



TVWS & DSA: Caribbean Investigations

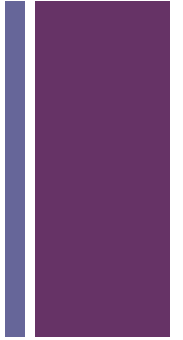
The Communications Systems Group
Department of Electrical & Computer Engineering, UWI

Dr. Kim Mallalieu (Leader), Dr. Sean Rocke, Dr. Richelle Adams, Mr. Daniel Goitia

Presenter: Dr. Sean Rocke



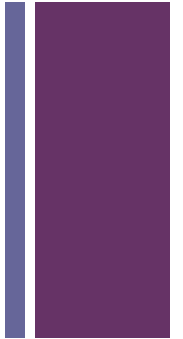
Outline



- Communication Systems Group (UWI)
- Caribbean Realities
- DSA/ TVWS Examinations
- Solutions
- Research Outputs

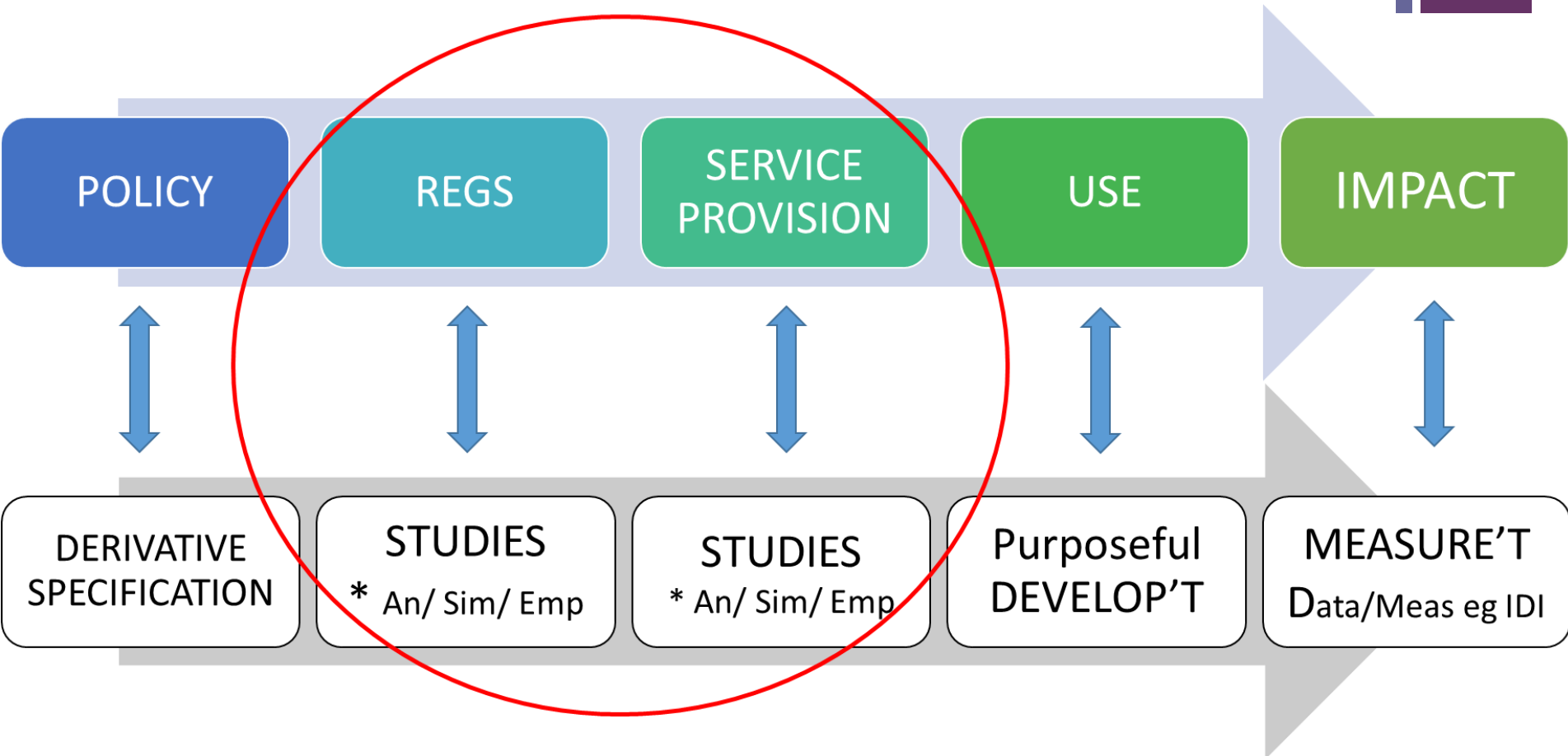


The UWI-DECE Communications Systems Group

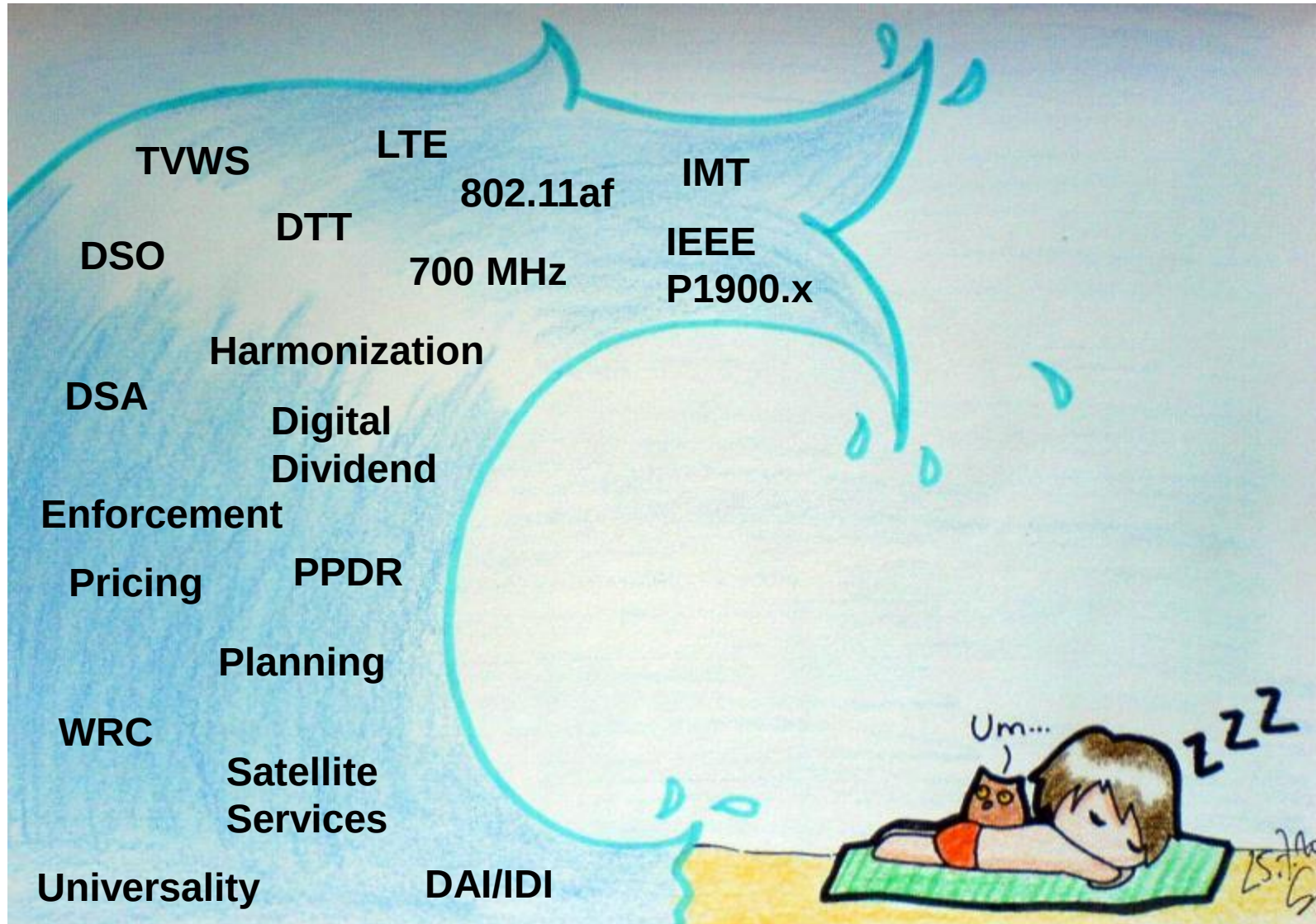


- Examine, evaluate and develop ICT solutions for regional needs:
 - Empirical studies
 - Simulation
 - Theoretical analysis
 - Software and hardware design and development
- Application spaces:
 - Disaster and other emergency communications
 - Social and economic development
 - Health

