Better Information Systems as a Catalyst for Achieving New Measures of Transportation System Performance.

by Barry Wellar, Wellar Consulting, Ottawa Canada, and Distinguished Geomatics and GIS Scientist
Lab for Applied Geomatics and Geographic Information Science
University of Ottawa

I am currently engaged as the Principal Investigator for the Transport Canada project, Methodologies for Identifying and Ranking Sustainable Transport Practices in Urban Regions. (Wellar, 2008). As part of that research activity, I have had occasion to consult with veteran URISA members (Urisans) William Garrison, Will Steger, and Ken Dueker, as well as with researchers and practitioners in various fields about designing new measures of transportation system performance.

The focus of the companion research regarding new measures is “sustainability”. This concept has been the subject of much discussion in the development domain for decades but, as of this writing, it is still short on specifics in the transportation field. The intent of the companion research initiative, therefore, is to accelerate the search for measures which can be incorporated in decisions about identifying, adopting, and implementing sustainable transport practices.

However, for reasons involving vested interests, inertia, the difficulty of compiling compelling evidence, and other factors which impede achieving change, breaking away from the old ways of measuring transportation system performance in favor of a sustainability agenda will not be easy. Indeed, I expect that the reader can quickly think of attitudinal, ideological, institutional, political, and other barriers to be overcome in order to move towards a new transportation order in which measures of performance are based on sustainability criteria.

That said, and in the spirit of all Urisans who embrace problems that beg for solutions, I believe that we are in fact on the cusp of a new era in terms of how transportation system performance is measured. To tilt matters in favor of the new order, one thing that is needed are persuasive arguments to induce citizens, businesses, governments, etc., to let go of the old order and grab onto the new one. This communication about catalysts is a contribution to the body of persuasive arguments.

In the research paper, “Cutting to the Chase in Designing New Measures of Transportation System Performance”, five catalyzing influences are proposed which may help Canada (and other countries) cut to the chase in deriving and implementing a new set of measures which are energy-conserving, and are sound ecologically, socially, economically, financially, and geographically (Wellar, 2008b). The five catalyzing influences are:

- The growing shift away from private motor vehicles for passenger trips, and possibly for freight trips;
- Geographical limits to development;
- More regard for legacy systems;
- More concern about safety and security issues;
- The increased availability of better information systems and better geographic information systems (GIS) in particular.

The section on Better Information Systems may be of particular interest to URISA members, and it has been excerpted from the larger paper (http://www.transport2000.ca/) along with the pertinent references.

Catalyst E: Better Information Systems

The final catalyst has many roots, including the Steger (1966) paper, the Wellar (1975) newspaper column, Garrison's 1965 paper in the Journal of the American Planning Association and the 2007 Anderson Lecture (Garrison, 1965, 2007), and numerous other publications on the topic of transportation measures over the past 40 years.

As Steger, Garrison, Wellar and other commentators observe, creating transportation system performance measures is a difficult and significant achievement. However, creating measures is just one part of the applied measures activity, because operationalizing the measures requires collecting, organizing, and processing the data needed to test and re-test the measures, and then performing analyses, calibration, evaluation, and so on using the measures in real-world engineering, traffic, planning, health, public safety, and other operational environments (Wellar, 1998, 2002).

This point is emphasized by Schneider (2008) who recently noted that the importance of having data available for measures applications in the walking and cycling modes cannot be over-emphasized: "Data collection is critical for measuring pedestrian and bicycle characteristics over time. This aspect of pedestrian and bicycle performance measurement is often a barrier for transportation agencies." The comments by Schneider at the 2008 ACSP-AESOP Congress support the position I took at the 2001 URISA conference regarding the critical importance of having an information system/geographic information system (IS/GIS) in place to support large-scale measures, such as those developed for the Walking Security Index (Wellar, 2001).

