nowwireless

Co-operative Systems

Project Analysis

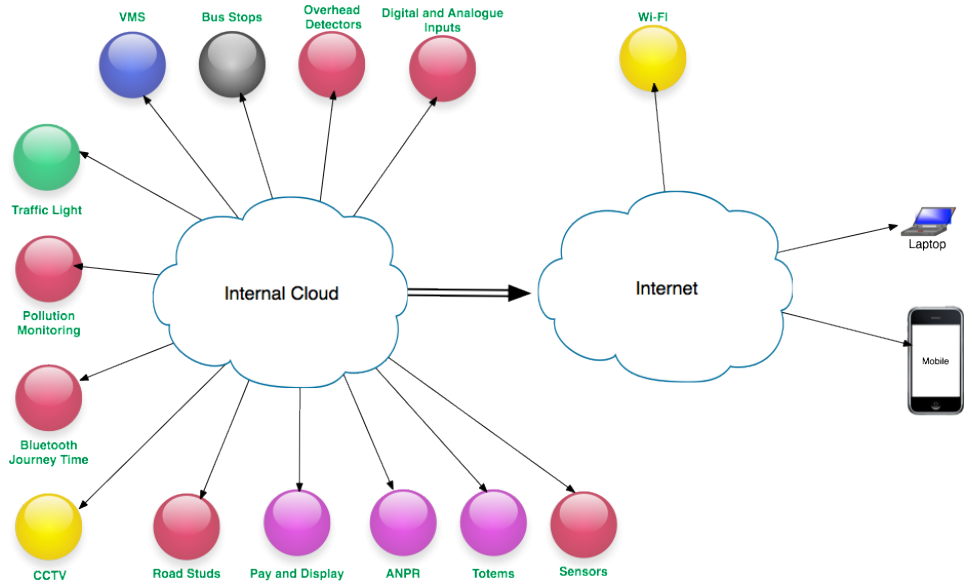
This report outlines the results of the Cooperative Systems Trial

SUMMARY OF RESULTS

The project set out to put a number of different technologies on street connected by a wireless Mesh. A network was set up at London Bridge connecting Elephant and Castle to London Bridge.

COOPERATIVE SYSTEMS

NOW Wireless provides integrated connectivity for transport systems supporting Traffic Lights, CCTV, RTI displays, Totems, ANPR, Wi-Fi and VMS. We have examples of all those available in our 3500 installations over 35 towns and cities.



Pollution is an issue that has become central to traffic management systems.

Pollution can be handled in many ways but the problem is the identification of the specific causes and a mechanism for dealing with this.

We believe that pollution monitoring integrated to UTMC and Co-operative vehicles gives the best opportunity for reducing pollution.

Pollution monitoring when tied to Journey-time allows us to predict when problems will occur in an area and the UTMC can use the early information from the Journey Time measurements to create different traffic plans than when the pollution levels are not at risk.

Co-operative vehicles allow us to instigate Green Waves for cars fitted with navigation equipment that can communicate with the roadside. Reports show that if a percentage of vehicles have this equipment and control their speed to go through a Green Wave then other vehicles will be forced to follow and also be in the Green

Wave. Buses and other public vehicles are part of this, and with newer vehicles also having this technology; a critical mass can be achieved.

MESH RADIO

The Mesh has performed excellently with 100% availability over the whole network during the trial and with the backhaul over 3G. The speed available of 70Mbps throughput provides a comprehensive data highway over the whole route.

POLLUTION

It is clear that in measuring Nitrogen Dioxide (NO_2) that the apparent traffic flows and the peaks in the measurement can lag by up to 2 hours. Sometimes, possibly due to the weather, there is no interaction. Carbon Monoxide (CO) seems to have a closer correlation and can be seen to rise as traffic increases.

This means that by the time you measure NO_2 being high the cause could have been between thirty minutes and two hours earlier, or that the cumulative effects have reached a critical level.

