

DRAB POL

NEWS

A U T O M O T I V E

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Quarterly Newsletter no 3(88) July – August – September 2020

Konvekta heat pump for e-articulated buses

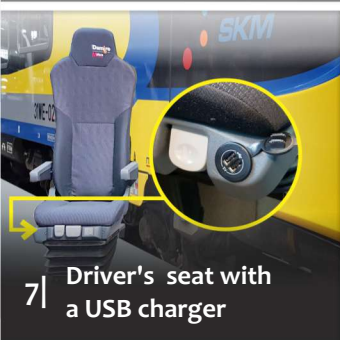
Natural refrigerant R 744 (CO₂)



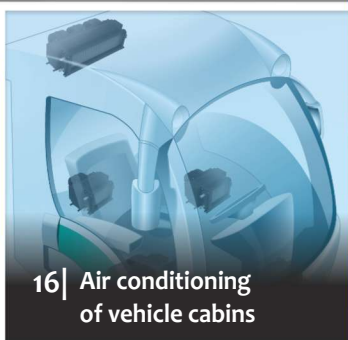
„The fundamental principle of transportation is its safety”

IN THIS ISSUE YOU CAN FIND:

3. Mobility package adopted
4. In the face of pandemic
6. Public transport safety
7. A train driver seat with a USB charger
8. SUMO LD system in an electric minibus
9. Become a workshop technician
10. 30 items of Alcolock V3 alcohol ignition interlocks in DAF vehicles
11. Safe railway
12. The worldwide first CO₂ heat pump in an e-articulated bus
16. One system for all driver's cabins
19. UDS-ATpro – the new generation of accident data recorder
19. The latest news and trainings – 3rd Quarter



7| Driver's seat with a USB charger



16| Air conditioning of vehicle cabins



8| SUMO LD system in e-bus



19| New UDS – Atpro – Coming soon!

FROM THE EDITOR

Ladies and Gentelman, Dear Readers!

We are slowly getting used to living and leading business in pandemic times. Our company has also incorporated further restrictions and sanitary regimes so that we can effectively – and in good health – continue our operation on the market.

This year's Autumn is undoubtedly different than any other. So far, this time of year was for us and most companies in our industry a time of extraordinary intensity of trade fairs, both in Poland and abroad. Unfortunately, the pandemic forced us to withdraw from several events, many of which did not take place at all.

For the first time for many years, we did not participate as an exhibitor in MSPO in Kielce. We appreciate the efforts of the organizers, thanks to which another edition of the fair was brought to life. Despite the lack of our stand, we were able to visit our customers who presented their current offer in the field of defence. See the MSPO report on pages 4 and 5.

Alicja Drabczyńska



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Editor:

Drabpol sp. jawna P. Drabczyński i Wspólnik
42-233 Mykanów, ul. Akacjowa 24/26
tel. 0-34 366 00 22, fax 0-34 366 01 02
centrala@drabpol.pl, www.drabpol.pl

DTCO 4.1 smart tachograph as the answer to the mobility package

MOBILITY PACKAGE ADOPTED



8th July 2020 The Commission and the European Council have adopted the package of changes in EU regulations governing international road transport, the so-called "Mobility Package". The most important aspect of the mobility package is the set of rules on cabotage, which means that the tachograph will record border crossings, thus making it easier for authorities to monitor compliance with the rules on cabotage and the posting of workers.

Continental VDO corporation, our business partner and tachograph manufacturer, welcomes the entry of the package into force.

Digital tachographs of the new generation will have an important role to play. They will enable implementation of the guidelines set forth in the Mobility Package.

The new DTCO 4.1 smart tachograph by Continental will register boarder crossing by means of GPS positioning. The device will also register the places where vehicles are loaded and unloaded.

Authorities can use these data to check compliance with regulations, in particular those pertaining to market access and to posting of drivers. In fact, in addition to using GPS signals, it will be one of the first industrial applications to support Open Service Navigation Message Authentication (OSNMA) of signals from the Galileo system.

The changes included in the Mobility Package will be gradually incorporated until 2026. The first of them have already entered into force in September.



The changes concern weekly rests of the driver, the driver's return to the base, the extension of driving hours (daily or weekly), as well as breaks in the case of a two-person crew in the vehicle.

“We welcome the use of the DTCO for monitoring compliance with the guidelines for cabotage and posting of workers, and we think it is good that tachographs will now be mandatory for vehicles with gross weights between 2.5 and 3.5 metric tons engaged in international transport” –says Gilles Mabire, Head of the Commercial Vehicles & Services business unit at Continental. **The Mobility Package will ensure fair competition in the European transport industry and promote better safety. That is very good news.”** – adds Gilles Mabire.

Work on the next generation, the DTCO 4.1, has already begun at Continental's tachograph manufacturing center in Schwarzwald.

We've been following the work on the Mobility Package very closely and have already drawn up technical scenarios for recording border crossings,” – says Dirk Gandras, Continental's manager in charge of tachograph development.

Our visit at 28th International Defense Industry Exhibition (MSPO) in Kielce

8-10th September



MSPO



IN THE FACE OF PANDEMIC

Despite the ongoing pandemic, Targi Kielce (Kielce trade fair) decided to organize, under the strict sanitary supervision, 28th International Defence Industry Exhibition in Kielce. For obvious reasons, one can not compare this year's event to previous editions, but this year's trade fairs attracted 185 companies from 15 countries. Although we did not join the group of exhibitors, we were present at this years MSPO.

We decided to visit our customers that presented vehicles equipped with our solutions.

One of them was AMZ Kutno, that presented a light armoured personnel carrier TUR VI / LTO on MAN TGM 4x4 chassis, dedicated to the police, and more specifically for the counter-terrorist service.

The vehicle has been equipped with KIBES 32 on-board electronics system, MUX-2B multiplexers, ZR 32 computer and MOKI 3 board, as a cockpit.

A light armoured personnel carrier TUR VI / LTO presented at AMZ Kutno stand was equipped with KIBES 32 on-board electronics system.



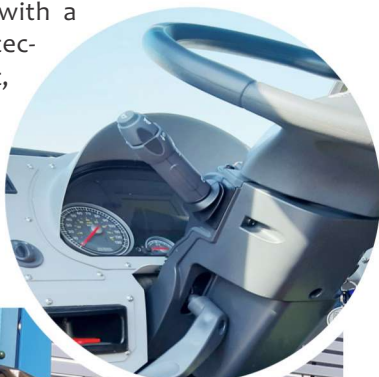


Traditionally, HSW – Jelcz Komponenty company was present at MSPO.

Most specialized Jelcz transporters presented at the stand were equipped with the solutions that we have in our offer – CAN Cockpit sensors and indicators, tire pressure and temperature sensors, washer fluid tanks with a pump and a TSU tachograph simulator.

We were also pleased to visit the stand of Concept company from Bielsko Biala. Polish manufacturer of special vehicles presented this year a long range reconnaissance vehicle „Żmija” (Viper), equipped with our configurable Flex Cluster display.

Flex Cluster characterizes with a solid casing, maximum protection against water and dust, and flexible software that allows displaying personalized icons, logos, barographs and different layers of masks, according to customer requirements.



For many years specialized Jelcz transporters have been equipped with our solutions, such as various sensors and indicators.

We would like to thank our customers for their hospitality. We hope that next year we will be present in Kielce as an exhibitor, as for the last 11 years.



Concept company from Bielsko Biala presented a long range reconnaissance vehicles „Żmija” (Viper), equipped with our configurable Flex Cluster display.

2nd Congress of Organizers and Operators of Public Transport in Poznań

19 August

PUBLIC TRANSPORT SAFETY

At the invitation of Chamber of Commerce for Urban Transport, we participated in the 2nd Congress of Organizers and Operators of Public Transport.



The Congress was co-organized by Miejskie Przedsiębiorstwo Komunikacyjne w Poznaniu Sp. z o.o. (Poznań Public Transport Company) and the Association of Polish Cities.

The Congress gathered over 100 people from approximately 30 Public Transport Companies and Public Transport Authorities, bus manufacturers, such as AUTOSAN, SOLARIS, MAN and MERCEDES, as well as suppliers of automotive components.

The basic thematic block was dedicated to the procedures of safety control in the field of employee monitoring in terms of alcohol and drugs presence, as

well as organizer's and operator's responsibilities in case of any critical situations.

For our company, the Congress was a great opportunity for direct meetings (after a few months) with Presidents of public transit companies from Warsaw, Rzeszów, Gniezno, Inowrocław, Lublin, as well as with the new President of MPK Wrocław, Mr Krzysztof Balawejder. We discussed lowering the bus operating costs and increasing driving safety due to the application of innovative solutions. Of course we could not avoid the topic of pandemic. There is no doubt that the financial losses suffered by the passenger carriers in recent months are enormous and it will take a long time to reach the pre-pandemic state.

Despite tough situation there was also an opportunity to celebrate. Namely 140 anniversary of the Public Transport Company from Poznań, that took place during the ceremonial dinner, of course in compliance with the applicable sanitary standards. We presented to the President of the Management Board of MPK in Poznań, Mr Wojciech Tulibacki, an official congratulatory letter. For our part, we also add congratulations on such a beautiful jubilee, we wish you lots of success and perseverance in this difficult time that affects us all.

COOPERATION WITH DAMIRO/Midura Group

This summer, our company started cooperation with DAMIRO /Midura Group. Our new partner specializes in the sale and service of seats manufactured by the leading European companies dedicated to trucks, buses, road machinery, rail vehicles, construction and specialist vehicles.

DAMIRO/Midura Group is an official dealer and authorized service centre of ISRI company.

Seats of this make are fitted in vehicles of such producers as: VOLVO, SCANIA, MERCEDES, MAN, DAF, IVECO, RENAULT, BOVA, NEOPLAN, SETRA, SOLARIS and IRIZAR.

The company has a large selection of parts and accessories for seats. In this respect, the company still broadens its portfolio with new components. This development resulted in cooperation of our companies in the field of equipping driver's seat with USB charger –

a solution that has been successfully applied in buses, trams and trains for many years. First seats equipped with USB chargers have been installed in PKP SKM Trójmia-sto. These are test seats and their task is to check the applicability of the ready solution in a given type of vehicle.

Initially, for test purposes DAMIRO/Midura Group company equipped a seat on NEWAG Impuls vehicle, however at the request of PKP SKM, the device has been finally installed in a seat on EN 71 vehicle.

The USB charger makes work of train drivers much easier because their contact with the dispatcher through the radio is not always possible, and thanks to the USB port they are able to keep the phone always ready. It translates into elimination of stress related to the lack of connectivity, which most of us have certainly experienced.

We would like to thank DAMIRO / Midura Group for participation in the joint project. For our part, we stay fully ready for further cooperation.

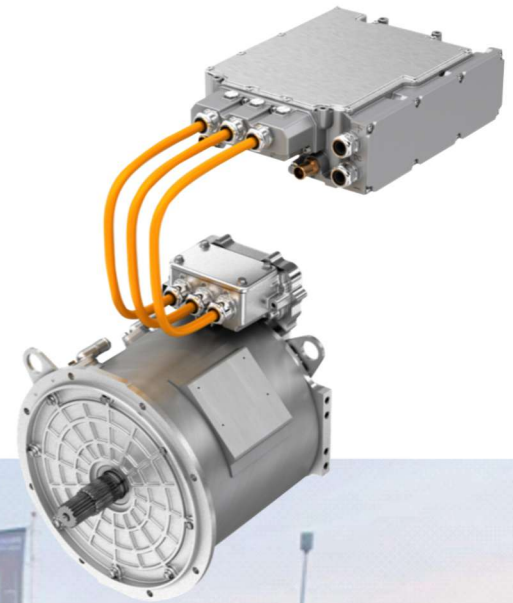


Another joint project with Concept.



Our solution on Concept electric minibus

A few years ago we started cooperation with Team-CONCEPT sp. z o.o. from Bielsko-Biała, a manufacturer of special vehicles, installations and components, as well as aluminium boats for the army and security services. Among others, we participated in a military project developing software for Flex Cluster for Wirus light strike vehicle, as well as „Żmija” (Viper) long range reconnaissance vehicle. The recent result of our cooperation is the design of an electric minibus based on a Mercedes Sprinter, in which our Sumo LD TM4 / Dana powertrain system will be used.



The complete SUMO LD system consists of the YTT060W20 motor and CO150 inverter.

Noteworthy is the low weight of the powertrain – the motor with the inverter weight only 115kg. Despite low weight, the powertrain characterizes with high efficiency and power, as well as high torque.

The continuous power is approx. 100 kW and the peak power is 150 kW.

TM4 SUMO LD system has been created expressly for a range of electric and hybrid applications, such as:

- Light Commercial Vehicles
- Mini Buses
- Medium-Duty Trucks
- Medium Buses
- Heavy-Duty Trucks when integrated into e-Axles



Thus, the solution is perfect for the new electric Team-Concept mini bus.

The recipient of this vehicle is the AutoCuby company, which produces and constructs buses - also our long-term customer. This vehicle, under the CUBY Bus brand, has been designed and will be constructed according to the requirements of the customer, to which it will finally be delivered after the completion of the project.

After tests and evaluation of the first mini bus, the serial production will be launched.

The first batch of these vehicles - 60 units, is to be delivered by the end of next year.

We invite you to stationary trainings at our business offices

BECOME A WORKSHOP TECHNICIAN

Soon after the outbreak of the pandemic, we began to create an E-learning platform, thanks to which we can conduct our trainings in the form of online sessions. However, such form is not available for all trainings. For example trainings for workshop technicians (both basic as well as periodical ones) can not be carried out online.

These trainings must follow the Regulation of the Minister of Entrepreneurship and Technology of August 30, 2018. The applicable provisions say that such trainings should have a form of lectures and exercises, which means practical

classes, carried out with the use of prepared patterns, forms, teaching aids and case studies requiring teamwork.

Following the needs of our customers, in the middle of June (after the lockdown period) we returned to organization of such trainings, of course in applicable sanitary regime.

We conduct basic and periodic trainings dedicated to workshop technician on the basis of the Certificate No. PS 6/2019 issued to our company by the President of the Central Office of Measures.

Moreover, to become a certified provider of such training services we had to confirm that we have appropriate training facilities and service equipment, which is used during the course of the training.

Range of topics during basic and periodic trainings is the same and covers the installation, inspection, maintenance and repair of digital tachographs.

The main aim of the training is to prepare candidates for workshop technicians for the examination conducted by the Central Office of Measures. Therefore the basic training lasts three days.

The completion of periodic training is related to the statutory requirement to take part in such trainings. Periodic training lasts one day.



Range of topics during basic and periodic trainings is the same and covers the installation, inspection, maintenance and repair of digital tachographs.

In addition to our "Workshop Technician" trainings, we also conduct stationary trainings in the field of AGB speed limiters. Once again, we carried out such training for Mercedes-Benz Trucks Polska Sp. z o.o., but this time, according to safety rules, with only six participants.

All trainings take place in our training centres – in Mykanów and Warsaw.

Our training schedule is available on <https://e-learning.drabpol.pl>.

We would like to invite you to our trainings, both stationary and online.

In our headquarters in Mykanów, we also conduct stationary trainings in the field of AGB speed limiters.



