The Future Of The GPS Market

A Little History of GPS Navigation

IN-CAR GPS NAVIGATION: BORN IN EUROPE WITH A U.S. SATELLITE

GPS navigation find its root in the US military with the NAVSTAR program that launched its first satellite in 1974 and reached a full constellation of 24 satellites in 1993.

The civilian availability of the GPS signal came in two waves. First the tragedy of Korean Airlines flight KAL007 that was accidentally shot by a soviet fighter jet after straying off course into USSR airspace. Two weeks later U.S. President Reagan proposed that GPS was made available to civilians.

But it took President Clinton in 2000 to make the accuracy of the signal as good for civilians as it is for the military, removing what was called "Selective availability", a feature that introduced errors in the data broadcast to civilians, limiting the accuracy to around 200 meters.

The end of selective availability opened up the door to many consumer applications from companies such as Garmin (US), Navman (New Zealand) and Magellan (US). But the breakthrough in GPS navigation mostly came in Europe from Netherlands-based TomTom.

The company released in 2002 its first navigation software, TomTom Navigator, for Windows CE-powered PDAs, sold bundled with a car cradle and a bluetooth GPS receiver. Then their first all-in-one device, the TomTom GO, was released in March 2004. It featured a 3.5 inch touchscreen, easy to operate software menus, a great loudspeaker, was round-shaped like an iMac and cost €799 at launch. This device enjoyed a great success, which was followed and amplified by a strong consumer marketing campaign.

TomTom was soon followed by its aggressive competitors and the niche market of so-called Personal Navigation Devices (PNDs) exploded to become one of the biggest consumer electronics segment in Europe in just a couple of years.

According to data from market research firm Gfk, 100,000 pieces of PNDs were sold in 2004 across the five leading EU countries (United Kingdom, France, Germany, Italy and Spain), this grew to 1.4 million in 2005, and 5.2 million in 2006. That year TomTom had 50 percent market share followed by Garmin (10%), Navman (8.7%), Mio (4%) and Becker (4%).

This growth was amplified by a continuous decline in prices. The average selling price was €370 for a PND in the last quarter of 2005 down to €345 end of 2006 then a huge drop of 33% (to €232) in the fourth quarter of 2007, according to market research firm Canalys.

According to gfk, in Western Europe, around 14.4 million portable satellite navigation systems were sold in 2007, up 85 percent against the prior year. That same year PNDs became a €1 Billion market in Germany.

In 2007 a poll from the European Commission (26,000 respondents) revealed that 20 percent Europeans (EU 27 countries) used GPS navigation, with already 39 percent in the Netherlands and 31% in Germany.

THE RISE OF MOBILE NAVIGATION

The first mobile phone with GPS, the Benefon Esc! was introduced by Finland-based phone maker Benefon in late 1999. This market would however remain quite confidential for a few years more. TomTom and a coupe of other companies had made attempts at launching GPS navigation software on Symbian and Windows mobile handsets in 2004-2005, but the experience was a bit clunky with a separated GPS mouse connected to the phone via Bluetooth.

Consumer much preferred the easy to use, touch screen experience found on PNDs.

In February 2007 Nokia is announcing the N95, their first GPS-enabled mainstream smartphone together with Nokia Maps. This time the GPS is embedded and the software is preloaded. At the end of the third quarter the company had already sold almost 4 million of these devices.

In September 2007 Michael Halbherr, Head of the location-based experience team at Nokia revealed that Nokia Maps had been downloaded more than 1 million times since its launch 8 month before. 95% of N95 smartphone owners had established a GPS fix and 67% of them used it for in-car navigation.

Clearly mobile phones are starting to compete with PNDs. A first signal of the end of the PND momentum is coming during the first quarter of 2008 when TomTom, its map supplier Tele Atlas and SiRF, at that time the major GPS chipset supplier to the PND industry, announce profit warnings due to a backlog of products unsold in the last quarter of 2007.

In the second quarter of 2008 shipments of GPS-enabled smartphones in Europe, Middle East and Africa (EMEA) equal those of PNDs for the first time. In the third quarter Canalys estimates that PND shipment were down six percent against the previous year - Meanwhile, shipments of smartphones with built-in GPS are soaring in EMEA, rising from 4.7 in the second quarter to 10.4 million in the third quarter.
In August 2008 Canalys estimated 38% smartphones had GPS in EMEA.

