ATC

Moving Traffic

Choose the Future

ATC
Moving Traffic

scats Move Smarter

About Us

ATC a global SCATS® distributor, is the leading developer and manufacturer for SCATS® VC6 DSRC and C2X ready traffic signal controllers to the local New Zealand and Australia market with healthy export market demand for the RMS SCATS® type approved controllers.

Our ATSC4 controller is constantly rated as the most reliable and advanced SCATS® controller by the local and Global markets.

To compliment our controller, ATC provides UPS and workstations for testing and configuring in a safe simulated environment, and for optimising configurations outside of the live traffic road corridors.

Through our sister company BRAUMS, we are proactive in the evolving world of smart city C-ITS technologies to interface with our controllers.

Certified System Health & Safety AS/NZS 4801 SAI GLOBAL
Certified System Environment ISO 14001 SAI GLOBAL
Certified System Quality ISO 9001 SAI GLOBAL

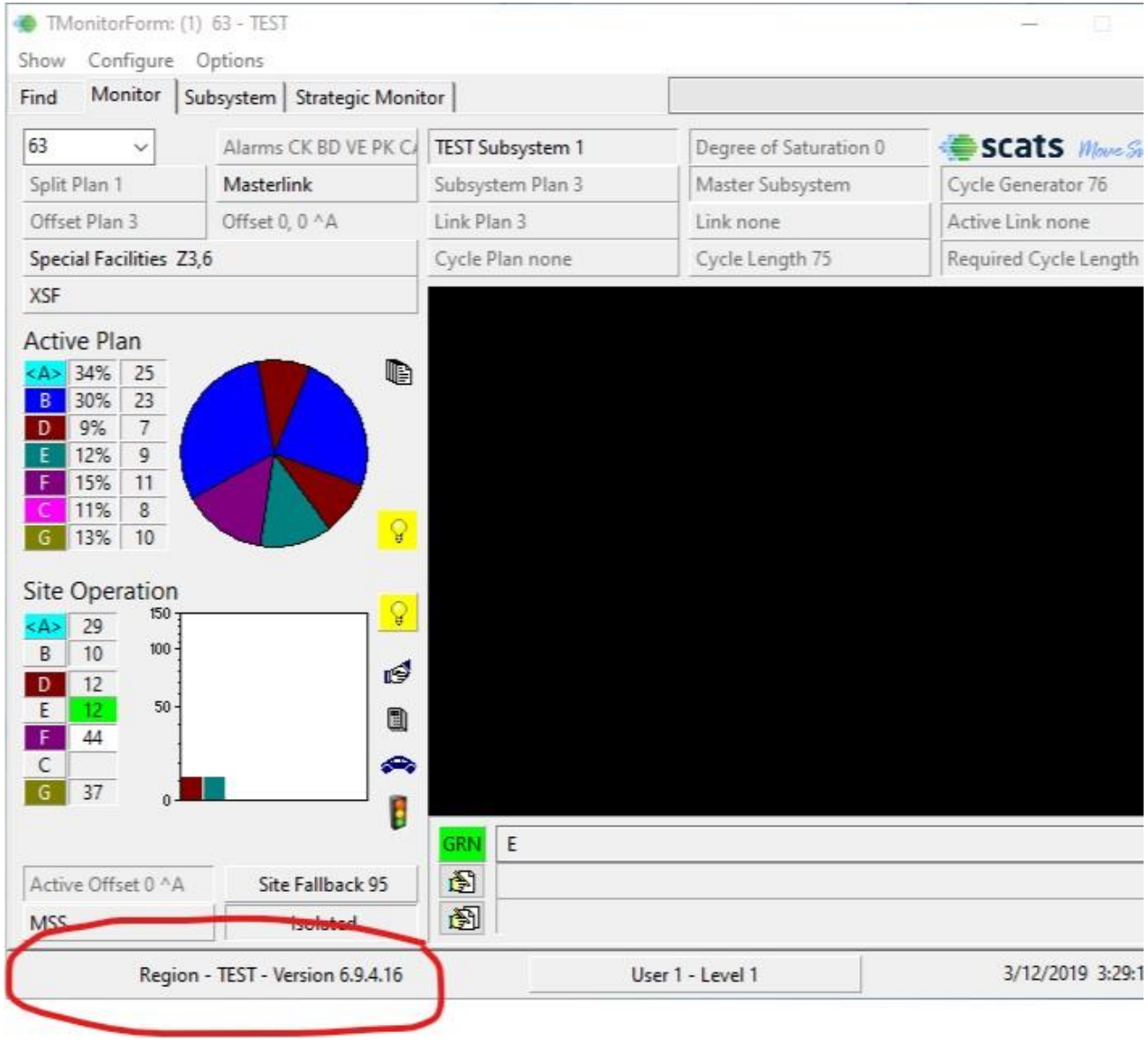
Trends in ITS Technology

- SCATS Developments
- Traffic Signal Controller Developments
- Network Centric Intersection
- Lantern technology
- Cooperative ITS – shift in what an intersection looks like

