# SMART MOBILITY SOLUTIONS

PRODUCT CATALOGUE



ARTIFICIAL INTELLIGENCE BY SWISSTRAFFIC INC.

AI:	Artificial Intelligence
ANPR:	Automatic number plate recognition
API:	Application Programming Interface; interface for automatic
	data transmission from sensor to a server in real-time
D:	Days
GDPR:	EU General Data Protection Regulation
GSM:	Global System for Mobile Communications; fully digital mobile
INAT	communications network
	Individual motorised traffic
	Internet of Inings
LUNA.	Long distances without LTE (con also SIGEOV)
I TE-	Long Term Evolution: a mobile communications standard for 4G 5G etc.
NMT:	Non-motorised traffic, cyclists and pedestrians
MTH:	Months
Multimodal:	Use of different transport modes during a certain period
o-d:	origin-destination
PT:	Public transport
SIGFOX:	Proprietary global communications network for low-energy wireless
	connection of objects to the internet (see also LoRa)
WK:	Weeks
	Public transport (PT)
$\wedge$	Safety
LED	l ED display
$\overline{O}$	Violations
Ρ	Parking
R	Services
្នាំ	Dashboard
AI A	Artificial Intelligence
	Data protection compliant
	Mobile installation
	Fixed counting station
Å	Pedestrian
<u>**</u>	e-Scooter
ōźo	Cyclist
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Motorcycle
	Car
	Car with trailer
	Bus, coach
	Van
	Van with trailer
	Articulated van
101010 01	Lorry
	Lorry with trailer
	Articulated lorry



The future of mobility is defined by seamlessly meshing of our work life, home life and leisure time. Just getting from A to B will no longer be enough. What will truly matter in a multi-mobile world are: experience, sustainability and health.

At SWISSTRAFFIC, we believe that mobility is one of the key areas affecting sustainability. All over the world, new products and services are evolving faster and faster, opening up a seemingly endless range of possibilities. But companies, governments, cities and other actors must still draw the right conclusions. Our aim is to support customers and to apply an integral approach to addressing this highly complex issue.

With over 20 years of expertise in mobility, we are your partner for innovative and sustainable mobility solutions.

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### SWISSDRONE A

Al-based monitoring and counting of multimodal traffi

across 2 lanes, also during congestion

n a width of 32 metres

on footpaths, at events and in parks etc.

with prediction and API

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# SMART MOBILITY VISION - HUMAN-CENTERED

### THE FUTURE OF MOBILITY

People are longing for peace of mind. Quality of life is becoming an increasingly precious commodity. Cities should be clean, green and quiet.

Experience is now more important than possession. Flexible access to an array of mobility options is the name of the game. Reality is shaped by diversity instead of routine. Seamless mobility blends personal and public concepts.

Autonomous driving is transforming the role that cars play. Driverless concepts reduce the need for parking spaces, expanding time spent in the car.

Cars are increasingly withdrawing from the cities. Bicycles will shape the future of mobility more and more.

VISION

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TOPICS





# swissTRAFFIC AI+Lora

AI-based fixed installation for multimodal counting in real-time. Use of existing camera infrastructure, if installed. swissTRAFFIC AI+LoRa complies 100% with GDPR data protection requirements.



Counting IMT, cyclists, persons Counting tourists, hikers Traffic signal optimisation Cyclist behaviour Nodal flow analyses Traffic flow Transfer relationships Analyses of near-accidents Impact analyses



Multimodal
9 object classes
Accurate lane tracking
Real-time data
Congestion-resilient
Speeds
Simple installation
GSM or LoRa
Parking

Ľ	COMBINABLE PRODUCTS	

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### CLOUD SOLUTION

Customer can install the camera. Dual use as a safety camera. Outstanding accuracy, even for congested objects in urban environments.

Easy use of already existing cameras possible. Encrypted data transmission and analysis in the cloud. API available.

### BOX SOLUTION

Additional hardware box is installed directly with the camera. Data transmission possible via GSM or LoRa. Easy use of current cameras possible. On-site data analysis. API available.



Customer can install the camera Can be used simultaneously as a safety camera.



