	AMICA/SOFTWARE STATUS REPORT	
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AMICA

AMICA SW: status report

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Abstract

The AMICA Control software is designed (see ACSW-Design document) as 4 independent applications (subsystem modules), which are coordinated by a top level software to support observation by IRAIT. Each camera's HW subsystem will have a dedicated control software module.
Here after, the list of control software modules and their design/implementation current status are presented

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AMICA SW: STATUS REPORT

Technical Report - v. 1.2

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1. Introduction

The AMICA Control software is designed (see ACSW-Design document) as 4 independent applications (subsystem modules), which are coordinated by a top level software to support observation by IRAIT.
Each camera's HW subsystem will have a dedicated control software module.

Here after, the list of control software modules and their design/implementation current status are presented.

2. Detector Control Software – DCS

The package takes care of the control of both MIR and NIR detectors by the SkyTech electronics, which is composed of

- one PC interface: PMC DSP based sequencer.
- one front end electronics configured with:
  - 1 SPC board: FPGA based sequencer which provides clocks for both detectors and control signals for the wobbling secondary mirror;
  - 1 NIR CDS board: video acquisition and bias generator interface for NIR detector;
  - 1 MIR CDS board: video acquisition and bias generator interface for NIR detector.

DCS basically implements the interface towards the SkyTech's software (STS), which comes in two applications: CAPTURE and TEST.
DCS and STS communicate and synchronise each other through the handshaking mechanism based on the shared RAM disk.

STS status:

Design & Implementation:

- Command interface :
  STS command interface is almost complete.

The chopper acquisition mode is still under implementation. SkyTech shall provide a single command supporting chopper and no-chopper acquisition, and
allowing to save detector frames into user named files

- Handshaking system:
  The communication mechanism has been tested, and demonstrates to work properly.
  Refinements are in progress in order to make the working directories configurable by initialization file.

DCS Status

Design Updating:

- Command interface:
  DCS command interface is still under definition.

- Database architecture:
  DCS DB basically relies on the detector controller telemetry; a suited short list of parameters to make public is under selection.

Implementation:

SkyTech software is currently tested by a patched version of the free, IDL based, ATV application; OAPd team is patching ATV.

3. Chopper Control Software – CCS

The package manages IRAIT's secondary mirror to behave in accordance to the AMICA observational modes.
It relies on the functionalities implemented within the M2 controller furnished by NTE.

CCS Status

Design updating:

- Command Interface:
  CCS interface implements at PC level the sw interface embedded in the NTE controller.

- Data base: TBD

Implementation: TBD

4. Environment Control Software – ECS

Environmental Control Software package is intended at controlling the AMICA insulated/warmed electronic cabinet, as well as the harness of AMICA's cryostat.
It manages the following HW devices:

- 1 LakeShore temperature controller is in charge of the control of working temperature of both detectors;
- 1 multimeter monitors power distribution within the AMICA's cabinet;
- 2 pressure gauges;
- electromagnetic valves ;
- temperature sensors ;
- cabinet's fans ;
- cabinet flaps ;
- cabinet's heaters;
- 1 vacuum pump;
- 1 cryocooler, 2 temperature stages;
- 1 PLC unit drives the electrical power distribution in the cabinet, and takes care of the cabinet working environment, inclusive temperatures and air stream;
- 2 motor drivers manoeuvre the filters wheel and the flipping mirror within the dewar;
- 1 shutter driver operates the shutter in front of the entrance window of the dewar;

ECS Status

Design updating:

OATe has recently updated the design by a detailed, almost complete list of controllable devices, use cases, events and alarms.

- Command interface:
An almost complete list of commands is available; it needs to be finalised.
Database: TBD

Implementation: TBD

Devices, already available/purchased, are currently tested by ad-hock Window applications, developed at OATe; the basic code of the test applications is meant to be ported into ECS.

5. AMICA Control Software – ACS

The module is intended to operate jointly individual modules, to achieve the camera observing modes; it constitutes the main user interface to AMICA as a whole.
ACS offers its functionalities to external user, either the **Telescope Control Software – TCS –** to execute the observing schedule, or the human user in case single operations are required.

ACS Status

Design updating:

- Command interface: A preliminary command list has been prepared.

