National Aeronautics and Space Administration

Webinar: Civil Space Shortfalls Feedback Opportunity

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Thanks for joining, we'll get started soon.

- This webinar is being recorded and will be available at **nasa.gov/spacetechpriorities**
- Participants will be in a listen-only mode until Q&A
- You can submit questions via the WebEx Q&A function at any time or raise your hand to ask a question after the presentation
- Additional questions can be sent to **hq-techport@mail.nasa.gov**
- View the shortfall list and descriptions at **techport.nasa.gov/strategy**
- NASA civil servants and contractors should submit feedback via **spark.nasa.gov**

External Feedback Site

REGISTER & SUBMIT FEEDBACK: spacetechpriorities.org

National Tech Base Priorities

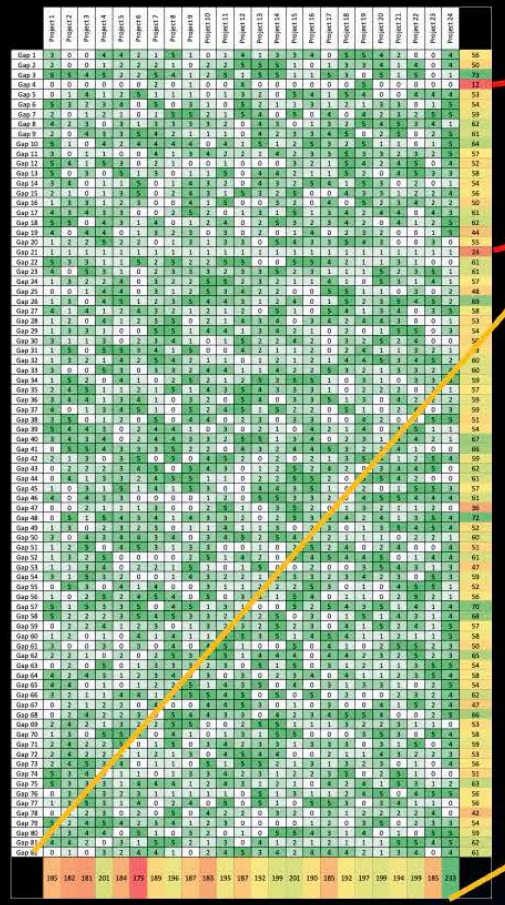
Publicly transparent, rigorously-developed process by which we establish our priorities based on comprehensive prioritized needs of our stakeholders

Idea Generation

OGAs
Industry
Academia
EOP
Hill

Mission Directorates
Centers
DARPA

Investments/Projects



Prioritized Shortfalls (Gaps)

Mission Directorates
Centers
Industry
Academia
EOP
Hill
OGAs

Prioritized Shortfalls (Gaps)

Project 24	233
Project 4	201
Project 15	201
Project 14	199
Project 20	199
Project 22	199
Project 19	197
Project 8	196
Project 11	195
Project 21	194
Project 13	192
Project 18	192
Project 16	190
Project 7	189
Project 9	187
Project 12	187
Project 1	185
Project 17	185
Project 23	185
Project 5	184
Project 10	183
Project 2	182
Project 3	181
Project 6	175

