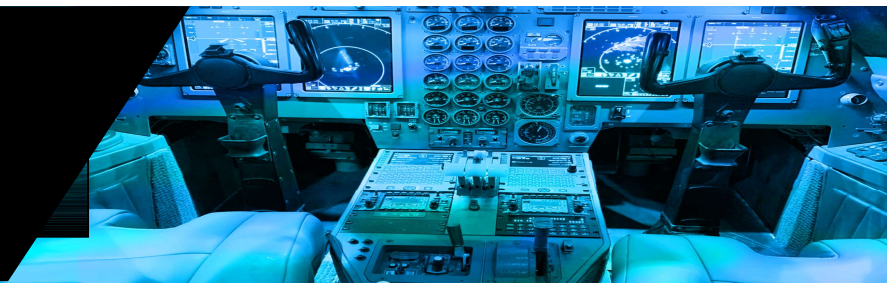
BECKER AVIONICS

DECEMBER 2019 NEWSLETTER



Dear Becker Avionics, customers, partners and friends,

With this end-of-year edition we are presenting our Season's Greetings to you.

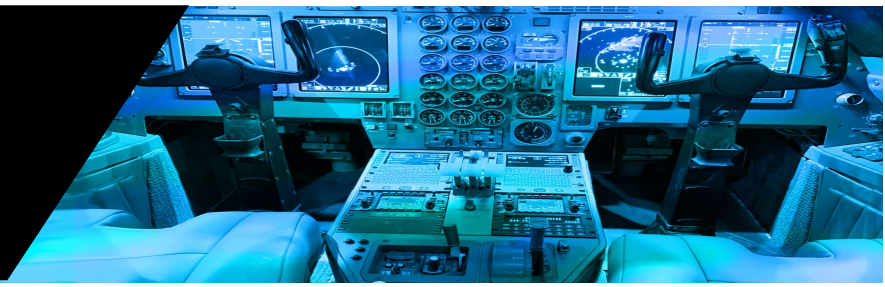
Not without mentioning the significant achievement of having received ETSO authorization for the AMU6500 and bringing forward the particularities of this digital audio management unit, such as maximum scalability and crystal clear sound via 3D audio function.

We will show you also the unconventional, but groundbreaking use of our transponder, filling the gap when it comes to night time marking of wind turbines.

See also, why our new sales manager Maximilian Schweinsteiger is looking forward to work for Becker Avionics and inform you on the highlights of the passed and coming events.

Your Becker Avionics GmbH

WHAT'S INSIDE



Becker Avionics' digital audio management unit (AMU6500) receives ETSO authorization from European Union Aviation Safety Agency EASA.

Becker Avionics remains true to its 60-year track record. As a recognized premier manufacturer of audio communication systems (Inter-Com), the digital audio management unit (AMU6500) receives ETSO authorization from European Union Aviation Safety Agency EASA.

AMU6500

Developing the system component was not just about integrating Becker Avionics values such as quality, longevity, and ease-of-use into the new product, but to set an exclamation point for Becker Avionics as an innovation and technology leader in audio systems position. In close cooperation with our customers and the users, an intercom system was developed that focuses on voice quality (3D), scalability and the human machine interface. Particularly important for achieving this goal were the experiences of the DVCS6100 and the numerous suggestions for improvement from daily use.

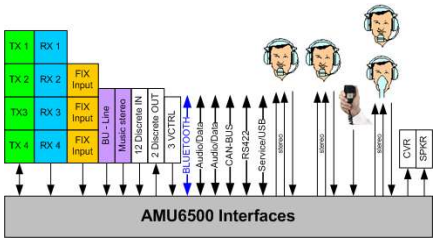
Becker Avionics GmbH's DVCS6100 (Digital Voice Communication System) was the first digital, software-configurable system on the market that revolutionized audio communications, especially for special mission aircraft and helicopters. So far, more than 3,000 systems of this type have been installed on a wide variety of aviation platforms.

