



# Welcome to the Johnson Space Center Neutral Buoyancy Laboratory Operations Contract II (NOC II) Industry Day

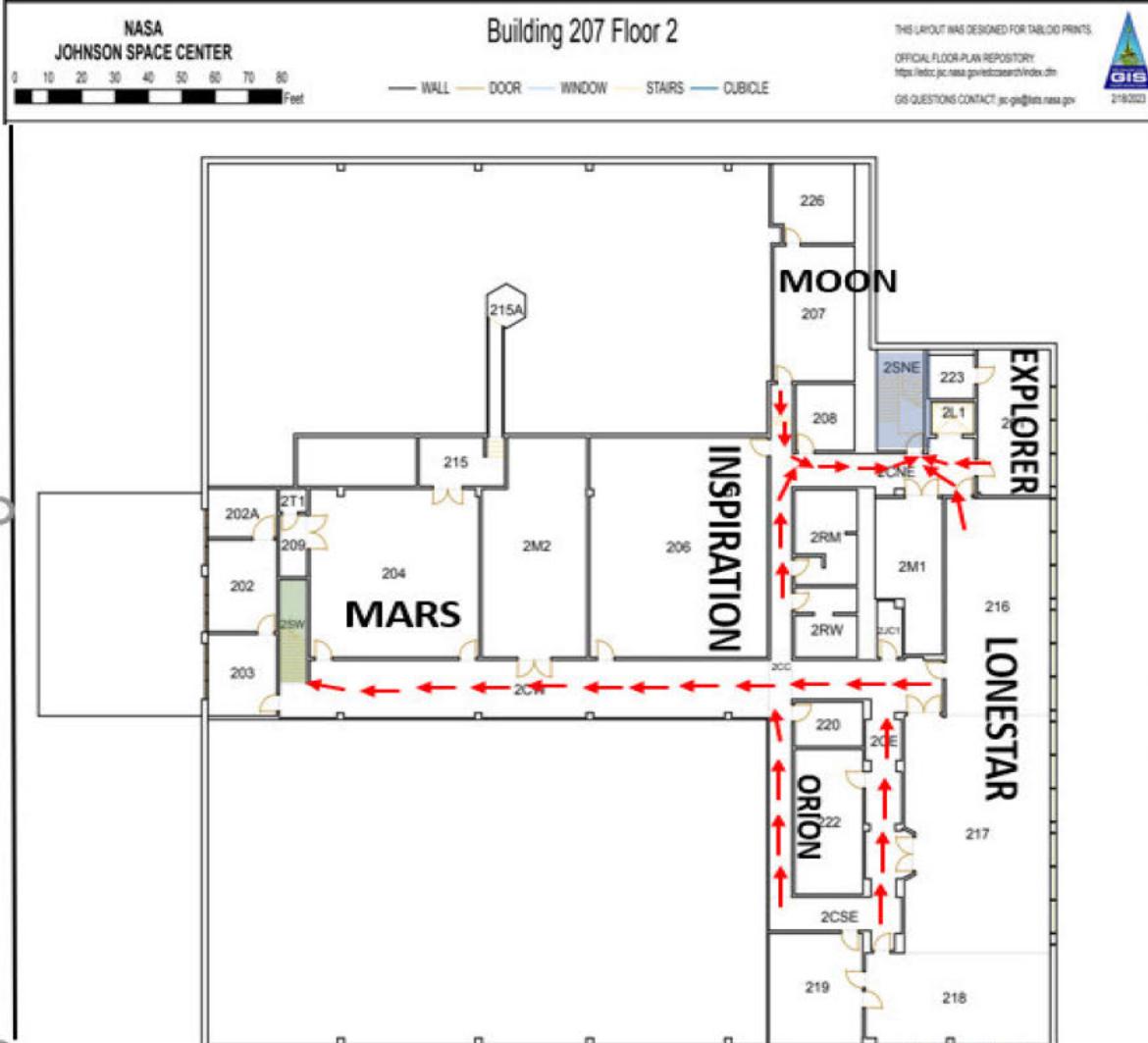
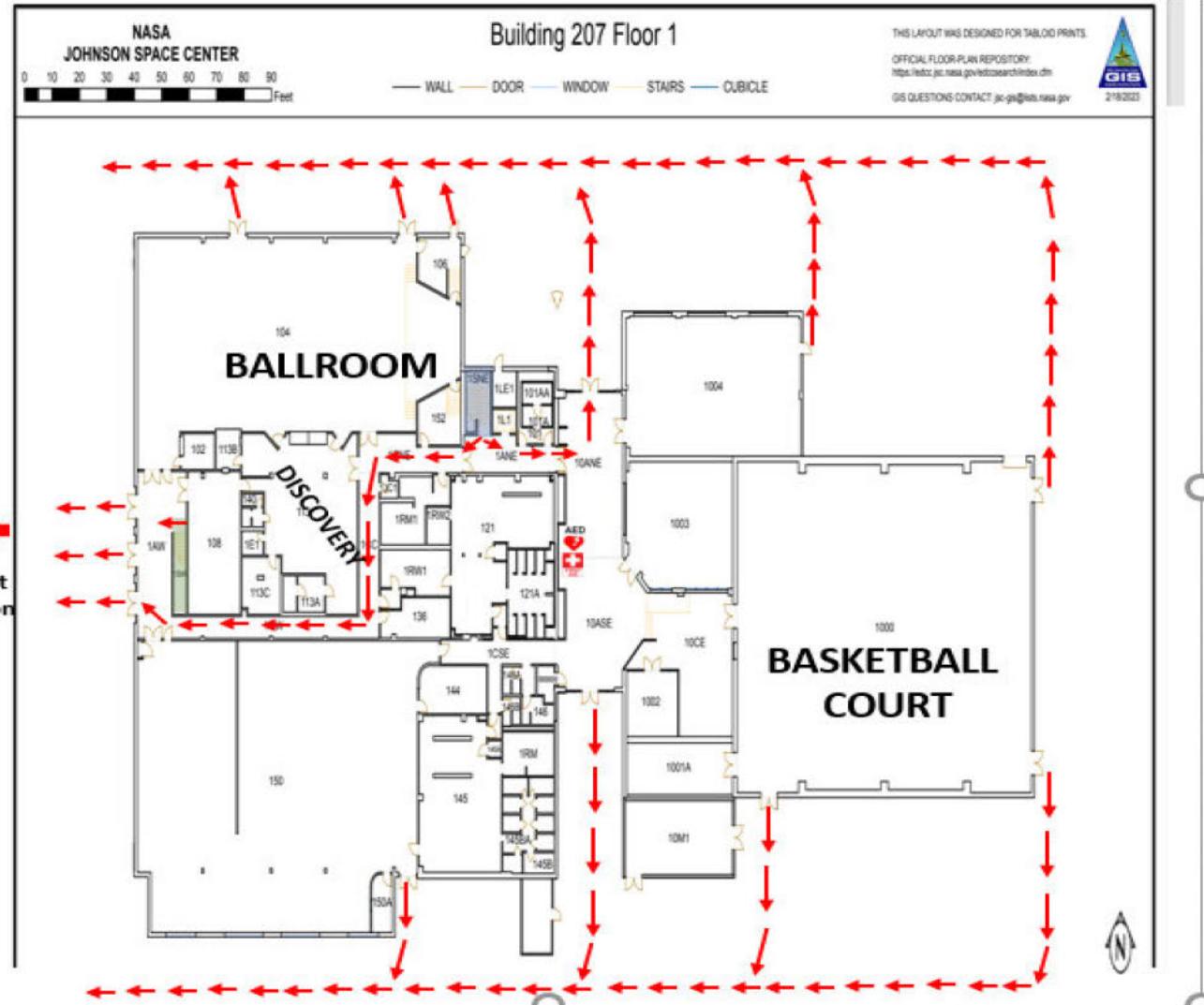
March 29<sup>th</sup>, 2023  
Gilruth Conference Center

Lone Star Conference Room (Second Floor)  
9:00 a.m.

