



**OPEN  
SOURCE  
SATELLITE**

# Open Source Satellite Programme Manifesto

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VERSION 1



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This Manifesto describes the approach for the development of a flexible, robust, low-cost microsatellite platform, making the design freely available for anyone to utilise and benefit from, and for realising this vision in a sustainable, enduring way.

All contributors to and beneficiaries of the Open Source Satellite Programme are deemed to have accepted the principles and approach described in this Manifesto.

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# 1 Introduction

The Open Source Satellite Programme Manifesto (“The Manifesto”) describes the philosophy and approach of the Open Source Satellite Programme (“The Programme”), which has been initiated by KISPE.

The purpose of The Manifesto is to provide clarity about the vision, philosophy, intentions, immediate and long-term goals and the approach to achieving those objectives. This Manifesto will ensure that everyone who wishes to be involved in the Programme, such as the internal team, Participants, the Community and other beneficiaries and stakeholders - is provided with the same, consistent framework and is able to make an informed decision about participating.

There are many reasons to be excited and motivated about getting involved, including:

- Accelerating the development of a new spacecraft design that all can use
- Accessing a brand-new satellite design to use in your own missions
- Being part of a Community of Open Source Space enthusiasts
- Building a new professional network with people from different disciplines and industries
- Championing Open Source Space to make space more affordable and accessible
- Developing and enhancing skills in areas that you are interested in
- Flying your work in Space, knowing that you played part
- Gaining hands-on experience in delivering space missions
- Getting involved in an innovative approach to space
- Giving something back, by sharing your knowledge, to grow the knowledge base
- Improving your resume with new experiences and results
- Personal satisfaction, being acknowledged for your efforts
- Recognition by peers for developing and improving space systems
- Supporting the Open Source culture by giving to, and benefitting from collective efforts.

The Manifesto is intended to be the primary reference for The Programme, to serve as guidance throughout all phases of The Programme. Additional information will be made available via The Programme team.

## 2 Primary Goal: Developing a Next Generation Microsatellite Platform

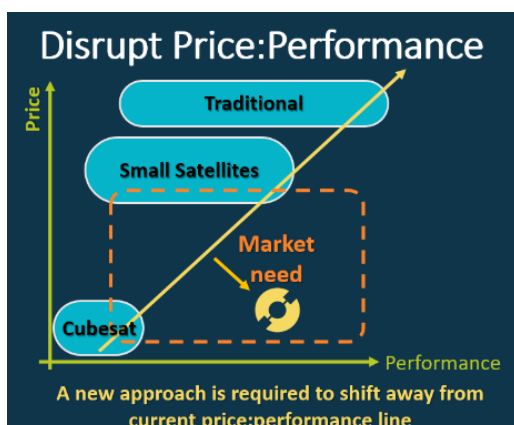
The primary goal of KISPE is to develop a Next Generation Microsatellite Platform (“NGMP”) and to make the NGMP design open source and freely available through The Programme.



KISPE's wider ambition is to support and stimulate the development of an Open Source Space ecosystem and community. The aim is to create a hub, centred around the Open Source Satellite Programme website, to connect teams that are developing open source space capabilities such as different mass classes of spacecraft, subsystems, payloads, mission analysis and planning tools, ground segments, operations systems, test facilities and tools that can analyse mission results. [www.opensourcesatellite.org](http://www.opensourcesatellite.org) will also be a focal point for open source developments from other industries that may be relevant to The Programme and other Open Source Space activities.

### 3 Making the Next Generation Microsatellite Platform Open Source

The key drivers for KISPE are to improve the affordability, accessibility and sustainability of space; to address the market need for an improvement in the price:performance point of small satellites; to stimulate the next wave of disruption in the small satellite industry; and to enable the development of new missions, applications and services.



Small satellites initiated the initial market disruption by leveraging COTS parts and processes, but it appears that the unit cost per spacecraft cannot be reduced much further.

Cubesats have been critical in recent years for lowering the barriers to entry, however they appear to be unable to provide sufficient robustness and mission enabling capability to support more demanding missions.

The goal is to develop the NGMP to fill this gap and deliver microsatellite-class performance for a cubesat price, even when manufacturing in low volumes. The aim is to increase the level of integration and robustness over subsequent missions in order to develop a single platform that is affordable for use in vLEO (very low Earth orbit) (low Earth orbit), GEO (Geosynchronous Equatorial Orbit), lunar and interplanetary missions.

