Discussion
MOC & Skymap

Interop IVOA – College Park – June 2025

Jointed session Apps & TDIG

The existing HEALPix ecosystem

	Role	Characteristics	Serialization	Origin
MOC	**Spherical Space coverage**	**Compact, hierarchical resolution**	**FITS, ASCII, JSON**	**IVOA standard**
Hierarchical Skymap	Spherical image	Hierarchical resolution, Size constraint	FITS	Ligo/Virgo
MOM	Spherical « image » and more	Hierarchical resolution, Size constraint	FITS	CDS python/rust lib (prototype)
(HEALPix) Skymap	Spherical image	Fixed resolution, Size constraint	FITS	HEALPix team & contrib
HiPS	**Spherical image, Catalog (visu)**	**Hierarchical resolution, Scalable**	**FITS, Compressed (JPEG, PNG)**	**IVOA Standard**
HATS	Catalog (partition)	Hierarchical resolution, Scalable	Parquet	IVOA candidate standard

Multi-dimensional extensions

	Role	Characteristics	Serialization	Origin
STMOC	**Time Space coverage**	**Compact, hierarchical resolution**	**FITS, ASCII, JSON**	**IVOA standard**
FTMOC	Frequency Space coverage	Compact, hierarchical resolution	FITS, ASCII, JSON	IVOA candidate standard
HIPS 3D	Freq or time Space cubes	Hierarchical resolution, Scalable	FITS, compressed (JPEG, PNG)	IVOA candidate standard

Questions of the day

Hierarchical Skymap	Spherical image	Hierarchical resolution, Size constraint	FITS	Ligo/Virgo
MOM	Spherical « image » and more	Hierarchical resolution, Size constraint	FITS	CDS python/rust lib (prototype)
(HEALPix) Skymap	Spherical image	Fixed resolution, Size constraint	FITS	HEALpix team & contrib

- 2 (3?) formats with **very similar characteristics**
- Can be seen as an intermediate “tool” between MOC and HiPS
- Allow us to describe spatial probability maps (among other things) – VOEvent 3.0 needs it
- Should we try to converge on a unique solution?
- **IVOA standardization**?