

# “Dreams to Reality”

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**Presented By:**

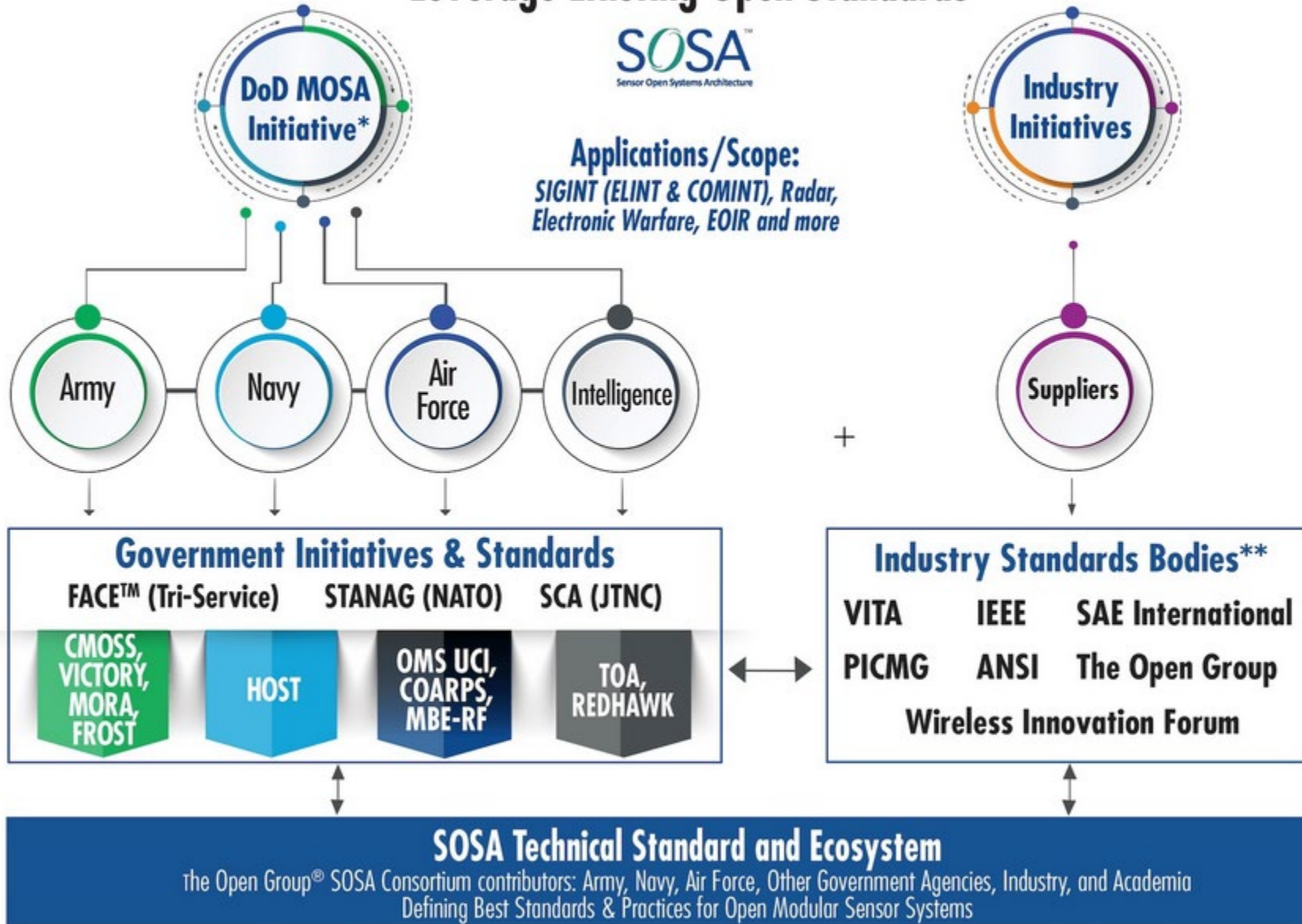
**Nigel Forrester**

Director of Strategy

Concurrent Technologies

# Dream?

## The Sensor Open Systems Architecture™ Approach: Leverage Existing Open Standards

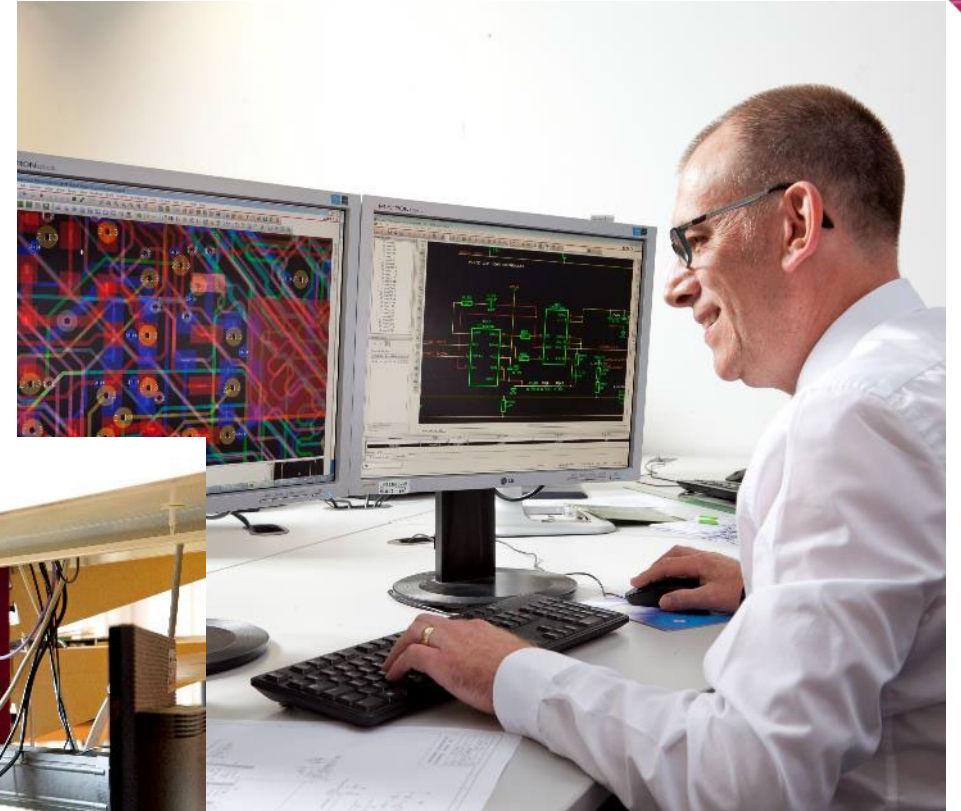


\*In support of the US DoD MOSA Mandate memo.