This Next Generation Microsatellite Platform will be a performant and flexible system that KISPE Space will be able to use to implement some of its own commercial missions; however, simply using it for KISPE Space missions will not result in the desired increase in accessibility to the design, nor stimulate the market.

Making the NGMP design open source, under the Open Source Satellite Programme brand, will maximise access and achieve the wider aims of The Programme.

## 4 The Open Source Satellite Programme Business Model

This Manifesto provides transparency about the approach that KISPE Space is taking to generate the funding to support the work of the Open Source Satellite Programme.

The objective is to develop a performant, robust and reliable satellite platform that teams want to use because of the mission enabling capabilities that it provides. The Open Source Satellite Platform design will be freely available for anyone to use, including for commercial utilisation. The aim is for the design to be flexible and capable and to improve the performance of the platform over subsequent generations of the design, to create more opportunities for new missions and services in benign and harsh space environments.

Significant investment is required to develop a new microsatellite platform design. Sustained funding is necessary to support high levels of innovation, evaluate emerging technologies and processes and integrate new mission enablers into future generations of the design. Financial support is also required to maintain a purpose-built repository where anyone can access these designs, to support the Open Source Satellite Programme stakeholders and to grow the wider Open Source Space community.

The Programme has observed many firms that have started with the objective of developing open source solutions. They have benefited from the early goodwill of open source collaborators, then pivoted to a fee-based model in order to generate revenue because they did not have a plan for long-term business sustainability from the start of their projects. This results in open source contributions to being lost and inaccessible by the open source community and increases distrust in the underlying motivations of the initiating teams, slowing progress.

The Programme intends to avoid this outcome and has developed a logical and coherent business model from the outset that will be able to deliver a design that is openly accessible and sustainable over the long-term. In order to balance the goals for inclusivity and community-building with a pragmatic approach to mission and business sustainability, The Programme will leverage a mix of open source tools and cost-effective commercially-available tools where it makes sense.

The Open Source Satellite Programme is developing a number of different funding streams to support the immediate activities and long-term vision.

### 4.1 Internal KISPE company funding

Funding from KISPE is being provided to develop the Open Source Satellite Platform. KISPE is "*investing in itself*", to develop a product that it believes in, based on strong indications that a low-cost performant microsatellite platform is required to further stimulate the market and enable a new wave of missions, applications and services.

## 4.2 Commercial use of the Open Source Satellite Platform design

Subject to the confidentiality period, the Open Source Satellite Platform designs in their native format will be freely available to anyone who wants to use them. All teams, including KISPE, can use the design for commercial and non-commercial projects.

The Programme's approach to open source is analogous to the approach adopted by SparkFun and AdaFruit; satellite platforms and services will be provided commercially using the NGMP brand whilst also making the designs freely available under the Open Source Satellite brand for anyone who wants to use the design and build a satellite for themselves.

KISPE Space will be sustaining the development of the Open Source Satellite Programme by delivering solutions using the NGMP brand as follows:

- Platforms: Producing NGMP platforms for mission teams who wish to buy a platform that is ready for integration and use it to independently develop their own microsatellite missions
- Spacecraft: Producing flight-ready mission-specific spacecraft, built with NGMP platforms at their core, integrated with mission-specific payloads and other mission-enabling capabilities
- Licencing: Working with a manufacturing partner to manufacture and sell NGMP platforms under licence, from which KISPE Space would receive a proportion of the sales value
- Mission services: Providing systems engineering, project execution and consultancy services to help customers develop and design and implement their own NGMP missions
- Training: Delivering training courses (such as classroom-based, workshops and hands-on classes based on the Open Source Satellite and other systems, to help teams to maximise the potential and success of their Open Source Satellite missions.

## 4.3 Participants: Collaborators, Contributors, Sponsors and Supporters

Participants are made up of Collaborators, Contributors, Sponsors and Supporters are able to support as much or as little of the programme as they wish, with financial or in-kind contributions. These contributions will be tailored to allow for the specific capabilities, requirements and desired outcomes of each Participant, and the level of benefits that sponsors and supporters receive will be linked to the scale and scope of their support. The Programme welcomes teams that wish to participate in collaborative development activities and also seeks to engage with teams with experience outside the space domain.

## 4.4 Grants

The Programme will consider applying for grants to fund development activities that enable progress to be made in specific project tasks.

## 4.5 Supplementary funding

The Programme will establish supplementary funding options such as merchandising and donations.

