

Insurance aspects of automated vehicles

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Abstract

This paper analyses some aspects of liability insurance law in relation to automated vehicles (hereinafter: AV). It examines the pertinent insurance provisions of EU law and the special provisions of German law and UK law. It is concluded that the parameters of liability insurance do not pose any major issues, save for provisions on data access and sharing. Problematic is the allocation of fault among the liable parties in redress claims, which will have to rely on performance-based standards and the traffic rules.

Keywords: automated vehicles, liability insurance, tort law, product liability, data protection

1. The advent of automatic vehicles

Automated vehicles (AV) are most probably the future of the car industry and driving. They are expected to dramatically decrease accidents and make roads safer, given that 94% of grave accidents are due to human error, while at the same time significantly reduce traffic congestion, driving costs and CO₂ emissions (NHTSA, n.d.) (Goldin, 2018). AV are the result of combining and integrating multiple sensors into a single system that help the vehicle “understand” the environment it is moving and adjust its road behaviour thereon (Gilbertsen, 2017).

There are different levels of automation, which vary from merely assisting the human driver to driverless operation. SAE International, a global association of engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries, has developed a widely recognised, six-class taxonomy of AV from Level 0 (no automation at all) to Level 5 (full self-driving capacity under all conditions) (SAE International, 2021). Currently, most new vehicles incorporate Level 1 and Level 2 automation technology, which means that they are equipped with driver-assistance systems, such as cruise control, automated lane keeping system etc., yet a human driver undertakes the driving task the whole time. There also plans for the introduction in the near future of Level 4 vehicles, which enable the vehicle to drive itself without the need of a human driver to intervene, but only under specific conditions, e.g. in the highways and in good weather. Expected are also the controversial Level 3 vehicles, which can drive themselves under specific

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conditions, yet the driver must be alert to resume control in case of an emergency or if prompted by the vehicle. Level 5 vehicles have proven technologically very challenging and are not expected to be soon commercially available.

In general, AV are complex systems comprised of sophisticated hardware and software components. They can act upon their environment without being fully controlled by a human being, while their actions and the potential consequences are not fully defined and predictable when they are taken into use (European Commission, 2018a, 104–105).

Things get further complicated by the fact the integration of AV into the Connected-Intelligent Transport Systems ecosystem (European Commission, 2016). In this framework, AV may be connected to and communicate with each other (V2V communication) and with traffic infrastructure (V2I communication), to exchange information and enhance safety. In addition, they may communicate with third parties who provide various services (V2X communication).

2. Effect on liability for traffic accidents

The above-mentioned elements pose great legal challenges also from a liability perspective. In conventional vehicles, the driver can fully control the vehicle while driving; hence, liability for traffic accidents rests with the person that exercises control over the vehicle (driver, owner, or keeper) and only exceptionally with the vehicle manufacturer. However, this situation is expected to change with AV, in which control of the vehicle is passed from the human driver to the vehicle system, depending on the automation level employed. In this regard, it is noteworthy that some manufacturers have already publicly stated that they will assume responsibility and the related liability for any accidents that may occur while their vehicles are operated in autonomous mode (Korosec, 2015; Euractiv.com, 2017).

It has been observed that there are four main categories of potential risks relating to the massive deployment of AV: (1) risks relating to software failures of the driving system of AV, (2) risks relating to network failures, (3) risks relating to hacking and cybercrime, and (4) risks/externalities relating to programming choice (European Parliament Research Service, 2018, 24–27).

Thus, the question is what liability rules apply to AV and how such liability is apportioned between the vehicle's driver and the manufacturer. The complex and non-deterministic nature of self-learning systems employed in AV creates also challenges as to the applicable standard of care for determining negligence. Questions of negligence arise in any case at the stage of redress claims, even if national law provides for strict liability of the vehicle's owner/ keeper/ driver to third parties.

It is beyond the ambit of this paper to examine in detail the provisions that govern such issues. As to product liability, at EU level applicable may be the Product Liability Directive (Directive 85/374/EEC), alongside the general provisions on negligence of the manufacturer. National law governs liability of the vehicle keepers or drivers. Many civil law legal systems provide for strict liability of the vehicle keeper and driver,

notwithstanding negligence liability. Common law countries apply ordinary principles of negligence.

