Citizen Mapping And Charting
How Crowdsourcing is Helping to Revolutionize Mapping & Charting

Michael J. Casey
IIC Technologies Inc.

Abstract

Since the dawn of time people have been making maps. Although often crude pictographs they helped tell a story and pass information from one to another. Such mapping was done by anyone and everyone. Eventually mapping became the domain of skilled mapmakers and so the amateur's role began a gradual decline.

Then technology changed the game. GPS was adopted wholeheartedly by the public, digital cameras were everywhere, broadband Internet arrived and suddenly people's natural wish to document and display what they have seen became fulfilled. Tourists now regularly document their travel by logging their photos online through such services as Flickr.com or Panoramio.com. The concept of geotagging - adding spatial data to the digital photos meta-data - is now done in increasing amounts by an eager segment of the population. As of November 2008 Flickr had 3 billion geotagged photos with more flooding in at a rate of 5 million each day. One can only expect an increase in this flooding with the release of new GPS embedded cameras from Nikon, Canon and others.

The wiki concept, so popular in the form of Wikipedia, has grown in size and influence despite what anyone might have predicted. Who knew that thousands of well educated, literate and well read citizens would pour countless hours, working anonymously and without any compensation spreading knowledge to the world. Wikimapia.org and openstreetmap.org takes the wiki concept to the mapping world.

Mapping agencies can avail themselves of these resources for such tasks as geocoding and map updating. Several agencies have tried this - some with success and others, victims of their own success. Many successful environmental mapping projects are largely carried out by volunteers, a variation of the phenomenon now known as Crowdsourcing. Nevertheless the pace of volunteered geographical information (also known as Citizen Mapping) goes on with or without the involvement of mapping agencies.

The paper will detail the state-of-the-art in Citizen Mapping in the world, the advantages and disadvantages of such efforts and what some mapping agencies are doing about this. Speculation is made about Citizen Charting, how it could evolve and how HO's might be enticed to get involved and help steer efforts.

Mapping and charting agencies might find it useful to investigate alternative methods for getting good map and chart data out to users. If citizens are willing to help perhaps we should give them the tools they need such as protocols, standards and a means to do this.

Is it just me or is it getting crowded in here?

Over the past 3 decades the world of mapping and charting has undergone multiple revolutionary changes. Nautical charting in particular has undergone industry-changing epochs. The switch to digital sensors, for example, opened up data processing to far more efficient computerized data production. It also opened the door for extensive and effective use of built-for-purpose GIS to prepare manuscripts ready for chart printing and then later, for the organization of the underlying data to be used in ECDIS and ECS. GPS in particular had a fundamental change on how surveys were conducted and greatly simplified a logistically difficult part of the field survey operation. Much more importantly it allowed chart users to see the nautical chart in a different

paradigm - and continuous situational awareness became routine. Improvements have come in incremental steps and in paradigm busting leaps such as with GPS and multibeam sonar. The mapping community has become so used to implementing and adjusting to these changes that several questions are always in the air - *what's the next big change? where will it come from? what will it mean to how we do things now? what traditions will we retain and what will we cast aside?*

I believe we are on the cusp of another revolutionary change at the moment and it is coming from a direction which few would have suspected - the untrained but committed nascent amateur mapping community. The change has already been profound on the land mapping side, particularly in the niche market of road networks but is also strongly evident in the use of GIS by citizen activists. The revolution is being led by a well educated, committed and cause-driven society of users who have the wherewithal to simply step around large mapping agencies and governments and do things themselves. Furthermore this work is being done, by and large, by a specific demographic - younger, hipper, more socially aware and concerned and crucially, the most technology savviest generation - the post boomers, post X-Gen under 25's who live and breathe in their uber-connected universe. They are very active, they are very connected, they are very creative and they like to make things. They also don't have a high expectation of anything good coming from large institutions whether they be corporations or governments. They prefer to do things themselves. They are very quick to figure out how to do things - and then share that knowledge with everyone else. And every day they get better and better.

