



## True Triaxial Apparatus (GDSTTA)

**Overview:** The GDS True Triaxial Apparatus (GDSTTA) has the defining characteristic that, unlike conventional triaxial apparatus, all three principal stresses can be controlled independently, rather than just two in a conventional triaxial system. This allows a wider range of complex stress paths to be performed. This dynamic cyclic system is powered by advanced electro-mechanical actuators or optional hydraulic actuators and is an extremely sophisticated research tool.

Vertical and one horizontal axis are loaded via the dynamic actuators (axis 1 and 2), stress control is provided for the 2nd horizontal axis, (axis 3) via cell pressure.

### Key Features:

### Benefits to the User:

Stress or strain is applied to a 75mm x 75mm x 150mm sample independently on three axes:	Two pairs of matched dynamic rams for axes 1 and 2, and a confining fluid provides pressure for the 3 <sup>rd</sup> axis on load readings.
Ram specification:	Each ram has its own internal submersible load cell and displacement transducer to ensure friction effects are minimised.
Electro-mechanical actuators as standard:	Electro-mechanical actuators provide an easier to use and environmentally friendly solution for accurate testing to 5Hz. Electro-mechanical actuators do not require a hydraulic power pack to be present, hence no requirement to service a powerpack or to protect system users from noise generated by a powerpack.
Custom designed optional hydraulic actuators:	The hydraulic actuators have been custom designed by GDS to be seal-less with hydrostatic bearings. This improves the actuator performance (up to 10Hz) and reduces whole-life servicing costs as there are no piston seals to replace. Each actuator pair can be controlled in "static-mode" with either constant, ramp or slow cyclic targets in terms of load, stress or displacement.
Sample preparation:	Full sample preparation equipment for cohesive and non-cohesive samples is provided with the system including a specially designed soil lathe for producing cuboidal samples.

### Upgrade Options:

Hydraulic 28kN actuators (10Hz), electro-mechanical 10/20kN actuators (5Hz), bender element system (vertical, horizontal, S and P waves), LVDT local strain and proximitors (axis 3 only), unsaturated testing and dynamic cell pressure (5Hz).

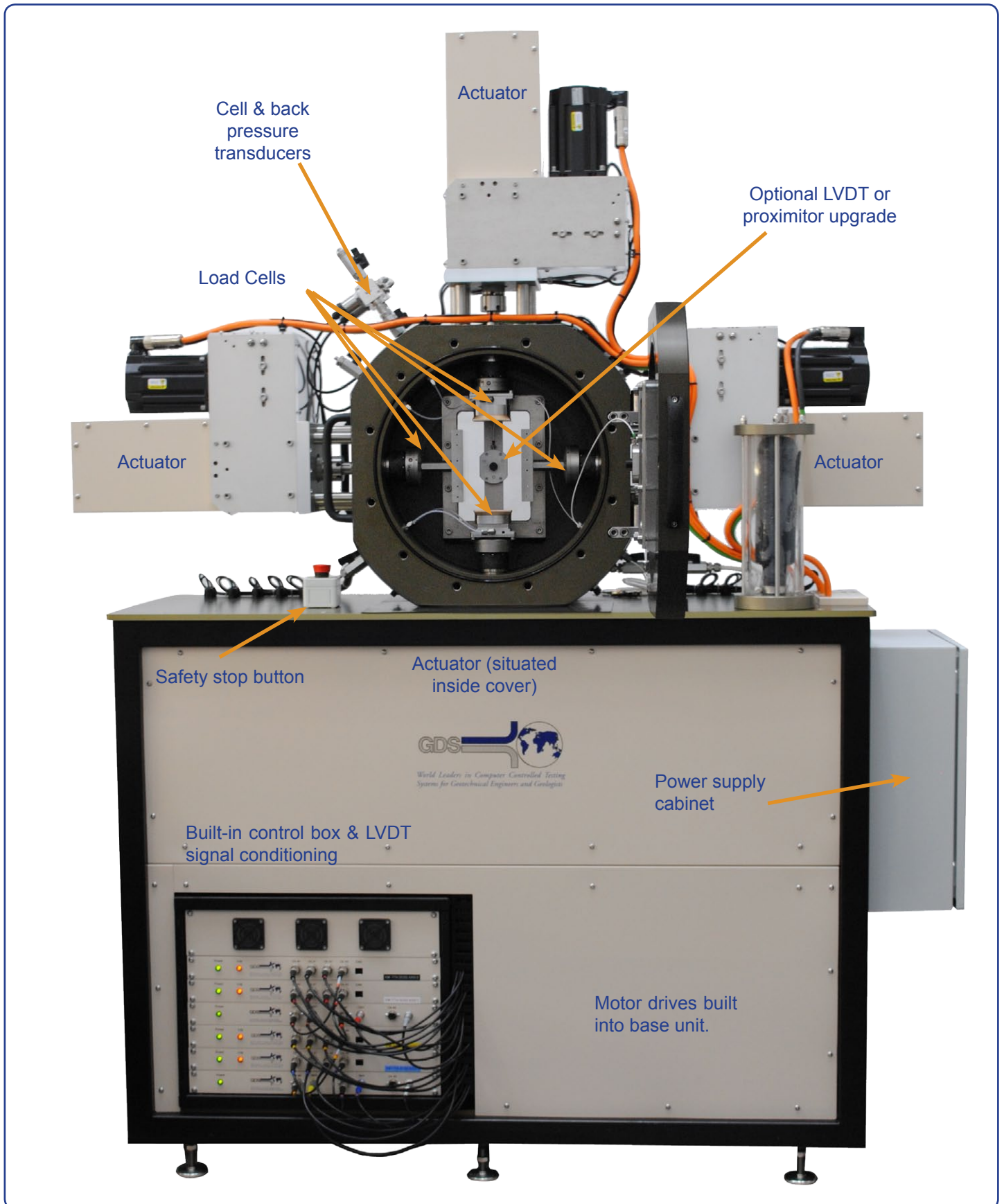
### Tests that can be Performed:

Fully independent control of axis 1 and 2 for load, stress, displacement and strain, stress control on axis 3 via cell pressure. Axis 1 and 2 can be controlled at up to 5Hz or 10Hz depending on the model selected (electro-mechanical vs hydraulic).

### Technical Specification:

<b>Data Acquisition:</b>	16 Bit, 16 Channel
<b>Pressure Range (MPa):</b>	2
<b>Load Range (kN):</b>	5, 10, 20 - Electro-mechanical 28 - Hydraulic

Fig 1. Key features of GDS Electro-mechanically actuated GDSTTA



### Tests that can be Performed:

Fully independent control of axis 1 and 2 for load, stress, displacement and strain, stress control on axis 3 via cell pressure. Axis 1 and 2 can be controlled at up to 5Hz or 10Hz depending on the model selected (electro-mechanical or hydraulic).

### GDSLAB Control Software

GDSLAB is the control and data acquisition software for geotechnical laboratory applications. GDSLAB starts with a core application known as the kernel. The GDSLAB kernel allows for data acquisition from your hardware, but no test control. Simply add the appropriate module or modules to complete the test suite functionality you require. GDSLAB is compatible with all existing GDS equipment and furthermore key hardware from other manufacturers.

GDSLAB has the ability to be configured to your hardware of choice, no matter how unique the arrangement. A text file (\*.ini) or initialisation file is created that describes the hardware connectivity to the PC. The hardware layout is available in graphical format via the GDSLAB 'object display'. This makes setting up the devices and checking the connectivity extremely simple.

