I-CEE INC.

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Oğuzhan A. Bulut
Ekin Kartal
Esra Dokuzoğlu
Berk Korkut
Ceren Hasançebi

CONTENTS

EXECUTIVE SUMMARY

Company:

- Founded in September 2007 with issued capital of $131,000.00
- Founders of the company:
  - İlker D. Kanatlı (CEO & head of Production Dept.)
  - Oğuzhan A. Bulut (CFO & head of Production Planning Dept.)
  - Esra Dokuzoğlu (COO & head of Quality & Assurances Dept.)
  - Berk Korkut (head of R&D Dept.)
  - Ekin Kartal (head of Finance& Accounting Dept.)
  - Ceren Hasançebi (head of Design Dept.)

EXECUTIVE SUMMARY

Product:

- VIBRO-I aims to rehabilitate the psychology of the visually impaired by eliminating the need for the cane.
- Instead, VIBRO-I only provides an accessory attached over clothes (which includes the heart of the product: the camera or the sensors serving as an eye) and wrist bands.

Before VIBRO-I

With VIBRO-I

EXECUTIVE SUMMARY

Product:

- VIBRO-I enables visually impaired to view the world as if they do not have a vision defect by vanishing the cane!
- VIBRO-I consists of two wrist bands which both have vibrator devices on them and an attachment accessory.
- VIBRO-I gives the recognition, distance and direction. It gives to visually impaired independence!

EXECUTIVE SUMMARY

Vision:

- I-CEE primarily aims to help the blind to move about independently,
- I-CEE values human psychology: VIBRO-I is specially designed to provide a new vision experience without the cane for the blind.

Mission:

- I-CEE aims to maximize the costumer satisfaction by providing high quality and low prices,
- aims to fulfil responsibilities to humanity and environment.

EXECUTIVE SUMMARY

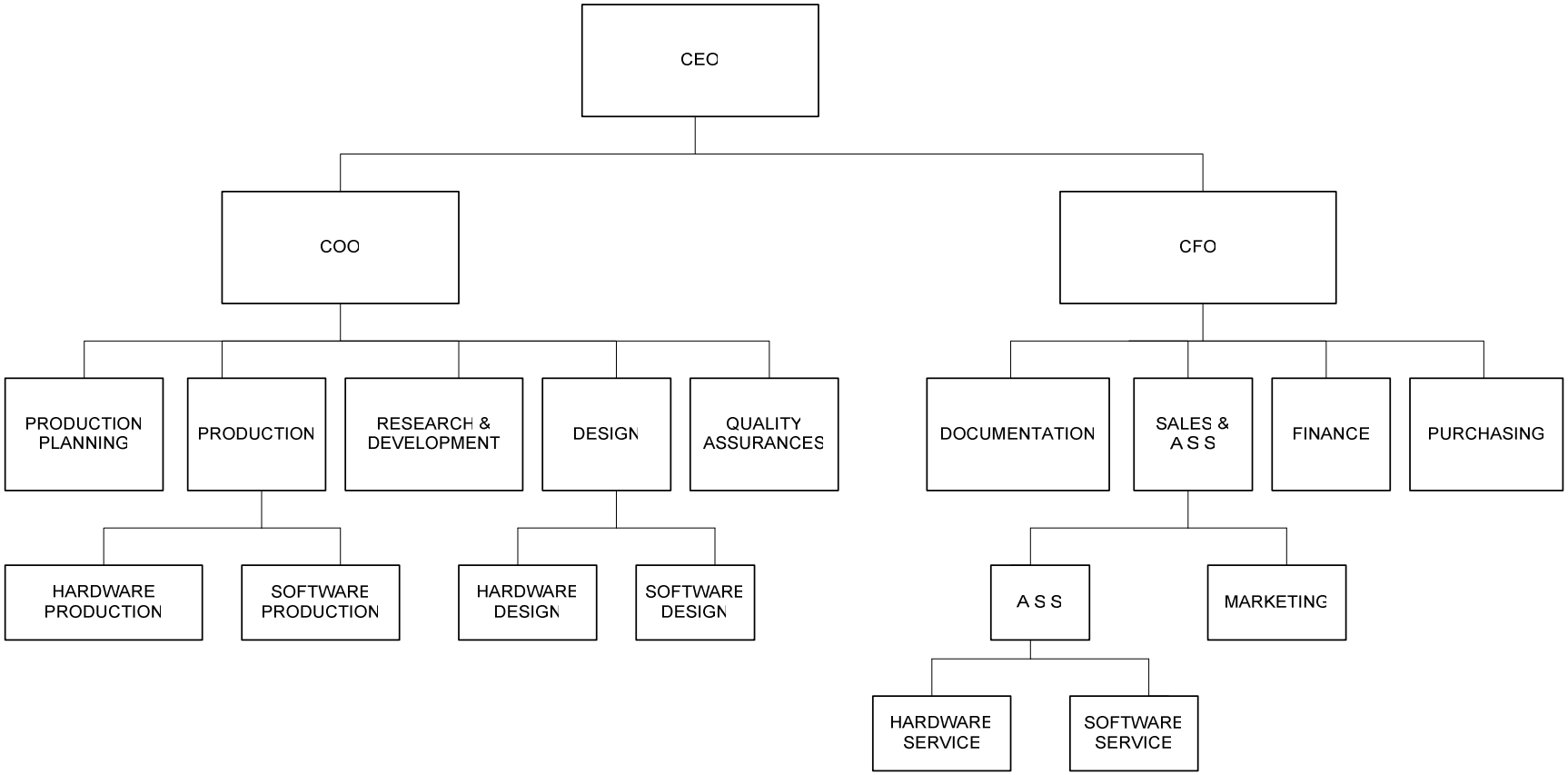
Company Values:

