

NIRSPEC Optical Engineer

Background : Management of NIRSPEC optical issues. The NIRSPEC project consists in the realization of a spectrograph for the space telescope JWST.

Objectives

Stake : Demonstrate that the mirrors alignment is possible with respect to the mechanical constraints and the preservation of the optical performances

Our Challenge : Calculate the mirrors necessary movements to get back to the best alignment for a large number of random cases of the theoretical system perturbation :

Our approach

A meeting with Client's Client has allowed to specify the requirement for the calculation as well as the mechanical constraints that should be considered for the alignment after the perturbation.

The use of the optical software Code V has enabled the creation of a macro performing a large number of random cases of the theoretical system perturbation, then the alignment after perturbation and calculating the optical performances.

A second macro allow the calculation of the mirrors sensibility to elemental perturbations in order to help during the practical alignment.

Results

The calculation has shown that in all random cases a alignment solution exists in order to keep the required optical performances.

Sensibility tables for each mirrors have been realized.

Clients benefits

Creation of the sensibility tables necessary for the practical alignment in clean room.

Demonstration to Client's client during meetings with optical experts that the technical aspects of the project are considered and well controlled,...

Electrical system design

Dealt with a power supply box designed to supply a system of radio transmission.

Objectives

The power supply box allows :

- supply the host system in an autonomous way,
- communicate the remaining autonomy.

Our approach

- 1) Choice and design of the main elements of the power supply box (Smart battery, electronic components, connectors),
- 2) Design, test, schematic seizure, realization, validation and industrialization of the electronic card,
- 3) Development of the software associated with the μ C selected,
- 4) Write-up of all associated documentation.

Results

The autonomous power supply box was realised in time.

It supplies the host system in an autonomous way and communicates the remaining autonomy via a RS232 serial line.

The battery can be recharged by connecting the battery charger to the box connector.

Clients benefits

Only one technical interlocutor throughout the life of the project..

Control of the line of sight

Objectives

To conceive the stabilization of the line of aiming of an aeronautical system

Our ways

The project is a fixed price. To synthesize a stabilization turn-key in with the maximum of reactivity (short deadlines), it is necessary to be autonomous as soon as possible:

- 1) To have a good idea of the system to control - method of characterization frequential and temporal to realize with the customer - to list in a way targeted with the Juste necessary the specifications essential of the elements characterizing the line of sight to decline the requirements systems environmental in requirements for robustness for control to realize
- 2) to synthesize a simulator readjusted and documented clearly on the basis of characterization realized by or with the customer allowing to validate theoretical work to come and carry out the fixed price without test facility
- 3) To establish a thorough theoretical work of expertise of expertise on modelling and the synthesis of the laws of robust order



Results

Delivery of a stabilization turn-key leads to employment after implementation in a calculator: - a document of the bible type "robust methodology of design of controls in environment applied to the project" (~500 pages) - a software of the simulator type of line of sight and its documentation (instructions, file of design) readjusted in environment

Clients Benefit

Obtaining algorithms, a method and tool to carry out futures of them turn-key usable on other fields

Logistics support analyse of a spaceship sight

Goals

Answer to the SLI requirements
Explain logistics Data



Our way

Analyses of :

- reliability and AMDEC
- Security
- Testability
- Maintainability (Plan and maintenance task, LORA),
- New analyse failure diagrams and stochastic computations associated

Logistics support data synthesis through the norm 1388.
Logistics data explanation (Access)

Results

SLI goals have been reached
The review has been successful.

Customer benefits

Easy to use Logistics filing system

Mechanical design of a weapon subset

Objectives

Mechanical design of a subset allowed to guide a missile.



Our Way

- . Seek technical solutions with respect to the specifications ;
- . Argumentations detailed of the technical choices ;
- . Constitution of the files of definition implemented on the data management system ;
- . Management of the team designers.

Results

Finalization of the files of definition in 11 months under SAP for the production of the prototypes ;

Returns of qualification taken into account.

Clients benefits

Technical training specialized in aeronautics of Defense ;
Capacity to manage a team of designers.