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Phrase-based statistical machine translation

Explanation of its processes and statistical models and evaluation of the English to Spanish translations produced

Translation Technologies [32524]

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ABSTRACT

Statistical machine translation (SMT) is an approach to Machine Translation (MT) that uses statistical models whose parameter estimation is based on the analysis of existing human translations (contained in bilingual corpora). From a translation student's standpoint, this dissertation aims to explain how a phrase-based SMT system works, to determine the role of the statistical models it uses in the translation process and to assess the quality of the translations provided that system is trained with in-domain good-quality corpora. To that end, a phrase-based SMT system based on Moses has been trained and subsequently used for the English to Spanish translation of two texts related in topic to the training data. Finally, the quality of this output texts produced by the system has been assessed through a quantitative evaluation carried out with three different automatic evaluation measures and a qualitative evaluation based on the Multidimensional Quality Metrics (MQM).

Key words: statistical machine translation, SMT, phrase-based SMT, translation model, language model, evaluation metrics

RESUMEN

La traducción automática estadística (TAE) es una aproximación a la traducción automática que emplea modelos estadísticos cuyos parámetros se estiman a partir del análisis de traducciones existentes realizadas por humanos (presentes en corpus bilingües). Desde el punto de vista de un estudiante de traducción, este trabajo de fin de grado tiene como objetivos: explicar el funcionamiento de un sistema de traducción automática estadística basado en segmentos bilingües, determinar el papel de los modelos estadísticos en el proceso de traducción y evaluar la calidad de las traducciones producidas por un sistema entrenado con corpus de buena calidad y del mismo tema que los textos a traducir. Con ese fin, se ha entrenado un sistema de TAE basado en Moses, que se ha utilizado posteriormente para llevar a cabo la traducción de inglés a español de dos textos relacionados en tema con el corpus de entrenamiento. Finalmente, se han analizado las traducciones producidas por el sistema mediante una evaluación cuantitativa llevada a cabo con tres medidas de evaluación automática distintas y una evaluación cualitativa basada en Multidimensional Quality Metrics (MQM).

Palabras clave: traducción automática estadística, TAE, TAE basada en segmentos bilingües, modelo de traducción, modelo de lenguaje, medidas de evaluación

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1. INTRODUCTION

Machine translation (MT), as the European Association for Machine Translation explains, is "the application of computers to the task of translating texts from one natural language to another". Interest in MT has existed almost since the first electronic computer was created. An example is Warren Weaver's suggestion in 1949 to apply the statistical and cryptanalytic techniques that were emerging at that time from the field of communication theory in order to solve the problem of using computers to translate texts written from one natural language to another (Brown 1993: 263-311). This interest has grown throughout the years to such an extent that MT programs are nowadays used all around the world with commercial, military and economic applications, among others.

Furthermore, even international organizations such as the EU have worked with MT systems in order to improve the productivity of their translations. As a matter of fact, the Machine Translation Service of the European Commission worked, from 1976 to 2013, with EC Systran, a full-text, automatic, rule-based technology that runs on UNIX/Linux (European Commission 2005: 2). Subsequently, on June 2013, the European Commission released MT@EC, a statistical machine translation (SMT) program based on the free/open-source software Moses and built on data derived from EU translations (European Union 2014: 3-5). This shift towards SMT systems has opened new opportunities given their quality, number of supported languages and development costs. Consequently, it can be argued that SMT has become nowadays one of the main focus in machine translation (MT) research and that it has gained an important share in the MT market, although new approaches such as neuronal machine translation are also gaining momentum.

In the Degree in Translation and Interpreting, only the rule-based translation systems are thoroughly taught and, consequently, the students lack of the basic knowledge in SMT systems, having just a slight idea of what these systems are capable of. For this reason, it seemed relevant to study these statistical systems that are now being considered to be a technological breakthrough within the field of Translation Technologies. In this light, the aims of this dissertation are to understand phrase-based statistical models and their roles in the translation process; to determine the impact of the evaluation metrics in the parameters' estimation; to learn how to train an SMT

system based on the free/open-source software Moses; to acquire the skills to interpret the results obtained and to make an evaluation of the translations produced.

The bibliography consulted comprises specialized books, chapters within books, proceedings of SMT conferences, tutorials and articles published in MT journals. These sources were essential in the first stage of the project, since a sound understanding of the processes and statistical models of SMT systems was needed in order to carry out the training and translation processes. Once the most theoretical part was addressed, the rest of the methodology and both the quantitative and qualitative evaluation procedures were designed so that the output texts and the results obtained in the training and translation processes could be analysed accordingly.

Therefore, this dissertation is divided in four major sections: the theory explaining how a SMT system works; the methodology carried out to train the system, translate the input text and evaluate the results; the analysis of the translations together with the results of the evaluation, and the final conclusions on the matter. The bibliography and annexes precede these sections with the aim of providing with the sources and documents used in the elaboration of this dissertation.

2. STATISTICAL MACHINE TRANSLATION: PHASES AND MODELS

Statistical machine translation (SMT) can be defined as an approach to MT founded on monolingual and bilingual corpora and characterised by the use of statistical models. This means that a SMT program is capable of translating automatically texts that have not been seen before using the information extracted from past human translations.

In order to achieve these translations, SMT procedure is divided into three important processes: **training, tuning** and **decoding**. Firstly, the training process involves the use of both monolingual and bilingual corpora in order to learn the different models to be used for translation. Secondly, the tuning process consists of learning the relevance of each model when it comes to combining them. And thirdly, the decoding process focuses on finding the best translation for a given sentence according to the global score that each possible translation hypothesis receives when the scores provided by the different models are combined using the weights obtained as a result of the tuning. Therefore, as Hearne and Way (2011: 206) explain, "rather than focusing on the best process to use to generate a single optimal translation for a source sentence, SMT focuses on generating many thousands of hypothetical translations for the input string, and then working out which one of those is most likely".

2.1. Training

The **training process** involves the use of both monolingual and bilingual corpora to obtain the statistical models to be used for translation. Nowadays, the best performing statistical machine translation systems are based on phrases (Koehn 2010: 127). This means that, rather than searching equivalents for each word, they intend to translate whole segments of words that may differ in length. These segments are called phrases in SMT jargon, but they do not have a linguistic meaning.

Consequently, as the source sentence is split into phrases that are translated in isolation based on the probabilities estimates for each one, a statistical model is needed to estimate the different translation options existing for each phrase and their

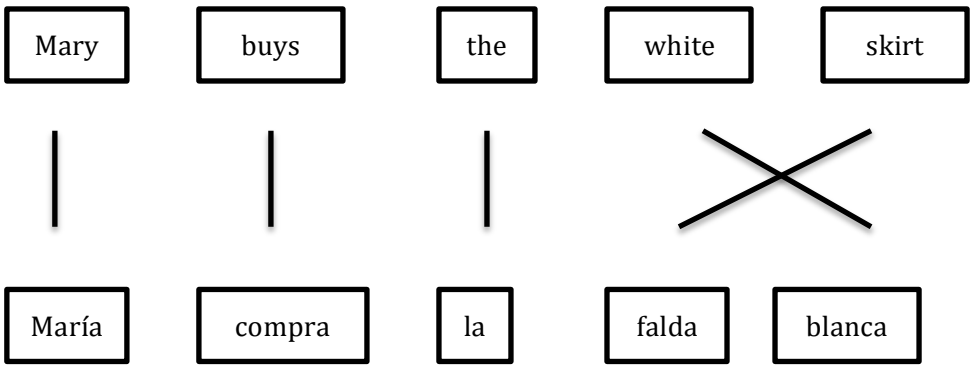
corresponding scores, which is the **translation model**. However, there are more statistical models applied in this process addressing each a different aspect of the translation process: the lexical weighting, the language model, the lexicalized reordering model, the distance-based reordering model and both the word and phrase penalty.

In light of this, the translation model will be first addressed in this section, followed by the explanation of the other major statistical models.

2.1.1. Translation model

The **translation model** is used to calculate the likelihood that a segment in the target language is equivalent to a segment in the source language. This model is learned from a corpus made of parallel texts previously divided into sentence pairs containing the source-text sentence and its equivalent in the target language. First, word alignments in each sentence pair are computed in order to identify equivalences between individual words in these pairs. Subsequently, bilingual phrases are obtained from these word alignments and finally, phrase translation probabilities are computed.

For word alignment, SMT programs use word-based translation models (Brown et al. 1990: 80-81) as it is portrayed in this example:



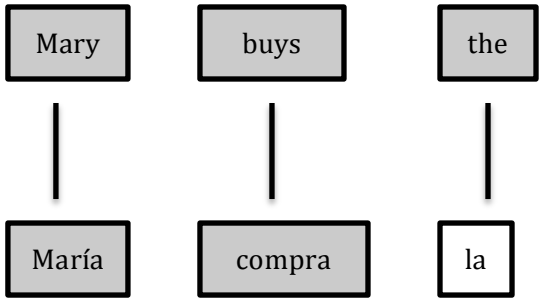
Based on Brown et al explanations of the word-based translation models, it can be affirmed that the Spanish translation has been generated from the English sentence word for word. Thus, “Mary” produces “María”, that is to say, “Mary” is aligned with “María “ while “buys” produces “compra” and so on.

Afterwards, SMT systems extract bilingual phrases that are consistent with the word alignments as this charter shows:

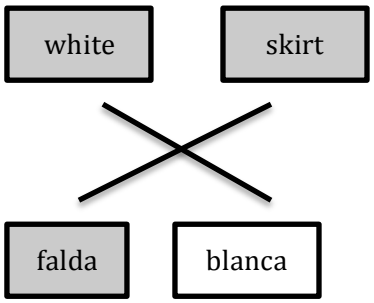
Source	Target
Mary	María
buys	compra
Mary buys	María compra
the	la
buys the	compra la
Mary buys the	María compra la
white	blanca
skirt	falda
white skirt	falda blanca
the white skirt	la falda blanca
buys the white skirt	compra la falda blanca
Mary buys the white skirt	María compra la falda blanca

Therefore, the concept of "consistent with the word alignments" is relevant in order to understand this phase. As Philipp Koehn (2010: 131) explains, a bilingual phrase pair (*s, t*) is consistent with a set of word alignments if none of the words in *s* is aligned to a word not in *t* and vice versa, and at least one of the words in *s* is aligned to a word in *t*. Let's illustrate this with some examples, where the phrase pairs that are being analysed to see if they are consistent are the ones painted in grey:

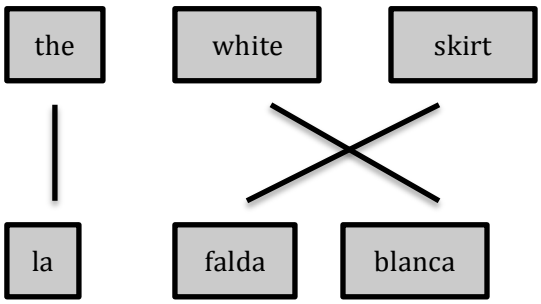
"Mary buys the" = "María compra" → **INCONSISTENT**



"white skirt" = "falda" → **INCONSISTENT**

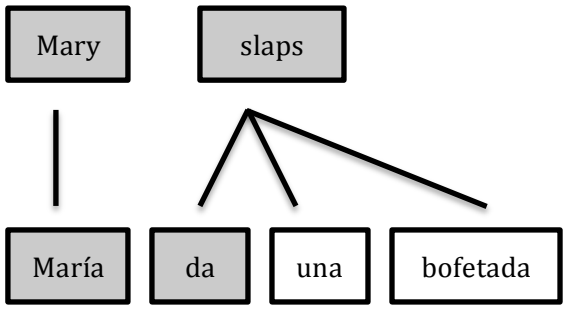


the white skirt = la falda blanca → **CONSISTENT**



With more complex sentences where a word in the source sentence is aligned to two or more words in the target language or vice versa, the consistency concept remains the same:

"Mary slaps" = "María da"→ **INCONSISTENT**



Hence, the phase of inducing a translation model from a corpus based on sentence-aligned parallel texts firstly involves word alignment and then phrase pair extraction. Once the bilingual phrases are extracted, SMT programs compute the probability that each phrase of the target language is obtained from a phrase in the source language and vice versa. Two models, one for each translation direction, are needed because the process of translation is not symmetric at all. An excellent example is the likelihood that "the" is translated as "la" [P(la | the)] compared to the likelihood that "la" is translated as "the" [P(the | la)]. "La" will be almost always translated as "the", but "the" can be translated as "la", "el", "los" and "las". Therefore, [P(the | la)] will be higher than [P(la | the)].

By their part, the P(T | S) translation probabilities are usually calculated by dividing the number of times that a source-target phrase has been extracted from the corpus by the number of times that a source phrase has been extracted from the corpus. The P(S | T) model is calculated analogously.

The charter below illustrates the result of the whole process of learning the two translation models as explained above:

Source	**Target**	**P (S | T)**	**P (T | S)**
Mary	María	0.89	0.87
buys	compra	0.85	0.87
Mary buys	María compra	0.85	0.75
the	la	1.00	0.25
buys the	compra la	0.75	0.35
Mary buys the	María compra la	0.89	0.45
white	blanca	0.80	0.25
skirt	falda	0.75	0.80
white skirt	falda blanca	0.72	0.85
the white skirt	la falda blanca	0.87	0.95
buys the white skirt	compra la falda blanca	1.00	1.00
Mary buys the white skirt	María compra la falda blanca	1.00	1.00

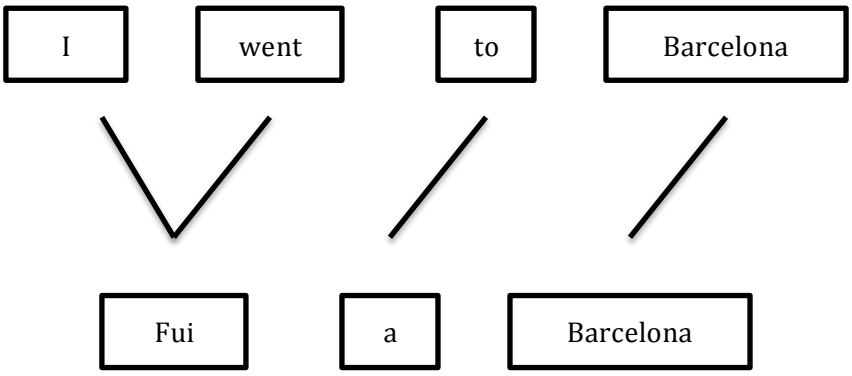
As it can be seen in the charter, the larger the sentences are, the most likely is that they obtain a high score (1.0 or near 1.0). However, rare phrase pairs, as well as long phrase pairs, are generally seen only once or a few times in the corpus and therefore we cannot be confident on the reliability of the estimated translation probabilities. The model in charge of addressing this problem is the **lexical weighting**, which will be explained hereafter.

2.1.2. Lexical weighting

Many long phrase pairs obtain a high translation probability due to the fact that it is not common for them to appear many times. However, the probabilities in those cases are not reliable, since the longer a segment is, the less times it will appear in the corpus. Then, how can we know whether a rare long phrase pair is reliable or whether it is collected from noisy data?

As Koehn et al (2003) affirm, "one way to validate the quality of a phrase translation pair is to check, how well its words translate to each other". Therefore, the **lexical weighting** is a smoothing method used to decompose these phrases into its word translations in order to know how well they match up because we have richer statistics at the word level and hence more reliable probability scores (Koehn 2010: 139).

