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# Galaxy GRS has saved the lives of over 200 people

THE LIBEREC-BASED COMPANY IS THE LARGEST EUROPEAN MANUFACTURER OF BALLISTIC PARACHUTE SYSTEMS FOR ULTRALIGHT AIRCRAFT. IT HAS ALSO PENETRATED THE WORLD OF GYROPLANES, HELICOPTERS, AND DRONES.



To-date, Galaxy GRS ballistic parachute systems have saved 115 human lives. But this is only the official statistic, the real number will be roughly twice that amount. Crisis situations often occur due to pilot error, and many rescued pilots are not interested in talking about them. Nevertheless, Galaxy GRS from Liberec is the European leader in its field. Its rescue systems are intended for ultralight and light sports aircraft, but also for gyroplanes, small helicopters, or drones. "We own five worldwide patents, which mainly relate to parachute ejection and opening", says founder, CEO, and chief designer Milan Bábovka. His company exports roughly 90% of its products. The main market is the European Union, especially France, Italy, Slovenia, and the Scandinavian countries. Important customers are also located in the USA, Brazil, Argentina, China, India, South Africa, the Philippines, Australia, and New Zealand.

## Supplies to aircraft manufacturers

The Liberec manufacturer also has important business partners in the Czech Republic, which is a European powerhouse in the production of ultralight and light sports aircraft that are now practically unsaleable without a ballistic rescue system. In addition, the production of unmanned vehicles has also begun to develop here. According to Milan Bábovka, drones are a trend from which the company can greatly profit. "The use of a rescue parachute system is a way to allow unmanned aircraft over populated areas within the framework of European rules", explains Ladislav Semetkovský, Director of Primoco UAV, which manufactures the One 150 unmanned aircraft. "We decided on systems from Liberec because we were convinced by the experience and approach of Galaxy GRS", he adds.

The tradition of the Liberec-based company is respectable. Its origins date back to the mid-1970s. It was then that model maker Milan Bábovka was one of the first Czechs to start building hang gliders. He became the founder and head of the Liberec Delta Club, which was one of the largest in Czechoslovakia and had dozens of members. However, with the increasing number of homemade hang gliders, the risk of crashes also increased. Therefore, Milan Bábovka and Jindřich Elsner decided to equip them with a rescue parachute. To do this, they used discarded reserve parachutes for paratroopers.

The parachute was attached to the pilots waist and if required a hatch would open on the package and the parachute were usually able to save both the hang glider and the pilot. However, in some situations there was a risk of the lines getting tangled in the structure of the falling wing. "That's why I designed a hand-thrown parachute that unfolded further from the hang glider", recalls Milan Bábovka.

## Rescuing motorized hang gliders

The next stage began with the onset of motorized hang gliders. In 1984, Milan Bábovka built a two-



Rescue system for motorized hang glider

seater hang glider powered by a two-cylinder Trabant. It was given the name Galaxy, which was a parody of the largest aircraft at the time, the Lockheed C-5 Galaxy, and from that moment the brand was born. It soon became clear that something new would have to be developed for motorized hang gliders. A hand-thrown parachute was no longer sufficient. Due to the weight of the motorized hang glider,



Milan Bábovka with a replica A6M5 Zero fighter



Company headquarters in Liberec. The logo includes a hang glider system with a swarm of parachutes

the size would have to be substantially bigger and it would take so long to fill with air that it could only rescue at higher altitudes. "I wanted to construct a system whereby a ballistic device would eject the parachute into free space, which would reduce the height necessary to fill the parachute canopy", explains Milan Bábovka. "Petr Suhomel from the parachute test center in Prague-Kbely helped with this idea.



System for gyroplanes and helicopters in a container

He suggested using a system with two blank cartridges to eject a parachute, which was used to activate the stabilizing parachute on the ejection seats of a MiG-15 aircraft, and he gave me one older activator. At the Liberec Delta Club, we began to produce these life-saving devices in a similar way as out hang gliders, i.e., ourselves while we were at work", he adds.

