

# TV White Space and ICTD

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# TV White Spaces

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In telecommunications, white spaces refer to frequencies allocated to a broadcasting service **but not used locally.**

In addition to white space assigned for technical reasons, there is also unused radio spectrum which has either **never been used**, or is **becoming free** as a result of technical changes.

# Quantifying TVWS

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How many TVWS are there?

In cities? In rural areas?

Do they change in time?

...in developing countries

...with low cost tools

...driven by academia

## Quantifying the Availability of TV White Spaces for Cognitive Radio Operation in the UK

Maziar Nekovee

BT Research, Polaris 134, Adastral Park,  
Martlesham, Suffolk, IP5 3RE, UK

and

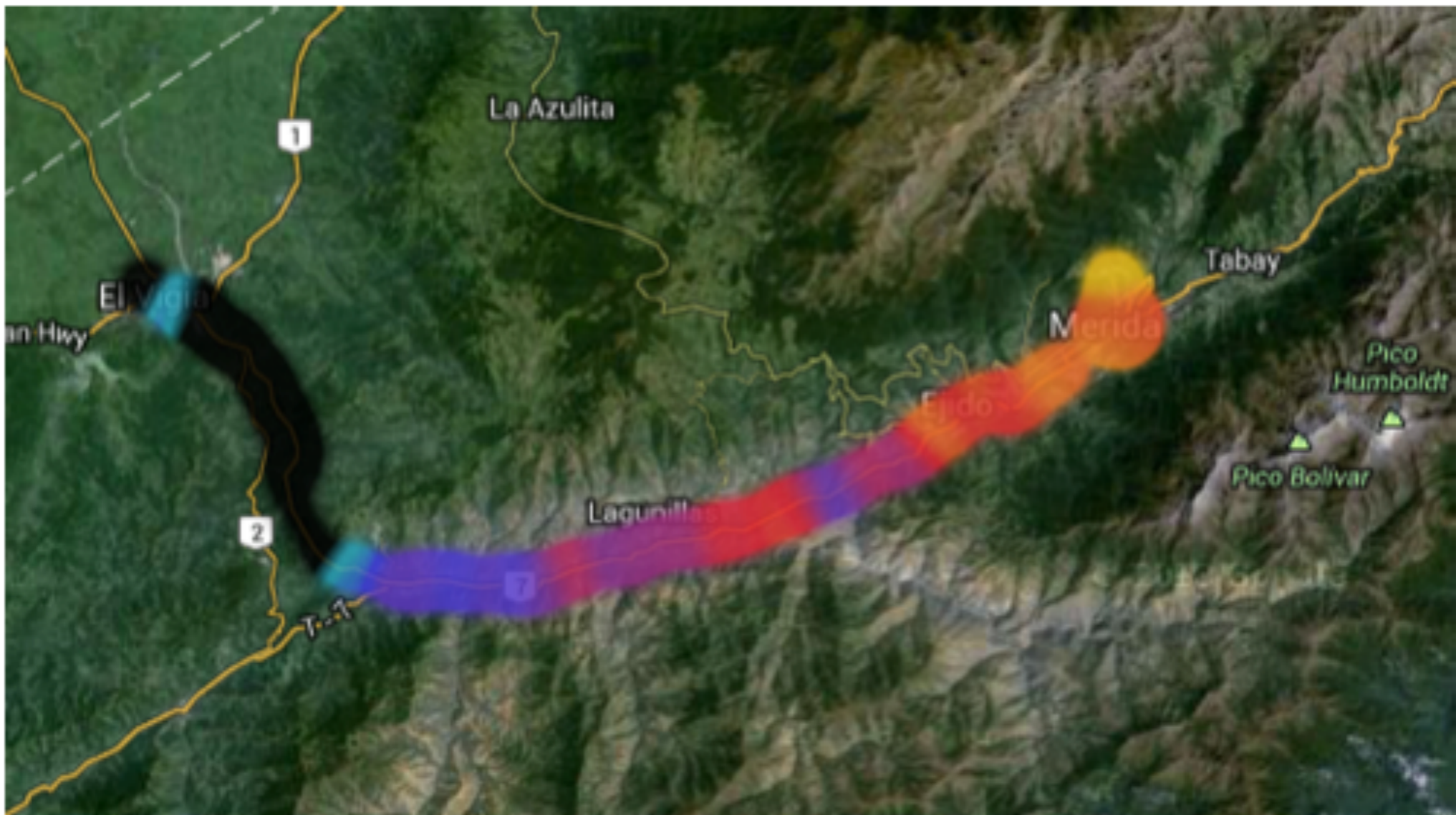
Centre for Computational Science, University College London  
20 Gordon Street, London WC1H 0AJ, UK  
maziar.nekovee@bt.com

