

# **EDGE 6D INTERFACE SPECIFICATION**

5 May 2025

*This document describes the interface of the EDGE 6D motion base. For compatibility with your system, please update to the latest firmware version.* 

The EDGE 6D system supports different network interfaces, including:

- Game interfaces for direct support of selected games
- Adapter interface for adapter software (e.g. SimTools, FlyPT) for all other games
- Native interface for directly driving and logging of the platform

#### PRESET MODES

In addition to the network interfaces described above, the EDGE 6D also supports PRESET modes. With these modes the system will respond to motion input differently. The selected PRESET is displayed at the upper center of the small dashboard display.

The following modes are supported by default:

- 6DF: default 6DOF operation
- 6DS: 6DOF operation without shocks
- 6Sx: 6DOF operation with limited sustained g-forces (x=0: 0%, x=2: 25%, x=5: 50%)
- 6Gx: 6DOF operation with limited gravity g-forces (x=0: 0%, x=2: 25%, x=5: 50%)
- 2DF: 2DOF operation (roll, pitch)
- 3DH: 3DOF operation (roll, pitch, heave)
- 3DY: 3DOF operation (roll, pitch, yaw)
- 4DR: 4DOF operation (roll, pitch, heave, yaw)
- 4DS: 4DOF operation (surge, sway, heave, yaw)

Further, there are the following additional PRESET modes that execute an internal pattern independently of external motion input:

- ALL: the system executes in all 64 extreme positions; can be used to determine the workspace
- 6AX: the system demonstrates the 6 axes (surge, sway, heave, roll, pitch, yaw)

The system preset mode can be selected as follows:

- Ensure the system is in READY mode
- Press and hold the button of the small black/blue dashboard unit for more than 1 second

#### NETWORK ADDRESS

The IP-address of the EDGE 6D system is acquired through DHCP (IPv4). The acquired IP-address is presented through the dashboard display. If a static IP-address is required, please configure your router to do so.

In addition to its IP-address, the system can be addressed with the following hostname:

EDGE6Dssssss (ssssss representing the system's serial number)



## **GAME INTERFACES**

Most of the leading race and flight simulation games run directly with the EDGE 6D system without the need for adapter software (such as SimTools or FlyPT Mover). There is even a subset that runs directly from PS4/PS5/Xbox.

Below you find the required configurations for these games, after which you can run them directly (plug-and-play) with the EGDE 6D system:

- Aerofly FS (PC)
- Assetto Corsa (PC/PS4/Xbox)
- Assetto Corsa EVO (PC)
- Assetto Corsa Competizione (PC)
- Automobilista 2 (PC)
- Beam NG (PC)
- Condor 2 (PC)
- Digital Combat Simulation (DCS) (PC)
- Dirt Rally (PC)
- Dirt Rally 2.0 (PC)
- Dirt 3 (PC)
- Dirt 4 (PC)
- EA Sports WRC
- EPIC Roller Coasters (PC/PS5)
- F1 2018/.../24 (PC/PS5/Xbox)
- FlightGear (PC)
- Forza Horizon 4 and 5 (PC/Xbox)
- Gran Turismo 7 (PS4/PS5 + PC)
- IL-2 Sturmovik Great Battles (PC NON-STEAM VERSION)
- iRacing (PC)
- Kayak VR: Mirage (PC)
- Microsoft Flight Simulator 2020/2024 (PC)
- Project Cars (PC/PS4/Xbox)
- Project Cars 2 (PC/PS4/Xbox)
- Project Cars 3 (PC)
- rFactor2 (PC)
- SensorLog (iPhone)
- X-Plane 11/12 (PC)
- Military and Space applications (DIS IEEE 1278)

## Aerofly FS (PC)

From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

If <drive> is your Windows installation directory, and <username> is your Windows user folder name, then copy the file from the Aerofly FS directory of the package to:

<drive>:\Users\<username>\Documents\<aerofly fs>\external\_dll\

...with <aerofly fs> the directory Aerofly FS 2 or Aerofly FS 4, depending on your version.



### Assetto Corsa (PC/PS4/Xbox)

Runs without any configuration.

## Assetto Corsa Competizione (PC) / Assetto Corsa EVO (PC)

From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

From the Assetto Corsa Competizione folder of the package, copy the .exe-file to an arbitrary directory on your computer.

Create a shortcut to this exe-file and open Properties of this shortcut. In the tab 'Shortcut' and line 'Target' add the hostname of the EDGE 6D system:

💶 edge6dacc.e	xe - Shortco	ut Properti	es		×
Terminal C General Sh	ompatibility ortcut O	Security ptions	Detai Font	ls Previo Layout	ous Versions Colours
ec	lge6dacc.exe	e - Shortcut			
Target type:	Application				
Target location:	Assetto Con	sa Competia	zione		
Target:	a Competiz	ione\edge	6dacc.exe	" EDGE6Ds	sssss
Start in:	"D:\Docun	nents\Gford	efactory	Gforcefactor	y Tec
Shortcut key:	None				
<u>R</u> un:	Normal win	dow			$\sim$
Comment:					
Open <u>F</u> ile L	ocation	Change lo	on	Advanced	ł
	-		_		
	L	OK	C	ancel	Apply

...where ssssss is the serial number of your EDGE 6D system. Alternatively you can use the IP-address instead of the EDGE 6D hostname.

Run this shortcut every time you play Assetto Corsa Competizione.

#### Automobilista 2 (PC)

From the main menu, select OPTIONS\SYSTEM:

```
Shared Memory = No
UDP Frequency = 1
UDP Protocol Version = Project CARS 1
```



## Beam NG (PC)

This interface only works if the EDGE 6D is connected to a router. It will NOT work when the EDGE 6D is wired directly to the PC (i.e. has IP address 169.xxx.xxx).

From the options menu, select OTHER. Select 'MotionSim UDP protocol'.