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# Safety Briefing



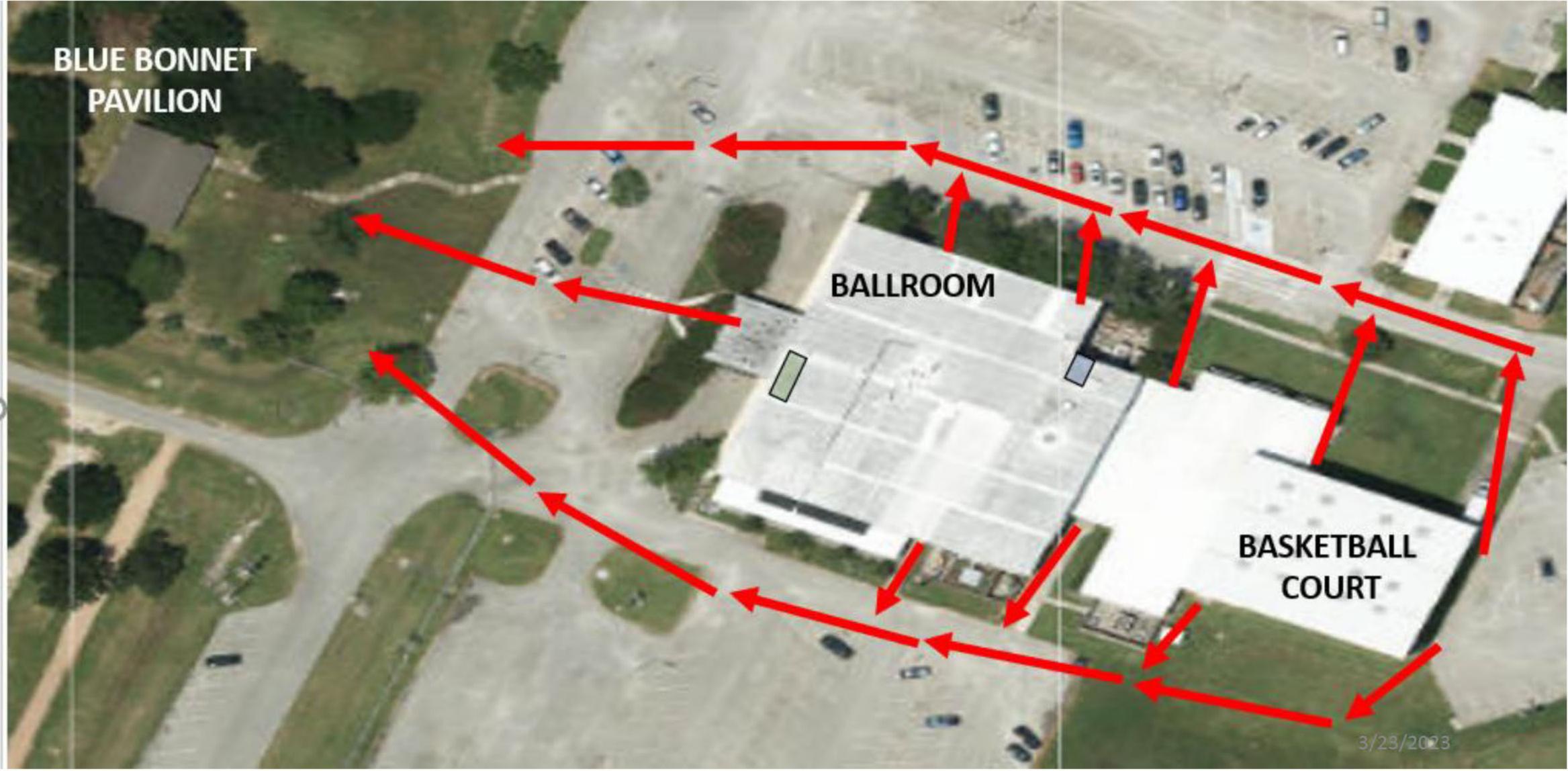
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# Safety Briefing



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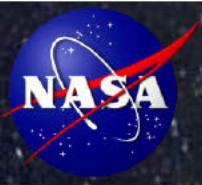
# Welcome to the NOC II Industry Day

Edwin Ortiz-Franco  
Contracting Officer



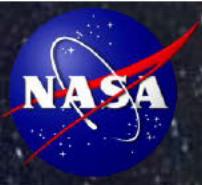
# Agenda

Speaker	Subject
Edwin Ortiz-Franco, Contracting Officer	Welcome to Industry Day, Introductions
Shari Miller, Office of Procurement	Welcome
Monica Craft, Small Business Specialist	Welcome
Norm Knight, Director Flight Operations Directorate	Organization Vision and Objectives
Edwin Ortiz-Franco, Contracting Officer	Current Contract Overview
Paul Dum, RDT Chair	Technical Overview
Edwin Ortiz-Franco, Contracting Officer	Procurement Schedule and Question/Answer



# Disclaimer

- These slides are for information and planning purposes only. No solicitation exists at this time.
- This presentation shall not be construed as a commitment by the Government or as a comprehensive description of any future requirements.
- If a solicitation is released, it will be synopsized on the Governmentwide point of entry (GPE), as defined by FAR 2.101.



# Goals of Industry Day

- Promote competition on the proposed acquisition
- Develop Industry's understanding of the Government's current vision and objectives
- Provide Industry with the opportunity to meet with the Government early enough in the procurement process to provide input into the NOC II procurement strategy
- Encourage offerors to submit questions and comments electronically via an email or Teams chat to the Contracting Officer, or in person during Industry Day
- The Government will respond officially to all questions submitted by posting them to the Governmentwide Point of Entry (GPE) and NOC II procurement websites



# Industry Day Logistics

- A copy of this presentation and answers to any questions submitted will be posted on the NOC II procurement website at:
  - <https://www.nasa.gov/jsc/procurement/noc2>
  - <https://sam.gov/opp/847b17198cef44aea46bd9220697468d/review>
- One-on-Ones from the SAM.gov RSVP registration will be held after the second tour starting at 2:00pm Central Time



# Responses to Questions

- Questions are encouraged; however, no answers shall be provided during today's Industry Day presentation in order to provide thorough written responses.
  - There will be a Q&A offered during the Pre-proposal Conference
- Questions must be submitted by 5:00 pm Central Time on Friday, March 31, 2023
- Questions submitted electronically and in writing will be answered and posted to GPE (SAM.gov) and will be considered official responses.
  - Clarifications concerning the way in which NASA conducts business today will be answered on SAM.gov
  - If a difference exists between any verbal communication and written responses to questions, the written responses shall govern
  - [psc-noc2@mail.nasa.gov](mailto:psc-noc2@mail.nasa.gov)



# Welcome

Shari Miller, Deputy Manager of Operations Support Procurement Office  
Office of Procurement

