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In This Issue

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Power Systems Research (PSR) is a world leader in providing power equipment information, whether it's pure data, analysis, forecasting or specific business intelligence. This product information ranges from IC engines to battery-electric and hybrid powertrain technologies. PSR has been providing world class business and market intelligence to industry leaders for 45 years. How can we help you? For details, call **+1 651.905.8400** or email **info@powersys.com**.
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Power Systems Research: Data...Forecasting...Solutions

Editor's Note: *This issue of PowerTALK News contains our newest feature, the Alternative Power Report, written by Guy Youngs. This monthly feature includes news and analysis about EV and power sources such as batteries and fuel cells.*

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Truck Production Index

By Chris Fisher, Senior Commercial Vehicle Analyst
and Jim Downey, Vice President - Global Data Products

Power Systems Research Truck Production Index Drops 13.7%

St. Paul, MN (October 24, 2022)— The Power Systems Research Truck Production Index (PSR-TPI) dropped from 110 to 101, or 8.2%, for the three-month period ended September 30, 2022, from Q2 2022. The year-over-year (Q3 2021 to Q3 2022) loss for the PSR-TPI was, 117 to 101, or 13.7%.

Power Systems Research TPI *Truck Production Index*

The PSR-TPI measures truck production globally and across six regions: North America, China, Europe, South America, Japan & Korea and Emerging Markets.

This data comes from **OE Link™**, the proprietary database maintained by Power Systems Research.

Chris Fisher

Jim Downey

All Regions. Medium and heavy commercial vehicle production will be mixed this year due to a variety of issues. In China, truck overcapacity continues to hinder demand while the Russian-Ukraine war is significantly impacting demand and production in Eastern Europe. The global supply chain will remain a problem through at least the end of this year for all regions. There is serious concern about a major slowdown in the North American and European economies as a direct result of higher fuel and energy prices and overall inflation which doesn't appear to be going away anytime soon.

Global Index. Global medium and heavy vehicle production is expected to decline by 13% this year primarily due to a significant drop in heavy truck demand in China. A slowing global economy along with continued supply chain disruptions will continue to place pressure on demand moving forward.

North America. Medium and heavy commercial vehicle production is expected to increase by 9.3% this year over 2021 as the OEMs continue to struggle with the supply chain disruption that is expected to continue well into next year. Freight demand continues to remain healthy but is expected to cool as the economy in general slows down primarily due to high inflation and energy costs along with higher interest rates and continued disruption within the overall supply chain. Within the class 8 truck segment, PSR expects truck demand to remain strong into the first part of next year as a result of significant pent-up heavy truck demand. **PSR**

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Alternative Power Report

By Guy Youngs, Forecast & Adoption Lead

Guy Youngs

Ideanomics Successfully Tests Quick Power 500 kW Charger

At 27%, the transport industry is the largest contributor to greenhouse gases in North America and Europe and within the transport sector, passenger cars contribute the most emissions followed by medium and heavy-duty trucks which contribute emissions at around 26% of the transportation industry. The move to reduce or eliminate emissions is one of the biggest priorities within the industry.

In a first, Ideanomics has announced that it successfully tested WAVE's 500kW ultra-fast wireless charger at the Port of Los Angeles, which can charge class 8 electric trucks in less than 15 minutes. Installation of the wireless electric chargers is already underway at the Port of LA, and Ideanomics expects the first chargers to be ready for use in 2023

Source: *Electrek* **Read The Article**

PSR Analysis: Most of the new EV trucks coming on to the market recently have relatively short ranges (compared to diesel) so this is significant news that could be a game changer, enabling heavy-duty electric trucks to run near continuously and making a huge impact on emissions levels. This technology can significantly improve the transportation industry, allowing customers to switch to zero-emission electric trucks without worrying about range. **PSR**

Hydrogen Combustion Engines Cheaper than Diesel?

As companies seek to decarbonize their truck fleets, Ryze Hydrogen says that hydrogen combustion engines are the way to go– they are cleaner than diesel and they also make more economic sense, according to the company. Many companies today are looking at fuel cells in order to be able to use H2 as a clean fuel, but there is a growing movement toward the use of hydrogen combustion engines.