June 18, 2009

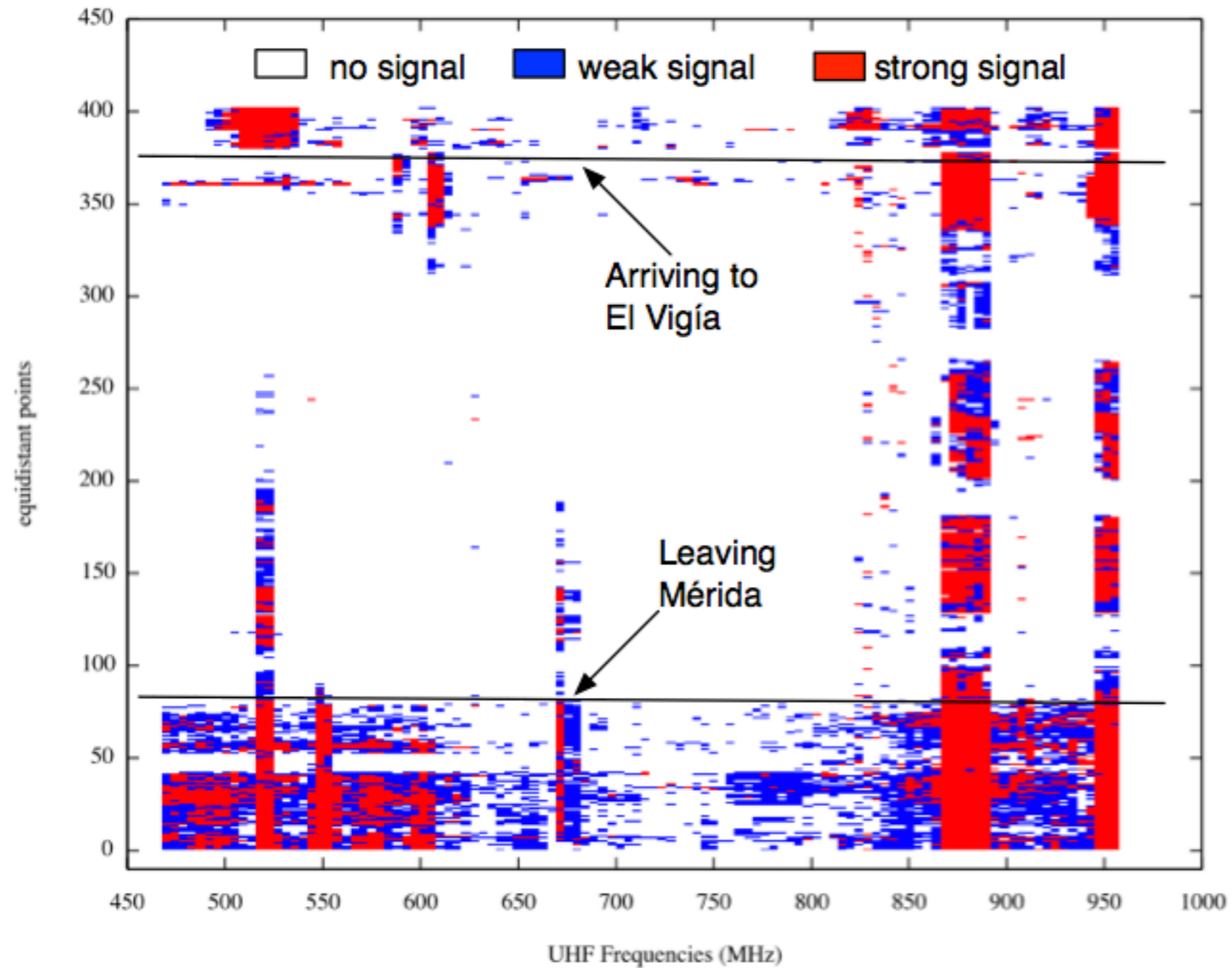
### Abstract

Cognitive radio is being intensively researched for opportunistic access to the so-called TV White Spaces (TVWS): large portions of the VHF/UHF TV bands which become available on a geographical basis after the digital switchover. Using accurate digital TV (DTV) coverage maps together with a database of DTV transmitters, we develop a methodology for identifying TVWS frequencies at any given





