

The Accelerated and intelligent collection of RAP attributes

Presentation by Monica Olyslagers, iRAP

Roundtable on Artificial Intelligence in Road Traffic Crash Prevention
10-12 February 2021



**DECADE
OF
ACTION**

*ai*RAP



The *accelerated and intelligent*
collection of RAP attributes



Monica Olyslagers
*Safe Cities and Innovation
Specialist, iRAP*



Daily road crashes

3,600 fatalities

US\$1.7 billion



99,210 severely injured

with brain trauma, internal injuries, spinal and nerve damage, blindness, loss of limbs, third degree burns...

US\$4.3 billion

SUSTAINABLE DEVELOPMENT GOALS

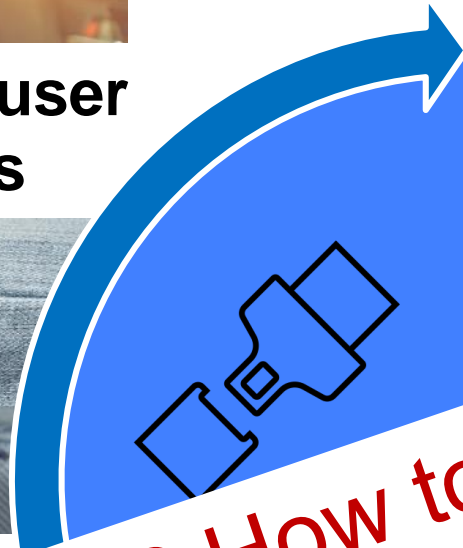


Sustainable Development Goal Target 3.6 aims to **halve** the number of road deaths and injuries by 2030.





Safe road user behaviours



The Challenge? How to implement it on the scale needed to achieve the SDG Target.



Safe roads





What we do

iRAP provides the intelligence, tools, technology and training to:



Inspect high-risk roads and develop Star Ratings, risk maps and safer roads investment plans



Track road safety performance so that funding agencies can assess the benefits of their investments



Build, support and sustain national, regional and local capability



Advocate for safer road policies, planning, design and investment


TARGET **3** | 2030

Target 3: By 2030, all new roads achieve technical standards for all road users that take into account road safety, or meet a three star rating or better.

TARGET **4** | 2030

Target 4: By 2030, more than 75% of travel on existing roads is on roads that meet technical standards for all road users that take into account road safety.



