of service options (in lay terms) it offers to meet the needs of the airport Authority as described in A & B. The Bidder should be prepared to provide any relevant technical specs for the systems & equipment it proposes.

Once selected, the approved Bidder (Contractor) will work directly with FBO staff to coordinate installation of equipment and software. The selected Contractor must provide a designated point of contact for all technical and customer service support questions.

II. INDEMNIFICATION

The Contractor will agree to defend, indemnify, and save harmless the West Michigan Airport Authority, its officers, agents, and employees, from any and all claims and liabilities that may result from the Contractors work. This covenant of indemnification shall include reasonable attorney's fees and costs incurred by the West Michigan Airport Authority, its officers, agents, and employees in defense of such claim or liability.

III. INSURANCE

The Contractor is to maintain the following insurance:

- a. General liability insurance with bodily injury limits of not less than \$1,000,000.
- b. Automobile Liability insurance with bodily injury limits of not less than \$1,000,000.
- c. Workers Compensation insurance in accordance with statutory requirements and employer's liability insurance with limits of not less than \$100,000 for each occurrence.
- d. Property Damage insurance in an amount of not less than \$1,000,000.
- e. Bonds if work exceeds \$50,000.

- f. The Contractor shall name the West Michigan Airport Authority, its officers, agents, and employees as additional insureds and the insurance coverage for general liability, automobile liability, and property damage shall waive subrogation against the West Michigan Airport Authority, its officers, agents, and employees.

IV. QUALIFICATIONS

Contractors must have experience performing work as described above.

V. WARRANTY

The Contractor shall warrant that the Work performed under the Contract conforms to the Contract requirements and is free of any defect in equipment, material, workmanship, furnished or performed by the Contractor or any subcontractor or supplier of the Contractor. This warranty shall continue for a period of one (1) year from the final acceptance of the Work. If the Authority takes possession of any part of the Work before final acceptance, this warranty shall continue for a period one (1) year from the date the Authority takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the Work. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to the Authority's real or personal property when that damage is the result of: (1) The Contractor's failure to conform to contract requirements; or (2) Any defect of equipment, material, workmanship, or design furnished by the Contractor or any subcontractor or supplier of the Contractor. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement. The Authority will notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Authority shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage, at the Contractor's expense, including reasonable attorney's fees and costs incurred to enforce the warranty. This warranty shall not limit the Authority's rights with respect to latent defects, gross mistakes, or fraud.

VI. MATERIALS TO BE USED

All materials used must comply with relevant state & federal regulations

VII. CONTRACTOR BID

Each Bidder is to provide an itemized price list for all relevant equipment & software attached to the bid form as an Addendum and clearly marked as "Product List A" & "Product List B."

Option A:

	Equipment Cost	Mobilization fees
<i>Items 1-5</i>	<input type="text"/>	<input type="text"/>
<i>Option A Total</i>		<input type="text"/>
Expected Timeline to complete installation (hours)		<input type="text"/>

Option B:

	Equipment Cost	Mobilization fees
<i>Items 1-3</i>	<input type="text"/>	<input type="text"/>
<i>Option B Total</i>		<input type="text"/>
Expected Timeline to complete installation (hours)		<input type="text"/>
Total Project Cost		<input type="text"/>

Proposals are due by 5:00 p.m. on Tuesday, November 6th, 2018. Two (2) sealed hard copies and one electronic (email or PDF) copy must be delivered to the reception desk at the Airport Business Center, 60 Geurink Boulevard. The envelope should be addressed to:

**The West Michigan Airport Authority
60 Geurink Blvd.
Holland, MI 49423**

And conspicuously labeled as:

Vehicle Gate Card Reader Bid

And must include the name of the contractor and business address.

The emailed copy may be submitted to Airport Authority assistant manager, Aaron Thelenwood, at: a.thelenwood@wmairportauthority.com with the subject line "Vehicle Gate Card Reader Bid"

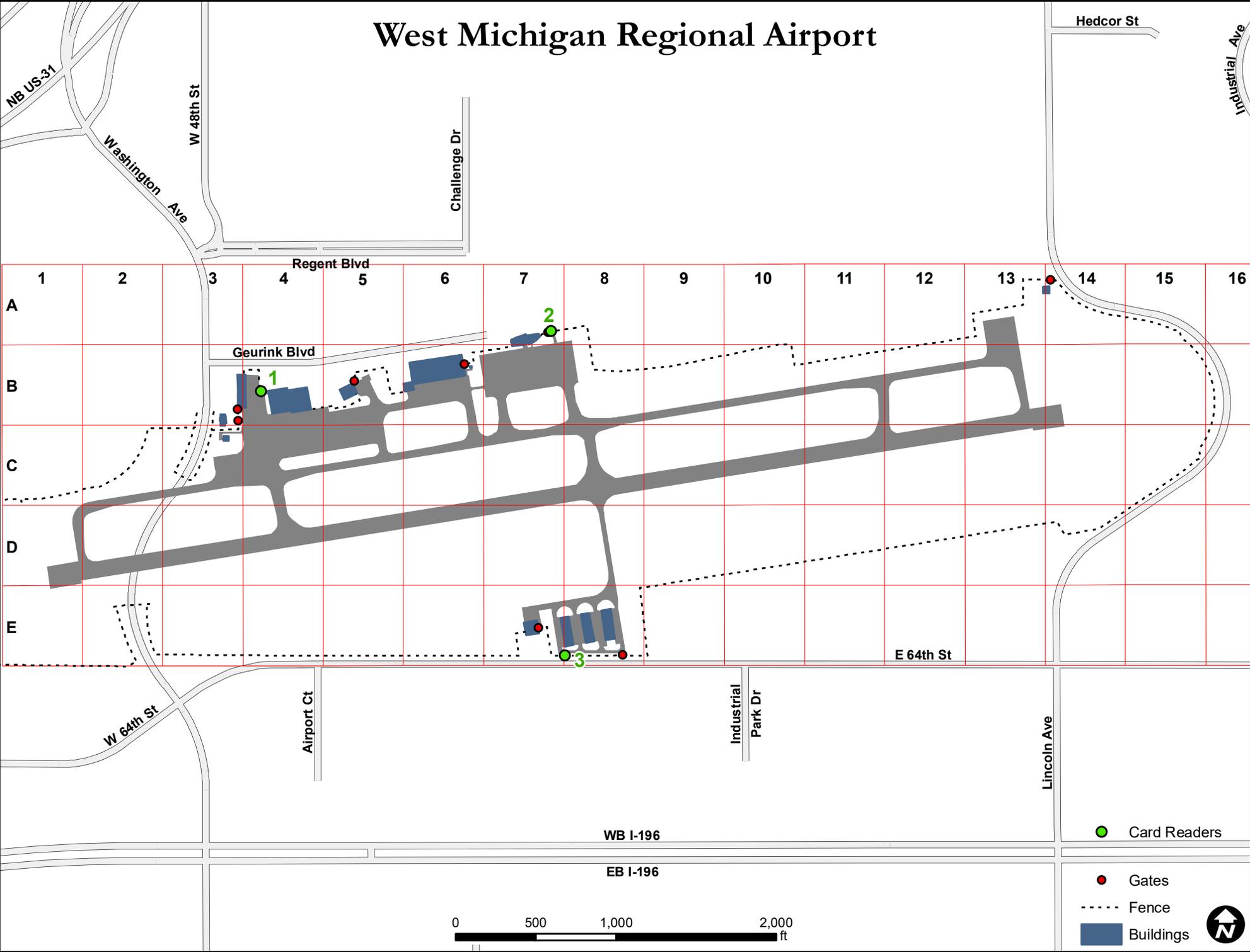
VIII. AWARD OF BID

The Airport Authority, at its sole discretion, will determine which equipment/system options will be approved. The contract will be awarded to the lowest, responsible, and qualified bidder.

The West Michigan Airport Authority reserves the right to accept or reject any or all bids, in whole or part, or rebid if it is in the best interest of the Authority. The Authority also retains the right to waive any informalities/irregularities in the bids, as well as the right to split the award or bid between two or more bidders.

Further information can be obtained from Authority Assistant Manager Aaron Thelenwood at a.thelenwood@wmairportauthority.com.

West Michigan Regional Airport



West Michigan Airport Authority

60 Geurink Boulevard, Holland, MI 49423

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Comprising City of Zeeland, Park Township and City of Holland



**WEST MICHIGAN REGIONAL AIRPORT
REQUEST FOR PROPOSALS – CARD READERS FOR SECURITY GATE
ADDENDUM I.**

This addendum serves as notice to all contractors initially contacted regarding the change of due date for bids related to the Request for Proposals to install/replace security card readers on the West Michigan Regional Airport Airfield.

Whereas, the Original Due Date was November 6th, 2018 by 5pm, that date has been extended to Friday, November 16th by 5:00pm.

Please note, there are no additional changes to the original RFP at this time. Any questions can be directed to Assistant Airport Authority Manager, Aaron Thelenwood at (616) 368-3021 or a.thelenwood@wmairportauthority.com.



The West Michigan Regional Airport Authority

60 Geurink Blvd.

Holland, Michigan 49423

Vehicle Gate Card Reader Bid

Submitted by:



Midstate Security Company, LLC

5975 Crossroads Commerce Parkway, SW

Wyoming, Michigan 49519

Account Executive, Jim Salzwedel

800-955-1317

jsalzwedel@midstatesecurity.com



Midstate Security Company, LLC

Overall Narrative and History

- Founded in 1980 – Over 35 years of experience with Security Systems Integration.
- Ranked in the top 50 largest security system integrators in the USA by SDM Magazine based on 2013 audited financials.
- Serves major vertical markets including Governmental, Correctional, Industrial, Commercial, Healthcare, Educational and Retail.
- Owns and Operates a UL Listed 24/7/365 Central Monitoring Station with round the clock monitoring, dispatch, and service capabilities.
- Installation and Service capabilities extend throughout the Central United States with clients from Key West, FL to the Canadian border.
- Court Services Division assists governmental clients with GPS tracking, alcohol use compliance and monitoring, and courtroom video arraignment.
- Average Technician, Installation and Project Management tenure is more than 10 years.
- Certified and Authorized with major security equipment manufacturers and distributors such as Paxton Access, Genetec, Avigilon, Honeywell, Exacqvision, Axis, Bosch and many others.
- Relocated to newer, larger and more modern offices in January 2013.
- 52 employees in 2007, 63 employees in 2010 and 90 employees currently.
- Awarded West Michigan's 101 Best and Brightest Companies to Work For in 2014, 2015 and 2016, 2017, 2018.
- Midstate Security is a regular participant in Community Outreach programs such as sponsoring and staffing Renuci House dinners for families of children with long-term health problems, Kids Food Basket collections, Habitat for Humanity construction volunteers for veterans housing needs and many other similar projects.



Midstate Security Company, LLC

Business Statement

From its founding in 1980, Midstate Security Company, LLC has grown into one of the largest providers of security automation, fire detection, and electronic monitoring services in the central United States. Privately owned and based in Michigan, Midstate Security Company, LLC has built a reputation for comprehensive and cost-effective security solutions using the latest in IP video technology, access control products, monitoring equipment, all supported by an industry leading Central Station monitoring facility.

Today, we employ more than 90 technicians, consultants, managers, and sub-contractors working throughout the central United States.

Educational, Government and Institutional Expertise

For over a quarter century, Midstate Security Company, LLC has established a track record of serving State of Michigan facilities, local municipal government facilities, and public and private educational and transportation institutions.

In the public sector, risk management must be balanced against accountability to taxpayers and elected officials. As a regional company whose employees live and work in these communities, Midstate Security Company, LLC aspires to provide our communities with the best value for taxpayer dollars.

To ensure our installations meet the highest possible standards for government contracting, we provide regular project management reporting, rigorous testing, 24/7 service and support from our highly trained technical staff, and unmatched training for users and staff.

Midstate Security Company, LLC

Executive Team

David Nemmers



Owner and President

In his role as President of Midstate Security Company, LLC David Nemmers sets Midstate's strategic priorities, oversees day-to-day operations, and identifies opportunities for growth.

Prior to this, Mr. Nemmers was chief financial officer for Great Lakes Computer, Inc. and Advance Packaging Corporation, and has held key positions in a variety of industries ranging from automotive supply to health care.

Education

Aquinas College, Bachelor of Science in Business Administration, 1984, *Magna Cum Laude*

Certification

Certified Public Accountant (1986)

Steve Premo



Chief Financial Officer and General Manager

Steve Premo has been Chief Financial Officer since 2008. In this role, he manages all financial activity and purchasing, oversees the company's financial reporting, maintains its banking relationships, and oversees budgeting and planning.

His responsibilities also include process improvements for project budgeting, quote reviews, manpower planning, and making financial projections and budgeting.

Education

Hope College, Bachelor of Arts, Business Administration, Accounting Emphasis, 1989

Stuart E. Longstreet



Chief Operating Officer

An employee since 1978, Stu Longstreet supervises the CAD department, project managers, and technicians; estimating and managing construction projects, including several valued in excess of \$4 million.

State of Michigan Licenses

- Master Electrical License
- Fire Alarm Specialist

Greg Gkekas



Vice President of Sales and Marketing

Greg Gkekas is responsible for the overall vision and strategy of Midstate's sales and marketing efforts. In his role, he provides leadership and direction in support of the company's growth initiatives, market positioning, and solution strategies.

A primary focus is on building teams that provide consultative relationships, and value-add solutions to Midstate's prospects, customers, and partners.

Education

Eastern Michigan University, Bachelor of Business Administration, 1987



Midstate Outline for this Project

Existing Security Infrastructure and Systems

Midstate Security Company, LLC was the installer and provider for security, access and video systems installed at the new Terminal Building, erected in 2016. The current systems on site are fully capable of handling the addition of Card Readers, Video Intercoms and Video Surveillance Cameras to the gates as a part of this project. Therefore, Midstate proposes to incorporate the gates into the existing systems to provide a unified system without the need to replace or add any head-end components or software.

Access Control Installation Concept and Theory of Operation for Section I, Scope of Work, Paragraph A

- The existing card readers on the gates are compatible with the Paxton controllers that will be added and so these readers will be re-utilized.
- Pricing for replacement readers of the same type, should they be necessary, can be found in the Contractor Bid Section of this bid proposal under the heading: Additional Optional Costs, page 10.
- We are offering an upgrade to long range card readers (18"-24" read range as opposed to the 4"-6" read range now). Costs can be found in the Contractor Bid Section of this bid proposal under the heading: Additional Optional Costs, page 10.
- Since the gate directly north of the new Terminal Building is already on the Paxton access control system, no new infrastructure will be necessary for access control at this gate.
- The Paxton Access software will be upgraded to the latest revision as a matter of course.
- Communications between each gate and the Terminal Building will be accomplished with encrypted wireless ethernet links.
- The transceivers necessary for these links will be mounted in such a manner as to provide line-of-site connectivity with each gate and the antenna structure on the north end of the Terminal Building or the Terminal Building itself.
- UPS's will be provided at each new switch location at the remote sites to provide clean power and power for short-term power outages.
- Training will be provided on gate operations as well as a general refresher course on the Paxton Access software.
- All other aspects of Section I, Scope of Work Paragraph A, 1-5, Required Equipment and Software, will be met as a part of this contract.

Video Intercom Installation Concept and Theory of Operation for Section I, Scope of Work, Paragraph B

- Paxton Access Net2 Entry video intercoms will be mounted at each gate to provide non-credential holders the ability to contact the Airport Terminal Building.
- Persons using the gate intercoms will be able to communicate with a single video intercom monitor station at the Terminal Building where identification can be confirmed prior to allowing remote access to the gate.
- Via an application provided, mobile device users will also be able to answer incoming calls from the gate video intercom users and confirm identification prior to allowing remote access to the gate.
- Custom modifications to the existing gooseneck stands will be made to accommodate the video intercoms to be mounted immediately adjacent to the card readers.
- The vandal resistant, weatherproof video intercoms will also be provided with rain hoods for further protection.
- Video intercoms will utilize the encrypted, wireless ethernet link provided in the Option A pricing for communications between each gate and the Terminal Building.
- All other aspects of Section I, Scope of Work Paragraph B, 1-3, Optional Equipment & Software, will be met as a part of this contract.

Video Surveillance Installation Concept and Theory of Operation for Section I, Scope of Work, Paragraph B

- Avigilon 3MP outdoor dome cameras with IR illuminators will be installed at a position to best view the area immediately in front of the gate for a view of the vehicle or other gate traffic. These cameras will be added to and recorded on the existing NVR at the Terminal Building.
- The proposed cameras will provide an approximate 90-degree angle of view.
- We are offering an upgrade to 12MP cameras with a 360-degree field of view. Costs can be found in the Contractor Bid Section of this bid proposal under the heading: Additional Optional Costs, page 10. The cameras will be added to and recorded on the existing NVR at the Terminal Building.
- Avigilon Video Surveillance software and licensing will be upgraded to the latest revision as a matter of course.
- The existing 1TB video storage hard drive in the server will be replaced with a 4TB hard drive for additional recording capacity.
- The new cameras will utilize the encrypted, wireless ethernet link provided in the Option A pricing for communications between each gate and the Terminal Building.
- All other aspects of Section I, Scope of Work Paragraph B, 1-3, Optional Equipment & Software, will be met as a part of this contract.



Summary of Service Options

Time and Material Service

For currently installed equipment and equipment out-of-warranty from this project Midstate Security Company, LLC will provide service and repairs on a case-by-case basis and bill for materials, repairs and labor on an itemized invoice for each occurrence.

Maintenance Contract

For currently installed equipment and equipment out-of-warranty from this project Midstate Security Company, LLC will provide labor only, for a predetermined price, invoiced annually, which will include quarterly maintenance, cleaning and inspection of all devices in the system and any needed repair labor. Materials and equipment repairs will be billed on a separate, itemized invoice, for each occurrence.

Service and Maintenance Contract

For currently installed equipment and equipment out-of-warranty from this project Midstate Security Company, LLC will provide labor and material, for a predetermined price, invoiced annually, for all labor and material for any needed repairs and will also provide the quarterly maintenance inspections as described in the Maintenance Contract Section, above.

Quotes for these Service Options can be developed after the review of all systems in their eventual configurations.

A Midstate designated point of contact from our Service Department will be assigned to any of the selected service or maintenance options. Account Executive, Jim Salzwedel, will monitor all contracts and their activities developed in this process.



Indemnification, Section II

Midstate Security Company, LLC agrees to defend, indemnify, and save harmless the West Michigan Airport Authority, its officers, agents, and employees, from any and all claims and liabilities that may result from the Contractors work.

Insurance, Section III

Midstate Security Company, LLC agrees to the Insurance requirements as evidenced by the attached insurance certificate.

Qualifications, Section IV

Midstate Security Company, LLC assures the Airport Authority that we are duly qualified to perform the work described with products that meet or exceed the requirements as evidenced by the successful completion of security systems for the new Terminal Building in 2016. Midstate Security Company, LLC has exclusive dealership agreements and is factory trained by all the major vendors who will supply materials for this project. Project references and dealership agreements are available upon request.

Warranty, Section V

Midstate Security Company, LLC will provide the warranty required in this Section with no exceptions. Midstate Security Company, LLC will also honor any manufacturer's warranty if it exceeds the warranty required by this contract.

Materials to be Used, Section VI

Midstate Security Company, LLC will provide materials that comply with relevant state & federal regulations.



Contractor Bid, Section VII

	<u>Equipment Costs</u>	<u>Mobilization Fees</u>
Option A, Items 1-5:	\$17,167.86	None (\$0.00)
Option A, Total:	\$17,167.86	
Expected Timeline to complete installation (hours): 80 Labor Hours		
Option B, Items 1-3:	\$19,227.55	None (\$0.00)
Option B, Total:	\$19,227.55	
Expected Timeline to complete installation (hours): 72 Labor Hours		
Total Project Cost	\$36,395.41	

Additional Optional Costs

Replacement cost for existing reader(same style):	\$ 440.00	each gate, installed
Upgrade card reader to long-range model:	\$1,555.00	each gate, installed
Upgrade camera to 360-degree view:	\$1,292.00	each gate, installed

Award of Bid, Section VIII

Midstate Security Company, LLC agrees to the Award of Bid statements in this Section.

Michigan Sales Tax is not included in any Project Costs. Owner to provide Tax Exempt Certificate upon contract award.

Midstate is in receipt of and acknowledges Addendum 1 which describes the new bid due date of Friday, November 16, 2018 at 5pm and the statement that no further changes to the project scope will be added.

