



# Always Sweat the *Small* Stuff

HRP-Research Operations and Integration Mission Science

2024 Human Research Program  
Investigators' Workshop

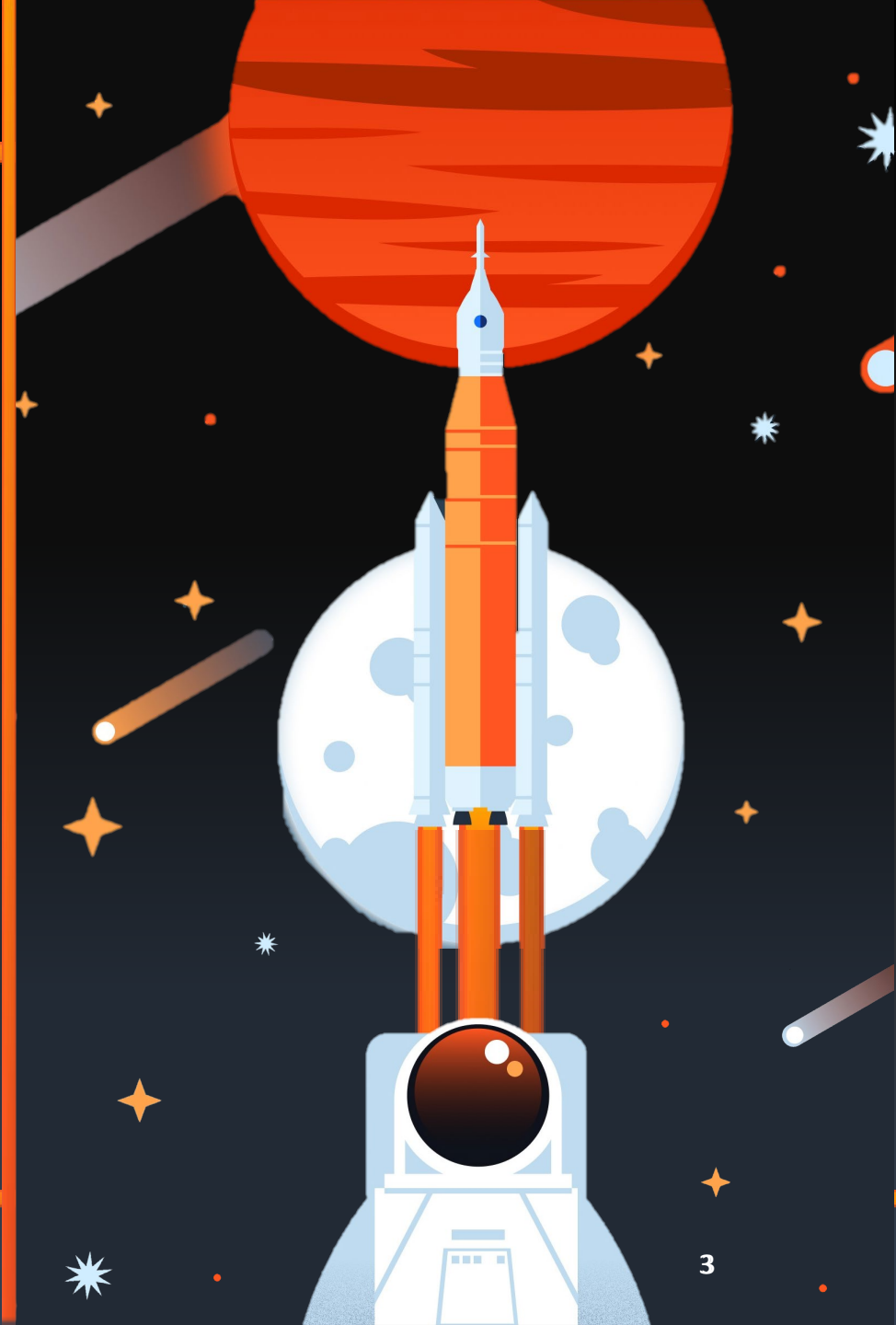
# Pre- and Post-flight Data Collection Procedures.....