SCATS 6.9.4 Features

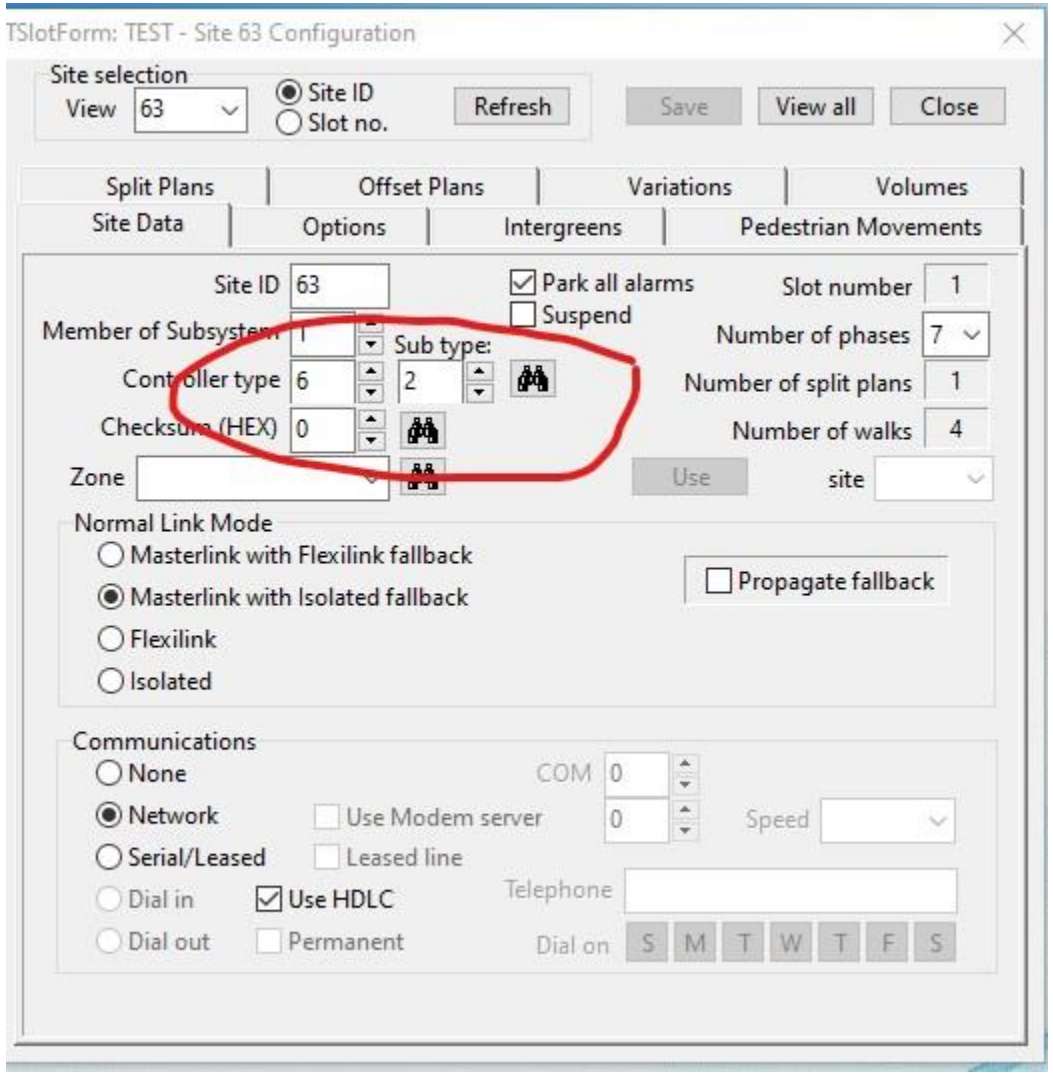
SCATS 6.9.4 Features

- Updated SCATS Access to version 6.9.4.16
- Central Manager version 6.9.4.16
- Central Manager Configuration version 6.9.4.17
- Region version 6.9.4.16
- Region Configuration version 6.9.4.17



SCATS 6.9.4 Features

- New SCATS Protocol sub-version 2
- Need to configure SCATS Access Slot data with VC 6 + 2
- At least 1 controller supports VC6.2 and is pending TfNSW Type Approval

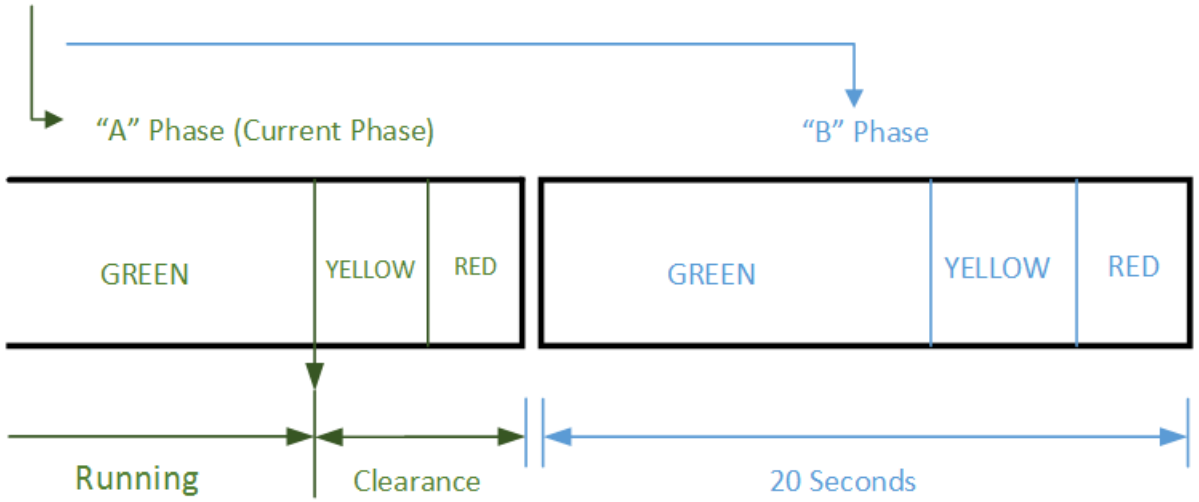


SCATS 6.9.4 Features

- Benefit of VC6.2 is a reduction in short term comms losses
- Typically, network connected intersections can experience IP related delays of 4 to 8 seconds.
- Such delays can cause ST, NC and CE alarms
- Fallback could be the result
- Coordination can be lost – loss of efficiency

VC6.2 Advanced Phase Notification

SCATS Sequence



- SCATS tells controller in advance what the next phase will be and its duration.
- This helps mitigate short interruptions to the network connection and ST Alarms.
- Avoids falling back to Flexilink or Isolated preventing break in scats coordination.

SCATS 6.9.4 Features

- The controller is given data on next phase and duration
- If comms is lost and recovered during the “next” phase – no alarms will be reported.
- No Fallback will be seen.
- Controller will stay in coordination.
- Especially useful with network based comms to intersection

SCATS 6.9.4 Features

- Dwell restrictions are now configurable
- New Secure ITS Link port is an API.
- API is available in C++ and Java Languages
- Site Option – ER – write to log when MSS and XSF flags change.

SCATS 6.9.4 Features

- New Variation Routines
  - VR73 Green Window Request for Priority Vehicles
  - VR78 can terminate a Phase in Masterlink if not dwelled
  - VR84 can marry or divorce a Subsystem
  - VR85 Test link volume (VO and/or VK)
  - VR87 Can Demand a Phase
  - VR97 Can add Comments
  - See release notes for other changes to existing VARs

SCATS 6.9.4 Features

- Changes 1
  - Bad Data alarm caused by PL0, PP when cleared reloads relevant plan
  - Flashing Yellow (FY) alarm no longer applied until controller is up, validated
  - Expected Clearance Max Times increased from 50 to 100 seconds
  - Expected Intergreen Max Times increased from 31 to 63 seconds
  - Extended Region Option BJ and CI have been permanently disabled
  - New History (*.hst) and Detector files (*.det) can be sent to Central Manager
  - Plan Vote Calibration Factor increased from 127 to 200

SCATS 6.9.4 Features

- Changes 2
  - RAM Update is now recorded as “Done”
  - FV option is disabled. All volumes collected are 5 min only.
  - Serial Comms Special Mode (300bps)
    - RPS request for ped status no longer requested every second
    - Controller log are not uploaded and saved in Region’s event log file
    - Signal Group data not requested every second unless a Signal Group based Strategic Input is defined at the site.
  - Subsystem Calculations for Cycle Length, Phase Splits and Offsets were being done at CG step 5 but was not evenly divisible for each cycle length and causing internal rotation and stretch phase was penalised. Now SS calcs done at 10 seconds after CG Step 0

