



What might Instruments want  
to know from the TCS?

Wolfgang Gaessler MPIA



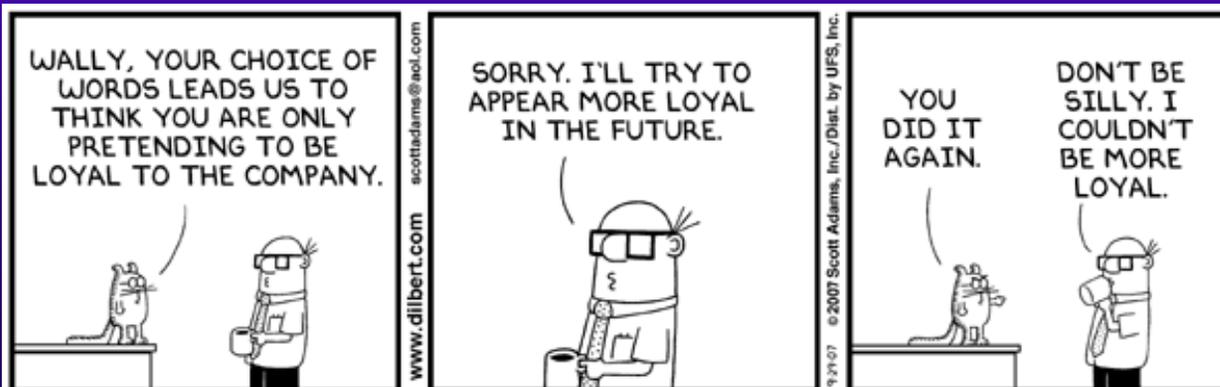
# The key elements

- ◆ Hierarchical FITS key value pairs

**LBT TEL TARG EPOCH = 2000.000 / Epoch**

**or an example written as one keyword**

**LBT.TEL.TARG.EPOCH = 2000.000 / Epoch**





## Example Fits Header

ORIGIN = 'ESO-PARANAL' / European Southern Observatory  
DATE = '2006-06-07T20:29:17.798' / Date this file was written  
TELESCOP= 'ESO-VLT-U4' / ESO Telescope Name  
OBJECT = 'HIP95567' / Target description  
RA = 291.590640 / 19:26:21.7 RA (J2000) pointing  
DEC = -65.19767 / -65:11:51.6 DEC (J2000) pointing  
EQUINOX = 2000. / Standard FK5 (years)  
RADECSYS= 'FK5 ' / Coordinate reference frame  
EXPTIME = 20.0000 / Total integration time  
AIRMASS = 1.31600 / Averaged air mass  
MJD-OBS = 53858.38571856 / MJD start (2006-05-03T09:15:26.084)  
DATE-OBS= '2006-05-03T09:15:26.0834' / Observing date  
UTC = 33324.000 / 09:15:24.000 UTC  
LST = 69499.826 / 19:18:19.826 LST  
ALARM = '' / Active alarm(s), if any.  
ARCFILE = 'NACO.2006-05-03T09:15:26.084.fits' / Archive File Name  
DATASUM = '3083989714' / data unit checksum updated 2006-05-03T  
UT = '09:15:24.000' / UT at start  
ST = '19:18:19.826' / ST at start  
HIERARCH ESO TEL AIRM END = 1.315 / Airmass at end  
HIERARCH ESO TEL AIRM START = 1.316 / Airmass at start  
HIERARCH ESO TEL ALT = 49.428 / Alt angle at start (deg)  
HIERARCH ESO TEL AMBI FWHM END= 0.90 / Observatory Seeing queried from AS  
HIERARCH ESO TEL AMBI FWHM START= 1.05 / Observatory Seeing queried from AS  
HIERARCH ESO TEL AMBI PRES END= 743.58 / Observatory ambient air pressure q  
HIERARCH ESO TEL AMBI PRES START= 743.58 / Observatory ambient air pressure q  
HIERARCH ESO TEL AMBI RHUM = 52. / Observatory ambient relative humi  
HIERARCH ESO TEL AMBI TAU0 = 0.002291 / Average coherence time  
HIERARCH ESO TEL AMBI TEMP = 11.93 / Observatory ambient temperature qu  
HIERARCH ESO TEL AMBI WINDDIR= 14. / Observatory ambient wind directio  
HIERARCH ESO TEL AMBI WINDSP = 10.23 / Observatory ambient wind speed que  
HIERARCH ESO TEL AZ = 358.602 / Az angle at start (deg) S=0,W=90  
HIERARCH ESO TEL CHOP ST = F / True when chopping is active  
HIERARCH ESO TEL DATE = 'not set ' / TCS installation date  
HIERARCH ESO TEL DID = 'ESO-VLT-DIC.TCS' / Data dictionary for TEL  
HIERARCH ESO TEL DOME STATUS = 'FULLY-OPEN' / Dome status  
HIERARCH ESO TEL FOCU ID = 'NB ' / Telescope focus station ID  
HIERARCH ESO TEL FOCU LEN = 120.000 / Focal length (m)  
HIERARCH ESO TEL FOCU SCALE = 1.718 / Focal scale (arcsec/mm)  
HIERARCH ESO TEL FOCU VALUE = -31.129 / M2 setting (mm)  
HIERARCH ESO TEL GEOELEV = 2648. / Elevation above sea level (m)  
HIERARCH ESO TEL GEOLAT = -24.6270 / Tel geo latitude (+=North) (deg)  
