



# Cluster E Meeting Summary

## GEC-5, July 2009

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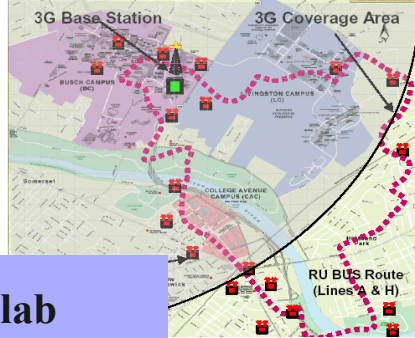
# Cluster E: Summary Report (1)

- Cluster E is a relatively small group of projects in GENI with primary focus on wireless testbeds
- ORBIT Management Framework (OMF) software used to support heterogeneous wireless deployments & mobility
  - Control & management at aggregate manager level
  - Tools for experimental workflow & measurement
  - Integration of various “open” radio technologies including WiFi, WiMAX, GNU
  - Features for orchestration of mobility & disconnected experiments (virtual tripline, GPS, etc.)

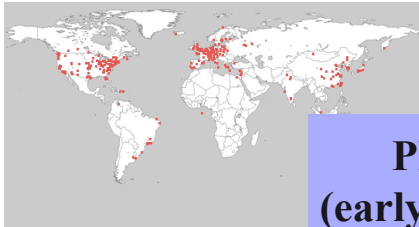
# Where is OMF currently used ?