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# Welcome

Monica Craft, Small Business Specialist  
Office of Small Business Programs

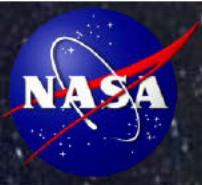
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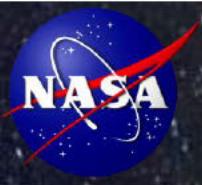
# Industry Assistance Office Contact Information

- Main phone number: (281) 483-4512
- Robert Watts, Senior Small Business Specialist
- Monica Craft, Small Business Specialist
- Tumarro Romain, Small Business Specialist
- All emails should be sent to: [psc-smallbusiness@mail.nasa.gov](mailto:psc-smallbusiness@mail.nasa.gov)
- Location: Building 1, Suite 453B
- Address:  
NASA Johnson Space Center,  
Industry Assistance Office  
Mail Code: BA  
2101 NASA Parkway  
Houston, TX 77058-3696



# Vision and Objectives

Norm Knight, Director  
Flight Operations Directorate



# NOC II Overview

Edwin Ortiz-Franco, Contracting Officer

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# Current Contract Overview

- Contract Number: 80JSC017C001
- Prime Contractor: Raytheon
- Contract Type: Cost Plus Award Fee transitioned to Cost Plus Fixed Fee
- Period of Performance: 01 Oct 2017 – 30 Sep 2024
- Skills currently provided on contract include:
  - Divers, Technicians (electrical/mechanical), Machinists, Safety, Engineers, Administrative Professionals, Quality Assurance, Business Specialists, IT Specialists, Management



# Proposed Contract

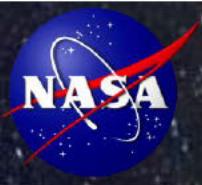
- Solicitation Number: TBD
- NAICS Code and Size Standard
  - The NAICS Code is 541715 (Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)
  - The size standard is 1,000 employees
- Period of Performance contemplated:

Period	Start	End
Phase-In	8/1/2024	9/30/2024
Base (2 years)	10/1/2024	9/30/2026
Option 1 (1 year)	10/1/2026	9/30/2027
Option 2 (2 years)	10/1/2027	9/30/2029
Option 3 (2 years)	10/1/2029	9/30/2031
Option 4 (1 year)	10/1/2031	9/30/2032
Option 5 (1 year)	10/1/2032	9/30/2033
Option to Extend (FAR 52.217-8)	10/10/2033	3/31/2034

- Contract Types contemplated: Cost Plus Award Fee w/option to transition to Cost Plus Fixed Fee
- Anticipated contract requirements are very similar to NOC
- In accordance with FAR 16.301-3(a)(3), a cost-reimbursable contract may only be used when the contractor's accounting system is adequate for determining costs applicable to the contract or order. This requirement also extends to subcontractors performing under a cost-reimbursable subcontract.
- Offerors should review Chapter 8 of the DCAA Audit Manual to determine if they are subject to full or modified Cost Accounting Standards (CAS) coverage and if they require an adequate Disclosure Statement prior to award. The link is:  
[extension://elhekieahbkpmcefcoobjddigcaadp/https://www.dcaa.mil/Portals/88/Chapter%208%20Cost%20Accounting%20Standards%2004-23-21%2028508F%29.pdf](https://www.dcaa.mil/Portals/88/Chapter%208%20Cost%20Accounting%20Standards%2004-23-21%2028508F%29.pdf)

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# Special Consideration

## **NOTE TO PROSPECTIVE OFFERORS:**

- Prospective offerors are reminded not to contact incumbent personnel (either directly or through electronic means) during duty hours or at their place of employment, as such contacts are disruptive to the performance of the current contract.



# Technical Overview

## NOC II

Paul Dum, RDT Chair

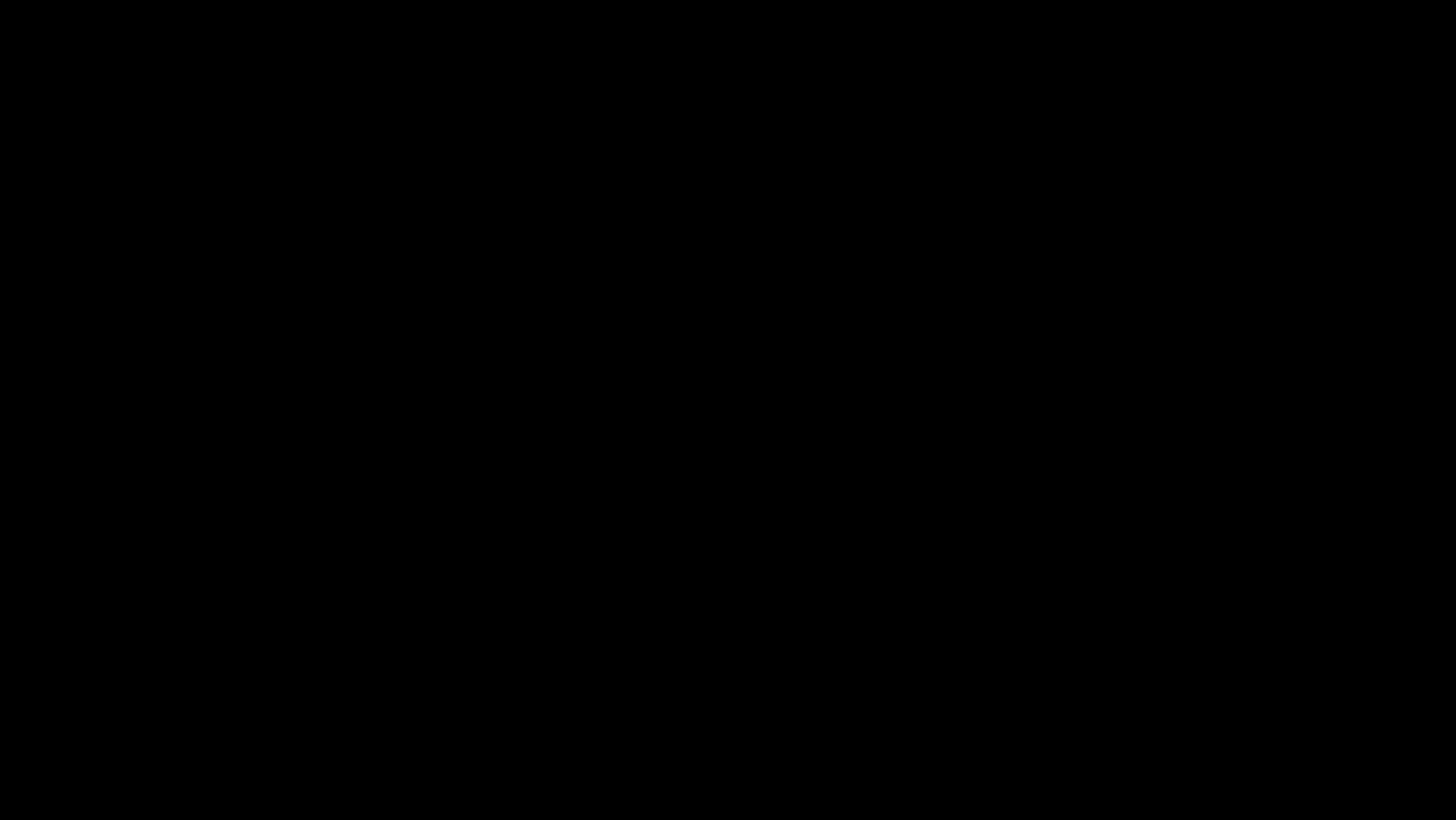
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# Intro video

## Lunar Surface Development Work Video



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# NOC II Functions

- Acquire support (labor and expertise) to ensure the continuing safe operation of the facility and support all required events.
  - SCUBA dive qualified personnel needed to support suited test events.
  - Technicians and engineers needed to design and fabricate new mockups as well as repair/maintain the existing NBL critical systems and mockups to ensure the systems are available for use. The fabrication and maintenance of the mockups is primarily completed in the Logistics and Mockup Facility (LMF).
  - Personnel to support the safety and quality, personnel and contract management, training, configuration management, IT, and external customer requirements.
- Support external customer utilization of current and future excess capacity in the facility. Recruit additional external customers if needed to utilize unexpected excess capacity.