Product List A

Quantity	Item Number	Description	U of M	Unit Price	Ext. Price
1	930-010-US	Paxton Software Upgrade (latest revision)	Each	\$588.01	\$588.01
2	682-528-US	Paxton Access Control, Single Door Controller, PoE+	Each	\$488.50	\$977.00
1	NB201611-100	L-COM Enclosure, Indoor (old hangar)	Each	\$904.46	\$904.46
1	NB201611-1HFS	L-COM Enclosure, Outdoor (t-hangar)	Each	\$1,122.49	\$1,122.49
3	ES-8XP	Ubiquiti EdgeSwitch, PoE+ Switch, 8 Port, Hardened, Managed	Each	\$253.02	\$759.06
2	0E-350V6	W Box UPS, 350VA, 255W, 120VAC	Each	\$68.18	\$136.36
2	DTK-ESS	Ditek Output Surge Protector	Each	\$30.98	\$61.96
4	NBE-5AC-GEN2	Ubiquiti Nano Beam Wireless Ethernet Transceivers	Each	\$132.88	\$531.52
750	4246IOBK1000	West Penn Cat 6 Network Cable, Outdoor, PVC	Each	\$0.36	\$270.00
2	ANTENNA MOUNTS	Custom Antenna Masts	Each	\$131.75	\$263.50
1	WIRE RACEWAY	3/4" EMT Conduit w/Raintite Fittings and Boxes	Each	\$232.50	\$232.50
1	SYSTEM COMMISSIONING	Misc Hardware, Shop Supplies, Programming, Test & Tune, Training	Each	\$310.00	\$310.00

Material Subtotal	\$6,156.86
Installation	\$11,011.00
Tax	\$0.00
Total	\$17,167.86

Product List B

Quantity	Item Number	Description	U of M	Unit Price	Ext. Price
1	337-515-US	Paxton Net2 Entry Single Door Kit w/Door Station & Monitor	Each	\$2,261.59	\$2,261.59
2	337-727-US	Paxton Net2 Entry Door Station	Each	\$673.96	\$1,347.92
1	SIP NETWORK	SIP Server, Software, Associated Hardware & Applications	Each	\$1,162.50	\$1,162.50
3	INTERCOM MOUNT	Custom Intercom Mount (attached to existing goosneck stands)	Each	\$193.75	\$581.25
3	3.0C-H4SL-DO1-IR	Avigilon 3MP Outdoor Dome Camera, IR	Each	\$530.10	\$1,590.30
2	CM-MT-WALL1	Avigilon Wall Mount (t-hangar & old hangar)	Each	\$65.10	\$130.20
1	H4-MT-POLE1	Avigilon Pole Mount Adapter (terminal bldg)	Each	\$83.70	\$83.70
1	HARD DRIVE EXPANSION	Replace Existing 1TB Hard Drive with 4TB Hard Drive	Each	\$387.50	\$387.50
1	8C-ACC5-ACC6-ENT-UPG	ACC 5 to ACC 6 Enterprise version upgrade for up to 8 camera channels	Each	\$190.65	\$190.65
2	1C-ACC5-ACC6-ENT-UPG	ACC 5 to ACC 6 Enterprise version upgrade for up to 1 camera channels	Each	\$27.90	\$55.80
3	1C-ACC6-ENT	ACC 6 Enterprise license for up to 1 camera channels	Each	\$311.55	\$934.65
500	4246IOBK1000	West Penn Cat 6 Network Cable, Outdoor, PVC	Each	\$0.36	\$180.00
1	WIRE RACEWAY	3/4" EMT Conduit w/Raintite Fittings and Boxes	Each	\$155.00	\$155.00
1	SYSTEM COMMISSIONING	Misc Hardware, Shop Supplies, Programming, Test & Tune, Training	Each	\$232.50	\$232.50

Material Subtotal	\$9,293.56
Installation	\$9,933.99
Tax	\$0.00
Total	\$19,227.55

Owner Considerations

- The assumption is made that the devices, cable plants and underground conduits to be re-utilized or connected to as part of this project are intact, compatible and in good working order, otherwise additional fees may apply.
- Customer is responsible to furnish, where required, unswitched 110-Volt AC power for direct connection to equipment or provide duplex power receptacles as may be required for equipment plug-in transformer connection.
- All portions of Option A must be completed before Option B can be installed and made operational due to the dependence upon the wireless network included in Option A.
- Absent a full FCC Frequency Search (which is not required) Midstate will do a frequency survey prior to selecting frequencies and channels for the proposed wireless ethernet links to avoid any conflict with Airport radio operations.
- All work is to be performed Monday through Friday, 8:00 a.m. to 5:00 p.m., excluding holidays. Work to be completed outside of these stated hours may involve additional costs.
- Special permits, licenses and inspections are not included and, if required, will be the responsibility of the Owner.
- Fences, gates, gate motor, controls, detection loops, primary power, underground and concrete/asphalt work (including cut & patch) are not included in this quotation.
- The customer is responsible to provide all required computer workstations, related hardware, IP addressing, network drops, and software operating systems as specified in the system equipment manufacturer's documentation.
- Owner is to designate one individual to be the systems administrator and project coordinator.
- Owner must have a mobile device on hand during Midstate programming for Application load and tutorial.
- Additional, ongoing fees may apply for third-party Applications used for remote operations.
- Midstate to provide basic parameter programming, Owner to provide card holder programming.
- Patch, paint or other repairs that are necessary after any equipment is removed is not included in this quotation.
- Labor time needed for any required safety/work reviews or classroom instruction is not included in this quotation.
- Labor expended on this project between November 15, 2018 and April 15, 2019 may be subject to a 25% premium due to winter weather conditions.

The following pages contain our Certificate of Insurance for this project plus Data Sheets for the major components of this project.



Paxton Access

Net2|Access Control

A Smart Security Solution for Your Building



Net2|Access Control

Net2 is a user-friendly and flexible networked access control system, designed to make the management of any building incredibly simple.

Easy to use and with excellent features, Net2 access control moves beyond the basics of managing the flow of people around a building, offering benefits like building control and system integration.

Net2 is an efficient solution for businesses looking for complete security. It's ideal for smaller sites, with moderate access requirements, as well as larger companies looking to expand in the future.

Simple System Management

- **Straightforward and easy to use** - Net2 is so intuitive, adding users and managing reports can be done with no need for specialist technical knowledge. A Net2 access control system can be used by anyone
- **Welcome screen** - this homepage can be customized with your installer's details, to make contacting them for help and advice really simple
- **Multiple workstations** - Net2 is so cost effective, you can install it free of charge to multiple PCs
- **Free software upgrades** - install the software once and enjoy free upgrades for life



High Security Systems

- **Emergency lockdown** - secure your building at the touch of a button. Security lockdown is ideal for buildings or sensitive sites that need to secure the premises in the event of an emergency
- **Intruder alarm zoning** - Net2 allows you to selectively secure zones in your building by securing doors and setting the alarm across specific areas of your building, at the click of a button. Partitioning your site in this way allows you to add varying layers of control, for complete flexibility
- **Anti-passback** - prevent unauthorized access from users sharing tokens by setting time delays in the Net2 software. This prevents the same token being used more than once within a certain timeframe



Give HR Processes a Helping Hand

- **Timesheet** - a valuable tool to help you keep track of staff hours and keep HR processes smooth and simple
- **Timeline** - a quick and easy way to monitor staff time and attendance, as well as sick days and holidays throughout the year, in one convenient package
- **Card designer** - use the card designer application in the Net2 software to create professional looking ID cards that can double up as access cards, for a really smart addition to your system



Building Control at the Touch of a Button

- **Areas** - a really simple way to control groups of doors within your building. Splitting your site into specific areas makes adding users with access permissions easier than programming each door individually
- **Energy saving triggers and actions** - set the system to switch off utilities automatically when the building is empty and save money on energy bills
- **Site graphics** - upload a graphic of your building to Net2 for an aerial view of access events happening in real time. It's a great way to monitor the doors on your site from one place and especially useful for security personnel



Sophisticated System Integration

- **Intruder alarm** - save time by integrating Net2 with your intruder alarm and reduce false alarms. Control your intruder and access systems as one, across different areas of the building
- **Fire alarm** - integrate Net2 with your fire alarm and program your system to automatically open secondary doors or as a backup to fire exit doors in the event of an emergency and improve safety
- **Roll call and muster** - set your system to generate an automatic roll call report when an emergency situation occurs. This helps to identify exactly who is missing during an evacuation
- **CCTV** - streamline your Net2 system with CCTV for a quick, efficient way to view footage related to what's going on at each door. Save time on logging video footage and save money on security guards



Net2 Access Control Software

Paxton offers two great versions of Net2 software for use with the Net2 access control system. With innovative functions, smart designs and effective programming; Net2 has been specifically developed to enhance your experience of using access control and make your life easier.

Net2|Lite

Simple and reliable access control software for Net2, ideal for getting your system up and running.

Net2|Pro

The intelligent new Net2 software from Paxton. Net2 Pro offers great features that move beyond simple access control.

Feature	Lite	Pro
Multiple clients	•	•
Free upgrades	•	•
CCTV integration	•	•
Site graphics	•	•
Triggers and actions	•	•
Intruder alarm integration*	•	•
Net2 Entry compatible	•	•
Biometric integration	•	•
Timesheet & Timeline*	•	•
Card designer	•	•
Landlord Tenant		•
Roll call and muster reporting*		•
Fire alarm integration*		•
Anti-passback*		•
Security lockdown*		•
Multi-zone intruder alarm integration*		•
Areas		•
Customizable welcome page		•

* Not available with wireless nano products

Paxton

Net2 Plus

DS1038-US

System specifications

Maximum total users/tokens	50,000
PIN Length	4 - 8
Number of codes	50
Code length	4 - 8
Number of time zones	64
Number of access levels	250
Stored events	2500+
Data retention during a total power loss	30 days
Handsfree compatible	Yes - requires interface
Clock and data	Yes
26 bit Wiegand	Yes (Max 50 bits)
Custom Wiegand	Yes (Max 50 bits)
Silent operation	Yes
Door open time	1 sec - 999,999 secs

Electrical

Operating Voltage	12V - 24V DC +/- 20%
Current consumption	200mA
Relay switchable voltage	24V DC
Relay switchable current	4A
Alarm output current	1A

Communication

TCP/IP	Yes
Wireless	No
RS485	Yes
Ethernet network speed	100Mbit/s auto MDIX
Ethernet bandwidth requirement	200 kbits/sec
DHCP support (fixed IP recommended)	Yes

Hardware

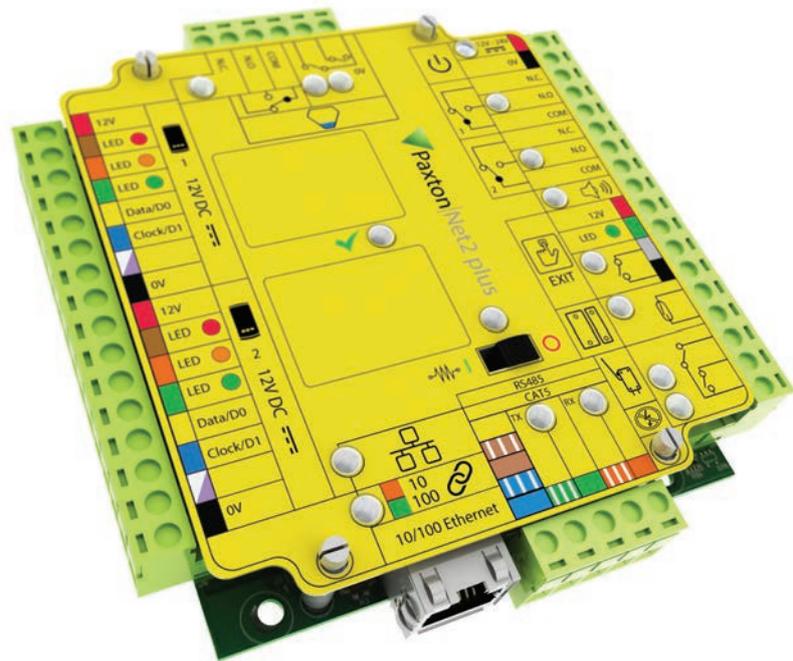
Reader ports per ACU	2
Readers/Keypads per ACU	4 - check current draw on individual readers
Total ACU reader port output current	500mA
3rd party reader support	Yes - if compatible
Reader cable type	Belden 9540 or General Cable equivalent C0745A
Network cable type	CAT5, Belden 8723 or General Cable equivalent C1352A

Features

Input for exit button	Yes
Input for door contact	Yes
Alarm/bell output	Yes

Environment

Operating temperature	0°C - +55°C +32°F - +131°F
Moisture resistance	No - if used externally, it must be protected in a weatherproof housing
Vandal Resistance	Low



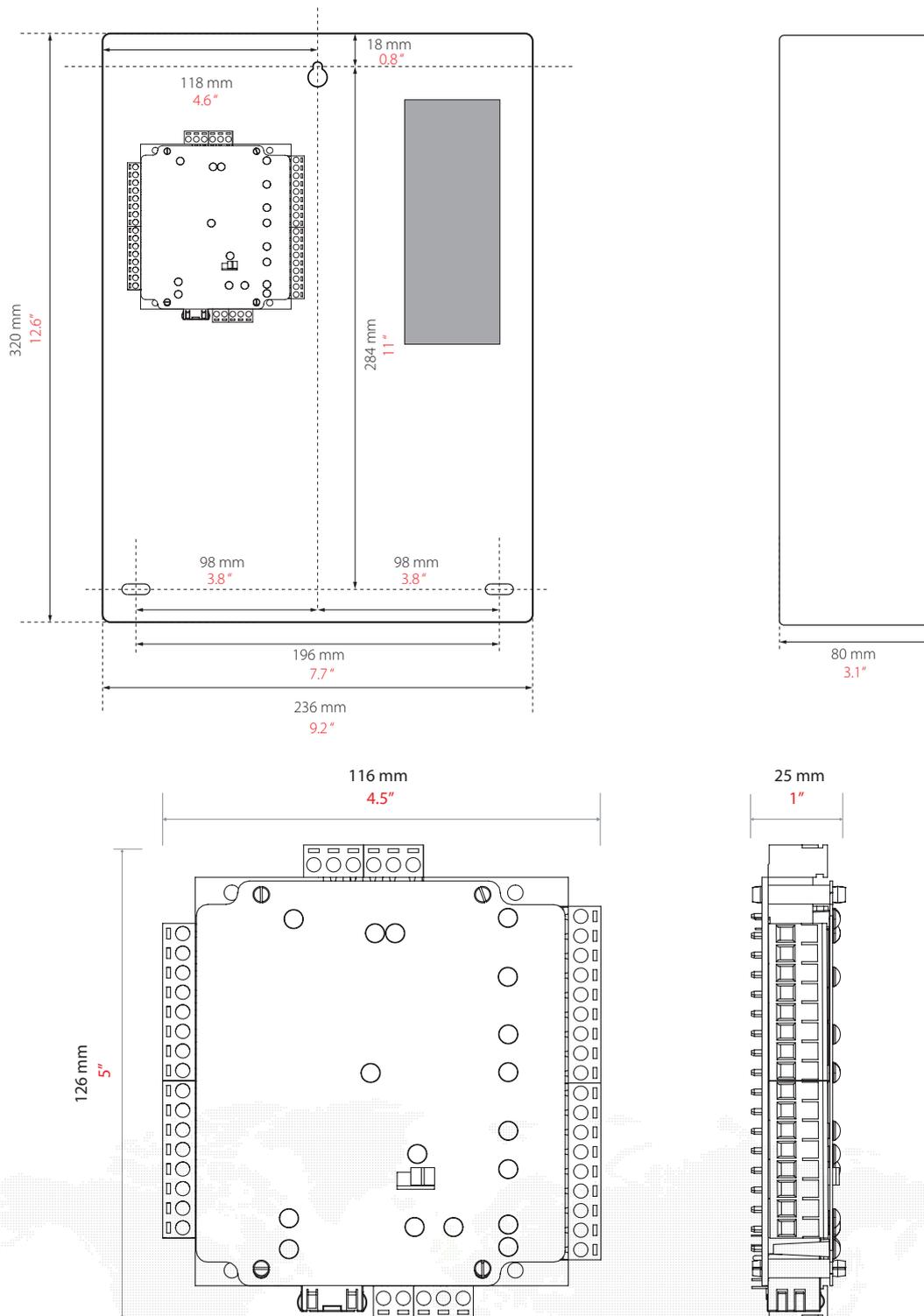
Net2 plus is a single door access control unit and is the most advanced control unit in the Paxton range. Employing the latest technology, it offers huge potential for future expansion and as security technology develops, Net2 plus can take full advantage. Unlike many systems of its type, Net2 plus is truly future-proof. Using Net2 plus ensures that the investment in access control is safe no matter how the system requirements change.

Net2 plus has on-board TCP/IP to allow direct connection to a computer network. This can save time, money and result in a better, more resilient system. Net2 plus control units can also be connected together using a dedicated RS485 network. This reduces the number of TCP/IP network points required for larger systems.

As with all Net2 control units, Net2 plus is designed to work seamlessly in the event of communications failure. It will continue to permit or deny access to users as appropriate. Once communications are re-established the activity is reported back to the PC.

Other hardware features:

- Volt free control relay
- Input for PSU fail
- Input for tamper
- Integrated termination resistors
- Dedicated intruder alarm



Accessories and sales codes

Net2 Plus 1 door controller	682-493-US	Net2 Plus 1 door controller - Plastic housing	682-528-US
Net2 Plus 1 door controller - 12V 2A PSU, Plastic cabinet	682-531-US	Net2 Plus 1 door controller - 12V 2A PSU, Metal cabinet	682-813-US
Net2 Plus 1 door controller - PoE+, Plastic cabinet	682-284-US	Net2 Plus 1 door controller - PoE+, Metal cabinet	682-721-US

Net2 Entry Panel

System specifications

Power over Ethernet (PoE)	Yes - IEEE 802.3af class 0
Ethernet bandwidth requirement	1Mb/s multicast per panel during call
Panels per system	100
TCP/IP ethernet extension limit	100m/328ft
Cable type	CAT5
Token compatibility	Paxton, EM4100/02, MIFARE®, MIFARE® Classic, MIFARE® DESFire® EV1, MIFARE Plus®, MIFARE Ultralight®, MIFARE Ultralight C®, MIFARE Mini®, HID® Prox (activation required)

Other hardware features

Audio system	Two way
Camera system	Full color
Back-lit keypad/LCD	Yes
PIN/Code entry	Yes
Proximity and PIN/Code entry	Yes - only in conjunction with Net2 software
IDC connector	Optional
Color	RAL 7021

Environment

Operating Temperature	-20°C - +50°C -4°F - +122°F
Moisture resistance	IP55
Vandal Resistance	IK08

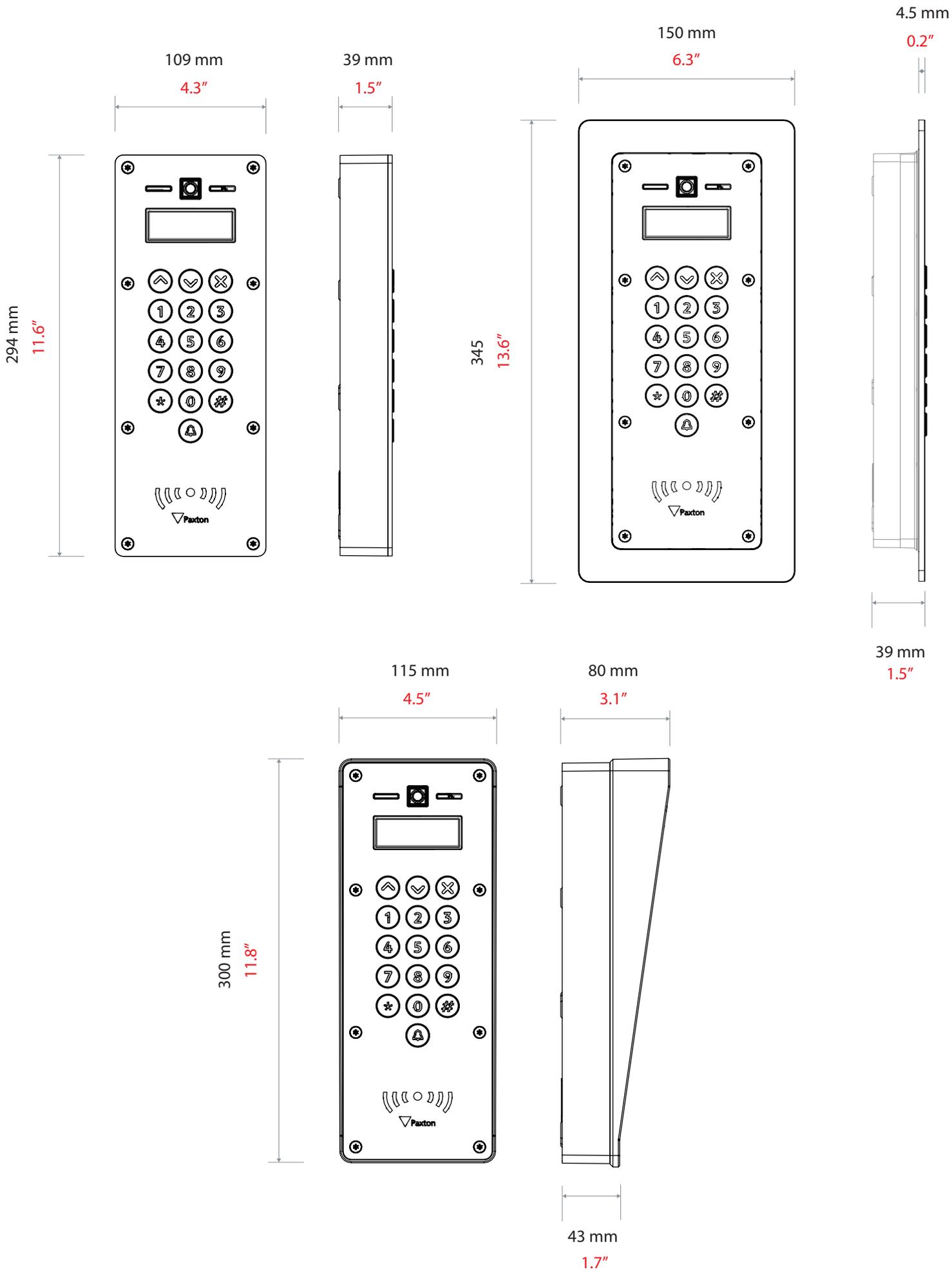


The Net2 Entry panel is a robust door entry panel incorporating both door entry and access control functions. It is powered using power over Ethernet (PoE) and communicates with the other elements of the system using IPv6, providing 'plug and play' installation. Each panel is associated with a Net2 Entry control unit which is the interface to the door hardware.

The panel is equipped with a keypad and a proximity token reader. A resident can use either the keypad or a token to gain entry. Installers gain access to the menu options using an engineer code or an engineer token.

Net2 software is used to administer the access control functions.

When deciding how the units are to be connected, you can either run your own wired network or (with the owner's permission) share the buildings existing data network. If using the owners network, the system uses IPv6 protocol and PoE (Power over Ethernet) so the network must support this switch type.



