# aaSIDRA for Roundabouts
# INTRODUCTION


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**TRB Roundabout Conference**
**Vail, Colorado, USA, May 2005**


*Power of analysis ...*

# DEMO Objectives

- You are interested in **Roundabouts** – How can **aaSIDRA HELP** you?
- This brief **Introduction** first
- **aaSIDRA 2.1 HCM version with US Units**
- **QUICK examples** to demonstrate:
  - Input & Output
  - Various intersection types
  - Different GEOMETRIES
  - CALIBRATION
  - Sensitivity Analysis
  - Case Studies

**7-10 August 2005**
**ITE 2005 Annual Meeting**

# Melbourne, Australia

# Australia…

Roundabouts are very common

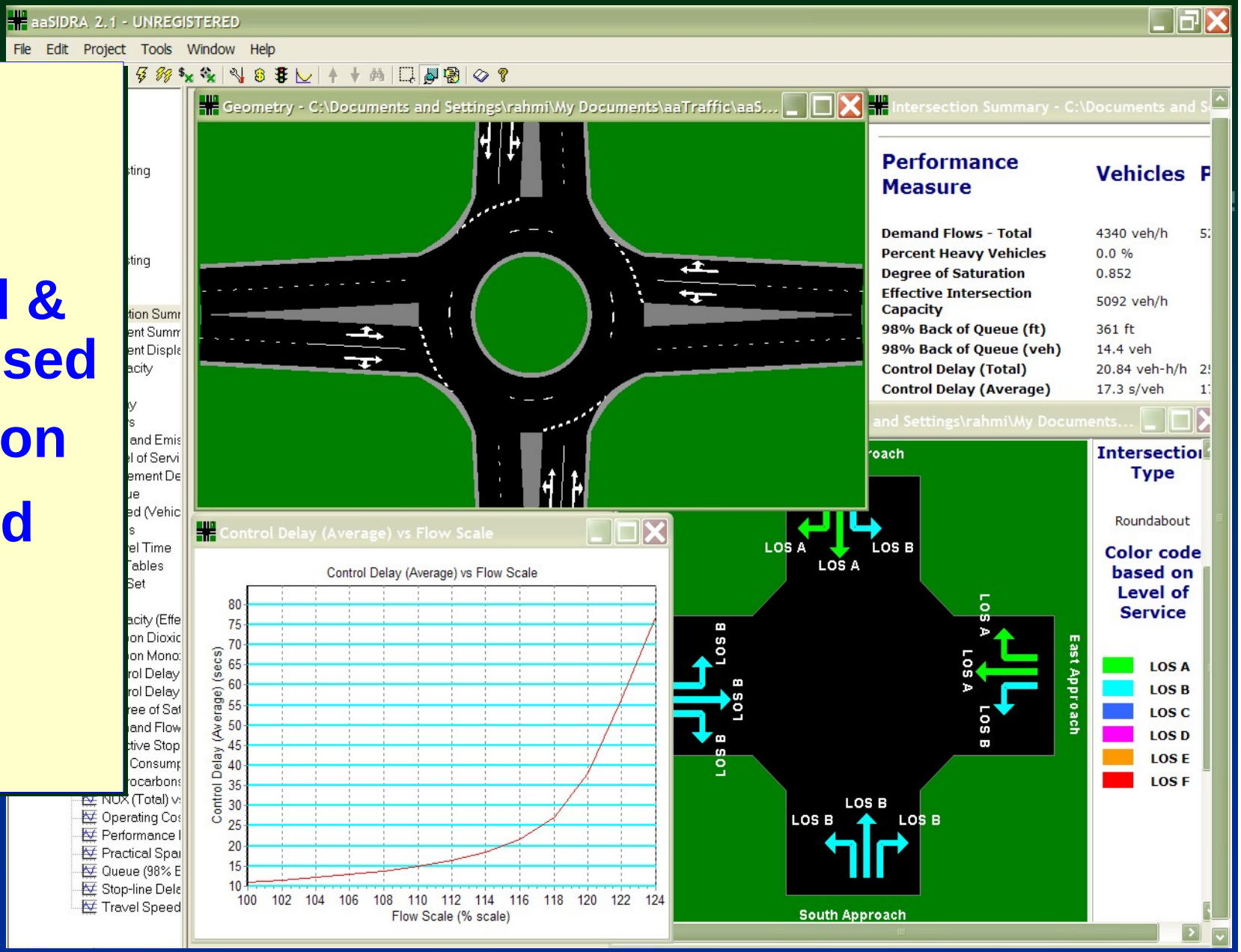
Images for US driving conditions


Australia...


Roundabouts are very common

akcelik &
associates

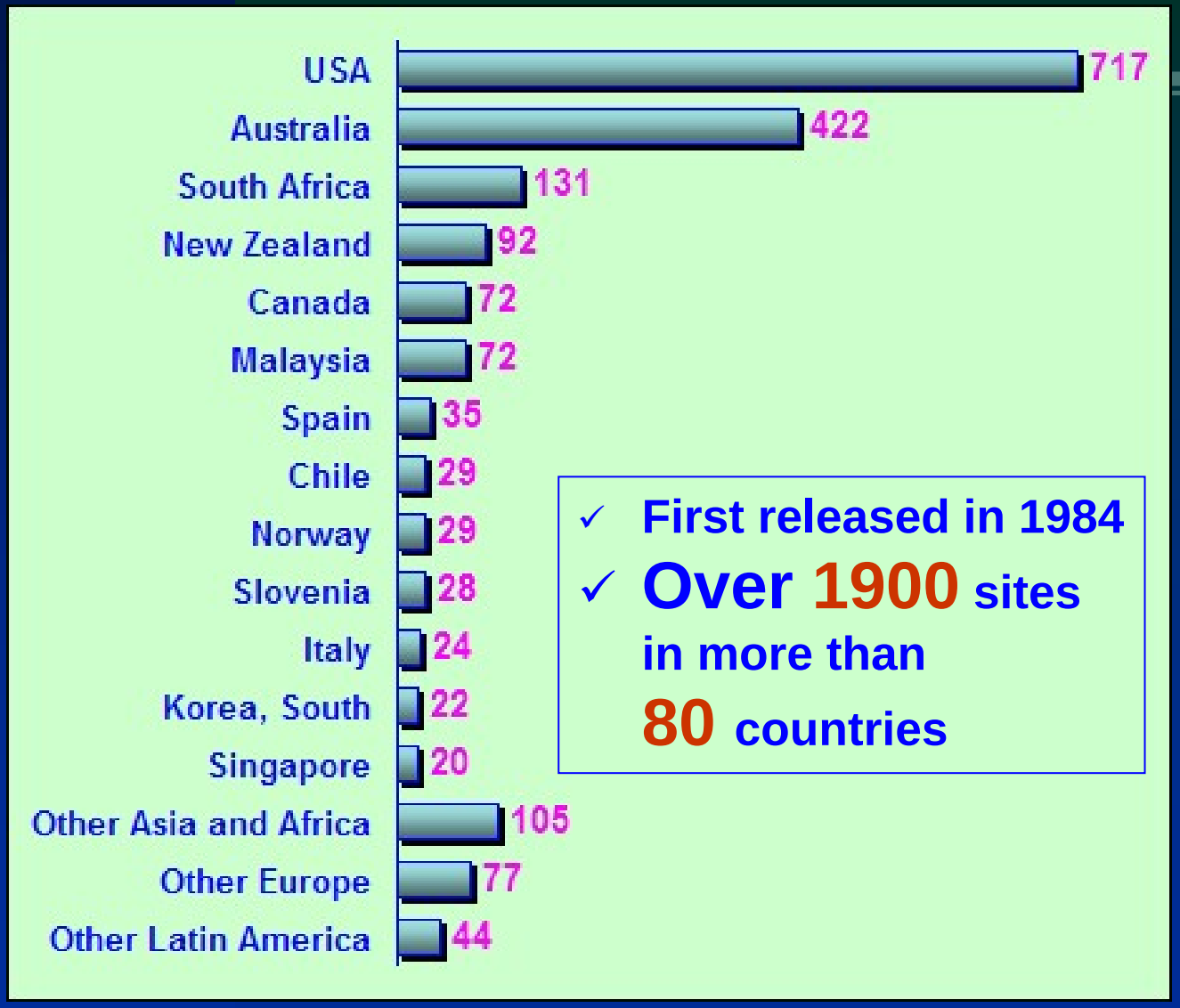
# Signalised & unsignalised Intersection Design and Research Aid