\*\* Representative group. Not all associated standards are listed.

# Our Working Environments

- Office Based



# Our Working Environments

- Hybrid (Remote / Office Based)



# Team Building and Well-Being



# Component Availability

- 2021: Typically < 4 weeks
- 2022: 30/40/50 weeks or on allocation
- 2023: ?

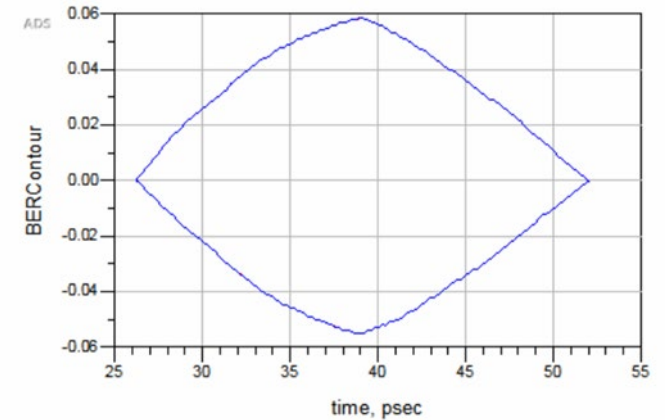
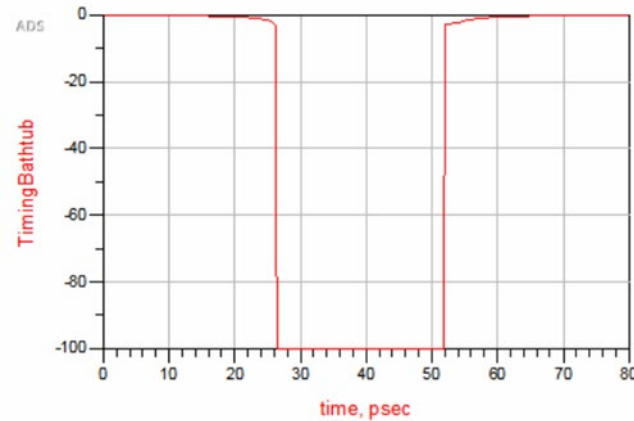
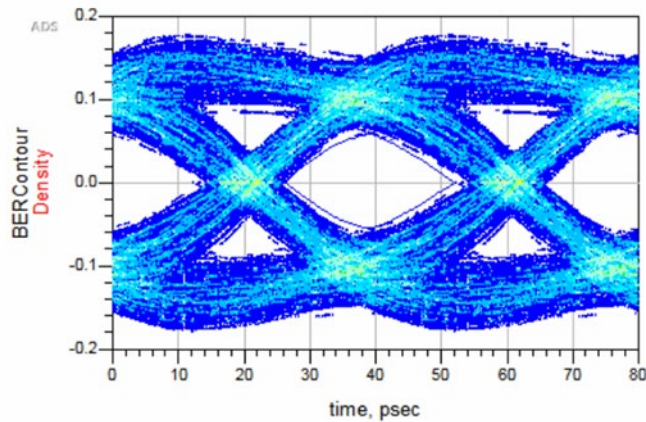


