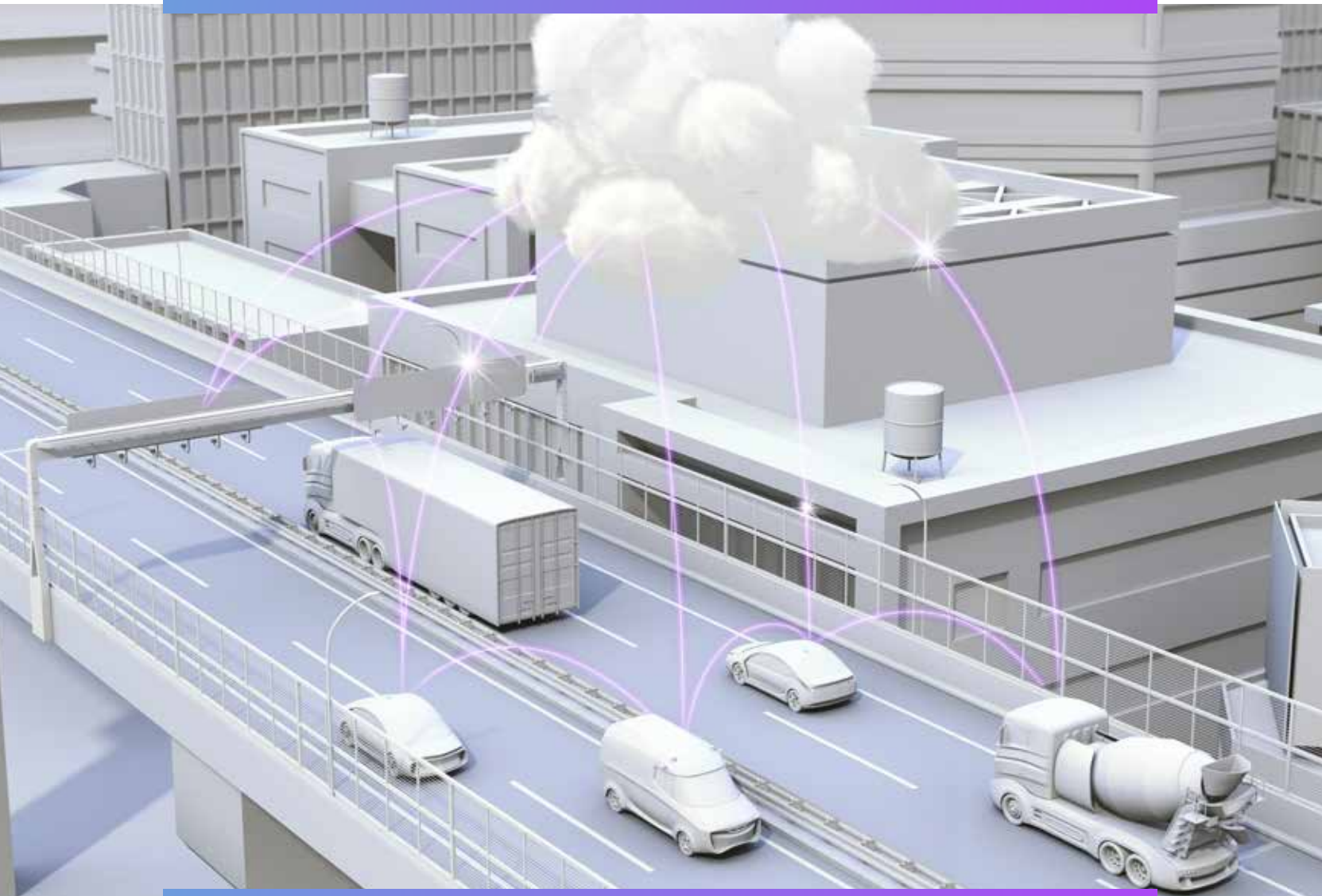


EYE-NET

ROAD SAFETY FOR EVERYONE



Japan's Road to Safety: Strategies and Successes

eBook

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Introduction

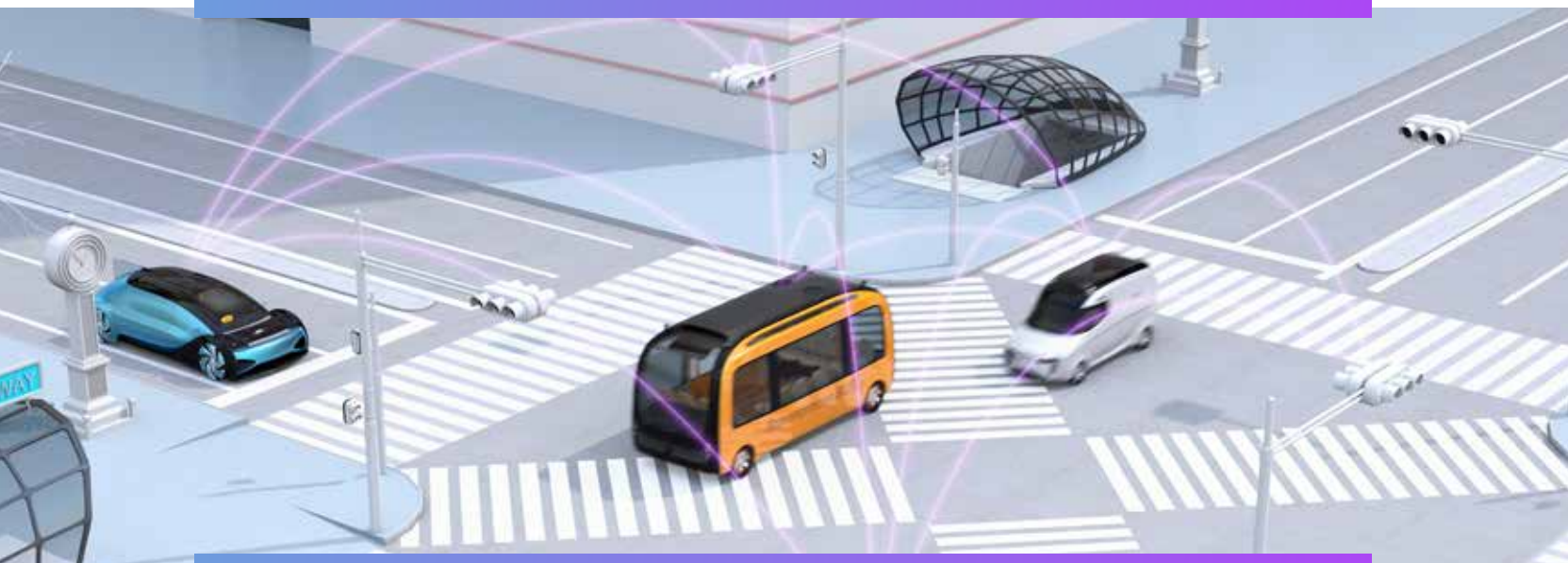
Japan is making remarkable strides in road safety, with a comprehensive and technologically innovative approach that has made it one of the safest countries in the world for road users. From a decline in road fatalities to the launch of the 11th Traffic Safety Program in March 2021, Japan is not just setting milestones but also global standards in road safety. The nation is working towards creating a more secure environment by integrating the latest technologies like Vehicle-to-Everything (V2X) communication and advanced predictive models, in cooperation with the private sector, including firms like Eye-Net™.

This e-book reviews Japan's road safety initiatives, examining the country's outstanding approach, multifaceted programs and the use of innovative technologies. We also explore how Eye-Net's pioneering V2X solutions can align with Japan's goal to become the safest country in the world in 2025, paving the way for a safer future for all road users. Through this paper, we aim to discuss the alignment of Eye-Net's technology with Japan's road safety strategies and explore how similar approaches might benefit road safety efforts globally.



