29-30 October 2026 | Filoxenia Conference Centre
Nicosia, Cyprus

8th Conference
Sustainable Mobility and Intelligent Transport Systems

Smart Traffic Signal Control Applications in Cyprus

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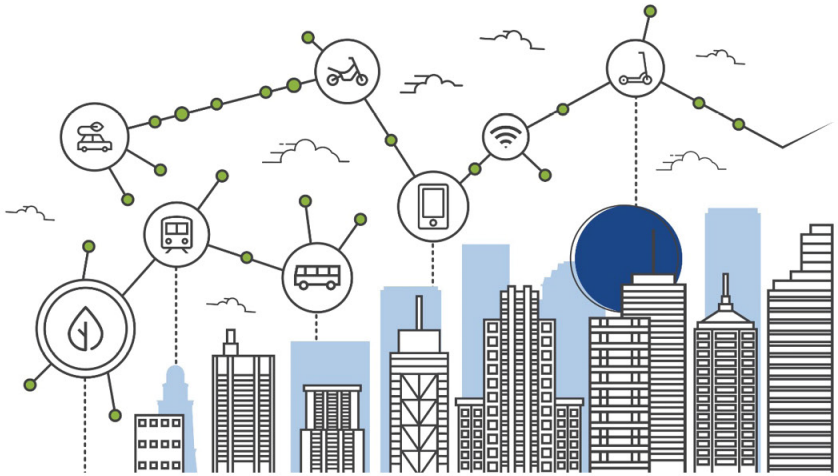


The Conference is implemented within the framework of the Cohesion Policy Programme "THALIA 2021–2027", Co-financed by the European Union.

Presentation Contents

- Smart Traffic Signal Applications…**evolution** of traffic signals



- **SCOOT** in Cyprus
- **Urban Traffic Control** (UTC) for Nicosia & Limassol –New System
- **Smart Intersection** applications at the Nicosia General Hospital Roundabout & Junctions in Nicosia and Paphos



- **MOVA** at Ayia Fyla Roundabout in Limassol
- **Vehicle Detection**, Vehicle Actuation (**VA**), Bus Detection/Priority – Isolated Systems

Traffic Signals in Cyprus: Evolution from the 60s…

The first system of traffic signals, which was a semaphore traffic signal, installed as a way to replace police officer control of vehicular traffic outside the Parliament in London, UK on **9/12/1868**

The first four-way, ***three-colour traffic light*** was created by William Potts in Detroit, USA in **1920**



