

## PERAN *ADAPTIVE TRAFFIC CONTROL SYSTEM* (ATCS) DALAM MENDUKUNG *SMART MOBILITY* DI KOTA SURAKARTA

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### INTISARI

Kota Surakarta dijangkiti dengan permasalahan kemacetan yang terkonsentrasi di persimpangan bersinyal. *Adaptive Traffic Control System* (ATCS) merefleksikan solusi *smart mobility* untuk menjaga kualitas sistem transportasi kota. Di sisi lain, *smart mobility* bukan hanya sebatas penyediaan dan integrasi TIK ke dalam sistem transportasi. Penelitian bertujuan untuk 1) Mengidentifikasi fitur dan teknologi yang terdapat dalam ATCS di Kota Surakarta, 2) Menganalisis gejala spasial dari pola distribusi APILL *demand responsive* di Kota Surakarta, 3) Menganalisis relevansi penyelenggaraan ATCS dalam mendukung *smart mobility* di Kota Surakarta, dan 4) Menganalisis kebutuhan pengembangan ATCS di Kota Surakarta.

Penelitian ini didasarkan pada pendekatan kualitatif dan kualitatif. Data primer diperoleh melalui observasi dan *in-depth interview* serta data sekunder diperoleh dari dokumentasi. Analisis relevansi penyelenggaraan ATCS dalam mendukung *smart mobility* dibingkai dari *Traffic Signal Management Plans* (2015) yang melibatkan aspek pengelolaan dan administrasi, desain, pengoperasian, dan pemeliharaan.

Hasil penelitian ini menunjukkan bahwa ATCS menghadirkan APILL *demand responsive* di persimpangan bersinyal dengan kemampuan adaptasi pengaturan waktu sinyal secara waktu nyata. Sebaran APILL *demand responsive* cenderung terkonsentrasi di sisi timur dan barat gerbang Kota Surakarta yang pelayanannya berkorelasi dengan jaringan jalan, simpul transportasi, pola ruang, dan pusat kegiatan. Penyelenggaraan ATCS mendukung *smart mobility* melalui ketersediaan dan integrasi TIK, koordinasi lalu lintas, otomasi, keamanan dan keselamatan, sistem informasi waktu nyata, dan konektivitas. ATCS di Kota Surakarta masih perlu pengembangan mengarah ke ITCS dengan memperhatikan aspek teknologi, manusia, dan kelembagaan.

Kata kunci: *ATCS*, *smart mobility*, pengaturan simpang bersinyal, APILL *demand responsive*, *Intelligent Transportation System*.

## **THE ROLE OF ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS) IN SUPPORTING SMART MOBILITY IN SURAKARTA CITY**

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### **ABSTRACT**

Plagued by congestion problems concentrated at signalized intersections, Adaptive Traffic Control System (ATCS) in Surakarta City reflects a smart mobility solution to maintain the quality of the city's transportation system. However, smart mobility is not only limited to the provision and integration of ICT into the transportation system. The study aims to 1) Identify the features and technologies within ATCS in Surakarta City, 2) Analyze the spatial phenomenon of the distribution pattern of demand responsive traffic lights in Surakarta City, 3) Analyze the relevance of ATCS implementation in supporting smart mobility in Surakarta City, and 4) Analyze the need for ATCS development in Surakarta City.

This study is based on qualitative and qualitative approaches. Primary data were obtained through observation and in-depth interviews and secondary data were obtained from documentation. The analysis of the relevance of ATCS implementation in supporting smart mobility is framed from Traffic Signal Management Plans (2015) which involves aspects of management and administration, design, operation, and maintenance.

The results of this study indicate that ATCS presents APILL demand responsive at signalized intersections with real-time signal timing adaptation capabilities. The distribution of demand responsive traffic lights tend to be concentrated on the east and west sides of the Surakarta City gate that are correlated with the road network, transportation nodes, spatial patterns, and activity centers. The implementation of ATCS supports smart mobility through the availability and integration of ICT, traffic coordination, automation, security and safety, real-time information systems, and connectivity. ATCS in Surakarta City still needs development towards ITCS by considering technological, human, and institutional aspects.

**Keywords:** ATCS, smart mobility, signalized intersection setting, APILL demand responsive, Intelligent Transportation System