# NOC II Priorities



- Maintain safety of crew and personnel that enter and use the NBL.
- Increase the quality of training.
- Expand the capabilities of the NBL to contribute to NASA's development of hardware and techniques for new environments (e.g., Gateway, Lunar Surface).
- Flexibly adapt to changing/unknown workloads in a multi-program and multi-customer environment.
- Maintain or increase technical expertise in NBL unique subject matters.
- Control and reduce cost without impacting safety, effectiveness or efficiencies.
- Innovation – to never be comfortable with success you have had, but to keep pushing to extend to areas previously unreachable.
- Inclusion – to seek out other experts and capabilities outside the past stakeholder domain. To create partnerships that provide for a mutually beneficial environment.



# Flight Operations: Leadership to safely and successfully accomplish NASA human spaceflight missions



Mercury



Gemini



Apollo



Skylab



Shuttle

## Improve

- Contextualize Lessons Learned & ops experience for application to existing and new vehicle development

## Design

- Incorporate Flight Lessons in design
- Requirements, ops concepts, crew interfaces, commonality
- Test like you fly

## Plan

- Incorporate test data into rules, procedures, and timelines
- Develop mission trajectories and timelines



International  
Space Station



Commercial  
Crew



Artemis



CommLEO

## Adapt

- Real-time updates to rules, procedures, and plans in response to unforeseen events

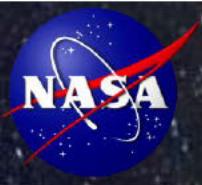
## Learn

- Systems analysis to optimize performance and address failures and unknowns
- Document Lessons Learned

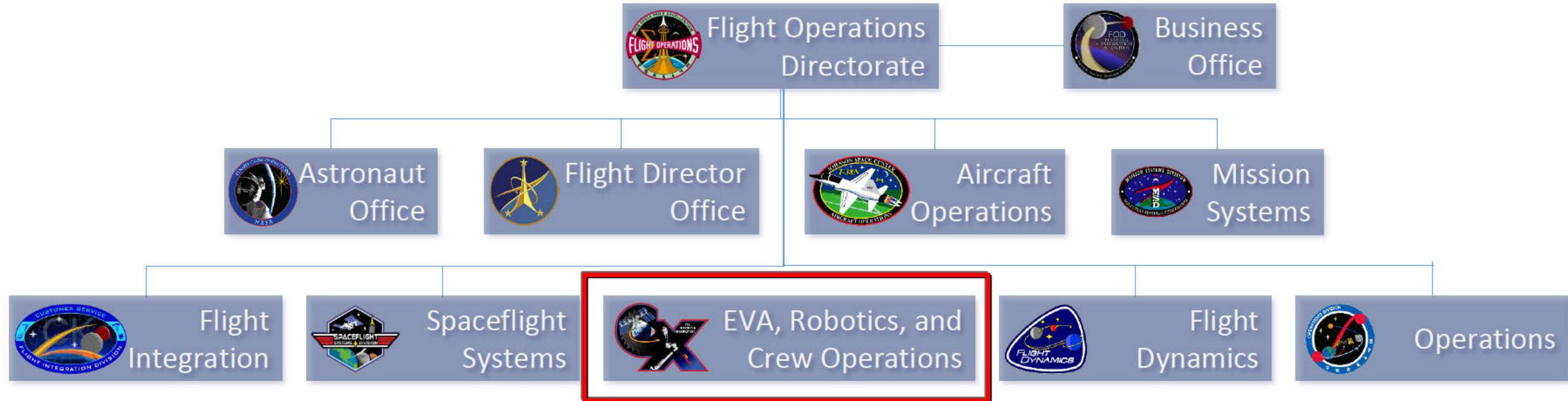
## Fly

- Real-time ops: vehicle and Mission Control
- Integrate all partners across the globe for all phases of flight





# FOD Organizational Chart

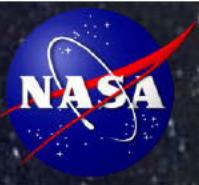


## Key

— NBL managed by EVA, Robotics and Crew Operations Division



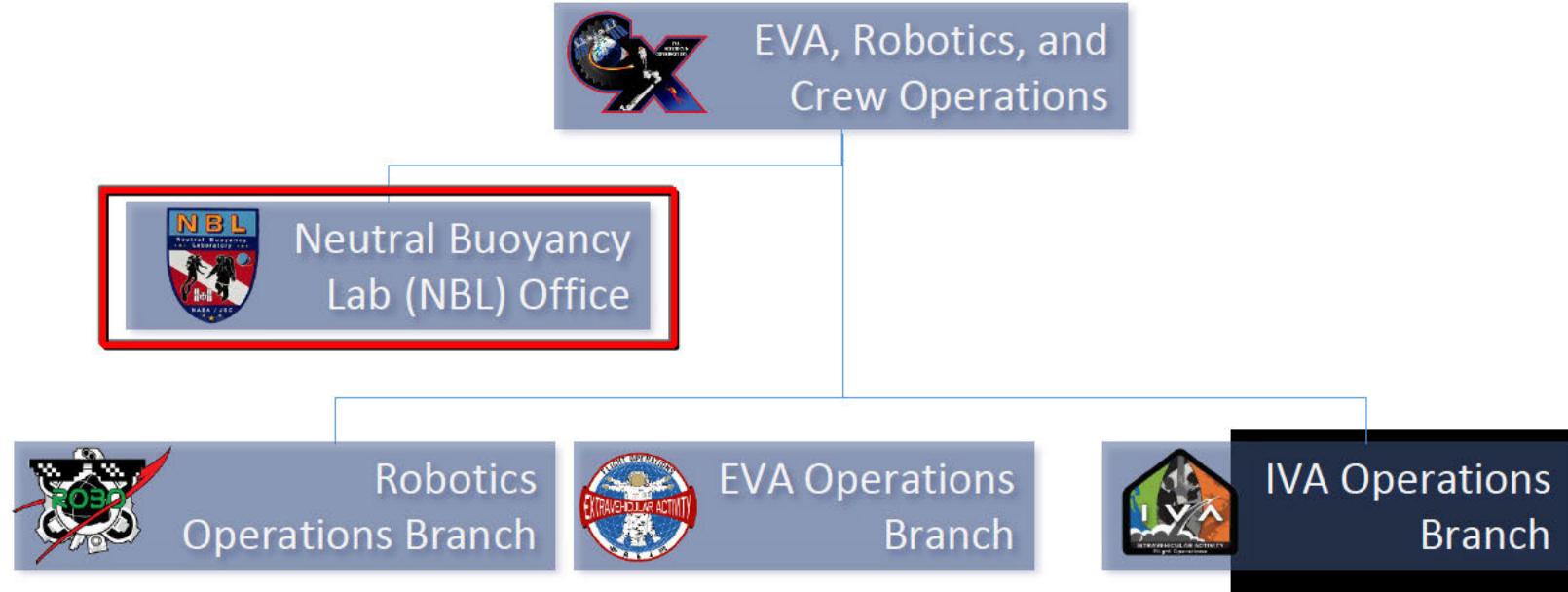
# EVA, Robotics, Crew Operations Division Mission and Organization Chart



## CX Mission

We put the human in human spaceflight for exploration, discovery, and inspiration.

