Space Time MOC discussion

Interop Groningen – 11-13 October 2019

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CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

Observatoire astronomique
de Strasbourg | ObAS

MOC standard history

First implementation

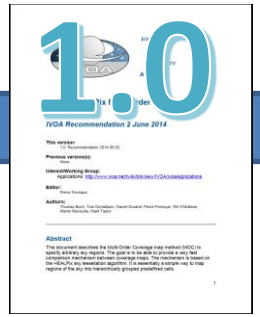
CDS proto

IVOA standardization

ADASS talk

Stilts support

IVOA MOC 1.0



MocServer

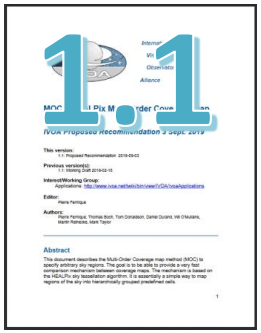
AladinV10

Portal CDS

MOC in registry

=> ASCII serial.

IVOA MOC 1.1



2011 2012 2013 2014 2017 2018 2019

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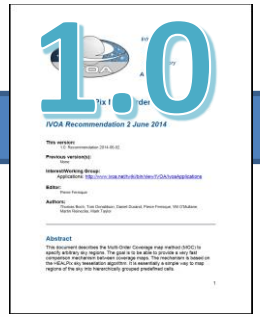

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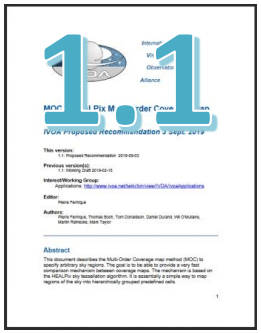

2011 2012 2013 2014 2017 2018 2019

Driven by the App Working Group

Space Coverage only

MOC evolutions

First implementation
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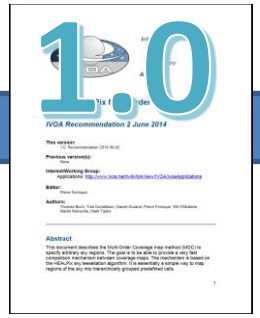

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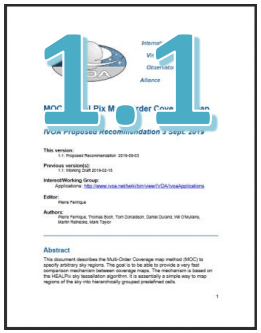
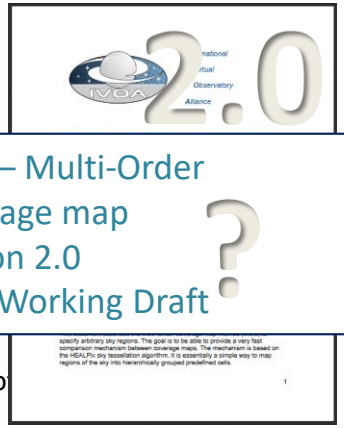




MOC – Multi-Order Coverage map
Version 2.0
IVOA Working Draft
?

Driven by the Time Working Group

ADASS talk

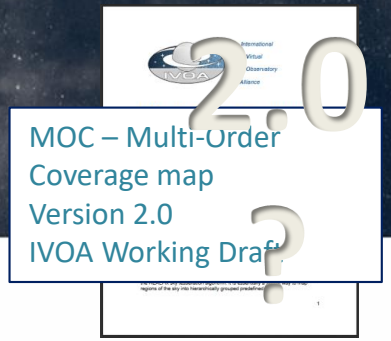
IVOA note (D.Durand, A.Nebo

STMOC (CDS – P.Fernique)

MocPy

TimeMOC (CDS – P.Fernique)

Towards a Time Space MOC standard => MOC 2.0



- **ST-MOC** is a generalization of MOC for manipulating **Space MOC**, **Time MOC** and **Space-Time MOC** (=> see Time MOC IVOA note).
- Fully compatible with MOC 1.1 (=> addition of the Time convention + extension of the syntax for the MOC 2D)

