

**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

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Statement of

RICHARD C. LIM
Director

Department of Business, Economic Development & Tourism

before the

SENATE COMMITTEES ON WAYS AND MEANS

Thursday, April 4, 2013

9:50 a.m.

State Capitol, Conference Room 211

in consideration of

SCR 195/SR 149

**RECOGNIZING COMMERCIAL SPACE TRANSPORTATION AS A STRATEGIC
AND TIMELY GROWTH INDUSTRY FOR HAWAII AND REQUESTING THE STATE
ADMINISTRATION TO TAKE PROACTIVE, COORDINATED, AND SUSTAINED
ACTION TO FULLY REALIZE THE SIGNIFICANT SCIENTIFIC, EDUCATIONAL,
AND COMMERCIAL BENEFITS THAT SPACE LAUNCH OPERATIONS AND
RELATED AEROSPACE ENTERPRISE CAN BRING TO HAWAII.**

Chair Ige, Vice Chair Kidani, and Members of the Committee.

The Department of Business, Economic Development and Tourism supports the intent of SCR 195/SR 149, which encourage State support to promote the significant scientific, educational, and industrial benefits commercial space launch operations can bring to Hawaii.

This resolution builds upon Hawaii's strategic mid-Pacific, near-equatorial location, advanced telecommunications and IT infrastructure, resident expertise in aerospace technology, and other assets and capabilities that make our State an optimal location to support commercial space launch activities. Such operations would not only advance our nation's aerospace industry, but also expand local transportation and communications infrastructure, while providing new technology-based training and employment opportunities to help diversify our economic base.

Thank you for the opportunity to testify on these resolutions.

George R. Ariyoshi
999 Bishop Street, 23rd Floor
Honolulu, HI 96813

March 27, 2013

TESTIMONY IN SUPPORT OF SCR195 AND SR149 – RECOGNIZING
COMMERCIAL SPACE TRANSPORTATION AS A STRATEGIC AND TIMELY
GROWTH INDUSTRY FOR HAWAII AND REQUESTING THE STATE
ADMINISTRATION TO TAKE PROACTIVE, COORDINATED, AND SUSTAINED
ACTION TO FULLY REALIZE THE SIGNIFICANT SCIENTIFIC, EDUCATIONAL,
AND COMMERCIAL BENEFITS THAT SPACE LAUNCH OPERATIONS AND
RELATED AEROSPACE ENTERPRISE CAN BRING TO HAWAII.

Dear Members of the 27th State Legislature,

I strongly support the intent of this resolution to promote and enable the significant scientific, educational and commercial benefits space launch operations can bring to Hawaii.

Our state's strategic mid-Pacific/near-equatorial location, resident expertise in multiple aerospace-related technologies, and long-standing ties with space-faring nations throughout Asia and the Pacific, clearly afford strategic assets and capabilities that can be leveraged to realize humankind's full potential in space, and in so doing enable our State to engage as both a major contributor to and beneficiary of the global space enterprise.

In particular, these factors collectively make Hawaii an ideal site to support commercial space launches to both equatorial and polar orbits, and to do so in a manner that will enable safer and more cost-effective launch operations in comparison with other launch sites on the U.S. Mainland.

Commercial space launch activities will provide multiple opportunities to grow and diversify our local economy – for example, through the deployment of small satellites and scientific payloads that can assist with monitoring and managing both man-made and natural disasters, the launching of “spaceplanes” that will carry Hawaii tourists to the edge of space, and the development of space-based power systems that can capture sunlight as a renewable energy resource for both interplanetary spacecraft and Earth-based applications.

Furthermore, commercial space launch operations could attract significant federal and private sector investments that would provide high-paying and sustainable technology-based employment opportunities for local residents, as well as promote pioneering research and innovative industrial applications statewide - and in so doing inspire the next generation of scientists, engineers and entrepreneurs that will lead us to the future.

As such, I would urge you pass SCR195 and SR149, and would be happy to address any questions you may have concerning this recommendation. I can be reached by e-mail at kyahiku@wik.com , by phone at (808) 544-6765 or by fax at (808) 544-8398.

Thank you for the opportunity to testify on these resolutions.