*Power of analysis ...*

# aaSIDRA Users




- ✓ First released in 1984
- ✓ Over 1900 sites in more than 80 countries

**aaSIDRA most popular roundabout analysis software in the USA**

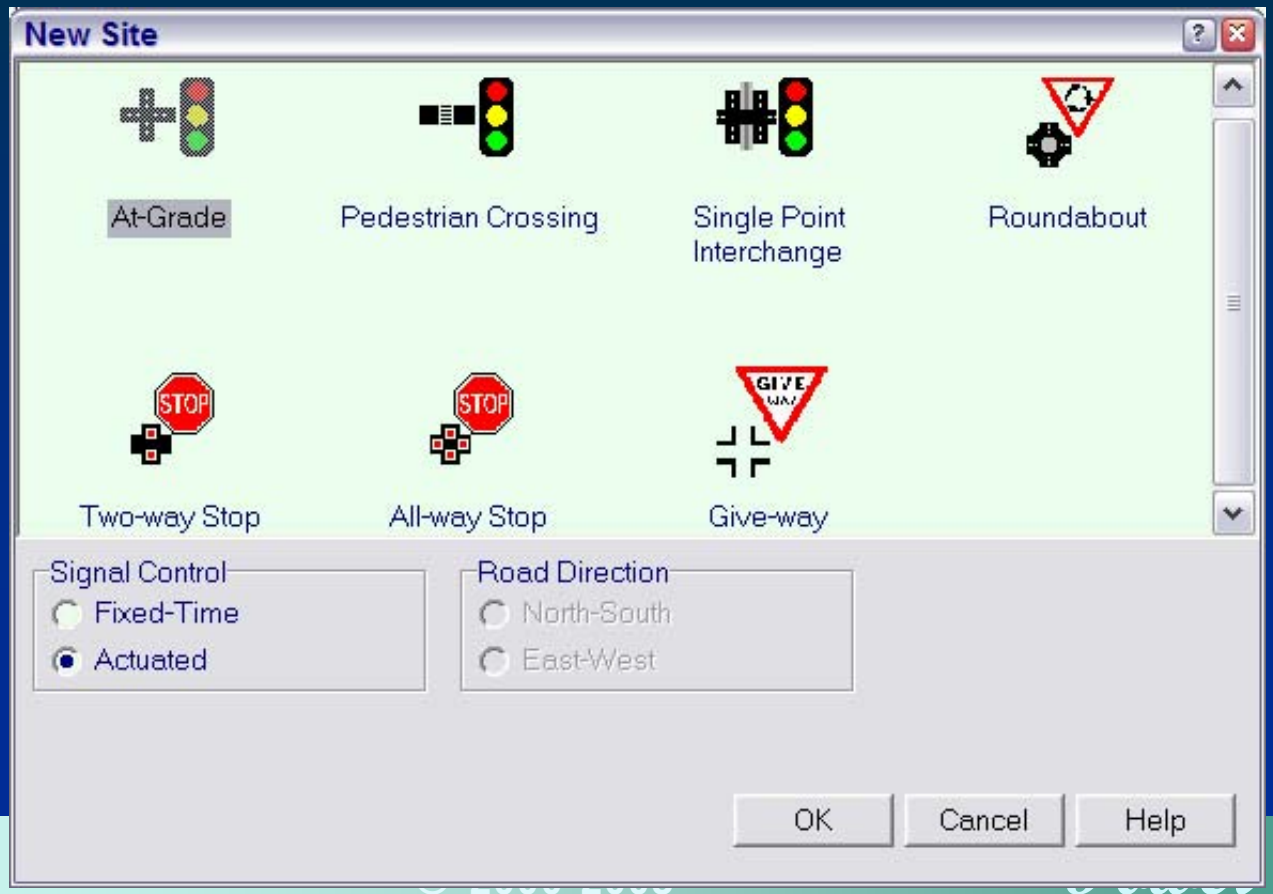
# US Highway Capacity Manual (HCM) version of aaSIDRA

- ✓ **USA largest user group (over 700 sites)**
- ✓ **The HCM version of aaSIDRA offers options for US Customary and Metric units**
- ✓ **aaSIDRA is HCM compatible**
  **See: www.aatraffic.com/SIDRA/aaSIDRA_HCMversion.htm**

# What makes aaSIDRA different?

# Total intersection analysis tool

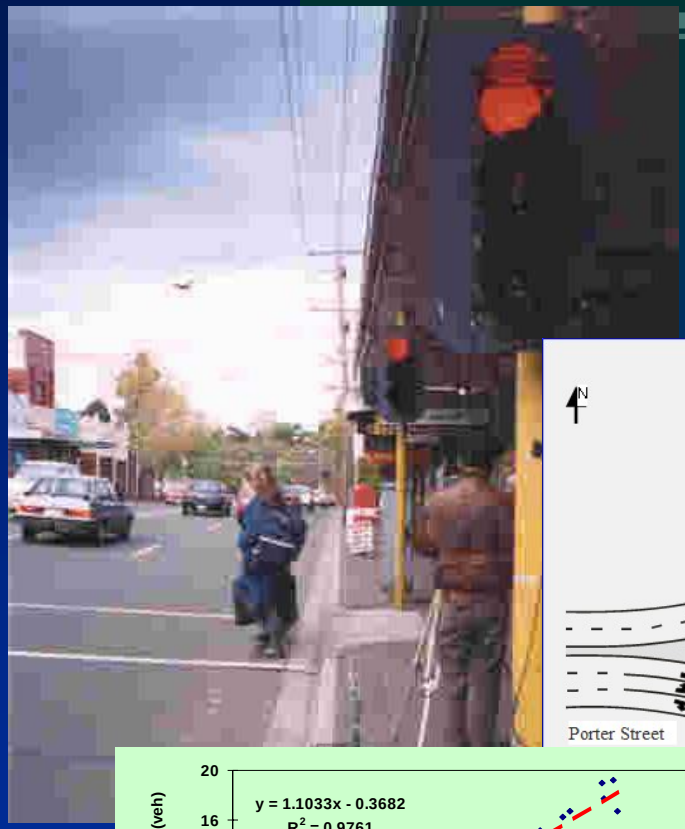
## Model CONSISTENCY in evaluating alternative intersection treatments