Cummins and Westpoint are cited as examples, with Cummins having unveiled a medium-duty concept truck using an H2-fueled internal combustion engine (ICE), which drew substantial attention in Germany at the IAA Transportation exhibition. Similarly, Westport Fuel Systems also unveiled its own HPDI hydrogen ICE engine for heavy duty vehicles earlier in September

Source: *Hydrogen Fuel News* **Read The Article**

PSR Analysis: With diesel engine architecture and engine manufacturing infrastructure already in place, this could have cost savings as the technology used by ICE is already familiar to engineers and mechanics worldwide, but the

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Alternative Power Report

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The battery is a hybrid supercapacitor-battery hybrid device which has demonstrated an unprecedented cycling stability of 99.2% capacity retention after 17,000 cycles at 100% depth of discharge.

question about H2 supply, still remains. Currently, there are encouraging levels of H2 production and infrastructure investment. For example hydrogen technologies specialist AFC Energy has partnered with Spanish contractor Acciona, on the development of a hydrogen fuel cell technology, to provide H2 to a construction site in Spain. Operations began at the road construction site, located north of Cadiz in mid-August. **PSR**

Super-Fast, Long-Life Aqueous Rechargeable Zinc Battery

An international group of researchers has demonstrated an aqueous zinc battery with excellent performance in terms of capacity, rate capability, specific energy, and output voltage. The battery is a hybrid supercapacitor-battery hybrid device which has demonstrated an unprecedented cycling stability of 99.2% capacity retention after 17,000 cycles at 100% depth of discharge.

This battery technology has been explored as a promising alternative due to its low cost, safety, environmental friendliness, and intrinsic non-flammable nature. However, their widespread adoption has been held back by their low Coulombic efficiency *(The Coulomb efficiency is usually used to describe the released battery capacity. It refers to the ratio of the discharge capacity after the full charge and the charging capacity of the same cycle)* and the notorious dendritic growth *(dendrites are basically whiskers of minerals that grow inside batteries and can cause the devices they're powering to lose power more quickly, short out, or in some instances, catch fire)* at the zinc-based anodes, along with the fast capacity fading of the cathodes.

Source: *PV Magazine* **Read The Article**

PSR Analysis: The demand for battery energy storage systems is constantly growing and with Lithium prices rocketing due to the anticipated supply shortfall, research continues unabated in the battery world. New battery technologies and chemistries seem to appear every month and the realization that not everything can hinge on single chemistry is growing. What makes this battery technology different is the capacity retention after so many cycles, but it remains to be seen if this can be commercialized over the next few years. Watch this space. **PSR**

Functional Miniature Hydrogen Fuel Cell Powers RC Truck

Hydrogen fuel cells are still a bit mysterious and likely are unattainable in the near future, but you can actually buy them right now, whether in vehicles or as parts. To demonstrate how practical they are, Alfonso Delgado Ollero built a miniature hydrogen fuel cell to power an RC truck.

The practical concerns of producing the hydrogen in the first place and the energy density being relatively low are relevant when talking about the future of the automotive industry, but according to Alfonso Delgado Ollero, they shouldn't prevent makers from experimenting with hydrogen fuel cells.

Source: *Arduino Team blog* **Read The Article**

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Alternative Power Report

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PSR Analysis: On the face of it, this article may seem to be un-important, but the development of small scale fuel cells has tremendous potential for a huge number of small products. Limited specifications were given (this test bed uses a 12kw fuel cell) but given the large numbers of two- stroke and small four-stroke engines, the potential is huge, especially as moves are being made to reduce emissions produced by two-stroke engines. **PSR**

DATAPOINT: *North America Skid Steer Loaders*

92,700

By Carol Turner, Senior Analyst, Global Operations

A **Skid Steer Loader**, also known as a skid loader, skid-steer loader, or skidsteer, is a small rigid frame, engine-powered machine with lift arms used to attach a wide variety of labor-saving tools or attachments.

The four major types of skid steer loaders are Agricultural, 29%; Rental Fleets, 22%; Construction, 20%, and Landscape, 12%.

92,700 units is the estimate by Power Systems Research of the number of Skid Steer Loaders to be produced in North America (United States and Canada) in 2022.

This information comes from industry interviews and from two proprietary databases maintained by Power Systems Research: **EnginLink™**, which provides information on engines, and **OE Link™**, a database of equipment manufacturers.

Exports: Collectively, up to 25% worldwide.

Market Share: With 33.5% of total units produced Bobcat leads in production of Skid Steer Loaders in North America. In second and third positions are Case New Holland and Deere with 21.5% and 15.5%, respectively.

Trends: In 2021, production of skid steer loaders in North America increased nearly 4% YoY. Production is expected to gain another 4.5% in 2022. The 2020 decline was mostly attributed to COVID-19 related factors along with new equipment saturation in the market and a slight drop in construction related activities.

The recent gains are attributed to the need for new construction equipment and the overall stabilization of the economy, especially in the construction industry. As the construction industry continues to recover, construction will continue to be a key driver in overall industry growth.

Sales are reduced by sluggish demand in the American agriculture industry (still battling soft commodity prices) that accounts for 29% of all skid steer usage in the market today. Expect production of skid steer loaders in NA to increase up to 7% over the next 3-5 years. **PSR**

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Brazil/South America Report

By Fabio Ferraresi, Senior Market Research Consultant

Record Sales of Agricultural Machines in Brazil

Fabio Ferraresi

Friday 7th of October Anfavea published the number of 42,8 thousand units of Agricultural machines sold from January to August 2022, 23,6% above same period of 2022.