- It's just a saliva sample, right?
  - And a body swab
  - And a sleep log
  - And an exercise log
  - And urine collection
  - And .....
- This session will provide a glimpse into the often overlooked outside-of-work BDC performed by our dedicated crew members.
- Opportunity to put yourself in the position of the crew member!



# Presentation Overview

- Background of astronaut pre- and post-flight schedule challenges
- Overview of “off-schedule” or autonomous BDC
  - Sample collections
  - Logging (such as exercise and food logs)
- Practical assessment – opportunity for audience participation and testing (with prizes!)





# Pre- and post-flight astronaut schedules

- Most astronauts begin a rigorously choreographed daily schedule at least 12 months prior to launch
- Their schedules are controlled down to 15-minute blocks of time (inflight the blocks are even shorter!)
- Discretionary work time is limited to brief hour-long periods a few times a week at most
- Even exercise time is tightly controlled
- Combined with inflight, most astronauts are looking at periods of nearly two years where over half their waking day is tightly regimented beyond their control

# A typical day for an astronaut preparing for flight

Normal workdays:

- Random lunches
- Sometimes **NO** lunch
- Full, intense days...but at least there are mornings...

	Monday	Tuesday	Wednesday	Thursday	Friday
6:00	BDC - Saliva, Logs	BDC - Saliva, Logs	BDC - Saliva, Logs, Urine, Body Swabs, Fecal	BDC - Saliva, Logs, Urine	BDC - Saliva, Logs, Urine
7:00					
8:00	Program Meeting	Systems Training	EVA Training	Program Meeting	Operational Simulation
9:00	Media Interview			VR Training	
10:00					
11:00	BDC Session	Systems Update			
12:00	Program Meeting				
13:00	Hardware Training	Medical Simulation		Docking Simulation	
14:00	Exercise	Console			Vehicle Training
15:00	Training				
16:00	Program Meeting	Hardware Consult			Exercise
17:00					
18:00					

# Nope, mornings can be packed too!

Sample collections all week:

- Saliva
- Exercise logs
- Diet logs
- Urine
- Body Swabs
- Fecal



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15:00	Training				
16:00	Program Meeting	Hardware Consult		Exercise	
17:00					
18:00					



# The challenge of the *small* stuff

- Most sample collections are required “immediately after waking” or “before brushing teeth” or “when personally experienced.”
  - Saliva (multiple types)
  - Body Swabs
  - Urine
  - Fecal
- We cannot place these activities on the crew member’s formal schedule.
- Most of these activities are performed on the crew’s own time before they arrive at work or on the weekends.

6am	Wake up. Get urine kit and collect sample (try not to spill any). Label bottle.
	Retrieve saliva sample supplies. Collect samples and label. There may be a questionnaire to fill out as well.
630am	Need to wake-up the kids soon, but first: Retrieve supplies, collect and label body swabs, and complete the survey. Also collect a fecal sample (and label) whenever nature calls.
7am	Finally, you get to drink a glass of water. Maybe have some breakfast (unless it's blood draw day!).
730am	Leave for work.