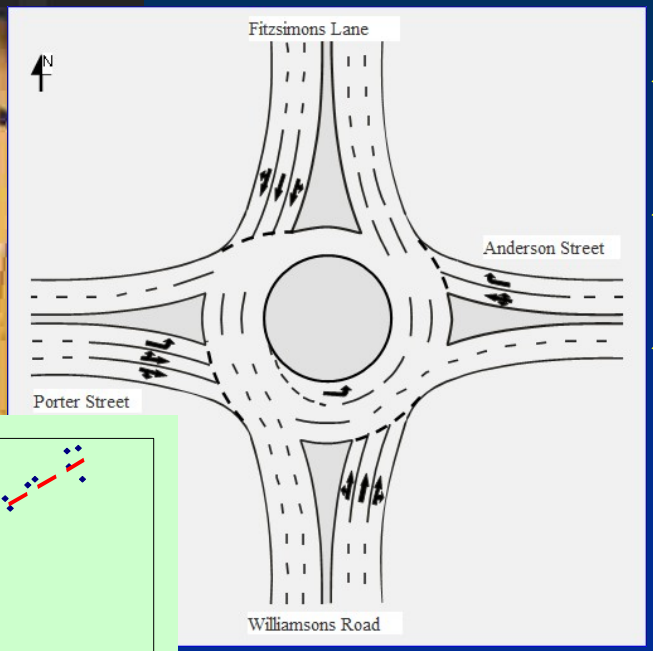


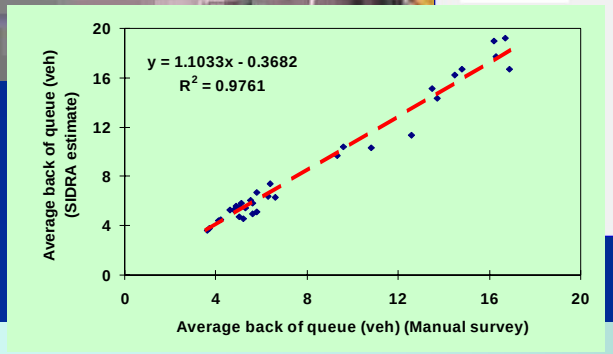
# aaSIDRA areas of application




# aaSIDRA is based on extensive research and development effort





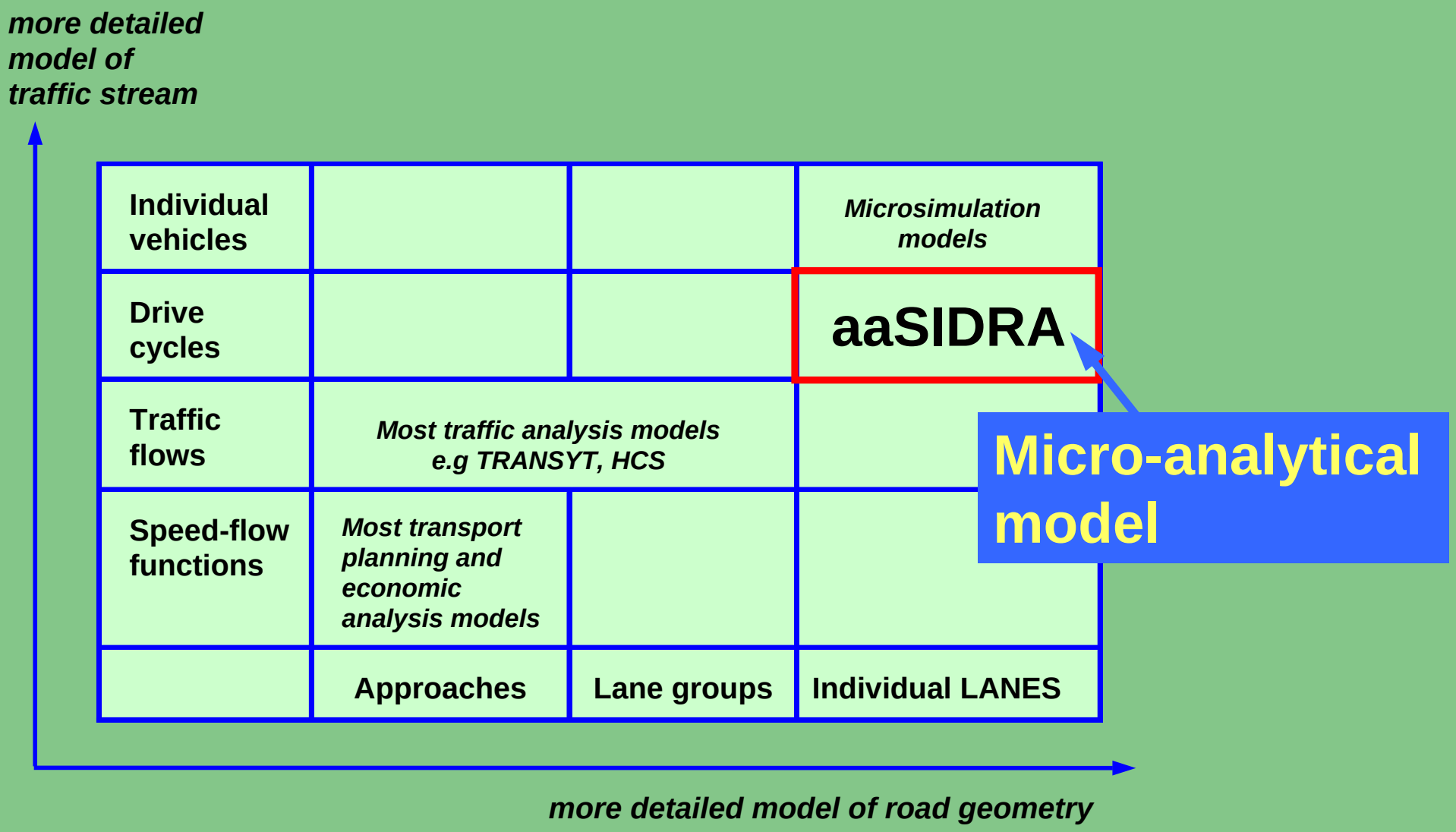




## Documentation

- ✓ aaSIDRA User Guide
- ✓ Research Reports
- ✓ Articles
- ✓ Our website

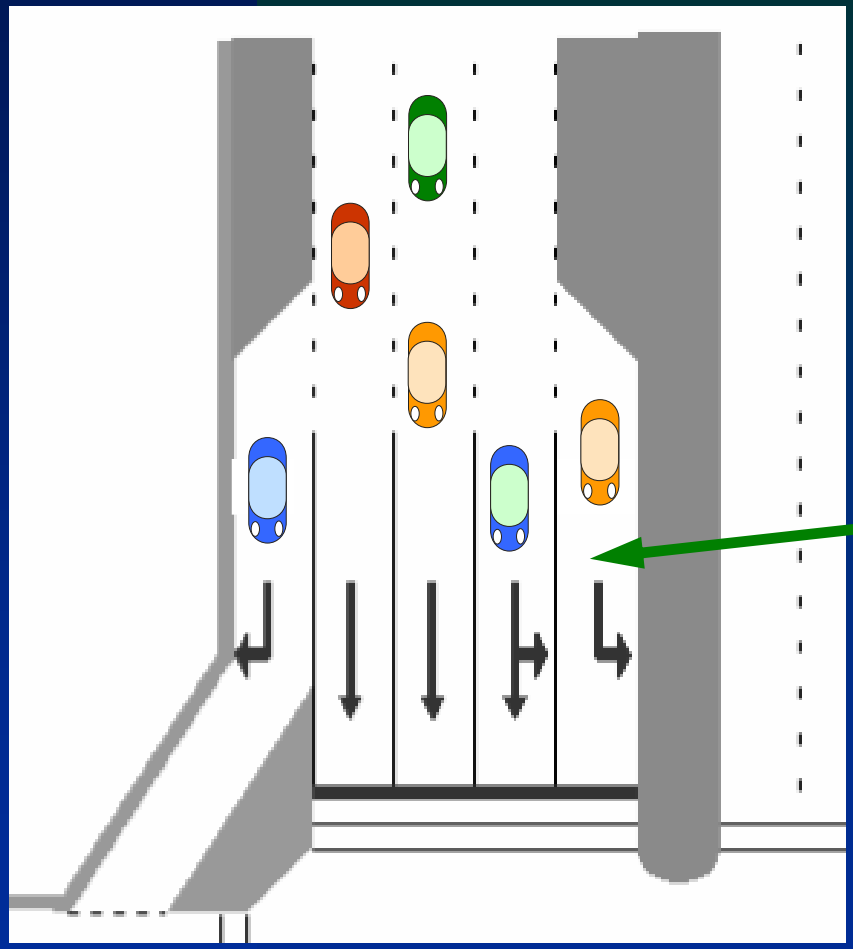
# What makes aaSIDRA different?

