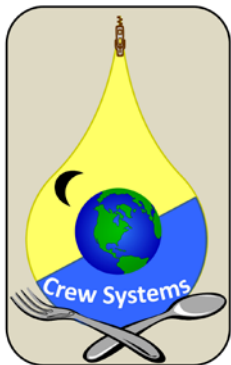




# Assessing ISS Habitability Training A Historical Perspective

Authors: Tiffany M. Swarmer, Gisela Muñoz, and Susan Schuh



70<sup>th</sup> International Astronautical Congress 2019

October 21-25

Washington D.C., USA



# Introduction: Habitability in Spaceflight



IAC-19-B3.5.3x51519

70th IAC, Washington D.C., USA

# ISS Habitability, Equipment, and Procedures Lessons

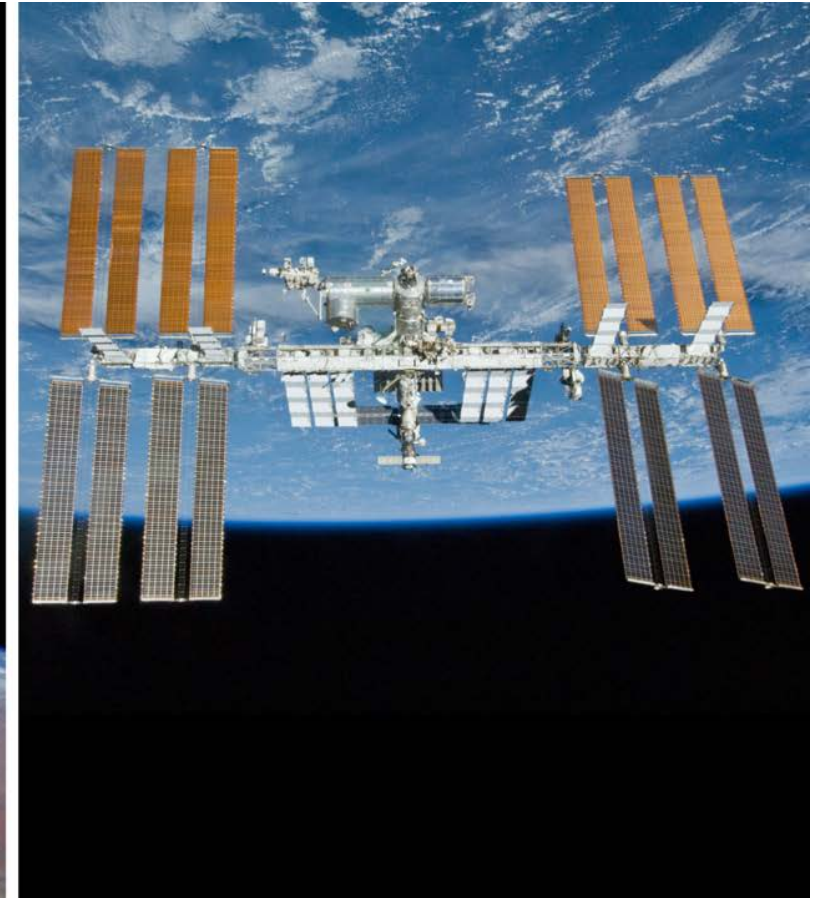
## LESSON PLANS

Objective: Main lesson goal(s).

Skill: Specific material taught in the lesson.

Training Categories:

- Skill
- Task
- Individual Hardware





# Crew Comments Database

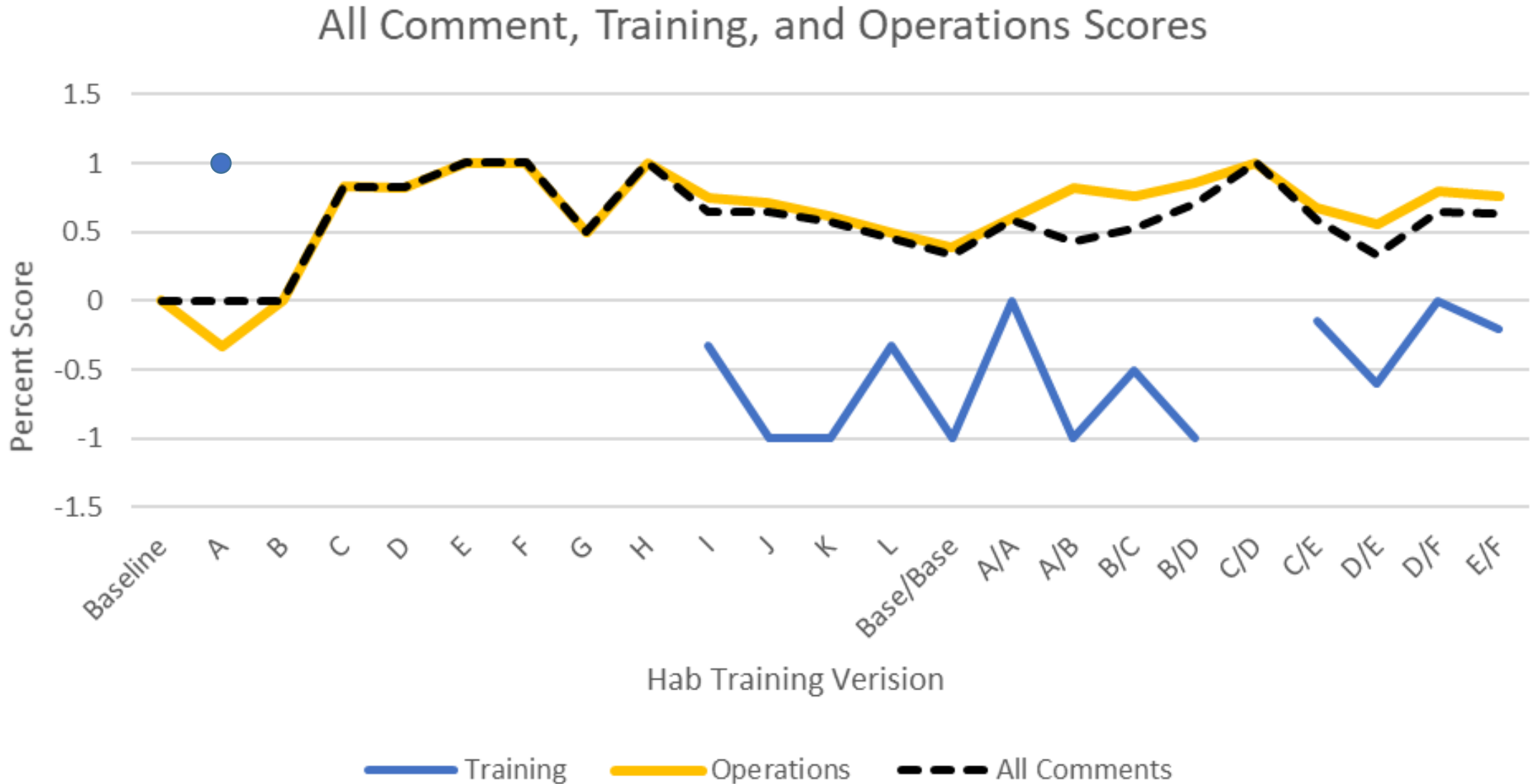
Crew Comments Database (CCDB) encompasses ISS crew post mission and on-orbit feedback from pre-Expedition 1 to Expedition 58/59

Key Words from Lesson Plan's Objectives and Skills:

- Location Coding
- Label Maker
- Restraints and Mobility Aids
- Filters/Housekeeping

Crew Systems Specific Training Question

# All Comment, Training, and Operations Scores



# Objectives and Skills

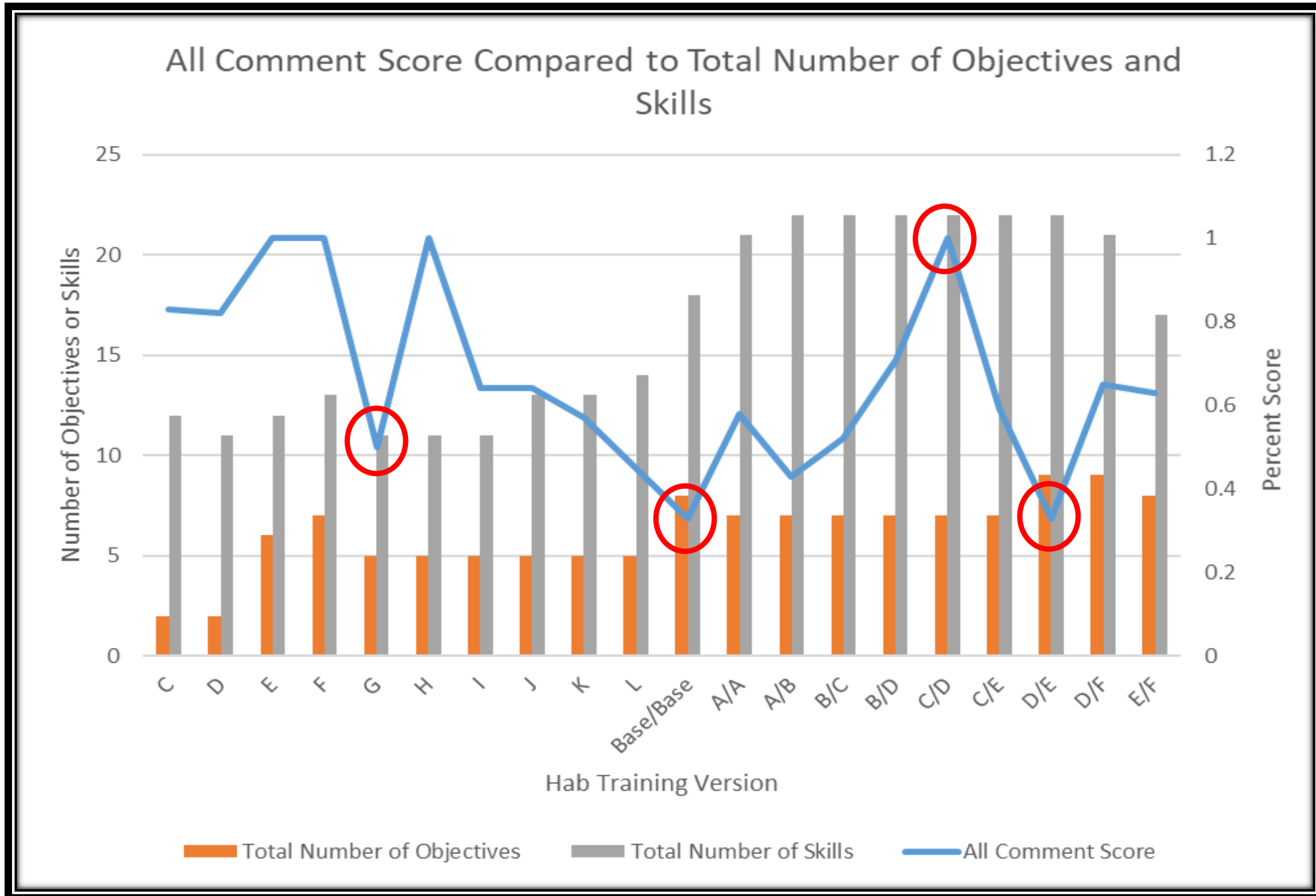
## Deviating Revs:

- G (Low)
- Base/Base (Low)
- C/D (High)
- D/E (Low)

## Low Comment Numbers

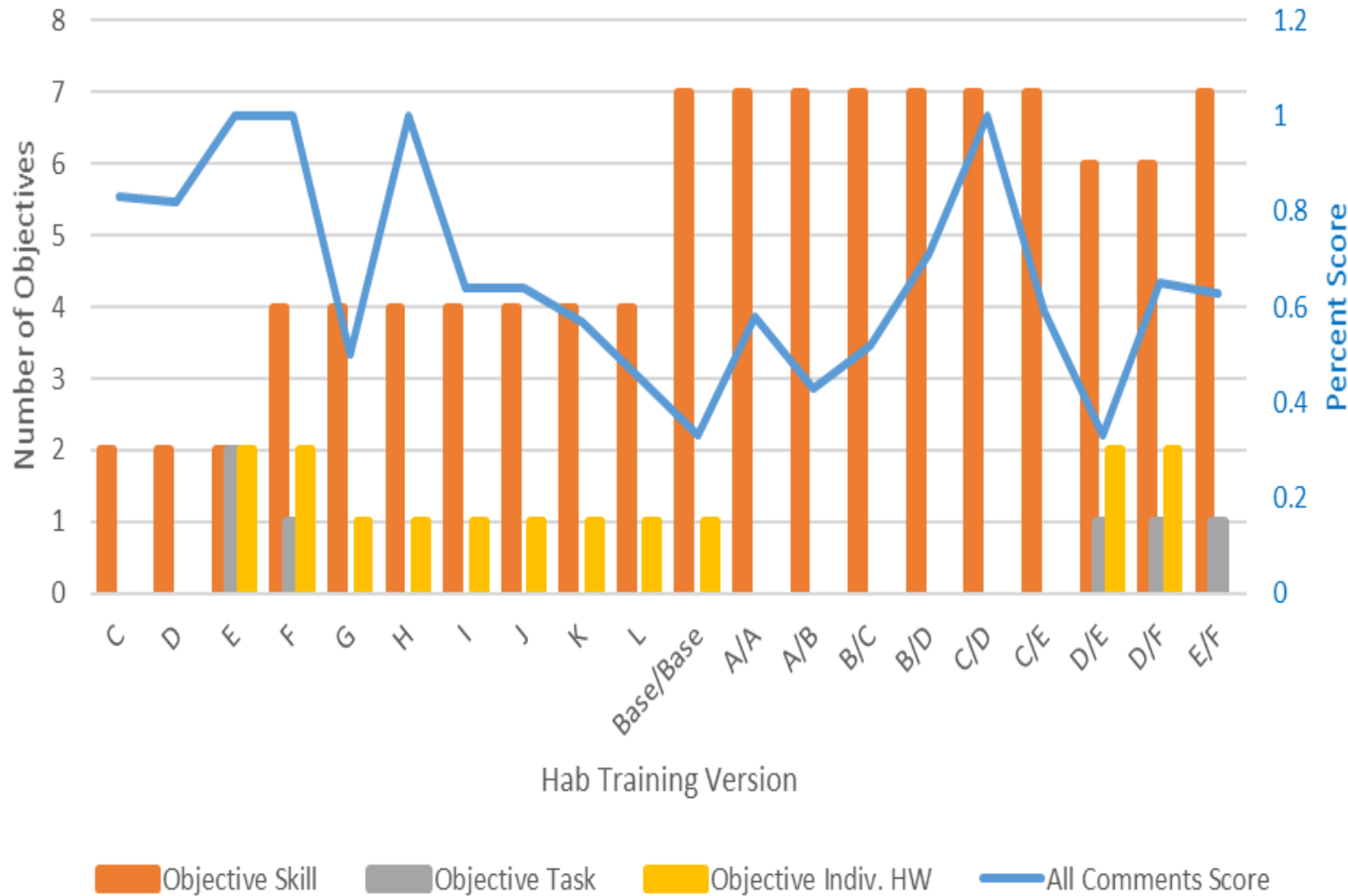
Base/Base first time the lesson is taught after being split into HT 1 and 2.