Famagusta, 1970s



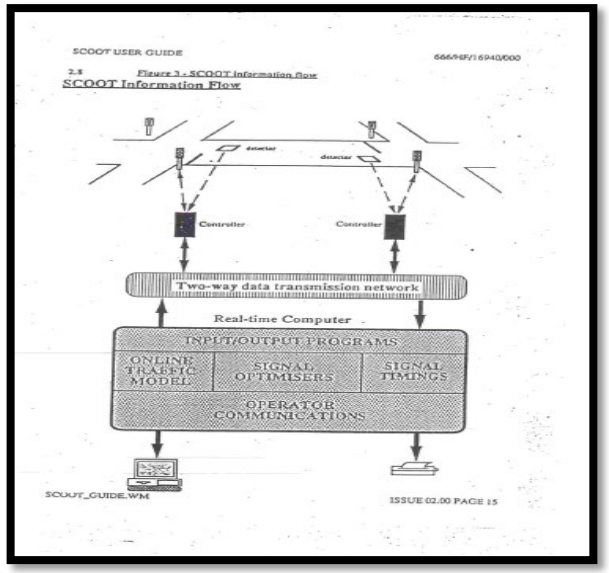


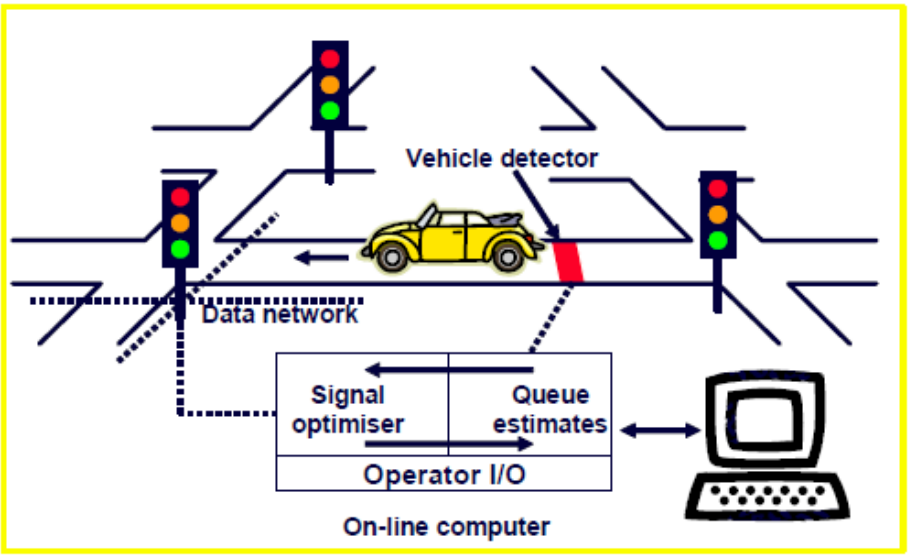
Nicosia, 2022



Introducing traffic signals in Cyprus early 1960s, Nicosia International Airport

SCOOT in Cyprus (1992-2023)





SPLIT, CYCLE, OFFSET, OPTIMIZE, TRAFFIC (SCOOT)

Supplied by SIEMENS Traffic Controls (UK) Ltd

Cyprus: **90 Junctions** in Nicosia, Limassol & Larnaca were on the adaptive system, TC12 technology (Telecommand 12/CYTA copper leased lines)

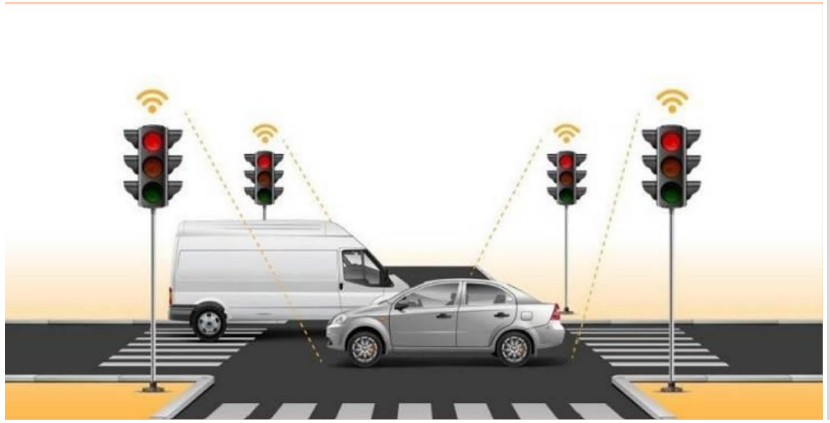
The SCOOT Control Centre was located in Nicosia (Public Works Department HQs)

A new Urban Traffic Control System for Cyprus

- Need to improve traffic conditions and road safety in Nicosia & Limassol
- Adaptive Control & Bus Priority based on other UTCs in Europe/UK
- Renovate & Upgrade existing SCOOT Control Centre/Room in Nicosia
- Fully funded from the THALIA EU Fund, 2021-2027
- €7.2 million
- 2 yrs implementation
- 5 yrs maintenance







- 950,000 people…700,000+ vehicles registered
- 7,750 km of roads
- UTC/SCOOT operated from 1992-2017 at 90 junctions in Nicosia/Limassol/Larnaca
- Only at a few junctions in Nicosia from 2017-2023
- Need a brand-new system
- Capability to connect signals in Larnaca and Paphos for remote access & monitoring

UTC Equipment & Traffic Controllers

- **125 Sites in Nicosia & Limassol**
  - 75 Sites in Nicosia
  - 50 Sites in Limassol