**Orbit, Winlab  
Rutgers University, USA**



**Thomson Lab,  
Paris, France  
(under deployment)**



**PlanetLab,  
(early deployment)**



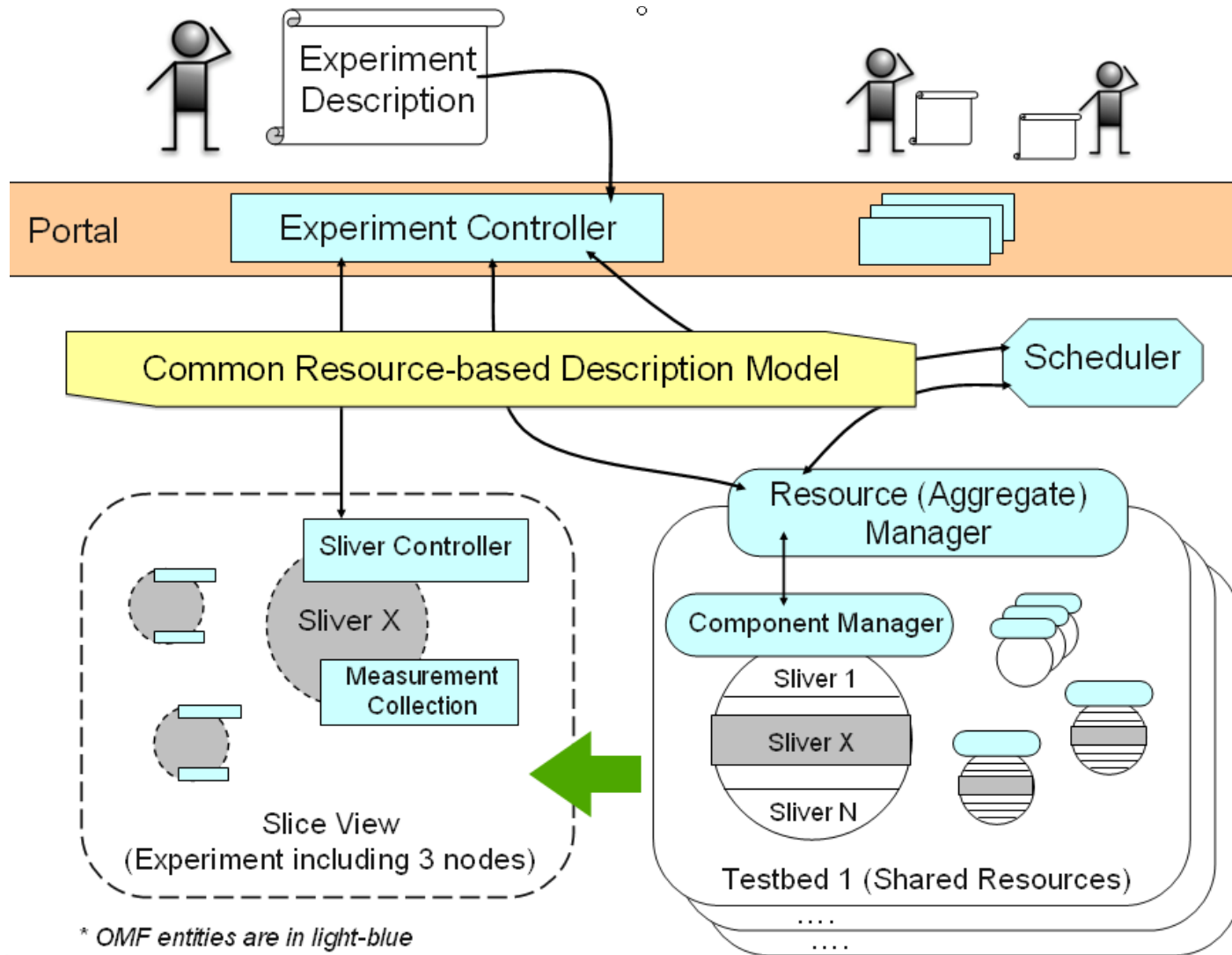
**NICTA  
Sydney, Australia**



**Center for Research and Technology,  
Greece, (under deployment)**



