



Where Beacons Are Making a Difference

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Introduction

As with any new technology, beacons are the subject of considerable speculation and even hype. Still in the early stages, beacon deployments have met with success as well as [disappointment](#),¹ prompting some to question whether beacons will ever fulfill their promise. This chapter shows how beacons, properly integrated with mobile solutions, are transforming customer experience, improving operations and boosting the bottom line for brand, retailers and other businesses.

The discussion highlights applications across 5 key verticals where beacons are making a difference, proving valuable and even indispensable to end-users as well as the organizations deploying them. The verticals include airports, attractions, restaurants, retail and

¹ <http://www.nfcworld.com/2014/11/17/332684/melbourne-ibeacon-trial-disappoints/>

enterprises, while the applications include location-specific alerts and notification, indoor navigation with “points of interest,” timely and relevant content and offers that consumers value and respond to, and more. Each section identifies customer needs and problems that beacons are solving. In our experience, this step is critical and often distinguishes between deployments that succeed and those that fall short or fail altogether.

In addition to the verticals and applications presented here, beacons are making a difference in many other instances. The summary includes a list of 30 use cases and a matrix highlighting the most compelling applications across the 5 key verticals. A full list highlighting the most significant applications across more than 20 verticals, including events, healthcare, movie theatres, transit, and others is available from the author.

The use cases presented in the following sections are a snapshot of current efforts – innovative businesses and imaginative developers are finding new ways to integrate beacons into mobile solutions. Given the benefits and growing momentum, companies in many verticals will soon be asked and forced to answer “why aren’t our apps ‘beacon enabled?’”

Airports Are Reducing Travelers' Stress

From [Miami](#) to [Hong Kong](#), the millions who travel each day through the world's airports can look forward to easier and more enjoyable experiences thanks to beacons. For even the most seasoned frequent flyers, circumnavigating through airports can be a hectic, nerve wracking and even costly experience. Before even setting foot on a plane, travelers must contend with a number of challenges, including:

- Last minute gate changes and flight delays
- Connecting flights in distant concourses and terminals
- Choosing where to eat, given schedule, budget and lines
- Finding baggage claim and one's own luggage
- Locating and choosing transportation from the airport to a hotel or venue
- Finding one's car, especially after a lengthy trip

In addition to the challenges above, problems and exceptions occur that can make travel harrowing. For example:

- Locating family members who have gotten lost or separated from the group
- Retrieving commonly lost items, such as luggage, electronics, passports, and wallets
- Flight delays and cancellations due to weather or mechanical problems, especially when rebooking or overnight accommodations are required
- On international trips, passport, visa, customs and related issues

While booking and in-flight experience have received considerable attention, airports and airlines have begun to focus more attention on travelers' needs in the airport, from arrival to departure and all points in-between. To assist travelers, airports and airline partners have historically relied on signage, printed materials, and personnel. Going

beyond these traditional solutions, airports like [Miami International](#) and [Schiphol in Amsterdam](#)² are developing and deploying innovative, beacon-powered mobile apps that enable travelers and enhance their experience.

Airports in countries around the world are turning mobile devices into digital concierge, guiding and assisting travelers with timely, personalized directions, information, alerts and notifications.

- Beacons allow airports' and partners' mobile apps to recognize travelers who have opted-in as they approach, enter, and move within the airport as well as in adjacent areas such as ground transportation and parking.
- Much like a personal navigation device (PND), beacon-powered apps provide "blue dot" navigation and step-by-step directions indoors, where GPS doesn't work, guiding travelers from parking and check-in to gates, concessions, baggage claim and customs.
- With access to airport operations data, mobile apps notify travelers of gate changes, flight delays and other disruptions and, with beacons pinpointing their location, redirect them in real-time to the proper gate or nearest support center.
- Useful for travelers as well as airport concessions, apps display on a map nearby stores, restaurants and other "points-of-interest" as well as information and access to ground transportation, parking and other amenities.
- With proximity revealed by beacons and (potentially) audience characteristics such as destination, time available, and others, brands and airport businesses can present timely, relevant mobile ads and offers that travelers value and respond to.