SCATS 6.9.4 Features

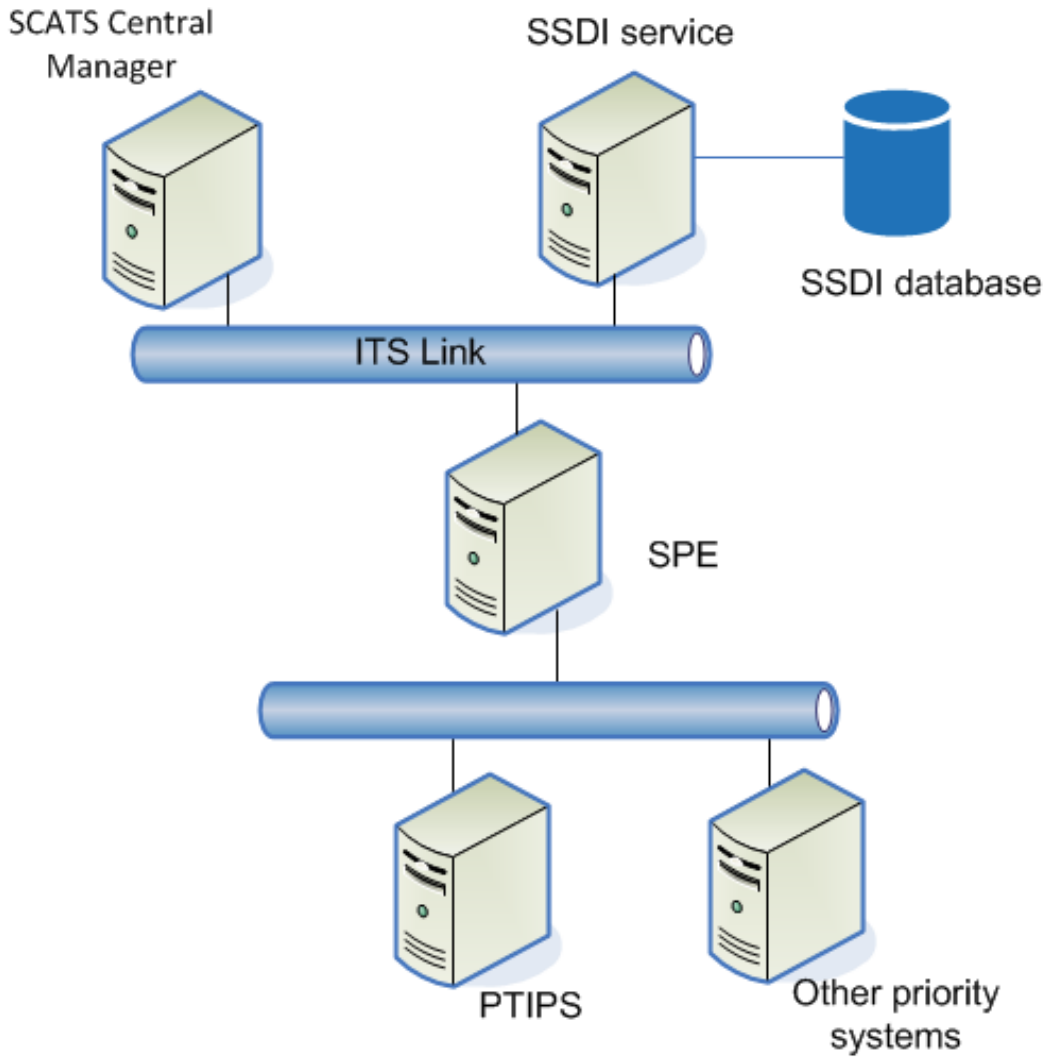
- Bug Fixes
  - SI Alarms limited to dets 1 – 32. Now extended for VC6 up to 48 det channels.
  - If site VC # changed from VC5 to VC6 a detector alarm at site crashed Region. Fixed.
  - Event Log – Fixed bug with user lock on Y- flag incorrectly reported in SCATS Log
  - ITS Interface – Second Green Window request was being accepted but not handled as expected while first green was still active.
  - Fixed bugs with new history and detector file recordings including controller termination request.
  - Events for new sites were not being correctly recorded in detector and history files.
  - If SCATS time was being changed to an earlier time, detector and history files were recorded with the previous time.

SCATS 6.9.4 Features

- Getting Ready for Future Apps
  - Upgrading to 6.9.4 will prepare the SCATS software for the release of future apps.
  - Specifically SCATS Spatial Data Interface (SSDI) that will replace SCATS Picture.
  - One site takes 1/3rd the time of SCATS Picture.
  - RMS have converted all 4200+ sites to SSDI.
  - Puts data hooks to support CITS including SPaT and MAP Messages.
  - An intersection's lanes will have attributes that determine if a movement is allowed or not.
  - Another APP is SCATS Priority Engine (SPE) to qualify emergency service priority through an interection. SPE integrates with SCATS via the ITS Link port.