In order to achieve this, the lexical weighting model uses a probabilistic bilingual dictionary, also obtained from the word alignments, to see how reliable is a phrase pair, as it can be induced from the following example:



lex (Fui a Barcelona | I went to Barcelona) =

(w(fui | I) + w(fui | went)) / 2 x w(a | to) x w(Barcelona | Barcelona) =

…

where three terms are multiplied, one per target word. The term for each target word is calculated as the sum of the translation probabilities of that target word given the source words aligned to it divided by the total number of source words it is aligned to (w(fui | I) + w(fui | went)) / 2).

Consequently, both the translation model and the lexicalized weighting aim to provide the best equivalent for each phrase in the source language, although this can led to a lack of fluency, since not all the equivalents will seem natural in the target language. To that end, the **language model**, with the aid of monolingual corpora, aims to measure the fluency of the translation hypothesis produced.

2.1.3. Language model

A **language model**, as Miles Osborne (2010: 912-915) conveys, "models the fluency of the proposed target sentence […] with higher probabilities being assigned to sentences that are more representative of natural language". These models use monolingual corpora and can be considered as **n-grams** models that predict the likelihood that a word follows another word or segment. For example, in the bigram language model, the probability that a word comes after another word is measured. This is computed by dividing the number of occasions in which both words appear one after the other by the total number of appearances of the first word in the corpus.

The n-gram model that is normally used by SMT programs is the **5-gram model**. It usually starts computing the likelihood that the first word appearing in the sentence is followed by the second one. Once this is computed, it calculates the probability that the third word follows the two first words. The process continues until it reaches a string of 5 words as it is portrayed through this example:

Sentence: *I am flying to Dublin on Friday*

Likelihood (using a 5-gram model) =

P(I | <s>) x P(am | <s> I) x P(flying | <s> I am) x P(to | <s> I am flying)

x P(Dublin | I am flying to) x P(on | am flying to Dublin)

x P(Friday | flying to Dublin on) x P(</s> | to Dublin on Friday)

where "<s>" and "</s>" are special tokens used for referring to the beginning and the end of a sentence respectively. Additionally, those strings that have not been seen before in the monolingual corpus are assigned a small probability rather than a zero-score so that a well-formed sentence does not receive a zero probability for just containing a previously unseen word (or n-gram) in the corpus.

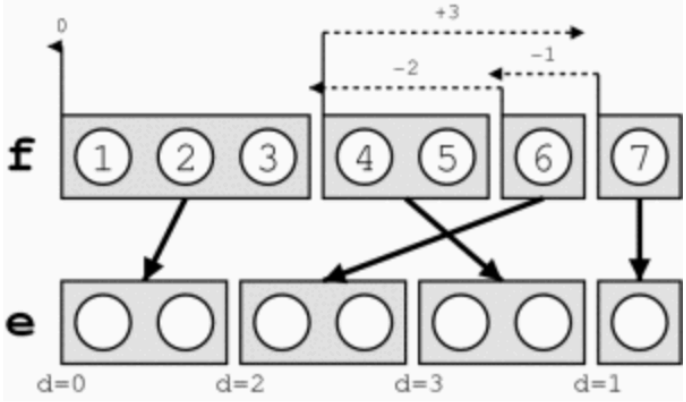
On the other hand, it is commonly known that languages differ in word order and **reordering models** are therefore needed to score the different hypothesis of word placement. In this sense, the language model is also indirectly measuring the quality of the reordering. There are two reordering models, which are the distance-based model and the lexicalized model.

2.1.4. Distance-based reordering model

The distortion, or distance-based reordering, cost is computed by measuring the number of words that are skipped when phrases in the source text are picked in the order dictated by the target text, being the formula below the one applied in the process:

$$D(e, f) = - \Sigma_i \, (d\_i)$$

with d_i = last word position of the previously translated phrase + 1 – first word position of the newly translated phrase. Let's see an example of how these calculations would be:



Example extracted from Moses' user manual (Koehn 2016: 66)

For the first phrase pair, the last position of the previously translated phrase is 0, since this is the first phrase pair and the first word position of the current phrase being translated is 1. Hence, the reordering cost for this phrase is 0:

$$d = | 0 + 1 - 1 | = 0$$

For the next phrase, the last position of the previously translated phrase is 3 and the first position of the newly translated phrase is 6, therefore, the reordering cost is 2:

$$d = | 3 + 1 - 6 | = 2$$

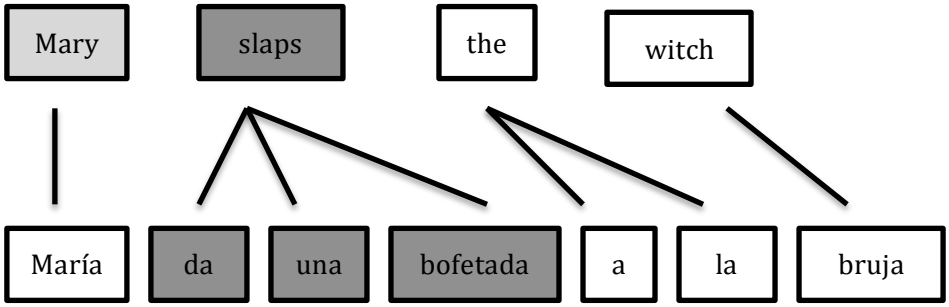
In the tuning phase, the weight of the distance-based reordering and the other models will be computed in order to have the best quality results. With regard to this parameter, if it is set closer to 0, monotone translations will be more likely to be produced.

2.1.5. Lexicalized reordering model

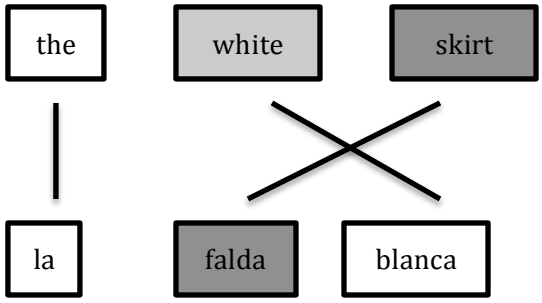
However, the distance-based model is fairly weak and, consequently, there is a need to introduce another model that conditions the reordering on the specific phrases that are being reordered. The lexicalized reordering model is learnt from the alignments obtained during the extraction of bilingual phrases and is used to score the order in which the aligned words appear in the target text. To that end, the different probabilities are scored regarding the position of both the word that is immediately before the phrase being analysed (backward model) and the word that comes immediately after (forward model). There are three types of reordering operations: swap, discontinuous and monotone (Feng et al 2013: 325). The examples below are used only applying the

backward model, which means that the reordering is based on the previous word. The darker grey is used for the phrases that are being analysed and the brighter grey for the previous word on which the reordering is based:

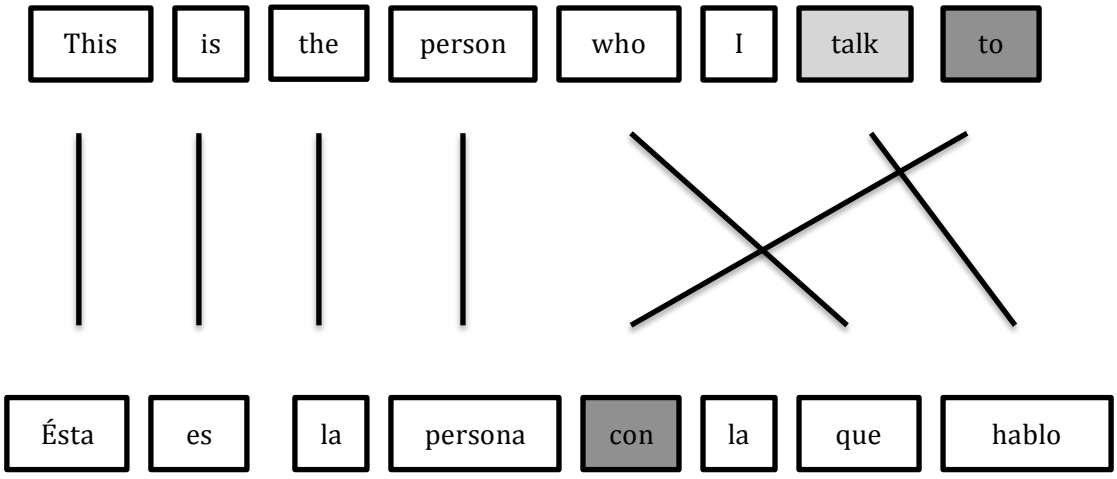
- **Monotone:** if the preceding source word is aligned to the preceding target word.



- **Swap:** if the preceding source word is aligned to the following target word.



- **Discontinuous:** if it is neither monotone nor swap.



In order to compute the probabilities obtained in this model, the number of times that the reordering operation has been seen with a bilingual phrase pair is divided by the number of times that this bilingual phrase pair has been extracted from the corpus.

2.1.6. Word penalty

The **word penalty model** is used in order to ensure that translations are not too long or too short, that is to say, it measures the number of words in the translation. As a matter of fact, candidate translations with more words generally have lower scores and therefore the decoder tends to have a bias towards shorter translations (Li et al 2008: 1-8). Therefore, this model counts the number of words existing in the translation and its weight is computed in the tuning phase. Koehn (2010: 140) explains that if $\omega < 1$, being ω the weight of the word penalty model, there will be a bias towards shorter translations. If $\omega > 1$ the system will prefer longer translations.

2.1.7. Phrase penalty

When SMT systems produce translation hypothesis, they segment the sentences into phrases, which can be either long or short. Therefore, depending of the scope of the project, different phrase lengths may be needed. Similar to the word penalty model, the phrase penalty model has an impact on the output text where there will be fewer and thus longer phrases or more and thus shorter phrases depending on the weight of the model. If, after the tuning process, the weight of the phrase penalty model is $\rho < 1$, we convey that there will be longer phrases whereas $\rho > 1$ means that the system will prefer shorter ones (Koehn 2010: 141).

2.2. Model combination

The **log-linear model** is the formula used in SMT to combine several models and compute an overall score for each translation hypothesis:

$$\sum_{m=1}^{M} \lambda_m \, . \; h_m \, (\mathrm{T}, \mathrm{S})$$

Here, M alludes to the number of models that will be used for translation (decoding process); λ_m is the weight of the m-th model according to its importance and h_m (T, S) is the logarithm of the probability provided by the m-model or its value, if it is not a probability (as is the case of the word and phrase penalties and the distance-based reordering model). Therefore, if the statistical models are used in a SMT program, each being thought of having a different importance, the scores might be similar to the ones in this charter:

m	λ_m	h_m
1	0.5	log (P (S | T))
2	0.5	log (P (T | S))
3	0.5	log (P(T))
4	0.3	log P(monotone backward | S, T)
5	0.27	log P(monotone forward | S, T)
6	0.35	log P(swap backward | S, T)
7	0.35	log P(swap forward | S, T)
8	0.2	log P(discont. backward | S, T)
9	0.2	log P(discont. forward | S, T)
10	0.4	distortion (S | T)
11	0.25	log (lex(S | T))
12	0.25	log (lex(T | S))
13	0.35	wordcount (T)
14	0.27	phrasecount (S, T)

However, not every model has the same weight, which depends on many different factors. Therefore, the process of adjusting the weights of the models, called **tuning**, is the following step in the training process carried out by SMT systems before we have a system that can be used to translate.

2.3. Tuning

It has been shown that not all models are equally important and, consequently, each one is assigned a different weight. In Section 4, the log-linear model was explained and it could be seen that it contains scores that can be added together. These scores are computed by multiplying λ_m and h_m(T, S), where λ_m represents the weight of the m-th model according to its importance and relative to the other models that are being used. Therefore, it is possible to 'tune' the relative importance of these models just by changing the λ_m values (Hearne and Way 2011: 217).

The tuning process uses an approximation technique called Minimum Error Rate Training (**MERT**), which requires both an evaluation corpus and a quality metric to operate. As Koehn (2010: 264) explains, the translation models used by SMT are normally estimated from huge corpora that contain ten to hundreds of millions of words and language models might use even more. However, in the parameter tuning those enormously large corpora are not needed, since the model weights that are being set do not normally exceed from 15. Therefore, in this process a **tuning or development set** containing a set of hundred or thousand source-target sentence pairs is used and kept separate from the original training data used to induce the models[1]. The target sentences in the tuning set are believed to be the correct reference translations that we aim to produce. These 'reference' translations are not translated by SMT programs, but by humans.

On the other hand, the quality metric that is commonly used is the **BLEU evaluation metric**[2], which evaluates the system quality by comparing the *n*-grams of the candidate translation with the *n*-grams of the reference translation and counting the number of matches (Papineni et al. 2001: 312). Obviously, the more matches the pair obtains, the better the quality of the translation is. Hearne and Way (2011: 218) also explain that the precision of the *n*-grams and the penalties applied for shorter translations show that candidate translations need to match the reference translations in length and both in word choice and, to a certain extent, in order, to achieve a high score in the BLEU metric.

[1] The development corpus may be composed as well of several target (reference) segments per source segment.

[2] Other quality functions that can be used are METEOR and TER, just to name two.

It is worth noting that the tuning process starts with random values for the weights λ_m and produces a set of candidate translations whose quality is measured with the BLEU metric. Then, the values are adjusted again so that more candidate translations are produced and evaluated in order to verify whether the BLEU scores have gone up or down. This is repeatedly done using different values for the weights λ_m so as to identify which is the set of values that gives the best performance according to the reference translations that are contained in the development set.

However, there is a problem with this procedure. Even with only 8 to 15 models, the space of their possible values is too large to be all searched in a reasonable lapse of time. Consequently, heuristic methods are needed to search in a dimensional space of 8 to 15 weights. This means that instead of searching throughout the whole space, it searches a direction where the performance increases and then it updates its parameter setting by moving to that direction (Koehn 2010: 264-270). The problem arises here because there is no way to predict that the direction where the performance increases is the direction that contains less errors in the whole space, which means that there might be a direction with better translations in this space that has not been identified.

2.4. Decoding

The process of **decoding** is in charge of the last link of the chain: the translation phase. Here we have many source sentences with their translations hypotheses each and the aim of this process, as Hearne and Way (2011: 223) affirm, is to "find the most probable translation amongst all translations possible given the model". SMT systems realise this procedure by searching over the space of all possible translations, scoring each translation with the different models in order to compute the final score and finally choosing the translation that has obtained the best overall score during the process.

However, we encounter a problem here, since there are an exponential number of hypotheses for each sentence. As a matter of fact, Knight (1999a: 607-615) has shown that the decoding problem is **NP-complete**, which means that the process of searching all possible translations, scoring them and choosing the best one is computationally too expensive for even a sentence of short length. Therefore, heuristic search methods are applied in order to avoid generating all possible translations and yet, it allows to carry out the search for the *best* translation. In this Section, the heuristic

methods will be explained, although it should be worth noting that they might not find the best translation, but one close to it.

Why there is no guarantee that the *best* translation possible is found? Koehn (2010: 155-156) explains that there are two types of errors that prevent this. One is the **search error,** for which SMT systems are not able to explore the whole search space in order to find the best translation; and the other is the **model error**, where the translation with highest probability according to a specific model might not be a good translation at all.

