

# The Lurio Report

(www.thelurioreport.com)

*News and Analysis of the 'New Space' Enterprise*

“Your newsletter is a great source of information with excellent topics and perceptive analysis.”  
-- Steve Landeene, Executive Director, New Mexico Spaceport Authority

“Thanks...for the great work you do with your newsletter keeping us up to date on private enterprise in space.”  
-- John Tierney, Columnist, “The New York Times”

## **Spaceports' Status, Falcon 1 Flight 4 and Congress, The Demo that Doesn't**

Vol. 3, No. 18, September 26, 2008

=====  
The new website contains subscription payment explanations and options. With the dominant exception of the institutional press, unpaid subscribers past their ‘free samples’ period will soon begin to be removed at random from this publication’s mailing list. I may send you reminders of what you’re missing, however.  
=====

### **Contents:**

#### **Quick Updates**

Falcon 1 Flight 4 ‘Window’ Shifts by Several Days  
COTS - D Politics, Implications of Falcon 1 Flights  
The Private Sector’s Use of Soyuz  
Lunar Lander Challenge (LLC) Deferred  
X-37 - For “New Space,” Less than Meets the Eye

#### **Dear Acquaintances,**

**- Spaceport and Related State Activity Updates -**  
California (Mojave Air and Space Port)  
New Mexico (Spaceport America)  
Oklahoma (Oklahoma Spaceport)  
Virginia (Mid-Atlantic Regional Spaceport - “MARS”)  
Florida

=====  
**Quick Updates:**

**Falcon 1 Flight 4 ‘Window’ Shifts by Several Days:** On September 19th, SpaceX’s Elon Musk said that a fourth flight of the Falcon 1 might come during the period September 23 - 25th. (PDT - add “1” for dates at Kwajalein atoll because of the international date line.)

However, in a further update on the 23rd Musk said, “...we decided to replace a component in the 2nd stage engine LOX [liquid oxygen] supply line. There is a good chance we would be ok flying as is, but we are being extremely cautious.” This decision resulted from data analysis from a hold-down test firing of the first stage engine on September 20th.

Speculatively, the (necessarily!) brief test firing likely involved a ‘dress rehearsal’ countdown for the whole rocket. One might assume that during such a process at least cold gaseous oxygen (GOX) if not LOX, would have flowed through the upper stage engine’s lines as part of a pre-cooling process. That could have enabled a sensor to pick up a leak point or a

temperature indicative of another anomaly.

**In any case, the bottom line is that, “... the updated launch window estimate is now Sept. 28th through Oct. 1st [CA time].”**

**COTS - D Politics, Implications of Falcon 1 Flights:** I’ve written on the following linked matters:

-- Growing desperation in NASA and by many in Congress to extend the exemption to the Iran, North Korea, Syria Nonproliferation Agreement (INKSNA) that allows NASA to purchase Soyuz transport capsules from Russia during the so-called “gap” period after Shuttle operations are scheduled to end;

-- The importance of the proposed COTS Capability D (COTS - D) demonstration program of private systems’ ability to transport humans as well as cargo to the International Space Station (ISS). As I discussed in my August 3rd issue (Vol. 3, No. 16), NASA’s imprimatur appears necessary to raise and/or sustain sufficient funding to create these crew transport systems, which will be vital to the advent within the next 5-10 years of new, extensive commercial activity in low orbit using such options as Bigelow’s stations;

-- That Washington insiders said the failure of the third Falcon 1 flight to reach orbit was a big blow to COTS - D funding prospects.

A huge amount is thus riding on what happens to Falcon 1 flight four. Simultaneously Congress is in a rush to close the present session. There, we are seeing the following (many thanks to Jeff Foust’s spacepolitics.com for information pointers):

1. In the Senate, the bill to extend the exemption to INKSNA, S.3103 (<<http://thomas.loc.gov/cgi-bin/query/z?c110:S.3103:>>) has passed the Foreign Relations Committee (whether it gets the required unanimous Senate floor support is undetermined at this writing).

