

FINAL REPORT

Independent Peer Review of the California High-Speed Rail Ridership and Revenue Forecasting Process

Findings and Recommendations from the September-December 2012 Review
Period

February 11, 2013

The Peer Review Panel held its sixth formal meeting on November 1-2, 2012 at the Parsons Brinckerhoff offices in San Francisco. The Panel also conducted discussions via electronic mail, teleconference, and videoconferencing both before and after this meeting. This report covers their activities and deliberations from September through December 2012. The panelists include:

- Frank S. Koppelman, PhD, Professor Emeritus of Civil Engineering, Northwestern University (chair)
- Kay W. Axhausen, Dr.Ing., Professor, Institute for Transport Planning and Systems, ETH Zurich (Swiss Federal Institute of Technology Zurich)
- Eric Miller, PhD, Professor, Department of Civil Engineering, University of Toronto
- David Ory, PhD, Principal Planner/Analyst, Metropolitan Transportation Commission
- Kenneth A. Small, PhD, Professor Emeritus, Department of Economics, University of California-Irvine

All panelists were present in person for the November meeting. Rick Donnelly, PhD, of Parsons Brinckerhoff (PB) served as facilitator and recorder for the Panel. In this capacity he serves at the convenience of the chair rather than as a representative of the project management team. The Panel invited several others to attend portions of the meeting on both days. They included Kimon Prousaloglou, David Kurth, and Michelle Bina from Cambridge Systematics (CS) and Thierry Prate from PB. Jeff Morales, the executive director of the California High Speed Rail Authority, joined the Panel at lunch and in the early afternoon of the first day. All other deliberations of the Panel were closed to non-members.

1 Executive Director Briefing

Jeff Morales, executive director of the California High Speed Rail Authority, met with the Panel by teleconference on Monday, 24 September 2012 and during the November meeting in San Francisco. The Panel, who had not had the chance to meet with him, initiated the conversations. They sought to learn his priorities for and expectations of the Panel.

Mr. Morales started the conversation by thanking the Panelists for their concerted efforts in reducing the controversy and confusion surrounding the modeling work, and helping to maintain a forward-looking perspective on it. He affirmed the important advisory role played by the Panel and its independent status. Both parties confirmed the need for the executive director to brief the Panel regularly about the issues facing the Authority and the context into which this places the work on demand modeling, so that the Panel can make its recommendations germane to the needs of the Authority and State of California.

A discussion of a potential memorandum of understanding (MOU) between the Authority and the Panelists helped to further define the role of the Panel. Certain aspects of the most recent individual contract were discussed. Three points of agreement emerged:

1. The Panel's role is to “review and advise on,” rather than “supervise,” the modeling work.
2. The Panel advises on and makes judgments about how forecasts are carried out, and whether certain inputs closely related to demand modeling are reasonable. However, it does not control what scenarios the Authority chooses to analyze. Also, it cannot neces-

sarily judge the validity of other inputs, such as those depending upon engineering or financial assumptions.

3. The Panel's purview does not include the merits of public-private partnerships. It can help design demand modeling systems capable of being used for such policy analyses, but cannot design the input scenarios needed for those analyses.

Mr. Morales also briefed the Panel on near-term issues relating to forecasting. The Authority is considering a shortened IOS that could become operational sooner, perhaps in conjunction with the planned XpressWest service to Las Vegas. Specifically, its southern end might be further northeast than the San Fernando Valley, with some connector to the western terminus of the XpressWest service. This raises questions of how to model the concurrent offering of service on both high-speed rail lines. The Panel expressed a desire to coordinate with the consultants being used by XpressWest to ensure that the demand forecasts are consistent. Mr. Morales agreed that the Authority will explore the possibility of such cooperation, including sharing of data and modeling assumptions. The Panel noted that preparing forecasts for this new scenario might further strain the resources available to CS for implementing the Version 1.5 of the model in time for the 2014 Business Plan.

The Panel currently reports to a member of the Authority's Board (Mike Rossi). The question was raised as to whether this will change now that there is a new Executive Director. Mr. Morales will take up this question with relevant members of the Board.

