

# Norwegian Baselines, Maritime Boundaries and the UN Convention on the Law of the Sea

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**Abstract:** With the signing of the recent agreement with Russia concerning the maritime boundary in the Barents Sea, it can finally be said that all the maritime delimitation lines with which Norway is concerned have been equitably resolved in accordance with the UN Convention on the Law of the Sea (UNCLOS). This paper reviews the events, difficulties, survey procedures and solutions that have led to the completion of the Norwegian maritime boundary definitions. The various UNCLOS concepts of baselines and maritime domains (Territorial Waters, the Contiguous Zone, and the Exclusive Economic Zone) are explained, and reference is made to important national and international decrees and judgments

that have been made over the years. Particular attention is drawn to the impact and importance of geodetic considerations on maritime boundary definitions. Practical consequences have arisen through not taking these geodetic impacts into account, especially since the advent of satellite navigation systems has enabled much improved positioning accuracy out of sight of land, while enormous natural resources have been identified and are being extracted from national maritime domains. The article gives an account of the solutions to these geodetic difficulties that have been negotiated with neighbouring nations.

**Key words:** United Nations Convention on the Law of the Sea, UNCLOS, baseline, territorial sea, contiguous zone, Exclusive Economic Zone = EEZ, maritime boundaries, geodetic datum, Norway, Jan Mayen, Svalbard, Bouvet Island.

## Introduction<sup>1</sup>

On 15<sup>th</sup> September 2010, Prime Minister Jens Stoltenberg of Norway and Prime Minister Dmitry Medvedev of Russia signed an agreement in Murmansk on the mutual maritime boundary in the Barents Sea. The last remaining agreement on Norwegian maritime boundaries with neighbouring states was thus in place. The agreement was subsequently ratified by the Norwegian Parliament and the Russian Duma, and it came into force on 7<sup>th</sup> July 2011.

It is therefore timely to look back at what happened concerning boundaries and their associated baselines up until the completion of this agreement. It is equally timely to review how the UN Convention on the Law of the Sea (UNCLOS) has involved application of the science of geodesy.

## The Story behind the Norwegian Baselines

Sovereignty at sea has been in question ever since nation states emerged. Sovereignty was for a very long time determined, according to the principle of power projection, as being a “sea mile,” where a sea mile was the distance by which a cannon ball could be projected. However, the length of the sea mile was somewhat variable, depending as it did on nations individual abilities with their cannon.

The Nordic sea mile in the 17<sup>th</sup> and 18<sup>th</sup> Centuries was standardized to be a “German mile” equal to one fifteenth part of one degree of longitude on the equator – in other words four minutes of longitude (on the equator). This “German mile” was therefore equal to four of the modern nautical miles. The English sea

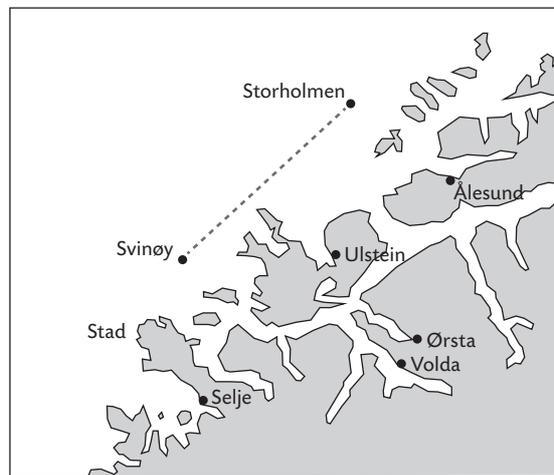
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1. The article is developed on the basis of Bjørn Geirr Harsson, “Norske gunnlinjer, sjøgrenser og FN’s Havrettskonvensjon,” in *Kart og Plan* (71) Nr 1/2011, p. 52–62.

mile, on the other hand, was set to one twentieth of a degree of longitude on the equator, which is equal to three modern nautical miles. A sea mile could therefore be either three or four nautical miles, depending on whether one was using German or English standards.

A Royal Decree for Denmark and Norway was issued on 22<sup>nd</sup> February 1812 which stated that its territory extended one sea mile from the outer island or islet which never becomes submerged by the sea due to high tides. At that time the Danish and Norwegian definition of a sea mile was one fifteenth of an equatorial degree of longitude. Using Bessel's Figure of the Earth, this distance on the equator worked out to be 7420.438 metres (today, one fifteenth part of an equatorial degree of longitude, which is equal to four modern nautical miles, or  $4 \times 1852 = 7,408$  metres).

Later, in the 1860s, Swedish fishermen began to appear on the banks off the coast of Møre, somewhat to the irritation of Norwegian fishermen. This was the background for a further Royal Decree dated 16<sup>th</sup> October 1869 which established exclusive fishing rights for Norwegian fishermen within a straight line parallel with and one sea mile outside the straight line from the outer edge of Svinøy to the outer edge of Storholmen. This line was a little over 26 nautical miles long, and provided the basis for an important principle for which Norway has subsequently received international support. This is the principle of using straight baseline segments to define maritime boundaries.



The line mentioned in the Royal Decree dated 16th October 1869, which established exclusive fishing rights for Norwegian fishermen.

