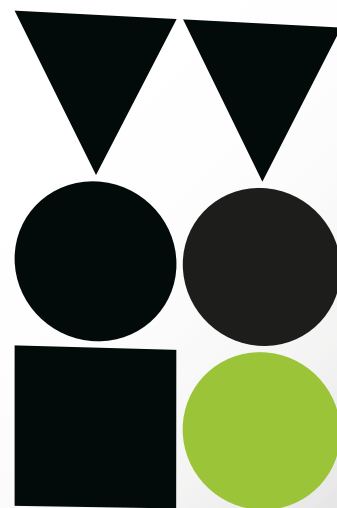


GLOBAL OOH AUDIENCE MEASUREMENT GUIDELINES

June 2026
Version 2.0



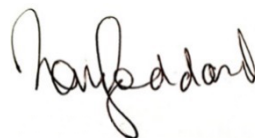
**WORLD
OUT OF HOME
ORGANIZATION**

“Collaboration” is easy to promote in principle. It is much harder to sustain in practice — which is why this second edition of the Global OOH Audience Measurement Guidelines represents a real achievement and deserves to be recognised for what it actually is: voluntary, substantive and undeniably consequential.

The organisations that have contributed to Version 2.0 did not have to do so. Sharing methodology is not a neutral act — it exposes thinking to scrutiny, invites comparison, and takes time that busy teams have in short supply. That so many have chosen to do it anyway, and that the number doing so has grown so significantly since 2022, tells you something important about the direction of travel in this industry, driven from within our membership.

OOH has always made a strong intuitive case to advertisers. What measurement allows us to do is make that case with evidence — to stand alongside other media not just on reach or cost, but on the credibility of the numbers we put forward. Every market that contributes to these guidelines, whatever its size or stage of development, strengthens that collective credibility. The work documented here raises the bar for the entire industry.

WOO exists to promote and grow the OOH medium globally, and these guidelines are one of the most direct expressions of that purpose. I am proud of what our members and their measurement partners have built, and grateful to everyone who gave their expertise to make this edition possible.



Tom Goddard - President

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Editor's Foreword:

Four years ago, when the first edition of these guidelines was published, eleven national measurement bodies came together to share their approaches and establish a common framework for OOH audience measurement around the world. That act of collaboration was itself significant — it demonstrated that the OOH industry, for all its local variety, shares a common purpose: to measure what we deliver with the rigour and transparency that advertisers rightly demand.

Version 2.0 of these guidelines reflects how far that purpose has travelled. Twenty-two national measurement bodies from five continents have contributed to this edition — double the number involved in 2022. They include markets that have built measurement systems from the ground up since the first edition was published, markets that have substantially rebuilt systems that were already well established, and additional markets covered in this volume to show the breadth of the work being done in OOH.

What has changed technically in four years is equally striking. When the first edition was written, AM4DOOH was described as a recent research project. It is now an adopted international standard, in operational use across multiple markets represented here. The Impression Multiplier, once a theoretical concept requiring guidance, is now a live commercial instrument in multiple markets, with standardised protocols agreed between measurement bodies, media owners and programmatic platforms. Contemporising — the moderation of audience models to reflect current behaviour — has evolved from a conceptual approach to tackle the significant changes in audiences during the covid period, into three distinct methodologies, each suited to different market conditions and data environments.

The relationship between mobile location data and OOH measurement has also been transformed since the publication of the first WOO Guidelines. The first edition treated SDK and telco data as supplementary sources that filled gaps where government counts were unavailable. In several markets represented here, continuously collected passive mobility data is now the primary input — tracking tens or hundreds of millions of devices daily, updating audience metrics frequently, and rendering the traditional distinction between planning data and contemporised delivery data increasingly difficult to sustain. Both continuous panel data (Portugal) and observed device-level exposure(GCC) are included in these guidelines as examples of weekly contemporising or performance measurement, whilst RoadStar in India is measuring 300,000 sites across 2,300 cities from a single continuously collected data stream. These are not approximations of traditional measurement — they are a different kind of measurement, and these guidelines have been updated to reflect that.

A further significant development is the growing adoption of synthetic population modelling — variously described as Activity Based Models, agent-based models or virtual populations — as a mainstream approach to OOH audience measurement. Rather than expanding a surveyed sample statistically, these systems generate a complete synthetic population in which every individual carries a consistent set of demographic attributes and daily movement patterns derived from observed behaviour. Australia's rebuilt MOVE system, produces hourly audience data for every day of the year across a synthetic population representing a 10% sample of all Australians, calibrated against tens of thousands of real-world count locations, delivering the temporal precision required for DOOH and pDOOH in an inherently privacy-safe manner. As privacy regulation tightens, that combination of granularity and privacy-by-design will become an increasing practical advantage.

The expansion of Section 3 to twenty-two market entries is itself a resource I hope practitioners will use well. Within it you will find approaches that challenge received wisdom in productive ways: markets that have deliberately chosen not to apply visibility adjustment, and articulate clearly why; markets that have achieved cross-media measurement not by adding OOH to an existing survey, but by building OOH into the fabric of a national multimedia joint industry committee from the outset; and markets expanding into synthetic agent-based population modelling, to expand datasets to bring person level granularity without compromising privacy. No single market has solved every problem. But collectively, they have between them explored almost every question the discipline poses, and the answers are here to learn from.

My own reflection, having worked across many of these markets in the preparation of this edition, is that the single most important thing an OOH measurement project can do — whatever its methodology, its budget or its stage of development — is to design for transparency from the first day. The markets that have grown fastest, attracted the broadest industry support and commanded the highest advertiser confidence are, without exception, those whose governance structures, data inputs and processing methodologies are open to scrutiny. That principle underpins every section of these guidelines, and it is the thread I would ask every reader to carry with them.

I would like to express my sincere thanks to the twenty-two measurement bodies who gave their time and knowledge to make this edition possible, and to the WOO team for their continued commitment to this work. These guidelines exist because people who are, in many respects, competitors, chose to act as a community. That instinct is what makes OOH measurement — and the medium itself — worth the effort.



Gideon Adey - Measurement Consultant, World Out of Home Organization

1.1. Statement of Approach and Principles

The intention of these guidelines is to build upon the existing body of work available, most notably the ESOMAR Global Guidelines for OOH Measurement published in 2009 in association with the World Out of Home Organization (formerly FEPE). These guidelines aim to update areas of the previous work, specifically in the areas of Digital Out-of-Home; Contemporising Audience data, and the use of continuously collected passive mobility data as a primary measurement input.

Outline guidance for complete OOH measurement is included here for context, although more detail in specific areas of modelling and measurement can be found in the recommended reading section towards the back of this document.

The World Out of Home Organization (WOO) has intended this document to be a set of guidelines rather than standards, and we outline the areas of importance in creating transparent and trusted data for the use in the measurement and trading of OOH media. Each OOH territory will have its own constraints on funding, complete industry involvement and the availability of external data, so this guide should be used in local context.

The journey to a complete understanding of all OOH frames and the audience they deliver is a long one, but it is a journey well worth embarking upon, with many stages and junctions which can be achieved, celebrated, and monetised along the way.

WOO has always been committed to the promotion of the OOH industry, through the collaboration of its members. Audience measurement represents a key area where OOH practitioners and associations can work together to promote the increased usage of OOH media in all of its forms. Accountable OOH audience delivery metrics add value to the overall proposition of OOH to advertisers - increasing the revenue to OOH media owners and, in turn, the investment available to develop the industry further.

WOO sees collaboration as a cornerstone of the organisation, and believe that shared learnings in OOH audience measurement is key in the industry's future success. However, in some territories, the path towards OOH measurement may be embarked upon by an individual company or small group of practitioners – following good governance from the start will help in both the credibility of the data but also in gathering other contributors to the project as it evolves.

WOO has worked with OOH audience measurement bodies from across the world to understand the approaches being deployed today and those that are in development. These approaches have been used to develop these guidelines alongside previous guidance – each territory has an approach best suited for their physical and organisational structures and many have developed over time, so no two approaches are identical, but all have common aims. A summary of the approaches examined is also included, alongside contact details of the organisations that have been generous enough in helping us compile these guidelines.

1.2. Governance

Ideally, audience measurement to be used as currency should involve all interested parties from across the industry – OOH Media Owners, OOH Media Buyers, alongside Advertiser and Agency representatives – both as individual companies but also as associations to represent the interests of the widest possible group.

A decision making and funding body may be a subset of this group but should include representation from each area of the business.

This decision making body may also wish to appoint a Technical Committee to advise on the appointment of any external suppliers and to scrutinise the work undertaken. The Technical Committee should also be representative of the interested parties and may also employ external expertise to advise where required. The committee's role will be in understanding both the users' needs and ensuring that all aspects of the research and modelling are open to scrutiny. Ensuring effective auditing, accreditation and quality control systems are in place would also fall to this group, giving them oversight of the performance of external research or data suppliers.

Alternatively, a smaller group of interested parties may form to embark upon OOH audience measurement, whilst applying the principles of transparency from the start will help the adoption of new members as the project evolves. For example, the South African ROAD approach was initially set up and funded by four stakeholders and has expanded to now involve more than 65.

Credible audience measurement may also be delivered initially by a single company and adopted across the industry if the principles of transparency and scientific rigour are maintained from the outset. The New Zealand “Calibre” roadside measurement system approach was initially set up by a single media owner before being adopted across the market as a whole. Since replaced by the cross-environment, multi stakeholder knOOH approach, this remains a good example of starting OOH audience measurement where you can, and then evolving and expanding over time

A further model is now included in these guidelines where developing through a formal JIC had not been feasible – a commercially operated or ‘syndicated’ measurement product applying the same governance approach via a technical oversight committee comprising major media owners and buying groups. This model - represented in these guidelines with examples from across the GCC, South Korea, India and Portugal - sits between a single-company proprietary system and a full JIC. Where this approach is used, the recommended transparency obligations should still apply: disclosure of methodology; an independent technical oversight committee and data governance standards.

In some markets, OOH measurement is embedded within a multimedia Joint Industry Committee covering television, radio, print, online and OOH from a single governance structure. This model – in use in Belgium (CIM), and the Netherlands (NMO) - offers significant advantages: shared

infrastructure cost, natural cross-media data integration, and stronger buy-side engagement. However, OOH-specific priorities may carry less weight within a larger multi-media body, and development timelines may be determined by the needs of the broader JIC.

1.3. Funding, Access and Transparency

Out of Home audience measurement is not an easy, or low cost task. Project design and management, alongside oversight, will require resources. Selecting research and data providers should be done through open tender for transparency, and may require a long term financial commitment from the funding body to embark upon the work. So stable long term funding arrangements should be secured to allow for the project to be developed and delivered.

Ideally the security of funding should be agreed across the widest group of end users at the outset, although a core group may start the project and bring in additional stakeholders as the data becomes available. Consideration should be made to the value gained from use of the data in relation to the fees or commitments sought. As the benefit of OOH audience metrics – increased use of OOH media – will be reaped by media owners and specialist OOH media agencies, the initial investment burden should be shared proportionately with the ultimate returns. Likewise ongoing funding should be in proportion to the organisations size or use of the data.

As metrics are predominantly a benefit to OOH companies, the wide usage of those metrics by advertisers, agencies and other advisers should be promoted. Any costs to these organisations should be minimised to encourage the use of both the data and the medium.

The exact funding and governance structure will be determined by local market conditions, but it is recommended that access to the data should be equal for different user groups – both to avoid anti-competitive practices, and to ensure the openness of the system – promoting even trading conditions across all parties in the market. User representatives, whether funding or otherwise, should have an effective say over the data and services provided – to ensure that the service is appropriate for their needs and to ensure that future development requirements are captured for consideration.

Data and research suppliers must ensure, and warrant, that their practices comply with all relevant regulations and codes of conduct and should share their methodology with the audience body. Ownership of the methodological IP, processes, documentation and input data should be agreed and clearly stated in the tender and financing process.

1.4. The use of Personally Identifiable Information

Almost all audience research projects, and especially those that track individuals movements and locations, involve the capture and retention of personally identifiable information (PII). It is critical that the audience body ensures its suppliers comply with all local regulation in relation to PII and to other territories regulations where they apply to their citizens across the world.

It is recommended that the audience body seeks legal expertise in the capture, retention and use of PII and submits to regular audits to demonstrate compliance. All suppliers used by the audience body should also be able to declare, and demonstrate through regular audit, that they remain compliant to all applicable regulations that governs how institutions collect, record, use, disclose, store, alter, disseminate, and process the personal data of individuals. Additionally, to have documented processes to notify the relevant authority in the case of a data breach, and accommodate the rights of data subjects, including rights to access, rectification, erasure, restricting processing, data portability, and rights in relation to automated decision-making and profiles.

A PII compliance audit should be conducted by an accredited body and address:

Data governance

Acquiring, identifying and classifying personal data

Managing personal data risk

Managing personal data security

Managing the personal data supply chain

Managing incidents and breaches, create and maintain awareness

Properly organising a data privacy organisation within your institution

The increasing use of mobile location data (SDK, telco and similar) as a primary or supplementary input to OOH audience measurement requires particular attention to the consent standards applicable to this data. Audience bodies and their suppliers should distinguish clearly between the following:

AppSDK data: location signals collected via applications where the user has actively opted in and granted location permissions within that specific application. This represents the highest standard of consent for mobile location data and is the preferred basis for audience measurement.

AdSDK / Bid Stream data: location signals derived from advertising bid requests. This data does not rely on explicit user consent for location-based audience measurement and should not be used as the basis for OOH audience currency.

Blended AppSDK and AdSDK data: combining these two sources obscures the consent basis of a significant proportion of the resulting dataset. Audience bodies should not accept blended data from suppliers unable to provide a full audit trail of the consent basis for each signal type.

Where home location is inferred from device behaviour patterns (for example, identifying the location at which a device is persistently static during sleeping hours and classifying this as a home location), the audience body must ensure that its suppliers' consent chains cover the use of location data for this form of inferred profiling, not only for the observation of location at a single point in time. This approach, known as home-graph inference, is now in use across multiple markets and carries specific obligations under GDPR and equivalent legislation.

Audience bodies using mobile location data should require suppliers to hold and make available for audit: time-stamped records of expressed consent for each device included in the dataset; documentation of compliance with all applicable national and territorial privacy legislation; and evidence of ongoing monitoring for changes in device manufacturer permissions policies that may affect the volume or representativeness of the dataset.

2.1. An overview of the required inputs for the measurement of OOH media

There are multiple approaches to building credible OOH Audience Measurement and delivering those data to end users. The approach used will depend as much on market composition and available data, as the budget available to conduct the project. However, with an overall knowledge of what is required for the complete process, including enhanced metrics, a project can be properly planned to deliver useful metrics during its development. Delivering usable data to investors and stakeholders at each stage may help in maintaining investment through subsequent developments.

A hierarchy of metrics, or stages in development, could be seen as this, each with its own use case:

How many people are passing OOH frames – Volume of audience available.

How many people are seeing those OOH frames – Delivered volume of audience.

Who is seeing those OOH frames – Demography and audience profiling.

How often are they seeing those OOH frames – Reach and Frequency modelling.

Of those, who has seen an individual 'spot' – Granularity required for measuring DOOH.

What was the actual performance – contemporised delivery against predicted delivery.

How does OOH contribute to the complete media campaign – Cross media measurement.

Below are the key requirements to deliver across all these stages; understanding the needs for later stages allows for the consideration of those requirements when delivering earlier stages.

2.1.1. Population/volume/OTS

Best practice involves the merging of a variety of different data layers. One of these fundamental layers is the absolute volume of people passing each advertising face, the potential audience volume. Count data of audience volumes can be gathered from multiple sources such as government or transport authorities, from transit operators, from landlords or from media owners. Additionally, count data products may also be available in market, such as HERE traffic volumes for vehicles. The method for gathering these counts should be validated and understood to apply weightings to more credible or more recent counts.

The cost of importing different datasets on traffic flows begins with locating data sources and then testing the data for quality and accuracy. Costs are dependent on the number and quality of data sources employed, which can

be managed by users. Where such data are limited or unavailable, traffic and pedestrian surveys can be carried out as 1st party count data, gathered from, for example, manual counts, cameras or purpose-built count stations.

Third-party and passively collected data sources – including telco signalling, opted-in SDK mobile location data, satellite imagery and commercial mobility datasets – are now used as primary volume inputs in a growing number of markets, and not solely as supplementary sources filling gaps in government count coverage. Where such data are used as a primary input, the method of collection, the consent basis, any imputation or upstream modelling, and the quality control procedures applied must all be fully transparent for validation by a technical committee. Where possible, the raw data should be scrutinised alongside cleaned or processed data to allow for direct validation of those processing steps. Markets with limited government count infrastructure may find that validated mobile location data or satellite imagery analysis provides a credible and accessible route to audience volume measurement that would not otherwise be available.

Volume counts will not be available for every OOH location, or for all time periods needing to be measured, so a model will need to be developed to estimate counts for all locations with OOH frames. Modelling audience flows and volumes from limited count data will rely on a detailed understanding of the road and transit infrastructure, with associated Points of Interest (POI). Inferring audience volumes for all road or transit ‘links’ where OOH exists may require limited modelling from existing counts, but where OOH locations are widespread and dispersed, a model that calculates audience volumes for all ‘links’ irrespective of OOH locations may be more appropriate.

2.1.2. Visibility Adjustment

With an understanding of the number of people and their profiles passing any OOH frame it is important to understand what proportion of that audience are likely to see advertising upon it. Visibility adjustment (VA) applied consistently across all OOH frames by the measurement body removes the application of adjustments being done in an uncontrolled ad hoc manner by buying agencies or advertisers, often discounting well below the actual audience delivered. Inconstant adjustments applied by different advertisers leads to inconsistent use of the data and disagreement on the actual delivery of OOH.

The use of Visually Adjusted Contacts (VAC) is applied commonly, but not universally by industry bodies for describing audience consumption for OOH. The metric is a stringent one and is only recently being applied to other media metrics as ‘Attention’ becomes more widely accepted as a requirement in audience measurement, however OOH has led this approach as the majority of OOH media is passively engaged by the audience. With no editorial or content to either draw or distract the viewer from the OOH advertisement, it is important to be able to demonstrate to advertisers that audience delivered in the metrics are as close to actual audience

consumption of the advertisement as possible.

The terminology for defining the VA applied varies by territory – see ‘Measurement Definitions’ – so it remains important to define the actual VA approach being used. A number of broad approaches exist to define the proportion of those that have been near an OOH frame to represent the frame’s audience:

Circulation – the audience count in proximity to an OOH frame

Opportunity to see (OTS) – audience in front of an OOH Frame, or defined to be in the area that the frame can be viewed from.

Opportunity to Contact (OTC) – sometimes referred to as ‘Realistic Opportunity to See’ (ROTS), where the audience is in the area that the frame can be viewed from, and where their direction of travel places the frame in their field of view, free of any obstruction, within agreed maximum and minimum visibility distances for the size of frame.

Visually Adjusted Contact (VAC) or ‘Impact’ – a probabilistic model based on visibility research to determine what proportion of those with an Opportunity to Contact will actually look at the OOH frame for an agreed period of time.

A further market-specific variant of visibility adjustment has been developed in the GCC region: the Opportunity to Read (OTR). This metric defines the number of opportunities an OOH face offers the passing audience to read the advertising creative, measured by fixing the creative at a minimum readable content level (one background image, one logo and a defined character limit for text). OTR measures the time needed to fully read the creative in comparison with the ROTs contact time, and is positioned as a close equivalent to ‘Viewable Impressions’ often used in on-line audience metrics.

It should be noted that audience bodies developing market-specific visibility should ensure the definition and derivation is fully documented of those metrics are disclosed to all users.

Some markets have made a deliberate decision not to apply visibility adjustment, instead reporting pure OTS (ROTS) impressions as the trading currency. This approach is used, for example, in New Zealand, where the industry has agreed to trade on standardised impression metrics without a VA layer. Where this approach is taken, it should be clearly disclosed to all users and advertisers, so that comparisons with markets that apply VAC are not made without an appropriate adjustment.

Understanding VAC is commonly seen as significantly important for OOH media as it is more often observed or consumed passively by the audience, free of either the distraction or draw of editorial content common in most other display advertising media. This higher ‘bar’ that is commonly used in OOH measurement has traditionally allowed OOH practitioners to counter the claim that ‘people don’t look at posters’ by using scientific research to demonstrate that they do. Visibility Adjustment (VA) also allows a more favourable valuation of OOH inventory that has visual scale, is well positioned

for the audience in that environment, is illuminated or has dynamic movement within the display frame. By applying VA advertisers can fully understand the value of OOH, and media owners can be rewarded for their investment in the quality of their inventory.

Understanding the calculation of Visibility Adjustment is highlighted by the increase in the development of Digital OOH faces where multiple advertisements can be seen by each audience member. This multiplier effect and increased valuation can only be fully realised by understanding how many messages the audience individually consumes as they pass the DOOH face and assessing the increased attractiveness of the digital delivery mechanism itself.

Visibility research studies have been carried out in several countries using different forms of prompt material and include both laboratory based and real world approaches. The common aim is to understand the factors that influence attention and their combined influence in a multitude of scenarios that can then be applied to all OOH faces being measured. Common factors that have been shown to influence visual attractiveness include:

Size of frame

Illumination type

Illumination and latitude/seasonality

Maximum visibility distance

Orientation to the audience's direction of travel

Distance from central field of view – horizontal and vertical

Exposure time

Speed of audience movement

Audience mode of travel

Dynamic changes in advertising image

Visual clutter

Visual obstruction

2.1.3. Travel survey

In the absence of Census data of population movements, there is generally a requirement for a travel survey or observational mobility dataset to understand the general mobility of the population being measured. This is needed to predict the profile of the audience passing any OOH advertising face, and to calculate the reach and frequency of exposure for individual faces and networks of faces.

2.1.3.1 Research based approaches

The highest quality of data captured will be research based and use techniques to ensure its representation of the total population. This is likely to be the highest variable cost in any research based OOH audience model and may need to be augmented by 3rd party mobility data and is likely to require some form of data expansion to create a dataset that covers all OOH inventory to be measured. The correct sample size will depend on the size and complexity of the populations to be measured. In some cases, demographics may be inferred but this is likely to come with assumptions and a resultant reduction in accuracy. The importance of this will vary by country.

The lowest cost direct travel survey research option is simply to ask people about the journeys they have taken on the previous day or for longer periods in a diary model, recruiting a sample through standard research techniques.

Passive approaches, which do not rely on respondent recall, are more accurate and capture more travel behaviour, and if accompanied with second-by-second readings, can be used to understand travel mode, speed and angle of incidence in approaching OOH frames – useful in calculating the visibility or likelihood to see an OOH advertisement.

Passive data capture includes using a dedicated device or a Smartphone-based solution where people are asked to download a tracking tool. The app monitors locations at regular intervals using GPS from which journeys can then be calculated. Smartphone locational tracking data are more accurate outside of buildings so some behavioural modelling of journeys for interior environments will still be required with this approach.

Higher quality tracking for interior and exterior movement can be achieved with a representative sample of people carrying a bespoke meter for a period of time. The advantage of a bespoke meter is that it may be designed to use multiple sensors and a more robust battery, to accurately determine its location second by second, in all settings over an extended period of time – including height above or below ground – especially useful in understanding multi-storey retail and underground transit environments. These additional sensors may include a digital accelerometer, gyroscope, barometer, magnetometer, thermometer, and wi-fi, alongside GPS – all synchronised by time code.

Increasingly, data expansion techniques for research based approaches have adopted synthetic modelling to create a larger, more representative ‘sample’ which can then be interrogated for intersections with OOH frames:

An Activity Based Model (ABM) is a synthetic population approach to mobility modelling that generates the travel behaviour of an entire population from directly observing a sample of real individuals. Each synthetic individual in the ABM is assigned a statistically representative set of daily activities (work, shopping, leisure, education) and the trips required to fulfil those activities, based on observed patterns from travel surveys, land use data, mobility data and ground truth volumetric data. ABMs are used

in Australia (MOVE), Belgium (CIM) and are being developed in Sweden (Outdoor Impact) and Great Britain (Route). They offer advantages in terms of scalability (the synthetic population can be as large as required), privacy (no real individuals are tracked) and comprehensiveness (every road link and environment can be populated with audience). ABMs require extensive calibration against observed count data to ensure the modelled population's movements correspond with reality, and the calibration methodology and tolerances should be documented and disclosed.

2.1.3.2 SDK/Telco locational data based approaches

Due to the relatively high cost of research based approaches and the high penetration of smartphones in many territories, opt-in SDK locational data is increasingly being used as the foundational dataset to map human movements.

Rather than expanding from a research dataset, mobility modelling from raw SDK data requires filtering and deduplicating techniques to reach a representative sample, which can be then weighted to represent the population as a whole. Existing 'mobility' data providers offer products that can be built upon for OOH audience measurement, or a complete approach from raw SDK data may be built by the measurement body for better control and transparency.

As mentioned previously in these guidelines, the principles of transparency and governance must be extended to all suppliers of locational or mobility data including the compliance with all relevant regulations in the region being measured or any region where the data is being processed.

Audience bodies using mobile location data should require suppliers make available for audit: records of expressed consent for each device included in the dataset; compliance with all applicable national and territorial privacy legislation and user opt-out procedures.

Furthermore, third party datasets require ongoing monitoring for changes in the raw data supply and accuracy due to, regional regulation, device manufacturer permission policies and churn in the phone applications being monitored. All may affect the volume or representativeness of the dataset over time and must be accommodated for in the modelling.

When selecting 3rd party datasets, it is imperative to consider the security of that data supply – building a measurement model based on data that may not be available in the medium to long term is analogous to building a house upon shifting sands. Consider whether data is privacy compliant and that legislation yet to be adopted will not affect its supply, volume or quality – ensure that your suppliers comply with relevant regulations and are audited to demonstrate as much. Any 3rd party data source also has the theoretical potential for interruption in supply, or cost inflation, so consideration also should be given to the supplier's corporate robustness, whilst agreements on acceptable long term cost inflation should be sought.

With any approach to gathering travel data and journey patterns, there will be a need for further modelling to represent the movement patterns of the entire population over an extended period and across all measured OOH environments. Understanding reach from the survey period feeds into these models to predict longer term and combined reach by audience subgroup.

2.1.4. Inventory Characteristics

The characteristics and precise location of an OOH frame heavily influence the audience available to view it and therefore it is critical that inventory characteristics are accurately recorded, audited, and are open to peer review. The characteristics required for modelling audience delivery are a core requirement here, but other characteristics that are used in market for trading and production of posters/creative assets may also be recorded centrally in standardised form, for benefits outside of audience measurement.

The precise location of every OOH frame will require it to be placed on a unified map or 'graph' of every OOH environment measured, and ideally use the same source as the mapping used for determining audience flows and volumes. Locating an OOH frame on this map may be done initially by use of GPS coordinates but is likely to need manual intervention to locate the frame precisely with orientation, altitude and setback from audience flows.

A system to allow media owners to upload inventory details including locational photographs is a core feature of OOH audience measurement. This system may be managed by the audience measurement body, by the media owners' trade association or an independent 3rd party. Flexibility, ease of use and security should be considered in commissioning or designing an Inventory Mapping System. The process and responsibility, for verifying and auditing inventory characteristics will also need to be agreed, including ensuring that both the database and individual frame characteristics are kept up to date.

Where indoor or place-based inventory is measured, every covered space should be mapped to create a digital replica of the real world showing all possible internal paths and flows, entrances, exits, gates, platforms, escalators, stairs and visibility obstructions, with associated probabilities of use. This digitisation is a prerequisite for calculating audience flows within the indoor environment and for establishing accurate visibility zones for each indoor frame, in order for a direct comparison in methodology to the measurement of exterior frames. Indoor maps should be updated whenever structural changes are made to the environment, and the currency and completeness of indoor mapping should be included in the scope of inventory audits.

Where mapping is impractical for indoor environments, such as small geometrically simple venues like bars, coffee shops and the interior of public transportation vehicles, a simple probability model may be applied to audiences who have been measured as visiting the venue. These probability

models should be based on published behavioural or observational research and be agreed by the technical committee.

A further development in inventory onboarding is the increasing use of dedicated mobile applications to capture inventory metadata in the field. These applications standardise data collection and reduce manual input errors by restricting the fields available to the collector, enforcing GPS coordinate capture, photography requirements, and timestamp. This standardised workflow supports both audit trails and quality control processes. Where such applications are used, the audience body should ensure that the data collected is subject to the same verification and peer review requirements as data submitted through other means.

2.1.5. A method and system to process all these data into usable information

The calculation of audience, reach, frequency and profile is central to the utility of the measurement system, so the assumptions that underlie the reach model must be reasonable, transparent and documented for scrutiny. The initial sample size must be adequate for the granularity of outputs required and may need to be augmented with further geographical and temporal data to understand reach beyond the survey period. Where these data are unavailable and long term reach is based on simulation, the approach must be based on systematic and logical procedures which can be tested by empirical analysis.

In principle, reach and profile is calculated by observing the contacts between the audience and advertising face that are achieved against the sample for any given OOH frame or selection of frames for the time period of the advertisement's display. Then weighting this delivery to correspond with the proportional weight, and profile, of each sample participant.

In practice the sample will not be sufficient to have enough contacts against every frame being measured for every incremental time period, even where a multi-year survey period is used. So a method of expanding the data through redistributing a proportion of the contacts from the sample across all frames will be required. There are several approaches that may be used for this, but most rely on grouping frames (by similar attributes and geography) and applying a statistical model that correlates with the observed data but allows for estimating the effect on the audience from frames with few or no audience contacts. This can then be validated and refined against the number of individuals passing a frame from known or modelled counts.

Alternatively, the initial sample may be used to create a modelled audience, of many millions of synthetic individuals that represent contacts with all frames, across all time segments. Although this requires advanced modelling and machine learning techniques, these synthetic media

consumers each have statistically accurate and representative journey behaviours and can therefore be treated as very low weight individuals in calculating both volume and reach for individual frames or indeed individual 'spots' on a digital screen.

A third processing approach has emerged with the increasing use of large-scale opted-in mobile location datasets as a primary mobility input: deterministic audience assignment. In this approach, individual device signals may be matched directly to the visibility area of the OOH face at the specific time of the signal, producing an observed count of device-level exposures for each frame in each time period. Reach may then be calculated directly as the number of de-duplicated devices recorded within the collective visibility areas during the campaign period, expanded to the full population using census-based weights.

Where deterministic assignment is used, the audience body must document and disclose the expansion methodology, the census weighting approach, and any corrections applied for known panel bias.