 **100+** countries

 **1,000,000+** km

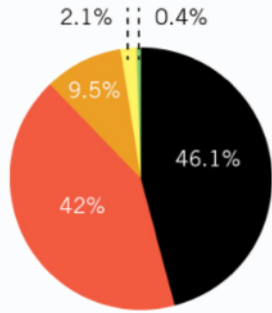
 **us\$75bn+**
investment made safer



Pedestrians



88%
of travel is only
1-2 stars
for pedestrians

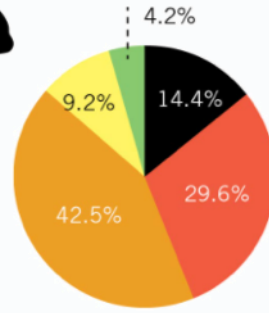


★ 1-star ★★ 2-star ★★★ 3-star ★★★★ 4-star ★★★★★ 5-star

Vehicles



44%
of travel is only
1-2 stars
for vehicles

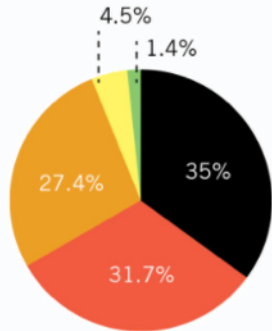


★ 1-star ★★ 2-star ★★★ 3-star ★★★★ 4-star ★★★★★ 5-star

Motorcyclists



67%
of travel is only
1-2 stars
for motorcyclists

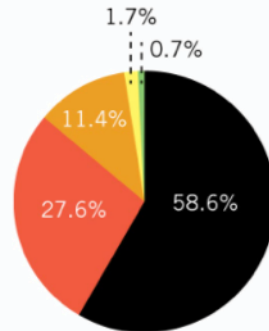


★ 1-star ★★ 2-star ★★★ 3-star ★★★★ 4-star ★★★★★ 5-star

Bicyclists

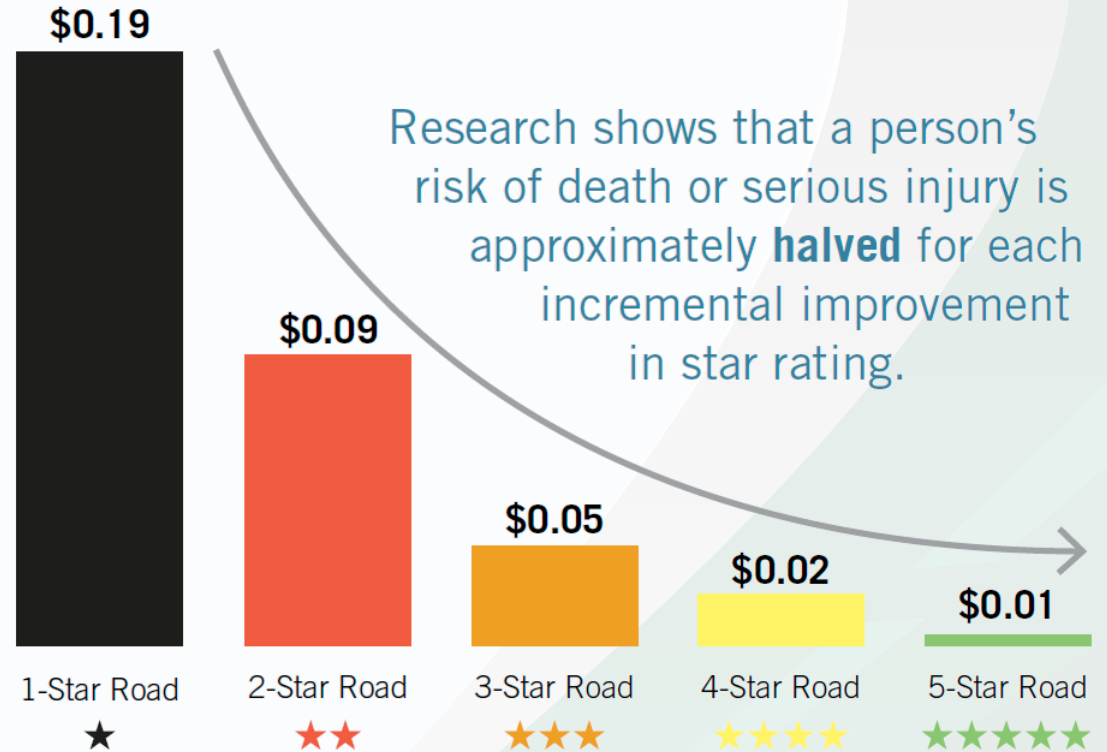


86%
of travel is only
1-2 stars
for bicyclists



★ 1-star ★★ 2-star ★★★ 3-star ★★★★ 4-star ★★★★★ 5-star

**Cost of killed and seriously injured
per vehicle-km travelled (USD\$)**



Source: OECD (2016)

Paved shoulder
Side walk provision
Roadside object
Roadside distance

Intersection type
Intersection quality
Intersecting volume
Channelisation
Property access point

Motorcycle facility
Bicycle facility
Bicycles flow
Pedestrian flow

Crossing facility
Crossing quality
Speed management
Roadworks

Lane width
Number of lanes
Road condition
Skid resistance

Median
Centreline rumble strips
Sight distance
Delineation
Grade

Curvature
Quality of curve

Area type
Speed
Vehicle flow

Street lighting
Shoulder rumble strips
Vehicle parking
Service road
Pedestrian fencing





Road attributes



Star Ratings

Safer Road Investment Plans

Risk factors



Treatments

BCR of safety measures

FSI estimation

Research & evidence



iRAP Coding Manual
Drive on the right edition

www.irap.org

Because every life counts.



