

The Wireless IP project

Project description and system proposal

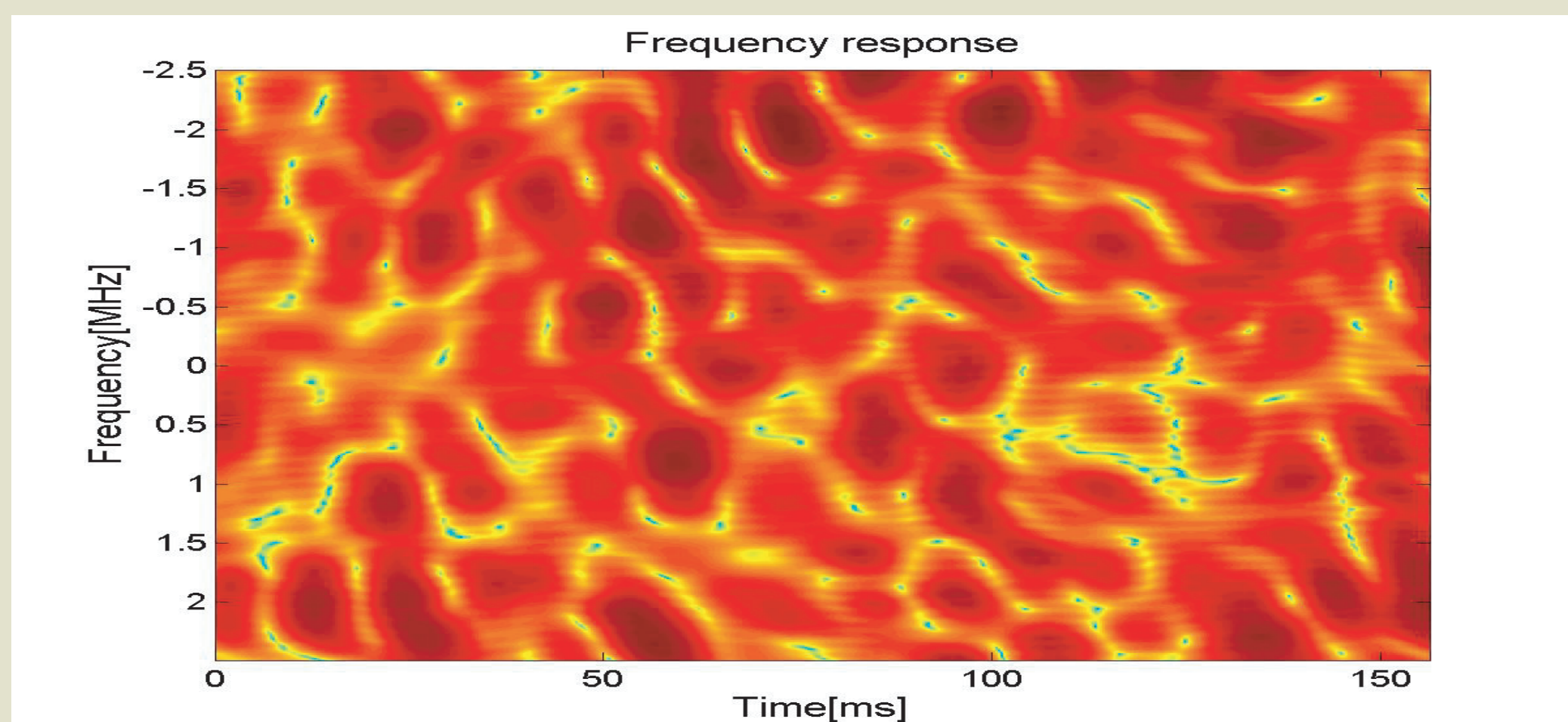


The Wireless IP project: a collaboration between
Uppsala University, Signals and Systems (host inst.)
Chalmers University of Technology, Signals and Systems
Karlstad University, Computer Science.
 Project leader: Mikael Sternad, UU
 Seven senior researchers and five Ph.D. students
www.signal.uu.se/Research/PCCwirelessIP

