

## VISCO— Querying GIS with Spatial Sketches

Volker Haarslev and Michael Wessel

University of Hamburg, Computer Science Department,  
Vogt-Kölln-Str. 30, 22527 Hamburg, Germany

<http://kogs-www.informatik.uni-hamburg.de/~haarslev/>

<http://kogs-www.informatik.uni-hamburg.de/~mwessel/>

Please visit the VISCO homepage at

<http://kogs-www.informatik.uni-hamburg.de/~mwessel/visco-engl.html>

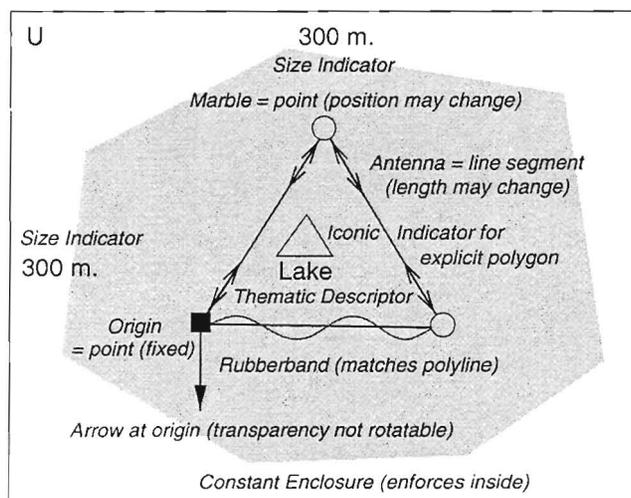
### Summary

We demonstrate the visual query system VISCO that offers a sketch-based query language for defining approximate spatial constellations of objects. VISCO smoothly integrates geometrical and topological querying with deductive spatial reasoning. It is based on a strong physical metaphor visualizing semantics of query elements. Approximate queries rely on combined topological and geometrical constraints enhanced with relaxations and “don’t cares” that could be visualized through live animations. VISCO is presented in full detail in (Haarslev & Wessel 1997; Wessel & Haarslev 1998).

The visual query system VISCO (Vivid Spatial Constellations) provides a sketch-based query language for defining approximate spatial constellations of objects. Our query language can express geometric as well as topological constraints. The query language elements are visualized with the help of a naive physics metaphor utilizing rubber bands, (cross)beams, swivel joints, nails, marbles, etc. The meaning of VISCO’s language elements is immediately graspable from the physical properties of their visualizations, e.g. a rubber band may be stretched, shrunk and wrapped around in contrast to a (rigid) beam, a marble can roll around and change its position in contrast to a nail.

In contrast to related approaches (see (Haarslev & Wessel 1997) for details) that usually focus on topological descriptions we adopt a bottom-up approach and parse the sketches and their geometry as drawn by the user. VISCO takes the geometry of query sketches seriously but supports the annotation of meta information which can be used to specify almost pure topological queries. The user may add meta information to a sketched query. This meta information specifies relaxations, additional constraints or “don’t cares” that define the interpretation of the query. The visibility of user-defined relaxations and “don’t cares” is a major advantage of our approach. In our opinion this explicit meta information (which has to be supplied by the user) is important since drawings are always in a sense “overspecified” and their (relaxed) interpretation strongly depends on the application domain.

For instance, the simple query shown in Figure 1



Transparency Film = aggregate with local coordinate system (translatable, 300 x 300 m. unscalable, not rotatable)

Figure 1: A simple VISCO query (annotations in italic font)

could be described as “Search for a lake of (nearly) arbitrary form that is not bigger than  $300 \times 300$  m.”. The semantics of the elements used in the query are explained in Figure 1 by annotations. This query is also shown in Figure 2. Screen shots of VISCO’s other interfaces are displayed in Figure 3.

### References

- Haarslev, V., and Wessel, M. 1997. Querying GIS with animated spatial sketches. In *1997 IEEE Symposium on Visual Languages, Capri, Italy, Sep. 23-26*, 197-204. IEEE Computer Society Press, Los Alamitos.
- Wessel, M., and Haarslev, V. 1998. VISCO: Bringing visual spatial querying to reality. In *1998 IEEE Symposium on Visual Languages, Halifax, Canada, Sep. 1-4*. IEEE Computer Society Press, Los Alamitos. In press.

