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Media Kit

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ECLIPTIC ENTERPRISES

Bringing Space home. When your mission depends on it.

Accomplished space systems engineering.

What sets Ecliptic apart in the evolving commercial aerospace industry is the fact that every member of our engineering staff has worked on actual missions.

To date, our team of accomplished space systems engineers has accumulated extensive experience on over 80 actual space projects (not just studies) as members of the core design and execution teams for 63 Earth-orbiting spacecraft and 11 deep-space missions, four Shuttle-based missions/payloads, and the development of the Pegasus rocket. *(See chart, next page.)*

Our senior managers have also been Vice Presidents and project leaders at leading organizations such as the Jet Propulsion Laboratory, Orbital, EarthWatch, QUALCOMM, SpaceDev, SkyLink, Microcosm, CrossLink, and AMSAT.

And various members of our staff have won major awards or hold key patents, including...

> World-renowned small-satellite and telecommunications regulations expert **Jan King**, a co-recipient of a prestigious 1991 National Medal of Technology, personally presented by then-President George Bush to the Pegasus launch vehicle technical team at Orbital Sciences Corporation. Among other honors over the years, King also received the 1980 John T. Chambers Award from the worldwide amateur radio ("ham") community for his contributions to the state-of-the-art in VHF, UHF, and microwave communications via amateur satellite during the previous decade.
>
> Space-mission engineer and systems architect **Rex Ridenoure**, co-recipient of a distinguished 1999 Laurel Award from *Aviation Week & Space Technology* magazine, for playing a key role in the salvage of the *HGS-1* comsat through a trajectory technique that made it the first commercial spacecraft to reach the Moon's distance.
>
> And space avionics expert **Doug Caldwell**, recipient of three JPL awards in 1999 for significant contributions to the pioneering, ion-propelled *Deep Space One* spacecraft project, among others over the years.

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Missions Worked by Ecliptic Staff (1960s to present)

Earth-Orbiting Spacecraft Missions (63 total)

AMSAT OSCAR-6
AMSAT OSCAR-7
AMSAT OSCAR-8
AMSAT OSCAR-10
AMSAT OSCAR-13
AMSAT Phase 3-A
Anik-C
APEX
ASUSat
ATS-F6
Australis OSCAR-5
~~CHIPSat~~
COSPAS/SARSAT (several)
CS-A1
DOVE OSCAR-17
EarlyBird
ERS 1
ERS 2
ESA-GEOS
EYESat
FalconSat
Globalstar-4
Hubble Deployment Mission
IMP-I8
INTASAT
ITAMSAT
Landsat 2
Landsat 3
Landsat 4
Landsat 5
LEASAT-1
LEASAT-2
LEASAT-3
LEASAT-3 Salvage
LEASAT-4
LEASAT-5
LUSAT OSCAR-19
~~MOST~~
New Millennium Earth-Orbiting 1
NuSAT
OAO-C2
ORBCOMM
ORBCOMM-X
OSO-I8
OSP-1
OSP-2
PACSAT OSCAR-16
QuickBird-1
RADARSAT-1
RCA-A1
RCA-A2
SBS-1
SeaStar
SMM-MMS
SPOT 1
SPOT 2
SPOT 3
Starshine-1
STRV-1D
SURFSAT
UNAMSAT
UoSAT OSCAR-9
Weber OSCAR-18

Deep-Space Missions (11)

AsiaSat-3/HGS-1 Salvage
New Millennium Deep Space 1
New Millennium Deep Space 2 Microprobes
Mars Global Surveyor 96 Camera
Mars Observer Camera (MOC)
Galileo/Jupiter Orbit
Voyager 2/Neptune Encounter
Voyager 1/Interstellar Mission
Voyager 2/Interstellar Mission
Viking 1
Viking 2

Shuttle-Based Missions/Payloads (4)

Hubble Servicing Mission
Citizen Explorer (HAM radio)
First Chinese Get Away Special
USAF Get Away Special

Rocket Development Efforts (1)

Pegasus

Note: Projects ~~underlined~~ are active but have not been launched.

Ecliptic Enterprises Staff Expertise, 1996-present

- **Earth-Orbiting Spacecraft Missions**

  Broadband and messaging satellite constellations (system architecting/engineering), commercial remote-sensing services (ground-segment infrastructure), science microspacecraft (design, engineering, testing), AMSAT spacecraft (design, engineering, testing), technology-demonstration missions (design).

- **Deep-Space Missions**

  Private Mars missions (TT&C architecture, project review and engineering); Mars 2003 lander (electrical ground support equipment design, engineering); 2005 *Mars Reconnaissance Orbiter* proposal support; commercial lunar missions (system architecting/engineering, prototyping); *Mars Ascent Vehicle* project (project management, system studies); *Mars Sample Return* project (system studies); Mars science micro-missions (system design, engineering); commercial asteroid missions (system architecting/engineering); New Millennium *Deep Space 1* project (project engineering, system design, engineering, testing); Mars mission imaging instruments (design, engineering, assembly, test); *AsiaSat-3/HGS-1* salvage mission (mission architecting); technology demonstration missions (design); New Millennium Program (program architecting).