HIERARCH ESO TEL GEOLON = -70.4040 / Tel geo longitude (+=East) (deg)  
HIERARCH ESO TEL ID = 'v 1.601+' / TCS version number  
HIERARCH ESO TEL MOON DEC = 26.42045 / 26:25:13.6 DEC (J2000) (deg)  
HIERARCH ESO TEL MOON RA = 114.841392 / 07:39:21.9 RA (J2000) (deg)  
HIERARCH ESO TEL OPER = 'I, Condor' / Telescope Operator  
HIERARCH ESO TEL PARANG END = -2.541 / Parallax angle at end (deg)  
HIERARCH ESO TEL PARANG START= -3.031 / Parallax angle at start (deg)  
HIERARCH ESO TEL TARG ALPHA = 192621.700 / Alpha coordinate for the target  
HIERARCH ESO TEL TARG COORDTYPE= 'M ' / Coordinate type (M=mean A=apparent)  
HIERARCH ESO TEL TARG DELTA = -651146.800 / Delta coordinate for the target  
HIERARCH ESO TEL TARG EPOCH = 2000.000 / Epoch  
HIERARCH ESO TEL TARG EPOCHSYSTEM= 'J ' / Epoch system (default J=Julian)  
HIERARCH ESO TEL TARG EQUINOX= 2000.000 / Equinox  
HIERARCH ESO TEL TARG PARALLAX= 0.000 / Parallax  
HIERARCH ESO TEL TARG PMA = 0.000000 / Proper Motion Alpha  
HIERARCH ESO TEL TARG PMD = 0.000000 / Proper motion Delta  
HIERARCH ESO TEL TARG RADVEL = 0.000 / Radial velocity  
HIERARCH ESO TEL TH M1 TEMP = 10.75 / M1 superficial temperature  
HIERARCH ESO TEL TRAK STATUS = 'NORMAL ' / Tracking status



Date  
Time  
Coord

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HIERARCH ESO TEL TARG RADVEL = 0.000 / Radial velocity



**Ambient  
Environ-  
ment  
Info**

**HIERARCH ESO TEL AMBI FWHM END= 0.90**

**/ Observatory Seeing queried from DIMM**

**HIERARCH ESO TEL AMBI FWHM START= 1.05**

**/ Observatory Seeing queried from DIMM**

**HIERARCH ESO TEL AMBI PRES END= 743.58**

**/ Observatory ambient air pressure**

**HIERARCH ESO TEL AMBI PRES START= 743.58**

**/ Observatory ambient air pressure**

**HIERARCH ESO TEL AMBI RHUM = 52.**

**/ Observatory ambient relative humidity**

**HIERARCH ESO TEL AMBI TAU0 = 0.002291**

**/ Average coherence time**

**HIERARCH ESO TEL AMBI TEMP = 11.93**

**/ Observatory ambient temperature**

**HIERARCH ESO TEL AMBI WINDDIR= 14.**

**/ Observatory ambient wind direction**

**HIERARCH ESO TEL AMBI WINDSP = 10.23**

**/ Observatory ambient wind speed**



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- ◆ Remaining Ranges of optical elements
- ◆ Who is authorized
- ◆ Lights in the enclosure on/off
- ◆ Fans on/off
- ◆ LBC retracted
- ◆ ASM retracted

# What might Instruments want to know from other instruments?





# Possible instrument hierachy

◆ LN.INS.STATUS = ONLINE





◆ **Status**

– OFF, STANDBY, ONLINE, WORKING

◆ **Cooling**

– OFF, STANDBY, ONLINE, WORKING

◆ **Lamps**

– OFF, STANDBY, ONLINE, WORKING





# What might Instruments want to provide the TCS?





- ◆ Pixel scale
- ◆ Observation wavelength
- ◆ Exposure/Observation time

