

# TECHNICAL RESCUE

EMS, EXTRICATION, SAR, AQUATIC, ROPE, DIVE, TACTICAL & USAR



ISSUE  
74

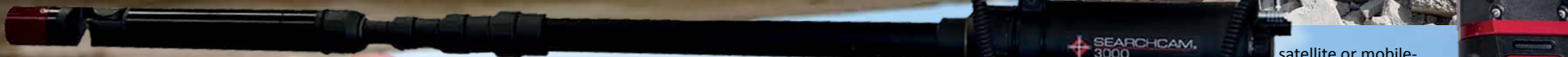
Aside from the use of drones as a vehicle on which to mount search cameras, there hasn't been much to get excited about in void-searching camera development in recent years. That's testament to how good and robust the existing technology is I suppose with one or two of the top models virtually unchanged since the last century.

Applications for pole-mounted search cameras began evolving about 20 years ago so that vehicle extrications in particular together with water searches became a more regular use of cameras previously marketed only at victim location in building collapse rescue. 'Pole-mounted' evolved into 'cable-lowered' and even helmet or ROV mounted. The biggest change within the market in recent years has been the purchasing of many of the main players in each sector by just three entities; *Scorpe*, *Savox* and *Leader Group* or *Groupe Leader* depending on which country you're in. The latter two companies dominate our sector as one-stop shops for disaster response equipment with *Delsar*, *Search Cam* and *Con-Space* on one side and *LeaderScan*, *LeaderCam* and *LeaderSound* (breath analysis) on the other – all are industry icons, as valuable today as they were in the 1990s.

Another legendary name from that period that seemed to disappear for a while outside of France is the *Vibrascope* and associated *Vibraphone*. This company was bought by *Scorpe* and added structural movement monitors to their existing range of hydraulic tools and lifting bags so they truly are a one-stop-shop.

The problem with many sectors of rescue is that the market is so specialised and financially small, that development stagnates once something is found to work well. Look at *Con-space Communications'* hard-wired system. That has hardly changed in over 30 year and is still the leading, if not sole, main contender for prospective purchasers of intrinsically safe, duplex comms. The same goes for *Search Cam* (both brands now being under the *Savox* umbrella). There will be changes of course; optics, acoustics and electronics are all superior now even if the outward appearance is the same. There was a period in the early 2000's when much smaller systems like *Red Box* began to appear aimed more specifically at vehicle

extrication and even underwater search at a more affordable price. Disaster response, however, continued to specify the larger, more complex and proven robust systems so *SearchCam* has remained at the forefront and is now sold as the 3000 together with its smaller brother the *Recon III*. The visually similar *Pro-Eye* from *Yone Corp* in Japan expanded on the underwater capability with a system that has sonar as well as a camera while *Groupe Leader* augmented their *LeaderSearch* acoustic system with *Leader Cam*, a system more in tune with the proliferation of separated camera and TV systems. One notable model that piqued a lot of interest when launched a couple of years ago and the impetus for us compiling this guide is the *FirstLook360* which we have mentioned a few times in this magazine and in our *Emag Access&Rescue*. This has taken many of the best features of current market leaders and incorporated some neat additions



satellite or mobile-network-dependant connectivity.

to set it apart. Not least is its ability to wirelessly transmit high resolution images to smartphones and tablets, doesn't everything these days? Apparently not and ironically, it's Andy Ibbetson, the son of the founder of *Con-Space Communications* Terry that has co-developed this new camera, presumably drawing on his and Terry's decades of experience in the confined space rescue sector. I say 'ironically' because, unlike the *Con-Space Comms* system, which is firmly rooted in 'old' reliable technology, *FirstLook360* embraces every element of smart technology which is why it is worlds apart from most of the others. And the same reason that *Con-Space Comms* has stood the test of time could conceivably be why the *FL360* uses direct, one-one wireless connectivity rather than relying on

Electronic, fly-by-wire and direct transmission is far superior most of the time but when mobile WiFi and Satellite comms fail so does your camera. Close-system connectivity using a wireless signal bypasses this particular failure mode but, as with all digital transmission, can presumably be hacked or jammed in some way if anyone was desperate enough. So, just in case, systems like *FL360* can be hardwired as well. You sometimes *can* have it all ways and it has to be said that catastrophic failures predicted by the doom-merchants for fly-by-wire and satellite dependent systems when they first appeared have proven largely baseless and indeed have probably been far less that the 'mechanical' or analogue systems they replaced. One thing the *FL360* doesn't do which most of the others list as a key feature is have a mechanically articulating camera head. The *LeaderCam* left and above right (as featured on Issue 73's front cover in use with the White Helmets in Syria and here with sunlight shroud on the screen) can be made to look sideways at the flick of a toggle by the camera operator. Plus, of course, the person manipulating the camera can rotate the pole – which is a handy back-up should articulation jam. Agility Corp, the new kids on the block, thought, what's the point of all that sophisticated camera head articulation and associated telemetry? If we stitch



