

Alviela, a Team Building Project

By Alexander Sawyer, Andrea Marassich and Ricardo Constantino

Introduction

When teaching GUE classes we generally draw attention to the many teams of GUE divers working on various projects throughout the globe, and I often notice students staring at me, wondering whether they will ever be a part of such a team. It is just a question of motivation and commitment, however; although it may seem like a difficult goal. I get the impression that people believe it is a big step from our GUE classes to exciting underwater projects, but on the contrary it is rather uncomplicated to get involved in a project relative to ones level of training, experience and commitment.

I met Alexander “Sasha” Sawyer for the first time while teaching a class outside of Barcelona during the summer of 2006. He was just in the area for a few days so we ended up co-teaching the class, our common passion soon making us feel as if we were old friends. We came to speak of cave diving in the Iberian Peninsula as Sasha had recently visited a complex and mysterious cave system in Portugal, and decided we had to return and attempt to learn more about it. A week later we were organizing our first team outing to *Olhos de Água do Alviela* with Ricardo Constantino in Portugal.

This article will share some of the thoughts and reflections we have had while surveying the Alviela cave system, focusing on how we built our team, how we selected our objectives, and what we learned from meeting the logistical and operational challenges involved.

Defining Our Objective

Learning to dive as a team is an important part of our GUE training, but it is only the first step towards learning to *work* as a team in a middle term project. Having been involved with various teams working on a project basis, it is my experience that this is the most critical issue for the success of long term projects. Coordination of a number of people is highly demanding and it was necessary for us to find a balance between reasonable project goals and personal satisfaction, enabling a development of a team spirit: The divers would have to get to know each other as well as the cave itself. Therefore, we envisioned the Alviela project right from the beginning as a team-building and experience-gathering project, and so the objectives would have to be relevant to the capacity and dedication of each team member involved.

The Alviela system has already been explored beyond 120meters of depth, so further and deeper exploration of Alviela was out of the question. However, a team put together from scratch could develop procedures adequate to get far more precise data of the initial part of the system. It seemed reasonable to believe that while developing the team’s middle term project experience, we could attempt to achieve a far more detailed survey of the Alviela cave.

Initial research revealed that there was indeed an enthusiastic desire amongst the community to learn more, as there still was only limited knowledge of the system. Although the cave had been explored by several divers (lately by Dr. Jérôme Meynié of France and Martin Burgui from Spain), the local scientific community proved to be in need of more precise data for a better understanding of the whole system.

Thanks to Prof. José António Crispim and Piotr Gajek we received full access to permissions and to available data on the system, and after reviewing the work already done we confirmed that focusing on a more detailed and precise survey was desirable. This could help give SPE (the local speleological group that hosted and supported our efforts), and other researchers a clearer picture of what is going on underwater in Alviela.

The team decided to work on a grade 3 survey of the whole system; showing walls, features and with a minimum percentage of error on loop closure (within 3%). Moreover, we wanted to produce some quality video footage of the cave system as well. This would be the objective of the Alviela project.

The Challenges

Our first challenge was to determine how many people we would need to be, and we were determined to keep the number to a minimum. A balance had to be maintained between having enough manpower to achieve our objective without creating too much logistical complexity. Although Alviela is a beautiful site there is a lack of on-site logistics and the dry section of the cave entrance is quite restricted. These issues predominantly determined the maximum number of people that could join the group.

For the sake of developing the local diving community, its initiative and project experience, we had decided to involve divers with limited experience in cave diving. Therefore old friends with sound skills in survey, filming or UW pictures were not considered in favour of allowing fresh Cave 1 divers a chance to get involved and develop. This meant scaling down some of the objectives we had initially envisioned, but we preferred to focus on developing a number of divers rather than getting too worried about the final results of the survey. Although more challenging, we were confident that a strong team mentality and a well-organized plan would still allow us to develop the desirable precision of our survey.

The Challenges: Planning and Communication

Creating a team roster with divers from Portugal, Italy, Norway, Spain and the United States was just a matter of exchanging a number of e-mails, but getting everybody properly involved was a different story. We tried different online platforms for efficient communication, attempting to hook members' attention giving each of them a basic task according to their background and expertise (tasks varied from arranging logistics to knotting line). We did not want to reinvent the wheel, however; so we got Dawn Kernagis, a veteran WKPP member, to help us with some valuable suggestions

First our focus was to get everybody participating in the online discussion about project objectives, personal objectives and sharing opinions on logistics and procedures. The results were variable, and at times there was no communication at all! Apparently not all the members were as active as we would have liked, but in the end we managed to find a reasonable balance – being internet savvy isn't necessarily a prerequisite for being a valuable team member. In hindsight it was necessary to get a first bite of Alviela to get everybody hooked, and thus willing to put in some more effort.

The Challenges: Equipment

The need for planning was evident: With the nearest fill station in Lisbon, more than 100km away, the lack of logistical support meant we had to fill our own tanks and manage the diving schedule accordingly. Basically we ended up having the dive teams rotating between diving, surface support

or filling tanks, and we generally managed to have two or three dive teams in the water at the same time.