Source: *Automotive Business* **Read The Article**

PSR Analysis: Record harvest and high commodities prices enable farmers to invest in Agricultural Machines. This situation supports and sustains our production forecast for the year.

Scania, VW and Volvo Show Euro VI Lineups

Three OEMs have announced new fuel efficient products.

Scania has announced an 8% fuel consumption improvement with Super 13 liters engines and promises 50% maintenance stops reduction. Volvo has announced a new Euro VI line with Volvo Engine produced in Brazil, replacing MWM on the VM platform. VW fuel consumption improvement is in the 5% range and the company reports 4,000 units Euro VI sold in 2022 already.

Source: *Automotive Business* **Read The Article**

PSR Analysis: With the Fenatran show coming in November and the cutoff date for Euro V to Euro VI coming in December, three of the main players announced the Euro VI lines. Prices are still a question, and mark fleet owners are calculating the promised cost savings to offset the expected prices increases. Meanwhile the production of Euro V Trucks in 2022 goes ahead with full speed and only the shortage of components can slow it down.

GM Opens Third Shift at Joinville Engine Production Plant

GM has added a third shift at its plant in Joinville, SC, Brazil, to increase production capacity and supply engines for the Montana, the new Light Pickup below the S10 size. The capacity production increase forecast is 30%.

Source: *Automotive Business* **Read The Article**

PSR Analysis: The new GM Montana pickup is aimed to complete with the Fiat Toro and Fiat Strada, and grab market share from the leaders. GM also expects to export engines, if the shortage of semiconductors can be solved, which will allow the plant to reach the desired production levels. **PSR**

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Show Report

By Lorena Violante, Senior Market Research Consultant and Chris Fisher, Senior Commercial Vehicle Analyst

Lorena Violante

Mexico Truck & Bus Update. Alternative Power Sources Displayed

*Editor's Note: This report includes a conversation with Miguel Elizalde Lizárraga, the executive president of ANPACT (**the National Association of Bus, Truck and Engine Manufacturers**) and a visit to the **Expotransporte 2022**, the largest truck show in Latin America.*

Chris Fisher

ANPACT represents the trucks, buses and engine manufacturers in Mexico. It participates actively with government organizations and other important related associations to ensure the truck and bus industry gets enough support, incentives, alliances, agreements and information to grow in the local market. Also, to continue with their outstanding role as one of the most important exporters of heavy duty vehicles globally.

The ANPACT gathers the most important trucks, buses and engine manufacturers in Mexico such as Kenworth, Freightliner, International, Mercedes Benz, Man, Volkswagen, Scania, Dina, Mack, Volvo, Isuzu, Hino, Detroit and Cummins.

During our conversation, Elizalde provided timely insights into the Mexican transportation industry and the major market challenges this country is facing today.

Vehicles manufactured in Mexico produce an important impact on the country's economy, logistics and mobility. For example, 71% of the foreign trade value is moved to the US through heavy duty trucks. Much of the movement of goods in Mexico is through trucks, and people use buses as their main transportation.

According to ANPACT´s August statistics, manufacturers produced a total of 127,858 heavy duty vehicles from January through August this year. This is 18% more than 2021 production. Through August, export volumes increased by 15.7% (106,824 units) compared to 2021. Retail demand has increased so far by 20.5% (25,196 units).

Current challenges the transportation industry is facing today in Mexico include road safety, environmental regulations implementation, supply chain lead times, driver shortage, e-commerce, vehicles renewals, safety and energy infrastructure.

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The effects and disruption on supply chains caused by the COVID-19 outbreak, the cargo ship crisis and the Russian-Ukraine war have made components delivery times much longer, from one or two months to six months and more.

Key Mexican Market Challenges

Road mobility and safety. There´s a new mobility and safety road law designed to reduce the negative social impacts (inequality, economic, health and environmental) with the objective of also reducing road accidents and deaths. This law became effective in May 2022, and is being implemented in different states.

Environmental Regulations. The next change in Mexico on environmental regulations will be the EPA10/EUROVI on Dec. 1, 2025. However, the timely implementation of this regulation depends mainly on the availability of ultra-low sulfur diesel and the government environmental approvals to implement it.

Supply Chain Crisis. The effects and disruption on supply chains caused by the COVID-19 outbreak, the cargo ship crisis and the Russian-Ukraine war have made components delivery times much longer, from one or two months to six months and more. This situation applies to semiconductors and many other parts. It is expected that some companies could solve this problem by the end of this year and many others will solve the problem next year.

