



**University of Applied Sciences
Ravensburg-Weingarten**

Prof. Dr.-Ing. Holger Voos



Utah State University
Center for Self-Organizing and
Intelligent Systems

Prof. Dr. YangQuan Chen

Marc Baumann

2007

**Imager Development and Image Processing for Small
UAV-based Real-time Multispectral Remote Sensing**

Master Thesis

submitted to the University of Applied Sciences Ravensburg-Weingarten
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Mechatronics

Handed to

Prof. Dr.-Ing. Holger Voos
University of Applied Sciences Ravensburg-Weingarten

Prof. Dr. YangQuan Chen
Center for Self-Organizing and Intelligent Systems
Utah State University, Logan, Utah

Handed in by

Marc Baumann
Matr. Nr.: 17877

Master of Mechatronics

University of Applied Sciences Ravensburg-Weingarten
Sommer Semester 2007

Affidavit

I hereby declare that the following master thesis “Imager Development and Image Processing for Small UAV-based Real-time Multispectral Remote Sensing” is the result of my own work. It was conducted without any external help.

Furthermore, I confirm that no sources have been used for this thesis other than those clearly indicated in the list of references.

Logan, October 2007

Marc Baumann

Foreword

The work presented in this thesis has developed from scratch during my seven months stay at the Utah State University in the United States of America.

I particularly thank my academic teacher, Prof. Dr.-Ing. H. Voos and Prof. Dr. YangQuan Chen, for their constant support for the success of the work and the great confidence shown in me.

Moreover, I would like to thank all students of the Center for Self-Organizing and Intelligent System (CSOIS) particularly B.Sc. Austin Jensen, M.Sc. Haiyang Chao and M.Sc. Yongcan Cao, who helped me in all situations during my thesis research with deed and advice.

For the financial support, I want to thank the DAAD (Deutscher Akademischer Austausch Dienst), the Center for Self-Organizing and Intelligent System (CSOIS) and the Utah Water Research Laboratory (UWRL) MLF Seed Grant (2006-2007) on “Development of Inexpensive UAV Capability for High-Resolution Remote Sensing of Land Surface Hydrologic Process: Evapotranspiration and Soil Moisture.” I also want to thank Professor Raymond L. Cartee for providing the Utah State University farm at Cache Junction as the UAV flight test field and Dr. Roger Hansen for allowing us to test in Desert Lake.

Furthermore, I want to thank Austin, Katie and Bryker Jensen as well as Coco for their help and the nice time I spent with them.

Finally, this work is dedicated to my parents who made my studies possible as well as my girlfriend Felicitas Koch who supported me during my stay in the United States of America.

It's done.

Logan, October 2007

Marc Baumann

Abstract

This study deals with low-cost light-weight camera systems for UAVs to acquire images in the RGB and NIR-bands to calculate the NDVI-index.

This thesis documents a basic μ C-board developed which allows to trigger multiple cameras with an adjustable triggering rate and another advanced board that interfaces with several sensors to store each acquired image as well as its position, orientation and altitude.

Furthermore, a Matlab tool is developed to generate based on image position, orientation and altitude, World-Files to georeference all acquired images.

Finally, three options (feature based stitching, feature based GEO-reference and georeferenced images based on World Files) to mosaic images are briefly introduced. The multispectral geomapping results are shown based on some real flight tests.

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