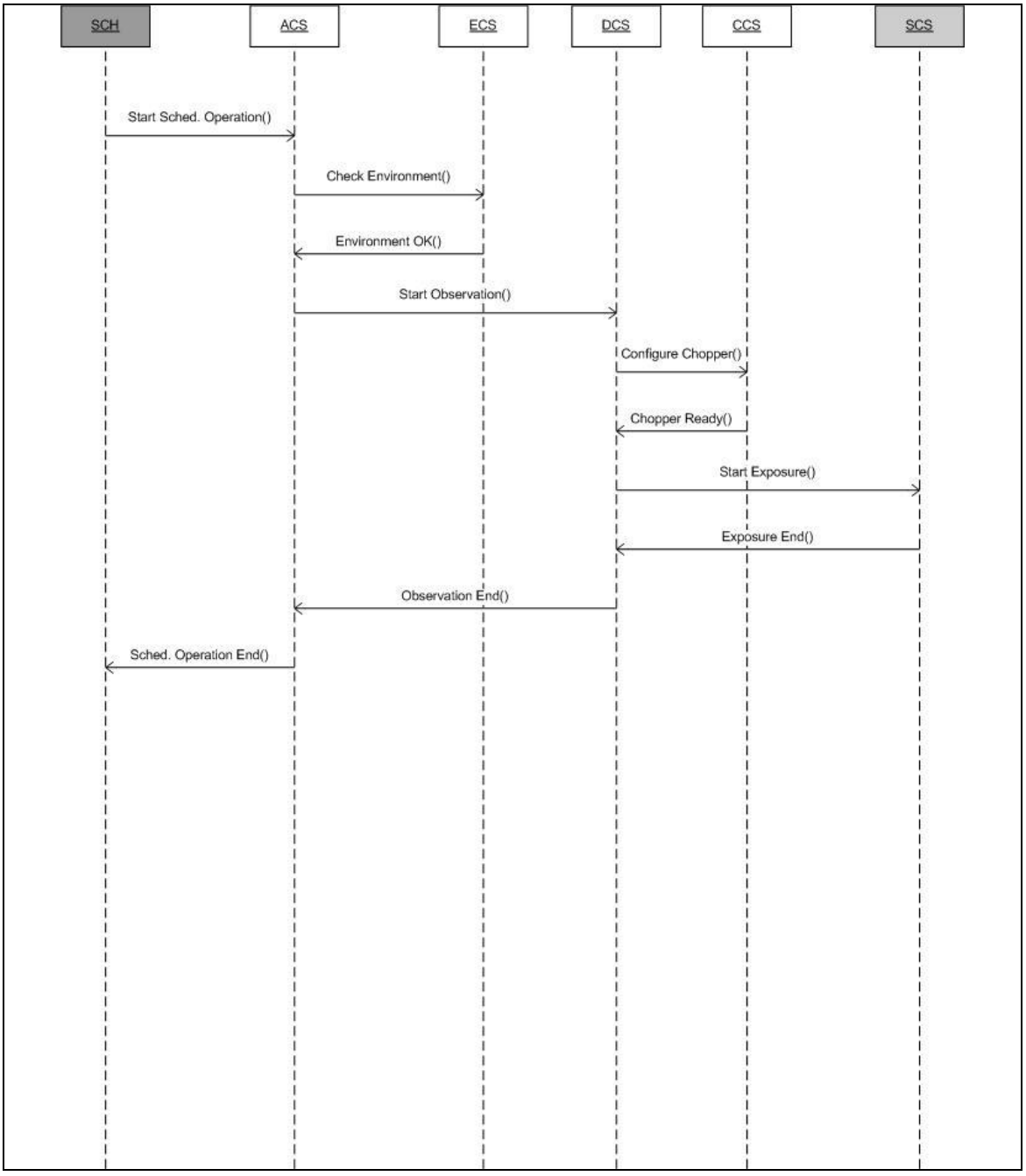
- Database: TBD

Implementation: TBD

Implementation Test at INAF-OATe

In order to assess few critical aspects of the control software implementation, some tests have been recently carried out at INAF-OATe. The tests were aimed at simulating typical/realistic observation schedule within the execution framework foreseen for ACS, in which communication and coordination between sw modules are based on the DCS-STS like handshaking mechanism: command execution and reply are implemented by files (command script file and command report file) exchanged through a shared

directory, on a RAM disk. Each sw module has been simulated by a small console application, executed in a Wndows DOS shell. The simulated schedule is shown in the figure below, and involves interactions with all AMICA sw modules.



a) *RAM disk (handshaking area) allocation*

Some restriction has been identified about the configuration of huge amount of RAM disk; Windows, by itself, doesn't seem to allow the allocation of RAM disk larger than 512 MB.
The limit would restrict seriously integration time in a single exposure achievable by the MIR detector, which potentially produces large amount of frames; besides, the reduced storage capability would impose frequent data transfers during observation.

Windows needs to be patched by commercial software, which extend the configurable RAM disk size up to 1 or to 2 GB

b) *Shared file handling*

The most efficient/reliable mechanism for locking files, in order to avoid concurrent asses to shared information, has been achieved by employing Kernel32.lib I/O functions, instead of standard C I/O library (i.e. <iostream.h>);

c) *Communication performances*

Communication between modules takes almost 20 msec, inclusive time for writing command script and reading the report file.
The whole schedule, for a exposure time equal to zero, lasts 80 ms; this is the case in which the chopper is supposed to be commanded by the SkyTech electronics.
Considering the no-optimised test conditions, the measurement can be realistically taken as the upper time overhead for a whatever long exposure.