

# BalticSatApps Acceleration Program: Overview and Analysis

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## Executive Summary

The BalticSatApps project ([www.balticsatapps.eu](http://www.balticsatapps.eu)) strived to increase the market uptake of open Earth Observation (EO) satellite data from the European Copernicus programme. Since 2014, Copernicus satellites have delivered earth observation data free of charge to anyone. The wealth of data holds tremendous potential for new services in the environmental, transport, energy and other sectors. BalticSatApps improved the opportunities of companies and organisations to use the data for developing the society and economy in the Baltic Sea Region.

Three partners of the BalticSatApps project developed and ran two rounds of Acceleration Programs (AP) targeting EO startup teams: Turku Science Park (Finland), Krakow Technology Park (Poland) and Tartu Science Park (Estonia).

BalticSatApps APs were implemented in three stages: preparation (2018), Round I (2018-2019) and Round II (2019 - 2020). Initially, in the beginning of the project, partners prepared, discussed and shared different tools, templates and potential acceleration activities (e.g. topics for workshops, team roadmap and meeting templates, mentor lists, etc.). Throughout the project, BalticSatApps AP was flexible and open for fine-tuning according to the specific needs of participating teams. Following the initial discussions AP Round I was carried out in Poland, Finland and Estonia from November 2018 – June 2019. 14 teams were chosen to the first BalticSatApps AP round: 8 in Poland, 3 in Finland and 3 in Estonia. After learnings from the first round and slight adjustments in the program, the second round was carried out, starting from November 2019 in Poland and Estonia and March 2020 in Finland. The Cross-Border Bootcamp and Demo Day were initially planned to be held in April 2020, but because of the Covid19 impact, all travelling was banned or really complicated. Thus, the final cross-border events were postponed and held online before and during theShift Business Festival in October 2020.

During the AP, the participating teams were provided a key mentor to help set milestones and follow-up during the program with access to an international pool of mentors according to specific needs of the participating teams. They also received seminars/trainings on relevant topics, e.g.: E-marketing, Pitching, Lean Canvas, Sales, Legal issues, Fundraising and Investments. Additionally, the program covered technical aspects connected with access to Copernicus data, downloading, processing, etc. Some of the teams had their chances to pitch to investors at different start-up events.

The current document is an overview of results and analysis on how the acceleration was performed with key learnings for the future.

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## 1. Acceleration Program structure in Tartu, Estonia



In Estonia, the BalticSatApps Acceleration Program (AP) Round I was implemented by Tartu Science Park as a 3-month training program, lasting January - March 2019. It was organized in close cooperation with Baltic Sat Apps partners, ESA BIC Incubation Programme and University of Tartu Starter Program, in order to create more interaction between participants with different skillset and involve both students as well as seasoned entrepreneurs. Overall aim of the program was to provide versatile perspectives on establishing a company and to build business skills. Trainings were provided by thematic experts and entrepreneurs with fresh experiences on establishing a company. In addition to training program, one-on-one mentoring was provided according to the specific needs of the teams. Round II was held during a longer timeframe, as one of key learnings after the first round was, that teams need more time to achieve something meaningful.

During both AP Rounds, visit to sTARTUp Day was organised. It is a yearly start-up festival held in Tartu, Estonia with more than 3000 participants, including investors, start-ups, business support organisations, Academia, motivational speakers, etc. At sTARTUp Day, BalticSatApps teams had an opportunity to listen expert presentations and take advantage of investor matchmaking and other networking opportunities. Top teams had opportunities to pitch their idea to international investors/mentors and received valuable feedback on their potential.

After several workshops of Round II, the teams focused on developing their applications and after the delay caused by Covid19, the remaining teams had the opportunity to participate at online cross-border events in October 2020, pitching their ideas to international mentors and networking at the Shift Business Festival.

### 1.1 Application phase and selection criteria

Both rounds started with promotion activities for scouting of teams for the acceleration program. During the ActInSpace Hackathon held 25-26.05.18 in Tartu, Estonia, the winner of the hackathon was SpaceTree, working on a forest monitoring application.

AP Round II was launched in October 2019 at the Space Apps Challenge with team formation and gathering of ideas. Open call was open until early December and the involved teams participated a bootcamp with key mentors in January 2020.



Participants of ActInSpace hackathon in Tartu, Estonia

In beginning of October 2018, the Space Apps Hackathon organised by University of Tartu, providing another source for teams with potential for Acceleration.



During Round II, the launch event was held at Space Apps Challenge in October 2019. During 3 days and 2 nights, more than 50 participants formed 8 teams and worked with their ideas together with skilled business and technology mentors and the best teams were invited to the BalticSatApps AP.

Picture to the left – Space Apps Challenge participants in Estonia.

Applicants to BalticSatApps AP were requested to provide an executive summary in form of a one-pager, covering:

1. Technology behind the idea
2. What problem will be solved
3. Go to market strategy
4. Key team members
5. Roadmap and next steps

Answers for these questions were used to evaluate whether or not the acceleration program can meet the requirements of participating teams, whether the team has enough capacities to benefit from the acceleration program and that the business idea has required relation to space tech. This background information was also useful, when scouting for suitable mentors to each team. Meetings were held with each team before the acceleration program started.

Criteria for being approved to the program:

1. Business idea is related to combined use of earth observation data, satellite telecommunications or satellite navigation technologies
2. Customer for the business idea has been identified
3. Participant can receive support from his/her team members or can rely on some other community, where such support is available

## 1.2 Participating teams

The following teams applied for the APs:

**Stargazing** - Idea was to find perfect spots for stargazing in light polluted urban areas by combining different EO data layers.

**ViralSat** - ViralSAT has developed a platform that uses the combination of social media and satellite images to provide a better story of a disaster to relief organizers that will help them make better decisions.

We believe that the additional information that ViralSAT can provide will

- Save lives through better initial response plans
- Provide faster information analysis thus providing faster response time

- Allow for quicker infrastructure damage reports and economic damage estimates

Furthermore, the images provided by ViralSAT can be used as training and reference data for remote sensing algorithms.

**SpaceTree** - SpaceTree is working on an application for forest monitoring using EO data.



Team SpaceTree

**DLC** - Team DLC presented the application/database that connects land cover changes with economic, environmental and social changes. Their target group is governmental bodies that are concerned with land use planning and regulations.

**Cloudless** – the aim of the team was to provide a cloud masking solution for satellite images, which would help experts in the field differentiate ground data from cloud data better.

**SatLog** – developing customised services that uses EO data for spatial data professionals.

During the final months of the project, three additional teams received mentoring directly by the internal mentors:

**Krattworks** ([www.krattworks.com](http://www.krattworks.com)) – an autonomous surveillance system for combatting landscape fires. It is a drone company, trying to utilise EO data as part of its service.

**EOMatic** (<https://eomatic.com>) - using Sentinel-2 data to provide soil moisture maps and irrigation advice. Their model does not require soil sensors and can be up to 100X more accurate comparing to others.

**Sky-Corp** ([www.sky-corp.eu](http://www.sky-corp.eu)) – drone company trying to utilise EO data for part of its monitoring service.

### 1.3 Key Mentors

A number of different mentors were involved for workshops, hackathons and the acceleration program. Key mentors from Estonia involved:

**Sven Lilla** - University of Tartu business manager 2011 – 2017, helping businesses to find development partners from academia and vice versa.

ESA BIC Estonia Tartu site manager since 2017, helping start-ups reach their potential by connecting them with VCs, University research groups.

Enterprise Europe Network Member since 2018, connecting companies with growth in mind.



**Tõnis Eerme** - Tõnis is a board member of Invent Baltics and an experienced innovation management consultant. Since 2008 he has been an industrial liaison partner of Estonian Space Office. An expert in H2020 funding schemes.

**Andrus Kurvits** – board member at Tartu Science Park with excellent knowledge in working with business models, setting up start-up teams and sales processes at start-ups.

**Piia Post** - expert in EO data, specifically on remote sensing of the atmosphere, specifically of clouds and trace gases, but recently has focussed on large-scale atmospheric circulation and its impacts on extreme hydro-climate events.

**Siim Kinnas** – an IP specialist with background in working with University IP protection and commercialisation. Currently working in Enterprise Estonia, consulting companies in their IP activities.

**Vaido Mikheim** - main pitching and slide-deck trainer.

## 1.4 Acceleration program

Before the acceleration programs (AP) started, the participating teams had to set up their roadmaps (free form document, no specific tools were used) for the duration of the program setting key milestones to reach. During the AP, key mentors had meetings to follow-up the roadmap and discuss other issues, the teams were struggling with. For the meetings a PPP format (shared also with other partners as a good practice) was used, covering:

- Progress - What the team has been doing? (Major accomplishments, finished items and closed tasks.)
- Plans – What is the team going to do next? (Goals and objectives for the team for the next reporting period.)
- Problems – Any problems the team is facing? (Items delayed and requiring mentor input/additional team members/funding, etc. Short analysis what can be done to resolve these issues.)

