17 DESERT EXPEDITIONS

Tom Sheppard

ETHOS AND OPERATING ENVIRONMENT

Reliability

Expeditions should be about total reliability, about planning the risks and problems out of the project at the planning and training stage. Nowhere is that more important than in the desert where the consequences of getting it wrong are unlikely to be cushioned by living off the land or getting assistance from local people. Detailed planning

Figure 17.1 *The beauty of the desert is often overwhelming. But the desolation emphasises the imperative need for reliability (© Tom Sheppard)*

Figure 17.2
(Top) Sharp rocks will damage tyres. Use full road tyre pressures and gentle driving. (Centre) Tracks offer a mixture of surfaces; with speed limited to 40 mph, a medium tyre pressure can help. (Bottom) Soft sand (very fine here too) needs a gentle right foot, use of diff locks (not in evidence here!) and lowest tyre pressures combined with severely limited speed (© Tom Sheppard)

Figure 17.3 *Transverse corrugations are among the most malevolent types of terrain to which it is possible to subject a vehicle. "Track" tyre pressures (see below) are best allied to a "harmonic" speed which transmits less vibration to the vehicle body (© Tom Sheppard)*

of day-to-day operations (not to be confused with inflexibility), total self-sufficiency and thorough contingency planning are essential.

The desert environment

Those already embarked on planning a desert expedition will not need reminding, but for those still uncommitted it is worth remembering the astonishing variety of terrain, topography and climate that deserts encompass. Gravel plains, sand dunes, sand sheets, low rounded hills, harsh rocky landscapes, mountains, stony plains, boulder-strewn outwash fans as well as endless nondescript vistas of tough grass tussocks all offer different obstacles and challenges to travel by vehicle.

Problems for vehicles

Surface roughness, surface unevenness and surface strength will be the main problems for vehicles. Stones and rocks, often with sharp edges or large rounded shapes, will demand careful, sympathetic driving and tyres inflated to the maximum. The unevenness of tracks – undulations or sudden potholes or, worst of all, the widely encountered transverse corrugations – will call for sensitive control of speed and usually an "on–off tracks" tyre pressure tied to a moderate upper speed limit. Typically this might be 1.8 bar and 40 mph for a light 4 × 4 such as a Defender 90.

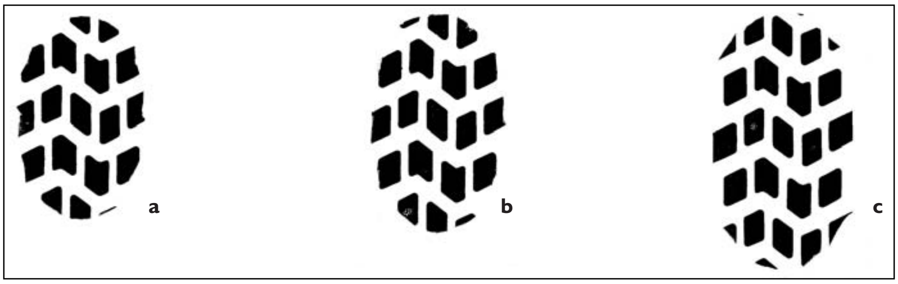

Figure 17.4 *Typical tyre footprints at (a) road, (b) track (40 mph maximum) and (c) emergency soft (15 mph maximum) pressures.*

Corrugations will demand a "harmonic speed" (probably 25–35 mph) which reduces the apparent effect of these features, but they will still be giving the suspension a pounding and at the same time make braking and steering far less effective than on normal tracks.

