Andy Seddon
22 December 2008

Regional Expedition Diving Scheme

Location – Korcula, Croatia

30th Sept to 5th October 2009

Introduction

After the initial survey of the Roman wreck in May of 2007 on the first West Midlands REDS the team has decided to do a more detailed survey photographic survey and investigate a new site.

The initial survey has been able to determine the orientation of the wreck and the layout of the site and some basic topology. The team were also able to gather some initial photographic information about the clumps of pottery around the site. This information has allowed an archaeologist to date the pottery to around the 2nd/3rd century originating in Iberia (Spain). Results of the initial survey can be viewed in appendix A.

This year the aim is to provide a detailed view of the wreck site using digital photography and photo mosaic/stitching techniques. This will be supplemented by taking more accurate measurements of depth across the whole site to get a better topological view.

Chris Griffiths, an Archaeologist who has worked at Dupin, has also provided some additional information and a new element to this project. The recommendations made by Chris are as follows;

1. Photo mosaic of the site and possible compare this data with that from the previous Croatian survey
2. Locate and document the iconographic representation of the galley on the rock face
3. Consider the question of the wrecking process

Leading on from this Chris has highlighted another site that is relatively nearby that could also be surveyed. In this particular site there are several amphorae clusters that have been fused together. The site itself is close to the confirmed remains of a Roman villa as well.

Part of the team plan to travel by road allowing additional dive equipment to be taken to the location this includes, twinsets, oxygen and rebreathers. By doing this the expedition will be able to extend bottom times so tasks can be completed and increase safety margins by using nitrox.

The team has also decided to adopt the wreck under the Nautical Archaeological Society scheme ‘Diving with a Purpose’. The NAS has also given advice on the next steps of the survey.

The expedition will be using Steve Collets’ Dupin Dive Centre, a BS-AC premier school, and its facilities on Korcula. Steve has extensive knowledge of the area and the Roman Trading vessel wreck site.

1 Travel and Logistics

Out of all the things in the expedition this will probably be the most challenging, to get all team members to Korcula from the Midlands!

Team members who live in the same area might want to travel to the airport together to save on costs for fuel and parking and it's a chance to get to know each other as well!

1.1 Travel Dates

- Arrive September 30th 2009
- Depart on October 5th 2009

1.2 Staying on Longer

For those who are interested, team members can stay on a do some general diving with Steve

1.3 The Island of Korcula

The following are links giving some history and information about the island and its inhabitants what to expect and regional food. This also covers general information on Croatian currency, exchange rates and travel information.

http://www.korcula-croatia.com/

http://www.korculainfo.com/

1.4 Air Travel

1.4.1 Destination Airport

All planning has been based around flying into Dubrovnik Airport, which is serviced by British Airways and Croatian Airlines. Also check the budget carriers such as Easyjet etc who operate summer only timetables.

1.4.2 Departure Airport

Depending on the airline you chose will determine where you fly from. Once you have your flight booked, please forward your flight information to Andrew.seddon@bsac.com. I can then circulate this so cars etc can be shared to/from the airport.

1.4.3 Air Carrier Information

BY AIR FROM THE UK

www.flybe.com
Flybe: flights from Birmingham to Split (Every Saturday)

flights from Birmingham to Dubrovnik

every Sundays and Tuesdays

www.easyjet.com
Easyjet: flights from London Gatwick to Split.

www.ba.com **Tel. 0870 850 9 850**
Flights from London Gatwick to Split

every day except Mondays

Flights from London Gatwick to Dubrovnik. Flies daily.

www.wizzair.com
Wizzair: flights from London Luton to Split

Mondays, Wednesdays, Fridays, Saturdays.

www.holidayoptions.co.uk **Tel. 0870 0130 450**
Flights from Gatwick, Bristol ,Birmingham, Manchester to Split every Saturdays

Flights from London Gatwick/Manchester/Norwich to Dubrovnik every Sundays

www.cosmos.co.uk **Tel.0800 083 3186**
Gatwick/Manchester/Birmingham to Dubrovnik every Sundays .

CROATIA AIRLINES www.croatiaairlines.hr **Tel. 0208 563 0022**
Croatia Airlines: Flights from Heathrow to Split (Saturdays)
London Gatwick to Split Mondays, Tuesdays, Thursdays and Fridays

Flights from London Gatwick to Dubrovnik every day except Wednesdays and Saturdays.

www.thomsonfly.com **Tel. 0870 550 2555**
Flights from London Gatwick to Dubrovnik (Sundays).
Flights from Manchester to Dubrovnik Sundays, Mondays and Wednesdays

1.4.4 Transfer to Korcula

Dupin Dive Centre is handling this element. Either Steve Collett or a Korcula Taxi firm will be there to collect team members from the airport. There is also a ferry journey from the Pejalic peninsular to the island. Once on the main island there will then be a transfer to Dupin Dive centre.