Aloha,



George R. Ariyoshi

GRA:khy



BUZZ ALDRIN
Astronaut

March 31, 2013

To: Members of the 27th Hawaii State Legislature

Reference: Buzz Aldrin's endorsement of HCR195/SR149 in support of commercial space launch operations from Hawaii

I am pleased to learn of Hawaii's commitment to further its emerging leadership in commercial space enterprise as called for in Resolutions HCR195 and SR149, and am delighted to offer my strongest possible endorsement of these proposals – which request your State Administration to explore and promote commercial space launch operations from Hawaii.

Much has changed in our Nation's space program since Neil Armstrong and I first stepped on the moon on July 20th, 1969. At that time, there were only a few space agencies around the world, and space launch was within reach of only a handful of nations.

Over the past four decades, our remarkable successes in space have enabled phenomenal advances in science, engineering, and healthcare, strengthened our national economy, and inspired intellectual interest in STEM-related studies that produced a highly educated technical workforce that continues to provide huge dividends from those early investments in space.

Having witnessed the benefits from America's leadership in space, today more than sixty nations are involved in space-related endeavors, as they also wish to emulate, and benefit from, these successes.

Members of the 27th Hawaii State Legislature
Buzz Aldrin
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With the new emphasis on commercial space, America is again providing pioneering leadership by engaging the private sector in new business opportunities that will undoubtedly pay even larger dividends than we have experienced in the past.

With its strong support of PISCES and innovative work on the International Lunar Research Park (ILRP) concept, Hawaii has already taken important steps toward becoming a key enabler for analog planetary research, as well as an incubator for innovation within the international space community.

By pursuing the recommendations proposed in SRC195 and SR149, Hawaii will leverage its unique mid-Pacific, near-equatorial location, significant aerospace infrastructure and expertise, and extensive ties with spacefaring nations throughout the Asia-Pacific region to become a leading launch services provider for the emerging commercial space launch sector. In doing so, it also will afford pioneering research, educational, and economic development opportunities for the people of Hawaii, which in turn will help inspire the next generation of scientists, engineers, educators and entrepreneurs that will pioneer the frontiers of space.

Thank you for the opportunity to testify on these resolutions.

Sincerely,

A handwritten signature in black ink that reads "Buzz Aldrin". The signature is written in a cursive style and is underlined with a single horizontal line.

Buzz Aldrin
Apollo XI



To: Members of the 27th State Legislature
From: Peter Quigley, member Hawaii Aerospace Advisory Committee
Subject: Testimony in support of SCR195 and SR149
Date: 3/30/13

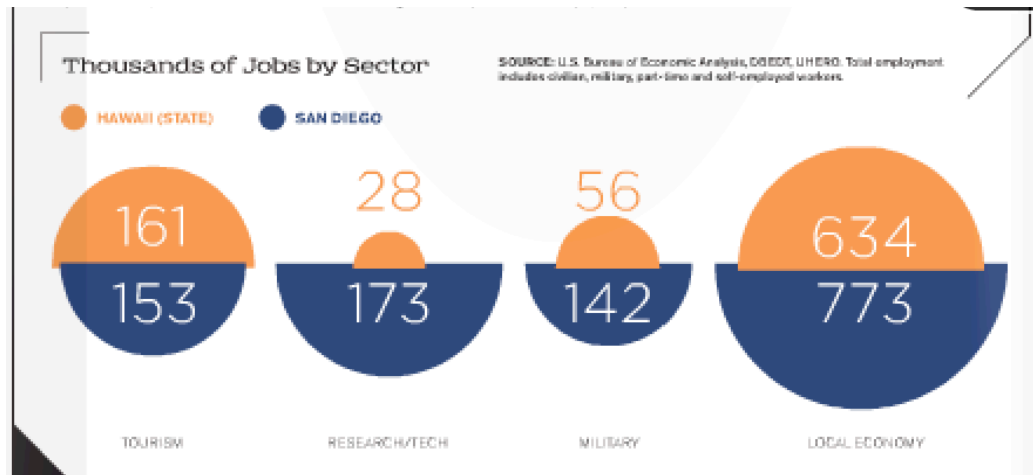
Over the last 10 years, I have had the privilege of serving as the Chancellor at Leeward College, Vice Chancellor at UH Manoa, Associate Vice President for the Community Colleges, and Executive Director of the Hawaii Innovation Initiative. It is particularly during the last two assignments that I have become acutely aware of the economic vulnerabilities facing Hawaii, as well as the enormous opportunity and promise possessed by this island state.

