



The VizieR ObsCore – FITS validator for images & spectra

- Invite authors to better use FITS standards,
but also to guide them : the FITS validator

Contributors:

G.Landais, L.Michel

□ What kind of validator ?



A validator to validate FITS quality header for images/spectra

- complete software like fitsverify which checks the FITS format
- validate FITS headers according to the FITS standards
- test compatibility with the VO standards (ObsCore DM)
- ObsCore mapping possible with FITS recommendations (Louys M.)

➔ But are they well used ?



obscore	FITS standards (ex)
target_name	OBJECT
s_ra	RA , WCS
Coord. syst.	RADESYS
s_dec	DEC , WCS
s_fov	WCS
s_region	WCS
s_resolution	WCS
t_min	TIME-OBS
t_max	TIME-END
t_exptime	EXPTIME
t_resolution	???
em_min	WCS
em_max	WCS
em_res_power	WCS
o_ucd	-- VO : fixed constant
pol_states	WCS-STOKES
facility_name	TELESCOP
instrument_name	INSTRUM

□ (VizieR) Feedbacks



Diversity of serialisation

- The FITS dictionary provided by Nasa are recommendations (!= standard) (https://fits.gsfc.nasa.gov/fits_dictionary.html)
- WCS: several projections used for positions and spectra LINEAR, multispec (WAT)...
- Different spectra serialization (into column, vector in columns)

Uncontrolled FITS header provided by authors

- The FITS format are widely conform (fits-verify checked)
- Authors are quite inventive / take some freedom with the FITS recommendations
 - Usage of exotic keywords (e.g.: POSRA, POSDEC)
 - Uncomplete WCS .. (e.g.:CUNITx not specified)

□ Motivations & strategy



To put authors FITS more close from the VO

- to improve re-usability & discovery
- decrease the workload needed to map FITS with ObsCore

To guide authors to improve FITS quality header

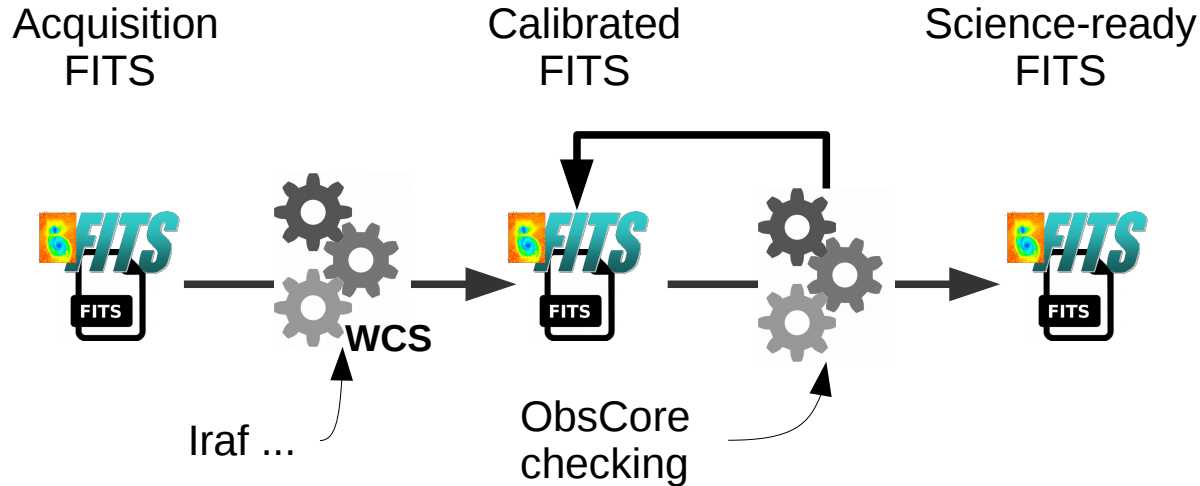
Today, the idea (in VizieR) consists to ask author contribution

- Mixed result – but improved when they are guided
- Authors are not lazy but they don't know how
 - How FITS header are reused
 - How to create FITS header reusable for the VO

□ Implementation



Implementation of a FITS validator



- Web application Based on Saada API
- Detects keywords from a list (from FITS recommendations)
- Detects a large variety of WCS projections



Conclusions



Is it really a FITS validator ?

- Not really - because adapted to Saada and VizieR
- A mapping combining standards detection (WCS, keywords) and heuristics methods (e.g.: search unit in description, comments..)
- The same process used in Fitvalidator and the VizieR submit web page (authors data submission)



a FITS ObsCore-checking indicating the level of visibility in VO

VizieR FITS validator

FITS Validator

This service is an add-on of the VizieR upload service based on the Saada engine. It establishes the compatibility of a FITS resource (spectra/image) with the ObsCore Data Model of the Virtual Observatory.

Understanding the validation

The validation service makes a mapping between FITS header and the ObsCore DataModel using standardized FITS keywords and the most popular WCS projections (Including the TNX WCS (IRAF)). Other WCS projections or incomplete WCS header are not resolved by the service.



Test your FITS spectrum/image

Put Fits J_AA...fit HDU(0)

Fits detection

Extension (hdu) default	Instrument <input type="checkbox"/>	WCS report: No WCS spatial axis found Keyword CTYPE1 not found No WCSDIM kw: not an iraf spectra No regular WCS spectral axis found:Keyword CTYPE1 not found No time projection found in wcs No WCS polarization axis found Keyword CTYPE1 not found
Position <input checked="" type="checkbox"/> BY EXPRESSION	Facility <input type="checkbox"/>	
Spectral <input type="checkbox"/>	Time 54327.0 54327.006944125	

VizieR catalogue upload

Upload spectra/time-series in VizieR and provide them through a dedicated database.

Providing these documents need description for indonation. Currently, the Indexation is available only for FITS document. The VizieR engine will first extract the metadata from the documents uploaded in a mapping that you can update or change.

Upload your spectra / time series

You have some spectra / time series

You can upload your documents one by one by describing them independently OR if you have documents with similar header you can upload a collection (an archive in tar, zip format) and put a common description.

Add new document(s) No file selected.

File spectrum/_AA_414_599_3d02766.fits (10 items) filled

Force my mapping

Target name	<input type="text" value="OBJECT"/>	Assigned by Keyword
Right ascension	<input type="text" value="RA"/> <input type="text" value="ICRS"/> (deg)	Assigned by Keyword
Declination	<input type="text" value="DEC"/> (deg)	Assigned by Keyword
Field of view	<input type="text" value="FOV"/> (arcsec)	
Region	<input type="text" value="REGION"/>	
Spatial resolution	<input type="text" value="SPATRES"/>	
Begin time	<input type="text" value="DATE-OBS"/>	Assigned by Keyword
End time	<input type="text" value="BY-SAADA"/>	Computed value
Exposure time	<input type="text" value="EXPTIME"/>	Assigned by Keyword
Time resolution	<input type="text" value="TIMRES"/>	Assigned by Keyword
Spectral min	<input type="text" value="WCS"/> Spec. Coord.	WCS assignment
Spectral max	<input type="text" value="WCS"/>	WCS assignment
Spectral resolution	<input type="text" value="BY-SAADA"/>	Computed value
Polarization	<input type="text" value="POLAR"/>	
Facility name	<input type="text" value="TELESCOP"/>	Assigned by Keyword
Instrument name	<input type="text" value="INSTRUME"/>	Assigned by Keyword