1.4.5 Baggage

Check with the airline you are travelling with on baggage allowances, number of pieces of baggage and what can be taken onto the plane as hand baggage. If you are using budget carriers they may levy an additional charge so please check. Some airlines will allow higher limits for sports equipment to be taken, provided they are given sufficient notice. Ask at the time of booking if they allow extra for divers.

Team members should take into account the current security restrictions in place about taking liquids onto flights. Check the web pages of your carrier about current restrictions.

Seal your bags using tie wraps to provide some security, don't forget to carry extra's in your hand baggage in case you need to open and reseal a bag.

1.5 Driving to Korcula

Based on the Via Michelin web site from Derby to Korcula it's approximately 2293 km via Southern Germany, Austria and Slovenia into Croatia. 2000 km are on motorways which are approximately 19 hours of the driving.

Time approximately 24 hours based on 120 km/h travel speeds.

Team members will depart from the Midlands on the 28th of September overnight near Austria arriving on the 30th. Once diving is complete they will leave on the 5th of October, overnight in Southern Germany and arrive in the Midlands on the 7th of October.

All driving will be done in shifts of 4 hours minimising accident risk

1.6 Passports

Team members should have a valid passport with at least 6 months before it expires. Those with non EU passport should check with the Croatian Embassy in London about visas and procedures for entering the country, the address is;

Embassy of Croatia
21 Conway Street, London, W1P 5HL.
Tel: 020 7387 2022 - **Visa:** 020 7387 1144
Fax: 020 7387 0310

On the internet http://croatia.embassyhomepage.com/

1.7 Travel and Medical Insurance

Having a good policy for delays, kit not turning up etc will allow you to at least get some money back. Even if it does impact on your expedition Croatia has reciprocal agreements with EU member states for getting medical treatment. This may not be practical while engaged in diving

activities especially if someone has to be medi-vac'ed to a recompression chamber, therefore a good diving policy is required. Some policies also restrict the depth that divers can go to typically 30 metres, check this prior to buying the policy.

The best providers are typically diving specific such as Dive Master Insurance and DAN but there are others.

1.8 Equipment Inventory

As part of the packing process take serial numbers of regulators (1st and 2nd stages) dive computers, underwater housings, cameras etc. Produce a list of all the dive kit you have packed and duplicate it put a copy in with your kit (laminated would be best) and take another copy in your hand baggage and leave a 3rd copy at home. It also means that if equipment is lost or goes missing information is easily available for claims.

Mark equipment with your initials or name to avoid confusion at the dive centre, on the boat etc. It will also eliminate the mix up of 5 sets of Plana Avanti large blue fins! Dymo tape or similar products are waterproof and usually stay on if applied to a clean, dry surface. Marker pen will suffice for 'soft' kit but tends to rub off hard items.

1.9 Local Health

When visiting countries overseas changes in the water, diet and weather can affect individuals so a few simple precautions can ensure that team members have an enjoyable stay. Things to consider are;

- **Water** – local water is safe but sticking to bottled water might be best.
- **Sun** – bring high factor sun bloc as well as a hat and tee shirt for the boat.
- **Dehydration** – the climate and repetitive diving will mean that team members should drink plenty of bottled water to remain hydrated.
- **Food** – team members just need to keep an eye on what they are eating salads for example will have been washed

2 Domestic Information

Having somewhere comfortable to relax, sleep and having a good meal are key to a successful expedition. Most of our time will be spent around the Dupin Dive Centre, the Bon Repos Hotel area and Steve Colletts' accommodation. In the evening, however, the team will try out the local sights and sounds of Korcula.

The cost of food and drink isn't included in the price of the accommodation and diving package with Dupin Dive Centre so please factor this into your finances.

2.1 Meals

Steve will brief the team on places to eat once we get there but the next three sub sections will give you an overview of what we'll be doing for meal times.

There are tea and coffee making facilities in at the accommodation and a cold location to store beer and wine – very important.

2.1.1 Breakfast

There is a local café and bar 10 minutes on the way to the dive centre opposite the supermarket where lunch can be bought

2.1.2 Lunch

The plan is to provide food at the dive centre. Team members should be prepared to 'grab and go' based on the dive schedule created. Team members will be asked to go to the local supermarket to get supplies for lunchtimes on the way to the dive centre in the mornings.

