OICA

How Technical Regulations cover the partial use of Machine Learning today

Artificial Intelligence || Machine Learning

Artificial intelligence is a set of methods or automated entities that together build, optimize and apply a model so that the system can, for a given set of predefined tasks, compute predictions, recommendations, or decisions.

Machine learning is a collection of data-based computational techniques to create an ability to learn without following explicit instructions such that the model's behavior reflects patterns in data or experience.

Status quo
for maintaining vehicle safety

- Software Updates had to be made in the maintenance center during regular service or recalls
- No feedback from vehicle in field
- Time to market was depending on
  - Time to redevelop the software
  - Time to write software code
  - Time to test software
  - Time until all affected vehicles had visited the garage to get updated

Use of Machine Learning
for maintaining vehicle safety

- Vehicular Communication enables Manufacturers to get field data from vehicles
- Artificial Intelligence/Machine learning may accelerate processes regarding
  - Redevelopment after report of findings
  - Writing software code
  - Virtual testing
- Vehicular Communication allows it to send an Update “over the Air”
- Manufacturers can respond faster by improving or expanding in-vehicle features and maintaining cybersecurity

Artificial Intelligence
and technical regulations

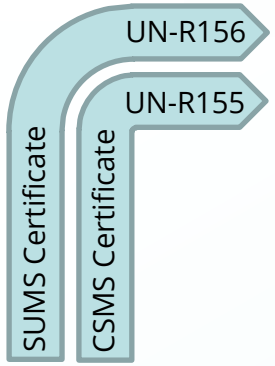
- Derive between functions, that are
  - Non type approval relevant
    - Infotainment
    - Speech recognition
    - Comfort functions (heated seats,…)
  - Type approval relevant
    - Steering, Brakes, Engine and Exhaust gas aftertreatments
    - Driver assistant systems
    - Automated Driving Functions
    - …

Introducing Machine Learning to the Type Approval Process according to the 1958 agreement

Technical Regulation of UNECE

Technical Regulations (e.g. according to the 1958 Agreement of the UNECE) are defining a **harmonization of minimum performance requirements and safety** to be fulfilled by a vehicle In order to be **certified with a Type Approval** that is accepted in 56 member states and therefore reduces efforts to bring vehicles to the market.

Type Approval
Coverage of Technical regulations



A Vehicle Manufacturer, who is planning to bring vehicles on the market which software is able to be updated needs to have a Certificate according to the technical regulations for Cybersecurity (UN-R155) and software updates (UN-R156)

CSMS: Cybersecurity Management System

SUMS: Software Update Management System

TAR: Type Approval Relevant

RxSWIN: Software Identification Number according to UN-R156

Type Approval
Coverage of Technical regulations

After the schematic development of a function, Software code will be created.

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Type Approval
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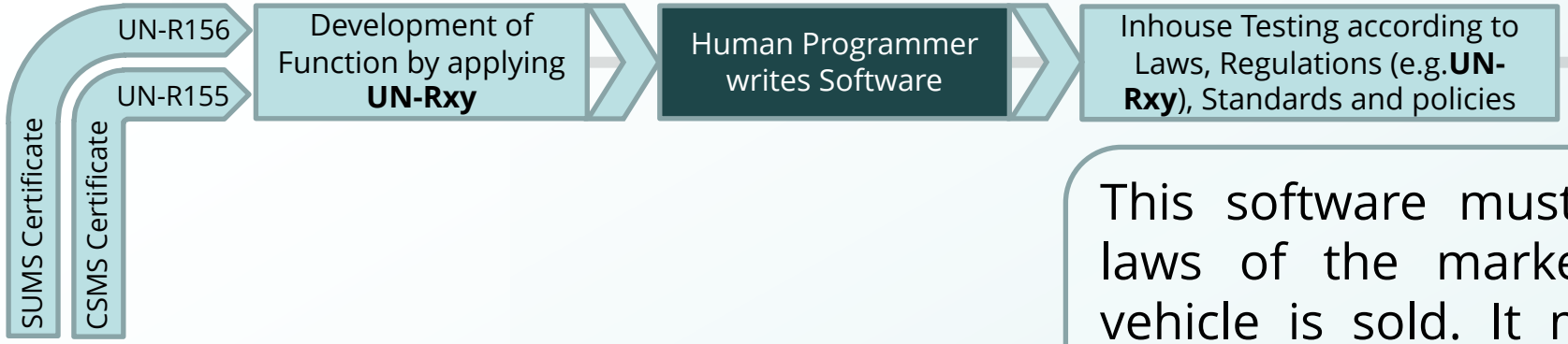