2 Travel Survey Design Review

The design of the updated revealed preference-stated preference (RP-SP) survey is nearly complete. A considerable amount of time was spent during the November 1-2 meeting in San Francisco discussing several remaining issues. The survey is expected to commence in December, and will collect 4,500 observations from travelers in three corridors:

- Los Angeles Basin to the San Francisco Bay Area
- Los Angeles Basin to the Central Valley
- San Francisco Bay Area to the Central Valley

CS has worked closely with the Panel during the design phase. The Panel reviewed the initial draft of the survey design provided by CS in early October. Individual panelists provided comments by email in advance of the 1-2 November meeting in San Francisco. This feedback included detailed comments on choice definitions, experiment design, and survey structure and wording. A large number of the comments were specific to a given question or section of the interactive test. However, some remaining overarching issues were identified by one or more panelists, and discussed at length with CS staff. These topics are summarized below.

2.1 Respondent attitude towards HSR

When the original SP survey was conducted in 2005, HSR was a largely unexplored option for California. Proposition 1A had yet to be passed, and no public debate or press coverage had occurred. Several panelists expressed concern that the extensive public debate on HSR in California might have already formed opinions in the minds of respondents about the validity of the

investment. The concern is that these opinions about the public policy, pro or con, might bias respondents' responses about whether or not they would use it, resulting in responses that do not reflect actual future choices. The Panel concluded that asking the respondent whether they had formed an opinion about HSR, and if so, how strongly they felt and in which direction, was the best approach. The answer to such a question can be used to systematically investigate potential bias. The topic will be revisited once the survey data are ready for analysis.

2.2 Merging surveys

The Panel has advanced the idea of combining, to the extent possible, the data from the 2005 and 2013 surveys. Doing so will increase the number of observations, enabling finer market segmentation than might otherwise be possible. It is also hoped that differences in behavior can be gleaned from contrasting data from the two time periods. For this reason, the Panel recommends careful attention to survey design to maximize compatibility between the two surveys. For example, the same socioeconomic strata used previously should be retained insofar as possible. Some changes to wording of the interactive survey were suggested with this goal in mind.

2.3 Trip orientation

Most intercept surveys collect information about the trip that is underway at the time that the respondent is intercepted. This may not correspond to the primary purpose for traveling in the first place (i.e., being intercepted while accessing an airport, rather than the flight itself). Moreover, while symmetry of flow can be assumed for many urban trips, the same is not necessarily true for multi-stop long-distance trips. The Panel discussed the issue at length, considering whether to collect attributes of the main trip purpose or the intercepted one. The former may yield better information, but at the expense of added complexity and problems with respondent recall. The key issue in this discussion involves ensuring that the survey data are collected in a form that is maximally consistent with the production-attraction (P/A) formulation of the model, in which trips are generated as productions associated with the home end of the trip, regardless of trip directionality, and in which the non-home end of the trip is always determined by the trip destination choice model, again regardless of trip directionality.

It was decided to use the current trip as the reference case, but the Panel emphasized the importance of rigorously identifying the directionality of the trip (i.e., outbound from home or returning to home). Note that cases in which the intercepted trip is an intermediary leg of a multi-stop trip for which neither trip end is home (e.g., the SF-SAC leg in an LA-SF-SAC-LA tour) this trip does not fit the model's home-based trip production format. In such cases the trip should still be used as the reference trip for the purpose of the survey, but it should be coded as an "intermediate" or "non-home-based."

This issue of directionality also needs to be carefully accounted for in station access/egress modeling, given that the so-called "access" trip always occurs in the model at the home end and the so-called "egress" trip always occurs at the non-home end, regardless of trip directionality. It is important that the access/egress mode choice sets properly reflect whether the access/egress trip is to/from home (in which case a private auto is generally a feasible travel mode) or to/from a non-home location (in which case a private auto is not a feasible travel mode).

2.4 Number of choice experiments per survey respondent

Each scenario presented to respondents in an SP survey is called an experiment. Each can include both known (experienced) and hypothetical situations and options. Given the cost of conducting such surveys, a balance is sought between harvesting as much data as possible and avoiding respondent burden and fatigue. American experience appears to reveal a drop-off in response quality with increasing number of experiments, but the evidence is not conclusive elsewhere, especially in Europe. The ideal number of experiments depends on the complexity of each experiment and the amount of time available to a respondent. Time available depends, in the case at hand, on whether the respondent is surveyed at an airport and rail departure areas, aboard the vehicle, or after travel is completed.