- **Launch Services**

  Live onboard video systems for rockets (RocketCam™), launch system avionics (architecting, engineering), launch range infrastructure (engineering), secondary payload launch services (system design, engineering), and launch service contracting (contract negotiations).

- **Other**

  Astronomical imaging instruments (design, engineering, assembly, test), autonomous Antarctic science stations (design, engineering, assembly, test), teaching space systems design and engineering, and teaching business accounting and ethics.

For more information, please contact:

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[2002 June]

ECLIPTIC ENTERPRISES

Bringing Space home. When your mission depends on it.

Recent Ecliptic Clients and Projects

Ecliptic Enterprises produces data-transport systems and onboard imaging systems for use with rockets, spacecraft and other remote platforms.

Ecliptic has the breadth and depth of expertise and industry contacts to tackle your project's system challenges. Below are examples of solutions provided to some of our recent projects and clients.

***Delta II, Delta III, Delta IV*: RocketCam™ onboard imaging systems**

Client: Boeing Launch Services

Ecliptic supplies Boeing with ruggedized full-color onboard video cameras for all of its expendable launch vehicles – and for *Delta II* and *Delta III*, all other onboard equipment required to get the video signal to the ground (S-band transmitter, antennas, power supplies, harnesses, etc.). Since 1997, seventeen Boeing rockets have carried these systems to orbit with 100% success. Look for the RocketCam™ debut on *Delta IV* in mid-2002!

***Atlas 2, Atlas 3, Atlas 5, Titan IV, Shuttle/External Tank*: RocketCam™ onboard imaging systems**

Client: Lockheed Martin Astronautics

Ecliptic supplies LMA with ruggedized full-color onboard video cameras and telecom equipment for all of its expendable launch vehicles. Since 2000, three LMA rockets have carried these systems to orbit with 100% success. Look for the RocketCam™ debut on *Atlas 5* and *Shuttle* in mid-2002!

***Mars Exploration Rover*: Robotic arm electrical test equipment**

Client: Alliance Spacesystems, Inc.

For Phase 1 of this effort, Ecliptic defined the requirements and baseline design for the complex electrical test equipment needed by ASI for testing the robotic arms for NASA's 2003 *MER* mission, which they were building for JPL. This equipment had to serve as an emulator of sorts for the *MER* avionics well before ASI's arms were ever mated to the rovers (2) at JPL – providing flight-like hardware interfaces, software functionality, fault protection and

command/telemetry functions. Ecliptic also designed test equipment for a movable lens cover for the imaging system on the robotic arm. For Phase 2, Ecliptic fabricated and delivered four sets of test equipment, including an extensive user's manual and set of engineering documentation.

Confidential projects: Telecom system analysis and design

Client: QUALCOMM

Ecliptic supported QUALCOMM at their San Diego facilities in a variety of technical roles, including space-related telecom system architecting, telecom system design and analysis, FCC regulatory analysis, technical due diligence, patent applications and strategic planning.

***CHIPSat* spacecraft: Telecom subsystem development support**

Clients: SpaceDev, Inc. and University of California, Berkeley

Ecliptic was put on contract by both organizations to troubleshoot the telecommunications subsystem design for this NASA-sponsored UV-astronomy small spacecraft (first in its University Explorer program, UNEX), assisting with the design development effort, prototype circuit-board fabrication process and subsystem test program planning. Working on-site at SpaceDev for several weeks, Ecliptic helped the CHIPSat development team recoup a significant project schedule deficit.

***Mars Reconnaissance Orbiter*: Proposal support.**

Client: Spectrum Astro

Ecliptic supported Spectrum Astro on-site at their Gilbert, AZ, facility in the definition of the deep-space telecommunications subsystem design (including deep-space navigation) for their proposed 2005 *MRO* spacecraft concept, responding to a formal RFP from JPL. Ecliptic staff also performed an independent validation of the firm's telecom subsystem analyses and related mission-engineering trades applied to this proposal effort.

***Mars Ascent Vehicle,* Proposal support.**

Client: ATK/Thiokol Propulsion

Ecliptic supported the Thiokol-led proposal team in the definition of the overall avionics and telecommunications architecture approach for their 2007 *MAV* vehicle concept, responding to a formal RFP from JPL.

Near-Earth Asteroid Tracking (NEAT) system: Troubleshooting support

Client: Jet Propulsion Laboratory

Ecliptic supported the Principal Investigator at JPL with system troubleshooting of the NEAT camera installed at Mt. Palomar Observatory. In a few days, the problem was identified and a technical solution proposed and implemented, leading to rapid return of on-line observation status and minimal disruption of critical near-Earth asteroid search data acquisition.

