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# 7.1 Getting started with radR: playing back WinHorizon ".rec" files

## DOWNLOAD

1. Download radR from http://discovery.acadiau.ca/radR/
2. Open download in containing folder
   - Right click on the "radRstablewindows_2010_11_04.zip" (or newer version) file
   - Select *Open With* and then *Compressed (zipped) folders*
   - Select *Extract all files* from left pane (you may have to de-select *folders* on the top pane)
   - Specify in the extraction a folder where you will put both the radR download and the R download
3. Download R from http://cran.r-project.org/bin/windows/base/
   - Right click on the "R-2.5.1-win32.exe" (or newer version) file
   - Select *Open With* and then *Compressed (zipped) folders*
   - Select *Extract all files* from pane on left
   - Select the extraction folder to be the same on where you extracted radR to
4. Put both in the same folder
   - Make sure the "R.[version].exe" is in the same folder as radR's "radR.[version].bat" file

## OPENING radR/SETTING UP

1. Open the folder where radR is saved
2. Double click on the "radR.[version].bat" file (ex. "radR2.5.1.bat")
3. Right click on plot
   a. Under *Plugins* scroll to *xir3000arch*
   b. Select *enabled*

   **Note:** the xir3000arch plugin allows you to play WinHorizon ".rec" files which were recorded with a xir3000 video processor
4. Right click on plot
   a. Under *Plugins* scroll to *tracker*
   b. Click on striped grey lines at top to keep window open
   c. Select *enabled*

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**Note:** the tracker plugin enables blips to be tracked based on settings you enter and it enables tracks to be saved

5. Right click on plot
    a. Under *Plugins* scroll to *zone*
    b. Click on striped grey lines at top
    c. Select *enabled*
    **Note:** the zone plugin creates exclusion or special zones (a way to blank out ground clutter)

NOTE: If you are looking for any of the following windows while using radR: *display, blip processing, player,* or *console,* right click on plot, scroll to *View* and select the missing windows.

## OPENING/SETTING UP FILES TO PLAYBACK AND TRACK

1. Click on *player* window
    a. Select *from*
    b. Scroll down to "*xir3000arc*"
    c. Select *choose a file*
    d. Choose first ".rec" file of folder of WinHorizon files you want to playback
    Note: radR will play all .rec files in one folder in sequence
2. In the *player* window, move the scroll bar across the folder to briefly examine entire folder of output
    a. Look for rain clouds or heading shifting
    b. Look at where the ground clutter moves around in its returns
    c. Isolate targets

### Setting the first exclusion zone:

3. Click on the *zone* window
    a. Ensure *zone* plugin is *enabled*
    b. Select *create new zone*
    Note: the first zone created is strictly an exclusion zone, it excludes tracking any blips that pass through the selected area as long as the exclusion zone itself is enabled
    c. Right click on zone line (blue or white)

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i. Select *edit zone*

d. Click on the small circle at the joints of the zone to adjust zone area
e. Holding ALT while dragging a zone border moves entire zone, opposed to one side at a time
f. When finished adjusting zone area, right click on zone line again
    i. Click on *finish edit*
    ii. Click on *enable zone*
g. In the *zone* window, select *zero data in exclusion zone*

**Setting all subsequent special zones:**

4. Click on the *zone* window
    a. Select *create new zone*
    **Note:** All other zones after the first zone will be "special zones" not "exclusion zones" but they can be made to act like "exclusion zones" by adjusting their zone parameters as specified below
    b. Select *edit zone*
    c. Adjust zone area (see 3.d/3.e)
    d. Right click on zone line again
        i. Click on *finish edit*
        ii. Click on *enable zone*
    e. In the *zone* window, select *edit zone parameters*
        i. Select zone to edit
        ii. Set *min blip samples* high (even equal to *max blip samples*)
        iii. Set *min blip area* high (even equal to *max blip area*)

## TRACKING

5. Click on *display* window
    a. Select *Update plot while playing* and *Use slow tk plotting; needed for displaying tracks and zones*.
6. Click on *tracker* window
    a. Make sure tracker is *enabled*
    b. Select *Save tracks to .CSV file*
    c. Click on *Choose .CSV output file…*
    d. Select where you want to save the output of the tracks

