ARRAY
OF
THINGS

MANUAL
ARRAY OF THINGS - VERSION 2

CONTENTS

Page

Node

Weight	6.1 kg / 13.5 lbs
Power Input	88-264 VAC 30 Watts 50/60 HERTZ
Recommended mounting height	5.5 meters / 18 ft. from ground level

Mounting Considerations

The recommended mounting height is 5.5 meters / 18 ft. from ground level.
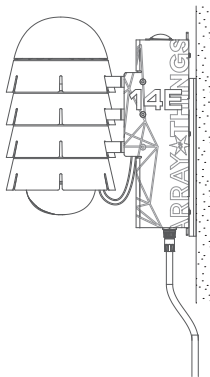
The location should be free from artificial sources of heat and particulates.

The cameras should be as unobstructed as possible. The top camera has a 75° field of view and the bottom camera has a 90° field of view.
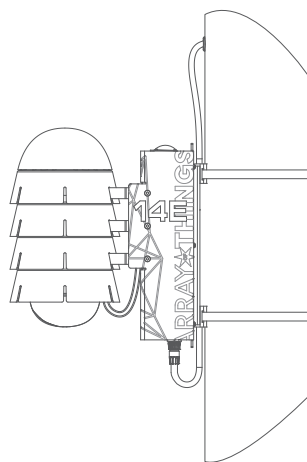

75°

90°

335 mm
13.2"

406 mm
16.0"

203 mm
8.0"

290 mm
11.4"

99 mm
3.9"
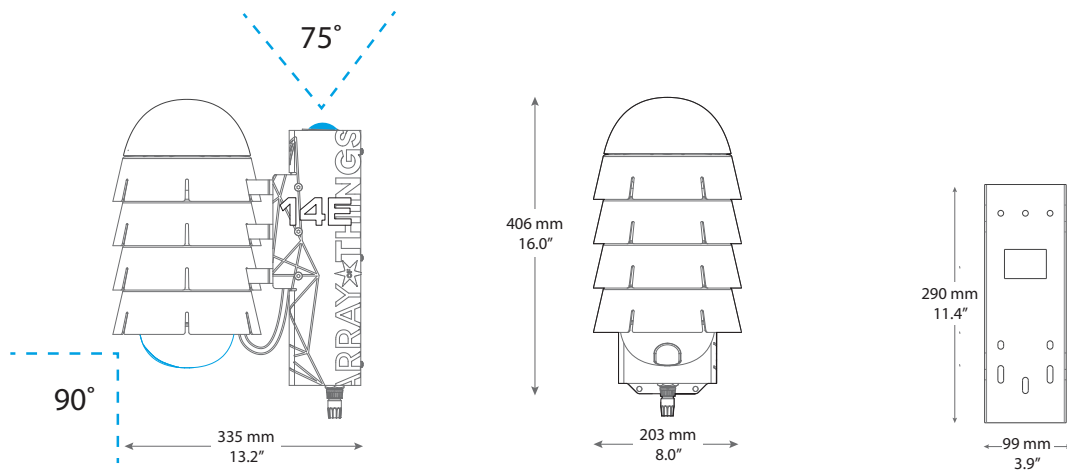
## Configurations

Wall Mount

Pole Mount

Welcome

Welcome to the Array of Things network of nodes. You have received everything that you need to get started. To do so, a yellow power cable was included in your shipment., and at the end of the cable there are pigtails, or 3 wires within the cord. Below is the breakdown of the wires:

Black: live
White: neutral
Green: ground

For mounting instructions on a pole-mounted system, please see page 4. For mounting instructions for a wall-mounted system, please see page 6.

