Life Science on the International Space Station using the Next Generation of Cargo Vehicles

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With the retirement of the Space Shuttle and the transition of the International Space Station (ISS) from assembly to full laboratory capabilities, the opportunity to perform life science research in space has increased dramatically, while the operational considerations associated with transportation of the experiments has changed dramatically. US researchers have allocations on the European Automated Transfer Vehicle (ATV) and Japanese H-II Transfer Vehicle (HTV). In addition, the International Space Station (ISS) Cargo Resupply Services (CRS) contract will provide consumables and payloads to and from the ISS via the unmanned SpaceX (offers launch and return capabilities) and Orbital (offers only launch capabilities) resupply vehicles. Early requirements drove the capabilities of the vehicle providers; however, many other engineering considerations affect the actual design and operations plans. To better enable the use of the International Space Station as a National Laboratory, ground and on-orbit facility development can augment the vehicle capabilities to better support needs for cell biology, animal research, and conditioned sample return. NASA Life scientists with experience launching research on the space shuttle can find the trades between the capabilities of the many different vehicles to be confusing. In this presentation we will summarize vehicle and associated ground processing capabilities as well as key concepts of operations for different types of life sciences research being launched in the cargo vehicles. We will provide the latest status of vehicle capabilities and support hardware and facilities development being made to enable the broadest implementation of life sciences research on the ISS.

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