The New Space Policy Regime and its Financial Foundation

Culture in Crisis Conference

at

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Introduction

Post the global financial crisis of 2008, the *National Aeronautical and Space Administration (NASA)* sought to expand the space economy through a public policy of commercialization consistent with U.S. federal legislation, "51 USC Ch. 509: Commercial Space Launch Activities," and element of Title 51—National and Commercial Space Programs (NASA 2017, Shank 2020, U.S. House of Congress 1998). In my dissertation research, I look at how the drive for privatization of the space economy has brought major changes in the form of mission funding strategies, now repositioned as public private partnerships (P3s).

Formed to fund space missions with private finance in lieu of publicly subsidized funding, P3s are investment and risk-sharing vehicles subject to the evaluation of financial intermediary institutions, insurers, and at times, the courts in the case where there is foreign direct investment (FDI) agreement. For this reason, it is arguable P3s have exceptional influence on the scope and future of federal space policy, and consistently by way of state legislation. The diversity of space infrastructure policy interests has also opened the door for more flexibility in governing structures at the state and local levels.

Financing New Space P3s

Review of NASA, state government, and private space sector upstream and downstream funding activity, shows a transition from the traditional funding provided by public subsidies, to a New Space economy of private investment, characterized by differentiated models of utility accorded P3s and their funding scheme (Crane et al. 2019). There are considerable public policy challenges occurring as result. Contributing substantial knowledge to the study of space policy reform(s), dimensional analyses of space mission funding scheme offer insight into the evolving, and multifaceted space finance policy domain.

NASA Economic Instruments for Space	
Category	Instrument
Capital Subsidies	• Equity subsidies • Government loans and loan guarantees (i.e. Federal space bank) • Tax incentives (i.e. Zero G zero tax)
R&D Subsidies	• Research grants • Small business innovation research grants • Cooperative agreements • Cooperative research and development agreements
Input Subsidies	• Access to ground facilities (i.e. enhanced use leases) • Access to International Space Station and space for R&D and testing (e.g. Facilitated access to the Space Environment for Technology Development and Testing) • Assistance from Technology Transfer Offices • Assistance with NASA patents licensing
Contracting mechanisms	• Cost-plus contracts • Fixed-price contracts • Advance purchase agreements • Funded Space Act agreements • Reimbursable Space Act agreements • Non-reimbursable Space Act agreements • Prizes, challenges, and competitions
Facilitating organizations	• Organizations to facilitate R&D • Organizations to facilitate procurement • Space authority • Independent government funded organization to support the development of space industries

Traditional Space Supply Chain		
Business Segment	Financing & Funding	Market Considerations
Large satellite manufacturing, launchers, and ground equipment industry	• R&D Grants and procurements • Subsidies • Corporate loans • Project Finance • Debt and equity capital market	The large system integrators and tier 1 suppliers generally have access to capital markets similar with other tech organizations. The companies serve stable institutional relationships as well as commercial markets.
SMEs in satellite manufacturing, launchers, and ground equipment industry	• R&D Grants and procurements • Corporate loans	The companies produce components for a subsystem in the traditional satellite supply chain, yet have financing issues due to long duration R&D times, and moderate revenue potential as result of "one-off" production etc.
Large satellite services industry	• Corporate loans • Project Finance • Debt and equity capital market	These satellite operators generally have good access to debt finance and receive guarantees by export credit agencies.

	• Export credit agencies	
SMEs in ground equipment (including downstream sector)	• R&D Grants and procurements • Internal financing • Venture capital for high growth cases • Business loans	Financing for the downstream sector is readily available. R&R is typically focused on software development though may not always be advanced by a fully proven market beyond institutional sales.
Crewed and robotic space science exploration	• R&D Grants and procurements • Public venture capital	Segment is defined mostly by an institutional market with planned commercial robotic and crewed space exploration endeavors. Long duration R&D phase with higher technological risks which may pose challenge for early ventures seeking private investment.

New Space Supply Chain		
Business Segment	Financing & Funding	Market Considerations
Start-ups in satellite manufacturing, launchers and ground equipment industry	• R&D Grants and procurements • Venture capital	Depending on funding round size, start-ups with higher capital needs can face challenges. Not all market segments have proven market potential at present.
Start-ups in satellite services	• R&D Grants and procurements • Venture capital • Project finance • Export credit agencies	Start-ups in satellite services segment experience similar challenges as manufacturing, launchers, and ground equipment segments. Added hurdle of market validation. Interaction with end customer is more delayed than 'deep tech' as satellite constellation must be orbiting to release test of a prototype.
Energy mining, processing, and assembly	• R&D Grants and procurements • Public and private venture capital markets	Some governments like Japan, Luxembourg and U.S. provide R&D grants or public equity in pursuit of a long-term but potentially highly valuable market. Intermediate range commercial solutions must be identified to attract VC. It remains unclear how the substantial mid- to long-term capital requirements of those companies will be addressed in the future.