At the Canalys Navigation Forum, held in Budapest on September 2008 the charts shown on the podium are not anymore hurting the ceiling. The PND industry starts to realize that growth is over, even if the entire year will see 18.1 million PNDs sold in Europe.

MOBILE NAVIGATION: HANDSET MAKERS, WIRELESS OPERATORS AND - FINALLY - APP STORES

At that time the mobile navigation market is clearly divided in two technologies: off-board and on-board maps, a technology choice that pretty much dictated commercial strategies: white label services with off-board maps sold via wireless operators or direct to consumer products with on-board data. the distribution of the later was made mostly by bundles between phones and software.

Off-board (server-based navigation) early vendors in Europe were Webraska, Telmap, Wayfinder, Appello and Jentro while Nokia Maps, ALK Technologies, Sygic, NNG, Navigon and TomTom were the on-board maps market leaders.

The subscription-based business model used by wireless operators to sell mobile navigation will however have a limited appeal to European consumers - unlike in the United States.

Then the inception of App Stores from Apple (July 2008 along with iPhone 3G, first GPS-enabled iPhone) and Google (Android Market in October 2008) will cut the content cord between wireless operators and consumers.

Mobile navigation quickly becomes a must on app stores, mostly selling in Europe as a lifetime license with prices around €80-€100 for a full map of Europe. As a result, for the full year 2009 half of the top ten best selling apps in Apple app stores in Europe are mobile navigation apps, led by Navigon, TomTom and CoPilot (ALK Technologies).

FREE NAVIGATION ON MOBILE PHONES

On October 2009 Google announced its free navigation software on Android smartphones, followed by Nokia in January 2010. At the same time wireless operators are also offering free turn-by-turn navigation to their top customers.

The business becomes therefore more difficult for mobile navigation vendors (at least not yet on iPhone) and see the launch of low cost or free solutions from Navmii and Skobbler using new map data providers (AND then Openstreetmap for Navmii and Openstreetmap for Skobbler). NDrive is also surfing on this wave with a €5 navigation software powered by TomTom maps that topped navigation charts in many markets in 2009.

"We asked Ludovic Privat, worldwide recognized expert in the location-based service industry and co-founder of GPS Business News, to write this White Paper for NavAds. Generally, people read a map as it comes. NavAds would like to provide you with some key insights into the world behind maps and the navigation market in Europe, including its relatively short history, its global relevance and how the GPS market will develop."

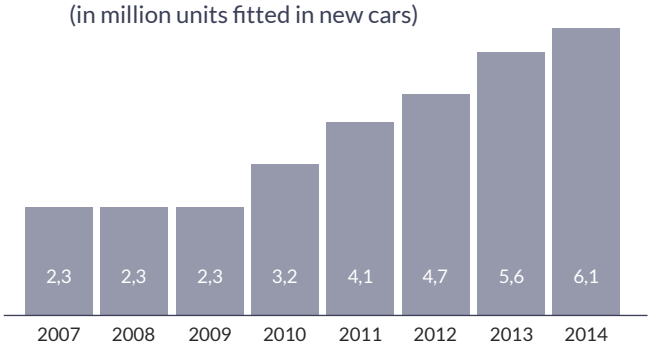
- Lex ten Veen, CEO NavAds

WHEN CARS ARE FIGHTING BACK

While the PND market was shrinking and the mobile navigation market rising, car makers were not staying idle either, even if changes were more progressive.

At first they competed in offering semi-integrated PNDs, i.e. personal navigation devices with dealership or factory-fitted mounts and powering systems, then they introduced low cost systems.

Sales of in-dash navigation in Europe
(in million units fitted in new cars)



In 2010 systems priced under €1,000 represent 42% of sales in Europe, two years later they are at 47% (source: Nokia HERE).

In 2012 some in-dash navigation systems starts fall under EUR 500 in Europe. With Renault, Dacia and Fiat starting to introduce more affordable options.

At the end of 2012 Renault releases R-Link and MEDIANAV two navigation systems priced under at €499 and €350 respectively and coming free in top of range models. MEDIANAV is also coming to Renault's subsidiary Dacia.

Fiat, also started to introduce embedded navigation systems also priced in the €500 range.

At this time the drop in PND sales is not only due to mobile navigation but also to more affordable embedded systems. In 2010 market research from Nokia HERE found that 34% of consumer would likely replace their PND by an in-dash system, a figure that grew to 50 percent in 2012.