- **55 New Controllers**
  - 29 in Nicosia
  - 26 in Limassol



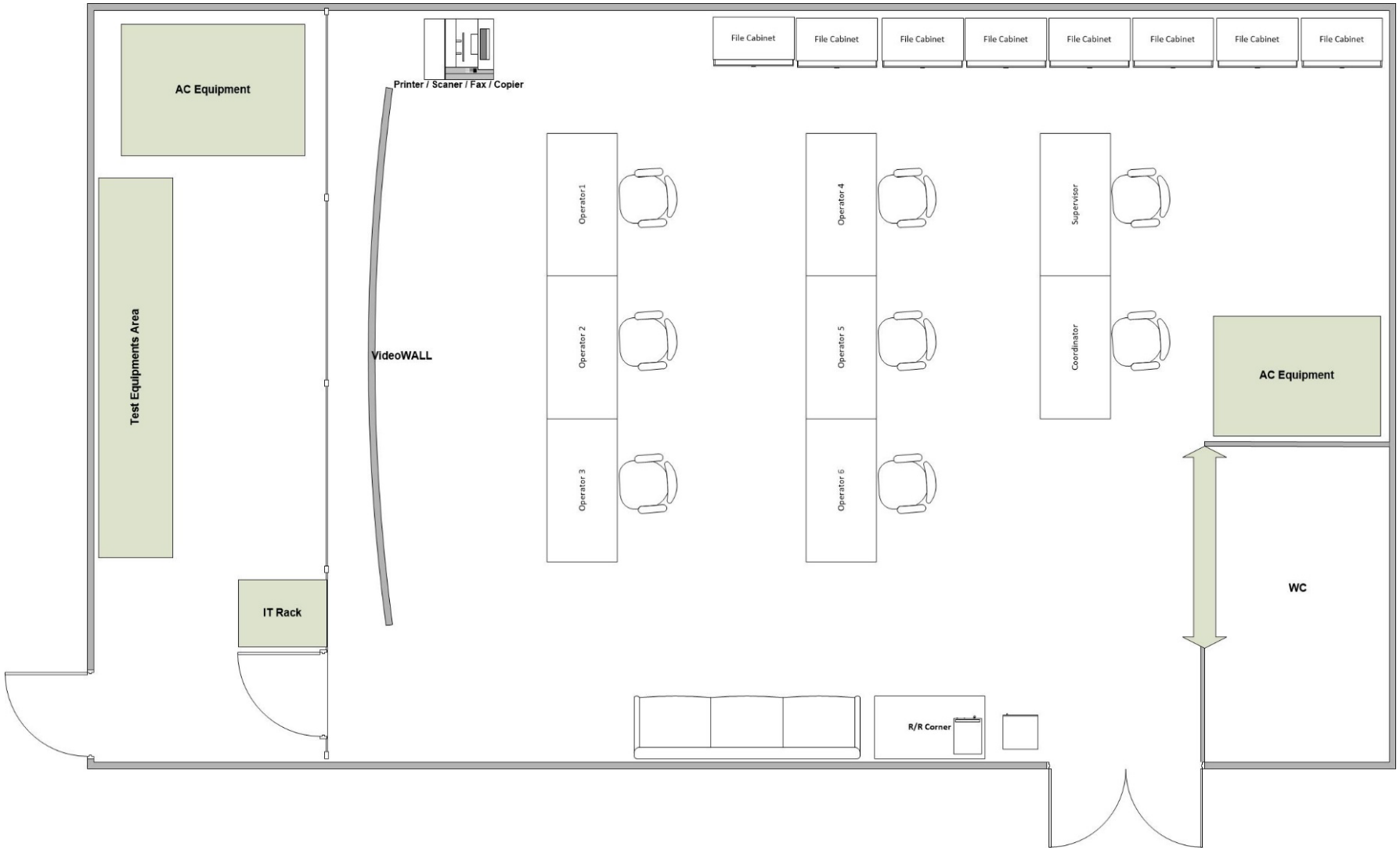
- 65 Pelican Controllers to be linked to UTC

- 125 Sensors, **O**ut**S**tation **U**nits -OSUs, Routers, Signals Equipment, Controllers Cables, Poles, Sensors etc

