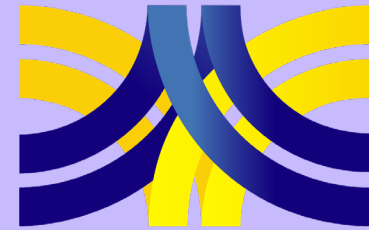


49th ASECAP DAYS

*Decarbonizing Road Infrastructure : Challenges,
Perspectives and Actions in Tough Economy*

ASECAP DAYS



BRUSSELS 2022



Hotel Marriott Grand Place, Brussels
24 – 25 November 2022

ASECAP DAYS



BRUSSELS 2022

Contribution of the introduction of new technologies to the greening of toll enforcement

Davorin Medved Senior Officer at the
Dars Enforcement Office

DARS d.d., Motorway Company in the
Republic of Slovenia

DARS



Enforcement DARS d.d.

How can enforcement contribute to reducing the carbon footprint?

Main goal: efficiency without interfering to the free traffic flow



Introduction: Enforcement environment

1. Legislation
2. Infrastructure
3. Equipment
4. Organization

Legislation

1. Authority
2. Data gathering
3. International cooperation
4. Personal data protection

Infrastructure

1. Highway construction
2. Highway maintenance
3. Roadside and safety equipment
4. C-ITS: Cooperative Intelligent Transport Systems and Services

Equipment

1. Enforcement vehicles
2. Dars enforcement equipment
3. Dars enforcement applications

Organization

1. 8 Local enforcement centers
2. 3 Regional enforcement centers
3. OCCN (Operational enforcement center)
4. Offense Authority Office (PO)

1. Authority

- empowerment of enforcement organizations
- quick and efficient execution of offense proceedings

2. Data gathering

- gathering technical data of the vehicles of interest
- gathering personal data of the vehicle drivers and owners

Legislation

3. International cooperation

- harmonized legislation
- data exchange - EUCARIS



4. Personal data protection

- collection and processing of personal data in accordance with the GDPR



1. highway construction

- Planning
- Placement
- Construction

2. highway maintenance

- Highway inspection
- Maintenance equipment
- Damage repair
- Winter service

Infrastructure

3. roadside and safety equipment

- Video surveillance cameras
- Changeable traffic signs
- System for weighing the HV while driving
- Smart tunnels
- Dangerous cargo detection in tunnels
- Roadside weather stations
- Traffic counters

4. C-ITS: Cooperative Intelligent Transport Systems and Services

- Road Safety
- Traffic Efficiency
- Comfort
- Environmental Protection

Organization

8 Local enforcement centers

- Regional coverage
- Short distances
- High response rate
- Terrain knowledge

3 Regional enforcement centers

- Coverage of the main traffic directions
- Coordination on a regional level
- Unified action

OCCN (Operational enforcement center)

- Operates in ACB Postojna
- Support to toll supervisors, coordinates their work on the field
- Receive calls and reports of infringements

Offense Authority Office (PO)

- Offense proceedings at the second instance
- Resolving offense cases in cooperation with the courts
- Offense Authority Office work at three locations, ACB Hrušica, ACB Ljubljana and CP Dob.