Items included
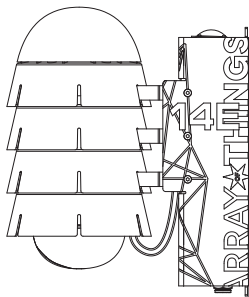
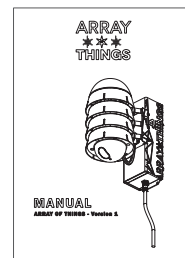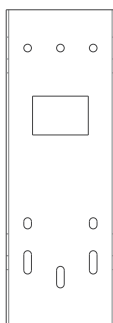AoT Node   Power Cable   Manual
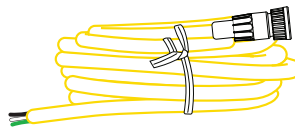
Mounting Bracket (If Requested)

Please note the supplemental items needed for mounting a node are not included in this shipment. An itemized list of necessary tools can be found on page 4 and page 6.

Requirements

Provided

10.6 meters / 35 ft. long 16/3 power cable

Needed

Stainless steel band, 3/4" x .44" Recommended: 150 Stainless steel band, Part #BA430 or equivalent

2 Stainless steel crimp buckles, 3/4" Recommended: Part # BU440 or equivalent

Tensioning and crimping installation tools

19 mm / 3/4" drill or hole saw

Rubber grommet, appropriate for hole size and pole wall thickness

Power Drill

Installation

1

Drill a 19 mm / 0.75" hole in pole at any convenient location above power connection point and insert rubber grommet.

Drill above
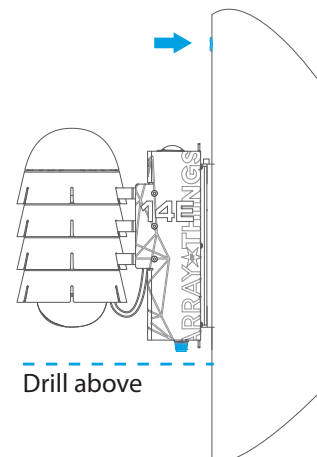
2

Drop power cable into pole and attach to AC power at base in accordance with local electrical and building codes.

AC power
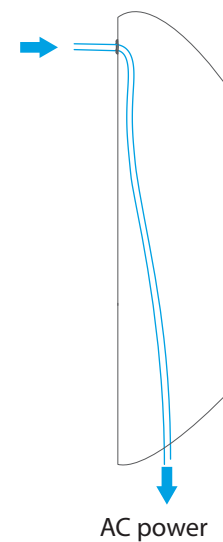
3

Attach node to pole using two stainless steel bands with crimps.
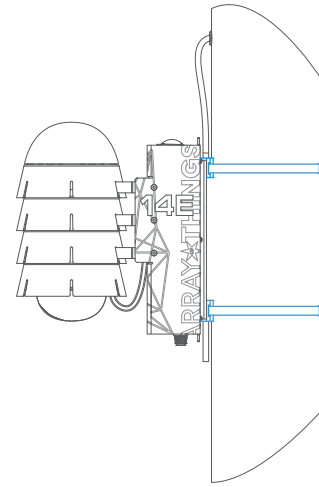
Requirements

Provided

Wall mount plate

4 Tapcon® TCH14114 screws

10.6 meters / 35 ft. long 16/3 power cable

Needed

Power drill

5/16" Hex driver

3/16" Masonry drill bit

Installation

1

Attach wall mounting plate in the desired location using screws appropriate for the wall material, four Tapcon screws are provided for installation on concrete or masonry walls.

2

Locate the slots on the node assembly on to the 4 hooks on the mounting plate and slide the node down until the retaining latch snaps into position.

Installation

1

To power on, connect the yellow power cable to node via the twist-and-lock connector. Tighten the cable collar until it is firmly fastened.