IP-address: IP address of your EDGE 6D system Port: 4444 Max update rate: 100

Condor 2 (PC)

In the install directory: .../Condor2/Settings

Edit the file UDP.ini as follows:

[General] Enabled=1

[Connection] Host=<IP-address of EDGE 6D system> Port=55278

[Misc] SendIntervalMs=10 ExtendedData=0 LogToFile=0

#### **Digital Combat Simulation (PC)**

Find the folder where file Export.lua of your DCS install is located.

For DCS World Steam Edition, this should be: C:\Users\<username>\Saved Games\DCS\Scripts\.

For non-steam version, this should be in the DCS main folder: ...\DCS World\Scripts.

If the folder does not exist on the C-drive, please create it.

Rename the original Export.lua to some other name to backup this file.

From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

From the Digital Combat Simulation folder of the package, copy the Export.lua file to the DCS folder (or replace Export\_BEH\_Motion\_Cls.lua in case you installed Brunner CLS2SIM).

## Dirt Rally (PC)

Search for the config file:



<drive>\Users\<user>\Documents\My Games\
DiRT Rally\hardwaresettings\hardware\_settings\_config.xml

Search for the line starting with <udp ...> and enable UDP with the IP-address as given on the EDGE 6D display by changing the line:

<udp enabled="true" extradata="1" ip="xxx.xxx.xxx.xxx" port="20779" delay="1" />

Save the file and start the game.

Dirt Rally 2.0 (PC)

Search for the config file:

<drive>\Users\<user>\Documents\My Games\ DiRT Rally 2.0\hardwaresettings\hardware\_settings\_config.xml

Note there are separate files for use with or without VR headset.

Search for the line starting with <udp ...> and enable UDP with the IP-address as given on the EDGE 6D display by changing the line:

<udp enabled="true" extradata="0" ip="xxx.xxx.xxx" port="20779" delay="1" />

Save the file and start the game.

#### Dirt 3 (PC)

Search for the config file:

<drive>\Users\<user>\Documents\My Games\ DiRT3\hardwaresettings\hardware\_settings\_config.xml

Search for the line <motion ...> and enable motion with the IP-address as given on the EDGE 6D display by changing the line:

<motion enabled="true" extradata="1" ip="xxx.xxx.xxx" port="20778" delay="1" extradata="0" />

Save the file and start the game.

#### Dirt 4 (PC)

Search for the config file:

<drive>\Users\<user>\Documents\My Games\
DiRT 4\hardwaresettings\hardware\_settings\_config.xml

Search for the line starting with <udp ...> and enable UDP with the IP-address as given on the EDGE 6D display by changing the line:

<udp enabled="true" extradata="0" ip="xxx.xxx.xxx" port="20779" delay="1" />



Save the file and start the game.

### **EA Sports WRC**

Search for the file <drive>\Users\<user>\Documents\My Games\WRC\telemetry\config.json Make a copy of this file as backup for later.

Within config.json file, search for the text:

```
"schema": 2,

"udp":

{

"packets": [

{

"structure": "wrc",

"packet": "session_update",

"ip": "xxx.xxx.xxx.xxx",

"port": ppppp,

"frequencyHz": -1,

"bEnabled": EEEE
```

Set xxx.xxx.xxx to the IP address of the EDGE 6D system Set ppppp to 20776 Set EEEE to true

Save the file and start the game.

## **EPIC Roller Coasters (PC/PS5)**

From the menu SETTINGS – HARDWARE:

Select: TELEMETRY: DEFAULT IP Address: <IP address of the EDGE 6D system> or 255.255.255.255 UDP port: 7701 START

F1 2018/.../24 (PC/PS5/Xbox)

From the main menu, select:

Home\Game Options\Settings\Telemetry Settings\:

UDP Telemetry = On

*Either:* Broadcast Mode = On ...*or:* Broadcast Mode = Off IP Address = <IP address as displayed on EDGE 6D dashboard>

Port = 20777



Send Rate = 60 Hz

*F1 2018/.../2020:* UDP Format = Legacy

*F1 2021/.../23:* UDP Format = 2021

*F1 2024* UDP Format = 2024

### FlightGear (PC)

Find the directory with name Protocol of your FlightGear installation. This directory should look like:

<drive>:\Program Files\FlightGear <version\_number>\data\Protocol

From www.gforcefactory.com/support download and extract the game plug-in package.

From the FlightGear folder of the package, copy the edge6d\_protocol.xml file to the FlightGear Protocol directory.

Now, find the fsfg.exe file. This file can be found in a directory similar to:

<drive>:\Program Files\FlightGear <version\_number>\bin

Create a shortcut to fgfs.exe on your computer (e.g. on your desktop). Open the Properties of the shortcut (right-click on the icon). Then under the tab 'Shortcut' change the Target attribute to:

"<PATH>\fgfs.exe" --launcher fgfs --generic=socket,out,50,255.255.255.255,50010,udp,edge6d\_protocol

...where <PATH> is the directory path where fgfs.exe is located.

From now, use this shortcut to play Flight Gear with the EDGE 6D.

#### Forza Horizon 4 and 5 (PC/Xbox)

From the main menu, select SETTINGS – HUD AND GAMEPLAY:

DATA OUTONDATA OUTPUT IP ADDRESS<IP address as displayed on EDGE 6D dashboard>DATA OUTPUT IP PORT51010

#### Forza Motorsport / Forza Motorsport 7 (PC/Xbox)

From the main menu, select OPTIONS – GAMEPLAY & HUD.

DATA OUTONDATA OUTPUT IP ADDRESS<IP address as displayed on EDGE 6D dashboard>DATA OUTPUT IP PORT51010DATA OUT PACKET FORMATSLED

Gran Turismo 7 (PS4/PS5 + PC)



To run Gran Turismo with the EDGE 6D system, you will need a PlayStation 4 or 5 AND a PC.

From www.gforcefactory.com/support download and extract the game plug-in package.

From the Gran Turismo 7 folder of the package, copy the .exe-file to an arbitrary directory on your computer.

Create a shortcut to this exe-file and open Properties of this shortcut. In the tab 'Shortcut' and line 'Target' add after "GT7proxy.exe":

--ps\_ip 255.255.255.255 --xsim\_ip 255.255.255.255

Run this shortcut on your PC every time you play Gran Turismo on the PlayStation.

