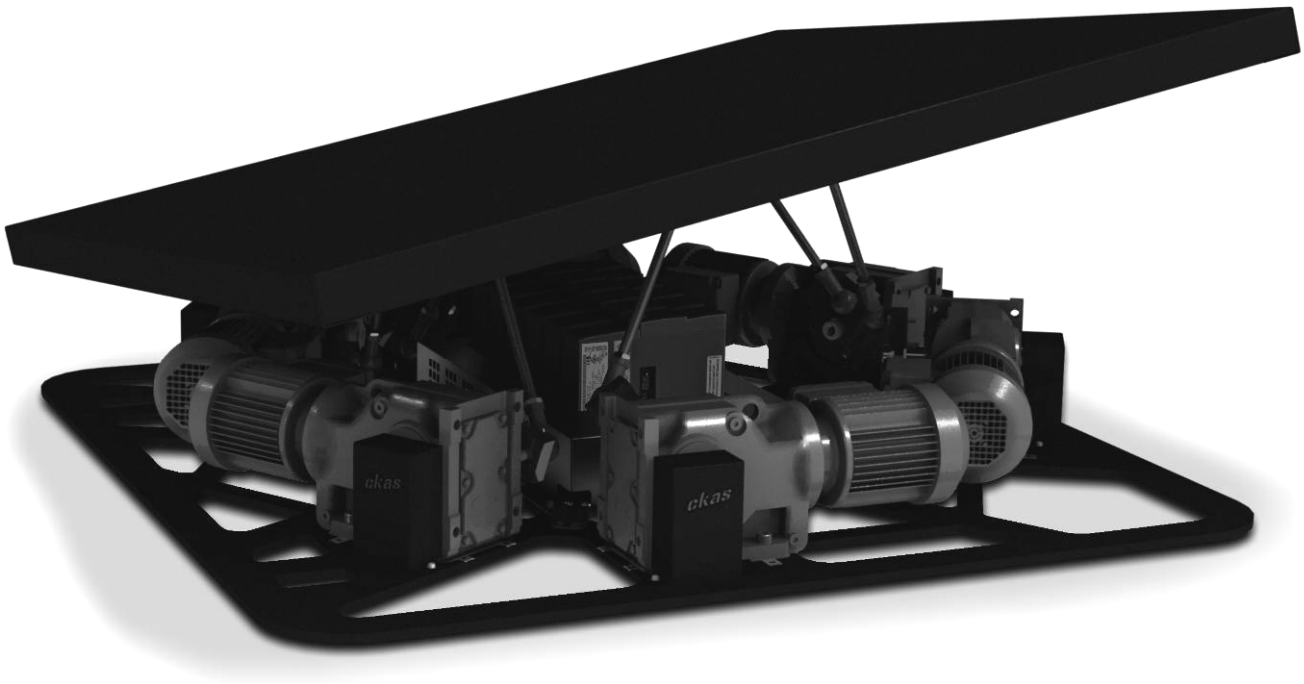
CKAS W3s 6DOF Motion System (300kg / 660lb Payload)



Introduction

The CKAS W3s 6DOF Motion System is specifically directed at **low cost high fidelity small scale motion simulator applications**, such as commercial and industrial simulators, next generation consumer coin-operated arcade entertainment simulators or hi fidelity home built flight and racing entertainment simulators.

Target Applications

- **Small Scale Low Cost Hi fidelity Flight Training Applications**
- **Small Scale Hi fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Small Scale Hi fidelity Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Small Scale Hi fidelity Train Driver Simulators**
- **Next Generation Unsupervised Coin-operated Motion Simulator Arcade Machines**
- **Home Built Hi fidelity Flight Simulators**
- **Home Built Hi fidelity Car Racing Simulators.**

General Description and Capabilities

The CKAS W3s 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to instantly add high fidelity full 6DOF motion to an existing or new design. This unit is pre-built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W3s 6DOF Motion System features a mere 200kg total weight, 1160mm total width, and sits only 360mm high when parked, therefore eliminating the need for any specialised stair or gangway for stepping up onto it. CKAS has used the technology it has developed for the heavier motion systems to design this unit, incorporating industry leading electronics, encoders and actuators.

The expected life of the W3s is extremely high for its price point, and the maintenance requirements are minimal, especially important in commercial or consumer based applications.

The CKAS W3s 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W3s 6DOF Motion System
Product Code	W3sMP
Product Number	38.0001.11
Product Description	Small Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	1160 mm (45.7”)
Nominal Length (Parked)	1160 mm (45.7”)
Nominal Height (Parked)	360 mm (14.2”)
Approx unit weight	200 kg (440 lb)
Anchoring Specification	Not required for this motion system – Rubber mat recommended

Performance Specifications

Payload Mass Limit	300 kg (660 lb)
Payload Moment of Inertia	100 $kg.m^2$ (2,610 $lb.ft^2$)
Payload CG horizontal offset	Less than 50mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 600mm high from top of Flying Platform
Payload Max Floor Size	Diameter 2000mm (79”)
Indep. Surge (disp. / vel. / accel.)	±50mm , ±100mm/s , 0.3G
Indep. Sway (disp. / vel. / accel.)	±50mm , ±100mm/s , 0.3G
Indep. Heave (disp. / vel. / accel.)	±50mm , ±100mm/s , 0.3G
Indep. Yaw (disp. / vel. / accel.)	$\pm 10^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Indep. Pitch (disp. / vel. / accel.)	$\pm 10^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Indep. Roll (disp. / vel. / accel.)	$\pm 10^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 6 Amps
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

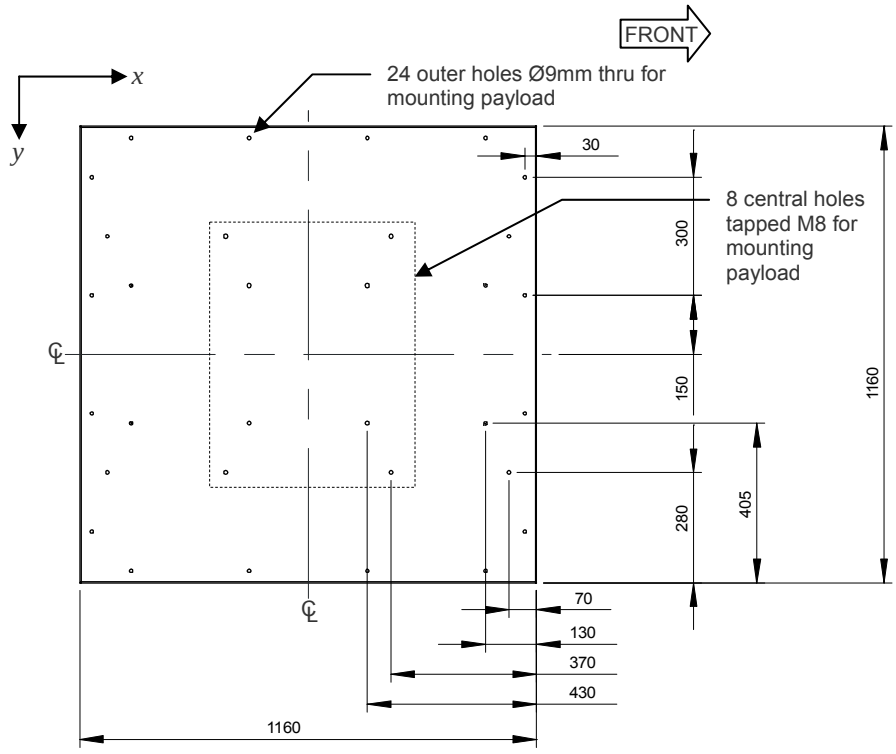
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

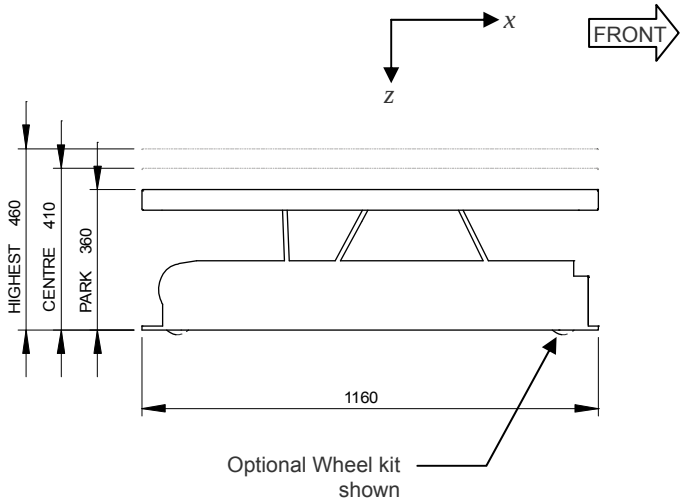
CKAS W3s 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

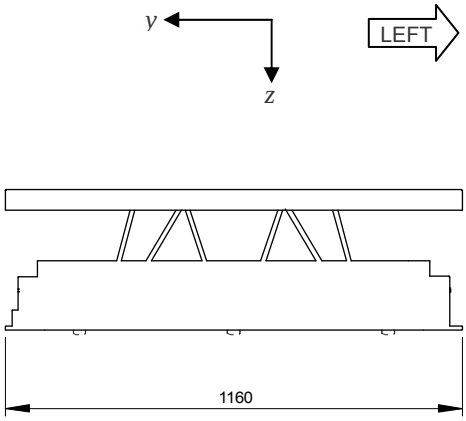
View of Base Mounting Holes from TOP



View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W6s 6DOF Motion System (600kg / 1320lb Payload)

Introduction

The CKAS W6s 6DOF Motion System is specifically directed at **low cost high fidelity small scale motion simulator applications**, such as commercial and industrial simulators, next generation consumer coin-operated arcade entertainment simulators or hi fidelity home built flight simulators.

Target Applications

- **Small Scale Low Cost Hi fidelity Flight Training Applications**
- **Small Scale Hi fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Small Scale Hi fidelity Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Small Scale Hi fidelity Train Driver Simulators**
- **Next Generation Unsupervised Coin-operated Motion Simulator Arcade Machines**
- **Home Built Hi fidelity Flight Simulators**

General Description and Capabilities

The CKAS W6s 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to instantly add high fidelity full 6DOF motion to an existing or new design. This unit is pre-built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W6s 6DOF Motion System features 460kg total weight, 1450mm total width, and sits only 365mm high when parked, therefore eliminating the need for any specialised stair or gangway for stepping up onto it. CKAS has used the technology it has developed for the heavier motion systems to design this unit, incorporating industry leading electronics, encoders and actuators.

The expected life of the W6s is extremely high for its price point, and the maintenance requirements are minimal, especially important in commercial or consumer based applications.

