CDR User's Manual

2.0

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Introduction

CDR (Constant Data Recording) is implemented on modern terminal air traffic systems and is therefore a viable source of radar and interfacility data for FIRS scenarios. FIRS software includes utilities to extract this data from ARTS IIIA, ARTS IIIE, and STARS CDR.

ARTS IIIA CDR

Description

ARTS IIIA CDR is recorded on 5.25 inch magneto-optical media and is often transferred to inexpensive Iomega Zip disks for storage or shipping. An MS-DOS filesystem format is used on both media types. The original magneto-optical media usually contains multiple partitions, some of which may not contain CDR data. Data is stored on the partitions in files with names rc_file**n.**cdr, where **n** is an integer of one or greater.

One of these files is mounted as a virtual ARTS IIIA filesystem where data can be extracted from the cdr file present on the virtual filesystem. The cdr3a utility is used to extract radar surveillance data from the cdr file. The if3a utility is used to extract flight plans from the cdr file. The flight plans can then be used with a Host object in FIRS scenario to send flight plans to a Terminal air traffic system. See the section on Creating FIRS Scenarios for more information.

cdr3a Usage

The cdr3a utility creates a radar surveillance file by extracting radar data messages from the cdr file on the ARTS IIIA filesystem. Many ARTS IIIA sites support multiple sensors, so the user can specify for which sensor to extract data. The following are command line options for cdr3a with descriptions:

cdr3a cdrfile [**outfile**] [**-f**] [**-h history file**] [**-t start time**] [**-l length**]

- **outfile** is the name of the surveillance output file. Default is standard out.
- **-f** instructs cdr3a to use the timestamps in the cdrfile for the surveillance file instead of starting at 00:00:00.
- **-h history file** specifies the name of the history file to use.
- **-t start time** specifies the beginning start time to use for the surveillance file.
- **-l length** specifies the duration in HH:MM:SS of the surveillance file.

if3a Usage

The if3a utility prints interfacility flight plan messages to the screen by extracting interfacility data messages from the cdr file on the ARTS IIIA filesystem. The following are command line options for if3a with descriptions:

if3a cdrfile [**outfile**] [**-t**] [**-b blocksize**] [**-m magic offset**]

- **outfile** is the name of the interfacility output file. Default is standard out.
- **-t**

- **-b blocksize** specify the blocksize to use.
- **-m magic offset** specify the magic offset value.

Extraction Procedures

- Mount the media containing the rc_file on the FIRS workstation.

  5.25 Magneto optical

  ```
  cdrtool % mount -t msdos /dev/sda1 /mnt
  ```

  IDE Zip Disk

  ```
  cdrtool % mount -t msdos /dev/hdd1 /mnt
  ```

- Ensure that the ARTS IIIA filesystem module is loaded.

  ```
  cdrtool % insmod arts3afs
  ```

- Ensure that loop device support is build into the kernel or the associated module is loaded.

  ```
  cdrtool % insmod loop
  ```

- Mount the ARTS IIIA virtual filesystem.

  ```
  cdrtool % mount -o loop -t arts3afs /mnt/rc_file1.cdr /mnt2
  ```

- Extract the surveillance data.

  ```
  cdrtool % cdr3a /mnt2/cdr sensor0.srv
  ```

- Extract the interfacility data.

  ```
  cdrtool % if3a /mnt2/cdr fplans.fp
  ```

- Unmount the filesystems.

  ```
  cdrtool % umount /mnt2
  cdrtool % umount /mnt
  ```

ARTS IIIE CDR

Description

ARTS IIIE CDR is recorded on either 5.25 inch magneto-optical or Castlewood Orb media. A Lynx filesystem format is used on both media types. The CDR disk, which contains a file named *cdr_data.cdr*, is mounted directly on a FIRS workstation. The cdr605 utility is used to extract radar surveillance data from the cdr file. The if605 utility is used to extract flight plans from the cdr file. The flight plans can then be used with a Host object in FIRS scenario to send flight plans to a Terminal air traffic system. See the section on Scenario Creation for more information.

cdr605 Usage

The cdr605 utility creates a radar surveillance file by extracting radar data messages from the cdr file on the Lynx filesystem. ARTS IIIE sites support multiple sensors, so the user can specify for which sensor to extract data. The following are command line options for cdr605 with descriptions:

cdr605 cdrfile [**outfile**] [**-p**] [**-d**] [**-q**] [**-h history file**] [**-t start time**] [**-l length**] [**-s sensor**] [**-m mode**] [**-c channels**]

- **outfile** is the name of the surveillance output file. Default is stdout.
- **-p** instructs cdr605 to operate in pcarts mode.
- **-d** operate in debug mode.
- **-q** operate in quiet mode.
- **-h history file** specifies the history file to use.
- **-t start time** specifies the beginning start time to use for the surveillance file.
- **-l length** specifies the duration for the output surveillance file.
- **-s sensor** specifies the sensor (radar) for which to extract data.
- **-m mode** specifies which mode.
- **-c channels** specifies how many channels to use for the output surveillance file.

if605 Usage

The if605 utility prints interfacility flight plan messages to the screen by extracting interfacility data messages from the cdr file on the Lynx filesystem. The following are command line options for if605 with descriptions :

if605 cdrfile [**outfile**] [**-f**] [**-h history file**] [**-t start time**] [**-l length**]

- **outfile** is the name of the interfacility output file. Default is standard out.
- **-f** instructs if605 to use timestamps from the cdr file.
- **-h history file** specifies the history file to use.
- **-t start time** specifies the beginning timestamp to use in the output file.
- **-l length** specifies the duration of the output file.

