



## Executive Summary

U.S.-Israel Commercial Space Working Group | February 1<sup>st</sup>, 2011 | Tel Aviv, Israel

The U.S.-Israel Science and Technology Foundation (USISTF) convened a U.S.-Israel Commercial Space roundtable on February 1<sup>st</sup>, 2011 in Tel Aviv, Israel. The impetus for organizing this working group stems from recent shifts in emphasis in both the U.S. and Israeli space policies towards encouraging development and testing of next generation, high-needs technologies, including space flight capabilities, in the private sector. A recent report submitted to and approved by the Israeli Government seeks to leverage the capabilities developed in the defense arena to stimulate the growth of a civilian and commercial space industry. Correspondingly, the National Space Policy (NSP) of the United States, published in late June 2010, endorses international cooperation as a means to augment U.S. Space exploration and capabilities. The NSP suggests that international cooperation should facilitate new market opportunities for U.S. commercial space services and capabilities, to promote harmonized regulations and to enhance U.S. relations with its allies in space activities. The NSP also tasks departments and agencies with identifying potential areas for international cooperation that could include space transportation, space surveillance and awareness, and space nuclear power to support space exploration among others.

In mid-August 2010, following the issuance of the NSP, National Aeronautics and Space Administration (NASA) Administrator Charles Bolden and Israel Space Agency (ISA) Director General Zvi Kaplan signed a statement of intent designed to facilitate further cooperation between the United States and Israel through existing NASA outlets on joint research responding to each country's needs. The NSP calls for greater international cooperation in space technology research which is why the USISTF is developing an action plan to advance the goals of the NASA-ISA Statement of Intent to Cooperate. While international cooperation in space has at times been challenging for the United States due in part to International Traffic in Arms Regulations (ITAR) and other export regulations, USISTF in the context of its commercial space working group as part of its project *Israel 2028: Industrial Innovation Policy 2028*, considers the renewed emphasis on international cooperation to open a window of opportunity to undertake concrete steps to operationalize the NASA-ISA statement of intent and leverage the power of international research and development (R&D) cooperation to advance industries in both the U.S. and Israel.

### Summary of Intended Goals

USISTF's goals in convening this roundtable are to further develop a work plan in consultation with government, industry and civil society that will enable increased industrial,

civilian and commercial space cooperation to meet the challenges and needs of the U.S. and Israel. In a time when government funding for R&D is constrained, international cooperation with high technology allies is a tool that can be used to leverage greater R&D activity. The goal is to facilitate cooperation amongst existing programs so that their results can be leveraged by funded partners. The roundtable discussion was focused around topics such as:

- How can the United States help Israel's new civilian space initiative become a success?
- How can Israel's limited, but highly capable space program be of benefit to NASA's science and exploration programs? U.S. commercial space ventures?
- What Israeli space products can provide value-added to NASA's space science missions? Which missions?
- What additional linkages should be made to strengthen the NASA-ISA relationship?
- What barriers currently exist that inhibit NASA-ISA cooperation and what can be done to remove those barriers?

### **Participants**

Ms. Ann Liebschutz, Executive Director of the U.S.-Israel Science and Technology Foundation moderated the working group. Meeting attendees included representatives from the commercial and private sectors. Dr. Zvi Kaplan, Director of the Israel Space Agency, Ms. Mina Goldiak, Deputy Chief Scientist for International R&D Affairs of the Ministry of Industry, Trade and Labor and Mr. David Miron-Wapner, Director of the U.S.-Science and Technology Commission represented the government of Israel. Dr. Jacob Cohen and Dr. Tony Caloprete represented NASA. Additional U.S. Government attendees included Environment and Science Officer of the U.S. Embassy Dr. Paul Rohrlich and his assistant Mr. Charles Swartz and Mr. Jonathan Heimer, Senior Commercial Service Officer and Ms. Irit Van Der Veur, Commercial Service Officer representing the U.S. Commercial Service and U.S. Department of Commerce. Israeli and U.S. Companies in attendance included: Rafael, IAI, SpaceIL, Spacealst, SpaceX, Amos-Spacecom, RRSat, Elbit Systems and Futron Corporation. Civil society representatives included: Mr. Ram Levi, Senior Researcher of the Yuval Ne'eman Institute for Science, Technology and Security Policy at Tel Aviv University, Dr. Gili Fortuna of the Samuel Neeman Institute based at the Technion, and Mr. Tal Inbar of the Fisher Brothers Institute.

