VERONTE
AUTOPILOTS

4xVeronte
Hardware User Manual

EMBENTION

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Figures and Tables

Acronyms

ADC	Analog to Digital Converter
AWG	American Wire Gauge
CAP	Capture Module
DC	Direct Current
DGPS	Differential GPS
DTS	Digital Transmission System
ECAP	Enhanced CAP
EGNOS	European Geostationary Navigation Overlay Service
EPWM	Enhanced PWM
FCS	Flight Control System
FHSS	Frequency Hopping Spread Spectrum
FTS	Flight Termination System

GIS	Geographical Information System
GND	Ground
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
GS	Ground Segment
ISM	Industrial Scientific and Medical
LADGPS	Local Area
LOS	Line of Sight
PWM	Pulse Width Modulation
PWR	Power
RF	Radio Frequency
RS232	Recommended Standard 232
RX	Receiver
SMA	SubMiniature Version A Connector
TX	Transmitter
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicle

CHANGES RECORD

Issue	Date	Page	Change description
1.0	09/11/2016		Initial Issue document for the new version
1.1	31/01/2017		Diagram added
1.2	09/05/2017		Mating connectors updated. Pinout updated.
1.3	17/08/2017		Enclosure updated. Connection panel updated.
1.4	20/09/2017		Pictures updated. Veronte performances table updated.
1.5	23/05/2018		Colour code added. Power and torque information added.

1. Overview

4xVeronte Autopilot is a triple redundant version of the Veronte Autopilot. It includes three complete Veronte Autopilot modules together with a dissimilar arbiter for detecting system failures and selecting the module in charge of the control.
The autopilot selected as the master will be the one controlling the actuators and communicating with the payloads, as seen in the following block diagram.