For all these reasons, the panel did not come to a definite conclusion about the ideal number of experiments. However, there was agreement among panel members and CS staff that each experiment must be concisely worded in order to keep the survey as brief as possible. The panel generally recommends six experiments per respondent as a target number, and eight as a maximum. It also recommends small choice sets (e.g., three to four alternatives for each experiment), especially if a larger number of experiments are chosen.

2.5 Time-of-day considerations

Congestion and pricing can vary considerably during the day on a given facility or location. Capturing the effects of such variation is arguably not important when dealing with system-level feasibility and planning studies, but becomes more important when conducting detailed corridor or station design studies. The Version 1.1 model considers daily travel patterns, obviating the need for time-of-day (TOD) information. The current plan for the Version 1.5 model, which will be used for the preparation of the 2014 Business Plan Update, does not include TOD modeling. Thus, it was questioned whether such information needed to be included in the SP survey. Doing so would add cost and complexity to the survey, which the Panel is keen to avoid.

The ensuing discussion revealed that the Panel is in favor of including some treatment of TOD in the Version 1.5 model if possible. This might take the form of dividing the day into four periods, in much the way that urban travel models do. The Panel also considered the desire expressed by our Board contact to conduct only one more round of data collection. This implied that any information needed for the development of later models (e.g., Version 2, which would include explicit treatment of time) would need to be collected in the 2013 survey. However, some information about TOD, as well as variation in travel by day of the week, should be available from the preliminary California Household Travel Survey (CHTS) data. These can be used for developing the Version 1.5 model, which is expected to include only a cursory representation of both.

For these reasons, after considerable discussion the Panel concluded that TOD information should not be collected as part of the 2013 survey. The Panel realizes that this means a narrowly focused future survey to capture detailed TOD choices and characteristics will be required for development of the Version 2 and subsequent models.

2.6 Efficient experimental design

Several panelists noted that initial designs of the interactive survey were unnecessarily verbose, potentially making the survey less efficient. Several specific examples were noted in written comments provided to CS prior to the meeting on November 1-2, as well as during that meeting.

CS acknowledged these issues, agreeing that reducing the bulk of the survey is a top priority. The Panel is satisfied with their attention to this aspect of experimental design, but underscores the importance of the issue in this and any subsequent SP surveys.

2.7 Sampling frame

The survey design submitted to the Panel focused on capturing data from intercity rail, auto, and air passengers. Considerable discussion centered on the question of whether to include intercity bus in the survey. The limited available information on bus traveler characteristics suggests that bus serves a distinctly different market than HSR. However, the growth in intercity bus travel and the emergence of premium carriers that cater to commuters may change it into a competing mode. A consensus emerged that it should not be ignored, and that the 2013 survey should attempt to include intercity bus riders. CS agreed to update their sampling plan to accommodate intercity bus.

Most of the discussion in the meeting centered on the air passenger portion of the survey. It was felt that this is the most time-sensitive component, owing to the potential delays in securing permission from airport operators and the Transportation Security Administration to conduct it in departure lounges. The Panel hopes to avoid a repeat of the inability to secure access to airports in Southern California in the 2005 survey work.

3 Version 1.5 Components

Several aspects of the Version 1.5 modeling system were discussed at length during the meeting. As previously noted, this system is an update of the current Version 1.1 system. As noted in our fifth report, dated October 31, 2012:

The model system 1.1 (both structure and implementation) will remain unchanged in Model System 1.5. However, some of the individual model components will be substantially updated using revised specifications and estimations. Moreover, additional data (portions of the 2012 RP-SP survey and CHTS) will be used in the estimation, calibration, and validation processes. Furthermore, some revealed preference (RP) data from the 2005 surveys, which was not previously used in estimation, will be pooled with the stated preference (SP) data from the same surveys, to improve estimation precision and to better establish commonalities between survey respondents' answers to the two parts of the survey.