3. Effect on insurance

3. 1. EU law

The EU Motor Insurance Directive (MID – Directive 2007/46/EC) prescribes mandatory third-party liability insurance for motor vehicles, which covers the vehicle's passengers too. According to a recent evaluation process by the European Commission, the MID does not need any amendments to accommodate AV. These were found to be fully covered by the existing provisions, which are technology neutral (European Commission, 2018b). The MID has also established a system for compensation of victims of accidents caused by unidentified or uninsured vehicles.

Important for AV is the CJEU judgment in the case C-162/13, *Vnuk* (ECLI:EU:C:2014:2146). The Court clarified that the concept of the 'use of vehicles' in the scope of the MID covers any use of a vehicle that is consistent with the normal function of that vehicle. It has been observed that the 'normal function' of an AV includes automated driving (ABI & Thatcham Research, 2016, 11–12; Eichelberger, 2020, para. 15). At the same time, caution is needed regarding the interplay of the PLD with the MID, to avoid complexities by establishing an insurance regime applicable during automated driving modes, which would be tailored to the PLD, combined with the requirements of the MID (ABI & Thatcham Research, 2016, 12).

3. 2. German law

Under German law, insurance repercussions arise from the provisions on road traffic liability for AV.

German law provides for special rules on third-party liability of the vehicle keeper and driver, which do not affect their potential liability under other provisions, e.g. general rules on torts. These rules can be found in the Road Traffic Act (StVG) and have been amended to include AV.

In general, the StVG regulates issues for AV of Levels 2-4. It establishes duties of keepers, drivers and manufacturers depending on the automation level. For AV of Levels 2 and 3, driver of the vehicle is also the person that engages its high-automated or fully-automated mode, even if she has hands off the wheel (StVG, §1a(4)). Level 4 vehicles cannot be operated, unless a natural person, called "Technical Supervision" (*Technische Aufsicht*), is prepared to authorise manoeuvres of the vehicle, if it cannot continue operating in autonomous-driving mode, or to deactivate such driving mode (StVG, §§1d-1f). The Technical Supervision may fulfil her tasks also remotely, i.e. from outside the vehicle (Bundesregierung, 2021, 28).

§7 StVG establishes strict liability of the vehicle keeper for any injury or damage caused to third parties, unless it was caused by force majeure. Such liability does not apply to a person that was participating in the vehicle's operation (StVG, §8(2)), i.e. the driver or the Technical Supervision. Under §17 StVG, if more than one vehicle have caused the accident, the respective keepers are liable to each other depending on the their degree of fault. The same goes for accidents caused by a vehicle to another vehicle.

Liable for accidents are also the drivers of the vehicles. However, their liability is based on negligence, which is presumed (StVG, §18).

The liability limits for keepers and drivers regarding personal injury and property damage amount to € 10m and € 2m respectively (StVG, §12(1)), which are twice the limits for conventional vehicles. The German government explains that these caps aim at the protection of accident victims and their amount reflects the lack of experience with claims arising from the operation of AV (Bundesregierung, 2017, 8). This is a paradox, given that AV are supposed to increase safety and reduce accidents.

§1 of the Mandatory Insurance Law (Pflichtversicherungsgesetz – PflVG) obliges keepers of AV to have insurance in place, which covers not only their own liability, but also the liability of drivers and the Technical Supervision. The Annex to the PflVG prescribes per event minimum insurance limits of € 7,5m for personal injuries, € 1,22m for property damage and € 50k for pure economic loss, which apply to both conventional and automated vehicles. It is obvious that there is a regulatory discrepancy between liability limits and minimum insurance coverage.

Consequently, German law channels liability to the keeper of the AV, who remains strictly liable and can afterwards clarify the exact apportionment with the manufacturer (Bundesregierung, 2017, 8). From an insurance perspective, claims will be handled by motor vehicle insurers, which may have recourse against the manufacturers or their insurers. It is also noteworthy that some German insurers are contemplating to offer to keepers of AV motor insurance policies, which could cover damage and injuries caused to them by technical defects of the AV (Autohaus, 2021).

3. 3. UK law

In the UK, the Automated and Electric Vehicles Act 2018 (AEVA) has been enacted, which establishes strict liability of insurers of AV. This is a remarkable feature under UK law, in which strict liability is treated as anomalous (Oliphant, 2019, 196).