Automatic detection of traffic flow for all moving objects without storing video or image data.



Data visualisation in a neatly arranged dashboard with separate customer portal.



# AI | SWISSSAFETY AI

Al-based detection of violations and misconduct in road traffic. Improved safety for the most vulnerable transport users – pedestrians and cyclists. Can be connected to police caution or fine correspondence.



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Improving safety, preventing accidentsSafety on school routesFailure to give way atpedestrian crossingsCyclist behaviour at roundaboutsDetection of near-accidentsDisregard of stop signalsUnauthorised parkingWrong lane or direction of travel



Fixed or mobile counting station
Autonomous for up to 7 days if mobile
Counting IMT, cyclists, persons
Speeds
Can be connected to an LED display
for awareness raising
Accurate lane tracking
Real-time data
Floating car data



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# IMPROVED SAFETY AT PEDESTRIAN CROSSINGS ALONG SCHOOL ROUTES

Al- and radar-based system to improve safety by the automatic detection of pedestrian crossings and failure to give way. Signals with special interior lighting and yellow strips attached to the poles can light up immediately during use of the pedestrian crossing to improve visibility, especially at night.

In addition to flashing, an alarm sound can also be emitted in potential "pedestrian-driver" conflict situations or if pedestrians are inattentive (staring at their phones). In case of violations, a brief video sequence can optionally be stored in the system to help with police investigations. As a fixed or mobile installation.

### PREVENTING ACCIDENTS

Al technology to analyse trajectories and speeds for the detection of near-accidents at intersections involving pedestrians, cyclists and vehicles or to analyse cyclist behaviour at roundabouts. As a fixed or mobile installation.

# AWARENESS RAISING IN THE EVENT OF VIOLA-TIONS

Downstream installation of LED displays, can sensitise transport users to their misconduct in real-time as a contribution to targeted improvement of road safety.



Pedestrians are distracted and tend to notice dangers too late.



Automatic detection of failures to give way at pedestrian crossings in real-time and warnings for road users.



Al improves safety along school routes and at pedestrian crossings. SAFETY



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# swissSCOUT AI

The mobile camera system for multimodal counting is 100% compliant with the GDPR thanks to integrated AI and allows autonomy of up to 7 days. The data is analysed in real-time.



Counting IMT, cyclists, persons Counting tourists, hikers Cyclist behaviour Nodal flow analyses Parking with origins Impact analyses Safety analyses



Multimodal Mobile solution with up to 7 days of round-the-clock autonomy Real-time data Speeds Accurate lane tracking Congestion-resilient Simple installation 12 object classes



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AI REVOLUTION IN MOBILE TRAFFIC DATA COLLEC-TION

swissSCOUT AI is revolutionising mobile traffic data collection. The integrated AI software enables onsite multimodal traffic analysis in real-time, without having to save videos or images. The analysed data is uploaded directly to the cloud, where it is then available for visualisation on the swissDASHBOARD.

swissSCOUT AI is the first mobile traffic data collection system with full GDPR compliance.

Please check the swissSCOUT website for further information: www.swissscout.com





Mobile camera system with integrated AI analysis software for real-time evaluations and presentation on a proprietary dashboard.



Swiss guality. Hardware and software from a single source.

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# swissBIKE+PED CROWD

Simultaneously counts cyclists and pedestrians in all directions on paths with a width of up to 4 metres. Combinable with an LED display. Counts also e-scooters.



Counting cyclists, persons Counting tourists, hikers Counting e-scooters



Laser technology LED display Solar fixed counting station Accurate lane tracking Real-time data Proprietary dashboard



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### SOPHISTICATED LASER TECHNOLOGY

The sensor uses a "laser curtain" that is defined during installation to log the cross section in a sequence of consecutive scans (every 16 ms). The laser uses this information to generate a 3D image that is analysed by the algorithms to determine the correct classification. The system accurately registers the direction of travel by detecting which of the 4 laser planes the cyclist, e-scooter or pedestrian reaches first.

The sensor is equipped with a CPU. All signals from the laser scanner are processed directly. A 4G modem is also installed in the laser to transmit text data (no images) to a server in real-time.





