

DRA **POL** **NEWS**

A V I O N I C S

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AVIONICS MODERNIZATION

– from project concept to completion

„The fundamental principle of transportation is its safety”

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FROM THE EDITOR

Ladies and Gentlemen! Dear Readers !

As usual, the next passing year invites us to reflect – did we manage to realize everything that we had planned, what worked successfully and what did not ?

We have also made a brief review in our „Drabpol Avionics” department, but focusing on the goals that we achieved. Certainly, the most important was obtaining the right to conduct trainings for operators of MX turrets (L3 Harris). We obtained this right after a two-week training that took place at manufacturer's headquarters in Canada.

In the past year, we also established cooperation with two new business partners, becoming their representative on the Polish market. The first of them is an Israeli company, Bet Shemesh Engines that deals with the repairs of engines for military and civil aviation. Our second partner is the American company – Gogo Business Aviation – a leading manufacturer of inflight connectivity and entertainment solutions for BA aircraft.

We hope that the upcoming year will bring us a lot of challenges and interesting projects – about which we will inform our Readers in our newsletter.

Alicja Drabczyńska



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NEWS FOR BUSINESS AVIATION MARKET

At the invitation of our partner, the American Collins Aerospace company, we took part in the global meeting of dealers for the first time after ownership changes of this avionics manufacturer.

The latest avionics solutions were presented at the meeting, including demo version of the latest, integrated system from the Pro Line series. It is the Fusion variant, with three multi-functional touchscreens.

The Pro Line series also includes integrated ADS-B Out messages and can cooperate with a European satellite support system.

CA representatives also familiarized participants with CASP programs - an offer addressed to both fleet and individual customers, including the Collins avionics insurance package. The program involves insuring avionics components for one predetermined amount.

In the event of damage to any of them, Collins Aerospace will replace the unit within 24 hours from notification, so within an example insurance amount of USD 30,000, we have the option of replacing units that, if not covered by insurance, can generate costs of up to hundreds of thousands of dollars.

The second day of the training was devoted to discussions on new projects, the development of STCs for Collins products and the collection of feedback from dealers on the operation of CA systems in their markets.



Collins Aerospace

Great emphasis was placed on proposals to improve mutual manufacturer-dealer interaction in the areas of supply, support and partnership in projects.

The newest integrated Pro Line Fusion system was presented at the conference.





Defence and security solutions

In the last year we debuted as an exhibitor at the International Arms & Security Fair in Kiev. This is the second fair in the Ukrainian capital at which we promote our defense solutions. A year ago, we were present at the AVIASVIT-XXI fair.

The theme of this event mainly included equipment and armament, dedicated to military services, both land and air, police, border and customs guards.

Our company has been present on the Eastern market for several years. Thanks to the certificates and authorizations we have obtained, we take part in foreign tenders and implement long-term contracts for the supply of goods and services for land forces, military aviation, police and border guards.

At our stand, we mainly promoted L3 Harris electro-optical observation systems, dedicated to manned and unmanned air vehicles. The L3 Harris Technologies solutions themselves are well known in the Ukrainian Armed Forces.

In Kiev we presented the mock-ups of the MX-10 and MX-15 systems. The lightest imaging system among all L3 el-op turrets - the MX-8 is also noteworthy. It provides high-quality images and has a low weight and small size.

For the first time at the fair, we also had the opportunity to promote training that we can independently conduct for operators of MX L3 Harris electro-optical systems. After training in the manufacturer's headquarters in the last summer, we have the authorization to train operators of MX turrets and O-level service personnel.

At Arms & Security, we promoted these solutions together with our partner Mike Rogers from L3 Harris.



Installation of Garmin avionics on the Cessna 172H aircraft from Aero club of Ziemia Lubuska

CESSNA with the new avionics for training

In the last autumn, our PART 145 Maintenance Organization completed the modernization of the avionic equipment of the Cessna 172H aircraft, belonging to the Aero Club of Ziemia Lubuska, which we have been cooperating with for many years.