The CKAS W6s 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W6s 6DOF Motion System
Product Code	W6sMP
Product Number	46.0001.11
Product Description	Small Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	1450 mm (57.1”)
Nominal Length (Parked)	1450 mm (57.1”)
Nominal Height (Parked)	365 mm (14.4”)
Approx unit weight	460 kg (1015 lb)
Anchoring Specification	Anchor positions available on base (12 holes x Ø16mm)

Performance Specifications

Payload Mass Limit	600 kg (1320 lb)
Payload Moment of Inertia	250 $kg.m^2$ (5,930 $lb.ft^2$)
Payload CG horizontal offset	Less than 50mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 600mm high from top of Flying Platform
Payload Max Floor Size	Diameter 2000mm (79”)
Indep. Surge (disp. / vel. / accel.)	±65mm , ±100mm/s , 0.3G
Indep. Sway (disp. / vel. / accel.)	±65mm , ±100mm/s , 0.3G
Indep. Heave (disp. / vel. / accel.)	±65mm , ±100mm/s , 0.3G
Indep. Yaw (disp. / vel. / accel.)	$\pm 15^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Indep. Pitch (disp. / vel. / accel.)	$\pm 10^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Indep. Roll (disp. / vel. / accel.)	$\pm 10^o$, $\pm 15^o/s$, $\pm 150^o/s^2$
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 10 Amps
Safety Interlocks	Park input, Parked output, and optional E-Stop (braked)
Connectivity	USB 2.0 / Ethernet 100BaseT
Controller Update Frequency	100 Hz

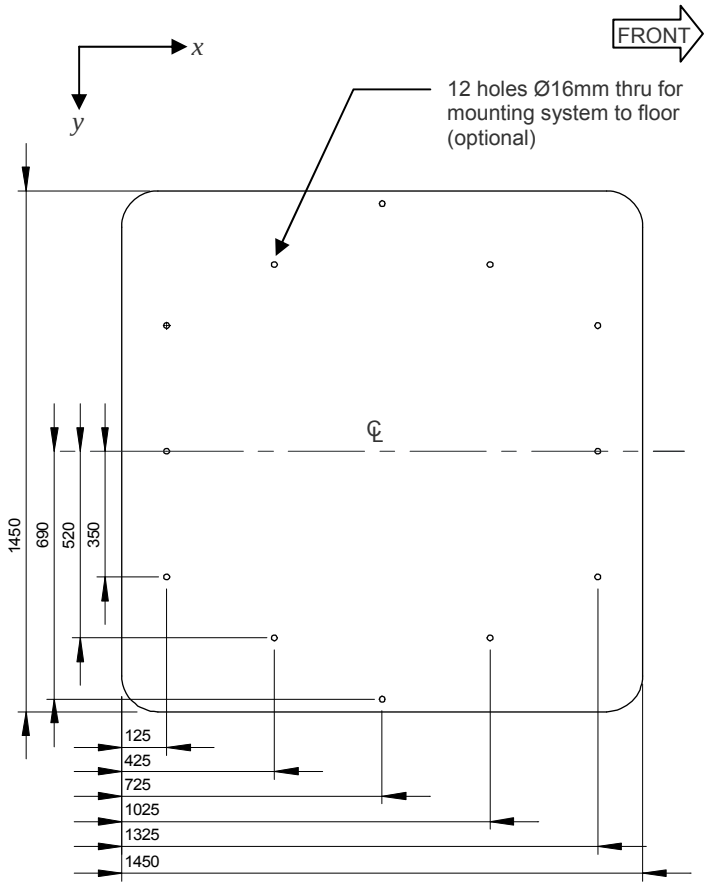
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

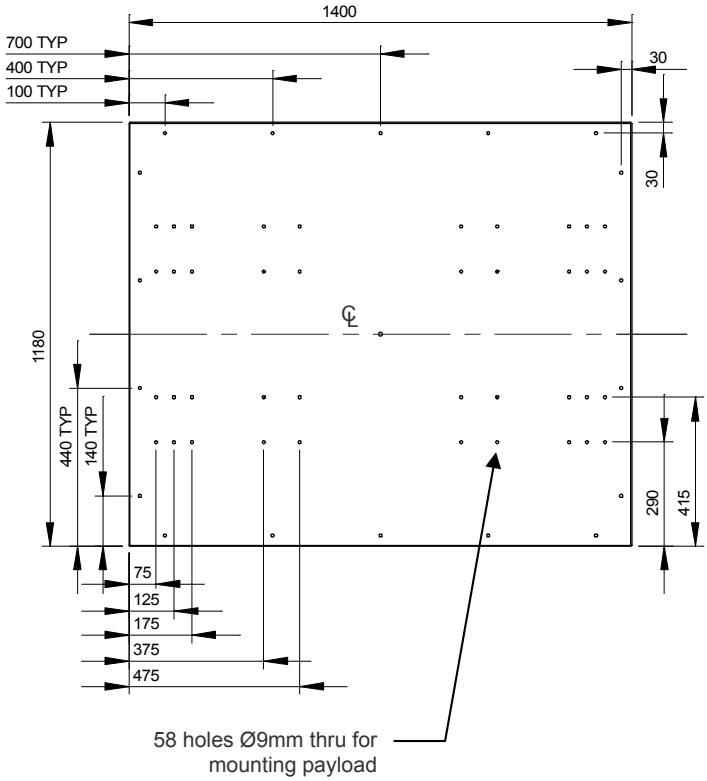
CKAS W6s 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

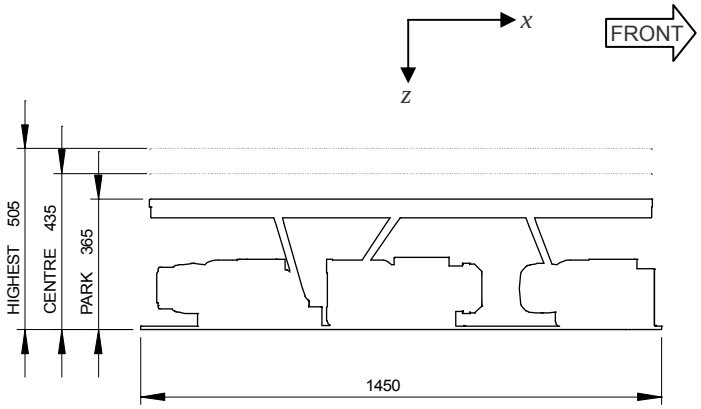
View of Base Mounting Holes from TOP



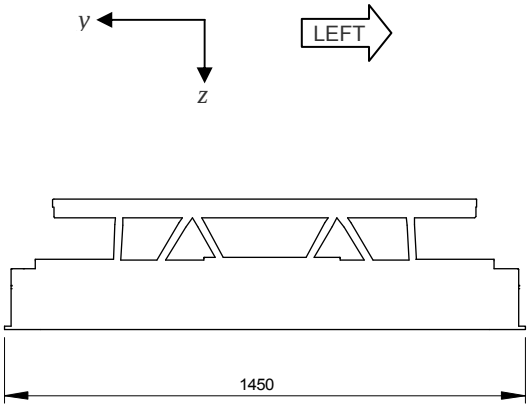
View of Flying Platform from TOP



View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W2 6DOF Motion System (200kg / 440lb Payload)

Introduction

The CKAS W2 6DOF Motion System is specifically directed at **professional Virtual Reality (VR) motion simulator applications**, such as entertainment and training simulators, operator manned arcade entertainment simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium Scale Professional Fidelity VR Flight Training Simulators for up to 1 person**
- **Medium Scale VR Military Training Simulators for up to 1 person**
- **Medium Scale Professional Fidelity Commercial Vehicle and Truck Driver VR Training Simulators**
- **Medium Scale Mining Equipment Simulators and Heavy Earth Moving Equipment VR Simulators**
- **Medium Scale Professional Fidelity VR Train Driver Simulators for up to 1 person**
- **Medium Scale Professional Fidelity VR Research Platforms**

General Description and Capabilities

The CKAS W2 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new Virtual Reality (VR) design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W2 6DOF Motion System is full motion unit, and features a lightweight plate structure, can carry 200kg, can swing a massive 24^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 2.5m size payload. The technology used on this professional 6DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators.

The expected life of the W2 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. As an indicator of the fidelity, reliability and quality of these units, CKAS 6DOF Motion Systems are used by military contractors such as NASA USA to train Astronauts and Cosmonauts. Also, CKAS W Series 6DOF Motion Systems are the only motion systems worldwide which carry prestigious full flight simulator credits with the aviation authorities, when couple to a synthetic trainer. This is a true testament to the accuracy and fidelity of our Washout System and onset cueing algorithms.

The CKAS W2 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed. The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W2 6DOF Motion System
Product Code	W2MP
Product Number	62.0001.11
Product Description	Medium Scale 6 degree of freedom personal electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2000 mm (78.7”)
Nominal Length (Parked)	2000 mm (78.7”)
Nominal Height (Parked)	730 mm (28.7”)
Approx unit weight	480 kg (1060 lb)
Anchoring Specification	Not required for this motion system – Rubber mat recommended

Performance Specifications

Payload Mass Limit	200 kg (440lb)
Payload Moment of Inertia	100 kg.m^2 (2,610 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 600mm high from top of Flying Platform
Payload Max Floor Size	Diameter 2500mm (98”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±25^o , ±40^o/s , ±500^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±22^o , ±40^o/s , ±500^o/s^2
Indep. Roll (disp. / vel. / accel.)	±23^o , ±40^o/s , ±500^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 10 Amps
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0 / Ethernet (Optional)
Controller Update Frequency	100 Hz

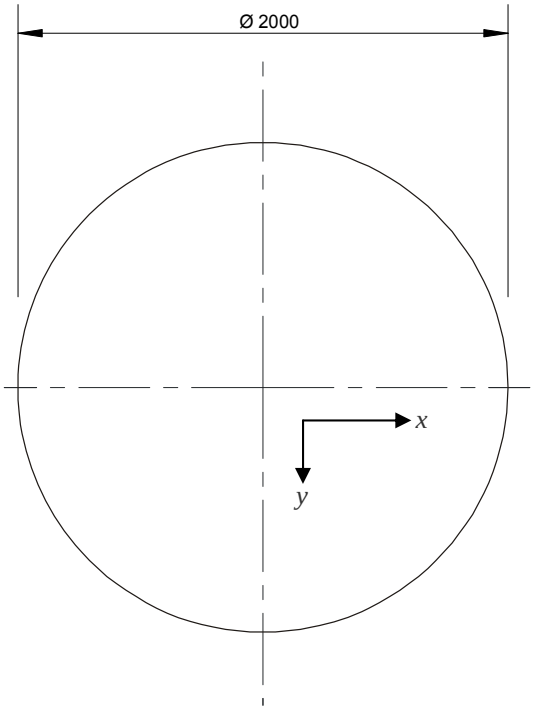
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

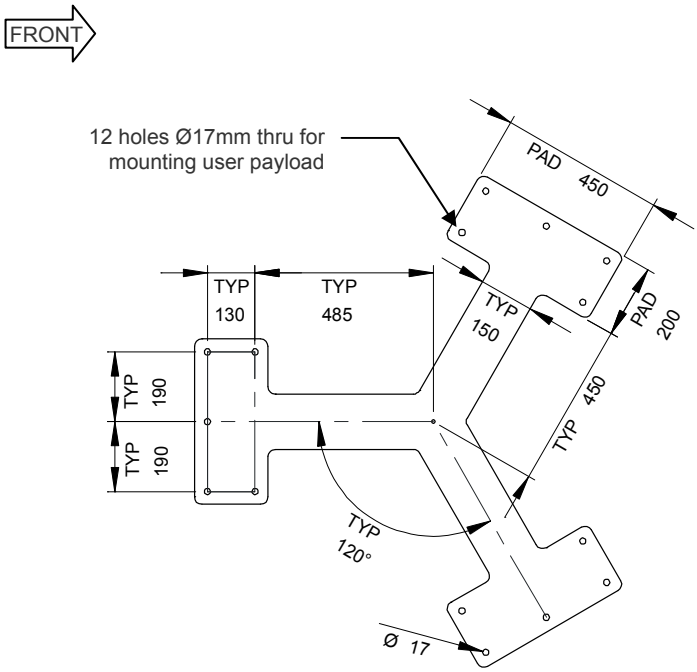
CKAS W2 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

