



## Phase 2 (Level 2): Final Report

# A National Strategic Science Engagement Programme for families



31 March 2021

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## Executive Summary

The UK Association for Science and Discovery Centres (ASDC) is a national organisation that brings together the UK's major science engagement organisations to play a strategic role in the nation's engagement with science. Within our network are over 60 of the nation's largest publicly accessible science centres, discovery centres, science museums and scientific bodies. Together our vision is for a society where people of all backgrounds and in all parts of the UK are inspired and fully involved with the sciences.

ASDC is delighted to be working in partnership once again with the UK Space Agency on Destination Space Phase 2 (Level 2), which builds on all the expertise, training, knowledge and enthusiasm for space science and exploration currently in science centres across the UK, and with their schools and family visitors. Specifically, this programme expanded upon Destination Space 2: Level 1 and created excellent new resources and hands-on activities focusing on the future potential of UK Spaceports and Launchers, Satellite Applications, The James Webb Space Telescope and the ExoMars mission. It also included activities around the 50<sup>th</sup> anniversary of the Moon landing in the summer of 2019.

This programme started in 2019 and created all the activities, resources, shows and equipment needed for Science Centres to deliver all areas of this successful national STEM programme. ASDC selected 13 UK Science Centres to deliver this phase of Destination Space and trained and equipped them. ASDC also created two training handbooks; one for the main programme, the other for Moon activities to celebrate the 50<sup>th</sup> anniversary of the first Moon landing in July 2019. ASDC and our project partners trained centres at two Training Academies in March 2019 and October 2019 to run this cutting-edge schools and families programme.

This programme began in September 2018 and completed in March 2021. During this programme, Covid-19 hit the UK, and in March 2020 all the UK Science Centres and Museums were forced to close their doors for most of the past year. Some opened for the summer holidays and those not in tier restrictions were able to open for the October 2020 half-term. Most Science Centres will open in May 2021. Due to Covid-19 many centres are continuing to deliver the activities throughout 2021.

However, despite the global pandemic and the difficult financial and staffing situation this has put Science Centres in, we are delighted to report that this programme reached **340,579** children and adults with the latest space science through UK Science Centres.

This is a huge testament to the ingenuity, adaptability and perseverance of staff within those centres, working in close contact with the team at ASDC as we planned and replanned delivery, pivoted to digital and blended delivery and options across the Covid year of 2020. The original target was to reach 200,000, so all the more remarkable.

The independent evaluation showed that the school children, teachers, families and children all enjoyed Destination Space Phase 2, learned from it and rated it highly.

The following has been shown by the independent evaluator.

- Over 95% of adults and children overwhelmingly found the family shows fun and interesting.
- 99% of children, and 98% of adults, liked space 'a lot more' or 'a bit more' following their Destination Space activities.

- Over 80% of adults and children wanted to find out more about the space science topics featured in the activities, following their involvement in Destination space.
- Parents said *“Great that it was geared towards children but also informative for adults, full of fun facts”*.
- 100% of teachers rated the Destination Space Activities as Excellent (79%) or Good (21%), following the Key Stage 2 or 3 workshops.
- 95% of Teachers rated the knowledge of staff presenting activities as “Excellent” (5% rated them as good).
- The majority of centres were able to hold ‘Meet the Expert’ activities with a range of UK space scientists and engineers.
- 86% of male students (n=248) and 86% of female students (n=289) said they enjoyed the activities. I.e. there was no difference in responses between the genders on this key point.
- 71% of girls (n=240) and 65% (n=184) of boys said they were more interested in science as a result of taking part in these Destination Space activities.

Overall we are delighted with the success of this programme, especially given that so much of it took place in the time of Covid-19 with Centres and ASDC needing to plan and re-plan on a regular basis to take into account Science Centres being shut, staff on furlough, staff redundancies and new restrictions.

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**Programme Vision:** To engage, inspire and involve families with school-age children, school groups and communities across the UK with the amazing stories and innovative science and engineering of the UK’s world-leading space sector, especially focussing on UK spaceports, satellite applications and space exploration.

**Programme Mission:** To create hands-on activities, school workshops, a family show and other resources to bring alive the new UK spaceports and launchers, innovative satellite applications, and areas of UK space exploration including the 50th anniversary of the first moon landing, the James Webb Space Telescope and ExoMars, and to select and train Science Centres and Museums across the UK to deliver these to schools, families and communities nationally.

# 1. An Overview of Destination Space

## Introduction

The UK is right at the start of an exciting new era for innovation and entrepreneurship across space science and engineering. In recent years we have seen the ground-breaking announcements of the first government-backed sites for new UK spaceports and with it the ambition for the UK to become the first place in mainland Europe with a launch capacity for satellites. The UK is already a world leader in satellite applications and making satellites, along with a history of innovation used in major space exploration programmes.

The new spaceports will launch small satellites. An expanding segment of the \$260.5bn global satellite industry are small satellites used for observing things on our planet, a sector in which the UK excels. These small satellites are used, amongst other things, for communication, navigation, and observation of the Earth from space. The global positioning system (GPS) provides most airliners, cargo ships and the military with satellite navigation. Small satellites are also used for communications of international news, sporting events, and financial transactions around the world as well as offering cameras in space that give us data on weather patterns and keep track of environmental issues such as wildfires and oil spills.

This programme, Destination Space Phase 2: Level 2, continues the national and strategic partnership between the UK Science Centres and Museum sector (brought together by ASDC) and the UK Space Agency, to bring the latest space engineering and space science directly to families, schools and communities. The programme created a host of resources, all of which are widely available for science centres, teachers, researchers and space scientists to use under creative commons to advance engagement in this area.

This programme was directed and project managed by the UK Association for Science and Delivery Centres (ASDC) who have considerable experience managing national strategic multi-partner science engagement programmes. ASDC is the UK's vibrant national charity that brings together the leading informal science engagement organisations in the UK, including all the major science and discovery centres and science museums.

ASDC selected, equipped and trained thirteen Science Centres in this programme. Ten of these centres were new to Phase 2 and received all the new equipment as well as relevant equipment from Level 1. Three centres were part of Level 1 and got all the new equipment plus relevant updates to their existing Level 1 kit.

Through this national infrastructure, this programme sought to engage over 200,000 people with activities and discussions around the UK spaceports and satellite applications, also involving them with other areas of current space exploration, such as the James Webb Space Telescope, ExoMars and the 50<sup>th</sup> anniversary of the Moon Landing. The programme reached over **340,000** people.

Destination Space Phase 2: Level 2 began in September 2018 and completed on March 31 2021. Due to Covid-19 many centres have chosen to continue to deliver the activities throughout 2021.

## Building on the success of Destination Space Phase 1

Destination Space is a very successful national STEM programme that first engaged, inspired and involved families with school-age children, school groups and communities across the UK with the amazing stories, science and achievements of human spaceflight, as part of a national celebration of Tim Peake's Principia mission.

ASDC and partners created, developed and delivered an excellent set of science engagement equipment along with a suite of activities including an interactive hands-on family show, three curriculum-linked STEM workshops for schools, a series of 'meet the expert' activities and special event and branding materials. ASDC then selected, equipped and trained 20 UK Science Centres to deliver the full Destination Space programme to inspire people across the nation and to celebrate Tim Peake's mission.

The 20 centres across the UK who took part in Phase 1 of this programme are:

1. Aberdeen Science Centre
2. At-Bristol Science Centre
3. Cambridge Science Centre
4. Centre for Life
5. Dundee Science Centre
6. Dynamic Earth
7. The Eden Project
8. Eureka! The National Children's Museum
9. Glasgow Science Centre
10. Jodrell Bank Discovery Centre
11. The National Space Centre
12. Royal Observatory Greenwich
13. Science Museum
14. Techniquest
15. Techniquest Glyndwr
16. The Observatory Science Centre
17. Thinktank, Birmingham Science Museums
18. W5 Interactive Discovery Centre
19. Winchester Science Centre and Planetarium
20. World Museum, Liverpool Museums



The families programme of Destination Space launched in the October half term 2015, followed by the schools programme in January 2016. The programme completed in March 2017 and the final project report was submitted to the UK Space Agency and is available [on the ASDC website](#). At that point 733,017 children and adults had taken part and 75,741 children and adults had met and spoken with a space scientist or engineer through the special meet the expert events.

Delightfully, when we collated all the activities again in March 2018, a year after the Phase 1 funded programme had completed, the number of participants had risen and the legacy was considerable. In 2018, we could see that overall **914,646** children and adults had participated in Destination Space Phase 1, taking part in the school workshops, family shows or at events to celebrate Tim Peake's mission. Of these **152,348**, were school students who were brought by teachers to science centres to



take part in specific curriculum-linked schools' workshops. There were also a host of meet the expert events, helping to showcase the types of careers that are possible with science.

In addition, a further **1,135,786 people** were engaged in Destination Space Phase 1 through all the newly created Destination Space exhibits, exhibitions and programmes in the Science Centres. This brings the **overall wider number of people engaged by ASDC's Destination Space Phase 1 to 2,050,432**. This is quite a tremendous legacy and the numbers will continue to rise year on year.

Destination Space also engaged audiences at a wide variety of events across the UK including Farnborough Airshow, Blue Dot Festival and the Principia Schools conferences in York and Portsmouth.



## Destination Space Phase 2: Level 1

ASDC were delighted to have secured funding for Destination Space 2. Our ambition was always for Phase 2 to be a bigger programme overall, and Destination Space Phase 2: Level 1 was the first six-months of the programme which ran from October 2017 to March 2018 and began the development and delivery of hands-on activities around the new ExoMars mission, the James Webb Space Telescope, UK Spaceports and the latest satellite applications.

**Level 1 Programme Vision:** To engage, inspire and involve families with school-age children, school groups and communities across the UK with the amazing stories, science, engineering achievements and innovative ideas of the UK's world-leading space science and engineering research, highlighting the relevance to people's daily lives and to society's future.

**Level 1 Programme Mission:** To create hands-on activities and resources to bring alive The James Webb Space Telescope, ExoMars and the satellite launch programme, and to work with UK Science Centres and a host of stakeholders to deliver activities. In addition, to develop the relationships required and to develop the content to deliver a wider inspirational national hands-on science and engineering programme celebrating UK space science, engineering and space exploration, that can be delivered in the future through the successful infrastructure of the UK's science and discovery centres and science museums.

The programme created all the content and resources along with a training handbook and invited applications from UK Science Centres who had run the first phase of Destination Space. The following five science centres were selected to deliver Destination Space Phase 2: Level 1:

1. The Eden Project in Cornwall
2. The National Space Centre in Leicester
3. Jodrell Bank Discovery Centre in Cheshire near Manchester
4. Dundee Science Centre
5. Winchester Science Centre

These centres were trained and equipped at the Training Academy in March 2018 to run this cutting-edge schools and families programme. These exciting new activities launched with families and schools from Easter 2018 and continued until February 2019.

Destination Space 2: Level 1 was just the start of Phase 2, and built on all the expertise, training, knowledge and enthusiasm for space science and exploration currently in science centres across the UK, and with their schools and family visitors. Specifically, this programme created great new resources and hands-on activities focusing on the science and engineering of the new James Webb Space Telescope, the ExoMars mission, satellite applications and the future potential for UK Spaceports. It also created a brand new full 50 minute KS3 workshop on the James Webb Space Telescope, and a brand new full 50 minute KS2 workshop on the ExoMars mission.

## Destination Space Phase 2: Level 2

ASDC were delighted to secure funding for Destination Space Phase 2: Level 2 which the rest of this report discusses. Beginning in September 2018, Destination Space Phase 2: Level 2 is a partnership between ASDC, the UK Space Agency and the Government's Spaceflight Programme; Launch UK.

This national programme celebrated the innovation and skills within the wider UK space sector in terms of UK space exploration, including UK Spaceports and space launchers, the new James Webb Space Telescope, the ExoMars mission and satellite applications an bringing together the 50<sup>th</sup> anniversary of the Apollo moon landing and the UK's role in this.

### The following Science Centres delivered Destination Space Phase 2: Level 2

1. Aberdeen Science Centre
2. Dundee Science Centre
3. Dynamic Earth
4. Eureka!
5. Glasgow Science Centre
6. International Centre for Life
7. National Space Centre
8. Observatory Science Centre, Herstmonceaux
9. ThinkTank (Birmingham Museums Trust)
10. W5
11. Winchester Planetarium and Science Centre
12. Woolsthorpe Manor\*
13. Xplore (formerly Techniquest Glyndwr)

\*Woolsthorpe manor were not on Destination Space 1 but have worked closely with the National Space Centre to increase their knowledge of the programme.



## 2. Key Goals

The key goals for this 30 month (2.5 year) national programme, in order of importance, were as follows:

1. To inspire and involve children and their families and teachers, creating a pioneering sense of curiosity, questioning and adventure in relation to space, our planet and the UK role in space exploration and applications.
2. To inspire science engagement professionals across the UK to help the children, families and teachers they engage to explore, test, experiment and discuss the brilliant creativity, innovation, ambition and entrepreneurship needed for space science and engineering programmes and exploration - with a specific focus on UK spaceports, satellite applications and space exploration.
3. To inspire both schoolgirls and schoolboys to consider careers in the space sector and in science and engineering more widely and to see the potential for their futures. Evidence points to young girls especially feeling 'it's not for me' and we would like to counter this using our methods which independent academic evidence shows appeals equally to boys and girls.
4. To build family science capital in the science centres we work with, and more widely, and to encourage young people and families from all sectors of society to grow their interest in science and to consider careers in this area.
5. To bring alive the areas of UK space science that have the greatest impact on all of us, showing the potential of spaceports, satellites and the applications industry and examining topics such as 'what happens if we switch space off?'
6. To train science engagement professionals embedded in ASDC member organisations across the UK to inspire families and schools with the latest on spaceports, space applications and recent developments in space science and engineering, including areas of space exploration such as the technology used and problem-solving needed for the first Moon landing, innovations for the James Webb Space Telescope and the design and technical development of the European Rover for the ExoMars mission.
7. To increase the public engagement opportunities of UK space scientists and engineers (in a gender balanced way) and enable the public to meet them in informal settings.

### 3. Key Audiences

The key audiences for this national programme are:

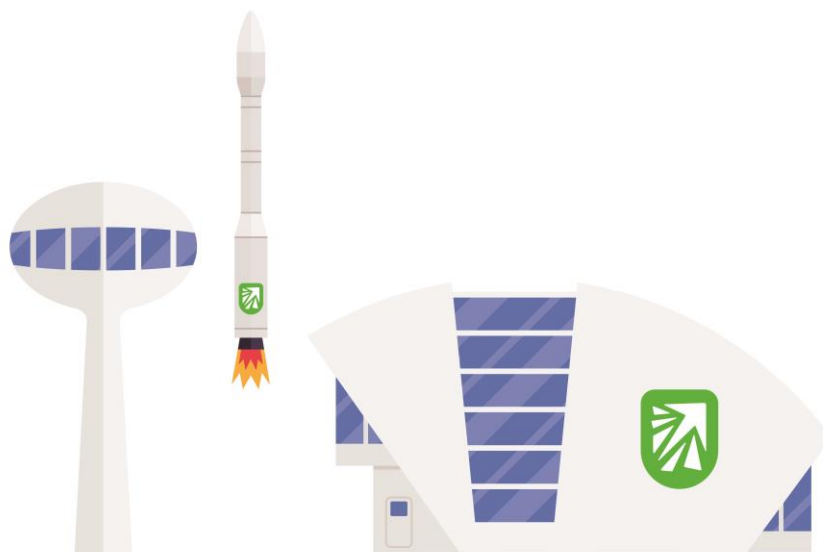
1. Young people aged 5 - 14 to explore space, spaceports, the latest satellite launches and applications and the engineering feats and spin offs from human spaceflight and exploration. There will be a special focus on children aged 7 - 10, an age group that the ASPIRES academic report has showed is vital to engage for longer term interest and engagement.
2. Parents and families of these young people so they are equally inspired by what the UK and our European and International partners can achieve together and can continue to inspire and encourage their children's science learning and career aspirations long into the future, seeking out other related activities.
3. Teachers, to inspire them to engage their school groups (aged 5 - 14) with the latest space science and to involve their students on an on-going basis, and to bring their classes to Science Centres to discover more space and science programmes.
4. Science centre and museum professionals in selected centres who will ensure spaceports, satellite launchers, ExoMars and other space content is included across their shows and activities, and develop relationships with spaceports, space scientists and engineers to ensure innovative content is built on into the future.
5. Engineers and scientists working with spaceports, satellites and in space exploration, to make it easy for them and to give them the confidence and motivation to share their excellent work with the public by offering great activities and methods to engage audiences.
6. Other stakeholders such as other space networks and organisations so they can better understand the range of world-leading space science and engineering expertise that the UK and other ESA member states have, and explore easy ways to engage the public.



