

# In the Depths of the Coiba Mare

**In the summer of 2011, a cave research team from Austria set off to Romania on an expedition into the Western Carpathian Mountains. The objective was to survey the dry area, what speleologists consider the accessible area, of the Coiba Mare cave. Of particular interest was the course of the water in the cave system. Romanian experts have long suspected that the cave is connected to a much more extensive system of underground passages. The survey team took along a Leica DISTO™ D3a to survey the dry area of the Coiba Mare.**

**by Walter Huber**

The Coiba Mare cave system extends over a total length of 5,042m (16,540ft). The major part of this cave system consists of a labyrinth, which begins just inside the huge entrance portal. After 727m (2,385 ft), the water running through the cave disappears into the Lacul Mortii final sump. Cave researchers use the term sump to describe a section of cave under water. Hydrological investigations have shown that the final sump must be connected to the Izbucul Taz karst spring, which emerges about four kilome-





■ Small and efficient: The Leica DISTO™ D3a with integrated tilt sensor.

ters further down the valley and, at -87 m (-285 ft) lower than the cave opening, is one of the deepest known sumps in Romania. This is where the water of the Coiba Mare reappears at ground level.

Because of the complexity and extreme conditions in the two connected cave systems a precise and conclusive layout drawing and a 3D model were required to continue research. From the beginning, it was clear that only extremely durable surveying equipment could be used - in addition to everything else, the humidity throughout the cave system is more than 90%, with areas of flowing or standing water as well as some narrow partially water-filled partial-sumps. A layout drawing would also be enormously helpful for the planning of the transport of several hundred kilograms of equipment. The small, robust Leica DISTO™ D3a, with its precision laser for distance measurement and integrated tilt sensor, was the ideal instrument for the job. An azimuth compass provided the bearings. The team also had the important task of determining the precise elevation of the Coiba Mare final sump.

The cave entrance is gigantic - at more than 50 x 70 m (165 x 230 ft), the cave portal is the second largest

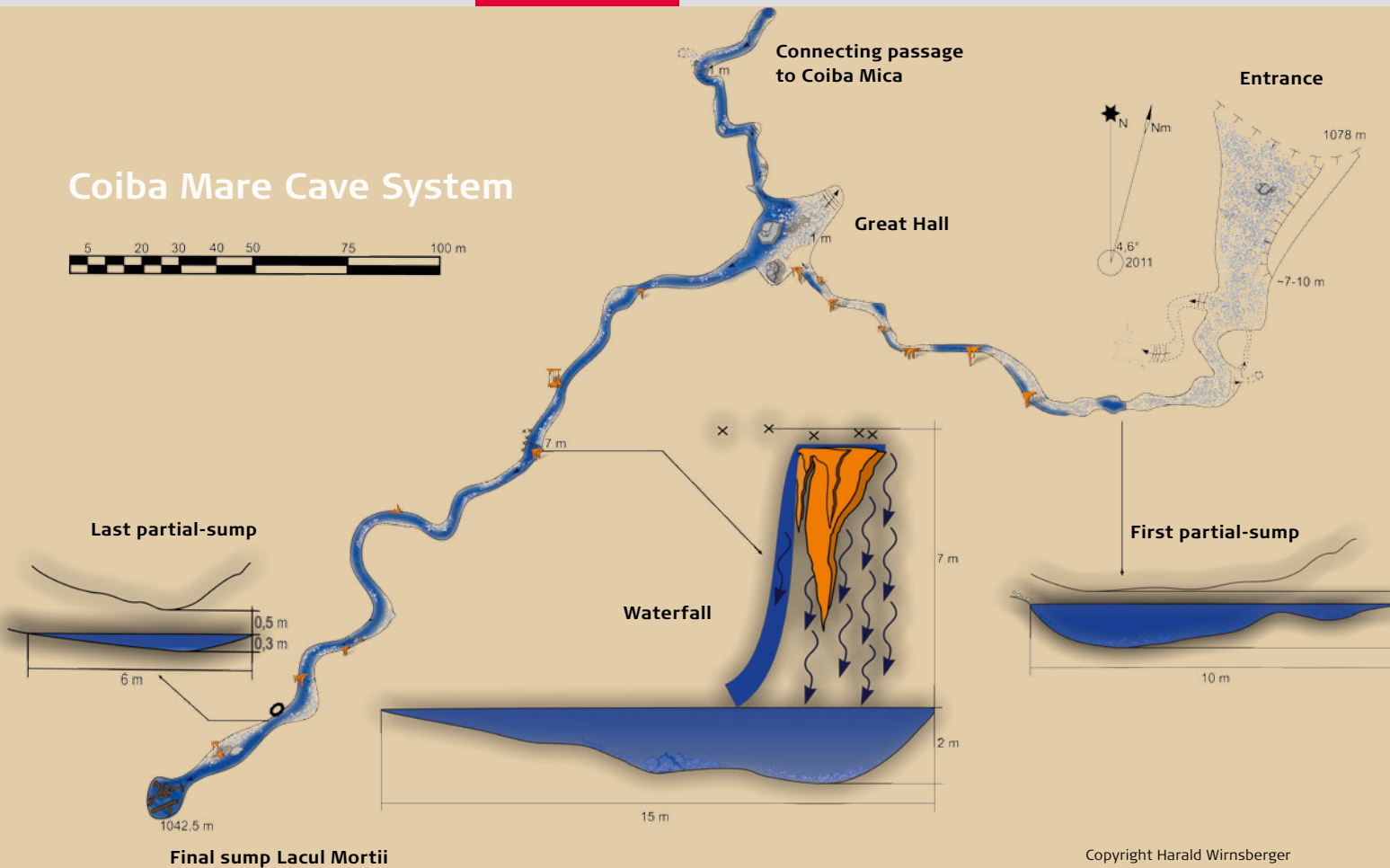
found so far in Romania - and attracts many tourists every year. In spite of direct sunlight and long sight distances, it had never been possible to produce a precise and detailed survey of the portal. The Leica DISTO™ D3a performed brilliantly to overcome this first challenge.

