the use of an operating consultant, but that has changed because the current arrangement seems to work well.

- The people who work with INFORM are always looking for opportunities to expand, enlarge, and enhance the system. Money has been made available for an IVHS project on Long Island that could be integrated with the INFORM system. There are also plans to expand the system in several directions, add new hardware components, and possibly relocate the control center. The state has also developed a unique relationship with a consulting firm for designing INFORM features into other corridor projects.

The final point that Mr. Powell made was that operations and maintenance efforts should be decentralized to the lowest possible level in the organization. It is very difficult to keep a system like INFORM in operation with a top-down approach from a central office.

ITMS Operations in Seattle

Peter M. Briglia
Washington State
Department of Transportation

Mr. Briglia provided a description of the efforts being made to integrate traffic management systems in the Seattle area. Currently, their systems are primarily freeway-based, but they are moving toward integration in several areas. His comments about those efforts and the operations and maintenance issues are summarized below.

- The existing traffic management system consists of 1,200 loop detectors, 23 metered ramps, 55 closed-circuit television cameras, 22 variable message signs, and 6 highway advisory radio stations. It covers about 30 miles of freeway, and about 7 of those have ramp metering. There are plans to expand the system to about 60 miles of freeway. The system crosses numerous jurisdictions, and the expansion will involve several more. A major effort is underway to convince those municipalities of the benefits of ramp metering, which can be a challenge.

- The department is also working on plans for traffic management systems in the cities of Tacoma and Vancouver, Washington. Typically, there is a lot of discussion about interagency coordination for traffic management, but it is also necessary to think about the integration of different districts within the department. Sometimes that can be as difficult as integrating separate agencies.

- One example of a successful integration effort is a traffic information telephone hot line, *622-CARS*. The objective of this program is to provide a single source of regional traffic information for motorists. In addition to traffic conditions, it provides construction information and road conditions that have been downloaded from city and county agencies.

- There is also a computer-generated graphic of freeway congestion information that is distributed to other agencies. The system is not used very effectively yet, but it does have significant potential in an integrated system for sharing real-time information among agencies.

- The Seattle area has many miles of both freeway and arterial HOV lanes in place or being planned. Like freeways, the HOV lanes cross many jurisdictions as well, and the operation of these facilities needs to be integrated in future systems.

- Currently there are two traffic management teams that meet regularly. One of the teams is working to implement a multi-jurisdictional traffic signal coordination system south of Seattle. A problem with these teams is that they are perceived as DOT controlled, and it has been difficult to get other agencies to participate actively.

- There are some specific problems with respect to the operation and maintenance of

integrated systems. The first is that the technology clearly out-paces the skills of the maintenance personnel. Some typical solutions include additional training or contracting the work out. A different approach is to not favor the latest technology, but to select hardware than can be supported with existing capabilities.

- Another issue is equipment compatibility to permit the sharing of data, including video, with other agencies and systems. Sometimes it is difficult for agencies to effectively coordinate their procurement processes to ensure compatibility.

- The department and the State Patrol have a good working relationship that includes direct connections between radio dispatchers. However, there is a definite lack of coordination with the local police agencies in the Seattle area. Most suggestions by the department to establish direct communications with the local police have received little attention.

- A different interpretation of integration is to integrate the skills of the engineers or technicians. Most of the staffing for these projects have backgrounds in civil engineering-related work, but there is a need for expertise in computers and electrical engineering. The perfect employee for these systems would be a civil engineer with a strong interest in electronics and computer programming.

- Steps also have been taken to integrate freeway operations with the other aspects of traffic engineering in the department. The main objective of this effort is to get the signal operations people and freeway operations people to begin working together, which is an essential step in the development of a truly integrated system.

- Finally, some successful efforts have been made to integrate transit into the freeway operations. In particular, the operation of the area HOV lanes is coordinated with the general freeway operations, and there is a direct communication link between the department's operations center and the Seattle Metro dispatchers. Metro is advised immediately of changes in the operation of the HOV lanes, and is consulted about the standard operating procedures of those facilities. The arrangement has worked very well for both Metro and the department.