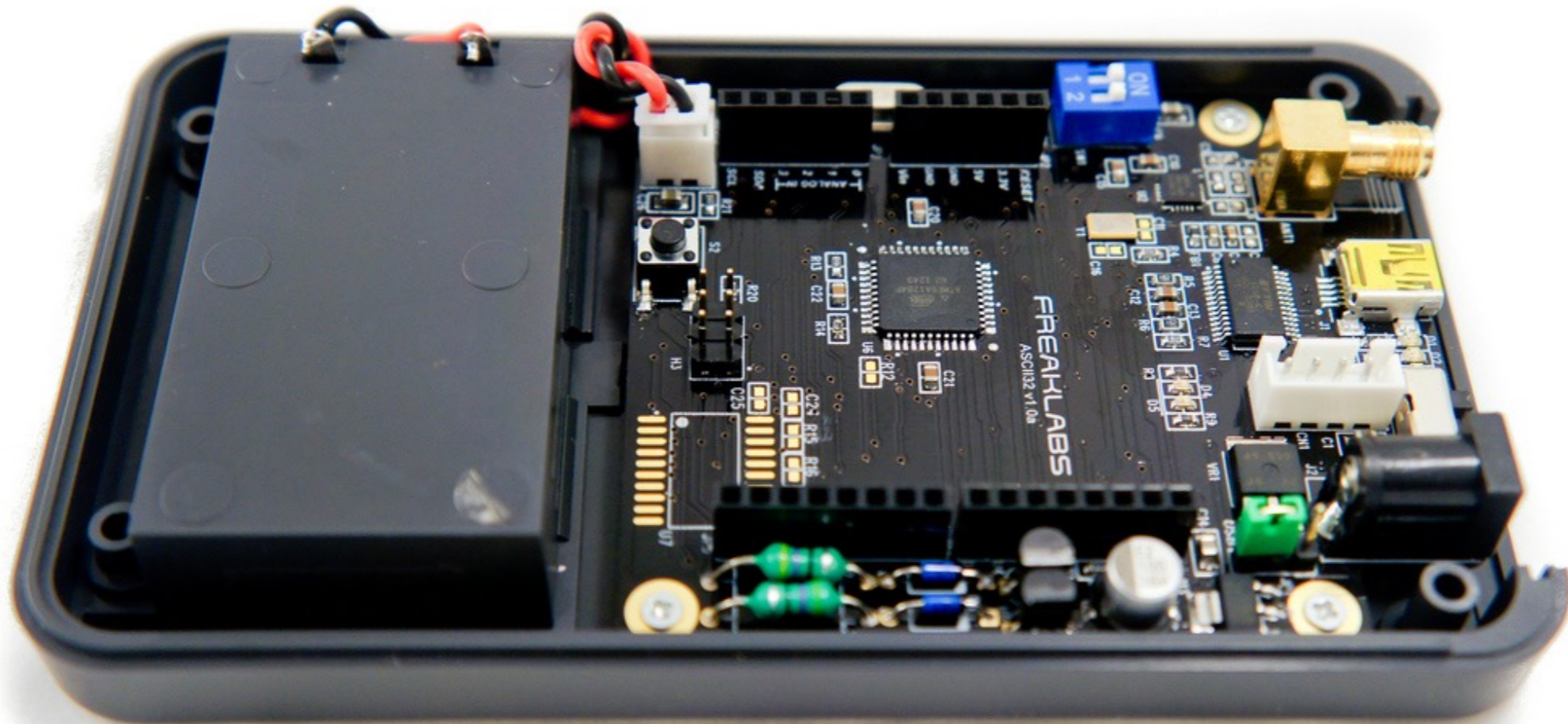
(b) Heatmap of channel 22 (518-524 MHz) in the route from Mérida to El Vigía.

