Cyanosense 2.0 Bill of Materials

This is the Finalized Bill of Materials for Cyanosense 2.0. Note that the Prices are based on the EXACT number to build the Prototype, unless noted otherwise. Tax and any shipping costs are NOT included. The total cost to build the Prototype was \$1,300.33, which is over two times cheaper than Cyanosense 1.0.

<u>ltem</u>	QTY	<u>Price</u>	<u>Link</u>	Reason		
	Electronics Parts					
Hamamatsu	2	\$700	BO-HAMA-C12880-V2-	Spectrometers		
C12880MA Micro-	(\$350		SENSOR GroupGets	for Cyanosense		
Spectrometer	Each)		LLC Development	2.0		
			Boards, Kits,			
			Programmers DigiKey			
TLP3556A	1	\$4.20	TLP3556A(TP1,F	Turns Sensors		
Photorelay			Toshiba Mouser	On and Off		
ROCKBLOCK 9603	1	\$299.95	RockBLOCK 9603 with	Satellite		
Iridium Satellite			USB Cable - Iridium	Communication		
Modem			Satellite Modem	to Transfer Lab		
			Bundle : ID 4521	Data		
			Adafruit			
ROCKBLOCK 9603	1	\$4.95	RockBLOCK 9603	Adaptor Cable		
Accessory Cable			Accessory Cable : ID	to ESP		
			4529 : Adafruit	Interface		
M1600HCT-P-SMA	1	\$64.95	Iridium/GPS/GLONASS	Antenna for the		
Iridium Passive			Passive Antenna -	Iridium Modem		
Anetnna			GPS-16838 - SparkFun			
SMA Male with	1	\$3.63	RedYutou SMA Male to	Antenna Cable		
Waterproof Ring			with Waterproof Ring	for Iridium		
SMA Female			SMA Female Bulkhead	Modem		
Bulkhead Antenna			nut o-Ring RG316			

Cable 30cm				
ESP32-S2 Saola	1	\$14.50	ESP32-S2 Saola 1R	Microcontroller
Dev Kit			Dev Kit featuring	for the system
			ESP32-S2 WROVER:	
			ID 4693 Adafruit	
DS3231 Real Time	1	\$3.80	Wishiot DS3231 Real	RTC to control
Clock			Time Clock Module	wakeup and
			High Precision	sleep for
			(amazon.com)	ESP32-S2
DIYHZ 1P2T SPFT	1	\$0.09	Amazon.com: DIYhz	Slide Switch
Vertical Slide			100Pcs High Knob 3	used to put
Switch			Pin 2 Position 1P2T	ESP32-S2 to
			SPDT Vertical Slide	Download Data
			Switch with PCB Panel	Mode or
			for Arduino, 0.5 Amp,	Normal
			<u>50V DC, 2 mm</u>	Operation
Voltaic 2 Watt Solar	1	\$59.99	2 Watt Solar Panel Kit	Solar Panel
Charger Kit			with USB Battery Pack	and Battery
(Includes Voltaic			(voltaicsystems.com)	
V25 Battery, 2W				
Solar Panel, and				
adaptor)				
0.5ft Micro USB	1	\$4.99	CableCreation Short	Connects
Cable to USB			USB to Micro USB	ESP32-S2 to
			Cable 0.5 FT, USB2.0	Battery
			Micro USB	
			(amazon.com)	
SchmalzTech	2	\$17.98	SchmalzTech Premium	Breadboard for
Premium 470	(\$8.99		470 Position	System
Position	Each)		Breadboard	
Breadboard ST-BB-				

470				
Jumper Wire Kit	1	\$11.99 (Not	560 Pieces Jumper	Wires for
		Exact)	Wire Kit 14 Lengths	Breadboard
			<u>Assorted Preformed</u>	
			Breadboard Jumper	
			Wire Amazon.com	
120pcs 10cm	1	\$6.98 (Not	Amazon.com:	Jumper Wires
Breadboard Jumper		Exact)	EDGELEC 120pcs	for RTC
Wires Assorted Kit			10cm Breadboard	
			Jumper Wires Assorted	
			<u>Kit</u>	
120pcs 40cm	1	\$11.99 (Not	Amazon.com:	Jumper Wires
Breadboard Jumper		Exact)	EDGELEC 120pcs	for
Wires Assorted Kit			40cm Breadboard	Spectrometers
			Jumper Wires Assorted	
			<u>Kit</u>	
		Mechanic	al Parts	
TICONN	1	\$19.99	TICONN Waterproof	Electronics
Waterproof			Electrical Junction Box	Housing
Electrical Junction			IP67 ABS Plastic	
Box IP67			Enclosure with Hinged	
(5.9"x5.9"x3.5")			Cover with Mounting	
			Plate, Wall Brackets,	
			Cable Glands (Off-	
			White, 5.9"x5.9"x3.5")	
			(amazon.com)	
3/4in PVC 1-Gang	1	\$7.68	Kraloy 1-Gang Gray	Sensor
Type FSE Box			PVC Weatherproof	Housing
			New Work/Old Work	
			Standard Rectangular	

