Camera Calibration Development Support

Prepared for:

Luritech Inc.

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Submitted by:

Quartus Engineering Incorporated

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Proposal No. Q5639-01, Rev A

Template: QAL-0046 Rev D

Validity Period

This offer is valid for 30 Days.

Statement of Confidentiality

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Revision History

Revision	Date	Author	Release Notes/Change Description	Valid Through
A	3/30/2022	M. Ferguson	Initial Release	4/30/2022

Contact Information

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1 INTRODUCTION

Luritech has recently procured a Tesseract XLHD system consisting of a Laser Module (Q5179-0160) and a Tesseract (Q5179-0050), for use on a fixture that they are developing. As such, Luritech has requested Quartus's support to develop software for laser control along with an image processing algorithm for use with the Tesseract.

2 SCOPE OF WORK

Quartus proposes to perform the following tasks:

2.1 Task 1 – System Architecture Support

Quartus will support Lurtiech with the evaluation of their fixture design. This will be completed via 3D CAD. Quartus will provide comments to Luritech based on this evaluation. Quartus will also provide Project Management services to coordinate meetings and tasks, to ensure success of this effort.

2.2 Task 2 – Image Processing Support

Quartus will provide the following software support.

2.2.1 Laser Control Software Support

Luritech is using a Windows based platform for their fixture. Quartus will update and validate previously developed (.net) laser control board GUI. Quartus will also build an installer for this application to be used for deployment.

2.2.2 Calibration Software Development

Quartus will modify existing image processing tools to tailor them for Luritech's application by performing the following:

- Implement calibration feature updates requested for this application
  - Combine EFLx,EFLy into a single EFL and estimate as one value.
  - Generate radial distortion lookup table, and inverse radial distortion lookup table, and inverse distortion coefficients.
- Develop and implement an application specific file format containing calibration information required for device NVM or for consumption by application software.
- Develop wrapper code for complied Matlab .dll, along with simple example application to show usage in the target development environment. (C# Assumed)

2.2.3 Implementation Support

Quartus will provide remote support as needed to:

- Support post processing of images captured in the application and select ideal image processing settings for the application.
- Debug any processing failures or anomalies observed in the application or processing during early bring up.

2.3 Task 3 – Laser Module Support

2.3.1 Laser Control Software Support

Luritech is using a Windows based platform for their fixture. Quartus will update and validate previously developed (.net) laser control board GUI. Quartus will also build an installer for this application to be used for deployment.

2.3.2 Remote Software Support

Quartus will provide remote software support for Laser Module (.net) application during early bring-up.

3 RECEIVABLES

1. Luritech Fixture CAD

4 DELIVERABLES

1. Compiled Matlab .dll which processes images, performs calibration, and generates specified output file.
2. Example console application which uses the compiled .dll to perform calibration given some test inputs.
3. (.net) application for Laser Control.

5 PRICE

Quartus proposes to perform this project on a Time-and-Materials (T&M) basis for an initial estimate of $29,664.00. The price is summarized by task in Table 5-1. As a T&M project, Quartus will bill Luritech based on the actual labor hours and rates utilized on the project. Quartus will send periodic financial status reports to Luritech during execution of the support.

Table 5-1: Summary of price.

Tasks	Labor Total		Task Total
	Hours	PRICE	
(1) System Architecture	20	$3,632.00	$3,632.00
(2) Software and Image Processing Support	94	$18,416.00	$18,416.00
(3) Laser Module Support	44	$7,616.00	$7,616.00
TOTALS	**158**	**$29,664.00**	**$29,664.00**

6 ASSUMPTIONS/EXCEPTIONS

1. It is assumed that meetings will be held at the Quartus facility in San Diego, California. No funding is included for labor or expenses for travel to other locations.

2. Hourly labor rates are based on Quartus' Rate Catalog released at the time of this proposal, QAL-0100 RevH.

7 TERMS & CONDITIONS

This quote does not include any hardware deliverables.

Quartus understands that time is of the essence and will use best efforts to maintain schedule. However, Quartus will not be responsible for delay to the schedule or prevention of performance that is caused by an act or event that is beyond its reasonable control and could not have been prevented or avoided by its exercise of due diligence (for example, acts of God, acts of terrorism, embargoes, epidemics, war, riots, insurrections, fires, explosions, earthquakes, floods, and abnormal weather conditions where the Services are being performed). In such case, Quartus will give the client written notice, as soon as practicable under the circumstances, of the act or event that so prevents such party from performing its obligations.

In no event shall Quartus be liable for indirect, special, incidental, consequential, or liquidated damages of any kind, including without limitation, lost data or lost profits.

Quartus submits invoices on a monthly basis. All invoices are due in full within 30 days of invoice date. A service charge of 2% per month will be added to all amounts billed if invoices are not paid within 30 days.