2.1.6. Data Delivery

In order to promote the use of OOH media, audience data should be made available to the wider advertising community, in addition to OOH practitioners. Data produced for OOH audience research is by its nature complex, to accommodate flexibility in the queries made by end users. Therefore the application of a further algorithm or calculation based on the user's request is normally hosted within a software application.

The audience measurement body may produce or commission this software to be used across the market, and/or may make the data and required calculation available for 3rd party software developers to compete commercially, based on their processing capabilities or user interface. A competitive marketplace in delivery software may make the data more readily available and accessed by a wider variety of end users with different requirements and use cases.

Where 3rd party software is in use, it is important to verify that the outputs from all applications are comparable, this will require the publication of test figures and a testing regime to authorise the 3rd party software application. This process will need to be repeated for every update to the published data. Maintaining ownership over the user interface for accessing the published data is often seen as an attractive way to control the consistency of outputs achieved by all users.

In order to include newly built or converted frames into the measurement data, and to update counts and travel patterns, a data publishing schedule should be agreed at a frequency that is both affordable and timely.

Where the sample and processing allow, reporting against a wide range of

audience profiles increases the usability of the data and increases the value of the outputs where they can match many separate advertisers' targeting requirements. Accommodation should be made to allow end users to understand the credibility of the output data where audience profiling has created a sample that is no longer robust – disclosing the confidence interval surrounding the audience estimates.

At a minimum, the data should be able to report against a range of trading audiences, ideally taking into consideration audiences used in other media, to allow for cross media comparison, and to allow comparability across international markets.

Reporting should be clear as to whether VAC or OTC metrics are being delivered and be available against Impacts (VAC) or Viewable Impressions (OTC/ROTS), and Reach, Frequency, Gross Rating Points at both a national and standard region/market level. The use of several terms varies by market and are often influenced by their application in other media measurement – an expansion on the terms 'contact', 'impression' and 'impact' is dealt with in the Measurement Definitions section of these guidelines.

The delivery of OOH audience data via Application Programming Interface (API) has become common practice in many markets to support both planning and trading, whether through direct IO or programmatically. An API allows media owners and buyers to integrate audience data directly into their own dedicated platforms, alongside SSPs and inventory management tools,

In most markets, the audience measurement body supplies data to media owners, who in turn integrate and distribute spot-level audience metrics to programmatic platforms and SSPs. This creates a chain of custody in which the measurement body does not directly control the data as it enters the automated trading ecosystem. To protect data integrity and currency credibility, the audience body should: define the permitted uses of published data; specify the level of aggregation and the transformation rules that media owners may apply before integration into SSPs; and require that media owners notify the audience body of any modifications made to the data before it is supplied to third parties. Where DOOH audience metrics are supplied to SSPs, the audience body should engage with the IAB and relevant DSP and SSP operators to confirm that the Impression Multiplier or equivalent metric is being applied consistently and in accordance with the published methodology.

2.2. Enhanced measurement requirements

2.2.1. DOOH – understanding the delivery of fractional space

DOOH is now the dominant growth area in OOH advertising, and thorough and transparent approach to understanding the delivery of DOOH has become a standard requirement for any OOH audience measurement system.

There are three main areas for consideration in approaching the measurement of DOOH:

- a The added attraction of DOOH screens to the passer by. Digital screens may have an increased visibility due to their illumination levels, due to the transition from one image to another or due to the ability to have moving images on the screen. This additional visual attraction can be measured through scientific research and several techniques have already been deployed to measure this uplift in screen visibility, creating an attraction factor that is applied to adjust base VAC for DOOH screens.
- b The ability to see more than one advertising message. The overall delivery of a digital screen is likely to be higher than a static one as the audience may be able to view more than one message as they pass the screen. Understanding the audience duration in front of a screen, and the advert duration, is critical in being able to calculate the increased overall OTS that the screen delivers. Each exposure may then be visibility adjusted to understand the total delivery of impacts from that screen – and those impacts would then be ‘shared’ amongst the advertisers on that screen.
- c The ability to use the screen for short periods of time makes it increasingly important to understand the audience delivery in far more temporal granularity than that of a static OOH face. Where a screen can be traded by the hour, or even by a spot length, applying an average delivery from the day or week will undervalue the screen in some hours and under-deliver for the advertiser in others. Temporal granularity needs to be captured in audience volume counts wherever possible and are likely to need to be modelled to accommodate all DOOH screens being measured.

Addressing these three areas are critical in understanding the increased value that DOOH screens provide in terms of audience delivery. Without a transparent approach to DOOH measurement there is a high likelihood of advertisers “netting down” delivery of screens in an overly simplistic manner, without consideration of their ability to attract and deliver higher audiences than static frames.

Visual attractiveness.

Understanding the increased visibility or attractiveness of a screen can only be addressed through new visibility research, giving subjects appropriate prompt material to simulate the passage past a digital screen from different modes of transport and recording the attractiveness of a screen in direct comparison with a static frame, especially at the point of transition from one image to another, or where moving images are deployed.

With modern eye camera techniques, it is possible to measure fixations on a frame, static or digital, in real world journeys – however it is difficult to control the multitude of variables that occur in the real world, such as weather, ambient lighting, temporary obstruction by vehicles or people, the behaviour of other road users and other distractions that may not be representative in an ‘average’ journey. This can be addressed through increased sample size, by capturing extremely large numbers of passages

and statistically removing outliers to find a visibility norm for each of the scenarios to be measured – however the sampling cost and processing required is likely to be prohibitive.

Alternatively a laboratory based approach can be used where the prompt material is pre-recorded or virtually created. By using controlled prompt material, different subjects can be exposed to identical passages past a frame where the attributes of the frame have been changed to reflect the aspect being tested. In this case specifically to understand the effect of illumination and movement in the frame, but the technique is equally valid to measure any other attributes that affect visibility, such as size, offset, audience speed, viewable distance etc.

The AM4DOOH research project – carried out by APG|SGA, Clear Channel Outdoor, Exterior Media and JCDecaux, and sponsored by WOO – has been widely adopted across international markets as the standard methodology for DOOH visibility adjustment. AM4DOOH uses virtual environments to expose consumers to digital and traditional OOH advertising in combination with eye-tracking, and provides uplift factors for DOOH relative to static OOH. The AM4DOOH methodology addresses the key parameters required to calculate the adjusted visibility of a DOOH face: screen size, contact time, audience speed, spot length, distance from audience flow, height and angle of incidence.

The specific uplift factors and their application method are documented in the AM4DOOH white paper, available via the WOO members database.

Multiple contacts.

The potential possibility to view more than one advert in a single passage past a screen can be represented mathematically without the need for a full understanding of the visual attraction of DOOH screens, or the increase in visibility delivered by movement or transition. The approach is a relatively simple calculation based on the duration of the audience contact with the frame and the spot length of the adverts played on that frame, delivering a theoretical increase in OTC, each spot with its own new duration of contact. Existing visibility adjustment can then be applied to each of these contacts to understand the total VAC or impacts delivered by the frame which are then apportioned between the advertisers using the frame.

In the approach above many new OTCs will be created, some with very short contact durations, and will therefore have limited opportunity to be measured as a VAC when existing visibility research approaches are applied. Understanding the increase in attractiveness of DOOH frames and the transition of image within a frame is vitally important in fully realising the value of these short duration contacts, and it is recommended that visibility research is updated specifically for the measurement of DOOH.

Increasing temporal granularity.

The ability to use DOOH for fractional time periods allows advertisers to minimise wastage through temporal targeting and for media owners to

maximise yield by delivering audience in the most efficient manner to their clients. This approach to inventory management may be automated through media owners' own inventory management systems, through external valuation approaches such as programmatic trading, or through a combination of both. All approaches require an understanding of the relative value of a DOOH screen across both hours and days.

It is possible to use the existing techniques to model sampled data across multiple frames and to further model across all likely time periods for all screens, however this approach does require a significant initial sample to maintain credibility.

Fundamentally additional count data, over time, will be required to both inform and validate the modelling approach. That data may be gathered with the use of additional count locations or may be inferred using 3rd party data sets such as transit gate data, HERE, Wi-Fi, SDK or Telco data. Data that is not gathered through a balanced research approach will need further validation and to be moderated to reduce the influence of sample bias and any bias in the method of collection. However, the availability of 3rd party data can be an excellent opportunity to add temporal granularity to an existing audience model.

With the increased need for granularity to measure DOOH there is an increased need for scrutiny of all the input data to the model. In addition to a better understanding of available audience and attractiveness, consideration must be given to the calculation of ROTS. Where multiple images may be seen in a single passage past a DOOH frame, defining both the contact zone accurately and duration of passage becomes even more critical, as these have a significant effect when considering multiple impacts. This is particularly the case where frames have a high proportion of pedestrian audience and where contact durations can be quite long – further scrutiny of models for interior environments including audience routing and visibility obstructions, should be considered.

As with all approaches to granularity, it is important to understand, and be transparent about, confidence intervals to ensure that data published as currency is trusted and robust. This may reduce the granularity offered in the data or may require longer sampling periods to identify behavioural patterns, ensuring that published data is both sensible and defensible.

The Impression Multiplier.

As DOOH inventory is increasingly traded through automated and programmatic platforms, a standardised approach to the Impression Multiplier has become essential.

In online advertising, a single ad impression is served to a single device. In DOOH, a single ad play on a screen may be seen simultaneously by multiple audience members, and this distinction must be reflected in the data provided by SSPs to DSPs. The Impression Multiplier is the factor by which a single DOOH ad play is multiplied to produce the number of audience contacts (Impacts or Impressions) that it delivers. The calculation

of the Impression Multiplier should be derived directly from the audience measurement methodology.

With DOOH media being traded increasingly through automated or programmatic platforms it is important to treat these platforms as 3rd party users of the data and offer guidance to ensure that metrics supplied by these platforms are consistent with the published data. This becomes increasingly important as Sales Side Platforms (SSPs) are required to apply an Impression Multiplier to DOOH opportunities. To maintain credibility as a currency it is important that both the buyer's Demand Side Platform (DSP) and the seller's SSP are using the same metrics, and where those metrics are adapted that the method of adaptation is both agreed and transparent to all parties.

In the Great Britain, for example, the Route/Outsmart agreed Impression Multiplier standard defines how DOOH Impacts are translated into impression-equivalent metrics for programmatic trading. The IAB has also produced guidance on DOOH Impression Multipliers for use in automated trading. Audience bodies developing DOOH metrics are strongly encouraged to engage with IAB, DSP and SSP operators at an early stage to agree a consistent and transparent approach to Impression Multiplier calculation and application, ensuring that buyers and sellers are always working from the same underlying audience data.

2.2.2. Adopting Contemporising to OOH audience delivery data

There is an increasing need for a deeper understanding of local and contemporary changes in audience volumes caused by attractor events, seasonality or government restrictions – as demonstrated during the Covid-19 pandemic, which revealed the limitations of historically-derived models in reflecting rapid changes in population movement. Bringing recent 'reporting' data into existing models allows for increased advertiser confidence in the data, and for the market to trade on performance or delivery.

OOH audience measurement to date has largely relied on the regular and repetitive nature of human movement – commuting to a single place of work, working from an understandable range of locations, shopping or socialising in a limited range of locations, with the occasional 'extreme' journey for holiday, or an unusual visit. Understanding these journey patterns has allowed measurement models to use extensive historical journey patterns as an accurate predictor of future movement behaviour.

Changes in working behaviour accelerated by the pandemic – including the growth of hybrid and home working – have permanently altered the mobility patterns of significant population segments in many markets. Historical journey studies collected prior to these changes may not fully represent current behaviour, and audience bodies should assess the vintage of their travel survey data and apply appropriate caution or contemporising

adjustments where the survey pre-dates significant behavioural change.

Furthermore, as the trading of DOOH increasingly uses on-line trading techniques the demand from advertisers for a more contemporary understanding in audience delivery, grows. Measurement of historical patterns will not reflect local changes in audience and are unlikely to be accurate predictors of audience targeted tactically using DOOH – contemporising data moves the granular trading of DOOH from predicted audiences to measured audiences.

Additionally, accurate estimates of actual audience delivery feeds directly into more accurate attribution modelling. Demonstrating the ROI of OOH media relies on the accurate measurement of the effect of media bought against the actual delivery of the media campaign – contemporised OOH audience data allows that ROI to be more readily calculated.

However, the need for contemporising audience delivery does not negate the value of understanding audience journey patterns and journey types through a comprehensive travel survey. The frequency of a journey type may change for some audience segments but without a change in road and transit infrastructure, the route taken to perform that journey is likely to remain constant.

Three distinct approaches to contemporising have emerged across markets, and the appropriate approach will depend on the underlying measurement methodology and available data.

Approach 1 – Index-based moderation of an existing model. This is the most widely deployed approach and involves applying relative indices derived from external data sources (SDK, telco data, floating car data, transit ridership, Wi-Fi sensor counts) to the baseline volumes in an existing audience model.

The indices adjust audience volumes for temporal variability – seasonality, day-of-week patterns, public holidays and special events – without replacing the underlying model. The number, reliability and geographic dispersion of the count data sources used to derive the indices is critical to the accuracy with which they can be applied across all OOH frames in the measured territory.

Approach 2 – Continuous panel observation as inherent contemporisation. Where a measurement system uses a continuously tracked mobility panel (see Section 2.1.3), the audience data is inherently current because it reflects actual, recently observed movement rather than a historical model.

In this approach, no separate contemporising layer is required: a rolling window of the most recent observations (for example, the last 13 weeks) provides the basis for each published data release, naturally incorporating seasonal variation, behavioural shifts and event impacts.

Approach 3 – Deterministic post-campaign delivery measurement. In markets using large-scale opted-in mobile location datasets, it is possible to identify the actual device-level audience delivered during a campaign by

matching device signals against the visibility area of each OOH face during the campaign's flight dates.

This produces a delivered audience dataset that reflects actual observed exposure rather than a modelled prediction, and can serve as the basis for post-campaign reconciliation and attribution. This approach is distinct from contemporising in the traditional sense: rather than moderating a planning model, it provides a separately computed delivered audience figure that can be compared against the planned audience.

Moderating existing models (Approach 1) should focus on two key areas:

- a Audience volumes – capturing contemporary audience counts from a variety of sources against a count baseline that is represented elsewhere in the model. Few count data sources represent actual rather than relative counts, so it is important to use data that is available both currently and for the period that the core audience measurement model represents. Contemporary relative counts can then be used to moderate audience volume through modelling counts across all OOH frames measured. Here the number, reliability and geographical dispersion of counts becomes critical in accurately modelling volumes for other areas. It is important to apply contemporising factors at a geographical and temporal level that can be credibly supported by the available data.
- b Audience journeys – capturing contemporary audience journeys and journey frequency is a more difficult task but is important in understanding contemporary reach. Applying reduced volumes to an OOH frame evenly may disproportionately reduce the audience reach of that frame, as the change in volume may well reflect a change in frequency of journey rather than the cessation of that journey type. Capturing contemporary origin to destination data in a geographically and temporally granular manner, against baseline data that is representative of the core measurement model, then allows the modelling of changes in journey types by different audience groups.

2.2.3. Cross media measurement

In recent years there has been increased focus by advertisers on transparency in intra-media comparison. This focus has been stimulated by the difficulty advertisers have experienced in assessing the type of measurement being used in the different media, with often very different measures using similar terminology, and a subsequent lack of trust in inputs critical to assessing the effectiveness of their advertising investment. These concerns have culminated in the WFA global Project Origin initiative, active across multiple markets, that seeks to increase transparency in measurement and terminology, and ultimately to facilitate meaningful cross media measurement.

In addition, there has been a recent greater focus in our industry on “attention” metrics, where clients of a medium seek a more balanced

comparable metric between media than merely different types of viewability. It is fair to say that OOH has historically been at the forefront of this thinking, having been measured for many years in most major markets based upon an attention metric (VAC), viewed impressions as opposed to the more generalised measure of viewable impressions. As advertisers and their agencies appear to be moving in this direction for other media, and it is particularly relevant in the measurement of digital ads, OOH should continue to engage in this area, and ensure that new measurement systems are designed with these cross-media metrics in mind.

Cross-media measurement has moved from aspiration to operational reality in a number of markets since the publication of the 2022 guidelines. Three structural models for OOH cross-media integration have emerged:

Embedded multimedia JIC: OOH measurement is built as an integral component of a national multimedia JIC covering all major media types. The Netherlands' BRO Next is fully integrated into the NMO Crossmedia dataset, combining OOH, TV viewing, radio listening, readership and online behaviour from a single nationally representative framework. Belgium's CIM is developing the CIM ONE single-source passive measurement study.

Third-party fusion or data supply model: OOH data is supplied to an independent cross-media planning tool via a formal data supply arrangement. Switzerland's SPR+ supplies OOH/DOOH data to WEMF Ltd. for integration into the MACH Strategy Consumer cross-media planning tool via fusion and touchpoints. The UK's Route data is available via the IPA Touchpoints tool for predictive cross-media reach estimates.

Single-source passive measurement: where the travel survey or mobility panel used for OOH measurement also captures other media consumption behaviour, a single-source cross-media dataset becomes possible. Germany's ma Out of Home GPS tracking study is conducted within the agma cross-media survey, enabling a single-source approach across all measured media. Portugal's MAPE continuous panel is being extended to include audio, TV/OTT and digital alongside mobility.

The discussion of cross media measurement is a whole topic in itself, but it is recommended that measurement organisations should where possible seek to develop OOH metrics and approaches that are comparable with other media measurement to facilitate the integration of OOH data with data on other media. Where possible, consumption of other media should be captured at a broad level in any research or survey of respondents to allow for third party fusions with other audience metrics. Measurement and reporting of demographic and geographic characteristics should be comparable to those available for other media in that territory.

2.3. Data Input Quality – Completeness and Transparency Requirements

To maintain trust in data used in currency, all data inputs should be published and open to scrutiny to stakeholders and users. The technical committee representing stakeholders and users should be allowed to request independent verification of the data input/collection, modelling and the processing used in producing OOH audience measurement data.

Where data is captured for the sole purpose of creating OOH audience measurement the methods should be scientific, balanced against the population being measured and transparent to users.

Where external data is used, the method of capture and any moderation or modelling by the 3rd party provider should be transparent to a technical committee representing the stakeholders and users – under non-disclosure agreement if required.

External data sets must also be validated by a technical committee for completeness, sample bias, bias from the method of capture, and be checked for completeness with QC approaches to identify and remediate incomplete data. For example ticket gate-line data may be seen as a highly accurate measure of passengers entering a transit station, however faults in recording or alternative entrances being opened will cause unusual fluctuations in those data. Telco data may be seen as complete for all transitions between cell boundaries, but can be under-representative if a cell tower becomes inoperative for a period of time. SDK data may have identifiable sample bias that can be readily moderated but a change in permissions from a phone hardware provider may influence the number of events recorded by users. It is important to fully understand the foundations and infrastructure required for the capture of 3rd party data sets, in order to design QC procedures that identify and remove unintended variability in these input data, before it is used in the model.

Rigorous quality control (QC) procedures must be deployed for every element of data capture, data modelling and data publishing. Separate codes of conduct are published both nationally and internationally such as the ICC/ESOMAR Code of Conduct – which should be referred to for additional guidance.

2.4. Frequency of Measurement/Publication

Data should be published frequently to accommodate changes in audience volumes, audience journeys, urban infrastructure and OOH inventory – however the availability of input data, specifically count data, and the cost of processing may make frequent publication both undesirable and potentially introduce inaccuracy through relying on smaller input datasets.

Consideration should be given particularly to updating OOH inventory data regularly to deliver value to stakeholders in the data outputs – essentially being able to add or change inventory characteristics to an existing journey model. This may involve a more complex and comprehensive audience flow model or may require significant reprocessing of the complete model to accommodate new inventory. Understanding the cadence required by the market will help in the initial model design to avoid repeat processing of a model that may have initially been designed for less frequent releases.

Contemporising of an existing model as described previously may be a more time and cost-efficient approach to updating audience volumes from a researched base line than attempting to frequently update a complete travel survey.

Evidence from the markets participating in the WOO Audience Measurement Survey 2.0 provides a useful empirical basis for minimum publication cadence recommendations. The following guidance reflects observed best practice:

Inventory additions and removals: continuous processing is achievable where the IMS is connected directly to the delivery system, with new and removed frames reflected within 24–48 hours. A minimum recommendation of monthly inventory updates is appropriate for markets where continuous processing is not yet implemented.

DOOH spot-level impression data (for programmatic trading): should be available at least weekly to SSPs, with daily availability the target for markets where DOOH programmatic trading is active.

Full audience/volume model updates: the appropriate cadence depends on the mobility methodology. Markets using continuous panel observation or deterministic device-level measurement naturally produce more frequent updates. Markets using periodic travel surveys typically update annually or twice-yearly

Contemporising index updates: should be applied at the highest frequency that can be credibly supported by the available count data. For markets using telco or floating car data, monthly or weekly updates are achievable. For markets using less frequent external data sources, quarterly updates may be the practical maximum.

3.1 Market Analysis - Australia, MOVE

Summary

MOVE (Measurement of Outdoor Visibility and Exposure) is the unified industry currency for measuring Out of Home (OOH) audiences in Australia. Developed by the Outdoor Media Association (OMA) with rigorous oversight and industry support, MOVE is endorsed by the Media Federation of Australia (MFA) and its Outdoor Futures Council, and by the Independent Media Agencies of Australia (IMAA). MOVE provides a comprehensive view of audience behaviour, capturing why, where and when Australians aged 14+ (and international visitors) move by hour and season across all OOH formats nationwide.

The Evolution of MOVE

2010 - MOVE 1

Australia's first industry-wide OOH audience measurement system. It introduced visibility-adjusted audiences for classic formats In Airports, Roadside, Shopping Centres, Stations and Transit (Bus, Light Rail, Train and Tram) across major metropolitan markets, based on an average typical week of travel behaviour. With Reach and Frequency up to 13 weeks.

2021 - MOVE 1.5

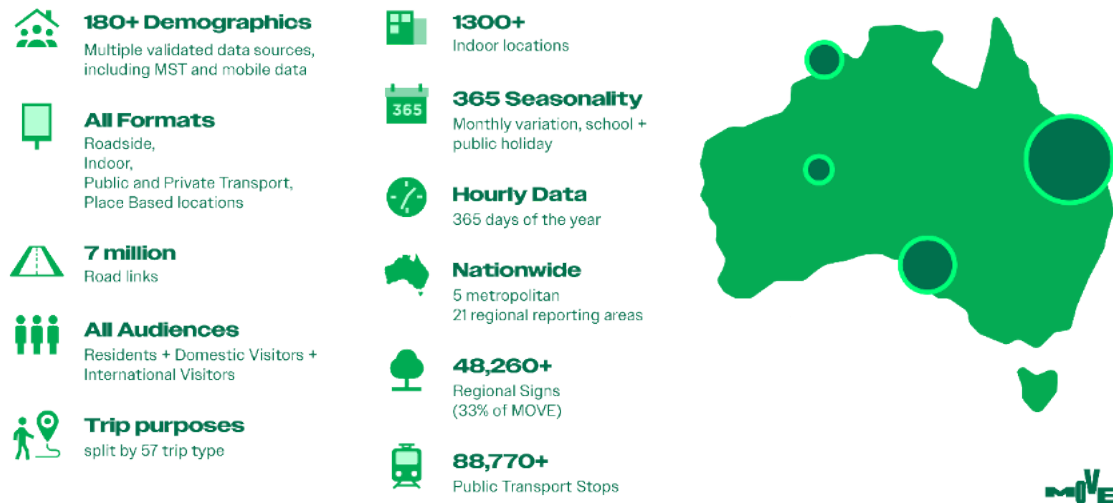
An interim digital measurement while the new MOVE was developed, added to MOVE1, that incorporated digital audience measurement at campaign level and launched the Neuro Impact Factor, a neuroscience-based metric quantifying how classic and digital OOH influence long-term memory and emotional response.

2026 - MOVE

A complete rebuild and step change for OOH measurement. The new MOVE draws on millions of validated data points to deliver robust, seasonally adjusted audiences that reflect real movement patterns, including public and school holidays, across all formats nationwide. With Reach and Frequency up to 12 months.

Each phase of MOVE has leveraged the best available technology. The latest rebuild marks a significant advancement, using modern data, computing power and modelling to deliver greater granularity and scale. OOH campaigns have not changed. However, the way they are measured has fundamentally evolved. The result is a more precise and comprehensive view of audience behaviour.

Scale & Data Richness



1. Scope of Measurement

Environments and Formats Covered

- Roadside – billboards and street furniture
- Indoor – airports, shopping centres and major transport hubs
- Place Based – cafes, gyms, health centres, offices, pharmacies, petrol stations, sports centres, supermarkets, universities and venues
- Transit – exteriors and interiors of buses, ferries, light rail, trains, trams, taxis, rideshare, delivery vehicles, private wrapped vehicles and trucks
- All formats/sizes across Classic and Digital within the four environments

Media Owners and Volume of Frames

- 36 media owners in Australia (all OMA Media Display members) as at March 2026
- 194,752 active in-market faces as at 4 March 2026
- By OMA revenue category: Roadside Billboards 8,691 / Roadside Other 84,301 / Transport 67,427 / Retail/Lifestyle/Other 34,333

Geography and Market Coverage

- 100% of Australia and its residents, plus international visitors
- SA1 level geography (groups of 300–400 people), international visitors clustered by port of arrival and split by country or origin, purpose of visit, age and more
- SA1 level data is combined into broader predefined area for reporting such as 5 metro and 21 regional TV reporting areas, and users can create custom geographies.
- 100% of OMA Media Display members' inventory measured; estimated to

represent more than 98% of total traded OOH inventory in Australia

2. Inventory Characteristics – How Measured and Stored

OMA Media Display members submit sign details (manually or via API to the IMS, or as bulk upload files) for all signs. Sign and location details required vary by format. MOVE manages the database of signs through Ipsos's Inventory Management System (IMS), including all sign reviews and authorisation. Location details are managed separately by Ipsos.

- All signs are assigned a GPS location; for Transit signs this is the depot the vehicle operates from.
- All signs have attributes of size, movement type (none for classic), illumination type, illumination period, orientation and both ad play length and default share of time for digital.
- Indoor environments (airports, shopping centres, stations): each has a digitised map with links representing public walkways; signs have a 60m cone of vision based on precise location and orientation capturing visible links.
- Roadside signs are entered on a hybrid version of the HERE network (HERE network with public transport routes added eg. train lines, tram lines); with a cone of vision based on size of the sign and precise orientation capturing visible links.
- Place Based signs attached to the location have generic position details (e.g. entry, exit, counter) and orientation of head one, parallel or in between to apportion a segment of the location volume to the sign under a basic plus approach.
- Transit signs are entered by vehicle (the construction) and position on the vehicle (eg. left, right, rear, interior or wrap type)
- Mapping: Google Maps in the IMS; MapBox in reporting software
- Physical audits of randomly selected signs conducted; all in-market signs require proof of existence (typically a photo)
- Agency users can download the list of in-market signs (format, size, location, GPS); members only have access to their own signs

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

MOVE uses either the audience model (TIM – Traffic Intensity Model) directly to determine volumes, or applies additional modelling as required by the environment.

No external counts are used to determine ROTS volumes directly; ROTS

comes entirely from the TIM (or mobile-normalised data for Place Based). Counts are used extensively throughout the model for calibration.

The TIM is more than just traffic volume, it is the audience model that represents the populations complete movements to replicate behaviour collected in the movement survey; the volumes are a build-up of trips made by different demographics for different purposes meaning it is also the basis for other metrics including reach and frequency; consequently mobile data is also used during calibration simultaneously with count data to maintain reach, frequency and volumes while ensuring behaviours in the movement survey are maintained.

Roadside – realistic opportunity to see (ROTS) are calculated using Ipsos's cone of vision against the model outputs. Within the cone of vision, only links that have viewing towards the sign without obstruction are identified and audience passing along those links is included.

Traffic Intensity Model (TIM) audience on road links within the Cone of Visibility (COV)

- GPS and orientation determine the direction of COV
- COV varies by size of sign
- Building layer creates obstructions
- Illumination period determines nighttime viewing
- Sunrise and sunset mapped by geographical region with monthly variation across the year



Indoor – ROTS is based off a cone of vision (similar to Roadside), but after Ipsos has built an indoor model for each location based off of the results of the MST data, zoning (aligned to trip purpose) and mobile data heatmaps to replicate behaviour within the location. Location volumes derived by VLC in the audience model are routed through the location according to the Ipsos model with the journey purpose of the trip creating a need for must pass links (eg. grocery shopping must use at least one grocery link).

Place Based – Uses a basic plus approach and does not start with MOVE's audience model.

Location volume: Initially, the average volume of people for a location type (eg. office tower) is derived using mobile data or MST survey results across a pool of locations to be measured (given the nature of mobile data accuracy at a single location or MST survey sample size per location). Individual locations are factored against the average derived using another source (eg. net lettable area for office towers), which when applied to the average gives the individual location volume.

Hourly profiles are derived from mobile data.

Synthetic respondents are then attached to the location to meet the audience volumes by hour from MOVE's audience file (TIM) who are at the SA1 or nearby and meet the trip purpose or appropriate trip purpose (eg. a café could attract work related trips from the SA1, among others). This stage uses the longitudinal survey by Ipsos to ensure demographic profiles and reach/frequency of visitation (eg. worker and visitor profiles for office) is replicated.

Sign volume is then based on the basic plus approach of apportioning a percentage of the synthetic respondents included at the location to determine ROTS (eg. an entry/exit sign facing people entering at a location with one entrance gets 100% of the people once).

Transit – ROTS is based on the intersection of vehicles (public and private) and MOVE's audience on the Road links (including pedestrian only, eg. malls) and also where applicable at platforms in the Indoor model (eg. trains). If a synthetic respondent is on the same link or link nearby (eg. parallel or intersection passed) when the vehicle passes through the link they become part of the ROTS. For public transport (PT) vehicles the location of the vehicle comes from published routes/timetables in the GTFS (additional allowance for dead running ie. out of service) and for private vehicles and PT without pre-determined routes (ie. ride share/taxi) a model of their behaviour is derived from GPS traces of actual use.

3.1 External Counts Used in Calculating Audience Volumes

63,000 count locations across roads, public transport routes and indoor locations (state and federal government data)

MOVE has not used count technologies due to the cost associated with scale, although member data does use these types of technologies (eg. Wi-Fi, cameras etc).

Media owner count data (such as above) is only used if independently verifiable; media owner profiles may be used even where absolute volumes are not eg. Annual location IQ count data for shopping centres, is adjusted using mobile data for better granularity and member data for seasonality profiles

MOVE has made use of mobile data and validated counts to train count models to provide additional counts for calibration.