		Exterior Electrical Box	
		in the Electrical Boxes	
		department at	
		Lowes.com	
TayMac 1-Gang 1	\$3.58	TayMac 1-Gang	Cover for
Rectangle Plastic		Rectangle Plastic	Sensor
Weatherproof		Weatherproof Electrical	Housing
Electrical Box		Box Cover in the	
Cover		Electrical Box Covers	
		department at	
		Lowes.com	
CANTEX 3/4in 10ft 1	\$2.06	CANTEX 3/4-in x 10-ft	Used to
Schedule 40 PVC		Non-metallic Schedule	Connect
Conduit		40 PVC Conduit in the	Sensor and
		Conduit department at	Electronic
		<u>Lowes.com</u>	Housings. Cut
			to 2ft.
CANTEX 3/4in 1	\$0.60	CANTEX 3/4-in	Attaches PVC
Schedule 40 PVC		Schedule 40 Schedule	Pipe to
Bushing Connector		80 PVC Bushing	Electronics
Conduit Fitting		Connector Conduit	Housing
		Fittings in the Conduit	
		Fittings department at	
		<u>Lowes.com</u>	
Sigma ProConnex 1	\$0.39	Sigma ProConnex 3/4-	Screws the
3/4-in Zinc-plated		in Zinc-plated Steel	Bushing
Steel Conduit		Conduit Locknut	Connector to
Locknut		Conduit Fittings (2-	the Electronics
		Pack) in the Conduit	Housing
		Fittings department at	
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plated Standard Flat Washer Flat Washer Standard Flat Washer In the Flat Washer In the Flat Washers Housing to prevent flex	Hillman 1-in Zinc-	1	\$0.78	Hillman 1-in Zinc-plated	Adds Support
department at Lowes.com prevent flex	plated Standard			Standard Flat Washer	to the Inside of
Lowes.com prevent flex 1-1/2 Inch Oversize Union Washer Flat Plumbing Slip Joint Washer Rubber Flat Washer Uxcell M3x30mm Round Aluminium Column Standoffs Uxcell M3x16mm Thumb Screws Hillman 4/40 Hex Machine Nuts M3x Screws Microscope Cover Microscope Cover 1 \$0.30 Amazon.com: 30 Pack Wasterproofs Electronics Box Union Washer Flat Union Washer Flat Union Washer Flat Washer Connection Maxanch.com: uxcell Uxcell M3x30mm Support Top Round Aluminum Column Alloy Standoff Electronics Box Amazon.com: uxcell Thumb Screws M3x16mm Knurled Head Thumb Screws Black 10pcs Millman 140009 Hex Machine Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com M3x10mm Machine Screws Pan Phillips Cross Head Screw 304 Stainless Steel Fasteners Bolts 30Pcs Microscope Cover Mortio Oversize Uxotell Maxanch Machine Screw 304 Standoffs to Mounting Plate in Electronics House Microscope Cover Mortuo 50 Pieces Cover Glass	Flat Washer			in the Flat Washers	the Electronics
1-1/2 Inch Oversize Union Washer Flat Union Washer Flat Plumbing Slip Joint Washer Rubber Flat Washer Uxcell M3x30mm Round Aluminium Column Standoffs Uxcell M3x16mm Thumb Screws Uxcell M3x16mm Thumb Screws Hillman 4/40 Hex Machine Nuts M3x Screws M3x Screws M3x Screws M3x Screws M3x Screws M3x Screws M3x10mm Machine Screws Standoffs to Screws Pan Phillips Cross Head Screw 304 Standoffs to Marzon.com: uxcell Marazon.com: uxcell Marazon.com: uxcell Thumb Screws Machine Screw 304 Machine Screw 304 Machines Steel Fasteners Bolts 30Pcs Microscope Cover Microscope Cover Machine Screw Screw Gover Standoffs to Mounting Plate Fasteners Bolts 30Pcs Motoroscope Cover Machine Screw Gover Glass Mounting Plate Fasteners Bolts 30Pcs Cover Glass				department at	Housing to
Union Washer Flat Plumbing Slip Joint Washer Rubber Flat Washer Washer Rubber Flat Washer Uxcell M3x30mm Round Aluminium Column Standoffs Uxcell M3x16mm Thumb Screws Hillman 4/40 Hex Machine Nuts M3x Screws 4 \$0.94 Solution Washer Flat Union Washer Union Washer Union Washer Union Union Vasher Standoff to Screw down Head Thumb Screws Union Screw down Head Thumb Screws Union Washer Union Union Vasher Union				<u>Lowes.com</u>	prevent flex
Plumbing Slip Joint Washer Rubber Flat Washer Uxcell M3x30mm Round Aluminium Column Standoffs Uxcell M3x16mm Thumb Screws Hillman 4/40 Hex Machine Nuts M3x Screws M3x Screws M3x Screws Microscope Cover 2 \$8.99 (Not Masher Flat Plumbing Slip Joint Washer Flat Washer Union Washer Flat Plumbing Slip Joint Connection Vasher Rubber Flat Washer Connection Namazon.com: uxcell Standoff to Support Top Layer in Electronics Box Amazon.com: uxcell M3x16mm Knurled Head Thumb Screws Black 10pcs Hillman 14/40 Hex Machine Screw Nuts, 4-40, Zinc, 100 Piece; Amazon.com M3x10mm Machine Screws Pan Phillips Cross Head Screw 304 Stainless Steel Fasteners Bolts 30Pcs MOTUO 50 Pieces Cover Glass	1-1/2 Inch Oversize	1	\$0.30	Amazon.com: 30 Pack	Waterproofs
