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Innovative bi-axial tracking mechanism for PV modules

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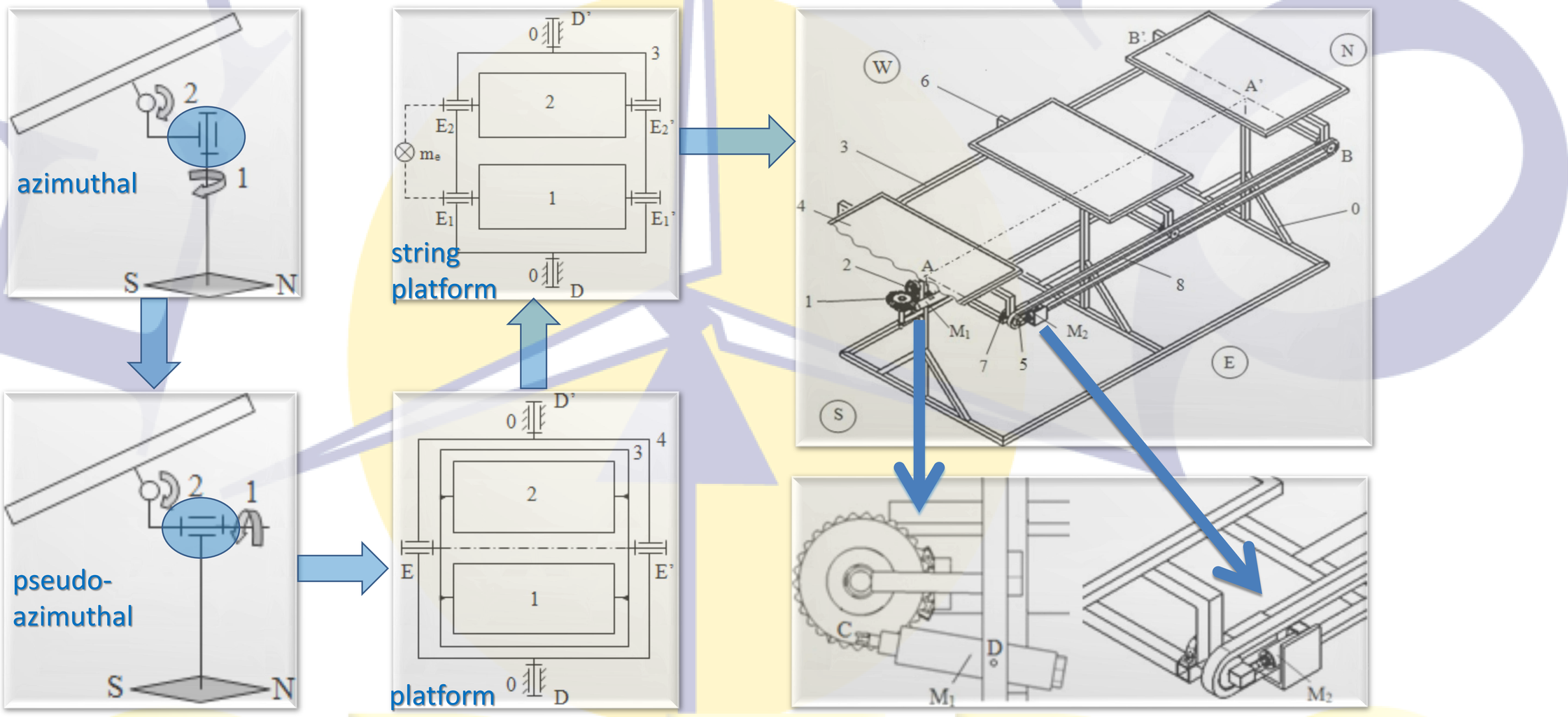
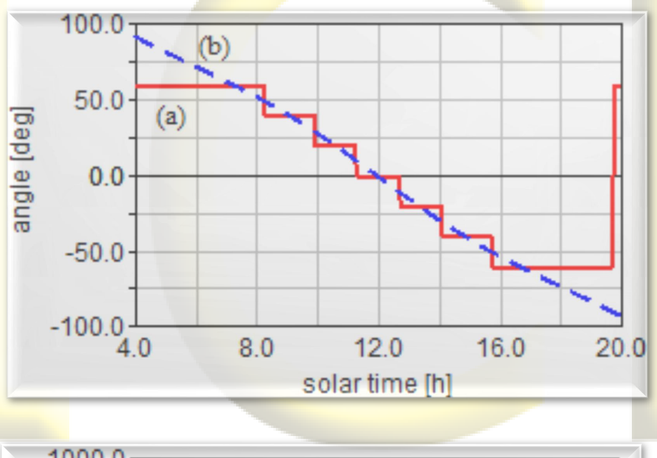
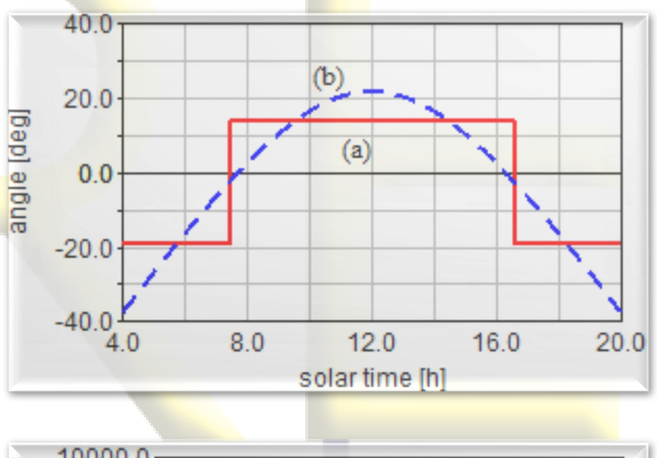
ABSTRACT. The paper deals with an innovative bi-axial tracking mechanism for a group of photovoltaic (PV) modules, which combines the features of the classical platform and string configurations. For the daily movement, the sun tracking is performed as in the case of a PV platform, while the elevation movement is transmitted similar to the case of a string of PV modules. The sun tracking is conducted by an open-loop control strategy, which was designed so that to capture as much as possible incident solar radiation with a minimum energy consumption. The modeling, simulation and optimization was performed by using the virtual prototyping package MSC.ADAMS.

