

INTERNATIONAL BOUNDARY FIXING AND THE ROLES OF INDONESIAN SURVEYORS

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SUMMARY

The roles of geodetic surveyor in Indonesia's international boundary fixings have formally been recognised since 1969. Those have been played and developed as the role of Indonesian surveyors in the process of international boundary delimitation and demarcation, from a traditional role as a boundary map drawer in maritime delimitation and as land border demarcation surveyors, to the modern role as boundary engineers, boundary managers and boundary designers. The roles are not only dealing with land territory boundaries, but are also in the maritime boundary delimitations.

This paper will describe and discuss Indonesian surveyor experiences in international boundary fixing, and we would like to share and exchange experiences as well with others for the purposes of further developments in this matters.

SUMMARY

Peranan surveyor indonesia di dalam pengelolaan batas internatsional Indonesia telah diakui sejak tahun 1969. Peranan tersebut telah dilakukan dalam tahapan delimitasi dan demarkasi. Namun peranan tersebut tidak hanya terkait di dalam peranan tradisional sebagai ahli penggambar peta, namun lebih daripada itu, surveyors indonesia juga telah berperan sebagai pembuat batas (boundary engginers or designers) dan pengelola perbatasan (boundary managers). Peranan tersebut tidak hanya juga ada untuk masalah batas darat, tetapi juga batas maritim.

Tulisan ini akan membagas pengalaman surveyor indonesia di dalam pengelolaan perbatasan. Diharapkan dari tulisan juga dapat menjadi media tukar pikiran dan pengalaman dengan pihak lain demi kemajuan di waktu mendatang.

INTRODUCTION

Indonesia is listed as the largest archipelagic state in the world. Its territory consists of land, water and air space, known as *Nusantara* or archipelagic, as is stipulated in Article 25A of the 1945 Indonesia's Constitution, and is further elaborated in the Republic of Indonesia (RI) Act Number 43 of 2008. The Indonesian territory, which under full sovereignty of the country was inherited from the Dutch which colonized Indonesia for around three and a half centuries. Besides those territory, Indonesia also has sovereign or exclusive rights over contiguous zone, economic exclusive zone (EEZ), and continental shelf which are given by the international law of the sea.

Geopolitically and geographically, Indonesia has international land and marine boundaries with ten countries, namely India, Thailand, Malaysia, Singapore, Vietnam, the Philippines, Palau, Papua New Guinea (PNG), Australia, and Timor-Leste (East Timor). With regards to maritime boundaries, there are three types of maritime boundaries, they are known as territorial sea, exclusive economic zone, and continental shelf boundaries. This forces Indonesia to define its joint boundaries with those ten countries which consisted of five segments of joint land boundaries, 11 segments of joint territorial seas boundaries (with four tri-junction points), 15 segments of joint EEZ boundaries (with ten tri-junction points), and 15 segments of joint continental shelf boundaries (with ten tri-junction points). In total there will be 46 international boundary lines with 24 tri-junction points to be fixed bilaterally with its neighbours. This is a challenging works for Indonesian surveyors to deal with the work.

There are several principles to apply in the related contexts. Firstly from the political point of view, there are international principles of good bilateral relationships, *uti possidetis juris*, and equitable principles. Secondly is the principles stipulated in the Law of the Sea Convention (LOSC). Thirdly from the technical point of view there are a lot of technical principles of geodesy, cartography, surveying, remote sensing, hydrography, geography, geology, geophysics, etc.

It is worth noting that, one of the first significant roles of Indonesian surveyors in this context was their role in establishing the 1960 Indonesian baselines as a follow up of the Djuanda Declaration which proclaimed that all waters surrounding, between and connecting the islands constituting the Indonesian State are integral parts of the territory of the Indonesian State and therefore integral parts of the internal or national waters which are under the exclusive sovereignty of the Indonesian State (Sumardiman, Adi., personal communication, 2009). The Declaration revoked the colonial three-nm territorial waters in favour of territorial model whose outer limits circumscribed the archipelago, thereby placing under the country's sovereignty a predominant portion of the inland seas within the archipelagos (Djalal, Dino Pati, 1990). The baselines had to be prepared by Indonesian surveyors by only referring to the geographical data which was inherited by the Dutch. The baselines later on becoming the starting point of delimitation and delineation of Indonesian maritime boundaries.