### **Meeting Introduction**

The 3-hour roundtable opened with remarks from Ms. Mina Goldiak illustrating the different ways that the Office of the Chief Scientist supports Israeli companies R&D activities internally (examples: MAGNET, Scientific Incubators, R&D Fund) and in collaboration with international partners through bi-national foundations such as the Bi-national Industrial Research and Development Foundation (BIRD) or bi-national agreements between Israel and other countries, including U.S. States for joint R&D collaboration. She suggested that further cooperation between the ISA or other Israeli entities and NASA could be done within the

existing frameworks already used by Israel for international cooperation. She stressed that there is no desire on behalf of the Israeli government for foreign governments to fund Israeli companies; rather Israeli programs are based on a system of "parallel support" which leverages the funding of respective government programs for their own companies to amplify results for mutual benefit. Dr. Jacob Cohen, representing NASA, seconded this idea and emphasized that companies can form the partnerships and the governments of each country could support its own companies. While Ms. Goldiak focused on government support of collaboration, NASA representatives articulated their expectation that the industry present would explore the ways that they could work together amongst themselves. Mr. Mike Kaplan, a recent new immigrant to Israel and former NASA and Boeing employee shared that he believed that in order to meet to business projections laid out in Israel's recent "Space as a National Plan" report, significant foreign funds will need to be procuring Israeli space hardware.

Industry participants shared their company strengths. Dr. Ami Halbersberg of IAI, noted that his company has served international clients before noting in particular their small launcher. Mr. Menachem Kidron noted that one of Rafael's strengths is that its work is done almost entirely in-house, and therefore they have access to corporate expertise in a variety of defense technologies that could be useful for civilian and commercial purposes. A few examples of Rafael's technology include small-satellites (less than 100kg), effective electric propulsion, and laser communications. Mr. Meidad Pariente, of Spacecialist, noted Spacecialist's role as a voice of small and medium enterprises at the table. According to Mr. Mike Kaplan, Israel has no sales to the United States to date. In his view, this indicates that Israel's current strategies have not been as effective as hoped, therefore innovative new ideas are required for success. A major problem that Mr. Kaplan has identified is a weak understanding within the Israeli industrial space sector of what the U.S.-NASA and its current commercial needs and how, if at all, Israeli capabilities map against those needs. He would suggest the creation of a "business plan" mapped to U.S.-NASA priorities to enable a greater understanding of U.S. needs in order to align Israel space companies priorities.

### **Facilitating Government Cooperation**

As the discussion turned towards U.S.-Israel cooperation in research and development of commercial space technologies, Dr. Jacob Cohen of NASA commented that while governments can play a role in funding research, often, in the U.S., private companies may have the capability to bankroll such innovative projects to a greater extent than governments. He also pointed out that if a country or a company has a certain technology that is in need, for example, communications technology in the case of Israel, there are greater options for funding beyond government. NASA does not fund research for all projects related to space, often only those they have identified a need and use. Further, working with NASA entails managing such restrictions as ITAR that can greatly impact intellectual property rights. However, he also suggests that Israeli companies seeking to cooperate more fully with NASA such as responding to NASAs needs through NASA solicitations. Mr. Jay Gullish of the Futron Corporation, noted that Israeli companies seeking to work with NASA should pay careful attention to NASA's decadal reports which guide R&D priorities at the Agency in ten year increments to gain deeper knowledge of

NASAs's ongoing needs. It was pointed out by Dr. Jacob Cohen that NASA responds to the requests of U.S. Congress in determining priority research focuses and programs and cannot itself lobby for new priorities on behalf of interested companies. In response to the suggestion of a U.S. legislative initiative to support Israeli participation in U.S. space programs, Mr. Mike Kaplan commented that he understands Dr. Cohen point to be that it is illegal for NASA to do any lobbying on behalf of other interests. He continues to note that by law, civil servants can only offer support to the President's proposed budget.

Mr. Danny Grossman, suggested that existing programs such as BIRD, the Binational Science Foundation and the USISTF provide powerful platforms for Israeli companies to work with American companies and by extension to cooperate with each countries space agency. Dr. Jacob Cohen also pointed out the usefulness of non-profits such as USISTF providing a forum for government and companies to interact.

