

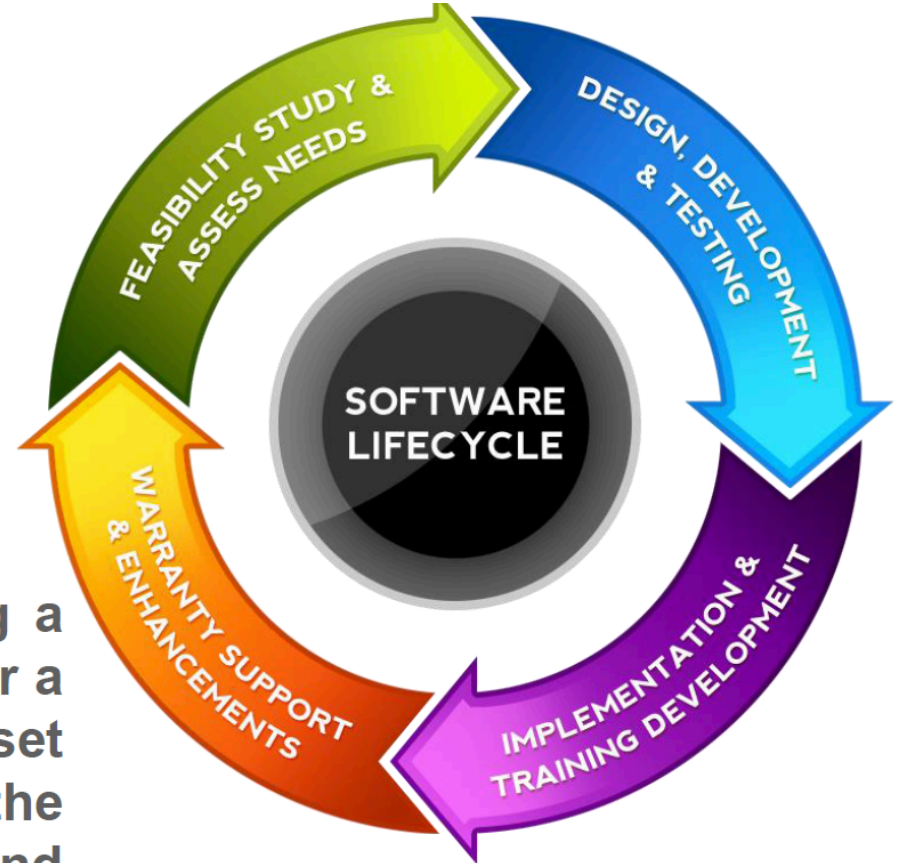
# General Introduction and scope of the meeting

G. Tosti

# Use Cases and SW LC

Use Case is part of Requirement analysis:

- ❑ Functional Requirements;
- ❑ What the software shall do;

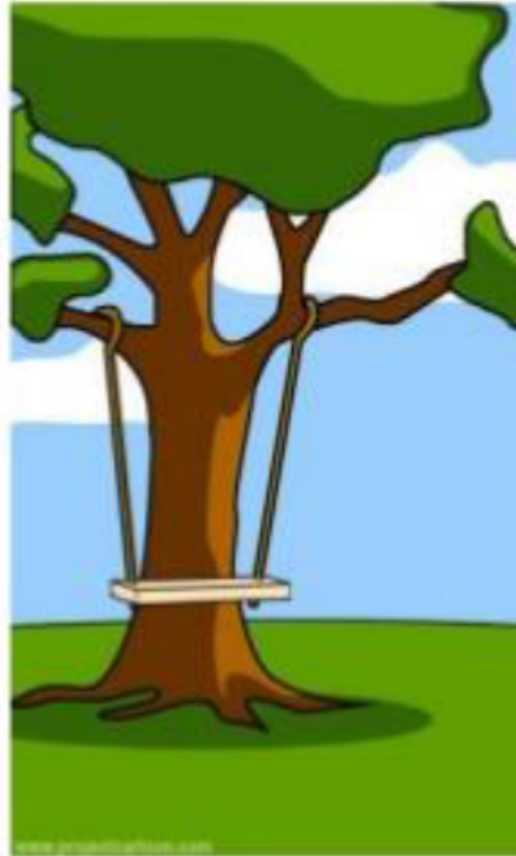


“A use case is all the ways of using a system to achieve a particular goal for a particular user. Taken together the set of all the use cases gives you all of the useful ways to use the system, and illustrates the value that it will provide”  
[I. Jacobson]