## 4. Five Key Content Areas

This Phase of Destination Space focussed on these five key areas of content:

1. **UK Spaceports**, covering the pioneering spirit of what is happening in the UK, the latest locations and fascinating developments of the newly proposed and selected UK spaceports and how people can find out more. It also included research and development to create new activities and experiments for schools and families to help people really share what is happening.
2. **Satellite Applications** and the types of satellites that will be launched from the UK. This covered the UK scientists, engineers and start-ups innovating in this area, the idea of 'what happens if you switch space off,' as well as Earth observation.
3. **The 50<sup>th</sup> Anniversary of the Moon Landing**. On July 19-20th 2019, the UK and the world celebrated The 50<sup>th</sup> Anniversary of the Moon Landing, when Neil Armstrong was the very first person to set foot on the moon. We explored all the UK links to the Moon landing and worked with over 100 partners to help everyone maximise this event and really bring alive where we have come since then, and where space exploration is headed in the future.
4. **ExoMars**. The programme highlighted one of ESA's most ambitious scientific endeavours to search for evidence that life may have once existed on Mars, with a special focus on the UK-built Rosalind Franklin Rover. The launch of the rover was due in summer 2020 but was delayed to 2022, but we were still keen to harness UK interest in this project.
5. **The James Webb Space Telescope**. This is expected to launch into space in October 2021 and Science Centres were trained on all aspects of this ground-breaking telescope.



## 5. Outputs of Destination Space

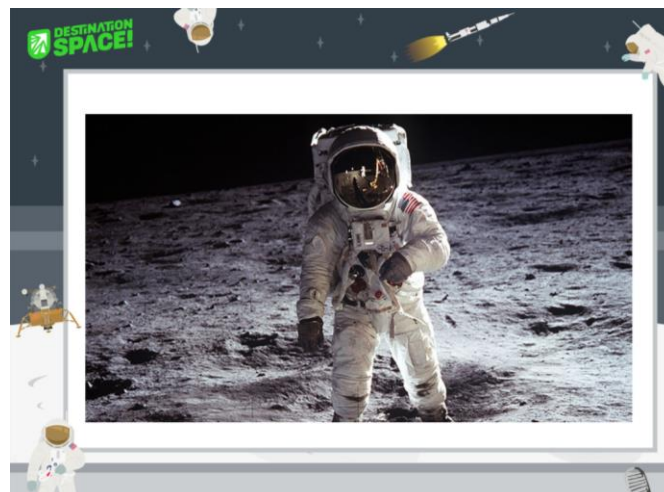
This project has delivered the following:

1. A suite of highly adaptable activities for use by science centres and museums across the UK for them to use in family shows, meet the experts, events and school workshops to share the latest in spaceports, launchers, satellite applications and other areas of 'Key Content' below.
2. An exceptional set of hands-on equipment and resources for each of the 13 selected science centres to use with families, schools and the wider public to explore the latest in spaceports and space science, focussing on the 'Key Content' areas.
3. A new family show focussing on spaceports, launchers, space applications and the 'Key Content' areas.
4. A specific curriculum-linked workshop for KS2 focussing on spaceports, launchers, space applications and the 'Key Content' areas, with an accompanying PowerPoint.
5. A specific curriculum-linked workshop for KS3 focussing on spaceports, launchers, space applications and the 'Key Content' areas, with an accompanying PowerPoint.
6. A meet-the-expert session format and guidance for space event days and activities for families with introductions to guest space scientists and engineers.
7. A new training handbook, with all the hands-on activities, demos and content.
8. A one-day Charette\*, bringing together professionals from across the UK with the very best experience in hands-on activities to engage families with space science, with engineers, academics and researchers working with spaceports, launchers, satellites and the other areas of key content. (\*A Charette brings together experts with different backgrounds to come up with creative ideas to create a leap forward in a field. ASDC has used this successfully at the start of every national project.)
9. A Destination Space Level 2 research and development report, building on the Level 1 report, summarising all the ideas, hands on activities, experiments that had been uncovered through this programme focussing on the key content areas.
10. Creation of a Science and Engagement Advisory group who were happy to advise ASDC and science centres on the latest space science and engineering by phone and email as the programme progresses.
11. A training academy for 26 science centre staff from the 13 selected science centres and museums across the UK to enable them to run the programme (2 staff members per centre), and to help them make it adaptable to incorporate new content as UK spaceports are built and missions develop.
12. Adaptations and developments to the bespoke ASDC Destination Space Website [www.destinationspace.uk](http://www.destinationspace.uk) to highlight all the resources that science centres will need to run the new activities, shows and schools workshops, and a place where all public participants who have visited science centres can find out more.

13. Easy access for Science Centres to video footage and images of the spaceports as they develop, the latest research and policy changes, launchers and new satellite applications as well as the ExoMars mission.
14. Specific guidance to help all families explore STEM careers with their children, building science capital, and to inspire girls with the physical sciences, as given at the training academy).
15. A 'Press and Marketing Pack', with images, video, logos, sample press releases and approved copy for the web and social media delivered in a flexible manner for centres to celebrate the latest space achievements and research. Note the pre-existing Destination Space brand was kept.
16. An infographic showing the Phase 1 impact of Destination Space.

### Outputs specific to the 50<sup>th</sup> Anniversary of the Moon Landing

17. A bespoke Family show, focussing on the first Moon landing, the UK role in it, and the role of the moon in future space exploration.
18. Activities to go into school workshops with the same focus as the above.
19. A set of equipment for the workshops and shows (adapted to what people want and already have).
20. A bespoke 1-day Moon Training Academy in March 2019 which brought together the 13 organisations to share content, and train on the family show and the equipment, inviting one person per centre.
21. A bespoke smaller Moon Training handbook for the 50<sup>th</sup> Anniversary of the Moon Landing, laid out like the main handbook, with the same brand and design, soft bound in time for centres to prepare events for the anniversary on July 19-20th 2019.
22. The creation of a new bespoke web portal, [www.Moon50.uk](http://www.Moon50.uk) for Science Centres and other UK public engagement to share resources and events to celebrate the Moon50 website. This allowed users to upload and download for free and has been reported on separately and the website is still online.





## 6. Steering Group

The steering group for Destination Space was responsible for the programme governance and strategic direction. This board met at the start of the programme for the kick off meetings to shape the programme direction, and several members were present at the Charrette and training academies. The board then met quarterly with email discussions in between where required. The chair of this steering group was Jeremy Curtis of the UK Space Agency.

Name	Organisation	Job Title
Jeremy Curtis (Chair)	UK Space Agency	Head of Education and Skills
Sophia Mitchell	UK Space Agency	Head of Communications, Engagement and Outreach – Spaceflight Programme
Dean Lee	UK Space Agency	Head of External Engagement – Spaceflight Programme
Susan Buckle (2019)	UK Space Agency	Education and Outreach Manager
Ingmar Kamalagharan (2020)	UK Space Agency	Education and Outreach Manager (maternity cover)
Dr Penny Fidler	ASDC	CEO and Project Director
Abi Ashton (from April 2019)	ASDC	Space and Physics Project Manager
Andy McLeod (spring 2019)	ASDC	Special Projects Manager
Dr Jackie Bell (until February 2019)	ASDC	Space and Physics Project Manager

## 7. The Project Team

This programme was directed and project managed by the UK Association for Science and Discovery Centres who have considerable experience managing national strategic multi-partner science engagement programmes.

The programme built on activities and equipment developed during Destination Space Phase 2: Level 1 in collaboration with a host of experts and partners including experts from the UK Space Agency, National Space Centre, Satellite Applications Catapult team at RAL, the ExoMars team at Aberystwyth University, the James Webb Space Telescope Team in Edinburgh and STFC.

The Project Team was responsible for all the content development and deliverables of the programme. It was led by ASDC with expertise and contributions from everyone listed below. Additional expertise came from the academic and engagement experts present at the Charrette.

Name	Organisation	Role
Dr Penny Fidler	ASDC	ASDC CEO and Programme Director
Shaaron Leverment	ASDC	ASDC Deputy CEO
Dr Jacky Bell (until Jan 2019)	ASDC	Space and Physics Project Manager
Andy McLeod (spring 2019)	ASDC	Special Projects Manager
Abi Ashton (from April 2019)	ASDC	Space and Physics Project Manager
Dr Kierann Shah	National Space Centre	Manager of National Space Academy
Sophie Allan	National Space Centre	Lead Physics Teacher Space Academy
Josh Barker	National Space Centre	Space Communications Team

## 8. Selected Delivery Partners

### Selecting the partner Science and Discovery Centres

ASDC sent out an invitation to participate document along with an application form in December 2018 to all 20 ASDC Destination Space Science Centres from Phase 1. We sought up to fourteen partners for delivery of Phase 2.

ASDC also held a bidder's conference call in January 2019 where all Science Centres and Museums interested in applying had the opportunity to dial in, hear about the programme from the ASDC CEO and Project Manager, have their questions answered and hear the responses given to others who would be bidding. This open framework has been used in all previous ASDC programmes and means there is absolute clarity about what centres need to deliver, schedules, audiences, grants, budgets, and reporting before each Centre applies. Applications were received from 13 organisations including 12 previous Destination Space partner centres and one who was completely new to the programme, Woolsthorpe Manor.

### Selection Panel

Applications were received from across the UK to take part in Destination Space Phase 2: Level 2. The applications were reviewed by the Selection Panel, which met on Tuesday 12<sup>th</sup> February 2019 and included staff from ASDC, UK Space Agency and Launch UK.

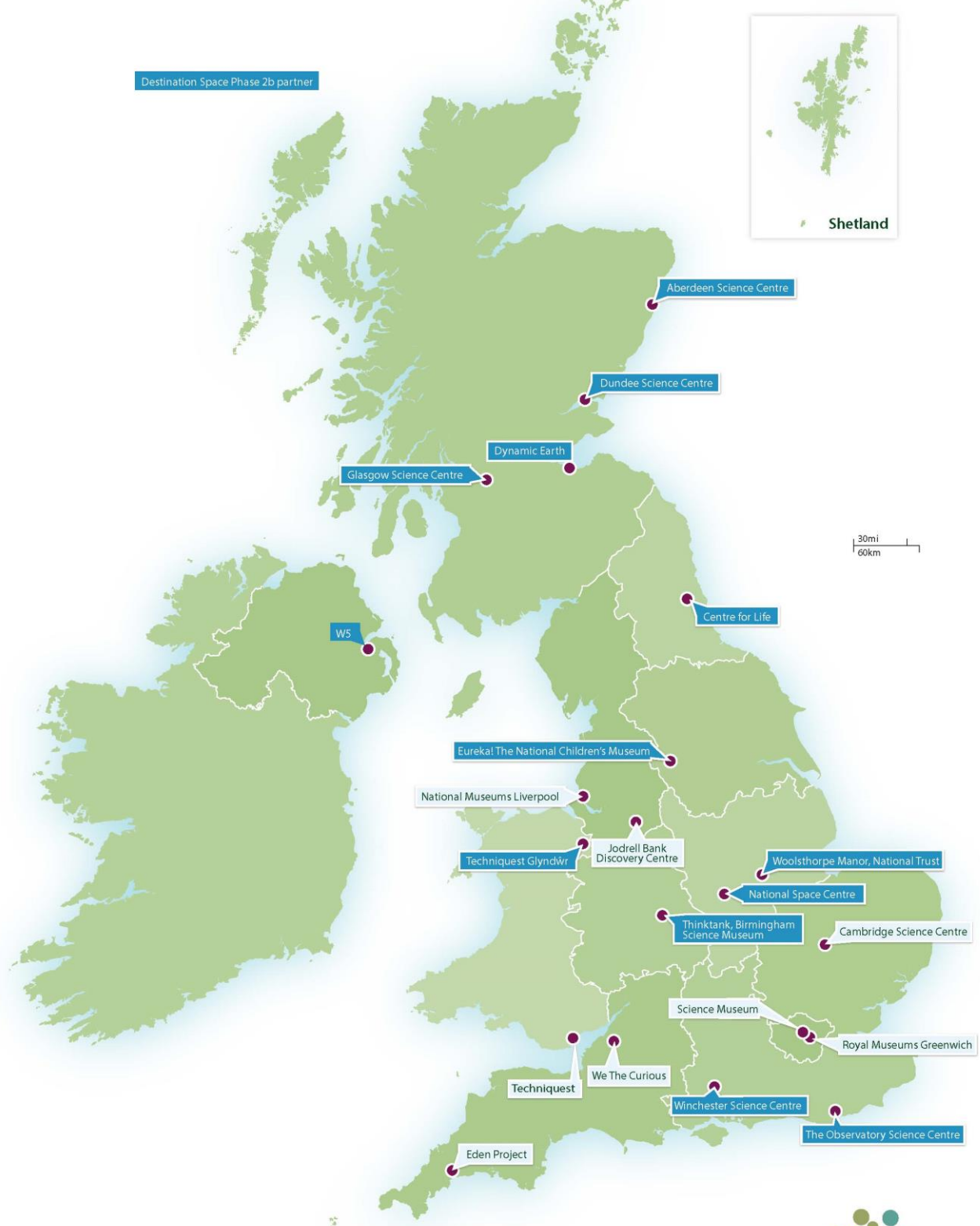
### Destination Space Phase 2: Level 2 selected Delivery Partners

The following Science Centres were selected to be trained and equipped to deliver Destination Space Phase 2 Level 2:

1. Aberdeen Science Centre
2. Dundee Science Centre
3. Dynamic Earth
4. Eureka!
5. Glasgow Science Centre
6. International Centre for Life
7. National Space Centre
8. Observatory Science Centre
9. Thinktank Birmingham
10. W5
11. Winchester Science Centre and Planetarium
12. Woolsthorpe Manor (National Trust)
13. Xplore (formerly Techniquest Glyndwr)

# The UK Science and Discovery Centre Network

## Destination Space Partners



[www.sciencecentres.org.uk](http://www.sciencecentres.org.uk)

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## 9. Equipment for each Science Centre

ASDC understands that all ASDC members are different. They have different strengths and existing partnerships, different audiences and unique relationships. We know that every Centre wants to play to their strengths and run slightly different activities and events and that each Centre needs freedom over how they choose to run these with their visitors if they are to do their very best work. We always fully endorse this approach and indeed ASDC designed all elements of this project to maximise this flexibility. Our goal was that selected Centres had the freedom to evolve and adapt the Destination Space content, to take advantage of their expertise and existing relationships and to adapt and update their offer as the programme progress.

ASDC provided an approved script for the family show and schools workshops along with slideshow and videos, and centres were also free to use the activities for busking and to run breakout sessions.

### The thirteen selected Science Centres were given the following:

1. A set of adaptable hands-on equipment for Moon Landing Anniversary activities including a 'smell of the Moon' box, a large 'moon mat' featuring satellite imagery of the moon and a host of other activities. Full kit list is in the Appendices.
2. A set of adaptable hands-on equipment for the four other key topic areas of this project including a 3D printed surface of Mars, a pocket satellite, a fire tornado and lots of other activities. The full kit list for this part of the project is also in the Appendices.
3. A brand new interactive family science show on the Moon with full script.
4. A brand new interactive family science show on spaceports and satellite applications.
5. 4 schools workshops. Two for Key Stage 2 (on ExoMars and Satellite Applications) and two Key Stage 3 (on the James Webb Space Telescope and Spaceports & Launchers).
6. Full and detailed training on how to use all the equipment, the hands-on experiments and all the related science for the research and key content areas.
7. A place for one Science Centre staff to attend a Moon Training Academy at the National Space Centre in Leicester.
8. Places for two Science Centre staff to attend a two-day residential training academy at the National Space Centre in Leicester. All travel, food and accommodation were provided at both training academies.
9. Excellent bespoke new Training Handbooks for all staff involved
10. Adaptable and flexible activities and demos to add to the family show for children and their parents.
11. A £3,000 grant to assist with running the programme until December 2020.
12. A full marketing pack, including logos, sample press releases and text for the family show marketing leaflets.
13. Evaluation forms and instructions for the project evaluation programme
14. Advice and on-the-phone support from ASDC and the project team throughout on any issue to maximise delivery, and to support staff working with new techniques and equipment.



## 10. Content Development for Destination Space Phase 2: Level 2

The project team worked together to create a lively, entertaining, interactive and flexible show for families, that Science and Discovery Centres and Museums could run at weekends, holidays, and other major events.

