

BTS SMART DX

High-precision optoelectronic system
for the biomechanical motion analysis



High Performances 4 Megapixel - 500 Hz



BTS Bioengineering

High-precision optoelectronic system for the biomechanical motion analysis

BTS SMART DX is the new generation of high-precision optoelectronic systems that confirm BTS's world leadership position in the development of advanced motion analysis solutions.

A new standard of reference for advanced motion analysis

With SMART DX, BTS extends the investigative capacity of doctors and researchers, providing them with a line of high definition systems characterised by an extreme calculation power and exceptional versatility that is able to cope with all analysis requirements, even in the most critical conditions.

All versions are based on new-design digital video cameras using highly sensitive sensors and innovative and functional illuminators whose high radiation power, combined with the high resolution of the video camera (up to 4 Megapixels), increases the working volume and allows for the capture of rapid, imperceptible movements.

BTS SMART DX represents an evolutionary leap in the progress of multifactorial motion analysis, now made more accurate, integrated, quicker and more productive.

The system integrates, synchronises and manages all kinematic, kinetic, electromyographic and video data in real time as it is obtained from connected devices such as force platforms, electromyographs, sensor-fitted treadmills, etc...

Designed for use in research, sport and medicine

BTS SMART-Analyzer.

Advanced software for multifactorial motion analysis. It allows for the easy construction of customised calculation protocols for a complete motion analysis by means of an innovative object interface. All graphic and multimedia reports can be configured as needed and can be printed out, exported or shared over the internet.

BTS SMART-Performance.

This allows for the analysis of all sporting movements with a view to better understanding and improving performance, optimising training, preventing injury and guiding rehabilitation programmes. It includes predefined analysis protocols in support of the various sporting disciplines namely football, golf, cycling, tennis and baseball, but also allows for the acquisition and assessment of any sports movement by the athlete and equipment, thanks to the high acquisition frequency (up to 2 kHz).

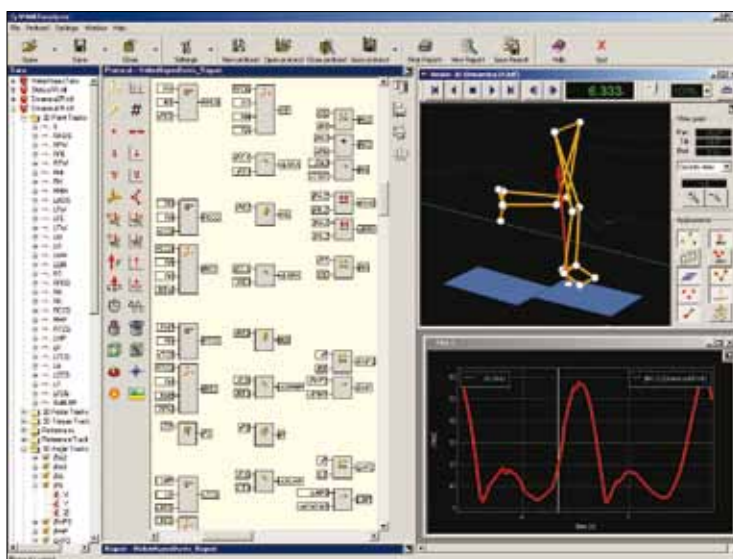
BTS SMART-Clinic.

Solution devoted to the clinical assessment of human movement. Based on protocols validated by the international scientific community, it is a powerful, advanced tool allowing for the simultaneous analysis of the movement of the entire body and individual body districts thanks to the high acquisition resolution (up to 4 Megapixels).



BTS SMART-Analyzer

Construction of calculation protocols by means of block diagrams and 3D and 2D graphic data display



Precision, speed and accuracy

- Precise and accurate marker identification
- High frequency acquisition up to 2000 Hz
- Resolution up to 2048x2048 pixels
- Processing of data collected in real time

Quick and easy calibration

- Quick calibration (requires less than 180 secs.) also where there are partial visual obstacles
- Calibration of multiple volumes and different dimensions

Use in critical light conditions

- Functions without any loss of precision and accuracy, even in environments with critical lighting conditions
- Automatic elimination of reflections due to the presence on the scene of metal objects such as treadmills or walking frames
- Can be used outside in daylight (playing fields, athletics tracks, etc.).

