



## Flexible & Scalable Software Solution for AFDX<sup>®</sup> compliant Networks

PikeOS RTOS & Hypervisor

### Safe & Secure System Operation



Certifiable  
according to  
DO-178C DAL A



Pure Software  
Solution



AFDX<sup>®</sup> Data  
Network  
compliant

**ARINC 664 DATA NETWORK**

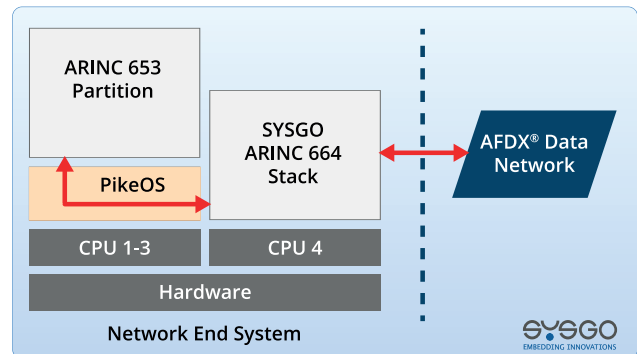
SYSGO's ARINC 664 data network software stack is designed to connect any kind of Avionics end-system to an AFDX® compliant data network. Compared to a complex hardware implementation it is more flexible and customizable to any particular situation. The stack is designed to be executed on

standard „Custom-off-the-Shelf“ (COTS) hardware. Due to its flexibility and scalability, it can be used as stand-alone on a simple embedded controller as well as inside a fully fledged end system.

**EXAMPLE 1**

**Complex Flight Display with High Performance Hardware**

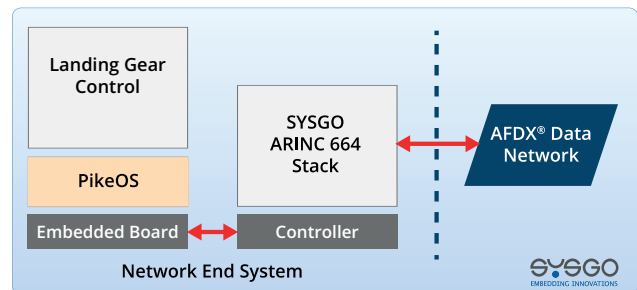
Following the multi-core initiative, the CAST-32A positioning paper has opened the possibility to use powerful processors on board of an aircraft. This allows the implementation of modern flight displays that typically require access to an onboard AFDX® data network. While a traditional approach would require additional hardware, such as an FPGA or ASIC, the software stack allows to implement the ARINC 664 right on one of the processor cores. Inside the ARINC 653 partition, the standard API is available by means of queuing and sampling ports.



**EXAMPLE 2**

**Critical, but Lightweight System**

A typical airliner has a vast number of critical systems that are required to be connected to the aircraft's AFDX® data network but do not depend on the full ARINC 664 specification. For example, the number of virtual links could be reduced. Landing gears or braking systems usually fall in this category. Here, a complete implementation of the ARINC 664 standard would exaggerate the certification costs. The modular software stack can be tailored to the exact needs, providing a more appropriate lightweight solution.



**MORE USE CASES**

- An end system is physically located within a rugged environment (e.g. a jet engine) and the available hardware-based FPGA/ASIC solutions do not fulfil the required specifications regarding temperature and vibration. In this case, SYSGO's software stack can be ported to a customly designed hardware.
- Connecting digital field buses to the AFDX® data networks by means of a data concentrator: Inputs are typically coming from legacy systems such as CAN or ARINC 429 and require additional preprocessing. Here, adapted software is running on high performance computer boards.
- Dedicated to a special operating mode with a low DAL Safety level, e.g. data loading on ground. This allows to

- utilize the end system's host CPU instead of expensive hardware.
- Power consumption, heat dissipation or size of hardware based solutions do not match the requirements: The software stack can be used in the context of a COTS computer board, e.g. beneath an operating system such as PikeOS. Both systems interact with each other by means of shared memory. On application side the AFDX® data network can be interfaced via ARINC 653 communication methods such as queuing and sampling ports. This allows multiple guest operating systems running on top of PikeOS to access the aircraft network in a deterministic way (graphical cockpit displays or fly-by-wire controls).

Founded in 1991, SYSGO became a trusted advisor for Embedded Operating Systems and is the European leader in hypervisor-based OS technology offering worldwide product life cycle support. We are well positioned to meet customer needs in all industries and offer tailor-made solutions with highest expectations in Safety & Security. More information at [www.sysgo.com/avionics](http://www.sysgo.com/avionics)