# HANDHELD Search Cameras

together the image from two wide-angle, side facing cameras to give a full 360 degree view it wouldn't need to move to look sideways. In the picture on the previous page you can see one half of the protruding 'bubble' lens at the top next to square LED lights (there's also a battery level and pairing indicator just below the 'F' of the product name.) It's like having 20x20 peripheral vision with no time-lag that you would otherwise get while articulating the camera head. Can't argue with that and so the 360 bit of the name was born. With no reliance on head manipulation there's less to go wrong. The camera head, remember, takes pretty much all of the abuse, and although they're built to be rugged with substantial protective shrouds around the hinge-points they're still vulnerable to damage and jamming when unceremoniously shoved through a small opening in dusty, dirty, sharp-edged, re-bar filled concrete.



camera specialists using or designing the pole or delivery system for that camera. One company however, is a pole specialist that has had a camera designed to utilise their

poles. *Reach and Rescue* in the UK have an enormous telescopic pole that can reach up to 55ft/17m indeed, they have a pole adapted specifically to fit the FL360 in addition to its standard pole offerings. This is currently the longest pole in the search camera sector and while it would be outstanding in large void searches, it might have limited applications in regular building collapse where the spectre of 'making progress' rears its head. Actually getting a rigid pole into a space to search can be problematic so camera heads have become compact so that a single manageable bore hole can be drilled in slabs or through brickwork to allow initial entry of the camera and pole.