Dr. Jacob Cohen also suggested that Small Business Innovation Research (SBIR) funds could be a very important tool for international cooperation between U.S. and Israeli companies responding to NASA needs. SBIR funds provide important kick starts to companies with high risk R&D and also help them to become government suppliers should their technologies ultimately be commercialized. He also suggests that SBIR calls for proposals could be synched with ISA calls for proposals so that respondents can work with international partners to amplify results. Mr. Mike Kaplan noted that he found SBIR to be a very useful tool during his time at NASA. He believes that Israeli companies could set up U.S. small business subsidiaries that could compete to develop new technologies called for by SBIR Program Managers at NASA. He notes that this is not for full scale development, rather to obtain seed money to jumpstart a larger project.

Dr. Tony Caloprete highlighted the importance of pre-planning and developing international working groups to solve problems, noting that these exist with European Space Agency (ESA), the Japanese Aerospace Exploration Agency (JAXA), the Canadian Space Agency (CSA) and others. Dr. Caloprete emphasized the need for Israelis to visit NASA research centers and develop the personal connections with research scientists who are the Program Managers in order to demonstrate that working together will advance NASA program's goals. He saw the prospect of future forums such as this roundtable as helpful. Other ideas to keep the dialogue going outside "official" channels include suggestions of U.S.-Arab-Israel work on space issues or holding an Ilan Ramon Conference in Houston to facilitate more American participation.

Mr. Mike Kaplan suggests that Israeli companies could set up U.S. small business subsidiaries that could compete to develop new technologies called for by SBIR Program Managers at NASA. He notes that this is not for full scale development, rather to obtain seed money to jumpstart a larger project. He also point out that U.S. space stakeholders have little to no understanding and familiarity with Israeli space capabilities. U.S. companies have active marketing operations. As an example, to pursue NASA science mission business, all successful US entities actively participate in relevant scientific conferences as well as have regular dialogues with NASA and key academic institutions to market their products. For Israeli

companies to be successful, they need to pursue similar strategies in his opinion. Dr. Caloprete and Cohen agreed with Mr. Kaplan's perspective.

Ms. Ann Liebschutz suggested that the Office of the Chief Scientist or the ISA could unilaterally run programs which prioritize technologies and capabilities that mirror the needs of NASA (as outlined in the decadal studies or elsewhere). This independent action could guide companies in strategic product development in-line with NASA priorities, and at the same time, with U.S. industries as it serves NASA mission needs.

While not directly related to government-to-government activity, Mr. Jay Gullish also suggested that the ISA invest in people initiatives that could promote Israeli interests internationally and create the human connections that drive many activities. Specific suggestions include: international outreach efforts, the creation of a Jewish Aerospace Association (similar to Women in Aerospace) and supporting local chapters of international associations and organizations.

### **U.S and Israel Industry Perspectives**

Mr. Ami Halbersberg, Director, Remote Sensing Satellites of the MBT Space Division of IAI, noted that the U.S. and Israeli companies could cooperate broadly by working together to bring new payload technologies into space that are needed in the geospatial and satellite industry. He also suggested that Israeli and U.S. companies could discuss processes of verification and validation, the integrated functional testing of projects and the direction of satellite and space missions in Israel in order to glean lessons learned to develop new and innovation ways to shorten space programs and decrease their costs. Jacob Cohen suggested that this could potentially be done through the ISS National Lab and the rapid turnaround BAA calls. Mr. David Miron-Wapner, Director of the U.S.-Israel Science and Technology Commission noted that U.S.-Israel industry partnerships could be useful as strategic solution providers and that partnerships might be facilitated under Israel-US state R&D agreements.

Dr. Gili Fortuna of the Samuel Neaman Institute highlighted the point that Israeli companies need U.S. business partnerships in order to sell in global markets. The Israeli market is too small to be the sole market for advanced Israeli defense and space related technologies. Partnerships with U.S. companies are important for Israeli companies to increase their presence in larger markets.