This aeroplane, intended for training, had an aviation incident a few years ago, after which, unfortunately, for a long time she waited for the repair of the airframe.

This was made by Aviation Services, a company known on the market, co-operating with us, based in Warsaw Babice airfield.

Although avionics did not suffer much damage, it represented the standards of the 70s and 80s of the 20th century, i.e. it was obsolete.

Comprehensive aircraft repair gave the opportunity to replace the old avionics equipment with the latest systems at a reasonable price and in a reasonable configuration.

This modernization was based on the Type Approval obtained by the manufacturer for this type of aircraft. Our PART 145 organization uninstalled the old mechanical flight instruments and re-



AFTER MODERNIZATION

placed them with two Garmin G5 displays with full HSI. The proven, but already old Bendix King KX 155 NAV/COM system has been replaced with the popular Garmin GNC 255A navigation equipment.

We have replaced the "lever" audio panel with a separate intercom with Garmin GMA 342 audio panel with a built-in marker receiver and a 4-place intercom system. Cessna was also equipped with the most common Garmin GTN 650 WAAS GPS NAV /

COM with touch screen – a device upgrading aircraft configuration from an analog IFR to an aircraft that meets PBN conditions. In addition, the Kannad ELT 406AF-Compact was installed and the aircraft is compliant with the new regulations that impose an obligation to have an ELT.

From the previous avionics, only the Mode S GTX 328 transponder and engine instruments remained, they are sufficient for aircraft operation but perhaps in the near future the Aero Club will decide to replace them.

BEFORE MODERNIZATION



New instrument panels were also created during the replacement of avionics. We replaced the old panels with beige finish with the grey, matte panels, prepared for the new equipment.

Please note that in addition to the new avionics, the repaired aeroplane has been repainted, she has also had thoroughly refreshed seats, upholstery and rugs.

She can be safely stated that training Cessna got younger by some 30 years and began training duties with new energy.

The old instrument panels with beige finish were replaced with the new grey ones during modernization. They are prepared for the installation of new equipment.



PILOTS, PASSENGERS, CREW, LEND US YOUR EARS And save your hearing

STORY BY DAVE HIGDON

Source: Avionics News, June 2018.



Aviation and aircraft share many traits amid their various configurations and missions, of wings and tails, of fuselages and landing gear. Quiet is not, however, among the shared traits. Aside from hang gliders, sailplanes and balloons, significant sound accompanies virtually all flight. One could argue that gas balloons are quietest, with hot-air balloons next – at least in between the balloon pilot's use of a noisy gas-engine-driven fan to inflate the envelope before the roar of lighted propane burners' gaseous "WOOSH!"

In between burns, not even wind noise exists in the basket. Absent the utility of powered aircraft, those quieter aerial conveyances account for a small percentage of the world's total. That leaves most pilots flying engine-powered aircraft – and in most, needing some form of headgear.

Years ago, headgear became de rigueur, initially to protect the heads and ears from prop blast and cold. Subsequently, that headgear enhanced the ability to communicate.

Today, most pilots and their fortunate passengers wear some style of headset or headphones, combining a boom-mounted microphone with two, sometimes one, earpiece with a speaker to help the pilot hear. And today's variety of models, features and protection levels spans dozens of models and a stunning array of price and performance points.

Today's pilots enjoy a range of choices covering old-school passive protection, new-school electronic noise canceling, and relatively new

models without ear cups, some wired, some wireless, and all offering a level of hearing protection – always worth its costs.

In the beginning

The Wright brothers lacked fancy hearing protection when they made two flights each in their Wright Flyer at Kitty Hawk in December 1903. The use of cotton balls, twisted and pushed into ears, was the dominant sound protection of the early 20th century. Before long, inventors and innovators began to develop protection against engine exhaust noise. The evolution of the aviation headset began in 1910, when Stanford University student Nathaniel Baldwin developed the first example. For a couple of years, Baldwin's best efforts failed to land backers for mass production.