Net2 Entry Panel 337-420-US

Net2 Entry panel - Flush mount 337-400-US

Net2 Entry panel - rain hood 337-410-US



Net2 Entry - Monitor

System specifications

Power over Ethernet (PoE)	Yes - IEEE 802.3af class 0
Ethernet bandwidth requirement	1Mb/s multicast per panel during call
Monitors per system	1000
TCP/IP ethernet extension limit	100m/328ft
Cable type	CAT5

Features

Audio system	Two way
LED touch screen	Full colour
Selectable ringtones	Yes
Do Not Disturb function	Yes
Built in help menu	Yes
'View video' mode	Yes
IDC connector	Optional

Environment

Operating temperature	-0°C - +45°C +32°F - +113°F
Moisture resistance	No
Vandal Resistance	Medium

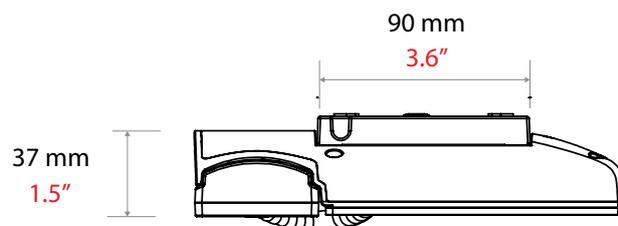
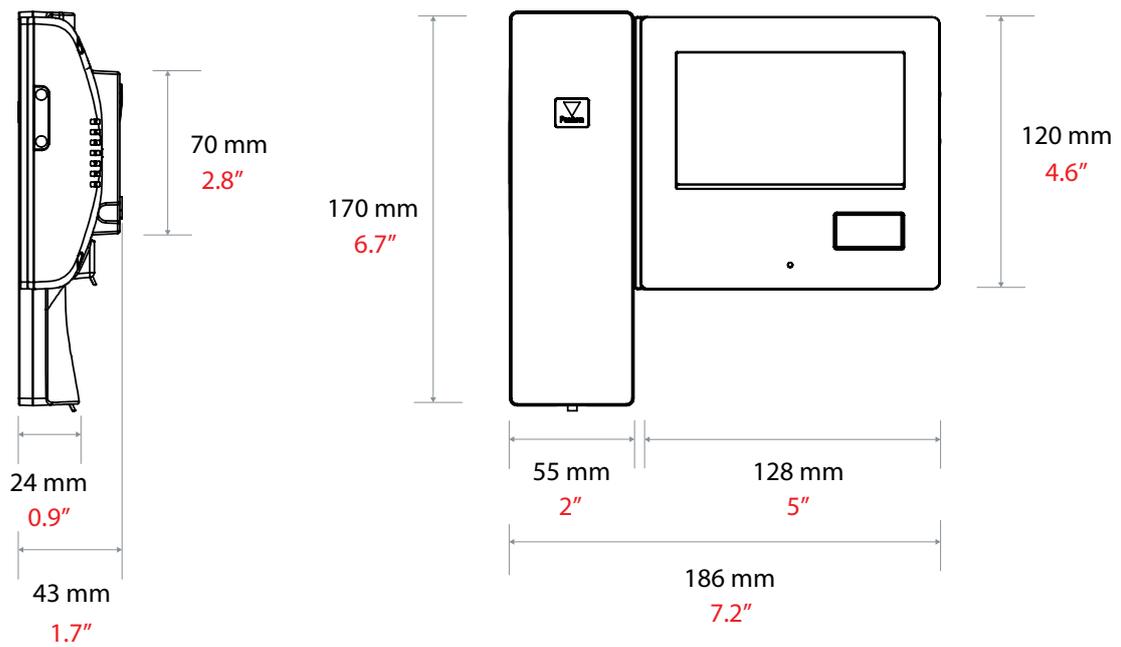
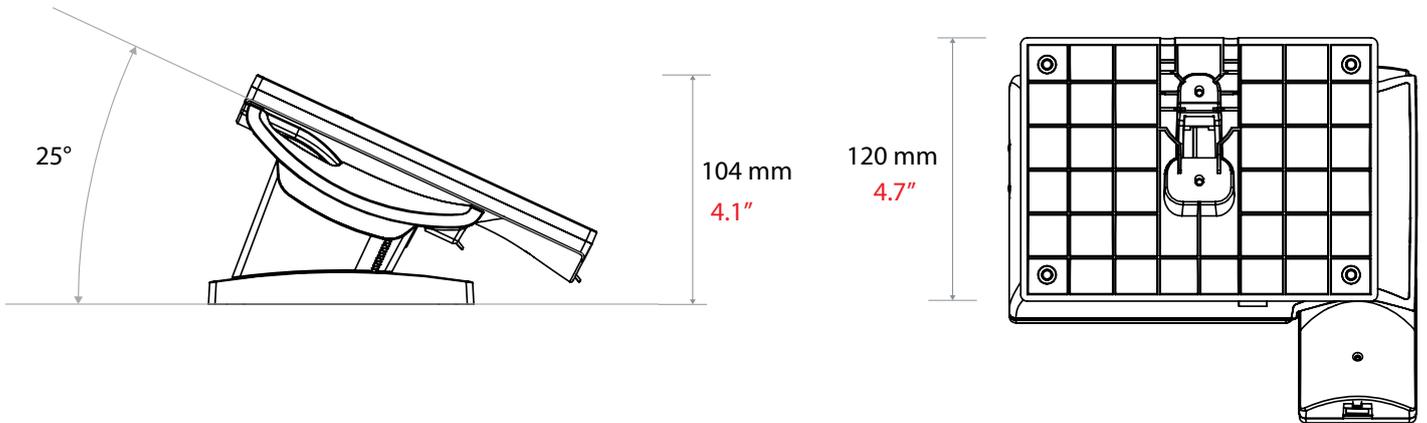


Net2 Entry is a door entry system that works standalone or alongside Paxton's Net2 access control, combining door entry with key features of Net2. Net2 Entry consists of 3 components that auto-detect on set up; external panel, interior monitor and door control unit. Net2 Entry is a plug and play solution that comes with a range of panel options and is suitable for a wide variety of sites.

The Net2 Entry monitor comes in a smart and simple design to suit a range of interiors, and can be wall or desk mounted.

Net2 Entry components simply interconnect using Cat5 or standard RJ45 terminated patch cables. Net2 Entry can also utilise existing network infrastructure for simple installation. PoE technology runs power and data along the same cable to avoid the need for separate power supplies.

A visitor initiates a video call via the bell button on the external panel. Visitor access can be granted via the Net2 Entry monitor, which features an intuitive touchscreen user interface. The internal monitor can be used via either the handset for private calls or in hands free mode.



Net2 Entry - Monitor 337-286

Net2 Entry - Monitor desk mount stand 337-847



H4 SL Dome Camera with LightCatcherTM Technology

The H4 SL camera line has an innovative and modular design that is easy to install. Built on the H4 platform, it combines our patented LightCatcher and Wide Dynamic Range (WDR) technologies to provide exceptional image quality in complex lighting.

Using HDSM SmartCodecTM and idle scene mode technologies, the H4 SL camera optimizes video streams in real time, minimizing bandwidth and storage requirements while maintaining clear, detailed images. It integrates with Avigilon Control CenterTM video management software (VMS), and is ONVIF-compliant for integration with a third-party VMS. With significant improvements to bandwidth savings and lower storage retention, as well as its easy-to-install, modular design, the H4 SL camera line adds even more value than before, lowering your total cost of ownership.



Straight out of the box, the H4 SL camera is designed and packaged for simple ordering and quick and flexible installation. This camera line's discreet and modular design allows it to seamlessly fit in to its surroundings.

The H4 SL camera's IK10-rated, vandal-resistant and IP66 dust and water-resistant housing (outdoor model only) make it ideal for monitoring a variety of indoor and outdoor environments, such as hallways, public entrances and lobbies of banks, schools, retail outlets and hotels.

Avigilon HDSM SmartCodec technology H4 SL optimizes the video stream in real time using automatic ROI encoding to save bandwidth and storage requirements while maintaining image quality.

KEY FEATURES

1.3, 2.0 and 3.0 megapixel resolution models
Innovative modular design for quick and easy installs
3-9 mm F/1.4 lens with remote zoom and focus
Content adaptive IR technology provides effective illumination through the field of view, while maintaining exceptional scene illumination
Wi-Fi camera configuration support
Avigilon LightCatcher technology provides exceptional image quality in low light environments
Dual exposure Wide Dynamic Range for complex lighting environments
Integrated IR (Infrared) LEDs provide uniform illumination in the dark, even at 0 lux, up to maximum of 15 m (~50 ft) away (outdoor model only)
Avigilon HDSM SmartCodec technology for reduce bandwidth and storage requirements
Idle scene mode lowers bandwidth and storage usage if there are no motion events detected in the scene
(Outdoor model only) IK10 vandal resistant construction and IP66 compliant

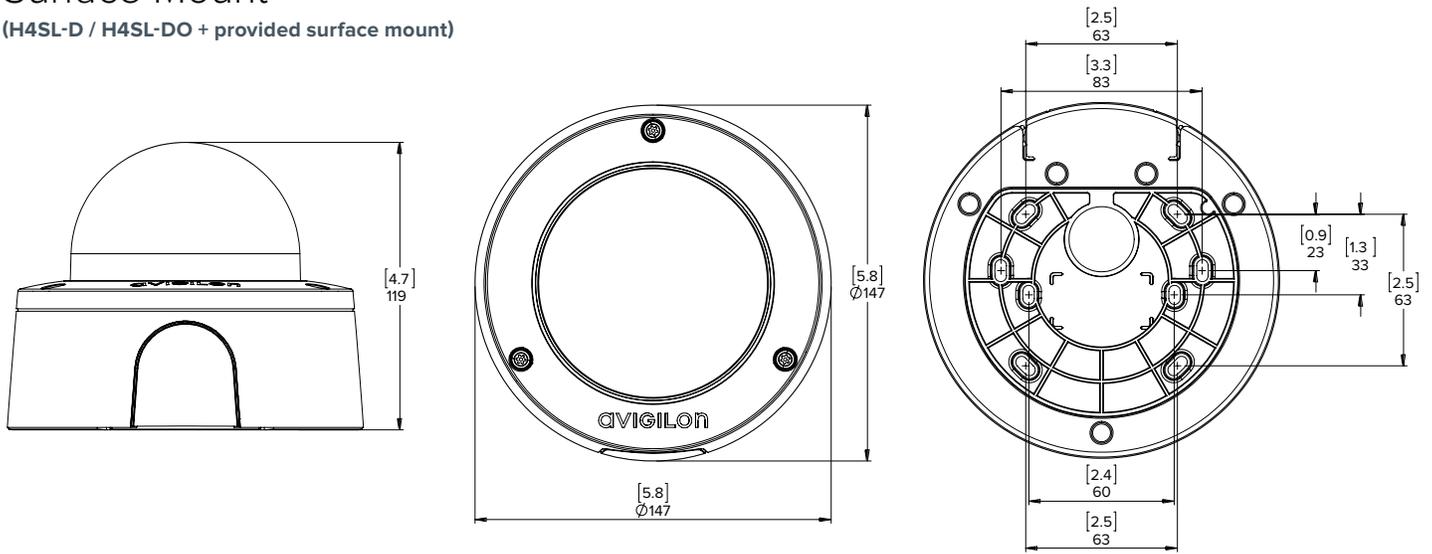
Specifications

		1.3 MP	2.0 MP	3.0 MP	
IMAGE PERFORMANCE	Image Sensor	1/2.8" progressive scan CMOS			
	Aspect Ratio	5:4	16:9	4:3	
	Active Pixels (H x V)	1280 x 1024	1920 x 1080	2048 x 1536	
	Imaging Area (H x V)	3.7 mm x 3.0mm; 0.145" x 0.118"	5.6 mm x 3.1 mm; 0.22" x 0.122"	5.12 mm x 3.84 mm; 0.202" x 0.157"	
	Image Rate	30 fps	30 fps	20 fps	
	Minimum Illumination	with IR	0.01 lux in color mode; 0 lux (F/1.4) in monochrome mode		0.02 lux in color mode; 0 lux (F/1.4) in monochrome mode
		without IR	0.01 lux in color mode; 0.002 lux (F/1.4) in monochrome mode		0.02 lux in color mode; 0.004 lux (F/1.4) in monochrome mode
	IR Illumination (high power 850 nm LEDs)	(H4SL-D) Indoor model — 10 m (33 ft) max. distance at 0 lux (H4SL-DO) Outdoor model — 15 m (50 ft) max. distance at 0 lux			
	Dynamic Range	100 dB			
	Resolution Scaling	Down to 384 x 216			
	Bandwidth Management	HDSM SmartCodec technology; Idle scene mode			
	3D Noise Reduction Filter	Yes			
	LENS	Lens	F/1.4, 3-9 mm, motorized, varifocal		
		(Aspect ratio) HFoV	(5:4) 26° – 60°; (16:9) 39° – 90°		(5:4) 36° – 84°; (16:9) 39° – 90°; (4:3) 39° – 90°
IMAGE CONTROL	Image Compression Method	H.264 (MPEG-4 Part 10/AVC), Motion JPEG			
	Streaming	Multi-stream H.264 and Motion JPEG			
	Video Compression	H.264/MJPEG/HDSM SmartCodec technology			
	Motion Detection	Pixel			
	Tamper Detection	Yes			
	Electronic Shutter Control	Automatic, Manual (1/6 to 1/8000 sec)			
	Iris Control	Automatic, Manual			
	Day/Night Control	Automatic, Manual			
	Flicker Control	50 Hz, 60 Hz			
	White Balance	Automatic, Manual			
	Backlight Compensation	Adjustable			
	Privacy Zones	Up to 64 zones			
	NETWORK	Network	100BASE-TX		
		Cabling Type	CAT5		
Connector		RJ-45			
ONVIF		ONVIF compliant with version 1.02, 2.00, Profile S			
Security		Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication			
Protocols		IPv6, IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, ARP			
Streaming Protocols		RTP/UDP, RTP/UDP multicast, RTP/RTSP/TCP, RTP/RTSP/HTTP/TCP, RTP/RTSP/HTTPS/TCP, HTTP			
Device Management Protocols		SNMP v2c, SNMP v3			
PERIPHERALS		USB Port	USB 2.0		
		Onboard Storage	microSD/microSDHC/microSDXC slot – minimum class 6; class 10/UHS-1 or better recommended		
MECHANICAL		SURFACE MOUNT	IN-CEILING MOUNT	PENDANT MOUNT	
				NPT ADAPTER	NPT + WALL MOUNT
	Dimensions (LxWxH)	147 mm x 147 mm x 119 mm; 5.8" x 5.8" x 4.7"	174 mm x 174 mm x 162 mm; 6.9" x 6.9" x 6.4"	153 mm x 153 mm x 166 mm; 6.0" x 6.0" x 6.5"	269 mm x 153 mm x 214 mm; 10.6" x 6.0" x 8.4"
	Max. Ceiling Thickness	n/a	32 mm (1.25")	n/a	n/a
	Weight	H4SL-D — 0.76 kg; 1.68 lbs	H4SL-D — 0.75 kg; 1.65 lbs	H4SL-D — 0.75 kg; 1.65 lbs	H4SL-D — 2.02 kg; 4.45 lbs
		H4SL-DO — 0.78 kg; 1.72 lbs	H4SL-DO — 0.77 kg; 1.69 lbs	H4SL-DO — 0.77 kg; 1.69 lbs	H4SL-DO — 2.04 kg; 4.49 lbs
	Dome Bubble	Polycarbonate, clear			
	Body	Polycarbonate			Polycarbonate/aluminum
	Housing	Vandal resistant			
	Finish	Fog coat, cool grey			Powder coat, RAL 9003
	Adjustment Range	360° pan, ±180° azimuth, 30° – 95° tilt (recommended), 10° – 95° tilt (maximum),			
	ELECTRICAL	Power Consumption	H4SL-D — 4 W max H4SL-DO — 7 W max		
		Power Source	PoE: IEEE802.3af Class 3 compliant		
RTC Backup Battery		3V manganese lithium			
ENVIRONMENTAL	Operating Temperature	Outdoor: -30 °C to +60 °C (-22 °F to 140 °F); Indoor: 0 °C to +60 °C (32 °F to 140 °F)			
	Storage Temperature	-10 °C to +70 °C (14 °F to 158 °F)			
	Humidity	0 - 95% non-condensing			
CERTIFICATIONS	Certifications/Directives	UL, cUL, CE, ROHS, WEEE, RCM, EAC (not applicable to 3MP indoor dome), KC			
	Safety	UL 60950-1, CSA 60950-1, IEC/EN 60950-1, IEC 62471			
	Environmental	(H4SL-DO outdoor models only) IK10 Impact Rating, UL/CSA/IEC 60950-22, IEC 60529 IP66 Rating			
	Electromagnetic Emissions	FCC Part 15 Subpart B Class B, IC ICES-003 Class B, EN 55032 Class B, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 55032, KN 32, EN 55011			
	Electromagnetic Immunity	EN 55024, EN 61000-6-1, EN 50130-4, KN 35			

Outline Dimensions

Surface Mount

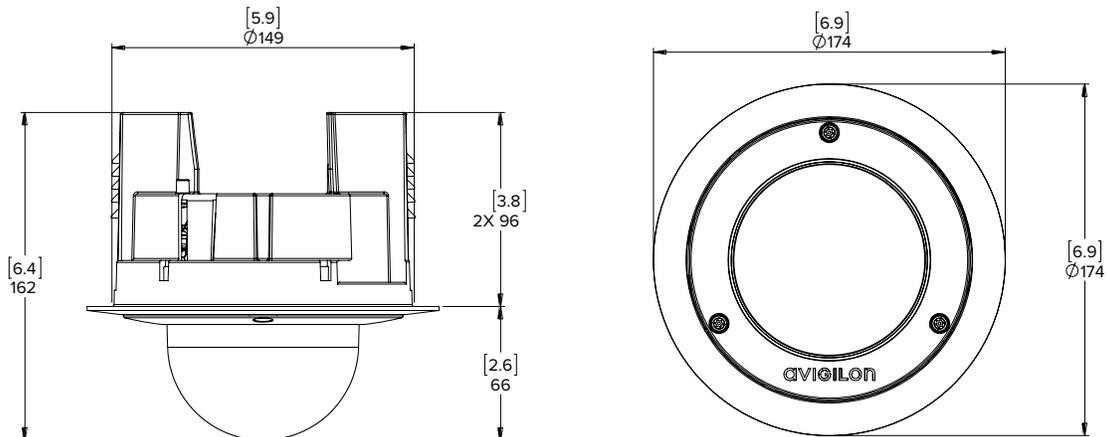
(H4SL-D / H4SL-DO + provided surface mount)



In-Ceiling Mount

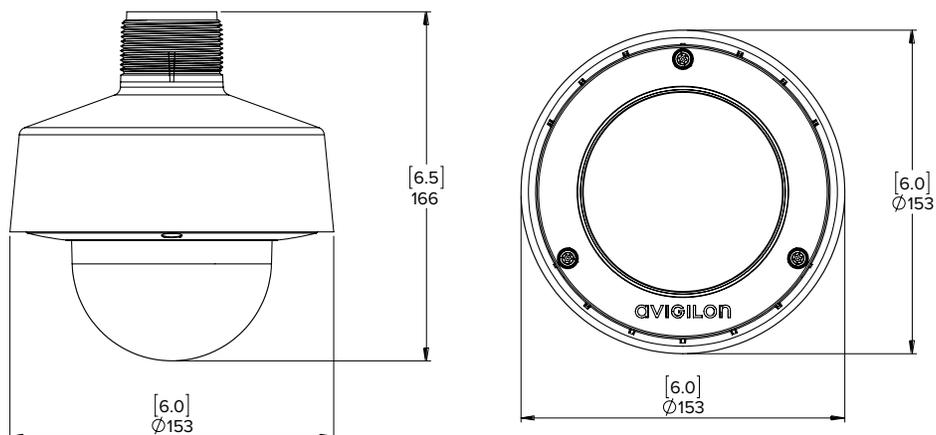
(H4SL-D/H4SL-DO + H4SL-MT-DCIL)

[X.X]	INCHES
X	MM



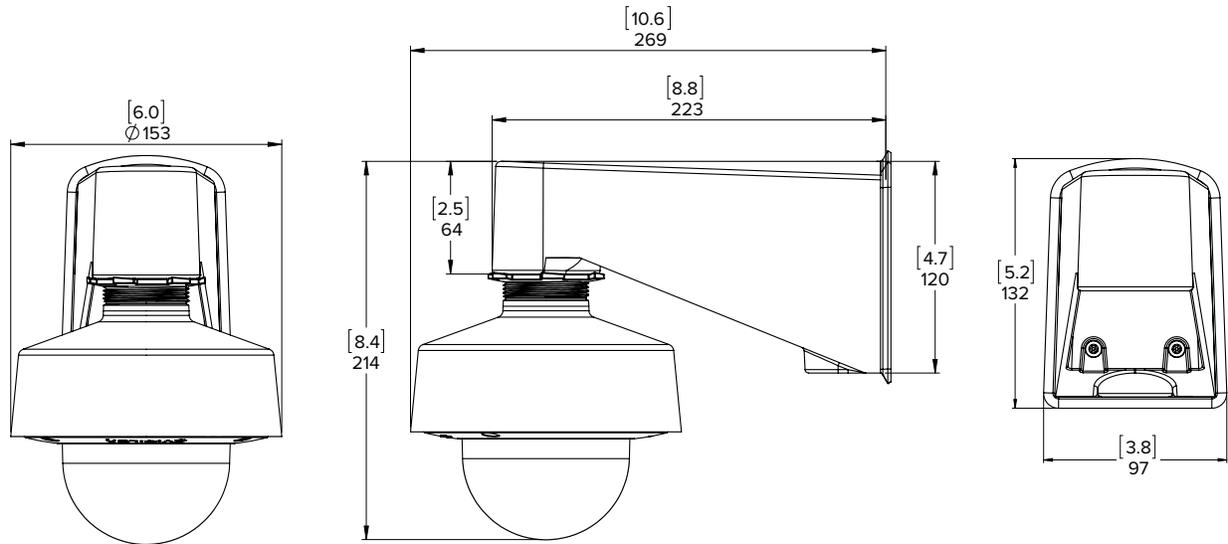
NPT Adapter

(H4SL-D/H4SL-DO + H4SL-MT-NPTA)



NPT Adapter and Pendant Wall Mount

(H4SL-D/H4SL-DO + H4SL-MT-NPTA + CM-MT-WALL1)



Ordering Information

	MP	WDR	LightCatcher Technology	Lens	IR	IP66	HDSM SmartCodec
1.3C-H4SL-D1	1.3	✓	✓	3 - 9 mm			✓
2.0C-H4SL-D1	2.0	✓	✓	3 - 9 mm			✓
3.0C-H4SL-D1	3.0	✓	✓	3 - 9 mm			✓
1.3C-H4SL-D1-IR	1.3	✓	✓	3 - 9 mm	✓		✓
2.0C-H4SL-D1-IR	2.0	✓	✓	3 - 9 mm	✓		✓
3.0C-H4SL-D1-IR	3.0	✓	✓	3 - 9 mm	✓		✓
1.3C-H4SL-DO1-IR	1.3	✓	✓	3 - 9 mm	✓	✓	✓
2.0C-H4SL-DO1-IR	2.0	✓	✓	3 - 9 mm	✓	✓	✓
3.0C-H4SL-DO1-IR	3.0	✓	✓	3 - 9 mm	✓	✓	✓
H4SL-MT-DCIL1	In-ceiling mounting adapter for the H4 SL dome camera						
H4SL-MT-NPTA1	NPT adapter for the H4 SL dome camera						
CM-MT-WALL1	Pendant wall mount						
H4-DC-CPNL1	Metal ceiling panel						
H4-MT-POLE1	Aluminum pole mounting bracket						
H4-MT-CRNR1	Aluminum corner mounting bracket						
H4-AC-WIFI2-NA	USB Wi-Fi adapter						
H4-AC-WIFI2-EU	USB Wi-Fi adapter						
H4SL-DD-SMOK1	Replacement outdoor smoke dome cover						
H4SL-DD-CLER1	Replacement outdoor clear dome cover						
H4SL-DI-SMOK1	Replacement indoor smoke dome cover						
H4SL-DI-CLER1	Replacement indoor clear dome cover						
H4SL-DO1-BASE	Replacement outdoor surface mount adapter						
H4SL-D1-BASE	Replacement indoor surface mount adapter						

H4 Fisheye Camera Line

The new Avigilon[™] H4 Fisheye camera line is designed to provide a complete high resolution 360-degree panoramic view of a scene with no blind spots. The H4 Fisheye camera line is a cost-effective, easy-to-install solution designed to provide clear image detail and broad coverage with fewer cameras.