Extraction Procedures

- Ensure that the Lynx filesystem module is loaded.
  ```
  cdrtool % insmod lynxfs
  ```

- Mount the CDR media on the FIRS workstation.
  5.25 Magneto optical
  ```
  cdrtool % mount -t lynxfs /dev/sda1 /mnt
  ```

  IDE Orb Disk
  ```
  cdrtool % mount -t lynxfs /dev/hdd1 /mnt
  ```

- Extract the surveillance data.
  ```
  cdrtool % cdr605 /mnt/cdr_data.cdr sensor0.srv
  ```

- Extract the interfacility data.
  ```
  cdrtool % if605 /mnt/cdr_data.cdr > fplans.fp
  ```

- Unmount the filesystem.
  ```
  cdrtool % umount /mnt
  ```

STARS CDR

Description

STARS CDR is recorded on DLT (Digital Linear Tap). The CDR DLT tape contains recorded radar and interfacility messages. The radar messages can be extracted with the starscdr utility. See the section on Scenario Creation for more information.

starscdr Usage

The starscdr utility creates a radar surveillance file by extracting radar data messages from the DLT tape. STARS sites support multiple sensors, so the user can specify for which sensor to extract data. The following are command line options for starscdr with descriptions:

starscdr cdrfile [**-s surveillance file**] [**-w weather file**] [**-r radar**] [**-e exercise**] [**-t start time**] [**-f end time**]

- **-s surveillance file** specifies the name of the surveillance file to create.
- **-w weather file** specifies the name of the weather file to create.
- **-r radar** specifies for which radar to extract data.
- **-e exercise** specifies for which exercise to extract data.
- **-t start time** specifies where to begin extracting data.
- **-f end time** specifies where to stop extracting data.

Extraction Procedures

- Insert the CDR tape into the tape DLT drive on the FIRS workstation.

- Extract the surveillance data.

```
cdrtool % starscdr /dev/st0 sensor0.srv
```

ADSB CDR

Description

ARTS IIIE CDR is recorded on either 5.25 inch magneto-optical or Castlewood Orb media. A Lynx filesystem format is used on both media types. The CDR disk, which contains a file named *cdr_data.cdr*, is mounted directly on a FIRS workstation. The adsb605 utility is used to extract ADSB asterix data from the cdr file. See the section on Scenario Creation for more information.

Adsb605 Usage

The adsb605 utility creates an asterix file by extracting ADSB data messages from the cdr file on the Lynx filesystem. ARTS IIIE sites support multiple sensors, so the user can specify for which sensor to extract data. The following are command line options for cdr605 with descriptions:

adsb605 cdrfile [**outfile**] [**-i sic -a sac -p pos**] [**-c**] [**-d**] [**-q**] [**-u**] [**-h history file**] [**-t start time**] [**-l length**] [**-m num_msgs**]

- default outfile are separate files for each GBT in local dir
- default histfile is NULL
- default starttime = 00:00:00
- default length is to file EOF. Length specified as hh:mm:ss
- **-i** sic
- **-a** sac
- **-p** position
- **-c** pcarts mode
- **-q** quiet mode
- **-d** debug mode
- **-m** drop n of first msgs
- **-u** allow unknown msgs

Example:
adsbcdr cdr_data -i 5 -a 3 -p 39:26:58:08,-74:34:00.7l -i 6 -a 3 -p 39:26:58:08,-74:34:00.7l -u

Sector Mark Timing

Background

Sector marks are messages transmitted by an ASR-9 or ASR-11 radars for the purpose of determining radar quality and timing. These messages are recorded in CDR, however the precision of the timestamps in CDR is usually insufficient to provide good sector mark timing. This often times affects SCIPs. It is suggested that the smqual utility be used on these surveillance files created by any of the CDR utilities to determine the quality of the sector mark timing. If smqual reports any timing problems, it is suggested that the smfix utility be used to correct these problems.

smqual and smfix Usage

- Check for sector mark timing problems.
  ```
  cdrtool % smqual er9.srv
  ```
- Correct sector mark timing problems.
  ```
  cdrtool % smfix er9.srv new.srv
  ```

Scenario Creation

Once surveillance and interfacility file have been created by one of the cdr extraction tools, a FIRS script must be created to use them. The following are common FIRS objects used with the extracted data. See the corresponding sections in the FIRS manual for more information on object usage.

Viewing (Qars)

Qars sen0 -srv sensor0.srv

Radar Playback (RadarSim)

RadarSim sen0 -srv sensor0.srv -dev /dev/srr0

Interfacility Playback (Host)

Host zcy -artsid acy-srv sensor0.srv -dev /dev/if0 -fp fplan.fp