iRAP Road Attribute Risk Factors: Facilities for Bicycles

iRAP Road Attribute Risk Factors: Delineation

iRAP Road Attribute Risk Factors: Curvature

iRAP Road Attribute Risk Factors: Centreline Rumble Strips

This technical document describes the most influential risk factors used in the iRAP methodology for Separation Rumble Strips. Centreline Rumble Strips also referred to as raised profile centre lines or audible centre lines can be used to delineate the centre of paved roads. They act as providing visual information. Centreline Rumble Strips can also be heard and felt by drivers and cyclists.

About risk factors

Risk factors, sometimes called modification factors (CMFs), are used in the iRAP Star Rating methodology to relate road attributes and road users. Risk factors (or CMFs) are identified by the Crash Modification Factor (CMF) studies as follows:

A crash modification factor (CMF) is a multiplicative factor used to calculate the expected number of crashes (also known as a crash modification rate) at a specific site.

For example, an intervention is considered to be a 10% reduction in crashes and 100 expected crashes per year. If you have a centreline rumble strip at a length of 100m of the road length of 1000m (0.10). The CMF would be 0.90. This means that the expected number of crashes per year following the intervention would be 0.90 x 100 = 90.

Related documents

The handbook should be read in conjunction with:

- Star Rating Guide for Safety: The iRAP methodology.
- Safer Road Investment Plans: The iRAP methodology.
- Star Rating and Investment Plan Coding Manual.
- Road Safety Audit (RSA) Handbook.

Risk Factors

Risk factors by road attribute category, road user type and crash type	Weighting	Weighting	Weighting
Separation Rumble Strips	1.0	1.0	1.0
Centreline Rumble Strips	1.0	1.0	1.0
Other	1.0	1.0	1.0

iRAP Methodology Fact Sheet #11: Countermeasures

iRAP Methodology Fact Sheet #10: Casualty estimation and calibration

iRAP Methodology Fact Sheet #9: Star Rating worked example

iRAP Methodology Fact Sheet #8: Smoothed Star Ratings

This handbook is part of a series that describes the iRAP methodology. It provides an overview of the process used to smooth Star Ratings.

Related documents

The handbook should be read in conjunction with:

- Other fact sheets in the iRAP Methodology Fact Sheet series.
- iRAP Road Attribute Risk Factors Handbook.
- Star Rating Guide.