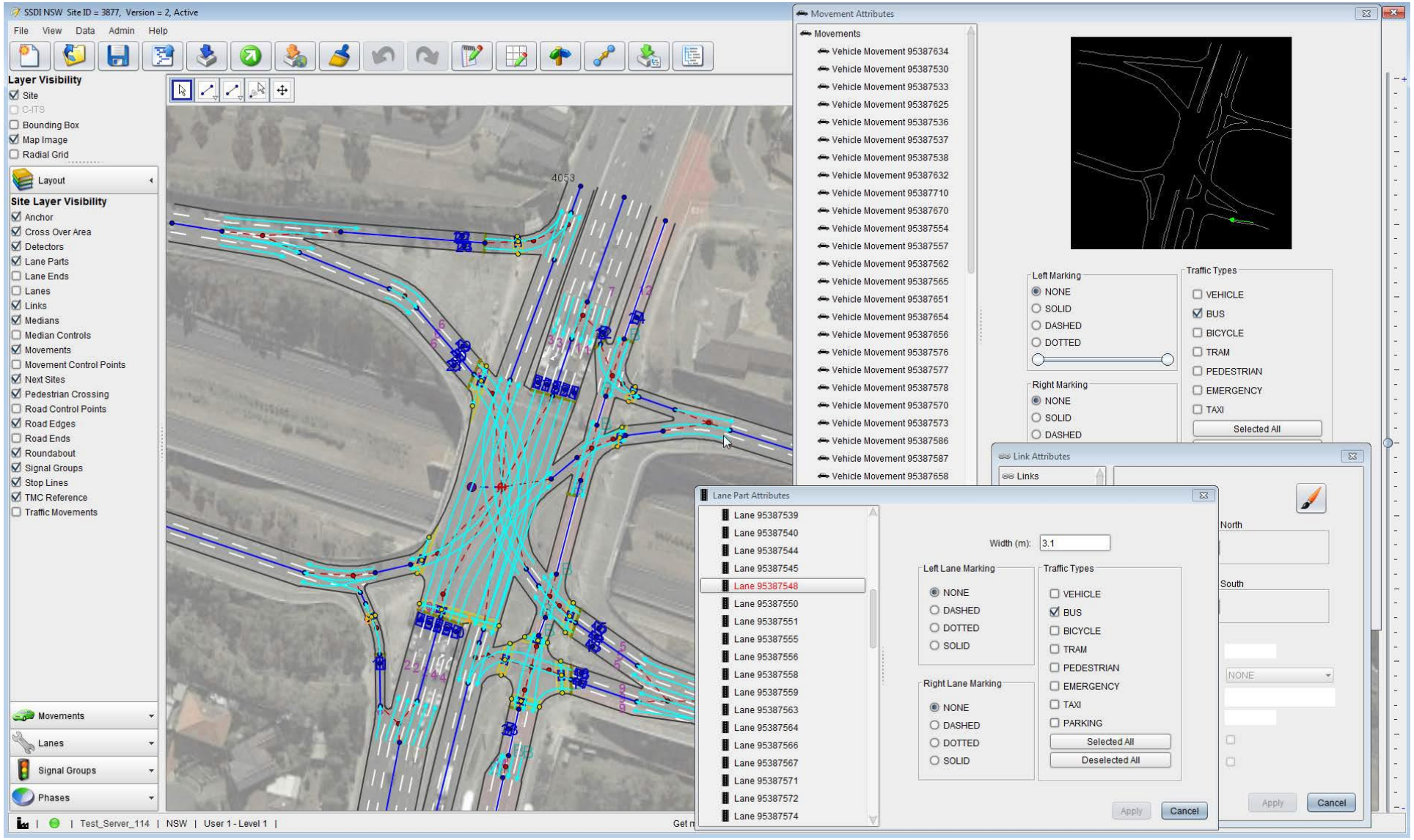
SCATS 6.9.4 Features

- SSDI
- SPE



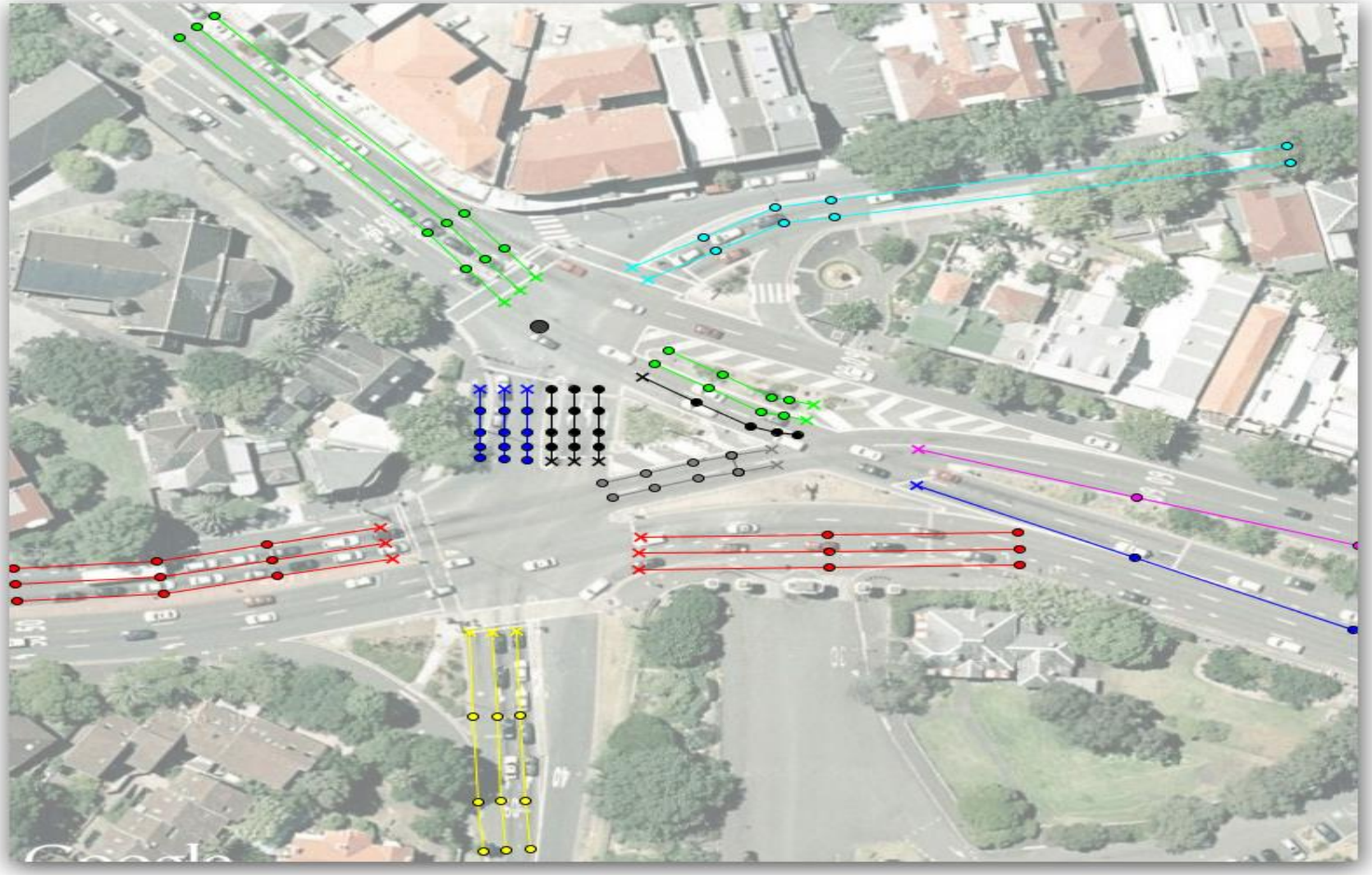
SCATS 6.9.4 Features

- SSDI



SCATS 6.9.4 Features

- SSDI



SCATS 6.9.4 Features

SPE

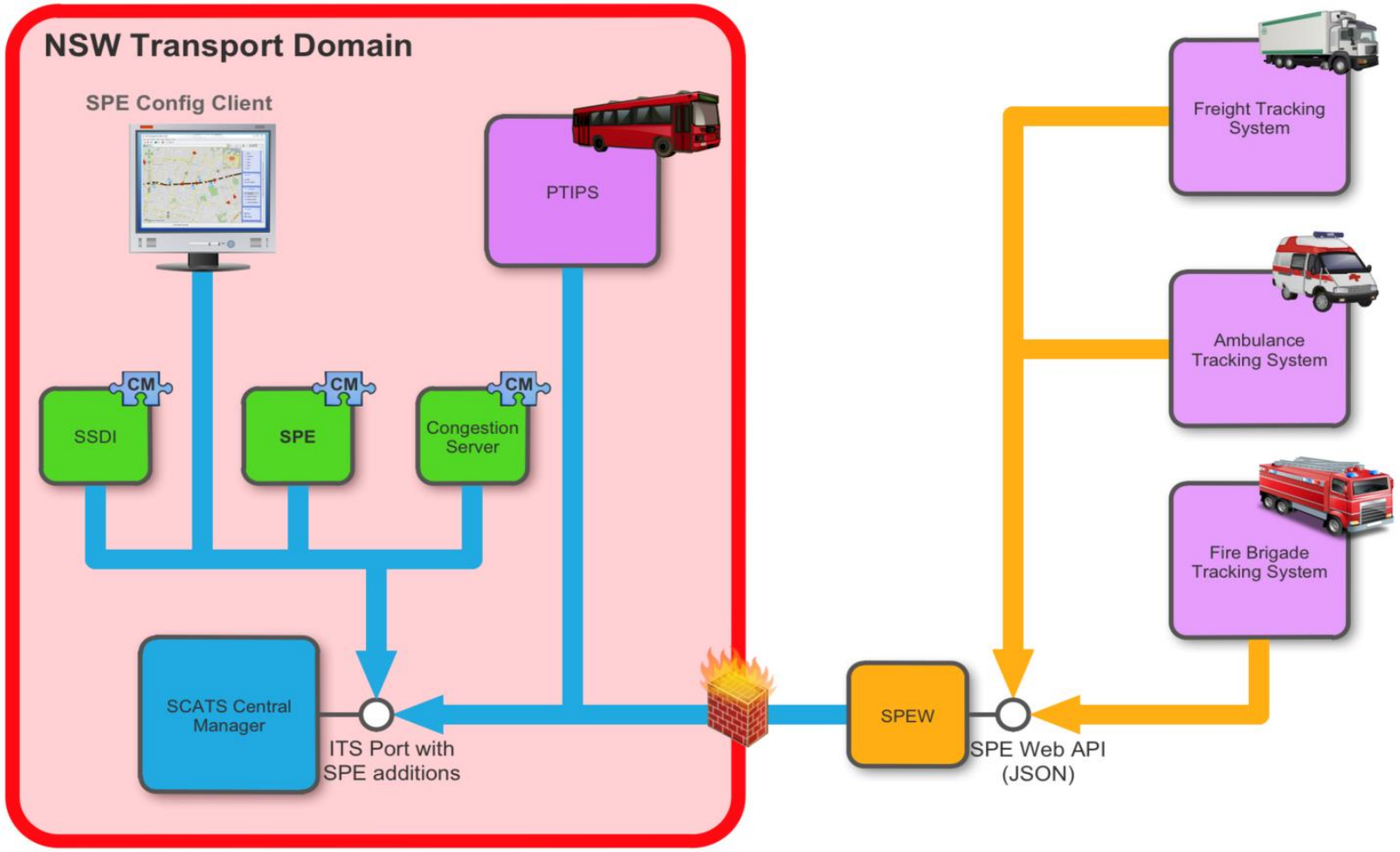
- Enables the next generation of real time priority systems, integrated with SCATS, interface via a secure external web interface

OBJECTIVE:

- achieve favouring certain vehicle types at certain corridors with configurable schedule while minimising the impact on non-prioritised journeys, ongoing operations and road efficiency

SCATS 6.9.4 Features

SPE



Traffic Controller Developments

Traffic Controller Developments

Standards Update

- ✓ AS2578 Traffic Signal Controller Specification is now 10 years old
- ✓ AS2578 Committee is likely to deprecate the standard as no Australian Road Authority is actively using it. It will be likely retired in 2020.
- ✓ Road Authorities have deferred to TfNSW's specification TSC/4 now known as TSI-SP-069.
- ✓ TfNSW (nee RMS, nee RTA, nee DMR ….) is actively developing TSI-SP-069
- ✓ Amendment 6 will be issued in near future likely Q220.