30 items of Alcolock V3 alcohol ignition interlocks in DAF vehicles

In September, ESA Trucks Polska Sp. z o. o. – an authorized dealer and service provider for DAF vehicles bought from us 30 items of ALCOLOCK V3 alcohol ignition interlocks for DAF FT XF 480 Super Space Cab vehicles. This is another order regarding purchase of ignition interlocks that we have completed for ESA Trucks Polska.

The DAF dealer offers this solution to many of its partners and a growing number of them decides to equip vehicles with alcohol interlocks.

The choice is mainly dictated by security considerations. By controlling the driver's sobriety, we influence not only their safety, but also the safety of all road users.

Alcolock V3 alcohol ignition interlock is programmed and fully adopted to the nature, activity and security policy of a given company.

Drivers can be tested both at the beginning of the shift and at programmed time intervals throughout the whole working day.

Proprietary software enables reporting of recorded events, such as: breath alcohol test results, time, date and many more.

The above mentioned DAF vehicles with V3 ignition interlocks on board will reinforce Boekestijn Transport Sp. z o.o. fleet.



8th Conference “Modernization of rolling stock – purchase and maintenance” in Mrągowo 30th September - 2nd October 2020

SAFE RAILWAY

At the beginning of Autumn, the Polish Chamber of Railway Equipment Producers and Railway Service Providers organized in Mrągowo the 8th conference on the rolling stock modernization. As a member of the organization we attended this meeting with great interest.

The autumn conference was devoted to issues connected with modernization, repairs, purchase, operation and safety of the rolling stock.

The main issues discussed were innovative solutions for passenger safety and comfort. We will gladly share our knowledge and experience with the conference participants. Our products increasing the travel comfort, such as USB chargers or HVAC systems for both the tram/train drivers and passengers, are installed in railway vehicles of leading manufacturers on a regular basis.

Also, we are not indifferent to the matters connected with increase in driving safety. Especially for the railway market, we dedicate Energys wagon batteries that meet the highest standards as well as indicators, sensors and controllers that ensure full transparency of information for the driver.

Our company also participates in projects related to the modernization of railway vehicles, e.g. in the field of visualization of information in the CAN

network. We develop software that reads the necessary information from CAN network. The information is then presented on the display in the train driver's cabin.

An important element of the autumn conference was the inauguration of the **#BEZPIECZNAKOLEJ** program. This idea was created on the initiative of and in cooperation with PKP Intercity SA and the Polish Chamber of Producers of Devices and Services for the Railway. The project is of a social nature, and its main goal is the safety of passengers, rolling stock and railway facilities and presenting railways as a reliable, predictable and comfortable means of mass communication.

We offer all necessary support while realization of this project.



Reliable, efficient and energy-efficient Konvekta solution in the field of heating technology – air conditioner / heat pump

Ultra Light UL 500 EM CO₂ HP



**The worldwide first CO₂
heat pump in an
e-articulated bus**



We are pleased to inform you about another success of our long-term business partner – Konvekta. It is without a doubt equipping the first e-articulated bus with a thermal management system with a CO₂ heat pump – Ultra Light 500 HP CO₂. The above mentioned bus has been operated by the public transport company VAG in Nuremberg since beginning of this year.

The e-bus is the emission-free alternative to diesel buses. If one wants to do completely without fossil fuel, also the a/c components have to be powered by the battery.

Electric buses don't produce exhaust heat which could be used to heat the passenger compartment.

In solo buses the efficient temperature control has already been managed quite well. But temperature control in articulated and double-deck buses is a new challenge.

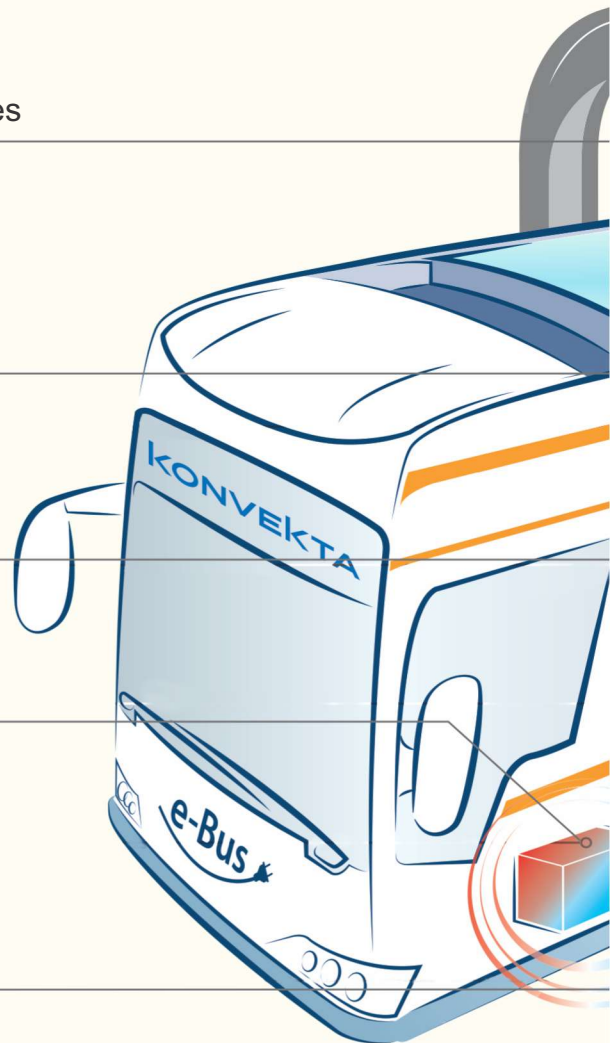
Konvekta CO₂ heat pump with compressor and energy storage modules

Wall heating

Convactor

Frontbox

Battery



E-articulated buses – a new challenge for the climate management

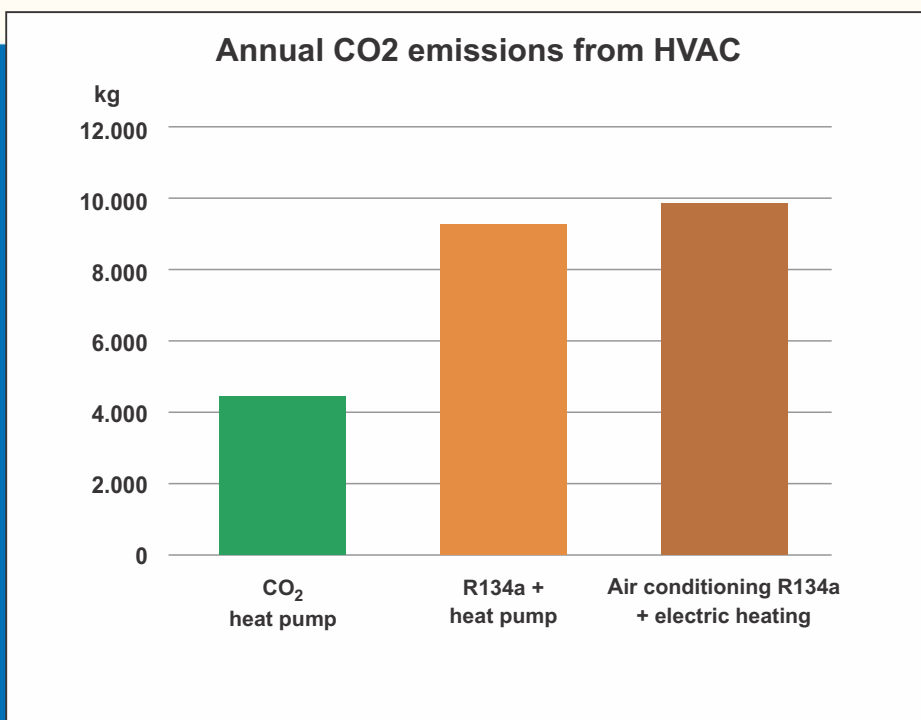
Due to its length of more than 18 meters the electric articulated bus needs more than one thermal management system which have to be networked optimally. Furthermore, the demands on air conditioning systems have changed. Classical applications comprise the air conditioning of the bus interior (driver's place and passenger compartment). Today's demands have been increasing.

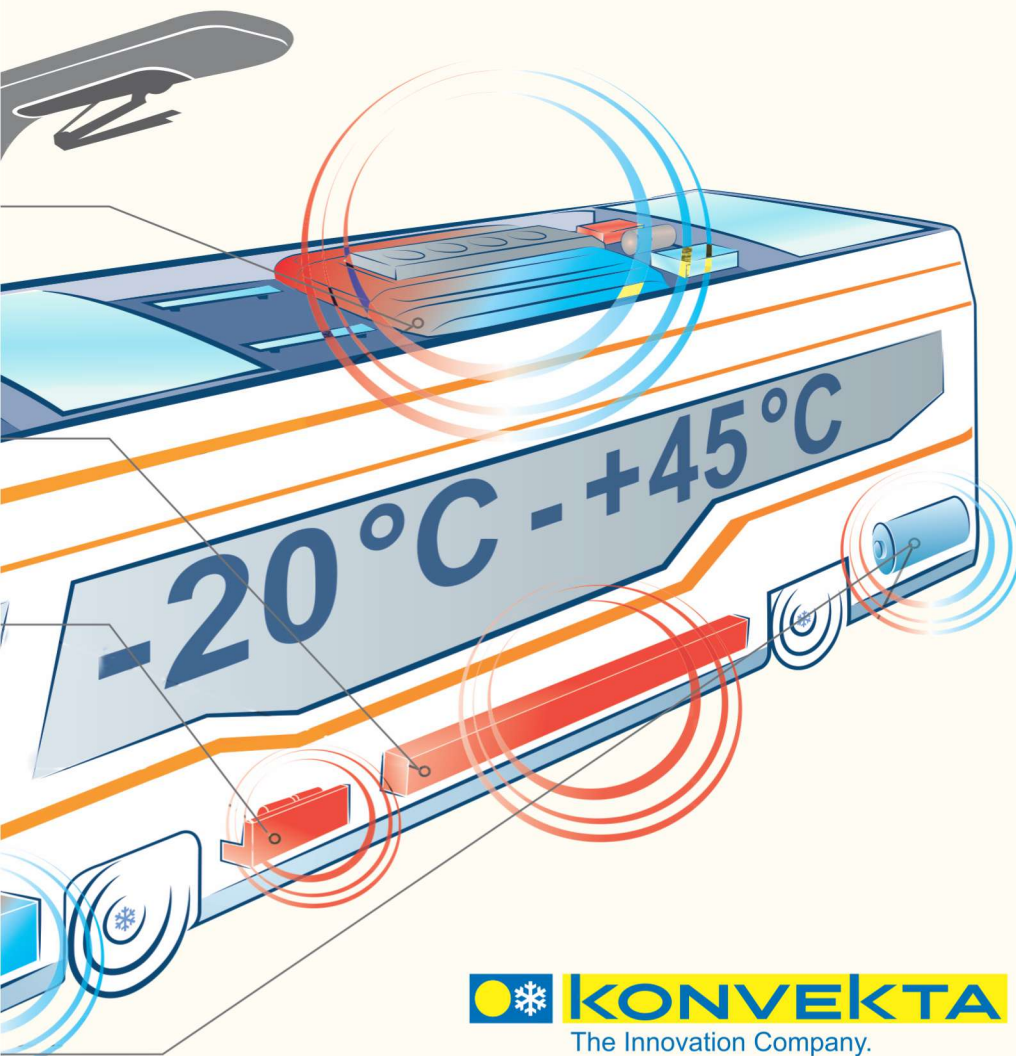
Thus, for example the temperature control of the batteries has to be integrated in the thermal management system because batteries need an optimal operation temperature frame to reach the maximum range and lifetime.

The first Konvekta CO₂ heat pump for e-articulated buses

Since the beginning of this year the worldwide first e-articulated bus equipped with a Konvekta CO₂ heat pump has been in scheduled service on routes in Germany.

The central part of the Konvekta CO₂ heat pump management system are the two UltraLight 500 CO₂ heat pumps 2.0 on the front and rear section, including the 2 energy carrier modules for hot and cold water. Both systems run on the refrigerant CO₂.





-10°C in comparison to classic electric heating systems.

If you look at the entire year, including air conditioning, the energy requirement is reduced by more than 50%.

A Konvekta CO₂ heat pump saves the operator money and the environment CO₂ emissions

There are significant financial advantages by using the CO₂ heat pump system compared to conventional heating and cooling of e-articulated buses.

The public transport company of Munich for example saves 53% of the annual costs of temperature control in the e-articulated buses that are equipped with a Konvekta CO₂ heat pump.

That means that a CO₂ heat pump system saves 1.700 € of the annual energy costs compared to an air conditioning unit with electrical auxiliary heaters. Additionally, up to 5.500 kg of the annual CO₂ emissions are avoided.

It is worth considering the lower energy consumption in the procurement of new e-buses.

Depending on the area of application battery capacity worth 66.000 € can be saved and the vehicle range extended up to 30%.

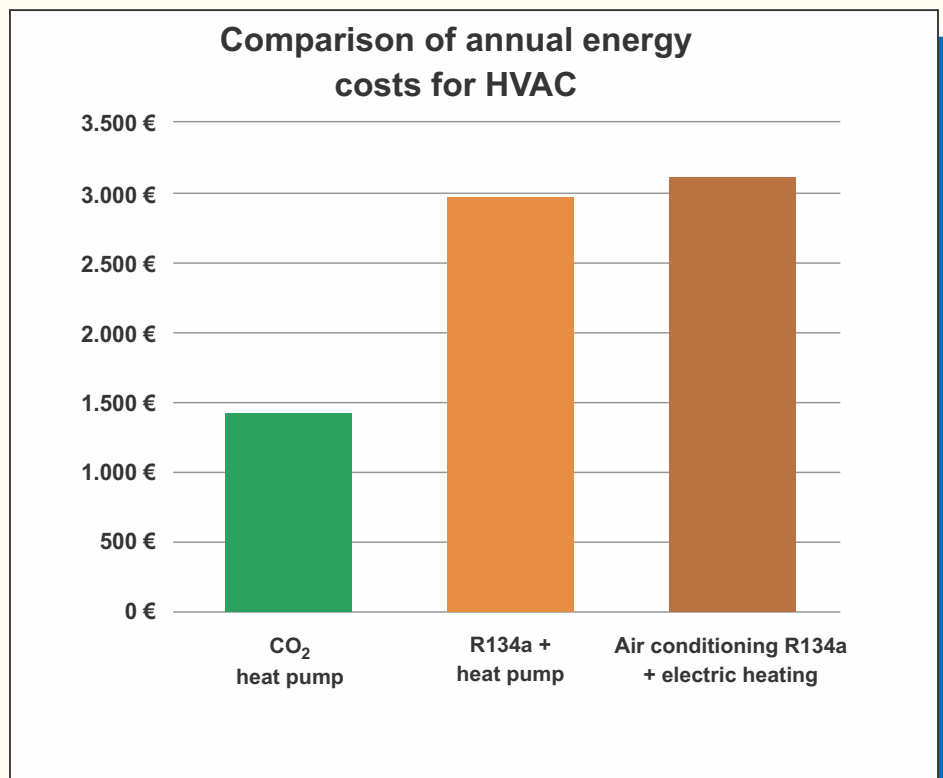
The heat pump system is the most intelligent and effective heating technology in the field of electromobility because a great part of the provided heating energy is sourced from the ambient air and not from fuel or electricity.

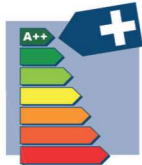
To obtain 100% heat the Konvekta CO₂ heat pump needs at best only 25% operating power (current) from the battery. The rest of the needed energy is gained free of charge via the thermodynamic cycle from the ambient.