3.1 Role of distance and regional distinctions

The panel and CS staff discussed the best way to handle differences in behavior based on trip distance and on whether the trips are within or across regions. The Panel examined preliminary summaries of trip lengths from the early CHTS data, prepared by CS. A continuing concern is the number of HSR trips currently being predicted by the Version 1.1 model in the range of 90 to 100 miles, which corresponds to the current boundary between short and long-distance trips. The Panel is eager to eliminate this artifact, as has been discussed in earlier Panel reports. That is, the current distinction between short (less than 100 miles) and long-distance (greater than 100 miles) trips is artificial from a behavioral point of view and creates potential anomalies ("cliff effects") near the distance boundary. It is acknowledged that the 100-mile boundary currently used was not arbitrarily chosen, but rather was dictated by definitions used in the 1995 American Travel

Survey (ATS). However, the CHTS should finally provide a large enough data set to estimate an entire distribution of trip lengths of long-distance travel in California. The analyses of these data will determine whether distinct distance categories are still needed, and, if so, how they should be defined. This should be a high priority component of the Version 1.5 model update. However, it was acknowledged that completing this by its implementation deadline (May 31, 2013) might not be possible if the full CHTS sample is required for robust estimation.

The Panel also discussed whether the distinction between intra- and inter-regional trips could be eliminated. Except in the case of the large urban regions (the Bay Area or MTC region and the Los Angeles Basin or SCAG region), the distinction between an intra-regional and an inter-regional trip is arbitrary (depending only on where a regional boundary happens to be drawn) and not generally behaviorally relevant. What matters are that very short trips are very unlikely to use HSR, and so the model can be simplified by focusing it on longer-distance trips that might be candidates for HSR. Currently, however, very short trips that happen to cross a regional boundary are classified as inter-regional and are included in the model while longer trips that are wholly contained within a single region are not considered (except in the case of Bay Area and Los Angeles Basin intra-regional trips). Thus, in general, the Panel believes that eliminating the intra/inter-regional dichotomy would both simplify the overall model and result in a more behaviorally sound representation of the travel markets in question.

The one (but very important) exception to this is the SCAG and MTC regions, which are currently modeled by detailed urban models derived from the models used by SCAG and MTC for their internal regional planning. These models have been calibrated for their regions to deal with the complex travel patterns that exist in these regions. Successfully replacing these models with a “universal” statewide model at this point in time would require far more work than is feasible given current timelines or is warranted given likely improvements in overall model predictive capabilities (indeed, it might well represent a step backwards in this regard).

Given these observations, the panel recommends the following approach to developing the Version 1.5 model:

1. Retain separate models for the SCAG and MTC regions, as now, predicting intra-regional trips (generation, destination choice, and mode choice) for those two regions for all trip distances.
2. Develop a model for all trips within the State of California that are greater than 40 miles in length. Alternatively, some other cutoff distance can be chosen based on a more thorough review of data. This model would be comparable to and would replace the current long-distance inter-regional generation, distribution and mode choice models. But it would not make any distinction between intra- and inter-regional trips.
3. Trips over 40 miles within the SCAG and MTC regions are duplicated in parts 1 and 2 above, so would be deleted from one or the other in order to eliminate double-counting.

Note that with this new approach, trips shorter than 40 miles (or whatever the final chosen threshold is) outside the large metropolitan areas will not be modeled. These trips, however, would generate negligible HSR ridership. Therefore, the Panel believes that the loss from not modeling them is unimportant, and more than compensated for by the simplification of the

model created by eliminating the current use of separate models for short- and long-distance trips, and for intra- and inter-regional trips.

This approach will require re-specification, re-estimation and re-calibration of the trip frequency, destination and mode choice models to conform to these new definitions. However, these models need to be re-estimated and re-calibrated using the new survey data in any event, so this change in definition does not entail any significant additional work. Indeed, by eliminating the need for separate short and long-distance models it reduces the number of models to be developed. Also, given the plan to re-estimate the models, now is the time to implement this change, which the Panel believes will both simplify and improve the overall model system.

As discussed in earlier reports, and in meetings with CS staff, distance can be included in various ways within the model specifications to account for its effect on behavior. In particular, it can be interacted with time or cost variables, and with modal constants.

3.2 Tour frequency model

Inter-regional trips are generated in the Version 1.1 modeling system using a tour frequency model originally based on the 2005 survey data and limited analyses of the 1995 ATS. Home-based trips by California residents are generated by income strata within the model. CS has repeatedly expressed concern that the trip frequency per capita is too low. The 2011 Harris interactive poll revealed a slightly higher rate, accompanied by a markedly high proportion of trips taken for personal (non-business) purposes. The Panel endorsed CS' suggestion that updating the long-distance trip rates using the preliminary CHTS results should be a high priority.

