



ISWIM NEWSLETTER

Message from the ISWIM president

Welcome to the first edition of our Newsletter for 2024 and my first welcome statement to you as president of this great society.

This issue begins with a summary of the successful joint event held by ISWIM and the Heavy Vehicle Transport & Technology Forum in Brisbane, Australia this past November. Technology Convergence 2023 was a joint conference of the 9th International Conference on Weigh-In-Motion (ICWIM9) and the 17th International Symposium on HVTT (HVTT17). The conference theme was ***'Reimagining the future of heavy vehicle, roads, and freight'***.

According to the conference delegates, there was great synergy between the two groups which resulted in new collaborative relationships being developed to further the work of ISWIM and HVTT.

In this issue you will also read about the various WIM research being conducted by transportation agencies, and new WIM developments by manufacturers throughout the world.

You will also see several opportunities to participate in conferences and webinars in the coming months and year. Some events are sponsored by ISWIM and are free to participate.

The new ISWIM Board and I look forward to serving you in advancing and increasing WIM technology and data usage for multiple applications and helping decision makers in transportation organizations understand how traffic loading information can be used to extend the life of their infrastructure assets.

The ISWIM Newsletter is your newsletter. Your articles, research initiatives, programs, and learning's are welcomed.

Deborah Walker, President of ISWIM

■ [Deborah Walker](#) | Deborah.Walker@dot.gov

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Technology Convergence 2023 - A Great Success



ISWIM and the HVTI Forum successfully held Technology Convergence 2023 in Brisbane, Australia from 6 to 10 November 2023. Technology Convergence 2023 was a joint conference of the 9th International Conference on Weigh-In-Motion (ICWIM9) and the 17th International Symposium on Heavy Vehicle Transport & Technology (HVTI17). This was the first time since meeting in Paris, France in 2008 that ISWIM and the HVTI Forum have come together to hold a joint conference.

Key members of the *organizational committee*

The theme of Technology Convergence 2023 was “Setting the Wheels in Motion – Reimagining the Future of Heavy Vehicles, Roads and Freight”. The conference showcased the importance of vehicle weighing technologies necessary to sustainably manage road infrastructure while accommodating the introduction of heavier Zero Emission Vehicles (ZEVs) onto the road network.

The conference also highlighted the synergies between vehicle- and road-based technologies to deliver improved productivity, safety and environmental outcomes together – a key objective of jointly hosting ICWIM9 and HVTI17.

The conference was a great success in presenting the latest research, developments and thinking and that will help shape the future of heavy vehicles, freight, asset management and technologies. Some key metrics from Technology Convergence 2023 are:

- Number of delegates: **179** full delegates
15 single day delegates
37 additional for social functions
- Number of scientific papers: **72**
(available at: www.is-wim.net/library/)
- Number of authors: **198**
- Number of keynote speakers: **10**
- Number of end-user workshops: **3**
- Number of Sponsors/exhibitors:
 - o Silver: **6**
 - o Gold and Special Gold: **9**
 - o Platinum: **3**



Disclaimer

The projects described, ideas shared, and claims made in this Newsletter do not necessarily represent the official view or position of ISWIM.

While care has been taken in the preparation of the content of this Newsletter, ISWIM accepts no responsibility in its use, for any omission, or damage that may be caused and does not endorse any specific product or result presented in the Newsletter.

ISWIM Website

Please visit the official ISWIM website: www.is-wim.net. Here you will find information on our society, all Newsletters, past ISWIM Events, the Guide for Users of WIM and links to our all Vendors & Consultants.

New is our online, searchable library with over 450 articles, papers and reports related to Weigh-In-Motion.

ISWIM LinkedIn Group

The ISWIM LinkedIn Group is another way of staying connected with the latest developments in WIM .

In this group, researchers, end-users and vendors can find and post short articles on initiatives, new projects, test results, or other developments related to WIM-technology, applications and data.

The ISWIM LinkedIn Group has currently more than **515** members. If you want to join, please visit:

linkedin.com/groups/13400438

Thank you to everyone who prepared papers, attended, presented, or exhibited at the conference. The conference's success was a combined effort of everyone involved. We will soon release complete video recordings of all 10 keynote speaker presentations. The keynote speakers were senior persons in their fields and/or executives within their organizations.

■ [Chris Koniditsiotis](#), General Secretary of ISWIM | ChrisK2.0@bigpond.com
 ■ [Gavin Hill](#), President HVTT Forum | GavinH@tca.gov.au

Young Researcher Award

Every year, ISWIM offers scholarships to bachelor, master and PhD students, or post docs up to five years after graduation working on WIM-related research projects. Participants must demonstrate a passion for WIM through either their studies or early professional life and show “substantial evidence” of their research. “Substantial evidence” could be an original contribution in the form of a journal or conference paper; a report; or a series of presentations that clearly defines the scope of the project, technical approach, and anticipated or final conclusion(s).

In the 2024 edition, ISWIM will fully sponsor the travel and registration expenses for recipients to present their work at the WIM Subcommittee meeting during the Transport Research Board (TRB) Annual Meeting 5-9 January 2025 in Washington DC, USA. Sponsorship from ISWIM will not exceed 2500 Euro. Applicants should send their CV, two reference letters, and an abstract up to 1000 words with supporting “substantial evidence” of their work. Submissions should be emailed to Lily Poulikakos, the chair ISWIM Young Researcher Award Committee at l.poulikakos@outlook.com. This year’s deadline is May 31st and the award winners will be announced mid 2024.