D/E Contains the highest number of Objectives and Skills.

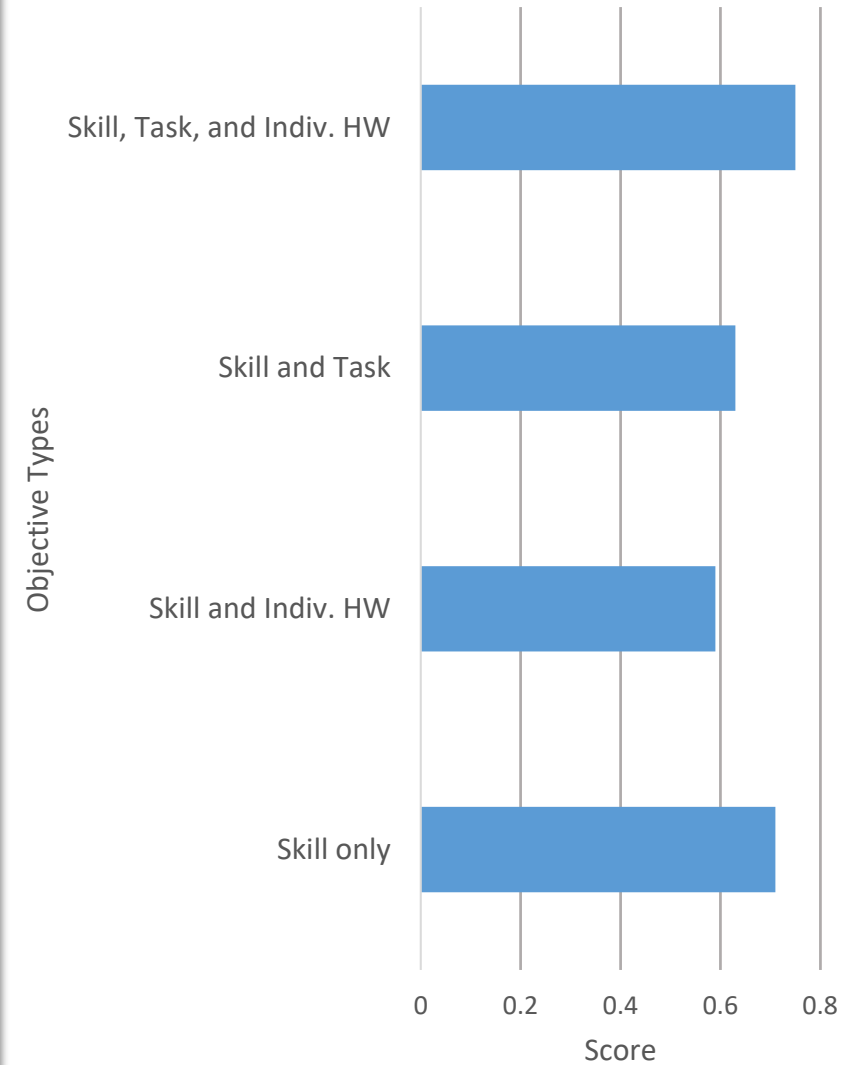


# Objective Composition

All Comment Score Compared to Objective Type Composition

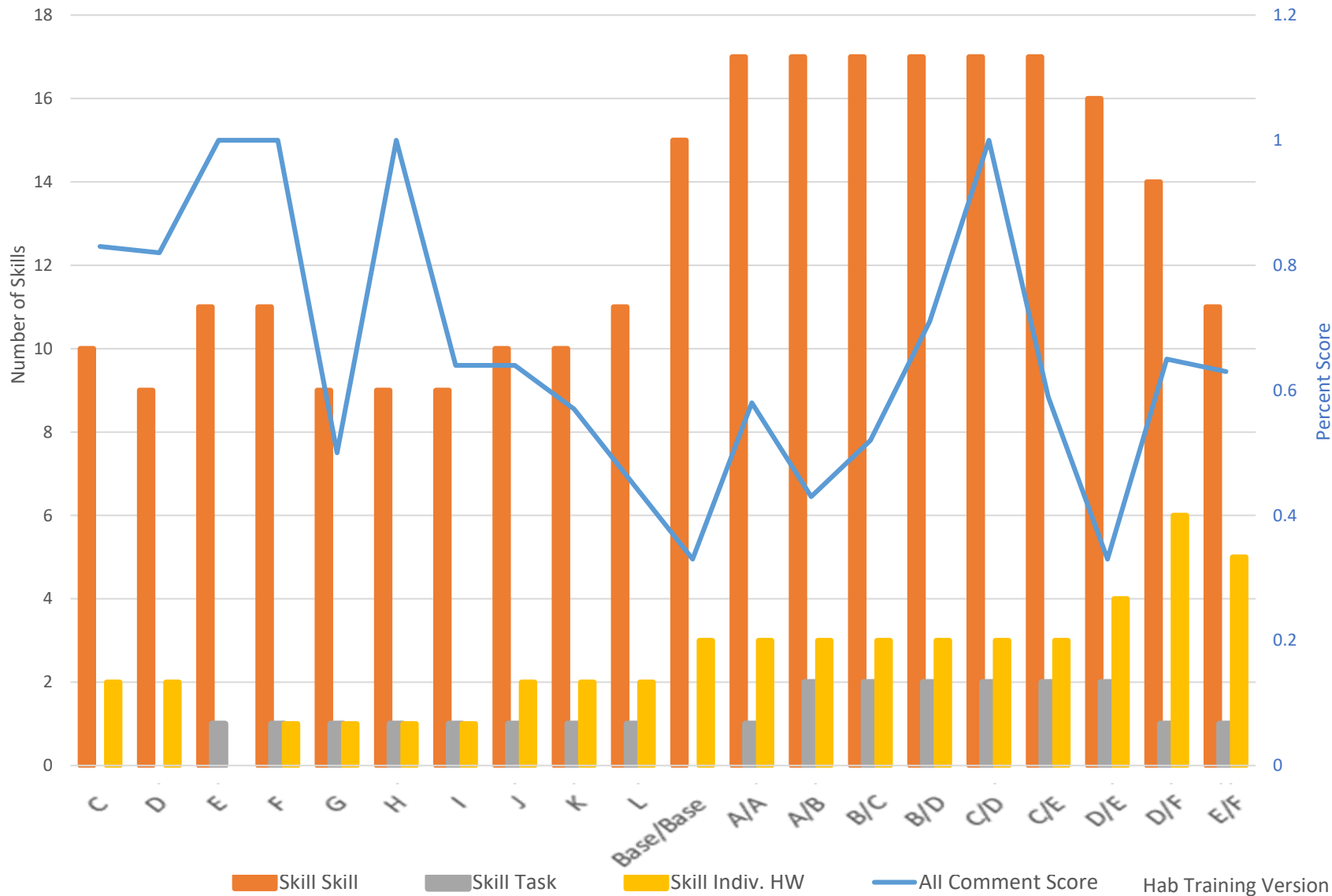


Objective Composition Score

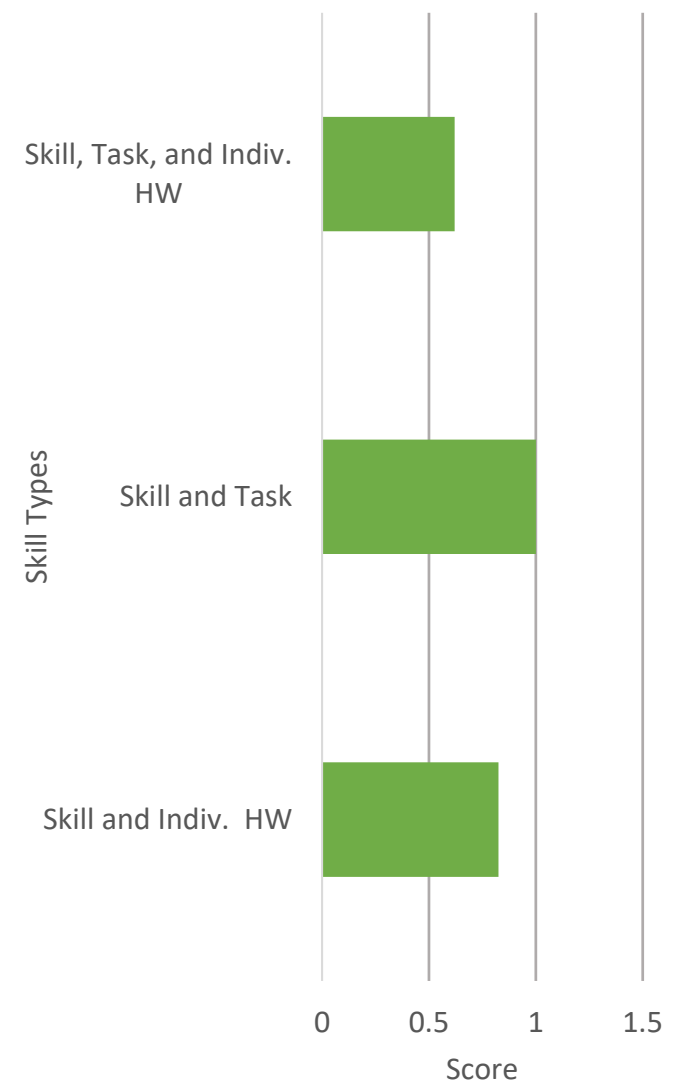