The early part of the 20<sup>th</sup> Century saw a number of commissions with the task of setting accurate definitions of the Norwegian maritime boundaries. Their conclusions led to a further Royal Decree of 12<sup>th</sup> July 1935 which established a base line consisting of straight segments offshore north of the Arctic Circle (latitude 66° 28.8' N). The Decree contained the positions of 47 base points (which defined the ends of the baseline segments) numbered in ascending order from the Russian Frontier at Grense-Jakobselv westwards around to Træna.

The July 1935 Decree provoked a degree of international irritation, especially amongst British fishermen, who asserted that a relatively large sea area had suddenly been declared under Norwegian jurisdiction and thus restricted to the exclusive use of Norwegian fishermen. The British view was that the baseline from which maritime and fishing boundaries should be calculated should systematically follow the coastal low water line. The two sides to the argument were unable to reach an acceptable compromise, and in the end Great Britain took the matter to the International Court in The Hague. The Court's verdict was handed down in December 1951 and supported the Norwegian point of view. By ten votes to two, the Court found that the Norwegian method of computing baselines was not in conflict with International Law. The Court's reasoning was related to the peculiar geographical conditions along the Norwegian coast, where the islands had to be seen as part of the same whole as the mainland.<sup>2</sup>

The remaining Norwegian base points from Træna southwards to the Swedish border were established by the Royal Decree of 18<sup>th</sup> July 1952, shortly after the Hague verdict was handed down. A formal but minor change was then promulgated on 17<sup>th</sup> October the same year. The completed baseline thus came to consist of straight line segments between 123 named points, each with stated coordinates. In the north, base point number 1 was identical with the most northerly point on the land border between Norway and the then Soviet Union. This point is at Grense-Jakobselv, and in the agreement of 18<sup>th</sup> December 1948 between Norway and the Soviet Union, this point was given as point 415 (buoy with stake). In the south, base point number 123 coincided with border point number XX as defined in the Norwegian-Swedish Border Agreement of 1909. (Point XX was a buoy marked with the Roman numeral for 20.)

Nothing is to be found concerning the geodetic datum in the Royal Decrees of either 1935 or 1952. A geodetic datum specifies the Figure of the Earth that is being used, giving ellipsoid size and flattening, as well as the datum point from

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2. NOU 2007: 13 *Den nye sameretten*, Chapter 11.2.3.

which coordinates are measured<sup>3</sup>. These technical details were not perceived as particularly relevant at the time of these Decrees. On the other hand, not having proper geodetic specifications became a distinct difficulty later on.

In 1975 the Norwegian Foreign Ministry informed the Geodesy Division of the Norwegian Mapping Authority (*Statens kartverk*) that new delimitation line negotiations with Great Britain were about to be undertaken. The main issue was the continuation of the median line northwards from the northernmost point of the 1965 agreement (latitude 61° 44' 12" N) and along the shared border with Great Britain up to the southernmost point on the median line between Norway and the Faroe Islands.

Geodesy Division began by carrying out check surveys at five base points on the west coast that would be used in the median line computations together with Great Britain. These showed that the published baseline coordinates in “Sjøkart 351” (Chart 351 published by Norges Sjøkartverk, 1952) were systematically between 100 and 300 metres too far to the east.

The original base points had been selected from older mapping which, although perfectly satisfactory at the time of publication, was perhaps of lesser reliability than demanded by modern standards. This was therefore thought to explain the discrepancy in these coordinates. It was thus decided to put in hand a systematic resurvey of all base points surrounding the Norwegian mainland and coastal islands. At this point, at the start of this project, it was taken for granted that the official lists of coordinates for the base points in “Sjøkart 351” from 1952 had used European Datum 1950 (ED50) as geodetic datum.

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3. Specifying a geodetic datum implies also specifying a coordinate system. The associated (and inevitably necessary) ellipsoid is defined with an equatorial radius (in metres) and a flattening factor which specifies the relationship between the ellipsoid’s equatorial and polar radii. The defining parameters of a selected ellipsoid are essential in the reduction of surveys to obtain terrestrial coordinates. Ellipsoids historically were devised to fit as closely as possible to national or regional terrain. It is only with the general use of satellite navigation and surveying systems that global ellipsoids have developed. Not unnaturally, global ellipsoids fit to regional terrain rather worse than regional ellipsoids. Physically, the Earth has an irregular shape that only approximately follows an ellipsoidal form. Thus, it would be very wrong to assume that the centres of radii of all ellipsoids are at the same point at the “centre” of the Earth – they can be up to hundreds of metres apart. Therefore, the coordinates of a physical point on the Earth’s surface, whether in Earth-centred Cartesian co-ordinates or in geographical latitude and longitude co-ordinates, can never be assumed to be the same regardless of which ellipsoid is being used. In the case of the Norwegian waters as an example, the difference between ED50 and EUREF89 co-ordinates can “appear” to be up to 207 metres in North-South and 81 metres in East-West.

Later, during the dispute between Norway and Denmark of 1988–93 concerning the maritime boundary between Jan Mayen and Greenland, copies of original Norwegian parliamentary documents were found, which clearly showed that the coordinates of the 123 base points in the official lists were given with respect to the Modified Bessel Ellipsoid. The fact that the coordinates in the official list of base points referred to a different ellipsoid than the one used in ED50<sup>4</sup> could explain most of the discrepancies found during the check surveys, although some of the differences were clearly due to the lesser accuracy of the older mapping that had been used. This discovery underlined the need for resurveying of the base points. The work was carried under the technical management and responsibility of one of the authors (BGH), and was completed in the summer of 1989.