Traditional Space/Traditional financing instruments	Traditional Space/ "New" financing instruments
• Corporate loans • Project finance • Debt/equity markets • Traditional procurement • IPOs	• Innovative procurement (service-based/result-driven, parameter oriented) • Risk-sharing instruments • Alternative solutions to govt. budget for financing of major space infrastructure

• Export credit	• Use of structural funds by way of risk finance in support of the space sector
"New" Space/Traditional financing instruments	"New" Space/ "New" financing instruments
• Project R&D Grants • Working capital/revolving facilities • Seed/Bas/VC • IPOs	• Flexible business grants • Dedicated space funding instruments (e.g. orbit validation) targeting or mitigating specific risks in the space sector • Fund of Funds (FoF) (i.e. InnovFin, Space Equity Pilot (SEP)) combining public and private finance • Alternative risk finance solutions (i.e. venture debt) • Corporate VC • Public-driven dedicated space financing initiatives • Innovative procurement (service-based/results-driven, parameter oriented versus technology specifications) • New IPOs on stock exchanges allowing SME to go public • Alternative finance for launch costs (versus equity) • Use of structural funds by way of risk finance in support of the space sector • Export Credit for NewSpace • Supply chain finance to support tier 2 companies of lead/prime contractors

Space Florida: A "Special District"

Florida legislation establishing the independent jurisdiction of Space Florida as a "special district" is example of how states are construing law and federal policy for commercial use and investment. Enacted by the Legislature in 2006, Space Florida was created for the purpose of consolidating the state's space entities, Florida Space Authority, Florida Aerospace Finance Corporation, and Florida Space Research Institute as a single organization, as well as for promoting "aerospace business development by facilitating business and infrastructure financing,

spaceport operations, research and development, workforce development and innovative education programs" (House of Representatives Staff 2020, The Florida Senate 2020).

Today, Space Florida acts as the single point of contact for state aerospace-related activities with federal agencies, state agencies, businesses, the military, and the private sector. Procurement is cited as reason for undertaking the consolidation of the special district's interest under a unified and independent government. Governed by a 13-member board of directors consisting of appointees made by the Governor, the Speaker of the House of Representatives, the President of the Senate, and members of the board of directors of Enterprise Florida, Space Florida, Inc. Space Florida is subject to the provisions of the state's Uniform Special District Accountability Act of 1989. Independent special district legislation may cover the entire state of Florida where required.

Bill # CS/HB 717 (2020) – *Space Florida Financing*

March 12,2020, the Florida State Legislature unanimously passed bill *CS/HB 717 (2020) - Space Florida Financing*, authorized Space Florida validation of securitized bonds according to specified provisions, thus eliminating gubernatorial powers over the process. House of Representatives *Final Bill Summary* of the proposed legislation for redefinition of *Space Florida Financing* was sustained with 115 Y's 0 N's, approving the Governor's Action in favor of special district control of bond debt financing of the jurisdiction. As result of the 2020 legislative change, Space Florida is authorized to issue bonds and other obligations "to pay for projects, facilities, services, and other activities, including the retirement or refunding of existing bonds and obligations."

The Definition of "Bonds"

With enactment of Space Florida legislation *CS/HB 717 (2020),* the definition of "bonds" was revised to eliminate "reference to any other type of bond other than a revenue bond' and to expand the existing definition to include all other types of debt held by the district, including bank loans issued by the district for the purpose of project fundraising. This enables Space Florida to engage in short-term borrowing and revises the district's bond issuing powers to conform with the new definition accorded "bonds" within active legislation. State appropriations are not defined as part of those pledged revenue sources eligible for revenue bond transactions, and revenue bonds may not be secured by the "full faith and credit" of Space Florida under the Space Florida Act (Part II, ch. 331, F.S.),.

Terms for Issuance and Validation

The bill authorizing Space Florida to validate its bonds pursuant to ch. 75, F.S., and the process used by other Florida governmental entities within the bonding process once in effect July 1, 2020, made all bonding authority actions subject to the requirements stated, in the process repealing state legislation, ss. 331.334, 331.336, and 331.337, F.S.. The amendment "reduces the maximum length to maturity" for Space Florida issued bonds, and allows for the special district to validate its bonds "pursuant to ch. 75, F.S." The new legislation also eliminated the state requirement the special district notice presiding officers and appropriations chairs of the legislature prior to bond proposal presentation to the Governor or Cabinet.

Debt financing under Space Florida law authorizes the special district to issue revenue bonds, assessment bonds, or any other bond debt obligations, including provision for the "retirement" or "refunding" of those obligations. The jurisdiction is entitled to acquire or develop any infrastructure required for the maintenance or advancement of "space payloads and space flight

hardware," equipment for R&D, or other space related activities. The resolution authorizes Space Florida setting of an "aggregate amount of bonds to be issued," and determination of:

- The purpose(s) for which the moneys derived are to be expended;
- Interest rate(s) setting;
- Bond denominations;
- Bond issuance in one or more series;
- The date(s) thereof and maturity;
- The payment medium;
- The state or external locations where payment will occur;
- Registration and Redemption privileges. With or without premium in the latter case;
- Redemption terms;
- The manner of execution;
- The form of the bonds and attachment of interest to coupon rates;
- The manner of execution, terms, covenants, and conditions for bonds and coupons thereof; and
- Reserve or other funds.