### Fulfilling the dream of flying

Milan Bábovka took advantage of the fact that he knew design work, but also how to work with his hands. He originally trained as a car mechanic, then graduated from a secondary industrial school, and later, while working, also graduated from the University of Mechanical and Textile Engineering. His activities really took off in 1989, when he obtained a trade license. In 1990, the new private business he founded with his sister and other family members began producing gyroplanes. The times favored them, because many people in the early 1990s wanted to fulfill their dream of flying. From the beginning, Milan Bábovka advocated the opinion that the key to long-term success must be a high technical level. After further improvement with a shock absorber, the new company produced GBS-1 parachute systems for single-seater and GBS-2 for two-seater hang gliders. By 1994, the company had sold 150 sets. "Many people who were already involved in production as part of the Delta club Liberec came to work for us, and some are still working here today", Milan Bábovka points out.

### Rescue even at low altitude

The interest of aviation enthusiasts gradually expanded towards ultralight aircraft. At the same time, the founder of the company also devoted himself intensively to flying. He was also one of the founders of the Amateur Aviation Association of the Czech Republic. As part of its technical committee, he met Jiří Matějček, whose work also included the ejection seat for the Aero L-39 Albatros. This aeronautical engineer was already retired in 1993 when Milan Bábovka convinced him to work for Galaxy GRS. "He came to us with the conviction that we will develop a completely new rescue system for ultralight aircraft, where the parachute will not be launched with a weight as before, but with a rocket, which will be compressed in a small package", says Milan Bábovka. In the end, Jiří Matějček spent four years of his creative life at the Liberec-based company. "He took charge of the concept of the rescue system and the rocket motor, I took care of the parachutes and the method of extracting them", adds Milan Bábovka. This resulted in a system that technically differed from competing products. The company still uses it to this day. "Its advantage is that the parachute in the package reaches the distance of the length of the parachute cords and the parachute strap, and only then does it open. This eliminates a possible failure due to debris from the damaged aircraft flying into the parachute canopy", says the executive.

The system can also effectively slow down a falling aircraft even at low altitude. In the case of an ultralight aircraft with a maximum design speed of up to 250 km/h, 60 m above the ground is sufficient, and for a motorized hang glider, 30 m. This is important because most accidents occur shortly after takeoff or before landing. In 80% of cases, an aircraft that has made an emergency parachute landing can be repaired and used again. The life span of a ballistic rescue system is 30 years, and



Three parachutes rescue a drone

every six years it must undergo a review. The company performs 400 to 450 reviews per year, which require the entire system to be disassembled and checked, necessary repairs to be made, the parachute repackaged, a new rocket motor attached to it, and everything reassembled.

### Purely Czech products

The company, which is based in a three-story building in the center of Liberec, traditionally uses Czech subcontractors. Rockets are produced by Charvát AXL from Semla, and fuel is supplied by Explosia from Pardubice. The Liberec-based company had the special parachute fabric developed and produced by Hedva Moravská Třebová. The fabric is characterized not only by its strength, but also by its pink color, which



Checking the GR rescue system





DJI M600 drone with a GBS 10 parachute system

is easy to see even on snow or on the surface of water. In 2022, the company produced approximately 550 ballistic systems for manned aircraft.

"We can make a rescue system for any small aircraft or unmanned vehicle weighing from 2 to 2400 kgs. We rely on the quality that results from the diligence of our workers, from the correct solution of calculations and constant testing of systems", says Milan Bábovka, whose company employs 25 to 30 people - mainly seamstresses, designers, and technicians. However, during the company's existence, many things have changed. Between 1989 and 2002, it produced two thousand paragliders, it also offered electronic devices, seats, and overalls for paragliding. In addition, Milan Bábovka ran a paragliding and hang gliding school, attended by 750 students from the Czech Republic, the Netherlands, France, and Germany. Currently, Galaxy GRS is focused on the production of missile rescue systems, offering approximately 78 of their modifications. Originally, these systems were mostly retrofitted, but now around 70% of them are purchased directly from aircraft manufacturers. "Highly qualified technicians work in our design office, and we cooperate with customers



Parachute production

during the development of the airplanes", says Milan Bábovka. Examples are cooperation with the Slovenian company Pipistrel, the Italian Tecnam, and the American Cirrus. "We also cooperate with the Belgian company JMB Aircraft, which manufactures the VL3 model designed by the Kábrt brothers in Chocna, which is the fastest ultralight airplane", highlights Milan Bábovka.