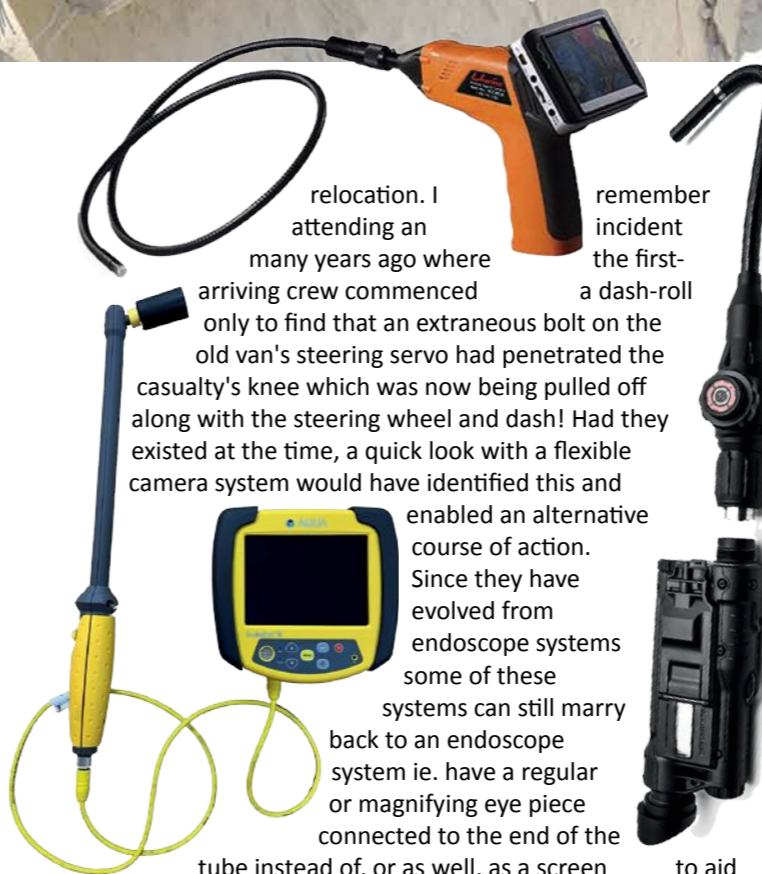


## CAMERA POLES

The original *Search Cam* now in its '3000' version and with a lighter, less costly variant the *Recon III* (above) had the TV screen permanently mounted at the end of the pole making the whole assembly heavier and cumbersome because it limited your ability to manoeuvre the camera and pole. Subsequent *SearchCam* models made the screen detachable and this is a standard feature of most modern camera systems which either have the screen hardwired like *Leader-Cam* or wireless like *FL360* but either way this enables much easier forward-operating of the camera by a separate person. This is not always the case, in the picture above, the operator is manoeuvring the *Tactical Electronics Core* pole while viewing a detached screen fastened to his arm – there are definitely times when it's easiest to view something by twiddling the pole yourself, and some, even the aforementioned *FL360* have the option to be mounted to the pole for single operator use. One model has been specifically downsized to be used by one operator – the Yone Nano system (right) has a teeny 7mm head on an otherwise standard looking search camera system with a toggle directed camera, on-handle screen and it runs on double AA batteries, truly light and portable. Savox had something similar with their diminutive 'Mongoose' but that seems to have now disappeared. Most companies in this sector are first and foremost search



A much easier device to get into limited spaces is the endoscope-type camera also called a borescope or fiberscope, that has mostly migrated across to rescue from 'inspection' in other sectors. These use a flexible tube from the screen or relay to the camera. The tube can be 'bent' into shape to ease entry into spaces and such cameras have proven particularly useful in vehicle crashes where the rescuers are able to identify specific foot and limb entrapment points before they commence metal



relocation. I remember attending an incident many years ago where the first-arriving crew commenced a dash-roll only to find that an extraneous bolt on the old van's steering servo had penetrated the casualty's knee which was now being pulled off along with the steering wheel and dash! Had they existed at the time, a quick look with a flexible camera system would have identified this and enabled an alternative course of action. Since they have evolved from endoscope systems some of these systems can still marry back to an endoscope system ie. have a regular or magnifying eye piece connected to the end of the tube instead of, or as well, as a screen to aid clearer imaging of what the camera is looking at. The downside to these semi-flexible tube systems like *SnakeCam* above and *Unifire's* (top) is that they are not usually capable of having the camera detached and used separate from the pole/tube and screen. The *Core* system (right) aimed more at tactical users but equally applicable to rescue, offers a number of camera options including this borescope/endoscope-style camera which uses an eyepiece *and* monitor option with wireless transmission.

## REMOTE OPERATION

The 'remote probe' idea, where the camera head is detached and lowered into a void was really pioneered by Con Space with their audio-only attachment to the hard-wired *Con-Space Communications* system so its no surprise that *Con-Space's* second cousin once removed, the *FL360* also has this option with a metal eye that can be screwed in to the camera head as the most robust of lowering attachments. *Leadercam* has a variant, the *RD90* which attaches to a 90m cable and, unlike their standard camera head listed in the following table, is waterproof to the full 90m of the cable. Many of the cameras have a two-way mic so that the operator can listen for, or communicate directly with the victim with the added huge advantage of full visual acuity of the victim and surroundings thanks to either on-board lighting or an infra-red camera (an option for some) or both. *FL360's* 'probe' head pictured on page 25 deserves special mention because it is so efficient as a probe with all-around vision and lighting and because it has, along with the *Tactical Electronics Core* systems, the ability to transmit wirelessly to any android mobile device, be it tablet or smart-phone they have, you guessed it, an app for that. Both systems are app-driven



**LEATHERMAN**

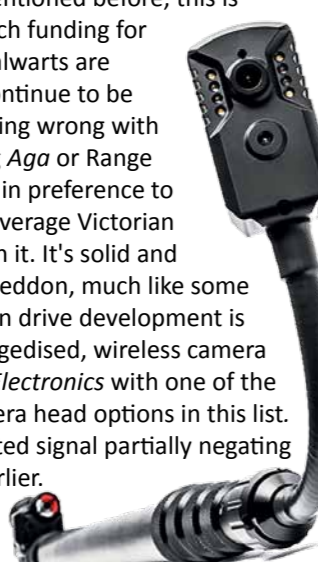
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allowing for updates and ad-ons. You would think that in this day and age of remote operated everything and drones in particular, that wireless would be standard in rescue but as we mentioned before, this is too specialist an area to attract much funding for development so most of the old stalwarts are updated as best they can be and continue to be sold. There is not necessarily anything wrong with that, look how many wood-burning Aga or Range cookers are increasingly sold today in preference to modern alternatives and yet your average Victorian cook would be entirely familiar with it. It's solid and reliable even in the midst of Armageddon, much like some of these cameras! One area that can drive development is the military and one of the few ruggedised, wireless camera systems in this list is from *Tactical Electronics* with one of the most comprehensive range of camera head options in this list. The *Core* (right) also has an encrypted signal partially negating our hacking concern mentioned earlier.