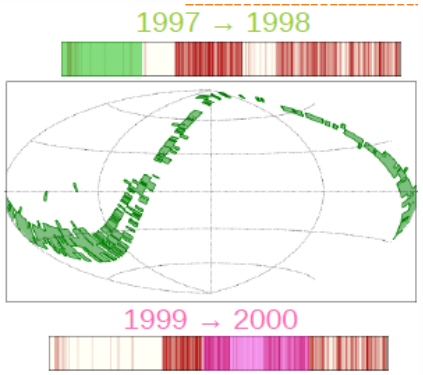
- But **required to rewrite the MOC document**
  => MOC 1.0 & 1.1 were only HEALPix oriented
  => MOC 2.0 will have to describe:
  - Space discretization by HEALPix
  - Time discretization by JD division

Already 2 implementations

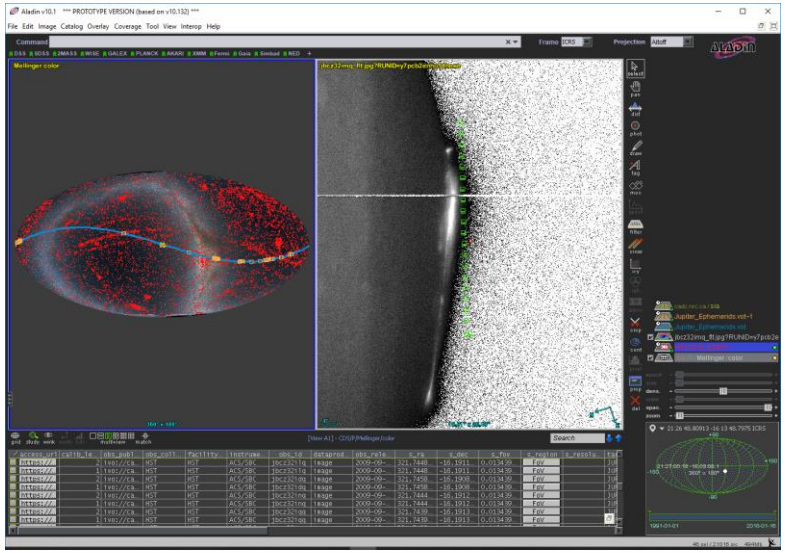
- **MOCPy** (M.Baumann)

New MOCPy Features:

- **Create** from a list of Astropy times and skycoords.
- **Query** by a time range to retrieve the spatial regions being observed within it.
- Perform **logical operations** (e.g. intersection of the XMM and Chandra ST coverages to find simultaneous observations).
- **Filter** an Astropy table containing position and time columns.
- **Save** to a **FITS** file.



- **Aladin v10 beta**
  (+ **Hipsgen**)



Already some material

- **List** of **STMOCs** already generated by CDS (T.Boch, M.Bauman) => http://alasky.u-strasbg.fr/footprints/STMOC