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Beacon-powered apps can also ease the burden on airport personnel, offloading many of the questions they must currently answer. JFK and other airports are also using beacons to identify lines that are getting too long and creating [choke points](#), thereby reducing wait times, one of the most frustrating parts of air travel. By streamlining customer experience and connecting consumers to shopping, restaurants, entertainment and other products and services, beacon-powered apps also boost on- and off-airport businesses, providing additional revenue for airports and their partners.

With the number growing by the day, the list of beacon deployments includes airports in every part of the world, including N. America (Austin, [Burbank](#), [Dallas – Ft. Worth](#), Miami International, [Orlando](#) and others); Europe ([Bologna](#), [Nice](#), 8 [UK airports](#), and others); and Asia ([Hong Kong](#), [Tokyo](#), and others). Much like digital signage, mobile apps powered by beacons will soon be a fixture in airports. [SITA](#), the airport industry's largest provider of technology services, expects most major airports will have beacons fully deployed by 2020. Integrating beacons with partners' systems and apps (airlines, car rental, concessions and other companies) adds to the complexity and requires more time. However, integrated solutions reach many more travelers and offer deeper functionality.

As these examples show, by deploying and integrating beacons, airports and their partners are transforming travelers' pre- and post-flight experiences and reducing stress for travelers and personnel. Beacon-powered solutions are also lowering the cost of delivering services and support and providing a powerful new channel for brands and airport businesses to engage receptive customers.

Attractions Are Engaging Guests with Content

Every major city in the world has a variety of attractions, including museums, zoos, aquariums, gardens, theme parks and many others. Attractions differ in a number of ways, including their focus, size, and audiences. Smaller attractions, such as the [Petersen Automotive Museum](#) in L.A., may attract fewer visitors but they are no less fervent than guests who visit larger attractions such as the [Metropolitan Museum of Art](#). While visitors may spend a couple of hours at the [World of Coca-Cola](#) in Atlanta, they can spend days taking in and absorbing the 19 museums that make up the [Smithsonian](#). While attractions such as the [National Wrestling Hall of Fame](#) tend to attract predominantly adult audiences, zoos and theme parks appeal to families with kids of all ages. Finally, guests may include occasional and even first-time visitors as well as “regulars,” some of whom have joined as members.

Despite their variety, attractions and their guests share a number of common characteristics:

- Attractions offer immersive experiences where guests can learn, appreciate, reflect upon, be entertained and possibly even inspired.
- While attractions offer lectures, demonstrations and interactive experiences, most curate and display artifacts and exhibits of every imaginable sort, from art to animals, automobiles, airplanes and even space ships. The items displayed are often rare, even one-of-a-kind, exposing guests to experiences that are not available elsewhere.
- Most attractions consist of a combination of permanent and temporary exhibits, with the latter changing periodically over the course of the year.
- The majority of attractions appeal to families, exposing adults and kids to new experiences, stimulating their creativity and expanding their appreciation for the world around them.

- Quite often selected exhibits within an attraction are much more popular than others, resulting in queues and crowds in some areas and light traffic in other areas

Regardless of size or audience, attractions face a number of challenges:

- Satisfying guests' curiosity – guests are curious and often want to know more about exhibits. While signage and staff can answer some questions, providing additional content that satisfies guests' curiosity is a never-ending challenge.
- Promoting exhibits – making guests aware of and encouraging them to visit less familiar and possibly less popular exhibits.
- Engaging guests – providing experiences that engage guests, regardless of their age or familiarity with the exhibits
- Stimulating patronage – enticing guests to visit more often and support the attraction by patronizing the gift shop, making a donation or even becoming a member

To achieve the objectives above attractions have historically relied on a mix of maps, guidebooks, and other printed materials, audio guides, and tours and interactive sessions led by paid and volunteer staff. Staff members are trained to answer a myriad of questions, from hours and amenities to "why are giraffes' tongues so long?"

