



**ASTROWRIGHT**  
SPACEFLIGHT CONSULTING

# Fitness Program Basics



## General Overview

**ASTROWRIGHT** preflight fitness training



# Overview

## INTRODUCTION

Spaceflight is a high-energy activity that exerts a number of physical and mental stresses on human participants.

By reviewing the basics of spaceflight and the stresses spaceflight imposes upon participants, the role and potential benefits of preflight fitness conditioning will be made clear.



## WHAT IS SPACEFLIGHT?

Spaceflight is the process of launching, via spacecraft, from the Earth's surface and out of the majority of the planet's atmosphere. There are a number of different ways to achieve spaceflight, but most involve the use of rocket engines to thrust a space capsule or spaceplane to an altitude of greater than 50 miles.

The physical stresses involved in this process include extreme acceleration (launch) followed by free-fall (microgravity) and extreme deceleration (reentry), which affect the cardiovascular system, sense of orientation and locomotion.

## CAN I FLY TO SPACE?

With only a few exceptions, the answer is a resounding “yes!”

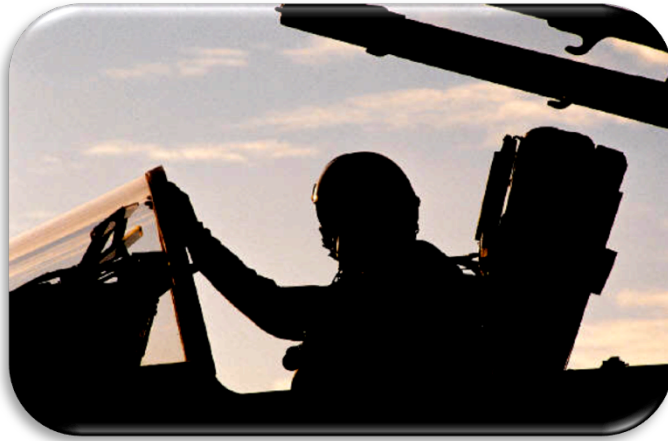
Ordinary men, women, and adolescents are in nearly all cases physically able to withstand the rigors of spaceflight. However, a participant's enjoyment will depend greatly upon fitness level. While one does not need to be an athlete to enjoy a spaceflight, taking a little time to enhance cardiovascular health and physical strength prior to a flight will greatly help to improve the quality of the experience and **maximize your time in space.**



# Stresses of Spaceflight

## PHYSICAL STRESS

One of the primary physical stresses of spaceflight is a result of **extreme acceleration**. You may have heard this referred to as “**g-forces**,” which relates the feeling of acceleration to the feeling of gravity pulling toward the Earth.



For example, if one were to accelerate quickly enough so that the feeling of being pushed back into a seat was twice as strong as the force of gravity pulling down, that would be called experiencing two “g’s” of force backward, or in the “g-x” direction. Most spaceflights will involve the experience of many g’s of force, which affects the ability of participants to comfortably function and move.



## DISORIENTATION

Because our bodies are adapted to conditions on Earth, we rely on gravity for a sense of orientation and up-and-down. However, once nearing apogee (the highest point in a suborbital flight) or achieving full orbit (perpetual free-fall around the Earth,) spaceflight participants enter a condition of apparent weightlessness called “**microgravity**,” where what the eyes see and what the inner-ear experiences may conflict, leading to disorientation.

In extreme cases, this effect may lead to **space motion sickness**, or SMS.

At a cost of many thousands of dollars per minute, time spent recovering from the physical strain of spaceflight is costly both in terms of money and the overall spaceflight experience, which preflight fitness training may help to reduce.



# Stresses of Spaceflight



## MENTAL STRESS

Many feel traveling to be a stressful experience under ordinary circumstances. Spaceflight, as an unfamiliar, high-speed, high-energy, high-cost experience, may be considered an even greater source of travel stress, even if only at the subconscious level. This may lead to reduced attentiveness, distraction, and at the very least, reduced enjoyment of the spaceflight experience.

## PREFLIGHT ANXIETY

In addition to the mental stress involved in space travel, the knowledge that spaceflight is a potentially high-risk activity involving a healthy degree of physicality may inspire unwanted feelings of anxiety.

Increased physical strength and improved cardiovascular health will help participants to manage mental stress, while regular exercise can actively reduce mental stress and anxiety. Further, training prior to a spaceflight will help to develop a sense of preparedness, which will ease feelings of stress and anxiety.



**In helping spaceflight participants to manage and reduce both physical and mental stresses, preflight fitness training represents a significant value added to the substantial investment represented in securing a spaceflight.**





## SPACEFLIGHT FITNESS TRAINING

Conventional fitness training, which is frequently and incorrectly employed as preflight fitness training, neglects stabilizer and core muscle groups that are used during spaceflight but that are ordinarily weak due to the presence of gravity.

Due to the unique nature of “weightless” and high-g fitness training, the idea of “points of stability” while exercising is particularly important. Under ordinary gravity conditions we usually benefit from two or more such points of stability from which to initiate motion, (e.g., two legs in contact with the ground.) However, those in a microgravity environment regularly benefit from only one point of stability, (e.g., handhold,) or none at all (free-floating).

**Therefore, fitness training that takes advantage of reduced points of stability will most effectively condition trainees for movement in the spaceflight environment.**



## POINTS OF STABILITY

While research suggests that zero-stability-point training is ideal for microgravity fitness conditioning, (e.g., swimming, indoor skydiving,) not everyone has access to a swimming pool with aquatic fitness equipment or an indoor jet turbine.



