2015 European CanSat Competition Proposal Form

Contact Details	
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CanSat or team name	spaceclub_berlin
Student's names and age	Christina Nadolsky (17), Nana Reinhardt (18), Adrian Melinat (15), Jasper Hufschmidt-Morse (16), Yuna Reinhardt (16), Christian Staudigl (17),
School name and town	spaceclub_berlin in the orbitall, in the FEZ Berlin
Country	Germany

Organization	
How will you distribute the work between the team members? Consider all aspects of your experiment (structure, software, data analysis, etc.)	The team will be divided intro groups of mainly two. Such as: Organization (finding sponsors, organize courses, etc.), documentation (photography, video recording, etc.), recovering systems (also parachute, GPS, etc.), CanSat building and tools (design, glass fiber case, software, etc.). The whole team will participate in analyzing the data.
Do you have access to a workshop or a laboratory?	Orbitall in the FEZ Berlin, Workshops in the FEZ Berlin
How much time will you have available to work on your CanSat and how will you spend it?	We have six months to advance the CanSat and improve the software.
How do you plan to finance your expenses? Are you supported by your school or other sponsors?	The project is funded by the spaceclub_berlin, a project of the Orbitall, in cooperation with the German Aerospace Center (DLR). Also by other organizations.

Do you have all the material and equipment needed for your mission? If not, how do you plan to obtain it?	In the German national CanSat competition we often bought the building elements twice, which we now will use for our advantage and use these elements in the European CanSat. To improve the CanSat we will use a better camera with an integrated SD-Card and a better battery. Therefore we will save the collected data in the CanSat itself and also have it transmitted to the team on the ground. We already have the following building elements: - Sharp GP2Y1010AU0F (optical dust sensor) - Two batteries (lithium polymer) and charging station - GPS (GTP A013) (on the ground) - Beeper (2 Opes 3V pie200) Additional building elements and components will be bought or reused from the old CanSat.

Scientific mission	
Please state in which category would you like to compete? (Beginner or Advanced)	Beginner
What is the secondary mission that you have chosen for your CanSat?	Collecting data of the particulate concentrations of the air, GPS/location sytsems, speed mesurement and photography of the flight area. - Particulate concentrations - Speed measurement - Photography with camera and saving on SD-Card - GPS/location systems - Parachute, beeper - Sending and transmitting collected data In the recovering system we will integrate a mobile GPS station and instal a better Yagi antenna. At the German CanSat competition we gained knowledge about measuring particulate concentrations, GPS, knowledge measurement, pressure measurement and photography. In the improved CanSat for the European CanSat competition we will use the same particulate concentrations measuring system as we did in the German national CanSat competition to also compare the data from the German CanSat competition with the data we are going to collect in Portugal.We will install a better camera which takes more reliable pictures, is smaller, has an integrated SD-Card and its own battery and power system. The collected data will not only be sent down to the CanSat team on the ground, but also will be saved on the SD-Card in the camera for backup. To ensure that the CanSat is ready for launch on launch day we will program a checking system with checking lights for the individual devices. If one light does not work we know that we must fix the error in the system and therefore save time. To ensure that the CanSat is ready for launch on launch day we will program a checking sytsme with checking lights for the individual devices. If one light does not work we know that we must fix the error in the system and therefore save time.

Outline the scientific or technical objective of your secondary mission and highlight any innovative aspects.	At the German CanSat competition we gained knowledge about measuring particulate concentrations, GPS, temperature measurement, pressure measurement and photography. In the improved CanSat for the European CanSat competition we will use the same particulate concentrations measuring system as we did in the German national CanSat competition to also compare the data from the German CanSat competition with the data we are going to collect in Portugal.We will install a better camera which takes more reliable pictures, is smaller, has an integrated SD-Card and its own battery and power system. The collected data will not only be sent down to the CanSat team on the ground, but also will be saved on the SD-Card in the camera for backup. To ensure that the CanSat is ready for launch on launch day we will program a checking system with checking lights for the individual devices. If one light does not work we know that we must fix the error in the system and therefore save time.The idea to measure the particulate concentrations came from us. We could not find any publication on satellites that measure the particulate concentration. These measurements are usually performed on the ground. At the German national CanSat competition we gained experience in collection data on particulate concentrations, GPS, temperature measurement, pressure measurement and photography of the flight zone. We will use the same particulate concentration measurement system as we did at the German national CanSat competition so we can later compare the data.
Where did you get the idea from? e.g. from a real satellite mission, another CanSat project, a scientific publication, a book, etc.	The idea to measure the particulate concentrations came from us. We could not find any publication on satellites that measure the particulate concentration. These measurements are usually performed on the ground. At the German national CanSat competition we gained experience in collection data on particulate concentrations, GPS, temperature measurement, pressure measurement and photography of the flight zone. We will use the same particulate concentration measurement system as we did at the German national CanSat competition so we can later compare the data.
Describe your secondary mission. This part should link the scientific objective to the experiment itself. Explain how you are going to fulfill the scientific goal.	We will install a measurement system to measure the particulate concentration in the atmosphere. Also we will take stills of the flight zone to connect the data on the particulate concentration with the flight zone (example: highway, forest, factory, etc.). To know where which data was collected we will determine the location of the CanSat with GPS. As this is the second CanSat we have build it will be easier and cheaper for us to build our CanSat 2.0. Also we will comapre the collected data with the data we collected at the German national CanSat competition. Additionally to that we will determine the speed of the CanSat in flight with a speed measurer. The collected data (despite the pictures) will be saved onto an SD-Card in the CanSat itself and will be sent to the CanSat team on the ground.

Which data will you measure and how?	The particulate concentration will be measured optically. GPS/location, speed, temperature and pressure will be collected and sent back to the CanSat team on the ground. On the ground these signals will be strengthened with a Yagi antennae and will be saved onto a computer. The camera will capture several images per second which will be saved onto a SD-Card in the camera. The GPS data of the CanSat will be compared with the GPS data of the location of the team on the ground to determine the whereabouts of the CanSat. The collected data will be put into charts and graphs and will be compared with the data from the German national CanSat competition.
What do you plan to do with your results after the flight?	The constant measurement and check of the particulate concentration in the air is very important, especially in large cities like Berlin to make sure that the people are in no medical danger. We will place the CanSat on the roof of the Orbitall/FEZ over a long period of time. In this time the CanSat will send data of the particulate concentration down to the laboratory of the Orbitall to train our capability of understanding and analyzing that form of data. The data which the CanSat collects on the roof will be compared with free online sauces. The data that the CanSat collects in Portugal will be summarized and then published at the Jugendforscht competition of the year of 2015. The collected data and images of the project will also be published on our website and presented to other spaceclub_berlin members.

Outreach program	
Describe your outreach program for before, during and after the CanSat competition campaign. e.g. newspaper articles, local radio, webpage, presentation at school, etc.	Just like at the German national CanSat competition we will have updates on our websites (www.orbitall-berlin.de and www.spaceclub-berlin.de) and on our spaceclub_berlin and Orbitall Facebook pages. Additional to that we have opened a YouTube channel and a Twitter page. During construction we issued several press releases. At the Orbitall's spacecamp of 2014 the team continued with the construction of the CanSat. Further publications of press releases are planed.

Before submitting your proposal, please ensure that you have read carefully the competition Guidelines available at www.cansat.eu . The Team should send an email with this completed form to cansat@esa.int before the deadline of Sunday 7 December 2014 at 24.00 CET.