# Level of analysis detail



What makes aaSIDRA different?

# Lane-by-lane analysis



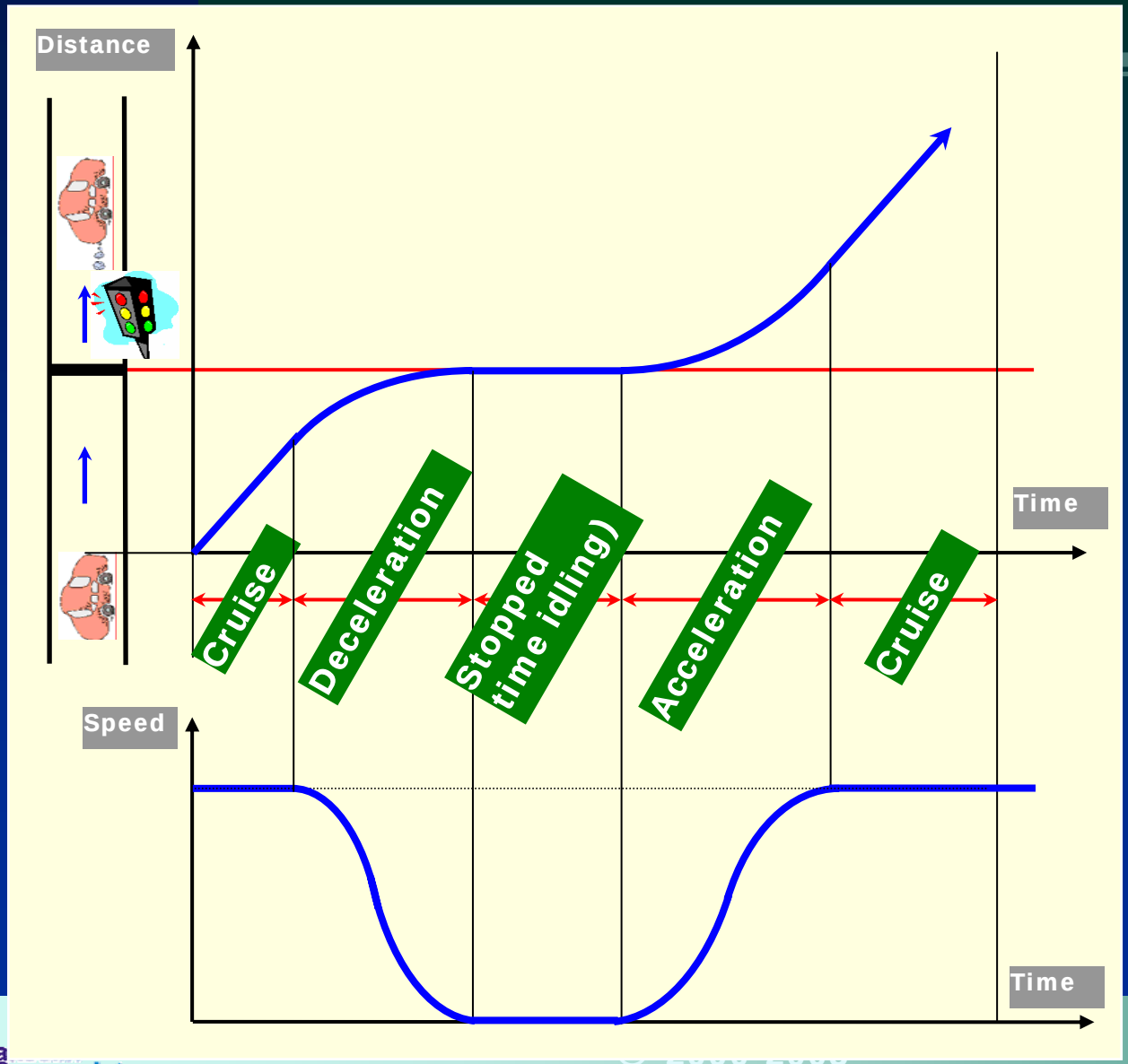
**aaSIDRA is the ONLY major analytical software with lane-by-lane analysis**