The Act applies to 'automated vehicles', i.e. vehicles that the Secretary of State has included in a special list and (a) are designed or adapted to be capable to safely drive themselves, at least in certain situations and (b) may lawfully be used when driving themselves, in at least some circumstances or situations, on roads or other public places in Great Britain (AEVA, 2018, s. 1(1) and (4)). A vehicle is 'driving itself', if it is operating in a mode in which it is not being controlled, and does not need to be monitored, by an individual (AEVA, 2018, s. 8(1)(a)). Therefore, the AEVA applies mainly to Level 4 and Level 5 vehicles, possibly to Level 3 vehicles too (Chatzipanagiotis & Leloudas, 2020, 169–170).

Without prejudice to any other person's liability in respect of an accident, insurers of AV are liable for damage caused to an insured person or any other person by an AV when driving itself on a road or other public place, provided that the vehicle is insured at the time of the accident (AEVA, 2018, s. 2(1) and (7)). Insurers are not allowed to contractually limit their liability, unless the accident was caused by unauthorised software alterations or failure to update the software (AEVA, 2018, s. 2(6)). If the AV is uninsured, then its owner is liable (AEVA, 2018, s. 2(2)).

As to software updates, s. 4 AEVA permits insurance policies that contain exclusions or limitations of the insurer's liability to the insured, if (a) software alterations were made by the insured or with their knowledge and such alterations were prohibited or (b) there was a failure of the insured to install safety-critical updates that they knew or ought to reasonably know of being 'safety critical', which means that it would be unsafe to use the vehicle in question without such updates being installed (AEVA, 2018, s. 4(6) (b)). However, if the insured is other than the policyholder, then liability limitations and exclusions are only permitted, if the insured knew or ought to know that such alterations are prohibited under the policy (AEVA, 2018, s. 4(2)). Although these provisions do not affect liability of the insurers towards third parties, they vest insurers with a right of redress against the insured (AEVA, 2018, s. 4(4) and (5)).

Furthermore, the liability of the insurer or the owner may be reduced, if there was contributory negligence of the person in charge of the vehicle in allowing the vehicle to begin driving itself, when it was not appropriate to do so (AEVA, 2018, s. 3).

Upon settlement of the liability of insurers of the AV to the injured person, insurers have a right of recourse against any party responsible for the accident, including the manufacturer of the AV (AEVA, 2018, s. 5). If the amount recovered from the responsible party exceeds the amount paid to the injured party, they are liable to the injured party for the excess (AEVA, 2018, s. 5(3)).

There is a gap in the AEVA regarding accidents caused by uninsured owners of AV, when operating in autonomous mode. Despite being expected that the Motor Insurance Bureau (MIB) will provide compensation, if the owner is not capable of paying out the claim, the MIB cannot cover such damage, as there is no liability for the uninsured owner under the AEVA (Law Commission & Scottish Law Commission, 2018, para. 6.19). To fill this gap, the British Government had been reported being in discussions with the MIB (Law Commission & Scottish Law Commission, 2018, para. 6.19), while the Law Commission and the Scottish Law Commission have recommended that the UK Government should put in place measures to provide compensation in respect of uninsured authorised AV (Law Commission & Scottish Law Commission, 2022, para. 13.39).

4. Accident-related data

Given the complexity of the AV, the division of the driving task between human driver and the system, and the eventual interaction of the vehicle with other parties, it is essential for insurers that they can accurately reconstruct the accident and identify

its factual parameters. The main issues are how these data will be collected and for how long they will be retained.

4.1. Collection and sharing of data

Insurers have supported the installation of data storage systems in AV and the sharing of the recorded data (ABI & Thatcham Research, 2016, 15). Such systems are mainly the Event Data Recorder (EDR), which records and stores critical crash-related parameters, and the Data Storage System for Automated Driving (DSSAD), which records who was in control and of what throughout the operation, in case of unexpected events that could impact road traffic safety (International Organisation of Motor Vehicle Manufacturers, n.d.). These systems can be very useful to establish critical facts surrounding an accident. Nonetheless, the automatic storage of data is triggered by specific events, e.g. sudden break, opening of an airbag etc., which may not occur if an accident has not been caused by a direct collision (Law Commission & Scottish Law Commission, 2018, para. 6.57). Thus, these systems have limitations.