- If they live and work in space, we prepare them.
- If it breaks, we fix it.
- If it can't be done, we find a way.



## Key

— NBL

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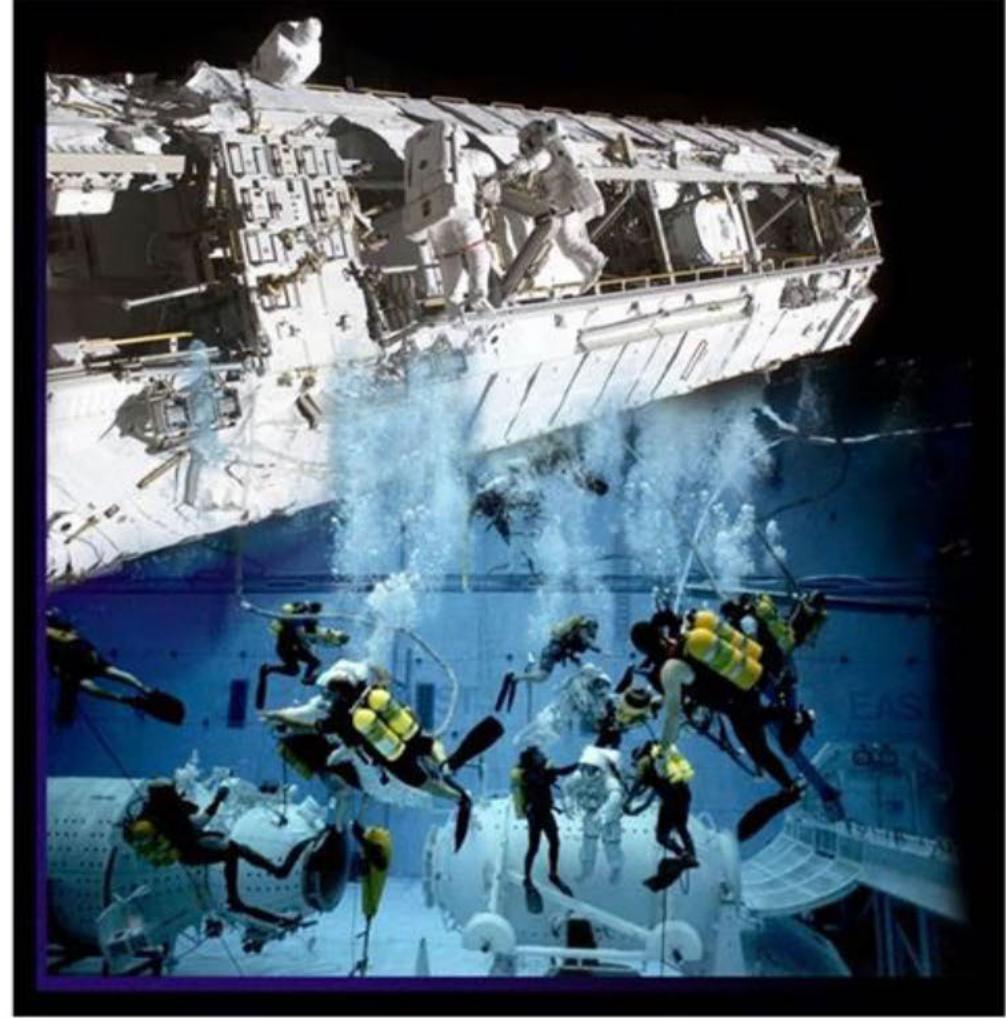
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# NBL Mission



- The mission of the Neutral Buoyancy Laboratory is to prepare astronauts for the hazardous and physically demanding environments associated with micro and reduced gravity suited operations and post-landing return to Earth recovery operations at sea. This is accomplished utilizing sub-surface buoyancy offset techniques to simulate a reduced gravity environment and through simulation of inclement weather surface conditions that may be encountered during post-landing recovery operations. The NBL strives to maximize relevancy and collaboration opportunities, for the benefit of all stakeholders, to reduce costs and achieve mission success.



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# NBL/Pool Aerial Photos



Aerial view of the Sonny Carter Training Facility



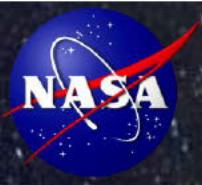
Aerial view of the pool located in the Neutral Buoyancy Laboratory

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# NBL Training in Progress



Post-Landing in-water development and training



Astronaut in-water training

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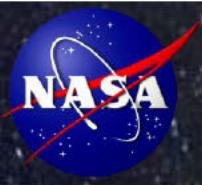


# NBL Overview Video



NBL Fly-

Through:[https://www.youtube.com/watch?app=desktop&v=NqeC0AnU-Ng&ab\\_channel=NASAJohnson](https://www.youtube.com/watch?app=desktop&v=NqeC0AnU-Ng&ab_channel=NASAJohnson)

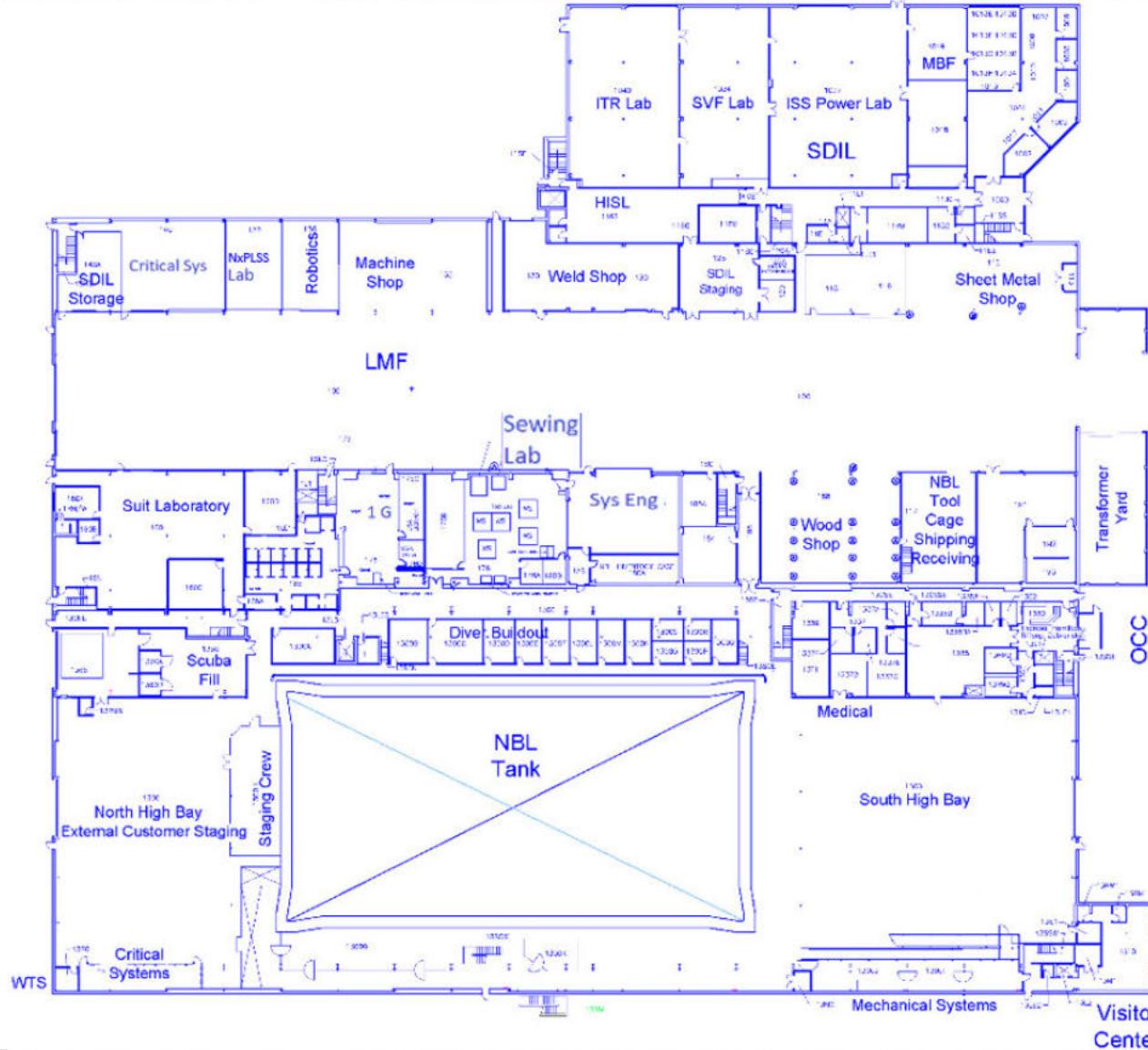
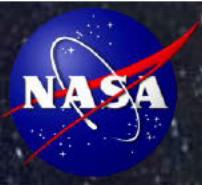