LEGENDA / LEGEND

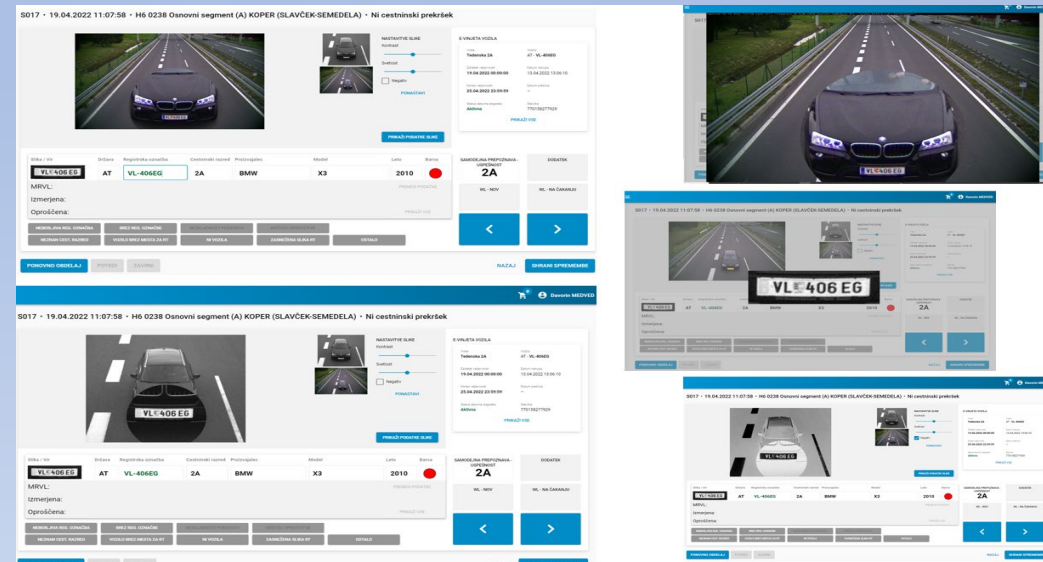
- nadzorni portal
- cestninski portal

DARS

Enforcement equipment



1. Enforcement vehicles
2. Dars enforcement equipment
3. Dars enforcement applications



Enforcement vehicles



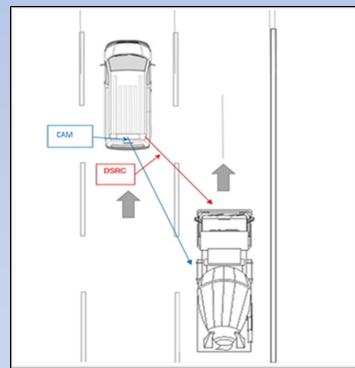
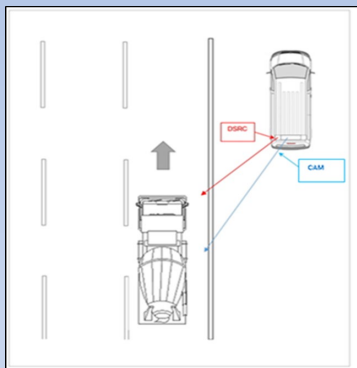
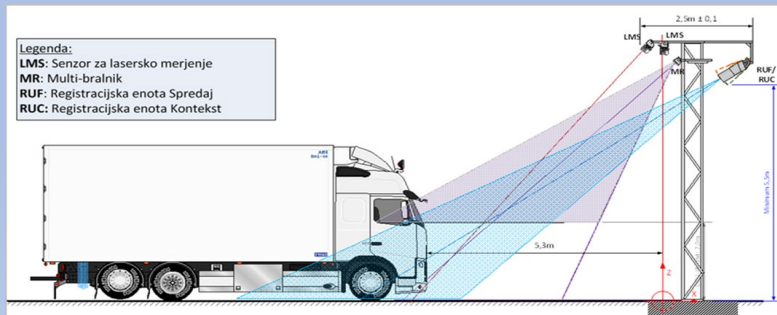
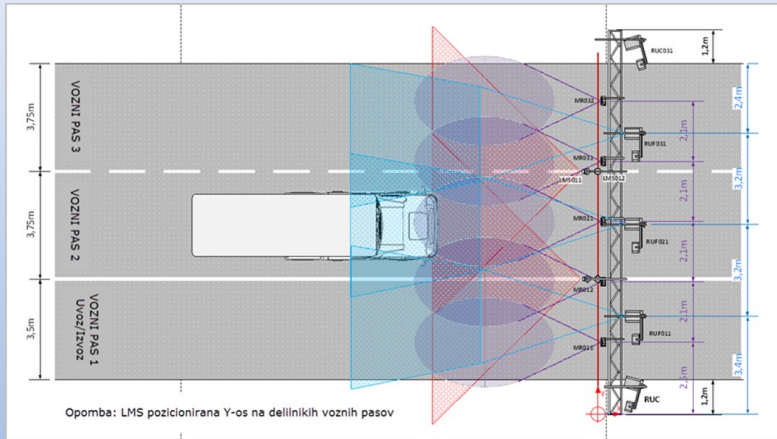
- 37 high performance vehicles
- Autonomy of operation without the engine running
- Mobile monitoring equipment
- All office and IT equipment
- Introduction of electric vehicles