Operator shortage. There is a global shortage of drivers, not only in the US and Mexico, but Mexico has a double problem. The shortage of drivers in Mexico is made worse because Mexican drivers are migrating to work some months in the US with a legal international license and with an authorized visa.

Vehicle Fleet Renewals. There´s not an existing culture to renew fleets in Mexico and there is no enforcement to retire old vehicles, so this is another challenge the country is facing today.

Energy Infrastructure. Mexico does not have enough ultra-low sulfur diesel. Also, there are only 65 public gas stations for vehicles, 9000 diesel stations and 38 electric stations (only 15 of them are used by HD vehicles, the rest are in other locations like parking lots).

Expotransporte ANPACT 2022

Vehicles Using Alternative Power Sources Displayed

We visited ExpoTransporte in October in the state of Puebla. This show is the most important truck and bus show in Latin America. This show is equal in organization and quality to those held in Europe and the United States. It is a major venue where OEMs, suppliers, transportation companies and owner operators meet to do business and create alliances. It´s a leading event to promote the transportation industry in the country.

While walking the show, we were able to see applied technologies such as diesel, natural gas, hybrids and electric options in vehicles. Some are already offered in the market and others are expected to be offered in the near future.

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Isuzu. Showcased some of their EuroVI units to be offered in the market once the emission regulation comes in place to Mexico. This includes the ELF400Z (Euro VI, Urea) which is a 4 cylinder diesel engine; also the Forward 800 EURO VI (4Hk1tcs 6 cylinder diesel engine)

Kenworth. Exhibited current diesel models, like the T680 Next Gen available with a Cummins X15 or a Paccar MX-13. Also some of the new products that we could see were their mid-range 100% electric truck K270E made at their plant in Mexicalli which started to be sold in 2022 (so far exported to the US). Another model exhibited was the T380 CNG, a mid-range truck with a Cummins natural gas engine B6.7N

Volkswagen. The manufacturer introduced the e-Delivery, their first electric truck 100% developed and made in Mexico and Brazil. It´s available in 11 and 14 tons

International. The LT model with a Cummins engine X15 Euro V/ VI available in 2023. Also presented the eMV and the eCE bus electric models

Shacman. A relatively new entrant in the Mexican market is Shacman. The Chinese manufacturer entered the Mexican market about two years ago. It´s led by Carlos Pardo, their managing director. They assemble some units today in the state of Hidalgo and have plans to expand their operation to a larger site. They exhibited their heavy duty trucks L3000 and X3000 powered by Cummins or Weichai engines. Shacman also offers trucks with natural gas engines.

Freightliner. This manufacturer presented the eCascadia and eM2, 100% electric heavy duty trucks powered by Detroit ePowertrain. Today, these units were exhibited as the first step towards an introduction in the country that will need a huge coordination between the manufacturer, the government and customers to make these trucks driving on the Mexican highways a reality.

Hino. Presented some of their current models like the Series 500 trucks, and also their latest technologies like their hybrid Series 300 trucks (Models 516HV, 616HV and (816HV) and the new Series 200 trucks to be introduced in 2023 . Also exhibited were their new electric technologies with two models. The Hino Dutro Z EV was introduced this year in the Japanese market and still is not sold in Mexico. The other electric model is a prototype, which Hino intends to introduce to the Mexican market. Hino offers today a broad range in the Mexican market with about 30 models.

Cummins. Exhibited their X15 Euro VI engine with no EGR system. **PSR**

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China Report

By Jack Hao, Senior Research Manager - China

Mercedes Produces Initial Heavy Trucks in China

Jack Hao

Mercedes-Benz heavy-duty truck factory in China has started mass production and its first domestic Chinese heavy-duty truck has rolled off the assembly line. The rollout reflects the Mercedes Benz truck localization project, under which Mercedes is producing heavy duty trucks built specifically for the domestic Chinese market.

The first batch of Mercedes Benz domestic heavy trucks is scheduled to be delivered to customers in early November.

In the process of localization, MB is striving to achieve a balance between high quality and cost. It is working with 150 domestic suppliers to improve manufacturing quality capability and localize the supply of more than 1500 parts. Presently, the localization rate of Mercedes Benz heavy truck Actros series exceeds 50%, and the localization rate of Actros C series is 90%.

Mercedes Benz trucks has established a Mercedes Benz business unit under the joint venture of Daimler Trucks Co., Ltd. and Foton Motor, which have a 50: 50 share ownership.

