▼ LoTSS DR2 data in CAOM

- Checked metadata in all columns on this page:

Mark ☐	Preview	Collection	Obs. ID	Product ID	RA (J2000.0)	Dec. (J2000.0)	▾Start Date	Instrument	Int. Time	Target Name	Filter
Filter:											
					[H:M:S ⇕]	[D:M:S ⇕]	[Calendar ⇕]		[Seconds ⇕]		
☐ ⬇	Preview	LOTSS	P002+18_dr2	P002+18_mosaic	00:08:42.64	+18:23:38.4	2019-12-13 14:11:08	LOFAR.HBA		P002+18	120-168MHz
☐ ⬇	Preview	LOTSS	P002+21_dr2	P002+21_mosaic	00:09:03.91	+20:54:17.7	2019-10-20 18:11:00	LOFAR.HBA		P002+21	120-168MHz
☐ ⬇	Preview	LOTSS	P001+41_dr2	P001+41_mosaic	00:04:21.80	+40:58:28.2	2019-07-20 23:52:08	LOFAR.HBA		P001+41	120-168MHz
☐ ⬇	Preview	LOTSS	P002+23_dr2	P002+23_mosaic	00:11:24.15	+23:25:12.8	2018-12-22 13:23:49	LOFAR.HBA		P002+23	120-168MHz
☐ ⬇	Preview	LOTSS	P000+23_dr2	P000+23_mosaic	00:00:07.45	+23:23:43.8	2018-11-30 15:14:35	LOFAR.HBA		P000+23	120-168MHz
☐ ⬇	Preview	LOTSS	P124+62_dr2	P124+62_mosaic	08:18:42.51	+61:59:23.7	2018-08-20 05:47:35	LOFAR.HBA		P124+62	120-168MHz
☐ ⬇	Preview	LOTSS	P000+38_dr2	P000+38_mosaic	00:03:47.28	+38:27:48.3	2018-02-28 09:10:19	LOFAR.HBA		P000+38	120-168MHz
☐ ⬇	Preview	LOTSS	P001+26_dr2	P001+26_mosaic	00:07:10.16	+25:55:15.3	2017-09-12 20:09:53	LOFAR.HBA		P001+26	120-168MHz
☐ ⬇	Preview	LOTSS	P002+28_dr2	P002+28_mosaic	00:10:34.24	+28:26:17.9	2016-09-15 19:52:40	LOFAR.HBA		P002+28	120-168MHz
☐ ⬇	Preview	LOTSS	P000+36_dr2	P000+36_mosaic	00:00:34.16	+35:56:47.1	2016-09-15 19:52:40	LOFAR.HBA		P000+36	120-168MHz
☐ ⬇	Preview	LOTSS	P000+31_dr2	P000+31_mosaic	00:00:52.75	+30:55:38.0	2016-09-01 20:36:30	LOFAR.HBA		P000+31	120-168MHz
☐ ⬇	Preview	LOTSS	P001+33_dr2	P001+33_mosaic	00:04:42.76	+33:26:43.8	2016-08-17 21:54:37	LOFAR.HBA		P001+33	120-168MHz

- The ingested metadata has the following issues:

  - The pixel scale of 1.5625″ is incorrect. Upon reading the fits file header, I find that the pixel scale is 1.5″. This value is also mentioned in the LoTSS DR2 paper (Shimwell et al. 2022).

  - The FOV listed in the table assumes the sky region being imaged is a square of 10210×10210 pixels. Upon inspecting the data, I find that the image is of a circular region. So the true FOV is ~4 sq. deg. less than the stated values. I can calculate the average FOV from the LoTSS DR2 paper, if needed.

  - End date assumes that the observation lasted for 16 hours. LoTSS papers mention that the observations are on average 8 hours. I confirmed in the LOFAR Long Term Archive (https://lta.lofar.eu) that the duration of this particular observation is 8 hours.