Enforcement equipment - DarsGo

The DarsGo enforcement infrastructure consist of following key elements:

- Stationary enforcement (EP) – represented by monitoring devices on portal
- Mobile enforcement (MEU) – represented by mobile monitoring devices used with DARS enforcement vehicles
- Handheld enforcement (HH) – represented by handheld monitoring devices



Enforcement equipment – E-vin



The enforcement infrastructure consist of following key elements:

- Stationary enforcement (SNO) – represented by monitoring devices either on portal or pillar construction
- Mobile enforcement (MNO) – represented by mobile monitoring devices used with DARS vehicles
- Handheld enforcement (RNO) – represented by handheld monitoring devices
- Portable enforcement (PNO) – represented by portable monitoring devices used with tripod





Enforcement SNO



Stationary monitoring device consist of:

- Camera box – consist of monitoring camera set equipment in stackable safety travel box,
 - Includes camera set with ANPR + CTX (context) camera for 1 direction
 - No tools required for mounting of monitoring cameras onto enforcement gantry portal
- Connection box – power and communication equipment fitted into safety travel box
 - LiFePO smart batteries with battery management including 230V chargers
 - Battery protection – to disconnect battery from other components (e.g. for long-term storage)
 - Fuse box
 - Monitoring module (voltage, current, capacity, temperature, etc.)
 - Communication module with LTE WIFI router
 - All connector ports are mounted on the side of Power box



Enforcement PNO



Portable monitoring device

- Almost the same “Camera Box” as for stationary monitoring device (SNO) but for PNO with different camera used
- “Connection box” almost the same as for SNO, optimized for portability and operation “on the road”
- Portable tripod placed inside camera box for optimum portability



Enforcement MNO



Mobile monitoring devices

- Mobile monitoring device (MNO) features:
 - 2 cameras installed per vehicle capturing data that are further processed directly in enforcement application installed on included central unit (heavy duty tablet)
 - used either in static mode – capturing vehicles passing by as well in dynamic mode – capturing vehicles while driving



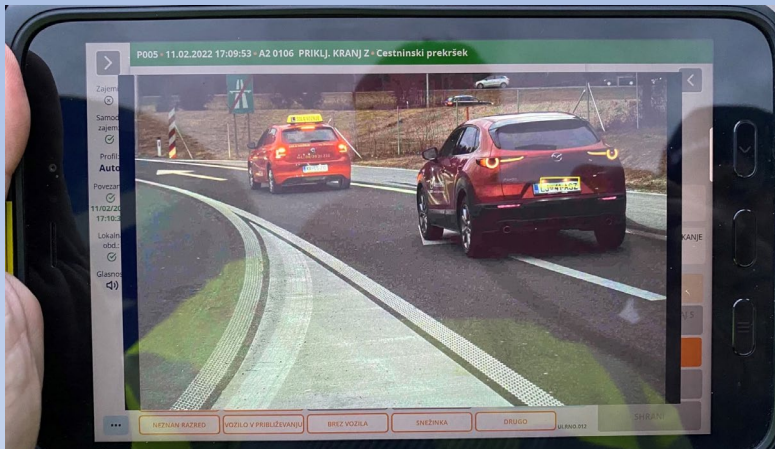


Enforcement RNO



Handheld monitoring devices

- Handheld monitoring device (RNO):
 - For central unit a rugged heavy-duty tablet is used
 - Pre-installed enforcement application is capable of capturing the vehicle data and recognize LPN (recorded through built-in camera), to evaluate whether the toll has been paid
 - To be used on by enforcement officer standing either standing on the control point and capturing vehicles passing by at low speed or capturing static vehicles e.g. on the rest areas



Enforcement BO



S017 • 19.04.2022 11:07:58 • H6 0238 Osnovni segment (A) KOPER (SLAVČEK-SEMEDELA) • Ni cestninski prekršek