Several people had to experience it themselves to fully appreciate how any delay on the schedule would force the next dive team in the chain to make up for the lost time. However, this was mostly cleaned up after the first day of diving. Other lessons would be learned for each subsequent day in Alviela, such as how to best organize the dive teams so that surface support is always free and available; different procedures for moving tanks in and out of the dry section (using ropes, pulleys and stairs); managing the dive platform in the cave; the best organization of the filling station with our compressor and the extra Js of helium and oxygen; even getting a better understanding of the necessary fitness/nutrition/hydration considerations. Naturally, all these lessons seem to be learnt the hard way.

Each day had a briefing and debriefing session, where daily activities are discussed and lessons learned were noted (and immediately introduced if necessary), dive plans for next day discussed and approved. Coordinating all this activity was real fun; occasionally it was necessary to use a little verbal whipping (for that an ex-Navy team member was useful), but after the first weekend in Alviela everyone was satisfied; happy and tired, and reflecting upon a new-found appreciation for the real challenges and proper tempo of multi-team diving.

Alviela

Alviela, or more correctly *Olhos de Água do Alviela* (which means “Eyes of the Water of Alviela”) is Portugal’s principal spring with an average discharge of 120 million m³ of water per year, and boasts a rich history to go with it.

By the end of the 19th century Lisbon, the capital, had a population of 190 000 inhabitants and a daily water supply of just 3000 m³ of bad quality water. Most of this water was sourced through the *Aqueduto das Águas Livres*, dating back to the mid 18th century and today still one of the major landmarks of the city of Lisbon. The solution to this water shortage in Lisbon was found by capturing and distributing water from the Alviela spring. The 114 km long aqua duct from Alviela to Lisbon was officially inaugurated in 1880, and with it a regular daily supply of 50 000 m³ of good quality water from Alviela.

The quality of the water would be called into question in later years, and the scientific community of the time ended up blaming a unique crustacean, at the time exclusive to Alviela, *Asellus Lusitanicus Frade* (Frade Viegas da Costa) for causing the degradation in the water quality. Presently less than 10% of Lisbon’s water supply stems from Alviela.

The Alviela River is one of the major tributaries of the River Tagus, which interestingly enough is also fed, albeit some 800km further upstream, by Fuentenavina (another interesting cave in Spain that has caught the interest of the Alviela Team).

The area is rich in some unique and interesting geological features. The *Ribeira de Amiais* stream ends its run where the Alviela river starts, but leaves behind some neat features. It forms a huge and impressive sink hole and the stream runs underground for 200m, before entering a beautifully carved canyon just before meeting Alviela at the spring. At the start of the canyon is located *Poço Escuro* (Dark Well), the second (known) entrance to the Alviela system. This entrance has been dammed off to avoid the polluted water from *Ribeira de Amiais* to enter the cave.

Recently (2007) the local municipality (*Alcanena*) and the Science Ministry inaugurated the Carsoscopio, that features 3d movies of the weather patterns in the area, and a virtual tour of the last 500 million years of evolution in the area.

The first recorded dive in Alviela took place in 1961 by Alvaro Vilar Moreira and his team. They penetrated some 150m inside the cave and reached a maximum depth of 35m. One of the mysteries of Alviela dates back to these early dives, when Alvaro came across a 2m long tree log lying across one of the tunnels some 100m in from the entrance (another big log lies at -42m, 200m from the entrance).

Over the years a number of explorers pushed the system further; J.P. Thiry, J. Michel, J.P. Stefanato, C. Touloumdjian, F. Poggia, P. Jolivet, J. Neves, P. Lage, F. Worsdell, Piotr Gajek. In the summer of 2002 Frank Vasseur (FFESSM) and SPE (Piotr Gajek and Filipe Worsdell) organized a large expedition to Alviela and explored, using OC, and surveyed most of what is currently known of the system. The map produced then is still the most complete map of the system, with a total extension of 1370m and a maximum depth of 125m.

SPE continues to explore Alviela and in later years has supported a number of initiatives, for example Jérôme Meynié and Martin Burgui, using rebreathers, who continue to discover new tunnels and progress deeper and farther into the system, and of course our Alviela Project Team focusing on the detailed survey and video of the system.

As these teams progress, more and more questions are raised for which we don't yet have answers:

- How did the tree logs end up in those tunnels?
- Why does the water temperature increase from 16°C in the shallower sections (up to -50m) to 22°C in the deeper and farther sections?
- Considering that in winter Alviela discharges some 17m³ per second, why does the supposed deep main tunnel have so much floor sediment in the deeper sections; and is clean shallower? Perhaps it is not the main tunnel!?

Those who have travelled around Europe and dived some of its many caves, rank Alviela to be one of the most beautiful and interesting cave systems in Europe.

