



HF Radar Clutter Boundary Version Description



UPOS-A53-16

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Version 1.0

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1. INTRODUCTION

1.1 Overview

The primary purpose of the HF-Radar Communication/Propagation software is to provide to AFWA an ASCII data file containing information about the location of the Clutter Boundary and the capability to read this data file. The HF-Radar Communications/Propagation Clutter Boundary project provides a real-time determination of where high latitude ionospheric clutter is likely to be present. It determines the location using real-time data from the SuperDARN radars. The Clutter Boundary is determined directly from the measurement of convection velocity and backscattered power in the input radar data.

1.2 System Overview

The system architecture is based on software that is currently used for similar purposes at JHU/APL. Figure 1 shows a diagram of the architecture and data flow.

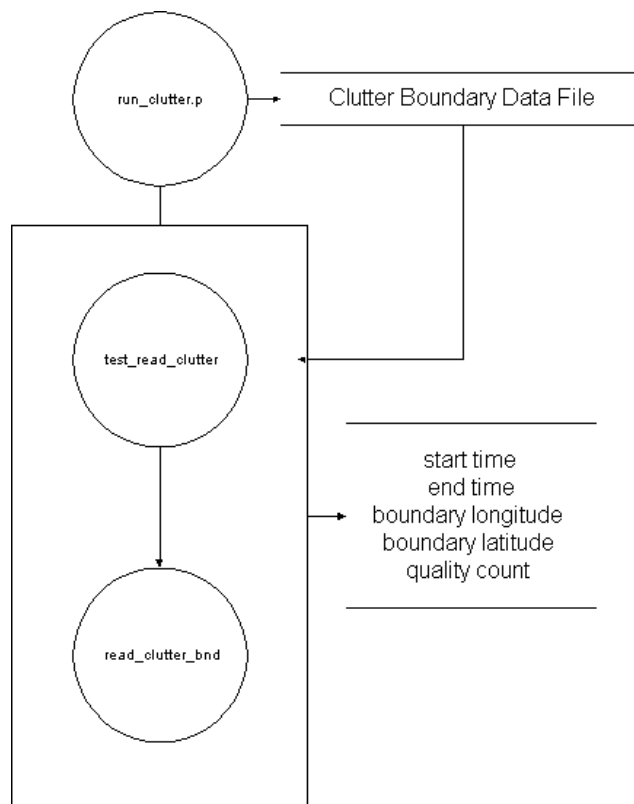


Figure 1. Architecture and Data Flow, HF-Radar Communication/Propagation Software System

The software (read_clutter_bnd.c) reads the clutter boundary data from the specified file and returns a pointer to a data structure containing the Clutter boundary information. Listed below is the format of the data structure returned:

File Type	Name	Description
time_t	st, et	Start and end times
int	nsegs	Number of segments
double	lon	Starting lon position of segment
double	lat	Starting lat position of segment
double	quality	Quality flag for segment

The test procedure (test_read_clutter.c) dumps to the screen the contents of the data structure containing the latest Clutter Boundary information. The following results are output to the screen:

- start time
- end time
- boundary longitude
- boundary latitude
- quality count

The executive script (run_clutter.p) serves as the driver and coordinates the execution of the process described above.

1.3 Document Overview

Section 1 describes the scope of the HF-Radar Communication/Propagation software system.

Section 2 lists Referenced Documents.

Section 3 provides a detailed description of the contents of Version 1.0 of the HF-Radar Communication/Propagation software system.

2. Referenced Documents

Baker, K.B., and S. Wing, A new magnetic coordinate system for conjugate studies at high latitudes, *J. Geophys. Res.*, 94(A7), 9139-9144, 1989.

Heppner, J.P., and N.C.Maynard, Empirical high-latitude electric field models, *J. Geophys. Res.*, 92, 4467, 1987.

Walker, A.D.M., R.A. Greenwald, and K.B. Baker, Determination of the fluctuation level of ionospheric irregularities from radar backscatter measurements, *Radio Sci.*, 22, 689-705, 1987.

3. Version Description

3.1 Inventory of Materials Released

The HF-Radar Communication/Propagation software system is being released on a single 4mm DAT tape labeled Operational UNIX HF-Radar Communication/Propagation software system Version 1.0.

The documentation that supports this version is listed below and has been delivered prior to installation of the system.

- HF-Radar Communication/Propagation Functional Requirements Document, UPOS-A53-13, Version 1.0, L. M. Hasselbarth, 06 July 2001
- HF-Radar Communication/Propagation Test Plan, UPOS-A53-15, Version 1.0, L.M. Hasselbarth, 06 July 2001
- HF-Radar Communication/Propagation Test Report, , Version 1.0, L. P. Butler, TBD
- HF-Radar Communication/Propagation User's Guide, UPOS-A53-14, Version 1.0, L. M. Hasselbarth, 06 July 2001
- HF-Radar Communication/Propagation Support Plan, UPOS-A53-17, Version 1.0, L. M. Hasselbarth, 06 July 2001
- HF-Radar Communication/Propagation Version Description, UPOS-A53-16, Version 1.0, L. M. Hasselbarth 06 July 2001

3.2 Inventory of Software Components

Appendix B contains the complete list of directories and files being delivered as Version 1.0 of the HF-Radar Communication/Propagation software system.