By providing quality imaging and situational awareness, the H4 Fisheye camera is an essential component of the complete Avigilon solution and a valuable addition to any existing surveillance solution.



The H4 Fisheye has a sleek, low-profile design making it suitable for installations where aesthetics are important and allowing it to fit in with architectural features without detracting from the surroundings. Its IK10-rated, vandal-proof and IP66 weather protected housing is ideal for indoor and outdoor environments such as retail stores, theatres, gas stations, manufacturing, healthcare, commercial and educational facilities.

Built on the H4 platform, the H4 Fisheye is available in 6 and 12 megapixel (MP) camera resolutions. It delivers exceptional image quality even in harsh environments and lighting conditions, and keeps bandwidth and storage to a minimum. Its content adaptive IR technology provides effective brightness while maintaining excellent scene illumination in dark environments. The H4 Fisheye also allows users to zoom in, focus and investigate a region of interest (ROI) in live or recorded video while preserving full situational awareness.

Harnessing the strength of Avigilon Control Center (ACC)[™] software, High Definition Stream Management (HDSM)[™] technology and idle scene mode technology, the H4 Fisheye camera intelligently and efficiently manages video data, lowering bandwidth and storage. The powerful client-side de-warping coupled with virtual PTZ technology allows easy navigation through live or recorded video, enabling security operators to view and track an object of interest from point A to B.

KEY FEATURES

6.0 and 12.0 megapixel resolution models

360 degree field of view fisheye lens

Patented High Definition Stream Management (HDSM)[™] Technology

Content adaptive IR technology provides effective illumination through the field of view, while maintaining excellent scene illumination

Integrated IR (Infrared) LEDs provide uniform illumination in the dark, even at 0 lux, up to a maximum of 10 m (32.8 ft) away

Idle Scene Mode lowers bandwidth and storage usage if there are no motion events detected in the scene

IP66 certification offers total dust ingress protection and protection against high-pressure water jets

Avigilon LightCatcher technology provides exceptional image quality in low light environments

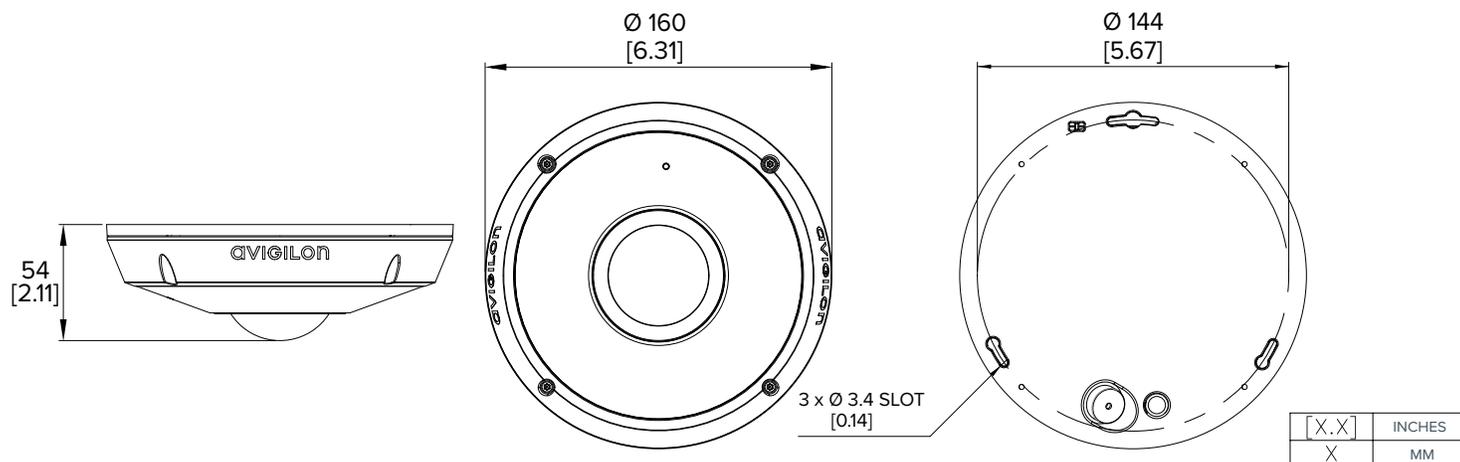
Vandal resistant with IK10 impact rating

ONVIF Profile S Compliant

Specifications

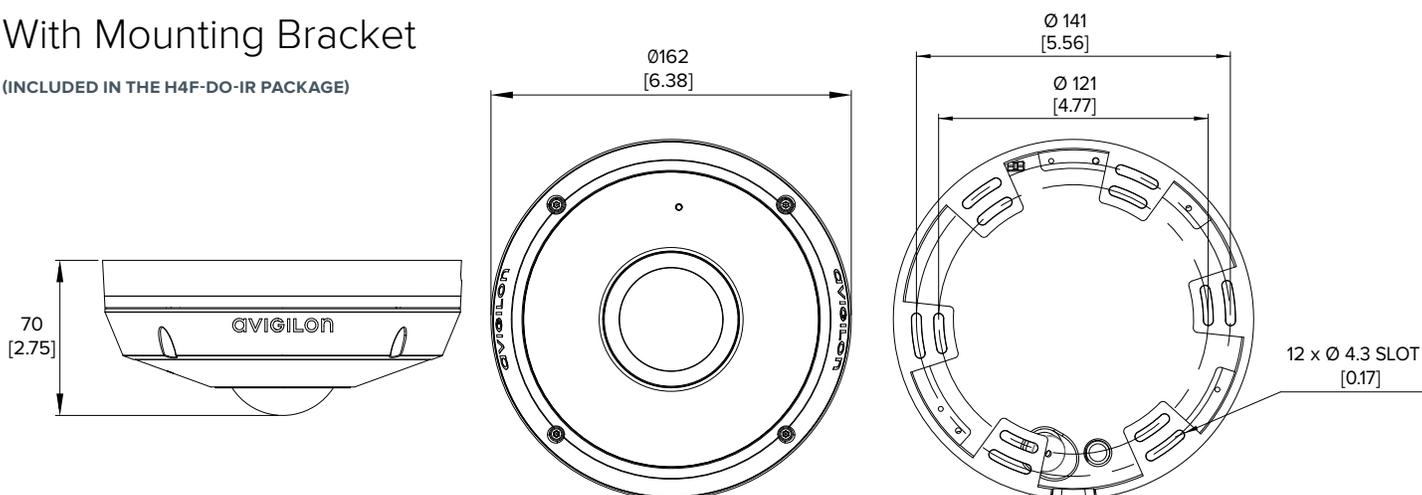
		6.0 MP	12.0 MP							
IMAGE PERFORMANCE	Image Sensor	1/1.8" progressive scan CMOS	1/2.3" progressive scan CMOS							
	Active Pixels (H x V)	2000 x 2000	2992 x 2992							
	Imaging Area (H x V)	4.8mm x 4.8mm (0.189" x 0.189")	4.6mm x 4.6mm (0.180" x 0.180")							
	IR Illumination	up to 10 m (32.8 ft)								
	Minimum Illumination	0.13 lux (F2.2) in color mode; 0 lux (F2.2) in monochrome mode with IR	0.49 lux (F2.2) in color mode; 0 lux (F2.2) in monochrome mode with IR							
	Image Rate	H.264 30 fps	20 fps							
		MJPEG 15 fps	10 fps							
	Dynamic Range	93 dB	81 dB							
	3D Noise Reduction Filter	Yes	Yes							
	LENS	Lens	1.45 mm, F/2.2							
Horizontal Angle of View		180° hemisphere								
Field of View		360°								
IMAGE CONTROL	Image Compression Method	H.264 (MPEG-4 Part 10/AVC), Motion JPEG								
	Streaming	Multi-stream H.264 and Motion JPEG								
	Bandwidth Management	HDSM; Idle Scene Mode								
	Motion Detection	Pixel motion								
	Tamper Detection	Yes								
	Electronic Shutter Control	Automatic, Manual (1/7 to 1/8000 sec)								
	Iris Control	Fixed								
	Day/Night Control	Automatic, Manual								
	Flicker Control	50 Hz, 60 Hz								
	White Balance	Automatic, Manual								
	Backlight Compensation	Adjustable								
	Privacy Zones	Up to 64 zones								
NETWORK	Network	100BASE-TX								
	Cabling Type	CAT5								
	Connector	RJ-45								
	ONVIF	ONVIF Profile S compliant								
	Security	Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication								
	Protocol	IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, ARP								
	Streaming Protocols	RTP/UDP, RTP/UDP multicast, RTP/RTSP/TCP, RTP/RTSP/HTTP/TCP, RTP/RTSP/HTTPS/TCP, HTTP								
	Device Management Protocols	SNMP v2c, SNMP v3								
PERIPHERALS	Audio Input/Output	Line level I/O and internal microphone (can be enabled)								
	Audio Compression Method	G.711 8kHz								
	External I/O Terminals	Alarm In, Alarm Out								
	Onboard Storage	microSDHC/microSDXC/UHS-1 – minimum class 10 or better recommended								
MECHANICAL	Dimensions (ØxH)	Camera	160 mm x 51 mm; 6.2" x 2.0"							
		With bracket	162mm x 70mm; 6.38" x 2.75"							
		With NPT	160mm x 124mm; 6.31" x 4.89"							
	Weight	Camera	0.826 kg; 1.77 lbs							
		With bracket	0.94 kg; 2.07 lbs							
		With NPT	1.138 kg; 2.5 lbs							
	Body	Aluminum								
	Housing	Vandal resistant. Surface mount; or pendant mount with NPT adapter.								
	Finish	Powder coat, RAL 9003								
	ELECTRICAL	Power Consumption	25.5 W max							
Power Source		VDC: 12 V +/-10%, 2.125 A min., L.P.S. per IEC 60950-1 PoE: IEEE 802.3af Class 3; PoE+: IEEE 802.3at Class 4								
Power Connector		DC power input adapter								
RTC Backup Battery		3V manganese lithium								
ENVIRONMENTAL	Operating Temperature	-40 °C to +55 °C (-40 °F to 131 °F) with 12 V DC or PoE+ power -20 °C to +55 °C (-4 °F to 131 °F) with PoE power								
	IR Illuminator Behavior	IR illuminator power is reduced to 8 m (26.2 ft) when PoE is used. IR illuminator will not turn on if temperature is 45 °C (113 °F) or higher.								
	Storage Temperature	-25°C to +50 °C (-13 °F to 122 °F)								
	Humidity	0 - 95% non-condensing								
CERTIFICATIONS	Certifications/Directives	UL	cUL	CE	ROHS	WEEE	RCM	EAC	KC	
	Safety	UL 60950-1		CSA 60950-1	IEC/EN 60950-1		IEC 62471			
	Environmental	IK10 Impact Rating (camera housing only)				UL/CSA/IEC 60950-22		IEC 60529 IP66 Rating		
	Electromagnetic Emissions	FCC Part 15		IC ICES-003 Class B		EN 55032	EN 61000-6-3	EN 61000-3-2	EN 61000-3-3	KN 32
		Subpart B Class B								
	Electromagnetic Immunity	EN 55024				EN 61000-6-1		KN 35		

Outline Dimensions



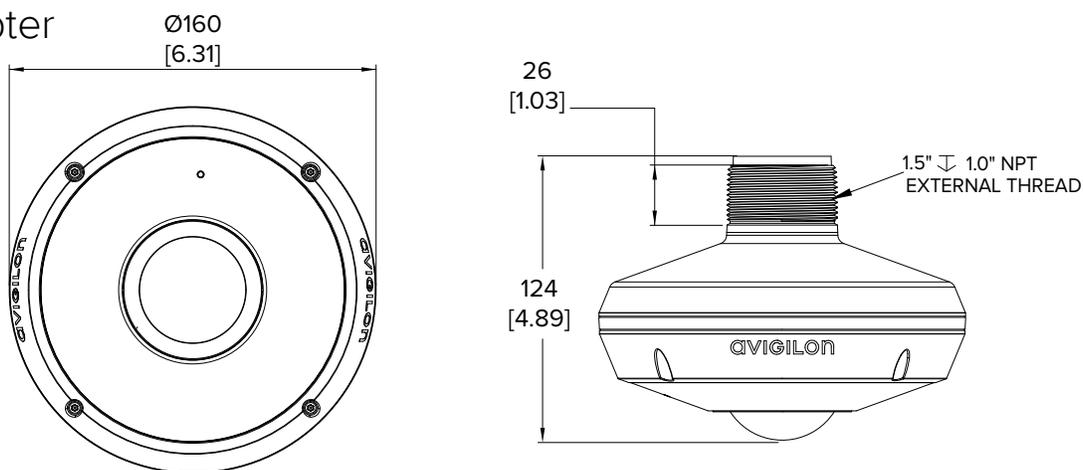
With Mounting Bracket

(INCLUDED IN THE H4F-DO-IR PACKAGE)



With NPT Adapter

(H4F-DO-IR + H4F-MT-NPTA1)



Ordering Information

	MP	LightCatcher Technology	Lens	IR	HDSM SmartCodec
6.0L-H4F-DO1-IR	6.0	✓	Fisheye	✓	✓
12.0-H4F-DO1-IR	12.0		Fisheye	✓	✓
H4F-MT-NPTA1	NPT adapter for the Fisheye Dome Camera				
CM-MT-WALL1	Pendant wall mount compatible with H4F-MT-NPTA				



EdgeSwitch[®] XP

Advanced Power over Ethernet Switches

Models: ES-5XP, ES-8-XP, ES-16XP

Gigabit PoE Ports

Intuitive Configuration Interface

Advanced Switch Management Features



EdgeSwitch[®] XP

Advanced Gigabit PoE Managed Switch

Introducing the Advanced Power over Ethernet Switches, EdgeSwitch™ XP from Ubiquiti Networks.

EdgeSwitch XP delivers reliable passive PoE and fast 10/100/1000 Mbps connectivity to attached Ubiquiti devices and other devices that support passive PoE.

To connect your PoE devices, simply enable PoE in the easy-to-use EdgeSwitch XP Configuration Interface. Each port can be individually configured to provide PoE, so both PoE and non-PoE devices can be connected.

EdgeSwitch XP is available in multiple versions to meet your deployment needs.

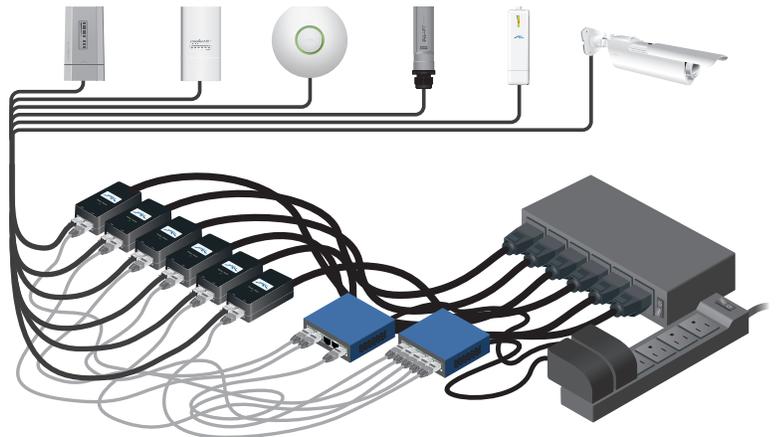
- EdgeSwitch 5XP is a cost-effective, 5-port Gigabit switch with 24V PoE support.
- EdgeSwitch 8XP is an industrial-strength, 8-port Gigabit switch with 150 watts of power capable of powering 24V or 48V devices. Output voltage is controlled by the software.
- EdgeSwitch 16XP features dual EdgeSwitch 8XP systems in a rack-mountable, 1U form factor with 300 watts of power supporting up to 16 devices.

Simplify Your Deployment

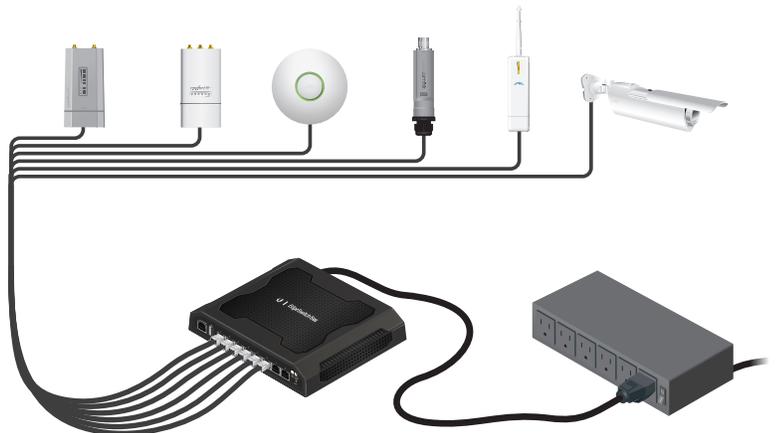
EdgeSwitch XP allows network architects to design cleaner, less cluttered deployments. For example, integrating one EdgeSwitch 8XP can eliminate the need for the following:

- 8 PoE adapters
- 8 power cords
- 8 power outlets
- 8 Ethernet patch cables

EdgeSwitch XP deployments increase efficiency and greatly reduce potential failure points – resulting in faster installations and less maintenance and troubleshooting.



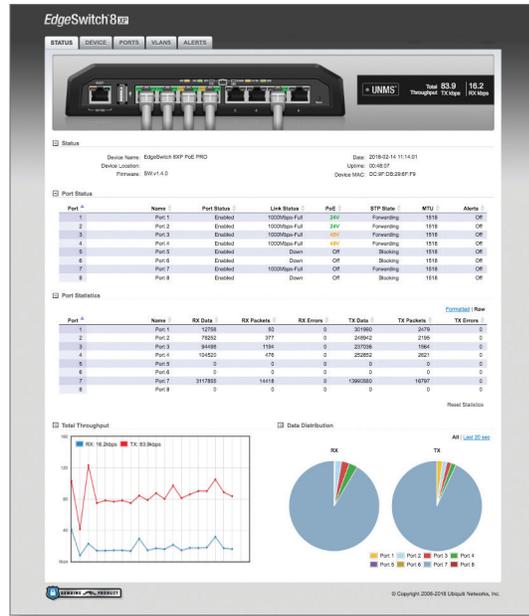
Deployment without EdgeSwitch XP



EdgeSwitch 8XP Deployment

Intuitive Configuration Interface

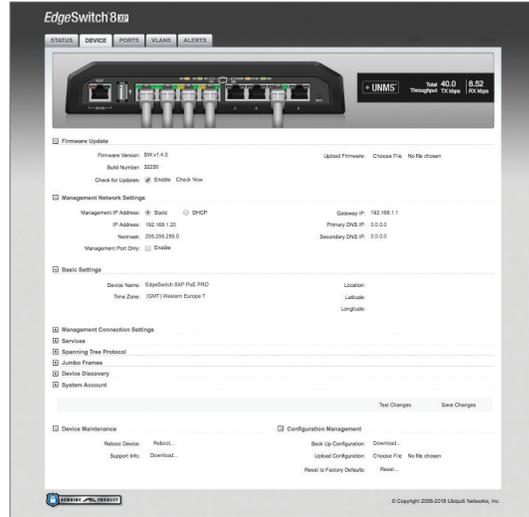
EdgeSwitch XP provides a user-friendly configuration interface designed for efficient setup and control. Accessed via a secured management port and web browser, the EdgeSwitch XP Configuration Interface provides intuitive management with a virtual view of the ports, showing physical connectivity, speed, and PoE status.