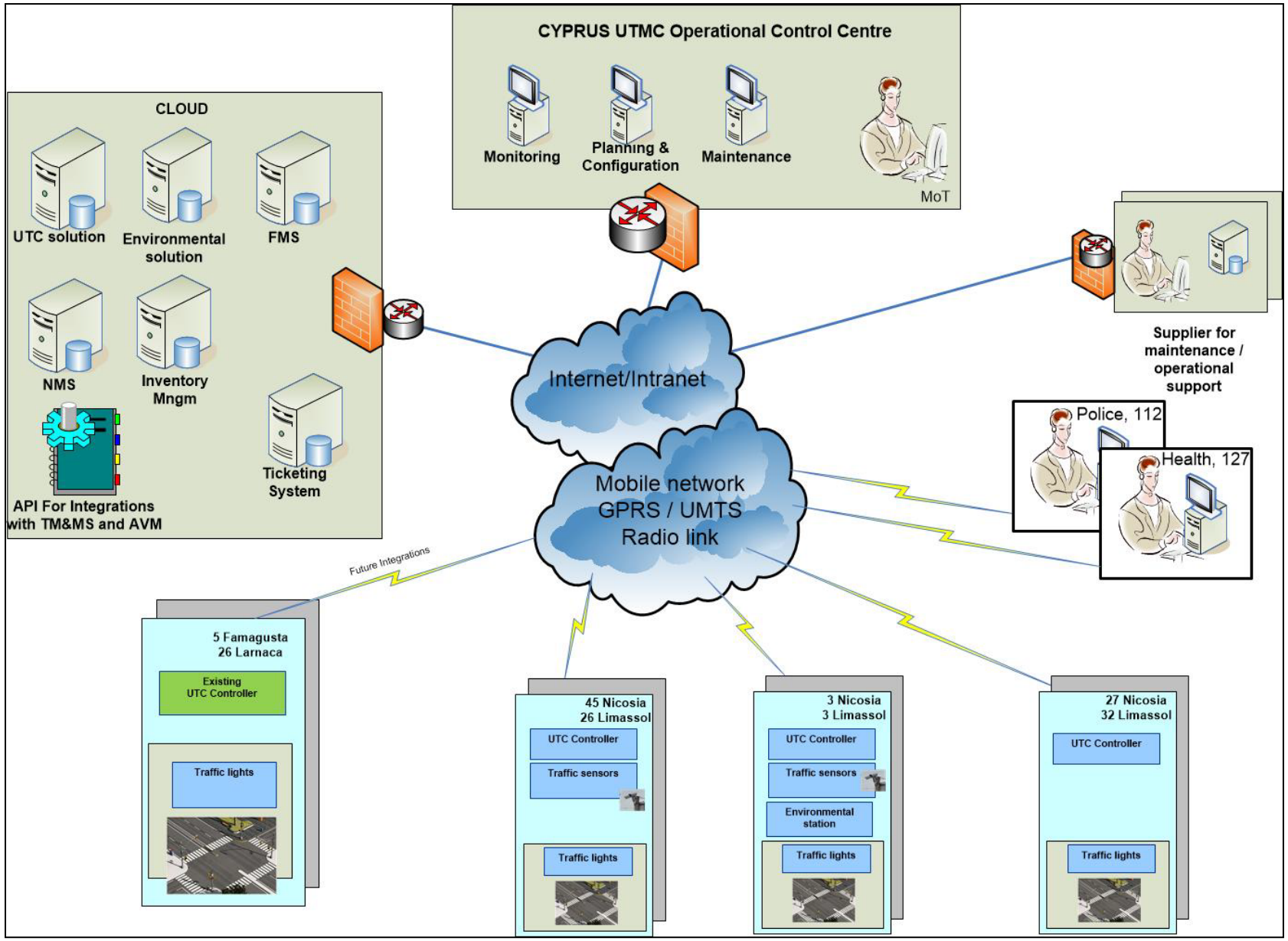
- Existing Controllers in Nicosia/Limassol: Yunex (ex Siemens), Peek & SWARCO

- 3+3 Environmental Stations in Nicosia & Limassol for emissions monitoring

New Layout of Operational Control Centre (OCC)