2.4.1. Translation process

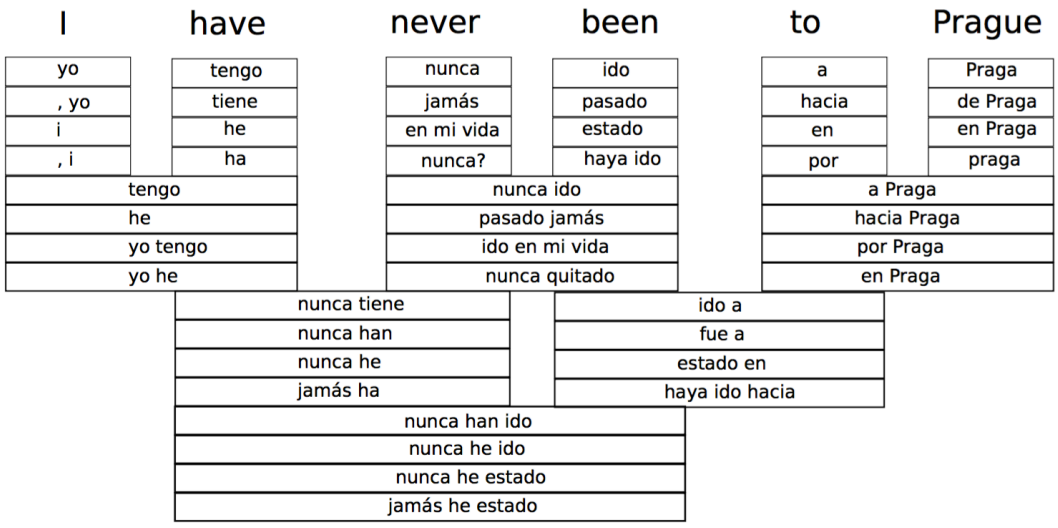
Translations are normally generated by "matching substrings from the input sentence against a translation model and, where available, retrieving their translations" (Hearne and Way 2011: 223). In the first phase of decoding, there is no preference in the order in which the translation options are obtained. We can start with the leftmost source word but there is no necessity of continuing from left to right, which means that in the sentence "I went to the park", we can establish first the translation options for "I", then "to the park" and finally come back to "went". However, once the translation options for the different source phrases are obtained, the translation hypotheses are indeed rendered in a sequence from left-to-right so that the language model can be computed incrementally.

Additionally, it should be taken into account that SMT systems, during the translation process, apply a relevant procedure called **partial scoring**, which means that partial scores can be computed for the partial translations that have been constructed. Therefore, these systems do not compute the scores for each whole translation hypothesis, but for every phrase translation that has been added to them. Then, each time a phrase translation is added, SMT systems need to factor in the scores from the translation model, the reordering model and the language model, which leads to the fact that the model score can be already known even if we only have a partial translation (Koehn 2010: 158).

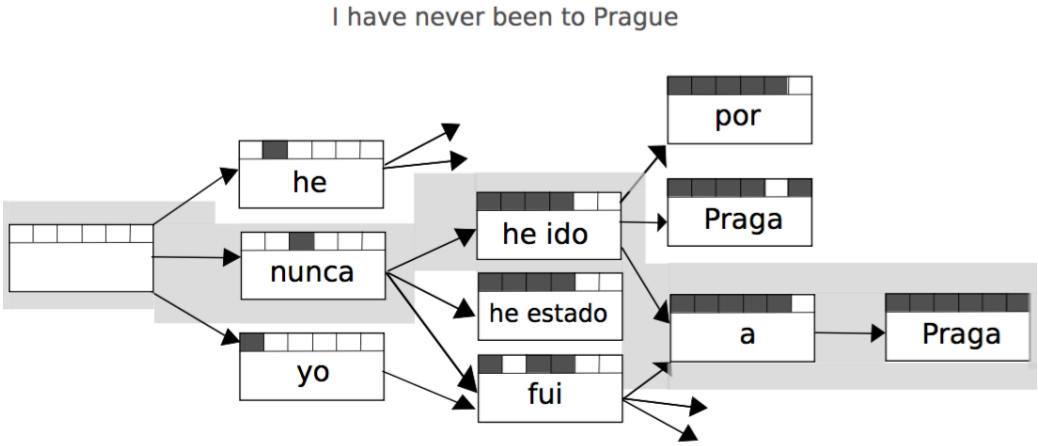
2.4.2. Beam search

The process of decoding carried out by SMT systems has been implemented

many times and the beam-search decoder is, generally, the most used (Koehn et al. 2003: 49). Firstly, in order to understand how this decoder works, it is essential to explain the concept of **translation options**, which are every applicable phrase translation for each source sentence (Koehn 2004: 116). These translation options are collected before the decoding takes place. The following example illustrates both the process of extraction of translation options and the decoding problem, which is to find the best phrase translations and place them together in a fluent target-language sentence:



When the actual decoding takes place, the aim is to construct sentences by adding one phrase translation at a time from left to right. The translation options above-mentioned became partial translation hypotheses. Therefore, this process starts with an empty hypothesis, which means that no word has been translated yet, and then the hypothesis gets expanded into new hypotheses by applying phrase translations to the source-language sentences that have not been covered yet. The graphic hereunder shows how this process is carried out:



This process of expansion continues until every single hypothesis has been expanded and then, the system proceeds to find the hypothesis with the highest score.

2.4.2.1. Hypothesis recombination

We should recall the fact that the decoding process has been shown to be NP-complete. Therefore, in order to tackle this problem, the hypothesis recombination is used as a strategy to optimize the search when two translation hypotheses are similar. Given this case, this mechanism recombines the two partial hypotheses and discards the one with a lower score (Xiong and Zhang 2015: 33). To be equivalent, the hypothesis must agree in the source words that have been covered, the last *n* target words generated and the end of the last output phrase covered. This strategy is extremely useful for tackling the problem of spurious ambiguity but it does not solve the exponential complexity of the machine translation decoding (Koehn 2010: 163), for which riskier methods like the one explained next must be used.

2.4.2.2. Pruning

A widely used method for combining (or discarding) hypothesis in the search space is the stack decoding, which consists in organizing similar hypotheses into hypothesis stacks. Each hypothesis is placed in a stack depending on the number of source words it covers, which means that one stack contains those hypotheses that have only translated one source word, other stack contains those hypotheses that have

translated two source words, and so on (Koehn 2010: 164). This method is aimed to keep just the number of hypotheses that are "promising" and then to prune the hypothesis with the worst scores from the stacks when they get too large. However, a hypothesis that did not seem appealing at first, may change later to such an extent that it may obtain the best overall score and this is the reason why there are different stacks depending on the number of words they cover. The problem is that we cannot search the whole space and the best solution is to prune those hypotheses that appear so bad that it is not likely that they will become the best overall translation. There are two approaches used in the pruning process. One is the **histogram pruning,** which, as Pylkkönen (2005: 581) affirms, "limits the number of active paths at each time frame by retaining only a predefined number of best paths"; and the other is the **threshold pruning,** where the hypotheses which are much worse than the best hypotheses in the stack are pruned out.

2.4.3. Future translation cost

It has already been shown that pruning can be risky and the right measures have to be carried out in order to minimise the search errors. When pruning out the hypotheses with worst probability score, it is not taken into account the fact that some parts of the sentence can be easier than others, meaning that hypotheses that translate in the first place the easy parts are unfairly preferred over the ones that do not. Thus, pruning decisions should be based not only on the probability score, but also on some measure of future cost, which is the cost that we expect to have when translating the rest of the sentence (Koehn 2010: 168).

Therefore, the future cost estimation aims to "favour hypotheses that have already covered difficult parts of the sentence and have only easy parts left, while discounting hypotheses that have covered the easy parts first" (Hearne and Way 2011: 224).

3. METHODOLOGY

To test everything learned in the theory, it was decided to use a real SMT system based on Moses to analyse the translations produced once the system had been trained with a bilingual corpus based as well on the topic being translated.

Firstly, in order to be able to use the SMT system, basic understanding of Linux and the command-line were acquired due to the fact that the system runs on Linux and therefore, the use of a terminal is necessary to translate with Moses, consult the models and obtain and edit the target and source texts. For this purpose, the seminar on Statistic Machine Translation of the Master's Degree in Computer Assisted Translation taught by Felipe Sánchez in the UAB widely increased the understanding of what was being studied.

3.1. Corpus preparation

Once the command-line and the training process were understood, the bilingual corpus had to be built and thus the next step consisted of searching for both the source texts to be translated and the bilingual corpus for the training. The source texts chosen for this dissertation were the UN Resolution 2268 (2016) on the Middle East (see **Annex 1**) and the UN Resolution 2264 (2016) on the Central African Republic (see **Annex 7**). Therefore, being "international politics" the prior topic of the source texts, two corpora already built were gathered to obtain an exhaustive corpus on the matter. The first corpus is MultiUN (Eisele and Chen 2010), a corpus of parallel texts in the 6 official UN languages from the Official Documents System (ODS) that goes from 2000 until 2009. The second corpus contains a sentence-aligned six-language collection of the United Nations General Assembly Resolutions (Rafalovitch and Dale 2009) from Volume I of the General Assembly regular sessions 55-62.

Both corpora were gathered and used in the training phase, although it must be borne in mind that the language model was trained on the target language side of the corpus. For the tuning, 2500 parallel sentences belonging to the UN General Assembly Resolutions' corpus were left apart, since the tuning phase is generally carried out with in-domain texts that are not included in the training data. Consequently, the parameter estimation, this is, the weight of each model, was computed taking into account only the

corpus of the UN resolutions. This was made on purpose, since the input texts are resolutions themselves and therefore it was convenient to obtain the best model combination scores for this specific type of text. The table hereafter provides further detail of the corpora used:

	Training		Tuning	
	#sentences	#words	#sentences	#words
English	11,268,479	283,760,695	2,500	103,575
Spanish		330,698,671		120,636

3.2. Training and translation phases

Before the training, the system first tokenizes and then truecases the aligned data. Tokenizing is the process of inserting spaces between words and punctuation, which means that elements such as "," or "." are treated as if they were words. Truecasing means converting initial words in each sentence to their most probable casing. This means that the system recognises that "Syria" will always appear with capital letter whereas "the" will only appear in capital letter at the beginning of a sentence.

Subsequently, the proper commands were executed and the system trained and tuned itself by analysing the bilingual corpus, which lasted 3 days. In this process each model was assigned a different weight and the source texts were given to the system for it to translate them. The script used for translating the input text created a folder whose most relevant content is the following:

- **input.txt**: the source text to be translated.
- **output.txt**: the target text after being de-tokenized and de-truecased (see **Annexes 2** and **8**).
- **translation-details**: text file containing the pairs of bilingual phrases used in the translation with information about the alignments and reordering.
- **unknown-words**: text file containing the words that the system has not been able to recognise.

- **nbestlist:** containing the best translation hypothesis for each sentence.

3.3. Quality assessment

Having obtained the output texts, the following step was to carry out a translation quality assessment. On the one hand, it was decided to make a qualitative evaluation of the output texts, for which the post-edited texts were needed in order to compare the translations and determine the nature of the errors. Consequently, the output texts were first post-edited manually (see **Annexes 3** and **9**) and then, the *Multidimensional Quality Metrics [MQM]* (Lommel et al 2014) was used to classify and evaluate the translation errors of the output texts produced by the system.

MQM is an error annotation framework developed by the German Research Centre for Artificial Intelligence (DFKI) for QTLaunchPad, a project funded by the European Union. In MQM's official website, Lommel et al (2015) explain that it provides a framework for describing and defining quality metrics based on the identification of textual features and using a shared vocabulary of issue types, which are composed by 10 general categories ("accuracy", "compatibility", "design", "fluency", "internationalization", "locale convention", "style", "terminology", "verity" and "other"). However, not every category of issue type was relevant for the purposes of this dissertation, since the metrics should be devised according to the type of text and the purpose of the evaluation.

Consequently, the error annotation of this dissertation is based on Mercader and Sanchez's (2015) study regarding the analysis of translation errors and evaluation of pre-editing rules for the translation of some specific texts. They elaborated a well-devised list of the most relevant categories focusing on both grammar and spelling, and eliminating some categories such as "design" (for problems related to graphic aspects) or "internationalisation", since they were not needed for their translation purposes. In this dissertation, it was also intended to produce translations that were correct from both the lexical and grammatical point of view and, therefore, the list elaborated in Mercader and Felipe's study has been applied in the error annotation of the translation of the UN Resolutions (see **Annexes 4** and **10**). As this error annotation was done manually, tags for each category had to be devised in order to classify the errors in the output texts. The list of categories with their correspondent tag is shown below:

- Accuracy [ac]
    - Mistranslation [mist8]
    - Omission [oms]
    - Untranslated [nt8]
    - Addition [add]
- Fluency [fln]
    - Spelling [spl]
    - Typography [typo]
    - Grammar [grm]
        - Word form [wfrm]
            - Part of speech [spch]
            - Agreement [agr]
            - Tense/ mood/ aspect [tma]
        - Word order [wor]
        - Function words [fw]
- Locale convention [lc]
    - Fate format [date]
    - Time format [time]
    - Measurement format [msr]
    - Number format [num]

On the other hand, it was also decided to carry out a quantitative evaluation, for which three different error metrics were used. The first metric was the BLEU, which evaluates the output texts quality by comparing the *n*-grams of the translations with the *n*-grams of the post-edited translation and counting the number of matches (Papineni et al. 2001: 312). The second framework was METEOR (Banerjee and Lavie 2005), an automatic metric for machine translation evaluation based on the word-to-word alignments between the output texts produced by the system and reference translations produced by humans. METEOR was designed in order to address several issued observed in BLEU's metric, so it includes some elements that cannot be found in other evaluation metrics such as the synonymy matching, which means that it does not only match the exact word form, but also the synonyms. Finally, the word error rate (WER) is based on the minimum number of word substitutions, insertions and deletions necessary to transform the output text into the reference translation.

The reference translations used to evaluate the output texts were the manually post-edited version and the official translation by the UN posted in their database (see **Annexes 5** and **11**). The time to post-edit the output texts was also calculated as a quantitative evaluation measure.

Simultaneously, as the errors were annotated and classified, the methods and steps that the system had followed were also investigated in order to understand more thoroughly how a real SMT system works and why the translation errors had been produced. This was carried out by consulting the language and translation models, the nbest-list file and the translation details file as well as the information about the weight of the models obtained after tuning. This way, by analysing both the process of translation and the errors produced, all the theory explained in the first part of this dissertation was put into practice.

The next section contains the most relevant discoveries of the analysis carried out taking into account the information produced by the system during the translation process; further considerations regarding the nature of the errors and the improvement of the system, and the final translation quality assessment.

4. ANALYSIS

The data obtained after the training, tuning and translation phases together with the results of the evaluation was able to show the procedures and processes carried out by the system in order to obtain the final output texts as well as its major failures. In this analysis, an explanation of the most relevant errors will be presented with the aim of providing a better understanding on how a statistical machine translation system works.

The initial step consisted of deciding which errors should be mentioned in the analysis. To that end, all the errors have been summed, leading to a total of 222 errors taking into account both the resolution on Syria and the resolution on Central Africa. Subsequently, the percentage of each error regarding the total sum has been computed in order to determine the most recurrent errors rendered by the system. The results were:

Error	**Tag**	**Number**	**%**
Omission	oms	40	18.01%
Word order	wor	36	16.21%
Mistranslation	mist8	31	13.96%
Addition	add	26	11.71%
Number format	num	25	11.26%
Typography	typo	23	10.36%
Function words	fw	15	6.75%
Untranslated	nt8	9	4.05%
Spelling	spl	5	2.25%
Agreement	agr	4	1.80%
Tense / mood/ aspect	tma	4	1.80%
Part of speech	spch	2	0.90%
Grammar	grm	1	0.45%
Accuracy	ac	1	0.45%

The most common errors are omission, word order, mistranslation, addition and number format. All these five are vastly influenced by the translation and language

model and therefore, it seemed convenient to analyse the influence of the weights of these models on the system's error making. To that purpose, the first part of this section analyses the variation of errors depending on the weights assigned to each model.