Presentation of graphical user interface

NASTAVITVE SLIKE
Kontrast
Svetlost
 Negativ
PONASTAVI

E-VINJETA VOZILA

Vrsta Tedenska 2A	Vozilo LPN
Začetek veljavnosti 19.04.2022 00:00:00	Datum nakupa 13.04.2022 13:06:10
Konec veljavnosti 25.04.2022 23:59:59	Datum preklica -
Status datuma dogodka Aktivna	Številka 770158277929

PRIKAŽI VSE

Slika / Vir	Država	Registrska oznacba	Cestninski razred	Proizvajalec	Model	Leto	Barva
LPN	AT	LPN	2A	BMW	X3	2010	●

MRVL:
Izmerjena:
Oproščena:

SAMODEJNA PREPOZNAVA - USPEŠNOST
2A

DODATEK
WL - NOV
WL - NA ČAKANJU

NEBERLJIVA REG. OZNAČBA
BREZ REG. OZNAČBE
NESKLADNOST PODATKOV
KRŠITEV OPROSTITVE
NEZNAN CEST. RAZRED
VOZILO BREZ MESTA ZA RT
NI VOZILA
ZASNEŽENA SLIKA RT
OSTALO

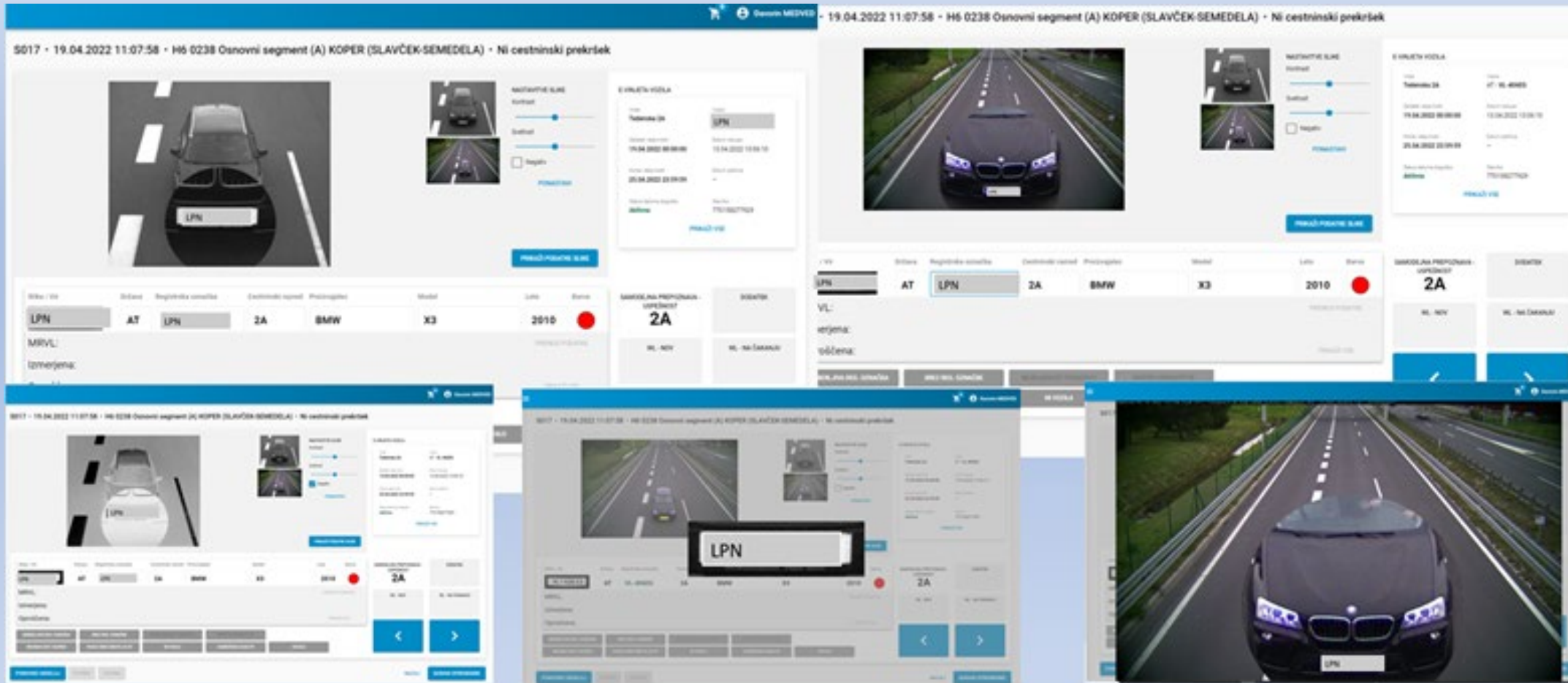
PONOVNO OBDELAJ **POTRDI** **ZAVRNI** **NAZAJ** **SHRANI SPREMEMBE**