This software must comply with all laws of the markets in which the vehicle is sold. It must comply with internationally harmonized and national regulations as well as internal quality policies.

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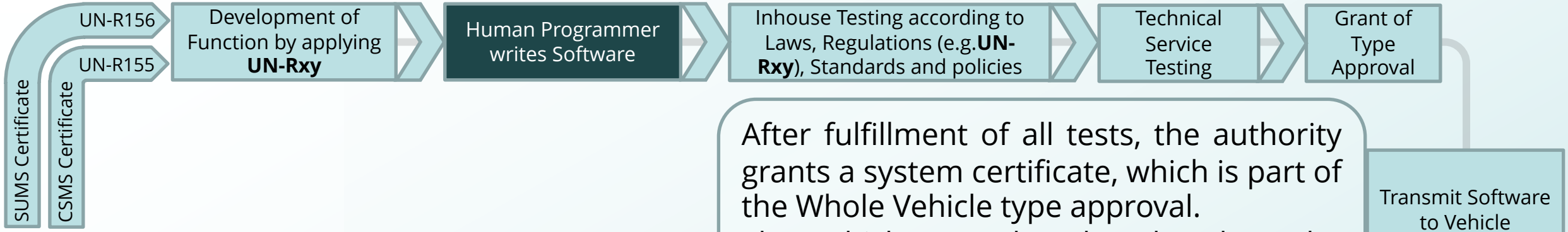

After fulfillment of all tests, the authority grants a system certificate, which is part of the Whole Vehicle type approval.
The Vehicle may then be placed on the market as it is compliant.

Transmit Software to Vehicle

placing vehicle on the market

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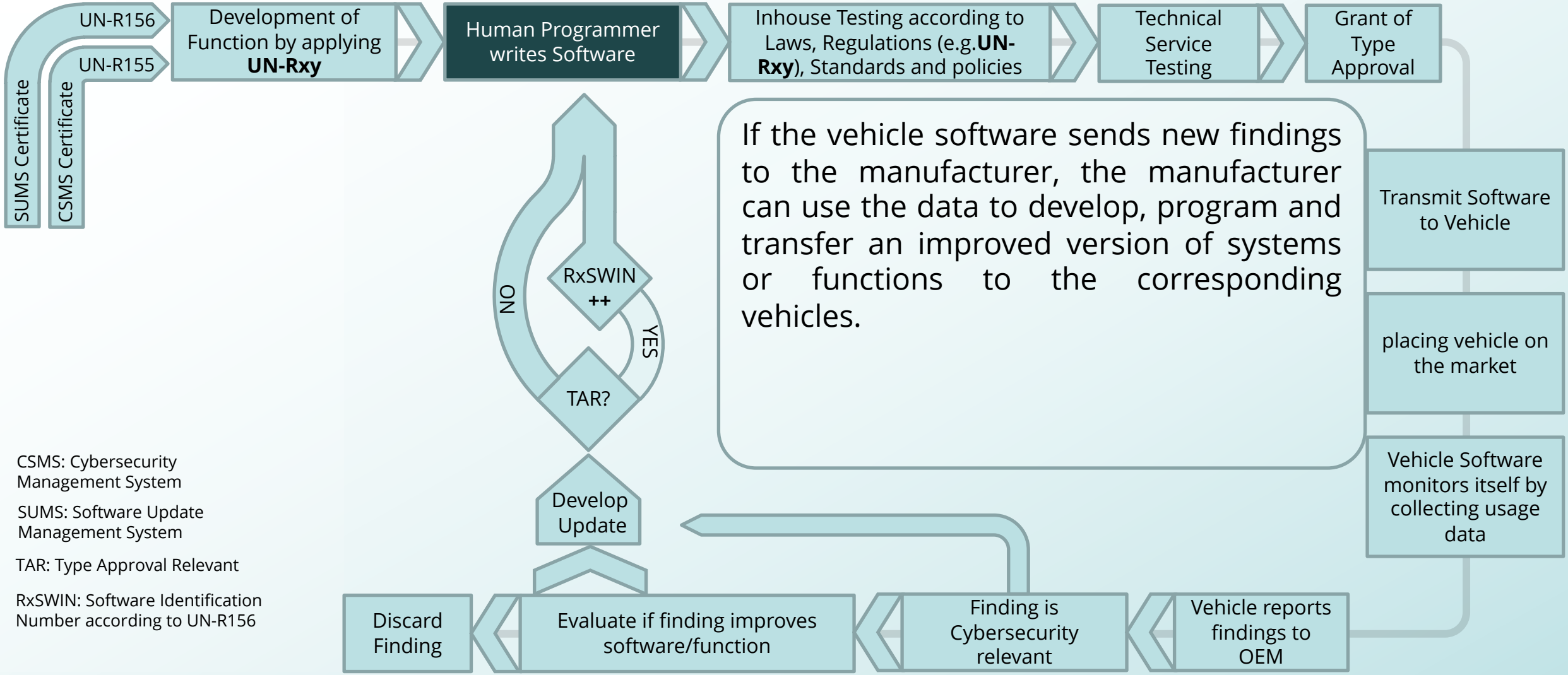