#	☐	Project	Release Date	Target Name	Right Ascension [degrees]	Declination [degrees]	Central Frequency [MHz]	Channel Width [Hz]	Channels Per Subband	Integration Interval [s]	Start Time	Duration [s]
1	✖	LT10_010	2021-05-30	P002+18	2.1779	18.3938	120.3125	12207.031250	16	1.00139	2019-12-13 14:11:08	28799.0

  - Shape should not be a polygon. Although the data in the fits file is a square of 10210×10210 pixels, upon analyzing the fits file with astropy and plotting the image, I find that the image is of a circular region. All array values outside the circle are NaNs.

  - IQ = 0.0004 arcseconds is not the correct position resolution. The unit should be degrees instead. In addition, the resolution should be 0.00166 deg instead of 0.0004 deg. While 0.0004 deg. is the pixel scale, it is not the true resolution as the image is oversampled.

- Checked metadata visible on this page: https://sc2.canfar.net/caom2ui/view/?ID=ivo%3A%2F%2Fcadc.nrc.ca%2Ftest%2FLOTSS%3FP002%2B18_dr2. The ingested metadata has the following issues:
  - Plane
    - The parameters Dimension2D[3402,3402] and resolution = 4.16666E-4 deg. are not consistent. The artifacts are files of two different dimensions: [10210,10210] and [3402,3402]. The resolution is 4.16666E-4 deg. for the former and 0.00555 deg for the latter. I suggest that the maximum dimension and resolution, [10210,10210] and 4.16666E-4 deg. be used here.
    - Bounds: Interval[58830.5910648149,58831.257731481564 samples[[58830.5910648149,58831.257731481564]]]. As mentioned earlier, the observation is 8 hours long. The interval in the metadata is currently 16 hours.
    - Artifact - uri - astron:LOTSS/P002+18/mosaic-blanked.fits
      - Resolution should be 0.001666 deg.
      - Time - resolution: 8.0. The unit is not mentioned, is it hours?
      - cdelt should be 0.33 day instead of 0.6666 day.
    - Artifact - uri - astron:LOTSS/P002+18/low-mosaic-blanked.fits
      - Resolution should be 0.00555 deg.
      - cdelt should be 0.33 day.
    - Artifact - uri - astron:LOTSS/P002+18/mosaic-weights.fits
      - Resolution should be 0.001666 deg.
      - cdelt should be 0.33 day.
    - Artifact - uri - astron:LOTSS/P002+18/low-mosaic-weights.fits
      - Resolution should be 0.00555 deg.
      - cdelt should be 0.33 day.
    - Artifact - uri - astron:LOTSS/P002+18/mosaic-rms.fits
      - coordsys: FK5 - The fits file header does not mention the coordinate system, so I am guessing the ingestion code by default assumes FK5. But this should be ICRS instead.
      - Resolution should be 0.001666 deg.
      - cdelt should be 0.33 day.
    - Artifact - uri - astron:LOTSS/P002+18/mosaic.pybdsmmask.fits
      - coordsys: FK5 - Should be ICRS instead.
      - Resolution should be 0.001666 deg.

- cdelt should be 0.33 day.

  - Artifact - uri - astron:LOTSS/P002+18/mosaic.resid.fits

    - coordsys: FK5 - Should be ICRS instead.

    - Resolution should be 0.001666 deg.

    - cdelt should be 0.33 day.

  - Artifact - mosaic.fits - I have not been able to inspect the metadata in the fits file as I cannot find it in the LoTSS DR2 database (https://vo.astron.nl/lotss_dr2/q/dlmosaic/dlmeta?ID=ivo%3A//astron.nl/~%3FLoTSS-DR2/P002%2B18). The metadata of this file still needs to be checked in detail.

    - Resolution should be 0.001666 deg.

    - I am not sure what this parameter means: range: (pix) 0.5 → 1.5.

    - cdelt should be 0.33 day.