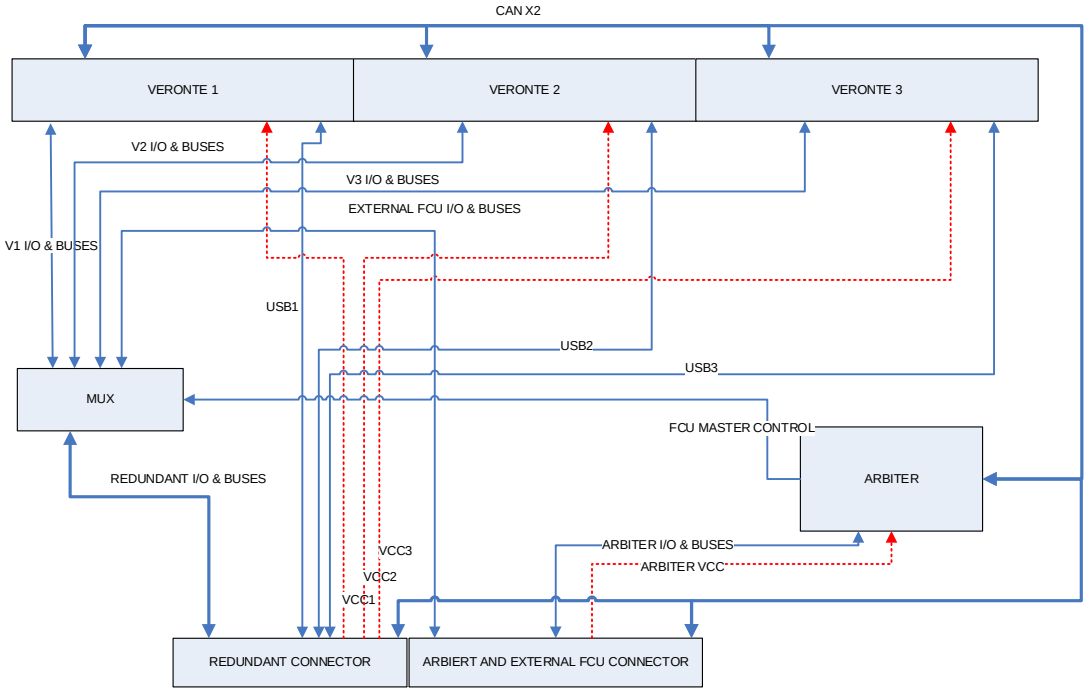

Figure 1: 4xVeronte Overview

Each Veronte autopilot contains all the electronics and sensors in order to properly execute all the functions needed to control the UAV. Veronte executes in real time all the guidance, navigation and control algorithms for the carrying airframe, acting on the control surfaces and propulsion system and processing the signals from different sensors: accelerometers, gyroscopes, magnetometer, static pressure, dynamic pressure, GNSS and external sensors.

Datalink communications can be also redundant, being possible to install inside the autopilot 3 radios of different frequencies. For example, it allows you to have two radios working in the 900MHz frequency and one in the 2.4GHz, so in case there is any issue in the 900MHz band the module connected to the 2.4GHz band will take control. In addition, an external radio can be controlled as a critical device using the serial port in the redundant connector.

All three modules are managed by a dissimilar microprocessor. This arbiter includes voting algorithms for managing the module in charge of vehicle control. This microprocessor compares data from all modules in real time and processes it for discarding any autopilot module showing an undesired performance.

Moreover, there is the possibility to connect an external autopilot from other manufacturer and include it in the redundant scheme.

2. Aircraft Mounting

2.1.1. Enclosure

4xVeronte is provided using an anodized-aluminium enclosure with enhanced EMI shielding and IP protection.

The approximate total weight including radio modules is 750g.
The following figure show the dimensions of the enclosure. M4 screws are recommended for mounting.

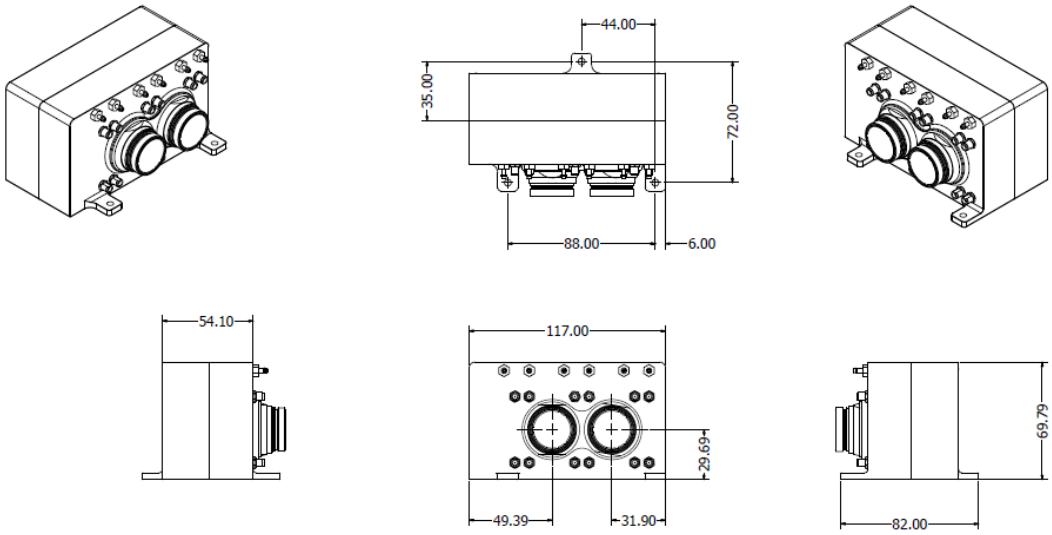

Figure 2: 4xVeronte dimensions (mm)

2.1.2. Vibration Isolation

Although Veronte rejects noise and modes of vibration with internal electronic and mechanical filters, an external vibration isolation might be needed depending of the vehicle.
Veronte can be mounted in different ways in order to reject the airframe vibration if needed. One way to avoid vibration would be the use of some external structure which could be rigidly attached to the airframe and softly attached to Veronte (e.g. foam, silent blocks, etc.)
The user should take into account that wiring should be loose enough so vibrations may not find another way to enter the aircraft system.