**Short lane analysis**

- **Lane flows**
- **Unequal lane use**
- **De facto exclusive lanes**

# What makes aaSIDRA different?

## Four-mode elemental model (drive cycles)



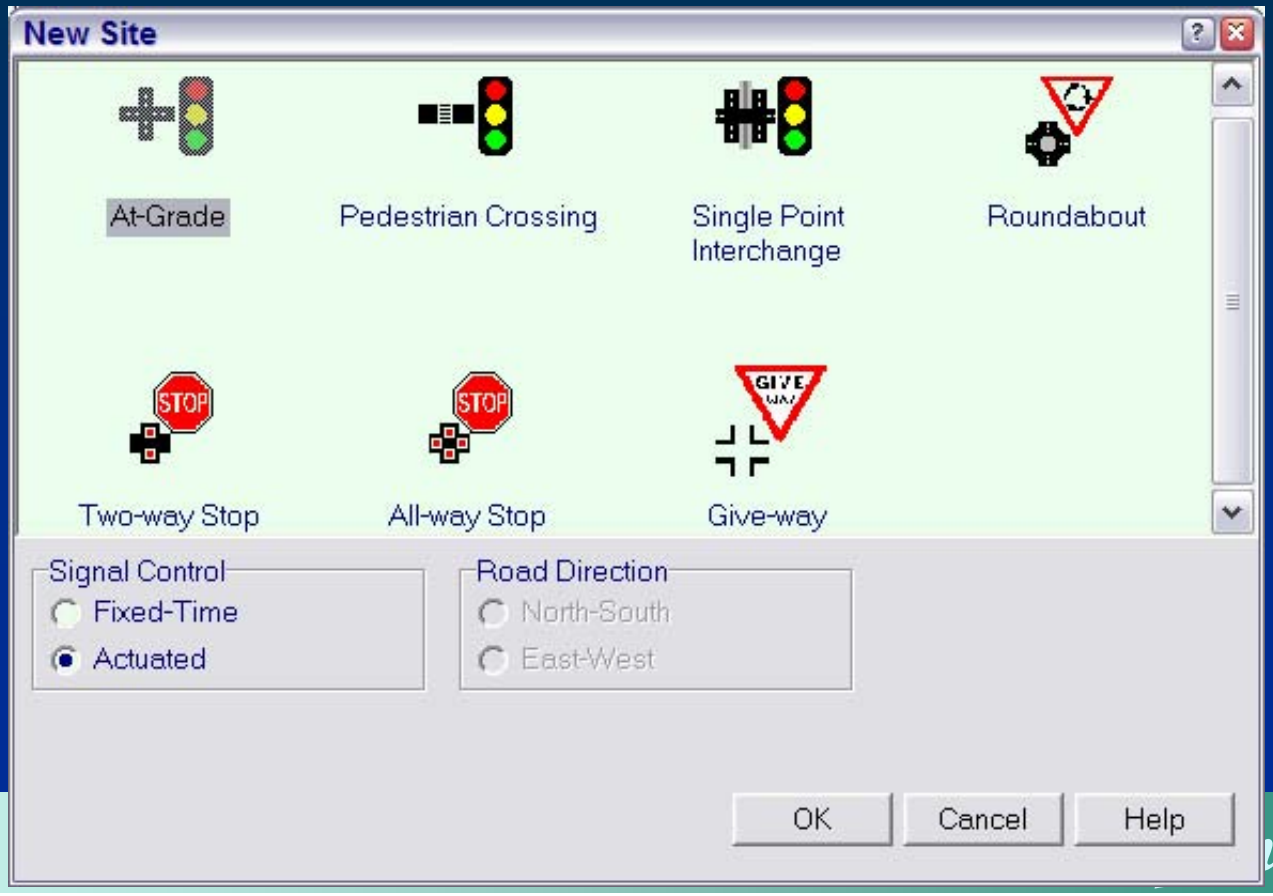

### For modeling

- Geometric delay
- Operating COST
- Fuel consumption
- Emissions

# What makes aaSIDRA different?

# Total intersection analysis tool

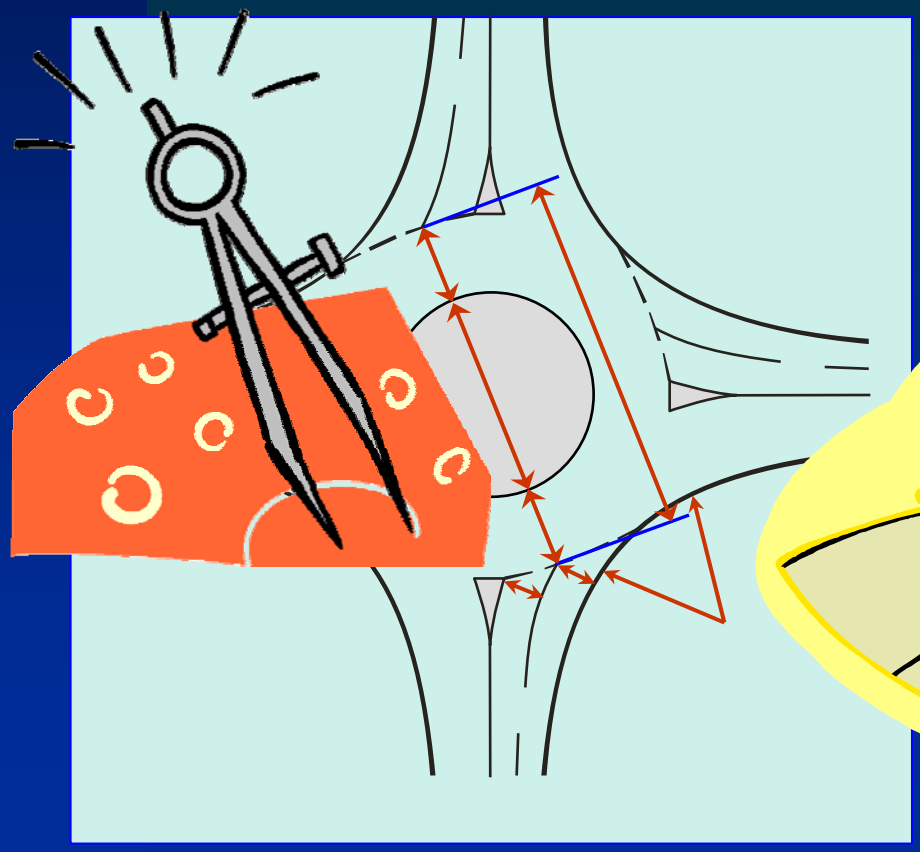
**Model CONSISTENCY in evaluating alternative intersection treatments**