AP Round I included several topical trainings:

- Sales & Lean Canvas Workshop in January, 2019
- Stephen Reckie investment seminar before sTARTUp Day Business Festival in Tartu, Estonia
- 23.01 Pitching Training – sTARTUp Day 2019
- 23.01 – 25.01 Meeting with mentors and investors at sTARTUp Day Business Festival in Tartu, Estonia
- Legal Issues seminar in February 2019
- Pitching ABC training in March 2019

Acceleration program offered valuable contents and networking opportunities. Stargazing team participated Startup Day 2019 and had useful meetings with Business Angel Stephen Reckie and ESA BIC Switzerland advisor Jose Achache.

Similar program was provided to round II participants, with slightly more focus on API/UX development. Although, from the selected teams only one followed through the whole Acceleration process during round I and two during round II, the events were open to other startups in the region, so the community received useful tips and tricks. Main reasons, the teams decided to drop off during the program was when they realized, their business case was not solid enough to proceed.

#### AP Round II program:

- Workshop: Marketing, 13.11.2019
- Workshop: Re-inventing your present self, 12.11.2019
- Mobile Monday: 27.01.2020
- Bootcamp 19-20.02.2020
- Workshop: Sorainen - legal and IP issues, 04.03.2020
- Webinar Finance for Startups, 16.04.2020
- Webinar: Sales Masterclass, 26.03.2020; 09.04.2020; 23.04.2020
- Joint online Bootcamp 21.10.2020

#### Some highlights:

Stargazing team had meetings with potential investors/mentors during the sTARTUp Day 2019:

- 1) Meeting with Stephen Reckie. Topics covered: executive summary, teambuilding, market readiness, investor readiness
- 2) Meeting with Jose Achache. Topics Covered: Business Case validation, Customer relations, segmented revenue streams

SatLog received mentoring from AP mentors to get ready with application to ESA BIC Estonia. Application was submitted, but it was not selected to BIC programme. The team got valuable information in sense what to focus on and what to improve. Unfortunately, team Satlog did not go on with the idea, since it was really hard to find a paying customer with the proposed business plan.

#### 1.5 Follow-up

After the acceleration program finished, Tartu Science Park helped the top teams to get ready to apply for ESA BIC Estonia, but nobody has used this opportunity yet. The Stargazing team participated a pitching and matchmaking trip to the SHIFT Business Festival in Turku in August 2019, but is progressing very slowly.

Instead, two teams involved in ESABIC Estonia incubator, Krattworks and Sky-Corp had the opportunity to test ideas regarding applying EO data within their drone service platforms.

EOMatic company, involved since after round II was finished, is close to applying to ESABIC Estonia incubator.

Additionally, three teams from Estonia participated at the cross-border bootcamp before the Shift and at theShift Business Festival in Turku, Finland in October 27-28, 2020: <https://balticsatapps.eu/shift2020> They received valuable input from involved international mentors regarding their business and EO data opportunities.

All the main mentors will be involved in the future ESABIC Estonia activities.



## 2. Acceleration Program structure in Turku, Finland

Two rounds of acceleration programs were organized. The first one was organized on autumn 2018 and second one on spring 2020. The first round Acceleration program in Finland was implemented as 10-week training program, starting on 26th September and lasting till 28th November, 2018. SpaceUP acceleration program was organized jointly with BusinessUP acceleration program, in order to create more interaction between participants with different backgrounds and skills. Overall aim of the program was to provide versatile perspectives on establishing a company and to build business skills. Trainings were provided by thematic experts and entrepreneurs with fresh experiences on establishing a company. In addition to training program, a mentor was appointed to each participant, who followed up the progress and provided more personalized assistance during the program.

During the first round, one joint visit to Stream Startup Festival in Tampere was organised. In the Stream Festival, participants had an opportunity to listen expert presentations and take advantage of investor matchmaking and other networking opportunities. Special advisory session was also organized in middle of the program, called "cross-mentoring day" in which participants had an opportunity to have one-on-one 20 minute meetings with all the mentors.

Details of the training sessions is provided in table below:

| SPACEUP & BUSINESSUP ACCELERATION PROGRAMME Round II  |  |   |
|---|--|---|
|   | Wednesday 26.9.  | Thursday 27.9.  |
|   | SpaceUP Kickoff and Keynote "Startup reality check", Mari Jokiranta and Mari Järvinen/MJ <sup>2</sup>                              | From Idea to Success, Belightful Design Oy, Taina Tallala and Miia Liesegang/Belightful Design Oy   |
| Monday 1.10.  | Wednesday 3.10.  | Thursday 4.10.  |
| Lean Canvas workshop (+BMC), Vesa Hautala   | Social Media   Organic Marketing   Sales<br>- Personal Branding, Business Strategies & Building Confidence. Maren Preis, Letaform. | Workshop: Productization: Why should you give your customers an outrageous promise and dollarize benefits? - Ten steps to productizing a successful service by ANTTI APUNEN/ Ediste Ltd |
| Monday 8.10.  | Wednesday 10.10.   | Thursday 11.10.   |
| IPR, Juha Salo/ Moosedog, on  | Pitching rehearsals, Mike Bradshaw/Startup Sauna   | Sales, costs, budget, cash flow - a non-financial view to financials. Tom Palenius  |
| Monday 15.10.   | Wednesday 17.10.   | Thursday 18.10.   |
| Networks: Yrittäjät (VSY ja NY), Yrityskummit, Monttu Ventures, BNI, EEN, Nuorkauppakamari ja Kauppakamari. Jani Rusi, Mari Männistö, Elia Elenius, Taiko | Pitching   | Cross-border mentoring with Tallinn Tehnopol  |
| Monday 22.10.   | Wednesday 24.10.   | Thursday 25.10.   |
| A Helicopter perspective/Lauri Koittola   | The new EU data protection regulation - what it is and what it means for companies. VILLY LINDTFELT/Lakius Oy                      | Understanding the law of digital business. Negotiations. VILLY LINDTFELT/Lakius Oy.   |

|   | <b>Wednesday 31.10.</b>                          | <b>Thursday 1.11.</b>  |
|---|--|--|
|   | Pitching rehearsals, Mike Bradshaw/Startup Sauna | Establishment of a limited liability company, shareholders' agreement and legal terms of funding rounds, Kimmo Sundqvist/Bird & Bird |
| <b>Monday 5.11.</b>   | <b>Wednesday 7.11.</b>                           |  |
| Conversation and negotiation skills for entrepreneurs, Jäänmurtajat, Karla Nieminen | Pitching   |  |
| <b>Monday 12.11.</b>  | <b>Wednesday 14.11.</b>                          | <b>Thursday 15.11.</b>   |
| Funding info: Entis , Noccela, Business Finland and ELY Centre                      | Natural Tendencies, Type One Oy, Jari Saarenpää, | Sales workshop, Antti Seppälä/ JULMA consulting Oy   |
| <b>Wednesday 21.11.</b><br>Pitching rehearsals, Mike Bradshaw/Startup Sauna         |  |  |
| <b>Monday 26.11.</b>  | <b>Wednesday 28.11.</b>                          |  |
| Grand rehearsals  | DEMODOY (booths and pitching competition)        |  |

The second acceleration program round was organized in Spring 2020. As in the first round, timing was based on the expectation to receive registrations from the hackathon organized earlier, this time namely the WeSeaChallenge-hackathon. Acceleration program included nine workshops, two mentoring sessions per participant and the demoday in the end of the the program. Kick-off event was organized on 3rd March 2020. Due to the covid-19 pandemic, only the first two events were organized on-site and the rest of the events were organized as Teams-sessions. Detailed schedule is presented in table below:

| <b>SPACEUP ACCELERATION PROGRAMME Round II</b>  |  |
|---|--|
| <b>"Space for Business" -event and Kickoff</b>  |  |
| <b>Date:</b> 3.3.2020<br><b>Time:</b><br>Space for Business 12.30–15.30<br>Kickoff<br>15.30–17.00<br><b>Location:</b> Joki-centre Lemminkäisenkatu 12B, Turku | Welcome to listen presentations from established space companies and Finnish experts in Space for Business event in Joki Visitor Centre. <b>More info about the event <a href="#">here</a>.</b><br>After this open event we officially launch the programme and you have an opportunity to meet with other teams, our mentors and the partners. The Tools and methods to assist you in your venture will be explained in detail.                                   |
| <b>Lean canvas &amp; The Human Side of Startups</b>   |  |
| <b>Date:</b> 11.3.2020<br><b>Time:</b> 15.00–18.00<br><b>Location:</b> SparkUp, Tykistökatu 4B, Turku, Meeting room Silo                                      | In this session you will learn how to use Lean Canvas tool to structure your thinking. All training sessions are connected to elements in Lean Canvas so it is beneficial to get acquainted with the tool.<br><i>Trainer, Marko Puhtila, Turku Science Park Oy</i><br>This second part of training day will help you to build a sustainable startup team. We will talk about startup entrepreneurship, building the foundations of your organization-to-be: topics |