Logistics & Survey

The team has continued to learn from diving Alviela, and is currently planning another meeting this April. Looking back at the evolution of the team in terms of planning, logistics, dives, results, and enjoyment is staggering. In October 2007, during our first meeting we gathered 10 divers (only 3 of whom were Cave 2 certified), and managed to log 11 dives throughout a weekend, producing a surprisingly accurate stick map of the first 120m of the cave (considering how many were new to surveying).

In April 2009 we are planning on conducting 40 dives, with 16 divers (8 of whom are Cave 2), a crew of 7 full time surface support, some 50 stage bottles, scooters, 20 J's of Helium, 2 onsite compressors, and a bank of 300bar tanks with 32% for top-offs.

The survey of the system has without a doubt been a major motivational force for the team. It is addictive once you start putting together the first stick maps and looking at extending the map and adding wall sketches and other features. Knowing that the data collected from each dive will have a

direct impact on the quality and progress of the map makes each project dive just that little more interesting.

The importance of a consistent approach to the data gathering phase of the survey process meant using standardized procedures and tools to get the job done. Fred Devos (DIR-Mexico) is our mentor here and he has provided the training, tools, procedures and guidance as we progress in this task.

Most of the survey work is in fact done on land, at home long after the dives are over. Here the importance of a strict and consistent data recording process is paramount because one very quickly loses memory of even the most 'obvious' data. What is not written simply does not exist. Long hours are spent around the various cave modeling programs out there to see which would be most suited to our needs.

The Future

The future, as they say, is limitless, and such philosophical reflections can easily be applied to the Alviela project. A site that was once known to the local community as small, deep underwater cave fit only for highly independent, resourceful and experienced divers has become the principle source of experience for a growing community of not just cave divers, but cave explorers.

However, each satisfying achievement simply highlights new desires, and although there is still work to be done on the limited survey objectives of the Alviela Project, we already look beyond and consider questions and objectives that could keep the project going for years to come. The consideration to establish limited objectives that relatively inexperienced cave divers could relate to was not just to include divers from the local community. More importantly, it was done with the intention to develop the project experience of the local community in order to support more challenging initiatives in the future.

The most obvious point is pushing the survey of the cave system to its end, which would require longer and deeper dives. The challenges of such diving require that which most people find themselves most unwilling to acquire, which is loads of experience. Any desire to survey Alviela to its end would depend on a core of divers highly experienced with the cave system.

Producing more professional video footage is also a desire of ours, and anybody with experience in underwater videography could easily relate to what an ambitious undertaking that is. Nevertheless, the slow, gradual acquisition of equipment, skills, and experience needed to produce better video simply remains a question of continuing to do dives.

Alviela is but one system in a network of interconnected caves that have formed on the Estremenho Massif (*MCE – Maciço Calcário Estremenho*). Pena, Almonda, Moinhos Velhos, Contenda are all located in this rich area, and many interconnect each other, with many more to be discovered, surveyed, filmed and explored ...

Travelling to Portugal to dive Alviela has served as a perfect opportunity to nurture a growing network of divers, many of whom develop from being 'buddies' to personal friends. This, far more than anything else, provides endless opportunities of new project initiatives, exciting objectives, and adventurous dive sites as the network of experiences companionship grows and grows.

Summary

During his three-day visit to Portugal in 2006, Ricardo took Sasha to Alviela. Afterwards, while excitedly talking about the dive, Sasha exclaimed that “We need to get a team together and take a better look at this cave!” Unfortunately, there were only two GUE certified cave divers active in Portugal at the time, but Sasha’s solution was to invite more divers from abroad.

Ricardo would later recall how he smiled while thinking to himself “Yeah, sure...” only to be pleasantly surprised when Sasha’s excitement was joined by Mara a week or so later; and then to get lit up in turn when more and more people started agreeing to coming for a visit.

Starting a project may not be easy, but it is actually that simple: There are numerous sites with something interesting to explore, such as a cave, a wreck, or simply a site with an interesting historical, geological or biological feature. Get together with some friends, or use other networking resources to find others who might share your curiosity, and start simple.

In Alviela it was the three of us - Ricardo, Sasha and Mara – who discovered we shared curiosity for cave systems in the Iberian Peninsula. We nurtured that curiosity by comparing our interests and agreeing upon some reasonable objectives, and then we went to work simply making it happen. Keeping the objectives very simple allowed us to learn as we went along, which enabled us to invite some less experienced, but equally passionate cave divers.

The simple objectives also focused our attentions onto relevant knowledge and skills, and the pursuit of that knowledge and skills only served to expand our network, generating momentum. Considering our experiences in Alviela so far, it has proven that the need to get started far outweighs the importance of special achievements – and in time we hope that it will also prove that extraordinary achievements are simply a result of steady, continuous effort and involvement over time.

More info:

- SPE, Sociedade Portuguesa de Espeleologia (www.spe.pt)
- Alviela Project Team Page, <http://www.alviela.com/>