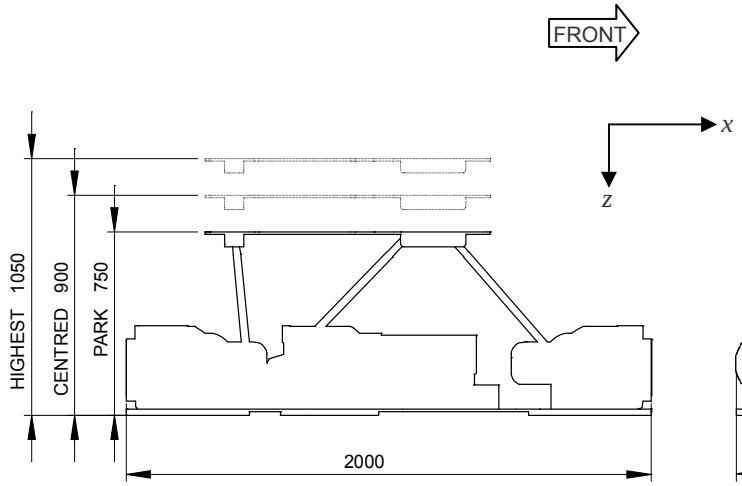
View of Base Mounting Holes from TOP



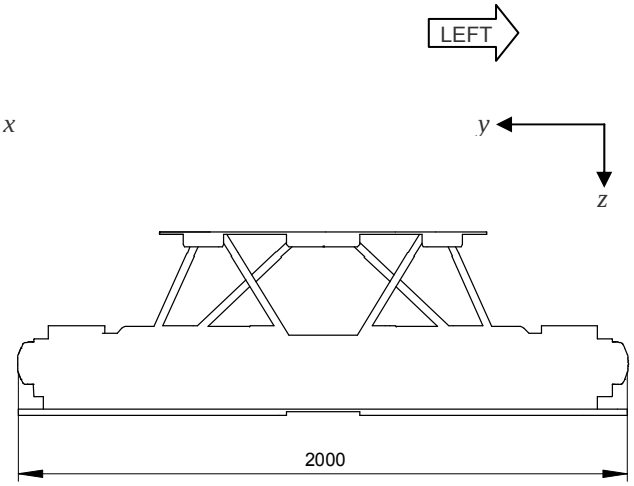
View of Flying Platform from TOP



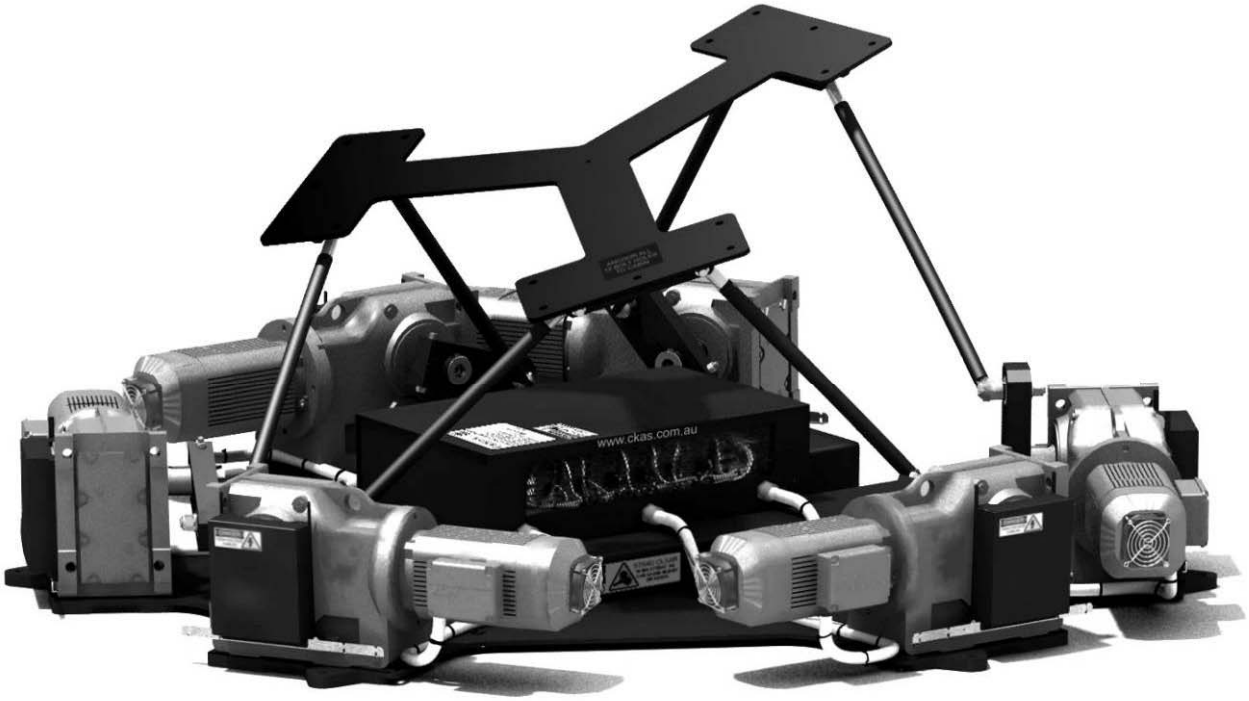
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W5 6DOF Motion System (500kg / 1100lb Payload)



Introduction

The CKAS W5 6DOF Motion System is specifically directed at **mid weight professional motion simulator applications**, such as commercial and industrial simulators, operator manned arcade entertainment simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium Scale Professional Fidelity Flight Training Simulators for up to 2 people**
- **Medium Scale Military Training Simulators for up to 2 people**
- **Medium Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Medium Scale Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Medium Scale Professional Fidelity Train Driver Simulators for up to 2 people**
- **Medium Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W5 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W5 6DOF Motion System is full motion unit, and features a lightweight plate structure, can carry 500kg, can swing a massive 24^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 2.5m size payload. The technology used on this professional 6DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators.

The expected life of the W5 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. As an indicator of the fidelity, reliability and quality of these units, CKAS 6DOF Motion Systems are used by military contractors such as NASA USA to train Astronauts and Cosmonauts. Also, CKAS W Series 6DOF Motion Systems are the only motion systems worldwide which carry prestigious full flight simulator credits with the aviation authorities, when couple to a synthetic trainer. This is a true testament to the accuracy and fidelity of our Washout System and onset cueing algorithms.

The CKAS W5 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed. The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W5 6DOF Motion System
Product Code	W5MP
Product Number	17.0001.11
Product Description	Medium Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2100 mm (82.7”)
Nominal Length (Parked)	1700 mm (66.9”)
Nominal Height (Parked)	625 mm (24.6”)
Approx unit weight	540 kg (1190 lb)
Anchoring Specification	6 places 13mm holes distributed to be anchored with 10-13mm fasteners

Performance Specifications

Payload Mass Limit	500 kg (1100lb)
Payload Moment of Inertia	250 $kg.m^2$ (5,930 $lb.ft^2$)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 600mm high from top of Flying Platform
Payload Max Floor Size	Diameter 2500mm (98”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	$\pm 24^o$, $\pm 40^o/s$, $\pm 500^o/s^2$
Indep. Pitch (disp. / vel. / accel.)	$\pm 24^o$, $\pm 40^o/s$, $\pm 500^o/s^2$
Indep. Roll (disp. / vel. / accel.)	$\pm 24^o$, $\pm 40^o/s$, $\pm 500^o/s^2$
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 16 Amps **hard wired (no RCD)**
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

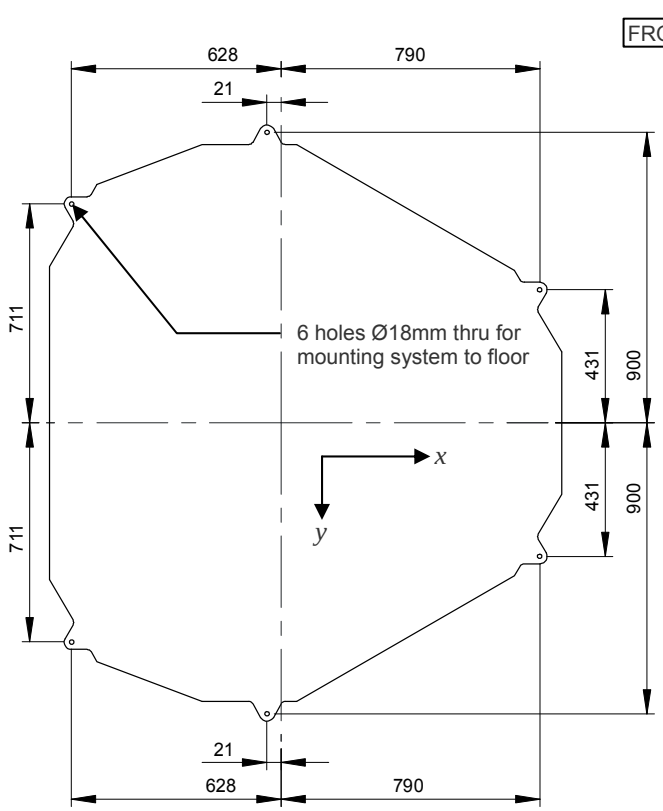
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

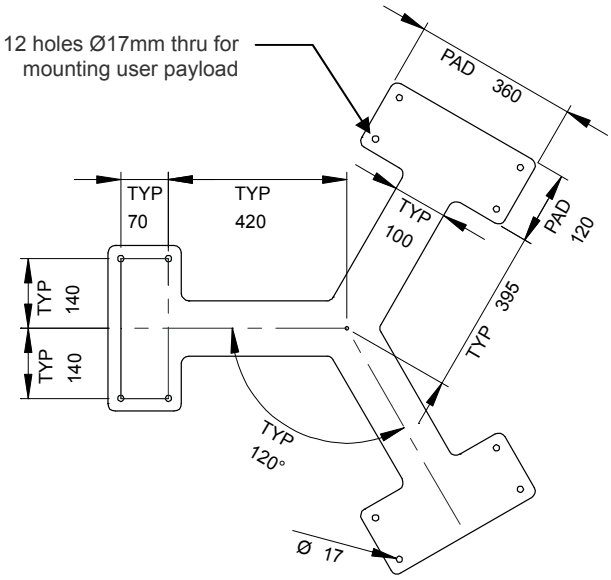
CKAS W5 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

