Education & Workforce Development: Texas-Japan Partnership Preparing the Workforce of the Future
USJC Japan-Texas Economic Summit
Tuesday, May 8th
With you today....

Ron Harman  
Principal and Future of Work Leader, Deloitte Consulting LLP

Barrett S. Caldwell  
Professor, Purdue University & Jefferson Science Fellow, U.S. Department of State

Motoko Uchitomi  
Japanese Aerospace Exploration Agency (JAXA)

Romanita Matta-Barrera  
Executive Director, SA Works
7 Disruptors

- Technology is Everywhere
- Tsunami of Data
- AI, Cognitive Computing, Robotics
- Jobs Vulnerable to Automation
- Diversity/Generational Change
- Careers – 100 year life
- Explosion in contingent work
The augmented workforce

Source: Deloitte, 2017
Three dimensions changing the future of work

1. WHAT?
   “Work”
   Automation level

2. WHO?
   “Workforce”
   Talent category

3. WHERE?
   “Workplace”
   Physical proximity

Current work options
Future work options
How does one deal with this era of massive disruption? One needs to Zoom Out to a future you can’t yet see, put a stake in the ground on what you think this future will be and then Zoom back in to take the first steps to get there.

- John Hagel, co-chairman of Deloitte Center for the Edge
Education and Workforce Development: Texas-Japan Partnerships Preparing the Workforce of the Future

Barrett S. Caldwell
Professor of Industrial Engineering and Aeronautics & Astronautics

Bureau of East Asian and Pacific Affairs, Office of Japanese Affairs, U.S. Dept. of State

Japan-Texas Economic Summit
May 8, 2018
Developing Middle-Skills and Higher-Skilled Science, Technology, Engineering and Mathematics (STEM) Workforce

• Advances in Automation and Robotics  
  – Replacing, or Supporting, Human Workers?

• Aging Workers and Societies  
  – Demands for higher productivity and quality

• Interactions of Hardware and Software Technology  
  – Internet of things, cybersecurity, social media  
  – Precision agriculture, precision medicine, secure supply chains
Increasing Opportunities for Middle-Skills STEM Workers

- Beyond High School, but Not Advanced Degrees
- Technicians, Analysts,
- Smart Factories, Advanced Agriculture, Healthcare & Services
National Space Grant College and Fellowship Program

- US NASA Office of Education Program
- National Network of Colleges, Universities, Science Outreach Centres, Companies, etc.
  - > 1000 locations
  - 52 consortia (US states + DC, Puerto Rico)
- Most Directors are University Faculty in Science / Engineering Disciplines

- **Inspiring, Recruiting, Educating Diverse Workforce Using NASA’s Unique Assets and Mission**
Space Grant Activities for Middle- and Higher-Skills STEM

- FIRST Robotics (Houston Championships Apr 18-21!)
- Partnerships with Community Colleges
- Design Challenges
Undergrad Design Challenge

- College Teams of 3-6 students work on a NASA project
- Faculty Advisor and NASA Mentor provide support
- Project may last 1 or 2 semesters, Teams earn funding
- At the end of each semester, teams present their work in Houston at the Design Challenge Showcase Event
  - NASA, industry, and educator audience
  - About 10-14 teams complete each semester
  - Poster, Models, and Presentations judged and Feedback provided
  - Top Design Teams awarded Scholarships
Prof. Barrett S Caldwell

- bscaldwell@purdue.edu; CaldwellBS@state.gov

- https://www.nasa.gov/offices/education/programs/national/spacegrant/about/index.html
- https://www.firstinspires.org/

- These slides represent the opinions of the author only and do not reflect official positions of any U.S. government agency.
Promoting Cooperation with Industry & Universities

2018.5.8
Motoko Uchitomi (Mizuno)
JAXA Aviation Industrial Collaboration and Coordination Division
Ms. Motoko Uchitomi (Mizuno) biography

Ms. Motoko Uchitomi (Mizuno)

1994 東京大学法学部卒業 Graduated from UT (Bachelor of Law)
1994 旧宇宙開発事業団（NASDA）入社、企画室（法務） ISS協定交渉、国連対応等

Former NASDA Policy Dept., : legal strategy & coordination for ISS, UN etc.
1997 外務省国際科学協力室出向、ISS国際協定国会批准、国際科学協力推