# NBL & LMF Physical Characteristics

- NBL
  - Tank: 202 ft x 102 ft x 40 ft, 20 ft above grade, 20 ft below
  - 6.2 million gallons
  - Heated to 82-88 deg F
  - Recycled/filtered every 19.6 hours (90 gal/sec)
  - High-bay South: 12,500 sq ft, North 11,500 sq ft
  - Roll-up doors South: 25 ft x 25 ft, North: 40 ft x 25 ft
- Logistics and Mockup Facility (LMF)
  - High-bay: 20,000 sq ft
  - Roll-up doors North: 27 ft x 21 ft, South: 30 ft x 30 ft
- 924 and 925 – Storage Buildings
  - 924 has Roll-up doors: 25ft x 25ft
- Lay-down Yard

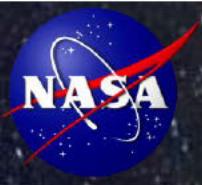


# Sonny Carter Training Facility Layout (NBL & LMF)



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# NBL Operations & Utilization

- Current NBL Training model per NOC
  - 150 pressurized suited events/yr
    - (Average of 3.25 runs/week (46 wks/yr, 6 hours/run)
  - ~46 other events/yr
    - ~10-12/yr NASA Aircraft Operations Directorate Water Survival
    - ~9/yr Orion/Commercial Crew Program Recovery/Egress events
      - 3 day duration (typical)
    - ~25 configured SCUBAs and miscellaneous
- Facility infrastructure to support dual operations includes control rooms, cranes, staging areas and communications
- NBL Products:
  - Flight hardware development
  - Procedure development
  - Crew Training (EVA wet/dry, water survival)
  - Real time flight support
  - Instructor training and certification
  - Support to external customers
  - Public Affairs activities

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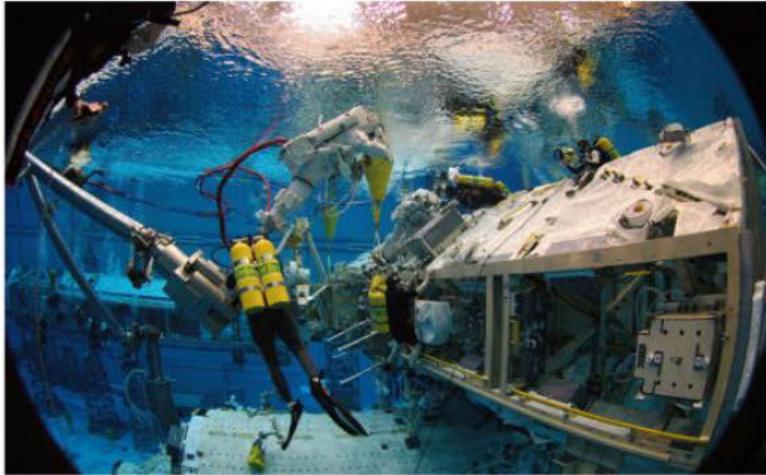
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# NBL Mockups



- NBL Mockups are 1:1 scale models of the flight hardware and are constructed of Stainless Steel, Titanium (Robotic Arm), Plastics or Composites, Natural Materials (e.g., rock, sand)
- The fidelity of the mockup is dependent upon training requirements.
- Current NBL Inventory:
  - Large-sized: 60+ (ISS trusses/modules, Orion Trainer, and lunar surface simulants)
  - Medium & small-sized: 3500+ (ORUs, support stands, cradles...)
  - On average, the NBL moves 10-12 major items per month





# Future NBL Operations and Utilization

- New Extravehicular Activity Suit (commercially developed under xEVAS contract) development, testing, and training
- Lunar surface and key hardware (e.g. Lunar Landers) in development for Lunar surface operations development and training
- Gateway module mockup planning and implementation



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# NBL System Entry Control Process

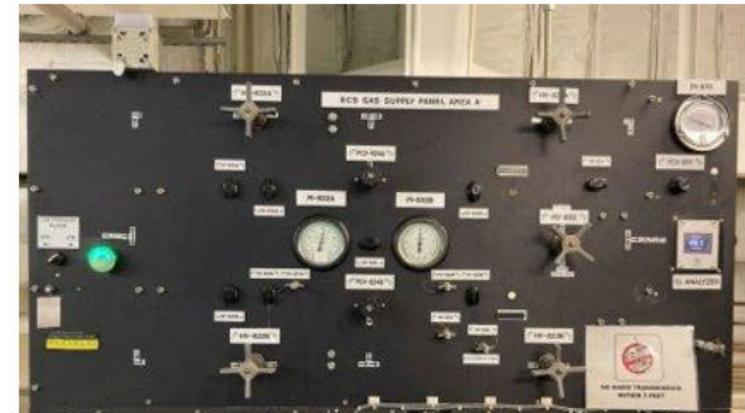
- The NBL uses a System Entry Control process (SECP) to ensure that the appropriate administrative and technical controls are maintained while working on NBL critical systems.
- This process is also applied to other projects, as appropriate, to reduce risk and mitigate hazards.
- The selected contractor will be expected to follow the SECP, or a similar process, while performing or overseeing work on select NBL systems.