|   |   |
|---|---|
|   | <p>every team should discuss from Day 1, such as culture, team roles and communication.</p> <p><i>Trainer: Mari Järvinen &amp; Mari Jokiranta, Profounder Oy</i></p>  |
| <b>Weeks 10–12: Team consultations, individual appointments (1-2 h)</b>                         |   |
| <b>Productization &amp; IPR</b>   |   |
| <p><b>Date:</b> 1.4.2020<br/> <b>Time:</b> 15.00–18.00<br/> <b>Location:</b> Teams meeting</p>  | <p>In a prompt productization training session, you get to challenge traditional service development methods and explore new paths for reaching your customer. Together, we will explore lean-spirited ways for service creation and commercialization. During the training, you will learn about such concepts as writing outrageous service promises, dollarizing the customer benefits, and anchoring the value of your offering to set your pricing right.</p> <p><i>Trainer: Antti Apunen, Ediste Oy</i></p> <p>IPR training session will provide insights related to patenting process. If you want to know how to identify and protect innovations for Space Technology and how the innovation protection can boost valuation of your company, please join the session.</p> <p><i>Trainer: Janne Aaltonen, European patent attorney, Moosedog Oy</i></p> |
| <b>Business modelling and networks</b>  |   |
| <p><b>Date:</b> 8.4.2020<br/> <b>Time:</b> 15.00–18.00<br/> <b>Location:</b> Teams meeting</p>  | <p>A good business idea, value proposition, preliminary revenue models and core elements as such are not enough yet. We will dig into iterative process of refining your concepts and creating a solid business model to be verified in real market environment. How to plan setting up your operations, functions, core capabilities and business networks to create your effective money-making machine? In this straight to the point - training session we will take you to a journey into the very core of effective strategy and operations planning to ensure effective business execution.</p> <p><i>Trainer: Mika Kallioniemi, Procexon Oy</i></p>   |
| <b>How to use EO Data</b>   |   |
| <p><b>Date:</b> 9.4.2020<br/> <b>Time:</b> 15.00–17.00<br/> <b>Location:</b> Teams meeting</p>  | <p>This technical session will be tailored according to training needs of the participants. Example of topics include: How to use QGIS, Python geospatial ecosystem, API's for Copernicus data, Sentinel Data Access platforms, etc.</p> <p><i>Trainers: Earth observation experts from Finnish Meteorological institute and University of Turku.</i></p>   |
| <b>Sales &amp; marketing</b>  |   |
| <p><b>Date:</b> 22.4.2020<br/> <b>Time:</b> 15.00–18.00<br/> <b>Location:</b> Teams meeting</p> | <p>In this training session we will focus on marketing and sales strategies for StartUp companies. You have a great business idea and in order to turn it</p>   |

|   |  |
|---|--|
|   | <p>into a successful business, you need customers. We will cover basic strategies from building your online presence to organic marketing strategies but also paid services to promote your business, so you can pick your right strategy. With this training, we will identify your ideal customers, their needs and how you can reach out to them.</p> <p><i>Trainer: Dr. Maren Katherina Preis, Letaform</i></p>                                |
| <b>ESA funding workshop</b>   |  |
| <p><b>Date:</b> 29.4.2020<br/> <b>Time:</b> 15.00–18.00<br/> <b>Location:</b> Teams meeting</p> | <p>In this session ESA BIC programme is introduced and application process explained. Participants will get hands-on advice on do's and don'ts in successful application. ESA BIC Alumni will also give their viewpoint on the programme.</p> <p><i>Trainer: Kimmo Isbjörnssund, ESA BIC Finland</i></p>   |
| <b>Financial calculations</b>   |  |
| <p><b>Date:</b> 6.5.2020<br/> <b>Time:</b> 15.00–18.00<br/> <b>Location:</b> Teams meeting</p>  | <p>How to convert elements in Lean Canvas into numbers and understand their meaning? This session will provide a layman's viewpoint on income statement, balance sheet and cash flow concepts. You will get practical insight on revenue and cost estimates, strategic financial planning and valuation principles from case Eduten Oy.</p> <p><i>Trainer: Tom Palenius, Turku Science Park Oy</i><br/> <i>Case: Henri Muurimaa, Eduten Oy</i></p> |
| <b>Weeks 16–17: Team consultations, individual appointments (1-2 h)</b>                         |  |
| <b>Demoday/Cancelled</b>  |  |

## 2.1. Application phase and selection criteria

### 2.1.1. Round I

Promotion of the first round started in beginning of August 2018 and was widely disseminated in social media, Space Finland website and via the Turku Science Park stakeholders and project support partners. Invitation to acceleration program was also sent directly to those individuals and teams, who participated to BSA Hackathons (Turku Space Hack and ESA BIC Ultrahack). These direct contacts were most successful way to recruit participants, since two of the applicants had participated to hackathons.

Applicants were requested to provide answers to following questions:

1. Give a short description of your idea, technology, or invention and its' connection to space
2. What problem(s) will your idea solve?
3. Who will be the user of the product or service and how do you plan to make money?
4. Describe your team members and their specific competences. Which competences are missing at this stage?
5. Future plans?

Answers for these questions were used to evaluate, whether the acceleration program can meet the requirements of participating teams, whether the team has enough capacities to benefit from the acceleration program and that the business idea has required relation to space tech. This background

information was also useful, when scouting for suitable mentors to each team. Each team was also interviewed before the acceleration program kick-off. These interviews provided also valuable information about the team and the business idea.

Criteria for being approved to the program:

1. Business idea is related to combined use of earth observation data, satellite telecommunications or satellite navigation technologies.
2. Customer for the business idea has been identified
3. Participant can receive support from their team members or can rely on some other community, where such support is available.

#### 2.1.2. Round II

Promotion of the second round began in the beginning of year 2020. Website (<https://spaceupacceleration.turkubusinessregion.com>) was built for acceleration program. This website contained all relevant information about the program and registration for the event. Applicants were requested to provide following info. This set of questions was slightly modified from the first round.

1. Give a short description of your idea, what problem it is solving and it's connection to space technologies
2. Who will be the client of the product or service and how do you plan to make money?
3. What are your expectations for the acceleration program?

Same criteria was used to evaluate the applicants as in the first round.

## 2.2 Participating teams

### 2.2.1. Round I

Three participants applied for the program first round. These three teams were:

#### **Zero Gravity:**

Team composition: Olga and Cedric Bodet

The urbanisation is the major driver of land surface transformation and the major centre of social-economic activities. By 2050 there will be 10 billion people on the Earth and 2/3 of population will be living in cities. The Earth ecosystem is a Rubik's cube: the changes that would happen due to uncontrolled urbanisation can lead to irreversible shift in the eco-system balance. Zero Gravity can reach this irreversible shift if the urban areas together with agriculture will comprise more than 50% of Earth's surface. Team's solution to this global challenge is to use sentinel imagery data to monitor urban areas development through time and space using change detection and provide a risk assessment network for a certain urban area to be constructed in a green space as well as detect the green areas at risk of being disrupted due to uncontrolled urbanisation via this graph network. This will help to manage urban development spaces in more ecological - green ways and urban growth in a more sustainable way.

#### **Hurricane Unwinder:**

Team composition: Svante Henriksson and Antti Pasila

Team is producing improved intensity forecasts for hurricanes and other tropical cyclones. They apply machine learning on high-resolution satellite images from ESA, EUMETSAT, NASA, NOAA and JMA. The novelty of the algorithm is in combining exact pattern recognition with statistics of the information content of the images.

Long-term goal is to be able to weaken tropical cyclones artificially through cloud seeding and other weather modification methods. Hurricanes can be very devastating. While the weather forecasts are constantly improving regarding the track (location) of hurricanes, intensity forecasts are hardly improving. Meanwhile, the intensity forecast is very important for emergency management and also financial risk management, including (re)insurance.

### Space Renewables:

Team composition: Esa Eklund and Aalto university student group

Team idea is to recycle debris satellite components to power the de-orbit maneuver. De-orbit mission consists of a group of inexpensive nanosatellites that dock with a broken satellite to stabilize and de-orbit it. Each nanosatellite has a simple precisely defined role in the complete mission, such as docking, providing anchor for other nanosats to dock, stabilize debris using thrusters or electric sail and finally brake for de-orbit. Connecting to satellite power bus will be tried to reuse the target satellite solar panels and to power the electric sail to bring the debris down from the orbit.