Hawaii's economy depends on its ability to sustain a tourism traded economy, as well as a military source for external funds. These fuel the local economy, but are also cyclic in terms of funding, and both are subject to unforeseen but inevitable periods of downturn. Even if one ignores cyclic downturns that destabilize the economy and interrupt livelihoods, there are other challenges that must be addressed by creating a larger economic pie.

There are, of course, unfunded liabilities (totaling \$26 billion) that the state MUST address if today's keiki are to have a decent place to live in 20 years. So many young people in our state today must leave Hawaii after graduating from college because of the lack of professional opportunities. As such, other sectors must be developed if our state is to have a vibrant economy that can sustain livelihoods and offer jobs to our college graduates.

Aerospace as an economic sector fits well with Hawaii's current professional capacity, research capability, and already existing investments, such as the telescopes on the Big Island, the PICSES project, and Pacific Missile Range Facility (PMRF) on Kauai. Of related interest is SB 1221, which is making its way through the legislature this term and proposes a four-year aviation program for UH Hilo that would lend even more depth and force to the space science, aerospace, and aviation activities that could emerge as part of a high tech and research economic cluster for the state.

I should note that 30 years ago the San Diego regional economy began to suffer because it too was considered isolated and dependent on two traded economic sectors: military and tourism. Today, we can see what this has meant for the San Diego region. In recent meetings with the San Diego head of tourism and other agency leaders (such as the Chair of the Chamber of Commerce), all testified to importance of a third leg of the traded economy profile.



By continuing to develop our strengths in technology and related research, we will enable much needed job growth in Hawaii. In addition to creating new jobs associated with a spaceport, commercial space launch activities in Hawaii would provide an enormous opportunity to increase our access to federal funding.

We are not starting from scratch. Over the next year, the University of Hawaii, in partnership with PMRF, will be the first University to launch a satellite into space. This is just one of many examples of the professional strength in aerospace already available and on the ground in Hawaii. A commercial spaceport would further secure this industry as a crucial component of our State's research and high technology economic sector.

In light of the work already taking place and the investments already made in this arena, in light of our strategic mid-Pacific/near equatorial location, in light of our need for a sustainable and growing economy, and considering that commercial launch operations would comport with and leverage our State's unique assets and capabilities in aerospace, I would strongly urge your positive consideration of this legislation.

Respectfully,

Peter Quigley, PhD
Associate Vice President
University of Hawaii
Hawaii Aerospace Advisory Committee member



March 28, 2013

To: The Senate, Hawaii State Legislature

From: Elliot Holokauahi Pulham
Chairman, Hawaii Aerospace Advisory Committee

Sub: SR149 and SCR195

As chairman of the Hawaii Aerospace Advisory Committee, it is my pleasure to offer testimony in support of SR149 and SCR195. Both resolutions offer support for the potential development of commercial space launch industries in Hawaii.

Before addressing the economic potential that the space launch industry might offer to Hawaii, I want to address environmental and cultural impacts; as a part-Hawaiian and native of Ka'u, these are important to me, as they are to many Hawaiians. In my 25-year career in the space industry, I have supported or observed more than twenty launches from the Kennedy Space Center and Cape Canaveral, Florida. I have seen first hand how launch operations, which require large, uninhabited safety zones, have actually helped to preserve and protect the natural environment of the 140,000 acre Merritt Island National Wildlife Refuge – including the Canaveral National Seashore, Indian River, and Mosquito Lagoon. This experience has taught me that well-run launch operations can be the lowest density, lowest impact use for environmentally sensitive areas. Accordingly, commercial launch operations are a much better fit for preserving the unique cultural, geologic and environmental assets of Hawaii than tourism, agriculture, retail or virtually any other use.

