Androids in Uganda

Yaw Anokwa, Carl Hartung, Adam Lerer, Gaetano Borriello, Julie Chin

Ask questions whenever. We are visual learners, so we'll just show mostly pictures...

Our Goals

- We are building generic tools for mobile devices to enable community data collection.

- We are targeting developing world because there is more need for higher fidelity and lower latency data collection.

- Our target users are community health workers who currently use paper forms.

We want to build generic tools.

So why not do this for Seattle? Well data in developing regions is non-existent. Google may have flu trends in the US, but in most places in the world, this is simply not possible.

Although we are building generic tools, our target users are CHWS. It is what we know and where we think we can make the biggest impact.

Why Google?

- Phones like the G1 have rich sensing, user interaction, and display capabilities.

- Google.com infrastructure for hosting (App Engine) and visualization (Gadgets) solution. Google.org for relevant deployment opportunities.

- We love building open source tools on open source platforms (Android).

Deployment Details

- Partner: Grameen Foundation AppLab in Kampala, Uganda

- Application: Survey to evaluate Farmer's Friend, a Google SMS-based farming database.

- Scale: 20 phone operators that send the SMS for farmers in mostly remote regions. 1000+ surveys expected.

- Goal: Evaluate functionality, user interface and local infrastructure.

Partner also has great ties with .org. In fact a team at Mountain View built the database. They get a good idea of how people like Farmer's friend and we get a good idea how our app works in Africa.

Not our target users, but a close enough deployment test for v1. Helps grameen avoid the paper forms.
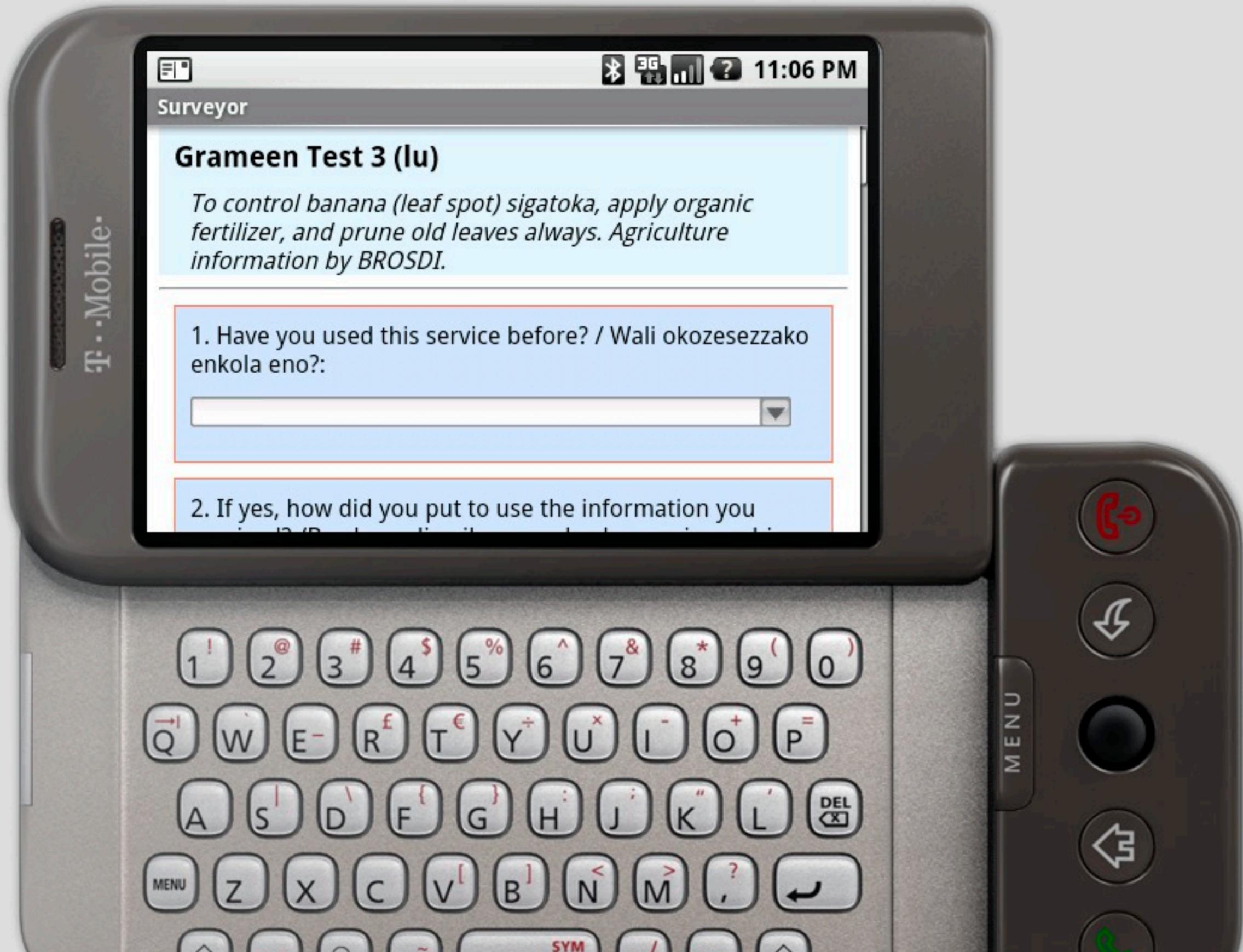
Ureport comes in two pieces. The first is Surveyor.