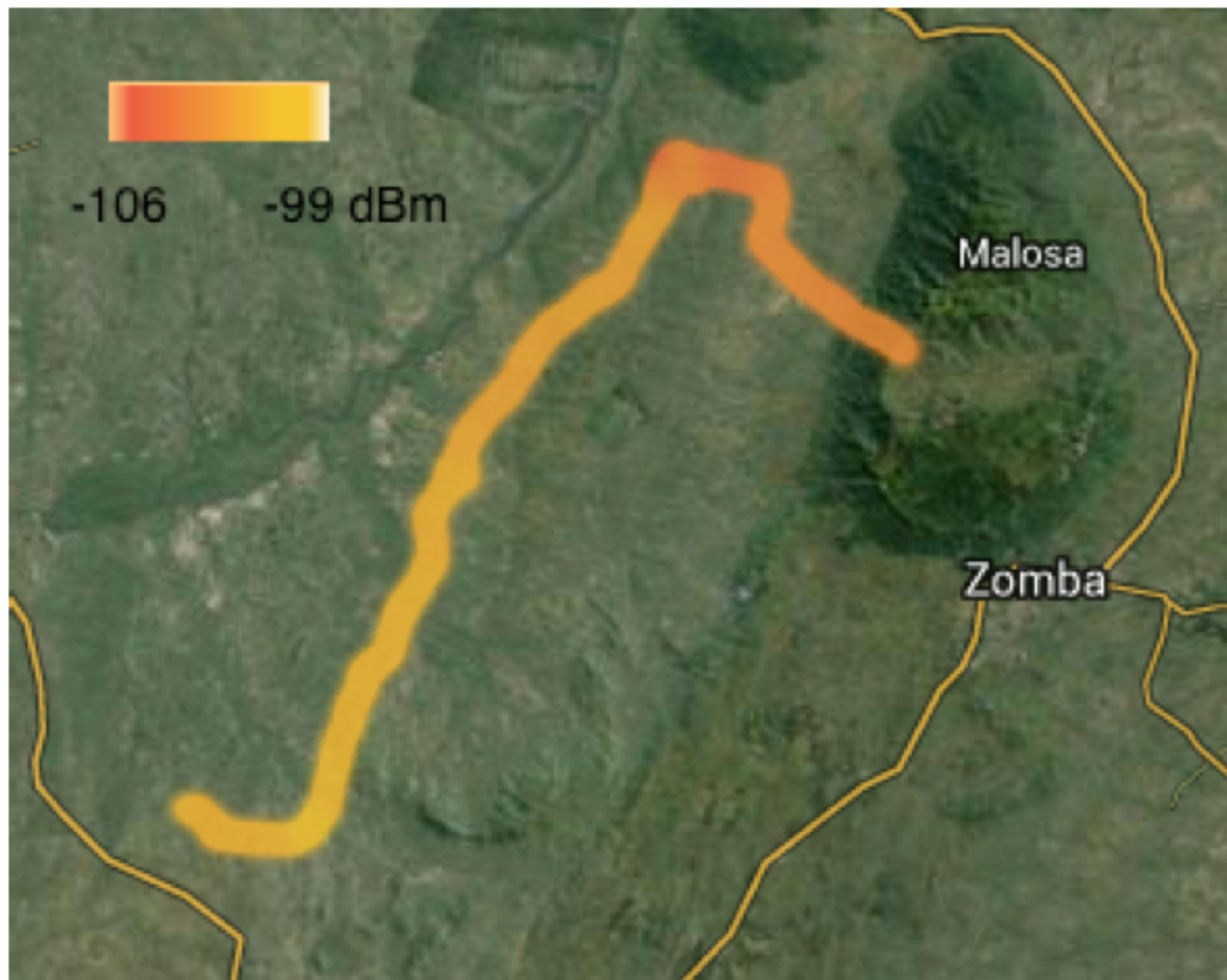


(d) Spectrum distribution from 470 to 960 MHz within the route from Mérida to El Vigía.

# ASCII-32

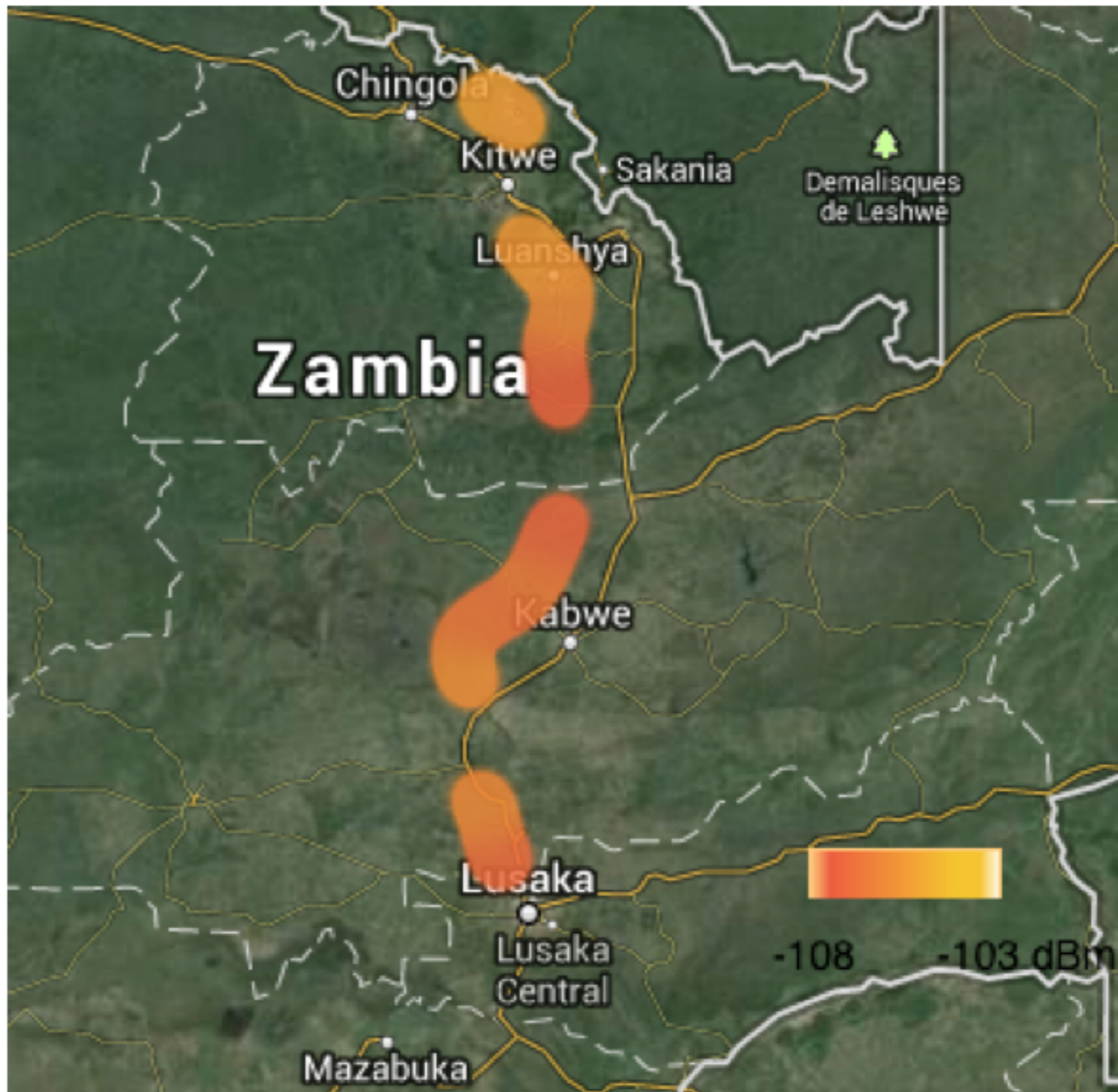
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**Figure 4: Heatmap for 498 MHz in Malawi.**





