



# CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

<b>Name(s)</b> <b>Vamsee K. Gangaram; Anup Vatti</b>	<b>Project Number</b> <b>S1408</b>
<b>Project Title</b> <b>Nonstop High Speed Rail</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Travel time is a crucial factor for the California high speed rail (HSR) project to be successful. It must be significantly faster than car, and comparable to air travel time. In order to increase ridership and revenues, the HSR needs to serve many stations en route. Travel time is increased due to deceleration and acceleration for each station, in addition to the stop time as shown below. Proposed stations for the HSR cause at least a 20% delay in travel time, and it will get worse as more stations are added. Our goal is to reduce travel time while serving all stations.</p> <p><b>Methods/Materials</b> We propose to reduce travel times by keeping the main train always running and connecting a local tram at the end for boarding and departing purpose.</p> <ol style="list-style-type: none"><li>1. The high speed rail goes nonstop, slowing down a little at each station.</li><li>2. A tram attached to the train at the end disconnects from the train and brings passengers to the station.</li><li>3. Another tram picks up passengers from the station and attaches itself to the high speed rail at the end.</li><li>4. A moving pathway in each car to ease passenger movement from the tram to their assigned cars</li></ol> <p>We will show the above concept(method) with 3D CAD drawings and animation.</p> <p><b>Results</b> I am not able to add tables and graphs on this page. We estimated stopping and acceleration times using kinematics equations. Based on this and published stop times at each station, we computed time wasted for each station for the current method and our method. Using published proposed time table for California HSR, we computed the travel time reduction for each segment. Using that and published projections of HSR ridership and revenues, we deduced the demand (ridership and revenue) increase using time elasticity of -0.8 and value of time using \$42 per hour estimate for HSR. Results show 13.33% reduction in average travel time, 5.61 million increase in ridership,\$181.27 million dollars of revenue increase and \$477.92 million worth of value of time savings.</p> <p><b>Conclusions/Discussion</b> We showed how travel times can be reduced by avoiding stops while serving all stations along the route. Our proposed method is easy to implement and</p> <ol style="list-style-type: none"><li>1. Reduces travel time by an average of 13.33% with potential ridership increase of 5.61 millions</li><li>2. Allows adding more stations (increasing ridership) without affecting travel time much.</li><li>3. Keeps scheduling simple and avoids overtake complexities.</li></ol>	
<b>Summary Statement</b> We reduce train travel time by avoiding stops for the main train and instead use secondary trains for boarding and departures.	
<b>Help Received</b> Dad helped with getting the poster printed by a local printing company; We tried to contact California High Speed Rail Authority but no luck so far.	