We modified Surveyor to trigger based on incoming SMS. Users could then take the survey. Submission was a user controlled separate process (because of credit issue).

...is the ...on for ...ice ...om? ...za ...ganno (text)	6) Do you trust the source of the information? / Wesiga esibukko ya mawulire ganno? (select)	7) Before this service existed, where would you learn this information? / Nga enkola eno tenabawo, amawulire nga gano wagajjangawa? (text)	8) Would you tell your friends about this service? / Oyinzza okubulira kubano kunkola eno? (select)	9) This service provides weather and farming information. What other topics would you like to see offered by this service? / Eno enkola ekuwa amawulire gebera yobudde ne byobubilimi, mu ki omulara mwewaliyagadde ofuna amawulire? (text)	10) Please record your location. / Tekamu ekifo woli. (location)	11) Please record the time. / Tekamu esawa wobuliza embera yobudde. (time)	12) Please enter the farmer's name. / Yingiza mu elinya lyo mulimi. (text)	13) Please take a picture of the farmer. / Omulimi mukubbe ekiffananyi bwaba ayagadde. (photo)
TN	Yes	kuba jjaja.	Yes	ku brosd .	0.5276870727539062, 33.384087681770325	Tue Dec 30 18:22:47 GMT+03:00 2008	kisala.	
armers	Yes			market and where to get farm suply.	0.521652102470398, 33.392053842544556	Tue Dec 30 17:39:06 GMT+03:00 2008	Peter	View Photo
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	Ye			kuradio	0.33593058586120605, 33.61358284950256	Thu Jan 01 08:47:19 GMT+03:00 2009	were robert	View Photo
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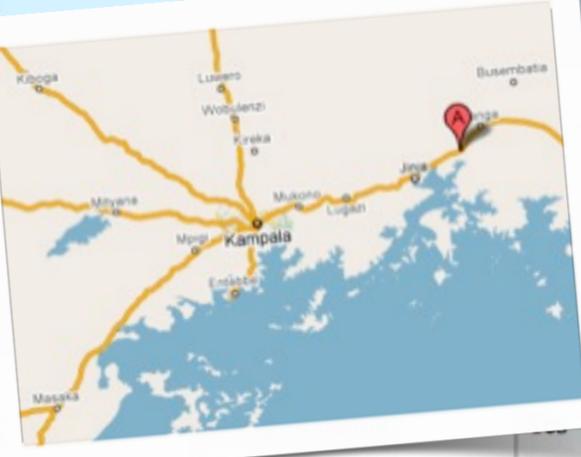
Surveyor Central is where the data is posted to.