Based on the DVCS6100 and the wealth of experience gained from numerous practical applications, Becker designed and developed a completely new generic audio system concept and received the ETSO certificate from the European Aviation Safety Agency EASA according to the qualification standards:

- ETSO-C139a, DO-214A;
- Software-Qualification DO178C Level C;
- DO-254 Level C, complex Hardware;
- Environmental Conditions DO-160G.

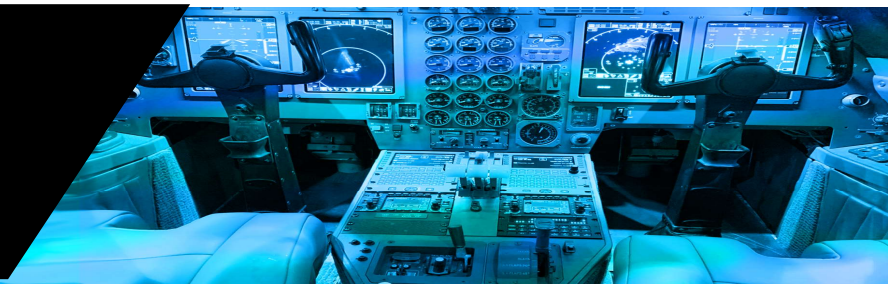
Product Description AMU6500

The AMU6500 is based on a completely new system architecture, which allows maximum scalability of the Inter-Communication System (ICS) for a wide variety of aviation platforms. The focus is always on the need of the customer for a safe flight and the optimal fulfillment of the assigned pilot and crew tasks. To ensure this, the new ICS architecture is able to be tailored to the specific needs of the pilot, crew and passengers in the aircraft.



AMU6500 Interfaces

Already a single AMU6500 forms a complete intercom system for single-engine surface aircraft and small helicopters. Up to 4 independent users can be connected to an AMU6500 via headsets. In the generic system architecture, it is planned for the next expansion stage to provide each additional user with a separate control unit. The audio receiving inputs are designed as "general-purpose audio inputs" and are freely configurable using configuration software for use as a TX, RX or FIX audio input.



Other configurable details are level and internal routing, so the final use of these inputs does not have to be determined before installation on the aircraft itself.The extensive configurability combined with the modern, digital signal processing enable an above-average and excellent audio quality.

Highlights for customer applications are the extensive interfaces of the AMU6500:

- Bluetooth® interface for connecting an external high-quality audio source;

- Stereo music input (high quality audio);

- Cockpit voice recorder interface;

- Integrated amplifier for an external speaker;

- USB, CAN-BUS, RS422 and Ethernet interfaces for various applications.

The HMI (Human Machine Interface) opens new, revolutionary paths. For the first time, it is possible for the user to determine large parts of his display and key assignments on the control unit of the AMU6500 itself. Using configuration software, 20 pushbuttons for selected functions can be defined and the associated display indications can be optimized. Defining the display colors, backlight and dimming are further gimmicks in the free choice of display parameters.

Predefined default settings can be added or changed by the user as desired using configuration software.

Thanks to the latest DSP and uC technology, high clock rates, future-proof computing and storage capacity, complex audio techniques have been implemented.

Examples are:

- 3D audio function, allows together with the use of stereo headphones to position defined audio sources in the room (configurable);

- COM playback function for two transceivers (repeats the last 90 seconds of the received audio signal with manual forward and backward function);

- Dual and Multi Transmit freely selectable during operation;

- Special mission applications for "Special Forces";

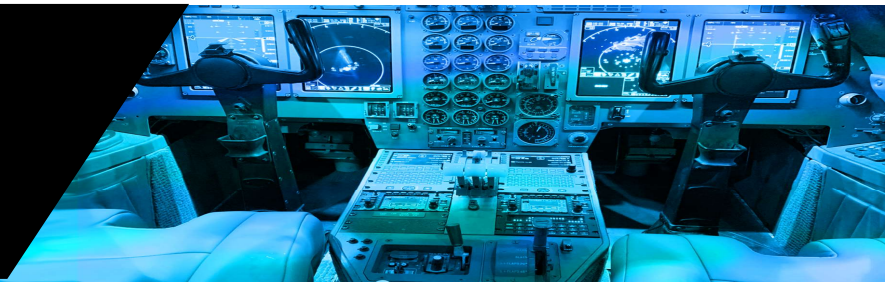
- Up to four (4) intercom groups configurable;

- Voice Message Player integrated (planned).