Why smoothing is necessary

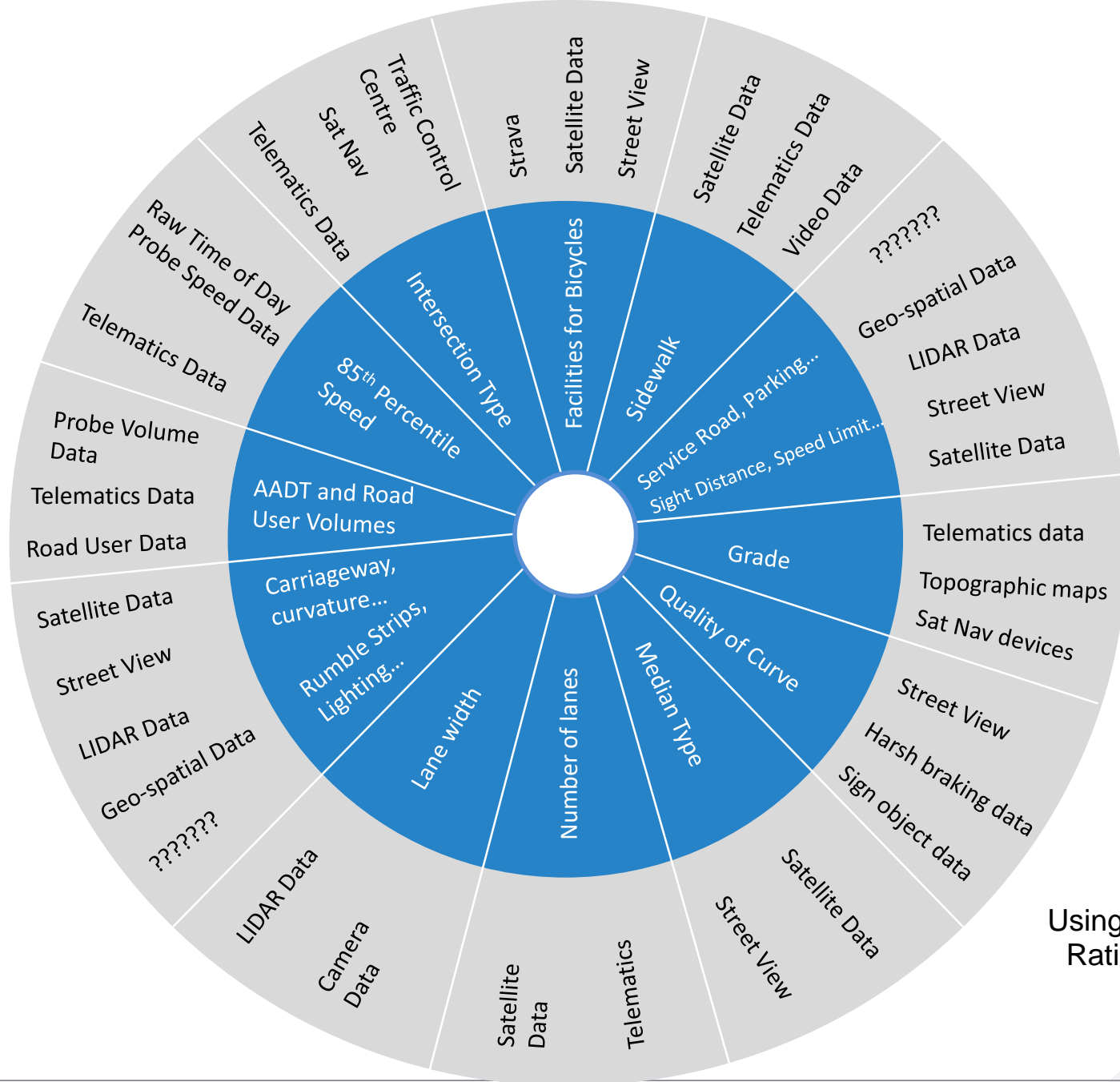
A Star Rating Score (SRS) is calculated for each 100 metre segment of road for vehicles occupants, pedestrians, bicyclists and motorcyclists. These scores are then averaged to give the Star Rating for each 100 metre road segment. The 100 metre road segment is used to calculate the SRS. The SRS is then smoothed to give the final Star Rating. The effect of smoothing is illustrated in the graph below, which shows the variation in the SRS in grey and smoothed SRS in white.

Star Rating Score (SRS) and smoothed SRS (SRS)

PRINT WARNING: printed copies of this document or parts thereof shall not be used as a legal reference document. Always refer to the electronic copy for the latest version at www.irap.org/Methodology_Fact_Sheet_11_Countermeasures

EuroRAP

- Globally applicable models for 4 road user groups: Pedestrians, bicyclists, motorcyclists and vehicle occupants.
- Supported by evidence documented in our Methodology Factsheets www.irap.org/methodology
- The Coding Manual ensures data is collected to the global standard www.irap.org/specifications

