AIRS/AMSU/HSB Version 4.0 FORTRAN and C Data Readers for Level 1B and Level 2 Data Products

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March, 2005
Version 1.0

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Introduction

The Version 4.0 User Guide provides sample readers in IDL (Interactive Data Language by Research Systems, Inc) and MATLAB (by MathWorks, Inc) languages for the Level 1B and Level 2 Standard AIRS Products (swath file format).

V4.0_Data_Release_UG.pdf

This document provides sample readers in FORTRAN and C for users who do not have access to IDL and MATLAB. Since building programs incorporating these readers is more complex than when using IDL and MATLAB, we also provide examples showing use of these readers and sample output.

The user community must realize that the AIRS Project does not have the resources to support consultation on these readers. They are being provided as an aid to give the user community a leg up in using the data. There is no commitment to provide assistance to the broad user community beyond the release of these readers and samples showing their usage.

The readers are one-call modules that read an entire granule into memory. The six data products for which readers are provided are:

- L1B AMSU-A Brightness Temperature Product
- L1B HSB Brightness Temperature Product
- L1B Visible/Near Infrared Radiance Product
- L1B AIRS Infrared Radiance Product
- L2 Standard Product
- L2 Cloud-Cleared AIRS Infrared Radiance Product

We also provide two useful utilities. One reads the AIRS channel properties files and the other provides access to and a report on the L1B AIRS IR Radiance Product QC parameters.

A script file to create the executables, “makeall” is included. This script file requires that HDFEOS v2.11v1.00 or later is installed, which in turn requires versions of HDF, HDF5, and SZIP. See the header of "makeall" for details. HDF-EOS can be obtained through the URL:

http://hdfeos.gsfc.nasa.gov/hdfeos/index.cfm

All programs except chan_props_rdr_test will print out a usage message if executed with no arguments.

Reader Modules

The parts of the reader modules for the various AIRS Products as well as their corresponding sample drivers and outputs are identified in Tables 1 and 2.

AMSU/HSB/VIS L1B PRODUCT	Calibrated Visible/NIR Radiances	Calibrated AMSU-A Brightness_Temps	Calibrated HSB Brightness_Temps
SHORTNAME	**AIRVBRAD**	**AIRABRAD**	**AIRHBRAD**
C Header	vnir_rad.h	amsua_bt.h	hsb_bt.h
C Reader	vnir_rad_rdr.c	amsua_bt_rdr.c	hsb_bt_rdr.c
C Sample Driver	extract_vnir.c	extract_amsua.c	extract_hsb.c
C Sample Output	vnir_spot.text	amsua_spot.text	hsb_spot.text
FORTRAN Header	vnir_rad.inc	amsua_bt.inc	hsb_bt.inc
FORTRAN Reader	vnir_rad_rdr.f	amsua_bt_rdr.f	hsb_bt_rdr.f
FORTRAN Sample Driver	N/A	N/A	N/A

Table 1: Modules that are part of the Level 1B Radiance Product readers

AIRS L1B/L2 PRODUCT	Calibrated IR Radiances	Cloud-cleared IR Radiances	AIRS Standard Retrieval
SHORTNAME	**AIRIBRAD**	**AIRI2CCF**	**AIX2RET**
C Header	airs_rad.h	airs_cc_rad.h	airs_ret.h
C Reader	airs_rad_rdr.h	airs_cc_rad_rdr.c	airs_ret_rdr.c
C Sample Driver	extract_spectrum.c	extract_cc_spectrum.c	extract_profile.c
C Sample Output	spectrum.text	cc_spectrum.text	profile.text
FORTRAN Header	airs_rad.inc	airs_cc_rad.inc	airs_ret.inc
FORTRAN Reader	airs_rad_rdr.f	airs_cc_rad_rdr.f	airs_ret_rdr.f
FORTRAN Sample Driver	N/A	N/A	get_profile.f
FORTRAN Sample Output	N/A	N/A	get_profile.text

Table 2: Modules that are part of the Level 2 Product readers

AIRS L1B QC and Channel Properties Utilities

The parts of the modules that access and report the AIRS L1B Product QC parameters and AIRS channel properties files are identified in Table 3.

Utility Modules	L1B IR Radiance QC Utility	AIRS Channel Properties File Reader
C Header	N/A	airs_chan_props.h
C Support Modules	N/A	select_chan_props.c read_chan_props.c
C Driver	airs_rdr_test.c	chan_props_rdr_test.c
C Sample Output	airs_rdr_test.text	cpr.txt
Input Files Used	N/A	L2.chan_prop.2002.08.30.v8.1.0.anc L2.chan_prop.2002.09.17.v8.1.0.anc L2.chan_prop.2002.10.22.v8.1.0.anc L2.chan_prop.2003.01.10.v8.1.0.anc L2.chan_prop.2003.11.19.v8.1.0.anc

Table 3: Basic utilities for the user

How to Use Sample Programs

extract_amsua extracts a single profile from a specified input file to stdout. It requires exactly three arguments:

1) scan line number [1, 45]
2) field-of-view number [1, 30]
3) file name

extract_hsb extracts a single profile from a specified input file to stdout. It requires exactly three arguments:

1) scan line number [1, 135]
2) field-of-view number [1, 90]
3) file name

extract_vnir extracts a single profile from a specified input file to stdout. It requires exactly three arguments:

1) scan line number [1, 135]
2) field-of-view number [1, 90]
3) file name

extract_spectrum extracts a single spectrum from a specified input file to stdout. It requires exactly three arguments:
1) scan line number [1, 135]
2) field-of-view number [1, 90]
3) file name

extract_cc_spectrum extracts a single spectrum from a specified input file to stdout. It requires exactly three arguments:
1) scan line number [1, 135]
2) field-of-view number [1, 90]
3) file name

extract_profile extracts a single profile from a specified input file to stdout. It requires exactly three arguments:
1) scan line number [1, 45]
2) field-of-view number [1, 30]
3) file name

get_profile extracts a single profile from a specified input file to the screen. It requires exactly three arguments:
1) scan line number [1, 45]
2) field-of-view number [1, 30]
3) file name

airs_rdr_test evaluates the quality of data in an AIRS Level-1B file. It requires exactly one argument: the name of the file. An optional second argument gives the path from which to read channel properties files.

ch_props_rdr_test selects the proper channel properties file in the path defined within the driver based on the date.