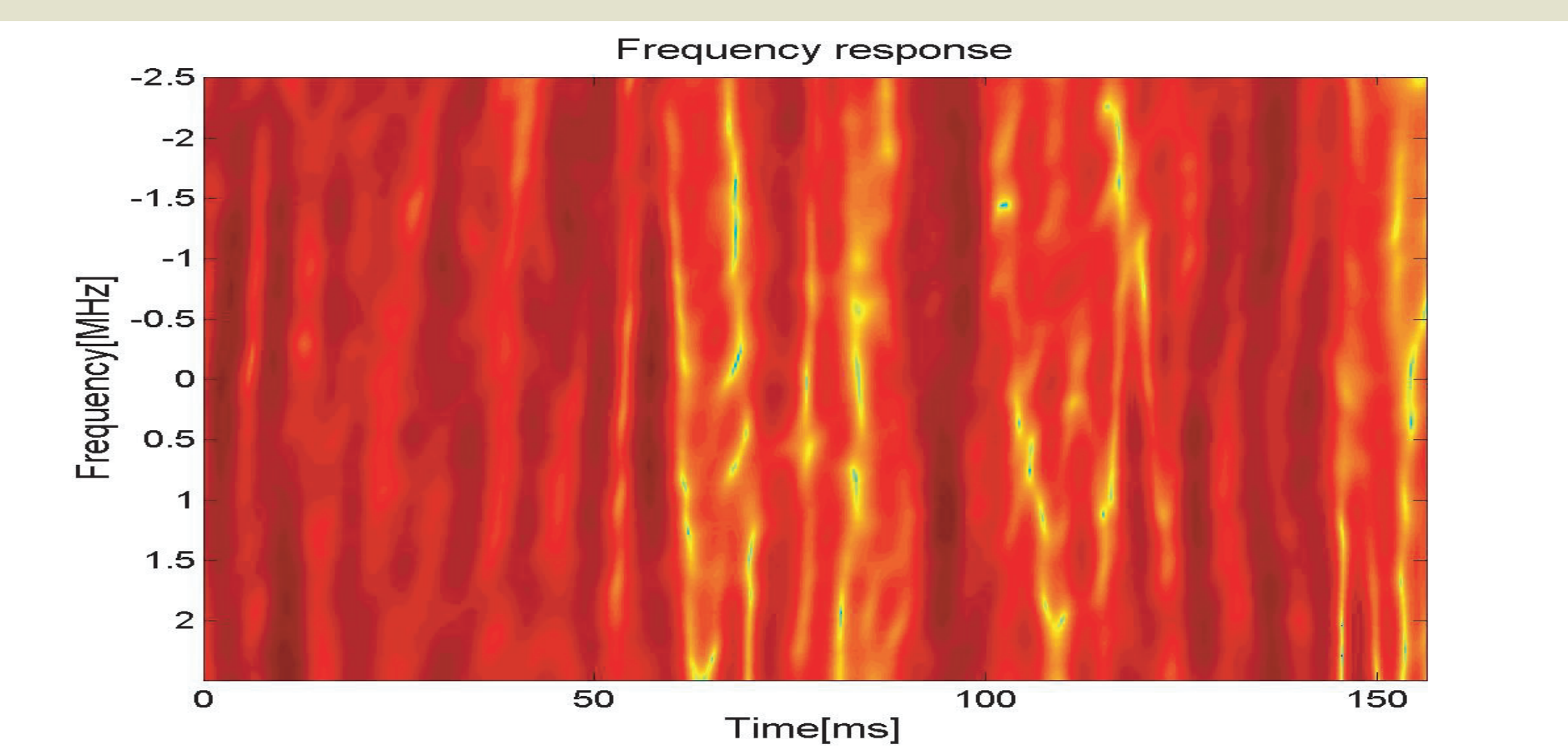
GOALS

- A flexible, low-cost general packet data system for wide area coverage and high mobility
- High spectral efficiency (10-fold increase)
- Perceived performance of 100 Mbit/s Ethernet (on 40 MHz bandwidth)
- Low delays and latencies, fast retransmission
- Quality of service and fairness