Ministry for Foreign Affairs: ISS/IGA Diet approval, international science cooperation
1999 オランダ ライデン大学留学（2000年9月に国際法修士号取得）

Leiden Univ., The Netherlands (Master of International Law/ 2000)
2000 有人本部（ISS国内外法務＆利用促進） NASDA ISS Dept.: ISS legal coordination & promotion of utilization
2003 JAXA産学官連携部（宇宙ビジネス促進） JAXA Industrial Cooperation Dept.: promotion of new space ventures
2007 国際部 欧米協力とりまとめ International Relations,: coordination with US. Russia & Europe
2012 法務・コンプライアンス課長 Manager of JAXA Legal Division
2015- 航空技術部門 事業推進部 参事・航空産業協力課長 Manager of Aviation Industrial Collaboration

（本務以外の活動 Works outside of JAXA）
東京大学非常勤講師（2010年-）、慶応大学非常勤講師（2013-14）、中小企業診断士（2010年登録）、航空宇宙学会宇宙ビジョン委員会幹事、宇宙芸術コミュニティbeyond発起人＆種子島宇宙芸術祭アドバイザ、日本ロケット協会宇宙女ボード発起人
Part-time lecturer at UT (2010-), Part-time lecturer at Keio Univ. (2013-14), Small business consultant, JSASS Space Vision Committee (Secretary), space art community “beyond” (Founder), JRS Diversity for Space Committee “Sorajo” (Founder)
Organizational Structure of JAXA & Related Government Agencies

- **Strategic Headquarters for Space Policy** (Secretariat: Cabinet Secretariat)
  - Cabinet Office
  - Council for Science and Technology Policy (CSTP)
  - Space Activities Commission

- **Council for Science and Technology / Committee on Science and Technology for Aeronautics**
  - Ministry of Education, Culture, Sports, Science and Technology (MEXT)
  - Ministry of Internal Affairs and Communications
  - Ministry of Economy, Trade and Industry (METI)
  - Ministry of Land, Infrastructure, Transport and Tourism (MLIT) / Civil Aviation Bureau
  - Ministry of Defense
  - Ministry of Environment

- **R&D Directorates**
  - Space Technology Directorate I
  - Human Spaceflight Technology Directorate
  - Institute of Space and Astronautical Science (ISAS)
  - Space Exploration Innovation Hub Center
  - Aeronautical Technology Directorate
  - Research and Development Directorate
  - Space Technology Directorate II

- Number of JAXA employees: Approx. 1,550 (220 in Aeronautics)
- **Budget** (@1 USD=100 JPY) Approx.
  - Overall budget: 1.54 billion USD
  - Aeronautics: 64 million USD (FY2017)
JAXA’s Aviation Research Initiatives
- 3 major R&D programs and basic research

Environment
Environment Conscious Aircraft Technology Program (ECAT)

Safety
Safety Technology for Aviation and Disaster-Relief Program (STAR)

Frontier
(Sky Frontier Program)

Science & Basic Tech
Aeronautical Science & Basic Technology Research Program
- Offering various testing facilities
- Reaching more than 100 R&D agreements/year
- Issuing research announcements
- Accepting students as RA

For more information: [http://www.aero.jaxa.jp/eng/research/basic/](http://www.aero.jaxa.jp/eng/research/basic/)
JAXA cooperates with universities & industry to produce top level researchers for aviation technologies by offering research & educational opportunities.

**Academic Society**

Established “Aeronautics education support Forum” with JSASS *
- Seminars for students at academic meetings
- CFD competitions
- Discussion for enhanced efficiency of educational support
  - Carrier path for students
  - Possibility of FTB utilization

**Local Gov. & Industry**

- Agreement with Aichi Pref.
- Collaboration with industry associations (ASTEC)
  - Seminars
  - Experimental opportunities

*The Japan Society for Aeronautical and Space Science

Developing framework for agreements with universities and supporting their educational activities such as sending visiting professors etc.
- Recruiting graduates as research assistant (RA)
- Accepting more than 300/year university students as trainees (160/year for Aviation Directorate)
- Making agreements with 30 universities & tech colleges to provide CFD tools for education
- Advising flight experiment program for students by universities (sponsored by MEXT)
Formal Education Support
Assisting development of teaching plans, as well as teaching and learning materials in classrooms

Informal Education Support
Developing unique programs for various levels of primary and secondary school students to learn in a progressive manner

Home Education Support
Developing education materials for parents and children to conduct simple experiments at home

International Activities
Collaborating within the frameworks of ISEB and APRSAF
“SPACE = Unique source of interest, imagination & inspiration.”

