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ANALYST REPORT

FLEET MANAGEMENT

A pioneering IoT vertical...

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Fleet management – a pioneering IoT vertical

Fleet management (FM) represents an early application area of M2M/IoT technology, writes Rickard Andersson, senior analyst at Berg Insight. The fleet management market for commercial vehicles has developed significantly over the past decades, impacted by general trends such as the transition to SaaS-based business models and the increasing integration of mobile devices as part of the infrastructure which goes hand in hand with a general commoditisation of hardware. Recent developments have even seen a diversification among providers of fleet management solutions for commercial vehicles to also support other types of assets. In line with a development sometimes dubbed as the Internet of Transportation Things, several solution providers now offer systems that can be deployed across off-highway vehicles, non-powered assets and other non-vehicle fleets, in addition to the conventional commercial vehicle types traditionally targeted by FM providers.

Fleet management infrastructure and applications

Fleet management (FM) is an ambiguous term used in reference to a wide range of solutions for different vehicle-related applications. Berg Insight's definition of an FM solution is a vehicle-based system that incorporates data logging, satellite positioning and data communications to a back office application. At a high level, the infrastructure for fleet management can be divided into four segments:

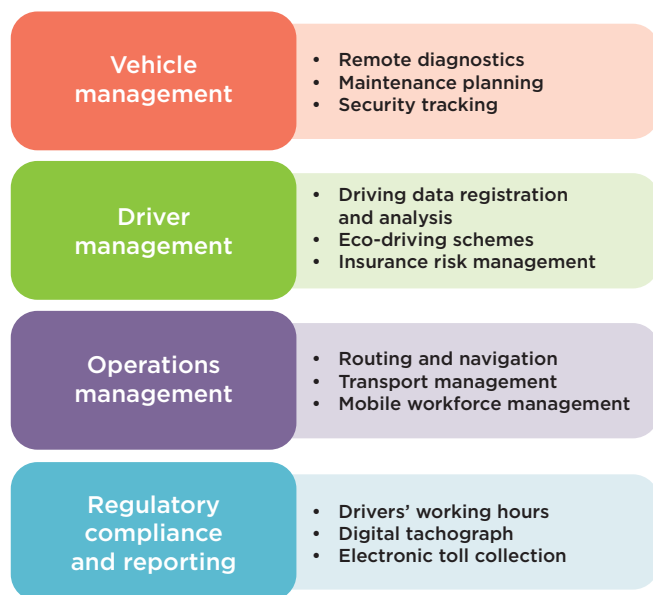
- **Vehicle segment** – All vehicles connected to the FM solution need to have a combined satellite positioning and wireless communications unit. The unit can be of a wide range of form factors and may be connected to various devices, peripherals and data interfaces inside the vehicle.
- **GNSS segment** – The FM solution relies on public global navigation satellite systems such as GPS and GLONASS for accurate positioning of the vehicles.

- **Network segment** – Wireless wide area networks are employed by the FM solution for data transmission. Cellular mobile networks are currently the most widely used, while systems using satellite communications are also available.
- **Back office segment** – Behind a data communications gateway, a wide range of standard and third-party applications may have access to data from the vehicles.

Fleet management includes numerous feature sets for various commercial vehicles. Typical high-level categories include vehicle management, driver management, operations management and regulatory compliance and reporting. Each category includes different subsets of functionality, some of which are generally applicable for all types of segments, while others are specific for certain operations.



Figure 1: Major applications for fleet management



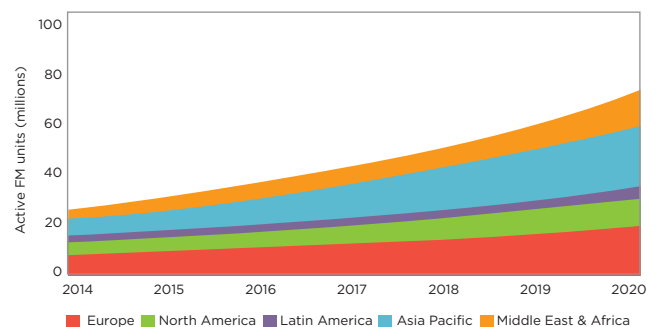
The global fleet management market for commercial vehicles

There are approximately 1.2 billion motor vehicles in the world today. The Americas represents the largest vehicle market with close to 400 million vehicles, followed by Europe and Asia-Pacific which both account for around 350 million vehicles respectively. More than 300 million vehicles of the total global fleet are commercial vehicles, out of which the majority are light commercial vehicles such as vans and pickups. Berg Insight estimates that over 30 million commercial vehicles worldwide are equipped with active fleet management systems based on satellite positioning and mobile communications. This corresponds to a penetration rate of 10%. Growing at a compound annual growth rate of 19%, the global fleet management market is forecasted to exceed 70 million active vehicle systems by 2020. The largest fleet management markets are currently Europe and Asia-Pacific followed by North America. Middle East & Africa and Asia-Pacific are expected to experience the strongest growth rates in the upcoming years.