Using a Becker proprietary interface (based on the standard Ethernet BUS), it is already possible today to connect up to three AMU6500s in such a manner that all audio, control and status information are simultaneously and fully available on each individual AMU6500. Such an expansion of the system performance allows optimized use even in much larger aircraft or very complicated deployment variants in the field of search & rescue, fire brigade or police forces.

By cascading multiple AMU6500s, it is possible to double or even triple the number of users and audio interfaces to radios, receivers and other audio sources as needed. In addition, the Becker-BUS between all AMU6500 ensures that every user can access all available audio sources. With the configuration software, the customer requests determine which audio sources are available to the user.

The modular system architecture of the DVCS6500 will be supported by further components in the next expansion phase. Control units with display (Audio Control Unit ACU6500) and the existing panels



from the DVCS6100 (ACU6100 and ACU6101) will be available as control panels for selection and application.

ACU6101

ACU6100

ACU6500

As a further stage of development, a remote, decentralized audio management unit (without control panel) is under development.

ARU6500

The ARU6500 (Audio Remote Unit) will be available in various form factors and cascading, so that a scalable and comprehensive communication architecture concept can be implemented in any flying platform.Important factors such as weight -, wiring - and not least cost optimization can be realized from this universally applicable system architecture. All component enhancements serve a purpose to optimally adapt the system architecture of the ICS to the aircraft and the individual customer needs.

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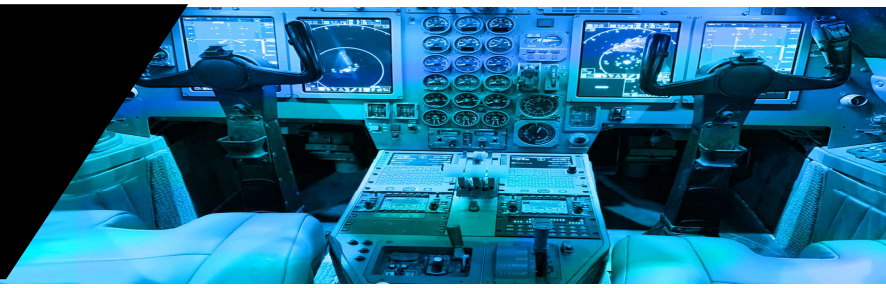


Becker Avionics successfully tests the prototype for on-demand night time marking of wind turbines

Becker Avionics has a long, successful history in the development and approval of transponder solutions for civil and military aviation.

Both the Mode S and NextGen ADS-B transponders are a family of high-quality aircraft surveillance systems that have been optimized for many different aircraft categories in aviation for functionality, the latest technology, compact dimensions and low weight. The Becker Avionics products are market leaders for their reliability and meet the highest manufacturing and testing standards in their segments.

Principles of the on-demand night time marking (German BNK)

The nightly flashing of wind turbines, which can lead to considerable annoyance to residents, will belong to the past. With the German Renewable Energy Sources Act (EEG), the on-demand night time marking for all - new and existing - wind turbines, for the marking of obstacles in accordance with aviation law, have been included as a requirement.

Amendment to the The Renewable Energy Sources Act (EEG) § 9, section 8:

Operators of onshore wind turbines that are required to carry out night lighting in accordance with the requirements of air traffic law must equip their systems with a device for on-demand night time marking of aviation obstacles. (...) The obligation according to sentence 1 applies from 2021 on. (...)