Washer Rubber Plumbing Slip Joint Washer Rubber Flat Washer Connection Uxcell M3x30mm 4 \$4.60 Amazon.com: uxcell 10Pcs M3 x 30mm Support Top Layer in Electronics Box Column Standoffs Round Aluminum Column Alloy Standoff Layer in Electronics Box Uxcell M3x16mm 4 \$5.20 Amazon.com: uxcell M3x16mm Knurled to screw down Head Thumb Screws Black 10pcs Thumb Screws Top Layer Hillman 4/40 Hex 4 \$0.24 Hillman 140009 Hex Machine Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com Nuts to screw Standoffs to Screws Pan Phillips Mounting Plate in Electronics Stainless Steel Fasteners Bolts 30Pcs Screws Pan Phillips House Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass	Union Washer Flat			1-1/2 Inch Oversize	Electronics Box
Flat Washer Uxcell M3x30mm	Plumbing Slip Joint			Union Washer Flat	to Pipe
Uxcell M3x30mm 4 \$4.60 Amazon.com: uxcell 10Pcs M3 x 30mm Support Top Round Aluminium Column Standoffs Electronics Box Amazon.com: uxcell Electronics Box Thumb Screws Thumb Screws M3x16mm 4 \$5.20 Amazon.com: uxcell Thumb Screws M3x16mm Knurled to screw down Head Thumb Screws Black 10pcs Hillman 4/40 Hex Machine Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com M3x Screws 4 \$0.94 Amazon.com: uxcell M3x10mm Machine Standoffs to Screws Pan Phillips Cross Head Screw 304 Stainless Steel Fasteners Bolts 30Pcs Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass	Washer Rubber			Plumbing Slip Joint	Connection
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Round Aluminium Column Standoffs Uxcell M3x16mm Thumb Screws Hillman 4/40 Hex Machine Nuts M3x Screws 4 \$0.24 \$0.24 Mazon.com: uxcell M3x10mm Aluminum Head Thumb Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com M3x Screws 4 \$0.94 Mazon.com: uxcell Max10mm Machine Screws Max10mm Machine Screws Max10mm Machine Screws Mounting Plate in Electronics Mounting Plate in Electronics House Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				Washer	
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Thumb Screws M3x16mm Knurled Head Thumb Screws Head Thumb Screws Top Layer				Column Alloy Standoff	Electronics Box
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Machine Nuts Machine Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com				Black 10pcs	
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M3x Screws 4 \$0.94				4-40, Zinc, 100 Piece:	
M3x10mm Machine Standoffs to Screws Pan Phillips Cross Head Screw 304 Stainless Steel Stainless Steel Fasteners Bolts 30Pcs Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				Amazon.com	
Screws Pan Phillips Cross Head Screw 304 Stainless Steel Fasteners Bolts 30Pcs Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass	M3x Screws	4	\$0.94	Amazon.com: uxcell	Screws
Cross Head Screw 304 in Electronics Stainless Steel House Fasteners Bolts 30Pcs Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				M3x10mm Machine	Standoffs to
Stainless Steel House Fasteners Bolts 30Pcs Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				Screws Pan Phillips	Mounting Plate
Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				Cross Head Screw 304	in Electronics
Microscope Cover 2 \$8.99 (Not MOTUO 50 Pieces Cover Glass				Stainless Steel	House
				Fasteners Bolts 30Pcs	
Glass Slips Exact) Microscope Slides and (20mm x 20m x	Microscope Cover	2	\$8.99 (Not	MOTUO 50 Pieces	Cover Glass
	Glass Slips		Exact)	Microscope Slides and	(20mm x 20m x

			100pcs Pre-Cleaned	0.13-0.17mm)
			20mm x 20mm	were used as
			Microscope Cover Slips	the lens for the
			Glass Amazon.com	Sensor
				Housing
GE Advanced	1	\$14.99 (Not	GE Advanced Silicone	Sealed Solar
Silicone		Exact)	Window And Door	Panel and
			Sealant Clear, 2.8 Oz.	Cable for
			(amazon.com)	Waterproofing.
				Was also used
				to attach glass
				lends in Sensor
				Hosuing
Miscellaneous	1	\$20 (Not	This Covers TPU Material used for 3D	
		Exact)	Printed FOV Adaptor, PETG Material	
			Used for the other 3D Printed Parts, and	
			Foam Pads used for Battery	
Total	Cost:	\$1,300.33	1	