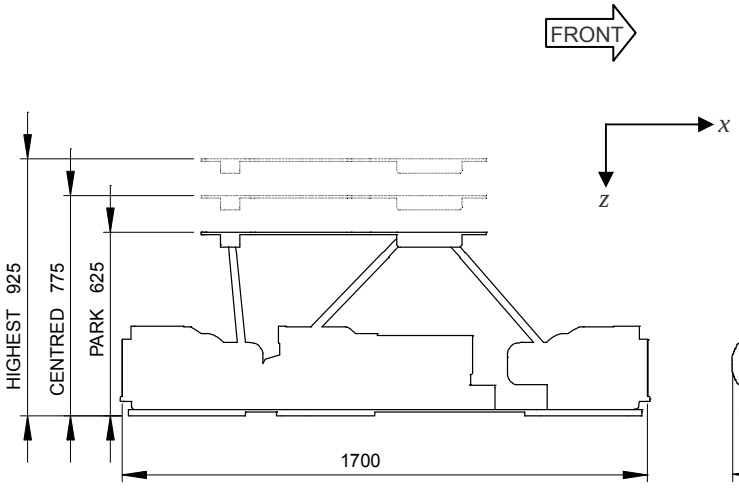
View of Base Mounting Holes from TOP



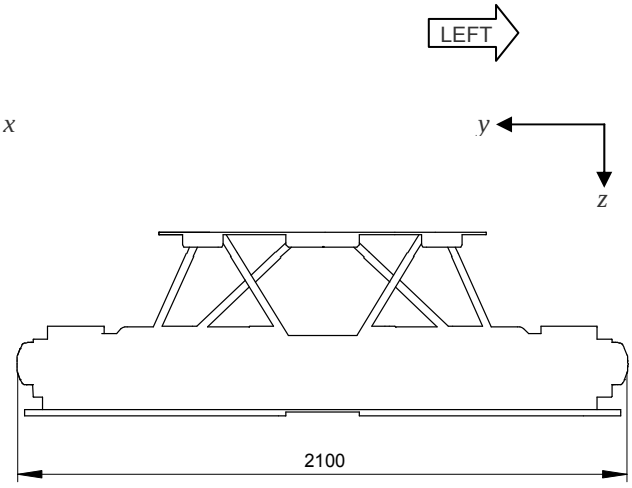
View of Flying Platform from TOP



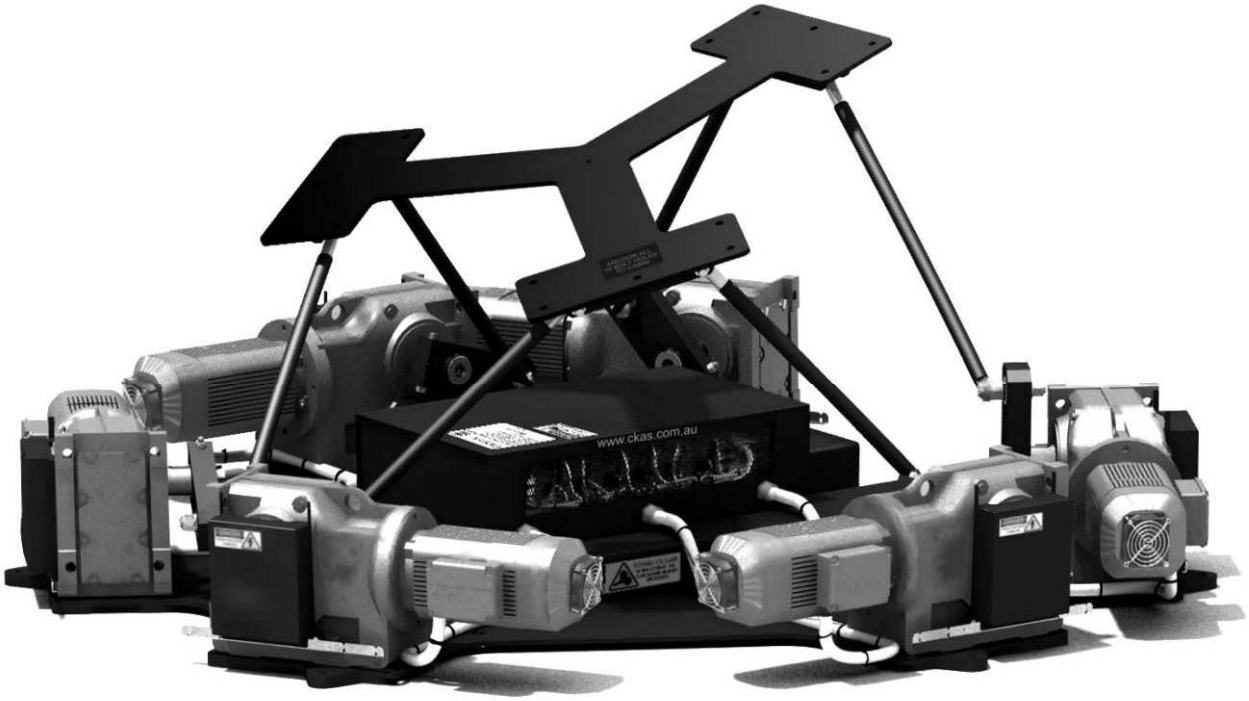
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W10 6DOF Motion System (1000kg / 2200lb Payload)



Introduction

The CKAS W10 6DOF Motion System is specifically directed at **mid weight professional motion simulator applications**, such as commercial and industrial simulators, operator manned arcade entertainment simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium Scale Professional Fidelity Flight Training Simulators for up to 3 people**
- **Medium Scale Military Training Simulators for up to 3 people**
- **Medium Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Medium Scale Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Medium Scale Professional Fidelity Train Driver Simulators for up to 3 people**
- **Medium Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W10 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W10 6DOF Motion System is full motion unit, and features a lightweight RHS frame structure, can carry 1000kg, can swing a massive 24^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 2.5m size payload. The technology used on this professional 6DOF system is "best in class", incorporating industry leading electronics, encoders and actuators.

The expected life of the W10 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. As an indicator of the fidelity, reliability and quality of these units, CKAS 6DOF Motion Systems are used by military contractors such as NASA USA to train Astronauts and Cosmonauts. Also, CKAS W Series 6DOF Motion Systems are the only motion systems worldwide which carry prestigious full flight simulator credits with the aviation authorities, when couple to a synthetic trainer. This is a true testament to the accuracy and fidelity of our Washout System and onset cueing algorithms.

The CKAS W10 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific "On-board" Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed. The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W10 6DOF Motion System
Product Code	W10MP
Product Number	18.0001.11
Product Description	Medium Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2100 mm (82.7”)
Nominal Length (Parked)	1700 mm (66.9”)
Nominal Height (Parked)	625 mm (24.6”)
Approx unit weight	600 kg (1320 lb)
Anchoring Specification	6 places 13mm holes distributed to be anchored with 10-13mm fasteners

Performance Specifications

Payload Mass Limit	1000 kg (2200lb)
Payload Moment of Inertia	450 kg.m^2 (10,700 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 600mm high from top of Flying Platform
Payload Max Floor Size	Diameter 2500mm (98”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±24^o , ±40^o/s , ±500^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±24^o , ±40^o/s , ±500^o/s^2
Indep. Roll (disp. / vel. / accel.)	±24^o , ±40^o/s , ±500^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 25 Amps **hard wired (no RCD)**
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

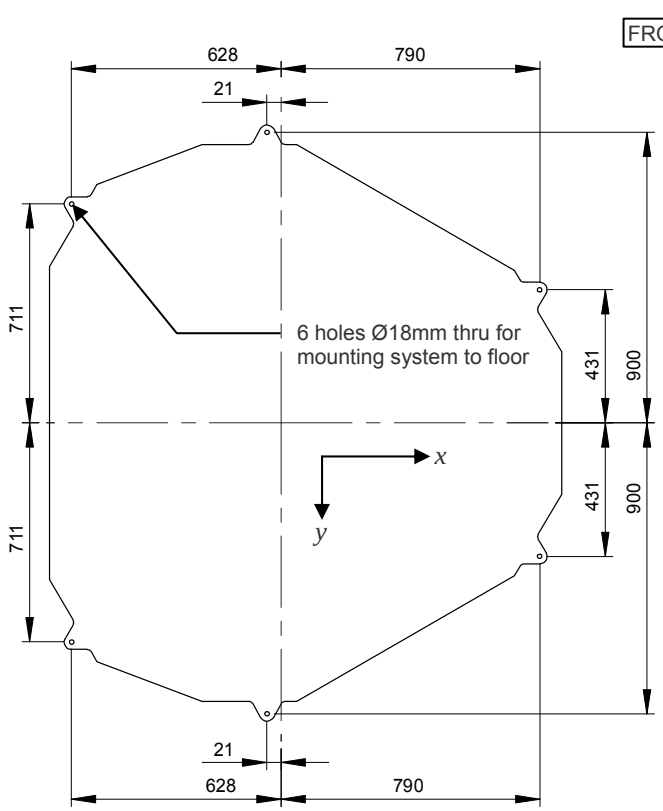
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

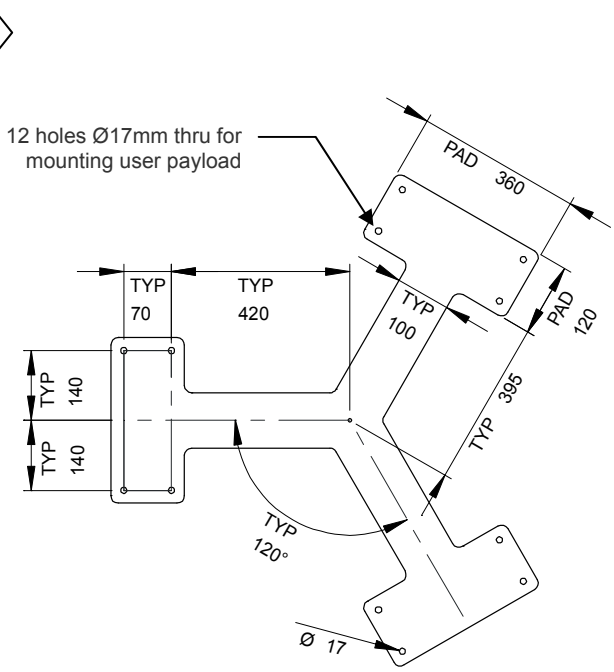
CKAS W10 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