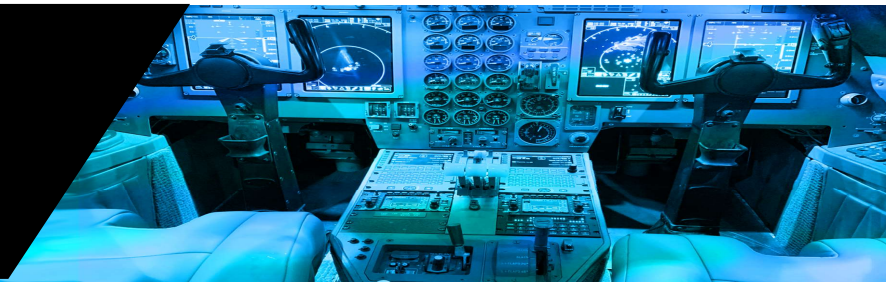
Technology-neutral legal standard for the on-demand night time marking

With the revision of the EEG, the legislator has pronounced the requirements for on-demand night time marking in a technology-neutral manner. The systems for on-demand night time marking, that are recognized in Germany so far, are radar-based technologies. These function in such a way that the existing lighting system on a wind turbine is connected to a radar system via a control unit. The radar detects approaching flying objects and notifies the control unit of the lighting of the wind energy installation. For radar systems, a distinction is made between primary and secondary radars.

Primary radars record high-frequency impulses and analyze them in order to obtain information about the location and distance of flying objects. The primary radar systems are either attached directly to the wind turbines or a rotating antenna is installed outside the wind farm. A distance of about one to two kilometers is necessary to ensure the functioning of the radar system.

Transponder based option

A secondary radar system is in use by civil air traffic control at 1,030 / 1,090 megahertz (MHz). After being interrogated by a ground station, the transponder in the aircraft sends information regarding e.g. aircraft position, speed, and altitude. This information can be used to determine whether and how an aircraft approaches a wind turbine. The Federal Network Agency considers this transponder solution as a sensible solution for the on-demand night time marking, since an existing established system can be used here and no new frequency ranges have to be identified and occupied. Only in some cases new floor components need to be installed for transponder



requests. In terms of implementation technology, the transponder-based option is the simplest solution in the industry.

Up to now, security concerns of the authorities have prevented the use of such a system. The Federal Ministry of Transport or the subordinate Federal Aviation Office feared that transponders could fail or be switched off accidentally. Now, however, this option should also be available to system operators as an alternative to the primary radar-based control systems. This would suggest that a general transponder obligation for all aircraft for night flights will soon be required by law.

On-demand night time marking prototype

Becker Avionics shares this approach and has therefore transcribed the functional requirements of the EEG in a robust and cost-effective transponder solution for wind turbines

ICAO id	Call sign	SQUAWK	Latitude	Longitude	Altitude	Track	H Velocity	V Velocity	timestamp	Distance
			Degree decimal	Degree decimal	Feet (Meter)	Degree	knots	feet/minute		Meters
5023765		1753	52.412930	13.677120	2325 (709)	250	144	-832	2019/12/17 01:56:31	6280
4967894	SXS9F	1000	52.452760	13.780140	5750 (1753)	332	257	-1024	2019/12/17 01:56:31	14013
5250328	CTN481	7617	52.900850	13.378840	36975 (11270)	175	380	0	2019/12/17 01:56:31	56136
4344286	UTA705	1000	52.592530	13.626340	3250 (991)	260	149	-512	2019/12/17 01:56:31	20265

Lat : 0.074036999999997 m Lon : -5.5968705073003
Lat : 4.49516699999994 m Lon : -11.831417393345
Lat : 54.233156999999 m Lon : 12.454387939307
Lat : 20.009636999999 m Lon : -2.5237750804575
Altitude (in Meter): 12000
Radius (in Meter): 40000
Latitude (in Degree): 52.412263
Longitude (in Degree): 13.584637

Illustration 1: Detection via on-demand night time marking transponder solution

Illustration 2: Prototype for a on-demand night time marking system

The goal is a cost-effective on-demand night time marking system, which due to its small size and weight can be installed centrally or decentrally for night time marking.