Advanced Features

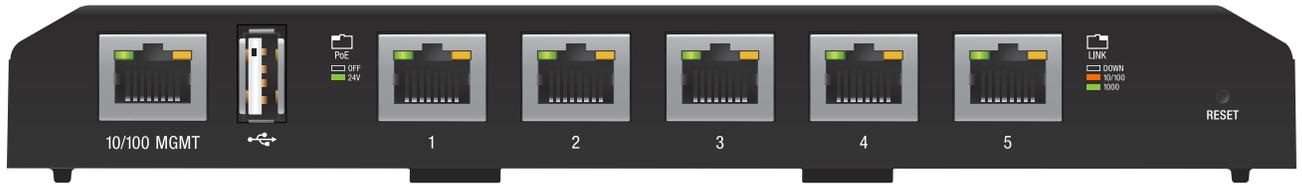
EdgeSwitch XP is loaded with a variety of advanced features, including:

- Port monitoring
- System connection and management services
- Virtual Local Area Network (VLAN) configuration
- Spanning Tree Protocol (STP)/ Rapid Spanning Tree Protocol (RSTP)
- Jumbo Frame Support
- Ping Watchdog
- Configurable alerts



Models

EdgeSwitch[®] 5 XP



Features:

- 5 Gigabit PoE Ports
- 24V Configurable Passive PoE
- EdgeSwitch XP Configuration Interface
- Wall-Mountable

EdgeSwitch[®] 8 XP



Features:

- 8 Gigabit PoE Ports
- 24V/48V Configurable Passive PoE
- 150 W Power
- EdgeSwitch XP Configuration Interface
- Tough Full Metal and Rubber Casing

EdgeSwitch[®] 16 XP



Features:

- 16 Gigabit PoE Ports
- 24V/48V Configurable Passive PoE
- 300 W Power
- EdgeSwitch XP Configuration Interface
- 1U Rack-Mount Form Factor

EdgeSwitch[®] 5XP

Specifications

ES-5XP	
Dimensions	197 x 87.5 x 27.3 mm
Weight	250 g
Power Input	24VDC, 2.5A Power Adapter (Included)
Max. Power Consumption	60 W
PoE Out Voltage Range	22-24VDC
Max. PoE Wattage Per Data Port	11.5 W
ESD Rating	24 kV Air / 24 kV Contact
PoE Method	Passive
Button	Reset
USB Port	2.0 Type A (Reserved for Future Use)
Processor	MIPS 24K, 400 MHz
System Memory	64 MB
Code Storage	8 MB
Certifications	CE, FCC, IC
Wall-Mount	Yes
Operating Temperature	-25 to 55°C (-13 to 131° F)
Operating Humidity	90% Non-Condensing

PoE Configurable Per Port	
Management Port	N/A
Data Ports	Off/24V

LEDs Per Port	
Management Port	Power /Link/Activity
Data Ports	PoE, Speed/Link/Activity

Networking Interfaces	
Management Port	(1) 10/100 Ethernet Port
Data Ports	(5) 10/100/1000 Ethernet Ports



Front Panel



Back Panel



Top View

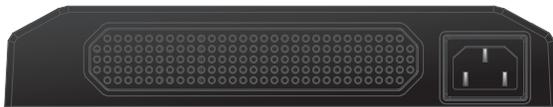
EdgeSwitch[®] 8XP

Specifications

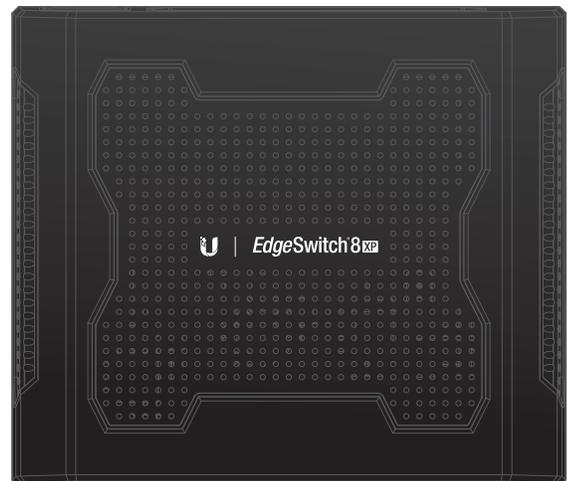
ES-8XP	
Dimensions	210 x 185 x 41 mm
Weight	1.24 kg
Power Input	110-120VAC / 210-230VAC
Max. Power Consumption	150 W
PoE Out Voltage Range	45-48VDC / 22-24VDC
Max. PoE Wattage Per Data Port	11.5 W (24 V), 23 W (48V)
ESD Rating	24 kV Air / 24 kV Contact
PoE Method	Passive
Button	Reset
USB Port	2.0 Type A (Reserved for Future Use)
Processor	MIPS 24K, 400 MHz
System Memory	64 MB
Code Storage	8 MB
Certifications	CE, FCC, IC
Operating Temperature	-25 to 55°C (-13 to 131° F)
Operating Humidity	90% Non-Condensing
PoE Configurable Per Port	
Management Port	N/A
Data Ports	Off/24V/48V
LEDs Per Port	
Management Port	Power/Link/Activity
Data Ports	PoE, Speed/Link/Activity
Networking Interfaces	
Management Port	(1) 10/100 Ethernet Port
Data Ports	(8) 10/100/1000 Ethernet Ports



Front Panel



Back Panel



Top View

EdgeSwitch[®] 16XP

Specifications

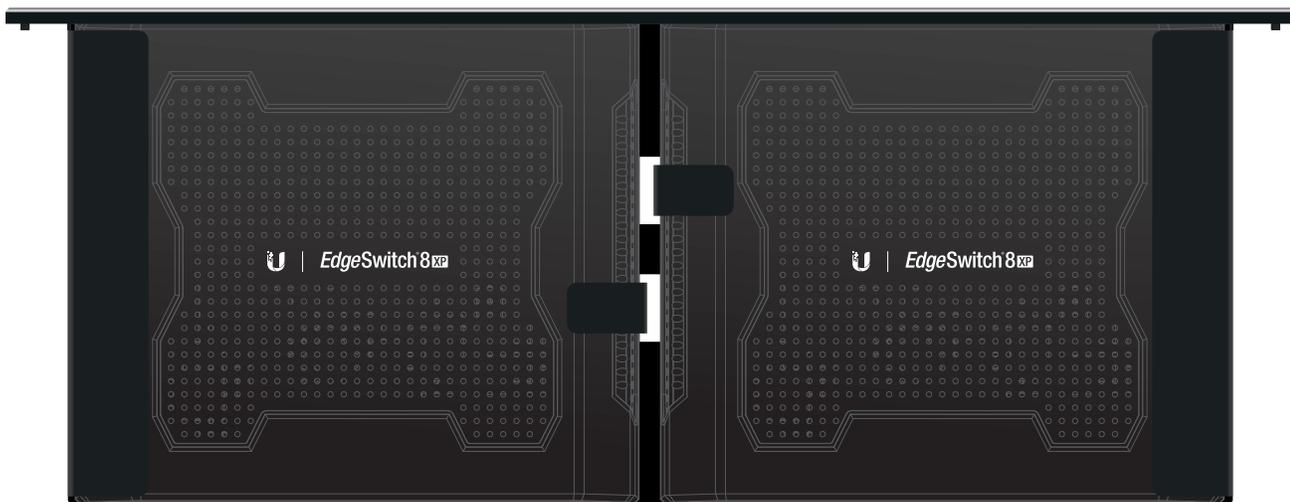
ES-16XP	
Dimensions	480 x 44.5 x 186 mm
Weight	3.95 kg
Hardware Configuration	(2) EdgeSwitch 8XPs
Mounting	Integrated 1U Rack-Mount



Front Panel



Back Panel



Top View

Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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NanoBeam[®] ac

airMAX[®] ac CPE with Dedicated Management Radio

Model: NBE-2AC-13

Uniform Beamwidth Maximizes Noise Immunity

airMAX ac Processor for Superior Performance

Dedicated Wi-Fi Radio for Management

Overview

Ubiquiti Networks launches the latest generation of airMAX CPE (Customer Premises Equipment), the NanoBeam^{ac} 2AC with dedicated Wi-Fi management.

Improved Noise Immunity

The NanoBeam 2AC directs RF energy in a tighter beamwidth. With the focus in one direction, the NanoBeam 2AC blocks or spatially filters out noise, so noise immunity is improved. This feature is especially important in an area crowded with other RF signals of the same or similar frequency.

Integrated Design

The radio and antenna are combined to create a more efficient and compact CPE. The NanoBeam 2AC gets maximum gain out of the smallest footprint.

Providing high performance and an innovative form factor, the NanoBeam 2AC is versatile and cost-effective to deploy.

Software

airOS⁸

airOS⁸ is the revolutionary operating system for Ubiquiti[®] airMAX ac products.

Powerful Wireless Features

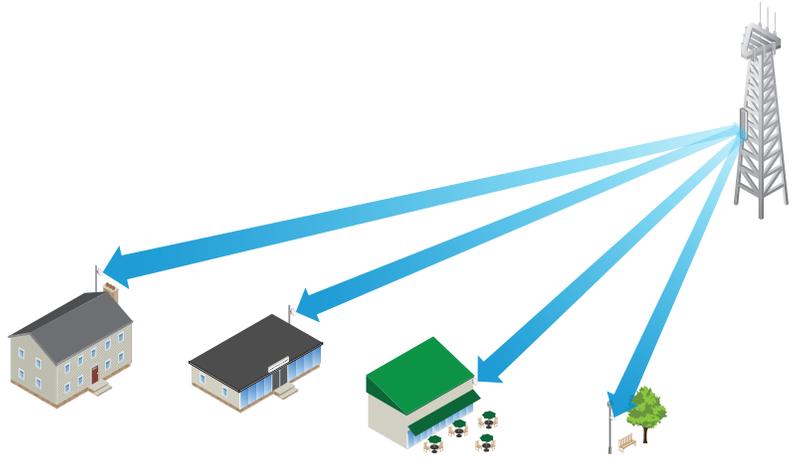
- Access Point PtMP airMAX Mixed Mode
- airMAX ac Protocol Support
- Long-Range Point-to-Point (PtP) Link Mode
- Selectable Channel Width
 - PtP: 10/20/40 MHz
 - PtMP: 10/20/40 MHz
- Automatic Channel Selection
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest WPA2 Security

Usability Enhancements

- airMagic[®] Channel Selection Tool
- Dynamic Configuration Changes
- Instant Input Validation
- HTML5 Technology
- Optimization for Mobile Devices
- Detailed Device Statistics
- Comprehensive Array of Diagnostic Tools, including RF Diagnostics and airView[®] Spectrum Analyzer

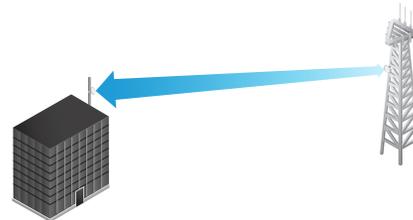
Application Examples

PtMP Client Links

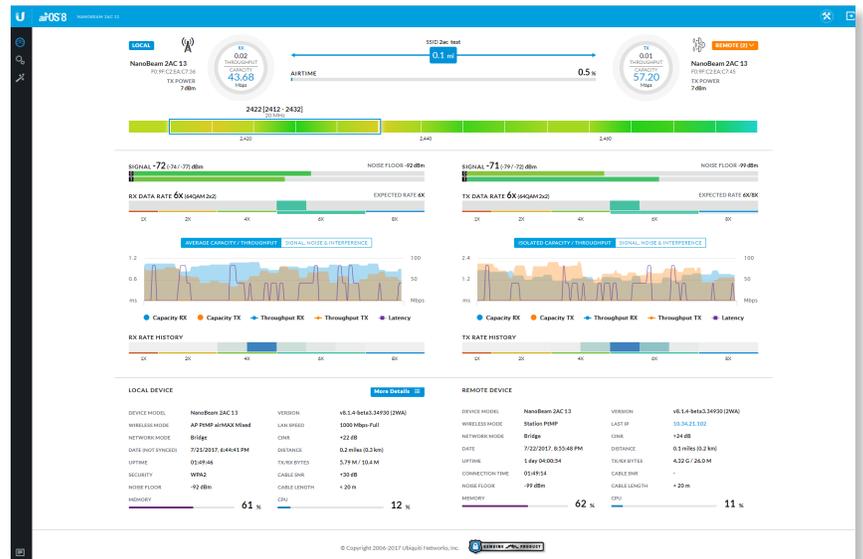


The NanoBeam 2AC used as a CPE device for each client in an airMAX PtMP network.

PtP Link



Use a NanoBeam 2AC on each side of a PtP link.



Advanced RF Analytics

airMAX ac devices feature a multi-radio architecture to power a revolutionary RF analytics engine.

An independent processor on the PCBA powers a second, dedicated radio, which persistently analyzes the full 2.4 GHz spectrum and every received symbol to provide you with the most advanced RF analytics in the industry.

Real-Time Reporting

airOS 8 displays the following RF information:

- Persistent RF Error Vector Magnitude (EVM) constellation diagrams
- Signal, Noise, and Interference (SNI) diagrams
- Carrier to Interference-plus-Noise Ratio (CINR) histograms

Spectral Analysis

airView allows you to identify noise signatures and plan your networks to minimize noise interference. airView performs the following functions:

- Constantly monitors environmental noise
- Collects energy data points in real-time spectral views
- Helps optimize channel selection, network design, and wireless performance

airView runs in the background without disabling the wireless link, so there is no disruption to the network.

In airView, there are three spectral views, each of which represents different data: waveform, waterfall, and ambient noise level.

airView provides powerful spectrum analyzer functionality, eliminating the need to rent or purchase additional equipment for conducting site surveys.

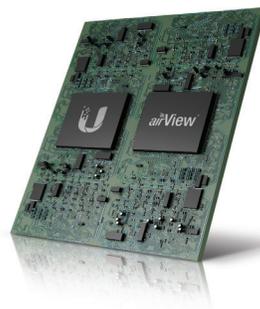
UNMS App

The NanoBeam 2AC integrates a separate Wi-Fi radio for fast and easy setup using your mobile device.

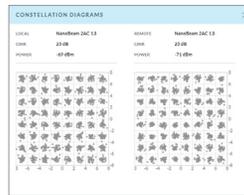
Accessing airOS via Wi-Fi

The UNMS™ app provides instant accessibility to the airOS configuration interface and can be downloaded from the App Store (iOS) or Google Play™ (Android). UNMS allows you to set up, configure, and manage the NanoBeam 2AC and offers various configuration options once you're connected or logged in.

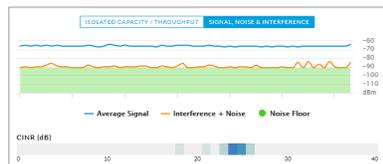
Multi-Radio Architecture



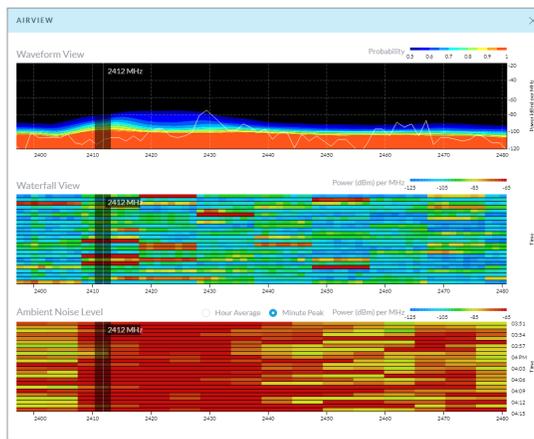
Constellation Diagrams



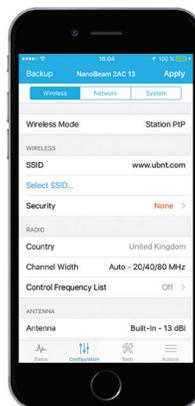
SNI Diagram and CINR Histogram



Dedicated Spectral Analysis



UNMS Configuration Screen



Technology



Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

This time slot method eliminates hidden node collisions and maximizes airtime efficiency, so airMAX technology provides performance improvements in latency, noise immunity, scalability, and throughput compared to other outdoor systems in its class.

Intelligent QoS Priority assigned to voice/video for seamless streaming.

Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Superior Performance

The next-generation airMAX ac technology boosts the advantages of our proprietary TDMA protocol.

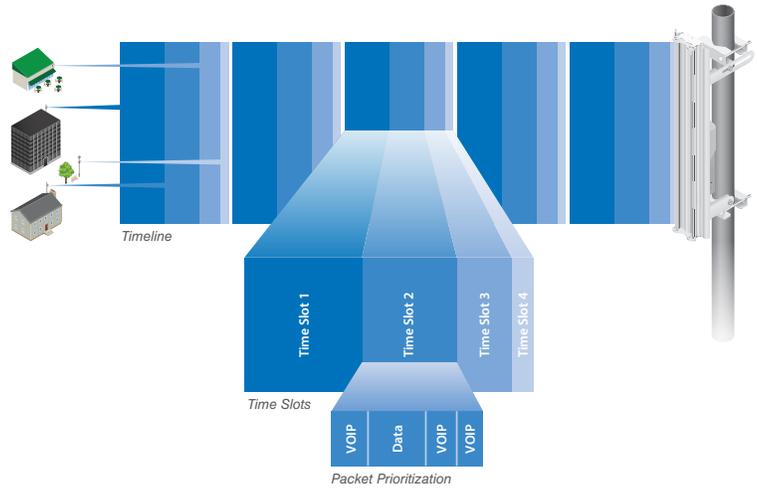
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

Throughput Breakthrough

airMAX ac supports high data rates, which require dense modulation: 256QAM – a significant increase from 64QAM, which is used in airMAX.

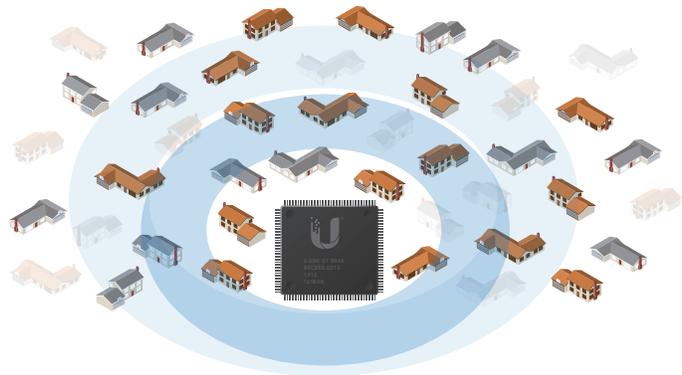
With their use of proprietary airMAX ac technology, 2.4 GHz airMAX ac products support up to 330+ Mbps real TCP/IP throughput – more than double the throughput of standard airMAX products.

airMAX ac TDMA Technology

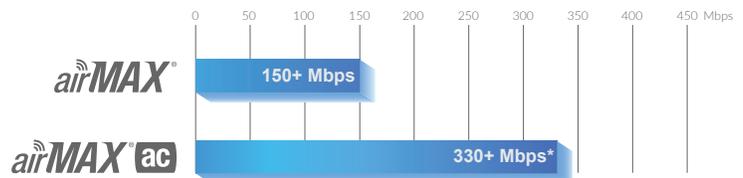


Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

airMAX Network Scalability



Superior Throughput Performance



* The 330+ Mbps throughput value is specific to 2.4 GHz airMAX ac products.

Hardware Overview

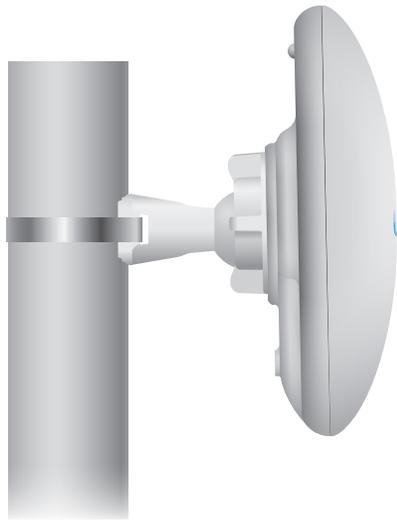
The NanoBeam 2AC features airMAX ac technology and a dedicated Wi-Fi radio for management.

Ease of Installation

- **Quick Installation** No fasteners are required for pole-mounting, and a single wall fastener (not included) is required for wall-mounting.
- **Convenient Alignment** The NanoBeam 2AC pivots on its ball joint mount for easy aiming.

Innovative Mechanical Design

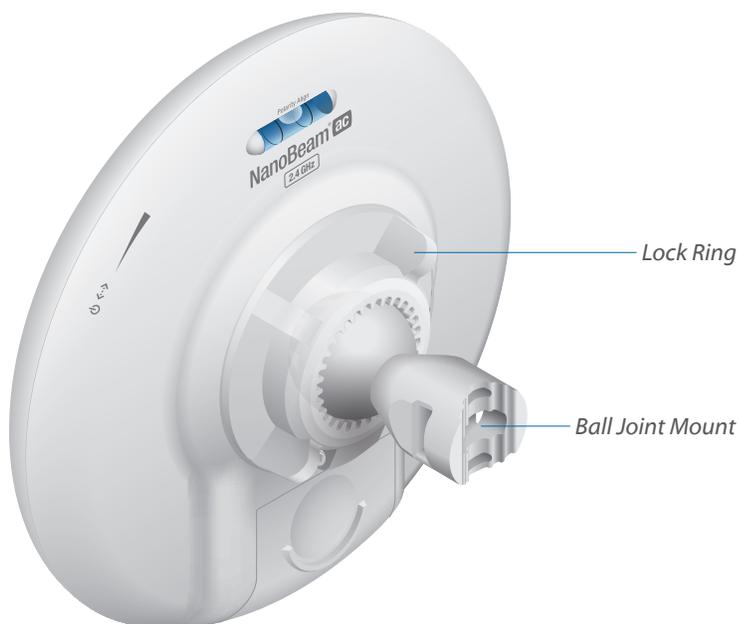
- **Efficient Footprint** The radio and antenna are combined into a single body that takes up minimal space. The form factor features the highest gain for its size.
- **Aesthetics** The NanoBeam 2AC is small enough to blend discreetly into the background at a customer's location.
- **Versatile Mounting** The NanoBeam 2AC can be mounted in almost any position needed for line of sight.



Pole-Mounted NanoBeam 2AC



Wall-Mounted NanoBeam 2AC



NanoBeam 2AC with Mounting Hardware

Mounting Accessories

NanoBeam[®] Wall Mount Kit

Model: NBE-WMK

A wall mount kit is available as an optional accessory to enhance stability for wall-mounting.

Wall-Mount Bracket Dimensions: 75mm x 55mm x 4mm



NanoBeam[®] Window Mount

Model: NBE-19-WM

A suction cup mount is available as an optional accessory to mount the NanoBeam 2AC on a window.



IsoBeam Accessory

IsoBeam[™]

Model: ISO-BEAM-19

An RF isolator shield is available as an optional accessory to enhance signal isolation.



