GPS Subcommittee

November 20, 2014

Web-Conference

Draft Summary

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1. **Introduction**

A meeting of the U.S. National Work Group on Taximeters (USNWG) was held in September of 2012, at NIST in Gaithersburg, MD. The members of that work group consisted of regulatory officials, taximeter manufactures, subject matter experts, and other stakeholders. During the meeting, one of the agenda items discussed was the use of Global Positioning Satellite (GPS) technology as a source of distance measurement used in association with cellular telephone software applications (or “apps”).

Mr. Michael Lombardi (NIST) provided the meeting participants with a presentation on the basic theory and function of GPS. Considering the information provided during this presentation, the work group agreed that the scope of the USNWG should include consideration of the use of GPS as a source for commercial measurements used in association with cellular telephone apps. This was considered necessary by the work group based on statements from regulatory field officials indicating that this type of system was being used by a transportation service provider to calculate fare charges.

The discussions during the September 2012 meeting included the potential future of GPS measurement as a viable alternative to more traditional methods of measurement, but it was acknowledged that the traceability and reliability of this form of measurement has not been established or recognized within the weights and measures community.

The USNWG agreed that a subcommittee be formed to further address GPS and it’s potential in becoming a documented and traceable means of measurement. Subsequently, a GPS subcommittee was formed from within the USNWG to continue work on this issue. The subcommittee began work by polling its members for their positions regarding the focus and scope of the subcommittee’s mission. Through an exchange of email and telephone conversations, the group’s objectives and work plan were established. Very shortly after the group’s direction had been determined, the chair position of the subcommittee was vacated and, lacking this leadership role, the subcommittee’s efforts were suspended.

It was not until the vacant chair position was filled in September 2014 that the efforts of the subcommittee were revived, and the possibility of the commercial use of GPS and cellular telephone apps was revisited. NIST Office of Weights and Measures has confirmed Mr. Bill Fishman as the new Chair of the GPS Subcommittee. Mr. Fishman has established contact with several cellular telephone software application providers used in transportation-for-hire services and is soliciting these companies to join the efforts of the GPS Subcommittee.

1. **GPS Subcommittee web-conference November 2014**

A web-conference style meeting of the GPS Subcommittee was conducted on November 20, 2014. The new Subcommittee Chair conducted the meeting and welcomed several new members to the group’s roster.

**Background:**

The following dialog was presented to the GPS Subcommittee during its initial conversations in June of 2013 to establish the subcommittee’s objectives. The subcommittee’s members were asked to respond to these questions and provide any additional comments. The responses from the initial subcommittee members at that time were to be then used as a basis for the scope and objectives of the subcommittee. It is believed that these same concerns remain valid and may be used in future discussions with the revival of the GPS Subcommittee.

*To initiate the work of the subcommittee, it seemed a logical place to begin would be to establish some limits for the scope of the discussion and to gauge what expectations there may be among the members. One method would be to survey the subcommittee members and use that input to plan our approach.*

*The following questions focus on some of the core issues that the subcommittee will need to address. Prior to working on specific details, it is hoped that by considering these items, the group will achieve a better focus on its overall objectives.*

*Questions and considerations for subcommittee:*

1. *There seem to be two distinct applications of GPS used in determining a charge for transportation service.*

*(A) One application functions by the entry of a point of origin and a point of destination, then through the use of mapping-type software (e.g., Google maps, mapquest), the distance between these two points is calculated. This calculation is based on and dependent on a pre-selected route which may or may not be the actual route followed by the hired vehicle. The charge for the trip is pre-determined and made available to the customer, up front.*

*(B) The second type of application is where a receiver located in a vehicle for hire serves to provide positioning information to the GPS system, and then based on successive signal transmissions and a frequent update of that receiver’s position, a course of travel can be plotted for that vehicle which represents the actual route traveled.*

*The subcommittee will need to determine if either or both of these applications will need to be considered when developing weights and measures (legal metrology) regulation.*

1. *Devices that employ GPS can be categorized into 3 classes, as stated below, is it prudent to develop regulation based on the particular characteristics of each of the following categories?*
   * + *(A) A taximeter that operates using features and functions found on traditional-type of taximeters. The only exception being that this taximeter uses GPS as a measurement source rather than a vehicle speed sensor, or input through the On Board Diagnostic (OBD) data-port both of which are an inclusive part of the vehicle.*
     + *(B) A software based device, installed in a vehicle which calculates fare based on GPS measurements. Other features and functions may or may not be those of a traditional taximeter (e.g., initial drop, time-only fare calculation, cross-over speed calculations, use of multiple rates, extras charges, flat and negotiated flat rates) may or may not be present.*
     + *(C) Apps (software application) that may be downloaded and then function on various types (smart phone, tablets, computers, etc.) of hardware devices.  The results of this software may be displayed on a monitor, ipad, smart cell phone, tablet or other device which is used in but not pertinently installed in a vehicle for the determination of a fare for the hiring of that vehicle*