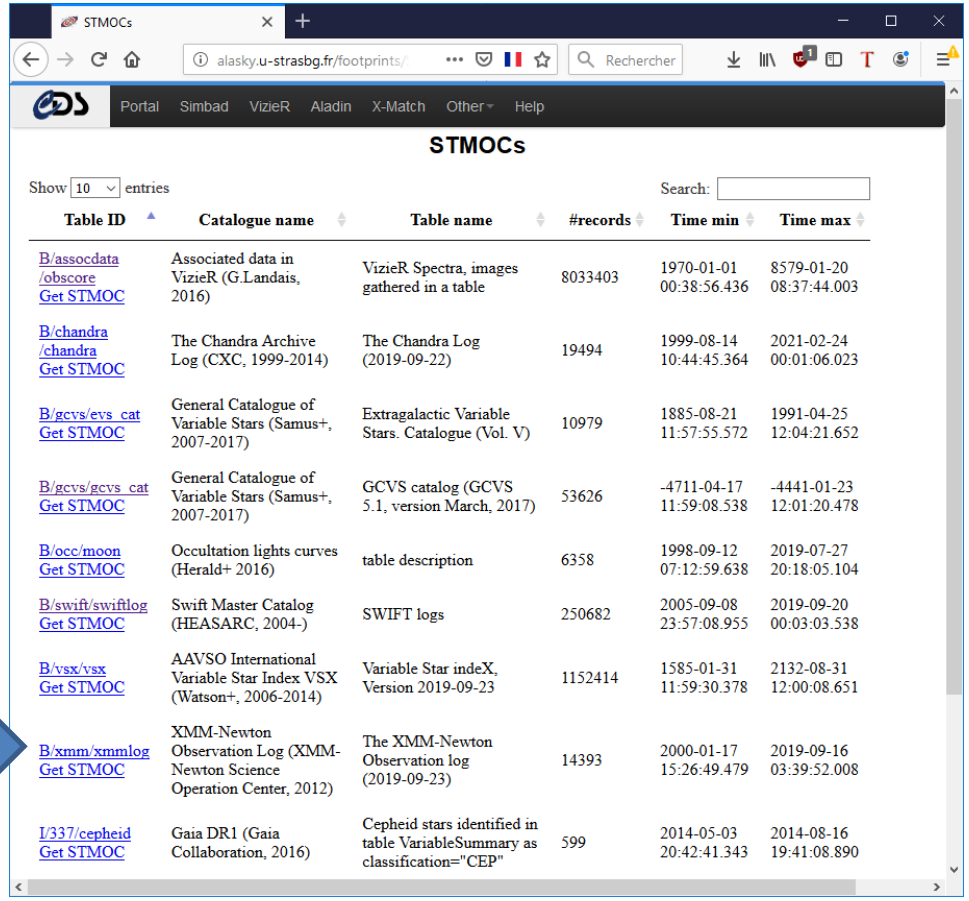


Table ID	Catalogue name	Table name	#records	Time min	Time max
B/assocdata/obscore Get STMOC	Associated data in VizieR (G.Landais, 2016)	VizieR Spectra, images gathered in a table	8033403	1970-01-01 00:38:56.436	8579-01-20 08:37:44.003
B/chandra/chandra Get STMOC	The Chandra Archive Log (CXC, 1999-2014)	The Chandra Log (2019-09-22)	19494	1999-08-14 10:44:45.364	2021-02-24 00:01:06.023
B/gcvs/evs_cat Get STMOC	General Catalogue of Variable Stars (Samus+, 2007-2017)	Extragalactic Variable Stars. Catalogue (Vol. V)	10979	1885-08-21 11:57:55.572	1991-04-25 12:04:21.652
B/gcvs/gcvs_cat Get STMOC	General Catalogue of Variable Stars (Samus+, 2007-2017)	GCVS catalog (GCVS 5.1, version March, 2017)	53626	-4711-04-17 11:59:08.538	-4441-01-23 12:01:20.478
B/occ/moon Get STMOC	Occultation lights curves (Herald+ 2016)	table description	6358	1998-09-12 07:12:59.638	2019-07-27 20:18:05.104
B/swift/swiftlog Get STMOC	Swift Master Catalog (HEASARC, 2004-)	SWIFT logs	250682	2005-09-08 23:57:08.955	2019-09-20 00:03:03.538
B/vsx/vsx Get STMOC	AAVSO International Variable Star Index VSX (Watson+, 2006-2014)	Variable Star indeX, Version 2019-09-23	1152414	1585-01-31 11:59:30.378	2132-08-31 12:00:08.651
B/xmm/xmmlog Get STMOC	XMM-Newton Observation Log (XMM-Newton Science Operation Center, 2012)	The XMM-Newton Observation log (2019-09-23)	14393	2000-01-17 15:26:49.479	2019-09-16 03:39:52.008
I/337/cepheid Get STMOC	Gaia DR1 (Gaia Collaboration, 2016)	Cepheid stars identified in table VariableSummary as classification="CEP"	599	2014-05-03 20:42:41.343	2014-08-16 19:41:08.890

If you agree…

- Presently this effort
  has been mainly driven by **CDS & Co**
- **Does IVOA agree to endorse again** the proposal for this MOC generalization?
- In which **Working Group** => Apps ?
- **Authors** => based on IVOA note list + ???
- **Editor** => I can do it. Help welcome.

Next steps

- Generate more STMOCs
  (from **VizieR catalogs,** and **HiPS**, and other **VO providers**)

- We will ingest them in the CDS **MocServer**:
  => Aladin Resource Tree
  by Space & Time
  => …

- **VO registry** could use either MOC, TMOC and/or STMOC