$$$

Roadmaps

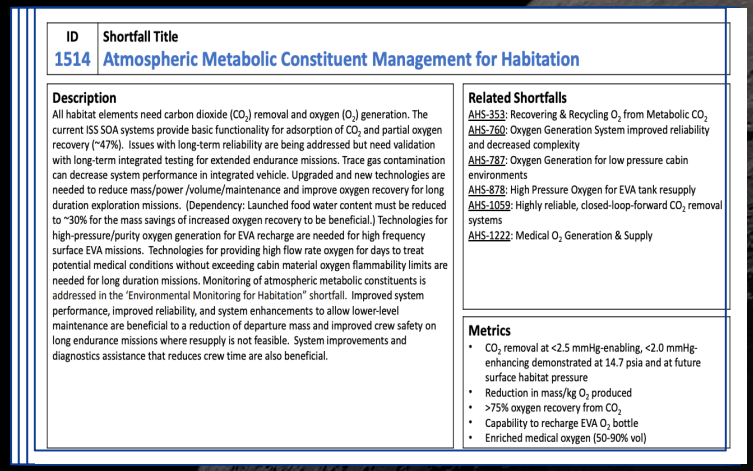
Initial TRL

TRL Goal

Civil Space Shortfalls

Capability Area	# of Shortfalls
Advanced Habitation Systems	16
Advanced Manufacturing	12
Advanced Materials & Structures	4
Autonomous Systems & Robotics	23
Avionics	7
Communication & Navigation	4
Cryogenic Fluid Management	5
Dust Mitigation	3
Entry, Descent & Landing	13
Excavation, Construction & Outfitting	9
In-Situ Resource Utilization	10
In-Space Servicing, Assembly & Manufacturing	9
Orbital Debris	3
Power	8
Propulsion	18
Sensors & Instruments	12
Small Spacecraft	8
Surface Systems	10
Thermal Management Systems	8
Miscellaneous	5

- NASA compiled an initial list of **187 shortfalls** organized into **20 capability areas**
- The shortfall description document (**techport.nasa.gov/strategy**) and feedback form are organized accordingly



ID	Shortfall Title
1514	Atmospheric Metabolic Constituent Management for Habitation

Description

All habitat elements need carbon dioxide (CO_2) removal and oxygen (O_2) generation. The current ISS SOA systems provide basic functionality for adsorption of CO_2 and partial oxygen recovery (~47%). Issues with long-term reliability are being addressed but need validation with long-term integrated testing for extended endurance missions. Trace gas contamination can decrease system performance in integrated vehicle. Upgraded and new technologies are needed to reduce mass/power /volume/maintenance and improve oxygen recovery for long duration exploration missions. (Dependency: Launched food water content must be reduced to ~30% for the mass savings of increased oxygen recovery to be beneficial.) Technologies for high-pressure/purity oxygen generation for EVA recharge are needed for high frequency surface EVA missions. Technologies for providing high flow rate oxygen for days to treat potential medical conditions without exceeding cabin material oxygen flammability limits are needed for long duration missions. Monitoring of atmospheric metabolic constituents is addressed in the "Environmental Monitoring for Habitation" shortfall. Improved system performance, improved reliability, and system enhancements to allow lower-level maintenance are beneficial to a reduction of departure mass and improved crew safety on long endurance missions where resupply is not feasible. System improvements and diagnostics assistance that reduces crew time are also beneficial.

