

## Iowa DOT – Smart Arrow Board Deployment

### Common Questions and Answers

February 26, 2021

**Q: Is the communications protocol complete and available?**

A: Yes, based on feedback from the industry the DOT has developed two communications protocols. One defines cases where data is to be polled directly from the arrow board, the other defines receiving data from an intermediary server. The protocols and requirements are available for use and can be found in the Specification and Requirements document, under the Smart Arrow Board “Featured Topic” at <https://iowadot.gov/workzonereferencelibrary>

**Q: Why create a whole new communications protocol? Why not just extend NTCIP 1203?**

A: This was considered, but not pursued for several reasons:

Extending NTCIP 1203 (DMS communications object) would involve a process of consultation, drafting and submitting the new objects for inclusion to NEMA. This process was likely to be time consuming and did not meet the schedule desired by Iowa DOT.

NTCIP has extensive device control capabilities and includes a set of mandatory data objects that would not be relevant to the arrow boards.

A controller with the hardware capabilities needed to implement an NTCIP -based solution would have likely been substantially more expensive than what would be needed for a ‘simple’ solution.

**Q: When connecting directly to an arrow board, the requirements specify TCP (Transmission Control Protocol) as the network protocol. Wouldn’t UDP (User Datagram Protocol) be more flexible?**

A: TCP ensures delivery of data packets, which is important for reliable delivery of data where every packet is significant. UDP is more useful for cases where data can be safely discarded without affecting overall performance, such as video streaming. UDP would allow multiple hosts to poll the board as it would not “block” a port, preventing other connections, but this is seen as an unlikely configuration and does not justify the reduction in reliability.

**Q: The protocol requirements define very few configurable objects. Doesn’t that limit the flexibility of the system?**

A: The protocol is meant to be as easy to implement as possible on low-cost hardware. Section 6 of the requirements is a shell to begin a structure way for manufacturers to add their specific features. However, the basic functions of location and arrow board state are meant to be accessible in a uniform way.

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**Q: The location data returned from the board seems to be very basic. Wouldn't it be better if the sign returned a roadway name, direction, mile marker, etc.**

A: Returning "rich" geographic data was considered when developing the requirements. This approach was rejected for two reasons:

It would have required a much more sophisticated controller, capable of storing geographic data and executing queries on a geodatabase.

The geodata in the controller would have to be synchronized to a central database and across all arrow boards. As a result, it was decided to keep any computationally intensive tasks at the ATMS host system, as this would reduce the cost of the field devices.

**Q: What Smart Arrow Boards meet the Specifications and Requirements**

A: Refer to the Iowa DOT's Approved Products List at <https://maple.iowadot.gov/Search.aspx> Search for "Traffic Control, Smart Arrow Board"

**Q: I'm an Arrow Board manufacturer, how can I get on the approved list?**

A: Complete the "Testing Form" under the "Featured Topic" on the Iowa DOT's web page: <https://iowadot.gov/workzonereferencelibrary> Be ready to bring a full Arrow Board/Trailer to Iowa.

**Q: How will the DOT ensure that arrow boards continue to meet the specification.**

A: The DOT will perform random test on all manufacturer's boards throughout the construction season to ensure that the SABP is updating correctly and in accordance with the performance specification.

**Q: Is the Iowa DOT considering to require other work zone devices to be "connected" (Smart)?**

A: Yes, the next device we are working to develop Specifications and Requirements are "Connected Temporary Traffic Signals" (CTTS). No details on dates yet.