Apart from such systems, manufacturers often collect data regarding the use of the vehicle. However, manufacturers may be reluctant to share the data collected with insurers for mainly two reasons: (a) they have set up their own insurance companies, e.g. Tesla (Tesla, n.d.), and may want to provide them with a competitive advantage; (b) they are afraid that insurers will seek to collect more data than necessary and use them to their commercial benefit (Law Commission & Scottish Law Commission, 2022, para.13.56). Hence, motor-vehicle insurers have advocated for the establishment of an independent data trust, which will ensure data security and data protection (Gesamtverband der Deutschen Versicherungswirtschaft, 2018). Such proposal had been advocated also by consumer-protection groups regarding non-personal data (Verbraucherzentrale Bundesverband, 2017, para. 5.3), while car manufacturers do not seem to object either (European Automobile Manufacturers' Association, n.d.).

Moreover, insurers could collect and process data through special equipment embedded in the AV or installed extra. Such equipment is already used in the framework of pay-as-you-drive insurance (Tselentis, Yannis, & Vlachogianni, 2016).

At the same time, much of the data collected may be personal data, if they allow the identification of a natural person either on board the vehicle or outside it (European Data Protection Board, 2021, para. 107; Forgó, 2020, paras 16–17). Thus, processing and sharing of such data is allowed only upon fulfilment of the applicable legislation on personal data protection.

4. 2. EU law

4. 2. 1. Mandatory Event Data Recorder

The EU, recognising the importance of Event Data Recorder(EDR) for accident investigation and enhancement of road safety, has made them mandatory for new

vehicles in the EU, under Regulation (EU) 2019/2144 on type approval requirements for motor vehicles. According to Art 6(1)(g), (4) and (5) and Art. 11(1)(d) of the said Regulation, all motor vehicles, including AV, must be equipped with an EDR, which will record and store vehicle data from the period shortly before until shortly after a collision. The pertinent provisions take into account the need of protection and security of personal data: the EDR must operate on a closed-loop system, which means that real-time, over-the-air transmission is not permissible, while the data collected must be anonymized and protected against manipulation and misuse. An EDR may not be capable of recording and storing the last four digits of the vehicle indicator section of the vehicle identification number or any other information which could allow the individual vehicle itself, its owner or holder, to be identified. Such data can be made available to national authorities only for the purpose of accident research and analysis, and in compliance with the General Data Protection Regulation (GDPR - Regulation (EU) No 2016/679). It is noteworthy that the Regulation 2019/2144 does not provide for sharing of data with insurers.

4. 2. 2. Processing of personal data by insurers

To the extent that the data collected by insurers are personal data, applicable will be the GDPR.

The affected data subjects may provide their consent to the processing of their data by insurers. Such consent could be given at the time of conclusion of the contract between the insurer and the keeper. The same could be valid for authorised drivers, who are named in the policy and, despite the likelihood that they are not party to the contract, they could sign a consent form for processing of their personal data in case of an accident. However, passengers of the AV could not consent at the time of conclusion of the contract. In such cases, any consent would be given after the accident.

An additional processing basis as to vehicle keepers, and in general the insured parties to the contract, is Art. 6(1)(b) GDPR, i.e. processing necessary for the performance of a contract to which the data subject is party. Besides, Art. 6(1)(c) GDPR permits processing if it is necessary for compliance with a legal obligation to which the controller is subject, as a possibility if there are pertinent provisions in national law.

Especially important in practice will be data collected by other vehicles and by infrastructure of the surrounding, e.g. security and traffic speed cameras. In such cases, processing of personal data could be based on the legitimate interest of insurers to provide compensation to victims and settle disputes, as per Art. 6(1)(f) GDPR. Yet this basis requires a balance of interests with the fundamental rights of the data subjects. It has been suggested that in insurance-related cases there may be a superior interest of the data subjects to prevent degradation of their legal position (Forgó, 2020, para. 36). Nevertheless, it would be in the interest of the persons involved to have the facts established as clearly as possible to expedite settlement proceedings and to avoid potential negative inferences from the objection to share specific data.