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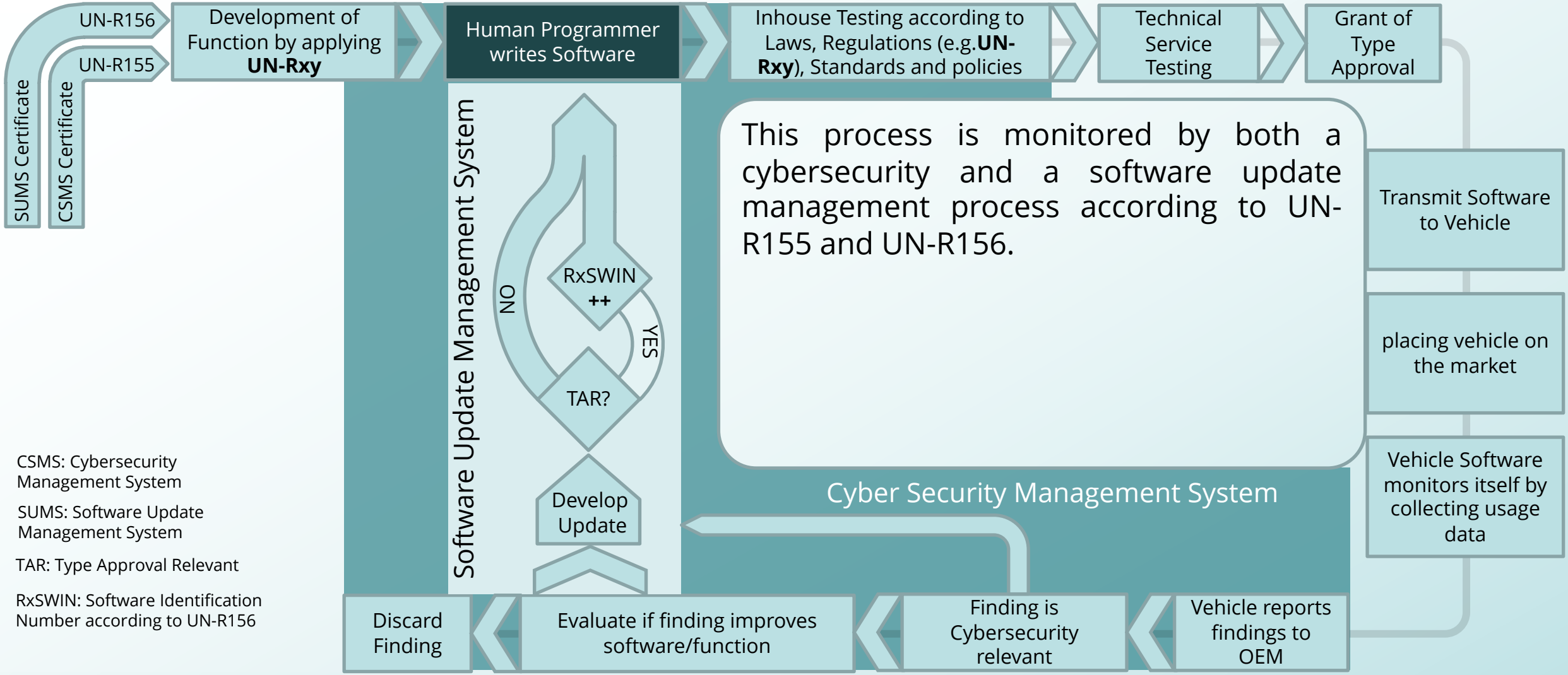