#### IL-2 Sturmovik Great Battles (PC – NON-STEAM VERSION)

In the installation folder, edit the following file: "data/startup.cfg". Then, adjust the following section accordingly:

```
[KEY = motiondevice]
    addr = "xxx.xxx.xxx.xxx"
    decimation = 1
    enable = true
    port = 49001
[END]
```

...with xxx.xxx.xxx the IP-address of the EDGE 6D system.

#### iRacing (PC)

From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

From the iRacing folder of the package, copy the file to an arbitrary directory on your computer.

Run the .exe file every time you play iRacing.

#### Kayak VR: Mirage (PC)

From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

From a Windows commandline, start:

edge6dUDPfwd 33001 <edge6d>

...where <edge6d> is either the hostname of your system or the IP address.

In the main menu of the game, select:

SETTINGS – GENERAL – TELEMETRY – SIM RACING STUDIO

Microsoft Flight Simulator 2020/2024 (PC)



From <u>www.gforcefactory.com/support</u> download and extract the game plug-in package.

From the Microsoft Flight Simulator folder of the package, copy the files to an arbitrary directory on your computer.

Run the .exe file <u>every time</u> you play Microsoft Flight Simulator. To avoid broadcast, you can add the IP-address or hostname of the EDGE 6D system as the first argument after the executable.

### Project Cars (PC/PS4/Xbox)

From the main menu, select: OPTIONS\GAMEPLAY.

Select UDP = '1'.

### Project Cars 2 (PC/PS4/Xbox)

From the main menu, select 'SYSTEM – Configure the game's interaction with external apps'.

Set the following:

Shared Memory = No UDP Frequency = 1 UDP Protocol Version = Project CARS 1

### Project Cars 3 (PC)

From the main menu, select the 'SYSTEM' tab, then set the settings below.

NOTE that the main menu may only be accessible after playing your first race after the demo race.

UDP MODE 1 UDP PROTOCOL VERSION PROJECT CARS 1

#### rFactor2 (PC)

From the Plug-in package, copy the DLL-file to:

<install directory>\rFactor 2\Bin64\Plugins

Start the game. Within the rFactor 2 game menu: Content & Settings – Settings – PLUGINS: Set the DLL-file to ON

Ensure that the EDGE 6D and the PC are on the same network segment.

#### SensorLog (iPhone)

The SensorLog interface on the EDGE 6D system can mirror real-time g-forces from iPhone to EDGE 6D system:

- 1. Install SensorLog App from App Store.
- 2. Configure SensorLog app according to the settings below
- 3. In CONFIGURATION GENERAL LOGGING SETTINGS: Set 'Log to stream' to 'yes'
- 4. In main menu: press 'record' button to start logging output



#### CONFIGURATION

#### GENERAL LOGGING SETTINGS

Logging rate: 50Hz Log format: ",", CSV JSON pretty print: yes Fill missing data with previous data: yes ML friendly data types (csv): no Device ID: <arbitrary> Display heading calibration: no Log to file: no Log to stream: yes [WHEN STARTING LOGGING]

STREAMING SETTINGS

Mode: client Protocol: UDP IP: <ip address of EDGE 6D system> [or use: 255.255.255.255 for broadcast] Port: 50011, set

#### HTTP SETTINGS: N/A

#### SENSORS AND DATA

Raw accelerometer data: yes Raw gyro data: yes Raw magnetometer data: no Unbiase: user acceleration, attitude, gravity, heading, magnetic field, rotation: no Db peak power, db average power: no Heading: no

SENSOR SAMPLING RATE UP TO 2HZ: all 'no'

#### MANUALLY CHANGED OR CONSTANT DATA: N/A

SENSOR CONFIGURATION: N/A

#### X-Plane 11/12 (PC)

From the main menu, select: SETTINGS

Then select the tab 'Data Output' and 'General Data Output'.

Here, select 'Network via UDP' with the following items:4. Mach,VVI,g-load16. Angular Velocities17. Pitch, roll & headings (optional / to your preference)

Under 'NETWORK CONFIGURATION' select 'Send network data output', with: IP Address = <IP address as shown on EDGE 6D dashboard> or 255.255.255.255 (for broadcast)



For X-Plane 11: Port = 49000 For X-Plane 12: Port = 49002

# Military and Space applications (DIS IEEE 1278)

The system supports the Distributed Interactive Simulation standard IEEE 1278, as used by simulation software such as Virtual Battle Space. For details, please contact Gforcefactory support.



### ADAPTER INTERFACE

For games that have no native support, the EDGE 6D provides interfaces to connect to adapter software. The following adapter software is supported:

- SimTools
- FlyPT

With these adapter software solutions, almost any game can be played with the EDGE 6D system. To use it, you need to install the software, and subsequently install a plug-in for the respective game.

The EDGE 6D system supports two BASIC interfaces for SimTools, and ADVANCED interface for SimTools and FlyPT.

The BASIC interface is easiest to configure, but offers little options for tuning.

The ADVANCED interface allows you to drive the platform directly and offers maximum tuning options.

#### <u>SIMTOOLS</u>

Simtools can be downloaded from: <u>https://simtools.us</u>

Installation will give you the following applications:

- SimTools GameEngine
- SimTools GameManager
- SimTools PluginUpdater

For downloading plug-ins for games, you need a subscription on the X-Simulator community: <u>https://www.xsimulator.net/simtools-motion-simulator-software/#plugins</u>.

Subsequently, you can download plug-ins from: <u>https://www.xsimulator.net/community/marketplace/categories/game-plugins.2/</u>

Any downloaded plug-in can be installed as follows:

- start SimTools PluginUpdater
- drag the plug-in file onto the PluginUpdater window

After installation of the plug-in, the game should appear in the GameManager.

To verify whether the plug-in was installed correctly, start the game. After starting the game, the GameManager should report 'Connected' and the buttons should change from green color to blue.

For configuring the plug-in, please find instructions below. Please beware that the quality of the plugins may differ for each game.