### 2.2.2. Round II

Second round received altogether five registrations. One of the applicants was outside Europe and as the training program planning was based on on-site workshops, this applicant was rejected and directed to receive other kind of support for their business idea. Five applications are described in table below:

| <b>1. Dryroads: Monitoring excess water in transportation infrastructure</b>                                 |  |
|--|--|
| Give a short description of your idea, what problem it is solving and it's connection to space technologies. | An online service, which would report the water presence, water flow rate or water depth on, on the sides and in canals which intersecting railroads, highways and main roads on a map is the business idea. The idea is based on water detection from SAR imagery from satellites. The service will inform and alarm the user about accumulating water in transportation infrastructure to fasten up the intervention to clear the water out from it. Water piling up in transportation due to different reasons is itself a great factor that is increasing the maintenance expenses, it destroys roads and causes train accidents. This problem is mentioned to me by a friend who is a civil engineer working in the construction and maintenance of transportation infrastructure. The biggest problem is the accumulation due to the blockage in water drains but in principle it is applicable for accumulation due to other reasons. |
| Who will be the client of the product or service and how do you plan to make money?                          | Transportation companies, their maintenance subcontractors, ministries. The idea is applicable globally. It will be sold as an online service, B2B, which is priced according to the area of interests. The system will be designed so that it will only use digital infrastructure that is used as much as the service is used, so expenses will be minimum. Biggest expense would be the development and testing of the service.   |
| <b>2. Among the stars</b>  |  |
| Give a short description of your idea, what problem it is solving and it's connection to space technologies. | We wish to create a gamified solution for the space experts, educators and engineers that can assist them in testing new solutions with real-time data as well as utilize the safety training and other learning objectives for professionals in the field. Our solution would be designed primarily for virtual reality experience, but also available on WebGL and mobile devices.<br>As a gaming company that focuses on gamification and utilizing latest gaming technologies with needs of our clients from the other industries (education,  |



|  |  |
|--|--|
|  | healthcare, industrial engineering etc.) we believe that there is a good fit between our expertise and SpaceUp Acceleration Program.   |
| Who will be the client of the product or service and how do you plan to make money?                          | <p>We have two business models that this product would be fitting for:</p> <ul style="list-style-type: none"> <li>- B2B - subscriptions based model for the industry partners (tech companies, engineering solutions, space training programs)</li> <li>- B2C - educational material for educational institutions and individuals (besides VR, our solution will be easily accessible on web-platforms and mobile devices)</li> </ul> <p>There is high scalability value with our solution, which lays in expanding the features according to the specific needs of the client (expanding the learning material, testing solutions by service providers etc.)</p>          |
| <b>3. TechTrout</b>  |  |
| Give a short description of your idea, what problem it is solving and it's connection to space technologies. | With TechTrout's solution fish farms can monitor their farms in a broader area. Combining satellite data to local measurements we are able to offer near real-time status of the water quality. Better monitoring means more sustainable fish production and possibilities of growth in the Baltic Sea.  |
| Who will be the client of the product or service and how do you plan to make money?                          | <p>Our clients would be fish farms. We could collect monthly payment for using our software. The monthly amount needs to be negotiated case-by-case and it would be based on the size and/or number of fish farming establishments. This way our product wouldn't be tied to only bigger companies, like Nordic Trout Ab, but private fish farms could also utilize our solution.</p> <p>In addition we could charge some service costs for different consultancy services, such as helping our clients to solve their problems and providing assistance on bringing the software into use. We could also generate more in-depth and tailored reports for our clients.</p> |
| <b>4. VesiVahti</b>  |  |
| Give a short description of your idea, what problem it is solving and it's connection to space technologies. | <p>VesiVahti is a software platform for monitoring water quality for fish farms. The initial prototype was developed during BalticSatApps event in Turku in the end of of 2019. A screenshot can be seen here <a href="https://imgur.com/a/yFh2hTm">https://imgur.com/a/yFh2hTm</a> . The prototype uses Copernicus Satellite data for water quality analysis combined with local water quality measurements if available. Weather data provided by NOAA.</p> <p>Satellite data enables fish farms to monitor water quality in near real-time without installing and maintaining expensive sensors</p>   |
| Who will be the client of the product or service and how do you plan to make money?                          | <p>Aquaculture farms can subscribe for a fee to the service to monitor their farm water quality. They can also use the platform to plan better farm location together with policymakers.</p> <p>The platform can also be used by authorities / consultants to monitor if the fish farm is compliant and generate the reporting.</p>  |
| <b>5. ProFIND: Proficient platform for Farm Insurance for Natural Disasters</b>                              |  |
| Give a short description of your idea, what problem it is solving and it's connection to space technologies. | <p>We are developing an InsureTech solution to make the crop insurance claims process much easier for both data-rich and labor-intensive insurance industry and farmers in south Asian countries. We solving key issues like delay in agricultural claim settlement process, unfair estimation damage due to natural calamities, lack of pre disaster preparedness and post disaster rehabilitation.</p> <p>We are using remote sensing coupled machine learning to make claim settlement process more fast, transparent, fair and automated. We are reaching our end customers through local social media channels to provide</p>   |

|   |  |
|---|--|
|   | then smart insurances services along with risk communication services to make them more risk resilient.  |
| Who will be the client of the product or service and how do you plan to make money? | Our primary clients are insurance agencies/ banks to whom, we provide various value added and cost cutting service. Our secondary clients are farmers/ farming groups, whom we provide free service and will ask provide ground data to improve our analytics. |

## 2.3. Acceleration program

### 2.3.1. Round I

From the selected three teams only one followed thorough whole process. Space Renewables team decided to drop off after two weeks, when they realized its business case was not solid enough. Hurricane Unwinder had time management problems and decided to concentrate on other topics, that were not on the SpaceUP acceleration program agenda. However, both these teams have decided later to establish space related business and have been approved for the ESA BIC program.

For the third team, Zero Gravity, SpaceUP acceleration program offered valuable contents and valuable networking opportunities. In the beginning of the acceleration program, team participated to Steam business festival in Tampere. During the 10-week acceleration program Zero gravity team, Olga and Cedric Bodet participated followingly:

- 1.10. Lean Canvas workshop
- 4.10. Productization workshop
- 11.10. A non-financial view to financials training session
- 18.10. Cross-mentoring Day
- 5.11. Negotiation skills workshop
- 7.11. Pitching skills training
- 28.11. Demoday

Acceleration program came to its completion in Demoday event, organized November 28th, 2018. In this event all the participants pitched their business to the audience and the jury. Jury selected the Zero Gravity as the best pitch.



Left: SpaceUP and BusinessUP teams together in Demoday 28.11.2018

Right: Milla Forman (right) from Lukander&Ruohola Oy rewarding the handing the grand prize to Olga and Cedrid Bodet.

### 2.3.2 Round II

Attendance for the training days was much higher than in the first round as all four teams participated to almost every event organized during the program. As explained earlier, covid-19 lockdown forced us to organize training days virtually. This had an effect on level of interaction between the teams and possibility for them to learn also not from only lecturer but from each other. Unfortunately, virtual sessions were not optimal for facilitating casual discussion. Some sessions, such as ESA BIC funding workshop and Sales & marketing workshop generated more discussion among the participants.

During the program Turku Science Park team also introduced some potential new market areas and potential customers for the teams. Such prospects were Raisio Aqua Ltd, Finnish fish feed manufacturer who was looking for solutions in aquaculture monitoring. Another prospect was Origin by Ocean Ltd, which is newly established company operational in Finland. Their business is to refine protein products from green algae and bladder wrack and they are looking for solutions to optimize the harvesting process. Vesivahti-team got interested about the opportunity to work together with Origin by Ocean and acceleration program provided support to start a joint project.

Due to the circumstances, arranging the demoday would not have added much benefit for the participants. Instead of organizing demoday only for Finnish participants, it was agreed with other partner that joint bootcamp would bring more value for all teams. Results of the Joint bootcamp are explained in chapter. As final demoday wasn't organized and only one Vesivahti team proceeded further with developing their idea, it was not reasonable to compare the progress of different teams with each other. Vesivahti team entered into pilot project with Origin by Ocean, where their intention was to demonstrate the feasibility of their software platform with actual green algae harvesting machine in Finnish archipelago. Results of this pilot prove the technical feasibility and team continues to refine their business model and learn more together with Origin by Ocean Ltd.

## 2.4 Key Mentors

### 2.4.1 Round I

Key Mentors appointed for the program in Finland were:

**Jaan Praks:** Areas of expertise: Remote sensing, microwave remote sensing, remote sensing of forest and land cover. Remote sensing applications and markets. Available remote sensing satellites and technologies.

Small satellites, small satellite constellations, small satellite payloads, small satellite capabilities. Small satellite market, satellite platforms, launch prices, technology development projects. Team building, team management, team communication, reviews and schedules. Idea development and brainstorming. Space legislation. Presenting and selling ideas.

**Patrick Halford:** Patrick is on the Singularity University Faculty for drones/mobility & a Senior Advisor to Gaia consulting. He is a board member for Finnish/Nordic drone, space and healthcare start-ups and advises corporates on how to partner with Start-ups, SMEs and Research. He has previously worked for IBM and number of other IT companies.

His main areas: Investor pitch deck and extension of the product application to other potential client groups. Invitation to drone conference and to connect with open circle VC fund. Proposition to become a company advisor for the team and permission to use him as a reference in grant applications. Promotion of the Singularity University and a possibility to enter acceleration program there. Importance of website.

**Miranda Saarentaus:** Miranda's area of activity is on internationalisation, space applications – (satellite navigation earth observation and satellite communications), transport and location-based services. Her core function is to assist Small and Medium-sized enterprises in taking their businesses to global markets. Geowise expertise lies in Geospatial & Environmental Technologies, Digitalisation, Safety & Security. She helped the start-up teams to prepare the ESA BIC applications.

**Marko Puhtila:** Marko is growth advisor in Turku Science Park Oy and responsible for giving startup advisory services. Marko has 15 years of experience in mentoring, personal experience as a business founder and main focus areas are finance, service/product design and corporate/public sector collaboration.

**Turku Science Park mentors** (Marko Puhtila and Michael Lindholm) and Mike Bradshaw helped the teams with preparing their slide-decks. New insights and USP. Idea to extend the prototype beyond urban planning.

Additionally, the partner organised a cross-border mentoring day including meetings with different mentors: Martin Goroško, Markko Karu, Petri Lehmuskoski, Patrick Halford, Petri Kalske, Jari Kauppila. Main topics included:

- Business vision direction for the start-up.
- Pricing range for a finished product.
- How to sell the prototype, product and business story.
- Communicating the value company brings and which problem are being solved.
- Approaching investors.
- Also, one of mentors suggested how company product can become necessity by using quality standards in urban planning and for whom it is important to act in the sustainable green ways.

