

QUOTE # 14



CryoElec LLC
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Quote #14

BILL TO

Arecibo Observatory

SHIP TO

Arecibo Observatory

Quote Date:

08/31/2021

LINE ITEM #	DESCRIPTION OF PRODUCTS AND SERVICES	QTY	UNIT PRICE	TOTAL
1	On site measurements of the feed mounted on the 12m antenna: antenna efficiency and noise temperature: using a room temperature feed + LNA . Duration: 2 weeks	1	\$9,849.96	\$9,849.96
2	Hardware Cost Estimate including: - A fully integrated, custom made, cryogenic system: high vacuum chamber with a large microwave transparent window cooled with the Trillium 350 cold head, including all internal and external components: vacuum flanges, connectors (RF + DC), temperature sensors, vacuum gauge, valves... - A Radome will be mounted on the receiver window to prevent condensation, with warm air blower, remotely controlled. - A receiver noise temperature (Trec) close to simulation data shown on figure2 of the Arecibo provided specification document (dated 07/02/2021) - A wideband feed 2-14 GHz, dual linear Polarized, with a 20dB taper at HPBW angle 50deg - 2-14GHz cryogenic LNAs (donated by Cosmic Microwave Technology) - Custom noise Injection circuitry: Cryogenic low loss wideband coupler connected to temperature stabilized (room temp or cryo) Low power (4 to 5% of average Tsys ~ 1K) and high power (40 to 50% of average Tsys~ 10K) noise sources switchable at 80Hz - Custom 2GHz Cryogenic Filters - Room temperature electronics: Switches, post amplifiers, variable attenuators, power splitters, combiners and custom made filters -A Solar filter: Aperture filter with ~20dB attenuation for solar observation: with its mechanical components and control electronics - A M&C system for the RF electronics and cryogenics: Monitor temperatures (1st and 2nd Stages) , pressure, LNA voltages and currents. Control noise sources (constant current sources), switches and attenuators.	1	\$94,526.25	\$94,526.25
3	Labor cost estimate: Design, Assembly, testing and deployment (per the attached detailed Proposal)	1	\$96,000.00	\$96,000.00
4	On site installation of the built hardware and measurements off and on antenna of Tsys, hand over to Arecibo engineers. Duration: 2 Weeks	1	\$9,849.96	\$9,849.96

SUBTOTAL 200376.21

Thank you for considering CryoElec LLC as a supplier for your RF/Microwave cryogenic electronics needs. We are pleased to quote your requirements as shown above and we look forward to the opportunity of serving you.

TAX RATE 0.00%
 TOTAL TAX 0.00
 SHIPPING 0.00

TOTAL \$ 200,376.21

Terms & Instructions

A PO needs to be issued to place an order.
 An invoice will be sent to the customer during shipping products and/or services