

# Grant Bonin, M.A.Sc. (2009), B. Eng. (2007)

## Consortium Technologies, LLC

- "Ad Astra per Lucrum." -

### Education

#### **University of Toronto Institute for Aerospace Studies | M.A.Sc, Space Flight Lab**

Currently undertaking master's degree at UTIAS-SFL, which has been responsible for MOST (Canada's first microsatellite); the CanX series of nanosatellites; and is currently investigating nanosatellite missions to the moon and Mars.

#### **Carleton University | B.Eng, Aerospace Engineering**

Degree completed in 2007 with honours. Studies focused on space systems design; orbital mechanics; aerospace structures and materials; and nuclear engineering.

### Recent Experience

#### **Consortium Technologies | 2006-present**

*Chief Technical Officer:* CTO and co-founder of McLean, VA based company. Currently pursuing applications in thermal neutron elemental analysis, fast neutron radiography, and space systems and mission design opportunities.

#### **Dept. of Mechanical and Aerospace Engineering, Carleton University | 2006-2007**

- 2007: *Principal Investigator:* Cobalt-60 gamma irradiation testing of microsatellite components for Defense Research and Development Canada (DRDC).
- 2006: *Researcher:* Systems-level optimization of low-thrust solar electric propulsion systems.

#### **Carleton University Northern Reconnaissance Satellite (NORSAT) Project | 2006-2007**

*Project Manager:* Served as manager of microsatellite constellation and smallsat launch vehicle preliminary designs for strategic observation of the Canadian north. Also responsible for designing the satellite electrical power subsystem.

#### **4Frontiers Corporation | 2006-2007**

*Mission Design Engineer:* Lead analyst in 7-member Mission Development division of the 4Frontiers Corporation studying human Mars settlement. Duties included mission trade-off studies; launch vehicle economic analyses; and entry, descent and landing simulations and analyses. Contract position.

#### **Canadian Space Agency Advanced Life Support Working Group | (pending approval)**

Member of proposed ALS working group for Canadian Space Agency; led by Dr. Michael Dixon, Chair, University of Guelph Department of Environmental Biology. Pending CSA approval.

### Papers and Publications

#### **Refereed Journal**

- G. Bonin and T. Kaya, "End-to-End Analysis of Solar-Electric Propulsion Earth-Orbit Raising for Interplanetary Missions", *AIAA J. of Spacecraft and Rockets* (accepted for publication 1 March 2007).
- G. Bonin and T. Kaya, "Human Venus Exploration using Piloted Flybys and Telerobotics", *J. of the British Interplanetary Society* (accepted for publication 3 July 2007).
- G.R. Bonin, "Initiating Piloted Mars Expeditions with Medium-Lift Launch Systems, *J. of the British Interplanetary Society*, Vol. 58, pp. 302-309, September/October 2005.

#### **Full Paper Refereed Conference**

- G. Bonin, E. Stevens and J. McKee, "A Novel Fundraising Proposal for Alternative Energy Research and Development", AIAA-2007-4783, *5th International Energy Conversion Engineering Conference and Exhibit*, June 25-27, St. Louis, MO, 2007.

### **Book**

- G. Bonin, "A Medium Lift Launch Vehicle Architecture for the Vision for Space Exploration", in *On to Mars II*, F. Crossman and R. Zubrin, ed., Apogee Books, 2006.

### **Opinion Essays**

- G. Bonin, "The Case for Smaller Launch Vehicles in Human Space Exploration", *The Space Review*, 3 January 2006 (part 1) and 9 January 2006 (part 2).
- G. Bonin, "Of NASA and NewSpace", *The Space Review*, 7 August 2006.