A cloud of points indicating a bicycle and an e-Scooter. The sensor software is able to distinguish cyclists, e-scooters and pedestrians.



A typical system for counting bicycles consists of a laser scanner and an LED display.



swissBIKE+PED CROWD has a neatly arranged, proprietary dashboard.



### PIEZO INSTEAD OF INDUCTION

Counting with piezo strips is far more accurate than using induction. An electromechanical pulse is triggered by the pressure applied by an object as it crosses the strip, which is then analysed by the system. Passing vehicles or cyclists are detected very accurately, even during congestion when a vehicle may be stationary on the piezo strip.



## swissTRAFFIC+BIKE

Uses induction loops, a thermal sensor or piezoelectric strips to count mixed traffic either temporarily or permanently.



Counting cyclists Counting IMT



Fixed or mobile counting station 3 months autonomous if mobile Speeds Accurate lane tracking Congestion-resilient Simple installation 5 vehicle classes

Free analysis software

Piezo or induction loops



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Mobile/temporary counting station with tubes



Installation of a fixed counting station with piezo technology. Only on smooth surfaces, no paving. Up to 5 m maximum width per lane.



Can count cyclists and pedestrians at the same time and identify their direction of travel.



### SMART LICENSE PLATE RECOGNITION

Detection rates of at least 98% - even for mobile deployments in Switzerland and abroad. Different vehicle types are distinguished and matrices are generated per vehicle type, which can be directly incorporated into a traffic model. Graphic visualisation of the results facilitates interpretation.

### SEGMENTAL SPEEDS FOR IMPROVED SAFETY

Average speed detection along a certain section of road – e.g. for school route safety – can be combined with an LED display to sensitise errant motorists. Optionally, the system can be used for the issue of fines by the police.

# Α 6

swissANPR AI

Precise traffic detection thanks to the use of the latest generation of smart license plate detection cameras with high data quality. swissANPR AI complies 100% with GDPR data protection requirements.



Destination, origin and transit traffic Rat-running traffic Travel times and routes Proportion of electric, hybrid, petrol or diesel vehicles Hazardous goods transports Segmental speeds Traffic models and scenarios



Fixed or mobile counting station Autonomous for 5 days if mobile LED display Accurate lane tracking Real-time data Congestion-resilient Origins: country/canton/town SWISS10 (10 vehicle classes)



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Graphical visualisation of the origin, destination and transit traffic through a city, municipality or neighbourhood with different vehicle types.



Identification of the share of electric, hybrid, diesel, petrol vehicles and their origins (country, canton, town)



Automatic registration of hazardous goods transports and their cargo types.

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# | swissDRONE AI

Aerial observation and counting of multimodal traffic situations. Detection of movement patterns for all transport users across a wider perimeter. Prevention of near-accidents.



Observation and counting of multimodal traffic Nodal flow analyses Traffic flow Parking Analyses of near-accidents



Multimodal
Autonomy for 60 minutes
Speeds
Accurate lane tracking
Congestion-resilient
Simple installation
9 object classes



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### ALSO COVERS WIDER PERIMETERS

At a suitable height, drones enable coverage of a wider observation perimeter, along with precise tracking and counting of all movements within it. The high resolution of the mounted camera enables visualisation of even the smallest objects such as pedestrians or cyclists using our Al software. All data protection requirements according to the GDPR are observed.

Special drones that receive power via a cable to the ground are deployed for assignments lasting more than 60 minutes.





Routes of travel are also determined, in addition to counting. Provides aerial analysis of how long parking procedures last as well.



Observation and counting of multimodal traffic in wider perimeters and identification of near-accidents (safety deficits).



Autonomous for 60 minutes. Can be extended to several hours if necessary.





# swissLASER

swissLASER was specially developed for directional counting of individual motorised traffic and to satisfy even the most rigorous accuracy requirements in an urban environment. swissLASER is able to distinguish up to ten vehicle classes according to SWISS10.



