

ezRA - Easy Radio Astronomy - Introduction

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The ezRA Easy Radio Astronomy set of programs are free PC tools to help explore Radio Astronomy. The programs run on the Python3 programming language, on Windows and Linux.

There are 5 major ezRA programs:

ezCol - COLlect radio signals into integrated frequency spectrum ezRA .txt data files.

Or convert previous radio data with ezColBaa, ezColHay, ezColIFAvg, ezColSc, etc.

ezFix – remove unwanted samples from, combine, edit, and split frequency spectrum ezRA .txt data files.

ezCon - CONdense one or more frequency spectrum data .txt files into one .ezb text data file, and perhaps one Galaxy crossing spectra *Gal.npz data file.

ezPlot - PLOT analysis from one or more .ezb condensed data files.

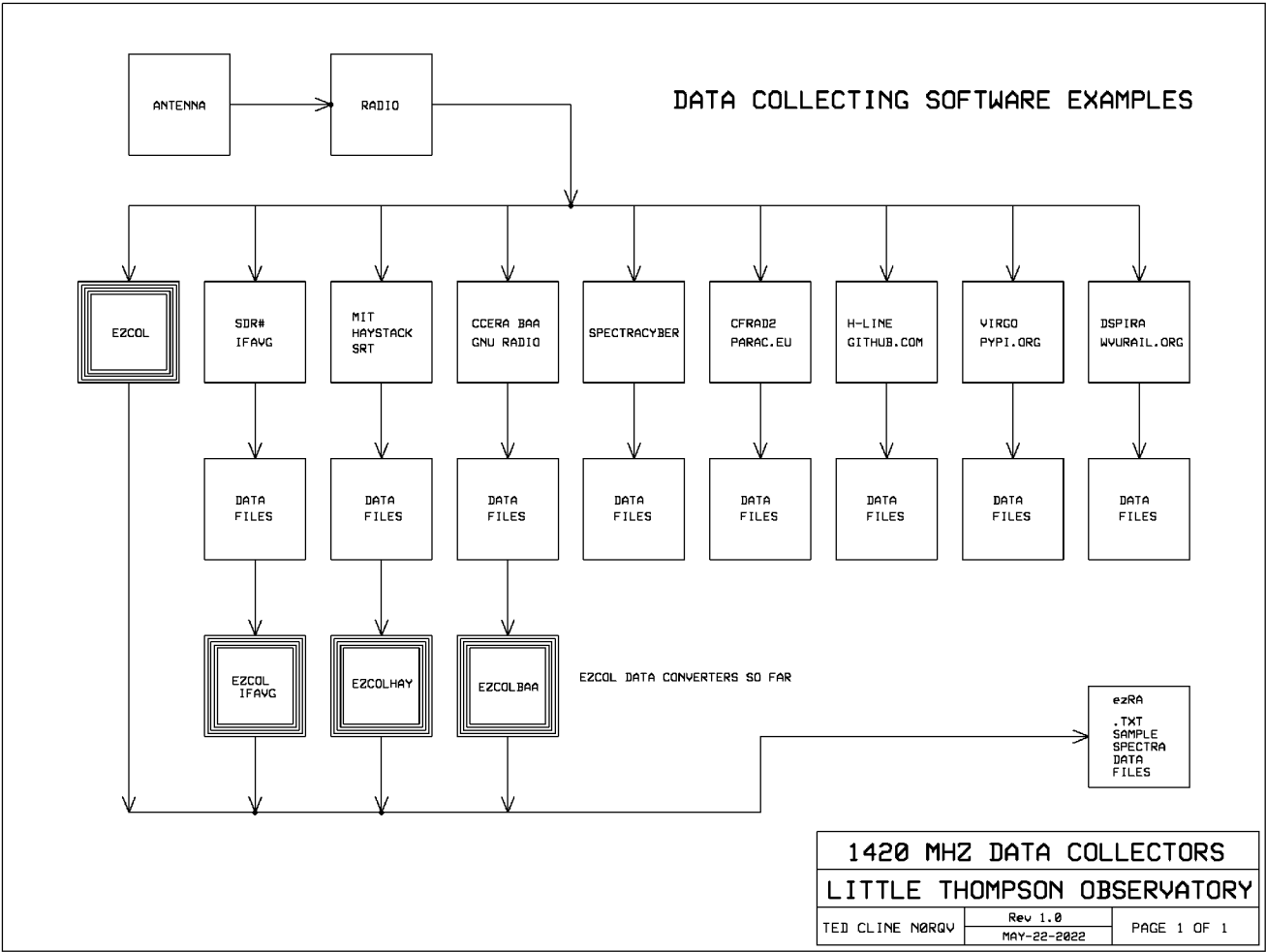
ezSky - SKY maps from one or more .ezb condensed data files.

ezGal - GALaxy plots from one or more spectra *Gal.npz data files (Galaxy rotation, Velocity vs Galactic Longitude, Galaxy arm plots?).