And now they have invaded our cosy little world. What to do?

OK, Now I'm Worried

First off - don't panic. In some ways what is going on is not all that different. It is relatively easy to convince oneself that in fact there is nothing different at all. After all, haven't we always had a committed core of citizens who are very active and like to participate in the management of their society or locale? For example, you don't need a brigade of ornithologists to go out and do a bird census. You merely need to somehow convince the tens of thousands of amateur birders to go out on a specific day and do a species-specific bird count - like they do every year for the Christmas Day Bird Count. Most professional ornithologists agree that the amateurs actually do a better job since most professionals have specialized to the point where identifying different species is beyond their scope of interest. But amateurs love it and have been throwing themselves into the National Audubon Bird Count with great enthusiasm since 1900 (***www.bsc-eoc.org/volunteer***). It would in fact be impossible to do a credible bird census without the participation of amateurs.

The Oxford English Dictionary has relied upon a gifted set of amateur sleuths to ferret out word usage and in particular, first published use of a specific word - a task far beyond the scope anything the professional lexicographers could accomplish.

Having a committed crowd of amateurs, well connected and with the time, energy and

patience to perform a task otherwise almost beyond the reach of the professional cartel - that's one description of what is now called "crowdsourcing".

What's this "Crowdsourcing"?
Here is one definition:

"Crowdsourcing is an online, distributed problem solving and production model. Problems are broadcast to an unknown group of solvers via the Web in the form of an open call for solutions. Users--also known as the crowd--typically form into online communities based on the Web site, and the crowd submits solutions to the site. The crowd also sorts through the solutions, finding the best ones." ... ***wikipedia.org***

That definition is according to Wkipedia on January 20, 2009.

Wikipedia? , ... perhaps you are aware of Wikipedia? You know, the encyclopedia created and managed by a crowd of unknown contributors who spend countless hours contributing to the global knowledge commons. The date is important for Wikipedia is a evolving story, written by a pen that never stops moving. Added to, amended, added to again and again, polished by a crowd of connected users who have never met, likely will never meet, but who show patience and respect for the contributions of others. Not because they are paid to do so - they are not - but simply because they believe in making a contribution.

Not that Wikipedia is perfect - its faults are well known and documented right within Wikipedia itself. Nevertheless it is almost certainly the first stop on an exploratory journey for someone wanting to learn more about some obscure South Pacific Island language or the mating habits of Horny Toads. Users of Wikipedia are well aware of the wiki-wars that rage between certain factions over controversial topics - don't bother trying to get much in the way of useful knowledge from Wikipedia about certain politicians in the course of a hard fought and partisan election campaign. Users of Wikipedia are knowledgeable enough to self censor such entries and little real harm is caused. Unless you have been in the business of publishing an encyclopedia for 200 odd years; then for certain Wikipedia is much more than a threat - it has essentially killed your business.

Wikipedia is an example of the Open Source Movement. If you don't think that Crowdsourcing could affect your business consider Microsoft - for years the sterling example of an iron-plated organization immune from the threats of any upstarts. And then Linux came along. Apple was, and is, a formidable opponent to Microsoft's hold on the Operating System market but even Apple will never do serious damage to the strangle hold that Windows has on the PC market. But Linux?

Who is Linux anyway? Just a bunch of committed, well connected, well educated and skilled coders who have taken it upon themselves to make a better operating system. And to do it for free, without almost any recognition; just for the satisfaction of contributing to an OS that is free for all - not just free as in "free beer" but free as in

"free speech". Anyone can amend Linux and any of the application software designed to run on Linux - and if your amendment meets with the approval of the Crowd (and in the case of Linux, with the approval of one Linus Torvalds) it is implemented.