Counting IMT Detection of congestion Parking



2 lanes simultaneously
Real-time data
Congestion-resilient
No lane encroachment
Simple installation
SWISS10 (10 vehicle classes)
Laser Class 1
Proprietary dashboard



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# TECHNOLOGY

The laser technology emits up to four beams. These are invisible to the human eye and harmless. The point cloud they create replicates the vehicle shape with the exact vehicle dimensions, enabling both precise classification and identification of any height and width restrictions.

The laser can be mounted either at the side or overhead. It also provides highly accurate speed measurements if the "Radar" option is enabled.

The laser complies with data protection requirements, as it does not record or transmit images. Precise laser detection distinguishes between the lengths and profiles of vehicles.





Two lanes can be covered simultaneously if the system is mounted at a height of around 8 m.



The laser point clouds map the precise vehicle shape and therefore differentiate up to 10 vehicle classes.



swissLASER has a neatly arranged, proprietary dashboard.



### PRECISE COUNTING IN PEDESTRIAN ZONES

This unique sensor enables precise counting of pedestrian traffic in pedestrian zones, even in dense crowds. Among its most outstanding features is the wide coverage of up to 32 metres with just a single sensor.



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### swissPED

Counts city centre pedestrians in zones with a width of up to 32 metres. swissPED complies 100% with GDPR data protection requirements.



Counting pedestrians in pedestrian zones



Laser technology Width of up to 32 metres Mounted at a height of up to 20 metres Real-time data Simple installation Fixed counting station



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The use of laser technology ensures compliance with all data protection requirements.



4x laser curtain for reliable counting and up to 98% accuracy.



Mounted at a height of up to 20 metres for counting zones with widths of 32 metres.



### 

# swissRADAR

A lateral radar device for intermittent and/or regular traffic counts, the identification of road sections with excessive vehicle speeds and for the collection of data used in urban traffic development plans.



30 km/h zones Counting IMT Speed detection



Fixed or mobile counting station
Autonomous for up to 3 weeks
if mobile
Speeds
Accurate lane tracking
Simple installation
4 vehicle classes
GSM



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### TECHNOLOGY

swissRADAR is characterised in particular by its capability for prolonged autonomous operation of up to three weeks without replacing the battery. Can be equipped with Solar and 4G modules to generate real-time data as a permanent counting station. Unsuitable for locations with congestion or stop & go traffic, as these factors distort the results.

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Up to 3 weeks of continuous operation possible.



Extended mounting height of between 1 and 8 metres.



Automatic calibration. Data export via Bluetooth.





# swissBIKE+PED LIGHT

This IoT sensor is specifically designed for the needs of tourist facilities such as parks and trails or for natural settings and is used to count hikers and cyclists, for social clubs or events without ticketing etc.



Counting tourists, cyclists, hikers, cross-country skiers, people attending events Pavements



Autonomous for 1 year Real-time data in the app Simple installation Counting widths of 1–6 metres 2 object classes SIGFOX or GSM Plug & count



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### TECHNOLOGY

The boxes use digital heat detectors. These components act like miniature thermal imaging sensors.

They concentrate infrared heat radiation when people cross the sensor beam. Digital analysis of this signal can be used to count the number of objects and determine their direction of travel. The speed is also used to distinguish between people and cyclists. These boxes are simple, small, adaptable to any environment and operate autonomously.



Automatic transmission of numerical data by LTE or SIGFOX. Counter visualisation on Android or iOS smartphones.



Counts cyclists and pedestrians.



Installation at the edge of a footpath (1 sensor integrated in a wooden post) possible.





# | swissNOISE AI

Al-based measurement of traffic noise from different directions. The downstream LED display raises awareness and encourages noise-conscious driving, which leads to a significant noise reduction in most cases. In turn, this improves quality of life considerably.



Impact analyses for 30 km/h speed limits Recording of noise emissions Awareness raising among vehicle owners



Fixed or mobile counting station
Solar-powered if mobile
Accurate lane tracking
Real-time data
With LED display
Simple installation
SWISS10 (10 vehicle classes)
Proprietary dashboard



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### NOISE MEASUREMENT USING ARTIFICIAL INTEL-LIGENCE

The highly sensitive sensor detects ambient noise and uses integrated machine learning software to analyse its profile. This distinguishes between cars, motorbikes and lorries. The sensor also recognises the direction of travel and speed based on the noise emission.