■ [Lily Poulikakos](#) | l.poulikakos@outlook.com

HVTT-18 – Call for Abstracts

The HVTT Forum is pleased to invite you to its 18th biennial, international symposium. Join us at the 18th Heavy Vehicle Transport & Technology (HVTT18) conference to tackle current challenges in the development of S²MART road freight transport systems, ensuring they are Sustainable, Safe, Modern, Adaptable, Resilient, and Trustworthy. This four-day collaborative event will be hosted by the Université Laval, located in historic Québec City, Canada, from May 26 to 29, 2025. Short abstracts (300 to 500 words) are due on April 19, 2024. Please visit the website (www.hvttforum.org) for more information or to submit an abstract. We look forward to seeing you there!

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Feedback on Technology Convergence '23

Some of the feedback we received:

“I would like to congratulate you all for running THE BEST conference that I have ever attended and there have been quite a few over the last 48 years.

The schedule was excellent, the papers were extremely good, the food was some of the best around and the delegates were some of the most interesting people I have ever met.

So, when are you going to organise another one???”

“Technology Convergence 2023 was an example of bringing disciplines together to move forward through synergy.

It enabled in-depth discussions and enriched the experience of conference delegates.

The organization was rock solid and was excellently taken care of. The bar has been set high for the next HVTT conference in Quebec City, Canada in 2025.”

“Such a great conference and an incredible effort by the HVTT & ISWIM teams to organise. Blown away by the research and progress in road safety, mass and zero emissions.”

“Congratulations to the organisers, not an easy task to bring over 150 delegates from all over the world and keeping them happy for 5 days!”

“What an incredible event. It was also my first taste of Australian hospitality which really was most heart-warming.”

“Well executed event with high quality papers and excellent presentations.”

“The conference was a big success and it was to me one of the best conferences I ever experienced.”

Honorary ISWIM Membership for Mr. Chris Koniditsiotis

The Board of ISWIM awarded Honorary Membership to Mr. Chris Koniditsiotis in recognition of his outstanding life-time contribution. Chris's Honorary Membership was awarded 9 November 2023 during the Technology Convergence 2023 conference in Brisbane.

Chris has been involved in Weigh-In-Motion since 1986. He attended the first International Conference on WIM, held in Zurich, Switzerland in 1995. He joined the inaugural board of ISWIM. Chris's first executive board position was that of Treasurer and then he was elected President in November 2016. As per the ISWIM statutes Chris retired from the Presidency in November 2023. He is was elected and is currently serves as the General Secretary of ISWIM.



Aleš Žnidarič presents Chris Koniditsiotis with his Honorary ISWIM Membership

Chris has been an Australian leader in WIM contributing for nearly four decades, leading multiple national and international initiatives including:

- development and testing of Australian standards,
- development of traffic loading distributions for updating the Austroads Guide to Pavement Design,
- World Bank consultancies on major Southeast Asian initiatives using WIM and the analysis of information to address specific transport needs,
- numerous international postings to investigate WIM systems, procurement, calibration and data analysis for varying policy objectives,
- policy investigation, specification development, and implementation of heavy vehicle on-board WIM systems in his capacity as Chief Executive Officer of Transport Certification Australia,
- numerous strategic planning initiatives assisting organizations in better implementing WIM and its use across policy settings,

ISWIM Board (Elected Nov 2023)

Executive Board:

- Deborah WALKER, United States
President ISWIM
- Gustavo OTTO, Brazil
Vice-President Science
- Matija MAVRIČ, Slovenia
Vice-President Vendors
- Aleš ZNIDARIČ, Slovenia
Treasurer
- Chris KONIDITSIOTIS, Australia
General Secretary
- Andrew Lees, Great Britain
Information Officer

Board Members:

- Gerhard DE WET, South Africa
- Vittorio DOLCEMASCOLO, France
- Bernard JACOB, France
- Steven JESSBERGER, United States
- Rish MALHOTRA, Canada
- Eugene O'BRIEN, Ireland
- Jonathan REGEHR, Canada
- Victor Joaquin VARGAS ARCE, Bolivia

Vendors & Consultants College:

- Matija MAVRIČ, Slovenia
- Christoph KLAUSER, Switzerland

Promotion Officer:

- Hans VAN LOO, Switzerland



- design, evaluation, and implementation of volume-based flowmeter systems as heavy vehicle on-board WIM systems,
- championing the integration of WIM technology and use with the broader ITS sector.

■ **Aleš Žnidarič** | Ales.znidaric@zag.si

ISWIM Webinar “Potential of WIM Data for Bridges”

Weigh-in-Motion data has traditionally been used by the road pavement industry for the assessment of remaining pavement life. However, it is being increasingly used today by bridge engineers for a range of bridge-related applications. This free webinar, hosted by ISWIM and given by bridge experts from around the world, will describe some of these applications.

Eugene O’Brien, from Research Driven Solutions and University College Dublin in Ireland, will introduce the topic and the range of bridge applications. Sylwia Stawska, from Modjeski and Masters Inc. in the United States, will describe how they use WIM data to provide site-specific traffic load models, often proving that the true load levels are less than HL-93. Bernard Jacob from the University of Gustave Eiffel, will describe how they are using WIM systems to protect vulnerable bridges in France.



Example of heavy goods vehicles crossing a bridge (courtesy ZAG Slovenia)

Gavin Hill will describe how Intelligent Access and Smart On-Board Mass systems have transformed heavy vehicle access arrangements in Australia. He will explain how the use of vehicle location, configuration and mass loading data can improve the lifecycle management of bridge infrastructure, while also improving freight productivity. Aleš Žnidarič, from the Slovenian National Building and Civil Engineering Institute, will show how WIM data can be used to optimize decision making for the rehabilitation of bridges. Finally, Heikki Lilja, Consulting Engineer, will describe how WIM data has been used to estimate the remaining fatigue lives of bridges in Finland.

This free online webinar will be held on Thursday 16th May, 2024 from 15:00-17:00 CET. If you want to participate, use this link: <https://ucd-ie.zoom.us/j/67965444055> with meeting ID: 679 6544 4055.

For more information on this webinar contact Eugene O’Brien.

