Some of these activities are performed in a collaborative way and others by individuals belonging to one or more entities. Table 1 summarizes the way each activity is performed ("C" representing collaboratively and "I", representing individually) and by members of an entity (the public agency works, E2 affected neighbors, E3 neighbors' committee).
Given that Al as well as A2 are simultaneous tasks, the platform must provide the means to perform an analysis process for both entities. The A3 activity corresponds to the presentation that the Public agency work makes to the social entities, with this outcome A4, A5 and A6 are made. These activities must have methods and tools that support a geo-referenced discussion including assessing proposals features in order to be able to fulfill A6, providing a prioritization of the discussed urban improvement proposal.
In the complete process we identify two points of strong interaction among the various entities. The first one corresponds to the interaction between the companies presenting the project for building an antenna tower with the public work agency. The interaction between these two entities corresponds to the simultaneous management of multiple geo-localized projects inside the area for which the governmental entity is in charge. In order to manage these projects efficiently we used a software platform for developing an application supporting geo-collaborative decision making, over which the tool presented in this work was implemented [12]. This platform allows the management of multiple projects, categorizing them in the typical discussion steps: brainstorming, planning and execution. Moreover, it allows the management of workspaces associated with geographical areas including space-time metrics, including iconographic information, tools for collecting information from various sources, as well as incorporating autonomous agents in order to perform simulations and analysis over the physical area represented by a map (Figure 3). This tool has been extended in order to include an autonomous agent which could represent and simulate the behavior of transmission antennas. When one of these agents is located on a certain location over a map (utilizing drag and drop) the tool creates two working spaces, which will be used by the public work agency and the affected neighbors for working collaboratively.

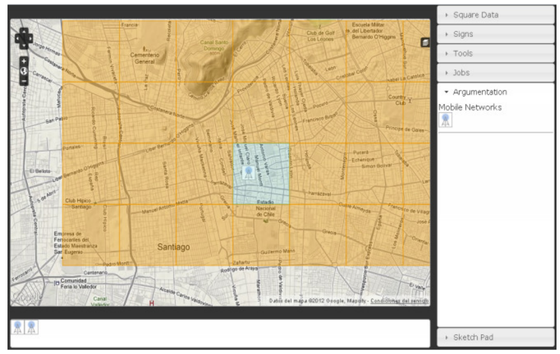

Figure 3: Collaborative platform. The square marks the area under analysis, which corresponds to the geo-referenced workspace. Red circles represent antenna tower locations.

The generated workspaces are accessible via a URL. Each one helps users answer each of the questions presented in the previous section. The first one is related to the question of whether or not the requirements about distances have been fulfilled (Q1). In order to help answer this question the workspace displays a view with the map of the area being analyzed (where the antenna was located by drag and drop) showing in a simple way all circles corresponding to the constraints and urban issues imposed by the law, considering the position and height of the tower (Figure 4).

