

GALAXY

HOW IT ALL BEGAN

Text: Milan Bábovka • Photo: Galaxy GRS s.r.o. archive, unless stated otherwise



THIS SERIES ON BALISTIC RESCUE SYSTEMS, WHICH WE LIKE TO PUBLISH WITH REVUE FLYING IN THE FOLLOWING MAGAZINE, HAS SEVERAL OBJECTIVES.

ON ONE SIDE, I WOULD LIKE TO INTRODUCE THIS CONCEPT TO LAY READERS, BUT ALSO TO EXPERTS IN THE AVIATION ENVIRONMENT, AND I WOULD LIKE TO EXPLANATE THEIR USE, EMPHASIZING SOME OF THEIR ADVANTAGES AND DISADVANTAGES. I WILL ALSO GUIDE READERS THROUGH THE COMPLEX PATH OF THEIR ORIGIN AND DEVELOPMENT.

In 2020, our company celebrated 36 years since its establishment, and looking back on the history of our company, I am convinced that we have accumulated a sufficient amount of material and experience to draw from. So first, let me provide a small recap.

As of last year, our company had produced over 2,500 paragliders in eighteen models, each in two to three sizes, as well as around 1,800 pilot parachutes, 4,500 parachutes for drones and unmanned aerial vehicles, and over 9,000 modern ballistic parachute rescue systems. In short, including prototypes for all categories of rescue equipment, we have produced over 20,000 parachutes. Since 2002, for production capacity reasons, we have been fully focused on ballistic systems, and since 2016 a new category of parachutes based on our latest patent,

which is the initiation of a parachute using a pyrogenerator. Here, we have achieved the best ratio of the weight of the rescue equipment to the weight of the rescued equipment, with a significantly lower rescue height. It is equipment mainly for unmanned aerial vehicles, where everything is controlled automatically via a computer. Until last year, we produced 40-60 systems per month, with an annual capacity of 450 to 700 pieces. We export our products to all continents, and we own five international patents in the field.

To date, we have registered 105 pilots and their passengers rescued using our parachute rescue systems. This is about 1% of the ballistic rescue systems we have manufactured and installed. Statistics on the use of individual pilot parachutes and unmanned aerial vehicles are not kept. Detailed statistics are maintained by

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• With the first Galaxy rescue parachute on his stomach - its canopy was from Svazarm, but everything else was made at home. The year was 1978.



• Galaxy IV's motor hang glider with a Trabant engine from 1984 with the first ballistic system

the American company BRS, which, with about 16,000 produced units, had about 160 rescued persons before they began to equip their system in four-seater aircraft. From that moment on, the number of rescued persons has, of course, increased significantly.

How we were established

Looking at our history, we find that our company was established shortly after the arrival of the first French hang-glider enthusiasts in what was then Czechoslovakia in the 1970s.

At the beginning, there was the Delta Club Liberec, which was one of the largest in the country. It had about 65 permanent

members and around 50 active pilots. At that time, of course, everyone built their own machine, and so the club's production activities were significantly supported, which brought a lot of work, and searching for material for the construction of hang gliders, electronic variations, and later rescue parachutes. At this time, a dozen wings were born, the construction of which was created on a drawing board. Among them were the "single-cover" Standard and Wasp, as well as more powerful hang gliders (Lightning and others), which I made with my friends Mirek Brož and Vašek Chvála either at home or wherever it was possible.

Later, after the arrival of motor hang gliders, we also spent a lot of time modifying various engines and manufacturing propellers, but in doing so we gained invaluable experience, which became the essential building blocks of our company, and which in a way help us to this day.

Comrades would call us the fifth column. They couldn't lock our hang gliders in the hangar, so they tried to control us in some other way for years. On the other hand, we did not have to grow crops or engage in related production as they did at Svazarm airports in order to fly, and so we created for ourselves. And that was good.

I modified the first rescue parachute for a classic hang glider from a reserve parachute in 1977, in cooperation with the diamond paraglider Jindra Elsner from Liberec. After later modifications and tests, it became common equipment on all hang gliders.

All you had to do was pull the hatch and the parachute would fall out below the pilot. It was worse when flying on your back, so ejectors in containers began to be developed and gradually used. The constructions were more or less successful, but we will look at this issue in more detail later.

After hang gliders came motor hang gliders. In 1984, there was a boom in motor hang gliders in the west. In our country, it was forbidden to fly flying these machines, and State Security assistants spied on and reported everyone who bought them. The consequences were unpleasant, but everything was still built and flown.

