

HORIZON-MSCA-2021-DN-01



ANTERRA

101072363

Detailed Planning of all Training Events

Deliverable D6.2



V2.1



## Document history – List of changes

Version	Date	Author name	Scope
V1.0	30/03/2023	Christian Fager	
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## 1 Introduction

The main objective of ANTERRA is to train early-stage researchers (ESRs) by means of the research projects in which they will work together to form a large multi-disciplinary and collaborative research team. In this way, the ESRs will learn to work across disciplines and sectors. On top of the training by doing research, the training programme includes specific training of scientific and technical skills, soft-skills and an industrial orientation. Next to the training programme, specific workshops will be organized that complement the training and research activities and will stimulate the interaction between the fellow ESRs. Additionally, the training involves training in a top-down joint demonstrator project. Upon successful completion of the training programme, the ESRs will receive a PhD degree.

In this deliverable, we briefly summarize the ANTERRA training programme and present the planning.

## 2 Training Programme Summary

Figure 1 provides a detailed overview of the overall PhD training programme with a total study load of 180 ECTS (1 ECTS = 28 hours of work), i.e. 60 ECTS per year. It is organised in the form of a **Doctoral School**, which will be continued after completion of the ANTERRA project. The **introduction workshops (3 ECTS)** provide the research fellows a first introduction into cross-disciplinary topics required in this programme. The post-master level **core courses (15 ECTS)** are mandatory for all fellows and will provide them a toolset for complex, multidisciplinary development efforts in the area of antenna systems for non-terrestrial applications. The **specialization part (15 ECTS)** of the project consists of an **individual research project** for each fellow as well as a **joint demonstrator project**. Towards the end of the project, the fellows will write a **joint white paper** about their individual research projects for the general public. It should include a section that describes the future **impact of their research on society**. The training programme is complemented with a comprehensive list of **professional skill courses (10 ECTS)** offered by the universities.

All technical courses will include a significant hands-on experience. Several theoretical modules will also be provided as **on-line modules using web-lectures, screencasts and electronic exercises**. Table 1.3aa provides a more detailed description of all courses and workshops including the involvement of the project partners and the type of evaluation that is used. The fellows have to pass all courses which are included in their CDP. The **industrial-academic training** program will provide the fellows the following **unique** learning objectives which cannot be obtained in a purely academic setting:

- Obtain state-of-the-art knowledge of industrial (mostly proprietary) system and manufacturing know-how,
- Work in innovative industrial multi-disciplinary project teams using modern project management methods,
- Obtain inside in defining business cases (e.g. return-on-investment), patent application and standardisation,
- Develop a cross-disciplinary joint demonstrator with input from various stakeholders in the value chain from component supplier to system integrator.

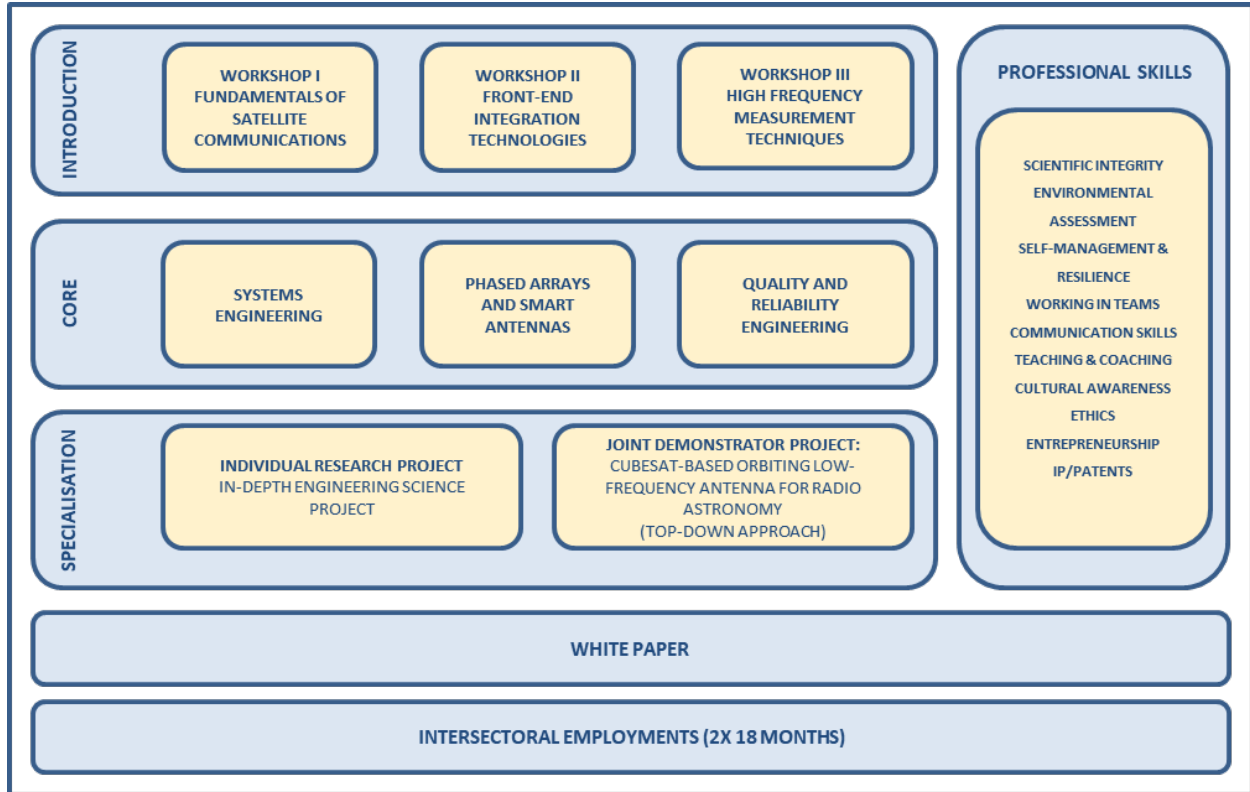


Figure 1. Overview of the ANTERRA Doctoral School. The total training programme has a study load of 180 ECTS.