*For this subcommittee to accomplish its goal, it must actively solicit the participation of companies that currently use GPS cell phone apps and GPS and as their form of measurement, this is the only way we can learn about the process to determine if the technology can be documented and evaluated to determine if it falls under the scope of NIST Handbook 44 regulation.*

**Discussion/Conclusion:**

During the November 2014 meeting, John Barton (NIST Technical Advisor) gave a brief overview of the history and relationship of the National Standards and Technology (NIST) and the National Conference on Weights and Measures (NCWM).

Mr. Barton also provided a brief history of NIST and its role as a non-regulatory federal agency. The subcommittee was informed about NIST’s mission to achieve uniformity in weights and measures standards and practices and to provide traceability to the nation’s standards.

This presentation also included information about the establishment of the National Conference on Weights and Measures in 1905 and how NCWM exists as a voluntary organization that develops weights and measure guidelines through committees and public hearings. Also included in the presentation was information regarding the establishment of the National Type Evaluation program (NTEP) to evaluate types of weighing and measuring devices on a national level.

The subcommittee was also given an overview of the process by which changes occur to commercial weighing and measuring devices standards (primarily contained in NIST Handbook 44).

Mr. Bill Fishman, (GPS Subcommittee Chair) briefly introduced himself and discussed his background with respect to the weights and measures community and taximeters.

Mr. Fishman then presented the subcommittee with background information regarding the principles and operation of taximeters. The subcommittee was informed that like other devices, taximeters started out as entirely mechanical devices and have now evolved to mainly electronics-base devices. In the last 40 years, taximeters have become more compact and have developed new features that were requested and considered necessary by many in the taxi industry. The modern taxi meter, while still charging a fare for a vehicle for hire, has developed into a complete point of sale system. Compared to the rapid evolution of taximeters, regulatory standards and evaluation procedures have not kept pace.

This presentation covered the functions and operation of taximeters, how they work, and if GPS and cellular telephone apps could become a viable alternative to traditional taximeters. The presentation proceeded to cover general information on the GPS system and some of the concerns regarding GPS accuracy and reliability. Some of the concerns shared with the subcommittee include:

* The accuracy of the GPS measurement when used with software apps;
* Problems if communication is lost with the GPS satellites;
* Interfacing GPS data with a software program;
* Determining accurate fare charges using the distance and time measurements from GPS and incorporating those measurements with an established rate schedule;
* Appropriate and correct presentation of the information to the passenger; and
* Presenting a recording (printed or electronic copy) of a meaningful receipt for the transaction.

Mr. Fishman then reviewed the objectives and goals for the GPS subcommittee which including the following:

* To solicit participation of; the weights and measures community, manufactures of taximeters, developer of transportation related software and other interested parties;
* To open an active and continuing dialog between these stakeholders;
* To obtain a consensus on the direction of the subcommittee’s efforts;
* To perform any necessary research for further understanding the technologies used; and
* To draft guidelines for future regulatory policies.

Mr. David Paul questioned whether the Subcommittee will only address GPS as used in cell phone apps or whether it will also consider GPS used in more conventional taximeters. Mr. Fishman responded that the group should consider the use of GPS in both types of devices. Another point raised during the meeting regarded the existing definition of taximeters in NIST Handbook 44 and question whether a GPS-based app used in a cellular telephone be able to be considered and evaluated under the Taximeters Code (section 5.54) of NIST Handbook 44, or would it need to be placed in a new section of the handbook. The subcommittee will need to establish an approach to resolve this issue in subsequent meetings.

The subcommittee members were then informed that subsequent meetings will be scheduled as needed (possibly 4-6 meetings over the next 12 months). The agendas for these subsequent meetings will consist of more technical issues and could occur in the form of web-conferences, teleconferences, exchange of emails, or face-to-face meetings.

1. **Attendance:**

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| **Name** | **Affiliation** | **Email** |
| John Barton | NIST Office of Weights and Measures | john.barton@nist.gov |
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