

Onboard Orientation Software

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This is an abstract **Complete this summary at the end of the paper**

I. THEORY

For theory, see section **Relevant Mathematics**
Jannik legger in kilde

II. INTRODUCTION

As there is no up or down in space we will have to create our own way of navigating the cosmos. For this purpose we have made software capable of orientation in space. It will be able to calculate the angular orientation, find the velocity and get the position of the spacecraft.

III. METHOD

A satellite is orbiting our home planet and has taken a $360^\circ \times 360^\circ$ picture of the entire sky where all positions are described using spherical coordinates. As the stars and galaxies are very far away we are going to assume the pictures look the same from the perspective of our shuttle. Using this picture we can create a stereographic projection as a means to convert from spherical coordinates to planar coordinates. Comparing the picture taken from a camera at on the shuttle we can find our orientation. To relate the spherical coordinates θ, ϕ

IV. RESULTS

V. DISCUSSION

VI. CONCLUSION

VII. APPENDIX: MATHEMATICAL DERIVATIONS

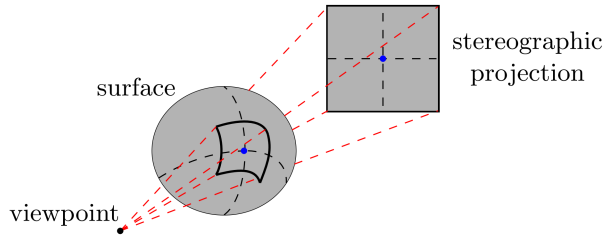


Figure 1. Illustration of stereographic projection

to the planar coordinates X, Y we use the following equations **Husk å ta med utledning** :

$$X = \kappa \sin \theta \sin(\phi - \phi_0) \quad (1)$$

$$Y = \kappa(\sin \theta_0 \cos \theta - \cos \theta_0 \sin \theta \cos(\phi - \phi_0)) \quad (2)$$