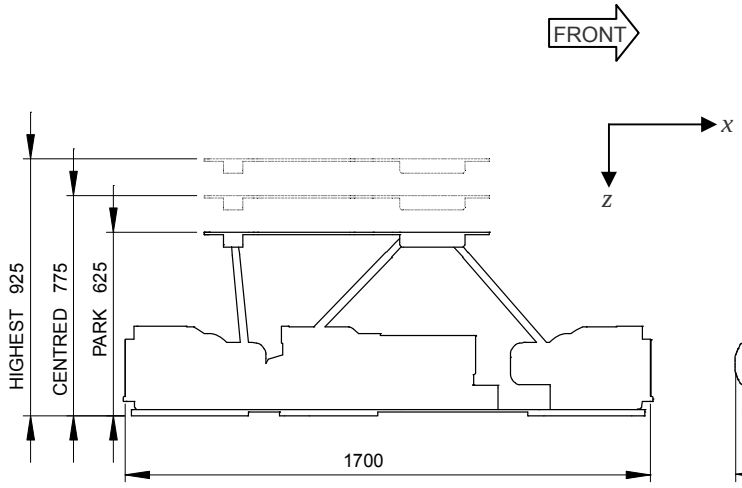
View of Base Mounting Holes from TOP



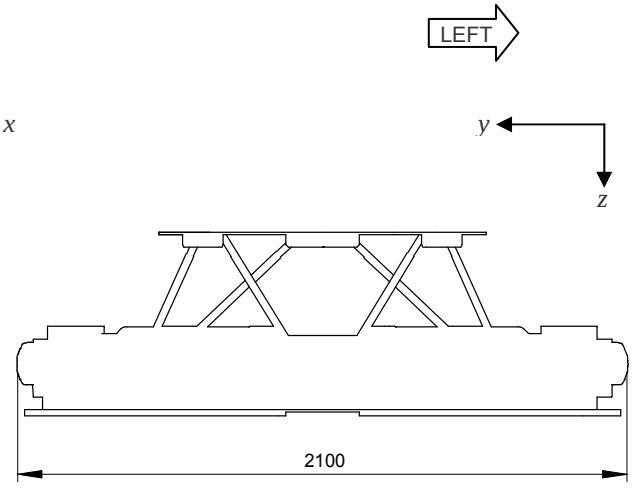
View of Flying Platform from TOP



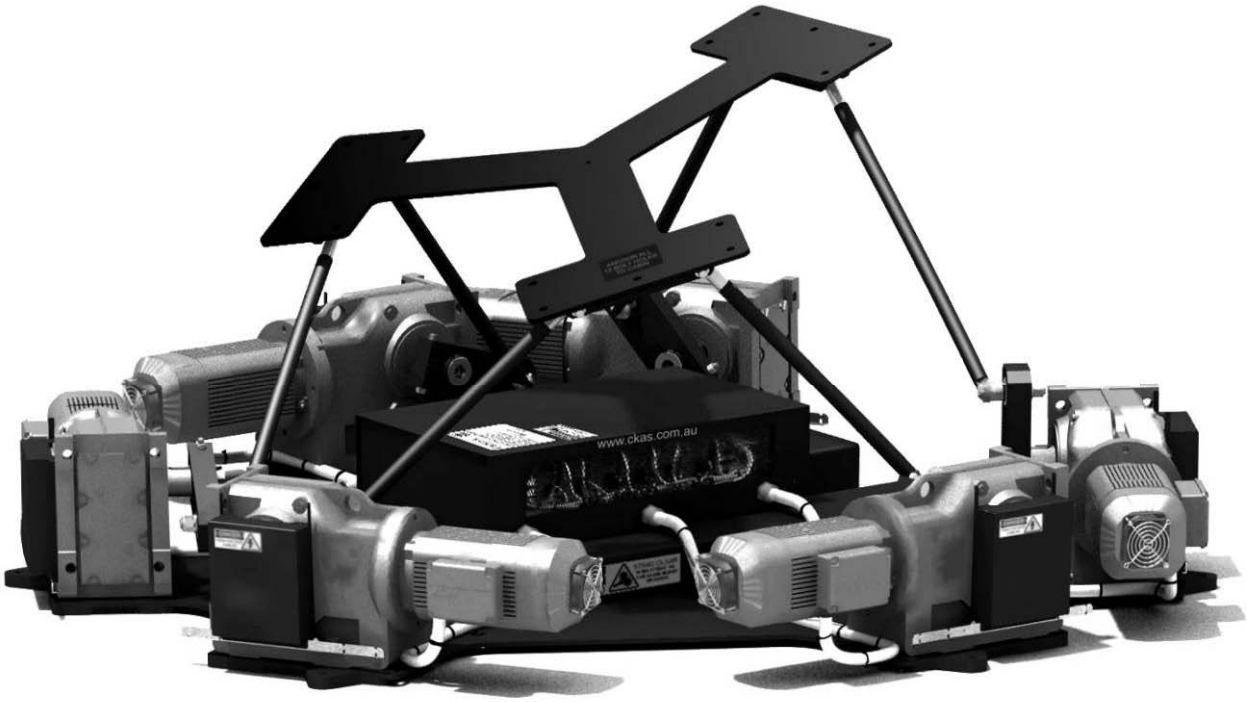
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W15 6DOF Motion System (1500kg / 3300lb Payload)



Introduction

The CKAS W15 6DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 5 people**
- **Medium-Large Scale Military Training Simulators for up to 5 people**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Medium-Large Scale Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Medium-Large Scale Professional Fidelity Train Driver Simulators for up to 5 people**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W15 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W15 6DOF Motion System is full motion unit, features a heavy plate frame structure, can carry 1500kg, can swing 18^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 3.0m size payload. The technology used on this professional 6DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators.

The expected life of the W15 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications.

The CKAS W15 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W15 6DOF Motion System
Product Code	W15MP
Product Number	19.0001.11
Product Description	Medium-Large Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2500 mm (98.4”)
Nominal Length (Parked)	2150 mm (84.6”)
Nominal Height (Parked)	750 mm (29.5”)
Approx unit weight	1100 kg (2400 lb)
Anchoring Specification	6 places 18mm holes distributed to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	1500 kg (3300 lb)
Payload Moment of Inertia	1500 kg.m^2 (35,600 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Roll (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 30 Amps **hard wired (no RCD)**
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

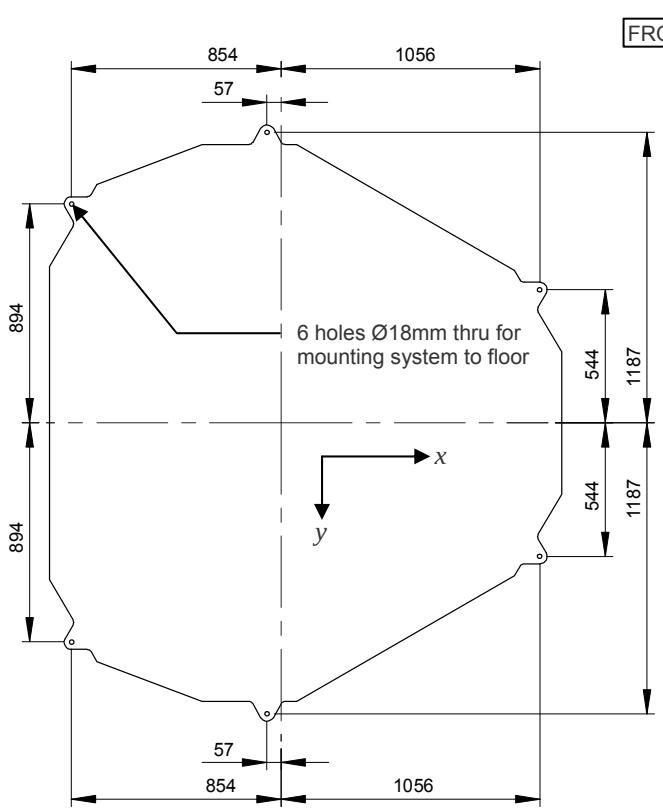
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

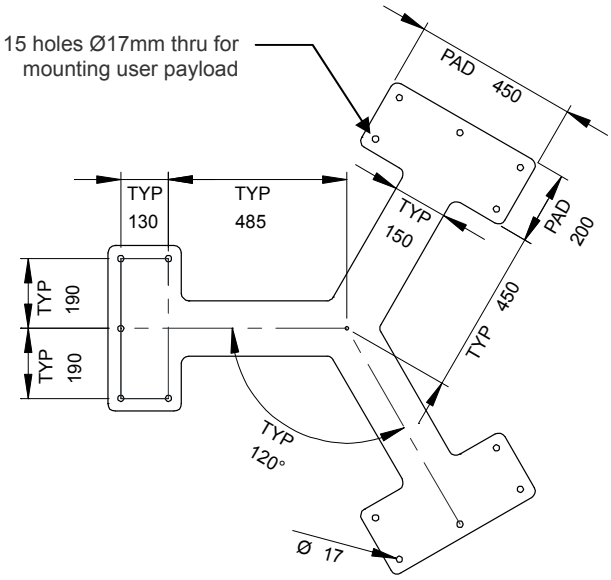
CKAS W15 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

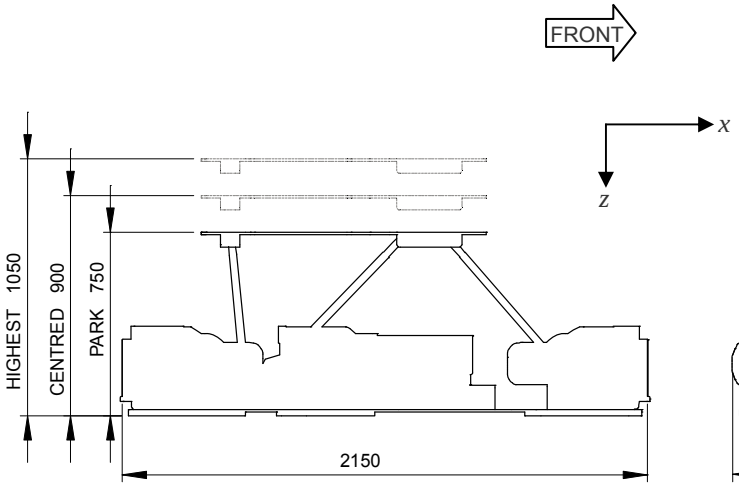
View of Base Mounting Holes from TOP



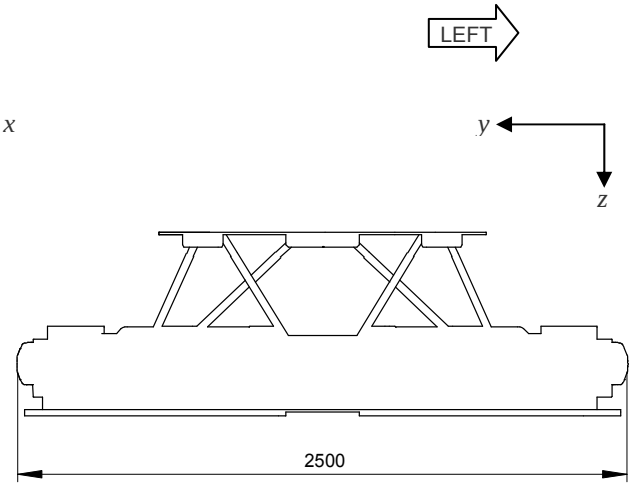
View of Flying Platform from TOP



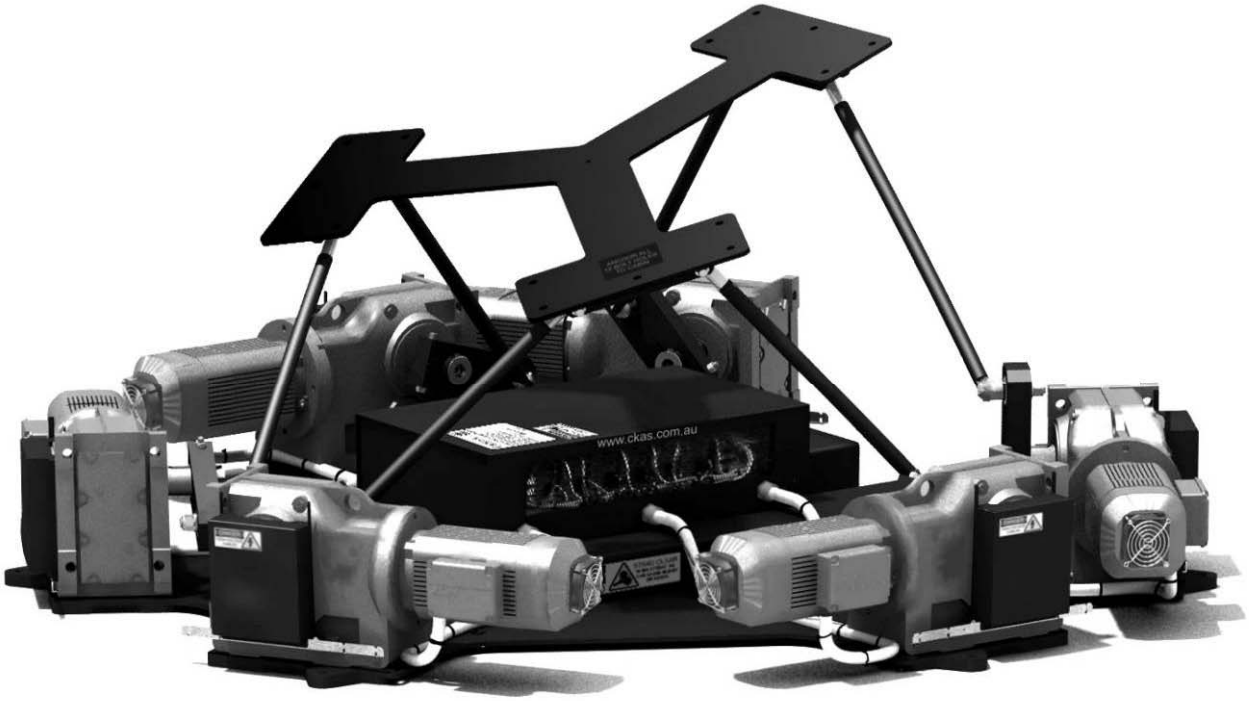
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W25 6DOF Motion System (2500kg / 5500lb Payload)



Introduction

The CKAS W25 6DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 12 people**
- **Medium-Large Scale Military Training Simulators for up to 12 people**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Medium-Large Scale Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Medium-Large Scale Professional Fidelity Train Driver Simulators for up to 12 people**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W25 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W25 6DOF Motion System is a full motion unit, features a heavy plate frame structure, can carry 2500kg, can swing 18^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 3.0m size payload. The technology used on this professional 6DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators.