# Skill Composition

## All Comment Score Compared to Skill Type Composition



## Skill Composition Score



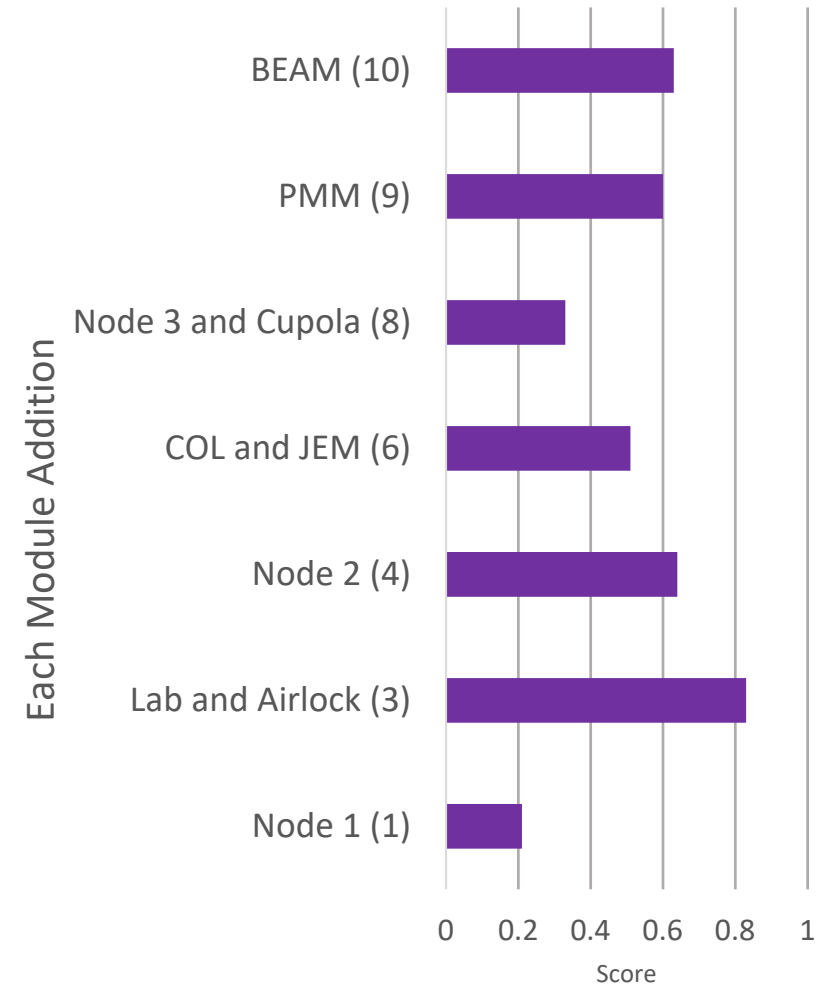


# Size of the ISS

## All Comment Score compared to ISS Size

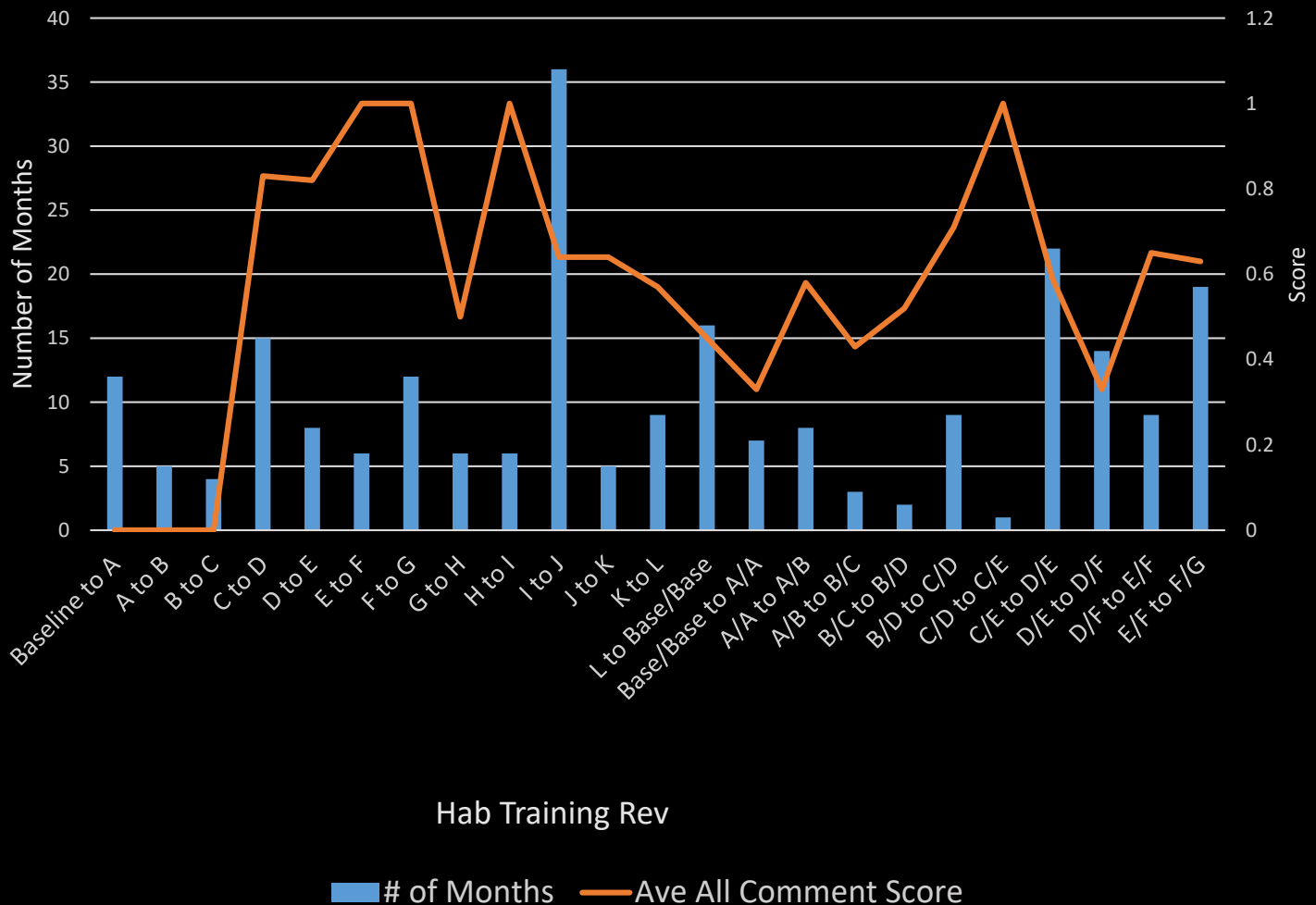


## Size of Station and Comment Score

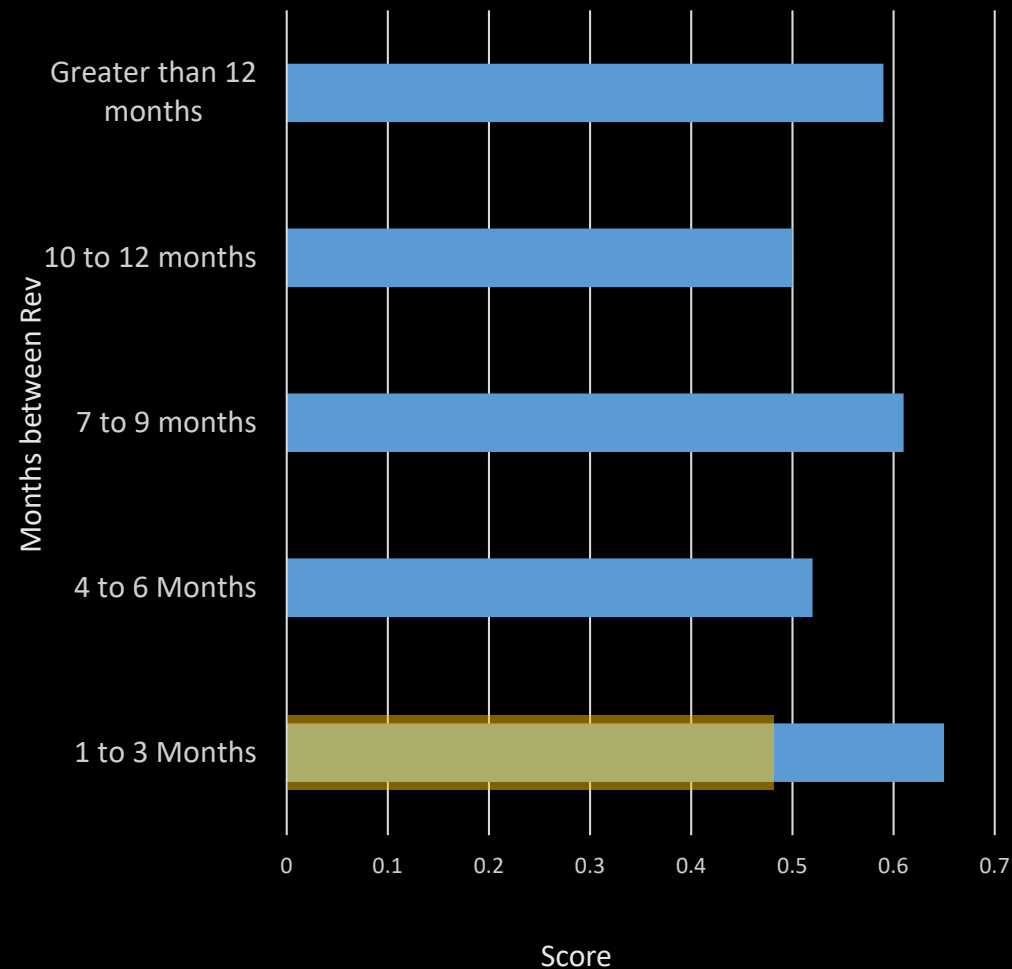


# Time Between Revs

## Number of Months between Hab Training Revs