■ **Eugene O’Brien** | eugene.obrien@ucd.ie

WIM Data for Bridge Engineering

ISWIM published its second Practitioners’ Guide, ‘WIM Data for Bridge Engineering’. Its main goal is to present the possibilities of using WIM data for various bridge applications in an easy-to-understand way.

All WIM data has applications in bridge engineering, whatever the technology used to secure it. Perhaps the most critical application is in traffic loads. With some statistical calculations, WIM data can be used to determine the characteristic maximum load effects on bridges and hence their design values. This has applications in developing traffic load models for countries and finding site-specific design loading for a particular bridge.



The WIM data can also be used to protect bridges with lower load-carrying capacity. It can support posting policy or issuing a warning to heavy vehicles using a variable message sign. WIM, particularly Bridge WIM, can also be used for bridge health monitoring. Having load and bridge performance under this load significantly improves the quality of the information on the overall safety of a bridge structure.

For more information on this ISWIM Practitioners’ Guide contact:

■ **Gustavo Otto** | otto.gus@gmail.com

■ **Aleš Žnidarič** | ales.znidaric@zag.si

MnDOT Initiates Advanced WIM Study, USA

The Minnesota Department of Transportation (MnDOT) in the United States has initiated a comprehensive long-term study on WIM systems at MnROAD, a pavement test track located on Interstate 94. Among the key objectives of this project are evaluating the accuracy and resilience of WIM sensor configurations, learning more about the makeup of traffic (classes of commercial vehicles), and monitoring overall rates of commercial vehicle safety factors, including overweight commercial vehicles and vehicles with tire problems.



Calibration Truck at MnROAD WIM Research Site

In-depth analysis will focus on understanding the costs and benefits of incorporating additional sensors into a WIM site, as well as determining the most efficient sensor layouts for accurate vehicle class identification. The study will also address potential errors caused by closely spaced vehicles and explore methods to alleviate the problems caused by closely following vehicles.

Additionally, the project incorporates a Tire Anomaly and Classification System (TACS) to gather data to further study safety-related issues. In part, this includes monitoring commercial vehicles for rates of flat, missing, and under-inflated tires, but MnDOT is also using VectorSense sensor data to scrutinize lane wander – defined as a variance in lane position from the solid white line (fog line) to the vehicle's tire position – to understand its impact on traffic classification measurements and how it plays a role in damage to pavement systems. Some initial results of the WIM and tire position studies were presented at the 2024 TRB conference in Washington, D.C.

MnDOT's initiative underscores its commitment to enhancing road safety while optimizing costs. The findings from this study may pave the way for more effective and economical traffic management solutions in the future.

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■ [Tyler Haichert](#) | Tyler.Haichert@irdinc.com

Guide on Calibration of WIM systems

The latest addition to the series of ISWIM Practitioners' Guides is the guide on "**Calibration of WIM systems**". This guide has been developed by a group of ISWIM volunteers and is aimed to assist WIM contractors and transportation agency personnel involved in field WIM equipment calibration. In addition, road owners responsible for developing WIM programs may find this document useful in establishing their specific requirements for a successful WIM operation.



This document will offer recommendations based on proven best practices and published documentation for conducting a successful WIM calibration for in-road and bridge WIM technologies. The purpose of this document is to describe step-by-step procedures to perform an initial or routine calibration of WIM equipment installed for high-speed WIM data collection to support highway monitoring and transportation statistics.

This guide should be used only for systems that are for general traffic monitoring, statistical applications and WIM pre-selection. This guide is not aimed at systems used for legal metrology applications such as direct enforcement and does not circumvent any available standard WIM specifications.

The ISWIM Practitioners' Guide will be published soon and made available via the ISWIM website: www.is-wim.net

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■ [Deborah Walker](#) | Deborah.Walker@dot.gov

How can VanJee 3D LiDAR solve major problems of WIM systems?

VanJee is using 3D LiDAR WLR-733 (64 Channel) to upgrade WIM systems to solve problems of WIM data mismatch and enforcement dispute. Many High Speed WIM systems have one major problem: the system cannot match axle and wheel weights to right vehicle especially when two vehicles driving at the same speed and follow each other closely, or change lane when passing the WIM. This is because WIM is 'blind': the system can only measure vehicle weights but cannot "see" it.



VanJee's 3D LiDAR in combination with WIM in China

Therefore, VanJee is using 3D LiDAR which provides vehicle tracking route including positioning vehicle in X-Y coordination. Then the WIM system can get real-time vehicle positioning information to coordinate with WIM system. As a result, the system can perfectly match weight data to right vehicle (including axles and wheels). Furthermore, VanJee 3D LiDAR improves Weight Enforcement legitimacy by providing additional evidence including: Vehicle Dimension data, 3D point cloud of vehicle profile and vehicle route tracking for inspection. This can supplement incomplete photos of trucks due to shelter and angle issue.

VanJee LiDAR WLR-733 has strong detection capabilities including 360° horizontal field of view, 215-meter long-distance range (10% reflectivity) and ± 3 cm ranging accuracy. Therefore, the LiDAR outputs high-density point cloud data and realizes real-time scanning in most WIM application scenarios. Single LiDAR can cover one entire system (4 lanes) and do multiple tasks including:

1. Detecting vehicles to trigger WIM system,
2. Positioning vehicles and coordinate with WIM sensors,
3. Providing dimension measurements for oversized enforcement,
4. Classifying vehicles.