Fading Channels: (Data collected in Stockholm)

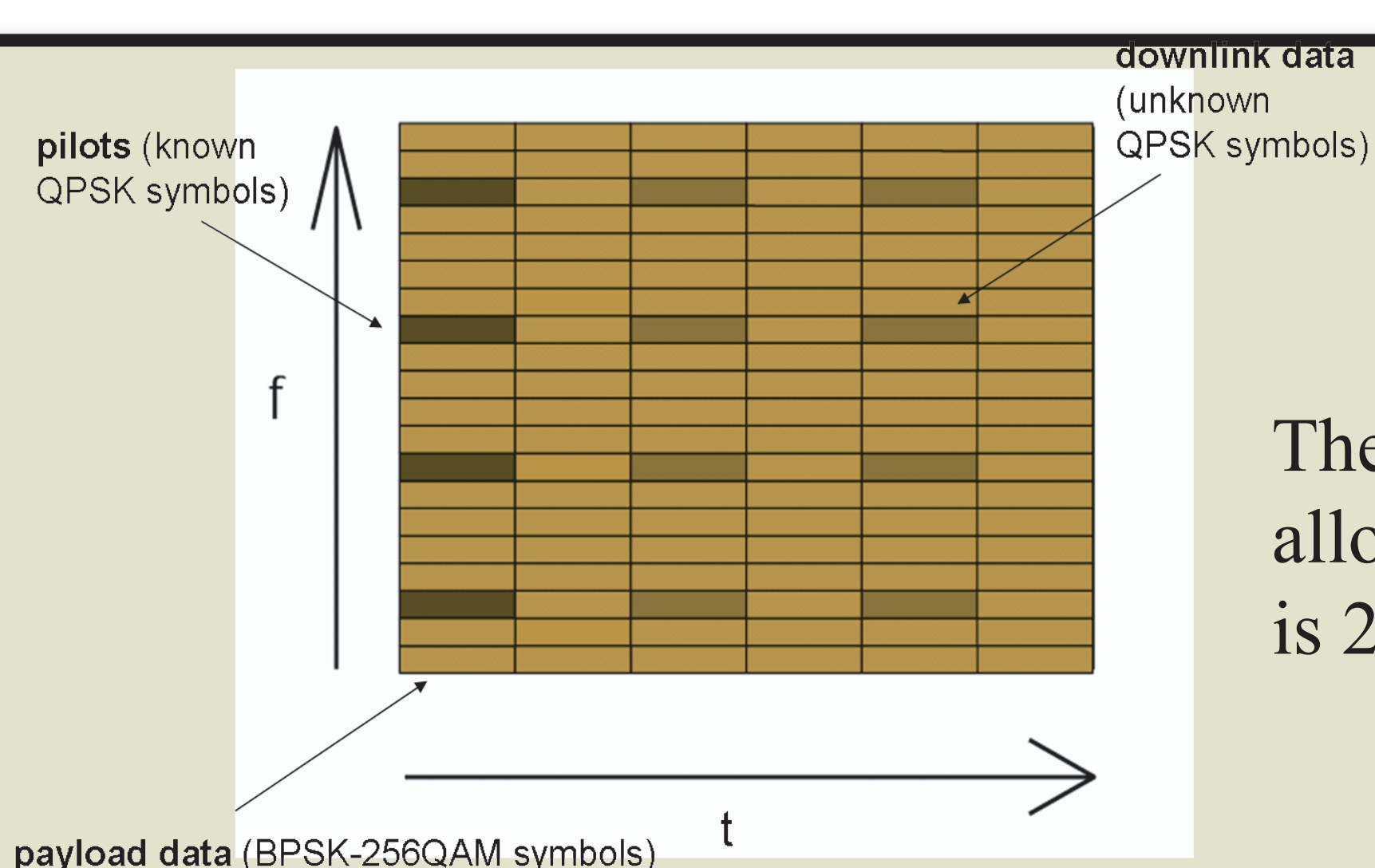


Coherence bandwidth : 0.6 MHz



Coherence bandwidth : 4.9 MHz

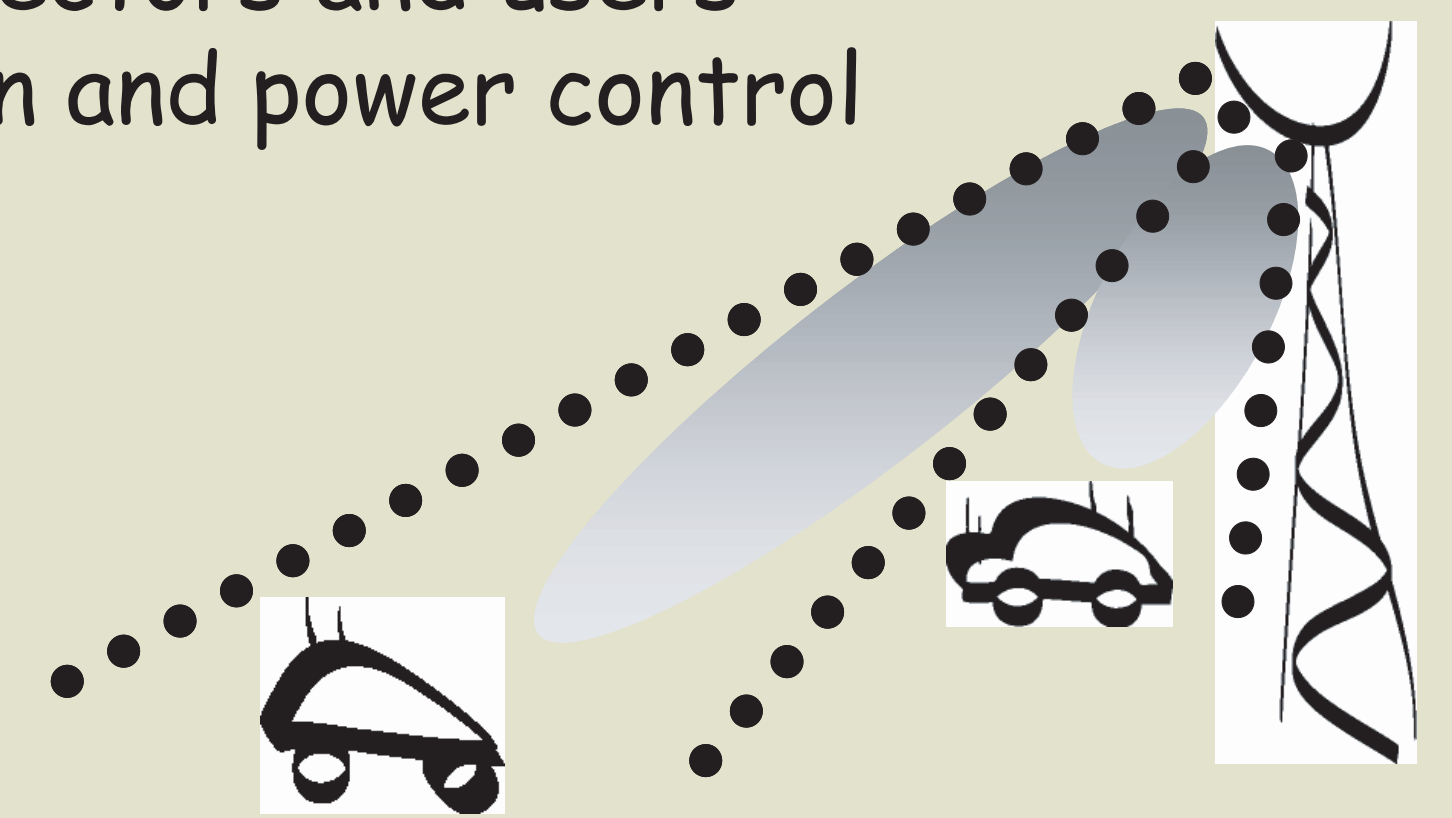
We utilize the variations of the radio channel. The system is designed in a totally new way.



The unit for user allocation. Each such "bin" is 200 kHz by 0.666 ms.

