

Preface

Recent terrorist attacks in France have shown that the Global War on Terrorism started after the September 11, 2001 attacks is far from being over. The security of US and EU citizens has been threatened by terrorists using multitude of ways including attacks by armed individuals, vehicles used as weapons or victim-operated Improvised Explosive Devices (IED). The reader of this book will be presented with advanced technologies used in practice to enable early recognition and tracking of various threats for national security.

Undeniably fast advances in development of sophisticated sensory devices, significant increase of computing power available to embedded designs and development of airborne and ground unmanned vehicles give almost unlimited possibilities to fight various types of pathologies affecting our societies.

The book shall address several innovative solutions and algorithms for tracking of moving objects in visual light as well as thermographic video streams and distinguishing objects from its surroundings under difficult field conditions. Visual and thermographic tracking and monitoring is often carried out by unmanned vehicles which equipped with intelligent algorithms become autonomous and automatically report about the place and conditions of detection of a potential security incident in complex multi-agent environments. Unmanned vehicles require control algorithms which must be carefully designed and properly tuned.

Present-day national security greatly benefits from available techniques of modeling and simulation used for training of security special forces as well as in analysis of past and possible security threats and incidents. The practical solutions may range from various types of calibration of DLP projectors through analysis of RF propagation under urban conditions to analysis of dynamics and kinematics of human arm.

Finally, the design of innovative control, tracking and monitoring algorithms most often require prior knowledge of dynamical characteristics of equipment being used in many different national security tasks carried out in extremely difficult field

conditions. From thermal characteristics of IMU modules and static tests of IED interrogation arm towards reducing the impact of IED on patrol vehicles used in war areas, one equipped in latest technology and algorithms becomes a strong opponent and hopefully the winner in the Global War on Terrorism.

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