2.1.3 Evening Meal

We will liaise with Steve and Jan Collett to find some good places to eat and drink locally.

2.2 Accommodation

For those with the standard package we will be staying at Steve Collett's accommodation, next to his house. Its about 15 minutes walk from the dive centre.

The Hotel is right next to the dive centre for those who want to take this option. Please let the expedition leader know if you want a hotel room so this can be booked. Please be aware that the cost of the hotel isn't included in the expedition cost and will have to be paid locally directly to the hotel.

There is also a campsite next to the dive centre http://www.korcula-croatia.com/camp-kalac.htm with costs of approximately 5 euro's a night for a tent.

2.3 Costs

Diving, Accommodation and transfer to/from Korcula approx £215.00

Breakfast cost is about £2.00 per day which is coffee, fruit juice, rolls and cold meats or jam.

Lunch is about £2.50 per day which is local breads, cheese, meats and fruit.

Allow £7 to £10 per night for food and beer.

Allow £5.00 for the beer kitty as well where the team has bought two cases of beer from the local supermarket for evening debrief sessions prior to going into Korcula.

Each team member is responsible for booking a flight to/from Dubrovnic and is not included in the costing, unless travelling by road.

3 Dive Information

Even though the plan is to intensively dive one site, there may be opportunities to dive other sites around the island, especially for those staying on. The following gives brief information on those sites there may also be the chance to do some exploratory diving to sites that Dupin Dive Centre have identified but not dived.

Included in this section is some basic info on sea temperature, visibility and tidal influences

Since part of the expedition is to allow divers to plan the diving schedule for the day no timings, tides, task or navigation information will be included in this section.

3.1 Tides and Visibility

3.1.1 Sea Temperature

The Adriatic Sea has a very marked annual change of the surface temperature. The average annual temperature is 11°C. During the winter, the sea is the coldest and the surface temperature is about 7°C; very seldom, it can drop below that too. In the spring, the sea becomes warmer, and the surface temperature rises to 18°C. In the summer the surface of the sea reaches a very high temperature, of up to 22 to 25°C, and in the southern Adriatic and Istria up to 27°C..

3.1.2 Visibility

In Northern Adriatic visibility is not as clear as in mid or south Adriatic because of influence of the river Po and flowering of the sea. In Mid and South Adriatic visibilities is excellent sometimes more than 50 meters.

3.1.3 Tides

In the Adriatic, the high and low tides have relatively small amplitudes. In the southern part, the difference is rarely above some forty centimetres, while in the northern part it is somewhat bigger, so that it comes to 1 meter in Istria and the Gulf of Trieste. In some narrow channels and bays, the high tide can grow considerably during a strong sirocco. That phenomenon is characteristic for big and deep bays of the southern Adriatic. The tides are of a mixed type, which means that their rhythm is semidiurnal during the new and full moon and of a daily type during the first and the last quarter. Their amplitudes are very irregular.

3.2 Roman Wreck

Site of a 2000 year old galleon sunk in the Peljesac canal just off Sv. Ivan in 30 m. See Appendix – 2007 Results for detailed information. The map below shows the location of the wreck.

3.3 Wreck of the 'Boca'

It sunk after running aground on Peljesac in the Bay of Zaliv Trstenica in 1984. It now lies in shallow water with the bows in 5 m and under the stern at 12 m. The wreck although it has been salvaged, there is still plenty to see with the two propellers, main and spare, with large sections

intact, penetration into the engine room is possible. The wreck has an abundance and variety of marine life colonising this artificial reef.

3.4 Wreck of the 'Garda'

An old steamship sunk on the south side of the island. She lies in 22 m on a sandy seabed making this a very light dive. The wreck is now very flat, but hiding a good variety of marine life under the plates and is well worth a rummage.

3.5 Islands of Sestrica

The island has rocky reefs from 6 m down to 18 m. There are plenty of crevices and holes with an abundance of life. This site also makes for a good night dive.

3.6 Point Raznjic

At the eastern tip of the island. A ledge starting at 6 m to 8 m and onto a wall down to a maximum of 30 m. This site also has a short canyon and a 13th Century anchor approx. 2.5 m long. On the wall between 12 m and 22 m is a curtain of Red Gorgonian (Fan Coral).

4 Project

In 2007 the survey team managed to produce a basic plan of the wreck site shown in figure 1.

