

GRAIL: A General Purpose Real Time Localization System: Version 1.0

Yingying Chen¹, Robert S. Moore², Eiman Elnahrawy³,
Konstantinos Kleisouris², John-Austen Francisco², Xiaoyan Li⁴,
Gayathri Chandrasekaran², Begumhan Turgut², Richard P. Martin²

¹yingying.chen@stevens.edu

²{romoore,kkonst,deymious,gayathri,bturgut,rmartin}@cs.rutgers.edu

³eiman@kordinate.com

⁴xili@cs.lafayette.edu

¹Dept. of ECE

Stevens Institute of Technology
Hoboken, NJ 07030

²Dept. of Computer Science

Rutgers University
Piscataway, NJ 08854

³Kordinate LLC

402 Main St. Ste. 100-213
Metuchen, NJ 08840

⁴Dept. of Computer Science

Lafayette College
Easton, PA 18042

**Rutgers University Department of Computer Science Technical Report DCS-TR-619
October 2007**

Abstract

This paper describes a general purpose Real Time Location System (RTLS), GRAIL, version 1.0. GRAIL provides real-time, adaptable, indoor localization for wireless devices. Because GRAIL's focus is to localize as diverse a set of devices as possible, it utilizes a centralized, anchor based approach. GRAIL defines an abstract data model for various system components to support different physical modalities and various localization algorithms. We show through real deployments that GRAIL functions over a variety of physical modalities, networks, and algorithms. Further, we found that a centralized solution has critical advantages over distributed implementations for handling privacy concerns. A contribution of this system is its universal approach: it can integrate different hardware and software capabilities within a single localization framework. The deployment of such a system in academic and research environments allows researchers to explore issues beyond algorithms and investigate effects in real deployments.