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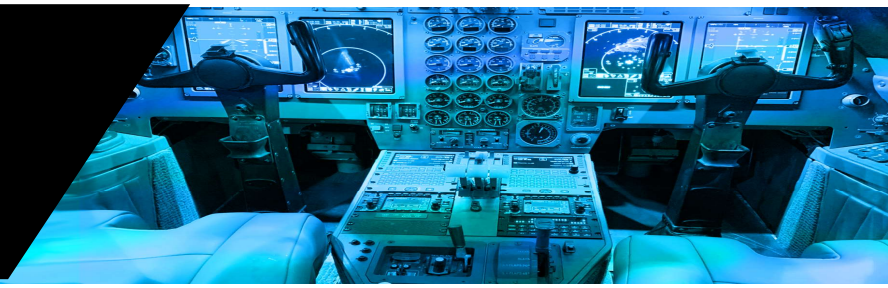


Maximilian Schweinsteiger strengthens the Becker Avionics sales team

Becker Avionics has extended its sales team with the appointment of Maximilian Schweinsteiger to the position of Sales Manager.

Mr Schweinsteiger is a graduated aeronautical engineer from the University of Applied Sciences in Aachen and has over ten (10) years of experience in technical development and testing. He managed various aerospace test and development teams effectively by setting clear goals and removing obstacles,.

Prior to joining Becker Avionics, Mr Schweinsteiger worked for well established companies in the civil and military aviation, including Comtronic, MBDA and Rolls-Royce. He held various positions from engine and flight test-engineer to program manager for complex hardware and systems.

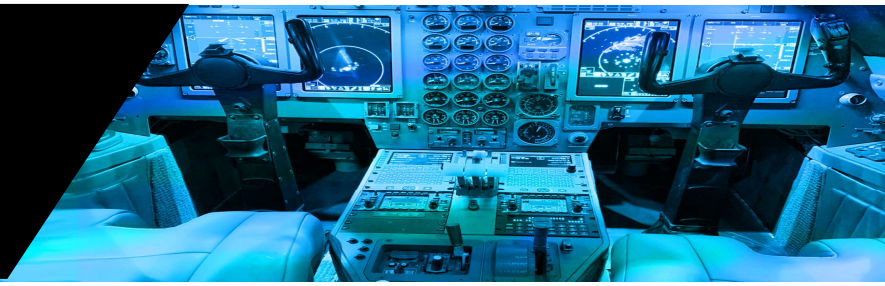
Mr Schweinsteiger worked on extremely notable products such as the Pearl 15 engine, Rolls-Royce first member of the aviation engine for the next generation of business jets.

His cited experiences and deep understanding of the market have led him to build strong relationships throughout the industry.

“It is a wonderful opportunity to be joining a leading company in digital aviations technology. I am looking forward to be working with the team and supporting the interests of the customers. After all, I see my role at Becker Avionics as bringing the customer’s requirements into the play and support them with their projects”.

Mr Schweinsteiger is the first of several new hires to the sales team. Further appointments will follow.

TO BE CONTINUED



Trade show and events – Past in review and a look ahead

Who does not know this situation: On a daily basis you are inundated by calls and emails, "inviting" you to trade shows and conferences. You could easily spend your entire time to hop from one event to the other. Therefore it is all the more important, to choose which event to attend.

For the last couple of months the contract was awarded to the Aviation Expo China in Beijing, China (September 18-20) and the Vertical Flight Expo in Farnborough, UK (November 05-07.). This was followed up by Becker East's presence at the Dubai Air Show (November 17-21).

