





Aquila Nuclear Engineering and Rolatube Limited, have an exclusive agreement to provide solutions to the nuclear industry for a deployment system, based on the unique Bi Stable Reeled Composite (BRC) technology.

The BRC is manufactured by Rolatube, while Aquila will engineer the complete system to meet the clients' specific application. The highly compact and lightweight deployment system, can be manufactured in diameters from 50mm to 500mm, with deployment lengths of 25m+.

The BRC tube can be extended in any orientation and carry payloads in full cantilever. Umbilicals are employed to supply power to the end effector with output from the end effector being wireless or, again, via umbilicals.

The viper can be integrated within telescopic carbon fibre mast extensions where higher loads are required at extended lengths.

#### TYPICAL END EFFECTOR:

- Cameras with tilt and zoom
- Radiation monitors
- Water jetting
- Manipulator/Grip Stick
- Tooling depending on duty



Viper with grip stick



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## KEY DATA

TUBE DIAMETERS	(D) 20mm to 500mm
TUBE EXTENSION	(E) 100mm to 25m
ORIENTATION	(O) Cantilever or vertical-North and South
CARRIED MASS	(M) is limited by D and E (Example M = 500g for D = 38mm and E = 4000mm)
CARRIED MASS INTEGRATED VERSION	(MI) – (Example MI- 25kg for D = 60mm and E = 3000mm)
DEFLECTION	(d) a function of D,E and M and can be supplied of request
TEMPERATURE	(t) a function of E,O and M
CYCLE LIFE FOR TUBE	2000 operations
TUBE MATERIALS CAN BE SELECTED DEPENDING ON THE APPLICATION.	

## POTENTIAL APPLICATIONS

### INSPECTION IN REMOTE OR CHALLENGING ENVIRONMENTS

The powered or manual Viper can be deployed to undertake visual inspection or radiological measurement, via small aperture penetrations through radiological shielding or a containment barrier. This task can be performed easily and quickly, once the unit is manually positioned in front of the aperture. The Viper can be deployed horizontally or vertically, with the chosen instrument already mounted at the end of the tube. In addition to camera or radiological measurement sensors, the Viper can be fitted with lights and small, low powered tooling. For more remote environments, the viper could be mounted on unmanned, powered vehicles taking the power from the vehicle itself. The standard Viper system offers an open tube when deployed, however, it can be used to provide motion only when integrated with a carbon fibre telescopic mast or telescopic metal slides. The integrated versions offer higher load capacity and possibly, improved containment.