We are also a partner of Czech manufacturers of ultralight and light sport aircraft TL-Ultralight, Zall Jihlavan Airplanes, Direct Fly, AirLony and others.

### Customer demands are on the increase

Our main competitor is the American company Ballistic Recovery Systems, which conducts business under the name BRS Aerospace. There are only a few other manufacturers, but one of them is the Czech company Stratos 07. "Our competitive advantage is our professional background, thanks to which everything we produce comes from our research and development", points out Milan Bábovka. The company must also react to changes in regulations. Today's ultralight aircraft can weigh more than before, and even larger, up to five-seater machines are now equipped with rescue systems. The original production program has therefore expanded to include systems that can rescue a significantly heavier aircraft. The pearl is then specific systems for replica fighter aircraft from World War II that are characterized by the ability to fly at high speeds. The company has also begun developing systems for light helicopters, gyroplanes, convertiplanes, small drones, and larger unmanned planes. In these cases, we cooperate with the Institute of Aerospace Engineering at the Technical University in Brno and with the Czech Aerospace Research Center in Prague.

"We developed the first rescue system for gyroplanes at the request of a Texas customer back in 2001", describes Milan Bábovka. From 2011, the company worked for three years on a significantly improved system, which is also suitable for small helicopters. Its advantage is the rapid ejection of the parachute, which ensures its safe opening in a fraction of a second at a distance of 20 to 30 m from the aircraft. These products are used in the Belgian Dynali light helicopter, the Canadian Mosquit, or the Italian CH7 Kompress aircraft.

Galaxy GRS has also developed a so-called anti-spin parachute. These are used in the case of unmanned flight to stabilize the aircraft and regain control by steering. Subsequently, the parachute is ejected and the drone continues in normal flight. Anti-spin parachutes are used for testing prototype aircraft, where the test pilot is required to master the spin length. In the case of ultralights, such tests are not required, pilots are not allowed to perform deliberate spins with them, and if they lose control of the ultralight aircraft, the pilot must use the ballistic rescue system.

However, with prototypes of commercial or military aircraft, it is necessary to test the spin, so the Liberec-based company participated in two projects of Aero Vodochody Aerospace. The first was an eight-seat turboprop Ae 270, which did not enter serial production, and the second was a L-39NG training jet, whose serial production was recently launched. "In these cases, it is important to install a rocket engine that guarantees that during the spin the parachute will not become entangled in the tail of the aircraft", emphasizes Milan Bábovka, whose company has successfully developed anti-spin systems for European and American customers.

### For soldiers and wind farms

"We know that our rescue systems are used in the armies of ten countries", says Milan Bábovka. These are products designed for aircraft, hang gliders, and drones. Some countries, for example South Korea and China, use drones for border controls, and in Poland they use them for drones. India has purchased 200 light Slovenian Pipistrel aircraft for basic training, each equipped with the Galaxy GRS system. In one case, the system has already saved the life of an Indian soldier. "However, these are not weapons systems, but rescue systems", emphasizes Milan Bábovka.

One parachute is sufficient for small drones, but for larger ones, the company has developed a system of three smaller parachutes, which open faster than one large one. The aim is again to rescue the drone even at a lower altitude. Parachutes for drones are followed by the development of rescue equipment designed for futuristic flying vehicles with vertical take off and



SOFT system intended for aircraft interiors

landing, which are intended to be used for transportation or as taxis in large cities. For these flying vehicles powered by electric motors, the company offers the GBS 10M/Robur system, named after the airplane from Jules Verne's novel. Its essence is a swarm of a number of smaller rescue parachutes. They intend to use a similar system in China for flying cars with a short take off and landing. Another use arises when mounting propellers on high masts of wind farms. Until now, helicopters have been used for this, but now the era of unmanned aircraft is coming, which can carry the cargo to the required height, and the modification of the Robur system can also be used as a means of rescue. "It began last autumn, and I think it will be an interesting business opportunity", notes Milan Bábovka, who is 74 years old, but is still active. He has not lost his passion for flying either. He now enjoys replicas of the Soviet front Jakovlev Yak-3 fighter jets and the Japanese A6M5 Zero in 80% scale, which the company had produced by the Brno designer Jiří Mička. The future of the company is assured by younger family members: sales director Martin Moser and technician Martin Dorotka.