#### 2.5.2. Round II

**Jaan Praks:** (See description above)

**Marko Puhtila:** (See description above)

**Tom Palenius:** Leading Turku Science Park Ltd's business development services, including business service center Potkuri, startup hub SparkUp, as well as accelerator and coaching programs for entrepreneurs and startups. Before joining Turku Science Park Ltd, Mr Palenius was the CEO for Abacus Diagnostica Oy, a Finnish IVD company specialized in rapid DNA based testing of infectious diseases. Before starting with Abacus, Mr Palenius held the position of VP Business Development at Biocellex Oy, an innovation and business development company focusing on early phase Life Science projects and companies, as well as searching and assessing investment targets for the Karolinska Development investment fund.

**Petri Kalske:** Petri Kalske, Head of Operations, Unike Oy. Unike is one of the fastest growing tech companies in Finland (read the article), and Petri is in charge of Unike's R&D, products and related delivery projects. He has 20 years of software and IT experience, most of the time in various management and leadership roles. His comfort zone is between business and technologies. Petri has also strong entrepreneur and Start-Up background and he's been helping start-ups with his own lessons learned, especially in fields of sharpening the business idea, raising funding and expanding the business abroad.

**Mr. Isbjörnssund** is heading the European Space Agency's business incubation activities in Finland, in cooperation with Aalto University. Previously he worked 12 years at Nokia in various technology marketing and business development positions. Prior to joining ESA was he was founder of a startup that won a tender and delivered a cloud 3D printing software to ESA in 2015.

In addition to mentors, round II incorporated supporting partners. They committed on providing facilities and expertise in technical matters teams might encounter during the acceleration period. Partners were:

**Identio Oy** can help you with software development – plain and simple. If you are wondering how you should start building your software, or what technologies to use, or just generally want to know how to go about software development (best practises, MVP-building, quick releases etc) – we are more than happy to help. We also have knowledge in how to SELL the software and / or the idea to your potential clients.

**Mariachi Oy** has a solid knowledge of embedded systems as used in industry, information technology and medical technology. Based on this knowledge Mariachi offers its Kasvattamo program® for start-ups and inventors, aimed at helping innovations to reach the market faster and with greater success. We can offer services such as embedded HW and SW product development, prototypes, new product introduction (NPI), contract manufacturing and maintenance.

**Terramonitor** is the world's most dynamic, comprehensive and cloud free mapping and analyzing platform of the globe, which consists of over 100 million images. Terramonitor gives professionals the power to analyze, build and organize geographical information into actionable insights by leveraging up-to-date satellite and remote sensing data by AI. Terramonitor can support SpaceUP teams in technical feasibility related questions, offer some of its Sentinel datasets for testing and streamline the first technical steps in working with Earth observation data.

## 2.6 Follow-up

After the first round of acceleration program finished, one team decided to continue as a business. Turku Science Park helped the team to establish first client contacts and receive customer feedback on the business idea. City of Turku urban planning department and South-West Finland Regional Council regional planning department were approached. In beginning of 2019 Zero Gravity Ltd was established. In May 2019 Zero Gravity Oy was granted with ESA BIC Finland funding. At the moment, Zero Gravity is running a Pilot with city of Tampere, in which Zero Gravity Oy's UrbanAI product is tested with Tampere City data and urban planning department. Company is also in negotiations with several other cities and companies.

After the second round again only one team, Vesivahti, was confident enough to progress with their idea. Since they have yet not decided to establish a company, no contracts nor revenues have yet been realized. Team has gained however enough understanding about requirements for taking further steps in establishing a company so when business feasibility is tested further in coming monthts (end of 2020, beginning of 2021), next steps might be taken.

### 3. Acceleration Program structure in Krakow, Poland



Two rounds of acceleration programs were organized. Acceleration programs in Krakow were implemented as 3+ month training programs led by Krakow Technology Park. First round started on 27th November and lasted till 25th April 2019. The second round started on 22nd November and continued until 7th March 2020. The period until May was the time when the teams could benefit from mentoring support and received additional information about the possibilities of developing their project after the end of the BSA program. SpaceUP BSA acceleration programs were organized with the support of the Institute of Geodesy and Cartography, in order to combine the knowledge of highly qualified satellite data specialists with specialists supporting business.

Overall aim of the program was to provide versatile perspectives on establishing a company and to build business skills and increase knowledge in the field of Copernicus satellite data. Trainings were provided by thematic experts and entrepreneurs with fresh experiences on establishing a company. In addition to training program, a mentor was appointed to each participant, who followed up the progress and provided more personalized assistance during the program.

During the training program, Space Business Workshops were organized to enable participants of the acceleration program to participate in the event and to further increase knowledge and help establish new relationships with people from the space sector.

At the end of the first edition of SpaceUp BSA acceleration program, startups presented their projects during the Demo Day organized during a dedicated track at the European Space Tech Transfer Forum 2019 conference, one of the most recognizable conference in Poland dedicated to the space sector.

At the end of the second edition startups presented their projects during the Demo Day organized during the International Meeting of the Space Industry conference, one of the biggest space conference in the northern part of the country.

Details of the training sessions during round I of the acceleration program is provided in table below:

| <b>Monday 26.11.18</b>   | <b>Tuesday 27.11.18</b>  |
|--|--|
| <b>SpaceUP BSA Kickoff and Mentors one-to-one with startups. Pitching.</b>   | <b>Workshop: Copernicus Satellite data <i>Martyna Gatkowska, Damian Olszewski</i></b>                        |
| <b>Friday 14.12.18</b>   | <b>Saturday 15.12.18</b>   |
| <b>Workshop: Types of satellite data and databases. Types of raster data and their processing. <i>Damian Olszewski</i></b>   | <b>Workshop: Business models for startups. Lean Startup, Value Proposition. <i>Agnieszka Lewandowska</i></b> |
| <b>Friday 11.01.19</b>   | <b>Saturday 12.01.19</b>   |
| <b>Workshop: Marketing. How to prepare a lead generation plan. Sources of lead acquisition. Persona. Basics of analytics in startups. <i>Robert Marczak, Mateusz Muryjas</i></b> | <b>Workshop: Adjusting data and their sources to the needs of startups. <i>Damian Olszewski</i></b>          |



| Friday 8.02.19   | Saturday 9.02.19  |
|--|---|
| Workshop: Use of radar data. Practical exercises. <i>Radosław Gurdak</i><br>Space Business Workshops | Workshop: Sales. The sales process. Lead generation. Product development. <i>Jakub Cyran</i>  |
| Friday 1.03.19   | Saturday 2.03.19  |
| Public speaking and presentations. Pitching. <i>Piotr Bucki</i>                                      | Understanding the law of digital business. Idea protection, copyrights, patents, contracts. <i>Agnieszka Grzesiek-Kasperczyk</i><br>Investor Relations. How to prepare for negotiations with the investor. <i>Marcin Molo</i> |
| Wednesday 25.04.19   |   |
| DEMO DAY (pitching competition)<br>at the European Space Tech Transfer Forum 2019                    |   |

Details of the training sessions during round II of the acceleration program is provided in table below:

| Friday 22.11.19   | Saturday 23.11.19   |
|---|---|
| SpaceUP BSA Kickoff and Mentors one-to-one with startups. Pitching.<br>European Innovation Council (EIC) - Horizon 2020 for startups<br>Regional Contact Point for Research Programs<br>Workshop: Introduction to Copernicus satellite data and their services.   | Workshop: Competitiveness analysis in the space sector<br>Workshop: Business Models for Startups  |
| Friday 13.12.19   | Saturday 14.12.19   |
| Workshop: Planning and preliminary analysis of satellite imagery - Waldemar Franczak<br>Workshop: Creodias Platform - Stanisław Krzyżanowski<br>Workshop: Types of data from Copernicus websites and their practical use - Damian Olszewski   | Workshop: Sales in a start-up (Sales models, Sales funnel, Generating leads)  |
| Friday 10.01.20   | Saturday 11.01.20   |
| Workshop: Continuation of Sentinel-2 optical data processing in ESA SNAP software - Remote sensing indicators + Pixel classifications<br>Workshop: Processing Sentinel-1 radar data in ESA SNAP software <ul style="list-style-type: none"> <li>• Pre-treatment of radar data</li> <li>• Use of radar data</li> </ul> | Workshop: Marketing <ul style="list-style-type: none"> <li>• Brand building</li> <li>• Planning of marketing activities based on the Armstrong and Kotler scheme</li> <li>• Planning of marketing activities based on the Armstrong and Kotler scheme</li> <li>• Marketing communication in the field of modern technologies</li> </ul> |
| Friday 24.01.20   | Saturday 25.01.20   |
| Workshop: Satellite data processing: <ul style="list-style-type: none"> <li>• Astri Polska - Michał Kubicki,</li> <li>• IGIK - Damian Olszewski.</li> </ul>   | B2B meetings with additional mentors: <ul style="list-style-type: none"> <li>• Michał Chwieduk - ARP,</li> <li>• Grzegorz Maciaszek - Space Bridge Fund,</li> <li>• Piotr Sęk - ICT Cluster,</li> </ul>   |

|   |   |
|---|---|
|   | <ul style="list-style-type: none"> <li>• Marek Krawczyk - KP Labs,</li> <li>• Jędrzej Kowalewski - ScanWay.</li> </ul> <b>Event: SpaceHUB conference "Space 2020"</b>                     |
| <b>Friday 21.02.20</b>  | <b>Saturday 22.02.20</b>  |
| <b>Workshop: Public speaking and presentations.<br/>Pitching. <i>Piotr Bucki</i></b>                              | <b>Workshop: Law, startups and the space sector,<br/>Agnieszka Grzesiek-Kasperczyk</b><br><b>Workshop: Sources of financing for a startup and<br/>the space sector, Paweł Kwiatkowski</b> |
| <b>Wednesday 6-7.03.20</b>  |   |
| <b>DEMO DAY (pitching competition)<br/>at the International Meeting of the Space<br/>Industry in Gdańsk/Sopot</b> |   |