The leading fleet management solution providers

The fleet management market is populated by hundreds of telematics players worldwide. The majority of the aftermarket involves small local players with installed bases in the range of a few thousand units up to 50,000 units. Most FM companies are only active in their respective domestic markets and

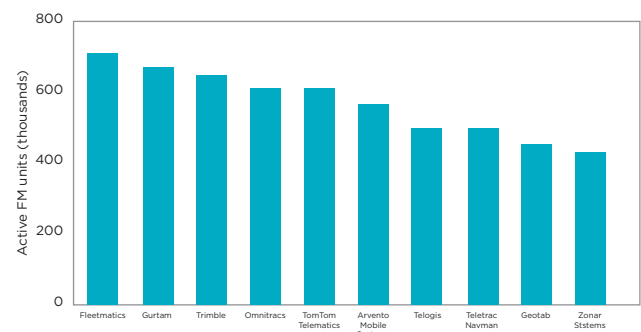
Figure 2: Active fleet management units by region (2014-2020)



The global fleet management market is anticipated to show healthy growth in the next 5 years

neighbouring countries. A number of major fleet telematics players have emerged which are active regionally or internationally with significant customer bases. The top ten FM providers worldwide together have a total active installed base of more than 5 million units. The fast-growing provider Fleetmatics has recently surpassed the milestone of 700,000 subscribers and is today the largest solution provider with presence in North America, Latin America, Europe and Australia. The runners-up include the Belarusian software player Gurtam, the major navigation provider Trimble, the US-based pioneer Omnitracs (formerly Qualcomm Enterprise Services) and TomTom Telematics which is a business unit of TomTom dedicated to fleet management, vehicle telematics and connected car services. These players all have more than 600,000 vehicles under management. Other vendors with over 400,000 active fleet management units include Arvento Mobile Systems, Telogis, Teletrac Navman, Geotab and Zonar Systems.

Figure 3: Top 10 fleet management providers worldwide (Q4-2015)



All of the top-10 fleet management providers have now surpassed 400,000 active units globally and many of them continue to experience strong growth



North America – front-running market with considerable momentum

North America represents a pioneering fleet telematics market from a global perspective. Early initiatives include Qualcomm's first commercial product OmniTRACS, a satellite-based communications system for the transportation industry used to manage truck fleets since the late 1980s. The market has in the following decades developed at a high pace, for example driven by various regulatory developments related to IFTA fuel tax reporting, distracted driving, CSA compliance, Driver Vehicle Inspection Report (DVIR) rules, anti-idling, Hours-of-Service (HOS) regulations and associated electronic logging devices (ELDs). The final ELD mandate rule was published in December 2015 and will affect around 3 million trucks in the US, with similar requirements expected also in Canada in the near-term. Compliant solutions are already available from a variety of different players, ranging from comparably simple solutions focused on fulfilling the regulatory demands based on mobile device integration to high-end fleet management systems offering ELD functionality as part of a broad portfolio of telematics services.

Leading providers on the North American fleet management market include Fleetmatics, Trimble, Zonar Systems, Omnitracs, Telogis, Verizon Networkfleet, Geotab and Teletrac Navman, all having more than 200,000 active fleet management units in the US and Canada. These two countries are generally seen as one and the same market as they exhibit similar market characteristics in terms of customer demands, corporate culture and regulatory implications on fleets. Some of the solution providers mentioned above are focused exclusively on the North American market while others have expanded geographically to other regions. The vendors also differ in terms of the fleet segments that they target. The North American heavy truck segment is dominated by Trimble's PeopleNet and Omnitracs (including XRS). Other companies active in this segment include Zonar Systems as well as Rand McNally and Cadec (now part of PeopleNet). Actors with substantial business within service fleets – often installing the solutions in LCVs such as “white vans” – include Fleetmatics, Verizon Networkfleet and NexTraQ. Other vendors often have a broader market scope covering both light and heavy vehicles.

