



ALERTTRACE™

VOS SYSTEMS LLC

304 W University Ave
Gainesville, FL 32601 USA
+1 (800) 281-2475

10874 Plano Rd Ste B
Dallas, TX 75238 USA
sales@alerttrace.com

325 Spencer Road
Conover, NC 28613 USA
+1 (888) 604-6975



AlertTrace™ Introduction & Instructions

About AlertTrace Contact Tracing

The AlertTrace system is designed to give companies and organizations the best data possible for use in limiting the impact to other team members in the event that one or more team members contracts an infection. It cannot prevent infection, of course. But in the event a team member subsequently tests positive, the AlertTrace data will provide the best information possible to enable the organization to proactively guard the health of other team members.

Receiving your AlertTrace Equipment

- Open the boxes. Check that you received everything you ordered.
- The Minis (the Wearables)
 - These are the devices that team members will wear. They record close proximity contacts between team members, and then transmit that data to the Hub-Gateways.
- The Hub//Gateways
 - These are the devices that upload the data from the Minis and then transmit the data to the cloud database.
 - The Hubs should come with the power cord attached. If you need to attach it yourself, note that these are IP67 waterproof USB plugs and are very tight when the cord is being inserted into the Hub.
- Accessories
 - Wristbands, if you ordered wristbands.
 - If not, Gator clips will be included in your box.
- Should you find anything is missing or if you need any help, just reach out to your Account Rep.



Connecting & Enabling your Hub/Gateway(s)

- The Bluetooth Cellular Gateway or "Hub" is going to upload data from the Minis/Wearables and send the data on to the cloud databases.
- When a Gateway/Hub is connected to AC power it will turn on automatically, and the left-most LED will turn solid green. (You may also turn on the Gateway by pressing the right-most red button on the front when it is not plugged into AC. When running on internal battery the left-most LED blinks green rather than being solid green.)
- You may begin to install Gateways before distributing Minis if you wish, or you may wait until Minis have been distributed. However, neither the Minis nor the Gateways will be transmitting data until after you have "activated" the Minis. Activation is accomplished via the Admin Dashboard.
 - *Important Note: DO NOT ACTIVATE THE MINIs until all Minis have been distributed to individuals. Activating before distribution, when multiple Minis are stored in a box near each other, will result in both diminished battery life AND large amounts of useless*



contact data cluttering your Admin Dashboard. See “Distributing & Assigning Minis to individuals” below.

- Each Gateway will pick up Minis within a radius of about 75 feet. Install your Gateways where they'll routinely see as many Minis as possible. Cafeterias, central hallways and exit/entranceways are good spots. They can be set at about any height, although we recommend at least 18" or a half meter off the floor, but as high as you want. You'll need to have power nearby, to plug each Gateway into a wall socket.

Registering, Assigning & Distributing Minis/Wearables to Individuals

- You can distribute your Minis before you install the Gateways in their permanent location if you wish. Either order is okay, Minis first or Gateways first, because neither will be transmitting data until you “activate” as described above.
- To register wearables in the AlertTrace system and to assign them to individuals, please read the detailed instructions in the document titled “Admin Platform Setup Guide”.
- If you have a small number of users, they will be able to be registered and assigned individually, following the instructions. If you have prepared the Excel file described above, you will use that file (as a CSV file) to register.
- Again, DO NOT “activate” the system until nearly all the minis have been distributed to the wearers. After you've activated the system, any minis that are not distributed will be pinging - every 10 seconds - other minis that are within a few feet of them, which after a number of days will take a toll on the batteries.

Dashboard Operations

- For details on all the features available on the Dashboard, please see the document titled “Admin Platform Setup Guide”.

Quick Set-Up Review

1. Unpack your devices and check that you’ve received what you ordered.
2. Log into the dashboard at <https://app.alerttrace.com/> using the access credentials you’ve been provided.
3. Place Gateways/Hubs in locations where they will see the most Minis the most time.
4. Via the Dashboard, register and assign the Minis to individuals.
5. After distributing the Minis, proceed with the “Activate” function (Gateway by Gateway) on the Dashboard.
6. On the Dashboard, enable piezos. Give the signal a few minutes to get from the Hubs to the Minis. (Give team members a warning that they will hear tiny chirps when they approach another Mini.).
7. Then, with the piezos enabled, “test” the distance between one Mini and another by, while being worn (to keep them awake), walking from 10-12 feet away toward another wearer of a Mini.



8. If the distance between the two is too close, go to the Dashboard and adjust the Contact Tracing Range to be further toward the “Far” setting (or the opposite if the distance is too far), and repeat the previous step.
9. Continue repeating this process until the Minis are activating at between 7 to 8 feet. (See information further on in this document on why 7 or 8 feet is better than 6 feet).
10. After completing this process, we recommend that you turn off the peizos so they don’t create confusion and interruptions.

FCC Part 15.19 Warning Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

FCC Part 15.21 Warning Statement

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER’S AUTHORITY TO OPERATE THE EQUIPMENT.



