To: Mario Bizzio, PE   Date: 7/01/2019
    Design Engineer

Financial Project ID: 442499-1-52-01   New Const. ☒   RRR ☐
Federal Aid Number:
Project Name: SR 44 ATSC - FROM AIRPORT ROAD TO 3rd AVENUE
State Road Number: 44   Co. / Sec. / Sub.: Volusia County
Begin Project MP: 23.00   End Project MP: 31.043
Full Federal Oversight: No ☒   Yes ☐   Note: If Yes, submit to FHWA Director.

A justification and all supporting documents must be attached to this document.
Mark the appropriate certification:

"I, Jon Cheney, PE   , Director   , of the Volusia County Traffic Engineering ,
    Print Name of Initiator   *Position Title*   *Name of Agency*

do hereby certify that in accordance with the requirements of 23 CFR 635.411(a)(2),
Mark appropriately (choose only one option):

☒ *that this patented or proprietary item is essential for synchronization with existing highway facilities.*
☐ *that no equally suitable alternative exists for this patented or proprietary item."*

_____ ,   7/2/2019 _____
Signature   Date

For Department Use Only

"I, JAMES S. STROB, JR.   , DIST. TRAFFIC OPS. ENGINEER ,
    Print Name   Position Title

of the Florida Department of Transportation, do hereby approve this certification request made in accordance with the requirements of 23 CFR 635.411(a)(2),
Mark appropriately (choose only one option):

☒ *that this patented or proprietary item is essential for synchronization with existing highway facilities.*
☐ *that no equally suitable alternative exists for this patented or proprietary item."*
Identify any conditions and limitations:

_____ ,   7/3/19 _____
Signature   Date

PUBLIC WORKS DEPARTMENT
TRAFFIC ENGINEERING DIVISION

July 1, 2019

Mr. Jim Stroz, P.E.
District 5 District Traffic Operations Engineer
Florida Department of Transportation
719 South Woodland Blvd
DeLand, FL 32720-6800

Subject: **Justification for Preferred Use of Proprietary Products for Traffic Signal and ITS Equipment by Volusia County – SR 44 FPN: 442499-1-52-01**

Dear Mr. Stroz: *Jim*

As a part of the above referenced project, we are requesting approval of the attached, signed and completed Proprietary Product Certification Form 630-020-07 for the following proprietary products for the Volusia County Traffic Operations Division:

  A. **InSync Adaptive Traffic Control System**
  B. **ITS Express, Layer 2 Managed Field Ethernet Switch model 8040 Plus (fiber optic Ethernet switch)**

A. **InSync Adaptive Traffic Control System**

  1. **Description of project need for the proprietary product.**

      a. Project Description: This project (FPID 442499-1-52-01) includes installation of an Adaptive Traffic Control System (ATCS) on 14 intersections on SR 44 in Volusia County extending from Airport Road to 3rd Street. The ATCS adjusts traffic signal timings and sequencing based on real-time traffic conditions measured by the system. The ATCS intersection equipment consists of new vehicle detectors mounted to existing traffic signal structures and ASCT processors installed in traffic signal controller cabinets.

      b. Existing Conditions and Investment: In Volusia County, FPID 435404-1-52-01 installed the InSync ATCS manufactured by Rhythm Engineering at five intersections along US 17/92 and the ATCS proposed as part of FPID 437842-1-52-01 will extend the ATCS southward; adding adaptive control at 15 additional intersections on the same corridor. Meaning the County is familiar with the system's operation and maintenance, and the system is expected to be in operation in Volusia County for the foreseeable future.

On US 17/92, Volusia County operates the traffic signals, from the Volusia County TMC, and FDOT District 5 operates the InSync adaptive system, from the RTMC; separate communication networks are used to provide this operational separation. InSync ATCS uses a distributed system approach where an adaptive processor is installed in each traffic signal controller cabinet, permitting separate connections to the controller and adaptive processor. The SR 44 ATCS intends to continue this operational paradigm to leverage existing procedures, knowledge, and performance expectations.

c. Compatibility with Existing Equipment: The Rhythm InSync ATCS operates using two separate but coordinated optimization algorithms: the local optimizer and the global optimizer. The local optimizer attempts to reduce individual movement delay at each intersection and monitors the number of queued vehicles in each lane and vehicle time in queue for optimization purposes. The global optimizer's objective is to reduce the number of stops vehicles must make when travelling along the corridor where InSync is operating by creating "green tunnels" on the mainline through movements for vehicle platoons to travel in. The time between arrival of these vehicle platoons is used by the local optimizer to serve individual movements.