Related Shortfalls

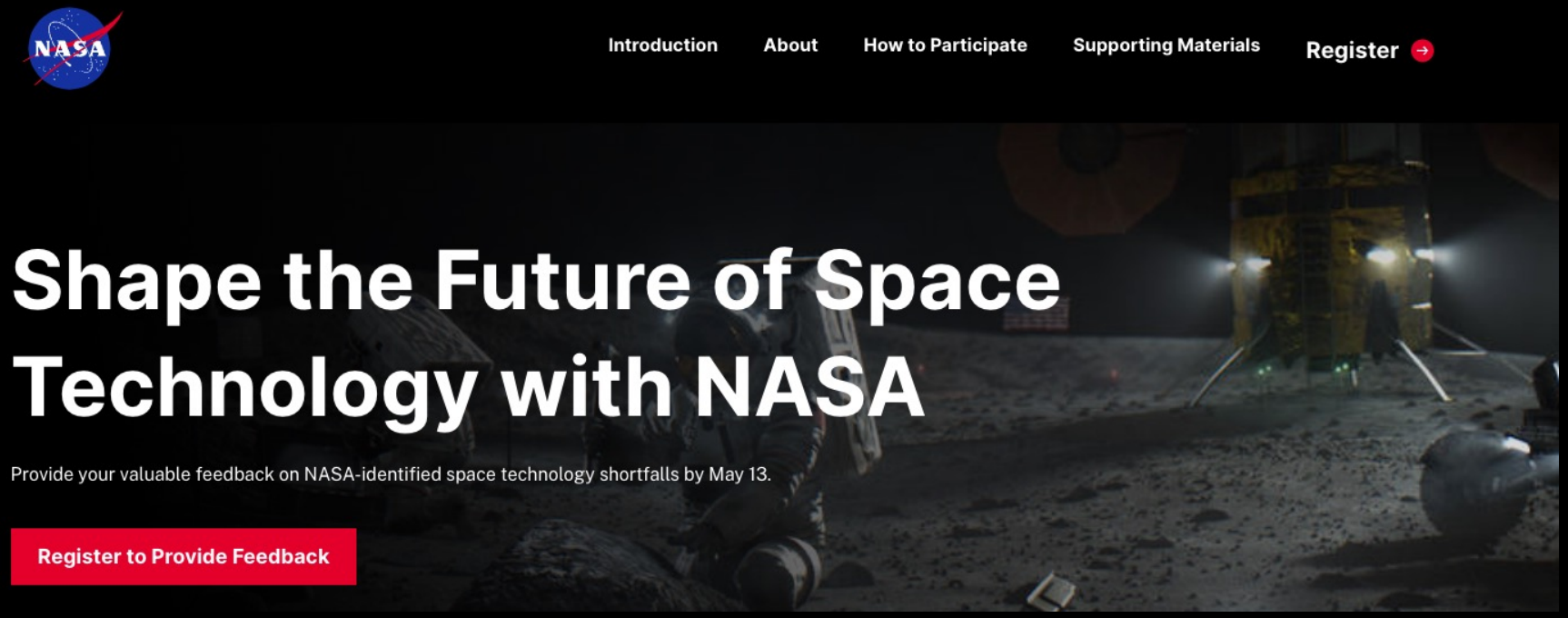
AHS-353: Recovering & Recycling O_2 from Metabolic CO_2
AHS-760: Oxygen Generation System improved reliability and decreased complexity
AHS-787: Oxygen Generation for low pressure cabin environments
AHS-878: High Pressure Oxygen for EVA tank resupply
AHS-1059: Highly reliable, closed-loop-forward CO_2 removal systems
AHS-1222: Medical O_2 Generation & Supply

Metrics

- CO_2 removal at <2.5 mmHg-enabling, <2.0 mmHg-enhancing demonstrated at 14.7 psia and at future surface habitat pressure
- Reduction in mass/kg O_2 produced
- >75% oxygen recovery from CO_2
- Capability to recharge EVA O_2 bottle
- Enriched medical oxygen (50-90% vol)

Shortfall: *Identified technology areas requiring further developments to meet future exploration, science, and other mission needs*

Register & Submit Feedback



- Consider aggregating input from your company/organization into one response
- Score shortfalls related to your expertise
- You don’t have to rate all 187 shortfalls
  - If you don’t score a shortfall it will default to “N/A: No opinion”
  - Only use “0” if you believe the shortfall is not important or that a solution exists
- Respond to the open-ended questions