**Of note for New Space: the text of S.3103 states that the exemption ends either when NASA’s Orion reaches full operational capability \_or\_ when, “a United States commercial provider of crew transportation and rescue services demonstrates the capability to meet mission requirements of the International Space Station.”**

**This effectively is an \_endorsement of the COTS - D idea\_.**

2. On the House side the INKSNA extension does not include this language, merely changing the present exemption’s cutoff date to July 2016. This has passed the floor embedded in a Continuing Resolution (CR) for funding of many government programs.

3. Meanwhile, back on the Senate side, an aide tells me that they are working frantically to get a “NASA bill” passed. Not forgetting that “Authorization” doesn’t provide ‘real’ dollars, recall that earlier in the summer I noted that a draft bill did authorize \$50 million for initiating COTS - D, and underscored that passing such a document would express Congress’s wishes.

**The same source tells me that what’s gone on with the controversies about Russia and Soyuz, Shuttle program extensions, etc., has “clearly made [COTS - D] a higher priority.”**

Some other other pointers may be less promising, but they are also less clearly relevant to the COTS-D matter.

Meanwhile, the apparent initial results of Mr. Griffin’s request for a fast study of extending Shuttle operations have come to light in the item at <<http://www.nasaspaceflight.com/content/?cid=5516>>. With it has come a possible permutation of COTS - D.

After drawing a scenario under which two Shuttle orbiters could continue flying to fill the “gap,” with a third used for spare parts, the item undercuts that scheme by noting that, **“Continuing to fly the Space Shuttle past 2010 is not the answer... [the hurdle is]...the ability to evacuate [ISS crew] in the eventuality of an emergency on the orbital outpost.”** The Soyuz can remain docked to the ISS for up to six months as an emergency escape capsule, but the Shuttle can only stay on orbit *\_anywhere\_* for a couple of weeks. The item continues, “Under NASA’s present operational safety rules, crew rescue capabilities for astronauts onboard the Space Station are a necessity. Today, only the Russian *Soyuz* provides this capability.”

**Following that it states, “a US-controlled “lifeboat” is also being evaluated on several fronts, especially in relation to opening discussions with COTS (Commercial Orbital Transportation Services) partners on providing such a vehicle.” This option is designated, “[COTS] Capability D-minus.” The article says that because of “ongoing discussions” names are embargoed but that, “...several companies have noted the ability to make available a lifeboat vehicle from 2012”**

This evidently is a lower-priced option than the full COTS - D. One prominent Washington New Space player has surmised that “COTS - D minus” may simply be a partially executed COTS -D demonstration program, halted once all crew related capabilities are installed on a capsule, which is then flown unmanned to an ISS docking. It stays there and is presumed to be ‘good enough’ to use in an extreme emergency descent.

Of course this whole notion of “COTS - D minus” comes from an environment of funds squeezed between Shuttle (extended or not) and Mr. Griffin’s commitment to the high-cost and badly conceived Orion/Ares 1. And what we really need is a multiple company, full COTS - D demonstration program.

But in the all-important realm of perceptions, Falcon’s fourth flight result is the overriding and pivotal event of the hour.

**The Private Sector’s Use of Soyuz:** One thing I’ve wanted to nail down is whether private companies would be affected (or not) should the INKSNA exemption not be extended. E.g., relating to Space Adventures’ announcement in June of the first private mission to ISS, for which a specially manufactured Soyuz would be built - see <http://www.spaceadventures.com/index.cfm?fuseaction=news.viewnews&newsid=616>. Two seats and some payload would be available for individuals, institutions or companies.

**Jim Muncy of “PoliSpace” informs me that. “ There is no ban against anyone doing anything with private money, or with non-U.S. government money.”** The key point is that INKSNA relates to *tax dollar* expenditures.

