

# SKE (Software Kernel Emulator)

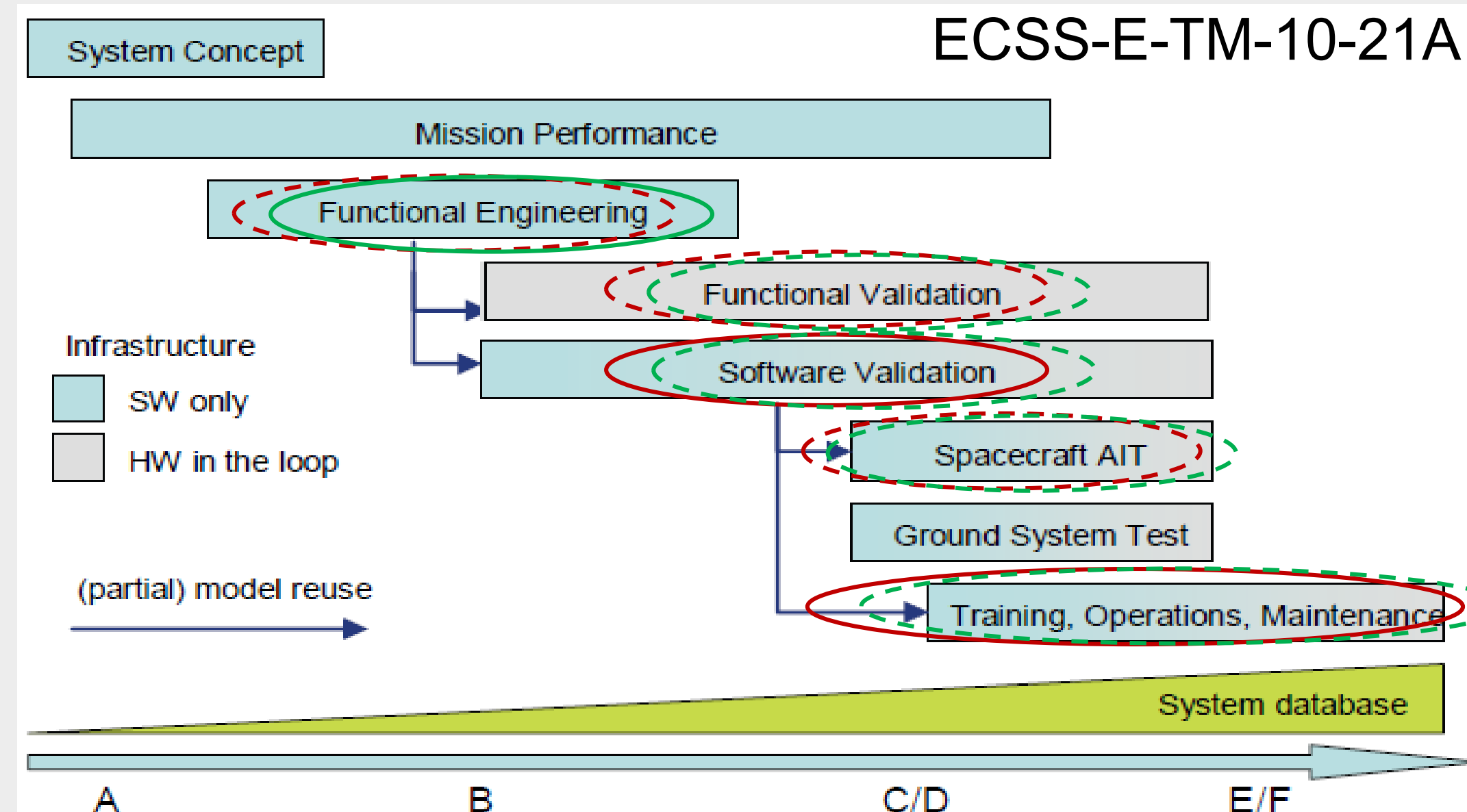
## A new proposition in the world of software simulation and validation

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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 :