**Space**
- **Curiosity**: Toward mysteries of the universe
- **Craftsmanship**: Engineering skills necessary for space activities
- **Adventurism**: Exploring into space

**Stimulating Children’s curiosity toward nature, universe and life while stressing the preciousness of life**

**Human Development through Space**
Overview of UNISEC-Japan

• UNISEC: “University Space Engineering Consortium”
  – UNISON: UNISEC Student Organization
  – UNISAS: UNISEC Alumni Organization
• Established in 2002
• NPO/NGO to facilitate/promote university level students’ practical space development activities, such as designing, manufacturing and launching small satellites and hybrid rockets.
• 74 laboratories/groups from 52 universities
• 955 student members, 270 individual supporters, and 15 corporate supporters (as of April, 2018)
• 3 pillars: Human resource development, Technological development, Outreach
UNISEC-Global

- UNISEC-Global is an international nonprofit, non-government organization, consisting of local-chapters across the world. *Points of Contact in 45 regions and 15 Local Chapters (LCs)/2018
- Since its establishment in November 2013, it has provided an annual forum, training programs, competitions.

• Training Program
  – CanSat Leader Training Program (CLTP)

• Competition
  – Micro/Nano Satellite Mission Idea Contest (MIC)
  – Debris Mitigation Competition (DMC)

• Conferences, workshops, and meetings
  – UNISEC-Global Meeting
  – Nano-satellite Symposium
CanSat Leader Training Program (CLTP)

Objective: CLTP is a training program for professors/instructors to learn how to conduct CanSat training by experiencing it. Participants are expected to teach their students after training. It has contributed to capacity building in basic space engineering and technology.

Launched: October 2010

Offered: Annually

Graduated: 73 participants from 34 countries
### Indices for Measurement of Gender Equality (HDI, GII, and GGI)

<table>
<thead>
<tr>
<th>HDI (188 countries) (Human Development Index)</th>
<th>GII (159 Countries) (Gender Inequality Index)</th>
<th>GGI (144 Countries) (Gender Gap Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Score</td>
<td>Country</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>Norway</td>
<td>0.949</td>
</tr>
<tr>
<td>2</td>
<td>Australia</td>
<td>0.939</td>
</tr>
<tr>
<td>3</td>
<td>Switzerland</td>
<td>0.939</td>
</tr>
<tr>
<td>4</td>
<td>Germany</td>
<td>0.926</td>
</tr>
<tr>
<td>5</td>
<td>Denmark</td>
<td>0.925</td>
</tr>
<tr>
<td>6</td>
<td>Singapore</td>
<td>0.925</td>
</tr>
<tr>
<td>7</td>
<td>Netherlands</td>
<td>0.924</td>
</tr>
<tr>
<td>8</td>
<td>Ireland</td>
<td>0.923</td>
</tr>
<tr>
<td>17</td>
<td>Japan</td>
<td>0.903</td>
</tr>
</tbody>
</table>


Note:
1. The Human Development Index (HDI) is a summary measure of achievements in key dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.
2. The Gender Inequality Index (GII) reflects gender-based disadvantage in three dimensions—reproductive health, empowerment and the labour market. It shows the loss in potential human development due to inequality between female and male achievements in these dimensions.

※Data from web page of Gender Equality Bureau, Cabinet Office
Proportion of Female Workers and Female Administrative/Managerial Workers

The proportion of female administrative and managerial workers in Japan is lower than other countries.

Note:
1. Created from “Labour Force Survey (Basic Tabulation), 2017” by the Ministry of Internal Affairs and Communications and “ILO STAT.”
2. Data of Japan is as of 2017; data of Australia is as of 2014; data of US is as of 2013; data of other countries are as of 2015.
3. “Administrative and Managerial Workers” include company officers, company management staff, and management government officials among workers. Definition of administrative and managerial workers varies across countries.
Promotion of gender equality (from FY 2013 to FY 2015)

Project Supporting Female Researchers (subsidy program by Ministry of Education, Culture, Sports, Science and Technology)

- Specific Measures
  A. Ensure a secure environment for giving birth, raising children, and caring for sick/elderly family members.
  B. Restructure work environment to ensure work-life balance.
  C. Improve capacities for research and development as well as for managing a group.
  D. Expand recruitment and appointments and increase awareness of such efforts.
  E. Visualize role models, increase opportunities for interaction with female graduate and undergraduate students.
  F. Construct networks for internal, external, and mutual collaborations.