TODAY

Register at spacetechpriorities.org

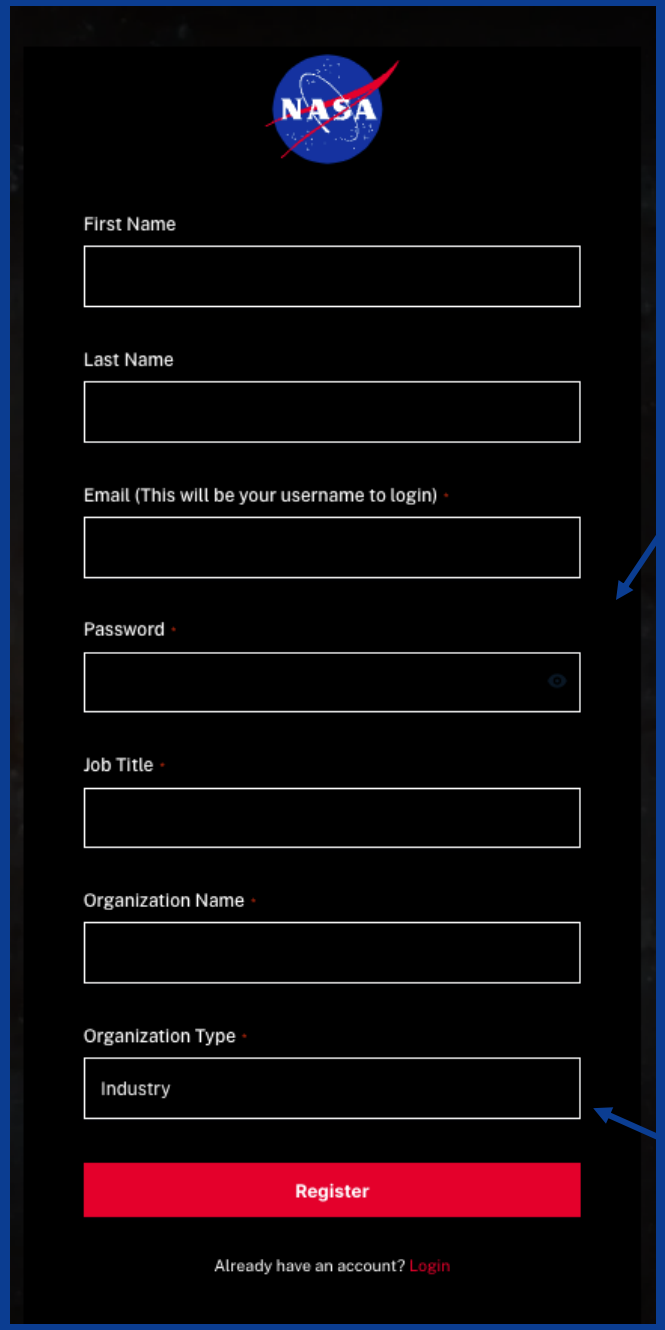
BY MAY 13

Submit feedback

SUMMER