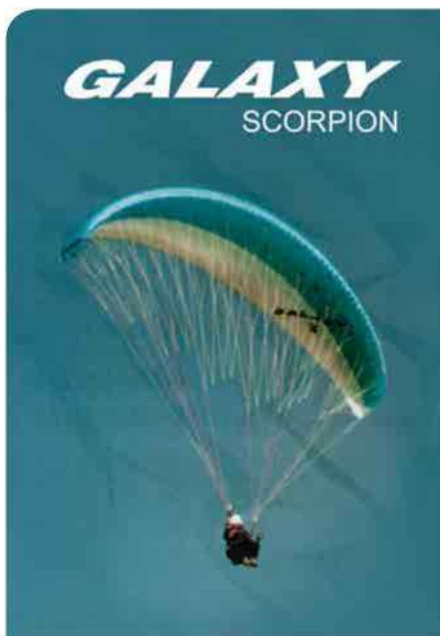
The year 1984 saw the start and establishment of our company, because our successful two-seater hang glider powered by a Trabant engine was born. It was named Galaxy. The Americans had their giant Lockheed Galaxy C-5 transport aircraft, and we said with exaggeration that our Galaxy is not only slightly smaller, but also more transportable.



It soon became clear that it would be necessary to develop a rescue system for motor hang gliders, because along with their development, of course, came the falls of amateur-built machines and, unfortunately, fatal accidents. The classic reserve parachute was out of the question due to the long time required to fill it. This is about 8 seconds, which corresponds to



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• Scorpion III paraglider



• Anti-spin parachute for A 270 aircraft

a height of around 800 meters. But our hang glider flew much lower. It was necessary to design a rescue system so that the rescue parachute would be launched into the open space using a ballistic device, whereby reducing the height necessary to fill the parachute canopy. Sometime in the autumn of 1983, I visited Petr Suchomel in Prague. Petr was a professional from the parachute test center in Kbely. He came up with the idea of using a system for firing a stabilizing parachute from a MiG seat to eject the parachute, and he gave one such older activator to me. Petr had access to this technology in his test workplace. He also found a E 67 pilot parachute. In a small group of people in Liberec, we at the Delta Club Liberec started to produce these rescue systems in the same way as the hang gliders or the three-wheel motor hang gliders had been created so far. So, self-help as much as possible. Parachutes (canopies with cords) discarded from Svazarm and the army, or from good

friends were generally used. For the original purposes and speeds, they no longer met the set limits, but they were enough for free and motor hang gliders flying at speeds of up to 80 km/h. In 1985, we were pleased when the use of our ballistic system saved our friend J. Zadin from disaster at Všen airport. This event became the first ever, and successful, use of our system!

I improved the original MiG system with a recoil damper, because the recoil caused by firing the two cartridges that released the weight, which subsequently ejected the parachute from the laminate container, was so large that without the damper the firing mechanism pierced the 10x10 cm wooden beam. They were not the so-called "piglet" cartridges, but modified 9 mm cartridges with a gunpowder weight of 9 g from the gunpowder factory in Vlašim. Thereby, production of ballistic systems began at the club. Our friend, Antonín Němeček, prepared the main parts, and the final assembly was performed at our house. The components were supplied by friends, who also made them, as far as possible, and the delivery of components and products took place on a barter basis. More than 50 of these rescue systems were produced at our club, and we produced about 200 more under the Galaxy brand. Some appeared on motor hang gliders in operation until 2010.

If we look at the history of BRS, America's largest manufacturer of rescue systems, we find that our products did not differ much from each other in terms of design, or the time at which they were created.



• GRS 6473 SD ready for final packaging and delivery to the customer



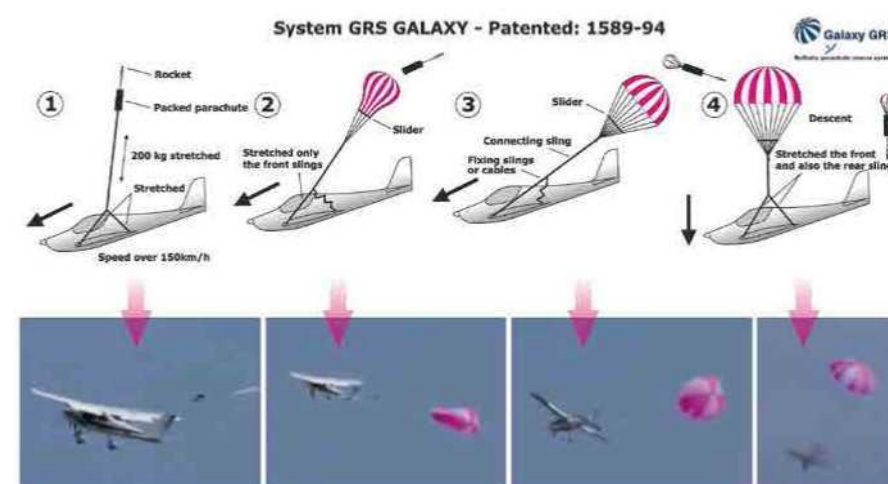
• Anti-spin parachute

Breakthrough changes

The company was able to gain a stronger legal framework only after the social changes in 1989, when it received a trade license, which is still valid today, even though today our company Galaxy GRS s.r.o. is a limited liability company. Many of the people involved in Delta Club production continued to work in my new company, and some of them still do today. Over time, others set up their own businesses, and later became our helpers and subcontractors.