Reduced surface strength presents as soft sand on dunes, in wadis, on cut-up tracks, or unpredictable patches on sand plains. Here tyre pressures may well have to be reduced to 1.5 bar or even less to enlarge the tyre footprint and benefit flotation,

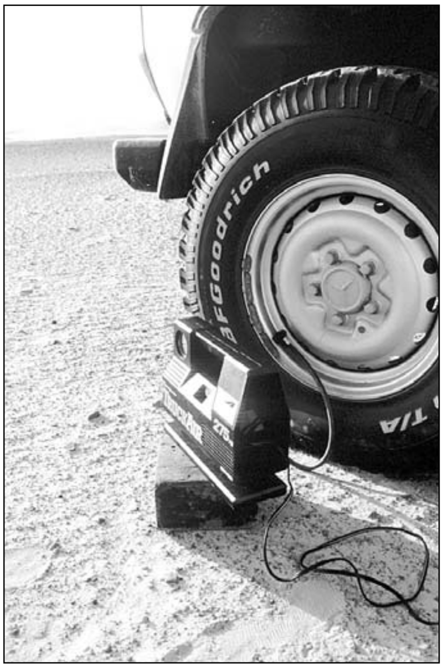

Figure 17.5
Reinflation of tyres deflated for sand is essential if hard, rocky conditions are encountered or higher speeds used. The TruckAir is a fan-cooled, high-capacity electric pump (© Tom Sheppard)

Figure 17.6 *Bogging in soft sand – and de-bogging – soon becomes a standard procedure. Reverse if you can, deflate the tyres to emergency soft, dig sand away from wheels, place sand mats behind rear wheels, reverse back on to firm ground, recce on foot the best way out (© Tom Sheppard)*

but must be accompanied by speed reduction to 15–20 mph – less if extreme deflation down to 1 bar is used. Reinflation must follow as soon as possible after the bad patches are covered. Failure to do so will cause tyre overheating with delamination, and will destroy covers; remember that this could be all four at once. Check the on-road tracks (40 mph maximum) and emergency soft (15 mph maximum) pressures for the tyres on your vehicle. Contact the tyre manufacturer when your dealer gives you a blank stare.

Problems for people

Despite high temperatures, dry desert climates are subjectively easier on the human body than tropical ones; details follow below. Effective acclimatisation takes about five days. So take things gently at first to give your sweat glands (and therefore cooling mechanisms) a chance to get up to speed. Sunburn can strike hard and quickly from the moment of your arrival – and all the time thereafter – so be meticulous with the use of protective creams and long-sleeved shirts and long trousers. It is even worth taking cotton-backed gardening gloves to protect hands and wrists. See below for more on clothing, water intake, etc.

CLIMATE

Temperatures

Desert temperature extremes of -5 to +50°C are bandied about by dramatists but these tend to be one-offs plucked from the relatively high-altitude Hoggar Mountains in winter to low-lying In Salah in summer. Far more precise, the Michelin planning maps also provide details of monthly daily maxima, overnight minima, and rainfall figures for a host of different African and Middle Eastern locations including desert areas.

Radiation and humidity

Less widely noted is radiation under clear-air conditions. This can be very strong (incoming, solar) during the day and strong (outgoing, from sleeping humans) at night. Typical diurnal shade temperature variation is of the order of 20°C but can feel more when standing in the sun or sleeping with no reflector over you – be it upper cloud, dust or a "space blanket" (see "Camping gear" below). Humidities, however, are very low, permitting most efficient evaporative cooling to be derived from

Figure 17.7 *Strong solar radiation from clear sky plus physical work digging out vehicles can bring on sunburn and dehydration very quickly. Be on your guard. Drink little and often and enough for your urine to be a normal colour. Allow time to acclimatise (© Tom Sheppard)*

sweating, so high temperatures will not feel as enervating as they would in rain forests. Similarly, exiting a sleeping bag on a still, ultra-dry morning will feel almost bracing compared with the penetrating damp cold of even a UK autumn.

Wind

Probably as trying as any temperature extreme are the diurnally variable moderate-to-strong winds in desert areas, often springing up for 2 or 3 hours before sunset to irritate anyone trying to cook, do end-of-day paperwork and map checking – or even trying to lay out a sleeping mat. Less frequently these winds can, over about 22 knots, raise sand and dust to above head height and prove the wisdom of comprehensive polythene bagging of such equipment as cameras. Sometimes these winds will rage overnight, leaving sleeping bags awash with fine sand. They will deposit fine sand into everything. Passing local sand storms can also call for rapid battening down of equipment left outside. All these winds may leave, to a greater or lesser extent, dust hanging in the atmosphere for days at a time, reducing nocturnal radiation cooling and dulling photographic light during the day.

