# Interdisciplinary project

Course objective

- To train the students in **developing a full project**, considering the different phases of the **design** and **implementation** as well as to develop the ability of **team working** and **communication of the results**

- **Project based** learning approach. Apply the knowledge gained in the ICT area to the domains of health, intelligent transport systems, innovative building design, smart grids and geomatics/navigation

- Project are inspired by real-world problems of a "smart-society"

Characteristics of the course

- Non conventional" with respect to other classes
  - Few hours with frontal teaching
  - The effort is spent in the group work
  - Methodology not usual in Politecnico, but widely used in other universities in the world

- Challenging opportunity but
  - Requires proactivity of the students
  - Independency
  - Ability to develop "problem solving"

Expected learning outcomes

- To learn problem-solving methodologies drawing on lessons from several disciplines and applying them in a very practical way.

- Knowledge

  - Application of ICT technologies to other domains

- Abilities

  - Ability to work in a heterogeneous team

  - Ability to apply and select the proper ICT technology in a context different from the one in which the technology was originally deployed

  - Scientific communications
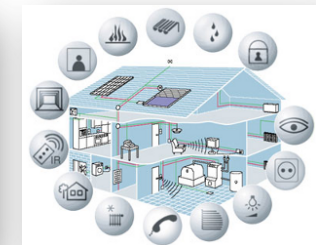
Organisation

- The course is formally split over 2 semesters

- Initial class hours are dedicated to:
  - the introduction of the different topics
  - Project management basics

- Group work (4-5 students)

- Supervision of a teacher/researcher

- About every 3 week each group prepares a progress presentation and provide updates on the advancement of the work
  - advancement
  - issues faced and solutions
  - few slides and presentation in English in front of the audience (teachers and classmates)
  - the presentation must be uploaded on the course webpage in the "elaborati" folder

- A ICT4SS day may be scheduled at the end of the second semester for an open presentation of the results to general public

Appointment of the projects: procedure

- The teachers prepared a list of topics that will be published today. In order to have more information about the topics you should contact the reference persons for each topic

- Students should express their preferences for 3 topics, in at least 2 different areas before **16/10 eob**

    Compiling a Google document (link will be provided)

- In the box, "notes" it is possible to give a preference of names of classmates you would like to work with
    - This preference will be taken into account as much as possible in the assignment of the topics

- The topics will be allocated as much as possible according to the preferences.

- Topics will be allocated during the following week

- At least one topic per area will be assigned

Exam

- The exam is the project itself that will be presented and discussed in front of the teachers committee

- The group discusses the project **all together**

- A report on the project has to be delivered **at least 1 week before the exam** to the reference teacher and to fabio.dovis@polito.it

- The actual date of the presentation of the project will be arranged during the exam session

Exam

- The exam grade is based for 1/3 on the quality of the progress presentations and the final presentation, and for 2/3 on the final oral exam.

- Each group is required to deliver the final report on the work performed at least one week before the exam's date.

- The interim presentation must show the ability of the team to manage the project, the organization of the team work, and a proper delivery mode (**correct technical language, clarity of presentation, ability to focus on the core ideas**).

- The oral exam is a discussion on the whole project that has been developed and it will start from the delivered report, in order to test:
  - their understanding of the developed work of each student of the team
  - their acquired ability for the problem solving
  - the acquired knowledge of the ICT topics necessary for the project development
  - the actual results achieved

Miscellanea

- The course takes 2 semesters but the project can be finished earlier
    - in particular for the students expecting to leave for thesis/stages during the second semester
    - the whole group must agree in finishing in advance

- The project **is not the thesis**! However, thesis topics might stem from the project itself and be further deployed as full thesis (with additional innovative contributions)