### 3.1 Application phase and selection criteria

The first information promoting the acceleration program began during the Space Business Workshops on April 10, 2018 and during the Space Business Day conference on April 25, 2018. During the conference, videos with speakers promoting the BSA project and the space sector were recorded. The videos were used to promote the acceleration program. The next step was to organize meetings / workshops with students at Krakow universities. For information purposes, the Polish version of the [balticsatapps.pl](http://balticsatapps.pl) program website has been created.

Promotion of the acceleration program started in October 2018. Graphic materials have been prepared: posters, stickers, internet graphics. Promotion was widely disseminated in social media, space-related websites, Krakow Technology Park website and project support partners. Invitation to acceleration program was also sent directly to those individuals and teams, who participated to BSA Hackathons and events. These direct contacts were most successful way to recruit participants.

The promotion of the second edition of acceleration program started during space events throughout 2019. Main promotion of the acceleration program started in October 2019. Graphic materials have been prepared: posters, stickers, internet graphics. Promotion was widely disseminated in social media, space-related websites, Krakow Technology Park website and project support partners. Invitation to acceleration program was also sent directly to those individuals and teams, who participated in the BSA Hackathons and events. These direct contacts were most successful way to recruit participants.

During the preparations for the second edition of the acceleration program, the program was promoted during various space events in Poland. We appeared as speakers at events and encouraged participation in the acceleration program.

#### Examples of events:

**GIS Challenge 30.05.19** - 60 students from universities from all over Poland will face tasks related to the numerical processing and analysis of geographical information as part of the 3rd Academic Geoinformatics Championships GIS Challenge 2019. During the hackathon, the BalticSatApps project was presented, as well as the possibilities to develop their own startup using Copernicus data.

**We Need More Space #2 17.06.19 & We Need More Space #3 02.10.19** - We took part in a meeting dedicated to the space sector. The possibilities of using satellite data were presented and the SpaceUp BSA acceleration program was promoted.

**World Space Week Wroclaw 5-7 October 2019 & Space Apps Challenge October 18-20, 2019** - SpaceUP BSA acceleration program was promoted during recognizable international space events.

Applicants were requested to provide answers to following questions:

1. Describe your product / service.
2. Indicate the main area in which you process satellite data.
3. What is the level of solution readiness for implementation?
4. What goal do you want to achieve during the program?
5. How many people are on the team?
6. Describe your experience. Roles in the team.
7. What problems does your product / service solve?
8. What is your business model?
9. Who is your competition?
10. Would you like to cooperate with any Polish company?

Answers for these questions were used to evaluate whether or not the acceleration program can meet the requirements of participating teams, whether the team has enough capacities to benefit from the acceleration program and that the business idea has required relation to space tech. This background information was also useful, when scouting for suitable mentors to each team. Chosen team was also interviewed before the acceleration program kick-off.

Criteria for being approved to the program:

Formal criteria:

1. Compliance of the project with the thematic scope.
2. Acceptance of the terms of participation in the acceleration program.

Substantive criteria:

1. The team and its potential - team diversity, knowledge and experience.
2. Innovation of the idea - way of using data, innovative approach of the proposed solution.
3. Business potential - business potential of the project: the possibility of monetization, market attractiveness, market threats, as well as the feasibility of the proposed solution.

## 3.2 Participating Teams

### 3.2.1 The first round of the acceleration program

Thirteen teams apply to the program. Eight teams were selected:

#### **AirABS**

A service supporting airspace users in reducing the risk of collision with birds. Losses incurred by airspace users and birds death stemmed from collision with flying machines (bird-strike) are increasing despite traditional efforts since many years. Data and advanced information modeling create opportunity to minimize losses and save birds' lives.

Electronic, actionable service with near-real-time birds occurrence probability assessment, based on constantly learning AI.

#### **Brols&Geosolution**

Service to find places susceptible to rainwater retention:

Support for the decision-making process in planning and spatial planning for urban planners and investors. Assistance in process of grading area designed to land development. Useful to develop by diverse type of constructions – by the grade of soil moisture (moisture different then agricultural).

#### **DeepFlow**

Innovative tool which facilitates information gathering from satellite pictures. It will allow you to train the network with large pools of data and find similar patterns in thousands of new input images. If the images require pre-processing and further transformations, these can be performed by DeepFlow image correction mechanisms.

#### **Meox**

Demonstration of soil chemical detection technology using hyperspectral remote sensing from satellites. The project contributes to the serious development of precision agriculture, which is an emerging strategic technology for Poland. The result is the delivery of innovative technology for agriculture on an unprecedented scale for the country to optimize harvesting and farming.

#### **Plantam**

Webapplication gathering and analyzing satellite data give possibility to define a certain place on earth that has specific terrestrial or atmospheric or climatic features, so our customers will find places corresponding to their requirements such as: water temperature, height of waves, type of beach, nature and distances. Moreover they will be able to calculate costs and type of getting to these places.

#### **Spectator**

Spectator platform simplifies creating products based on satellite imagery. It centralises and automatises satellite image access for easier data discovery and acquisition planning, allows to collaborate in teams on product development and gives possibility to build customized interface for the clients.

#### **Vinum 4.0**

As a response for negative effects of climate changes, solution offers a system for precision viticulture providing vineyard environmental conditions monitoring and notifications (need for irrigation or fertilization, possibility of weather anomalies or disease occurrence). We also offer a tool for site selection for setting up a new vineyard.

#### **Wind Power**

Web application which supports and speeds up location's selection process by using up to date (and historical trend) wind speed data from Copernicus together with land use and local geospatial data. In the result user gets selected area suitable for wind farm with given parameters.



Workshop for participants of the SpaceUp BSA acceleration program.

### 3.2.2 The second round of the acceleration program

Thirteen teams applied to the program. Five teams were selected:

#### **No-InMUD**

The solution for the transport industry dealing with the transport of heavy equipment in difficult, muddy terrain. Based on satellite data, a route with the lowest possible risk of getting stuck in the mud is selected. The application also has many other potential applications dedicated to mobile robots, land forces and individual customers.

#### **Plukry**

An application aimed at assisting in choosing a construction or agricultural plot through a comprehensive report containing data on irrigation, landslides, and insolation.

#### **EnviSAT (Ansee)**

A platform that collects satellite data on the environment and nature as well as on land development and its changes over time. It aims to improve the work of specialists using up-to-date data about the area. The application is divided into layers: data preparation, analysis and presentation. In the first stage, the product will be the identification of areas susceptible to changes and the identification of areas that should be inventoried. The solution will reduce the time and costs of nature inventory.

#### **CityForm (Almine)**

CityForm is a tool that uses augmented reality for city spatial planning and studying the impact of changes on such elements as: satisfaction of residents, air pollution, city congestion, real estate valuation. Satellite data is superimposed on the available maps, which makes it possible to develop the necessary data model. By using information from satellites, it is possible to assess potential pollution levels, prevent environmental damage and optimize urban processes.

#### **GlobKids (Kreatikon)**



GlobKids educational products are global scalable educational packages with knowledge tailored to pre-school, primary school and secondary school students. GlobKids brand is developing by Kreatikon's Company team of instructors trained in ESA and after finished Baltic SatApps acceleration program. Almost a thousand satisfied customers have benefited from stationary classes such as Satellite Field Games, many participant use online lessons in the form of a webinar and online course resources, played automatically. The space theme is currently receiving free TV advertising thanks to the achievements of Space X or the mission to colonize the Moon and Mars. GlobKids wants to reach out on a global scale to parents who want to provide children with the "Professions of the Future".



Workshop for participants.



### 3.3 Key Mentors

Key mentors appointed for the program in Poland.

#### 3.3.1 The first round of the acceleration program

**Martyna Gatkowska** - Deputy Head of the Remote Sensing Center, Institute of Geodesy and Cartography in Warsaw. A competent Project Manager with skills in establishing business contacts and experience in implementing European Space Agency projects. Over 7 years of experience in the implementation and management of research and development and implementation projects carried out on an international and national scale. Specialized in the use of remote sensing data for agricultural production management and data management for the bioenergy crop sector.