# Saliva Samples

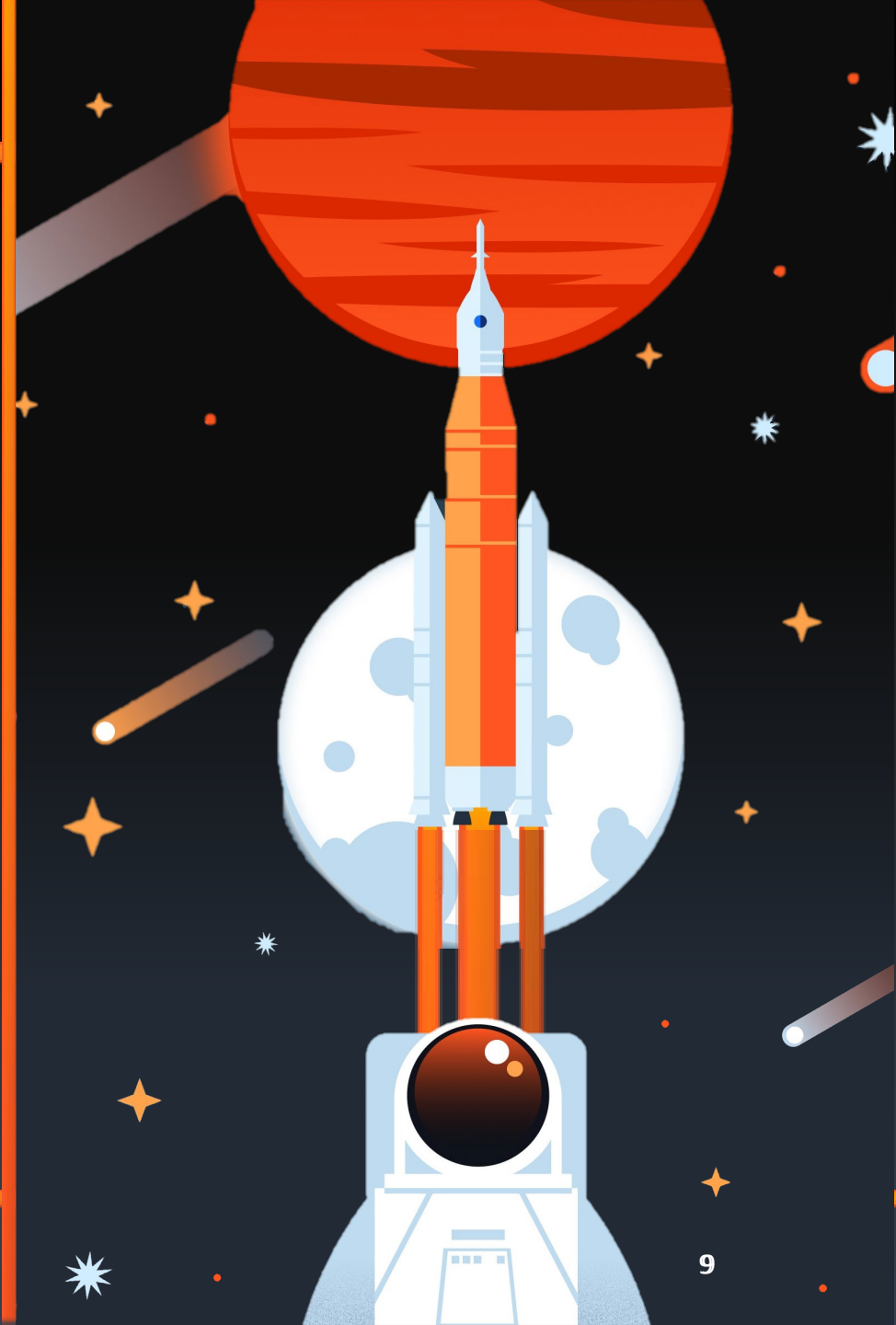
- Often a crew member is participating in multiple studies that have different types of saliva sample collections.
- These collections can occur during the same week or even same day, but have different collection requirements
  - Some are **chewed**
  - Some must **not** be chewed
  - All must be sufficiently soaked
  - Most must be collected before drinking water





# Example Experiment #1


- Four days worth of salivettes
- **Cannot** be chewed
- Must be rolled around mouth for several minutes



# Example Experiment #2

- Collection of saliva, buccal samples, and fecal sample
- These look very similar to supplies used for other experiments
- Imagine looking at this first thing in the morning – before you've even brushed your teeth





