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#### **Title**

Vesta Imager: Handheld Imager for Rapid Burn Wound Assessment

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#### **Publication Date**

2017-03-15

Peer reviewed

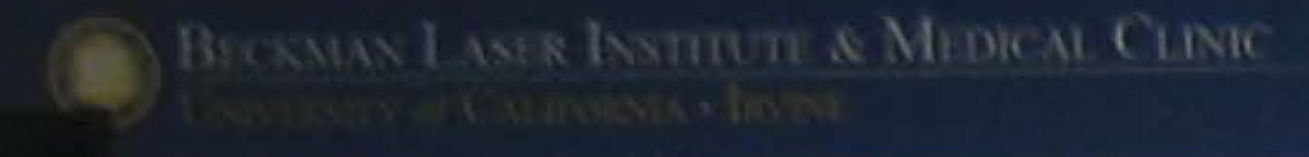


# Vesta Imager: Handheld Imager for Rapid Burn Wound Assessment

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## Introduction

Primary methods to determine burn severity are visual observation and histology. Visual diagnoses are only 50% accurate.



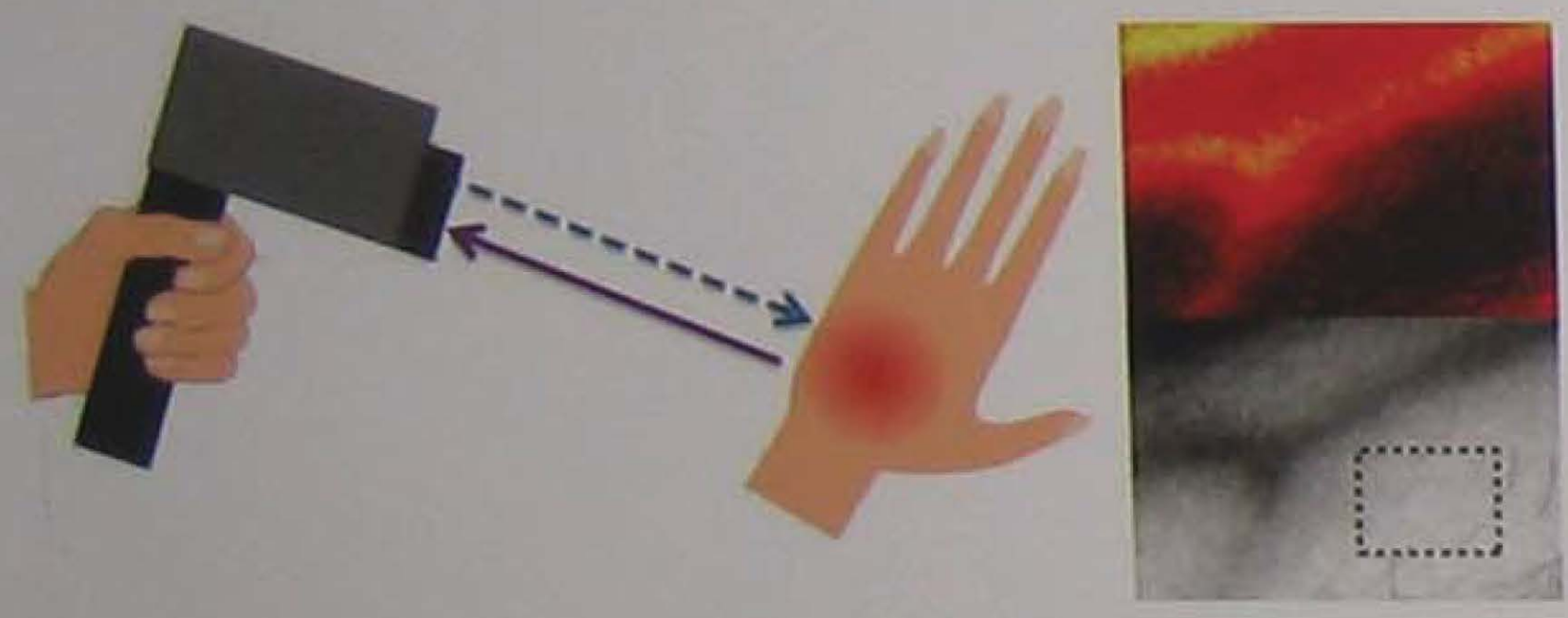
Figure 1: Visualization of burn wounds

**CHALLENGES**  
Similar in clinical appearance  
Heterogeneity

**DIFFERENCE IN MANAGEMENT**  
SPT generally heals in 2-3 weeks  
DPT requires grafting (surgery)

## Project Goal

We seek to develop a low cost, handheld imaging device for the rapid and accurate assessment of burn wound injuries. This device will be available at all types of health care institutions



A) Projector displays pattern onto the area of the burn wound  
B) Light is scattered and absorbed across the injured skin. The returning light is captured by the CMOS camera  
C) Images analyzed to determine burn severity and depth by its optical properties (Figure 2)

## The Customer and Revenue Streams

The Vesta Imager brings instant and accurate diagnoses to emergency departments nationwide. Our primary customers are hospital administrators.