## Survey Procedures

Classical geodetic methods were used during the first years of base point resurveys. Four survey teams were flown out by helicopter to triangulation stations which had clear line-of-sight to the base point. The teams would deploy 3–4 hours before low water, and would check in by radio as soon as they were ready to observe. At that time the project leader would be flown out to the day's first base point. The first task was to reconnoitre the area to make sure that the assumed base point was acceptable. Where there was some doubt, the helicopter would be directed to alternatives so that sight lines could be confirmed.

Once the base point had been finally selected, the helicopter was directed to hover for about five minutes with a red painted oil barrel hanging directly over the point. This would normally be long enough for the survey teams to complete the necessary observations using the oil barrel as sighting target. In some cases it was possible to actually place the oil barrel on the ground during observations close to the actual base point. In this event the project leader was required to compute the distance from the barrel to the point (normally 2 – 5 m).

Thereafter photographs were taken from the air for identification purposes, while the survey teams reported their observations by radio so the project leader could assess whether the observations had satisfied the observing specifications. At this stage the decision would be made as to whether further observations would be required or not. If not, then the teams would continue on to the next base point.

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4. ED50 is based on the International Ellipsoid – the “Hayford Ellipsoid” – which has distinctly different size and shape parameters than the Modified Bessel Ellipsoid. The International Ellipsoid has equator radius:  $a = 6,378,388$  m, flattening:  $f = 1/297$ ; and Modified Bessel Ellipsoid:  $a = 6,377,492.0176$  m,  $f = 1/299.15281285$ .



The helicopter was directed to hover for about five minutes with a red painted oil barrel hanging directly over the base point, 1977.



Measuring directions by theodolite to a base point in Sogn og Fjordane, West Norway, 1977.

In this way sufficient observations were collected to enable subsequent computation of the coordinates of base points with respect to the national geodetic datum. The accuracy of this method was assumed to be better than 3 metres, and usually around 1 metre.

### **Tides and the timing of survey observations**

The difference between low water and high water in the Oslo Fjord and south-westwards around towards Stavanger is relatively small – less than 0.5 metre. It was therefore not normally necessary to be very concerned about observing at low water. Northwards from Stavanger right up to the Russian border at Varanger, however, observations were scheduled during the 4 hours of lowest tide water, as the tide difference is up to approximately 3 metres. Particularly critical base points such as small reefs were attempted when the tide was at its lowest. For base points on Jan Mayen and Svalbard (Spitzbergen), the low water time frame was increased to 6 hours.

### **Surveying of Base points at Svalbard, Jan Mayen and Bouvet Island**

Baselines for a large part of the Svalbard archipelago were originally surveyed by classical geodetic methods and officially established on 25<sup>th</sup> September 1970. The

arrival of satellite positioning technology, however, generated a need for improved accuracy. Most of the Svalbard base points were therefore resurveyed using GPS by the Norwegian Polar Institute during the 1990s, and new base point coordinate lists were developed in cooperation with the Norwegian Mapping Authority. A total of 196 base points were established to encircle the five archipelagic groups of Svalbard: Bear Island, Hopen, Kong Karls Land, Kvitøya and Nordaustlandet/Edgeøya/Spitsbergen.

The baselines for Jan Mayen were based on coordinates from surveys early in the 1950s, and were promulgated by the Prince Regent's Resolution of 30<sup>th</sup> June 1955. At that time, the position of Jan Mayen Island in the Atlantic Ocean had been determined by astronomical observations. Subsequently, the Norwegian Mapping Authority was instructed by the Norwegian Foreign Ministry to resurvey the Jan Mayen baselines in connection with the aforementioned dispute with Denmark. The field work was accomplished in 1991 by means of a GPS antenna mounted on the fuselage immediately above the pilot's seat in a Lynx helicopter. The survey was made by hovering the helicopter vertically above each of the base points in turn all around the island. This was in fact the first time that GPS had been used for baseline surveying. Later, in 2000, these measurements were used with a view to baseline revision for the whole island. The end result was 42 base points covering the whole island. The baselines are straight in all except three segments where the baseline actually follows the low water mark.

Bouvet Island's position in the South Atlantic Ocean was originally determined during 1978–79 using the TRANSIT Doppler Satellite system, and the Island was later surveyed by aerial photography. No field work was undertaken to determine baselines. Instead, in 2000, and at the request of the Norwegian Foreign Ministry, the Norwegian Mapping Authority defined a baseline round the Island to reflect low water mark. This was done by reading coordinates of 31 base points from mapping at a scale of 1:20,000 that had been produced by the Norwegian Polar Institute in 1986. The Island's coast is so irregular, and these points are so close together, that it was found that 31 points were sufficient for defining the 12 nautical mile territorial waters and the other maritime boundaries further out to sea.

## **Publication of Norwegian Baselines and Territorial Waters Boundaries**

Observational data from the baseline surveys were computed and reduced by Geodesy Division with respect to the EUREF89 datum system. Publication of the base point coordinates was arranged in close collaboration with the Norwegian Foreign Ministry.