On the other hand, the errors of word order and untranslated words depend on the segmentation of the sentences and the reordering, which are influenced at the same time by the appearance of unknown words (numbers are included in this category). Consequently, the impact of unknown words will be also analysed in this section. Omissions and additions will be addressed individually to understand why they have been produced and, lastly, before the results of the qualitative assessment, there will be an explanation of the impact of the word order in the output text.

4.1. Language model vs. translation model

Firstly, the weight assigned to each one of the models in the tuning phase as well as the BLEU score that this model combination had obtained were consulted. The BLEU score was 0.82232, a considerably high score, meaning that this set of values gives the best performance according to the reference translations that are contained in the development set. The corresponding weights of the models were the following:

m	λ_m	h_m
1	0.124094	log (P (S | T))
2	**0.039016**	**log (P (T | S))**
3	**0.194958**	**log (P(T))**
4	0.064472	log P(monotone backward | S, T)
5	-0.0409665	log P(monotone forward | S, T)
6	0.0285894	log P(swap backward | S, T)
7	0.0148673	log P(swap forward | S, T)
8	0.126	log P(discont. backward | S, T)
9	-0.0227287	log P(discont. forward | S, T)
10	-0.0128585	distortion (S | T)
11	0.00110911	log (lex(S | T))
12	0.0277224	log (lex(T | S))
13	-0.286949	wordcount (T)
14	0.0155945	phrasecount (S, T)

Having a close look at both the language and the translation models, it can be observed that the former has a higher weight than the latter. This means that the output texts produced by the system are usually very fluent in the target language, as it can be observed in these translations appearing in the output texts (see **Annexes 2** and **8**):

Input text (en)	**Output text (es)**
Acting under Chapter	Actuando en virtud del capítulo
constructively towards this goal	de manera constructiva para lograr ese objetivo
welcomes	acoge con beneplácito

These examples show very well formed sentences that maintain the written style characteristic of the UN Resolutions in Spanish. In fact, "welcomes" have not been translated as "da la bienvenida" (a more common solution in other type of texts), but as "acoge con beneplácito"; and "en virtud de" was preferred to "bajo el" when translating "acting under Chapter". The same applies to the tenses used at the beginning of the pre-ambulatory clauses, since the gerunds in English have been translated as gerunds as well in Spanish ("commending"/ "encomiando"). In texts of a different genre, the gerund in Spanish would have been translated as a temporal or a causative clause, among others, but the use of the gerund in the initial pre-ambulatory clauses is the most used structure according to the guidelines of the UN.

This word and tense choice is due to the fact that the system has been trained with a specific corpus containing previous resolutions of the UN. This way, the language and the translation models boost the scores of those translation hypothesis that have appeared more frequently in the corpus and rule out those which are not likely to appear, which means that "da la bienvenida" has a lower score than "acoge con beneplácito" because its appearance in the corpus based on international politics is much lower than the other solution. Consequently, this proves that training a statistical machine translation system with topic-orientated corpora will not only improve the translations regarding their meaning, but also regarding their word selection and genre style.

On the other hand, the language model has a big influence on these results, since it has a higher weight than the translation model. This means that the language model had a higher impact on the final translation hypothesis choice even if the translation model produces a translation hypothesis with a better score. The advantage of this phenomenon is the fluency in which the target language text is written. However, the major drawback is the fact that it can lead to some errors in the meaning, accuracy or even in the use of function words. Let's see some examples:

Input text (en)	**Output text (es)**
on 26 February **2016**	celebrada el 26 de febrero de **2006**
the letter dated 21 December **2015**	la carta de fecha 21 de diciembre de **2005**

The years "2015" and "2016" were frequently translated as "2005" and "2006", which changed completely the time clause of the source texts. In order to understand this phenomenon, the translation model was first consulted and the following figures were obtained when searching for the translation of "2016". It should be taken into account that only the figures of the third column have been added, since it represents the translation direction needed in this case [P(T | S)] and is the one that determines the order of appearance in the ranking of the best translation hypothesis. The scores below are logarithms, meaning that the best scores are those closer to 0:

2016	-0.537854
futuro 2016	-0.802839
de futuro 2016	-2.43042
de 2016	-2.8824
en 2016	-4.13517

This ranking of the best 5 translation options shows that the translation model does not contemplate "2006" as a potential solution to translate "2016" in its first five translation options. Instead, "2006" appears much below in this list. However, the final output text given by the system offered "26 de febrero de 2006" as the best equivalent

for the source text. Subsequently, the language model was consulted and it offered much different results for this number both individually and in context:

2016	Total: -9.02442
2006	Total: -7.20007

celebrada en febrero de 2016	Total: -17.3438
celebrada en febrero de 2006	Total: -11.0875

As it can be seen, "2006" has a better score than "2016", since it is closer to 0 than the other solution and, therefore, the former hypothesis is preferred to the latter. This happened because the corpus contains texts from 2000 to 2009 and then it is more common for "2006" to appear than "2016". Consequently, since the language model has a higher weight, its scores have a major impact on the final hypothesis selection. To see the influence of the language model and the errors that this can lead to, let's examine some other examples:

Input text (en)	**Output text (es)**
statements **on** the Central African Republic	las declaraciones **de** la República Centroafricana
the Geneva **Communiqué**	la **Declaración** de Ginebra

When consulting the translation model for "statements on", the first five translation hypothesis with their correspondent scores were:

declaraciones sobre	-0.959217
declaraciones en	-2.95458
formulan declaraciones sobre	-3.13046
las intervenciones sobre	-3.39283
las declaraciones sobre	-3.55535

Again, "declaraciones de" did not even appear in the ranking of the best 5-translation options suggested by the translation model. However, the language model gave a major score to "declaraciones de" than "declaraciones sobre" even in context,

which explains why the former was the solution appearing in the output text:

declaraciones de	Total: -8.79839
declaraciones sobre	Total: -10.1255
las declaraciones de la República Centroafricana	Total: -10.9968
las declaraciones sobre la República Centroafricana	Total: -12.969

The same applies to "the Geneva Communiqué", since the translation model had "Comunicado de Ginebra" as its first option in the ranking, but, on the contrary, the language model gave a better score to "Declaración de Ginebra". Therefore, the last examples show the negative impact of having the language model with a much higher score than the translation model, which might lead to the system committing certain errors that could have been avoided if the translation model had a higher weight. However, it should be reminded that this model combination gave the best BLEU results in the tuning phase, which was carried out using segments of the UN resolutions' corpus. Consequently, the aim here is not to conclude that a different model combination would be better, but to show the positive and negative impact of this specific parameter estimation.

As far as this impact is concerned, a last example will be analysed in order to show how it can also affect the word choice regarding synonyms:

Input text (en)	**Output text (es)**
Syrian government	Gobierno de la **República Árabe Siria**
the **Syrian** people	el pueblo de la **República Árabe Siria**
Syria	La **República Árabe Siria**

The charter shows that the same term is used repeatedly even when there are other correct options such as "Siria", a shorter solution that might be handy once the whole name of the country has already been said for the first time. In fact, the translation model had a higher score for "Siria" than for "la República Árabe Siria"

when the translation of "Syria" was consulted:

Siria	-0.201173
La República Árabe Siria	-3.31193

However, the language model gave a lower score to this translation option and, therefore, "Syria" and "Syrian" were translated as "(de) la República Árabe Siria", which is not exactly a translation error but decreases the overall accuracy of the output text, especially if it is considered that this translation would best fit in those cases where the term Syrian Arab Republic appeared and "Siria" would have been a better translation for "Syria". The following figures correspond to the scores given by the language model to these terms with and without context:

Siria	Total: -6.20369
La República Árabe Siria	Total: -4.73491
el pueblo de la República Árabe Siria	Total: -9.12668
el pueblo sirio	Total: -9.68442
el pueblo de Siria	Total: -10.1498

It can be consequently affirmed that the language model had a higher influence on the output texts produced by the system than the translation model. For this reason, the weights of the translation and language models were changed so that the former had a higher weight, as shown below:

m	λ_m	h_m
1	0.124094	log (P (S | T))
2	**0.120916**	**log (P (T | S))**
3	**0.0695958**	**log (P(T))**
11	0.00110911	log (lex(S | T))
12	0.0277224	log (lex(T | S))

With the weights changed, the translation command was again executed and two different output texts were obtained. This way, the differences between these translations and the translations produced with the initial weights could be analysed.

Firstly, it was decided to check the translations of "2016" and "2015". As the translation model now had a major impact on the output texts, the time clause was not modified, meaning that the numbers remained the same and the error was sorted out. However, there was a fluency error, since "7634th**"** appeared in an incorrect position. Additionally, as far as the translations of "statements on" and "Geneva Communiqué" were concerned, the results showed that the errors produced in the first output texts were again solved when the weight of the translation model had been increased:

Input text (en)	**Output text (es)**
7634th meeting, on 26 February 2016	el 26 de febrero de **7634th 2016**
the letter dated 21 December **2015**	la carta de fecha 21 de diciembre de **2015**
statements **on** the Central African Republic	declaraciones **sobre** la República Centroafricana
the Geneva **Communiqué**	el **Comunicado** de Ginebra

Moreover, "Syria" and its derivatives were not always translated as "República Árabe Siria", for which there was more variety concerning this word depending on the phrase:

Input text (en)	**Output text (es)**
on Cessation of Hostilities in **Syria**	para la cesación de las hostilidades firmado en **Siria**
in order to end the conflict in **Syria**	a fin de poner fin al conflicto en la **República Árabe Siria**
their influence with the government of **Syria**	su influencia con el Gobierno de **Siria**

However, there was as well a negative impact on the overall quality, accuracy and fluency of the new output texts, being these less understandable for the readers in

some paragraphs:

Input text (en)	Initial output text (es)	Output text with the models changed (es)
an ISSG humanitarian task force and an ISSG ceasefire task force	un grupo de tareas humanitarias ISSG ISSG y un equipo de tareas de la cesación del fuego	un equipo de tareas y una humanitaria ISSG ISSG grupo especial, a saber, cesación del fuego
2,080 police personnel, including 400 Individual Police Officers, and 108 corrections officers which includes an additional 68 corrections officers	policías de 2.080 individuales, incluidos 400 agentes de policía, funcionarios de prisiones, que incluye a otros 68 funcionarios de prisiones;	el personal de la policía, incluidos, entre otros, 400 2.080 Individual y 108 las correcciones los Agentes de Policía, los agentes de policía, que comprende un nuevo 68 los oficiales penitenciarios;

Consequently, it can be affirmed that the initial output texts had a better overall quality than the output texts with the weights changed, even if some initial errors did not exist in the translations. Changing the weights is useful when users find themselves preferring translations that are closer to the meaning (although they tend to be less natural and fluent), but it is generally best to leave the weights that the system has obtained due to the fact that this is the weight combination with the highest BLEU score and therefore, the one that has obtained better results in the tuning phase. For minor errors such as “declaraciones de”, it is always possible to consult the translation model afterwards in the post-edition stage and correct them easily.

Moreover, there is a feasible solution to the errors produced by the system regarding numbers. If the training data was updated with current texts, years such as “2016” or “2015” would appear more frequently in the corpus and the language model will give them a better score. Therefore, it can be argued that the SMT system would have produced much better quality translations if it had been trained and tuned with corpora containing more current texts.

4.2. Unknown words

As its name implies, an unknown word is a word that the SMT system does not recognise to be part of the source language, that is to say, a word that is not seen in the training data and, consequently, that does not have its corresponding translation hypothesis in the target language. In the translation of the UN Resolutions, some unknown words such as "MINUSCA", "Syrian-led" and "ISSG" were encountered.

These words were not translated in the output text, which means that they were copied verbatim to the output texts. However, this is not the major problem because searching the word in the dictionaries once the text is post-edited could easily solve it. The dilemma arises because the unknown words also break the segmentation of the sentences, which affects the reordering, the lexical selection and the overall meaning of the sentence. To portray this, let's see how sentences in which these words were located have been translated:

Input text (en)	**Output text (es)**
Decides that **MINUSCA** will comprise up to 10,750 military personnel	Decide que 10,750 **MINUSCA** constaría de un máximo de 480 efectivos militares
Commending the commitment of the International Syria Support Group (**ISSG**) to ensure a **Syrian-led** and Syrian-owned political transition	Encomiando el empeño del Grupo Internacional de Apoyo (Siria) **Syrian-led ISSG** Syrian-owned para garantizar una transición política

Seeing these examples, one can argue that the meaning and the word order of the target texts became quite incomprehensible, since the structures and clauses are mostly changed. SMT systems based on Moses can either copy them literally or discard them, but the latter is not a solution either, since the segmentation would also be broken and it could be even more misleading for the human reader. Consequently, it can be affirmed that unknown words can greatly jeopardise the overall translation quality.

One solution to this problem might be reading the texts to be translated before-hand and then adding the more specific and complex words in the corpus by aligning them with their translations. Nevertheless, this would mean that the words would have

only one appearance in the corpus and their scores in both the translation model and the language model would be extremely low. Moreover, the time and effort needed to carry out this process would not be worth it.

A more interesting solution has been developed by Jiajun Zhang et al (2012). Instead of trying to obtain the translation of the unknown words, they propose two new models to find the words, already existent in the training data, with the most similar semantic function to them and then to replace them with these similar words before the translation takes place. By doing this, both the lexical selection and the word reordering are handled in the context of the unknown words thanks to their semantic function information, even if they remain still untranslated. Therefore, since the segmentation does not break, the quality of the translation increases.

4.3. Numbers

Numbers fall in the same category than unknown words since every element of the text such as words, numbers and punctuation are treated equally and, therefore, even commas are translated as if they were normal words (tokens) and have their corresponding translation options. This is helpful as far as the reordering is concerned, since every element has its position and must be taken into account for the output text. However, it can also have a negative impact on the translation, since, being considered normal words, the system will not recognise those numbers that do not appear in the training data. This way, small numbers from 1 to 100 and numbers likely to appear in dates will not be a problem because a well-assembled corpus will contain them all, but, the larger the number is, the more difficult it would be for it to appear in the training data.

This means that, whenever an unknown number is encountered throughout the text, it will break the segmentation and affect the reordering and the lexical selection of the whole sentence. Additionally, even if they are recognised by the system, they may change according to the scores provided by the language model, which will affect the meaning, the accuracy and the overall quality of the output text. In the examples below, it can be seen the procedure in numbers translation carried out by the system:

SOURCE: [13..13] **2118**
TRANSLATED AS: 2118|UNK|UNK|UNK
WORD ALIGNED: 0-0

SOURCE: [74..74] **2258**
TRANSLATED AS: 2.258
WORD ALIGNED: 0-0

SOURCE: [123..123] **2013**
TRANSLATED AS: de 2013 a más tardar
WORD ALIGNED: 0-1 0-3 0-4

The first number was not recognised by the system and, therefore, it was left untranslated. The second number was adapted to its most probable punctuation for a thousand-figure and, finally, there was an addition of a future clause in the third figure that changes the meaning of the sentence. Considering that the corpus had been assembled with texts from 2000 to 2009, it was more probable that "2013" appeared in the training data followed by a future clause than alone and, consequently, the language model had given a higher score to the solution where the future was implied. The translation model had a better score for "2013" alone, but the influence of the language model has already been explained above.