Thus, should no extension of the INKSNA exemption occur, and given NASA’s “lifeboat” rules for its own crews (see the last section above) one could imagine *individual companies* having access to the ISS for employees to perform experiments, while the US government would not be able to keep a crew there. I’m not overly disturbed by such a circumstance. But without US - originated transport to/emergency return capabilities from the ISS, the Russians could charge the private sector as much as they like. Price and transport capacity would likely sooner or later become prohibitive factors for projects such as SpaceHab’s pharmaceutical experiments.

**Lunar Lander Challenge (LLC) Deferred:** Organizers of the forthcoming International Symposium on Personal and Commercial Spaceflight (ISPCS) had announced the extra registration benefit of a free ticket to observe this year’s Lunar Lander Challenge, which had been scheduled to occur at Holloman AFB Friday, October 24th and Saturday, October 25th.

In a September 20th item Clark Lindsey of spacetransportnews.com stated that he’d heard that a “highly classified” activity at the base had “bumped” the LLC at least to November, and possibly to another location as well. The delay - if not the reason for it - was confirmed by X-Prize Cup officials to space journalist Leonard David in his “LiveScience” blog later that same day, <http://www.livescience.com/blogs/2008/09/20/lunar-lander-challenge-problems-curtail-october-competition/>.

**I underscore that the ISPCS meeting itself remains an outstanding event** (<http://spacegrant.nmsu.edu/ispcs/>).

As Clark pointed out, the LLC delay gives the competition to Armadillo Aerospace some much needed extra time. He has recently pointed to fundamental progress being made by “Unreasonable Rocket” (see Paul Breed’s blog at <http://unreasonablerocket.blogspot.com/>), and a recent tethered test at <http://www.youtube.com/watch?v=ikaxvvFq0Ks>) and “TrueZer0” (<http://www.truezer0.com/>). Neither of these entries exactly look “ready for prime time,” are demonstrations that even with meager resources one can eventually make notable progress.

**X-37 - For “New Space,” Less than Meets the Eye:** An orbital flight test (boosted by an Atlas V) is scheduled in December for the USAF/DARPA X-37B testbed, an automated, winged reusable craft. As stated in an midsummer article in Aviation Week & Space Technology, technologies to be tried out will include, “...advanced thermal protection, autonomous approach and landing...and orbital and ground operations” ([http://www.aviationweek.com/aw/generic/story\\_generic.jsp?channel=awst&id=news/aw080408p2.xml&headline=Air%20Force%20Ready%20To%20Launch%20First%20Spaceplane%20Demonstrator%20Mission](http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=awst&id=news/aw080408p2.xml&headline=Air%20Force%20Ready%20To%20Launch%20First%20Spaceplane%20Demonstrator%20Mission)).

**But just how useful will this program be to the development of Reusable Launch Vehicle (RLV) technologies for the private sector?** These will be essential to bringing *\_orbital\_* access costs down another order of magnitude from that of projected ‘first generation’ vehicles such as the SpaceX Dragon - i.e., from millions per seat to something in the same starting range as foreseen for suborbitals presently under development.

A part of the answer is literally inscrutable since much of X-37B is a ‘classified’ program. Following some discussions, I’d say that the rest of the answer is most likely, “not all that much,” because the project is not adequately focussed on system operability development and test.

Longtime readers may recall that a program to address those areas to the degree needed had long been proposed and has been considered feasible for at least 20 years. This would entail development of a small automated craft that could do repeated flight tests at relatively low Mach numbers using its own propulsion systems, and which would cover the higher velocities - including reentry tests of a rugged Thermal Protection System (TPS) - with boost to orbit from a low cost, conventional rocket. But the estimated \$100 million project has never found a place to ‘fit’ among contending internal government interests.

The dollars that *\_could\_* be scratched together have gone into a three-pronged, ground-based precursor project at the Air Force Research Laboratory (AFRL), with now unintentional irony called “FAST.” By the 2010-11 time period it would give another opportunity to decide on whether to create an actual flight test program.