Ranked shortfall list published

spacetechpriorities.org

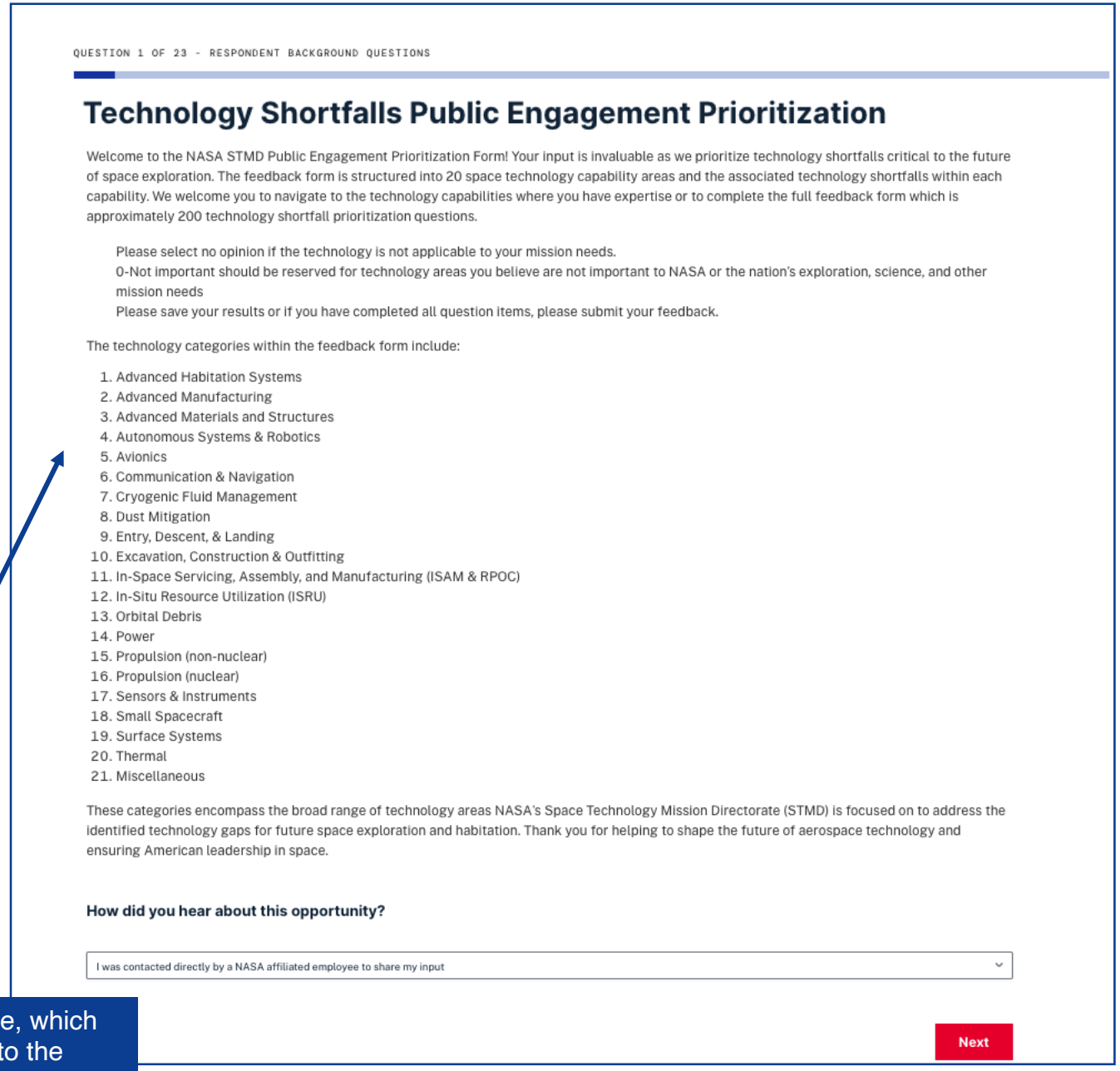


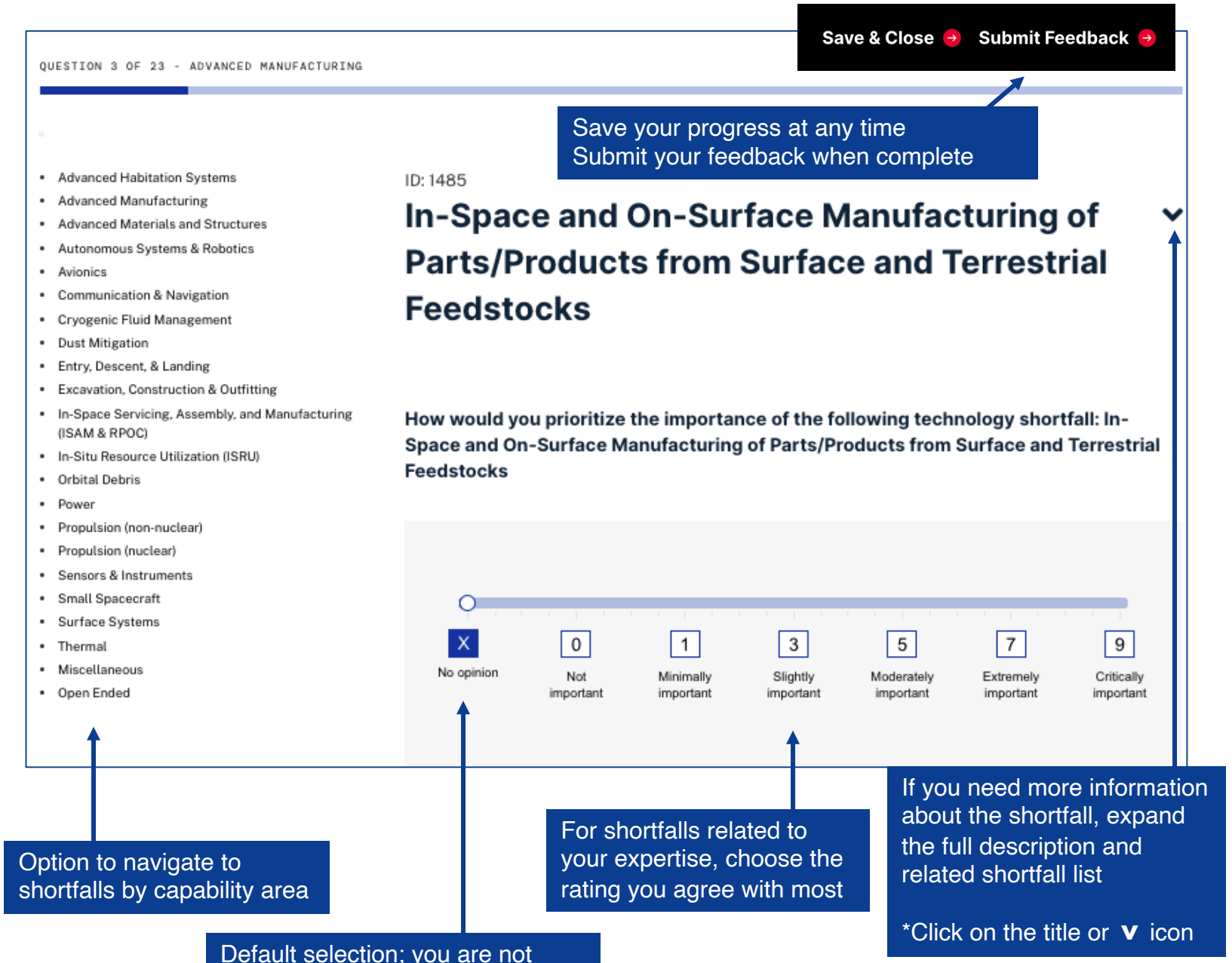