I-CEE:

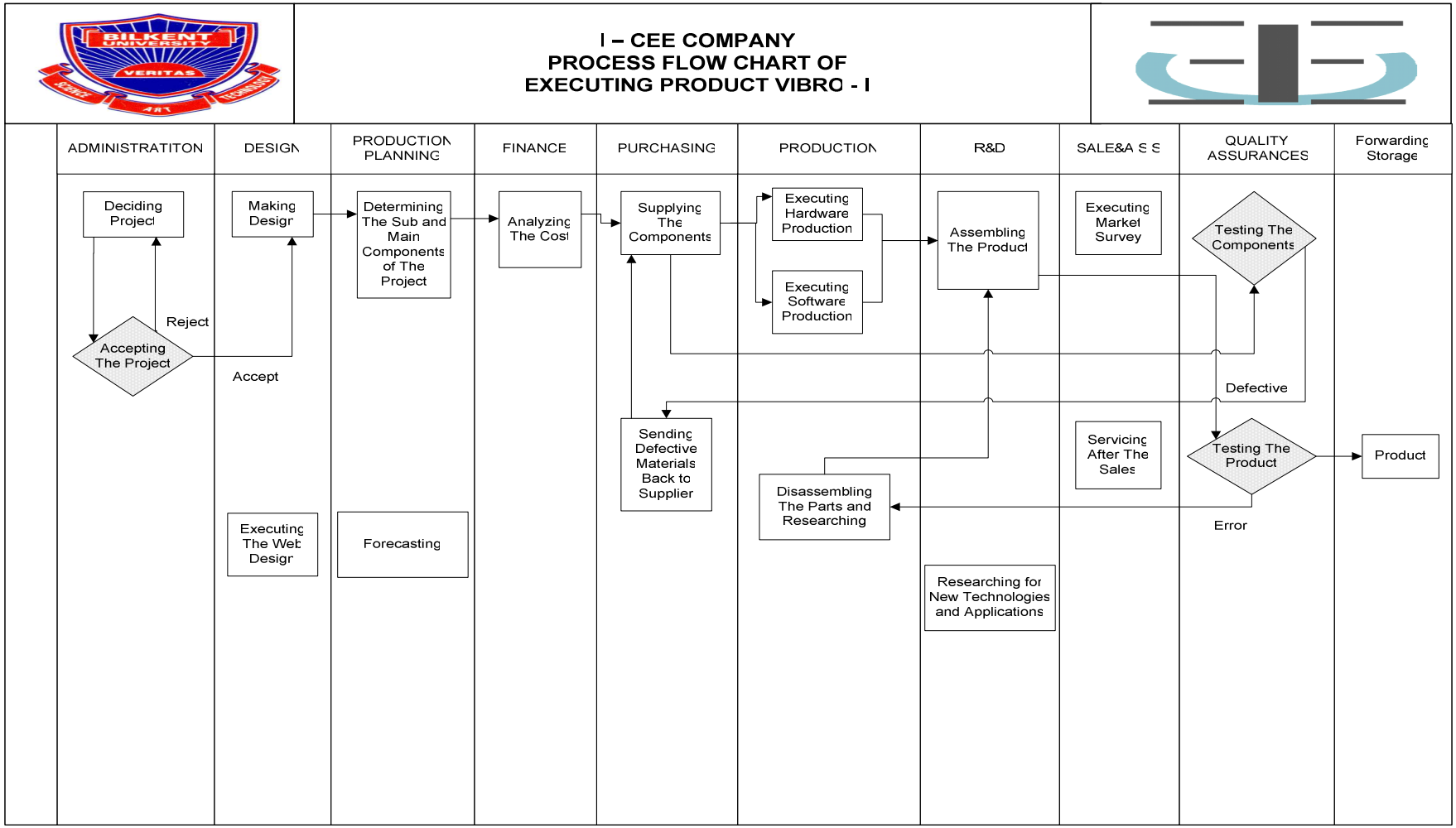
- cares for costumer rights,
- highly values public trust and customer feedback,
- is open to new ideas throughout the development,
- operates within strict legal and ethical rules,
- relies on human resources,
- provides a democratic arena where employees share ideas,
- improves teamwork within the organization.