Throughout the development, the project team focussed on the vision and mission of the programme to ensure they were delivering a programme that ‘engages, inspires and involves families with school-age children, school groups and communities across the UK with the amazing stories and innovative science and engineering of the UK’s world-leading space sector, especially focussing on UK spaceports, satellite applications and space exploration’.

A key factor in the success of all ASDC programmes, is that the equipment and activities we give to the Science Centres are flexible, allowing them to focus on specific content for particular occasions or audiences. This flexibility is critical to the success of our programmes, not least because the centres we select to take part have their own expertise in specific areas and work locally with university and other experts who contribute and enhance what is delivered. These local connections are important in bringing the content alive and making it relevant to children and families. Academic evidence from Professor Louise Archer’s team working on science capital, also shows that local relevance is even more important in engaging those who do not usually engage with science.

The content development process for Destination Space Phase 2: Level 2 began in November 2018 with the partners at the kick-off meeting. The process was led by the ASDC project managers and involved the ASDC CEO, deputy CEO and the rest of the ASDC team along with a host of external experts. Below is the ASDC content development process used for this programme.

### Phase 1: Content Research

This phase involved broad-based research to identify all the relevant hands-on and interactive activities from and around the UK in order to inform the projects content outputs. This research identified other interesting projects and activities related to this project that we, or project partners, might be able to link with in the future. The outputs of this phase included an internal document (Content Research Document), an equipment list for potential experiments and the Project Charrette.

### Phase 2: Content Definition

This phase involved planning and deciding on the specific content of each of the previous outputs, based on the research carried out in Phase 1. The project outputs are outlined in a previous section, but the main outputs were the family show and the Key Stage workshops for schools.

### Phase 3: Piloting and Content Finalisation

This phase involved piloting some of the experiments and activities with target audiences and finalising the training handbook pages for each activity. The pages were edited internally by ASDC, with input from UK Space Agency and STFC. The outputs of this phase were the finished training handbooks in time for the Training Academy.

## 11. Ideas Charrette

### How ASDC created this national programme

Across the UK, there are a number of people from a variety of academic and research backgrounds who have considerable knowledge and experience in the subject area of this programme, as well as those with expertise in engaging families with the great stories and science in this area.

At the start of the programme, ASDC ran an 'Ideas Charette', which efficiently and cost-effectively brought together these people from different backgrounds for a one-day Charette to share inspirational ideas, and knowledge that could be incorporated into the project.

ASDC have run a number of Charettes for other programmes and each has proven to be absolutely key to ensuring inspirational, new and highly engaging content for the project. The day was led by the ASDC CEO, Dr Penny Fidler, and was structured to ensure that collective knowledge and ideas were shared, with plenty of space for creative and innovative thought. There was a mini-Charrette looking at Moon content on 9<sup>th</sup> January 2019 at the ASDC office in Bristol and the full Destination Space Charrette took place on 19<sup>th</sup> January 2019 at Cosener's House in Oxfordshire. The full programme is in the appendix.

Participants were arranged into groups and had the opportunity to share and see lively new demonstrations and experiments, and to use equipment to help inspire and stimulate new creative ideas and experiments.

ASDC were delighted to have had such an exceptional group of participants, the full list of delegates is included below.

### Participants at Destination Space Moon mini-Charrette

Name	Organisation	Job Title
Dr Penny Fidler	ASDC	CEO
Shaaron Leverment	ASDC	Deputy CEO
Dr Jaclyn Bell	ASDC	Space and Physics Project Manager
Andy McLeod	ASDC	Special Project Manager
Sophie Allan	National Space Academy	Lead Physics Teacher
Josh Barker	National Space Centre	Planetarium Co-ordinator

## Participants at Destination Space Phase 2: Level 2 Charrette

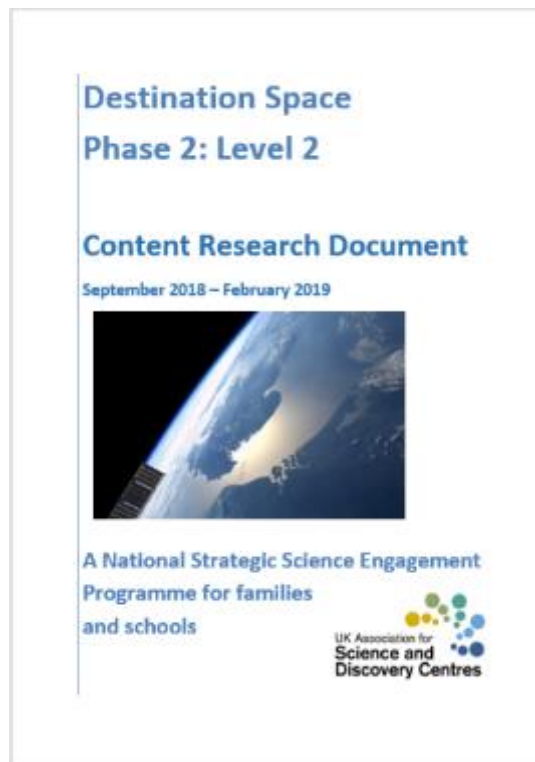
Name	Organisation	Job Title
Dr Penny Fidler	ASDC	CEO
Alastair Bruce	Royal Observatory Edinburgh	Astronomer and JWST-UK Public Engagement Campaign Officer
Amber Gell	Lockheed Martin	Program Manager
Andy McLeod	ASDC	Special Projects Manager
Ben Jarvis	Raptor Aerospace Ltd	Managing Director
Benjamin Harris	Lockheed Martin	Systems Engineer Staff
Casey Bodman	UK Space Agency	Education and Engagement Manager
Catriona Francis	Orbex	International Liaison Director
Christopher Duff	Winchester Science Centre	Head of STEM Networks
Dr Jaclyn Bell	ASDC	Space and Physics Project Manager
Dr Jeremy Curtis	UK Space Agency	Head of Education and Skills
Jonathan Heirons	European Astrotech Ltd	Education Outreach Co-Ordinator
Josh Barker	National Space Centre	Planetarium Co-ordinator
Katie Miller	Skyrora	Business Development Executive
Katy Evans	EDT	Head of Experience Days and Schools Programmes
Lottie Ford	Reaction Engines Ltd	Marketing & Communications Assistant
Matjaz Vidmar	University of Edinburgh	Postgraduate Researcher and Science Communicator
Melissa Thorpe	Spaceport Cornwall	Head of Sector Engagement
Mike Taylor	UK Space Agency	Head of International Spaceflight Policy
Paul Meacham	Airbus	ExoMars Lead Systems Engineer
Prof Keith Mason	Lockheed Martin	Senior Consultant
Sophie Allan	National Space Academy	Lead Physics Teacher
Dr Tamela Maciel	National Space Centre	Space Communications Manager
Tom Lyons	ESERO-UK	Teacher Fellow





## Content research document

All the ideas, content and activities from the Charrette and other research were collated by the project team and put into a research report. This is a working document and ASDC is happy to make it available to UK Space Agency at any point. It is not in a publishable format, rather a collation of all the ideas some of which were developed and used in this programme and others that could be developed in future programmes.



## 12. Training Handbooks

The project team wrote and created a vibrant, engaging and informative training handbook, some pages of which are shown below. The Moon handbook is 56 pages long, and was very popular with our Delivery Partners. The Destination Space 2b handbook is 94 pages long, in a bespoke A4 file and has been hugely well received. ASDC still has some copies of this, please ask if you would like some.

A printed copy was given to all delegates at the Training Academies, so they could learn all the different areas of the programme and remind themselves during delivery, as well as train their staff to run the entire programme.

### The Moon handbook

The Moon handbook contained the following information:

- The family show
- Detailed information on all Moon activities, and equipment
- Further ideas and information
- Some tips around dealing with doubt about the Moon landing
- Marketing information, branding and PR
- Evaluation guidance
- Health and safety



## The main Destination Space Phase 2: Level 2 handbook:

This larger and comprehensive hardback Handbook covers Spaceports, Satellite Applications, James Webb Space Telescope and ExoMars

The Handbook contains the following information:

- Information on how to run the four school workshops
- Detailed information on all the activities, and equipment
- Further ideas and information
- Marketing information, branding and PR
- Evaluation guidance
- Health and safety



### 13. Training Academies for Science Centre Staff

The training programme is fundamental to the success of this programme and considerable resource is put into achieving excellence. Professional staff who are enthused and fully confident to impart the latest knowledge to their colleagues, children and family visitors back in their part of the UK are the key to success in all ASDC programmes.

#### The Moon Training Academy

The one-day National Training Academy about activities around the Moon landing took place at the National Space Centre on 27<sup>th</sup> March 2019.

16 people took part, including a member of science engagement staff from each selected Science Centre and Museum. They were trained in how to use all the Moon equipment, resources and in the latest knowledge. The project paid for delivery partner staff's travel, accommodation, food and training at the academy.

#### Topics covered included:

- An introduction to Destination Space and the 50<sup>th</sup> anniversary of the Moon landing
- How to run all the experiments and hands-on science activities for the Moon landing
- How to use the Moon equipment and maintain it
- How to run the Moon Family Show and each of the activities
- Health and safety surrounding the handling of equipment and chemicals
- Evaluation and reporting
- A full review of the project branding and logo usage
- Resources, images, videos and more
- Social media strategy and resources online



## The Main Destination Space Training Academy

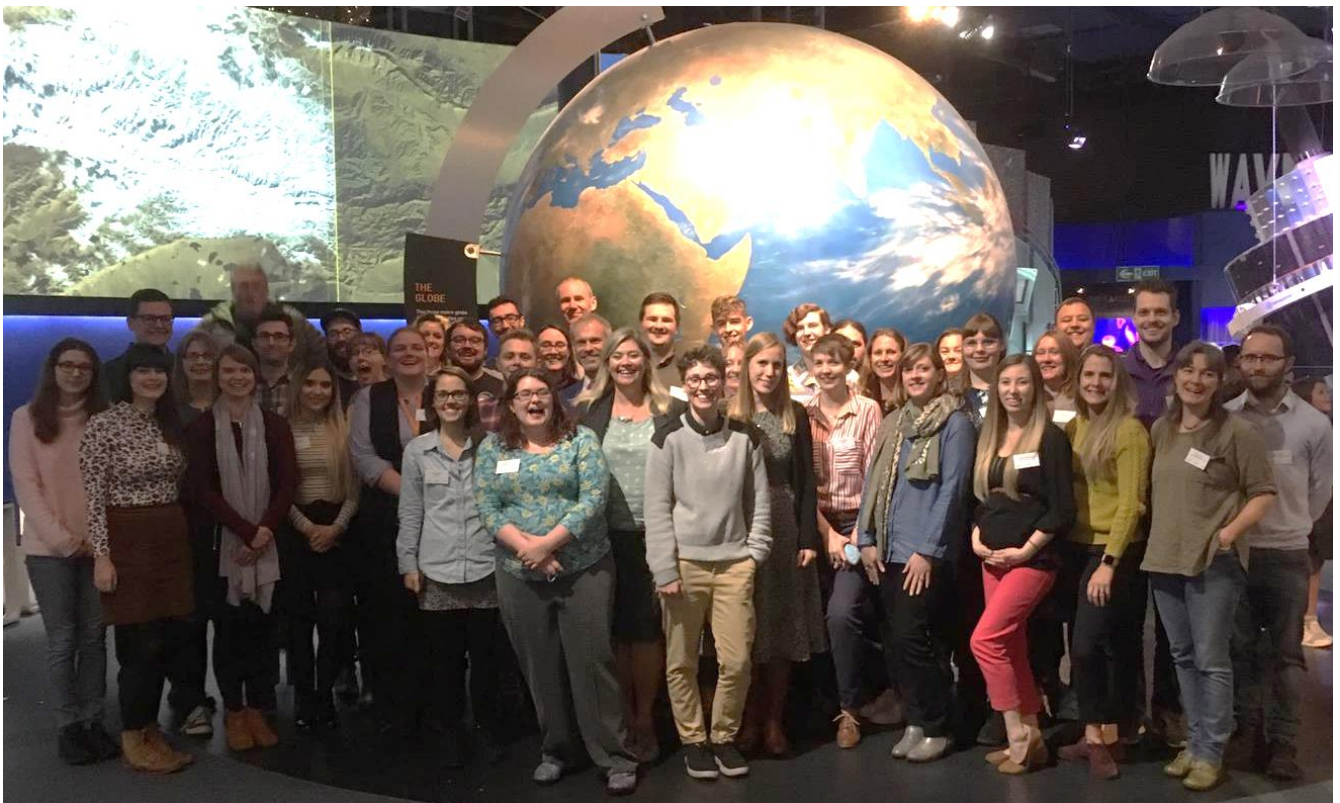
### Covering UK Spaceports and Launchers, Satellite Applications, James Webb Space Telescope and ExoMars Training Academy

The Destination Space Phase 2: Level 2 two-day residential National Training Academy took place at the National Space Centre on October 3<sup>rd</sup> – 4<sup>th</sup> 2019.

43 people took part, including two members of science engagement staff from each delivery partner and two further staff members from the centres running the extension to this project, 'Spaceports in Communities'. They were trained in how to use all the equipment, resources and in the latest knowledge as well as hearing from speakers from the UK Space Agency, ASDC, the National Space Centre and an academic from the James Webb Space Telescope team at the University of Leicester. The project paid for attendees travel, accommodation, food and training at the academy.

#### Topics covered included:

- An introduction to Destination Space
- An introduction to the research and work of the UK Space Agency and the LaunchUK team
- How to run all the experiments and hands-on science activities
- How to use all the equipment and maintain it
- How to run the Destination Space 2 family show and each of the activities
- How to run the 4 key stage workshops
- Health and safety surrounding the handling of equipment and chemicals
- Evaluation and reporting
- A full review of the project branding and logo usage
- Resources, images, videos and more Social media strategy and resources online





## 14. Destination Space Website and Social Media

Destination Space uses the following channels and addresses:

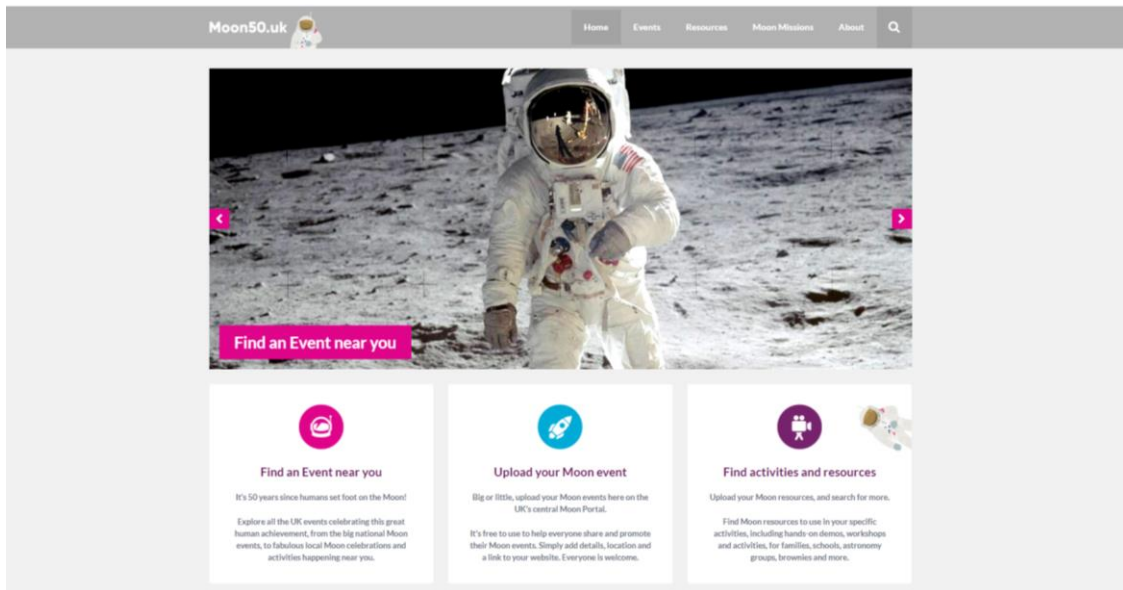
- [www.DestinationSpace.uk](http://www.DestinationSpace.uk)
- @Destin\_Space
- #DestinationSpace
- [www.Moon50.uk](http://www.Moon50.uk)
- #moon50
- There is also a Destination Space Facebook group for those at the academy.

With the public excitement around the 50<sup>th</sup> Anniversary of the Moon landing, ASDC were particularly keen to use all channels to showcase the celebrations around the UK. A successful Twitter campaign reached more than 78,000 people and the Moon50 web portal ([www.moon50.uk](http://www.moon50.uk)) was created for people and organisations from around the UK to share their events.