## BASIC interface (SimTools only)

To configure the plug-in you need to configure the Axis assignment and Network interface as follows (see also screenshots):



Axis assignment (DOF 1-6): <Surge><Sway><Heave><Roll><Pitch><Yaw> Network interface: <Axis1a><Axis2a><Axis3a><Axis4a><Axis5a><Axis6a> Data size: 16 bits Port: 50002 or 50003 (see below)

Ensure that the <Roll>, <Pitch> and <Yaw> are all set to 100%. This is important, as these dimensions are expressed in angle positions. If you set these dimensions at a lower percentage, anomalies in movements will occur at certain angle positions (e.g. rolling over/looping a plane or cornering a plane/car).

For the port you can either use 50002 or 50003. Using port 50002, the roll and pitch angles are included. In 50003 these angles are not included, so here it is expected that the roll and pitch angles are included in the Surge and Sway as gravity components.

The configuration should look like the pictures below. Note that the Game list must show your game, and the IP address should correspond to the IP address shown on the dashboard of the EDGE 6D system. If your EDGE 6D system is on the same network segment as your PC, you can also configure a broadcast using the IP address 255.255.255.255.

	Interface 1	Interface2	Interface3	Interface4	Interface5	Interface6
Home	F	Presets			Interface 1	1 Гуре
Axis Assignments	- Network C	Vutput	Create Preset	Reset	Network Plugin By	✓ - yobuddy
Interface Settings	Save	IP Add Output - Bit Rai	ress 255 255	5 255 25 Output - Type O	55 Port 5000; Binary O Decimal	2 Hex
Output Testing	Startup - O	Output Output (Axis2a	a> <axis3a><axis4a< td=""><td>&gt;<axis5a><axis6a< td=""><td>- ~ <sub>ms</sub> H</td><td>W Start utput Rate</td></axis6a<></axis5a></td></axis4a<></axis3a>	> <axis5a><axis6a< td=""><td>- ~ <sub>ms</sub> H</td><td>W Start utput Rate</td></axis6a<></axis5a>	- ~ <sub>ms</sub> H	W Start utput Rate
Tools	Shutdown	i - Output			· ∨ <sub>ms</sub> H	W Stop



	(a) Axis	Assign	nents			(1	) A	xis	Assign	nme	nts				Ax	is Li	imiting	ŝ	
Home	G	ame L	₋ist												Axis	Тур	e		
Axis	Default				Loa	d Def	ault		(eset	F	'reset:		G	eneric	2D Star Plugir	ndaro 1 By	l - yobu	√ ddy	
Assignments	Save		D	OF	1				D	OF	2				D	OF	3		
Interface	Axis 1	Dir	Forc Surge	e ~	% 100	Fi V	ι C	Dir	Forc	e V	%	~	Fit	Dir	Forc	e V	%	F	lt ·
Settings	Axis 2		-	~	_	~ •	[		Sway	~	100	~	•		-	~			
	Axis 3		-	~	_	~ ·	[			~	•	v	•		Heave	~	100		
Output Testing	Axis 4		-	~		~ ·	[			~	•	~	•			~	-	-	
	Axis 5		-	~	_	~ ·			_	~	-	~	٠		-	~	-	-	
	Axis 6		-	~	-	~ ·	[			~		~	٠		-	~	-	-	

	(a) Axis	Assignm	ents			(Ь	) Axi	s Assign	nme	nts			Ax	is Li	miting		
Home	G	ame L	ist										Axis	Тур	e		
Axis	Default			ř	Load	l Defa	ult	Reset	F	Presets	G	eneric	2D Star Plugir	ndard n By -	- yobud	Ƴ dy	
Assignments	Save		D	OF	4			D	OF	5			D	OF	6		
Interface	Axis 1	Dir	Forc	e V	%	Fit	Dir	Ford	e V	% - ~	Fit	Dir	Ford	e V	% - ~	Fit	
Settings	Axis 2			~	. ``	·			~	. v	·		-	~	. v	•	
	Axis 3			~	- ~	•			~	. v	•		-	~	. v	·	
Output Testing	Axis 4	F	Roll	~	100 ~	·			~	. v	•		-	~	. ~	•	
	Axis 5			~	. 、	·		Pitch	~	100 ~	•		-	~	. v	•	
Tools	Axis 6			~	- ``	Ŀ			~	. v	ŀ		Yaw	~	100 ~	ŀ	

You should now be able to test SimTools with the EDGE6D system through Output testing.



Finally, to further tune the system, be sure to adjust the values in the Tuning Center, accessible through the Tools menu, as follows:





### ADVANCED interface (SimTools & FlyPT)

The ADVANCED interface can be used to drive both the SimTools and FlyPT Mover adapter software.

For this, please configure the network output as:

IP-address: IP-address of the EDGE 6D system, or use 255.255.255.255 Port: 50004

When using the ADVANCED interface, we strongly advice to use a network cable (not Wifi) from the PC to the EDGE 6D system to avoid jitter and dropped packets.

We recommend using an output frequency between 50 and 100 Hz.

The output string of the ADVANCED interface always starts with:

<71><version\_number>...

...where <version\_number> is 0, 1 or 2.

The remainder of the output string is version dependent, and will be described below.

For all versions: if the output string is NOT well-formed, the EDGE 6D dashboard will display the incoming packet frequency extended with a question mark '?'.

#### Version 0

This version can be used to drive the EDGE 6D system with SimTools. For this, the output needs to be configured with:

Output – Bit Range: 16 Output – Type: Binary

Interface Output:

<71><version\_number><mode\_Axis1a><Axis1a><mode\_Axis2a><Axis2a><mode\_Axis3a><Axis3a><mode\_Axis4a><Axis4a><mode\_Axis5a><Axis5a><mode\_Axis6a><Axis6a>

...where the <*mode\_AxisXX*> must be a number, as follows:

0: power offset (Axis 1 represents pod 1, Axis 2 represents pod 2,...)