ORGANIZATION OF THE COMPANY

I – CEE
ORGANIZATION CHART



ORGANIZATION OF THE COMPANY



Microsoft Visio

BUSINESS STRATEGY

- Product Strategies
- Price Strategies
- Distribution Strategies
- Promotion Strategies
- Financial Strategies
- Administration Strategies
- Software Strategies
- Production Strategies

MARKET AND COMPETITIVE ANALYSIS

Market Segmentation:

- 412,312 visually impaired
- 80,813 including retired, have income, expected to work
- 241,738 registered to Social Security Foundation [1]

MARKET AND COMPETITIVE ANALYSIS

Sector Partners:

- Competitors
  - GPS Trekker:
    - voice information control according to defined location marks in GPS navigation
    - access to GPS status information
    - route planning and recording [2]

MARKET AND COMPETITIVE ANALYSIS

Sector Partners:

- Industry Participants
  - Medical Shops
  - Hypermarkets
  - Drug stores

SALES FORECAST

- %16.9 retired
- %2.5 have regular income
- %0.2 expected to work
- %63.7 registered to Social Security System
- with above items: totally %19.6 of visually impaired - our range (approximately equal to 80000 per year)
- population increase = ~ %2.26 per year
- 2 years after first market sales, agreement with Social Security Foundation