**Figure 6: Heatmap for 546 MHz in Zambia.**

# Thailand

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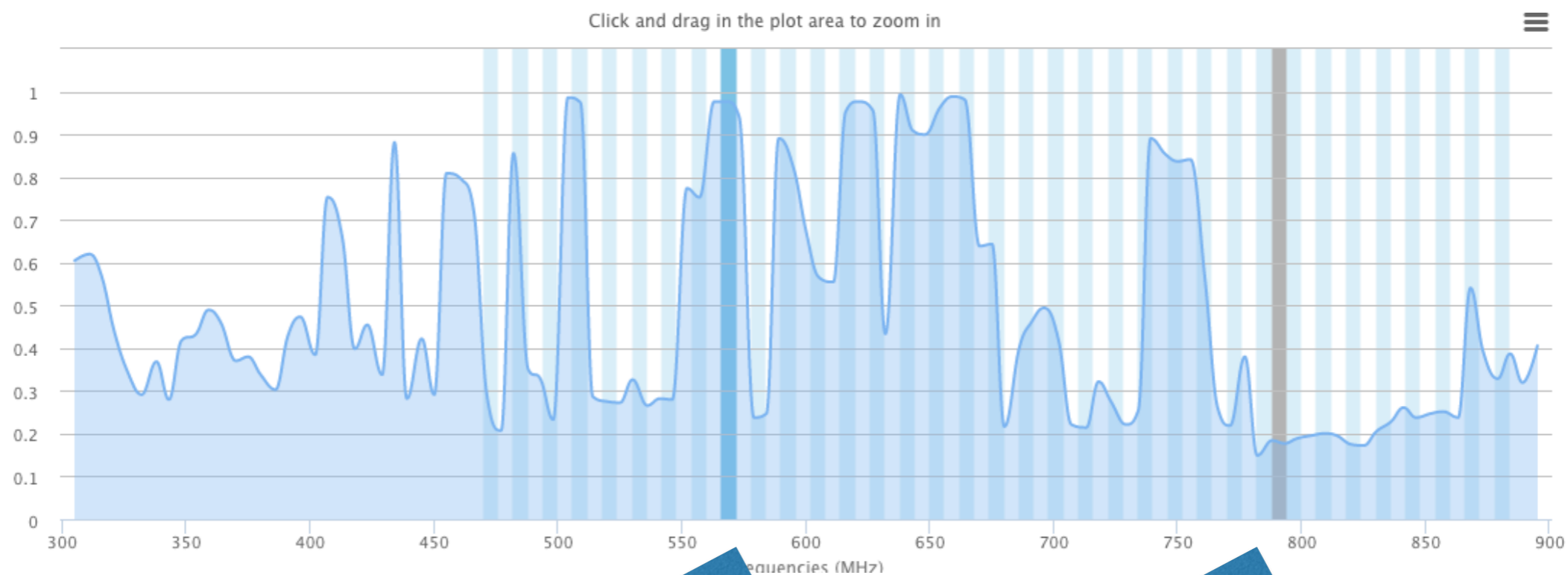
# TVWS+Android

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# TVWS+Android

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Busy Channel Partially used Channel