In terms of the potential economic benefit to Hawaii, I call your attention to two sets of data. The first has to do with wages paid in the space industry. As you can see from the following chart, from the Space Foundation's soon-to-be-released *The Space Report 2013*, the average compensation in the space industry is substantially higher than in other industries:

EXHIBIT 4h. Top Five States by Space Industry Average Annual Salary, 2011

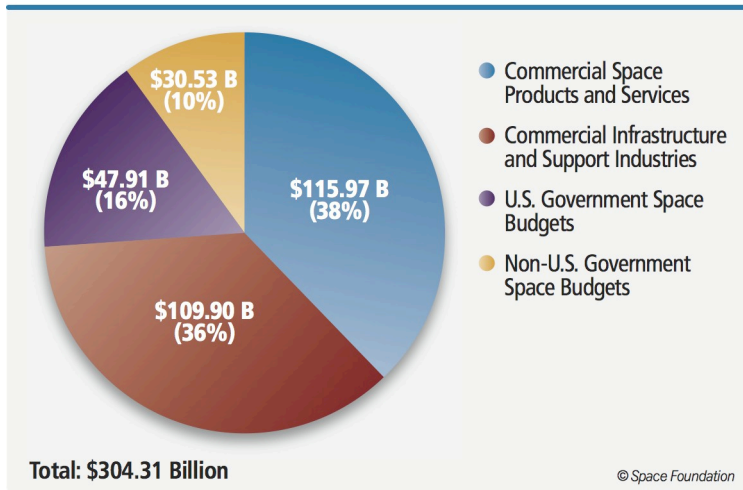
State	Space Industry Salary	Private Sector Salary	Salary Differential
Massachusetts	\$129,293	\$50,620	155%
Colorado	\$128,645	\$49,245	161%
Maryland	\$115,825	\$50,620	129%
California	\$113,752	\$54,345	109%
Virginia	\$113,591	\$50,261	126%

Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages

In short, space industry wages range from 109% higher to 161% higher than the average, prevailing wages in any state. When you compare the nearly \$130,000 per year average space wages in Massachusetts and Colorado to the State of Hawaii’s average wages of only \$37,020 – it is immediately apparent the phenomenal economic impact a vibrant space sector could have in creating jobs and prosperity for our keiki.

Second, I would like to address the market opportunity for Hawaii. As you will see in the following chart, also from *The Space Report 2013*, the global space economy was a \$304 billion marketplace in 2012:

EXHIBIT 2c. Global Space Activity, 2012



Within this \$304 billion industry is the launch business. In 2012 there were 78 orbital launch attempts (74 successes, 4 failures) that represented \$6.94 billion in activity. While this roughly \$7 billion total is a small fraction of the industry, it is a huge addressable market segment for Hawaii. Of particular importance:

- The launch business brings with it a number of adjacent, job-creating activities, including payload processing, payload and launch vehicle integration, data management, telemetry services, and so on. These are also high paying, space industry jobs.

- The forecast for the launch sector is very strong. As shown in the following two charts, average annual payload mass has grown almost 50% in the past five years, and the Space Foundation forecasts that 261 total launches will be required to orbit 449 satellites in the next nine years.

EXHIBIT 3j. Number of Launches Attempted and Payload Mass Intended for Orbit by Country, 2007–2012

	2007		2008		2009		2010		2011		2012		Total	
	Launches	Mass (kg)	Launches	Mass (kg)	Launches	Mass (kg)	Launches	Mass (kg)	Launches	Mass (kg)	Launches	Mass (kg)	Launches	Mass (kg)
China	10	26,007	11	30,613	6	16,388	15	37,990	19	64,907	19	48,448	80	224,353
Europe	6	25,156	6	40,384	7	35,220	6	24,442	7	43,810	10	50,962	42	219,974
India	3	3,185	3	2,294	2	1,336	3	4,187	3	3,576	2	2,650	16	17,228
Multinational	0	0	1	1,370	3	8,913	0	0	2	7,800	3	15,500	9	33,583
Iran	0	0	1	45	1	26	0	0	1	15	3	150	6	236
Israel	1	300	0	0	0	0	1	272	0	0	0	0	2	572
Japan	2	4,085	1	2,000	3	19,838	2	2,300	3	18,600	2	18,400	13	65,223
North Korea	0	0	0	0	1	500	0	0	0	0	2	200	3	700
Russia	26	90,370	26	92,814	29	116,932	31	125,997	31	137,365	24	117,778	167	681,256
South Korea	0	0	0	0	1	100	1	100	0	0	0	0	2	200
United States	20	78,665	20	206,186	25	112,136	15	100,383	18	96,799	13	72,124	111	666,293
Total	68	227,768	69	375,706	78	311,389	74	295,671	84	336,376	78	326,212	451	1,909,618