Fortunately, a concerted effort has been made by professional organizations such as the Urban and Regional Information Systems Association (http://www.urisa.org/) to address various data problems that confront researchers, consultants, professional staff, elected officials, and members of the public who undertake transportation and related studies at the local and regional scale. Further, there is a large North American industry of private corporations which have also been active as data providers, and as sources of information system hardware, software, services, and, most notably for this report, of geographic information systems (GIS) software, peripherals, and services.

As participants in the evolution of GIS are acutely aware, tremendous steps have been taken in the last decade, indeed, last half-decade, to dramatically increase the functionality, scope, and ease associated with using GIS in transportation studies.

Evidence in this regard is illustrated, for example, by the ten websites that were selected for each of GIS Day and Transportation Day during Geography Awareness Week 2007 hosted by the Canadian Association of Geographers. (http://www.cag-acg.ca/en/geography_week.html.) And, as further evidence of the growing popularity of GIS, witness the rapidly growing number of comfortable users of Google Maps and global positioning systems (GPS).

That progress notwithstanding, however, the use of GIS for developing, testing, implementing, and evaluating new measures of transportation system performance still faces several major challenges. First, although the concepts and measures introduced by the Walking Security Index project 1994-2002 spawned numerous follow-on projects and studies, it appears that only limited progress has been made in developing the IS/GIS capabilities that were discussed in several WSI publications a decade ago (Wellar, 1998, 2002).

Second, IS/GIS applications in the walk mode involve issues of scope, scale, and functionality which are very different from the private motor vehicle experience, and evidence of lessons learned seems slow to materialize. Third, it appears that in a number of municipalities, only very limited progress has been made in applying geographic information systems and geographic information science to address issues involving the cycle mode. And fourth, there appears to be very little published work describing how GIS is being used to analyze and improve the connections between and among active transit modes, that is, walking, cycling, and transit.

Those challenges are significant, but they are more the result of lack of regard and action in support of active transportation, than they are measures of technical or technological shortcomings in GIS. Consequently, given the need for new measures on the one hand, and the rapid advances in how GIS technology can be used to produce better transportation system performance information across all modes, it is expected that within the next several years GIS will play a major role in advancing efforts to design and implement new measures of transportation system performance.

References

Garrison, W. 1965. Urban transportation models in 1975. Journal of the American Institute of Planners, May, 156-158.

Garrison, W. 2007. Increasing the flexibility of legacy systems. Anderson Lecture in Applied Geography. *Proceedings of the 2007 Anderson Lecture in Applied Geography*. Editor, B. Wellar. http://agsg.binghamton.edu/, (Anderson Lecture, 9-20).

Schneider, R. 2008. Pedestrian and bicycle performance measures in practice: Lessons learned from communities that are measuring human-powered transportation. *Designing New Planning Measures of Transportation System Performance*. Joint Congress, ACSP and AESOP, Chicago, Illinois, July 6-12, 2008. http://www.transport2000.ca/

Steger, W. 1966. Transportation output measures: Needs for decision-making. *Papers, Transportation Research Forum.* San Francisco, CA, 49-65.

Wellar, B. 1975. Taking steps towards the end of the automobile era. Citizen Forum, *Ottawa Citizen*, December 9, page 6. Posted at http://agsg.binghamton.edu/ and http://www.transport2000.ca/.

Wellar, B. 1998. *Walking Security Index*. Ottawa: Regional Municipality of Ottawa-Carleton and University of Ottawa.

Wellar, B. 2001. Strategies for designing IS/GIS strategies to implement Walking Security Indexes. In *URISA 2001 Proceedings*. Chicago: Urban and Regional Information Systems Association, CD-ROM publication.

Wellar, B. 2002. *Walking Security Index Pilot Study*. Ottawa: City of Ottawa and University of Ottawa.

Wellar, B. 2008a. *Methodologies for Identifying and Ranking Sustainable Transport Practices in Urban Regions. Project Synopsis.* http://www.wellar.ca/wellarconsulting/TCProjectSynopsis.pdf

Wellar, B. 2008b. *Cutting to the Chase in Designing New Measures of Transportation System Performance.* www.transport2000.ca

Source: URISA News, November/December 2008, pages 10-11