Chapter 1

Japan's Approach to Road Safety - A Joint Effort with Great Results



Japan is known for its advanced approach to road safety, recording 3,416 road fatalities in 2020, marking a 13% decrease compared to 2019 and reaching the lowest level of road mortality since 1948. Over half of the road deaths in Japan occur amongst senior citizens and children, making them a key focus for safety improvement initiatives. ¹

Safety concerns include - amongst others - sudden unintended accelerations, particularly among older drivers. The government is promoting the development of Safety Support Cars equipped with automatic brakes, and also aims to improve post-crash response time and lifesaving medical treatment applications via the use of helicopters for

emergency medical treatment. ²

Road junctions are another significant concern, accounting for 54% of all road accidents. This alarming rate has prompted local authorities to take action. One of the primary issues is the design of these junctions—specifically, road junctions with short intervals and acute angles which can limit visibility and lead to collisions. To mitigate these risks, design guidelines now recommend that intersections have angles close to 90 degrees and be spaced as far apart as feasible. ³

In urban areas, where there is a diversity of mobility needs and competition among means of transportation is viable, a variety of transportation services are provided, with a strong focus on public transportation.

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On the other hand, in rural areas, where depopulation and aging are often occurring simultaneously, more and more areas are finding it difficult to maintain and secure public transportation services.²

In order to decrease road fatalities and increase road safety and convenience, Japan launched the 11th Traffic Safety Program in March 2021, aiming to make the country's road traffic the safest worldwide. The Program's strategic objectives are to limit the deaths within 24 hours of a crash to no more than 2,000, and to have no more than 22,000 serious injuries. The plan comprises eight pillars, including road environment maintenance, reinforcement of traffic safety messages, safe driving, vehicle safety, enforcement, improved emergency medical system, victim support, and research and

development.¹ Additionally, the Comprehensive Safety Plan for Business Vehicles 2025 aims to reduce fatalities from crashes involving business vehicles to 225 or less.²

As part of this strategy, Japan is leveraging new technologies for road safety. The 2020 Public-Private ITS Initiative/Roadmap, has already emphasized co-operation between state ministries, the public sector, and the private sector.

In conclusion, the Japanese approach to road safety is comprehensive and reliant on technology advancements to bolster safety. This is reflected in their traffic safety programs, regulation revisions, and integration of innovative technologies in their transportation system.



Chapter 2

Connections, Connectivity and Japan's Journey to Becoming the Safest Country in the World

In Japan, the societal quest to be the safest country in the world is rooted in both tradition and technological advancement. The nation's history of community spirit and mutual aid is merging with an age where almost everyone, regardless of age, has a cellphone. Together, they provide the platform upon which this ambition is built.

The automotive sector stands as a key player in this journey. Representing a significant slice of Japan's economy, automobiles are the focus of an extremely wide range of industrial and related activity, from materials supply and vehicle production to sales, servicing, freight shipping and other auto-centered operations. Auto-related employment in Japan at present totals 5.52 million people.⁴

Modern cars are now software-driven, and this connectivity offers opportunities ranging from integrated routing, infotainment, in-vehicle e-commerce services, to real-time emergency responses. Importantly, it also facilitates safety-focused services like the Eye-Net™ Protect Software Development Kit (SDK) designed to easily supplement third-party location-based cellular applications like navigation and shared micro-mobility apps, as well as the Company's Eye-Zone, a

comprehensive safety solution tailored for the automotive industry.

Eye-Net's fundamental concept—ensuring every pedestrian, cyclist, and e-mobility user is visible—serves as a powerful catalyst for enhancing road safety, aligning seamlessly with the prevailing approaches in the Japanese market.



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The automotive future of Japan resonates with the acronym CASE (Connected, Autonomous, Shared & Service, Electric). This future is not just about sophisticated cars; it's about ensuring they remain safe. Advanced systems like Automatic Emergency Brakes and Autonomous Vehicles have the potential to enhance road safety. Yet, as these technologies develop, new challenges emerge. Overconfidence or misinterpretation of these systems could lead to accidents. Maintaining the technology's efficacy therefore becomes paramount.