Register to view the form, score shortfalls, save progress, and submit feedback

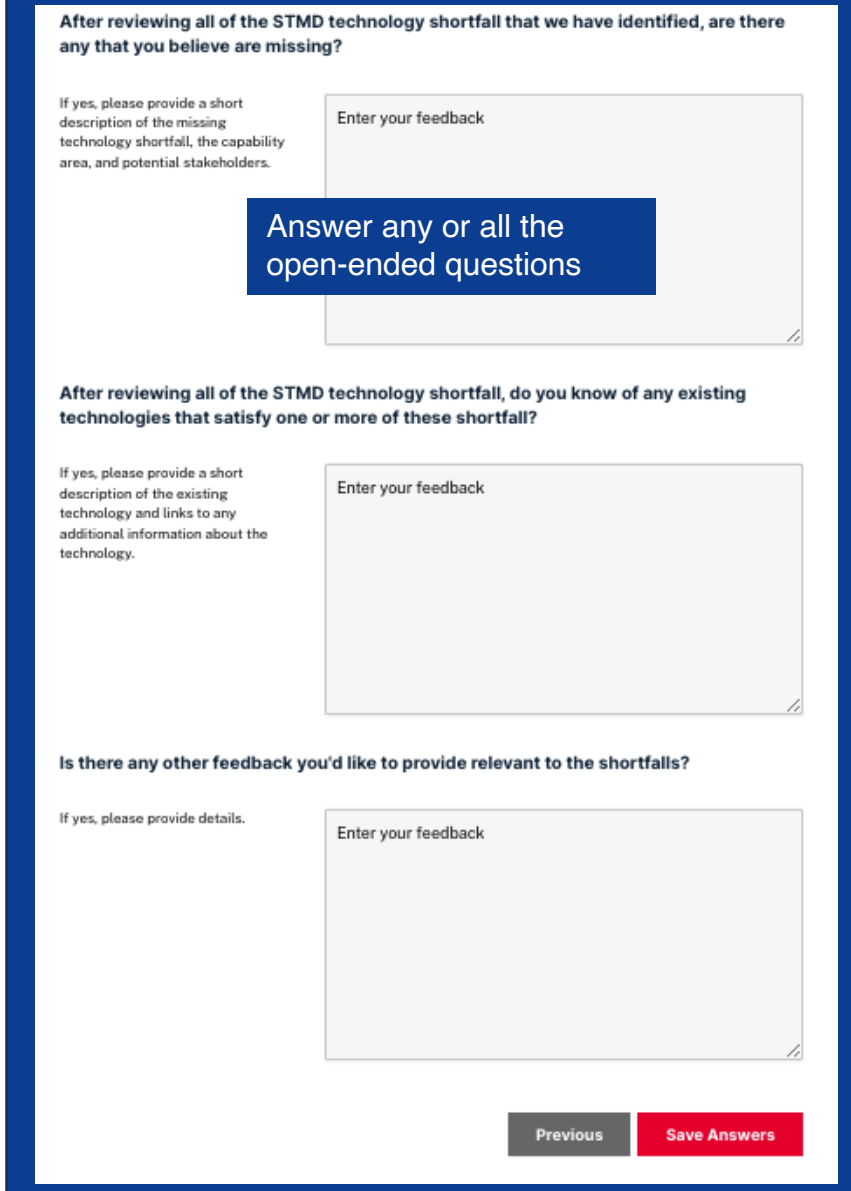
You do not have to complete the form in one sitting; You can revisit the form by logging in with the email address and password provided at registration