AlertTrace™ Testing & Settings Information

About Testing: Short-Term Static Testing is Bound for Problems... Here's Why

Trying to set up devices in static locations and trying to ascertain results in a few minutes or an hour of testing will provide more confusion than valuable information for several reasons, including:

- The accelerometers in the devices will make consistent data collection challenging;
- The wearables only report data to the Gateway/Hubs in “episodes” every ~15 minutes;
- Each wearable has its own internal clock so reporting to the Gateway/Hubs will be different from wearable-to-wearable;
- The time for data to transit from the Gateway/Hub to the cloud servers and then to appear on an Admin Dashboard can vary and sometimes can be delayed.

When testing, remember that the system is designed to aggregate data over relatively long periods of time.

How to Set Up Real World Testing

For all the reasons above, and other more complicated reasons, attempting to perform short-term tests will be confounding rather than helpful. We highly recommend “real world” testing.

- Place Wearables/Minis on a number of people who will be working in relatively close quarters.
- Let them move about normally.
- Gather the data at the end of the day or the next day.
- Don't be concerned if a wearable occasionally records a contact that is a few feet beyond what you set. This will happen relatively infrequently, and in the long run the data will provide better and more actionable results specifically because you have set the system up with a less tightly prescribed distance/range.

Over time, when the system is used as intended, it will generate the best data possible for proactively guarding the health of team members.

Precision & Accuracy can be Problematic

The data that is most effective for contact tracing may in some ways seem counterintuitive. Intuitively, it might seem that the best data would be that which is the most “precise”... where the accuracy of distance computations would be very precise. But this is not the case. A good example would be this:

The Situation: Over a two-week period, a team member, Alice, has been in contact with John, a fellow worker, for only 12 minutes at 4 to 6 feet of distance. But Alice's desk sits 8 feet away from John's and during that same two weeks Alice has been within 8 feet of John for 60 hours. John subsequently tests positive for infection.

Case 1: The contact tracing system records the duration of contact with other workers in instances where the workers are precisely 6 feet or less from one another, but does



not capture contacts at 6 ½ or greater feet. The system's distance accuracy is very precise.

- The contact tracing system generates a very precise and accurate report, looking back over the past two weeks, showing that Alice has had only 12 minutes of contact with John.

Case 2: The contact tracing system records the duration of contact in instances where the workers are between 7 to 10 feet from one another.

- Although this is less "precise", the system will generate a report showing Alice was within 7-10 feet of John for 50-60 hours.

Which would you view as the most valuable report in terms of knowing the potential risk of infection for Alice? Clearly 50-60 hours of indoor exposure within 7-9 feet presents a much higher risk of infection than does 12 minutes of under-6 feet of exposure.

Adjusting the Range/Distance of Mini-to-Mini Detection

The AlertTrace Dashboard allows Admins to adjust the range that the Minis/wearables "see" each other. This allows an organization to avail itself of the most current information from medical authorities in determining how near or far to set the range. But in general, less "precision" in terms of proximity/distance measurement can be more helpful than precision and perfect accuracy, as demonstrated by the example above. The AlertTrace system provides the most meaningful data when the range/distance settings are wider rather than shorter, because the system aggregates data hour-by-hour, day-by-day and week-by-week, and in the long run the "wider" range of distance will provide more actionable information, as demonstrated in the example of Alice and John above.

An Historical Example of "Fuzziness"

Another example from an historical perspective is the challenges that were experienced with optical bomb-sighting from aircraft platforms in the early days of aerial bombing. The British found that inaccuracies in optics and alignment of the optics with the airframe resulted in bombs missing their target, but doing so consistently to one side of the target. Attempting to make the targeting systems more precise didn't resolve the problem. British mathematicians came up with a solution: they introduced random vibration into the targeting mechanism, resulting in a "fuzzy" targeting path. After this, statistically, the bombs came much closer to their mark, with uniformly distributed error.

Cumulative Durations of Exposure Provide the Best Data

As described above, the AlertTrace system will provide the most statistically useful data if the range/distance settings are set to wider rather than closer. The system is also designed to aggregate cumulative contact data rather than provide simply contacts over a certain duration.

The CDC's current guidance can be challenging to interpret. They say *"Data are insufficient to precisely define the duration of time that constitutes a prolonged exposure. Recommendations vary on the length of time of exposure, but **15 minutes of close exposure** can be used as an operational*



*definition. Brief interactions are less likely to result in transmission; however, **symptoms and the type of interaction** (e.g., did the infected person cough directly into the face of the exposed individual) remain important". < **bold added**>. The virologists and infectious disease experts with whom we work have stressed the following:*

1. "15 minutes of close exposure" does NOT mean it must be continuous exposure. Context of the exposure is important.
2. The "type of interaction" is important. For example, 15 periods of 12-minute exposure would obviously be of more concern than one 15-minute exposure. Again, overall context of the exposure is important.
3. "Close exposure" should not be precisely defined. For example, 120 minutes of sporadic 7' exposure would obviously be of more concern than one 15-minute exposure at 5' (assuming no one directly coughed on another). Again, context of the exposure is important.