Rain

Rain is rare, though less so in recent years – possibly due to climate change. It damps down the dust, firms up soft sand, cleans dust off rocks and foliage, and results in a riot of small plants erupting within a few days. But rain run-off can also cause flash floods of devastating force in wadis. Many are the tales of a wall of water coming down a wadi to sweep camping gear and even vehicles and people before it. Be aware of the potential when choosing a camping site.

MAP RESEARCH

Advance knowledge of the area that you plan to visit will pay handsome dividends when you reach it. Anywhere in Africa and as far east as Muscat, it would be fair to regard the Michelin 1:4 m maps – Sheets 741, 745 and 746 (with enlarged areas 743/744) – as the definitive planning maps. Road types and surfaces, rest-houses and hotels in remote regions and the all-important fuel availability are regularly updated with 2-yearly new editions. For transit purposes these maps will probably suffice, although the traveller will be missing a lot of interesting detail available on larger-scale maps.

The type, scale and standard of maps available to scales larger than the Michelin 1:4 m vary considerably from country to country and a starting point for subsequent research in the UK will be Stanfords in London's Long Acre, where in-country published road maps will be available plus some topographical maps. It is worth being discerning at this stage. Familiarity may have led you to accept the outstanding cartography of the British Ordnance Survey and the French Institute Geographique National (IGN) as the norm, but nationally published road maps for many overseas

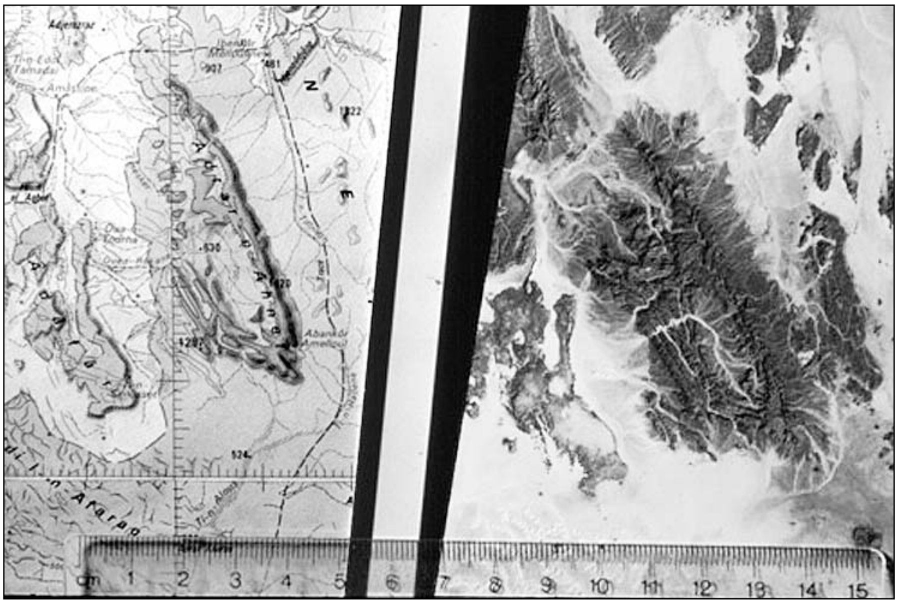

Figure 17.8 *Even the cheapest, no-geo-referenced satellite shots can hugely improve on coverage of even good maps – here a 1:500 k IGN sheet. Fortuitous in deserts is the dark depiction of rock and mountains, helping them stand out as terrain indicators against the light-coloured sand or gravel (© Tom Sheppard)*

countries look like cartoons in comparison, not helped by often depicting planned routes or projects as *faits accompli* superhighways. Nor are many overseas maps updated regularly. Even in the thrusting, go-ahead Gulf, *de facto* city and local roads are way ahead of the maps.