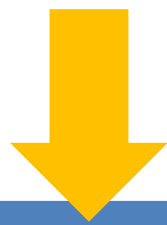
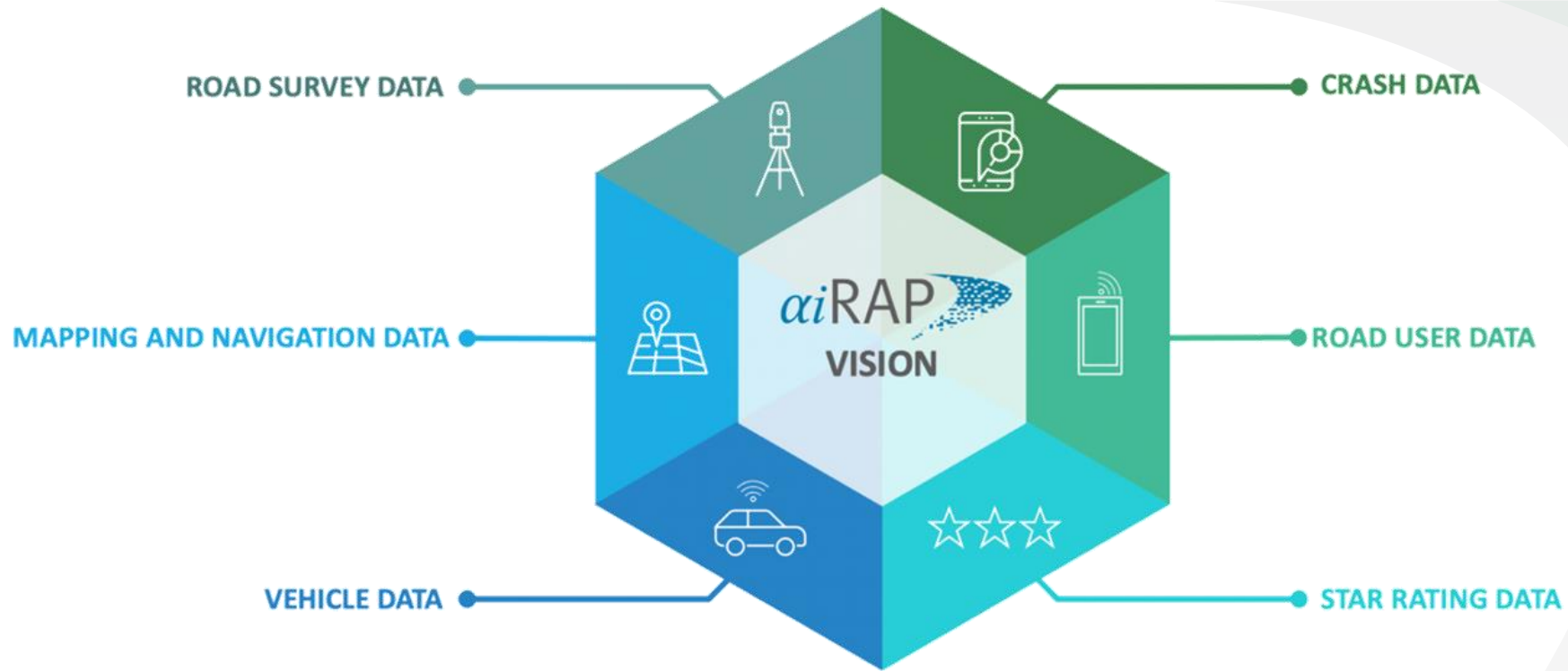


*ai*RAP

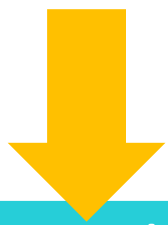
The *accelerated and intelligent* collection of RAP attributes

★ Using new data sources for iRAP Star Rating assessments and crash risk mapping

✓ Managing quality



Readily available
Data collected, stored and readily available, i.e. minimum 'conversion' is required



Compute on demand
Data collected but converted into iRAP attributes as needed, i.e. moderate – high 'conversion' required

