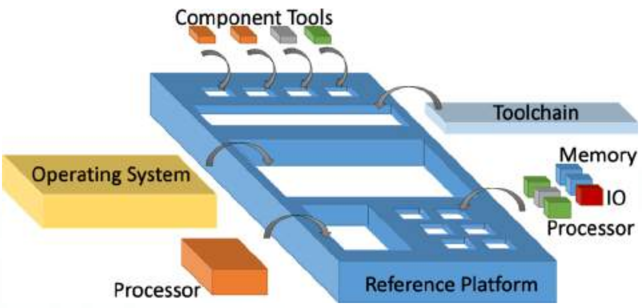
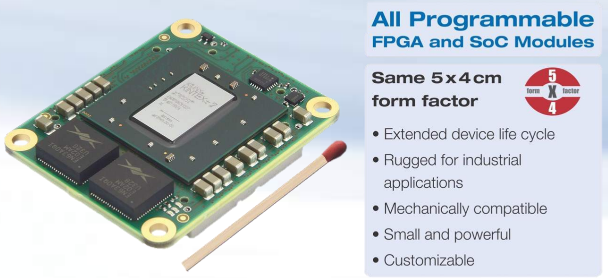
Tulipp: Reference Platform



Define implementation rules and interfaces between heterogeneous off-the-shelf HW, OS and Toolchain



COTS Tulipp Hardware Concept

Improvements compared to 2013	End of Tulipp 2018	5 years later 2023
Peak perf. per watt	x 4	x 100
Average perf. per watt	x 10	x 200

Consortium members:

Ruhr-University of Bochum (Germany)

Norwegian University of Science and Technology (Norway)

Fraunhofer (Germany)

Synective Labs (Sweden)

Efficient Innovation (France)

Hipperos (Belgium)

Sundance Multiprocessor Technology Ltd. (United Kingdom)

Thales (France)

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Towards Ubiquitous Low-power Image Processing Platforms

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Use Case

Surveillance and Rescue UAVs

Goal: Bring intelligence to the drones

Small Unmanned Aerial Vehicles (UAVs) have entered a large range of applications as their underlying technology has improved and more avenues for use have been explored. Now applications such as Surveillance, Search and rescue, Video production, logistics and research are now just a small subset of their uses. Their use in the entertainment domain is rapidly growing as the results vs cost ratio becomes more competitive.

However with the growing number of UAVs in use the number of crashes and problems with their control are also increasing. These problems can be caused by operator error or malfunction. In the worst case scenario these errors can cause damage to more than just the UAV involved and end up harming people, goods or infrastructure.

If the UAV had a more intelligent control system, such as automatic collision avoidance or more robust prose estimation, then these problems would reduce. The problem is that more intelligence in general needs more computing power which is something a UAV is generally very limited with.

The TULIPP solution aims to fill this processing gap by using it's good performance to weight and power consumption to weight figures.

In this UAV use case we plan to use computer vision algorithms such as depth estimation and obstacle detection to evaluate the surroundings and make the UAV more intelligent.

Use Case

Medical X-Ray Imaging

Goal: Reduce Radiation Dose by 75%

Surgery requires that the practitioner controls his movements inside the body of the patient or the way blood flows in arteries and veins but cannot see inside with his own eyes and need imagery systems. Depending on the kind of surgery, X-Ray imaging will be used. Now days X-Ray sensors are working just like digital camera sensors and are very sensitive to noise when the level of incoming radiation is too low. This is problematic for both the patient and the surgeon while the system will not only emit radiation for one X-Ray picture but for a real-time video with tens of pictures per seconds.

In the Tulipp project, we want to reduce this radiation dose by 75%. Doing that, the noise from the sensor would blur the image and make it unusable to see the many little details of the body. A solution is to add image processing to “clean” the image and cancel the noise.

Since the surgery room is small and the device mobile, the processing solution must be compact, consume low power and yet deliver the processing at real-time which is a challenge as for the design of a matching solution.

Use Case

Advanced Driver Assistance

Goal: Safer driving experience

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