

The Three Witches of US Private Commercial Spaceflight

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The Three Witches of US Private Commercial Spaceflight
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Three issues of jurisdiction & liability



1. Third-party liability: national & international
2. Passenger liability: national & international
3. On-orbit operations: national & international

Witch #1

- Manned & unmanned launches
- Internationally: Liability Convention 1972
 - Launching state space object causing damage liable – to state(s) (whose nationals) sustained damage, strict liability for damage on earth & unlimited compensation
 - ➔ State liability *de facto* requires launching state to license licensee for US launch operator / launch operator in US
- Nationally: US Commercial Space Launch Act 1984



US govt
Thou shalt not kill innocent third parties –
US govt
Thou shalt not kill the business either ...

US third-party liability regime (1)

- Three-tier system – application *domestically*
 - 1st tier: compensated by licensee; insurance obligatory
 - ◆ Lowest of:
 - Maximum Probable Loss (w/r/t a 1: 10,000,000 chance of occurring)
 - Insurance cover available at reasonable rates
 - 500 M US\$
 - ◆ Highest amount quoted 261 M US\$ – 3.1 M US\$ SpaceShipOne
 - 2nd tier: *possibly* indemnified by US government
 - ◆ *Promise* to ask Congress for special appropriation
 - ◆ Up to 1.5 B US\$ (1988-rates: now some 2.95 B US\$)
 - 3rd tier: ... again for licensee to compensate



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US third-party liability regime (2)

- Three-tier system – result *internationally*
 - *Works the other way around:* US liable as state ...
 - ➔ 1st tier: now US government compensated by licensee
 - ➔ 2nd tier: *has* to be taken care of by US government
 - ➔ 3rd tier: may see US government derogate to licensee
 - ↔ Phrasing CSLA makes clear focus US regime is on domestic third-party liability
 - ◆ First phase of launch most risky – cf. limitation of cover mandatory insurance to 30 days after payload separation / launch
 - ◆ Launch sites close to open waters / not close to international borders – little chance of causing damage across borders



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Other third-party liability regimes

- ↔ Focus on *international* third-party liability
 - E.g. France requires reimbursement French government up to 60 M € (± 81 M US\$) for international third-party damage resulting from Arianespace launches at Kourou
 - State coverage above cap unlimited & unconditionally
 - Domestic liability regulated almost in passing – *identically*
- ➔ These differences of approach might have to be taken into account when discussing change US regime



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"Daddy... please!???"

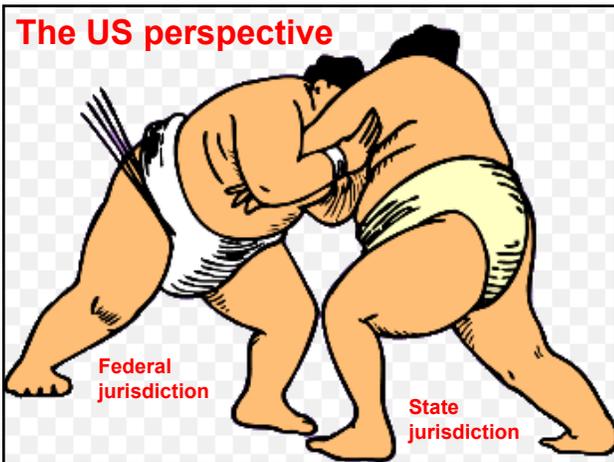
"Soon, my son, soon – once we know it's safe!"

Witch #2

- **Manned launches only**
- **CSLA as amended 2004 (now 51 U.S.C.)**
 - Contractual liability clauses **do not apply to passengers**
 - FAA has no authority to impose safety-related certification
 - 'Informed consent' → **presumption** of absence of contractual liability, but no **guarantee** in court
- **VA, FL, NM, TX, CO & CA Statutes**
 - Explicitly link informed consent to **waiver of operator liability**



us quo
Thou shalt not kill people on board – but thou shalt not kill the business either ...



The US perspective

Statutory divergences

- Phrasing 'informed consent' differs
- Inclusion entities beyond operators varies
 - From 'only those responsible for the payload' to a range of individuals involved
- Exceptions to immunity vary
 - Only gross negligence, wilful / wanton disregard & intentional injury ↔ also knowledge of existence of dangerous conditions
- Common law liability ↔ statutes?

