A FAST-GROWING MARKET

Smartphones may have been hogging the innovation spotlight in recent years, but turning up almost unnoticed, except to the geekiest of geeks, has been wearable computing. Technology observers are touting it as the next big thing that could redefine how we use and interact with information.

In fact, the wearable market, encompassing everything from hearing aids to wristband pedometers, has been around for a number of years. But it is just the beginning. Credit Suisse predicts that the market for wearable technology will increase tenfold to as much as US$50 billion over the next three to five years.

What is driving the phenomenal growth is not just smarter gadgets, but their ability to connect to other devices, such as smartphones and iPods, and the wireless Internet. It is another part of the long-predicted ‘Internet of Things’ in which everyday objects are connected enabling them to communicate and transfer data. As such they will also be a contributor to big data.

Smart watches

Both Sony and Samsung are staking claims to the smart watch territory. Both have launched new devices this year and that’s had some tech observers predicting that this year will be the year of the smart watch. ABI Research estimates that more than 1.2 million smart watches will be shipped in 2013.

Currently there are around ten different smart watches available today split into roughly three types. The first two are seen as an accessory to the smartphone:

- Notification smart watches – these offer alerts for incoming calls, messages and other notifications.
- Voice operational smart watches – enable users to conduct calls and speak some commands via the device.

A third type of smart watch with its own operating system that can be used independently of the smartphone is now starting to appear. This type offers high functionality and can connect to other consumer devices. The Sony and Samsung products are examples of this, but other brands are also expected to enter the market, with strong rumors of Apple joining the fray in 2014 with its iWatch.

Headsets

A less-developed wearable market until very recently has been smart headgear. However, Google grabbed the headlines in early 2013 with the launch of a head-mounted display device called Google Glass ‘Explorer Edition’ to a select group of users. The release to the general public is slated for early 2014.

Google Glass aims to augment our world with contextual information. The device, worn like glasses, is able to take pictures and record video and sound. Users can do a number of things, including check calendars, see messages, get weather updates, make calls and use other apps, all with a display that responds to voice commands. The frames are lightweight equipped with Wi-Fi and Bluetooth connectivity. Other glasses like Meta’s Space Glasses can do similar tricks but have added features including 3-D imaging and virtual reality capabilities, making them useful for gaming systems.

Intel has also made a push into the wearable computing device market with its stake in Recon Instruments, a five-year-old company that makes Google Glass-like headsets for sports participants such as cyclists and skiers.


2. www.abiresearch.com/press/more-than-one-million-smart-watches-will-be-shippe
MAJOR PLAYERS IN THE WEARABLE COMPUTING MARKET

<table>
<thead>
<tr>
<th>Product</th>
<th>Maker</th>
<th>Type</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Glass</td>
<td>Google</td>
<td>Smart glasses</td>
<td>Phone calls, view messages, built-in camera for video and photos, run Android apps, Wi-Fi and Bluetooth connectivity</td>
</tr>
<tr>
<td>Galaxy Gear</td>
<td>Samsung</td>
<td>Smart watch</td>
<td>Phone calls, email and social media alerts, photos, videos</td>
</tr>
<tr>
<td>SmartWatch 2</td>
<td>Sony</td>
<td>Smart watch</td>
<td>Phone calls, read email and social media messages, photos, videos</td>
</tr>
<tr>
<td>Pebble</td>
<td>Pebble Technology</td>
<td>Smart watch</td>
<td>Runs apps if connected to iPhone or Android device and has fitness tracker</td>
</tr>
<tr>
<td>Space Glasses</td>
<td>META</td>
<td>Smart glasses</td>
<td>Similar to Google Glass but also includes 3-D imaging, infrared camera and virtual reality capabilities</td>
</tr>
<tr>
<td>Recon Jet</td>
<td>Recon Instruments</td>
<td>Smart glasses</td>
<td>Real-time fitness tracker for athletes. Can be connected to a smartphone for viewing text messages and answering calls</td>
</tr>
<tr>
<td>M100</td>
<td>Vuzix</td>
<td>Smart glasses</td>
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</tr>
</tbody>
</table>

WHAT’S THE BIG DEAL?

There are a number of advantages expected from wearable technologies in general and smart headsets in particular.

The first is the ability to do hands-free computing. This is of immediate benefit to anyone who performs physical tasks using their two hands and needs access to information at the same time. Hands-on professionals in emergency situations are a clear example.

A related benefit that applies equally to other wearable technologies, such as smart watches, is the ability to multi-task. It is not necessary to stop what you are doing to use the device while there can be constant interaction available between the device and user with no need to turn the device on or off.

Another advantage of wearable technologies is that they can provide context-specific information that doesn’t have to be explicitly ‘pulled’ by the user. It means many of tasks that today use a tablet or smartphone could be simplified by wearable devices.

Fitness training is a good example and a number of companies like Nike have come out with sports-related, wearable activity trackers that can display real time stats as you exercise.

CAN WEARABLE TECHNOLOGY BENEFIT AIR TRAVEL?

SITA Lab, the strategic technology research team at global air transport IT provider SITA, has been investigating if wearable technologies could have a role to play in the air transport sector. The focus was on speeding up passenger processing using Google Glass and Vuzix M100, but the Lab also investigated other use cases, including the passenger use of smart watches.

SITA Lab was one of a few selected developers to receive both the Vuzix M100 and Google Glass devices before their public launch, in order to evaluate them.