The first set of base points to be published was in fact for Svalbard. These were promulgated by *FOR 2001-06-01 nr 556: Forskrift om grunnlinjene for sjøterritoriet ved Svalbard* published by Royal Decree dated 5<sup>th</sup> May 2001. These were closely followed by the base points for Jan Mayen promulgated in *FOR 2002-08-30 nr 943: Forskrift om grensen for det norske sjøterritorium ved Jan Mayen* and published by Royal Decree of 30<sup>th</sup> August 2002

The base points for mainland Norway came next by *FOR-2003-10-10 nr 222: Forskrift om endring i forskrift om grunnlinjene for sjøterritoriet rundt Fastlands-Norge* published by Prince Regent's Resolution of 10<sup>th</sup> October 2003. Here a total of 103 base points were listed to cover the coast of mainland Norway, after a critical review had found that 20 of the original 123 points could be discarded without conflict with UNCLOS technical requirements. In this review base points were rejected if they were found to be just a few metres off the straight line connecting the neighbouring base point on each side. After this reduction of base points the maximum distance between two neighbouring base points (44,3 nautical miles) did not exceed the longest distance between the 123 old base points. Among the 103 chosen base points were all the base points with their coordinates as used during the negotiations with Great Britain and the Faroe Islands in the 1970s.



In the lower part of the picture, Norwegian base point number 20, named Vesterfallet i Gåsan (Troms, North-West Norway). The longest distance between any two neighbouring base points at the Norwegian mainland is from Vesterfallet to base point number 19 (44,3 nautical miles).

With effect from 1<sup>st</sup> January 2004, Norwegian territorial waters were extended from four to twelve nautical miles (22,224 m) from the baseline around the mainland. The change was established in Norwegian Law by *LOV 2003-06-27 nr 57: Lov om Norges territorialfarvann og tilstøtende sone [territorialfarvannsloven]*, which also applies for Svalbard, Jan Mayen, Bouvet Island, Peter I's Island and Queen Maud's Land.

Finally, Bouvet Island's base points were promulgated by *FOR-2005-02-25 nr 174: Forskrift om grunnlinjen for sjøterritoriet ved Bouvetøya*, published by Royal Decree on 25th February 2005.

## **United Nations Convention on the Law of the Sea (UNCLOS)**

As long ago as the 1920s the League of Nations had attempted to clarify issues related to coastal nations' baselines and maritime borders, but without success. These issues were inherited by the United Nations which held its first conference on the Law of the Sea in Geneva in 1958. The conference addressed the provisions on maritime law, especially with a view to the technical developments of the time. The need was recognised for international conventions to regulate coastal nations' sovereignty over sea areas, as well as regulating fishing and the conservation of natural resources in the open ocean.

Concerning the delimitation of territorial waters, the 1958 conference accepted the judgement handed down by the International Court in The Hague in 1951 with regard to the previously mentioned dispute between Norway and Great Britain. The International Court had accepted the Norwegian claim that an irregular coastline with many headlands, islands and reefs was best represented by baselines drawn as straight lines between the outermost headlands, islets and reefs that are exposed at low water.

## **UNCLOS Baselines and Maritime Boundaries**

That which is now called UNCLOS (the United Nations Convention on the Law of the Sea) was adopted by 119 nations in Montego Bay, Jamaica, on 10<sup>th</sup> December 1982. The Convention came into force on 16<sup>th</sup> November 1994, thirty days after the 60th nation had ratified it. By early 2011, a total of 161 nations had ratified the Convention.

The Convention contains 320 Articles which regulate coastal and island nations' rights and duties connected to their coastal sea areas. Article 5 of the Convention states that the baseline shall follow the coastline at low water mark, and this would

be known as a “normal baseline.” Article 7, meanwhile, states that “in localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity, the method of straight baselines joining appropriate points may be employed in drawing the baseline from which the breadth of the territorial sea is measured.”<sup>5</sup>

No other forms of baseline are described in the Convention. Further, the Convention gives no maximum distance between base points for a coastal nation. For island states, meanwhile, 125 nautical miles is given as absolutely the greatest allowable distance between base points. Furthermore, the manual “The Law of the Sea. Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea,” published by the United Nations, shows that the longest distance between two Norwegian base points is slightly less than 48 nautical miles (referring to the Hague ruling from 1951), so it is recommended that no coastal state should exceed this distance between two neighbouring base points.

When baselines are defined by means of coordinates, the following UNCLOS related maritime boundaries can be deduced:

1. Territorial Waters, determined in accordance with UNCLOS to be 12 nautical miles outside the baseline. The Convention also makes it clear that no coastal nation may claim territorial waters beyond the median line with a neighbouring nation. Meanwhile, within Territorial Waters, national laws apply without hindrance.
2. The Contiguous Zone – 12 nautical miles outside Territorial Waters (i.e. 24 nautical miles outside the baseline). In the Contiguous Zone, the coastal nation has the right to take action against smuggling and the plundering of wrecks.
3. The Exclusive Economic Zone (EEZ). This zone is defined to be 200 nautical miles outside the baseline, on condition that a neighbouring nation is distant by at least 400 nautical miles. Coastal nation sovereignty in the EEZ covers the continental shelf and ocean fishing.
4. A coastal state may in some cases claim a continental shelf limit further out than 200 nautical miles from the baseline. However, documentation is required based on seabed topography and geophysical research. UNCLOS Article 76 specifies the acceptance requirements for extending the continental shelf definition beyond 200 nautical miles. One of these specific requirements is associated with a further boundary of 350 nautical miles beyond the baseline.

