Preliminary Design of Spacecraft Trajectories for Missions to Outer Planets and Small Bodies

by

Demyan Vasilyevich Lantukh, B.S.A.E., M.S.A.E.

DISSERTATION

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Dedicated to Gbenga Yomi Afolabi.

With just seven months of friendship, his joy for living, his willingness to trust, and his passion for the transforming message of Jesus Christ have left an indelible mark on my life. His life – lived to the full as Jesus promised in John 10:10 – has left ripples that will meet G in eternity, where he went before us July 17, 2012.

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Vita

Demyan Vasilyevich Lantukh was born in Ukraine and emigrated to the United States with his family at the age of three. As a result, he grew up somewhere between an ethnic Slavic community and a suburban Southern community outside Atlanta, Georgia.

After graduating Valedictorian of Milton High School, Demyan applied his passion for learning and his conviction to make the most of every opportunity by earning a B.S. & M.S. in aerospace engineering from Georgia Tech, where he also minored in French. Following through on living to the fullest included not only research in orbital mechanics and interning at the Applied Physics Lab Space Department, but also studying and traveling in Europe, teaching English in Africa, humanitarian work, personal mentorship, and most importantly spiritual development – following Jesus Christ.

Shortly after becoming a NASA Space Technology Research Fellow and beginning his PhD researching global trajectory searches, Demyan transfered to the University of Texas at Austin, continuing to work with Ryan Russell. During this time, Demyan completed a couple internships at the Jet Propulsion Lab, where his research on small body proximity operations began. The move to Texas began a difficult and rewarding period of Demyan's life, with challenges coming from the degree program and from numerous personal and community circumstances. By God's grace Demyan continued to pursue (though sometimes falteringly) excellence in research and a balanced life – a life that demonstrates love and leaves a legacy echoing to eternity.