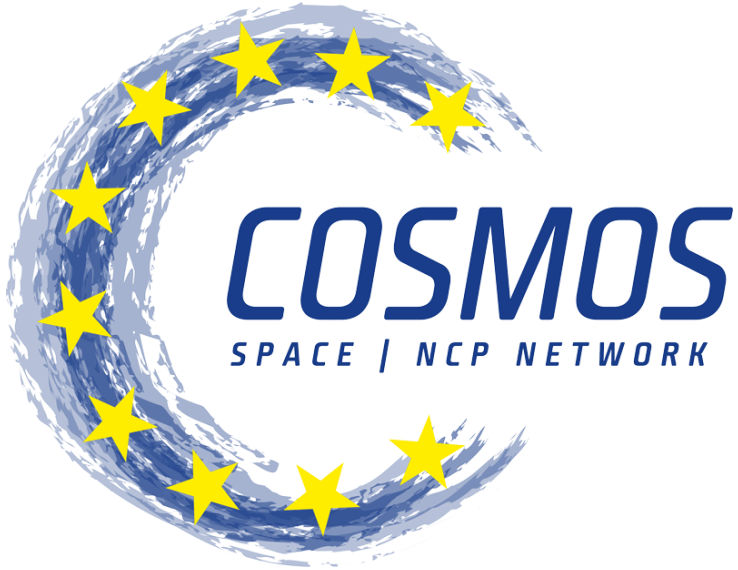
Pitch session



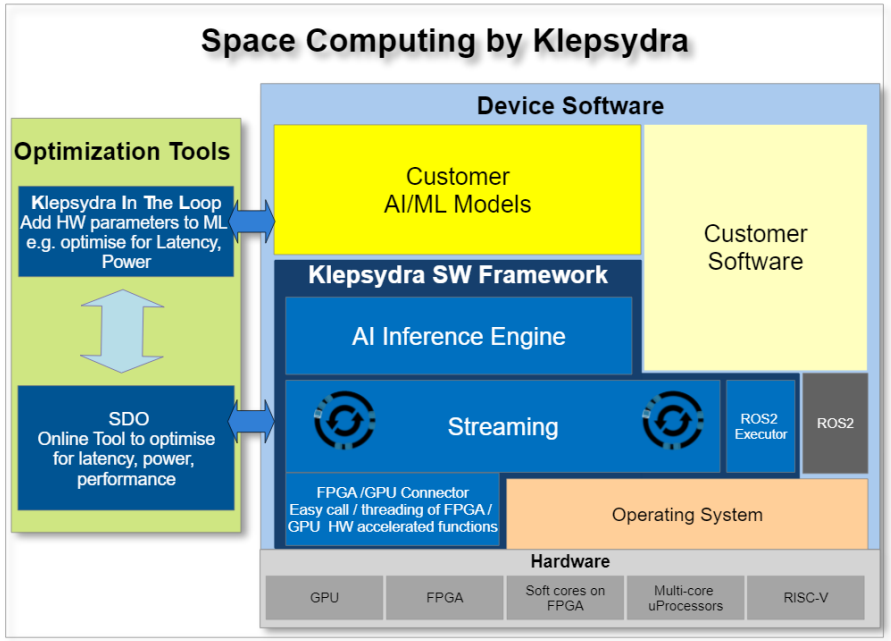
Software Framework for highly efficient AI inference and data processing to enable Intelligent Space Systems

Tomasz Drazek
Klepsydra Technologies AG /Astertom

KLEPSYDRA
TECHNOLOGIES

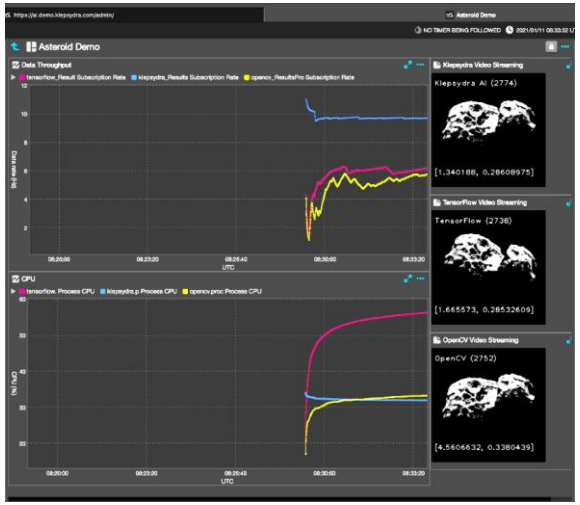
Pitch session

Our Expertise



Lock-Free Algorithms	Use of **ultra-low-latency 'lock-free' algorithms** inspired from financial trading
2-dim Threading Framework	**2-dimensional threading framework** to optimise the execution of any AI algorithm