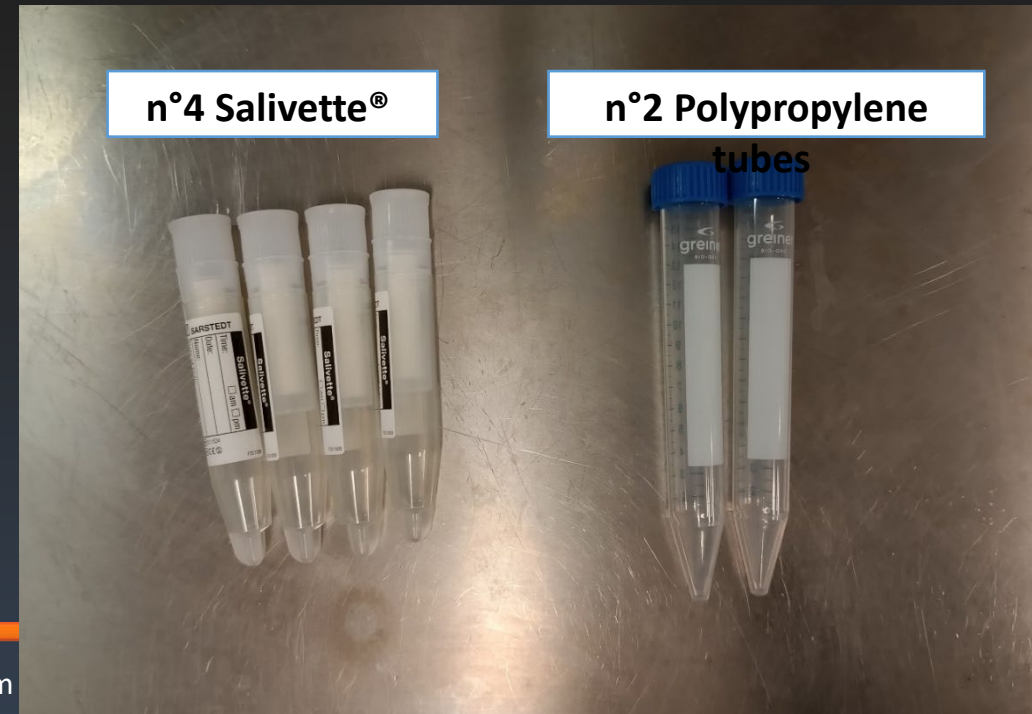
# Example Experiment #2 - Rolled Saliva Collection

- Notes:
  - **DO NOT bite down, chew or squeeze salivette**
  - **DO NOT leave salivette stationary between gum and cheek**
  - **DO NOT brush teeth, eat or drink anything until after collecting saliva**
- Procedure:
  - 1. Open bag. Knead and manipulate outside of bag to separate one Salivette from the others and move toward opening to put directly into mouth without touching.
  - 2. Lightly roll Salivette in the mouth with tongue from cheek to cheek for at least 3 minutes to completely saturate the Salivette
  - 3. Label bag and use mouth to place Salivette into the labeled bag without touching
  - 4. Close bag and put in freezer within 30 minutes of collection
  - 5. After collection on Day 4, place all saliva collections in provided cooler with ice packs and bring to Increment Science Coordinator



# Example Experiment #3

- Two sampling procedures are required per session/per subject (6 samples in total):
  - Sampling with Salivette. For each session/collection, 4 Salivette® (Sarstedt) are required.
  - Sampling with polypropylene centrifuge tube: For each session/collection, 2 tubes are required.
- We suggest first collecting the 4 salivette samples and then the 2 samples by spitting into the tubes. **Chewing** the salivettes stimulates the production of saliva, making it much easier to collect the 2 samples by spitting into the tubes.



# Urine collection


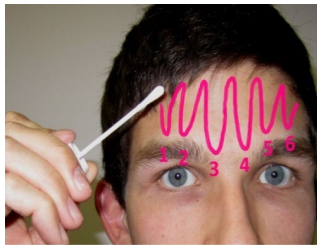
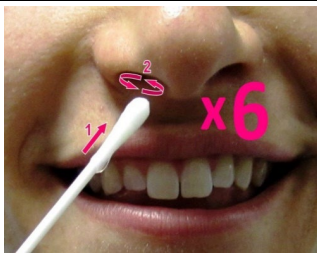
- What's the first thing we do when we get up?
  - Hint: It's usually not something requiring dexterity
- Urine sample collection takes something fairly routine and turns it into a time-consuming chore (especially for women)
- Every void collected in 24-48 hours (depending on experiment)





# Body Swabs

- Four different locations for body swabs
- Each has specific instructions to follow (review in the morning or setup at night)

Body Swab Cue Card			
Sample Location Number	Subject Sample Site	Description	Image
1	Either Inner Forearm	Trace at least 5 non-overlapping peaks/valleys on either left or right	
2	Forehead	Trace at least 5 non-overlapping peaks/valleys on your forehead using one Body Swab.	
3	Either Nostril	Insert Body Swab into either nostril (per crew discretion) and make 6 turns while applying constant pressure.	
4	Control (air)	Remove Body Swab tip from tube, wave in air, and return to tube.	N/A

## INSTRUCTIONS FOR BODY SWABS

### NOTES BEFORE GETTING STARTED:

When sampling, only hold onto the Body Swab cap. DO NOT touch collection tip to anything other than the designated site.

