Metadata for VO use of interferometry data

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- End Users: Any astronomers (from PIs to grad students)
  - Consistent processing path implicit in B2E/E2E models, SDM
- Data products – user view
  - Any available, for downloading/off-line processing
  - Products which other VO tools understand in workflow e.g.
    - Feed image to source extractor, construct radio-to-X-ray SED
    - Feed spectrum to SLAP (line ID package)
- Data products – archive view
  - Data characterisation – metadata – observing log
  - Quick-look/static products
  - Products from remote-user-steered/VO triggered pipelines
  - Use test data for access tests too
- Data products – VO view
  - Get minimum essential descriptions tested on users

Data products – VO view

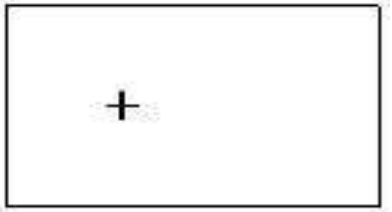
- See www.ivoa.net/Documents
- NG interferometry metadata in database/xml
  - (not generated by direct search of FITS headers by VO)
- Registry – broad overview of data
  - Find if region (in any/all dimensions) *might* be available
    - Problems – different coverage in space, wavelength, time...
  - Self-assessed 1-2-3 quality; VO-assessed metadata quality
  - Restrictions on volume and availability
    - VO authentication should be possible in a year or so
- Observation/Characterisation/Spectrum etc. models
  - Describe data for selection and for workflow tools
  - Terms useful to users e.g. sky resolution not just baselines
  - Eventually algorithms e.g. f.o.v. dependance on $\delta\nu$, t_{int}
    - Possible issues: sub-bands in different configurations
    - Different minimum time resolution for imaging v. light curve ...etc.