With regards to those principles mentioned above, Indonesia started the works of boundary delimitation in 1969 by defining continental shelf boundaries with Malaysia, followed by with India, Thailand, PNG and Australia which resulted of 10 segments of CS. Furthermore, for the delimitation of territorial sea, it was started with Malaysia in 1970, followed by with PNG and Singapore in 1973, which resulted of 4 segments of Territorial

Seas. After the LOSC entered into force, Indonesia started to delineate its EEZ boundary lines with Australia in 1997 (Indonesian Ministry of Foreign Affairs, 2008). At the time of writing, there are still some of on going boundary delimitation negotiations between Indonesia and Malaysia, the Philippines, and Singapore (Border Mapping Centre (BMC) Bakosurtanal, 2009).

In land border demarcation, a heavy involvement started in 1973 when Indonesia and Malaysia started to reconstructing and demarcating the land boundary lines between the two countries in Borneo which was previously had been defined by the Dutch and British in the year of 1891 (BMC Bakosurtanal, 2006). Besides that, in the same decade Indonesia and Australia also started to demarcating the land bordery lines between Indonesia and Papua New Guinea (PNG) in New Guinea Island. With the newly independent country, up to present Indonesia and Timor-Leste (East Timor) is still also fixing their land boundary lines. This demarcation is based on the treaty between the Portugese and the Dutch in 1904 and Arbitration Decision of 1913 (BMC Bakosurtanal, 2007).

With reference to “the theory of boundary making” (Stephen B. John, 1945), Indonesian geodetic surveyors have successfully extending the application of the theory to not only for land boundary management only but also to maritime boundary. While for the purpose of joint border developments the terms of boundary management have become an importance element in the boundary making theory that consisting of allocation, delimitation, demarcation, and administration processes.

In relevance to that, the Indonesian surveyors also played their role in the establishment of the Indonesian National Coordinating Agency for Border Management. It is undoubtedly that they are one of the main contributors for this. It is worth noting as well that long before the establishment of the agency, they also part of the main drafters of the Indonesian Act on Indonesian Territory that mandated the establishment of the agency.

These roles have been possible be played and conducted by the Indonesian surveyors since the availability of advanced developments of surveying and mapping technologies (known as the three-ending-S technologies: GPS/GNSS, RS, and GIS) supported by the advance of information and communication technologies (ICT). The present surveying and mapping methodologies in the spatial managements require data integration (including boundary fixing data) started from the allocation and delimitation processes up to the demarcation and administration works be managed in a proper manner. These shall not be applied only to the land boundaries, but also to the maritime boundaries, such as in territorial seas, exclusive economic zones, and continental shelf boundaries. In this sense, Indonesian surveyors’ experiences in international boundary fixing have developed the “surveyor’s role in delineation and demarcation of international land boundaries” (Adler, 2002) to four role functions as boundary surveyors, boundary engineers, boundary designers, and boundary managers as well.

THE ROLE OF SURVEYORS IN EVERY STAGES OF BOUNDARY MAKING

The technical issues are the main competence of surveyors, this is commonly practised in treaty interpretation, border monument erections, coordinat fixing, watershed mapping, thalweg mapping, offset surveys, borderline reconnaissances, joint boundary mapping, point

positioning, traversing, staking out, minutes plans, different coordinate systems problem-solving, territorial seas, eez and continental shelves projections in accordance to relevance legal references. This reasons, in certain issues raising the idea of establishing a boundary technical commisioners.

In the process of boundary delimitation, surveyors play a role as an international boundary engineers which contribute technical suggestion and or support to the chief negotiators and international legal affairs on the following technical issues: geodetic datum definition (common border datun reference frame), boundary map construction, border line projection, land border fixing, border delineation, construction of basepoints and baselines, construction of geo-database and information system, adjustment method for proportionality definition, treaty maps construction and provision. With regards to that, it is obvious why surveyors always asked to sit in the negotiation technical teams.

As part of the international boundary designers surveyors also provide: reliable geospatial data (base maps, photogrammetric imageries, satellite emageries, digital terrain model, etc.), land border definition, maritime delienation methods, identification of boundary geographical features elements, method of proportionality principles, boundary dispute settlement, expertise in boundary negotiation.

In boundary administration, surveyors also still play a significant role. For example, Indonesian surveyors up to present becoming the leader in the context of joint border mapping, frontier area mapping, spatial planning maps, border markers meaintenance, border crossing. This led to the trust given to the indonesian surveyors to become members of joint boundary commission. Their role not only as field surveyors, but also can be named as geospatial boundary data managers.

