

Automatic Tracking Antenna System Design for Mobile Communications

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Abstract. Rapid development of various remotely controlled devices like UAVs, small satellites, remotely operated boats, etc., raised the demand for design of in-motion communication systems, capable of tracking moving targets. On the other hand, advances in antenna design and the development of highly pointed antenna arrays, is raising the requirements for accuracy and precision of such systems.

In this paper will be discussed the problems of in-motion communications and the design of automatic tracking antenna systems, several solutions will be presented and compared. In details will be discussed the closed-loop control of such systems, different sources of feedback signals and information needed for this control, methods of combining this information and their efficiency. Different methods for accurate position calculation will be presented and their precision and accuracy over time will be analyzed. Finally the role of the received signal strength as an input parameter of scanning algorithm will be discussed. A practical experiment as a method for studying all the previous mentioned issues will be also presented. The results will be discussed in parallel with the theoretical examinations of the problems. This paper is part of a broader study connected with the author's Ph.D. thesis with subject "Methods and Models for Control of Mobile Satellite Communications".