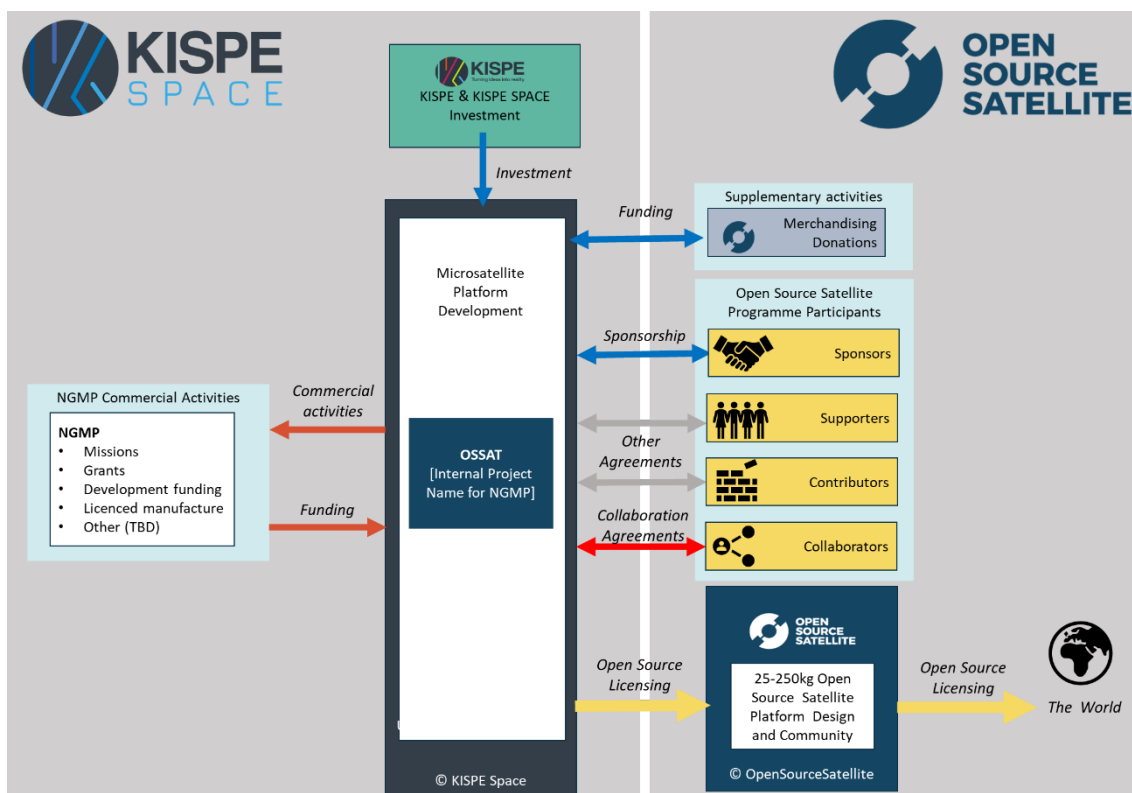


Figure 1: The Open Source Satellite Programme Business Model

## 5 Participation Opportunities

The Programme is seeking engagement with teams and individuals that have an interest in getting involved. There are many ways to get involved in, and many ways to benefit from The Programme.



## 5.1 Collaborators

Collaborators are defined as teams and individuals who contribute their time on a voluntary basis to work on specific work packages for The Programme. Collaborators will gain early access to specific elements of the Open Source Satellite design depending on their area and level of participation and will have their contributions acknowledged on the Open Source Satellite Programme website.

There is a continuous open call for Collaborators to let The Programme know about their interest in getting involved. Potential participants are invited to register at [www.opensourcesatellite.org/register](http://www.opensourcesatellite.org/register) to indicate their interests and level of experience.

Calls for participation in specific activities will be announced via the [www.opensourcesatellite.org](http://www.opensourcesatellite.org) website and promoted on [LinkedIn](#), [Twitter](#) and other platforms and channels.

A member of the KISPE team will contact registrants to verify and match skills, interests and availability with planned activities. Once a Collaborator is accepted, they will gain access to The Programme repository where they will be able to browse potential projects for contribution.

The team is seeking to collaborate with participants with backgrounds and experience across all engineering disciplines and from diverse industries, through all phases of the project, to create the building blocks required to implement the programme. For example:

- Provision of stakeholder use cases
- Reviewing of architecture(s)
- Reviewing of functional design(s)
- Reviewing of physical design(s)
- Writing code
- Reviewing of software
- Designing hardware
- Verification and testing activities

### 5.1.1 Definition of Collaborator tasks and work packages

Clear descriptions will be written for each task/package of work that could be undertaken by individuals or teams, including:

- A description of the package of work,
- A definition of the requirements, the starting-point and inputs, any constraints and the critical outputs,
- Timescales for completion,
- Guidance on the level of effort that will be required to complete the task,
- The skills and level of experience that are required,
- Quality requirements and acceptance test criteria.