The expected life of the W25 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications.

The CKAS W25 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W25 6DOF Motion System
Product Code	W25MP
Product Number	20.0001.11
Product Description	Medium-Large Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2500 mm (98.4”)
Nominal Length (Parked)	2150 mm (84.6”)
Nominal Height (Parked)	750 mm (29.5”)
Approx unit weight	1100 kg (2400 lb)
Anchoring Specification	6 places 18mm holes distributed to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	2500 kg (5500 lb)
Payload Moment of Inertia	3500 kg.m^2 (83,000 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Roll (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 50 Amps **hard wired (no RCD)**
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

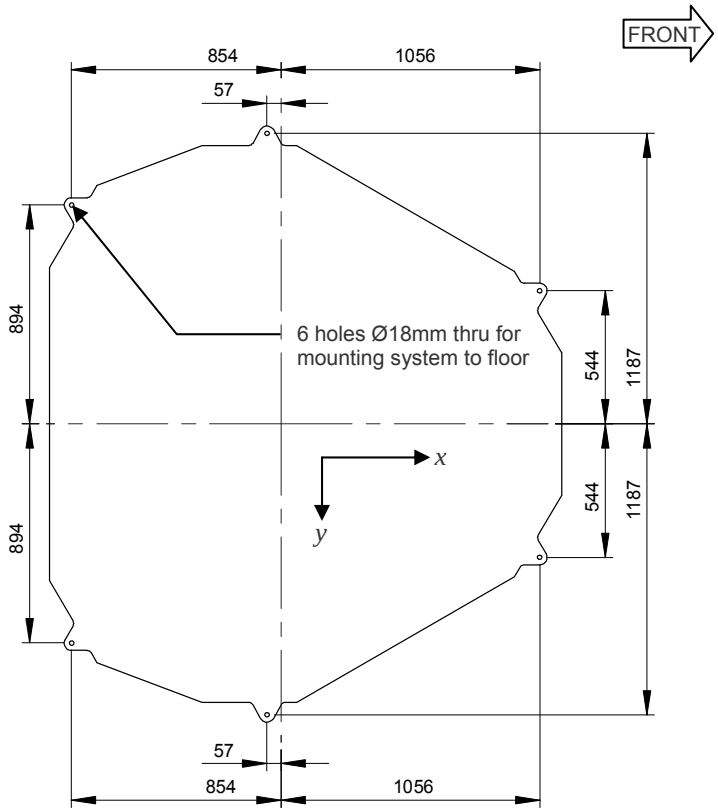
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

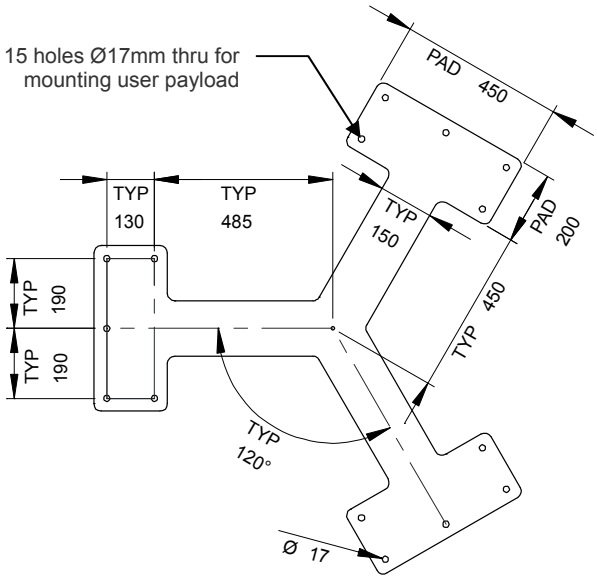
CKAS W25 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

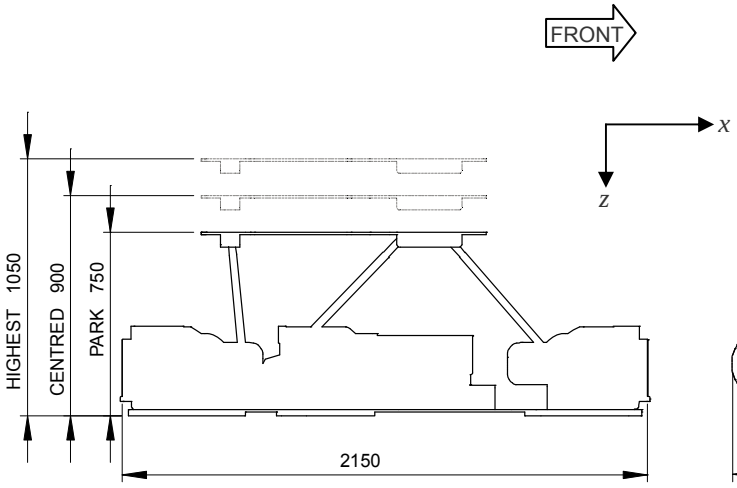
View of Base Mounting Holes from TOP



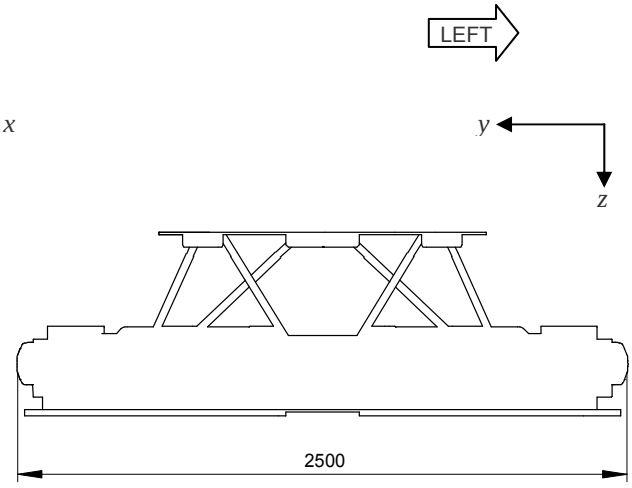
View of Flying Platform from TOP



View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W50 6DOF Motion System (5000kg / 11000lb Payload)

Introduction

The CKAS W50 6DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 25 people**
- **Medium-Large Scale Military Training Simulators for up to 25 people**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators**
- **Medium-Large Scale Mining Equipment Simulators and Heavy Earth Moving Equipment Simulators**
- **Medium-Large Scale Professional Fidelity Train Driver Simulators for up to 25 people**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W50 6DOF Motion System is Ideal for OEM manufacturers of existing simulator products or home builders who are looking for a cost effective method to add professional motion to an existing or new design. This unit is built to CKAS standards, and is USB plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W50 6DOF Motion System is a full motion unit, features a heavy plate frame structure, can carry 5000kg, can swing 18^{o} in any axis, make an excursion of 150mm in any direction, and a high enough architecture to take a 3.0m size payload. The technology used on this professional 6DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators.

The expected life of the W50 is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications.

The CKAS W50 6DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W50 6DOF Motion System
Product Code	W50MP
Product Number	65.0001.11
Product Description	Medium-Large Scale 6 degree of freedom electric motion system
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	6 Degree of Freedom Modified Stewart Hybrid
Actuation	Fully Electric
Nominal Width (Parked)	2700 mm (106.3”)
Nominal Length (Parked)	2600 mm (102.4”)
Nominal Height (Parked)	980 mm (38.6”)
Approx unit weight	1500 kg (3300 lb)
Anchoring Specification	6 places 18mm holes distributed to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	5000 kg (11000 lb)
Payload Moment of Inertia	6000 $kg.m^2$ (140,000 $lb.ft^2$)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	$\pm 18^o$, $\pm 30^o/s$, $\pm 300^o/s^2$
Indep. Pitch (disp. / vel. / accel.)	$\pm 18^o$, $\pm 30^o/s$, $\pm 300^o/s^2$
Indep. Roll (disp. / vel. / accel.)	$\pm 18^o$, $\pm 30^o/s$, $\pm 300^o/s^2$
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	380 - 450V AC Three Phase @ 50 Amps per phase **hard wired (no RCD)**
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
PC Connectivity	USB 2.0
Controller Update Frequency	100 Hz

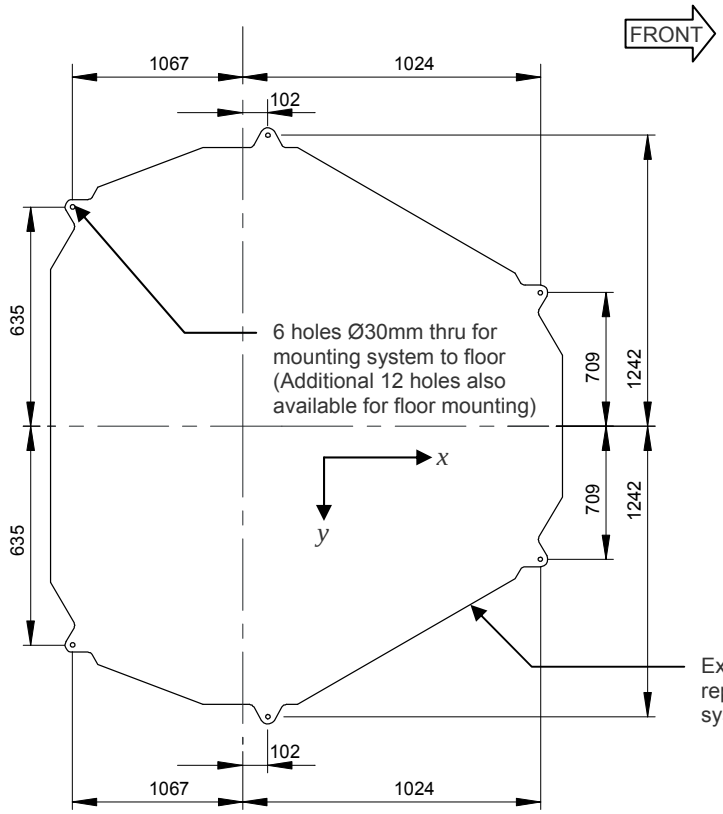
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

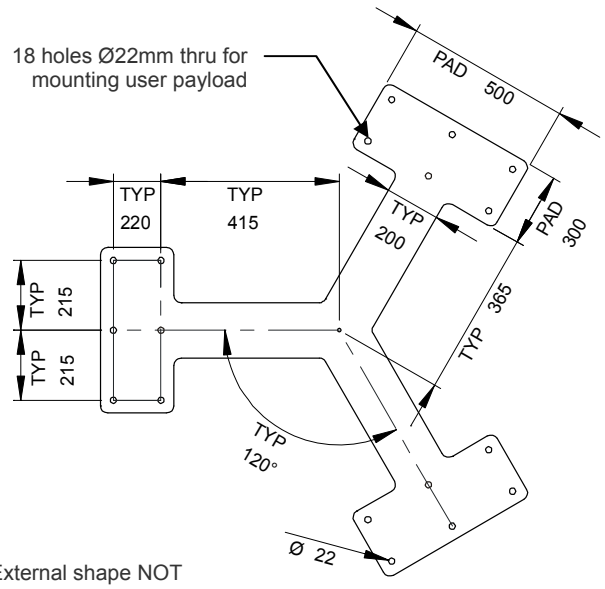
CKAS W50 6DOF Motion System Engineering Dimensions

(Subject to change without notification)