Autonomous GPS Antarctic science station: System design

Client: Jet Propulsion Laboratory

In support of a JPL Principal Investigator's proposal efforts, Ecliptic completed a phase of system architecture definition and design upgrades for an existing trans-Antarctic science station network built and fielded in the late 1990s. Such stations are in many ways like a small spacecraft operating in a remote, hostile environment. Significant improvements to the station's power, thermal-control, data and telecom subsystem designs were identified.

Confidential project: Launch range infrastructure definition

Client: Commercial launch services firm

Ecliptic defined the requirements and end-to-end reference system design for all telemetry, tracking and command (TT&C) and telecommunications infrastructure for a proposed new launch site. The effort included a short list of potential suppliers for all key hardware and software elements, a detailed project implementation schedule and a bounded implementation cost estimate, including risk assessment.

New Millennium Program, *Space Technology 7* project: Proposal support

Client: Jet Propulsion Laboratory

As part of NASA's New Millennium Program of demonstration missions for leading-edge space technologies, Ecliptic supported a JPL-led proposal team defining an end-to-end mission concept for demonstrating a viable, cost-effective aerocapture technology system for eventual use for the recovery of a sample-return capsule carrying geologic samples from Mars back to Earth. Ecliptic provided a reference ground segment/TT&C architecture and cost estimate for supporting this demo mission (conducted in a GTO Earth orbit) using commercial ground-tracking networks, commercial mission-control software and low-cost small-satellite project implementation methods.

***Team Encounter* private solar sail mission: Engineering of onboard imaging system**

Client: Team Encounter LLC

Ecliptic defined the technical requirements for the *Team Encounter* Solar Sail onboard imaging system, consisting of full-color video and still cameras and associated camera control, onboard data handling, compression and telemetry downlinking functions.

***Inaugural launch from Oklahoma Spaceport*: Onboard video system**

Client: Takeoff Technologies LLC

Ecliptic supplied a RocketCam™ full-color video camera to capture onboard video of the launch and ascent of the first vehicle to lift off from the new Oklahoma Spaceport in Burns Flat, OK. The vehicle, a *Dark Sky Station* high-altitude balloon platform provided by JP Aerospace, was unable to launch in spring 2002 due to high winds.

Mobile personal robot: RF system architecture

Client: idealab/Evolution Robotics

Ecliptic assessed design options for the telecommunications, RF-tracking and control systems for a prototype personal robotics product. Evolution Robotics unveiled its *ER1*—the world's first mass-produced automaton—in late May 2002.

***QuakerFinder 1* microsatellite: Attitude control system engineering**

Client: QuakeFinder LLC

Ecliptic assisted in the design of the attitude control system for this microspaceraft that will carry a specialized magnetic sensor to detect earthquakes from Earth orbit.

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[2002 June]

ECLIPTIC ENTERPRISES

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Our Senior Management & Engineering Staff

Rex Ridenoure

President, CEO and Co-founder

Rex Ridenoure has been a space-mission engineer and system architect on more than a dozen space missions, as well as a leader in the emerging market sector of commercial deep-space missions.

He is a co-recipient of a prestigious 1999 Laurel Award from *Aviation Week & Space Technology* magazine, for playing a key role in the salvage of the *HGS-1* comsat through a trajectory technique that made it the first commercial spacecraft to reach the Moon's distance.

Prior to co-founding Ecliptic, Ridenoure served as the Chief Mission Architect and Vice President of Payload Products for BlastOff! Corporation, which had developed the most mature commercial lunar mission (a lander/rover) to date.

In the late 1990s, he held senior positions for two commercial space companies: as Chief Mission Architect for SpaceDev, Inc., defining and developing new commercial deep-space and Earth-orbiting missions, and Manager of the Space Systems Division at Microcosm, Inc., defining and engineering low-cost space missions.

For eleven years, beginning in 1986, Ridenoure served as a mission and systems engineer at the Jet Propulsion Laboratory/California Institute of Technology in lead engineering roles on such distinguished projects as the pioneering, ion-propelled *Deep Space One* (Project Engineer), the New Millennium Program of advanced spacecraft (Program Architect), the *Lunar Observer* pre-project (Mission Engineer), the *Voyager* Neptune encounter (Mission Planner), and the ultra-low-cost Caltech/JPL SURFSAT (Project Manager). Also at JPL, Ridenoure managed several initiatives addressing low-cost deep-space missions using microspacecraft.

Prior to that, he spent a year as a research engineer for Utah State University's Center for Atmospheric and Space Sciences, where he gained hands-on experience with low-cost small satellites and Shuttle Get Away Specials, and taught space systems design for the university.

Collectively, Ridenoure spent five years with Hughes Aircraft Company's Space and Communications Group as a Systems Engineer, working on the *LEASAT* spacecraft program in 1982-85, and the *HS-376* spacecraft program in 1978-80. On the former, he gained extensive experience with design, integration, testing and mission operations on the first Shuttle-optimized

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spacecraft. On the latter, he was involved in mission and trajectory planning and crew procedures development for first Shuttle-deployed spacecraft.