Not surprisingly since 2010 the number of cars sold with factory-fitted navigation systems has been growing at a good clip, from 4.1 million in 2010 to 6.1 million in 2014.

Today's state of the market across PND, Mobile and in-dash Systems

PND MARKET DECLINE SOFTENING

While the PND market has been going down 15 percent per year since 2009, during the first half of 2014 market research firm Gfk noticed "a slight improvement" in the PND market in Europe. "In the first half of 2014, the market saw an 11.3 percent decline in volume revenue while value revenue fell by 8 percent. In the same period of 2013, the corresponding figures had been higher at around -15 percent."

The market landscape is in fact not the same everywhere, noticed Gfk. While positive developments are seen in Northern Europe (especially UK and Germany) Southern Europe markets continue to suffer a sharp decline. Germany saw for example a volume decline of 5 percent and a total stable market value.

"These positive developments are above all attributable to innovations which are impelling customers to choose premium products: large screens as of 5 inches, improved traffic jam warnings via mobile internet or DAB, free map updates and more," wrote Gfk analysts.

In the third quarter 2014 TomTom even noted that the decline slowed down losing 6 percent in units against loss of 11% in the second quarter and 12 percent in the first quarter compared to the previous year.

Another reason of the strengthening of average selling prices is the strong market concentration. In 2006 the top 5 brands had 76% market share in Europe. End of 2014 the top two brands: TomTom and Gamin have together 85% to 90% share on average.

Looking forward, market research firm Berg Insight predicts that PND shipments in Europe will continue to fall 8-15 percent annually through 2019. The firm forecasts that the industry will ship around 4 million PNDs in 2019.

The research firm also expects that the replacement cycle of PNDs is likely to be prolonged: "many devices are now sold with lifetime map updates giving users less reason to replace their existing device as frequently."

MOBILE NAVIGATION ON A CONTINUED RISE

Nowadays mobile navigation is a standard, a commoditized feature in all smartphones. iPhones have Apple Maps, Android devices have Google Maps - Samsung devices also have HERE - and Windows Phone handsets have HERE Drive.

A number of third party vendors however continue to distribute successfully their navigation software using various strategies and business models. Companies such as TomTom and Garmin (Garmin and Navigon brand) are leveraging their strong brand and product features to make the difference. For example having on-board maps is differentiating against Apple and Google product that require a wireless connection to work.

Others like Navmii, MapFactor or Skobbler (the later now part of TeleNav) rely on the free Openstreetmap database, offering free navigation and making a revenue essentially selling premium features (speed camera databases, country map download, etc..) and/or displaying banner ads.

Sygic, which is currently leading in terms of downloads (55 million users in August 2014) right after Google Maps and Waze, has adopted a freemium marketing strategy with TomTom maps. The software is free to download but the turn-by-turn navigation feature is coming as a small premium. Then other upgrades are possible: real-time traffic, new countries, speedcam warnings, dash cam recording, voices, etc.

IN-DASH MARKET OPPORTUNITIES

As we learned earlier the take rate of in-dash navigation in new vehicles is reaching around 40 percent in Europe. This average percentage is however little representative of the reality: the more expensive the car, the bigger is the navigation penetration.

While the high end of the market is highly penetrated, with 60 percent penetration in the D segment (i.e.

Honda Accord, Peugeot 407, Jaguar X-Type) and 80% plus in the luxury and high luxury segments, the penetration is much lower in more affordable cars.

The C segment (Golf, Ford Focus, BMW series 1) has 40 % penetration, the B segment (Opel Corsa, Peugeot 207) has 30% and the A segment (Renault Twingo, Fiat 500) is close to zero penetration. There are therefore good opportunities for growth in the A, B and C segments, the B and C segments representing half the cars sold on the market.

THE BLURRING FRONTIER BETWEEN IN-DASH AND MOBILE NAVIGATION

The tethering of phones to dashboards to safely display mobile apps is however an announced landslide for the in-dash navigation market. There are a number of technologies available today to replicate apps on dashboard: some are proprietary like Ford appLink or General motor's IntelliLink, some other rate working across different car brands like Bosch mySPIN, one, MirrorLink, was developed by a consortium of car and smartphone makers, and the most talked about, CarPlay and Android Auto, have been developed respectively by Apple and Google.

