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Electronic (digital) Indoor Wayfinding

Foreword:

This document was written by Here2There Software (H2T), a subsidiary of Global Software Applications, LLC (GSA) in Pennsylvania, USA.

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The purpose of this document is to educate you on electronic indoor wayfinding with a focus on H2T. The statements that appear in this document are opinions that have been formed over years of development and implementations.

Electronic Indoor Wayfinding is a new phenomenon and may be the logical next step in product evolution after Outdoor Wayfinding Systems.

The fact is, with the technological advancement of digital signage solutions and the prices coming down on hardware, it is easier to offer Indoor Electronic Wayfinding to your customers.

A new product brings new questions and since the questions are for the wayfinding solution of your facility, the answers will be personal and only applicable for your facility.

There is, fortunately, a lot of industry specific common ground. But your professional input and knowledge of your establishment's processes is still required.

In this document we focus on the **Health Care industry**. We share information on common solutions, offer our advice on which way is better, let you know what works and what doesn't. Always ask yourself "how will it work for us?"

The electronic indoor wayfinding solution has to seamlessly connect with the existing processes in your facility

If you are not part of the health care industry, this document provides the ground work for Electronic Indoor Wayfinding. We can help you decide how this solution would best fit your facility.

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Health Care Industry

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Wayfinding

"Wayfinding encompasses all of the ways in which people and animals orient themselves in physical space and navigate from place to place" *Wikipedia.*

History

In the old days our ancestors 'found their way' with the help of constellations and the sun. Later they invented tools, like the sextant, to help them find their way.

Today

Now we have GPS (Global Positioning System), which has been incorporated by Tom-Tom™ and Garmin™ in their navigation products. Although GPS is a very recent product, most, if not all, of us can't imagine a life without it already.

We need help with finding our way. We need to know what our destination is and how we are going to get there. Modern day tools like GPS, Google Maps and MapQuest only partially help, because they cover exclusively outdoor directions.

Indoor Wayfinding

Do we need it? Of course! It's a fundamental part of our being, desiring the knowledge of where we are, where we need to be and how we are going to get there.

"…as a matter of fact, in this study wayfinding was revealed to be
'one of the greatest sources of stress' associated with the hospital
for both patients and visitors alike…."
"Wayfinding in Hospitals: Solving the Maze"
J. Carpman (1986)

Health Care facilities are not the only ones to struggle with this phenomenon. Think about how Universities, Malls, Casinos, Corporate Buildings, Airports, Cemeteries, etc. would benefit from Wayfinding.

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A Closer Look at existing Wayfinding Systems

The existing Outdoor Wayfinding systems are functional, fulfill the need to access this information instantly and provide a familiar user experience. While designing an Indoor Wayfinding System we want to keep this in mind.

Outdoor Wayfinding systems, like the **GPS Wayfinder** in your car, use the GPS signal to determine your location. After you have entered your destination it compiles and displays the fastest route.

It provides answers to these fundamental questions:

- Where am I?
- Where is the destination?
- How do I get there from here?

The Outdoor Application uses the following basic materials to provide you this information:

- GPS Signal
- Maps

Google Maps / Mapquest

Other Outdoor Wayfinding Systems, like Google Maps or Mapquest, are used at home to pre-arrange your trip. For obvious reasons, these systems cannot sync with GPS and only give the route for you to print out and take along.

If you run Google Maps on your smart phone it **can** tie in with GPS and in doing so offers the same functionality as a Vehicular Navigation System.

Include or Omit

The GUI (Graphical User Interface) that these outdoor applications use is very clean, only showing information relevant to its purpose. Of course, the display of a vehicular GPS and smart phone GPS are also very small with a limited amount of space to use. Nevertheless, the result is a very functional tool with little room for confusion.

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Electronic Indoor Wayfinding:

As we move to Indoor Wayfinding we can use some of the proven aspects of Outdoor Wayfinding Systems.

On a side note:
As said previously, we can't use GPS for Indoor Wayfinding on hardware like Kiosks and LCD touch screens. Real time turn-by-turn directions would require a portable device, such as a Smart Phone, for their display. This concept would not work very well on a Kiosk.

Q: Does that mean that you can't have an Indoor Wayfinder on a Smart Phone?
A: You can, but not with real time turn-by-turn directions.
(Smart companies are looking into an Indoor position tracking system, using the phone signal, Blue-Tooth and WiFi. It will take a few years before there is a practical and reliable system for indoor GPS.)

Contents of the GUI

Start by asking yourself, "what information do I need to offer my visitors on a Wayfinding system?"