From museums to wineries and zoos, attractions are rapidly integrating beacons with mobile apps to enhance guests' experiences using some variation of the approach outlined below:

- For each exhibit, content is produced that explains in more detail what the exhibit is all about. The content is accessible either via the web or within the app.
- As a guest approaches an exhibit, the beacon-powered app recognizes the guest's location and the app (or website) displays the content for that exhibit.
- As with social media, visitors can "like" attractions and post comments. User-generated comments, photos, and ratings can be displayed as part of the exhibit's content.

- The app can also recommend and provide directions to other exhibits that are likely to be of interest.
- Trivia, passbooks and other elements of gamification can be incorporated, challenging kids and adults alike.

In the hands of imaginative designers beacons transform mobile apps and devices into docent, concierge and tour guide, all in one. For example:

- In [Istanbul](#) and other countries, museums are providing self-guided tours, triggered by beacons. More sophisticated solutions can tailor tours to a visitor's schedule (e.g., one- to four hours), interests (modern vs. 19th century artists) and more.
- Zoos in [Italy](#) and elsewhere are providing additional information on animals, including origin, habitats, risk of extinction, eating habits, offspring and much, much more.
- The [Kew Royal Botanic Gardens](#) in London and others are providing information on exotic species. Some gardens even offer tips for related plants suitable in guests' own gardens.
- Many attractions, including [The World of Coca-Cola](#), provide links that make it easy to shop for and purchase prints, stuffed animals, apparel and other memorabilia that extend the guest experience and support the attraction.

By making engaging content for each exhibit automatically accessible, beacon-powered apps are providing highly personalized, immersive experiences. The content and forms of engagement are limited only by the imagination of designers and budget. While museums are leading the way, attractions of all sorts are rapidly integrating beacons and mobile solutions to [transform](#) guests' experience.

Restaurants Are Making Diners Happy

There is a good chance that diners will be seeing more beacons with their meals – that is, in the restaurants that serve their meals. And actually, they won't be seeing them because beacons work in the background.

At breakfast, lunch and dinner, a majority of the meals consumed by Americans are prepared by restaurants. Long dominated by McDonalds, Taco Bell and other QSRs (Quick-serve Restaurants), the restaurant industry's growth has been propelled by Chipotle, Panera and other so-called Fast Casual restaurants. In addition to national and regional chains, the industry includes a large number of independent restaurants.

At QSR and Fast Casual restaurants, millions of consumers daily take part in a now familiar drill – they drive up or walk in, wait in line, look at the menu behind the register, place an order, pay, step aside, wait for the order, request or pick up condiments, and, if dining in, find a table and enjoy their meal. While the ritual is familiar, several aspects detract from the customer's experience and interfere with the restaurant's objectives:

- Consumers don't like to wait in line
- Despite new and improved digital signage, consumers have a limited opportunity to view the menu, much less learn of and consider new items.
- Requesting a variation ("hold the _____") can complicate and delay the process.
- Whether an order is placed at the counter or drive-thru, as many as 2-3% of customers' orders have errors, with the number higher during busy times.
- While enjoying or completing their meal, if diners wish to order dessert or additional items they must repeat the drill.
- When a dining experience is exceptionally good or bad, short of asking to speak with the manager (which few do), customers cannot easily provide feedback or resolve the issue.

Recognizing these and other challenges, QSRs and Fast Casual restaurants are racing to incorporate digital and mobile solutions into the dining experience. Taco Bell's CEO heralded their new mobile app, which enables ordering and customization, as "the biggest breakthrough since the drive-thru." Along with mobile apps, beacons are helping to streamline and enhance the entire guest experience, especially ordering and payment. For example:

- Using Taco Bell's mobile app, customers can order ahead and, as they approach and come within range of the restaurant's beacons, a team member can deliver the food at curbside, eliminating the need to wait in the drive-thru line.
- Using a mobile app like [Downtown](#), restaurant customers can view the menu on their device, place their orders, and have their food delivered to their table, bypassing the usual lines. During the meal, customers can also order additional items and have them delivered to their table. Finally, without ever leaving the table customers can pay their tab, eliminating the need to wait, all enabled by beacons.
- With a number of third-party apps, customers can enroll in a restaurant's loyalty program. Beacons in the restaurant allow customers to automatically check-in and receive points for visits and purchases. Beacon-powered loyalty apps are being used by a growing number of restaurants.

