CLiKAPAD

Maximum Range

What is the maximum range of the keypads?

The maximum range of the system is quite simple to deduce: find a large enough open space and keep increasing the distance between the keypad and base station.

The CLiKAPADs will vote successfully up to a distance of 140m (460 feet).

This figure is a theoretical maximum range; it requires line-of-sight from the keypad to the base station. In real world use this is rarely achievable and so the practical range of the system is reduced.

What factors reduce this range in 'real world' use?

Unlike the maximum range of the system the 'practical' range of the system is a difficult thing to deduce. It is determined by external factors including:

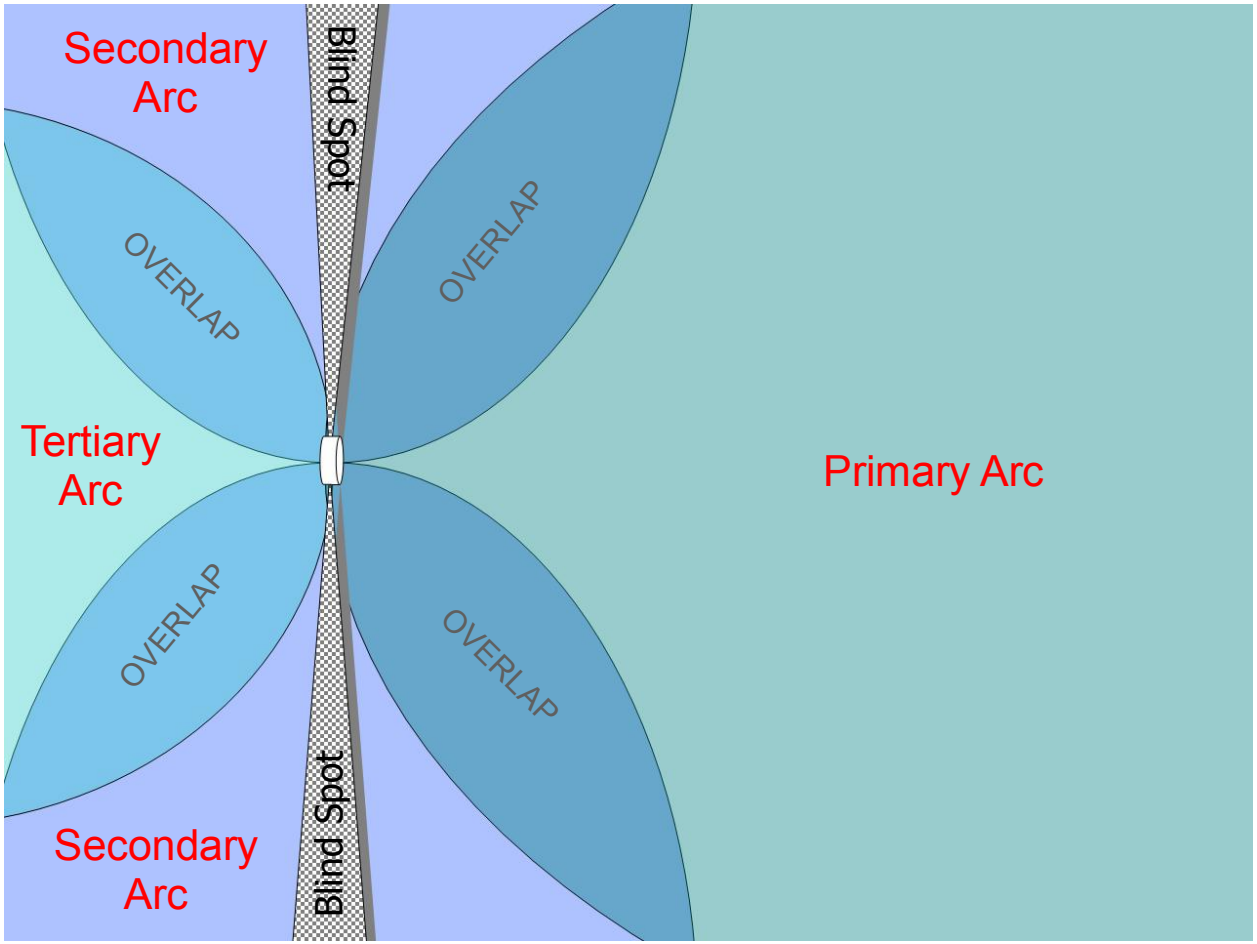
- Number of people between base station and keypad (big bags of water are quite effective at absorbing radio transmissions!).
- Other electromagnetic interference; e.g. radio microphones, other WiFi devices, large electrical power sources, etc.
- The construction/dimensions of the room; i.e. height of ceiling, supporting pillars, materials used, etc.