All counts adjusted to remove people aged 13 and under before use; erroneous counts are discarded during validation

3.2 Temporal Variability in Volume Data

Hourly data for 365 days of the year

Seasonal adjustment built into the TIM

3.3 Annual Update to Volume Data

Model uses latest available data to project forward (annual cadence of update)

Adjustment made for significant new infrastructure (e.g. new train lines, motorways) commencing during the projection period

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is applied to all contacts using data supplied by Simon Cooper. Both ROTS and VAC are calculated by Ipsos and stored in the Consolidated Contact File (CCF). Every synthetic person passing the sign has ROTS recorded; VA is calculated for each passage and determines a yes/no answer to 'did they see the sign'. VAC is the total of 'yes' outcomes. Both ROTS and VAC are available for reporting.

For digital signs, ROTSD and VACd are reported. In addition to the standard VA, an attraction factor is applied to VA based on sign size for digital, using an average of Route data and a local Australian eye-tracking study.

4.1 What Constitutes a Contact/Impact/Delivered Impression

- ROTS (Realistic Opportunity to See / Viewability) – measures viewability of a sign based on size, location, orientation and environment
- VAC (Visually Adjusted Contacts / Attention Filter) – VA attention filter applied to each responded separately in ROTS, informed by eye-tracking data, estimating the likelihood of actually looking at the sign
- Neuro Impact Factor (NIF) – a qualitative metric quantifying the impact of classic and digital OOH on long-term memory and emotional response. NIF scores exist by format, size groupings within format and mode where applicable (eg. Roadside). NIF scores reported by total campaign, total classic and total digital based on weighting impressions (contacts) delivered by each format included.

5. Audience Measurement – Reach and Mobility

MOVE is a series of machine learning models built by Veitch Lister Consulting (VLC) that replicate known behaviour across a synthetic population representing a 10% sample of Australians and 100% of international visitors. The models produce behaviour by hour of the day for 365 days of the year,

enabling volumes, reach and frequency to be calculated from synthetic respondent movements. Collectively these models are referred to in this document as the Traffic Intensity Model (TIM)

There are 4 groups of models to cover behaviour:

1. Local trips are covered by the Activity Based Model (ABM) and measure the Australian population's daily movements within 150km of home SA1. The ABM uses 14 demographic variables (ie. age, gender, personal income, household income, cars per household) applied to each synthetic respondent to determine which of the 57 different trip purposes (ie. to usual place of work, work for client visit, grocery shopping, supermarket shopping, pharmacy and more) they will make each day. The MST survey undertaken by Ipsos is a key part of this model.
2. Pedestrian short trip model covers additional pedestrian movements to account for missing trips not covered in the ABM (ie. short trip within a zone or between zones (eg. the result of parking the car). Validated pedestrian counts and mobile data are key to this model
3. Out of Market (OOM) model covers daily movement over 150km or overnight if 40km from home SA1 (aligns with federal government data inputs) and international visitors arrival and departure (from port of arrival to place of stay [SA2]). Four trip purposes exist covering the primary purpose of the trip business travel, holidays, visiting family and friends or other reasons. Government surveys and air passenger movements are key to this model.
4. Trucks in use model, covers the Australian Population's movement in a truck (heavy & light). Treated separately as their behaviour is unique different to the general population's everyday trips, be it local truck use or long haul (eg. trucks account for a high proportion of vehicle counts around ports). Government data (licensing / registration) and mobile data (to identify truck drivers) are key parts of this model.

The synthetic populations of Australians is a key part of all 4 models, with the Synthetic population of International visitors being a key part of the OOM.

When Australians are in either the OOM or truck in use models they are not in the ABM. Calendars of activity for each individual respondent are developed that replicate real world behaviour for a year to manage where the Australian population is across these models based on observed behaviour and other inputs. A synthetic respondent can be in two models on the same day (eg. ABM till 2pm before being represented in OOM as heading to the airport for 3pm flight to another city).

The result is a rich picture of travel by the synthetic population by week of the year, day of week, time of day, mode, demographics, trip purpose, home SA1 and more. The combined result is referred to as the Traffic Intensity Model (TIM) with volumes across all roads and locations that are required for measurement.

Example of car trip granularity in Melbourne w/c 28 July 2025 in the TIM



A variety of data inputs are used to drive each model's behaviour including:

- Multi Sensor Tracking (MST) second by second (Ipsos) on 5,000 Australians for 14 days, producing 70,000 different days of behaviour across more than 280,000 trips. 5 minutes at same location used as a minimum threshold before a trip was identified.
- A longitudinal recall survey on these respondents (eg. how frequently do you visit the supermarket)
- A check in by respondents via mobile app when the MST device detects a dwell in areas of high points of interest (eg. shopping centre) to confirm purpose.
- Mobile data for a range of reasons including airport catchment, short trip pedestrian model, identifying truck drivers, time of day profiles for place-based locations and more.
- Federal government national visitor survey (NVS) and international visitor survey (IVS) to provide demographic profiles, purpose, destinations, length of stay and more for the OOM model.
- Granular zoning system across Australia for zone to zone modelling (more than 20,000).
- 1 million Points of Interest for destinations within zones
- Complete transport network of Australia covering all roads (7 million links), public transport stops and routes and 1300+ Indoor locations requiring measurement.
- Census information and annual change estimates from the Australian Bureau of Statistics (for population) along with alignment to TV universe estimates to ensure current year population estimates. 5.1 Representativity and Data Quality

5.1 Representativity and Data Quality

The MST survey was conducted on a representative sample of Australians both demographically and geographically. Upweighting of sample was

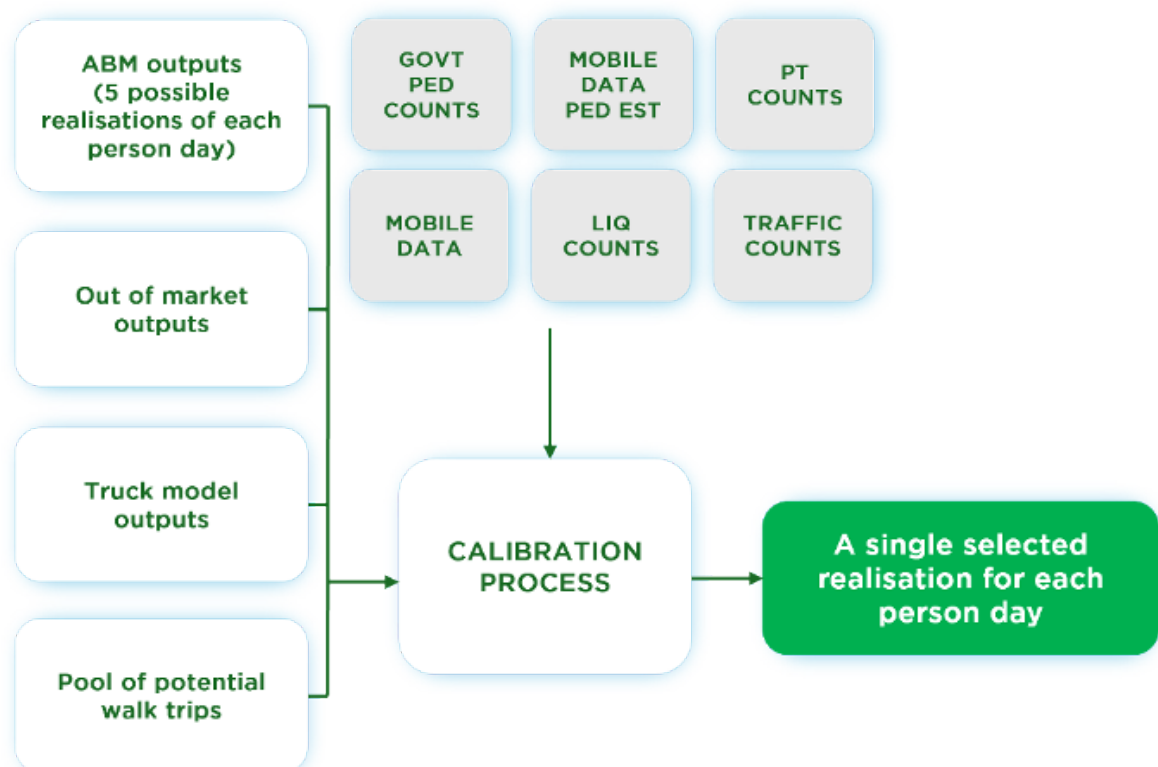
undertaken when sample rates on certain demographics (eg. teens) or geographical regions (eg. remote Australia) meant sample weights were too low.

The Synthetic Population of Australia uses census information to create a geographical profile of Australians at an SA1 level (300 to 400 people on average) to generate a sample of ~2.2 million respondents (10% of Australians).

The international visitor synthetic respondents uses the IVS for the demographic profile and expands it by federal government passenger numbers to generate a synthetic population of 1 to 1 for international visitors.

The models are designed to replicate known behaviour and are calibrated against real world counts (63,000 locations) and mobile data for both volume and reach controls respectively.

For Australians, actual days observed in the MST data are transposed to individual synthetic respondents to ensure a day they undertake matches a real day someone in the MST survey undertook. To achieve these 5 possible days from the MST pool for every day are given to a synthetic respondent and the calibration will pick one. Overall, the calibration process looks to assign 803 million days (2.2 million people x 365 days) to the synthetic population so that the observed behaviours underlying each model, the count volumes and reach controls are maintained.



Calibration summary

There are 491 acceptance criteria across the models and process outlined in figure 3 that must be passed, covering model behaviour and both volume and reach outputs before it is finalised.

Within the synthetic population each respondent is given a weight to represent how many Australians they represent of the same demographic profile within the SAI. Collectively they represent the population as defined by census inputs. These weights are used during calibration.

Within the TIM the weight on average is 10 (ie. every synthetic respondent represents on average 10 Australians) and at time of audience calculation this is expanded by Ipsos by a factor of roughly four to preserve demographic profiles when VAC is calculated (every synthetic respondent represents on average 2.7 Australians in the consolidated contact file).

For international visitors the synthetic population is a one-to-one mapping. Profile derived from the government IVS survey is expanded to match arrival volumes from government data. The OOM currently covers arrival and departure of international visitors.

5.2 Data Privacy and Compliance

MOVE's audience file is based on synthetic populations – the final output is privacy-safe

Where personally identifiable data exists in model inputs, suppliers adhere to the Australian Privacy Act or equivalent; this is a contractually binding obligation

5.3 Audience Segmentation

At launch there is 180+ audience segments available within MOVE reporting across Australian residents and international visitors.

Within the synthetic population there are more than 30,000 possible audience segments. For each synthetic respondent the following attributes are attached:

- Australians – age by year (14 or over), gender, primary status (eg. full time employed), grocery buyer status, occupation, industry of employment, personal income, household income, household size, cars per household, number of children, household structure and dwelling type.
 - Note: primary trip purpose is part of the outputs and could also become a demographic attribute. Likely, we should wait until secondary and tertiary trip purposes are added ie. primary purposes was banking, and destination was in a shopping centre where other purposes may have been undertaken eg. Grocery shopping (at present we only have banking attached to the trip)
- International Visitor – age by band (15 or over), gender, life cycle³, length of stay, party type, port of arrival, model of arrival, country of origin, trip purpose and total trip spend.

6. Output Data and Digital OOH

Digital audience is calculated in the reporting software based on the respondent's contact time, ad play length and share of time (SOT) of the campaign in that hour.

The ad play length and SOT create a virtual loop (where the advertisers campaign appears once) which is compared to the respondents contact time to determine the level of overlap (with 1 equalling an exact match).

- If overlap less than 1 then a random number generator will determine if the contact goes into ROTsD/VACd or not.
- If overlap is over 1 then the synthetic respondent is included.
- Any partial overlap above 1 also has a random number generator to determine the frequency of contact in that same trip on that sign ie. if overlap is 2.4 then the person has a 40% chance of seeing the advertiser 3 times (2 plus the 0.4) and 60% chance of seeing it twice (the 2, because the randomly generated number was higher than 0.4)

In addition to above the digital calculation also applies an attraction factor to the VA based on size of the sign to adjust VAC prior to above. The attraction factor uses an average of Route and a local Australian eye tracking study for driver safety.

6.1 Temporal Granularity of Output Data

Digital is reported with the same unit increments as classic signs. At launch:

1. Data is reported in weekly increments within the software as the industry shifts from an average typical week (MOVE 1.5) to the new currency (ie. 52 weeks of different data instead of 1).
2. For programmatic hourly impression multipliers (IM) exist for all weeks but only the reference week is being used given not all SSPs can handle 52 weeks of data currently. - Reference week is the week where car, public transport, shopping trips and more are in total closest to the average. Only People 14+ is available in IM and it is based on VACd.

6.2 Contemporising Factors

MOVE does not currently apply contemporising factors to adjust data more frequently (e.g. using mobile data from the previous week). The audience model projects data forward using the latest available 12 months of data. Adjustment is made for significant new infrastructure. Contemporising is not currently on the roadmap, though the synthetic population approach provides a basis for future integration.

Each model is producing at least 18 months of forward projection, and the models are to be updated annually. Meaning data for the same month for some of the months in a release is expected to overlap (previous TIM and next TIM) going forward

6.3 Data Release Schedule

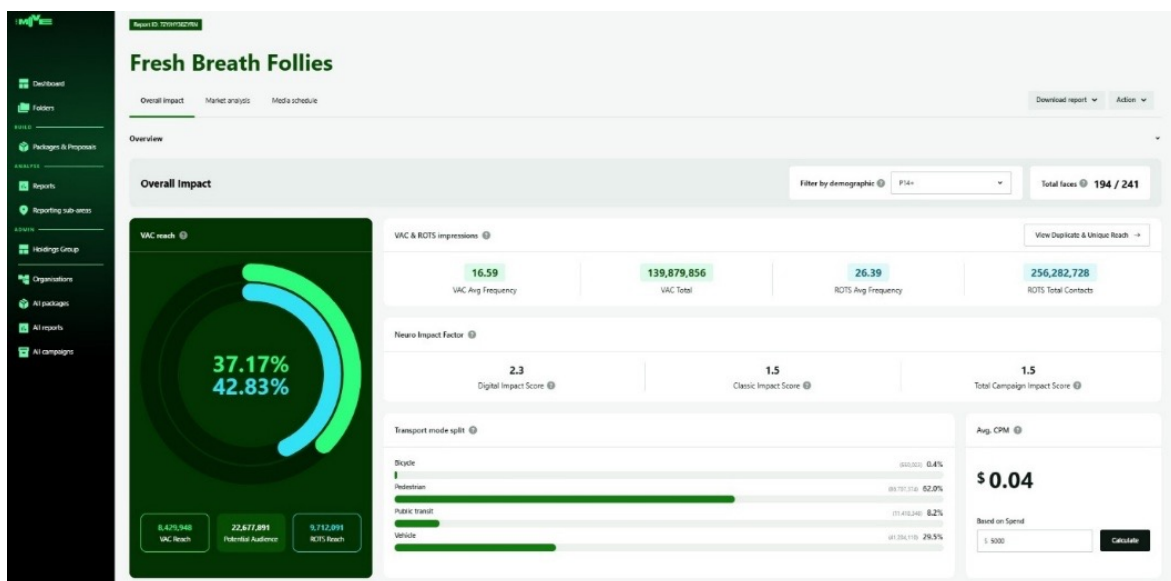
- New sign additions/changes: continuous delivery monthly
- Audience models (TIMs): released annually; each model produces at least 18 months of forward projection.

7. Trading Metrics and Data Delivery

- Currency: VAC/VACd (classic/digital), including for impression multiplier calculations in programmatic
- ROTS/ROTSd provided as a comparison point for other media where visibility adjustment does not occur
- NIF: qualitative metric; some agencies are starting to use it as a weighting factor alongside VAC for format selection
- Programmatic: all SSPs access the impression multiplier from MOVE via API within the reporting software; members manage SSP sharing and hookIDs within the software

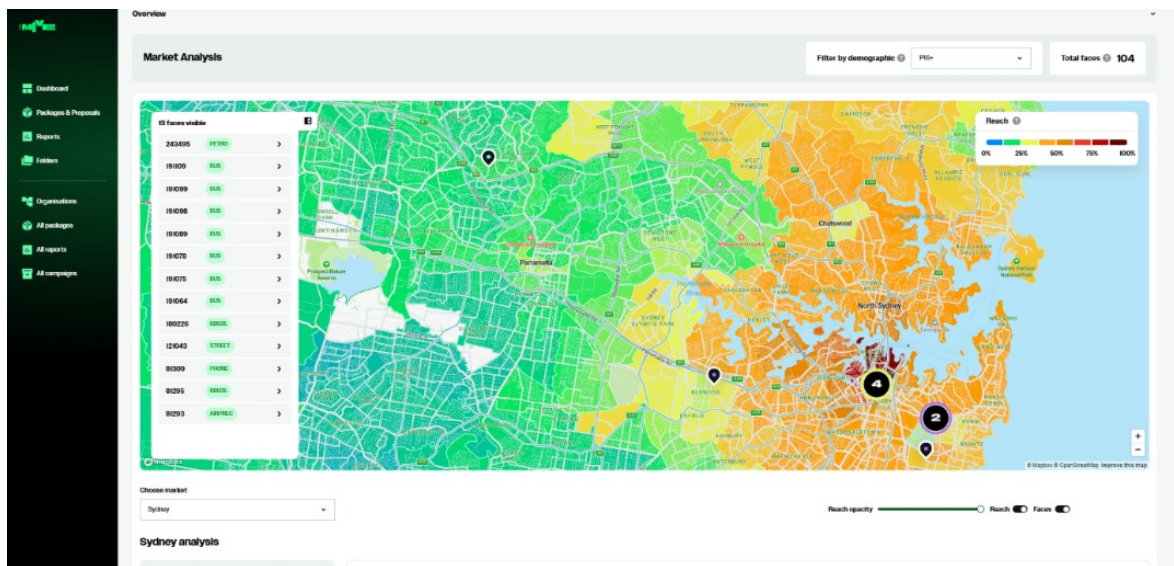
7.1 Delivery Software and User Access

- Reporting software built by Howatson & Co, operating on the CCF file; available to OOH companies and agencies under licence



Software dashboard showing campaign results, users can change selected demographics and markets to dynamically interact with the report data.

Heatmap showing reach of selected demographic by geographic area and sign locations



- Media Owners have API available for schedule creation, report request and report results.
- Third-party platform integration: not currently available (including Agency API to reporting software); roadmap of inclusions to follow launch

8. Organisational Structure

8.1 Governance and Management Structure

- MOVE Board: comprised of media owners and OMA
- Original Development Committee: media owners and media agencies
- Ongoing this shifts to Working Groups (media owners and media agencies) split by methodology (enhancements to existing approach), audience release (annual update), audience data (usage) and software, with a steering committee on top to Board
- Endorsed by: Media Federation of Australia (MFA) / Outdoor Futures Council, and IMAA

8.2 Funding Structure

- Currently 100% funded by media owners

8.3 Data, Research and Platform Partners

- Veitch Lister Consulting (VLC) created the audience model (owned by MOVE)
- Ipsos Australia provide the market research (ie. MST survey), indoor model and audience calculation
- Software platform and cloud infrastructure: Howatson & Co

8.4 Approach to Cross-Media Measurement

MOVE data is not currently used in cross-media measurement, nor are there current plans for this in Australia (Strategy and MMM areas, along with the whole campaign cycle areas of future potential for Board consideration). The synthetic population approach provides a basis for future integration into a cross-media measurement tool, provided the necessary hooks between system respondents are available.

3.2 Market Analysis – Austria, Outdoor Server Austria (OSA)

Summary

The Austrian audience measurement project for Out of Home Media called Outdoor Server Austria (OSA) is an established multi-source model generally based on three pillars, incorporating diverse data sources and innovative technologies.

R&C Plakatforschung und -kontrolle GmbH runs the media research project.

Flow Data / Traffic Intensity Model

The OSA frequency landscape encompasses the HERE road network with over 1,3 million road segments, with passages at each advertising location differentiated by modal split.

Among other data commercial traffic, tourism, and international traffic are also included.

Traffic Survey

The data from this OSA sub-project is used to derive travel routes determined through GPS-based tracking of participants' movement patterns. Furthermore, Telco data-based mobility behaviour data has been added.

Site Classification

OSA includes more than 43,500 panels and frames and approx. 262,000 placement variants, all of which are individually assessed and evaluated according to international standards such as POSTAR/ROUTE, FEPE/WOO, and ESOMAR - Considering parameters such as format, angle, distance, visibility, and illumination enables genuine advertising media contacts.

1. Scope of Measurement

Environments and Formats Covered

- Roadside Environment
- Indoor Locations: shopping malls, trains and bus stations, metro/ underground train stations, and others

Analogue Media Formats

- Classical billboards (8/1 to 96/1 sheets); billboard pillars
- Poster lights/rolling boards (scrollers, 14/1 to 24/1 sheets)
- Street furniture/city lights/Eurosize (4/1 and 8/1 sheets); city light pillars (12/1 to 24/1 sheets); city light scrollers (4/1 sheets)

- Bigboards (20 to 100 sqm)

Digital Media Formats

- Digital screens from 32-inch diagonal up to 100 sqm; most common are 75-86-inch diagonal screens

Media Owners and Coverage

- 20 media owners and publishers
- Analogue: 41,700 total (Roadside 39,200 / Non-Roadside 2,500)
- Digital: 1,800 total (Roadside 1,350 / Non-Roadside 450)
- Geography: national; 9 provinces (Bundeslander); 15 main city regions; 96 political districts
- Approximately 95% of traded OOH inventory covered

2. Inventory Characteristics – How Measured and Stored

- IMS-AT (Inventory Management System Austria): managed by R&C; all media owners have access to and can edit their own panels
- Inventory data approved by the owner, by R&C and by one supplier
- Mapping: HERE map layer with external links and Points of Interest
- Indoor/place-based inventory is required to be mapped in models

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

The Traffic Intensity Model (TIM) – called ‘Frequenzlandschaft’ (Flow or Traffic Landscape) – is built on a digital map by HERE with all road segments, providing quantitative flow values differentiated by mode of transport (motor vehicle traffic, pedestrians and public transport). The TIM is built completely independently from the mobility behaviour project.

3.1 External Counts Used in Calculating Audience Volumes

- Official counting data from the Austrian government and/or the provinces (Bundeslander)
- Count technologies: not yet deployed for roadside; cameras and sensors used for parts of indoor locations (metro stations and shopping malls)
- Commercial supplier and media owner/retailer/landowner count data: used partially, always re-checked and double-checked before approval
- Re-checks performed with other data sources and/or ad-hoc weighted

countings

3.2 Temporal Variability in Volume Data

- Influences on variance: telecommunication data and/or continuous counting data
- Analogue media: daily and weekly variance available
- Digital media: hourly, daily and weekly variance available

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is applied based on different visibility surveys, including POSTAR/Route UK surveys and AM4DOOH by FEPE/WOO. VAC is the primary market metric; ROTS is provided as an additional KPI but not generally used in market trading.

4.1 What Constitutes a Contact/Impact/Delivered Impression

Visibility Adjusted Contact (VAC) as defined by POSTAR/Route and applied across multiple markets. For digital screens, spot and loop lengths are based on seconds; time shifts are hourly.

5. Audience Measurement – Reach and Mobility

OSA uses a multi-source approach combining: travel survey (GPS-based interviews, supplemented by routing interviews); telecommunication data combined with approximately 160,000 anonymous household data records; and Telco data providing mobility information for foreign visitors (tourists, commuters etc.).

5.1 Representativity and Data Quality

- Multi-stage cleaning procedures applied
- Weighting with census data
- Combination of travel survey data, telco data and household data through internal fusion processes

5.2 Data Privacy and Compliance

- All aspects of OSA comply with General Data Protection Regulation (EU) 2016/679 and other applicable national and European legal rules
- Every contact with the different suppliers includes enhanced larger privacy articles including some specific parts to ensure this.

5.3 Audience Segmentation

Apart from the regional levels (national, provinces, Main City Regions and

political districts), Audience Segments are available by gender (all/male/female) and age bands (14+, 14-29, 14-39, 14-49, 20-39, 20-49, 30-49, 30-59, 50-69, 70+); employment status (employed/unemployed); education level (low/medium/average/high); Head of Household (14+ and 20-49 years); and Children in household (under 15 years).

6. Output Data and Digital OOH

AM4DOOH has been applied for digital frames. Spot and loop lengths are based on seconds; time shifts are hourly. VAC for average spot/loop lengths (10-second spot in 60-second loop) for each of the 168 hours per week is provided to media owners.

6.1 Temporal Granularity of Output Data

- Spot/loop lengths: second-level precision
- Time shifts: hourly
- 168 hourly VAC values per week provided to media owners for programmatic integration

6.2 Contemporising Factors

Not yet applied, but planned for the future. Currently, telco data are applied to Traffic Intensity data, ROTS and VAC. Frequency of application is to be determined.

6.3 Data Release Schedule

- New/removed units: continuous updates
- Full volume/audience updates: 3 to 4 times per year

7. Trading Metrics and Data Delivery

- VAC used for all trading, regardless of whether analogue or digital media
- 168-hour-per-week VAC values at average spot/loop length provided to media owners for SSP integration

7.1 Delivery Software and User Access

- Media agencies and relevant market players can access a counting tool
- Data can be saved to SSP or media owner-specific tools

8. Organisational Structure

8.1 Governance and Management Structure

R&C Plakatforschung und -kontrolle GmbH runs the audience measurement

project as a MOC (Media Owner Company). Two shareholders (both media owners) sit on the board. The technical oversight group includes the two shareholders, media agencies and one representative of the OOH association (OOHA Austria).

8.2 Funding Structure

- Media owner funded: base fee per year per media owner; fee per newly built frame; fee per existing frame

8.3 Data, Research and Platform Partners

- Telco data: A1/Invenium (Austria's largest telecommunications operator and its data-providing subsidiary)
- Anonymous household data: AZ Direct
- Research and modelling/processing: IPSOS Prague (Czech Republic); ISBA Hamburg (Germany)
- Dashboard/platform: IPSOS Prague

8.4 Approach to Cross-Media Measurement

OSA currency was used in a Cross Media Measurement tool called Media Server for almost 10 years. The Media Server project was discontinued in 2024. Cross-media measurement plans for Austria are not currently confirmed.

3.3 Market Analysis – Belgium, CIM

Summary

The Centre for Information about Media (CIM) is Belgium's Joint Industry Committee (JIC) entrusted with currency media research. Its impartial media research sets the industry standard for audience measurement and advertising campaign assessment. As a true JIC, CIM's membership comprises over 150 members from the three families of the Belgian communications landscape: media, agencies and advertisers. CIM is a multimedia JIC covering TV, radio, internet, publishing and OOH.

The primary goal of the CIM OOH Audience Study is to provide the market with necessary information for the analysis of OOH and DOOH audiences and tactical media planning. The study is based on a 'hybrid' methodology, integrating traditional survey data and other 'big data' sources including census data, official mobility surveys, traffic counts and independently collected road traffic data.

CIM is currently developing a cross-media study (CIM ONE) based on single-source passive measurement of audio, video, publishing and online for the same media consumer, with bridges being built to print, cinema and OOH. First results for total video and total audio are to be published in 2027.

1. Scope of Measurement

Environments and Formats Covered

- Roadside: 35,000 frames
- Metro/train stations: 4,000 frames
- Shopping malls and retail: 500 frames
- Formats: FSU/bus shelters (1m², 2m², 55", 65"...), billboards (4m² to 38m²), giant boards (87–132m²)

Media Owners and Coverage

- Three media owners: JCDecaux, Bauer Media Outdoor, Belgian Posters
- Geography: national coverage
- Approximately 90% of OOH inventory in Belgium included in the CIM OOH survey

2. Inventory Characteristics – How Measured and Stored

- Inventory management: each media owner maintains their own inventory

on dedicated inventory software

- Audited by CIM or third parties
- Mapping: OSM (OpenStreetMap) cartography currently used
- Indoor places mapped in the inventory management system

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Travel data is the result of modelling multiple data sources: CIM own travel surveys and public mobility surveys; Floating Car Data (GPS data); Telco data; traffic counts, public transport data and official statistics; and WiFi sensors in shopping malls and retail. The result is traffic volumes per transport mode, per hour, at street segment level for seven days.

3.1 External Counts Used in Calculating Audience Volumes

- Publicly available governmental and transit authority counts: yes
- Loop detectors deployed for traffic measurement
- WiFi sensor data from shopping malls and retail (media owner/retailer supplied)
- Quality weighting applied: e.g. withdrawal of trucks and foreign vehicles from Floating Car Data
- No commercial suppliers of count data used beyond the above sources

3.2 Temporal Variability in Volume Data

- Results of modelling are hourly data for an average week
- A weekly traffic index (based on Floating Car Data variation) applied to gross volumes to reflect seasonality of traffic

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment (VA) is applied. Output metrics: ROTS, VA Contacts, VA Reach, VA Frequency and VRPs (Visibility Adjusted Rating Points). For digital calculation, a model very similar to AM4DOOH is applied, based on Lumen research on DOOH viewability. Outputs are available at hourly level.

4.1 What Constitutes a Contact/Impact/Delivered Impression

- ROTS = sum of people on approved road segments (within cone of vision from which panel is visible), travelling in the direction of the frame
- VAC = ROTS x VAI (Visibility Adjustment Index)

- VRP (Visibility Adjusted Rating Point) = the primary trading metric

5. Audience Measurement – Reach and Mobility

Travel data is based on several data sources (travel survey and big data). The result of modelling is a virtual population representative of the Belgian population aged 12+, with their demographics and travel behaviour (road used, day, time, mode of transport, motive) for a week. Mapping of travels on the OSM map allows crossing of individual trips with frames and calculation of reach of individual panels or networks for each hour of the week. After 7 days, reach accumulation is extrapolated using Negative Binomial Distribution (NBD).

5.1 Representativity and Data Quality

- CIM has an updated travel database RFP in progress at time of submission.

5.2 Data Privacy and Compliance

- CIM's rules govern handling of GDPR-related matters in relationships with members

All supplier agreements require compliance with GDPR

5.3 Audience Segmentation

The virtual population database includes personal characteristics (gender, age, language, profession, education, income, social class, household size and others) as well as geographical characteristics (zip code, province, Nielsen areas). These variables are modelled using government census data and CIM survey data.

6. Output Data and Digital OOH

For digital calculation, a model very similar to AM4DOOH is applied, based on Lumen research on DOOH viewability. Outputs are available at hourly level.

