

# PINELLAS COUNTY ADAPTIVE SIGNAL CONTROL – COSTS FOR IMPLEMENTATION THEN AND NOW

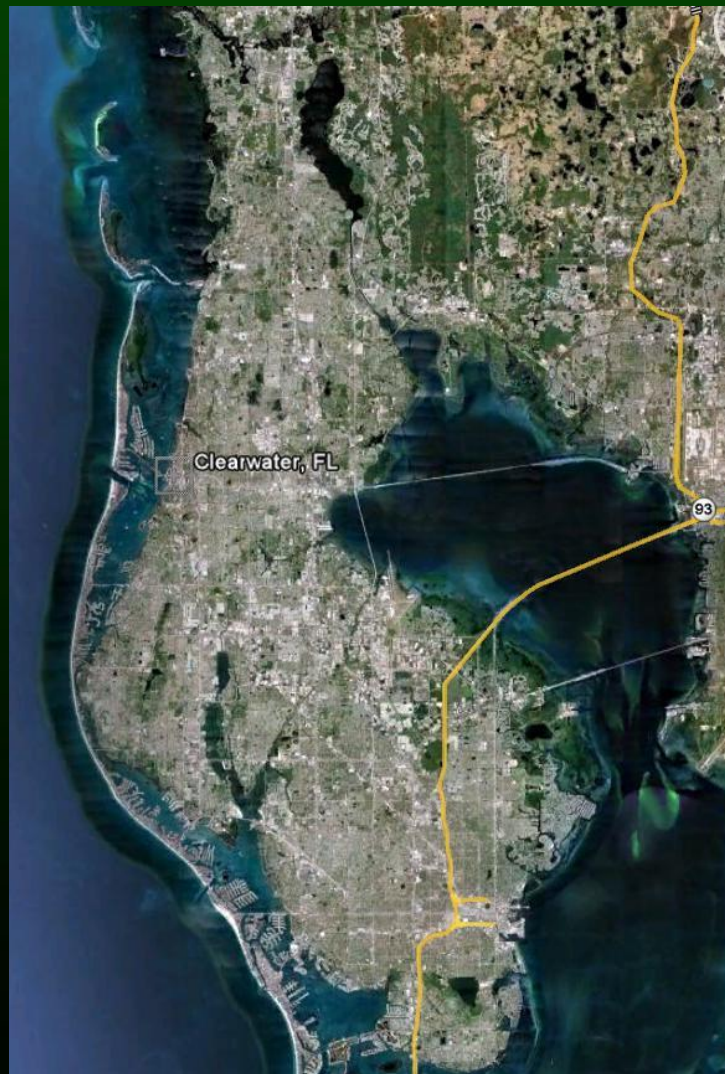


Presented by:

**Adam Moser, P.E.**

**Pinellas County Public Works  
Traffic Management Division**

# ABOUT PINELLAS COUNTY



- Tampa Bay's beach county (35 mi of beach!)
- Tampa Bay's main tourist and retirement county
- Most densely populated county in Florida (3300 per sq mi)
- Only 4% of developable land left
- Only one interstate, I-275 (Tampa to St Pete/Skyway Bridge)



# PINELLAS COUNTY'S SELECTION OF ADAPTIVE SOFTWARE

- ITS Committee formed
  - Committee made up of State and Local government officials, members of the general public, and transportation professionals
  - Visited and gathered information on existing and emerging systems throughout the U.S.
  - Weighed pro's and con's of central and adaptive signal systems
- In early 2000's, committee reviewed 4 adaptive systems:
  - OPAC (FHWA RT-TRACS software)
  - RHODES (FHWA RT-TRACS software)
  - SCATS (Australia based software)
  - SCOOT (UK based software)



# COSTS TO DEPLOY IN 2005

- RHODES and OPAC had similar requirements in order to operate:
  - Full 2070 controller w/ VME chassis
  - Single board processor w/ OS9 operating system in 2070 VME chassis
  - Stop bar detection (Video or Inductive Loops)
  - Advanced detection ~ 700' upstream (Inductive Loops)
  - Required a new cabinet in order to handle detection requirements – 170/332
  - Dedicated communications system (terminal server/switch)
  - Development of intersection parameters
- Due to other ITS elements and technology trends, Pinellas County chose to install a fiber optic IP Ethernet communications network