Worldwide a trend is emerging where automotive, cellular providers, service companies, and startups are forming

synergistic collaborations, all with a shared vision of significantly improving vulnerable road users' safety and saving lives. Japan, always at the forefront of technological and societal trends, is no exception. SoftBank's recent partnership with Eye-Net exemplifies this direction, highlighting a dynamic confluence of technology and intent in the pursuit of safer roads.

While the journey towards a safer Japan is technological, it's crucial to remember the essence of this journey - the social connections binding the nation. As Japan harnesses the power of technology, this balance of modernity and tradition is what will potentially truly make it the safest country in the world.



Chapter 3

V2X and Road Safety



Vehicle-to-Everything (V2X), a technology enabling vehicles to communicate with surrounding entities, presents an opportunity for enhancing road safety globally. Originating from the late 1990s US intelligent transportation services, V2X evolved from the Wireless Access in Vehicular Environments (WAVE) and Vehicle Infrastructure Integration (VII) concepts to contemporary DSRC and C-V2X protocols, employing differing connectivity methodologies.

V2X promises to revolutionize traffic management and safety, creating a world with reduced collisions, optimized traffic flow, and increased pedestrian safety. The current developments include both hardware-based and software-based solutions. While hardware-based

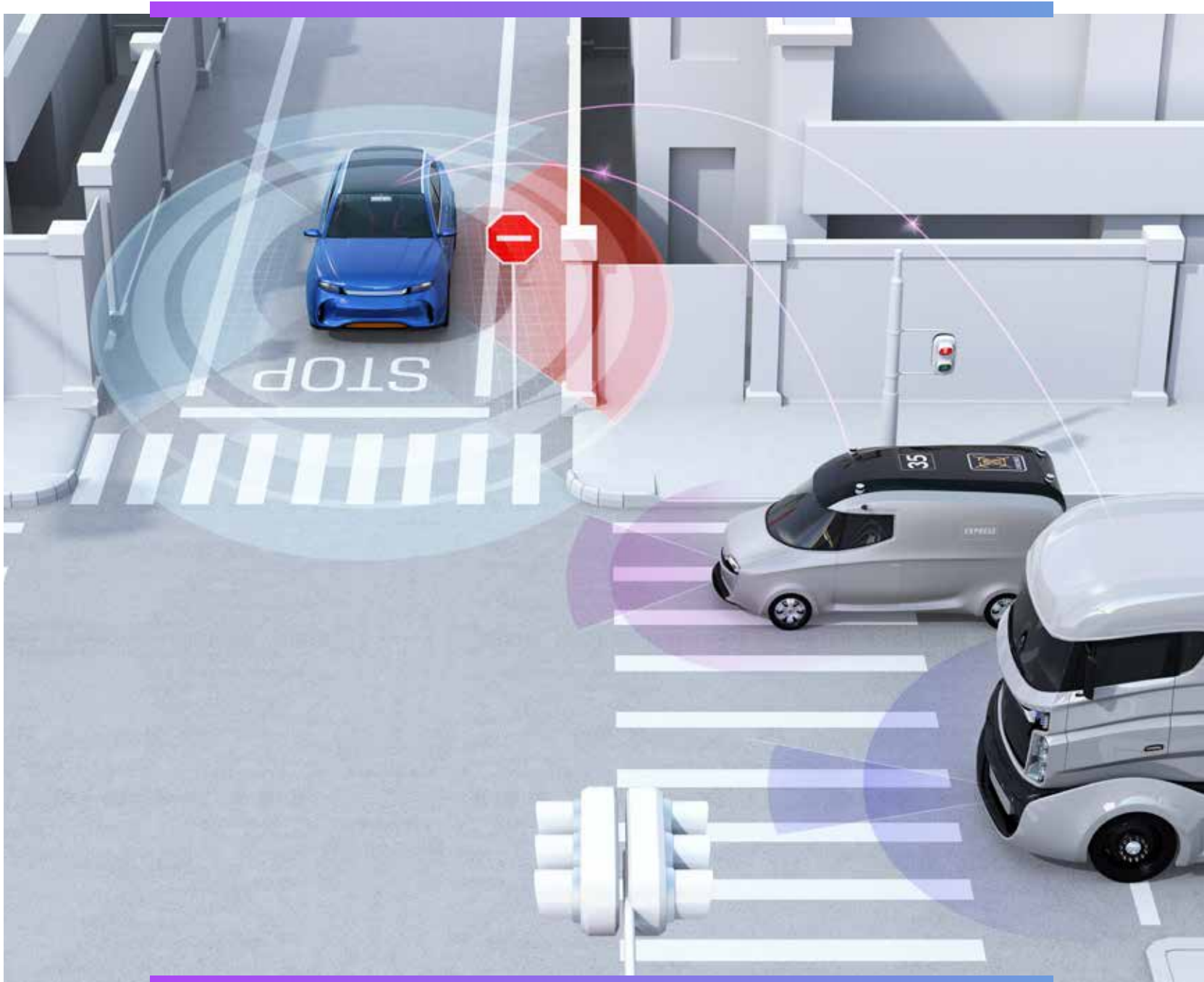
solutions use dedicated modules for vehicle communication, software-based solutions leverage existing technology platforms, leading to cost-effectiveness and adaptable deployment.