- In case issues arise within a group they have to be reported to prof. Dovis before the exam date
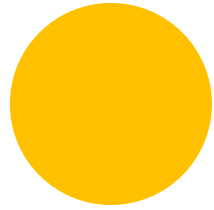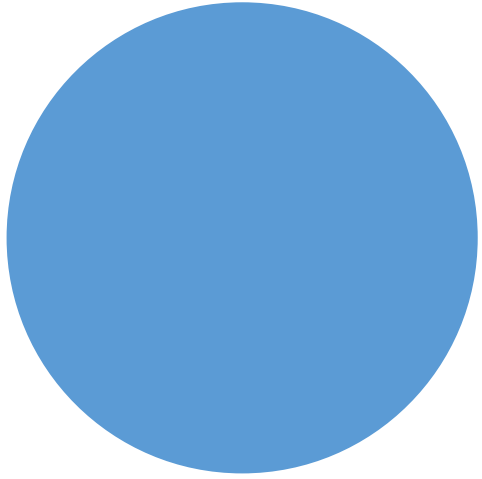
Project planning

ICT4SS

Project Management

- Complex project require organisation of the work

- The exercise done in this course is very similar to typical work projects to be developed by teams

- In this course you will have to organize your workflow according to the typical phases of collaborative projects
  - Workplan preparation
  - Definition of user requirements
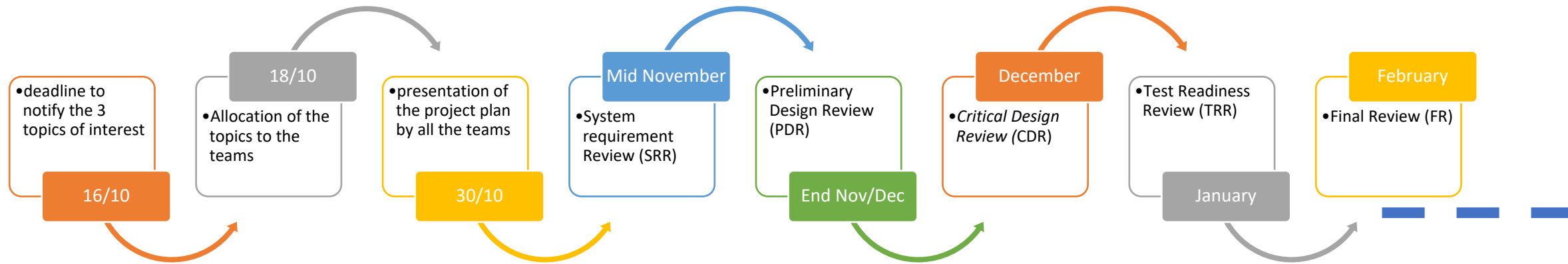 - Milestones

First presentation (30/10)

Interim presentation

Example of workflow

MILESTONES

- **Workplan preparation**

- **Definition of the User Requirements:** The first project phase will consolidate the system objectives and target challenges with the aim to detail the target performance and related operational environment, justification of the remaining operational limitations and constraints (if any).

  - *System Requirement Review* (SRR) : Building on the preliminary requirements defined in the proposal, the beneficiary shall further elaborate, justify and validate the requirements,

- **Performance of the core Design activity**

  - *Preliminary Design Review* (PDR) to consolidate the conceptual prototype architecture and the verification and validation approach, before entering into the detailed design phase;

  - *Critical Design Review (CDR)* which will finalise the system detailed design and architecture. The high-level architecture is also defined and broken down into the low level design.

  - *Detailed Design Review (DDR) [optional in our project]*

  - *Test Readiness Review* (TRR), the functional and performance **testing** is performed, which aims at verifying the **prototype's compliance with the requirements** for what concerns the **functionalities** and the target **performance**.

  - *Final Review* (FR), Final presentation

Schedule of progress presentations

This is a possible schedule for a project to be developed in the first semester

Only the 30/10 date is fixed, you have to decide when to put the other milestones according to your workplan

- **Dissemination activities,** including a final demonstration execution targeting a specific application within the identified application's class.

