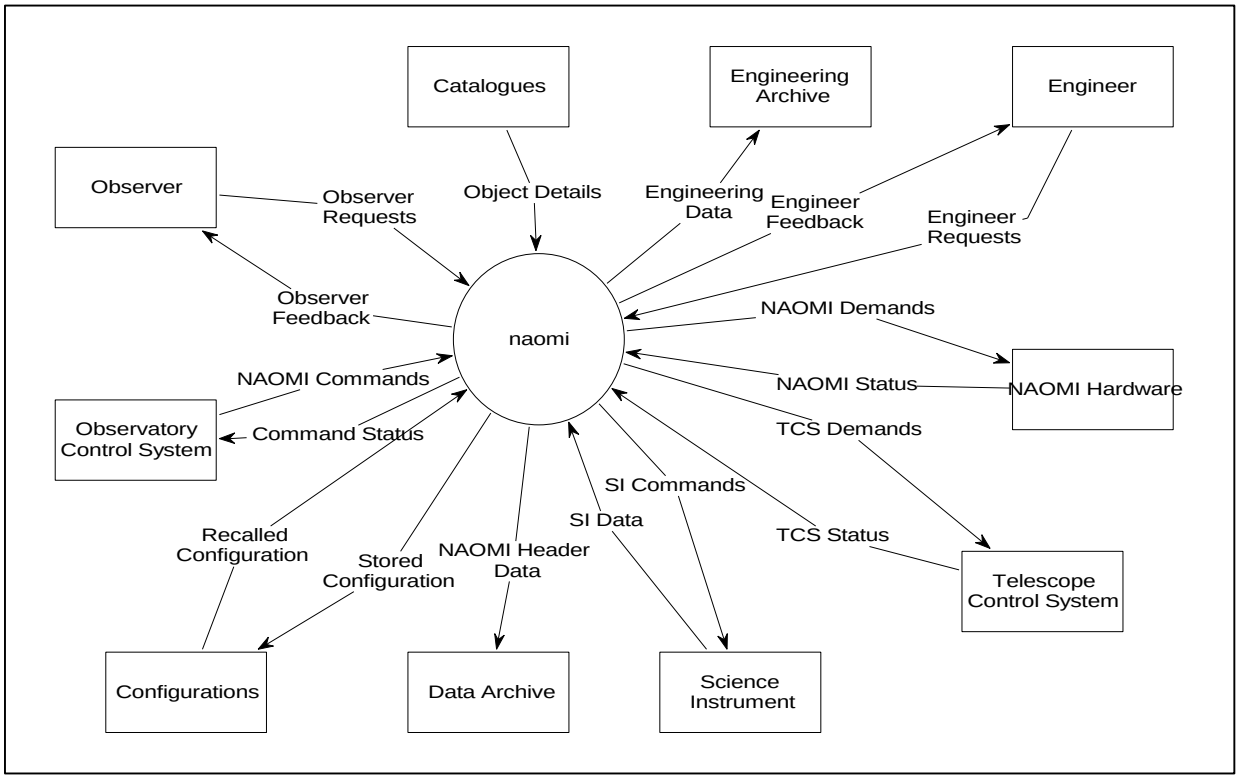
NAOMI Software Design

1. Context Diagram

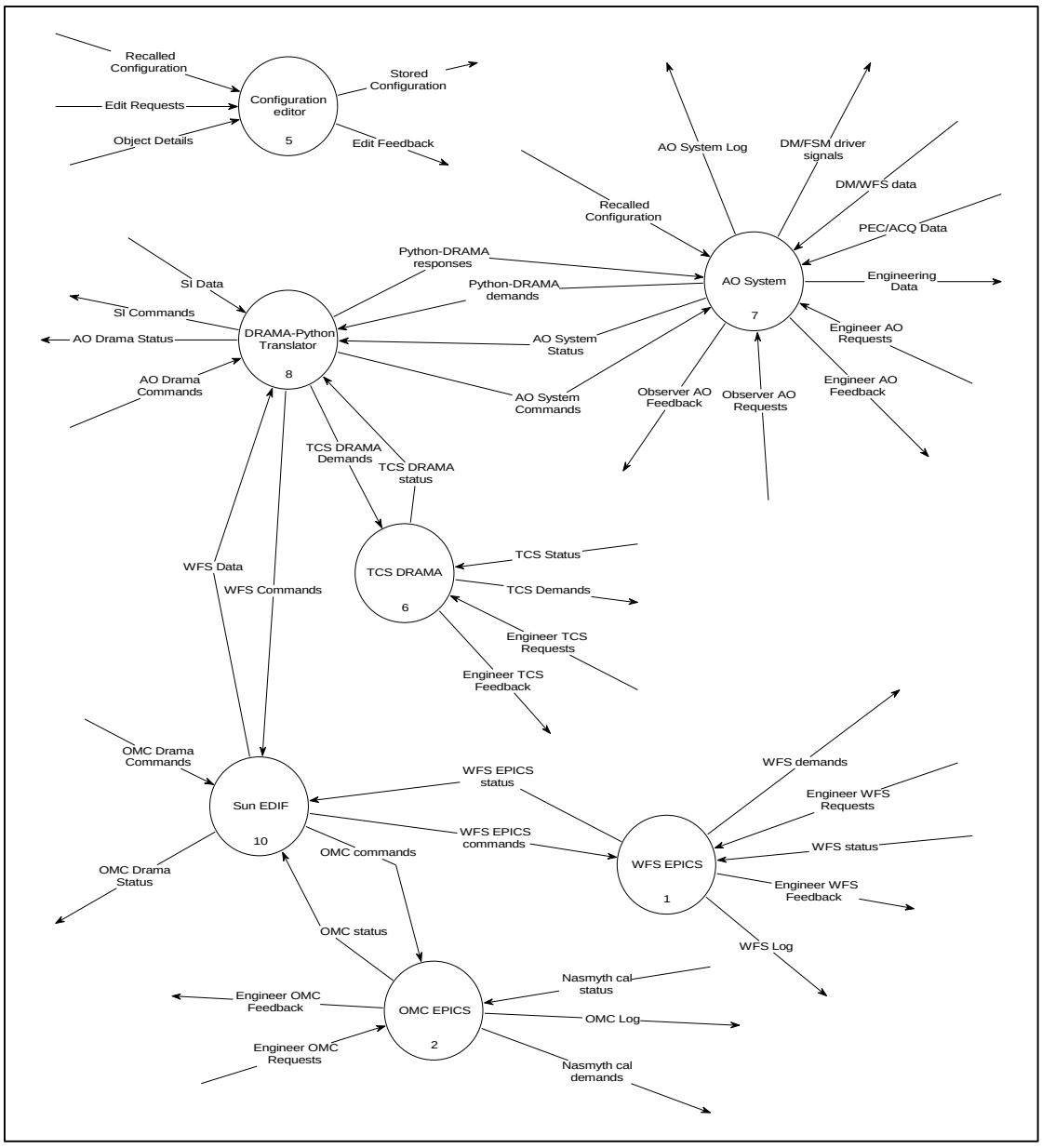


The Context Diagram shows the NAOMI system and the various data flows between NAOMI and the following external items.

- Observer - this is a user of the NAOMI system who is expecting to use NAOMI while obtaining data from the Science Instrument.
- Catalogues - these are catalogues of Astronomical objects, for example, suitable guide stars.
- Engineering Archive - this is for long-term storage of NAOMI engineering data. It might be necessary to take special steps because the data might be obtained at high speed.
- Engineer - this is someone wishing to interact with the NAOMI system in order to test it or monitor its behaviour in detail.
- NAOMI hardware - this includes the AO optical mechanisms, wavefront sensing system and calibration system.
- Telescope Control System - the WHT software system.
- Science Instrument - an Infrared imaging instrument, assumed to be INGRID.
- Data Archive - the WHT repository for stored astronomical observations.
- Configurations - a store for descriptions of required configurations of NAOMI.

- Observatory Control System - the software responsible for coordinating the operations of the telescope, the Science Instrument and NAOMI in such a way as to facilitate the acquisition of astronomical data.

2. Top-Level Data Flow Diagram



3. Data Flow Definitions

This shows how the data flows on the Context Diagram are split when they appear on the Data Flow diagram.

Flow	Composition

Command Status	AO Drama Status OMC Drama Status
Engineer Feedback	Engineer AO Feedback Engineer OMC Feedback Engineer TCS Feedback Engineer WFS Feedback
Engineer Requests	Engineer AO Requests Engineer OMC Requests Engineer TCS Requests Engineer WFS Requests
NAOMI Commands	AO Drama Commands OMC Drama Commands
NAOMI Data	AO System Log WFS Log OMC Log
NAOMI Demands	Nasmyth cal demands WFS demands DM/FSM driver signals
NAOMI Status	Nasmyth cal status WFS status DM/WFS data PEC/ACQ Data
Observer Feedback	Observer AO Feedback Edit Feedback
Observer Requests	Observer AO Requests Edit Requests