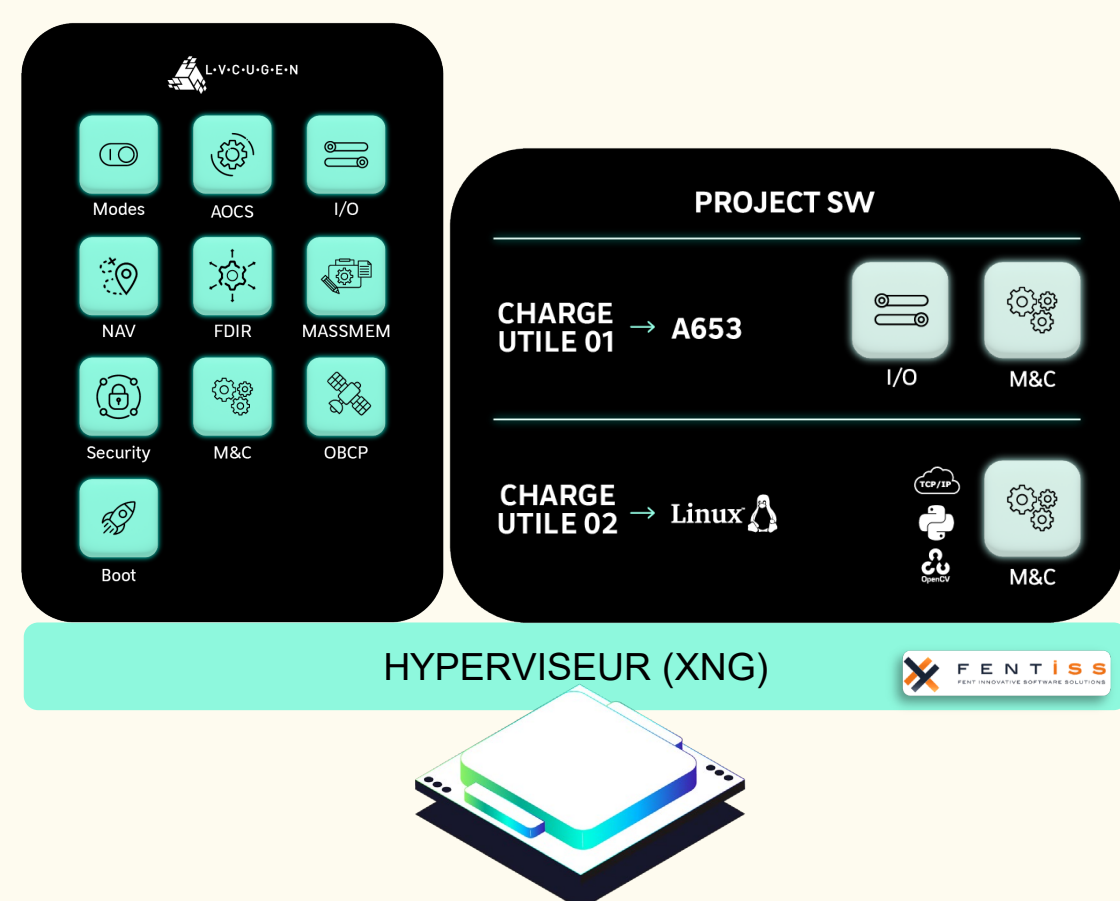
- For all simulators
- For some simulators