+ Group Research Lifecycle



+ Making Sense Of



Based on original image courtesy of [Susutastic](#)

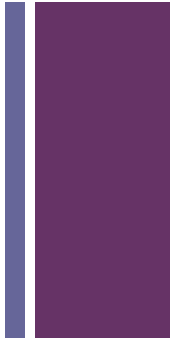
+ Caribbean Context for DSA & TVWS

- Independent island jurisdictions
- Small geographies
- Relatively low pop's & pop'n densities
- DSO planning imperatives





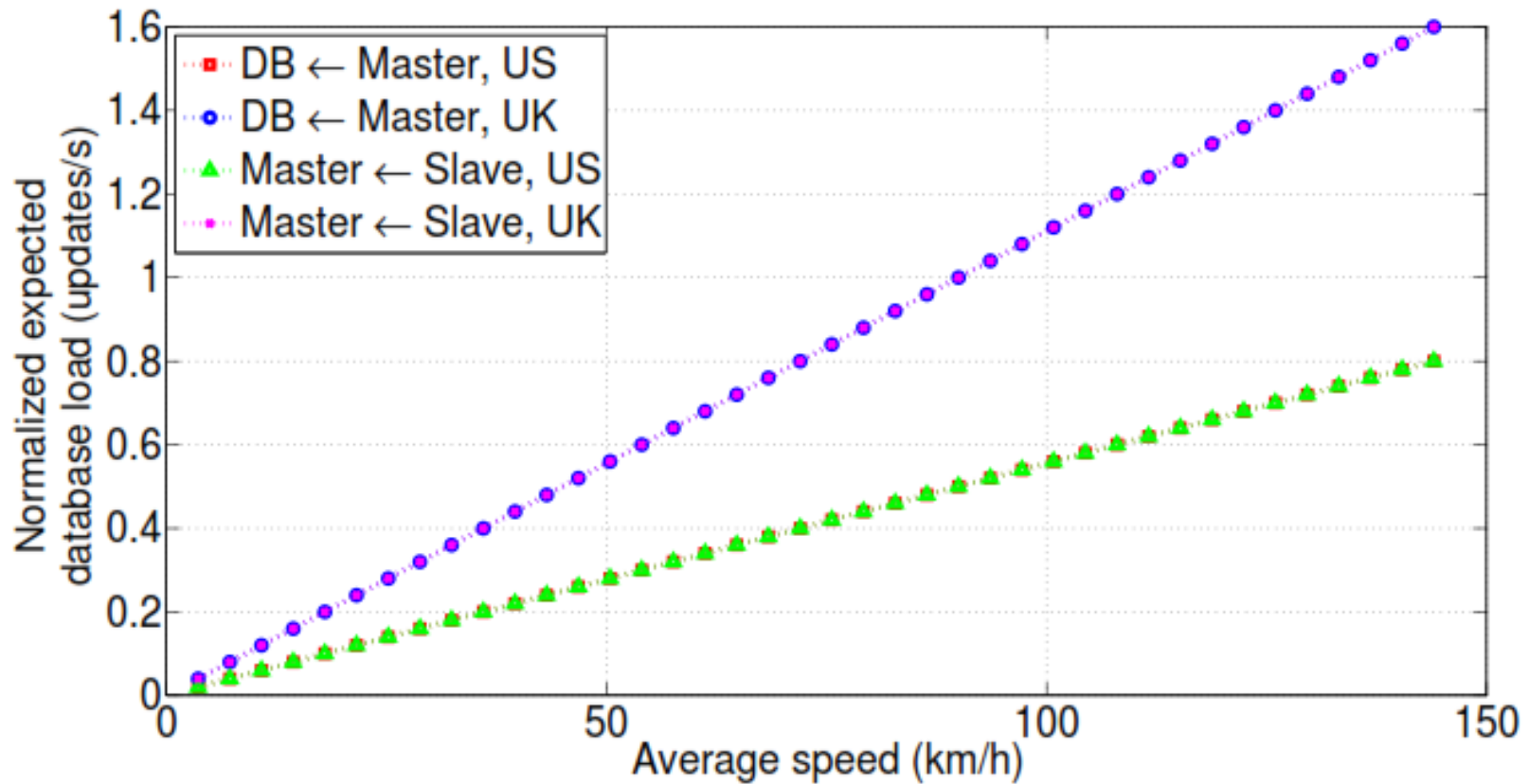
Explorations are necessary...