For more information please contact:

■ **Zhai Zhao** | zhaizhao@vanjee.net

Coming Events (subject to change)

Transport Research Arena (TRA)

Dublin, Ireland
15-18 April 2024
www.traconference.eu

Intertraffic

Amsterdam, The Netherlands
16-19 April 2024
www.intertraffic.com

ANTT Workshop

HS-WIM Sandbox
7-8 May 2024
www.antt.gov.br

ISWIM Webinar

Potential of WIM Data for Bridges
16 May 2024
www.is-wim.net

NaTMEC

Boise, Idaho, USA
2-5 June 2024
www.natmec.org

South African Transport Conference

Pretoria, South Africa
8-11 July 2024
www.satc.org.za

CVSA

Annual Conference and Exhibition
8-12 September 2024
www.cvsa.org

ITS World Congress

Dubai, UAE
16-20 September 2024
www.itsworldcongress.com

Intermobility Expo

Jeddah, Saudi Arabia
11-13 November 2024
www.intermobilitysaudi.com

CVSA-FHWA-ISWIM Webinar

WIM for Enforcement and Traffic Safety
End November 2024
www.cvsa.org

Transport Research Board (TRB)

Washington, USA
5-9 January 2025
www.trb-annual-meeting.nationalacademies.org

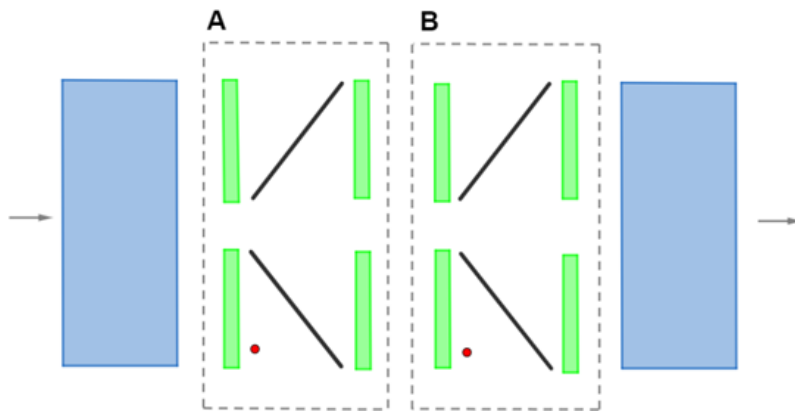
HVTT18 Symposium

Québec City, Canada
26-29 May 2025
www.hvttforum.org

Sterela HS-WIM approval in Belgium

Many issues such as deterioration of the roadway or lack of safety may arise due to overloaded vehicles on a highway. STERELA has dealt with the settings and approval of a HS-WIM system in Belgium. The HS-WIM system consists of a renewal of all the layers of the road section and a double grid of sensors with optimized parameters for the weighing algorithms.

In this new sensor configuration for the roadway, the HS-WIM system was installed according to the figure below (piezo-quartz sensors in green, lateral position sensors in black, temperature sensors in red and magnetic loops in blue). Two independent WIM systems compute the weight of the same vehicle. The first one (A) is used to make of the weight estimate, while the second one (B) provides a second measurement for legal metrology purpose, i.e., to confirm the first measurement.



HS-WIM configuration comprised of 2 independent weighing grids.

The certification process focused on the following types of vehicles:

- T2S3: two-axle tractor with a semi-trailer on a tridem axle;
- U2: vans i.e., two-axle rigid vehicle with a maximum authorized weight of 3.5 tons.

As an example, the table below shows the performance for T2S3 vehicles which came directly from the traffic flow (data collection started in Sept. 2019 and ended in Feb. 2020). These performances fulfill the minimum level of confidence of 99.8% with 0 false positive required by the Belgium legal metrology.

Entity	N	m (%)	s (%)	δ	π
Gross weight	180	0.53	0.98	5	99.99
Single Axle	180	0.73	1.59	8	99.99

The model approval for this HS-WIM system manufactured by STERELA has been delivered in 2021. This first site in Belgium, now used for direct enforcement, is a perfect example of a powerful tool allowing all the Member States to comply with EU Directive 2015/719 by implementing effective, non-discriminatory, proportionate and dissuasive penalties against overloaded vehicles in order to avoid any distortions of competition and to ensure road safety.

■ Astrid Cousteau | astrid.cousteau@sterela.fr

ISWIM Vendors

APM	www.apm.pl
Axtec	www.axtec.co.uk
Betamont	www.betamont.sk
CAMEA	www.cameatechnology.com
Captels	www.pesage-captels.com
Cestel	www.cestel.eu
Ciemsá	www.ciemsá.com.uy
Cross	www.cross.cz
Dynaweigh	www.dynaweigh.com
Excel Technology	www.exceltech.com.au
GEC Scales	www.gecscales.com
Girwim	www.girwim.com
Intercomp	www.intercompcompany.com
IRD / PAT Traffic	www.irdinc.com
iWIM	www.iwim.it
Kistler	www.kistler.com
Mikros	www.mikros.co.za
Osmos Group	www.osmos-group.com
Q-free	www.q-free.com/products
Sterela	www.sterela.fr
TDS	www.traffic-data-systems.net
Tramanco	www.tramanco.com.au
VanJee Technology	www.wanji.net.cn

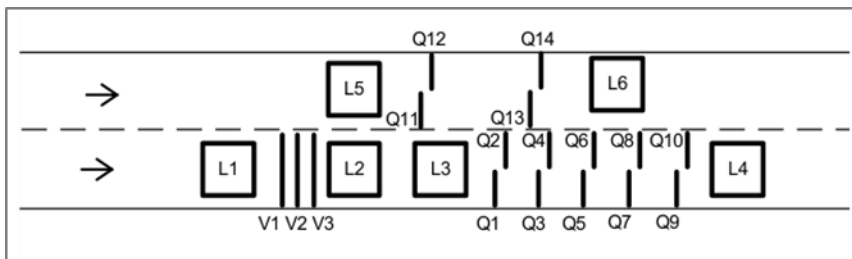
Interested to join the ISWIM Vendors, just contact:

■ Matija Mavrič | matija.mavric@cestel.si

■ Hans van Loo | hans.vanloo.int@gmail.com

Minnesota DOT road WIM System and TACS

International Road Dynamics (IRD) was contracted by Minnesota Department of Transportation (MnDOT) to install a complex 17-sensor WIM site for the MnROAD WIM study. The site was installed in the Summer of 2023 and operational by the Fall of 2023. In all, the site includes 14 Kistler Lineas WIM sensors. An iSINC WIM controller is configured to treat the sensors as though they are arranged in separate lanes with different multi-threshold configurations. This allows MnDOT to evaluate the differences between double, triple, quadruple, and quintuple threshold accuracy in the collection of traffic volume measurements and determine the optimal spacing length between sets of sensors.