The InSync solution is controller agnostic, meaning it is compatible with the existing traffic signal controllers present along the SR 44 corridor. Retaining existing traffic signal controllers will reduce the project's construction cost and allow the County's existing traffic signal central management software to remain compatible. Additionally, the InSync solution uses Ethernet/IP communication, consistent with FDOT District 5's existing communication scheme.

d. Proprietary Product Description: The Rhythm InSync ASCT consists of the following main components:

    i. InSync Detection Camera (optical or thermal) – provides vehicular detection capable of per lane queue measurement.

    ii. InSync Processor - gathers data and determines which vehicular movements to serve then passes this information to the traffic signal controller.

    iii. InSync Equipment Panel - power and communication hub for the intersection equipment.

    iv. InSync SDLC Intercept Module - provides connections for NEMA TS2 controllers and the InSync Processor.

    v. InSync DIN Relay – permits remote power cycling of the Detection Cameras.

    vi. InTraffic Central Command Console – central management software for InSync ATSC.

2. Factual and technical supporting evidence for synchronization.

a. Function: The proprietary product is necessary to ensure compatibility with existing practices established on the US17/92 corridor in Volusia County and at the FDOT District 5 RTMC. Furthermore, it is compatible with the existing traffic signal controllers deployed on SR 44 and requires no significant modifications to Volusia County's existing traffic signal central management software or software operating at the FDOT District 5 RTMC.

    i. A product brochure for the system is attached (Exhibit A).

    ii. This product is installed at five intersections on US 17/92 and is planned for 15 more in the near future.

      iii. FDOT District 5 operates InSync for a number of corridors throughout the District, meaning existing software is in place at the RTMC to operate InSync.

b. Logistics: The proprietary product is familiar to the signal maintaining agency: Volusia County County. Additionally, FDOT District 5 currently operates this system on other corridors in the district.

      i. This product is already in use and is guaranteed to be interchangeable with existing maintenance inventory.

      ii. Traffic signal technicians are familiar with the maintenance, deployment, and functionality of this product.

      iii. Traffic Management Center (TMC) operators in Volusia County are familiar with how this system interacts with their traffic signal system. Volusia County has InSync deployed on on a corridor where they are responsible for traffic signal system management and operation, and additional deployment of the system is planned for the near future.

      iv. Regional Traffic Management Center (RTMC) operators with FDOT District 5 are familiar with this system's operation and no new central software installation is required.

c. Training Costs: Volusia County and FDOT District 5 are familiar with the system's operation—no additional training costs are anticipated.

      i. Traffic signal maintenance staff is familiar with this product as it is deployed elsewhere in the County.

      ii. Volusia County TMC operators are familiar with the system's operation and interaction with their traffic signal systems.

      iii. RTMC Operators are familiar with operating the system.

d. Software Development Costs: The system is compatible with Volusia County's existing traffic signal central management software and software in operation at the FDOT District 5 RTMC.

      i. InSync is already being operated from the FDOT District 5 RTMC for a number of corridors in the district.

      ii. The InSync system is compatible with traffic signal controllers present along the corridor. No new drivers or other software will need to be developed to provide compatibility between the traffic signal controllers and ASCT.

3. Explanation how the evidence links the proprietary product to the project need.

a. The SR 44 corridor experiences unpredictable traffic demand caused by non-recurring congestion resulting from I-95 incident related traffic diversions, special event traffic, and seasonal beach traffic; therefore, the corridor was selected for ATSC. The Rhythm InSync system is the only APL listed system capable of true "Traffic Adaptive Control" as defined by FHWA as "Cycle free, rapid reaction to sense traffic conditions" which provides maximum adaptability to current traffic patterns.

The InSync system will facilitate operation of the adaptive system by FDOT District 5 while the traffic signal controllers are operated by Volusia County, which retains consistency with established operational paradigms in the County and allows both FDOT and the County to override adaptive operation in response to system failure or other emergency situations.

4. **Factual and technical supporting evidence that no alternatives are available.**

   a. To ensure compatibility with existing ATSC operational paradigms in Volusia County and District 5, the same solution must be used. Use of the InSync ATSC will ensure compatibility as it is in use on the US17/92 corridor in Volusia County.

   b. At this time, there are no FDOT APL listed alternatives that allow separate connections to the adaptive processors and traffic signal controllers, allowing each to be connected to a separate network.

B. ITS Express, Layer 2 Managed Field Ethernet Switch model 8040 Plus (fiber optic Ethernet switch)

Evidence for Synchronization:

   a. Function: The ITS Express Managed Field Ethernet Switch Model 8040 Plus is consistent with the existing network deployment throughout Volusia County's ATMS system and links traffic signal Ethernet devices. This switch is compatible with the TMC's central software and provides proprietary network monitoring protocols. The County has been using ITS Express Switches with minimal issues.

   b. Logistics: This ITS Express switch is compatible with the existing traffic signal network. County staff is experienced with ITS Express Switches. The County's Traffic Division maintenance staff is already trained and the use of a new family of switches would require significant training for operations and maintenance. A new family of switches could also create integration and interoperability issues.

In conclusion, Volusia County is requesting that the proprietary products listed in this document be furnished for this project. If you have any questions, please feel free to contact me at (386) 736-5968 or via email at jcheney@volusia.org.

Sincerely,

Jon Cheney, P.E.
Director - Volusia County Traffic Engineering