# NBL Critical Systems

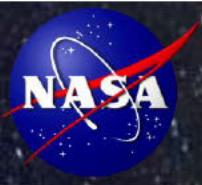


- Environmental Control System
  - Breathing Gas System
    - *700K scf of Nitrox (46% O<sub>2</sub>) is produced & consumed annually*
  - Water Treatment System
  - Robotics
    - SSRMS (Robotic Arm – Space Station Remote Manipulator System)
  - Communication System
    - Diver Voice System
    - Communications Matrix
  - SCUBA
    - Twin-80 ft<sup>3</sup> & twin-50 ft<sup>3</sup> bottles
    - Surface-Supplied Dive System
  - Video
  - Uninterruptible Power Supply
  - Wave Generators
  - NOMAD (NASA Orion Multi-Axis Demonstrator) Post-Landing trainer



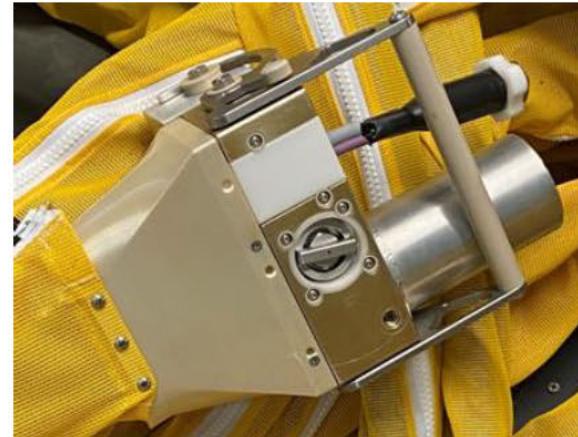
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# Environment Control System (ECS)

- Purpose: Provide breathing gas, chilled water and two way/full duplex voice communications through life support umbilicals to pressurized suits for NBL operations
- Breathing gas is typically Nitrox (46% O<sub>2</sub>)
- Chilled water is provided to suit for temperature control
- Interface between ECS and suited subject is via an umbilical connection at the back of the suit
- Data flow to/from suit



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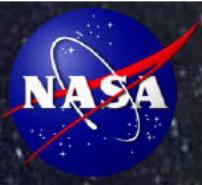
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# Breathing Gas System (BGS)

- Purpose: Manufacture and store 46% O<sub>2</sub> Enriched Air (Nitrox) used for all diving operations
- BGS Subsystems
  - Air Compressors
  - Nitrox Compressors
  - Liquid Oxygen (LOX) Storage tank
  - Nitrox Blenders
  - SCUBA charging





# Water Treatment System (WTS)

- Purpose

- Controls water recirculation rates
- Controls water clarity and temperature
- Controls and monitors water chemistry
- Remotely alarms operators to all significant anomalies



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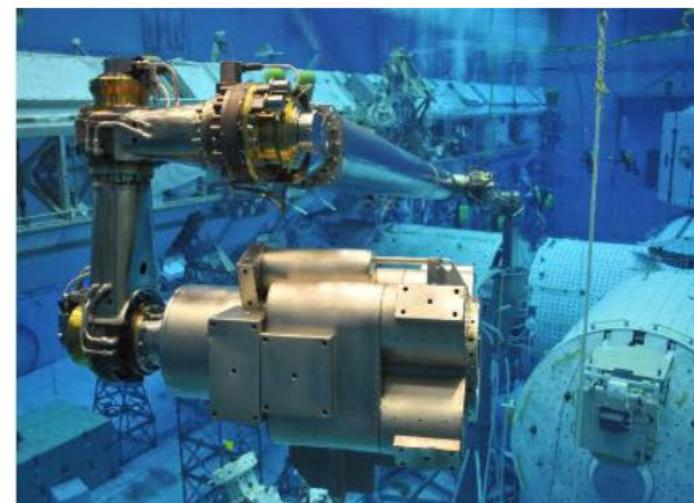
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# Robotics



- The NBL's Space Station Remote Manipulator System (SSRMS) is a one of a kind, hydraulically actuated robotic arm that is used in engineering evaluations and training astronaut crews for upcoming EVAs
- The SSRMS can be controlled from two locations, one flight-like robotics workstation located in the Test Conductor Area A (used for crew training) and the other located on the pool deck.
- The hardware and most of the software are operated and maintained by the NBL contractor. A few aspects of the software are maintained by JSC's Engineering Directorate with NBL contractor oversight.

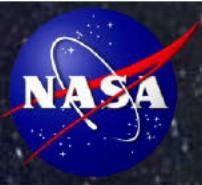




# Communications System

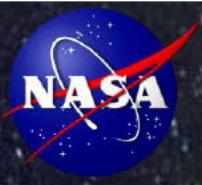
- Purpose - Provide reliable communication for
  - Two simultaneous independent training events
  - Real-time mission engineering support
  - Non-suited test diving and operations activities
- Methods of Communication covered include
  - Suit Communication Umbilicals
  - Diver Voice Comm System
  - Underwater Speaker System
  - SCUBA 2-way Comm System
  - Test Team Wireless Comm Loop
  - Mobile Handheld Radio





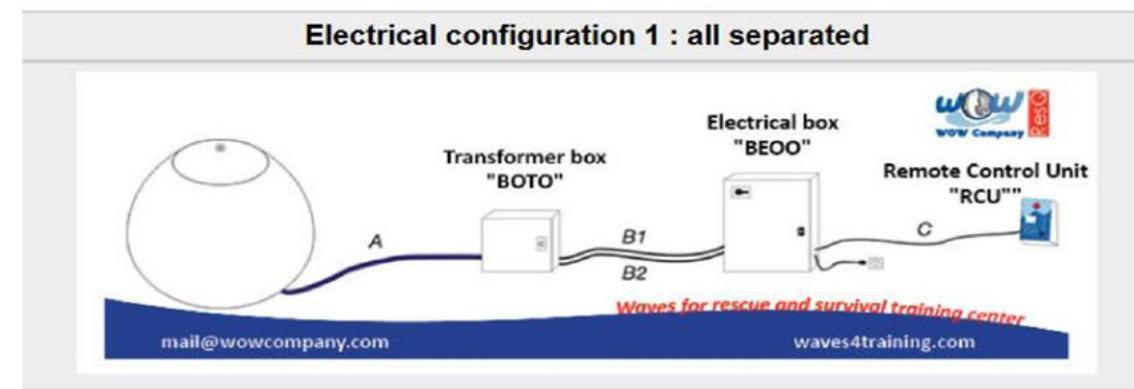
# Video System

- Purpose
  - Provide test conductors with the ability to monitor all test activities
  - Provide the test team the ability to record and distribute video
  - Allow the test team to remotely control underwater and above water fixed camera locations
  - Route test video and audio to JSC TV and Ustream
- A portion of the video system is currently maintained by the JSC Information Resources Directorate (IRD)
- The system is capable of recording and distributing both standard and high definition video
- Two RED cameras
  - 6k RED Weapon, underwater and topside capable
  - 8k RED Helium, underwater and topside capable



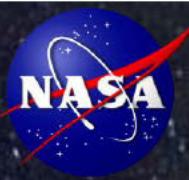
# Wave Generators

- 2 WoW (Wonderful Waves): Model W180F
- Wave generators move water at the pool's natural frequency to create standing waves
  - Wave Length: 26' x 26'
  - Wave Height: 5 settings with varying height 1-2.5ft
- System requirements:
  - 400v, 25A





# NBL Subsystems

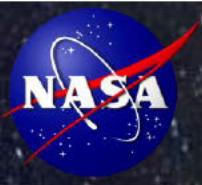


- Facility Subsystems (Maintained by COD)
  - Material Handling Equipment
    - NBL: Two 25 ton Bridge Cranes
    - NBL: Three 4000lb Jib Cranes,
    - NBL: Personnel Lifting Device\*
    - NBL: Two 495 pound Davit Cranes
    - LMF: Two Bridge Cranes, one 10-ton Trolley, and two 5-ton Trolleys
    - LMF: Approx 90 Pieces of Shop Equipment (~20 Different Types: Water Knife, Mills, Welding, Shears)\*
    - Tow Tug\*
    - Four forklift trucks\*
    - Lift-a-lot & Scissor jack\*
  - Utilities
    - Water
    - Natural Gas
    - Electrical – two Independent Feeds
  - Chillers
  - Facility Compressed Air
  - Clean Room\*
- \* Maintained by NOC II Contractor