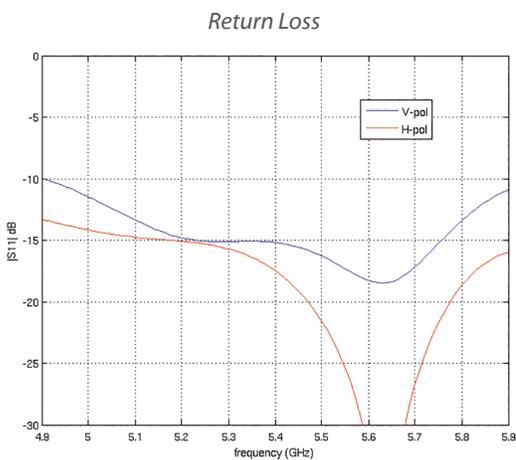
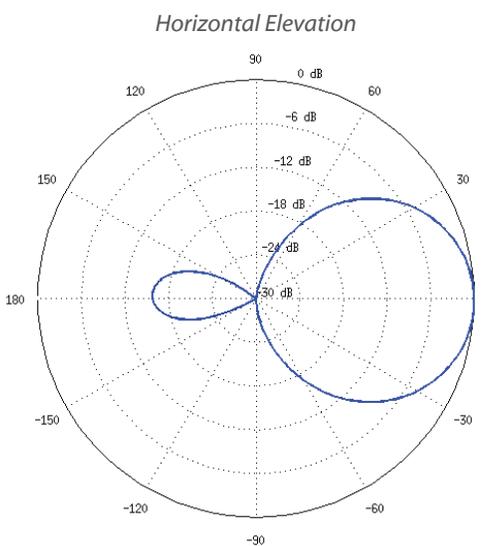
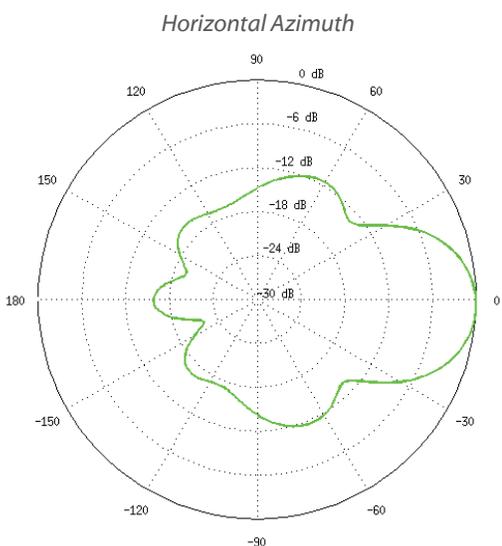
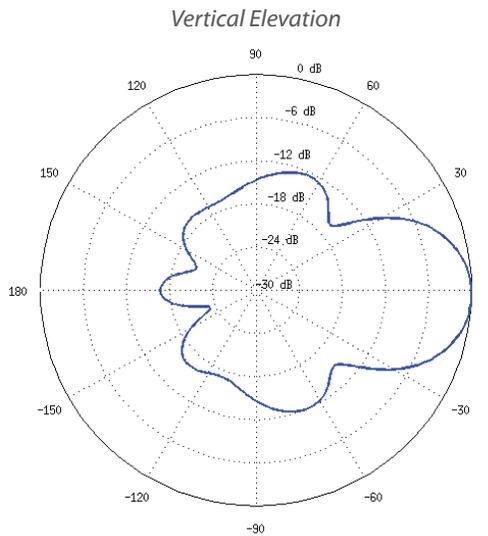
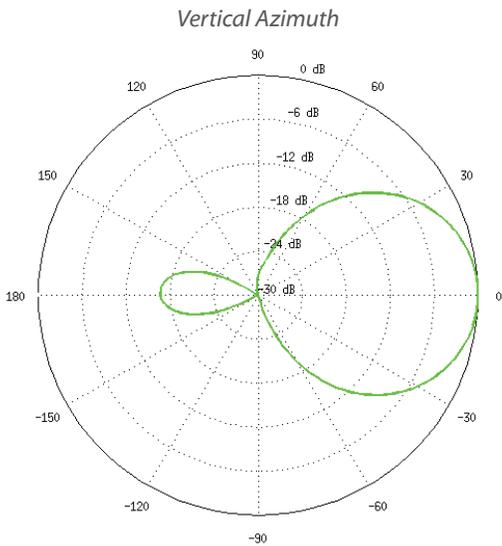
Specifications

NBE-2AC-13		
Dimensions (Mount Included)	189 x 189 x 125 mm (7.44 x 7.44 x 4.92")	
Weight (Mount Included)	0.530 kg (1.17 lb)	
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)	
Max. Power Consumption	7.5W	
Gain	13 dBi	
Networking Interface	(1) 10/100/1000 Ethernet Port Wi-Fi for Management	
Processor Specs	Atheros MIPS 74Kc, 533 MHz	
Memory	64 MB DDR2	
LEDs	Power, Ethernet, (4) Signal Strength	
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels	
Max. VSWR	1.5:1	
Channel Sizes	PtP Mode	PtMP Mode
	10/20/40MHz	10/20/40 MHz
Polarization	Dual Linear	
Enclosure	Outdoor UV Stabilized Plastic	
Mounting	Pole-Mount (Kit Included), Wall-Mount	
Wind Loading	45.4 N @ 200 km/h (10.2 lbf @ 125 mph)	
Wind Survivability	200 km/h (125 mph)	
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV	
RoHS Compliance	Yes	
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5	
Vibration Test	IEC 68-2-6	
Temperature Shock Test	IEC 68-2-14	
UV Test	IEC 68-2-5 at 40° C (104° F), Equivalent: ETS 300 019-1-4	
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5	
Operating Temperature	-40 to 70° C (-40 to 158° F)	
Operating Humidity	5 to 95% Noncondensing	
Certifications	CE, FCC, IC	

Operating Frequency (MHz)		
Worldwide	2412 - 2472	
USA	2412 - 2462	

Management Radio (MHz)		
Worldwide	5150 - 5250	
USA	U-NII-3: 5725 - 5850	

NBE-2AC-13 Output Power: 27 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (½)	27 dBm	± 2 dB	airMAX ac	1x BPSK (½)	-96 dBm	± 2 dB
	2x QPSK (½)	27 dBm	± 2 dB		2x QPSK (½)	-95 dBm	± 2 dB
	2x QPSK (¾)	27 dBm	± 2 dB		2x QPSK (¾)	-92 dBm	± 2 dB
	4x 16QAM (½)	27 dBm	± 2 dB		4x 16QAM (½)	-90 dBm	± 2 dB
	4x 16QAM (¾)	26 dBm	± 2 dB		4x 16QAM (¾)	-86 dBm	± 2 dB
	6x 64QAM (¾)	25 dBm	± 2 dB		6x 64QAM (¾)	-83 dBm	± 2 dB
	6x 64QAM (¾)	24 dBm	± 2 dB		6x 64QAM (¾)	-77 dBm	± 2 dB
	6x 64QAM (¾)	23 dBm	± 2 dB		6x 64QAM (¾)	-74 dBm	± 2 dB
	8x 256QAM (¾)	22 dBm	± 2 dB		8x 256QAM (¾)	-71 dBm	± 2 dB
	8x 256QAM (¾)	21 dBm	± 2 dB		8x 256QAM (¾)	-68 dBm	± 2 dB



Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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20"x16"x11" 120 VAC Industrial Enclosure with Mounting Plate Model: NB201611-100

Applications

- Remote Wireless LAN WiFi equipment installations
- Indoor and outdoor installations
- Rapid Deployment installations
- Corrosive environments
- Security and surveillance equipment installations

Features

- Molded fiberglass reinforced polyester (FRP) enclosure with integral mounting flanges
- Fully gasketed lid with stainless steel quick release latches with padlock hasps
- NEMA Type 4, 4X / IP66 rated
- Features aluminum mounting plate with surge protected duplex 120 VAC outlets



Description

The NB201611-100 is a rugged weatherproof enclosure that is ideal for both indoor and outdoor applications. Constructed from molded halogen free self extinguishing fiberglass reinforced polyester (FRP), it is well suited for high temperature or corrosive environments. The integral mounting flange allows it to be wall mounted as well as on a flat surface without the need for extra mounting hardware. The fully gasketed lid features a stainless steel continuous hinge and stainless steel quick release latches with padlock hasps. The light grey color of the NB201611-100 is cleaner, cooler and aesthetically pleasing. Users can enjoy the physical benefits of better heat reflection and better UV resistance due to the lighter color. The contoured body provides an attractive and contemporary appearance. Due to the large size of this enclosure, it can accommodate dual sets of most access points.

120 VAC Mounting Plate with Lightning Protection

The aluminum mounting plate features standard surge protected duplex 120 VAC outlets and a terminal block for easy hook up to the externally provided line power.

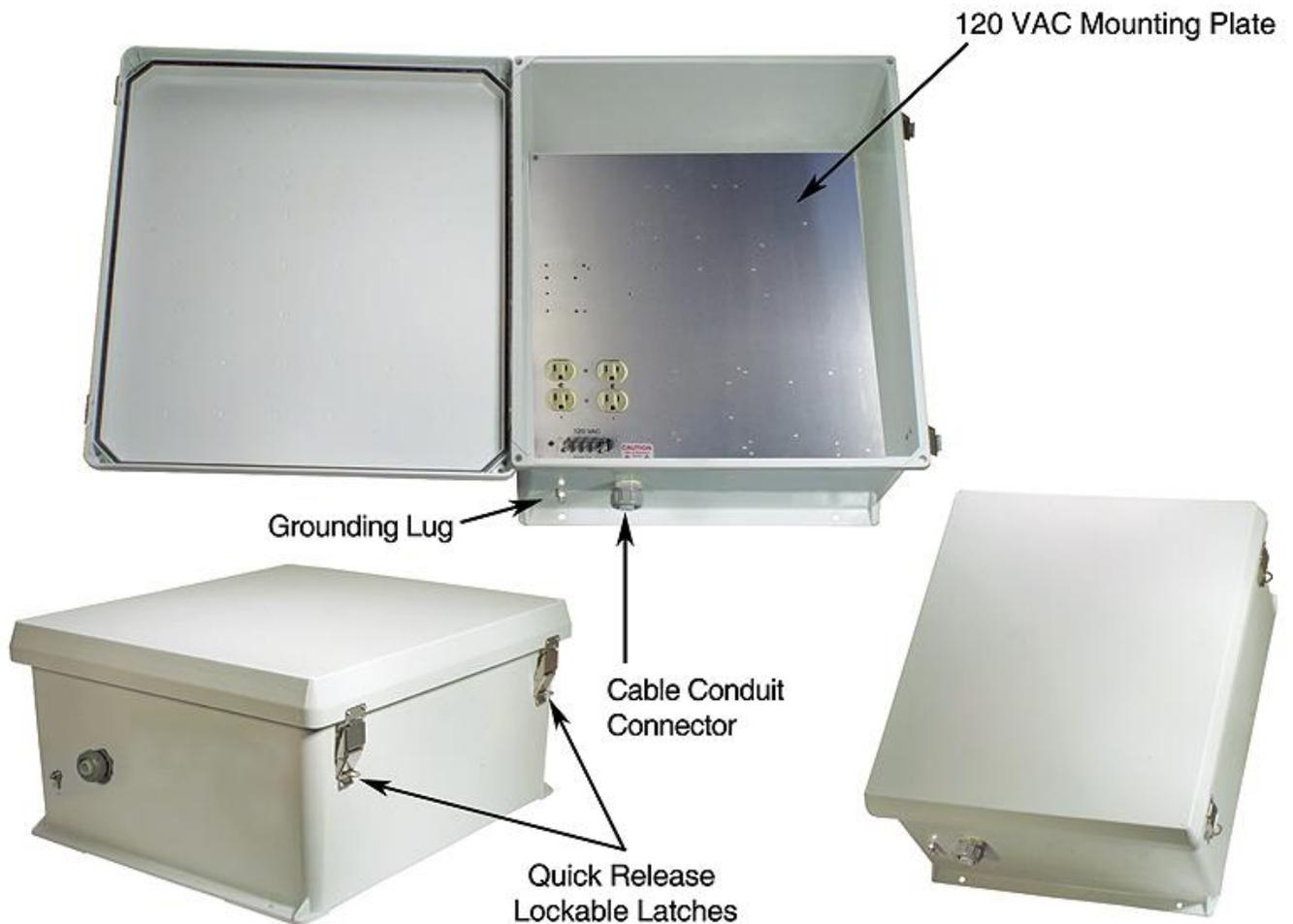
Optional Pole Mounting Kits

Available on the L-com web site, these optional kits allows the enclosure to be mounted on poles ranging from 1.2 to 11 inches in diameter.

Specifications

Enclosure Material	Halogen free, self-extinguishing fiberglass reinforced polyester (FRP)
Enclosure Color	Light Grey (RAL7035)
Voltage	120 VAC
Weight	22.5 lbs (10.2 kg)
Mounting Plate Material	.10" (2.5mm) Thick Anodized Aluminum
Mounting Plate Dimensions	18.9 x 14.9 in. (479 x 378 mm)
Outside Dimensions (max)	17.3 x 21.3 x 11.6 in. (440 x 541 x 294 mm)
Inside Dimensions	19.7 x 15.7 x 9.7 (plate to cover) in. (500 x 398 x 246 mm)
Flame Rating	UL 94-5V
RoHS Compliant	Yes
Cable Feed	1/2" Cable Conduit Connector
Ratings*	NEMA Type 4, 4X / IP66

*Note: Enclosure ports (Cable conduit connector and N-type holes for lightning protectors or connectors) must be properly sealed to maintain NEMA TYPE 4, 4X / IP66 rating.



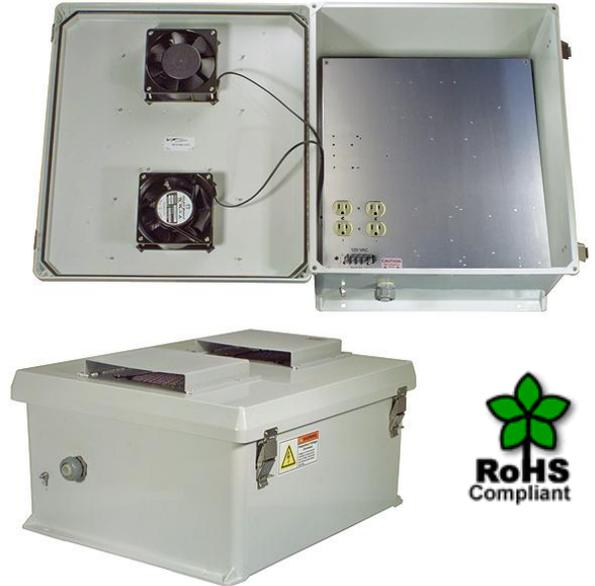
20"x16"x11" 120 VAC Industrial Enclosure with Mounting Plate and Cooling Fans, Heaters & Solid State Dual Point Temperature Controllers - Model: NB201611-1HFS

Applications

- Remote Wireless LAN WiFi equipment installations
- Indoor and outdoor installations
- Rapid Deployment installations
- Corrosive environments
- Security and surveillance equipment installations

Features

- Molded fiberglass reinforced polyester (FRP) enclosure with integral mounting flanges
- Fully gasketed lid with stainless steel quick release latches with padlock hasps
- NEMA Type 3R, 3RX / IP24 rated
- Features aluminum mounting plate with surge protected duplex 120 VAC outlets & dual point solid state controlled heating and cooling system



Description

The NB201611-1HFS is a rugged weatherproof enclosure that is ideal for both indoor and outdoor applications. Constructed from molded halogen free self extinguishing fiberglass reinforced polyester (FRP), it is well suited for high temperature or corrosive environments. The integral mounting flange allows it to be wall mounted as well as on a flat surface without the need for extra mounting hardware. The fully gasketed lid features a stainless steel continuous hinge and stainless steel quick release latches with padlock hasps. The light grey color of the NB201611-1HFS is cleaner, cooler and aesthetically pleasing. Users can enjoy the physical benefits of better heat reflection and better UV resistance due to the lighter color. The contoured body provides an attractive and contemporary appearance. Due to the large size of this enclosure, it can accommodate dual sets of most access points.

120 VAC Mounting Plate with Lightning Protection

The aluminum mounting plate features standard surge protected duplex 120 VAC outlets and a terminal block for easy hook up to the externally provided line power.

Hot and Cold Environments

To help ensure trouble-free operation of electronic equipment, proper operating temperatures inside an enclosure needs to be maintained. With the built-in Heater and Cooling system, internal temperatures can be better maintained. This model is ideal in Hot and Cold environments.

The NB201611-1HFS comes with two 120 VAC 200 watt heating elements and two 120 VAC cooling fans. The fans and heaters are controlled by HyperLink's exclusive solid-state temperature controller. The standard unit has a fan turn-on temperature of +93° F (+33.8° C) and a heat turn-on temperature of +16° F (-8.8° C). The controller features improved temperature setpoint accuracy and can be factory modified for other temperature setpoints. The heater and fan are controlled by two integral high current solid-state AC relays. The relays feature Zero Cross Detection for EMI reduction. No extra room for the controller is required since it is mounted underneath the plate.

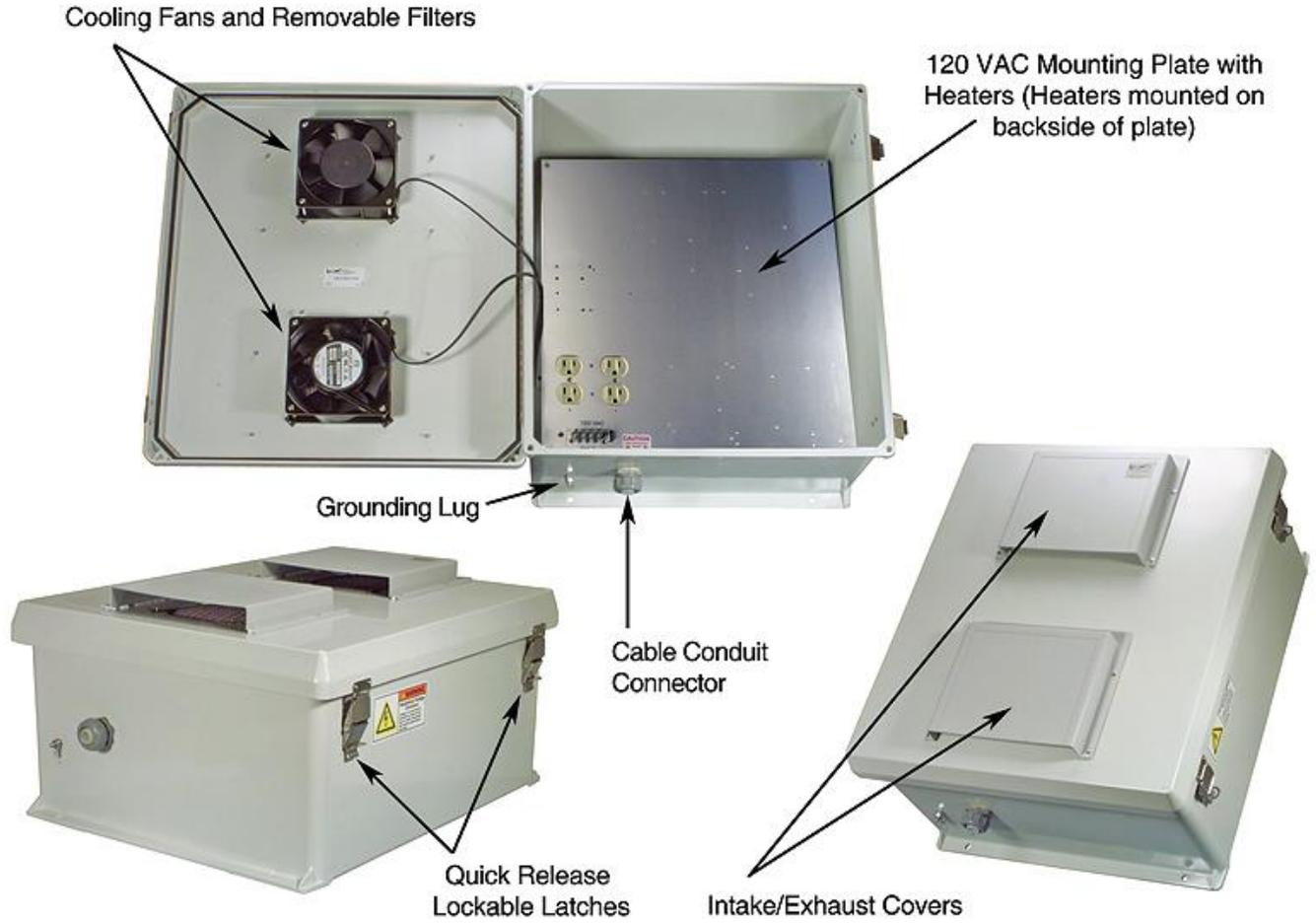
Optional Pole Mounting Kits

Available on the L-com web site, these optional kits allows the enclosure to be mounted on poles ranging from 1.2 to 11 inches in diameter.

Specifications

Enclosure Material	Halogen free, self-extinguishing fiberglass reinforced polyester (FRP)
Enclosure Color	Light Grey (RAL7035)
Voltage	120 VAC
Heater Power	200 Watts Each (400 Watts Total)
Fan Power	12 Watts Each (24 Watts Total)
Weight	25.3 lbs (11.5 kg)
Mounting Plate Material	.10" (2.5mm) Thick Anodized Aluminum
Mounting Plate Dimensions	18.9 x 14.9 in. (479 x 378 mm)
Outside Dimensions (max)	17.3 x 21.3 x 11.6 in. (440 x 541 x 294 mm)
Inside Dimensions	19.7 x 15.7 x 9.7 (plate to cover) in. (500 x 398 x 246 mm)
Flame Rating	UL 94-5V
RoHS Compliant	Yes
Cable Feed	1/2" Cable Conduit Connector
Ratings*	NEMA 3R, 3RX / IP24

Temperature Controller Specifications	
Fan Setpoint Temperature	+34° C (+93° F)
Heater Setpoint Temperature	-9° C (+16° F)
Hysteresis Window	5° C (9° F)
Contact L-com for custom Fan Setpoints	



SPEC SHEET



BATTERY BACK UP STANDBY UPS

0E-350V6

350VA/255W STANDBY UPS

COMMERCIAL AND RESIDENTIAL



The 0E-350V6 Uninterruptible Power Supply (UPS) is ideal for electronics as well as power protection for individual commercial work spaces. With 350VA and 255 Watts of capacity, the 0E-350V6 UPS protects equipment from blackouts, brown outs, spikes, and surges.