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5. From [http://www.un.org/Depts/los/convention\\_agreements/texts/unclos/part2.htm](http://www.un.org/Depts/los/convention_agreements/texts/unclos/part2.htm) (accessed December 2011).

A separate UN commission has been established to review information with respect to UNCLOS Article 76 in cases where a nation's continental shelf extends beyond 200 nautical miles from baselines. This commission is entitled the Commission on the Limits of the Continental Shelf (CLCS), and has 21 members drawn from UN member nations. The members are experts in the fields of geology, geophysics and hydrography. Norway has been represented by Harald Brekke from the Norwegian Petroleum Directorate for two five-year terms.

Norway has submitted such information to CLCS for areas beyond 200 nautical miles in Smutthavet, Smutthullet and an area north of Svalbard. Recommendations have been received from the CLCS respecting the outer limit of all these areas except a small part north in Smutthavet. Norway has indicated its agreement with the recommendations, and legislation of its outer limit of the continental shelf beyond 200 nautical miles based on the recommendations received from CLCS is under preparation.

In addition, and as a consequence of the UNCLOS, the UN has established its own special court called the International Tribunal for the Law of the Sea (ITLOS). The Tribunal functions in accordance with the provisions of UNCLOS and its Annex VI. ITLOS is the central forum available to states, to international organizations, and to private entities for resolving disputes about how UNCLOS should be interpreted and applied.

The first case for ITLOS, *The M/V "SAIGA" Case (Saint Vincent and the Grenadines v. Guinea), Prompt Release*, was submitted to the Tribunal on 13 November 1997. To date, nineteen cases have been submitted to the Tribunal.<sup>6</sup>

Since 2000 ITLOS has been permanently located together with its administrative staff in Hamburg. The ITLOS Court meets as necessary and consists of 21 judges elected by the UN member nations. There is no Norwegian judge elected to ITLOS, while Bjørn Geirr Harsson became the ITLOS geodetic consultant in early 2011.

A number of the UNCLOS Articles (16, 47, 75, 76 and 84) are directly related to geodesy, where it is clearly stated that where the baseline or maritime boundary is given as a list of coordinates, then the geodetic datum shall also be specified. It is clear that experts on the Law of the Sea have now understood that coordinates given without their associated geodetic datum will be ambiguous. Many geodetic datum systems have been used over the years and decades, but in today's age of

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6. The number of cases is given in: <http://www.itlos.org/index.php?id=10&L=0> (December 2011). It should be noted that nations may alternatively use the International Court of Justice or third-party arbitration to resolve maritime boundary disputes.

satellite navigation and positioning, the size of the associated reference ellipsoid's semi-major axis (the GRS80 Ellipsoid) is known to within a decimetre.

Despite the UNCLOS requirement for the geodetic datum to be stated, unfortunately some nations' baseline and sea borders regrettably remain published without this information.

### **Geodesy Division's Technical Responsibility for Maritime Boundaries with neighbouring Nations**

While the work of UNCLOS continued on the international level, Norway undertook maritime boundary negotiations with neighbouring nations. An agreement on the border in the North Sea between Norway and Great Britain, north from the border with Denmark to latitude 62° 44' 12" north, was signed in early 1965. The parties agreed to follow the median line principle for the division, and ruler and dividers were used. At that time, the Norwegian Hydrographic Office acted as the Foreign Ministry's technical advisors. As a final check of the coordinates of median line turning points, results were sent to the Geodesy Department at the Norwegian Geographical Survey (now the Norwegian Mapping Authority).

The Department's leading geodesist at that time, Gunnar Jelstrup, carried out these checks using mathematical methods with well known geodetic formulæ. The results were remarkable, if not to say frightening. Jelstrup found that the southernmost median line point was 12,931 metres nearer to the Norwegian coast than to the British coast. On further investigation, Jelstrup found that the parties had used mapping on the Mercator projection for measuring out the median line. Mercator projection maps are perfectly normal for maritime use because a sailing course set out on the map will be exactly the same as should be followed using the ship's compass. However, it is also well known that the mapping scale increases with increasing latitude northward and southward from the equator. In this case, the Norwegian base points were further north (with a bigger scale factor) than the British base points. This was to Norway's disadvantage when trying to place median line turning points that would be equally distant from both coasts.

It was considered that this map projection issue had been an oversight. Moreover, the paper charts that had been used were at quite a small scale – 1: 631,000 – in other words one millimetre on the chart represented 631 metres in reality. Clearly the solution was to compute the median line turning points using well established geodetic techniques, and the values so obtained were duly adopted.

Later in 1965, a similar median line agreement was reached with Denmark. In the case of the boundary with Sweden, the boundary from inner Iddefjord to the

outer edge of territorial waters (at that time at four nautical miles) had been agreed in the agreement of 1909 after a round of arbitration in The Hague.

Latterly, ever since 1965, geodesists from the Geodesy Department (later the Geodesy Division) have continued to act as technical advisors to the Foreign Ministry with regard to national maritime boundaries.