# RESULT?



~ \$135,000 per intersection\*

\*DOES NOT INCLUDE COST TO INSTALL FIBER OPTIC NETWORK



# HOW DO WE CUT THESE COSTS?

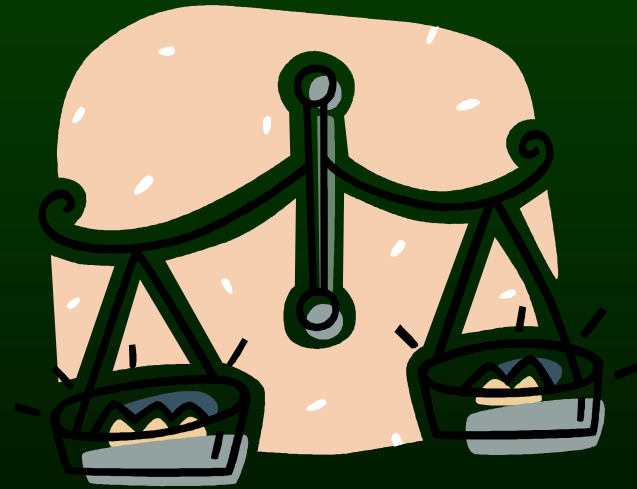
- The software developer and engineer reviewed the requirements and technology to come up with some cost savings ideas:
  - Use 2070L (no VME chassis) - \$2000 savings
  - Use common 'off the shelf' enclosed single board processor - \$3000 savings
  - Use Linux operating system for adaptive algorithms – IT'S FREE!
  - Rack based Video Detection - \$10,000 savings
  - Advanced Detection Alternatives – Sensys wireless magnetometer solution - \$40,000 savings
  - TS2 Type 1 Cabinet that could work with some legacy controllers - \$0 savings but has maintenance benefit
  - Require all software/hardware to be IP addressable and have RJ45 Ethernet port - \$3000 savings
  - Lower adaptive development costs - \$5000 savings

# 2010 RESULT?



~ \$75,000 per intersection

**BUT WAIT!**



How does the cost compare to other adaptive systems?



# ADAPTIVE SIGNAL CONTROL SYSTEMS OVERVIEW

- ACS Lite (Adaptive Control Software Lite)
- InSync
- LA ATCS (Los Angeles Adaptive Traffic Control System)
- OPAC (Optimized Policies for Adaptive Control)
- RHODES (Real-Time Hierarchical Optimized Distributed Effective System)
- SCATS (Sydney Coordinated Adaptive Traffic System)
- SCOOT (Split, Cycle and Offset Optimization Technique)

# ADAPTIVE SIGNAL CONTROL SYSTEMS OVERVIEW

Adaptive System	Controller Type	Detection required	Field/Central Based Algorithm	Field Processor Required
ACS Lite	Various legacy controllers/cabinets	Existing stop-bar detection (by phase). Prefer 1 or more advance detectors per coordinated phase	Field or Central	Yes
InSync	Various - can work with most controller firmwares	Video Stop bar only	Field	Yes
LAACTS	ATCS firmware, 170/2070 platform	Unknown at time of report	Unknown	UNK
OPAC	Econolite ASC2, ASC3; Other NTCIP controllers on way	Stop bar and upstream detection	Field & Central	Yes
RHODES	Siemens NextPhase 1.7.6c - 2070	Stop bar and upstream detection	Field	Yes
SCATS	SCATS firmware on 2070-1B CPU	Stop Bar only (by lane)	Central	No
SCOOT	SEPAC firmware on EPAC M50 and 2070	Stop bar and upstream detection	Central	No



# COST COMPARISON OF ADAPTIVE SYSTEMS

- Based on what each software requires, these were the main items compared:
  - Detection requirement
  - Extra field or central hardware required (single board processors)
  - Cost from provider to develop the software at each intersection
- NOTE: if new controllers and/or cabinets are required to run a particular compatible firmware, then it should be considered an added cost for comparison purposes:
  - Pinellas County is at 'end of life' for our controllers and Type 5 cabinets, so chose not to add that cost for comparison

# COST COMPARISON OF ADAPTIVE SYSTEMS

Adaptive System	Detection Cost (1)	Additional hardware cost	Average software developer cost	Average Total per Intersection Cost	Notes
InSync(2)	Unknown	Unknown	Unknown	<b>\$28,500</b>	InSync charges on a 'per intersection' basis. Not much known about pricing breakdown
SCATS	\$20,000	\$0	\$17,000	<b>\$37,000</b>	Developer cost varies from \$15k - \$23k per intersection
ACS Lite	\$35,000	\$0	\$4,500	<b>\$39,500</b>	Cost is relatively unknown due to FHWA grant funding & limited deployments
RHODES	\$50,000	\$1,200	\$2,500	<b>\$53,700</b>	Currently testing central server communications and calculation to negate need of field hardware
OPAC	\$50,000	\$1,200	\$3,000	<b>\$54,200</b>	
SCOOT	\$50,000	\$0	\$20,000	<b>\$70,000</b>	Developer cost varies from \$15k - \$25k per intersection
LAACTS (2)	Unknown	Unknown	Unknown	<b>\$78,000</b>	Cost may be skewed because other ITS items were part of the cost estimate. The software cost is an initial \$30,000 for an area wide software license (per agency)

- (1) NOTE: Cost includes cost of new stop bar (rack based video) and advanced detection as required
- (2) NOTE: Average per intersection cost based on study "Adaptive Traffic Control Systems in the United States" by HDR Engineering Inc. Matt Selinger, PE, PTOE and Luke Schmidt



**EXIT**



**QUESTIONS?**

[amoser@pinellascounty.org](mailto:amoser@pinellascounty.org)

**727-464-8815**