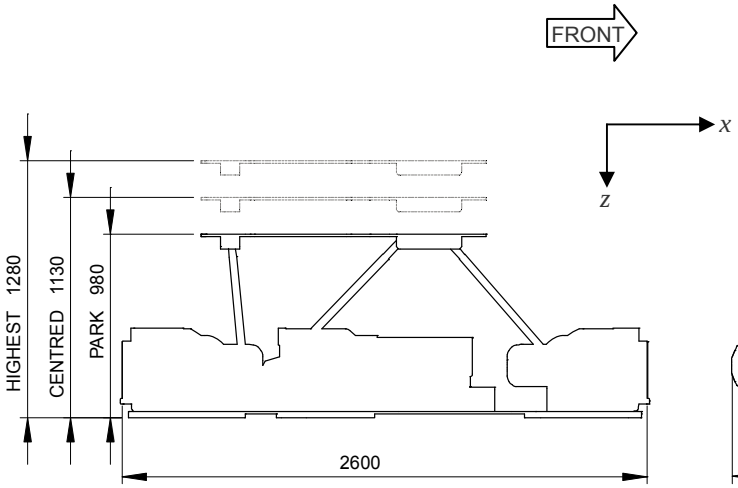
View of Base Mounting Holes from TOP



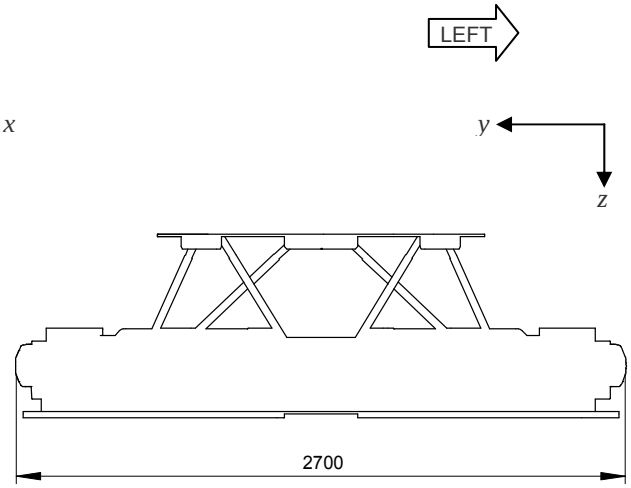
View of Flying Platform from TOP



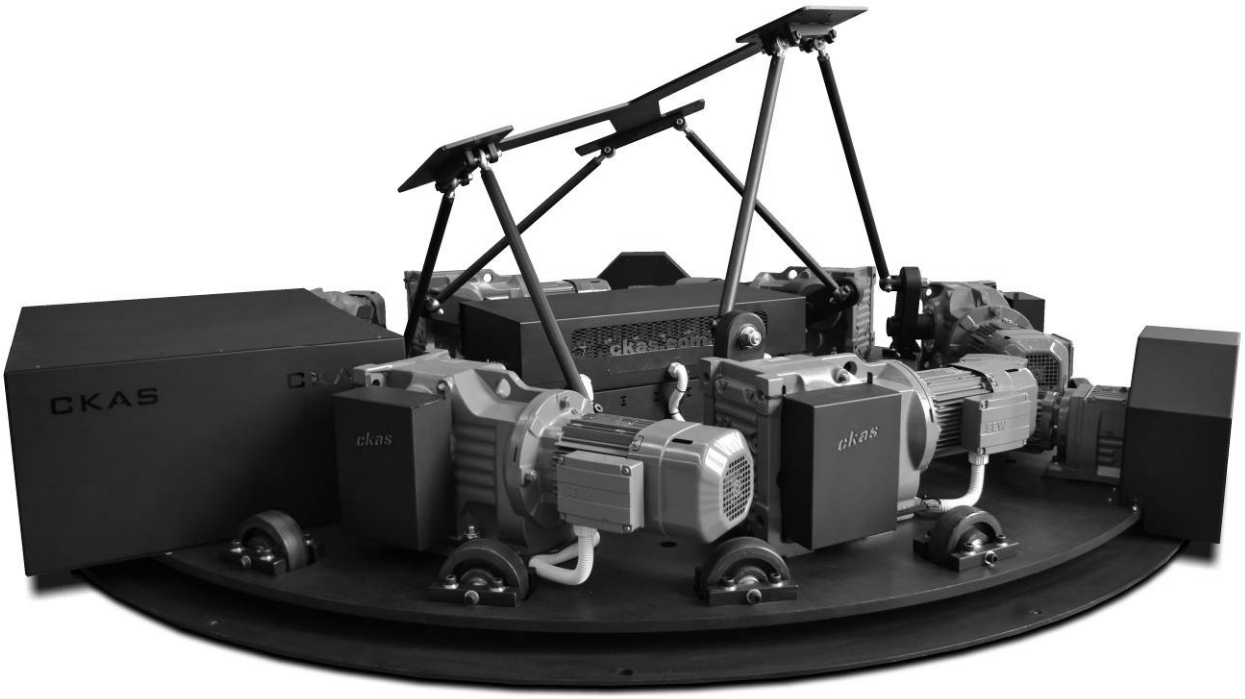
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W15R 7DOF Motion System (1500kg / 3300lb Payload) 6DOF + Infinite Turntable



Introduction

The CKAS W15R 7DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications requiring excellent ground handling capabilities or disorientation training abilities**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **absolute highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 5 people with UPRT and Disorientation Training abilities**
- **Medium-Large Scale Military Training Simulators for up to 5 people with superior ground handling or Disorientation Training**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators with proper ground handling**
- **Antenna and Radome Research Platforms**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W15R 7DOF Motion System is Ideal for OEM manufacturers of existing simulator products who are looking for a cost effective method to add the highest level of professional motion to an existing or new design. This unique 7DOF unit (6DOF + Infinite Turntable) is built to CKAS standards, and is USB (or Ethernet) plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W15R 7DOF Motion System is a full motion unit with additional infinite rotation turntable capability, features a heavy plate frame structure, can carry 1500kg, can swing 18^{o} in any axis, make an excursion of 150mm in any direction, can rotate indefinitely in the Yaw axis with enough speed to simulate a turning vehicle, and a high enough architecture to take a 3.0m size payload.

The W15R has a connection to power which the user can supply up to 80 amps into. Some of this power (up to 35 Amps) is utilised by the motion system and the remainder is available for the user for items such as computers and visuals. The W15R can carry up to 4 x 4U rack computers on the turntable itself in a 2 x 8U Full Depth Rack.

The expected life of the W15R is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. The technology used on this professional 7DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators

The CKAS W15R 7DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W15R 7DOF Motion System
Product Code	W15RMP
Product Number	60.0002.11
Product Description	Medium-Large Scale 7DOF electric motion system with infinite turntable
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	7 Degree of Freedom Modified Stewart Hybrid with infinite turntable
Actuation	Fully Electric
Nominal Width (Parked)	2900 mm (114.2") (additional 100mm (4") overhang for on board PC rack)
Nominal Length (Parked)	2900 mm (114.2") (additional 100mm (4") overhang for on board PC rack)
Nominal Height (Parked)	790 mm (31.1")
Approx unit weight	1600 kg (3500 lb)
Anchoring Specification	8 places 22mm holes on 2850 PCD to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	1500 kg (3300 lb)
Payload Moment of Inertia	1500 kg.m^2 (35,600 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118")
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Roll (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Turntable (disp. / vel. / accel.)	±∞^{o} , ±25^o/s , ±150^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 35 Amps **hard wired (no RCD)** for Motion
Power Available to Onboard	Up to 200 – 250V AC Single Phase @ 45 Amps (if 80 Amps supply used)
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
Connection Interface	1 x Single Phase Power up to 80 Amps, 1 x Ethernet, 4 x General I/O Lines
PC Connectivity	USB 2.0 (Ethernet Optional)
PC Space on Turntable	2 x 8U full depth rack for on board computing
Controller Update Frequency	100 Hz

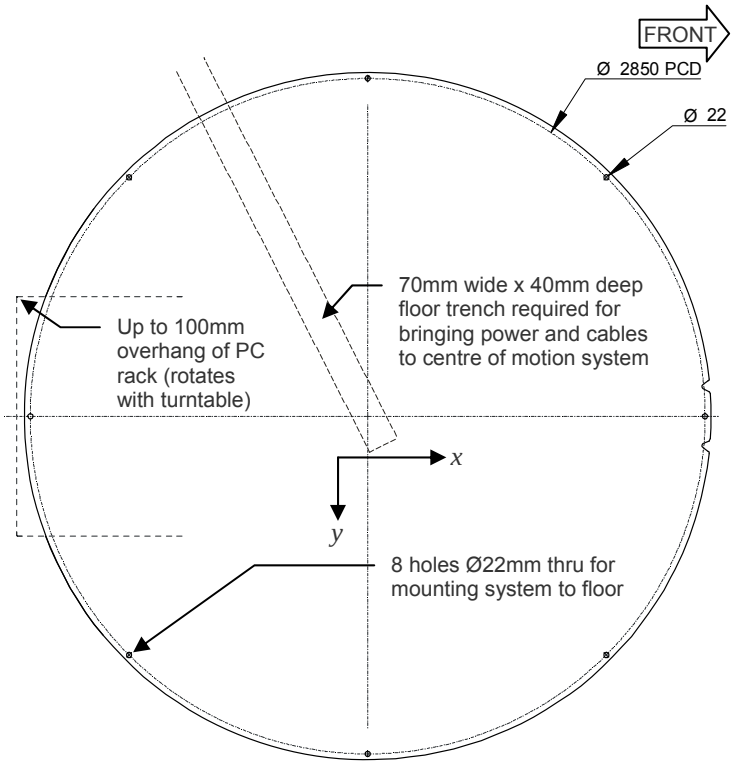
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

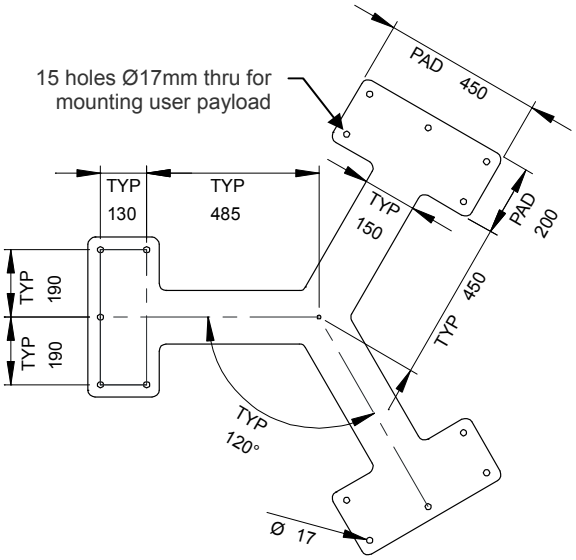
CKAS W15R 7DOF Motion System Engineering Dimensions

(Subject to change without notification)