Using Journey Time to trigger timing changes to the traffic flows would enable less queuing and stop the build up of critical NO_2.

The measurement of the pollution cannot be used in real-time so it should be used as a confirmation that the traffic plan is working. However if we set it up for real-time measurement we could use alarms to stop all but public transport traffic completely until the levels decline.

Appendix A reviews the pollution results with Journey Time.

JOURNEY TIME

The Journey Time recording has successfully recorded the traffic flows without problem. The data is not real-time at present but we are working us to provide an interface so we can feed the data in real-time just as you would a traffic sensor.

CCTV

CCTV has been via a PTZ camera and a low-cost CCTV (£150 plastic) camera. We have taken snapshots over the period of the trial to try to view events, however, originally we had planned to record the data locally and then interrogate it for more detailed information but lack of access to OTU cabinets precluded this.

To be able to do traffic planning and relate pollution to journey time the use of CCTV is essential, otherwise what would appear to be spurious pollution reading may not be explained. In one instance a high reading early in the morning could be seen to be vehicles parked up waiting for shops to open. The cost of the recording equipment for the street is less than £1000 and could be used as part of a moving Pollution Monitoring scheme.

UTMC

We could not integrate the UTMC system in as we had no access to the OTU, however Mesh4G is used in over 2500 traffic signal installations and we can assume that any TCP/IP connection would not be a problem. Wireless connection as mentioned above is one method of connecting the OTU to the wireless mesh when civils is not possible.

BACKHAULS

The VMAe3G was used to connect back to the Cloud. This performed well and we had excellent availability. We realised that we could have also connected with BT OpenZone and in future we will propose that as a fail-over mechanism. Normally we would use a BT circuit or ISP connection for the backhaul. With the proximity of the river we could have run wireless links between bridges to minimise connections.

CONCLUSION

The Mesh system and all equipment performed well, upgrading the software to provide a real-time input to UTC looks relatively easy and a trial of this could be the next step. Connection of the OTU cabinets via wireless could also be included so CCTV recording and UTC integration could be implemented.

This equipment could be moved to another road for the cost of the labour to do so if required. In addition we are examining Cooperative vehicles and when the technology is clear we will come back with information on upgrading the Mesh to support it.