Traffic Controller Developments

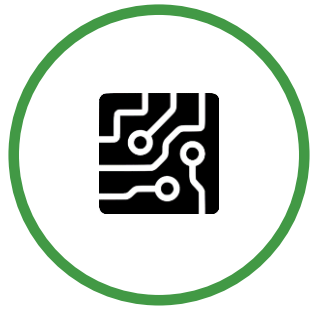
Current VC6.1 Features

Signal Groups

- ✓ Increased to 32 Groups
- ✓ More flexibility of group usage
- ✓ One manufacturer type approved.
- ✓ Second manufacturer shortly to be type approved

Detection

- ✓ Increased to 48 inputs
- ✓ Plus 8 Pedestrian Inputs



Special I/O

- ✓ 24 SPIPs
- ✓ 24 SPOPs

Traffic Controller Developments

Reason to upgrade from VC5 to VC6.2

Traffic Controller Developments

AMD3 Changes in a Nutshell

- Network native controller interface – SCATS and Web Interface for maintenance
- Housing encoding for LV, ELV, Phase, Xformer Dimming.
- New Personality Module XPM 48 Way IEC
- Dim-By-Wire Signal & feedback for dimming new LED Lanterns.
- Better lamp fault tolerance handling and reporting.

Traffic Controller Developments

AMD3 Changes in a Nutshell

- 2 Network Interfaces (comms (XNS SCATS) and maintenance)
- New Secure web interface to configure controllers (XNW).
- Accommodate USB interface to file storage, transfer, loading (XUP). Available now to write controller logs to USB flash drives.
- New Personality Module (XPM) with separate READ ONLY and WRITE areas (local config info).

Traffic Controller Developments

AMD3 Changes in a Nutshell

- Personality module can be inserted/removed on live running controller without damage (controller will stop if configured for loss of XPM personality).
- Local intersection specific data – veh det sensitivity, IP address etc stored in “writeable area of personality).

Traffic Controller Developments

AMD3 Changes in a Nutshell

- PSTN modem interface (XRJ) – line to internal modem (ATSC4 has this).
- Signal Group Voltage suppressing circuits now mandatory – ATSC4 always had them.
- Site ID now provides configuration data for operating voltage & type (LV or ELV etc) – controller housing characteristic.

Traffic Controller Developments

AMD3 Changes in a Nutshell

- 16 types of housing are configurable – by setting of diodes in Site ID and connected via ZHC.
- Phase or Amplitude dimming encoded
- LV (240v) and ELV (42v) encoded
- Additional CB for CCTV to be included.
- Flash Change Over relays have a test button and flash suppression capability.
- Generator Input Circuit mandatory

Traffic Controller Developments

AMD3 Changes in a Nutshell

- Dim-By-Wire – two control signals 15v from Site ID to command LED lanterns to dim internally (not dim from the signal group output) via ZDC.
- Single feedback wire for dim-by-wire into controller 8v.
- Front panel indicators Red = Dimmed, Green = Undimmed.

Traffic Controller Developments

AMD3 Changes in a Nutshell

- Ethernet ports to be MDI/MDX compatible – you can use straight or cross over Ethernet cable to ATSC4.
- Secure web browser interface to supervise operation of controller and is the NEW HHT.
- The controller communicates via secure network protocols.

Traffic Controller Developments

AMD3 Changes in a Nutshell

- Better lamp fault monitoring with varying lamp fault tolerance based on signal group loads.
- In dimming mode, the algorithm shall use different lamp fault wattage values to avoid false faults.

Traffic Controller Developments

New VC6.2 the next generation of TRAFF

- ✓ Logical Detectors – Operate Logical Detectors from SCATS Access
- ✓ Report true signal group colours including the flashing state
- ✓ Report Clearance 1 & 2 pedestrian timers
- ✓ Increased number of personality flags from 64 to 128

Network Centric Intersections

Network Centric Intersections

- The ITS industry has been falling behind others where large scale infrastructures are deployed such as SCATS and Controllers.
- Communications to remote devices have long since changed from serial to ethernet.
- TCPIP as a suite of protocols allows ITS to have secure (https) web interfaces to configure/interrogate.
- More importantly it leverages the ability to add resilience due to the ability to fail over to a back up path.

Network Centric Intersections

Network Centric Interfaces

- ✓ Allows SNMP to be used for Network Monitoring Systems such as Solarwinds, Tivoli, Nagios and OpenView among others.
- ✓ NMS is used to monitors fleets of thousands of networked devices.
- ✓ Onboard secure web server (https) allows remote access from control centres
- ✓ Ability to remotely diagnose problem before physical site attendance.
- ✓ Networking allows for capability to fail over to backup path