What can I do to reduce the effects of these factors?

There are a number ways to negate the effects of external factors:

- Raising the height of the base station reduces the impedance effects of the audience by improving line-of-sight of each keypad to the base station.
- Testing the system with all other radio equipment active may help to identify sources of interference - if found the radio channel of the CLiKAPAD system can be altered.
- Use additional base stations to cover any obvious blind spots and ensure that all keypads are in at least one base stations primary arc.

Base Station Transmit and Receive Arcs

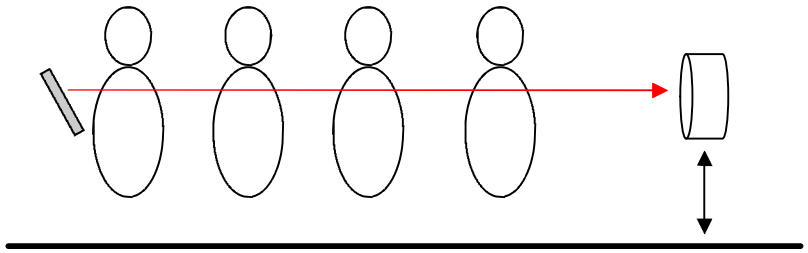


A base station's pad antenna is omni-directional and is therefore able to collect votes from all directions. The range at which a keypad is able to vote is greatest in the primary arc, less in the secondary arcs and least in the tertiary arc. To ensure that all keypads are able to vote it is recommended that all keypads reside in the primary arc of a base station

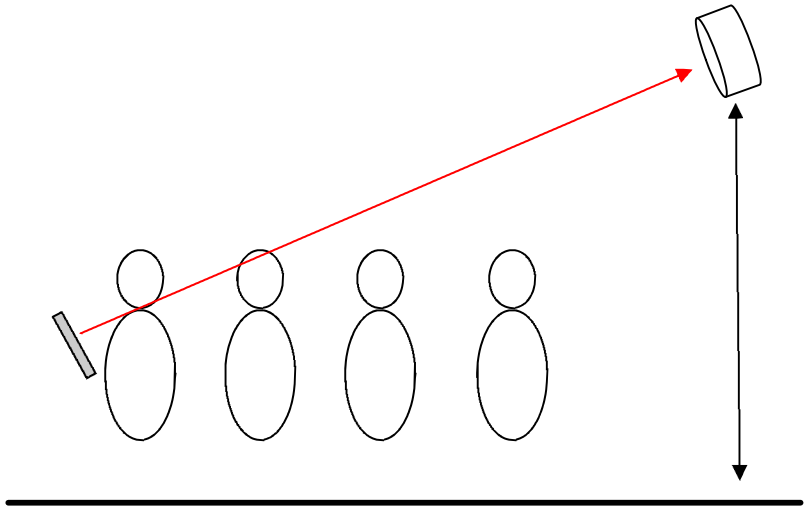
This diagram is for guidance only and is not an exact portray of physical events

How to position the base station - 1

Height plays an important role in determining the level of impedance experienced by the keypads



If the base station is too low the keypads furthest away have to vote through the rest of the audience. This level of impedance may result in reduced performance and range



Placing the base station at a greater height reduces the amount of impedance experienced by the keypad

