PRACTICAL APPROACH TO AN NTCIP CONFORMANT SYSTEM

Gentlemen

Further to our meeting on Monday June 30, 2003 I would like to offer the following observations.

In the first instance we would recommend that the NTCIP requirements of Actuated Traffic Signal Controllers are considered separately from all other Traffic Devices. For the purposes of this paper our proposals and opinion is confined to all Traffic Devices except Traffic Signal Controllers.

GENERAL

Based on comments at our meeting, it would appear there is a general consensus regarding the benefits of an NTCIP conformant system.

- Freedom from dependence on a particular manufacturer of an individual Traffic Device by reason of compatibility with previous purchases from that manufacturer.

- The ability to communicate with multi Devices from the same or different manufactures from one Central System.

The perceived problem lies with the **how** and **when** of implementation.

Another frequently voiced concern is, **what constitutes NTCIP conformance.**

The perception is that the current NTCIP standards are open to ambiguous interpretation by different manufacturers for the same Traffic Device. This may be somewhat correct with regard to Traffic Signal Controllers, but is incorrect with regard to all other Traffic Devices. For these Devices the NTCIP standards are clearly defined at the fundamental level, and in our opinion not open to ambiguous interpretation. Where there may be some variation in interpretation, it is generally limited to ancillary or advanced issues which are not required for a fundamental **baseline of functionality.**

Taking account of the above general observations we would offer the following as a practical approach to NTCIP implementation:

1. TESTING

We believe the first step in the NTCIP implementation process should be to acquire or build an appropriate testing tool. As stated above the NTCIP standard

is clearly defined therefore the Testing requirement can be established at an early stage.

There are a number of NTCIP testing tools available in the market. We of course would strongly recommend that you consider the Intelligent Devices, Device Tester. This is not because Intelligent Devices has made any unique interpretation of NTCIP standards, we are dealing with a published standard, but because we believe Device Tester is, easy to use, very flexible, and completes the testing process faster than any other tool. We believe that device testing covers three components.

- Functionality
- NTCIP conformance
- Reliability

Device Tester covers all three areas, whereas other available testing tools only deal with NTCIP communication.

For the purposes of this paper let us assume that you do in fact choose Device Tester as your method of testing for NTCIP conformance. This is a propriety product to Intelligent Devices, and we give an unconditional warranty that Device Tester conforms to current NTCIP standards with free software upgrades for 2 years.

However, utilizing the script building capability of Device Tester we would supply it complete with scripts of the Florida DOT Product Specifications for each individual Traffic Device. This version of the tool is now unique to Florida DOT and should be referenced as such, for example, Florida DOT Device Tester Version 4054/ July 1, 2003.

The DOT now has the means of testing any device for, functionality, NTCIP conformance, and reliability in line with FDOT individual Product specifications.

By means of the reference number Intelligent Devices can make this specific Florida DOT version available to any OEM supplier in order that they may carry out their own conformance testing prior to shipment.

Another important feature of Device Tester in addition to testing Traffic Devices for NTCIP conformance is the ability to simulate any of the existing Traffic Devices as a method of testing the NTCIP conformance of the Central System.

Utilizing the script building capability referred above, Device Tester can test the Central Systems conformance with NTCIP standards and specifically test the Central Systems ability to communicate with an individual Traffic Device in accordance with the Florida DOT Product Specification for the Device concerned.

However, whether you select Device Tester, another testing product or in fact a test suite developed by the FDOT test laboratory is not important. What is important is that a Test Method with automated testing of NTCIP conformance be established; the Traffic Device baseline of functionality and communication, which we will call in the rest of this paper the FDOT Acceptance Test.

2. TMC CENTRAL SYSTEM

Having established an acceptable method of testing the next step should be to acquire or implement an NTCIP conformant Central System. There is little benefit in purchasing NTCIP conformant Traffic Devices without simultaneously establishing the ability to communicate with them through a Central System.

From our meeting I understand that Florida DOT is in the process of acquiring a new TMC Central System or a major upgrade of the current system. I am sure the new Central System will cover a wide range of attributes over and above, NTCIP conformance and basic functionality of individual Traffic Devices. For example the software library you referred or the many other advanced traffic management features that form part of a “state of the art” TMC Central System.

Obviously, this will be a very significant project and take time to complete and implement, I believe you were estimating at least 1 / 2 years. The problem with this is that during this period legacy protocol Traffic Devices will continue to come into the State which will require the cost of conversion to NTCIP in the future.