The major example to show how numbers decrease the quality of the translations when they are not treated as due is the translation of the first paragraph of both resolutions, since these paragraphs contain the higher level of errors in the output texts and seemed almost unreadable:

Input text (en)	**Output text (es)**
Recalling its resolutions 2042 (2012), 2043 (2012), 2118 (2013), 2139 (2014), 2165 (2014), […]	Recordando sus resoluciones, las 20.42 2043 (2012), (2012), 2139 2118 (2013), en 2014) (párrafo 2165 2170), en 2014) […]
[…]resolutions 2121 (2013), 2127 (2013), 2134 (2014), […]	[…]la resolución 2121 (2013), (2127. 2134 (2013), en 2014), […]

The solution to this problem might be keeping the syntactic function of the

numbers without having them translated. This way, the segmentation of the sentence would not break whenever an unknown number appears and they would not change or suffer additions such as the examples above. Therefore, changing the numbers for the attribute [num] will make the system recognise the numbers, maintain their semantic function and keep them unchanged, which would be extremely useful for the majority of dates and small numbers appearing in the text.

However, this is not a feasible solution for bigger figures such as "10,097" or "189,000" because they contain punctuation that varies depending on the target languages and, consequently, they cannot remain untranslated. Mei Tu et al (2012) have developed an interesting project regarding this matter, since they also affirmed that it is difficult to obtain accurate translations for the infinite set of numbers depending just on traditional statistical methods. Accordingly, they have designed a language-independent rule-based method, whose templates are completely separated from the source codes, that has improved significantly the translation of numerical and time expressions.

4.4. Omissions, additions and word order

Apart from the errors explained above and the mistranslation, the other major errors produced by the system were: addition, omission and word order. The addition generally depends on the language model, since this will add those words that are likely to appear with the word that has been translated provided that the translation model "offers" it as a translation option. However, this can be easily solved by decreasing the weight of the language model or even by removing those words when post-editing the text. The following are examples of word addition:

SOURCE: [3..3] 2042
TRANSLATED AS: **las** 20.42
WORD ALIGNED: 0-0 0-1

SOURCE: [123..123] 2013
TRANSLATED AS: **de** 2013 **a más tardar**
WORD ALIGNED: 0-1 0-3 0-4

By their part, both omission and word order errors are more frequent and yet, harder to solve. In the examples below, it can be seen how the system did not recognise "the Secretary-General to the" as due and translated it as "al", that is to say, it translated four words with a loaded semantic function as an article. In the second example, "Syria" was not recognised and therefore omitted by the system:

SOURCE: [9..14] from **the Secretary-General to the** President
TRANSLATED AS: dirigida **al** Presidente
WORD ALIGNED: 0-0 **1-1 2-1 3-1 4-1** 5-2

SOURCE: [25..26] for Syria
TRANSLATED AS: a
WORD ALIGNED: 0-0

Finally, it is relevant to observe the importance of word ordering and its impact on the output text. Humans tend to have certain word order structures in their languages to minimise certain distances between specific words and, this way, sentences are easier to process (Zwarts and Dras 2006). In the output text, whenever a word order error was produced, sentences were difficult to understand, which led to serious comprehension problems as well as a lack of fluency in the target text, as it can be seen below:

Input text (en)	**Output text (es)**	**Post-edited output text (es)**
and demands **the cessation of hostilities** to begin at 00:00	la declaración **de la cesación de las hostilidades** y exige ante todo a las 00.00	y exige que **la cesación de las hostilidades** comience a las 00.00
Decides that MINUSCA will comprise up to **10,750** military personnel	Decide que **10,750** MINUSCA constaría de un máximo de **480** efectivos militares	Decide que la MINUSCA constará de un máximo de **10.750** efectivos militares

4.5. Translation quality assessment

The results of the qualitative assessment have been analysed above and they have shown that the major errors affecting the translation quality were unknown words

(numbers included), omissions, additions and changes in the word order and those errors deriving from the fact that the language model had a much higher weight than the translation model.

Additionally, a quantitative evaluation was carried out in order to have an exhaustive overall translation quality assessment. In the methodology section, it was explained that the evaluation metrics used were BLEU, METEOR and the word error rate, being the reference translations used for the evaluation both the manually post-edited version and the official translation by the UN posted in their online database. These were the results:

- **Syria**

Evaluation metric	**Manually post-edited text (reference text)**	**Official translation (reference text)**
BLEU	0.625	0.443
METEOR	0.765	0.669
Word error rate	0.372	0.588

- **Central Africa**

Evaluation metric	**Manually post-edited text (reference text)**	**Official translation (reference text)**
BLEU	0.616	0.559
METEOR	0.789	0.751
Word error rate	0.287	0.400

Both charters show that the evaluation with the manually post-edited text has better scores than the evaluation with the official translation. This is due to the fact that the texts were post-edited with the aim of taking into account the less errors possible. This means that, even if “pide” is not the best translation for “demands”, it is not considered an error since the meaning is perfectly maintained and therefore the word is

left in the post-edition. However, in the official translation, the word used is “solicita” and the evaluation metric consequently considers it an error because the word choice has been changed.

The BLEU and the METEOR scores do not help much on their own but they would be extremely useful if there were other translations produced by different systems or different weights combinations. In these cases, the translations could be compared and then it would be possible to decide which one is the best translation. On the contrary, the word error rate gives more information because the score presented is a percentage, meaning that the Resolution on Syria had 37% of error rate and the Resolution on Central Africa had 28%.

Lastly, the post-edition time was also considered in the quantitative evaluation because it could be compared with the time spent in the human translation and help discover which procedure gives more benefits to the translator. The post-edition of the Resolutions on Syria and on Central Africa took around 55 min per 1,000 words.

5. CONCLUSION

The first part of this dissertation was aimed to explain the processes and statistical models of an SMT system whereas the subsequent parts addressed the methodology carried out in order to train the system, translate the input text, analyse the translation details, and evaluate the output texts.

Having obtained the results of the analysis and evaluation, it can now be concluded that the system gave sufficiently good translations that had less than 40% of errors. In fact, this percentage would have decreased considerably if the first paragraph containing all the numbers had been omitted in the evaluation or if a proper model that addressed the numbers as is due had been applied. In light of this, it can be affirmed that SMT systems give good translation results when the input texts belong to the same domain than the bilingual corpus used in the training process. As a matter of fact, they become extremely useful when carrying out larger projects containing many input texts related in domain such as EU proceedings and UN resolutions.

On the contrary, these quality results would worsen in the case of translating input texts that do not belong to the domain of the training data. In the analysis, the problems derived from unknown words were addressed and it could be seen how they broke the reordering, word selection, fluency and overall quality of the output sentence. This means that, if texts related to the French *haute cuisine*, for example, were translated with an SMT system trained on a corpus based on international politics, there would be so many translation errors that the output texts would be impossible either to understand or to post-edit.

The post-edition of the output texts produced by the system was not a difficult task either, since many of the translation errors were related to word selection and omission issues that could have been easily solved by consulting the translation model on its own. Consequently, if time – which was less than an hour – and the low/medium intricacy of the post-edition are added to this equation, it can also be concluded that the use of SMT eases the translator's job in both time and effort, especially considering that a translator would take from 5 to 6 hours to translate the output texts from scratch with their corresponding previous research.

On the other hand, it has also been shown the effect that having a slightly outdated training data has on the output texts. As both corpora contained texts from 2000 to 2009, the language model boosted those numbers that had appeared more times. This produced some errors such as “2016” being translated as “2006”. For this reason, it must be kept in mind that the training data needs to be frequently updated so that the system can always produce proper translations.

Therefore, the findings support the argument that phrase-based SMT systems are nowadays an invaluable tool for translators provided that they are trained with enough good-quality in-domain up-to-date training data. With regard to the future directions of SMT, new models and features are being constantly implemented to improve the quality of the translations. This means that SMT is bound to continue dominating academic MT research, since there is a widely open field for future studies on the improvement of parameter estimation, evaluation metrics and statistical models as well as on the solution of qualitative errors regarding fluency, accuracy and local convention. Moreover, there is an increasing interest in the incorporation of linguistic knowledge into statistical models, which means that the future of SMT does not only depend on computer science engineers, but also on linguists and translators.

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ANNEXES

Annex 1: Syria [input text]

Resolution 2268 (2016)

Adopted by the Security Council at its 7634th meeting, on 26 February 2016

The Security Council,

Recalling its resolutions 2042 (2012), 2043 (2012), 2118 (2013), 2139 (2014), 2165 (2014), 2170 (2014), 2175 (2014), 2178 (2014), 2191 (2014), 2199 (2015), 2235 (2015), 2249 (2015), 2253 (2015), 2254 (2015), and 2258 (2015) and Presidential Statements of 3 August 2011 (S/PRST/2011/16), 21 March 2012 (S/PRST/2012/6), 5 April 2012 (S/PRST/2012/10), 2 October 2013 (S/PRST/2013/15), 24 April 2015 (S/PRST/2015/10) and 17 August 2015 (S/PRST/2015/15),

Reaffirming its strong commitment to the sovereignty, independence, unity and territorial integrity of the Syrian Arab Republic, and to the purposes and principles of the Charter of the United Nations,

Recognizing the efforts of the Secretary-General in implementing resolution 2254 (2015) and noting, through his good offices and by his Special Envoy for Syria, the launch of the formal negotiations on a political transition process, consistent with paragraph 2 of resolution 2254 (2015), on 29 January 2016,

Commending the commitment of the International Syria Support Group (ISSG) to ensure a Syrian-led and Syrian-owned political transition based on the Geneva Communiqué of 30 June 2012 in its entirety and to immediately facilitate the full implementation of resolution 2254 (2015), and emphasizing the urgency for all parties in Syria to work diligently and constructively towards this goal,

Welcoming the ISSG statement of 11 February 2016, including the establishment of an ISSG humanitarian task force and an ISSG ceasefire task force,

1. *Endorses* in full the Joint Statement of the United States and the Russian Federation, as Co-Chairs of the ISSG, on Cessation of Hostilities in Syria of 22 February 2016 and the Terms for the Cessation of Hostilities in Syria (hereafter referred to as "the Annex") attached to the Statement, and demands the cessation of hostilities to begin at 00:00 (Damascus time) on 27 February 2016;

2. *Demands* the full and immediate implementation of resolution 2254 (2015) to facilitate a Syrian-led and Syrian-owned political transition, in accordance with the Geneva Communiqué as set forth in the ISSG Statements, in order to end the conflict in Syria, and stresses again that the Syrian people will decide the future of Syria;

3. *Demands* that all parties to whom the cessation of hostilities applies as set forth in the Annex (hereafter referred to as the "parties to the cessation of hostilities") fulfil their commitments laid out in the Annex, and urges all Member States, especially ISSG members, to use their influence with the parties to the

cessation of hostilities to ensure fulfillment of those commitments and to support efforts to create conditions for a durable and lasting ceasefire;

4. Recognizes the efforts of the Russian Federation and the United States to reach understanding on the Terms of the Cessation of Hostilities, and *acknowledges and welcomes* that the forces of the Syrian government and those supporting it, as communicated to the Russian Federation, and the Syrian armed opposition groups, as communicated to the Russian Federation or the United States, have accepted and committed to abide by the Terms of the Cessation of Hostilities, and as such are now parties to it;

5. *Reiterates* its call on the parties to immediately allow humanitarian agencies rapid, safe and unhindered access throughout Syria by most direct routes, allow immediate, humanitarian assistance to reach all people in need, in particular in all besieged and hard-to-reach areas, and immediately comply with their obligations under international law, including international humanitarian law and international human rights law as applicable;

6. *Expresses support* for the ISSG initiative, coordinated through the ISSG humanitarian working group, to accelerate the urgent delivery of humanitarian aid, with the view towards the full, sustained, and unimpeded access throughout the country, including to Deir ez Zor, Foah, Kafraya, Az-Zabadani, Madaya/Bqin, Darayya, Madamiyet Elsham, Duma, East Harasta, Arbin, Zamalka, Kafr Batna, Ein Terma, Hammuria, Jisrein, Saqba, Zabadin, Yarmuk, eastern and western rural Aleppo, Azaz, Afrin, At Tall, Rastan, Talbiseh, Al Houle, Tier Malah/Al Gantho/Der Kabira, Al Waer, Yalda, Babila and Beit Saham;

7. *Reaffirms* its support for a Syrian-led political process facilitated by the United Nations, requests the Secretary-General, through his good offices and the efforts of his Special Envoy for Syria, to resume the formal negotiations between the representatives of the Syrian government and the opposition, under the auspices of the United Nations, as soon as possible, and urges the representatives of the Syrian government and the Syrian opposition to engage in good faith in these negotiations;

8. *Welcomes* the cessation of hostilities as a step towards a lasting ceasefire and reaffirms the close linkage between a ceasefire and a parallel political process, pursuant to the 2012 Geneva Communique, and that both initiatives should move ahead expeditiously as expressed in resolution 2254 (2015);

9. *Calls* on all states to use their influence with the government of Syria and the Syrian opposition to advance the peace process, confidence building measures, including the early release of any arbitrarily detained persons, particularly women and children, and implementation of the cessation of hostilities;

10. *Requests* the Secretary-General to report to the Council on the implementation of this resolution, including by drawing on information provided by the ISSG ceasefire taskforce, and on resolution 2254 (2015), within 15 days of the adoption of this resolution and every 30 days thereafter;

11. *Decides* to remain actively seized of the matter.

Annex 2: Syria [Output text]

2268 (resolución 2016)

Aprobada por el Consejo de Seguridad en su 7634th sesión, celebrada el 26 de febrero de 2006

El Consejo de Seguridad,

Recordando sus resoluciones, las 20.42 2043 (2012), (2012), 2139 2118 (2013), en 2014) (párrafo 2165 2170), en 2014) (párrafo 2014), 2175, 2178, 2014) (párrafo 2199), n ° 2.191 de 2014 y 2015) (2005), a las 22.49 2235 (2015), 2253 (2015) (2015), y 2254 (2.258 (2015), y las declaraciones presidenciales de 3 de agosto de 2001 (S / PRST / 2001 / 16), el 21 de marzo de 2002 (S / PRST / 2002 / 6), de 5 de abril de 2002 (S / PRST / 2002 / 10, de 2 de octubre de 2013 a más tardar en 2013 (S / PRST / / 15), de 24 de abril de 2005 (S / PRST / 2005 / 10) y el 17 de agosto de 2005 (S / PRST / 2005 / 15),

Reafirmando su firme determinación de preservar la soberanía, la independencia, la unidad y la integridad territorial de la República Árabe Siria y de los propósitos y principios de la Carta de las Naciones Unidas,

Reconociendo los esfuerzos realizados por el Secretario General en cumplimiento de la resolución 2254 (2015), y tomando nota de que, por medio de sus buenos oficios, así como a su Enviado Especial, el inicio de negociaciones oficiales sobre el proceso político de transición, de conformidad con el párrafo 2 de la resolución 2254 (2015), celebrada el 29 de enero de 2016,

Encomiando el empeño del Grupo Internacional de Apoyo (Siria) Syrian-led ISSG Syrian-owned para garantizar una transición política y sobre la base de la Declaración de Ginebra de 30 de junio de 2012 a más tardar en su totalidad y sin demora a fin de facilitar la plena aplicación de la resolución 2254 (2015), y subrayando la necesidad urgente de que todas las partes en la República Árabe Siria a que trabajen con diligencia y de manera constructiva para lograr ese objetivo,

Acogiendo con beneplácito la declaración de 11 de febrero de 2006 ISSG, incluido el establecimiento de un grupo de tareas humanitarias ISSG ISSG y un equipo de tareas de la cesación del fuego,

1. Hace suya plenamente la declaración conjunta de los Estados Unidos de América y la Federación de Rusia, en su calidad de copresidentes de la cesación de las hostilidades ISSG, celebrada el 22 de febrero de 2006 en el país y las condiciones para la cesación de las hostilidades en la República Árabe Siria (en adelante, "el anexo "), que se adjunta a la presente la declaración de la cesación de las hostilidades y exige ante todo a las 00.00 (Damasco) el 27 de febrero de 2006;

2. Exige la aplicación inmediata y plena de la resolución 2254 (2015), para facilitar una transición política Syrian-owned Syrian-led y, de conformidad con la Declaración de Ginebra ISSG como se indica en el informe, a fin de poner fin al

conflicto en ese país, y el pueblo de la República Árabe Siria destaca una vez más que se decida el futuro de su país.