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Problems from a federal perspective

- How 'informed' can consent be?
- Can heirs be bound by consent spaceflight participant?
 - Different phrasing
- Limited 'territorial' scope 6 statutes
 - What if heirs claim in other US state? Or even abroad?
- (So far) 44 US states *without* any statute
- NASA interest in sub-orbital astronaut flights

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Federal pre-emption?

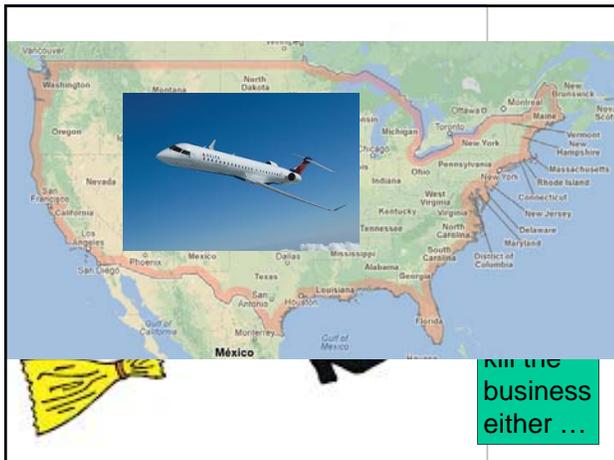
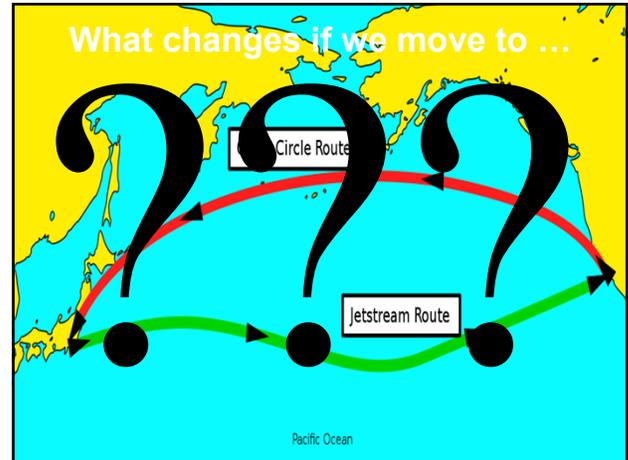
- FAA *has* regulatory authority – even if limited, so far, to 'light' regulation
 - Cf. Sec. 50919(c): not inconsistent ↔ additional / more stringent
- Private spaceflight = of national interest
 - Economically – ref. Commerce Clause
 - Security-wise – ref. ITARs; 'informed consent'
- International ramifications
 - US operators & Sweden, Curacao, UAE, South Korea, ...

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The international perspective

License shopping (within the US)

- On passenger liability: no int'l regulation whatsoever
 - ◆ In many non-US jurisdictions 'informed consent' is 'signing your life away', & may even be unconstitutional
- US operators abroad also require local license & may thus face different / additional licensing requirements there
- On third-party liability: no int'l regulation whatsoever
 - ◆ 'Territories of convenience' would likely suffer first & most heavily
 - ◆ Beauty of the state liability system of the Liability Convention
 - ↔ US operators also outside US subject to CSLA
 - ↔ Non-US operators may go for 'territories of convenience'
- Need for international discussions → harmonization?



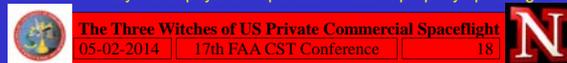
On-orbit operations: the status quo

- Manned & unmanned on-orbit activities
- Internationally: Registration Convention 1975
 - Registration space object allows exercise quasi-territorial jurisdiction on board *in outer space*
- Nationally in the US
 - FCC can license telecom satellite operations
 - NOAA can license remote sensing satellite operations
 - FAA can license (or permit) launch & re-entry objects launched into outer space ↔ *on-orbit jurisdiction?*



What is 'on-orbit jurisdiction'?