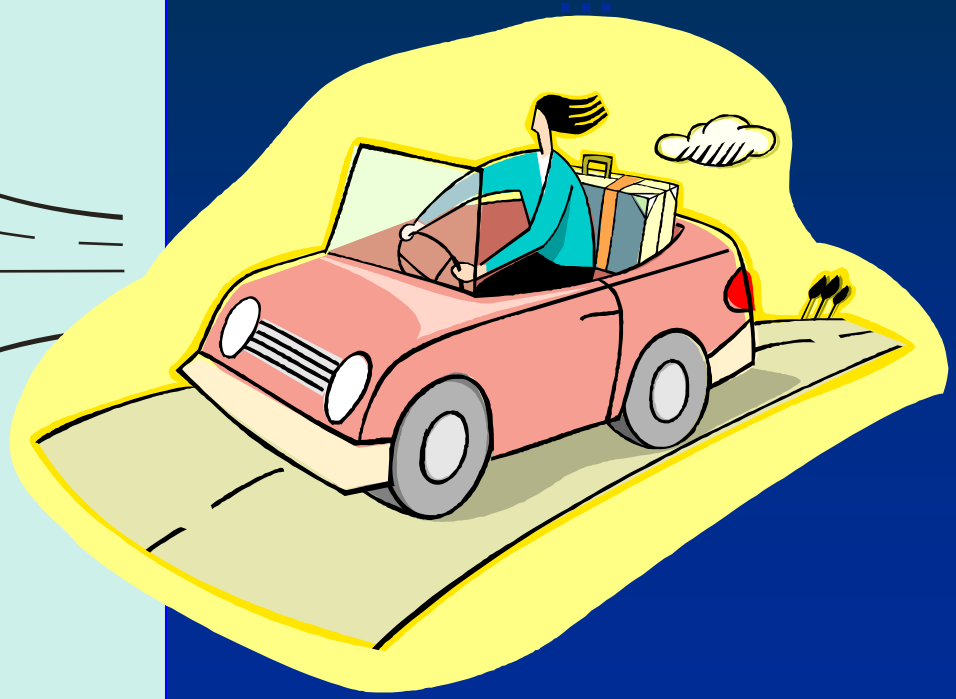


# Roundabout Model

- Geometry
- Driver–Vehicle Characteristics

**BOTH are included in aaSIDRA (not just Geometry)**





# Modeling of LANE USE at roundabouts is very important

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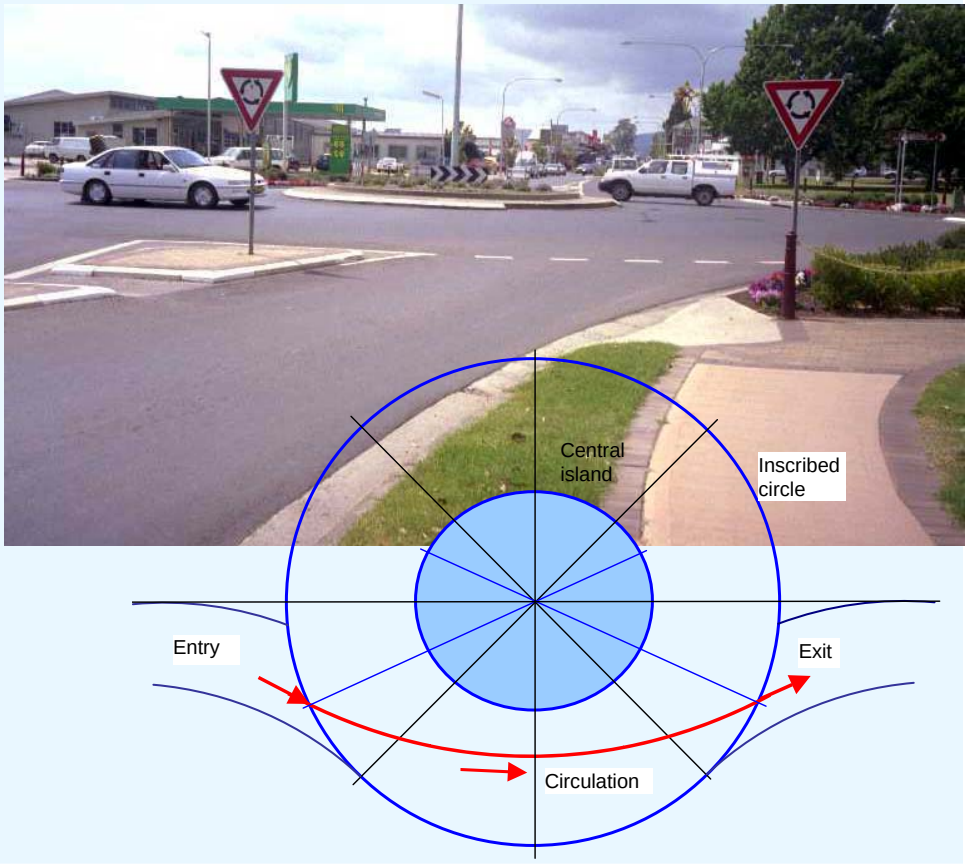
*Power of analysis ...*

# What makes aaSIDRA different?
# **Roundabout design**

## Important for roundabouts with **low demand**: aaSIDRA models negotiation radius, speed and distance allowing for path smoothing by drivers

# What makes aaSIDRA different?

## Roundabout design

**Important for roundabouts with high demand: aaSIDRA identifies congestion caused by heavy circulating flows especially with unbalanced flow patterns**

# What makes aaSIDRA different?
## Roundabout model

**aaSIDRA uses an *empirical gap-acceptance method* to model roundabout capacity and performance.**

**The model allows for the effects of *both roundabout geometry and driver behaviour.***

**It incorporates effects of:**

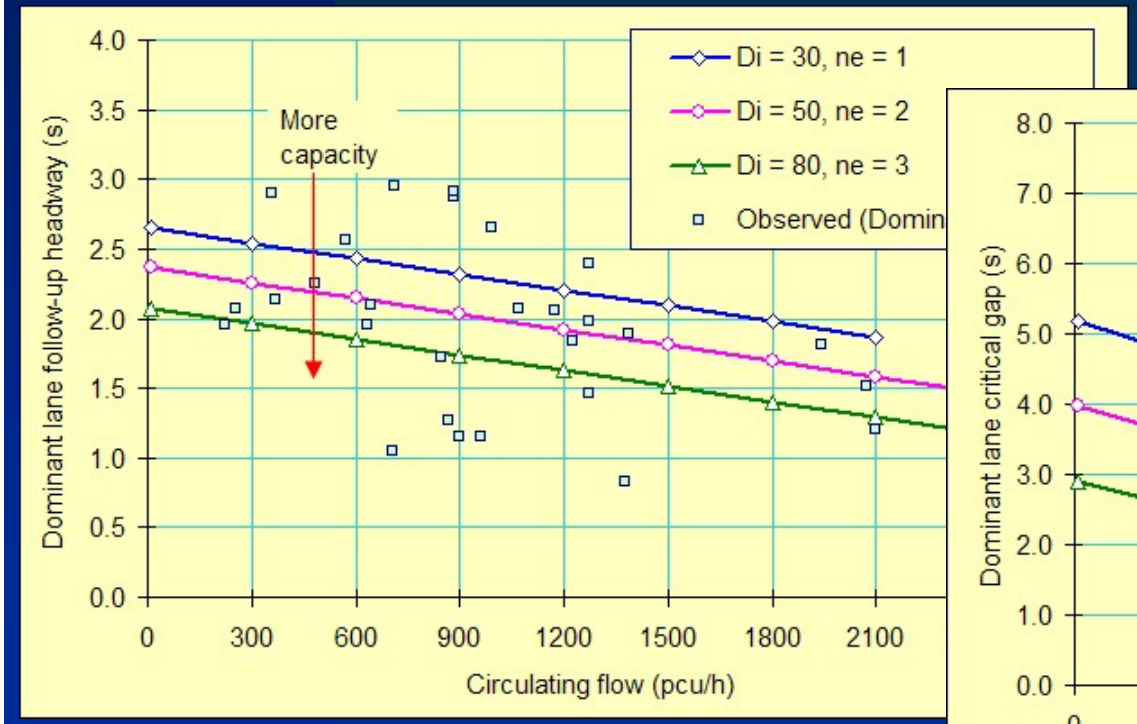
- ***priority reversal*** **(low critical gaps at high circulating flows),**
- ***priority emphasis*** **(unbalanced O-D patterns), and**
- ***unequal lane use*** **(both approach and circulating lanes).**

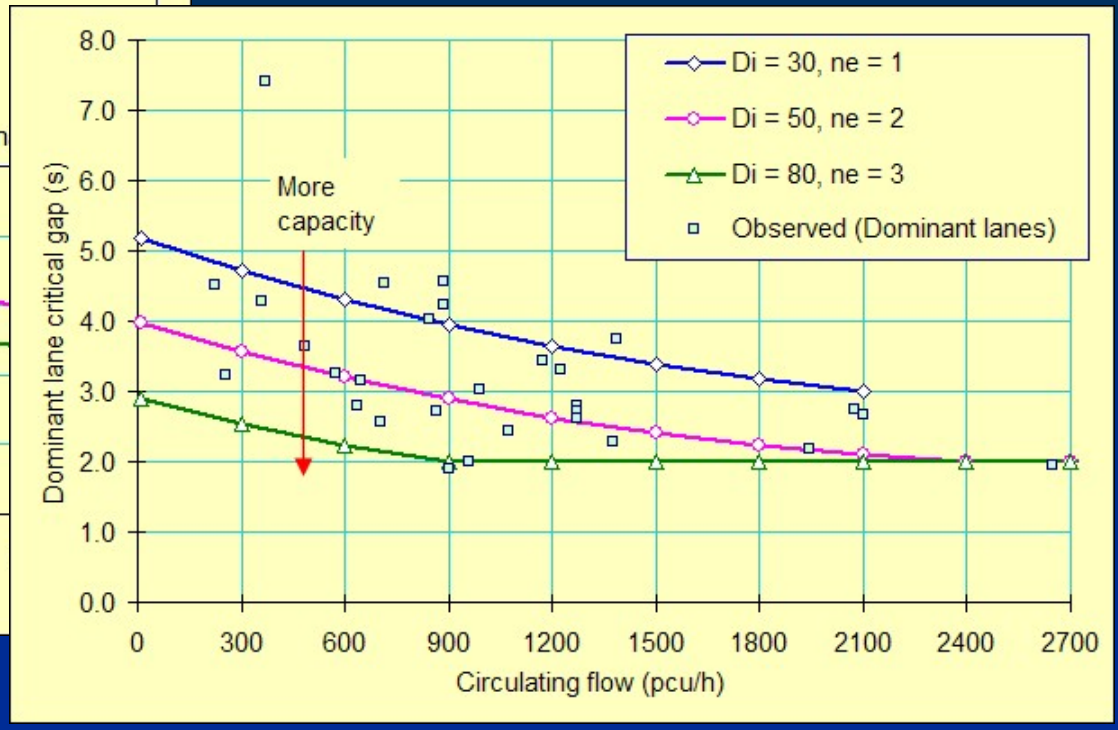
**CAPACITY can be measured as a *service rate* for each traffic *lane* in *undersaturated conditions* according to the HCM definition of capacity to represent *prevailing conditions*.**