- 1: servo angle offset (Axis 1 represents pod 1, Axis 2 represents pod 2,...)
- 2: pod length offset (Axis 1 represents pod 1, Axis 2 represents pod 2,...)
- 3: platform offset:
  - Axis 1 represents platform surge (+/-)
  - Axis 2 represents platform sway (+/-)
  - Axis 3 represents platform heave (+/-)
  - Axis 4 represents platform roll (+/-)
  - Axis 5 represents platform pitch (+/-)
  - Axis 6 represents platform yaw (+/-)

4: platform acceleration (Axis 1 = Surge excl gravity, Axis 2 = Sway excl gravity, Axis 3 = Heave, Axis 4=Roll, Axis 5 = Pitch, Axis 6 = Yaw)



5: platform acceleration (Axis 1 = Surge incl gravity, Axis 2 = Sway incl gravity, Axis 3 = Heave, Axis 4=Roll, Axis 5 = Pitch, Axis 6 = Yaw)

Effectively, the behavior of mode 4 and 5 is the same as the BASIC input, but here it is possible to assign it for each axis individually. This may be useful, if the filter settings of the adapter software do not have the desired result.

The pod numbering starts from the user perspective at the right front and increments clock-wise.

Within SimTools it is possible to assign the game outputs (Surge, Sway, Heave, Roll, Pitch, Yaw) to more than one axis. For example, it is possible to assign the game Surge to the platform surge by assigning Surge to Axis 1, and at the same time assign the game Surge to platform pitch by assigning Surge to Axis 5. For natural behavior we recommend for the Surge on Axis 1 a high-frequency washout and for the Surge on Axis 5 a low-pass filter/slow smooth.

	Interface 1	Interface2	Interface3	Interface4	Interface5	Interface6
Home		resets			Interface 1	1 Type
Axis Assignments	- - Network C	vtput	Create Preset	Reset	Network Plugin By	- yobuddy
Interface Settings	Save	IP Addr Output - Bit Ran	ess 255 255 iqe 16 ~	255 25 Output - Type <b>O</b>	5 Port 5000 Binary O Decimal	4 Hex
Output Testing	Startup - C	Dutput Output <mark>&lt;71&gt;&lt;(</mark>	)><4> <axis1a>&lt;4&gt;</axis1a>	<axis2a>&lt;4&gt;<axis< th=""><th>- ∽ <sub>ms</sub> H <u>≲</u> 20 ∽ <sub>ms</sub> O</th><th>W Start utput Rate</th></axis<></axis2a>	- ∽ <sub>ms</sub> H <u>≲</u> 20 ∽ <sub>ms</sub> O	W Start utput Rate
Tools	Shutdown	- Output			<mark>- ∽</mark> ms H	N Stop

As an example, please consider the screenshots below.

The axis assignments are similar to the SimTools BASIC interface.



## Version 1

This version of the ADVANCED interface can be used to drive FlyPTMover in a basic way. Here we describe only the basics of the FlyPT Mover software. For further details, we recommend reading the FlyPT Mover manual itself.

To configure FlyPT Mover, press the right mouse button on the desktop of the FlyPT Mover application to configure the RIG and the OUTPUT:



RIG

From the FlyPTMover desktop: Add – Rig – Linear hexapod. Then configure as follows:

Position bit output: 16

RIG :: LINEAR HI	EXAPOD											
Pose keys	Sway PPoseSway	Surge PPoseSurg	Heave PPoseHeav	Yaw PPoseYaw	Roll PPoseRoll	Pitch PPosePitch	Actuator 6			- Actua	itor 1	
Pose limits	9999	9999 🜲	9999 🖨	180.0 🜲	180.0 ‡	180.0 🜲	Actuator 5 -	100 0		-Ac	tuator 2	
Drive pose	0 🖨	0 🛊	0 🖨	0.0	0.0	0.0	¥					
Pose filtering		VALUE	~		VALUE	~	IL I	14				
Center of rotation	0 🖨	0 🖨	0 💠	mm Gain	1.000 🜲 I	Auto gain	M.	THE A	77 3	H		
Actuator filtering		9 ()	VAL	IF	, transf	~		11-				
Position bit output	16	(0 to 65535 in	2 bytes)	Scale	1.000	around 0						
Calculate coeed	Sav on	laet noeebla n		1.000 1	0.000	0.000 *			-	NK		
Second bit output		(1274a 127	in 1 huto)	Ma	beene mum	107 *						
opeco bit odiput	10.0	(12/10/12/	in royic)	19102	andin apood	16.1 -				5		
Singularity angle	e 10.0		Concerning (1978)		Looper and the state			ALC IO	0.5	7		
Middle	1025.0	mm L1	1030.0	mm L3	125.0 🔹	mm		V		/		
Range	200.0	mm L2	125.0 🜲	mm L4	1030.0 🚔	mm		. //		turtor 2		
		Default height	881.8	mm			Citizen Citizen		AL			
							Set current pos					
	Original	Filtered	Cropped	Bit output	Current	Speed	Actuator position test	Park	Park bit value	Position Key	Speed Key	
Actuator 1	0.0	0.0	0.0	32,767	511	12/		U 🐨 mm	32/6/	<<	< speed ta >	>
Actuator 2	0.0	0.0	0.0	32,767	511	127		0 🖨 mm	32767	< Axis2a >+	Speed2a >	2
Actuator 3	0.0	0.0	0.0	32,767	511	127	-	0 ≑ mm	32767	< Axis3a >	Speed3a >	>
Actuator 4	0.0	0.0	0.0	32,767	511	127	-	0 💠 mm	32767	< Axis4a >	< Speed4a >	>
Actuator 5	0.0	0.0	0.0	32,767	511	127		0 🗢 mm	32767	< Axis5a >	Speed5a >	>
Actuator 6	0.0	0.0	0.0	32,767	511	127		0 💠 mm	32767	< Axis6a >+	Speed6a >	>

#### OUTPUT

From the FlyPTMover desktop: Add – Output - UDP. Then configure as follows:

Output String: <71><1><2><Axis1a><2><Axis2a><2><Axis3a><2><Axis4a><2><Axis5a><2><Axis6a>.



