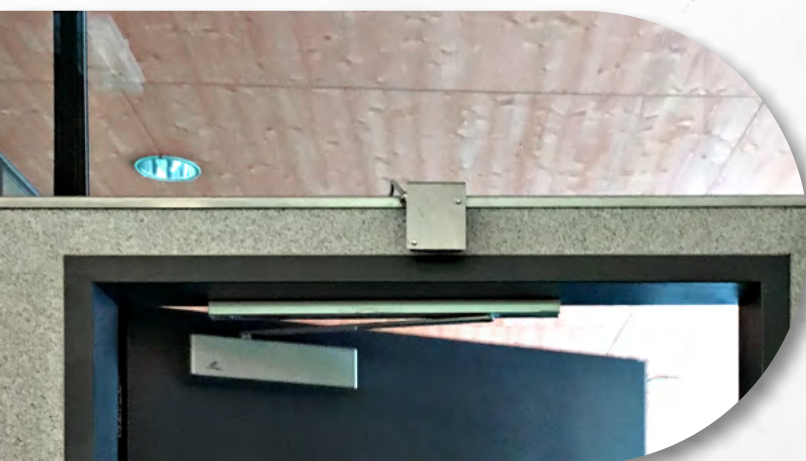# Efficient toilet cleaning at motorway facilities using DATAEAGLE radio module

Networking in the sense of Internet of Things

DATAEAGLE NETWORKED REST AREA

More than 12 rest areas of ASFINAG have already been equipped with DATAEAGLE to improve the service.

A sensor counts the persons entering the toilets and reports this via the DATAEAGLE via mobile radio to a cloud portal.

The service personell can be automatically notified through the cloud portal when a a certain number of visitors is reached.

DATAEAGLE
INDUSTRIAL RADIO SYSTEMS

12.07.2017
09:00 - 23:00

Location	Male	Female	Handicapped
			19
	129	148	30
Rest area 1	80	202	378
Rest area 2	1.598	1.350	1.894
Rest area 3	3.671	4.722	14
Rest area 4	67	120	754
Rest area 5	2.970	2.310	22
Rest area 6	501	487	127
rea 7	381	579	2

APPLICATION

Demand-oriented cleaning and maintenance of toilet facilities of motorway resting places of motorways and highways represent an economical-logistical challenge for the operator and his cleaning service providers. Depending on the time of the day, week and year the facilities are extremely differently frequented, but should be in excellent condition whenever visited by the user. Both operators and cleaning service providers appreciate any information on user frequency and user behavior for guaranteeing an efficient cleaning adapted at intervals. A solution attractive in every respect for this is provided by a demand-driven, radio-based user counting system which in Austria has successfully been tested and introduced by ASFINAG (operating company of motorways). Measurement of customer frequency resolved in time and according to the three user groups - Ladies, Gentlemen, Urinal - is registered continuously using sensors and transferred by the IoT data radio system via mobile radio to a cloud portal especially established for this purpose for user-friendly representation and data evaluation: an IoT-based business model and at the same time DATAEAGLE application with a high benefit for all parties involved.

CHALLENGE

Permanently reliable and at the same time economic cleaning of toilet facilities requires high functionality and availability of the entire system, sensors, radio module and transmission technology up to the cloud and the portal. This must be guaranteed at all resting places of the motorway network, even in remote regions without internet availability. Data transmission shall be possible independent of any possibly available IT infrastructure and of course at lowest possible costs. Finally, destruction of facilities by vandalism (e.g. at exposed cable sections) shall be excluded as far as possible.

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Rest area 1	129	148	19
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Rest area 3	1.598	1.350	378
Rest area 4	3.671	4.722	1.894
	67	120	14

SOLUTION

Following thorough solution analyses by ASFINAG and the Austrian company Funk Fuchs the decision was finally taken in favor of data transmission using a radio module of the DATAEAGLE 7000 device series of Schildknecht AG, having been tried and tested for years. The GSM network represents the densest communication network worldwide which thanks to the universal eSIM card integrated in DATAEAGLE 7000 and valid for hundreds of networks can be used without problems via far distances and at very low costs. Signals of the three sensors installed at the toilet doors are supplied to the radio module via three digital inputs and from there – after data compression – forwarded to a cloud portal via mobile radio and internet where the processed data is ready for retrieval for all web-enabled devices with corresponding role-based access authorizations. The service staff can now be notified automatically once certain threshold values are achieved.

RESULT

Intensive cooperation of Funk Fuchs, ASFINAG and Schildknecht AG rapidly and successfully involved a functionally reliable solution. Clear ideas of the user, proven technologies (DATAEAGLE) and intensive application experience of the supplier have been the prerequisite. After first installation of five systems in 2015, more than 20 systems are meanwhile in failure-free operation and many others will follow. Thanks to data compression the costs for the monthly data volume transmitted is less than 10 Euros per system and therefore the appropriate transmission costs for mobile radio are consequently low – and on top of that with maximum efficient headcount planning. The solution implemented here is not just appropriate for counting people, but also for universal applications: Under decentralized measurement, a sensor value is transmitted to the cloud where it is processed and represented in a portal in a user-friendly manner and retrieved by the authorized user and used for appropriate measures.

As a conclusion a comment of the user: *By applying the solution provided by Funk Fuchs for recording user frequency and intervals we succeeded in considerably increasing quality and cleanliness at our ASFINAG resting places. Future demands on cooperation with our cleaning service provider are substantially characterized by existing data and allow customized solutions for efficient and optimal cleaning of our resting facilities. David Kollenhofer, Project Manager ASFINAG*

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