Network Centric Intersections

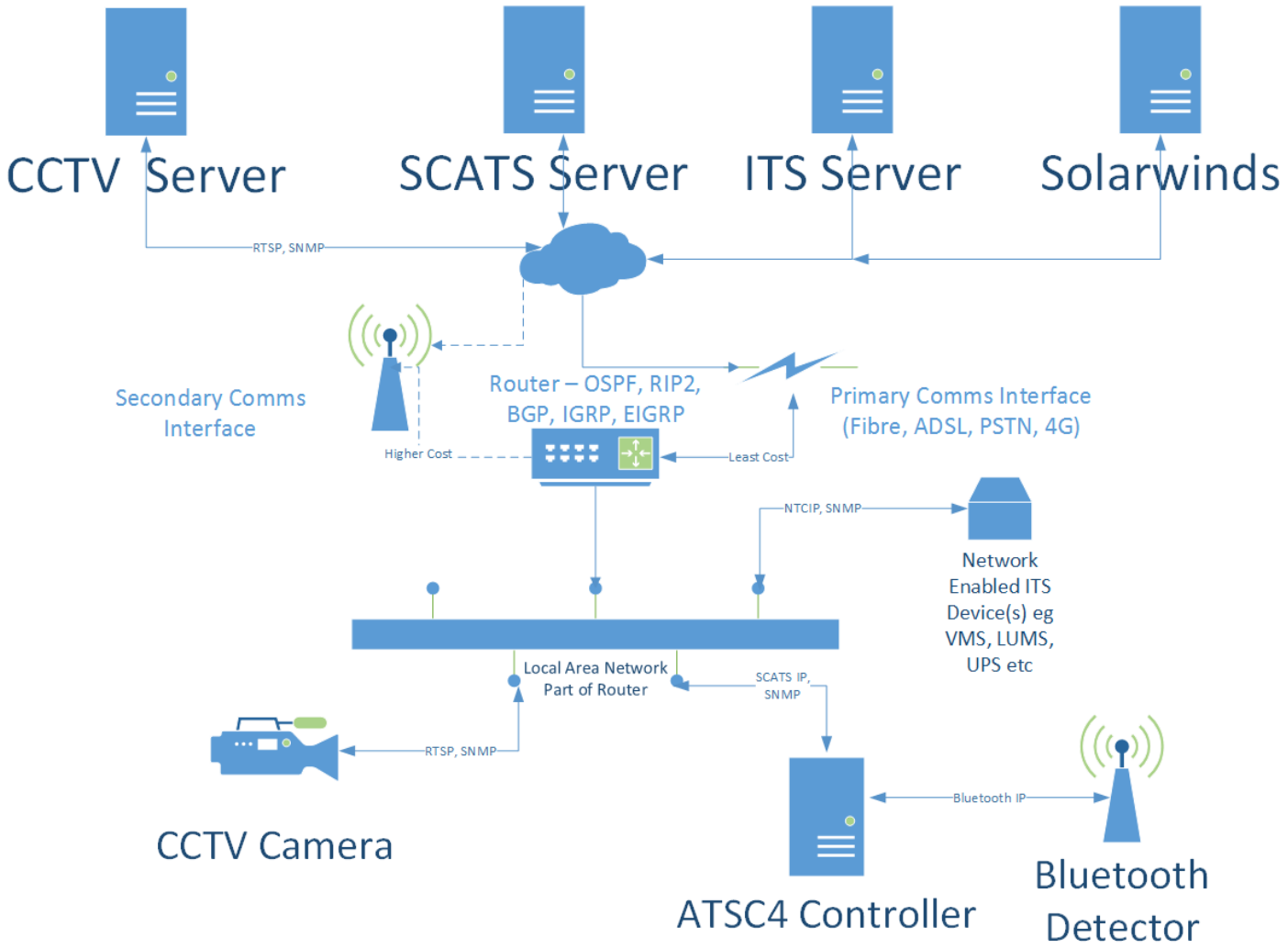
Network Centric Interfaces

- ✓ There are controllers that exist that use the Ethernet port as their primary link to SCATS.
- ✓ They also have a built-in 3G/4G modem that can be used to re-connect to SCATS should the ethernet link fail.
- ✓ This increases the resilience of the SCATS Controller network.

Network Centric Intersections

- This is what a modern intersection is starting to look like these days

Network Centric Intersections



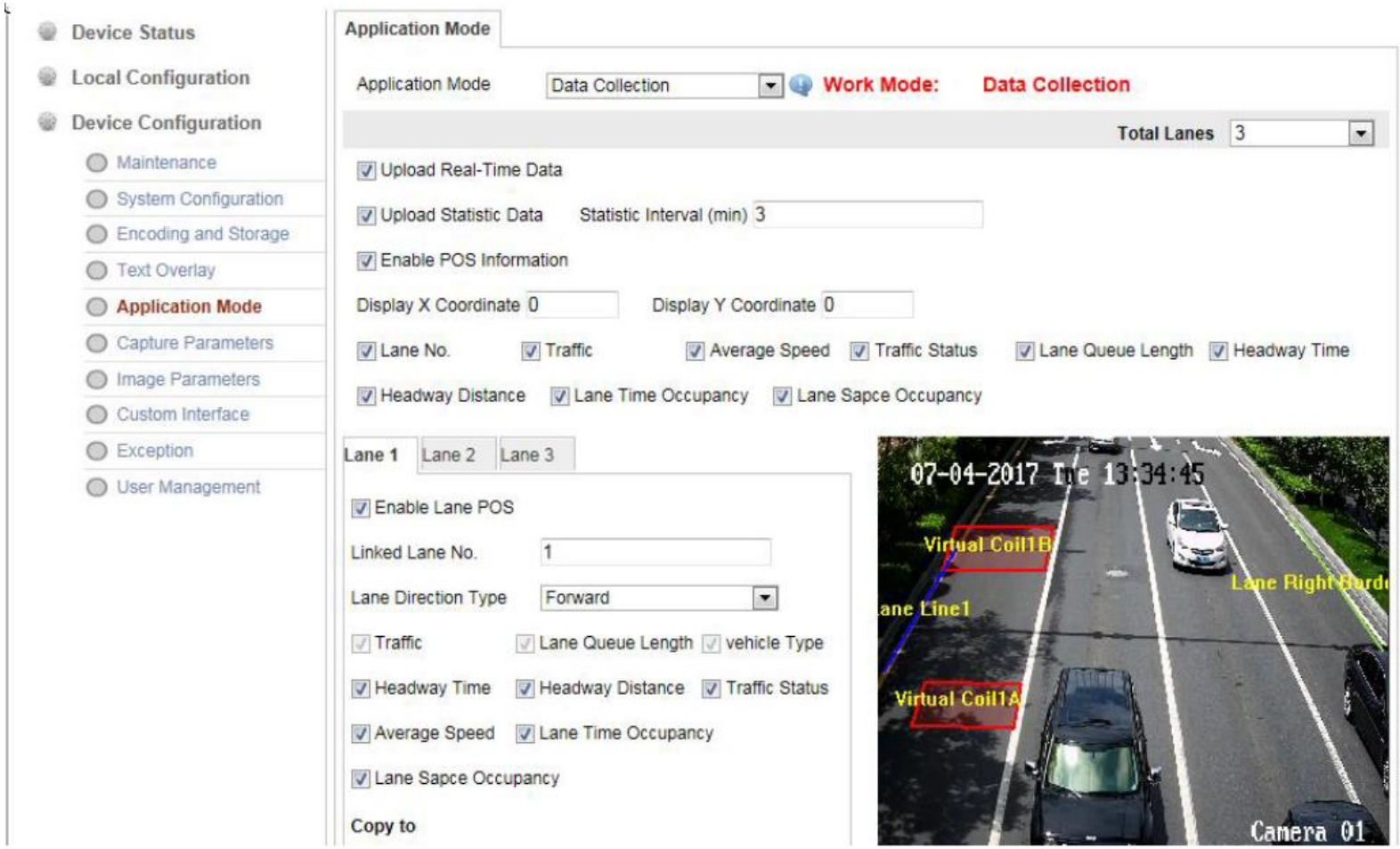
Network Centric Intersections

Network Centric Interfaces

- ✓ In near future, controllers will “talk” to above ground detectors.
- ✓ Controllers will use the Ethernet port to “pull” detector data from video detectors and radar detectors directly.
- ✓ Such detector channels will be automatically mapped by the controller.
- ✓ This will do away with the old way of contact closures.
- ✓ Because above ground detectors are network enabled, SNMP allows us to “monitor” the status of the individual detectors.

Network Centric Intersections

Sample Video Detector with loops configured



CITS
Cooperative ITS

Cooperative ITS

- ISO TC204 has published CITS standards to be used by Road Authorities and Vehicle Manufacturers.
- Such standards cover all facets of how an intersection runs as well as highways.
- CITS also addresses emergency assistance via such protocols such as E-Call.
- All vehicles in Europe have the CITS Processor fitted since 2018.