Depending on the vehicle type, the CO₂ heat pump consumes for example at -10°C approximately 45 kWh electric energy per 100 km in contrast to conventional electric heating components that consume more than 100 kWh for the same distance.

The energy consumption in comparison shows that of the possible variants of air conditioning an electric bus, the CO₂ heat pump is the most energy-efficient.

The heat pump reduces energy consumption with zero emissions e.g. by 60% at

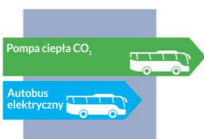




- Maximum energy efficiency



- Up to 50 % cost savings



- Up to 60 % higher range



- Eco-friendly cooling and heating system with natural refrigerant R744 (CO₂)

Potential savings of service costs by 70%.

In the area of service and maintenance, CO₂ results in considerable cost and time savings. This is because there is no need to recover or dispose of this refrigerant (R744) after any maintenance or repair work.

The simple and safe handling of the R-744 means that service times are reduced by more than half compared to the R-134a.

The acquisition costs for the refrigerant per kg are over 90% lower.

Another benefit is the use of UltraLight technology. The extremely light and stable high-performance material forms the basis for holding all components, which makes exchanging components extremely easy.

Filters, fans and other components are replaced in a few seconds. This results in an overall saving in service costs of approx. 70%.

The described solution is installed as standard in Mercedes Citaro buses.

Also other bus manufacturers, including company Solaris Bus & Coach, install them at the customer's request.

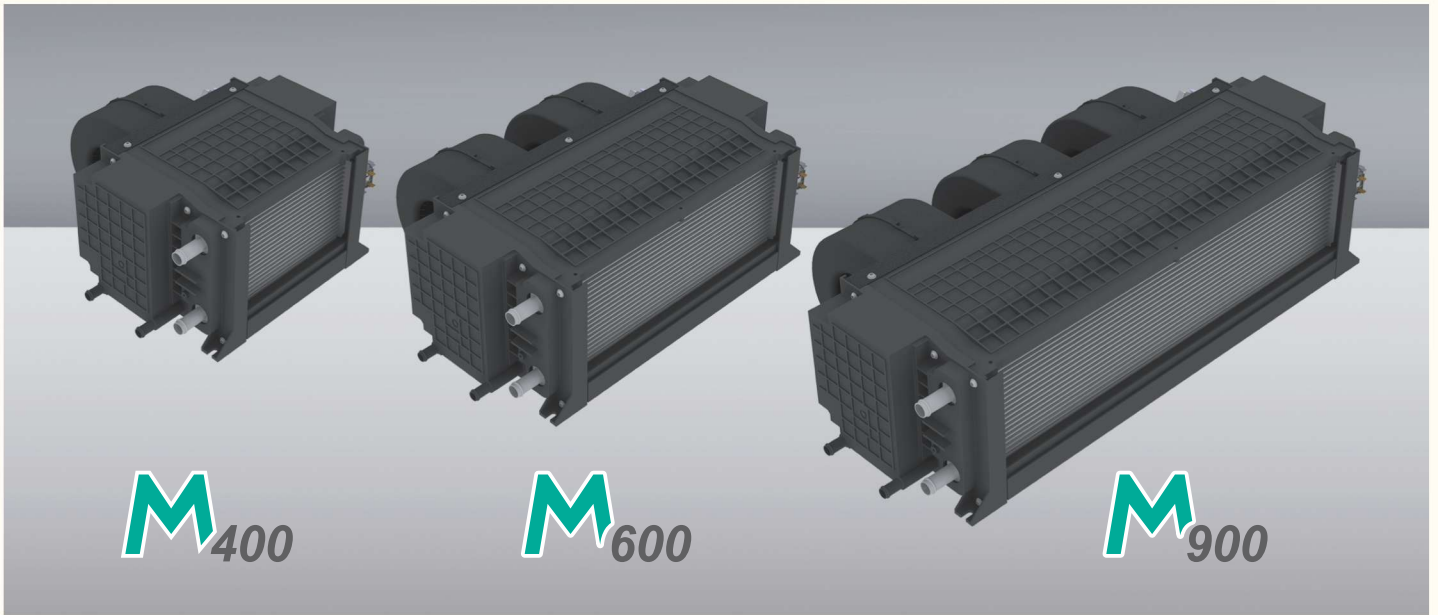
Benefits of using air conditioning/heat pump UL500 HP CO₂

- Electric modular and hermetic CO₂ system.
- Up to 70% potential service cost savings.
- CO₂ is a natural, nontoxic and incombustible refrigerant.
- 100% fresh air supply.
- Permanent high cooling capacity due to constant compressor speed.
- No refrigerant pipes are necessary.
- Entirely recyclable system and therefore ecologically valuable.
- Noise reduced fans (about 5 dBA)

Modular series „M400, M600, M900” – air-conditioning concept for cabins in construction, agricultural, forestry and special machinery.

One system for all driver's cabins

From the wide range of heating, ventilation, and air conditioning (HVAC) systems the new Konvekta solution in the field of air conditioning of vehicles, such as construction, agricultural, forestry and special machinery, deserves attention. It's about the M400, M600, M900 modular air conditioning series, which can be optimally adjusted to each cabin and machine.



Flexibility and versatility of the system

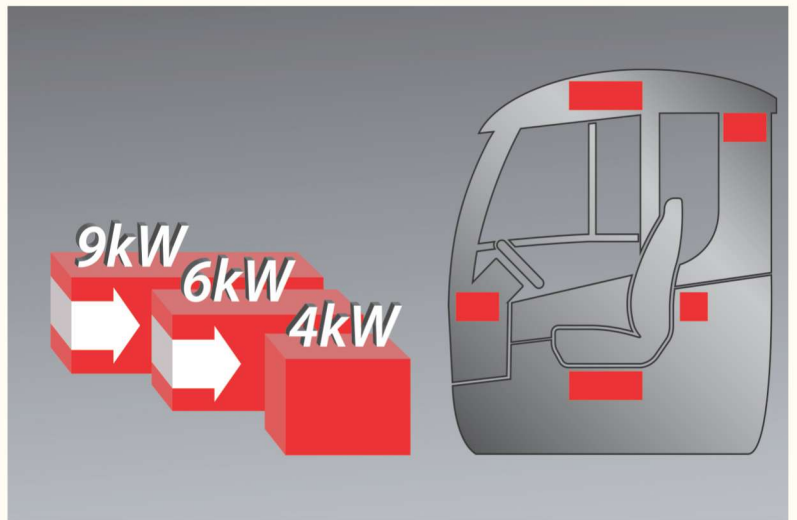
The new "M" series stands out for its reliability, maximum efficiency and extremely long service life.

Thanks to its modular and flexible design the "M" series offers a high degree of individuality.

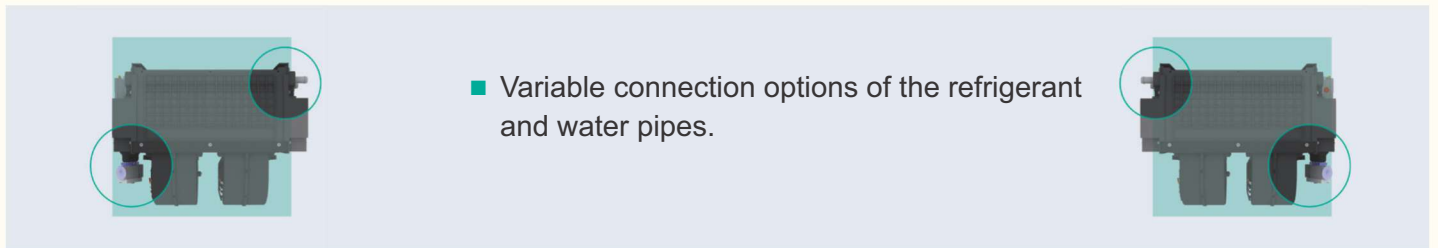
Any installation position can be used with this system, like on the roof, behind the driver's seat, on the sides or at the front. An optimal and efficient solution is suitable even for the smallest installation spaces. Thus, the series can be adapted to space requirements, as well as technically configured in many different ways. As a result, the connection options of the refrigerant and water pipes can be chosen freely.

Another advantage of the system is that the customised adaptation of the blow-off and suction situation.

The series of heaters and evaporator units with cooling capacity of 4 to 9 kW, are available in 12V and 24V versions, which make them suitable for any machinery or cabin. The air conditioning system can be used as air conditioning heating, air conditioning unit or for heating only.



A series of heaters and evaporator units with cooling capacity from 4 to 9 kW, available in 12V and 24V version, which makes them applicable for all vehicles and driver's cabins. The air conditioning system can be used as air conditioning heating, air conditioning unit or for heating only.



- Variable connection options of the refrigerant and water pipes.



- Customised adaptation of the blow-off and suction station.

Reliability

Thanks to modern production technology, the housing of air conditioning components are made of a stable and durable technopolymer.

All airflow areas are optimized - air is gently blown directly to the target. The ideal airflow increases capacity and provides the smooth work of the entire system.

The construction of the entire system is robust and shock-resistant. The heart of the system is a semi-automatic control solution that enables an even and vehicle-adapted air flow.

In addition, the design of the nozzles is individually adopted to the interior of the cabin. The "M" series is adapted to the difficult working conditions of off-road machines.

Quality and availability – worldwide production

The device consists exclusively of components developed by Konvekta, in Germany. Due to the international nature of the company and long experience, the entire system is manufactured in all existing locations of the company - in China, Argentina, India and Turkey, maintaining the quality of Konvekta.

"M" series cabin air conditioning systems are specially adopted to the needs of customers. Adapted to the harsh conditions of the construction and agricultural industries, they successfully accomplish all difficult tasks and prove their efficiency and reliability in everyday use. The versatility of this solution is reflected in the fact that the "M" series is successfully used in rescue vehicles, ambulances, snow plows, snow groomers and all construction, agricultural and forestry machines.

SERIES "M" – benefits:

- One system for all drivers' cabins
- Suitable for all installation positions
- Variable connection options of the refrigerant and water pipes
- Customised adaptation of the blow-off and suction situation
- Suitable for the smallest installation spaces.

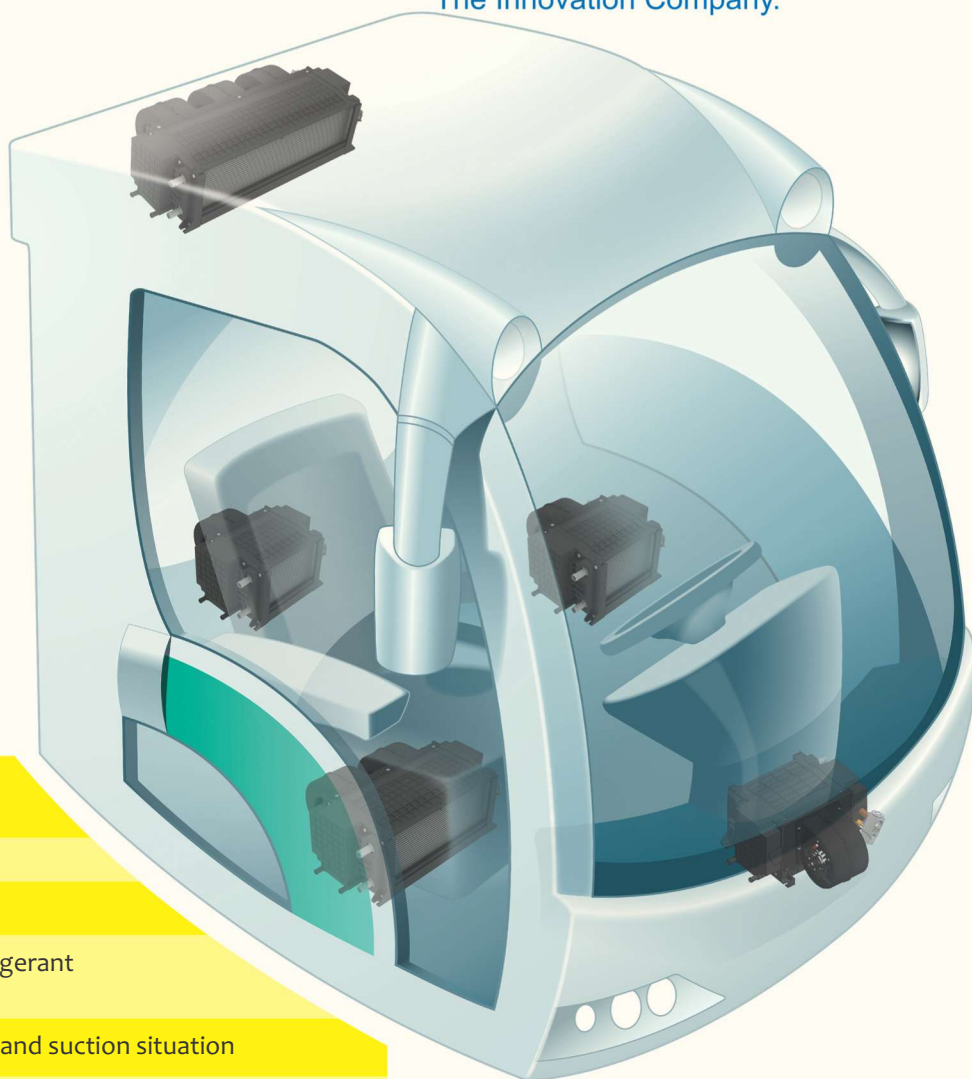
SERIES "M" – Features:

- Modular series concept with the principle of equal parts.
- Modular concept that can be adapted to almost any driver's cabin and vehicle.
- Possible configurations:
 - Heating only,
 - Cooling only,
 - Cooling and heating.
- Available in 12V and 24V

The module range concept with the principle of identical parts "M400, M600, M900", can be adapted to almost any driver's cabin and is impressive thanks to its outstanding versatility.

There are no restrictions concerning system location or possible line connections. With a power range of 4-9 kW, the range of evaporators- heaters, available in 12 V and 24 V version, is suitable for almost any machinery and cabin size.

In addition to the space requirements, the series can also be technically configured in many different ways. Our highly developed air conditioning system can be used as air conditioning, pure air conditioning or only for heating.



UDS-ATpro

– the new generation of accident data recorder is coming soon

As announced by the manufacturer – Kienzle Argo, a new UDS accident data recorder - ATpro – the successor of the previous UDS-AT – will appear on the market in December this year.



In addition to the well-known features, the new Kienzle Argo UDS-ATpro offers significant customer benefits due to improved functionality and performance.

- Smaller size
- More memory for events
- Increase in the number of recordable CAN signals
- Extended CAN signal information
- New and more flexible cable concept
- New and updated user interface, new UDS key
- Future-proof receiver for global navigation satellite systems through optionally integrated GNSS module.

Along with the introduction of the UDS-ATpro an updated end-user software will also be available.

Among others, the new version offers:

- ✓ Communication with UDS 2.0, UDS-AT and UDS-ATpro
- ✓ Compatibility with all PRI file formats of the previous UDS software families
- ✓ Graphical processing of all additional channels
- ✓ New auto-tab for an overview of all recorded data (Science version)
- ✓ Visualisation of the validity (topicality) of individual data items
- ✓ Display of all new device functions

The legacy UDS-AT generation will be available only until the current stock lasts.

