

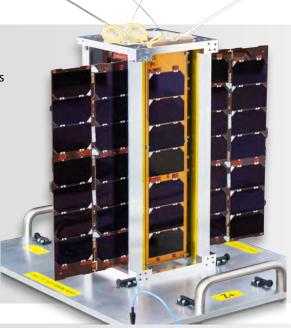
TITLE COMPANY ADDRESS CONTACT C3S PLATFORM DATA SHEET, v03- 02/02/2022 C3S ELECTRONICS DEVELOPMENT LLC HU-1097 BUDAPEST, KÖNYVES KÁLMÁN KRT. 12-14. WWW.C3S.HU • SALES@C3S.HU • +36-21-200-5160

3U/3U PLUS PLATFORM

MAIN FEATURES*

- Flight heritage acquired in 2021 with the launch of RadCube
- In-house developed structure and subsystems based on ECSS standards
- 5-year design lifetime in LEO
- Population by ESA-qualified hand soldering operators
- Double redundancy and soft degradation in all subsystems
- Single-point failure tolerant design
- 32% higher payload power availability**
- Integration time reduced by 55%**
- Redundant CAN and MLVDS buses (OBC)

*Platform developed under the framework of RADCUBE mission founded by ESA ** Than market average



SUMMARY

C3S's main strength in the small satellite industry is that our engineering team devoted great attention to thermal design during the development of our platform. Therefore, the structure is optimized for high dissipation density and thermo-elasticity, both payload and platform wise. Furthermore, our unique radiator design allows unequalled freedom in payload dissipation along unprecedentedly high payload power availability. Our devoted team will be at your service from mission planning throughout the operation of the entire mission, until deorbiting.

SERVICES

- Launch management
- Testing
- Remote testing facility using flatsat
- Mission planning
- Payload design & MAIT from TRL 4
- Mission Operation Center based data collection for one month or longer upon request /extension available

USE CASES

- IoT
- Earth observation
- IOD
- Space weather monitoring

TESTS PERFORMED*

- ✓ SEE radiation test (in anechoic chamber)
- ✓ TID test
- ✓ Vibration test
- ✓ TVAC test (thermal cycling & thermal balance tests, performed in thermal-vacuum chamber)
- ✓ Burn-in test
- ✓ Functional test
- ✓ RF test
- ✓ Autocompatibility test
- ✓ Mechanical properties inspection

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^{*} Test plan and test reports approved by ESA