2.1.3. Location

The location of 4xVeronte has no restrictions. You only need to configure its relative position with respect to the centre of mass of the aircraft and the GPS antenna. The configuration of the location of Veronte can be easily configured using Veronte Pipe Software.

2.1.4. Orientation

The orientation of 4xVeronte has no restrictions either. You only need to configure Veronte axes with respect to the aircraft body axes by means of a rotation matrix or a set of correspondences between axes. The configuration of the location of Veronte can be easily configured using Veronte Pipe Software.

Veronte axes are printed on the box and aircraft reference frame are defined by the standard flight dynamics conventions.

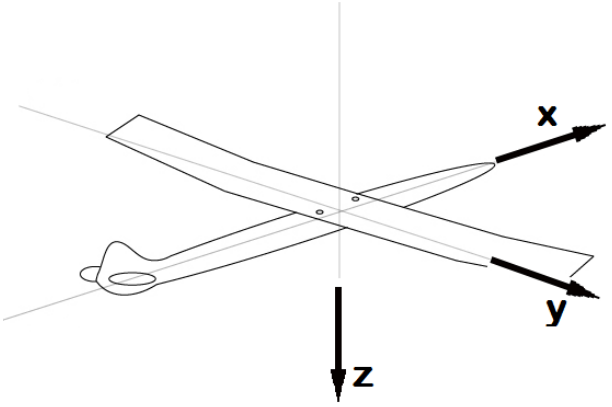

Figure 3: Aircraft Axis

2.1.5. Connector Layout

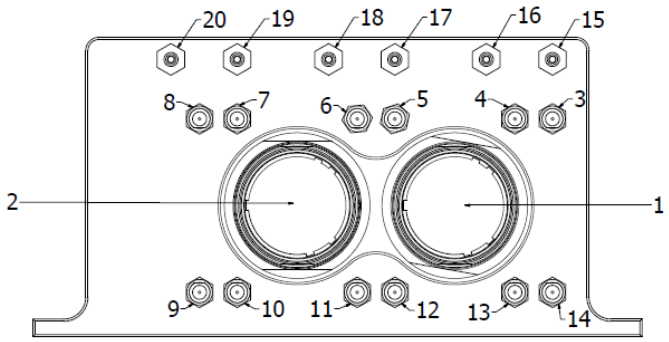

Figure 4: 4xVeronte Connectors

Index	Connector
1	Redundant (Critical) connector
2	Arbiter (Optional) connector
3	LOS SSMA connector for Veronte 3

4	GNSS1 SSMA connector for Veronte 3
5	LOS SSMA connector for Veronte 2
6	GNSS1 SSMA connector for Veronte 2
7	LOS SSMA connector for Veronte 1
8	GNSS1 SSMA connector for Veronte 1
9	GNSS2 SSMA connector for Veronte 1
10	M2M SSMA connector for Veronte 1
11	GNSS2 SSMA connector for Veronte 2
12	M2M SSMA connector for Veronte 2
13	GNSS2 SSMA connector for Veronte 3
14	M2M SSMA connector for Veronte 3
15	Dynamic pressure port (Fitting 5/64in) for Veronte 3
16	Static pressure port (Fitting 5/64in) for Veronte 3
17	Dynamic pressure port (Fitting 5/64in) for Veronte 2
18	Static pressure port (Fitting 5/64in) for Veronte 2
19	Dynamic pressure port (Fitting 5/64in) for Veronte 1
20	Static pressure port (Fitting 5/64in) for Veronte 1

Table 1: 4xVeronte connection panel

For pressure ports, mating with clamped 2mm internal diameter flexible tubing is recommended.