As Europe edged closer to the start of the first World War, however, the American military recognized the potential of Baldwin's invention and ordered 100 sets. Although most pilots in World War I flew sans communications headsets – early aircraft sported no radios – the headsets used gained great popularity. The dye was cast.

From those early models through the 1930s, headsets aided cockpit communications, but offered precious little protection against the din of unmuffled engines firing hot gasses past the speed of sound. Hollow ear cups with speakers but no sound insulation prompted some pilots to put cotton balls or cigarette filters into their ears in hopes of a small amount of sound attenuation.

We've seen many results of this lack of sound attenuation in the hearing aids worn by many veterans of the second World Wars and Korea. Veteran aviators of those conflicts share a high incidence of wearing supplemental hearing assistance. As protection for hearing, however, aviation headsets came into their own only in the last 50-odd years. And today, the aviation headset is indeed de rigueur, with the variations on type, utility and, most of all, protecting pilots' hearing.

In the beginning, hearing protection came second

Early aviation helmets offered relatively little in the way of hearing protection. Sound enhancement became a feature after aircraft radios became standard equipment in some aircraft – mostly commercial and military. In the beginning, hearing protection wasn't the concern.

From the first World War into the second, pilot headgear evolved from leather "helmets" designed to protect their heads and to shelter ears from the cold and wind of flight through the innovation of headsets offering a few decibels of passive sound attenuation, and on through today's modern state-of-the-art in hearing protection: the active noise reduction, or ANR, headset.

The options today range from better passive headsets to ANR headsets, with choices that include monaural – one sound channel – to stereo.

Today's offerings also include wireless headsets that eliminate the occasional cable entanglement problem. So listen up as we explore the options and sound out their various strengths and weaknesses.

Headset types: passive versus active noise reduction

The two dominant general aviation headset styles differ little and share much in their construction.

Two ear cups, or shells, mount to a headband that holds them over the ears. Typically, a speaker element resides inside each shell, along with some form of sound-insulating material.

The speakers and insulation usually sport a cover to keep unwanted materials out of the shell. Over that, covering the head-side edges of the shells, rests some form of ear seal, sometimes foam, sometimes a gel or thick liquid in a form-fitting material to affect a seal between the ear cups and the user's skull.

A set of wires connect the two ear cups and a boom microphone, which rounds out the audio technology.

One set of wires ends in a male jack that connects the ear cups to the audio source; another jack connects the boom microphone. As a system, these two sets of conductors carry current from the intercom.

Anatomy of a passive headset

The passive headset comes as described above: speakers in the shell, sound installation, headbands, ear cups, wires and jacks. Some versions deliver stereo sound through more complicated wiring; others are strictly monaural.

And many stereo models sport a switch to go between stereo and monaural. Advising pilots on a choice should include an opportunity for the prospect to try on the headset for fit and clamping pressure.

For best consideration, a demo flight can't be beat. Then the prospective buyer can truly weigh the audio quality, volume setting needed, comfort and clarity.

Benefits of a passive headset: inexpensive; lightweight; never need batteries; wide variety of choices. Disadvantages of a passive headset: wide variation in sound attenuation – some models simply deliver less sound attenuation than others; and fit can be difficult to adjust since the ear cups must seal for the best performance.

Anatomy of an ANR headset

Similar to the passive headset components described above, the ANR headset typically employs all the same said components as described, plus a couple of additional items.

Beyond the common speakers in the shell, sound installation,

WHERE AVIATION
HEADSETS
ARE CONCERNED, THE
PROSPECTIVE BUYER
SHOULD FOCUS ON
PERFORMANCE,
AS WELL AS
COMFORT AND
COSTS.

headbands, ear cups, wires and jacks, each ANR ear cup will carry a small, sensitive microphone, an additional speaker driver, and electronic circuitry to process what the microphone “hears” into the counter sound to cancel the offensive noise the model is designed to target.

