

Japanese Contribution to the Space Situational Awareness*

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Abstract

Space Situational Awareness (SSA) will be one of the solutions for maintaining outer space in a safer condition. Asia region is one of the areas which do not have enough observation ability. Japan might play a role for covering such a missing part of Asia in a global SSA observation network.

1. The Present Situation of Outer Space

In recent years, there are some severe accidents which were made by space debris. As the number of space debris is increasing, to observe such debris and to be aware of space situation properly is now more and more important for the safer use of outer space. In this paper the authors will analyze the present circumstance of space situation and the possible contribution by Japan in future.

2. Lack of Global Observation Network

Considering the present space situation in danger, the United States of America (USA) has proposed the space situational awareness (SSA) concept. Because USA is heavily depending upon the space assets for their national activities of civil and military sectors, to keep outer space safe is an essential requirement. SSA will be one of the necessary methods for that purpose. This SSA includes space weather forecast, observation of space objects and space debris on the orbit for collision avoidance, re-entry risk avoidance, inspection of space law observation by space faring nations, etc.

* Any opinion in this article is the personal opinion of the authors, not the opinion of any organizations, which the authors belong.

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On the global level, most of outer space is observed from the Earth surface. On North American Continent and European Continent the observation networks have been established for SSA. However in Asia such observation system is not established on the same level as in North America and Europe. Though Japan has some limited ability of space object and debris observation, this is not enough for proper SSA activities. This is the reason why Japan should consider additional effort to contribute to the more effective global SSA networks.

3. Japan's Possible SSA Role

(1) Short Term Contribution

Japan has already kept a certain level of SSA ability. Japan Space Forum (JSF) has operated two facilities (KAMISAIBARA Space Guard Center and BISEI Space Guard Center) for observing space objects, space debris, Near Earth Objects (NEO), meteor shower, etc.¹ Japan Aerospace Exploration Agency (JAXA) gains the data obtained by JSF Space Guard Centers and cooperates with USA, Europe as well as the United Nations by providing such results. Additionally National Institute of Information and Communication Technology (NICT) has provided space weather forecast². However, these activities are only partial some factors of SSA.

To make an additional contribution, Japan will be able to modernize JSF facilities. And Japan might prepare another facility for SSA. For example, Japan Self Defense Forces (JSDF) has some radar to watch Japanese territory and its surrounding area. Now Japan thinks of testing such radar to observe space objects and debris. If such radar systems are useful for SSA, this will contribute to level up the present observation ability.

(2) Longer Term Contribution

In longer term, the above mentioned activities should be integrated under one national organization. At present Japanese players for SSA are JAXA, JSF, NICT and possibly JSDF. However, such SSA data/information should be treated by one single national organization like Joint Space Operations Center (JSpOC) of USA, French SSA Center and German SSA Center. Looking at other countries' situation, to establish Japan SSA Center should be considered. If such Japan SSA Center can be established, it will cooperate with USA and European countries, and play a partial role for the effective SSA activities on the global scale. This complete SSA system will be able to share the space situational information including space objects, space debris, suspicious maneuvers of satellites, space weather forecast to avoid the undesirable accidents and troubles like collision, intentional destruction, etc. Observing outer space by SSA will contribute to not only civil space utilization but also security space activities.

1 <www.jsforum.or.jp/technic/sgc_kamisaibara.html>; <www.jsforum.or.jp/technic/sgc_bisei.html>

2 <http://swc.nict.go.jp/contents/index_e.php>

SSA purposes are collecting data and analyzing it for maintaining outer space in safe. SSA will play a role of space traffic management. Such traffic management service will be provided to both civil (public and commercial) and military sectors, as a kind of infrastructure prepared by the nation. Considering some national SSA centers in USA and Europe are administrated by military sectors, also in Japan MOD/JSDF might contribute to the national SSA center and share sensitive information with them. However, there are some styles for its affiliation. This Japan SSA Center might be organized under the Cabinet Office like Cabinet Satellite Intelligence Center. Or this center might be established under MOD like other nations' SSA centers. In any case, to such Japan SSA Center, JAXA, JSF as well as NICT will dispatch appropriate personnel who were in charge of present SSA observation. They will continue their tasks and play a tutorial role for other new staff in the center.

4. Conclusion

Now the outer space condition is getting worse. Our society must respond to this situation on the global scale. SSA and International Code of Conduct for Outer Space Activities proposed by European Union will be both good solutions to the present contaminated outer space. All space faring nations should cooperate with each other for keeping our outer space in a better and safer condition.