2.1.6. Mating Connectors

Index	Connector	Mating Connector
3,5,7	RF antenna (SSMA Jack Female)	SSMA male Plug, low-loss cable is recommended.
4,6,8,9,11,13	GPS antenna (SSMA Jack Female)	SSMA male Plug, low loss cable is recommended. Active Antenna GPS: Gain min 15dB (to compensate signal loss in RF Cable) max 50dB, maximum noise figure 1.5dB, power supply 3.3V max current 20 mA
10,12,14	M2M antenna (SSMA Jack Female)	SSMA male Plug, low-loss cable is recommended.
1	Redundant Connector HEW.LM.368.XLNP	Mating connector P/N: FGW.LM.368.XLCT Mating harness is available on demand.
2	Arbiter Connector HER.LM.368.XLNP	Mating connector P/N: FGR.LM.368.XLCT Mating harness is available on demand.

Table 2: Mating Connector Table

2.1.7. Antenna Integration

The system uses different kinds of antennas that must be installed on the airframe. Here you can find some advices for obtaining the best performance and for avoiding antenna interferences.

RF Antenna Installation
• Maximize separation between antennas as much as possible. • Keep it far away from alternators or other interference generators.

• Always isolate antenna ground panel from the aircraft structure. • Make that the antenna is securely mounted. • Always use high quality RF wires minimising the wire length. • Always follow the antenna manufacturer manual. • SSMA connections shall be tightened applying 1Nm of torque.
GPS Antenna
• Antenna top side must point the sky. • Install it on a top surface with direct sky view. • Never place metallic / carbon parts or wires above the antenna. • It is recommended to install it on top of a ground plane.

Table 3: Antenna Installation

2.1.8. Pressure Lines

4xVeronte has 6 pressure input lines, 3 for static pressure to determine the absolute pressure and 3 for pitot in order to determine the dynamic pressure on each internal autopilot.

Absolute pressure connection on the aircraft is mandatory while pitot port can be obviated in some aircrafts. Pitot port absence must be configured on Veronte Pipe software.

Pressure Intake
• Pressure intakes must be located in order to prevent clogging. • Never install pressure intakes on the propeller flow. • Design pressure tubing path in order to avoid tube constriction.
Static Pressure
• It is not recommended to use inside fuselage pressure if it is not properly vented.
Pitot Tube
• It is recommended to install it near the aircraft axis in order to avoid false measures during manoeuvres. • For low speed aircrafts it is recommended at least 6,3mm tubes for preventing rain obstruction.

Table 4: Pressure Intake Connect

3. Electrical

3.1.1. Power

4xVeronte can use unregulated DC **(6.5V to 36V)** for the internal Veronte autopilots and also for the arbiter.

LiPo batteries between 2S and 8S can be used without voltage regulation. Remaining battery can be controlled by the internal voltage sensor and by configuring the voltage warnings on the PC application.

For higher voltage installations, voltage regulators must be used. For dimensioning voltage regulators take into account that a blocked servo can activate regulator thermal protection.

⚠ **Caution!!**Power Veronte out of the given range can cause irreversible damage to the system. Please read carefully the manual before powering the system.

Veronte and servos can be powered by the same or different batteries. In case there are more than one battery on the system, a single point ground union it is needed to ensure a good performance. The ground signal should be isolated from other system ground references (e.g. engines).

It is recommendable to use independent switches for autopilot and motor / actuators. During the system initialization, PWM signal will be fixed to low level (0V), please make sure that actuators / motor connected support this behaviour before installing a single switch for the whole system.

3.1.2. Redundant connector pinout

Figure 5: 68-pin redundant connector for 4xVeronte Autopilot

REDUNDANT CONNECTOR				
PIN	SIGNAL	TYPE	INTERNAL POWER DOMAIN[1]	COMMENTS
1	I/O1	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
2	I/O2	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
3	I/O3	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
4	I/O4	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
5	I/O5	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)

[1] 4xVeronte has 2 internal power domains (A,B) that are redundant and independent from each other. Taking this information into account, payloads can be connected externally so a safer scenario can be reached.