### **Abstract Refereed Conference**

- G. Bonin, "Sensitivity and Trade Studies for Mars Cargo and Crew Transportation", Proc. of the 26<sup>th</sup> International Space Development Conference, Dallas, Texas, May 25-28 2007.
- G. Bonin, "Reaching Mars for Less: Human Mars Expeditions with Existing Launch Vehicles", Proc. of the 25<sup>th</sup> International Space Development Conference, Los Angeles, CA, May 4-7 2006.
- G. Bonin and R. Hewer, "Physiological Issues in Human Space Exploration: Review and Proposed Countermeasures", Proc. of the 9<sup>th</sup> International Mars Society Convention, Washington, DC, August 2006.
- B. Irving, M. Paton, A. McSorley, and G. Bonin, "Virtual Prototyping of Human Mars Missions in the Orbiter Spaceflight Simulator", Proc. of the 9<sup>th</sup> International Mars Society Convention, Washington, DC, August 2006.
- G. Bonin, "Luna and Mars for Less: A Medium Lift Launch Vehicle Architecture for the Vision for Space Exploration", Proc. of the 7<sup>th</sup> International Mars Society Convention, Chicago, IL, August 2004.
- G. Bonin, "The Space Lottery", Proc. of the 7<sup>th</sup> International Mars Society Convention, Chicago, IL, August 2004.

### **Consultations and RFIs**

- G. Bonin and J. Wright, "Sustainable Long-Duration Lunar Exploration Vehicles that Lead to Mars", NASA ESMD RFI 06-0263, May 2006.
- G. Bonin, A. Fleming, et al., "Advanced Spacesuit Technologies", Canadian Space Agency Consultation on Priority Technologies, April 2006.

### **Selected Additional Articles**

- G. Bonin and D. Faber, "Return to the Moon: A New Mission for Canadian Astronauts", article in the *Canadian Space Gazette*, February 2007.
- G. Bonin, "Canada's Role in the Vision for Space Exploration", article in the *Canadian Space Gazette*, May 2006.
- G. Bonin, "The Underestimated Importance of Life Sciences in Human Spaceflight", article in *GearedUp*, December 2005.

- Carleton University Dean's List (A average), 2005-2006
- Invited Delegate (one of 180 worldwide), NASA Next Generation Exploration Conference, NASA Ames Research Center, 2006
- Cis-Lunar Working Group Spokesperson, NASA NGEC 2006
- Invited Keynote Speaker, SpaceVision 2006
- Chair, 2006 Canadian Space Summit
- Steering Committee Member, Canadian Space Agency 2006 Exploration Canada Workshop
- Board of Directors Member, Canadian Space Society, 2007
- Founder and past President, Carleton University Students for the Exploration and Development of Space (CUSEDs), 2005
- Director of Media Relations, SEDS Canada, 2006

## Affiliations and Memberships

- Chair, Engineering Communications, Ontario Engineering Competition, 2007
  - Vice President (Publications), Carleton University Student Engineering Society, 2005
  - Student Representative, *Ingenius* Carleton University Faculty of Engineering and Design Newsletter, 2006
  - Judge, University of Toronto Space Design Contest (UTSDC), 2006
  - Guest Lecturer, Carleton University Shad Valley Program, 2006
  - Past Provincial Public Speaking Champion, 2001
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- Canadian Space Society
  - Engineers Without Borders

## Software Skills

- Microsoft Office 1997-2007 Applications
- Satellite Toolkit (STK)
- NASTRAN Finite Element Analysis
- ProEngineer Wildfire Solid Modeling
- ProMechanica Finite Element Analysis
- AutoCAD
- MatLab and SimuLink
- Maple
- MathCAD
- C, C++, Visual Basic, and Fortran programming experience

## Applicable Practical Skills

- Metal shaping lathe
- Metallographic specimen preparation and microscopy
- Soldering
- Microcontroller programming

## Personal Interests and Hobbies

- Music (Guitar, Piano, > 10 years)
- Sports (Football, Baseball, Golf)
- Sailing (CanAm CL-16 Regatta, 2004 and 2005)
- Cooking
- Philosophy and Political Economy; North American and European History

## References

- Available upon request