ARM R Series

The example application is flight control of a commercial hexapod, for this reason and given that we are using an ARM R series processor, I would consider this a hard-real time application, meaning that our main choices would be either cyclic executive or RTOS, given that this would deliver parcels in a urban environment I would feel more comfortable using a cyclic executive approach nonetheless any choice from the 2 is valid.

TABLE OF ARM R Series Processors

Feature	Cortex-R4	Cortex-R5	Cortex-R7†	Cortex-R8	Cortex-R52	Cortex-R52+	Cortex-R82
Instruction Set Architecture	Armv7-R	Armv7-R	Armv7-R	Armv7-R	Armv8-R	Armv8-R	Armv8-R
Pipeline Depth	8 stage in-order, dual issue	8 stage in-order, dual issue	11 stage out-of-order, superscalar	11 stage out-of-order, superscalar	8 stage in-order, superscalar	8 stage in-order, superscalar	8 stage in-order, triple issue
Address Bits	32	32	32	32	32	32	40
Addressable Memory	4GB	4GB	4GB	4GB	4GB	4GB	1TB
ECC on Memories	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MPU or MMU	MPU	MPU	MPU	MPU	MPU	MPU	Both
Maximum MPU Regions	12	16	16	24	24+24	24+24	32+32
Symmetric Multi-Processing (SMP) Support	1 core, No coherency	2 core, IO coherency	Up to MP2	Up to MP4	Up to UP4, No coherency	Up to MP4	Up to MP8
Floating Point Unit (FPU)	Optional	Optional	Optional	Optional	Optional	Optional	Optional
SIMD (Neon)	No	No	No	No	Optional	Optional	Optional
DMIPS/MHz*	1.67	1.67	2.5	2.5	2.04	2.04	3.4
CoreMark®/ MHz*	3.47	3.47	4.35	4.62	4.3	4.3	5.82
Maximum # External Interrupts	Up to 480	Up to 480	Up to 480	Up to 480	Up to 960	Up to 960	56K+
Bus Protocol	AXI3	AXI3	AXI3	AXI3	AXI4	AXI4	AXI5

CHOOSING A CPU

Any choice from the previous table is good, this is an engineering choice, once again, it depends on budget and features that we need, I would suggest starting with the most simple and cheapest Cortex-R4 and consider if this can meet the requirements of our application. However to list a few, ECC memory, interrupts and in-order pipeline are good features to have.