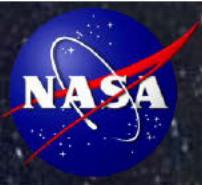
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# NBL Hazardous Operations

- Dive operations (suited, SCUBA, and surface-supplied)
- Oxygen enriched environment
- Breathing Gas Compressors
- Pressure vessels
- Electrical (lightning & shock isolation)
- Critical lifts (hundreds per year)
- Robotics
- Confined spaces
- Chemical storage, handling, utilization
- LMF Manufacturing – machine tools
- System entry control processes used for all human (BGS, ECS, Robotics)



# NBL Team Interfaces

## NBL Customers/Users

## JSC Institutional Support & "Compliance" Orgs

JSC

Real-time Support	EVA and Human Surf. Mobility Prg.	Other NASA Installations (KSC, GSFC, JPL)	Other Agencies and Local Governments	Commercial Companies	STEM Events	Center Operations	Human Resources
Flight Operations Directorate	Station Program		USCG	HMI	JSC Education's Micro-G NEXT	Safety, Quality, and Reliability	ISO 9000 Office
Engineering Directorate	Orion Program		Harris County Sheriff's Office	AOR	MATE Robotics (former)	White Sands Test Facility	Legal Office
Health and Human Prf Directorate	Commercial Crew Program			Raytheon		Information Resources	Business Office
Public Affairs, Space Ctr Houston	HLS Program						





# External Customers



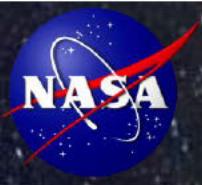
- JSC is eager to support and partner with the burgeoning Commercial Spaceflight Industry and recognizes that the NBL provides unique capabilities that may be helpful to many entities.
- The NBL is currently highly subscribed and is anticipated to be so for much of NOC II – but flexibility is key. Therefore it is an expectation that offerors will have the capability to “turn on” recruitment of new external customers if necessary
- Current and previous external customers include:
  - NASA field centers; e.g., KSC, GSFC, JPL
  - US Government agencies; e.g., U.S. Coast Guard, USMC
  - Commercial companies; e.g., Nauticus, AOR, Raytheon, BP, Petrofac
- The support provided to date includes:
  - Use of the NBL for submerged operations (AUVs, ROVs, etc.) or water survival training
  - Use of the LMF for manufacturing to support FOD
  - Use of the NBL for media and educational events that promote NASA and STEM
    - NBL does not support edutainment events





# Current and Future NBL Challenges

- Recruiting and retaining a skilled workforce through the dynamics of Human Space Flight Program ramp-up and ramp-down
- Flexibly managing workload and resources to address the demands of multiple dynamic Programs as well as external customers
- Having flexibility to recruit new external customers if excess capacity becomes available
- IT security mandates



# Target Opportunities for Innovation

- Lunar surface simulation
  - Expansion and effective use of lunar surface area
  - Leveraging cross-organizational expertise to develop best solutions
  - Ability to ensure novel solutions don't disrupt existing systems
- Development of self-contained Life Support System for umbilical-less suited training
- Multi-program support integration (ISS, Gateway, Artemis, HLS)
- Dynamic resource allocation – pool space, support staff, etc.
- Training innovations for NBL Operations and NOC personnel
- Methods for effective integration of commercial suits and other hardware
- Project management and reporting
  - Get things done on time and on budget, and proactively communicate if they are not going to be
- Flexible approaches to External Customer recruitment
- Streamlining hardware procurement system



# NOC II Summary

- Operate the NBL as an efficient team maintaining technical depth and breadth – supporting multiple missions and programs
- Reducing costs without affecting quality or compromising safety and operations
- Build partnerships with organizations outside FOD to enhance their capabilities while strengthening our own.
- Acquire support (labor and expertise) to ensure the continuing safe operation of the facility and support all required events.
- Support external customer utilization of current and future excess capacity in the facility. Recruit additional external customers if needed to utilize unexpected excess capacity

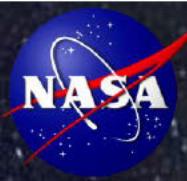


# Tour Logistics

Paul Dum, RDT Chair

3/23/2023

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# Site Tour Safety Briefing: NBL Tour

- Meet your bus in Gilruth Parking lot **promptly at 12:00 noon Central Time**. Those who are late will miss the opportunity to take tour.
- The NBL is an operational facility with live hazards – Please listen and follow safety instructions provided by your tour lead
- In the event of an emergency requiring evacuation of the facility or a shelter in place, your tour leader will identify and lead the group to the nearest exit or shelter
- Stay behind the yellow line that runs along the perimeter of the pool
- Restrooms will NOT be available during the tour – plan accordingly
- Photography and video/audio recording is permitted
- Entire tour takes approx. 45 minutes, involves some stairs and covers between  $\frac{1}{2}$  and  $\frac{3}{4}$  of a mile



# Procurement Schedule and One-on-One Communication Logistics

Edwin Ortiz-Franco, Contracting Officer

3/23/2023

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# Procurement Schedule

- The Government does intend to issue a Draft Request for Proposal (DRFP).
- Following the release of the Draft RFP, Industry will have an opportunity to submit anonymous questions in writing so that the Government may officially respond.

## Anticipated Milestone Schedule:

- Release Draft Request for Proposal: June 09, 2023
- Release Request for Proposal: August 15, 2023
- Preproposal Conference: August 22, 2023
- Proposal receipt: September 14, 2023
- Contract Award: June 15, 2024
- Phase-In Begins: August 01, 2024
- Contract Start: October 01, 2024

- It is the Government's intent to request that offerors provide past performance information within 30 days of the release of the Final RFP to expedite the evaluation process.



- Reminder that email questions will be accepted through Friday (3/31/2023) by 5 pm Central Time
  - [jsc-noc2@mail.nasa.gov](mailto:jsc-noc2@mail.nasa.gov)
- Answers will be provided in writing and posted at SAM.gov
  - <https://sam.gov/opp/847b17198cef44aea46bd9220697468d/review>



# One-on-One Communication with Industry

- Dates:
  - March 29 (2:00 pm To 6:00 pm).
  - March 30, if needed.
- Location: MARS Conference Room.
- No more than 4 individuals may represent any party or team of parties.
- Only one meeting will be allowed per company.
- Meetings will not exceed 25 minutes in length.



# How to Get Connected

- NOC II Public Websites
  - <https://www.nasa.gov/jsc/procurement/noc2>
  - <https://sam.gov/opp/847b17198cef44aea46bd9220697468d/review>
- NASA/JSC Contract Opportunities
  - <https://sam.gov/content/home>
- JSC Procurement Website
  - <https://www.nasa.gov/jsc/procurement>
- Industry Assistance Office, JSC Bldg. 1
  - [jsc-industry-assistance@mail.nasa.gov](mailto:jsc-industry-assistance@mail.nasa.gov)



# Responses to Questions

## Thank you for attending!

Visit: <https://www.nasa.gov/jsc/procurement/noc2>