Jeff Howe is the author of the best selling book - "Crowdsourcing - Why The Power Of The Crowd Is Driving The Future of Business" and he coined the term "Crowdsourcing" in a article in Wired Magazine in June, 2006. According to Howe "Crowdsourcing" is defined as:

> *"the act of a company or institution taking a function once performed by employees and outsourcing to an undefined (and generally large) network of people in the form of an open call" ...* ***wired.com***

So Where Is All This Crowdsourcing?
Howe's book goes into great detail about how Crowdsourcing has changed certain markets and gives many examples showing how the phenomenon has worked spectacularly well and also some case where it fell on its face.

Amazon.com and eBay are masters at getting the Crowd to contribute. Professional book reviews are available for most books but the most read reviews are those posted by individual readers who have no axe to grind, nor back to scratch. These reviews, although sometimes lacking in style, do get to the substance of the review that most Amazon customers want - should I buy this book or not? A quick parsing of the 5 stars and 1 star reviews can give the average customer a sense of whether or not the book is for them. And if you like a certain book perhaps you would like this other one too, after all, many of your fellow customers bought them both.

eBay.com has customers evaluate sellers through personal experience and is rigorous about preserving the integrity of this service. eBay has a very high rate of customer satisfaction due to the successful completion of each transaction. Customers provide free feedback and both eBay and other customers benefit. Trust is at the heart of each eBay transaction and is the essential element for the company's success and what eBay does is monitor the trust rating provided by users and report it.

Zazzle.com and ***Threadless.com*** are two design companies that let customers do most of their work; they merely facilitate transactions. Both companies encourage customers to provide designs for embossing on T-shirts and other items. The new designs are posted online and other customers evaluate the designs. In the case of Threadless the "winning" design is then outsourced to the various T-shirt, coffee mug etc. embossers and products are shipped directly to customers. Both companies cut designers in on the take. A small army of designers work out of their bedrooms, showcase their talent and earn some income.

Mob-4-Hire.com and ***uTest.com*** provide a Crowd of testers for companies wanting to test software and mobile applications. They are all commerce-driven and make payments to volunteers. The "Crowd" in these cases is being paid but the call for

volunteers is made via a general call for anyone interested - no matter where you reside. ***Share-Your-Brian.com*** asks the Crowd to provide creative solutions to problems posted by specific customers.

Google.com employs crowdsourcing methods in most of its endeavours. The heart of PageRank, its indexing algorithm, simply looks at what other people think is useful. Based on the same principle used in evaluating the scientific merit of a published article - i.e. how many times has it been cited - the value of a web site is ranked by the number of other web sites that cite it (link to it). The more people that link to a site the more important it must be.

Google also employs clever passive crowdsourcing techniques. That is, simply track the nature and trends in searching and use this information for marketing and pricing information. An interseting, but non commercial example of this kind of passive crowdsourcing is that Google has demonstrated its ability to detect an outbreak of influenza before national disease control agencies have tracked it.

> *"We have found a close relationship between how many people search for flu-related topics and how many people actually have flu symptoms."*
> *...**Google.org***

NASA Clickworkers:
NASA used the skill sets of thousands of amateur planetary geographers to classify features on the Martian landscape; again a task largely undoable in-house due to its scale. NASA simply posted the Martian imagery on its web site, provided some tools and guidelines for how to classify specific features and then let the Crowd roll on. ***clickworkers.arc.nasa.gov***

US Fish and Wildlife Vernal Pools Surveys
Several US environmental protection agencies employed the good intentions of hundreds of volunteer wetlands enthusiasts to map the locale and key features of Vernal Pools - the small lakes of water that form in depressions after a heavy rain. They are difficult to map any other way due to their ephemeral nature and yet are very important in understanding and managing the wetlands. They also employ legions of volunteers for finding invasive species in National Wildlife Refuges. See ***www.fws.gov/invasives***

USGS National Map Corps
This program invites members of the public to review map sheets they are familiar with and locate items of interest to add. USGS provides an easy to use web service so that volunteers can add features they have geolocated with their GPS. The program provides USGS with thousands of amateur map updating volunteers whose only wish is to improve the quality and up-to-datedness of their favourite map sheets. See ***nationalmap.gov/TheNationalMapCorps/***

These last three examples take advantage of the fact that there is an army of

volunteers available for the right cause as long as suitable motivation is provided (a common goal deemed important to a segment of society), easy to use tools (web access, GPS), suitable feedback and correction mechanisms so the Crowd can learn (the Crowd coaches the Crowd) and can be done in one's spare time. Many of the most profound examples have a strong spatial element.