In the early 1980s, Ridenoure served as a Crew Systems Engineer for Lockheed Missiles and Space Company's Space Systems Division on the *Hubble Space Telescope* program. While there, he also co-organized a proposed corporate astronaut office and served as a space-suited test subject for *Hubble* in-orbit servicing simulations.

Education: M.S. in Aeronautics, California Institute of Technology. B.S. (cum laude) in Aerospace Engineering, Iowa State University (Ames)

Jan King

Chief Technical Officer and Co-founder

One of the leading space telecommunications and systems engineers in the U.S., Jan King has been a member of the core design and engineering teams on nearly forty space missions – among them, ten large spacecraft (including several for NASA), 17 small satellites, and the innovative Pegasus winged rocket. He is also a recognized authority on the international space-frequency regulatory process and associated telecommunications implementation issues.

Significant of his standing in the Space community, King was a co-recipient of a prestigious 1991 National Medal of Technology, personally presented by then-President George Bush to the Pegasus launch vehicle technical team at Orbital Sciences Corporation. Among other honors over the years, King received the 1980 John T. Chambers Award from the worldwide amateur radio ("ham") community for his contributions to the state-of-the-art in VHF, UHF, and microwave communications via amateur satellite during the previous decade.

Prior to joining Ecliptic, he served as the Chief Technical Officer for BlastOff! Corporation. Before that, he spent two years as the Vice President for Space Engineering at SpaceDev, Inc., where he was responsible for commercial deep-space spacecraft design studies conducted for JPL and Boeing and provided the technical leadership that led to the company winning the contract for the *CHIPSat* extreme ultraviolet science mission spacecraft (the first in NASA's University Explorer program, UNEX) and worked closely with UC-Berkeley and the University of South Australia to establish a cooperative ground station system for the *CHIPSat* mission.

In 1997, he was appointed the Schriever Chair Professor in the Department of Astronautics at the United States Air Force Academy, where he taught for two years and directed the Academy's *FalconSat* small satellite project.

As the Vice President of Technology for QUALCOMM Corp. in 1995-97, King provided system-level engineering support for the *Globalstar* program, and worked closely with other consortium company members to plan and execute detailed inter-segment functional tests that verified ground station elements (using CDMA technology) with *Globalstar* flight and engineering-model payload equipment.

Beginning in 1989, he spent a total of seven years with Orbital Sciences Corp., first as the Director of their Space Technology Laboratory, followed by a promotion to Vice President of Boulder Operations. Besides managing up to 43 aerospace engineers developing space-rated equipment (including microsatellites and launch-vehicle components) for government and commercial customers, King supervised the development of avionics components for the Pegasus

launch vehicle and assisted in the early business development of Orbital Communications Corporation (ORBCOMM) and its FCC licensing process.

In 1982, he co-founded and served as Vice President for Space Engineering for Skylink Corporation – one of the original eight entities of the American Mobile Satellite Corporation, formed at the direction of the FCC. During the next seven years, his responsibilities included the engineering applications of two license applications filed with the FCC for the provision of Mobile Satellite Services. At the request of the United States State Department, he was a member of the American delegation to the ITU World Administration Radio Conference for the Mobile Services, held in Geneva in 1987, and at the request of the Federal Aviation Administration, acted as a delegate to the 1986 ICAO/FANS-3 Conference in Montreal.

Beginning in 1968, King spent 13 years as an Aerospace Technologist for NASA at the Goddard Space Flight Center. During that time, he worked in various divisions, including Communications and Navigation, developing techniques to locate and transfer environmental data via satellite from remote terminals, platforms and buoys to small local user terminals; designing and developing a second generation Emergency Locator Transmitter (ELT) using microprocessor technology; and development of a concept for an Advanced Information Transfer System (AITS) intended for transmission of high-resolution imaging radar data to local field users. He also served as a Spacecraft Integration Engineer in the Delta Project Office on several space missions: NASA's *Orbiting Solar Observatory*, RCA *Satcom 1* and *Satcom 2*, the European Space Agency's *GEOS*, and the National Space Development Agency of Japan's *CS-1*.

In a parallel career, in 1969 King co-founded Radio Amateur Satellite Corp. (AMSAT), the international non-profit organization that has been a leading pioneer in low-cost space missions. While serving on the Board of Directors and as the Vice President for Engineering until 1993, he acted as the U.S. Project Manager for the AMSAT *OSCAR-5* through AMSAT *OSCAR-19* series of spacecraft (launched as secondary payloads by NASA, ESA, and Arianespace), and as the senior technologist for AMSAT-North America. Notably, AMSAT designed, fabricated, launched and operated 13 different amateur telecommunications and science spacecraft during this period, of which many are still in operational use today.

King has been a guest lecturer for the University of Colorado's Interdisciplinary Telecommunication Program, MIT's Department of Aeronautics and Astronautics, and the University of Colorado's Department of Telecommunications. He has also co-authored numerous papers, which have either been published in leading journals or presented at international conferences and symposiums.

Education: M.S. in Electrical Engineering, Catholic University of America (Washington, D.C.). B.S. in Physics from Oakland University (Michigan).