By integrating beacons and proximity into mobile solutions, leading restaurants are streamlining and improving order accuracy, saving customers precious time and enhancing diners' experience. These customer-centric innovations are also boosting orders and average ticket size, which improves margins and profitability. Loyal customers also appreciate the seamless recognition and rewards that beacons automatically enable, strengthening customer loyalty, persistence and advocacy.

Retailers Are Combining Digital and Physical Shopping

With beacons integrated into their platforms, retailers from Europe's [Carrefour](#) to [CVS](#), [Barney's](#) and others are providing timely, relevant offers that customers value and respond to. In the early days of location-based advertising one of the oft-mentioned scenarios depicted consumers walking past Starbucks and receiving an offer to purchase a coffee or latte. Fortunately, the wisdom of bombarding consumers with unsolicited, untargeted offers has been roundly critiqued and the scenario debunked. In virtually every category brick & mortar retailers face two critical challenges – how to attract more shoppers to their stores more often, and how to generate more sales from customers who visit their stores. Since malls and shopping centers are dependent on their stores' success, these questions are equally if not more important for Westfield, Simon and other properties.

While mobile and beacons are critical parts of the solution, determining the most appropriate use case(s) and strategy for a particular retailer is complicated by a number of factors.

- "Retail" encompasses a broad category of very different types of stores – while there are similarities, the differences between a Macy's and a 7-Eleven, not to mention Home Depot, Costco, Walgreens and other types of stores, require different approaches.
- In addition to differences across store types, shoppers' needs and interests vary across segments (teens vs. adults), time (hour, day of week, and season) as well as occasion (e.g., a fill-in trip to the grocery store vs. shopping for a party prior to the big game).
- In the same store – for example, a department store such as Macy's, consumers shopping for a product such as mattresses have requirements and expectations that are very different from shoppers, say, in the cosmetics department.

- Even within the same store type and same category, customers may be browsing to see what's new, researching products and brands, searching for specific item (or set of items), or simply comparing prices on a product and brand they've already decided to purchase.

While the intensity of competition also varies, brick & mortar retailers are under intense pressure Amazon and other online competitors to improve shoppers' experience. Consumers view shopping online much more favorably than shopping in stores – in fact, Amazon enjoys a 2:1 "[favorability margin](#)" over the average brick & mortar retailer. Sales from the recent holiday season showed the power of Amazon's appeal, in particular – the online leader accounted for nearly [43%](#) of e-commerce sales.

Amazon has built its formidable franchise by removing frictions and personalizing and enriching shoppers' experience. While pioneering one-click shopping, Amazon continues to make shopping easier with services such as subscriptions for reordering regularly purchased products, Prime subscriptions for next day ordering, same day delivery and others. Amazon is also the undisputed leader in personalization, presenting on its opening page no less than 8 different personalized options to entice consumers to shop.

In contrast, with the typical brick and mortar retailer a shopper may have received an e-mail in their inbox; picked up at entrance to the store one of the ubiquitous circulars showing items on sale; and scanned a directory or signage pointing to specific departments. Retailers offer little if any personalization that makes in-store shopping easier, more enjoyable and productive. In terms of integrating digital and mobile solutions into the shopping experience, brick & mortar retailers to date have barely scratched the surface.

Integrated with mobile apps, beacons play a vital role in removing frictions and personalizing shoppers' experience. Consider the following examples, all enabled by beacons and a retailer's own or third-party mobile apps:

- Like Amazon beacons can show and direct consumers to the "best deals" throughout the store and in specific departments.
- Like K-Mart's Blue Light specials, beacons can direct shoppers to items that are available in limited quantities or on sale for a limited time.
- In combination with beacons, a shopping list prepared online or based on previous purchases, can guide a shopper through the store. As the customer navigates down an aisle, the app can display items on the list as well as related, complementary or alternative items.
- With beacons pinpointing a shopper's location down to the aisle, the app can display trending items in the department, reviews from previous buyers as well as online items not available in the store.
- A customer's purchases can be held for pick-up or delivered to their home. As customers approach merchandise pick-up, a beacon signal can prompt the staff to retrieve their order, streamlining fulfillment and reducing wait times.
- While viewing a product in the store, shoppers can use the app to request assistance from a salesperson or remote support team.