SALES FORECAST

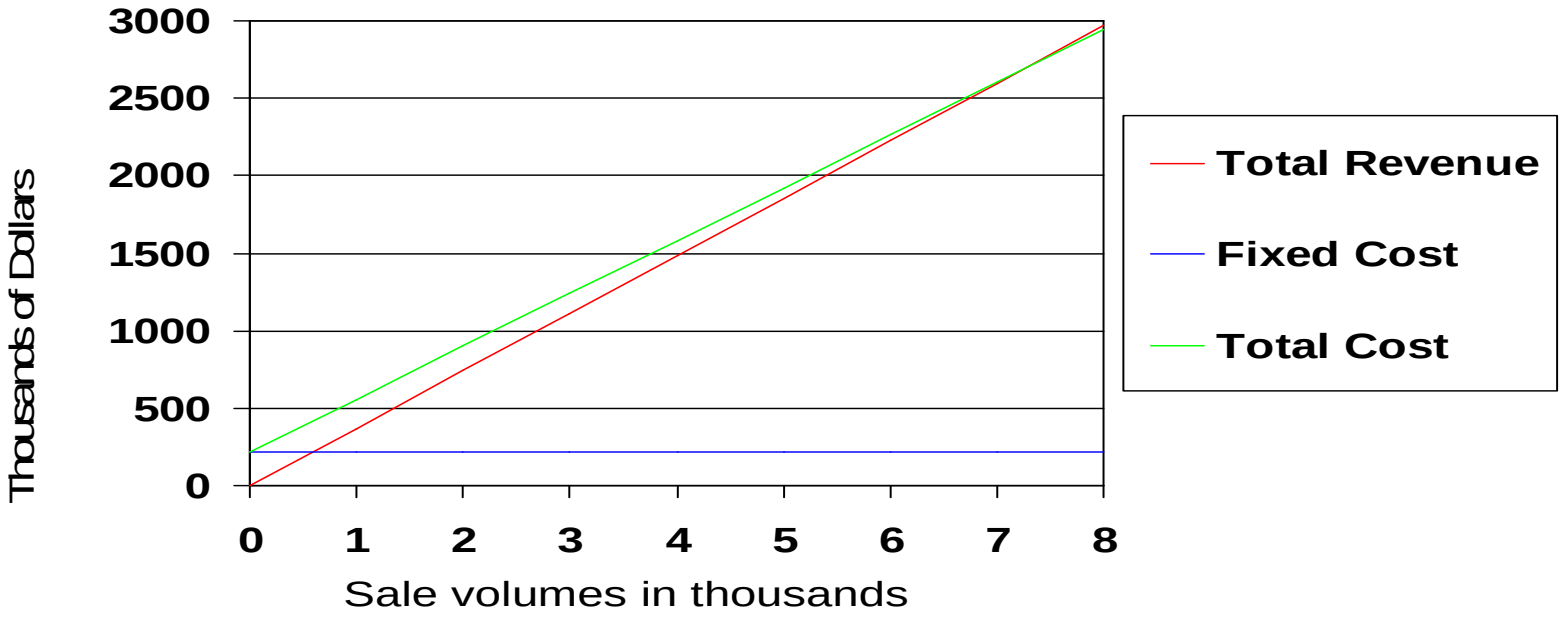
Year	Number of visually impaired people	Quantity (item)
2007	80,000	4000
2008	82,000	4100
2009	84,000	4200
2010	340,000	17000
2011	348,000	17400

BREAK-EVEN ANALYSIS

Break-Even at 7,188 Units

Variable Unit Cost : 340.6$
Fixed Cost : 218,500$
Expected Unit Sales : 4000
Price per Unit : 371$

Total Variable Costs : 2,724,800$
Total of All Costs : 2,943,300$
Total Revenue : 2,968,000$
Profit : 24,700$



SWOT ANALYSIS

Strengths	Weaknesses
■ location of the offices ■ unique in the market	■ forecast of the visually impaired may be erroneous
Opportunities	**Threats**
■ arrival of GPS navigation maps for whole country	■ high probability of reverse engineering

PRODUCT DESCRIPTION

Hardware of the System:

- Process of Camera:
  - will be used for identifying the surrounding objects using object detection,
  - will capture the frames and send them to the processor board.

- Process of Sensor:
  - will detect objects in a specific range, which are undetectable by the image processing capability of the camera,
  - will inform the user from the distances of the objects by sending denser signals to vibrator devices when closer to the object.

