

SAT.LMC *Concept and Design*

NCRA • TIFR





SAT.LMC Team:

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SIGNAL AND DATA TRANSPORT





SAT.LMC will provide Monitor and Control to the following Synchronisation and Timing (sub) systems:

- SAT.Clocks
 - One central interface (per telescope)

• SAT.STFR.FRQ

- Interface to the centrally located STFR.Tx Unit:
 - x20 for MID
 - x??? for LOW
 - x??? For Survey

• SAT.STFR.UTC

 Originally assumed one central interface to White Rabbit Grandmaster network switch (per telescope). This may change as SAT.STFR.UTC design matures.

Monitor & Control Hierarchy (architecture)

SUBARE KILOMETRE ARRY

SIGNAL AND DATA TRANSPORT



The University of Manchester

The University of Manchester

Monitor & Control S/W (architecture)



SIGNAL AND DATA TRANSPORT



-Voltage() default 230v AC -Current() default 20A -Temperature() default 100DegC -Humidity() default 100%

Maintenance Interval

default 6 month

Location

Execute

Protocol





- SAT.LMC will be centrally located in the Central Processing Facility.
- SAT.LMC will leverage SADT.TM to collect and send M&C data to SAT equipment at remote stations. The Non-Science Data Network (NSDN) may also be used.
- At remote locations (receptors) SAT.LMC will physically connect to the SAT (sub) systems using Ethernet interface.





• External Interface

- Telescope Manager (TM) \rightarrow not defined
- INFRA \rightarrow less well defined
- AIV (SAT.LMC referenced in AIV led documentation) → SAT.LMC provided input.

Internal Interface

- SAT.Clocks System \rightarrow well defined
- SAT.STFR.FRQ Sub-system → less well defined
 - SAT.STFR.FRQ.GLASSBOX \rightarrow well defined
- SAT.STFR.UTC Sub-system \rightarrow less well defined

NOTE: Interface discussions are ongoing.



• At present it is proposed that:

MANCHESTER

- SAT.LMC (sub) system controller hardware will be PC104 type equipment.
- SAT.LMC central system controller will be a desktop type PC or rack mounted industrial PC.
- SAT.LMC software will be deployed on a UNIX based OS.
- EPICS will be the framework employed by SAT.LMC (however SAT.LMC will align with the common element LMC framework decision)
- Prototyping is yet to start.
 - This is planned to begin in Q3 2015, subject to successful IICD agreement with the SAT system design teams



- SAT.LMC are in discussions with Telescope Manager about how they will interface.
 - Interface specification discussions with TM are needed.
- For PDR purposes SAT.LMC will facilitate Monitor & Control for the UTC distribution network.
 - This may be better facilitated by SADT.NMGR.
 - Discussions are ongoing.
- Simulators for prototyping phase. Where will the boundaries be between the LMCs and TM?
- Error handling. What is the threshold between handling locally within the LMC or requesting TM to handle.



SAT.LMC Assumptions



- It is assumed that:
 - The SAT.STFR.FRQ primary concept (Tsinghua University) is taken forward. No contingency in place if secondary concept leads (Risk).
 - SAT.LMC shall leverage <u>SADT.TM</u> for transmission of M&C data between SAT.LMC and SAT and between SAT.LMC and TM'
 - SAT.LMC will have a single point interface to the TM.





- Clarification is needed on the following:
 - Simulators for prototyping phase. Where will the boundaries be between the LMCs and TM?
 - Error handling. What is the threshold between handling locally within the LMC or requesting TM to handle.



SAT.LMC Standardization



- Naming Convention
 - To date we use (this aligns SAT.LMC to the convention used by SAT):
 - SAT.LMC → Local monitor and control for the Synchronisation and Timing Systems
 - SAT.Clocks \rightarrow Clock generation and distribution system of SAT system
 - SAT.STFR.FRQ → Station Timing and Frequency Reference, Frequency Distribution SAT sub-system
 - SAT.STFR.UTC → Station Timing and Frequency Reference, UTC reference Distribution SAT sub-system
- Standards
 - Awaiting guidance from TM
- Technology
 - Awaiting guidance from TM. EPICS has been downselected, but open to change.
- Protocols
 - Hoping for clarify following this LMC workshop.

SAT.LMC Common Framework



- EPICS has been highlighted as development environment of choice. However will align to LMC guideline (when official statement made).
- Distributivity of SAT equipment (not SAT.LMC but SAT)
- Different protocols of COTS equipment



End of presentation from SAT.LMC.

Questions?