The essentials of the required techniques were to be covered by FAST: a composite airframe development to, “integrate tanks, structure, and TPS;” a subsystems ‘iron bird’ to explore areas such as adaptive guidance, navigation and control and automated system health management; and a “propulsion product” for ground-up development of simple, affordable, low maintenance components for a LOX/hydrocarbon propulsion system.

But even in the modest FAST effort, the subsystems section of the program seems to have become the only part relatively unaffected by further constraints. Those limits largely appear to originate from internal politics rather than dollar disputes.

From the start, it turned out that the propulsion work could not be funded. Data for this part of FAST is only being estimated, using a hypothetical downscaling of a unit for a different project, a proposed reusable lower stage booster to be used with a throwaway upper stage.

My contact presently involved with FAST had no problem indicating progress with the multiple-function loadbearing airframe, but work on the vital TPS part of that experiment seems to be on a slow track at best.

In sum, the message I heard was that to the extent that it helps support work on that other project - the lower stage reusable booster, operating to only about Mach 7 - it’s okay to speak of and to fund FAST. Higher speed capabilities for launch and reentry seem to have become an “unhealthy” topic to talk about or to pursue given the Pentagon’s internal politics.

Thus even the very modest FAST project seems to be turning into another demonstration of government abrogating the long-term research investments for which it *\_theoretically\_* has greater freedom than the private sector, which is constrained by faster payback needs. But I’m not surprised.

The situation only provides yet more reason to cheer on the efforts of New Space ventures such as Virgin/Scaled, XCOR, and Masten that have attempted to develop stair-step paths to eventual orbital RLVs, trying to design each step to have an acceptable payback for

investors. **This may take longer than could a very modest government investment in the required technology tests, but the latter dream is irrelevant if it can never occur.**

-----  
**Dear Acquaintances,**

**- Spaceport and Related State Activity Updates -**

California (Mojave Air and Space Port)

The nation's first inland spaceport was established in Mojave, California in 2004 (<<http://www.mojaveairport.com/index.html>>). The state has been a leader in the establishment, Old Space industry for decades, something that could breed complacency. To me that seemed a pretty clear explanation why it's been woefully inactive in cultivating the New Space seeds taking root in Mojave.

Mojave Air and Space Port Manager Stuart Witt spoke to me in parallel terms recently, confirming that nothing had really changed at the state level and surmising that California pretty much takes for granted that it will continue to lead in any flight industries.

My message to them is: watch out.

But whatever happens in the longer term, for now Mojave is an epicenter of research efforts such as those by Scaled Composites for Virgin Galactic, at XCOR and at Masten Space Systems. Witt said that virtually every morning he reviews a manifest of rocket tests in flight or on the ground.

By some time in the week of September 21st, XCOR rocket powered aircraft flights were expected to give the spaceport the distinction of having hosted more than 50% of all manned rocket vehicle launch and landings in the world of all types in this century. During the same week, the company was also hoping achieve a ten-minute turnaround between flights.

New Mexico (Spaceport America)

The state continues aggressive progress towards making "Spaceport America" the first large scale commercial operations center of the New Space era (<<http://www.spaceportamerica.com/>>) and providing new, related, non-flight attractions there and in the area for a broader public. I'm aware of specific progress on one of the latter, but have been asked not to discuss it yet. In parallel the Rocket Racing League (RRL) is developing real estate at the Las Cruces Airport, where it hopes to host ventures related to the Spaceport as well as its own facilities (Vol. 3, No. 14, July 16, 2008).

In early September, Executive Director of the New Mexico Spaceport Authority (NMSA) Steve Landeene noted that his agency is searching for personnel to fill two new positions: one to be General Manager for the development and operation of the Spaceport; the other as General Council and for contracting and business development work. Landeene admitted that getting the desired 'three-in-one' for the latter position may be a challenge.