PRODUCT DESCRIPTION

- Process of Processor Board:
  - a Linux board in order to process the image data received from the camera,
  - image processing code will be saved on SD card that can be plugged into the Linux board,
  - processed information on the board will be sent to correct vibration device.

PRODUCT DESCRIPTION

- Process of Vibration Device:
  - Left-Hand Wrist-Band:
    - 3 vibration devices will be located:
    - One at the front
    - One at the right
    - One at the left
    - Each vibration device will vibrate according to the direction of the obstacle.

PRODUCT DESCRIPTION

- Process of Vibration Device:
  - Right-Hand Wrist-Band:
    - 4 vibration devices will be located:
    - One at the front
    - One at the back
    - One at the left
    - One at the right
    - Each vibration device will be objected to vibrate for each pre-defined different object.
    - Those pre-defined objects planned to be implemented in object detection software are: door, human body, stairs and car. (in future development more to be defined)

PRODUCT DESCRIPTION

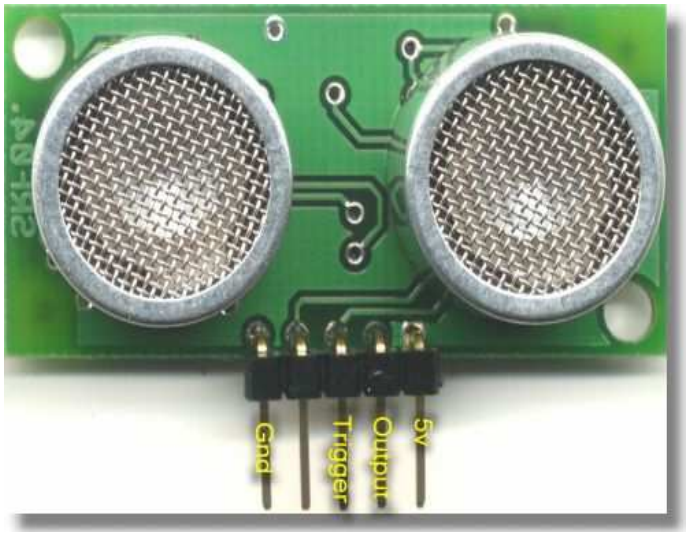
- Process of Vibration Device:
  - Left-Hand Wrist-Band:
    - 3 vibration devices will be located:
    - One at the front
    - One at the right
    - One at the left
    - Each vibration device will vibrate according to the direction of the obstacle.

PRODUCT DESCRIPTION

System Subcomponents Specifications

PRODUCT DESCRIPTION

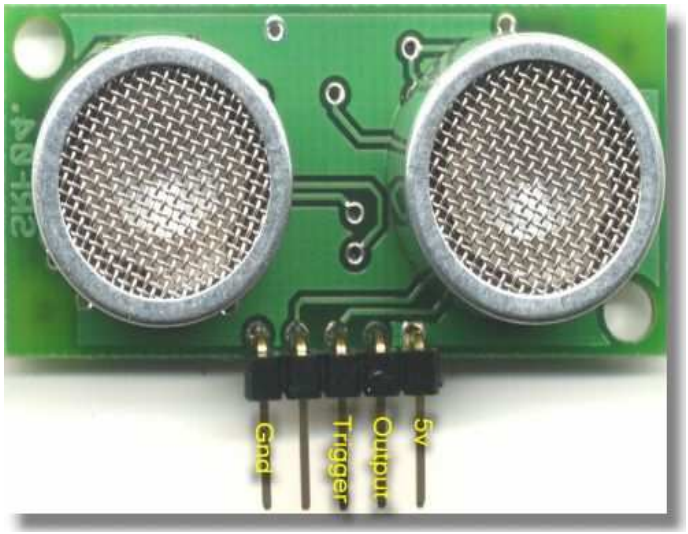
- Sensor: SRF04 Interface



Beam Pattern	**see graph**
Voltage	**5v**
Current	**30mA Typ. 50mA Max**
Frequency	**40KHz**
Maximum Range	**3 m**
Minimum Range	**3 cm**
Sensitivity	**Detect a 3cm diameter stick at > 2 m**
Input Trigger	**10uS Min. TTL level pulse**
Echo Pulse	**Positive TTL level signal, width proportional to range.**
Weight	**0.4 oz.**
Size	**1.75" w x 0.625" h x 0.5" d**