TECHNICAL ISSUES IN INTERNATIONAL BOUNDARIES

In International boundry making, there are several technical issues where the existence of surveyors are really needed. The examples of those technical issues are as follow:

1. During the Alocation Process, surveyors are needed to produce a technical opinion related to general boundary description maps. Besides that, they are also responsible to provide a reliable and accurate related data base for the purpose of negotiations in delimitation process.
2. During the Delimitation Process: Boundary definition, Verbal treaty formulation, Treaty map construction, Geodetic datum is fundamental
3. The Demarcation Process, surveyors play their role in treaty interpretation, Border pillars erection, coordinat fixing, watershed mapping, thalweg mapping, offset surveys, border monument reconstruction, Border joint mapping, point positioning, traversing, staking out, minutes plan, different coordinate systems problem-solving, etc.

As land boundary surveyors will deal with: survey demarcation (surveying along the land border lines to find out the exact location of watershed and/or thalweg, land border coordinate fixing, boundary mapping, watersheed mapping, thalweg mapping,

erecting border pillars/monuments), reconstruction of missing and/or broken border pillars/monuments, searching historical border monuments, dealing with local datum, and maintenance of boundary pillars/markers/monuments.

4. The Administration Process, surveyors contribute in joint border mapping, frontier area mapping, spatial planning maps, border markers maintenance, and the establishment of boundary data base and information system.

THE IMPLEMENTATION OF MODERN TECHNOLOGY

Within the stage of boundary creation and drafting of border treaties or agreements, the boundary engineer is serving as technical adviser to the negotiator (statesmen, lawyer, politician,) of the treaty or the agreement. One essential tool of the boundary engineer is the use of satellite images which would serve as an illustration and sometimes update of the real situation on the ground. Satellite images can be an essential resource at the negotiating table and revise existing maps or serve as map substitutes in poorly or even non mapped areas. In this case however annotated images should be used and may be extremely helpful. In addition recent satellite data contains much information missing from the maps or other descriptive materials, such as details of agricultural activities, density of trees, existence and course of waters, temporary structures, such as ditches and fences, destroyed buildings, or even dismantled roads, which would serve as prove of sovereignty during negotiations and decision making and the writing of the treaty or agreement between countries involved.(Sutisna & Handoyo, 2006).

Satellites images are also one of the best means to ensure that the decisions of negotiators are transformed to the ground in the demarcation and delineation stages. (TSC-BDR RI RDTL, 2004). This paper will reflect to the practical experiences which have been made in writing and implementation of the international boundary treaty between the Kingdom of Saudi Arabia and the Republic of Yemen. The work shown here will focus on the use of rectified satellite images in the delimitation stage, for reconnaissance tasks (office and field), and the production of “fly through’s” for the border area. The latter proved as very useful. During the negotiations and decision makin they could be used as confining tools, supporting the formulations in the writing of the treaty, like adding some clauses on the modification of the border line, when it passes through villages. Further essential applications of satellite data concentrated in survey demarcation and delineation tasks, photo control planning and map production of the unmapped areas of the treaty. A small scale mapping was agreed upon for regions outside the area covered by aerial photography. Quite a number of factors affecting the considerations to use the satellite imagery in the large scale boundary mapping such as the size of the area, its topography and environment, the technical characteristics of the final product and its accuracy limitations, the availability of image data and last not least the cost of the data required .In conclusion the principal advantage of satellite images in international boundary application tasks is their availability on a commercial basis without the well known problem of getting authorization in over- flying certain territories or censorship of any kind. Examples will be shown that demonstrate the importance of such tools bringing the terrain to the negotiating table and enabling the enhancement of existing GIS, maps or map substitutes in poorly or unmapped areas (BMC Bakosurtanal, 2007)

The principal advantage of the satellite images in boundary applications is their availability on commercial basis without problem of over flying certain territories or censorship of any kind. Satellite images application for international boundaries is an important tool which brings the terrain to the negotiating table and enhances existing maps or map substitutes in non mapped or poorly mapped areas. The use of satellite images gave the decision makers the possibility and convincing support during the formulations in the writing of the treaty between the Kingdom of Saudi Arabia and Yemen to add clauses to solve the problem when the borderline crosses villages. Satellite images have proven to be cost effective for the production and background of the medium to small scale border maps.

CONCLUSION

Indonesian surveyors have been playing its significant role in every stage of Indonesian international boundary making. In this regard, they have contributed far forward from being only surveyors in the past into boundary designers and engineers. These contributions are possible as they have developed their knowledge and skills from time to time, learning from boundary experts and engineers from other countries.

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