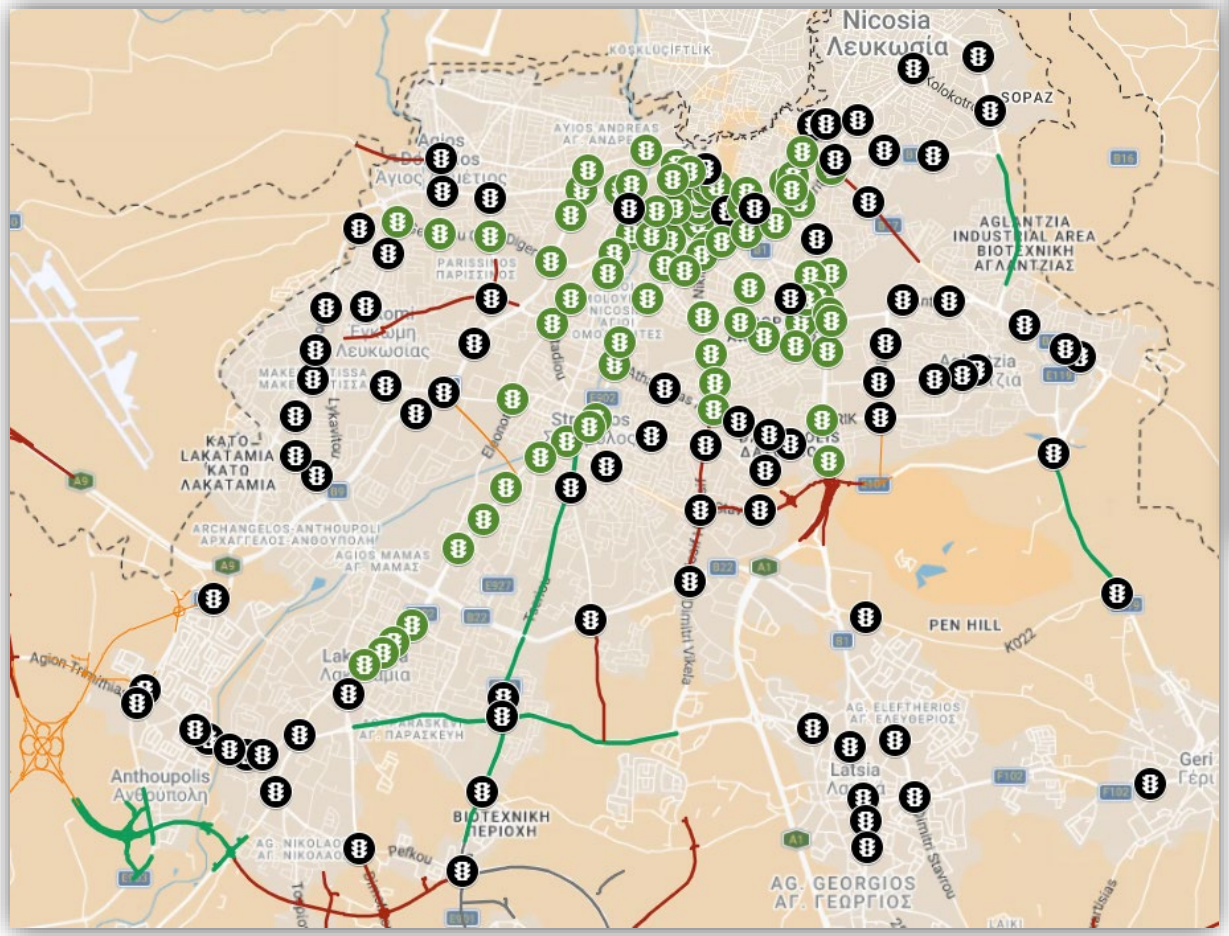


CYPRUS-UTC Architecture



New Urban Traffic Control System Locations in Nicosia & Limassol

Nicosia UTC Scope (75+ locations)

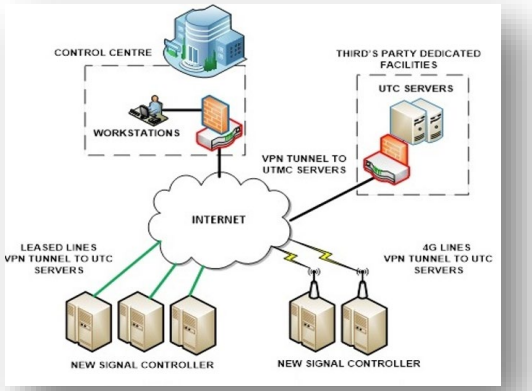




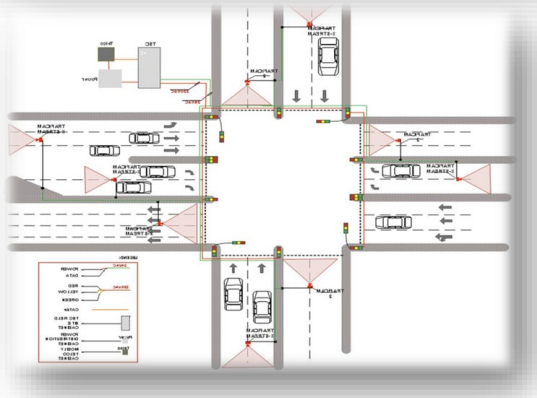
Limassol UTC Scope (50+ locations)

Anticipated Benefits of the new UTC

- Reduction of **travel time** by **~10-25%**
- Reduction of **delays** by **~15-35%**
- Reduction of **start-stop** conditions by **~10-30%**
- Reduction of **public transport travel time** by **28%**
- Reduction of emissions by **~10-15%**
- Reduction of **fuel consumption** by **~8-10%**
- Reduction of **incident handling** time by **up to 30%**
- Time savings for commercial vehicles and logistics
- Improved **air quality** and **reduction of fuel consumption**
- Reduction of aggressive driving behavior, including red-light running