Group size is not included in the current model, an issue raised earlier as a criticism of the model. While acknowledging its potential influence in mode choice, the CS team believes that its effect on trip generation is small. Data limitations probably precluded a robust estimate of the effect of group size prior to availability of the CHTS, and it would have added undesirable complexity to the model. The CHTS includes an eight-week retrospective survey of long-distance trips. The Panel recommended that the trip frequency estimates be re-estimated using these data as part of the Version 1.5 update. However, continued use of the current model structure is advised, maintaining the group size segmentation for a given trip purpose rather than developing a separate model to predict group size. The latter approach is envisioned as a Version 2 model feature, although its form will depend upon analysis of the final CHTS data. The Panel emphasized the importance of collecting party size in the upcoming RP-SP survey to facilitate such analyses.

The availability of the CHTS will also facilitate an analysis of non-home-based (NHB) trips, which are not accounted for in the Version 1.1 modeling system. Of particular interest is the determination of the size of the long-distance NHB market, which has traditionally thought to be small. Insight into this market segment has not been possible using the 1995 ATS and long-distance elements of the 2001-2002 and 2009 NHTS due to survey design limitations. The Panel is eager to see the results of this analysis, in particular whether it adds significant market segments that would be candidates for high-speed rail ridership

3.3 Modal constants

The Panel discussed several modeling and estimation issues related to the alternative-specific constants in the main mode choice model, which are quite important in predicting HSR ridership. While estimation of such constants is simple and routine, there are two issues that require special attention: inertia in response, and adjustments to these constants during calibration.

When combining SP and RP data, it is important to allow for an “inertia” variable, accounting for a possible tendency of respondents to answer SP questions so as to favor the same alternative they reported in the RP questions. The inertia variable could be interacted with distance and other variables if needed. It is intended to control for response bias specific to the survey format involving SP questions, and thus would not be included as part of forecasting since all the forecasts are intended to represent actual, not hypothetical, behavior.

For HSR, there is not an obvious existing mode from which to define such an inertia variable. After considerable discussion, the Panel recommends that a separate inertia variable, a dummy variable equal to one if the actual mode choice is conventional rail and the SP choice is HSR, but estimated with its own separate coefficient – meaning separate from a generic inertia coefficient estimated on the air and automobile modes. The rationale is that conventional rail is most like HSR, and so most likely to trigger a response bias toward the chosen mode. However, this tendency will not necessarily be of the same strength as when the very same mode (i.e. air or automobile) that was chosen is available in the SP questions.

Regarding calibration, as is standard practice, the modal constants will be adjusted to better match known totals by mode based on recent aggregate data. This raises the question of how to adjust the HSR constant to be consistent with the others, since no such aggregate data for HSR will exist. The Panel believes that the HSR constant should be adjusted to as to maintain consistency with the calibrated air and conventional rail constants. One way to achieve this would be to shift the HSR constant by the average of the shift in those two constants, similarly to what was done in calibrating the current model (see our Report 4, Section 1.1.2). An examination of the relationship among the three modal constants as functions of distance will be needed to ensure a plausible result after calibration.

3.4 Other specification issues

The Panel expects that separate scale parameters will be estimated for the RP and SP portions of the data to account for differences in the two survey instruments. In addition, estimation must account for the fact that there are multiple SP responses, but only one RP response, from a given survey respondent. The theoretically best approach for this is error components, which allow for correlation among the SP responses from a single individual. The Panel believes there is adequate software available for this approach, but if it proves impractical, an alternative is to provide weights to the SP responses used in estimation that are the inverse of the number of SP responses from a given individual.

4 Statistical and sensitivity tests, model validation, and sources of change

The model testing process should include a range of comparative statistical tests and summaries, as well as sensitivity testing of key inputs to the model, as has been discussed in previous Panel reports and was undertaken at the Panel’s request with the Version 1.1 model.

In addition, the Panel believes a number of validation tests should be conducted to verify model accuracy and help diagnose any remaining problems with model performance after calibration is completed.

In its second report, dated August 1, 2011, the Panel identified a number of validation tests that should be included in addition to those carried out and documented by CS as part of the Version 1.0 development efforts. Other model reasonability checks, such as those documented by CS in previous work, are also appropriate for use in this project (Cambridge Systematics 2010a, 2010b).

Since this model will be estimated with somewhat different specifications and using new data, it will naturally produce different forecasts; it is important that the sources of these differences be analyzed so they can be understood. Doing so will enable the CS team to understand and explain the sources and magnitude of changes in forecast values, and will enable the Authority and other users to better understand how forecasts can be used in business planning.