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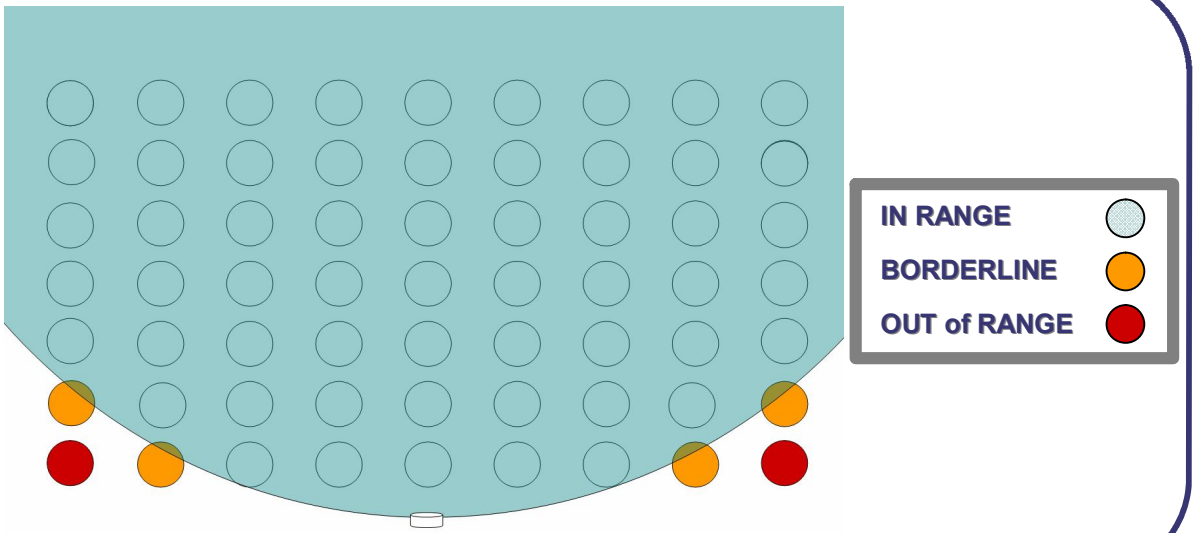
How to position the base station - 2

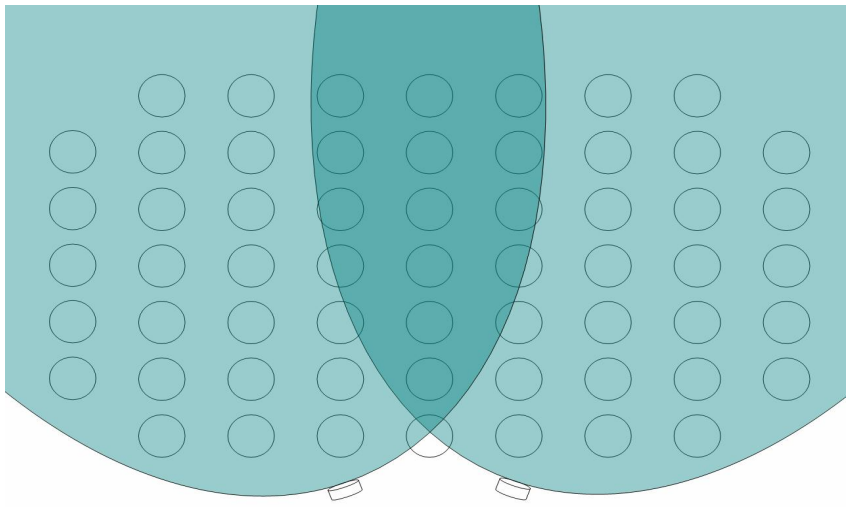
Problem

Using a single base station results in some keypads not being included in the primary arc of the base station. Keypads at the side of the room may therefore have difficulty voting.



Solution

With two base stations operating on the same channel all keypads reside in the primary arc of at least one of the base stations



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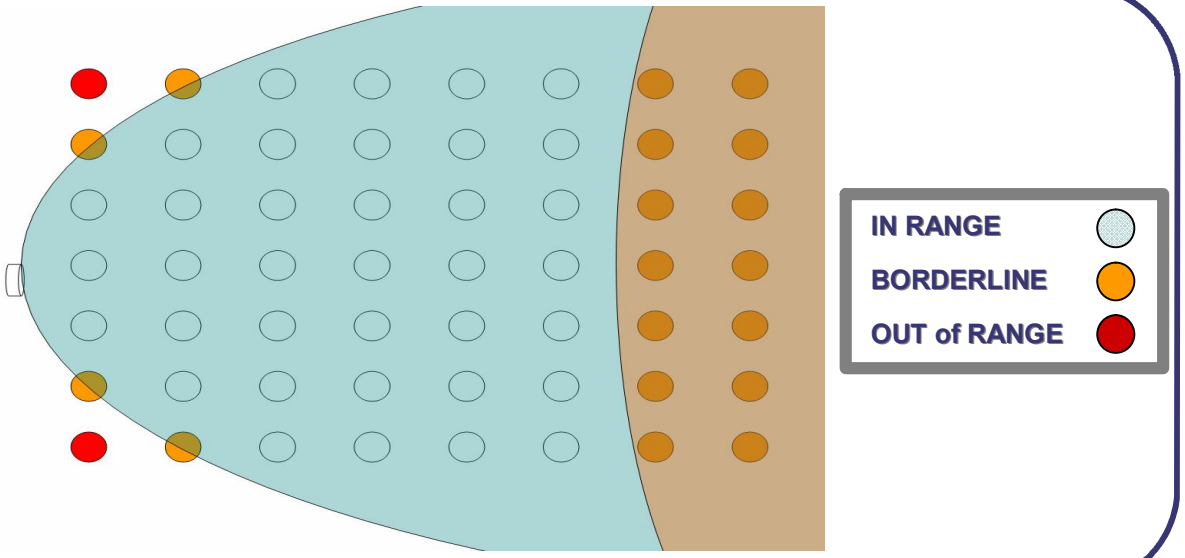
How to position the base station - 3