## 15. Moon50 website ([www.moon50.uk](http://www.moon50.uk))

ASDC was awarded additional funding from UK Space agency to create an events hub for the 50<sup>th</sup> anniversary of the Apollo Moon landings. This online platform focussed national celebrations, allowing all UK organisations to upload what they were doing. It acted as a central hub, enabling members of the public to search for and access events near them, increasing awareness of space science through audience and community participation. People were able to find their closest moon event and feel part of the much larger worldwide celebration of the Apollo Moon landings.

Moon activities, resources and 128 events were shared on the Moon50 website from across the UK and the website was widely praised.



## 16. Impact and Geographical Reach

Together, the ASDC membership attracts 25 million people each year. Some of our larger members attract several million people annually, and our smaller member centres attract 100,000 people every year. Within this 2 ½ year Destination Space programme, ASDC selected and trained thirteen ASDC members to deliver the full programme ensuring geographical reach whilst maximising the numbers of families that can take part. The map shows the geographical location of all Destination Space partners.

### Proposed impact and reach of this programme

In ASDC's proposal to the Space Agency, and in our contract, ASDC committed to reach 200,000 people.

Numbers centres said they could reach in their PROPOSALS	
Aberdeen Science Centre	15,778
Dundee Science Centre	16,975
Dynamic Earth	19,055
Eureka!	16,460
Glasgow Science Centre	19,185
International Centre for Life	20,900
National Space Centre	21,300
Observatory Science Centre	28,520
Thinktank Birmingham	15,000
W5	14,300
Winchester Science Centre and Planetarium	30,700
Woolsthorpe Manor	19,870
Xplore (formerly Techniquet Glyndwr)	14,700
<b>Total</b>	<b>252,744</b>

## Actual Impact and Geographical reach: Exceeded Targets

The selected Science Centre have done remarkably well on their targets, especially in light of closures and furloughs due to the Covid-19 pandemic. Overall, they engaged 340,579 people.

Numbers reached across all of Destination Space Phase 2 Level 2	Number engaged	%
Family Shows	132,031	38.8%
Careers events	989	0.3%
KS1 workshops	1482	0.4%
KS2 workshops	16,629	4.9%
KS3 workshops	2105	0.6%
Other activities	118,797	34.9%
Digital asynchronous activities, e.g. video views, resource downloads.	64,403	18.9%
Digital synchronous activities, e.g. virtual workshops.	4143	1.2%
<b>Total</b>	<b>340,579</b>	

Types of reach and engagement	Number engaged	%
Schools Workshops and shows around 30 mins duration	180,636	53.0%
Busking, demonstrations and meet the experts	159,943	47.0%
<b>Total</b>	<b>340,579</b>	

## Reach and engagement for the Moon part of the Programme

Early on in the delivery of phase 2b, the activities were focussed around the 50<sup>th</sup> anniversary of the Moon landings. These are summarised in the table below and took place in the summer of 2019.

Number engaged	Number engaged
Family Shows	69,965
Careers events	121
KS1 workshops	577
KS2 workshops	2637
KS3 workshops	1061
Other activities	70,517
<b>Total</b>	<b>144,878</b>

This means that 195,701 people were engaged on non-moon 50 related programmes. We note that many of the Moon 50 celebrations also included much on the latest in space exploration and the other key content areas.

Science centres offered a broad range of activities linked to the 50<sup>th</sup> anniversary of the Moon landings. Common formats included workshops, talks and drop-in sessions. Some centres held inter-generational events with families, where adults would share their personal memories of the Moon landings. Other sessions included storytelling and the use of hands-on objects. Being able to show visitors a sample of Moon rock was reported as being particularly impactful.



## 17. Impacts of Covid-19 Global Pandemic on UK Science Centres

### Science Centre closures

In March 2020, the global Covid-19 pandemic struck the UK and towards the end of March 2020 all public venues, including the UK's entire lively and successful national network of charitable Science Centres, along with all the UK's Museums were forced to close to contain the Pandemic.

For the charitable Science and Discovery Centres in every city and region of the UK, this meant they had to also close their doors to every source of income that has previously kept these Educational Charities operating, for example their corporate event operations as gatherings were not permitted, schools programmes, families paying an entry fee, cafes, shops and other income streams. These robust and entrepreneurial STEM education charities had their entire incomes cut off overnight.

Many have remained shut ever since, with some opening over the summer holiday period.

A furlough scheme was announced quickly which has been a lifeline to the UK Science and Discovery Sector. However, it has not been sufficient and whilst the Government chose to support museums and the arts with a £1.57 billion Cultural Recovery Fund (adding a further £300 million in 2021), the Science Centres were mainly excluded from applying for this fund - unless they happened to have their Science Centre in a heritage building or had a small, accredited collection so could access museums funding. The result of the lack of funding was large numbers of skilled and trained staff being made redundant in 2020.

The Scottish Government have provided around £2 million of support for the four Scottish Science Centres, which has played a large part in protecting them from staff redundancies until 2021.

98% of Science Centres have told us they can't break even operating at the reduced capacity of 30% of visitors, however timed tickets have helped smooth out the visitors across the day which has helped. Some opened across the summer holidays when visitor numbers are at a peak, but for many centres the regional tier system and of restrictions meant they could not open for the October half-term which was a huge financial blow and impacted what they could deliver for this programme.

Since March 2020, ASDC has undertaken a large amount of advocacy and lobbying to try to change this situation, culminating in a Parliamentary Debate on the subject of Science Centre funding on 24 March 2021.

### The impact of Covid-19 on The Destination Space Programme

The impact on this Destination Space Programme, has been considerable, especially that most UK Science Centres had to make over half of their Education and outreach teams redundant (50 – 80%) in the summer of 2020. This includes some of the teams that ASDC have trained to run the workshops and activities of the Destination Space programme.

Likewise, furloughed staff have often been the very staff members who were trained and responsible for delivery of Destination Space Phase 2: Level 2, meaning for some centres over the last 12 months there has been nobody in our delivery centres who could deliver Destination Space activities through any method. Thankfully, many had undertaken a lot of the delivery before Covid struck.

The closure of the Science Centres meant that they could not deliver what they agreed to deliver as it was all hands-on and face to face in the Science Centres. To mitigate, the ASDC team have worked tirelessly all year to replan and reshape all our national STEM programmes. In particular we have asked every centre to resubmit proposals of what they could deliver, retrained centres on digital approaches and worked with teams to help their new programmes. Each centre has recast what they can do, adding digital and blended delivery to their programme whilst their centre is closed.

### Pivoting to online and remote delivery

On 2<sup>nd</sup> July 2020, ASDC hosted a conference call with delivery partners to discuss their plans around adjusting in-person delivery of this project to online and remote engagement methods. This was an opportunity for centres to share their plans and discuss ideas together.

On 24<sup>th</sup> September 2020, ASDC hosted a session for the wider ASDC network about evaluation of online engagement and Destination Space Delivery Partners attended this.

Some Science Centres were able to pivot to digital and remote engagement delivery of Destination Space activities, but this was not possible with every centre due to limitations on space, staffing, redundancies, and furlough.

### Challenges with timing

Delivery of Destination Space Phase 2: Level 2 Moon Anniversary activities was carried out across the summer of 2019 before Covid. Likewise, in October 2019, the Training Academy was held for the other four content areas of this project; UK Spaceports and Launchers, Satellite Applications, James Webb Space Telescope and Exomars. Two centres were given their equipment early, at the training academy, as they wanted to deliver activities across the October half-term. The remainder of centres received equipment in December 2019 and January 2020.

Some centres began delivering activities across the Pre-Covid Christmas break and February half-term which had a large impact, but many centres planned activity on this project to begin across the Easter break of 2020 but were then in lockdown due to Covid, with significant activity planned in the summer term and summer holiday of 2020. This has definitely affected the delivery numbers achieved on this project, without Covid closures we would expect to have reached many more people with the Destination Space content.

### What the Future holds

The UK went into a further lockdown in November and remained mainly that way until May 2021 when they will be allowed to open again. This is after the March 31 deadline of this programme and Science Centres have told us they want to continue delivering Destination Space when they re-open where possible.

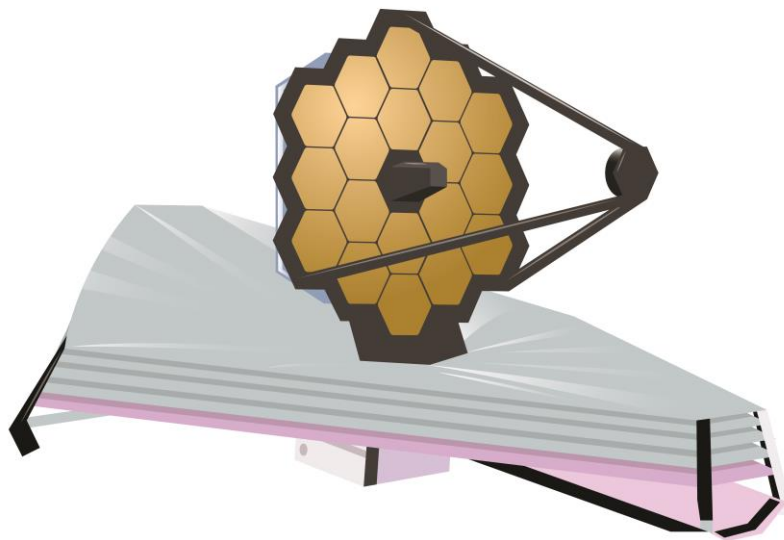
Most UK Science Centres and Museums will re-open for the May 2021 half-term, one of the busiest weeks of the year, and hope to remain open until the summer.

**However, there are additional financial hazards to this. These include:**

- How to break even with such restricted numbers
- How to ensure the experience – which is so collaborative and hands-on - can be matched in these Covid times.
- Teachers being over stretched and not bringing large school parties in what was the very busy June and July end of year school visits.
- Income from Corporate hire and Events reduced to zero until 2022.
- Income from families during the summer holidays reduced due to restricted numbers.
- There is some indication income to the Café and shop may increase, as it did after the last lockdown, but this depends also on consumer confidence in the economy and job market.
- Some centres cannot open until the autumn for a variety of other reasons.

In summary, the independent evaluator noted:

*“The amount of additional work the closure caused science centres should not be underestimated. Many plan their delivery at least six to twelve months in advance allowing them to market, book and effectively plan their operations. It is unprecedented for many centres to have only a few weeks’ notice to not only cancel bookings but re-assess the future of their entire learning programme and staff commitment. In most cases early on in the March 2020 lockdown, the focus was around the financial viability of the science centres with the majority of centre staff being on furlough, with the exclusion of the senior management teams.”*



## 18. The Evaluation Findings of Destination Space Phase 2: Level 2

The following paragraph is taken from Executive Summary of the evaluation report carried out by OnData.

Destination Space Phase 2b has had an extremely positive impact on adults and children, science engagement professionals and science centres in general. The audience numbers engaged with between summer 2019 and spring 2021 are over **340,000**. This exceeds the stated target of 200,000 and is a commendable achievement given the uncertainty under which centres have been operating due to the COVID-19 pandemic. Some of this reach has been possible due to centres pivoting to digital resources and online delivery methods. In responding to the pandemic, science centres have demonstrated immense creativity and responsiveness in adapting content and developing new approaches to continue to engage with audiences online and in the community.

With regards to legacy, the resources, activities and kit provided will have a long life within centres, with aspects being incorporated by many into their longer-term programming. There is further legacy within science centres in relation to staff development. Whilst only two members of staff attended the training academies, often tens of science engagement professionals at each centre were able to develop their skills and knowledge of space science topics as those two staff members provided training for their colleagues. Some centres were also able to use the programme as an opportunity for staff to develop their project management expertise. A third area of legacy is around relationship-building, with new relationships forming with community partners, between centres and with specialists in academia and industry. Centres are keen to participate in national programmes such as Destination Space, with one centre commenting that taking part “*adds credibility to the centre*” and the impact continues long after the funded period ends.



## The impact of the Show on children and their families

A range of sources of evaluation evidence have been considered on the impact of participation on children, their families and teachers, including survey returns, reporting and interviews with science centres and a range of different Destination Space activities have been considered.

Feedback from families was gathered by science centres as part of a structured interview following participation in the Destination Space family show. The exact content of the show varies between centres, but they are all interactive and encourage participation. Analysis of these interviews shows:

- Over 95% of adults and children overwhelming found the family shows fun and interesting.
- 98% of adults and 99% of children liked space “a lot more” or “a bit more” following the activity. This is a slight increase on the 95% of children responding “a lot” or “a bit” more from the phase 1 report (Dillon & Moncada Arce 2017). Whilst this sample size is much lower, the results are consistent with phase 1.
- Over 80% of adults and children wanted to find out more about the space science topics featured in the activities.

## Quotes from Participants after the Show

**It is clear, from the various sources of evaluation evidence, that the activities have successfully engaged children and adults at the same time.** Comments include *“Great that it was geared towards children but informative for adults, full of fun facts”*. Centres reported the popularity of the family show, with availability exceeding demand.

Across the range of Destination Space activities, there was clear evidence of a sense of “curiosity, questioning and adventure”:

- Following the family show at ThinkTank, families would regularly stay on afterwards to ask staff lots of questions.
- After a school trip to Dynamic Earth and participation in a workshop, one pupil said *“It has made me more curious about the world around me and I am going to ask more questions”*.

## Teacher’s responses

Teachers frequently commented on the high level of involvement in the activities, and different schools workshops, with children commenting that the opportunity to get involved contributed to a positive experience.

- 100% of teachers responded Excellent or Good (Excellent, 79%, n=23 or “Good” 21%, n=19) when asked about “how they would rate today’s activities” following the Key Stage 2 and 3 workshops.
- Teachers rated the knowledge of staff presenting activities as “Excellent” (95% at Key Stage 2, 90% at Key Stage 3) or “Good” (5% Key Stage 2, 10% Key Stage 3). Furthermore, evidence from the teacher survey showed presenters were well-prepared and effective in presenting the technical content.
- The teacher survey also showed significant evidence of improvement in Key Stage 3 teachers’ knowledge of UK Space Agency or the European Agency as a result of taking part in the activities (80% agreed) and some evidence of improvement in Key Stage 2 teacher knowledge (53% agreed).

## Other quotes from Teachers

- A teacher said of the impact of the Key Stage 2 workshop at Eureka: *“It will get them interested in space exploration and engage in questioning science, not just taking it as fact”.*
- In open-ended responses to the survey, teachers were very positive about the way in which the space science topics had impacted on their pupils, with one commenting that the workshop *“helped them form a vision of [the] wider world due to the information provided about Rosalind Franklin Rover.”*
- *“Very motivated. Children are keen to read more about ExoMars and to look out for articles coming up in the news.”*
- *“The session introduced many ideas which were to be explored and investigated, it wasn't about getting answers.”*

## Responses of the Key Stage 2 Students

Key findings from the analysis of the Key Stage 2 survey returns (n=631 from 7 centres):

- 86% of male students (n=248) and 86% of female (n=289) said they enjoyed the activities. I.e. there was no difference in responses between the genders on this key point.
- Girls (71%, n=240) showed a slightly higher level of being more interested in science as a result of taking part in the activities than males (65%, n=184).
- There was no difference between genders being more interested in a job in science as a result of taking part in the activities with both reporting 50% (male n=144, female n=170), and only minimal differences saying they felt about the same (40% of males, n=117 and 43% of females, n=145).
- In the open-ended responses there were several references to positive female role models for future science careers, for example *“The first person to take a photo of a black hole was a girl! Girl Power!”* and evidence of family support being a factor: *“I already know a lot on science from help from my mum and teacher”, “mum is a science teacher”* and *“mum works in a lab”.*

## Meet the Expert events

The majority of centres were able to hold ‘Meet the Expert’ activities with a range of UK space scientists and engineers. These took place as part of careers events and talk programmes.

A range of space science topics within Destination Space were covered by scientists and engineers from universities (including Dundee, Durham, Newcastle, Teeside, Oxford, Northumbria, Leicester, Edinburgh, St Andrews, Strathclyde, Glasgow, Colorado, Liverpool John Moores University, Queens University Belfast, Sussex), research institutes (for example, NASA JPL, UKATC) and industry was represented through companies such as Lockheed Martin, Airbus and Skyrora. Following the centre closures these activities continued through pre-recorded films (Life Science Centre) or Q&A sessions via platforms such as Zoom (Aberdeen Science Centre).

## Supporting science engagement professionals

The independent evaluator concluded that through experiencing high quality training and support, science engagement professionals have developed their knowledge about space science topics and through the Destination Space activities have successfully engaged with visitors.

Evaluation data shows strong evidence that upskilling the delivery team in the technical content of the programme was successful.