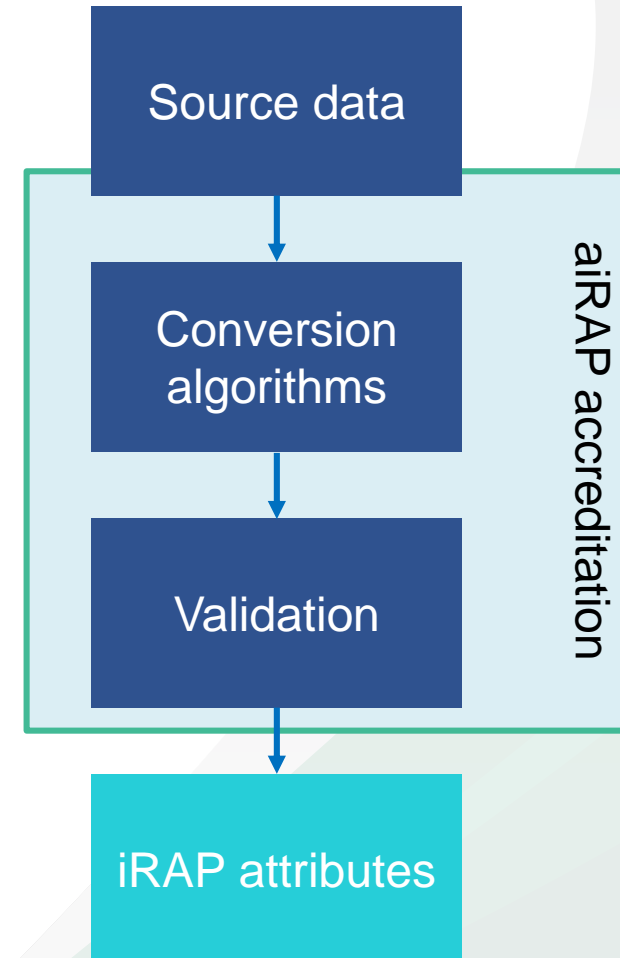


Collect and compute on demand
Data needs to be collected and converted

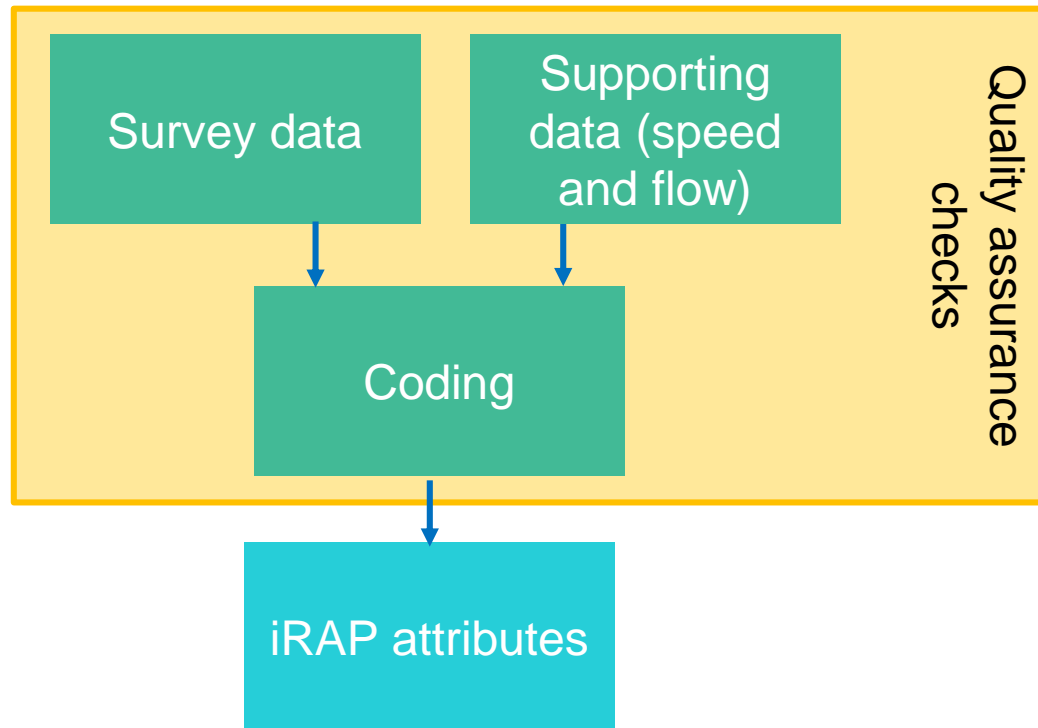
Data quality and consistency is key!

