Developing Astronauts4Hire: The First Two Years

Brian Shiro[1,2] and Jason Reimuller[1,3]
([1]Astronauts for Hire, Tampa, FL; [2]NOAA, Ewa Beach, HI, [3]Integrated Spaceflight Services, Boulder, CO)

Summary: Astronauts for Hire is a 501(c)(3) non-profit formed in April 2010 to recruit and train qualified scientists and engineers for the rigors of spaceflight [1]. Commonly referred to as "Astronauts4Hire" or just "A4H," the organization conducts a range of activities related to commercial astronaut workforce development. A4H's principal service is to train its members as professional astronaut candidates who can assist researchers, payload developers, and spaceflight providers with mission planning and operations support.

Background: Companies such as Virgin Galactic and XCOR will soon carry passengers on suborbital spaceflights. These passengers will range from tourists paying for the privilege of the experience to scientists and educators carrying out experiments in the unique environment of space [2,3]. While some researchers will train to fly their own experiments firsthand, many may not wish to subject themselves to the risk or liability of flying on experimental spacecraft. Also, some researchers may not be medically qualified to fly, don't have the time or funding to undergo spaceflight training, or their expertise may be needed on the ground monitoring telemetry. For these and other reasons, there is a market for a highly-trained commercial astronaut crew service who can work with researchers and flight operators to ensure payloads fly successfully.

A4H Members: A4H is a volunteer-based membership organization. As of December 2011, it consists of 20 Flight Members and a quickly growing number of Associate Members currently totaling 58. A4H Flight Members are established professionals representing a wide range of disciplines in engineering, life, and physical sciences, and are selected on a competitive basis. It is necessary to keep this group relatively small to maintain a high degree of quality control on the astronauts A4H can offer to clients but large enough to ensure sufficient diversity of skills to meet the needs of any prospective client. Several A4H Flight Members were interviewees or highly qualified applicants in recent NASA, CSA, and ESA astronaut selections.

A4H Research: A4H has partnered with a number of academic and industry groups. These partnerships expand the training, research, and operational capabilities of the organization. A4H has already secured two contracts to carry out research on parabolic microgravity flights. In February 2011, A4H completed its first contract testing the physiological effects of alcohol absorption in microgravity [4]. In May 2012, A4H will complete its second microgravity research flight testing biometric monitoring hardware [5] through NASA's Flight Opportunities Program [6]. A4H has other projects at various stages of development, and expects to support research projects onboard both suborbital and orbital missions in the future.

A4H Training: Under the guidance of an advisory team consisting of former NASA astronauts and astronaut instructors, A4H has developed a comprehensive training program to qualify its members to serve in multiple capacities on repeated space flights and mission profiles [7]. Safety and performance are the cornerstones of the A4H training philosophy. We have identified three primary roles that commercial astronaut crewmembers will likely be asked to fill in the foreseeable future. These include Research Specialist Astronauts (RSA), Operations Specialist Astronauts (OSAs), and Pilot Qualified Astronauts (PQAs). RSAs are analogous to NASA's payload specialists and will be responsible for the successful operation of scientific experiments. OSAs fill the role of flight operations engineers analogous to NASA mission specialists and will be qualified to operate a variety of spacecraft systems, manage in-flight contingencies, and support a myriad of non-pilot duties as flight crew. PQAs operate the vehicle. An initial class of seven A4H members completed core RSA training elements in Summer 2011, and the first group of fully certified A4H OSAs and RSAs will be announced by mid-2012.

Discussion: Going forward, A4H will continue to serve the needs of the scientific community through the recruitment and training of astronaut candidates, functioning as a body that certifies professional astronauts much like the National Association of Underwater Instructors (NAUI) certifies professional SCUBA divers [8]. Simultaneously, as a Research and Education Affiliate member of the Commercial Spaceflight Federation [9], A4H will continue to support activities that advance space education and development.

References: [1] www.astronauts4hire.org. [2] Sanderson, K. (2011). Commercial space flight: Scientists in space, *Nature*, **476**, 477-478. [3] Matthews, J. (2010). Suborbital research to hitch a ride on commercial space cruisers, *Physics Today*, **63**:10, 28-30. [4] Held, J., et al. (2011). Vostok Space Beer: The first beer recipe designed for drinking in microgravity, *2nd Next Gen Suborbital Res Conf*. [5] Komatireddy, et al. (2012). Noninvasive Biometric Monitoring of Spaceflight Participants, *3rd Next Gen Suborbital Res Conf*. [6] flightopportunities.nasa.gov. [7] Seedhouse, et al. (2012). Commercial Scientist-Astronaut Medical and Training Certification, *Aviat Space Env Med*, In Prep. [8] www.naui.org. [9] www.commercialspaceflight.org.