
andocument title/ titre du document

SUMMARY OF PROBA3 MISSION ANALYSIS FOR CORONAGRAPH INSTRUMENT

prepared by/préparé par	PROBA3 Team
reference/référence	P3-EST-TN-7002
issue/édition	1
revision/révision	0
date of issue/date d'édition	1-July-2009
status/état	Draft
Document type/type de document	TN
Distribution/distribution	

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P3-EST-TN-
7002_Issue1_rev0.doc

APPROVAL

Title <i>Titre</i>	Summary of PROBA3 Mission Analysis for Coronagraph Instrument	issue <i>issue</i>	1	revision <i>revision</i>	0
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author <i>auteur</i>	PROBA3 Team	date <i>date</i>	1-July-2009
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approved by <i>approuvé by</i>	date <i>date</i>
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CHANGE LOG

reason for change / <i>raison du changement</i>	issue/ <i>issue</i>	revision/ <i>revision</i>	date/ <i>date</i>
First Draft	1	0	1-Jul-09

CHANGE RECORD

Issue: 1 Revision: 0

reason for change/ <i>raison du changement</i>	page(s)/ <i>page(s)</i>	paragraph(s)/ <i>paragraph(s)</i>

TABLE OF CONTENTS

1	INTRODUCTION	4
1.1	Definitions.....	4
1.2	Scope of Document	4
1.3	Applicable Documents	4
1.4	Reference Documents	4
1.5	Acronyms	4
2	ENVIRONMENT	5
2.1	PROBA3 Baseline Final Orbit	5
2.2	Radiation Environment	5
2.3	Orbit Segments.....	5
2.3.1	Orbit Segment- Perigee Pass.....	5
2.3.2	Orbit Segment- Coronagraph Science Observation Phase.....	5

1 INTRODUCTION

1.1 Definitions

1.2 Scope of Document

This document is intended purely as a summary of RD-2, extracting only the information deemed important or necessary for the definition and design of the Coronagraph Payload. See RD-3 for a list of Coronagraph Mission Requirements.

1.3 Applicable Documents

AD-1

1.4 Reference Documents

RD-1	PROBA3 Mission Requirements Document (MRD) P3-EST-RS-1006
RD-2	PROBA 3 Phase B Mission Analysis Report, P3-SSC-RP-2010 (Version 1F)
RD-3	PROBA3 System Requirements Document (SRD) P3-EST-RS-1001

1.5 Acronyms

AoP Argument of Perigee

2 ENVIRONMENT

2.1 *PROBA3 Baseline Final Orbit*

Perigee	800 km
Apogee	71,200 km
Semi-major Axis	42378 km
Eccentricity	0.83062
Inclination	50 deg
Argument of Perigee	180 deg
Orbit Duration	~24 hours

Figure 1: PROBA3 Baseline Final Orbit

2.2 *Radiation Environment*

At an argument of perigee (AoP) of 180°, an inclination of 50°, with 5mm of Aluminium shielding, the total dose over the 2 year lifetime is 13 kRad. With 50% margin, the requirement on the components in this orbit is 20 kRad (behind 5mm Aluminium).

2.3 *Orbit Segments*

2.3.1 ORBIT SEGMENT- PERIGEE PASS

The PROBA 3 orbit is divided into segments during which different operations will occur. Between the exit from an experimental phase and the acquisition of the required configuration for the next experimental phase, the satellites must be manoeuvred with the main objective of minimising collision risk around the perigee whilst spending as little propellant as possible. The Perigee Pass segment will consist of the direct transfer manoeuvre which will ensure that the satellites achieve the desired relative position and velocity at entry of next experimental phase allowing a smooth transition into the science observation phase.

The direct transfer manoeuvres is also complemented by the application of one or more mid-course correction manoeuvres in order to compensate any error in the computation or execution of the baseline manoeuvres.

The Perigee Passage will last between 12 and 18 hours per orbit.

2.3.2 ORBIT SEGMENT- CORONAGRAPH SCIENCE OBSERVATION PHASE

The Coronagraph science experiments will be executed in parallel with other experiments during non-working days, provided that its operation can be automated. The Coronagraph Science Observation phase will last between 6 and 12 hours per orbit, for those orbits

designated as Coronagraph observation orbits (see RD-1), and this phase will be centred around apogee.