News – 3rd Quarter

- ▶ Three electric Solaris buses have been equipped with tire pressure and temperature monitoring system CPC and nine USB chargers (three per each bus).
- ▶ MPK Nowy Targ has supported its fleet with 4 Solaris buses – each of them with USB port on board.
- ▶ Fifty-two USB chargers have been installed in 13 Solaris CNG buses (four per each bus) bought by PKS Bielsko Biała (Bielsko Biała public transport company).
- ▶ Six Solaris electric buses have been equipped with CPC systems and thirty-six USB ports (six per each bus) have supported the fleet of MZK Ostrów wlkp. (Ostrów Wielkopolski public transport company).
- ▶ Fourty-five electric 18-metre long Solaris buses for MZA in Warsaw have been equipped with 135 USB chargers.
- ▶ ZTM Lublin has equipped its fleet with a 18-metre long Trolejbus Solaris (trolleybus), in which there were installed 5 USB chargers

Trainings – 3rd Quarter

25 August

Periodic training for workshop technicians for FROST THERMO KING Sp. z o.o. carried out in our Warsaw office.

18 September

Periodic training for workshop technicians for FROST THERMO KING Sp. z o.o. carried out in our Warsaw office.

23-25 September

Three-day basic training for workshop technicians for SCANIA Polska S.A. carried out in our Warsaw office.

28 September

An online training in the field of WorkshopTab dedicated to WEMAN Sp. z o.o..

28-29 September

The second part of training in the field of KIBES5 dedicated to Hungarian company - Evopro Bus Kft. The training was conducted on the Teams platform.

29 September

The stationary training on AGB speed limiters dedicated to Mercedes-Benz Trucks Polska Sp. z o.o, carried out in our headquarters in Mykanów.

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- ✓ installation, dismantling and warranty repairs of Toll Collect,
- ✓ WABCOWÜRTH computer diagnostic,
- ✓ installation of GPS devices,
- ✓ installation of ContiPressureCheck,
- ✓ air conditioner repairs.



- two service stands in the hall with lifting devices,
- measuring distance,
- adjustments for air conditioning servicing on the roof of the vehicle,
- truck (TIR) parking for customers during service / waiting time,
- comfortable waiting room (Wi-Fi, TV, computer),
- convenient location.



DRABPOL – Headquarters in Mykanów
42-233 Mykanów; ul. Akacja 24/26
e-mail: serwis@drabpol.pl
tel.: +48 795 501 929, +48 694 414 866

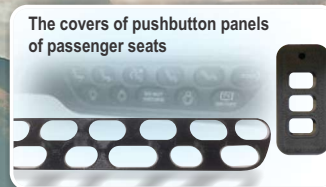
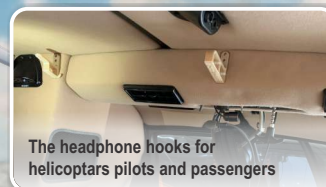
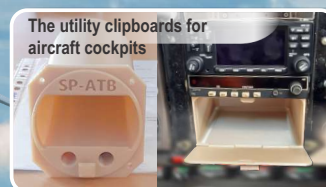
DRAB POL[®] NEWS

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A V I O N I C S

Quarterly Newsletter no 3(88) July – August – September 2020

FROM DESIGN TO 3D PRINT



„The fundamental principle of transportation is its safety”

IN THIS ISSUE YOU CAN FIND:

3. The clipboard for pilots
4. We modernize the avionics equipment in the CESSNA CITATION CJ1
9. UA eNews
 9. InSight Flight Deck for the Falcon 900B
 11. InSight™ Retrofit Flight Deck Solution for the Falcon 50
 13. Sixth Generation Recorders – new series KAPTURE
14. GARMIN G3X receives certification
18. BendixKing - Taking aim at General Aviation avionics market
22. Digital incentives
25. News for GA – Garmin Avionics
 25. Garmin® Unveils the Aera® 760 Portable Aviation GPS
 27. GI 275 Now Compatible with GFC™ 50
 28. GI 275 Available for Helicopter Installations
 28. EASA Approves G3x Touch for Nearly 500 Certified Aircraft
 31. Garmin Adds GFC™ 500 Aircraft Approvals Now Available for Piper PA-28RT-201 and -201T



4 | We modernize the avionics equipment in the CESSNA CITATION CJ1



14 | GARMIN G3X receives certification



13 | Sixth Generation Recorders – new series KAPTURE



18 | BendixKing – Taking aim at General Aviation avionics market

FROM THE EDITOR

Ladies and Gentelman, Dear Readers!

The pandemic has stamped its influence also on the aviation world. We mainly mean the organization of various trade fairs and industry events. For obvious reasons, we did not participate at this year's MSPO in Kielce or at the Arms & Security trade fairs in Kiev, where we promoted our solutions dedicated to the aviation industry every year.

Instead, we focused on the services provided by the Part 145 Service Organization, among others, in the field of avionics modernization. This summer, we started another avionics modification in Cessna Citation 1, there is more about this on pages 4-6.

Also our services in the field of designing and manufacturing various types of elements for pilots or aircraft cabins are becoming increasingly popular. Thanks to our specialized 3D printer, we can print any individual customer's order, such as shelves, hooks, cup holders, end caps and many more.

Have a nice reading!

Alicja Drabczyńska



DRABPOL[®]
AVIONICS NEWS

Published by DRABPOL

Editor:

Drabpol sp. jawna P. Drabczyński i Wspólnik
42-233 Mykanów, ul. Akacyjowa 24/26
tel. 0-34 366 00 22, fax 0-34 366 01 02
centrala@drabpol.pl, www.drabpol.pl

An optimal solution for aircraft cockpits



The clipboard for pilots

At the individual request of our client - the AMC Aviation company, for whom we also carry out the modernization of the avionics described in this issue, our Design Office designed and then manufactured on 3D printer, an additional part of auxiliary equipment - the clipboard. It was used in the Morane-Saulnier type aircraft.

The closed clipboard is 158 mm wide, 200 mm deep and 87 mm high. It is installed in the place intended for the avionics device. Thanks to this, we can avoid additional and often time-consuming modifications to the cockpit.

The clipboard for everyday items was printed on a Fortus 450mc 3D printer from ULTEM 9085 aviation certified material. It meets the most stringent material criteria, required by the aviation industry and regulatory agencies. It is characterized by high thermal and chemical resistance, and it is also fireproof.

Designing and producing this type of elements, as well as a wide range of other solutions, is possible quickly and effectively thanks to our 3D printer and 3D scanner, and modern CAD software. Based on the idea presented, our designers can create there a design from scratch. At the client's individual request, we can design and then print the designs ordered - from highly specialized tools, functional prototypes to everyday utility items.



The first stage of avionics modification is complete

We modernize the avionics equipment in the CESSNA CITATION CJ1



In the summer of this year we started the modernization of the avionics in the Cessna CJ1 airplane - one of the initial models of the Cessna's bizjets. The first aircraft of this series performed the maiden flight in the 70s of the last century and is known as the Citation 1.



GARMIN GTN750

The aircraft, which we received for modernization from AMC Aviation, was factory-equipped with the Bendix King CNI 5000 NAV/COM set dedicated to Business Aviation. It includes the KY 196B transceiver (well known in general aviation) and the KN 53 navigation receivers, adapted for installation in a special integrated, illuminated panel in a gray colour typical for this aircraft series.

Satellite navigation was made possible by the Bendix King KLN 90B GPS receiver and an integrated flight planning and management computer (FMS) Honeywell GNS-XLS.

Flight information for the first pilot is provided by a set of two electronic Honeywell SPZ-5000 EFIS displays. The aircraft is also equipped with the RDR 2100 weather radar with the IN-182 radar indicator.



2x GARMIN GTN750

The planned cockpit arrangement

The modernization that we have undertaken assumes the replacement of old GPS receivers with a system of two Garmin GTN 750 touchscreen navigators, compatible with the WAAS system, integrating the radio, VOR / ILS radios and a multifunctional map.

The new navigation systems will introduce the possibility of implementing precise GPS approaches (LPV – Localizer Performance with Vertical guidance) thanks to the addition of a LPV converter specially developed by Avionic Straubing company.

This converter allows to convert the precision approach signals, now easily implemented in glasscockpit systems, into a form accepted by the Honeywell EFIS display, dating from 1990s / 2000s.

The almost 7-inch display size of the new FMS systems (the Garmin GTN series can be thought of as FMS) will also allow to uninstall the old weather radar indicator. The weather data will be displayed on a large colour touchscreen.

Since we treat the GTN 750 as an FMS computer, it should be mentioned that the ADC200 will also be modified - this device is responsible for measuring fuel flow, thanks to which it will be possible to provide data to GTNs, which will automatically "monitor" this consumption.

Changing the configuration of the equipment obviously requires a new, central part of the aircraft's instrument panel and a slight modification of the pilot and co-pilot's panels, because some of the "old" devices must be installed on a new place, due to the size of the new GTN 750s and the lack of space for all devices that were previously were located in central panel. The autopilot control panel and the OAT (Outside Air Temperature) indicator will be moved to a new location.

Due to the restrictions introduced by the European Commission to the air traffic, i.e. the requirements for the obligation to equip aircraft with the ADS-B Out system, the Cessna CJ's transponders will also be upgraded. The originally installed two GTX 330D Mode S transponders will be modified to the ES (Extended Squitter) version, which



Before modernization

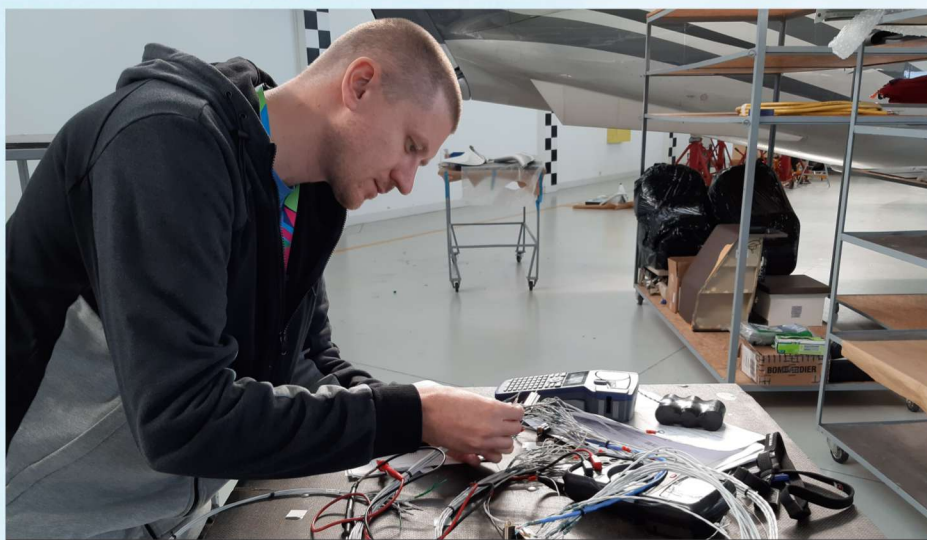
will enable automatic sending of the aircraft position to ground terminals and directly to other aircraft via ADS-B Out technology.

The last element of this modernization will be the installation of a True Blue Power double USB socket for charging mobile devices, which will certainly make the work of the pilot much easier.

In addition to assembly and installation activities, we also deal with electrical works, such as the manufacturing of electrical harnesses and their installation / integration with avionics on the airplane, marking the existing harnesses and wires to be used during integration, marking the produced wires in accordance with STC and assembly of electrical components, switches, contactors, etc. We are also responsible for the preparing of electrical diagrams, first run, tests and configuration.



The removal of current avionic equipment.



The electrical system – checking the harness before installation on the airplane

The installation works described above are performed by our PART 145 Maintenance organization based at Modlin Airport.

The co-operation of PART-21 Design Organization.

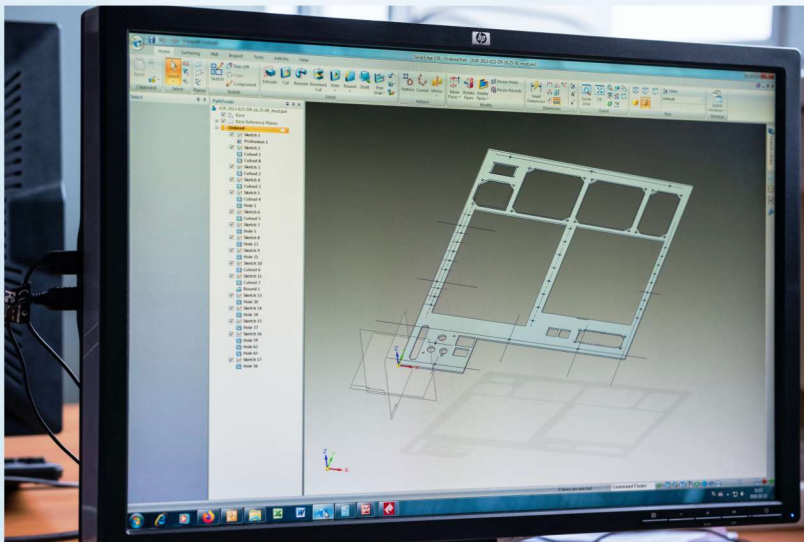


Earlier, however, our designers from the PART 21 Design Organization started to work, who developed complete drawings and the engineering documentation, in accordance with the needs of the project and the guidelines in STC from Avionic Straubing.

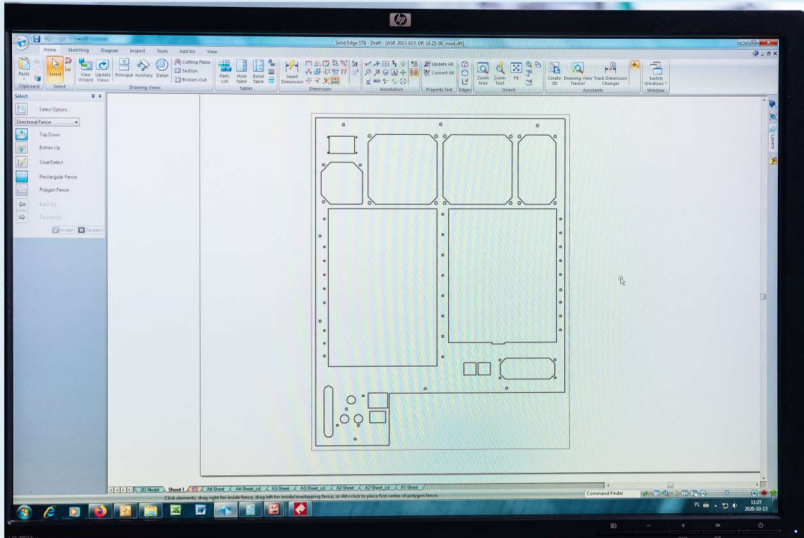
In cooperation with PART 145, they also prepared documentation for 'mechanical' work (an adapting the airplane and her instrument panels to new equipment), as well as uninstalling the old equipment and installing new devices. The PART 21 Organization constantly supervises the aircraft documentation and the engineering

documentation, as well as helps in completing the new details for assembly.