- Esp. relevant for manned space activities
- What does the law say?
 - Sec. 50904: license required for 'launch' & 're-entry'
 - Sec. 50902(4) defines 'launch':
 - ◆ "To place or try to place a launch vehicle or reentry vehicle and any payload, crew, or space flight participant from Earth - (A) in a suborbital trajectory; (B) in Earth orbit in outer space; or (C) otherwise in outer space"
 - FAA jurisdiction on activities related to launch or reentry
 - 14 C.F.R. 440.11 determines extent insurance obligation:
 - ◆ 30 days after payload separation / launch properly speaking



'Orbital' vs 'sub-orbital'

Orbital

- = Completing at least a full orbit around the Earth (operational criterion)
 - ◆ Almost by definition: in orbit means *in outer space* (not v.v.!)
 - No territorial jurisdiction
 - ◆ Entry into orbit (& re-entry from orbit) requires traversing airspace

Sub-orbital

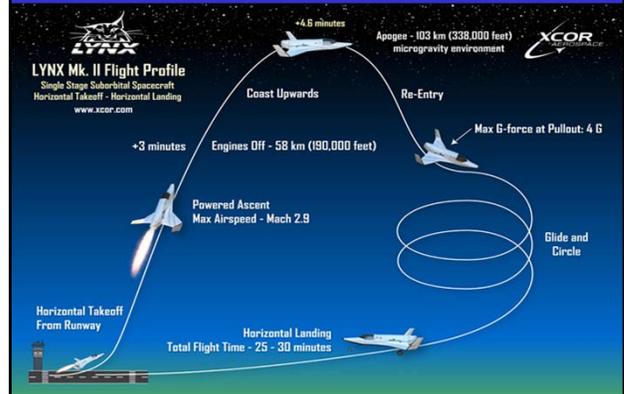
- = **Not** completing at least one full orbit (operational criterion)
 - ◆ Does **not** mean that part of trajectory \neq in outer space – in spite of 'sub' suggests remaining below a certain altitude (that of an orbit?)
 - May mean *part of an orbital trajectory* is followed...



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Impending sub-orbital trajectories



Future suborbital trajectories (1)

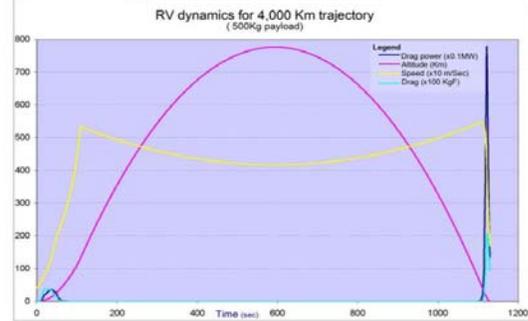
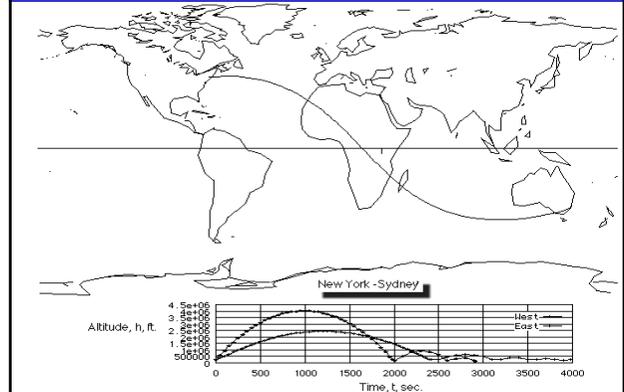
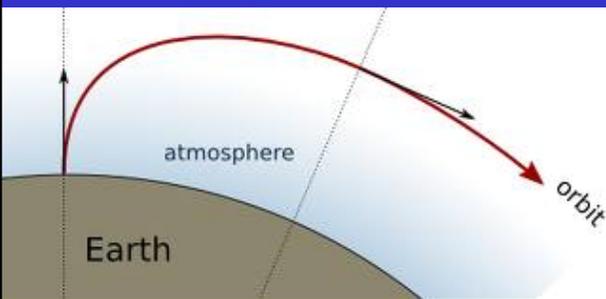


Figure 6: Typical flight profile (Altitude, Velocity, Drag and Heat)

Future suborbital trajectories (2)



Future (sub)orbital trajectories (3)



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