Imagine the power of beacon-powered shopping apps when combined on an opt-in basis with a customer's preferences and past purchases. In essence, the combination provides Amazon-like personalization to deliver frictionless, rewarding shopping experiences in stores. Retailers are also utilizing beacons to (i) help customers navigate to specific departments or find specific items; and (ii) reward customers for visiting the store and specific departments.

In virtually every category, leading retailers as well as malls in N. America, Europe, and [Asia](#) are deploying and experimenting with ways to integrate beacons into their mobile solutions, enhancing the shopping experience. Leading retailers deploying beacons include CVS, [Rite-Aid](#), [Macy's](#) and Target. Clearly, careful thought and [planning](#) are required to avoid spamming customers with irrelevant and unsolicited offers and instead provide timely, relevant content, offers and services that customers welcome.

Enterprises Are Automating and Verifying Field Inspections

Most discussions related to beacons center around consumer applications. A number of significant applications are emerging within enterprises as well, particularly in industries that have equipment in the field that require periodic inspections. Consider for a moment the vast number of fire extinguishers – on every floor of every office and commercial building, in elevators, stores, warehouses and factories, and in many other places the average person is unaware of.

With equipment in the field regular inspections and maintenance can be critical. For example, in the event of a fire, a single, non-working extinguisher can mean the difference between a small, contained fire that is quickly extinguished with minimal damage and a three-alarm blaze that results in significant property damage and puts building occupants at risk. While inspections may seem to be routine, they can have serious, even life and death consequences. As a result, there are strict industry regulations governing compliance and vendors and customers must carefully monitor the status and working condition of extinguishers in the field.

Despite advances in technology, inspections and maintenance in many fields are still performed manually, in much the same way they've always been. While the process varies across vendors and owners, the process for inspecting extinguishers typically consists of the following:

- On a regularly scheduled basis, inspectors travel to locations and physically inspect the devices.
- At the beginning of a shift, inspectors are given a list, generally on paper, with the location, age and other information specific to each extinguisher scheduled for inspection that day.
- In each location, the inspector examines the extinguishers, the cases in which they are housed, user instructions and any other materials to confirm that extinguishers are visible, accessible and in proper working condition.

- If there is an issue that needs to be addressed, the inspector either corrects the problem or initiates a work order to fix or replace the unit.
- The inspector then notes the time and disposition of the inspection, again, generally on paper.

Enterprises and their vendors are rapidly equipping field inspectors with mobile devices and solutions, shifting from paper-based tasks to digital.

As it turns out, beacons are a perfect complement to mobile field inspections. From fire extinguishers to railway equipment, enterprises are streamlining and improving the process of inspections, as the following case, compliments of SAP, illustrates:

- A large industrial enterprise can have hundreds of fire extinguishers in a single facility, and many thousands across facilities spread around the globe. Given the associated risks, inspecting and keeping extinguishers in working order is a mission-critical safety process.
- Installed in each unit, beacons can be integrated into a mobile inspection app, allowing the app to “recognize” each extinguisher in close proximity
- By pinpointing the exact location of each unit, the beacon-powered app reduces the amount of time inspectors spend searching and insures that units are not overlooked.
- As an inspector approaches a particular extinguisher, its beacon triggers the app to recognize the unit and pull up a pre-populated template with information specific to that unit. This “automatic detection” reduces time as well as errors that can arise as inspectors check and verify the serial number, compare it to specs on their worksheet, etc.
- Beacons also provide independent verification that each extinguisher was indeed inspected by confirming that the inspector was in its presence for a designated amount of time on a particular date.

- Finally, any issues that require follow up can be communicated instantly to a dispatcher, along with specifics describing the problem. When a maintenance person is dispatched the beacon in the extinguisher allows the unit to be located and repaired more quickly and easily.