As a result of the opposite, canceling noise coming from the second driver, what the wearer hears is the background sounds virtually vanishing, leaving silence within the ear cups. OEMs include all the popular companies; prices vary widely.

A third option: in-the-ear headsets

A small number of manufacturers offer so-called in-the-ear headsets, arguably the lightest, smallest and easiest to wear compared to over- and on-the-ear versions.

These sets claim noise reduction levels of 29 decibels to 47 decibels of reduction – competitive with many ANR sets – but without active noise reduction, ear cups or batteries.

Weight of these in-the-ear sets ranges from a few ounces to less than 2 ounces. The key to their capabilities stems from their design. The self-molding Comply Canal Tips for the Clarity Aloft models can deliver better sound reduction than custom ear molds. And the audio quality is aided by the frequency-response range of the individual drivers feeding each earpiece.

Custom-made ear-molded headsets are another option for comfortable, in-the-ear hearing production.

The Clarity Aloft and similar models employ a microphone boom; in-the-ear molded models use a mic that clips to sunglasses or shirt collars. Comfort being relative, some pilots find the sensation of something in their ear difficult to endure; others feel the same way about some of the over-the-ear headsets.

A growing question:

To Bluetooth or not to Bluetooth?

Bluetooth wireless connectivity brings another option to a growing list of aviation headsets.

Whether a pilot values what Bluetooth offers hinges on their technology use. Pilots already using wireless earbuds, or used to streaming music to a player or from a smartphone, may find the option attractive.

Bluetooth makes it possible to connect a smartphone on which pilots can make and receive phone calls without the need to remove their headset – a great option for pilots who need to retrieve a clearance by phone.

A Bluetooth-connected headset also enables listening to music – or, even better, to receive critical audio alerts from mobile aviation apps such as Garmin Pilot or ForeFlight. These options make Bluetooth a useful tool for many pilots.

Another option: wired or wireless

Reviewing the many headset options available, one particularly sticks out as ideal for reducing, if not totally eliminating cable entanglements on any flight deck or cockpit: wireless headsets. Among the newest features developed for aviation headsets, the option of going wireless literally

eliminates the prospect of tangled wiring – at least where the headsets come into play.

Combine a viable EFB running on a Bluetooth-connected tablet with a wireless headset and an audio panel with Bluetooth and a pilot can handle ATC calls, stream music and call for clearance delivery – all without removing the headset or wrapping themselves in cabling.

Naturally, prices vary by manufacturer, model and performance

An informal survey of headset prices, using outlets commonly known to most aviators, range from less than \$200 for low-end, passive headsets and rise quickly to the middle level – \$350 to \$600 – onward to the upper end of the ANR product lines – where a pair, or set, can cost as much as \$1,000 or more. In-the-ear models can range from less than \$500 to nearly \$800, depending on the vendor and the model.

Bluetooth, of course, will add to the tab.

More equals less

Where aviation headsets are concerned, the prospective buyer should focus on performance, as well as comfort and costs. And noise or sound attenuation is certainly an area in which more is less: The greater the drop in decibel levels, the lower the noise coming through the headset’s barrier action.

Sound, as measured in decibels, doubles with every 3-decibel increase – or, conversely, falls in half for every 3 decibels of attenuation.

So a headset with a 29-decibel noise-reduction level is letting past one-ninth the sound pressure present. A 44-decibel reduction blocks all but 1/15th of the sound pressure present. Here, the higher the measured decibel reduction, the lower the amount of noise that gets through. Consider some of these options in headsets, or headphones, as some call them.

A sampling of modern headset technology

A lengthy review of the options available in headsets drove home that the list runs long – too long for this article – and absent an opportunity to try most of them, we’ll leave the reviewing to another time.

So, we look at options in various price ranges: up to about \$200; from \$201 to \$500; \$501 and more.