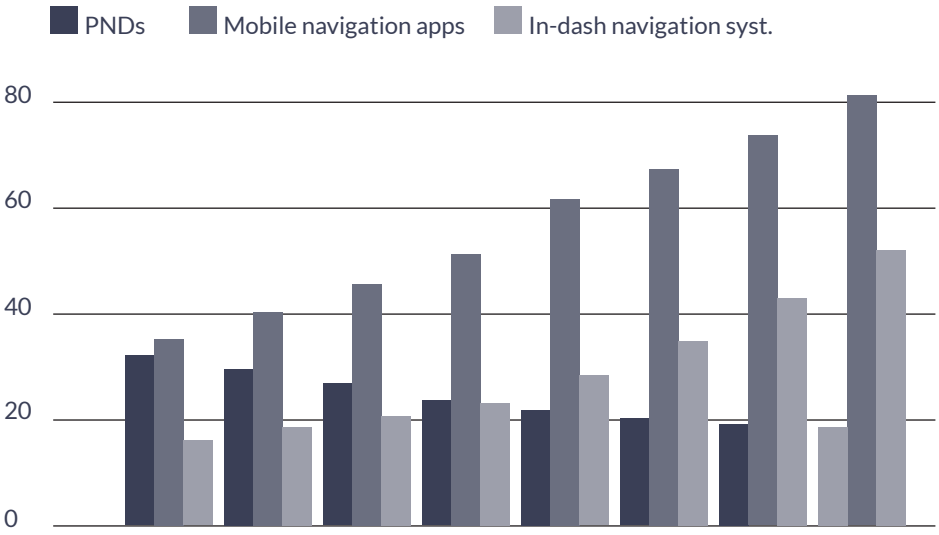
Announced in January 2014 CarPlay and Android Auto are slowly but surely coming to cars in Europe in 2015. Both tech companies have announced tens of car brands that will integrate their solution.

Whatever the technology is, the promise is the same: display mobile apps, including navigation on a dashboard and leverage the processing and connectivity of the phone to offer the best experience on the car screen and navigate it using car commands: wheel buttons, voice, etc.

The tight integration of these mobile solutions with the digital life of consumers (music, contacts, text messages, phone books) gives those a strong appeal to drivers. In the case of CarPlay and Android Auto the quality of the voice recognition systems (Siri and Google Now) is an additional plus.

Usage trends
Source: Berg Insight

Navigation users by platform EU28+2
(in million of active users)



Looking into the future

CLOUD-BASED VS ON-BOARD NAVIGATION

In the early days of GPS navigation the value of such devices was to route you from A to B. Nowadays the addition of quality traffic information makes them relevant everyday, even when you know your destination. In addition to that, a lot of additional real-time service are hosted on these devices: speed alerts, speed camera alerts, weather along route and at destination, eco-route to save gas, fuel price search, parking booking, charging station booking, etc.

A significant part of these services are real-time and most of them have impact on routing or estimated time of arrival (ETA).

Additionally, navigation systems tends to be more personal, i.e. recording you preferred route, your driving routines to predict where you want to go and customize the routing experience accordingly.

This can lead to very sophisticated experience. For example, in a scientific paper a team of Yahoo! research in Barcelona described how to calculate the most beautiful route instead of the shortest or the quickest, using metadata of geolocated Flickr pictures.

In another example, a leading car manufacturer is working on a special routing algorithm based on pollution data to be used by asthmatic patients.

All of that obviously requires connectivity, large databases and a fair amount of processing. Therefore it will ultimately become impossible to have the routing taking place in the car. The future of navigation is off-board routing, taking place in a cloud and sent to the dashboard - via a phone or not.

MOORE'S LAW AND IN-DASH OBSOLESCENCE

As mentioned earlier, technologies such as MirrorLink, CarPlay, and Android Auto are blurring the frontier between mobile and in-dash navigation.

One could think that the two systems might co-exist. And many car makers do.

But the problem is the difference of lifecycle between automotive devices and consumer's smartphones. While consumers are changing handset every two to three years, the average age of a car is 8.6 years in Europe. And when a new car is hitting the dealership its electronics specifications have anyway often been decided two years earlier; i.e. two generations of phone away.

It is therefore unlikely that in-dash systems can compete in this race. The best they can do is probably to stay on the edge of sync standards to keep displaying smartphone apps over the lifetime of the vehicle.

Obviously this trend towards a phone-enabled in-car digital experience is not going to realize to its full potential overnight.