# Why Use Cases



**How the customer explained it**



**How the project leader understood it**



**How the analyst designed it**

# Top Level Use Cases

- The scope of this is to start the process to define the CTA **Top Level Use Cases**.
- They will provide a high level view of how the the Observatory will be used by the different Users regardless to the WP that will realize a specific subsystem.
- For the scope of this meeting the Scientists is the User of the CTA Observatory will provide the main inputs on how to use the system.
- The focus of each Use Case will be the science and the operations to perform science → **the purpose is to find an agreement between scientists and engineers in term of content and language.**

# The Top Level Use case Can be derived from Science Observing Scenarios

- CTA offers the possibility to implement different science scenarios (often simultaneously)
  - Observe a distant AGN with LST
  - Observe a hard spectrum Galactic source with SST
  - Observe up to ten variable sources simultaneously with a subarray of MSTs
  - Observe up to ten variable sources simultaneously with a subarray of SSTs
  - Survey an extended region of arbitrary shape with CTA telescopes
  - Survey extragalactic sky with CTA
  - Survey the Galactic Plane with CTA
  - Survey the Large Magellanic Cloud with CTA
  - Observe transient phenomena ( real-time analysis pipeline)
    1. Observe gamma-ray bursts (GRBs) with CTA ( fast slewing telescopes )
    2. Observe flaring active galactic nuclei (AGN) and galactic compact object binary system with CTA
    3. Observe galactic compact object binary system.

These scenarios have to be detailed, describing the needs to realize them: From Proposal Preparation to Final data products. → Science Use Cases

# Science Scenario

- Target Source definition
- Environmental and sky Conditions/Constraints (**derived from the Science Use Cases**)
- Observing Modes (**derived from the Science Use Cases**)
  - The full array targeting a selected object
  - sub-system of telescopes (e.g. all SST telescopes, or all MST telescopes, or all LST telescopes)
  - sub-array of telescopes (e.g. a few MSTs plus a few SSTs)
  - survey mode, where telescopes are pointed to cover a large field of the sky;
    - Pointing Modes (**derived from the the Science Use Cases**)
      - Normal pointing: All telescopes target the same sky coordinates
      - Divergent pointing:
  - Trigger Modes
- Data Processing
- Data products