Heirachical Coverage model

Location

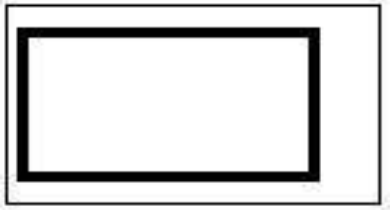
Location

MUST



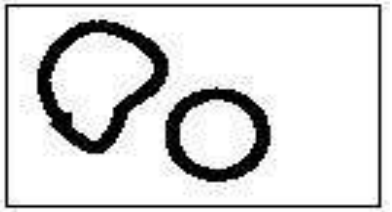
Bounds

Bounds



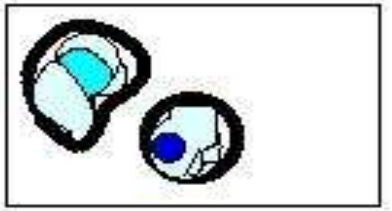
SHOULD

Support

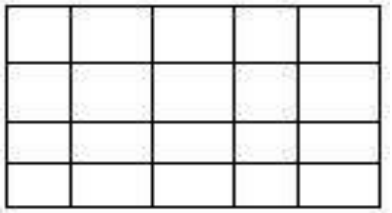


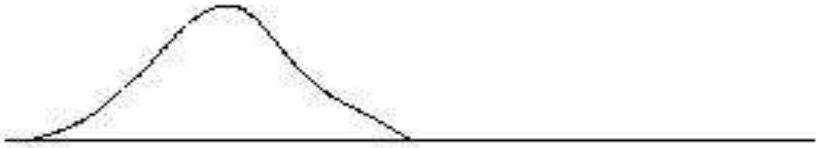
Sensitivity

MAY

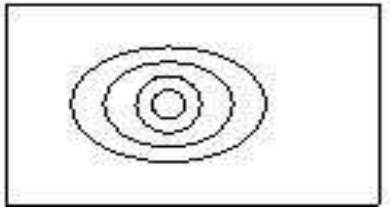


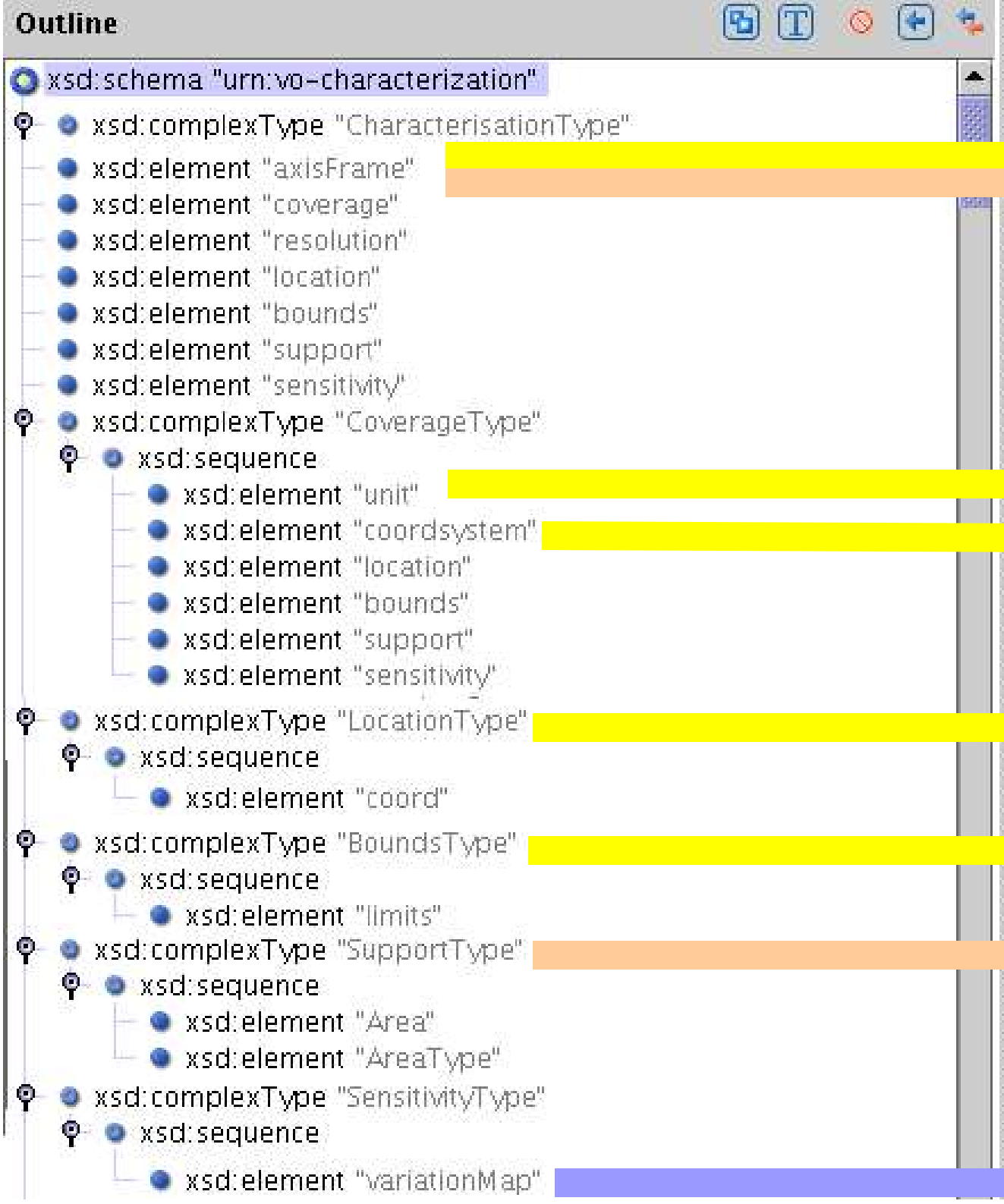
Sampling





Resolution





Must have at least one

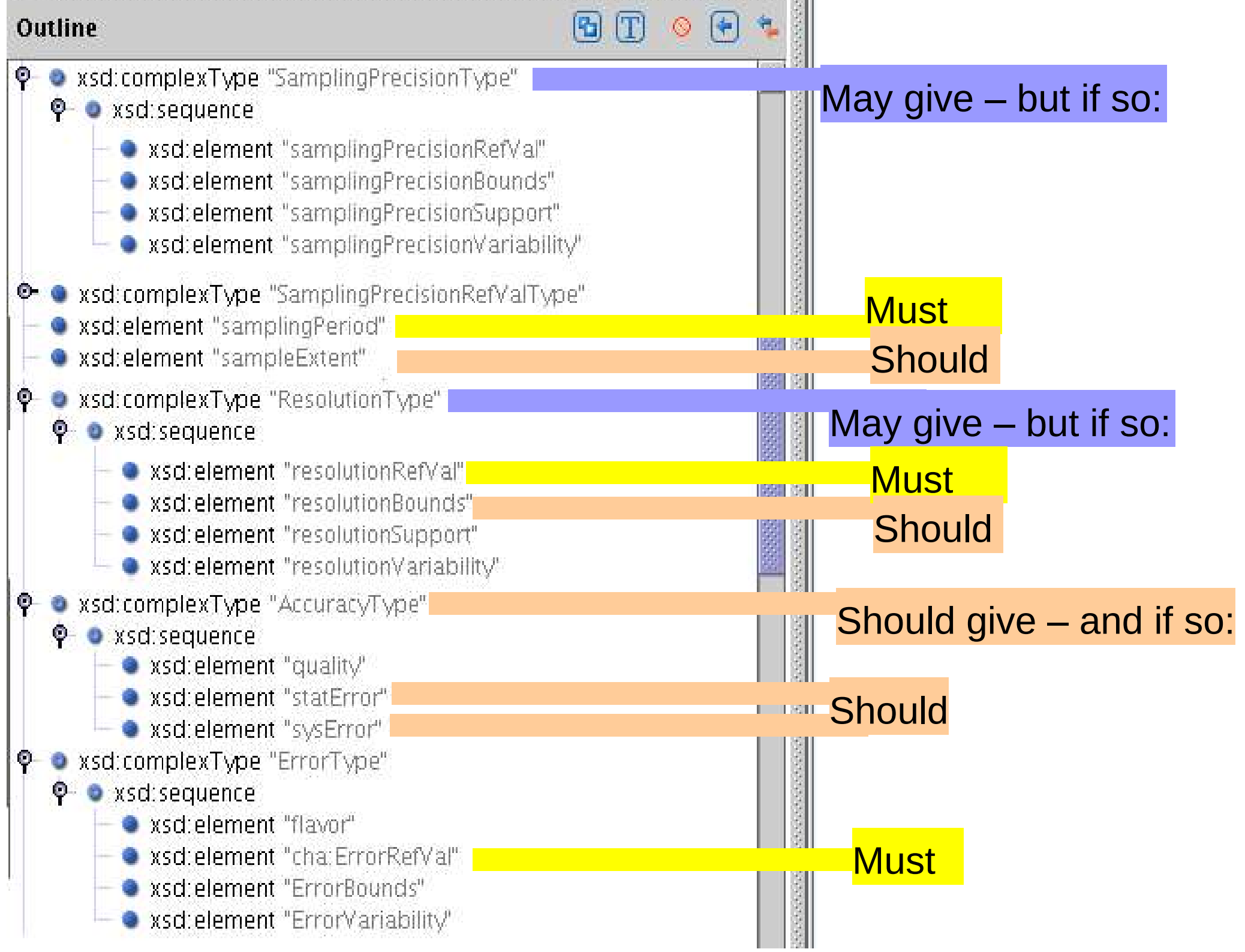
Most data should have at least 3 STC axes plus observable (flux)