Up to \$200

A good selection exists here, ranging from about \$80 to \$200, with noise reduction levels of about 24 decibels nominal. Otherwise, these are generally passive sets, many of them with stereo capability when connected to a source capable of producing stereo output.

One particular surprise was a passive-reduction model priced under \$125 – with Bluetooth.

\$200 to \$500

As prices rise into the \$200 to \$500 range, more and more of the available options offer stereo sound and ANR in packages as low as \$350. The majority of the headsets available fall into

this price range, most of them with ANR and stereo, and some with Bluetooth as an option.

Above \$500

In this spectrum, more and more of the features become standard equipment, with the full spectrum often available: ANR, stereo, Bluetooth and wireless connectivity. Some of the highest-priced models don't offer all three, while several between \$800 and \$1,000 include all these options. This is also the price range where you'll most often find variations on the in-the-air models, which, absent ANR, still run into the higher prices.

Priority setting: protection and comfort as equal partners

No one can direct a pilot into a set of headphones that aren't comfortable. When the user may need them for hours at

a stretch, it would be easy to pontificate how comfort should top the list. After all, if it's not comfortable, a pilot may avoid using it. And any level of sound attenuation beats no attenuation at all. But the happiest pilots of my acquaintance found their headphones in balance: Necessary sound attenuation with necessary comfort – comfortable enough to wear for all full-range flights. While sound chambers and aircraft cockpits may help a buyer decide whether the attenuation and sound quality meet the buyer's needs and expectations, there's no simulator for checking fit and comfort. Well, none outside the prospective buyer's head.

A test flight – preferably in the prospects' regular aircraft – is the best place to decide whether a model of aviation headsets offer the fit and comfort that prospect desires. Finding the perfect match may take a few demos, but to the pilot, they're all worth the time since he or she will live with that choice for years to come.

News for GA – AVIONICS



Garmin Introduces the GWX™ 75R Aviation Weather Radar

Garmin is pleased to announce the GWX™ 75R, a new version of the GWX 75 designed for aircraft with limited radome space. The GWX 75R offers the reliability and clarity of the GWX 75, but with a smaller lateral scan range requirement.

Intended for a wide range of fixed wing aircraft and helicopters, the Doppler-based, solid-state GWX 75R incorporates exceptional range and a high-definition color palette that features four times more color contouring than traditional aviation weather radars on the market.

Boasting a solid-state design, GWX 75R offers reduced power consumption and extended life compared to earlier generation, magnetron-based weather radars. GWX 75R offers a range of 320 nautical miles, horizontal



scan angles of up to 90 degrees, and pilot-adjustable sector scanning. GWX 75R also retains vertical scan capabilities, which allows the pilot to focus on storm tops, gradients, and storm cell build-up at various altitudes.

GWX 75R is compatible with select Garmin integrated flight decks, GTN™ series touchscreen navigators, and TXi series flight displays. The GWX 75R utilizes a receiver/transmitter

known as the GWX Processor R, which is designed with a near identical footprint as the GWX 70R, simplifying a replacement of an existing GWX 70R installation.

Optional features, such as turbulence detection and ground clutter suppression, are also available with GWX 75R. Units can be ordered now and will ship late January. Please contact your sales manager with any questions.



G1000[®] NXi Upgrade Available for Embraer Phenom 100

Garmin is pleased to announce that the G1000 NXi integrated flight deck, successor to the popular G1000 flight deck, is now available for the Embraer Phenom 100 business jets equipped with the Prodigy Flight Deck.

The G1000 NXi flight deck offers aircraft owners and operators an array of modern features, including wireless connectivity, SurfaceWatch™ runway monitoring technology, visual approach guidance, HSI map, and more. The displays and controller also preserve the same footprint and connectors so time to complete the G1000 NXi upgrade is minimized.