Source: Futron

EXHIBIT 3c. Commercial Satellite and Launch Forecasts, 2013–2021

Satellites	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total	Average
GSO Forecast (COMSTAC)	21	20	23	21	20	20	20	22	22	189	21.0
NGSO Forecast (FAA)	44	28	35	42	49	16	15	16	15	260	28.9
Total Satellites	65	48	58	63	69	36	35	38	37	449	49.9
Launch Demand											
GSO Medium-to-Heavy	16	15	18	16	15	15	15	17	17	144	16.0
NGSO Medium-to-Heavy	12	13	15	12	16	11	11	10	10	110	12.2
NGSO Small	1	0	0	1	1	1	1	1	1	7	0.8
Total Launches	29	28	33	29	32	27	26	29	28	261	29.0

Note: GSO – geosynchronous orbit, NGSO – non-geosynchronous orbit, COMSTAC – Commercial Space Transportation Advisory Committee; FAA – Federal Aviation Administration
Source: FAA

The data are clear. Well-managed space launch represents an environmentally benign economic opportunity of vast potential for the State of Hawaii. Accordingly I heartily endorse SR149 and SCR195, and urge that the Senate pass these two important resolutions as a clear signal to industry that Hawaii is ready to play an important role in the exploration, development and utilization of the final frontier.

Me ka ha'aha'a,



Elliot Holokauahi Pulham
Chairman, Hawaii Aerospace Advisory Committee

Henk B. Rogers

Pu'u Wa'awa'a Ranch

March 31, 2013

Dear Members of the 27th Hawaii State Legislature,

I am pleased to provide testimony in strong support of SCR195 and SR149, which request our State administration to proactively explore and promote opportunities for commercial space launch operations in Hawaii.

I firmly believe that there is a very big future for mankind and, more specifically, for our nation in space exploration. It is only a matter of time before we once again set foot on the Moon and for the first time set foot on Mars. So where in this country will the next stage in the space program be based? Will it once again be Florida? Or will it be Hawaii? This is up to us.

We have a distinct and unique opportunity here. As NASA and the rest of the world once again turn their attention to the Moon and Mars, we can focus their attention on basing the activities of space exploration in Hawaii. We have the best terrain for realistic Mars and Moon base simulations since our islands are made of the same basic material (basalt/regolith). We are also the best location to launch from in the U.S. since we are closest to the equator of any U.S. state.

If we could convince space-faring nations to test planetary exploration in Hawaii and/or launch payloads from Hawaii, we would have a high tech sector in Hawaii equal to the military or tourism.

Please give this legislation your utmost attention. If we are able to bring commercial space transportation to Hawaii, it will be our legacy.

Sincerely Yours with Aloha,

A handwritten signature in black ink, appearing to read 'Henk B. Rogers'. The signature is stylized with a large, looped 'H' and a long, horizontal flourish extending to the right.

Henk B. Rogers
Vice Chairman
Pacific International Space Center for
Exploration Systems

March 31, 2013

To: Members of the 27th Hawaii State Legislature

Reference: HCR195/SR149 in support of commercial space launch operations from Hawaii

I am pleased to provide written testimony offering my personal endorsement of and strongest support for Resolutions HCR195/SR149 - requesting the State Administration to explore and promote commercial space launch operations from Hawaii.

As a member of the Board of Directors for Hawaii's Pacific International Space Center for Exploration Systems (PISCES), I have the honor of working with the great State of Hawaii, and its Office of Aerospace Development, in assisting with the implementation of the State's visionary initiatives to become a leader in international space endeavors.