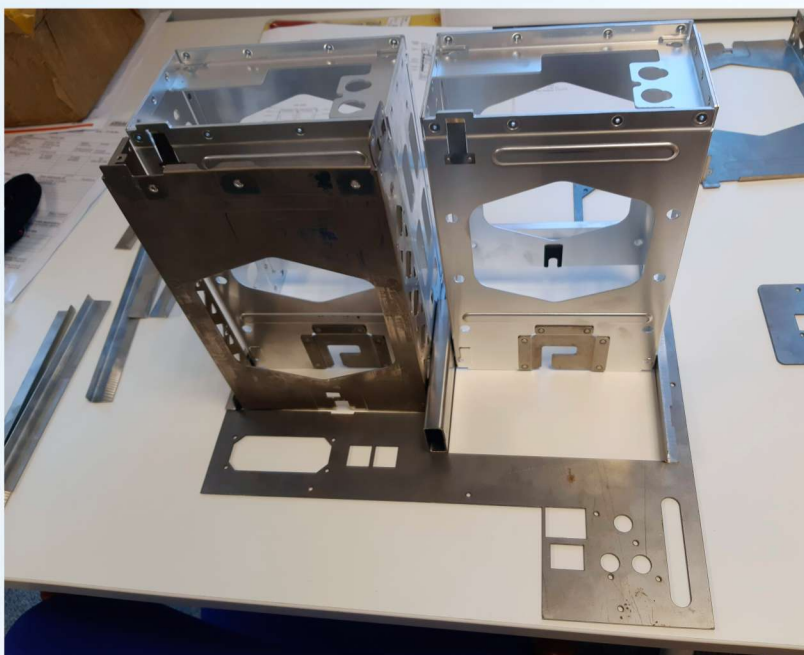
In addition, it develops input files for CNC machines, containing the data necessary to make machining and sheet metal parts (instrument panels, brackets, mounting trays, etc.)



3D model of instrument panel developed by our designers from PART-21 organization.



The 2D dxf drawing (drafting) was created on the basis of a 3D model.



The instrument panel was laser cut by the specialized company on the basis of a documentation developed by PART-21 organization.

Continuously, our designers also solve current installation problems (i.e. interferences) and carry out "conceptual work" in unclear situations – such as, real installation possibilities in relation to what is included in the STC certificate.

They also offer their knowledge and experience in the use of certified material substitutes (sheet-metals, anti-corrosion agents and paints).

Currently, the entire process of modernizing the avionics in the mentioned Cessna airplane is at the stage of checking the correctness of the harnesses manufactured and integration with the aircraft. All pins that were added to or changed position in the electrical connector during this modernization are thoroughly checked with the multimeter. In terms of mechanical work, a new, central instrument panel is already manufactured.

After assembling, it will be powder coated and then installed on the plane. In order to avoid a difference in shades, the boards of the pilot and the co-pilot will also be painted / refreshed. Currently, there are small new parts, such as brackets, supports, handles, etc. installing on the plane.

We will inform about the completion of the avionics modernization process in the next issue of Drabpol News.



The finished instrument panel with new GTN 750 touchscreen navigators before powder painting.



InSight Flight Deck for the Falcon 900B

Universal Avionics' InSight flight deck upgrade for the Falcon 900B features a fully integrated display system with substantial capabilities, including Data Communications (Data Comm), Satellite-Based Augmentation System (SBAS) Localizer Performance with Vertical Guidance (LPV), and Automatic Dependent Surveillance-Broadcast (ADS-B) Out.

The retrofit package positions the aircraft for today's avionics technologies as well as future growth, allowing for future add-ons like the ClearVision™ Enhanced Flight Vision System (EFVS) with SkyLens™ Head-Wearable Display (HWD), which provides a cost-effective and modern alternative to a traditional fixed Head-Up Display (HUD).

Key Features & Benefits

The InSight Display System is designed as an integrated flight deck solution for the Falcon 900B, featuring:

- Embedded Synthetic Vision (SVS) with advanced mapping capability and 3D Terrain.
- Electronic charts.
- Radio control.
- Broadcast weather.
- Terrain Awareness Warning System (TAWS).

The InSight avionics modernization package includes LPV Approach capability, enabling more direct routes provided by the SBAS-Flight Management System (FMS) leading to fuel savings and decreased flight time.

You will benefit from less maintenance costs and increased Mean Time Between Failure (MTBF) with four new 10.4" diagonal electronic flat panel displays to replace your older analog flight instruments.

Reversionary modes between the Primary Flight Display (PFD) and Multi-Function Display (MFD) guarantee redundant capabilities, offering the safest flight deck operating environment.

The InSight PFD presents flight critical data such as flight guidance, air data, vertical and lateral deviation indicators,



navigation data, radio altimeter, attitude, heading, flight director, Horizontal Situation Indicator (HSI), airspeed, altitude, vertical speed, and turn coordination instruments.

The InSight MFD presents map data such as flight plan, Navigational Aids (NAVAID), airports, airways, controlled airspace, charts, terrain, traffic, weather, and lightning depiction.

The MFD may also display SVS terrain maps, enhanced multi-layered moving maps with own-ship position, and an SVS 3D map for increased situational awareness.

Both the PFD and MFD can be pilot configured to display desired flight critical information during various phases of flight.

The optional UniLink™ Communications Management Unit (CMU) imagery such as wind, weather, and ground communication information may also be displayed on the MFD.

Your aircraft will lose up to 200 lbs. of weight with this installation, and your flight deck will be refreshed with a cleaner pedestal and flight panel since the InSight Display System is primarily controlled through the Touch EFIS Control Display Unit (ECDU), minimizing knobs and buttons.

Required databases can be uploaded via a SolidState Data Transfer Unit (SSDTU)

or a secure disk card scanner optimizing the fastest database upload times for databases; no more sitting in a hot flight deck waiting for your databases to upload.

All new installations carry our standard two-year warranty with optional extended warranty plans available.





InSight™ Retrofit Flight Deck Solution for the Falcon 50

Integrated Flight Deck Solution

Universal Avionics' latest InSight flight deck upgrade features the most innovative avionics technologies available for your Falcon 50 today. Designed as an integrated flight deck solution, InSight features embedded 3D Synthetic Vision (SVS), advanced mapping capabilities, and electronic charts.

Embedded 3D SVS

- Current position
- High-resolution terrain
- Inset map view with flight plan overlay
- Second generation SVS



Advanced Mapping

- Moving map with waypoints, airports, and navaids with auto range
- High and low airways
- Auto declutter

Electronic Charts

- Replaces paper charts
- Within view of critical flight information
- Quick zoom in/out

Key Benefits

- Increase reliability with high component MTBF/MTBUR
- Intuitively control and input via graphical user interface
- Enhance safety and situational awareness, even while taxiing
- Customize screen layouts to display critical information during different phases of flight

Reliable Retrofit Package

The reliable InSight flight deck upgrade for the Falcon 50 replaces aging and obsolescent equipment, positioning your aircraft for today's operating environment as well as providing a path for future growth.

- Aeronautical Telecommunications Network Baseline 1 (ATN B1)
- Automatic Dependent Surveillance-Broadcast (ADS-B) Out
- Controller-Pilot Data Link Communications (CPDLC)
- Data Communications (Data Comm)



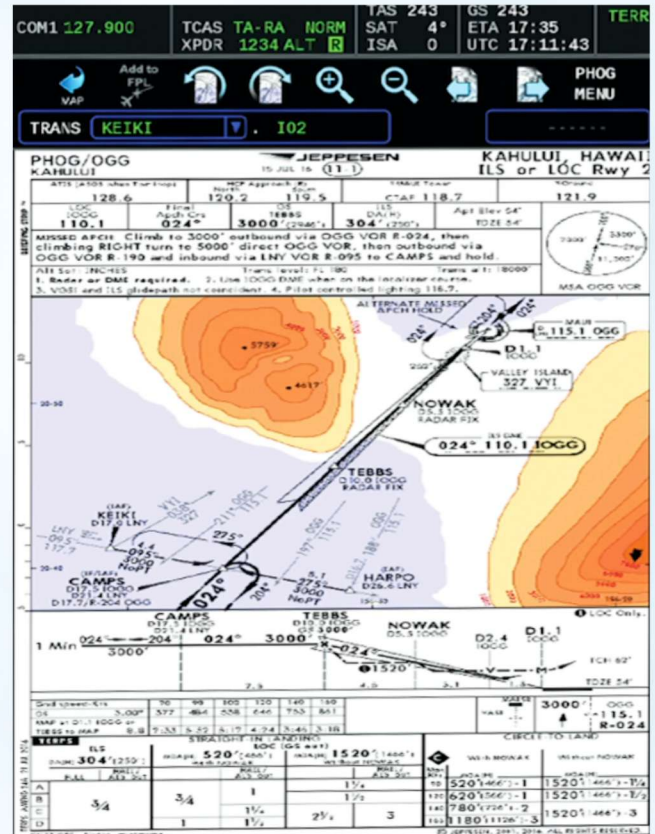
Embedded 3D SVS.

- Future Air Navigation System (FANS) 1/A+
- SBAS Localizer Performance with Vertical Guidance (LPV).

The InSight Display System also allows for add-ons like the ClearVision™ Enhanced Flight Vision System (EFVS) with



Advanced mapping.



Electronic charts.

SkyLens™ Head-Wearable Display (HWD), which provides a cost-effective and modern alternative to a traditional fixed Head-Up Display (HUD).

All new installations carry Universal Avionics' standard two-year warranty with optional extended warranty plans available.

System Components

- 4 EFI-1040 Displays

- 2 Touch EFIS Control Display Units (ECDU)
- 2 Alphanumeric Keyboards (ANK)
- 2 UNS-1Fw SBAS-Flight Management Systems
- 1 UniLink™ UL-801 Communications Management Unit
- 1 Cockpit Voice and Flight Data Recorder (CVFDR)
- 1 Solid-State Data Transfer Unit (SSDTU).

KAPTURE™
COCKPIT VOICE & FLIGHT DATA RECORDERS



Sixth Generation Recorders – new series KAPTURE

The KAPTURE line of Cockpit Voice and Flight Data Recorders (CVR/FDR) includes five lightweight and compact model options, providing a customized recording solution for your aircraft. Available models include a CVR, FDR, and combination Cockpit Voice and Flight Data Recorder (CVFDR). Each model features a lithium-free 90 day Underwater Locator Beacon (ULB), and the CVR and CVFDR models offer a patented all-inclusive, internal Recorder Independent Power Supply (RIPS) option.

UA's sixth generation of recorders include all the features and benefits of the company's previous CVR/FDR product line with reduced weights, plus many improvements and enhanced capabilities.

With its increased cockpit voice and ambient audio recording capability of over 25 hours, the CVR and CVFDR models meet EASA's mandate which requires all aircraft with an MTOW of 59,500 lbs. first issued with an individual CofA on or after January 1, 2021, to be equipped with a 25 hour CVR. Recorded

playback is proven to be clear and audible. The CVR and CVFDR models also provide over 25 hours of non-audio recording such as UTC, rotor speed, and data link messaging, while the FDR offers over 90 hours of recording ARINC 717 data and at least 25 hours of ARINC 429 data, allowing for expanded integration capabilities.

A new, versatile Flight Archive Ground Maintenance Tool allows for faster downloads and field-loadable software updates. Paired with improved download speeds from the CVR/FDR itself, and removing the need for a Quick Access Recorder (QAR), operators gain significant savings in time and maintenance costs.

The KAPTURE line of CVR/FDR offers the utmost in reliability with high Mean Time Between Failure (MTBF) and is backed by UA's world-renowned customer support. The line is designed for operators seeking a recording solution that meets all of the latest certifications and requirements, including MOPS ED-112A compliance, for the freedom to fly in airspace around the world.

GARMIN G3X

RECEIVES CERTIFICATION

STORY BY - Dave Higdon

Source: AVIONICS NEWS November 2019



From the day Garmin first unveiled its advanced G3X system for experimental aircraft, many pilots of certificated aircraft envied this new option available to builders and operators of experimental, amateur-built aircraft. But Garmin's history with avionics for the EAB segment prompted many of the envious to exercise some patience. They harbored expectations that the avionics giant would follow a familiar path: launching an EAB product and letting builders fulfill their panel ambitions while simultaneously working toward approval for the same systems in type-certificated aircraft.

Its options cover many bases

That patience paid off. Four years after introducing the G3X Touch in March 2014, Garmin announced Federal Aviation Administration approval for the G3X Touch family for certificated aircraft in March 2019 during the new product introductions session at the AEA International Convention & Trade Show in Palm Springs, California. The approved model list encompassed nearly 500 piston-single general-aviation aircraft.

After that announcement, it took more time than either Garmin or Avionics News wanted to coordinate a flying demonstration of the new systems. Weather repeatedly thwarted our plans to fly the certification platform, a Grumman Tiger, with scheduled demos postponed multiple times before Air Venture Oshkosh in July 2019.

But patience again ultimately paid off when, in late August, Garmin's media relations pro and veteran demonstration pilot Jessica Koss flew the Grumman Tiger to our frequent demo airport, Lloyd Stearman Field in Benton, Kansas, from Garmin's facilities on New Century AirCenter near Olathe, Kansas.

Even with initial weather ideal for a demo flight, pressing weather required Koss and the Grumman to head back north almost immediately after we completed the flight.

The reigning conclusion from the demonstration: Garmin has yet another system designed to deliver excellent performance, sharp, easy-to-discern graphics on the displays, and Garmin's typical effort to build in compatibility with its other products. The compatible, connectable other devices include the GFC 500 flight-control system installed in the Tiger, as well as Garmin's GNC 255 and the GTN 650 IFR GPS navigator.

We spent some airtime sampling the functions and capabilities of the 10-inch G3X Touch PFD paired with a portrait-oriented 7-inch model - and the G5 backup compact attitude indicator/directional gyro installed in the Tiger.

The Basics

At its core, a single-screen G3X Touch delivers a full-function combination of a primary flight display and a multifunction display in a compact, integrated package. A single 10.6-inch model offers a display with real estate enough to give the pilot whatever combination of PFD, MFD and engine data desired, laid out in one of the many possible combinations. The display is 1,280 pixels wide and 768 pixels high; the box itself measures 10.85 inches wide by 7.82 inches tall.

The 7-inch G3X Touch model comes in two configurations: a 7-inch landscape/horizontal-oriented model and a companion version oriented in portrait - or vertical - mode. In portrait mode, the display provides a screen with 480 pixels wide and 800 pixels high in a box measuring 6.01 inches wide by 7.82 inches high. The 7-inch also allows for divvying up the screen space into PFD, MFD and engine data from the Engine Indication System.

A single G3X Touch display of whatever size combines with a single Garmin G5, equipped with the optional standby battery, to allow removal of air-powered gyro instruments, along with the air pump - suction or positive-pressure - and the associated plumbing and regulator valve. With a single G3X Touch display installed, a

G5 provides the redundancy required by regulations - and desired by savvy pilots.

With two or more displays, most redundancy needs are covered. But the G5 adds depth to that redundancy, and the reversionary mode of the G3X models helps keep the transition clean, simple and easy to use.

The G3X: Evolved from its EAB/LSA origins

Today's certified Garmin G3X Touch advanced step by step from its origins as a system aimed at the EAB and light-sport aircraft segments of general aviation. After its introduction, Garmin unveiled new advanced peripherals in early 2013 that reduced the price of a high-functioning, full-featured G3X system.