CAMERAS, SCREENS &



**ELECTRONICS**  
Quality of electronics and optical components are obviously key to the best systems. You want to be able to see what the camera sees and hear with as much clarity as possible. Headphones,

as shown by the *Leader Cam* in our title picture, accentuate and concentrate the mind to listen for relevant sounds cutting out extraneous noise that might otherwise inhibit your ability to hear the faint signs of life coming from an external screen speaker. At least three systems here, the *Savox*, *Leader Group* and *Scorpe* systems allow integration of other assets such as acoustic monitoring, structural movement, breath analysis and even radar in the case of *LeaderScan*. The optics themselves don't necessarily make things easier when you're exploring a monotone dusty void where even exposed skin looks like concrete dust. It can even be the case that enhanced resolution just confuses things as it shows up every grain of dust. This is where infra-red and thermal imaging stand out as invaluable tools but we have yet to see a system with multiple camera systems on one head and the ability to switch seamlessly between them. Thermal imaging can offer the best option for live-person recovery as shown by the *Core* system screen (above) and *Leader Group* now has a thermal imaging camera option for its system which replaces the existing standard camera head when you need it. The TI camera head (below-right) simply replaces the standard camera above it by screwing onto and plugging back into the pole of the *LeaderCam*. Thermal imaging effectiveness becomes marginal for hypothermic or near-death victims with little surface



temperature to detect or paradoxically in very hot environments where masonry retains and emits heat long after the collapse and can mask the bodies diminishing thermal signature.



Modern cameras are pretty much all daylight colour with LED illumination with some switching to infrared in low light which can accentuate and contrast skin tones more easily. Unless everything is covered in dust or is the same colour in which case camera orientation can be a real problem. Without wishing to sound like a rep for the *FirstLook360*, its modernity means it has a useful handle on 'spatial orientation' in environments that are otherwise incredibly difficult to reconcile with what you think you should be seeing. This is to be expected for the newest camera on the market and similarly it has a higher resolution screen than most because it's the newest and is using easily upgradeable technology. Touch-screen overlays on the tablet(s) it's transmitting to show the camera's real-time orientation – effectively an artificial horizon and depth perception indication because, don't forget, it has that 360 degree view – like two bubble observation ports stitched together back-to-back or the product images you see online where you can navigate all around them, back, front, top, bottom. It's not 3D but it is virtual 3D. This system and the *Tactical Core* models allow video snapshots to be taken of the entire void which is relayed back to larger screens (which might be on the other side of the world!) and enable support personnel to examine for clues in greater detail and report back to the frontline operators if they spot anything worth checking out. With some, like the *FL360*, images are GPS tagged so the operator knows exactly where to go even if frontline rescuers have long since moved on to another search area. As mentioned earlier, screens have mostly become a detached component, no longer firmly fastened to the telescopic pole but handheld and most often used by a second rescuer while the first manoeuvres the camera. We will probably see more systems becoming wifi compatible and using apps so that regular tablets and smart phones can be used instead of a dedicated screen. The *FL360* for instance uses a *Samsung S2* tablet, albeit the top-end LTE version costing \$850 but you can get lesser S2 models for about \$300 and the incredibly versatile *Tactical Electronics Core* systems use virtually anything including radio networks so you can see how replacement and augmentation will become cheaper and easier in the future. However, there is something to be said for the simplicity of a screen with a handful of colour-coded buttons with icons as exemplified by the *Search Cam* screen above. When rain and dust are hindering the use of touch-screens, more conventional button screens will keep working.

UNDERWATER USE

A number of the cameras in this list will operate underwater or at least under the surface of the water, in other words you can break the plane of the surface to get a much clearer view underwater without going too deep – similar to a periscope of a glass bottom boat. Some however, are designed to be used underwater and have attributes that lend themselves to dive team searches or perhaps in place of a dive team search. The *Reach&Rescue Underwater*, *Yone ProEye 751 SNR* with Sonar and the *JW Fishers* models are clearly designed with an aquatic environment in mind but don't forget some of the regular models like the *LeaderCam* in it's *RD90* variant, the *Red Box Snake eye* and even the venerable *SearchCam 3000* which have camera heads that will all go beyond 20m/60 feet in depth.