Who's Gathering All This Data?

> *"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it" ...* ***Weiser, M. (1991) The Computer For The Twenty-First Century***

The Internet, mobile phones, GPS - these are all technologies that have "woven themselves into the fabric of everyday life" and they are all technologies that can be used to make a number of useful applications which utilize spatial data in innovative ways. They have been adopted by the new generation and harnessed to accomplish tasks which have previously been the domain of government institutions. For example, one expects that monitoring air pollution, chemical hazards, excessive noise etc. to be the domain of public institutions. Specialists must be hired to carry out the work, sensors developed, surveys conducted, analysis performed, judgements made and policies developed. But many public institutions often struggle with funding, staffing, sensors that fall out of date, scientific advice ignored and policies developed which tend to protect, rather than monitor and regulate certain enterprises.

However there is nothing to stop a cadre of well educated and knowledgeable citizens from coming together to develop their own sensors, conduct their own surveys, analyze their own data and publish it online, usually in real time to an open access web site that anyone can view. Not only is this being done but it is being done with breathtaking innovation and creativity. Need several airborne sensors to evaluate pollution levels across a metropolis? A group in California developed GPS enabled air sensors so small they are fitted to the backs of carrier pigeons who are released at key points to travel across suspected "hot" sites. The data is transmitted wirelessly in real time to a web site where the data is displayed instantaneously (***pigeonblog.mapyourcity.net***). Do this every day for a month and you have complied a serious and credible environmental impact profile of virtually any region you care about.

Worried about noise levels or noxious gases at street level during the morning commute? Then simply outfit a platoon of commuter cyclists to carry a small sensor package which transmits time, location and intensity of whatever issue you want to monitor. It is being done daily in New York City (***www.pm-air.net***). Think that the dumpster you pass on the street may contain lead, asbestos or some other toxic? Then simply plunk your cell phone/sensor into the pile and the toxicity, time, location are transmitted automatically to a public web site. Sensors like this are under development at various research institutions around the world (***www.urban-atmospheres.net and citizensensing.org***).

> *“The Common Sense team is developing mobile environmental sensing platforms to support community action and citizen science. An increasing number of mobile devices have the potential to become personal environmental sensors. To this end, we are developing sensing platforms that allow individuals to collect environmental information [and] software applications that allow people to analyze, share and discuss this information, in order to influence environmental regulations and policies. We aim to develop new communication paradigms that empower communities to produce credible information that can be understood by non-experts, in order to effect positive societal change.”*
> ***... www.receiver.vodafone.com/the-rise-of-the-sensor-citizen***

This movement is known as Citizen Sensor and we will see more and more examples of it. Such developments place serious challenges to public institutions charged with providing credible arms-length environmental monitoring. However the movement is unlikely to be stopped and is much more likely to increase. One municipality has decided to join the parade and reports:

> *"We have deployed our air quality sensing system on over half the fleet of street sweepers and are currently collecting CO, NOx, O3, temperature and humidity data. These sensor readings plus GPS data are sent to a database server via GSM text messages. This provides daily readings of air quality from across the city."* ***www.urban-atmospheres.net/CitizenScience***

So Now We're All Into Sharing?

Citizen activists love to share information. They know that's how you can build a crowd and then a consensus for action. The Internet provides the perfect forum; everybody has access and one can dip in at any time of day or night to make their contribution to the debate.

Take the case of racist graffiti. A city can ill afford to have employees prowling the streets looking for offensive material. Citizens of Vienna now respond to any racist graffiti they see. They simply send a geo-tagged photo to a web site where it will be immediately attended to (***www.rassismusstreichen.at***).