6.1 Temporal Granularity of Output Data

- Hourly level outputs
- Media owners can access hourly frame results per SOV via API

6.2 Contemporising Factors

External factors (such as weather) are sometimes used by media owners applied on CIM results through their own selling platforms. These factors are applied by media owners, not by CIM, and are media owner specific.

6.3 Data Release Schedule

- Inventory updates: typically twice per year depending on market needs
- Travel database: last updated 2020; active RFP in progress for update

7. Trading Metrics and Data Delivery

- OOH metrics: VA Contacts, VA Reach, VA Frequency and VRPs (Visibility Adjusted Rating Points)
- DOOH programmatic trading: impressions more commonly used
- Media owners can access hourly frame results per SOV via API for programmatic purposes

7.1 Delivery Software and User Access

- OOH survey results available to the market via exploitation software used for media planning

8. Organisational Structure

8.1 Governance and Management Structure

Board members come from the three families of the Belgian communications landscape: media, agencies and advertisers. OOH has one guaranteed board seat (out of 4 for the sell side; 8 in total including buy and sell side). Technical committees include representatives of media and media agencies; advertiser representation in OOH technical committee not currently in place.

8.2 Funding Structure

- CIM is a multimedia JIC pooling resources for research across different media types (OOH, TV, Radio, Internet, Publishing)
- Funding based on subscriptions from members to its studies: approximately 15% from agencies, remainder from media and their sales houses

8.3 Data, Research and Platform Partners

- Travel database modelling: Be-Mobile
- Inventory management and exploitation software: MGE Data/IPSOS
- Each CIM survey has its own published methodological documentation detailing specific partners

8.4 Approach to Cross-Media Measurement

The current OOH survey is not used for cross-media measurement. However, CIM is currently developing CIM ONE – a cross-media study based on single-source passive measurement of audio, video, publishing and online for the same media consumer, creating bridges with print, cinema and OOH. First results for total video and total audio are to be published in 2027.

3.4 Market Analysis – Canada, COMMB

Summary

COMMB – the Canadian Out-of-Home Marketing and Measurement Bureau – was created in 2018 through the merger of OMAC (Out-of-Home Marketing Association of Canada) and COMB (Canadian Out-of-Home Measurement Bureau, founded 1954). COMMB is the industry not-for-profit representing all stakeholders in the Canadian OOH media channel: 37 media owners, 46 media agencies and global holdcos, 4 poster specialists, and 5 programmatic and data platforms.

COMMB's purpose is to drive the growth of Canadian Out-of-Home for the benefit of all members and stakeholders, through measuring and marketing the power of the OOH medium. COMMB is predominantly funded by media owner membership, with all members contributing to operations.

The current measurement system – ROADMAP – was launched in May 2025.

In 2017, the decision was made to update Canadian Measurement. This decision was driven by the WOO conference (Then FEPE) in Barcelona, with many senior industry leaders having seen what other global markets were doing from a measurement perspective.

ROADMAP is an OTS based model (with the option to move to LTS at a later date should the industry require it) which measures Circulations (Static) and Impressions (Digital) for all Roadside and Place-Based inventory. We currently measure 68,000+ individual OOH faces. Longer term the ambition is to include Transport Media as well.

From a Reach and Frequency perspective, the ROADMAP RF module currently measures only Roadside inventory in Canada's largest 44 markets, with the ability to bring in Place-Based Media. This should happen in 2027. This is based on the quality and accuracy of the mobile data available – in the smaller markets, due to the lack of quality and reliability of the data we are unable to accurately measure R&F.

In 2027 there will also be a number of place-based environments included in the ROADMAP RF platform, including Office Towers, Sports Arenas and Recreational Centres, Resto-bars and Shopping Centres.

The R/F measurement is at a CMA and CSD level, but we only publish the CMA information.

Geographically ROADMAP RF covers defined markets, measuring circulation and impressions for an “in market” and “out of market” population. As already stated from a reach and frequency perspective we measure the largest 44 markets (CMA's) in Canada which broadly represents 75% of the total Canadian population.

We believe we measure between 90% and 95% of all Canadian OOH inventory.

1. Scope of Measurement

Environments and Formats Covered

- Outdoor (Roadside): billboards, posters, street furniture, superboards – static and digital
- Place-Based (to be added in 2027): Office Towers, Sports Arenas, Recreational Centres, Resto-Bars, Shopping Centres etc.
- Transport Media longer-term ambition

Media Owners and Volume of Frames

- 37 media owner members; 68,000+ individual OOH faces currently measured
- Circulation and Impressions measured for all roadside and place-based inventory

Geography and Market Coverage

- Circulations & Impressions for all markets in Canada
- R&F available only in the top 44 markets due to data quality thresholds in smaller markets; representing approximately 75% of total Canadian population
- Geographical measurement for R/F at CMA and CSD level; only CMA information published
- Approximately 90–95% of all Canadian OOH inventory estimated to be covered

2. Inventory Characteristics – How Measured and Stored

COMMB's ROADMAP platform features an integrated inventory management portal for members, allowing inventory managers to submit and edit all metadata on their assets. The database is overseen and reviewed by COMMB, with members having full control of managing their own inventory.

The ROADMAP Mapping tool provides a custom mapping solution allowing interactive searching, filtering and selection of inventory by geography, metadata, POI and audience index. Place-Based inventory is also mapped within the platform.

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Outdoor – Incorporates multiple sources of data to estimate average annual vehicular and pedestrian volumes by average day, day type (Monday, Tues. etc.) and by average hour for every directional road segment (as defined by OSM) in Canada. Volume data is combined with many other factors (as indicated below) to calculate an average daily circulation for either a static or digital face as well as screen impression and/or ad-play (spot) level impressions for DOOH. These final ‘available audience’ numbers are an extrapolation of all items listed below and vary based on the specific outdoor location information such as size, facing direction, spot length for DOOH etc. For DOOH specifically our platform will house 168 hourly impressions for vehicular, 168 hourly impressions for pedestrian and 168 hourly impressions for the combination of veh+ped, taking a programmatic-first approach to ensure digital adoption. This data also exists for static inventory, however in most cases is not accessed based on the use-case of selling traditional media vs. digital/pDOOH.

Place-Based – The networks incorporate a range of manual counts during set times (regression analysis based), transactional data, survey data and any available relevant studies to determine weekly impressions. COMMB is working actively to revise this approach to include daily and hourly impression data. Sensors, cameras, and SDK data have been deployed where viable.

3.1 External Counts Used in Calculating Audience Volumes

- Local, regional and federal government transportation authorities
- Travel studies, plans and surveys
- Asset type/size/facing direction; Opportunity to See; Distance Visibility Zones; vehicular/pedestrian volume; vehicular flow; spot counts; speed; dwell time; visibility hours; in-market and out-of-market percentage; vehicle occupancy; home origin data
- Place-Based: seasonal sales, transactional data and first-party data used to adjust counts

3.2 Temporal Variability in Volume Data

- Outdoor: currently sourcing average annual data; methodology can accommodate seasonal data if members choose to adopt it; data refresh frequency under review by Board of Directors
- Place-Based: usage statistics or transactional data used to adjust counts to annual averages where available

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Outdoor circulations account for Distance Visibility Zones (DVZ) in assigning vehicular or pedestrian volume sources with OTS. The product type determines applicable distances. For example, if the standard DVZ for a digital superboard is 1,500ft but the actual/optimal visibility zone is 900ft, the 900ft distance is used for impression calculations. Every board is evaluated based on its individual product dimensions, placement, facing & obstructions.

4.1 What Constitutes a Contact/Impact/Delivered Impression

Impressions are based on the Opportunity To See a static face, digital screen or place-based ad. For DOOH, OTS, vehicular flow percentages and speeds are leveraged to calculate dwell time, which feeds into spot/ad-play impression calculations that vary by spot length.

5. Audience Measurement – Reach and Mobility

Audience Profiles: 1st-party anonymized AppSDK data enables precision in determining trip paths and postal code origins of traffic passing OOH locations. Postal code-level demographic, consumer product usage and lifestyle data is provided by a supplier and correlated to Statistics Canada information.

R/F Model: uses empirical (device-driven) reach measurement over a number of weeks. The shape of the reach curve is controlled by three parameters; estimated reach is a function of TRP(GRP) on that curve. Parameters are determined for every individual unit and for 44 markets and all Outdoor OOH companies within them.

5.1 Representativity and Data Quality

- Contemporising factors applied wherever available to ensure models are representative of the data's vintage
- Deduplicated AppSDK data and ground truth counts used to improve data representation
- These are an intrinsic part of the data process incorporated into every data update

5.2 Data Privacy and Compliance

- COMMB complies with all Federal and Provincially mandated Canadian privacy legislation
- Only anonymized AppSDK data is leveraged; AdSDK or blended AppSDK/AdSDK data not accepted

- Only partners providing full transparency into time-stamped 'expressed consent' (not 'implied consent') are used
- Ability to audit expressed consent for location tracking at any time required from all data providers

5.3 Audience Segmentation

- 21 audience categories covering 500+ different audience variables
- Categories include: standard demographics (age, income, occupation); and nuanced categories (visits to specific QSRs, spending, commuting mode, leisure activity, financial, vacation)

6. Output Data and Digital OOH

COMMB's measurement approach for DOOH incorporates dwell time, visibility, spot length and number of spots, all layering onto the base circulation calculation. This data is available per spot at average daily, average day-hour, average hour, day-type and day-part levels of granularity.

6.1 Temporal Granularity of Output Data

- 168 hourly impression sets per week (24 hours × 7 days) for vehicular, pedestrian and combined audiences
- Average daily, average day-hour, average hour, day-type and day-part granularity for DOOH
- Spot-level data available for programmatic trading via API or direct download from ROADMAP platform

6.2 Contemporising Factors

Contemporising factors are applied wherever available and are an intrinsic part of the data process incorporated into every data update. Deduplicated anonymized AppSDK data and ground truth counts are used to improve data representation for both volumes and audiences.

6.3 Data Release Schedule

- Outdoor inventory revisions (additions/deletions/revisions): within a few days
- Vehicular and pedestrian volume/speed data: 3-year update cycle (under review; semi-annual/annual refresh being evaluated)
- Place-Based networks: currently studied every 2–4 years; aiming to increase frequency

7. Trading Metrics and Data Delivery

- Trading metrics: general impressions, CPM, CPA, R/F

7.1 Delivery Software and User Access

- ROADMAP platform: web-based tool providing all COMMB data for members
- APIs available for member access into proprietary platforms and tools
- Spot-level data for programmatic trading: available via API or download directly from ROADMAP

8. Organizational Structure

8.1 Governance and Management Structure

COMMB is governed by a Board of Directors and subcommittees comprising both media owners, specialists and media buyers. One board seat is allocated to tech stacks/programmatic members, ensuring representative industry oversight. The majority of COMMB's funding comes from media owners, with remaining contributions from agencies, tech stacks and advertisers.

8.2 Funding Structure

- Majority funded by media owners; remaining contributions from agencies, tech stacks and advertisers

8.3 Data, Research and Platform Partners

- Vehicular and pedestrian volumes/speeds: Bentley Systems
- Mobile SDK data for R/F and Audience Profiling, demographics, population modelling: Environics Analytics
- R/F and audience modelling: Docma
- Software engineering, architecture and development of the ROADMAP system: Tactable

3.5 Market Analysis – Finland, Outdoor Impact

Summary

Outdoor Impact is the Finnish Joint Industry Currency (JIC) for classic out-of-home audience measurement, jointly established by JCDecaux and Clear Channel in 2006. Currently, only JCDecaux participates in the system as the active media owner. Digital frames are not included in the current measurement scope.

The system's purpose is to provide standardised audience metrics (Flow, OTC/OTS, VAC) at panel level, and reach and frequency at campaign level, used by media owners and agencies (via CAFAS planning tool) for planning and trading analogue OOH. Methodologically it combines a travel survey, panel classification, traffic flow data and eye-tracking studies to model visibility and generate VAC at panel level.

Note: The Finnish Outdoor Impact system is at a development stage compared to many other markets in these guidelines. The current travel survey and volumetric data will not be updated further as a new measurement system is being developed. The system covers only analogue formats and a single media owner at present. Finland's inclusion in these guidelines is intended to document the existing measurement foundation and support the development of a more comprehensive approach.

1. Scope of Measurement

Environments and Formats Covered

- Roadside
- Pedestrian/Non-Roadside environments (retail, pedestrian streets)
- Transport (metro stations, railway stations, trams)
- Analogue formats only: Eurosize, billboards, columns, transport surfaces (tram/bus, no fully-wrapped), lamp post panels
- Digital frames: not included in Outdoor Impact

Media Owners and Coverage

- One media owner: JCDecaux
- Approximately 10,000 frames
- Geography: nationwide
- Proportion of traded OOH inventory covered: not quantified in submission

2. Inventory Characteristics – How Measured and Stored

Panel and environment information collected via a Collector app including ID, panel picture, environment pictures, status and site code. Data transferred to a research database (PSS, Photograph Survey System), updated and tested. Research management is provided by Simon Cooper. The database is audited after each update.

- Mapping layer: not specified (N/A in submission)
- Indoor/place-based mapping: not applicable

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Flow is a modelled figure: traffic counts (vehicles and pedestrians) are used and then adjusted for panel visibility and direction to obtain OTC. Volumes are based on traffic flow data and a travel survey describing mobility patterns.

3.1 External Counts Used in Calculating Audience Volumes

- Traffic counts and transit authority counts: publicly available government data
- Sito: commercial traffic count data
- Annual visitor counts for malls from the Finnish Council of Shopping Centers
- No camera, sensor or radar count technologies deployed by Outdoor Impact

3.2 Temporal Variability in Volume Data

- Typical week and monthly modelling (March used as a typical reference month)
- No finer granularity (hourly, daily) confirmed in current system

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is applied using eye-tracking studies and panel classification. Output metrics: Flow (total passing traffic), OTC/OTS (potential contacts: person passing panel with possibility of seeing it, excluding those who cannot see it due to direction/position), and VAC (Visibility Adjusted Contact – probabilistic confirmed contact: the share of OTC expected to actually view the poster).

4.1 What Constitutes a Contact/Impact/Delivered Impression

VAC (Visibility Adjusted Contact) is the primary currency for analogue frames – the share of OTC that is expected to actually view the poster, based on visibility models from eye-tracking studies and panel classification. OTC is used for frames not in scope of Outdoor Impact (including all digital frames), though the definition of OTC may vary by media owner.

5. Audience Measurement – Reach and Mobility

Reach and frequency is based on an interview-based travel survey describing people's trips and mobility patterns. This is combined with traffic flow data and panel exposure probabilities to compute reach and frequency at campaign level using the CAFAS planning tool.

5.1 Representativity and Data Quality

Representativity details not specified in submission.

5.2 Data Privacy and Compliance

Privacy compliance details not specified in submission.

5.3 Audience Segmentation

- Age groups, gender, income
- Derivation methodology not specified in submission

6. Output Data and Digital OOH

Digital OOH is not part of Outdoor Impact. For frames outside the Outdoor Impact scope (including all digital frames), OTC is used as the metric, though the definition may vary by media owner.

6.2 Contemporising Factors

Not applied.

6.3 Data Release Schedule

- Frame updates: annually
- Volume data: previously annual; has not been updated for three years at time of submission

7. Trading Metrics and Data Delivery

- VAC: trading currency for analogue frames
- Reach and frequency: campaign-level metrics

- OTC: used for frames not in Outdoor Impact scope (e.g. all digital frames)
- No spot-level metrics for automated or programmatic trading

7.1 Delivery Software and User Access

- CAFAS media planning tool: end-user access for campaign planning
- No third-party dashboard integration confirmed

8. Organisational Structure

8.1 Governance and Management Structure

Data is currently used only by JCDecaux. Governance details beyond the JIC joint ownership (JCDecaux and Clear Channel) are not specified in the submission. Technical oversight details not provided.

8.2 Funding Structure

- Media owner funded

8.3 Data, Research and Platform Partners

Partner details not specified in submission.

8.4 Approach to Cross-Media Measurement

Not addressed in submission.

3.6 Market Analysis – Great Britain, Route

Summary

Route's remit is to provide accountability for the Out of Home (OOH) medium by publishing audiences that have seen OOH advertising in Great Britain. Route's audience measurement data launched in February 2013 and has seen continual development since, most recently adding spot ratings for digital screens in April 2020. Route provides gold-standard audience measurement and common metrics for use as currency across all OOH environments.

Route Audience data is available for single frames/screens to complete campaigns nationally, at a temporal granularity of any combination of 15-minute segments up to one year in duration.

1. Scope of Measurement

Environments and Formats Covered

- Roadside (billboards, street furniture)
- Tube and urban transit systems (stations and rolling stock)
- Rail (stations, rail side and rolling stock)
- Buses (exterior only)
- Taxis (exterior only)
- Airports (interior and exterior)
- Indoor and outdoor shopping centres
- Supermarket car parks
- Motorway service station car parks

Note: Airports have been removed from the active scope for the current measurement cycle.

Media Owners and Coverage

- 40 media owner subscribers as of Q1 2026
- 383,908 total frames/screens measured in Q1 2026, including approximately 19,936 digital screens
- Geography: fully national (Great Britain)
- 77% of in-charge inventory within the centralised SPACE database is measured by Route, equating to approximately 90–95% of total OOH revenue

2. Inventory Characteristics – How Measured and Stored

Details of OOH inventory for each environment are provided by Outsmart via the SPACE database, which is managed by Adwanted UK (not Route directly). Further attributes required for the calculation of visibility areas and the application of the visibility model are added by media owners into an Inventory Management System (IMS). The IMS is subject to a 'challenge system' available for peer review. Inventory in the Route data is updated on a quarterly release cycle.

- Mapping layer: HERE Maps is used as the primary geospatial reference
- Indoor environments: mapped within Route's models where relevant; mapping is not required for vehicle carriage interiors

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

A Traffic Intensity Model (TIM) ingests volumetric traffic figures at known locations from external sources and maps the volume of vehicles and pedestrians along all roads/paths based on a digitised network of 4.5 million links supplied by HERE, with classification characteristics appended. Frame locations, and the links they can be seen from, are attached to this model.

The model creates volumes of traffic around the network, with vehicle volumes fed by 28,064 Annual Average Daily Flow (AADF) counts from the Department for Transport and road counts from Local Authorities. The vehicular element of the current model is also informed by additional research, looking at typical flows on smaller road types where AADF counts are less likely to be available.

The pedestrian model is a gravity model, fed by counts from point-of-interest attractors including stations, transport hubs, schools and hospitals.

All HERE road links are assigned a weekly TIM audience for both vehicles and pedestrians. The audience for each is then split over 672 quarter-hour periods across the week. The model for roads is matched by similar models created for other environments, fed by multiple external population counts of travellers and visitors.

3.1 External Counts Used in Calculating Audience Volumes

- AADF Traffic counts from the Department for Transport
- National Travel Survey (NTS)
- Bus depot volumes and digitised bus routes; NAPTAN dataset for bus stop locations
- Rolling Origin and Destination Survey (RODS) – annual survey of London

Underground travellers

- London Underground Users Survey (LUUS) / DLR Survey
- Underground, DLR and Glasgow Subway gate-line data
- National Rail Travel Survey (NRTS); LENNON Rail Ticket Database
- Civil Aviation Authority (CAA) gate-room survey
- PMRS pedestrian footfall data
- Experian daytime and retail counts; Local Data Company high street footfall counts
- Footfall counts for shopping malls, including quality-weighted data removing under-16s and tourists
- Google Popular Times used to shape volumetric distributions for points of interest

3.2 Temporal Variability in Volume Data

- A seasonal factor is applied at monthly level
- Google Popular Times and the travel survey inform the shape of volumetric distributions across the day and week
- Variance granularity available: monthly, day of week, and hourly within the week

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Route uses 25+ years of experience in eye-tracking research to create an adjustment model that calculates likelihood to see (LTS) based on both frame and audience attributes. The model first defines the areas from which it is possible to see posters and screens (maximum visibility distances within an unobstructed field of vision) and then calculates a 'visibility adjustment' factor accounting for the likelihood of people seeing the ads when in visibility areas.

An adjustment for the likelihood of seeing each frame/spot is calculated from every possible approach path, with a further adjustment for the effect of digital or scrolling movement. The visibility models account for: time spent within the visibility area; frame size; distance from the frame; offset distance; distortion or angle; illumination; dynamic movement; and mode of transport (vehicular or pedestrian).

- Output metrics available: ROTS (Realistic Opportunity to See) and VAC (Visually Adjusted Contact/LTS)
- The Route visibility algorithm is applied to all audiences on a ROTS/LTS basis

4.1 What Constitutes a Contact/Impact/Delivered Impression

An audience contact is defined as an individual having the 'likelihood to see' the advertising structure – travelling on links within the defined visibility area in a direction towards the ad. This is further defined as the Realistic Opportunity to See (ROTS) adjusted by a visibility coefficient, known as 'visibility adjusted ROTS'. A contact is an 'eyes-on' the advertising structure to the extent of the visibility adjusted ROTS, with the output in the data expressed as Impacts.

5. Audience Measurement – Reach and Mobility

Route operates a Travel Survey of 7,200 participants per annum, nationally representative, recruited face to face (CAPI) to carry a passive Multi-Sensor Tracking (MST) meter for 14 days. This records interior and exterior location second by second using GPS and a number of other sensors.

Route uses a multi-year database comprising 25,000+ participants carrying MST devices, weighted and grossed to population estimates provided by JICPOPs. A mobile application is also used for an element of sample collection, recruited online.

5.1 Representativity and Data Quality

- Significant sample controls ensure geographic and demographic distributions are in line with population targets
- Data is weighted to the overall population using JICPOPs targets
- Route uses redistribution of excess contacts and the creation of virtual contacts to ensure sufficient sample coverage across all frames
- The travel survey enables deduplication of audiences and the creation of target audiences for profiling purposes

5.2 Data Privacy and Compliance

Route's data is all opt-in and adheres to MRS guidelines and all data protection requirements. Route does not hold nor access any personally identifiable information. Ipsos is the data controller for Route data, with MGE Data responsible as data processor, ensuring full GDPR compliance.

5.3 Audience Segmentation

Any question asked on the demographic recruitment questionnaire or the self-completion questionnaire can be used to create target groups. Additionally, Route has partnered with Kantar to fuse approximately 300 additional TGI variables to the Route dataset for profiling purposes. These are available via the Route API to Route and TGI subscribers.

6. Output Data and Digital OOH

Route calculates digital audiences based on the respondent's contact time,

ad play length and share of time (SOT) of the campaign. Attraction factors for digital screens are applied based on size and movement.

6.1 Temporal Granularity of Output Data

- Data is available at any user-defined spot duration from one second through to one week
- Spot schedules are standardised within 15-minute increments

6.2 Contemporising Factors

Contemporising factors were introduced as a response to COVID-19 but have since been discontinued as audiences have stabilised and the adjustment was deemed superfluous. No contemporising factors are currently applied to Route's output data.

6.3 Data Release Schedule

- Inventory updates (new/removed units): quarterly
- Volume/audience data updates: annually

7. Trading Metrics and Data Delivery

Core trading metrics: Impacts, Reach, Frequency, GRP, and Cover. Route and Outsmart have recently agreed a standard for 'Impression Multipliers' – the average impacts per play – used to better align online impressions with Route Impacts and to account for the fact that more than one person can see an ad broadcast on a digital screen.

- Impression multipliers: a new API call targeted at SSPs is set to launch in 2026
- For pDOOH trading, spot-level metrics are available via the Route API to subscribers

7.1 Delivery Software and User Access

Route does not offer proprietary delivery software; stakeholders access data through licensed data bureaux software systems, their own UI, or via the Route API (provided by Mediatel/Adwanted).

8. Organisational Structure

8.1 Governance and Management Structure

As a Joint Industry Currency (JIC), Route is independent of any special interests. Its board of directors has equal representation from buyers and sellers of the medium.

8.2 Funding Structure

Route is a non-profit organisation, run on commercial principles. The trade associations for buyers and sellers of the medium underwrite Route jointly, with additional income from subscriptions to the service.

8.3 Data, Research and Platform Partners

- Data collection, processing and modelling: Ipsos
- API and inventory management: Adwanted UK (SPACE)
- Academic consultancy: Glasgow University

8.4 Approach to Cross-Media Measurement

Route is not currently engaged in industry-wide cross-media measurement, nor are there active plans to do so. Route has had initial discussions with ISBA about the Project Origin initiative. Route data is available via the IPA cross-media tool 'Touchpoints', which gives predictive estimates for cross-media reach. The Route questionnaire is designed to include other media consumption, allowing for third-party fusions with other audience measurement models.

3.7 Market Analysis - GCC, 7th Decimal/Streach (Saudi Arabia, UAE, Qatar, Kuwait, Oman, Bahrain)

Summary

Launched in 2019, Seventh Decimal's Streach is the OOH audience measurement currency for the Gulf Cooperation Council countries: Kingdom of Saudi Arabia, United Arab Emirates, Qatar, Kuwait, Bahrain and Oman (also with coverage in Amman, Jordan). It was built to address the OOH measurement gap in a market that had no currency, JIC or association.

Streach is centred on measuring observed, temporal audience exposure to OOH and DOOH through layering multiple datasets on top of a representative, high-volume mobility dataset. The methodology encompasses the results and findings of over five years of local field work, research, testing and development in the OOH media space. It serves 70% of the market – approximately 20 media owners and the five major media agency holding companies.

1. Scope of Measurement

Environments and Formats Covered

- Roadside: 31,000 units
- Transit Media Scheduled (metros, tramways, buses, taxis): 6,000 units
- Transit Media Non-Scheduled: 500 units
- In-Malls: 200 units
- Place-Based: 53 units
- Both static and DOOH covered; bus stations also included

Market Coverage

- Kingdom of Saudi Arabia: nationwide (approximately 80% of traded inventory)
- United Arab Emirates: nationwide (approximately 70%)
- Qatar: nationwide (approximately 100%)
- Kuwait: nationwide (approximately 100%)
- Oman: nationwide
- Bahrain: nationwide
- Jordan: Amman city only

2. Inventory Characteristics – How Measured and Stored

Seventh Decimal provides media owners with a proprietary mobile application (Streach Explorer) to collect the parameters needed for onboarding OOH assets, restricting manual intervention by media owners. Data collected includes: panel dimensions, face GPS coordinates and azimuth (orientation), and three photos per face (street view, panel face and licence number). The onboarding process follows three steps: Initial Verification (GIS visual screening), On-Ground Verification (photo/information checks and blocker identification), and Geo-Aware Polygons (geospatial polygon generation per face).

- Database (Streach Explorer IMS): managed internally by Seventh Decimal, updated quarterly
- Audited by media owners for their own inventory
- Attributes recorded: Streach ID, OOH face, H3 address, environment, owner, ad format type, static/DOOH, dimensions, latitude/longitude, azimuth, illumination, blocker count, blocking time
- Indoor/place-based inventory required to be mapped in models

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Mobile location data (SDK) is used to create Streach Movement Data – a mobility dataset capturing pedestrian, vehicular and indoor visitation. Mobile GPS location data collected from dedicated SDKs provides coverage and granularity. An intricate technology stack filters and cleanses data daily, producing a statistically significant travel model with high positive geographical correlation with the population in each city.

For DOOH, a deterministic approach synchronises individual pass-bys with the time a specific ad was in rotation on a screen. The impact of ad duration and rotation length on OTR is estimated to provide DOOH impressions. Volumetric datasets are used for ground truth validation and tuning of extrapolation algorithms.

3.1 External Counts Used in Calculating Audience Volumes

- Publicly available governmental and transit authority counts: yes
- Media owner and land owner supplied count data: yes
- No camera, sensor or radar count technologies deployed; no commercial supplier count data
- System designed to ingest data daily, capturing event mobility impacts (surges, weather reactions) and seasonality on a near real-time basis

3.2 Temporal Variability in Volume Data

- System ingests data daily; mobility data refreshed daily through an automated ETL pipeline
- For predictive data: mobility behaviour produced using past two years of data, adjusted for calendar events and outliers
- Metrics can be reported on hourly and daily level, aggregated at campaign level
- Impression multipliers for DOOH provided at day-of-week/hour-of-day aggregation per frame

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Seventh Decimal conducted over 40 field drive tests on a controlled set of outdoor media formats (lampposts, bridges and unipoles) across multiple days, times and traffic situations, for both driver and passenger points of view. After calculating the maximum visibility distance for each face based on size, height from ground, illumination, distance from road and road classification, a preliminary coverage area (geospatial polygon) is generated in the direction of azimuth. Survey photos are examined in correlation with GIS map data to identify blockers and coverage blind spots, and the polygon is adjusted accordingly. Each OOH face has its own unique coverage area.

The proprietary OTR (Opportunity to Read) metric is the visibility adjustment: calculated from field drive tests and frame-specific parameters including dimensions, height, orientation, distance from road and blockers. OTR measures the number of opportunities to read the creative while passing in the coverage area, fixing the creative at limited visual components (1 background image, 1 logo, 16 characters of text).

4.1 What Constitutes a Contact/Impact/Delivered Impression

- Impression: a pass-by defined as a device seen within the coverage area of a given OOH face travelling in an angle parallel to or towards it
- Total Impressions: aggregated pass-bys across all OOH faces booked for the campaign (= OTR x Total Pass-Bys)
- Unique Reach: deduplicated unique devices/users who passed by an OOH face
- Total Reach: deduplicated unique devices/users who passed by the OOH faces booked for the campaign
- Frequency: average number of times a unique user had the opportunity to see OOH during the campaign
- OTR impressions used for direct trading; pass-bys used for pDOOH trading

5. Audience Measurement – Reach and Mobility

The mobile movement dataset is derived from high-precision, opted-in, privacy-compliant SDK location signals representing 300M+ monthly active devices, 200M+ daily active devices, and 30B+ monthly signals. All mobility data is refreshed daily and processed through an automated ETL pipeline with filters for duplicates, low-precision coordinates and hotspot clusters. Trip origins, destinations and routes are reconstructed. Device IDs are secured via AWS Key Management Service (KMS) encryption; home locations assigned using an H3-based home-graph process.

Statistical weights are applied to device IDs based on the H3 cohort they represent and their activity, to extrapolate exposure metrics to the full population. The count of deduplicated exposed device IDs translates into Reach; the ratio of gross to deduplicated count gives Frequency.