It's true that these will mostly be involved in body or evidence searches rather than rescue but as has been proven time and time again with cold-water drowning victims, they're not dead until they're warm and dead. Assets like underwater cameras can be the difference between being just-in-time or having not-much-hope-in-the-first-place. It could be argued that any team or agency with available cameras AND with bodies of water on their response patch should leave the cameras packaged to be able to search underwater straight from the box since a change to structural collapse mode (if a change is even required) will never be as time sensitive as a drowning victim. It may be that the regular set up using a telescopic pole is your best approach to shallow water searches, particularly for victims that have fallen through ice where a pole can search an area in a radius of several metres from the entry hole or flow-predicted search hole. Cold, deep open water on the other hand will generally benefit from a cable-lowered camera worked in a pre-determined search pattern via boat. Remember that many camera systems offer cable lengths that are far in excess of the camera's depth-rating. This is not an oversight, this is because your camera may be operating



LATERALLY from the screen rather than straight down – you may for instance be using a crew on the bank/shore rather than in a boat so that the camera head may be hundreds of feet away and only a few feet deep rather than being hundreds of feet deep. Or you may be search a well or liquid storage tank with a large void before reaching the water. This all sounds obvious but you may want to mark your cables with a maximum depth indication for those occasions when you ARE sending the camera straight down into water.



Another option is a rescue swimmer using a handheld camera like the *Fishers CHV-2* or *CM-1* with pistol grip (option). This is effectively a hard-wired dive camera capable of working the deepest of all the models in our guide. Nevertheless, it is prospectively still immensely useful even if used at the surface as a sub-water periscope or slightly deeper by a duck-diving rescuer without full scuba because surface monitoring of the screen by attentive observers may spot something the swimmer doesn't. In the case of the *MC-2 Mini* camera this can be mounted on a pole or even on a helmet (pic above) but is otherwise a fully functioning dive camera which have no lens or camera movement other than being pointed in a particular direction by the rescuer.

Finally mention should be made of *Yone's Pro Eye* variant with sonar (right) This adds a whole new tool to your array because it is a colour camera on a cable which extends out from a sonar sensor sitting just below the water surface. Once a target is identified the camera can be lowered to visualise the sonar's detection. You don't have to use sonar since the camera can still operate as a stand-alone device but



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there is a gunwale clamp on the camera mount and two different screens in the system case – one for sonar and one for simultaneously colour imaging. The Yone cameras are also oddly unique in using propriety power tool 12v batteries that are easily obtainable from DIY stores, which is a useful option.

**IN THE FOLLOWING TABLES.....**

We have included ONLY cameras that are actively marketed to and for rescuers even though there are a number of inspection cameras from other industries that might be viable. The majority of these are pole cameras which helps to narrow the field but there are a couple of flexible wire cameras because they are specifically sold to rescuers.

**COST:** Very approximate. Some manufacturers are oddly reticent to provide a price. We get this in all of our guides and particularly for high cost item which always makes us suspicious that there is differential pricing going on or they feel that a higher cost comparison counts against them.

**WEIGHT:** There are 2 weights given, the first is the complete system including a case if that is how the system is sold. This is an important figure because it affects the overall shipping limits when moving equipment into a disaster zone. The second figure (in burnt orange) is the weight of the camera unit plus pole as it feels to the person holding and/or controlling it. For some cameras this may include the display screen because it is permanently attached. If not, the display screen is given as a separate weight in green in the SCREEN column.

**MIN to MAX LENGTH:** the length of pole from shortest extension to longest. A single figure is the MAX extension. Many have extension or longer pole options and some, like the Reach&Rescue and JWFishers don't fit the pole in the case so you would need to factor in that extra weight to the system total.

**SUPPLIED CABLE:** refers to a camera extension cable to enable the camera to be clipped on and lowered or used remote from the operator. Most kits are supplied with a minimum length so you will again need to factor in the weight of longer lengths if purchased extra to the kit (in terms of air transport for overseas deployments). Cable lengths are shown in burnt orange and in brackets for optional lengths.

**SCREEN RESOLUTION, SIZE, WEIGHT:** We often see a screen resolution AND a camera resolution but if one is substantially lower than the other you will presumably not be seeing the image to best advantage. Screen or Monitor resolution is usually in Pixels and is shown in burnt orange. Size and weight of the screen as distinct from the

whole kit is important where the screen is fully detached and may be hand-held or worn on the sleeve. For some it remains 'embedded' in the carry case (eg. the ProEye Sonar, Reach & Rescue and JW Fishers models) which is sat on the ground or a stand so weight isn't such an issue.

**CAMERA RESOLUTION** (in burnt orange) for the camera may be given in a number of scales including TVL, lux (for the light-source operating limit rather than resolution) and Pixels.