China is the largest truck market in the world, and the strategic significance of the launch of Mercedes Benz's first Chinese made heavy truck is very important. In the opinion of Dr. Xie Houde, President and CEO of Foton Daimler Automobile, for many years, the imported trucks have been restricted by the price and a relatively single product structure and have been focusing on serving a relatively specific market segment

Source: *cvworld* **Read The Article**

PSR Analysis: For a long time, foreign well-known commercial vehicle brands could only penetrate the niche market where middle and high-end customers purchased vehicles due to their high prices. Now, the domestic logistics and transportation industry has begun to evolve towards the direction of efficiency, intensification, low-carbon and intelligence. The market and users have increasingly strong demand for high-end logistics equipment. With the upgrading of user groups, the trend to younger user groups is obvious, and they put forward new demands for improving equipment comfort, intelligence and other equipment features.

At the same time, customers' choice of equipment is no longer purely "cost only", but it is more and more focused on factors such as operational efficiency, vehicle performance, and life-cycle cost accounting.

The medium and high-end market is in a transition period and has become an incremental market to be developed. Over the past two years, well-known foreign

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China Report

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Agri Week 2022 is a comprehensive exhibition on agriculture, livestock, and horticulture. It is held twice a year in Kyushu and Kanto.

commercial vehicle brands have launched localization strategies, and domestic heavy truck brands have offered medium and high-end products.

Localization will bring several cost advantages: tariff savings after localization will reduce costs and the localization of the overall supply chain, while reducing the cost of the whole vehicle, will also achieve faster supply of parts, better prices and shorter maintenance cycles in terms of service.

With the participation of domestic products of imported brands, high-end products of domestic brands and new forces of car making, diversified participants are boosting the transformation and upgrading of China's heavy truck industry and will also reshape the industrial pattern of the medium and high-end heavy truck market. **PSR**

Far East: Japan Report

By Akihiro Komuro, Research Analyst, Far East and Southeast Asia

Agri Week 2022 Report: Drones Become Popular

Akihiro Komuro

Agri Week 2022 is a comprehensive exhibition on agriculture, livestock, and horticulture. It is held twice a year in Kyushu and Kanto. Agricultural materials, smart agriculture products, livestock materials, and products related to industrialization are exhibited. Agriculture Week consists of the following four exhibitions: AGRI TECH (Material & Technology), AGRI NEXT (Next Generation), AGRI PROCESS (Farmer's Processing), LIVESTOCK (Livestock Supply & Equipment)

Source: Official HP

PSR Analysis: The drone market is seeing an increase in the number of new entrants. Currently, the market size is estimated to be around 300 billion yen, but some say it will grow to nearly 800 billion yen in five years. This is because the revision of the Civil Aeronautics Law to be implemented this December will lift the ban on Level 4 unassisted visual flights in manned areas. Until now this has been limited to Level 3 unmanned areas. Currently, the use of drones is mainly for spraying chemicals, but it is also being considered for logistics, inspections, civil engineering, and construction.

The shortage of labor due to the decrease in the number of farmers and the aging of the farming population has become a serious problem, and DX (digital transformation) is being promoted as a countermeasure. More and more exhibits such as equipment that determines the timing of harvest by image analysis and equipment that evaluates soil are being exhibited.

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Far East Report

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In the space next door, two exhibitions, Garden & Outdoor EXPO and Tool Japan, were held side by side, where hand tools such as chain saws and gardening equipment were on display. At the booths of Makita, HiKOKI, and others, production of engine-powered equipment has already been discontinued, and almost all products are now battery-powered. There was some concern that batteries are underpowered compared to engines, especially for high output products, but this will gradually be resolved as batteries evolve.

As for mobility, a concept model exhibited by Yamaha stood out. This is an EV mainly used in orchards to assist in harvesting.

Two LiDERs mounted on the left and right sides of the vehicle recognize the rows of fruiting trees on either side of the vehicle and perform the work. The vehicle travels slowly and automatically along the rows of trees. If the driving route is set in advance, the vehicle can move between rows of trees and turn around. When the vehicle is not working, it can disengage from automatic driving and be driven by a human driver. Headlights and indicator lights are also installed in anticipation of driving on public roads.

I feel that updating in the direction of reducing the burden of work performed by humans, rather than performing the entire harvesting process completely automatically, is the right course.

The major theme of Japanese agriculture is how to compensate for the labor shortage, and manufacturers are developing products to meet this demand. **PSR**

極東 > 日本レポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

展示会「農業Week2022」視察レポート

展示会概要：農業・畜産・園芸に関する総合展示会。年2回、九州と関東で開催される。農業資材やスマート農業製品、畜産資材、6次産業化関連製品が展示される。来場者数約28,000人、出展社数約550。農業Weekは以下の4展で構成されている。・農業資材EXPO・スマート農業EXPO・6次産業化EXPO・畜産資材EXPO