Groundbreaking for the 8.5 mile access road to the site occurred on September 18th (see <<http://www.spaceportamerica.com/news/press-releases/18-spaceport-press-articles/163-spaceport-america-construction-begins.html>>). The sharp oil price rises earlier in the summer had delayed bidding on that work by several weeks. Landeene is expecting to shortly complete

a contract with Sierra Electric to bring power to the site on a six mile branch line. There's also a Memorandum of Understanding (MOU) with that company covering possible photovoltaic or solar thermal electric power add-ons.

On September 24th the NMSA issued a press release seeking RFPs by October 15th for a Construction Management firm, "to oversee and manage the construction" of the Spaceport (<<http://www.spaceportamerica.com/news/press-releases/18-spaceport-press-articles/164-spa-issues-rfp-construction-management.html>>). The announcement was issued in parallel with an updated design for the hangar/terminal complex. (I don't see it up on their website yet, but a copy of the illustration is available at <<http://www.hobbyspace.com/AAdmin/Images/SpacePorts/NMSpaceport/SpaceportHangerTerminalArial-small-2008-09-24-700x525.jpg>>).

Recall that Sierra and Dona Ana counties have voted to start imposing a sales tax with the new year to back state issued bonds for Spaceport construction. Otero County will vote on joining them with the November 4th general election.

In the meantime Sierra and Dona Ana have agreed on plans for the official Tax District, which will be governed by a body including two representatives from each county. Their plan has been sent to the NMSA and requires state certification to create the District. The state will then formally agree to join and the Governor will either directly or through NMSA appoint two representatives of the state to the governing entity. Otero would join under the same rules, as could other state political entities later - should they approve the required sales tax.

A formal "Record of Decision" on the Environmental Impact Statement (EIS) is expected to be issued in December of this year by the FAA as the lead agency overseeing the spaceport. The actual operating license for the spaceport is expected almost immediately thereafter, either before the end of the year or in January.

Other work is in hand for agreements between the NMSA and Virgin Galactic: a document laying out terms and conditions for development of the terminal and hangars at the Spaceport (minor final adjustments were being made at this writing); and a 'first cut' discussion has recently been held between the state and Virgin to draft a twenty year lease for these initial facilities.

## Oklahoma (Oklahoma Spaceport)

The Oklahoma Spaceport is based at a former USAF Strategic Air Command facility, with an enormous runway, many available buildings and a large unobstructed airspace (<<http://www.okspaceport.state.ok.us/index.html>>). A spaceport license for suborbital launches was granted on June 12, 2006. This covers horizontal takeoff and landing systems using jet or rocket power on liftoff, and air launched systems performing horizontal landings.

Armadillo Aerospace has used the facility for free-flight tests of its vertical takeoff and landing systems. Bill Khourie, executive director of OSIDA (Oklahoma Space Industry Development Authority) noted that because these have stayed in hovering mode, they have not risen to the definition of an suborbital launch.

More recently, Armadillo used the Spaceport for initial tests of the rocket powered aircraft it developed for the RRL. (NOTE: Armadillo has now released a long report on the preparations of the vehicle and its tests, with many illustrations, see <[http://www.armadilloaerospace.com/n.x/Armadillo/Home/News?news\\_id=361](http://www.armadilloaerospace.com/n.x/Armadillo/Home/News?news_id=361)>.)

Jack Bonny, OSIDA Board Vice-Chairman, recently dropped by the Mojave spaceport while on private travel, commenting afterwards that, “Doug Graham [and XCOR] have been very helpful with what we are doing in Oklahoma.”

Khourie said that he expects continuing activity in Oklahoma by Armadillo. The facility is also promoting itself for conventional aircraft development and test work. But he summed up their situation with the comment that, “The next real step forward [for us and other new space facilities] is really keyed to when someone’s suborbital vehicle is ready to fly.”

### Virginia (Mid-Atlantic Regional Spaceport - “MARS”)

Despite a challenge from Florida, Virginia’s Mid-Atlantic Regional Spaceport won the contest to launch Orbital Sciences Corporation’s (OSC’s) new Taurus II rockets (<<http://www.marsspaceport.com/index.php>>). OSC had won a recompensation of COTS dollars from NASA to demonstrate an unmanned supply system for the International Space Station (ISS) (<<http://www.orbital.com/AdvancedSpace/COTS/>>).