We would like to offer the following alternate solution:

Large scale modern computer systems consist of a series of building block modules that easily interface with each other and operate on the same hardware.

We would therefore like you to consider an approach we describe as **the base line of functionality.** Below this line we are dealing with the basic functionality of an individual Traffic Device.

Examples of this for a DMS would be:

- Message display
- Scheduling
- Brightness control
- System status
- Pixel failure and other diagnostics
- Error logging and reporting

For CCTV:

- Pan, Tilt, Zoom
- Iris and focus control
- Presets
- Position feedback
- Labels

For a Traffic Sensor:

- Speed, Volume and Occupancy
- Accumulation of buffered data
- Time stamping of data
- Multiple zone control
- Status feedback

Intelligent Devices is able to offer a Central System Module, **Intelligent Control that** can communicate with any Traffic Device in NTCIP protocol and will support all specified requirements for basic functionality. You can test the NTCIP conformance of Intelligent Control with the Florida DOT Acceptance Test referred above.

The advanced traffic management features referred above can easily be integrated to run alongside Intelligent Control, either existing legacy features or new features that will ultimately form part of the updated Central System when that project is complete. We are happy to work with the DOT chosen System Specialist Consultants to ensure a trouble free interface with the wider aspects of the TMC Central System.

The advanced traffic management system would deal with center to center communication, State wide – Regional – Local security and privileges, interface to GIS systems, Traffic responsiveness algorithms, inventory, Maintenance tracking, and the various other attributes of state of the art integrated TMC solution.

We believe Intelligent Control offers a low cost solution for NTCIP conformance in the area of providing a baseline of functionality, and is available now for immediate implementation. This will obviously accelerate the time frame for introduction of NTCIP within the Central System.

However, we also believe that Intelligent Control offers real value in general terms to the implementation of an Advanced Traffic Management Central System.

- System Specialists have considerable experience with software systems and equal experience in Traffic Management. They often lack practical experience with the individual Traffic Devices concerned.

- Intelligent Devices has considerable experience with Traffic Devices below the **base line of functionality.**

- By separating this area by the method outlined, future system development, and introduction of new Traffic Management features, can be implemented without affecting the integrity of basic functionality.

- Advanced Traffic Management features preferred at District level or TMC Headquarters can be incorporated within the Central Systems whilst keeping basic functionality consistent throughout the State.

3. NEW TRAFFIC DEVICE PURCHASES

Whichever TMC Central System is preferred the next step is to specify NTCIP conformance for all new Traffic Device purchases. We would recommend the NTCIP requirement not be specified in general terms.

It should be specific:

Traffic Device A will conform to Florida DOT Acceptance Test Version 4054/ July 1, 2003.

As this Acceptance Test Version was used to test the conformance of the Central System, this specification will guarantee that future Traffic Device purchases will conform to the NTCIP communication protocol of the chosen Central System.

4. LEGACY TRAFFIC DEVICES CURRENTLY PART OF DOT INVENTORY

The remaining area to be dealt with is the above legacy Traffic Devices.

Intelligent Devices has proposed a range of economical Translator/ Controllers that can be used with any Traffic Device to convert that Device to NTCIP conformance. Again before installation the Translator/ Controller devices must conform to Florida DOT Acceptance Test Version 4054/ July 1, 2003 to guarantee the converted Traffic Device will conform to the NTCIP communication protocol of the TMC Central System.

The additional advantage with the IDI range of Translators is that they can continue to allow the Traffic Device concerned to operate by communication from the legacy protocol of the existing TMC Central. Once the NTCIP Central System is fully implemented the legacy Traffic Devices can be quickly converted to NTCIP protocol by means of a simple switch located on the Controller card.

For example, when switch 8 is OFF, the controller will pass the legacy protocol through to the Traffic Device and back to the Central. When switch 8 is ON, the NTCIP protocol and functionality is enabled and the Traffic Device will now conform to the NTCIP requirements tested by the FDOT Acceptance Test Version 4054/ July 1, 2003.

The above means an installation program of the IDI Translators can begin so that the legacy Traffic Devices are ready when the NTCIP Central System is operational, rather than wait until that date and be faced with the problem of instant installation of the entire legacy Devices.

The above has the very significant advantage of providing a method of phased installation. The alternative is that the Central and Field Device implementation must be very carefully coordinated, which can be difficult to achieve in practice.

Intelligent Devices, Inc
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