With this output string, we effectively define that the actuator positions from the RIG menu are now sent out as 16 bit binaries to the pod positions (mode 2, see descriptions earlier under Version 0) of the EDGE 6D system.

			RIG :: LINEAR HEXAPOD
Type of output To port Receive Start string Output string Stop string Input string	Connect           Binary         ✓           50004         ÷           from port         10001         ÷           <71><1><2> <axis1a>&lt;2&gt;<axis2a>&lt;2:</axis2a></axis1a>	Interval loops 10	Actuator Axis Ia  Actuator Axis Ia  Actuator Axis 2a  Actuator Axis 3a  Actuator Axis 4a  Actuator Axis 5a  Actuator Axis 5a  Actuator Axis 6a  Rig pose (mm and <sup>9</sup> in doubles)  Rig pose (mm and <sup>9</sup> in floats)
A Debug	2 127 255 002 127 255 002 127 255 00	Rigs-Direct 2 127 255 002 127 255 002 127 255	

After pressing 'Connect', the EDGE 6D dashboard should now show 50Hz (without question mark).

You can now verify the settings by sliding the 'Actuator position test' in the RIG menu. The corresponding pod should now move with the slider.

As another example, you could also change the output string to:

<71><1><3><Axis1a><3><Axis2a><3><Axis3a><3><Axis4a><3><Axis5a><3><Axis6a>

In this case, the slider of Actuator 1 in the RIG menu will produce a Surge of the EDGE 6D system.

#### Version 2

This version of the ADVANCED interface can be used to drive FlyPT Mover with more flexibility. For this, you can use the following output string format:

<71><2><mode\_AxisXX><AxisXX><scale\_AxisXX><format><parameter>...<0>

...where: <mode\_AxisXXX> [see Version 0] <AxisXX> the targeted axis of the EDGE 6D (1 to 6) <scale\_AxisXXX> scale to be applied to parameter value (0-255; 100=100%) <format> the number format of <parameter>:

- 'b' or <98>: 16-bit binary (LSB first) (0-65535)
- 'B' or <66>: 16-bit binary (MSB first) (0-65535)
- 'f' or <102>: 32-bit float (-1.0 to 1.0)
- 'd' or <100>: 64-bit double (-1.0 to 1.0)

<parameter> output parameter of FlyPT Mover, as available in the right column of the OUTPUT-UDP
menu.



For example, we can add SOURCE – LOOP sine pattern as shown below. Note we restricted the Amplitude to match the -1.0 to 1.0 range of floats.

						_		Longitudinal speed (m/s)
					Disconnect			Longitudinal acceleration (m/s <sup>2</sup> )
ave type	Sine	~						Longitudinal acc. with gravity (m/s <sup>2</sup> )
mplitude	1.000	4	Pe	eriod	5000	-	ms	Longitudinal gravity (m/s²)
ical shift	0.000	+	Phase	shift	0	*	ms	World vertical z position (m)
Filter			VALUE	-		~		Vertical speed (m/s)
							1	Vertical acceleration (m/s²)
	• 2				1	Loon fr	10.021	Vertical acc. with gravity (m/s²)
	· · · · ·							
								Vertical gravity (m/s²)
		2		2				☐ Vertical gravity (m/s²) ☑ Yaw position (º)
	Yav	v position	-0.241 9	1				<ul> <li>Vertical gravity (m/s<sup>2</sup>)</li> <li>✓ Yaw position (<sup>9</sup>)</li> <li>Yaw speed (<sup>9</sup>/s)</li> </ul>
	Yav Ro Pito	v position Il position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>9</sup> ) Yaw speed ( <sup>2</sup> /s) Yaw acceleration ( <sup>9</sup> /s <sup>2</sup> )
	Yav Ro Pito	v position Il position h position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>9</sup> ) Yaw speed ( <sup>9</sup> /s) Yaw acceleration ( <sup>9</sup> /s <sup>2</sup> ) Roll position ( <sup>9</sup> )
	Yav Ro Pito	v position Il position h position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>2</sup> ) Yaw speed ( <sup>e</sup> /s) Yaw acceleration ( <sup>2</sup> /s <sup>2</sup> ) Roll position ( <sup>2</sup> ) Roll speed ( <sup>2</sup> /s)
	Yav Ro Pito	v position Il position h position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>2</sup> ) Yaw speed ( <sup>2</sup> /s) Yaw acceleration ( <sup>2</sup> /s <sup>2</sup> ) Roll speed ( <sup>2</sup> /s) Roll speed ( <sup>2</sup> /s) Roll acceleration ( <sup>2</sup> /s <sup>2</sup> )
	Yav Ro Pito	w position # position h position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>2</sup> ) Yaw speed ( <sup>2</sup> /s) Yaw acceleration ( <sup>2</sup> /s <sup>2</sup> ) Roll speed ( <sup>2</sup> /s) Roll acceleration ( <sup>2</sup> /s <sup>2</sup> ) Yetch position ( <sup>2</sup> )
	Yav Ro Pito	w position	-0.241 9 -0.241 9 -0.241 9	2				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>9</sup> ) Yaw speed ( <sup>9</sup> /s) Yaw acceleration ( <sup>9</sup> /s <sup>2</sup> ) Roll speed ( <sup>9</sup> /s) Roll speed ( <sup>9</sup> /s) Pitch position ( <sup>9</sup> ) Pitch speed ( <sup>9</sup> /s)
	Yav Ro Pito	v position Il position h position	-0.241 9 -0.241 9 -0.241 9	9 9 9				Vertical gravity (m/s <sup>2</sup> ) Yaw position ( <sup>2</sup> ) Yaw speed ( <sup>2</sup> /s) Yaw acceleration ( <sup>2</sup> /s <sup>2</sup> ) Roll speed ( <sup>2</sup> /s) Roll acceleration ( <sup>2</sup> /s <sup>2</sup> ) Pitch position ( <sup>2</sup> ) Pitch speed ( <sup>2</sup> /s) Pitch acceleration ( <sup>2</sup> /s <sup>2</sup> )