SKE use cases :  
applicative FS simulation

- Confirmed
- Potential

### SKE

#### Real OBC

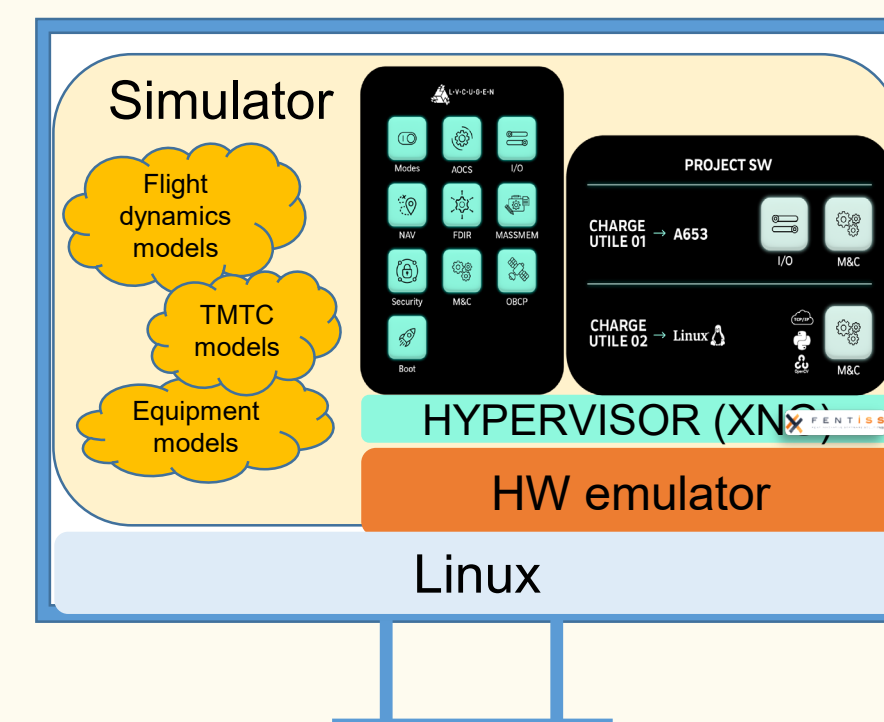


Real processor  
Real hypervisor  
Real Applicative SW

Runs Real time  
Hardly scalable  
Expensive

HW world

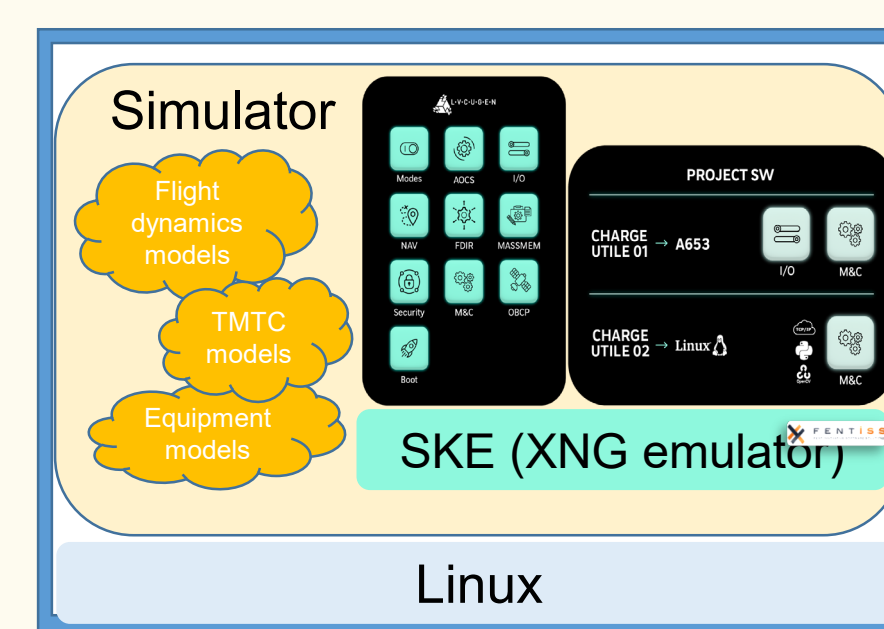
#### Emulated HW OBC



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

