Invitation to Tender: Qualified Teacher (computing specialist desirable) to support the work of the ESERO-UK and the National STEM Learning Centre

1. Summary

STEM Learning Ltd is seeking an individual with the necessary experience to carry out work to develop resources for primary teachers and other educators, related to the European Space Agency ExoMars Rover.

The key aspects of this brief are as follows:

ESERO-UK is working with a consortium of partners on an education programme, around the ExoMars Rover, funded by a grant from the UK Space Agency.

Part of the resources developed will include “unplugged” teaching resources for the 7-11 age group, linking in to areas of the computing curriculum and to the real challenges of operating a semi-autonomous rover on the surface of Mars.

The learning activities (and wider programme) aim to achieve identifiable impacts on young people, teachers, and other educators:

- Increased awareness of the UK Space Agency and European Space Agency, and the space industry in the UK.
- Increased enjoyment and engagement in STEM subjects, using the ExoMars mission as a context.
- Increased awareness of the importance and relevance of computing and computational thinking, in relation to space missions
- Increased knowledge of future career pathways available to young people who study STEM subjects and gain the STEM skills needed to adapt to working with new technologies and the opportunities they present, improving life choices.

Between five and eight “unplugged” resources will be developed. Suggested topics for the focus of the resources are listed below but proposals are not limited to these topics:

- Communications link delay
  - How can we simulate the delay from Earth to Mars with an activity in the classroom?
- Communicating with the minimal quantity of data
  - How can we get the rover to complete a task with the minimum amount of instructions?
- Error checking
  - How might errors be introduced to our instructions and how can we check for them?
- Autonomous movement and decisions
  - What types of movement and decisions do we want the rover to be able to make by itself?
- Avoiding obstacles
  - Which kinds of obstacles will the Mars rover need to avoid and how to we simulate this with a classroom activity?
- Moving up/down slopes (how does nature deal with this?)
  - How do animals deal with climbing or going down slopes? How could we use this in a design for a rover?
- Treads on wheels / different surfaces
  - Which kinds of treads have better grip? How can we trial this in the classroom? This can be linked to moving up and down slopes activity
- Sensors – camera with stereo vision, light, smell (chemical analysis)
  - Which senses do we use as humans. How can we use these to guide us and find out about our surroundings?
- Taking samples
  - Simulating taking samples in the classroom
- Processing samples
  - Simulating analysing samples in the classroom
- Materials selection (wheels, case, thermal insulation)
  - What type of materials do we need to choose for a rover on Mars

Each resource must contain all guidance and materials necessary to support their use as stand-alone resources. All resources will require a resource description to be written to agreed standards. Guidance on this will be provided.

A planning session will be mandatory prior to commencement of this work to take place face to face at an agreed location.

After a draft of the resources have been submitted to STEM Learning, a period of review and testing will take place with teachers to gather feedback on the resources. This will inform an update of the resources which will form part of the contract.

Tenders should be submitted by 12:00 on 4th July 2019.

2. Background

STEM Learning Limited was established in 2004 by the White Rose University Consortium, which comprises the Universities of Leeds, Sheffield, Sheffield Hallam and York. It is an organisation wholly dedicated to supporting STEM education across the UK by working with and developing teachers, lecturers and technicians who work with young people across the education system.
ESERO-UK, also known as the UK Space Education and Resource Office, helps teachers use the context of space to open doors for young people by delivering engaging, world-class teaching in STEM.

ESERO-UK is based in the National STEM Learning Centre in York. Working alongside STEM Learning Ltd, ESERO-UK is able to provide influence, funding and services to improve the teaching of STEM subjects in schools and colleges, and inspire young people through engagement and enrichment activities.

The consortium of companies working on the overall proposal are shown in image.

![Image of Project Partners]

The consultant will be working with Airbus Foundation Discovery Space, to ensure strong links to the real ExoMars Rover and the engineers from Airbus Defence and Space who are working on the mission.

3. Purpose of the Work
The work will include the following elements:

- Planning and scoping session
- The creation of draft learning resources
- The finalisation of resources based on feedback from teacher CPD sessions

4. Intellectual Property Rights
All intellectual property arising from any work will be owned by STEM Learning Ltd.

5. Deliverables and audience
The key deliverable is the successful completion of the resources to the satisfaction of the subject specialist, in a format ready for branding and design.
6. Timescales

<table>
<thead>
<tr>
<th>Activity</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>Open, competitive ITT issued</td>
<td>24 May 2019</td>
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<tr>
<td>Closing date for tender submission</td>
<td>04 July 2019</td>
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<tr>
<td>Successful bidder announced</td>
<td>09 July 2019</td>
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<tr>
<td>Scoping and planning</td>
<td>w/b 08 July 2019</td>
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<tr>
<td>Completion of draft resources</td>
<td>27 September 2019</td>
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<tr>
<td>Completion of final drafts following feedback</td>
<td>01 February 2020</td>
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7. Costing and pricing

Proposals should include detail of the costs proposed to deliver this contract, based upon a rate per day. This fee should be exclusive of VAT and will be payable upon receipt of all completed resources, only following the full approval of the National STEM Learning Centre subject specialist. The duration of this work is expected to be approximately 30 days, including the planning session.

Decisions will be based on perceived value for money, rather than the lowest cost proposal.

8. Tender process

Tenders should show, as a minimum:

- Full CV(s) of the staff undertaking the work
- Examples of previous similar work completed, or examples of areas of expertise relevant to the contract as detailed.
- A work plan showing key dates/milestones and deliverables
- A breakdown of costs by staff

9. Submission and format of proposals

The deadline for receipt of submissions is **12:00 on 4th July 2019**. Late submissions will not be accepted. All submissions will be acknowledged with a notification of receipt.

An electronic copy of the proposal should be received in PDF format by this deadline. This is an electronic only submission process; therefore all documentation must be submitted in PDF format as a single zipped folder if the size of the submission is greater than 10Mb.

Proposals should be no longer than 3 sides of A4 (excluding CVs of people involved) and typed in Arial size 12 font. If the proposal exceeds this limit evaluators will be advised to disregard any information outside the limit.
Proposals should be emailed to Eleanor Booker e.booker@stem.org.uk. Any questions for clarification of content or purpose should be emailed to Tom Lyons t.lyons@stem.org.uk

STEM Learning Ltd reserves the right not to award a contract.

References

Tenderers should indicate the names of two references prepared to act as referees.

10. Selection criteria

Proposals will be evaluated against the following criteria which are not listed in order of importance:

- Compliance with, and understanding of, requirements outlined in this tender document
- Clarity and feasibility of the programme of work
- Relevant experience of the tendering team
- Ability to meet the required timetable
- Value for money.

11. Enquiries

Enquiries about this tender should be directed to:

Tom Lyons, ESERO-UK Teacher Fellow, t.lyons@stem.org.uk

And / or Eleanor Booker, Project Officer e.booker@stem.org.uk

National STEM Learning Centre; University of York
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