Original projects by JAXA
Implementing above-mentioned measures among all employees (including non-researchers and males)

Work-Life Support and Diversity Office
Efforts toward promoting gender equality and diversity (from FY 2016)

- Increasing recruitment and appointments of females and increasing awareness about these efforts
- Specific measures for all employees
  1. Ensure a secure environment for giving birth, caring for children, and caring for sick/elderly family members.
  2. Restructure work environment to ensure work-life balance.
  3. Improve capacities for research and development as well as for managing a group.
- Basis for supporting implementation of the measures
  1. Transmitting information on results of activities, “best practices,” etc.
     Operating a website, publishing a magazine
  2. Constructing networks for internal, external, and mutual collaborations
     Attending related international and national conferences
  3. Collecting data for supporting implementation of the measures, introducing national and international “best practices”
     Preparing statistical data and various investigations

The Act on Promotion of Women’s Participation and Advancement in the Workplace
Basic Act for a Gender Equal Society
The Promotion Plan of Telework by Ministry of Internal Affairs and Communication
Basic Plan for Gender Equality

An employee-friendly workplace in which one can freely demonstrate his/her abilities

Contribution to the field of aerospace through promoting innovations
Bringing More Diversity in Japan’s Aerospace Industry

-voluntary team "Sorajo" based in Japanese Rocket Society-

- Hosting seminars and networking events for professional women (and men as supporters) and the next generation in association with academic society and industry
- Collaborating with WIA
SA Works, housed under SAEDF, is an industry-led workforce organization aligning San Antonio’s education providers and private sector to promote economic mobility.
Explosive Growth & Momentum

► Explosive Growth
  – Population of 1.4m expected to double by 2040
  – 7th Largest City in the U.S. (5th by 2030)

► Quality of Life
  – #2 for Millennial Population Growth – Business Insider
  – Top 10 Cities in the U.S. for Tech Jobs – Entrepreneur Magazine
  – #1 U.S. Metro with the most ‘Brain Gain’ – Brookings Institute
  – #1 “Best City for Young Grads” – Forbes
  – Top Creative City for Gastronomy – UNESCO

► Ideal Business Climate
  – A pro-business local government that values growth
  – Only large U.S. city (1m+) with AAA bond rating
  – Competitive cost of living, 12% less than U.S. average
  – Affordable land, energy and water
Demographic Snapshot

As former head of the U.S. Census Bureau, Stephen Murdoch once said, ‘If you want to see what the future will look like in the U.S., look to San Antonio.’ The country will one day become as multicultural, young, and tolerant as we are today.
Strategic Framework

Business Attraction

Business Retention & Expansion

Global

Entrepreneurial Development

WORKFORCE DEVELOPMENT

New Energy  IT / Cyber Security  Aerospace  Bioscience  Advanced Manufacturing  Financial Services  Military  Headquarters
Our Relationship with Japan

Japanese companies in San Antonio today

Japanese City of Kumamoto Sister City with San Antonio

Naoko Shirane Foundation: Summer Study Tour of Japan for children of employees of TMMTX and suppliers
Challenge: Middle Skills Jobs Not Being Filled

Healthcare
2 posted job openings for every 1 healthcare graduate in San Antonio*

Information Technology
10 posted job openings for every 1 IT college graduate in San Antonio*

Manufacturing
Nationally over the next decade, projected 3.4 million job vacancies with 2 million that will go unfilled **

*SA2020 Talent Pipeline Report  **The Manufacturing Institute
GUIDING PRINCIPLE: 
Meet Employer Demand

GROWING
Our Talent (K-12)

UPSKILLING
Incumbent Workers

RECRUITING & RETAINING
Talent that is Hard to Find Locally
Job Shadow Day

One day event to provide students exposure to various companies across Bexar County. The companies participating in the city-wide Job Shadow Day planned for months to provide a combination of meaningful and informative activities.

