WCSLIB – its origins and development

Invited talk, ADASS 2025, Görlitz, Germany

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2025 November 11

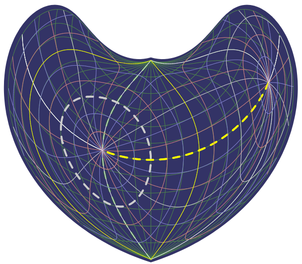
Origins

- Deeply entwined with FITSWCS
- Born from AIPS++ in early 1992
- Successor to the "AIPS convention"
- ADASS II (1992), Boston
- AIPS++ Memo 107 $\rightarrow$ FITSWCS proposal, 1993-02-04
- IDL implementation, Rick Balsano
- ADASS IV (1994), Baltimore, FITS BoF

Eric Greisen in 2005

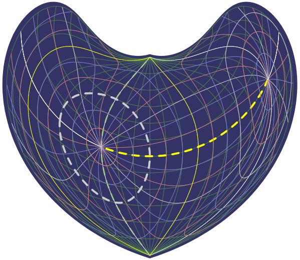
WCSLIB 1.0 & 2.x, 1995-2002

- WCSLIB 1.0, 1995-01-31
- Independent C and Fortran libraries
- GNU Library General Public License
- Limited implementation of WCS Paper II
- Uncovered serious flaw in FITSWCS proposal → LATPOLE
- WCS Papers I & II implemented by WCSLIB 2.9 → original scope fulfilled



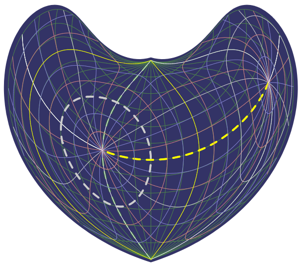
WCSLIB 3.x, 2003-2004

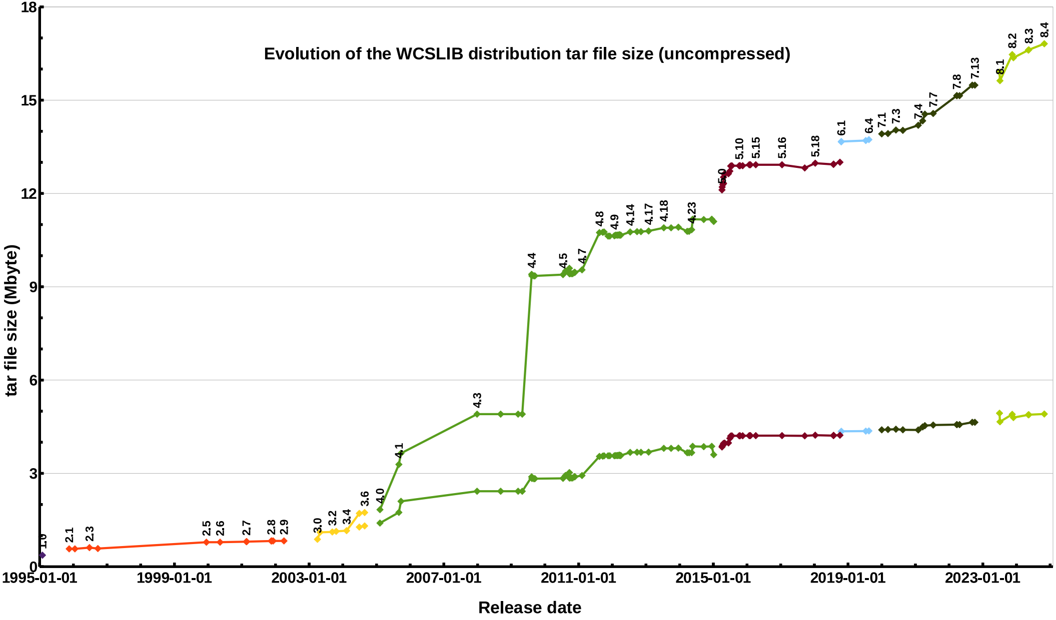
- FITSWCS standard, 2002-12-18
- Major development, changed API
- Fortran now implemented via wrappers
- Vectorised interface
- FITS image header and units parsers
- Memory management
- WCS Paper III implemented



WCSLIB 4.x, 2005-2014

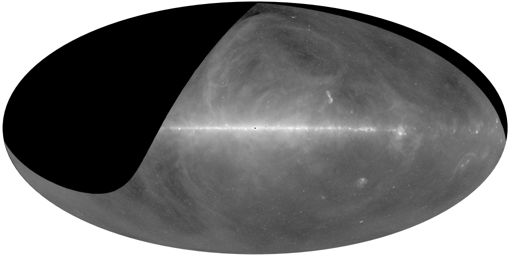
- WCSLIB Paper V: `HPX` projection
- Tabular coordinates (`-TAB`)
- *autoconf*
- Binary table header parser
- *Doxygen*-generated user manual
- Error diagnostics, Michael Droettboom (STScI)
- WCSLIB Paper VI: `XPH` projection




Evolution of the WCSLIB distribution tar file size (uncompressed)
tar file size (Mbyte)
Release date
0
3
6
9
12
15
18
1995-01-01
1999-01-01
2003-01-01
2007-01-01
2011-01-01
2015-01-01
2019-01-01
2023-01-01
1.0
2.1
2.3
2.5
2.6
2.7
2.8
2.9
3.0
3.2
3.4
3.6
4.0
4.1
4.3
4.4
4.5
4.7
4.8
4.9
4.14
4.17
4.18
4.23
5.0
5.10
5.15
5.16
5.18
6.1
6.4
7.1
7.3
7.4
7.7
7.8
7.13
8.1
8.2
8.3
8.4

Subsequently, 2015-2025

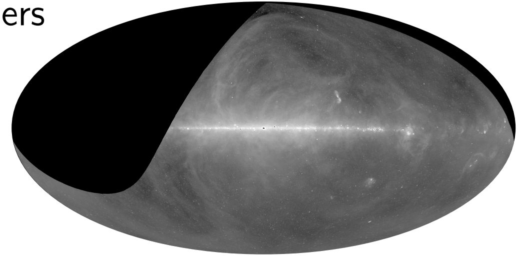
- Major releases now mark changed ABI
- WCSLIB 5.x: WCS Paper IV, distortions
- WCSLIB 6.x: WCS Paper VII, time
- WCSLIB 7.x: Solar keywords
- WCSLIB 8.x: More solar keywords



CHIPASS, 1.4 GHz radio continuum

In retrospect

- Crucial role of user feedback
- Testing, testing, testing
- Supporting non-standard FITS headers
- 30 years of technological change
- No substitute for using your own software



CHIPASS, 1.4 GHz radio continuum

Prize plaque

ADASS 2025 Software Prize plaque (photo-bombed by Mia).