

Monitoring the Location of Firefighters Using Available Radio Frequency Identification (RFID) Tag Technology and Newly Developed Software

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Introduction

A committee was formed by the Rockland County Fire Chiefs' Association to investigate the relevance and feasibility of a real world, simple-to-use electronic system of tags. Over several years we have tested a commercially available reader⁵ and several different commercial tags^{5,6}. Interestingly, the hypothesis of reader and tags has been further supported through the availability of a newly developed software program⁶ and points us to further studies in the near future.

Materials and Methods

Two chiefs' vehicles were retrofitted with a reader (see figure 5) that was powered through a DC/DC car converter having a cigarette lighter plug. The reader communicated with the onboard laptop computer through Wi-Fi or through a cable. The newly developed software engine⁶ was loaded into the onboard laptops. Tags for testing (see figure 5) were either hand carried or put in a bunker pant pocket. Communication between the reader and each tag was wireless. Tag identification can be readily changed. Figures 1-4 are images taken from the screen of the onboard computer. Figure 1 has displayed on the left side the initial arrival of the firefighters on the emergency scene. Firefighters are displayed in yellow when read and in red if the communication is lost. Figure 2 displays the picture or architectural drawing chosen to describe the fire building. In figure 3 firefighters have been moved throughout the tactical diagram locations (A1-D2). Figure 4 is a copy of a generated report that can be regenerated as necessary.