For each axis frame; apply to all elements unless redefined

Must give at least one (sometimes both)

Should give (unless = Bounds)

May give


Outline
xsd:complexType "SamplingPrecisionType"
xsd:sequence
xsd:element "samplingPrecisionRefVal"
xsd:element "samplingPrecisionBounds"
xsd:element "samplingPrecisionSupport"
xsd:element "samplingPrecisionVariability"
xsd:complexType "SamplingPrecisionRefValType"
xsd:element "samplingPeriod"
xsd:element "sampleExtent"
xsd:complexType "ResolutionType"
xsd:sequence
xsd:element "resolutionRefVal"
xsd:element "resolutionBounds"
xsd:element "resolutionSupport"
xsd:element "resolutionVariability"
xsd:complexType "AccuracyType"
xsd:sequence
xsd:element "quality"
xsd:element "statError"
xsd:element "sysError"
xsd:complexType "ErrorType"
xsd:sequence
xsd:element "flavor"
xsd:element "cha:ErrorRefVal"
xsd:element "ErrorBounds"
xsd:element "ErrorVariability"
May give – but if so:
Must
Should
May give – but if so:
Must
Should
Should give – and if so:
Should
Must

Visibility data for potential products

General	Spatial	Temporal	Spectral	Observable
frame/units	ICRF, deg	MJD	MHz	Jy/beam
Location	13.123456 +55.987654	50613.5	1658	0.001
Bounds	12.92, +55.58 13.32, +56.38	50613.0 50614.0	1650 1665	0.0002 0.5 (or function)
Support	13.123456 +55.987654 0.4	(on-source scan listing URL)	1650 1665	undef
Sensitivity	*f* (support, 1ary beam)	undef	(bandpass LUT URL)	1
Filling Factor	1	0.7	0.93	undef
Resolution	0.″2 2.″ 0 0.″2 2.″ 0	5 m	1000 kHz	50 100 μJy/beam
Sampling	0.″04 0.″ 0625 0.″04 0.″ 0625	16 s	1000 kHz	undef

Current VO metadata harvesting

- Data providers fill in Registry templates
  - Clunky, automation works poorly, manual entries rudimentary
- Existing tools (MeXx, DALIngestor) work on FITS
  - Will ALMA/EVLA/*e*-MERLIN use DB? XML?
- How do metadata map to Characterisation elements?
  - Unambiguously: e.g. Location = POS_EQ_RA_MAIN or CRVAL1
  - Conversion formulae needed: e.g. Bounds = *f* (*ν*, aperture...)
  - Separate information: e.g. instrument log (on- or off-line)
- How should VOs retrieve metadata?
  - Trial XML templates or forms
  - Form to provide mappings common to large collection
  - Heuristics/manual tweaking (if safe from overwriting)

thought: will engineering information be useful to a different community?

AstroGrid/RadioNet workshop

- Radio data management (1400 5 Dec – 1600 8 Dec)
- Workshop for data providers/large surveys etc.
  - Data flow using archives and pipelines
    - ParselTongue, Common Proposal Tool etc.
  - Data delivery
    - Publishing data to VOs
    - Use and development of relevant VO tools
- Science use (0900 4 Dec – 1300 5 Dec)

Oxford w/c 4 December 2006

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