Native integration with analogue devices

- A single workstation includes all the technology needed for data acquisition, processing and analysis.
- Up to 80 analogue channels are available for the connection and synchronisation of signals from:
- electromyographs with analogue outputs
 - force platforms
 - sensor-fitted treadmills and cycle ergometers
 - haptic devices

Data synchronisation and integration

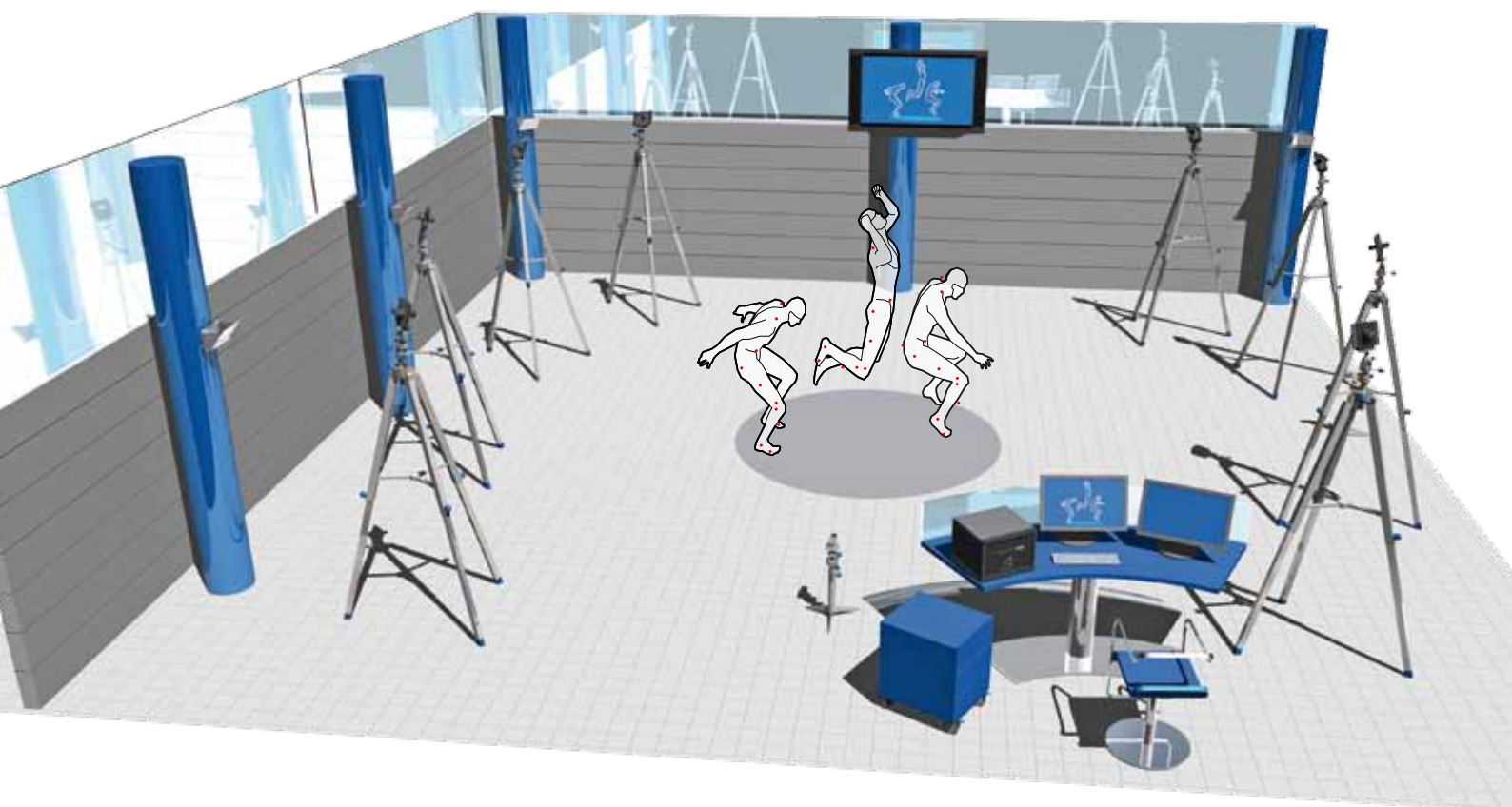
- All the kinematic, kinetic, electromyographic and video data is synchronised even in the event of long-lasting acquisitions.
- The data acquired is sent with the relevant time stamp.
- The system correlates all data received and records it on the timeline.