- **Commercialisation activities/ Exploitation Plan**: set of actions taken by to undertake to prepare the ground for commercialisation of the results, in accordance with the approved Business plan, or further develop your project

On October 30, 2019 you will present your Workplan and your analysis of User Requirements, possibly anticipating your ideas for the Preliminary Design

Preparing the workplan

- Careful analysis of the problem is essential to plan the activities

- This can be done using a **splitting of the project in workpackages and tasks**, assessing the effort needed for each of the tasks
- The effort is measured in
  - Time-needed to perform the task
  - Hours spent by each person
    - *A task can be done in 2 weeks by 1 worker, but it may not be possible to do it in 1 week by 2 workers…*
- The unit used to quantify the effort is typically the man hours/month

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  - <u>Clearly define who is doing what</u>
  - <u>Balance the effort</u>

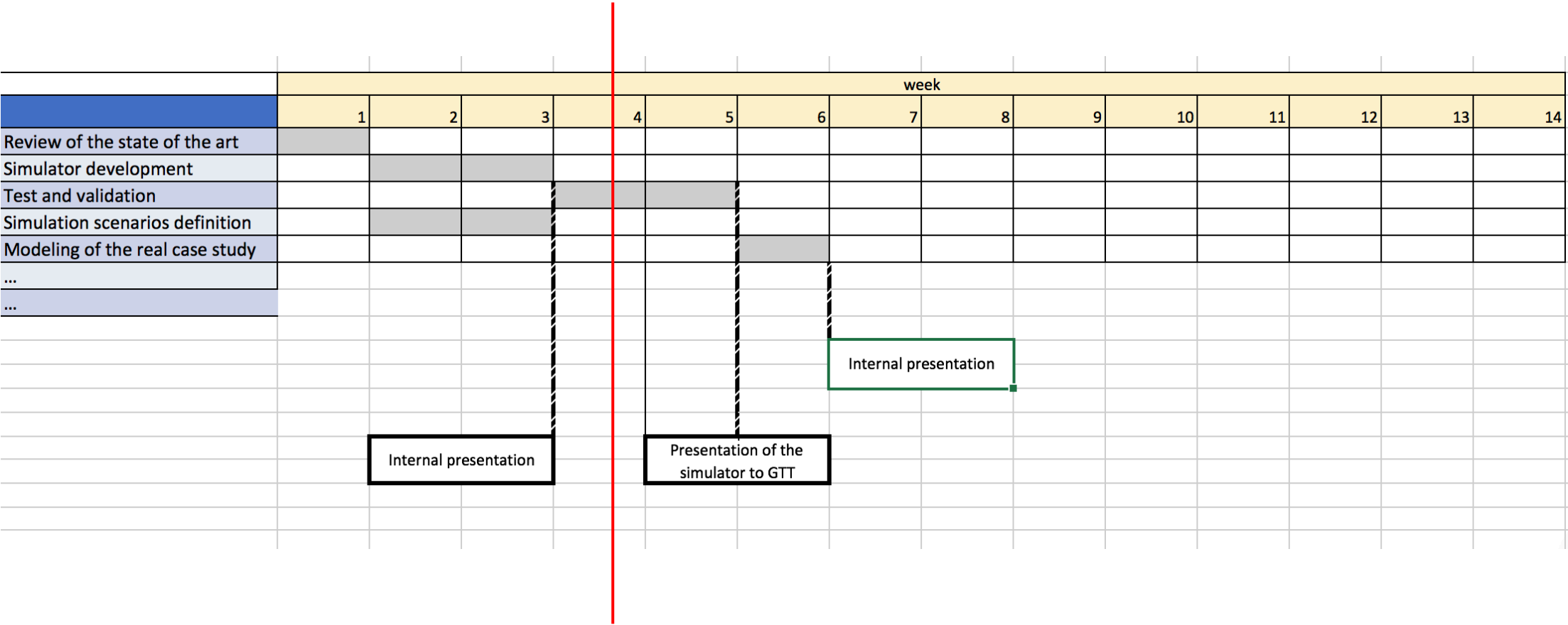 - <u>Be realistic! (time available, exam sessions, etc..)</u>

