

Life cycles of Automation  
systems

IN EXPERIMENTAL  
FACILITIES

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# CONTENT



- Presentation

- Task

-Related Information

-Ideas on how to achieve the  
objective

-Create planning/ scheduling and  
decomposition of work

-Ideas how to split tasks among  
other participants



# Who I am?

Academically, I would like to study a master's degree focused on particle physics, high energies or space science.

Im Oscar Vázquez, im Mexican 🇲🇪, i am 22 years old, I studied physics at the UNAM science faculty, I already finished my credits, just working on my thesis to have my degree.



# TASK

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1.

- Define the project objective: Design automation processes for colliders, focusing on DCS life cycle improvement with insights from ALICE and ATLAS experiments.



2.

- Define Automation Systems: Automated systems involve the use of control technologies to operate processes without direct human intervention.

3.

- Develop a detailed project plan with milestones for each stage of the life cycle, adapting it to our context, budget, regulations, infrastructure and personnel.

# Related information

## Automated

Use of control systems and technologies to operate and control various processes without direct human intervention.



## Systems

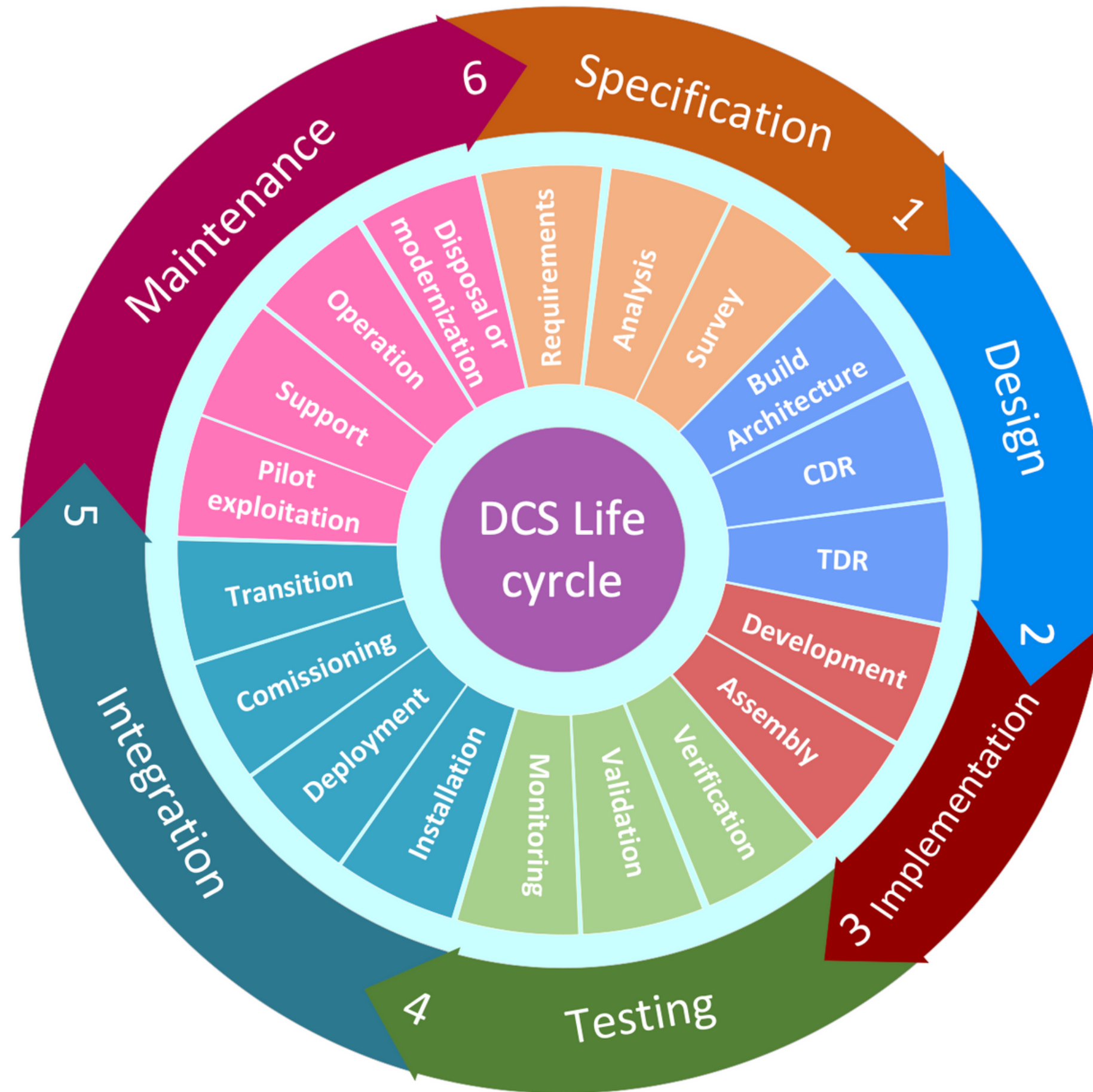
Components:

1. Particle Acceleration and Control.
2. Beam Steering and Focusing.
3. Data Acquisition and Monitoring.
4. Safety Systems.
5. Remote Operation.
6. Calibration and Alignment.
7. Experiment Control



# Life cycle of automated systems

08



TDR and CDR refer to two important reports that play crucial roles in the planning, design, and execution of particle physics experiments. These reports provide detailed information about the technical aspects of the experiment, guiding the project through different stages of development.



### Conceptual design report

The Conceptual Design Report outlines the conceptual framework, scientific goals, and initial design considerations for a proposed experimental project.

### technical design report.

- The Technical Design Report serves as a comprehensive documentation of the technical specifications and design details of a proposed experimental project.

# What design stages van they be?

## DESIGN CDR AND TDR

### CDR

1. DEFINE THE PROJECT SCOPE AND OBJECTIVES.
2. OUTLINE THE EXPERIMENTAL APPROACH.
3. PRELIMINARY DESIGN CONSIDERATIONS.
4. RESOURCE REQUIREMENTS.
5. COLLABORATIONS AND PARTNERSHIPS.

### TDR

1. INTRODUCTION AND PROJECT OVERVIEW.
2. DETAILED TECHNICAL SPECIFICATIONS.
3. PERFORMANCE EXPECTATIONS.
4. DATA ACQUISITION AND ANALYSIS.
5. SAFETY CONSIDERATIONS AND RISK ASSESSMENTS.
6. BUDGET AND FUNDING.
7. COMPLIANCE WITH INTERNATIONAL STANDARDS.





# International Standards

## Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems:

take care of the processes carried out in the experimental stage to avoid risks and how to act if they happen

IEC  
61508

ISO  
9001

## Quality Management

Ensure the quality of components, procedures, techniques, design, execution, safety and handling

## Occupational Health and Safety Management Systems:

Regular safety training for personnel working on the experiments, conducting risk assessments in experimental areas, and maintaining thorough records of safety incidents and corrective actions.

ISO  
45001

ISO  
14001

## Environmental Management

Minimize the environmental impact. How to repair damage to the environment

# TEAMWORK

Integration



computer systems



architecture development



physical processes