This is the only item that you need to plug into the node. At this point, the node is currently booting on its own.
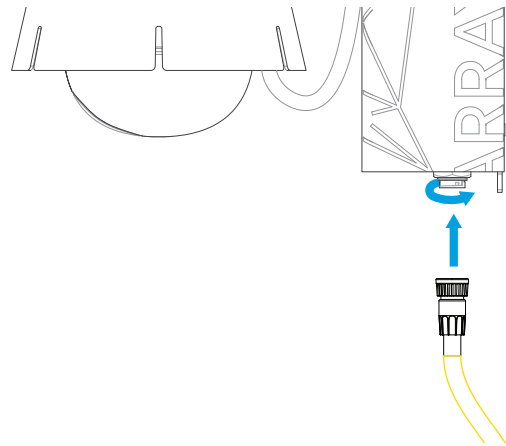
2

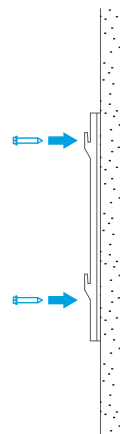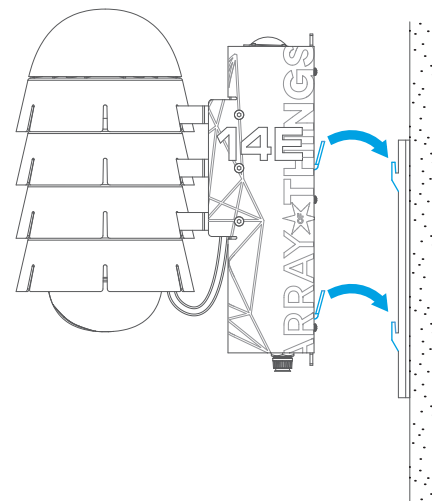After a couple of minutes, you should see lights start illuminating in the Stevenson (sensor pod). Although the lights do not ensure logical integrity/uptime, they do ensure the node is receiving power.
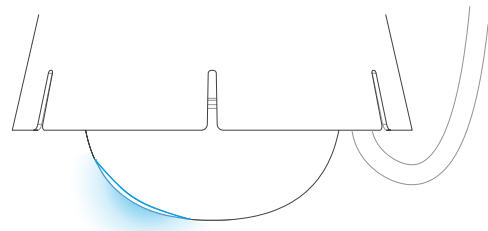
3

Adjust power cable length until it has at least a 15 cm / 6" drip loop.

6 Inches
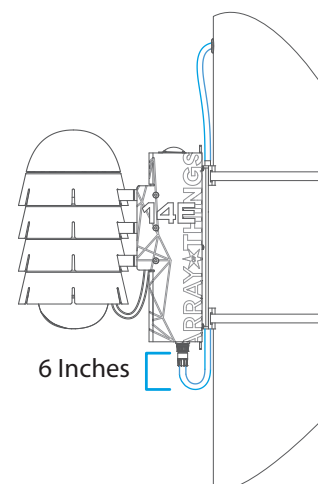
You may have noticed another external port on the exterior of the node. This is the console connection for the node. Upon being shipped to you, this cable should have its end taped with electrical tape and be zip-tied to the black-sleeved cable going into the Stevenson (sensor pod). When the node arrives the console cable will not be accessible to any partner, and therefore should not be tampered with or be attempted to be connected to.

Accessing your data

At this point, you will be interested in interacting with the node. As part of the AoT pack-
aged product, your node has a built-in AT&T cellular modem (continental US partners
only). This modem is the main and only communication method that your node will relay
its collected sensor data back out of the node to your collection point.
We have implemented a secure, message broker system that enables your node to send
your data back to the database managed at Argonne National Laboratory, decode it, and
become available for easy consumer digestion. Your gateway to
 your data can be found here:
http://www.mcs.anl.gov/research/projects/waggle/downloads/beehive1/

Once you have browsed to that page, simply match the external 3-character
alpha- numeric code on your nodes, casing against the name on the web page to gain
access to all the collected sensor data. This webpage will link you to a day-by-day break-
down of data collected by the node.
*Note: Once your node is powered on, you should see your node and sensor data in about
15 minutes after boot

Sensor information

For information on all the sensors in our sensor pod, as well as the data sheets for each
sensor, we encourage you to visit our public GitHub project. You can find
sensor-specific information and data sheets at the following address:
https://github.com/waggle-sensor/sensors

So you have brought Array of Things to your community, and you want to talk about it. We encourage this behaviour! Transparency is a core principle of the Array of Things project, and outreach to local media and residents helps us accomplish that mission. We have learned a lot from launching AoT in Chicago, and we want to help you benefit from those lessons as you talk about your own deployment.