6	I/O6	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
7	I/O7	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
8	I/O8	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
9	GND	GROUND		GROUND SIGNAL FOR ACTUATORS 1-8
10	I/O9	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
11	I/O10	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
12	I/O11	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
13	I/O12	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
14	I/O13	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
15	I/O14	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
16	I/O15	I/O	A	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
17	I/O16	I/O	B	MUXED PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
18	GND	GROUND		GROUND SIGNAL FOR ACTUATORS 9-16
19	RS_232_TX	OUTPUT	A	MUXED RS-232 OUTPUT
20	RS_232_RX	INPUT	A	REDUNDANT RS-232 INPUT
21	V2_USB_DP	I/O		VERONTE 2 USB DATA LINE
22	ANALOG_4	INPUT	B	REDUNDANT ANALOG INPUT 0-36V
23	ANALOG_5	INPUT	B	REDUNDANT ANALOG INPUT 0-36V
24	V2_USB_DN	I/O		VERONTE 2 USB DATA LINE
25	CANA_P	I/O		CANbus interface. It supports data rates up to 1 Mbps. Twisted pair with a 120Ω Zo recommended
26	CANA_N	I/O		
27	GND	GROUND		GROUND SIGNAL FOR BUSES
28	CANB_P	I/O		CANbus interface. It supports data rates up to 1 Mbps. Twisted pair with a 120Ω Zo recommended
29	CANB_N	I/O		
30	V2_USB_ID	I/O		VERONTE 2 USB ID LINE
31	I2C_CLK	OUTPUT	A	MUXED CLK LINE FOR I2C BUS
32	I2C_DATA	I/O	A	MUXED DATA LINE FOR I2C BUS
33	GND	GROUND		GROUND FOR 3.3V POWER SUPPLY
34	3.3V	POWER	B	3.3V-100mA POWER SUPPLY
35	GND	GROUND		GROUND FOR 5V POWER SUPPLY
36	5V	POWER	B	5V-100mA POWER SUPPLY
37	GND	GROUND		GROUND FOR ANALOG SIGNALS
38	ANALOG_1	INPUT	A	REDUNDANT ANALOG INPUT 0-36V
39	ANALOG_2	INPUT	A	REDUNDANT ANALOG INPUT 0-36V
40	ANALOG_3	INPUT	A	REDUNDANT ANALOG INPUT 0-36V
41	V2_USB_VCC	POWER		VERONTE 2 USB POWER (GND2 SHOULD BE USED FOR USB CONNECTOR)
42	V3_USB_DP	I/O		VERONTE 3 USB DATA LINE
43	V3_USB_DN	I/O		VERONTE 3 USB DATA LINE
44	GND	GROUND		GROUND SIGNAL FOR BUSES
45	UART_TX	OUTPUT	B	MUXED UART OUTPUT
46	UART_RX	INPUT	B	REDUNDANT UART INPUT
47	GND	GROUND		GROUND SIGNAL FOR BUSES

48	V3_USB_VCC	POWER		VERONTE 3 USB POWER (GND3 SHOULD BE USED FOR USB CONNECTOR)
49	V3_USB_ID	I/O		VERONTE 3 USB ID LINE
50	OUT_RS485_P	OUTPUT	B	NON-INVERTED OUTPUT FOR MUXED RS-485 BUS
51	OUT_RS845_N	OUTPUT	B	INVERTED OUTPUT FOR MUXED RS-485 BUS
52	IN_RS845_N	INPUT		INVERTED INPUT FOR MUXED RS-485 BUS
53	IN_RS485_P	INPUT		NON-INVERTED INPUT FOR MUXED RS-485 BUS
54	RS-485_GND	GROUND		GROUND FOR RS-485 BUS
55	EQEP_A	INPUT	A FOR VERONTE 1&2 B FOR VERONTE 3	ENCODER QUADRATURE REDUNDANT INPUT A (0-5V)
56	EQEP_B	INPUT		ENCODER QUADRATURE REDUNDANT INPUT B (0-5V)
57	EQEP_S	INPUT		ENCODER STROBE REDUNDANT INPUT (0-5V)
58	EQEP_I	INPUT		ENCODER INDEX REDUNDANT INPUT (0-5V)
59	GND3	GROUND		VERONTE 3 GROUND INPUT
60	V1_USB_DP	I/O		VERONTE 1 USB DATA LINE
61	V1_USB_DN	I/O		VERONTE 1 USB DATA LINE
62	V1_USB_ID	I/O		VERONTE 1 USB ID LINE
63	V1_USB_VCC	POWER		VERONTE 1 USB POWER (GND 1 SHOULD BE USED FOR USB CONNECTOR)
64	VCC3	POWER		VERONTE 3 POWER SUPPLY (6.5 to 36V)
65	GND2	GROUND		VERONTE 2 GROUND INPUT
66	GND1	GROUND		VERONTE 1 GROUND INPUT
67	VCC2	POWER		VERONTE 2 POWER SUPPLY (6.5 to 36V)
68	VCC1	POWER		VERONTE 1 POWER SUPPLY (6.5 to 36V)