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SPECIFICATION

PropertyValue/Option:Note:Mass3.3 kgPayload excludedDimensions100 x 100 x 340.5 mm3U sizeSubsystem mechanical interfacesCard Guide, Box-in-a-boxMicro-D: MIL-DTL-83513 Nano-D: MIL-DTL-83513 Nano-D: MIL-DTL-83139BedundancySubsystem level cold / hot (COM) redundancyMicro-D: MIL-DTL-83139Lifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CPlatform average power consumption4.5 WPlatform average power consumption20 WBattery capacity58 Wh / 65 WhPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 VCommand bus, Data bus2 x CAN busCon-Board computer CPU Core32bit ARM Cortex-M7On-Board computer CPU Core16 GByte eMMCMass storage capacity16 GByte eMMCMass storage capacity16 GByte eMMCMass storage capacity399-401 MHzProfessional Band199-401 MHzYRK Frequency Band399-401 MHzYRK Frequency Band30 dBmMaximum transmit power30 dBmStorage capacity50 dBm	3U PLATFORM			
Dimensions100 x 100 x 340.5 mm3U sizeSubsystem mechanical interfacesCard Guide, Box in-a-boxMicro-D: MIL-DTL-83513 Nano-D: MIL-DTL-83513 And micro-D connectorsSubsystem interconnectionRigid backplane with nano-D and micro-D connectorsMicro-D: MIL-DTL-83513 Nano-D: MIL-DTL-32139RedundancySubsystem level cold / hot (COM) redundancyExcept battery pack (0°C+50 °C)Lifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CExcept battery pack (0°C+50 °C)Platform average power consumption20 WMission dependentPlatform peak power consumption20 WMission dependentPlatform peak power consumption21 W90% / 100% SOCPower Buses3.3 V, 50 V, 9.9 V - 12.6 V2Command bus, Data bus2 x CAN busCold-redundant pairCommand bus, Data bus2 2 X ALVDSCold-redundant pair to COMOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadMass storage capacity16 GByte eMMCFadiation resistantMass storage capacity16 GByte eMMCRadiation resistantTX/RX Frequency Band399-401 MHzProfessional Band	Property	Value/Options	Notes	
Subsystem mechanical interfacesCard Guide, Box-in-a-boxSubsystem interconnectionRigid backplane with nano-D and micro-D connectorsMicro-D: MIL-DTL-83513 Nano-D: MIL-DTL-32139RedundancySubsystem level cold / hot (COM) redundancySubsystem level cold / hot (COM) redundancyLifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CExcept battery pack (0°C+50 °C)Platform average power consumption4.5 WMission dependentPlatform peak power consumption20 WMission dependentPlatform peak power consumption58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 50 V, 9.9 V - 12.6 V2x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pair to COMOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board cock frequencyUp to 300 MHz	Mass	3.3 kg	Payload excluded	
Subsystem interconnectionRigid backplane with nano-D and micro-D connectorsMicro-D: MIL-DTL-83513 Nano-D: MIL-DTL-32139RedundancySubsystem level cold / hot (COM) redundancyLifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CExcept battery pack (0°C +50 °C)Platform average power consumption4.5 WMission dependentPlatform peak power consumption20 WMission dependentPlatform peak power consumption58 Wh / 65 Wh90% / 100% SOCPattery capacity58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V2Command bus, Data bus2 x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pair to COMOn-Board computer CPU Core32bit ARM Cortex-M7Mass storage capacity16 GByte eMMCTo Hom SectMass storage capacity16 GByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHzProfessional Band	Dimensions	100 x 100 x 340.5 mm	3U size	
Subsystem interconnectionand micro-D connectorsNano-D: MIL-DTL-32139RedundancySubsystem level cold / hot (COM) redundancyLifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CExcept battery pack (0°C +50 °C)Platform average power consumption4.5 WMission dependentPlatform peak power consumption20 WMission dependentPlatform peak power consumption20 WMission dependentPlatform peak power consumption58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V2Power Buses2.2 x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pairOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board dock frequencyUp to 300 MHz	Subsystem mechanical interfaces	Card Guide, Box-in-a-box		
Redundancy(COM) redundancyLifetime5-year design lifetime in LEOOperating temperature range-40 °C +80 °CPlatform average power consumption4.5 WPlatform peak power consumption20 WBattery capacity58 Wh / 65 WhPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 VPower Buses2.2 K-AN busCommand bus, Data bus2.2 K-AN busCommand bus, Data bus2.2 K-AN busCon-Board computer CPU Core3.2 bit ARM Cortex-M7On-Board clock frequencyUp to 300 MHzMass storage capacity16 GByte eMMCMass storage capacity16 MByte MRAMRadiation resistant399-401 MHzTX/RX Frequency Band399-401 MHz	Subsystem interconnection			
Operating temperature range-40 °C +80 °CExcept battery pack (0°C +50 °C)Platform average power consumption4.5 WMission dependentPlatform peak power consumption20 WMission dependentBattery capacity58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V90% / 100% SOCPower Buses2 x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pair to COMOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board clock frequencyUp to 300 MHz	Redundancy			
Platform average power consumption4.5 WMission dependentPlatform peak power consumption20 WMission dependentBattery capacity58 Wh / 65 Wh90% / 100% SOCBattery capacity58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V2 x CAN busCommand bus, Data bus2 x M-LVDSCold-redundant pairCommand computer CPU Core32 bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board clock frequencyUp to 300 MHz	Lifetime	5-year design lifetime in LEO		
consumption4.3 WMission dependentPlatform peak power consumption20 WMission dependentBattery capacity58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V90% / 100% SOCPower Buses2 x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pair to COMQ x M-LVDSCold-redundant pair to COM2 x M-LVDSOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board clock frequencyUp to 300 MHz	Operating temperature range	-40 °C +80 °C	Except battery pack (0°C+50 °C)	
consumption20 WMission dependentBattery capacity58 Wh / 65 Wh90% / 100% SOCPower Buses3.3 V, 5.0 V, 9.9 V - 12.6 V2 X CAN busCommand bus, Data bus2 X CAN busCold-redundant pairCommand bus, Data bus2 X M-LVDSCold-redundant pair to COM0 n-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board clock frequencyUp to 300 MHz		4.5 W	Mission dependent	
Power Buses3.3 V, 5.0 V, 9.9 V - 12.6 VCold-redundant pairCommand bus, Data bus2 x CAN busCold-redundant pair to COM2 x M-LVDSCold-redundant pair to COM2 x M-LVDSCold-redundant pair to payloadOn-Board computer CPU Core32bit ARM Cortex-M7On-Board clock frequencyUp to 300 MHzMass storage capacity16 GByte eMMC16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHz		20 W	Mission dependent	
Command bus, Data bus2 x CAN busCold-redundant pairCommand bus, Data bus2 x M-LVDSCold-redundant pair to COM2 x M-LVDSCold-redundant pair to payloadOn-Board computer CPU Core32bit ARM Cortex-M7On-Board clock frequencyUp to 300 MHz16 GByte eMMC	Battery capacity	58 Wh / 65 Wh	90% / 100% SOC	
Command bus, Data bus2 x M-LVDSCold-redundant pair to COM2 x M-LVDSCold-redundant pair to payloadOn-Board computer CPU Core32bit ARM Cortex-M7On-Board clock frequencyUp to 300 MHzMass storage capacity16 GByte eMMC16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHz	Power Buses	3.3 V, 5.0 V, 9.9 V – 12.6 V		
ConstraintConstraintConstraintOn-Board computer CPU Core32bit ARM Cortex-M7Cold-redundant pair to payloadOn-Board clock frequencyUp to 300 MHzImage: ConstraintMass storage capacity16 GByte eMMCImage: ConstraintTX/RX Frequency Band399-401 MHzProfessional Band	Command bus, Data bus	2 x CAN bus	Cold-redundant pair	
On-Board computer CPU Core32bit ARM Cortex-M7On-Board clock frequencyUp to 300 MHzMass storage capacity16 GByte eMMC16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHz		2 x M-LVDS	Cold-redundant pair to COM	
On-Board clock frequencyUp to 300 MHzMass storage capacity16 GByte eMMC16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHzProfessional Band		2 x M-LVDS	Cold-redundant pair to payload	
Image: Mass storage capacity Image: GByte eMMC Mass storage capacity 16 MByte MRAM Radiation resistant TX/RX Frequency Band 399-401 MHz Professional Band	On-Board computer CPU Core	32bit ARM Cortex-M7		
Mass storage capacity16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHzProfessional Band	On-Board clock frequency	Up to 300 MHz		
16 MByte MRAMRadiation resistantTX/RX Frequency Band399-401 MHzProfessional Band	Mass storage capacity	16 GByte eMMC		
		16 MByte MRAM	Radiation resistant	
Maximum transmit power30 dBm1 W	TX/RX Frequency Band	399-401 MHz	Professional Band	
	Maximum transmit power	30 dBm	1 W	