Main System Components:

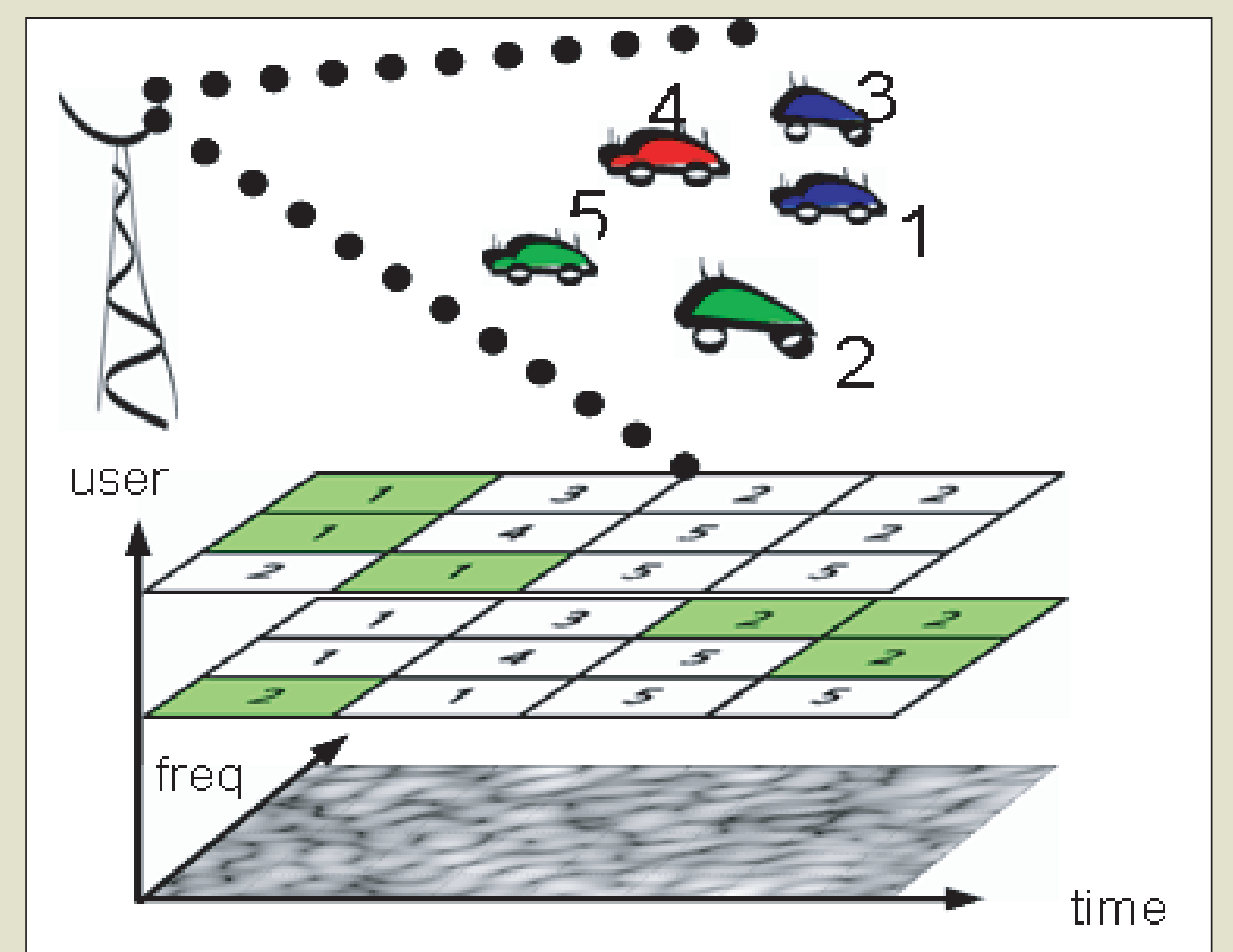
- Long term power prediction
- Multiple antennas at base stations and terminals
- Scheduling among sectors and users
- Adaptive modulation and power control
- TCP over wireless