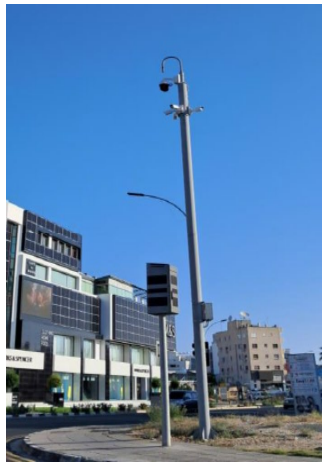




Existing ITS & National Access Point (NAP)

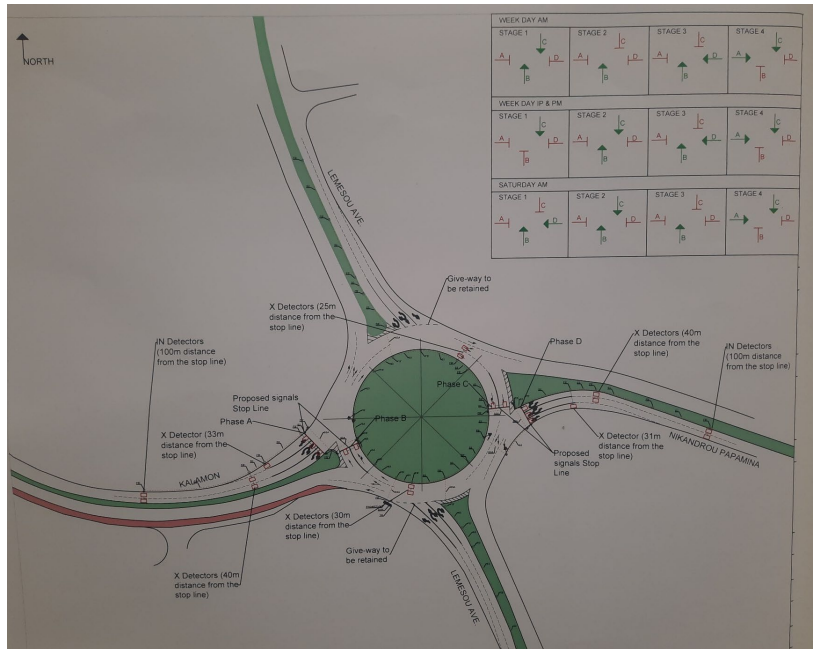
- 380 signalized junctions in Cyprus
- 370 pelican crossings
- 2 signalized roundabouts:
  - MOVA (Limassol, 6/2021)
  - SWARCO Smart Intersection (Nicosia, 10/2024)
- 140 traffic counters
- 13 Weigh in Motion (WIM)
- 165 Bluetooth detection devices for travel time

- 12 Bicycle counters
- 200 CCTV Cameras
- 45 Variable Message Signs
- Traffic Management System/ OMNIA-MYSTIC
- Bus Telematics/ITS
- GIS Platform (GNOSIS)
- Vehicle-Actuation Systems
- Smart Intersection/Green:
  - Nicosia
  - Paphos





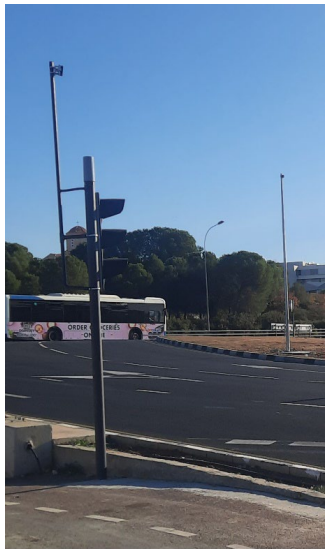
Nicosia General Hospital Roundabout – Part-Time Signals using Smart Intersection of SWARCO - October 2024







- ✓ Signal optimization at the roundabout and T-Junctions
- ✓ Optimal Timings
- ✓ Remote access & easy set-up
- ✓ Use of smartmicro detectors (AGDs)