- All necessary information in one place
- interface adapted for quick decision making
- the possibility of a detailed review
- automatic display of valid and invalid vignettes
- automatic display of data from the national register of vehicles

Enforcement BO



Presentation of graphical user interface




Enforcement BO



TEST BO Davorin Medved

P001 • 13.04.2022 19:43:06 • A1 1777 NADZ. TOČ. PESNICA V 0 km • Incident



NASTAVITVE SLIKE

Kontrast

Svetlost

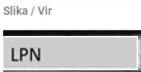


Negativ

PONASTAVI

E-VINJETA VOZILA

PRIKAŽI VSE

PRIKAŽI PODATKE SLIKE

Slika / Vir	Država	Registrska oznamba	Cestninski razred	Proizvajalec	Model	Leto	Barva
	SI	LPN	2A	Seat	Ibiza	2008	
MRVL:	SI	LPN	2A	SEAT	IBIZA / 1.4 /		
Izmerjena:							
Oproščena:							

NEBERLJIVA REG. OZNAČBA

BREZ REG. OZNAČBE

NESKLADNOST PODATKOV

KRŠITEV OPROSTITVE

NEZNAN CEST. RAZRED

VOZILO BREZ MESTA ZA RT

NI VOZILA

ZASNEŽENA SLIKA RT

OSTALO

PONOVRNO OBDELAJ

POTRDI

ZAVRNI

NAZAJ

SHRANI SPREMEMBE

Presentation of graphical user interface (SLO)

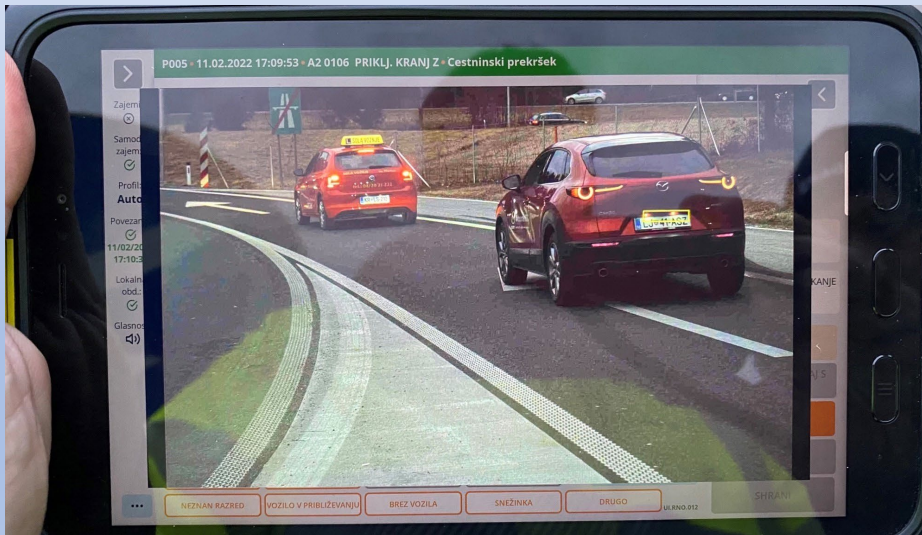
- Automatic display of data from the national vehicle register
- Detection of unauthorized transfer of license plates
- Easier decision-making in borderline cases - vehicle conversions, motorhomes, maximum permissible vehicle weight