**... GARMIN ANNOUNCED
FEDERAL AVIATION
ADMINISTRATION APPROVAL
FOR THE G3X TOUCH
FAMILY FOR CERTIFICATED
AIRCRAFT IN MARCH 2019
DURING THE NEW PRODUCT
INTRODUCTIONS SESSION
AT THE AEA INTERNATIONAL
CONVENTION & TRADE SHOW...**

Garmin brought out a new, lower-cost and lighter-weight Air Data Attitude Heading Reference System and new EIS interface module. These two advances allowed a sharp price reduction for the G3X price. At the same time, Garmin introduced other new-product options that brought enhanced capability to the G3X system, among them a fully integrated Garmin autopilot, an angle of attack probe and a remote-mount ADS-B receiver.

Next, in 2014, Garmin announced the launch of the G3X Touch, and, as the company proclaimed in its March press release, “The noncertified G3X Touch system offers pilots easy-to-read, easy-to-use, high-resolution 10.6-inch flight displays with split-screen functionality and a host of advanced interface options - all at a great price.”

More advances and expansions of the system followed until Garmin offered three display options: the original 10.6-inch landscape-oriented screen and the two 7-inch models.

Compatibility with other Garmin avionics advanced and, in the spring of 2019, Garmin announced certification of the G3X system and supplemental type certificates for aircraft installation.

During the summer, Garmin unveiled an approved-model-list STC for the G3X covering nearly 500 single-engine aircraft. Throughout, Garmin worked to not only advance the package's capabilities but also keep prices competitive. For example, Garmin includes the STC in the G3X Touch system price. And it's this latest incarnation of the G3X Touch certified system sampled here.

The end-of-flight impression: Whether one, two or three displays, the G3X Touch succeeds at providing broad capabilities, an outstanding display and arguably the most pilot-friendly user interface yet to come from Garmin.

And Garmin advanced functions for experimental aircraft while working a parallel advancement program for its certificated system.

G3X serves well, from engine-start to shutdown

The G3X's capabilities are vast, easy to use. And since the control interface is also the display, all bright, clear, sharp and colorful, with and without polarized sunglasses, we start our familiarization flight with a look at them. Unlike many other thin-film-transistor displays, the G3X Touch's displays suffer no ill side effects or degradation when viewed wearing polarized sunglasses, an issue with other similar displays.

The improvement over what usually comes through polarized sunglasses was dramatic, still rich in color quality. No shaded bands, no muted colors.

It was like viewing the displays sans shades altogether. There had to be an explanation. Koss relayed this explanation from the engineers involved in the development of the G3X.

“Engineering explained that our displays are optimized for the best experience with polarized sunglasses,” she said. “It helps that our displays are high-end in terms of quality.”

“We also try to polarize the light for what we think will be the best experience with polarized sunglasses, so that is a consideration we take into account.”

As for how the engineers accomplish this, Garmin demurred. However they do it, it works.



More standard features

In the G3X Touch system, whether certificated or an EAB version, the standard features help Garmin keep pricing simple and competitive.

The displays provide a dynamic moving-map function in several ways - from the MFD's chart depictions, approach plates, standard instrument departure procedures to standard terminal arrival procedures.

With a standard Synthetic Vision System view over the PFD, the G3X Touch delivers a safety-enhancing system shown to dramatically improve situational awareness regardless of the weather and time of day.

The autopilot capabilities integral to the EAB models can be enhanced with an add-on controller, or the pilot can simply use the interface built into the G3X Touch itself. Garmin offers other peripherals to expand on the capabilities of the G3X Touch line.

Since the certified G3X Touch is approved for both IFR and VFR flight, the certified G3X Touch displays can interface with select autopilots, among them Garmin's own GFC 500 digital autopilot, which we flew in the Grumman Tiger test bed. Capabilities include

coupled LPV, LNAV, VNAV and ILS approach capability, complete with the procedures for missed approaches with an installation of a compatible navigator like the GTN 650 and GTN 750 all-in-ones, and others. When connected to a compatible ADS-B In receiver, such as the remotely mounted GDL 50R or GDL 52R, the G3X Touch gains the ability to display the FAA-supplied Traffic Information Service-Broadcast traffic indication and Flight Information Service-Broadcast weather services.

The same services are available for view when the G3X Touch is mated with Garmin's new GNX 375, GTX 345 transponder or the above-mentioned ADS-B In receivers.

Garmin's version of ADS-B In also includes the company's TargetTrend and TerminalTraffic technology, which provide a quicker, easy-to-interpret view of ADS-B traffic targets.

The G3X Touch also provides the option to display the subscription-based SiriusXM aviation weather as well as listen to audio entertainment when fed by a remotely mounted GDL 51R or GDL 52R receiver.

And the pilot can control all the remotely mounted accessories through the G3X Touch's touch-sensitive display screens, helping reduce panel clutter while supporting maximum capabilities.

Among the Garmin products compatible with the G3X Touch controls are Garmin's GTR 225 VHF transceiver, the GNC 255 nav/comm, the popular GTN all-in-one GPS/nav/comms, as well as the GNX 375 and GTX 345 or GTX 335 ADS-B-enabled transponders.

Additional capabilities the G3X Touch flight displays incorporate Garmin's wireless Connex cockpit connectivity system. This feature allows the pilot to stream information between the avionics and select Garmin portables or mobile device apps, among them ForeFlight, Garmin Pilot and FltPlan Go.

With this wireless capability, the pilot can create flight plans ahead wherever the pilot chooses, on a tablet or smartphone, before uploading the data to the avionics while conducting a preflight inspection.

The Connex link also provides the option to stream GPS position and display backup attitude information from the installed system to portable peripherals like an iPad or Android tablet.

So, how does it all work in-flight?

From the moment of switching on the avionics master in the Tiger, the two G3X displays, the installed GTN 650, the GFC 500 autopilot and the G5 quickly performed their startup and self-test routines. Within a few seconds, the Tiger's panel was alive with color, as each system completed booting up and settled into their normal states.

While back-taxiing south to depart from Stearman Field's Runway 35, the PFD set on the 10.6-inch G3X Touch display's SVS accurately reflected our position and movement.

The 7-inch portrait display provided us with the MFD functions showing our location on a VFR chart view, while the EIS tape kept us informed of the status of the Tiger's 180-horsepower Lycoming O-360 powerplant.

During takeoff, the SVS on the PFD and the display on the MFD both kept pace with the Tiger's movements, no lag or delay, as

the airspeed, altitude and vertical-speed tapes responded to our climbing departure.

Flying a brief series of linked turns demonstrated the real-time response of the ADAHRS system, as the solid-state gyro sensors responded smoothly and accurately reflecting our bank angles in turns and pitch angles in climbs and descents.

Koss quickly ran through some of the myriad display-configuration options available, both with the two displays functioning and with one display or the other disabled showing the different reversionary modes usable should one display fail.

When Koss pulled the breakers for both G3X displays and their screens went dark, the G5 instantly displayed a flag alerting us that the GFC 500 autopilot disengaged. She re-engaged the autopilot, which then coupled to the G5 to display all the autopilot mode annunciators.

Approaching weather, long visible on the FIS-B feed, forced us to cut short our flight plan, but not before the ADS-B In feed gave us a long-distance view of the weather approaching from the northwest. And the ADS-B In feed helped us keep track of nearby and distant air traffic in a part of Kansas heavy with active airports.

We flew in airspace typically busy with traffic from the nearby air fields. A few miles south, Augusta Municipal Airport was busy with traffic, as was Wichita's Col. James Jabara Airport to the west-southwest, Beech Field just south of Jabara, and McConnell Air Force Base just south of Beech, and farther southwest, Wichita Dwight D. Eisenhower National Airport, 17 nautical miles southwest of Stearman.

Every setting sampled, every screen combination and the ancillary functions performed as smoothly and seamlessly as one could ever expect, right down to the depiction of Runway 17 and its centerline paint as we touched down back at Stearman to end the demonstration.

Something for the certificated pilots to envy

AVIONICS NEWS NOVEMBER 2019 45 Garmin's G3X delivers an impressive array of functions on bright, sharp displays - displays that double as the primary control interface for the G3X system and many of its connected peripherals.

The displays are bright, well-defined, sharp and easy to read - even for a set of eyes well past their prime, and without the usual need for reading glasses to make out the smaller symbols and type.

The list of compatible equipment leaves nothing out, giving an operator the flexibility of installing a G3X Touch system as well-equipped as the operator's desires and budget will allow.

Speaking of budget, a two-screen G3X with the EIS option retails for under \$18,000, plus installation. Singlescreen options start at under \$8,000.

And this is where the certificated operators may still suffer a bit of EAB envy, because pricing for the same system for the EAB market is markedly less.

But regardless of which market and which displays a pilot needs, the G3X Touch offers a highly capable system with a high level of functionality using displays as sharp, colorful and clear as any this pilot has sampled.

WITH AN AGGRESSIVE NEW LEADERSHIP GROUP AND A MORE “RETAIL-LIKE” APPROACH TO THE EXPANSION OF ITS AVIONICS PRODUCT LINE, BENDIXKING HAS TAKEN THOSE FIRST IMPORTANT STEPS TO REESTABLISHING ITSELF AT THE TOP OF THE AVIONICS INDUSTRY HIERARCHY.

BENDIXKING

Taking aim at General Aviation avionics market

STORY BY – Dale Smith

Source: AVIONICS NEWS October 2019

When Bendix Avionics acquired King Radio back in the mid-1980s, the new company, BendixKing, was proclaimed as the next ruler of the vast general aviation avionics realm. During its reign, hardly a piston, turboprop or light jet was built in Wichita, Independence, Kerrville or Ve-ro Beach without a Bendix radar or piece of Silver or Gold Crown avionics in its panel.

And the villagers throughout Olathe, Kansas, rejoiced. Then, on a spring day in 2004, it all changed. Diamond Aircraft introduced the Garmin G1000 glass panel in its DA40. Seemingly just that fast, six-

packs and center stacks were out, and all-digital, integrated panels were in. Before BendixKing or any other avionics OEM could respond, Garmin swept in and captured the vast majority of new aircraft avionics production.

For the past several years, BendixKing, now as part of Honeywell, has made its way as a niche avionics manufacturer concentrating on its unparalleled expertise with airborne weather radar and supplying repairs and replacements for the thousands of King radios flying around the world.



BendixKing is partnering with Avidyne to rebrand its popular IFD touch-screen navigators as the BendixKing AeroNav series.

Mock-up of BendixKing's AeroVue Touch Integrated Flight Deck, which was unveiled at AirVenture 2019



That was then. This is now.

We just celebrated our 60th year in the general aviation market,” stated **Gregg Cohen, BendixKing president**. “We’re not looking back-ward; we are looking forward to the next 60 years. BendixKing has rededicated itself to the general aviation avionics market, and I want to emphasize that our goal is having the right products with the right capabilities at affordable prices for our customers. “That dedication comes

from our top leadership at Honeywell. Our aerospace business unit has the right team driving our business growth. Our goal is to be the top provider in the market. We have not been there in GA recently, so we’re working very hard in that direction now.”

Cohen explained that while the company has been working hard on the new direction for the past five years, the effort has gained “measurable traction” in the past year or so. The most recent examples include the introduction of an array of avionics solutions for experimental up through Part 23, Class 1, 2 and 3 certified aircraft.

“Our plan has driven us to explore the best complementary technology that matches what we already have and what we want to offer to be able to supply complete cockpit solutions,” he said. “Right now, it all starts with our AeroVue Touch flight

display. We think it is faster, simpler to use and more powerful than anything currently out there.”

BendixKing’s AeroVue Touch is a 10.1-inch touchscreen PFD/MFD that is currently approved for installation in more than 400 models of aircraft.

“AeroVue Touch was designed from the ground up to be easy for the pilot to operate via the touchscreen or with the knobs,” Cohen said. “Everything is reachable within two touches of the screen. It can be configured for single-, double- or multiscreen display formats.

We haven’t done that in a display product for many years. “It’s a brand-new product, but we have used some proven, key technologies derived from Honeywell’s business aviation group. For example, our synthetic vision is a Honeywell technology. Our goal is to use the best of what is out there.”

Taking a complementary approach to avionics introductions

Cohen explained that while BendixKing has been able to transfer some current Honeywell technologies to its product

development efforts, the time and cost associated with custom building all the units that BendixKing would need to jump back into the GA market was just too much to absorb. So the company took a page out of the Silicon Valley technology playbook and went the partnership route.

This practice involves working with complementary technology providers to put together a complete solution – an avionics suite in this case – that works as if one company had developed it alone. Few companies can afford to develop all the products they want to sell, and those that do often trade depth of product features for breadth of offering.

In BendixKing’s case, it has strategically decided to follow this practice with other avionics manufacturers whose products deliver, as Cohen put it, “the best of what is out there.” For the GPS/nav/comm products, BendixKing is partnering with Avidyne and using the company’s popular IFD-series of navigators and rebranding them as the BendixKing AeroNav series. “Dan Schwinn and his team at Avidyne had been a great partner for a long time before we worked this deal with them,” explained **Roger Dykmann, BendixKing vice president of sales, Americas.** “The Avidyne IFD units are the ideal complements to our AeroVue Touch units. For example, the high-resolution displays on the Avidyne IFD units are ideally suited to serve as displays for our weather radar units in panels that don’t have space for dedicated displays.

It’s the perfect natural progression for BendixKing to sell and support the Avidyne IFD units. Together, we will go a lot further in the market than we can individually.”

Another of BendixKing’s new branded offerings is its AeroPoint 200 digital engine-monitoring unit, which is manufactured by JPI Instruments. “Being a full-line supplier is very important to both BendixKing and our dealers today,” **Dykmann said.** “Whether it’s internal or external product development, we are continuing to develop the best products and relationships we can.”

The experimental partnership that became permanent

Another piece of the panel upgrade puzzle was the need for an affordable autopilot solution that would meet the needs of both experimental and certified aircraft owners.

The solution became BendixKing’s acquisition of TruTrak Flight Systems, which was announced at AirVenture Oshkosh in July 2019.

“As soon as we decided to be in the experimental aircraft market, we knew we needed a partner with proven experience,” Cohen said.

“So we reached out to Andrew Barker and his team at

TruTrak about selling their auto-pilots under our xCruze brand.”

“We started discussing interfaces between BendixKing products and our autopilots, and as we got into that transition, we realized how well their goals and my vision for where I wanted TruTrak autopilots to go were aligned,” Barker explained.

“I was looking for a way to get more resources – we have a huge backlog of orders that we didn’t have the manufacturing resources to fill. “In addition to continuing our work with our experimental products, we are committed to continuing and growing the current list of approved aircraft on our AML-STC for TruTrak autopilots in the certificated markets.

Branded as the AeroCruze 100, the autopilot is now available for most popular Cessna and Piper models. We will also have the first approval for a Mooney very soon.” Barker also noted that as part of the BendixKing leadership team, he’s much better positioned to meet all of his goals, including the ability to get affordable autopilots into the hands of pilots and making their flying easier and safer.

“This now gives us a wide breadth of autopilots from experimental all the way up to business jets, all with Honeywell products,” Cohen said. “Andrew’s team brings a lot of experience on how to get a great product to customers and still keep it affordable for everyone.

That’s one thing that will be a great benefit to our entire group.” Of course, none of this would be possible without BendixKing building its avionics using an open-architecture design, which makes it much easier for all the different avionics units to seamlessly work together.



One of three available form fits for the AeroCruze/xCruze 100 autopilot.

6,000 Cessnas and unlimited possibilities

While BendixKing's decision to incorporate other manufacturers' products will obviously enable the company to bring new systems to market faster and at a lower cost, **Cohen said** there's another benefit: It will give owners greater flexibility when it comes time to planning for a panel upgrade.