You can see that pictures can be viewed and location is plotted on a Google map. Grameen really only wanted a CSV so they could analyze offline.
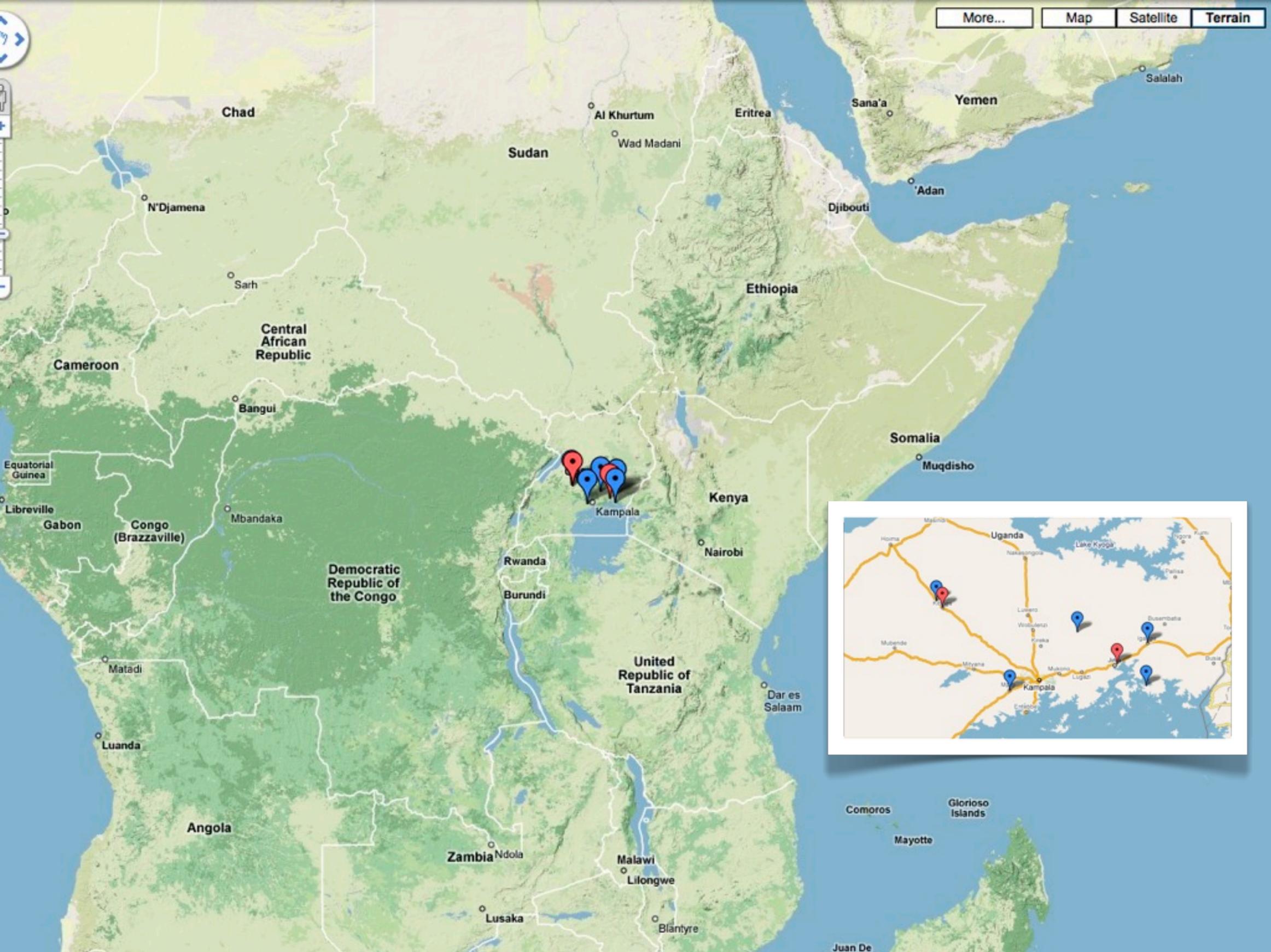
A map of Uganda for those not familiar.

