



Presenter:

Charlie Eccleson – Sales & Support Engineer

TRAFFIC SENSORS

AUTOMOTIVE RADAR

ENGINEERING SERVICES

COMPANY



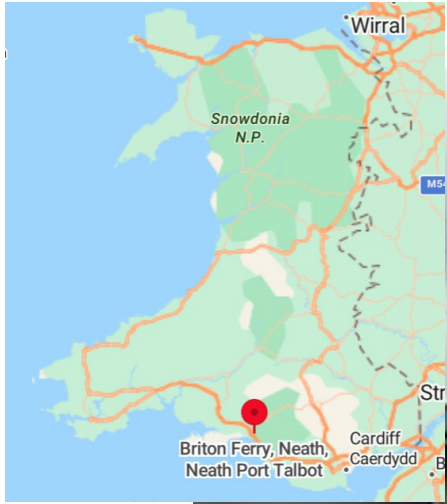
TRAFFIC SENSORS

OVERCOMING THE CHALLENGES OF BRIDGE MOUNTED DETECTION A48 BRITON FERRY BRIDGE IN SOUTH WALES

centregreat
traffic signals



OVERVIEW



SITE HISTORY

- The bridge consists of a 17-span steel viaduct some 585m long, carried on steel and concrete piers.
- The river is crossed by the central span of 91m
- It runs parallel to the newer M4 Bridge, which was completed in 1993
- Major diversion route if M4 is closed
- Bridge is a steel and concrete structure built in 1953 to replace a ferry
- Highly elevated position with significant changes in elevation along its route
- Carries 4 lane dual carriageway plus cycleway
- Speed limit 50mph – reduced from national speed limit in 2014
- Upgrade from VA to MOVA was planned to be added in 2014 – design by Atkins

SITE LAYOUT



EARLY DETECTION CHALLENGES - 2014

Due to the age of the bridge structure, precise construction details were not available.

It was understood that the road construction above bridge water proofing was approximately 30-40mm deep.

1. Very shallow road construction
2. Significant, potentially structural, 'step up' from carriageway level to adjacent footway/reserve
3. No available ducting in the bridge
4. No access to lamp columns
5. Change in elevation - bridge climbs 'away' from signals
6. Elevation – Significant drops to the side of the bridge
7. Weather, an exposed location which was prone to wind and fog
8. Solution for detection at 100m+ required

Detector Technology	Reason for rejection
Conventional loops	Insufficient depth for slot cutting. No ducting.
Side fire radar	Unable to position new poles on bridge deck. Whilst could be lamp column mounted, unable to install cables into lamps
Video detection	100m detection would require camera at extreme height plus bridge prone to fog
Thermal detection	Camera required at extreme height – not viable
Conventional radar	Could not cover the 100m distance required in 2014
Wireless magnetometers	Insufficient carriageway depth for core drill
Slot-cut wired magnetometers	No carriageway depth, no way to get tails off carriageway
Increase road depth	Significant bridge redesign. Barrier redesign and weight on bridge.
Do nothing!	MOVA required to improve operation. Current operation sub-optimal

WHAT WAS DONE IN 2014?

- ✓ Wired magnetometer detection was selected
- ✓ It was suggested that they could accurately detect vehicles if installed underground, adjacent to a traffic lane, rather than directly under the lane.
- ✓ 15 years of maintenance-free design life was claimed



Installation was completed August 2014



SUCCESS OR NOT?

Initial results were good for lane 1

- Most traffic was detected successfully

Results for Lane 2 were not so successful

- The majority of drivers appeared to keep well to the left of the lane and kept outside of the range of the detection.
- Only a few vehicles were detected correctly

*(NB: above comments taken from Atkins independent report on the scheme from 2014)

Although the installation was initially deemed successful, the detectors grew increasingly unreliable, culminating in total failure and requiring the South Wales Trunk Road Agency to seek replacement technology in 2023.

ON TO 2023.....

- ✓ It became clear that the detection technology previously installed had failed – causing particular issues at the Earlswood location.
- ✓ The South Wales Trunk Roads Agency (SWTRA) sought an alternative detection solution
- ✓ The reputation and previous success of the smartmicro radar range was known to the clients' consultants, and a recommendation was given to utilise these radars.
- ✓ The UMRR-11 Type 45 radars were chosen:
 - ✓ Long range (219m/718 feet) with multiple lanes covered (4)
 - ✓ Replace up to 30 loops with 'virtual loops' on the carriageway
 - ✓ Works in all weather conditions – bridge particularly affected by fog/mist
 - ✓ Maintenance free