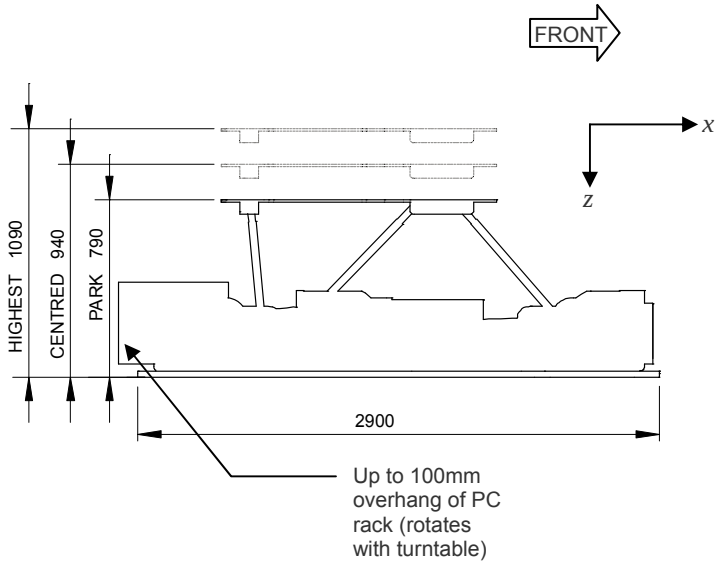
View of Base Mounting Holes from TOP



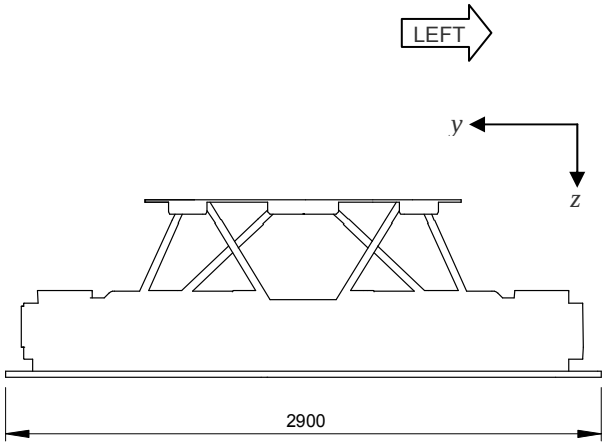
View of Flying Platform from TOP



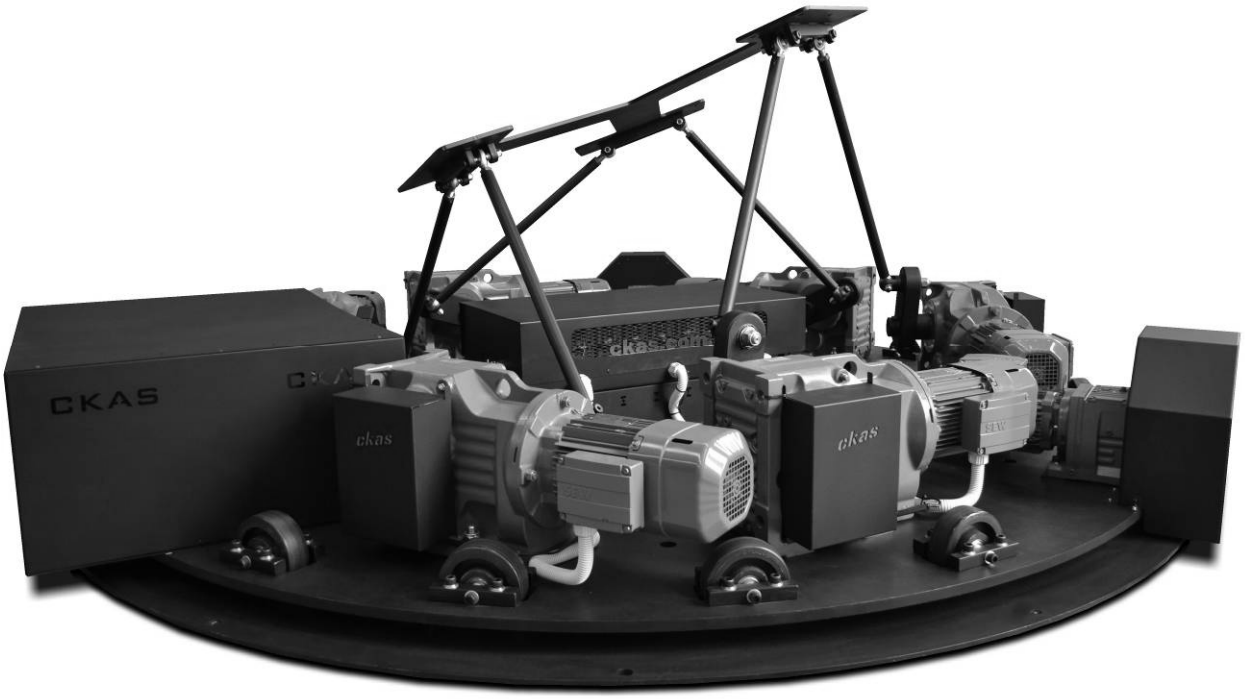
View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W25R 7DOF Motion System (2500kg / 5500lb Payload) 6DOF + Infinite Turntable



Introduction

The CKAS W25R 7DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications requiring excellent ground handling capabilities or disorientation training abilities**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **absolute highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 5 people with UPRT and Disorientation Training abilities**
- **Medium-Large Scale Military Training Simulators for up to 5 people with superior ground handling or Disorientation Training**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators with proper ground handling**
- **Antenna and Radome Research Platforms**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W25R 7DOF Motion System is Ideal for OEM manufacturers of existing simulator products who are looking for a cost effective method to add the highest level of professional motion to an existing or new design. This unique 7DOF unit (6DOF + Infinite Turntable) is built to CKAS standards, and is USB (or Ethernet) plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W25R 7DOF Motion System is a full motion unit with additional infinite rotation turntable capability, features a heavy plate frame structure, can carry 2500kg, can swing 18^{o} in any axis, make an excursion of 150mm in any direction, can rotate indefinitely in the Yaw axis with enough speed to simulate a turning vehicle, and a high enough architecture to take a 3.0m size payload.

The W25R has a connection to power which the user can supply up to 80 amps into. Some of this power (up to 55 Amps) is utilised by the motion system and the remainder is available for the user for items such as computers and visuals. The W25R can carry up to 4 x 4U rack computers on the turntable itself in a 2 x 8U Full Depth Rack.

The expected life of the W25R is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. The technology used on this professional 7DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators

The CKAS W25R 7DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

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- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W25R 7DOF Motion System
Product Code	W25RMP
Product Number	60.0001.11
Product Description	Medium-Large Scale 7DOF electric motion system with infinite turntable
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	7 Degree of Freedom Modified Stewart Hybrid with infinite turntable
Actuation	Fully Electric
Nominal Width (Parked)	2900 mm (114.2”) (additional 100mm (4”) overhang for on board PC rack)
Nominal Length (Parked)	2900 mm (114.2”) (additional 100mm (4”) overhang for on board PC rack)
Nominal Height (Parked)	790 mm (31.1”)
Approx unit weight	1800 kg (4000 lb)
Anchoring Specification	8 places 22mm holes on 2850 PCD to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	2500 kg (5500 lb)
Payload Moment of Inertia	3500 kg.m^2 (83,000 lb.ft^2)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118”)
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Pitch (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Indep. Roll (disp. / vel. / accel.)	±18^o , ±30^o/s , ±300^o/s^2
Turntable (disp. / vel. / accel.)	±∞^{o} , ±25^o/s , ±150^o/s^2
Max Motion Excitation Frequency	50 Hz

Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 55 Amps **hard wired (no RCD)** for Motion
Power Available to Onboard	Up to 200 – 250V AC Single Phase @ 25 Amps (if 80 Amps supply used)
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
Connection Interface	1 x Single Phase Power up to 80 Amps, 1 x Ethernet, 4 x General I/O Lines
PC Connectivity	USB 2.0 (Ethernet Optional)
PC Space on Turntable	2 x 8U full depth rack for on board computing
Controller Update Frequency	100 Hz

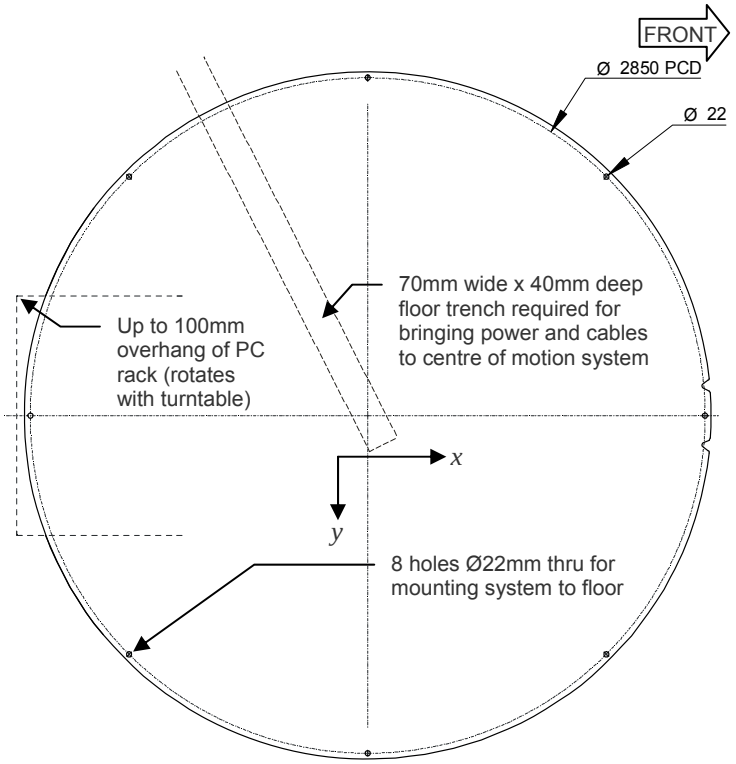
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

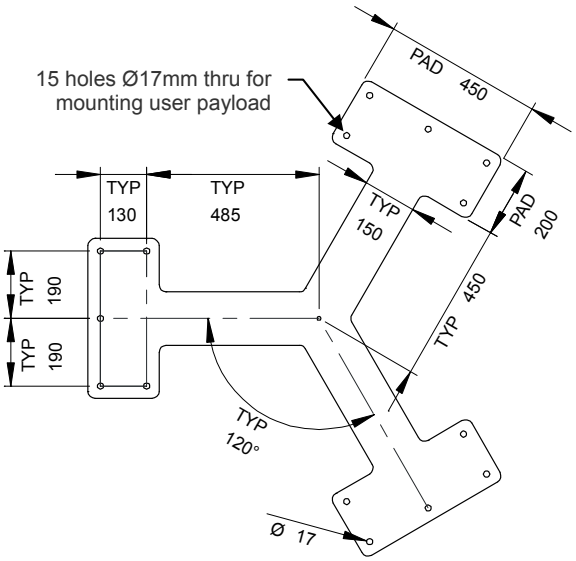
CKAS W15R 7DOF Motion System Engineering Dimensions

(Subject to change without notification)

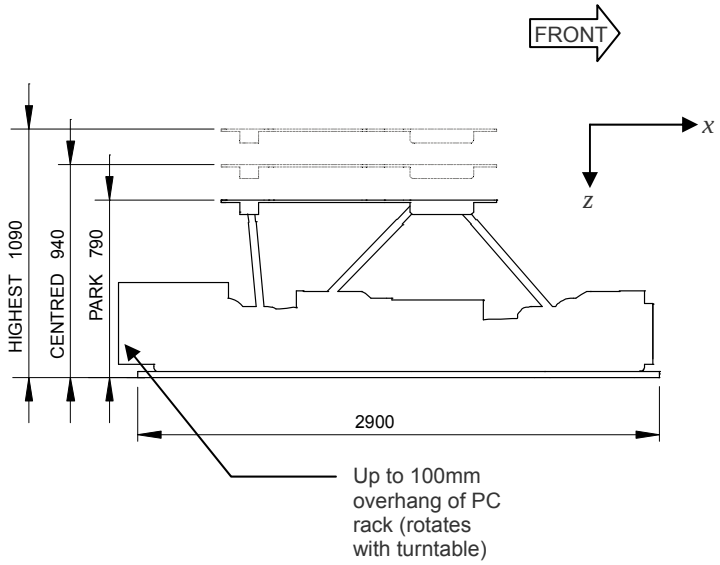
View of Base Mounting Holes from TOP



View of Flying Platform from TOP



View of Motion System from RIGHT



View of Motion System from FRONT