# What makes aaSIDRA different?

## Roundabout model

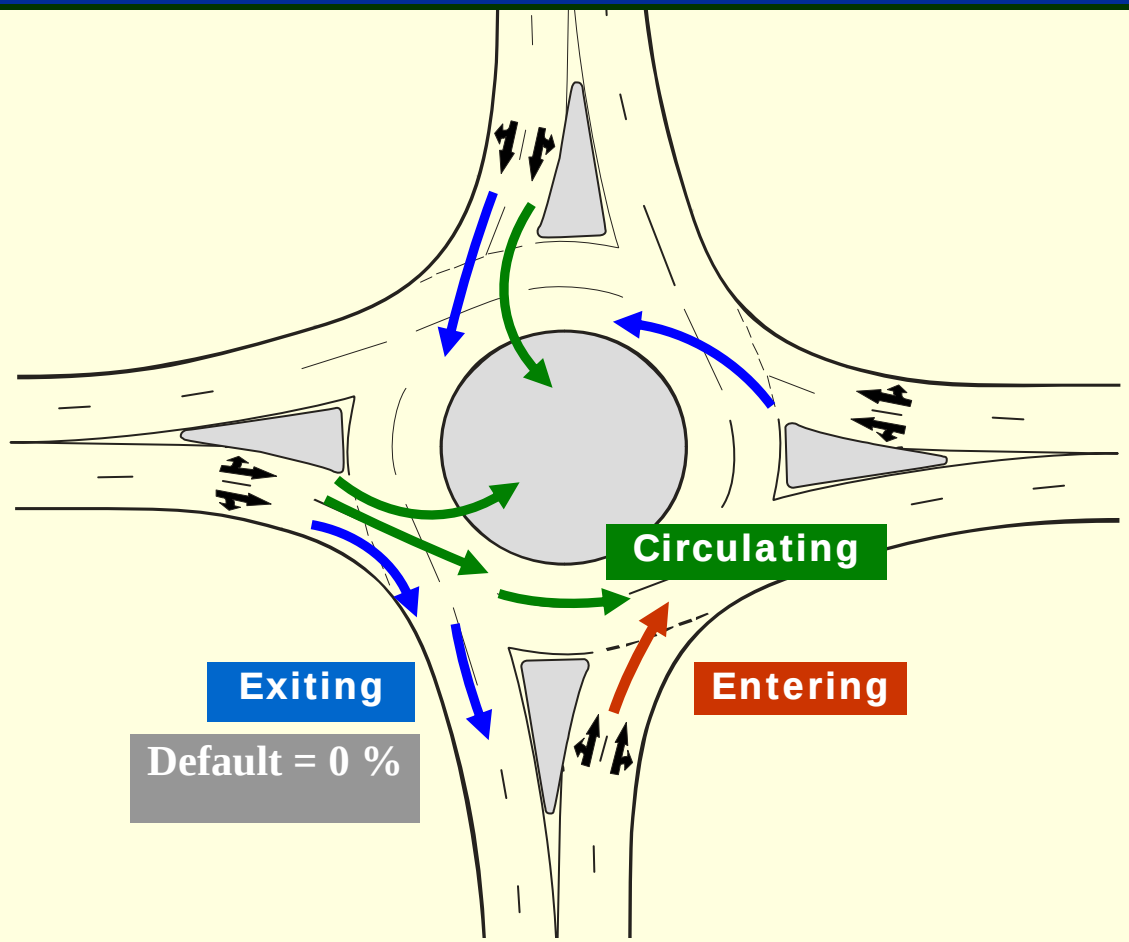
**aaSIDRA gap-acceptance parameters are *NOT fixed*, but vary with roundabout geometry and flow rates.**



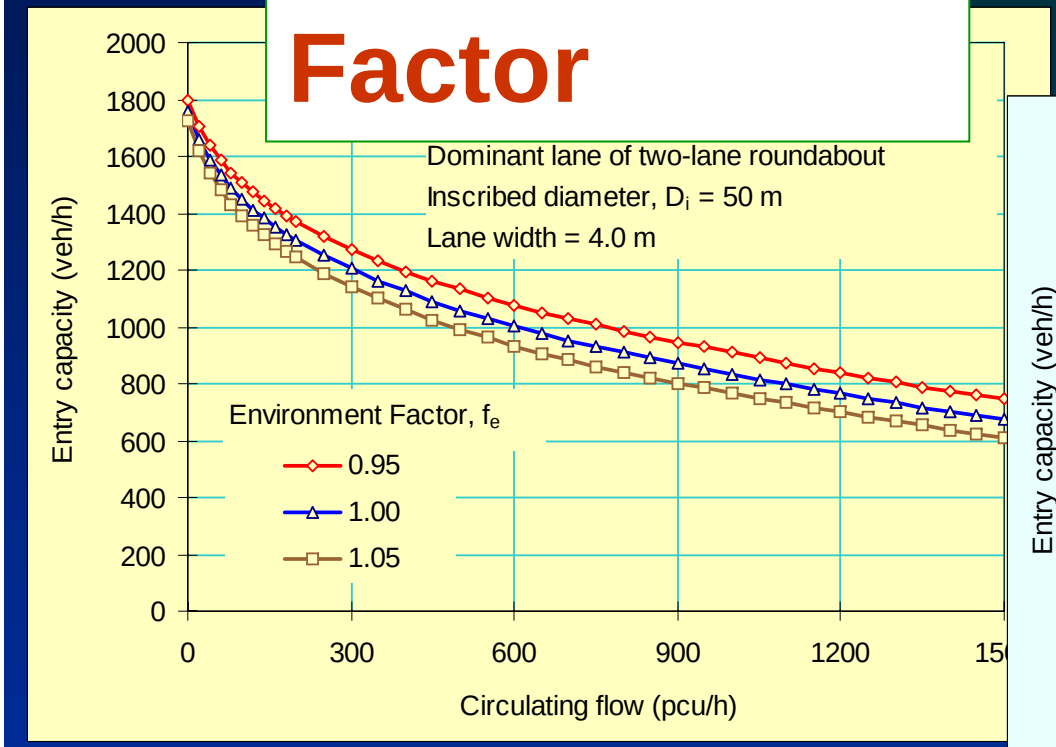
# Dominant flows at roundabouts (effect of O-D demand pattern)

