OLPC France
NosyKomba deployment
Long distance Wi-Fi installation report
Xavier Carcelle - September 2011

1.Situation of the OLPC deployment in NosyKomba (Madagascar)

The OLPC deployment in Antitourna, NosyKomba is located in the island of NosyKomba, between the island of Nosybé and the « great island » of Madagascar. The OLPC deployment done by OLPC France consists of 160 XOs + 1 XS installed in the primary school of the village of Antitourna. This village is located one-hour away (by boat) from the city of Hell-Ville in Nosybé

The GPS coordinates of the Antitourne school is : 13°27'03.50" S, 48°21'34" E
The GoogleEarth KMZ file can be found here :
http://carcelle.fu8.com/NK_EcolePrimaire_Antintorona.kmz
Some pictures of the deployment can be found here :
http://nosykomba2011.blogspot.com/2011/07/wifi-nk-2011-mission-accomplie.html
http://olpc-france.org/blog/2011/08/nosy-komba-lheure-du-premier-bilan/
and on the flickr account of OLPC France.

# 2.Architecture of the long distance wifi deployment

After the deployment of the XS server at the Antitourna school, OLPC France decided to find a way to connect the school to Internet with an affordable and reliable solution operated by a local team in Nosybé/NosyKomba area.

Internet connexions in the island of NosyKomba are currently (Sept 2011) only wireless solutions (VSAT-IP, WiMAX, 2.5/3G usb dongle) that either are costly and latency intensive (vsat, wimax) or non-reliable in terms of bit rate (2.5/3g).

However Madgascar has a pretty good DSL coverage through the national ISP Telma and proposed a DSL subscription (512k or 1M downlink) in Hell-Ville (on the island of Nosybé) with a reliable throughput due the optical fiber connecting Madagascar to the African optical loop (sometimes hybrided with long distance wireless connexions in the 21GHz band).

The targetted architecture was then to connect the Antitourna school to a DSL wired connexion in Hell-Ville even if the GPS coordinates from the school indicates no direct line-of-sight with Hell-Ville (cf the KMZ file indicating the 2 points of connexion).