## Boundary Negotiations with the Soviet Union/Russia

Norway first approached the Soviet Union with a view to resolving mutual boundary issues in 1967. The Soviet standpoint at that time, however, was that there was nothing to discuss, because as far back as 1926 the Soviet Union had declared Soviet sovereignty over the land area in a sector right up to the North Pole between the meridians at longitude 32° 04' 35" east and through the Bering Straits at longitude 168° 49' 30" west. (The Soviet Union had in fact accepted the Svalbard Act of 17<sup>th</sup> June 1925 and had moved the western sector line eastwards to longitude 35° E between latitudes 74° N and 81° N.) It should be noted that the 1926 Declaration was meant to apply to land areas, and made no mention of sea areas. It can only be surmised that in the intervening decades the declaration became understood or interpreted to also determine sea area sovereignty between these two sector lines.

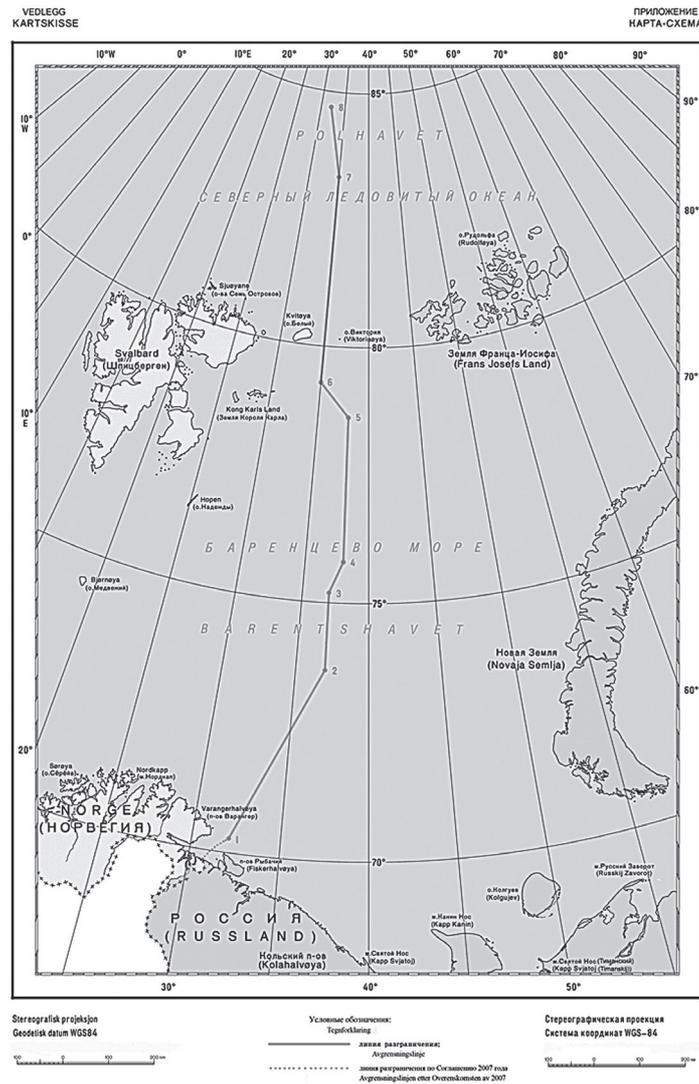
Contact with the Soviet Union nevertheless continued in the 1970s, primarily concerned with fishing and shrimping rights. Jens Evensen and Arne Treholt successfully negotiated an agreement in early 1978 in which a so-called "gray zone" was defined. The gray zone could be described as a roughly rectangular area described by six corner coordinates, where the majority of it would actually have been within Norwegian territory as would have been determined using median line specifications. Unfortunately, this agreement about the gray zone turned out to be somewhat inconvenient in the years that followed.

The delimitation of the Barents Sea then became an issue, however, once both Norway and the Soviet Union, together with 117 other nations, had signed the UNCLOS in 1982. Negotiations to find a boundary line that would be a compromise between the Soviet sector requirements and the Norwegian median line claims continued throughout the 1980s. The area lying between the sector line and median line was called 'the disputed area' (which incidentally had nothing to do with the gray zone), and the area was estimated to be 175,211 km<sup>2</sup>. Norway's mainland with coastal islands, by comparison, has an area of about 324,000 km<sup>2</sup>, and the whole of Denmark's land area amounts to approximately 43,000 km<sup>2</sup>. In other words, the disputed area could only be described as relatively large.

Geodesy Division was tasked by the Foreign Ministry with computing the size of the zones connected with the disputed area, as well as distances to the junctions

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of various potential boundary line crossings and other parameters that demanded geodetic expertise for computation on the ellipsoid. Bjørn Geirr Harrson, as a geodesist from the Norwegian Mapping Authority, was a regular member of the Norwegian maritime boundary negotiating delegation, working with neighbouring nations from 1977 until his retirement in 2005.



The delimitation line between Norway and Russia in the Barents Sea, agreed in 2010 and effective from 7th July 2011.

An important point in the early 1990s was to agree which geodetic datum should be used for determining the coordinates that would be quoted in the eventual agreement. Up to that time, Norway had usually used the NGO1948 national geodetic datum, while Russia also had its own national datum system, known as Pulkova 1942. Eventually, later in the 1990s, the negotiating parties came to agree that the WGS84 geodetic datum would be used. Subsequently, in 2010, the negotiating parties finally settled on a boundary line which divided the disputed area almost equally.