The LED information panel raises awareness and encourages noise-conscious driving. Practical experience has shown significant success in reducing noise at locations fitted with swissNOISE AI.

There are plans to extend detection capabilities to also include electric vehicles and electric bicycles.





The LED information panel raises awareness and encourages noise-conscious driving.



The highly sensitive sensor detects ambient noise and uses integrated AI machine learning software to analyse its profile.



swissNOISE AI has a neatly arranged, proprietary dashboard.





# **swissTRAVEL**

swissTRAVEL logs journey times and delays in real-time for both personal transport and cycling. This enables deficiency analyses to be performed and the optimisation of traffic distribution and connections.



Analysis of journey times and delays Segmental speeds Impact analyses



Bluetooth and WiFi MAC-addresses Fixed or mobile counting station Autonomous for 7 days if mobile Speeds Real-time data LED display Simple installation 3 vehicle classes Proprietary dashboard



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### TIME IS A PRECIOUS COMMODITY

Receiving early information can improve the mobility patterns of transport users. Reliable predictions can be made regarding journey times and delays by incorporating AI together with the measurement of real traffic events.

### TARGETED IMPACT ANALYSES

Gains (or losses) in travel times are the best and most effective way of substantiating statements about the impact of infrastructure projects or accompanying measures over a longer period.







Real-time determination of journey times and delays on various routes and optimisation of the traffic flow.



LED display indicating delays.

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swissTRAVEL has a neatly arranged, proprietary dashboard for travel times.

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# swissparking al

End-to-end solution for the public sector, private enterprises and private properties. From the issue of access rights and a reservation system, to barrier authentication and automatic shuttle buses, this product supports all of your parking requirements.



Municipal parking facilities Tourist or event parking Company parking Property parking On-street ofr off-street car parking



FEATURES End-to-end hard- + software solution Payment app, dynamic parking fees Issue of access rights Parking space reservation Authentication at the barrier Automatic parking buses

Origins: country/canton/town Fixed or mobile solution

Proprietary dashboard



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### PUBLIC

The professional, cloud-based platform gives municipalities an end-to-end solution for parking management. swissPARKING AI improves the capabilities of your traffic infrastructure, limits congestion and reduces the search for parking spaces. Car parks must be accessible at all times and well frequented. 85% is considered a benchmark for optimum occupancy.

The price is an effective instrument for controlling occupancy levels in car parks. A carefully selected fee structure balances demand and minimises unnecessary traffic. Prices can be adjusted flexibly to prevent bottlenecks or stimulate use. This means that pricing should certainly be dynamic.

### PRIVATE

Companies sometimes struggle with the increasing scarcity of parking spaces and long waiting lists. Digital parking solutions help them to manage this problem and provide facilities for their staff both easily and efficiently.

In today's world, smart IoT technology and innovative software and app solutions create innumerable opportunities to make better use of available parking capacities. Aside from standard elements like number plate recognition, visitor reservations and an array of app functionalities, swissPARKING AI offers additional modules to enhance your end-toend solution. swissPARKING AI can even be integrated into existing systems.





Automatic reservation and navigation to free parking space with customisable visitor and employee attributes.



Automatic authentication at the barrier entrance enables entry to the parking space without stopping using automated payment.



swissPARKING AI has a neatly arranged, proprietary dashboard.

PARKING



# swissSERVICES

Our mobility experts assist you from planning to implementation. We offer everything from a single source, including consulting, data collection and collaborative development of a solution.

# IDEAL APPLICATION AREAS

Traffic flow simulations Development planning Technical traffic studies Performance capability analyses Accident analyses Reconstruction concepts End-to-end parking solutions Holistic traffic concepts Safety analyses



From identifying the problem to creating the solution Mobility engineers & fitters Over 20 years of experience State-of-the-art technology Installation and maintenance

Ľ	COMBINABLE PRODUCTS	

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### WE HELP YOU ACHIEVE STRATEGIC MOBILITY OBJECTIVES – FOR SMART MOBILITY IN TOMOR-ROW'S WORLD.