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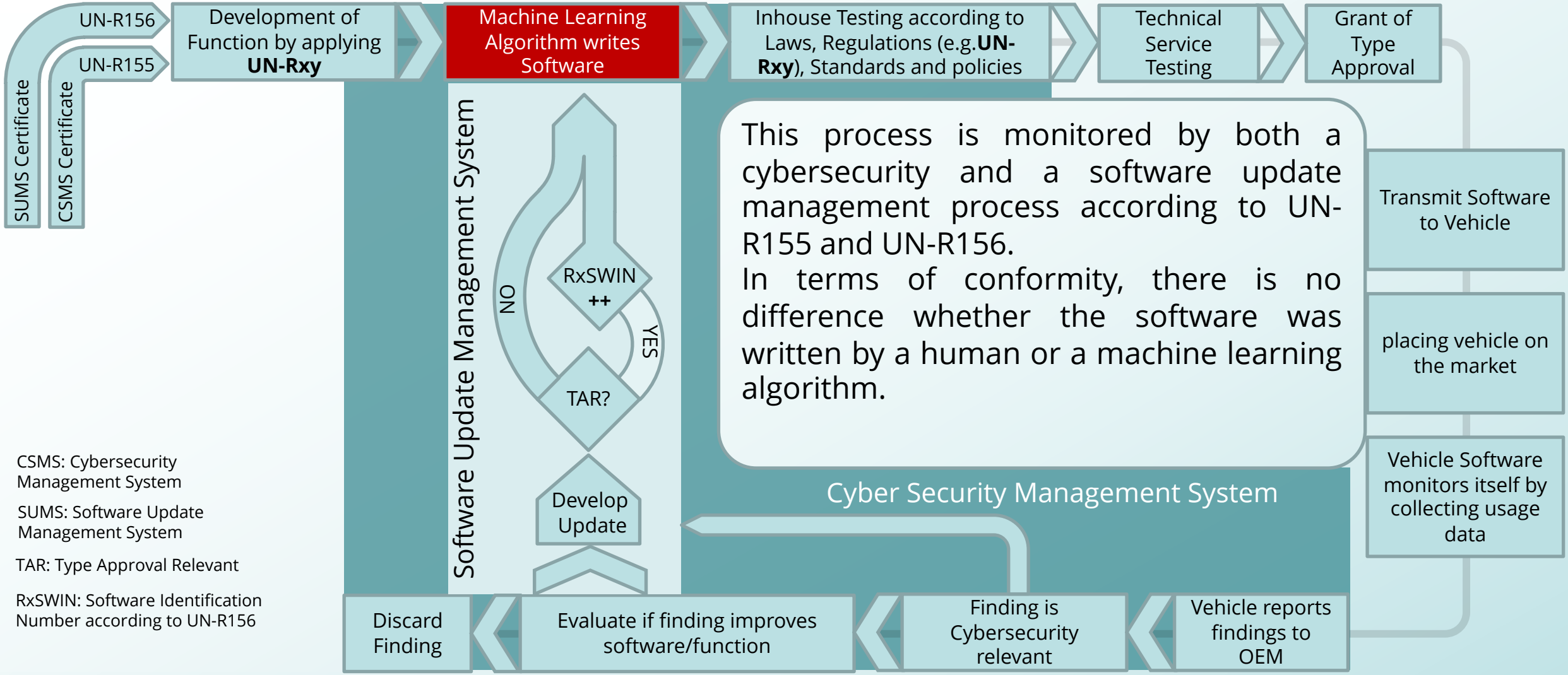