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3U Platform/ Specification

Symbol rate uplink	1.25-150 kbps	
Symbol rate downlink	5-150 kbps	
Modulation	OOK/FSK/GFSK	
Knowledge accuracy	0.2°	
Pointing accuracy	2°	
3U PAYLOAD ALLOWANCE		
Property	Value/ Options	Notes
Mass	Up to 4.7 kg	Depending on deployer/ launcher
Volume	1.25 - 1.4 U (Units = Litres)	Depending on payload positioning
Dimensions within Z-frame	146.5 x 94 x 94 mm	Ca n be extended with up to 150,000 mm ³
Average power (average power during 1 orbit)	Up to 20 W	Power available for the payload Mission dependent**
Peak power	35 W ***	Power available for the payload
Communication interface	CAN 2.0B, M-LVDS	
3U PLUS* PAYLOAD ALLOWANCE		
Property	Value/ Options	Notes
Volume	1.45 - 1.65 U (Units = Litres)	Depending on payload positioning
Dimensions within Z-frame	172 x 94 x 94 mm	Can be extended with up to 200,000 mm ³
		* Platform size depending on dispenser 3U PLUS platform dimensions: 100 x 100 x 366 mm

** The presented value is calculated for: Orbit: 600 km, SSO, 9h LTAN Orientation: Z+ axis points to Nadir, Wing is perpendicular to sun vector

*** It can be exceeded as an impulse, for a short period of time (<<1 sec)

The platform's attributes are mission dependent, the datasheet calculates with the basic configuration.