When changing directions, turn Body Swab to ensure entire surface of collection tip is used. Ensure there is a little friction between the sample site and the collection tip.

NOTE: One spare swab is provided; if not used, discard in trash.

- 1) Use Body Swab Cue Card to correlate number to Subject Sample Site.
- 2) Take one sample at a time until all 4 samples are obtained.
- 3) Write date and initials on each tube; place an 'X' in the corresponding Sample Location Number box on the tube label.
- 4) Verify all tubes are tightly sealed.
- 5) Place all Body Swabs in ziplock bag, and place ziplock bag with Body Swabs in home freezer (store UPRIGHT) within 30 minutes of first sample collected.
- 6) After final Microbiome *saliva* collection, place Ziplock bag with Body Swabs in cooler with ice packs and return them to Pasha in the cooler containing saliva samples.

# Fecal sample collection

## NOTES BEFORE GETTING STARTED:

Wear gloves during this sample collection.  
Collect feces only; no urine, no toilet paper, etc.  
Label container with initials and date.

## **DIRECTIONS:**

- 1) Collect sample per instructions on container. Write date and initials on container.
- 2) Place container in Biohazard Bag, then place Biohazard Bag in bag labeled "Sterile Stool Sampling Kit."
- 3) Place "Sterile Stool Sampling Kit" bag in cooler with ice packs within 20 minutes of sample collection.
- 4) Give cooler to Pasha asap after sample collection.



# We also want to know things about you....

- A **sleep log** can take about five minutes in the morning
- **Diet and exercise logs** are often performed in the morning reflective of the previous day and take another five to ten minutes

The image shows a sample sleep log form. The top section asks "How are you feeling right now?" and includes four mood indicators with horizontal bars for rating: "Tired", "Mentally Sharp", "Energetic", and "Not Stressed at All". The bottom section is titled "You indicated you woke up 3 time(s) during the night. Please indicate the time you woke up and for how long for each instance. For example, waking up at 1:15am for 25 minutes is input as '0115' and '25'." It contains a table with three rows for "Time 1", "Time 2", and "Time 3". Each row has columns for "What time? Use 24hr time (HHMM)", "For how long? (minutes)", and "I don't remember". There are also blue arrows for navigation.

Time	What time? Use 24hr time (HHMM)	For how long? (minutes)	I don't remember
Time 1	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Time 2	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Time 3	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>



# Now it's time for the interactive portion!

- We need three volunteers to be our contestants
  - Each contestant will complete four tasks as quickly and accurately as possible:
    - Two involve actual sample collection (saliva and body swabs) and two are with simulants (urine and fecal)
  - The fastest contestant wins, **BUT** time will be added to your total for inaccuracies



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# Here are the tasks

- Saliva collection
  - You'll get to use real spit wads (just like the astronauts!), but hope you were paying attention when we were covering the differences between experimental methods or you'll be penalized!
- Urine collection
  - Fill containers with urine simulant, but we don't want to miss a drop!
- Fecal collection
  - Get the simulant into the container and seal the lid. **Warning** - this could get messy! 😊
- Body swabs
  - This is also the real thing. Lack of accuracy in collection or labelling will cost you!