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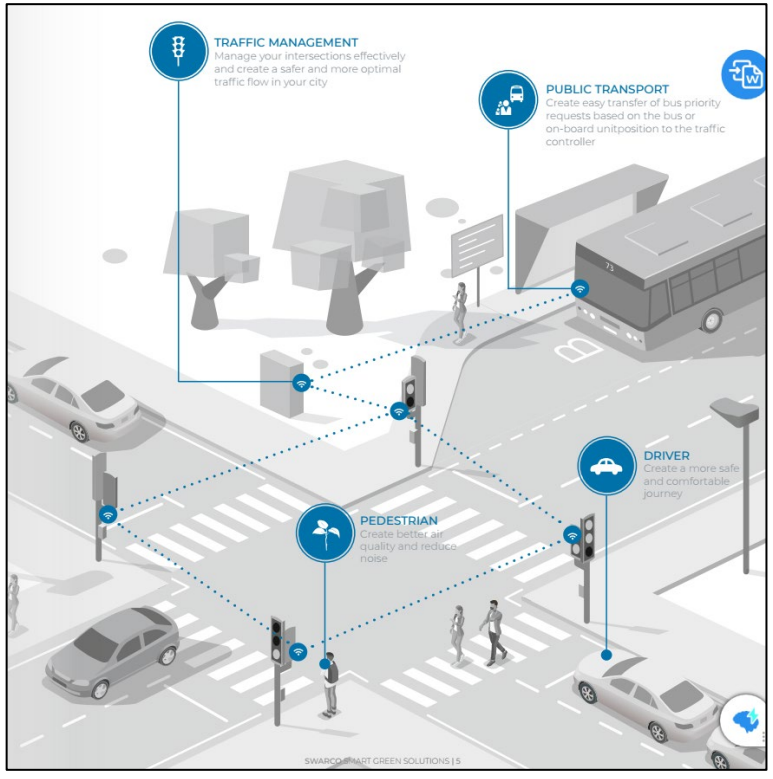


Key Benefits

- Optimize green times in an intersection
- Minimize air pollution
- Create optimal traffic conditions
- User-friendly Web-Interface
- Easy set-up and configuration

Ayia Fyla Junction on the Limassol Bypass – Part-time Signals 6/2021



Part-time traffic signals at Ayia Fyla Roundabout/A1

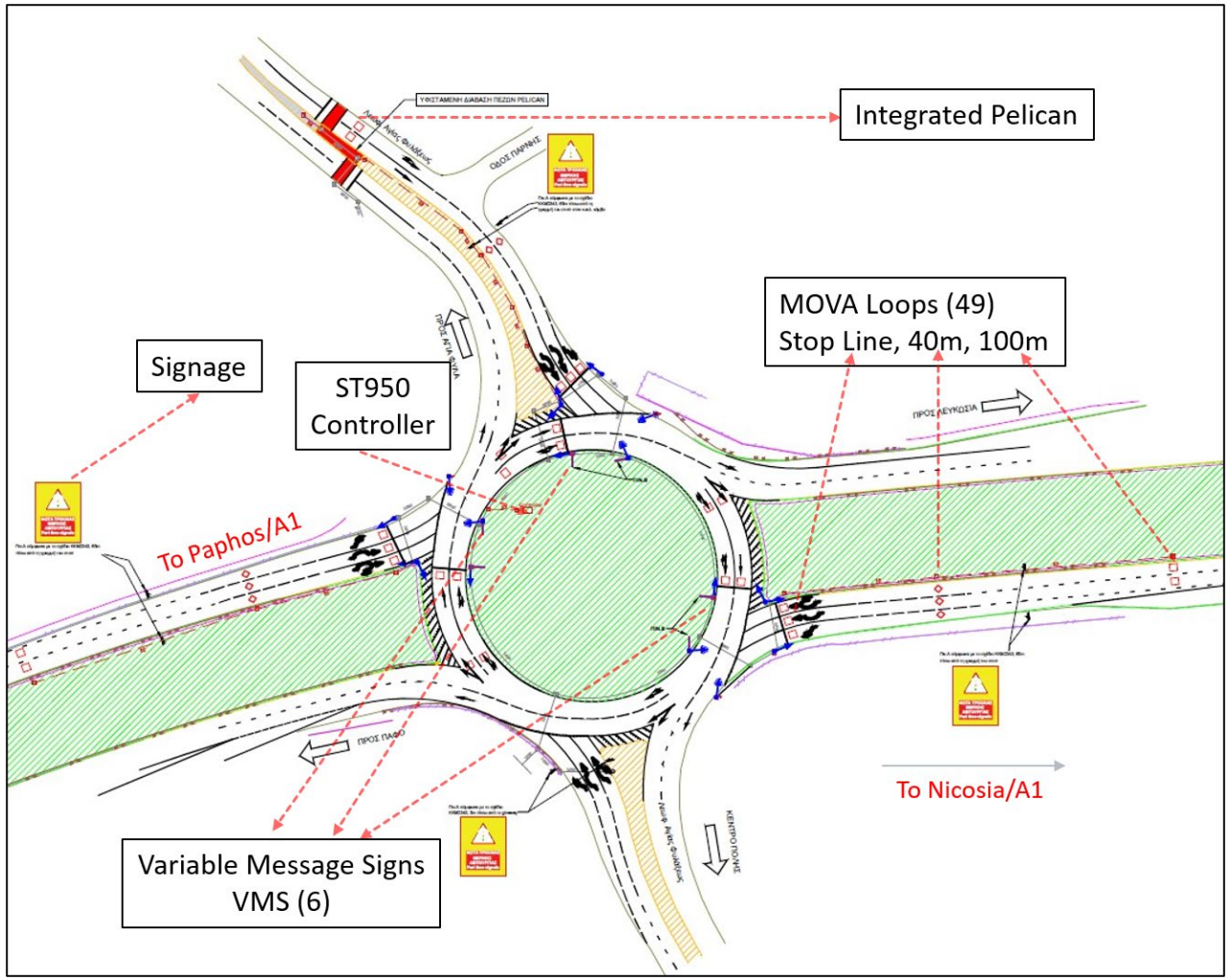
- Method to have the optimal green stage, cycle time and control strategy using prevailing traffic conditions and to minimize queuing at signal-controlled junctions
- Proactive methodology that optimizes green times
- MOVA performs better than VA in similar cases (per research)
- MOVA is more responsive to traffic conditions and often leads to a significant increase in capacity
- Use of detectors to assess flow profiles at the entry links and predicting the arrival at the stop line
  - 45 loops installed at Ayia Fyla JCT (also on non signalized approaches)
- MOVA identifies when the end of saturation flow occurs

