

Earth Features

De Psimu

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La version imprimable n'est plus prise en charge et peut comporter des erreurs de génération.
Veuillez mettre à jour les signets de votre navigateur et utiliser à la place la fonction d'impression par défaut de celui-ci.



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Earth shape

First, the user will have to define some data relative to the Earth shape and its rotating frame as shown on the next image:



Frames configuration

Frames configuration is, by default, relatively simple as it has been considered the best ratio between precision and **CPU** time. Anyway, it is possible to make it more complex. Nevertheless, be careful about the **EOP** corrections as it needs some data provided by [[PATRIUS_DATASET](#)] (included in the jar). So, if the data for a given epoch are not available, the propagation will exit with an error status.

Note : in V11.0, by default configuration is the complex (factory) one.

How to update data

Nevertheless, in order not to wait for a new **PSIMU** version, it is allways possible to put additional data (as **EOP** parameters or a new **UTC/TAI** gap) to the ones included Inside the [[PATRIUS_DATASET](#)] *jar* file. This file may be used externally (when used **psimu-xx.x.jar**) or internally (when used **psimu-xx.x-jar-with-dependencies.jar**).

Since V11.4 version

Since this V11.4 version it is really simpler to take into account additional data: we have just to add them in the directory defined by the **ADDITIONAL_PATRIUS_DATA** variable of the **psimu.properties** file (no need to respect the original hierarchical structure of [PATRIUS_DATASET](#) but be careful to respect the exact names)!



For versions previous to V11.4

Let us show how to add, for example, some EOP data for year 2017.

- First, open the jar file using an application allowing to work with compressed files as [7-Zip](#)
- Then go through the .jar tree to reach the *fr/cnes/sirius addons.patriusdataset/earth-orientation-parameters* directory ...



- At last, add inside the *yearly* subdirectory, a file obtained from the [IERS site](#) ... now you are able to propagate during all the year 2017 !



Frames dependencies

The following diagram explains the links between all considered frames.



Precision vs CPU

In the table below, we can see an example of precision versus CPU time depending on the frames configuration and for a 30 days LEO propagation:

Case Corrections	Max position error (m)	Max velocity error (m/s)	CPU time (s)
1 All (IERS2010)	-	-	4.24
2 All except EOPs	14.6	1.68E-02	4.02
3 Only Precession-Nutation	14.6	1.68E-02	2.88
4 No corrections	469	5.42E-01	1.97

Here is the example of the "factory" configuration for [IERS 2010](#):



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