UMRR-11 SERIES

SRO

8 programmable relays

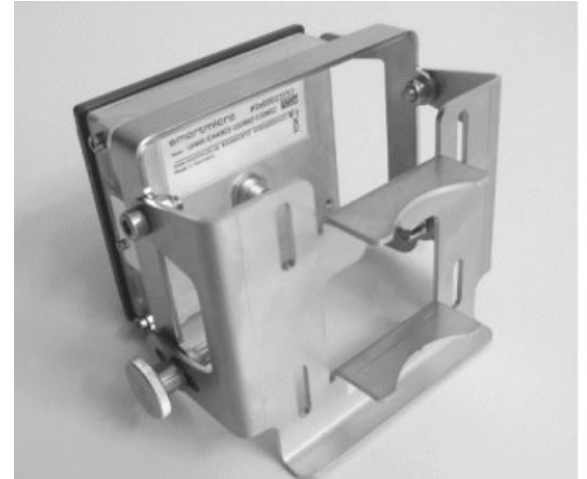
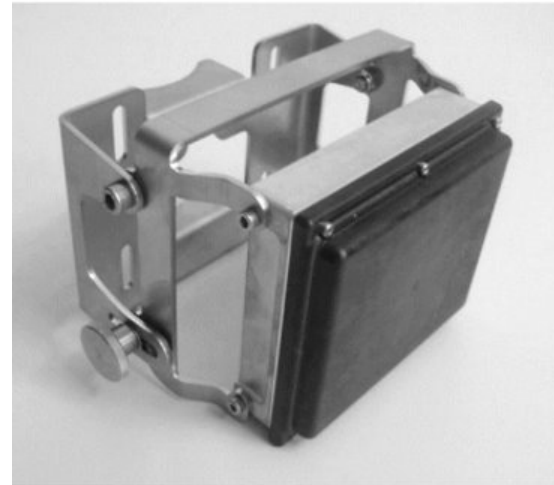