# Effect of Exiting Flow can be included

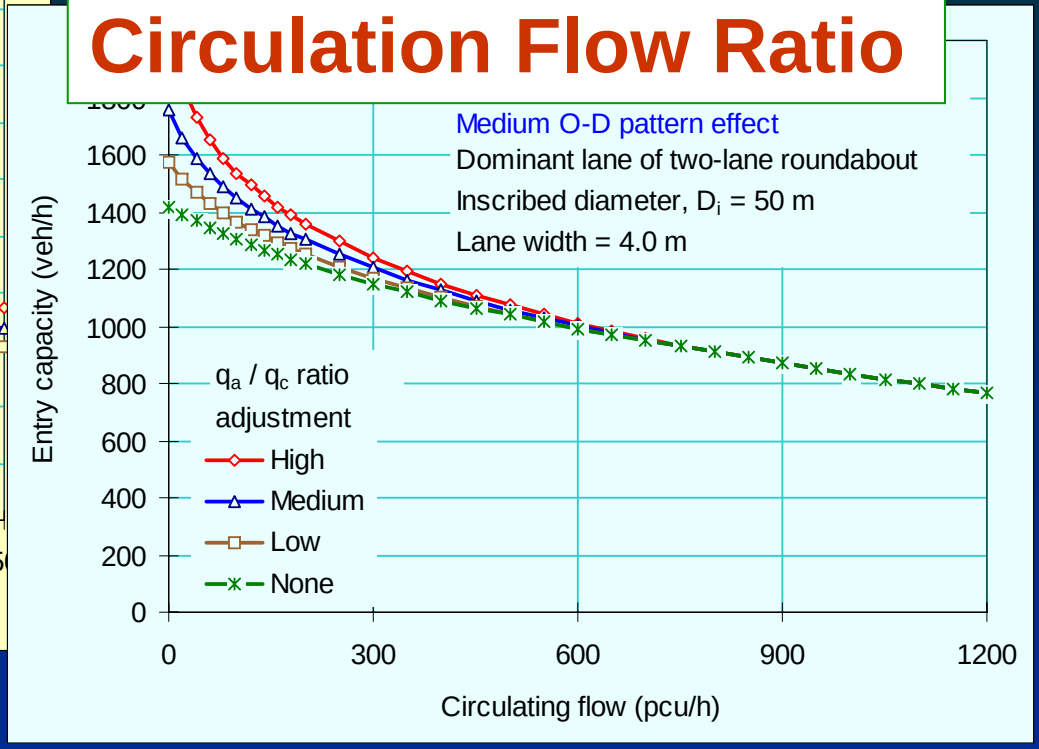


# Model Calibration for local conditions

## Environment Factor




## Adjustment for the Entry Flow / Circulation Flow Ratio

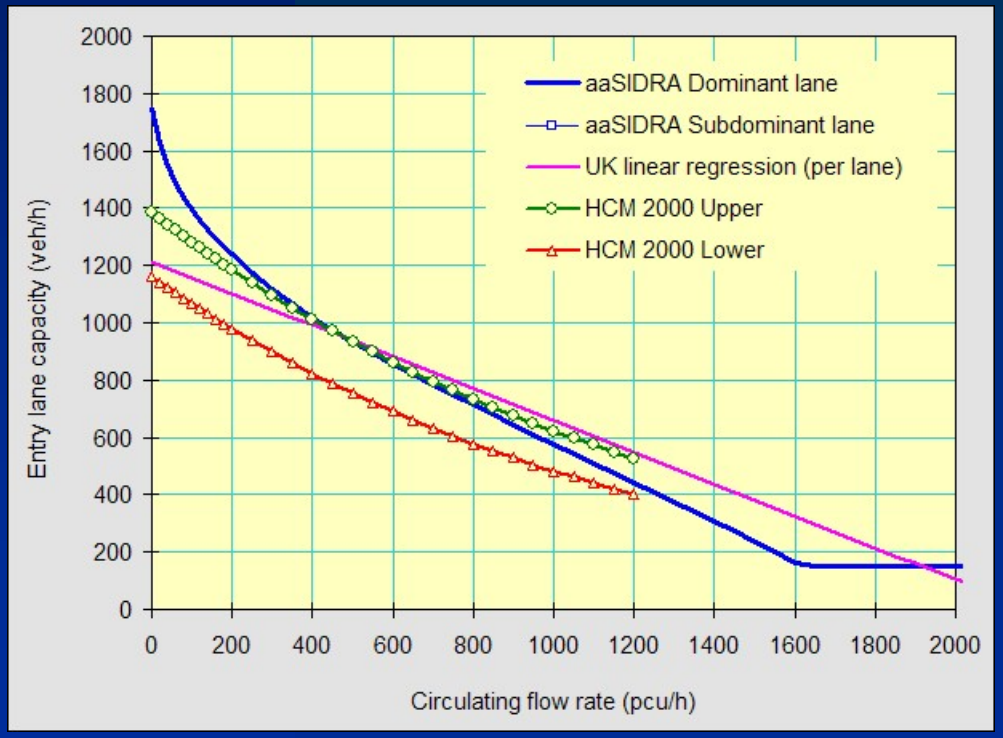


# Model Calibration for local conditions

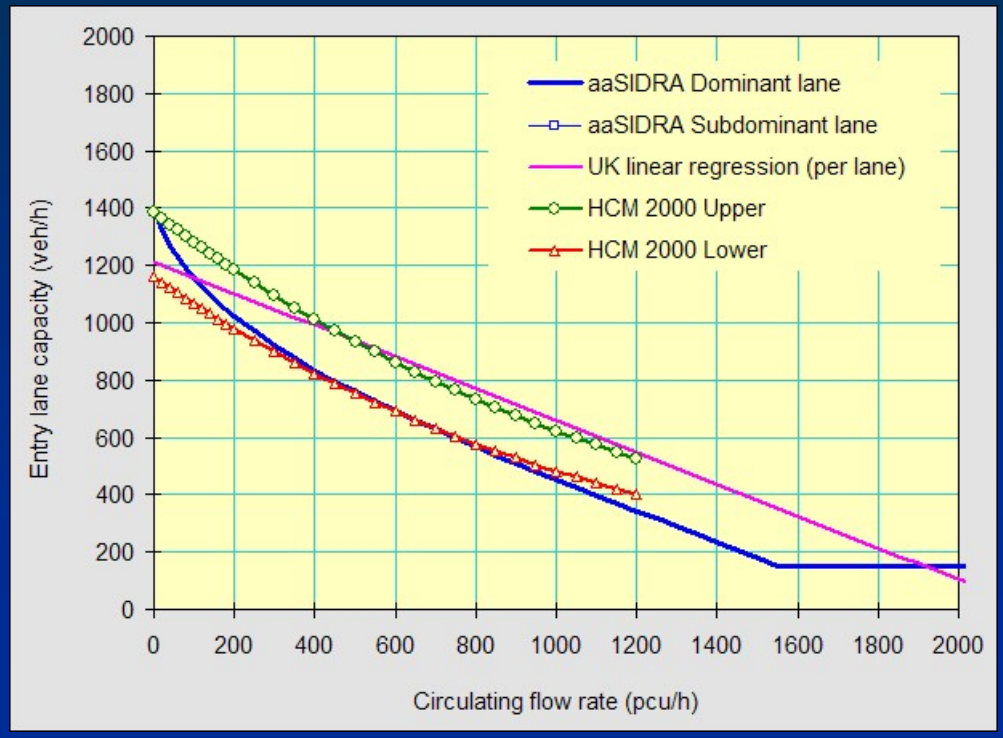
## HCM single-lane roundabout example, WB approach:

**inscribed diameter = 36 m (118 ft), entry lane width = 4.0 m (13 ft), approach half width = 3.5 m (11.5 ft), turn radius = 26 m (84 ft), flare length = 20 m (66 ft), entry angle = 30º**

**aaSIDRA model with default parameters: Environment Factor = 1.0, Medium entry flow adjustment, Medium O-D pattern effect**




**aaSIDRA model calibrated to match the HCM lower capacity model: Environment Factor = 1.15, Low entry flow adjustment, Medium O-D pattern effect**



# Information on roundabouts

**Visit our web page for extensive information on roundabouts**

**www.aatraffic.com/SIDRA/roundabouts.htm**

# aaSIDRA for Roundabouts
# CONCLUSION

- **Paper presentations during the conference:**
  - Session 4A, Monday – Metering Signals
  - Session 7B, Tuesday – Model Calibration
- **DENVER Workshop: 26-27 May**
- **Exhibition:**
  - Leaflet
- **DISCUSS any issues with us**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