参考: 公式HP（一部筆者により元記事内容を改編しました）

PSR 分析: ドローン市場は新規参入企業が増えている。現在は約3,000億円の市場規模という話だが、5年後には8,000億円ちかくまで成長するという声もあった。これまでは無人地帯の目視外飛行のレベル3だったが、今年12月に施行される航空法の改正で、有人地帯における補助なし目視外飛行「レベル4」が解禁されるためだ。農業向けが先行しており現在は主に薬品散布を中心とした活用がされているが、今後は物流や点検、土木や建築などに向けた利活用も検討されている。

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Far East Report

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> *Alliances between automobile and telecommunications giants are a global trend. Toyota Motor and NTT have formed a capital and business alliance, and General Motors (GM) and AT&T have announced a series of tie-ups.*

農業従事者の減少と高齢化に伴う労働力不足はかなり深刻なレベルになってきており、対策としてDX（デジタルトランスフォーメーション）化が進められている。画像解析によって収穫時期を判定する機器や、土壌を評価する機器などの展示が増えてきた。

また、隣のスペースではガーデン&アウトドアEXPO、ツールジャパンというふたつの展示会が併設されており、ここではチェーンソーなどのハンドツールや園芸機器の展示がされていた。マキタやHikOKIなどのブースでは、すでにすべての製品でエンジン機器の生産は終了しており、ほぼ全ての製品がバッテリー駆動になっている。特に大出力のものについてはエンジンに比べてバッテリーではパワー不足だ、という懸念があったが、これはバッテリーの進化に伴って徐々に解消されていくだろう。

モビリティとしてはヤマハが展示していたコンセプトモデルが目立っていた。これは主に果樹園で使用される収穫補助用のEVだ。左右の果実がなる樹々の列を車体左右に取り付けられた2つのLiDERが認識し、作業をおこなう。樹列に沿ってゆっくりと自動走行をおこなう。あらかじめ走行ルートを設定しておけば、樹列間の移動や折り返しも可能だ。作業以外の移動時には自動走行を解除し、人間が運転をすることもでき、公道を走ることも想定しヘッドライトやウインカーなども取り付けられている。このように、完全に自動で収穫までを行うのではなく、あくまでも人が行う作業の負担を軽減する方向でのアップデートは正しい路線であるように感じる。日本の農業は労働力不足をどう補うかを大きなテーマにしており、その需要を満たそうと各メーカーは開発を進めている。**PSR**

Far East: South Korea Report

By Akihiro Komuro, Research Analyst, Far East and Southeast Asia

Hyundai Motor and KT Invest in Autonomous Driving

The Hyundai Motor Group and telecommunications giant KT have formed a capital and business alliance. The two companies will invest about 750 billion won in each other by exchanging their shares.

The two companies will jointly develop communication-related technologies to produce autonomous driving equipment. In addition to automobiles, Hyundai Motor is expanding its business in the fields of robotics and urban air transportation (UAM, or flying cabs), and has decided that partnering with KT will enable it to accelerate research and development in fields other than automobiles.

Alliances between automobile and telecommunications giants are a global trend. Toyota Motor and NTT have formed a capital and business alliance, and General Motors (GM) and AT&T have announced a series of tie-ups.

Source: The Nikkei

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Far East Report

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PSR Analysis: The two companies will first jointly develop a 6G communication standard optimized for the operation of self-driving vehicles. As for the satellite based AAM communication infrastructure, Hyundai Motor Group will be in charge of developing the AAM vehicle and constructing the vertical takeoff and landing port, while KT will build the control and communication network essential for AAM operation using its own communication satellites.

Meanwhile, the Korean government has embarked on building the communications infrastructure necessary for the operation of automated vehicles and plans to launch eight satellites by 2035. The core of the project is to develop a navigation system with centimeter-level accuracy beyond the metric level, and it will be interesting to see how fast these actions penetrate the market in Korea, where the IT culture is mature. **PSR**

極東 > 韓国レポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

現代自とKTが相互出資　自動運転共同開発

韓国の現代自動車グループと通信大手KTが資本・業務提携を結んだ。自社株を交換する方式で、相互に約7500億ウォンを出資する。自動運転車の実現のために通信関連技術を共同開発する。提携の狙いは、自動運転技術の実現のための「コネクティビティー技術」の共同開発だ。現代自は自動車のほか、ロボットや都市航空交通（空飛ぶタクシー、UAM）分野の事業拡大を進めている。KTと組むことで車以外の分野でも研究開発を加速できると判断した。

自動車大手と通信大手の提携は世界の潮流だ。トヨタ自動車とNTTが資本業務提携したほか、米ゼネラル・モーターズ（GM）と米AT&Tが提携するなど大手企業同士が相次ぎ提携を発表している。