5.1 Representativity and Data Quality

District/city-specific data quality rules enforce accuracy thresholds, signal-density minimums and movement-plausibility checks

Population universe per city regularly updated based on official population counts; out-market (tourists) based on official transport authority counts

Statistical weights applied for population extrapolation

5.2 Data Privacy and Compliance

Privacy-by-design framework; all SDK data providers required to supply only opt-in signals with valid consent strings

All incoming identifiers pseudonymised and encrypted using AWS KMS; no raw personal identifiers collected or stored

Compliant with: GDPR, CCPA/CPRA, PDPA, IAB Transparency and Consent Framework

Suppliers hold SOC 2 Type II Attestation and ISO 27001:2013 certification

5.3 Audience Segmentation

Age group and gender available across all markets

Disposable income available in UAE only

Behavioural audiences across all markets

Segments derived from first- and third-party datasets overlaid on mobility data

6. Output Data and Digital OOH

For DOOH, pass-bys are filtered against an ad play timetable generated based on ad unit duration, position in sequence and ad rotation length (loop duration). The proprietary OTR approach is applied as the visibility

adjustment. No secondary AM4DOOH model is used.

6.1 Temporal Granularity of Output Data

- Impressions reportable at hourly and daily level, aggregated at campaign level
- Impression multipliers for DOOH at day-of-week/hour-of-day aggregation per frame
- Spot-level impression multipliers available to media owners on request

6.2 Contemporising Factors

Contemporising factors are unnecessary as Streach records actual audience delivered during the campaign period through a deterministic approach.

Two downstream datasets are generated from the daily pipeline:

- Stable Planning Dataset: aggregates historical mobility, refreshed monthly on a rolling-window basis for planning and forecasting
- Delivered Dataset (Reconciled): refreshed weekly, supporting post-campaign measurement and near-real-time trend analysis

6.3 Data Release Schedule

- Stable Planning Dataset: monthly rolling refresh
- Delivered Dataset: weekly refresh

7. Trading Metrics and Data Delivery

- OTR impressions for direct trading
- Pass-bys for pDOOH trading
- Impression multipliers at frame/spot level available to media owners for programmatic integration

7.1 Delivery Software and User Access

- Streach platform: two modules – Simulator (predictive/planning dataset) and Measurement (post-campaign measurement)
- Not yet available in third-party dashboards or platforms

8. Organisational Structure

8.1 Governance and Management Structure

Streach is a syndicated measurement product marketed by Seventh Decimal. A technical oversight committee is convened comprising major media owners and Holdco media buying companies. The committee approves the methodology and any updates, and prioritises the metrics roadmap. There is no formal independent JIC structure in the GCC markets at present.

8.2 Funding Structure

- Subscription-based: accessed by both buy side and sell side on a subscription basis

8.3 Data, Research and Platform Partners

- Data suppliers: SDK mobility data providers
- All research, modelling/processing and platform development: internal to Seventh Decimal

8.4 Approach to Cross-Media Measurement

Not currently in operation in the GCC markets. Cross-media measurement projects are planned for the following year.

3.8 Market Analysis – Bundesverband der Aussenmedienn (B|A|M)

Summary

Developed by the German professional out-of-home advertising association 'Bundesverband der Aussenmedien' (B|A|M) and published annually by the joint industry committee agma, a working group for media analysis, ma Out of Home is Germany's leading out-of-home advertising coverage study for almost all 300,000 analogue and digital out-of-home advertising media. It forms the basis for the targeted planning of both advertising agencies and other advertising entities.

1. Scope of Measurement

Environments and Formats Covered

- Roadside
- Shopping environments
- Public transport (stations)

Note: Advertisements inside and outside of public transport vehicles are evaluated in a separate study called AdMotion, which is based on the travel survey of ma Out of Home.

Volume of Frames/Locations

- 270,000 OOH and DOOH locations
- Geography: national

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

The traffic volume dataset 'frequency atlas', produced for B|A|M by the Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS), provides data on the frequency of traffic based on numerous counts of the average number of people walking or travelling by vehicle, including users of public transport, along all seven million street segments.

3.1 External Counts Used in Calculating Audience Volumes

- Traffic counts from the Fraunhofer IAIS frequency atlas covering all seven million street segments
- Movement patterns from mobile app data used to derive hourly location-specific traffic indices

3.2 Temporal Variability in Volume Data

- Hourly location-specific traffic indices are applied for an average week of the year, derived from mobile app movement data
- Seasonality is not currently offered in the output data

4. Visibility Adjustment – Relative Impact of Different Inventory Types

For each format, there is a defined set of visibility factors. According to the exact positioning of each panel in the database and its exact relation to each street segment, the result is a likelihood of contact with the panel for each traffic mode: car, public transport, or pedestrian. The visibility adjustment additionally accounts for dwell time, bright illumination and visual attractiveness due to movement of images for DOOH.

4.1 What Constitutes a Contact/Impact/Delivered Impression

A contact is the multiplication of all passages alongside the panels by their individual visibility adjustment. Additionally, digital spots are weighted by their probability of exposure. The currency is the number of contacts. Since gross contacts and net reach are calculated, all combinations (GRP, OTS, CPT) are published through the software products.

5. Audience Measurement – Reach and Mobility

A representative survey of mobility patterns covering the whole of Germany uses a 14-day GPS study combined with a previous-day CATI (Computer-Assisted Telephone Interview) study. CATI interviews are conducted with approximately 60,000 people, who are asked about the routes they took the day before. For 7 to 14 days, all movements of a sample of approximately 12,000 people are registered by GPS.

5.1 Representativity and Data Quality

Opportunities to See (OTS) are identified for each panel; net reach is determined indirectly by combination with gross contacts. For each site with a sample lower than 100 people, 'missing' people are substituted by adding passers-by from the immediate surroundings, or the value is extrapolated on the basis of OTS 1 or similar panels. The number of expected net contacts for each panel is projected onto the overall population of 14+. Individual values can be combined into booking units whose overall reach can be calculated based on a binomial distribution model.

5.2 Data Privacy and Compliance

- ma Out of Home is fully GDPR compliant

5.3 Audience Segmentation

The dataset covering all respondents by all ad units is distributed to interested members and inputted into counting software products (both provided by B|A|M and independent software bureaux), enabling individual creation of target groups.

6. Output Data and Digital OOH

The ma Out of Home is expanded by drilling DOOH to specific spot contacts (impressions per spot = IPS). The visibility adjustment takes into account dwell time, bright illumination, and visual attractiveness due to movement of images. The basic traffic volume and average speed are weighted according to hourly location-specific traffic indices (for an average week of the year) derived from mobile app data. For each booking unit, spot contacts are calculated taking into account the probability of exposure. Digital spot impressions were added to ma Out of Home in September 2021.

6.1 Temporal Granularity of Output Data

- Hourly granularity for an average week of the year

6.2 Contemporising Factors

- Since 2022, mobile data has been added to enable dynamisation of reach and impact metrics.

6.3 Data Release Schedule

- At least once per year; updates occur in between
- From 2027 onwards, at least one regular update during the year is planned

7. Trading Metrics and Data Delivery

- Trading metrics: contacts (gross), net reach, GRP, OTS, CPT

7.1 Delivery Software and User Access

A full dataset with all respondents by all ad units is distributed to members. The dataset is inputted into counting software products provided both by B|A|M and independent software bureaux. These offer individual creation of target groups.

8. Organisational Structure

8.1 Governance and Management Structure

Developed by the German professional out-of-home advertising association 'Bundesverband der Aussenmedien' (B|A|M) and published annually by agma. The GPS tracking is embedded within the agma cross-media survey,

providing a single-source approach.

8.2 Funding Structure

- Vendors pay their share based on the number of units (primary funding)
- Clients pay a membership fee plus a small licence fee for counting software

8.3 Data, Research and Platform Partners

- Classification of ad units: MGE Data/IPSOS
- Field work (GPS tracking): agma contracts with different institutes each year
- Calculation of reach and frequency: ISBA Hamburg

8.4 Approach to Cross-Media Measurement

agma publishes a cross-media survey every year. Since the GPS tracking is conducted within the cross-media survey, there is a single-source approach. Additional hooks are integrated into the pure OOH fieldwork to enrich the sample base with respondents who are fused into the cross-media dataset.

3.9 Market Analysis – India, RoadStar

Summary

RoadStar is an audience measurement system for Out-of-Home (OOH) media, launched in February 2021, built on large-scale mobility data derived from anonymised mobile GPS signals. Developed by Relu AI Systems, the methodology combines traditional market research principles with high-frequency digital data to enable both planning and reporting of OOH campaigns. Unlike traditional site-based measurement, RoadStar models consumer movement across entire cities, enabling estimation of audience exposure, reach and frequency at scale.

The system uses a curated and continuously updated panel of approximately 35–40 million mobile devices, weighted to represent the population of the measured markets. The platform supports pre-campaign planning, post-campaign reporting and attribution analysis, making OOH comparable with other media channels. RoadStar is recognised by the Indian Outdoor Advertising Association (IOAA).

RoadStar is built with the ethos of enabling transparent, scalable and audience-centric measurement for OOH media. Its mission is to help planners target the right audiences through OOH and provide standardised metrics comparable with other media such as TV and digital.

1. Scope of Measurement

Environments and Formats Covered

- StreetSide: roadside OOH formats such as billboards and transit-facing media
- Ambient: enclosed and semi-enclosed environments including malls, airports, metro/rail stations, corporate business districts and retail locations
- RoadStar is format-agnostic – all OOH formats and sizes can be measured, including billboards, street furniture, transit media and DOOH

Media Owners and Volume of Frames

- RoadStar is media-owner agnostic; metrics can be delivered across sites from all media owners
- Curated database of approximately 300,000 media sites/screens across India
- Measurement is location-based (latitude/longitude coordinates or geo-fenced zones)
- Geography: national coverage across approximately 2,300+ cities and

markets; approximately 200 major urban markets reported individually; smaller towns aggregated at Taluk level

- No formal tracking of proportion of traded inventory covered; system is not limited to a predefined inventory set

2. Inventory Characteristics – How Measured and Stored

Inventory metadata is captured using a standardised template shared with media owners and agencies, including: location, media owner, city, traffic direction, dimensions, format (billboard, gantry etc.), media type (backlit, frontlit, digital), environment classification (streetside vs ambient), and latitude/longitude coordinates. Data is typically provided by media agencies or owners as part of campaign planning workflows.

- Database managed by ReLU AI Systems
- Mapping: Google Maps used as the primary base mapping layer
- Indoor/ambient inventory: required to be mapped using both latitude/longitude coordinates and defined geo-fenced polygons
- Internal validation checks applied; no formal third-party audit or peer review currently in place

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

RoadStar derives all audience volumes entirely from large-scale mobility data based on anonymised mobile GPS logs. GPS data is processed and cleaned, and each mobile device (MAID) is anchored to a home market based on observed mobility patterns. The country is divided into approximately 4.8 million grid cells (0.5 km resolution), with the presence and movement of devices across these cells measured continuously to estimate mobility flows.

All volume estimates are derived from observed mobility patterns within the panel and extrapolated to the population. No external 1st-party traffic count data is used.

3.1 External Counts Used in Calculating Audience Volumes

- No external count data (governmental, transit authority, sensors, cameras, radar, commercial suppliers, or media owner data) is used
- All measurements are derived from anonymised mobile GPS data using a curated panel approach extrapolated to the broader population

3.2 Temporal Variability in Volume Data

- Data captured and processed on a daily basis; variability driven entirely by observed mobility behaviour from anonymised mobile signals

- Variance available by hour of day, day of week, and campaign period
- No external data or proprietary adjustments used to model variances

4. Visibility Adjustment – Relative Impact of Different Inventory Types

RoadStar does not currently apply visibility adjustment (VA) to its output data. Audience volumes reflect pass-by/OTS without a formal visibility or likelihood-to-see adjustment.

4.1 What Constitutes a Contact/Impact/Delivered Impression

A contact (impression) is defined as an instance where an individual's mobility path intersects with the defined location of a media asset, based on observed mobile GPS data. Key output metrics:

- Unique Reach: unduplicated count of individuals whose movement paths intersect with the media asset location during the campaign period
- Impressions (Contacts): total exposure instances; duplicate exposures within a one-hour window are removed
- Frequency: average number of exposures per individual (Impressions / Unique Reach)
- Opportunity to See (OTS 1+ to 5+): distribution of individuals by number of exposures
- Cross-Site Visitation: unique individuals exposed across multiple media sites within a campaign
- Reach Build-Up Quintiles: rate at which cumulative reach is achieved over time

5. Audience Measurement – Reach and Mobility

RoadStar follows a device observation approach using anonymised mobile data combined with a panel-based market research framework. Mobility data is sourced from third-party data providers collecting anonymised mobile location signals through SDK integrations in mobile applications, associated with anonymised MAIDs and including timestamped GPS coordinates. RoadStar processes approximately 4.5–5 billion location signals from 90–100 million devices.

5.1 Representativity and Data Quality

- Devices anchored to a home market using consistent night-time location patterns
- Curated panel created per market based on data consistency and observed mobility behaviour

- Panel weighted and extrapolated to represent market population using external population benchmarks
- Each panel device assigned a statistical weight representing its contribution to the population

5.2 Data Privacy and Compliance

- All data anonymised and aggregated; no personally identifiable information (PII) processed or stored
- Compliant with applicable frameworks including GDPR and CCPA
- Data partners selected from industry-recognised providers with established consent frameworks; compliance ensured through contractual agreements and internal data governance

5.3 Audience Segmentation

- Primary demographic segments: age and gender (sourced from third-party data providers, mapped to anonymised MAIDs where available; indicative in nature)
- Behavioural cohorts: custom audience segments based on observed visitation to Points of Interest (e.g. airports, fine dining, golf courses, luxury hotels for 'affluent' audiences)
- AI-assisted tools available to help planners identify relevant POIs and build audience cohorts aligned with campaign objectives

6. Output Data and Digital OOH

DOOH media is measured in RoadStar in the same way as other OOH formats – based on location and audience movement rather than play-out or spot-level data. No secondary adjustment models (such as AM4DOOH) are applied.

6.1 Temporal Granularity of Output Data

- Hourly level is the finest temporal granularity currently available
- Reporting can be aggregated to daily and campaign-period levels
- Spot-level or per-play measurement not currently supported

6.2 Contemporising Factors

RoadStar does not apply separate contemporising factors. As the system is based on continuously collected mobile GPS data, variations in audience movement are directly captured in the underlying data. Data is processed and updated daily (with a one-day latency), naturally reflecting day-to-day changes without additional adjustment factors.

6.3 Data Release Schedule

- Audience metrics updated daily (one-day latency)
- Inventory: provided on demand for any specified location; no fixed inventory database updated on a continuous schedule
- Panel refreshed monthly: inactive devices removed and new devices added to maintain representativity

7. Trading Metrics and Data Delivery

In the Indian OOH market, primary trading metrics are reach and impressions, though media is frequently still traded based on inventory (site/location) rather than standardised audience metrics. Time-based or spot-based trading is not yet commonly used. RoadStar metrics are typically used as post-campaign evaluation and proof-of-performance metrics rather than the primary trading currency.

- Trading metrics: Reach, Impressions, Frequency, OTS (1+ to 5+)
- Programmatic/play-based trading models (ROTS, VAC) not yet standard in India; no spot-level metrics currently supplied for automated or programmatic trading

7.1 Delivery Software and User Access

Proprietary RoadStar platform: dashboard interface for media planners and buyers to plan campaigns and analyse performance

API available for integration into third-party dashboards and platforms

8. Organisational Structure

8.1 Governance and Management Structure

RoadStar is developed and operated by Relu AI Systems Pvt. Ltd. as an independent audience measurement platform. Governance and technical oversight details are managed internally. RoadStar is recognised by the Indian Outdoor Advertising Association (IOAA).

8.2 Funding Structure

Developed and funded by Relu AI Systems Pvt. Ltd. as an independent, commercially operated platform

Access to audience metrics provided to clients (media agencies and advertisers) on a commercial basis

Not funded by media owners or through an industry-wide pooled funding mechanism

8.3 Data, Research and Platform Partners

Partner details to be confirmed by Relu AI Systems.

8.4 Approach to Cross-Media Measurement

Cross-media measurement status to be confirmed by Relu AI Systems.

3.10 Market Analysis – Italy, Audioutdoor

Summary

Audioutdoor has been established since 1979 and became fully operational in 1980, founded as INPE (Istituto Nazionale Pubblicità Esterna). It operates within the sphere of AGCOM (Autorità per le Garanzie nelle Comunicazioni), Italy's national communications authority, and is confirmed as the main shared reference standard for the Italian OOH industry. A major turning point occurred in 2004 when Audioutdoor introduced a new audience measurement system based on portable GPS meters – one of the first large-scale applications of this methodology to OOH measurement globally.

The current research framework, released in 2024, is continuously evolving and captures specific characteristics of each environment while ensuring full interoperability. Audiences are integrated and de-duplicated across environments. Audioutdoor brings together all key OOH stakeholders: media owners, agencies, media centres and advertisers (represented by UPA). Its governance is based on neutrality, transparency and full parity. In early 2025, MediaTelling was established as a joint initiative to align methodologies and metrics across Italy's five official audience measurement bodies.

1. Scope of Measurement

Environments and Formats Covered

Roadside (90 cities)

Dynamic/Transit (buses and trams, approximately 100 cities, approximately 13,000 vehicles)

Metro networks (5 networks, 200+ stops, approximately 9,000 panels)

Airports (9 airports across 7 cities, approximately 1,000 panels)

Railway stations (14 stations across 11 cities, approximately 1,700 panels)

Roadside: 55,000+ panels; audience metrics provided at panel level without distinction by format or size

Media Owners and Coverage

13 media owners at time of writing, with additional owners expected to join

Coverage: national, at city level; analyses extendable to individual municipalities

Approximately 52% of the national OOH/DOOH market covered

Census-based inventory database; approximately 90% of panels associated with audience data

2. Inventory Characteristics – How Measured and Stored

The database is managed and maintained by Audioutdoor. Media owners are required to update the database promptly to reflect any inventory changes and are responsible for ensuring it includes all and only the assets under their control. All inventory data is subject to continuous periodic verification.

- Peer review: each media owner has visibility over inventory declared by other media owners
- Mapping: OpenStreetMap (OSM) used as the base mapping layer
- Indoor inventory: mapped within a dedicated application (AudiMap) using relative Cartesian coordinates, developed and maintained by partner Tandem

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Audioutdoor measures OTS (Opportunities To See). Both volumes and net coverage are derived from the mobility modelling approach.

3.1 External Counts Used in Calculating Audience Volumes

- Official transit authority data used for subway and airport models
- Sensors used in support of the railway station model; assessment underway for extending to other environments
- Airport model: retail transaction data (e.g. shop receipts) used to model indoor movement patterns
- Quality weighting currently outside the scope of Audioutdoor
- No media owner, retailer or landowner supplied count data currently used
- Evaluation underway for a 1st-party data control framework

3.2 Temporal Variability in Volume Data

- Model natively provides a database of all OTS generated over an 'average day' across a 12-month period, with second-by-second granularity
- Standard commercial output aggregated to hourly level
- Pre-post analysis based on Telco data (from a major Italian telecommunication provider) updated monthly, providing day-by-day granularity as a set of indices adjusting average data to reflect observed temporal variations

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is applied as the first step of the modelling process. The ‘cone of visibility’ is projected onto OpenStreetMap to represent the area from which a panel is potentially visible. All portions of the visibility area where obstacles obstruct a clear view are excluded.

4.1 What Constitutes a Contact/Impact/Delivered Impression

A ‘contact’ or ‘OTS’ (referred to as a ‘cross’ in the models) occurs when an individual passes through the area from which a panel is visible, according to Audioutdoor’s defined visibility rules. Duration of exposure and direction of movement are not factors, except for motorised vehicle contacts where only individuals moving towards the panel are counted. Output metrics:

- Net coverage (unique individuals reached at least once, deduplicated)
- Reach % of target population
- Frequency (average exposures per distinct individual)
- Gross contacts
- GRPs (Reach% x Frequency)
- Seconds of exposure per person reached
- Average contact duration
- All KPIs available at panel level and deduplicated across panels, networks, cities and environments

5. Audience Measurement – Reach and Mobility

For roadside environments: a Residence-Origin/Destination (O/D) matrix broken down by hour over an average day across the year. The CityFull module (used for larger cities) has four components: Visibility (reconstructs actual visibility of panels); SampleDiary (uses the O/D matrix to generate a synthetic population and simulate daily movements); Path (reconstructs specific routes taken by each individual using OSM nodes, transport mode and timestamps); and Cross (calculates movements and individuals passing through each panel’s visibility area).

The CityLight module estimates mobility for smaller cities using modelled outputs derived from CityFull data. For indoor environments, each context is modelled separately using census-derived volumetric data, representing individuals’ logical movement sequences (e.g. entrance, turnstile, platform). For railway stations: a combination of telco data (to define volumes of distinct individuals) and counting sensors (to support path reconstruction).

5.1 Representativity and Data Quality

- Outdoor CityFull: GPS sampling via SDK

- Outdoor CityLight: modelled output derived from CityFull observations
- Indoor subway and airport: census data provided by authorities
- Indoor railway stations: telco data and counting sensors
- Scaling methodology applied where data is based on GPS sampling; technology partner applies SampleDiary model with official Italian population universes from GfK (Sinottica research and GeoSinottica tool)
- Each synthetic individual assigned an expansion coefficient for scaling to total population

5.2 Data Privacy and Compliance

- All acquired data is fully anonymised and aggregated; no individual can be identified from delivered outputs
- Strict contractual requirements with data providers; suppliers required to document and disclose how data is collected, processed and anonymised
- Contractual indemnities obtained from suppliers; responsibility for lawful data acquisition rests with the data provider

5.3 Audience Segmentation

- Gender: Male / Female
- Age: <14, 14–24, 25–34, 35–44, 45–54, 55–64, 65+
- Primary Grocery Shopper: Yes / No
- Residence: 28 areas x 'local capital' vs 'non-capital' = 56 origin areas; resulting in 2,016 socio-demographic combinations
- Individuals under 14: fixed national total, not further profiled; Foreigners: estimated per environment, not assigned to the socio-demographic grid
- Segments derived from Sinottica (GfK proprietary research) and GeoSinottica (GfK proprietary tool for smaller geographic areas)

6. Output Data and Digital OOH

Audioutdoor has developed a proprietary adjustment system operating as a post-processing layer on top of elementary model data. This system uses a custom Monte Carlo simulation to model the impact of Share of Time (SOT) and loop time on campaign performance, simulating how creative rotation affects both the probability of exposure and the time spent in front of a specific message.

6.1 Temporal Granularity of Output Data

- User-accessible: day-by-day and hour-by-hour granularity at panel level

- Underlying data: structured contact-by-contact with potential second-by-second precision (used internally to feed the evaluation platform; not exposed publicly)

6.2 Contemporising Factors

Telco data is used to post-evaluate 'average day over the year' output. The adjustment (pre-post analysis) is applied across all KPIs including both volumetric and reach metrics. Indices are updated monthly (with work towards weekly updates) and provide day-by-day granularity. End users can choose whether to evaluate results with or without the pre-post analysis.

6.3 Data Release Schedule

- No fixed release schedule; needs-based approach to ensure accuracy and alignment with real-world changes
- Removed frames: excluded from the database from the day following removal
- New frames: integrated within approximately 2–4 weeks from start of the update process
- Three levels of update: minor (new/modified panels only); intermediate (mobility and panels); full (cartography/planimetry, mobility and panels)

7. Trading Metrics and Data Delivery

Trading and planning metrics: net coverage, reach %, frequency, gross contacts, GRPs, seconds of exposure, average contact duration

SSP integration: some media owners use Audioutdoor data within SSPs; Audioutdoor is working towards enabling direct data provision to SSPs

7.1 Delivery Software and User Access

Web-based platform and APIs for M2M integration

Industry-wide access; third-party platform integration under development

8. Organisational Structure

8.1 Governance and Management Structure

Board of Members: media owners (supply side), media buyers (demand side) and advertisers (brands). Technical Committee: all media owners (one seat each); three representatives nominated by UNA (national association of communication agencies); three representatives from UPA (national association of advertising investors); Audioutdoor also participates.

Technology partners may be invited on an ad hoc basis without permanent seats. All participants required to sign NDAs.

8.2 Funding Structure

Media owner funded; contributions proportional to revenue and audience share

8.3 Data, Research and Platform Partners

SDK data: Jakala and NextDifferent

Telco data: Vodafone-Fastweb and WindTre (via partners)

Indoor volumetric data: local transport authorities

Sensor data (railway stations): Quividi (via Dialogica)

Population universes: GfK and IPSOS (via Auditel)

Population and mobility modelling: GfK, Tandem, TargetResearch

Sensor pre-processing: Dialogica

Post-processing and dashboard: MediaConsultants (MCS)

8.4 Approach to Cross-Media Measurement

Audioutdoor data is the primary independent currency used by the vast majority of Italian agencies and media centres. In early 2025, MediaTelling was established as a joint initiative across Italy's five official audience measurement bodies (Auditel for TV, Audioutdoor for OOH, Audiradio for radio, Audicom for press/web, and Audimovie for cinema), with dedicated working groups and task forces. Audioutdoor is fully engaged in MediaTelling and as of 2026 is actively collaborating with the other bodies to support the development of a cross-media measurement network.

3.11 Market Analysis – Korea, PODO

Summary

PODO, founded in November 2019, was the first company in Korea to provide standardised audience measurement data for Digital Out-of-Home (DOOH) media. Its measurement model is certified as the industry standard for OOH advertising by the Korea Outdoor Advertising Association. Since February 2024, PODO has played a central role in the OOH Audience Measurement Alliance, the first JIC in Korea, formed under the Korea OOH Advertising Center (Ministry of the Administration and Safety) with approximately 35 participating OOH media, agencies and data providers. PODO currently covers an estimated 30–35% of traded OOH inventory in Korea.

Scope of Measurement

- Large-format digital billboards (~250 screens)
- Static billboards (~50 screens)
- Bus stops/street furniture (~1,000 screens)
- Mall environments (blended with Wi-Fi captured data)

Total: over 1,300 screens nationwide, covering 4 media owner companies. Metrics are national.

Inventory Characteristics

PODO captures and periodically updates: media owner name, address, screen description, dimensions, number of screens, digital status, orientation and pixel data. The database is managed internally by PODO's data team. Methodology and data integrity are certified by the Korea Outdoor Advertising Association. GIS services from both Korean and foreign providers are used for mapping. For indoor/mall environments, inventory is mapped by blending Wi-Fi signal data with the core mobility model to define precise indoor visibility zones.

Population / Volume / OTS

PODO calculates available audience by extrapolating statistical location data from over 13 million SK Planet subscribers to represent the total population. Audience volumes are derived directly from mobility modelling within predefined visibility zones using SK Planet's GPS and SK Telecom's network signalling. Publicly available transit authority ridership data (bus and subway boarding/alighting statistics) is incorporated.

Rigorous quality control cross-references PODO's proprietary data to identify and rectify data redundancies or over-counting in raw datasets. Weights based on official government census data are applied to ensure data representativeness.

Visibility Adjustment

Visibility factors are assigned to each media unit based on unique characteristics: size, location, direction, obstacles and visual clarity. The

primary output metric is Impressions (Realistic OTS), determined by analysing whether a person is moving towards the screen and calculating their specific dwell time within the predefined visibility zone.

Mobility Data

Multi-sourced location data including SK Planet's GPS-based tracking and SK Telecom's network-level base station signalling, covering over 13 million subscribers. Data is processed in real-time with a 3-day latency to ensure accuracy and thorough data cleaning. SK Planet extrapolates subscriber data to calculate floating population figures on a national scale using a proven statistical expansion framework.

Audience Segments

Age, gender and income segments derived from verified SK subscriber information.

DOOH Measurement

PODO's proprietary model integrates total ad rotations, individual ad lengths and average audience dwell time within the visibility zone. Data is available at hourly granularity. Since raw data is captured in real time, audience volumes naturally reflect current conditions without secondary contemporising adjustments. Data for all units is updated daily internally; formal client releases are provided monthly.

Trading Metrics

Reach, Frequency, OTS, ROTS for all trading. Aggregated audience metrics rather than real-time spot-level programmatic data at this stage.

Data Delivery

Audience metrics are accessible via PODO's proprietary platform, with customised data exports and reports provided to advertisers, agencies and media owners. Data is currently available exclusively through PODO's own infrastructure. Platform partners include Peron, Vistar Media, Google DV360 and Naver.

Governance and Funding

PODO is an independent corporate entity with executive management making all strategic decisions. Technical oversight is managed by PODO's internal tech team in collaboration with SK Planet's data science team. PODO is 100% self-funded through private capital, maintaining financial independence from specific media owners or buyers.

Data and Research Partners

Data supplier: SK Planet. Modelling and platform: internal.

Cross-Media Measurement

PODO is actively collaborating with terrestrial broadcast sales houses and leading digital ad platforms to develop standardised cross-media measurement methodologies.

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3.12 Market Analysis – Netherlands, BRO Next

Summary

BRO Next is the Dutch OOH audience measurement study. It has been in market since April 2024, succeeding the former OOH study BRO. BRO Next has been established in a way that allows for further innovation, so it can adjust to market changes and new types of inventory. It includes inventory for twelve different media owners and covers all types of faces: from bus stops to trams, from A0 to billboard, and from traditional to digital faces. BRO Next has been fully accepted as the market standard by all affiliated media owners, with all pricing based on BRO Next market standards from January 2026.

BRO Next is an integral part of the NMO Cross-media dataset that is now being developed. NMO Cross-media is based on five NMO datasets: viewing, reading, listening, online and OOH – forming a comprehensive cross-media measurement.

1. Scope of Measurement

Environments and Formats Covered

- Roadside (all formats from A0 to billboard)
- Indoor environments: airports, train stations, metro stations, gas stations, shopping malls, parking garages, supermarket entrances, and shopping facades
- Moving objects: trams and buses (exterior)
- All formats and sizes – traditional frames, scrollers and digital frames

Media Owners and Volume of Frames

- All 12 members of Outreach (the OOH industry organisation) included in BRO Next
- Over 72,000 faces included, situated across the Netherlands; inventory is still growing
- Geography: fully national
- Represents the vast majority of the Dutch OOH market (proportion of traded inventory not formally monitored)

2. Inventory Characteristics – How Measured and Stored

All inventory details are submitted by media owners into an inventory

management system. All information is accessible to NMO (the JIC), but not visible between competing media owners. Data is checked after submission by the research partner. One inventory image per face is published in the inventory delivery system, alongside categorised data on size and exact location.

- Mapping: Google Maps used for outdoor inventory display; indoor locations digitised on provided maps
- Indoor environments: maps are only visible within the inventory management system, not in the public inventory delivery system
- Indoor inventory is mapped within the models

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

All audience volumes are modelled in ‘het Mobiliteitsspectrum’ (the Mobility Spectrum model) for four different modalities: pedestrians, cyclists, public transport and motorised vehicles. The fully calibrated model combines both indoor and outdoor locations. It is based on over 30 public sources (including government sources) and is updated annually. It uses HERE, OSM, cycling networks and digitisations of indoor locations to assign volumes.