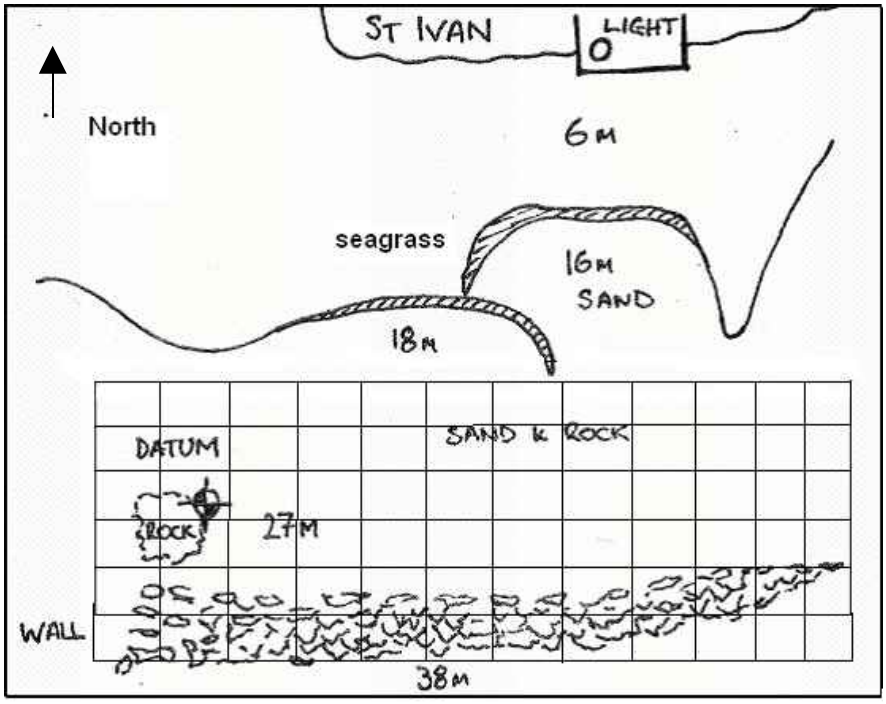

Figure 1

The plan is to create a more detailed picture of the site using digital photo mosaic techniques from available software.

The plan is to set up a grid, overlaid in figure 1, onto the primary wreck debris field (which is approximately 30m by 50m). The grid will be oriented to the datum point so that photos can be accurately positioned.

A photo of each square will be taken then loaded into the software building up an overall view of the wreck debris field as we go along. At each grid intersection a depth measurement will be taken. This can be used to provide a topological view of the site.

The expedition has also been provided information on a secondary underwater site which needs to be surveyed.

4.1 Project Tasks

The team will have approximately 4 days on the site with a planned three dives per day. This is a demanding work schedule and the team will dive together in the UK to dry and wet run some key elements of this.

4.1.1 Primary Site

Tasks

- Re measure datum point
- Put in guide system to get divers to wreck site quickly
- Lay baselines for measurement left for duration of project
- Get GPS marks at end of baseline to orient the site
- Put down day to day lines to make up grid sectors
- Photo grid sections
- Measure depth on grid intersections
- Move day to day lines as needed
- Input information into project database
- Write up daily logs and findings
- Recover baselines
- Recover guide systems
- Search and Locate and document the iconographic representation of the galley on the rock face

4.1.2 Secondary Site

From the input of Chris Griffiths and additional site has been identified with clustered amphorae near a known roman villa.

- Lay baselines for measurement left for duration of project
- Get GPS marks at end of baseline to orient the site
- Carry out basic offset survey of site
- Photo document key elements of site
- Input information into project database
- Write up daily logs and findings
- Recover baselines

5 Diving Operations

The expedition has been designed with a special purpose to be accomplished. It is also intended to allow the team members, at all levels, to have fun, enjoyable and safe diving while following the BS-AC Safe Diving Practice (BS-AC SDP) publication. The various tasks will be divided up to ensure that everything is covered and the team functions smoothly.

5.1 Diving Roles

5.1.1 Dive Manager

Each day the expedition leader will allocate a Dive Manager (DM) and possibly Assistant Dive Managers (ADM) based around the dive plan

and tasks for the day. The DM responsibility is the overall execution of the plan and delegation of tasks as needed.

5.1.2 Assistant Dive Managers

The DM will allocate Assistant Dive Managers (ADM) as needed and delegate tasks to them. There will be a number of ADM's throughout the diving day; each ADM will be responsible for briefing the nextADM relieving them on the schedule.