This is best explained by taking an example set-up of an Indoor Wayfinding System:

1st Page (Default Screen)

Two (2) displays that simultaneously cater to two (2) users.

What works well is to have the first screen that contains the following:

- Welcome Screen / Instructional screen
- Display your Name and/ or Logo
- A 'What-is-This?' feature explanation, like
  - i.e.
    - "Touch Screen Wayfinding System"
    - "Find your way to the Department"
    - "Find your way to Department of Physician"
    - "Touch Screen Directory"
    - A separate button with a link to its own info page, explaining the Wayfinding feature to visitors.
- Choose a language to Start

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2nd Page

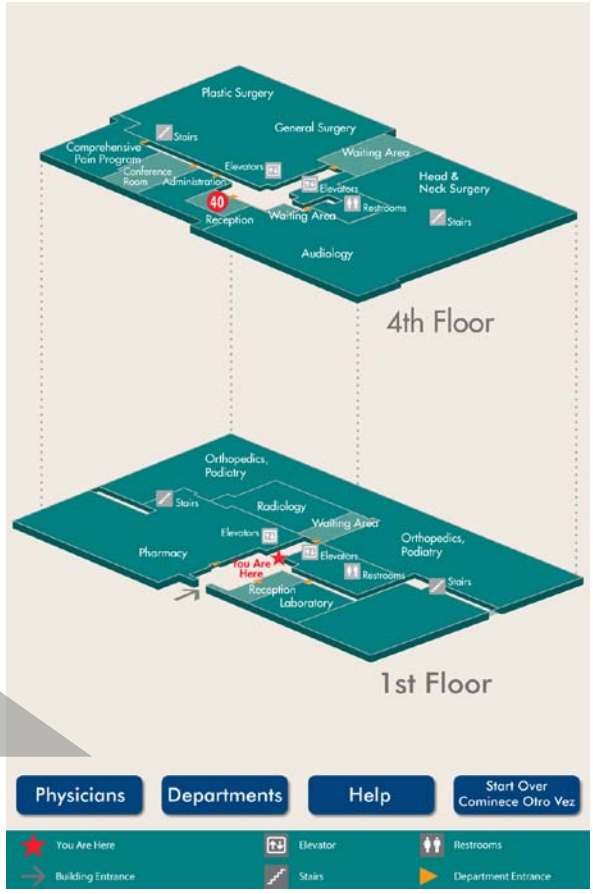
'You Are Here' & Select a Directory to narrow down the destination search

This screen is a combination of A) Map of the Building and B) a Navigational area.

A) Map of the Building:

- If you have only one (1) building, your choice is easy. Show only the floors which are accessible to the public.
- If you have multiple buildings on a campus, display the map of the building in which the kiosks is located. Offer a button labeled 'Campus map' in the navigational area if you wish to offer a campus overview option, or to allow your visitor the option of selecting other buildings.
- If you have 2 interconnected Buildings, each with its own Main-Entrance, show the publicly accessible areas of both buildings. If the connection is not publicly accessible, show only the layout of the building in which the kiosk is located.
- The orientation of the map displayed on the kiosk needs to be similar to the orientation of the layout of the building.

For ADA reasons the navigational buttons are oriented on the lower half of the screen.



Notes:

- This facility only had Floor 1 and Floor 4 open to the public.
- The GUI was made to fit a 42" Vertical Touch Screen.

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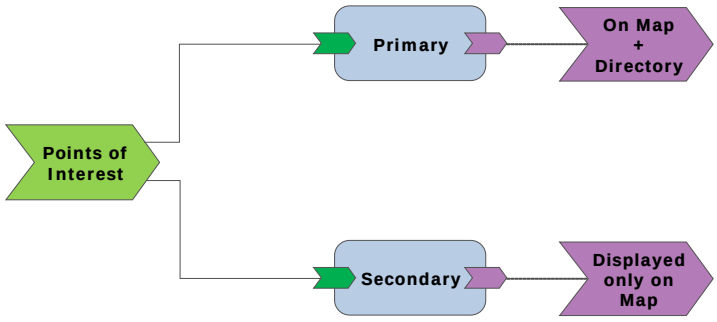
Map Design

The perspective map design gives the user a perception of depth. It helps with understanding the layout of the building, orientation and visualization of the requested route. In most cases, this design is usually not available and needs to be created.

Points of Interest

There are 2 kinds of Points of Interest that need to be marked on the Map.