Figure 1

Figure 2

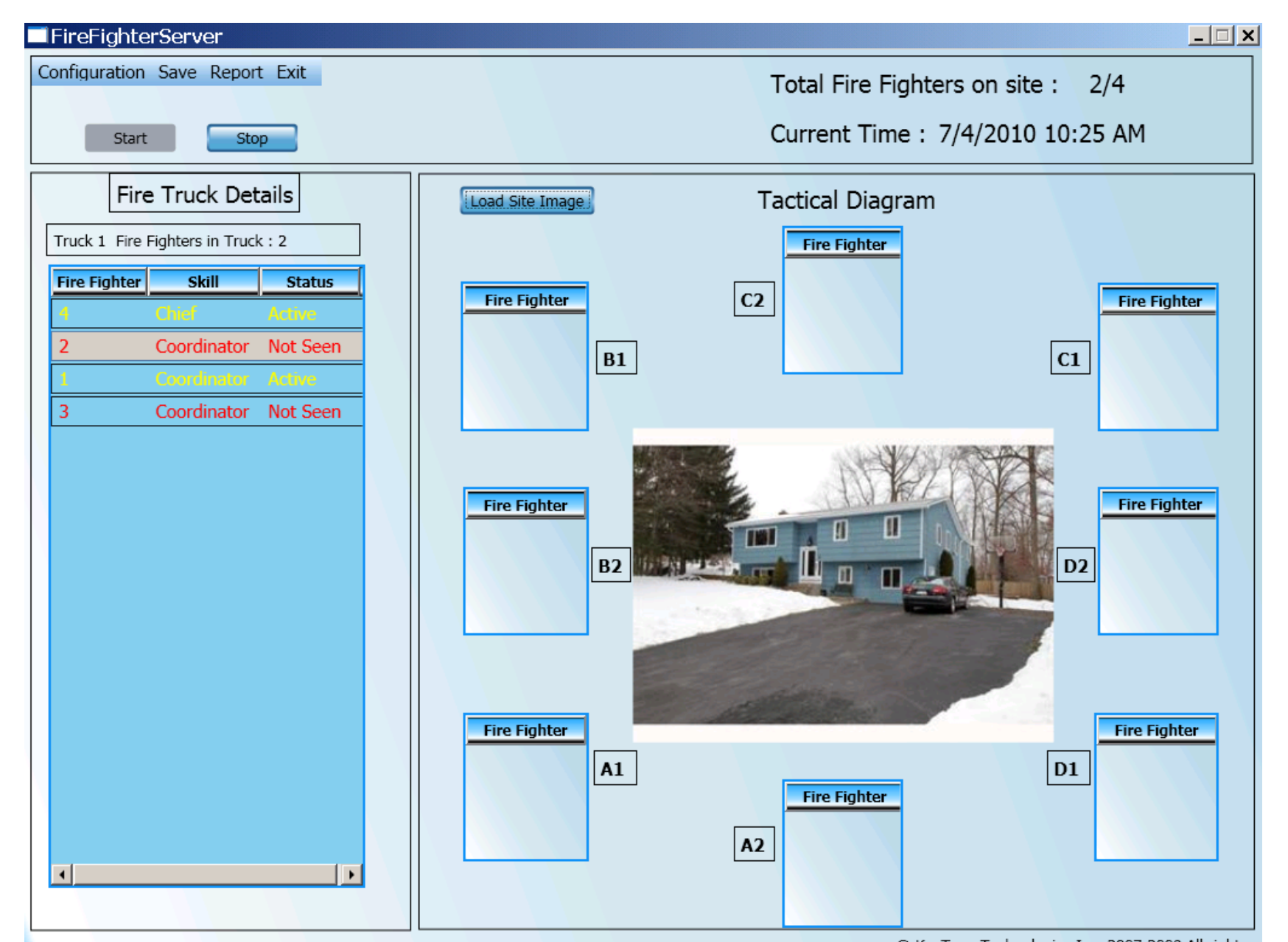
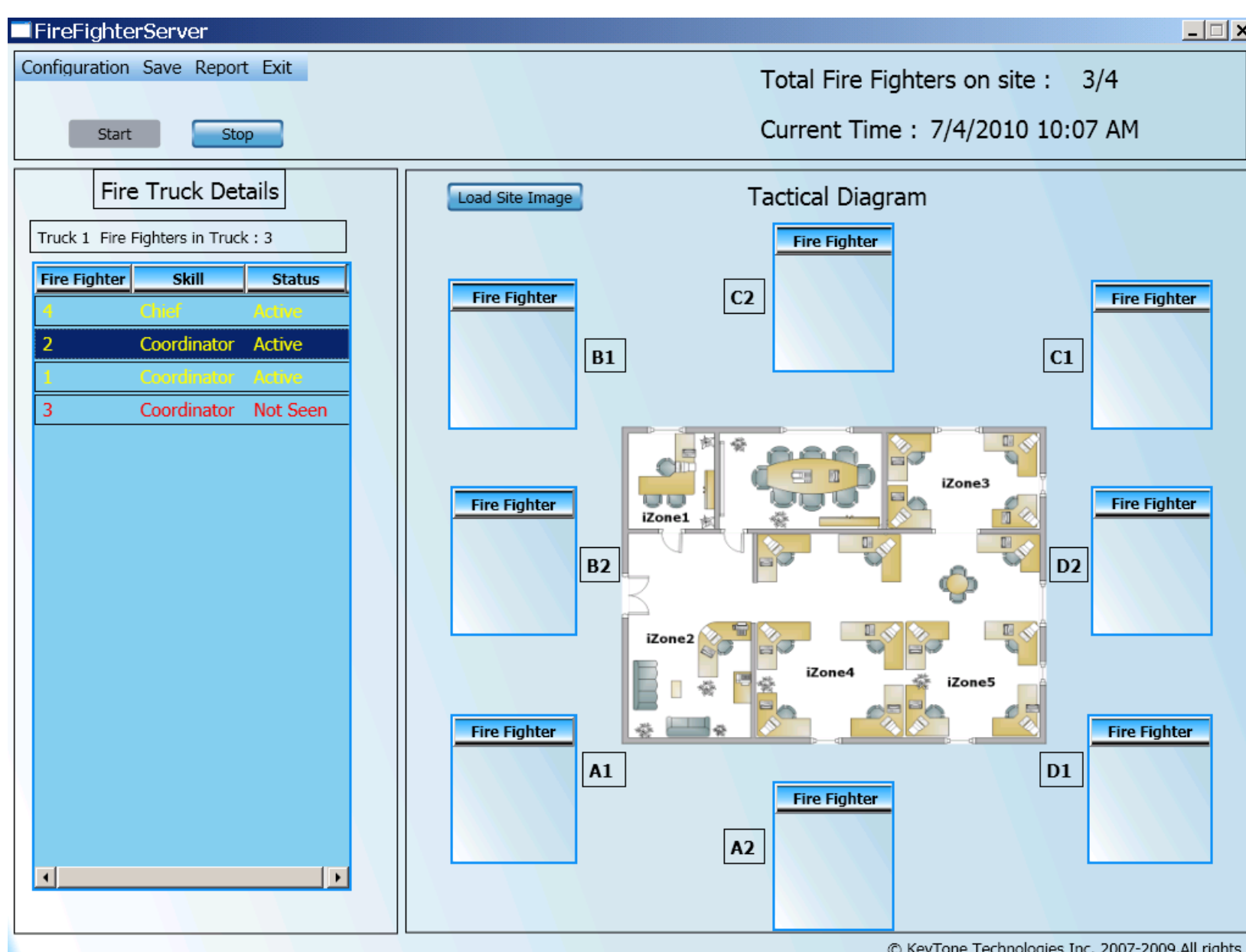


