John Schilling, Ph.D.

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SUMMARY:

Aerospace engineer with almost twenty years of experience working with the Air Force Research Laboratory, covering all aspects of advanced spacecraft propulsion and familiar with a broad range of aerospace and defense technologies. Have developed new thrusters from research and experimentation, through prototype development and testing, culminating in systems engineering of flight hardware and technology transfer to industry. Recent emphasis on mission-level systems engineering and performance optimization, finding the best path to substantial mission performance improvements over the state of the art. Proven track record for quickly identifying optimal solutions to complex technical problems.

World-class expert in spacecraft propulsion and maneuvering, concept to implementation

EXPERIENCE:

Chief Scientist **Silverbird Astronautics** **2008-2009**

Techical consulting, research and development in space technology and mission planning. Follow-on work to several AFRL projects, providing specialized expertise to small propulsion and spacecraft manufacturers.

- Low-thrust trajectory design for Earth orbit, Lunar, and deep space missions
- Propulsion system design and analysis, with emphasis on microsatellite deployment
- IHPRPT technology assessment.

Mission Analyst **ERC, Incorporated** **2004-2008**

Performed all mission analysis for Air Force Research Laboratory's advanced spacecraft propulsion branch. Recommended propulsion systems and mission profiles for present and future USAF space missions, evaluated proposed new propulsion technologies for future utility to the USAF, and provided general guidance on advanced propulsion R&D policy.

- Supported TacSat-2, Advanced EHF, MPX, FX-AIRSS and ISAT programs
- Developed "Beyond IHPRPT" goals and technology paths for spacecraft propulsion; will control USAF and NASA spacecraft propulsion R&D through 2029
- Coordinated development of hybrid ESPA orbital maneuvering system and high/low-thrust trajectory to enable NASA/AMES MAAT asteroid rendezvous mission,
- Guided Multi-Mode Propulsion BAA through source selection, $8 million cost savings
- Wrote key policy documents on AFRL spacecraft propulsion capabilities and requirements
- Evaluated new propulsion technologies for relevance to Air Force mission requirements
- Rapid turnaround of mission analysis requests; typically one week or less

Chief Scientist **White Engineering & Research** **1999-2004**

Conducted advanced propulsion research and development in a small-business environment. Wrote research proposals, interacting closely with government sponsors and industry/academic collaborators to ensure success. Performed subsequent research, development, and laboratory testing of prototype thruster systems, usually supervising a team of 2-4 engineers and laboratory technicians. Also provided rapid-response mission analysis support to AFRL propulsion directorate, as described above.

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- Three successful SBIR/STTR efforts from proposal through Phase II, $2.5 million total revenue
- Member of TechSat-21 spacecraft development team, propulsion & formation flying
- Member of science team for ESEX flight experiment, identified key plume/spacecraft interactions
- Developed proprietary low-thrust trajectory optimization software
- On-call mission analysis in support of Air Force Research Laboratory
- Invented, developed, and tested micro pulsed plasma thruster, flown on FalconSat 3 spacecraft
- Developed and tested arcjet-neutralized Hall Thruster and diamond-insulated Hall Thruster
- Supported development of electrically controllable, extinguishable, and restartable solid rocket

Research Engineer **Sparta, Inc. (now Spiral)** **1997-1999**

Supported ground testing of advanced propulsion systems at Air Force Research Laboratory, working at a post-doctoral level. Worked with arcjets, Hall effect thrusters, and pulsed plasma thrusters. Conducted mission analysis tasks and wrote presentations supporting AFRL propulsion R&D efforts.

- Upgraded legacy thrust stand, from milliNewton to microNewton accuracy
- Wrote command and telemetry software for ESEX flight experiment
- Developed propulsion architecture for TechSat-21 and MightySat II.1 spacecraft

EDUCATION:

Doctor of Philosophy **Astronautical Engineering** **University of Southern California**
Dissertation: "Development of the Micro Pulsed Plasma Thruster", under Dr. Daniel Erwin
Coursework in spacecraft propulsion, space mission analysis & design, plasma physics
Laboratory experience with optical diagnostics, pulsed electron beams, arcjet thrusters

Bachelor of Science **Aerospace Engineering** **University of Texas at Austin**
Emphasis on astronautics and hypersonic aerodynamics

SKILLS:

- Extensive knowledge of advanced in-space propulsion systems, including ion thrusters, plasma thrusters, and arcjets. Familiar with research, development, testing, spacecraft integration, and flight operations. Have worked with all major US players in advanced spacecraft propulsion field.

- Space mission analysis and planning, particularly including the use of advanced propulsion systems. Strong knowledge of orbital mechanics, with emphasis on low-thrust trajectory optimization.

- Launch vehicle system design and engineering, particularly performance analysis for payload delivery beyond Low Earth Orbit. Familiar with current and emerging space launch systems. Launchspace™ professional training in Launch Vehicle Systems Design and Engineering

- Plasma dynamics, rarefied and high-energy gas dynamics, with particular emphasis on Monte Carlo and Particle-in-Cell numerical methods.

- Veteran laboratory engineer, with experience in vacuum systems, test instrumentation, optical diagnostics, plasma diagnostics, and laboratory automation.

- Scientific programming in Fortran, C, C++, and LabView.

SECURITY: Clearance: Secret Grant Date: December 1998 Citizenship: USA

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