

Future Wireless Cities: A Vision for Philadelphia

Kapil R. Dandekar, Ph.D.

dandekar@ece.drexel.edu

<http://wireless.ece.drexel.edu>

PROFESSOR

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

(Not formally affiliated with the City of Philadelphia)



PHILADELPHIA, PA 19104

Philadelphia Infrastructure and Challenges



- Philadelphia was one of the first cities to pursue municipal wireless access
 - Wireless Philadelphia history and legacy
 - <http://technical.ly/philly/2015/03/04/cities-learn-phillys-failed-municipal-broadband-effort/>
 - J. Breitbart et al., The Philadelphia Story: Learning from a Municipal Wireless Pioneer, New America Foundation
 - https://static.newamerica.org/attachments/3996-the-philadelphia-story/NAF_PhilWireless_report_1b05277a71314650ba4f9e23c1a23aeb.pdf
- “Failure” of this initial Wireless Philadelphia effort led to an emphasis on digital inclusion for low income city residents
 - KEYSPOTs (www.phillykeyspots.org) is a city wide network of public computing centers to provide internet access and computer training to disadvantaged communities.
 - 79 sites around the city
 - Already provided over 200,000 hours of training to over 20,000 city residents; over 400,000 visits for free internet access

Community Vision



- Envision a city wide testbed connecting **KEYSPOTS** (fiber+wireless) to make Philadelphia a living laboratory for **Advanced Workforce Development** in disadvantaged communities
 - Virtual reality based training in the cloud delivered to relatively low-end desktop machines in public computing centers

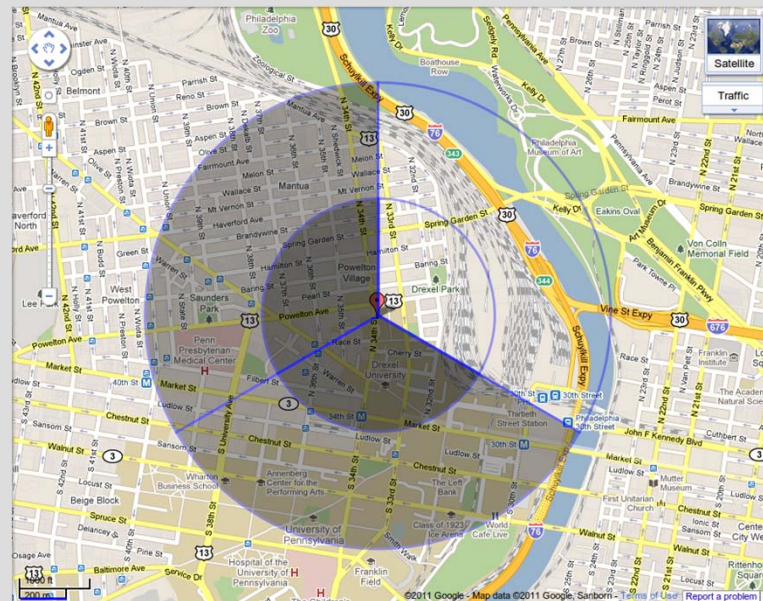


- Alignment with related local / national initiatives:
 - White House “Smart Cities” initiative (Drexel/Penn) – Apps for traffic congestion, fighting crime, fostering economic growth, managing the effects of a changing climate and improving the delivery of city services.
 - US IGNITE and UpSkill America
 - Drexel “Peace Engineering” partnership with the U.S. Institute of Peace / PeaceTech labs to apply technology to mitigate sources of domestic / international conflict (e.g., access to resources, government services)

Desired Wireless Network Infrastructure



- Testbed for Advanced Workforce Development to allow for remote experimentation of new training technologies
- Proposed vision requires high speed wireless / fiber backbone for concepts to be demonstrated at their full potential

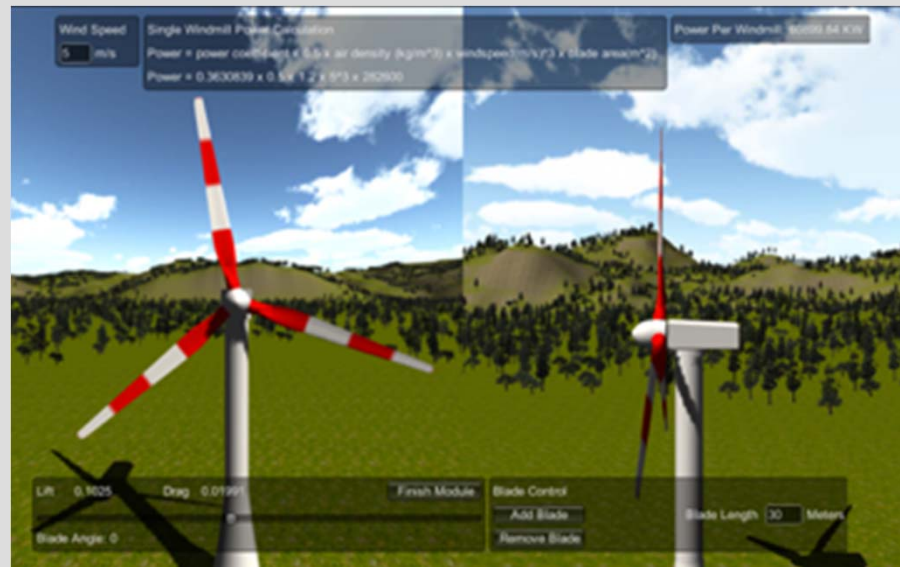


Initial demonstration NSF GENI-WIMAX (upgrade to LTE) testbed
– Provides data coverage for Dornsife Center for Neighborhood Partnerships KEYSPOOT in Powelton/Mantua area of Philadelphia (HUD designated Promise Zone)

Potential for New Technologies



- NSF US IGNITE: #1354572 EAGER: US Ignite: A Cloud Enabled Virtual Reality Based Pedagogical Ecosystem for Green Energy and Environmental Engineering Education (PI: Abichandani, Drexel)
- Desktop virtual reality as a validated educational and training tool



- Very promising discussions with local industry about potential for virtual reality based training – initial efforts focused on energy applications

P. Abichandani et al., “A Cloud Enabled Virtual Reality Based Pedagogical Ecosystem for Wind Energy Education”, Proceedings of the 2014 FIE Conference.

- KEYSLOT location finder:
 - <https://www.phillykeyspots.org/keyspot-finder>
 - Potential to upgrade these sites (i.e., local non-profits, libraries, YMCA) to make use of high bandwidth connections but doing so will require high levels of coordination
- Significant challenges with urban deployments for testbed deployments
- No shortage of city and private mounting locations though these may not be “easily available” for research testbed purposes (e.g, public safety dual use)
- Have sought cooperation with local telecomm providers to create a research testbed at scale to use Philadelphia as a living laboratory for advanced workforce development
 - Comcast
 - Verizon
 - Sunesys
 - ... but significant effort will be required to develop a testbed at urban scale

THANK YOU!



Questions

Contact Information:

dandekar@ece.drexel.edu

<http://wireless.ece.drexel.edu>