# TVWS+Android

## Data Settings

Pick a function to operate on the data

Average

Referential Maximum



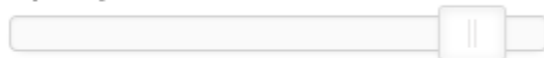
-30 dBm

Change data by

Frequency  Channels

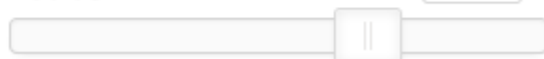
## Heatmap Settings

Opacity



Radius

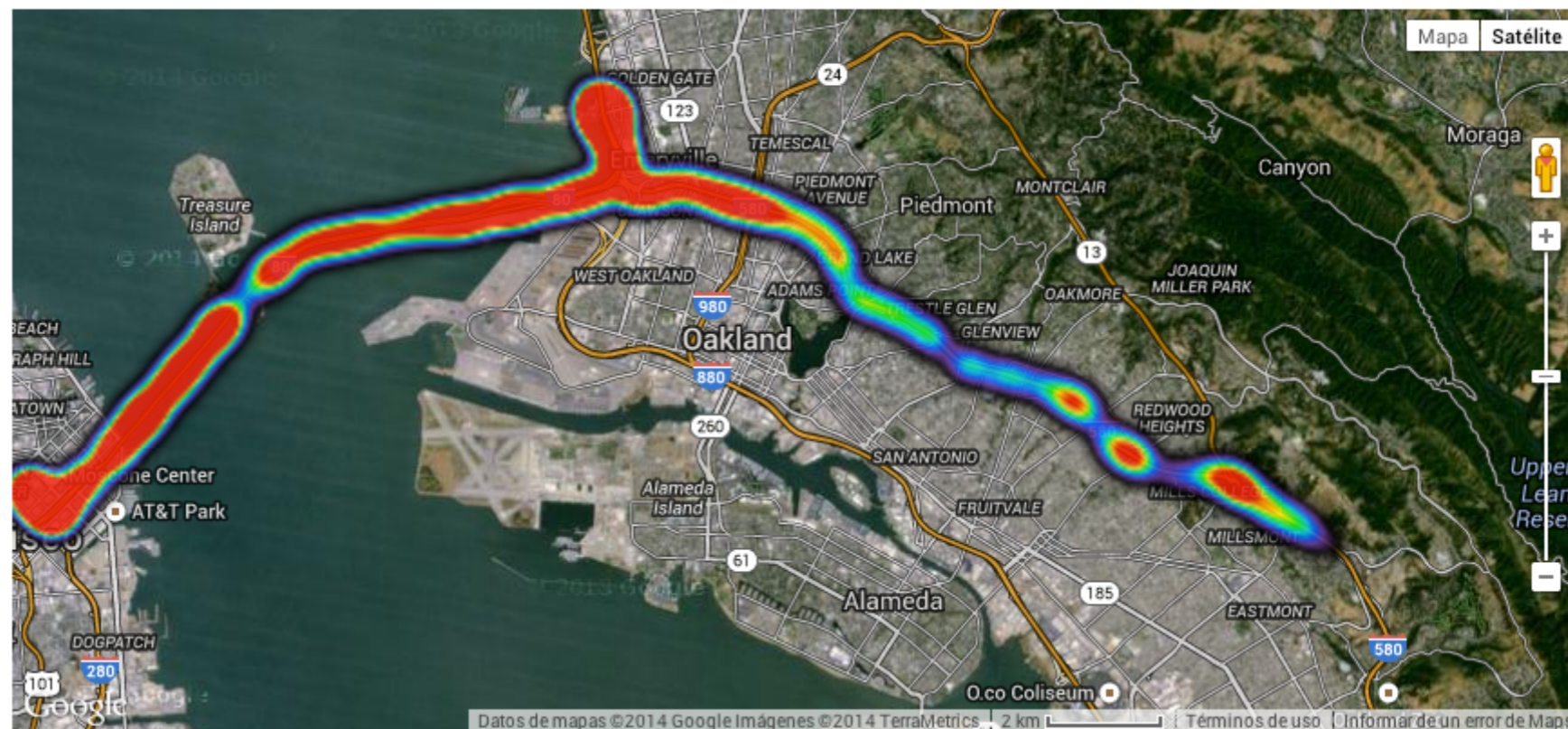
86%



20px

Allocation channel

American 6Mhz



Please select the channels to observe

x Channel 67 [788-794]

- Partially used channel 67 from SF to SJ
- Referential Max to -61 dBm
- Half of the route with low activity

# Malawi

**MALAWI COMMUNICATIONS**  
MACRA House, Salim Amour Road  
Private Bag 261, Blantyre, Malawi



**REGULATORY AUTHORITY**  
Tel: (265) (0)1 883 611 Fax: (265) (0)1 883 890  
e-mail: dg-macra@macra.org.mw

Our Ref: **MACRA/DOT/50/Im**

15<sup>th</sup> July, 2013

T/ICT4D Lab, The International Center for Theoretical Physics  
Trieste

**ITALY.**

Dear Sir,

**MACRA PARTICIPATION IN THE TELEVISION (TV) WHITE SPACE PROJECT**

The Malawi Communications Regulatory Authority (MACRA) would hereby like to confirm its commitment to participate and support the implementation of the Television (TV) White Spaces Project in Malawi.

The support from the Authority will among others include:

