

# SKE (Software Kernel Emulator)

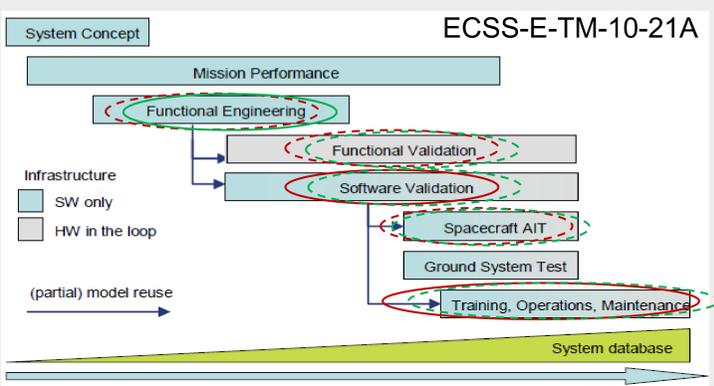
A new proposition in the world of software simulation and validation

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**System simulators used in different phases of the project**



SKE is a software embedded in Basiles, that allows to run the functional part of the flight software in Linux Environment.



**Basiles / Basiles-NG use cases :**

— For all simulators

- - - For some simulators

**SKE use cases :**

— applicative FS simulation

— Confirmed

- - - Potential

**SKE**



**Real OBC**

Real processor  
Real hypervisor  
Real Applicative SW

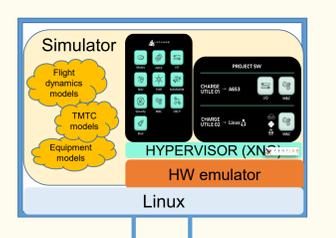
Runs Real time  
Hardly scalable  
Expensive

**HW world**

Legacy

Better perfs

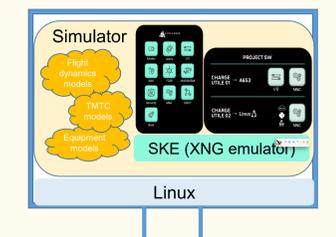
**Emulated HW OBC**



Emulated processor  
Real hypervisor  
Real Applicative SW (binary)

Runs ~ Real time  
Scalable  
Cheap

**Emulated Flight SW**



Native code execution  
Emulated hypervisor  
Real Applicative SW (code)

Runs >> Real time  
Scalable  
Cheap

**Numerical world**

OBC Emulation Challenges	Processor	Performances of emulator on x86 @4Ghz
Today	mono or bicore @80MHz	~ real-time
Tomorrow	4-8 cores @600-1000MHz	Performance wall

**SKE**

- API = XNG
- Configuration ≈ XNG
- Restricted to XNG-based OBSW
- Launched by a Python server
- Real or stubbed partitions
- 64 bits native execution
- I/O representativity at register level or simplified
- Emulates Time and Space Partitioning
- A good companion scheduled by a simulator such as Basiles

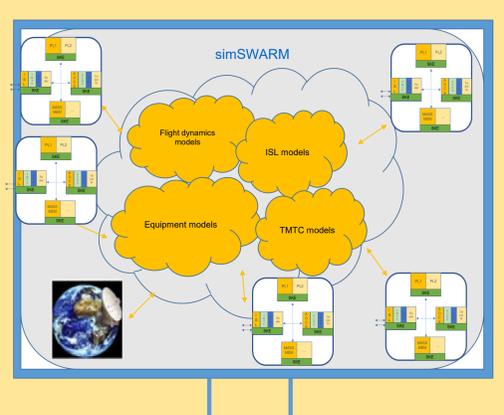
<https://www.fentiss.com/ske/>

Suitable for Flight Software functional simulations

**SWARM.net, a case study for SKE**

Test bench simulating a swarm of up to 20 satellites hosting SKE

Exploratory project Ramping up swarm concepts



simSWARM

n satellites simulated  
n instances of SKE

**SimSwarm simulator**



**Computation time Performances evaluation**