Artificial Intelligence Planning is the science and technology of automated reasoning that involves actions, goals, activities, time and resources. Over the last 10 years major advances have taken place in the field, concerning the expressiveness and efficiency of planning technology. The aim of this project is to research and develop the enabling technology that will make intelligent planning technology generally accessible to the user community, and to prototype this technology by the creation of intelligent planning services targeted at the semantic web. (*this needs expanding to show the great breadth of 'the user community' and the very high impact such a development will have on them*).

The two main tangible objectives are to:

(a) create and evaluate a prototype of an online 'planning service' which is capable of solving planning problems from a wide range of application domains;

(b) create and evaluate a prototype of an online knowledge engineering service, capable of helping a user to accumulate sufficient input to effectively use (a).

The best way to explain the ideas is via an example using the figure.

Through the Knowledge Engineering Service (KES) users will develop a domain model of enough detail to be translatable into the External Interface (EI) language. A range of integrated features may support this. Templates of common domains, and a range of existing ontologies may be used to build
up an initial domain theory. If appropriate, information retrieval agents can assist in building up
domain knowledge. Complex operator specifications may be induced by sample user-supplied plans.
For example, the user may use her understanding of a planning ontology to indicate the format and
sequencing of sample plans. Using the example plans and the previously acquired domain knowledge
the system may be able to acquire declarative, hierarchical operators, and induce heuristics for their
application.

The EI will comprise of domain model language(s) AND plan language(s) based on web languages
such as RDFS or similar. An advanced user or machine agent may use the Planning Service (PS)
directly without the need to use the KES. An initial call to PS by a user would comprise of a domain
model translated into the input language of EI. This may invoke domain analysis tools which would
select the best planner / planner configuration perhaps holding some dialogue before solving tasks.
This would motivate a configuration program to put together an application program which can be run
efficiently to solve tasks in the user’s particular domain. Output of the PS would be conducted via the
EI’s plan language.

Research / Development needed

The objectives need to be strengthened with other significant targets to do with the following:

- research into Planning Ontology: including terms for describing the characteristics of domains, of
plans, of actions etc

- Web-based, knowledge-rich Domain Model Languages and Plan Languages need to be formulated
and agreed, to be used as formats for knowledge interchange.

- Application domain < --- > Planner correspondence needs to be worked out. This could be
embodied in a domain analysis tool which extracts domain characteristics and chooses an appropriate
planner / planner configuration

- Planner configuration generator, architectures for multiple planner configurations

- Ontology languages for typical application domains. Research into re-using abstract descriptions of
types of domains to act as templates for new domains

- knowledge acquisition tools and methodologies

- web infrastructure problems e g to do with the use of KES remotely

Particular Input from commerce/industrial partners

- example applications,

- technology trials, evaluation, feedback,

- knowledge of current technology, including related technologies and examples of the kinds of envi-
ronment into which PLANSERVE may be embedded.

- examples of ’conventional’ processes in which PLANSERVE would provide assistance.