Job Shadow Day exposes students to:
• company culture and values
• career opportunities in diverse industries
• technical and marketable skills needed in the workplace

Teacher Externships

Teacher Externships provide opportunities for educators to learn how math and science is applied in the workplace with one-week summer sessions that include employer visits and creation of project-based learning lessons. The Externships for Teachers Project in San Antonio is carried out by the Alamo STEM Workforce Coalition (ASWC). ASWC member organizations include:
• Workforce Solutions Alamo (WSA)
• The Alliance for Technology Education in Applied Math and Science (ATEAMS)
• Education Service Center, Region 20 (ESC-20)
• The University of Texas at San Antonio (UTSA) Academy for Teacher Excellence (ATE)

Affiliated partners include: San Antonio Chamber of Commerce and PL6Plus Council
Summer Jobs for High School Students

2017 SA WORKS SUMMER INTERNSHIP PROGRAM

THE EMPLOYED LIFE
All SA Works interns gain real world, hands on and paid experience and get exposure to new career paths.

OVER 700 14-19 YEAR-OLDS EMPLOYED

TOTAL IMPACT
$1,102,500

THE ECONOMIC IMPACT OF EMPLOYMENT

HOW OUR EMPLOYERS BENEFIT
- Increased productivity
- Potential recruitment
- Mentoring opportunities
- Fresh ideas and perspectives

ECONOMIC IMPACT OF EMPLOYMENT

33 EMPLOYERS REPRESENTING
- 19 Private Sector Companies
- 10 Non-Profit Organizations
- 4 Public Sector Entities

ROI EXAMPLE
$4,000 SAVED

GET INVOLVED!
Help us grow San Antonio’s talent.
sanantonioworks.org

Mayor’s Call to Action
Cultivating Our Talent: TMMTX

TMMTX Community Engagement

Education & Workforce

Comprehensive Strategy

Long Term:
- PreK4SA
- BiblioTech
- PREP
- Core 4 STEM
- FIRST
- Robotics

Mid Term:
- Alamo Academies
- AMT Program
- Solar Car
- Electric Car
- Scholarships
- FIRST Robotics

Short Term:
- GED Program
- Military Hiring
- Career Technologies Education (CTE)

Education & Workforce

SCHOLARSHIPS

- Toyota Texas STEM Teacher Scholarship
- MBKSA Scholarship (My Brothers Keeper San Antonio)
  - MLK Scholarship
  - GED Programs
- Athlete to Teacher Scholarships (in progress)
Southwest High School’s engineering team tests a robot on stage after Southwest ISD received a $1.7 Million Grant from Toyota USA Foundation.
Upskilling Incumbent Workforce

Increased Awareness of Manufacturing Outreach & Recruitment

Cultivating & Upskilling Talent

RESULTS: Increased AMT Enrollment with New & Incumbent

BUILD YOUR CAREER PATH AS A HIGHLY-SKILLED MANUFACTURING TECHNICIAN IN ONLY

About the AMT Program:
- **College:** Classroom instruction will be offered at the St. Philip’s College Southwest Campus in subjects including electricity, fluid power, mechanics, fabrication, and robotics. Your commitment is to fully attend to your class and work schedule every week.
- **Work:** You will work at the sponsoring employer job site during the week managing, maintaining, and repairing their high tech industrial robots, conveyance systems and other technical and mechanical systems.
- **College and Work:** You will earn a competitive salary to ensure that you are able to make a living wage to pay for college and expenses. Employers will accommodate your weekly work hours to ensure you are attending college.
School-to-Career Program Success

**JOB SHADOW**
- **2017**: 3,000+
  - Employers-107
  - 30-Returning, 77-New
- **2016**: 1,700
  - Employers-59

**STUDENT INTERNSHIPS**
- **2017**: 700
  - SA Works Employers-33
    - 21-Returning, 12-New
- **2016**: 573
  - SA Works Employers-14
    - 2-Returning, 12-New

**TEACHER EXTERNSHIPS**
- **2017**: 194
  - Employers-40
    - 21-Returning, 19-New
- **2016**: 151
  - Employers-29
    - 20-Returning, 9-New

**ECONOMIC IMPACT OF STUDENT EMPLOYMENT**
- **TOTAL IMPACT**: $1,102,500
REAL AND READY