Various types of telematics solutions are also marketed by vehicle manufacturers such as Daimler, Ford, GM, Hino,

Peterbilt, Kenworth, Navistar, Volvo and Mack. In many cases, the OEM solutions offered on the North American market are powered by telematics partners such as Telogis, Zonar Systems and PeopleNet. The OEM channel thus constitutes a major opportunity for the aftermarket solution providers which can secure sales of large quantities of factory-fitted systems and associated subscriptions.

Mobile operators have become an important sales channel for fleet management solutions, as operators increasingly have diversified beyond providing the mere wireless communications services to promote end-to-end solutions through partnerships where the operator acts as a reseller and point of contact towards the end client. In North America, partner-powered FM offerings are available from carriers such as AT&T, Sprint, Bell, Telus and Rogers. Verizon even has its own fleet management subsidiary – Verizon Networkfleet – following the acquisition of Hughes Telematics.

Latin America – fragmented market with strong security focus

While mature fleet telematics markets generally have been driven by resource optimisation and cost savings, Latin American fleets have focused on counteracting epidemic criminal activities such as vehicle theft, cargo robbery and even fuel siphoning. Basic track and trace solutions complemented with special features such as panic buttons and remote immobilisers are common in the region. Such solutions are available from a myriad of suppliers and often provide little functionality beyond the possibility of ensuring that vehicles and cargo are not lost. Providers of advanced fleet management solutions have historically claimed to have a hard time convincing businesses of the efficiency gains made possible by high-end FM applications, and an educational process has often been required in order to extend the perception of fleet management beyond security-related aspects. The Latin American fleet market has however in the past years started to evolve from the traditional emphasis on security to also focus on optimisation of fleet operations through management of logistics processes and improvement of driver behaviour.

The Latin American market is still highly fragmented and poised for consolidation as a very large number of players are active in many of the countries. Leading fleet telematics companies on the Brazilian market include the domestic



providers Sascar, Autotrac, Zatix and OnixSat, while Encontract, Copiloto Satelital, Grupo UDA and Global Track are examples of significant players based in Mexico. Other notable actors in Latin America include WideTech and Satrack based in Colombia, Tastets System, Wisetrack and GPS Chile in Chile, Hawk GPS in Argentina and Location World based in Ecuador, each holding important positions in their respective domestic markets and in some cases having expanded to neighbouring countries. A number of international players are also active in the region. Omnitrac for example has a solid presence in Latin America where Brazil and Mexico are the main countries. Also, US-based Position Logic which is today owned by KORE Wireless has a strong position in Latin America where the majority of its client base can be found. Additional international players with large subscriber bases in the region include Telogis and Teletrac Navman from the US, Pointer Telocation and Ituran based in Israel, and Gurtam which is headquartered in Belarus.

Western Europe – large multinationals and local providers coexist with strong OEM players

Western Europe is one of the most mature fleet telematics markets in terms of adoption rates. There are however considerable variations across the Western European countries. The UK and Ireland together with the Benelux countries represent the most advanced regional markets for fleet management solutions in Europe followed by the Nordics, France and the German-speaking markets. Southern European countries including the Mediterranean on the other hand represent comparably lagging markets with penetration rates far below the northern parts of the European continent. Continuous developments on the EU level such as regulatory mandates affecting transportation-intensive sectors and a general convergence between member countries in line with increased mobility across borders are however expected to result in a more homogenous market in the future.

The largest players in the region are TomTom Telematics and Masternaut which hold the leading market shares, both having more than 300,000 active fleet management units primarily in the western parts of Europe. Additional players with 100,000 subscribers or more include Microlise in the UK, DigiCore (Ctrack) based in South Africa, Teletrac Navman, Trimble and Orange Business Services. The latter is the business services

arm of the French operator group which acquired the domestic vendor Ocean in 2015, thus boosting its FM subscriber base considerably. Additional large Western European aftermarket players for example include the strong heavy truck telematics provider Transics (now part of WABCO) which is based in Belgium, Traqueur in France, and Trakm8, Quartix and Blue Tree Systems which are all headquartered in the UK and have expanded to various international markets. Fleetmatics has furthermore strengthened its position in Western Europe through multiple acquisitions in recent time.

The leading truck manufacturers in Europe such as Scania, Volvo and Daimler have all introduced in-house developed fleet telematics solutions that have captured large market shares, especially in the European truck telematics market. Scania Fleet Management has surpassed 170,000 connected vehicles globally and Volvo's Dynafleet has reached 90,000 vehicles while Daimler's FleetBoard has an installed base of around 80,000 connected vehicles worldwide. Around 80–90% of their subscriber bases can be found in Europe.