Figure 5
Tags and Reader

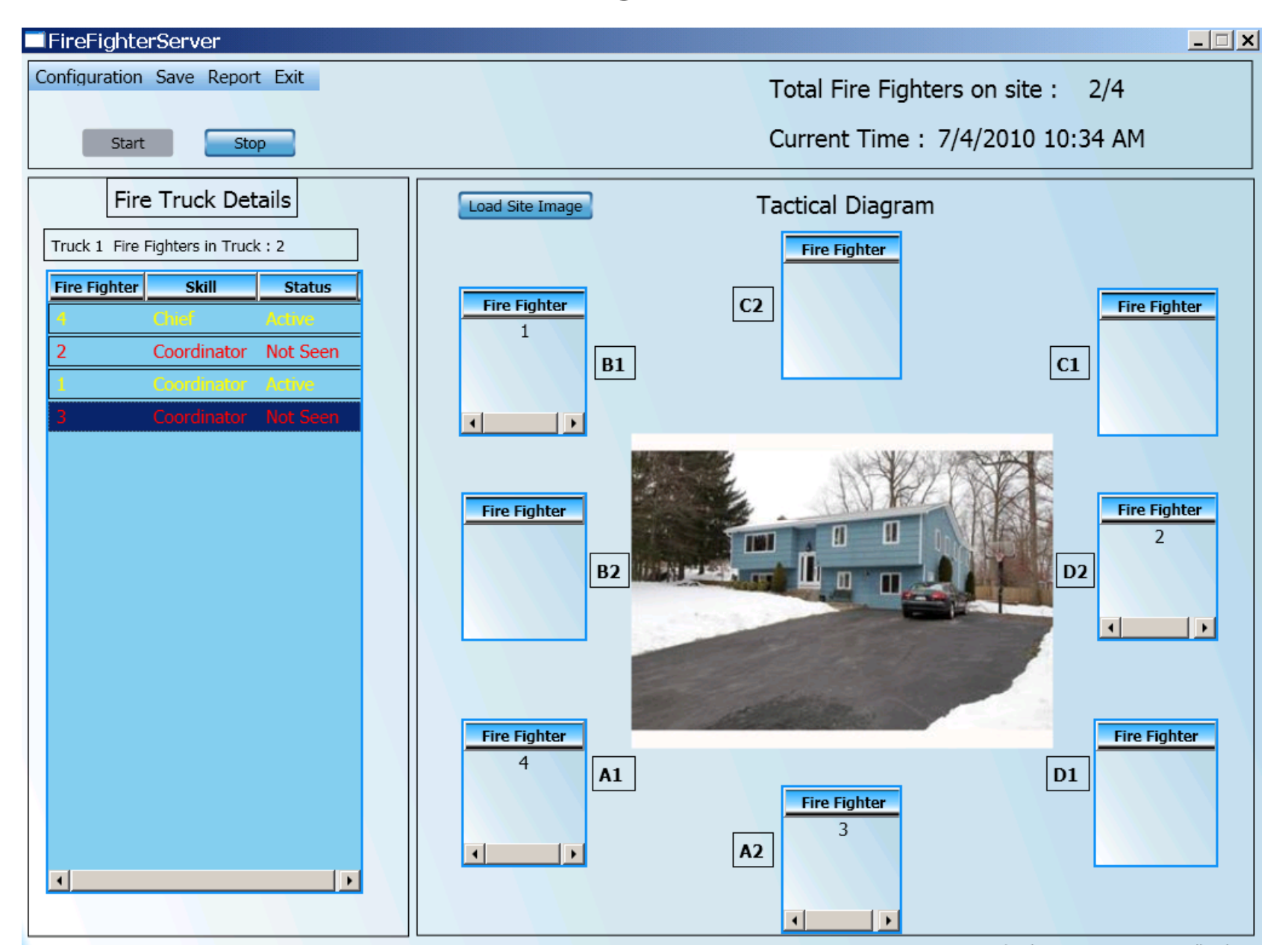


Figure 4

Figure 3

The screenshot shows a 'Fire Truck Summary Report' for 7/4/2010. It includes a table with columns for Truck name, ID, Station, Fire fighter, Entry time, End time, and Skill.

Truck name	ID	Station	Fire fighter	Entry time	End time	Skill
Truck 1	4	Station 1	19-FF4	9:49:51 AM	10:36:37 AM	Chief
Truck 1	2	Station 1	19-FF2	9:49:51 AM	Not Seen	Coordinator
Truck 1	1	Station 1	19-FF1	9:50:02 AM	10:36:37 AM	Coordinator
Truck 1	3	Station 1	19-FF3	10:03:27 AM	Not Seen	Coordinator



Future work

Remote battery operated receivers, a multi-sensor system and Google map assisted overlay maps are in the future.

Results

Continuous communication between the reader and tags was provided throughout a single-family dwelling, in a 100' one story commercial building of steel and concrete block and also in a commercial building through two sets of steel doors and two concrete walls.

Acknowledgments

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