As an example, consider this situation: John, a co-worker with Alice, has tested positive for infection. Alice has done a good job of socially distancing at work, and over the previous 10-day period Alice has recorded having no interactions within 6 feet of John, and hence would be considered "low risk" based on that – not even one instance of over 15 minutes. However, Alice's work-station sits 8 feet away from John's. Alice's job includes moving often to a nearby work-station (away from John). Even loosening the range and measuring at a 8-9' range, because she moves in and out of the area frequently she only records episodes of a few minutes at a time... no 15-minute episodes. But by doing cumulative measurement, adding all the short-duration interactions within 8 feet of John, the system shows she has had a cumulative 36 hours of exposure. Our experts all agree that 36 hours of cumulative indoor exposure within 7-9 feet would clearly present a much higher risk of infection than would even 15 or 30 minutes of under-6 feet of exposure.

Based on the experts we work with, we recommend choosing range/distance settings that are wider rather than shorter to produce data that are more statistically valid and helpful. And the example above demonstrates why we provide "cumulative" data... the system aggregates contact data, including both shorter and longer periods of duration. Over the long-run of a 10-day or 14-day lookback period, the "wider" range of distance and aggregation of shorter and longer intervals will provide more actionable information.



AlertTrace™ Lights, Indicators & Activity

LED Lights on Gateways/Hubs and Minis

On the Minis (the User Wearables):

- There are two series of LED flashes on the Mini:
 - Very brief flash every 5 seconds = the Mini has battery power.
 - ❖ NOTE: When the Mini is not being worn and goes into “sleep” mode, the every-5-seconds flash will stop.
 - Flashing several times quickly (occasionally) = Mini is transmitting its collected data to the hub.

On the Gateways/Hubs:

- Three LEDs are on the Gateway –
 - Left LED = Power
 - Solid green when hub unit is on AC power.
 - Blinks green when charging via USB.
 - Middle LED = Cell Connection
 - Blinks green when it has a cell connection.
 - Blinks red when hub unit has no cell connection.
 - Right LED = Data Transfer to Cloud
 - Light is off when no data transfer is occurring between hub and minis.
 - Light is solid red when data is being transferred.

Functional LED Activity Indicators:

- On powering up the Hub -
 - Left LED (power) is green while middle (cell) blinks red, about 30 seconds, followed by all three LEDs flashing red for 4 flashes and then orange for 4 flashes, followed by “normal” lights (left power LED green + middle cell LED blinking green).
- All LEDs flash red several times, followed by flashing red & green several times -
 - Hub is performing routine sync with the cloud to check for new parameter from the Dashboard (e.g. change in Distance/Range settings).
- All LEDs flash red several times, then orange several times followed by flashing green -
 - Hub found new parameters during routine sync with the cloud, and downloaded the new parameters from the Dashboard.
- All LEDs flash red, then orange and green, then Hub goes through “powering up” process –
 - This is a rare occurrence when the Hub found a full firmware update was waiting to be download. After it reboots (under 1 minute) it will return to normal operations.
- Nightly Rebooting –



- All Gateway/Hubs will reboot and power-up again once every 24 hours to ensure problem-free operation.

Red Buttons on the Gateways/Hubs:

- Pushing the left button will force the hub to look for new settings (via cell). If it finds new settings waiting it will flash through the red/orange/green or red/green patterns described above.
- The right button is the “on/off” button. Note that when plugged into AC power the unit will always be “on” (left-most green light blinking). The only way to turn the device “off” is to unplug it from power and then push the right button.



AlertTrace™ FAQs

Operational Questions & Answers:

- How do the Gateways communicate with the server?
 - The Gateways/Hubs communicate with the server database via cell. It requires a cellular signal.
- What cellular network is used?
 - Currently AT&T is the default network in the US. If AT&T is weak in an area we can provide for a Sprint SIM. Outside the US we must first ascertain what carrier provides Cat M1 in the area and then must provide a specially-provisioned SIM. By 30-Sep 2020 we expect to have a network-agnostic version of the Gateways that will automatically connect to the strongest carrier anywhere in the world.
- How do I know if it has cellular signal?
 - The middle LED shows cell connection. It blinks red when there is no cell connection, and blinks green when cell connection is achieved.
- What is the function of the LED on the Minis?
 - There are two series of LED flashes on the Mini. The first is a very brief flash every 5 seconds to show the Mini has battery power. NOTE: When the Mini is not being worn and goes to “sleep” mode the every-5-seconds flash will stop.
 - When the Mini is transmitting its collected data to the Hub, the LED on the Mini will flash several times quickly.
- What is the range? How close does the Mini need to be to the Gateway/Hub and does that connection need to be constant?
 - Minis will generally connect to a Gateway/Hub within a radius of ~75 feet (25 meters). However, the Mini can operate outside the range of a Hub, and will store its contacts internally until it is back within range of a Hub.