

State-Based Scheduling via Active Resource Solving

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Abstract—A mixed-initiative approach to activity planning for space mission operations was introduced in the Mars Exploration rover missions, and has been extended and adapted to other missions. The approach involves a collaboration between a human planner and automated tools that reason about activities and constraints. One important class of constraints arises from state requirements and effects. The mixed-initiative framework passively detects and reports constraint violations. At the user's request, it can also offer suggestions, obtained through

automated planning techniques, for actively fixing certain violations. Due to the need for a rapid response, active solving previously used a timeline insertion strategy that limited the types of violations that could be fixed, whereas the passive checking employed an encoding of the state constraints as resource constraints that identified all the violations. In this paper, we report on an extension of the active solver to handle resource problems, allowing a unification of the passive and active strategies.

Keywords—component; mixed-initiative planning; automation for flight and ground operations