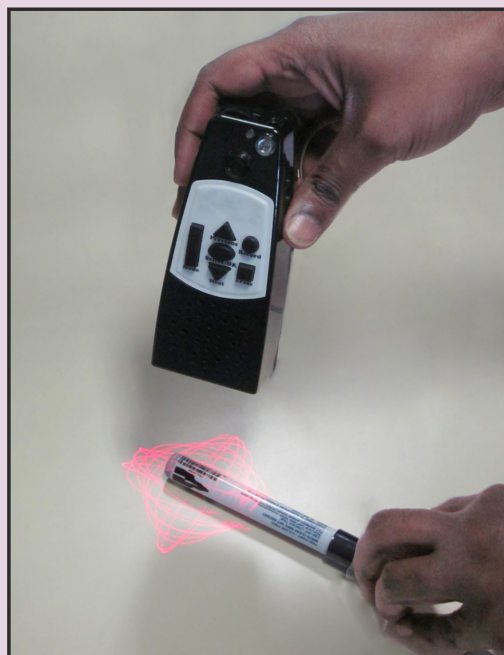




# Portable barcode scanner for visually impaired

## Introduction

This case study showcases Mistral's expertise in providing product design services in the consumer electronics segment. Mistral was approached by a leading original device manufacturer (ODM) in the US providing high-tech products for people with visual impairments, to develop a portable "all-in-one" talking barcode scanner. Mistral's concept-to-deployment services helped in realizing the customer's idea of the product and bringing it quickly-to-market.



“ A portable, lightweight, all-in-one device that acts as an 'eye' for visually impaired and allows live video/image streaming through Skype ”

## The Customer

The customer is a company providing high-tech products aimed at solving problems for those with visual impairments. The company is based on the single premise: To provide customers with greater independence through technology.

## The Requirement

The customer approached Mistral to design and develop a portable "all-in-one" talking barcode scanner, that will become the "eye" for the visually impaired. This lightweight product should help visually impaired people in identifying objects through its barcode, offer face/object/currency recognition and also live video streaming to remote locations through Skype connectivity. Additionally, users should be able to listen to music. The requirement was to design and develop a portable "all-in-one" talking barcode scanner.

## Solution Provided

Mistral developed the complete product from design to production, including hardware design, software development - firmware, middleware, embedded applications; product qualification and production support. The product concept was shared by the customer. Mistral designed the hardware and developed the Linux BSP for the hardware. The Mistral team also developed the complete keypad-based user interface application for controlling and configuring the entire product including camera, WLAN and Bluetooth. The team also ported and integrated third party interfaces, such as the Text-to-Speech engine, Skype, Image Processing engines for currency and color identification, Optical Character Recognition (OCR), camera sensors and barcode readers.

The product is based on TI's AM/DM37x Sitara Microprocessor. The initial design and development was done around the AM/DM37x EVM from Mistral. Mistral used the development platform as a reference design, customized it to a small form-factor prototype and developed the solution for this product requirement.

The team at Mistral assessed the product through independent verification and validation across different stages of the product development including pre-certification tests and FCC Class B pre-qualification tests.

## The Challenges

- Bringing the user interface with keypad and text-to-speech: The customer's product requirements involved various modes of operation and different activities to be performed on each mode. The Mistral team defined these modes of operation, segregated each mode and then went into the details of each activity under the mode. The applications to suit the modes were designed, customized and implemented. Each use case was tested thoroughly and refined
- Given the impairment of the end-user of the product, his/her inability to focus on objects and gauge the distance/angle of the camera to the object being focused poses another important challenge in the customization of the camera. The Mistral team customized the video capture (Auto-focus, zoom-in or zoom-out) to suit the variations in the inputs from the camera
- Integrating third party applications to the device was challenging as the sample applications had to be customized and tested to suit the features of the product.

## Key Achievement

- This is the first time that Skype was integrated into a product in this segment (for the visually impaired)
- The user interface based on text-to-speech and key-press developed by Mistral is unique to the non-invasive medical electronics industry
- Power Management for 8 hours operation with barcode engine and video processing engine, WLAN and Bluetooth.

## Customer Benefits

- **Reuse:** Usage of Mistral's EVM as the base platform facilitated in bringing up a prototype quickly, which in turn enabled early software development and testing
- **Quicker Time-to-Market:** Mistral's team who worked on the project has vast experience in power management and embedded products; this saved valuable development time facilitating quicker time-to-market value for the customer
- **End-to-end product development:** Mistral being a single source for hardware and software expertise allowed the client to get a complete end-to-end solution done at one place. This helped the customer to save time in terms of dealing with multiple vendors, and helped immensely in getting the product-to market faster.



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