PRODUCT DESCRIPTION

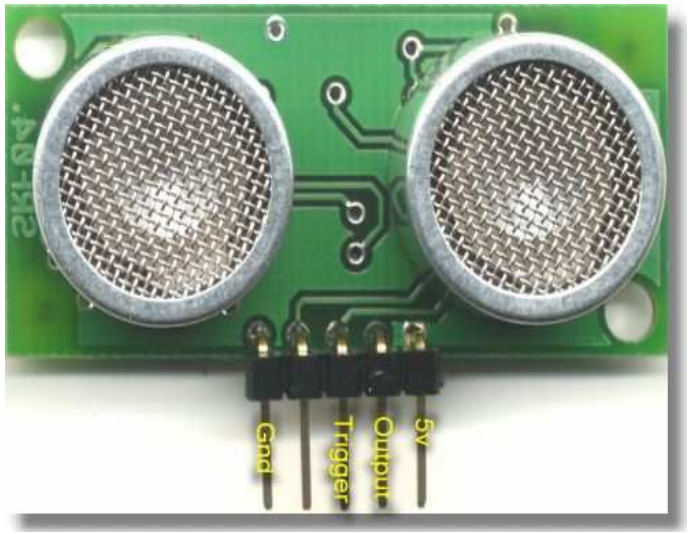
- Sensor: SRF04 Interface



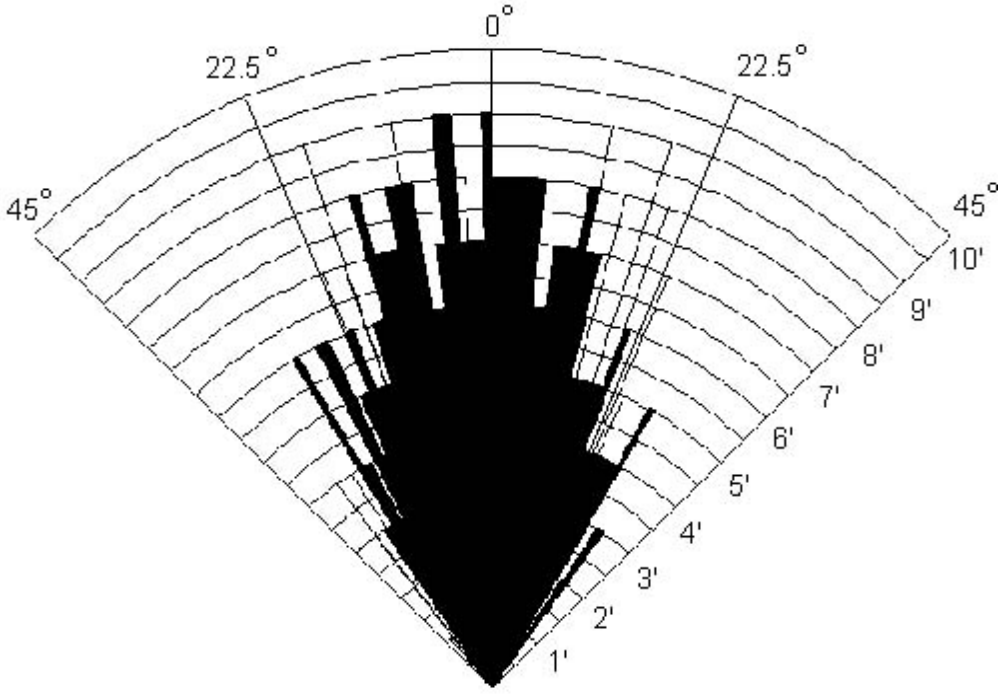
- **You supply a pulse from low to high and back low again on the trigger lead to start the SRF04.**
- **This sends out a pulse.**
- **The SRF04 will then pause for a few ms then deliver a pulse on the output line.**
- **To read the range we measure the length of this pulse.**
- **We will use the pulseout command to trigger the sensor and the pulsein command to read the echo time.**