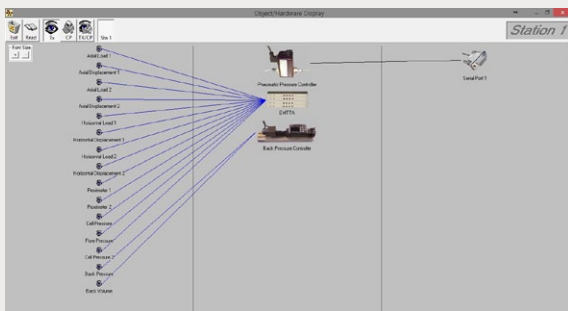


Fig 2. GDSTTA Control Parameters within the GDSLAB Object Display

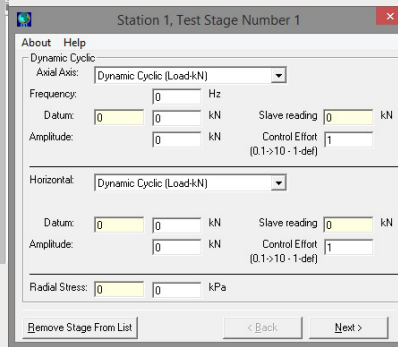
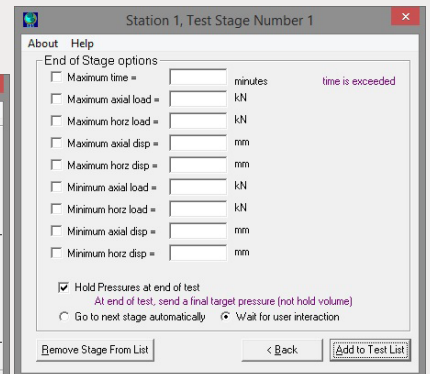


Fig 3. Shows GDSTTA Advanced Loading module forms



Operating System: Windows XP SP3 or higher (We recommend that whichever version of Windows you are running, that it is up to date with the latest Service Pack). PC Spec Hardware: 1GHz (minimum) / 1GB Ram (minimum): CD Rom.

### GDSTTA Control Panel

The GDSTTA actuators may be individually positioned via the GDSTTA Control form within the Object Display to allow correct system configuration before and during specimen installation in the triaxial cell.

The Position Limits and Load Limits allow the user to specify upper and lower bounds for the displacement and load readings of each individual actuator during system operation. If a value is entered for a specific limit and the checkbox is ticked, then actuator movement will be halted by the system firmware if the limit is reached or exceeded at any point. Note these limits are superseded by the maximum and minimum system limits, as displayed underneath the user-specified limit input boxes.



Fig 4. Control tab within the GDSTTA Control form.

## Why Buy GDS?

### Technical Support:

GDS provide comprehensive on-site product training and installation. GDS understand the need for ongoing after sales support, so much so that they have their own dedicated customer support centre. The support centre allows the user to log queries, download helpsheets and get the latest information on product updates. The site is fully searchable and provides a great resource to customers.

Alongside their support centre GDS use a variety of additional support methods including...

- **Remote PC Support:** Remote PC support works by GDS providing a secure link to a customers PC, thereby allowing GDS to take control. Once in control of the PC, GDS can help with any problems associated to software, installation, testing etc.
- **Product Helpsheets:** The helpsheets are the GDS FAQ documents. They cover a multitude of hardware and software questions and are free to download from our online support centre.
- **YouTube Channel:** GDS YouTube channel holds both software and hardware video's aimed to give you better understanding of how the products work.
- **Email & Telephone Support:** If you prefer you can email requests to support@gdsinstruments.com where they will be automatically added to the support system and then allocated to a support engineer.

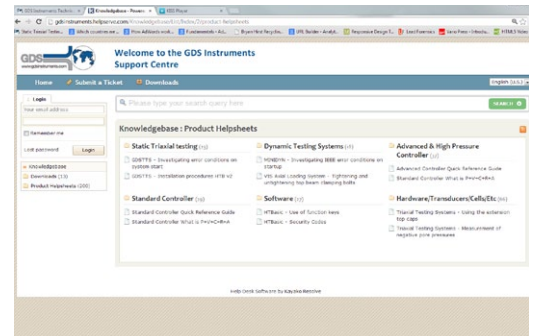


Fig. 5 GDS online customer support centre.

### GDS Awarded Queens Award for Enterprise in International Trade:

GDS have been presented with the most prestigious corporate award made in the UK – The Queen's Award for Enterprise in the International Trade category. GDS are delighted to have won the award which has been given to GDS for increasing overseas trade by 190% over six years of continuous sustained growth, and for selling over 85% of their production overseas. GDS have achieved this through a combination of continuous product development, understanding customer's requirements and a company wide dedication to customer support.



THE QUEEN'S AWARDS  
FOR ENTERPRISE:  
INTERNATIONAL TRADE

### Made in the UK:

All GDS products are designed, manufactured and assembled in the UK at our offices in Hook. Quality assurance is taken of all products before they are dispatched.



GDS are an ISO9001:2000 accredited company. The scope of this certificate applies to the approved quality administration systems relating to the "Manufacture of Laboratory and Field Testing Equipment".



Due to continued development, specifications may change without notice. See the GDS website for the full product range & to visit our Geotechnical Learning Zone.