"Collaboration allows the aircraft owner to pick and choose what they want to do in their aircraft," he said. "This will allow us to bring these great products and capabilities to more customers than other solutions allow." Front and center of the company's commitment is its recent program announcement to provide a flexible upgrade path to the owners of the 6,000 single-engine Cessnas produced in Independence, Kansas, between 1996 and 2004.

"We were standard fit in all those aircraft," **Dykmann said**. "The Nav 1 and Nav 2 packages have the KLN 89 and KLN 94 – all the center stack avionics along with some of the six-pack instruments are all BendixKing. With the recent introduction of the AeroVue Touch, KT 74 ADS-B transponder, AeroCruze 100 and AeroCruze 230 units and AeroNav, you can replace individual legacy avionics or the entire cockpit with new-generation BendixKing products. This is where our whole idea started: Giving owners an easy, affordable upgrade path for those old avionics all without any interface problems. It's not an all-or-nothing decision."

Dykmann added that while the initial program is targeted at those 6,000 Cessna singles, the upgrade path is just as viable to the seemingly countless numbers of Wichitahatched Cessna singles and twins that came equipped with early generation King radios and Bendix radars. Of course, there were a lot more than Cessnas flying away from their respective factories with Bendix and King avionics. But they are well-accounted for in BendixKing's avionics upgrade plans. "We're starting with the Cessnas, but we are absolutely including all the other makes and models flying with our avionics," **Dykmann said**. "Beechcraft, Piper, Mooney – we already have approvals for our AeroVue Touch PFD/MFD in over 400 aircraft types and that many or more for the AeroNav navigators."

Dykmann also explained that BendixKing is committed to providing a similar upgrade path for helicopter owner/operators. The first of its kind is a recently announced collaboration with Airwork New Zealand. The two companies are working to obtain FAA STCs for cockpit upgrades using the BendixKing AeroVue Touch Integrated Flight Deck on light and medium helicopters. According to BendixKing, the first announced STC effort also includes a package for the Airbus AS350 helicopter and draws on technology from Honeywell's Primus Apex and Primus Epic avionics systems.

Upgrade solutions that benefit aircraft owners and avionics shops

"Right now, our main competition is our own avionics repair capabilities," **Cohen said**. "But repairing some of these older units is getting very difficult and cost prohibitive for owners. The cost of repairing the computer in a KFC 150 autopilot is getting close to the cost of upgrading to a new AeroCruze 230 unit.

And the new autopilot comes with a full warranty." Cohen explained that while the new generation of BendixKing avionics

are aimed squarely at delivering market-leading capabilities at truly affordable pricing, the company's long history serves as a solid reminder of the invaluable role its global dealer network does and will play in its ultimate long-term success.

"Over the past number of years, we've organized our dealer network with a sharp focus on helping them be productive and profitable," Cohen said.

"It's worked very well so far in enabling us to better serve our dealers. "We've also recently begun the process of revamping our webinar-based training program and online training forums, as well as other outlets to meet our dealers' needs for product training.

Our goal is to take care of our dealers and customers from a product training standpoint. The more they know about BendixKing products, the better."

The King is dead. Long live the King.

From its product portfolio and planning, it's clear that BendixKing has created a path to reestablishing itself among the top-tier aftermarket avionics suppliers. So what are the company's plans for getting back into the aircraft OEM's standard-fit avionics business?

"We are absolutely set on penetrating that market again," **Cohen said**. "We now have the breadth of products and advanced technologies that the aircraft OEMs want.

We have already won a number of OEM platforms with internationally based aircraft manufacturers. "At AirVenture Oshkosh, we announced a program to provide our xVue Touch Integrated Flight Deck for Pipistrel's new-generation Alpha King flight training aircraft. Based on our current avionics offerings, the xVue Touch is a versatile and intuitive cockpit solution that is designed specifically for training aircraft." As far as getting back into the cockpits of new general aviation aircraft built in the United States, that goal is firmly in the company's sights, according to Cohen.

BendixKing has put great effort into its latest offerings, meeting all the OEM's primary needs. The company offers the latest technologies and capabilities that are lighter weight and easier to install.

"Lighter weights and easier installations are at the top of what the aircraft manufacturers want in new avionics today," Cohen said. "We weren't going for any major OEM programs until we had that ready – we are definitely ready now.

"We're really proud of the products we've come up with and the companies we've chosen to partner with. We're especially excited about the TruTrak acquisition. It definitely shows we have a comprehensive plan going forward.

"We are just getting started here and want our customers, dealers and aircraft manufacturers to know that we will continue to do the right things for them. We have heard their input over these many years, and now we are acting on it."

*Time turns
must-have capabilities
into commodities*

DIGITAL INCENTIVES

STORY BY – Scott M. Spangler

Source: AVIONICS NEWS February 2020



A capability, the dictionary tells us, is the ability to do something well, in a skilled and competent way. It can be “a capacity for being used or developed,” but it can also be “an ability or feature not yet developed or utilized.” A commodity, on the other hand, is an economic good, “any useful thing,” an article of commerce. While it has useful value, something people buy and sell, its wide availability typically leads to smaller profit margins, making it subject to marketing exploitation.

In the era of digital avionics, these definitions seem to proscribe the marketing lifespan of must-have functions that all too soon become expected, standard features. Do you remember when moving maps were something special?

Before moving maps, back when boxes did just one thing, sales and rebates were the go-to sales incentives avionics manufacturers used to market their analog hardware. Now, with boxes

With a new bezel and keyboard, the Avidyne Atlas is an IFD that employs most of its optional functions as standard capabilities.

performing multiple functions, sales incentives seem to be software driven. Market forces drive the incentive employed, but the goal is the same, to increase sales. “To be crystal clear, manufacturers don’t like these,” said Bill Stone, Garmin’s senior business development manager, with a chuckle.

At the same time, consumers expect them, Stone said just before Thanksgiving, noting that the Black Friday sales had already begun. Consumers won’t write the check until they get that deal. “From a marketer’s standpoint, even though they hate it, it gives us more arrows in the quiver.” Despite consumer expectations, “show specials” are not universal. In the nicest way possible, original equipment manufacturers must explain to consumers that there is no show special on popular products with delivery waiting lists because their sales don’t need incentives.

“Consumers have a different view of things, different expectations,” said **John Uczekaj, president and chief executive officer of Aspen Avionics**. “A consumer, naturally, wants lower costs all the time, but they are also expecting that their flying lives are more in tune with the digital environment of their personal lives, and that seems reasonable.”

It is a subtle change as the avionics industry digitizes. It began with glass cockpits, whose first customers were flight departments and airlines, who were concerned with fleet costs and standardization.

The general aviation consumer has different expectations. “In their daily digital lives, people are getting upgrades on their phones, tablets and home systems,” **Uczekaj said**. “These expectations are starting to bleed into our world. OEMs have to start working to meet those expectations.”

Cost is what separates aviation from everyday life in the digital realm. Most of the apps on a pilot’s phone and tablet add more features and functionality through free updates. Given the consequences of unfulfilled promises of reliable functionality, aviation is not so free or freewheeling. “Certification costs certainly affect the price of what we do, so we have to take that into consideration,” **Uczekaj said**. “Software is not well understood,” **Stone said**.

There seems to be no money in the digital ones-and-zeros, “except for the millions spent on development and certification, and that can significantly outweigh the costs of producing hardware.”

Amortizing software development costs across an unknown number of products is difficult. “The more you sell, the lower the cost of the product, but you don’t know how many you are going to sell,” **Stone said**. “With large development costs typically at risk, it’s moving beads on the abacus.” Ultimately, Uczekaj believes that the expectations of “free” update functionality

between a pilot’s personal and flying life will harmonize.

Obviously, “the logistics of that still need to be worked out, but the concept is where we are headed. The challenge for us is deciding what we charge for and what we do not charge for.

What is part of an app upgrade, and what is truly a new functionality?” Some OEMs provide more functionality and better displays through new hardware.

Call it the old-school iPhone paradigm; the hardware has just enough digital horsepower to run the operating system and applicable apps. Perhaps this is a continuation of an analog mindset, where new hardware was the only way to deliver new capabilities.

Given the pace of technology, a more efficient and economical strategy is to build hardware with more computing horsepower than the initial application needed, according to **Dan Schwinn, president and CEO of Avidyne**. “We designed our first-generation products 25 years ago,” **Schwinn said**. “They kind of ran out of gas after 10 years in terms of new features, whereas our current generation has had a lot of legs and still have room to grow. That enables us to provide major upgrades. Maybe we charge for them,

maybe we use them as an incentive.” Synthetic vision is an example, **said Tom Harper, Avidyne’s marketing director**. Designed as an option, it was also an opportunity to reward existing customers by giving them a free upgrade.

“It turned satisfied customers into big fans because they effectively got something they were never promised for nothing.” Like a modern car, the IFD is loaded with processors,



Synthetic vision is built into all Aspen Evolution systems, and an SD card unlocks this capability for a 10-hour incentive.

Schwinn said. “When we come up with something new, with all these processors, where’s the right place to put the new capability? Maybe we have to streamline something else,” but such software work is not that pressing a challenge.

The Avidyne Atlas system, introduced at the National Business Aviation Association’s Business Aviation Convention & Exhibition in October 2019, is an example. Building on the success of the IFD’s integration with the legacy Pro Line 21 and Primus 1000 avionics in business jets, the Atlas embodies many expensive IFD optional capabilities as standard features, **Schwinn noted.** It has a larger bezel and keyboard, but “we were able to do that without making a new product on the inside because we have plenty of headroom left in our current-generation platform.”

There is no denying that software growth and capabilities will require a hardware transition at some point. “We are trying to create an infrastructure for consumers to get better stuff without all the additional cost,” **Schwinn said.** Citing the Evolution display upgrade, “We charge for the upgrade, but it is a fraction of what a new unit costs, and it comes with a two-year warranty,” **Uczekaj said.** “It really has no install cost for the consumer, but I have to recover my certification costs somehow.”

The efficient, economical logistics of avionics upgrades benefit consumers, but it changes the game for OEMs and their dealers. “Now dealers are not earning money for installing new hardware, and I think we are in that transition period,” **Uczekaj said.** Call it a harmonization of tech environments, which will contribute to the pilot population. Given the pervasive nature of technology, “If we don’t address it, we’ll be left behind.”

“Market research drives incentive decisions,” **Schwinn said.** They are based on customer requests, marketplace competition, and what’s popular with consumers. Avidyne’s recent ADS-B incentive is an example. Looking at the galaxy of transponders, “from low end to TCAS II, some with standard interfaces and other not so standard, we set out to work with all of them,” Schwinn said. “We are able to do that without it being an overwhelming undertaking.”

Given this compatibility, and without a self-contained ADS-B transponder solution, Avidyne’s free ADS-B incentive motivates pilots to think about the qualifying purchase of an IFD, which provides the position source for the 1090 ES transponder. In the digital environment, where people can find an app that meets their needs, or reveal one they didn’t know they had, there is no definitive marketing playbook. “To pick an incentive,” **said Uczekaj,** OEMs must “experiment because consumer expectations are changing.” How they want to employ tablets is a prime example. When introduced, everyone wanted to use the

iPad in the cockpit. “Then they started dealing with the limitations, reliability, the heat and visibility aspects, having something loose in the cockpit that you’re trying to look at while you’re flying, especially IMC,” **Uczekaj said.** “People see all these limitations, but they also see the power of it.

Now they want that power in their cockpit avionics.” Regulatory requirements are what separate the consumer’s personal and flying lives. “The two worlds are starting to collide,” **Uczekaj said.** “It is a strong word, but it is a collision between expectations in the cockpit and alternatives pilots have today in their installed avionics.

The FAA is looking at all of these things and how they can improve safety in the cockpit without losing their oversight and safety responsibilities. The regulatory world is changing, albeit more slowly, but you can see it with the Part 23 rewrite, NORSEE equipment, and STCs without TSO stuff.”

What’s clear to OEMs is that in the digital era, avionics consumers can pick from a multitude of primary flight displays, navigators, engine instruments, and integrated systems. “All these glass cockpits are very flexible,” **Uczekaj said.** “Therefore, our marketing has to change, and we are experimenting on how to market to avionics consumers as we go forward.” One experiment is the Aspen incentive of 10 hours of free synthetic vision. Like all of the system capabilities, this option is built into the system software, and the pilot unlocks it for the allotted time with an SD card. Pilots who get hooked on synthetic vision during the 10 hour freebee can buy the SD card that unlocks it forevermore. “It has been quite successful,” **Uczekaj said.** Like moving maps, synthetic vision is standard on

glass from most avionics OEMs. “It has almost become a commodity; it’s not there yet, but everyone expects it,” **Uczekaj said.**

Software certification rules are helping OEMs introduce new capabilities more quickly. An avionics package used to last seven to 10 years, **Uczekaj added.** “Now it seems like five to seven years because technology is moving so fast, and people expect upgrades.” Connectivity is the next level.

Aspen pioneered iPad connections in 2011 and rare is the system today that doesn’t offer this capable commodity. “But it is still pretty basic,” **Uczekaj said.** Increased bandwidth will be the next revolution, bringing real-time weather and other capabilities to the cockpit. Naturally, “cybersecurity plays a role in that, but our industry has to move where our consumers’ expectations are, or we are going to lose the consumer.”

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NEW!

Garmin® Unveils the Aera® 760 Portable Aviation GPS

7" Format Portable Navigator Designed Specifically for the Cockpit

Garmin is pleased to introduce the aera® 760, a premium aviation portable that is purpose-built for the pilot and the cockpit. The aera 760 boasts a 7-inch bright, sunlight readable touchscreen display complete with comprehensive chart options in a compact and dedicated portable GPS.

Additional features of the aera 760 include the option to load instrument approach procedures, arrivals and departures, approach chart overlay on the map, Garmin Connex® wireless connectivity, as well as the option to integrate it with select Garmin avionics. Featuring a modern yet rugged design, the aera 760 is an all-in-one aviation portable complete with a built-

in GPS/GLONASS receiver that is optimized for the cockpit. Its bright, 7-inch sunlight readable display can run on battery power for up to four hours on a single charge. Along the bezel, an industry-standard USB-C connection is used to charge and power the aera 760, while a microSD card slot allows pilots to load topography and street maps or use it to easily transfer



user waypoints. The aera 760 features an intuitive user-interface resembling that of many other popular Garmin products such as the GTN™ Xi series, G3X™ Touch and Garmin Pilot™ allowing pilots to easily transition between multiple Garmin products in the cockpit. Capable of operating in harsh conditions, the aera 760 has also been tested and hardened to meet stringent temperature and vibration standards.

New to the aera 760, pilots can load departures, arrivals and instrument approach procedures (IAPs) within a flight plan, which can be wirelessly transferred to a navigator in the cockpit. Once a procedure is loaded within the aera 760, pilots have the option to view the chart or they can overlay it on the moving map. IFR enroute charts, VFR sectionals and Garmin FliteCharts® are also geo-referenced, providing optimal situational awareness. Jeppesen electronic charts are compatible with the aera 760 and give customers worldwide access to instrument approach chart information. In addition to procedures, victor airways, user-defined holds and holds over an existing navigation fix can be entered into a flight plan.