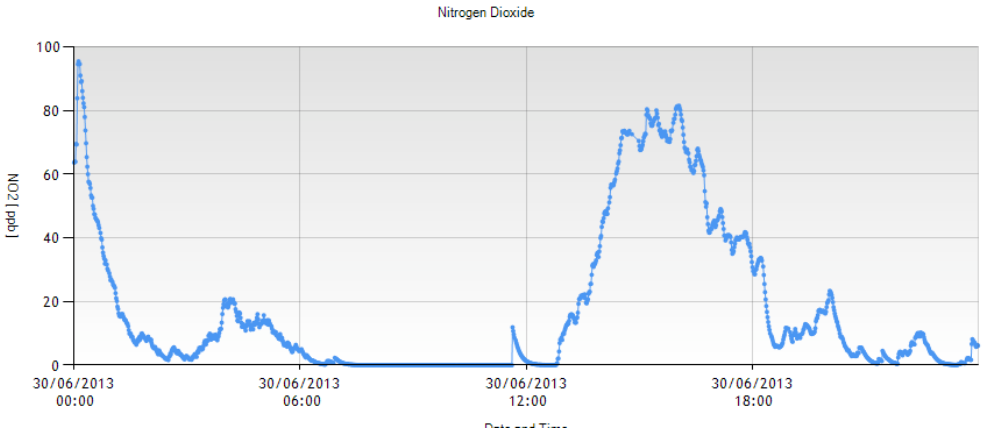
APPENDIX A

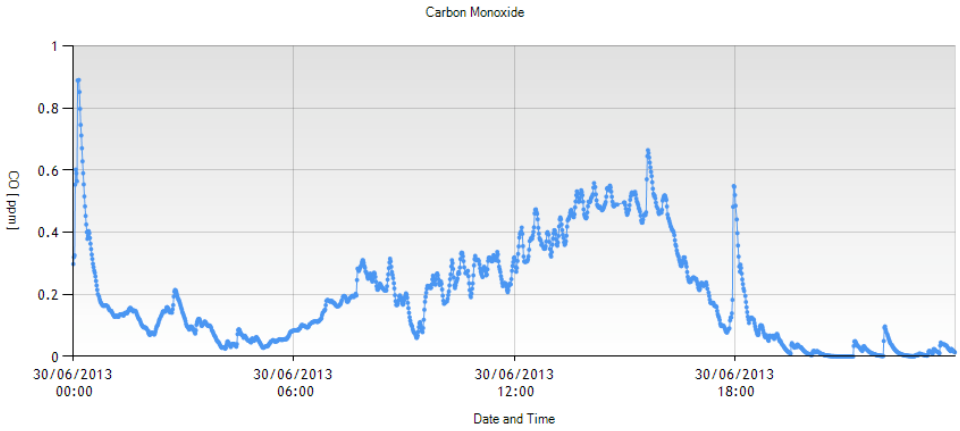
Analysing the data from the trial is extremely difficult as there are so many interactions. However the best example is to examine a Sunday and a day of the week.

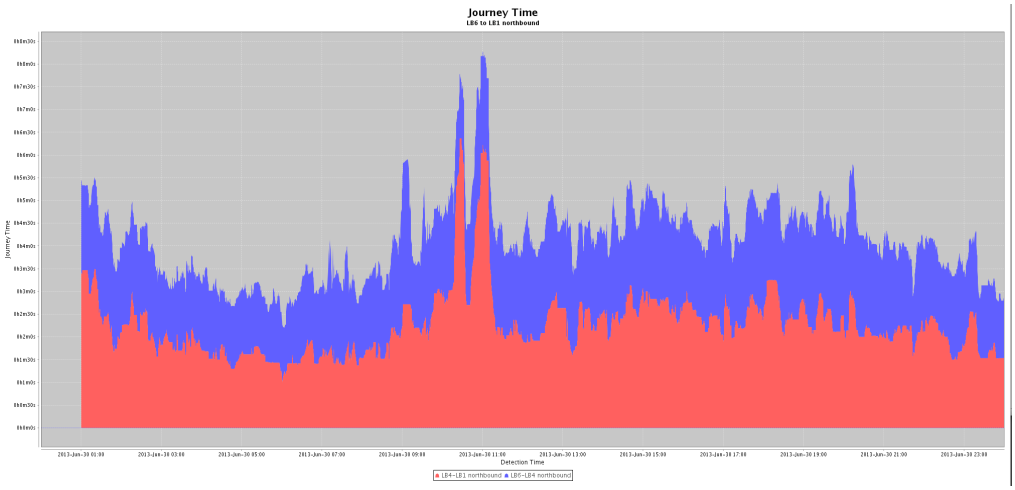
SUNDAY 30TH JUNE 2013

A spike in Journey Time occurs and subsequently the Nitrogen Dioxide levels spike after a time period has been observed. Carbon Monoxide increases sooner.

The temperature during the day was 25 degrees Celsius and there was no rain.







As can be seen, the delay from the event of extended Journey Time and the start of Nitrogen Dioxide is almost 2 hours. The spike occurred at 11am and the pollution started on the Carbon Monoxide almost immediately and the Nitrogen Dioxide much later.

Analysing the data is extremely difficult and there are many parameters but Clearview are developing a real-time SOAP interface allowing us to feed the data in real-time to a local controller or back to the UTMC control room.

SUNDAY CCTV AT 11.00

SUNDAY CCTV AT 16.00

TUESDAY 2ND JULY 2013

The peak Journey Time is at 10am and the peek Carbon Monoxide is at a similar time; however the Nitrogen Dioxide does not have a similar increase.