Then, the parameters <M9\_YAW\_P>, <M9\_ROL\_P> and <M9\_PIT\_P> can be assigned to axes 4, 5 and 6 respectively as platform position (<mode\_AxisXX> = 3), as follows:

Connect       SOURCE :: LOOP         Type of output       Binary       Interval loops       10 ÷ (20 ms) <m9_yaw_p>         To pot       50004 ÷       To IP 255 ÷ 255 ÷ 255 ÷ 255 ÷       <m9_rol_p>         Receive       from pot       10001 ÷       &lt;       RIG :: LINEAR HEXAPOD         Start string        0 ÷ ms       Actuator Axis 1a         Start string        Actuator Axis 1a       Actuator Axis 3a         Stor string       k71&gt;&lt;2&gt;&lt;3&gt;&lt;4&gt;&lt;100 ±        0 ÷ ms       Actuator Axis 3a         Stor string       0 ÷ ms       + Actuator Axis 3a       + Actuator Axis 3a</m9_rol_p></m9_yaw_p>
Output string         k71><2><3><4><100/f <m9_rol_p>&lt;3&gt;&lt;5&gt;&lt;100/f<m9_pit_p>&lt;3&gt;&lt;6&gt;&lt;100/f<m9_yaw_p:< th=""></m9_yaw_p:<></m9_pit_p></m9_rol_p>
nput string

<71><2><3><4><100>f<M9\_ROL\_P><3><5><100>f<M9\_PIT\_P><3><6><100>f<M9\_YAW\_P><0>

After pressing 'Connect', the platform will roll, pitch and yaw according to the sine pattern.

As another example, you could define the output string for rFactor2 as follows:

<71><2>



<4><1><100>f<M12\_LAT\_A> <4><2><100>f<M12\_LON\_A> <4><3><100>f<M12\_VER\_A> <4><4><100>f<M12\_ROL\_S> <4><5><100>f<M12\_PIT\_S> <4><6><100>f<M12\_YAW\_S> <0>



#### NATIVE INTERFACE

Port: 50001

The NATIVE INTERFACE can be used to drive the platform directly from custom applications (e.g Unreal and Unity). See also the sample code for Unity in the plug-in package that can be downloaded from <u>www.gforcefactory.com/support</u>.

#### Numbering and coordinate system

From the user perspective, the six pods are numbered clockwise, starting with pod 0 at the front right.

EDGE 6D adopts the ISO coordinate system. The ISO coordinate system means that x is forward, y is leftward and z is upward. Rotations are clockwise, relative to positive direction along the axes.

'World' coordinates refer to the global position/orientation of the user in the simulation world. For example, if a user moves forward, it may be in all directions x, y and z simultaneously, depending on the orientation of the user.

'User' coordinates refer to the (local) position/orientation as experienced by the user. For example, if a user moves forward, it is only in the direction of x.

#### Platform motion packets

The following motion packets are defined. Packets of different types may be used during the same session, enabling offsets during simulation.

Туре	Meaning	Value / Unit
CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion packet type	77
CHAR	Type 'Servo Power Offset'	0
UINT32	Timestamp of the data	microseconds
FLOAT32	Power Offset 0	-1.0 - 1.0
FLOAT32	Power Offset 1	-1.0 - 1.0
FLOAT32	Power Offset 2	-1.0 - 1.0
FLOAT32	Power Offset 3	-1.0 - 1.0
FLOAT32	Power Offset 4	-1.0 - 1.0
FLOAT32	Power Offset 5	-1.0 - 1.0

CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'Servo Angle Offset'	1
UINT32	Timestamp of the data	microseconds
FLOAT32	Angle Offset 0	rad (+/-)
FLOAT32	Angle Offset 1	rad (+/-)
FLOAT32	Angle Offset 2	rad (+/-)
FLOAT32	Angle Offset 3	rad (+/-)
FLOAT32	Angle Offset 4	rad (+/-)
FLOAT32	Angle Offset 5	rad (+/-)



CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'Servo Length Offset'	2
UINT32	Timestamp of the data	microseconds
FLOAT32	Length Offset 0	m (+/-)
FLOAT32	Length Offset 1	m (+/-)
FLOAT32	Length Offset 2	m (+/-)
FLOAT32	Length Offset 3	m (+/-)
FLOAT32	Length Offset 4	m (+/-)
FLOAT32	Length Offset 5	m (+/-)

CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'Platform position'	3
UINT32	Timestamp of the data	microseconds
FLOAT32	Tx – platform position	m (+/-)
FLOAT32	Ty – platform position	m (+/-)
FLOAT32	Tz – platform position	m (+/-)
FLOAT32	Rx – platform orientation	rad (+/-)
FLOAT32	Ry – platform orientation	rad (+/-)
FLOAT32	Rz – platform orientation	rad (+/-)

CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'User incl. gravity and centrifugal'	4
UINT32	Timestamp of the data	microseconds
FLOAT32	Tx – acceleration incl. gravity and centrifugal	m/s2 (user)
FLOAT32	Ty – acceleration incl. gravity and centrifugal	m/s2 (user)
FLOAT32	Tz – acceleration incl. gravity and centrifugal	m/s2 (user)
FLOAT32	Rx – rotation speed	rad/s (user)
FLOAT32	Ry – rotation speed	rad/s (user)
FLOAT32	Rz – rotation speed	rad/s (user)

CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'User incl. centrifugal'	5
UINT32	Timestamp of the data	microseconds
FLOAT32	Tx – acceleration incl. centrifugal	m/s2 (user)
FLOAT32	Ty – acceleration incl. centrifugal	m/s2 (user)
FLOAT32	Tz – acceleration incl. centrifugal	m/s2 (user)
FLOAT32	Rx – orientation	rad (user)
FLOAT32	Ry – orientation	rad (user)
FLOAT32	Rz – orientation	rad (user)



CHAR	Header	71
CHAR	Packet version	0
CHAR	Motion type	77
CHAR	Type 'World speed & orientation'	6
UINT32	Timestamp of the data	microseconds
FLOAT32	Tx – speed	m/s (world)
FLOAT32	Ty – speed	m/s (world)
FLOAT32	Tz – speed	m/s (world)
FLOAT32	Rx –orientation	rad (world)
FLOAT32	Ry –orientation	rad (world)
FLOAT32	Rz –orientation	rad (world)



### Platform commands

It is possible to send commands to start platform logging or to change the state of the EDGE 6D system.