Dr. Douglas Caldwell

Vice President, Engineering and Co-founder

After nearly two decades of solid experience, Doug brings a wide array of expertise to Ecliptic in electronics, avionics, computer engineering and systems engineering, and in exploring approaches for using commercial electronics in space.

In 1999, Caldwell was honored with the JPL Award for Exceptional Technical Excellence ("*DS1* Avionics and Flight Software Team") and two NASA Group Achievement Awards ("*DS1*

Systems Engineer Team") and ("*DS1* Subsystems Analysis and Technical Validation Team") for his significant contributions to the pioneering, ion-propelled *Deep Space One* spacecraft. The year before, he also received the NASA Certificate of Recognition for the technical brief, "Detection of Single-Event Latch-up (SEL) in Electronic Circuits Using Self-Checking Hardware." Caldwell also holds the U.S Patent 5,036,457 for "Bit-String Compressor with Boolean Operation Processing Capability."

Prior to the formation of Ecliptic, Caldwell was the Avionics Systems Lead and Manager for BlastOff! Corporation, where he led the group responsible for all flight electronics (including power systems and telecom), GN&C analysis and software, and C&DH software for a commercial lunar rover.

Beginning in 1992, he spent eight years with the Jet Propulsion Laboratory on its senior technical staff. For the first six years, he served as the Lead Avionics Systems Engineer on *Deep Space 1*, for which he defined the spacecraft electrical system and flight system test-bed architecture for this advanced technology-demonstration spacecraft, headed up all subsystem interactions involving avionics, and served on the New Millennium Program's Architecture Development Team.

Following the October 1998 launch of *Deep Space 1*, Caldwell was named the System Element Manager on JPL's Mars Ascent Vehicle (MAV) as part of the *Mars Sample Return* Mission. During that time, he led the development of the rocket that was slated to become the first vehicle to launch from Mars, before the program was cancelled in April 2000.

Prior to joining JPL, he worked as the Director of the UCLA Space Projects Group for four years and a Senior Systems Technologist at Nucleus International Corporation for six years, among other positions.

Education: Ph.D. and M.S. in Computer Science, and B.S. in Engineering, University of California – Los Angeles.

Jim Perren

Principal Engineer for End-to-End Information Systems and *Co-founder*

Jim Perren has over 15 years of experience defining, installing, and operating space-mission tracking systems.

He previously served as the Ground Segment Engineer at BlastOff! Corporation, working on commercial lunar missions. Prior to that, Perren spent four years at EarthWatch, Inc., working on the pioneering *EarlyBird* and *QuickBird* high-resolution, commercial remote-sensing spacecraft. As a Software Engineer and Ground System Engineer, respectively, he led the effort on the *EarlyBird's* wideband front-end processing software, and the technical implementation of *Quickbird's* ground segment, including the command and control links, Mission Control Center, and the 320 Mbps image downlink. Both systems featured remote 'lights out' operation at distant sites in Alaska and Norway.

In the mid-1990s, Perren spent two years at Datron, Inc., a market-leading space tracking antenna business. Starting out as a Remote Sensing System Engineer, he played a leading role in the development of the Singapore ground station, the world's first open-systems-based remote-

sensing ground station. Promoted to Project Manager in 1996, he was responsible for the execution of the image-processing component of the Singapore Ground System.

Before moving to the U.S. from Australia, Perren spent five years with Astro Pacific Pty. Ltd/CAL Pacific as a Chief Engineer and General Manager. In the former role, he was instrumental in bringing the global COSPAS/SARSAT satellite-enabled search and rescue systems to Australia, Southeast Asia and the south Pacific, as well as leading the maintenance and operations support for Australian, Indonesian, and New Zealand LUT systems.

Perren began his career as an engineer for the Australian *Landsat* Station/ACRES, where he spent almost four years leading the day-to-day operations of Australia's premiere remote-sensing image-processing facility.

Education: M.S. in Engineering Science and B.S. in Engineering (with honors) in Electrical and Electronic Engineering, James Cook University of North Queensland (Australia).

Steve LaBrecque

Senior Engineer, Instrument Systems

Steve LaBrecque has nearly two decades of experience with electronics, precision instrumentation, space-quality camera and instrument systems, and astronomical imaging systems.

Prior to joining Ecliptic, LaBrecque was a Camera Engineer at BlastOff! Corporation, where he was responsible for reverse engineering high-end commercial digital cameras for space applications. Notably, BlastOff! had developed the most mature commercial lunar mission (a lander/rover) to date, and the landed system design accommodated more onboard imaging systems than any prior planetary space vehicle ever designed.

During the late 1990s, he spent three years on the engineering staff at the Jet Propulsion Laboratory, where he designed, assembled, and tested 4K by 4K CCD cameras for JPL's Near-Earth Asteroid Tracking (NEAT) projects; served as the analog design engineer for the *STRV-1D* spacecraft project (infra-red detector experiment); and designed autonomous GPS stations for Antarctica.