A wealth of modern integrated flight deck features and benefits accompany the G1000 NXi upgrade in the Phenom 100. In addition to a new, faster processor and sharper display,

wireless connectivity is available as standard with the Flight Stream 510. The Flight Stream 510 provides Connex[®] technology, enabling the wireless transfer of aviation databases from the Garmin Pilot™ app on a mobile device to the G1000 NXi.

Additional wireless capabilities include two-way flight plan transfer, the sharing of traffic and weather in ADS-B equipped aircraft, GPS information, back-up attitude information and more between the G1000 NXi and the Garmin Pilot, FltPlan Go and ForeFlight Mobile applications.



Garmin Adds GFC™ 500/ GFC 600 Aircraft Approvals

Garmin is pleased to announce it has received Federal Aviation Administration (FAA) Supplemental Type Certification (STC) for the GFC 500 autopilot in the Cessna 182RG. Additionally, the FAA and EASA STC approval is expected imminently for the GFC 600 autopilot in the Piper PA-46 310P/350P JetPROP and Socata TBM 700/850.

When properly equipped, GFC 600 will also offer additional features in the TBM 700/850, including Emergency Descent Mode (EDM) and Low Bank Mode. GFC 500 and GFC 600 deliver superior in-flight characteristics, self-monitoring capabilities and minimal maintenance needs when compared to older generation autopilot systems.

GFC 500 is intended for single-engine piston aircraft, while GFC 600 is intended for high performance piston single/twin-engine and turbine aircraft that have a wide range of speed and performance characteristics.

Aircraft models now approved for the GFC 500 autopilot include:

- Cessna 182RG; Models: R182, FR182, TR182

Aircraft models soon to be approved for the GFC 600 autopilot include:

- Piper PA-46; Models: 310P JetPROP, 350P JetPROP (Only JetPROP Aircraft Modified by STC #ST00541SE)
- Socata TBM; Models: 700, A, B, C1, C2, N (TBM 850)

New GFC 600 Features

With the approval of the GFC 600 autopilot in the TBM 700/850, new features will be introduced to GFC 600. Low Bank mode will help increase passenger comfort by automatically lowering the autopilot roll limit at higher altitudes. A separate switch may also be used by the pilot to activate/deactivate Low Bank Mode at any altitude. Additionally, GFC 600 equipped TBM 700/850 aircraft will also feature Emergency Descent Mode (EDM). In the event an aircraft loses cabin pressurization, EDM is capable of automatically descending the aircraft to a preset altitude without pilot intervention to help avert hypoxic situations. Please note, a G600 TXi flight display is required for installation of GFC 600 in the TBM 700/850.

NEWS IV QUARTER

- ▶ We delivered and replaced the BAT 200 battery for Robinson R44 helicopter.
- ▶ We upgraded the avionics on Cessna 172 of Aero Club of Ziemia Lubuska. The new avionics set includes: Kannad 406AFCompact ELT, AV-200 antenna, CI-105 antenna, 1394T100-10RZ sideslip indicator and new glareshield.
- ▶ We delivered the new Jeppesen card leader (necessary for the performed upgrades) to 23rd Air Tactical Base in Mińsk Mazowiecki.
- ▶ We equipped the Mi-8 helicopter from Police Aviation with Artex ELT battery.
- ▶ The card unlocking HSVT was installed on Robinson R-44 helicopter from DIAMOND MODULE company.

- ▶ The Pilatus PC 12 /45 of Cracovia Air company was equipped with the new Garmin avionics: 2 GTN 750 systems, 2 GA35 antennas, GTX345 transponder, GMA350c audiopanel and 2 International Database cards.
- ▶ We delivered GTN 650 nav system and GA35 antenna and International Database card for Cessna 172S airplane.
- ▶ We will upgrade Cessna 152 of Aero Club of Ziemia Lubuska with the Garmin avionics: GA 35 antenna, GNC 255A radio, GMA 340 antenna, GMA 342 audiopanel, GTX 335 transponder, A-30 encoder, G5 EFIS and G5 HSI w/GAD. The installation will take place in 2020.