The 1-Fleet Alliance has attracted a growing number of members in Europe, together having a total of more than 400,000 FM units in operation



There are so far few truly pan-European fleet management solution providers. Even the largest players in the region have most of their installed bases concentrated in a relatively small number of countries. Many of the small- and mid-sized fleet telematics providers are largely focused on the domestic markets while international presence is typically limited to a few neighbouring countries. A noteworthy development in recent years is the emergence of alliances between fleet management providers on the European market. The most notable example is the 1-Fleet Alliance which today brings together 17 companies in Western as well as Eastern Europe, together totalling more than 400,000 active fleet management units. Being part of this type of constellation may enable smaller players to conduct joint R&D projects and enjoy benefits related to scale in terms of, for example, purchasing activities.

Eastern Europe – trailing the neighbouring markets in the west

The gap between the eastern and western parts of Europe has gradually narrowed and the western-most countries in Eastern Europe including EU members in the area today have fleet management markets which to a large extent resemble Western Europe. Many countries in the region are already tracking the most developed European markets relatively closely in terms of system functionality and service models. The Eastern European FM market is influenced by the same drivers and barriers, but there are also local market conditions which can have a positive effect on the adoption patterns for fleet management. Eastern companies for example tend to keep close control on fuel costs as they represent a significant share of the total fleet costs. This drives the uptake of fleet management solutions integrating advanced fuel level sensor technology. An example of a local phenomenon influencing the fleet telematics market is the Hungarian electronic toll collection system HU-GO which is compatible with a range of conventional FM systems, unlike most other initiatives of this kind that generally demand dedicated hardware infrastructure. Instead of opting for on-board units that only support the toll system, fleets in Hungary can thus choose to leverage telematics platforms from domestic or foreign FM providers, so enabling various efficiency improvements

alongside mere regulatory compliance.

Notable fleet management players based in Eastern Europe for example include Finder (owned by TomTom Telematics) in Poland, Secar Bohemia in the Czech Republic, WebEye International based in Hungary, Ruptela which is headquartered in Lithuania, Slovenia-based CVS Mobile, ICOM (EuroGPS) in Bulgaria and ETA Automatizari Industriale (SafeFleet) based in Romania. These players all have total subscriber bases of more than 35,000 units. Another company, Ecofleet, was established through the merger of two companies based in Denmark and Estonia respectively, having a strong presence especially in the Baltics in addition to Scandinavia. The large Turkish market is moreover the home of several major telematics players such as Arvento Mobile Systems and Mobiliz that have installed bases in the hundreds of thousands.

Russia/CIS – financially troubled market challenging for fleet telematics players

Similarly to Eastern Europe, the expectations for the future fleet management market in Russia and the CIS also include a continued gradual convergence with the developments in Western Europe. The major Russian solution providers have historically mainly served large corporations with standalone software systems which are paid upfront and hosted in-house, whereas subscription services traditionally have been adopted primarily by SMBs. Cloud services based on monthly service fees have however now also become a greater focus for major enterprise fleets on the Russian market and the domestic FM solution providers are increasingly pushing for a transition towards SaaS-based models. In terms of functionality, there is similarly a gradual shift in customer requirements – initially among high-end customers – to increasingly align with fleet management features demanded in mature markets such as time- and money-saving automation tools and integration of eco-driving components.

The leading provider of fleet management software in the CIS region is Belarus-based Gurtam. The company has an installed base of around 500,000 active units on the Russian market alone. Major players based in Russia moreover include



TechnoKom, Navigator Group, NIS, SCOUT and Omnicomm, all having 100,000 active units or more today. A number of incumbent players on the Russian fleet management market have experienced challenges in the past years, leading to significant staff reductions and even bankruptcy. This has opened up opportunities for new dynamic solution providers to reap market shares. International players from Western markets are however yet to reach significant market positions in the region. The recent economic developments in Russia and other markets in the CIS region such as Ukraine have indeed been troublesome for all industry players. Still, the telematics market in the region is now expected to benefit from developments such as ERA-GLONASS and the Platon electronic toll collection system which can have a positive effect on the adoption of commercial FM solutions as the general awareness of telematics increases.

