Canadian Technologies for the WFIRST Coronograph; the next US Astronomy Flagship Mission

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ABSTRACT

Canada has been a prime contributor to one of the greatest space endeavor of the last decade; the construction of the James Webb Space Telescope which is awaiting its 2018 launch. By providing key optical-IR instrumentation to the observatory it established itself as a dependable partner for such breakthrough missions set to dramatically change our view of the universe. With the recent unexpected offering of a pair of Hubble-sized spy telescope, NASA is planning to repurpose one to explore a new rapidly evolving field mostly unknown at the time of defining the JWST; exo-planets characterization. Although the primary goal of the Wide-Field InfraRed Survey Telescope (WFIRST) is to study the dark energy distribution thanks to a field of view about a 100 times that of Hubble, it will also carry a very special auxiliary payload capable of blocking a star's light in order to get a first true look at nearby foreign "solar systems". The list of potentially observable exo-planet candidate is expanding at an unprecedented pace nowadays. Numerous enthusiast teams around the world have or are developing instruments capable of discovering smaller and smaller candidates located further away from their parent stars down into the "habitable zone" where life as we know it could exists. By the time WFIRST is launched into orbit it is expected that a long list of a few thousand exo-planets some earth-like will be awaiting their first portrait.

Canada has a unique heritage into exo-planetary imaging having produced the first image of a multi- planetary system using a mix of coronography and special image processing technique. Combining the strengths of eminent scientists and space optics industry, Canada is offering to take on the leadership of the imaging devices and spectral analysis hardware behind the US coronograph. This contribution shares strong similarities with other non-astronomical prospective Canadian mission by building on two Canadian Signature Technologies: photon counting EMCCD cameras and hyperspectral imaging. While the former is considered for a Sapphire successors or an Asteroid Redirect Mission the latter technology is centric to missions like the Canadian Hyperspectral Mission (CHM), the PCW science payload and other proposed earth observation missions. We will present these potential contributions, how vital they are to the observatory and how progress on these can payoff for other domestic uses or exports.

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