LaBrecque was an Assistant Electronics Engineer at the California Institute of Technology (Caltech) for seven years, serving as the acting Systems Engineer for the Mars Orbital Camera launched aboard the *Mars Global Surveyor* mission. He also assembled, tested, and qualified space-rated camera electronics; conducted CCD burn-in and characterization testing; designed, assembled and tested various robotic control circuitry for the LRIS (Low Resolution Imaging Spectrograph) instrument; installed the LRIS on the Keck Telescope in Hawaii; and designed and fabricated the multi-chip module data logger for the *Champollion* comet lander Physical Properties Probe.

He was also a Senior Electronics Technician for the Lamont-Doherty Geological Observatory of Columbia University for six years, designing circuitry and software for integrating digitally two side-scan sonar instruments into a dual side-scan sonar.

Education: A.A.S. in Electronics Technology, Southern Maine Vocational Technical Institute.

Mike Maguire

Senior Engineer, Ground Systems

Mike Maguire is an experienced hands-on systems engineer and RF electronics engineer, with strong integration, test and verification background. He has a decade of experience in the specification and installation of ground receiving stations and space-to-ground telecom equipment and related test systems.

Prior to joining Ecliptic, Maguire was a Systems Engineer for Ground System Operations for BlastOff! Corporation. He previously spent four years as a Systems Engineer for EarthWatch Inc., developing the system requirements, verification and traceability matrices, system integration and test plans for the *QuickBird* satellite ground segment, including: Mission Control Center, LAN/WAN support networks, tracking antenna systems, real-time command and control systems, telemetry analysis and archive system, as well as command and telemetry RF equipment, among other responsibilities. The *QuickBird* spacecraft was designed to capture the highest resolution, commercially available images ever taken of the Earth.

Beginning in 1991, he spent almost five years at SED Systems in Canada, working on *Radarsat* – a sophisticated Earth-observation satellite developed to monitor environmental change and the planet's natural resources, which launched in November 1995. During the first phase of the project, Maguire served as the Lead Systems Engineer on the *Radarsat* Telemetry Tracking and Command Station program, then became the Spacecraft Systems Engineer for the *Radarsat* Mission Control Center.

Education: M.S. in Engineering Physics, Institute of Space and Atmospheric Studies, and B.S. in Engineering Physics, College of Engineering, at the University of Saskatchewan in Canada.

Jeff Dodson

Senior Engineer, Information Systems and Applications Software

Jeff Dodson is highly regarded in client-side and server-side Java development, including Swing-based GUI client applications, server-side Java with a web-based interface, and database design and database application development, as well as cross-compiling Java code to run in embedded system environments.

Before joining Ecliptic, he was a software engineer at BlastOff! Corporation, where he developed a client/server application to enable remote operations of a robotic lunar vehicle over the Internet, and other software modules for vehicle control, camera control, display of telemetry and image data, and various gauges to display vehicle state. He also implemented a system that allowed the user to control the vehicle by simply pointing and clicking on an image.

Dodson also spent two years at the Jet Propulsion Laboratory as a remote-sensing engineer for the *Galileo* spacecraft then in orbit around Jupiter. In that position, he designed scientific observations to command the motion of a span platform that hosted four remote-sensing instruments on board the spacecraft, for which he used software that models the spacecraft trajectory and orientation, the orbital and rotational motion of the planets and their satellites, and the motion of the instrument platform.

Education: M.S. in Physics, California State University-Long Beach; B.S. in Physics, University of California-Santa Barbara.

Dr. John Scully, CPA

Chief Financial Officer and Co-founder

John Scully brings over 20 years of high-level experience in accounting, corporate information systems, project tracking systems, auditing and human resources to Ecliptic as a former senior manager for several major companies in the high-technology, engineering-services and consulting fields.

He previously served as the Director of Finance for BlastOff! Corporation, an aerospace subsidiary of Internet incubator idealab. Prior to that, Scully spent five years with Aon Consulting, a subsidiary of Aon Corporation, the Fortune 500 insurance underwriting, brokerage and human resources firm with more than 500 offices in 120 countries. Starting out as the West Region Controller, he was promoted to Corporate Controller in 1999, with responsibility for the company's consolidation, financial reporting activities and internal control procedures worldwide.

For seven years, beginning in the late 1980s, Scully held the positions of Group Controller and West Region Controller with the environmental engineering consulting firm, Roy F. Weston, Inc., where he managed the internal auditing, revenue reporting and operations analysis departments. Before that, he spent seven years at DuPont in their accounting and auditing departments.

Scully has published book reviews in the *Journal of Accountancy* and *Internal Auditor,* and has taught both graduate and under-graduate accounting, finance, ethics and philosophy classes at a number of universities, including Pepperdine (Los Angeles), Penn State, UCLA (extension), University of Pennsylvania, University of Delaware, Temple University, and Cabrini College.

Education: Ph.D. in Philosophy, University of Pennsylvania; M.B.A. with Accounting emphasis, Temple University (Philadelphia); M.A. in Philosophy, University of Delaware; B.A. in Philosophy, West Chester University (Pennsylvania).

