

# Planning in a Complex Real Domain<sup>1</sup>

F. Ricci, A. Perini and P. Avesani,  
Istituto per la Ricerca Scientifica e Tecnologica  
38050 Povo (TN)  
Italy  
e.mail: {ricci,perini,avesani}@irst.it

## Abstract

Dimensions of complexity raised during the definition of a system aimed at supporting the planning of initial attack to forest fires are presented and discussed. The complexity deriving from the highly dynamic and unpredictable domain of forest fire, the one related to the individuation and integration of planning techniques suitable to this domain, the complexity of addressing the problem of taking into account the role of the user to be supported by the system and finally the complexity of an architecture able to integrate different subsystems. In particular we focus on the severe constraints to the definition of a planning approach posed by the fire fighting domain, constraints which cannot be satisfied completely by any of the current planning paradigms. We propose an approach based on the integration of skeletal planning and case based reasoning techniques with constraint reasoning. More specifically temporal constraints are used in two steps of the planning process: plan fitting and adaptation, and resource scheduling.

Work on the development of the system software architecture with a OOD methodology is in progress.

## Introduction

In this paper is described the current state of development of a system supporting the planning of initial attack to forest fires. This system is part of a decision support system aimed at supporting the user in the whole process of the forest fire management including both situation assessment and planning activities. One of the goal of this paper is to present and discuss some topics related to AI planning that we have rediscovered in studying the fire fighting domain. In fact our research starts from a deep analysis of the domain that we have pursued collecting information from many sources: manuals, books, regional laws and plans, interviews with firemen and responsible of anti-fire centres. The development of the system is still in an early phase. We have completed a first cycle of knowledge acquisition interviews and we have defined a complete functional architecture. We are addressing now the software architecture of the system. This architecture will be developed using the design methodology proposed by G. Booch [Booch 91] and with the aid of a software tools OSD, that implements faithfully the Booch methodology.

In a classical AI perspective there is a neat distinction of roles between the user and the planner: the user poses the goal, the environment sets the initial conditions and the planner finds out the solution. This simplified view