Thus was a 43-year-old dispute finally resolved. In fact, Norway had now reached agreement with all neighbouring nations in the Northern Hemisphere. Of the Norwegian dependencies in the Southern Hemisphere, only Bouvet Island has baselines and territorial boundaries defined. The other Norwegian dependencies in Antarctica are covered by the Antarctic Treaty of 1<sup>st</sup> December 1959, which is an international agreement on the ice and land areas south of 60 degrees south latitude.

### **The Maritime Boundary with Great Britain**

While negotiations with the Soviet Union (from 1991 the Russian Federation) continued, Norway also undertook negotiations with the other neighbouring nations and generally arrived at agreements within one to three years. The agreement with Great Britain concerning the northern part of the median line up to the tripoint between Norway, Great Britain and the Faroe Islands was concluded in 1977–1978.

A negotiating delegation arrived in London in 1977 to open talks with Great Britain about the continuation of the median line northward from point no. 8 of the 1965 agreement. Immediately, an interesting difficulty emerged. Point no. 8, the end point of the 1965 agreement, was at 61° 44' 12" north latitude. When the new median line was computed, however, the starting point of the new line was found to lie about 300 metres west of Point no. 8. The Norwegian delegation argued that the shortest distance from the southern delimitation line to the northern one would be to follow a line perpendicular from old point no. 8 to the start of the new median line. However, the old median line at that point would cause that perpendicular to have a direction slightly south of west, and this would be slightly to Norway's advantage.

In contrast, the British delegation considered that the 1965 agreement had been satisfied by the definition of a specific value for the latitude of point no. 8, so one could not continue the median line northwards from a point to the south of point no. 8.

The disputed area between the old and the new median lines amounted to no more than some 16,000 m<sup>2</sup>. However, experience from further south had shown that enormous values could be at stake. The delegations were therefore unwilling to give up more sea area than absolutely necessary. The delegations thus decided to hold over their decisions on this matter until a subsequent meeting that took place in Oslo some six months later.

Informal enquiries among the international legal communities suggested that the Norwegian proposed solution would be unlikely to be supportable. The British proposal of following the circle of latitude was considered rather more likely to be defensible, and, at the next negotiating conference, final agreement was reached on the northward extension of the Norwegian-British median line from the end of the 1965 agreed line up to the beginning of the Norwegian-Faroes line.

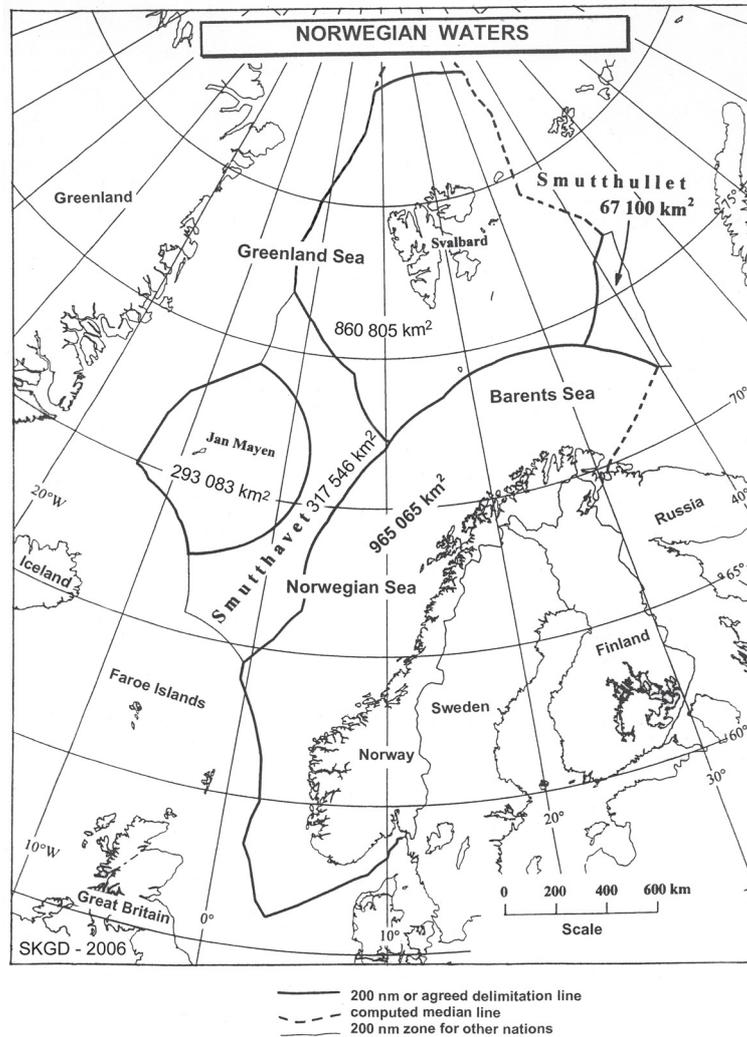
## **The Maritime Boundary with the Faroe Islands, around Jan Mayen and the Svalbard Archipelago**

Now that the median line with Great Britain was completed, agreement concerning the Norwegian-Faroe Islands median line followed in 1979. This agreement essentially presented no geodetic challenges, since it concerned a simple straight line between two points 61 km apart.