Table 5: Redundant connector pinout

3.1.3. Arbiter connector pinout

Although being the same part, Arbiter connector and the Redundant connector are polarized differently to avoid wiring swapping.

ARBITER AND EXTERNAL FCU CONNECTOR				
PIN	**SIGNAL**	**TYPE**	**INTERNAL POWER DOMAIN**	**COMMENTS**
1	EXTERNAL FCU I/O1	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
2	EXTERNAL FCU I/O2	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
3	EXTERNAL FCU I/O3	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
4	EXTERNAL FCU I/O4	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.

5	EXTERNAL FCU I/O5	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
6	EXTERNAL FCU I/O6	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
7	EXTERNAL FCU I/O7	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
8	EXTERNAL FCU I/O8	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
9	EXTERNAL FCU I/O9	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
10	EXTERNAL FCU I/O10	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
11	EXTERNAL FCU I/O11	I/O	A	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
12	EXTERNAL FCU I/O12	I/O	B	EXTERNAL FCU PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V). Input current must be limited to 25mA.
13	GND	GROUND		GROUND SIGNAL FOR ACTUATORS
14	EXTERNAL FCU ANALOG INPUT 1	OUTPUT	A	EXTERNAL FCU ANALOG INPUT (0-36V). This is the analog signal corresponding to Analog signal 1 on Redundant connector.
15	EXTERNAL FCU ANALOG INPUT 2	OUTPUT	A	EXTERNAL FCU ANALOG INPUT (0-36V). This is the analog signal corresponding to Analog signal 2 on Redundant connector.
16	EXTERNAL FCU ANALOG INPUT 3	OUTPUT	A	EXTERNAL FCU ANALOG INPUT (0-36V). This is the analog signal corresponding to Analog signal 3 on Redundant connector.
17	EXTERNAL FCU ANALOG INPUT 4	OUTPUT	B	EXTERNAL FCU ANALOG INPUT (0-36V). This is the analog signal corresponding to Analog signal 4 on Redundant connector.
18	GND	GROUND		GROUND FOR ANALOG SIGNALS
19	EXTERNAL_ FCU TO PAYLOAD UART SIGNAL	INPUT	A	CONNECT EXTERNAL FCU UART OUTPUT. (0-3.3V) THIS SIGNAL WILL BE AN INPUT FOR THE RS_232 MULTIPLEXER. MULTIPLEXED OUTPUT ON REDUNDANT CONNECTOR PIN 19
20	PAYLOAD TO EXTERNAL_ FCU UART SIGNAL	OUTPUT	A	CONNECT EXTERNAL FCU UART INPUT. (0-3.3V) THIS SIGNAL WILL BE THE OUTPUT OF THE RS_232 MULTIPLEXER THAT MULTIPLEXES REDUNDANT CONNECTOR PIN 20 SIGNAL.
21	PAYLOAD TO EXTERNAL FCU RS-485_P	OUTPUT		RS-485_P OUTPUT SIGNAL FROM PAYLOAD (REDUNDANT CONNECTOR PIN 53)TO FCU RS-485_P INPUT
22	PAYLOAD TO EXTERNAL FCU RS-485_N	OUTPUT		RS-485_N OUTPUT SIGNAL FROM PAYLOAD (REDUNDANT CONNECTOR PIN 52)TO FCU RS-485_N INPUT
23	EXTERNAL_ FCU TO PAYLOAD RS-485_P	INPUT	B	RS-485_P OUTPUT SIGNAL FROM EXTERNAL FCU TO PAYLOAD RS-485_P INPUT (REDUNDANT CONNECTOR PIN 50)
24	EXTERNAL_ FCU TO PAYLOAD RS-485_N	INPUT	B	RS-485_N OUTPUT SIGNAL FROM EXTERNAL FCU TO PAYLOAD RS-485_N INPUT (REDUNDANT CONNECTOR PIN