PRODUCT DESCRIPTION

- Sensor: SRF04 Interface



- Graph:



PRODUCT DESCRIPTION

- Vibration Motor: Micro Pager Motor G12809

- Its size is only 4mm (.16”) Dia.x 12.5mm (.49”) long (excluding shaft and weight).
- Has 2 tiny terminals for hookup and is mounted in a slip-off rubber shock sleeve.
- Operates from 1VDC up to 5VDC.
- Motor resistance is about 11W.
- Great for thousands of micro projects, robots, etc.

PRODUCT DESCRIPTION

Software of The System

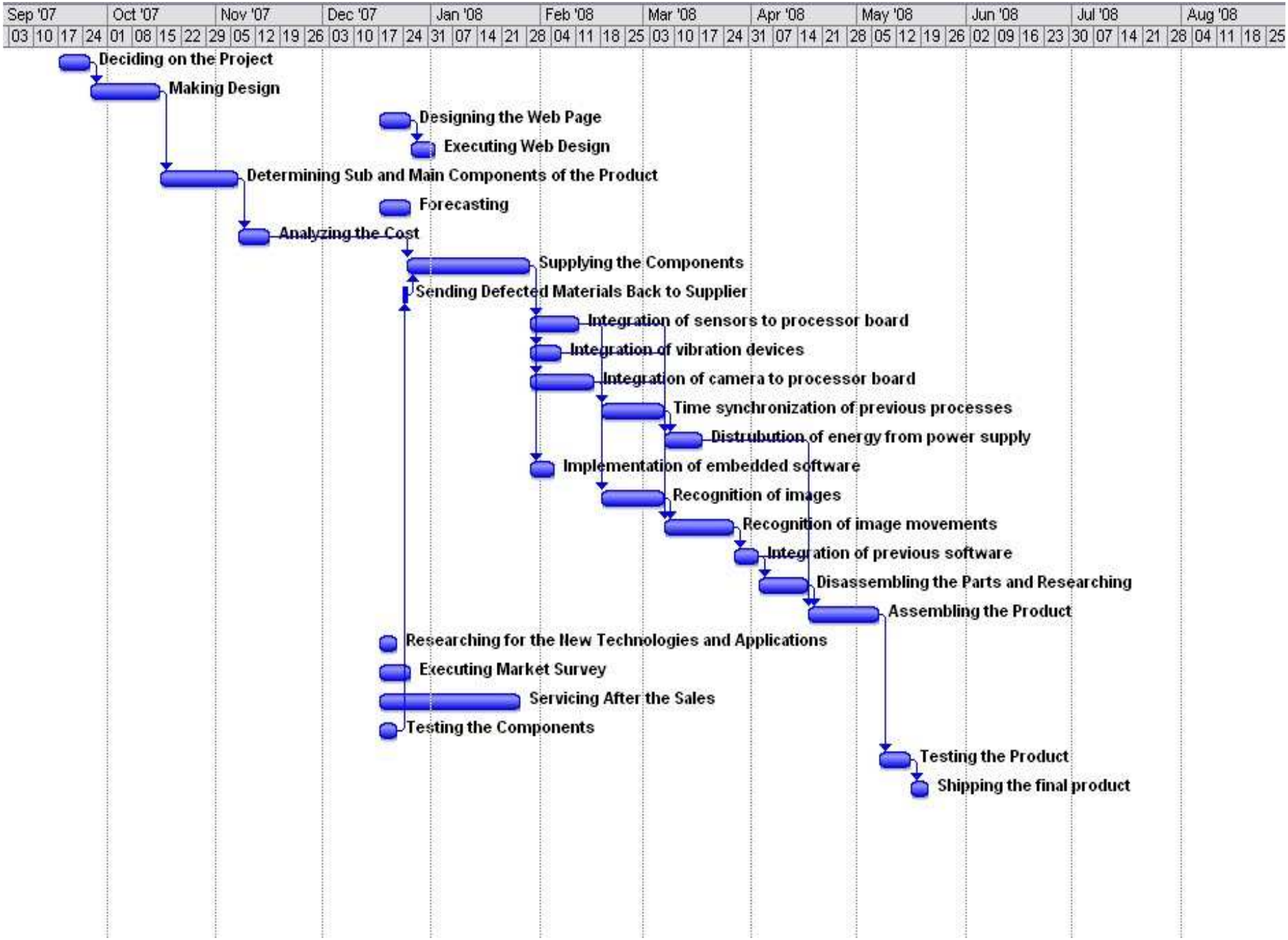
- Image processing needed for detecting objects will be implemented either with C++ or with Matlab (not decided yet)
  - Also heavily considering to find an existing software which suits our case (already a few choices are present)
- Linux board, which will include the necessary electronic circuitry and microprocessor, will be coded with embedded C