For more information, please contact:

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[2002 June]

ECLIPTIC ENTERPRISES

Bringing Space home. When your mission depends on it.

Who's using our RocketCam™ Imaging Systems?

RocketCam™ has been bringing the drama of Space to life since 1997. With RocketCam™, you never have to worry about "getting the picture." Our unique, end-to-end turnkey systems have performed flawlessly on 20 consecutive Delta, Atlas and Titan launches, using a total of 30 cameras – with more to come this summer.

Upcoming RocketCam™ missions for 2002

July:

- **Lockheed Martin *Atlas 5* – Eutelsat *Hot Bird 6***

  This will be the inaugural launch for Atlas 5, when it launches the Hot Bird 6 TV and data-broadcasting satellite for Eutelsat of France.

August:

- **Shuttle *Atlantis* (STS-112) – ISS 9A**

  STS-112 will be the fifteenth U.S. mission to the International Space Station. The Shuttle will deliver the first starboard truss segment, the S1 Truss, and the Crew and Equipment Translation Aid (CETA) Cart A to help space walkers move around the station's exterior. The onboard RocketCam™ will be mounted near the nose-end of the giant external tank, looking aft along the orbiter's belly in an attempt to image what has been scratching the delicate thermal protection tiles on prior missions.

- **Boeing *Delta IV – Eutelsat W5***

  This will be the inaugural launch for this new giant in the Delta series, powered by the Boeing Rocketdyne RS-68 main engine. It's mission is to orbit the W5 telecommunications satellite for Eutelsat of France.

October:

- **Boeing *Delta II – Gravity Probe B***

  This rocket will launch this sophisticated NASA-sponsored spacecraft on its 2-year mission to validate Einstein's General Theory of Relativity using advanced space-borne gyroscopes.

November:

- **Lockheed Martin *Titan IV – Milstar 2-F4***

  The nation's largest, most powerful expendable space launch vehicle, produced and launched for the U.S. Air Force, will launch another *Milstar* military communications satellite.

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- **Boeing *Delta IV* – *DSCS B6***

  This rocket will launch the Defense Satellite Communications System (*DSCS*) *B6* spacecraft on the first military launch of the Air Force's Evolved Expendable Launch Vehicle (EELV) program.

- **Lockheed Martin *Atlas 2AS* – NRO *MLV-14***

  This rocket will launch a classified payload for the U.S. Air Force and National Reconnaissance Office (NRO).

Missions to date since 1997

2002:

- **Lockheed Martin *Titan IV* – *Milstar 2-F3*** (January)

  Launched another *Milstar* military communications satellite.

2001:

- **Boeing *Delta II* – *Jason* and *TIMED*** (December)

  Launched the NASA-CNES *Jason-1* spacecraft to study world ocean dynamics and NASA's *TIMED* (Thermosphere * Ionosphere * Mesosphere * Energetics & Dynamics) spacecraft to conduct the first global study of a critical region of Earth's atmosphere.

- **Lockheed Martin *Atlas 2AS* – NRO *MLV-12*** (September)

  Launched a classified payload for the U.S. Air Force and National Reconnaissance Office (NRO).

- **Boeing *Delta II* – *Genesis*** (August)

  Launched NASA's unmanned probe, *Genesis*, on a three-month journey to park approximately 930,000 miles from Earth, where it will spend about two years collecting 10-20 micrograms of solar wind (the weight of a few grains of salt), before returning to Earth in 2004.

2000:

- **Boeing *Delta II* – *Mars Odyssey*** (April)

  Sent NASA's *Mars Odyssey* spacecraft on a six-month journey to Mars, as a continuation of NASA's exploration of the red planet.

- **Boeing *Delta III* – Demo Mission *DM-F3*** (August)

  Placed the U.S. Air Force's *DM-F3* payload into Geosynchronous Transfer Orbit. Also, using a mission profile to match the previous *Delta III* launch, *DM-F3* demonstrated the repeated performance of the systems verified during the last mission, to prove that the issues seen during the previous anomalous launch had been resolved. .

- **Boeing *Delta II* – *GPS IIR-5*** (July)

  Carried a U.S. Air Force Global Positioning System (GPS) satellite into a nearly 11,000-mile circular orbit, placing it into the B Plane of the GPS constellation. Recognized as the world's leading satellite-based navigation system, GPS helps to locate and guide military and civilian users in the air, at sea, on the ground, and in space.

- **Lockheed Martin *Atlas 3* – *Eutelsat W4*** (May)

  This launch marked the debut of the *Atlas 3A*. It was also the first time an American rocket has been powered by a Russian-designed and built rocket engine. The *W4* communications satellite, owned by Europe's leading satellite operator Eutelsat, provides capacity for consumer digital broadcasting services in Russia and developing new markets in sub-Saharan Africa.

- **Boeing *Delta II* – *Globalstar-7*** (February)

  Delivered the final four *Globalstar* satellites in a constellation of 48 to support its digital voice services system.