For starters, feel free to introduce yourself and your media/communications person to our communications manager, Rob Mitchum (rmitchum@uchicago.edu). We are happy to set up a phone call to discuss the project and answer any questions. As a courtesy, we ask that you run any major public communications -- such as a news release or website story -- past us before publication, so we can make sure it's in sync with our overall messaging. If you need photos or graphics, or want to include a quote from the project PI, Charlie Catlett, or any other AoT team members, we can help with that, too. Please loop us in on any media inquiries and coverage as well.

In general, if you are hitting any milestones, such as installing the first node, releasing data, or holding a community meeting, drop us a line and send us photos. We will share it out on our social media accounts (@arrayofthings and facebook.com/ArrayofThings), but are also particular interested in photos as it helps our technical team better understand the placement of your node(s).

Below are some of the messages we try to emphasize with the project, as well as some sensitive areas and how we handle them. Do not feel like you need to stick to these messages word-for-word, but they will give you an idea of how we talk about Array of Things with the media and the general public. The website (arrayofthings.org) is also an excellent resource for language around the project and specific questions we receive often.

The Array of Things is a collaborative effort among leading scientists, universities, local government, and communities to collect real-time data on the city's environment, infrastructure, and activity for research and public use. The project is led by the University of Chicago and Argonne National Laboratory, and is funded primarily by the National Science Foundation.

Array of Things is a network of interactive sensors collecting real-time data about the urban environment, infrastructure, and activity that will improve how communities address their biggest challenges.

- Combining existing data with purpose-built sensors to equip cities to better   understand its natural and built environments:

- Leads to a greater understanding of an area's liveability with respect to climate,   air quality, noise, and other factors

- Effectively creates a city-wide "fitness tracker" with tools and resources for   residents to directly use the data

- Gathering hyper-local data will help governments operate more efficiently,   anticipating and pro-actively addressing potential problems

• Researchers with the Array of Things project have developed the technology through iterative design over the past 5 years, improving the overall system to   be reliable, resilient, and secure.

• AoT data will be open source, free, and publicly available. These policies promote innovation through creation of applications that help residents lead healthier and happier lives and allow for greater transparency, accountability and collaboration.

• We are creating an innovation ecosystem based on collaborations between   government and citizens, partnerships between public and academic institutions, transparency, and connectivity that is a blueprint for other cities around the world.

AoT is a first-of-its-kind community technology, promoting collaboration and innovation among diverse groups like never before.

• Residents will use existing and planned web portals and mobile applications to monitor factors such as air quality or congestion in their neighbourhoods.

• Developers and Students will use the data to create new applications that help individuals apply AoT insights to everyday life.

• Researchers will have unprecedented insight into new liveability data, generating breakthrough discoveries in public health, sociology, climate, and beyond.

• City & Community Policymakers will be given powerful tools to investigate new data, combine it with other information, and make predictions about the City's future that inform allocation of resources and policy changes.

Privacy and Transparency

Array of Things is interested in monitoring the city's environment, infrastructure, and activity, not individuals. Privacy protection is built into the design of the sensors and into the operating policies, and no sensitive publicly identifiable information will be collected or published.

An AoT privacy policy was developed by the University of Chicago and the City of Chicago, with the public providing feedback through community meetings and online comments. It is available at http://arrayofthings.us/privacypolicy.html.

All hardware, software and plans to collect data are regularly reviewed by a Technical Security and Privacy Group, made up of community members and representatives from academia, the City of Chicago, and digital privacy organizations.

For any technical or node-related assistance, please contact:
Rajesh Sankaran: rajesh@anl.gov

For any licensing, financial, or contract-based questions, please contact:
Kate Kusiak Galvin: katekusiak@uchicago.edu

For communications or media questions, please contact:
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