**NEW**

### SKE

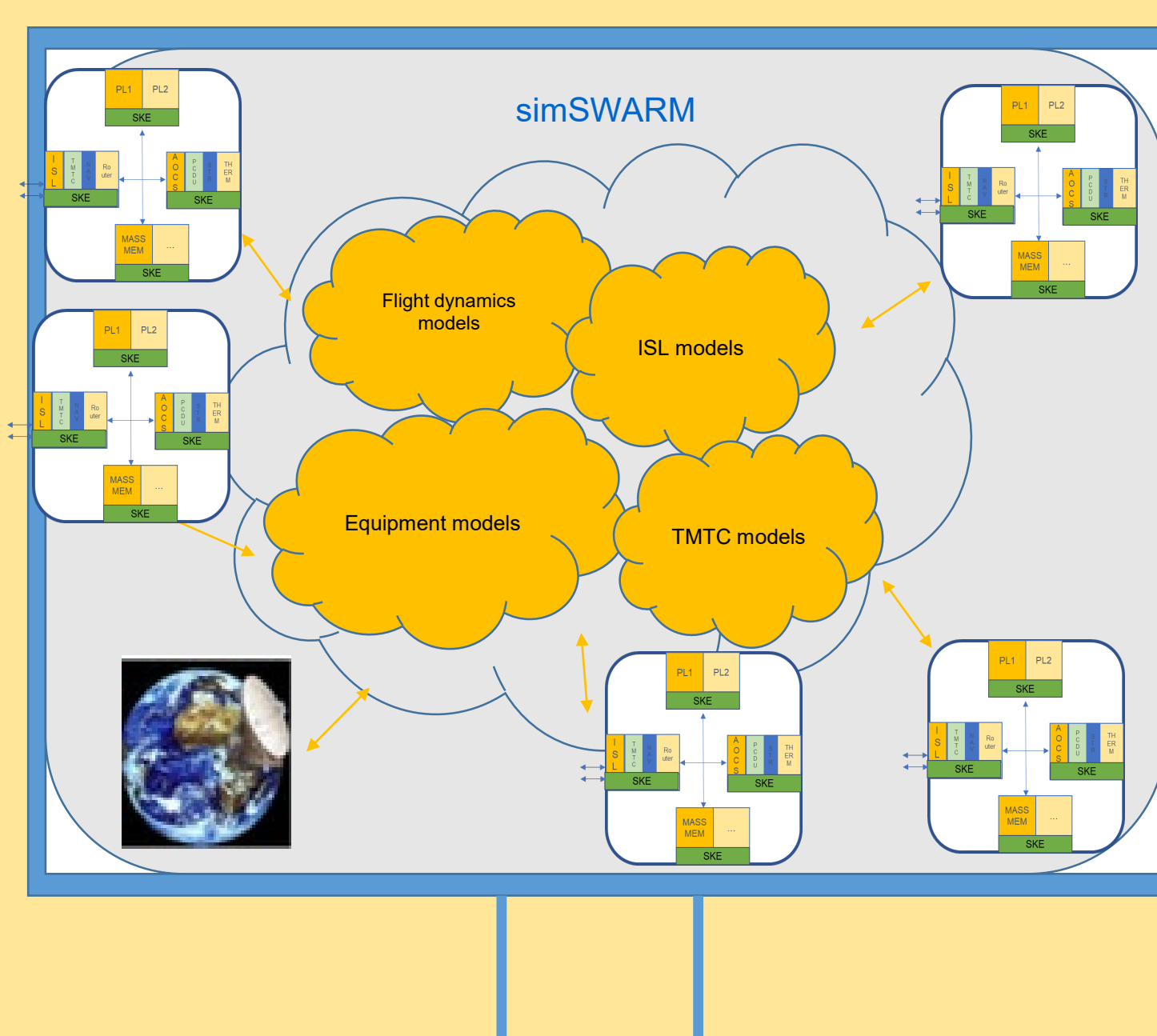
- API = XNG
- Configuration ≈ XNG
- Restricted to XNG-based OBSW
- Launched by a Python server
- Real or stubbed partitions
- 64 bits native execution
- I/O representativity at register level or simplified
- Emulates Time and Space Partitioning
- A good companion scheduled by a simulator such as Basiles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