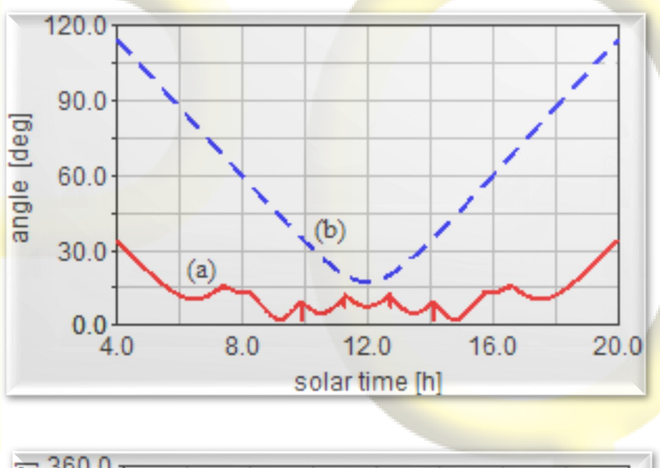
THE CONCEPT

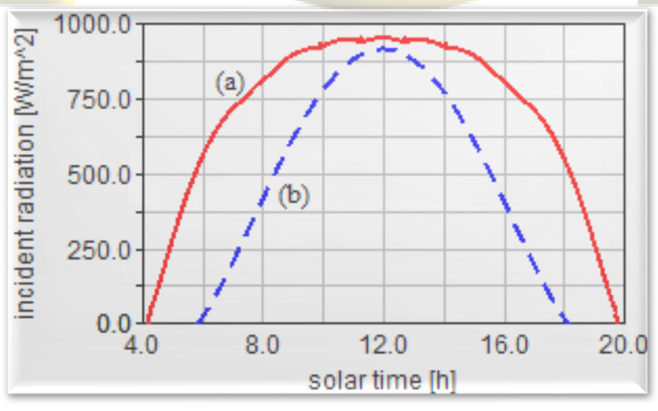


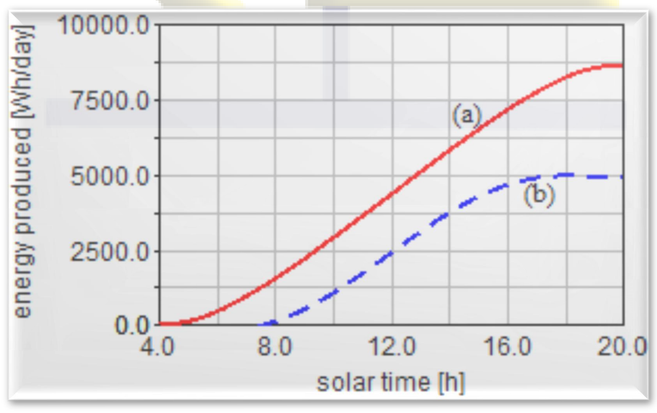
SIMULATION RESULTS

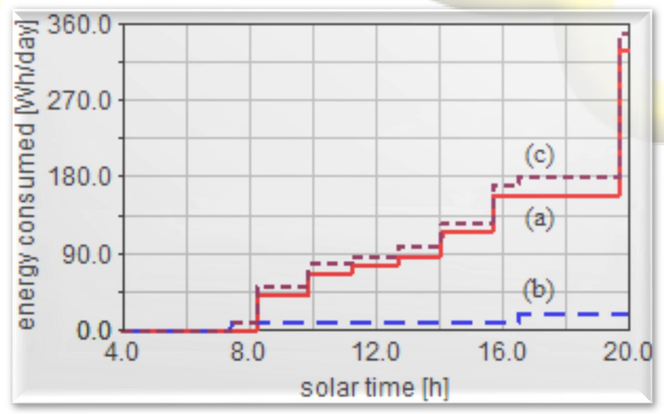












CONCLUSIONS

- possibility to orient medium and large platforms of strings of PV modules;
- reducing the cost of the system by minimizing the number of motor sources relative to the classical solution of individual modules;
- the gears interleaved in the daily and elevation movement subsystems act as stroke multipliers and power reducers, thus allowing to use low size/power actuators.