After the first 150 m (500 ft) the cave becomes wet and narrow before it reaches the start of the first partial-sump. At this point, the cave roof is as little as 30 cm (12 in) above the water surface. For surveying beyond here, we had to wear our drysuits. The partial-sump is 11 m (36 ft) long and about one meter (3 ft) deep. The next leg of the survey, a wet part of the cave with over 90% relative humidity and an ambient temperature of 6°C (43°F), was a really hard test for the Leica DISTO™ D3a.

After a further leg of 200 m (656 ft), we reached the great hall, which has a branch leading into the Coiba Mica cave. The longer distances in the hall were measured successfully despite the high relative humidity. The passageway in this section is more than 10 m (33 ft) high, several meters wide and breathtakingly beautiful. The mineral deposits create fairy-tale rock forms. We then made a 130 m (426 ft) detour along



# Coiba Mare Cave System



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the gallery to the north in the direction of the Coiba Mica cave system.

Back in the great hall, after a leg of 140m (459ft) we reached a 7m (23ft) deep waterfall, which required safety harnesses and ropes to descend. The topographical features made the choice of survey points difficult and the measurements had to be taken while roped up. The reliability of the DISTO™ D3a was a great advantage to us here.

Once we were down, the passage headed off in the direction of the Lacul Mortii final sump, which translates as "Lake of Death". After overcoming another partial-sump, 40m (131ft) from the final sump, we surveyed the leg down to the final sump, 285m (935ft) from the waterfall. Unfortunately, we were not able to survey the final sump due to driftwood barring our path.

By using GPS to determine elevations above national datum of the entrance to the cave system and the Izbuluc Tauz karst spring, we hoped to confirm our assumption that the passageway from the Lacul

Mortii final sump must rise again. We believed that beyond the submerged section, which unfortunately was blocked, there must be another dry passageway before the water finally reaches -87m (-285ft), its lowest level in the system, in Izbuluc Tauz.

Based on the survey, we now know that there is a height difference of over 200m (656ft) between the Coiba Mare final sump and Izbuluc Tauz. This means the final sump of the Coiba Mare must actually be higher. Therefore there must be another dry section after this sump. Romanian researchers had long speculated that there was a further major system of passageways half-way (by distance and height) between the final sump and Izbuluc Tauz - which would then be Romania's longest cave labyrinth. Until now, however, nobody had found the "key".

Using the Leica DISTO™ D3a, the team was able to complete the survey in considerably less time than it would otherwise have taken. The integrated tilt sensor enormously increases efficiency when surveying caves. Distance measurement produced extremely reliable results because common sources of error,





■ At the bottom of the 7m (23 ft) high waterfall, onwards to final sump.

such as the sagging of steel tapes, misreading tape markings, etc., were eliminated. Despite the high relative humidity and low temperatures, battery life was sufficient. We can confidently say the DISTO™ D3a withstood the endurance test in Romania's Western Carpathian Mountains. ■

*About the author:*

*Walter Huber is a diving instructor and as Regional Manager of the International Diving Educators Association (IDEA) his responsibilities include the association's activities in Romania (www.idea-romania.org). walter@bluesunlight.info*

## The Coiba Mare Expedition

<b>Duration:</b>	3 days (23 hours)
<b>Total length of watercourse:</b>	924.4 m (3,032.8 ft)
<b>Height difference (w/o final sump)</b>	- 35.5 m (- 116.5 ft)
<b>Furthest distance from entrance:</b>	726.8 m (2,384.5 ft)
<b>Highest surveyed point:</b>	1,078 m (3,536.7 ft) (entrance)
<b>Lowest surveyed point:</b>	1,042.5 m (3,420.3 ft) (final sump)
<b>Number of survey legs:</b>	75
<b>Average leg length:</b>	15 m (49.2 ft)

**Expedition team:**

- Harald Wirnsberger
- Rainer Kraberger
- Walter Huber
- Joachim Haschek
- Erwin Sipos

Further information about the team and their diving projects can be found at: [www.bluesunlight.info](http://www.bluesunlight.info)  
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