# Technology Challenges

- PCIe Data plane
- 10/40G Ethernet
- PCIe Gen 3
- Rudimentary management



- Ethernet data plane
- 25/100G Ethernet
- PCIe Gen 4 (and Gen 5 this year)
- Enhanced management





Are We There Yet?



# New Generation of Building Blocks

- Components
- Chassis
- Backplanes
- Payloads:
  - CPU
  - GPGPU
  - FPGA
- Switches
- Timing



# Timing

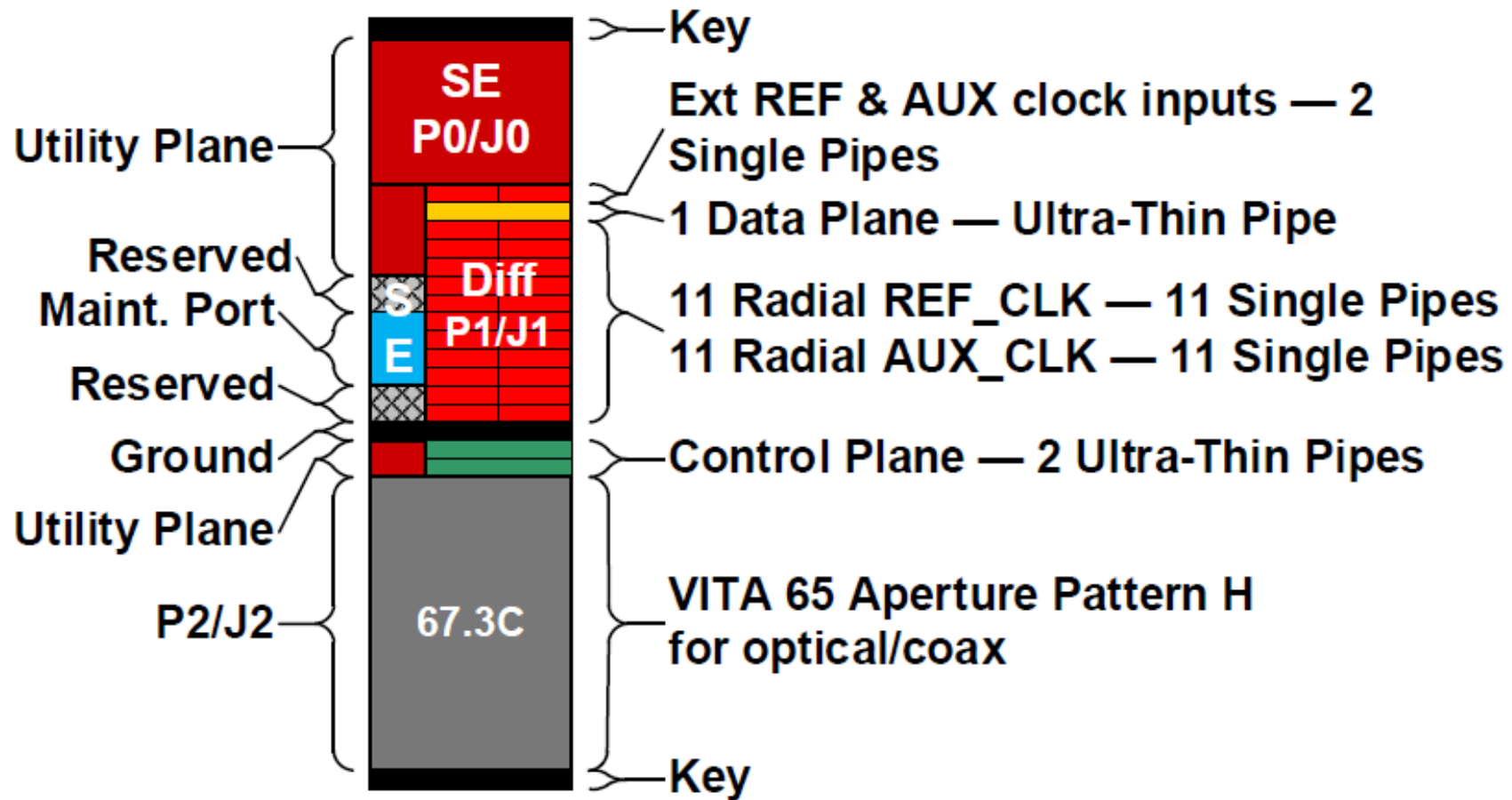


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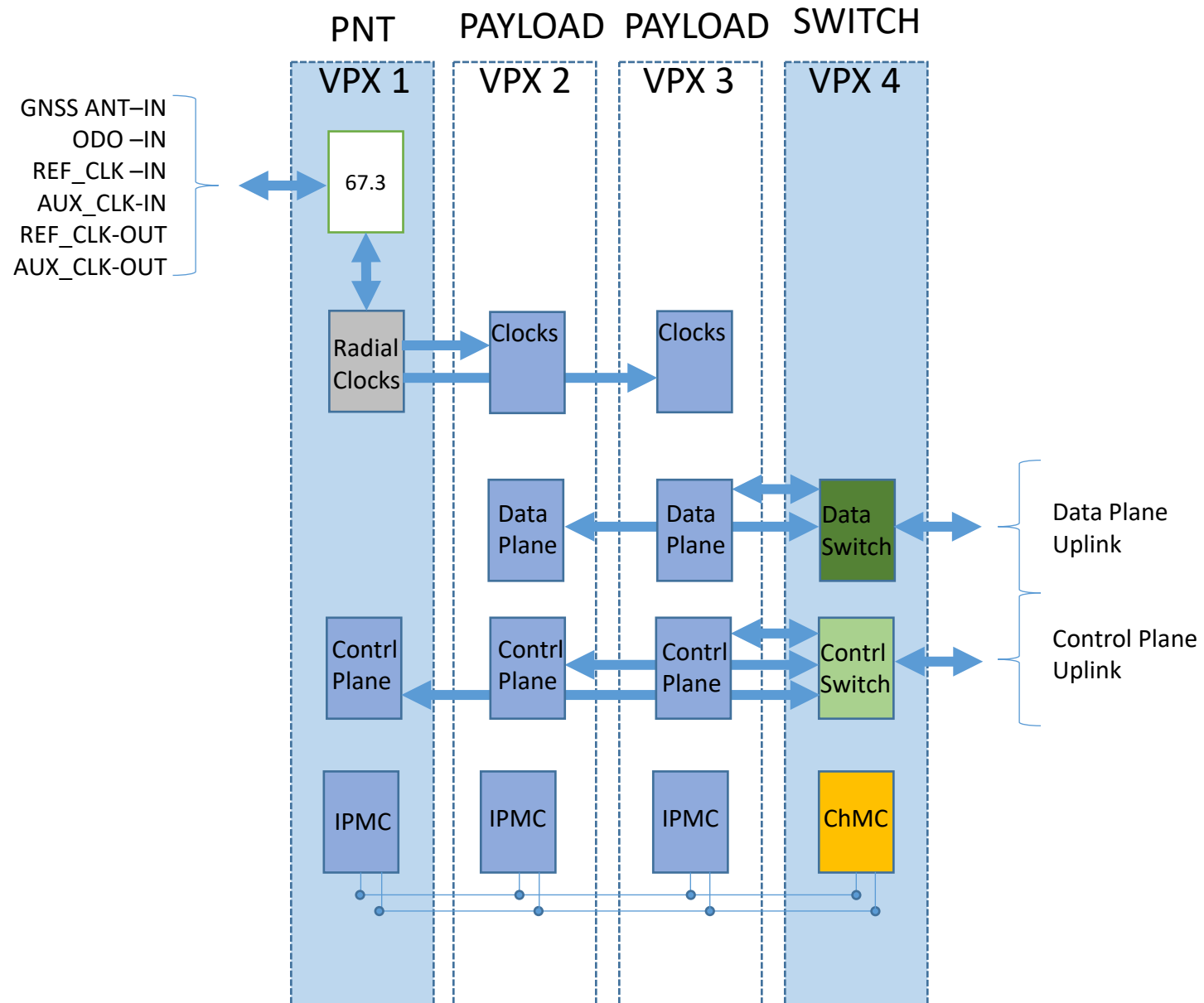
- Fundamental for Applications like:
  - SIGINT, ELINT, COMINT
  - RADAR
  - EW
  - EOIR

