that it does not negotiate with other agents but it registers itself with the name server 135 and also visualises itself.

Referring to Figure 10, the overall architecture of the Debugging/Visualisation Software Module 140 comprises a central hub made up of a mailbox 1000, a message handler 1005, a message context database 1010, and a tool launcher 1015. The hub has available to it a set of tool outlines 1020.

The mailbox 1000 provides facilities for messaging between the Debugger/Visualiser 140 and other agents, using the common agent communication language which in this case is KQML.

The tool launcher 1015 launches (on demand by the user) instances of the different tools in the tool set, namely instances of the Society, Statistics, Micro, Reports, and Control Tools. There are a large number of dimensions along which a multi-agent system can be visualised. Developing a single complex tool which supports all the different visualisation modes could make the visualiser difficult to use, inflexible and difficult to maintain: hence the use of a suite of tools, the tool set, with each tool sharing a common look and feel and being dedicated to a single visualisation task. All tools are launched from a central hub and share a common interface with the hub. This way, the visualiser is easier to maintain and readily extensible. The set of tools selected are those which have been found most useful in visualising, controlling and debugging multi-agent systems.

Primarily, the visualiser 140 sends request messages to other agents for data which they hold. It queries the name server 135 for agent addresses and then uses those addresses. The message handler 205 of the receiving agent routes the received request message appropriately, depending where the data of interest will be located. Data received by the visualiser 140 from all the other agents is stored, retrieved and processed for appropriate display.

The visualiser 140 can also install data in an agent. It can therefore be used to modify an agent's behaviour. This is further described below.

The message handler 1005 of the visualiser 140 handles incoming messages received by the mailbox 1000 and delivers them to tool instances that have registered an interest in messages of that type. Tool instances register an interest in receiving messages of a particular type by using the message context database 1010 which is consulted by the message handler 1005 during its