With a bit less than 250 million passenger cars on the road in the EU and only 14 million new cars per year, changes are indeed going at the speed of metal corrosion rather than the speed of the web economy.

THE FUTURE OF LOCAL SEARCH & POIS

Local search is also an area where there is a lot happening in the navigation market. Traditionally, points of interest (POIs) databases have been the business of digital map vendors (TomTom, Nokia HERE), local yellow pages and business directories and, of course, Google. But new players have come to this market, particularly social platforms like Facebook, Foursquare, Tripadvisor or Yelp.

Two other players are also worth mentioning: Openstreetmap and Factual.

Dubbed the wikipedia of maps, Openstreetmap is a worldwide map database built by more than 1.7 million volunteers. In addition to road geometries, building footprints and many other details, the database includes millions of points of interest all over the world, updated by locals.

Factual is a Los Angeles based start-up created by Gil Elbaz, whose previous startup was bought by Google to form Adsense. Using open source data, web scraping robots and machine learning technologies, Factual has

gathered in its database more than 65 million local businesses and POIs in 50 countries.

Adding to these two, there is a number of vertical players such as Parkopedia for parking data, Navx for fuel prices/fuel stations and charging stations or Open Tables and La Fourchette (thefork) for restaurant booking that have developed "niche", high quality content databases.

The virtue of these vertical players is not only to offer comprehensive data but also a depth in this content and, for some of them, the capacity to transact. The location of the nearest fuel stations is nice but getting the cheapest one is better. Finding a restaurant is good, but booking it and getting a discount is a must. The same applies to parking, charging stations, etc.

As the number of POI sources enlarges there is obviously a need to aggregate these databases and feeds and mash them up in a meaningful way. Digital map makers are playing this role as they have done in the past, but they are not the only one. Some navigation software vendors are doing their own content sourcing, aggregation and cleansing. And there are new players, such as for example real-time traffic provider INRIX, that is aggregating and reselling fuel prices, parking location and more to car manufacturers which want to limit the number of their suppliers.

As a consequence, this area continues to be a moving field, as new crowdsourcing techniques and social networks are emerging.

Another significant advancement in local search for navigation is voice. Performing a search on a navigation device is difficult with a keyboard but not anymore with systems using natural language recognition. Therefore one might expect the number of local searches performed by driver to grow sharply as the technology gets completely intuitive and smart enough to grab the context of your question.

THE CHALLENGED MONETIZATION OF MOBILE NAVIGATION

Navigation is de facto following the general trend of app stores: freemium and advertising. While freemium works well, as demonstrated by Sygic and a few others, advertising is harder.

Indeed, the advertising business model has not proved to be hugely successful for navigation vendors until today.

Looking back at the reasons, this has mostly been due to the lack of scale of each player alone in this market and the lack of advertising inventory adapted to this type of app. NAVTEQ Media solution (2009-2010) was built to answer this problem, i.e. as an advertising network offering native formats and calls to action (i.e. "click to navigate") to advertisers that were built in the workflow of navigation, with a scale offered by multiple partnerships with app developers (ALK, NDrive, Navigon, Appello Telmap - and obviously Nokia Maps - were part of it).

But this was a bit too early in the mobile advertising game and the project was killed by Nokia that did not have the resources to invest in this new business.

One exception though is Mappy (France). The subsidiary of the French Yellow Pages company SoLocal (formerly Pages Jaunes) launched a free GPS navigation application (powered by software from NDrive) end of 2011. The app, free to the end users (700,000 unique monthly users), is monetized by merchants that buy preferred placement in the prominently displayed local search feature of the app. Mappy GPS Free comes as an additional feature to the local advertising products sold by hundreds of SoLocal sales representatives. A good community of users and feet on the ground to sell ads is the right combination.

Another exception is Waze, that has developed native advertising formats well integrated in the app workflow, for example with starting when the vehicle is idle. Its reach is large enough to attract advertisers, particularly in verticals such as quick restaurant services, car retail, repair shops, or fuel vendors.

While many seem reluctant, at least one car maker has already started to adapt to this digital advertising trend. At the CES trade show in Las Vegas, early 2015, General Motors unveiled AtYourService: "a commerce and engagement offering that connects drivers with retailers and merchants on their drive, providing information, convenience and money-saving values tied to their specific destinations," the car manufacturer said.

The trend goes definitely towards advertising in the car, which is by the way as old as listening to commercials on radio in a car.