Then, in an agreement of 1980, Norway assented to the Icelandic claim for an unrestricted 200 nautical mile zone in the direction of Jan Mayen. Agreement with the Icelandic claim entailed yielding almost 30,000 km<sup>2</sup> of sea area, which in fact lies within 200 nautical miles of the Jan Mayen coastline. When, however, negotiations began with Denmark concerning the median line arrangements between Jan Mayen and Greenland, Denmark made a similar claim to that which had been made by Iceland. In this case, Norway did not accept the Danish claim, and Denmark consequently took the dispute to the international Court in The Hague. The Court's judgement, handed down in 1993, was that the disputed area of some 64,500 km<sup>2</sup> would be divided approximately 60% to 40% in favour of Norway. The final delimitation line between Jan Mayen, Greenland and Iceland was established as a result of negotiations that took place in Reykjavik in October 1997.

Negotiations on the maritime boundary between the Svalbard Archipelago and Greenland began towards the end of 2004. The only difficulty with this boundary was a flat island about two km long called Tobias Island. Tobias Island had been discovered as late as 1993, some 80 km off the coast of Greenland. The negotiating teams were quickly able to find an acceptable solution based on a median line, and agreement was finally reached early in 2006.

## NORWEGIAN BASELINES, MARITIME BOUNDARIES



Delineation of Norwegian waters as in 2010, immediately before the final agreement between Norway and Russia.

### Conclusion

The basis for Norwegian maritime boundary negotiations with neighbouring nations has been the principle of defining median lines. These median lines should be defined so that the distance from the median line to the two opposing baselines is equal. Further, if a curved median should be desired, then a large number of

coordinated points would be needed to define the curve with satisfactory accuracy. A practical solution was to replace the curve by a series of straight line segments, mathematically selected so that both nations received and relinquished equal areas.

With the arrival of satellite positioning technology it has become possible to detect positions at sea with an accuracy of about one metre. Naturally enough, one cannot set up boundary markers at sea in the same way as on land, so one is inevitably dependent upon mathematical solutions. Geodesy therefore had to play a central role in finding good solutions for maritime boundary definitions that were reliable to an accuracy better than could be detected – centimetre level – and that could be used for diplomatic negotiation. These solutions were unavoidably dependent on geodetic formulæ and computing techniques in order to provide coordinates with the required level of accuracy.

Norway has managed to expand its sea area significantly over the past 45 years by means of negotiating with neighbouring nations on the basis of the United Nations Convention on the Law of the Sea (UNCLOS). The table below shows that the Norwegian Sea area is now more than two million square kilometres.

**Table 1.** Norwegian Sea area

<b>Name</b>	<b>Land Area Km<sup>2</sup></b>	<b>Sea Area within the Perimeter of the Norwegian Economic Zone, Fishery Zone and Fish- ery Protection Zone Km<sup>2</sup></b>	<b>Sum of Land and Sea Area Km<sup>2</sup></b>
Mainland Norway (including coastal islands)	323 802	965 066	1 288 868
Jan Mayen	377	293 083	293 460
Svalbard Archipelago	61 022	860 805	921 827
Sum of Mainland Norway, Jan Mayen and the Svalbard Archipelago	385 201	2 118 954	2 504 155
Approximate area in the Barents Sea arising from the newly signed agreement with Russia		2 033 950	2 419 150

The above square kilometre values for the Barents Sea are computed based on the Norwegian median line claims. The agreement with Russia divided the disputed area into two approximately equal parts. The exact area of the Norwegian sector had not been computed at the time of writing. The last line in the table above therefore shows approximate values adjusted to the agreed boundaries.

The Norwegian Mapping Authority's dedication to developing accurate definitions of baselines, and participation in subsequent international negotiations, represents a solid investment of time and resources and demonstrates Norway's ability to help resolve complex multilateral maritime concerns.

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**Размышления о норвежских водных пространствах, морских границах и Конвенции ООН по морскому праву**

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**Аннотация**

С недавней ратификацией договора с Россией о морских границах в секторе Баренцевого моря, можно, наконец, сказать, что делимитация морского пространства, о котором беспокоилась Норвегия, справедливо разрешена в соответствии с Конвенцией ООН по морскому праву (UNCLOS). В статье рассматриваются события, трудности, обзор процедур и решений, которые привели к завершению процесса определения норвежско-российской морской границы. В статье также объясняются различные концепции UNCLOS, такие как фактические обстоятельства и морское пространство (территориальные воды, прилежащие зоны, и исключительная экономическая зона), и делается ссылка на ряд важных национальных и международных постановлений и решений, которые были приняты за последние годы. Особое внимание читателя обращается на влияние и значение геодезии в определении понятий по морской тематике, измерений и расчетов в морском пространстве. В силу несовершенства и устаревания этих геодезических определений проявился ряд практических последствий, особенно с появлением навигационных спутниковых систем, которые позволили значительно улучшить точность позиционирования скрытых из вида участков земли. Благодаря последнему, появилась возможность выявить огромные природные ресурсы, которые в настоящее время извлекаются из морских недр. В статье предлагаются возможные решения этих геодезических трудностей, по которым можно провести переговоры с соседними странами.

**Ключевые слова:**

Конвенция ООН по морскому праву, UNCLOS, базовые условия, территориальные воды, прилежащие зоны, исключительная экономическая зона, морские границы, исходные геодезические данные. Норвегия, Ян-Майен, Шпицберген, остров Буве.