- *Is DSO necessary for the entire Caribbean?*
- *How can we put reclaimed spectrum to use?*
 - License all bands | Mix of licensed and unlicensed bands
- *Consequences of using DSA equipment designed for other markets?*
 - Bands | Interference | GeoDB access protocol
- *Are licensed bands underutilized?*
- *For what congested bands is service extension crucial?*
- *Can portions of reclaimed spectrum be used to address regional needs eg:*
 - Extension of (terrestrial) mobile services;
 - Infrastructure-less emergency comms & public safety comms;
 - Extension of marine coverage.

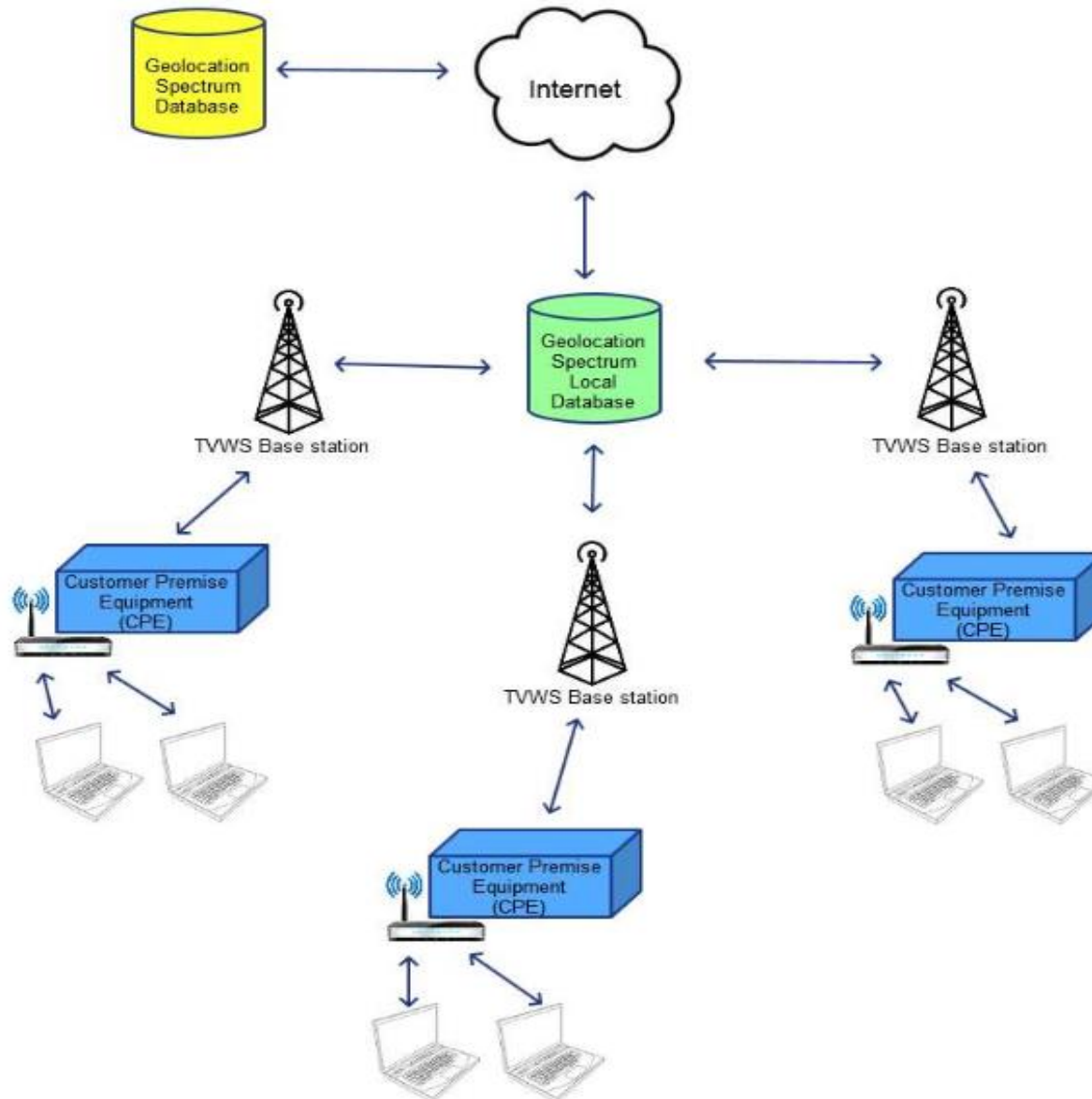


GeoDB Loading vs Protocol (US/UK)