Worried about crime in your neighborhood? It's relatively common for police departments to share some crime data with the public. But rarely is the data displayed in a way that citizens can interpret any spatial element to crime trends. So it has become routine for some citizen groups to take this on themselves and map the crime data (including house addresses of the alleged perpetrator) to a city map. This may look like an alarming development to some - there is a reason the police don't display the data this way. But there is no denying an angry citizen from just doing it themselves. And they do.

On a more positive note, countless websites let people know what to do in their city.

Great Places for Kids in Portland is one example of citizens banding together to share information about what's good (and perhaps not so good) in their area. **Nokia** makes an experimental cell phone that transmits the location of crowds of vehicles containing these phones travelling in traffic. The system monitors the average traffic speed and feeds this information back to the vehicles allowing drivers the option of selecting a different route. The system is completely transparent but takes advantage of a Crowd of drivers passively supplying traffic density data in real time to a central site for processing.

Clever use of different web sites can create a "mashup" - and young people love mashups. For example if you're in Berlin and have your friends listed on some social network site then one application (***plazes.com/radar***) will look at where you are (cell phone location) and where your friends are (ditto) and tell you if you are within walking distance of a friend. If so, send them a text and have coffee together, or since it's Berlin, a beer or two. Somewhere else? Try ***IRLConnect.com***

Suddenly Everybody's a Mapmaker?
The previous applications all make extensive use of spatial data and use map applications to display their results. Some (like ***pigeonblog.mapyourcity.net*** and the AIR (Area's Immediate Reading) project (***www.pm-air.net***) use graphic displays that most public institutions could only dream about, clearly a benefit from having one or two design students on your team of volunteers.

The Crowd makes extensive use of maps for display purposes but perhaps the biggest development that the mapping community has to be concerned about is the *creation* of maps by the Crowd. Teams of amateur mapmakers are forming "mapping parties" on weekends to gather road network data and compile it into very useful and credible street maps free for all to use. The leader of this movement - although not the only one - is OpenStrretMap.org or OSM to the Crowd. OSM and its band of mappers have literally remapped the UK and much of Europe and is slowly working its way around the world with extensive mapping going on in India and North America. One has to view the web site to see how extensive the coverage is and the level of detail captured. As one reviewer on ***OpenGeoData.org*** has noted:

> *"OpenStreetMap maps a lot more than roads. All the things you mention: roads, paths, buildings, heights, pylons, fences … AND… post boxes, pubs, airfields, canals, rock climbing routes, shipwrecks, lighthouses, ski runs, whitewater rapids, universities, toucan crossings, coffeeshops (the dutch kind), trees, fields, toilets, speed cameras, toll booths, recycling points and a whole lot more." ... **www.opengeodata.org***

OSM as of January 2009 has more than 50,000 registered users and more than 5000 mapmaking contributors each month and the number is doubling every year. That's an impressive number no matter how you view it.

How did this happen? Unfortunately the story involves one of the most highly

respected mapping agencies in the world - the Ordnance Survey. The OS has a long and storied history and virtually anyone in the mapping business is aware of its capabilities, the high quality of its work and the contributions it has made to the mapping community through education, training and standards development. Unfortunately these days it is also known for its fee structure for map data. Google "Ordnance Survey" and you will soon come across various writers who regularly lambaste the organization without mercy. In fairness to OS they have been re-created as a quasi public/private sector trading company which must raise much of its revenue through the sale of its products. Nevertheless many users see the OS as imposing onerous user fees and far too restrictive use policies on data that was acquired through tax funding. The end result was almost inevitable. As Tim Berners-Lee (developer of the World Wide Web) has pointed out:

> *"If you don't make [lower-resolution mapping data] publicly available, there will be people with their cars and GPS devices driving around with their laptops .. They will be cataloging every lane, and enjoying it, driving their 4x4s behind you farm at the dead of night. There will, if necessary, be a grass-roots remapping"* ... ***Tim Berners-Lee***

Which is exactly what has happened. One has to visit the site to see the level of detail acquired and now provided free to anyone who wants to use it. The site also provides links to free software to help process the GPS "traces" that OSM participants acquire and compile them into recognizable road maps. The software of course is OpenSource.