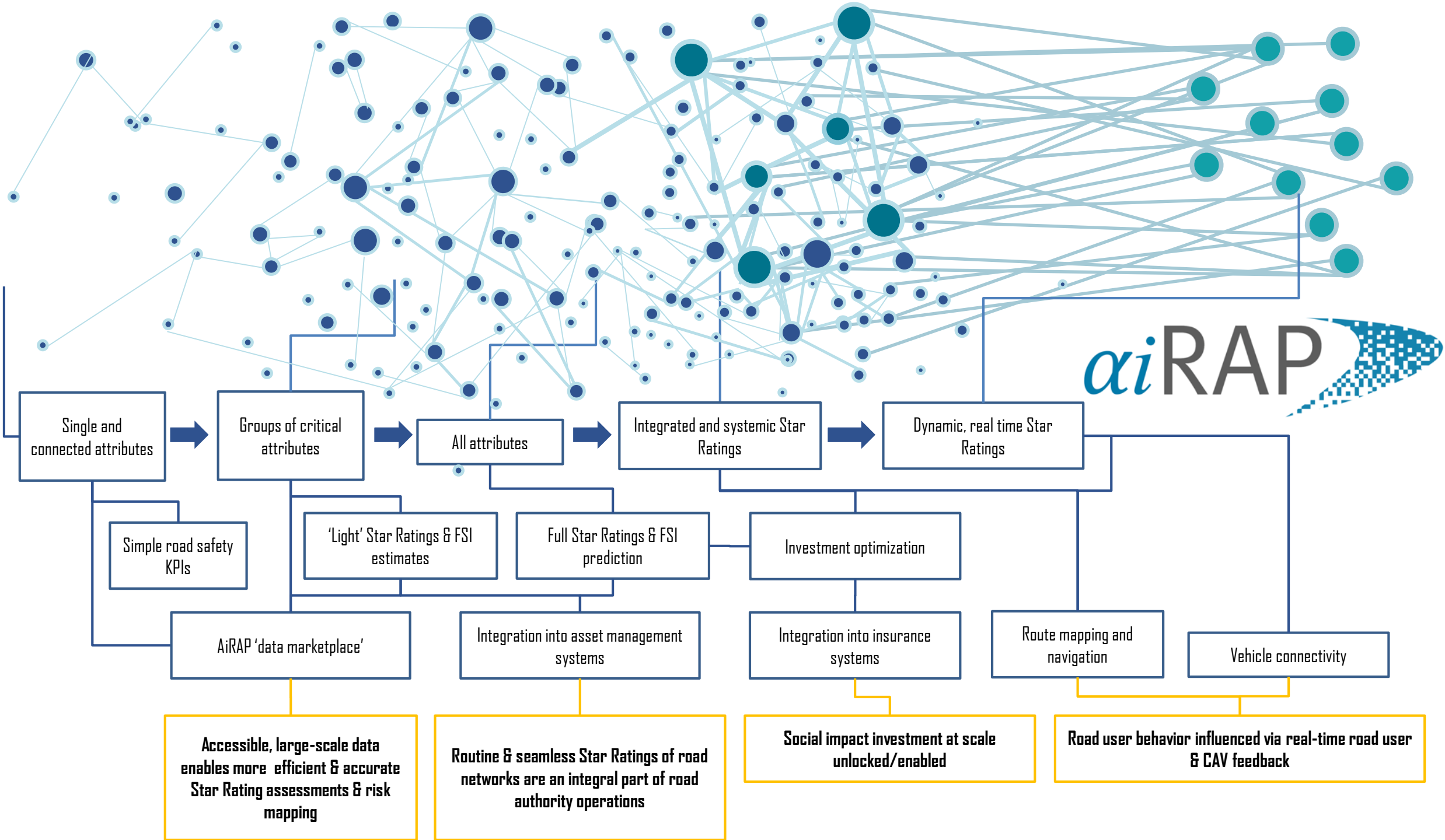


AiRAP method



Conventional methods





Questions?

Monica.Olyslagers@irap.org

[Linkedin.com/in/monica-o-51818185](https://www.linkedin.com/in/monica-o-51818185)