

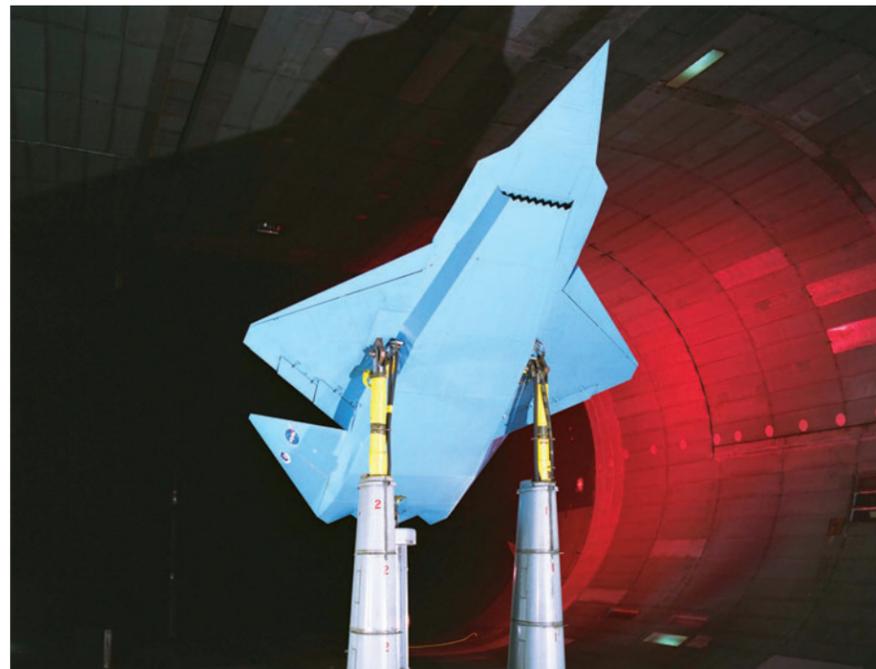
# Fighter Tactics

## Ultimate Fighter: Lockheed Martin F-35 Joint Strike Fighter

by Bill Sweetman. Zenith Press, 2004. 160 pp., \$34.95.

At around \$200 billion, the contract for the Joint Strike Fighter was the Pentagon's biggest ever, and it touched off an epic five-year battle between Boeing and Lockheed Martin. At stake were the futures of the two aerospace titans and the fate of the world's fighter market for decades to come. The government's JSF specifications posed formidable engineering challenges: Build a fighter so advanced it would virtually fly itself; make it so versatile it would satisfy the combined needs of the Navy, Marines, and Air Force; bring it in for about a third of the cost of the state-of-the-art F-22 Raptor; and, trickiest of all, solve the thorny problems of controlling vertical lift in a supersonic, short-takeoff-and-vertical-landing design.

With a keen eye for irony and telling detail, aerospace journalist Bill Sweetman, a frequent contributor to *Air & Space/Smithsonian*, traces the origins of the JSF and STOVL back to the Harrier and its forerunners. He gives a blow-by-blow account of the design teams' rivalry as they struggled with mechanical glitches, parts shortages, and ever-tightening deadlines. Boeing's team opted for simplicity by relying on direct lift from the engine, but that



Before Boeing and Lockheed submitted their designs for the Joint Strike Fighter, the Air Force developed the SHARC concept vehicle to study unconventional control of flight.

made it more difficult to accommodate every pound of weight added as Pentagon requirements grew. Meanwhile, Lockheed Martin engineers solved the STOVL challenge with a liftfan, but its complexity led to frequent, unnerving breakdowns and the ignoble nickname "Chitty Chitty Bang Bang."



*Ultimate Fighter* is lushly illustrated and includes substantial coverage of the stealth and information technology of Lockheed Martin's winning F-35 design. Sweetman has spent years reporting on the JSF for aerospace periodicals, and

his authority on the subject is clear. But this is not a definitive account; he stresses that the JSF story is far from over. Mounting costs, weight gains, and reluctance to give away too many stealthy secrets may make the F-35 less of a competition killer in the marketplace than originally hoped. In a shifting strategic world of insurgency and unconventional warfare, the JSF's value as a first-attack aircraft is open to question. Sweetman

concludes that "the next few years look more than interesting for this ambitious airplane."  
—Evan Hadingham is the senior science editor of the PBS series "NOVA." He wrote about the JSF competition in the Dec. 2002/Jan. 2003 issue.

## Astro Turf: The Private Life of Rocket Science

by M.G. Lord. Walker & Company, 2005. 249 pp., \$24.

At each turn, *Astro Turf* rages against The Man. The narrative skips between author M.G. Lord's experiences as the daughter of an emotionally distant low-level engineer at NASA's Jet Propulsion Laboratory and a work culture's oppression of women, gay people, and suspected Communists during the space race.

