ACKNOWLEDGMENTS

The work presented here would not be possible with the contributions of many individuals and organizations. Without these individuals and organizations I would not have been able to partake in this education journey through optics and atmospheric science. I would like to thank the Institute for Space and Atmospheric Studies, the University of Saskatchewan, the Natural Sciences and Engineering Research Council, the Centre National d'Etudes Spatiales, and the Canadian Space Agency for their financial support.

Members of my research team have been monumental to assisting in the completion of this project. Thanks to Paul Loewen for building and testing the electronics for ALI; Seth Dueck creating the polarized version of SASKTRAN-HR as well as the guidance given using the polarized model; Landon Rieger for help and advice in using the retrieval package; Dr. Nick Lloyd for his assistance in the designing and testing of the flight software; and Dr. Douglas Degenstein for overall advice and knowledge during the project.

To my supervisor, Dr. Adam Bourassa, I would extend a sincere thanks for the wonderful opportunity to work alongside him in this endeavor. Without his guidance, knowledge, and enthusiasm this project would not be what it became.

Finally, I would like to thanks my family and friends for their support throughout this work