The training events were highly rated with a positive impact on confidence.

**Quotes from Science Centre staff include**

*“incredibly useful and fantastically run”*

*“[The training] made our staff feel confident about some of the things, particularly spaceports and James Webb Space Telescope”*

*“Staff enjoyed having a lot of new content to deliver. It was a topic that everyone could connect with and get involved in, from our Communications and Graphics team with a strong social media campaign and creation of posters and banners (including print posters around the city), to our food and beverage team, who got involved by creating a space-themed food and drink offer”*

The evaluator notes: It is often assumed that science centre staff all have a science background, but that isn't necessarily the case. Staff may have come from a teaching background or have been performers and not all have a science degree. Programmes such as this provide crucial opportunities to widen knowledge and to ensure all staff have access to current developments in the field. Whilst science engagement staff became more aware of the UK involvement in space science, there were opportunities to engage with local companies involved in the industry. In many cases these were new relationships that were being formed.



## 19. Evaluation Methodology

The ASDC CEO and Project Manager created the evaluation methodology, tools and online mechanisms to allow the national multicentre evaluation of Destination Space Phase 2 Level 2. Evaluation questionnaires were sent to Science Centres around the time of the Training Academy in 2019, and Science Centres ensured their participants completed the questionnaires and interviews, and the teams in each Science centre submitted their evaluation results onto ASDC's online mechanism to allow ASDC to collate the results across the whole National STEM Programme.

The evaluation run by ASDC looked for:

- Increased curiosity and enthusiasm for learning more about the space science and engineering sectors
- A desire to know more
- Attitudes to space science and engineering science
- Awareness and knowledge of the key content areas

Forms also gathered gender, age and school postcode data for a thorough analysis of the data.

### External Evaluation of Destination Space Phase 2 Level 2 by OnData

The evaluation of Destination Space Phase 2 Level two was undertaken by external evaluation experts, OnData [www.ondata.org.uk](http://www.ondata.org.uk). The evaluation questionnaires and interviews are given at the end of this report.

OnData have analysed the Science Centre final reports, metrics and evaluation data, and compiled an independent evaluation report looking at the outcomes of Destination Space Phase 2 Level 2 against the key goals and vision. This report will be available on the ASDC and the Destination Space project websites and upon request from the ASDC project manager.

### The Evaluation data collected by March 2021

Due to Covid-19 there were challenges returning comprehensive evaluation forms. ASDC received the following number of forms:

- 632 KS2 surveys.
- 78 KS3 surveys.
- 171 family surveys.
- 29 teacher surveys.

There were multiple reasons for this lower number, overall due to Covid-19:

- Some centres had collected paper forms but were unable to access their offices due to lockdown restrictions.
- Others did not have staff available due to people being on furlough, which meant that those involved in the data collection for Destination Space weren't able to contribute to reporting.
- Other centres had planned to undertake their data collection when their school workshop delivery increased in summer 2020, something that wasn't able to take place due to the COVID-19 pandemic.



## Pre-pandemic evaluation Commitments

Before the Pandemic, we had hoped each centre could return the following, but this rapidly became impossible with centres shut and no face to face delivery. Most centres had left the evaluation for the busier Easter and summer periods, but were then forced to close.

- 300 evaluation forms with school children (minimum 12 classes)
- 100 school children at careers relevant events (eg where they are meeting an expert)
- 50 questionnaires completed with family audiences

## Pre-pandemic Metrics

The Delivery Partners were asked at the training academy to provide ASDC with the following information as part of their interim report and their final project report:

- Numbers of people participating in the family events and shows.
- Numbers of school children participating in the curriculum-linked schools workshops and activities.
- Numbers of children taking part in career-related events showcasing the types of roles available in the space sector (and number of these events).
- Numbers of people interacting with a scientist or engineer.
- The types of activities you are delivering and details on the audiences you are engaging, including approximate ages or Key Stages.
- Male / female split for schools workshops, family shows, careers events (if not approx. 50:50)
- Postcode data of schools, to analyse regional dispersion and indices of multiple deprivation

## 20. Programme Schedule

After covid had struck, many areas of the programme from March 2020 onwards were re-planned in partnership with the management board.

2018	
September – October 2018	The programme begins. Kick off meeting and partner meetings
December 2018	Invitation to Participate issued
2019	
January /February 2019	Bidder’s Conference Call Selected thirteen Delivery Partners and contracted them
March 2019	<b>One-day Moon Training Academy</b> for one member of staff from each science centre
March 31 2019	Delivery of the anniversary of the moon landing aspect of the programme begins in centres, along with some other areas of the programme if centres had the equipment.
July 2019	Moon 50 Anniversary and multiple events and programmes as part of Destination Space Across the UK
October 2019	<b>Destination Space two-day Training Academy</b>

November 2019	Schools and family Programme Delivery began at science centres. Some Science Centres asked to start earlier, in the October half term. ASDC speedily delivered the equipment early to these centres to enable this.
<b>2020</b>	
January and February 2020	Schools and family Programme Delivery in progress by science centres, including large amount of delivery during the February half-term
<b>MARCH 2020: Covid strikes the UK. All UK Science Centres and Museums had to close in March 2021. Many have had to remain closed until now and will re-open in May 2021. Some opened for 2 months in the summer.</b>	
Easter holidays	Centres shut due to Covid-19 and could not deliver Destination Space activities as planned
May Half-term	Centres shut due to Covid-19 and could not deliver Destination Space activities as planned
July 2020	Launch of the ExoMars rover – POSTPONED
March 19 2021	Landing of the ExoMars rover – POSTPONED
March 30 2021	Launch of the James Webb Space Telescope – POSTPONED
June, July August 2020	<ul style="list-style-type: none"> <li>• Interim report submitted by Science Centres to the ASDC project manager</li> <li>• Discussions with every Science Centre in details about what they could do when reopening in the Summer or autumn.</li> <li>• Re-submission by every centre of what they could do in a virtual, blended and digital way.</li> </ul>
October Half-term	Centres shut due to Covid-19 tier restrictions and few could not deliver Destination Space activities as planned
<b>2021</b>	
Jan & February 2021	<ul style="list-style-type: none"> <li>• Discussions with every centre of their reporting, evaluation and what they can do in the future, and if they have delivered sufficient to claim their grant.</li> <li>• Final reporting from every Science Centre, to ASDC.</li> <li>• Discussion with external evaluator OnData.</li> </ul>
March 2021	<ul style="list-style-type: none"> <li>• Evaluation analysis and reporting by OnData</li> <li>• Finalising the Main Project report</li> </ul>
March 31 2021	Programme closes

## 21. Grants to Centres and Budget

Each of the 13 Centres was awarded a grant of £3000 paid in two instalments with the final instalment on March 31.

The overall budget of the main programme was £324,997, making each engagement with the latest space science, 95p per person.

## 22. Reports from Delivery Partner Science Centres

The following section is taken from Science Centre's overview of their Destination Space Phase 2 Level 2 activities. The full reports from centres are available upon request to the ASDC project manager and have been extensively referred to in the evaluation report.

### Aberdeen Science Centre

Aberdeen Science Centre (ASC) delivered the Destination Space project to a wide range of audiences both in the Science Centre, at local events in the community and virtually through social media platforms and online events.

ASC launched the delivery of Destination Space Phase 2 with a week-long celebration of the 50<sup>th</sup> Anniversary of the moon landing, this event included the 'Meet the Moon' Show, the 'Roving the Moon' workshop and 'What's on the Moon?' memory card game. Visitors were also encouraged to design their own mission patches and share their memories of the moon landing. This celebration continued as the moon related activities were also delivered during TechFest (Aberdeen's Science Festival), at Duthie Park's Environment Day and Wild About Aden. ASC STEM Club in June 2019 was themed around the Destination Space with 110 children between the ages of 7-12 taking part in activities including moon buggy building, moon painting and designing a mission patch. The moon activities alone engaged with a total of 2,957 of participants.

Following the moon celebrations the family shows and demonstrations were updated to create 'The Space Race' theme which included the 'Plan to Land' workshop in which 1,614 participants engaged with the activities. Following the re-opening at the fully refurbished Constitution Street site in November 2020, the Destination Space content was communicated in-person through exiting demo shows, structured family and school workshops and drop-in table activities with a focus on the James Webb Space Telescope. Since re-opening 512 have engaged with the project, this number is lower due to social distancing requirement due to the Covid-19 pandemic.

To expand the reach of the project while the Science Centre was closed due to the Covid-19 pandemic, ASC focused on virtual engagement, creating interactive videos on topics including microgravity, space debris and satellite applications to feature on social media channels and in online science festival programmes and offering a virtual escape room style experience to families and school groups.

Destination Space is included as one of the 12 curriculum-linked workshops currently being promoted as part of ASC's newly launched virtual schools offering 'ASC in Your Classroom.' This offering has proved very popular and to date the Destination Space theme has 564 pupils and teachers signed up, from 15 schools, under local authorities Aberdeen City, Aberdeenshire, Highlands, Angus and Dundee.

In total 8,572 of people have engaged with the Destination Space project in-person or virtually. ASC will continue to deliver this project through summer 2021 with Destination Space shows and workshops for visitors to the Science Centre, through sharing online content for public and school audiences and by creating bespoke remote engagements for ASCs community audiences. This decision has been taken because space is a topic that Science Centre staff and visitors always enjoy exploring, responding with great enthusiasm particularly as there is a strong likelihood that some of the younger visitors may work in the space industry in the future.

## Dundee Science Centre

Destination Space has become an integral part of Dundee Science Centre's approach to engaging our local schools, community groups and families with STEM. We regularly discuss the contributions the UK has made to the space industry including work on MIRI, ExoMars, and other Mars rovers. UK satellite launch capability already has local interest after the selection of a launch site in Scotland. We also have links with the Space Technology Centre at the University of Dundee, including an exhibition about their Satellite Receiving Station. We welcome the opportunity to bring more awareness of these projects to our audiences.

From March 2019 until mid-March 2020, DSC used Destination Space Phase 2 Level 2 (DS2.2) for schools workshops, public events, family shows, community workshops, and festival events. When the country went into lockdown in March 2020, we had to adapt the way we ran as a business, and much of our offering since that time has been online. All of our delivery staff have been furloughed much of the time since this point, and we only had one staff member in Programme Development to work on content creation.

### Pre-COVID-19 Programming

#### *In-Centre*

As we were building on the legacy of DS2.1, we were able to roll out the schools workshops quite quickly. Beginning from May 2019, we hosted 29 different schools in-centre to see a total of **582 pupils and adults**. Throughout the summer of 2019, the theme was Mars Odyssey. Though the family show itself had already been planned, we adapted the centre to incorporate the key ideas about DS2.2 in a Mars rover pit, the Moon meteorite and Moony costume for Visitor Engagement, and UK Spaceports in our rocket launch demos. This reached an estimated **12,401 children and adults**.

#### *Schools Outreaches*

Between September 2019 and March 2020, our STEM Learning Team delivered Destination Space outreaches to 17 schools, 14 of which either ranked at Top 20% most deprived on the Scottish Index of Multiple Deprivation or were considered rural. These workshops were subsidized with money from the Scottish Government and did not require payment from the schools, allowing **1,587 pupils and teachers** to access Destination Space free of charge. In total, schools workshops and assemblies both in-centre and on outreach reached **2,169 pupils and teachers**.

#### *Moon Landing Event*

On 16<sup>th</sup> July 2019 DSC also delivered a special Moon Landing event that encompassed activities specifically focused on educating visitors about the moon landings and the processes that STEM professionals went through in order to succeed in this mission. The event reached **200 children and adults**.

#### *Dundee Science Festival 2019*

Dundee Science Festival 2019 included several different weekly themes. Destination Space dominated one weekend with an in-centre show, busking, and guest speakers from (Rocket Labs?)

giving guests the opportunity to pilot a virtual space launch. The Festival Weekend events saw **140 children and adults**.

### **Post-COVID-19 Programming**

In response to COVID-19, DSC had to drastically change the way it functions as a charity in order to meet the needs of our community under great stress. With a limited staff not furloughed, the programmes we built were an attempt to be highly impactful with minimal input. Our solutions were as follows.

#### *Home Learning*

With our community learning from home, it was important to create a provision that would care for not only our school-aged learners, but also their families. We created the DSC@Home home learning programme to reach a wide range of ages and include some bits for other family members to participate in as well. Over the course of the programme, we have had 2 general space weeks, 1 specific “Destination Space” week, and 1 “Space Exploration” week, during which, we were sure to address the topics of the DS2.2 programme. From our website logistics, we estimate that there were about **86 unique page visits** for “Destination Space” week and the first general space week had about **2,290 unique page visits** (likely because the Destination Space week was during the summer holidays. Our Destination Space show (which was also used during Dundee Science Festival 2020) received **66 views**. Our most recent space weeks – “Stargazing and the Moon” and “Space Exploration” received **300 and 193 unique page visits** respectively.

#### *Home Kits*

In partnership with the Gate Church and Barnardo’s for Children, we created Home Kits for children in need. These were given free of charge to children and families identified as needing assistance through social worker referrals on the FORT System. During Dundee Science Festival 2020, we were able to give out **200 Home Kits to families in need**. These kits included some Destination Space activities such as an Earth Observation Satellites and UK Spaceports word search and a rocket launcher activity.

#### *Dundee Science Festival 2020*

Dundee Science Festival 2020 was a combination of mostly digital with a few in-person activities. We were able to re-open the centre at the weekends to limited, pre-booked guests for 3 weekends. Our first weekend was themed “Space and Climate” during which we addressed how small satellites are useful for detecting climate change and how they are launched into space with our pre-recorded Destination Space show. We also had a Maker’s Lab craft for those who came in-centre which was to design and build a CubeSat with certain working requirements. Due to the limited numbers we were allowed to have in the building, we saw **78 children and adults** throughout the course of the weekend. We have had **72 total views** on our Destination Space show on YouTube and **275 unique page visits** to the Dundee Science Festival page the week of the Space & Climate theme.

## Dynamic Earth

The Destination Space programme at Dynamic Earth has been a great success. We have engaged families, school, and community groups with a wide range of activities and events. This included 26 days of family drop-in activities which covered the main Destination Space programme and celebrated the moon landings. More than 10,000 people got the chance to marvel at Edinburgh from above, see what the real surface of Mars looks like, and appreciate just how many satellites are in the sky above us. Members of the public also got the chance to meet an expert, with scientist from the Royal Observatory Edinburgh and the Open University running talks and special events and family drop-in days with interactive activities.

We successfully engaged with schools, with over 500 young people attending our careers event. They met experts from 19 different organisations across academia and industry all working in the space sector in Scotland. Children got the chance to speak with scientists about their job, how they got it, and what their days at work look like whilst also trying their hand at a range of interactive activities, inspiring them with lots of the amazing stories that space science has to offer them. One student said it was, *“The best school trip ever!”*

We also effectively engaged with community groups. We made new relationships with community partners bringing our moon resources to Wester Hailes library, engaging with families who may not otherwise have experienced the programme. We were delighted to welcome groups of Brownies, Guides and Scouts to the centre for sleepovers. These groups did our James Webb Space Telescope themed workshop, which gained lots of feedback for how fun it was and gained comments such as, *“It changed my view on science.”*

Despite taking place across an incredibly challenging time, our adaptability has ensured that we have continued to engage a wide range of audiences through the programme. Indeed, the switch to online delivery has provided an opportunity for us to engage audiences from further afield that would not otherwise have come to the centre. Our suite of digital resources which anyone can access from our website for free from anywhere in the world are a high-quality, lasting legacy of the project. Adapting our schools workshop to a digital format has provided us with a fantastic resource which we plan to use widely in the future but also given us new ways of thinking about the way we work with schools which we hope to apply to other topics and workshops going forward.

## Eureka!

In total Eureka! The National Children’s Museum has engaged with **9,857** children and adults with the Destination Space Phase 2: Level 2 programme through family activities, school workshops and special events. Due to the coronavirus pandemic the bulk of our delivery has been centred around the 50<sup>th</sup> anniversary of the moon landing in 2019. Between May – September 2019 children and adults were able to take part in shows, workshops and hands-on demonstrations which showcased the momentous achievement and collaboration of scientists, engineers and mathematicians in getting the Apollo astronauts to the moon in 1969.

Our moon anniversary family show was the highlight of our programme and was delivered 119 times to 4,143 visitors across 24 days.

The May half term week was themed 'Moon Mission' and alongside the family show we ran drop-in science busking activities using the kit provided by the project. It proved to be a popular themed event and we estimate an additional 2,700 visitors engaged with these activities across the week.

In June 2019 we ran a sleepover event for schools and uniformed groups in which activities celebrated the moon landing and was attended by 141 children and adults, the majority of which were Brownies.



