

## ***Interactive comment on “PHOCUS radiometer” by O. Nyström et al.***

### **Anonymous Referee #1**

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#### Introduction:

The paper presents the scientific justification, design concept and implementation of an unusual millimetre/submillimetre wave Earth observation radiometer. The authors clearly describe the instrumentation requirements and the need to comply with a demanding operational environment. Faced with a constrained payload capacity, a novel design approach has been taken towards providing instrument calibration. Although this encountered some operational issues during the first instrument flight, and which the authors report, it has provided a demonstration of the technique, and subsequent analysis offers a plan for enhancement. Rather pleasingly, and impressively, the instrument gathered data on its maiden flight. A good achievement and one that I feel is of interest to the community and meets the objectives of the AMT journal.

Overall, I think that the paper is well written, though there are some improvements to

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the text that should be made, and nicely describes a rare experiment in rocket borne observation. I believe that the work will be of interest to others and that its publication is both reasonable and justifiable.

#### Specific Comments:

##### Abstract

Define acronyms FFTS, IF and CW.

##### Section 1.1

Why does altitude control matter? Please explain.

##### Section 2.1

The sentence beginning “Approximately 2m above...” could be better structured.

The same comment applies to the sentence “During the observation...”

##### Section 2.2

Define DC and RF.

##### Section 2.2

Define LNA.

##### Section 4

The first sentence of the first paragraph requires revision.

I am surprised that the instrumentation was seemingly not tested under representative thermal and vacuum conditions prior to flight. Doing so may have revealed the temperature rise problem encountered during flight. Was there a reason for this?

The authors have performed post flight instrumentation analysis and have seemingly determined reasons for the unexpected thermal deviation. Will this be checked in a

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representative environment?

Section 6:

I am a bit unclear as to why the feedhorn design should have been singled out for especial treatment, particularly as the design concept is well known and previously demonstrated. A more unusual optimisation approach has been taken and measured pattern performance is interesting, so this might be sufficient justification for its retention. However, no mention is made of the effects of the signal window on the beam pattern and calibration of the instrument. Are there any effects that would influence the scientific data?

Typing errors:

There are a number of areas of the text that require adjustment. Mostly these are minor, but I would advise that the authors seek the support of a native English speaker.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 271, 2012.