

J. Fujita and M. Cherney

Department of Physics, Creighton University, Omaha, Nebraska USA

Abstract

An inventory system using iBeacon technology has been developed. Using a specially written iOS app, makes the location of the equipment easier to a workers during the routine access to the experiment. The use of iBeacons and iOS devices allow us to distinguish one equipment rack from another very easily. Combined with 2D barcode, the use of iBeacons may provide better inventory management of the equipment for experiments.

Introduction

STAR (Solenoidal Tracker At RHIC)

- STAR (Solenoidal Tracker At RHIC) Collaboration (Brookhaven National Laboratory, Upton, NY) composed of 56 institutions from 11 different countries.
- During the data-taking period, nearly a hundred different members in the collaboration will come to participate as shivers each year.
- During the data-taking period, it sometimes is necessary to access the during a limited intervention.
- Having a system to guide them which hardware needing service could be critical.

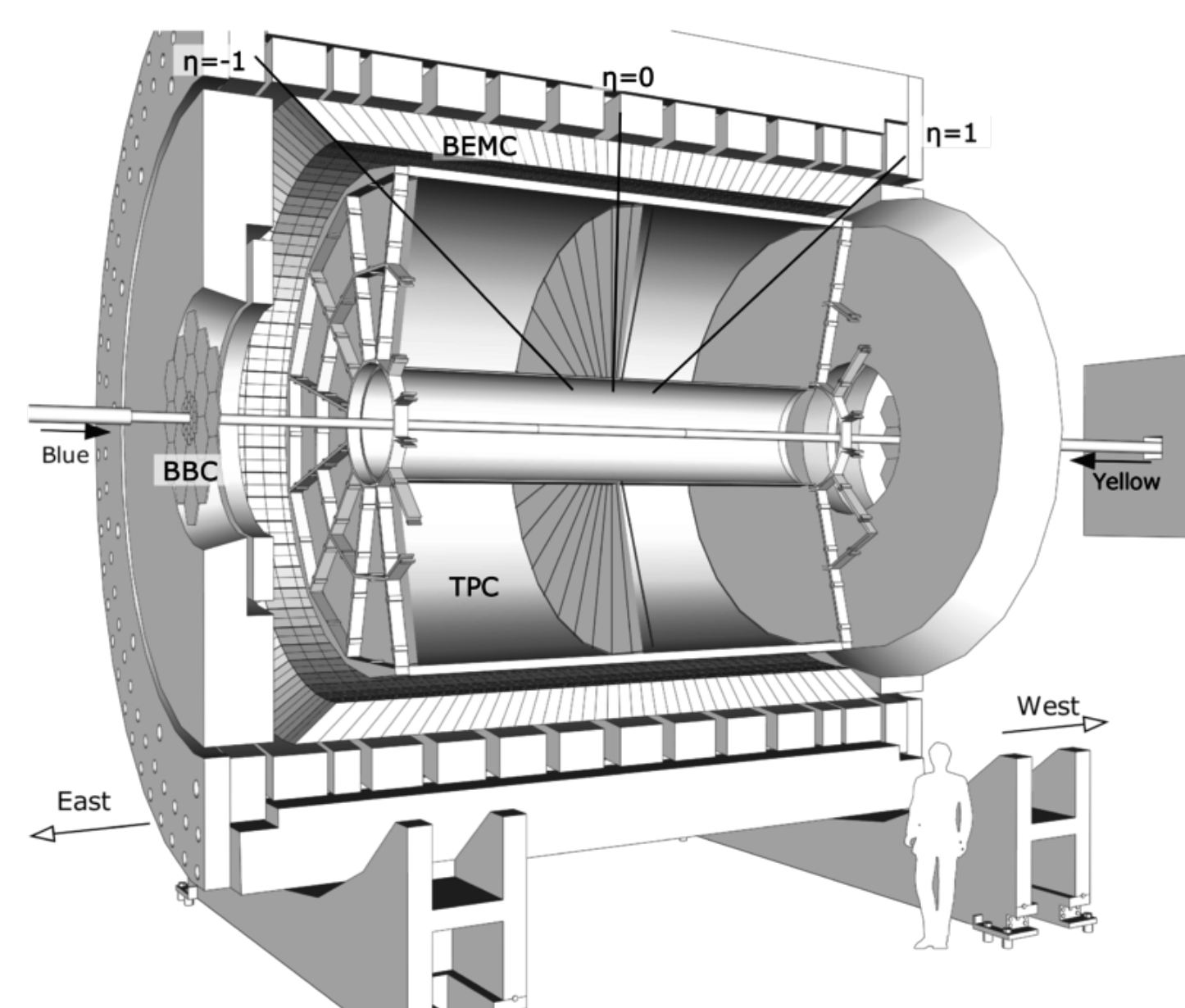


Figure 1: The STAR detector schematic

System

General Concept

- Use iBeacons to show what equipment are in the proximity.
- Use QR code to identify the actual device using the built-in camera of a mobile device.



Figure 2: The Conceptual design

iBeacon

- Protocol standard created by Apple
- Uses Bluetooth Low Energy to transmit universally unique identifier picked up by a compatible app on mobile devices.
- The actual hardware was implemented by using Raspberry Pi computers with Bluetooth 4.0 USB dongles.



Figure 3: The Actual iBeacon and the app

iOS Application

- Special iOS App was developed for Equipment Inventory at the STAR Experiment.
- Devices in the proximity were grouped with iBeacon information.
- The inventory database is hardcoded in this prototype app.