#### Platform logging

Platform logging is initiated by sending a log COMMAND UDP packet by the host computer to port 50001 of the system.

The log COMMAND packet has the following format:

CHAR	Header	71
CHAR	Packet version	0
CHAR	Command type	76
CHAR	Packet type	Power = 0
		Angle = 1
		Length = 2
		Platform position = 3
		Acceleration and rotation = 4
		LOG RESET = 255

Subsequently, the EDGE 6D system will respond to the host computer at port 50001 with corresponding log DATA packets at 200 Hz, with the following structure:

Туре	Meaning	Value/Unit
CHAR	Header	71
CHAR	Packet version	0
CHAR	Logging type	76
CHAR	Number of log DATA packets	0-255

...followed by the corresponding log DATA packets, as specified below:

Туре	Meaning	Value / Unit
DATA		
CHAR	Type 'Power'	0
FLOAT32	Power 0	-1.0 - 1.0
FLOAT32	Power 1	-1.0 - 1.0
FLOAT32	Power 2	-1.0 - 1.0
FLOAT32	Power 3	-1.0 - 1.0
FLOAT32	Power 4	-1.0 - 1.0
FLOAT32	Power 5	-1.0 - 1.0
CHAR	Type 'Angle'	1
FLOAT32	Angle 0	rad (0-2pi)
FLOAT22	Angle 1	

CI II AIX	Type TillBle	-
FLOAT32	Angle 0	rad (0-2pi)
FLOAT32	Angle 1	rad (0-2pi)
FLOAT32	Angle 2	rad (0-2pi)
FLOAT32	Angle 3	rad (0-2pi)
FLOAT32	Angle 4	rad (0-2pi)
FLOAT32	Angle 5	rad (0-2pi)



CHAR	Type 'Length'	2
FLOAT32	Length 0	m (+/-)
FLOAT32	Length 1	m (+/-)
FLOAT32	Length 2	m (+/-)
FLOAT32	Length 3	m (+/-)
FLOAT32	Length 4	m (+/-)
FLOAT32	Length 5	m (+/-)

CHAR	Type 'Platform position'	3
FLOAT32	Tx – platform displacement	m (+/-)
FLOAT32	Ty – platform displacement	m (+/-)
FLOAT32	Tz – platform displacement	m (+/-)
FLOAT32	Rx – platform rotation	rad (+/-)
FLOAT32	Ry – platform rotation	rad (+/-)
FLOAT32	Rz – platform rotation	rad (+/-)

CHAR	Type ' Acceleration and rotation'	4
FLOAT32	Tx – acceleration	m/s2 (+/-)
FLOAT32	Ty – acceleration	m/s2 (+/-)
FLOAT32	Tz – acceleration	m/s2 (+/-)
FLOAT32	Rx – rotation	rad (+/-)
FLOAT32	Ry – rotation	rad (+/-)
FLOAT32	Rz – rotation	rad (+/-)

### State commands

It is possible to change the state of the EDGE 6D system by sending a log COMMAND UDP packet by the host computer to port 50001 of the system. State changes will be forgotten once the system is powered down.

The COMMAND packet has the following format:

Header	CHAR	71
Packet version	CHAR	0
Command type	CHAR	67
Command	CHAR	ToState = 1, SetVolume = 2, SetPreset = 3,
		SetFilter = 4, ReadState = 5, ReadVolume =
		6, ReadPreset = 7, ReadFilter = 8,
		ReadSeatBelt = 9
<command parameters="" specific=""/>	<see below=""></see>	<see below=""></see>



In case the COMMAND is a read command, the following packet will be returned:

Header	CHAR	71
Packet version	CHAR	0
Command type	CHAR	82
Command	CHAR	ToState = 1, SetVolume = 2, SetPreset = 3, SetFilter = 4, ReadState = 5, ReadVolume = 6, ReadPreset = 7, ReadFilter = 8, ReadSeatBelt = 9
<command parameters="" specific=""/>	<see below=""></see>	<see below=""></see>

ToState

Sets the EDGE 6D either in MOTION state or in READY state

Command specific parameters:

	ToState	CHAR	ToMotion = 0, ToReady = 1
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*SetVolume* Sets the motion intensity of the system

Command specific parameters: Volume CHAR 0 - 100

SetPreset

Sets the EDGE 6D to the preset with the designated number (if available).

Command specific parameters: Preset number | CHAR | 0-255

SetFilter

Configures the parameters in the appropriate EDGE 6D filter. This command can be used for fine tuning the system for specific applications. For more information, please contact Gforcefactory support.

*ReadState* Returns whether the EDGE 6D is in MOTION state or not

Command specific parameters to send: NONE

Command specific parameters to receive:

State	CHAR	Off = 0, OffToReady = 1, Ready
		= 2, Motion = 3,
		ReadyToMotion = 4,
		MotionToReady = 5,
		MotionToUnsafe = 6, Unsafe =
		7, MotionToSuspend = 8,
		Suspended = 9, Calibrating =
		10, Paused = 11, Error = 12



*ReadVolume* Returns the motion intensity displayed on the dashboard.

Command specific parameters to send: NONE

Command specific parameters to receive:

	Volume	CHAR	0-100
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ReadPreset

Returns the filter preset that is currently active.

Command specific parameters to send: NONE

Command specific parameters to receive:

Preset CHA
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ReadFilter

Returns the filter settings of the corresponding filter. For more information, please contact Gforcefactory support.

ReadSeatBelt

Returns the current state of the active seat belt.

Command specific parameters to send: NONE

Command specific parameters to receive:

SeatBeltState	CHAR	BITO: seat belt open (0) / closed (1)
		BIT1: seat belt detected: no (0) / yes (1)
		(seat belt is only detected after the first close)