Red pins are where we trained. Blue pins where we deployed.

1950s america

Training took place in bustling small towns like Jinja. You can see the power lines, super markets, regular traffic, buildings under construction.

We deployed in places like Mayuge. Less bustling. Only bicycles and cows. No paved roads, no power.

When we arrived, there was a fair bit of setup and bug fixes that we discovered in the first few days.

Here, we are trying to get the phones to get new GPS almanacs since they've moved from Seattle to Kampala.

Once the users were identified, we did a lot of training on the phone and the application.

English and Luganda guides were generated.

The younger users got it pretty quickly (one even complained at the lack of a video player -- he had a Nokia N72 earlier), while the older users struggled -- for some, vision was an issue.

A few days later, we'd follow up with the trainees to answer any questions.

We made sure everyone could walk through the scenarios. We also verified power and connectivity.

Of course, Carl hung out with all the kids who had never seen a mzungu before.

So you are probably asking yourself. Is that it? No roadblocks besides these cows?

Power was an issue.

For our users off the grid, power is generally provided by 12v car battery which is charged in the city. That can get expensive.

We worked with another .org partner called Potenco. They have a hand charger, which was quite successful.

Potential for income generation is there, but ironically, Potenco is itself now out of business -- no VC funds.

Connectivity was an issue.

Cell coverage is universally available in uganda (if you have a phone). Everything is on a prepaid model. All incoming calls and SMS are free.

Although coverage are fairly ubiquitous, but voice has highest priority.

Translation? SMS is fine because messages are short, but GPRS suffers greatly especially during the day.

Hardware was also an issue.

Hardware is not "Africa robust" –– screen mechanism is too delicate. Two phones are dead already. Likely from cable to screen is broken.

Touchscreen is intuitive in some ways (blood in phone), but limiting in others (calloused fingers)

Keys are too small and lettering is hard to read (O vs 0). Not everyone has glasses.

Interesting about this screen shot –– most people when given the internet, use yahoo.

Besides viruses on every Windows computer and usb stick we touched, we had some other software problems.

Software Challenges

- App Engine is limiting. No background tasks, 1MB limit on data structures, 1000 item limit on fetch, filtering on multiple variables, no local instances.

- Android is great overall, but API not discoverable. Had minor pains with carrier configurations and phoning home.

- UReport v0 was built inside the Android web browser and that has limitations.

App Engine makes it hard to do things like generate CSVs on the fly. If you want to make a large PDF with some pictures, then you hit the file limit. If you want to to say filter on lat and lon and get results on that, it's not really possible. No local instances mean that governments just aren't excited about medical data storage on the cloud.

Most of the Android problems are due to deploying before the phone was widely available. There is better configuration documentation now. As to phoning home, it is annoying as it deducts money from your phone.

We built a rough first cut to iterate on and we did it in a browser. That has certain limitations that we are addressing in the next versions.

Next Steps

- Re-design phone client as native app with better UI.

- Align with OpenROSA/ XForms standards.

- Re-design server side to avoid App Engine limitations.

- Address connectivity with Cumulus as sync.

Next Deployments

- ✦ Tanzania - CHW Supervisors

- ✦ Zanzibar - UN Water Survey

- ✦ Ghana - Health Management

The phone app is going native. This gives us access to more functionality and a smarter UI. We are getting bigger buttons, using swipes to navigate, supporting multiple languages, etc. All this is aligned with OpenROSA which is a group of folks working on phone data collection systems. We use the XForms standard so forms can be used across devices and data can be shared.

We are redesigning a lot of the backend to make it more App Engine friendly. We want to add in Culumus so we can do data syncing which is more tolerant of the connectivity and latency issues. You can also imagine that survey results integrated with google docs so people can collaboratively edit them, etc.

Grameen now has 600+ results and is using v0 and we are pushing an updated version to them in the next week so they can do a new set of surveys. We just finished a supervisor app shown in this picture that is being tested in Tanzania right now where data being submitted to the server gets reviewed by a supervisor.

go/ureport

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