## Months between Rev and Ave Score



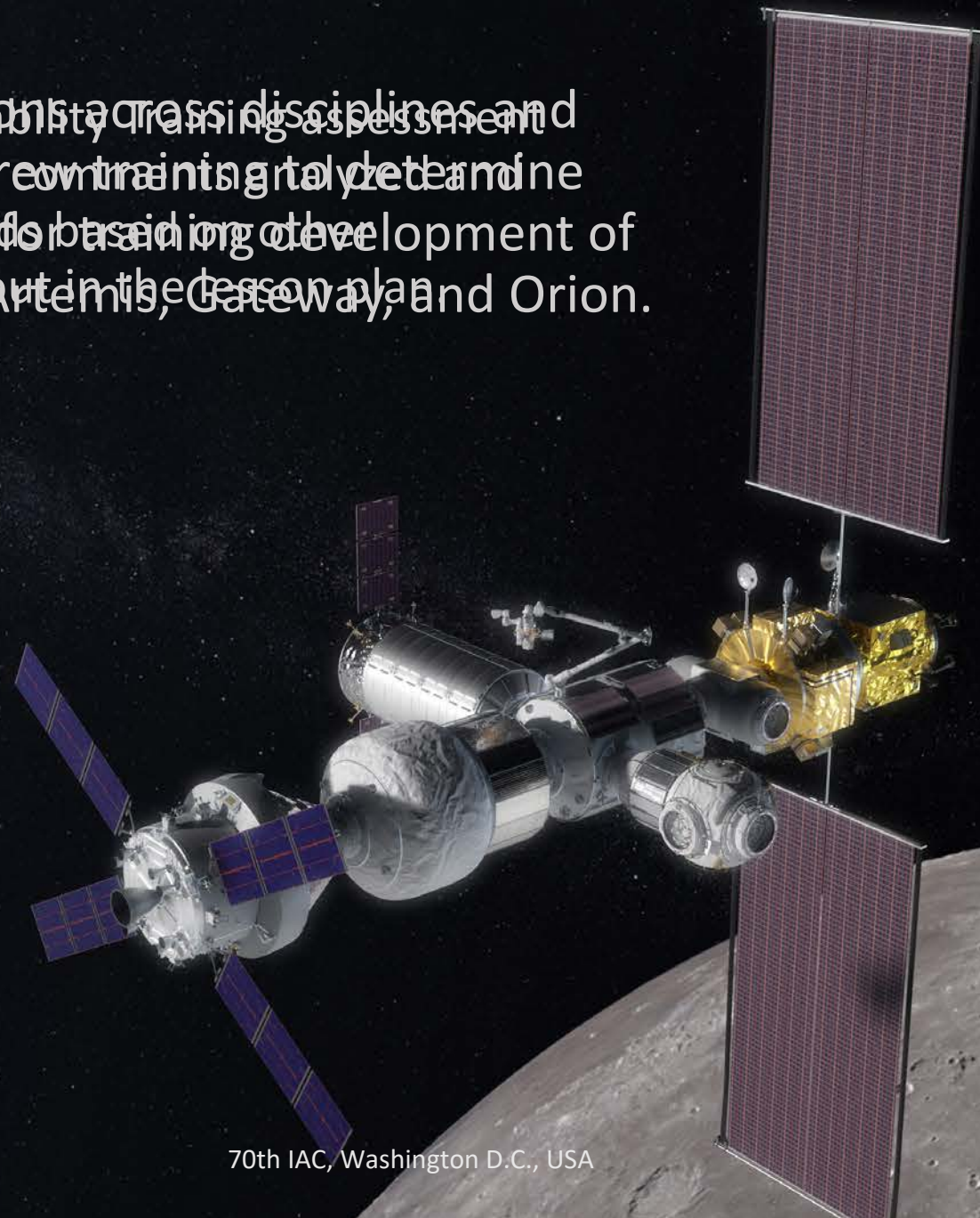
# Conclusions

**Successful proof of concept used Crew Comments Database to assess Habitability, Equipment, and Procedures revisions to determine impacts of training on crew operations.**

- Operational comments provide insight into training success, while training comments trended towards suggested improvements.
- The expansion of the ISS did not show a trend towards decreasing All Comment Score.
- Declining performance trends were found in revisions with the addition of Individual Hardware Objectives.
- Optimal revisions time was found to be between 7-9 months and Greater than 12 months.

# Forward Work

Apply this method of lessons across disciplines and ISS systems that require crew training to determine selecting additional keywords based on development of Objectives for Skills such as Artemis, Gateway, and Orion.



# Acknowledgements



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# Questions

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