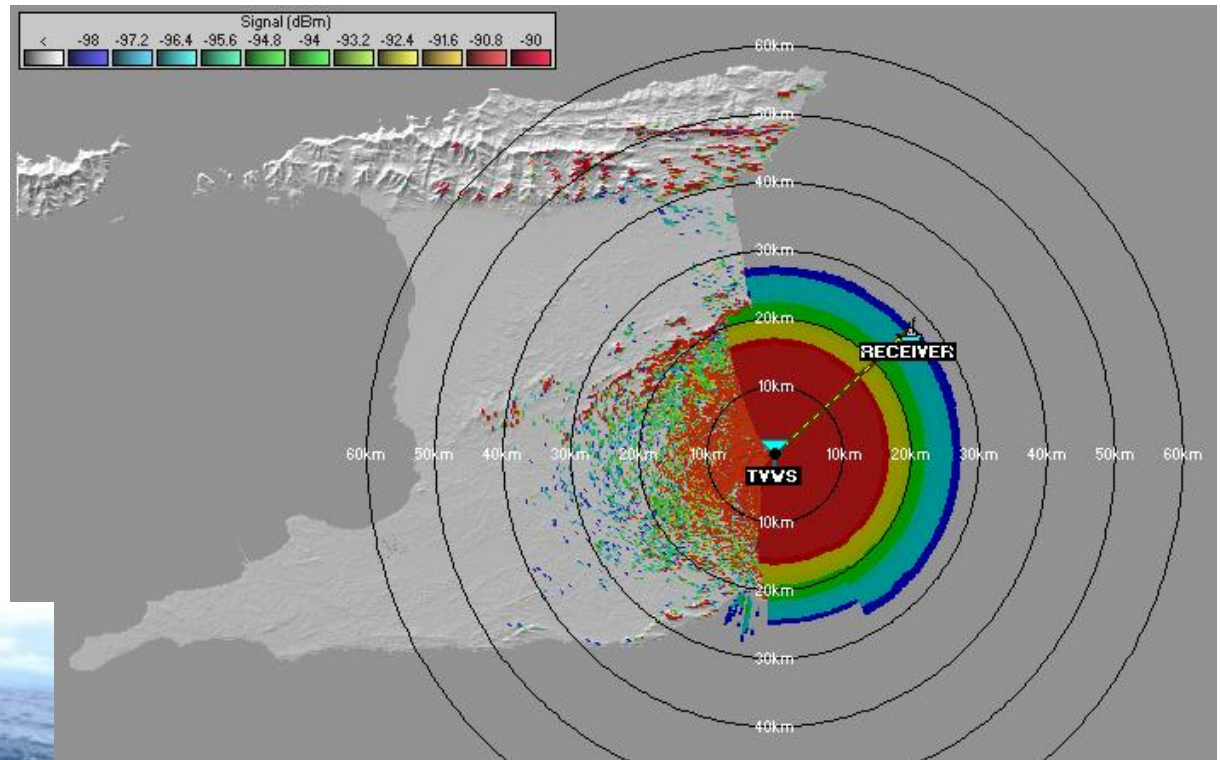
GeoDB Net Architecture Studies





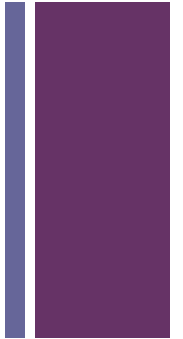
Emergency Comms @ Sea

- *Standard message format with minor updates*
- *NZR*
- *Low data rate*
- *Long range*
- *High error tolerance*
- *Latency tolerant*