- STANDBY UPS
- 350VA/255W CAPACITY
- 120V NOMINAL VOLTAGE
- HIGH EFFICIENCY DESIGN
- ENERGY STAR QUALIFIED
- 6 OUTLETS
- TRANSFER TIME 4ms
- 810 JOULES OF SURGE PROTECTION
- PHONE LINE PROTECTION
- EMI AND RFI FILTRATION
- CONNECTED EQUIPMENT WARRANTY \$75,000

PART #: **0E-350V6**

UPC: **8 11914 02226 8**

LENGTH: **7.1"**

WIDTH: **4.3"**

HEIGHT: **3.2"**

WEIGHT: **3.5 LBS**

FULL-LOAD RUNTIME: **2 MIN**

HALF-LOAD RUNTIME: **8 MIN**

BATTERY SIZE: **12V / 3.6Ah**

UL LISTING: **E473223**

Product Certification:



RohS



FOR MORE INFORMATION,
CONTACT YOUR ADI SALES PERSON.

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December 10, 2018

Report 5

To: West Michigan Airport Authority Board.
From: Aaron Thelenwood, Authority Assistant Manager.
Subject: **EV Charging Station Purchase Agreement with HBPW.**

The Holland Board of Public Works (BPW) formerly owned and maintained a number of Electric Vehicle Charging Stations throughout the City of Holland; including one on Airport property, located adjacent to Tulip City Air Service's hangar.

Early in 2018, the BPW began moving away from administration of these charging stations, choosing to focus on incentivizing home charging stations over public charging ports. As such, the BPW began a process to sell the charging stations to the property owners where the stations are currently located. The sale price for each unit is \$1.00, which the BPW will waive. In exchange, the property owner will be responsible for all associated service costs, and upkeep.

The units currently installed across the City, and at the airport, are reaching the end of their service life and will likely need to be replaced with more state-of-the-art models. The BPW offers various incentives for upgrading these units.

Though not used on a daily basis, the charging station at the airport is used frequently enough that staff feels this station is a valuable customer service amenity. Likely, the current charging station/model will remain in its present location. When it comes time to replace this model, staff will explore relocating the new model near the Airport Business Center.

Recommendation

It is recommended that the Airport Authority Board approve the Purchase Agreement with the Holland Board of Public Works for the Electric Vehicle Charging Station currently located on Airport property.

WMAA MONTHLY FBO REPORT

Total Fuel Gallons Delivered	Current Month Nov-18 47,234	One Year ago Nov-17 47,036	Fiscal Year To Date 10-1-18 to 9-30-19 105,180	F/Y to Date Compared 2018 1,390
Transplant Flights	0			
Wings Of Mercy Flights				
Freight Flights From/To Holland	3			
FREIGHT WEIGHT	2652#			
NUMBER OF PARTS IF KNOWN	3 skids+7 boxes			

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DATE: December 10, 2018

SUBJECT: WMAA Communications Committee Board Update

Page 1 of 3

Tier 1 (most important)

UPDATE WEBSITE ON A CONTINUAL BASIS

- Please check the WMRA website for news and updates. www.WestMichiganRegionalAirport.com
There is a new slider on the home page featuring airport facts.

SOCIAL NETWORKING

- WMRA's **Facebook** page is online listed as "West Michigan Regional Airport." Please take a moment to visit and "Like" the page, make a comment, and share with colleagues, friends and family.

The WMRA Facebook page has 2,607 "Likes ."

2018 RECENT PHOTOS

Operation Good Cheer airplanes will be delivering loads of presents for local foster kids on Saturday, December 8, 2018. The photos below were taken at the 2017 Operation Good Cheer at WMRA.



- WMRA's **Twitter** microblogging account is up and "Tweeting." Please join in and add your "Tweets."

Tier 2 (important)

PRESS RELEASES/NEWS ARTICLES

- 11.13.2018 Holland Sentinel "Research for eatery at airport continuing"

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REGIONAL AIRPORT

PAGE 2 OF 3

2018-2019 PARADES & EVENTS

- **Zeeland's Pumpkinfest Parade:** Saturday, October 6, 2018
Thanks to Aaron Thelenwood and his family for riding on the jet float in the 2018 Pumpkinfest Parade on Saturday, October 6. We're not sure if the adults had the most fun or the kids!



- The jet float participated in the **Tulip Time Muziekparade** for the 7th year on Saturday, May 12, 2018. The float received a Director's Award for "Creativity" from the Tulip Time Board in 2013 and 2015.
- **Wings of Mercy CareAffaire:** Saturday, August 25, 2018
Due to the weather, the event turned into a huge fundraising hangar party that everyone enjoyed.

PRESENTATIONS/SPEAKING ENGAGEMENTS

- Please contact a Communications Committee member for presentations or speaking engagements.

TIER 3 (*less important*)

- **Design for History Wall in Boardroom**
The History Wall is being designed in-house and is on its way to be completed. The draft below will give an idea of what it will look like.



JCI/PRINCE · REQUEST FOODS · HERMAN MILLER · GENTEX · HANWORTH · METAL FLOW · HOPE COLLEGE · HOLLAND HOSPITAL · WEST SHORE AVIATION · ZEELAND FARM SERVICES · ELZINGA & VOLKERS · BUHLER · ALTICOR · PLEOTINT · WINGS OF MERCY · JRAUTOMATION

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Page 3 of 3

- **2018 WMRA Video**

The video will include the new Business Center, airport activities and amenities. It will be designed with the Communications Committee's recommendations. The Communications Committee approved the script outline on 12/5/18.

- **Note Cards and Business Cards**

Note cards and business cards for Board members are printed and available for use.

Tier 3 (*less important*)

- **eNEWS**

The eNews was sent out on August 21, 2018. A hard copy is available.

PLEASE CONTACT KAREN IF YOU HAVE ANY QUESTIONS OR COMMENTS.

k.scholten@wmregionalairport.com C 616.953.9633

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December 10, 2019

Report 9

To: West Michigan Airport Authority Board.
From: Aaron Thelenwood, Assistant Authority Manager.
Subject: **Airport Authority Board Meeting Schedule 2019.**

The Airport Authority meets the 2nd Monday of every month at 11:30am. Below is the list of meeting Dates and 2019 Meeting Locations:

Monday, January 14th, 2019 @ **Airport Business Center**
Monday, February 11th, 2019 @ **Airport Business Center**
Monday, March 11th, 2019 @ **Airport Business Center**
Monday, April 8th, 2019 @ **Airport Business Center**
Monday, May 13th, 2019 @ **Howard Miller Library, Zeeland**
Monday, June 10th, 2019 @ **Airport Business Center**
Monday, July 8th, 2019 @ **Airport Business Center**
Monday, August 12th, 2019 @ **Airport Business Center**
Monday, September 9th, 2019 @ **Park Township Offices**
Monday, October 14th, 2019 @ **Airport Business Center**
Monday, November 11th, 2019 @ **Airport Business Center**
Monday, December 9th, 2019 @ **Airport Business Center**

Any questions can be directed to Greg Robinson (368-3023) or Aaron Thelenwood (368-3021).

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December 10, 2018

Report 10 Other Business

To: West Michigan Airport Authority Board.
From: Greg Robinson, Authority Manager.
Subject: Development Activities.

Regarding development activities at the airport, the following has taken place since the last Board meeting.

1. I met with Chris Hart again on the status of the **restaurant analysis** and have received his Phase 1 report. This phase included evaluation of the potential for a restaurant at the airport, possible menu and hours. If his phase 1 work indicates that there is the potential for a restaurant, then he will research possible tenants and building costs. I will be reviewing this report prior to Monday's Board meeting.
2. We have had interest expressed for constructing two **private hangars** at the airport. We do receive interest/inquiries like this from time to time and our intent is to be as responsive and informative as we can. I have met with both parties and development options will be discussed with the Board at the December meeting.
3. I met with a representative of **Lakeshore Advantage** to discuss available properties at the airport and what role they may be able to play in assisting us or vice versa. We also sent to Lakeshore Advantage site maps for the parcels available at the airport.
4. Ron Engel of airport consultant Mead & Hunt has provided a couple of potential firms that may be able to assist us with identifying and contacting **aeronautical-related companies**. I will be checking references and contacting these firms soon.
5. We have contacted our MDOT/AERO representative concerning the status of the **FAA land release** for parcel K. We do not have a status report yet.
6. As is explained in a report later in the December Board meeting agenda, the Building & Development Committee has completed its evaluation of concepts for the location of **additional public and corporate hangars** at the airport.
7. Attached to this report is an **organization chart** for our Property Development efforts.

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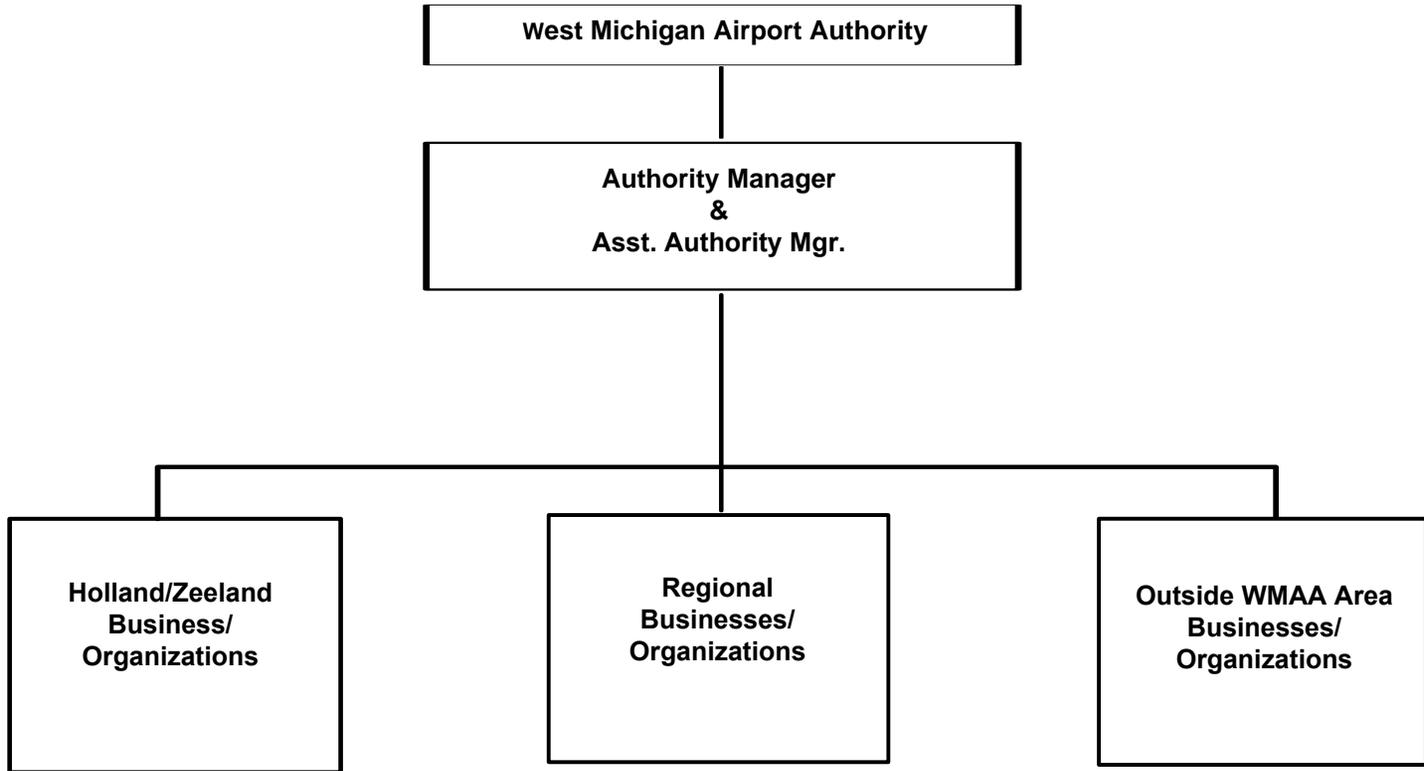


I do not want to create any unreasonable expectations with you about developing airport properties. This can be a long, labor-intensive activity that may at times seem not to bear significant results. However, we need to be sure that:

- We have our plans in place;
- The properties are ready for development;
- Area economic development organizations and companies are aware of opportunities at the airport;
- We are conducting outreach activities;
- We are aware of the development process with the City and FAA; and that
- We are ready to move quickly.

The West Michigan Airport Authority will provide the public with state-of-the-art global air access to strengthen the local economy and improve the area's quality of life.

**West Michigan Airport Authority Organizational Structure
Property Development Organization
December 10, 2018**



Partners:

- Lakeshore Advantage
- TCAS
- West Coast Chamber

- Lakeshore Advantage
- TCAS

- Lakeshore Advantage
- Search Consultant

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December 10, 2018

Report 11

To: West Michigan Airport Authority Board.
From: Greg Robinson, Authority Manager.
Subject: **Strategic Plan Discussion.**

At the October 2018 Authority Board meeting, a member suggested that the Board prepare a Strategic Plan. We did not discuss what exactly was meant by "Strategic Plan" but explored this idea further at the November 2018 Board meeting. We have set aside at least an hour at the December 10, 2018 Board meeting to discuss what gaps the Board feels need to be addressed in order to have a complete "Strategic Plan".

A Strategic Plan can mean different things to each of us. To me a Strategic Plan for the airport would involve:

- How we propose to use vacant or underutilized airport parcels;
- How we go about attracting developments for these parcels.
- How we provide services needed by the airport community;
- How we sustain a viable governing organization for the airport; and
- How we interact with airport stakeholders.

Board members may feel differently about what should be included in a Strategic Plan. At the December 10 meeting, we should resolve what needs to be part of a Strategic Plan and whether we have the elements already in place.

Background Materials

The following documents have been prepared relatively recently and have served as the guides for the Board and staff as we consider present and future development of the airport.

- 2013 Master Plan for West Michigan Regional Airport.
- Airport Layout Plan (drawings located at the end of Chapter 6 of the Master Plan).
- 2017 Site Development Evaluation for West Michigan Regional Airport.

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The **2013 Master Plan** was an extensive effort, funded in part by the FAA, that was developed by a Work Team of 10 members comprised of Authority representatives and representatives of Gentex, Metal Flow, JCI, Haworth, Tiara Yachts and the City of Holland Planning Commission. It is a comprehensive document that covers a wide-range of airport related interests.

The **Airport Layout Plan (ALP)** guides the use of airport property and any projects to be funded with FAA participation must be shown on this plan. As a result, this ALP is updated periodically to reflect changes at the airport.

The **2017 Site Development Evaluation** identifies all airport properties that are vacant or underutilized. This evaluation provides a summary of how each parcel is intended to be used.

The Authority's **Building & Development Committee** has been discussing concepts for future public and private hangars. The Committee has also discussed the merits of a crosswind runway. The Committee has completed its work and a presentation will be ready for the December 2018 Board meeting.

Recommendation

It is recommended that the Board review the documents already in place and discuss at the December Board meeting whether these constitute a "Strategic Plan"; or if there are other elements that need to be included as well.

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December 10, 2018

Report 11 B

To: West Michigan Airport Authority Board.
From: Greg Robinson, Authority Manager.
Subject: **Crosswind Runway Report.**

The Authority's Building & Development Committee has discussed the merits of constructing a crosswind runway and had Mead & Hunt prepare a report on this subject.

The attached report provides the:

- Background
- Justification and Need
- Implementation Steps
- Crosswind Runway Assessment
- Pros and Cons
- Summary of Action Options

As you will see in the report, a crosswind runway could provide some benefit to smaller aircraft, however, it could not be justified for jet use. The estimated cost is between \$8.75 and \$15 million, depending on multiple factors. Although the Authority could justify the runway for smaller aircraft, a strong need would need to be demonstrated through a cost/benefit analysis. Also, the report notes that "The FAA does not equate eligibility with fundability."

The Airport Authority does not show this project in the five-year capital program which was presented to MDOT/AERO in October 2018. The crosswind runway is shown in the Airport Layout Plan (ALP) as a future project and it would be prudent to keep the project as depicted on the ALP.

West Michigan Airport Authority

60 Geurink Boulevard, Holland, MI 49423

P (616) 510-2332

Comprising City of Zeeland, Park Township and City of Holland



Recommendation

It is recommended that the Authority Board accept the Mead & Hunt report as information and continue to depict the crosswind runway on the ALP as a future desired project.

Attachment: Mead & Hunt report



2605 Port Lansing Road
Lansing, Michigan 47906
517-321-8333
meadhunt.com

6/16/2018

Mr. Gregory Robinson, Manager
West Michigan Airport Authority (WMAA)
60 Geurink Blvd
Holland, MI 49423

Subject: Crosswind Runway Review and Considerations
West Michigan Regional Airport (BIV)
Holland, Michigan

Dear Mr. Robinson:

At the May 22, 2018 Building and Development Committee Meeting there was a discussion regarding the future crosswind runway that is shown on the Future Airport Layout Plan sheet in the current Airport Layout Plan (ALP) set. drawing. The committee requested a summary of the considerations regarding whether they should continue to plan and protect for a future crosswind runway. This letter briefly presents and summarizes the key considerations related to the potential crosswind runway.

Background

West Michigan Regional Airport, located in Holland, Michigan, is classified as a General Utility airport per the State of Michigan licensing standards. The airport has a single paved runway, Runway 8-26 (6002' X 100') which utilizes an Instrument Landing System (ILS) for Runway 26. Much of the airport infrastructure can accommodate aircraft classified by the Federal Aviation Administration (FAA) Aircraft Reference Code as D-III aircraft; however, the airport is classified as design group D-II per the most recent ALP update based upon the calculation of the critical aircraft for the airport per the FAA Advisory Circular 150/5300-13A *Design Standards*.

Per the 2017 *Michigan Aviation System Plan* (MASP), the airport reported 35,000 operations in 2015, split approximately 50/50 between local operations (operations from aircraft based at the Airport) and itinerate operations. This is forecasted to increase to nearly 39,000 by 2035. The airport currently serves as the base airport for 34 single engine piston aircraft, 11 multi engine aircraft, and 13 jet engine aircraft.

The Airport is listed as a Tier 1 airport in the 2017 MASP, based on it supporting significant population centers, business centers, tourism centers, overall land area coverage and regional capacity. This designation demonstrates the value of the Airport to the community as a business or corporate related asset. The Airport served 126,275 passengers via general aviation and charter operations and saw 25,975 tons of cargo pass through it in 2016. The Community Benefits Assessment (CBS) study which

was completed with the 2017 MASP estimates that the Airport, supports over 3,000 community jobs and generates more than \$521 million in local impact annually, when including direct and income re-spending effects.

The Airport's Airport Layout Plan (ALP) has depicted and protected for a future crosswind runway, at 3,500 feet in length and 75 feet wide, for many years. The Airport had been including projects in the outer years of its Five-Year Capital Improvement Plan (CIP) for the implementation and construction of the crosswind runway for many years. However, each year when conducting CIP planning with the MDOT Office of Aeronautics, higher priority projects have been inserted into the CIP nearly every year and the crosswind runway has continually been pushed back in priority. Considering this, in the latest CIP presented in late 2017, the crosswind runway has been removed from the five-year plan.

Justification and Need

As noted above, the crosswind runway has been shown on the CIP for many years, however, that is just one step in the broader process of constructing the runway. Certain FAA criteria must be met for federal funding participation eligibility for the project. FAA Advisory Circular 150/5300-13A, *Airport Design*, states that a crosswind runway is recommended when the primary runway orientation provides less than 95 percent wind coverage. The 95 percent wind coverage is computed based on the crosswind component not exceeding allowable speeds for various classifications of aircraft. FAA design standards have an allowable crosswind of 13 knots for A-II and B-II aircraft and 10.5 knots for A-I and B-I small aircraft (under 12,500 pounds).

An analysis of wind data for BIV was conducted when the airport master plan was developed and is shown on the ALP, with the following wind coverages provided by existing Runway 8/26 are shown in **Table 1**.

Table 1 – Crosswind Coverage

Aircraft Classifications (Runway Design Code)	Allowable Crosswind Component (knots)	Wind Coverage (All Weather)
A-I and B-I (small aircraft)	10.5	92.1%
A-II and B-II	13	96.1%

Therefore, FAA design standards would recommend a crosswind runway be provided for A-I and B-I small aircraft as the primary runway does not provide them with 95.0% wind coverage. Federal funding participation eligibility in a crosswind runway would be limited to a runway length and width adequate to serve A-I and B-I small aircraft, as larger aircraft have over 95.0% wind coverage on Runway 8/26. A crosswind runway to service A-I and B-I small aircraft for visual and non-precision approaches would be anticipated to be justified at a length of between 2,800 to 3,500 feet in length and 60 feet in width.

Implementation Steps

In addition to the actual physical construction of the projects, the development of any new runway utilizing federal funding or being completed on federally incumbered property includes several additional steps that must be completed for federal compliance. **Table 2** summarizes the major projects and steps, with rough order of magnitude cost ranges, that would be anticipated for the implementation of a new runway at BIV.

Table 2 – Typical Implementation Steps for New Runway

Project / Step	Rough Order of Magnitude Cost	
	Low	High
Feasibility / Funding Justification Study	\$ 50,000	\$ 150,000
Environmental Assessment and Prelim Engineering	\$ 500,000	\$ 750,000
Land Acquisition (60 to 80 acres @ \$25k to \$50k/acre)	\$ 1,500,000	\$ 4,000,000
Wetland Mitigation (30 to 40 acres @ \$30k to \$50k/acre)	\$ 900,000	\$ 2,000,000
Approach Clearing (30 to 40 acres @ \$10,000/acre)	\$ 300,000	\$ 400,000
Runway Construction	\$ 5,350,000	\$ 7,500,000
Runway 26 Glideslope Relocation	\$ 150,000	\$ 300,000
Total	\$ 8,750,000	\$ 15,100,000

Note: All costs based upon 2017 costs

Crosswind Runway Assessment

The addition of Runway 18/36 would increase the wind coverage of the airport when combining both runways, for a 10.5 knot allowable crosswind, from 92.1% to 97.8%.

