IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

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IDENTIFYING AND CHARACTERISING PERSONAL "STYLES" ON EVA OPERATIONS.

Abstract

Purpose Extra-Vehicular Activity (EVA) is one of the most challenging activities for astronauts. We postulate that observing astronaut's movements and body displacements during EVA may provide hints of their psychological state, whether there's stress or a normal condition. In order to do so, we first need to identify one's ordinary behavior on EVA. The purpose of this paper is to identify and characterize some of these EVA "styles".

Methodology In order to characterize EVA styles, we chose to focus on arms, as they're the most movement-shown body parts during EVA. We also chose to focus on feet, as these extremities perform maximum amplitude during body displacement. We carried out a qualitative observation and movement description. We also time arm movements and count body displacements in 3 times 20 seconds randomly chosen within the video segment (e. g. Rapid arms movement for 5 seconds, four body displacements in the 20-seconds period). We chose the SAS exit video segment: starting on hatch opening and ending when the last astronaut leaves the SAS zone. Our source materials were integral spacewalk videos published by NASA on its social media. As this is an independent study based on public materials, complete anonymity is of course provided and we generically refer to astronauts with numbers. Each astronaut was observed on one to two EVA, we do not specify in order to avoid any possible identification. We carried out the study on a population of n=13.

Results Two different styles were identified, one slow (slow body displacements, arm movements are less frequents, arms stay closer to the body), one more dynamic (arm movements are frequently associated with body displacements, arm movements are more rapid). We must point out that one's EVA style characterization could be biased by comparing to the other teammate (e. g. someone who's very dynamic could make the other, who still is dynamic, seem slow. We feel this is a point to be aware of and pay attention to for future observations.

Conclusion These findings need to be defined and specified with a more detailed analysis. There are some elements we suggest to take into account for future research: sex, level of experience, different types of task, time spent in space (LEO), etc. We also aim to interview voluntary astronauts in front of videos of their work on EVA (what we call a "self-confrontation interview"), in order to conduct further analysis with them.