**67\*** Burn Centers  
**6,400\*** Urgent Care Centers  
**5,025\*** Emergency Departments  
\*In the U.S.

REVENUE: Profit from original device sale and continuous revenue from disposable cone package sales. CPT Codes 16000-16030 and EM Codes 99281-99288 cover reimbursement for use of our device

## Vesta Imager: Project Design & Current Status

- Firefly MV 1.3 MP Color USB 2.0
- 3D Printed Housing
- UNIC Micro DLP Projector

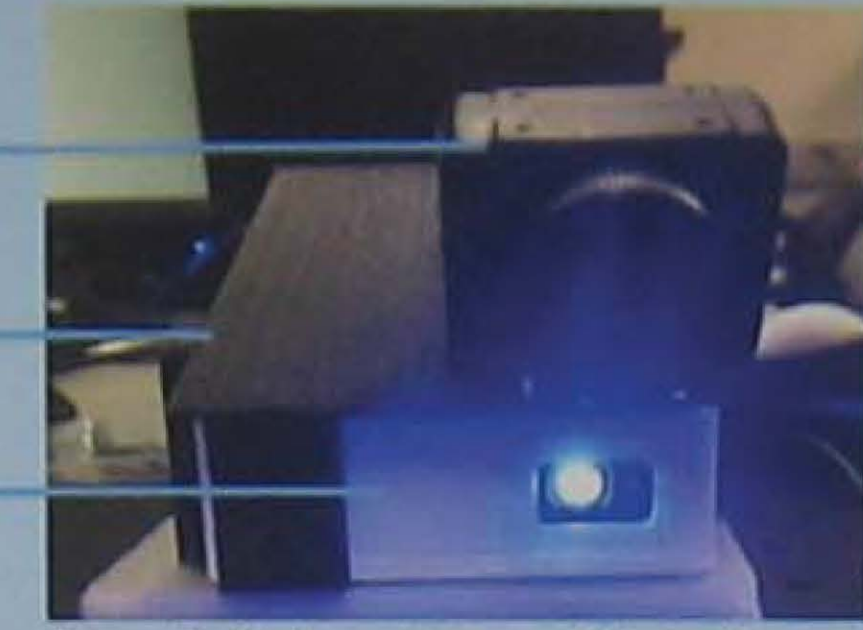


Figure 3: Alpha prototype of Vesta Imager

The camera is mounted on top of the casing by a slider and screws. The projector is placed on the bottom part of casing. **Material used for the housing is Polylactic Acid (PLA).** (Figure 3)

The alpha prototype uses LabVIEW to project spatially patterned light onto skin and have the camera captures images of each pattern. From there, MATLAB performs image analysis and reveals scattering and absorption of the skin.