Development of a crosswind runway at BIV offers several benefits to the airport users and community. However, the implementation also contains significant challenges and costs. **Table 3** summarizes several the key considerations in a pro/con type format as to whether the Airport may want to continue to plan and protect for future crosswind runway.

Table 3 – Crosswind Runway Pros and Cons Summary

Pros	Cons
1. Allows small aircraft to takeoff and land when crosswinds are present. Increases wind coverage for small aircraft from 92.1% to 97.8%.	1. At a length of not more than 3,500 feet, it provides no benefit for jets or larger aircraft.
2. As there is adequate space for near-term future hangar development at the Airport, there is little lost for the Airport by continuing to protect for the crosswind runway for now,	2. Significant costs for implementation, rough order of magnitude of between \$8.75 and \$15.1 million.

<p>deferring a decision about its long-term need and implementation into the future.</p>	
<p>3. If the crosswind runway is removed from the ALP and future development occurs in its location, it likely becomes nearly impossible to ever implement the runway in the future.</p>	<p>3. Requires deferring all other significant projects and improvements for the 5 to 6 years required for crosswind runway implementation, assuming funding could be obtained over that time frame.</p>
	<p>4. Protecting the land and airspace for the runway limits on- and off-airport development.</p>
	<p>5. There are significant environmental challenges to constructing the crosswind runway, making implementation questionable, such as possible impacts to:</p> <ul style="list-style-type: none"> • Wetlands • North Branch Macatawa River • Floodplains • Tree clearing • Land acquisition
	<p>6. While the crosswind runway would likely be determined to be justified and therefore eligible for federal funding, that would not ensure federal participation. The FAA does not equate eligibility with fundability. The WMAA would still likely need to demonstrate a strong need through a benefit cost analysis, approved by the FAA, to receive federal funding.</p>

Considerations Summary

The proposed crosswind runway depicted on the ALP meets FAA policies for federal funding participation and is recommended in accordance with current FAA design standards. However, it only provides an incremental benefit for a small percentage of the Airport's users for a small percentage of the time. Additionally, implementation has a significantly high cost in terms of construction costs and the likely deferment of other high priority projects at the Airport.

The Airport Authority has three primary options in terms of its ALP and the future crosswind runway.

1. Continue to show the crosswind runway on the ALP and protect the land and airspace as much as possible for the potential runway. This would allow the airport to defer a decision about the crosswind runway until a later date. However, this limits development within the vicinity of the crosswind runway both on and off airport. It could be eventually removed from the ALP in the future if desired or kept and implementation sought.

Mr. Greg Robinson

6/16/2018

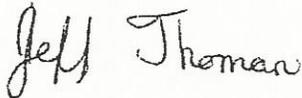
Page 5

2. Immediately remove the crosswind from its ALP, opening those areas both on and off airport for potential development. This requires an immediate ALP update project.
3. Remove the crosswind runway from the ALP at the next significant ALP update. This restricts development in those areas until it is removed from the ALP but defers costs for an immediate ALP update.

If you have any questions or require additional information, please contact us.

Sincerely,

MEAD & HUNT, Inc.

A handwritten signature in cursive script that reads "Jeff Thoman".

Jeff Thoman, PE
Project Manager

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**WEST MICHIGAN REG. AIRPORT
HANGAR SITE OPTIONS**

HOLLAND, MI

ISSUED

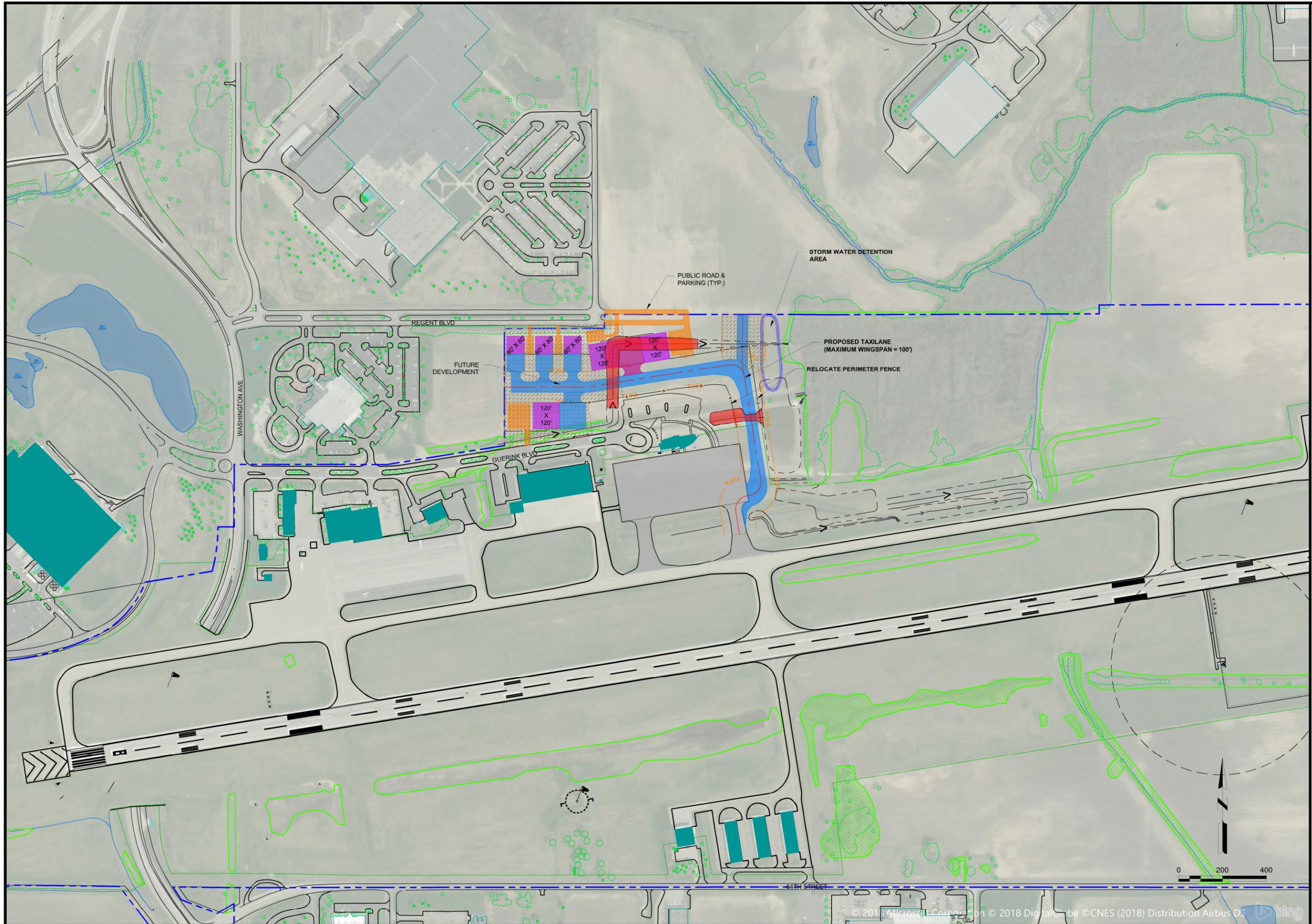
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M&H NO.: 0819900-170419.01
DATE: NOV. 20, 2018
DESIGNED BY: JET
DRAWN BY: JET
CHECKED BY: MDB
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SHEET CONTENTS
HANGAR LAYOUT
CORP ALT 04

SHEET NO.

CORP 04



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ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST- ALTERNATE 4



PROJECT:	Preliminary Engineering for Hangar Layout - ALTERNATE 4
LOCATION:	West Michigan Regional Airport
CITY:	Holland, Michigan
DATE:	11/21/2018
REVISED:	
PREPARED BY:	JMM

FINAL DESIGN
 PRELIMINARY DESIGN
 PROJECT PROGRAMMING
 FEASIBILITY STUDY
 BASED ON FY 2018 DOLLARS

WORK DESCRIPTION:	Development of corporate area Taxiway, Access Road and Parking
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LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	ITEM COST
0010	100001	Mobilization and General Conditions	LS	1	\$20,000.00	\$20,000.00
0010	100001	Mobilization and General Conditions	LS	1	\$70,000.00	\$70,000.00
0020	100002	Safety and Security	LS	1	\$10,000.00	\$10,000.00
0020	100002	Safety and Security	LS	1	\$35,000.00	\$35,000.00
0030	100003	Permits	DLR	2,500	\$1.00	\$2,500.00
0030	100003	Permits	DLR	2,500	\$1.00	\$2,500.00
0040	108001	5 KV Cable & Conduit	LFT	2,500	\$6.00	\$15,000.00
0050	108002	Counterpoise	LFT	2,500	\$3.00	\$7,500.00
0060	110001	2 BK 2" Duct Bank	LFT	200	\$25.00	\$5,000.00
0070	115001	Electrical Handhole	EA	4	\$6,500.00	\$26,000.00
0080	125001	Taxiway Edge Light	EA	20	\$1,200.00	\$24,000.00
0090	152001	Unclassified Excavation	CYD	5,000	\$7.00	\$35,000.00
0090	152001	Unclassified Excavation	CYD	10,700	\$7.00	\$74,900.00
0100	154001	Subbase Course (10" Parking Lot, 18" Road)	CYD	1,400	\$20.00	\$28,000.00
0100	154001	Subbase Course (24" Taxiway)	CYD	5,300	\$20.00	\$106,000.00
0110	156001	Soil Erosion, Silt Fence	LFT	900	\$3.50	\$3,150.00
0110	156001	Soil Erosion, Silt Fence	LFT	1,800	\$3.50	\$6,300.00
0120	162001	Chainlink Fence	LFT	1,900	\$20.00	\$38,000.00
0130	209001	Aggregate Base Course (6" Parking and Road)	CYD	600	\$45.00	\$27,000.00
0130	209001	Aggregate Base Course (8" Taxiway)	CYD	1,800	\$60.00	\$108,000.00
0140	401001	Bituminous Surface Course	TON	1,000	\$90.00	\$90,000.00
0140	401001	Bituminous Surface Course	TON	2,400	\$90.00	\$216,000.00
0160	603001	Bituminous Tack Coat	GAL	2,300	\$1.00	\$2,300.00
0170	620001	Pavement Marking, Yellow	SFT	4,000	\$0.50	\$2,000.00
0170	620001	Pavement Marking, Yellow	SFT	4,000	\$0.50	\$2,000.00
0180	620002	Pavement Marking, Yellow, Half Rate	SFT	1,300	\$0.50	\$650.00
0190	705001	Underdrains	LFT	2,600	\$7.00	\$18,200.00
0200	751001	Storm Water System	LS	1	\$25,000.00	\$25,000.00
0200	751001	Storm Water System	LS	1	\$50,000.00	\$50,000.00
0210	901001	Seeding	ACRE	1.0	\$1,000.00	\$1,000.00
0210	901001	Seeding	ACRE	2.0	\$1,000.00	\$2,000.00
0220	908001	Mulching	ACRE	1.0	\$2,000.00	\$2,000.00
0220	908001	Mulching	ACRE	2.0	\$2,000.00	\$4,000.00
SITWORK CONSTRUCTION TOTAL =						\$245,650.00
CONSTRUCTION CONTINGENCY (30%) =						\$73,695.00
ENGINEERING (7%) =						\$22,354.15
CONSTRUCTION ADMINISTRATION (10%) =						\$31,934.50
SITWORK TOTAL =						\$373,633.65
SITWORK CONSTRUCTION TOTAL =						\$813,350.00
CONSTRUCTION CONTINGENCY (30%) =						\$244,005.00
ENGINEERING (7%) =						\$74,014.85
CONSTRUCTION ADMINISTRATION (10%) =						\$105,735.50
SITWORK TOTAL =						\$1,237,105.35
ENVIRONMENTAL CLEARANCE (SHORTFORM EA)* =						\$20,000.00
WETLAND PERMITTING =						\$15,000.00
WETLAND MITIGATION @ 1.70AC** =						\$85,200.00
TOTAL ESTIMATED PROJECT COSTS =						\$1,730,939.00

NOTES:
 * Shortform EA requires the approval of MDOT Aeronautics
 ** Wetland Mitigation quantity reflects a mitigation rate of 1.5:1 for wetland @ \$50,000/AC

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**WEST MICHIGAN REG. AIRPORT
HANGAR SITE OPTIONS**

HOLLAND, MI

ISSUED

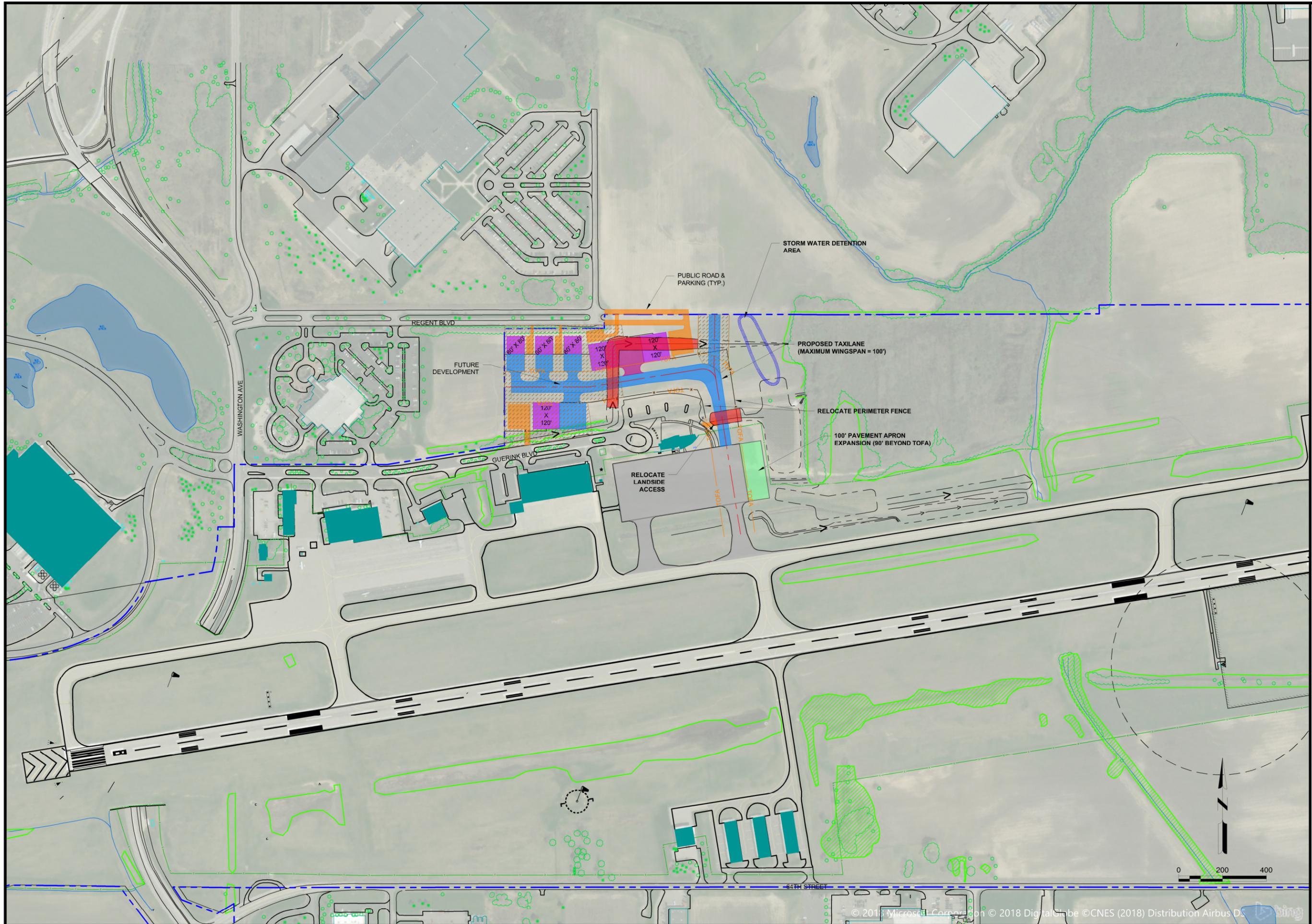
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SHEET CONTENTS
HANGAR LAYOUT
CORP ALT 05

SHEET NO.

CORP 05



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ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST- ALTERNATE 5



PROJECT:	Preliminary Engineering for Hangar Layout - ALTERNATE 5
LOCATION:	West Michigan Regional Airport
CITY:	Holland, Michigan
DATE:	11/21/2018
REVISED:	
PREPARED BY:	JMM

FINAL DESIGN
 PRELIMINARY DESIGN
 PROJECT PROGRAMMING
 FEASIBILITY STUDY
 BASED ON FY 2018 DOLLARS

WORK DESCRIPTION:	Development of corporate area Taxiway, Apron Expansion, Access Road and Parking
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0010	100001	Mobilization and General Conditions	LS	1	\$20,000.00	\$20,000.00
0010	100001	Mobilization and General Conditions	LS	1	\$50,000.00	\$50,000.00
0010	100001	Mobilization and General Conditions	LS	1	\$30,000.00	\$30,000.00
0020	100002	Safety and Security	LS	1	\$10,000.00	\$10,000.00
0020	100002	Safety and Security	LS	1	\$25,000.00	\$25,000.00
0020	100002	Safety and Security	LS	1	\$15,000.00	\$15,000.00
0030	100003	Permits	DLR	2,500	\$1.00	\$2,500.00
0030	100003	Permits	DLR	2,500	\$1.00	\$2,500.00
0030	100003	Permits	DLR	2,500	\$1.00	\$2,500.00
0040	108001	5 KV Cable & Conduit	LFT	1,400	\$6.00	\$8,400.00
0050	108002	Counterpoise	LFT	1,400	\$3.00	\$4,200.00
0060	110001	2 BK 2" Duct Bank	LFT	200	\$25.00	\$5,000.00
0070	115001	Electrical Handhole	EA	4	\$6,500.00	\$26,000.00
0080	125001	Taxiway Edge Light	EA	12	\$1,200.00	\$14,400.00
0090	152001	Unclassified Excavation	CYD	5,000	\$7.00	\$35,000.00
0090	152001	Unclassified Excavation	CYD	9,500	\$7.00	\$66,500.00
0090	152001	Unclassified Excavation	CYD	3,500	\$7.00	\$24,500.00
0100	154001	Subbase Course (10" Parking Lot, 18" Road)	CYD	1,400	\$20.00	\$28,000.00
0100	154001	Subbase Course (24" Taxiway)	CYD	3,300	\$20.00	\$66,000.00
0100	154001	Subbase Course (20" Apron Expansion)	CYD	1,600	\$20.00	\$32,000.00
0110	156001	Soil Erosion, Silt Fence	LFT	900	\$3.50	\$3,150.00
0110	156001	Soil Erosion, Silt Fence	LFT	1,800	\$3.50	\$6,300.00
0110	156001	Soil Erosion, Silt Fence	LFT	1,500	\$3.50	\$5,250.00
0120	162001	Chainlink Fence	LFT	1,900	\$20.00	\$38,000.00
0130	209001	Aggregate Base Course (6" Parking and Road)	CYD	600	\$45.00	\$27,000.00
0130	209001	Aggregate Base Course (8" Taxiway)	CYD	1,100	\$60.00	\$66,000.00
0130	209001	Aggregate Base Course (6" Apron Expansion)	CYD	500	\$60.00	\$30,000.00
0140	401001	Bituminous Surface Course	TON	1,500	\$90.00	\$135,000.00
0140	401001	Bituminous Surface Course	TON	1,000	\$90.00	\$90,000.00
0150	501001	Portland Cement Concrete Pavement (10.5")	SY	2,900	\$75.00	\$217,500.00
0160	603001	Bituminous Tack Coat	GAL	1,650	\$1.00	\$1,650.00
0170	620001	Pavement Marking, Yellow	SFT	4,000	\$0.50	\$2,000.00
0170	620001	Pavement Marking, Yellow	SFT	1,300	\$0.50	\$650.00
0180	620002	Pavement Marking, Yellow, Half Rate	SFT	850	\$0.50	\$425.00
0190	705001	Underdrains	LFT	1,700	\$7.00	\$11,900.00
0190	705001	Underdrains	LFT	750	\$7.00	\$5,250.00
0200	751001	Storm Water System	LS	1	\$25,000.00	\$25,000.00
0200	751001	Storm Water System	LS	1	\$50,000.00	\$50,000.00
0200	751001	Storm Water System	LS	1	\$25,000.00	\$25,000.00
0210	901001	Seeding	ACRE	1.0	\$1,000.00	\$1,000.00
0210	901001	Seeding	ACRE	2.0	\$1,000.00	\$2,000.00
0210	901001	Seeding	ACRE	1.0	\$1,000.00	\$1,000.00
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0220	908001	Mulching	ACRE	2.0	\$2,000.00	\$4,000.00
0220	908001	Mulching	ACRE	1.0	\$2,000.00	\$2,000.00

LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	ITEM COST
						SITWORK CONSTRUCTION TOTAL = \$245,650.00
						CONSTRUCTION CONTINGENCY (30%) = \$73,695.00
						ENGINEERING (7%) = \$22,354.15
						CONSTRUCTION ADMINISTRATION (10%) = \$31,934.50
						SITWORK TOTAL = \$373,633.65
						SITWORK CONSTRUCTION TOTAL = \$583,925.00
						CONSTRUCTION CONTINGENCY (30%) = \$175,177.50
						ENGINEERING (7%) = \$53,137.18
						CONSTRUCTION ADMINISTRATION (10%) = \$75,910.25
						SITWORK TOTAL = \$888,149.93
						SITWORK CONSTRUCTION TOTAL = \$390,000.00
						CONSTRUCTION CONTINGENCY (30%) = \$117,000.00
						ENGINEERING (7%) = \$35,490.00
						CONSTRUCTION ADMINISTRATION (10%) = \$50,700.00
						SITWORK TOTAL = \$593,190.00
						ENVIRONMENTAL CLEARANCE (SHORTFORM EA)* = \$20,000.00
						WETLAND PERMITTING = \$15,000.00
						WETLAND MITIGATION @ 1.56 AC** = \$76,400.00
						TOTAL ESTIMATED PROJECT COSTS = \$1,966,373.58

NOTES:

* Shortform EA requires the approval of MDOT Aeronautics

** Wetland Mitigation quantity reflects a mitigation rate of 1.5:1 for wetland @ \$50,000/AC