### 3 Introduction Workshops (M6-M12)

The ANTERRA programme defines a series of introductory workshops. The table below summarizes the planning of these events:

Introduction Workshop	Lead Organizer and Time
Workshop I: Fundamentals of Satellite Communications	Lead: TAS-F May 31- June 1, 2023
Workshop II: Front-end integration technologies	Lead: TAC Online training, autumn 2023
Workshop III: High frequency measurement techniques	Lead: TU/e Part of project meeting, autumn 2023

### 4 Core Courses (M6-M18)

The core courses are offered as a mix of university courses from Chalmers, TU/e, and POLITO, respectively, and courses and training offered by the member industries and related associations. The following table describes the list of the recommended core courses and their planning.

## 4.1 Technical courses

Core Courses	Time
<b>Systems Engineering (5 ECTS)</b>	<b>M6 – M18</b>
Dedicated ANTERRA course: Course via Fraunhofer IEM	Q2 2024
TU/e: 5Z066 - Systems engineering	
Chalmers: IMS105 - <a href="#">Fundamentals of Systems Engineering</a>	Annually, Oct – Dec
<b>Phased Arrays and Smart Antennas (5 ECTS)</b>	<b>M6 – M18</b>
TU/e: 5LPB0 - Phased array and smart antennas	Apr. – July (annually)
Chalmers: <a href="#">SSY100 - Antenna engineering</a>	Apr. – June (annually)
POLITO: <a href="#">01NVS0Q - Advanced antenna engineering</a>	
<a href="#">European School of Antennas</a> : E.g. Active Arrays or similar	
<b>Quality and Reliability Engineering (5 ECTS)</b>	<b>M6 – M18</b>
Workshop on Quality and reliability in space industry. Presenters by TAS-F and SATCUBE	Online, Fall 2023
Workshop on Quality and Reliability in telecom industry. Presenters by Ericsson and TAC (TBC)	Winter 2023/2024

## 5 Specialization

### 5.1 Individual research project (M4-M40)

All ESRs have a well-defined individual research project, each contributing to the overall scope of the 6G non-terrestrial antenna systems as defined in the project proposal.

The Individual research project is carried out from the ESR start date (approximately M4) until the end of the ANTERRA project, corresponding to an overall workload of 135 ECTS.

### 5.2 Joint demonstrator project (M12-M36)

In order to engage the fellows in multi-disciplinary team setting that is similar to a large system development project encountered in industry, the training programme includes a joint demonstrator project, which is coordinated in WP5. Here, the fellows can put the content of the introduction workshops, core courses and professional skill courses directly into practice. The joint demonstrator will target a radio satellite communications payload for a CubeSat satellite. The requirements will be derived from user needs, which will be derived together with TAS-F, TAS-I, EAB and AST in a virtual use case workshop. The remainder of the demonstrator project will then follow contemporary systems engineering approaches, e.g. using concurrent engineering for the payload system concept and an agile approach for the development stage. The project will be successful once the team passes the critical design review, which is the critical last milestone before the implementation phase.

The Joint demonstrator project is scheduled to start in M12 and last until the end of the project, and correspond to an overall workload of 15 ECTS.

## 6 Professional skills training (M6-M36)

The professional skills training is an important part of ANTERRA, corresponding to 10 ECSTs. In summary, the training includes the following sessions: (i) Environmental assessment (MSCA Green Charter) (ii) Taking charge of your PhD project, including scientific integrity (iii) Giving an audience-focused

presentation, (iv) Writing a scientific paper, (v) Project management, including an extensive training session with actors, (vi) Working in teams, (vii) Intercultural communication and gender issues and (viii) Scientific integrity (ix) Entrepreneurship, (x) Hands-on course on filing of IP/Patents and on standardisation, (xi) Career opportunities and preparation where they will gain more insight in their own wishes (type of jobs/companies), how to use sources to orientate themselves on the job market, how to present themselves.

All the universities (TUE, CHA, POLITO, UANT) offer a wide portfolio of professional skills courses to choose from to match the topics mentioned above. The planning of the relevant professional skills courses for each of the ESRs is specified in their individual CDPs.

## **7 White Paper (M24-M36)**

At the end of the project, the ESRs will write one joint white paper about their research project for the general public. It should include a section that describes the future impact of their research on society.

The White Paper corresponds to a workload of 2 ECTS.

## **8 Inter sectorial employments (M4-40)**

The ANTERRA ESRs will have a split employment, consisting of 18 months at an academic institution and 18 months at an industrial/institute consortium member. The inter sectorial employments play a crucial role in the training and personal development of the ESRs. In this way, they will be exposed to an academic environment (with focus on fundamental research, training and teaching) and an industrial environment to gain application-specific skills and insight in economic and market-related aspects. To simplify the administration, relocation, and productiveness the employments are typically split in continuous 18 month periods in each host. The research is carried out at a hosting university and by a hosting industry (18 months each). In some cases, the employments are complemented with a shorter stay at a second industrial host.