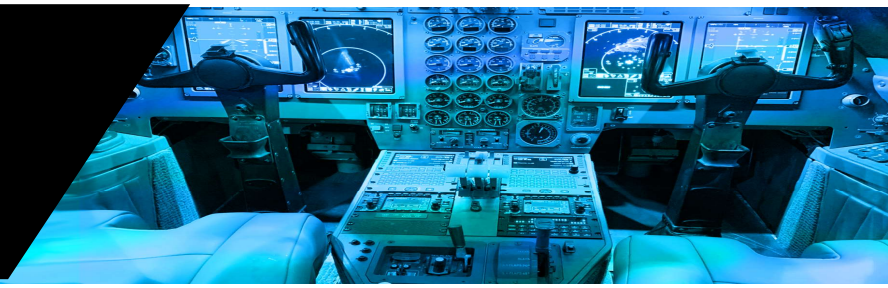
A different - albeit thrilling wind - is blowing in China: In front of the Aviation Expo China in Beijing

"The Chinese aerospace market is very fertile for strategic alliances and technological partnerships. China is not afraid of bringing the investment to a highly interesting level, as long as the European counterpart has something to offer in terms of innovation, efficiency, cost effectiveness and development capability. Becker has understood this message for many years and today it is moving forward: to consolidate our position inside the Chinese market. China Aviation Expo provided a good climate of cooperation between Chinese companies and Becker Avionics", says Armando Gessinger, Director of Sales.

Sales Director Armando Gessinger with Leigh Yang, Managing Director of Becker China

With excitement and some apprehension we had prepared ourselves for the Vertical Flight Expo. It was well known in advance that grand actors of the industry and specific OEMs would boycott the trade show. To stay or to go? We decided to go forward and were pleased by the positive feedback on our new products BXT6500 and RT6512. Also the new AMU, DVCS and PRB MR510 were well received. Furthermore, we benefitted from the international platform to introduce Stéphane Duchesne, our external - and charming - Business Development Manager for the French market to a greater number of visitors. Happy landing!

The challenge was then, to ship the equipment in time to Dubai, where our products were represented by Becker East: the company's Managing Director Khaddour Ben Ammar found it



noteworthy that attention was not only paid to the latest Becker Avionics additions, but to the complete Becker range. A sign of high quality and sustainability regarding Becker Avionics products, which makes us very proud.

Our external - and charming - Business Development Manager for the French market Stéphane Duchesne on duty.

Highly sophisticated products – professionally camouflaged by Becker Avionics staff, waiting for transfer to Dubai Air Show

LOOK AHEAD

Here are the Q1/2020 dates to save for a direct exchange with Becker Avionics:

- AEA Europe Connect Conference in Cologne, Germany, January 23-24, *2020*.
- World ATM Congress in Madrid, Spain, March 10-12, 2020
- Aerospace Tech Week in Toulouse, France, March 18-19.

Do not hesitate and schedule your personal meeting with by writing an email to: info@becker-avionics.com

We would be glad to welcome you at the Becker Avionics booth!

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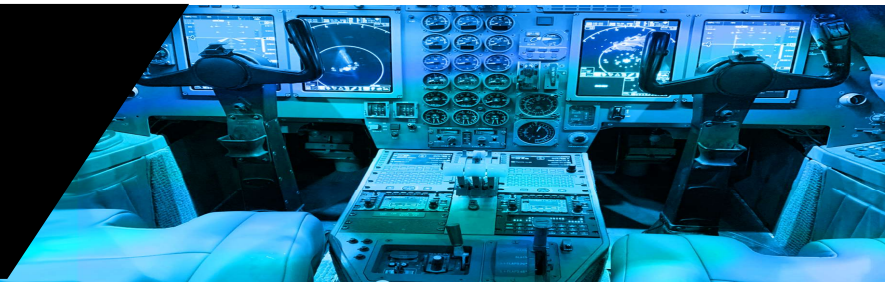

Dear customers, partners and employees,

As the Holiday Season is upon us, we find ourselves reflecting on the current year and on those who have helped to shape and strengthen our business – like you.

May the joys of the season reside with you and your family all throughout the New Year. Becker Avionics looks forward to working with you in the year to come.