5.1.3 Record Manager

The role of record management will be delegated to an ADM. This individual will record dive information before, during and after the scheduled dives.

5.1.4 Project Manager

Since the Expedition team will be carrying out a survey task information about the task will need to be collated and recorded from each dive. It is the Project Managers (PM) role to do this.

5.1.5 Incident and First Aid Manager

This will be the responsibility of the DM or ADM on site at the time of the incident to co-ordinate tasks and delegate tasks to team members as appropriate.

5.1.6 Project Diver

All team members are project divers; they will have a diving task allocated at the start of the day by the DM as part of the overall project task list. Project divers will need to feed back information to the PM and ADM/DM and RM as needed.

5.1.7 Gas/Air Manager

This individual will need to co-ordinate with Dupin Dive Centre staff that all cylinders are filled prior to the next day diving. With the correct gasses for the target dives

5.2 Diving Protocols

5.2.1 Dive Planning

All divers will need to produce a dive plan prior to going into the water based on the depth and time allowed and hand to the ADM who is acting as Record Manager. This will then provide the manifest and buddy list for the Skipper and DM/ADM.

5.2.2 Decompression Tables

The tables being used are the BS-AC 88 tables

5.2.3 Dive Computers

Divers using dive computers will need to be able to use them in a planning mode so that the depth and time information can be put into the planning pro forma.

5.2.4 Backup Decompression Plan

Divers using dive computers will need to plan using tables as well to provide a backup should a dive computer fail written on a diving slate.

5.2.5 Time and Depth Information

All divers must have a primary and secondary means of tracking depth and time. This would typically be;

- Primary - Dive Computer
- Secondary – Depth Gauge and Watch

5.2.6 Breathing Gas Consumption

All divers will need to ensure they have sufficient Breathing Gas (BG) to complete the dive with a suitable reserve based on BS-AC SDP (one third reserve). Divers will need to find the correct information and place this into the planning pro forma.

5.2.7 Alternate Source of Breathing Gas

As per BS-AC SDP all divers must have an Alternate Source, typically an ‘octopus regulator’ to provide to the dive buddy should they require breathing gas.

In addition to this two additional cylinders with regulators will be placed underwater on the dive site where the team will be working. One will be at approx 27 metres on a shot line. The second will be on the decompression trapeze. Each one of the cylinders will be turned on at depth and divers needing to use them simple take the regulator. If for, any reason, they are used inform the DM/ADM so it can be replaced with a full cylinder.

5.2.8 Decompression Station

The target depths around the dive site will be approx 30 metres, these depths combined with the repetitive diving schedule will mean that staged decompression is inevitable. To make life easier underwater and provide a stable visual reference a decompression trapeze will be deployed. This will comprise of the following;

- 2 off scaffold (if possible) poles 2 metres long
- 2 off buoys of 25 litre buoyancy
- 2 off 10 kg weights with loops
- 2 off lines with karabiners at either end length 6 metres
- 2 off lines with karabiners at either end length 3 metres
- 1 off line with karabiners at either end length 2 metres

5.2.9 On Station Decompression

Divers will return up the ascent line where the travel line is clipped on they will then follow this over to the 9 metre level of the trapeze and complete any stops needed at this depth. If none are needed or 9 metre stop are complete then they will ascend to 6 metres and complete stops, a final ascent to the surface taking one minute.

5.2.10 Off Station Decompression

There may be occasions where divers will not be able to decompress on the station. Each diver will have a reel and DSMB to deploy allowing the DM/ADM to see where the divers are. Divers should complete all required stops on the DSMB at the specified depths.

5.2.11 Ascent and Decent Information

BS-AC 88 table rates will be used as maximum limits;

- Descent rate of 30 metres per minute maximum
- Ascent rate of 15 metres per minute to 6 metres
- Ascent rate of 6 metres per minute from 6 metres to the surface

Team members using dive computers will *need to* follow the rates dictated by the individual computer.

5.2.12 Safety Stops

All divers will complete 3 minutes at 6 metres

5.3 Boat Protocols

Dupin Dive Centre will skipper and manage the boat and provide site location, however the team will need to work alongside the dive centre *staff* to ensure that the team utilise boat time efficiently.

Boat Loading

It is the skipper's responsibility to decide where the divers and kit will be located to ensure optimum trim of the boat for the journey to/from the site.

An ADM will provide a manifest to the skipper for each trip out to the dive site. The ADM will count the number of divers and carry out a role call to ensure the correct team is onboard

Each diver is responsible for ensuring that their equipment is ready and configured to be placed on the boat as per the skipper's instructions.