# Supporting Federation



# Base Station Deployment at WINLAB Tech Center Building

- Rt.1 campus deployment Q1/09
- Performance evaluation in progress

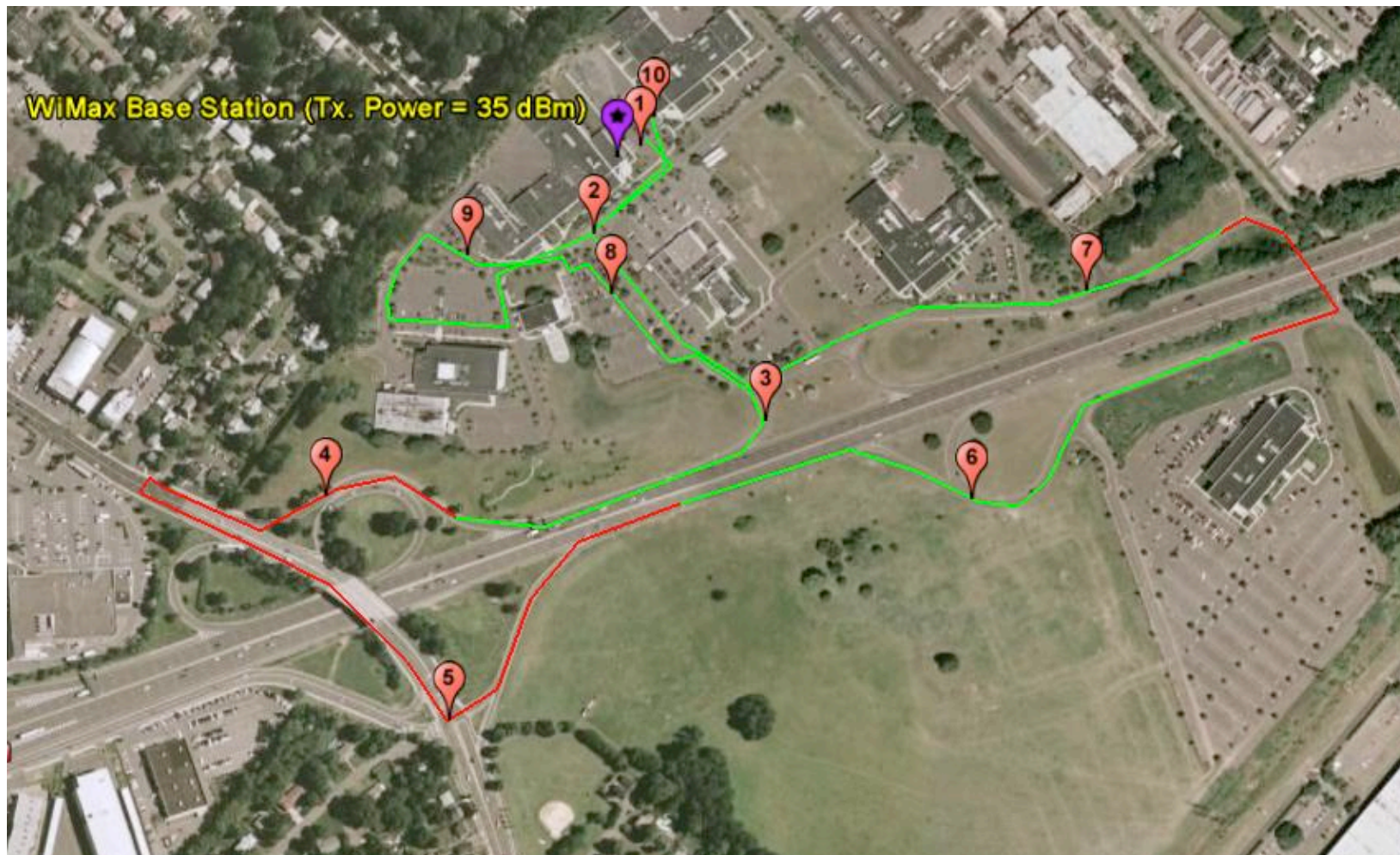
RF Module  
( sector)