出典: 日経（一部筆者により元記事内容を改編しました）

PSR 分析: 両社はまず、自動運転車の運用に最適化された6G通信規格を共同開発する。また、衛星を利用したAAMの通信インフラについては、現代自動車グループがAAM車両の開発と垂直離着陸ポートの建設を担当し、KTが自社の通信衛星を利用してAAMの運用に不可欠な制御・通信網を構築するという。一方、韓国政府は自動運転車両の運行に必要な通信インフラの構築に乗り出し、2035年までに衛星8機を打ち上げる計画だ。メートル級を越えてセンチ級の正確度を持つナビゲーションシステムを開発するのが事業の核心だ。IT文化が成熟している韓国において、こうしたアクションがどのような速度で市場に浸透していくかに着目して見ていくと興味深い。**PSR**

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Far East Report

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Southeast Asia: Vietnam Report

By Akihiro Komuro, Research Analyst, Far East and Southeast Asia

Urban Railroads Delayed

The development of urban railroads in Vietnam has been significantly delayed. The opening of the second line in the capital Hanoi is expected to be delayed to 2027, and the first line in the southern city of Ho Chi Minh City may not open until the end of 2023.

In addition to financial difficulties, there are cases where administrative authorities are not proactively resolving problems, leading to further delays.

In mid-September, Hanoi City abandoned the planned Hanoi Urban Railway Line 3 (Nhon Hanoi Station), which was planned to run through the center of the city, to open by the end of the year. The line is 12.5 kilometers long. Construction of the line began in 2010, and although it was originally planned to open in 2015, it is believed that the plan has already been changed about five times.

The total project cost was originally expected to be $1.2 billion, but due to repeated delays, it is now likely to exceed $1.5 billion. Hanoi City has cited delays in land acquisition, lack of competence of builders and consultants, differences between international contracts and Vietnamese law, and the outbreak of the new coronavirus as reasons for the delay in the opening of the line. However, it is an unusual situation for it to take nearly 20 years from the start of construction to the start of operation, despite the general development of urban railroads.

Even in Ho Chi Minh City, the largest city, the opening of the urban railroad supported by the Japan International Cooperation Agency (JICA) has been significantly delayed. Originally scheduled to open in 2018, the project has been repeatedly revised, and the current plan of opening the line in 2023 is becoming increasingly unlikely. The city has frequently had to provide payment support to consultants and operators, and the Japanese government is also concerned about the situation.

The main reason for the slow infrastructure development in Vietnam is the country's laws and regulations. In Vietnam, the Criminal Code stipulates that "acts that cause damage to national property due to lack of responsibility" are criminal acts, and there is a risk of being charged with a crime. When procedural errors are discovered, such as in accidents, or when costs are higher than originally planned, those responsible can be held criminally liable for past crimes.

The Communist Party, which is ruled by a single party, is committed to eradicating corruption and is increasingly exposing those involved. In the case of infrastructure projects, a series of investigations may lead to the discovery of bribery, etc., of those involved. The operation of the criminal law is unclear, and the situation is becoming increasingly difficult for those in charge with authority to avoid making decisions.

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Southeast Asia Report

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Vietnam, with a population of approximately 100 million, is facing a major challenge in infrastructure development in line with its economic growth. However, for the same reason that the opening of urban railroads has been delayed, the construction of power plants, airports, and other facilities is also generally behind schedule.

Source: The Nikkei

PSR Analysis: With a growing population, chronic traffic congestion in urban areas has become a social problem in Vietnam. To solve this problem, it is necessary to improve public transportation systems such as railroads, but many such projects are financed by foreign ODA and technical cooperation. However, delays such as those reported this time are hampering growth, and if these infrastructure projects, which are being carried out with foreign cooperation, continue to be delayed, it could spur further declines in investment at a time when foreign investment has slowed due to COVID-19 and friction between the U.S. and China. **PSR**

東南アジア > ベトナムレポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

都市鉄道、相次ぐ開業遅れ　当局責任逃れも一因

ベトナムで都市鉄道の整備が大幅に遅れている。首都ハノイの2番目の路線の開業は年内を断念し、2027年に遅れる見通しになった。南部ホーチミン市で初となる路線は2023年末の開業が難しい情勢になりつつある。資金難だけでなく、行政当局が主体的に問題を解決しないケースが目立っており、さらなる遅延を招いている。

ハノイ市は9月中旬、中心部を走る計画のハノイ都市鉄道3号線（ニョンーハノイ駅）の年内の開業断念を明らかにした。同路線は全長12.5キロメートル。地上部分は韓国の大林産業、地下部分は韓国の現代建設とイタリアの建設会社ゲラの共同企業体（JV）が担っている。10年に着工し、当初は15年に開業する計画だったものの、既に5回前後の計画変更になるとみられている。全線開業が27年にずれ込めば、建設費用も膨らむ。総事業費は当初12億ドルを見込んでいたが、たび重なる遅れで15億ドルを超える可能性が出ている。ハノイ市は今回の開業遅延の理由について、土地の買収遅れ、建設業者やコンサルタントの能力不足、国際契約とベトナムの法律の違い、新型コロナウイルスの流行などを挙げた。ただ、一般的な都市鉄道の整備にも関わらず、着工から開業まで20年近くかかるのは異常事態といえる。最大都市のホーチミン市でも、国際協力機構（JICA）が支援する都市鉄道の開業が大幅に遅れている。当初は18年の開業を予定していたが、計画見直しを繰り返し、現行計画の23年の開通も難しい情勢になりつつある。市からコンサルタントや事業者に対する支払い支援が度々発生しており、日本政府も頭を悩ませている。