To identify the extent to which differences in forecasts generated by the Version 1.1 model for the 2012 Business Plan and those that will be generated by the Version 1.5 model for the 2014 Business Plan are due to changes in the model versus due to changes in input data, four forecast runs should be undertaken, as shown in Table 1. The upper left cell of this table consists of forecast results already undertaken for the 2012 Business Plan using the Version 1.1 model and the 2008 input data that were available at the time these runs were performed. The lower right cell represents the new 2014 Business Plan runs that will be made using the new Version 1.5 model and 2012 input data. The other two cells represent runs in which model versions are mixed with input data sets to investigate the individual effects of each on model results. The lower left cell represents runs in which the older 2008 input data are used in the new Version 1.5 model. The upper right cell represents runs in which the Version 1.1 model is run using the new 2012 input data. Comparing results within the same row (i.e., either row 1 for the Version 1.1 model or row 2 for the Version 1.5 model) provides indications of the effects of the change in input data on forecast results when using the same model system. Comparing results within the same column (i.e., either column 1 for 2008 input data or column 2 for 2012 input data) provides indications of the effects of the change in model version while holding data input constant.

Table 1: Model validation testing combinations

Modeling system	Source of major model inputs	
	2008 input data	2012 input data
Version 1.1 (parameters estimated using 2005 survey data)	Used for 2012 Business Plan	Validation test 2
Version 1.5 (parameters estimated using revised 2005 survey, 2013 RP-SP survey, and CHTS data)	Validation test 1	To be used for 2014 Business Plan

The first combination, in the upper left cell of Table 1, has already been implemented as part of the Version 1.1 model used to develop the 2012 business plan. The second, in the lower right cell, describes the model and data that will be used to inform the 2014 business plan. The

remaining two cells make it possible to conduct validation tests across models and to explain changes in forecasts. The validation tests consist of comparing two forecasts in the same column: for example, does the Version 1.5 model, when given the inputs used for the 2012 Business Plan, produce similar results to Version 1.1? The explanation of changes in forecasts consists of comparing two forecasts in the same row: how much of any change in forecasts is explained by updating the input data used by a given model system?

5 Next steps

The Panel was pleased with the progress in design of the RP-SP survey. CS also reported significant progress in the update of their adaptation of the SCAG model for the LA Basin and development of 2010 validation targets. Both efforts were expected to be complete by the end of November. However, a number of issues must be promptly addressed in order to maintain the momentum necessary to deliver the Version 1.5 modeling system within the time required:

- Timely attention is needed to securing access to the airports, Amtrak, and Caltrain facilities. The air passenger data in particular is seen as crucial.
- The survey instrument was to be finalized by the end of November. Professors Koppelman, Axhausen, and Small remain the points of contact on the Panel for this activity.
- The interregional destination choice model should be revised based upon the preliminary CHTS data available for approximately 30,000 households. It is expected that the large number of constants in the current model can be eliminated or greatly reduced in number, given the quality and quantity of data not available previously. The Panel would like to see this work undertaken promptly, for it is not dependent upon the RP-SP survey data.
- The Panel would like to obtain detailed draft model specifications for each of the components of Version 1.5 modeling system prior to their next scheduled meeting in January 2013. The specifications should include a discussion about the theoretical basis of the model, methodological approach, functional form (including specification of likely variables), data required for development and application, calibration targets, and acceptance criteria.

The Panel is prepared to engage via teleconference or videoconferencing, as needed, to assist CS in dealing with these issues in a timely manner.

6 Conclusions

The success of the Version 1.5 model system depends upon timely completion of the RP-SP survey, and analysis of both it and the preliminary CHTS data. The schedule is tight, but as of this writing the CS team has commendably kept on schedule. The Panel is satisfied with the progress to date and the high level of responsiveness from the CS team.

The Panel is particularly eager to eliminate the distinction between short and long-term trips in the model. This goal may not be achieved in the Version 1.5 modeling system, but if not should remain a high priority in the design and development of Version 2. The Panel is also particularly intent upon a rigorous validation process, as illustrated in Table 1 and discussed in Section 4 of this report.

In recognition of the tight schedule and imperative for having the Version 1.5 model system complete and reviewed when needed, the Panel plans to meet three times during the first half of 2013.

References

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