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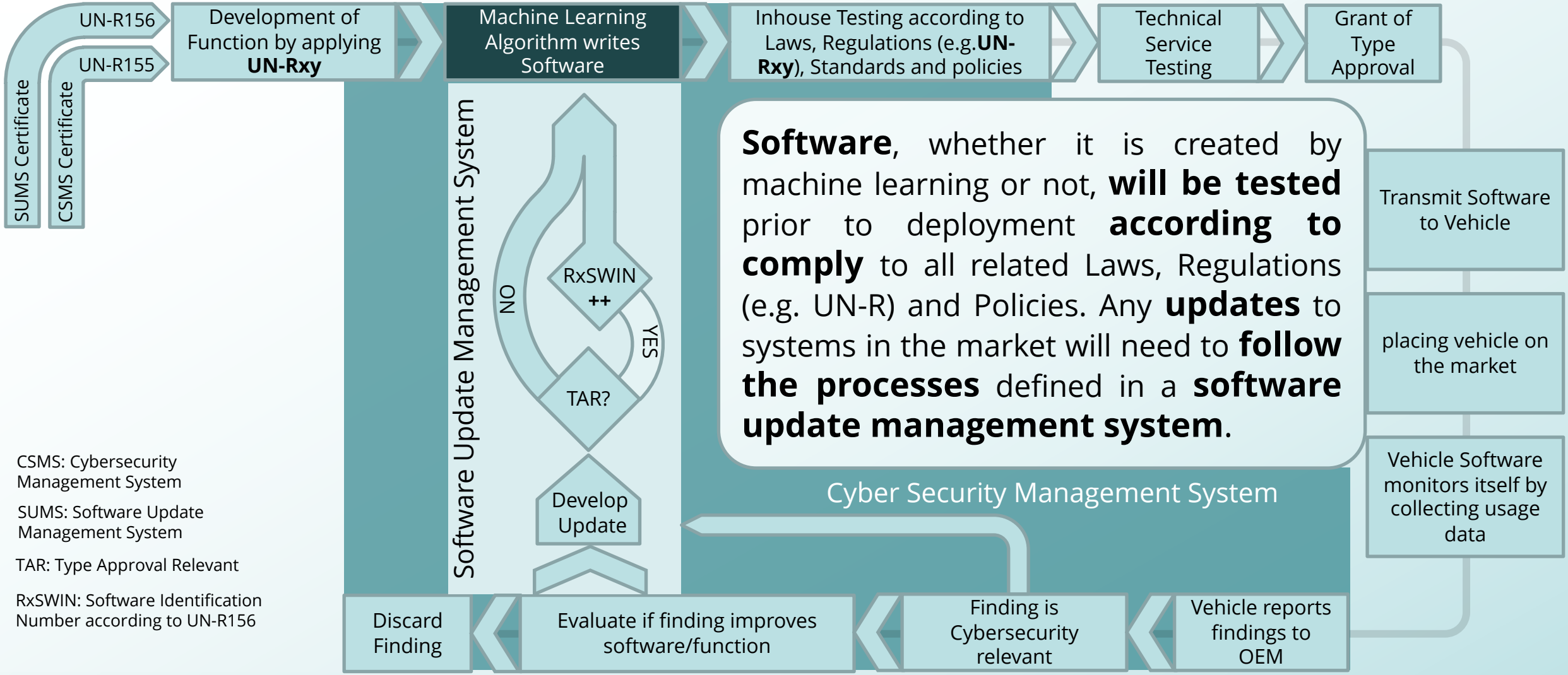

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THANK YOU