Viper being used as inspection equipment in Hot Cell



Handheld Viper

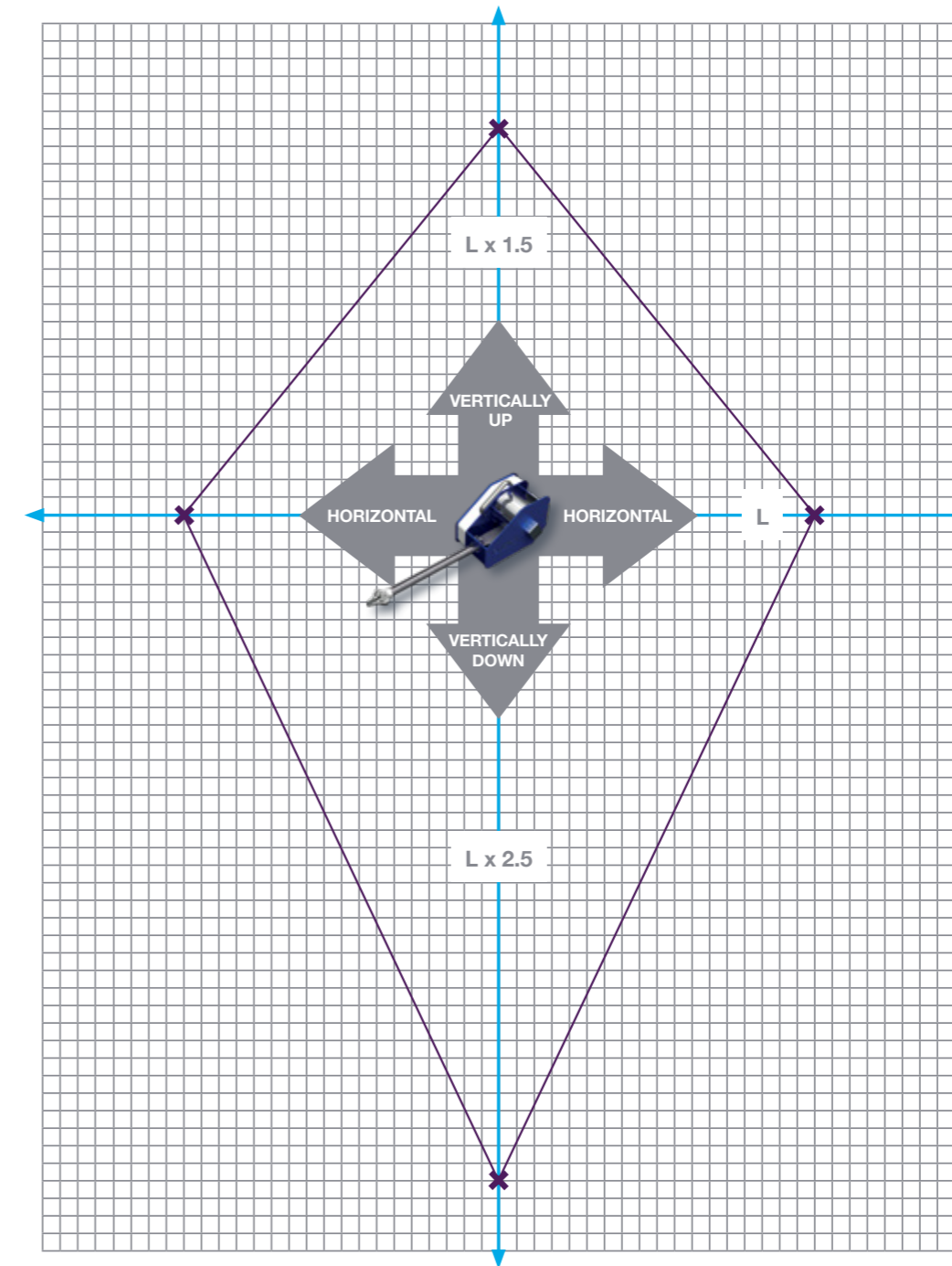
### LIQUID AGITATION AND LIQUID LEVELS

The Viper can be integrated with a nozzle and hose system and used to agitate sludge or slurries in tanks. The nozzle can be directed horizontally, at an angle or downwards to move the fluid. Trials have been carried out at Aquila, employing a 38-4 tube, vertically downwards, together with a pressure system providing 7 bar at the nozzle, directed radially towards the tank wall. This has proven to be a low cost method of mixing in a remote environment. Distances between the surface of supernatants and the surface of resins contained within tanks, can also be measured by the viper supporting, dedicated sensors.

### INSPECTION AT HEIGHT

Applications exist where a camera mounted on the Viper can be employed to inspect and capture plant and structures at a high level without having to build scaffold towers. The powered viper incorporates a tablet with integrated software to capture and store images. The powered Viper can be used as a hard wired system or can operate via WI FI and Bluetooth, to the remote camera.

## TYPICAL STABILITY ENVELOPE FOR EACH TUBE DIAMETER AND END MASS



### EXAMPLE

TUBE DIAMETER	38mm
L	2500mm
END MASS	500g
DEFLECTION CANTILEVER	100mm



## AQUILA HAS UNDERTAKEN IN HOUSE TRIALS DURING THE DEVELOPMENT OF VIPER

- Load-deflection
- Back thrust deflections
- Cycle and endurance
- Laser distance trials
- Camera research assessment
- Torsional stiffness
- Compression assessment
- Camera power



### offers the following features:

- Operable in any orientation including unsupported cantilever
- Bespoke system solutions, based on proven sub-systems selection
- Compact and lightweight
- Simple to set up – plug and play
- Real time inspection and data capture
- Control software supplied, compatible with devices running Windows OS
- Connection via RJ45 Ethernet so control can be hardwired or via Wi-Fi
- Extremely cost effective compared with existing, long reach manipulator technology
- Simple training provided to operators, together with maintenance and tube replacement instructions
- Designed and built in the UK to clients' functional specification
- Manual version also available.



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