1. Primary Points of Interest are the ones you want to provide directions to, like Departments and Physicians. You can request these directions by selecting them from the directory on the touch screen display.
2. Secondary Points of Interest, like rest-rooms, elevators, stairwells, ATM, and emergency exits, are very important to show on the map. However, directions are not provided to these locations.



Always offer directions to departments.

The need to offer directions to a physician's office depends on how your appointments sheet is organized. If it also states the name of the physician, offer a Physicians Directory.

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B) Navigation:

Large, self-explanatory buttons work well in any environment. Psychologically they reflect ease of use and act as an invitation to use the system.

Directory buttons like '**Departments**' and '**Physicians**' fill the need of the majority of visitors.

For those who forgot their appointment paper or are visiting and don't know where to go, provide an **FAQ** button (i.e. Where do I go for an MRI?).

A **Help** button is always useful to provide information about how to use the Wayfinding application.

If you have multiple buildings on a campus you might want to consider a **Campus Map** button. This works great for cross-referencing destinations.

3rd Page: Choose destination

Department Directory:

- Click or use navigation button to select
- Generate Directions

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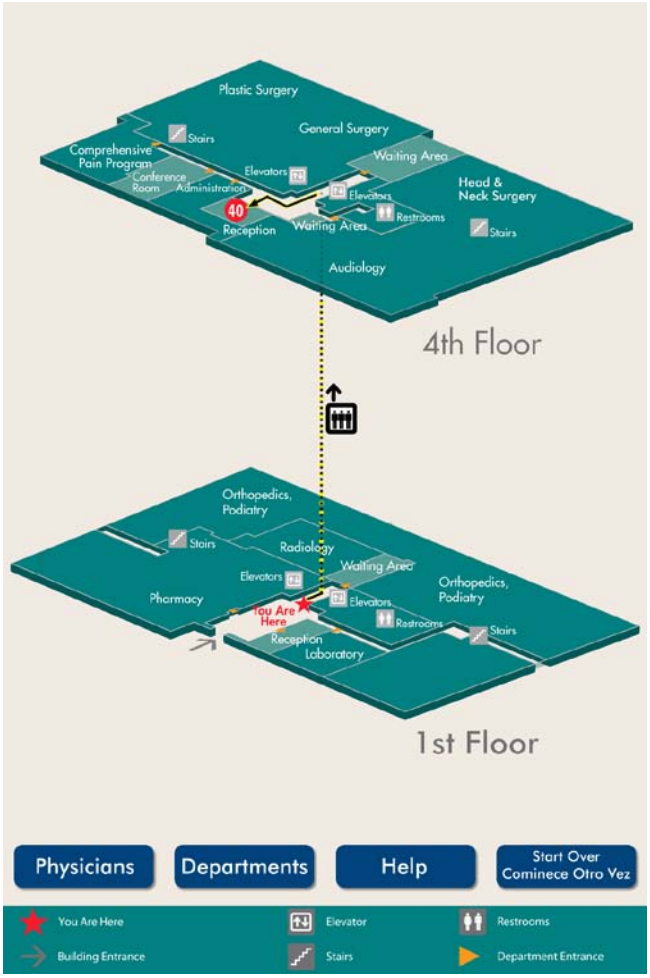
4th Page: Directions

- Directional Line
- Text Directions



Text Directions: Yes or No?

Providing Text Directions is helpful, without any doubt. Existing wayfinding applications (think Car GPS, Google Maps, MapQuest) display a combination of the two. This is not without reason. They complement each other.

However, providing text directions is initially more time consuming and requires more maintenance.

Include or Omit?

If a building has 8 floors and a direction to the 4th floor is requested, only show the start floor and the destination floor. Omitting the rest of the floors creates a very clean result.

To Print or not to Print?

The best reason to allow printing is that some routes are just too complicated to remember. The visitor can print the route and take it along for later reference.

There is, however, a lot of downside: There would be an additional investment in hardware and maintenance. If you decide on a 42" Touch Screen built into the wall, it looks very pretty and takes up little space, but where will you place the printer? You also have to worry about the disposal of used maps. It would be best to find the ideal number of public stations so the guest can refresh their memory en-route.

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Wayfinding Applications:

On Location: LCD Touch Screens

So far, we've seen Indoor Wayfinding on LCD touch screens in the picture examples on the previous pages. For a Hospital, LCD touch screens seem to work best for the following reasons:

- Take up little space
- Cost effective
- Hospital grade available
- Complements previously installed static directory / maps
- Fits seamlessly in any décor
- In contrast to a free standing kiosk, an LCD touch screen is perceived as a lot less scary to use.
- To comply with ADA, hang it vertically and place the navigation in the lower half of the screen.