Suitable for  
Flight Software  
functional  
simulations

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

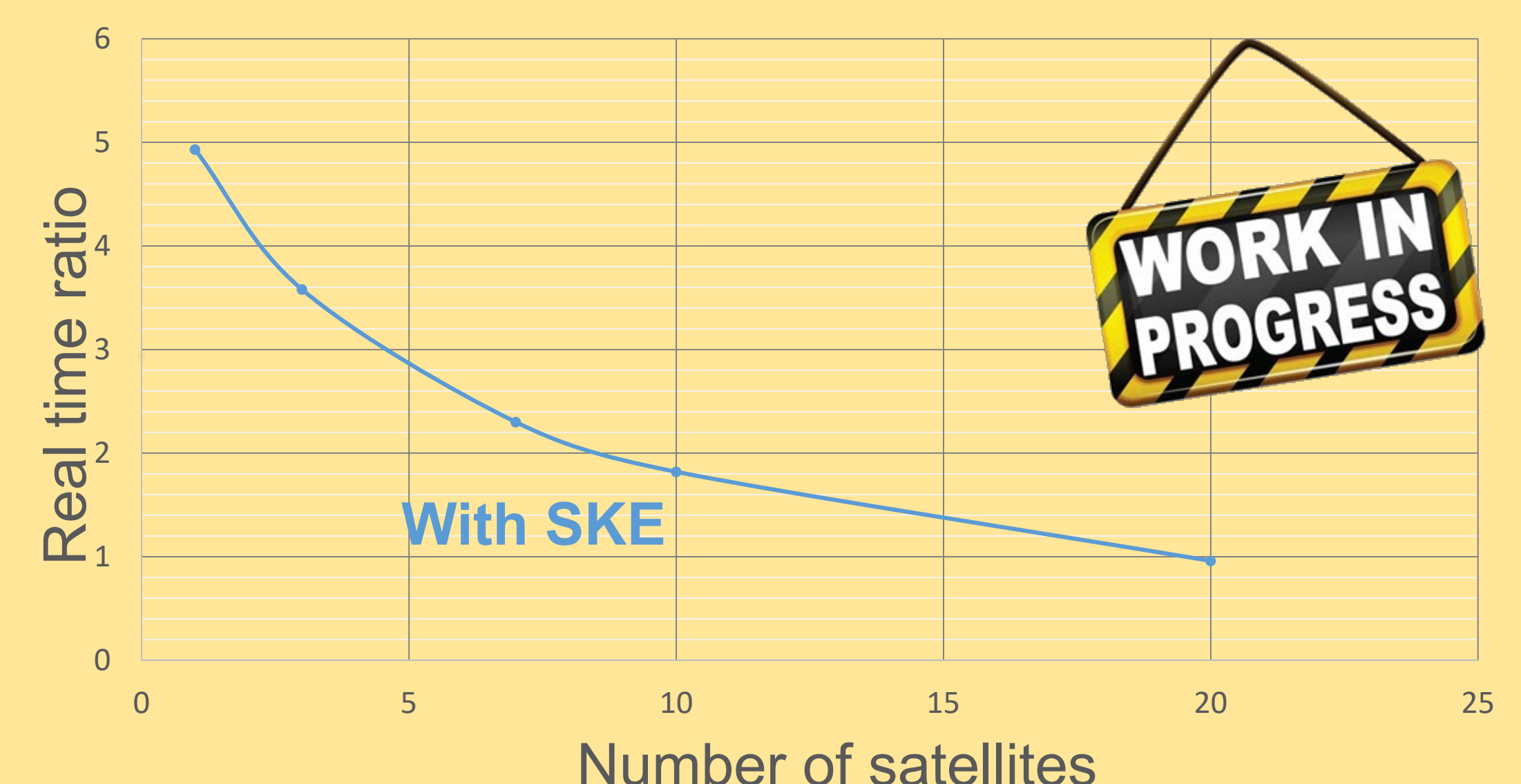
Test bench  
simulating a  
swarm of up  
to **20  
satellites**  
hosting **SKE**

**Exploratory  
project**  
Ramping up  
swarm  
concepts



n satellites simulated  
n instances of SKE

**SimSwarm simulator**



**Computation time  
Performances evaluation**