Specific uses for biomechanical motion analysis

- BTS SMART-Analyzer
Advanced software for multifactorial motion analysis.
- BTS SMART-Performance
Solution for the assessment and improvement of athletic performance.
- BTS SMART-Clinic
Solution devoted to gait analysis and the assessment of movements of the body district.

Development tool

- For expert researchers, hardware and software accessories are included for the direct control of the system and integration with third party systems: SDK for access to 3D data in real time, trigger events management, external synchronisation clock management, kit for isokinetic dynamometers.



BTS SMART DX

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BTS SMART DX is available in 4 different versions with different performances designed to meet the differing motion analysis demands. All models use the new IR high-efficiency illuminator with a wide range of action.

BTS SMART DX 100

Compact, portable system that makes motion analysis easy and flexible, as it can be carried out directly in the rehabilitation gymnasium and on the training field. Ideal for use in assessing individual body districts and focal movements.

BTS SMART DX 500 e 5000

Extremely versatile systems that are well able to meet all analysis laboratory demands, both in routine use, typical of the clinical field, and in experimental use under the scope of sport and research.

BTS SMART DX 7000

An extremely high performance system designed for laboratories needing maximum performance for the analysis of complex, very fast movements that require large spaces for execution and simultaneous segmental assessments.



TECHNICAL SPECIFICATIONS *

TVC	BTS SMART DX 100	BTS SMART DX 500	BTS SMART DX 5000	BTS SMART DX 7000
Infrared Digital Cameras	up to 4 TVCs for each workstation	up to 16 TVCs for each workstation	up to 16 TVCs for each workstation	up to 16 TVCs for each workstation
Multiple Workstations connection capability	yes	yes	yes	yes
Sensor Resolution	640x480	640x480	1400x1000	2048x2048
Acquisition Frequency at Maximum Resolution	100Hz	300Hz	100Hz	500Hz
Maximum Acquisition Frequency	200Hz	1000Hz	500Hz	2000Hz
Accuracy	<0,2mm on a volume 4x3x3m	<0,2mm on a volume 4x3x3m	<0,1mm on a volume 4x3x3m	<0,1mm on a volume 6x6x3m
Preprocessing	-	on board	on board	on board
Preview	full frame	full frame	full frame	full frame
LED Illuminator Wavelength	850nm	850nm	850nm	850nm
Number of markers detected simultaneously	Unlimited	Unlimited	Unlimited	Unlimited
Data Transmission Technology	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet
TVC Power	Directly supplied by the Workstation	Directly supplied by the Workstation	Directly supplied by the Workstation	Directly supplied by the Workstation
Lenses	interchangeable C-mount	interchangeable C-mount	interchangeable C-mount	interchangeable C-mount
Fixed Focal Length lens	4,5-8 mm	4,5-8 mm	4,5-8 mm	4,5-8 mm
Zoom Lens	6-12/25 mm	6-12/25 mm	6-12/25 mm	6-12/25 mm

WORKSTATION

Processor	Intel Core 2 Duo Mobile T9600	2 Intel Xeon 5600 six core	2 Intel Xeon 5600 six core	2 Intel Xeon 5600 six core
Video Card	Intel GM45 on board	nVidia Quadro FX	nVidia Quadro FX	nVidia Quadro FX
Memory	RAM 4GB - HDD 500GB - SSD 80GB	RAM 6GB - HDD 1TB - SSD 100GB	RAM 6GB - HDD 1TB - SSD 100GB	RAM 6GB - HDD 1TB - SSD 100GB
Case	Slim	High Profile	High Profile	High Profile
Analog Acquisition Board	0-32	32-80	32-80	32-80
LCD	1 LCD 24" Full HD	2 LCD 24" Full HD	2 LCD 24" Full HD	2 LCD 24" Full HD

MARKER

Passive and Retro Reflecting Markers	Ø from 3 to 20 mm	Ø from 3 to 20 mm	Ø from 3 to 20 mm	Ø from 3 to 20 mm
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PREINSTALLED SOFTWARE

	BTS SMART-Analyzer	BTS SMART-Analyzer	BTS SMART-Analyzer	BTS SMART-Analyzer
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ADD ON

For all models: Software BTS SMART-Clinic, Software BTS SMART-Performance, 50 Inch Plasma Display, Tripods, TV wall or ceilingmounts, Extended Warranty, All-inclusive Support.



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BTS COMMERCIAL PARTNER NETWORK