3. Pide a todas las partes a las que se aplica la cesación de las hostilidades, que figura en el anexo (denominados en lo sucesivo "las partes ") el cese de las hostilidades el cumplimiento de sus compromisos, que figuran en el anexo, e insta a todos los Estados Miembros, especialmente los miembros ISSG a que utilicen su influencia sobre las partes para el cese de las hostilidades con miras a garantizar el cumplimiento de esos compromisos y de apoyar los esfuerzos por crear las condiciones para una cesación del fuego duradera y sostenible;

4. Reconoce los esfuerzos de la Federación de Rusia y los Estados Unidos de lograr la comprensión de las condiciones de la cesación de las hostilidades, y acoge con beneplácito y reconoce que las fuerzas del Gobierno de la República Árabe Siria y aquellos que lo apoyan, lo comunicará a la Federación de Rusia, la República Árabe Siria y los grupos de la oposición armada, que se comunicaron a la Federación de Rusia y los Estados Unidos se han comprometido a respetar y aceptar las condiciones de la cesación de las hostilidades y, como tales, se han adherido a ella;

5. Reitera su llamamiento a las partes para que permita de inmediato a los organismos humanitarios el acceso rápido, seguro y sin trabas en todo el territorio, por las rutas más directas e inmediatas para permitir que la asistencia humanitaria llegue a todas las personas necesitadas, en particular en las zonas de difícil acceso, y se apoderó de inmediato y cumplir con sus obligaciones en virtud del derecho internacional, incluido el derecho internacional humanitario y las normas internacionales de derechos humanos aplicables;

6. Expresa su apoyo a la iniciativa ISSG ISSG, coordinados por el grupo de trabajo del personal de asistencia humanitaria, a que acelere la prestación de la asistencia humanitaria de emergencia, con el fin de lograr la plena protección y con el acceso sin obstáculos, sostenido en todo el país, incluso en Deir ez Zor Az-Zabadani Kafraya Foah,,,,,, / Bqin Madaya Madamiyet Darayya, Duma ELSHAM Arbin Harasta oriental de Kafr, Batna, Ein Zamalka terma,,,,,, Saqba Hammuria Zabadin Jisrein Al-Yarmuk, oriental y occidental, en las zonas rurales, Aleppo, en Tall Azaz Rastan Afrin,,,,, Al Talbiseh Malah / Al Houle Gantho / Der Yalda Kabira, Al Waer, Beit Babila Saham; y,

7. Reafirma su apoyo a un proceso político Syrian-led facilitados por las Naciones Unidas, pide al Secretario General que, por conducto de sus buenos oficios y los esfuerzos de su Enviado Especial a la República Árabe Siria de reanudar las negociaciones oficiales entre los representantes de la oposición y el Gobierno de la República Árabe Siria, bajo los auspicios de las Naciones Unidas, tan pronto como sea posible, e insta al Gobierno de la República Árabe Siria y los representantes de la oposición a participar de buena fe en esas negociaciones.

8. Acoge con satisfacción la cesación del fuego como paso hacia una cesación del fuego duradera y reafirma el estrecho vínculo que existe entre la cesación del fuego y un proceso político paralelo en 2012, de conformidad con lo

dispuesto en el Comunicado de Ginebra, y que las iniciativas en curso, como se expresa en la resolución pronta 2254 (2015);

9. Exhorta a todos los Estados a que utilicen su influencia sobre el Gobierno de la República Árabe Siria y los sirios de la oposición para llevar adelante el proceso de paz, incluidas las medidas de fomento de la confianza, de que se ponga rápidamente en libertad a cualquier detenido arbitrariamente a las personas, en particular mujeres y niños, y la aplicación de la cesación de las hostilidades;

10. Pide al Secretario General que le presente un informe sobre la aplicación de la presente resolución, entre otras cosas, basándose en la información proporcionada por el grupo de trabajo, sobre la cesación del fuego y ISSG 2254 (2015), resolución dentro de los 15 días siguientes a la aprobación de la presente resolución y cada 30 días a partir de entonces;

Decide seguir ocupándose activamente de la cuestión.

Annex 3: Syria [post-edited output text]

Resolución 2268 (2016)

Aprobada por el Consejo de Seguridad en su 7634a sesión, celebrada el 26 de febrero de 2016

El Consejo de Seguridad,

Recordando sus resoluciones 2042 (2012), 2043 (2012), 2118 (2013), 2139 (2014), 2165 (2014), 2170 (2014), 2175 (2014), 2178 (2014), 2191 (2014), 2199 (2015), 2235 (2015), 2249 (2015), 2253 (2015), 2254 (2015) y 2258 (2015) y las declaraciones presidenciales de 3 de agosto de 2011 (S/PRST/2011/16), 21 de marzo de 2012 (S/PRST/2012/6), 5 de abril de 2012 (S/PRST/2012/10, 2 de octubre de 2013 (S/PRST/2013/15), 24 de abril de 2015 (S/PRST/2015/10) y 17 de agosto de 2015 (S/ PRST/2015/15),

Reafirmando su firme determinación de preservar la soberanía, la independencia, la unidad y la integridad territorial de la República Árabe Siria y los propósitos y principios de la Carta de las Naciones Unidas,

Reconociendo los esfuerzos realizados por el Secretario General para poner en práctica la resolución 2254 (2015), y tomando nota de que, por medio de sus buenos oficios, así como de su Enviado Especial para Syria, el inicio de las negociaciones oficiales sobre el proceso de transición política, de conformidad con el párrafo 2 de la resolución 2254 (2015), celebrada el 29 de enero de 2016,

Encomiando el compromiso del Grupo Internacional de Apoyo a Siria [ISSG] para garantizar una transición política liderada por Siria y que Siria considere como propia basada en el comunicado de Ginebra de 30 de junio de 2012 en su totalidad y a fin de facilitar sin demora la plena aplicación de la resolución 2254 (2015), y subrayando la necesidad urgente de que todas las partes en la República Árabe Siria trabajen con diligencia y de manera constructiva para lograr ese objetivo,

Acogiendo con beneplácito la declaración del Grupo Internacional de Apoyo a Siria 11 de febrero de 2006, que incluye el establecimiento en el Grupo DE un equipo de tareas humanitarias y de un equipo de tareas para el alto el fuego,

1. *Hace suya* plenamente la Declaración Conjunta de los Estados Unidos de América y la Federación de Rusia, en su calidad de copresidentes del Grupo, sobre la cesación de las hostilidades en Siria, celebrada el 22 de febrero de 2016 en Siria y las condiciones para la cesación de las hostilidades en la República Árabe Siria (en adelante, "el anexo"), que se adjunta a la presente declaración y exige que la cesación de las hostilidades comience a las 00.00 (hora de Damasco) del 27 de febrero de 2016;
2. *Exige* la aplicación inmediata y plena de la resolución 2254 (2015), para facilitar una transición política dirigida por Siria y que Siria considere como propia, de conformidad con el comunicado de Ginebra como se indica en las declaraciones del Grupo, a fin de poner fin al conflicto en ese país, y vuelve destacar que el pueblo sirio decidirá el futuro de su país.

3. *Pide* a todas las partes a las que se aplica la cesación de las hostilidades, que figura en el anexo (denominado en lo sucesivo "las partes en la cesación de las hostilidades), que cumplan con sus compromisos, que figuran en el anexo, e insta a todos los Estados Miembros, especialmente a los miembros del Grupo, a que utilicen su influencia sobre las partes para el cese de las hostilidades con miras a garantizar el cumplimiento de esos compromisos y a apoyar los esfuerzos por crear las condiciones para un alto el fuego duradero;

4. *Reconoce* los esfuerzos de la Federación de Rusia y los Estados Unidos para lograr la comprensión de los términos de la cesación de las hostilidades, y reconoce y acoge con beneplácito que las fuerzas del Gobierno de la República Árabe Siria y aquellos que lo apoyan, según se ha comunicado a la Federación de Rusia y a los grupos armados de la oposición siria, según se ha comunicado a la Federación de Rusia o los Estados Unidos, se han comprometido a aceptar y acatar los términos de la cesación de las hostilidades, por lo que ahora forman parte de ella;

5. *Reitera* su llamamiento a las partes para que permitan de inmediato a los organismos humanitarios el acceso rápido, seguro y sin trabas en todo el territorio sirio por las rutas más directas e inmediatas para permitir que la asistencia humanitaria llegue inmediatamente a todas las personas necesitadas, en particular en las zonas asediadas y de difícil acceso o sitiadas, y para que cumplan de inmediato con las obligaciones en virtud del derecho internacional, incluido el derecho internacional humanitario y las normas internacionales de los derechos humanos aplicables;

6. *Expresa* su apoyo a la iniciativa del Grupo, coordinada por el equipo de asistencia humanitaria del Grupo, para que se acelere la prestación de asistencia humanitaria de emergencia, con el fin de lograr el acceso pleno, continúo y sin obstáculos en todo el país, incluso en Deir Ez zor, Foah, Kafraya, Az-Zabadani, Madaya/Bqin, Darayya, Madamiyet Elsham, Duma, Harasta Oriental, Arbin, Zamalka, Kafr Batna, Ein Terma, Hammura, Jisrein, Saqba, Zabadin, Yarmuk, las zonas rurales de Alepo oriental y occidental, Azaz, Afrin, At Tall, Rastan, Talbisa, Al-Houle, Tier Malah/Al Gantho/Der/Al-Kabira, Al-Waer, Yalda, Babila y Beit Saham;

7. *Reafirma* su apoyo a un proceso político coordinado por el pueblo sirio y facilitado por las Naciones Unidas, pide al Secretario General que, por conducto de sus buenos oficios y los esfuerzos de su Enviado Especial a la República Árabe Siria , se reanuden las negociaciones oficiales entre los representantes de la oposición y el Gobierno de la República Árabe Siria, bajo los auspicios de las Naciones Unidas, tan pronto como sea posible, e insta a los representantes del Gobierno de la República Árabe Siria y de la oposición a participar de buena fe en esas negociaciones;

8. *Acoge* con beneplácito el acuerdo de cesación de las hostilidades, como paso en pro de un alto el fuego duradero y reafirma el estrecho vínculo que existe entre el alto el fuego y un proceso político paralelo, de conformidad con lo dispuesto en el Comunicado de Ginebra de 2012, y que ambas iniciativas deberían avanzar rápidamente como se expresa en la resolución 2254 (2015);

9. *Exhorta* a todos los Estados a que utilicen su influencia sobre el Gobierno de la República Árabe Siria y la oposición siria para llevar adelante el proceso de paz, las medidas de fomento de la confianza, incluido el hecho de que se ponga rápidamente en

libertad a cualquier detenido arbitrariamente, en particular las mujeres y los niños, y la aplicación de la cesación de las hostilidades;

10. *Pide* al Secretario General que le presente un informe sobre la aplicación de la presente resolución, en el que se incluya especialmente la información proporcionada por el equipo de tareas para el alto el fuego del Grupo y la resolución 2254 (2015), dentro de los 15 días siguientes a la aprobación de la presente resolución y cada 30 días a partir de entonces;

11. *Decide* seguir ocupándose activamente de la cuestión.

Annex 4: Syria [error annotation]

[WOR]2268 (resolución [WOR] 2016)

Aprobada por el Consejo de Seguridad en su [NUM 7634th NUM] sesión, celebrada el 26 de febrero de [NUM 2006 NUM]

El Consejo de Seguridad,

Recordando sus resoluciones, [ADD las ADD] [NUM 20.42 NUM] 2043 (2012), [OMS](2012), [WOR 2139 WOR][OMS] 2118 [WOR (2013) WOR], [ADD en ADD] 2014) ([ADD párrafo ADD] [WOR 2165 2170 WOR]), [ADD en ADD] 2014) [OMS]([ADD párrafo ADD] 2014), 2175 [OMS], 2178 [ADD , ADD] 2014) ([ADD párrafo 2199 ADD]), [ADD n ° 2.191 de ADD]2014 [ADD y ADD]2015) [OMS] (2005), [ADD a las ADD] [NUM 22.49 NUM] 2235 (2015), 2253 (2015) [OMS] (2015), y 2254 ([NUM2.258 NUM] (2015), y las declaraciones presidenciales de 3 de agosto de [NUM 2001 NUM] (S[TYPO / TYPO]PRST [TYPO / TYPO] [NUM 2001 NUM] [TYPO / TYPO] 16), [ADD el ADD] 21 de marzo de [NUM 2002 NUM] (S [TYPO / TYPO] PRST [TYPO / TYPO] [NUM 2002 NUM] [TYPO / TYPO] 6), [ADD de ADD]5 de abril de [NUM 2002 NUM] (S[TYPO / TYPO] PRST [NUM 2002 NUM] [TYPO / TYPO] 10[OMS], [ADD de ADD] 2 de octubre de 2013 [ADDa más tardar en 2013 ADD] (S [TYPO / TYPO] PRST [TYPO / TYPO] [OMS] [TYPO / TYPO] 15), [ADD de ADD] 24 de abril de [NUM 2005 NUM] (S [TYPO / TYPO] PRST [TYPO / TYPO] [NUM 2005 NUM] [TYPO / TYPO] 10) y [ADD el ADD] 17 de agosto de [NUM 2005 NUM] (S [TYPO / TYPO] PRST [TYPO / TYPO] [NUM 2005 NUM] [TYPO / TYPO] 15),

Reafirmando su firme determinación de preservar la soberanía, la independencia, la unidad y la integridad territorial de la República Árabe Siria y [FW de FW]los propósitos y principios de la Carta de las Naciones Unidas,

Reconociendo los esfuerzos realizados por el Secretario General [MIST8 en cumplimiento de MIST8] la resolución 2254 (2015), y tomando nota de que, por medio de sus buenos oficios, así como [FW a FW] su Enviado Especial [OMS], el inicio de [OMS] negociaciones oficiales sobre el proceso [WOR político WOR] de transición, de conformidad con el párrafo 2 de la resolución 2254 (2015), celebrada el 29 de enero de 2016,

Encomiando el [MIST8 empeño MIST8] del Grupo Internacional de Apoyo [OMS] [ADD (ADD] Siria [ADD) ADD] [OMS] [NT8 Syrian-led ISSG Syrian-owned NT8] para garantizar una transición política [MIST8 y sobre la base de la MIST8] [MIST8 Declaración MIST8]de Ginebra de 30 de junio de 2012 [ADD a más tardar ADD] en su totalidad y [WOR sin demora WOR] a fin de facilitar la plena aplicación de la resolución 2254 (2015), y subrayando la necesidad urgente de que todas las partes en la República Árabe Siria [FW a que FW] trabajen con diligencia y de manera constructiva para lograr ese objetivo,

Acogiendo con beneplácito la declaración [OMS] de 11 de febrero de 2006 [WOR ISSG WOR], [GRM incluido GRM] el establecimiento [OMS] de un grupo de tareas

humanitarias [NT8 ISSG ISSG NT8] y [FW] un equipo de tareas [MIST8 de la cesación del MIST8] fuego,

1. Hace suya plenamente la [SPL declaración conjunta SPL] de los Estados Unidos de América y la Federación de Rusia, en su calidad de copresidentes [OMS] de la cesación de las hostilidades [NT8 ISSG NT8], celebrada el 22 de febrero de [NUM 2006 NUM] [MIST8 en el país MIST8] y las condiciones para la cesación de las hostilidades en la República Árabe Siria (en adelante, "el anexo [TYPO] "), que se adjunta a la presente [FW la FW] declaración [OMS] [ADD de ADD] la cesación de las hostilidades [WOR y exige ante todo WOR] [OMS] a las 00.00 ([OMS]Damasco) el 27 de febrero de [NUM 2006 NUM];

2. Exige la aplicación inmediata y plena de la resolución 2254 (2015), para facilitar una transición política [NT8 Syrian-owned Syrian-led NT8] [ADD y ADD], de conformidad con [MIST8 la Declaración MIST8] de Ginebra [NT8 ISSG NT8] como se indica en [MIST8 el informe MIST8] [OMS], a fin de poner fin al conflicto en ese país, y [WOR el pueblo de la República Árabe Siria WOR] destaca una vez más que [TMA se decida TMA] el futuro de su país.