The company is headquartered in Liberec



• GRS Galaxy system, first patent from 1994

In the 1990s, we added the production of our newly designed pilot rescue and drop parachutes, as well as the production of paragliders, pilot seats, and electronic variometers, in addition to the production of the original rescue systems. But about that some other time. Then, we began production of a very successful new generation of GRS ballistic rescue systems.

The arrival of J. Matějček

A great benefit to the company in 1992 was the arrival of Jiří Matějček, a prominent Czech aircraft designer and, among other things, the father of the ballistic launch seat for the L-39 Albatros training aircraft. Nevertheless, his design skills were varied, as he also designed the VT-16 Orlik glider, the four-seater HC-4 helicopter, and a whole range of other promising projects of the time.

Jiří was a great visionary, a bold designer, and a man with extraordinary technical intuition. This is demonstrated by the simple fact that only a limited number of companies and design studios have managed to successfully design and manufacture

ballistic ejection seats to this day. The then Czechoslovakia also joined this exclusive club thanks to Jiří Matějček and co-workers from the Czech Aerospace Research Centre in Prague. The others, as they say, failed miserably in solving this problem.

I met Jiří at the Central Technical Commission at LAA CR, where we solved all sorts of problems with the permitting of serial production for UL aircraft manufacturers. He came to our company as a pensioner and with the clear conviction that the parachute will not be fired with weights as before, but with a rocket, and not in a sleeve, as is practiced by some foreign and local manufacturers to this day. The parachute will be pressed into a small package. Everything that was known until then was not perfect.

We will develop a completely new system, he said at the time. He was not convinced by the arguments



Galaxy GRS now also offers rescue parachute systems for aircraft replicas weighing up to 600 kg and with a maximum speed of up to 390 km/h



Chief designer of the Cirrus Paul Johnston visits the company headquarters

that no one has it, we will not be able to cope with it, and the development will be so expensive that we will be ruined financially.

And so, there was a development shift in the field of rescue systems at our company. Jiří Matějček was in charge of the new rescue system concept and a universal rocket ballistic engine, and I was in charge of the construction of the ejection system and new parachutes.

No one gave us a single penny, and the entire development was covered by the production of paragliding and cartridge launchers, and all the profits were invested into the new project. We did well then.

To this day, the competition remains at the level of the American BRS, which other manufacturers copied, leaving them with the original, not completely perfect, rescue system, which didn't always work properly.

Jiří Matějček sat across the table from me, as a working pensioner, in my

company for four years. He was a phenomenal designer.

He never knew the phrase, "It can't be done", and I remember, whenever something went wrong, he would say, "Onwards and upwards". I am convinced that this was one of the main reasons why we, as a company, got to where we are now.

Paragliding

However, it would not be right to forget another part of our company's activities, which was closely related to paragliding. It all started in the late 1980s, when new possibilities opened up. While flying as part of a club exchange in Switzerland in 1988, I drew the first paraglider, Big, in a parking lot in Lausanne together with Jirka Šubrt and Honza Janeček.

I found that they do not have a very good profile –the glider had a maximum of 3:1, so I improved it a little.

The Swiss came all the way to Liberec to see how it flies. I got 4.5:1 out of it. I sewed a couple of improved parachutes for them at home in Veritaska time, and they gave me a slightly used Peugeot 305. This is also what the natural start of the business looked like at the time. Between 1989 and 2002, the company produced two and a half thousand paragliders, including the Big X, Orion, Speedy, Absorber, Experience, Gladiator, Calibra, and Excalibur models, as well as acrobatic gliders such as the Shark, with Austrian pilots also collaborating on their development. In 1999, Lubor Groh flew our Scorpion II glider on one of the first ever long-distance flights: 180 km from the Broumov Walls to the town of Náměšť.

With the rise of paragliding, the establishment of a paragliding school and a hang-gliding school, which was attended by 750 pupils from the Czech Republic and abroad, was a natural part of the company's development. This was logically followed by gaining all the required qualifications for pilots, instructors, inspectors, and, given the experience, also inspectors of paragliders and hang glider technology.

This also included paragliding accessories and equipment. Seats, overalls with thermal padding, and until the mid-1990s also electronic devices (variometers), which were manufactured by Jiří Zadina. To this day, the production line includes GP-1, GP-2, GP -3, GP-36, and GP-40 backup parachutes.

However, the focus of our activities now lies in the production of ballistic rescue systems under the Galaxy GRS brand.



Current manufacturing facilities



• The situation 0.9 seconds after a GRS is ejected. Top a rocket with a small soft container after discharge