The transformative power of V2X is apparent in various applications: collision avoidance through vehicle-to-vehicle (V2V) communication, pedestrian safety via vehicle-to-pedestrian (V2P) communication, efficient traffic management through vehicle-to-infrastructure (V2I) communication, and quicker emergency responses. V2X leverages technologies like cellular networks, DSRC, and the newer Cellular Vehicle-to-Everything (C-V2X) standard.

Advanced developments in V2X technologies are focusing on addressing challenges like high-speed movement, fluctuating speeds, dense traffic, non-line-of-sight communications, and loss of GPS access, amongst others. C-V2X allows for broader connectivity in transport ecosystems, enabling direct communication between road users and

real-time traffic information dissemination.

In conclusion, V2X is a transformative technology with vast potential for improving road safety in Japan, and its ongoing development promises even more significant advancements.



Chapter 4

Eye-net: Pioneering V2X Collision Prevention



Eye-Net Mobile's software solutions tap into V2X connectivity to prevent collisions and transform road safety. Using advanced algorithms and predictive models, Eye-Net's unique offerings aim to mitigate the concerning global road traffic accident statistics that claim approximately 1.3 million lives annually.

The Company's flagship products, as mentioned in chapter 2, include Eye-Net™ Protect, a Software Development Kit (SDK) designed to easily supplement third-party location-based applications like navigation and shared micro-mobility apps, and Eye-Zone, a comprehensive safety solution tailored for the automotive industry.

Eye-Net solutions utilize existing cellular networks and smart devices, minimizing the need for additional hardware. The system incorporates cutting-edge algorithms, protocols, and system architecture, enhancing accuracy, predicting collisions, reducing latency, and optimizing device resource consumption.

Eye-Net's technology harnesses distributed edge computing and two layers of cloud services, leveraging spatial cross-correlation to calculate collision probabilities multiple times per second.

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The system is compatible with any cellular infrastructure (3G and up), providing real-time alerts by compensating for network latency differences among users' cellular devices.

Powered by the Global Navigation Satellite System (GNSS), Eye-Net's technology addresses its inherent challenges related to positioning accuracy, and positioning update rates. The company employs a hyper-sampling virtualization algorithm, enabling it to predict an object's location with increased precision, even when faced with the GNSS's typically slower update rates.

Furthermore, Eye-Net implements intelligent dynamic thresholds, which adapt according to the user's velocity and

positioning accuracy. This ensures accurate collision probability assessments in severe scenarios, even when positioning data might be less precise. As a forward-looking measure, Eye-Net plans to augment safety by integrating techniques like Precise Point Positioning (PPP) across mobile and automotive sectors.

Eye-Net's approach to road safety is focused on providing real-time preventative alerts with near zero false alerts, prioritizing vulnerable road users, and providing industry-specific solutions. With a user-focused approach, Eye-Net's technological innovation promises to transform the landscape of road safety.