Volumes are then combined with GPS data from the Netherlands Verplaatsingspanel (NVP) to combine total volumes with background demographic variables. The NVP is an ongoing app-based study providing a yearly updated dataset of approximately 20,000 respondents, each tracked for at least two weeks.

On metro and train platforms, the model allows for waiting time before passengers board. Waiting times are based on NVP GPS data. On-site eye-tracking studies for train and metro platforms confirmed a linear build-up of contacts and validating the inclusion of waiting time in the model.

3.1 External Counts Used in Calculating Audience Volumes

- Over 30 government and public sources form the basis of the Mobiliteitsspectrum model
- Calibration data provided via media owners: includes registry data, public transport card scan counts, and shopping centre counts
- Every external source is approved by the NMO Kamer Buiten and subject to a sanity check by the research partner
- Registry data is calibrated to reflect visitor numbers where necessary

3.2 Temporal Variability in Volume Data

- The smallest time unit available is one hour; hourly data differs for each hour of the year and is available for digital faces

- Traditional and scroller data is available per week (a week can start on any day of the year)
- Basis for BRO Next is an average weekday; volumes are then assigned to specific hours, days and weeks of the year using activity-based factors
- Pedestrian factors derived from the government source Onderweg in Nederland (ODiN) and NVP app-data; other modality factors derived from total volumes

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Two market standards are available in BRO Next: (D)ROTS and (D)VAC. ROTS (Realistic Opportunity to See) is adjusted for share of time or spot/loop combination for digital frames to produce DROTS. VAC (Visibility Adjusted Contact) is derived from (D)ROTS by applying a standardised visibility adjustment following the Route (UK) standard. For digital frames, a digital attractiveness factor of 1.1 is additionally applied to produce DVAC. Illumination, operating hours and daylight hours are included in all calculations.

- Output metrics: (D)ROTS, (D)VAC, contact frequency, absolute reach, reach per target group, GRPs – at national and regional level

4.1 What Constitutes a Contact/Impact/Delivered Impression

In the Dutch market, a (D)ROTS represents the opportunity to see a face. A (D)VAC constitutes a contact. (D)VAC is split into contact frequency and absolute reach.

5. Audience Measurement – Reach and Mobility

BRO Next combines volumes from the Mobiliteitsspectrum model with app-based GPS measurements from the Nederlands Verplaatsingspanel (NVP) for demographic profiling. The NVP provides a yearly updated dataset of approximately 20,000 respondents, each tracked for at least two weeks.

5.1 Representativity and Data Quality

- Sample weighted using standardised population targets applied across all NMO studies (viewing, listening, reading, online)
- All mobility behaviour for 13–15 year-olds is modelled due to privacy constraints relating to GPS data collection
- Additional modelled respondents added for ages up to 34 to account for low participation rates among young people in the NVP

5.2 Data Privacy and Compliance

Privacy regulations reviewed by the NMO privacy officer in consultation with external privacy experts

Privacy requirements are an integral part of legal agreements between NMO and research partners, and govern all data exchange between partners

5.3 Audience Segmentation

BRO Next provides all audience segments available in the other NMO studies. Segments directly observed in the panel include age, gender and household composition. All additional segments are fused into the dataset using the Doelgroepmonitor (DGM) – part of the large-scale NMO readership study based on 17,000 respondents annually. Media owners and media agencies can combine segments in the inventory delivery system to align with their own target group definitions.

6. Output Data and Digital OOH

For all digital frames, DROTS and DVAC are available in BRO Next. This is based on AM4DOOH and constitutes a spot-level ROTS or spot-level VAC. For DVAC, a digital attractiveness factor of 1.1 is included. All DROTS and DVAC data is available at hourly level.

6.1 Temporal Granularity of Output Data

Digital faces: hourly granularity for every hour of the year; all data is spot-level within the inventory delivery system

Traditional frames and scrollers: weekly granularity, can start any day of the week

All hourly digital data is also delivered to media owners for use in automated or programmatic trading systems

6.2 Contemporising Factors

BRO Next does not currently apply contemporising factors.

6.3 Data Release Schedule

One major release per year: full update of volumes, audiences and methodological updates

Three further quarterly updates: new frames and locations may be added, plus smaller or well-defined methodological updates

7. Trading Metrics and Data Delivery

- Market standards: (D)ROTS (potential contacts) and (D)VAC (contacts); GRP, reach and contact frequency also available

- CPM used by some media owners for elements of their inventory
- Digital faces: all data is spot-level in the inventory delivery system; hourly data delivered for a comprehensive selection of spot/loop-length and share-of-time combinations, suitable for automated or programmatic trading

7.1 Delivery Software and User Access

- All data available in an industry-wide inventory delivery system accessible to all media owners and media agencies
- Minimum threshold: n=20 for analogue faces for agency/non-owned inventory; digital faces available per frame without minimum
- APIs available for media owners; development of agency APIs under consideration
- Data can be made available in third-party dashboards or platforms where the media owner provides their own data to clients; no complete third-party-accessible dataset currently exists

8. Organisational Structure

8.1 Governance and Management Structure

BRO Next is part of the Joint Industry Committee (JIC): Nationaal Media Onderzoek (NMO). Each media-specific audience measurement study is overseen by a Kamer (chamber). For OOH, the Kamer includes representatives from Outreach (the OOH industry organisation), PMA (the media agency organisation) and bvA (the advertiser organisation). The overall NMO board has representatives from trade bodies of different media types, the NPO (public broadcaster), PMA and bvA.

8.2 Funding Structure

BRO Next is part of NMO, a JIC funded by its stakeholders

Non-NMO members may access data under separate arrangements

8.3 Data, Research and Platform Partners

Research partner details are subject to change and are being updated at the time of publication; specific partner details are currently confidential pending completion of the transition process.

8.4 Approach to Cross-Media Measurement

BRO Next is an integral part of the NMO Crossmedia dataset, which combines five NMO datasets: viewing, reading, listening, online and OOH. This represents an advanced and comprehensive cross-media framework that provides a strategic planning dataset for the Dutch media landscape.

3.13 Market Analysis – New Zealand, knOOH

Summary

knOOH team - mission and purpose:

knOOH is Aotearoa New Zealand's unified Out-of-Home (OOH) audience measurement and planning platform, introduced to replace the legacy Calibre system and establish a single industry currency for OOH trading. It is owned by the five largest OOH media operators in New Zealand (GO Media, JCDcaux, LUMO, MediaWorks and oOh! Media) and operates in alignment with the Out of Home Media Association Aotearoa (OOHMAA). Collectively, the system represents the vast majority of traded OOH inventory in New Zealand measuring all primary format types nationwide.

The purpose of knOOH is to provide advertisers, agencies and media owners with a unified, transparent and robust measurement framework that supports confident planning, evaluation and trading of OOH media. Its mission is to deliver an accurate, industry-centric and easy-to-use platform, underpinned by a precise and widely accepted methodology.

knOOH's ethos centres on transparency, standardisation, methodological integrity and market unification. It is designed to ensure equitable treatment of inventory across formats, suppliers and regions, and to strengthen confidence in OOH as a measurable and accountable channel.

The underlying data model is developed and maintained by Mortal, an independent analytics and technology partner. The methodology uses a multi-source data approach, blending mobility, traffic and reference datasets to model audience volumes, reach and impressions. The system reports standardised "impressions" as the core trading metric, aligning the New Zealand market to a commonly adopted opportunity-based exposure framework. For Digital Out-of-Home (DOOH), impressions are derived at screen level and allocated to campaigns based on booked share-of-time using an industry-approved formula, ensuring consistency across static and digital environments.

Overall, knOOH exists to provide a stable, future-ready measurement foundation for the New Zealand OOH industry - supporting planning efficiency, improving comparability across formats, and enabling continued evolution of audience measurement practices in line with international standards.

Mortal - approach, ethos and history

Mortal have been developing OOH Audience Measurement Systems in New Zealand for more than 10 years.

Mortal's approach is to leverage multiple datasets and technology types in

a multi-model system, ensuring we are leveraging benefit and mitigating limitations of any particular data type.

The architectural approach ensures high performance of query speeds (reach & frequency results in 1 - 6 seconds). NZ market and ways of working is not aligned to lengthy, queue-based querying of the system

The system is built to be future-proofed against a changing technology and data landscape that will be continually disrupted by legislative change, AI growth, publisher and technology platform evolution.

In a small market, where the industry and media owners have limited internal data capability, part of our mission is to make OOH AMS as simple to understand and execute as possible.

Cost vs benefit is a key consideration in the product development strategy. knOOH needs to be highly credible to engender trust in the wider media marketplace, but does not need to be over-engineered or over-scoped for the market we operate in.

The NZ market is committed to accurate OTS measurement. We do not currently support adjustments for Visibility or an LTS metric.

1. Scope of Measurement

Environments and Formats Covered

- Roadside/Street furniture
- Retail
- Airport
- Transit (Bus, Train, Ferry Station)
- Bus (launching 2026)
- All formats and sizes within the above environments are covered

Media Owners and Volume of Frames

- 11 media owners (and growing). Total frames measured:
- Airport: 216
- Bus: 15
- Billboard: 1,074
- Retail: 688
- Street Furniture: 3,340
- Transport: 129

Geography and Market Coverage

- Nationwide, with regional audience breakdowns per Functional Urban Area
- Approximately 96% of traded OOH inventory measured (still onboarding a small number of operators)

2. Inventory Characteristics – How Measured and Stored

Media owners upload inventory directly into the knOOH application via a Panel Management system accessible to logged-in admin users. The database is managed by Mortal, with editing and maintenance features made available to media owners.

- Mapping: MapBox used as the basemap layer; agency users can view all OOH inventory on a map-based planning screen
- Indoor environments: location data and floor-level maps required for internal assets
- Auditing: available for review by the industry body (holistic access); competitor media owners cannot view each other's inventory
- Automated and manual location/facing checks are conducted within the Mortal team; further auditing capability is under development

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

knOOH uses a multi-source data approach, blending mobility, traffic and reference datasets to model audience volumes. In summary, Mobile SDK data (properly balanced to remove inherent volumetric variances and demographic skews) provides an audience distribution when blended with traffic data. Telco data (covering a high proportion of the base population, though less spatially precise) provides a useful scaling mechanism alongside population demographics and survey information.

Volumes are derived based on the OTS methodology, including a share-of-time adjustment for digital screens. No upweighting for digital attraction or supplementary neurological impact factors is applied.

3.1 External Counts Used in Calculating Audience Volumes

- Publicly available counts: vehicular count data from NZTA (RAMM data) and regional transport hub/travel statistics
- Commercial suppliers: Qrious, Lifesight, Statistics NZ
- Physical hardware-derived counts (traffic sensors, venue counters) leveraged where available

- Media owner or landowner count data: not currently used directly, though future enhancements may leverage venue data
- No formal quality weighting applied to counts at this stage

3.2 Temporal Variability in Volume Data

- Model is seasonal, with raw data inputs providing high temporal granularity
- Weekly and monthly planning is standard; daily planning available for some formats
- Hourly impression multiplier data available via download for use in pDOOH systems

4. Visibility Adjustment – Relative Impact of Different Inventory Types

knOOH does not apply a formal Visibility Adjustment. The OTS metric may be considered equivalent to ROTS given the specific viewing corridors applied and the share-of-time adjustment made for digital scores.

4.1 What Constitutes a Contact/Impact/Delivered Impression

Output metrics include: Reach (number of unique people exposed to a campaign); Frequency (average number of times each person is exposed); and Impressions (the number of times an ad is exposed to its audience). For digital panels, impressions are based on a standardised 15% share of time. DOOH audiences leverage the Impression Multiplier, calculated as: hourly audience contacts at screen × ad exposure per dwell time / ad slots per screen per hour.

5. Audience Measurement – Reach and Mobility

Mortal operates an in-house system blending multiple types of mobility data in a proprietary set of models. Data inputs include SDK and Telco data from partners, live and static traffic APIs (capturing vehicular volumes, speed and direction), in-car GPS APIs, published transit statistics, and survey data.

5.1 Representativity and Data Quality

- Various validation and scaling techniques ensure data is representative of population volumes
- Deduplication models leveraging multiple raw data inputs ensure reported Reach figures are unique
- Very high raw data volumes in general limit the need to extrapolate or synthesise data artificially

5.2 Data Privacy and Compliance

- International data partners compliant with major regulations including GDPR and CCPA
- Compliant with New Zealand Privacy Legislation; monitoring privacy law changes coming into effect in 2026

5.3 Audience Segmentation

- Age, gender, and home region (origin of traveller)
- Derived by matching device data with population demographics

6. Output Data and Digital OOH

knOOH utilises a proprietary approach incorporating standardised viewing corridors driven by vision science, audience dwell time, and ad play length to provide a share-of-time adjustment to DOOH audience scores. This leverages the IAB-approved probabilistic Impression Multiplier formula to generate standardised reach and impression metrics.

6.1 Temporal Granularity of Output Data

- In the planning interface: campaign level (minimum 1 day)
- As an export: hourly impression multiplier data available per media owner
- Direct API integration to pDOOH systems is a roadmap enhancement

6.2 Contemporising Factors

While knOOH is fundamentally a forecast model, the underlying methodology is deeply rooted in contemporised data. A multi-model approach continuously ingests recent, high-quality reference data (aggregated mobile SDK/MAID data, telecommunications data, live and static traffic APIs, and published regional transit statistics) to refine seasonal baseline models. These inputs influence both Impressions (total exposure volumes) and Reach (unique mobility profiles). A planned quarterly release schedule is in place; delivering Post-Campaign Actuals is a near-term product roadmap priority.

6.3 Data Release Schedule

- Panel changes: weekly cycle; some changes can be self-managed by media owners
- Full audience model: planned quarterly refresh

7. Trading Metrics and Data Delivery

- Core trading metrics: OTS Reach and Impressions

- knOOH is not a trading platform and does not provide CPM metrics at this time
- Spot-level metrics for programmatic trading: available via downloadable file per media owner; direct API integration to pDOOH systems is a roadmap item

7.1 Delivery Software and User Access

- Online planning interface available to media owners and agency users
- Not directly integrated with third-party platforms; media owners may upload impression data into DSPs/SSPs independently

8. Organisational Structure

8.1 Governance and Management Structure

The operating board for the knOOH platform – Calibre Audience Measurement Limited (CAML) – is a limited liability company with 11 directors. Shareholders are oOh! Media, JCDcaux, MediaWorks, GO Media and Lumo, each with an equal share represented by two directors. The board is led by independent chair Paul Maher from OOHMAA. Media owners are represented on the Technical Committee; media buyers and brands are represented via the Outdoor Futures Council (the OFC represents large and small agencies and large OOH advertisers).

8.2 Funding Structure

- Media owner funded in current state

8.3 Data, Research and Platform Partners

- Data partners: Qrious, Lifesight, Statistics NZ (census/population demographics)
- Modelling, processing, dashboard and platform: Mortal (independent analytics and technology partner)
- Industry research engagement planned once the knOOH launch is fully embedded

8.4 Approach to Cross-Media Measurement

Not directly and not at industry level. No formal cross-media measurement initiative is currently in place.

3.14 Market Analysis – Norway and the Baltics Estonia, Latvia, Lithuania, Outdoor Impact

Summary

All markets have used OOH audience measurement broadly in line with the WOO global guidelines since the early 2000s. The first project was based on Simon Cooper's work on panel classification, inventory management (PSS) and the delivery system (CAFAS). Following Mr Cooper's retirement, the Norwegian JIC issued an RFI and RFP and appointed Ipsos to deliver the next generation of measurement. A parallel approach was developed for the smaller Baltic markets.

The main purpose is to trade on credible audience data that defines the industry's currency. The market requires greater granularity, more environments, better interregional commuting data, and hourly data. Audience metrics cover Norway separately from the three Baltic states of Estonia, Latvia and Lithuania.

PART A – NORWAY

1. Scope of Measurement – Norway

Environments and Formats Covered

- Roadside
- Malls
- Rail (stations)
- Metro (stations)
- Buses/trams (exterior)
- Formats: 2m², 6m², 8m² (classic); 1.5m²–8m² (bus/tram exterior); all DOOH screen sizes from 50-inch LCD to 70m² LED

Media Owners and Coverage

- Media owners: JCDecaux, Bauer Outdoor, Ocean Outdoor
- Total frames: approximately 15,000 (Roadside 11,400 / Malls 2,000 / Metro 700 / Rail 900)
- Geography: national
- Approximately 80–90% of traded inventory covered

2. Inventory Characteristics – Norway

- Inventory metadata captured by media owners and audited and classified by Ipsos
- Mapping: HERE Maps and Google Maps, plus digitised maps of every indoor location (malls, stations etc.)
- All indoor inventory is mapped within the model

3. Population/Volume/OTS – Norway

A Traffic Intensity Model (TIM) is built using a large number of data sources, providing volumes by link, mode of transportation, time of day, and day of year for all environments.

3.1 External Counts Used in Calculating Audience Volumes

- Publicly available governmental counts and transit authority counts
- Radars and Bluetooth-sniffers deployed for physical counting
- Various commercial count sources used to determine dwell time
- Media owner and mall operator count data
- Different calibration/weighting approaches applied to available counts

3.2 Temporal Variability in Volume Data

- Most external counts include seasonality down to hourly level
- Hourly data available for 365 days per year

4. Visibility Adjustment – Norway

- Output data includes both ROTS (Realistic Opportunity to See) and VAC (Visually Adjusted Contact)
- AM4DOOH applied for digital screens

4.1 What Constitutes a Contact/Impact/Delivered Impression

A VAC (Visually Adjusted Contact) or Viewed Impression. Data is available at spot and hourly level for DOOH.

5. Audience Measurement – Norway

- Travel survey: 2,000 respondents combined with an Activity-Based Model (ABM) with 500,000 synthetic agents
- Data capture: interviews, apps and tracking devices

5.1 Representativity and Data Quality

- Representativity secured within individual regions for gender and age
- ABM model used to scale and expand observed mobility

5.2 Data Privacy and Compliance

All relevant GDPR and data privacy regulations respected and signed off by Ipsos

5.3 Audience Segmentation

- Audience segments correspond to typical Norwegian media standards: Age, Gender, Income, Education, Professional activity, Household
- Segments determined by Ipsos

6. Output Data and Digital OOH – Norway

- AM4DOOH applied
- Granularity: per spot/hour

6.2 Contemporising Factors

Not currently applicable.

6.3 Data Release Schedule

- Frame updates: every 6 months (transitioning to dynamic/instant from H1 2026)
- Volume/audience updates: every 6 months

7. Trading Metrics and Data Delivery – Norway

- Same metrics across all business models: VAC or Viewed Impressions
- Spot-level metrics supplied to media owners and SSPs
- Delivery platform: Ipsos IDS (Inventory Delivery System); data available via API to third-party platforms

8. Organisational Structure – Norway

8.1 Governance and Management Structure

The project is owned by Outdoor Media AS – a limited liability company 50/50 owned by JCDecaux and Bauer. The board consists of two media owner representatives, one representative appointed by the media agency association, and one from the advertisers' association. The technical oversight committee consists of media owners, media agencies and

advertisers.

8.2 Funding Structure

- 100% funded by media owners

8.3 Data, Research and Platform Partners

- All data collection, research, modelling and platform delivery outsourced to Ipsos

8.4 Approach to Cross-Media Measurement

Not currently in use. Several attempts have been made but nothing has gone live so far.

PART B – THE BALTICS (Estonia, Latvia, Lithuania)

1. Scope of Measurement – Baltics

Environments and Formats Covered

Roadside only

Formats: 2m², 9m², 18m², 40m², 110m², 163m², 205.2m² (classic); DOOH: 75", 84", 86" LCD (~2m²), 58m² and 60m² LED

Media owner: JCDecaux (Latvia, Lithuania, Estonia)

Volume of Frames/Locations

Total frames: 7,022

Coverage: national, with city-specific data for largest cities where JCDecaux owns furniture

Approximately 61% of traded inventory (51% Estonia / 57% Lithuania / 74% Latvia)

2. Inventory Characteristics – Baltics

- Metadata captured by media owners and audited/classified by Ipsos
- Mapping: HERE Maps and Google Maps
- No indoor/place-based inventory currently measured

3. Population/Volume/OTS – Baltics

A Traffic Intensity Model (TIM) is built using a large number of data sources, providing volumes by link, mode, time of day, and day of year.

3.1 External Counts Used

- Publicly available governmental counts and transit authority counts
- Radars, WiFi sensors, and telecom data (in Estonia)
- Media owner count data
- Ipsos applies different calibrations/weighting on available counts

3.2 Temporal Variability

- External counts include seasonality down to hourly level
- Hourly data for 365 days per year

4. Visibility Adjustment – Baltics

- Output data includes ROTS and VAC
- AM4DOOH applied for digital screens; data available per spot/hour

4.1 What Constitutes a Contact/Impact/Delivered Impression

VAC or Viewed Impression.

5. Audience Measurement – Baltics

- Travel survey: 6,651 respondents
- Data capture: interviews and apps
- Representativity secured within individual regions

5.2 Data Privacy and Compliance

- All relevant GDPR and data privacy regulations respected and signed off by Ipsos

5.3 Audience Segmentation

- Age (15–75, splits by 10 years), Gender (male, female, other), Household income levels (>€1,000–<€5,000, splits by €1,000), and reach in specific territories

6. Output Data and Digital OOH – Baltics

6.3 Data Release Schedule

- Frame updates: every 6 months (transitioning to dynamic/instant from H1 2026)

- Volume/audience updates: annually

7. Trading Metrics and Data Delivery – Baltics

- VAC or Viewed Impressions across all business models
- Spot-level metrics to be supplied to media owners and SSPs from H2 2026
- Delivery: Ipsos IDS platform; API available to third-party platforms (no current third-party live connections)

8. Organisational Structure – Baltics

8.1 Governance and Management Structure

The project is owned by JCDecaux Latvia, JCDecaux Lithuania, and JCDecaux Estonia. Technical oversight committee consists of media owners, media agencies and advertisers.

8.2 Funding Structure

100% funded by media owners

8.3 Data, Research and Platform Partners

- All data collection, research, modelling and platform delivery outsourced to Ipsos
- Travel Habit Survey partner: NielsenIQ

8.4 Approach to Cross-Media Measurement

Not currently in use. Several attempts have been made but nothing has gone live so far.

3.15 Market Analysis – Poland, Outdoor Track

Summary

The Outdoor Track project was established to introduce a unified measurement standard for Out of Home advertising in Poland. The methodology is based on the licensed ROUTE system (UK), representing the latest generation of the POSTAR methodology, adapted to Polish market conditions. Outdoor Track integrates three core components: Traffic Intensity Measurement, a Travel Survey based on GPS mobility tracking, and an Inventory Management System (IMS). The study design ensures compatibility with international OOH audience measurement standards.

1. Scope of Measurement

Environments and Formats Covered

- Roadside and car parks
- Formats: billboards, backlights, frontlights, citylights, citylight scrolls

Media Owners and Volume of Frames

- Media owners: AMS and Stroer
- 25,830 frames measured
- Geography: 10 major Polish agglomerations – Warsaw, Krakow, Wroclaw, Poznan, Lodz, Lublin, Szczecin, Bydgoszcz, Trojmiasto, Silesia
- Approximately 60–65% of traded OOH inventory covered

2. Inventory Characteristics – How Measured and Stored

- Panel data provided by media owners
- Database managed by IBO (the measurement body)
- Mapping: HERE Technologies and Google Maps
- No indoor/place-based inventory currently measured

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

Outdoor Track measures audience volumes through a three-component system. Traffic Intensity Data (BIT) is supplied by Biuro Inzynierii Transportu. The Ipsos (MGE) Data Traffic Intensity Model (TIM) extrapolates BIT

measurements to all links in the agglomeration, assigns traffic flows to individual frames, and applies adjustments for visibility, angle of vision and duration of passage.

3.1 External Counts Used in Calculating Audience Volumes

- Publicly available governmental counts: national road authority statistics from GDDKiA (Generalna Dyrekcja Drog Krajowych i Autostrad) and municipal statistics
- Traffic modelling supplied by Biuro Inżynierii Transportu (BIT)
- No camera, sensor or radar count technologies deployed directly
- No media owner, retailer or landowner count data used

3.2 Temporal Variability in Volume Data

The integration process (Conforming) ensures: TS totals preserved at stratum level; TIM provides proportional distribution at frame level; sampling weights applied; Visibility Adjustment (VA) applied; Conforming Factor (CF) applied.

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility Adjustment (VA) is applied at contact level. The Conforming process integrates TS totals, TIM distribution, sampling weights, VA and a Conforming Factor.

4.1 What Constitutes a Contact/Impact/Delivered Impression

A contact is defined as a visibility-adjusted Opportunity To See ($OTS \times VAI$), weighted and conformed to align TS totals with TIM distribution.

5. Audience Measurement – Reach and Mobility

Outdoor Track uses a passive, behaviour-based mobility measurement system integrated with traffic modelling and reach and frequency modelling. The Travel Survey uses random route sampling, covers the population aged 15–65, includes approximately 5,000 respondents in total, and tracks respondents for 14 or 28 consecutive days using dedicated GPS devices (MOBITEST). The survey collects respondent-by-frame contact data.

5.1 Representativity and Data Quality

- Random route sampling methodology
- Stratified sampling by agglomeration
- Sampling weights applied at respondent level
- Population expansion via weighting

- Scaling includes: sampling weights, Visibility Adjustment (VA), and Conforming Factors (CF)

5.2 Data Privacy and Compliance

Not detailed in submission.

5.3 Audience Segmentation

- Age and gender segments available, derived from Travel Survey data

6. Output Data and Digital OOH

DOOH measurement is not currently applicable within Outdoor Track's scope.

6.2 Contemporising Factors

Not currently applicable.

6.3 Data Release Schedule

- Data released 1–2 times per year (both new/removed units and full volume/audience updates)

7. Trading Metrics and Data Delivery

- Trading metrics: visibility-adjusted OTS contacts, reach and frequency, GRP
- No spot-level metrics for automated or programmatic trading currently supplied
- End user access: via the OOH IDS platform at <https://www.oohids.com/idspl/Login.aspx>

8. Organisational Structure

8.1 Governance and Management Structure

IBO (the measurement body) is owned by media owners: AMS S.A. and Stroer Polska Sp. z o.o. Technical oversight is managed by media owners.

8.2 Funding Structure

- Media owner funded

8.3 Data, Research and Platform Partners

- Data suppliers: Biuro Inżynierii Transportu (BIT), HERE Technologies, GDDKiA (official road traffic statistics)
- Research suppliers: Ipsos, Millward Brown

- Methodological framework: ROUTE (adapted to Poland); modelling: MGE Data (currently part of Ipsos)
- Dashboard/platform: MGE Data (currently part of Ipsos)

8.4 Approach to Cross-Media Measurement

Cross-media measurement discussions are at a very early stage in the Polish market.

3.16 Market Analysis – Romania, BRAT / SAO

Summary

BRAT, founded in 1998, is Romania's Joint Industry Committee (JIC) for media measurement and advertising transparency, with around 150 members including media agencies, media owners and advertisers. BRAT provides industry standards for OOH, online and print media, as well as consumer data, ad investment monitoring and other projects supporting market transparency and accountability.

Romania's OOH audience measurement system is delivered by BRAT through SAO (Studiul de Audienta Outdoor) – the official Joint Industry Currency for the Romanian OOH market. SAO was developed to provide the market with an objective, transparent and professionally governed measurement for static and digital OOH panels, using internationally recognised principles adapted to local conditions. SAO combines a large-scale mobility survey, satellite-based traffic modelling, continuous inventory mapping and panel-level visibility analysis.

1. Scope of Measurement

Environments and Formats Covered

- Outdoor street-level advertising panels only (static and digital); does not currently include subway, rail, airport, mall or other indoor/place-based environments
- Formats: billboard, backlit, citylight, rooftop, mesh and digital formats; metrics produced at individual panel level

Media Owners and Volume of Frames

- 12 OOH media owners participating
- Approximately 10,000 static frames and approximately 300 digital panels
- Geography: 19 cities – Bucharest and all Romanian cities with more than 100,000 inhabitants; 8 largest cities include metropolitan areas
- Universe: approximately 4.8 million people (over 60% of Romania's urban population)
- Approximately 70–75% of traded OOH inventory covered

2. Inventory Characteristics – How Measured and Stored

Inventory metadata is collected from media owners and verified in the field by BRAT through a continuous inventory audit process. Main attributes

collected and audited: GPS coordinates, format, size, height, elevation, orientation, illumination. Field data is collected via an in-house application developed by BRAT, integrated directly into the inventory software used for ad monitoring, audience measurement and planning.

- Database managed by BRAT
- Independently verified by BRAT after collection from media owner; any discrepancies reviewed jointly, with second/third field checks where necessary
- Mapping: dedicated mapping layer based on GPS coordinates; visualised through Google Maps and OpenStreetMap interfaces
- Indoor/place-based inventory: not applicable at this stage

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

SAO uses a mobility-based modelling approach. Journeys reported in the travel survey are modelled and expanded using independently sourced satellite traffic data to generate weekly average traffic flows consistent with observed traffic intensity. These modelled flows are linked to each panel's visibility area and adjusted by direction of travel, speed, passage time, transport mode, obstacles, road structure and lighting conditions.

3.1 External Counts Used in Calculating Audience Volumes

- No external governmental, transit or count technology data used for audience volume estimation
- Satellite-based traffic data from DigitalGlobe/Maxar (used by CUENDE Infometrics) is the sole external volume input, used to calibrate and model traffic intensity across measured cities
- No media owner, retailer or landowner count data used

3.2 Temporal Variability in Volume Data

- Model based on an average week over the year, with variation by day of week and time of day in case of digital panels
- Satellite imagery taken across a full year to account for observed traffic intensity variations
- No additional contemporising factors applied; modelling accounts for seasonal patterns through the full-year satellite imagery

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is built into the SAO methodology through panel-level

visibility analysis and contact probability modelling. Factors considered: visibility area, direction of travel, obstacles, travel speed/time, lighting conditions, transport mode and road configuration. The main output metrics are audience/reach (unique people with OTS), impacts/contacts, GRP, target GRP and affinity. These visibility and contact conditions are embedded within the delivered audience metrics rather than published as separate labelled metrics (OTS/ROTS/LTS/VAC).