Lord's descriptions of the cold-war-era chauvinism at JPL are eye-opening. She includes stories of gay employees who were forced to out themselves to keep



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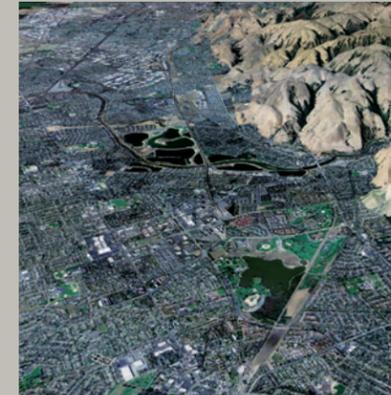
### NASA World Wind

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Hey, I can see my house from here! For years, satellite photography gurus have promised the revolution. One day (always soon) we'll be able to explore Earth from our desktops, flying over a virtual planet rendered so accurately that Rand and McNally would be agog.

The future has arrived. Two new programs, *Keyhole* and *NASA World Wind*, come very close to fulfilling the promise by letting you zoom from Earth orbit down to your neighborhood, your house, even your car. If you have a broadband Internet connection and an up-to-date PC (sorry, Mac users), high-resolution photographs taken from airplanes and satellites will stream onto your screen almost as fast as you can point your mouse anywhere on the globe.

On my *Keyhole* test drive, I zeroed in on my childhood home near Washington, D.C., which, like most large metropolitan areas, appeared in color, with resolution good enough to make out the flower beds lining the sidewalk. I tilted the



*NASA World Wind* reconstructs Fremont, California, from aerial photos compiled by the U.S. Geological Survey.

view to a flyover and went riding down the street where I used to deliver papers. Very cool.

NASA's free *World Wind* program doesn't have the high-resolution aerial photography, but makes up for it in coverage. It's better than *Keyhole* for rural areas and less populated parts of the world, pulling from medium-resolution Landsat and other space images.

The existence of these photos (which are typically a couple of years old, depending on when the satellite or airplane took them) is not new. You can find them on Web sites like [www.terraserver.com](http://www.terraserver.com) and [www.terrafly.com](http://www.terrafly.com), or you can buy the higher-resolution (hence pricier) aerial photos from companies like AirPhotoUSA. But who needs to, when tools like these are becoming available? And now that Google has bought *Keyhole* (with undisclosed plans to incorporate it into the company's scheme to dominate the info-world), who knows what's coming next?

—Tony Reichhardt is an Air & Space consulting editor.



Cambridge, Massachusetts, at *Keyhole*'s peak resolution: three inches.

their jobs; the disappointments and triumphs of women like Mars Exploration manager Donna Shirley; and smaller battles, like that to establish an on-site daycare center. The author also ponders how the United States could overlook the horrific past of the Germans it culled to father its space program, while at the same time committing crimes against its own loyal scientists (Lord focuses on intrusions into the life of left-leaning U.S. missile pioneer Frank Malina).

Of course, *Astro Turf* is in part the author's personal journey. Much can be inferred about Lord when she tells us that she no longer goes by her given name, Mary Grace, because of her idolization of the strong female characters in Robert Heinlein's science fiction. And passages about her lifelong struggle to relate to her father—which inspired the book—are

well constructed but at times indulgent.

Lord's intimate style results in a book that sometimes feels like a diary, sometimes like a *60 Minutes* exposé that has turned up hidden details of a shameful past. But *Astro Turf*'s bite comes from the mere mention of details—JPL's Miss Guided Missile pageant; its scientists' belief that acidity in the skin of menstruating women could harm electronic components—that seem irreconcilable with American life in 2005. Unfortunately, during the last third of the book, tired passages such as "One can easily interpret a launch as a symbol of masculine power. It involves a potent object penetrating the heavens" cheapen an otherwise successful account of The Man's many offenses.

—Sam Goldberg is an Air & Space associate editor.

## SHORT HOPS

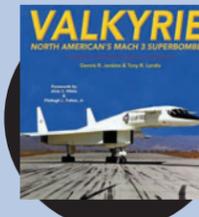


### Frau Im Mond

directed by Fritz Lang, 1929. DVD, Kino Video. 169 min., \$29.95.

An eccentric professor theorizes there's gold on the moon and a plucky scientist battles industrial espionage and a romantic triangle to prove him right. That's the premise of director Fritz Lang's *Frau Im Mond* (*The Woman in the Moon*), a 1929 silent film long available only in truncated form. Kino Video's newly restored version is not for everybody, but space buffs will find items of interest. Pioneer rocketeer Hermann Oberth was the film's consultant, and the movie includes the first launch countdown, a multi-stage rocket, and weightlessness. Lang's foresight wasn't 20-20, though: His astronauts explore the moon in street clothes.

—Tom Huntington



### Valkyrie: North American's Mach 3 Superbomber

by Dennis R. Jenkins and Tony R. Landis. Specialty Press, 2004. 264 pp., \$39.95.

This book documents not only the history of North American Aviation's ill-fated B-70 Valkyrie supersonic bomber, but also the remarkable period during which it was developed. The narrative begins with the early days of work on supersonic and nuclear-powered bombers and continues with the exciting and sometimes terrifying test flights, tales of the Valkyrie's tremendous speed, and stories of the brave pilots who flew the only two Valkyries ever built. B-70 enthusiasts will enjoy little-known details of the short-lived program, as well as never-before-seen photographs and technical sketches, while reading what certainly seems to be a complete history of this fascinating aircraft.

—Bettina Chavanne



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