In July 2019 we ran an adult 'Lates In Space' event which had 167 attendees. Participants could hold a piece of the moon, take part in a moon science show, and re-create the moon landings using a green screen. On the anniversary weekend itself (20/21 July 2019) a museum wide event to celebrate the momentous occasion saw approx. 1,000 of our family visitors engage with moon themed activities and in September 2019, 248 people attended a special Home Educator Day event and took part in a moon science show and related science busking activity.

For our primary school audience, we adapted two of our existing programmes about space to incorporate facts, video and demonstrations linked to the moon landing. Across the summer term 2019, our KS1 'Mission Control' workshop was attended by 538 pupils and our KS2 'Journey to the Moon' science show was attended by 150 pupils.

Regarding the second part of the programme which was to engage, inspire and involve audiences with the amazing stories and innovative STEM of the UK space sector, we were just getting started with our programme of delivery when the pandemic hit. We did however manage to deliver a number of school workshops across Jan, Feb and early March 2020. We again adapted the existing KS1 'Mission Control' workshop that had previously focused on the moon landing to now look at the UK involvement in space exploration and spaceports. This was attended by 72 KS1 pupils. For KS2 pupils the 'Destination Space: The ExoMars Mission' saw 495 children take part in an hour long workshop where they explored if there could be life on Mars, found out about the ExoMars mission and took part in hands-on investigations to test 'Martian' soil samples.

## Glasgow Science Centre

Glasgow Science Centre launched Destination Space 2.2 in July 2019 to celebrate the 50th Anniversary of the Apollo Moon landing. We ran a week of special events under the title Moon50, expanding our family and community offer, from 13 - 21 July 2019.

During this week we aimed to celebrate this incredible feat of human ingenuity, discovery and wonder and to inspire curious minds, young and old. We wanted this to be a spectacular and memorable celebration of the moon landings and how they changed our lives. It offered the opportunity for families and communities to come together and share memories, experiences and aspirations for the future.

Just under **13,000 people** engaged with us during the week of Moon50, with over **3000** being part of our main anniversary weekend. Activities to celebrate the lunar landings continued throughout the summer and into November 2019.

We created **11 brand new experiences**, which included the Destination Space family science show and workshop, plus two unique family Planetarium shows. Our Moon50 activities were covered by **19 media outlets**, including UK-wide newspapers, local radio and national television news.

We aimed to engage with **9,290 participants** for part one of the project, through delivery of the family science theatre show, family lab workshops, Planetarium shows, a family evening party, expert engagement events, and our Science Lates programme for adults.

Between July and November 2019, we exceeded projected targets and engaged with **18,160 participants** through our Apollo 50 activities, including additional guest speaker family talks, films, and an early years activities weekend.

Before we closed on 18 March due to the Coronavirus pandemic, we had delivered only part of the second programme of activity, which focused on Spaceports and Satellite Launches, Satellite Applications, Exomars, and Webb Telescope. We had aimed to engage with **9,895 further participants** through a second family science show, education workshops, uniform group sleepovers, family talks and expert events.

By March 2020, we had engaged with **1,797 participants** for part two. We were able to deliver a series of adult, family and school talks, expert events for school pupils and science on the spot activities.

Overall, we aimed to engage **19,185 participants** with the Destination Space 2.2 programme. By March 2020, before we closed, we had engaged with **20,212 participants**.

Although we were not able to deliver either of our school workshops, nor the second family science theatre show (except for the pilot shows) as part of the second phase of the project, we instead delivered alternative activities through online video, print and radio content. The estimated reach for these combined activities is **120,000**.



## International Centre for Life

To call the Destination Space project a project of flux would be an understatement. At Life the project spanned significant staffing changes, two maternity leaves and a pandemic. Yet the project has been a success demonstrating how, with support and understanding from ASDC, imaginative changes can take place to achieve results greater than the sum of its parts.

Celebrating the 50<sup>th</sup> anniversary of the moon landings took place within Life Science Centre and delivery was relatively straightforward reaching 8,498 family engagements, many more than the proposed 4,200. Particularly popular were the busking activities and Moon inspired making activities.

The second stage was specifically targeted at inspiring families with a Destination Space theatre show and other activities on gallery, delivered by Life staff but also trusted experts invited into the centre. By the time the family programme was cut short by covid, it had already reached beyond its proposed 11,830 engagements. The Meet the Experts programme was an overwhelming success with 18 experts keen to share their experiences with families in Life's gallery space. In total these direct family engagements with experts reached many more of Life's visitors than proposed.

The greatest delivery challenge that covid offered Life was with regards to the schools' programme. The Spring and Summer terms were the intended focus on the schools offer, which was significantly cut short, and it is to the schools' audience that Life had its greatest shortfall reaching 1,154 of the proposed 3,750 pupils and sadly none of the proposed five teacher CPD events were able to take place.

Once the original programming was cut short, Life began to offer a virtual programme on social media platforms #LifeGoesOnline. Through the #LifeGoesOnline project Life created seven new Destination Space videos that reached at least 5,414 engagements. These videos included family challenges to go satellite spotting, a rocket demonstration and several Meet the Expert profiles.

A new Space Zone Hub was added to Life's website, consisting of a walk-through of the Space Zone gallery in the centre and links to activities and other relevant webpages. This new hub reached at least 9,288 visits.

In order to reach some of the most disadvantaged pupils in the region Life also teamed up with regional holiday hunger providers, StreetGames, providing activity packs and food parcels to those on the free school meals programme. For one week of this programme Life provided rocket activities. At least 3422 pupils were reached in this way.

In total Life reached an audience of 22,054 pre-pandemic, and at least 18,124 after March 2020. The original proposed reach was 20,900 in total.

## National Space Centre

Building on the success of the first destination space 2 project the National Space Centre have been proud to provide a scheme of activities for the family and schools audiences on behalf of the ASDC, Launch UK and UK Space Agency. Unfortunately, due to the current covid pandemic this has been interrupted in some aspects as you can see from the numbers of schools involved in some of the activities.

Over the entire project we had over 44,000 family interactions and had 2,500 school interactions. This was more than anticipated over all, but we had less school interactions than we hoped, due to the pandemic.

Although, many family interactions took place in 2019, we were also able to open to the public for the summer holidays in 2020 and October half term 2020, to reach a large amount of family groups. Unfortunately due to the pandemic and school closures we were unable to meet our target number of schools, but we still aim to hit target by the end of March by sending out recorded video shows, and worksheets to schools on our mailing list.

In March 2020 we ran our first UK in space festival, celebrating the UK space industry, we had Tim Peake and Helen Sharman as special guest speakers. During this event we ran our space port talk and our egg satellite activity.

Our activities included school holiday talks and busks, 2 x key stage 2 space careers events, 2 x home education day events, a UK space festival, Moon festival city talks, and an Apollo themed sleepover. Many of the activities took place at the centre or around the city of Leicester. During 2020 we moved to online interactions for some of our activities. Staff were furloughed for the most part and although we were able to have some interactions these were much fewer than our original target.

## Observatory Science Centre

Overall, we engaged with 18,038 visitors throughout the project

Following the first training session, equipment was brought directly from the academy to immediately start in-house training for the 50<sup>th</sup> Anniversary of the Moon Landings Show. A fast turn-around was important to be ready for the Easter holidays. The show was extremely well received by both visitors and staff who loved presenting the show. 5,466 visitors mainly families with school age children, were engaged. Adapted to present to schools, a total of 1083 students and teachers were engaged with the show and even a group of 37 uniformed children (beavers, cubs and scouts) with their leaders enjoyed a presentation.

A special weekend of activities centred on the Moon Landing Anniversary took place on 20/21 July and 651 visitors made and launched rockets and enjoyed the show. An expert was invited to talk about Apollo 11 on the Saturday evening and 181 people, mainly adults/seniors with some older (>11 years old) children, were totally engaged in an interactive, lively event.

During our annual Astronomy Festival (September 2019) we had a hugely entertaining talk about becoming an astronaut, which fitted in beautifully with the Moon Landing anniversary. In addition and rather pre-empting the second training academy the University of Sussex displayed a model of the JWST mirror giving a fantastic taste of what was to come in the next phase of the project. 1397 visitors attended from general public, members of astronomy societies and families.

Following the second training academy the team developed a lively half hour show of explanations and demonstrations about spaceports and launchers, introducing the ExoMars mission and the James Webb Space Telescope.

During February half-term the show was delivered to 2830 visitors mainly families with school age children. Adaptations were made for presenting the show to schools in British Science Week. With COVID infections on the rise fewer bookings were made and some cancelled. We eventually engaged 588 students and teachers. No school booked on the first Monday of BSW so the Home Educator community was invited at a reduced rate with a free show. 210 visitors from local families attended.

An activity weekend heralded the end of BSW and having developed a range of activities based on the show and other resources some of these were trialled at this event. 218 visitors were engaged; disappointing but unsurprising due to the escalating pandemic. Then lockdown!

We re-opened between 18 August and 2 November. Our season ended on 6 December so we didn't re-open again. Operating 7 days/week during school holidays and 3 days/week term time we opened for 48 days. With restrictions to visitor number but we engaged 5377 visitors. Social distancing rules meant we were unable to present the family show so we adapted! A dedicated DS area was set up and included stand-alone displays and video plus staff-led demonstrations. Due to the modifications required to keep OSC COVID-secure it is very likely all visitors engaged with the DS activities.

In addition to the in-house activities OSC was part of National Astronomy Week, an event streamed live via zoom and YouTube in November 2020 demonstrating the Lego model of Rosalind Franklin in a presentation about Life on Mars.

## ThinkTank

Thinktank, Birmingham Science Museum has delivered Destination Space Phase 2: Level 2 since January 2020. Engaging with over 27,000 students and families onsite and online in the latest work undertaken by the UK Space Agency focusing on UK Spaceports, ExoMars Satellite Applications and James Webb Space Telescope. Through these topics' visitors have experienced spaceports in our 4k Planetarium and learnt how rockets launch in the family show in our Thinktank theatre.

The programme has provided a great opportunity to engage with children aged 7-14 in STEM activities, demonstrate career opportunities here in the UK and showcase different ways of getting involved. This has been delivered through our three school workshops for Key Stage 2 &3, our family shows and through our online social media engagement.

## Winchester Planetarium and Science Centre

Winchester Science Centre has made over 50,000 engagements across the Destination Space Phase 2: Level 2 project, with almost 15,000 directly relating to schools and school groups.

During June and July 2019 the weekend public theme of the science centre was dedicated to the Apollo missions, in particular Apollo 11 reaching over 6,500 engagements. Visitors to the centre could attend a free live science show about the journey and hardships of the Apollo astronauts, while taking part in some engineering challenges in our Invention studio. Many visitors also included a planetarium show onto their visit, either presenter led, or the UK made full dome show CAPCOM GO!

During February half term 2020, our busiest time of year, we continued our destination space activities this time with around 30,000 engagements across our live science show, invention studio, busking activities, and the planetarium. With the destination space theme, we focused more on Mars, satellites, and spaceports during this period.

Throughout the whole project, we have been running our Destination Space workshop, one of our most popular with school groups. Our workshop focuses on The Webb Telescope in particular light; how to protect the instruments from infrared light, and how light travels through the telescope to its various instruments.

Destination space has also been a part of some of our major events including a small robot programming session at the Noel Turner Science Festival on the Isle of Wight, and as part of our Big Bang fair hosted by Winchester Science Centre. These events reached a combined 3,000 school students and teachers.

Covid-19 had minimal impact on our public delivery of the project with most of our major events having already taken place by March 2020. Unfortunately, this was not the case with schools with many cancelled visits, and workshops shortly before the lockdown in March 2020 then the centre closing its doors to schools soon after. To continue our engagement with school audiences Winchester Science Centre in connection with STEMnow and the STEM ambassador program ran some digital masterclass sessions, one of which focused on ExoMars, and included interaction with local space experts.

## Woolsthorpe Manor

The report from Woolsthorpe is taken from their interim reporting point in May 2020. Due to closures and redundancies they were unable to complete a final report for this project.

We attended The 50<sup>th</sup> Anniversary of the first Moon Landing Training Academy in March 2019 in Leicester. Over the Summer of 2019, and the Anniversary in July 2019 we ran an exhibition of the Moon landing plus a short video of the actual landing in the Manor House. We also created a lunar landscape and life size astronaut for selfies in one of our barns. Over the exhibition period we had approx. 30,000 Visitors. We ran family workshops reaching around 480 visitors and 13 schools workshops reaching 391 pupils. We also held moon landing talks plus an evening family talk reaching around 250 people. We also held an event to take part in the global rocket launch to celebrate the 50<sup>th</sup> Anniversary.

For the main part of Destination Space – 2 members of our team attended the training academy on October 2019 in Leicester. Using the resources and training handbook, we trained 16 volunteers and 2 members of staff who can now run all the schools workshops, activities and family programmes. We ran ‘pop-up- science demos over the weekends reaching around 40 families. We ran workshops over half term in February which included Satellites and the James Webb telescope and reached approx. 120 families.

We also trained a group of 5 sixth form students, in Destination Space and Science Capital, and they were in the process of putting together their own Family Show about Mars.

We had the programme ready to go with plans to deliver across the whole year which were stopped by Covid19 when the whole site was closed in March 2020 due to Covid-19.

## W5

**Who:** The DS Phase 2 project has been delivered, in the main, by the education team at W5. Up to the point where delivery and planning stopped due to the impacts of C-19 the events also included delivery with an astrophysicist from Queens University, a leading local astronomer and a local space enthusiast. Delivery included key opportunities for young people to interact with presenters, asking questions, sharing knowledge and extending learning.

**What:** The events have varied in format but have included the following:

**Summer of Science (2019) space activities** – a wide range of family hands on activities.

**Bright Sparks Science Summer Camp** – x3 week long science camp that included Moon activities, shows and demonstrations.

**Mission Moon Anniversary shows** – a high quality family show that reviewed the context and achievements of the Moon landings.

**Mission Moon walk-up floor shows** – a shorter ‘floor’ version of the lecture theatre show.

**Mission Moon hands-on family activities** – these two hour, walk up events gave the public the opportunity to investigate the Moon landings using the DS materials.

Intergenerational Mission Moon panel discussion – with an award winning science communicator from NI, a leading local astronomer and a local space enthusiast and former science communicator, this event explored the impacts the Moon landing had on people at key times in their lives.

**Meet the Expert astrophysics talk and Q/A** – Alan Fitzsimmons from Queens Astrophysics Centre took us through a fascinating exploration of the solar system and look at potential future developments in astrophysics.

Half-term space events (Oct 2019)

**W5 Science & Discovery Month** – the Mission Moon Anniversary shows ‘launched’ this month long series of science events in W5.

**Moon Adventure KS2 workshop** - (two events before lockdown) . This newly developed content for the DS project brought maths and physics in to a focus on the movement of Moon buggies.

Space Academy for aspiring astronauts ( Feb 20 half term) – this popular event for young children looked at the knowledge, skills and understanding of our solar system for those aspiring to become astronauts.

**Destination Space workshops** for KS1 and KS2

**Mars Rover coding family sessions** x2 with WeDo Lego kits and Scratch.

**Mission to Mars** family demonstration show (Feb 20 half term) – this multi-media, interactive show took a mission to Mars with the audience, igniting Martian gases, searching for water with Mars Rovers, battling with the Martian winds while learning about key scientists along the way.

**Stardome Outreach events.**

**Space Show**

**Space Busking at x3 external conferences.**

**Where, why and how:** All events have been operated within W5 to an audience from schools, organised family events and walk-up family events. We had plans to develop digital content over Dec/Jan/Feb in order to meet the remaining DS deliverables but we have not had capacity to do this as yet. We do plan to deliver on these agreed events as restrictions reduce and staff are removed from furlough. This delivery would be beyond the end of this financial year.

## Xplore

Xplore! Science Discovery Centre was delighted to deliver Destination Space phase 2 level 2.

Our programme started with moon-related activities to celebrate the 50<sup>th</sup> anniversary of the moon landing in 1969. Families were treated to a special weekend at our previous site and could attend a concert in conjunction with Wrexham Symphony Orchestra. In the September, a week of evening events were put on for local youth groups in our centre and pupils from south Wales were engaged as part of the UK Space Conference. Total engagement with moon-related content from the programme was 2,400 participants.

In February 2020 the Destination Space family show with demonstrations, discussions and audience participation was run at Catalyst Science Discovery Centre. The show covers all key themes for phase 2: ExoMars, spaceports and UK launches, satellite applications and the James Webb telescope. At the same time, our astronomy club on tour featured two nights at community venues in Wrexham using Destination Space activities. In spring 2020, a total of 1,050 face-to-face engagements took place.