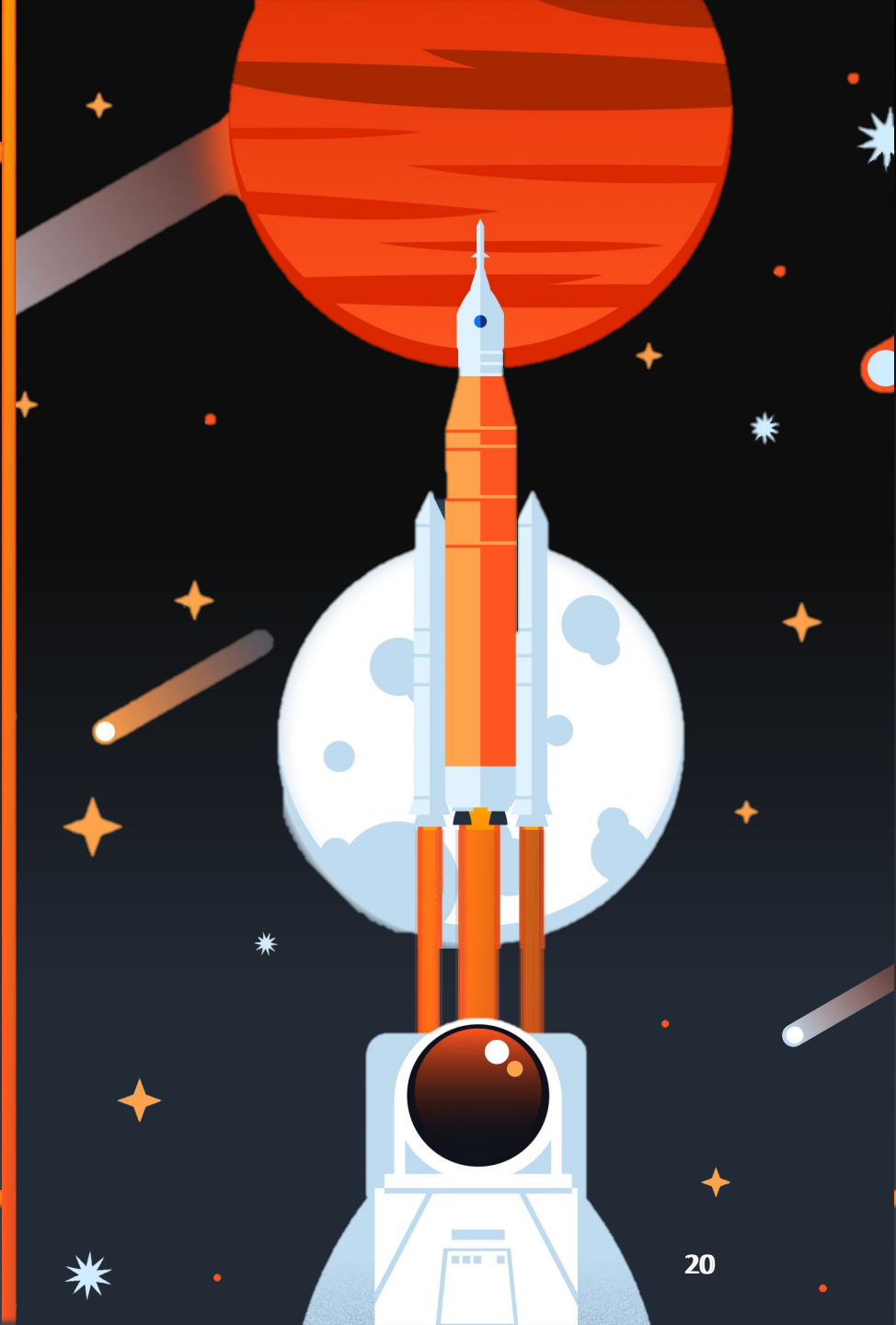




# So ... who's in?



And the winner is....





# Take-aways for this session

- Even something that doesn't take much crew time on paper isn't without its impacts
  - There is no such thing as an “easy” flight experiment and even “small” collections take time and can add up
- Be sure to consider the complexity of even small tasks when designing experiments
  - The more complex a task, the greater the risk to it being performed correctly
- Remember each crew member is performing multiple experiments with similar “small” sample collections
- ***Our crew members are awesome!***
  - The success of our experiments would not be possible without their extensive efforts to perform even the “small” stuff correctly

Photo courtesy of Crew-3's Raja Chari



Thanks for coming!  
Any questions?