OpenStreetMap.org is not alone in this enterprise. ***Wikimapia.org*** is another, ***OpenNewYorkMap*** yet another. There are many amateur mappers working away, honing their skills and advancing their processes, day-by-day and week-by-week and all sharing their new knowledge and steadily improving their tools.

We cannot discuss the modern mapping environment without mentioning the biggest use of digital maps today – route guidance in automobiles. This market has grown from a novelty item for luxury automobiles a decade ago to the present situation where the distribution of road network maps has become a billion dollar business. The important part of this enterprise in the context of this paper is the feedback on road changes from users. **TomTom** alone reports 5,000,000 map updates provided by its MapShare community by January 2009. Tens of thousands of users have clearly bought into the idea that if the map is in error – don't get angry – fix it.

> "...accuracy and reliability of road network information looks quite different when the data stem from a student collecting data every few years for a company or when thousands of drivers do it implicitly and explicitly every day." ***Werner Kuhn, Vespucci Initiative and Institute for Geoinformatics, University of Muenster***

The OpenStreetMap data, by and large, is used in navigation systems and as the backdrop for citizen activist websites. There have been several studies performed to test the quality of the OSM product in the UK, particularly against the official OS data. The OS data is often more accurate but it is hard to beat the up-to-datedness of the OSM product. It improves steadily and tracks changes in the city landscape at a rate that even civic institutions find hard to match. See ***www.ucl.ac.uk/~ucfamha/OSM data analysis 070808_web.pdf***

The OpenStreetMap data is in fact so good that the organization has taken steps to ensure that its data is not used in commercial systems.

> *"Similarly and in order to professionalise OpenStreetMap due to the increasing completeness and therefore value of the OpenStreetMap data we need to protect copyright. The OpenStreetMap Foundation* ***has decided to begin a process of entering trap streets in to our data****. These will be in out of the way places so that they are not noticed, but if that data turns up in a TomTom or similar device then we will be able to prosecute for infringing our data."* ***www.opengeodata.org***

There are valuable lessons to be learned here. Consider this:

> *"...Suddenly, the picture is changing from expensive GI trickling down to citizens from governments and industry,* ***to GI generated by citizens and potentially useful for governments and industry.*** *Policies of GI may now have to address privacy and liability issues much more than pricing and access."* ***Werner Kuhn***

OK, Now I'm Really Worried

At *fin-de-cycle* moments like this it is good to review how we got here in the first place. Usually there is a reason why things are as they are.

So why are maps made the way they are? First, there was a very high cost to carry out base surveys both in time and money and consequently their creation had to be sponsored by some organization, usually the national government. Second, the work was conducted by a small number of specialists (surveyors, cartographers) with long learning curves necessary to achieve the level of expertise needed - meaning it was difficult for any other organization to get involved or compete. That expense of limited resources meant that it only made economic sense to map items that were more or less constant through time. Furthermore, the capital cost of the essential heavy printing presses left the major map production work to public institutions. That in turn only encouraged large press runs. And from this it only made sense to maximize the number of users per product.

So maps became all things to all users ...

> *"Large-scale services, while tremendously important, often suffer from*

lowest common denominator effects as they seek to make a single system satisfy the needs of everyone."
Urban Informatics: Community Integration and Implementation

But now we live in a world where, apparently, many people are willing to do basic mapping functions for free as a hobby. Not only that, but the tools they use are easy to use and users catch on quickly. Evidence shows that they do a good job. They are also willing to map things that are here today and gone tomorrow. What's more, since the maps are all shared online there is little need for large heavy and expensive printing presses. And finally, clearly many people love the idea of built-for -purpose maps. The more specific the better as the Crowd is motivated by a cause. See for example maps for snowmobiling, surely a niche market, available at ***GPSSledMaps.com***

Nowhere is community-driven mapping anymore evident than in the number of map sites for cyclists. And this is where we, in the marine mapping business, can gain a lot of insight.