4.1 What Constitutes a Contact/Impact/Delivered Impression

A contact or impact represents one valid exposure opportunity generated when a person passes through the panel's visibility area in a viewing direction, under adequate lighting and without visibility obstacles. For digital panels, a contact additionally requires the overlap between the passage through the visibility area and the spot duration to exceed 2 seconds. Reach/audience = unique people with at least one such opportunity per average week. GRP = total contacts as % of the universe; TRP = same for a defined target group.

5. Audience Measurement – Reach and Mobility

SAO is based primarily on a large-scale travel survey, supported by traffic modelling using independent satellite-based traffic data. Mobility data is captured through continuous face-to-face CAPI interviews at respondents' homes, collecting detailed trip information: origin and destination coordinates, departure/arrival time, trip purpose, frequency and transport mode. Interviews are conducted continuously throughout the year, every day without interruption.

5.1 Representativity and Data Quality

- Multistage, stratified, random probability sample allocated independently for each measured cities,
- Fieldwork evenly distributed across weekdays and weekends
- Weighted using official population statistics (gender, age, city size, weekday/weekend)
- Fieldwork by specialised market research companies contracted by the JIC and continuous verified by the JIC according to the quality standards agreed by the industry. Survey journeys used as the basis, then scaled through modelling with independent satellite-based traffic data.

5.2 Data Privacy and Compliance

- GDPR compliant and all applicable Romanian and EU data protection legislation; data processing agreements signed with all research suppliers;
- Contractual obligations covering data ownership&right of usage,

confidentiality, security, staff training, incident notification, sub-processing restrictions, retention/deletion of the research info, and BRAT's right to perform current continuous verifications and to contract external audit

5.3 Audience Segmentation

Broad range of socio-demographic and behavioural segments available:

- Demographics: gender, age, city, city size, education, occupation, household income, household size
- Mobility: travel habits, mode of transport, frequency, journey purpose, average daily time outside home
- Media consumption: TV, radio, internet, print, cinema (including exposure time and frequency)
- Internet/online behaviour: access and usage patterns
- Consumer behaviour: goods/services consumption, household expenditure by category, household equipment, purchase intentions, travel behaviour
- All information derived from direct respondent interview

6. Output Data and Digital OOH

SAO uses a visibility model developed by Cuende, incorporating the principles used by the visibility model developed by Route, adjusted for the DOOH with findings of the AM4DOOH research for DOOH measurement. Specific adjustments are applied for spot duration, loop configuration and digital visibility effects including attraction factors. DOOH is integrated within the main audience system, not treated as a completely separate model.

6.1 Temporal Granularity of Output Data

- Static panels: minimum time period is one week
- Digital panels: impressions available by hour, day and week; reach by week
- Digital panel contacts account for specific spot duration and loop length of each unit

6.2 Contemporising Factors

Not applicable. No sensors, weather feeds, MAIDs or other live inputs are used as contemporising factors.

6.3 Data Release Schedule

- Full audience data release: annually

- Inventory updates: monthly (new frames added; removed frames retained in database for 6 months after being removed from the field)
- Annual audience model refresh: oldest wave of mobility data removed, newest wave added; satellite-based traffic inputs updated with most recent imagery

7. Trading Metrics and Data Delivery

- Main trading/planning metrics: Contacts/Impressions, Reach, Frequency, OTS, VAC, GRPs/TRPs
- Direct trading: VAC, OTS, Reach, Frequency; DOOH workflows also use granular delivery measures by spot or hour
- Programmatic/automated trading: data supplied to media owners via static CSV files for digital panels

7.1 Delivery Software and User Access

- Quantum platform (Cuende): core planning, inventory management and analysis tool for SAO results; industry-wide access
- Digital panel data also supplied in static file format for automated/programmatic use
- Audience metrics for ad campaigns available in the ad investment platform (GRP/TRP level)
- High-level aggregated results publicly available on the BRAT website
- CHAT OOH – RO (AI-based interface, developed with Cuende): under development
- Audience metrics integrated into media owner internal tools (inventory/sales) and agency tools (campaign tracking)

8. Organisational Structure

8.1 Governance and Management Structure

BRAT is a multimedia tripartite organisation, acting as a Joint Industry Committee for each of the 3 media represented: OOH, online and print. For each media type, including OOH, BRAT has its own governance: General Assembly and Technical Committee, including representation in the BRAT's Board of Directors (together with the representatives of the other media projects). The OOH General Assembly includes OOH companies, agencies and advertisers and is responsible for the main activities related to the SAO study: decide the methodological design, select and contract the research suppliers, overview the research activities, agrees on the current verifications, decide the external audit, decide the result publication&usage rules, decide the budget and financing model. Voting in the General

Assembly: OOH companies/sales houses - 50% for the total, agencies/advertisers - 50% of the total.

The Technical Committee is comprised of representatives of media agency/advertiser and OOH company/sales house and supervises the implementation of the supplier contracts, methodology and technical procedures.

The management is comprised of the General Manager of BRAT and the Project Director.

8.2 Funding Structure

- Shared cost model: the total cost of the project is jointly shared by the sell-side (media owners) and the buy-side (agencies and advertisers)
- Each category's share allocated based on size/relevance and use of the data;

8.3 Data, Research and Platform Partners

- Official statistical data: National Institute of Statistics (weighting/calibration)
- Satellite-based traffic data: DigitalGlobe/Maxar via CUENDE Infometrics
- Mobility study fieldwork: Data Dive CSOP, iSense Solutions, AskPeople
- Modelling, processing, platform (Quantum) and AI interface (CHAT OOH-RO): CUENDE Infometrics

8.4 Approach to Cross-Media Measurement

The Romanian market is already moving in this direction. BRAT does not currently provide a fully integrated cross-media planning tool, but agencies use in-house multimedia systems that integrate BRAT OOH data with other media datasets for cross-media planning, strategy and evaluation.

3.17 Market Analysis – South Africa, ROAD (Out of Home Measurement Council)

Summary

The Out of Home Measurement Council (OMC), a Joint Industry Council, was established in early 2015 in accordance with international best practices. The OMC represents an increasing number of OOH media owners and is dedicated to developing an out-of-home currency – known as ROAD – that enhances the credibility and standing of the OOH industry in South Africa. The OMC's vision is to deliver comprehensive, inclusive and representative research encompassing all sectors of OOH.

The OMC started with four founding members and has expanded to 65 media owners, ranging from small operators with only a few panels to those with more than 2,000. The ROAD methodology is delivered by Ipsos Outdoor and is built on four core components: an Inventory Mapping System (IMS), a Travel Habit Survey, a Traffic Intensity Model (TIM) and an Inventory Delivery System (IDS).

Since the original Version 1.0 guidelines, ROAD has undergone significant development. The travel survey sample has grown to a continuous dataset of 71,000 respondents (2017–2024), representing 28.7 million people. Membership has grown from 4 founding members to 65. The scope has been extended to include taxi rank exteriors, and active work is underway to digitise airport areas. Testing of Ipsos Outdoor MobiComp sensor devices for contemporising is in progress.

1. Scope of Measurement

Environments and Formats Covered

- Roadside: primary scope; static and digital panels across all sizes and formats visible to both pedestrians and vehicles
- Taxi rank exteriors: recently introduced; approximately 162 panels on exterior of taxi ranks (designated areas where minibus taxis gather to pick up and drop off passengers)
- Airports: digitisation of airport areas currently underway
- Future planned extensions: shopping malls, indoor transport nodes, and other indoor environments

Media Owners and Volume of Frames

- 65 media owners, ranging from operators with a few panels to those with more than 2,000
- Approximately 6,300 panels in media planning software: 5,701 static and

599 digital

- All currently roadside, including approximately 162 taxi rank exterior panels

Geography and Market Coverage

- All metropolitan, urban and small urban areas throughout South Africa; communities with populations of at least 8,000 residents
- Estimated total South African OOH market: over 350 media owners with just less than 16 200 billboard faces (static and digital) – source: Outdoor Auditors
- Urban billboards only: -Estimated at around 14 000; OMC currently covers more than 6,300, equating to approximately 46% of urban billboards from its 65 members
- Digital roadside DOOH: Just over 800 frames in South Africa (as at April 2026); OMC covers just under 600, representing approximately 75% of digital roadside billboards

2. Inventory Characteristics – How Measured and Stored

Media owners are responsible for loading their inventory into the IMS (Inventory Mapping System), supplied by research partner Ipsos Outdoor. Every panel must specify: size, coordinates, illumination status, height above ground, orientation, and whether it is digital or static. Optional items include the actual address, media owner site code and rate card price.

- Ipsos Outdoor checks and verifies the accuracy and integrity of each frame before inclusion in the media planning software
- Due to South Africa's Competition Commission regulations, peers are restricted from seeing certain competitor information; the OMC holds full sight and access of all inventory for all members
- Mapping: HERE Maps for data modelling; Google Maps and OSM available as display layers in the IMS; Google Maps used in the IDS for inventory display and points of interest
- Indoor/place-based mapping: not yet implemented but will be required when indoor measurement commences

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

The methodology is based on the HERE digital map, which supplies information regarding traffic regulations, road attributes including road type, speed limits, access limitations, road capacity, and the network topology

required for routing and flow modelling. By integrating travel survey data with this mapping system, the Traffic Intensity Model (TIM) estimates volumes (frequency) across all road links.

In South Africa, traffic volumes are predominantly based on data from the Travel Habit Survey since publicly available external traffic counts or third-party commercial sources are not currently available for integration into the ROAD model. Synthetic traffic modelling and thresholds extend Travel Survey traffic estimates to the entire street network and adjust links where traffic falls below expected capacity. This synthetic modelling is used solely to expand TIM volumes to achieve full road network coverage and is distinct from the agent-based approaches used in other markets to extend sample reach.

3.1 External Counts Used in Calculating Audience Volumes

- Governmental or transit authority counts: unavailable in South Africa at present
- Count technologies: Ipsos Outdoor MobiComp passive sensing devices currently in testing to add an additional layer of volume data; camera monitoring via a third party also under investigation
- Commercial supplier count data: available externally but not yet included in ROAD; several sources under investigation for future use
- Media owner/retailer/landowner count data: not yet provided to or incorporated into ROAD
- MobiComp devices undergo video calibration to evaluate real-world scenarios associated with panels as part of the testing process

3.2 Temporal Variability in Volume Data

- Illumination index: accounts for South Africa's moderate variation in daylight duration
- Traffic index: shows how traffic is distributed across time units; currently each period uses the same annual average due to limited source data
- DOOH: hourly, daily, weekly and monthly data available via the traffic index
- Static panels: smallest reporting period is one week; can be aggregated to any extended period

4. Visibility Adjustment – Relative Impact of Different Inventory Types

4.1 What Constitutes a Contact/Impact/Delivered Impression

Visibility adjustment (VA) is applied to output data. OTS and ROTS data are

used in the calculation process, but only VAC (Visibility Adjusted Contacts) data is shared with members and the market. ROAD defines VAC as an attention-based currency, calibrating audience measurement according to the probability of actual panel exposure rather than a simple opportunity-to-see basis.

5. Audience Measurement – Reach and Mobility

The Travel Survey (TS) is the cornerstone of ROAD's measurement. It captures where people travel to and from, their stops along the way, the means of transport used, and how often they visit each place. The survey is conducted by research partner Ask Afrika via face-to-face interviews covering demographics, origin-destination trips, transport modes, travel frequency and timing. Respondents recall their travel over the previous 7 days. All origins and destinations are geocoded for precise mapping.

The ROAD travel survey comprises a - rolling sample of 71,000 respondents representing 28.7 million people, covering the period from 2017 to 2024. A new 2026 survey wave is currently in field. The reach and frequency model uses data from each travel survey participant, including their survey responses and frame contact information.

5.1 Representativity and Data Quality

- Nationally representative sample of South Africa reflecting the country's diversity
- Multistage Stratified Probability Sampling methodology ensuring the sample is both random and representative
- Synthetic traffic modelling extends Travel Survey traffic estimates to the entire street network and adjusts links with traffic below expected capacity (for volume coverage only, not for sample extension)

5.2 Data Privacy and Compliance

- The OMC does not hold or have access to any identifiable personal information
- Ask Afrika (travel survey fieldwork and processing partner): compliant with the South African Protection of Personal Information Act (POPIA) and GDPR
- Ipsos Outdoor (data processing): fully GDPR compliant

5.3 Audience Segmentation

Audience segments include both demographic and travel information, analysable individually or combined to create specific target markets. Segments available in the IDS media planning software:

- Personal: exact age, gender, population group, marital status, home language, highest completed school education, highest education level, work status

- Economic: household income, personal income, Living Standard Measure (LSM), Socio-Economic Measure (SEM)
- Geographic: provinces, district municipalities, municipalities and area types

In addition, the raw Travel Survey data is available for use with cross-tabulation tools, providing strategic insights into travel behaviour (not cross-referenced with inventory).

All segments are derived from the Travel Survey.

6. Output Data and Digital OOH

The AM4DOOH model is applied to all digital data. By integrating a Spot Plan into the Inventory Delivery System (IDS), spot and loop lengths can be specified on an hourly basis for each day. The highest level of granularity available is spot durations segmented by hour.

6.1 Temporal Granularity of Output Data

- DOOH: hourly granularity via Spot Plan in IDS; spot and loop lengths specified per hour per day
- Static panels: minimum reporting period of one week
- Spot-level metrics available via the Spotplan option in IDS; calculation is adaptable for user-defined spot plans
- Media owners manage spot data and provide metrics to SSPs; Ipsos Outdoor has developed an API for this purpose

6.2 Contemporising Factors

Contemporising factors are not currently incorporated into ROAD data. Testing of Ipsos Outdoor MobiComp devices is underway to determine how this data may be effectively overlaid onto the model. Once the testing phase is completed, results are envisaged to be applied to both volumes (impressions) and audiences (reach). The frequency of application is unknown at this time.

6.3 Data Release Schedule

- Travel Survey data: released annually; all modelling components including HERE Maps geo information updated at the same time
- New/removed units: continuous release protocol via Ipsos Outdoor; integrated into planning software within 24 to 48 hours
- Full frame volume/audience data: updated when the new Travel Survey is released annually

7. Trading Metrics and Data Delivery

- Primary OOH metric: VAC (Visibility Adjusted Contacts)
- Additional metrics: reach, frequency, GRPs and CPTs (Cost Per Thousands) against VACs
- DOOH: additional variables including spot duration, frequency per hour and share of spots within a loop
- Spot-level metrics: available via Spotplan option in IDS; users define customised spot plans

7.1 Delivery Software and User Access

- IDS (Inventory Delivery System): industry-standard planning software; funded by members and provided free of charge to end users (media owners and agencies)
- OOH planning in South Africa is unique in that buyers cherry-pick inventory rather than booking packaged networks; audience metrics are delivered through IDS for independent data analysis
- Future enhancements planned to incorporate accessible dashboards within the software
- Data currently not available in third-party dashboards or platforms
- API available for media owners to supply metrics to SSPs

8. Organisational Structure

8.1 Governance and Management Structure

The OMC is a non-profit company with a Board of Directors, initially represented by the 4 founding members. As the member base grows, additional board members are included. The board approves all monetary spending and investments. Day-to-day running is handled by the General Manager, who reports to the board quarterly. An annual AGM brings all members up to speed with plans for the year ahead.

Voting rights are currently weighted towards the 4 founding members; each member's voting rights are based on the number of panels loaded on the IMS and their monetary investment, and this is reviewed as membership grows.

8.2 Governance Bodies

- Operating board: media owners (4 founding members plus additional members as the organisation grows)
- Technical oversight group: media owners, with Kuper Research as the technical oversight and scrutiny partner
- User Advisory Group: media buyers provide input from time to time on

data, training and other needs as required

8.3 Funding Structure

The OMC is a non-profit organisation relying on media owners to cover all operational, research and software costs for both members and end users. The travel survey is funded by members. Member fees are currently based on each member's percentage share of total inventory at financial year end. The funding structure is currently under review as the current model is not considered sustainable should any members resign.

8.4 Data, Research and Platform Partners

- Travel survey fieldwork and processing: Ask Afrika
- Data processing, traffic modelling, inventory mapping and delivery systems (IMS and IDS), API development: Ipsos Outdoor
- Technical oversight, data scrutiny and training: Kuper Research

8.5 Approach to Cross-Media Measurement

No cross-media measurement is in place at this stage, but the OMC is extremely interested in pursuing this. The ROAD methodology has been designed to meet high media currency standards and is considered a comparable source of information should cross-media measurement tools become available in the South African market in the future.

3.18 Market Analysis – Sweden, Outdoor Impact

Summary

Outdoor Impact is the planning tool for OOH media in Sweden. It is governed by a full tri-party JIC with media owners, agencies and advertisers represented in the committee. The aim is to provide a professional, accurate, neutral and transparent tool for calculating the potential reach and frequency for any campaign using OOH/DOOH media in Sweden. The system currently covers seven media owners and approximately 35,600 permanent units nationally.

A significant development is planned for end of 2026: Outdoor Impact will move to an agent-based model covering every adult person in Sweden, with additional data layers including telecom data.

1. Scope of Measurement

Environments and Formats Covered

- Roadside
- Indoor: shopping centres and public transport stations
- Bus and tram exteriors in the three largest regions
- Discussions ongoing regarding potential addition of airports and interiors of buses and trams
- All commercial sizes can be included in the system

Media Owners and Volume of Frames

- Seven media owners currently in the system
- Approximately 35,600 permanent units: Roadside 25,300 / Shopping centres/retail 3,200 / Metro 5,800 / Stations 1,300
- Bus and tram exteriors in the three main regions also included
- Geography: all of Sweden, analysable in five main regions (Greater Stockholm, Greater Gothenburg, Greater Malmo, Other large cities #4–#20, Rest of the country)
- Coverage: more than 98% of all permanent locations in public areas

2. Inventory Characteristics – How Measured and Stored

- IMS (Inventory Management System): geographical and technical data on

every object tracked

- Responsibility for data rests with Outdoor Impact; technically managed and stored by the research partner/system provider
- Every object audited and available for peer review
- Mapping: both HERE and Google Maps used
- Indoor/place-based inventory required to be mapped in the models

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

The main currency is VAC (Visibility Adjusted Contacts), a likelihood-to-see metric, which can be broken down into reach and frequency for the whole population or by target group. ROTS (Realistic Opportunity to See) data is also available. Volumes are derived from a Traffic Intensity Model (TIM) that integrates multiple data sources, with mobility factors applied via the travel survey.

3.1 External Counts Used in Calculating Audience Volumes

- Traffic counts from Trafikverket (National Traffic Authority) and local councils
- Entries/exits and passenger numbers in public transport
- Visitor counts at retail and public interest locations – independently verified and/or audited
- Derived visitor counts at retail, based on published turnover and average receipt value from independent research (Delfi retail analysis, GfK consumer spend data covering approximately 400 retail operators)
- Own travel survey data based on 7,000 individuals
- HERE maps for modelling traffic distribution
- Sensors used in most traffic counts by external suppliers; investigation underway for calibrating sensors on individual OOH objects
- Data from commercial suppliers (property owners) is audited and/or independently verified; public authority and transport provider data is treated as official and not subject to additional verification
- Hourly variations in traffic for indoor/points of interest based on Google Popular Times

3.2 Temporal Variability in Volume Data

- Annual variations in daylight applied based on six geographical regions
- Seasonal variations in traffic volume applied by region and type of transport, based on traffic data

- Main planning horizon: by week; for DOOH the planning structure is hourly

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Visibility adjustment is applied based on the findings of the AM4DOOH research. The main currency is VAC; reports also include ROTS. For static formats, VAC is the combination of traffic volume (ROTS) and a specific VA factor. For digital formats, a minimum viewable time of 1 second is required while the receiver is within the viewability zone (+/- 60 degrees perpendicular to the surface of the screen).

4.1 What Constitutes a Contact/Impact/Delivered Impression

VAC (Visibility Adjusted Contact) is the market standard. For static: combination of traffic volume (ROTS) and specific VA factor. For digital: minimum viewable time of 1 second within the viewability zone, based on AM4DOOH research.

5. Audience Measurement – Reach and Mobility

Reach and frequency is based on a proprietary travel survey of 7,000 respondents: a combination of 3,000 interview respondents and 4,000 respondents using MST (Multi-Sensor Tracking) devices. This combination of active (interview) and passive (MST device) approaches provides high-quality individual travel data.

By end of 2026, Outdoor Impact will move to an agent-based model covering every adult person in Sweden, incorporating additional data layers such as telecom user data.

5.1 Representativity and Data Quality

- Selection and analysis designed to represent the national population
- Respondents upweighted for the 20 largest urban areas (where the vast majority of OOH objects are located)
- Move to agent-based model by end of 2026 will further enhance representativity and granularity

5.2 Data Privacy and Compliance

- All data records are totally anonymised

5.3 Audience Segmentation

- Parameters include: age, gender, income, interests, education and more
- Source: background data from the travel survey

6. Output Data and Digital OOH

AM4DOOH is applied for digital screens. Data is available by hour and by object.

6.1 Temporal Granularity of Output Data

- Digital: hourly, by object
- EA-VAC (estimated average VAC calculated on a daily or weekly basis) used in some programmatic contexts to set expectations before individual placements
- Spot-level metrics not supplied directly to market (Outdoor Impact's remit is planning, not trading); however, all media owners can use Outdoor Impact data to inform how they make inventory available for programmatic buying

6.2 Contemporising Factors

Not currently applied.

6.3 Data Release Schedule

- Individual frame data: media owners can add/update data on individual frames continuously
- Networks: updated quarterly
- Full update of all parameters: annual basis

7. Trading Metrics and Data Delivery

- Main trading metrics: VAC, reach and frequency
- EA-VAC (estimated average VAC) used in some programmatic trading contexts
- No spot-level metrics supplied directly to market by Outdoor Impact

7.1 Delivery Software and User Access

- IDS (Inventory Delivery System): user interface providing all data on objects, networks and audiences; open to all interested media agencies and advertisers for OOH campaign planning
- Data availability in third-party or aggregate cross-media planning platforms: currently under discussion

8. Organisational Structure

8.1 Governance and Management Structure

Three operational levels: (1) The Outdoor Committee – a full JIC consisting of

all seven media owners in the system, six media agency representatives and the Swedish Advertisers' Association; handles both technical and operational decisions. (2) Outdoor Impact – the small operational unit managing the system (three people on a part-time consultancy basis). (3) Outdoor AB – the holding company legally responsible for the system; board comprises the three large media owners, the Swedish Advertisers' Association, the Swedish Media Agencies' Association, and an independent chairman.

8.2 Funding Structure

- 100% media owner funded

8.3 Data, Research and Platform Partners

- Data suppliers: Trafikverket (National Traffic Authority), local councils, public transport operators (SL, Västtrafik, Skånetrafiken), Jernhusen (railway property owner), property owners, Google
- Research, modelling/processing and dashboard/platform: Ipsos

8.4 Approach to Cross-Media Measurement

A project and pre-study is in place from the Swedish Advertisers' Association. Outdoor Impact is also in discussions with media research companies developing technical solutions in this area. Discussions are ongoing regarding how Outdoor Impact data can be made available in aggregate form for cross-media measurement planning.

3.19 Market Analysis – Switzerland, Swiss Poster Research Plus Ltd. (SPR+)

Summary

Swiss Poster Research Plus Ltd. is the scientific, neutral, transparent research institute for Swiss out-of-home media and mobility. It is supervised by the Research Advisory Council. Over 60'000 OOH and DOOH advertising faces of the providers APG|SGA, Goldbach Neo OOH, SwissPlakat, Horizon, Format12 and Screen7 are recorded in the system. These faces/screens are located on streets, railway stations and shopping centres.

In the SPR+ Expert planning tool, OOH and DOOH campaigns can be simulated, planned, optimised and controlled. The SPR+ Expert delivers contacts per advertising face/spot weighted by visibility as well as net and gross reach, OTS, GRP, CPM, CPP and affinity for cross-provider outdoor advertising campaigns.

The research model complies with ESOMAR's global guidelines for outdoor advertising research. It is an integrated approach using multiply source data inputs. Switch-on plans with cost, performance and panel overviews can be created at the push of a button. SPR+ has a national mobility model including people frequencies for every road segment in Switzerland.

1. Scope of Measurement

Environments and Formats Covered

- Roadside
- Railway stations
- Shopping malls
- OOH Formats
- F200 City format (116.5 x 170 cm); F12 Wide format (268.5 x 128 cm); F24 Large format (268.5 x 256 cm); F400 Portrait format (116.5 x 340 cm); GF Large format (388 x 295 cm); Format12 Large format (442 x 271.5 cm)
- Installations: fixed faces, scrollers, prism rotators, rotating columns; LED illuminated or not
- DOOH: D20 (diagonal 30" to <55"); D40 (diagonal 55" to <145"); D80 (diagonal 145" and above)

Media Owners and Coverage

- Six media owners: APG|SGA, Goldbach Neo OOH, Horizon, SwissPlakat, Format12, Screen7. All together they own over 98% of the above formats in the Swiss market.

- Over 60,000 analogue and digital outdoor advertising faces recorded; updated twice a year
- Metrics produced for 84% of the above-mentioned inventory
- Geography: Target areas and universes can be individually configured on the basis of combining individual municipalities, as the smallest geographical entity, or on the standard government hierarchy: municipality, couronne-city, agglomeration, canton, economic area, economic region, language region (German, French, Italian), national.

2. Inventory Characteristics – How Measured and Stored

All 60,000 analogue and digital outdoor advertising faces are digitally recorded and geocoded in relation to the HERE road network. Every single face has an individualised visibility area derived from vectors of all buildings in Switzerland provided by the government. All information is stored in the central database managed by SPR+.

- Metadata input provided by media owners and audited by SPR+ before integration
- Required attributes: media owner ID, face ID, coordinates, azimuth (orientation), format, illumination, number of faces on installation, rating method, price, height above street level
- DOOH additional attributes: screen format, diagonal, operating time, spot and loop length, maximum motion level
- Optional attributes (not required for currency calculation): address, location information, individual marketing product name, photo link
- Indoor inventory mapped into indoor maps; the national vector network combines indoor and outdoor at street/pathway-segment level, more granular than polygon-based approaches

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

The national mobility model of SPR+ covers the mobility of the entire population living in Switzerland. For each of the approximately one million street segments, it is known how many vehicles and pedestrians move on them, as well as where they come from and where they are going. Socio-demographic characteristics such as age and gender are known for each of these people.

3.1 External Counts Used in Calculating Audience Volumes

- Population (age and gender) for every building in Switzerland with coordinates (FSO, ARE)

- Households geocoded (FSO)
- NOGA working places with business field, number of employees, work percentage, gender, geocoded for all companies in all buildings in Switzerland(FSO),
- Traffic measurement with 10,000 counting points (FSO, SPR+)
- Micro census mobility and transport (FSO, ARE)
- Speeds for all Swiss street segments with 15-minute granularity (HERE traffic patterns)
- Railway station frequency measurements (SBB): boarding, alighting, transferring, transit passengers, edge and total frequencies
- Shopping mall frequency measurements (mall operators)

3.2 Temporal Variability in Volume Data

- Current basis: average annual week with variance by quarter-hour for each day of the week
- From 2027: seasonality will be added with different weighting for each calendar week, based on app-based panel, smartphone data, navigation system data, shopping centre data and Swiss national railway data

4. Visibility Adjustment – Relative Impact of Different Inventory Types

SPR+ applies visibility adjustment in order to produce realistic Likelihood to see values as the sole currency for the Swiss market. VAC/LTS mean that the face/spot was a) physically visible for min. 1s and was b) looked at with the human eyes for min. 100ms. SPR+ calculates VAC with the variables mentioned above under 2. Red /7. Blue, which represent LTS. Currency=VAC=LTS=ad impression.

The OTS displayed in our SPR+ Expert planning tool are the average number of VAC/LTS people have with the campaign who fall into the net reach under the defined coverage contact class which is again based on VAC/LTS.

Frame size; individualised visibility area per face; visibility distance; angle of passage; speed of passage; illumination/time of day; height (tunnel, street level, bridge); clustering (number of faces per location); temporal visibility; spot and loop length; operating hours; booked time window (minimum of one spot with minimum 1 second length); digital attraction.

4.1 What Constitutes a Contact/Impact/Delivered Impression

Currency = VAC = LTS = ad impression.

The face/spot was (a) physically visible for minimum 1 second during the passage and (b) looked at with human eyes for minimum 100ms. OTS

displayed in the SPR+ Expert planning tool represents the average number of VAC/LTS people have with the campaign among those in net reach, under the defined coverage contact class (itself based on VAC/LTS). There is one single currency in the Swiss market, applied across all trading models and inventory types and is the only currency accepted by the Association of Swiss Advertisers (ASA).

5. Audience Measurement – Reach and Mobility

More than 11'500 test persons were equipped with GPS trackers, with which all movements of the persons were recorded for seven days. The GPS tracks not only provide individual routes of the test persons, but also allow statements to be made about the variability of the routes - in terms of route length as well as spatial dispersion. In addition, the mobility in residential areas is mapped very precisely via the GPS data, which is incorporated into the route generation for the National Atlas as well as into the Route model.

The “knowledge matrix” component contains in concentrated form the results of the mobility atlas, route model and panel-specific information. The contents of the matrix are processed and scaled in such a way that they can be understood as probabilities with which a person enters a street segment. A balancing algorithm (iterative proportional fitting) is used to adjust the matrix so that the sums of the columns each realise the segment frequencies of the mobility atlas. The row sums are adjusted to the micro census daily distances.

With the knowledge of which advertising faces are positioned in which angle at which segments, the contacts can now be summed up over all persons. In particular, it is possible to perform target group-specific calculations, e.g. for all men between 30 and 40 in the city of Zurich.

The method described above is simplified. Additional parameters enter into the calculation. These are realised in the form of panel-specific or panel-segment-specific devaluation factors.

5.1 Representativity and Data Quality

- Micro census: detailed information on the mobility behaviour of 33,000–54,000 Swiss people, representative of the entire Swiss population
- Information transferred to the population according to micro census person weights
- Routes of 10,500+ GPS-tracked test persons integrated into path generation from every household in Switzerland
- Age, gender and POI-specific characteristics (coordinates, number of employees) all considered

5.2 Data Privacy and Compliance

- SPR+ is fully GDPR compliant

- Travel survey is 1st-party data; structural and population data from publicly available or publicly accountable sources

5.3 Audience Segmentation

- Age, gender, community of residence, geographic target areas (from municipality up to national level)
- All input data from government population statistics; available with breakdown for each individual building across Switzerland for all inhabitants

6. Output Data and Digital OOH

The international AM4DOOH standard has been adopted and integrated into SPR+. Data delivery for spot lengths of minimum one second. Results per spot/loop differ according to time of day and weekday. Spot and loop length is 100% flexible. VAC for a spot means the spot was (a) physically visible during the passage and (b) looked at with human eyes.

