

Tree-to-tree locomotion for forest operations

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Forest harvesting operations have been physically demanding and extremely dangerous, with forest workers on foot exposed to heavy and fast-moving trees, logs and machinery. Many tasks in forestry have already been mechanised to reduce hazards to the worker and increase productivity. For example, the axe was replaced by the chainsaw, which was replaced by the excavator based harvesting machine. However large machines can damage the sensitive forest soils and cannot work on steep terrain where many forest grow. This presentation will discuss, in our view, the next stage of forest machine development which uses the standing trees for support.

Animals have lived in the trees for millions of years and have developed behavioural, structural and physiological adaptations to the arboreal environment. Some animals move slowly from branch-to-branch like the stick insect. Others can move rapidly using brachiation, engaging in the arboreal equivalent of running through the forest moving from branch to branch. An opportunity exists to use this form of locomotion, although more slowly than gibbons, for the movement of forestry machinery. Our machine could always stay above ground moving from tree-to-tree using the trees for support. The machine would eliminate the problem of soil disturbance and would not be limited by terrain steepness.

Development of a real machine demonstrated that being independent of the ground makes operator control easier because the ground conditions (holes, rocks, loose soil) do not have to be adjusted for. Work is ongoing to develop a "forest-ready" prototype.

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