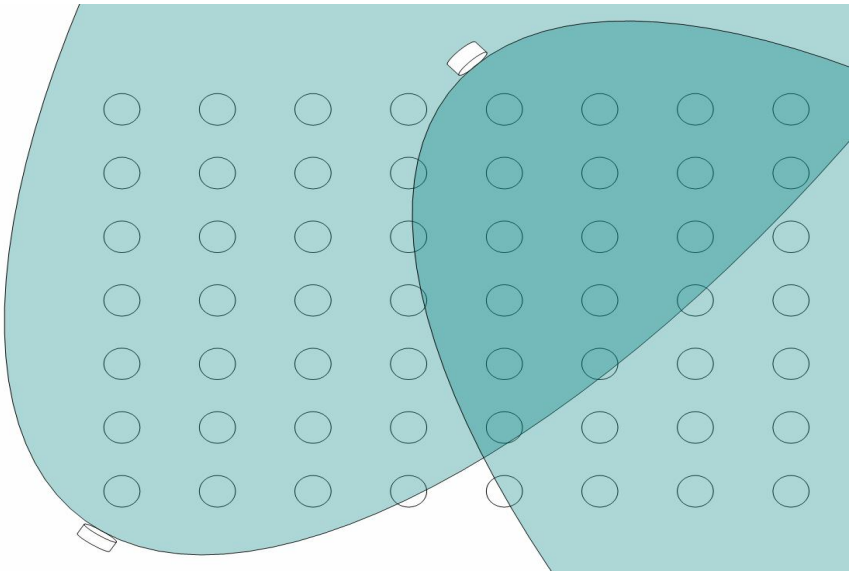
Problem

Keypads at the far end of the room are too far from the base station, additionally some keypads at the side are not in the primary arc of the base station.



Solution

With two base stations operating on the same channel all keypads reside in the primary arc of at least one of the base stations and the issue of range has also been resolved



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Conclusions

Practical Range

A single base station is most likely able to collect votes up to a range of 100m - 120m (330 - 390 feet).

Compared to the maximum range of 140m this may seem like a conservative estimate - however it is best to err on the side of caution.

You will normally find that you can collect votes well in excess of 100m - the actual range observed is dependent on external factors.

Large Audiences

When using a CLiKAPAD system with a larger audience (200 participants or more) it is recommended that you equip yourself with the following:

- At least 2 base stations
- A method of elevating the base stations to a height of at least 2m (6.5 feet) - i.e. microphone stands.
- USB extension cables (USB can be extended to a maximum of 25m).
- USB to CAT extension system - this allows the base station to be positioned up to 100m* from the computer

* depending on manufacturers specification

Multiple Base Stations

Same Channel:
Using multiple base stations on the same channel increases the time taken to collect the votes from all keypads. It takes a single base station 1 second to collect votes from 200 keypads, if you added an additional base station it would take 2 seconds. Using three base stations increases the overall time to 3 seconds, etc.

Different Channels:
If you know beforehand where each keypad will be positioned you can split your keypads into groups of separate channels. Splitting 200 keypads into two groups of 100 keypads means that each base station only needs to collect votes from 100 keypads each. Because base stations on different channels are able to operate at the same time it will only take 0.5 seconds to collect votes from all 200 keypads