Simplified Sensor Layout (Q-Quartz, V-VectorSense, L-Loop)

To ensure 'drift' does not negatively impact study data, the sensors are calibrated frequently; MnDOT supplies a calibration truck, and IRD Technical Services provides remote support.

A separate Tire Anomaly and Classification System (TACS) is installed before the WIM to provide lane position and tire anomaly information. TACS provides lane position, axle width, and wheel type on a per-axle basis. The TACS includes three (3) VectorSense sensors to measure tire-to-road contact patch pressure distribution. Contact pressure measurements are made every 0.4in [10mm] across the lane width.



VectorSense and Quartz Sensor Installation

Due to MnDOT's complex data requirements for this project, IRD supplies data via a number of separate (but time-stamp matched) outputs from the iSINC and from the TACS' VectorSense electronics to create data-rich individual vehicle records for each vehicle passing over the system. This information is added to the MnROAD database and will be available for research for years to come.

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ISWIM Consultants

Corner Stone www.corner-stone-int.com

FIMAU www.FIMAU.com

NMI www.nmi.nl

RTS GmbH doupal@hispeed.ch

Static Motion www.staticmotion.co.za

Interested in joining the ISWIM Consultants, please contact:

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■ [Hans van Loo](mailto:hans.vanloo.int@gmail.com) | hans.vanloo.int@gmail.com

Meeting of ISWIM Vendors & Consultants

All members of the ISWIM Vendors & Consultants College are invited to their traditional meeting of the during the Intertraffic, Amsterdam.

The meeting is scheduled for Thursday April 18th and will start at 16:00. As for the past editions Cestel has offered to facilitate the meeting at their booth (01.227) and to bring some Slovenian beers.

The general objective of the meeting is to discuss the issues that all ISWIM Vendors & Consultants encounter and what ISWIM could do about them.



All other members of ISWIM are invited to visit the Intertraffic Amsterdam (16-19 April 2024, www.intertraffic.com) to see many of our vendors and the new solutions they will be presenting.

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■ [Hans van Loo](mailto:hans.vanloo.int@gmail.com) | hans.vanloo.int@gmail.com

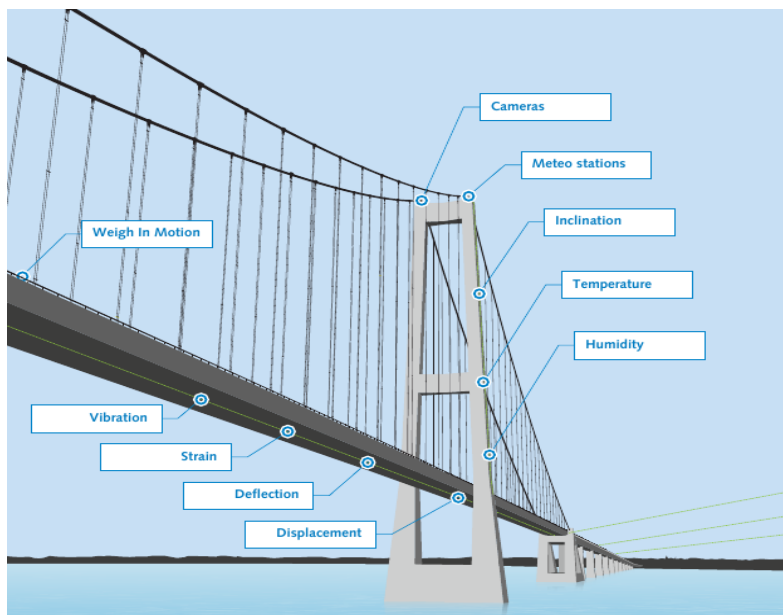
Structural Health Monitoring and Weigh-In-Motion from Kistler



Kistler presents Structural Health Monitoring (SHM) solutions for bridge protection plus the new KiTraffic Digital Weigh In Motion (WIM) platform, at the Intertraffic 2024 in Amsterdam from April 16 to 19.

Overweight trucks, extreme weather, cracking, and corrosion are just a few of the factors affecting bridge infrastructure and shortening its lifespan. When structural deficiencies become too severe, drastic measures need to be taken, such as closing a bridge or imposing heavy limitations on traffic. To avoid such restricting actions and extend the life of bridges, Kistler has developed its unique SHM portfolio.

Kistler's comprehensive SHM solution continuously monitors the bridge's structural resistance and real traffic loads as reported by the integrated WIM system. The smallest structural movements and vibrations are detected immediately to prevent serious damage, and users receive immediate notifications and alarms. Kistler's K-Beam accelerometers withstand extreme weather conditions (operating range: -55 to +125°C); they offer maximum temperature stability (variations below 0.01 %/°C), and highly accurate measurements from 0 to 1,500 Hz. The KiDAQ data acquisition system and a cloud-based software platform ensure easy data access and remote equipment configuration.



Elements of the Kistler SHM solution

International WIM Conferences

Nine International Conferences on Weigh-In-Motion have been held and the 10th edition is scheduled for spring 2027 in Ljubljana, Slovenia.