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7. Click on *blip processing* window
    a. Make sure *filter blips* is selected
    b. Change values under *filter blips* to suit your output files
    **Note:** *min blip samples* and *min blip area* make the biggest difference
    c. Finding blip values that will track your targets:
        i. Select play (not play1) and give it a few seconds to start tracking (colour changes will appear on screen as radR considers whether returns are blips or not)
        ii. If the tracker appears to not track enough objects on the screen, pause playback and scroll over one of the targets you want to track
        iii. The window at the top left of the plot screen will enlarge to include specific details of the target blip
        iv. Note the value of *Samples* and *Area*
        v. Change the values in the *blip parameters* window (min samples and min area) to include the values of the targets you want the tracker to track
        vi. Select play again and see if the tracking includes more targets
        vii. Adjust as necessary

**Start tracking**

8. Scroll playback bar to start of folder
    a. Ensure the tracker is saving to the file you want (*tracker> Choose .CSV output file*)
    b. Click on *Delete all tracks from current file* (if you have done any test tracks)
    c. Click on the play button (not play1)
    Note: If you have watched the screen for a few seconds and you are happy with the tracking, you can set the file to track much faster by de-selecting in the *display* window *Update plot while playing* and *Use slow tk plotting*.

## TRACKING AND EXAMINING A SINGLE TARGET'S TRACK

9. As soon as a target has been tracked, while track is still active (bright colour), pause playback

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10. Scroll over track
    a. Track should turn white
    b. Click on track
11. Open *console* window
12. Type "tr" after ">"
    a. The track output is displayed here and also copied onto clipboard
    b. Open notepad
    c. Paste track output (Ctl+v)
    d. Save notepad file as ".txt"
    e. Open Excel
        i. Open ".txt" file just saved
        ii. Select *Delimited* by *space*

    **Note:** You can cut and paste each subsequent block of cells to the right end of the previous block of cells and line up the rows by number.

**radR OUTPUT**

For each point along the track, the "x and "y" values in the output are the coordinates on the plot of where it appeared, assuming the radar was at the origin (0,0). A negative x value means left of centre on the horizontal plane, a negative y value means left of middle on the vertical plane.

When outputting the radR values to GIS, simply add the radar's UTM values to the "x" and "y" values to get the UTMs of each of the points (in a single sheet .csv file with only values).

**Outputting radR tracks to GIS**

1. Open the radR output file
2. Change headings to be less than 8 characters long with no spaces or punctuation
3. Insert 4 rows after the y row
4. In the first new row enter the radar UTME
5. In the second new row enter the radar UTMN
6. In the third new row enter "=round(("xrow"+"UTME"),0)" (To round up the value)
7. In the fourth new row enter "=round(("yrow"+"UTMN"),0)"

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8. Delete Sheet2 and Sheet3
9. Save file As a ".csv" file
   **Note:** File can now be opened in ArcCatalog and converted to a shape file for GIS.

**Adding up number of bird tracks (surrogate for number of birds)**

1. Open up radR output ".csv" file in excel
2. Sort spreadsheet by "track no."
3. Insert a new column after "track no."
4. In the third cell of the new column type the following formula:
   a. =if((B3=B2),0,1)
      i. This will return 0 if the two consecutive track numbers are the same, and return 1 if they are different. In other words, it will assign "1" every time a new track begins, regardless of how many scans it is made up of.
   b. Copy this formula down for all cells of new row
      i. Copy cell with formula (CTL+c)
      ii. Scroll to bottom of sheet
      iii. Click on last cell in last row of data
      iv. Hold down CTL+SHIFT and click the up arrow on keyboard (This will select all cells up to copied cell)
      v. Paste the copied formula into selected cells (CTL+v)
   c. In cell below last row of data of new column type the following formula to add all tracks:
      i. =1+sum(C3:C[cell above addition total cell])
      Note: This is the total number of tracks/birds in the folder of .rec files you just ran through radR.

## TROUBLESHOOTING

Problem: radR's plot window won't open (only the "Rterm" and "Loading radR plugins" load when you click on "radR.2.5.1.bat" file)

Solution: Open the "radRstablewindows_2010_11_04.zip" (or newer version) file.

- Select *Open With* and then *Compressed (zipped) folders*
- Select *Extract all files* from pane on left

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- Specify in the extraction a folder where you will put both the radR download and the R download, different from where it was originally extracted to
- Repeat this process for the "R-2.5.1-win32.exe" (or newer version) file
- Make sure the "R.[version].exe" is in the same folder as radR's "radR.[version].bat" file
- Double click on the "radR.[version].bat" file in the new folder to which you have re-extracted radR and R.