				51)
25	CANA_P	I/O		CANbus interface. It supports data rates up to 1 Mbps. Recommended cable is a twisted pair with a 120Ω Zo.
26	CANA_N	I/O		
27	GND	GROUND		GROUND FOR BUSES
28	CANB_P	I/O		CANbus interface. It supports data rates up to 1 Mbps. Recommended cable is a twisted pair with a 120Ω Zo.
29	CANB_N	I/O		
30	ARBITER_RS485_OUT_P	OUTPUT	ARBITER	NON-INVERTED OUTPUT FOR ARBITER'S RS-485 BUS
31	ARBITER_RS485_OUT_N	OUTPUT	ARBITER	INVERTED OUTPUT FOR ARBITER'S RS-485 BUS
32	ARBITER_RS485_IN_N	INPUT	ARBITER	INVERTED INPUT FOR ARBITER'S RS-485 BUS
33	ARBITER_RS485_IN_P	INPUT	ARBITER	NON-INVERTED INPUT FOR ARBITER'S RS-485 BUS
34	ARBITER_ARINC_TXA	OUTPUT	ARBITER	ARBITER'S ARINC POSITIVE OUTPUT
35	ARBITER_ARINC_TXB	OUTPUT	ARBITER	ARBITER'S ARINC NEGATIVE OUTPUT
36	ARBITER_ARINC_RXA	INPUT	ARBITER	ARBITER'S ARINC POSITIVE INPUT
37	ARBITER_ARINC_RXB	INPUT	ARBITER	ARBITER'S ARINC NEGATIVE INPUT
38	GND	GROUND		GROUND SIGNAL FOR BUSES
39	ARBITER_I2C_SCL	OUTPUT	ARBITER	CLK LINE FOR ARBITER'S I2C BUS
40	ARBITER I2C_DATA	I/O	ARBITER	DATA LINE FOR ARRBITER'S I2C BUS
41	ARBITER_RS232B_RX	INPUT	ARBITER	ARBITER RS-232 INPUT B
42	ARBITER_RS232B_TX	OUTPUT	ARBITER	ARBITER RS-232 OUTPUT B
43	ARBITER_RS232A_RX	INPUT	ARBITER	ARBITER RS-232 INPUT A
44	ARBITER_RS232A_TX	OUTPUT	ARBITER	ARBITER RS-232 OUTPUT A
45	GND	GROUND		GROUND SIGNAL FOR ANALOG SIGNALS
46	ARBITER ANALOG_INPUT_1	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
47	ARBITER ANALOG_INPUT_2	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
48	ARBITER ANALOG_INPUT_3	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
49	ARBITER ANALOG_INPUT_4	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
50	ARBITER ANALOG_INPUT_5	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
51	ARBITER ANALOG_INPUT_6	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
52	ARBITER ANALOG_INPUT_7	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
53	ARBITER ANALOG_INPUT_8	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
54	ARBITER ANALOG_INPUT_9	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)