# Compliance

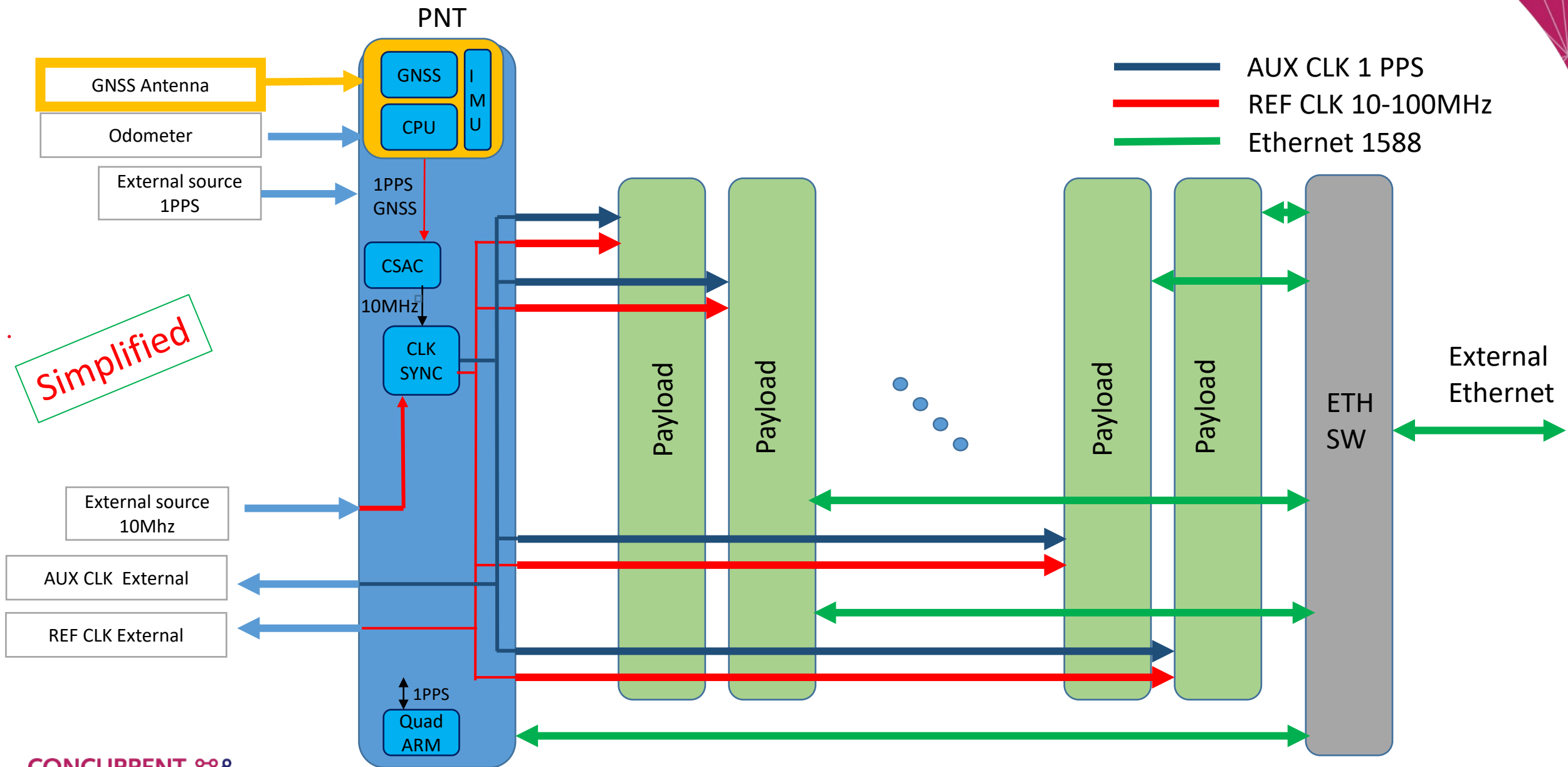
- OpenVPX™ Profiles:
  - SLT3x-TIM-2S1U22S1U2U1H-14.9.2-1
  - MOD3x-TIM-2S1U22S1U2U1H-16.9.2-2