Work breakdown structure (WBS)
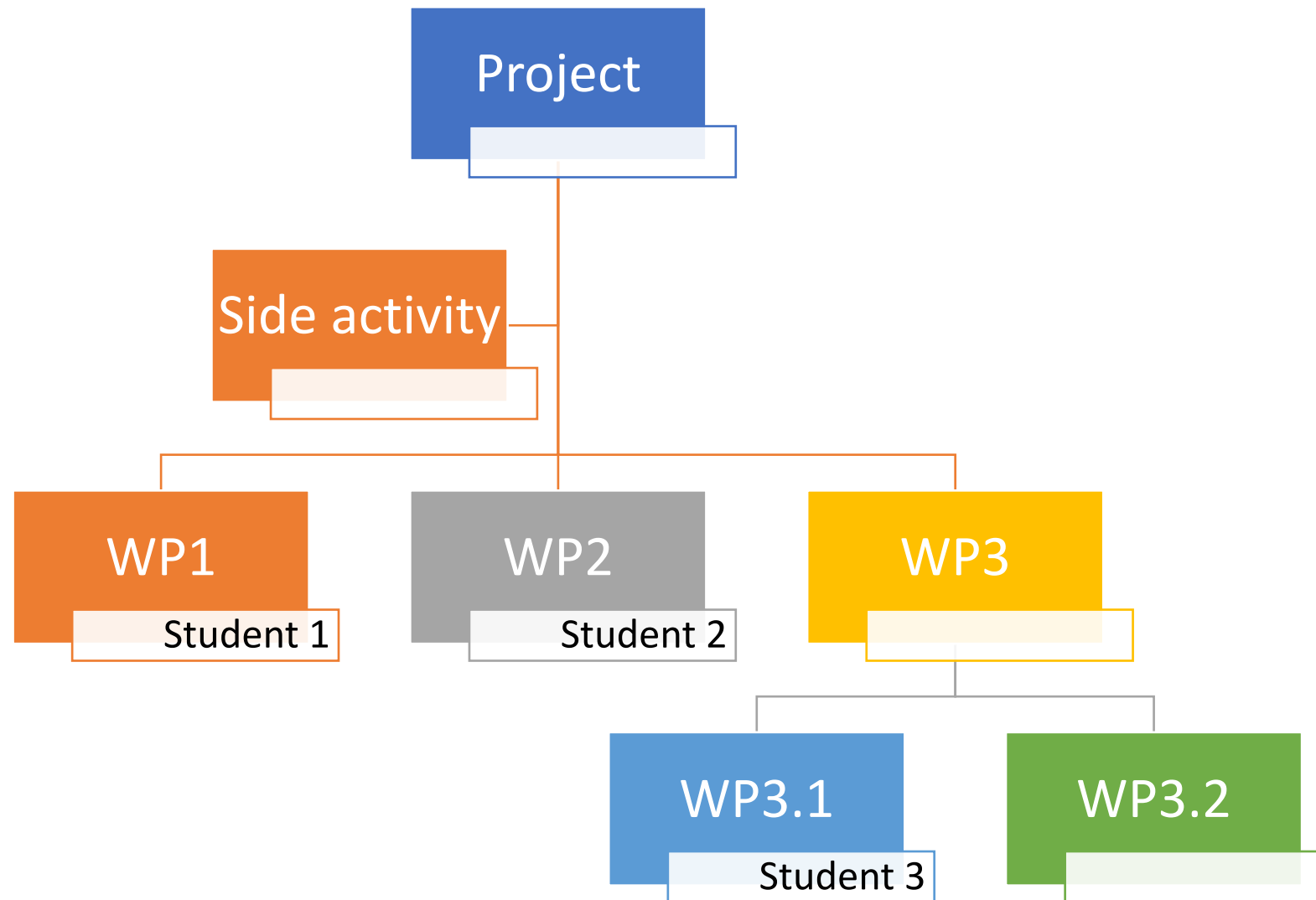
Workplan - schedule