The cost and facilities required for major national surveys derive mostly from military, ex-colonial or geopolitical alliance sources. Thus the British mapping in Oman is superb, the 1960s French IGN 1:200 k, 1:500 k and 1:1 m maps of Algeria are excellent and the Russian maps of Libya are very good – albeit of varying accuracy, and saddled with a unique grid and only Cyrillic notations. Many of the American TPC and ONC maps are hopelessly vague and inaccurate, but are improving as they are updated. Few of these maps are stocked by map shops but may be available to special order with a long wait and high costs. Därr in Munich, like Stanfords, has a good selection and comprehensive catalogue.

Enormous accuracy and detail for enormous money sums up the satellite image market but by careful selection of older images at low resolutions (say, 30 metre pixels), often in black and white, your needs can be tailored to your budget. Draw the distinction, however, between geo-referenced images and straight prints. The former will have had latitude and longitude and/or UTM (Universal Transverse Mercator) grid superimposed on the image – but this is high-priced work done "by hand" and is only as accurate as the best available terrestrial maps, which will have been used as a reference. Costs and availability are improving all the time.

Remember, too, that global positioning systems (GPS) give you a position on a grid – not a position on the ground. Its accuracy as a fixing aid is only as good as the map on which it is used and the accuracy of the grid on that map. Check the grid-on-map accuracy in the field on a prominent and unmistakable landmark.

When measuring distances across country on a map, be sure to apply a "terrain factor". Thus on a gravel plain actual distance covered by the vehicle will probably be up to 1.1 to 1.15 times the distance measured on the map; in bush it may be 1.3 and weaving through varied low hills 1.4–1.5. Getting from A to B over dunes you could travel anything up to 2.0 times the map indication.

EQUIPMENT

Weight and bulk

An overriding consideration to bear in mind when planning equipment is weight. You will read elsewhere in this book never to exceed a vehicle's permitted gross weight. Desert expeditions are extremely demanding logistically. As a result of the distances involved and the lack of replenishment points, fuel and water will usually comprise well over half the vehicle payload. As a result of this and calculations of the logistical "cost" of each person in terms of water and supplies, you may well already have had to limit crew to two people per vehicle (assuming that archetypal "light 4 × 4s" such as a Defender 110 or Toyota are being used). Weight must therefore be the prime consideration for any equipment assigned to a particular vehicle. Do not fall into the trap of putting equipment aboard until you run out of space. Varying load densities and general averages almost invariably mean that a maximum load limit is reached before the load "bulks out".

Packing and lashing

All equipment must be secured to the vehicle and lashed down on to old carpet or rubber mats. Track conditions will be such that severe vibration and shaking will be the norm so think "strap-down" at all times. Packing should be based on the assumption of sand blowing constantly through the vehicle – not an unusual situation. Lidded containers and polythene bags should be the norm. Have the high-density cargo (such as the fuel and water jerry cans) up front against the bulkhead behind the driver and passenger so that the overall load is spread as evenly as possible between the vehicle axles, and not concentrated over the rear axle alone.

Figure 17.9 *Looking aft from driver's seat, cargo lashed for a desert trip. Fuel and water cans are at the front against the bulkhead; lightweight plastic food storage boxes are lidded and lashed. Note fire extinguisher mounted near back door where cooking takes place (© Tom Sheppard)*

Camping gear

To save weight, don't take a tent; a further bonus is the breathtaking beauty of the desert sky at night. Do take a low camp bed, lightweight garden lounger or some such device to keep you off the ground away from the attention of scorpions trying to escape the cold. A sleeping mat on top of this will prevent heat loss downwards. A graded combination of light-to-medium sleeping bag, Gore-Tex bivvy bag, cotton inner sheet bag and long-johns (cotton–acrylic long underwear to use as pyjamas) will cover the varying night temperature conditions at most times of the year. In winter an additional fibre-pile inner may be needed. All this can be used in warm conditions by sleeping in the cotton sheet on top of, then inside the bivvy bag as the night gets colder. Unroll and sleep on top of the sleeping bag within the bivvy bag and it is ready to get into if the temperature really drops as it sometimes does around 4 am. Lock the vehicle, sleep with the key, and keep a water bottle, torch and mini-flare handy. Useful for cold conditions when the sky is very clear is an aluminised "space blanket" to drape over the bivvy bag to reflect body heat. A few desert areas may require the use of a mosquito net and, by sleeping alongside the vehicle, a single-point attachment can be made to the rain gutter.