MARS is ‘collocated’ with the NASA Wallops Flight Facility and two of the launch pads are operated by the Virginia Commercial Spaceflight Authority. One is presently in use while the other is being prepared for the Taurus II, with the expectation that it will be ready in about 14 months. The Virginia legislature has provided \$16 million in bonds for refurbishment of that pad, and former state legislator Jack Kennedy indicated in mid - September that the state’s Congressional delegation may be well on the way to providing another \$14 million in funding.

In July, it became public that OSC is studying the feasibility of converting the Taurus cargo system into one capable of carrying a two person capsule to orbit (e.g. <<http://spaceports.blogspot.com/2008/07/taurus-2-may-seek-human-launch-rating.html>>). Kennedy, a member of the Virginia Aerospace Advisory Council, said that he hopes that at their next meeting the Council will look closely at this possibility.

Kennedy also notes that in addition to the vertical launch facilities, the Wallops site has a runway that could be used to support a horizontally launched suborbital.

### Florida

Work proceeds to prepare Launch Complex 40 (LC-36) at the Cape Canaveral Air Force Station to support flights of the Falcon 9/Falcon 9-Dragon vehicle for COTS and other customers. Partly to try to attract the OSC Taurus II from Virginia, the state legislature had put up \$14.5 million for redevelopment of Launch Complex 36 (LC-36). Steve Kohler, President of ‘Space Florida,’ the state entity charged with aerospace development, told me that work on LC-36 is proceeding to create a commercial medium launch site, for systems able to carry up to 13,000 lbs payload to Low Earth Orbit (LEO). The complex was originally a two pad facility, and eventually they hope to have two active pads there again. Neither has Kohler given up on attracting Taurus II flights at a later date.

Space Florida was granted what Kohler called an “access” license for LC-36 in early August by the Air Force (<[http://www.spaceflorida.gov/news/08\\_07\\_08\\_LC36.php](http://www.spaceflorida.gov/news/08_07_08_LC36.php)>). In early September, the service granted SpaceX an “Operational License” for LC-40 (<<http://www.spacex.com/press.php?page=20080909>>, see also construction photo). Dr. George Nield, head of the FAA’s commercial space office (FAA/AST) notes that since Space Florida and SpaceX have been granted control of their respective sites, they each need a “site operator license” from his agency - these are identical to commercial spaceport licenses. (He noted that a

previous commercial spaceport license at a Canaveral launch site had been allowed to expire.)

A general and interesting point that Nield clarified: a site operator/spaceport license *\_in itself\_* does not distinguish between flying only cargo or both cargo and human launches. That is covered by other parts of the regulatory framework for flying a particular vehicle at a particular time.

In my May 14th issue (Vol. 3, No. 10) I mentioned that as part of an economic stimulus package, the state legislature had approved a Reusable Space Vehicle prize (<[http://www.myfloridahouse.gov/Sections/Documents/loaddoc.aspx?FileName=\\_s2310er.DOC&DocumentType=Bill&BillNumber=2310&Session=2008](http://www.myfloridahouse.gov/Sections/Documents/loaddoc.aspx?FileName=_s2310er.DOC&DocumentType=Bill&BillNumber=2310&Session=2008)>). This would award a total of \$40 million (half from the state, half to be found from private sources), for which rules are required by January 1, 2009. Kohler expressed confidence that the rules would be ready by that date.

Yours very truly,

Charles A. Lurio, Ph.D.

**The Lurio Report**

*News and Analysis of the 'New Space' Enterprise*

Charles A. Lurio, Ph.D., Writer/Publisher

charleslurio@thelurioreport.com

services@thelurioreport.com (subscription queries)

(617)480-0755 Business, Cell & Voicemail

(617)469-9117 Landline