Passenger processing

Armed with the preview editions of these technologies, SITA Lab developed an application called SWIFT Boarding using the built-in camera as a scanner and the heads-up display. The aim was to allow agents in the boarding area to securely scan and verify both a boarding pass and passport simultaneously wearing smart glasses. Both documents are held side by side while the app matches the two to ensure they belonged to the same person.

As a proof of concept the SWIFT application was a success. Travel documents and loyalty cards can be scanned by smart glasses. However, the devices are not fast enough yet to be able to meet the high speed passenger processing requirements needed at airports. Matching the documents takes longer than the industry’s one second benchmark making it unviable currently as an alternative to existing systems, until more powerful smart glasses are developed.

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However, there are opportunities to use smart glasses in less demanding scenarios where fast throughput is less critical but scanning capabilities are required.

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For instance, replacing the tablets currently carried by roving agents or by agents at the entrance to airport lounges, to remove the need to physically scan boarding passes and frequent flyer cards.

Similarly, the team at SITA Lab found that smart glasses can be used to scan bag tags to retrieve mislaid bag information from WorldTracer, the airline industry database for finding misplaced baggage, or even phone the owner of the bag.

**Operational efficiencies**

The hands-free computing capability of smart glasses means there are clear benefits in areas such as aircraft maintenance. The mechanic can communicate directly with database systems and sensors to perform step-by-step replacement of parts, while having both hands to do the work. This could speed up turnaround times and make maintenance work far easier and safer. It is an area that SITA sees a number of interesting opportunities to develop further through studies and trials with airlines.

Aircraft turnaround can also benefit from the strong notification capabilities of wearable technologies. It is a critical activity comprising of numerous time-sensitive and event-driven tasks. The dispatch officer can be kept fully informed and up-to-date on progress without being tied to a desk.

Customer service is another potential area. When a passenger has an interaction with airline staff, the staff member is typically behind a desk using a keyboard to enter and access information. About 90% of their attention is focused on the computer and not the customer. Smart glasses could change this and allow customer service agents to focus on the passenger much more. Discussions in a foreign language could be made easier by real-time translations where smart glasses use voice recognition software to translate the customer’s language into text on the glasses’ display.

**REALITY CHECK**

Inevitably with a new technology, particularly a disruptive one, there are issues to address.

**A work in progress**

More often than not the technology itself is a work-in-progress requiring incremental improvements before its intended benefits can be realized. Wearable technologies are no exception.

The technology needs to be more robust to avoid breakages and the cost will have to come down. The camera quality will also need to be enhanced. Currently it requires near perfect light conditions within the airport for scanning documents to be successful.

Furthermore, bandwidth needs to be available. Large numbers of staff using wearable devices will put a severe strain on wireless networks. Reliable wireless connectivity via Wi-Fi or 3G would be needed across the entire airport campus.

Importantly, battery life is currently not long enough. SITA Lab found that their pair of smart glasses was limited to around 30 minutes of activity. However, this is likely to improve. According to Credit Suisse battery power could increase by a factor of 2.2 by 2020. In tandem, more powerful processing capabilities will be needed for smart devices if they are to take on the tasks of other mobile devices.

Apps for wearable devices will not only require software developers to handle a new user interface, but also particularly in the case of smart watches, a major shift in screen size. It could add another layer of complexity and cost for airline and airport IT departments to manage.

**Privacy concerns**

There are also going to be cultural and social issues. People do not want to be surreptitiously videoed or photographed. Wearing a heads-up display can also feel awkward. It may be less of an issue in the context of work, if other employees are wearing the device, but in a US-based survey from Cornerstone OnDemand, 42% of workers said they would not be willing to strap on wearable tech for their jobs.
BEYOND THE LAB

The wearable computing market is still in the early stage of evolution, but like laptops and smartphones before, there is the potential to truly revolutionize the way we access and use information. It has already demonstrated significant growth in some consumer markets such as fitness and healthcare.

Wearable computing is a natural evolution of the smartphone technology that has become so indispensable. Today, wearable devices are seen as more of an accessory to the smartphone, but we are only at the beginning of a learning curve that will eventually lead to something completely different to the wearable computing SITA Lab started out with.

When SITA Lab first worked with the camera on smartphones five years ago to scan bag tags and get WorldTracer data, the cameras only worked in ideal conditions. Within 18 months the capabilities had advanced to not only easily scan the bag tags but 2D barcoded boarding passes (BCBPs) too. It is highly likely the same level of competition and rapid evolution seen in smartphones will apply to smart glasses.

In the meantime, airlines are unlikely to offer services on wearable technology to passengers. However, industry personnel, such as flight attendants, maintenance personnel, flight crew and ground operations staff could be benefiting from a hands-free experience in the next few years.

There’s no doubt tech companies believe that wearable devices are a big part of the future of computing and SITA Lab endorses that view. An app-ecosystem for wearable devices is developing and this will broaden their use both with the traveling public and among industry workers. The team at SITA Lab will continue to take the lead, building on the experience and knowledge they have gained, to validate the applicability of wearable computing for the airport of the future.

DEVELOPER.AERO POWERS NEXT GENERATION OF DEVICES

Getting fast and easy access to an airline’s or airport’s data in order to build and test new applications is a tough challenge. But not anymore. For the last two years SITA Lab has been running the developer.aero API program which simplifies access to legacy airline data. It makes building new apps on the latest technology a whole lot faster.

Identifying unattended baggage could benefit from smart glasses

For further information, please visit www.sita.aero

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