In October 2020, Xplore! launched our new Wrexham town centre located science centre and our weekend openings for local visitors (due to Covid-19 restrictions in Wales) saw around 450 family visitors engage with ExoMars activities at our brand new Hub experience in the exhibition area until the lockdown in December 2020. Our Science Communicators delivered 1:1 engagements with household bubbles whilst maintaining social distancing and the 3D model of Mars was a firm favourite with visitors and staff alike.

Over winter and spring 2020/21, Xplore! staff were able to deliver key stage two and key stage three school workshops on ExoMars, spaceports and satellite applications. Covid-19 meant the sessions were a mixture of socially distanced face-to-face sessions to school bubbles, live-streams into school classrooms and virtual sessions with pupils learning from home. Xplore! was able to reach over 100 key stage two learners, 330 key stage three learners and a total of 28 members of school staff.

Xplore! adapted the Destination Space activities to enable youth groups to book a virtual session focussing on either Exomars or spaceports and satellites. These sessions were delivered as a live-stream 76 times, reaching young people and their families from all corners of the UK and total participation of over 1,700 people.

To cater for our public visitors who were unable to visit Xplore! in spring 2021, two virtual astronomy clubs have reached about 100 participants. Guest speakers brought in external expertise about ExoMars and the James Webb telescope, and having real scientists working in the UK space industry were brilliant part of the sessions. A short video about Wales' contribution to the James Webb telescope was released in English and Welsh as part of our St David's Day celebrations.

All the staff at Xplore! have loved being part of Destination Space phase 2 level 2 and have all contributed to us reaching approximately 6,200 participants in total with activities from the programme.

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Thank you from ASDC and the Project Partners





## Appendix 1: Moon Anniversary Equipment List



### Kit List: Moon Landing Anniversary

Glowing Moon lamp	<a href="#">Amazon</a> (available from various suppliers)
Phases of the moon sheet and stickers	Dropbox (each centre to print)
Plastic fasteners	<a href="#">Alplas</a> (snap rivet with hole)
Large Earth (pack of 2 balloons)	<a href="#">Amazon</a> (by Qualatex)
Smaller Earth (beach ball)	Bought at Party Stores also available <a href="#">Amazon</a>
Ping pong ball	<a href="#">Amazon</a> (available many places)
Footprint doormat	
Moon newspaper	
Moon smell block	<a href="#">Aroma Prime</a>
Moon smell refill	<a href="#">Aroma Prime</a>
VR goggles	<a href="#">Amazon</a>
Suitcase/holdall	<a href="#">Amazon</a>
Inflatable splints	<a href="#">Ebay</a>
Litter picker	<a href="#">Amazon</a>
Piece of the moon	From Graham Ensor
Large moon map	<a href="#">KK solutions</a>
White guttering	<a href="#">Wickes</a>
Bottles for ethanol rockets	<a href="#">Smart Water</a> bottles (650ml and 800ml with sports cap)
Badgemaker	<a href="#">Amazon</a>
Buzz cardboard cutout	<a href="#">www.standees.com</a> and <a href="#">Amazon</a>

## Appendix 2: Destination Space Phase 2 Level 2 kit list

### Destination Space 2B Kit List UK spaceports and launchers



Page #	Demo/activity/workshop	Equipment	Need	Supplier/Link/Ordering instruction
8	Whoosh rocket (ethanol)	Smart water bottle with lid	1	Supermarket
		Guttering	2m	<a href="#">Wickes – Guttering</a>
		Ethanol	250ml	<a href="#">Better Equipped – Ethanol</a>
9	Where in the world to put a spaceport?	Dry wipe globe	1	<a href="#">Tts-group – Write on, write off globe</a>
		Dry markers: black	3	<a href="#">Tts-group – Dry wipe markers (Black)</a>
		Dry markers: coloured	15	<a href="#">Tts-group – Dry wipe markers (Coloured)</a>
10/11	Where to put UK spaceports?	Spaceport magnets	20	<a href="#">Camaloon – Spaceports logo magnets</a>
		Magnetic boards	4	<a href="#">The Works – Magnetic whiteboard</a>
		Duct tape for magnetic board boarders	1	<a href="#">Amazon – Duct tape</a>
		Printed world labels	4	<a href="#">Contact ASDC Project Manager</a>
		Printed UK maps labels	4	<a href="#">Contact ASDC Project Manager</a>
17	Fire tornado	Ramekin dish	2	<a href="#">Amazon – Ramekin</a>
		Mesh bin	1	<a href="#">Amazon – Mesh bin</a>
		Rotating board/Lazy Susan	1	<a href="#">Amazon – Rotating board/lazy susan</a>
		Sponges	2	<a href="#">Amazon – Sponges</a>
19	Microgravity	Camera	1	<a href="#">Amazon – Camera</a>
		Loaf baking tin	1	<a href="#">Amazon – Loaf baking tin</a>
		Velcro dots	20	<a href="#">Amazon – Velcro dots</a>
		Water sample bottle (30ml)	1	<a href="#">Ebay – Water sample bottle (30ml)</a>
		Glass jar for candle	2	<a href="#">Amazon – Glass jar</a>
		Long handled lighter	1	<a href="#">Amazon – Long handled lighter</a>
21	What has space done for me?	Box of stuff - Spinoffs	-	See handbook for suggestions on what to put into the box

## Destination Space 2B Kit List

### James Webb Space Telescope



Page #	Demo/activity/workshop	Equipment	Need	Supplier/Link/Ordering instruction
47	What does Webb look like?	3D printed Webb	1	<a href="#">Download plans from NASA website</a>
48	Building the mirror	Grey board hexagons (285x285mm)	18	<a href="#">Amazon – Grey board</a>
		A3 Foil gold card	18	<a href="#">Amazon – Foil gold card</a>
		Corrugated cardboard for handles (100x100)	10	<a href="#">Amazon – Double cardboard</a>
		'Pritt' stick adhesive	3	<a href="#">Amazon – Pritt adhesive</a>
52	Infrared (IR) camera	FLIR IR camera*	1	<a href="#">FLIR – IR camera</a>
		Black bin bag	1	Supermarket
		Silver fire blanket	2	<a href="#">Amazon – Silver fire blanket</a>
		Can of compressed air	1	<a href="#">Amazon – Compressed air</a>
53	Keeping cool (heatshield)	Infrared lamp	8	<a href="#">Amazon – Infrared lamp</a>
		Infrared thermometer	8	<a href="#">Amazon – Infrared thermometer</a>
		Black bin bag	1	Supermarket
		White card	1	<a href="#">Amazon – White card</a>
		Coloured paper	100	<a href="#">Amazon – Coloured paper</a>
		Stopwatch	1	<a href="#">Amazon – Stopwatch</a>
		Pegs	20	<a href="#">Amazon – Pegs</a>
		Blu Tack	2	<a href="#">Amazon – Blu tack</a>
54	Nebula board	FLIR IR camera*	-	Uses same camera from the "Infrared IR Camera" demo
		Nebula board	1	<a href="mailto:blavster@gmail.com">Ben Lavender: blavster@gmail.com</a>
55	Redshift (Doppler Effect)	Pilates band (Green)	1	<a href="#">Amazon – Pilates band</a>
		Computer with Spectrum Labs installed	-	<a href="#">Download and install from Dropbox</a>
		Phone or tablet with tone generator app	-	<a href="#">Apple - App store</a> OR <a href="#">Google: Play store</a>

\*Camera used for "Infrared (IR) camera" and "Nebula board" demos

## Appendix 3: Moon Charrette Agenda



### Destination Space: Moon Charette



Wednesday 9th January 2019

11 am – 6 pm

ASDC, Suite 101, 30 Queen Charlotte Street, Bristol, BS1 4HJ

Chaired by Dr Penny Fidler

11:00 – 11:15	Tea, coffee and pastries	
11:15 – 11:30	<p>An overview of Destination Space Phase 2: Level 2</p> <p>The goals of today (creating great hands-on activities and equipment around the Apollo missions to celebrate the 50<sup>th</sup> anniversary of the first moon landing)</p> <p>Introductions from the project team and participants</p>	Dr Penny Fidler, CEO of ASDC
11:30 – 11:45	<ul style="list-style-type: none"> <li>• What do we need to create specifically?</li> <li>• What would the Training Handbook look like?</li> <li>• What is the content focus (e.g. including future moon missions)</li> </ul>	All
11:45 – 13:15	<p>Ideas for Cool kit and great activities: Creating the most amazing set of hands-on equipment and activities</p> <p>We would really like to capture your ideas of what we could include in the project's hands-on kit to bring alive the Apollo missions.</p> <ul style="list-style-type: none"> <li>• What equipment and activities should we include?</li> <li>• What is off the shelf, and what needs development?</li> <li>• How can it scale for teachers and schools?</li> <li>• What activities could go in to school workshops?</li> <li>• What does it show of the science and engineering?</li> <li>• Please bring supplier names, and laptops to search for moon items</li> </ul> <p>Demonstrations of any excellent ideas or activities from the group</p>	All
13:15 – 14:00	Lunch (sandwiches provided by ASDC)	

14:00 – 16:00	<p><b>Creating an exciting and bespoke family show</b>          We want to produce a bespoke family show to celebrate the first moon landing, the UK role in it and the role of the moon in future space exploration.</p> <ul style="list-style-type: none"> <li>• How can we best achieve this?</li> <li>• Which demos can we include for maximum 'wow-factor'?</li> <li>• Best to cover 6-8 key topics</li> </ul>	All
	Summary List of Cool kit and great activities	All
16:00 – 16:15	<b>Coffee break</b>	
16:15 – 17:00	<p><b>You really shouldn't miss ....</b>          What are the remaining excellent ideas, demos, websites, apps, experiments, citizen science programmes, social media, people, projects and equipment you would love to see play a part in this project?</p> <ul style="list-style-type: none"> <li>• What shouldn't we miss?</li> <li>• Who should we talk to?</li> <li>• What must we include as we create our kit?</li> </ul>	All
17:00 – 18:00	<p>Group discussion to clarify the best ideas, share any ideas that need a solution, share new ideas and make sure everything is recorded.</p> <p><b>This hour will be used to ensure we have everything we need written up.</b></p>	All
6pm	Close	

#### Directions to the office

The ASDC office is located on Queen Charlotte Street, Bristol, BS1 4HJ. We are across the street from the One Stop shop, with blue pillars outside the entrance. **Please ring our landline or buzzer 1.1 on arrival.**

The nearest train station is Bristol Temple Meads. If you are driving, we would recommend parking at Wapping Warf car park (<http://wappingwharf.co.uk/car-park>).

#### Hotels

- Try Brooks Guesthouse, or the Bristol Hotel. Both are lovely, and few minutes walk from the office.
- If you want a hotel and spa, and it's last minute and inexpensive, try the Bristol Harbour Hotel.
- Please book your own on a NSC credit card, then invoice ASDC to reimburse the NSC.
- We recommend a budget of £70-£100 for a hotel room for one night.

#### Dinner

Happy to take you all for dinner if you want. Please let Jaclyn or Andy know your preferences and dietary requirements so that we can book a table.

#### Participants

Name	Job Title	Organisation
Dr Penny Fidler	CEO	UK Association for Science and Discovery Centres
Shaaron Leverment	Deputy CEO	UK Association for Science and Discovery Centres
Dr Jaclyn Bell	Space and Physics Project Manager	UK Association for Science and Discovery Centres
Andy McLeod	Special Projects Manager	UK Association for Science and Discovery Centres
Sophie Allan	Lead Physics Teacher	National Space Academy
Josh Barker	Planetarium Co-ordinator	National Space Centre

## Appendix 4: Full Charrette Programme



### Destination Space Phase 2: The Ideas Charette



Friday 18<sup>th</sup> January 2019

10.30 am – 5 pm

The Cosener's House near RAL, Oxfordshire, OX14 3JD

Chaired by Dr Penny Fidler

In Partnership with UK Space Agency, ESERO-UK and EDT

10:00 – 10:30	Registration with coffee and pastries	
10:30 – 11:30	Welcome to the Charette Introduction to the Project Team	Dr Penny Fidler, CEO of ASDC
	Introduction by all the Charette participants	All Participants
	An overview of ASDC Destination Space 1: A National STEM Programme involving 914,646 people, the Training Academy and the Handbook	Dr Penny Fidler, CEO of ASDC
	An introduction to Destination Space 2 & the 5 Key Content areas: 1. UK spaceports and UK satellite launch capabilities 2. Satellite applications 3. ExoMars 4. The James Webb Space Telescope 5. The Moon Landing 50th anniversary	and Dr Jaclyn Bell, Space and Physics Project Manager, ASDC
	An overview from the UK Space Agency Spaceports, future missions and goals for this national STEM Programme.	Jeremy Curtis, Head of Education and Skills, UK Space Agency
	The Synergy between Several Programmes  Overview of the UK European Space Education Resource Office Programme (ESERO-UK)  Overview of the Engineering Development Trust (EDT) Programme	Tom Lyons, Teacher Fellow, ESERO-UK  Katy Evans, Head of Experience Days and Schools Programmes, EDT

	The Goals of Today (creating great hands-on activities and equipment around Spaceports and the other key content areas)	Dr Penny Fidler
11:30 – 11:45	<p>Hands-on activities and demos from Destination Space 2 (Level 1) and beyond (Giving the flavour of what we seek)</p> <ul style="list-style-type: none"> <li>• Launchers and rocket demo</li> <li>• PocketQube satellite and data download</li> <li>• Activities with an Infrared Camera (Webb Telescope)</li> <li>• Spaceports and what more we need</li> <li>• (The Mars surface demo, shown over coffee)</li> </ul>	<p>Josh Barker, Education Presenter and Planetarium Coordinator National Space Centre</p> <p>with Sophie Allan, Lead Physics Teacher, National Space Academy</p>
11:45 – 12:05	<p><b>Coffee Break</b></p> <p><b>Hands-on Showcase by Participants: Introduced by Dr Jaclyn Bell and Andy McLeod, ASDC</b></p>	
12:05 - 12:45	Hands on Showcase and Discussions	Dr Jaclyn Bell
12:45 – 1:20	<p><b>Ideas for Cool kit and great activities: Creating the most amazing set of hands-on equipment and activities</b></p> <p>For this session, you will be working in small groups to capture all your ideas of what we could include in the project's hands-on kit to bring alive the spaceports, satellites and the huge advances happening in the UK</p> <ul style="list-style-type: none"> <li>• What equipment and activities should we include?</li> <li>• What is off the shelf, and what needs development?</li> <li>• How can it scale for teachers and schools?</li> <li>• What does it show of the science and engineering?</li> </ul>	<p>Chaired by Dr Penny Fidler</p> <p>Facilitated by the project team</p> <p><b>Output:</b> Please fill in the 'Cool Kit Cards' (One per person)</p>
1:20 – 2:10	Lunch and a creative stroll in the Abbey Grounds by the river	
2:10 – 3:10	<p><b>The Creative Challenge Session</b></p> <p>We want this project to develop some fabulous new activities for families and school children to help inspire them with space exploration, and to get them thinking and questioning. We also want to capture or develop activities that are already in use.</p> <p>Please choose from the following tables:</p> <ol style="list-style-type: none"> <li>1. Innovations in vertical and horizontal launch</li> <li>2. New types of rockets and technology</li> <li>3. Payloads, and what's important</li> <li>4. Satellites, and what they are used for</li> <li>5. Safety and minimizing risk</li> </ol>	<p>Chaired by Dr Jaclyn Bell</p> <p>Please join the table of your chosen specialist topic.</p> <p>Note: All ideas will be shared freely after the charette, so please say (and write) if you want an idea acknowledged to someone.</p> <p><b>Output:</b> Please fill in the 'Creative Challenge Cards'</p>
3:10 – 3:30	Group discussion and sharing ideas	Dr Jaclyn Bell
3:30 – 3:40	Your top idea of the day (please add your name so we can contact you to find out more about your excellent idea)	Dr Penny Fidler
3:40 – 4:00	Coffee and biscuits (please book your shared taxi to Didcot Train Station)	

4:00 - 4:30	<b>You really shouldn't miss ....</b> In this session, we will ask you to tell us about remaining excellent ideas, demos, websites, apps, experiments, social media, people, projects and equipment you would love to see play a part in this project. From spaceplanes to UK-led space science and exploration what shouldn't we miss, who should we talk to what must we include as we create our kit?	<b>Output:</b>  Working individually, we will ask you to fill out 'Ideas Cards' to capture your brilliant ideas
4:30 – 4:40	Invitation to join 'The Science and Engagement Advisory Panel'	Dr Penny Fidler
4:40 – 5pm	Group discussion to clarify the best ideas, share any ideas that need a solution, share new ideas and make sure everything is recorded.	Dr Penny Fidler
5pm	Close We would be very grateful if you would fill in an evaluation form	
5:15pm	Taxis	

#### The format of the Charette

A Charette brings together people from a variety of backgrounds to come up with new ideas and create solutions to address a specific goal.