4. 3. German law

Under German law, §63a StVG, which was added in 2017 and applies mainly to Level 3 AV, provides that AV should store satellite data on positioning and timing each time the operation mode is shifted from automated to manual and vice versa. Furthermore, such data should be stored, also when the vehicle system calls the driver to take control or when a technical malfunction occurs in the vehicle system. The data stored must be communicated to the competent authorities upon demand and to the extent necessary for the purpose of their investigation. Moreover, the data must be handed over, upon demand, to third parties involved in an accident, to the extent necessary to enable the exercise of their legal rights. Data should be stored for a period of six months, unless the vehicle has been involved in an accident, in which case the storage period is three years. The three-year period nominally coincides with the general limitation period under German law (§195 BGB). However, such period begins at the end of the year in which the accident occurred (§199(1) BGB). In this regard, the German legislator did not follow the recommendation of the German insurers to lay down a four-year storage period (Gesamtverband der Deutschen Versicherungswirtschaft, 2017, 12).

In 2021 the StVG was amended anew to include provisions on Level 4 vehicles. Among others, a new §1g was added on data processing. It establishes the keeper's duty to store a series of data, such as Vehicle Identification Number, positioning data, number and times of activation and deactivation of the autonomous mode etc., in cases of non-nominal operation of the vehicle, i.e. (a) interventions through the Technical Supervision, (b) accidents and safety incidents, (c) unplanned change of lanes and deviations and (d) problems in the operation of the vehicle. Manufacturers are obliged to have appropriate equipment installed on the vehicle to enable such data collection, as well as to provide instructions to the keeper on the settings of the processing of data, to protect privacy (privacy by design). The keeper has to send these data to specific public authorities upon request. Of special importance for insurers is §1g(7) StVG which entitles third parties to require stored data from the keeper, in order to pursue or defend themselves against legal claims. Third parties must delete the data, as soon as they are of no further use to them, and in any case upon limitation of their respective claims (Bundesregierung, 2021, 20).

4. 4. UK law

The AEVA 2018 does not provide specifically for data storage and sharing. However, the insurance industry has repeatedly underlined the need of insurers to access in-vehicle data, for a workable liability and insurance system to exist (ABI & Thatcham Research, 2019, 19; International Underwriting Association, 2019, 11).

The Law Commission and the Scottish Law Commission, after extended consultation, have proposed to the Government that Data Storage System for Automated Driving equivalent data should be uploaded to a neutral central server and be retained

for the three-year standard limitation period, plus another three months to enable the data to be found and preserved. During these three months, the insurers are expected to promptly contact those holding the data, so as to ensure enough time to identify and preserve the data (Law Commission & Scottish Law Commission, 2022, paras 13.50–13.51). Such servers are neither operated nor financed by the manufacturers but by an independent party, to promote fair and open competition among service providers (European Automobile Manufacturers' Association, n.d.) .

Moreover, the Law Commissions have recommended the establishment of a duty of those controlling AV data to disclose data to insurers, where the data is necessary to decide claims fairly and accurately (Law Commission & Scottish Law Commission, 2022, para. 13.61). This would provide an additional basis for processing of personal data under Article 6(1)(c) GDPR, i.e. where “processing is necessary for compliance with a legal obligation to which the controller is subject” (Law Commission & Scottish Law Commission, 2022, para. 13.54).

5. Single-insurer model

The above developments manifest the regulatory preference for a single-insurer model. Motor insurers undertake to compensate victims, irrespective of the automation level of the vehicle and of whether the vehicle or a human was undertaking the driving task. Subsequently, the insurer will have recourse against the manufacturer and/or other liable parties, depending on the apportionment of fault. Therefore, from a third-party liability perspective, liability is channelled to the insurer either directly (under the UK model) or indirectly (under the German model). This approach has the advantage of expediting compensation of victims, while leaving complex technical issues to be determined and settled among professionals. A further advantage is that does not distinguish between automated and conventional vehicles, both of which will be sharing the roads for a long time. Thus, compensating third parties does not get too complex.