DEVELOPMENT

- We considered suggestions and comments received during the preliminary presentation:
  - Possible difficulty while wearing / taking off the product and maintaining it during usage.
  - Possibility of being affected from weather conditions
  - Recognization of the visually impaired (cane and the yellow arm band as international conventions)

DEVELOPMENT

- Here are our own suggestions for those:
  - Design is renewed. Still cables exist but they will be less of concern because major component of the product (the camera or the sensors) is now encapsulated in a special coverage which also includes a generic attachment unit allowing attachment over any part of the clothing,
  - Weather conditions do no more cause problems with the special coverage
  - Major difference VIBRO-I offers is to save the visually impaired from disability psychology: basically VIBRO-I has a huge claim such that changing the way people approach to the visually impaired.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Deciding on the Project
Making Design
Designing the Web Page
Executing Web Design
Determining Sub and Main Components of the Product
Forecasting
Analyzing the Cost
Supplying the Components
Sending Defected Materials Back to Supplier
Integration of sensors to processor board
Integration of vibration devices
Integration of camera to processor board
Time synchronization of previous processes
Distrubution of energy from power supply
Implementation of embedded software
Recognition of images
Recognition of image movements
Integration of previous software
Disassembling the Parts and Researching
Assembling the Product
Researching for the New Technologies and Applications
Executing Market Survey
Servicing After the Sales
Testing the Components
Testing the Product
Shipping the final product

CONCLUSIONS

- Here are the results we obtained:
  - After our research, there is a few image processing software which suits our case but cannot decide which one totally meets our needs,
  - Previous design does not offer ergonomical solutions in order to be efficient to use (for the visually impaired).

CONCLUSIONS

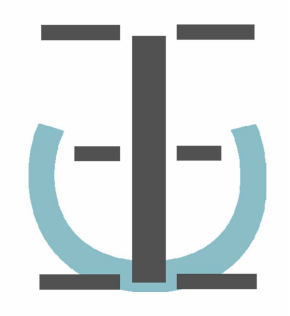
- Here are the conclusions we have drawn:
  - We decided to first implement the sensor version of the product, than we will implement the camera version later when we decided on the image processing software,
  - We developed a partially new design which is explained in 'Development' section.

CONCLUSIONS

- Here are the conclusions we have drawn:
  - Our renewed design does not offer a complete solution to the recognition problem because we value psychology of the visually impaired. --> not even considered a recognizable solution since it contradicts with the vision of VIBRO-I
  - We see that our Business Plan and the preliminary technical design are being accompanying our development well throughout the whole semester!

REFERENCES

1. http://www.ozurluler.gov.tr/arastirma/troailerianaliz.htm
2. http://www.nanopac.com/GPS%20Trekker.htm



THANKS FOR LISTENING

QUESTIONS & COMMENTS