The conferences are:

ICWIM-1

Zurich, Switzerland
8-10 March 1995

ICWIM-2

Lisbon, Portugal
14-16 September 1998

ICWIM-3

Orlando, Florida, USA
13-15 May 2002

ICWIM-4

Taipei, Taiwan, ROC
20-23 February 2005

ICWIM-5

Paris, France
19-22 May 2008

ICWIM-7

Foz do Iguaçu, Brazil
7-10 November 2016

ICWIM-8

Prague, Czech Republic
19-23 May 2019

ICWIM-9

Brisbane, Australia
6-10 November 2023

ICWIM-10

Ljubljana, Slovenia
Spring 2027

All papers of the past ICWIM conferences can be found at:

www.is-wim.net/library/

For questions, please contact:

■ Hans van Loo | hans.vanloo.int@gmail.com

Kistler's KiTraffic Digital WIM platform detects overweight trucks at any speed and in real time as they pass, so offenders can be automatically fined, forced to unload, or diverted to an alternative route. Lineas Digital, the world's first fully digitized WIM sensor, features unique piezoelectric quartz crystals for accuracy of ± 2 percent for gross vehicle weight – as confirmed by the OIML R-134 certification from the Swiss Federal Institute of Metrology. SHM and WIM from Kistler; the combination that is revolutionizing bridge protection.

https://www.kistler.com/INT/en/kistler-presents-unique-structural-health-monitoring-and-weigh-in-motion-portfolio-at-intertraffic-2024/C00000710?utm_source=newsletter&utm_medium=referral&utm_campaign=wim

■ **Christoph Klauser** | Christoph.Klauser@kistler.com

Giropès awarded 6 Weighing Stations in Spain

Giropès, a leading company in weighing solutions and technology, has secured a €2 million contract for the installation of "High-Speed Weighing Stations". This contract, led by the Directorate General of Traffic and Mobility aims to establish a network of Weighing Stations at strategic locations across Catalonia's road network. It represents one of the largest projects of its kind in Europe.

These state-of-the-art systems are engineered to swiftly identify vehicles exceeding legally prescribed weight limits and detect offending driving behaviors. They subject such vehicles to meticulous on-site inspections using verified and certified weighing equipment at low speeds. The primary objective is to enhance control efficiency, optimizing the deployment of human resources in the field.

Giropès, through its division Girwim, will implement a comprehensive system using Kistler Quartz Sensors certified under OIML R-134 for Precision Class 10F, enabling precise weighing and detailed analysis of all vehicles. Additionally, low-speed weighing systems certified under OIML R-134 for precision class 0.5B will be installed, allowing direct enforcement for speeds up to 10 km/h, with a precision of $\pm 1\%$ GVW, $\pm 0.5\%$ in static mode.

Furthermore, the installation will incorporate devices such as ANPR and CCTV cameras, DSRC, and VMS panels mounted on gantries, seamlessly integrated into the High-Speed Weighing Station system, capturing all passing vehicles, and pre-selecting potential offenders. All data will be centralized on Gesdyn Web, a cloud-based solution facilitating the consolidation of information from various stations and control points. Gesdyn API will enable integration with third-party systems, allowing relevant authorities to extract and utilize the data.

	
OIML Member State Denmark	OIML Certificate of Conformity No. R134/2006-A-082-2021.01
OIML CERTIFICATE ISSUED UNDER SCHEME A	
OIML Issuing Authority	
Name:	FORCE Certification A/S
Address:	Park Allé 345, 2605 Brønshøj, Denmark
Person responsible:	Per Rasmussen
Applicant	
Name:	Giropès
Address:	Pol. Española Internacional C/F parcela 15.16 17469 VILAMALLA (Girona) Spain
Manufacturer	
Giropès	
Identification of the certified type (the detailed characteristics will be defined in the additional pages)	
BPFEM - B615	
Designation of the module (if applicable)	
Automatic instrument for weighing road vehicles in motion	
This OIML Certificate attests the conformity of the above identified type (represented by the sample(s) identified in the OIML type evaluation report) with the requirements of the following Recommendation of the International Organization of Legal Metrology (OIML):	
OIML R 134-1, Edition (year): 2006	
For accuracy class: 0.5 and B	

ANTT HS-WIM 'Sandbox' Workshop

The National Land Transport Agency (ANTT) is a regulatory agency that enforces public policies regarding infrastructure exploitation and the operation of land transport in Brazil. ANTT started a collaborative experimentation to test regulatory innovations on HS-WIM for direct weight enforcement in a controlled area through a so called Regulatory High-Speed WIM Sandbox.

This Sandbox allows for the creation of an experimental environment for the implementation of new technologies and operational models. This workshop will present the results from the experiments done in Brazil so far and will expand the discussion on the regulatory challenges in HS-WIM implementation. The workshop will be held on 7-8 May 2024.



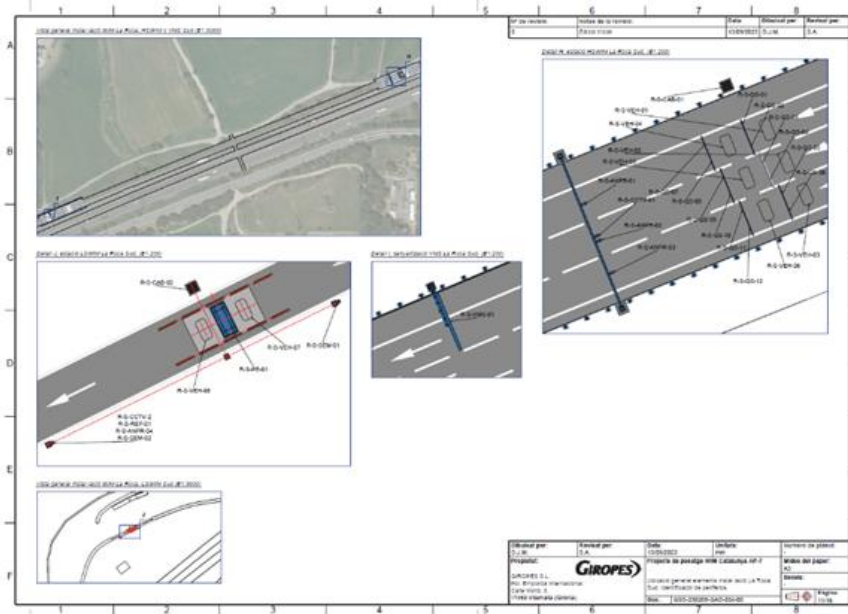
Topics of the workshop are:

1. Recent developments in technologies related to the measurement of vehicle characteristics under free-flow conditions.
2. Public policies, legislation, metrology, and regulations related to the monitoring and enforcement overloading on highways using free-flow technologies.
3. Studies, opportunities, and recent advances in the use and analysis of data collected by free-flow technologies related to overweight enforcement.
4. Road infrastructure and communication to support the operation of free-flow technologies.

Registration will be free, and a link will be provided by ANTT.

■ **Gustavo Otto** | otto.gus@gmail.com

■ **Hans van Loo** | hans.vanloo.int@gmail.com



Design of the Girwim High-Speed WIM systems

The Girwim brand boasts over a decade of experience in developing and implementing maintenance contracts and penalty systems on roads worldwide through the installation of WIM systems. Those systems aim to preserve roads and mitigate the detrimental effects of heavy vehicle traffic, including accidents and pollution.

■ **Jean Paul Belinga** | jpbelinga@giropes.com

Intercomp Strain Gauge Strip Sensors Enhance Cargo Control at Malaysian Customs

In the bustling world of international trade, efficient cargo control and precise weight verification are essential for customs authorities. Recognizing this need, a Malaysian-owned company specializing in x-ray cargo scanning approached Intercomp with a visionary concept: integrating their cutting-edge scanning technology with WIM data collection.



WIM system at the Tanjung Kupang Checkpoint, Malaysia

Intercomp supplied its OIML-certified Strain Gauge Strip Sensors. The integration process employed Intercomp’s API, which parses the WIM data and

ISWIM Guide for Users of WIM

The ISWIM Guide for Users of Weigh-In-Motion serves as a basic, yet comprehensive introduction to Weigh-In-Motion. The Guide covers different aspects related to the working, specifying, buying, installing, testing, maintaining and using of WIM systems and data. To enhance accessibility for users starting with WIM, these topics are described in easy-to-understand language.



This document covers different aspects related to the working, specification, purchase, installation, testing, operation and maintenance of WIM systems, and the application of the data they produce.

To enhance accessibility for users starting with WIM, these topics are described in an easy-to-understand language. This means that sometimes a simplified description is given that may not be completely in line with the latest scientific results. For those interested in more detailed and scientific explanations, references to these detailed reports are included.

A PDF version of the WIM User Guide can be downloaded at the ISWIM website: www.is-wim.net.

■ **Hans van Loo** | hans.vanloo.int@gmail.com

communicates with the operating software. This innovative fusion of cargo scanning and WIM data collection empowered customs officers to accurately verify cargo weights and detect false declarations, all while maintaining the flow of traffic at busy border crossings.



Detail of the installed Strain Gauge Strip Sensors

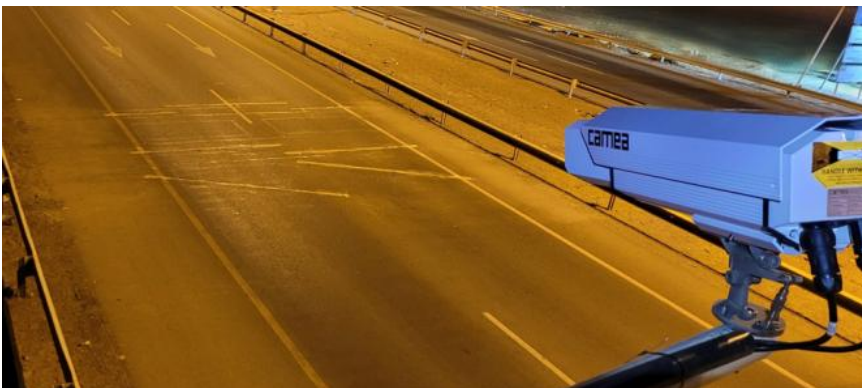
On Malaysian ports, every container truck undergoes scrutiny at checkpoints. As trucks pass through the scanner, Intercomp's sensors capture weight data while customs officers receive real-time x-ray images. This synchronized approach enables officers to verify declared contents and weight, swiftly identifying any discrepancies or suspicious items for further inspection.

The integration of Intercomp WIM Strip Sensors into the x-ray cargo scanner system marks a significant advancement in cargo control. Now, customs officers can efficiently cross-reference recorded weight information with declaration forms, enhancing the detection of false declarations. This comprehensive approach, seamlessly blending x-ray imaging with weight data, not only streamlines operations but also promotes secure and compliant international trade. Ultimately, it enhances productivity and reduces congestion at busy ports, showcasing the transformative power of innovation in the realm of customs enforcement.

■ [Leonardo Guerson](#) | leonardog@intercompcompany.com

Why CAMEA Offers Various WIM Sensor Lengths

WIM systems use weighing WIM strip piezo-quartz or strain gauge sensors installed perpendicular to the direction of travel in two or more rows and positional piezo-polymer cable sensors installed tilted to the direction of travel.



Installation with CAMEA sensors covering the whole road width

An Harmonized WIM Standard*

Governments and industry have worked over many years to establish specifications such as COST323 developed in Europe and standards such as ASTM-E1318 developed in North America, and many more on a national or regional basis. Another document that is often used internationally as a WIM reference is the OIML R-134; international recommendation on "Automatic instruments for weighing road vehicles in motion and measuring axle loads".