**ADJ RANGE** (in black) refers to the articulation angle of the camera head. Some can be controlled by the operator to rotate through as much as 240 degrees (Recon III above right). The FL360 on the other hand doesn't articulate at all but has taken the more obvious option of a camera head that already sees a 360 degree view of the space. Reach&Rescue's camera head is a flexible but stiff articulation that is adjusted manually but normally views in the direction of the pole.

**FIELD OF VIEW** (in green) is what the camera actually sees or rather the view you see from peripheries to straight in front. In the case of the FL360 you see the entire 360 degree view but for most the view is dependant on how wide-angle the lens is. Endoscope style cameras tend to be quite narrow while larger lenses on SearchCam and ProEye give up to 260 degrees of view. Wide angle can sometimes lead to distortion at the peripheries.

**COLUMNS**

**CAMERA DETACH** refers to the ability to remove the camera from its pole or mount and attach it to a cable for lowering.

**COLOUR / B&W CAMERA** refers to the output to your screen being in full colour (in burnt orange) which may convert to Infra-Red in low light, or Black and White which is the minority of cameras in our Guide here even the Mini JWFishers has a colour option.

**THERMAL / IR CAMERA** refers to thermal imaging in burnt orange and/or Infra Red (IR) in black. Options are shown in an outline box □.

**IP RATING** is an internationally recognised ingress protection figure for water, dust and gas – none of which is necessarily the same, ie. just because a product is waterproof doesn't mean it's intrinsically safe. The first figure is solids (dust) where 6 is the highest/best. The second figure is for liquids where 8 is the highest/best meaning waterproof beyond 1m and 7 is waterproof up to 1m below water. IP68 is therefore the best.

**CAMERA IMMERSION** is further qualification of the IP Rating to show the actual depth capability of the camera – remember NOT to use cable longer than your camera's depth rating if lowering straight down into water.

**DATA STORAGE** may be to a hard drive (in black) generally the case with laptops and tablets, SD card in burnt orange for transfer to other devices for manipulation or USB in green which is again normally only with a laptop option as with JW Fishers.











**IMAGE/VIDEO CAPTURE** refers to either still images or video in burnt orange.

**GPS/GPSIMAGE TRACK** this may be on-board GPS to indicate the location of the camera and operator (black square) or it might be an image tracking GPS (in burnt orange) which shows where any given image is taken so that search teams can return to the spot.

**HD CARRY CASE:** The HD in burnt orange refers to a heavy duty, waterproof, shockproof case like the Peli, Explorer, Storm, Hardigge, IMPH or Otter. The cases pictured here are all toughened, waterproof cases. A case listed as a black square will be a more standard hard carrying case, not necessarily waterproof or shock proof but well up to transporting the camera system. An outline square indicates a soft pack option – maybe a back pack or a fabric carry bag.