South Africa – mature market dominated by strong domestic telematics companies

South Africa represents a mature telematics market and the country is clearly established as the front-running market on the African continent, being the home of renowned international fleet management solution vendors. The South African market however differs from other mature telematics markets in a number of ways. Many of the local providers have their roots in the security side of vehicle applications given the widespread adoption of stolen vehicle tracking and recovery in the country. Many telematics companies have extended their SVR offerings with additional functionalities, aiming to position themselves as providers of fleet management services. This development has blurred the lines between pure stolen vehicle recovery and fleet management solutions on the South African market and there are many offerings such as SVR services that include dot-on-a-map vehicle tracking and other basic FM features adopted by fleet customers. A notable share of the installed fleet telematics systems on the South African market is represented by comparably low-end tracking systems of this kind. Some industry players use the categorisation of light FM to distinguish low-end products from premium fleet management solutions.



Five domestic players that have more than 100,000 FM units each in South Africa together control the majority of the market

The South African fleet management market is dominated by a distinct group of aftermarket telematics players including MiX Telematics, Cartrack, Altech Netstar, DigiCore (Ctrack) and Tracker which are all headquartered in the country and have installed bases of more than 100,000 fleet management units each on the domestic market. These top-5 players together represent as much as two-thirds of the total number of active fleet management systems in use in South Africa today. Renowned international vendors active on the market for example include TomTom Telematics, Pointer Telocation and Geotab. The latter is today based in Canada but has South African origins. Foreign telematics players have however generally not managed to achieve any significant market shares on the South African fleet management market so far. The remote location and the relatively high telematics penetration on the market in general combined with the presence of an abundance of local providers may potentially act as barriers to entry for international FM players eyeing the South African market.

China – challenging and highly price-sensitive market with major untapped potential

The fleet management sector in China is dominated by track and trace systems and the installed base so far includes a significant share of low-end systems with comparatively limited functionality by Western standards. The steep growth of the Chinese FM market anticipated in the upcoming years is expected to be driven by a combination of political decisions to track selected commercial vehicles and the



booming e-commerce market which creates demand for efficient transport operations. The top providers in terms of installed base are local Chinese players including E6GPS, Etrans, Beijing Zhongdou Technology (Ccompass), Shenzhen Huabao Electronics Technology, Shenzhen Weitongda Electronics and 666GPS. In the OEM segment, truck manufacturers such as Foton and Shaanxi Automobile Group stand out as prominent in terms of fleet telematics activities.

Also a number of international aftermarket solution providers have entered the Chinese fleet management market. US-based CarrierWeb has been active in China for more than a decade, serving a range of state-owned and private transportation companies with its traditional offerings as well as China-specific tracking products. Other international players with various levels of activities on the Chinese market include Trimble, MiX Telematics, Microlise, Teletrac Navman, Astrata Group and DigiCore. The installed bases of these solution providers however generally remain limited and international players report numerous issues when expanding their presence in China. In general, the telematics systems provided by local suppliers and adopted by Chinese fleets are most often heavily feature-stripped and priced at a level far below that of even the most basic entry-level systems available in Europe or North America. The Chinese market moreover has its own barriers to entry due to issues related to, for example, mapping, data privacy protection and the operation of web-based back office portals using SaaS models. Political influences on provincial and regional level are also working to the advantage of local Chinese telematics providers which will most likely continue to capture a major share of the market. Berg Insight nevertheless expects that there are substantial future business opportunities for Western FM providers in China if they adapt to the local market conditions.

High M&A pace drives global consolidation in the fleet management market

Fleet management solution providers come in all shapes and sizes. The market is served by diverse players ranging from micro businesses laser-focused on specific FM features to

multinational conglomerates for which fleet management is only one of many business areas. The abundance of vendors offering seemingly similar solutions in terms of functionality has resulted in intense competition, sometimes pushing pricing to a point where there is limited room for profitability. In line with increasing market maturity, this fragmented industry has entered a phase of consolidation and M&A activities have been common over the past years. More than 30 company transactions have been done in Europe and North America alone during 2014-2015.

One category of transactions consists of businesses – commonly large enterprises – expanding in the fleet management space through acquisitions of specialised FM providers. Notable examples in 2014-2015 include Michelin's acquisition of Sascar in Brazil, WABCO's acquisition of Transics, FleetCor which together with Summit Partners acquired Masternaut, and the Russian operator group MTS which acquired NIS. These deals all include elements of diversification to more or less adjacent and – at least to some extent – related business areas. Novatel Wireless has furthermore in 2015 acquired DigiCore (Ctrack) and subsequently in 2016 sold its telematics hardware business to Micronet Enertec Technologies, aiming to accelerate its transformation from a hardware-centric manufacturer to a provider of IoT SaaS and Solutions.