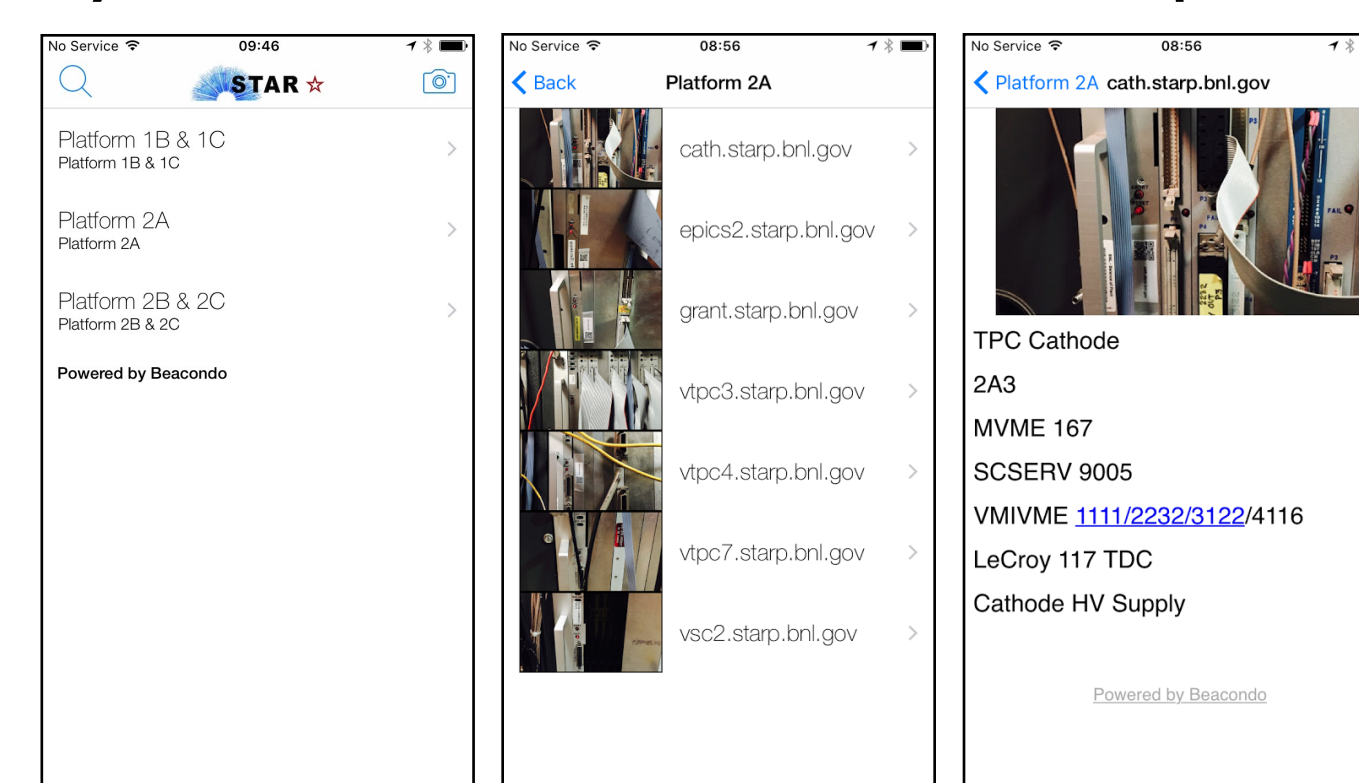


Figure 4: The iOS App Screenshot

QR Code

- Used to identify the individual hardware.
- The QR Code information is tied to the actual hardware in the app.
- The QR Code can be read out via built-in camera of the iOS device.

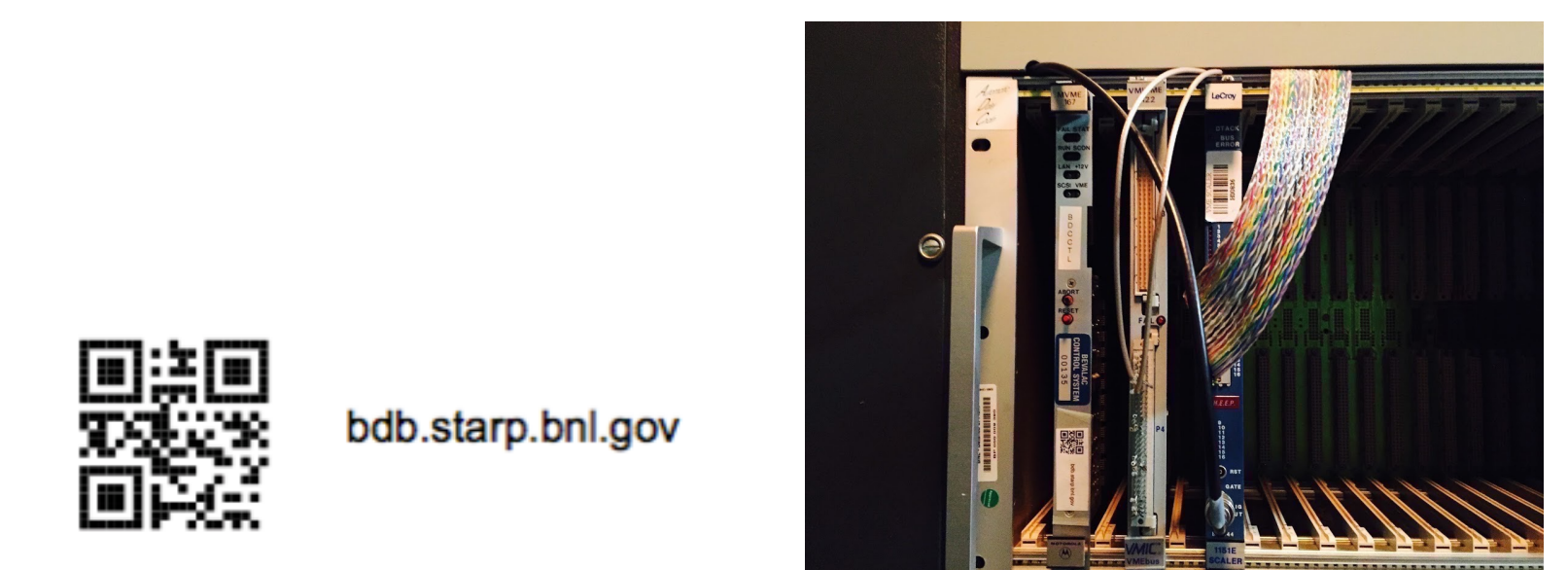


Figure 5: The QR code and the QR code on actual equipment

Performance evaluation

- Tested at the experiment earlier this year.
- Several iBeacons were placed at key location of the equipment racks on the STAR Equipment platform.
- Tested by using two different iPhones.
- It has been determined to be cost effective & future upgradable possible solution.

Future Plan

- Android version development.
- Better distance algorithm.
- Google's Eddystone evaluation.
- Web based for equipment information management.

Acknowledgement

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