In a remarkably short period of time, PISCES has flourished from simply an interesting concept to a program demonstrating an important and unique role that Hawaii can serve in furthering our Nation's goal to promote international collaboration in space, while also providing economic and social benefits to the State, as well as inspiring our youth to pursue STEM-related studies that will ultimately permit them to contribute to this goal in their future careers.

As the former Director of Advanced Programs at NASA, where I spent my career leading and sponsoring innovative advanced technology projects, programs and missions that have flown in space in support of human exploration and development of space, it is also clear to me that the shift to commercial space launch will play a critical new role for our national space program, as NASA again leads the world in bringing the private sector into the space launch domain that has been the purview of international space agencies for more than five decades.

I was fortunate to attend the recent launch of SpaceX's Falcon 9/Dragon International Space Station (ISS) cargo servicing mission from Kennedy Space Center's launch facilities at Cape Canaveral. This was the third of three successful missions by SpaceX to ISS, which collectively have demonstrated the efficacy of commercial space for Earth to Orbit launch operations, allowing NASA to focus on the more challenging task of developing the technologies and capabilities required to support human exploration far beyond low-Earth orbit – to the Moon, to asteroids, and eventually to Mars.

As other private sector companies also begin to field their maturing commercial launch systems, I believe this will provide an opportunity for Hawaii to become a leader in commercial space launch operations – leveraging its unique mid-Pacific, near-equatorial location that affords opportunities for all-azimuth launch operations, while providing enhanced performance by virtue of its lower launch latitude (as compared to competing US mainland launch sites).

By supporting these Resolutions, Hawaii will again demonstrate its commitment to being an international leader on the space frontier, which will provide significant economic and societal returns to the State of Hawaii, as well as to the future workforce it will inspire to pursue this vital work for Hawaii, for our Nation, and for the benefit of all humankind.

Respectfully,

Lewis L. Peach, Jr.
Secretary, PISCES Board of Directors,
Aerospace Consultant, and
NASA Executive (retired)

International Ventures Associates

5333 Potomac Avenue NW, Washington, D.C. 20016

March 29, 2013

Ref: Support of SCR 195 & SR 149 (Commercial Space Transportation)

Dear Members of the 27th State Legislature:

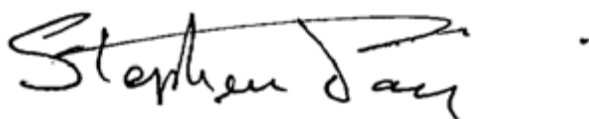
As a member of the Hawaii Aerospace Advisory Committee (HAAC), past chairman of the Japan/U.S. Science, Technology & Space Applications Programs (JUSTSAP), and former executive at COMSAT in Washington, D.C., I am pleased to provide testimony in strong support of these resolutions, which request the Hawaii State Administration to proactively explore and promote opportunities for commercial space launch operations in Hawaii.

Your State's strategic geographical location, resident expertise in a broad range of technology-related fields, and international partnerships with space-faring nations throughout the Asia-Pacific Region make Hawaii an ideal site from which to support commercial space launch activities, and to do so in a way that can couple with other industries to strengthen and diversify your local economy – especially toward developing an “arc of related technologies” statewide (analogous to the highly successful and ultimately transformational economic development models implemented in other metropolitan areas, including Pittsburgh, Austin, Rochester, and Silicon Valley).

These resolutions highlight timely opportunities to advance innovative economic development scenarios in Hawaii. Commercial space launch activities would both complement and enhance your State's technology-based industries, including DoD and private sector aerospace programs, your Pacific International Space Center for Exploration Systems (PISCES), and K-12/University STEM initiatives statewide – leading to higher paying jobs, expanded overseas investments, and increased competitive capabilities across many fields (e.g., broadband telecommunications, renewable energy, remote sensing, telerobotics – among others).

As such, I would urge you to adopt this most visionary “call to action”!

Sincerely,

A handwritten signature in black ink that reads "Stephen Day". The signature is written in a cursive, flowing style with a long horizontal stroke extending to the right.

Stephen M. D. Day
Chief Executive Officer