Diving From the Boat

The onboard ADM will ensure the divers will enter the water as per the schedule when allowed by the skipper.

Divers will carry out a buddy check prior to entry into the water, air and time of entry will be noted by the ADM onboard.

Once the dive is complete, divers will be recovered into the boat along with equipment this will then be stowed ready for the return journey.

Prior setting off from the dive site the ADM will count the number of divers and carry out a role call to ensure the correct team is back onboard.

The ADM will record details on the dive sheet and divers will forward information to the PM. *Records Manager?*

Boat Diving Order Considerations

Since the project will involve surveying with photographic and video information the team must consider the order in which the divers doing those tasks must go in. To ensure that these divers get the best visibility for taking images *photographers* should enter the water first.

Boat Unloading

Once the dive is complete each diver is responsible for ensuring that their equipment is removed and empty cylinders identified to the GM for filling. New cylinders should be collected ready for the next dive.

Deploying and Recovering Lines and Shots

As part of the project shot lines and the decompression trapeze will need to be deployed and recovered from the boat. The ADM and skipper will coordinate with team members on the boat however a brief and dry run will be carried out onshore.

6 Diving Incidents

The location of Korcula in Croatia has certain challenges around the diving infrastructure we would not experience in places like the UK or centres of tourist diving like Sharm El Shiek. However by taking some simple precautions and adopting a conservative attitude, risk can be minimised to the dive team.

6.1 Oxygen

There is an oxygen set on board the dive boat and at the dive centre, all divers will be briefed on its use.

6.2 First Aid Kit

There is a first aid kit on board the dive boat and at the dive centre all divers will be briefed on location and use.

6.3 Local Dangers

Dupin Dive Centre will brief the team regarding local laws, poisonous fish, local protocols etc.

6.4 Recompression Facilities

Any issues around DCS contact the staff at the facility on the following numbers

Split:

++385 (0)21 562- 035
++385 (0)21 562- 688
++385 (0)21 354- 511
++385 (0) 21 361 355

Pula:

++385 (0)52 217- 877, mob: 098/255 945, 098/219 225

6.5 Emergency Contact Information

The following numbers should be used in an emergency

Medical emergency: 94

Police: 92

Centre for stress and rescue: 9155,

VHF channels 16,10 and 74

7 Post Expedition Tasks

After the diving and information has been collected the expedition still has work to do.

7.1 Expenses

All divers are to submit expenses to the expedition with receipts so that actual expenditure can be compared to the budget. This will also allow individuals to be reimbursed for fuel, gas etc.

7.2 Report

On returning to the UK the Project Manager will delegate sections of the report to team members to complete. This will be the forwarded to the NAS and to Croatian Archaeologists via Chris Griffiths. The report will also be used as a basis for an article in the International Journal of Underwater Archaeology

7.3 Photo Mosaic

From the photos taken the team will use a commercially available program to stitch the photos together. From this we will be able to show the full extent of the site and tasks for the next expedition.

7.4 Presentations

We will be looking to present at DOC 2009 and NAS Conference in 2009

Acknowledgements

Many thanks to Gary and Penny Stroud who went through this document covering off all niggles, so it made sense from a diving and readability point of view.

Thanks to Steve and Jan Collet of Dupin Dive Centre for information and putting up will all those phone calls and questions that must have seemed blatantly obvious at the time.

Chris Griffiths who with a single email expanded this project but confirmed my own thought on what we are doing.

A.

B. Appendix – Budget

- The initial survey carried out in 2007 was self funding the aim is to do that again.
- Prices from the dive centre have been quoted in sterling and paid in the UK to insulate the budget from currency fluctuations in the current market conditions.
- Overland transport costs from Via Michelin web site in Euros, these costs have been converted at 1 Euro to the pound.
- Flight costs are not included in the budget but estimated at £160 per person for a return flight
- Food cost are not included in the budget but the expedition plan provides estimated costs for meals

Accommodation, diving per person £220 – Total of £1760

Transport – overland only

- Diesel for 5000 km - £450.00
- Tolls - £80.00
- Austrian and Slovakian road fund - £50.00
- Ferry - £250.00
- 2 Overnight stops in hotel - £400.00
- Additional insurance for vehicle - £80.00

Transport total - £1310
Assuming 5 people share this journey cost per person - £330

Gas costs total (above air) - £80.00
All divers will be using nitrox cost per person - £10.00

Estimated individual cost per person (flying) - £230.00
Estimated individual cost per person (overland) - £492.00