IMAGES NOT TO SCALE	MODEL	COMPANY	ORIGIN	COST Basic System excluding accessories	WEIGHT PACKAGE TOTAL IN HAND	LENGTH MIN to MAX SUPPLIED CABLE	SCREEN RESOLUTION SIZE WEIGHT	CAMERA Diameter	CAMERA RESOLUTION ADJ RANGE FIELD OF VIEW	LIGHTS	BATTERY DURATION RECHARGE	OPERATING TEMP	TWO-WAY MIC	CAMERA DETACH	COLOUR/B&W CAMERA	THERMAL / IR CAMERA	IP RATING	CAMERA IMMERSION	DATA STORE SD USB	WIRELESS STREAMING	IMAGE VIDEO CAPTURE	MAINS/12v CHARGER	GPS/GPS IMAGE TRACK	HeavyDuty CARRY CASE	NOTES	WWW.
	First Look 360	AGILITY TECHNOLOGIES		N/A	15.5kg/34.2lb 1.4kg / 3 lb	3m 9.8ft	2048 x 1536 246mm / 9.7" 0.39kg / 0.9 lb	49.5mm 1.95"	1920 x 960 - 360°	6 x wide-angle LED	Li-Ion* 3-5 hrs 1.5 hrs	-10 to 60C 14 to 140F					68	3m 10ft						*Will also operate using 4x CR123A cells # IR version/option in 2019	agilitycorp.com	
	Leader-Cam	GROUPE LEADER/ LEADER GROUP		N/A	14kg / 31 lb 2.78kg/6 lb	2.4 - 3.4m* 7.8 - 11ft (1x25m or 2x90m cable options)	800 x 480 178mm / 7" 1.38kg / 3 lb	47mm 1.85"	700 x 480 0-170° 260°	8 x LED	NiMH or 10x AA 2.3 hrs 3.3 hrs	-10 to 60C 14 to 140F					54	2m# 6.5ft						* figures for Std kit. Option for Poles up to 5.66m/18.6' Batteries compatible with Leader Scan, Hasty & Search #RD90 version waterproof to 90m. GPS in 2019.	leader-group.eu	
	DV2	JW FISHERS		\$3295 +\$3195*	27kg / 59 lb 6.8kg / 15 lb	No Pole 50m / 150ft (300m/1000ft option)	* 264mm/10.4" 10.9kg/24 lb*	127mm 5"	0.8 lux /480L NO 170°	2 x 1500 lumen LED	Marine, AC-mains or 12v DC	-25 to 60C -14 to 140F					150m# 500ft							*For VRM-2 screen module. Camera can be linked to any suitable laptop/display. #300m/1000' housing available. *exc cable, add 9kg/20lb /150ft *Wt includes integral case	jwfishers.com	
	DHC-2	JW FISHERS		\$3795 +\$3195*	23kg / 51 lb 3.2kg / 7 lbs*	No Pole 50m / 150ft (300m/1000ft option)	800 x 600* 264mm/10.4" 10.9kg/24 lb*	114mm 4.5"	0.8 lux /480L NO 170°	2 x 1500 lumen LED	Marine, AC-mains or 12v DC	-25 to 60C -14 to 140F					150m 500ft							*For VRM-2 screen module. Camera can be linked to any suitable laptop/display. #300m/1000' housing available. *exc cable, add 9kg/20lb /150ft *Wt includes integral case	jwfishers.com	
	MC-2 Mini Camera	JW FISHERS		\$2095 +\$3195*	15.4kg / 34 lb 0.45kg / 1 lb*	Pole adapter=\$225 50m / 150ft (300m/1000ft option)	800 x 600* 264mm/10.4" 10.9kg/24 lb*	60mm 2.375"	NO 50°	Halogen or 12 x LED option	Marine, AC-mains or 12v DC	-25 to 60C -14 to 140F					150m 500ft							*For VRM-2 screen module & exc lights. Camera can be linked to any suitable laptop/display. Camera is B&W as standard but colour and EuroPAL options. *exc cable, add 4kg/9lb /150ft	jwfishers.com	
	Underwater Camera System	REACH&RESCUE		£2014	10.2kg / 22.5 lb exc pole	*5m 16.4ft 20 m / 65ft (30 & 40m options)	800 x 480 178mm / 7"	23mm 0.9"	480 TVL 360° (manual) 120°	12 x LED	Li Ion 6-8 hrs 8 hrs	-10C to 50C 14 to 122 F					68	30m 100ft						*Poles can be 5m, 9m 13m or 17m/55ft long. Pole can be simultaneously fitted with rescue aids and body recovery hook (shown).	reachandrescue.com	
	SnakeCam (RBW Kit)	RED BOX AVIATION		£4500	1.4kg / 3 lb	0.45m 1.5ft 9.25m* / 30ft (500m option)	640 x 480* 127mm / 5"	30mm 1.2"	512 x 492 90° 46°	4 x LED 1 XeNon	6v NiMH 35mins x 2 (6hr option)	0 to 50C -32 to 122F					68	30m 100ft						*Basic kit uses a lower res screen with no audio-visual record capability. * Up to 500m cable available + 1.2-7.8m Pole option	redboxaviation.com	
	SearchCam Recon III	SAVOX		\$9000	18kg/40lb*	1.09-1.43m 3.5 - 4.7ft	640 x 480 146mm / 5.75"	47mm 1.85"	811 x 507 0-240° 289°	16 x LED	Li Ion 2 hrs	-10 to 60C 14 to 140F					68	23m						*weight is for Hasty kit including Recon III and Delsar sensors and accessories	savox.com	
	SearchCam 3000	SAVOX		>\$15000	4kg/8.8 lb	1.04 -2.34m 3.4 - 7.6ft	640 x 480 146mm / 5.75"	47mm 1.85"	811 x 507 0-240° 289°	16 x LED	Li Ion 2 hrs	-10 to 60C 14 to 140F					68	23m						Pole options up to 6m/19ft	savox.com	
	Vibrascope BVA6	SCORPE		€12000	13.2kg/29 lb 6.4kg/14 lb	0.5 - 2m 1.6 - 6.6ft 5m / 16.4ft (100m/330ft option)	178mm / 7"	39mm 1.5"	0.5 lux 0-360°	6 x LED	12v NiMH 4.5 Ah 4-5 hrs 4 hrs	-20 to 50C -4 to 122F					67	100m						Data for waterproof camera, more basic camera available.	scorpe.eu	
	DS100	SECA		£1890	7kg/15.4 lb 3.5kg/7.7 lb	1.2 - 4m 3.9 - 13ft	640x480 127mm / 5" 3.5kg	65mm 2.56"	420 TVL 0-110° 90°	36 x LEDs	11.1v Li 7hrs 4.5 hrs	-20 to 55C -4 to 131F					67	Yes						DM version has wireless AND wired camera	dartsystems.co.uk	