**Dr. Eng. Grzegorz Nykiel** - an adjunct at the Faculty of Civil and Environmental Engineering of the Gdańsk University of Technology. In his scientific work, he focuses on the development of precision positioning methods using GNSS satellite navigation systems, as well as the use of their signals to model the state of the atmosphere. He participated in domestic and foreign scientific and research projects, including in the European project COST Action ES1206. Participant of organized courses and trainings, including by the University of Bern and the European Space Agency. He is also interested in the use of numerical weather forecasting models.

**Bartosz Kulawik** - graduate of the Jagiellonian University Institute of Geography and Spatial Management. In 2008-2009 an employee of Techmex as a project manager. In the years 2010-2012 an employee of the Space Research Center of the Polish Academy of Sciences in Warsaw. Since 2012, an employee of the SmallGIS company in which he is responsible for Coordination of International Projects, including cooperation with the European Space Agency. Since 2013, he has been a certified examiner of the international ECDL GIS training program.

**Agata Hościło** - Head of the Laboratory for Remote Sensing Environmental Risk Research Institute of Geodesy and Cartography. Has experience in monitoring the condition and changes of the natural environment caused by climate processes and human activity, changes in land cover and assessment of forest damage using modern satellite techniques. Has specialist knowledge about the ecology of peat bogs, carbon circulation and peat bog fires occurring in the temperate and tropical zones. Coordinator of the CORINE LC project at IGIK.

#### 3.3.2 The second round of the acceleration program

**Waldemar Franczak** - After obtaining an engineer degree in Mechatronics and a master degree in Computer Vision and Robotics, Waldemar moved to Satellite Earth Observation to apply unorthodox approach to the way satellite images are used today. Former stagiaire at ESA Advanced Concepts Team and Head of Technology at award winning Earth Observation company Astrosat. Currently a co-founder and data specialist at spectator.earth, building a platform to speed up the process of bringing satellite image based intelligence to everyone's everyday life.

**Sonia Bazan** - Business Development Specialist, PhD student at the Department of Geoinformatics and Applied Computer Science at AGH. Specialist in the field of GIS and remote sensing based on satellite data and data obtained by means of unmanned aerial vehicles. It combines business knowledge with the technical aspects of working on applications using spatial data. Open data, open-source and citizen science enthusiast.

**Martyna Gatkowska** - Deputy Head of the Remote Sensing Center, Institute of Geodesy and Cartography in Warsaw. A competent Project Manager with skills in establishing business contacts and experience in implementing European Space Agency projects. Over 7 years of experience in the implementation and management of research and development and implementation projects carried out on an international and national scale. I specialize in the use of remote sensing data for agricultural production management and data management for the bioenergy crop sector.

**Agata Hościło** - Head of the Laboratory for Remote Sensing Environmental Risk Research Institute of Geodesy and Cartography. Has experience in monitoring the condition and changes of the natural environment caused by climate processes and human activity, changes in land cover and assessment of forest damage using modern satellite techniques. Has specialist knowledge about the ecology of peat bogs, carbon circulation and peat bog fires occurring in the temperate and tropical zones. Coordinator of the CORINE LC project at IGik.

Additional the most important and active mentors:

**Jakub Nalepa** - PhD, is Head of AI at KP Labs, Poland, and Assistant Professor at the Silesian University of Technology, Poland. His research is currently focused on machine learning applied to medical and satellite image analysis – he has published more than 100 peer-reviewed journal and conference papers in these fields so far, and was awarded the IEEE GRSS Symposium Interactive Session Prize Paper Award at IEEE IGARSS 2020. He has been involved and led several R&D projects in both academia and industry, and is currently Chief AI Scientist in the projects related to Earth Observation (including the Intuition-1 mission), multi/hyperspectral image analysis, and anomaly detection from telemetry data using deep learning-powered algorithms that are to be deployed on board a satellite.

**Michał Kubicki** - M. Sc. Eng. Geoinformation specialist with several years of experience in the industry. Graduate of the Wrocław University of Environmental and Life Sciences (master degree in Geodesy and Cartography) and Military University of Technology in Warsaw (engineer's degree in Geodesy in Cartography). In professional career focused mainly on the use of satellite and aerial imagery, familiar with most of the nowadays used data and software. In his hitherto work he gained experience in creating databases of topographic objects and utility networks, worked on creating map portals, satellite orthophotomaps and worked in 3D environment. In his current work he focuses primarily on the processing of optical and radar imagery as well as the publication of spatial data on the Internet. He is heavily involved in national and pan-European projects aimed at automatic detection of ice on satellite imagery. Ready to help in selecting the best-suited satellite and geographic data for a dedicated solution, as well as to outline the basic steps of data processing.

### 3.4 Acceleration program

From the selected eight teams all of them completed the program, but two of them, after consultation, pivots and support in the program, decided that their project did not fit the market and decided not to present start-ups at the end of the program.

Acceleration program came to its completion in Demo Day, organized April 25th at the European Space Tech Transfer Forum 2019 conference, one of the most recognizable conference in Poland dedicated to the space sector. In this event participants pitched their business to the audience and the jury.



SpaceUP BSA teams together in Demoday 25.04.2019.

The second round of the acceleration program was completed by all teams and all startups prepared the final presentations. After all meetings and workshops were completed, Demo Day took place on March 6-7 at the International Meeting of the Space Industry.

At the end of the project two teams, after consultations, pivots and support in the program, decided that their project did not fit the market or did not find business potential, therefore decided not to present startups during international Bootcamp. It is a natural process for some teams to no longer work on their projects. Statistically 90% of companies / startups fail. The most important thing is that they don't give up and try to modify projects or build completely new ones, and the knowledge gained helps them to better approach new challenges.

Programs like BSA are a great place where ambitious young people can try to get involved in projects that they would not otherwise try to develop. Knowledge and business contacts are highly appreciated by teams and allow them to verify projects faster. The only thing startups lack is additional small financing that they could allocate for the initial development of the project.



All representatives of the teams from the second round of the acceleration program.

## Key learnings

Based on the experience from the first edition, the second edition of the program was altered to fit expectations of participating teams. The selection of key mentors for startups took place on the first day, after one-on-one interviews, so that mentors and startups were sure that the people to support would be properly selected and will have the right knowledge.

One of the meetings was organized in Warsaw, to organize workshops with satellite data specialists who were unable to come to the Krakow Technology Park.

B2B meetings with startups and representatives of organizations and companies related to the space sector were organised. These conversations were greatly appreciated by the teams. This allowed them to create a new network as well as get constructive feedback on their projects. Some considered these meetings important enough to decide to pivot their startup.

Also, all team members had the opportunity to participate in space-related events and networking, to secure knowledge flow and potential for success stories in the future.

## 3.5 Follow-up

### 3.5.1. The first round of the acceleration program

The teams were encouraged to establish relationships with companies and institutions and to apply for the international programs.

DeepFlow and Vinum 4.0 qualified for the **Copernicus Accelerator** (<https://accelerator.copernicus.eu/event/closing-bootcamp>) and took part in a series of training and mentoring support. The Copernicus Accelerator prepares 50 of Europe's boldest innovators every year for success by creating a challenging, inspiring and supportive environment to learn and grow. Our 12-month acceleration programme is designed explicitly for driven entrepreneurs and start-ups ready to turn their transformative business cases into impactful commercial solutions.

**DeepFlow** has found out that there was interest in their product in sectors they had not considered before. There was interest from one of the largest cities in the Emirates, from an association of companies operating distribution networks across the UK and from the largest waterworks company in the UK. In the future they will be talking to potential customers and we will check the possibilities of entering the water treatment sector.

Vinum 4.0 received, as one of three start-ups in Poland, a grant of up to EUR 5,000 gross as part of the **EIT Food Test Farms** pilot project. The project assumed support for start-ups by co-financing testing of the developed solution together with the target recipient (farmer, in this case the owner of the vineyard), research institute or university, and then presenting the solution to potential clients during the Test Day. It was important that the implementation of the project by startups was foreseen for a very short period of time - about 2 months, which enabled rapid validation of the solution. Implementation of the project was carried out in cooperation with mentor dr inż. A. Hościło from Institute of Geodesy and Cartography, and the target recipient was one of the largest vineyards in Poland - Winery Srebrna Góra from Krakow.

### 3.5.2. The second round of the acceleration program

To help startups in the further development of their projects, they were supported to find external funding. Together with large multinational competitions as Copernicus Masters, MyGalileoSolution or Startup Academy, the startups were encouraged to participate the key events, to apply with their ideas so that they can gain access to international mentors, but also get their first funding. ESA Kick-start Call projects can also be an important source of support.

In the following years, ESA BIC Poland will begin its operation in Poland. It is a great tool offering business, technical and financial support for space startups. BSA startups are encouraged to prepare for this development path.

The Polish BSA team did not only encourage startups that participated in acceleration programs, but also teams that participated in BSA Hackathons to participate in EU projects. From this year's hackathon participants, a team was formed that applied to the Copernicus Masters, and BSA team helped them prepare for the presentation.