ベトナムのインフラ整備が遅れる主要因は同国の法令にある。同国では「責任不足により、国家財産に損害を与える行為」も刑法に規定され、罪に問われるリスクがある。事故などで手続きミスが発覚した場合や費用が当初計画より膨

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Far East Report
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Toyota has launched the Corolla Altis, India's first flex-fuel engine. This car will be able to run on petrol or ethanol as well as electric power.

らんだ場合に、過去に遡り、責任者が刑事罰に問われている。一党支配の共産党は汚職撲滅を掲げ、関係者を摘発する動きが増えている。インフラ事業の場合、一連の捜査などで関係者の贈収賄などが発覚する場合もある。刑法の運用が不透明なこともあり、権限がある責任者が意思決定を避ける状況が強まる状況だ。人口約1億人を抱えるベトナムは経済成長に伴い、インフラ整備が大きな課題だ。ただ、都市鉄道の開業遅れと同じような理由で、発電所や空港などの建設も全般的に遅れ気味だ。

出典: 日経（一部筆者により元記事内容を改編しました）

PSR 分析: 人口が増え、ベトナムでは都市部での慢性的な渋滞が社会問題になっている。これを解決するためには鉄道などの公共交通機関の充実が必要だが、そうしたプロジェクトの多くは海外からのODAや技術協力によって賄われている。だが今回報じられているような遅延が成長を妨げている。COVID-19や米中摩擦などの理由で海外からの投資が鈍化した現在、外国からの協力を得て進められているこれらのインフラ工事がこれからも遅延するようなら、更なる投資減少に拍車がかかる可能性がある。**PSR**

India Report

By Aditya Kondejkar, Research Analyst – South Asia Operations.

Toyota Launches India's First Flex-Fuel Hybrid

Aditya Kondejkar

Toyota has launched the Corolla Altis, India's first flex-fuel engine. This car will be able to run on petrol or ethanol as well as electric power. It is part of a pilot project developing Flexi-Fuel Strong Hybrid Electric Vehicles in India.

Source: *Hindu Times* **Read The Article**

PSR Analysis. Because of the great diversity in India's consumer population, especially its per-capita income disparity, and multiple applications of vehicles, India might not use one technology but might use a combination of technologies involving various fuel types.

The Indian market can't simply shift from petrol/ diesel engines to EVs over the next few years. Hence, many OEMs are working on CNG/ hydrogen/ hybrid vehicles. Toyota has launched this new vehicle for the Indian market as part of these efforts.

The new vehicle is imported from Toyota Brazil. It is powered by flex-fuel technology, which allows the engine to run on fuel blended with a higher percentage of ethanol, reducing the consumption of gasoline. This car can run on various grades of Ethanol-blended petrol, going up to 100 % Ethanol. It uses a hybrid powertrain

Currently, EV adoption is moving slowly and major critical components are imported from many countries, primarily China. To minimize this dependence, the

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India Report

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Indian government may have to consider flex fuels.

India presently has a 10% ratio of ethanol in petrol. This has helped save money and reduce emissions. (In 2020-21, a saving of Rs 10,000 crore was achieved due to Ethanol blending.) The mixing ratio is planned to go up to 20% by 2025 as the government continues to push for flex fuels. As India is a major producer of sugar, it is keen to boost its use of ethanol. Hence, the objective of the pilot is to see how the car operates in India and increase awareness of the technology.

"As India progresses towards E20 (20% Ethanol) blending, we can expect our fuel-savings to go up Rs 30,000 crore per year," says Vikram Gulati, Country Head and Senior Vice-President, Toyota Kirloskar Motor. "In barrel numbers, the savings would be about 86 million barrels in 2024-25." **PSR**

Russia Report

By Maxim Sakov, Market Consultant, Russia Operations

Editor's Note: *PPower Systems Research has paused all research and business development activities in Russia. We have maintained a presence in Russia since 2013 to bring important updates to our clients about the powered equipment markets within Russia. We are monitoring the current situation on a daily basis and hope to again establish this presence when the conflict with Ukraine is resolved. Please contact us at* ***info@powersys.com*** *if you have questions regarding business conditions in Russia. Thank you.* **PSR**

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