DISCUSSION CONCLUDING AAS 11-664

Rob Seaman noted that the number of results that could be seen was only a fraction of those that could not be seen, so there is no reason to assume that those unseen results might not extend into broader categories. John Seago replied that a Google search result declared a certain number of discoveries (several thousands), but as one tried to view those outcomes by displaying them as a list, the search engine would only allow the user to view so many outcomes. Therefore, Seago commented that he had no way to identify the content of outcomes that were not displayable, or even if the report of thousands of un-displayed outcomes was accurate.

Neil deGrasse Tyson commented that clearly the exercise was to get some kind of quantitative understanding of impact. Seago added that the goal of exercise was to possibly discover technical areas that might have some interest in a redefinition in UTC. Tyson said it might be useful to investigate how pockets of research or reporting have to change due to alterations of any other specification that might go on. Standards change regularly and this is why the National Institute of Standards and Technology (NIST) exists. If the experiment was a concern about the impacts of redefining UTC rather than just the awareness of the impact, then it might be that this industry is changing its parameters all the time for other reasons as well. Seago replied that Tyson's point was a very good one, but Seago's effort did not go very far in that direction, because his primary goal was simply an attempt to identify possibly affected domains that might be impacted. Seago noted that while a census of the topical areas was conducted and relative results were reported, as was alluded to by Seaman's comments, it seemed difficult to make good judgments based on relative numbers of "hits" and this caveat was noted in the presentation. As a point of comparison, Tyson replied that it might be interesting to choose another definition from metrology that had been redefined within the last century, like the length of meter, to see which domains might care about that. Seago agreed that would be interesting and that Tyson's point was well taken. Seaman speculated that such a search could emphasize the difference as well, so it is unclear which way the result would go, but agreed that it would be interesting.

Arnold Rots commented that the restriction to English-language books was not surprising considering that the search term was English. Seago agreed, explaining that he is unfamiliar with the technical nomenclatures of other languages and therefore did not feel he could search or categorize results in any other language. Even if Seago could do this, he lacked the time to attempt it; he is not part of an established study effort on this issue and the results are simply informative to demonstrate a proposed approach. With regard to the "Spacecraft" category, Rots asked if there was any difference in emphasis on down-looking versus up-looking spacecraft. Seago said that, while there were apparently interesting aspects to many of the discovered references, he was not able to delve into any details of these references due to the large numbers of references involved. For the purposes of his paper, he was just looking to see if a particular topical domain mentioned "leap seconds" and "UTC" which might indicate some stakeholder domain in the definition of UTC. Even then, the results wouldn't say for sure that a stakeholder domain existed.

Steve Malys asked if each reference was only counted once; Seago replied that he assigned each title to a specific topical category and thereby each was only counted in the tally once. Seago

admitted that there is some subjectivity in the decision because some titles are multidisciplinary; also, a few titles may be released as different editions and thereby the separate editions may have contributed to the tallies.

Seaman commented that this exercise would be interesting to extend to other types of technical literature such as journal articles. Seaman also said that just because a book doesn't include the phrase "leap second" doesn't mean that a book's topic doesn't depend on the leap second. If Coordinated Universal Time is redefined to no longer be Universal Time, then the user base interested in a DUT1 correction would suddenly increase. Seago agreed and added that the approach is extensible.

David Simpson noted that the acronym "UTC" is frequently misinterpreted as an abbreviation for *Universal Time Code* among software people; a search on that term might reveal additional discoveries within literature about software.