

6 - Fold Reduction Workshop

At a recent Wind Tunnel Test Technology Workshop, a proposed plan for the wind tunnel technology portion of the Consolidated Wind Tunnel Management Plan was developed, and is currently under review by attendees of the workshop. One of the major goals of the plan is: “Fully implement, in focal point facilities, the capability to continuously produce at least a 6-fold reduction in the time to conduct transonic, high-lift, and airframe/propulsion system integration wind tunnel test cycles, including model construction, in four years from the initiation of the Wind Tunnel Test Technology Plan”.

The objective of the 6-Fold Reduction Workshop is to ratify, flesh out, and develop at least a first cut on the cost of the above goal. Meeting this objective in a short workshop is a challenging task and will require advance preparation by the workshop attendees. Somewhat different preparation will be required of testing site and industry representatives.

Testing Site Representatives:

The advance preparation for the testing site representatives is more extensive than for the industry representatives. Some preparation will be common to both group and the description will be repeated in each set of instructions.

1. Please read the accompanying background material: TESTING 2000 Text, TESTING 2000 Charts, and AIAA paper “Measurement and Improvement of Productivity in Wind Tunnel Testing at Ames Research Center”. This material has been developed over the past year or two, and is intended to serve as a starting point for the discussions at the workshop. Please be prepared to discuss the general ideas and concepts of “quick” wind tunnel testing.
2. Although a set of Focal Point facilities for prototyping and implementing the 6-fold reduction has not been chosen, for the purposes of the workshop, we will select one facility at each testing site and build our discussion around that set of facilities, as being typical. Please select one facility at your testing site as a candidate Focal Point Facility. Having made that selection, please think through what would be required to prototype and fully implement a 6-fold reduction in the time for a wind tunnel test cycle in that facility. Is it possible, or what is a more realistic, yet visionary goal?

3. Having identified what would be required, please develop a rough engineering estimate of the cost and schedule of prototyping and implementing the capability. We have set a goal of four years, so as a starter, assume the capability would be prototyped and implemented in that time span. If that time is too short, what is a more reasonable time span, and what would the costs be for the longer time? Will facility modifications be needed? (Here a rough idea of the scope and cost is adequate, since facility modifications will be included in the Facility Investment Plan portion of the Consolidated Wind Tunnel Management Plan.)

4. To this point, we have focused on capabilities and processes that will be required to bring about a 6-fold reduction in the time to conduct a wind tunnel test cycle. We also need to consider, at least roughly, what kind of manpower resources will be required to support this testing model. Please give some thought to what level of staffing would be required to support “quick” testing. Are the current manpower levels adequate? Please be prepared to discuss staffing. Although the staffing levels we develop will be preliminary, they will be used in presentations to management in the near future that will give them a rough idea of what will be required to achieve a 6-fold reduction and to support the “quick” testing model.

Industry Representatives:

The advance preparation for industry will focus upon requirements. The industry representatives will be asked to verify that the 6-fold reduction and the “quick” testing model will meet their future testing requirements.

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2. Please be prepared to discuss your requirements for “quick” wind tunnel testing, and the time line requirements for implementing that capability in the primary developmental facilities.

3. We will need to develop some idea of future wind tunnel testing load. This will be necessary for staffing level predictions. It is plausible that as some of the testing load in the NASA tunnels begins to decline with the completion of the High-Speed Research Program, and the Advanced Subsonic Transport Initiative that the combined research and developmental testing load will not fill the capacity of the facilities. Yet, the facilities will be needed whenever they are needed. The projected future testing load will be needed to determine the severity of this problem. How will we collectively resolve this conflict if it indeed becomes the situation?

4. One possible solution to resolving the testing load situation would be to market our facilities to foreign users. Will this represent a conflict if industry has cost shared in the development of the technology that we would end up marketing to foreign users?