Downside:

- Needs to be built into, or mounted on, the wall
- Computer needs to be located nearby

On Location: Free Standing Kiosk

Free Standing Kiosks have their own advantages. It can be considered a somewhat mobile unit, since it is 'All-In-One'. Even integrating a printer is a breeze. Maintenance is easy but needs to be done by a qualified technician.

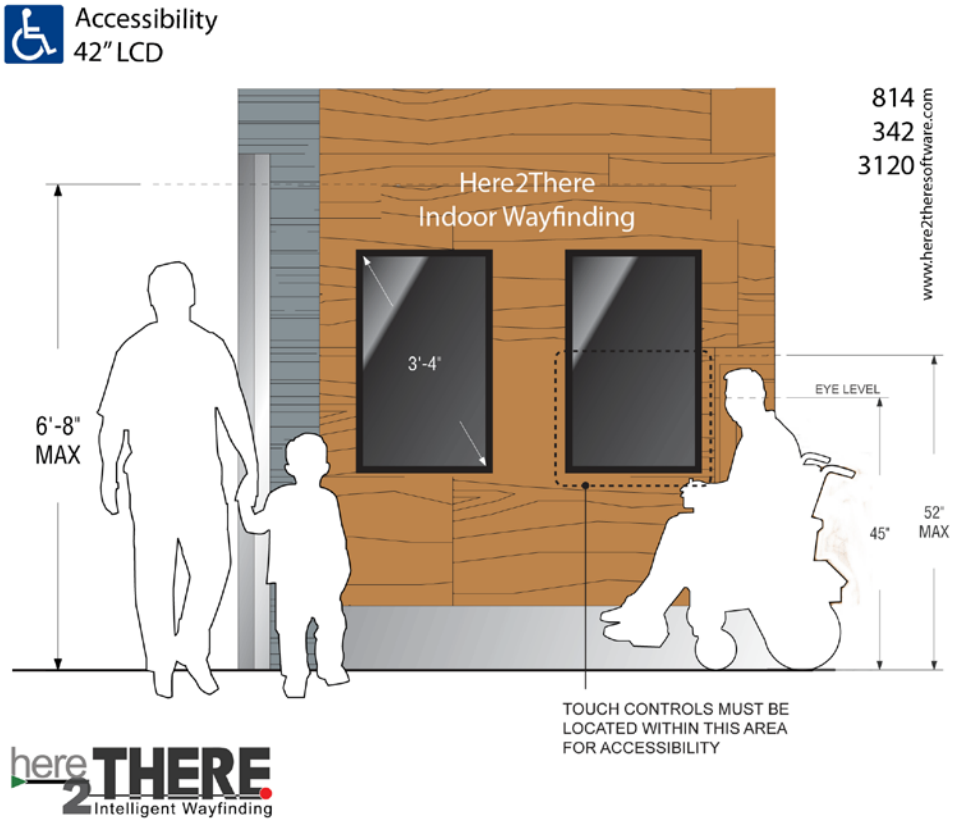
You only need to pick a spot and install.

Indoor and ruggedized Outdoor units available.

ADA compliant units are available

Images courtesy of www.kiosk.com and www.slabb.com

ADA


Accessibility
42" LCD
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Here2There
Indoor Wayfinding
3'-4"
6'-8"
MAX
EYE LEVEL
45"
52"
MAX
TOUCH CONTROLS MUST BE
LOCATED WITHIN THIS AREA
FOR ACCESSIBILITY
here 2 THERE
Intelligent Wayfinding

On the Web (WWW, your Homepage)

Where Public Stations (kiosks / wall mounted LCD touch screens) only cater to the visitor on-site, access to your Indoor Wayfinder through the internet also has its advantages. There is a large category of people that like use their home computer to gather all necessary information, at their leisure.

It would make the circle in customer service complete.

508 Compliant
(Accessible Web Access)

More than halfway there!

If you already have a touch screen application for your on-site Indoor Wayfinder, conversion to a web application is a breeze. After all, it uses the same back-end programming and databases, which also means that changes need to be done only once for all displays.

A conversion is necessary because the lay-out of a touch screen application differs substantially from a web page. A touch screen application is made to be navigated through touch, while our PC's at home are keyboard and mouse driven.

If you don't have a touch screen application on-site and you want to offer just this web application, the costs are about the same as the touch screen wayfinder application.