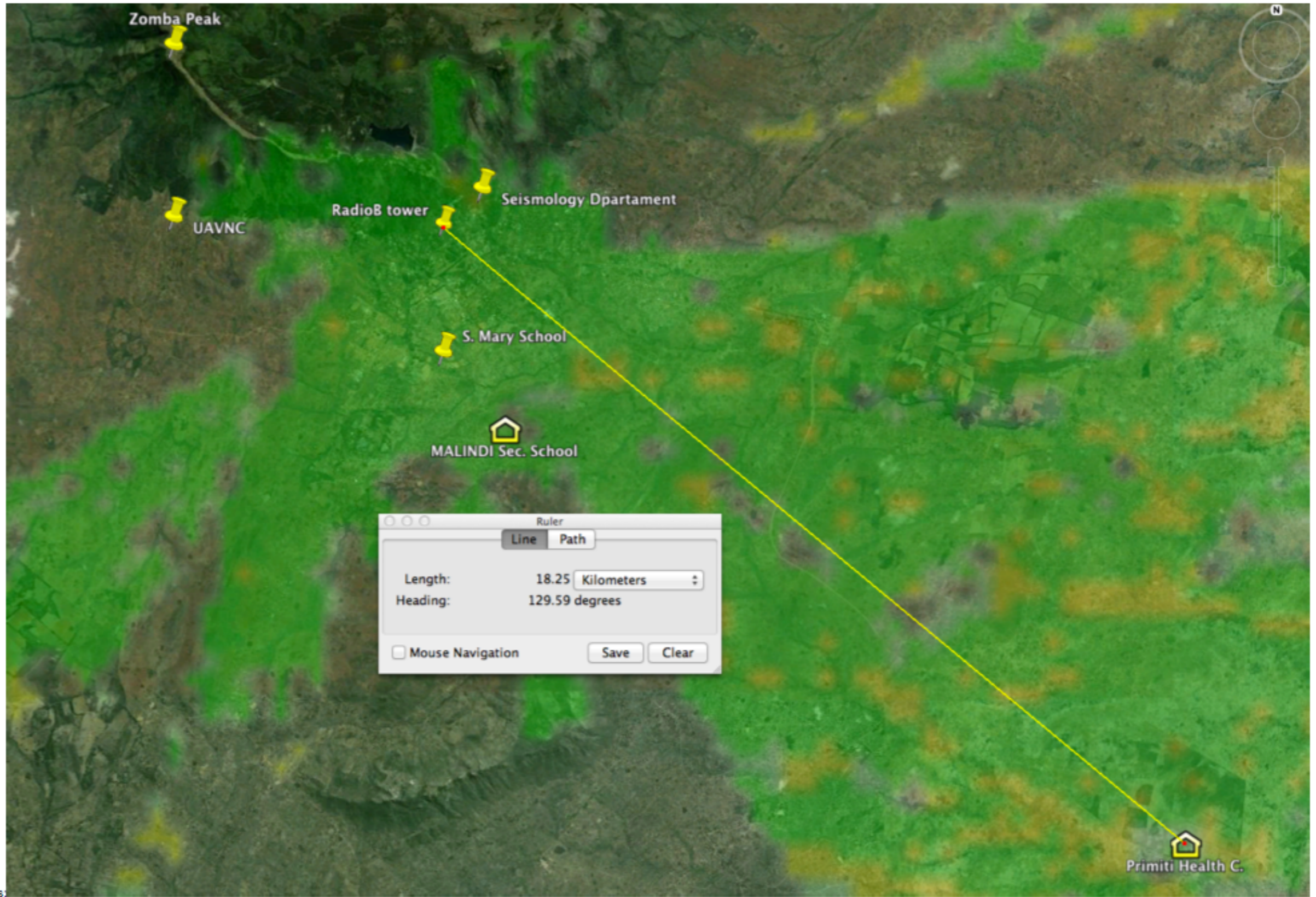
1. The release of officers to work with the Physics Department of Chancellor College;
2. The allocation of TV channels to be used in the pilot phase of the project (deployment starting 2<sup>nd</sup> September, 2013); and
3. The partial funding of the operational costs for the project.

MACRA appreciates the donation of equipment from ICTP for the pilot phase in Malawi and will do the needful to facilitate shipment and delivery of the equipment from Italy to Malawi.

In line with its mandate, MACRA is always committed to continue working towards promoting and supporting the ICT industry in Malawi in order to promote universal ICT access in the country.

Yours faithfully,

Charles Nsaliwa  
**DIRECTOR GENERAL**



Ruler

Line Path

Length: 18.25 Kilometers

Heading: 129.59 degrees

Mouse Navigation

Save Clear

# Deployment

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# White Space technology improves education in Malawi

FEBRUARY 28, 2014



THERESA CHAPULAPULA



[NO COMMENTS](#)



**ST MARY'S STUDENTS**—Said to be benefitting from Television white space .

St Mary's Secondary School head teacher Mary Chimalizeni says Television White Spaces (TVWS) Pilot project being implemented at the school has helped to improve the quality of education at the institution.

# Malawi pilots White Spaces

BY CAROLINE I

**M**ALAWI is the third country to pilot a White Spaces in Africa after South Africa and Kenya, the Malawi Communication Authority (Maca) said.

White spaces providing broadband to rural Malawi at using the identified spaces) in the band.

Speaking during a week long television white space training in Blantyre, Information Minister Mose Malawi is one of the world's first in the world during the pilot phase of the project.

"This project

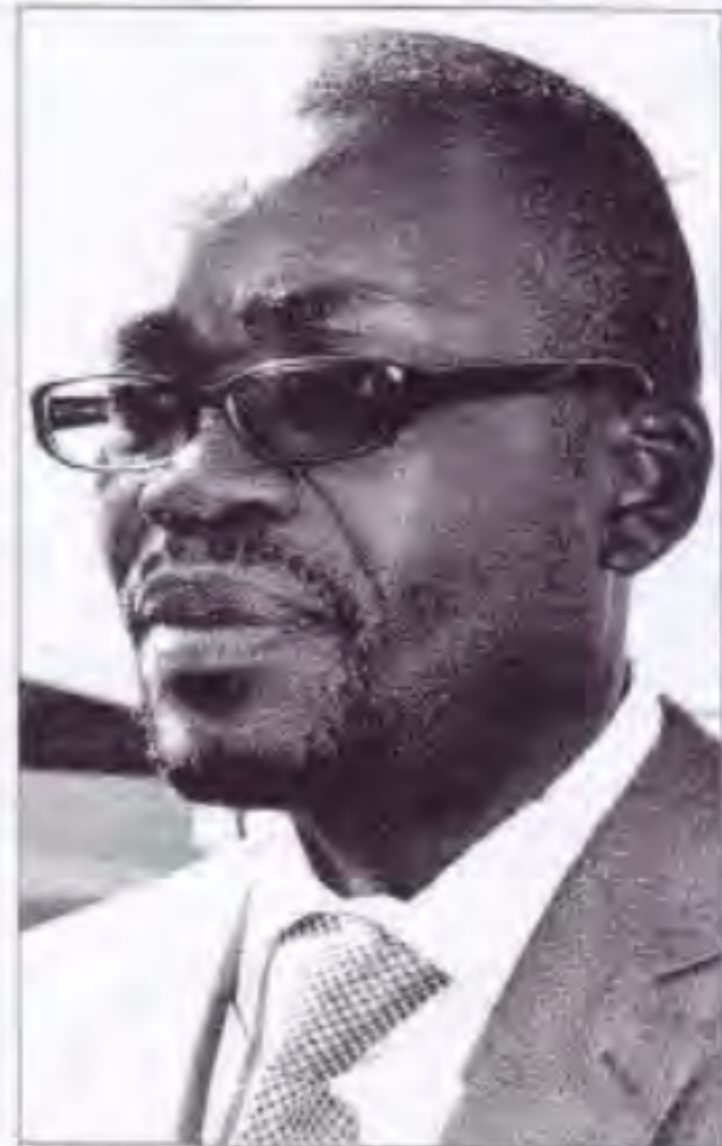
**M**ALAWI will become the third country to roll out a pilot project for the White Spaces in Africa after South Africa and Kenya, the Malawi Communication Authority (Maca) has said.