- Use of a Gantt chart is suggested, showing interdependencies between the workpackages and tasks
  - https://en.wikipedia.org/wiki/Gantt_chart

- This chart will be used as a reference for checking the advancement of the work
  - It should be shown at each progress presentation to present the advancement of the work, comparing old and new versions in case of changes
  - **Changing of the Gaant is a negative thing**! That's why the workplan should be carefully prepared
  - Deviations from the plan can be accepted if they are **properly justified**
    - *«I didnt have time to do the work»* is not a justification
    - *«Considering the output of the PDR, perfroming the test we noticed that we had to change…»* may be acceptable

- Your Gaant will have to report the milestones (SRR, PDR, CDR, TRR,FR), i.e. your presentations on the class slot on Fridays

Example of Gannt chart

	week													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Review of the state of the art														
Simulator development														
Test and validation														
Simulation scenarios definition														
Modeling of the real case study														
...														
...														

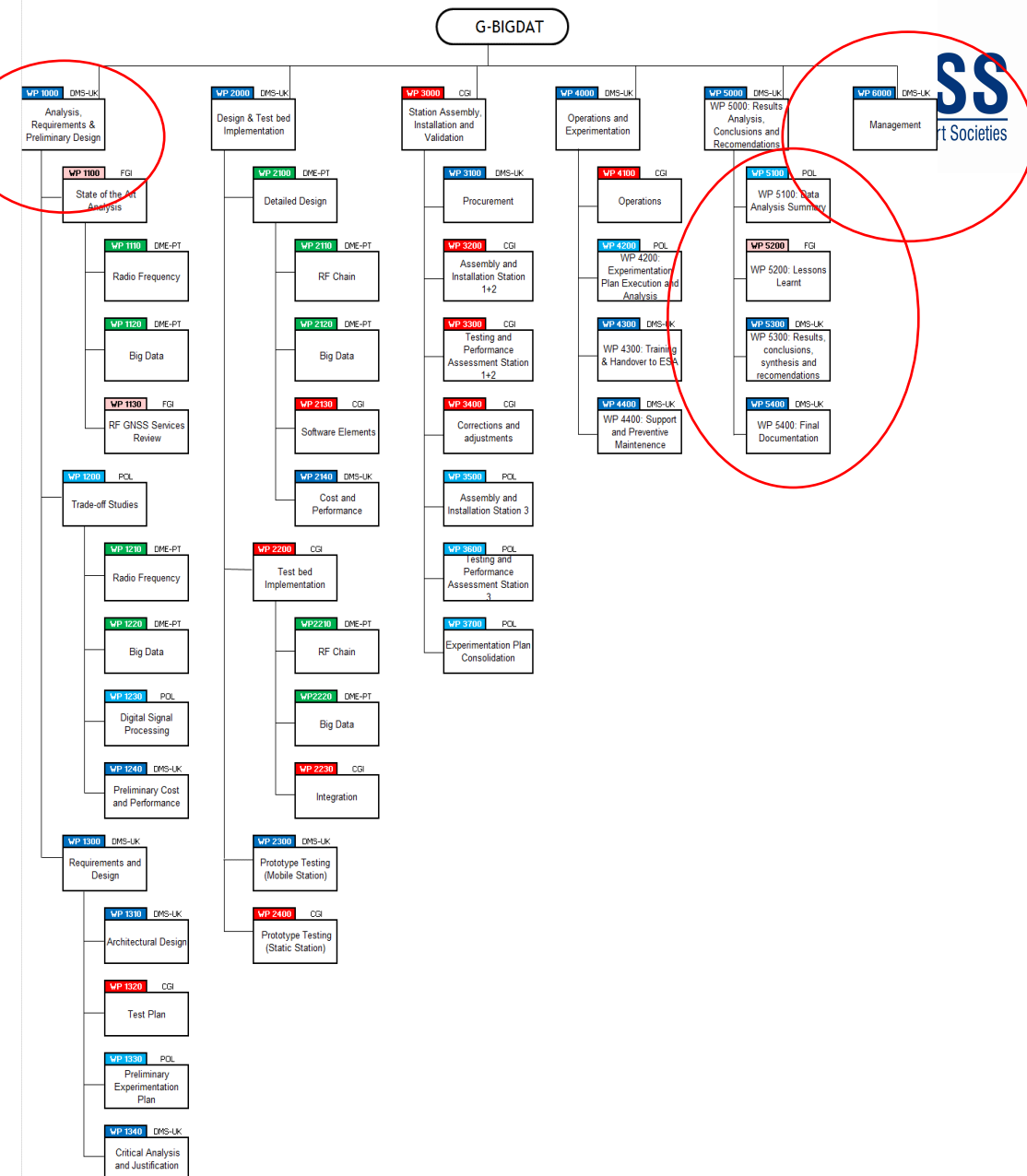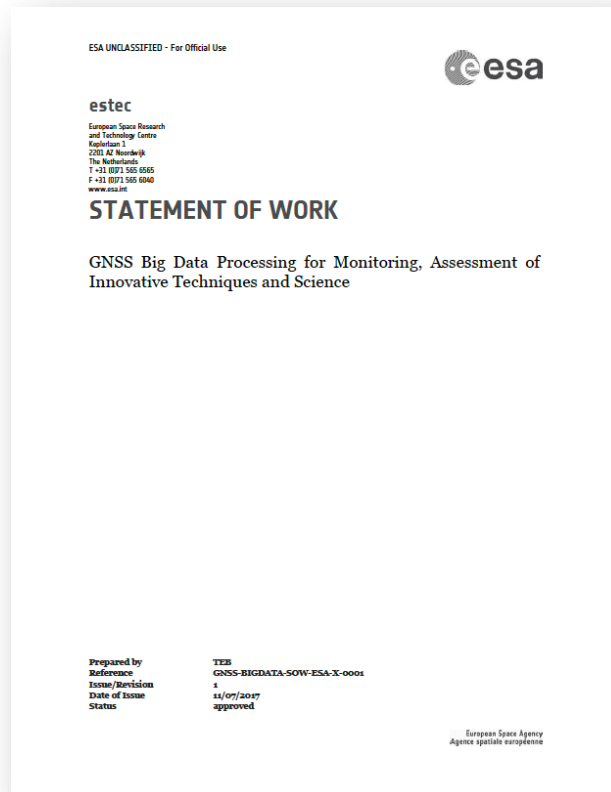Internal presentation