MOVA

Microprocessor Optimised Vehicle Actuation



Part-time traffic signals at Ayia Fylaxi Roundabout/A1 –Benefits/Results



- Better throughput and traffic flow after
- 37% Traffic Flow Increase from the North (suburbs/villages)
- Travel time at AM peak from 35-40 mins reduced to 15-20 mins
- 30% traffic flow increase on west approach and 54% from the east
- Maximum capacity of the RBT junction ***4800 vehicles per hour***
- Spare capacity of 15-20%
- Improved road safety conditions

Part-time traffic signals at Ayia Fyla Roundabout/A1









Vehicle Detection, Vehicle Actuation (VA), Bus Detection/Priority – Isolated Systems





- Implementation of an **"adaptive mode"** for traffic signal control at seven (7) intersections in Nicosia and eight (8) intersections in Limassol, through the installation and integration of **Above Ground Detectors (AGDs),**
- ***Optimization*** of traffic signal operation through real-time vehicle detection and the dynamic adjustment of signal timings,
- The **reduction of vehicle delays*, queue lengths, and total travel time*** at selected intersections and along the corresponding road axes,
- The ***improvement of traffic flow efficiency*** and intersection operation under varying traffic demand conditions.
- Improvement of ***road safety*** and ***operational reliability*** at signalized intersections.
- ***Bus detection & priority*** at three key junctions in Nicosia using loops & AGDs

Organisers

Ministry of Transport, Communications and Works

DEPARTMENT OF PUBLIC WORKS

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KOΙΟΣ Research and Innovation Center of Excellence

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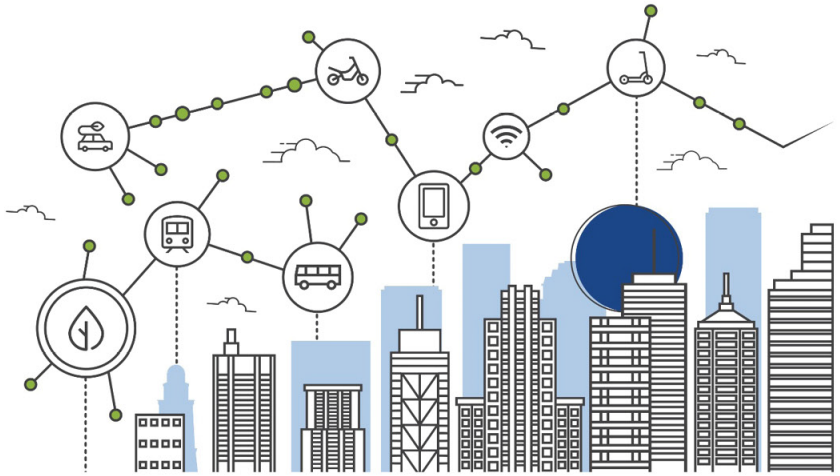

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Thank you for your attention!

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