Clothing

Outer layers

Something to keep the wind out, something to keep the rain off and something to keep the dirt off are the basics of outer clothing for desert trips. The first two are pretty obvious, rare as rain may be, and the waterproofs can be the very lightweight stuff from the economy end of the outdoor clothing catalogues – something that will roll up small for a corner of one of your bags. Depending on what you have brought for inner layer clothing, the rainproof can also be the windproof for use in the field.

Overalls – a large, white, loose-fitting boiler suit is ideal – are excellent for keeping your normal clothing clean when working on the vehicle or doing chores around camp such as re-fuelling and moving boxes and cans. Desert trips are naturally not blessed with generous washing and laundry facilities so prevention is the best approach. With even minimal care, the desert also being an inherently very clean environment, the overall itself can usually be kept clean enough to use at the end of the day as an around-the-camp item in which to cool off. Also part of the working gear will be working gloves to prevent abrasion, cuts and greasy dirt during wheel changing or hoisting cans of diesel.

Day to day

No points are awarded for the ragged explorer image of old and, although modern technical clothing favours the baggy look for sound practical reasons, there is no excuse for it not to be clean or for you not to have a set of "presentables" in your bag too. Appearing at customs posts, campsites or hotels looking like a vagrant does no one any favours. Be careful in Arab countries not to offend local sensibilities by under-dressing – especially if you are a woman. Wear long trousers and cover your arms in any centre of population.

For the clothes themselves, the principle of loose-fitting, well-ventilated garments is obviously applicable with, at least at the start of the trip, long sleeves to keep the sun off. Plenty of pockets, with coin- and key-proof closures, preferably zips on trousers or small Velcro patches on shirt pocket flaps, will ensure that valuable objects stay in your pockets rather than falling into the sand during digging or other activities. It is worth tagging keys with a small length of brightly coloured cord so if they do fall into loose sand you will spot them at once. Regatta and Wynnster do "working trousers" in 70/30 polycotton (with many zipped pockets) that keep an ideal balance between smartness and practicality.

Coolmax (an ingeniously cross-sectioned polyester fibre with a large surface area to encourage wicking) and nylon (polyamide) microfibres are names to look out for in choosing hot climate clothing. The latter should preferably have a hydrophilic chemical treatment to enhance wetting and wicking such as DuPont's Vaporwick (The North Face ventilation shirt) or Aquadry MMS (Craghoppers' Barkhan shirt).

A decade ago, the wearing of nylon against the skin in hot climates would have been unthinkable but the microfibre and wicking enhancement has produced a hard-wearing, comfortable, very quick-drying material ideal for expeditions.

Coolmax-rich trekking socks and lightweight, flexible walking boots will take care of the feet. Select a boot with a low heel cup because ankle flexibility is important when driving. Clarks produce high-street leisure footwear – light, breathable, flexible yet strong enough for rock scrambling – that is ideal for desert expeditions; their FastWalker is a classic. For the other end of the body take a cotton sun hat with (unlike the dreaded baseball cap) a brim wide enough to keep the back of your neck and the tops of your ears in the shade.

COOKING, FOOD, WATER

Cooking

A good, simple, field-maintainable, multi-fuel stove such as the MSR Dragonfly and a 5-litre can of kerosene will keep an expedition going for 6–8 weeks. Trying to run any multi-fuel stove on diesel makes a good promotional exercise for cold food. The ratio of cleaning time to cooking time is about four to one. Leaving your MSR stove fully assembled and mounted on a board to stow in a box is a luxury that a vehicle-based expedition can afford and thus preclude the messy disassembling of it after use with attendant drips of fuel.