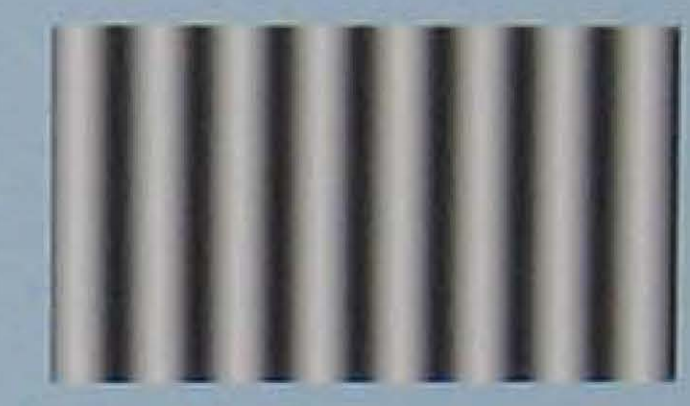


Figure 4: MATLAB generated sine wave pattern sent to projector



Patterns on skin

Camera Dimensions: 44 x 34 x 24.4 mm

Projector Dimensions: 7.80 x 7.00 x 2.50 cm

Figure 5: Vesta Imager used on Skin

## Device Testing and Validation



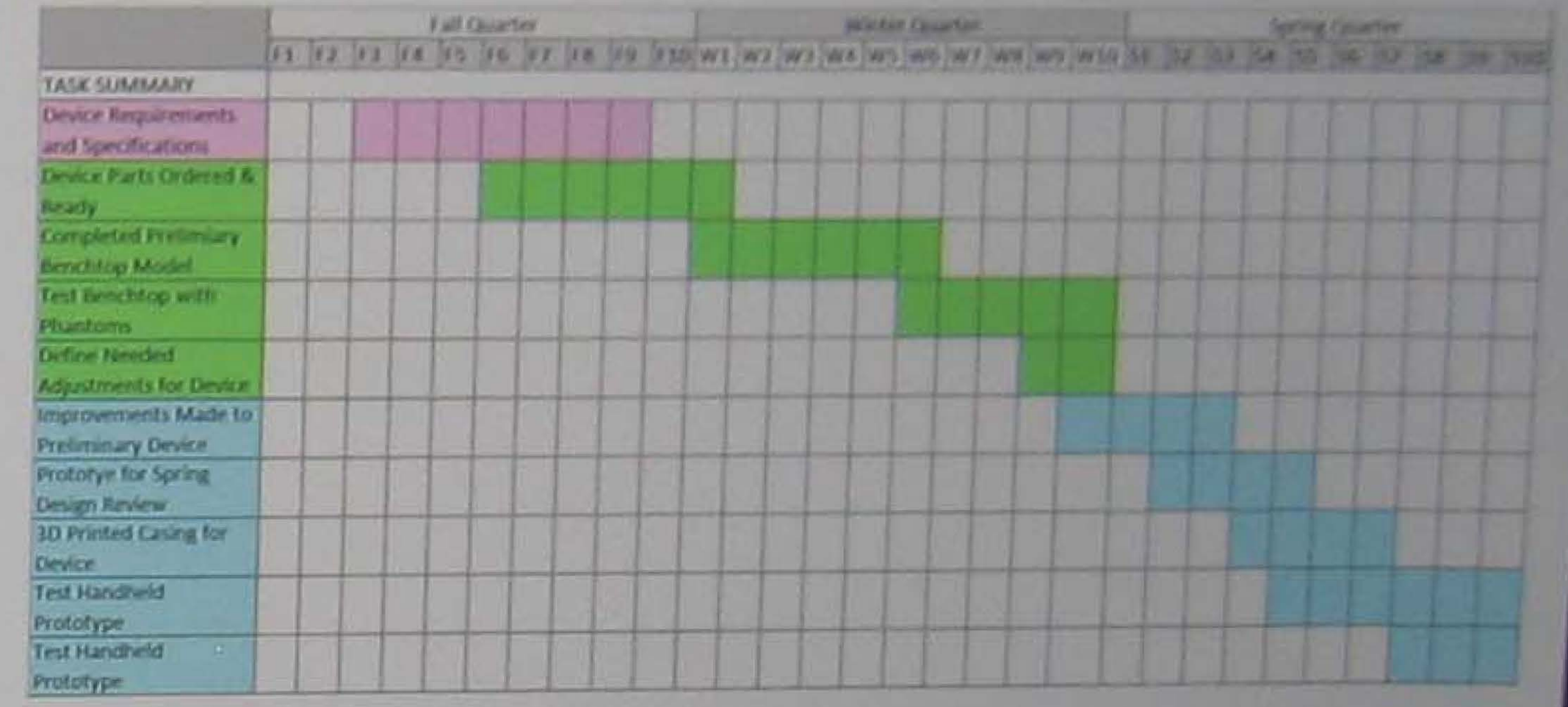
Figure 6: Tissue simulating phantoms

- Construct tissue simulating phantoms with varying skin properties
- Test phantoms using Alpha Prototype & BLI SFDI technology
- Validate device using an optical model for graded burn severity

## Design Criteria

Criteria	Acceptance Level
Handheld and Portability	No more than 1000mm by 150mm by 450mm and 4kg
Reusability	Must be rigid plastic (PVC or Polycarbonate) and use disposable cones
Real-time Analysis	Usage of algorithm to provide accurate quantification
Cost-efficiency	Usage of cost-efficient plastic
Usability	Easy-to-use graphic user interface and results platform.
Repeatability	Usage of disposable cones to stabilize device

## Timeline



## SALUX Diagnostics: Meet our Team

It is our mission to promote excellence in diagnostic imaging technology and patient care.



- DEVICE DESIGN**  
Develop designs for device prototypes via Solidworks
- DATA ACQUISITION**  
Develop software for data acquisition and processing through LabVIEW
- DATA ANALYSIS**  
Develop MATLAB code for analysis of acquired data

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## Citations:

- Bevilacqua, F., et. al, United States Patent 6,958,815
- Durkin, A., et. al, U.C. Case# 2008-325-2, USPTO # 8,509,879