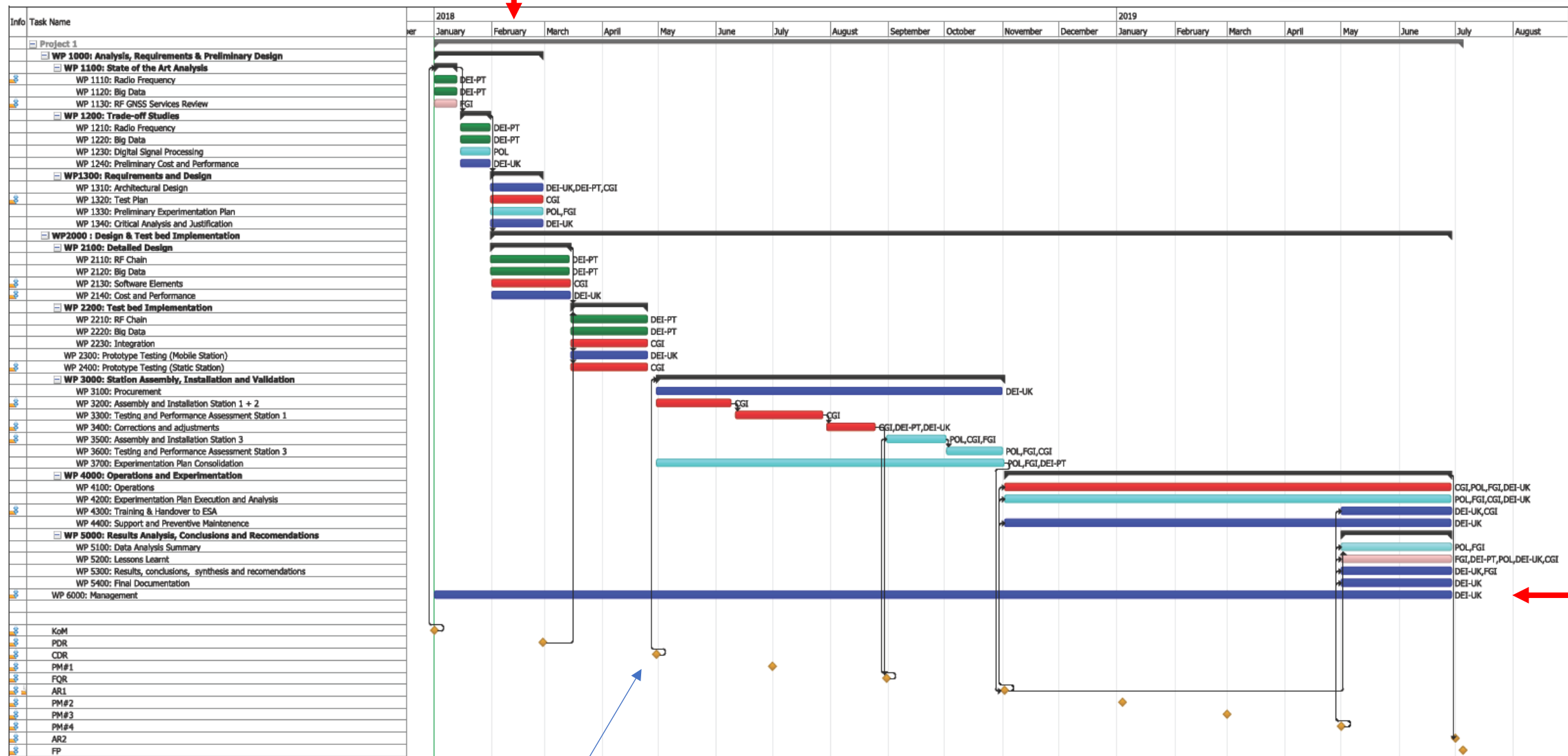Internal presentation

Presentation of the simulator to GTT

where we are

A real example

GNSS Big Data Processing for Monitoring Assessment of Innovative Techniques and Science
G-BIGDAT

ESA UNCLASSIFIED - For Official Use

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STATEMENT OF WORK

GNSS Big Data Processing for Monitoring, Assessment of
Innovative Techniques and Science

Prepared by   TEB
Reference   GNSS-BIGDATA-SOW-ESA-X-0001
Issue/Revision   1
Date of Issue   11/07/2017
Status   approved

European Space Agency
Agence spatiale européenne

A real case

meetings

milestones

RULES FOR THE PRESENTATION

max 7 minutes per group

All the members of the group are expected to participate to the presentation

Time for questions after the presentation by teachers and classmates

If someone is not present there must be a clear justification!

Nice quality of the template is appreciated, but the **content** is important
Be effective in your communication: focus on the **main messages** you want the audience to get

A possible Outline of the first presentation

Project's objective and goals

State-of-the-art / background

Workplan

Tools to be used and preliminary design

State-of-the art / background and requirements

- Describe here the context in which your project is developed, the issues and solutions already implemented

- Give to the audience the essential background elements to understand you work

- Define the specific **requirements** of your project (preliminary version)
  - USER REQUIREMENTS : The project has to…
    - …
    - …
    - …
  - FUNCTIONAL REQUIREMENTS: technical choices
- Requirements will be consolidated at the SRR

Questions ???

Prof. Fabio Dovis

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