Cyclists?? What Can Cyclists Tell Us About The Future of Charting?
First off cyclists are a well defined community. They enjoy talking to other cyclists and they love to ride to new locations. Now since cyclists must share the road with faster and heavier vehicle traffic there is a safety concern shared by all cyclists. So there is a common need to tell other cyclists how to navigate in their specific neck-of-the-woods. The cycling community is also well connected, technically savvy and environmentally active. It is no surprise then that the web is full of sites offering tips to cyclists about the best routes through a community.

Consider the case of Cambridge, England. There a local group of cyclists have formed the Cambridge Cycling Campaign's Journey Planner (**www.camcycle.org.uk**). The site offers preferred navigation routes through Cambridge. A user enters their current location, their destination and their choice of Fastest, Shortest or Quietest route and the site returns turn-by-turn guidance - in many cases showing video imagery of the streets you will cycle through. The site is an example of what is known as a GeoWiki. Any user can change the map or its route recommendations in the traditional wiki way. What is clever about this site is the computational nature of choices for route finding.

Fietsrouteplanner.eu is another such site, ***cyclopath.org*** another, ***ridethecity.com*** another, ***bbbike.sourceforge.ne*** yet another and on and on. As one enthusiast has noted:

*"Everyone has their own reasons for enjoying OpenStreetMap, but for me, cycling is the "killer app" -in that OSM gives you the best cycling maps in the world (on the web and on your GPS), and mapping is also a great excuse to get out there and cycle." ...**www.opengeodata.org***

Cyclopath.org provides a mechanism for riders to update the maps after each ride. It is hard to imagine competing with that level of updating.

Having a committed group of enthusiasts, eager to share new navigation information with their fellow travelers to ensure they also have a safe, enjoyable and incident-free journey - surely there is a lot to learn from this?

Recreational Boaters and Cyclist, There Is a Lot in Common

We in the marine mapping world have been largely sheltered from the OpenStreetMap crowd. Perhaps it is that the nature of the nautical chart does not lend itself to easy remapping the way that land mapping does. After all, there aren't that many boaters with the kind of echo-sounding equipment we think is necessary to do the job. Perhaps too, it is just a matter of time.

In fact a large percentage of the recreational boating market does not really care about the specific depth of water at any specific point. Many simply care where the dangerous shoals are - or, in Mark Twaine's Riverboat voice, "where they ain't". What they do very much care about is any information other boaters could pass along about a specific voyage - including the equivalent of the "shortest, fastest and quietest". If that is the case - and I do believe it is - then it really is only a matter of time before ***wikinautica.org*** is up and running.

Sea kayakers, for example, are a group to strongly benefit from some community-driven wiki action. Water depth is largely irrelevant to even the most heavily laden tandem kayak – it still draws less than 1 foot at best. Sea kayakers are for more interested in the effects of tidal currents in a region – an aspect that can really affect their safety. Similar to cyclists, sea kayakers rely on their fellow travellers to provide advice based on first hand experience of sailing in an area; the nature of the currents, kelp beds to avoid, places to launch, beaches to camp on etc. A wiki-based chart would seem to be a good fit. ***OpenOceanMap.org*** in California provides a site with NOAA nautical charts marked with points at which sea-kayaks could be launched.