SRO

Attached to UMRR-11 Type 45



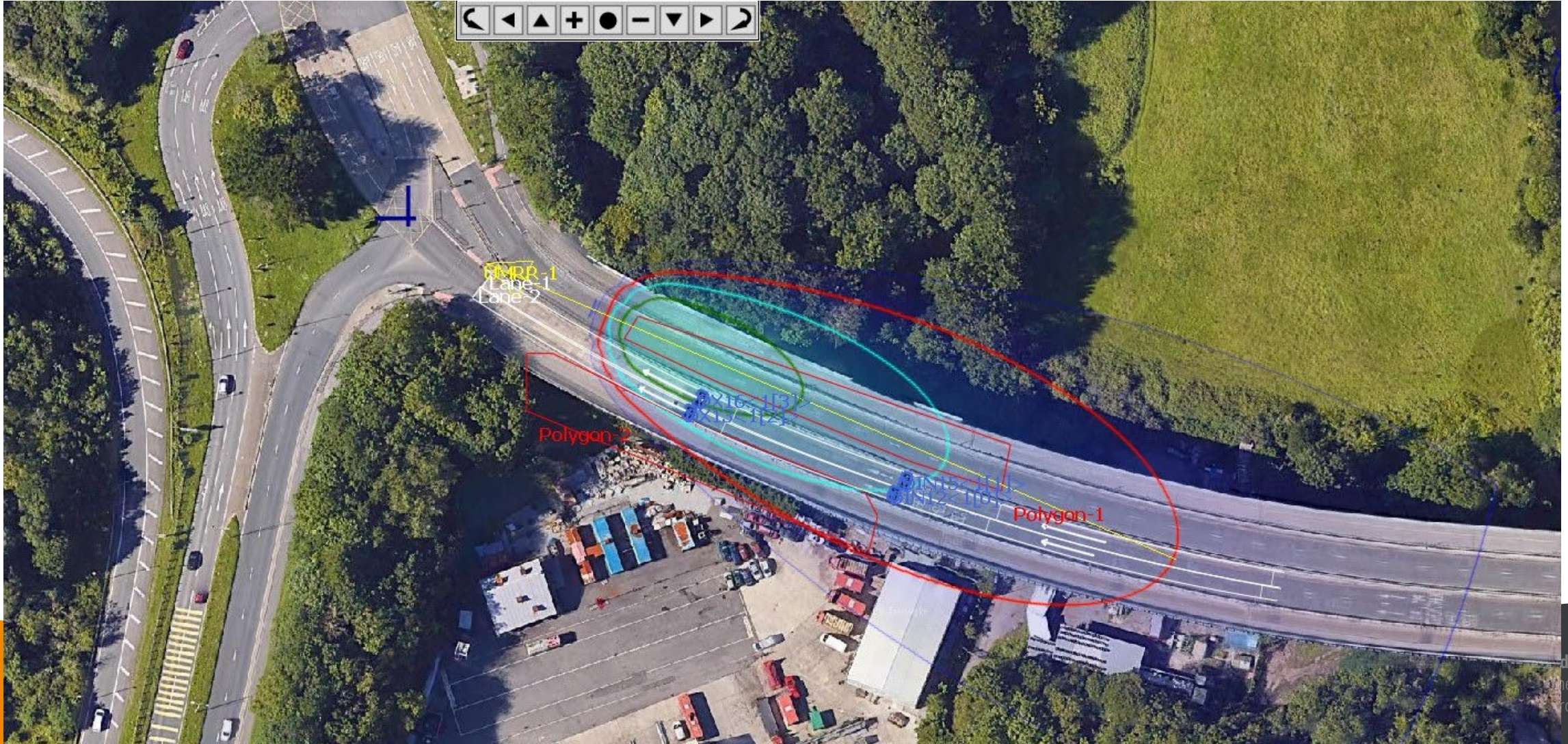
Stainless steel bracket



INSTALLATION - EARLSWOOD

- ✓ Failure of the detection at this site had become a major issue
- ✓ IN loops completely failed
- ✓ X loops were 'partially' operational, controlling the green time on that approach, but MOVA was 'blind' to vehicles further out than the X loops, causing an erroneous 'end of green' decision.
- ✓ Replacement of detection was deemed necessary
- ✓ UMRR-11 Type 45 radar was chosen
- ✓ Site was plotted within the traffic management software and detection loops programmed (IN's and X's)
- ✓ Site verification was undertaken to the satisfaction of Matt Williams of JSTSM

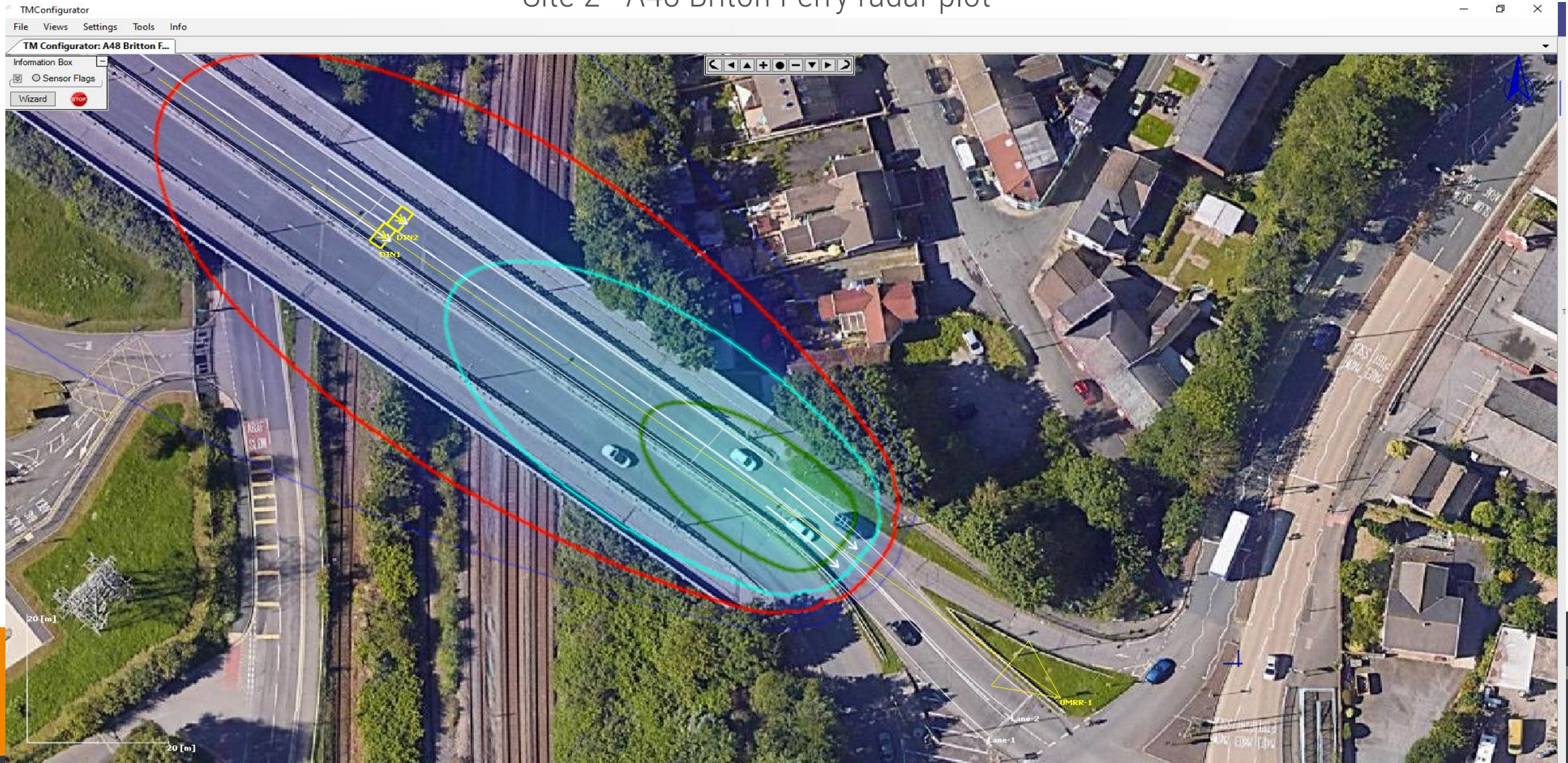
Site 1 Earlswood (J42 M4) – Briton Ferry Bridge radar plot