According to Space Florida rules, the bond term cannot exceed 30 years, reducing the term from 40 years from date of issuance. The legislation provides revenue bonds "may be secured by the rates, fees, rentals, tolls, fares, or other charges to be collected from the users of any project, from any revenue-producing undertaking or activity" within the jurisdiction, or from "any source of pledged security." Additionally, revenue bonds do not constitute an indebtedness unless secured by the "full faith and credit" of Space Florida. The district may also issue refunding

bonds, as well as bond anticipation notes, obtain loans, and issue debt to pay for costs and expenses.

Procedural Rules for Bonds

Chapter 75, F.S. and Section 331.346, F.S., specify the rules and procedures for bond validation and jurisdiction of "claims, plaintiffs, notice, appeal and review,' and Section 331.334, F.S., provides for the "pledging of assessments and other revenues and properties as additional security on bonds." Pursuant to this section, the special districts can pledge its full faith and credit for any of its bonds "to ensure the full payment of principal, interest, and any other funds provided for if pledged revenues are insufficient for such payment" and "additional bond security the revenues from any project," including mortgage of "properties, rights, interest, or other assets" held by Space Florida. All revenues and assessments pledged and thereafter collected may be subject to a lien of pledges where physical delivery has not occurred. Finally, Space Florida has the authority to borrow money "for the purposes for which the bonds are to be issued." The special district must ensure at time of closing, the bonds meet "at least one" of the following requirements:

- Are rated consistent with one of the highest four ratings given by a nationally recognized rating service;
- Were privately placed or sold to accredited investors;
- Backed by a bank, savings and loan association, or other creditworthy guarantor letter of credit, or by bond insurance that guarantees the payment of both the principal and interest on the bond contracts; or
- Are accompanied by independent fiduciary affirmation that estimates of debt service coverage and probability of debt repayment are reasonable.

Space Florida Finance and the Future of Space P3s

Though Space Florida legislation does not cite bond issuance rules as having direct "fiscal impact on state or local government," the legislature's official *Fiscal Analysis of the Bill*, identifies "positive economic impact on the private sector" as the sole outcome of the reform. I argue here, when one considers the state of the space economy and its fiscal future, one could effectively argue there is important reason for such stimulus. Over the past decade, there has been demonstrated evidence of the private space sector's investment and infrastructural capacity building, including $24.6 billion in venture capital equity investment in satellite innovations and launch for purposes of commercial and governmental use 2009—2019 (SpaceCapital 2020).

Placing investment opportunities at the forefront of space economy policy priorities, the issuance of bond debt by Space Florida reduces federal obligation to Florida's role in NASA subsidized missions, while mitigating much of the risks associated with space launch and other liabilities that would otherwise be sustained by the state. Moreover, the legal definition of a special district construes Space Florida as an independent jurisdiction and government, allows for targeted economic policy support of NASA's commercialization mission over the short term, and vital reforms in the long run. Contemporary example of the federalist assumptions of the nation's founders inspired by a Biblical model of statesmanship and diplomacy, Space Florida's independent control of debt issuance in the form of bonds is quite believably the next public policy step for P3s, and humankind.

References

Crane, Keith W. et al. (2019). Assessment of the Utility of a Government Strategic Investment Fund for Space. *Science & Technology Policy Institute*, Washington D.C., April 2019.

House of Representatives Staff. FINAL BILL ANALYSIS BILL #: CS/HB 717 Space Florida Financing SPONSOR(S): Commerce Committee, Sirois TIED BILLS: IDEN./SIM. BILLS: CS/CS/SB 1070, https://www.flsenate.gov/Session/Bill/2020/717/Analyses/h0717z1.WTS.PDF

National Aeronautical and Space Administration (2017). NASA establishes new public-private partnerships to advance US commercial space. Feb 22, 2017. .https://www.nasa.gov/press-release/nasa-establishes-new-public-private-partnerships-to-advance-us-commercial-space

Shank, Christopher (2020). "Space – The Final Economic Frontier?" conference, *Politico* Oct 28, 2020. https://www.politico.com/live-stream/space-the-final-economic-frontier

Space Florida (nd.). https://www.spaceflorida.gov/

"Space Investment Quarterly Q3 2020." *SpaceCapital*, 2020. https://www.spacecapital.com/publications/space-investment-quarterly-q3-2020?source=news_body_link

The Florida Senate (2020). CS/HB 717 — Space Florida Financing. https://www.flsenate.gov/Committees/billsummaries/2020/html/2207

U.S. House of Congress (1998). “51 USC Ch. 509: COMMERCIAL SPACE LAUNCH ACTIVITIES. From Title 51—NATIONAL AND COMMERCIAL SPACE PROGRAMS. Subtitle V—Programs Targeting Commercial Opportunities.” https://uscode.house.gov/view.xhtml?path=/prelim@title51/subtitle5/chapter509&edition=prelim