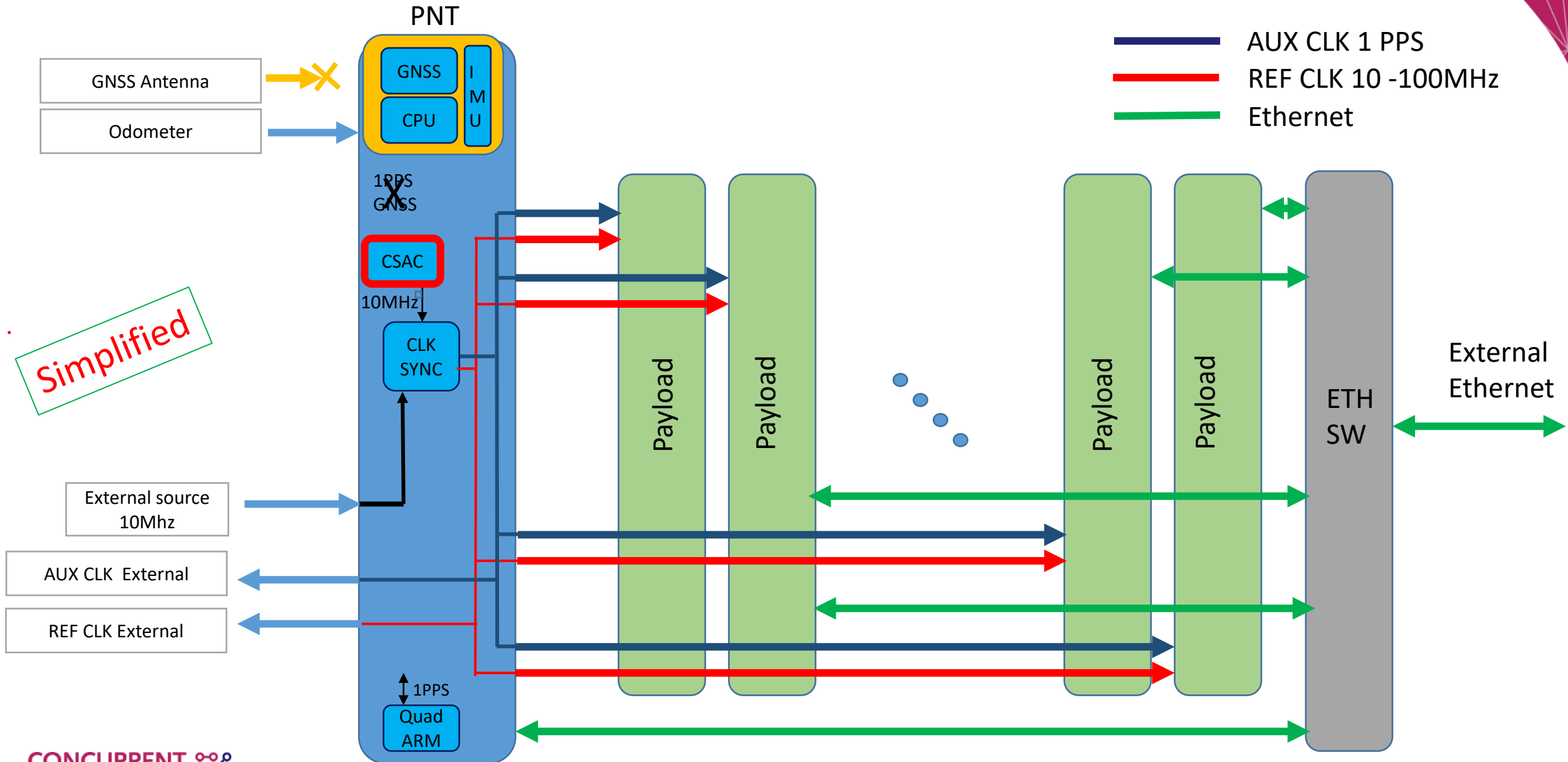
# Radial Cloning – System Context



# System Timing Functional Perspective (GNSS Source)

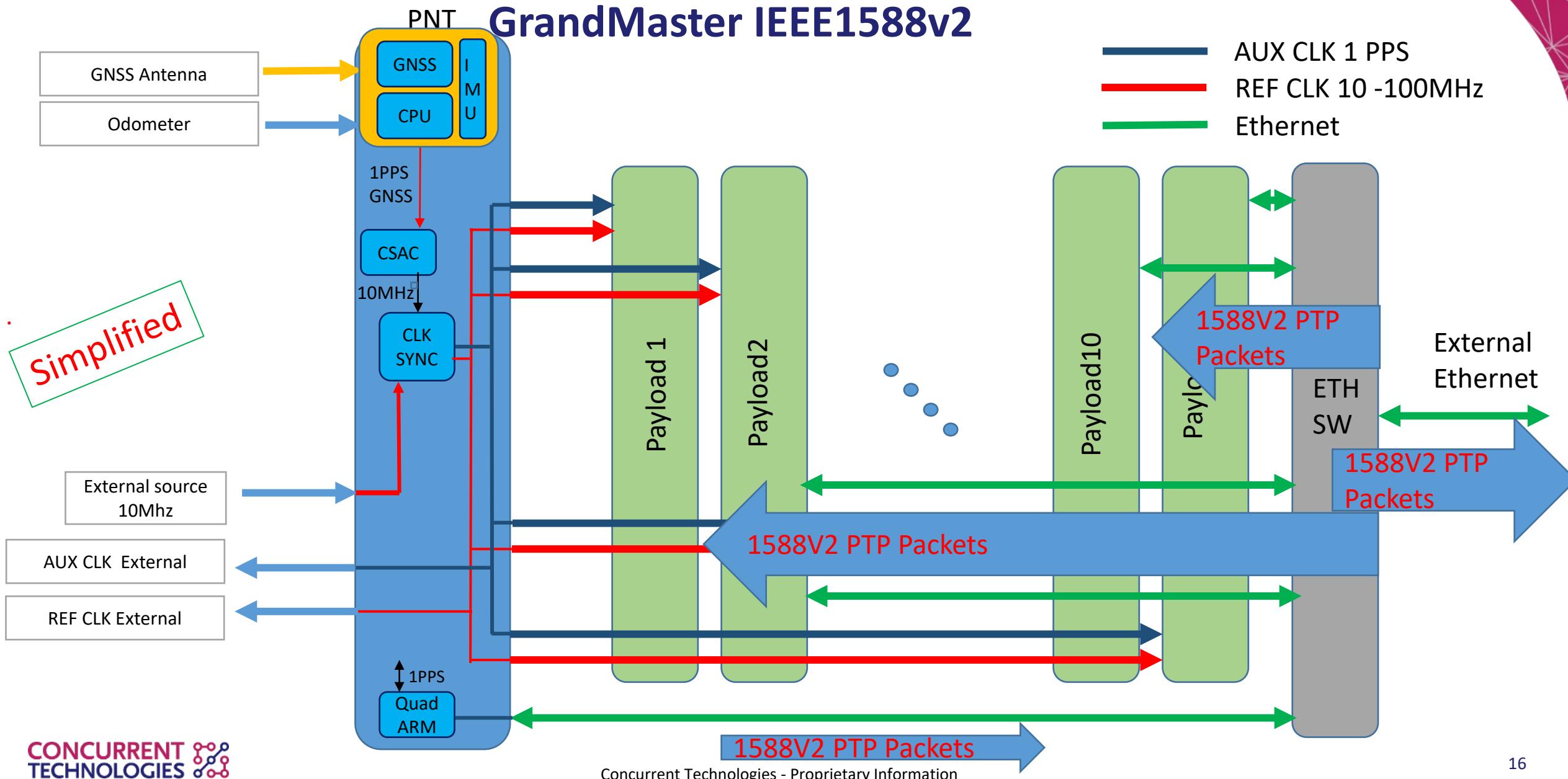


# System Timing Functional Perspective (GNSS fail – CSAC holdover)



Simplified

# System Timing Functional Perspective (GNSS Source)

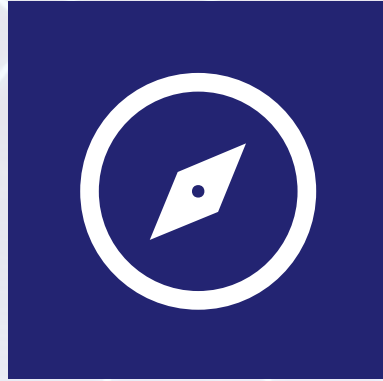


# What is A-PNT & Why is it Needed?



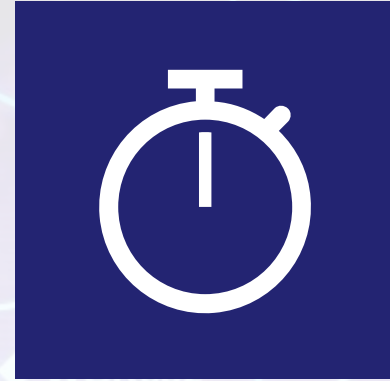
## (P) Position

- Where you are
- Aim to be accurate to centimeter level



## (N) Navigation

- Allows you get where you want to be



## (T) Timing

- Needed to synchronize internal and external resources

## ■ Assured PNT

- Non-GNSS mechanisms available to determine the position and maintain precision



# Global Navigation Satellite System (GNSS) Features

## ■ Satellite Constellations:

- GPS: L1C/A, L1C, L1PY, L2C, L2P, L5 (United States)
- Galileo: E1, E5a, E5b, E5 AltBoc, E611 (European Union)
- QZSS: L1C/A, L1C, L2C, L5, L611 (Japan)
- GLONASS: L1CA, L2CA, L2P, L3 CDMA (Russia)
- Beidou: B1I, B1C, B2a, B2I, B311 (China)