# From Science Scenario to Top level use cases

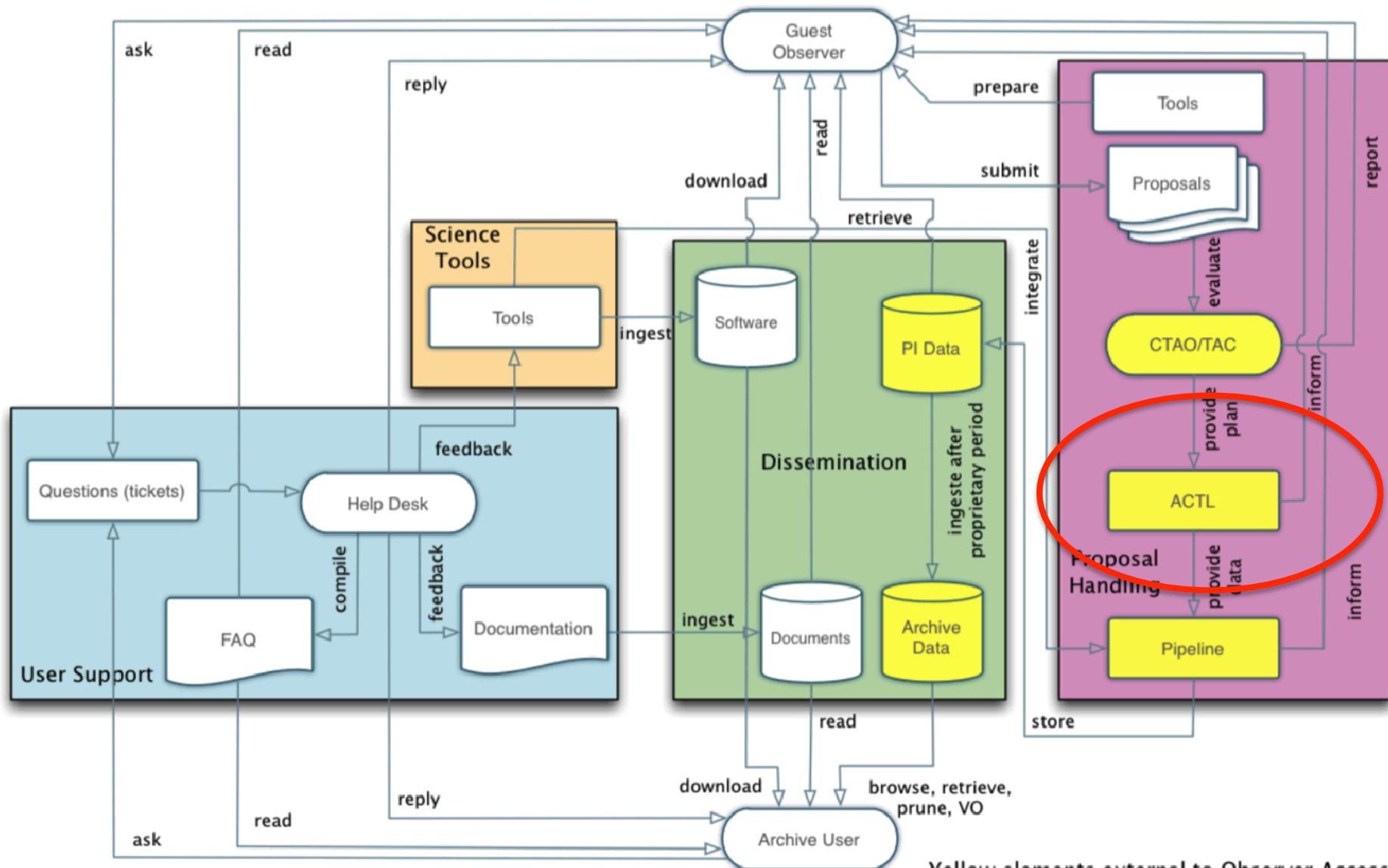
- Contribution of scientists to define the CTA software functionality and not only (see Joe's talk) is mandatory:
  - Definition of the Observing Process
  - Definition of the CTA Top level Use Cases derived from the Science Use Cases such as:
    - Observing with CTA
    - Create Observing Program
    - Schedule Observing Blocks
    - Execute Observing Blocks
    - Archive Data
    - Process data
    - Observing modes ( and pointing mode
    - Manage external ToO (see Andrea's example)

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# Top Level Use cases



Yellow elements external to Observer Access

# First step: definition of The Observing Process and Glossary

Which are the main observing process entities?

- **Proposal** (Which data should be provided by the User?)
  - If approved:
- A **Project** is created (part of approved proposal). For each Project:
- **Observing Program** is created in order to be scheduled.
  - **Scheduling Block** (Observer responsibility?)
    - Templates for standard Observing modes ?
  - **Break Points** (Observer responsibility ? )
- **Observing Session** - the time continuous execution of one or more Scheduling Blocks in a Observing Program
- **Observation Sequence**: It is a sequence of one or more **Run** that share a single goal
  - **Run** : is the minimal amount of data taking that can be commanded ?
  - **Event**: is the basic written unit of data ?

(Adapted from ALMA)

# Scope

- Build science-drive Use Cases and the relevant observing strategies
  - It will derive the detailed Use Cases refining the the level-C requirements specifications ( that for a software systems we consider software requirements (functional and quality/non-functional) for:
    - control,
    - data acquisition,
    - triggering,
    - scheduling,
    - calibration and common facilities,
    - data reduction and data analysis, archiving, observer access.