Base  
Module

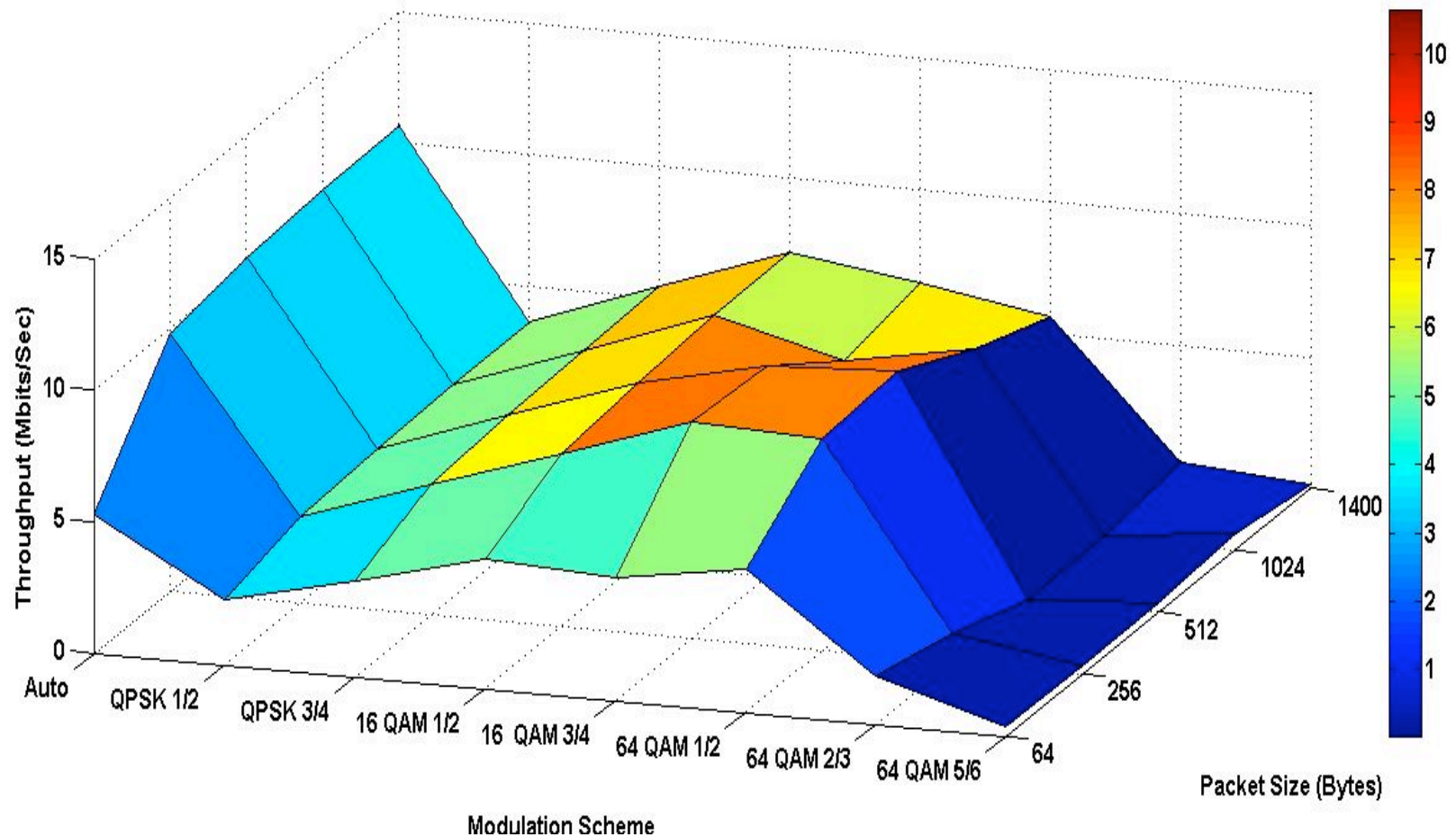


Omni-directional antenna  
(elev. < 6ft above roof!)