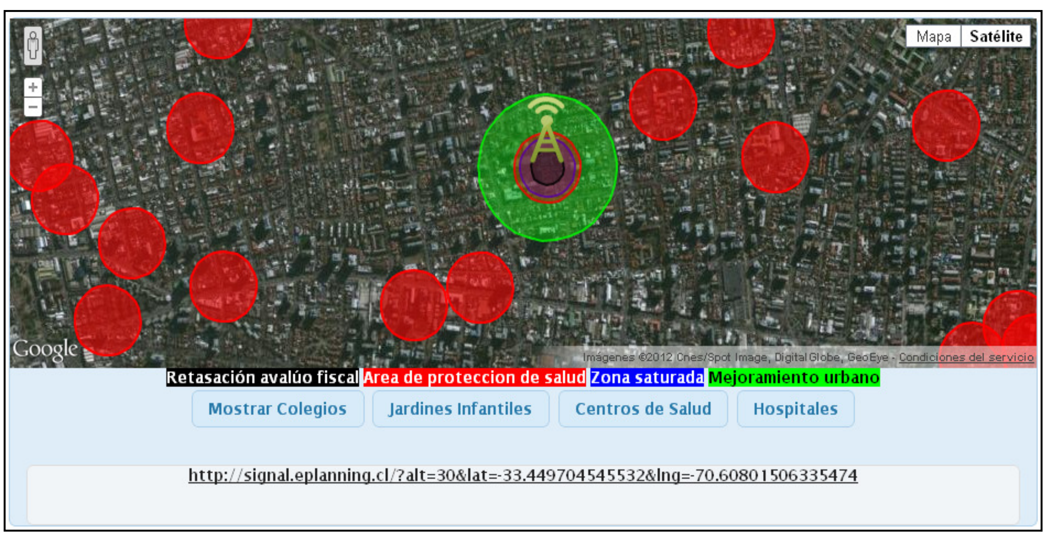

Figure 4: Red circles correspond to sensitive zones like schools and health caring facilities; the green circle is the urban improvement zone; the black circle is the zone of affected neighbors; the blue circle is the zone where only one antenna can be placed

As we can see in Figure 5 this first view supports the performance of activities A1, A2 by providing a clear picture of the situation. It also displays a link to the second view which supports the revision of the proposals for urban improvement works and provides a link to the project proposal A3. The second space is oriented to answer the second question (Q2) which refers to the revision of the urban improvement works (Figure 5).

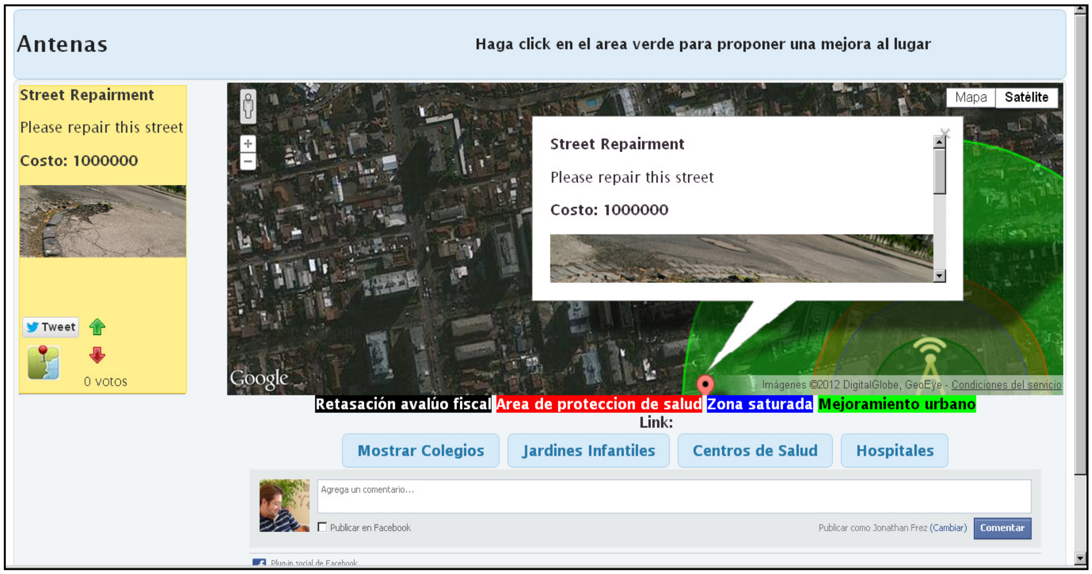

Figure 5: Second question view. Left size: Urban improvements voting system; Right: allows adding an urban improvement proposal by clicking on the location.

4. CONCLUSIONS

This work aims to make a contribution to the development of smarter cities by allowing their inhabitants to actively participate in the decisions about its development. The need of this tool was triggered by a new law issued in Santiago, Chile, which allows citizens to participate in the decision making process about granting permission for building an antenna towers in their neighborhood. Since the time frame given by this law for discussing the proposal presented by the company is rather short, it is desirable to have access to a tool which facilitates this process. We developed such a tool on top of an existing platform for supporting the construction of systems for geo-referenced decision-making. The tool eases and speeds up this process by presenting the relevant information in such a way that efficient and effective decisions are easier to make. Since the tool has just been finished, it has not been tested yet. However, other tools developed with the same platform have been successfully tested, which leads us to think that this tool will also gain the same acceptance. Nevertheless, a formal testing of the tool is already planned for the near future.

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