Mobile

A stand-alone mobile wayfinding application for smart phones may be less interesting for Hospitals, as the majority of hospitals do not permit the use of smart phones throughout their facilities. This would prevent the amount of usage necessary to justify the expense.

However, if you already have a web based wayfinder, reformatting for Mobile Access is easy.

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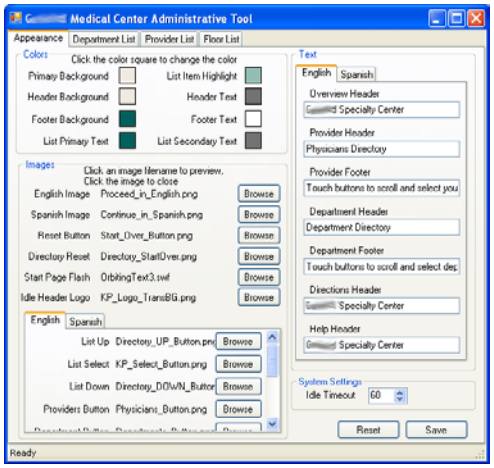
Maintenance:

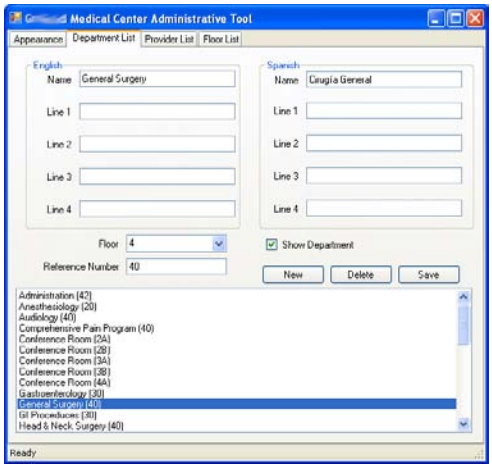
We have sorted out how the Wayfinding Application must work, how it will look like and a decision on the hardware has been made…

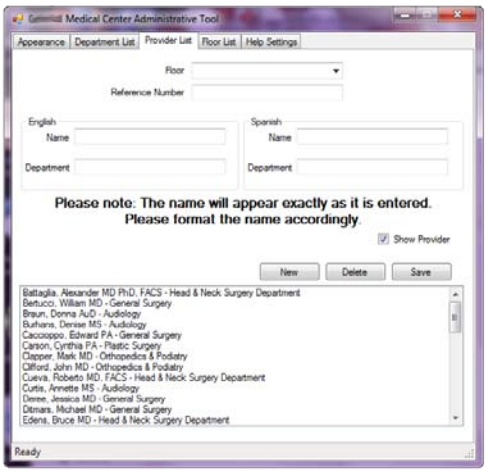
Now consider what would happen when departments move over-time; physicians leave and get replaced or move offices; a hallway is under construction or when you need to provide another language. Make sure a tool is provided with the application that allows you to make updates to the wayfinding system. Having the ability to make your own changes should also save you money, as you would not need to rely on someone else to update your system.

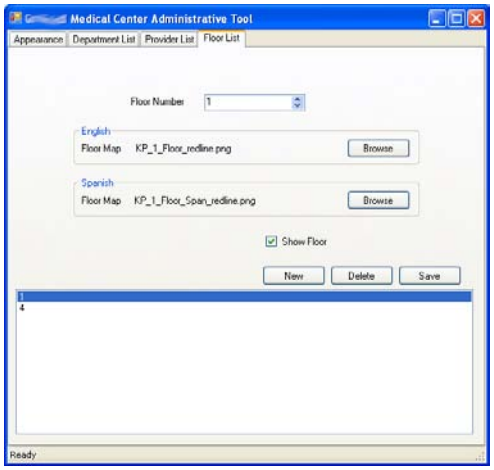
Back-Office

(Example)









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Digital Signage: Do you want your system to do more?

Can you display more information than just the Wayfinding Application? Absolutely. You are limited only by your own imagination.