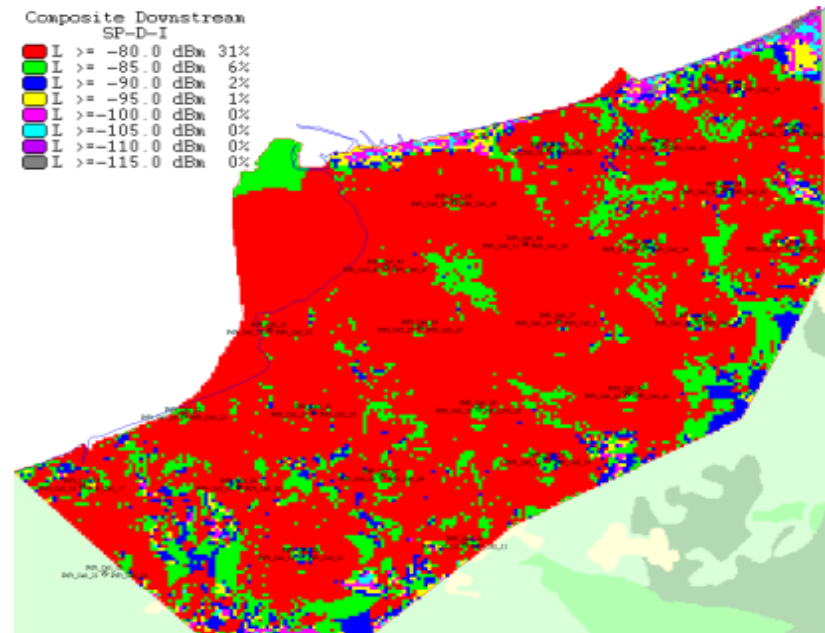


Universality



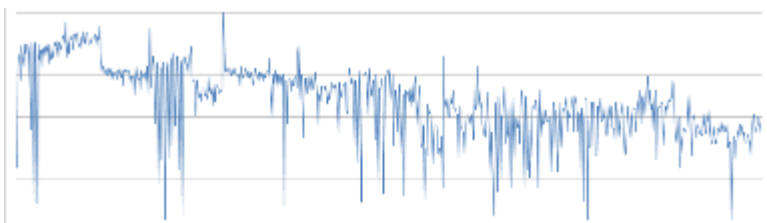
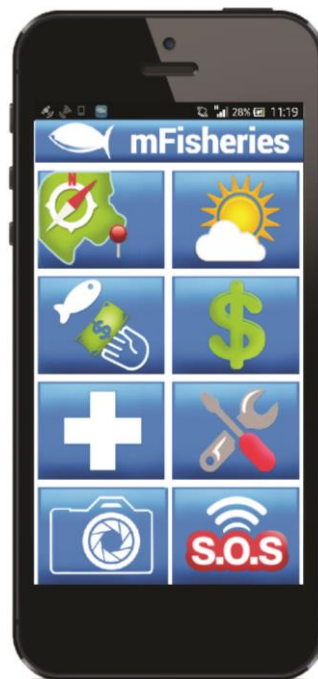
- The *Universal Service Framework for Telecommunications Services in Trinidad and Tobago* (2012) establishes that Universal Service is the provision of accessible and affordable basic telecommunications services on a household or individual basis, as far as reasonably practical.
- Basic services prescribed in the Universal Service Framework include “Affordable broadband Internet services of throughput no less than 5 Mbps by 2015”

Service Class	% of area serviced
Data Outdoor	≥ 10Mbps : 51%
	≥ 5Mbps: 3%
Data Indoor	≥ 10Mbps : 27%
	≥ 5Mbps: 11%
Voice Outdoor	≥ 10Mbps : 14%
	≥ 5Mbps: 33%
Voice Indoor	≥ 10Mbps : 1%
	≥ 5Mbps: 10%



+ Solutions are possible ...

- Innovation: reconfigurable transceivers
- Economy: scale
- Regulation: light
- Regionality: soft harmonization

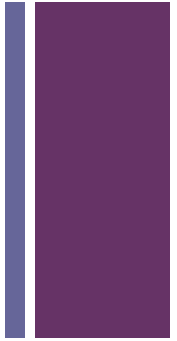


$$Prob_{Cell|P_T}(R) = \frac{\hat{\alpha}}{2} + \frac{1}{R^2} \int_{r=0}^R r \times \text{erf} \left(\frac{P_T - P_{MDS} - L_{50}(r)}{\sigma_L \sqrt{2}} \right) dr.$$





Research Outputs



(POLICY)
DERIVATIVE
SPECIFIC'N

(REGS)
STUDIES
* An/ Sim/
Emp

(SERVICE)
STUDIES
* An/ Sim/
Emp

(USE)
Purposeful
DEVELOP'T

(IMPACT)
MEASURE'T

- Universality
- Disaster Management
- etc.

- Coexistence
- Context-appropriate allocations and assignments
- Context-appropriate Service profiles
- DSA spectrum monitoring req's
- Compliance enforcement for DSA
- RF Studies
- Emergency Comms

- Context-appropriate Service profiles
- GeoDB and signaling load
- Basket of Services
- Universality Network Requirements

- PPDR planning, response & recovery solns
- Network Designs
- Disaster Data Collection
- SDR Solutions
- Filters

- IDI etc
- Specification from Policy



Thank You... Questions????