Chapter 5

Eye-Net's Quest to Join Hands with Japan's Safety initiatives

As Japan emerges as a global leader in road safety, with its intricate fusion of technology and tradition, Eye-Net seeks to intertwine its pioneering V2X solutions with Japan's vision. In this synthesis of innovation and dedication, there's an opportunity for a safer future on the roads.

The establishment of the 11th Traffic Safety Program, designed with the future in mind, underscores Japan's commitment to enhancing road safety at every possible juncture. Technological strides are paired with an unwavering dedication to societal wellness, creating a unique model for others to emulate.

A core underpinning of Japan's drive lies in the interconnectedness of its society. The nation gracefully merges its long-standing traditions of community spirit with the modern reality of cellular connectivity. Within this junction, the automotive industry is undergoing a transformative shift, illustrated by the embracing of the CASE concept. But while technology serves as the vehicle, the ultimate destination remains the same: fostering a network of care, collaboration, and mutual protection.





V2X technology emerges as an influential player within this narrative. V2X heralds a promising era characterized by road safety, efficient traffic management, and most critically, the safeguarding of vulnerable road users. Amidst this backdrop, Eye-Net's innovative approach stands out. Products like Eye-Net™ Protect and Eye-Zone can work to assist in closing the gap for Japan to become the safest country in the world - for example, with their unique ability to detect threats beyond the line of sight that ensures enhanced safety in crowded junctions.

They're designed not just to coexist but to integrate seamlessly with automotive software and third-party applications. This not only widens the net of safety but also democratizes access to cutting-edge

safety tech.

Moreover, this fusion is only possible due to the robust cellular infrastructure in Japan. Giants in the telecommunications arena, like SoftBank, play a pivotal role in this scenario. Their vast networks and unparalleled connectivity serve as the backbone, enabling solutions like Eye-Net's to work optimally.

Cellular providers contribution transcends mere infrastructure; they're enablers, bridging innovative solutions with societal needs.

Eye-Net aspires to align harmoniously with Japan's broader safety goals. By leveraging the nation's strengths, from its societal fabric to its tech-savvy cellular networks, Eye-Net hopes to work together to co-create a safer tomorrow.

Conclusion

Japan's efforts in road safety demonstrate a blend of social responsibility, cutting-edge technology, and cross-sector collaboration. The nation's focus on reducing fatalities, especially among vulnerable groups like children and senior citizens, is commendable.

Through strategic governmental initiatives like the 11th Traffic Safety Program and the Comprehensive Safety Plan for Business Vehicles 2025, Japan is showing a commitment to setting a gold standard in road safety.

Technologies like V2X are not just buzzwords but actionable solutions that are transforming road safety paradigms in real-time. Companies like Eye-Net are contributing by bringing advanced, cost-effective solutions to the table. This e-book highlighted the synergy between Japan's long-term safety goals and the innovative approaches companies like Eye-Net can offer. The future of road safety in Japan appears not just promising but potentially transformative, creating a template that could serve as a model for global best practices in road safety.

References

1. International Transport Forum: Japan Road Safety Report 2021: <https://www.itf-oecd.org/sites/default/files/japan-road-safety.pdf>
2. Yoshifumi Wada, Yasushi Asami, Kimihiro Hino, Hayato Nishi, Shino Shiode, Narushige Shiode, 2023. Road Junction Configurations and the Severity of Traffic Accidents in Japan.
3. Ministry of Land, Infrastructure, Transport and Tourism (MLIT), 2023. Report: The Future of Vehicle Safety.
4. Japan Automobile Manufacturers Association (JAMA): The Motor Industry of Japan 2022.

Additional resources

- DIGITAL TRANSFORMATION IN JAPAN - Assessing business opportunities for EU SMEs, TOKYO, February 2022
- Road Transport Bureau, MLIT: The Future of Vehicle Safety for a Traffic Accident-Free Society (English version)
- A Brief History of V2X and will Software Take the Lead? The Eye-Net Mobile team: <https://www.eyenet-mobile.com/media-center/blog/a-brief-history-of-v2x-and-will-software-take-the-lead/>

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