Nevertheless, the thorny questions of allocation of liability still exist, but are merely driven to the background. Insurers have to clarify who was at fault. Since fault in the case of automated systems and AI is hard to determine under traditional principles of negligence, fault will have to be determined on the basis of adherence to traffic rules and technical safety standards, such as UN Regulation 157 on uniform provisions concerning the approval of vehicles with regard to Automated Lane Keeping Systems (E/ECE/TRANS/505/Rev.3/Add.156). Safety standards should be performance-based (cf. Law Commission & Scottish Law Commission, 2018, 93–94), i.e. they should prescribe the desired technical result and not the means to achieve it, to enable flexibility of compliance and avoid stifling innovation. Traffic rules have been developed with human users in mind. However, AV are expected to comply with them as a minimum, since roads will be shared between AV of different levels of automation and human users. Should no determination of fault be possible, each insurer will bear the cost of compensating its own insured (in the case of passengers and drivers), while liability to third parties could be attributed equally to each party involved.

6. Liability caps and insurance funds

There have been suggestions that liability for AV should be limited, to promote the use and adoption of the technology and protect manufacturers from excessive liability exposure. In this regard, there have been several proposals, mainly in the US, for the establishment of special insurance funds for AV (Abraham & Rabin, 2019, 145; Colona, 2012, 118–119).

Nevertheless, an AV could cause no greater damage than an ordinary car. Even if a defect affects a whole fleet of cars, the situation is not significantly different than a design defect in ordinary vehicles. As to cyber-security risks, these exist too in modern conventional vehicles with internet links (Taub, 2021). Thus, from an insurance perspective the probable maximum loss remains largely unchanged.

In this respect, the AV industry is different than the nuclear-energy industry as well as the shipping and aviation industries. The activities of the said industries have a catastrophic potential that is hard to quantify and call for a liability cap to be rendered insurable. The nuclear accidents in Chernobyl (World Nuclear Association, 2021a) and Fukushima (World Nuclear Association, 2021b), as well as the oil-spill cases of Deep Horizon (Environmental Protection Agency, n.d.a) and Exxon Valdez (Environmental Protection Agency, n.d.b) have demonstrated their immense disaster potential in terms of public health and environmental damages. Moreover, the 9/11 attacks have demonstrated the enormous insurance risks arising from the deliberate misuse of aviation (Institute for the Analysis of Global Security, n.d.). Nonetheless, even the most extreme cases of terrorists using cars as weapons (CNN Editorial Research, 2021) are dwarfed by the above-mentioned cases.

What is special about AV is the shift of liability from the driver or the owner to the manufacturer, which increases the manufacturer's exposure to liability. However, such exposure is inherent in all new technologies, until they mature.

Thus, the disaster potential of AV does not affect their insurability, to justify imposing special liability caps.

7. Conclusion

AV partially shift liability from the keeper or driver of the vehicle to the manufacturer. From the perspective of third-party liability, the single-insurer model has prevailed, which expedites compensation of victims, regardless of fault of the driver or keeper. Such model may result from the application of material provisions imposing strict liability on the vehicle's keeper, as in Germany, or from direct legislative intervention on motor insurance, as in the UK. In any case, there is strict liability towards third parties, which should be maintained.

Nevertheless, questions of fault need to be addressed at the stage of substitution and redress. To this end, access to the vehicle data collected by data storage systems is crucial. The main practical problems relate to the sharing of non-personal data between insurers and manufacturers. Such problems have begun being addressed by regulators, albeit in rather generic terms so far. Regulators seem to regard it as both less urgent compared

to other priorities, like type certification issues and establishment of standards, and able to be settled privately among parties that are both commercially experienced and reasonable. The support of both insurers and manufacturers for uploading data to neutral servers appears to confirm the latter point, at least in part. As to sharing of personal data, a subtle balance of interests with the provisions of the GDPR on the sovereignty of the data subject is required, which means that ad hoc evaluation will be necessary, depending on the details of the case.

Liability caps or special insurance funds to ensure insurability of liability arising from the technical particularities of AV are not needed. There is no evidence that AV have a greater disaster potential for third parties that conventional vehicles – and if they do, they will most likely not be allowed to enter into service.

In general, from the perspective of liability insurance the main problem is access to accident data, which requires specific regulatory intervention. Prompt compensation of victims is maintained through the single-insurer model. The rest of the issues regard either the contractual relationship of the insured with the insurer or material provisions on liability, especially the problem of allocating fault in redress claims. The latter could be best tackled through gradual development of technical standards and through application of the traffic rules, which apply to all vehicles, irrespective of their mode of operation.

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