Our company has a highly qualified pool of specialists. It goes without saying that we operate consistently at the cutting edge of technology and strive to build green and economically viable solutions.

As traffic engineers, we deliver expert planning and competent advice. Professional technology and state-of-the-art technology are used in the execution of all our assignments.

Our engineers have developed processes for mobility intelligence analytics that enable the real-time evaluation of big data. We make use of open data and also collect our own information.

This means we can offer a full service – from planning to implementation – from a single source based on more than 20 years of experience. You are in safe hands with us.



As traffic engineers, we deliver solution-oriented planning and competent advice.



Planning and achievement of strategic mobility objectives.



Installation and maintenance of sensors by qualified SWISSTRAFFIC staff. SERVICE





# | swissDASHBOARD

Modern, interactive, customisable, multimodal dashboards with predictions and APIs that map multimodal mobility in real-time.



Pairing clarity with KPIs for optimised ease-of-use.



APIs for your own dashboard
Customisable
Expandable
All data exportable
Predictions
Meteo



Pages 10-35 all swissSENSORS





You select the parameters that matter to you and receive the data neatly arranged in real-time – accessible anytime, anywhere.



Presentation of the transfer relationships and occupancy rates for passenger trains at a railway hub.



TRAFFIC

Dashboard for traffic experts. A variety of neatly arranged performance indicators are displayed per period and object class at the push of a button. DASHBOARD



PRODUCT OVERVIEW	COUNTING	MOTORISED TRAFFIC	CYCLISTS	PEDESTRIANS	ORIGIN-DESTINATION, TRANSIT	SPEED	PARKING	LANE RECOGNITION	REAL-TIME	<b>CONGESTION RESISTANT</b>	EASY TO INSTALL	LED DISPLAY	PERMANENT COUNT LOCATION	MOBILE INSTALLATION	NUMBER OF VEHICLE CLASSES	AUTONOMY WHEN MOBILE	ADDITIONAL USES
swissTRAFFIC AI+LoRa	ullet	ightarrow	ightarrow	ullet	D	ightarrow	ightarrow	ightarrow	ightarrow	ightarrow		✓	✓		9		4/5G, TURN OFF RELATIONS
	ullet	ightarrow	ightarrow	ightarrow		ightarrow			ightarrow			✓	✓	✓		7 D	RIGHT OF WAY, RED LIGHTS, ILLEGAL PARKING
swissSCOUT AI			0		$\bigcirc$									✓	10	7 D	
swissBIKE+PED CROWD	ullet		ullet	ullet		●		ullet	ullet		D	✓	✓		3		LED DISPLAY, + E-SCOOTERS
swissTRAFFIC+BIKE		ightarrow	ightarrow			ightarrow		ightarrow		ightarrow	D		✓	✓	5	3 MTH	
swissANPR AI		•	igodol			lacksquare			lacksquare			✓	✓	✓	10	5 D	ORIGIN, E-VEHICLES, E-CAR, CO₂
SWISSDRONE AI	ullet	ullet	ullet	ullet	ullet	ullet		ullet		ullet	ullet			✓	9	1 HR	
swissLASER		ightarrow				D	ightarrow	ightarrow	ightarrow	ightarrow		✓	✓		10		SWISS10
swissPED												✓	$\checkmark$		1		PEDESTRIAN ZONES
swissRADAR	ullet	ullet				ullet		ullet	Ð		ullet			✓	4	3 WKS	4/5G
swissBIKE+PED LIGHT	$\bullet$								$\bullet$				$\checkmark$	✓	2	1 Y	
swissNOISE AI												$\checkmark$	$\checkmark$	✓	10	SOLAR	E-VEHICLES
swissTRAVEL	D	ullet	Ð		D	ullet			ightarrow	ightarrow	ightarrow	✓	✓	✓	3	7 D	DELAY TIMES
swissPARKING AI											$\bigcirc$	$\checkmark$	$\checkmark$	$\checkmark$		5 D	

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