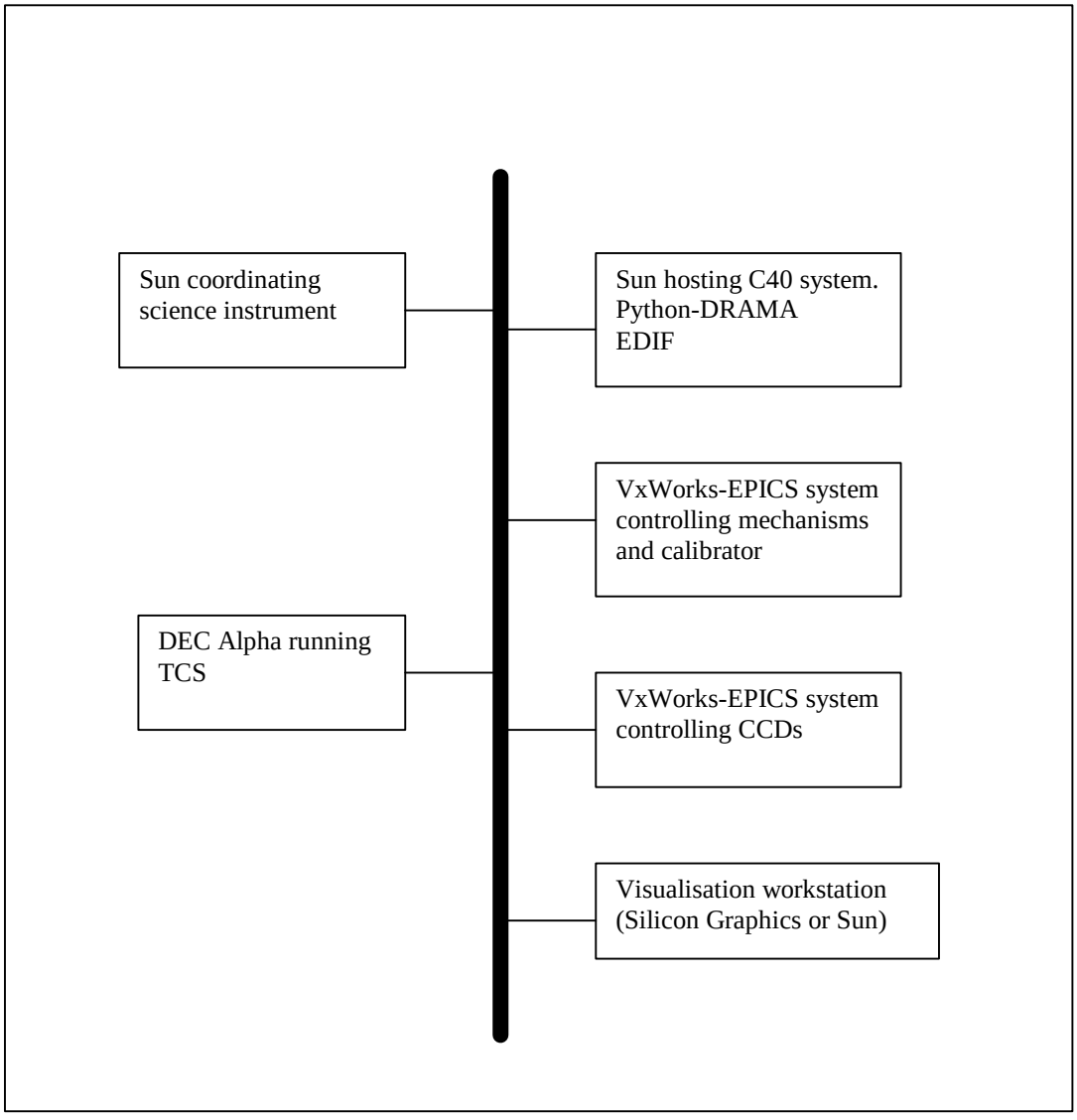
4. Process Definitions

EDIF is the EPICS-DRAMA interface task written by Min Tan.

Name	Description	Effort Estimate
AO System	Durham Software	N/A
Configuration editor	Observation preparation, probably based on the Gemini tool.	3 months

DRAMA-Python Translator	Drama task providing two-way interface between AO System and Drama tasks.	2 weeks coordinated with Durham
Sun EDIF	Standard EDIF set-up to interact with the relevant EPICS records.	1 week
OMC EPICS	Controls Nasmyth calibration unit: lamp, Tip-Tilt injector mirror, beamsplitter	??
TCS DRAMA	TCS interface writes RS232 strings to provide telescope offsets and sends DRAMA messages to adjust telescope focus.	3 weeks
WFS EPICS	Controls X,Y,Z motions, CCD camera readout, filter wheel?	??

5. Computer Hardware



The hardware diagram shows the relevant computers which are connected to the local area network, and indicates their prime responsibilities. The workstation used for visualisation will be a Silicon Graphics, unless a sufficiently powerful Sun/Solaris machine can be obtained. In the latter case, some of the software on the Sun hosting the C40 system may be transferred to the workstation (eg. the Drama-EPICS and Drama-Python interface processes).

6. Interface Control Documents (ICDs)

The following ICDs are expected to be necessary.

- NAOMI to NAOMI Hardware - this is to specify all the mechanisms (motors, switches, position sensors) which have to be interfaced using EPICS.
- NAOMI to Telescope Control System - this allows NAOMI to offload autoguider information to the TCS and also to cause the telescope focus to change.
- NAOMI to Science Instrument - this interface is to enable NAOMI to tell the Science Instrument to take a windowed exposure, and for NAOMI to collect the resulting data frame.
- NAOMI to Observatory Control System - this is the main command interface during normal observing. It has to include the ability for the OCS to tell NAOMI to perform its AO/autoguider function and to stop performing this function. It also has to be able to tell NAOMI to perform an explicit offset as part of "Dithered" observing.
- NAOMI to Data Archive - this provides header data which the WHT system may wish to add to the Science Data FITS header.