The island of NosyKomba is like a mountain in the sea with a stip up-hill path to the top. A point of relaying for the wireless signal was then identified with 2 direct lines-of-sight to Hell-Ville and to Antitourna primary school. Below is the global architecture of the Internet connexion :
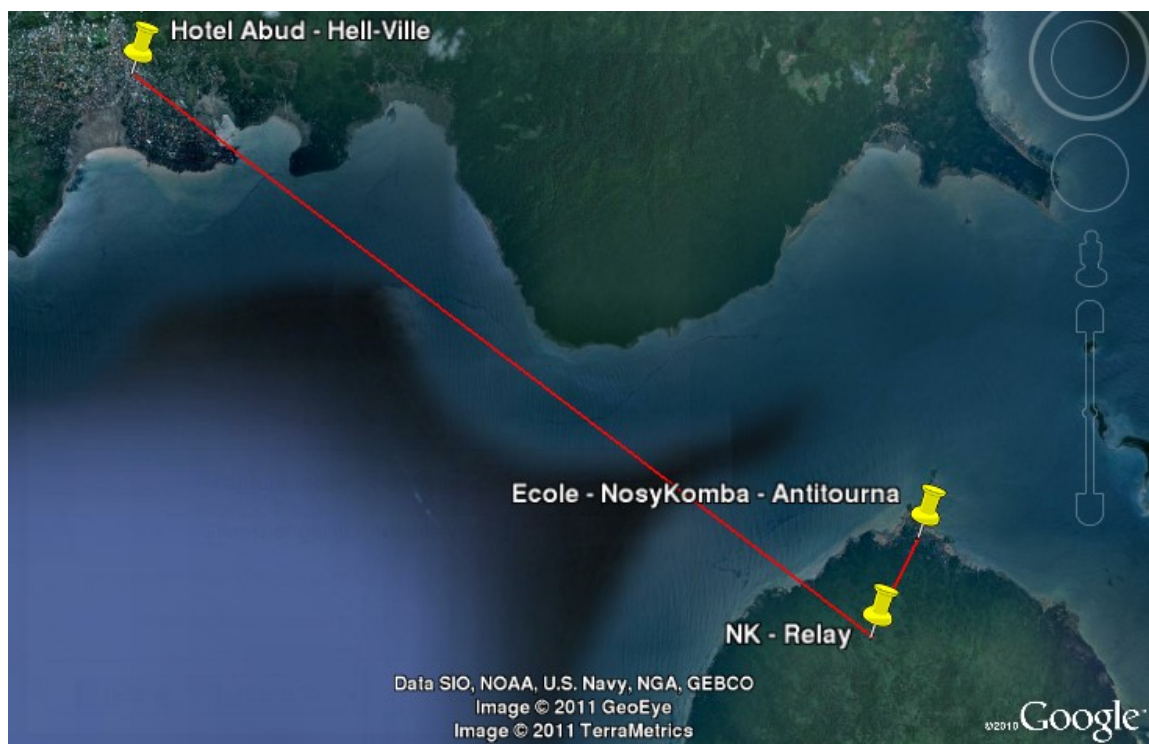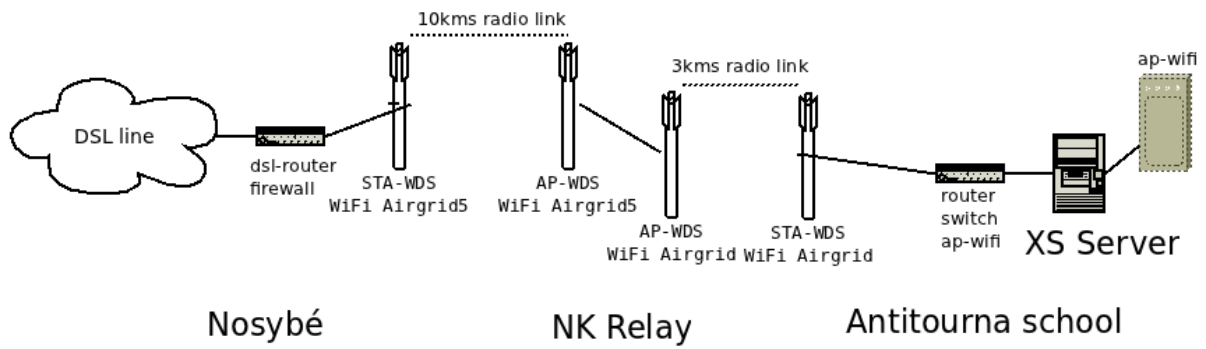
On the school, a normal Internet access architecture was configured with a switch connected to the receiving UBNT Airgrid5 and to the XS server as Internet Gateway for the local wireless network and the local services for the XOs. The XS has 2 network interfaces (one for Internet and one to the local wireless router in bridge mode to serve connectivity to the XOs)

The main devices used to set-up the long shot wifi in the 5GHz band was Ubiquity Airgrid5, below is a picture with the 27dBi antenna and the active head with the router inside, powered by PoE (Power over Ethernet)

3. Technical details of the deployment

Location	Hardware	Power supply
Hell-Ville high point	DSL router (Zyxel)	220V/50Hz
	UBNT Airgrid5	PoE (UBNT passive injector 220-to-5V) 1 UBNT requires less than 5W under
NosyKomba wireless relay	2 x UBNT Airgrid5 DIY-made RJ45 female-to-female connector between the 2 UBNT	50W/12V solar panel (Femtoni SS50 2.78A) Solar charge controller (Steca Solsum 6.6F 12/24V, 6A) 3 x 12v batteries (intact block-power BP 12-7.0, 7.0Ah, 1.75V/cell@ 20°) 12V/5V DC-DC converter (for the UBNT passive PoE injector) crepuscular relay for night power switching
Antitourna school	1 UBNT Airgrid5 1 Switch 1 FON 2200 (main) 1 wireless router (back-up)	250W solar panel (used for X0s also) 12V/220V DC-AC converter APC for the technical room (XS, wireless router)

4.Pictures

The final pole installation at NK Relay	The video-conf with the Antitourna school during the SugarCamp 2011 in Paris