Read the instructions closely before proceeding to the shortfalls

“NASA” is an option here, which will redirect employees to the NASA Spark feedback form

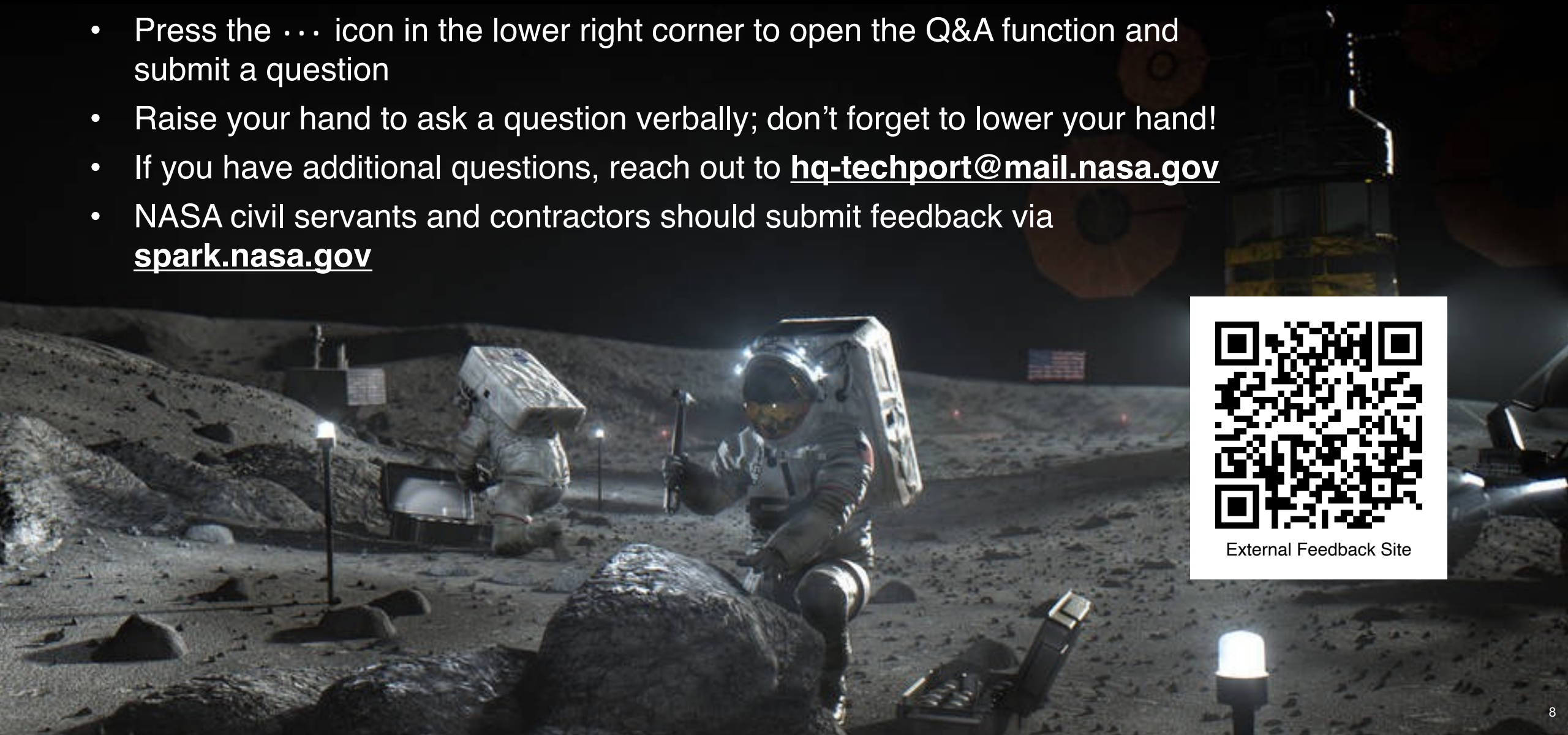



Save & Close
Submit Feedback
QUESTION 3 OF 23 - ADVANCED MANUFACTURING
Save your progress at any time
Submit your feedback when complete
Advanced Habitation Systems
Advanced Manufacturing
Advanced Materials and Structures
Autonomous Systems & Robotics
Avionics
Communication & Navigation
Cryogenic Fluid Management
Dust Mitigation
Entry, Descent, & Landing
Excavation, Construction & Outfitting
In-Space Servicing, Assembly, and Manufacturing (ISAM & RPOC)
In-Situ Resource Utilization (ISRU)
Orbital Debris
Power
Propulsion (non-nuclear)
Propulsion (nuclear)
Sensors & Instruments
Small Spacecraft
Surface Systems
Thermal
Miscellaneous
Open Ended
ID: 1485
In-Space and On-Surface Manufacturing of Parts/Products from Surface and Terrestrial Feedstocks
How would you prioritize the importance of the following technology shortfall: In-Space and On-Surface Manufacturing of Parts/Products from Surface and Terrestrial Feedstocks
X
No opinion
0
Not important
1
Minimally important
3
Slightly important
5
Moderately important
7
Extremely important
9
Critically important
Option to navigate to shortfalls by capability area
Default selection; you are not required to score every shortfall
For shortfalls related to your expertise, choose the rating you agree with most
If you need more information about the shortfall, expand the full description and related shortfall list
*Click on the title or ⌄ icon


spacetechpriorities.org
After reviewing all of the STMD technology shortfall that we have identified, are there any that you believe are missing?
If yes, please provide a short description of the missing technology shortfall, the capability area, and potential stakeholders.
Enter your feedback
Answer any or all the open-ended questions
After reviewing all of the STMD technology shortfall, do you know of any existing technologies that satisfy one or more of these shortfall?
If yes, please provide a short description of the existing technology and links to any additional information about the technology.
Enter your feedback
Is there any other feedback you'd like to provide relevant to the shortfalls?
If yes, please provide details.
Enter your feedback
Previous
Save Answers

Questions?

- Press the ··· icon in the lower right corner to open the Q&A function and submit a question
- Raise your hand to ask a question verbally; don't forget to lower your hand!
- If you have additional questions, reach out to **hq-techport@mail.nasa.gov**
- NASA civil servants and contractors should submit feedback via **spark.nasa.gov**



External Feedback Site