Other pleasure craft would also benefit from a wiki-based Coastal Pilot or Sailing Directions. It is the contribution of other sailors who regularly sail within the area which will have the most benefit given its relevance to the size and nature of the craft and the up-to-datedness. Speaking along a similar line Jeremy Crampton notes:

> *"Is data created by an "trained expert" who is not familiar with an area somehow more "accurate" than data created by an "amateur" who lives in that area and has a vested interest in correct information? Especially given that the local amateur has the means (through OSM) to make corrections on the fly?"* ***... Mapping Without a Net: Neogeography in the 21st Century***

Given the heavily regulated nature of commercial shipping it might appear unlikely that any wiki-based approach, free from the guiding hand of a national HO, could provide a benefit to the mariner. Having said that, it does seem at a minimum inefficient, if not foolhardy to not take advantage of the advice of fellow mariners about aspects of

sailing in an area now that the technology is at hand to provide that advice.

It is almost certain that some form of marine wiki-based navigation device will be implemented, particularly after the next generation of mariners takes command. Given that scenario it would be wise to begin experiments now, at least in the unregulated part of our industry.

But surely maps made by professionals are vastly superior?
In many ways they are but:
Are they always up to date?
Do they portray the map data in the most usable fashion for a specific use?
Are they comprehensive enough for some users?
Are they cheap to maintain?

As one reviewer of the war going on between The Ordnance Survey, OpenStreetMap and Google maps has observed:

> *"...I think we're looking at competing views of how to do a map: a comprehensive, all-in-one method showing plenty of extra information you **might** need, and a focused method showing only the information you **will** need. The fact that one has historically been paper-based and the other has generally been computer-based is not necessarily always true. … Where we are, in other words, is at the end of an era in which one map has to perform many tasks. This may well be a difficult concept for some cartographers to grasp."*

Summary
Let's review what's going on:

Consumers are driving Businesses: *e.g. eBay, Amazon, etc.*
Users are leading knowledge production: *e.g. Wikipedia, etc.*
Users are creating the vast majority of content: *e.g. YouTube, Blogs,etc.*
Formerly passive consumers are now active producers: *e.g. OpenStreetMap*

We are shifting from top-down controlled production and distribution to bottom-up Crowdsourced production and open sourced distribution.

Most importantly, we now have a generation of well educated and knowledgeable citizens who have come together to develop their own sensors, conduct their own surveys, analyze their own data and publish it online, usually in real time to an open access web site that anyone can view. They include groups of enthusiasts, eager to share new map and navigation information with their fellow travelers to ensure they also have safe, enjoyable and incident-free journeys.

It's time to join the revolution!
Viva LaRevolucion!

References
Note: I have included web sites for the various quotations within the text itself.

A chief resource was the Proceedings of the ***Conference on Volunteered Geographic Information*** held in December 2008 and organized by Michael F. Goodchild , Professor of Geography at the University of California, Santa Barbara. See: ***http://www.ncgia.ucsb.edu/projects/vgi/index.html***

Howe, Jeff, 2006; ***Crowdsourcing*** ;Wired Magazine. June, 2006

Howe, Jeff, 2008: ***Crowdsourcing: Why The Power Of The Crowd Is Driving The Future Of Business***; Crown Business Group, New York

Haklay, Muki, 2008; ***How good is OpenStreetMap information? A comparative study;*** *www.ucl.ac.uk/~ucfamha/OSM data analysis 070808_web.pdf*

Paulos, E; Honicky, RJ,;Hooker,B; ***Citizen Science Enabling Participatory Urbanism***; Chapter in Urban Informatics: Community Integration and Implementation

Winchester, Simon;1999, ***The Professor and The Madman***, Harper Perennial

Mailing Lists, Forums, Blogs:
GeoWanking: *geowanking.org/mailman/listinfo/geowanking_geowanking.org*

Open Forum on Participatory Geographic Information Systems and Technologies; *www.ppgis.net*

NeoGeography.net *neogeography.net*

Google Maps Mania: *googlemapsmania.blogspot.com*

Google Earth Blog: *www.gearthblog.com*

Richard's Tech Reviews: *scilib.typepad.com/techreviews*

Community Map Builder: *communitymapbuilder.org*

Crowdsourcing: *crowdsourcing.typepad.com*

OpenStreetMap Forum: *forum.openstreetmap.org/index.php*