## ■ Satellite Based Augmentation System (SBAS):

- WAAS, EGNOS, MSAS, GAGAN etc

## ■ RTK and RTK Networks

# Jamming Sources

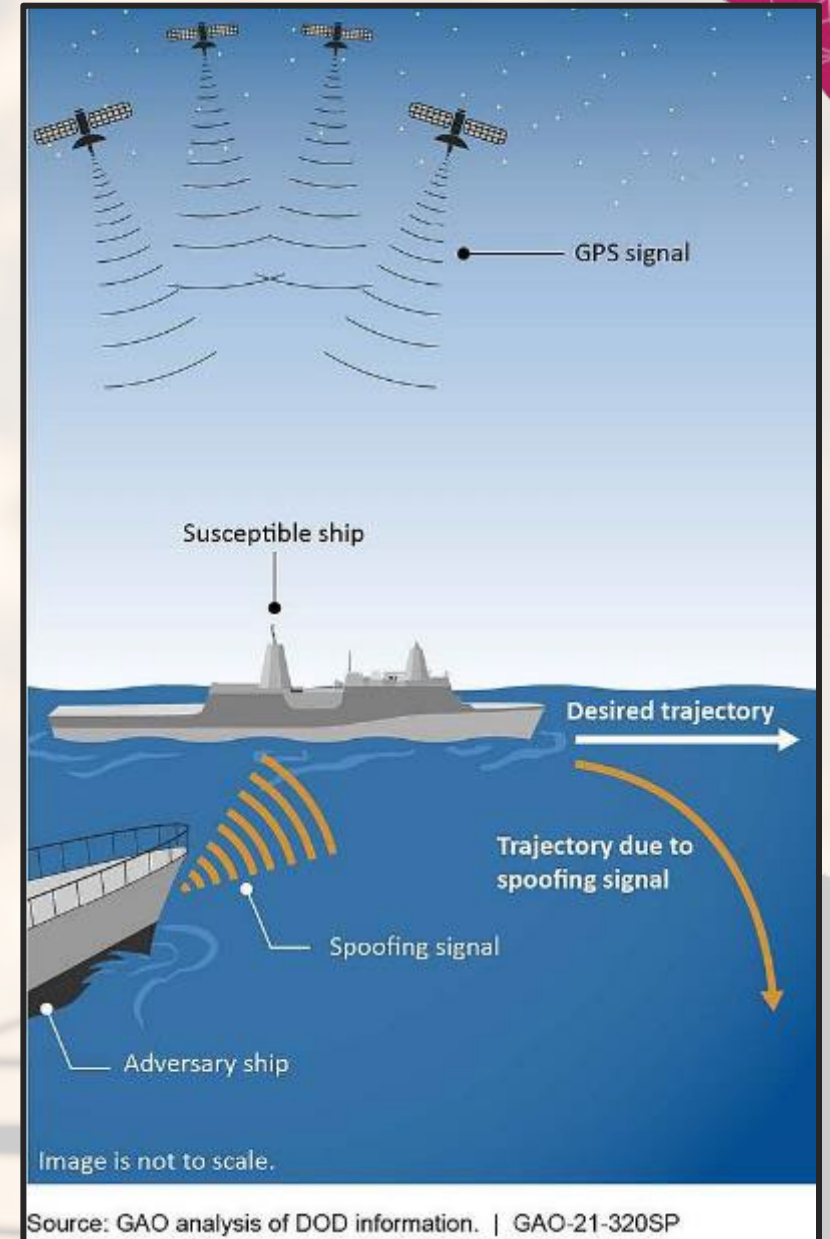
- **Physical obstructions:**
  - Tunnels, tall buildings
- **Unintended Interference:**
  - Space weather
  - Faulty equipment radiating on the GNSS bands
- **Intentional Interference:**
  - Easy to overpower the very weak GNSS signals
  - 1KW Jammer effective area 1m square Km



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# Spoofting

- GNSS spoofing is the provision of GNSS-like signals, transmitted locally and coded to fool the receiver to think it is somewhere it is not



**Thanks**