Cooperative ITS

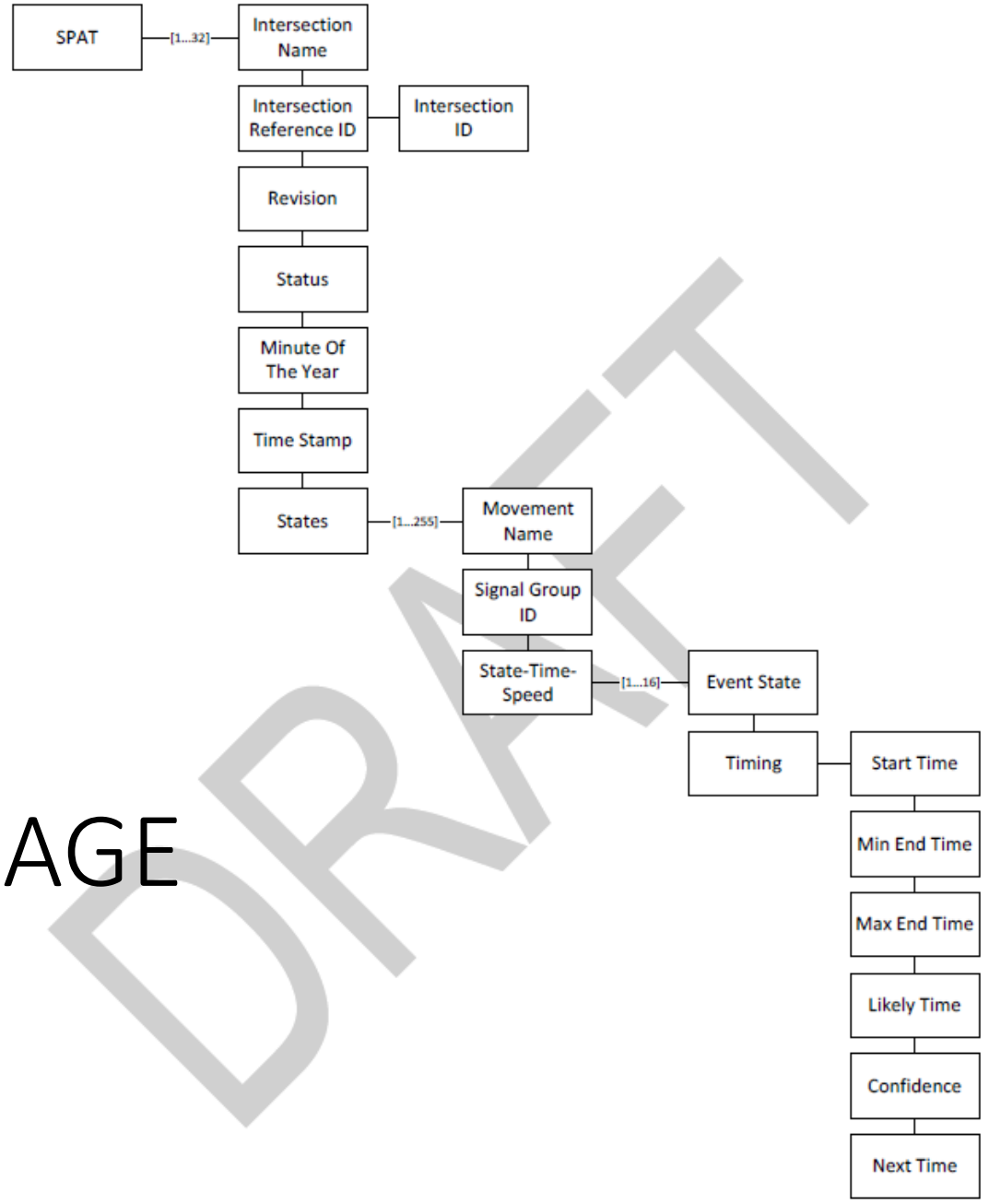
- Data interaction between infrastructure and road users.
- Ready to deal with Autonomous Vehicles.
- Native networking allows Controllers to communicate to any external device.
- The 2 dominant CITS media are DSRC and V2X (5G).
- Controllers have been tested with DSRC Roadside Units.
- TSC/4 capable of interfacing to V2X – 5G based.
- J2735 SAE Standard referred by ISO standard.
- Australia aligns to Europe for DSRC at 5.9GHz

Cooperative ITS

What is SPaT?

SPaT – collection of four messages - SAE J2735 standard

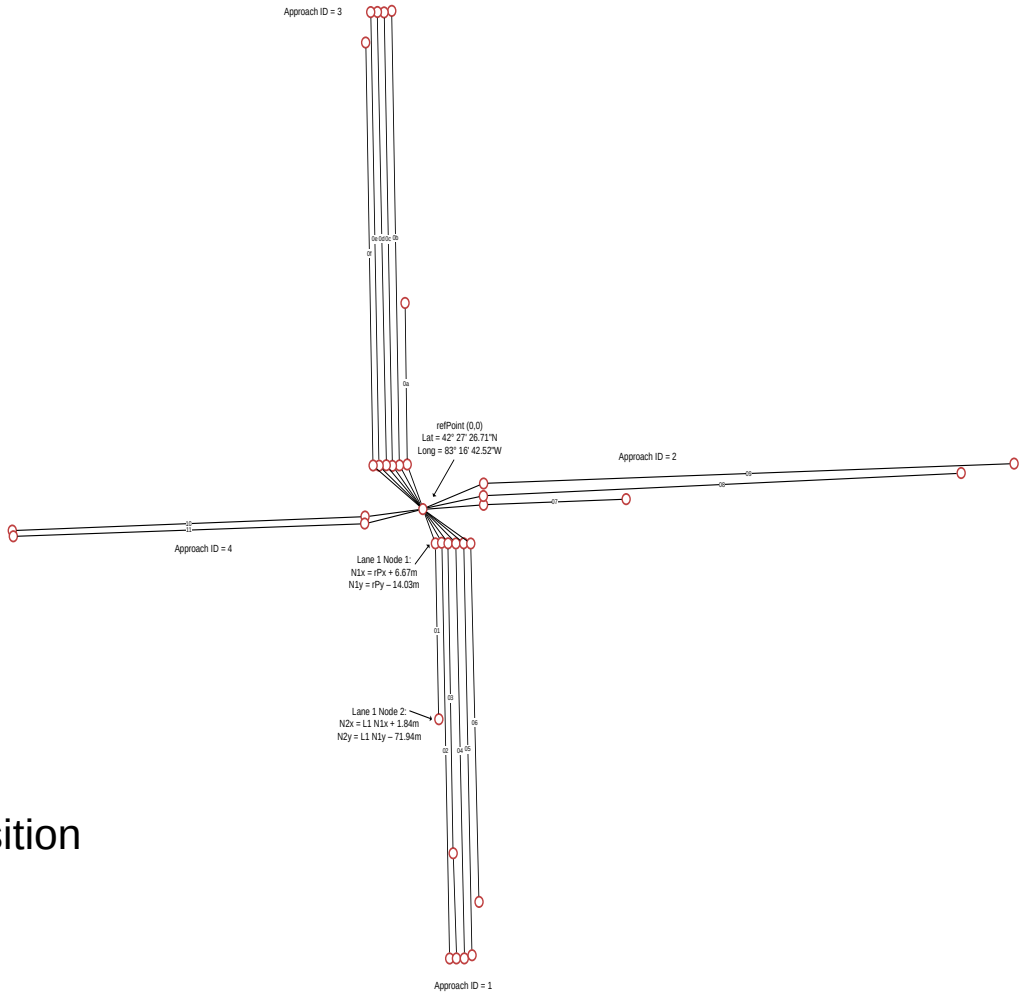
- SPaT: Signal Phase and Timing – provides the intersection's signal light phases
- MAP: Map Data – provides the physical geometry of the intersection
- SSM: Signal Request Message – requests pre-empt or priority services
- SRM: Signal Status Message – information about the internal state of the controller