It was pointed out that when a company is looking for partners and new technologies that the origin of such technology is not as important as whether or not the technology works and is easier or better in some way than existing solutions. Due to a variety of factors, U.S. companies may not be "in-country" in Israel looking for partners, therefore Israeli companies should consider spending more time in the U.S. in order to build the relationships that Dr. Caloprete mentioned earlier and to pitch their products. In terms of the perspective of a small U.S. enterprise doing business with the Government of Israel, it was noted that small U.S. businesses will generally not contract directly with the government, rather they work with large government subsidiaries such as IAI to provide services. These kinds of situations can be

preferable the local private company is better prepared to manage local government procurement technicalities. It was also mentioned that developing a relationship with the government of Israel was a slow process, but, that it is not unlike developing a business relationship with any other foreign government – relationships take time. Finally, it was suggested that an American company’s work in Israel may be facilitated when they offer a unique service that Israeli companies are not offering thereby avoiding issues of “Buy Domestic” preferences or other local competitive pressures.

### **Additional Linkages**

Shortly following this meeting, NASA’s Kennedy Space Center (KSC) issued a request for information about using its facilities, which will be vacant following the end of the Space Shuttle Program. In response, the USISTF described the possible establishment of a joint U.S.-Israel Commercial Space Research and Development Incubator (CSDRI) to be physically located KSC. The objective of the CSDRI would be to encourage development of joint U.S.-Israel R&D programs and commercial incubators in commercial space through innovative usage of KSC facilities and capabilities. The CSDRI would leverage the synergy offered by the existing technical capabilities at Kennedy, the local resources of the Florida and broader U.S. commercial space sector, and the recent Israeli government policy emphasis on the development of commercial space.

The goal of the CSDRI would be to foster R&D partnerships leading to commercial development. The CSDRI would build partnerships between U.S. and Israeli space companies, and seek to identify opportunities to utilize KSC assets to support activities of these partnerships. The CSDRI would provide both technical/engineering lab space and administrative office space to participating organizations. Early discussions between U.S. and Israeli companies, and the U.S. and Israeli space agencies have identified the following potential example opportunities for such activities at KSC:

- Micro and nano-satellite development, launch and operations
- Processing and development of joint U.S.-Israeli projects for ISS utilization
- Activities such as these would capitalize on areas of cooperation highlighted in the recently signed Memorandum of Understanding between NASA and ISA

### **Work Plan**

- Dr. Jacob Cohen emphasized his current communication and work with Dr. Zvi Kaplan, Director of ISA and suggested that the Office of the Chief Scientist should coordinate meetings with all NASA research centers, including Ames, Goddard Space Flight Center, NASA Headquarter and the Jet Propulsion Center with the Israel Space Agency to advance relationships and do further planning.
- Establish a joint U.S.-Israel Commercial Space Research and Development Incubator (CSDRI) to be physically located KSC. The objective of the CSDRI would be to

encourage development of joint U.S.-Israel R&D programs and commercial incubators in commercial space through innovative usage of KSC facilities and capabilities.

- The Office of the Chief Scientist of the Israel Ministry of Industry, Trade and Labor should procure NASA's "wish list" of technologies based on mission priorities and make them readily available to Israeli industry to guide them in developing technology congruent with U.S. Industries needs to serve NASA priorities. Consider creating a "business plan" mapped to U.S.-NASA priorities to enable greater understanding of U.S. commercial space needs in order to align Israel space industrial R&D priorities for better cooperation.
- Ms. Mina Goldiak and Mr. David Miron-Wapner proposed an Israel Space Technology Day and/or organizing a "trade" mission of Israeli industry and academic representatives to visit NASA Centers and interface with researchers and US industries in the local surrounding areas that supply each Center's research needs and may be recipients of NASA SBIR grants.
- Consider SBIR as a mode for U.S.-Israel cooperation on developing high risk technologies responding to NASA and U.S. Government Agency needs. This arrangement would require **no exchange of funds** between the U.S. and Israel, rather each country would fund its own participating company. In order to better take advantage of SBIR opportunities, Israeli companies could set up U.S. small business subsidiaries that could compete to develop new technologies called for by SBIR Program Managers at NASA.
- Coordinate a further working group for U.S. and Israeli commercial space industry representatives to explore how they can work together beyond cooperation securing with each country's government funding sources.
- Determine feasibility of constructing a U.S.-Israel MAGNET consortium based on technologies identified in the NASA/ISA Statement of Intent for bilateral cooperation such as microsatellites and hyper-spectral cameras.