Built-in Wi-Fi® and Bluetooth® allow the aera 760 to take advantage of Garmin Connex wireless connectivity inside and outside of the cockpit. When connected to Wi-Fi, pilots can easily download aviation database and software updates without the need to physically connect it to a computer. Prior to departure, pilots can also view worldwide weather information on the aera 760 when it's connected to Wi-Fi. In the cockpit, it is capable of wirelessly connecting to select products such as the GTX™ 345 or the GDL® 50 to display the benefits of Automatic Dependent Surveillance-Broadcast (ADS-B) traffic, Flight Information Service-Broadcast (FIS-B) weather, SiriusXM2 aviation weather and more via Bluetooth. Exclusive features such as TerminalTraffic™ and TargetTrend™ can also be viewed on the moving map and dedicated traffic pages. Pilots can hard-wire the aera 760's power, audio and dual RS-232 connections to receive additional benefits. When connected to a navigator such as the GTN 650Xi/750Xi, GTN 650/750 or the GNS 430W/530W, the aera 760 can send and receive flight plan data that is entered into the navigator over a serial port so all products remain synchronized throughout the flight.

It is also capable of wirelessly connecting to these navigators when paired with a Flight Stream 210/510.

When connected to a NAV/COM such as the GTR 225, GNC 255 or GTR 200, frequencies and airport identifiers can also be transferred from the aera 760 to the corresponding NAV/COM.

For aircraft flying in visual conditions, pilots can optionally connect the aera 760 to select autopilots to fly lateral GPS and single point vertical navigation (VNAV) guidance.

For example, pilots flying in visual conditions can fly a VNAV profile from their current altitude to pattern altitude using the aera 760 fully coupled to the autopilot.

3D Vision technology displays a virtual 3D perspective view of surrounding terrain, obstacles and airports, as well as a horizontal situation indicator (HSI) that is capable of showing lateral and vertical deviation bars. When the aera 760 is panel mounted or paired with a compatible attitude source such as a GDL® 50 or GTX 345, pilots can view synthetic vision (SVX), which adds the display of back-up attitude information on the portable.

The aera 760 also features fuel price information, an E6B flight computer and weight and balance calculators. The E6B can be used prior to a flight to aid in calculating fuel burn, estimated time of arrival (ETA) and more. While in-flight, the aera 760 utilizes ground speed information to recalculate fuel burn and ETA. Helicopter operators also have access to features tailored to their unique operations, such as WireAware™ wire-strike avoidance technology.

WireAware overlays power line locations and relative altitude information on the moving map and provides both aural and visual alerting when operating near power lines. With optional map data, pilots can also enter street intersections or non-aviation waypoints. GPS altitude display is offered in both mean sea level (MSL) and above ground level (AGL), so they are easier to identify relative to the aircraft flight path.

The aera 760 is expected to begin shipping in late May for a list price of \$1,599 USD and is compatible with the cost-effective Garmin Navigation Database that is available with Worldwide coverage starting at \$74.95 for a single update. A variety of annual bundles are also available on the flyGarmin® website, such as the European Database bundle for \$299.95, which includes the Navigation Database, FliteCharts, terrain, obstacles, SafeTaxi®, and the airport directory with fuel prices. Pilots can also add enhanced map information such as topography or street maps using a MicroSD card. The aera 760 is supported by Garmin's award-winning aviation support team, which provides 24/7 worldwide technical and warranty support.



GI 275 Now Compatible with GFC™ 500

Garmin is pleased to announce that the GI 275 electronic flight instrument can now be interfaced with the GFC™ 500 autopilot to deliver superior in-flight performance and added redundancy when multiple GI 275s are installed in an aircraft. In addition to GFC 500 compatibility, the GI 275 can serve as a replacement attitude indicator and/or horizontal situation indicator (HSI) to legacy Century II/III autopilots.

Additional features of the latest GI 275 upgrade include the display of outside air temperature, groundspeed, true airspeed and wind on the attitude indicator, as well as data field enhancements on the multi-function display (MFD) page.

GFC 500 Compatibility

A single GI 275 ADAHRS variant (with Mod 1) can now be used as the attitude source to drive the GFC 500 autopilot, while displaying mode annunciations and flight director indications. In addition, added redundancy is possible with two GI 275s ADAHRS models installed. In aircraft equipped with dual GI 275's, the secondary GI 275 is capable of coupling to the GFC 500 autopilot, as well. In the unlikely event of a



primary GI 275 failure, the autopilot remains fully functional when paired with the secondary GI 275. Additional redundancy is extended to include the G500 TXi/G600 TXi flight displays, which also allows the GI 275 to couple to the GFC 500 autopilot if needed.

Unique to the GI 275 and TXi, pilots will receive a miscompare notification if the AHRS sources between the two do not align.

When replacing the old attitude indicator, pilots receive a reliable electronic flight instrument with additional capabilities beyond the traditional display of attitude information. Even further, unlike legacy attitude indicators paired with the Century II/III autopilots, the GI 275 is capable of disconnecting the autopilot in the unlikely event of an attitude upset or in the event of a miscompare of attitude data between two GI 275's. Depending on the Century autopilot variant, dual GI 275 ADAHRS + AP units may be required. Information on how to determine that requirement will be located in the GI 275 installation manual on the DRC.

Additional GI 275 Display Enhancements

The GI 275 electronic flight instrument is capable of displaying outside air temperature (OAT) and true airspeed (TAS) using a temperature probe. Wind speed and direction can also be displayed. Additionally, MFD data field enhancements allow pilots to easily edit and change data fields on the MFD page.

The latest upgrade for the GI 275 is expected to be available in August and is approved for installation in over 1,000 single-engine and multi-engine aircraft models.



Mod 1 Note

Mod 1 for the GI 275 ADAHRS variant was recently incorporated into GI 275 production and is expected to be in all qualifying part numbers and product shipments in August. For customers that request or require Mod 1 status (support for GFC 500 or Century II/III autopilot compatibility only), an upgrade is available at no additional cost during the 2-year warranty.

Century II/III Autopilot Compatibility

The GI 275's autopilot interface compatibility continues to grow with the addition of the Century II/III autopilots, which can now be paired with the GI 275 ADAHRS + AP (with Mod 1) variant to replace an antiquated attitude indicator.

GI 275 Available for Helicopter Installations

Garmin is pleased to announce that the GI 275 electronic flight instrument is now able to be installed into Helicopters. The GI 275 has completed stringent helicopter vibration and temperature testing, demonstrating it can withstand the harsh operating environments encountered in helicopters.

Initial variants include the course deviation indicator (CDI), radar altimeter display, and the multi-function display (MFD) versions of the GI 275. Follow-on approval of the GI275 as a replacement for the attitude indicator (AI) and horizontal situation indicator (HSI) is expected via a FAA STC in the fourth quarter of 2020. Once completed, Garmin will seek EASA validation. Installation of the MFD version can potentially be undertaken via a FAA Field approval, or EASA minor change process.

Part Changes

A new adapter plate kit for helicopter installations has been created. For rotary applications that also need an adapter plate, the 011-05285-01 kit is required. The new kit is qualified for both fixed wing and helicopter installation, but the original kit (011-05285-00) is not to be used in helicopter installations. The 011-05285-00 kit will continue to be sold for a limited time, transitioning to 011-05285-01 as the only option for both fixed wing and helicopter installations in the future. The new kit will be added to the latest Aviation Dealer Price Catalog, which will be available to download from the DRC.



EASA Approves G3X Touch for Nearly 500 Certified Aircraft

Garmin is pleased to announce the EASA certification of G3X Touch™ flight displays for hundreds of certificated aircraft. G3X Touch offers a variety of scalable panel configurations and a superior feature set that includes wireless connectivity and synthetic vision as standard, as well as options such as display redundancy, advanced autopilot compatibility, engine monitoring and more.

Touchscreen displays offer an intuitive user interface and through any combination of the touchscreen or dual-concentric knobs, pilots can efficiently perform common in-flight functions such as Direct-to navigation, setting altitude pre-select or radio tuning.

Pilots will also appreciate the seamless in-flight experience behind G3X Touch as the user interface is harmonious with multiple Garmin products, such as the GTN™ 650/750Xi and new GPS 175/GNX™ 375/GNC 355 navigators. EASA has granted installation approval of G3X Touch via a validation of the FAA AMLSTC that features nearly 500 certified single-engine piston aircraft. Breaking new ground to validate a non-TSO's product

is an ongoing effort and Garmin remains focused to continue delivering developments to the market. Garmin will now seek to add an STC that includes the EASA Only models.

Multifaceted Screen Formats

Multiple panel configurations and display options allow pilots and aircraft owners to better leverage their current and future avionics investments. For space-limited panels, a single 10.6" or 7" display can accommodate both PFD and MFD windows within the same unit. The 10.6" display can also include an EIS strip for additional versatility.



Another single display configuration offered is a standalone Multifunction Display (MFD) with an optional Engine Indication System (EIS). All three display types – 10.6" Landscape, 7" Portrait and 7" Landscape – support the standalone MFD configuration.

Another option allows two 7" screens to be installed side by side and accommodate PFD, MFD and optional EIS functionality. Or pair a 10.6" split-screen unit with a 7" format to provide even more flexibility to lay out the preferred arrangement of PFD, MFD and optional EIS displays. In configurations where multiple displays are installed, the G3X Touch system offers redundancy and reversionary mode as a single

display is capable of showing all primary flight information, including engine information when installed. For aircraft owners that have already installed a G5 electronic flight instrument in their aircraft, they can easily add a G3X Touch display to take advantage of the redundancy benefits associated with this configuration. The building-block design of these four approved cockpit configurations give aircraft owners scalable upgrade options that suit a variety of panels.

Dynamic Maps, SVX™ and Wireless Connectivity

The G3X Touch suite offers an impressive array of standard features that gives pilots greater situational aware-

ness throughout every phase of flight. Synthetic vision (SVX) comes standard on all G3X Touch displays and provides a rich, three-dimensional depiction of terrain, obstacles, water features, the runway environment, and more.

Capable of serving as a standalone VFR navigator, G3X Touch provides benefits that help further situational awareness



in visual conditions with features such as vertical navigation (VNAV), which allows pilots to generate a vertical descent profile by setting an altitude constraint in the flight plan. VFR sectionals and IFR enroute charts display pertinent information pertaining to VFR/IFR flights, and geo-referenced instrument approaches improve situational awareness by overlaying own-ship position information on the instrument approach chart. Modern tools such as wireless connectivity are also available as standard. Wireless flight plan transfer, the sharing of traffic, weather, backup attitude information and more with a compatible tablet or smartphone are all available via Connex[®].

G3X Touch flight displays for certificated aircraft can interface with a variety of optional Garmin equipment including:

- For complete IFR-approach compatibility, customers can pair G3X Touch with a variety of Garmin GPS navigators and Nav/Comms, including the



new GPS 175/GNX[™] 375/GNC 355, GTN[™] 650/750Xi, GNS[™] 430W/530W, GNS 480, SL 30 and GNC[®] 255.

- For aircraft that can benefit from a modern autopilot, the GFC[™] 500 autopilot provides workload-reducing features such as auto-trim, flight director, airspeed climbs and descents, dedicated level (LVL) mode and

more. Garmin ESP[™] (Electronic Stability and Protection) technology as well as underspeed and overspeed protection are also available as standard, and work in the background to help pilots avoid inadvertent flight attitudes or bank angles while the pilot is hand-flying the aircraft.

The addition of yaw damping (YD) minimizes yawing oscillations and helps maintain coordinated flight by keeping the slip/skid indicator centered. Additionally, G3X Touch can now serve as an attitude source for the GFC 500 autopilot, which does not require the G5 electronic flight instrument when installed with G3X Touch. GFC 500 is available as an option for select models of aircraft with additional certifications in progress. For a comprehensive list of supported aircraft, visit: Garmin.com/GFC500.

- Pilots can fly fully coupled instrument and visual approaches when G3X Touch is paired with the

GFC 500 autopilot and a 2" Navigator or GTN 650/750Xi. Pilots can also fly fully coupled go-arounds during missed approach sequencing after an instrument approach.

- The G5 electronic flight instrument can be utilized as an all-in-one back-up instrument to G3X Touch flight displays, offering superior redundancy and the sharing of attitude information, air data, baro sync, and miscompare alerts. In the event of a miscompare between the G3X Touch and G5 attitude or air data sources, the GFC 500 autopilot will choose the best available source and continue to function normally (if installed).

- Pilots can receive and display the benefits of ADS-B "In" via the new GNX 375, GTX[™] 345 or the GDL[®] 50R/52R. ADS-B-enabled features such as patented TargetTrend[™] and TerminalTraffic[™] are also available with these products.

- With GDL 51R/52R, pilots can receive and display SiriusXM[®] aviation weather and listen to audio entertainment with a compatible subscription in territories where this service is available.

- The GMA[™] 345/342 audio panel adds advanced functions, including auto squelch, 3D Audio and BLUETOOTH[®] connectivity. Note that audio panel control from the G3X Touch displays is not supported in certificated aircraft.

- Up to two Comm radios can be supported and controlled by G3X Touch, including the GNC[®] 255 Nav/Comm and the GTR 225 Comm, the GNC 355 GPS/Comm, as well as the GTN[™] 650/750Xi.

- G3X Touch can display primary engine information with the addition of the GEA[™] 24 and appropriate sensors. This includes various engine, fuel and electrical gauges with easy-to-interpret color bands. In addition to providing real-time indications, the system also offers a fuel computer, lean assist mode, pilot alerts/adv-



sories and more. Most popular Lycoming or Continental 4- to 6-cylinder engines are sup-ported.

- The GTS™ 800 active traffic system can inter-face with G3X Touch, offering added protection and visibility while operating in high-density airspace and traffic environments.

G3X Touch systems for certificated aircraft are available for immediate shipping at list prices of \$7,995 for a single 7-inch display and \$9,995 for a 10.6-inch display. These base system prices include PMA versions of the G3X Touch display, GSU 25D ADAHRS and GMU 11 magnetometer — as well as a GTP 59 temperature probe and appropriate install kits.

There is no additional cost for the STC. Optional components such as the GEA 24 or GDL 52R are also available with PMA, and G3X Touch for

Certificated Aircraft utilizes the same engine sensor kits as TXi series systems. For full pricing information, please refer to the latest edition of the Aviation Dealer Price Catalog found on the Garmin Dealer Resource Center (DRC). For more information please contact your regional sales manager with any questions.



Garmin Adds GFC™ 500 Aircraft Approvals Now Available for Piper PA-28RT-201 and -201T

Garmin is pleased to announce it has received Federal Aviation Administration (FAA) Supplemental Type Certification (STC) for the GFC 500 autopilot in the Piper Arrow IV (PA-28RT-201) and Turbo Arrow IV (PA-28RT-201T) series aircraft. EASA validation is expected shortly, a SB will be released once available. Please refer to the table below for pricing and part numbers that are now available for order. Intended for qualifying piston single-engine aircraft weighing less than 6,000 lbs., the GFC 500 delivers superior in-flight characteristics, self-monitoring capabilities, and minimal maintenance needs when compared to older-generation autopilot systems. Please contact your regional sales manager with any questions.



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CENTRUM SERWISOWE

EPMO Lotnisko Modlin - Hangar nr 1
05-102 Nowy Dwór Mazowiecki, ul. Gen. Thommee 1a
tel/fax: (0048) (22) 467 11 90
e-mail: lcsmodlin@drabpol.pl
www.drabpol.pl