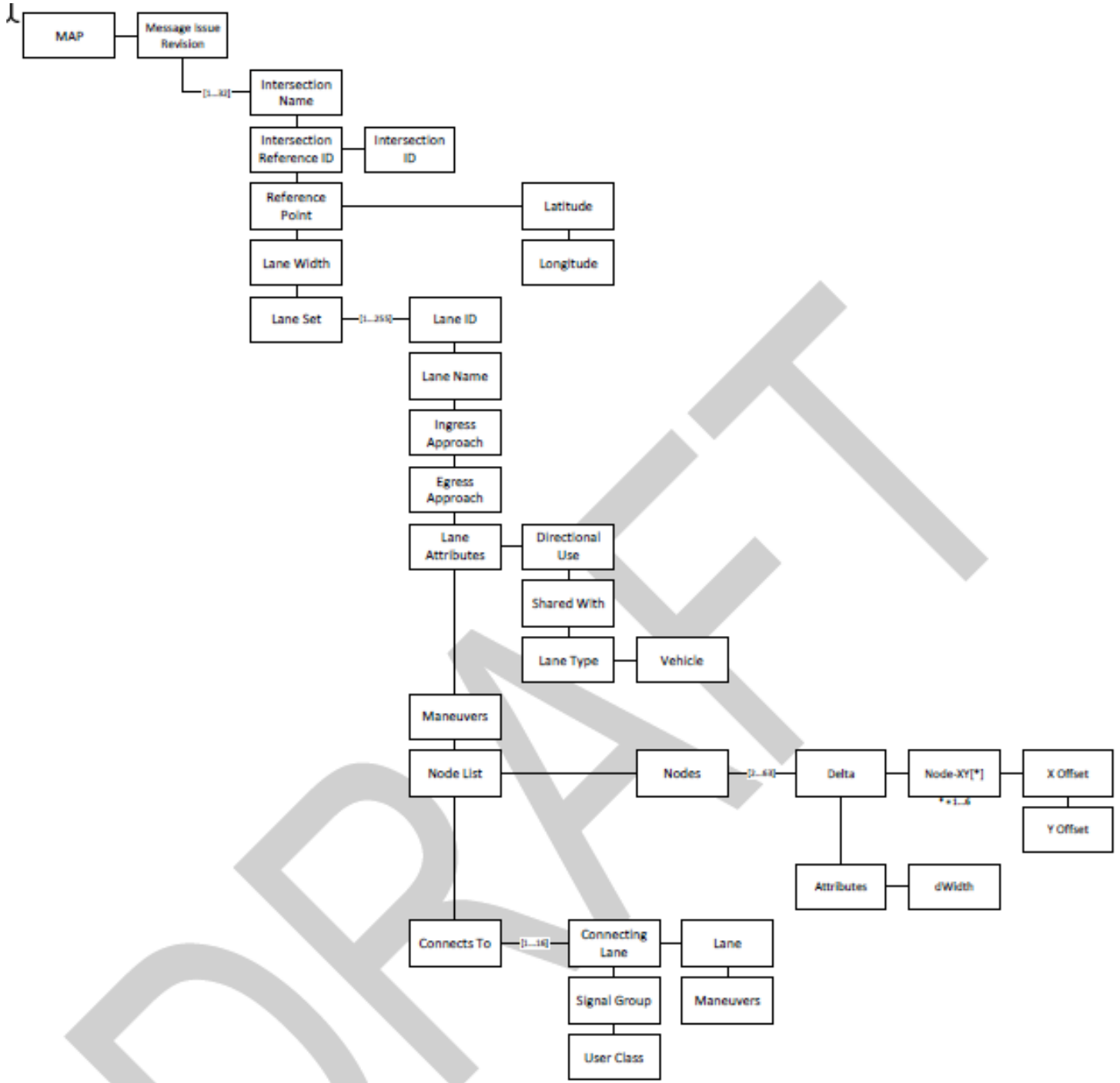
SPAT MESSAGE

Cooperative ITS

- **Purpose of MAP message**
  - Geometric layout of intersection
- **Message data**
  - Reference point (intersection centre)
  - Number of approaches
  - Lane number
  - Lane width
  - Lane attributes
    - Straight, Left, Right, Turn on Red, Bus, etc...
  - Offsets
    - Points along each lane - used to detect vehicle position



MAP MESSAGE

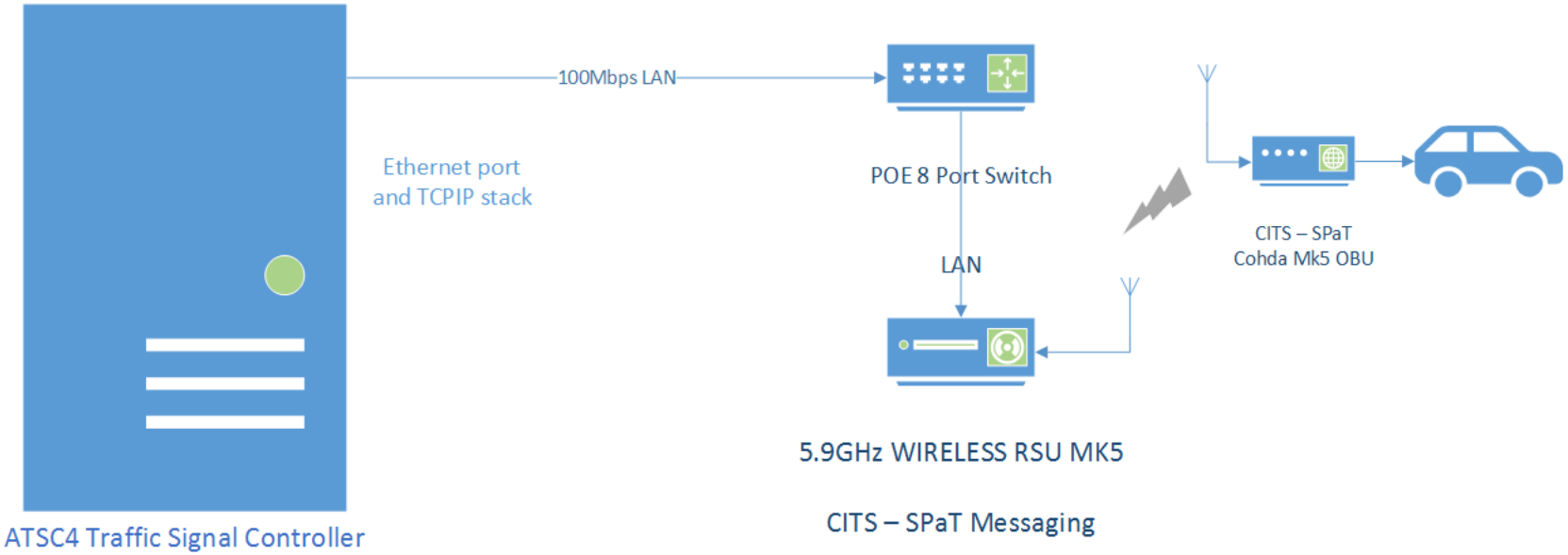


Cooperative ITS

- CITS covers the so-called SPaT and MAP messages.
- SPaT – Signal Phasing and Timing is where a controller supplies the latest timing on how long is left in a current phase.
- For fixed time systems this is simple.
- For adaptive systems this is not so simple.
- The adaptive control system suppliers (SCATS and SCOOT) elected to fill the timing data with only the clearance times.
- SPaT data also tells vehicles if a specific movement (ingress and egress) is allowed or not and what restrictions apply.

Cooperative ITS

CITS WIRELESS SYSTEM BLOCK DIAGRAM



Cooperative ITS

- Remember SSDI?
- SSDI is the SCATS way of integrating the MAP data.
- The MAP data is known as Localisation.
- Localisation is where a controller “transmits” the current layout of the intersection.
- It tells the cars how many lanes each approach has and where each lane can egress to.
- This assists applications such as in car navigation as well as autonomous vehicles.

Cooperative ITS

- Each intersection's traffic controller will need to interface to a Roadside Unit via an Ethernet cable.
- Roadside units have been designed to connector to a Power Over Ethernet switch.
- So it is imperative to have controllers that can use the ethernet port to exchange CITS data.

Cooperative ITS

What are you doing to be ready for CITS enabled vehicles?

Lantern Technology

Lantern Technology

- Lanterns have been developed and are available on the market to support the DBW enabled controllers.
- These meet the latest AS2144:2014 Specification both for wattage reporting as well as the Dim-By-Wire functionality.
- These lanterns can actually work at lower wattages but a prohibited from doing so until the TfNSW Specification TSI-SP-069 specifies a lower wattage reporting regime. (5W minimum undimmed)

Lantern Technology

- Latest development in Europe is for a more intelligent lantern.
- The next generation is a bus based lantern that can report its state and wattages directly to the controller.
- Lanterns are configured to belong to an approach based setup.
- Essentially each pole will have a cluster of lanterns all talking back via a node to a controller.

Question Time
?????