#### The Goal

The Goal of this Charette is to bring together some of the very best people in the UK at the start of this exciting national project to work collectively for one day to create a fantastic set of hand-on Space Kit and activities that will engage families and schools around spaceports, launchers, payloads, satellites and their applications and risk management.

#### The Participants

For this Ideas Charette we are delighted to be joined by scientists, engineers, university researchers, public engagement professionals including experts from the National Space Centre, STFC, ESERO, EDT and staff from the UK Space Agency. To mix up all your talents, we will work in groups, with each table facilitated by one of the project team. The format of the day will combine work in small groups, individually and to share ideas with the wider Charette. We will also have 'Ideas Cards' and other mechanisms to capture all the information. ASDC has run around 10 Charettes at the start of national STEM programmes, and the team will write up all the information after the Charette to create 'The Destination Space 2 Content Research Document'. This is an ASDC internal working document, however we are happy to share this in confidence with any of the delegates if it is helpful and upon approval by the UK Space Agency, please just ask.

#### The Focus of the Charette

The 5 Key Content areas of the whole ASDC programme are:

1. UK Spaceports and UK Satellite launch capabilities
2. Satellite Applications
3. ExoMars
4. The James Webb Space Telescope
5. The Moon Landing Anniversary

For the Charette, we will primarily focus on finding brilliant hands on equipment that brings alive Spaceports and launchers, and helps children and adults understand the relevance of these exciting new developments to themselves and the UK. We will also focus on finding ideas and equipment that brings alive the increasingly important role of satellites to people and the planet now and in the future.



## Appendix 5: Moon Training Academy Programme



### The Moon Landing Training Academy

Wednesday 27th March 2019

Endeavour and Atlantis shuttle suites

The National Space Centre, Exploration Drive, Leicester LE4 5NS

#### Wednesday 27<sup>th</sup> March

9:00am	Taxis leave hotel	
9.30 – 10:00am	Coffee, arrivals and registration at The National Space Centre	
10:00 – 11:00	Welcome Introductions to the Project Team	Dr Penny Fidler, CEO of ASDC
	Introductions by all the participants	All Delegates
	Introducing ASDC An overview of Destination Space 2b, covering the project vision, mission and what's included in the Moon project	Dr Penny Fidler, CEO of ASDC
	Introducing the Moon Landing Anniversary	Josh Barker, The National Space Centre
	The Training Handbook The website <a href="http://www.moon50.org.uk">www.moon50.org.uk</a>	Andy McLeod, ASDC Dr Penny Fidler, ASDC
	Health and Safety across the project, risk assessments and your responsibilities, and Curriculum links	Dr Penny Fidler
11:00 – 11:30	Moon Hands-on activities part 1	
	<ul style="list-style-type: none"> <li>The Ethanol Rocket</li> <li>A piece of the Moon</li> <li>Mission Patch maker</li> </ul>	Sophie Allan National Space Academy Lead Physics teacher and Josh Barker, The National Space Centre
11.30 – 11.50	Coffee break with biscuits	
11:50 – 1:00	Moon Hands-on activities part 2	
	<ul style="list-style-type: none"> <li>Glowing Moon Model</li> <li>Earth and Moon Scale Demo</li> <li>Moon Phases</li> <li>The Moon in Virtual Reality</li> </ul>	Sophie Allan National Space Academy and Josh Barker, The National Space Centre
1:00 – 1:30	Lunch	
1:30 – 2:00	Tour of the Rocket Tower and group photo 1:35pm Free exploration of the National Space Centre	

1:00 – 2:00	Lunch, Tour and Photo	
2:00 – 3:10pm	Moon Hands-on activities part 3	
	<ul style="list-style-type: none"> <li>• The Moon Landing Newspaper</li> <li>• The Footprint</li> <li>• The Moon Mat and the Apollo 15 Landing Site</li> <li>• Smell of the Moon</li> <li>• Google Moon</li> </ul>	Penny Fidler Sophie Allan Andy McLeod Josh Barker
3:10pm – 3:30pm	An overview from UK Space Agency: Strategy, spaceports and, future moon exploration By video link	Jeremy Curtis, Head of Education, UK Space Agency
3:30 - 3:45	Coffee and cake break (15 minutes)	
3:45 – 4:00pm	Hands-on part 4 and Discussion	
	<ul style="list-style-type: none"> <li>• Working on the Moon</li> <li>• The Spacesuit</li> </ul>	Sophie Allan Josh Barker
4:00 – 4:30pm	The family Show A full run through of the family show (20 -30 mins)	Sophie Allan Josh Barker
4:30 – 5:00pm	<ul style="list-style-type: none"> <li>• The marketing resources and website</li> <li>• Reaching wider audiences and gender equity</li> <li>• Your evaluation commitments, contractual commitments</li> <li>• Health and Safety and any questions.</li> </ul>	Dr Penny Fidler
	Final questions and your next steps	Dr Penny Fidler ASDC
5pm	Close (and filling in your evaluation forms)	
5:15pm	First Taxis to the train station, or stay and talk to the team. Trains from 5.40pm	

### Arrival instructions

The Training Academy is taking place in the Endeavour and Atlantis shuttle suites at the National Space Centre.

To get to the shuttle suites, enter the National Space Centre and turn right under the magnificent Soyuz spacecraft. Head straight past the shop on your right and straight ahead you should see an entrance to the shuttle suites. An ASDC banner will be placed near the entrance to the shuttle suites to help guide you

If driving to the venue, please print a parking permit in advance and display in your car.

If travelling by taxi, the taxi should be able to drop you off at the entrance to the National Space Centre.

For more information on how to get to the venue please visit the National Space Centre website <https://spacecentre.co.uk/>.

## Appendix 6: Main Training Academy Programme



### The Training Academy

Thursday 3rd and Friday 4<sup>th</sup> October 2019

The Shuttle suites

The National Space Centre, Exploration Drive, Leicester LE4 5NS

#### Day 1: Thursday 3rd October

8:45	Taxis from Reception to the Space Centre	
9:00 – 9:30	Arrival, registration and coffee	
9:30 – 11:00	Welcome Introductions to the Project Team and the UK Space Agency	Dr Penny Fidler, CEO of ASDC
	Introductions by all the participants	All Delegates
	Introducing ASDC An overview of Destination Space 2 Covering the project vision, mission, a broad overview of the equipment and resources, grants and your delivery timeframes.	Dr Penny Fidler, CEO of ASDC
	Introducing the topics in Destination Space 2: 1. UK spaceports and launchers 2. Satellite applications 3. The James Webb Space Telescope 4. ExoMars	Abi Ashton Space and Physics Project Manager, ASDC
	Introducing your bespoke Training Handbook	Abi Ashton, ASDC
	An overview from UK Space Agency: The Future of UK Spaceports, Space exploration, Mars missions and will we return to the moon?	Jeremy Curtis, Head of Education and Skills UK Space Agency
	Health and Safety across the project and your responsibilities	Dr Penny Fidler
11:00 – 11:20	Coffee break	
	Spaceports in the UK	
11:20 – 11:45	UK Spaceports <ul style="list-style-type: none"> <li>• What is a Spaceport?</li> <li>• Will the UK have Spaceports?</li> <li>• Where might they be? What will they do?</li> <li>• What will they send into space? Why is the UK leading?</li> </ul>	Susan Buckle Education and Outreach Manager UK Space Agency
11:40 – 12:40	Training on the Hands-on Demos <ul style="list-style-type: none"> <li>• Where in the world to put a spaceport?</li> <li>• Where to put UK spaceports?</li> <li>• Horizontal and vertical launchers</li> <li>• Compressed Air Rocket</li> <li>• The Ethanol Whoosh Rocket</li> <li>• Fire tornado</li> <li>• Microgravity</li> <li>• Space spin-off or spin-not</li> </ul>	Josh Barker Space Communications Team  Sophie Allan National Space Academy, Lead Physics teacher  The National Space Centre
12:40 – 1:00	Training to run schools workshop 'Spaceports for 11-14 year olds'	Josh Barker The National Space Centre

1:00 – 2:15	1:00 – 1:30: Lunch 1:30 – 2:15: Time to explore The National Space Centre (and team photo)	
Satellite Applications: What happens if you switch space off?		
2:15 – 2:35	Introducing satellite applications	Jeremy Curtis UK Space Agency
2:35 – 3:45	<b>The Hands-on Demos</b> <ul style="list-style-type: none"> <li>• How far away/close are satellites?</li> <li>• Choosing an orbit</li> <li>• Are there satellites above us now?</li> <li>• Build-your-own-satellite</li> <li>• The Mat: Satellite imagery of your city</li> <li>• Near-infrared webcam</li> <li>• Triangulation and navigation</li> <li>• Earth observation</li> <li>• Satellite heat transfer</li> <li>• Fuels for space</li> </ul>	Sophie Allan and Josh Barker  The National Space Centre
3:45 – 4:00	Coffee and comfort break	
4:00 – 4:20	<b>The Pocket satellite</b> <ul style="list-style-type: none"> <li>• What are cube sats and pocket sats?</li> <li>• How to run the demo</li> <li>• How to set up the equipment and upload the software</li> <li>• Round table discussions to answer questions</li> </ul>	Josh Barker and Sophie Allan The National Space Centre  (Please upload the software to your computer before arrival)
4:20 – 4:40	Schools workshop on Satellites 7-11 and 11-14 year olds	Sophie Allan and Josh Barker The National Space Centre
4:40 – 4:55	The Mini Mars Rovers Demo, including how to assemble and program the Lego EV3 Rover	Josh Barker
5pm	Close	
5.15pm	Taxis back to the hotel	
7:15 for 7:30pm	Dinner at The Mumbai Inn Meet Abi in the hotel foyer at 7:15 to walk there for dinner at 7:30pm (few minutes walk)	

For this programme we have created 4 School workshops. These are:

1. ExoMars workshop 7-11 year olds
2. Satellites workshop 7-11 and 11-14 year olds
3. Webb Workshop 11-14 year olds
4. Spaceports workshop 11-14 year olds

#### Programme Vision

To engage, inspire and involve families with school-age children, school groups and communities across the UK with the amazing stories and innovative science and engineering of the UK's world-leading space sector, especially focusing on UK spaceports, satellite applications and space exploration.

## Appendix 7a: Evaluation Forms: Family Survey



*Ask one of the adults* Hello! My name is ... and I work for [name of your Centre]. Thanks for watching/taking part in Destination Space; we'd love to know what you all thought. Would you and your family be willing to help us – it will only take about three minutes?

**1. Do you feel the activities you took part in ....** *Read out each question & the range of answer options*

		Definitely No	Not Sure	Definitely Yes
a) Were fun?	Adult			
	Child 1			
	2			
	3			
b) Were interesting?	Adult			
	Child 1			
	2			
	3			
c) Made you want to find out more about the space science sector?	Adult			
	Child 1			
	2			
	3			
d) Increased your knowledge/awareness of <ul style="list-style-type: none"> <li>• Spaceports</li> <li>• Satellite Applications</li> <li>• James Webb Space Telescope</li> <li>• ExoMars</li> </ul> <i>Circle as appropriate/relevant</i>	Adult			
	Child 1			
	2			
	3			
e) Any other notes on the above				

**2. What did you enjoy most about these activities/the show and why?**

	What?	Why?
Adult		
Children		

*Remember to ask 'why?' as well as 'what?'*

3. To the adults: Do you work in a science-related job?

Please circle for each adult present	Gender	Science-related job (please circle)	Details
Adult 1		Y N	
Adult 2		Y N	
Adult 3		Y N	

4. To the children: Do you think today has made you more interested in science?

	Yes	Maybe	No
Child 1			
Child 2			
Child 3			

5. To the children: Do you think you would be more likely to be interested in studying science in the future...?

	A lot more likely after today?	A bit more likely...?	Less likely...?	A lot less likely...?
Child 1				
Child 2				
Child 3				

6. Thinking about the whole show do you now like space.....

	A lot more than before the show?	A bit more...?	A bit less...?	A lot less...?
Adult 1				
Child 1				
Child 2				
Child 3				

7. To the children: How old are you?

	Gender	Age
Child 1		
Child 2		
Child 3		

**THANK YOU FOR YOUR TIME TODAY**

**Additional Information for the interviewer**

*'Families' are defined as having at least one child (under 16) and one adult. Any combination of adults (parents, grandparents and carers) and numbers of children are thus included in this definition. However, it will be difficult to administer the interview to groups with more than 3 children.*

*Each interview should only take 3-5 minutes*

*Allow the respondents plenty of time to speak, and do prompt them for richer answers, for example "what do you mean when you say xxx?" or "Anything else?"*

TODAYS DAY and DATE.....

NAME of YOUR CENTRE.....

What have the family just taken part in? A SHOW / Other (Please specify)

## Appendix 7b: Evaluation Forms: Key Stage 2 Questionnaire



### Destination Space (Phase 2) Activity Questionnaire for Students aged 7-11

1. How old are you? Please circle.

7      8      9      10      11

2. Please circle

Boy      Girl      .....

3. Did you enjoy the activities? Please circle.

YES	NOT SURE	NO
-----	----------	----

4. What did you like most about the activities?

5. What did you learn from these activities?

1.

2.

6. Will these activities help you with some of your schoolwork? Please circle.

YES	NOT SURE	NO
-----	----------	----

7. How did today's activities make you feel about studying science?

MORE INTERESTED	THE SAME	LESS INTERESTED
-----------------	----------	-----------------

8. How did these activities make you feel about maybe one day having a job in science?

MORE INTERESTED	THE SAME	LESS INTERESTED
-----------------	----------	-----------------

Can you tell us why?

Name of your School.....

## Appendix 7c: Evaluation Forms: Kay Stage 3 Questionnaire



### Destination Space (Phase 2) Activity Questionnaire for Students aged 11-14

*We would like to find out what you thought of today's activities.  
Please complete this form and return it to a member of staff. Thank You.*

---

1. How old are you? Please circle.

11                  12                  13                  14                  15

2. What is your gender?

Female                  Male                  .....

3. Did you enjoy the activities? Please circle.

YES	NOT SURE	NO
-----	----------	----

4. What did you like most about the activities?

4. What were the two things (bits of knowledge, or experiences) that you think you'll most remember from these activities?

1.

2.



## Appendix 7d: Evaluation Forms: Teacher Questionnaire



### Teacher Questionnaire

*We would like to find out what you thought of today's activities.  
Please complete this form and return it to a member of staff. Thank you for your assistance.*

**1a. Which year group(s) of students have you brought today?**

**1b. What did they do?**  
e.g. a schools workshop, show, planetarium show or other activities (please specify)

**2. How would you rate the following aspects of today's workshop / show? (Please tick)**

	Excellent	Good	Average	Poor	Very Poor
The knowledge of the staff running the workshop					
Access to the science content					
The equipment					
The venue					
Overall, how would you rate the workshop / show?					

**4. What did you particularly like about today's activities?**

**5. What effect do you think today's activities may have on your students long-term motivation for science?**

**6a. Are there any activities that you took part in today that you are not able to deliver in your classroom?**

**6b. Please briefly explain why**

7. Will you use any of the ideas, experiments, films or online resources from today back in your classroom? (We would be delighted if you would, they are all free to use via the project website [www.destinationspace.uk](http://www.destinationspace.uk))

YES	NOT SURE	NO
-----	----------	----

7b. Please add any details

8. Would you recommend this workshop to other teachers like yourself?

YES	NOT SURE	NO
-----	----------	----

8b. Please tell us why

9. Do you feel that this workshop was good value for money? (Please circle your response)

YES	NOT SURE	NO
-----	----------	----

9b. Please expand upon your answer

10. Have you increased your knowledge about the work of the UK Space Agency or European Space Agency through this programme (Please circle your response)

Yes    No    How? .....

11. Do you have any other comments or suggestions that you'd like to share with us?

How did you hear about the workshop (please tick all that apply)

- Leaflet/email sent to your school
- Personally contacted by someone from the Science Centre/Museum
- Word-of-mouth recommendation from colleague
- Science Centre/Museum website or social media
- Through STEMNET or ESERO
- Other social media or website {please specify} .....
- Other {please specify} .....

Name of your school .....

Postcode or road name of your school .....

Date of visit .....

Approximately how many students did you bring today?.....

Approximately how many of these are on pupil premium? .....