Choice of food is common sense except to emphasise that plenty of breakfast cereal fibre, tinned fruit and vegetables should be included. Use Ryvita or similar when local bread is not available.

Water

Water supplies in population centres in Libya, Algeria and Tunisia are fit to drink from the tap. Take a microfilter such as the Katadyn as a back-up, however; it is expensive but will remove parasites, protozoa, bacteria and viruses. You don't want to add gastric infections to any water crisis that you may encounter. Consumption will depend on workload but planning figures (per head, per day) would be:

- night/day temperatures 5/35°C – 5–10 litres (less if you are skinny)
- night/day temperatures 25/45°C – 8–15 litres per head per day (less if you are skinny)

A general ballpark figure for moderate workloads of 7.5 litres per day is safe to generous for most conditions. Usage takes a leap above 42°C ambient.

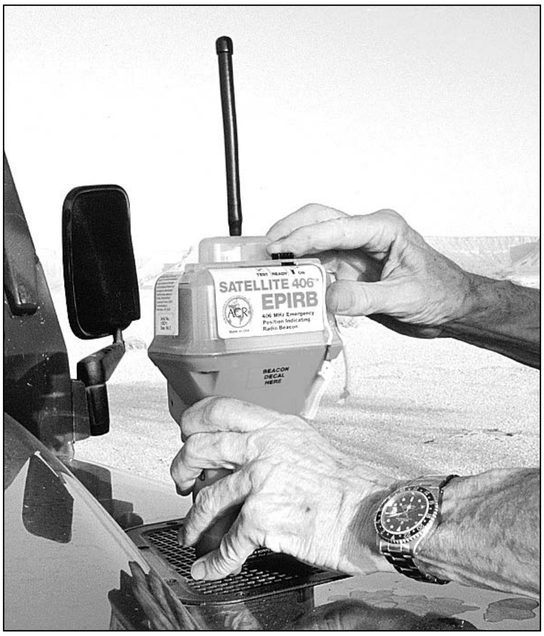

Figure 17.10
EPIRBs are registered in the name of the user and will send a position-tagged emergency signal to a worldwide ground station network via a satellite when triggered. Battery life is usually 48–60 hours in use, 7 years in storage. For smaller units and more detail, see Vehicle-dependent Expedition Guide, *Section 5.6. (© Tom Sheppard)*

SAFETY AND RESCUE AIDS

EPIRBs and sat-phones

With the infrastructure already orbiting the earth, satellite-based emergency rescue aids are worth considering. A Sarsat EPIRB (Emergency Position-Indicating Radio Beacon – about £600–800) is registered on purchase and, thereafter, activation will transmit a signal to a satellite which will take a fix and relay your position to a worldwide network of stations. Although, as a prime marine-oriented rescue aid, its back-up is cast iron, it is an all-or-nothing device with no ability to distinguish between "I am trapped under a rolled vehicle and can't move" or "I will need rescue but I have plenty of water so don't rush".

A satellite phone, however, enables you to contact specific agencies or a base party and even to get advice about particular problems. The Inmarsat or iridium-based worldwide phones cost in the region of £1200. However, the Thuraya satellite, commissioned late 2001 (now with back-up satellite), is geo-stationary approximately over the Egyptian–Libyan border with a footprint extending from the western Sahara to India and north to the UK and Germany, and yields ideal coverage for most African and Middle Eastern desert areas. Call charges are considerably lower than the world-coverage networks and the instrument and its set-up cost around £700.

Figure 17.11 *Desert terrain can encompass enormous variety. Expect the unexpected. Always put the welfare of your vehicle first, drive it with care. Recce difficult terrain on foot if in any doubt (© Tom Sheppard)*

Flares

Miniflares – like the EPIRB, these are obtainable from yacht chandlers – are invaluable small-package items that can be issued to individuals, typically to parties going out on foot. If you do equip your party with these, be sure to agree a particular time when they will be used, e.g. 8 pm when it is dark and they will be seen; a set time when all eyes can be trained in the expected direction of discharge.

FURTHER READING

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