White spaces project aims at providing broadband connectivity to rural Malawi at affordable cost using the identified gaps (white spaces) in the television UHF band.

will always strive it with emerging trends. White spaces manifestation that collaboration with trying to make use of technologies to connect to the internet.

use in the access to the country has a economic growth and of citizens in the implemented, this is poised to make various institutions a social well being Malawians," said

VWS is being led by the Physics Department in collaboration with Maca and the Ministry of Information.



KUNKUYU—Malawi is one of the countries involved

# Conclusions

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- we can measure TVWS with low cost tools
- spectrum maps can be used to convince regulators
- need for regional regulation
- TVWS equipment currently is expensive and designed for the western market (database, power)
- penetration is the main advantage

# TVWS book

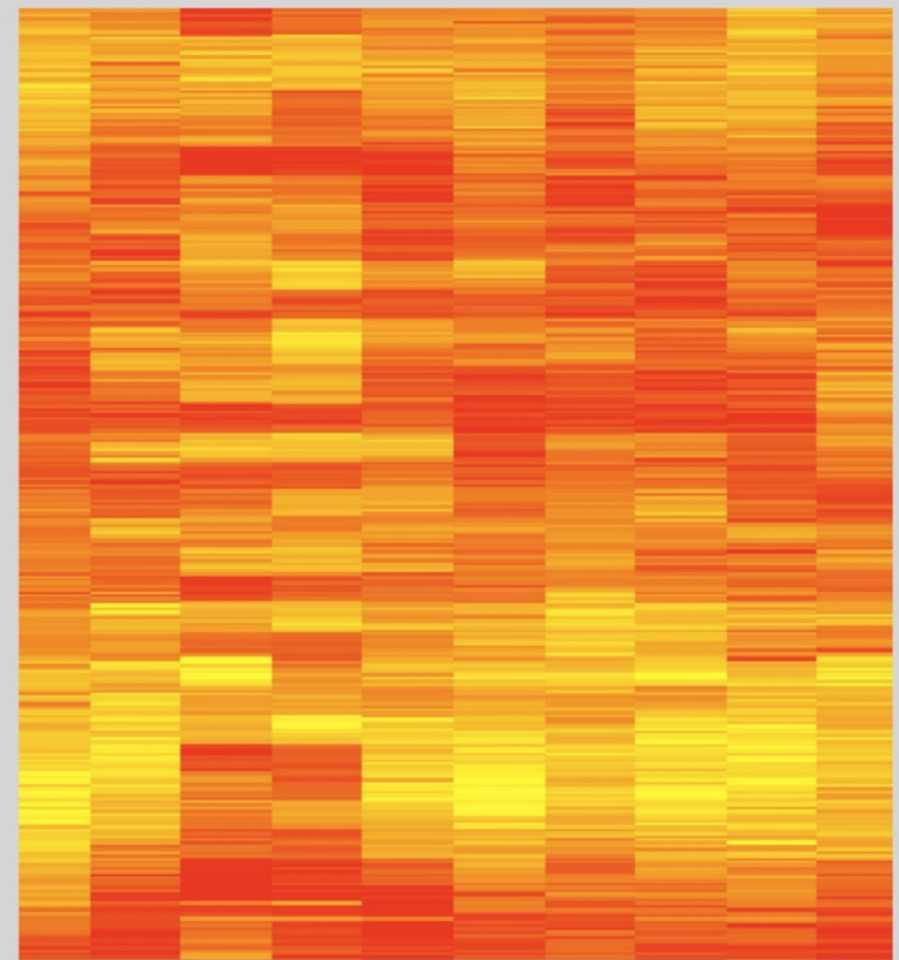
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TV White Spaces,  
a pragmatic approach

E. Pietrosemoli

M. Zennaro

[http://wireless.ictp.it/  
tvws/book/](http://wireless.ictp.it/tvws/book/)



## **TV White Spaces**

A pragmatic approach

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### **Editors**

Ermanno Pietrosemoli and Marco Zennaro



Thank you!