3.3 Changes Installed

This is the initial delivery of the software system.

3.4 Related Documents

All documents pertinent to Version 1.0 of the HF-Radar Communication/Propagation software system are included in the release.

3.5 Install Instructions

A UNIX system administrator will need to be available to monitor the installation and the acceptance testing for the UNIX version of the HF-Radar Communication/Propagation software system. The UNIX installation script is below.

```
#!/software/bin/perl
#
# Name: CLUTTER_install.pl
#
# Description: Script for installing Read Clutter software
#
#
# Author: L. Hasselbarth
# Date: 05/01
#
#####
# MAKE READ_CLUTTER
#
system("cd src;make -f makefile");
#
# REMOVE OBJECT FILES
#
system("rm src/*.o");
```

APPENDIXES

A. Acronyms and Abbreviations

Acronym	Definition
AACGM	Attitude Adjusted Corrected Geomagnetic
AFCCC	Air Force Combat Climatology Center
AFOSR	Air Force Office of Scientific Research
AFRL	Air Force Research Laboratory
AFSCN	Air Force Satellite Control Network
AFSPACECOM	Air Force Space Command
AFSWC	Air Force Space Weather Center
AFWA	Air Force Weather Agency
AFWIN	Air Force Weather Information Network
AF/XOW	Air Force Director of Weather
APL	Applied Physics Laboratory of Johns Hopkins University
ASCII	American Standard Code for Information Interchange
ASPAM	Atmospheric Slant Path Analysis Model
AVHRR	Advanced Very High Resolution Radiometer
AVN	Aviation Model
AVO	Alaska Volcano Observatory
BATS	Biosphere-Atmosphere Transfer Scheme
CLASS	Canadian Land Surface Scheme
COE	Common Operating Environment
DII	Defense Information Infrastructure
DMSP	Defense Meteorological Satellite Program
ECMWF	European Center for Medium-Range Weather Forecasts
FNMOC	Fleet Numerical Meteorology and Oceanography Center
FSL	Forecast Systems Laboratory
FTP	File Transfer Protocol
GI	Geophysical Institute
GIF	Graphic Interchange Format
GMT	Generic Mapping Tools
GOLD	Geophysical On-Line Data
GRIB	Gridded Binary
HLBL	High Latitude Boundary Layer
IDL	Interactive Data Language
IMF	Interplanetary Magnetic Field
JHU	Johns Hopkins University
LAN	Local Area Network

LAPS	Local Analysis and Prediction System
LSM	Land Surface Model
MM5	Fifth Generation Mesoscale Model
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
netCDF	Network Common Data Form
NGDC	National Geophysical Data Center
NGM	Nested Grid Forecast Model
NOGAPS	Navy Operational Global Atmospheric Prediction System
NWP	Numerical Weather Prediction
OWS	Operational Weather Squadron
PACE	Polar Anglo-American Conjugate Experiment
PBL	Planetary Boundary Layer
PCA	Polar Cap Absorption
PFRR	Poker Flat Research Range
SABER	Sounding of the Atmosphere using Broadband Emission Radiometry
SD	Space Department of the Applied Physics Laboratory
SDP	Software Development Plan
SEC	Space Environment Center
SEE	Solar EUV Experiment
SEON	Solar Electro-optical Observing Network
SFOC	Spaceflight Operations Center
STP	Solar Terrestrial Physics
SWOC	Space Weather Operations Center (Offutt)
SWXS	Space Weather Squadron
Tcl	Tool Command Language
Tk	Toolkit
Tix	Tk Interface Extension
UAF	University of Alaska, Fairbanks
UCAR	University Corporation for Atmospheric Research
UPOS	University Partnering for Operational Support
WDC	World Data Center
WF	Weather Flight
WMO	World Meteorological Organization
XDR	External Data Representation

B. Inventory of Software Contents of Version 1.0

UNIX SOFTWARE

Directory /project/upos/dev/clutter			
bin	1024	scripts	1024
data	1024	src	1024
Total of 4 files, 4096 bytes.			
Directory /project/upos/dev/clutter/scripts			
run_clutter.p	5814		
Total of 1 files, 5814 bytes.			
Directory /project/upos/dev/clutter/src			
clutter_bnd.h	1168	read_clutter_bnd.c	11248
control.txt	72	read_clutter_bnd.h	2086
makefile	854	test_read_clutter.c	2600
Total of 6 files, 18028 bytes.			
Grand total of 4 directories, 7 files, 27938MB.			