## 4. International online bootcamp and theShift experience in 2020

### 4.1 International online bootcamp

During the BalticSatApps project, the Tartu Science Park, the Turku Business Region/Turku Science Park and the Krakow Technology Park have run BalticSatApps Space Acceleration Program twice, sharing good practice, mentors and experience on the way. During the project it was agreed, that the top teams should meet at least once during the project. However, Covid-19 impacted project activities by not allowing international travel. Thus, it was decided to meet online and a Joint Bootcamp of BalticSatApps Accelerator Programs was agreed to be held on October 21<sup>st</sup>, 2020. In this event the teams had an opportunity get feedback from mentors, learn from experience of the KappaZeta company (Keynote speech from a successful EO team from Estonia) and other participating teams, and rehearse their pitch in front of the on-line audience — an important skill in modern networking! In addition, participating teams received tickets to The Shift virtual Business Event on 27–28 October.

After registration, participating teams were requested to fill in a one-pager template, describing their business case and expectations for the mentor meeting. They also prepared a 5-minute pitch, which they presented during the pitching session. Participants also indicated in advance, which mentors they wish to meet during the one-on-one sessions.

Participating teams: 3 teams from Estonia: EOmatic, SkyCorp and Krattworks, 3 teams from Poland: Solar System Resources, GlobKids and Skyverse and ExamineAqua from Finland.

Participating mentors:

**Jaan Praks**, Dr. S. at the Aalto university, is the leader of the Aalto Space Technology and Microwave Remote Sensing research group

**Marko Puhtila** works as Growth advisor in Turku Science Park Oy with background in economics

**Sven Lilla** is Head of Operations for ESA BIC Estonia with background in technology transfer and business consulting for 10 years



**Andrus Kurvits** is Member of Board of the Tartu Science Park and Manager of the ESA BIC Estonia

**Jakub Nalepa**, PhD, is Head of AI at KP Labs, Poland, and Assistant Professor at the Silesian University of Technology.

#### Agenda (EET) of Joint Bootcamp of BalticSatApps Accelerator Programs on October 21, 2020:

10.00–10.05 Opening words by organisers

10.05–10.20 Keynote: “Sentinel changing the world”, Mr. Kaupo Voormansik, CEO, Kappazeta

10.20–11.20 Team pitches

11.20–11.45 Break

11.45–12.00 Team pitches

12.00–12.05 Break

12.05–12.45 One-on-one mentoring

12.45–13.00 Break

13.00–13.30 One-on-one mentoring

13.30 Closing of the Bootcamp

#### Feedback from participants:

Participants were requested to send feedback after the event regarding event organization and mentor meetings. According to the seven responses to questions with scale of 1 to 5 (from “most disappointed” to “most satisfied”), participants were least satisfied to the quality of the communication (avg. 3.5) and most happy with the keynote and pitching sessions (both avg. score of 4). Technical arrangements (Teams environment, registration site etc) got the score of 3.71 and mentoring session received average score of 3.8 points. Responses to the open-ended question requesting general feedback and recommendations were all positive and encouraged to organize similar cross-border mentoring/pitching events also in the future.

#### 4.2. SHIFT 2020 Business Webstival experience



BalticSatApps partners at the project booth at the Shift Webstival, October 28<sup>th</sup> 2020.



The SHIFT Business Festival was launched successfully in 2016, and has been organised in Turku, Finland since. In addition to startup companies, the event has been targeted to decision-makers and tech innovators. The focus has been in intelligent business that is sustainable and profitable, and able to adopt new technologies when they're relevant to the business. The Covid-19 pandemic affected profoundly the organising of the event this year. From the different variations and postponed event timing, all the festival programme was turned virtual and finally organised on 27–28 October. This meant that the knowledge sharing and networking was to happen with help of the VirBELA software, and the event was built in an immersive virtual world.

The delayed timing of the SHIFT Business Festival in 2020 matched with the plans of the BalticSatApps project's final event that was to be held in Turku in Autumn 2020. As a result, the project managed a virtual booth on 27–28 October, and a virtual workshop on 27 October to share the project achievements and promote satellite data based solutions. It was possible to participate in those events by buying a virtual festival pass.

The BalticSatApps Virtual Booth was located at the Expo Hall and was open on 27–28 October. The booth was equipped with four interactive information screens and two table groups. At the tables, it was possible to have private conversations between the visitors and the BalticSatApps experts. Conversations inside the blue area were not available for persons outside it. In addition to live talk option, it was possible to chat with other participants and write messages to them. It was also possible to follow the programme, do matchmaking and communicate with other participants with the help of a separate Talque application.

Key activities and results of the BalticSatApps project were presented on the screens: Accessing and using Earth Observation data (user uptake), Promoting innovations in EO-based services, and Commercialisation of EO-based innovations (business development).

There were at most approximately a hundred persons active at the Expo Hall at the time. BalticSatApps partners' personnel available at the booth for queries and discussions, which resulted also in new collaborations during the two days.

At the Startup Corner, some of the EO startups that have been involved in the BalticSatApps activities had their presentations running at all times. Additionally, it was constantly possible to arrange 1-on-1 meetings with other participants for changing knowledge and experience.

TheShift experience is described in more detail at the BalticSatApps project website: <https://balticsatapps.eu/balticsatapps-final-event-at-shift-2020-business-webstival>

## 5. Discussion

An abstract from the Astropreneurs Handbook (<http://astropreneurs.space/handbook>): According to research, the failure rate for start-ups is over 50% across industries (Mansfield, 2016). The Harvard Business School found that about three-quarters of the start-ups in the United States fail (Gage, 2012). Considering the high risks involved with space systems, as well as the long timeframes before return of investment, it is assumed that the rate is especially high for start-ups in the sector (Hackler, 2014).

Running the BalticSatApps APs in 2018-2020 provided insights into the specific challenges of the start-ups in the Earth Observation field. The topic was new for all the three organisations leading the programs and provided insights into the opportunities and a platform for future cooperation in this field.

Most of the teams involved in APs met during one of the hackathons organised at BalticSatApps partners' premises. Hackathons have proved an effective tool in creating groups with backgrounds ranging from software developers and data scientists to business and design enthusiasts. The follow-up of hackathons is essential for pushing the teams to continue after the event – to establish a roadmap and continue the development, apply for funding and start the working on the minimum viable product (MVP), business modelling and business planning.

The three BalticSatApps partners involved decided to offer to AP teams:

- Further develop business idea and team
- Develop a business case
- Improving their pitch
- Access to mentors
- Extra visibility at international events
- Improving readiness for applying to ESA BIC Incubation

The topics were covered by trainings and access to experienced people with business and technology backgrounds.

Several overlapping issues encountered during the EO Acceleration programs:

(1) Not enough teams - EO domain is difficult and needs specific data analysis/EO data related skills. Improved cooperation with universities offering courses connected with EO is needed and the students need early access to business knowledge, so they could effectively utilise technical skills to provide viable services needed in the market.

(2) High fallout of teams - as with any incubator/accelerator program, there has been a significant fallout of teams during the process. As AP providers have almost no control in this, the number of teams needs to be higher in the next round.

(3) Difficulties with verifying the market and the need for a given solution. Startups struggled to find competition that existed, but was not easy to find on the Internet.

(4) Technical issues regarding the EO domain – quality of data, access to data/data sources, data storage, cooperation with EO hubs. Copernicus EO data is available for free. However, storing the data and building algorithms that provide fast and meaningful results for different applications is a challenge, the teams are struggling with the most. Hopefully, with the launch of new satellites, the data quality will be improved.

There is insufficient knowledge on the market regarding the possibility of using (free) satellite data. No easy access to data. It must be remembered that many people may have great business ideas based on satellite data, but are not able to verify the possibilities offered by satellites at an early stage.

As local data hubs (e.g. FMI in Finland, ESTHub in Estonia) have been created and are constantly improving access to data, the technical issues will hopefully be solved in the future.

(5) Finally, there is a lack of financing for the development of a startup. Teams at an early stage, after analyzing the market and starting work on the MVP, often abandon the project due to the lack of funds for the work of programmers or graphic designers. Incubation or acceleration programs, apart from the vast knowledge they offer to teams, should offer at least a small start-up financial support. At least EUR 10,000 – 20 000 is needed to develop a working prototype within 6 months. This would help the teams to attract further funding in the future.

### **Improvement suggestions for similar activities in the future**

As EO and space related startups are new for most of the participating regions, there is a lot to learn and constant sharing of experience is needed between partners. In Estonia and Finland, ESA Business Incubators were launched in 2017 and 2018. In Poland, there is still ongoing discussions on launching the activity. Local Copernicus Hubs, supporting the access to EO data usage in Europe are also a recent activity, e.g. ESTHub was launched in 2019 in Estonia.

Thus, there is a high need for continuous and improved cooperation to maximise the BalticSatApps joint effort in finding and boosting startups in the EO field. The cooperation during Round II of the BalticSatApps incubation focused on further sharing of mentors and organisations of joint events, e.g. international online meetup of teams and mentors before and during theShift Business Festival.

During Round I as the participant number was rather small in Estonia and Finland, it was possible to offer flexible services to start-up teams. During this period, cooperation with different service providers was tested. – e.g. university High Performance Computing resources to be utilised for developing, optimising and hosting the start-up applications (at least at the MVP stage).

And finally, as the message of working with EO data for business applications is rather new in the whole BSR area, visibility improvements is needed to support scouting of participating teams with the target of higher number of participants. BSA partners working with the APs definitely see the need for future projects dedicated to space startups, in which financial support to startups is part of the activities.