TEST BO Davorin Medved

MRVL

Vista uvoznega vozila do vključno 3,5t	Kategorija vozila M1	Število sedežev 5	Status registrirano Od 18.05.2012 14:25:01
Cerinski razred 2A	Dodatek h kategoriji vozil -	Število registriranih -	Čas prehoda 13.04.2022 19:43:08
Znamka SEAT	Naziv kategorije vozila osebni avtomobil	Oblika vozila -	Čas izenega 01.01.1 01:22:00
Tip IBIZA / 1.4 /	Vista registrske tablice -	Vista registrske tablice Navadna registrska tablica	Status začasne registrske tablice -
Modelno leto -	Nacpustna večnamensko vozilo	Začetnik veljavnosti začasne registrske tablice -	Konoc veljavnosti začasne registrske tablice -
Barva navaden - RDEČA - TEMNA	Dodatna nadgradnja -	Največja dovoljena masa vozila 1526 kg	Masa vozila 1075 kg
Datum prve registracije 18.05.2012			

Enforcement Software – RNO



Presentation of graphical user interface

RNO.012

RMZ-3 • 23/02/2022 12:50:00 • NADZ. TOČ. PESNICA V • Cestninski prekršek • Odobreno 23.02.2022 12:50:00

Zajemi: **Izključeno**

Samod. zajem:

Profil: **Samodejno**

Povezano: 23/02/2022 12:50:00

Lokalna obd.:

Glasnost:

Kontrast:

Svetlost:

Negativ

Obreži

PONASTAVI

VINJETA VOZILA

Vrsta: Vozilo

Stanje na datum dogodka: Številka

PRIKAŽE VEČ

60% >1,3m

WL - NOV 3 NA ČAKANJU 5

PREVERI

PONOVNO OBDELAJ S POVEZALO

POTRDI

ZAVRNI

SHRANI

Slika/ Vir	Država	Reg. označba	Cestnins...	Proizvajalec	Model	Leto	Barva
LPN	LPN	SI	2A	Mercedes	GLK	2007	Črna
MRVL:	LPN	SI	2A				
Izmerjeno:	LPN	SI	2A				
Oproščeno:							

NEČITLJIV LPN/CC BREZ LPN/CC NESKLADJE PODATKOV KRŠITEV OPROSTITVE PRIKAŽI PODROBNOSTI

NEZNAM RAZRED VOZILO V Približevanju BREZ VOZILA SNEŽINKA DRUGO

- The user interface provides all the data necessary for event processing
- In appearance, it is adapted to the back-office application for easier and faster processing

Challenges for the future – green efficiency

1. Enforcement efficiency

- Introduction of own company electric vehicles with the aim of reducing the carbon footprint
- Better and more advanced technology enables targeted control without redirecting the entire traffic
- All necessary information about the offense and technical data of the vehicles available in real time
- Fast and efficient handling of offences

2. Availability of data

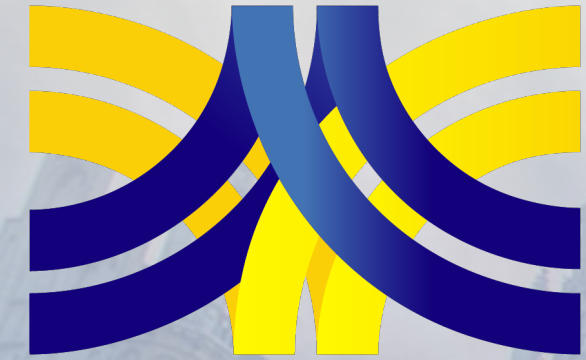
- Fast processing requires the availability of data as soon as it is needed
- Once the offense is confirmed, access to personal data via national and EUCARIS registers

3. Impact on traffic flow

- The possibility of targeted treatment of vehicles without interfering with free traffic flow via C-ITS notifications
- self-exclusion of the vehicle in violation at the control point



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BRUSSELS 2022

THANK YOU FOR YOUR ATTENTION

Davorin Medved, Senior Officer at the
Dars Enforcement Office

DARS d.d., Motorway Company in the
Republic of Slovenia



DARS
CESTNINSKI
NADZOR

DARS