For a short demo of the application above, see this [video](#) courtesy of SAP. Another example illustrating the compelling application and benefits for a UK railway company is provided by [Mubaloo](#).

Extinguishers represent just one of many examples of equipment in the field – across commercial, transit and industrial applications, the number of pieces of equipment in the field requiring regular inspection and maintenance is staggering. Fail-safe compliance is often critical and mistakes can be costly, even deadly, exposing the manufacturer, building owners and companies to huge liabilities. Integrating mobile and beacon technologies bring much needed automation and consistency to field inspections.

Conclusion

The examples above provide convincing evidence that beacons, properly integrated with mobile solutions, are transforming customer experience and improving marketing, operations and customer service across verticals. The examples represent a sample of a larger set of use cases, all illustrating the value of beacons.

Despite these successes, beacon deployments and integration are not without challenges and risks. While many companies are treading ahead deliberately and experimenting, others have forged ahead without adequately developing a strategy to solve significant problems and deliver compelling use cases.

The following page shows a matrix highlighting the most compelling applications, from a list of 30, across the 5 verticals. A full list of applications across some 20+ verticals is available upon request from the author. While specific use cases vary across verticals, in general successful applications are delivering compelling solutions on one or more of the following dimensions of the [PEER framework](#):

- Personalize – as illustrated by applications in Retail and Attractions, beacons allow apps to deliver personalized, highly relevant content, messages, offers and services that consumers appreciate, value and respond to.
- Enable – by removing frictions and making apps “smarter,” beacon-powered mobile solutions are helping consumers accomplish tasks more easily and effortlessly, from shopping and browsing to ordering, paying and more. Navigating through a busy airport to catch a flight is a classic and compelling example, but there are many other “frictions” waiting to be removed.
- Enhance – by extracting insights from anonymized patterns of behavior over time, innovative beacon-powered apps can surprise and delight consumers – for example, displaying comments from previous users “in the moment” are making the

(chapter in forthcoming [book](#) edited by Steve Statler)

experience in an attraction even more memorable. Businesses and consumers are just beginning to appreciate the power of fusing the digital and physical – however, once experienced neither will want to revert to the status quo.

- Reward – by recognizing loyal customers, beacon-powered apps can automate and deliver privileges, recognition, rewards and other incentives valued by customers. This capability gives brands and companies a powerful new set of tools to compete for consumers’ attention and affection.

Of course, the prospects and ultimate value of these solutions are in the hands of brands, retailers, developers and technology partners. Based on the use cases and momentum above, the future for beacons and proximity-enabled apps is bright.

	Airports	Attractions	Restaurants	Retail	Enterprise
1 Advertising		Useful	Useful	Useful	
2 Alerts	Valuable	Useful			
3 Asset tracking					Indispensable
4 Authentication					Indispensable
5 Automation					Indispensable
6 Check-in	Valuable		Useful		
7 Clienteling				Useful	
8 Content		Indispensable		Useful	
9 Customer service	Valuable			Useful	
10 Detection/Presence	Valuable	Useful	Valuable	Valuable	Indispensable
12 Games		Valuable			
13 Greeting/Thanks					
14 History/Log		Useful			
15 Market research					
16 Navigation	Indispensable	Indispensable		Indispensable	Indispensable
17 Offers/Coupons	Valuable	Valuable	Valuable	Indispensable	
18 Ordering			Indispensable		
19 Parking	Valuable	Useful			
20 Payment	Valuable	Valuable	Indispensable	Valuable	
21 Points-of-interest	Valuable	Indispensable		Valuable	
22 Price comparisons				Valuable	
23 Product information				Valuable	
24 Product pick-up	Valuable			Useful	
25 Rewards			Useful		
26 Social				Useful	
27 Ticketing	Valuable	Valuable			
28 Tracking/counting	Indispensable	Indispensable	Indispensable	Indispensable	Indispensable
29 Vending					
30 Wait list	Useful	Valuable	Useful		

Key

● Indispensable
● Valuable
● Useful

Source: Dr. Phil Hendrix, immr@phil_hendrix
 Full summary (30 applications across 20+ verticals) is available from author