## Coverage: Drive-by Connectivity Trace



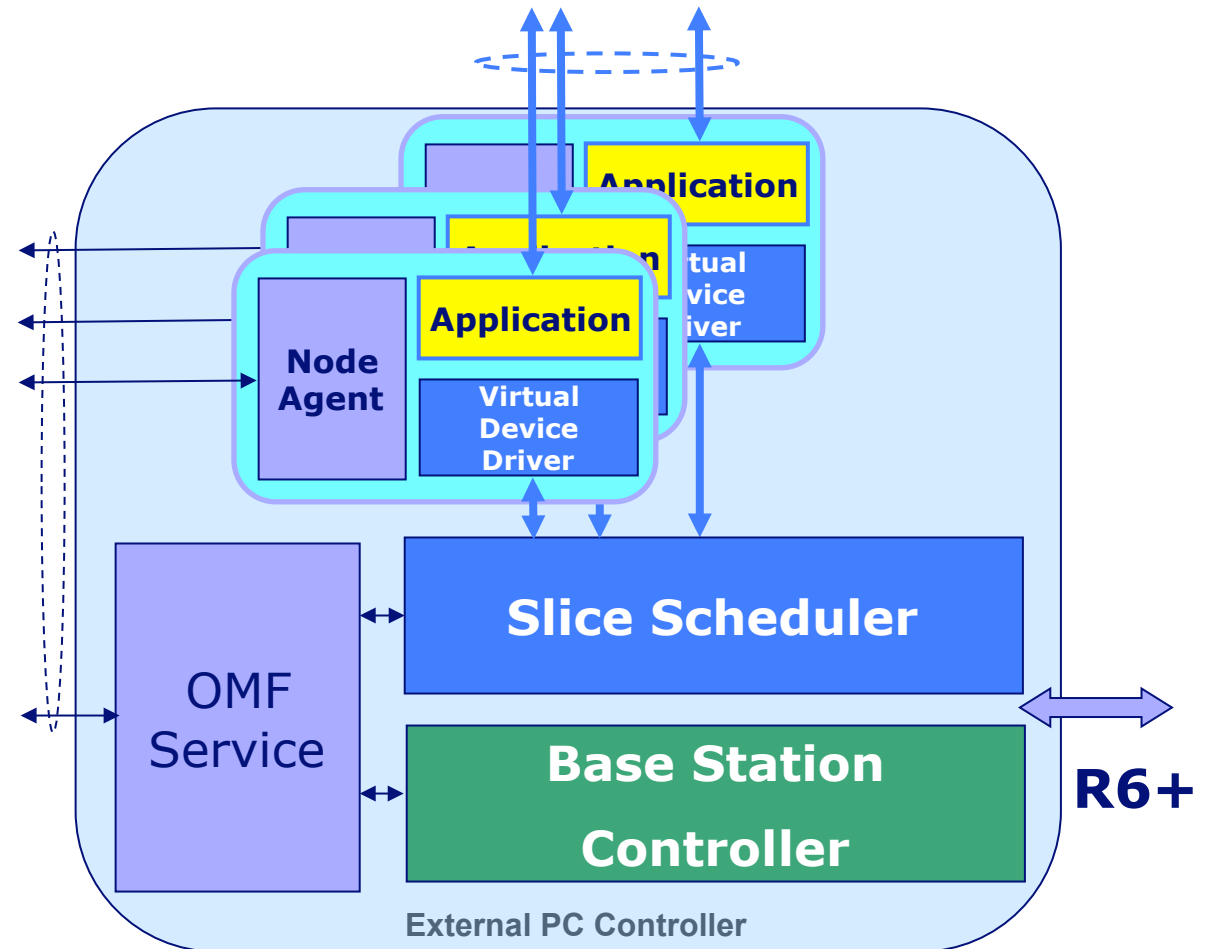
# Performance: Stationary Throughput



**Location 2 (Distance from BS = 0.14 Miles)-- > CINR = 24 RSSI = -72**

# WiMAX Integration with OMF (software)

- OMF service for base station/slice scheduler control
- Node Agent for experiment orchestration support
- (WiMax) virtual device in each sliver



*Capability Demonstrated at GEC-4*





# Cluster E: Summary Report (2)

- Discussion items in Cluster E meetings
  - WiMAX project status
    - Initial outdoor deployment at Rutgers completed
    - Baseline performance measurements & sample vehicular WiMAX + WiFi experiments
    - “Vertical” integration of WiMAX BS with OMF
    - Current work to demonstrate virtual network with resource mgmt
  - OMF development & deployment status
    - Over 15 OMF wireless deployments worldwide
    - Large scale deployment at Rutgers + several others including projects in Aus and EU (OneLab, etc.)
    - “Horizontal” integration of OMF clusters demonstrated via L2/VLAN
    - New mobility support features (disconnected/cached OMF support on mobile device, virtual tripline,..) demonstrated



## Cluster E: Summary Report (3)

- Open issues and action items from meetings
  - Role of OMF in GENI – aggregate level, wireless subnets as primary target
  - OMF experiment workflow and measurement features available for use by other control frameworks
  - Plan ahead for campus WiMAX and cognitive radio networks in GENI roadmap
  - Need to integrate with one or more “global” control frameworks such as ORCA, PL and ProtoGENI
    - Resource discovery & spec sufficient for heterogeneous wireless network requirements an important requirement
    - Considering OMF integration with ORCA as next step
    - Complexity/cost of multiple integration efforts
    - Single control/mgmt spec and aggregate manager API would help!



[www.orbit-lab.org](http://www.orbit-lab.org)  
**[omf.mytestbed.net](http://omf.mytestbed.net)**