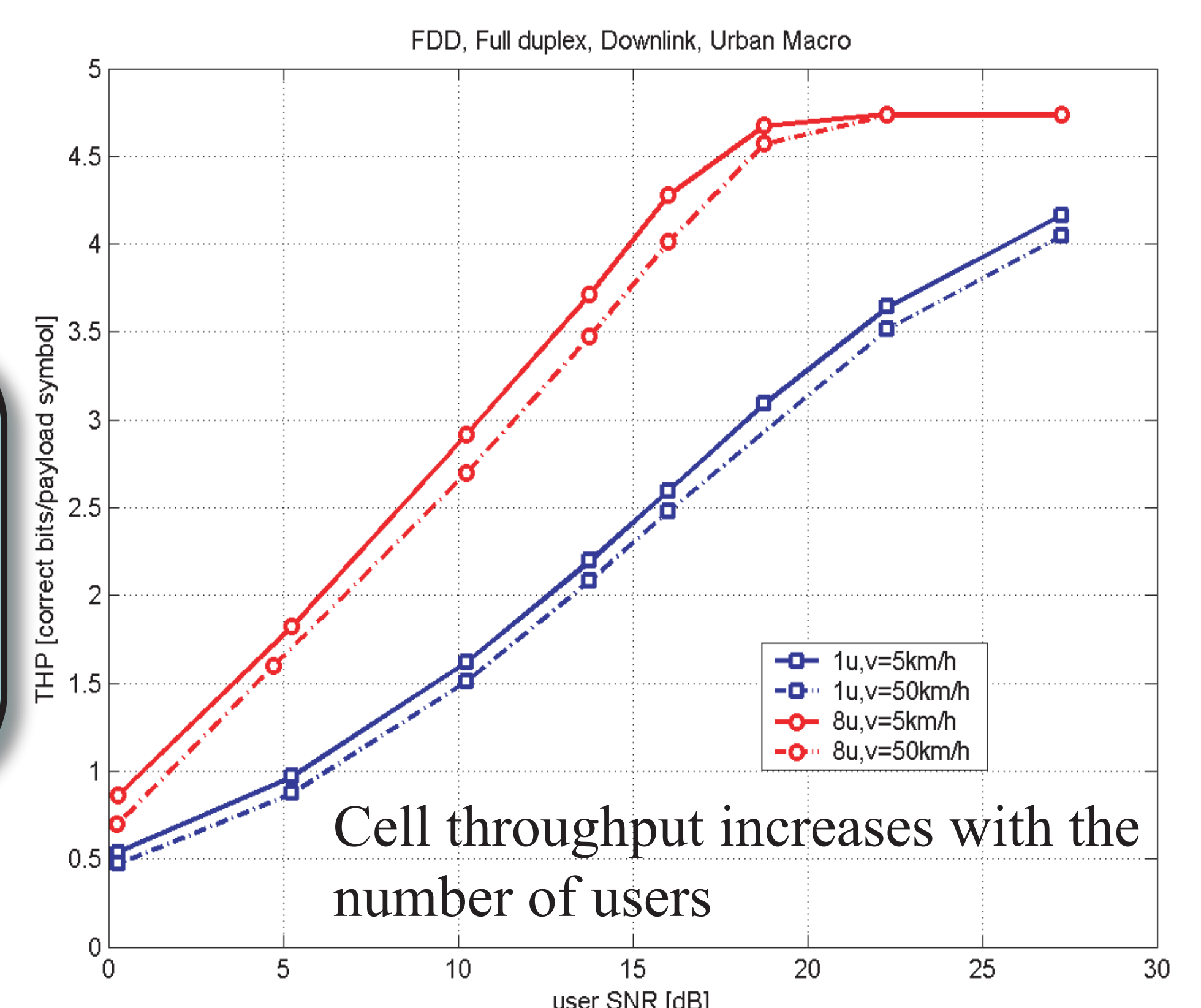
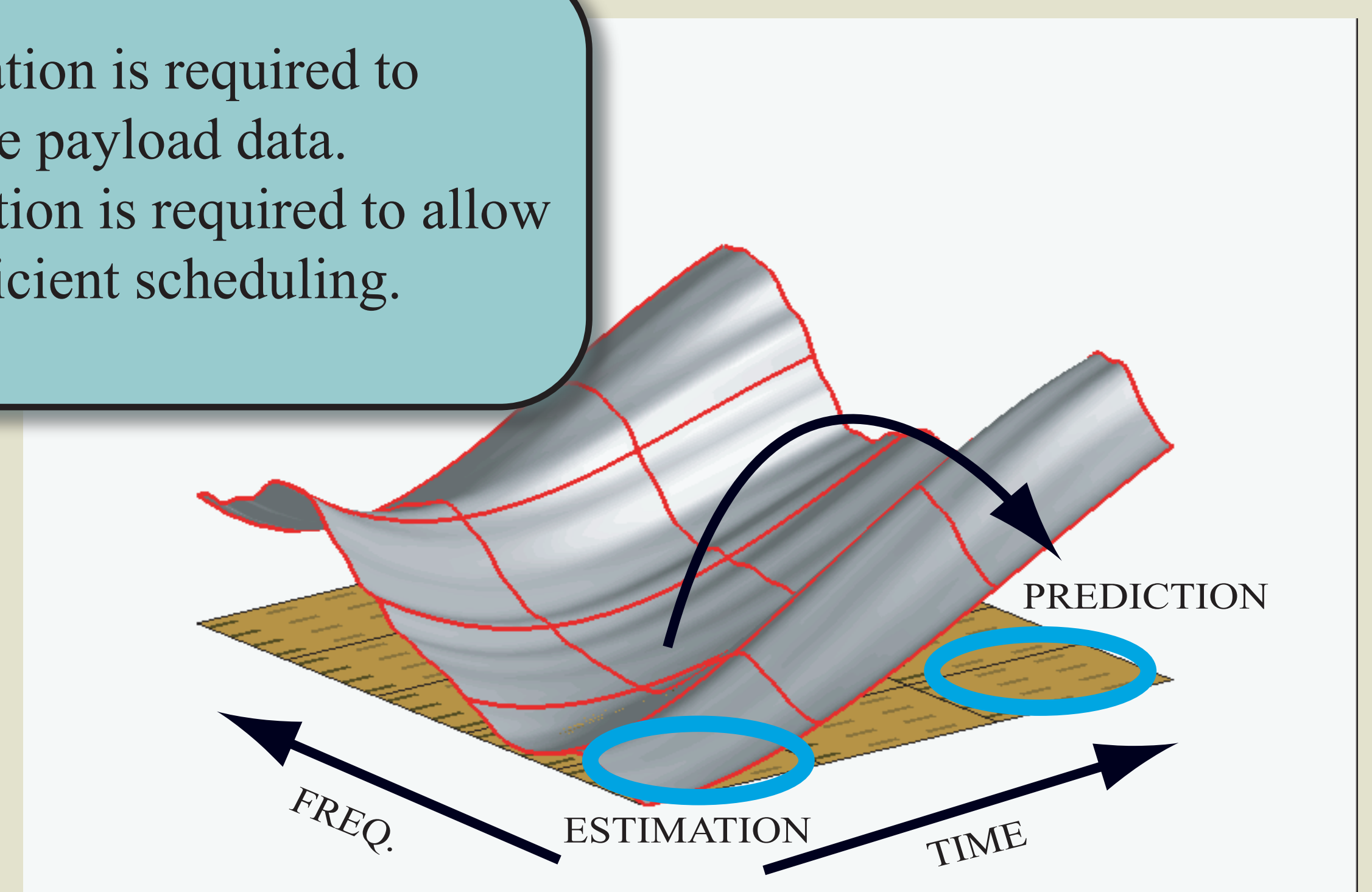
Scheduling Among Users in a Sector:

Perform scheduling based on predicted SNR:

- For each bin, let the "best" user transmit
- Use adaptive modulation and automatic repeat request



Estimation is required to retrieve payload data. Prediction is required to allow for efficient scheduling.



Cell throughput increases with the number of users

Multiuser diversity combined with channel prediction and scheduling allows us to efficiently utilize the radio resources.