1999:

- **Boeing *Delta II* – *Globalstar-6*** (August)

  Delivered another set of four *Globalstar* satellites in a constellation of 48 to support its digital voice services system.

- **Boeing *Delta II* – *Globalstar-5*** (July)

  Delivered another set of four *Globalstar* satellites in a constellation of 48 to support its digital voice services system.

- **Boeing *Delta II* – *FUSE*** (June)

  Placed NASA's Far Ultraviolet Spectroscopic Explorer (FUSE) satellite into orbit to increase astronomer's abilities to test basic theories about the evolution of galaxies and the formation of the universe by allowing them to study ultraviolet light wavelengths that are unobservable to other Earth-based telescopes.

- **Boeing *Delta II* – *Stardust*** (February)

  Inserted NASA's *Stardust* spacecraft onto the first phase of a seven-year round-trip mission to collect cometary dust from the comet known as Wild 2—as well as interstellar dust enroute—for return to Earth, marking this the world's first mission to collect extraterrestrial materials from outside the orbit of the Moon.

- **Boeing *Delta II* – *Mars Polar Lander* + *Deep Space 2*** (January)

  Launched a Mars-bound spacecraft for NASA—the *Mars Polar Lander*—to spend three months digging for traces of water beneath the planet's frozen surface, as well as search for evidence of a physical record of climate change. Attached to the *MPL* cruise stage was *DS2*, composed of two microprobes designed to penetrate Mars' surface and collect samples for testing water vapor content of the planet's subterranean soil, among other tasks.

1998:

- **Boeing *Delta II* – *Mars Climate Orbiter*** (December)

  Launched the *MCO* spacecraft, a NASA probe that was designed to function as an interplanetary weather satellite and communications relay for *Mars Polar Lander* and subsequent Mars missions.

- **Boeing *Delta II* – *MS-10* Iridium** (September)

  Placed another five Iridium system satellites into low Earth orbit.

- **Boeing *Delta II* – *Globalstar*** (April)

  Delivered another set of four *Globalstar* satellites in a constellation of 48 to support its digital voice services system.

- **Boeing *Delta II* – *Globalstar*** (February)

  Delivered another set of four *Globalstar* satellites in a constellation of 48 to support its digital voice services system.

1997:

- **Boeing *Delta II* – *ACE*** (August)

  Delivered NASA's *Advanced Composition Explorer* (*ACE*) observatory to an elliptical transfer orbit in preparation for its one million-mile journey to study space matter, including the solar corona and galactic matter. ACE's studies of these energetic particles may contribute to our understanding of the formation and evolution of the solar system.

- **Boeing *Delta II* – *MS-1* Iridium** (May)

  Placed five Iridium system satellites into low Earth orbit. The Iridium system is a global wireless communications network combining the worldwide reach of 66 low-Earth orbit satellites with land-based wireless systems to enable subscribers to communicate with hand-held telephones and pagers virtually anywhere in the world.

For more information on this launch history, please contact:

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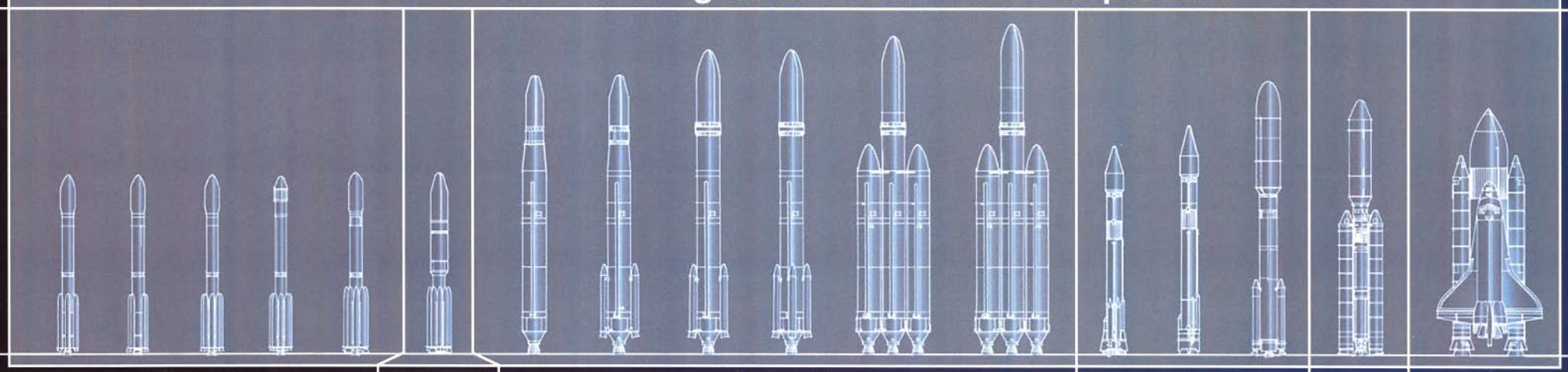

Vehicle Illustration by Luc Mayrand

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