3. Pide a todas las partes a las que se aplica la cesación de las hostilidades, que figura en el anexo ([AGR denominados AGR] en lo sucesivo "las partes [WOR ") el cese de las hostilidades WOR] [SPCH el cumplimiento SPCH] [FW de FW] sus compromisos, que figuran en el anexo, e insta a todos los Estados Miembros, especialmente los miembros [NT8 ISSG NT8] a que utilicen su influencia sobre las partes para el cese de las hostilidades con miras a garantizar el cumplimiento de esos compromisos y [FW de FW] apoyar los esfuerzos por crear las condiciones para [MIST8 una cesación del MIST8] fuego duradera [MIST8 y sostenible MIST8];

4. Reconoce los esfuerzos de la Federación de Rusia y los Estados Unidos [FW de FW] lograr la comprensión de [MIST8 las condiciones MIST8] de la cesación de las hostilidades, y [WOR acoge con beneplácito y reconoce WOR] que las fuerzas del Gobierno de la República Árabe Siria y aquellos que lo apoyan, [MIST8 lo MIST8] [TMA comunicará TMA] [FW a FW] la Federación de Rusia, [MIST8 la República Árabe Siria y MIST8] los grupos de la oposición [WOR armada WOR], que [OMS] se [TMA comunicaron TMA] a la Federación de Rusia [FW y FW] los Estados Unidos [OMS] se han comprometido a [MIST8 respetar MIST8] y [WOR aceptar WOR] [MIST8 las condiciones MIST8] de la cesación de las hostilidades y, [MIST8 como tales, se han adherido a MIST8] ella;

5. Reitera su llamamiento a las partes para que [AGR permita AGRM] de inmediato a los organismos humanitarios el acceso rápido, seguro y sin trabas en todo el territorio [OMS] [ADD, ADD] por las rutas más directas e inmediatas para permitir que la asistencia humanitaria llegue a todas las personas necesitadas, en particular en las zonas de difícil acceso, y [mist8 se apoderó mist8] de inmediato [WOR y cumplir WOR] con sus obligaciones en virtud del derecho internacional, incluido el derecho internacional humanitario y las normas internacionales de [OMS] derechos humanos aplicables;

6. Expresa su apoyo a la iniciativa [NT8 ISSG ISSG NT8], [AGR coordinados AGR]por el [MIST8 grupo de trabajo del personal de MIST8] asistencia humanitaria,

[FW a FW] que acelere la prestación de [FW la FW] asistencia humanitaria de emergencia, con el fin de lograr [MIST8 la plena protección y con MIST8] el acceso sin obstáculos, [MIST8 [WOR sostenido WOR] MIST8] en todo el país, incluso en Deir [SPL ez Zor SPL] Az-Zabadani [SPL Kafraya Foah SPL] [TYPO ,,,,,, / TYPO] [WOR Bqin [OMS] Madaya WOR] [WOR Madamiyet Darayya, Duma ELSHAM Arbin WOR] Harasta oriental [OMS] [ADD de ADD] Kafr, Batna, [SPL Ein Zamalka terma [TYPO ,,,,,, TYPO] Saqba Hammuria Zabadin Jisrein Al-YarmukSPL], [WOR oriental y occidental WOR], [WOR en las zonas rurales WOE], [SPL Aleppo, en Tall Azaz Rastan Afrin [TYPO,,,,, TYPO] Al Talbiseh Malah / Al Houle Gantho / Der Yalda Kabira, Al Waer, Beit Babila Saham SPL] ; [WOR y WOR],

7. Reafirma su apoyo a un proceso político [NT8 Syrian-led NT8] [MIST8 facilitados MIST8] por las Naciones Unidas, pide al Secretario General que, por conducto de sus buenos oficios y los esfuerzos de su Enviado Especial a la República Árabe Siria [SPCH de reanudar SPCH] las negociaciones oficiales entre los representantes de la oposición y el Gobierno de la República Árabe Siria, bajo los auspicios de las Naciones Unidas, tan pronto como sea posible, e insta al Gobierno de la República Árabe Siria y [WOR los representantes WOR] [OMS] de la oposición [OMS] a participar de buena fe en esas negociaciones [TYPO . TYPO]

8. Acoge con [MIST8 satisfacción la MIST8] cesación [WOR del fuego WOR] como paso [WOR hacia una cesación del WOR] fuego duradera y reafirma el estrecho vínculo que existe entre [MIST8 la cesación del MIST8] fuego y un proceso político paralelo[WOR en 2012 WOR], de conformidad con lo dispuesto en el Comunicado de Ginebra [OMS], y que las iniciativas [MIST8 en curso MIST8], como se expresa en la resolución [MIST8 pronta MIST8] 2254 (2015);

9. Exhorta a todos los Estados a que utilicen su influencia sobre el Gobierno de la República Árabe Siria [MIST8 y los sirios de la MIST8] oposición para llevar adelante el proceso de paz, [WOR incluidas WOR] las medidas de fomento de la confianza, [OMS] de que se ponga rápidamente en libertad a cualquier detenido arbitrariamente [ADD a las personas ADD], en particular mujeres y niños, y la aplicación de la cesación de las hostilidades;

10. Pide al Secretario General que le presente un informe sobre la aplicación de la presente resolución, [MIST8 entre otras cosas, basándose en MIST8] la información proporcionada por el [MIST8 grupo de trabajo, sobre la cesación del fuego MIST8] y [NT8 ISSG NT8] 2254 (2015), [WOR resolución WPR]dentro de los 15 días siguientes a la aprobación de la presente resolución y cada 30 días a partir de entonces;

[OMS] Decide seguir ocupándose activamente de la cuestión.

Annex 5: Syria [official UN translation]

Resolución 2268 (2016)

Aprobada por el Consejo de Seguridad en su 7634a sesión, celebrada el 26 de febrero de 2016

El Consejo de Seguridad,

Recordando sus resoluciones 2042 (2012), 2043 (2012), 2118 (2013), 2139 (2014), 2165 (2014), 2170 (2014), 2175 (2014), 2178 (2014), 2191 (2014), 2199 (2015), 2235 (2015), 2249 (2015), 2253 (2015), 2254 (2015) y 2258 (2015) y las declaraciones de su Presidencia de 3 de agosto de 2011 (S/PRST/2011/16), 21 de marzo de 2012 (S/PRST/2012/6), 5 de abril de 2012 (S/PRST/2012/10), 2 de octubre de 2013 (S/PRST/2013/15), 24 de abril de 2015 (S/PRST/2015/10) y 17 de agosto de 2015 (S/PRST/2015/15),

Reafirmando su firme compromiso con la soberanía, la independencia, la unidad y la integridad territorial de la República Árabe Siria, y con los propósitos y principios de la Carta de las Naciones Unidas,

Reconociendo los esfuerzos realizados por el Secretario General para aplicar la resolución 2254 (2015) y observando, mediante sus buenos oficios y su Enviado Especial para Siria, la puesta en marcha de las negociaciones oficiales sobre un proceso de transición política, de conformidad con el párrafo 2 de la resolución 2254 (2015), el 29 de enero de 2016,

Encomiando el compromiso asumido por el Grupo Internacional de Apoyo a Siria de asegurar una transición política dirigida por Siria y que Siria considere propia basada en el comunicado de Ginebra de 30 de junio de 2012 en su totalidad y de facilitar de inmediato la aplicación plena de la resolución 2254 (2015), y poniendo de relieve la urgencia de que todas las partes en Siria trabajen diligente y constructivamente en pos de ese objetivo,

Acogiendo con beneplácito la declaración del Grupo de 11 de febrero de 2016, que incluye el establecimiento en el seno del Grupo de un equipo de tareas humanitarias y de un equipo de tareas sobre el alto el fuego,

1. *Hace plenamente suya* la Declaración Conjunta de los Estados Unidos y la Federación de Rusia, en su calidad de Copresidentes del Grupo, sobre la Cesación de las Hostilidades en Siria, de 22 de febrero de 2016, y las Condiciones para la Cesación de las Hostilidades en Siria (en adelante, "el Anexo") adjuntas a la Declaración, y exige que la cesación de las hostilidades comience a las 00:00 (hora de Damasco) del 27 de febrero de 2016;

2. *Exige* la aplicación plena e inmediata de la resolución 2254 (2015) para facilitar una transición política dirigida por Siria y que Siria considere propia, de conformidad con el comunicado de Ginebra según se establece en las Declaraciones del Grupo, con objeto de poner fin al conflicto en Siria, y destaca una vez más que el pueblo sirio decidirá el futuro de Siria;

3. *Exige* que todas las partes a las que se aplica la cesación de las hostilidades establecida en el Anexo (en adelante, las "partes en la cesación de las hostilidades") cumplan los compromisos establecidos en el Anexo, e insta a todos los Estados Miembros, especialmente a los miembros del Grupo, a ejercer su influencia en las partes en la cesación de las hostilidades para garantizar el cumplimiento de esos compromisos y apoyar los esfuerzos por crear las condiciones para un alto el fuego duradero;

4. *Reconoce* los esfuerzos de los Estados Unidos y la Federación de Rusia para alcanzar un entendimiento sobre los términos de la cesación de las hostilidades, y reconoce y acoge con beneplácito que las fuerzas del Gobierno sirio y quienes lo apoyan, según lo han comunicado a la Federación de Rusia, y los grupos armados de la oposición siria, según lo han comunicado a los Estados Unidos o a la Federación de Rusia, han aceptado los términos de la cesación de las hostilidades y se han comprometido a acatarlos, por lo que ahora son partes en ella;

5. *Reitera* su llamamiento a las partes para que permitan inmediatamente el acceso rápido, seguro y sin obstáculos de los organismos humanitarios en todo el territorio de la República Árabe Siria por las rutas más directas, que permitan que la asistencia humanitaria llegue inmediatamente a todas las personas necesitadas, en particular en todas las zonas asediadas y de difícil acceso y cumplan de inmediato sus obligaciones en virtud del derecho internacional, en particular el derecho internacional humanitario y las normas del derecho internacional de los derechos humanos aplicables;

6. *Expresa* su apoyo a la iniciativa del Grupo Internacional de Apoyo a Siria, coordinada por su equipo de tareas humanitarias, para acelerar la entrega urgente de ayuda humanitaria, con el fin de lograr el acceso pleno, continuo y sin obstáculos en todo el país, incluso en Deir Ezzor, Foah, Kafraya, Az-Zabadani, Madaya/Bqin, Darayya, Madamiyet Elsham, Duma, Harasta Oriental, Arbin, Zamalka, Kafr Batna, Ein Terma, Hammura, Jisrein, Saqba, Zabadin, Yarmuk, las zonas rurales de Alepo oriental y occidental, Azaz, Afrin, At Tall, Rastan, Talbisa, Al-Houle, Tier Malah/Al Gantho/Der/Al-Kabira, Al-Waer, Yalda, Babila y Beit Saham;

7. *Reafirma* su apoyo a un proceso político dirigido por los sirios y facilitado por las Naciones Unidas, solicita al Secretario General que, mediante sus buenos oficios y las gestiones de su Enviado Especial para Siria, se reanuden las negociaciones oficiales entre los representantes del Gobierno sirio y la oposición, bajo los auspicios de las Naciones Unidas, lo antes posible, e insta a los representantes del Gobierno sirio y de la oposición siria a participar de buena fe en esas negociaciones;

8. *Acoge* con beneplácito la cesación de las hostilidades, lo cual constituye un paso hacia un alto el fuego duradero, y reafirma el estrecho vínculo que existe entre el alto el fuego y un proceso político paralelo, de conformidad con el Comunicado de Ginebra de 2012, y que ambas iniciativas deberían avanzar rápidamente como se indica en la resolución 2254 (2015);

9. *Exhorta* a todos los Estados a que ejerzan su influencia en el Gobierno sirio y la oposición siria para llevar adelante el proceso de paz, las medidas de fomento de la confianza, incluida la pronta liberación de cualquier persona detenida arbitrariamente, en particular las mujeres y los niños, y el cumplimiento de la cesación de las hostilidades;

10. *Solicita* al Secretario General que le presente un informe sobre la aplicación de la presente resolución, entre otras cosas sobre la base de la información proporcionada por el equipo de tareas sobre el alto el fuego del Grupo Internacional de Apoyo a Siria, y sobre la resolución 2254 (2015) del Consejo de Seguridad, en un plazo de 15 días a partir de la aprobación de la presente resolución y cada 30 días a partir de entonces;

11. *Decide* seguir ocupándose activamente de la cuestión.