"**Digital signage** is a form of electronic display that shows information, advertising and other messages. Digital signs (such as LCD, LED, plasma displays, or projected images) can be found in public and private environments, such as retail stores and corporate buildings." *Wikipedia.*

(example)

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Behind the scenes of a Wayfinding Application

Technical Details: The Wayfinding Application is designed to run on Windows™ operating system. It consists of:

1. Front-End (GUI) for multiple displays
    a. PC Based Interface written using the MS .NET Framework (.NET 4 Required)
        1. Can connect to a central data server or read information locally
        2. Can maintain a local data store in the event of a network outage
    b. Web Based Interface written using HTML, JavaScript, XML, ASP, PHP
        1. Can be tailored to fit the client homepage
        2. Can host data on client server or H2T server
        3. "Hybrid Hosting" available (data and directions hosted on a H2T server, web hosting provided by client)

2. Back-End
    a. Back-End Programming (VB.NET)

        1. Windows™ based application
        2. .NET 4 Required
        3. Various data storage areas supported
            a. Local Data to XML file
            b. Specified Client Hosted Server
            c. H2T Servers
        4. Background Intelligent Transfer Service (BITS) required for image upload on Client Hosted Server

    b. Database
        1. Multiple database types supported
            a. XML Based
            b. MySQL
            c. MSSQL
            d. PostgreSQL

3. 1 Server (can be hosted on-site)
    a. Client Hosting - Windows Server required
        1. If windows server not available a H2T hosted processing page is available
            a. Returns XML data
            b. Full API available
        2. Database can be hosted on any type of system
    b. H2T Hosting - No Server required by client
    c. Hybrid Hosting - No Database server required by client

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Client-Server technology

Single Display implementations can host both client and database on one PC. Instead of a database, XML documents are used.

Two or more Displays (and web application) require a separate computer to host the database.

One of the display computers could also be used as the host computer, although this is not recommended. If the host computer were to go down, then the entire system would be down.

Computer

Any modern computer will be able to run the application. In some situations an additional graphics card may be necessary.

Windows XP or higher recommended (can be 64bit or 32 bit)
.NET 4.0 or higher
All Windows and .NET Framework updates and service packs should be installed
Minimum Recommendations: 2GB RAM, Dual Core Processor (1.8GhZ or higher), 256MB Video RAM

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Investment (Cost)

The Electronic Wayfinding solution is very personal and is based on your requirements, existing processes and wishes.

Hopefully, you now have an idea of the direction you want to go. This will help greatly in determining the software and hardware cost.

Single Building estimate, 6 floors, 100 destinations

A typical Healthcare Indoor Wayfinding System consists of the following components:

- Software (approx. 15K-25K)
  - Touch Screen Application for On-Site Public Access Point(s)
  - GUI design (ADA Compliant)
  - Map Layout
  - Navigation
    - Welcome Screen
    - Building Overview (Floors)
    - Directories
      - Departments
      - Physicians
    - Help
    - FAQ
  - Back office
- Hardware (approx. 5K-7.5K)
  - 1 LCD Touch Screen (Hospital Grade) + PC (Installation not included)
- Services (included)
  - 1 Yr Service/Support/Updates
  - 2 Hrs instruction on GUI and Back-Office
- Optional features:
  - Multi-Building cross-wayfinding
  - Campus Map
  - Text-Directions
  - Multi-lingual
  - Printing
  - Visits on-site
  - On-Site Warranty: Labor and tools

The size of the project is directly affected by the size of the building(s); for this example we took an average size building (6 Floors, 100 destinations, 1 Public Access Point).

If you have multiple buildings, the cost for each extra building will be about 15-25% of the cost of the first building (depending on complexity).

If you want to show more on the screens than indicated, additional cost will apply.

Please send us the specs of the project so we can give you a fitting proposal.

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Check-List for Proposal

Project:

Your Name:

Company:

Phone#:

E-mail address:

A) Facility:

- Number of Buildings……..
- Number of average floors per building……..
- Number of primary destinations (Estimate) ……
- Number of patient / member beds (If Applicable) ……
- Total SQFt……..

B) Public Access Points for the Wayfinding Application:

- How many? ……..
  - ☐ LCD Touch Screens (Screen Size 42”)? ……..
  - ☐ Kiosks? ……..

C) Software:

- ☐ Touch Screen Application or
- ☐ Web Application
- GUI Design:
  - ☐ Welcome Screen
  - ☐ Default Screen (Shows ‘You are Here’ on Map + Navigation Panel)
  - ☐ Result page (Graphical Directions)
- Directories
  - ☐ Departments
  - ☐ Physicians
  - ☐ Other? …….
- ☐ Outdoor directions as well? (Building to Building)
- ☐ Text Directions
- ☐ Print Directions
- Extra Buttons (Links)
  - ☐ Help
  - ☐ FAQ
- ☐ Multilingual?
  - ☐ If yes, how many languages (Other than English) (Translation is charged separately)

Your additional comments (that may be of importance of the Proposal):

_____
_____
_____
_____

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