Other deals involve the combination of existing fleet management players providing similar solutions. TomTom has in 2013-2015 acquired multiple local European FM providers including Coordina in Spain, DAMS Tracking in France, Fleetlogic in the Netherlands and, most recently, the leading Polish fleet management service provider Finder. These deals together contribute considerably to extending both the subscriber base and the geographic footprint of TomTom Telematics, and the company remains on the lookout for similar additional acquisitions. Fleetmatics has similarly in 2013-2015 acquired Australia-based Connect2Field, Italy-based KKT, Ornicar in France and most recently Visirun in Italy in a bid to expand globally, while at the same time diversifying the product portfolio. Every year, there are numerous transactions of this kind taking place across the globe, where fleet management providers absorb smaller players. There are



also examples of large fleet management providers joining forces and consequently rising significantly in the subscriber base rankings. In 2015, the two Danaher-owned companies Teletrac and Navman Wireless for instance merged to create a global top-10 provider tracking more than 500,000 vehicles on five continents.

The fleet management market has over the years become increasingly international as an effect of geographic expansion efforts in general and cross-border M&As among

the solution providers. The consolidation is expected to continue in the coming years, with additional blockbuster transactions as well as smaller strategic deals foreseen in the near-term. Leading solution providers on a global basis are now competing to be the first to reach a million subscribers, in many cases using a strategy that combines organic growth and selective M&As. Berg Insight anticipates a future scenario where the global fleet management market is dominated by a handful of providers with installed bases measured in the millions.



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Rickard Andersson is a senior analyst at Berg Insight, which he joined in 2010. Rickard's current focus at Berg Insight is the telematics market and he has authored a wide range of reports on various telematics topics including fleet management solutions and intelligent transportation systems, covering geographies such as Western Europe, Eastern Europe, Russia and the CIS, North America, Latin America and China. He is also currently researching the market for insurance telematics in Europe and North America. Rickard holds an MSc degree in Industrial Engineering and Management from Chalmers University of Technology.



Berg Insight is a dedicated M2M/IoT market research firm based in Sweden, specialising in all major M2M/IoT verticals such as fleet management, car telematics, smart metering, smart homes, mHealth and industrial M2M since 2004. Berg Insight can offer numerous market reports, detailed market forecast databases and advisory services and provide custom research tailored to a client's requirements including focused research papers, business case analysis, go-to-market strategies and bespoke market forecasting.

Berg's clients include many of the world's largest mobile operators, vehicle OEMs, fleet management solution providers, wireless device vendors, content providers, investment firms and venture capitalists, IT companies, technology start-ups and specialist consultants. The company has provided analytical services to 850 clients in 70 countries to date.

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Company Summary

Aeris is a privately held global technology company headquartered in Silicon Valley, having a total of 175 employees across locations in the US, the UK, India and soon in Japan. Founded in 1992, Aeris began offering M2M data services in 1997. The company today positions itself as an IoT platform company having a three-pronged strategy, offering Enterprise Connectivity-as-a-Service, End-to-end IoT Platform-as-a-Service and Cloud-based IoT applications and analytics.

Company Credentials

Aeris is a pioneer on the IoT market. The company currently has operational reach in 180 countries, managing a total of over one billion IoT events per day. Aeris has in 2016 surpassed seven million active subscriptions, out of which more than 60% are associated with things that move such as vehicles, trains and parcels. Over one million subscriptions are related to fleet and logistics operations including trucks and vans.

Key Differentiators

Aeris is 100% focused on IoT and is the only player providing support for GSM, CDMA and LTE under the same umbrella. Key differentiators include its agility, flexibility and innovativeness. The company's intellectual property portfolio includes more than 50 industry patents. The business strategy is to build infrastructure from the

ground up optimised for IoT, focus relentlessly on scale, quality and cost, and use the platform position to move up the stack from data delivery to data intelligence and applications with an application enablement and development platform.

Competitive Pressures

The company has the industry's only purpose-built core network dedicated to M2M. Owning and operating the core network provides a level of visibility and control to Aeris which is not available to MVNOs and not leveraged by MNOs. Real-time visibility of device transactions on the network has allowed Aeris to develop features which can detect events in near real-time and trigger immediate action. The company has a strategy of seeking first-mover advantages to stay ahead of competitors, thus continuously innovating to create new solutions that serve customers cheaper, faster and better.