Title	New technique to take a high-resolution picture of the earth at night from a small satellite
Sub Title	
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Publisher	慶應義塾大学大学院システムデザイン・マネジメント研究科
Publication year	2017
Jtitle	
Abstract	
Notes	
Genre	Thesis or Dissertation
URL	http://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=K040002001-00002017-0016

New Technique to Take a High-Resolution Picture of the Earth at Night from a Small Satellite

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September 2017

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SUMMARY OF MASTER'S DISSERTATION

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Title

New Technique to Take a High-Resolution Picture of the Earth at Night from a Small Satellite

Abstract

Nowadays, developing small satellite (as micro satellite or nano satellite) to take pictures of Earth has become popular in observation satellite technology, because of its advantages (low cost and short development time). Thanks to the picture taken from satellite, there are a lot of application such as manage resources, monitor weather or disaster.

Typical observation satellite using visible camera capture picture of ground based on the reflection of sunlight so it is only available during daylight. There are some technologies using an infrared camera or Synthetic-aperture radar for satellite to take pictures at night. However, the pictures from both technologies do not contain natural color information. In this research, by applying a super high sensitivity camera, satellite can get pictures not only in day but also in night time base on the reflection of moonlight. So that, we can increase the time taking picture of earth by visible camera. However, taking a ground picture at night from LEO satellite in low light condition (less moon) at night, cause motion blur for the picture. The research will estimate the effect of motion blur for the picture taken by super high sensitivity camera on orbit for monitoring accident ship on the ocean and disaster at night. The experiments will be conducted to create motion blur pictures as the pictures taken by satellite using super high sensitive camera. These motion blur pictures are de-blurred by using digital signal processing and the results will be used to estimate the performance and feasibility of applying a super high sensitive camera for Earth Observation.

Key Word (5 words): Observation Satellite, Micro Satellite, Super high sensitive camera, motion blur, Earth Observation.