When tourists visit a city or region it is impossible to visit everything they are interested in, thus, tourists have to select what they believe to be the most valuable attractions. A Personalized Electronic Tourist Guide (PET) presents a trip that maximizes the satisfaction of the tourist, taking into account the location, the entrance fee, the opening and closing hours, the tourist "value", the traveling time and the money and time budget. Route planning for a PET has to be calculated nearly in real time in order to react dynamically to tourists’ actions and preferences or to unexpected events. This planning problem can be modeled as a Multi-Constrained Team Orienteering Problem with Time Windows (MCTOPTW).

The MCTOPTW is a combinatorial optimization problem defined by a set of locations, each of them with a certain score, a time window and one or more associated attributes, such as an entrance fee. Visiting a location within its time window allows collecting its score. The goal is to determine a fixed number of routes that maximize the collected scores without violating any of the constraints.

An Iterated Local Search metaheuristic has been developed to obtain high quality results for the MCTOPTW in limited computation time. The metaheuristic is based on an insert move and a perturbation phase removing consecutive locations. To evaluate a possible insert move, checking all other visits on their feasibility would take too much time. Therefore, MaxShift is recorded for each included location. MaxShift is defined as the maximum time the service completion of a given visit can be delayed, without making any visit infeasible. In order to further increase the quality of the results, visits removed during one iteration are not considered for removal during the next few iterations.

The heuristic has been tested on a large set of problems (with up to 288 locations), and has very low execution times (below 1s for problems with up to 100 locations, two routes and two constraints). The high quality of the results is proven by means of a comparison with exact solutions for the Selective Vehicle Routings Problem with Time Windows.