Utilize the full Potential of available Space Computers

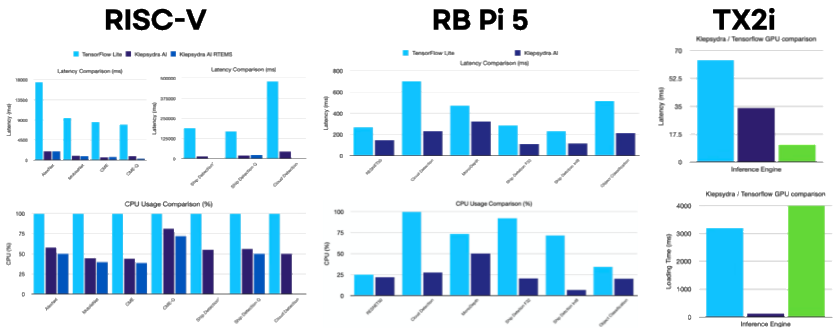


	Klepsydra	TensorFlow	OpenCV
Throughput	☺	☹	☹
CPU Usage	☺	☹	☺
Model Agnostic	☺	😐	☹
Hardware Agnostic	☺	😐	☹

Comparison done in a Project with esa

Building Block for Intelligent Space Systems:

- Modular Architecture
- SW/AI defined Systems
- Over-the-Air upgrade
- Common SW Architecture
- Standardized Interfaces / Open Specifications



Implement Intelligence on a larger range of Space Systems

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Topic

HORIZON-CL4-2025-02-SPACE-31: Digital enablers and building blocks for Earth Observation and Satellite telecommunication for Space solutions

Advanced Earth observation payloads, technologies and processing means (on ground and/or in space) - **distributed computing** - *flexible and modular testbed prototype with representative building blocks for complex SatCom typologies* - **breakthrough digitalized technology steps, such as AI algorithms** - *digital techniques and technologies to support novel operational approaches* - **including their digitalized on-board processing electronics** - *fit for affordable EO constellations to address emerging markets* - **maturation of high-performance processing payload H/W to support space network capabilities together with software functions to support reconfigurability, inter alia**

HORIZON-CL4-2025-02-SPACE-32: Preparing demonstration missions for collaborative Earth Observation and Satellite telecommunication for Space solutions

- on-board processing to optimize EO missions' performance or timeliness (e.g., **standardized software framework to host embedded edge-computing applications** -AI, Machine Learning-, data/signal image processing, enhanced downlink and uplink capabilities)
- in-orbit demonstration focusing on software and digital tools (e.g. algorithms, functions), **supporting open-HW alternatives** (e.g. processors, electronics) such as **RISC-V** or similar from design to pre-operation phases

We also see possibilities to contribute to, depending on topics and approaches, e.g. utilizing / developing an on-board SW component:

- Digital solutions for autonomy for space transportation systems, design and simulation tools - HORIZON-CL4-2025-02-SPACE-12/13
- ISOS Pilot Mission Detailed Design - HORIZON-CL4-2025-02-SPACE-22/23/24

COSMOS SPACE | NCP NETWORK

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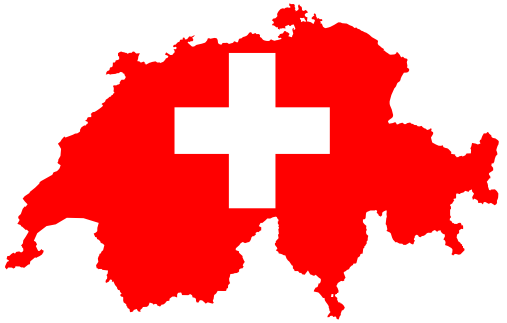
Contact us

- **3** mEUR orders secured in 3 sectors Space, Defense, Mobility
- **3** mEUR Funding - Investments & Grants
- **15** People Across Europe and North America
- **2** Patents 1 Granted, 1 Pending Wordwide application

- KATESU Proof-of-Concept on running AI on space computers
- KRONOR Benchmarking & GPU Streaming
- PATTERN Support of GR740 & GR765 RTEMS6
- MANDALA HDPD-40 support
- ENORMITY Ramon RC64 support
- REBECCA RISC-V support
- SMART-Connect Framework for on-device acceleration



- **Swiss SME**

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- **Experience**

  Several ESA Projects

  REBECCA – H-Europe/KDT-JU on EdgeAI

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