The OIML R-134 was initially introduced to address low-speed and static weighing. With the advent and growth of high-speed WIM, amendments have been added to this recommendation. Appreciated by ISWIM, about four years ago, OIML began the process of revising R-134 to consider the advancements in technology since its original inception in 2006, specifically including free-flow HS-WiM.

Several ISWIM vendors have already carried out - or are in the process of obtaining - OIML accreditation. Vendors, see this as a necessary investment while noting the significant drain on cost, time and human resources for making systems available for laboratory tests, finding new test sites, installing a test system, hiring test trucks, etc. This is a task not to be taken lightly, but is a necessary step for vendors who seek to demonstrate the performance and compliance of their HS-WiM systems.

Once accreditation has been awarded to the equipment, in theory, vendors should be able to apply for tenders globally where OIML R-134 accreditation has been achieved. ISWIM vendors are becoming increasingly frustrated that in daily practice, their OIML accreditation is not proving to be enough to satisfy tenders in other member states. The leadership of ISWIM is under increasing pressure from its members to address this situation.

Because of the suitable design, CAMEA's piezo-quartz WIM sensors can be installed not only perpendicularly but also tilted, which replaces and enhances the functions of both types of sensors in detecting double tires, detecting vehicles driving outside the weighing sensors (position in lane), and measuring tire pressure. It also reduces the total number of sensors (less cost and road interference) and simplifies the processing electronics (no need to process signals from multiple sensor types).

For high quality WIM applications, it is essential that the sensors are installed closely together across the entire width of the roadway, including the shoulder. Otherwise, the WIM system will not weigh in the exposed parts of the road, which the drivers will soon learn, and will then deliberately drive through these areas to avoid weighing their usually overloaded vehicle.

As a standard, CAMEA offers WIM sensors in lengths of 150, 175, 200 and 225 cm, or even 125 or 100 cm, and with a cable outlet on the long side, allowing them to be installed close together across the entire width of the road without gaps or uncovered shoulders. In practice, these perpendicular plus tilted combinations can for example be used: 150+175 cm, 175+200 cm, 200+225 cm.

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CROSS weigh station on Hungarian-Croatian border

CROSS Zlín, a.s. recently delivered another interesting project; the installation of a complete weighing station on both sides of the M6 motorway on the Hungarian-Croatian border in southern Hungary, connecting the cities of Szekszárd in Hungary and Osijek in Croatia. The weighing station includes high-speed WIM systems for pre-selection consisting of: a CrossWIM 3.0 with one lane and two rows of WIM-sensors, license plate detection and overview cameras, and a pair of 2D laser scanners for measuring vehicle dimensions.



CROSS weigh station at the Hungarian-Croatian border

Another part of the weigh station are variable message signs for guiding potentially overloaded vehicles on static scales. The static scales consist of two lanes with: static weigh bridges for accurate weighing of total weight, low speed axle scales and a 3D laser scanning system for accurate measurement of vehicle dimensions. Incinity's Invipo ITS system is incorporated into the station to control the entire weigh station and provide data to the highway superintendent.

An Harmonized WIM Standard*

From the WIM buyers and system users points of view, it may seem like a good idea to have their own dedicated set of specifications or a 'procurement document' with a set of requirements specific to their needs. However, in practice this approach often means that many WiM vendors will choose not to repeat the additional tests for this specific set of requirements. As a result, the buyer may end up with very few or even just one vendor preparing a bid for a tender with a well-known impact on both the price and the long-term quality due to a lack of competitive forces. It is appropriate to apply a strict set of specifications in a tender to select the highest quality providers. However, this can backfire when the specific nature of the specifications results in providers of high-quality solutions deciding not to participate in a tender.

The ISWIM membership base combines the most expertise and experience with WiM technologies and applications worldwide. However, ISWIM - apart from acknowledging and supporting them - has no formal position in the development and implementation of international standards.

ISWIM is serving as an external expert in the current revisions of OIML R-134. ISWIM welcomes the opportunity to collaborate with OIML in the 'education' of the WiM end users on the pros and cons of using an international recommendation versus using a set of specific tender specifications. In addition, ISWIM is willing to assist OIML in educating management of national legal authorities and certification institutes of the benefits of adopting an international recommendation over developing their own specific specification from its members to address this situation.

* note: This is summary of the article that is published in the April 2024 edition of the ITS International Magazine.

■ www.itsinternational.com

The accuracy requirements of HS-WIM are $\pm 5\%$ total weight and $\pm 11\%$ axle load for speeds between 30 and 50 km/h. The accuracy requirements of 3D laser scanning system are ± 50 mm (length), ± 30 mm (width) and ± 30 mm (height) at 5 km/h. It was installed during autumn 2023. The HS-WIM is capable of processing more than 1600 vehicles per hour per site, in practice this number is limited by the speed limit at the site.

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APM's WIM Pro with DSRC solution

With the new EU Road Traffic Control Directive set to be implemented in August 2024, it is important to understand the Dedicated Short Range Communication (DSRC) device and its potential use in equipping WIM stations. The WIM Pro with DSRC antenna is a modern solution that combines access to digital tachograph data with HS-WIM data.



APM's WIM Prosystem with DSRC antenna

Authorized services can access important data from digital tachographs and weigh stations at high speeds using an external DSRC antenna placed on the support structure above the road. This solution combines the benefits of HS-WIM stations and digital tachograph reading stations. The DSRC antenna is permanently installed on the support structure, eliminating the need for reinstallation and significantly reducing the time and effort required by enforcement agencies. Visual images can be used to easily identify vehicles that require detailed inspection.

Visit APM's stand at Intertraffic (Hall 02 Stand 328) to learn how they are helping to ensure traffic safety!

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