### 5.1.2 Creating a body of work for the open source space community

It may be the case that some of the Collaborator work packages are preliminary preparatory activities to fact-find, de-risk and determine feasibility. Some contributions will be relevant for use in a future version of the Open Source Satellite design, or they may be applicable to open source activities being led by other teams in the Open Source Space ecosystem.

The Programme wants to ensure that Collaborators have the opportunity for their work to be accessed, used and acknowledged; therefore all such potentially useful contributions will be hosted in the Open Source Satellite Programme repository for the wider community to access and use, in the interests of moving the open source community forward.

## 5.2 Contributors

Contributors are defined as teams and individuals who have a desire to support the vision of The Programme and the open source philosophy by providing in-kind contributions and preferential rates for items such as hardware items, software, design tools and testing tools that support The Programme activities.

Contributors may have their contributions acknowledged on the Open Source Satellite Website and promotional opportunities such as corporate logo placement and article writing opportunities.

Contact The Programme at [info@opensourcesatellite.org](mailto:info@opensourcesatellite.org) to enquire about Contribution opportunities.

## 5.3 Supporters

Supporters are defined as teams and individuals who wish to amplify the work of The Programme through their own activities and platforms.

Supporters may have their contributions acknowledged on the Open Source Satellite Website and promotional opportunities such as corporate logo placement, article writing opportunities and webinar co-hosting.

Contact The Programme at [info@opensourcesatellite.org](mailto:info@opensourcesatellite.org) to enquire about Supporter opportunities.

## 5.4 Sponsors

Sponsors are defined as teams and individuals who provide significant strategic levels of financial or in-kind contributions that allow us to fast-track the achievement of the programme funding.

Sponsors may have early access to, and rights to use the designs to accelerate their own projects and missions, prominent sponsor logo placement, article authorship options, webinar co-hosting and co-branding opportunities.

Contact The Programme at [info@opensourcesatellite.org](mailto:info@opensourcesatellite.org) to enquire about Sponsor opportunities.

## 5.5 Supplementary funding

Teams and individuals can show their support for the Open Source Satellite Programme and Open Source Space vision through purchasing branded merchandising and offering donations.

## 6 Sharing and Using The Programme Information

The Programme will be releasing information and making information accessible as the design matures and milestones are achieved.

All of the platform design information will be released to the Community under a [Creative Commons](#) Licence and will be publicly available to all by Launch+12 months, with discrete elements of the design being made available before that time. Additional materials will also be available to all, including our articles, blogs and webinars; open source satellite programme resources and open source space resources. This information and material will be available to all for commercial and non-commercial purposes.

Design information will be made available to Participants in advance of public release; the degree of timeliness and the types of information will be tailored to the degree of participation and their motivations for getting involved in The Programme. For example, strategic Sponsors may be interested in gaining live access to design information in order to accelerate their own mission developments; Collaborators may be interested in having live access to specific project files that are related to their area of interest.

## 7 The Legals

There are only three main requirements for everyone who gets involved in the Open Source Satellite Programme:

1. If you make any contributions, we need you to confirm that you are the originator of the contributions, or that you have the right to submit those contributions. This is required to make sure that The Programme is able to make all contributions freely available to all.
2. You will not disclose or transmit the content of any items marked as Confidential Material until one year after the launch of the spacecraft, when

all design information shall be made available. This is to allow The Programme to generate funding and to ensure that the final released design is robust and reliable, before making the design available to all.

3. Once design outputs have been marked as Open Source, all such material will be subject to Creative Commons Licence CC BY-SA 4.0. This will make sure that all of the platform design information remains available without restriction.

## 8 Next Steps

The team at KISPE will review the information you have provided about yourself and your experience. In the meantime, please keep an eye out for emails and social posts with updates and upcoming milestones. If you have contacted us via [opensourceatellite.org](https://opensourceatellite.org), you are on our mailing list and we will be sure to keep you in the loop.

Please do not hesitate to contact us at any stage: [info@opensourceatellite.org](mailto:info@opensourceatellite.org)

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We're really excited about developing the world's first open source microsatellite platform and we look forward to the possibility of collaborating with you.

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