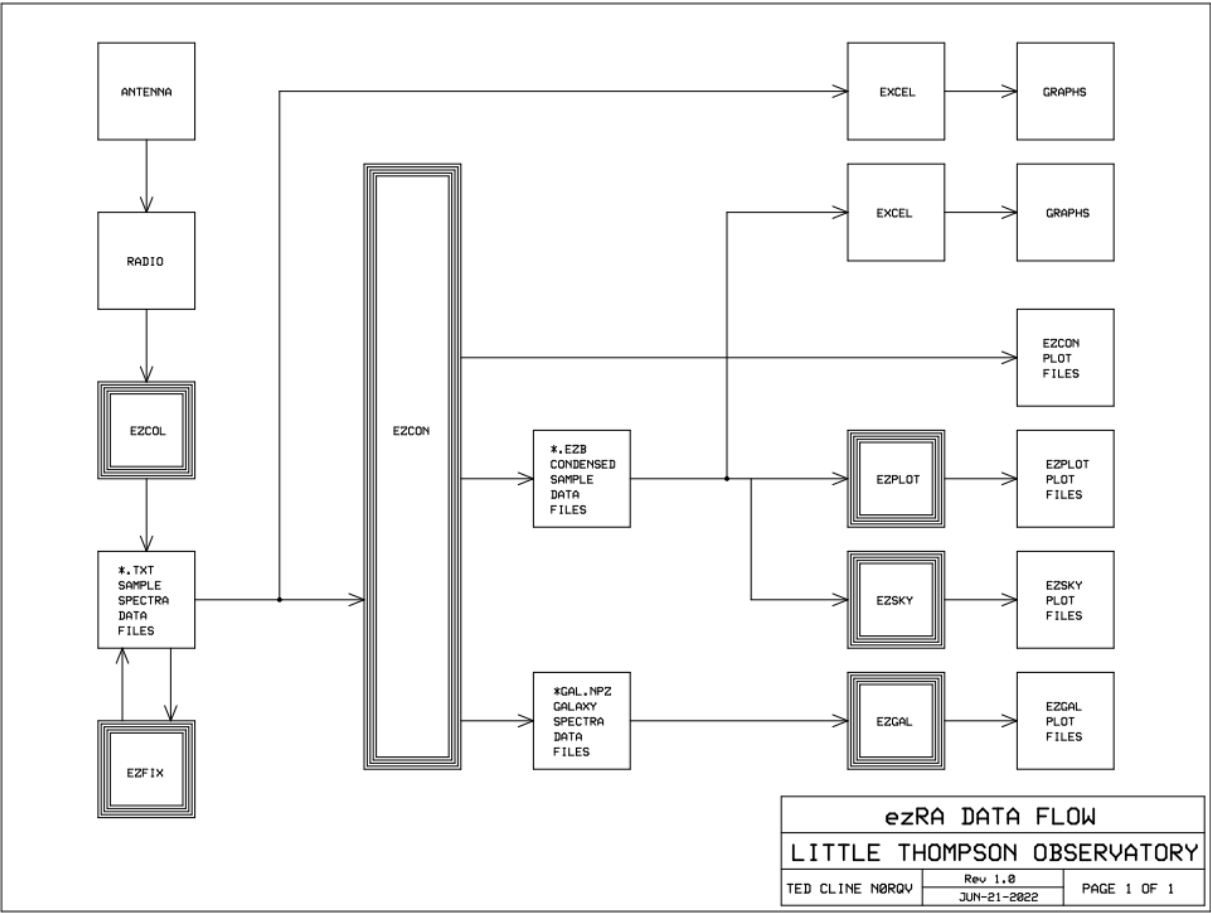
First, a brief system overview.

A Radio Astronomy antenna receives a signal from the sky, and a computer system collects and records the signal into data files. There are many choices of frequency, reflectors, antennas, polarization, amplifiers, filters, cable, power methods, receivers, bandwidths, precision, integration, temperature stabilization, frequency stabilization, etc.

And there are many choices of drift-scan data collecting software. For 1420 MHz, there is ezCol, SDR# with an IF Average plugin, MIT Haystack SRT, CCERA BAA GNU Radio, SpectraCyber, CFRAD2, H-Line, Virgo, DSPIRA, and others. All their data file formats can be converted into ezRA frequency spectrum .txt data files. The ezCol program's data files need no conversion.



Once in the proper format, the data files can edited and analyzed with the ezRA programs.



Documentation for ezRA includes:

README.txt

ezRA_00_Introduction.pdf

ezRA_01_Tour.pdf

ezRA_05_Demonstration.pdf

ezRA_10_Hardware_1.pdf

ezRA_11_Hardware_2.pdf

ezRA_20a_Software.pdf

ezRA_20b_Software_Installation_Windows.pdf

ezRA_20c_Software_Installation_Linux.pdf

ezRA_21a_ezCol.pdf

ezRA_21d_ezColBAA.pdf

ezRA_21c_ezColHay.pdf

ezRA_21b_ezColIFAvg.pdf

ezRA_21e_ezColSC.pdf

ezRA_21y_ezRename.pdf

ezRA_21z_ezFix.pdf

ezRA_22_ezCon.pdf

ezRA_23_ezPlot.pdf

ezRA_24_ezSky.pdf

ezRA_25_ezGal.pdf

Notes:

ezRA documentation assumes your antenna is stationary on the earth's northern hemisphere.

“Galactic hydrogen emission” usually refers to radio waves from hydrogen gas in our nearby Milky Way Galaxy. The Andromedia galaxy is too far away for us amateurs to explore.

ezRA is short for Easy Radio Astronomy.

ezRA is pronounced “EZZ-rahh”.

Ezra is an ancient word meaning “help” or “aid”.