INSTALLATION – A48

- ✓ IN loops on this site had failed.
- ✓ Use of the radars on this second site was endorsed by success of Earlswood installation, where the conditions were much the same – fog, road speed, bridge deck depth, etc.
- ✓ The site didn't initially go as planned
- ✓ Access problems with MEWP to the original pole was deemed to be unsafe
- ✓ An alternative pole was selected and found to be suitable for the coverage necessary
 - ✓ The upside of this particular problem demonstrated the flexibility in the use of these radars
- ✓ Verification was undertaken to the satisfaction of Tom Siddall of 4Ways Consulting

Site 2 - A48 Britton Ferry radar plot



INSTALLATION (MOUNTING) – A48



UMRR-11 Type 44 radar (Mounted on 3m extension pole)

J-Box for traffic signal cable access





ADDRESS

smartmicro UK Limited
1-2 Highcroft Industrial Estate
Enterprise Road, Waterlooville
PO8 0BT

CONTACT

Phone: +44 (0) 2392 248250
smart1@smartvideosensing.com
www.smartmicro.com

DISCLAIMER NOTICE

All products, product specifications and data in this presentation may be subject to change without notice to improve reliability, function or otherwise.

Not all products and/or product features may be available in all countries and regions. For legal reasons features may be deleted from products or smartmicro may refuse to offer products. Statements, technical information and recommendations contained herein are believed to be accurate as of the stated date. smartmicro disclaims any and all liability for any errors, inaccuracies or incompleteness contained in this document or in any other disclosure relating to the product.

To the extent permitted by applicable law, smartmicro disclaims (i) any and all liability arising out of the application or use of the product or the data contained herein, (ii) any and all liability of damages exceeding direct damages, including - without limitation - indirect, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of the suitability of the product for particular purposes.

Statements regarding the suitability of products for certain types of applications are based on smartmicro's knowledge of typical requirements that are often placed on smartmicro products in generic/general applications. Statements about the suitability of products for a particular/specific application, however, are not binding. It is the customer's/user's responsibility to validate that the product with the specifications described is suitable for use in the particular/specific application. Parameters and the performance of products may derive from statements made herein due to particular/specific applications and/or surroundings. Therefore, it is important that customer/user has thoroughly tested the products and has understood the performance and limitations of the products before installing them for final applications or before their commercialization. Although products are well optimized to be used for the intended applications stated, it must also be understood by the customer/user that the detection probability may not be 100% and that the false alarm rate may not be zero.

The information provided, relates only to the specifically designated product and may not be applicable when the product is used in combination with other materials or in any process not defined herein. All operating parameters, including typical parameters, must be validated for each application by the customer's/user's technical experts. Customers using or selling smartmicro products for use in an application which is not expressly indicated do so at their own risk.

This presentation does not expand or otherwise modify smartmicro's terms and conditions of purchase, including but not being limited to the warranty. Except as expressly indicated in writing by smartmicro, the products are not designed for use in medical, life-saving or life-sustaining applications or for any other application in which the failure of the product could result in personal injury or death.

No license expressed or implied, by estoppel or otherwise, to any intellectual property rights is granted by this presentation or by any conduct of smartmicro product names and markings noted herein may be trademarks of their respective owners.

Please note that the application of the product may be subject to standards or other regulations that may vary from country to country. smartmicro does not guarantee that the use of products in the applications described herein will comply with such regulations in any country. It is the customer's/user's responsibility to ensure that the use and incorporation of products comply with regulatory requirements of their markets.

If any provision of this disclaimer is, or is found to be, void or unenforceable under applicable law, it will not affect the validity or enforceability of the other provisions of this disclaimer.