Consequently, portable, single-stability-point exercise systems, such as the **TRX® Suspension Trainer**, are ideally suited to help spaceflight participants develop muscles utilized during their flight.

**Appropriate training is especially important considering that microgravity movement is the leading cause of injuries to NASA astronauts while in space.**



# Training Options

All participants in an Astrowright fitness program will be delivered an at-home, portable **TRX® Suspension Training System** for personal use. As a truly customized fitness experience, Astrowright instructors will then utilize the strength, cardiovascular, and balance exercise techniques **most convenient for your fitness and comfort level**, whether this involves designing simple, at-home resistance exercises or setting up workouts that may be performed in the office or hotel.

## DISTANCE TRAINING

The primary method of delivery for Astrowright's fitness training is via Internet video, which requires no travel and affords maximum flexibility to incorporate training into your daily routine.

Requirements for participation in this training program are simply an Internet connection, a video-enabled computer or smartphone (with camera), and access to internet video software or applications (e.g., Skype).



## IN-PERSON TRAINING

For those seeking more hands-on training, contact our representatives for in-person training options at our headquarters in Las Vegas, NV.

Enhanced fitness packages, including the use of local, state-of-the-art fitness and wellness facilities, are available upon request. Additionally, customized programs for larger groups, corporations, or institutions are also available.

Please direct inquiries to [info@astrowright.com](mailto:info@astrowright.com).



# Training Products



## WHAT DO I GET?

Included with all Astrowright fitness packages is a **TRX® Suspension Training Pro Kit** and **Door Anchor** for personal use, with a **customized, at-home fitness plan** developed specifically as a result of our initial consultations with you and based on your level of physical fitness, health history, and spaceflight fitness goals.

This plan includes a list and description of specific assigned exercises, tips and notes on how best to perform them, and a schedule developed to help you reach your fitness goals prior to your flight.

Also included is a packet of **spaceflight reference material** intended to assist in the preparation of your own experience, along with an **Astrowright fitness tee** and **flight patch**, (suitable for use on or off world.)

Finally, for those seeking additional spaceflight preparedness credentialing, participation in an Astrowright fitness program qualifies participants to **test for Flight Readiness Status (FRS)**.



FRS certification is geared toward spaceflight professionals and incorporates cognitive tests with industry-standard fitness benchmarks to demonstrate a certificate-holder's ability to withstand the physical and mental rigors of spaceflight while performing thoughtful, complex tasks.



# Testimonials

## WHAT OTHERS ARE SAYING ABOUT THE PROGRAM:

“The Astrowright Preflight Fitness course was great. The course was tailored for my individual fitness ability and requirements. Over a number of weeks, the Astrowright team helped me to build muscle strength and improve my stamina for upcoming large G-loading environments. The daily routines they created were manageable and fitted into my busy schedule. I quickly noticed visible signs of improvement. Astrowright even supplied the TRX exercise equipment that made exercise easy and enjoyable.

The team was professional, friendly and knowledgeable. The course they have designed will stand me in good stead for future high-G and suborbital spaceflights. I highly recommend this course!”

- **Dr. Constantine Tsang, Planetary Scientist**  
Boulder, CO

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“The Astrowright training program for flight fitness has been a revelation for me. I have never been involved with any physical program that so thoroughly explored every muscle group. The biggest surprise is that it has been fun! ... The TRX equipment is fantastically effective and extremely well- designed. It is also elegantly simple; one uses straps and his/her own body weight to provide resistance.

In eight weeks I have lost very little weight but have lost two inches off of my waist and GREATLY increased my muscle mass, strength, and endurance. ... In all, the TRX system is ingenious in its simplicity, and it is ideally suited for preparing a person for any physically-challenging activities, such as spaceflight. I am excited to be part of Astrowright’s training program!”

- **Dr. Richard M., Music Professor**  
Las Vegas, NV





## Fitness Director



**Ashley A. Onstott**  
**M.Sc., NASM-CPT, ACE-CPT**

A scientist, artist, fitness specialist and nationally-acclaimed personal trainer, Ashley is the driving force behind Astrowright's pioneering spaceflight fitness program.

With degrees in Ballet (B.F.A.), Anthropology (B.S.) and Exercise Science and Health Promotion (M.Sc.), and with certifications from the American Council on Exercise and the National Academy of Sports Medicine, she brings a unique, interdisciplinary perspective to the issue of spaceflight fitness.

Since beginning her fitness career in 2001, Ashley has successfully trained numerous types of people representing the full spectrum of fitness backgrounds and goals, from NASA personnel and astronaut candidates to toddlers and the elderly. Additionally, she has worked with many special populations, including prenatal women, professional athletes, and those suffering from advanced Parkinson's Disease.

"Everyone can and should be exercising! There are very few conditions in which exercise in some way, shape or form is harmful. The secret is in knowing how to work the body without worsening the condition. Over the years I have worked with clients with numerous kinds of injuries, illnesses and conditions, and the bottom line is that everyone felt better with exercise."





## For More Information

### TRAINING INFO, SCHEDULING & PURCHASING

For more information about the **TRX® Suspension Training System**, Astrowright fitness plans, or other Astrowright services, visit our website at [www.astrowright.com](http://www.astrowright.com).

To purchase/schedule your preflight fitness training, please email us at [info@astrowright.com](mailto:info@astrowright.com), or email our fitness director directly at [ashley.onstott@astrowright.com](mailto:ashley.onstott@astrowright.com).

Contact us today, and let Astrowright help you get fit to fly!



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