ORIGIN = company origin, not necessarily the country of manufacture COST: INCLUDES local taxes/VAT . DUTY: HD Heavy Duty, STD Standard Duty, LD Light Duty. ADJUSTMENT: Black box= Standard feature. White ( black or orange outline) Box =Option

IMAGES NOT TO SCALE	MODEL	COMPANY	ORIGIN	COST Basic System excluding accessories	WEIGHT PACKAGE TOTAL IN HAND	LENGTH MIN to MAX SUPPLIED CABLE	SCREEN RESOLUTION SIZE WEIGHT	CAMERA Diameter	CAMERA RESOLUTION ADJ RANGE FIELD OF VIEW	LIGHTS	BATTERY DURATION RECHARGE	OPERATING TEMP	TWO-WAY MIC	CAMERA DETACH	COLOUR/B&W CAMERA	THERMAL / IR CAMERA	IP RATING	CAMERA IMMERSION	DATA STORE SD	USB	WIRELESS STREAMING	IMAGE VIDEO CAPTURE	mains/12v CHARGER	GPS/IMAGE TRACK	Heavy Duty CARRY CASE	NOTES	WWW.
	CORE POLE CAMERA	TACTICAL ELECTRONICS		\$8623	1.56kg/3.4 lb	0.6-3.2m 4-10ft (5.3m/17ft option)	1280x720 127mm / 5" 0.4kg / 0.85 lb	42mm 1.65"	1280x720 0-360° (manual) 70°	4 x LED	3xCR123 2.5hrs	-20 to 50C -4 to 122F	■	NO	■	■	-	NO	■	■	■	■	■	■	■	Hardwire option. 4 different camera head options - Fixed, Flexible, Flat/Under door and small-bore endoscope as well as a K9 camera.	tacticalectronics.com
	WSC4926	UNIFIRE		\$600	0.67kg/1.5 lb	0.9m* 3ft	712 x 486 60mm / 2.36" 50g	41mm 1.61"	320 x 240 0-360° (manual) 45°	4 x LED	4 x AA 2hrs	-10 to 50C 14 to 122F	NO	NO	■	NO	-	NO	NO	NO	■	■	■	■	■	*Cable available in 3ft lengths up to 12ft	unifireusa.com
	Pro Eye 751 SNR	YONE CORPORATION		N/A	19kg/42 lb 8.5kg/18.7 lb	2.4m 7.8ft 10m* 33ft	795x595 142mm / 5.6"	36mm 1.4"	811 x 507** 0-180° 231°	12 x LED	12v NiMH (Li-Ion option) 3-6hrs 5 hrs	N/A	■	■	■	■	67	50m	□	NO	■	■	■	■	■	DSX version without sonar. SNR-SONAR & Colour visual cameras 3, 5 & 6m pole options. **PAL version = 795 x 595 *4,20,30 & 50m cable options	yone-co.co.jp
	ProEye 951 S-IR	YONE CORPORATION		N/A	19kg/42 lb	(20m / 65ft option)	177mm / 7"	32mm 1.25"	450TVL 0-180° 270°	12 x LED	12v NiMH 3-4hrs 3hrs	N/A	■	■	■	■	67	50m	□*	NO	■	■	■	■	■	Standard version with colour camera. Second camera interchangeable with IR/TIC *OPTION with 8gb or 4gb SD Casualty temperature monitor	yone-co.co.jp
	ProEye 991 NH Nno-Cam (Handy)	YONE CORPORATION		N/A	15kg/33 lb 3.3kg/7.3 lb	0.7-1.7m 2.3-5.6ft 3m (5m option) 10ft (16ft option)	9cm / 3.5"*	6.9mm 0.27"	0-360° 72°	4 x LED 8 Auxilliary	6xAA NiMH	N/A	■	■	■	NO	67	10m	■	NO	■	■	■	■	■	*Standard model has 2.5" screen	yone-co.co.jp



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