SPR+ supplies spot-level metrics to media owners at 15-minute intervals based on the applied spot and loop length for each individual screen. Media owners use these metrics to calculate prices based on their CPM definitions. The same SPR+ output metrics are used independently of whether inventory is traded direct, automated, pDOOH, or via any combination.

6.1 Temporal Granularity of Output Data

- 15-minute intervals for spot-level DOOH data delivered to media owners
- Results vary by time of day and day of week
- Media buyers can export pDOOH campaigns from DSPs (e.g. Splicky) and import into SPR+ Expert Planning tool for net reach calculation across multiple media owners

6.2 Contemporising Factors

Currently under evaluation in a large feasibility study is adding additional multiple data sources to those already in use: integration of nationwide mobility panel data (via app measuring GPS and beacons), SDK data, mobile phone data, additional government data, sensor data, navigation system data and further frequency data to weight plan (model) data according to the effective situation during the campaign period. Factors influencing actual vs. planned data may include weather/precipitation, holidays, sport events, festivals and demonstrations which should be also included. Within the scope of the feasibility study is the testing of implementing graph-transformers, diffusion-transformers and graph-diffusion-transformers for estimating and calculating the national mobility model for all vector segments. Once implemented, factors will be applied for VAC/LTS (impressions) and reach. Frequency of application to be defined by stakeholders.

6.3 Data Release Schedule

- Twice yearly

7. Trading Metrics and Data Delivery

- Trading metrics: net reach per campaign, contact value per face/spot, gross reach, OTS, GRP, total cost, CPM, CPP and affinity
- Target area and universe individually configurable from a single municipality up to national level
- Single currency (VAC/LTS) used for pDOOH trading and direct trading – no separate metrics by trading model
- After each update, SPR+ delivers LTS/VAC metrics to media owners who integrate them into their databases and SSPs

7.1 Delivery Software and User Access

SPR+ Expert is a web-based Java application running on all common operating systems. Research data is kept at SPR+; campaign data stored on the client's computer as a local file. Programme updates are carried out on the SPR+ server.

SPR offers a range of tools to the OOH market with an intuitive UI interface:

- “SPR+ Expert”, the user interface for the online evaluation of faces and campaigns designed with four components that follow the usual planning process for OOH
- SPR+ Studio – audience and budget planning
- SPP+ Product – availability and trading
- SPR+ Planning – Scenario planning and audience metrics, with optimisation
- SPR+ Control – campaign evaluation

SPR+ supplies these metrics to the media owners on for 15 minutes intervals based on the applied spot and loop length for the individual screen. Media owner apply these metrics to calculate their prices based on their CPM definitions. The same SPR+ output metrics are used independent of whether the inventory is traded direct, automated, pDOOH or all.

Independent of the trading method applied for the digital inventory the sole currency LTS/VAC metrics are delivered by SPR+ after each update to the media owners and they integrate the metrics into their data bases and into their SSPs.

Media buyers can export from their DSP's such as Splicky their pDOOH campaigns and import theses campaigns into the “SPR+ Expert Planning” tool to calculate not only gross reach but also net reach for individual contact

classes and target areas and target groups for campaigns across different media owners.

The total number of VAC/LTS shown for an individual campaign will always be on the same currency basis and independent of whether it is directly, automated and pDOOH traded

8. Organisational Structure

8.1 Governance and Management Structure

SPR+ is the only research institute in the field of out-of-home research that makes its concepts, models, methods, data inputs, weighting criteria with their factors and the results absolutely transparent. This is the only permissible scientific approach. Any other approach would not be serious research, but at best marketing. It also ensures the neutrality and objectivity of SPR+, which is a very important client concern. SPR+ is supervised by a Research Advisory Council. The members represent advertisers, media agencies and media owners. SPR+ is the one and only OOH/DOOH media currency accepted in Switzerland by the Association of Swiss Advertisers (ASA).

8.2 Funding Structure

- Licence fee basis based on number of users and tool usage
- Base funding guaranteed by participating media owners via long-term commitment according to their inventory size and market share

8.3 Data, Research and Platform Partners

- Modelling: Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS)
- Planning tool development: Karakun (software) in collaboration with Fraunhofer Institute
- Test person recruitment, traffic counts, field interviews: LINK and GfK Switzerland
- GPS technology and related technical aspects: MGE DATA and Geosat

8.4 Approach to Cross-Media Measurement

SPR+ delivers OOH/DOOH data to WEMF Ltd., which conducts the MACH Strategy Consumer study. This study delivers data via an online planning tool in which OOH/DOOH can be planned at strategic level in combination with all other media and consumer data. OOH/DOOH data is integrated via fusion and touchpoints. This represents an established cross-media planning capability in the Swiss market.

3.20 Market Analysis – United States of America, Geopath

Summary

Established in 1933 as the Traffic Audit Bureau for Media Measurement Inc., Geopath is the United States' not-for-profit industry standard for OOH audience measurement. It is governed by a tripartite board of advertisers, agencies and media companies and has over 300 members. Geopath's historical mission was to audit the circulation of out-of-home media; its scope has since expanded to encompass state-of-the-art audience location measurement, deep consumer insight and innovative market research.

Geopath uses a holistic, integrated approach to provide tools that measure and analyse audience location and show how consumers engage with out-of-home advertising. It powers a smarter OOH marketplace across all environments – roadside, place-based and scheduled bus fleets – covering approximately 750,000 roadside ad units, 625,000 scheduled bus fleet ad units and 250,000 place-based ad units across approximately 220 media owners. Coverage spans all geographies within the continental USA, Hawaii and Alaska.

Audience impressions (Visibility Adjusted Contacts, or VACs) are aligned to the United States Media Rating Council (MRC) OOH Measurement Standards and are the primary currency for both direct and programmatic trading across the US market.

1. Scope of Measurement

Environments and Formats Covered

- Roadside: billboards, posters, street furniture, and all fixed-size static and digital signage (bulletins, posters, panels, displays, murals)
- Place-Based: transit stations, malls, airports, and dozens of other indoor media contexts
- Scheduled Bus Fleet: exterior advertising on scheduled bus routes
- Geopath inventory aligns to a standardised list of general categories for OOH media formats/sizes

Media Owners and Volume of Frames

- Approximately 220 media owners with signage across the continental USA, Hawaii and Alaska
- Approximately 750,000 roadside ad units (including street furniture)
- Approximately 625,000 scheduled bus fleet ad units

- Approximately 250,000 place-based ad units
- Geography: all geographies within the continental USA, Hawaii and Alaska; excludes other US territories (Puerto Rico, Guam, American Samoa, US Virgin Islands etc.)

2. Inventory Characteristics – How Measured and Stored

Inventory metadata is provided by Geopath's media owner members and managed by Geopath. The inventory metadata database is manually audited by Geopath personnel using Google Street View and media owner-provided photographic evidence.

- Mapping: Open Street Map (OSM) used as the primary mapping layer
- Place-based inventory: a geospatial polygon is created upon ingesting new place-based inventory, encompassing all pedestrian movement within the specific place and used as the basis for pedestrian circulation measurement

3. Population/Volume/OTS – Approach to Measuring Overall Volumes of Available Audience

For roadside and scheduled bus fleet media, annualised vehicular and pedestrian volumes are scaled using a traffic flow model informed by 'ground truth' sources including US Federal Highway Administration and local Department of Transportation roadway usage statistics. These volumes are provided for all roadways in the continental United States and linked to logical roadside signage units and bus routes traversing those road segments, representing the most granular circulation metrics used as inputs to Geopath's audience measurement process.

For place-based media, specific geospatial polygons are defined to represent pedestrian circulations within particular places, sourced from mobile device data and subdivided into multiple categories (visits, drop-offs, long-term stays etc.) as inputs to the audience measurement process.

3.1 External Counts Used in Calculating Audience Volumes

- US Federal Highway Administration roadway usage statistics
- Local Department of Transportation counts
- Mobile device data (deduplicated and scaled upstream) for place-based pedestrian circulations and annual contemporising adjustments at county level
- No cameras, sensors or radar technologies deployed directly by Geopath for volume measurement

- No additional commercial suppliers, media owner, retailer or landowner count data beyond the above

3.2 Temporal Variability in Volume Data

- Traffic and pedestrian circulations are sourced for the most recently available 12-month period and represent annual average daily traffic estimates
- No sub-annual temporal variability applied to circulation volumes; no seasonal, weekly or hourly breakdown of base volumes
- DOOH: annual average audience impressions estimated and reported on an hourly basis for each unique day of the week (share-of-voice basis)

4. Visibility Adjustment – Relative Impact of Different Inventory Types

Geopath produces audience impressions (VACs) by adjusting circulation estimates using bespoke eye-camera research conducted in real-world scenarios. This research measures media ‘fixation’ rates based on distances from the panel, frame characteristics and duration of passage. Fixation rates are applied to calculated visible durations of any frame based on its characteristics and the directional flow of the audience within the path of the media. This proprietary visibility adjustment methodology is applied by Geopath to all circulation data sourced from external suppliers.

4.1 What Constitutes a Contact/Impact/Delivered Impression

Geopath’s audience impressions represent Visibility Adjusted Contacts (VACs), aligned to the United States Media Rating Council’s (MRC) definition of ‘audience’ according to its latest out-of-home measurement standards. Reach and frequency metrics represent the average unique number of people and average frequency of VAC according to this audience definition. The MRC OOH Measurement Standards are the authoritative reference for all Geopath output metric definitions in the US market.

5. Audience Measurement – Reach and Mobility

Geopath leverages anonymised mobile app location data, calibrated weekly, to determine journeys and trip types based on origin-to-destination routing using persistently observable devices. Geopath’s circulation and visitation data suppliers use aggregated and cleaned mobile device data that is de-duplicated and scaled upstream of Geopath to ensure statistically accurate representation.

5.1 Representativity and Data Quality

- Mobile device data is de-duplicated and scaled upstream by Geopath’s

data suppliers to ensure statistically accurate population representation

- Calibration performed weekly; circulation data updated annually to reflect the latest available 12-month period
- Contemporising adjustments to vehicular and pedestrian circulations (not audience impressions or reach) driven by deduplicated mobile device data representing population movement at county level during annual planning dataset creation

5.2 Data Privacy and Compliance

- Geopath is fully compliant with applicable US privacy legislation at both federal and state levels, including COPPA, CCPA and CPRA
- Geopath does not handle or receive personally identifiable information (PII), unique MAIDs or MAC addresses that can be reconciled to specific people, devices or households
- All data suppliers operate within Geopath's strict data usage and privacy compliance framework

5.3 Audience Segmentation

- 490 distinct demographic segments across age, gender, ethnicity and household income
- 186 unique consumer profile segments
- 68 unique household attribute segments
- Demography derived from US census tracts contributing to the estimated audience proportions exposed to OOH media

6. Output Data and Digital OOH

Digital out-of-home inventory is represented alongside non-digital inventory and characterised by a 'share of voice' value of less than 100% for any given ad unit on a unique OOH frame. Annual average audience impressions for DOOH inventory are estimated and reported on an hourly basis for each unique day of the week. No secondary AM4DOOH model is applied; Geopath uses its own proprietary visibility adjustment methodology derived from eye-camera research.

6.1 Temporal Granularity of Output Data

- DOOH: hourly estimates for each unique day of the week (7 days x 24 hours), on a share-of-voice basis
- Static OOH: annual average daily figures
- Ad unit (spot)-level metrics for both direct and programmatic trading available via Geopath's API (directly leveraged by major SSPs) and the Geopath Insight Suite UI

6.2 Contemporising Factors

Contemporising factors are used to adjust vehicular and pedestrian circulations (not audience impressions or reach metrics) to represent the latest available 12-month time period. These adjustments are driven by de-duplicated mobile device data representing population movement at county level and are applied during the annual planning dataset creation process, remaining unchanged throughout the duration of that annual dataset's release.

6.3 Data Release Schedule

- Monthly updates: inventory metadata additions, removals and revisions; audience measurement metrics recalculated based on changed inventory metadata
- Annual updates: core vehicle/pedestrian circulation data, geography definitions, audience definitions, and all non-inventory metadata used in Geopath's OOH measurement process

7. Trading Metrics and Data Delivery

In the USA, the vast majority of both direct and programmatic trading metrics are sourced from Geopath and represent audience impressions (VACs), alongside reach and frequency metrics aligned with the VAC/audience definition. Some direct and/or programmatic buys are conducted using OTS and/or LTS metrics, typically for inventory sourced from smaller media owners who are not Geopath members.

7.1 Delivery Software and User Access

- Geopath Insight Suite: industry-wide UI providing inventory metadata and corresponding audience measurement; also accessible for third-party media buying/planning platforms under strict data usage guidelines
- Geopath API: directly leveraged by major SSPs for ad unit (spot)-level metrics for automated/programmatic and direct trading
- Third-party platform integration: Geopath data may be ingested into third-party media buying/planning platforms subject to strict data usage guidelines

8. Organisational Structure

8.1 Governance and Management Structure

Geopath's tripartite board consists of media owners and media buyers with additional representation from advertisers. Technical committees consist of representatives of the board. Geopath has over 300 members and has operated as the US OOH industry standard since its founding in 1933 (originally as the Traffic Audit Bureau for Media Measurement Inc.).

8.2 Funding Structure

Subscription model with annual dues based on member company size

8.3 Data, Research and Platform Partners

Geopath uses external suppliers for circulation and visitation data, and applies its own proprietary visibility adjustment methodology to derive audience/VAC metrics. Specific supplier names are not publicly disclosed; data suppliers are required to operate within Geopath's privacy and data governance framework.

8.4 Approach to Cross-Media Measurement

Geopath does not currently provide cross-media measurement itself, nor are Geopath metrics used as direct inputs to cross-media measurement models. However, Geopath provides data that can enable third-party fusions with other cross-media measurement models, and is currently exploring these opportunities.

4. Measurement Definitions

Defining the terms used to describe audience metrics should be consistent throughout methodological documentation and in all published materials, to allow for currency to be both understood and adopted.

Several terms used in OOH audience metrics differ in their definition by territory and reflect the usage of those terms across other media in those territories. Although it is tempting to suggest a consistent usage of all terms for OOH globally, that would ignore both existing, established usage and multiple languages. So, to promote the usage of OOH metrics it is important to consider the understanding of the terms used in the local market.

For OOH metrics to be adopted more readily in any market, they should be comparable to other media metrics already in use, and where equivalents are required, they should be made clear to end users and advertisers.

4.1. Contact, Impression or Impact?

The use of terms such as Impression, or Opportunity to See, must be defined clearly in any documentation as these terms are used with differing meanings in different territories. Adopting terminology commonly used in trading other media in the territory may make OOH audience metrics more easily understood and transferable. However, care must be taken to ensure that if more stringent rules are applied in OOH measurement terms than are applied in other media, those differences are clearly reflected and understood.

Broadly there are four levels to defining an OOH audience volume, but the terms are not universal:

- i Circulation** – The count of audience in proximity to an OOH frame. Where an audience member's precise location or path cannot be determined, or where the detailed mapping of inventory, audience flows and obstructions are not available, circulation allows for some comparison between frames based on how busy a location is. This metric does not account for any ability to actually see the frame and might be seen as the equivalent to 'Served Impressions' in on-line measurement.
- ii Opportunity to see (OTS)** – The count of audience in front of an OOH frame or defined to be in the area that the frame can be viewed from. Where audience members' exact location or path can be determined, and the attributes of the frame are accurately recorded such that a visibility area or viewshed can be determined, an OTS metric can be calculated. As OTS is also referred to as 'Exposure' and often used interchangeably with OTC (below), it is important to be clear in the definition used as this metric may not account for the audience's direction of travel.
- iii Opportunity to Contact (OTC)** – The count of audience in the area that the frame can be viewed from, and where their direction of travel places the frame in their field of view, free of any obstruction. This metric may alternatively be referred to as Realistic Opportunity to See (ROTS),

Opportunity to See (OTS) or Impression, so again it is important to be clear in the definition used. This metric does not account for any probability to see the ad message during the time in contact with the frame. OTC may be seen as the equivalent to 'Viewable Impressions' in on-line advertising or as having been recorded to have been 'in the room' whilst a TV or audio advertisement has played.

iv Visually Adjusted Contact (VAC) – The count of audience in the area that the frame can be viewed from, and where their direction of travel places the frame in their field of view, free of any obstruction, and has a calculation to determine whether the audience has a likelihood to see the advertising message. Most often calculated by applying a probabilistic model based on visibility research to determine what proportion of those with an Opportunity to Contact, will actually look at the OOH frame whilst the ad content is playing. This metric may also be referred to as an Impact; Likelihood to See (LTS); Visibility Adjusted Impact (VAI); and has been described as 'Eyes on Impressions'. VAC may be seen as the equivalent to 'Viewed Impressions' in on-line measurement or 'Audience Impressions' in attention-based media metrics.

4.2. Demographic Parameters

Demographic subsets should be tailored to mirror those used locally by other media to allow for cross media comparisons and for 3rd party fusions with other media audience measurement data. However, consideration should be made, where the confidence exists in the data, to allow advertisers to measure OOH delivery against combinations of:

- Gender (Male; Female; Non declared)
- Age range (15–17; 18–24; 25–34; 35–44; 45–49; 50–54; 55–64; 65+)
- Household Income / Social Class / Professional Status
- Ethnicity
- Geography (State, Region, Major City, Postal/Zip code)

It is important to segment audience delivery only where the granularity of the data allows it. Segmentation in reporting where it cannot be robustly justified, can produce unrealistic results and undermine the credibility of the overall OOH measurement project.

4.3. A Glossary of OOH Terms

The following glossary retains all terms from the 2022 edition and adds new terms identified through the WOO Audience Measurement Survey 2.0. New and amended entries are marked [NEW] or [AMENDED].

Activity Based Model (ABM) [NEW] A synthetic population approach to mobility modelling in which the travel behaviour of an entire population is generated from census, demographic and land use inputs rather than by directly observing a sample of real individuals. Each synthetic person is assigned a statistically representative set of daily activities and the trips

needed to fulfil them. ABMs are used in Australia (MOVE), Austria (OSA) and are being developed in other markets. ABMs must be calibrated against observed count data and the calibration methodology and tolerances should be fully documented.

Accelerometer An electronic device that helps us to understand respondent movement by measuring vibrations (relative accelerations).

Ad Audience The number of individuals estimated to be in the Display Audience while ad content is present and deemed viewable.

Ad Campaign A series of Ad Units delivered for an advertiser during a defined period of time.

Ad Exposure Time The length of time the audience spent viewing when ad content is present and deemed viewable.

Ad Rotation Duration The number of seconds required to view all of the ads in a rotation or Loop.

Ad Segment The portion of the Loop, or some other defined period of time, containing advertising content.

Ad server An ad server is a web server dedicated to the delivery of advertisements.

Ad Unit Relates to Frame or Spot.

Ad Unit Length See Spot Length.

Ad unit orientation The proportions of an OOH frame – referred to as either Landscape or Portrait.

Advertiser Market (Trading Area) A custom market (often a group of counties) defined by an advertiser or buying agency.

Advertising spot See Spot.

Affinity Measures the suitability of an advertising vehicle for a specific target group.

Affinity Index Reach within target group divided by reach in the underlying universe multiplied by 100.

Angled When a poster frame is angled to oncoming traffic or pedestrian flow.

Approach See Maximum Visibility Distance.

Aspect ratio The dimensions of a display screen's image expressed as a ratio of the horizontal width to the vertical height.

Audience The number of individuals counted as having consumed media.

Audience Delivery The size of an audience that notices Out of Home advertising.

Audience impression See Visibility Adjusted Contacts (VAC).

Automated guaranteed A programmatic ad transaction that most closely mirrors a traditional digital direct sale.

Behavioural profiles Profile based on past-observed behaviour.

Billboards Stationary inventory outdoor whose audience moves by those locations on a trip to a destination.

Campaign Delivery The audience delivered by an Out of Home advertising campaign.

Circulation Audience count in proximity to an OOH frame.

Cone of vision The field of view for an individual – typically a 120° cone.

Contact See Realistic Opportunity to See (ROTS).

Content Editorial material displayed alongside OOH advertisements.

Content management software/system (CMS) An application used to create, schedule, manage and modify digital content.

Content Segment The portion of the Loop containing program or non-advertising content.

Contemporising The process of updating or moderating a baseline OOH audience model to reflect current or recent changes in audience volumes and journey patterns.

Copy The advertising displayed on an outdoor frame.

Copy area The viewing area on an OOH frame.

Cost per Play (CPP) The cost (price) to deliver an ad play on a screen.

Cost per Ratings Point (CPRP) The cost of advertising exposure opportunities that equals one Gross Rating Point (GRP).

Cost Per Thousand (CPM) The cost for delivering 1,000 Impacts or Impressions.

Cost per Thousand (CPT) See Cost Per Thousand (CPM).

Coverage The number of individuals delivered by an advertising campaign or network of frames.

Cycle See Display Period.

Data Management Platform (DMP) A piece of software that collects, stores, manages data about users for the purposes of profiling, analysing and targeting an audience.

Day Part A set period of time or proportion of a day to define audience delivery.

Deal ID The unique number assigned to an automated ad buy.

Delivered play The number of times a creative (with a defined spot length) plays fully.

Demand Side Platform (DSP) A piece of software used to purchase advertising in an automated fashion (programmatic).

Demographic Audiences Audience breakdowns based on various characteristics such as age, sex, income, education, etc.

Digital Out Of Home Media (DOOH) Any Out of Home display that can change its advertising content remotely – generally LCD or LED screens.

Display See Frame.

Display Exposure Zone See Visibility Area.

Display Period The interval of time when an outdoor advertising frame or campaign is run.

Duration See Dwell Time.

Dwell Time The time spent by an audience member in the visibility area of an OOH Frame.

Dynamic OOH An OOH frame that shows more than one advertising message.

Eccentricity The angle of viewing between the audience and the face at a specific distance.

Environment The place and location of the advertising network and screens.

Exposure See Opportunity to See (OTS).

Eye tracking A survey methodology that records the movement of the eye and its fixations in relation to what an individual is looking at.

Face The number of advertisements shown individually on a frame.

Facing The direction a Frame is pointing.

Flight See Display Period.

Format Refers to the type of OOH media.

Frame The surface area on an outdoor unit where advertising copy is displayed.

Frequency The average number of times an individual notices an out of home advertising message during a defined period of time.

Frequency distribution Distribution showing the percentage of the target audience population who have viewed a schedule of faces at each level of frequency.

Gap length The time gap between spots of the same advertiser.

Geofencing A technology that allows an advertiser to select a geographic point and create a virtual “fence” around that point to deliver a digital

communication to a particular audience.

Global Positioning System (GPS) The satellite navigation system that provides precise location information for electronic devices.

Gross Impressions The number of individuals over a period of time with presence in the defined Exposure Zone – may also be defined as OTS or ROTS.

Gross Rating Points (GRPs) The total number of impacts delivered by an Out of Home schedule expressed as a percentage of total market population.

Head-on When a poster frame is facing oncoming traffic or pedestrian flow.

Home-graph A technique used in mobile location-based measurement to assign a home location to a device, typically by identifying the location at which the device is persistently static during sleeping hours over a defined observation period.

Impact See Visibility Adjusted Contacts (VAC).

Impression A term that varies by market and can refer to Opportunity to See (OTS), Opportunity to Contact (OTC) or Visibility Adjusted Contacts (VAC).

Impression multiplier Exactly how many audience contacts (Impacts or Impressions) are delivered in a single ad play on a DOOH screen.

In-Charge See Posting Date.

Internal Frames that have no external viewing opportunity are classified as internal.

Likelihood-To-See (LTS) See Visibility Adjusted Contacts (VAC).

Line of sight The simultaneous viewing of more than one OOH unit.

Location Traffic See Circulation.

Loop Segments of content and advertising programmed to a specific length that repeats on standard intervals.

Maximum visibility distance The distance measured along the line of travel from the point where an advertising unit first becomes fully visible to the point where the copy is no longer deemed viewable.

Media Agency A company that provides advice to companies on how and where to advertise, and to negotiate costs on behalf of an advertiser.

Media Owner Individuals, groups or business entities that own a medium of mass communication.

Media plan A plan for an advertising campaign that specifies details of the selected media, advertising content, dates and delivery goals.

Mobility Cluster An audience segmentation variable derived from the observed or inferred mobility behaviour of an individual, rather than from stated demographics.

Mode See Travel Mode.

Occupancy factor The average occupancy of a vehicle – generally defined as adults and often derived from governmental or transport authority statistics.

Offset In relation to ‘straight ahead’, the OFFSET is the angle away from this path at which the poster is located (see also Eccentricity).

OOH Specialist Agency A company that provides advice to companies on how and where to advertise using OOH, and to negotiate costs on behalf of an advertiser.

Open auction A way to buy/sell programmatic advertising where the publisher generally allows any and all buyers to participate.

OpenRTB The IAB standard for Real Time Bidding (RTB) now used by most DSPs.

Operating hours The period of time each day the frame location is displaying advertising and content to audiences.

Operator See Media Owner.

Opportunity to Contact (OTC) See ROTS.

Opportunity to Read (OTR) Defines the number of opportunities an OOH face offers the passing audience to read the advertising creative.

Opportunity to See (OTS) The number of individuals over a period of time with presence in the defined Visibility Area.

Orientation The direction a Frame is pointing – relative to true north (Azimuth).

Out of Home Media (OOH) All media formats specifically intended to reach consumers outside the home.

Panel See Frame.

Parallel When a poster frame is parallel to a particular flow of traffic or pedestrian flow.

Participant See Respondent.

Passive Describes research fieldwork that requires minimal input from the participant.

Performance Evaluation of a campaign’s achievements after the event.

Place-Based Located at a destination venue (indoors or outdoors) with associated dwell time.

Plant A media company’s entire outdoor advertising inventory.

Plant operator See Media Owner.

Point of Purchase See POS.

Point Of Sale (POS) The time and place that a customer executes the

payment for goods and services.

Population The total potential audience available to be measured.

Poster specialist See OOH Specialist Agency.

Posting Date The date when an advertising billboard is set up or digital LED screen display program is scheduled to commence.

Private marketplace A way to buy/sell programmatic advertising where a publisher restricts participation to select buyers/advertisers.

Programmatic A trading technique applying automation in the buying and selling of media, often using data to value the media bought.

Reach The percentage of a target audience who notice an advertising message at least once.

Real time bidding (RTB) An automated auction process in which multiple buyers can bid in real time for available digital ad inventory.

Realistic Opportunity to See (ROTS) The number of individuals in the defined Visibility Area, facing the advertising Frame whilst the advertisement is displayed.

Respondent A participant in a research study.

Return on Investment (ROI) The value of increased sales or other measured outcomes over the cost of achieving those outcomes.

Rotation The process of moving the advertiser's message from one location to another at stated intervals to achieve a more balanced coverage of a market.

Share of time (SOT) A percentage share of time on a Dynamic frame that has been used by an advertiser.

Share Of Voice (SOV) A percentage share of a defined market that has been used in an advertising campaign.

Sign See Frame.

Site classification Each advertising frame needs to be classified according to its location, format, size and other specific characteristics.

Splay See Angled.

Spot A piece of advertising creative content.

Spot length The amount of time the advertiser has to play their creative.

Start date See Posting Date.

Street furniture Advertising displays, many that support the provision of a public amenity, positioned at close proximity to pedestrians for eye-level viewing or at a curb side to impact vehicular traffic.

Supply Side Platform (SSP) A piece of software used to sell advertising in an

automated fashion (programmatic).

Target Audience The audience defined by the advertiser to most closely fit their desired consumers.

Target Rating Point (TRP) The total number of impacts delivered by an Out of Home schedule against a specified target audience group expressed as a percentage of the population of that target group.

Traffic Count The measured number of vehicles (including their occupancy rate) and/or pedestrians passing a given point.

Traffic Hourly Index (THI) [NEW] A measure of audience intensity across 24 hours for each of the seven days of the week, used to distribute average daily audience volumes into hourly segments for DOOH measurement.

Transit Outdoor and indoor inventory affixed to moving vehicles or positioned at transport hubs.

Transit Advertising OOH advertising appearing on the exterior or interior of public transportation vehicles or stations.

Transition The change from one message to another on a Dynamic OOH frame.

Travel Mode The mode of travel used by people when passing advertising units.

Vendor See Media Owner.

Venue The place and location of the advertising network and displays.

Venue Traffic The total number of individuals estimated to be present in the venue.

View See VAC.

Viewable Impressions See ROTS.

Viewed Impressions See VAC.

Viewshed See Visibility Area.

Visibility Adjusted Contacts (VAC) The number of individuals in the defined Visibility Area, facing the advertising Frame whilst the advertisement is displayed, adjusted for the probability that they have looked at that ad content.

Visually Adjusted Contacts (VAC) See Visibility Adjusted Contacts (VAC).

Visibility Adjusted Impacts (VAI) See VAC.

Visibility Adjustment (VA) A ratio or the percentage of a frame's total ROTS audience who are likely to notice an ad (VAC).

Visibility Adjustment Index (VAI) See VA.

Visibility Area The area from which an OOH frame can be viewed without

defined obstruction.

Visibility Index Score (VI) See VA.

Wastage The proportion of an advertising campaign's expenditure or advertising weight which is not seen or heard by the specified target audience.

Zone of Visibility See Visibility Area.

“The organisations that have contributed to Version 2.0 did not have to do so. Sharing methodology is not a neutral act — it exposes thinking to scrutiny, invites comparison, and takes time that busy teams has in short supply. That so many have chosen to do it anyway, and that the number doing so has grown so significantly since 2022, tells you something important about the direction of travel in this industry, driven from within our membership.”



Tom Goddard - President, World Out of Home Organization

These guidelines could not have been produced without the time and effort - given freely - by the organisations below. The World Out of Home Organisation, and readers of this document, fully appreciate the contributions from the following:



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Global OOH Audience Measurement Guidelines 1.0

These updated guidelines rely heavily on the work conducted in the creation of the initial document published in 2022. The time and knowledge of the contributors to the WOO Guidelines 1.0 is acknowledged here:

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Additional Documentation and Links

The following documents are referenced throughout these guidelines and are available via the WOO members' area.

- **ESOMAR – Global Guidelines on Out-of-Home Audience Measurement**
- **AM4DOOH – Audience Measurement for Digital Out of Home**
- **Route – A Methodological Review**
- **Route Visibility Paper – Pedestrians**
- **Route Visibility Paper – Drivers and Passengers**
- **Route Visibility Paper – Dynamic Scenes**
- **POSTAR – Visibility Research**
- **Swiss Poster Research Ltd – Organisation, Studies, Model, Planning Tool**



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