55	ARBITER ANALOG_INPUT_10	I/O	ARBITER	ARBITER ANALOG INPUT (0-36V)
56	WD_EXT	I	ARBITER	WATCHDOG SIGNAL FROM EXTERNAL AUTOPILOT TO ARBITER (0-3.3V)
57	EXT_DETECT	I	ARBITER	CONNECT TO GND IF EXTERNAL FCU IS CONNECTED. OTHERWISE LEAVE OPEN
58	GND	GROUND		GROUND SIGNAL FOR GPIO
59	ARB_GPIO1	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
60	ARB_GPIO2	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
61	ARB_GPIO3	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
62	ARB_GPIO4	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
63	ARB_GPIO5	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
64	ARB_GPIO6	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
65	ARB_GPIO7	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
66	ARB_GPIO8	I/O	ARBITER	ARBITER'S PWM/DIGITAL OUTPUT/DIGITAL INPUT SIGNAL (0-3.3V)
67	GND_ARBITER	GROUND		ARBITER GROUND INPUT
68	VCC_ARBITER	POWER		ARBITER POWER SUPPLY (6.5 to 36V)

Table 6: Arbiter connector pinout

3.1.4. Harness colour code

68-PIN CONNECTOR		
PIN	COLOUR CODE	
1	WT	
2	BN	
3	GN	
4	YL	
5	GY	
6	PK	
7	BL	
8	RD	
9	BK	
10	VT	
11	GY	PK
12	RD	BL
13	WT	GN

Description		
BK	Black	Negro
BL	Blue	Azul
BN	Brown	Marron
GN	Green	Verde
GY	Gray	Grís
OR	Orange	Naranja
PK	Pink	Rosa
RD	Red	Rojo
VT	Violet	Violeta
WT	White	Blanco
YL	Yellow	Amarillo

14	BN	GN
15	WT	YL
16	YL	BN
17	WT	GY
18	GY	BN
19	WT	PK
20	PK	BN
21	WT	BL
22	BN	BL
23	WT	RD
24	BN	RD
25	WT	BK
26	BN	BK
27	GY	GN
28	YL	GN
29	PK	GN
30	YL	PK
31	WT	
32	BN	
33	GN	
34	YL	
35	GY	
36	PK	
37	BL	
38	RD	
39	BK	
40	VT	
41	GY	PK
42	RD	BL
43	WT	GN
44	BN	GN
45	WT	YL
46	YL	BN
47	WT	GY
48	GY	BN
49	WT	PK
50	PK	BN
51	WT	BL
52	BN	BL
53	WT	RD
54	BN	RD
55	WT	BK
56	BN	BK
57	GY	GN

58	YL	GN
59	PK	GN
60	YL	PK
61	WT	
62	BN	
63	GN	
64	YL	
65	GY	
66	PK	
67	BL	
68	RD	

Table 7: Colour code

4. Performances

Variable	Value
Weight (radio included)	750g
Voltage range	6.5V to 36V
Power	17W without M2M 29W with 3.75G M2M 47Wmax with 2G M2M
Minimum Temperature	-40ºC
Maximum Temperature	+50ºC [2]
Max. Internal Temperature	+85ºC
Minimum Pressure	0kPa
Maximum Pressure	104kPa
Maximum Dynamic Pressure	6kPa [3]
Protection Rating	IP67
Acceleration Limits (3 axes)	±2 to ±16g [4]
Angular Velocity Limits (3 axes)	±125 to ±2000 deg/s [5]
Magnetic Field Limits (3 axes)	±4 to ±16 Gauss
GPS	72 channels, GPS L1C/A, GLONASS L1OF, BeiDou B1I
Standard Datalinks	410 to 480 MHz licensed or FHSS 902-928MHz FHSS 2.4 to 2.483 GHz FHSS
Special Datalinks on request	920 – 925 MHz, Singapore regulation compliance 869.5-869.75 MHz ISM Band

Table8: Veronte performances

[2] No convection, ask for increased limits (up to 71ºC)
[3] Ask for increased limits (up to 50kPa)
[4]Limit for sustained maneuvers. Transitional higher accelerations are possible (e.g. catapult launch). Ask for increased limits.
[5]Limit for sustained maneuvers. Transitional higher angular velocities are possible. Ask for increased limits.