Annex 6: Syria [output text with weights changed]

2268 (resolución 2016)

Aprobada por el Consejo de Seguridad en su sesión, celebrada el 26 de febrero de 7634th 2016

El Consejo de Seguridad,

Recordando sus resoluciones las 20.42 (2012), 2043 (2012), (2013), 2139 2118 2014), (2014), 2170 2165 (2014), 2175 (2014), 2178 (2014), (2014), n ° 2.191 (2015), las 22.35 2199 (2015), las 22.49 ((2015), 2253 (2015), 2254 (2015), y 2.258 (2015) y declaraciones de la Presidencia de 3 de agosto de 2011 (S / PRST / 16 2011 / 2012), 21 de marzo de 2012 (S / PRST / 5 / 6), abril de 2012 (S / PRST / 10 2012 / 2013), 2 de octubre (S / PRST / 2013 / 15), 24 de abril de 2015 (S / PRST / 2015 / 10) y el 17 de agosto de 2015 (S / PRST / 2015 / 15),

Reafirmando su firme determinación de preservar la soberanía, la independencia, la unidad y la integridad territorial de la República Árabe Siria, así como con los propósitos y principios de la Carta de las Naciones Unidas,

Reconociendo los esfuerzos realizados por el Secretario General en la aplicación de la resolución 2254 (2015), y señalando, a través de sus buenos oficios y por su Enviado Especial a Siria, el lanzamiento de las negociaciones oficiales sobre un proceso de transición política, en consonancia con el párrafo 2 de la resolución 2254 (2015), celebrada el 29 de enero de 2016,

Encomiando el compromiso Grupo de Apoyo Internacional de Siria Syrian-led ISSG) Syrian-owned a fin de asegurar una transición política y sobre la base del Comunicado de Gibera de 30 de junio de 2012 para que de manera inmediata, en su totalidad, y facilitar la plena aplicación de la resolución 2254 (2015), y poniendo de relieve la urgencia de que todas las partes en la República Árabe Siria a que trabajen con diligencia y de manera constructiva con miras a lograr ese objetivo,

Acogiendo con beneplácito la declaración de 11 de febrero de 2016 ISSG, incluido el establecimiento de un equipo de tareas y una humanitaria ISSG ISSG grupo especial, a saber, cesación del fuego

1. Hace suyas en su totalidad la Declaración Conjunta de los Estados Unidos y la Federación de Rusia, en su calidad de Copresidentes de la ISSG, de cesación de las hostilidades firmado en Siria, de 22 de febrero de futuro 2016 y los términos para la cesación de las hostilidades firmado en Siria (en adelante, “el Anexo ”), que se adjunta a la presente la declaración y exige el cese de las hostilidades para comenzar a las 00.00 (Damasco en tiempo) de 27 de febrero de 2016;

2. Exige la aplicación plena e inmediata de la resolución 2254 (2015), para facilitar una transición política Syrian-owned Syrian-led y, de conformidad con lo dispuesto en el Comunicado de Ginebra ISSG, tal como se proclama en la Asociación de Declaraciones de Principios, a fin de poner fin al conflicto en la República Árabe Siria,

y destaca una vez más que el pueblo de la República Árabe Siria decidirán el futuro de la República Árabe Siria;

3. Exige que todas las partes a las que se aplica la cesación de las hostilidades, como se establece en el anexo (denominados en lo sucesivo "las partes en la cesación de las hostilidades ") cumplir los compromisos contraídos en las del anexo, e insta a todos los Estados Miembros, especialmente los miembros ISSG, a hacer uso de su influencia con las partes en el Acuerdo de cesación de las hostilidades con miras a garantizar el cumplimiento de esos compromisos y apoyar los esfuerzos para crear las condiciones necesarias para lograr una cesación del fuego duradera y sostenible;

4. Reconoce los esfuerzos realizados por la Federación de Rusia y los Estados Unidos de lograr la comprensión de las condiciones de la cesación de las hostilidades, y acoge con beneplácito y reconoce que las fuerzas del Gobierno de la República Árabe Siria y aquellos que lo apoyan, como se comunicó a la Federación de Rusia, la República Árabe Siria y los grupos armados de la oposición, según lo comunicado a la Federación de Rusia o los Estados Unidos, han aceptado y firmemente decidida a respetar por el mandato del Acuerdo de Cesación de Hostilidades, y, como tales, son ahora partes en la Convención;

5. Reitera su llamamiento a las partes para que de manera inmediata que permitan a los organismos humanitarios el acceso rápido, seguro y sin obstáculos en toda Siria por las rutas más directas, que permita de manera inmediata, la prestación de asistencia humanitaria a llegar a todas las personas que necesitan atención, especialmente en zonas de difícil acceso, sitiado y objeto de todos y que cumpla inmediatamente sus obligaciones en virtud del derecho internacional, incluido el derecho internacional humanitario y las normas internacionales de derechos humanos, según el caso;

6. Expresa su apoyo a la iniciativa, ISSG ISSG coordinado por conducto del grupo de trabajo del personal de asistencia humanitaria, a que acelere la prestación urgente de asistencia humanitaria, con la opinión, a fin de lograr la plena protección y con el acceso sin obstáculos, sostenido en todo el país, incluso en Deir ez Zor Az-Zabadani Kafraya Foah,,,,,, Madaya / ELSHAM Bqin Darayya, Duma, Timor Madamiyet Harasta, Batna, Kafr Arbin, Ein Zamalka terma Hammuria,,,,,, Saqba Zabadin Jisrein Yarmuk, oriental y occidental, Alepo, rurales, At Azaz Afrin Rastan Tall,,, Escalón Talbiseh, Al Al Houle Gantho / Der Malah / Kabira, Al Waer, Saham Babila y Beit Yalda,;

7. Reafirma su apoyo a un proceso político Syrian-led facilitados por las Naciones Unidas, pide al Secretario General que, por conducto de sus buenos oficios y la labor de su Enviado Especial para la República Árabe Siria, a reanudar las negociaciones oficiales entre los representantes del Gobierno de Siria y con la oposición, bajo los auspicios de las Naciones Unidas, tan pronto como sea posible, e insta a los representantes del Gobierno de Siria y con la de la oposición al Gobierno de Siria para participar de buena fe en esas negociaciones;

8. Acoge con beneplácito la cesación de las hostilidades, como paso en pro de una cesación del fuego duradera y reafirma la estrecha vinculación existente entre la cesación del fuego y un proceso político paralelo en 2012, de conformidad con lo

dispuesto en el Comunicado de Ginebra, y que debería seguir adelante de manera expedita ambas iniciativas, que se recoge en la resolución 2254 (2015);

9. Exhorta a todos los Estados a que hagan uso de su influencia con el Gobierno de Siria y los de la oposición al Gobierno de Siria, para hacer avanzar el proceso de paz, incluidas las medidas de fomento de la confianza que se ponga rápidamente en libertad a cualquier detenido arbitrariamente a las personas, en particular las mujeres y los niños, y la aplicación de la cesación de las hostilidades;

10. Pide al Secretario General que informe al Consejo sobre la aplicación de la presente resolución, entre otras cosas, basándose en la información proporcionada por el Equipo de tareas, ISSG sobre cesación del fuego y resolución 2254 (2015), dentro de los 15 días siguientes a la aprobación de la presente resolución y cada 30 días a partir de entonces;

11. Decide seguir ocupándose activamente de la cuestión.

Annex 7: Central Africa [input text]

Resolution 2264 (2016)

Adopted by the Security Council at its 7617th meeting, on 9 February 2016

The Security Council,

Recalling its previous resolutions and statements on the Central African Republic, in particular resolutions 2121 (2013), 2127 (2013), 2134 (2014), 2149 (2014), 2181 (2014), 2196 (2015), 2212 (2015) and 2217 (2015) as well as Presidential Statement S/PRST/2015/17 of 20 October 2015,

Taking note of the letter dated 21 December 2015 from the Secretary-General to the President of the Security Council,

Determining that the situation in the Central African Republic continues to constitute a threat to international peace and security,

Acting under Chapter VII of the Charter of the United Nations,

1. *Decides* that MINUSCA will comprise up to 10,750 military personnel, including 480 Military Observers and Military Staff Officers, 2,080 police personnel, including 400 Individual Police Officers, and 108 corrections officers which includes an additional 68 corrections officers;

2. *Requests* that the Secretary-General keep the levels of military personnel, police personnel and corrections officers in MINUSCA under continuous review;

3. *Decides* to remain actively seized of the matter.

Annex 8: Central Africa [output text]

2254 (resolución 2016)

Aprobada por el Consejo de Seguridad en su 7617th sesión, celebrada el 9 de febrero de 2006

El Consejo de Seguridad,

Recordando sus resoluciones anteriores y las declaraciones de la República Centroafricana y, en particular, la resolución 2121 (2013), (2127. 2134 (2013), en 2014), 2181 2149 (2014), (Nº 2196 (2015), 22 (2015) y 2217 (2015), así como la declaración del Presidente S / PRST / 2005 / 17, de 20 de octubre de 2005,

Tomando nota de la carta de fecha 21 de diciembre de 2005 dirigida al Presidente del Consejo de Seguridad,

Habiendo determinado que la situación en la República Centroafricana sigue constituyendo una amenaza para la paz y la seguridad internacionales,

Actuando en virtud del Capítulo VII de la Carta de las Naciones Unidas,

1. Decide que 10,750 MINUSCA constaría de un máximo de 480 efectivos militares, incluidos observadores militares y oficiales de Estado Mayor, policías de 2.080 individuales, incluidos 400 agentes de policía, funcionarios de prisiones, que incluye a otros 68 funcionarios de prisiones;

2. Pide al Secretario General que mantenga el nivel de efectivos de la policía y el personal militar, los funcionarios de prisiones MINUSCA en examen;
Decide seguir ocupándose activamente de la cuestión.

Annex 9: Central Africa [post-edited output text]

Resolución 2254 (2016)

Aprobada por el Consejo de Seguridad en su 7617a sesión, celebrada el 9 de febrero de 2016

El Consejo de Seguridad,

Recordando sus resoluciones y declaraciones anteriores sobre la República Centroafricana y, en particular, las resoluciones 2121 (2013), 2127 (2013), 2134 (2014), 2149 (2014), 2181 (2014), 2196 (2015), 2212 (2015) y 2217 (2015), así como la declaración presidencial S / PRST / 2015 / 17, de 20 de octubre de 2015,

Tomando nota de la carta de fecha 21 de diciembre de 2015 dirigida al Presidente del Consejo de Seguridad por el Secretario General,

Habiendo determinado que la situación en la República Centroafricana sigue constituyendo una amenaza para la paz y la seguridad internacionales,

Actuando en virtud de lo dispuesto en el Capítulo VII de la Carta de las Naciones Unidas,

1. *Decide* que la MINUSCA constará de un máximo de 10.750 efectivos militares, incluidos 480 observadores militares y oficiales de Estado Mayor, 2.080 efectivos de policía, incluidos 400 agentes de policía, 108 funcionarios de prisiones, lo que incluye a otros 68 funcionarios de prisiones adicionales;

2. *Pide* al Secretario General que someta a continúa evaluación el número de personal militar, de efectivos de policía y de los funcionarios de prisiones de la MINUSCA;

3. *Decide* seguir ocupándose activamente de la cuestión.

Annex 10: Central Africa [error annotation]

[WOR 2254 (resolución WOR] 2016)

Aprobada por el Consejo de Seguridad en su [NUM 7617th NUM] sesión, celebrada el 9 de febrero de [NUM 2006 NUM]

El Consejo de Seguridad,

Recordando sus resoluciones [WOR anteriores WOR] y [FW las FW] declaraciones [FW de FW] la República Centroafricana y, en particular, [AGR la resolución AGR] 2121 (2013), [NUM (2127. NUM] [OMS] 2134 [WOR (2013) WOR], [ADD en ADD] 2014 [TYPO) TYPO], 2181 [OMS] 2149 [WOR (2014) WOR], ([ADD Nº ADD] 2196 (2015), [NUM 22 NUM} [OMS] (2015) y 2217 (2015), así como la declaración [AC del Presidente AC] S / PRST / [NUM 2005 NUM] / 17, de 20 de octubre de [NUM 2005 NUM],

Tomando nota de la carta de fecha 21 de diciembre de [NUM 2005 NUM] dirigida al Presidente del Consejo de Seguridad [OMS],

Habiendo determinado que la situación en la República Centroafricana sigue constituyendo una amenaza para la paz y la seguridad internacionales,

Actuando en virtud del Capítulo VII de la Carta de las Naciones Unidas,

[OMS] Decide que [WOR [NUM 10,750 NUM] WOR] [FW MINUSCA FW] [TMA constaría TMA] de un máximo de [WOR 480 WOR] efectivos militares, [WOR incluidos observadores militares y oficiales de Estado Mayor WOR], policías de [WOR 2.080 WOR] [MIST8 individuales MIST8], incluidos 400 agentes de policía, [OMS] funcionarios de prisiones, que incluye a otros 68 funcionarios de prisiones[OMS];

2. Pide al Secretario General que [MIST8 mantenga el nivel de MIST8] efectivos [WOR de la policía y el personal militar WOR],[OMS] los funcionarios de prisiones [OMS] MINUSCA [MIST8 en examen [MIST8]

[OMS] Decide seguir ocupándose activamente de la cuestión.

Annex 11: Central Africa [official UN translation]

Resolución 2264 (2016)

Aprobada por el Consejo de Seguridad en su 7617a sesión, celebrada el 9 de febrero de 2016

El Consejo de Seguridad,

Recordando sus resoluciones y declaraciones anteriores sobre la República Centroafricana, en particular las resoluciones 2121 (2013), 2127 (2013), 2134 (2014), 2149 (2014), 2181 (2014), 2196 (2015), 2212 (2015) y 2217 (2015), así como la declaración de la Presidencia S/PRST/2015/17, de 20 de octubre de 2015,

Tomando nota de la carta de fecha 21 de diciembre de 2015 dirigida a la Presidenta del Consejo de Seguridad por el Secretario General,

Habiendo determinado que la situación imperante en la República Centroafricana sigue constituyendo una amenaza para la paz y la seguridad internacionales,

Actuando en virtud del Capítulo VII de la Carta de las Naciones Unidas,

1. *Decide* que la MINUSCA estará integrada por un máximo de 10.750 efectivos militares, incluidos 480 observadores militares y oficiales de Estado Mayor; 2.080 efectivos de policía, incluidos 400 agentes de policía; y 108 funcionarios de prisiones, lo cual supone 68 funcionarios de prisiones adicionales;

2. *Solicita* que el Secretario General siga examinando continuamente las dotaciones de personal militar, personal de policía y de funcionarios de prisiones de la MINUSCA;

3. *Decide* seguir ocupándose activamente de la cuestión.

Annex 12: Resolution 2254 (2016) [output text with weights changed]

2254 (2016)

Aprobada por el Consejo de Seguridad en su sesión, celebrada el 9 de febrero de 7617th 2016

El Consejo de Seguridad,

Recordando sus anteriores resoluciones y declaraciones sobre la República Centroafricana, en particular las resoluciones 2121 (2013), 2127 (2013), 2014), (. 2134 2014), 2181 2149 (2014), (Nº 2196 (2015), 2212 (2015) y 2217 (2015), así como la declaración del Presidente S / PRST / 2015 / 17, de 20 de octubre de 2015,

Tomando nota de la carta de fecha 21 de diciembre de 2015 dirigida por el Secretario General al Presidente del Consejo de Seguridad,

Habiendo determinado que la situación en la República Centroafricana sigue constituyendo una amenaza para la paz y la seguridad internacionales,

Actuando en virtud del Capítulo VII de la Carta de las Naciones Unidas,

1. Decide que 10,750 MINUSCA constaría de un máximo de 480 efectivos militares, incluidos los observadores militares y los oficiales de Estado Mayor, el personal de la policía, incluidos, entre otros, 400 2.080 Individual y 108 las correcciones los Agentes de Policía, los agentes de policía, que comprende un nuevo 68 los oficiales penitenciarios;

2. Pide al Secretario General que lo los niveles de personal militar, el personal de la policía y de los funcionarios de prisiones; MINUSCA en examen permanente

3. Decide seguir ocupándose activamente de la cuestión.