

Dressing space tourists for microgravity: Considerations for spacewear designers

Dr Barbara Brownie
The Royal College of Art, London, UK

Abstract

The commercial spaceflight sector provides identikit flight suits to commercial passengers on the assumption that they will want to imitate the appearance of astronauts. There are missed opportunities to offer clothing that is designed specifically with weightlessness in mind, and that meets the needs of space tourists, including the desire to observe the visible effects of weightlessness, and the desire for individuality and self-expression. This paper will outline the ways in which commercial spaceflight providers need to more thoroughly consider the range of spacewear options available to their clients, and some considerations for the design of new spacewear.

The clothing needs of spaceflight participants

Commercial spaceflight providers offer passengers a range of branded, form-fitting flight suits, inviting them to 'dress-up' as astronauts. The design of these flight suits is informed by the design of professional astronauts' flight suits, which are in turn informed by designs for pilots during the jet age. While there has been considerable investment in these garments, their overall form does not sufficiently take account of passengers' needs and motivations for space travel, including:

- The desire to observe the effects of weightlessness on their body and surrounding objects;
- The desire to make visual records of their experience of weightlessness;
- The desire for self-expression.

While options for COTS routine wear made available to astronauts on board the ISS do offer some personal choice, space tourists have different needs and engage in different activities during their flights.

Observations of the passengers of Inspiration4, as well as tourists on Earth, tell us that tourists want to record evidence of the conditions of their surroundings (e.g. selfies, video diaries). Further, participants of reduced gravity flights seek to experience the effects of weightlessness on their

own bodies and other objects (e.g. by letting their hair down while weightless). Existing form-fitting flight suits erase the effects of weightlessness, thereby depriving spaceflight participants of an opportunity to showcase these effects. Spacewear designers need to account for passengers' desire to make visible the effects of weightlessness through their clothing.

Considerations for spacewear designers

Existing research has established key considerations for the safety and practicality of flight suits. To date, aesthetic decisions made in spacewear design have been focused on surface design and features that do not alter the long-established form of the flight suit. Existing approaches adhere to design practices that have been established in Earth gravity, including designing for a body in anatomical position with priority given to the upright, front view of the garment.

Established approaches to apparel design on Earth focus on particular on drape – a product of gravity. While form-fitting flight suits are shaped to eliminate drape, weightlessness provides opportunities to exploit the absence of drape in more visible ways.

While there is a tendency to assume that advances in spacewear design must incorporate wearable technology or somehow represent technological advancement, this view detracts from opportunities to consider the form of the garment.

Conclusions

Spaceflight participants should be offered a wider variety of spacewear designs, including those designed with weightlessness in mind. Considerations for spacewear designers should include:

- Orientation, and the appearance of the garment from all angles;
- The ways that drape is affected by weightlessness and subsequent opportunities to for clothing to visibly evidence weightlessness.