

# Motion device output of IL2 v3.012

revision 1.0

## 1. Basic setup

Starting from 3.012 version IL2 Grate Battles supports Motion Devices output, allowing connecting motion device (simultaneously one connected device) via UDP transport layer with specified IP address and port.

Basic setup of motion device output is done in “data/startup.cfg”, section “MotionDevice”. Default parameters are:

```
[KEY = motiondevice]
  addr = "127.0.0.1" //target address
  decimation = 2      //decimation rate of 50Hz output
  enable = false      //true to enable output
  port = 4321         //target port
[END]
```

Simulation produces 50Hz rate data output (output 50 samples per second) of in-game player body's state: orientation, rotation speed (spin) and acceleration (if game mission has user-controlled body). To reduce UDP messages output rate the above setup section contains an integer setting “decimation”:

$$UDP\_output\_rate = Data\_output\_rate / decimation$$

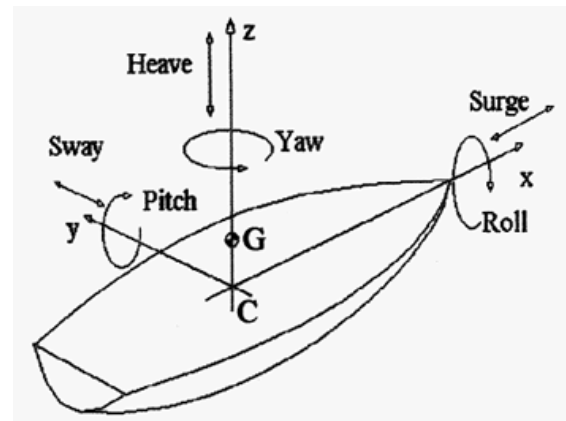
The default setup makes UDP output rate half of simulation's rate and is equal 25Hz.

## 2. Output state

Output layer makes conversions of game player's body kinematics relative it's local reference frame. So that UDP message contains orientation in world space coordinate system, spin and acceleration are in body's local reference frame

State units:

- Orientation represented as Euler angles (rad), transformation order is Roll-Pitch-Yaw
- Spin (rad/sec)
- Acceleration (m/sec<sup>2</sup>)



Axes directions and spin directions are shown on the given figure. Depending on *decimation* setting output values are averaged inside of output sample period time interval. If *decimation*=1, no output data averaging occurs.

When user press “pause” key during simulation, output layer generates zero-state output with the previous time-stamp

### 3. UDP message

The format of UDP message is shown below

Member	Offset	Size	Type	Comment
Packet_ID	0	4	DWORD	Valid value: <b>0x494C0100</b>
Tick	4	4	DWORD	Simulation frame tick (1 unit = 1/50 second)
Yaw	8	4	float	Rad
Pitch	12	4	float	Rad
Roll	16	4	float	Rad
Spin_x	20	4	float	Rad/sec
Spin_y	24	4	float	Rad/sec
Spin_z	28	4	float	Rad/sec
Acc_x	32	4	float	m/sec <sup>2</sup>
Acc_y	36	4	float	m/sec <sup>2</sup>
Acc_z	40	4	float	m/sec <sup>2</sup>

Type *float* corresponds to *float IEEE 754* floating point type;

Type *DWORD* corresponds to LSB unsigned integer